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July 6, 2016

Chris Dahrling
Vista Azul, LLC
8109 Santaluz Village Green South
San Diego, CA 92127

Subject: Vista Azul Residential Development Exterior and Interior Noise Evaluation in Lemon Grove CA

The firm of Ldn Consulting, Inc. is pleased to submit the following exterior and interior noise impact analysis for the proposed Vista Azul Residential development in the City of Lemon Grove. The purpose of the survey is to determine the estimated exterior and interior noise levels within the outdoor areas of the project site and within the residential structures and recommend mitigation measures for compliance with the California Code of Regulations Title 24 and the City of Lemon Grove guidelines and requirements for noise.

PROJECT LOCATION/DESCRIPTION

The proposed project is located at the intersection of Palm/Troy Street and Camino De Las Palmas, west of State Route 125 in the City of Lemon Grove, CA. The project known as "Vista Azul Residential" consists of 20 residential units on approximately 2.06 gross acres.

The primary noise source that affects the site is vehicular traffic from adjacent Troy Street and nearby State Route 125. The project vicinity can be seen in Figure 1 and the project site configuration is provided in Figure 2 below.

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Figure 1: Project Site Location

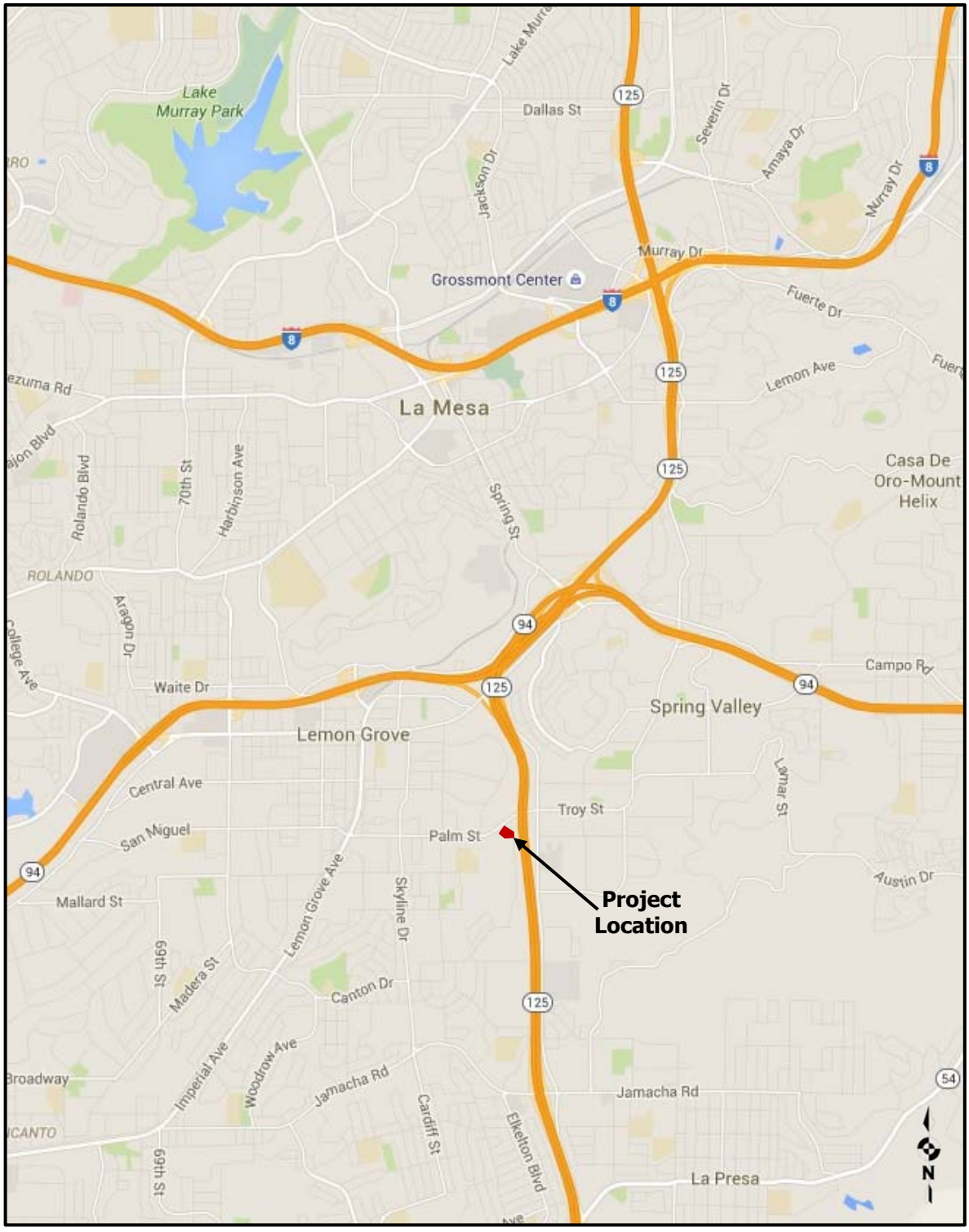

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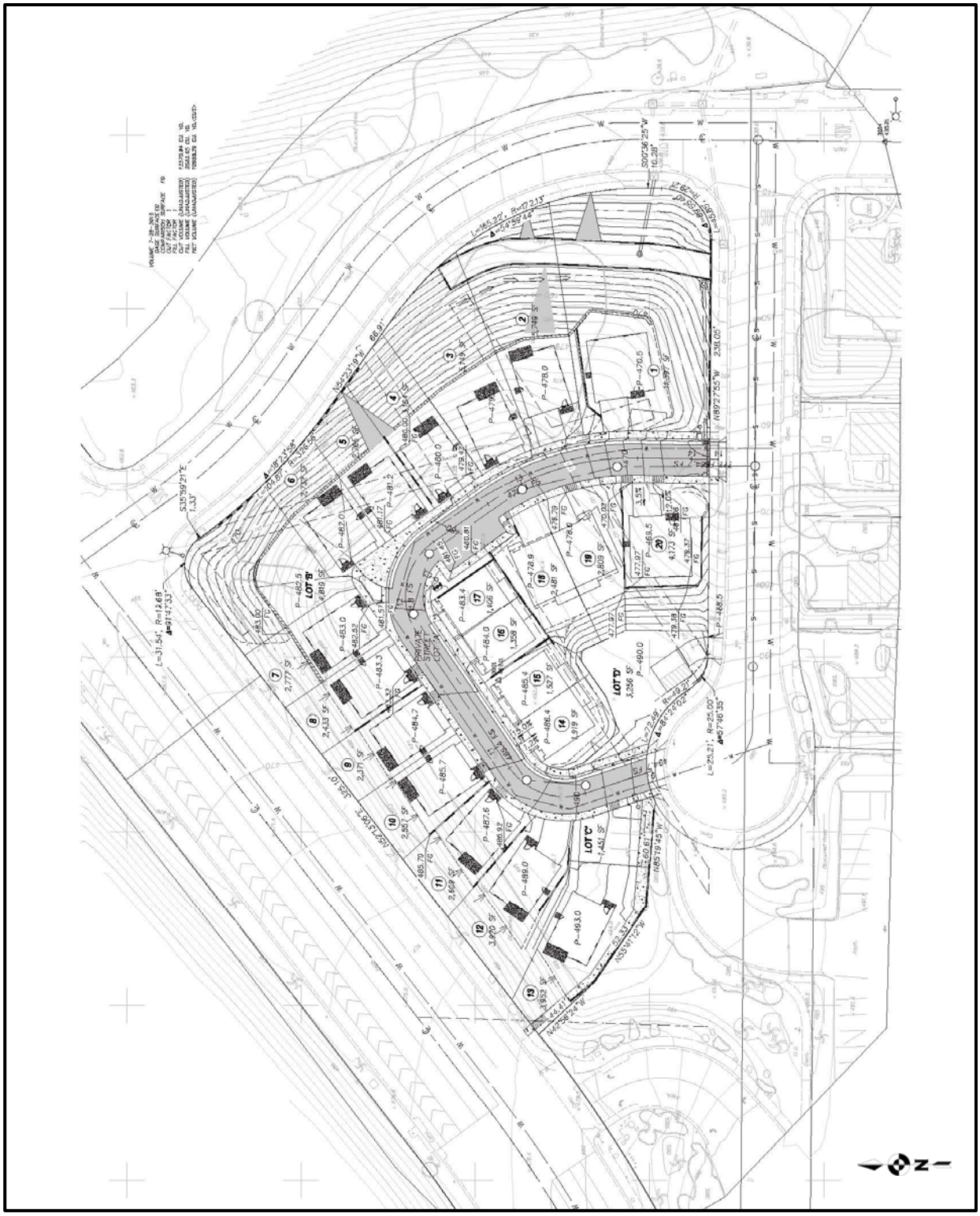
Figure 2: Proposed Project Site Plan



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ACOUSTICAL FUNDAMENTALS

Noise is defined as unwanted or annoying sound which interferes with or disrupts normal activities. Exposure to high noise levels has been demonstrated to cause hearing loss. The individual human response to environmental noise is based on the sensitivity of that individual, the type of noise that occurs and when the noise occurs. Sound is