ACOUSTICAL ANALYSIS REPORT

Shady Oak Subdivision
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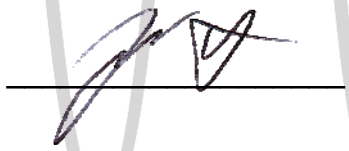

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The proposed project, Shady Oak Subdivision, consists of the construction of a five-acre residential development to contain 47 single-family, two-story, detached residences. The project site is located at 27522 Valley Center Road in the unincorporated community of Valley Center, County of San Diego, California.

The primary noise sources in the vicinity of the project site include automobile and truck traffic noise from Valley Center Road, Woods Valley Road, and Mirar de Valle Road. According to the County of San Diego Noise Element to the General Plan, noise levels at outdoor use areas of single-family residential sites should not exceed 60 CNEL. Calculations show that, as designed, ground level noise impacts at some residential outdoor use areas for this project are expected to exceed the 60 CNEL requirement. Recommended sound attenuation barrier configurations for single-family residential lots have been provided to ensure that noise levels will meet the 60 CNEL requirement at ground level receivers. Building facade noise impacts are expected to be 60 CNEL or greater at the second stories of some residences on site, and therefore, an interior noise analysis will be required for residential structures proposed on Lots 6, 7, 12, 13, 18, 19, 24, 25, 30, 31, 36, 37, 41, 42, 47, and 48 as part of the conditions of approval. This analysis can be conducted upon completion of construction documents and prior to the issuance of building permits. Additionally, project-generated traffic is not anticipated to create any direct noise impacts at off-site noise-sensitive receivers.

Noise from proposed mechanical equipment to be located on site has also been evaluated to determine whether noise from these sources will exceed the noise standards of the County of San Diego Noise Ordinance. Mechanical noise sources to be located on site include air conditioning units at the residences. It has been determined that noise from air conditioning units at surrounding property line receivers would be expected to comply with applicable noise limits as currently designed. No mitigation is deemed necessary for the attenuation of mechanical noise impacts.

Temporary construction noise was calculated to determine the impact this activity will have on surrounding residential properties. Section 36.409 of the County of San Diego Noise Ordinance states it is unlawful to operate construction equipment that exceeds an average sound level of 75 dB 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. Section 36.410 of the Noise Ordinance provides noise level limits for impulsive noise, such as blasting or the use of equipment such as a rock crusher, pile driver, hoe ram, or drill rig. Current proposed construction activities are expected to meet County of San Diego noise regulations for temporary construction noise during all phases of construction. General good practice measures should be followed, including reasonable maintenance of equipment, conservative planning of simultaneous equipment operation, and using equipment with effective mufflers. Equipment operation must also be limited to the allowable hours of operation set by the County of San Diego. With these recommendations, it is expected that construction equipment noise levels will be at or below an average eight-hour equivalent noise level of 75 dBA at surrounding occupied properties, in compliance with County of San Diego regulations.

1.0 INTRODUCTION

This acoustical analysis report is submitted to satisfy the acoustical requirements of the County of San Diego for discretionary approval. Its purpose is to assess noise impacts from nearby roadway traffic and to identify project features or requirements necessary to achieve exterior noise levels of 60 CNEL or less at outdoor useable areas of single-family residential properties, in compliance with the County of San Diego noise regulations. Additionally, noise impacts from proposed mechanical equipment operation on site have been evaluated, as well as temporary construction noise.

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 7:00 p.m. to 10:00 p.m. have an added 5 dB weighting, and sound levels during nighttime hours of 10:00 p.m. to 7:00 a.m. have an added 10 dB weighting. This is similar to the Day-Night sound level, L_{DN}, which is a 24-hour average with an added 10 dB weighting on the same nighttime hours but no added weighting on the evening hours. Sound levels expressed in CNEL are always based on A-weighted decibels. These metrics are used to express noise levels for both measurement and municipal regulations, for land use guidelines, and for enforcement of noise ordinances. Further explanation can be provided upon request.

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 method to provide information without the distance requirement, but it may be used to calculate the sound pressure at any desired distance.

1.1 Project Description

The proposed project, Shady Oak Subdivision, consists of the development of a five-acre site for residential use. The site is currently vacant. The project is consistent with the County of San Diego General Plan, as the site currently has the following General Plan Land Use Designations: Village Core Mixed Use and Zoning S90 (Holding Area).

The project will consist of 47 single-family, two-story, detached residences. The project has one direct access point from Mirar de Valle Road. Please refer to project plans provided as Appendix A for more details.

1.2 Environmental Settings and Existing Conditions

1.2.1 Project Location

The project site is located at 27522 Valley Center Road in the unincorporated community of Valley Center, County of San Diego, California. The Assessor's Parcel Number (APN) for the property is 186-270-01-00. The property has an overall site area of approximately 5.2 acres.

The project location is shown on the Vicinity Map, Figure 1, following this report. An Assessor's Parcel Map, Satellite Aerial Photograph, and Topographic Map of this area are also provided as Figures 2 through 4, respectively.

1.2.2 Existing Noise Environment

The primary noise sources in the vicinity of the project site include automobile and truck traffic noise from Valley Center Road, Woods Valley Road, and Mirar de Valle Road. No other noise source is considered significant. Current traffic volumes have been provided by the project traffic study, prepared by Darnell & Associates and dated August 15, 2016, or the SanDAG Series 12 Traffic Forecast Information Center (http://gis.sandag.org/tficsr12/tfic_2008.html). Pertinent sections of the project traffic study are provided as Appendix B.

Valley Center Road is a four-lane, two-way Major Road (4.1A) running north-south to the east of the project site. The posted speed limit is 45 mph, although the minimum design speed for a roadway with this classification is 55 mph. This speed limit will be considered in future noise calculations. According to the project traffic study, Valley Center Road currently carries approximately 24,419 Average Daily Trips (ADT) in the vicinity of the project site.

Mirar de Valle is a two-lane, two-way Community Collector (2.1D) running east-west along the north boundary of the project site. The posted speed limit is unknown, and therefore, the minimum design speed of 45 mph was used for this roadway. According to the project traffic study, Mirar de Valle Road currently carries approximately 1,593 ADT in the vicinity of the project site.

Woods Valley Road is a two-lane, two-way Community Collector (2.1D) running east-west to the south of the project site. The posted speed limit is 45 mph, as is the minimum design speed. No existing traffic volumes have been provided for this roadway within the traffic study. According to SanDAG, Woods Valley Road, in the vicinity of the project site, currently carries a traffic volume of approximately 2,700 ADT.

Current and future traffic volumes for the roadway sections near the project site are shown below in Table 1. For further roadway details and ADT traffic volumes, please refer to Appendix C: Traffic Noise Model (TNM) Data and Results.

Table 1. Overall Traffic Information

Roadway Name	Speed Limit (mph)[1]		Current ADT[2]	Future ADT (2030)
	Current	Future		
Valley Center Road	45	55	24,419	16,600
Mirar de Valle	45	45	1,593	6,800 / 27,400[3]
Woods Valley Road	45	45	2,700	15,000
New Road 19	N/A	40	N/A	26,100

[1]Future speed limits consider the minimum design speeds for the roadway classification, as specified within the County of San Diego Public Road Standards.
[2]Current ADT has been provided for the year 2015 for all roadways except Woods Valley Road, for which traffic volumes are given for the year 2008 by SanDAG.
[3]Future traffic volumes for Mirar de Valle given east and west of New Road 19, respectively.

No traffic mix information was available for these roadways, but based on neighboring and surrounding land use, roadway classification, professional experience and on-site observations, a truck percentage mix of 2.0% medium and 2.0% heavy trucks was used for Valley Center Road, and a truck percentage mix of 2.0% medium and 1.0% heavy trucks was used for all other roadways.

Noise contours were calculated for the project site using Traffic Noise Model. Without considering topography or project structures, in the current noise environment, the project site is expected to be exposed to traffic noise levels ranging from approximately 47 CNEL to 64 CNEL. Noise contours run generally parallel to Mirar de Valle Road. For a graphical representation of contours, please refer to Figure 5: Site Plan Showing Current Traffic CNEL Contours and Noise Measurement Location.

1.2.3 Measured Noise Level

An on-site inspection and traffic noise measurement were made on the morning of Thursday, June 30, 2016. The weather conditions were as follows: clear skies, moderate humidity, temperatures in the mid 80's with winds at 7-10 mph. A “one-hour" equivalent measurement was made at the north boundary of the property, approximately 20 feet from the centerline of Mirar de Valle Road. The microphone position was approximately five feet above the existing project site grade. Traffic volumes were recorded for automobiles, medium-size trucks, and large trucks on Mirar de Valle Road during the measurement period. After a continuous 15-minute sound level measurement, there was no change in the L_{EQ} and results were then recorded. The measured noise level and related weather conditions are found below in Table 2. More information can be found in Appendix C: Traffic Noise Model (TNM) Data and Results.

Table 2. On-Site Noise Measurement Conditions and Results	
Date	Thursday, June 30, 2016
Time	11:48 a.m. – 12:03 p.m.
Conditions	Clear skies, winds at 7-10 mph, temperature in the mid 80's, moderate humidity
Measured Noise Level	61.2 dBA L_{EQ}

The primary source of noise during the noise measurement was traffic on Valley Center Road and Mirar de Valle Road.

1.3 Methodology and Equipment

1.3.1 Field Measurement

Typically, a “one-hour” equivalent sound level measurement (L_{EQ}, A-Weighted) is recorded for at least one noise-sensitive location on the site. During the on-site noise measurement, start and end times are recorded, vehicle counts are made for cars, medium trucks (double-tires/two axles), and heavy trucks (three or more axles) for the corresponding road segment(s). Supplemental sound measurements of one hour or less in duration are often made to further describe the noise environment of the site.

For measurements of less than one hour in duration, the measurement time is long enough for a representative traffic volume to occur and the noise level (L_{EQ}) to stabilize. The vehicle counts are then converted to one-hour equivalent volumes by using the appropriate multiplier.

Other field data gathered includes measuring or estimating distances, angles-of-view, slopes, elevations, roadway grades, and vehicle speeds. This data was checked against the available maps and records.

1.3.2 Roadway Noise Calculation

The Traffic Noise Model, Version 2.5 program released by the U.S. Department of Transportation was used to calculate the future daytime average hourly noise level (HNL) at various locations at the project site. The daytime average hourly traffic volume is calculated as 0.058 times the ADT, based on the studies made by Wyle Laboratories (see reference). The HNL is equivalent to the L_{EQ}, and both are converted to the CNEL by adding 2.0 decibels, as shown in the Wyle Study. Future CNEL is calculated for desired receptor locations using future road alignment, elevations, lane configurations, projected traffic volumes, estimated truck mixes, and vehicle speeds. Noise attenuation methods may be analyzed, tested, and planned with TNM, as required. Further explanation can be supplied on request.

Noise levels were calculated for the site using the methodology described above for the location, conditions, and traffic volumes counted during the noise measurements. The calculated noise level (L_{EQ}) was compared with the measured on-site noise level to determine if adjustments or corrections (calibration) should be applied to the traffic noise prediction model. Adjustments are intended to account for site-specific differences, such as reflection and absorption, which may be greater or lesser than accounted for in the model.

The measured noise level of 61.2 dBA L_{EQ} was compared to the calculated (modeled) noise level of 62.1 dBA L_{EQ}, for the same conditions and traffic flow. According to the Federal Highway Administration's Highway Traffic Noise: Analysis and Abatement Guide (see reference), a traffic noise model is considered validated if the measured and calculated noise impacts differ by three decibels or less. No adjustment was deemed necessary to model future noise levels for this location as the difference between the measured and calculated levels was found to be less than three decibels. The Traffic Noise Model is assumed to be representative of actual traffic noise that is experienced on site. Please refer to Table 3 for further evaluation.

Table 3. Calculated versus Measured Traffic Noise Data

Location	Calculated	Measured	Difference	Correction
20 feet from Mirar de Valle Centerline	62.1 dBA L_{EQ}	61.2 dBA L_{EQ}	0.9 dB	None Applied

1.3.3 Cadna Noise Modeling Software

Modeling of the outdoor noise environment is accomplished using Cadna Version 4.6, which is a model-based computer program developed by DataKustik for predicting noise impacts in a wide variety of conditions. Cadna (Computer Aided Noise Abatement) assists in the calculation, presentation, assessment, and mitigation 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.

No proposed project buildings were included in calculations of mechanical noise. In order to validate the results of the Cadna noise prediction model, noise impacts from mechanical equipment were manually calculated using simple attenuation by distance methodology. This was performed for each noise-sensitive property line. These values were compared to those predicted by Cadna. The calculated values were all found to be within one decibel of the Cadna noise level, thereby validating the results of the noise model. This data is summarized in Table 4.

Table 4. Calculated Noise Levels for Model Comparison						
Noise Source	**Receiver**	**Receiver Location**	**Distance from Source (ft)[1]**	**Calculated Noise Level[2] (dBA)**	**Cadna Model Noise Level[3] (dBA)**	**Difference (dB)**
AC Units	R-1	North	120 / 155	40.2	40.4	0.2
	R-2	South	45	44.3	44.5	0.2
	R-3	East	70 / 115	41.2	41.4	0.2
	R-4	West	66 / 121	42.4	42.5	0.1

[1]Values shown as distance to nearest groups of AC units.
[2]Calculated as attenuation by distance only (see Section 1.3.4)
[3]As predicted by Cadna model

1.3.4 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:

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

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

Attenuation Due To Distance

Attenuation due to distance is calculated by the equation:

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

where SPL_1 = Calculated sound pressure level at distance,
SPL_2 = Known sound pressure level at known distance,
D_1 = Distance from source to 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.

Hourly L_{EQ} Summation

To determine the hourly average noise levels (L_{EQ}) when the noise is created for less than the full hour, convert the logarithm values to the base energy value, multiply by the percentage of the hour

that the noise occurs, and then convert the sum back to a logarithmic value. This is done with the following formula:

$$L_{EQ} = 10\log(P_H \times 10^{L_P/10})$$

where P_H = the percent or fraction of the hour noise is created, and
L_P = the partial hour noise level (dB).

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.
Project-Generated Traffic Noise Impacts

Changes in traffic noise levels can be predicted by inputting the ratio of the two scenarios into the following logarithmic equation:

$$\Delta = 10\log(V2/V1)$$

where: Δ= Change in sound energy,
V1 = original or existing traffic volume, and
V2 = future or cumulative traffic volume.

1.3.5 Measurement Equipment

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

- Larson Davis Model LxT Sound Level Meter, Type 1, Serial # 4084
- Larson Davis Model CA250 Calibrator, Serial # 1081
- Hand-bearing magnetic compass, microphone with windscreen, tripods
- Distance measurement wheel, digital camera

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 SI.4). All instruments are maintained with National Bureau of Standards traceable calibration, per the manufacturers' standards.

2.0 NOISE SENSITIVE LAND USES AFFECTED BY AIRBORNE NOISE

2.1 Guidelines for the Determination of Significance

The County of San Diego Noise Element to the General Plan states that exterior noise levels at outdoor use areas of single-family residential property should not exceed 60 CNEL. In the event that noise levels exceed 60 CNEL, mitigation must be proposed to bring noise levels into compliance. For lots with a net area of less than 4,000 square feet, as is the case for most of the single-family homes on this project site, at least 400 square feet must be noise-protected. For lots with net areas ranging from 4,000 square feet to 10 acres, at least 10% of the net lot area must be noise-protected. In addition, the interior noise levels of all on-site residences must not exceed 45 CNEL, as per the County of San Diego Noise Element as well as the State of California Building Code.

The County of San Diego Report Format and Content Requirements also detail the guidelines for the determination of significance for project-generated traffic noise levels. Direct noise impacts can be determined by comparing existing traffic versus existing traffic plus project-generated traffic. If project-generated traffic more than doubles the existing sound energy (an increase of 3 dB), this is considered to be a direct noise impact. Cumulatively significant noise impacts can be determined by comparing the existing traffic versus the existing plus cumulative plus project-generated traffic. Cumulative traffic volumes consist of the anticipated traffic generated by other permitted or planned projects in the vicinity of the project. If cumulative and project-generated traffic more than double the existing sound energy, this would be considered a significant cumulative noise impact; however, the project's contribution must also be determined. By comparing existing traffic plus cumulative traffic versus existing traffic plus cumulative traffic and project-generated traffic, the project contribution to the overall noise level can be determined. If the project-generated traffic results in more than a one decibel increase, the project's contribution can be considered "cumulatively considerable."

Pertinent sections of the County of San Diego Noise Element and Report Format are provided as Appendix D.

2.2 Potential Noise Impacts

2.2.1 Potential Build-out Noise Conditions & Impacts

The future traffic volumes were provided in the County of San Diego General Plan Update EIR Volume Plot for the year 2030. The traffic volume of Valley Center Road is expected to decrease to 16,600 ADT by the year 2030. The traffic volume of Mirar de Valle Road is expected to increase to 6,800 ADT to the east of New Road 19 (see below), and 27,400 ADT to the west of New Road 19. Woods Valley Road is expected to carry 15,000 ADT by the year 2030.

In addition to the roadways described above, New Road 19 will be constructed to connect Valley Center Road to Lilac Road. This roadway will be classified as a Boulevard (4.2B). The minimum design speed for this type of roadway is 40 mph. The 2030 traffic volume of New Road 19 is anticipated to be approximately 26,100 ADT. This roadway has been incorporated into the future noise model.

Where speed limits of circulation element roadways were shown to be less than the minimum design speeds of the County of San Diego in the current environment, these speeds have been increased for future noise evaluation. Speed limits are shown in Table 1 of this report.

2.2.1.1 Exterior

The exterior noise impacts at the project site are primarily the result of automobile and truck traffic traveling on Valley Center Road, Mirar de Valle Road, Woods Valley Road, and future New Road 19. Without considering topography or project structures, traffic noise contours have been calculated for the future noise environment. The contours are expected to shift slightly in the future noise environment, exposing the project site to higher noise levels ranging from approximately 51 CNEL to 70 CNEL. Noise contours will continue to run generally parallel to Mirar de Valle Road. For a graphical representation of contours, please refer to Figure 6: Site Plan Showing Future Traffic CNEL Contours and Noise Measurement Location.

As current traffic volumes exceed future traffic volumes projected for this section of Valley Center Road, the current scenario for this roadway has been incorporated into calculations for a worst-case analysis of noise levels at the site. In order to achieve a more accurate depiction of noise levels at proposed residential lots, a Traffic Noise Model has been calculated in which a single receiver has been placed at the ~~center~~ / anticipated backyard of each lot. Noise levels have been calculated at both ground level and the second story. Noise levels at ground level receivers must be 60 CNEL or less in order to comply with the regulations of the County of San Diego for outdoor use areas. Calculated noise levels are shown in Table 5, and receiver locations are shown in Figure 7.

Table 5. Unmitigated Worst-Case Traffic Noise Levels at ~~Centers~~ / Anticipated Backyards of Lots

Receiver	Location	Exterior Traffic Noise Level (CNEL)	
		Ground Level	2nd Story
R1	Lot 1	51.4	~~55.1~~ / 55.2
R2	Lot 2	~~52.3~~ / 52.2	~~55.9~~ / 55.8
R3	Lot 3	53.4	~~56.7~~ / 56.8
R4	Lot 4	55.0	~~57.9~~ / 58.0
R5	Lot 5	~~57.3~~ / 57.2	59.9
R6	Lot 6	~~59.7~~ / 59.5	**~~62.3~~ / 62.2**
R7	Lot 7	**63.9**	**64.8**
R8	Lot 8	~~51.3~~ / 51.4	55.0
R9	Lot 9	~~52.3~~ / 52.2	55.7
R10	Lot 10	53.3	~~56.6~~ / 56.5
R11	Lot 11	~~56.8~~ / 56.7	~~59.4~~ / 59.3
R12	Lot 12	~~59.0~~ / 58.9	**61.8**
R13	Lot 13	**62.6**	**64.2**
R14	Lot 14	~~51.5~~ / 51.4	55.0
R15	Lot 15	52.2	55.7
R16	Lot 16	~~53.4~~ / 53.3	~~56.6~~ / 56.5
R17	Lot 17	56.7	~~59.4~~ / 59.3
R18	Lot 18	58.9	**61.8**
R19	Lot 19	**~~62.5~~ / 62.6**	**64.2**
R20	Lot 20	51.7	~~55.1~~ / 55.2
R21	Lot 21	52.4	55.7
R22	Lot 22	53.4	56.5
R23	Lot 23	56.7	59.3

Table 5. Unmitigated Worst-Case Traffic Noise Levels at ~~Centers~~ / Anticipated Backyards of Lots			
Receiver	**Location**	**Exterior Traffic Noise Level (CNEL)**	
		Ground Level	**2nd Story**
R24	Lot 24	~~58.7~~ / 58.8	**61.8**
R25	Lot 25	**~~62.5~~ / 62.3**	**~~64.2~~ / 64.1**
R26	Lot 26	~~51.9~~ / 51.8	55.3/
R27	Lot 27	~~52.6~~ / 52.5	~~55.8~~ / 55.2
R28	Lot 28	~~53.6~~ / 53.4	~~56.6~~ / 56.5
R29	Lot 29	~~56.6~~ / 56.7	59.3
R30	Lot 30	~~58.6~~ / 58.8	**~~61.7~~ / 61.8**
R31	Lot 31	**~~62.6~~ / 62.3**	**~~64.2~~ / 64.1**
R32	Lot 32	~~52.2~~ / 52.3	55.6
R33	Lot 33	52.9	56.1
R34	Lot 34	53.8	~~56.7~~ / 56.8
R35	Lot 35	~~56.6~~ / 56.7	~~59.4~~ / 59.5
R36	Lot 36	~~58.5~~ / 58.4	**61.7**
R37	Lot 37	**~~62.2~~ / 62.1**	**64.1**
R38	Lot 38	~~52.5~~ / 52.3	~~55.9~~ / 55.7
R39	Lot 39	53.6	56.8
R40	Lot 40	~~56.6~~ / 56.7	59.5
R41	Lot 41	~~58.5~~ / 58.4	**~~61.9~~ / 61.8**
R42	Lot 42	**62.2**	**64.1**
R43	Lot 43	~~52.8~~ / 52.5	~~56.4~~ / 56.1
R44	Lot 44	53.4	~~57.0~~ / 57.1
R45	Lot 45	54.1	~~57.5~~ / 57.6
R46	Lot 46	56.7	~~59.8~~ / 59.9
R47	Lot 47	58.3	**62.0**
R48	Lot 48	**~~62.0~~ / 62.2**	**~~64.1~~ / 64.2**

The following lots are all shown to have ground level noise impacts that exceed 60 CNEL in the worst-case noise environment: Lots 7, 13, 19, 25, 31, 37, 42, and 48. Mitigation is therefore required in these locations.

2.2.1.2 Interior

The State of California and the County of San Diego require buildings to be designed in order to attenuate, control, and maintain interior noise levels to below 45 CNEL in habitable residential space. Current exterior building construction is generally expected to achieve at least 15 decibels of exterior-to-interior noise attenuation, with windows opened. Therefore, proposed project building structures exposed to exterior noise levels greater than 60 CNEL could be subject to interior noise levels exceeding the 45 CNEL noise limit for residential habitable space.

As shown in Table 5, Lots 6, 7, 12, 13, 18, 19, 24, 25, 30, 31, 36, 37, 41, 42, 47, and 48 are all shown to have noise levels that exceed 60 CNEL in the worst-case noise environment at either ground level or second story receivers. Interior noise mitigation would be required for residences on these lots and is detailed in the following section.

2.2.2 Design Considerations & Mitigation Measures

2.2.2.1 Exterior

As detailed above, mitigation measures are required for attenuating noise at some residences to be located on site. In order to mitigate ground level noise impacts at Lots 7, 13, 19, 25, 31, 37, 42, and 48 to be 60 CNEL or less, all of the following mitigation measures would be required:

1. A minimum six-foot high sound attenuation barrier must be installed along the west and north boundaries of Lot 7.

2. A minimum six-foot high sound attenuation barrier must be installed along a portion of the west property line of Lot 13, along the entire northern boundary of Lots 13 and 19, and along a portion of the east property line of Lot 19.

3. A minimum six-foot high sound attenuation barrier must be installed along a portion of the west property line of Lot 25, along the entire northern boundary of Lots 25 and 31, and along a portion of the east property line of Lot 31.

4. A minimum six-foot high sound attenuation barrier must be installed along a portion of the west property line of Lot 37, along the entire northern boundary of Lots 37 and 42, and along a portion of the east property line of Lot 42.

5. A minimum six-foot high sound attenuation barrier must be installed along the east and north boundaries of Lot 48.

Receiver locations and sound attenuation barrier locations are shown in Figure 8. Noise levels have been calculated at the aforementioned receivers with these mitigation measures in place and are shown in Table 6.

Table 6. Mitigated Worst-Case Noise Levels at Select ~~Centers~~ / Anticipated Backyards of Lots

Receiver	Location	Mitigated Exterior Traffic Noise Level at Ground Level (CNEL)
R7	Lot 7	~~59.2~~ / 58.1
R13	Lot 13	56.6
R19	Lot 19	~~56.5~~ / 56.6
R25	Lot 25	56.6
R31	Lot 31	~~56.7~~ / 56.6
R37	Lot 37	56.5
R42	Lot 42	~~56.5~~ / 56.6
R48	Lot 48	~~57.8~~ / 56.8

As shown above, with the sound attenuation barriers in place as described above, ground level noise impacts are expected to be 60 CNEL or less at all single-family residential properties on site.

A sound wall should be solid and constructed of masonry, wood, plastic, fiberglass, steel, or a combination of those materials, with no cracks or gaps, through or below the wall. Any seams or cracks must be filled or caulked. If wood is used, it can be tongue and groove and must be at least 7/8-inch thick or have a surface density of at least 3½ pounds per square foot. Where architectural or aesthetic factors allow, glass or clear plastic may be used on the upper portion, if it is desirable to

preserve a view. Sheet metal of 18-gauge (minimum) may be used, if it meets the other criteria and is properly supported and stiffened so that it does not rattle or create noise itself from vibration or wind. Any gate(s) proposed to be constructed in a sound wall must be designed with overlapping closures. The gate(s) may be of ¾-inch thick or greater wood, solid-sheet metal of at least 18-gauge metal, or an exterior-grade solid-core steel door with prefabricated door jambs.

It should be noted that the barrier walls shown in Figure 8 have been modeled to show the feasibility of achieving compliance with County noise regulations. At the time of building permit application, alternate mitigation measures may be proposed, including the use of architectural features (the residential structure) as mitigation or the combination of the residential structure and a free-standing sound wall provided the lot can still provide the required noise-protected area at ground level.

2.2.2.2 Interior

Although ground level noise levels at Lots 7, 13, 19, 25, 31, 37, 42 and 48 are expected to be reduced to 60 CNEL or less with proposed barriers and/or residential structures in place, second story receivers on these lots may be exposed to greater than 60 CNEL, as will second story receivers at Lots 6, 12, 18, 24, 30, 36, 41, and 47. An interior noise analysis should therefore be provided for multi-story residential structures proposed on Lots 6, 7, 12, 13, 18, 19, 24, 25, 30, 31, 36, 37, 41, 42, 47, and 48 to ensure that interior noise levels of 45 CNEL or less are maintained. These lots are indicated graphically on Figure 8. Mitigation measures typically consist of glazing recommendations and mechanical ventilation.

2.3 Off-Site Direct and Cumulative Impacts

In the traffic study prepared by Darnell & Associates, Inc., three existing intersections have been evaluated in depth to determine AM/PM peak hour and estimated daily traffic volumes. These intersections include Valley Center Road and Lilac Road; Valley Center Road and Woods Valley Road; Valley Center Road and Mirar de Valle Road. All intersections have been evaluated to determine existing (2015) volumes and existing plus project volumes. No cumulative traffic volumes have been evaluated, per the request of the County of San Diego, as the project is consistent with the goals of the General Plan. Noise impacts from increased traffic due to project activity have been evaluated to determine compliance with County of San Diego noise standards, described in Section 2.1. Calculations have been provided as Appendix E, and pertinent sections of the project traffic study are provided in Appendix B.

2.3.1 Direct Noise Impacts

In order to determine whether any direct noise impacts will be experienced at off-site receivers, the existing traffic scenario was compared to the increase in volumes shown in the existing plus project traffic scenario for AM and PM peak hours, for a worst-case analysis of increased traffic noise levels. The maximum increase in noise levels was found to be approximately 1.1 dB at the intersection of Valley Center Road and Mirar de Valle Road. No intersections are anticipated to have an increase in noise levels that exceeds the three decibel threshold, and therefore, the proposed project is not expected to result in a direct noise impact at any noise-sensitive property.

2.3.2 Cumulatively Significant Noise Impacts

A review of cumulative traffic noise impacts could not be conducted, as cumulative traffic volumes were not provided within the project traffic study, per the request of the County of San Diego. The

direct noise impacts calculated are assumed to be representative of the project site's contribution to the surrounding noise environment.

2.3.3 Design Considerations & Mitigation Measures

As a direct noise impact is defined as a doubling of existing sound energy, or an increase of 3 dB, it has been determined that no direct noise impacts will be caused by the proposed project at noise-sensitive receivers. As the project is not anticipated to cause any direct noise impacts, no mitigation is deemed necessary to attenuate project-generated traffic noise.

3.0 PROJECT-GENERATED AIRBORNE NOISE

3.1 Guidelines for Determination of Significance

The County of San Diego Noise Ordinance states that noise levels from stationary sources shall not exceed 50 dBA between the hours of 7 a.m. and 10 p.m. and 45 dBA between the hours of 10 p.m. and 7 a.m. at residentially zoned properties or properties zoned S90.