measured on a logarithmic scale consisting of sound pressure levels known as a decibel (dB). The sounds heard by humans typically do not consist of a single frequency but of a broadband of frequencies having different sound pressure levels. The method for evaluating all the frequencies of the sound is to apply an A-weighting to reflect how the human ear responds to the different sound levels at different frequencies. The A-weighted sound level adequately describes the instantaneous noise whereas the equivalent sound level depicted as Leq represents a steady sound level containing the same total acoustical energy as the actual fluctuating sound level over a given time interval.

The Community Noise Equivalent Level (CNEL) is the 24 hour A-weighted average for sound, with corrections for evening and nighttime hours. The corrections require an addition of 5 decibels to sound levels in the evening hours between 7 p.m. and 10 p.m. and an addition of 10 decibels to sound levels at nighttime hours between 10 p.m. and 7 a.m. These additions are made to account for the increased sensitivity during the evening and nighttime hours when sound appears louder. CNEL values do not represent the actual sound level heard at any particular time, but rather represents the total sound exposure.

Additionally, Sound Transmission Class (or STC) is an integer rating of how well airborne sound is attenuated by a building partition. STC is widely used to rate interior partitions, ceilings/floors, doors, windows and exterior wall configurations (see ASTM International Classification E413 and E90). The STC number is derived from tested sound attenuation values found at the 1/3 octave band frequencies. These transmission-loss (TL) values are then plotted and compared to a standard reference contour. Acoustical engineers fit these values to the appropriate TL Curve to determine a single STC value found at 500 Hertz. STC is roughly the decibel reduction in noise a partition can provide, abbreviated 'dB'.

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If an 85 dB sound on one side of a wall is reduced to 50 dB on the other side, that partition is said to have an STC of 35. This number does not apply across the range of frequencies because the STC value is derived from a curve-fit from the tested 1/3 octave band frequencies. Any partition will have less TL at lower frequencies. For example, a wall with an STC of 35 may provide over 40 dB of attenuation at 3000 Hz but only 15 dB of attenuation at 125 Hz.

NOISE STANDARDS

California's Title 24 Noise Standards

In 1974, the California Commission on Housing and Community Development adopted noise insulation standards for multi-family residential buildings (Title 24, Part 2, California Code of Regulations or CCR). CCR Title 24 establishes standards, based on the U.S. Department of Housing and Urban Development (HUD) requirements, for interior room noise (attributable to outside noise sources). The regulations also specify that acoustical studies must be prepared whenever a multi-family residential or motel/hotel building or structure is proposed to be located near an existing or adopted freeway route, expressway, parkway, major street, thoroughfare, rail line, rapid transit line, or industrial noise source, and where such noise sources create an exterior CNEL (or Ldn) of 60 dBA or greater. Such acoustical analysis must demonstrate that the residence has been designed to limit intruding noise to an interior CNEL (or Ldn) of at least 45 dBA.

City of Lemon Grove Noise Standards

The City of Lemon Grove has adopted interior and exterior noise standard sources as part of the General Plan Noise Element for assessing the compatibility of land uses with transportation related noise impacts. For noise sensitive residential land uses, the City has adopted an exterior noise level goal of 65 dBA CNEL for the outdoor living areas and requires an interior noise level of less than 45 dBA CNEL.

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ANALYSIS PROCEDURES

Existing Noise Environment

Noise measurements were taken using a Larson-Davis Model LxT Type 1 precision sound level meter, programmed, in "slow" mode, to record noise levels in "A" weighted form. The sound level meter and microphone were mounted on a tripod, five feet above the ground and equipped with a windscreen during all measurements. The sound level meter was calibrated before and after the monitoring using a Larson-Davis calibrator, Model CAL 200.

The ambient measurements were conducted on September 29, 2015 at 5 p.m. during peak afternoon traffic conditions. The results of the noise level measurements are presented in Table 1. The measurements were located along the eastern portion of the project site free of obstruction and having direct line of sight to the roadways. The sound level meter (ML1) was located approximately 200-feet from the centerline of Troy Street and approximately 400-feet from the centerline of SR-125. The statistical indicators Lmax, Lmin, L10, L50 and L90, are given for the monitoring location. As can be seen from the L90 data, 90% of the time the noise level is below 50 dBA. The noise monitoring locations can be seen in Figure 3 on the following page.

Table 1: Measured Ambient Noise Levels

Measurement Identification	Description	Time	Noise Levels (dBA Leq)					
			Leq	Lmax	Lmin	L10	L50	L90
ML1	Eastern portion of the site facing SR-125	5:00 p.m.–5:15 p.m.	65.7	72.2	61.2	66.9	65.6	63.8
Source: Ldn Consulting, Inc.								

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Figure 3: Ambient Monitoring Location

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Future Noise Prediction Methodology

To determine the future noise environment the Caltrans Sound32 noise model was utilized. The critical model input parameters, which determine the projected vehicular traffic noise levels, include vehicle travel speeds, the percentages of automobiles, medium trucks and heavy trucks in the roadway volume, the site conditions (hard or soft) and the peak hour traffic volume. The peak hour traffic volumes range between 6-12% of the average daily traffic (ADT) and 10% is generally acceptable for noise modeling purposes. The required coordinate information for the noise prediction model input was taken from the site plans provided by Landmark Consulting, 2016. To determine future noise levels the site plans were used to identify the pad elevations, the roadway elevations, and the relationship between the noise source(s) and the receptors.

Table 2 presents the roadway parameters used in the analysis including the average daily traffic, vehicle speeds and the vehicle mix for the future Buildout conditions provided by the SANDAG Traffic Prediction Model. The vehicle mix provides the hourly distribution percentages of automobile, medium trucks and heavy trucks for input into the Sound32 Model. The existing vehicle mix along State Route 125 was determined from the Caltrans 2012 Annual Average Daily Truck Traffic report. To assess the peak hour traffic noise conditions, 10% of the ADT was utilized. The future traffic noise model also utilizes the common vehicle mix found on City's roadways. The modeled observer locations for the common outdoor areas of the proposed project are presented in Figure 4 below along with the modeled building façade locations.