Section 36.409 of the County of San Diego Noise Ordinance states it is unlawful to operate construction equipment that exceeds an average sound level of 75 dBA 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. In addition, according to Section 36.408 of the ordinance, construction activities must be limited to the hours of 7 a.m. to 7 p.m., Monday through Saturday (except legal holidays). No construction activity is permitted on Sunday. Section 36.410 provides noise limits for impulsive noise, which is defined as a high peak noise level of short duration (one second or less). Impulsive activity includes blasting and the use of equipment such as a rock crusher, hoe ram, pile driver, or drill rig. Impulsive noise limits are provided for both residential and agricultural properties.

Pertinent sections of the County of San Diego Noise Ordinance are provided in Appendix D.

3.2 Potential Operational Noise Impacts

3.2.1 Potential Build-Out Noise Conditions

Anticipated operational noise impacts from the proposed project will primarily consist of air conditioning units to be located at residential buildings on site.

The HVAC units that will be used on site are currently unknown, and for this reason, were assumed to be a typical unit manufactured by Carrier. It was assumed that a single three-ton unit would be located in the side yard of each residence. Sound power levels have been provided by the manufacturer in octave band values. Values are shown in Table 7. Manufacturer data sheets have been provided as Appendix F.

Table 7. Sound Power Levels of Carrier 24ACB3 Performance Units								
Source	Sound Power at Octave Band Frequency (dBA)							Total (dBA)
	125	250	500	1K	2K	4K	8K	
24ACB336 (3-ton)	57.0	65.0	67.5	69.5	67.5	65.0	60.0	75

Noise levels have been calculated using Cadna at surrounding noise-sensitive receivers, and are shown in Table 8. Where the property lines of the subject parcel are located immediately adjacent to a roadway (Mirar de Valle Road at the north and Old Mirar de Valle Road at the south and west), receivers have been calculated across the adjacent road where actual noise-sensitive receivers would be located. More information is provided in Appendix G: Cadna Analysis Data and Results, and a graphical representation of source/receiver locations and equipment noise contours is provided as Figure 9.

Table 8. Unmitigated Mechanical Equipment Noise Levels at Surrounding Receivers			
Receiver	Location	Noise Limit (dBA)	Equipment Noise Level (dBA)
R-1	North Property Line	45	40.4
R-2	South Property Line	45	44.5
R-3	East Property Line	45	41.4
R-4	West Property Line	45	42.5

3.2.2 Design Considerations & Mitigation Measures

As shown above, noise levels from stationary equipment sources on site are expected to comply with the nighttime noise limits set within the County of San Diego Noise Ordinance at surrounding property line receivers as currently designed. For this reason, no mitigation is deemed necessary for the attenuation of noise levels from stationary equipment noise sources.

3.3 Potential General Construction Noise Impacts

3.3.1 Potential Temporary Construction Noise Impacts without Mitigation

According to the County of San Diego Noise Ordinance, temporary construction noise must be adequately controlled at occupied properties. The occupied properties surrounding the site include receivers to the west and north (across Mirar de Valle Road). Additional residential properties are located to the south of the project site; however, they are separated from the subject property by a vacant parcel. For this reason, receivers to the west and north are considered the worst-case receiver locations, as any other surrounding receivers would be exposed to lesser noise impacts due to distance attenuation or shielding from intervening structures.

Construction information for grading activity was obtained from Brian Nestoroff of Touchstone Development. The earthmoving on site is expected to balance with no import or export required, and therefore dump trucks are not expected to be present during grading. Impulsive construction activity is not anticipated. Grading is expected to take three to four weeks, and, according to Mr.

Nestoroff, will consist of the use of four scrapers, two bulldozers, two loaders, two trenchers, and one grader.

Please refer to Table 9 for typical noise levels of construction equipment planned to be used on site during grading, as described above. All noise levels have been provided by the UK Department for Environment, Food and Rural Affairs (DEFRA), with the exception of noise levels for the scraper, which were measured by Eilar Associates, Inc. at an existing construction site (performed at the 91 Freeway/Green River project site near Corona, California on March 25, 2010).

Table 9. Typical Construction Equipment Noise Levels[1]		
Noise Source	**Duty Cycle (%)**	**Calculated Noise Level (L_{MAX}) at 50 feet (dBA)**
Trencher	40%	70
Bulldozer	40%	79
Front Loader	40%	76
Grader	40%	82
Scraper[2]	40%	72

[1]Source: UK Department for Environment, Food, and Rural Affairs (DEFRA) Construction Noise Database.
[2]Eilar Associates noise measurement data.

Receivers to the west and north were calculated for the grading phase considering the equipment detailed above. All other phases will either use smaller pieces of equipment or will use less equipment than the grading phase, and therefore, this phase represents the worst-case anticipated noise exposure at surrounding properties. The site was divided into quadrants, and it was assumed that all pieces of equipment would be operating simultaneously (considering duty cycle) near the center of each area. This method accounts for the varying distance from source to receiver as equipment moves around the site.

Noise levels for the grading phase of construction are shown in Table 10. Detailed calculations can be found in Appendix H. Graphical representations of source and receiver locations are shown in Figure 10.

Table 10. Temporary Construction Noise Levels at Neighboring Properties			
Phase	**Receiver Location**	**Distance from Center of Nearest Construction Area (ft)**	**8-Hour Average Noise Level (dBA)**
GRADING	C-1 (West)	140	73.9
	C-2 (North)	177	71.8

3.3.2 Design Considerations and Temporary Mitigation Measures

As shown above, noise levels from temporary construction are expected to be in compliance with the County of San Diego eight-hour average equivalent noise limit of 75 dBA during grading activity, which is anticipated to be the phase of construction that generates the highest noise levels. All other phases of construction are therefore also expected to remain in compliance with County of San Diego construction noise limits.

For any project in which construction activity will take place near occupied residential properties, the following "good practice" recommendations should be adhered to whenever possible:

1. Turn off equipment when not in use.

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

3. Use equipment with effective mufflers.

4. Minimize the use of backup alarms.

5. Equipment staging areas should be placed at locations away from noise-sensitive (occupied) receivers.

These general recommendations, in addition to limiting construction equipment operation to the allowable hours detailed in the County of San Diego Noise Ordinance, will assist in maintaining the comfort of neighboring sensitive receivers during the construction of this site.

3.4 Potential Impulsive Noise Impacts

There is no anticipated need for impulsive construction activity on site, and therefore, this noise source has not been included in this analysis.

4.0 CONCLUSION

According to the County of San Diego Noise Element to the General Plan, noise levels at outdoor use areas of single-family residential sites should not exceed 60 CNEL. Calculations show that, as designed, ground level noise impacts at some residential outdoor use areas for this project are expected to exceed the 60 CNEL requirement. Recommended sound attenuation barrier configurations for single-family residential lots have been provided to ensure that noise levels will meet the 60 CNEL requirement at ground level receivers. Building facade noise impacts are expected to be 60 CNEL or greater at the second stories of some residences on site, and therefore, an interior noise analysis will be required for residential structures proposed on Lots 6, 7, 12, 13, 18, 19, 24, 25, 30, 31, 36, 37, 41, 42, 47, and 48 as part of the conditions of approval. This analysis can be conducted upon completion of construction documents and prior to the issuance of building permits. Additionally, project-generated traffic is not anticipated to create any direct noise impacts at off-site noise-sensitive receivers.

Noise from proposed mechanical equipment to be located on site has also been evaluated to determine whether noise from these sources will exceed the noise standards of the County of San Diego Noise Ordinance. Mechanical noise sources to be located on site include air conditioning units at the on-site residences. It has been determined that noise from air conditioning units at surrounding property line receivers would be expected to comply with applicable noise limits as currently designed. No mitigation is deemed necessary for the attenuation of mechanical noise impacts.

It is determined that typical construction activities will meet the County of San Diego temporary construction noise limit of 75 dBA at all adjacent property lines, given reasonable maintenance of equipment and conservative planning of simultaneous equipment operation. No mitigation is required for attenuating the brief construction noise impacts.

5.0 CERTIFICATION

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 proposed Shady Oak Subdivision project, located within the unincorporated community of Valley Center, County of San Diego, California. This report was prepared by Jonathan Brothers and Amy Hool.

Amy Hool, Senior Acoustical Consultant

Jonathan Brothers, Principal Acoustical Consultant

6.0 REFERENCES

1. California Building Code, Based on the International Building Code, Chapter 12, Section 1207 - *Sound Transmission Control*.

2. Federal Highway Administration, Traffic Noise Model Version 2.5.

3. County of San Diego Noise Element to the General Plan.

4. County of San Diego Noise Ordinance.

5. Harris, Cyril M., Handbook of Acoustical Measurements and Noise Control, 3rd Edition, Acoustical Society of America, 1998.

6. Heeden, Robert A., Compendium of Materials for Noise Control, U.S. Department of Health, Education and Welfare, National Institute for Occupational Safety and Health, November 1978.

7. Irvine, Leland K., Richards, Roy L., Acoustics and Noise Control Handbook for Architects and Builders, Kreiger Publishing Company, 1998.

8. NBS Building Sciences Series 77, Acoustical and Thermal Performance on Exterior Residential Walls, U.S. Department of Commerce/National Bureau of Standards, November 1976.

9. Western Electro-Acoustic Laboratory, Inc., 1711 Sixteenth Street, Santa Monica, California 90404, 213-80-9268, Sound Transmission Loss Vs. Glazing Type, Window Size and Air Filtration, January 1985. The research described in this report was prepared for the California Association of Window Manufacturers, 823 North Harbor Boulevard, Suite E, Fullerton, California 92632, 714-525-7088.

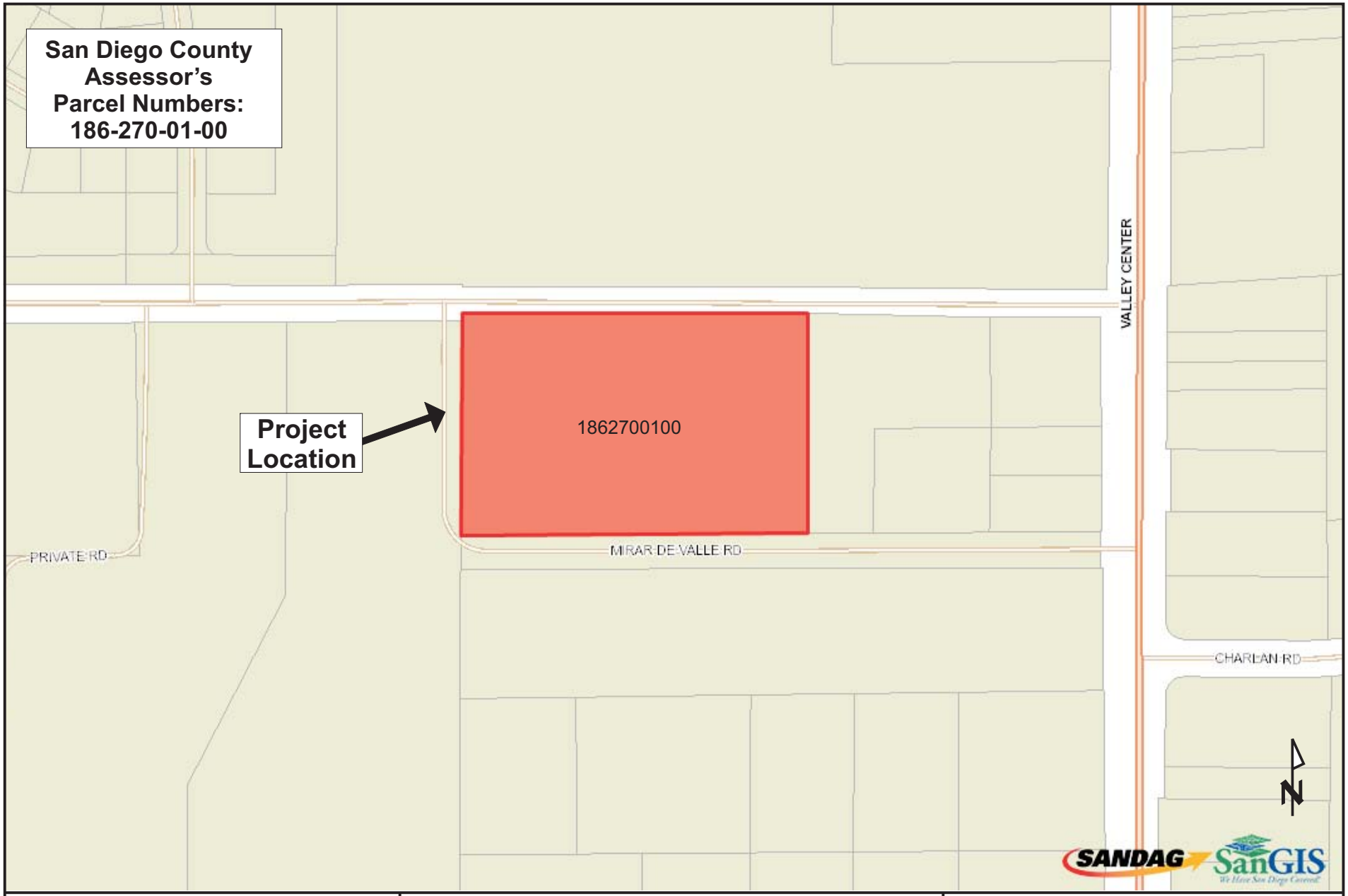
10. United States Department of Transportation Federal Highway Administration, Highway Construction Noise Handbook, Section 9.0 “Construction Equipment Noise Levels and Ranges,” August 2006.

11. Wyle Laboratories, Development of Ground Transportation Systems Noise Contours for the San Diego Region, December, 1973

12. Federal Highway Administration, Highway Traffic Noise: Analysis and Abatement Guide, December 2011.

FIGURES

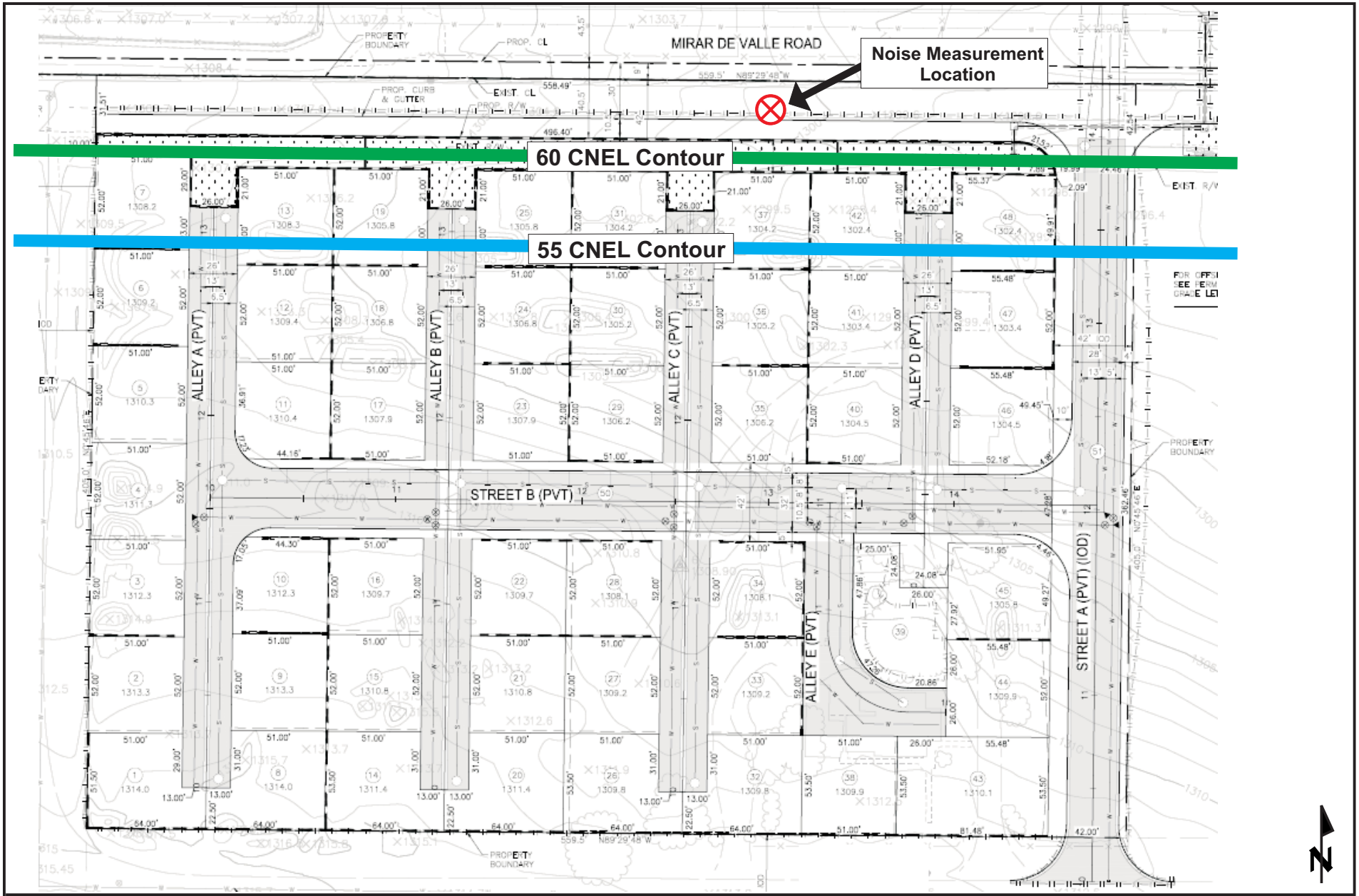
Eilar Associates, Inc. **210 South Juniper Street, Suite 100** **Escondido, California 92025** **760-738-5570**	**Vicinity Map** **Job #B60611N1**	**Figure 1**



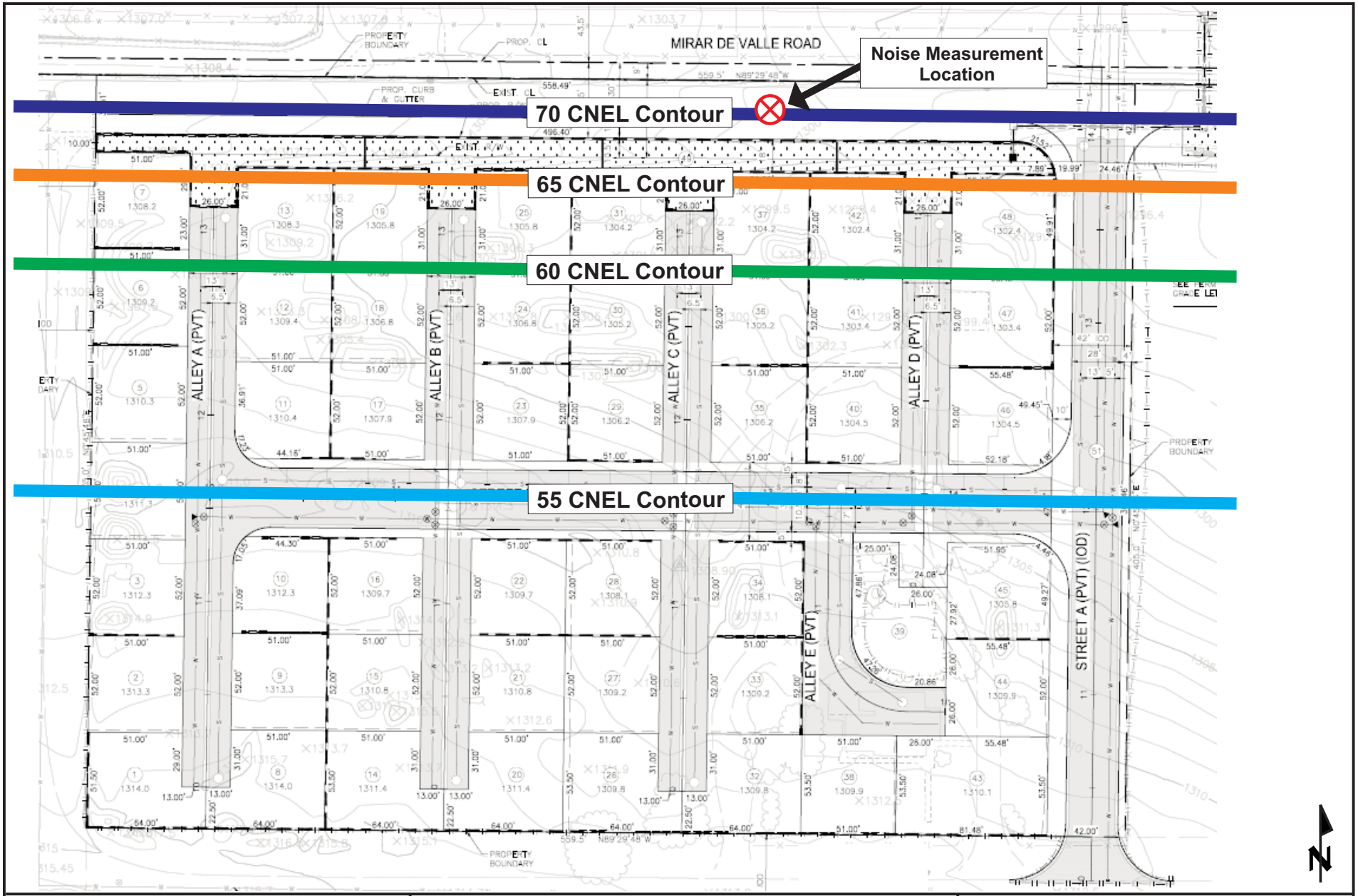
Eilar Associates, Inc. 210 South Juniper Street, Suite 100 Escondido, California 92025 760-738-5570	Assessor's Parcel Map Job # B60611N1	Figure 2

Eilar Associates, Inc. **210 South Juniper Street, Suite 100** **Escondido, California 92025** **760-738-5570**	**Satellite Aerial Photograph** **Job # B60611N1**	**Figure 3**

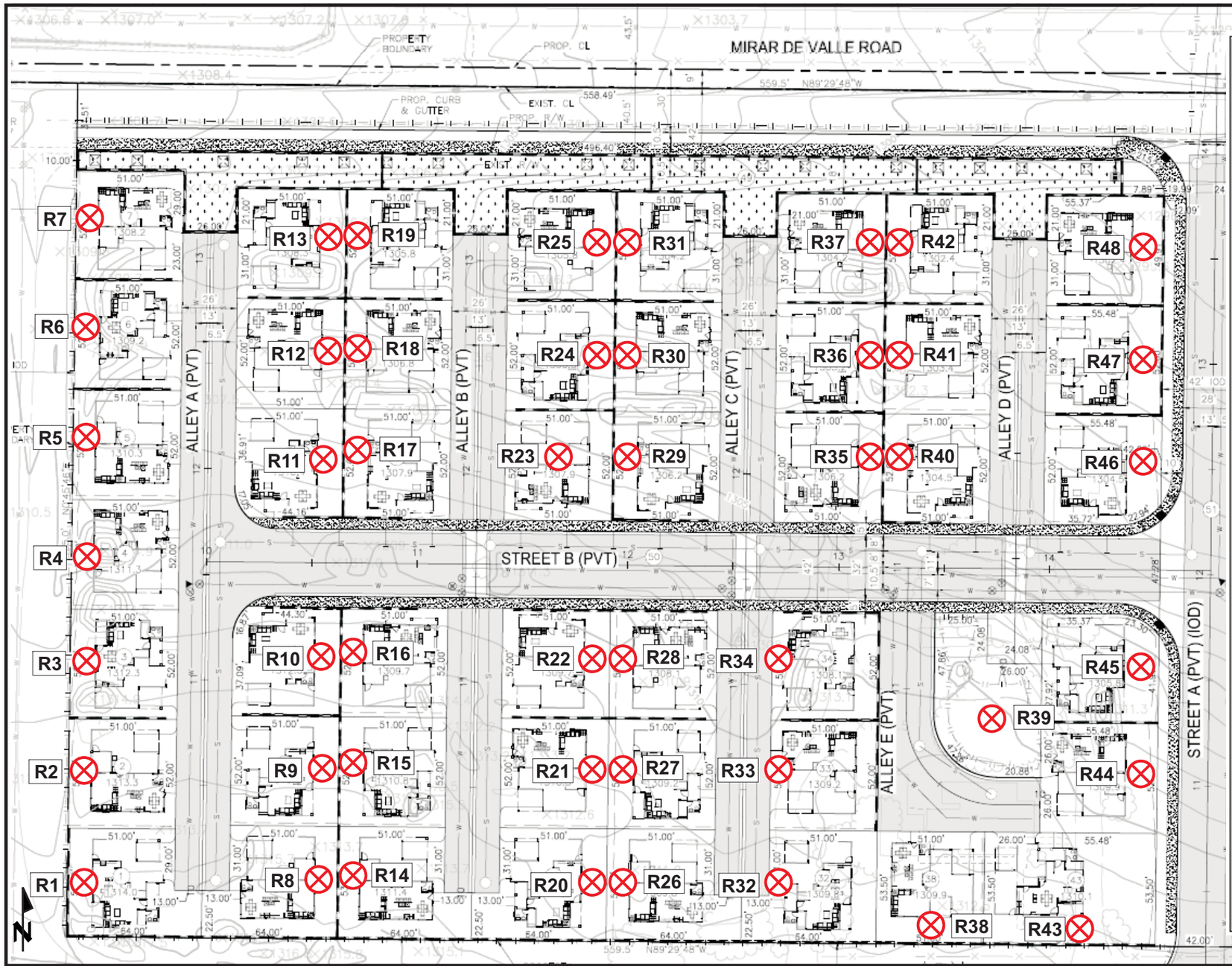
Eilar Associates, Inc. **210 South Juniper Street, Suite 100** **Escondido, California 92025** **760-738-5570**	**Topographic Map** **Job # B60611N1**	**Figure 4**



Eilar Associates, Inc. **210 South Juniper Street, Suite 100** **Escondido, California 92025** **760-738-5570**	**Site Plan Showing Current Traffic CNEL Contours and Noise Measurement Location** **Job # B60611N1**	**Figure 5**



Eilar Associates, Inc. **210 South Juniper Street, Suite 100** **Escondido, California 92025** **760-738-5570**	**Site Plan Showing Future Traffic CNEL Contours and Noise Measurement Location** **Job # B60611N1**	**Figure 6**



Unmitigated Traffic Noise Levels at Anticipated Backyards of Lots			
Receiver	Location	Exterior Traffic Noise Level (CNEL)	
		Ground Level	2nd Story
R1	Lot 1	51.4	~~55.1~~ / 55.2
R2	Lot 2	~~52.3~~ / 52.2	~~55.9~~ / 55.8
R3	Lot 3	53.4	~~56.7~~ / 56.8
R4	Lot 4	55.0	~~57.9~~ / 58.0
R5	Lot 5	~~57.3~~ / 57.2	59.9
R6	Lot 6	~~59.7~~ / 59.5	**~~62.3~~ / 62.2**
R7	Lot 7	**63.9**	**64.8**
R8	Lot 8	~~51.3~~ / 51.4	55.0
R9	Lot 9	~~52.3~~ / 52.2	55.7
R10	Lot 10	53.3	~~56.6~~ / 56.5
R11	Lot 11	~~56.8~~ / 56.7	~~59.4~~ / 59.3
R12	Lot 12	~~59.0~~ / 58.9	**61.8**
R13	Lot 13	**62.6**	**64.2**
R14	Lot 14	~~51.5~~ / 51.4	55.0
R15	Lot 15	52.2	55.7
R16	Lot 16	~~53.4~~ / 53.3	~~56.6~~ / 56.5
R17	Lot 17	56.7	~~59.4~~ / 59.3
R18	Lot 18	58.9	**61.8**
R19	Lot 19	**~~62.5~~ / 62.6**	**64.2**
R20	Lot 20	51.7	~~55.1~~ / 55.2
R21	Lot 21	52.4	55.7
R22	Lot 22	53.4	56.5
R23	Lot 23	56.7	59.3
R24	Lot 24	~~58.7~~ / 58.8	**61.8**
R25	Lot 25	**~~62.5~~ / 62.3**	**~~64.2~~ / 64.1**
R26	Lot 26	~~51.9~~ / 51.8	55.3/
R27	Lot 27	~~52.6~~ / 52.5	~~55.9~~ / 55.2
R28	Lot 28	~~53.6~~ / 53.4	~~56.6~~ / 56.5
R29	Lot 29	~~56.6~~ / 56.7	59.3
R30	Lot 30	~~58.6~~ / 58.8	**~~61.7~~ / 61.8**
R31	Lot 31	**~~62.6~~ / 62.3**	**~~64.2~~ / 64.1**
R32	Lot 32	~~52.2~~ / 52.3	55.6
R33	Lot 33	52.9	56.1
R34	Lot 34	53.8	~~56.7~~ / 56.8
R35	Lot 35	~~56.6~~ / 56.7	~~59.4~~ / 59.5
R36	Lot 36	~~58.5~~ / 58.4	**61.7**
R37	Lot 37	**~~62.2~~ / 62.1**	**64.1**
R38	Lot 38	~~52.5~~ / 52.3	~~55.9~~ / 55.7
R39	Lot 39	53.6	56.8
R40	Lot 40	~~56.6~~ / 56.7	59.5
R41	Lot 41	~~58.5~~ / 58.4	**~~61.9~~ / 61.8**
R42	Lot 42	**62.2**	**64.1**
R43	Lot 43	~~52.8~~ / 52.5	~~56.4~~ / 56.1
R44	Lot 44	53.4	~~57.0~~ / 57.1
R45	Lot 45	54.1	~~57.5~~ / 57.6
R46	Lot 46	56.7	~~59.8~~ / 59.9
R47	Lot 47	58.3	**62.0**
R48	Lot 48	**~~62.0~~ / 62.2**	**~~64.1~~ / 64.2**