Table 2: Future Traffic Parameters

Roadway	Average Daily Traffic (ADT) [1]	Peak Hour Volume [2]	Modeled Speeds (MPH) [1]	Vehicle Mix % [3]		
				Auto	Medium Trucks	Heavy Trucks
Troy Street	10,000	1,000	40	96	2	2
SR 125	149,700	14,970	65	95.6	2.6	1.8

[1] Source: SANDAG 2030 Traffic Prediction Model
[2] 10% of the ADT
[3] Caltrans Truck Data and typical mixed in the City

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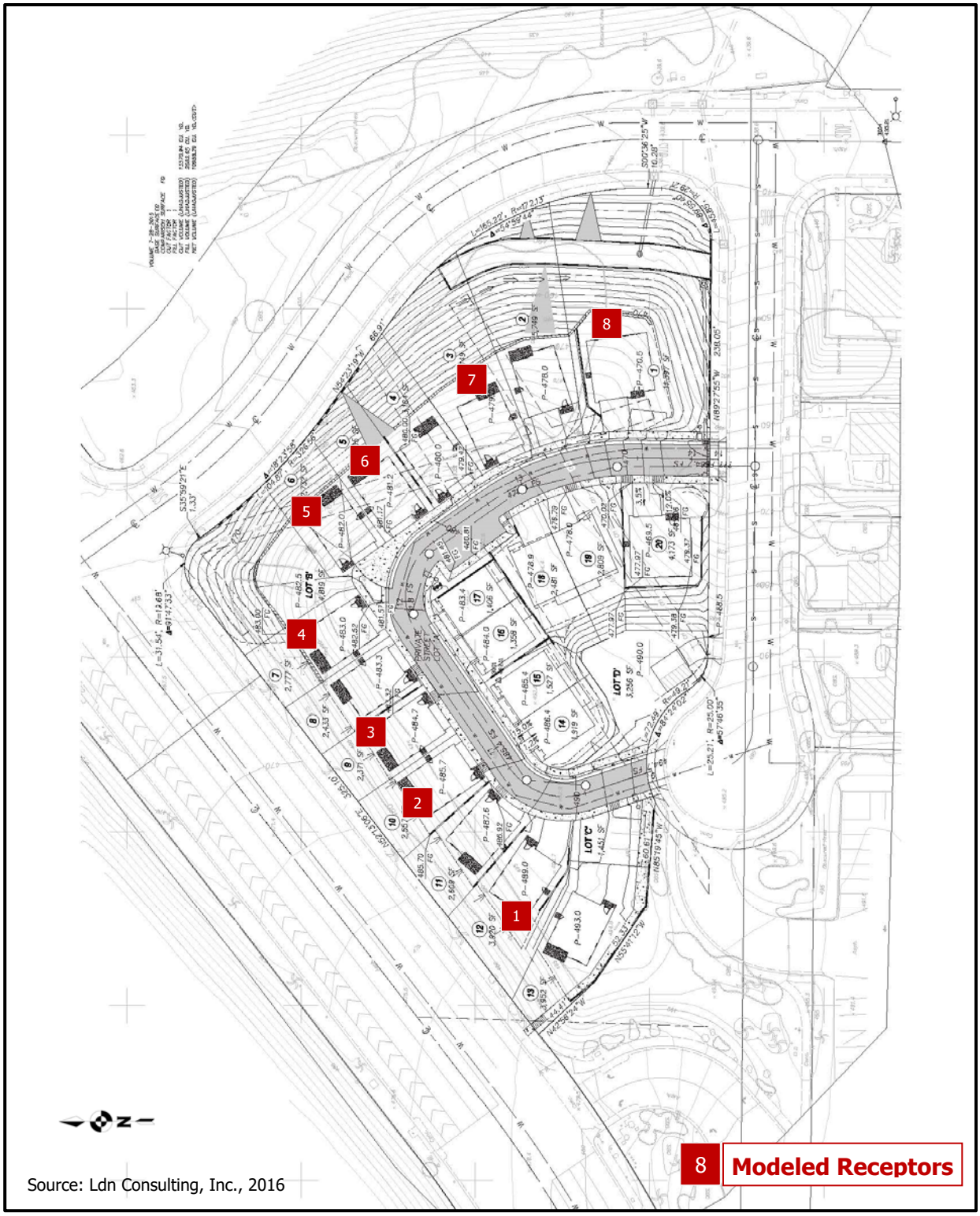
Figure 4: Modeled Receptor Locations



Source: Ldn Consulting, Inc., 2016

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FINDINGS

Exterior Noise Levels

The Buildout analysis was modeled utilizing the roadway parameters described above for the future conditions. The modeling results are quantitatively shown in Table 3 below. The S32 models input parameters and output files for the future conditions with and without mitigation are also provided in ***Attachment A***. In order to meet the 65 dBA standard, the project will require 6-foot high barriers at the top of slopes along State Route 125.

Table 3: Future Exterior Noise Levels

Receptor Location	Unmitigated Noise Level (dBA CNEL)	Barrier Heights (Feet)	Mitigated Noise Level (dBA CNEL)	Upper Floor Noise Level (dBA CNEL)*
1	64	--	64	66
2	65	--	64	67
3	65	--	64	68
4	66	**6**	62	69
5	67	**6**	64	71
6	68	**6**	64	72
7	68	**6**	64	73
8	68	**6**	64	73
* Interior Noise Assessment required if façade noise level is above 60 dBA CNEL.				

Figure 5 shows the location of the required barriers to bring future noise levels to the City of Lemon Grove 65 dBA CNEL exterior noise level standards for the proposed outdoor areas. The barriers must be constructed of a non-gapping material consisting of masonry, ½ inch thick glass, earthen berm or any combination of these materials. The City of Lemon Grove, consistent with Title 24 of the California Code of Regulations (CCR), a project is required to perform an interior assessment on the portions of a project site where building façade noise levels are above 60 dBA CNEL in order to ensure a 45 dBA CNEL interior noise level. The interior noise analysis is provided below.