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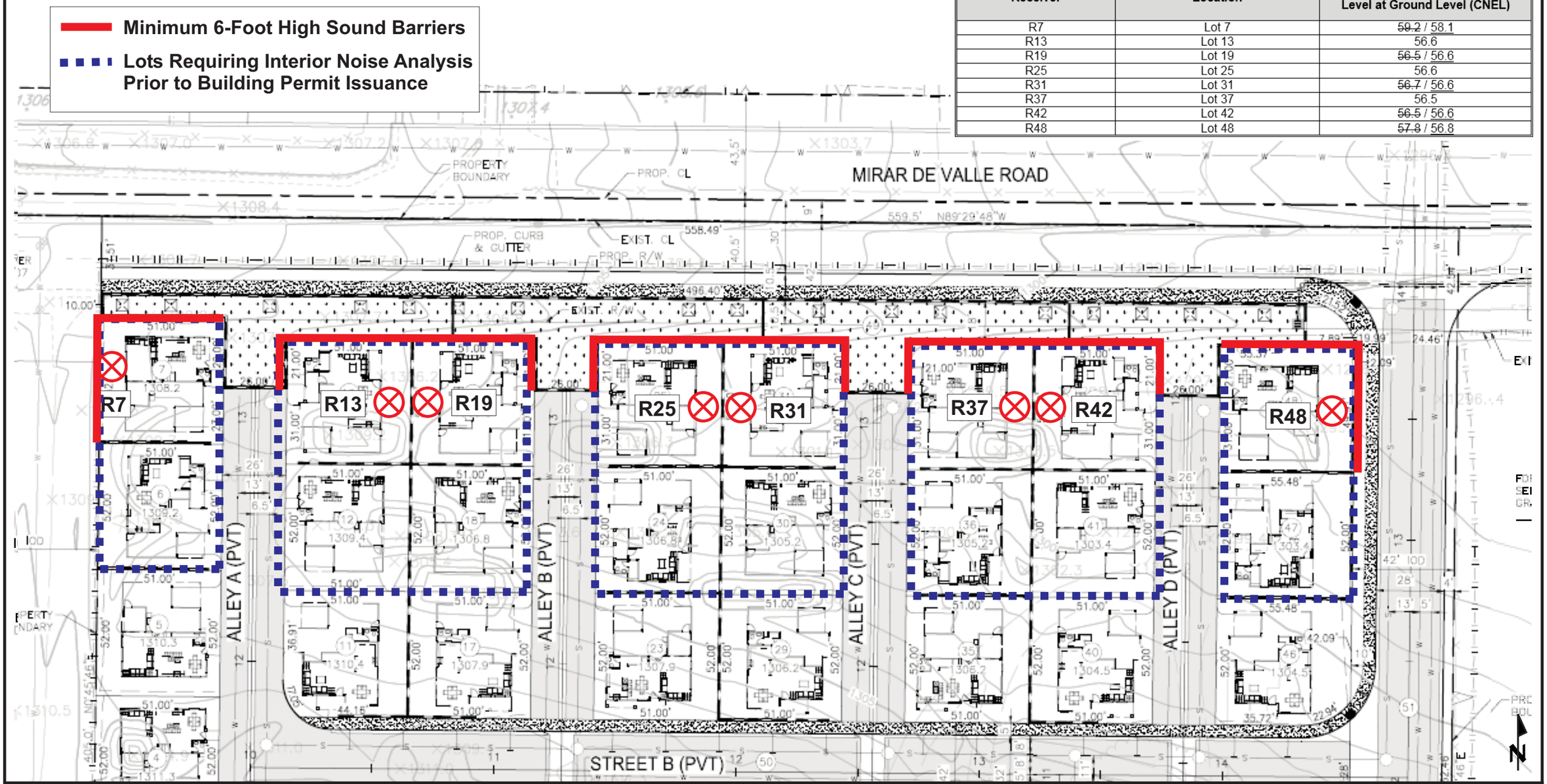
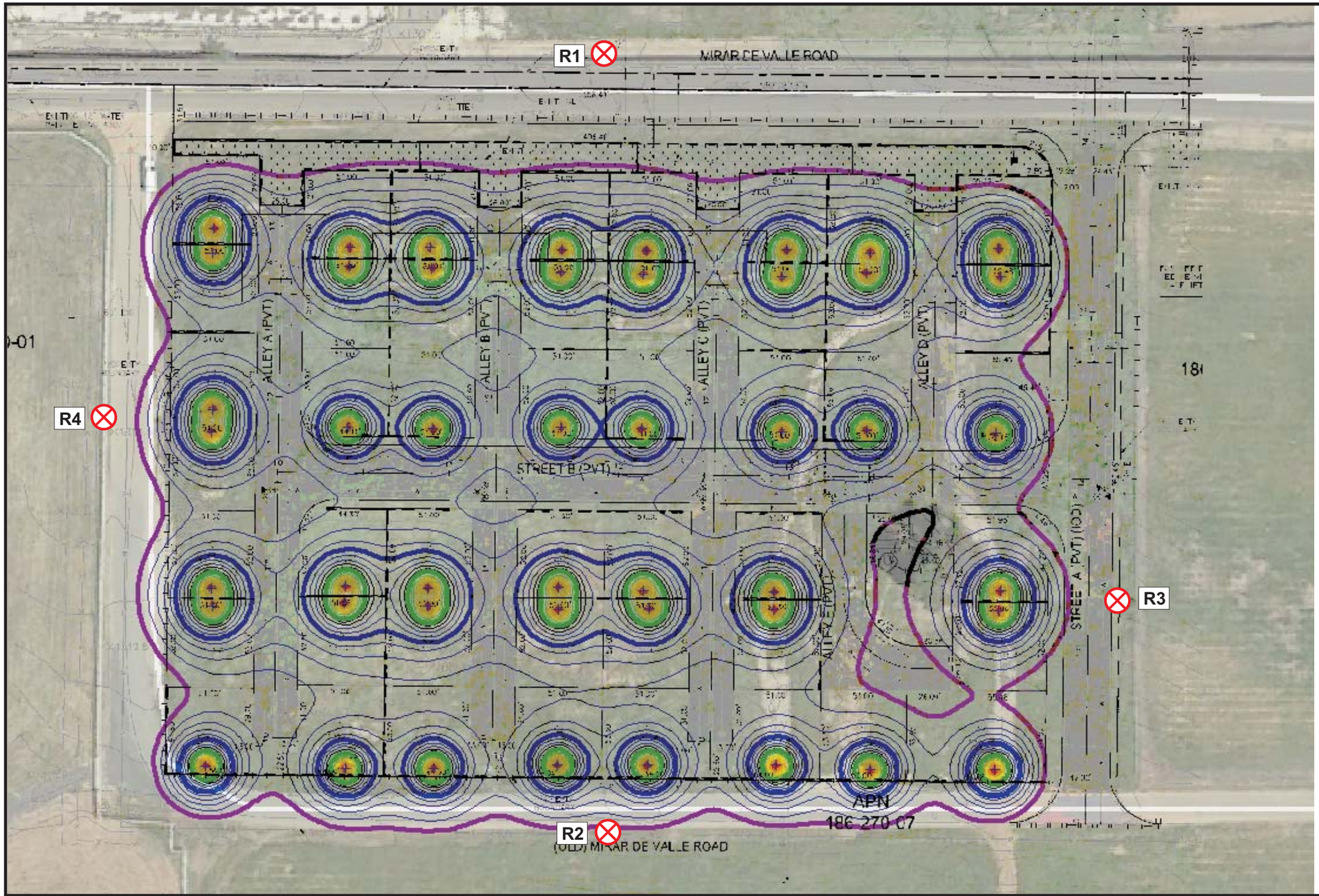
Site Plan Showing Unmitigated Worst-Case Traffic CNEL Impacts at Lots and 2nd Story Receivers
Job # B60611N1

Figure 7

Table 6. Mitigated Worst-Case Noise Levels at Select ~~Centers~~ / Anticipated Backyards of Lots		
Receiver	**Location**	**Mitigated Exterior Traffic Noise Level at Ground Level (CNEL)**
R7	Lot 7	~~59.2~~ / 58.1
R13	Lot 13	56.6
R19	Lot 19	~~56.5~~ / 56.6
R25	Lot 25	56.6
R31	Lot 31	~~56.7~~ / 56.6
R37	Lot 37	56.5
R42	Lot 42	~~56.5~~ / 56.6
R48	Lot 48	~~57.8~~ / 56.8



Eilar Associates, Inc. **210 South Juniper Street, Suite 100** **Escondido, California 92025** **760-738-5570**	**Site Plan Showing Mitigated Worst-Case Traffic CNEL Impacts at Lots and Sound Barrier Locations** **Job # B60611N1**	**Figure 8**



Calculated AC Noise Impact Levels	
Receiver Number	**Noise Level (dBA)**
R-1	40.4
R-2	44.5
R-3	41.4
R-4	42.5

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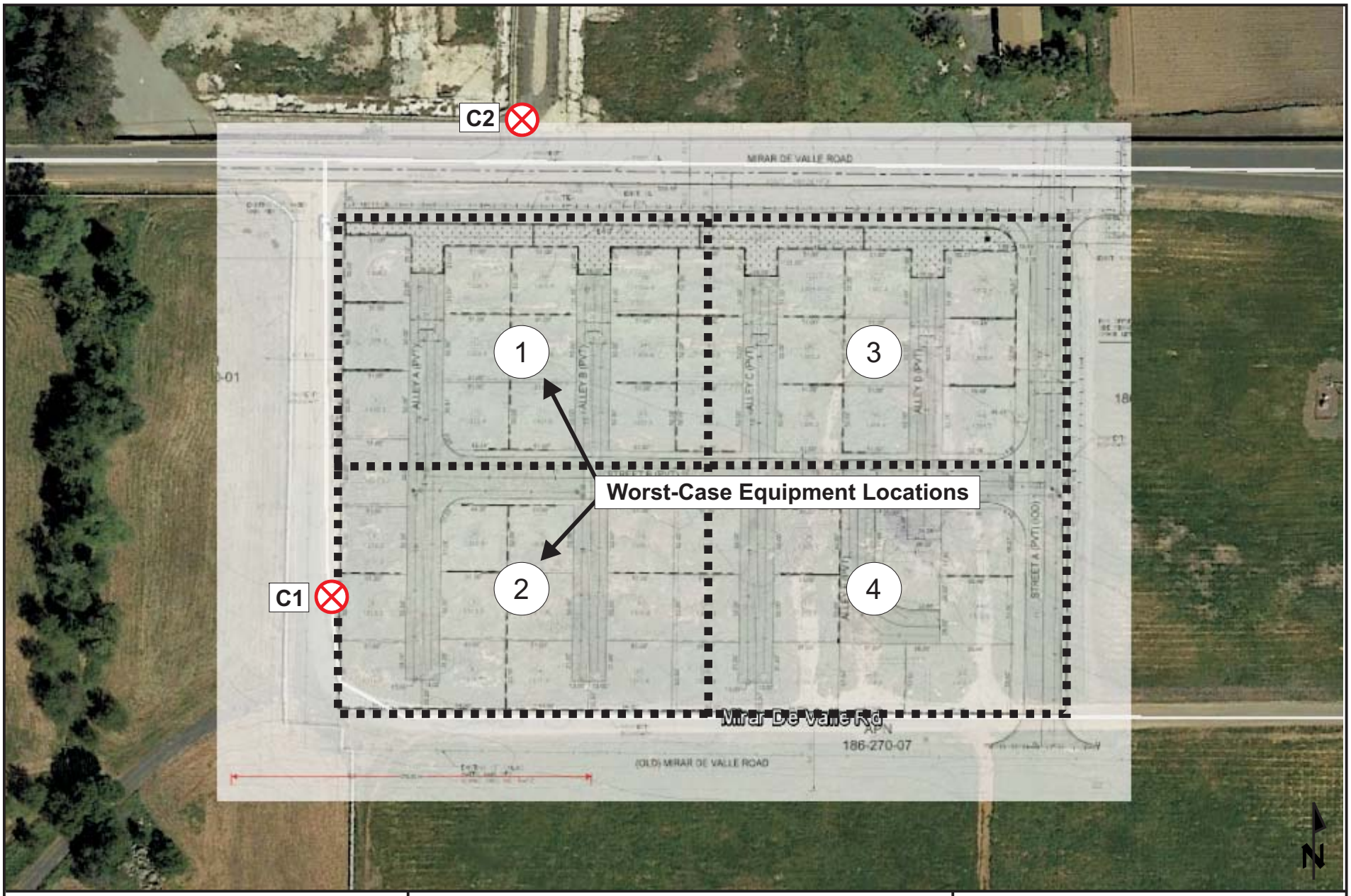
760-738-5570

Satellite Aerial Photograph Showing Air Conditioning Equipment Noise Contours and Receiver Locations
Job # B60611N1

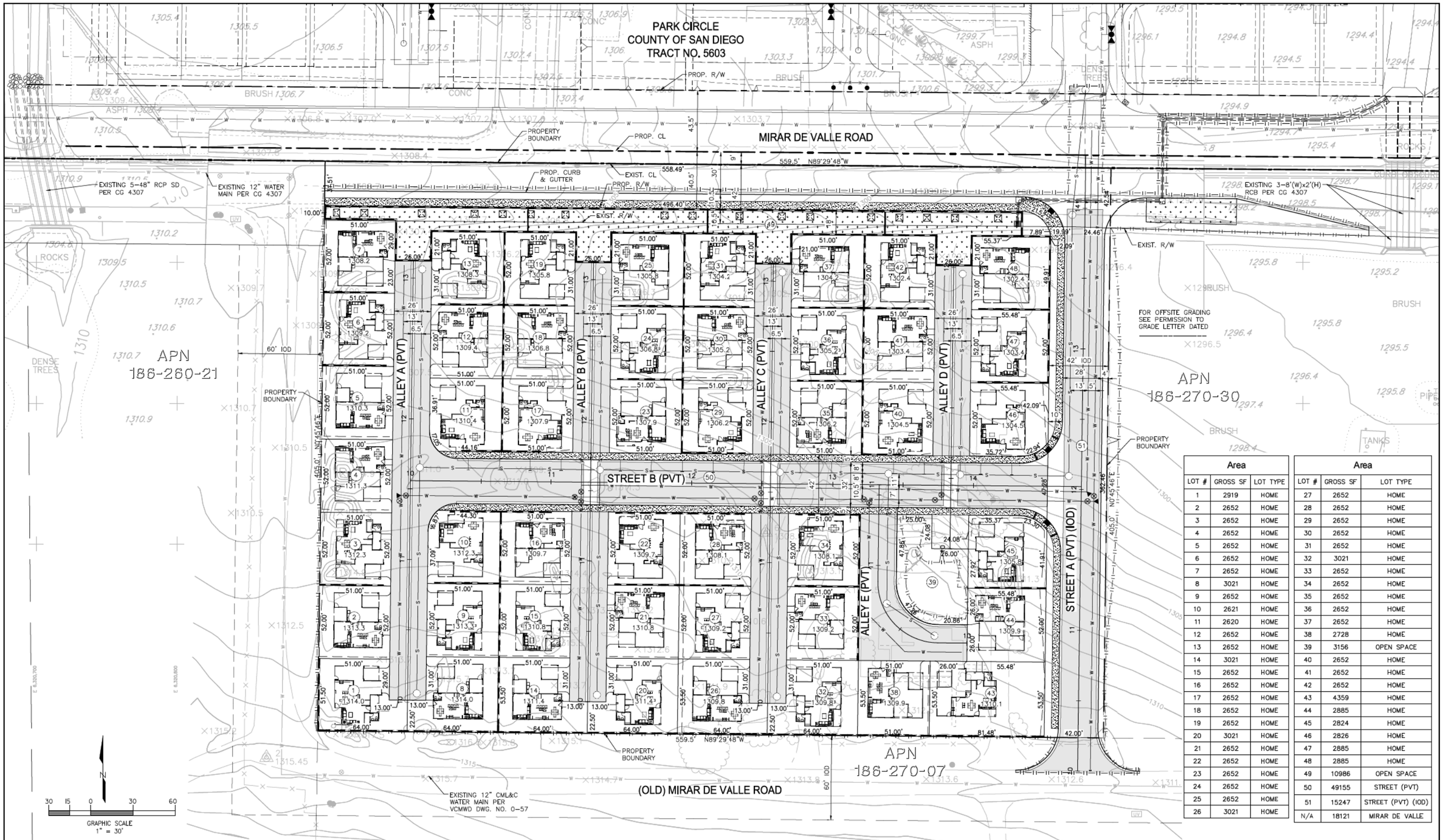
Figure 9



Eilar Associates, Inc. **210 South Juniper Street, Suite 100** **Escondido, California 92025** **760-738-5570**	**Satellite Aerial Photograph Showing Temporary Construction Noise Source and Receiver Locations** **Job # B60611N1**	**Figure 10**

APPENDIX A

Project Plans



Area		
LOT #	GROSS SF	LOT TYPE
1	2919	HOME
2	2652	HOME
3	2652	HOME
4	2652	HOME
5	2652	HOME
6	2652	HOME
7	2652	HOME
8	3021	HOME
9	2652	HOME
10	2621	HOME
11	2620	HOME
12	2652	HOME
13	2652	HOME
14	3021	HOME
15	2652	HOME
16	2652	HOME
17	2652	HOME
18	2652	HOME
19	2652	HOME
20	3021	HOME
21	2652	HOME
22	2652	HOME
23	2652	HOME
24	2652	HOME
25	2652	HOME
26	3021	HOME

Area		
LOT #	GROSS SF	LOT TYPE
27	2652	HOME
28	2652	HOME
29	2652	HOME
30	2652	HOME
31	2652	HOME
32	3021	HOME
33	2652	HOME
34	2652	HOME
35	2652	HOME
36	2652	HOME
37	2652	HOME
38	2728	HOME
39	3156	OPEN SPACE
40	2652	HOME
41	2652	HOME
42	2652	HOME
43	4359	HOME
44	2885	HOME
45	2824	HOME
46	2826	HOME
47	2885	HOME
48	2885	HOME
49	10986	OPEN SPACE
50	49155	STREET (PVT)
51	15247	STREET (PVT) (IOD)
N/A	18121	MIRAR DE VALLE

PREPARED BY:
TSAC ENGINEERING
16885 Via Del Campo Ct, Suite 304, SD, CA 92127
PHONE: 858.762.9611 FAX: 858.762.9612

SHADY OAK
TENTATIVE MAP

COUNTY OF SAN DIEGO TRACT NO._____
VALLEY CENTER, CA

DATE: _____

NO.	BY	DATE	REVISIONS:

TENTATIVE MAP
SHADY OAK

COUNTY OF SAN DIEGO TRACT NO. _____
Valley Center, California

GENERAL NOTES:

1. GROSS PROJECT AREA: APPROX. 5.2 ACRES
2. NET PROJECT AREA: APPROX. 4.8 ACRES
3. TOTAL NUMBER OF LOTS: 47
4. TOTAL NUMBER OF DWELLING UNITS: 47
5. MINIMUM LOT SIZE: 2,600 SF
6. GROSS DENSITY: 9.03 DU /ACRES
7. SAN DIEGO COUNTY ASSESSORS PARCEL NUMBER 186-270-01
8. PRESENT LAND USE: VACANT
9. WATER AND SEWER SYSTEMS TO BE INSTALLED IN ACCORDANCE WITH STANDARDS AND THE REQUIREMENTS OF THE VALLEY CENTER MUNICIPAL WATER DISTRICT.
10. SOURCE OF TOPOGRAPHY: PHOTOGRAMMETIC SURVEY DATED 07-16-2015 PREPARED BY RICK ENGINEERING COMPANY
11. UTILITIES SHALL BE UNDER GROUNDED AND EASEMENT PROVIDED AS NECESSARY.
12. CUT AND FILL SLOPES NOT TO EXCEED 2:1, UNLESS OTHERWISE NOTED
13. UTILITY LAYOUTS SHOWN ARE PRELIMINARY AND MAY BE MODIFIED DURING FINAL DESIGN.
14. TEMPORARY AND PERMANENT STRUCTURAL BEST MANAGEMENT PRACTICES WILL BE INCORPORATED IN THE FINAL DESIGN AND IMPLEMENTATION OF THE DEVELOPMENT.
15. SOLAR ACCESS STATEMENT: ALL LOTS WITHIN THE SUBDIVISION HAVE A MINIMUM OF 100 SQUARE FEET OF SOLAR ACCESS FOR EACH FUTURE DWELLING UNIT ALLOWED BY THIS SUBDIVISION.
16. ASSESSOR'S TAX RATE AREA: 94075
17. SPECIAL ASSESSMENT ACT: NONE PROPOSED
18. STREET DEDICATION: THE SUBDIVIDER WILL DEDICATE ON THE SUBDIVISION MAP ALL PUBLIC STREETS SHOWN ON TENTATIVE MAP.
19. STREET LIGHTS: THE DEVELOPER SHALL COMPLY WITH THE REQUIREMENTS SPECIFIED IN THE COUNTY STANDARDS.
20. ALL CUT AND FILL SLOPES WILL BE PROPERLY LANDSCAPED, IRRIGATED AND MAINTAINED IN ACCORDANCE WITH COUNTY STANDARDS.
21. THE PLAN IS PROVIDED TO ALLOW FOR A FULL AND ADEQUATE DISCRETIONARY REVIEW OF A PROPOSED DEVELOPMENT PROJECT. THE PROPERTY OWNER ACKNOWLEDGES THAT ACCEPTANCE OR APPROVAL OF THIS PLAN DOES NOT CONSTITUTE AN APPROVAL TO PERFORM ANY GRADING SHOWN HEREON, AND AGREES TO OBTAIN GRADING PERMISSIONS BEFORE COMMENCING SUCH ACTIVITY.
22. BENCH MARK: FOUND BRASS DISC STAMPED "SD COUNTY ENGR. DEPT. SURVEY MON. 1991 HORIZONTAL CONTROL VCR17", PER RECORD OF SURVEY NO. 14689. LOCATION 20 FEET NORTHERLY OF NORTH EDGE OF MIRAR DE VALLE ROAD, 150 WESTERLY OF CENTERLINE OF VALLEY CENTER ROAD. ELEVATION: 1303.320'
23. ALL DRAINAGE IMPROVEMENTS TO BE INSTALLED IN ACCORDANCE WITH COUNTY STANDARDS AND SHALL BE MAINTAINED BY THE COUNTY.
24. THIS PLAN IS PROVIDED TO ALLOW FOR FULL AND ADEQUATE DISCRETIONARY REVIEW OF A PROPOSED DEVELOPMENT PROJECT. THE PROPERTY OWNER ACKNOWLEDGES THAT ACCEPTANCE OR APPROVAL OF THIS PLAN DOES NOT CONSTITUTE AN APPROVAL TO PERFORM ANY GRADING SHOWN HEREON, AND AGREES TO OBTAIN VALID GRADING PERMISSIONS BEFORE COMMENCING SUCH ACTIVITY.

LEGAL DESCRIPTION:

THE NORTH 405 FEET OF THE WEST 17 1/2 ACRES OF THE EAST 35 ACRES OF THE NORTH HALF OF THE NORTHEAST QUARTER IN SECTION 24, TOWNSHIP 11 SOUTH, RANGE 2 WEST, SAN BERNARDINO BASE AND MERIDIAN, IN THE COUNTY OF SAN DIEGO, STATE OF CALIFORNIA, ACCORDING TO THE OFFICIAL PLAT THEREOF.

APN: 186-270-01

PUBLIC UTILITIES:

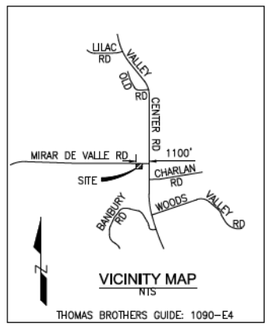
GAS AND ELECTRIC.....SAN DIEGO GAS AND ELECTRIC
TELEPHONE.....AT&T
WATER.....VALLEY CENTER MUNICIPAL WATER DISTRICT
SEWER.....VALLEY CENTER MUNICIPAL WATER DISTRICT
STORM WATER.....SAN DIEGO COUNTY FLOOD CONTROL
FIRE.....VALLEY CENTER FIRE PROTECTION DISTRICT
SCHOOLS.....VALLEY CENTER PAUMA UNIFIED SCHOOL DISTRICT

PARKING REQUIRED:

RESIDENT	47 UNITS X 2.0 = 94 SPACES
RESIDENT VISITOR	47 UNITS X 0.5 = 23.5 SPACES
TOTAL	118 SPACES

PARKING PROVIDED:

RESIDENT GARAGE	94 SPACES
RESIDENT STANDARD	47 SPACES
RESIDENT PARALLEL ON ST.	12 SPACES
TOTAL	153 SPACES



VICINITY MAP
NTS
THOMAS BROTHERS GUIDE: 1090-E4

INDEX:

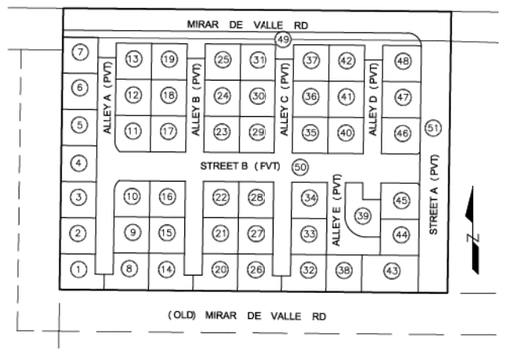
PROPOSED ZONING INFORMATION:

P_ANNING AREA	EX. APN 186-270-01
USE REGULATIONS	RR
ANIMAL REGS.	–
DENSITY	–
LOT SIZE	2600
BUILDING TYPE	C
MAX. FLR. AREA	–
FLR. AREA RATIO	–
HEIGHT	G
COVERAGE	–
SETBACK	V
OPEN SPACE	–
SPECIAL AREA REGS.	B

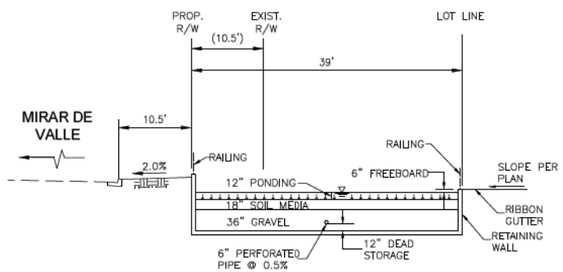
EXISTING ZONING INFORMATION:

GENERAL PLAN REGIONAL CATEGORY: VILLAGE
GENERAL PLAN LAND US DESIGNATION: VILLAGE CORE MIXED USE
COMMUNITY/SUBREGIONAL PLAN AREA: VALLEY CENTER COMMUNITY PLAN

P_ANNING AREA	EX. APN 186-270-01
USE REGULATIONS	S90
ANIMAL REGS.	J
DENSITY	–
LOT SIZE	1 AC
BUILDING TYPE	C
MAX. FLR. AREA	–
FLR. AREA RATIO	–
HEIGHT	G
COVERAGE	–
SETBACK	B
OPEN SPACE	–
SPECIAL AREA REGS.	B

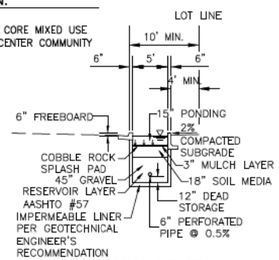


LOCATION MAP
SCALE: 1"=100'

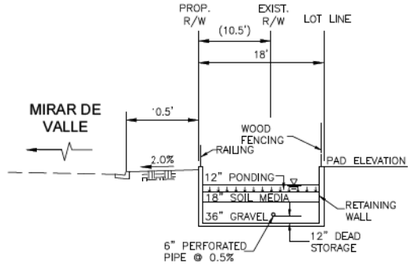


* BIOFILTRATION BASIN SIZE MAY BE CHANGED IN FINAL ENGINEERING TO MEET MUNICIPAL PERMIT REQUIREMENTS

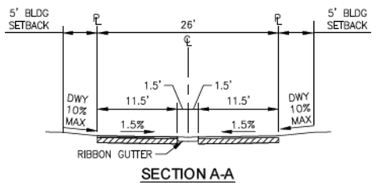
*BIOFILTRATION BASIN ADJACENT TO ALLEY
SCALE:1"=10'



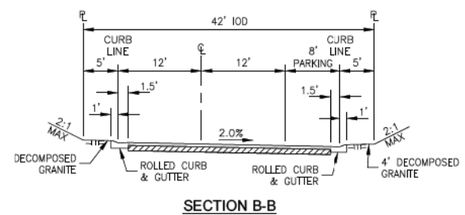
*GREEN STREET BIOFILTRATION BASIN
SCALE:1"=10'



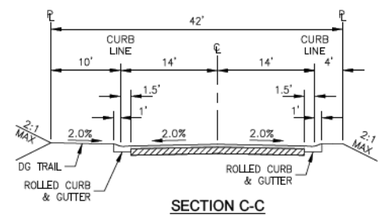
*BIOFILTRATION BASIN ADJACENT TO RESIDENTIAL PAD
SCALE:1"=10'



SECTION A-A
SCALE:1"=10'

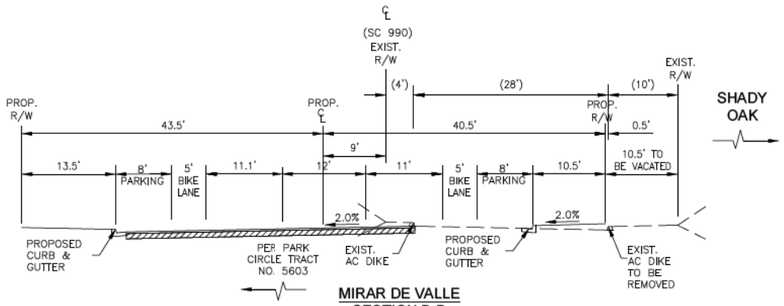


SECTION B-B
SCALE:1"=10'



SECTION C-C
SCALE:1"=10'

PARK CIRCLE



MIRAR DE VALLE
SECTION D-D
SCALE:1"=10'

LEGEND:

PROJECT BOUNDARY
EXISTING CONTOURS
EXISTING EASEMENT LINE
EASEMENT CALL OUT (9)
PROPOSED PRIVATE UTILITY EASEMENT
LOT NUMBER (53)
PAD ELEVATION 1310.4
LOT LINE
GRADED SLOPE 2:1 TYPICAL
PROPOSED CURB & GUTTER
PROPOSED AC PAVEMENT
PERCENT OF GRADE 1%
PROPOSED RETAINING WALL
PROPOSED 8" PVC SEWER LINE
PROPOSED 8" PVC WATER LINE
PROPOSED CLEAN OUT
PROPOSED CURB INLET
PROPOSED STORM DRAIN
PROPOSED CATCH BASIN
PROPOSED BIOFILTRATION BASIN

OWNER/APPLICANT/SUBDIVIDER:

I HEREBY CERTIFY THAT TOUCHSTONE MDV, LLC IS THE RECORD OWNER OF THE PROPERTY SHOWN ON THIS TENTAITVE MAP, AND THAT SAID MAP SHOWS ALL OF THE CONTIGUOUS OWNERSHIP IN WHICH IT HAS ANY DEED OR TRUST INTEREST. I UNDERSTAND THAT THE TOUCHSTONE MDV, LLC PROPERTY IS CONSIDERED CONTIGUOUS EVEN IF IT IS SEPARATED BY ROADS, STREETS, AND/OR UTILITY EASEMENTS.