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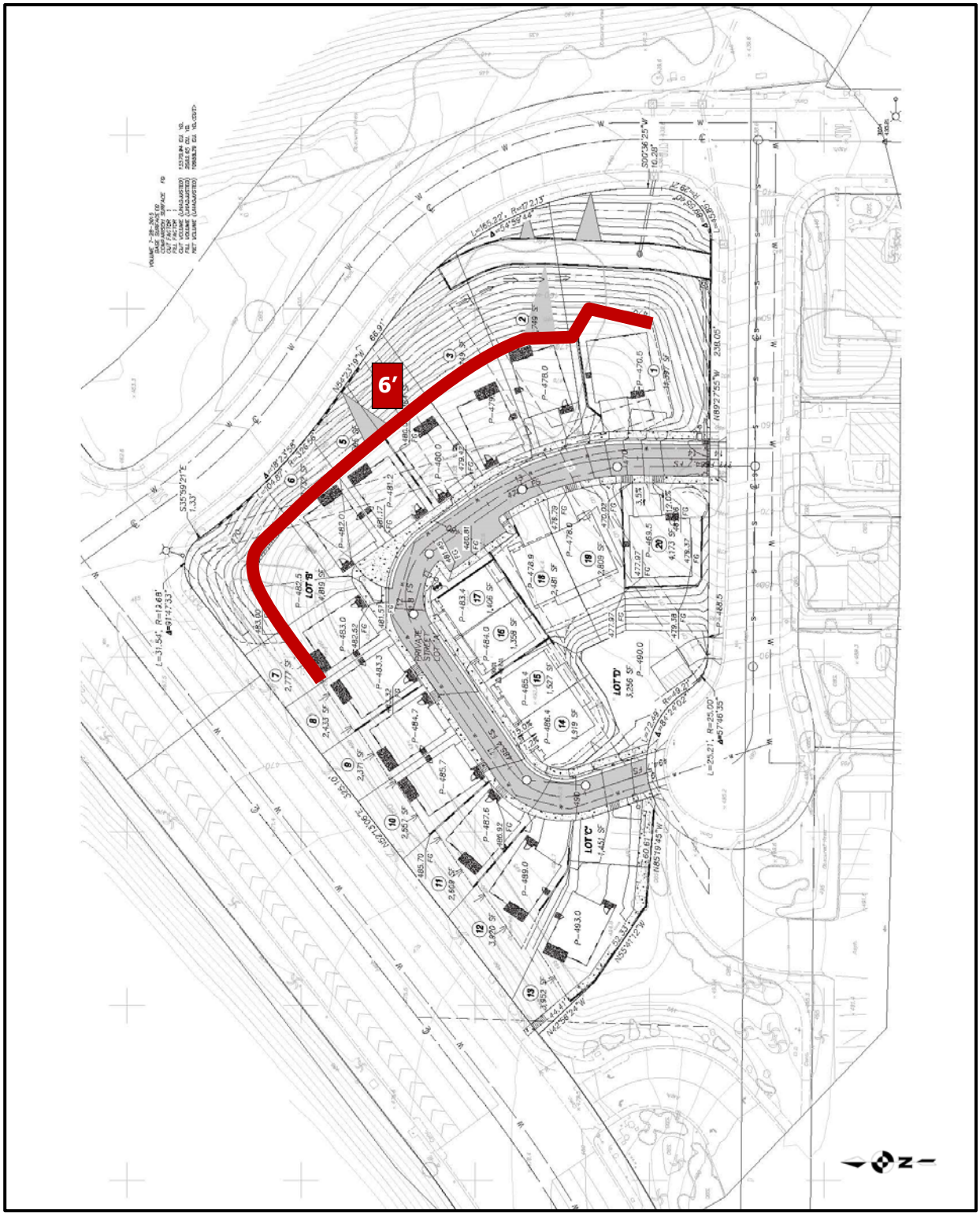
Figure 5: Noise Barrier Location



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Interior Noise Levels

The methodology used to determine the interior noise levels is based on the exterior noise level minus the sound transmission loss as identified in the American Society of Testing and Materials (ASTM) guidelines: E413 & E90. Standard building construction will provide a noise reduction of approximately 12-15 dBA with a windows open conditions and minimum 20 dBA noise reduction with the windows closed. The exterior noise levels at the proposed structures calculated in terms of dBA are converted to the six octave band sound pressure levels between: 125 Hertz - 4000 Hertz.

Acoustical modeling of the proposed project's future building dwelling units was performed in accordance with the above guidelines and included combining the transmission loss for each of the building components that will reduce the interior noise levels. Building components typically include the windows, exterior doors, and exterior walls. The total noise reduction is dependent upon the transmission loss of each building component, their subsequent surface area, quality of the building/construction materials, a building façade and angle correction.

The interior noise level is also dependent on the acoustical energy absorbed within the room based upon the Noise Reduction Coefficients (NRC). NRC is a scalar representation of the amount of sound energy absorbed upon striking a particular surface and the arithmetic average of sound absorption coefficients indicating a material's ability to absorb sound. The absorption coefficients for individual surface areas such as carpet (if installed), drywall and furnishings are used to calculate the interior room effects. The calculated building noise reduction includes both the room absorption characteristics and the transmission loss from the exterior wall assembly.