TOUCHSTONE MDV, LLC
9909 MIRA MESA BLVD, SUITE # 150
SAN DIEGO, CA 92131
(858) 586-0414

BY:
KERRY GARZA DATE

ENGINEER:

TSAC ENGINEERING
16885 VIA DEL CAMPO CT, SUITE 304
SAN DIEGO, CA 92127
1-858-762-9611

STEPHEN MCPARTLAND
EXP. 09/30/17

REGISTERED PROFESSIONAL ENGINEER
STEPHEN J. MCPARTLAND
No. CO35109
Exp. 09/30/17
CIVIL
STATE OF CALIFORNIA

PREPARED BY:
TSAC ENGINEERING
16885 Via Del Campo Ct, Suite 304, SD, CA 92127
PHONE: 858.762.9611 FAX: 858.762.9612

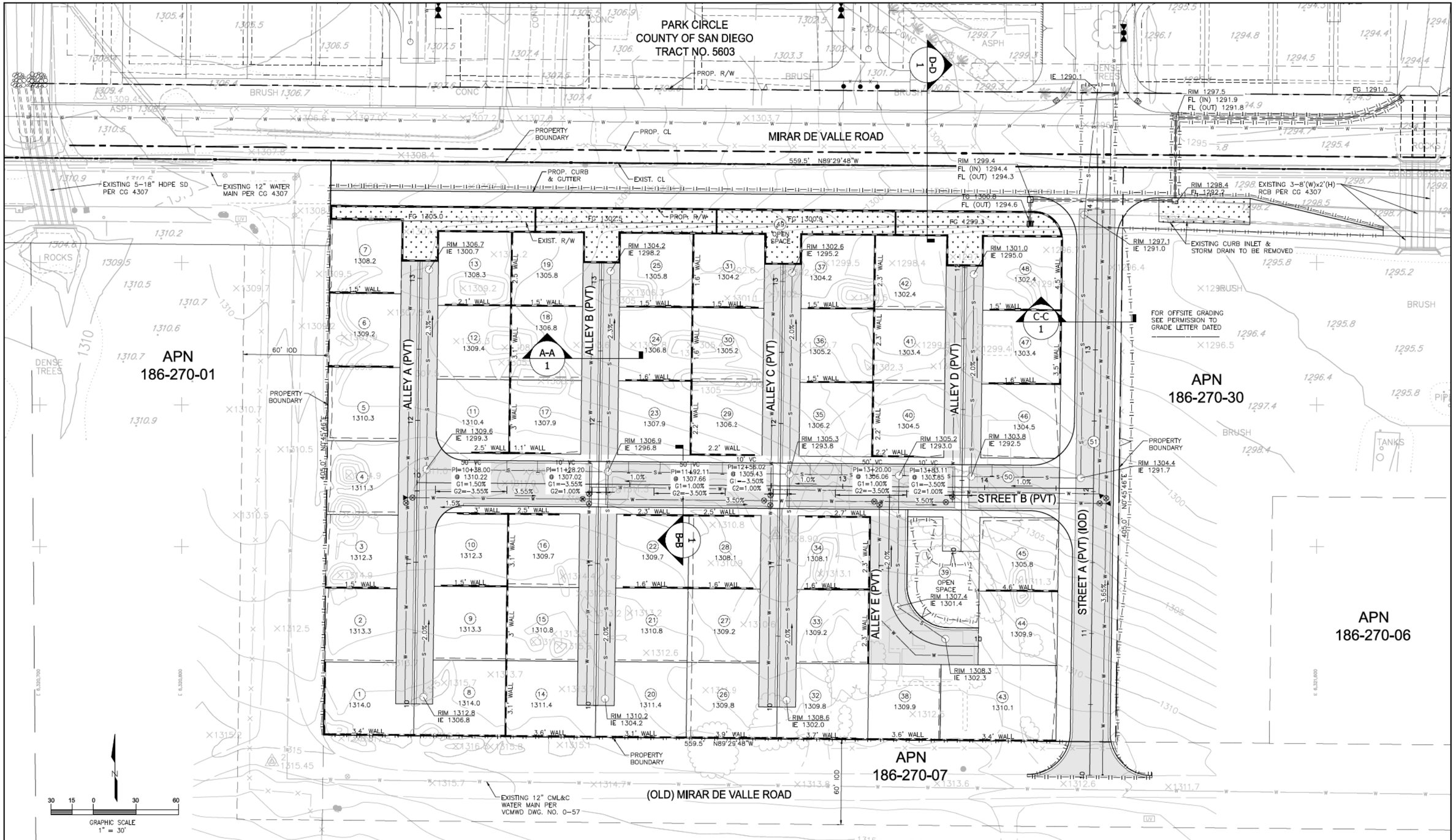
SHADY OAK
TITLE SHEET

COUNTY OF SAN DIEGO TRACT NO._____
VALLEY CENTER, CA

DATE: _____

NO.	BY	DATE	REVISIONS:

SHEET 1 OF 4



PREPARED BY:

TSAC ENGINEERING
16885 Via Del Campo Ct, Suite 304, SD, CA 92127
PHONE: 858.762.9611 FAX: 858.762.9612

SHADY OAK GRADING PLAN

COUNTY OF SAN DIEGO TRACT NO._____
VALLEY CENTER, CA

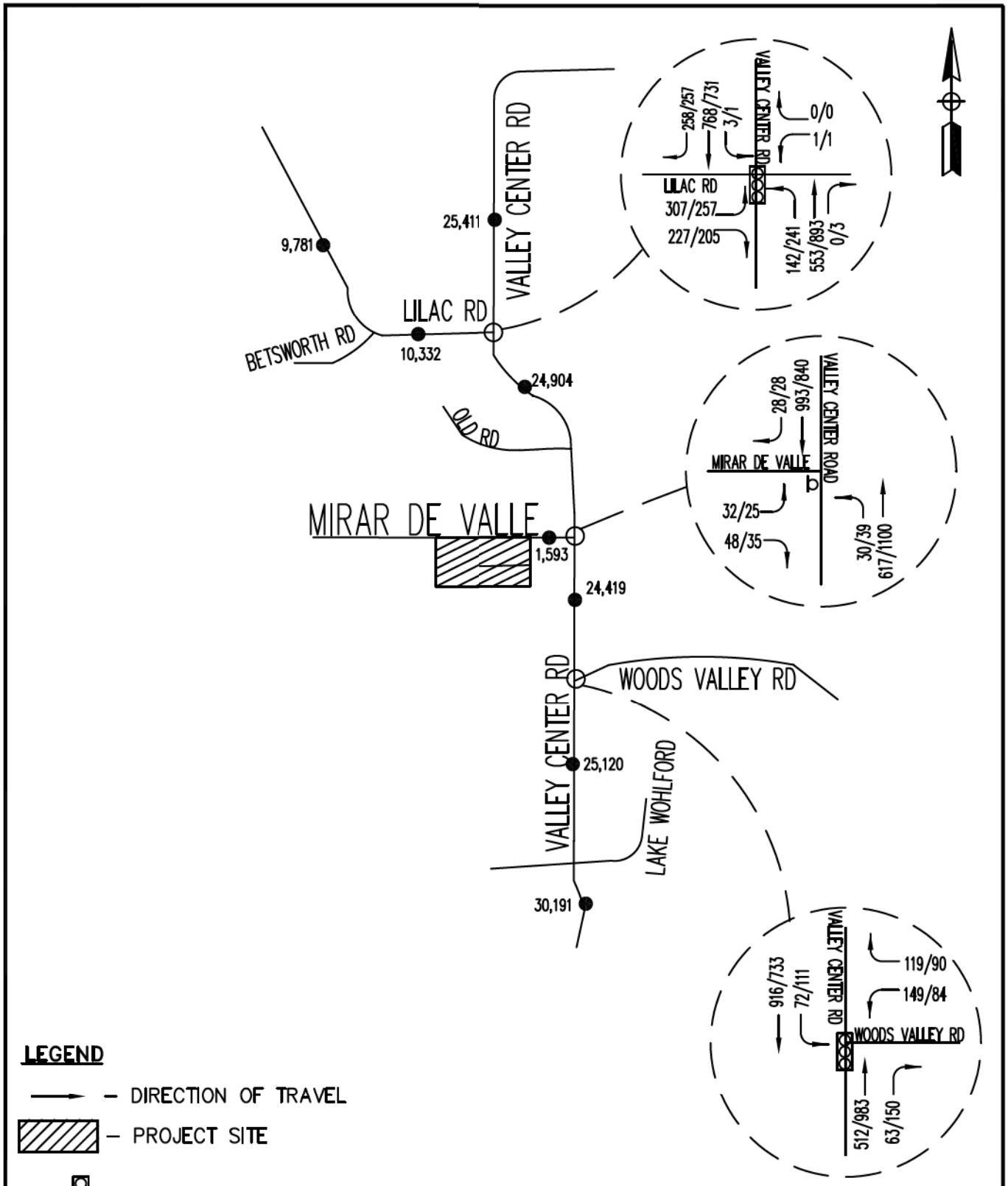
DATE: _____

NO.	BY	DATE	REVISIONS:

SHEET 3 OF 4

APPENDIX B

Pertinent Sections of Darnell & Associates Traffic Study

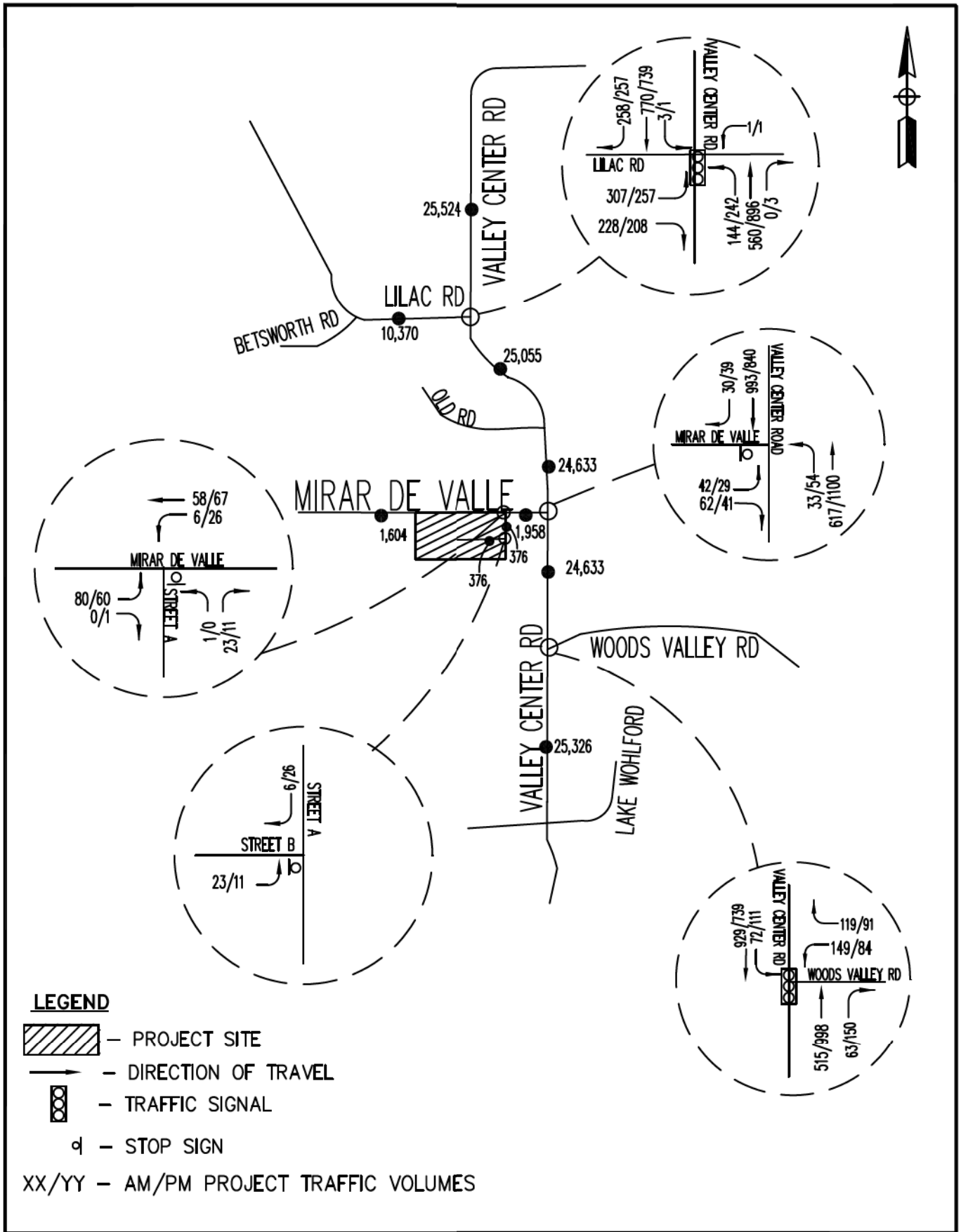


Darnell & ASSOCIATES, INC.

160701–AA.dwg 8–16–16 VLA

FIGURE 5

EXISTING (2015) TRAFFIC VOLUMES



Darnell & ASSOCIATES, INC.

160701–AA.dwg 8–16–16 VLA

FIGURE 8

EXISTING PLUS PROJECT TRAFFIC

APPENDIX C

Traffic Noise Model (TNM) Data and Results

Eilar Associates, Inc. 26 August 2016
AH TNM 2.5

INPUT: ROADWAYS
PROJECT/CONTRACT: B60611N1 Shady Oak
RUN: Calibration

Average pavement type shall be used unless a State highway agency substantiates the use of a different type with the approval of FHWA

Roadway		Points					Flow Control			Segment	
Name	Width	Name	No.	Coordinates (pavement) X	Y	Z	Control Device	Speed Constraint	Percent Vehicles Affected	Pvmt Type	On Struct?
	m			m	m	m		km/h	%		
WB Mirar de Valle	3.7	point1	1	-417.6	-336.5	0.00				Average	
		point2	2	-1,270.3	-341.7	0.00				Average	
		point3	3	-1,853.9	-327.5	0.00				Average	
		point4	4	-1,962.6	-376.7	0.00				Average	
		point5	5	-2,193.0	-401.2	0.00					
EB Mirar de Valle	3.7	point6	6	-2,194.3	-411.9	0.00				Average	
		point7	7	-1,954.5	-387.8	0.00				Average	
		point8	8	-1,841.8	-335.3	0.00				Average	
		point9	9	-1,504.3	-342.2	0.00				Average	
		point10	10	-1,070.5	-345.2	0.00				Average	
		point11	11	-779.5	-342.2	0.00				Average	
		point12	12	-415.9	-343.9	0.00					
Woods Valley Rd	7.3	point13	13	-351.1	-884.9	0.00				Average	
		point14	14	144.9	-723.9	0.00				Average	
		point15	15	248.5	-757.2	0.00				Average	
		point16	16	326.3	-829.4	0.00				Average	
		point17	17	411.4	-973.7	0.00				Average	
		point18	18	487.3	-1,025.5	0.00				Average	
		point19	19	578.0	-1,038.5	0.00				Average	
		point20	20	1,582.9	-958.9	0.00				Average	
		point21	21	1,732.8	-925.6	0.00				Average	
		point22	22	1,975.2	-1,038.5	0.00					
NB Valley Center	7.3	point32	32	-159.7	-1,847.5	0.00				Average	
		point33	33	-139.3	-1,616.1	0.00				Average	
		point34	34	-146.7	-1,540.3	0.00				Average	

		point35	35	-204.1	-1,325.6	0.00				Average	
		point36	36	-331.8	-1,018.4	0.00				Average	
		point37	37	-365.1	-870.3	0.00				Average	
		point38	38	-385.5	-726.0	0.00				Average	
		point39	39	-389.2	117.9	0.00				Average	
		point40	40	-392.9	408.5	0.00				Average	
		point41	41	-404.0	462.1	0.00				Average	
		point42	42	-453.9	552.8	0.00				Average	
		point43	43	-663.1	854.5	0.00				Average	
		point44	44	-722.3	993.3	0.00				Average	
		point45	45	-738.9	1,163.5	0.00				Average	
		point46	46	-722.3	1,470.7	0.00				Average	
		point47	47	-700.1	1,570.7	0.00				Average	
		point48	48	-613.1	1,670.6	0.00				Average	
		point49	49	-500.2	1,731.7	0.00					
SB Valley Center	7.3	point68	68	-578.8	1,721.8	0.00				Average	
		point69	69	-671.9	1,655.7	0.00				Average	
		point70	70	-733.2	1,552.7	0.00				Average	
		point71	71	-762.6	1,302.8	0.00				Average	
		point72	72	-767.5	1,197.4	0.00				Average	
		point73	73	-745.4	1,013.6	0.00				Average	
		point74	74	-689.1	856.8	0.00				Average	
		point75	75	-625.4	753.8	0.00				Average	
		point76	76	-456.3	525.9	0.00				Average	
		point77	77	-409.7	435.3	0.00				Average	
		point78	78	-409.7	120.9	0.00				Average	
		point79	79	-409.7	-131.7	0.00				Average	
		point80	80	-409.7	-677.0	0.00				Average	
		point81	81	-408.8	-735.0	0.00				Average	
		point82	82	-347.2	-1,042.0	0.00				Average	
		point83	83	-218.7	-1,349.0	0.00				Average	
		point84	84	-157.6	-1,598.4	0.00				Average	
		point85	85	-205.7	-1,838.9	0.00					

Eilar Associates, Inc. **26 August 2016**
AH **TNM 2.5**

INPUT: TRAFFIC FOR LAeq1h Volumes
PROJECT/CONTRACT: **B60611N1 Shady Oak**
RUN: **Calibration**

Roadway	Points		Segment									
			Autos		MTrucks		HTrucks		Buses		Motorcycles	
Name	Name	No.	V	S	V	S	V	S	V	S	V	S
			veh/hr	km/h	veh/hr	km/h	veh/hr	km/h	veh/hr	km/h	veh/hr	km/h
WB Mirar de Valle	point1	1	26	72	6	72	0	0	0	0	0	0
	point2	2	26	72	6	72	0	0	0	0	0	0
	point3	3	26	72	6	72	0	0	0	0	0	0
	point4	4	26	72	6	72	0	0	0	0	0	0
	point5	5										
EB Mirar de Valle	point6	6	26	72	6	72	0	0	0	0	0	0
	point7	7	26	72	6	72	0	0	0	0	0	0
	point8	8	26	72	6	72	0	0	0	0	0	0
	point9	9	26	72	6	72	0	0	0	0	0	0
	point10	10	26	72	6	72	0	0	0	0	0	0
	point11	11	26	72	6	72	0	0	0	0	0	0
	point12	12										
Woods Valley Rd	point13	13	162	72	3	72	2	72	0	0	0	0
	point14	14	162	72	3	72	2	72	0	0	0	0
	point15	15	162	72	3	72	2	72	0	0	0	0
	point16	16	162	72	3	72	2	72	0	0	0	0
	point17	17	162	72	3	72	2	72	0	0	0	0
	point18	18	162	72	3	72	2	72	0	0	0	0
	point19	19	162	72	3	72	2	72	0	0	0	0
	point20	20	162	72	3	72	2	72	0	0	0	0
	point21	21	162	72	3	72	2	72	0	0	0	0
	point22	22										
NB Valley Center	point32	32	727	72	15	72	15	72	0	0	0	0

	point33	33	727	72	15	72	15	72	0	0	0	0
	point34	34	727	72	15	72	15	72	0	0	0	0
	point35	35	727	72	15	72	15	72	0	0	0	0
	point36	36	727	72	15	72	15	72	0	0	0	0
	point37	37	727	72	15	72	15	72	0	0	0	0
	point38	38	727	72	15	72	15	72	0	0	0	0
	point39	39	727	72	15	72	15	72	0	0	0	0
	point40	40	727	72	15	72	15	72	0	0	0	0
	point41	41	727	72	15	72	15	72	0	0	0	0
	point42	42	727	72	15	72	15	72	0	0	0	0
	point43	43	727	72	15	72	15	72	0	0	0	0
	point44	44	727	72	15	72	15	72	0	0	0	0
	point45	45	727	72	15	72	15	72	0	0	0	0
	point46	46	727	72	15	72	15	72	0	0	0	0
	point47	47	727	72	15	72	15	72	0	0	0	0
	point48	48	727	72	15	72	15	72	0	0	0	0
	point49	49										
SB Valley Center	point68	68	727	72	15	72	15	72	0	0	0	0
	point69	69	727	72	15	72	15	72	0	0	0	0
	point70	70	727	72	15	72	15	72	0	0	0	0
	point71	71	727	72	15	72	15	72	0	0	0	0
	point72	72	727	72	15	72	15	72	0	0	0	0
	point73	73	727	72	15	72	15	72	0	0	0	0
	point74	74	727	72	15	72	15	72	0	0	0	0
	point75	75	727	72	15	72	15	72	0	0	0	0
	point76	76	727	72	15	72	15	72	0	0	0	0
	point77	77	727	72	15	72	15	72	0	0	0	0
	point78	78	727	72	15	72	15	72	0	0	0	0
	point79	79	727	72	15	72	15	72	0	0	0	0
	point80	80	727	72	15	72	15	72	0	0	0	0
	point81	81	727	72	15	72	15	72	0	0	0	0
	point82	82	727	72	15	72	15	72	0	0	0	0
	point83	83	727	72	15	72	15	72	0	0	0	0
	point84	84	727	72	15	72	15	72	0	0	0	0
	point85	85										

Eilar Associates, Inc. **26 August 2016**
AH **TNM 2.5**

INPUT: RECEIVERS
PROJECT/CONTRACT: **B60611N1 Shady Oak**
RUN: **Calibration**

Receiver Name	No.	#DUs	Coordinates (ground) X	Y	Z	Height above Ground	Input Sound Levels and Criteria: Existing LAeq1h	Impact Criteria LAeq1h	Impact Criteria Sub'l	NR Goal	Active in Calc.
			m	m	m	m	dBA	dBA	dB	dB	
Calibration	1	1	-614.4	-346.6	0.00	1.52	0.00	66	10.0	8.0	Y

Eilar Associates, Inc.
AH
RESULTS: SOUND LEVELS
PROJECT/CONTRACT: B60611N1 Shady Oak
RUN: Calibration
BARRIER DESIGN: INPUT HEIGHTS
ATMOSPHERICS: 20 deg C, 50% RH

26 August 2016
TNM 2.5
Calculated with TNM 2.5

Average pavement type shall be used unless a State highway agency substantiates the use of a different type with approval of FHWA.

Receiver Name	No.	#DUs	Existing LAeq1h	No Barrier LAeq1h Calculated	Crit'n	Increase over existing Calculated	Increase over existing Crit'n Sub'l Inc	Type Impact	With Barrier Calculated LAeq1h	Noise Reduction Calculated	Noise Reduction Goal	Noise Reduction Calculated minus Goal
			dBA	dBA	dBA	dB	dB		dBA	dB	dB	dB
Calibration	1	1	0.0	62.1	66	62.1	10	----	62.1	0.0	8	-8.0

Dwelling Units	# DUs	Noise Reduction Min	Noise Reduction Avg	Noise Reduction Max
		dB	dB	dB
All Selected	1	0.0	0.0	0.0
All Impacted	0	0.0	0.0	0.0
All that meet NR Goal	0	0.0	0.0	0.0

Eilar Associates, Inc. **28 August 2016**
AH **TNM 2.5**

INPUT: TRAFFIC FOR LAeq1h Volumes
PROJECT/CONTRACT: **B60611N1 Shady Oak**
RUN: **Current Contours**

Roadway	Points		Segment									
			Autos		MTrucks		HTrucks		Buses		Motorcycles	
Name	Name	No.	V	S	V	S	V	S	V	S	V	S
			veh/hr	km/h	veh/hr	km/h	veh/hr	km/h	veh/hr	km/h	veh/hr	km/h
WB Mirar de Valle	point1	1	45	72	1	72	0	0	0	0	0	0
	point2	2	26	72	6	72	0	0	0	0	0	0
	point3	3	26	72	6	72	0	0	0	0	0	0
	point4	4	26	72	6	72	0	0	0	0	0	0
	point5	5										
EB Mirar de Valle	point6	6	45	72	1	72	0	0	0	0	0	0
	point7	7	45	72	1	72	0	0	0	0	0	0
	point8	8	45	72	1	72	0	0	0	0	0	0
	point9	9	45	72	1	72	0	0	0	0	0	0
	point10	10	45	72	1	72	0	0	0	0	0	0
	point11	11	45	72	1	72	0	0	0	0	0	0
	point12	12										
Woods Valley Rd	point13	13	152	72	3	72	2	72	0	0	0	0
	point14	14	152	72	3	72	2	72	0	0	0	0
	point15	15	152	72	3	72	2	72	0	0	0	0
	point16	16	152	72	3	72	2	72	0	0	0	0
	point17	17	152	72	3	72	2	72	0	0	0	0
	point18	18	152	72	3	72	2	72	0	0	0	0
	point19	19	152	72	3	72	2	72	0	0	0	0
	point20	20	152	72	3	72	2	72	0	0	0	0
	point21	21	152	72	3	72	2	72	0	0	0	0
	point22	22										
NB Valley Center	point32	32	680	72	14	72	14	72	0	0	0	0

	point33	33	680	72	14	72	14	72	0	0	0	0
	point34	34	680	72	14	72	14	72	0	0	0	0
	point35	35	680	72	14	72	14	72	0	0	0	0
	point36	36	680	72	14	72	14	72	0	0	0	0
	point37	37	680	72	14	72	14	72	0	0	0	0
	point38	38	680	72	14	72	14	72	0	0	0	0
	point39	39	680	72	14	72	14	72	0	0	0	0
	point40	40	680	72	14	72	14	72	0	0	0	0
	point41	41	680	72	14	72	14	72	0	0	0	0
	point42	42	680	72	14	72	14	72	0	0	0	0
	point43	43	680	72	14	72	14	72	0	0	0	0
	point44	44	680	72	14	72	14	72	0	0	0	0
	point45	45	680	72	14	72	14	72	0	0	0	0
	point46	46	680	72	14	72	14	72	0	0	0	0
	point47	47	680	72	14	72	14	72	0	0	0	0
	point48	48	680	72	14	72	14	72	0	0	0	0
	point49	49										
SB Valley Center	point68	68	680	72	14	72	14	72	0	0	0	0
	point69	69	680	72	14	72	14	72	0	0	0	0
	point70	70	680	72	14	72	14	72	0	0	0	0
	point71	71	680	72	14	72	14	72	0	0	0	0
	point72	72	680	72	14	72	14	72	0	0	0	0
	point73	73	680	72	14	72	14	72	0	0	0	0
	point74	74	680	72	14	72	14	72	0	0	0	0
	point75	75	680	72	14	72	14	72	0	0	0	0
	point76	76	680	72	14	72	14	72	0	0	0	0
	point77	77	680	72	14	72	14	72	0	0	0	0
	point78	78	680	72	14	72	14	72	0	0	0	0
	point79	79	680	72	14	72	14	72	0	0	0	0
	point80	80	680	72	14	72	14	72	0	0	0	0
	point81	81	680	72	14	72	14	72	0	0	0	0
	point82	82	680	72	14	72	14	72	0	0	0	0
	point83	83	680	72	14	72	14	72	0	0	0	0
	point84	84	680	72	14	72	14	72	0	0	0	0
	point85	85										