The interior noise reduction calculations were performed using Ldn's interior noise model. The model converts the exterior sound level to octave band frequencies and accounts for the transmission loss, correction factors and room absorption. The floor plans used for this analysis were provided by Architects BP Associates, 2016. The following construction details were utilized for each of the building assemblies to determine the noise reduction characteristics:

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Exterior walls and roof assemblies must have a Sound Transmission Class (STC) rating of 46 or better. Exterior walls with this rating consist of 2"x 4" studs or larger, spaced 16" o.c. with R-13 insulation minimum and an exterior surface of 7/8" cement plaster (stucco). Interior wall and ceiling surfaces shall be at least 1/2" thick gypsum or plaster. Roof assemblies should have a minimum of 1/2" sheathing, R-19 insulation and sealed to prevent noise leaks. Exterior entry doors should be of solid core construction typically have a minimum STC rating of 28.

Glass assemblies should be dual-paned and acoustical sealant applied around the exterior edges. Typical dual-paned glass assemblies have an STC rating of 26 or higher depending on the manufacturer. The window assemblies are generally the weakest noise reducing component but are the most convenient and cost effective elements to change if additional attenuation is needed. The STC ratings for the glass assemblies was calculated in the interior noise model and provided in the findings below.

Bathrooms, kitchens, closets and corridors are not required to meet the 45 dBA CNEL standard and therefore were not modeled. All living areas where lower noise levels are essential for conversation and sleep typically have carpeting installed (i.e., bedrooms). These rooms and were modeled to determine the interior noise reductions. If the modeled interior noise levels were found to be higher than 45 dBA CNEL in the living areas with the minimum assembly requirements described above additional modeling was performed to determine the needed STC ratings for the glass assemblies to further reduce interior noise levels below the acceptable interior threshold of 45 dBA CNEL.

Basic calculations show that a windows open condition will only reduce the interior noise levels 15 dBA CNEL and not provide adequate interior noise mitigation at all units. Therefore a closed window condition is required for all units above 60 dBA CNEL to reduce interior noise levels to comply with CCR Title 24 and City of Lemon Grove requirements. The windows closed condition requires that mechanical ventilation is installed to move air within the structure.

It was determined that an STC rating of 31 will be needed for the glass assemblies of the perimeter units having direct line of sight to State Route 125 to reduce the interior

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noise levels below 45 dBA CNEL. The remainder of the proposed units will have noise levels that are 5 dBA CNEL lower and STC ratings of 28 for those glass assemblies would reduce the noise levels below the 45 dBA CNEL threshold. The necessary Sound Transmission Class and transmission losses for the upgraded glass assemblies are provided in Table 4. The modeled results with an anticipated interior noise level of 45 dBA CNEL or less are provided as ***Attachment B*** to this report.

Table 4: Sound Transmission Class Ratings

Buildings[1]	Assembly	STC Rating[2]	Octave Band Transmission Loss (Hz)					
			125	250	500	1000	2000	4000
Adjacent to State Route 125	Windows	**31**	21	17	28	37	42	36
	Fixed Windows	**31**	24	19	29	36	37	35
	Glass Doors	**31**	24	18	30	34	33	33

[1] Remainder of the Buildings will comply with standard STC 28 ratings.
[2] STC Ratings used in Model

No interior noise impacts are expected with the incorporation of the STC ratings provided above. If you have any questions, please do not hesitate to contact me directly at (760) 473-1253 or jlouden@ldnconsulting.net.

Sincerely Ldn Consulting,

Jeremy Louden, Principal

Attachments: A - Exterior Noise Modeling
B - Interior Noise Model

ATTACHMENT A

EXTERIOR NOISE MODEL INPUT AND OUTPUT FILES

LEMON GROVE - GROUND LEVEL UNMITIGATED
T-PEAK HOUR TRAFFIC CONDITIONS, 1
960 , 40 , 20 , 40 , 20 , 40
T-PEAK HOUR TRAFFIC CONDITIONS, 2
14311 , 65 , 388 , 65 , 271 , 65
L-TROY, 1
N,-296,69,490,
N,-138,85,485,
N,87,199,478,
N,385,420,466,
N,626,609,457,
N,799,678,452,
L-125, 2
N,912.,708,415,
N,903.,411,409,
N,937.,132,404,
N,971.,-147,399,
B-SLOPE, 1 , 2 , 0 ,0
179.,166,493,493,
230.,199,493,493,
263.,238,486,486,
289.,254,486,486,
314.,272,484,484,
338.,290,484,484,3
362.,309,482,482,6
388.,327,482,482,
409.,335,482,482,
B-SLOPE-2, 2 , 2 , 0 ,0
409,335,482,482,
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458.,319,482,482,
474.,299,482,482,
494.,275,481,481,
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700.,241,448,448,
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603.,418,462,462,
532.,455,462,462,
R, 1 , 65 ,10
215,183,498,R1
R, 2 , 65 ,10
279,243,491,R2
R, 3 , 65 ,10
333,281,489,R3
R, 4 , 65 ,10
392,323,487,R4
R, 5 , 65 ,10
458,312,487,R5
R, 6 , 65 ,10
497,262,486,R6
R, 7 , 65 ,10
532,212,483,R7
R, 8 , 65 ,10
556,133,478.,R8
D, 4.5
ALL,ALL
C,C