Eilar Associates, Inc. 28 August 2016
AH TNM 2.5

INPUT: RECEIVERS
PROJECT/CONTRACT: B60611N1 Shady Oak
RUN: Current Contours

Receiver Name	No.	#DUs	Coordinates (ground) X	Y	Z	Height above Ground	Input Sound Levels and Criteria: Existing LAeq1h	Impact Criteria LAeq1h	Impact Criteria Sub'l	NR Goal	Active in Calc.
			m	m	m	m	dBA	dBA	dB	dB	
Calibration	1	1	-614.4	-346.6	0.00	1.52	0.00	66	10.0	8.0	Y
1	3	1	-563.9	-347.1	0.00	1.52	0.00	66	10.0	8.0	Y
2	4	1	-563.7	-354.6	0.00	1.52	0.00	66	10.0	8.0	Y
3	5	1	-563.9	-362.4	0.00	1.52	0.00	66	10.0	8.0	Y
4	6	1	-564.4	-377.7	0.00	1.52	0.00	66	10.0	8.0	Y
5	7	1	-564.4	-393.4	0.00	1.52	0.00	66	10.0	8.0	Y
6	8	1	-563.7	-408.4	0.00	1.52	0.00	66	10.0	8.0	Y
7	9	1	-564.9	-424.2	0.00	1.52	0.00	66	10.0	8.0	Y
8	10	1	-564.7	-440.1	0.00	1.52	0.00	66	10.0	8.0	Y
9	11	1	-564.7	-455.9	0.00	1.52	0.00	66	10.0	8.0	Y
10	12	1	-571.7	-346.9	0.00	1.52	0.00	66	10.0	8.0	Y
11	13	1	-571.7	-354.6	0.00	1.52	0.00	66	10.0	8.0	Y
12	14	1	-571.5	-362.7	0.00	1.52	0.00	66	10.0	8.0	Y
13	15	1	-572.2	-378.2	0.00	1.52	0.00	66	10.0	8.0	Y
14	16	1	-572.7	-392.6	0.00	1.52	0.00	66	10.0	8.0	Y
15	17	1	-572.4	-408.9	0.00	1.52	0.00	66	10.0	8.0	Y
16	18	1	-572.4	-424.4	0.00	1.52	0.00	66	10.0	8.0	Y
17	19	1	-572.7	-439.9	0.00	1.52	0.00	66	10.0	8.0	Y
18	20	1	-572.5	-455.6	0.00	1.52	0.00	66	10.0	8.0	Y
19	21	1	-580.2	-346.9	0.00	1.52	0.00	66	10.0	8.0	Y
20	22	1	-580.4	-354.4	0.00	1.52	0.00	66	10.0	8.0	Y
21	23	1	-580.7	-362.4	0.00	1.52	0.00	66	10.0	8.0	Y

22	24	1	-580.7	-377.9	0.00	1.52	0.00	66	10.0	8.0	Y
23	25	1	-580.7	-393.4	0.00	1.52	0.00	66	10.0	8.0	Y
24	26	1	-580.5	-409.1	0.00	1.52	0.00	66	10.0	8.0	Y
25	27	1	-580.5	-423.6	0.00	1.52	0.00	66	10.0	8.0	Y
26	28	1	-581.2	-439.9	0.00	1.52	0.00	66	10.0	8.0	Y
27	29	1	-581.0	-455.7	0.00	1.52	0.00	66	10.0	8.0	Y
28	30	1	-595.7	-347.1	0.00	1.52	0.00	66	10.0	8.0	Y
29	31	1	-595.9	-354.0	0.00	1.52	0.00	66	10.0	8.0	Y
30	32	1	-595.7	-362.4	0.00	1.52	0.00	66	10.0	8.0	Y
31	33	1	-596.5	-377.5	0.00	1.52	0.00	66	10.0	8.0	Y
32	34	1	-596.5	-392.0	0.00	1.52	0.00	66	10.0	8.0	Y
33	35	1	-596.1	-409.2	0.00	1.52	0.00	66	10.0	8.0	Y
34	36	1	-596.3	-424.4	0.00	1.52	0.00	66	10.0	8.0	Y
35	37	1	-596.5	-440.1	0.00	1.52	0.00	66	10.0	8.0	Y
36	38	1	-597.0	-455.9	0.00	1.52	0.00	66	10.0	8.0	Y
37	39	1	-611.5	-346.2	0.00	1.52	0.00	66	10.0	8.0	Y
38	40	1	-611.0	-354.6	0.00	1.52	0.00	66	10.0	8.0	Y
39	41	1	-611.5	-361.6	0.00	1.52	0.00	66	10.0	8.0	Y
40	42	1	-611.7	-377.3	0.00	1.52	0.00	66	10.0	8.0	Y
41	43	1	-612.1	-392.2	0.00	1.52	0.00	66	10.0	8.0	Y
42	44	1	-611.2	-408.4	0.00	1.52	0.00	66	10.0	8.0	Y
43	45	1	-612.3	-424.4	0.00	1.52	0.00	66	10.0	8.0	Y
44	46	1	-612.1	-439.9	0.00	1.52	0.00	66	10.0	8.0	Y
45	48	1	-611.9	-455.2	0.00	1.52	0.00	66	10.0	8.0	Y
46	49	1	-626.8	-346.2	0.00	1.52	0.00	66	10.0	8.0	Y
47	50	1	-627.0	-354.2	0.00	1.52	0.00	66	10.0	8.0	Y
48	51	1	-626.8	-362.4	0.00	1.52	0.00	66	10.0	8.0	Y
49	52	1	-627.6	-376.9	0.00	1.52	0.00	66	10.0	8.0	Y
50	53	1	-627.4	-392.5	0.00	1.52	0.00	66	10.0	8.0	Y
51	54	1	-627.8	-408.4	0.00	1.52	0.00	66	10.0	8.0	Y
52	55	1	-627.4	-424.0	0.00	1.52	0.00	66	10.0	8.0	Y
53	56	1	-628.0	-439.7	0.00	1.52	0.00	66	10.0	8.0	Y
54	57	1	-627.8	-454.8	0.00	1.52	0.00	66	10.0	8.0	Y
55	58	1	-641.7	-346.7	0.00	1.52	0.00	66	10.0	8.0	Y
56	59	1	-641.9	-353.4	0.00	1.52	0.00	66	10.0	8.0	Y
57	60	1	-641.7	-362.2	0.00	1.52	0.00	66	10.0	8.0	Y

58	61	1	-642.3	-377.5	0.00	1.52	0.00	66	10.0	8.0	Y
59	62	1	-642.7	-392.0	0.00	1.52	0.00	66	10.0	8.0	Y
60	63	1	-643.0	-408.2	0.00	1.52	0.00	66	10.0	8.0	Y
61	64	1	-643.2	-423.3	0.00	1.52	0.00	66	10.0	8.0	Y
62	65	1	-642.5	-439.9	0.00	1.52	0.00	66	10.0	8.0	Y
63	66	1	-644.2	-455.0	0.00	1.52	0.00	66	10.0	8.0	Y
64	67	1	-657.4	-346.5	0.00	1.52	0.00	66	10.0	8.0	Y
65	68	1	-658.1	-353.8	0.00	1.52	0.00	66	10.0	8.0	Y
66	69	1	-658.1	-361.2	0.00	1.52	0.00	66	10.0	8.0	Y
67	70	1	-657.4	-376.9	0.00	1.52	0.00	66	10.0	8.0	Y
68	71	1	-658.3	-392.2	0.00	1.52	0.00	66	10.0	8.0	Y
69	72	1	-658.1	-408.2	0.00	1.52	0.00	66	10.0	8.0	Y
70	73	1	-658.1	-423.5	0.00	1.52	0.00	66	10.0	8.0	Y
71	74	1	-658.3	-439.5	0.00	1.52	0.00	66	10.0	8.0	Y
72	75	1	-658.3	-454.6	0.00	1.52	0.00	66	10.0	8.0	Y
73	76	1	-672.6	-346.0	0.00	1.52	0.00	66	10.0	8.0	Y
74	77	1	-673.0	-353.4	0.00	1.52	0.00	66	10.0	8.0	Y
75	78	1	-673.0	-361.4	0.00	1.52	0.00	66	10.0	8.0	Y
76	79	1	-672.8	-377.1	0.00	1.52	0.00	66	10.0	8.0	Y
77	80	1	-673.0	-392.2	0.00	1.52	0.00	66	10.0	8.0	Y
78	81	1	-673.6	-409.0	0.00	1.52	0.00	66	10.0	8.0	Y
79	82	1	-673.8	-422.9	0.00	1.52	0.00	66	10.0	8.0	Y
80	83	1	-673.4	-439.1	0.00	1.52	0.00	66	10.0	8.0	Y
81	84	1	-673.4	-454.6	0.00	1.52	0.00	66	10.0	8.0	Y
82	85	1	-688.7	-345.4	0.00	1.52	0.00	66	10.0	8.0	Y
83	86	1	-688.7	-353.0	0.00	1.52	0.00	66	10.0	8.0	Y
84	87	1	-688.9	-361.0	0.00	1.52	0.00	66	10.0	8.0	Y
85	88	1	-689.2	-376.5	0.00	1.52	0.00	66	10.0	8.0	Y
86	89	1	-688.3	-392.0	0.00	1.52	0.00	66	10.0	8.0	Y
87	90	1	-689.4	-408.0	0.00	1.52	0.00	66	10.0	8.0	Y
88	91	1	-689.6	-422.9	0.00	1.52	0.00	66	10.0	8.0	Y
89	92	1	-689.6	-439.3	0.00	1.52	0.00	66	10.0	8.0	Y
90	93	1	-689.8	-454.6	0.00	1.52	0.00	66	10.0	8.0	Y
91	94	1	-703.8	-345.8	0.00	1.52	0.00	66	10.0	8.0	Y
92	95	1	-703.8	-353.4	0.00	1.52	0.00	66	10.0	8.0	Y
93	96	1	-703.6	-361.2	0.00	1.52	0.00	66	10.0	8.0	Y

94	97	1	-703.6	-376.7	0.00	1.52	0.00	66	10.0	8.0	Y
95	98	1	-704.3	-391.8	0.00	1.52	0.00	66	10.0	8.0	Y
96	99	1	-704.3	-407.8	0.00	1.52	0.00	66	10.0	8.0	Y
97	100	1	-704.3	-422.9	0.00	1.52	0.00	66	10.0	8.0	Y
98	101	1	-704.5	-438.9	0.00	1.52	0.00	66	10.0	8.0	Y
99	102	1	-704.9	-454.0	0.00	1.52	0.00	66	10.0	8.0	Y
100	103	1	-720.4	-345.6	0.00	1.52	0.00	66	10.0	8.0	Y
101	104	1	-719.8	-352.8	0.00	1.52	0.00	66	10.0	8.0	Y
102	105	1	-720.8	-361.4	0.00	1.52	0.00	66	10.0	8.0	Y
103	106	1	-721.5	-375.9	0.00	1.52	0.00	66	10.0	8.0	Y
104	107	1	-721.3	-392.0	0.00	1.52	0.00	66	10.0	8.0	Y
105	108	1	-721.5	-406.9	0.00	1.52	0.00	66	10.0	8.0	Y
106	109	1	-721.5	-424.4	0.00	1.52	0.00	66	10.0	8.0	Y
107	110	1	-721.9	-438.6	0.00	1.52	0.00	66	10.0	8.0	Y
108	111	1	-721.7	-455.0	0.00	1.52	0.00	66	10.0	8.0	Y

Eilar Associates, Inc.
AH
28 August 2016
TNM 2.5
Calculated with TNM 2.5

RESULTS: SOUND LEVELS
PROJECT/CONTRACT: B60611N1 Shady Oak
RUN: Current Contours
BARRIER DESIGN: INPUT HEIGHTS
ATMOSPHERICS: 20 deg C, 50% RH

Average pavement type shall be used unless a State highway agency substantiates the use of a different type with approval of FHWA.

Receiver Name	No.	#DUs	Existing LAeq1h	No Barrier LAeq1h Calculated	Crit'n	Increase over existing Calculated	Crit'n Sub'l Inc	Type Impact	With Barrier Calculated LAeq1h	Noise Reduction Calculated	Goal	Calculated minus Goal
			dBA	dBA	dBA	dB	dB		dBA	dB	dB	dB
Calibration	1	1	0.0	61.4	66	61.4	10	----	61.4	0.0	8	-8.0
1	3	1	0.0	61.2	66	61.2	10	----	61.2	0.0	8	-8.0
2	4	1	0.0	57.5	66	57.5	10	----	57.5	0.0	8	-8.0
3	5	1	0.0	54.5	66	54.5	10	----	54.5	0.0	8	-8.0
4	6	1	0.0	51.8	66	51.8	10	----	51.8	0.0	8	-8.0
5	7	1	0.0	50.8	66	50.8	10	----	50.8	0.0	8	-8.0
6	8	1	0.0	50.2	66	50.2	10	----	50.2	0.0	8	-8.0
7	9	1	0.0	49.8	66	49.8	10	----	49.8	0.0	8	-8.0
8	10	1	0.0	49.6	66	49.6	10	----	49.6	0.0	8	-8.0
9	11	1	0.0	49.4	66	49.4	10	----	49.4	0.0	8	-8.0
10	12	1	0.0	61.4	66	61.4	10	----	61.4	0.0	8	-8.0
11	13	1	0.0	57.5	66	57.5	10	----	57.5	0.0	8	-8.0
12	14	1	0.0	54.3	66	54.3	10	----	54.3	0.0	8	-8.0
13	15	1	0.0	51.6	66	51.6	10	----	51.6	0.0	8	-8.0
14	16	1	0.0	50.7	66	50.7	10	----	50.7	0.0	8	-8.0
15	17	1	0.0	50.0	66	50.0	10	----	50.0	0.0	8	-8.0
16	18	1	0.0	49.6	66	49.6	10	----	49.6	0.0	8	-8.0
17	19	1	0.0	49.4	66	49.4	10	----	49.4	0.0	8	-8.0
18	20	1	0.0	49.2	66	49.2	10	----	49.2	0.0	8	-8.0
19	21	1	0.0	61.3	66	61.3	10	----	61.3	0.0	8	-8.0
20	22	1	0.0	57.5	66	57.5	10	----	57.5	0.0	8	-8.0
21	23	1	0.0	54.3	66	54.3	10	----	54.3	0.0	8	-8.0
22	24	1	0.0	51.6	66	51.6	10	----	51.6	0.0	8	-8.0
23	25	1	0.0	50.6	66	50.6	10	----	50.6	0.0	8	-8.0

24	26	1	0.0	49.8	66	49.8	10	----	49.8	0.0	8	-8.0
25	27	1	0.0	49.4	66	49.4	10	----	49.4	0.0	8	-8.0
26	28	1	0.0	49.2	66	49.2	10	----	49.2	0.0	8	-8.0
27	29	1	0.0	49.0	66	49.0	10	----	49.0	0.0	8	-8.0
28	30	1	0.0	61.1	66	61.1	10	----	61.1	0.0	8	-8.0
29	31	1	0.0	57.7	66	57.7	10	----	57.7	0.0	8	-8.0
30	32	1	0.0	54.2	66	54.2	10	----	54.2	0.0	8	-8.0
31	33	1	0.0	51.4	66	51.4	10	----	51.4	0.0	8	-8.0
32	34	1	0.0	50.4	66	50.4	10	----	50.4	0.0	8	-8.0
33	35	1	0.0	49.5	66	49.5	10	----	49.5	0.0	8	-8.0
34	36	1	0.0	49.1	66	49.1	10	----	49.1	0.0	8	-8.0
35	37	1	0.0	48.8	66	48.8	10	----	48.8	0.0	8	-8.0
36	38	1	0.0	48.6	66	48.6	10	----	48.6	0.0	8	-8.0
37	39	1	0.0	61.7	66	61.7	10	----	61.7	0.0	8	-8.0
38	40	1	0.0	57.3	66	57.3	10	----	57.3	0.0	8	-8.0
39	41	1	0.0	54.4	66	54.4	10	----	54.4	0.0	8	-8.0
40	42	1	0.0	51.3	66	51.3	10	----	51.3	0.0	8	-8.0
41	43	1	0.0	50.1	66	50.1	10	----	50.1	0.0	8	-8.0
42	44	1	0.0	49.1	66	49.1	10	----	49.1	0.0	8	-8.0
43	45	1	0.0	48.6	66	48.6	10	----	48.6	0.0	8	-8.0
44	46	1	0.0	48.4	66	48.4	10	----	48.4	0.0	8	-8.0
45	48	1	0.0	48.2	66	48.2	10	----	48.2	0.0	8	-8.0
46	49	1	0.0	61.6	66	61.6	10	----	61.6	0.0	8	-8.0
47	50	1	0.0	57.4	66	57.4	10	----	57.4	0.0	8	-8.0
48	51	1	0.0	54.0	66	54.0	10	----	54.0	0.0	8	-8.0
49	52	1	0.0	51.1	66	51.1	10	----	51.1	0.0	8	-8.0
50	53	1	0.0	49.8	66	49.8	10	----	49.8	0.0	8	-8.0
51	54	1	0.0	48.6	66	48.6	10	----	48.6	0.0	8	-8.0
52	55	1	0.0	48.1	66	48.1	10	----	48.1	0.0	8	-8.0
53	56	1	0.0	47.8	66	47.8	10	----	47.8	0.0	8	-8.0
54	57	1	0.0	47.5	66	47.5	10	----	47.5	0.0	8	-8.0
55	58	1	0.0	61.3	66	61.3	10	----	61.3	0.0	8	-8.0
56	59	1	0.0	57.8	66	57.8	10	----	57.8	0.0	8	-8.0
57	60	1	0.0	54.0	66	54.0	10	----	54.0	0.0	8	-8.0
58	61	1	0.0	50.9	66	50.9	10	----	50.9	0.0	8	-8.0
59	62	1	0.0	49.6	66	49.6	10	----	49.6	0.0	8	-8.0
60	63	1	0.0	48.3	66	48.3	10	----	48.3	0.0	8	-8.0
61	64	1	0.0	47.7	66	47.7	10	----	47.7	0.0	8	-8.0
62	65	1	0.0	47.3	66	47.3	10	----	47.3	0.0	8	-8.0
63	66	1	0.0	47.0	66	47.0	10	----	47.0	0.0	8	-8.0
64	67	1	0.0	61.4	66	61.4	10	----	61.4	0.0	8	-8.0

65	68	1	0.0	57.5	66	57.5	10	----	57.5	0.0	8	-8.0
66	69	1	0.0	54.3	66	54.3	10	----	54.3	0.0	8	-8.0
67	70	1	0.0	50.9	66	50.9	10	----	50.9	0.0	8	-8.0
68	71	1	0.0	49.3	66	49.3	10	----	49.3	0.0	8	-8.0
69	72	1	0.0	48.0	66	48.0	10	----	48.0	0.0	8	-8.0
70	73	1	0.0	47.2	66	47.2	10	----	47.2	0.0	8	-8.0
71	74	1	0.0	46.7	66	46.7	10	----	46.7	0.0	8	-8.0
72	75	1	0.0	46.5	66	46.5	10	----	46.5	0.0	8	-8.0
73	76	1	0.0	61.7	66	61.7	10	----	61.7	0.0	8	-8.0
74	77	1	0.0	57.7	66	57.7	10	----	57.7	0.0	8	-8.0
75	78	1	0.0	54.2	66	54.2	10	----	54.2	0.0	8	-8.0
76	79	1	0.0	50.8	66	50.8	10	----	50.8	0.0	8	-8.0
77	80	1	0.0	49.1	66	49.1	10	----	49.1	0.0	8	-8.0
78	81	1	0.0	47.6	66	47.6	10	----	47.6	0.0	8	-8.0
79	82	1	0.0	46.8	66	46.8	10	----	46.8	0.0	8	-8.0
80	83	1	0.0	46.3	66	46.3	10	----	46.3	0.0	8	-8.0
81	84	1	0.0	46.1	66	46.1	10	----	46.1	0.0	8	-8.0
82	85	1	0.0	62.2	66	62.2	10	----	62.2	0.0	8	-8.0
83	86	1	0.0	57.9	66	57.9	10	----	57.9	0.0	8	-8.0
84	87	1	0.0	54.3	66	54.3	10	----	54.3	0.0	8	-8.0
85	88	1	0.0	50.8	66	50.8	10	----	50.8	0.0	8	-8.0
86	89	1	0.0	49.0	66	49.0	10	----	49.0	0.0	8	-8.0
87	90	1	0.0	47.3	66	47.3	10	----	47.3	0.0	8	-8.0
88	91	1	0.0	46.4	66	46.4	10	----	46.4	0.0	8	-8.0
89	92	1	0.0	45.8	66	45.8	10	----	45.8	0.0	8	-8.0
90	93	1	0.0	45.5	66	45.5	10	----	45.5	0.0	8	-8.0
91	94	1	0.0	61.8	66	61.8	10	----	61.8	0.0	8	-8.0
92	95	1	0.0	57.6	66	57.6	10	----	57.6	0.0	8	-8.0
93	96	1	0.0	54.3	66	54.3	10	----	54.3	0.0	8	-8.0
94	97	1	0.0	50.8	66	50.8	10	----	50.8	0.0	8	-8.0
95	98	1	0.0	48.8	66	48.8	10	----	48.8	0.0	8	-8.0
96	99	1	0.0	47.0	66	47.0	10	----	47.0	0.0	8	-8.0
97	100	1	0.0	46.1	66	46.1	10	----	46.1	0.0	8	-8.0
98	101	1	0.0	45.5	66	45.5	10	----	45.5	0.0	8	-8.0
99	102	1	0.0	45.1	66	45.1	10	----	45.1	0.0	8	-8.0
100	103	1	0.0	61.9	66	61.9	10	----	61.9	0.0	8	-8.0
101	104	1	0.0	57.9	66	57.9	10	----	57.9	0.0	8	-8.0
102	105	1	0.0	54.2	66	54.2	10	----	54.2	0.0	8	-8.0
103	106	1	0.0	50.8	66	50.8	10	----	50.8	0.0	8	-8.0
104	107	1	0.0	48.5	66	48.5	10	----	48.5	0.0	8	-8.0
105	108	1	0.0	46.8	66	46.8	10	----	46.8	0.0	8	-8.0

106	109	1	0.0	45.7	66	45.7	10	----	45.7	0.0	8	-8.0
107	110	1	0.0	45.1	66	45.1	10	----	45.1	0.0	8	-8.0
108	111	1	0.0	44.7	66	44.7	10	----	44.7	0.0	8	-8.0

Dwelling Units	# DUs	Noise Reduction		
		Min	**Avg**	**Max**
		dB	**dB**	**dB**
All Selected	109	0.0	0.0	0.0
All Impacted	0	0.0	0.0	0.0
All that meet NR Goal	0	0.0	0.0	0.0

Eilar Associates, Inc. 28 August 2016
AH TNM 2.5

INPUT: ROADWAYS
PROJECT/CONTRACT: B60611N1 Shady Oak
RUN: Future Contours

Average pavement type shall be used unless a State highway agency substantiates the use of a different type with the approval of FHWA

Roadway Name	Width	Points Name	No.	Coordinates (pavement) X	Y	Z	Flow Control Control Device	Speed Constraint	Percent Vehicles Affected	Segment Pvmt Type	On Struct?
	m			m	m	m		km/h	%		
WB Mirar de Valle	3.7	point1	1	-417.6	-336.5	0.00				Average	
		point88	88	-870.0	-339.1	0.00				Average	
		point2	2	-1,270.3	-341.7	0.00				Average	
		point3	3	-1,853.9	-327.5	0.00				Average	
		point4	4	-1,962.6	-376.7	0.00				Average	
		point5	5	-2,193.0	-401.2	0.00					
EB Mirar de Valle	3.7	point6	6	-2,194.3	-411.9	0.00				Average	
		point7	7	-1,954.5	-387.8	0.00				Average	
		point8	8	-1,841.8	-335.3	0.00				Average	
		point9	9	-1,504.3	-342.2	0.00				Average	
		point10	10	-1,070.5	-345.2	0.00				Average	
		point89	89	-870.0	-343.7	0.00				Average	
		point11	11	-779.5	-342.2	0.00				Average	
		point12	12	-415.9	-343.9	0.00					
Woods Valley Rd	7.3	point13	13	-351.1	-884.9	0.00				Average	
		point14	14	144.9	-723.9	0.00				Average	
		point15	15	248.5	-757.2	0.00				Average	
		point16	16	326.3	-829.4	0.00				Average	
		point17	17	411.4	-973.7	0.00				Average	
		point18	18	487.3	-1,025.5	0.00				Average	
		point19	19	578.0	-1,038.5	0.00				Average	
		point20	20	1,582.9	-958.9	0.00				Average	
		point21	21	1,732.8	-925.6	0.00				Average	
		point22	22	1,975.2	-1,038.5	0.00					
NB Valley Center	7.3	point32	32	-159.7	-1,847.5	0.00				Average	

		point33	33	-139.3	-1,616.1	0.00				Average	
		point34	34	-146.7	-1,540.3	0.00				Average	
		point35	35	-204.1	-1,325.6	0.00				Average	
		point36	36	-331.8	-1,018.4	0.00				Average	
		point37	37	-365.1	-870.3	0.00				Average	
		point38	38	-385.5	-726.0	0.00				Average	
		point39	39	-389.2	117.9	0.00				Average	
		point40	40	-392.9	408.5	0.00				Average	
		point41	41	-404.0	462.1	0.00				Average	
		point42	42	-453.9	552.8	0.00				Average	
		point43	43	-663.1	854.5	0.00				Average	
		point44	44	-722.3	993.3	0.00				Average	
		point45	45	-738.9	1,163.5	0.00				Average	
		point46	46	-722.3	1,470.7	0.00				Average	
		point47	47	-700.1	1,570.7	0.00				Average	
		point48	48	-613.1	1,670.6	0.00				Average	
		point49	49	-500.2	1,731.7	0.00					
SB Valley Center	7.3	point68	68	-578.8	1,721.8	0.00				Average	
		point69	69	-671.9	1,655.7	0.00				Average	
		point70	70	-733.2	1,552.7	0.00				Average	
		point71	71	-762.6	1,302.8	0.00				Average	
		point72	72	-767.5	1,197.4	0.00				Average	
		point73	73	-745.4	1,013.6	0.00				Average	
		point74	74	-689.1	856.8	0.00				Average	
		point75	75	-625.4	753.8	0.00				Average	
		point76	76	-456.3	525.9	0.00				Average	
		point77	77	-409.7	435.3	0.00				Average	
		point78	78	-409.7	120.9	0.00				Average	
		point79	79	-409.7	-131.7	0.00				Average	
		point80	80	-409.7	-677.0	0.00				Average	
		point81	81	-408.8	-735.0	0.00				Average	
		point82	82	-347.2	-1,042.0	0.00				Average	
		point83	83	-218.7	-1,349.0	0.00				Average	
		point84	84	-157.6	-1,598.4	0.00				Average	
		point85	85	-205.7	-1,838.9	0.00					
New Road 19	3.7	point86	86	-870.4	-337.6	0.00				Average	
		point87	87	-879.4	833.4	0.00					

Eilar Associates, Inc. **28 August 2016**
AH **TNM 2.5**

INPUT: TRAFFIC FOR LAeq1h Volumes
PROJECT/CONTRACT: **B60611N1 Shady Oak**
RUN: **Future Contours**

Roadway	Points		Segment									
Name	Name	No.	Autos		MTrucks		HTrucks		Buses		Motorcycles	
			V	S	V	S	V	S	V	S	V	S
			veh/hr	km/h	veh/hr	km/h	veh/hr	km/h	veh/hr	km/h	veh/hr	km/h
WB Mirar de Valle	point1	1	191	72	4	72	2	72	0	0	0	0
	point88	88	771	72	16	72	8	72	0	0	0	0
	point2	2	771	72	16	72	8	72	0	0	0	0
	point3	3	771	72	16	72	8	72	0	0	0	0
	point4	4	771	72	16	72	8	72	0	0	0	0
	point5	5										
EB Mirar de Valle	point6	6	771	72	16	72	8	72	0	0	0	0
	point7	7	771	72	16	72	8	72	0	0	0	0
	point8	8	771	72	16	72	8	72	0	0	0	0
	point9	9	771	72	16	72	8	72	0	0	0	0
	point10	10	771	72	16	72	8	72	0	0	0	0
	point89	89	191	72	4	72	2	72	0	0	0	0
	point11	11	191	72	4	72	2	72	0	0	0	0
	point12	12										
Woods Valley Rd	point13	13	844	72	17	72	9	72	0	0	0	0
	point14	14	844	72	17	72	9	72	0	0	0	0
	point15	15	844	72	17	72	9	72	0	0	0	0
	point16	16	844	72	17	72	9	72	0	0	0	0
	point17	17	844	72	17	72	9	72	0	0	0	0
	point18	18	844	72	17	72	9	72	0	0	0	0
	point19	19	844	72	17	72	9	72	0	0	0	0
	point20	20	844	72	17	72	9	72	0	0	0	0
	point21	21	844	72	17	72	9	72	0	0	0	0

	point22	22										
NB Valley Center	point32	32	462	89	10	89	10	89	0	0	0	0
	point33	33	462	89	10	89	10	89	0	0	0	0
	point34	34	462	89	10	89	10	89	0	0	0	0
	point35	35	462	89	10	89	10	89	0	0	0	0
	point36	36	462	89	10	89	10	89	0	0	0	0
	point37	37	462	89	10	89	10	89	0	0	0	0
	point38	38	462	89	10	89	10	89	0	0	0	0
	point39	39	462	89	10	89	10	89	0	0	0	0
	point40	40	462	89	10	89	10	89	0	0	0	0
	point41	41	462	89	10	89	10	89	0	0	0	0
	point42	42	462	89	10	89	10	89	0	0	0	0
	point43	43	462	89	10	89	10	89	0	0	0	0
	point44	44	462	89	10	89	10	89	0	0	0	0
	point45	45	462	89	10	89	10	89	0	0	0	0
	point46	46	462	89	10	89	10	89	0	0	0	0
	point47	47	462	89	10	89	10	89	0	0	0	0
	point48	48	462	89	10	89	10	89	0	0	0	0
	point49	49										
SB Valley Center	point68	68	462	89	10	89	10	89	0	0	0	0
	point69	69	462	89	10	89	10	89	0	0	0	0
	point70	70	462	89	10	89	10	89	0	0	0	0
	point71	71	462	89	10	89	10	89	0	0	0	0
	point72	72	462	89	10	89	10	89	0	0	0	0
	point73	73	462	89	10	89	10	89	0	0	0	0
	point74	74	462	89	10	89	10	89	0	0	0	0
	point75	75	462	89	10	89	10	89	0	0	0	0
	point76	76	462	89	10	89	10	89	0	0	0	0
	point77	77	462	89	10	89	10	89	0	0	0	0
	point78	78	462	89	10	89	10	89	0	0	0	0
	point79	79	462	89	10	89	10	89	0	0	0	0
	point80	80	462	89	10	89	10	89	0	0	0	0
	point81	81	462	89	10	89	10	89	0	0	0	0
	point82	82	462	89	10	89	10	89	0	0	0	0
	point83	83	462	89	10	89	10	89	0	0	0	0
	point84	84	462	89	10	89	10	89	0	0	0	0

	point85	85										
New Road 19	point86	86	1468	64	30	64	15	64	0	0	0	0
	point87	87										

Eilar Associates, Inc.
AH
28 August 2016
TNM 2.5
Calculated with TNM 2.5

RESULTS: SOUND LEVELS
PROJECT/CONTRACT: B60611N1 Shady Oak
RUN: Future Contours
BARRIER DESIGN: INPUT HEIGHTS
ATMOSPHERICS: 20 deg C, 50% RH

Average pavement type shall be used unless a State highway agency substantiates the use of a different type with approval of FHWA.