SOUND32 - RELEASE 07/30/91

TITLE:
LEMON GROVE - GROUND LEVEL UNMITIGATED

REC	REC ID	DNL	PEOPLE	LEQ(CAL)
1	R1	65.	10.	64.0
2	R2	65.	10.	64.7
3	R3	65.	10.	65.0
4	R4	65.	10.	65.9
5	R5	65.	10.	66.8
6	R6	65.	10.	67.3
7	R7	65.	10.	67.9
8	R8	65.	10.	68.2

LEMON GROVE - GROUND LEVEL MITIGATED
T-PEAK HOUR TRAFFIC CONDITIONS, 1
960 , 40 , 20 , 40 , 20 , 40
T-PEAK HOUR TRAFFIC CONDITIONS, 2
14311 , 65 , 388 , 65 , 271 , 65
L-TROY, 1
N,-296,69,490,
N,-138,85,485,
N,87,199,478,
N,385,420,466,
N,626,609,457,
N,799,678,452,
L-125, 2
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N,903.,411,409,
N,937.,132,404,
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R, 3 , 65 ,10
333,281,489,R3
R, 4 , 65 ,10
392,323,487,R4
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458,312,487,R5
R, 6 , 65 ,10
497,262,486,R6
R, 7 , 65 ,10
532,212,483,R7
R, 8 , 65 ,10
556,133,478.,R8
D, 4.5
ALL,ALL
C,C

SOUND32 - RELEASE 07/30/91

TITLE:
LEMON GROVE - GROUND LEVEL MITIGATED

REC	REC ID	DNL	PEOPLE	LEQ(CAL)
1	R1	65.	10.	63.7
2	R2	65.	10.	64.3
3	R3	65.	10.	64.3
4	R4	65.	10.	61.4
5	R5	65.	10.	63.5
6	R6	65.	10.	63.7
7	R7	65.	10.	64.0
8	R8	65.	10.	64.3

LEMON GROVE - SECOND LEVEL
T-PEAK HOUR TRAFFIC CONDITIONS, 1
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T-PEAK HOUR TRAFFIC CONDITIONS, 2
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L-TROY, 1
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R, 2 , 65 ,10
279,243,501.,R2
R, 3 , 65 ,10
333,281,499.,R3
R, 4 , 65 ,10
392,323,497.,R4
R, 5 , 65 ,10
458,312,497.,R5
R, 6 , 65 ,10
497,262,496.,R6
R, 7 , 65 ,10
532,212,493.,R7
R, 8 , 65 ,10
556,133,488.,R8
C,C

SOUND32 - RELEASE 07/30/91

TITLE:
LEMON GROVE - SECOND LEVEL

REC	REC ID	DNL	PEOPLE	LEQ(CAL)
1	R1	65.	10.	66.0
2	R2	65.	10.	66.4
3	R3	65.	10.	66.7
4	R4	65.	10.	68.6
5	R5	65.	10.	70.0
6	R6	65.	10.	71.1
7	R7	65.	10.	72.5
8	R8	65.	10.	72.9

LEMON GROVE - THIRD LEVEL
T-PEAK HOUR TRAFFIC CONDITIONS, 1
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T-PEAK HOUR TRAFFIC CONDITIONS, 2
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L-TROY, 1
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L-125, 2
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562.,109,473,479,
B-125-TOP, 3 , 2 , 0 ,0
740.,-3,434,434,
738.,81,440,440,
720.,156,442,442,
700.,241,448,448,
662.,317,458,458,
603.,418,462,462,
532.,455,462,462,
R, 1 , 65 ,10
215,183,518.,R1
R, 2 , 65 ,10
279,243,511.,R2
R, 3 , 65 ,10
333,281,509.,R3
R, 4 , 65 ,10
392,323,507.,R4
R, 5 , 65 ,10
458,312,507.,R5
R, 6 , 65 ,10
497,262,506.,R6
R, 7 , 65 ,10
532,212,503.,R7
R, 8 , 65 ,10
556,133,498.,R8
C,C

SOUND32 - RELEASE 07/30/91

TITLE:
LEMON GROVE - THIRD LEVEL

REC	REC ID	DNL	PEOPLE	LEQ(CAL)
1	R1	65.	10.	66.3
2	R2	65.	10.	66.8
3	R3	65.	10.	67.9
4	R4	65.	10.	69.2
5	R5	65.	10.	71.4
6	R6	65.	10.	72.3
7	R7	65.	10.	72.7
8	R8	65.	10.	72.9

ATTACHMENT B

INTERIOR NOISE MODEL RESULTS

INTERIOR NOISE CALCULATIONS

Project Name:	Lemon Grove		Ldn Consulting, Inc.
Building (s)	All		
Floor Level	1	Date:	7/1/16
Arch Plan:	1		
Room Type:	Living/Dining	Project #	15-127

Exterior Noise Levels

	dBA CNEL*	Frequency (Hz.) 125	250	500	1000	2000	4000
Exterior Noise Level (Traffic Spectrum)	73.0	59.0	63.7	66.5	68.8	65.7	60.0

Transmission Loss (TL)

Exterior Assembly	Source	Area	STC	Transmission Loss (dB) Frequency (Hz.) 125	250	500	1000	2000	4000
Stucco	NBS W-50-71	584	46	27	42	44	46	49	54
Windows	Starline	69	31	21	17	28	37	42	36
Fixed Window	Starline	0	31	24	19	29	36	37	35
Glass Doors	Starline	48	31	24	18	30	34	33	33
Exterior Door	NBS Monograph 77	24	28	18	16	25	32	38	28