Receiver Name	No.	#DUs	Existing LAeq1h	No Barrier LAeq1h Calculated	Crit'n	Increase over existing Calculated	Crit'n Sub'l Inc	Type Impact	With Barrier Calculated LAeq1h	Noise Reduction Calculated	Goal	Calculated minus Goal
			dBA	dBA	dBA	dB	dB		dBA	dB	dB	dB
Calibration	1	1	0.0	68.0	66	68.0	10	Snd Lvl	68.0	0.0	8	-8.0
1	3	1	0.0	67.7	66	67.7	10	Snd Lvl	67.7	0.0	8	-8.0
2	4	1	0.0	63.7	66	63.7	10	----	63.7	0.0	8	-8.0
3	5	1	0.0	60.2	66	60.2	10	----	60.2	0.0	8	-8.0
4	6	1	0.0	56.4	66	56.4	10	----	56.4	0.0	8	-8.0
5	7	1	0.0	54.8	66	54.8	10	----	54.8	0.0	8	-8.0
6	8	1	0.0	53.5	66	53.5	10	----	53.5	0.0	8	-8.0
7	9	1	0.0	52.4	66	52.4	10	----	52.4	0.0	8	-8.0
8	10	1	0.0	51.7	66	51.7	10	----	51.7	0.0	8	-8.0
9	11	1	0.0	51.2	66	51.2	10	----	51.2	0.0	8	-8.0
10	12	1	0.0	67.8	66	67.8	10	Snd Lvl	67.8	0.0	8	-8.0
11	13	1	0.0	63.7	66	63.7	10	----	63.7	0.0	8	-8.0
12	14	1	0.0	60.0	66	60.0	10	----	60.0	0.0	8	-8.0
13	15	1	0.0	56.4	66	56.4	10	----	56.4	0.0	8	-8.0
14	16	1	0.0	54.9	66	54.9	10	----	54.9	0.0	8	-8.0
15	17	1	0.0	53.3	66	53.3	10	----	53.3	0.0	8	-8.0
16	18	1	0.0	52.3	66	52.3	10	----	52.3	0.0	8	-8.0
17	19	1	0.0	51.6	66	51.6	10	----	51.6	0.0	8	-8.0
18	20	1	0.0	51.1	66	51.1	10	----	51.1	0.0	8	-8.0
19	21	1	0.0	67.8	66	67.8	10	Snd Lvl	67.8	0.0	8	-8.0
20	22	1	0.0	63.8	66	63.8	10	----	63.8	0.0	8	-8.0
21	23	1	0.0	60.2	66	60.2	10	----	60.2	0.0	8	-8.0
22	24	1	0.0	56.5	66	56.5	10	----	56.5	0.0	8	-8.0
23	25	1	0.0	54.8	66	54.8	10	----	54.8	0.0	8	-8.0

24	26	1	0.0	53.3	66	53.3	10	----	53.3	0.0	8	-8.0
25	27	1	0.0	52.2	66	52.2	10	----	52.2	0.0	8	-8.0
26	28	1	0.0	51.5	66	51.5	10	----	51.5	0.0	8	-8.0
27	29	1	0.0	51.0	66	51.0	10	----	51.0	0.0	8	-8.0
28	30	1	0.0	67.6	66	67.6	10	Snd Lvl	67.6	0.0	8	-8.0
29	31	1	0.0	63.9	66	63.9	10	----	63.9	0.0	8	-8.0
30	32	1	0.0	60.1	66	60.1	10	----	60.1	0.0	8	-8.0
31	33	1	0.0	56.5	66	56.5	10	----	56.5	0.0	8	-8.0
32	34	1	0.0	54.9	66	54.9	10	----	54.9	0.0	8	-8.0
33	35	1	0.0	53.1	66	53.1	10	----	53.1	0.0	8	-8.0
34	36	1	0.0	52.0	66	52.0	10	----	52.0	0.0	8	-8.0
35	37	1	0.0	51.3	66	51.3	10	----	51.3	0.0	8	-8.0
36	38	1	0.0	50.8	66	50.8	10	----	50.8	0.0	8	-8.0
37	39	1	0.0	68.3	66	68.3	10	Snd Lvl	68.3	0.0	8	-8.0
38	40	1	0.0	63.6	66	63.6	10	----	63.6	0.0	8	-8.0
39	41	1	0.0	60.5	66	60.5	10	----	60.5	0.0	8	-8.0
40	42	1	0.0	56.6	66	56.6	10	----	56.6	0.0	8	-8.0
41	43	1	0.0	54.9	66	54.9	10	----	54.9	0.0	8	-8.0
42	44	1	0.0	53.1	66	53.1	10	----	53.1	0.0	8	-8.0
43	45	1	0.0	51.8	66	51.8	10	----	51.8	0.0	8	-8.0
44	46	1	0.0	51.1	66	51.1	10	----	51.1	0.0	8	-8.0
45	48	1	0.0	50.5	66	50.5	10	----	50.5	0.0	8	-8.0
46	49	1	0.0	68.2	66	68.2	10	Snd Lvl	68.2	0.0	8	-8.0
47	50	1	0.0	63.8	66	63.8	10	----	63.8	0.0	8	-8.0
48	51	1	0.0	60.1	66	60.1	10	----	60.1	0.0	8	-8.0
49	52	1	0.0	56.7	66	56.7	10	----	56.7	0.0	8	-8.0
50	53	1	0.0	54.8	66	54.8	10	----	54.8	0.0	8	-8.0
51	54	1	0.0	52.9	66	52.9	10	----	52.9	0.0	8	-8.0
52	55	1	0.0	51.6	66	51.6	10	----	51.6	0.0	8	-8.0
53	56	1	0.0	50.8	66	50.8	10	----	50.8	0.0	8	-8.0
54	57	1	0.0	50.2	66	50.2	10	----	50.2	0.0	8	-8.0
55	58	1	0.0	67.8	66	67.8	10	Snd Lvl	67.8	0.0	8	-8.0
56	59	1	0.0	64.2	66	64.2	10	----	64.2	0.0	8	-8.0
57	60	1	0.0	60.2	66	60.2	10	----	60.2	0.0	8	-8.0
58	61	1	0.0	56.7	66	56.7	10	----	56.7	0.0	8	-8.0
59	62	1	0.0	54.9	66	54.9	10	----	54.9	0.0	8	-8.0
60	63	1	0.0	52.8	66	52.8	10	----	52.8	0.0	8	-8.0
61	64	1	0.0	51.5	66	51.5	10	----	51.5	0.0	8	-8.0
62	65	1	0.0	50.5	66	50.5	10	----	50.5	0.0	8	-8.0
63	66	1	0.0	49.9	66	49.9	10	----	49.9	0.0	8	-8.0
64	67	1	0.0	68.0	66	68.0	10	Snd Lvl	68.0	0.0	8	-8.0

65	68	1	0.0	64.0	66	64.0	10	----	64.0	0.0	8	-8.0
66	69	1	0.0	60.6	66	60.6	10	----	60.6	0.0	8	-8.0
67	70	1	0.0	56.8	66	56.8	10	----	56.8	0.0	8	-8.0
68	71	1	0.0	54.9	66	54.9	10	----	54.9	0.0	8	-8.0
69	72	1	0.0	52.8	66	52.8	10	----	52.8	0.0	8	-8.0
70	73	1	0.0	51.4	66	51.4	10	----	51.4	0.0	8	-8.0
71	74	1	0.0	50.3	66	50.3	10	----	50.3	0.0	8	-8.0
72	75	1	0.0	49.7	66	49.7	10	----	49.7	0.0	8	-8.0
73	76	1	0.0	68.3	66	68.3	10	Snd Lvl	68.3	0.0	8	-8.0
74	77	1	0.0	64.2	66	64.2	10	----	64.2	0.0	8	-8.0
75	78	1	0.0	60.6	66	60.6	10	----	60.6	0.0	8	-8.0
76	79	1	0.0	56.9	66	56.9	10	----	56.9	0.0	8	-8.0
77	80	1	0.0	54.9	66	54.9	10	----	54.9	0.0	8	-8.0
78	81	1	0.0	52.7	66	52.7	10	----	52.7	0.0	8	-8.0
79	82	1	0.0	51.3	66	51.3	10	----	51.3	0.0	8	-8.0
80	83	1	0.0	50.2	66	50.2	10	----	50.2	0.0	8	-8.0
81	84	1	0.0	49.5	66	49.5	10	----	49.5	0.0	8	-8.0
82	85	1	0.0	68.8	66	68.8	10	Snd Lvl	68.8	0.0	8	-8.0
83	86	1	0.0	64.5	66	64.5	10	----	64.5	0.0	8	-8.0
84	87	1	0.0	60.8	66	60.8	10	----	60.8	0.0	8	-8.0
85	88	1	0.0	57.1	66	57.1	10	----	57.1	0.0	8	-8.0
86	89	1	0.0	54.9	66	54.9	10	----	54.9	0.0	8	-8.0
87	90	1	0.0	52.7	66	52.7	10	----	52.7	0.0	8	-8.0
88	91	1	0.0	51.3	66	51.3	10	----	51.3	0.0	8	-8.0
89	92	1	0.0	50.2	66	50.2	10	----	50.2	0.0	8	-8.0
90	93	1	0.0	49.3	66	49.3	10	----	49.3	0.0	8	-8.0
91	94	1	0.0	68.4	66	68.4	10	Snd Lvl	68.4	0.0	8	-8.0
92	95	1	0.0	64.3	66	64.3	10	----	64.3	0.0	8	-8.0
93	96	1	0.0	60.8	66	60.8	10	----	60.8	0.0	8	-8.0
94	97	1	0.0	57.2	66	57.2	10	----	57.2	0.0	8	-8.0
95	98	1	0.0	55.1	66	55.1	10	----	55.1	0.0	8	-8.0
96	99	1	0.0	52.8	66	52.8	10	----	52.8	0.0	8	-8.0
97	100	1	0.0	51.3	66	51.3	10	----	51.3	0.0	8	-8.0
98	101	1	0.0	50.1	66	50.1	10	----	50.1	0.0	8	-8.0
99	102	1	0.0	49.3	66	49.3	10	----	49.3	0.0	8	-8.0
100	103	1	0.0	68.6	66	68.6	10	Snd Lvl	68.6	0.0	8	-8.0
101	104	1	0.0	64.6	66	64.6	10	----	64.6	0.0	8	-8.0
102	105	1	0.0	60.9	66	60.9	10	----	60.9	0.0	8	-8.0
103	106	1	0.0	57.4	66	57.4	10	----	57.4	0.0	8	-8.0
104	107	1	0.0	55.1	66	55.1	10	----	55.1	0.0	8	-8.0
105	108	1	0.0	53.0	66	53.0	10	----	53.0	0.0	8	-8.0

106	109	1	0.0	51.2	66	51.2	10	----	51.2	0.0	8	-8.0
107	110	1	0.0	50.2	66	50.2	10	----	50.2	0.0	8	-8.0
108	111	1	0.0	49.3	66	49.3	10	----	49.3	0.0	8	-8.0

Dwelling Units	**# DUs**	**Noise Reduction**		
		Min	**Avg**	**Max**
		dB	**dB**	**dB**
All Selected	109	0.0	0.0	0.0
All Impacted	13	0.0	0.0	0.0
All that meet NR Goal	0	0.0	0.0	0.0

Eilar Associates, Inc. **28 August 2016**
AH **TNM 2.5**

INPUT: TRAFFIC FOR LAeq1h Volumes
PROJECT/CONTRACT: **B60611N1 Shady Oak**
RUN: **Worst-Case Lots**

Roadway	Points											
Name	Name	No.	Segment									
			Autos		MTrucks		HTrucks		Buses		Motorcycles	
			V	S	V	S	V	S	V	S	V	S
			veh/hr	km/h	veh/hr	km/h	veh/hr	km/h	veh/hr	km/h	veh/hr	km/h
WB Mirar de Valle	point1	1	191	72	4	72	2	72	0	0	0	0
	point88	88	771	72	16	72	8	72	0	0	0	0
	point2	2	771	72	16	72	8	72	0	0	0	0
	point3	3	771	72	16	72	8	72	0	0	0	0
	point4	4	771	72	16	72	8	72	0	0	0	0
	point5	5										
EB Mirar de Valle	point6	6	771	72	16	72	8	72	0	0	0	0
	point7	7	771	72	16	72	8	72	0	0	0	0
	point8	8	771	72	16	72	8	72	0	0	0	0
	point9	9	771	72	16	72	8	72	0	0	0	0
	point10	10	771	72	16	72	8	72	0	0	0	0
	point89	89	191	72	4	72	2	72	0	0	0	0
	point11	11	191	72	4	72	2	72	0	0	0	0
	point12	12										
Woods Valley Rd	point13	13	844	72	17	72	9	72	0	0	0	0
	point14	14	844	72	17	72	9	72	0	0	0	0
	point15	15	844	72	17	72	9	72	0	0	0	0
	point16	16	844	72	17	72	9	72	0	0	0	0
	point17	17	844	72	17	72	9	72	0	0	0	0
	point18	18	844	72	17	72	9	72	0	0	0	0
	point19	19	844	72	17	72	9	72	0	0	0	0
	point20	20	844	72	17	72	9	72	0	0	0	0
	point21	21	844	72	17	72	9	72	0	0	0	0

	point22	22										
NB Valley Center	point32	32	680	72	14	72	14	72	0	0	0	0
	point33	33	680	72	14	72	14	72	0	0	0	0
	point34	34	680	72	14	72	14	72	0	0	0	0
	point35	35	680	72	14	72	14	72	0	0	0	0
	point36	36	680	72	14	72	14	72	0	0	0	0
	point37	37	680	72	14	72	14	72	0	0	0	0
	point38	38	680	72	14	72	14	72	0	0	0	0
	point39	39	680	72	14	72	14	72	0	0	0	0
	point40	40	680	72	14	72	14	72	0	0	0	0
	point41	41	680	72	14	72	14	72	0	0	0	0
	point42	42	680	72	14	72	14	72	0	0	0	0
	point43	43	680	72	14	72	14	72	0	0	0	0
	point44	44	680	72	14	72	14	72	0	0	0	0
	point45	45	680	72	14	72	14	72	0	0	0	0
	point46	46	680	72	14	72	14	72	0	0	0	0
	point47	47	680	72	14	72	14	72	0	0	0	0
	point48	48	680	72	14	72	14	72	0	0	0	0
	point49	49										
SB Valley Center	point68	68	680	72	14	72	14	72	0	0	0	0
	point69	69	680	72	14	72	14	72	0	0	0	0
	point70	70	680	72	14	72	14	72	0	0	0	0
	point71	71	680	72	14	72	14	72	0	0	0	0
	point72	72	680	72	14	72	14	72	0	0	0	0
	point73	73	680	72	14	72	14	72	0	0	0	0
	point74	74	680	72	14	72	14	72	0	0	0	0
	point75	75	680	72	14	72	14	72	0	0	0	0
	point76	76	680	72	14	72	14	72	0	0	0	0
	point77	77	680	72	14	72	14	72	0	0	0	0
	point78	78	680	72	14	72	14	72	0	0	0	0
	point79	79	680	72	14	72	14	72	0	0	0	0
	point80	80	680	72	14	72	14	72	0	0	0	0
	point81	81	680	72	14	72	14	72	0	0	0	0
	point82	82	680	72	14	72	14	72	0	0	0	0
	point83	83	680	72	14	72	14	72	0	0	0	0
	point84	84	680	72	14	72	14	72	0	0	0	0

	point85	85										
New Road 19	point86	86	1468	64	30	64	15	64	0	0	0	0
	point87	87										

Eilar Associates, Inc. 9 January 2017
AH TNM 2.5

INPUT: RECEIVERS
PROJECT/CONTRACT: B60611N1 Shady Oak
RUN: Worst-Case Lots

Receiver Name	No.	#DUs	Coordinates (ground) X	Y	Z	Height above Ground	Input Sound Levels and Criteria: Existing LAeq1h	Impact Criteria LAeq1h	Impact Criteria Sub'l	NR Goal	Active in Calc.
			m	m	m	m	dBA	dBA	dB	dB	
Calibration	1	1	-614.4	-346.6	0.00	1.52	0.00	66	10.0	8.0	Y
R1	3	1	-723.0	-453.5	0.00	1.52	0.00	66	10.0	8.0	Y
R2	4	1	-723.1	-438.2	0.00	1.52	0.00	66	10.0	8.0	Y
R3	5	1	-723.1	-422.7	0.00	1.52	0.00	66	10.0	8.0	Y
R4	6	1	-723.0	-406.8	0.00	1.52	0.00	66	10.0	8.0	Y
R5	7	1	-722.6	-391.3	0.00	1.52	0.00	66	10.0	8.0	Y
R6	8	1	-722.0	-375.3	0.00	1.52	0.00	66	10.0	8.0	Y
R7	9	1	-721.9	-358.7	0.00	1.52	0.00	66	10.0	8.0	Y
R8	10	1	-688.0	-453.6	0.00	1.52	0.00	66	10.0	8.0	Y
R9	11	1	-688.0	-437.8	0.00	1.52	0.00	66	10.0	8.0	Y
R10	12	1	-687.9	-422.3	0.00	1.52	0.00	66	10.0	8.0	Y
R11	13	1	-687.7	-393.5	0.00	1.52	0.00	66	10.0	8.0	Y
R12	14	1	-686.7	-377.3	0.00	1.52	0.00	66	10.0	8.0	Y
R13	15	1	-687.1	-361.4	0.00	1.52	0.00	66	10.0	8.0	Y
R14	16	1	-684.2	-453.5	0.00	1.52	0.00	66	10.0	8.0	Y
R15	17	1	-684.0	-437.8	0.00	1.52	0.00	66	10.0	8.0	Y
R16	18	1	-684.3	-422.3	0.00	1.52	0.00	66	10.0	8.0	Y
R17	19	1	-683.2	-393.6	0.00	1.52	0.00	66	10.0	8.0	Y
R18	20	1	-683.3	-377.1	0.00	1.52	0.00	66	10.0	8.0	Y
R19	21	1	-682.9	-361.5	0.00	1.52	0.00	66	10.0	8.0	Y
R20	22	1	-649.2	-454.1	0.00	1.52	0.00	66	10.0	8.0	Y
R21	23	1	-648.9	-438.8	0.00	1.52	0.00	66	10.0	8.0	Y

R22	24	1	-648.9	-422.7	0.00	1.52	0.00	66	10.0	8.0	Y
R23	25	1	-648.4	-393.5	0.00	1.52	0.00	66	10.0	8.0	Y
R24	26	1	-648.2	-377.0	0.00	1.52	0.00	66	10.0	8.0	Y
R25	27	1	-647.9	-361.8	0.00	1.52	0.00	66	10.0	8.0	Y
R26	28	1	-645.8	-454.2	0.00	1.52	0.00	66	10.0	8.0	Y
R27	29	1	-645.3	-438.7	0.00	1.52	0.00	66	10.0	8.0	Y
R28	30	1	-645.0	-422.8	0.00	1.52	0.00	66	10.0	8.0	Y
R29	31	1	-644.7	-393.4	0.00	1.52	0.00	66	10.0	8.0	Y
R30	32	1	-644.5	-376.7	0.00	1.52	0.00	66	10.0	8.0	Y
R31	33	1	-644.1	-361.9	0.00	1.52	0.00	66	10.0	8.0	Y
R32	34	1	-610.5	-454.9	0.00	1.52	0.00	66	10.0	8.0	Y
R33	35	1	-610.1	-438.9	0.00	1.52	0.00	66	10.0	8.0	Y
R34	36	1	-610.0	-422.3	0.00	1.52	0.00	66	10.0	8.0	Y
R35	37	1	-609.0	-393.5	0.00	1.52	0.00	66	10.0	8.0	Y
R36	38	1	-609.1	-378.1	0.00	1.52	0.00	66	10.0	8.0	Y
R37	39	1	-608.6	-362.3	0.00	1.52	0.00	66	10.0	8.0	Y
R38	40	1	-601.1	-461.2	0.00	1.52	0.00	66	10.0	8.0	Y
R39	41	1	-592.5	-429.9	0.00	1.52	0.00	66	10.0	8.0	Y
R40	42	1	-605.4	-393.1	0.00	1.52	0.00	66	10.0	8.0	Y
R41	43	1	-605.5	-377.9	0.00	1.52	0.00	66	10.0	8.0	Y
R42	44	1	-605.2	-362.1	0.00	1.52	0.00	66	10.0	8.0	Y
R43	45	1	-586.0	-461.4	0.00	1.52	0.00	66	10.0	8.0	Y
R44	46	1	-570.2	-438.6	0.00	1.52	0.00	66	10.0	8.0	Y
R45	48	1	-570.8	-423.5	0.00	1.52	0.00	66	10.0	8.0	Y
R46	49	1	-569.5	-394.1	0.00	1.52	0.00	66	10.0	8.0	Y
R47	50	1	-569.9	-378.4	0.00	1.52	0.00	66	10.0	8.0	Y
R48	51	1	-569.1	-362.3	0.00	1.52	0.00	66	10.0	8.0	Y
2nd-1	52	1	-723.0	-453.5	0.00	4.57	0.00	66	10.0	8.0	Y
2nd-2	53	1	-723.1	-438.2	0.00	4.57	0.00	66	10.0	8.0	Y
2nd-3	54	1	-723.1	-422.7	0.00	4.57	0.00	66	10.0	8.0	Y
2nd-4	55	1	-723.0	-406.8	0.00	4.57	0.00	66	10.0	8.0	Y
2nd-5	56	1	-722.6	-391.3	0.00	4.57	0.00	66	10.0	8.0	Y
2nd-6	57	1	-722.0	-375.3	0.00	4.57	0.00	66	10.0	8.0	Y
2nd-7	58	1	-721.9	-358.7	0.00	4.57	0.00	66	10.0	8.0	Y
2nd-8	59	1	-688.0	-453.6	0.00	4.57	0.00	66	10.0	8.0	Y
2nd-9	60	1	-688.0	-437.8	0.00	4.57	0.00	66	10.0	8.0	Y

2nd-10	61	1	-687.9	-422.3	0.00	4.57	0.00	66	10.0	8.0	Y
2nd-11	62	1	-687.7	-393.5	0.00	4.57	0.00	66	10.0	8.0	Y
2nd-12	63	1	-686.7	-377.3	0.00	4.57	0.00	66	10.0	8.0	Y
2nd-13	64	1	-687.1	-361.4	0.00	4.57	0.00	66	10.0	8.0	Y
2nd-14	65	1	-684.2	-453.5	0.00	4.57	0.00	66	10.0	8.0	Y
2nd-15	66	1	-684.0	-437.8	0.00	4.57	0.00	66	10.0	8.0	Y
2nd-16	67	1	-684.3	-422.3	0.00	4.57	0.00	66	10.0	8.0	Y
2nd-17	68	1	-683.2	-393.6	0.00	4.57	0.00	66	10.0	8.0	Y
2nd-18	69	1	-683.3	-377.1	0.00	4.57	0.00	66	10.0	8.0	Y
2nd-19	70	1	-682.9	-361.5	0.00	4.57	0.00	66	10.0	8.0	Y
2nd-20	71	1	-649.2	-454.1	0.00	4.57	0.00	66	10.0	8.0	Y
2nd-21	72	1	-648.9	-438.8	0.00	4.57	0.00	66	10.0	8.0	Y
2nd-22	73	1	-648.9	-422.7	0.00	4.57	0.00	66	10.0	8.0	Y
2nd-23	74	1	-648.4	-393.5	0.00	4.57	0.00	66	10.0	8.0	Y
2nd-24	75	1	-648.2	-377.0	0.00	4.57	0.00	66	10.0	8.0	Y
2nd-25	76	1	-647.9	-361.8	0.00	4.57	0.00	66	10.0	8.0	Y
2nd-26	77	1	-645.8	-454.2	0.00	4.57	0.00	66	10.0	8.0	Y
2nd-27	78	1	-645.3	-438.7	0.00	4.57	0.00	66	10.0	8.0	Y
2nd-28	79	1	-645.0	-422.8	0.00	4.57	0.00	66	10.0	8.0	Y
2nd-29	80	1	-644.7	-393.4	0.00	4.57	0.00	66	10.0	8.0	Y
2nd-30	81	1	-644.5	-376.7	0.00	4.57	0.00	66	10.0	8.0	Y
2nd-31	82	1	-644.1	-361.9	0.00	4.57	0.00	66	10.0	8.0	Y
2nd-32	83	1	-610.5	-454.9	0.00	4.57	0.00	66	10.0	8.0	Y
2nd-33	84	1	-610.1	-438.9	0.00	4.57	0.00	66	10.0	8.0	Y
2nd-34	85	1	-610.0	-422.3	0.00	4.57	0.00	66	10.0	8.0	Y
2nd-35	86	1	-609.0	-393.5	0.00	4.57	0.00	66	10.0	8.0	Y
2nd-36	87	1	-609.1	-378.1	0.00	4.57	0.00	66	10.0	8.0	Y
2nd-37	88	1	-608.6	-362.3	0.00	4.57	0.00	66	10.0	8.0	Y
2nd-38	89	1	-601.1	-461.2	0.00	4.57	0.00	66	10.0	8.0	Y
2nd-39	90	1	-592.5	-429.9	0.00	4.57	0.00	66	10.0	8.0	Y
2nd-40	91	1	-605.4	-393.1	0.00	4.57	0.00	66	10.0	8.0	Y
2nd-41	92	1	-605.5	-377.9	0.00	4.57	0.00	66	10.0	8.0	Y
2nd-42	93	1	-605.2	-362.1	0.00	4.57	0.00	66	10.0	8.0	Y
2nd-43	94	1	-586.0	-461.4	0.00	4.57	0.00	66	10.0	8.0	Y
2nd-44	95	1	-570.2	-438.6	0.00	4.57	0.00	66	10.0	8.0	Y
2nd-45	96	1	-570.8	-423.5	0.00	4.57	0.00	66	10.0	8.0	Y

2nd-46	97	1	-569.5	-394.1	0.00	4.57	0.00	66	10.0	8.0	Y
2nd-47	98	1	-569.9	-378.4	0.00	4.57	0.00	66	10.0	8.0	Y
2nd-48	99	1	-569.1	-362.3	0.00	4.57	0.00	66	10.0	8.0	Y

Eilar Associates, Inc.
AH
9 January 2017
TNM 2.5
Calculated with TNM 2.5

RESULTS: SOUND LEVELS
PROJECT/CONTRACT: B60611N1 Shady Oak
RUN: Worst-Case Lots
BARRIER DESIGN: INPUT HEIGHTS
ATMOSPHERICS: 20 deg C, 50% RH

Average pavement type shall be used unless a State highway agency substantiates the use of a different type with approval of FHWA.

Receiver Name	No.	#DUs	Existing LAeq1h	No Barrier LAeq1h Calculated	Crit'n	Increase over existing Calculated	Crit'n Sub'l Inc	Type Impact	With Barrier Calculated LAeq1h	Noise Reduction Calculated	Goal	Calculated minus Goal
			dBA	dBA	dBA	dB	dB		dBA	dB	dB	dB
Calibration	1	1	0.0	68.0	66	68.0	10	Snd Lvl	68.0	0.0	8	-8.0
R1	3	1	0.0	49.4	66	49.4	10	----	49.4	0.0	8	-8.0
R2	4	1	0.0	50.2	66	50.2	10	----	50.2	0.0	8	-8.0
R3	5	1	0.0	51.4	66	51.4	10	----	51.4	0.0	8	-8.0
R4	6	1	0.0	53.0	66	53.0	10	----	53.0	0.0	8	-8.0
R5	7	1	0.0	55.2	66	55.2	10	----	55.2	0.0	8	-8.0
R6	8	1	0.0	57.5	66	57.5	10	----	57.5	0.0	8	-8.0
R7	9	1	0.0	61.9	66	61.9	10	----	61.9	0.0	8	-8.0
R8	10	1	0.0	49.4	66	49.4	10	----	49.4	0.0	8	-8.0
R9	11	1	0.0	50.2	66	50.2	10	----	50.2	0.0	8	-8.0
R10	12	1	0.0	51.3	66	51.3	10	----	51.3	0.0	8	-8.0
R11	13	1	0.0	54.7	66	54.7	10	----	54.7	0.0	8	-8.0
R12	14	1	0.0	56.9	66	56.9	10	----	56.9	0.0	8	-8.0
R13	15	1	0.0	60.6	66	60.6	10	----	60.6	0.0	8	-8.0
R14	16	1	0.0	49.4	66	49.4	10	----	49.4	0.0	8	-8.0
R15	17	1	0.0	50.2	66	50.2	10	----	50.2	0.0	8	-8.0
R16	18	1	0.0	51.3	66	51.3	10	----	51.3	0.0	8	-8.0
R17	19	1	0.0	54.7	66	54.7	10	----	54.7	0.0	8	-8.0
R18	20	1	0.0	56.9	66	56.9	10	----	56.9	0.0	8	-8.0
R19	21	1	0.0	60.6	66	60.6	10	----	60.6	0.0	8	-8.0
R20	22	1	0.0	49.7	66	49.7	10	----	49.7	0.0	8	-8.0
R21	23	1	0.0	50.4	66	50.4	10	----	50.4	0.0	8	-8.0
R22	24	1	0.0	51.4	66	51.4	10	----	51.4	0.0	8	-8.0
R23	25	1	0.0	54.7	66	54.7	10	----	54.7	0.0	8	-8.0

R24	26	1	0.0	56.8	66	56.8	10	----	56.8	0.0	8	-8.0
R25	27	1	0.0	60.3	66	60.3	10	----	60.3	0.0	8	-8.0
R26	28	1	0.0	49.8	66	49.8	10	----	49.8	0.0	8	-8.0
R27	29	1	0.0	50.5	66	50.5	10	----	50.5	0.0	8	-8.0
R28	30	1	0.0	51.4	66	51.4	10	----	51.4	0.0	8	-8.0
R29	31	1	0.0	54.7	66	54.7	10	----	54.7	0.0	8	-8.0
R30	32	1	0.0	56.8	66	56.8	10	----	56.8	0.0	8	-8.0
R31	33	1	0.0	60.3	66	60.3	10	----	60.3	0.0	8	-8.0
R32	34	1	0.0	50.3	66	50.3	10	----	50.3	0.0	8	-8.0
R33	35	1	0.0	50.9	66	50.9	10	----	50.9	0.0	8	-8.0
R34	36	1	0.0	51.8	66	51.8	10	----	51.8	0.0	8	-8.0
R35	37	1	0.0	54.7	66	54.7	10	----	54.7	0.0	8	-8.0
R36	38	1	0.0	56.4	66	56.4	10	----	56.4	0.0	8	-8.0
R37	39	1	0.0	60.1	66	60.1	10	----	60.1	0.0	8	-8.0
R38	40	1	0.0	50.3	66	50.3	10	----	50.3	0.0	8	-8.0
R39	41	1	0.0	51.6	66	51.6	10	----	51.6	0.0	8	-8.0
R40	42	1	0.0	54.7	66	54.7	10	----	54.7	0.0	8	-8.0
R41	43	1	0.0	56.4	66	56.4	10	----	56.4	0.0	8	-8.0
R42	44	1	0.0	60.2	66	60.2	10	----	60.2	0.0	8	-8.0
R43	45	1	0.0	50.5	66	50.5	10	----	50.5	0.0	8	-8.0
R44	46	1	0.0	51.4	66	51.4	10	----	51.4	0.0	8	-8.0
R45	48	1	0.0	52.1	66	52.1	10	----	52.1	0.0	8	-8.0
R46	49	1	0.0	54.7	66	54.7	10	----	54.7	0.0	8	-8.0
R47	50	1	0.0	56.3	66	56.3	10	----	56.3	0.0	8	-8.0
R48	51	1	0.0	60.2	66	60.2	10	----	60.2	0.0	8	-8.0
2nd-1	52	1	0.0	53.2	66	53.2	10	----	53.2	0.0	8	-8.0
2nd-2	53	1	0.0	53.8	66	53.8	10	----	53.8	0.0	8	-8.0
2nd-3	54	1	0.0	54.8	66	54.8	10	----	54.8	0.0	8	-8.0
2nd-4	55	1	0.0	56.0	66	56.0	10	----	56.0	0.0	8	-8.0
2nd-5	56	1	0.0	57.9	66	57.9	10	----	57.9	0.0	8	-8.0
2nd-6	57	1	0.0	60.2	66	60.2	10	----	60.2	0.0	8	-8.0
2nd-7	58	1	0.0	62.8	66	62.8	10	----	62.8	0.0	8	-8.0
2nd-8	59	1	0.0	53.0	66	53.0	10	----	53.0	0.0	8	-8.0
2nd-9	60	1	0.0	53.7	66	53.7	10	----	53.7	0.0	8	-8.0
2nd-10	61	1	0.0	54.5	66	54.5	10	----	54.5	0.0	8	-8.0
2nd-11	62	1	0.0	57.3	66	57.3	10	----	57.3	0.0	8	-8.0
2nd-12	63	1	0.0	59.8	66	59.8	10	----	59.8	0.0	8	-8.0
2nd-13	64	1	0.0	62.2	66	62.2	10	----	62.2	0.0	8	-8.0
2nd-14	65	1	0.0	53.0	66	53.0	10	----	53.0	0.0	8	-8.0
2nd-15	66	1	0.0	53.7	66	53.7	10	----	53.7	0.0	8	-8.0
2nd-16	67	1	0.0	54.5	66	54.5	10	----	54.5	0.0	8	-8.0

2nd-17	68	1	0.0	57.3	66	57.3	10	----	57.3	0.0	8	-8.0
2nd-18	69	1	0.0	59.8	66	59.8	10	----	59.8	0.0	8	-8.0
2nd-19	70	1	0.0	62.2	66	62.2	10	----	62.2	0.0	8	-8.0
2nd-20	71	1	0.0	53.2	66	53.2	10	----	53.2	0.0	8	-8.0
2nd-21	72	1	0.0	53.7	66	53.7	10	----	53.7	0.0	8	-8.0
2nd-22	73	1	0.0	54.5	66	54.5	10	----	54.5	0.0	8	-8.0
2nd-23	74	1	0.0	57.3	66	57.3	10	----	57.3	0.0	8	-8.0
2nd-24	75	1	0.0	59.8	66	59.8	10	----	59.8	0.0	8	-8.0
2nd-25	76	1	0.0	62.1	66	62.1	10	----	62.1	0.0	8	-8.0
2nd-26	77	1	0.0	53.2	66	53.2	10	----	53.2	0.0	8	-8.0
2nd-27	78	1	0.0	53.7	66	53.7	10	----	53.7	0.0	8	-8.0
2nd-28	79	1	0.0	54.5	66	54.5	10	----	54.5	0.0	8	-8.0
2nd-29	80	1	0.0	57.3	66	57.3	10	----	57.3	0.0	8	-8.0
2nd-30	81	1	0.0	59.8	66	59.8	10	----	59.8	0.0	8	-8.0
2nd-31	82	1	0.0	62.1	66	62.1	10	----	62.1	0.0	8	-8.0
2nd-32	83	1	0.0	53.6	66	53.6	10	----	53.6	0.0	8	-8.0
2nd-33	84	1	0.0	54.1	66	54.1	10	----	54.1	0.0	8	-8.0
2nd-34	85	1	0.0	54.8	66	54.8	10	----	54.8	0.0	8	-8.0
2nd-35	86	1	0.0	57.5	66	57.5	10	----	57.5	0.0	8	-8.0
2nd-36	87	1	0.0	59.7	66	59.7	10	----	59.7	0.0	8	-8.0
2nd-37	88	1	0.0	62.1	66	62.1	10	----	62.1	0.0	8	-8.0
2nd-38	89	1	0.0	53.7	66	53.7	10	----	53.7	0.0	8	-8.0
2nd-39	90	1	0.0	54.8	66	54.8	10	----	54.8	0.0	8	-8.0
2nd-40	91	1	0.0	57.5	66	57.5	10	----	57.5	0.0	8	-8.0
2nd-41	92	1	0.0	59.8	66	59.8	10	----	59.8	0.0	8	-8.0
2nd-42	93	1	0.0	62.1	66	62.1	10	----	62.1	0.0	8	-8.0
2nd-43	94	1	0.0	54.1	66	54.1	10	----	54.1	0.0	8	-8.0
2nd-44	95	1	0.0	55.1	66	55.1	10	----	55.1	0.0	8	-8.0
2nd-45	96	1	0.0	55.6	66	55.6	10	----	55.6	0.0	8	-8.0
2nd-46	97	1	0.0	57.9	66	57.9	10	----	57.9	0.0	8	-8.0
2nd-47	98	1	0.0	60.0	66	60.0	10	----	60.0	0.0	8	-8.0
2nd-48	99	1	0.0	62.2	66	62.2	10	----	62.2	0.0	8	-8.0

Dwelling Units	**# DUs**	**Noise Reduction**		
		Min	**Avg**	**Max**
		dB	**dB**	**dB**
All Selected	97	0.0	0.0	0.0
All Impacted	1	0.0	0.0	0.0
All that meet NR Goal	0	0.0	0.0	0.0

Eilar Associates, Inc. **28 August 2016**
AH **TNM 2.5**

INPUT: BARRIERS
PROJECT/CONTRACT: **B60611N1 Shady Oak**
RUN: **Worst-Case Lots-Mitigated**

Barrier									Points										
Name	Type	Height		If Wall	If Berm			Add'tnl	Name	No.	Coordinates (bottom)			Height	Segment				
		Min	Max	$ per	$ per	Top	Run:Rise	$ per			X	Y	Z	at	Seg Ht Perturbs			On	Important
				Unit	Unit	Width		Unit						Point	Incre-	#Up	#Dn	Struct?	Reflec-
				Area	Vol.			Length							ment				tions?
		m	m	$/sq m	$/cu m	m	m:m	$/m			m	m	m	m	m				
Barrier1	W	0.00	30.48	0.00				0.00	point1	1	-724.0	-366.6	0.00	1.83	0.00	0	0		
									point3	3	-724.0	-351.6	0.00	1.83	0.00	0	0		
									point2	2	-708.4	-351.6	0.00	1.83					
Barrier2	W	0.00	30.48	0.00				0.00	point4	4	-700.8	-360.4	0.00	1.83	0.00	0	0		
									point5	5	-700.8	-354.8	0.00	1.83	0.00	0	0		
									point6	6	-669.4	-354.8	0.00	1.83	0.00	0	0		
									point7	7	-669.4	-360.4	0.00	1.83					
Barrier3	W	0.00	30.48	0.00				0.00	point8	8	-661.8	-360.4	0.00	1.83	0.00	0	0		
									point9	9	-661.8	-354.8	0.00	1.83	0.00	0	0		
									point10	10	-630.4	-354.8	0.00	1.83	0.00	0	0		
									point11	11	-630.4	-360.4	0.00	1.83					
Barrier4	W	0.00	30.48	0.00				0.00	point12	12	-623.1	-360.4	0.00	1.83	0.00	0	0		
									point13	13	-623.1	-354.8	0.00	1.83	0.00	0	0		
									point14	14	-591.7	-354.8	0.00	1.83	0.00	0	0		
									point15	15	-591.7	-360.4	0.00	1.83					
Barrier5	W	0.00	30.48	0.00				0.00	point16	16	-567.2	-366.6	0.00	1.83	0.00	0	0		
									point17	17	-567.2	-351.6	0.00	1.83	0.00	0	0		
									point18	18	-584.1	-351.6	0.00	1.83					

Eilar Associates, Inc.
AH
RESULTS: SOUND LEVELS
PROJECT/CONTRACT: B60611N1 Shady Oak
RUN: Worst-Case Lots-Mitigated
BARRIER DESIGN: INPUT HEIGHTS
ATMOSPHERICS: 20 deg C, 50% RH

9 January 2017
TNM 2.5
Calculated with TNM 2.5

Average pavement type shall be used unless a State highway agency substantiates the use of a different type with approval of FHWA.

Receiver Name	No.	#DUs	Existing LAeq1h	No Barrier LAeq1h Calculated	Crit'n	Increase over existing Calculated	Crit'n Sub'l Inc	Type Impact	With Barrier Calculated LAeq1h	Noise Reduction Calculated	Goal	Calculated minus Goal
			dBA	dBA	dBA	dB	dB		dBA	dB	dB	dB
Calibration	1	1	0.0	68.0	66	68.0	10	Snd Lvl	68.0	0.0	8	-8.0
R7	9	1	0.0	56.1	66	56.1	10	----	56.1	0.0	8	-8.0
R13	15	1	0.0	54.6	66	54.6	10	----	54.6	0.0	8	-8.0
R19	21	1	0.0	54.6	66	54.6	10	----	54.6	0.0	8	-8.0
R25	27	1	0.0	54.6	66	54.6	10	----	54.6	0.0	8	-8.0
R31	33	1	0.0	54.6	66	54.6	10	----	54.6	0.0	8	-8.0
R37	39	1	0.0	54.5	66	54.5	10	----	54.5	0.0	8	-8.0
R42	44	1	0.0	54.6	66	54.6	10	----	54.6	0.0	8	-8.0
R48	51	1	0.0	54.8	66	54.8	10	----	54.8	0.0	8	-8.0
2nd-6	57	1	0.0	59.4	66	59.4	10	----	59.4	0.0	8	-8.0
2nd-7	58	1	0.0	62.8	66	62.8	10	----	62.8	0.0	8	-8.0
2nd-12	63	1	0.0	58.6	66	58.6	10	----	58.6	0.0	8	-8.0
2nd-13	64	1	0.0	62.2	66	62.2	10	----	62.2	0.0	8	-8.0
2nd-18	69	1	0.0	58.6	66	58.6	10	----	58.6	0.0	8	-8.0
2nd-19	70	1	0.0	62.2	66	62.2	10	----	62.2	0.0	8	-8.0
2nd-24	75	1	0.0	58.6	66	58.6	10	----	58.6	0.0	8	-8.0
2nd-25	76	1	0.0	62.1	66	62.1	10	----	62.1	0.0	8	-8.0
2nd-30	81	1	0.0	58.7	66	58.7	10	----	58.7	0.0	8	-8.0
2nd-31	82	1	0.0	62.1	66	62.1	10	----	62.1	0.0	8	-8.0
2nd-36	88	1	0.0	58.5	66	58.5	10	----	58.5	0.0	8	-8.0
2nd-37	89	1	0.0	62.1	66	62.1	10	----	62.1	0.0	8	-8.0
2nd-41	92	1	0.0	58.6	66	58.6	10	----	58.6	0.0	8	-8.0
2nd-42	93	1	0.0	62.1	66	62.1	10	----	62.1	0.0	8	-8.0
2nd-47	98	1	0.0	59.2	66	59.2	10	----	59.2	0.0	8	-8.0

2nd-48	99	1	0.0	62.2	66	62.2	10	----	62.2	0.0	8	-8.0

Dwelling Units		**# DUs**	**Noise Reduction**		
			Min	**Avg**	**Max**
			dB	**dB**	**dB**
All Selected		25	0.0	0.0	0.0
All Impacted		1	0.0	0.0	0.0
All that meet NR Goal		0	0.0	0.0	0.0

APPENDIX D

Pertinent Sections of the County of San Diego Noise Element, Report Format, and Noise Ordinance

Noise Effects

Noise has a significant effect on quality of life. An individual's reaction to a particular noise depends on many factors such as the source of the noise, its loudness relative to the background noise level, and the time of day. The reaction to noise can also be highly subjective; the perceived effect of a particular noise can vary widely among individuals in a community. Because of the nature of the human ear, a sound must be about ten dB greater than the reference sound to be judged as twice as loud. In general, a three dB change in community noise levels is perceivable, while one to two dB changes generally are not perceived. Although the reaction to noise may vary, it is clear that noise is a significant component of the environment, and excessively noisy conditions can affect an individual's health and well-being. The effects of noise are often only transitory, but adverse effects can be cumulative with prolonged or repeated exposure. The effects of noise on a community can be organized into six broad categories: noise-induced hearing loss; interference with communication; effects on sleep; effects on performance and behavior; extra-auditory health effects; and annoyance.

Noise Standards

Noise exposure criteria are incorporated into land use planning to reduce future conflicts between noise and land use. This is achieved by specifying acceptable noise exposure ranges for various land uses throughout the County. The County uses the Noise Compatibility Guidelines listed in Table N-1 (Noise Compatibility Guidelines) 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.

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 (Noise Standards). For land uses where the exterior noise levels fall within the "unacceptable" range, new construction generally should not be undertaken.

Table N-1 Noise Compatibility Guidelines

Land Use Category		Exterior Noise Level (CNEL)						
			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.

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.

In addition, the County has adopted community noise control standards as part of the County's Noise Abatement and Control Ordinance (County Code of Regulatory Ordinances, Title 3, Division 6, Chapter 4) and provides guidance for implementation of the County's noise policies and ordinance in the County's *California Environmental Quality Act* (CEQA) Guidelines for Determining Significance for Noise. The Noise Ordinance defines limits for activities that generate excessive noise and sets noise level limits for land uses. The County's CEQA significance guidelines provide guidance on the use of the General Plan Noise Element and the County Noise Abatement and Control Ordinance when considering the environmental impact of noise exposure to high or excessive noise levels.

2.0 NOISE SENSITIVE LAND USES (NSLU) AFFECTED BY AIRBORNE NOISE

2.1 Guidelines for the Determination of Significance (Excerpt from Section 4.1)

Project implementation will result in the exposure of any on- or off-site, existing or reasonably foreseeable future NSLU to exterior or interior noise (including noise generated from the project, together with noise from roads [existing and planned], railroads, airports, heliports and all other noise sources) in excess of any of the following:

A. Exterior Locations:

i. 60 dB (CNEL); or

ii. An increase of 10 dB (CNEL) over pre-existing noise.

In the case of single-family residential detached NSLUs, exterior noise shall be 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 area:

(1) Net lot area up to 4,000 square feet:	***400 square feet***
(2) Net lot area 4,000 square feet to 10 acres:	***10% of net lot area***
(3) Net lot area over 10 acres :	***1 acre***

For all other projects, exterior noise shall be measured at all exterior areas provided for group or private usable open space.

B. Interior Locations:

45 dB (CNEL) except for the following cases:

i. Rooms which are usually occupied only a part of the day (schools, libraries, or similar facilities), the interior one-hour average sound level due to noise outside should not exceed 50 decibels (A).

ii. Corridors, hallways, stairwells, closets, bathrooms, or any room with a volume less than 490 cubic feet.

2.2 Potential Noise Impacts

Discuss the exposure of NSLU receptors to potential noise from all sources particularly roads, highways, railroads, airports, heliports or extractive industries (Transportation and Non-transportation). This includes noise caused by new development impacting existing or foreseeable future NSLUs.

Design Consideration Calculations

For exterior and interior locations:

- Identify all existing topographic and structural elements that are modeled in noise analysis.
- Discuss modifications to the development that have been made or will be made which reduce the exterior and interior noise level below CNEL equal to 60 decibels
- Identify all existing topographic elements that are modeled in the noise analysis. Provide a quantitative analysis of all topographic elements taken into calculations.

Mitigation Calculations

For exterior and interior locations:

- Discuss modifications to the development that have been made or will be made which reduce the noise sensitive receptors to a noise level below CNEL equal to 60 decibels
- Provide mitigation measures to reduce potential noise impacts. Determine whether the potential noise impacts are significant by quantifying the anticipated changes to the noise environment with the recommended mitigation. Compare noise impact results with and without the recommended mitigation.
- Determine whether mitigation or design is feasible to adequately reduce noise levels to meet County Standards.

Table X.X Sample Potential Mitigated Traffic Noise Impacts

Receptor Number	Receptor Location	Elevation	Mitigation	Mitigated Traffic Noise Level (CNEL)

2.3 Off-site Direct & Cumulative Noise Impacts (If applicable)

a. Direct Noise Impacts

(Existing vs. Existing + Project)

Direct noise impacts occur in discretionary applications where existing noise conditions and the project related noise contributions will combine to exceed the standards of the County Noise Element at exterior noise sensitive land uses (NSLU). It is more likely to occur in locations where existing noise levels are elevated or approach the applicable criterion of 60 decibels CNEL for an exterior NSLU. It is considered a significant direct impact when:

"New projects combine to generate more than double the existing sound energy of a documented noisy site."

b. Cumulatively Significant Noise Impacts

(Existing vs. Existing + Cumulative [Near-term] + Project)

Cumulative noise impacts may occur in discretionary applications where other permitted or planned projects will combine to exceed the standards of the Noise Element. It is more likely to occur in locations where existing noise levels are elevated or approach the applicable criterion of 60 decibels CNEL for an exterior noise sensitive land use (NSLU). Two examples of cumulative effects are (1) major residential developments in a region generate sufficient project-related traffic to affect significantly existing or planned NSLU and (2) extractive industries or long-term construction activities from several projects are in close proximity to existing or planned NSLU with future conditions exceeding 60 decibels CNEL. With an identified significant cumulative impact (doubling the existing noise conditions), the analysis also needs to determine whether the project's contribution is "cumulatively considerable" before addressing the issue of feasible mitigation measures.

- ***Cumulatively Considerable***
  (Existing + Cumulative vs. Existing + Cumulative + Project)
  Mitigation measures are required to reduce potential "Cumulatively Considerable" impacts. Evaluation of mitigation feasibility and limitations shall be addressed in association with their implementation. A "cumulatively considerable" contribution requiring mitigation or design measures is identified whenever:

  "A more than a one decibel increase from the project was identified in the model analysis."

  A major project issue for cumulative noise effects can be identified whenever there is no supporting evidence that (1) the surrounding community would consent to a proposed off-site mitigation scheme or (2) the feasible measures (on or off-site) are not sufficient to comply with the Noise Element.

c. Design Considerations & Mitigation Measure Calculations

This section shall discuss and identify all design considerations and noise mitigation measures to reduce significant impacts to noise sensitive land uses to less than significant. For each significant impact and mitigation measure, determine if the proposed mitigation have reduced the significance level to an acceptable and feasible level in accordance with the stated Significance Guidelines.

Cross reference(s)--Definitions, § 12.101 et seq.

SEC. 36.403. SOUND LEVEL MEASUREMENT.

(a) A sound level measurement made pursuant to this chapter shall be measured with a sound level meter using A-weighting and a "slow" response time, as these terms are used in ANSI S1.1-1994 or its latest revision.

(b) Each measurement shall be conducted at the boundary line of the property on which the noise source is located or any place on the affected property, but no closer than five feet from the noise source.

(c) The sound level meter shall be calibrated and adjusted by means of an acoustical calibrator of the coupler-type to assure meter accuracy within the tolerances in the ANSI specifications for sound level meters, ANSI S1.4-1983 or its latest revision. The sound level meter shall be used as provided in the manufacturer's instructions.

(Amended by Ord. No. 9962 (N.S.), effective 1-9-09)

SEC. 36.404. GENERAL SOUND LEVEL LIMITS.

(a) Except as provided in section 36.409 of this chapter, it shall be unlawful for any person to cause or allow the creation of any noise, which exceeds the one-hour average sound level limits in Table 36.404, when the one-hour average sound level is measured at the property line of the property on which the noise is produced or at any location on a property that is receiving the noise.

TABLE 36.404
SOUND LEVEL LIMITS IN DECIBELS (dBA)

ZONE	TIME	ONE-HOUR AVERAGE SOUND LEVEL LIMITS (dBA)
(1) RS, RD, RR, RMH, A70, A72, S80, S81, S90, S92, RV, and RU with a General Plan Land Use Designation density of less than 10.9 dwelling units per acre.	7 a.m. to 10 p.m.	50
	10 p.m. to 7 a.m.	45
(2) RRO, RC, RM, S86, V5, RV and RU with a General Plan Land Use Designation density of 10.9 or more dwelling units per acre.	7 a.m. to 10 p.m.	55
	10 p.m. to 7 a.m.	50
(3) S94, V4, and all commercial zones.	7 a.m. to 10 p.m.	60
	10 p.m. to 7 a.m.	55
(4) V1, V2	7 a.m. to 7 p.m.	60
V1, V2	7 p.m. to 10 p.m.	55
V1	10 p.m. to 7 a.m.	55
V2	10 p.m. to 7 a.m.	50
V3	7 a.m. to 10 p.m.	70
	10 p.m. to 7 a.m.	65
(5) M50, M52, and M54	Anytime	70

(6) S82, M56, and M58.	Anytime	75
(7) S88 (see subsection (c) below)		

(b) Where a noise study has been conducted and the noise mitigation measures recommended by that study have been made conditions of approval of a Major Use Permit, which authorizes the noise-generating use or activity and the decision making body approving the Major Use Permit determined that those mitigation measures reduce potential noise impacts to a level below significance, implementation and compliance with those noise mitigation measures shall constitute compliance with subsection (a) above.

(c) S88 zones are Specific Planning Areas which allow different uses. The sound level limits in Table 36.404 above that apply in an S88 zone depend on the use being made of the property. The limits in Table 36.404, subsection (1) apply to property with a residential, agricultural or civic use. The limits in subsection (3) apply to property with a commercial use. The limits in subsection (5) apply to property with an industrial use that would only be allowed in an M50, M52 or M54 zone. The limits in subsection (6) apply to all property with an extractive use or a use that would only be allowed in an M56 or M58 zone.

(d) If the measured ambient noise level exceeds the applicable limit in Table 36.404, the allowable one-hour average sound level shall be the one-hour average ambient noise level, plus three decibels. The ambient noise level shall be measured when the alleged noise violation source is not operating.

(e) The sound level limit at a location on a boundary between two zones is the arithmetic mean of the respective limits for the two zones. The one-hour average sound level limit applicable to extractive industries, however, including but not limited to borrow pits and mines, shall be 75 decibels at the property line regardless of the zone in which the extractive industry is located.

(f) A fixed-location public utility distribution or transmission facility located on or adjacent to a property line shall be subject to the sound level limits of this section measured at or beyond six feet from the boundary of the easement upon which the facility is located.

(Amended by Ord. No. 7094 (N.S.), effective 3-25-86; amended by Ord. No. 9478 (N.S.), effective 7-19-02; amended by Ord. No. 9621 (N.S.), effective 1-9-04; amended by Ord. No. 9962 (N.S.), effective 1-9-09; amended by Ord. No. 10211 (N.S.), effective 6-1-12)

SEC. 36.405. REPAIRING, REBUILDING OR TESTING MOTOR VEHICLES.

It shall be unlawful for any person to repair, rebuild or test any motor vehicle in such a manner as to cause a disturbing, excessive or offensive noise as defined in section 36.402 of this chapter.

(Amended by Ord. No. 9962 (N.S.), effective 1-9-09)

SEC. 36.406. POWERED MODEL VEHICLES.

It shall be unlawful for any person to operate a powered model vehicle between 9 p.m. and 7 a.m. A powered model vehicle operated in a County park shall meet the daytime sound level standards for an RS zone measured at a point 100 feet from the park property line or 100 feet from where the model vehicle is being operated, whichever is less.

(Amended by Ord. No. 9962 (N.S.), effective 1-9-09)

SEC. 36.407. REFUSE VEHICLES & PARKING LOT SWEEPERS.

No person shall operate or allow to be operated, a refuse compacting, processing, or collection vehicle or a parking lot sweeper between the hours of 10 p.m. to 6 a.m., in or within 100 feet of a residential zone.

(Amended by Ord. No. 7428 (N.S.), effective 2-4-88; amended by Ord. No. 9962 (N.S.), effective 1-9-09)

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.

(Amended by Ord. No. 9962 (N.S.), effective 1-9-09)

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.

(Amended by Ord. No. 9700 (N.S.), effective 2-4-05; amended by Ord. No. 9962 (N.S.), effective 1-9-09)

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, 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.

(Added by Ord. No. 9962 (N.S.), effective 1-9-09)

SEC. 36.411. CONTAINERS AND CONSTRUCTION MATERIAL.

It shall be unlawful for any person to handle, transport, or cause to be handled or transported in any public place, any container or any construction material in such a way as to create a disturbing, excessive, or offensive noise as defined in section 36.402 of this chapter.

(Amended by Ord. No. 9962 (N.S.), effective 1-9-09)

SEC. 36.412. SIGNAL DEVICE FOR FOOD TRUCKS.

No person shall operate or cause to have operated or used any sound signal device other than sound-amplification equipment attached to a motor vehicle wagon or manually propelled cart from which food or any other items are sold which emits a sound signal more frequently than once every ten minutes in any one street block and with a duration of more than ten seconds for any single emission. The sound level of this sound signal shall not exceed 90 decibels at 50 feet from the point of the noise source.

(Amended by Ord. No. 9962 (N.S.), effective 1-9-09)

SEC. 36.413. MULTIPLE FAMILY DWELLING UNITS.

Notwithstanding any other provision of this chapter it shall be unlawful for any person to create, maintain or cause to be maintained any sound within the interior of any multiple family dwelling unit which causes the noises level to exceed those limits set forth below in another dwelling unit:

TABLE 36.413
ALLOWABLE INTERIOR NOISE LEVEL

Type of Land Use	Hours		Allowable Interior Noise Level (dBA)	
		No Time	1 min in 1 hour	5 min in 1 hour
Multifamily	10 pm- 7 am	> 45	40	35
Residential	7 am-10 pm	> 55	50	35

(> greater than)

APPENDIX E

Project-Generated Traffic Noise Calculations

Project-Generated Traffic Noise Impact Calculations

Project: Shady Oak
Project #: B60611N1
Date: 8/26/2016

Intersection: Valley Center Rd & Lilac Rd

AM Peak Hour Traffic

Approach	Existing		Existing + Project	
	Volume	*Total*	*Volume*	*Total*
North Right	258	1889	258	1898
North Straight	768		770	
North Left	3		3	
East Right	0	4	0	4
East Straight	0		0	
East Left	1		1	
South Right	0	1691	0	1703
South Straight	553		560	
South Left	142		144	
West Right	227	934	228	937
West Straight	0		0	
West Left	307		307	

Existing v. Existing + Project (Project Contribution)	
North	0.0
East	0.0
South	0.0
West	0.0

1 Valley Ctr _ Lilac

Project: Shady Oak
Project #: B60611N1
Date: 8/26/2016

Intersection: Valley Center Rd & Lilac Rd

PM Peak Hour Traffic

Approach	Existing		Existing + Project	
	Volume	*Total*	*Volume*	*Total*
North Right	257	2139	257	2150
North Straight	731		739	
North Left	1		1	
East Right	0	5	0	5
East Straight	0		0	
East Left	1		1	
South Right	3	2074	3	2089
South Straight	893		896	
South Left	241		242	
West Right	205	960	208	964
West Straight	0		0	
West Left	257		257	

Existing v. Existing + Project (Project Contribution)	
North	0.0
East	0.0
South	0.0
West	0.0

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Project-Generated Traffic Noise Impact Calculations

Project: Shady Oak
Project #: B60611N1
Date: 8/26/2016

Intersection: Valley Center Rd & Mirar de Valle

AM Peak Hour Traffic

Approach	Existing		Existing + Project	
	Volume	*Total*	*Volume*	*Total*
North Right	28	1670	30	1682
North Straight	993		993	
North Left	0		0	
East Right	0	0	0	0
East Straight	0		0	
East Left	0		0	
South Right	0	1688	0	1705
South Straight	617		617	
South Left	30		33	
West Right	48	138	62	167
West Straight	0		0	
West Left	32		42	

Existing v. Existing + Project (Project Contribution)	
North	0.0
East	N/A
South	0.0
West	0.8

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Project: Shady Oak
Project #: B60611N1
Date: 8/26/2016

Intersection: Valley Center Rd & Mirar de Valle

PM Peak Hour Traffic

Approach	Existing		Existing + Project	
	Volume	*Total*	*Volume*	*Total*
North Right	28	1993	39	2008
North Straight	840		840	
North Left	0		0	
East Right	0	0	0	0
East Straight	0		0	
East Left	0		0	
South Right	0	2014	0	2035
South Straight	1100		1100	
South Left	39		54	
West Right	35	127	41	163
West Straight	0		0	
West Left	25		29	

Existing v. Existing + Project (Project Contribution)	
North	0.0
East	N/A
South	0.0
West	1.1

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Project-Generated Traffic Noise Impact Calculations

Project: Shady Oak
Project #: B60611N1
Date: 8/26/2016

Intersection: Valley Center Rd & Woods Valley Rd

AM Peak Hour Traffic

Approach	Existing		Existing + Project	
	Volume	*Total*	*Volume*	*Total*
North Right	0	1619	0	1635
North Straight	916		929	
North Left	72		72	
East Right	119	403	119	403
East Straight	0		0	
East Left	149		149	
South Right	63	1640	63	1656
South Straight	512		515	
South Left	0		0	
West Right	0	0	0	0
West Straight	0		0	
West Left	0		0	

Existing v. Existing + Project (Project Contribution)	
North	0.0
East	0.0
South	0.0
West	N/A

3 Valley Ctr _ Woods Vly

EILAR ASSOCIATES, INC.
Acoustical and Environmental Consulting

Project: Shady Oak
Project #: B60611N1
Date: 8/26/2016

Intersection: Valley Center Rd & Woods Valley Rd

PM Peak Hour Traffic

Approach	Existing		Existing + Project	
	Volume	*Total*	*Volume*	*Total*
North Right	0	1917	0	1939
North Straight	733		739	
North Left	111		111	
East Right	90	435	91	436
East Straight	0		0	
East Left	84		84	
South Right	150	1950	150	1971
South Straight	983		998	
South Left	0		0	
West Right	0	0	0	0
West Straight	0		0	
West Left	0		0	

Existing v. Existing + Project (Project Contribution)	
North	0.0
East	0.0
South	0.0
West	N/A

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APPENDIX F

Manufacturer Data Sheets

24ACB3
Performance™ 13 Series Air Conditioner with Puron® Refrigerant
1–1/2 To 5 Nominal Tons (Size 18 To 60)

Carrier
turn to the experts

Product Data

Puron™
the environmentally sound refrigerant

Performance® SERIES

Carrier's Air Conditioners with Puron® refrigerant provide a collection of features unmatched by any other family of equipment. The 24ACB has been designed utilizing Carrier's Puron refrigerant. The environmentally sound refrigerant allows you to make a responsible decision in the protection of the earth's ozone layer.

This product has been designed and manufactured to meet Energy Star® criteria for energy efficiency when matched with appropriate coil components. Refer to the combination ratings in the Product Data for system combinations that meet Energy Star® guidelines.

NOTE: Ratings contained in this document are subject to change at any time. Always refer to the AHRI directory (www.ahridirectory.org) for the most up-to-date ratings information.

INDUSTRY LEADING FEATURES / BENEFITS

EFFICIENCY

- 13 - 15 SEER/11 - 12 EER
- Microtube Technology™ refrigeration system
- Indoor air quality accessories available

SOUND

- Sound level as low as 74 dBA

COMFORT

- System supports Thermidistat™ Control or standard thermostat

RELIABILITY

- Puron® refrigerant - environmentally sound, won't deplete the ozone layer and low lifetime servce cost.
- Front-seating service valves
- Scroll compressor
- Internal pressure-relief valve
- Internal thermal overload
- Low-pressure switch
- High-pressure switch
- Filter drier
- Balanced refrigeration system for maximum reliability

DURABILITY

WeatherArmor Ultra™ protection package:

- Solid, durable sheet metal construction
- Steel louver coil guard
- Baked-on, complete outer coverage, powder paint

APPLICATIONS

- Long-line - up to 250 feet (76.20 m) total equivalent length, up to 200 feet (60.96 m) condenser above evaporator, or up to 80 ft. (24.38 m) evaporator above condenser (See Longline Guide for more information.)
- Low ambient (down to -20°F/-28.9°C) with accessory kit

ELECTRICAL DATA

UNIT SIZE – VOLTAGE, SERIES	V/PH	OPER VOLTS*		COMPR		FAN	MCA	MIN WIRE SIZE†	MIN WIRE SIZE†	MAX LENGTH ft (m)‡	MAX LENGTH ft (m)‡	MAX FUSE** or CKT BRK AMPS
		MAX	MIN.	LRA	RLA	FLA		60° C	75° C	60° C	75° C	
18–30	208–230–1	253	197	48.0	9.0	0.5	11.8	14	14	67 (20.4)	64 (19.5)	15
24–30				58.3	13.5	0.75	17.6	14	14	45 (13.7)	43 (13.1)	25
30–30				64.0	12.8	0.75	16.8	14	14	47 (14.3)	45 (13.7)	25
36–30				77.0	14.1	1.4	19.0	12	12	66 (20.1)	63 (19.2)	30
42–30				112.0	17.9	1.2	23.6	12	12	53 (16.2)	51 (15.5)	40
48–30				109.0	19.9	1.2	26.2	10	10	76 (23.2)	73 (22.3)	40
60–31				134.0	26.4	1.2	34.2	8	8	91 (27.7)	86 (262)	50

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

† If wire is applied at ambient greater than 30° C (86° F), consult table 310–16 of the NEC (ANSI/NFPA 70). The ampacity of non–metallic–sheathed cable (NM), trade name ROMEX, shall be that of 60° C (140° F) conditions, per the NEC (ANSI/NFPA 70) Article 336–26. If other than uncoated (no–plated), 60° or 75° C (140° or 167° C) insulation, copper wire (solid wire for 10 AWG or smaller, stranded wire for larger than 10 AWG) is used, consult applicable tables of the NEC (ANSI/NFPA 70).

‡ Length shown is as measured 1 way along wire path between unit and service panel for voltage drop not to exceed 2%.

** Time–Delay fuse.

FLA – Full Load Amps
LRA – Locked Rotor Amps
MCA – Minimum Circuit Amps
RLA – Rated Load Amps

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

Complies with 2007 requirements of ASHRAE Standards 90.1

A-WEIGHTED SOUND POWER (dBA)

UNIT SIZE – VOLTAGE, SERIES	STANDARD RATING (dBA)	TYPICAL OCTAVE BAND SPECTRUM (dBA, without tone adjustment)						
		125	250	500	1000	2000	4000	8000
18–30	74	50.0	61.5	64.5	66.5	64.0	61.0	54.5
24–30	75	55.5	63.5	67.0	70.0	66.0	63.5	57.0
30–30	74	52.5	63.0	68.5	70.0	66.5	62.5	56.5
36–30	75	57.0	65.0	67.5	69.5	67.5	65.0	60.0
42–30	74	55.0	64.0	68.0	68.5	64.5	60.0	54.0
48–30	74	52.5	62.5	65.5	69.0	63.5	60.5	56.0
60–31	74	54.0	59.0	65.5	67.5	63.5	60.0	55.5

NOTE: Tested in accordance with AHRI Standard 270–2008 (not listed in AHRI).

CHARGING SUBCOOLING (TXV-TYPE EXPANSION DEVICE)

UNIT SIZE–VOLTAGE, SERIES	REQUIRED SUBCOOLING °F (°C)
18–30	8 (4.4)
24–30	13 (7.2)
30–30	16 (8.9)
36–30	16 (8.9)
42–30	10 (5.6)
48–30	17 (9.4)
60–31	11 (6.1)

APPENDIX G

Cadna Analysis Data and Results

Sound Power Level to Sound Pressure Level Analysis

Distances			
Source Height:	h_S =	3.5	(ft)
Receiver Height:	h_R =	5.0	(ft)
Source to Receiver Distance:	d_{SR} =	120.0	(ft)

Project Name: Shady Oak
Project Number: B60611N1
Date: 8/30/2016
Source Description: AC Noise
Path Description: R1 North

Path Calculation			
Source to Receiver Direct Path Distance:	r =	**120.0**	(ft)

Sound Power to Sound Pressure Calculations

Octave Band	125	250	500	1000	2000	4000	8000	(Hz)			
Sound Power Level: L_W	57.0	65.0	67.5	69.5	67.5	65.0	60.0	(dBA)			
Sound Pressure Level: $L_p = L_W - 20\ log\ (r) - 0.75$	**14.7**	**22.7**	**25.2**	**27.2**	**25.2**	**22.7**	**17.7**	(dBA)	at	120.0	(ft)

Combined Sound Pressure Level at Receiver				
Total Sound Pressure Level:	32.1	(dBA)		
# of sources	4			
Combined Sound Pressure Level:	**38.2**	(dBA) at	120.0	(ft)

Total Sound Pressure Level at Receiver **40.2** dBA

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Sound Power Level to Sound Pressure Level Analysis

Distances			
Source Height:	h_S =	3.5	(ft)
Receiver Height:	h_R =	5.0	(ft)
Source to Receiver Distance:	d_{SR} =	155.0	(ft)

Project Name: Shady Oak
Project Number: B60611N1
Date: 8/30/2016
Source Description: AC Noise
Path Description: R1 North

Path Calculation			
Source to Receiver Direct Path Distance:	r =	**155.0**	(ft)

Sound Power to Sound Pressure Calculations

Octave Band	125	250	500	1000	2000	4000	8000	(Hz)			
Sound Power Level: L_W	57.0	65.0	67.5	69.5	67.5	65.0	60.0	(dBA)			
Sound Pressure Level: $L_p = L_W - 20\ log\ (r) - 0.75$	**12.4**	**20.4**	**22.9**	**24.9**	**22.9**	**20.4**	**15.4**	(dBA)	at	155.0	(ft)

Combined Sound Pressure Level at Receiver

Total Sound Pressure Level:	29.9	(dBA)		
# of sources	4			
Combined Sound Pressure Level:	**35.9**	(dBA) at	155.0	(ft)

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Sound Power Level to Sound Pressure Level Analysis

Distances			
Source Height:	h_S =	3.5	(ft)
Receiver Height:	h_R =	5.0	(ft)
Source to Receiver Distance:	d_{SR} =	45.0	(ft)

Project Name: Shady Oak
Project Number: B60611N1
Date: 8/30/2016
Source Description: AC Noise
Path Description: R2 South

Path Calculation			
Source to Receiver Direct Path Distance:	r =	**45.0**	(ft)

Sound Power to Sound Pressure Calculations

Octave Band	125	250	500	1000	2000	4000	8000	(Hz)			
Sound Power Level: L_W	57.0	65.0	67.5	69.5	67.5	65.0	60.0	(dBA)			
Sound Pressure Level: $L_p = L_W - 20\ log\ (r) - 0.75$	**23.2**	**31.2**	**33.7**	**35.7**	**33.7**	**31.2**	**26.2**	(dBA)	at	45.0	(ft)

Combined Sound Pressure Level at Receiver				
Total Sound Pressure Level:	40.7	(dBA)		
# of sources	2			
Combined Sound Pressure Level:	**43.7**	(dBA) at	45.0	(ft)

Total Sound Pressure Level at Receiver **44.3** dBA

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Sound Power Level to Sound Pressure Level Analysis

Distances			
Source Height:	h_S =	3.5	(ft)
Receiver Height:	h_R =	5.0	(ft)
Source to Receiver Distance:	d_{SR} =	70.0	(ft)

Project Name: Shady Oak
Project Number: B60611N1
Date: 8/30/2016
Source Description: AC Noise
Path Description: R3 East

Path Calculation			
Source to Receiver Direct Path Distance:	r =	**70.0**	(ft)

Sound Power to Sound Pressure Calculations

Octave Band	125	250	500	1000	2000	4000	8000	(Hz)			
Sound Power Level: L_W	57.0	65.0	67.5	69.5	67.5	65.0	60.0	(dBA)			
Sound Pressure Level: $L_p = L_W - 20\ log\ (r) - 0.75$	**19.3**	**27.3**	**29.8**	**31.8**	**29.8**	**27.3**	**22.3**	(dBA)	at	70.0	(ft)

Combined Sound Pressure Level at Receiver				
Total Sound Pressure Level:	36.8	(dBA)		
# of sources	2			
Combined Sound Pressure Level:	**39.8**	(dBA) at	70.0	(ft)

Total Sound Pressure Level at Receiver	**41.2**	dBA

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Sound Power Level to Sound Pressure Level Analysis

Distances			
Source Height:	h_S =	3.5	(ft)
Receiver Height:	h_R =	5.0	(ft)
Source to Receiver Distance:	d_{SR} =	115.0	(ft)

Project Name: Shady Oak
Project Number: B60611N1
Date: 8/30/2016
Source Description: AC Noise
Path Description: R3 East

Path Calculation			
Source to Receiver Direct Path Distance:	r =	**115.0**	(ft)

Sound Power to Sound Pressure Calculations

Octave Band	125	250	500	1000	2000	4000	8000	(Hz)			
Sound Power Level: L_W	57.0	65.0	67.5	69.5	67.5	65.0	60.0	(dBA)			
Sound Pressure Level: $L_p = L_W - 20\ log\ (r) - 0.75$	**15.0**	**23.0**	**25.5**	**27.5**	**25.5**	**23.0**	**18.0**	(dBA)	at	115.0	(ft)

Combined Sound Pressure Level at Receiver				
Total Sound Pressure Level:	32.5	(dBA)		
# of sources	2			
Combined Sound Pressure Level:	**35.5**	(dBA) at	115.0	(ft)

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Sound Power Level to Sound Pressure Level Analysis

Distances			
Source Height:	h_S =	3.5	(ft)
Receiver Height:	h_R =	5.0	(ft)
Source to Receiver Distance:	d_{SR} =	66.0	(ft)

Project Name: Shady Oak
Project Number: B60611N1
Date: 8/30/2016
Source Description: AC Noise
Path Description: R4 West

Path Calculation			
Source to Receiver Direct Path Distance:	r =	**66.0**	(ft)

Sound Power to Sound Pressure Calculations

Octave Band	125	250	500	1000	2000	4000	8000	(Hz)			
Sound Power Level: L_W	57.0	65.0	67.5	69.5	67.5	65.0	60.0	(dBA)			
Sound Pressure Level: $L_p = L_W - 20\ log\ (r) - 0.75$	**19.9**	**27.9**	**30.4**	**32.4**	**30.4**	**27.9**	**22.9**	(dBA)	at	66.0	(ft)

Combined Sound Pressure Level at Receiver

Total Sound Pressure Level:	37.3	(dBA)		
# of sources	2			
Combined Sound Pressure Level:	**40.3**	(dBA) at	66.0	(ft)

Total Sound Pressure Level at Receiver **42.4** dBA

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Sound Power Level to Sound Pressure Level Analysis

Distances			
Source Height:	h_S =	3.5	(ft)
Receiver Height:	h_R =	5.0	(ft)
Source to Receiver Distance:	d_{SR} =	121.0	(ft)

Project Name: Shady Oak
Project Number: B60611N1
Date: 8/30/2016
Source Description: AC Noise
Path Description: R4 West

Path Calculation			
Source to Receiver Direct Path Distance:	r =	**121.0**	(ft)

Sound Power to Sound Pressure Calculations

Octave Band	125	250	500	1000	2000	4000	8000	(Hz)			
Sound Power Level: L_W	57.0	65.0	67.5	69.5	67.5	65.0	60.0	(dBA)			
Sound Pressure Level: $L_p = L_W - 20\ log\ (r) - 0.75$	**14.6**	**22.6**	**25.1**	**27.1**	**25.1**	**22.6**	**17.6**	(dBA)	at	121.0	(ft)

Combined Sound Pressure Level at Receiver

Total Sound Pressure Level:	32.1	(dBA)		
# of sources	4			
Combined Sound Pressure Level:	**38.1**	(dBA) at	121.0	(ft)

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Cadna Noise Model - Sound Levels														
Name	ID	Type	Oktave Spectrum (dB)											Source
			Weight	63	125	250	500	1000	2000	4000	8000	A	lin	
Carrier 24ACB36 (3 ton)	L_2	Lw	A		57.0	65.0	67.5	69.5	67.5	65.0	60.0	74.5	78.6	Mfr

Cadna Noise Model - Point Sources								
Name	ID	Result. PWL	Lw / Li		Height	Coordinates		
		Day	Type	Value		X	Y	Z
		(dBA)			(m)	(m)	(m)	(m)
AC1	S_1	74.5	Lw	L_2	1.07	-729.28	-353.95	1.07
AC2	S_2	74.5	Lw	L_2	1.07	-729.45	-358.45	1.07
AC3	S_3	74.5	Lw	L_2	1.07	-729.45	-386.29	1.07
AC4	S_4	74.5	Lw	L_2	1.07	-729.61	-390.29	1.07
AC5	S_5	74.5	Lw	L_2	1.07	-729.61	-418.3	1.07
AC6	S_6	74.5	Lw	L_2	1.07	-729.45	-421.46	1.07
AC7	S_7	74.5	Lw	L_2	1.07	-730.61	-449.97	1.07
AC8	S_8	74.5	Lw	L_2	1.07	-705.78	-450.47	1.07
AC9	S_9	74.5	Lw	L_2	1.07	-705.94	-420.8	1.07
AC10	S_10	74.5	Lw	L_2	1.07	-705.61	-417.96	1.07
AC11	S_11	74.5	Lw	L_2	1.07	-689.94	-450.47	1.07
AC12	S_12	74.5	Lw	L_2	1.07	-690.94	-421.46	1.07
AC13	S_13	74.5	Lw	L_2	1.07	-690.94	-418.3	1.07
AC14	S_14	74.5	Lw	L_2	1.07	-705.28	-389.46	1.07
AC15	S_15	74.5	Lw	L_2	1.07	-705.11	-360.79	1.07
AC16	S_16	74.5	Lw	L_2	1.07	-704.94	-357.45	1.07
AC17	S_17	74.5	Lw	L_2	1.07	-690.61	-357.45	1.07
AC18	S_18	74.5	Lw	L_2	1.07	-690.28	-361.12	1.07
AC19	S_19	74.5	Lw	L_2	1.07	-690.11	-389.79	1.07
AC20	S_20	74.5	Lw	L_2	1.07	-667.11	-357.81	1.07
AC21	S_21	74.5	Lw	L_2	1.07	-667.37	-361.78	1.07
AC22	S_22	74.5	Lw	L_2	1.07	-667.37	-389.57	1.07
AC23	S_23	74.5	Lw	L_2	1.07	-667.64	-418.14	1.07
AC24	S_24	74.5	Lw	L_2	1.07	-667.64	-422.11	1.07
AC25	S_25	74.5	Lw	L_2	1.07	-667.8	-449.74	1.07
AC26	S_26	74.5	Lw	L_2	1.07	-651.81	-449.9	1.07
AC27	S_27	74.5	Lw	L_2	1.07	-651.5	-421.85	1.07
AC28	S_28	74.5	Lw	L_2	1.07	-652.55	-418.67	1.07
AC29	S_29	74.5	Lw	L_2	1.07	-652.82	-389.83	1.07
AC30	S_30	74.5	Lw	L_2	1.07	-652.55	-362.31	1.07
AC31	S_31	74.5	Lw	L_2	1.07	-652.03	-358.08	1.07
AC32	S_32	74.5	Lw	L_2	1.07	-626.89	-357.81	1.07
AC33	S_33	74.5	Lw	L_2	1.07	-627.68	-362.58	1.07
AC34	S_34	74.5	Lw	L_2	1.07	-627.68	-390.36	1.07
AC35	S_35	74.5	Lw	L_2	1.07	-629.27	-418.94	1.07
AC36	S_36	74.5	Lw	L_2	1.07	-629.27	-422.11	1.07
AC37	S_37	74.5	Lw	L_2	1.07	-628.74	-449.9	1.07
AC38	S_38	74.5	Lw	L_2	1.07	-612.07	-450.69	1.07
AC39	S_39	74.5	Lw	L_2	1.07	-589.84	-450.69	1.07
AC40	S_40	74.5	Lw	L_2	1.07	-589.05	-422.38	1.07
AC41	S_41	74.5	Lw	L_2	1.07	-588.79	-418.67	1.07
AC42	S_42	74.5	Lw	L_2	1.07	-589.58	-390.62	1.07
AC43	S_43	74.5	Lw	L_2	1.07	-588.79	-362.58	1.07
AC44	S_44	74.5	Lw	L_2	1.07	-589.05	-357.55	1.07
AC45	S_45	74.5	Lw	L_2	1.07	-612.07	-358.34	1.07
AC46	S_46	74.5	Lw	L_2	1.07	-612.6	-362.05	1.07
AC47	S_47	74.5	Lw	L_2	1.07	-612.6	-390.1	1.07

Cadna Noise Model - Noise Levels at Receivers (Unmitigated)						
Name	ID	Level Lr	Height	Coordinates		
		Day		X	Y	Z
		(dBA)	(m)	(m)	(m)	(m)
North	R_1	40.4	1.52	-659.80	-323.13	1.52
South	R_2	44.5	1.52	-659.24	-462.00	1.52
East	R_3	41.4	1.52	-568.02	-420.58	1.52
West	R_4	42.5	1.52	-749.18	-387.69	1.52

APPENDIX H

Temporary Construction Noise Calculations

EILAR ASSOCIATES, INC.
Acoustical Environmental Consulting

Noise Attenuation by Distance Calculation

Job: Shady Oak
Job #: B60611N1
Date: 8/29/2016
Source: Bulldozers (x2)
Receiver: West (C1)

Noise Source

Noise Level (dBA) 82 at 50 feet

Distances

Source Elevation 0 feet at 5 feet above grade
Receiver Elevation: 0 feet at 5 feet above grade
Source to Receiver Distance: 140 feet

Path Calculation

Source to Receiver Direct Path Distance: **140** feet

Sound Pressure Level **73.1** at 140 feet
Hours of Use: **8**
Duty Cycle (%): **40**
Level During 8 Hour day: **69.1**

Summation

Number of Sources: 5

Level during 8 hour day: **73.9**

Noise Attenuation by Distance Calculation

Job: Shady Oak
Job #: B60611N1
Date: 8/29/2016
Source: Grader
Receiver: West (C1)

Noise Source

Noise Level (dBA)	82	at	50	feet

Distances

Source Elevation	0	feet	at	5	feet above grade
Receiver Elevation:	0	feet	at	5	feet above grade
Source to Receiver Distance:	140	feet			

Path Calculation

Source to Receiver Direct Path Distance:	**140**	feet

Sound Pressure Level	**73.1**	at	140	feet
Hours of Use:	**8**			
Duty Cycle (%):	**40**			
Level During 8 Hour day:	**69.1**			

Noise Attenuation by Distance Calculation

Job: Shady Oak
Job #: B60611N1
Date: 8/29/2016
Source: Front Loader (x2)
Receiver: West (C1)

Noise Source

Noise Level (dBA)	79	at	50	feet

Distances

Source Elevation	0	feet	at	5	feet above grade
Receiver Elevation:	0	feet	at	5	feet above grade
Source to Receiver Distance:	140	feet			

Path Calculation

Source to Receiver Direct Path Distance:	**140**	feet

Sound Pressure Level	**70.1**	at	140	feet
Hours of Use:	**8**			
Duty Cycle (%):	**40**			
Level During 8 Hour day:	**66.1**			

Noise Attenuation by Distance Calculation

Job: Shady Oak
Job #: B60611N1
Date: 8/29/2016
Source: Scraper (x 4)
Receiver: West (C1)

Noise Source

Noise Level (dBA)	78	at	50	feet

Distances

Source Elevation	0	feet	at	5	feet above grade
Receiver Elevation:	0	feet	at	5	feet above grade
Source to Receiver Distance:	140	feet			

Path Calculation

Source to Receiver Direct Path Distance:	**140**	feet

Sound Pressure Level	**69.1**	at	140	feet
Hours of Use:	**8**			
Duty Cycle (%):	**40**			
Level During 8 Hour day:	**65.1**			

Noise Attenuation by Distance Calculation

Job: Shady Oak
Job #: B60611N1
Date: 8/29/2016
Source: Trencher (x2)
Receiver: West (C1)

Noise Source

Noise Level (dBA)	73	at	50	feet

Distances

Source Elevation	0	feet	at	5	feet above grade
Receiver Elevation:	0	feet	at	5	feet above grade
Source to Receiver Distance:	140	feet			

Path Calculation

Source to Receiver Direct Path Distance:	**140**	feet

Sound Pressure Level	**64.1**	at	140	feet
Hours of Use:	**8**			
Duty Cycle (%):	**40**			
Level During 8 Hour day:	**60.1**			

EILAR ASSOCIATES, INC.
Acoustical Environmental Consulting

Noise Attenuation by Distance Calculation

Job: Shady Oak
Job #: B60611N1
Date: 8/29/2016
Source: Bulldozers (x2)
Receiver: North (C2)

Noise Source

Noise Level (dBA) 82 at 50 feet

Distances

Source Elevation 0 feet at 5 feet above grade
Receiver Elevation: 0 feet at 5 feet above grade
Source to Receiver Distance: 177 feet

Path Calculation

Source to Receiver Direct Path Distance: **177** feet

Sound Pressure Level **71.0** at 177 feet
Hours of Use: **8**
Duty Cycle (%): **40**
Level During 8 Hour day: **67.0**

Summation

Number of Sources: 5

Level during 8 hour day: **71.8**

Noise Attenuation by Distance Calculation

Job: Shady Oak
Job #: B60611N1
Date: 8/29/2016
Source: Grader
Receiver: North (C2)

Noise Source

Noise Level (dBA)	82	at	50	feet

Distances

Source Elevation	0	feet	at	5	feet above grade
Receiver Elevation:	0	feet	at	5	feet above grade
Source to Receiver Distance:	177	feet			

Path Calculation

Source to Receiver Direct Path Distance:	**177**	feet

Sound Pressure Level	**71.0**	at	177	feet
Hours of Use:	**8**			
Duty Cycle (%):	**40**			
Level During 8 Hour day:	**67.0**			

Noise Attenuation by Distance Calculation

Job: Shady Oak
Job #: B60611N1
Date: 8/29/2016
Source: Front Loader (x2)
Receiver: North (C2)

Noise Source

Noise Level (dBA)	79	at	50	feet

Distances

Source Elevation	0	feet	at	5	feet above grade
Receiver Elevation:	0	feet	at	5	feet above grade
Source to Receiver Distance:	177	feet			

Path Calculation

Source to Receiver Direct Path Distance:	**177**	feet

Sound Pressure Level	**68.0**	at	177	feet
Hours of Use:	**8**			
Duty Cycle (%):	**40**			
Level During 8 Hour day:	**64.0**			

Noise Attenuation by Distance Calculation

Job: Shady Oak
Job #: B60611N1
Date: 8/29/2016
Source: Scraper (x 4)
Receiver: North (C2)

Noise Source

Noise Level (dBA)	78	at	50	feet

Distances

Source Elevation	0	feet	at	5	feet above grade
Receiver Elevation:	0	feet	at	5	feet above grade
Source to Receiver Distance:	177	feet			

Path Calculation

Source to Receiver Direct Path Distance:	**177**	feet

Sound Pressure Level	**67.0**	at	177	feet
Hours of Use:	**8**			
Duty Cycle (%):	**40**			
Level During 8 Hour day:	**63.0**			

Noise Attenuation by Distance Calculation

Job: Shady Oak
Job #: B60611N1
Date: 8/29/2016
Source: Trencher (x2)
Receiver: North (C2)

Noise Source

Noise Level (dBA)	73	at	50	feet

Distances

Source Elevation	0	feet	at	5	feet above grade
Receiver Elevation:	0	feet	at	5	feet above grade
Source to Receiver Distance:	177	feet			

Path Calculation

Source to Receiver Direct Path Distance:	**177**	feet

Sound Pressure Level	**62.0**	at	177	feet
Hours of Use:	**8**			
Duty Cycle (%):	**40**			
Level During 8 Hour day:	**58.0**			