Room Absorption (RA)

Interior Characteristics	Source		NRC	Absorption Coefficients Frequency (Hz.) 125	250	500	1000	2000	4000
Carpet	Army TM 5-805-4		0.28	0.15	0.17	0.12	0.32	0.52	0.30
Furnishings	Army TM 5-805-4		0.45	0.32	0.29	0.42	0.58	0.60	0.48
Drywall	Netwell		0.07	0.09	0.08	0.05	0.03	0.06	0.09
Overall Absorption Factor (Furnished Room)			0.8	0.56	0.54	0.59	0.93	1.18	0.87

Noise Reduction

	125	250	500	1000	2000	4000
Noise Reduction from Absorption based upon Floor Area	-24.8	-24.8	-24.8	-24.8	-24.8	-24.8
Noise Level Increase for Defects and Exposed Surface Area	18.8	18.8	18.8	18.8	18.8	18.8
Overall Reduction from Tranmission Loss + Room Absorption - Surface Exposure						27.6
Building Façade Noise Level (dBA CNEL)						73.0
Resultant Interior Noise Level (dBA CNEL)						**45**

* Corrections for Façade Level was accounted for in the modeling.

INTERIOR NOISE CALCULATIONS

Project Name:	Lemon Grove		Ldn Consulting, Inc.
Building (s)	All		
Floor Level	2	Date:	7/1/16
Arch Plan:	1		
Room Type:	Master	Project #	15-127

Exterior Noise Levels

		Frequency (Hz.)					
	dBA CNEL*	***125***	***250***	***500***	***1000***	***2000***	***4000***
Exterior Noise Level (Traffic Spectrum)	73.0	59.0	63.7	66.5	68.8	65.7	60.0

Transmission Loss (TL)

				Transmission Loss (dB)					
				Frequency (Hz.)					
Exterior Assembly	***Source***	***Area***	***STC***	***125***	***250***	***500***	***1000***	***2000***	***4000***
Stucco	NBS W-50-71	279	46	27	42	44	46	49	54
Windows	Starline	58	31	21	17	28	37	42	36
Fixed Window	Starline	0	31	24	19	29	36	37	35
Glass Doors	Starline	0	31	24	18	30	34	33	33
Exterior Door	NBS Monograph 77	0	28	18	16	25	32	38	28

Room Absorption (RA)

				Absorption Coefficients					
				Frequency (Hz.)					
Interior Characteristics	***Source***		***NRC***	***125***	***250***	***500***	***1000***	***2000***	***4000***
Carpet	Army TM 5-805-4		0.28	0.15	0.17	0.12	0.32	0.52	0.30
Furnishings	Army TM 5-805-4		0.45	0.32	0.29	0.42	0.58	0.60	0.48
Drywall	Netwell		0.07	0.09	0.08	0.05	0.03	0.06	0.09
Overall Absorption Factor (Furnished Room)			0.8	0.56	0.54	0.59	0.93	1.18	0.87

Noise Reduction

	125	***250***	***500***	***1000***	***2000***	***4000***
Noise Reduction from Absorption based upon Floor Area	-22.7	-22.7	-22.7	-22.7	-22.7	-22.7
Noise Level Increase for Defects and Exposed Surface Area	16.2	16.2	16.2	16.2	16.2	16.2
Overall Reduction from Tranmission Loss + Room Absorption - Surface Exposure						30.7
Building Façade Noise Level (dBA CNEL)						73.0
Resultant Interior Noise Level (dBA CNEL)						**42**

* Corrections for Façade Level was accounted for in the modeling.

INTERIOR NOISE CALCULATIONS

Project Name:	Lemon Grove		Ldn Consulting, Inc.
Building (s)	All		
Floor Level	2	Date:	7/1/16
Arch Plan:	1		
Room Type:	Bedroom 2	Project #	15-127

Exterior Noise Levels

		Frequency (Hz.)					
	dBA CNEL*	***125***	***250***	***500***	***1000***	***2000***	***4000***
Exterior Noise Level (Traffic Spectrum)	73.0	59.0	63.7	66.5	68.8	65.7	60.0

Transmission Loss (TL)

				Transmission Loss (dB)					
				Frequency (Hz.)					
Exterior Assembly	***Source***	***Area***	***STC***	***125***	***250***	***500***	***1000***	***2000***	***4000***
Stucco	NBS W-50-71	198	46	27	42	44	46	49	54
Windows	Starline	20	31	21	17	28	37	42	36
Fixed Window	Starline	10	31	24	19	29	36	37	35
Glass Doors	Starline	0	31	24	18	30	34	33	33
Exterior Door	NBS Monograph 77	0	28	18	16	25	32	38	28

Room Absorption (RA)

				Absorption Coefficients					
				Frequency (Hz.)					
Interior Characteristics	***Source***		***NRC***	***125***	***250***	***500***	***1000***	***2000***	***4000***
Carpet	Army TM 5-805-4		0.28	0.15	0.17	0.12	0.32	0.52	0.30
Furnishings	Army TM 5-805-4		0.45	0.32	0.29	0.42	0.58	0.60	0.48
Drywall	Netwell		0.07	0.09	0.08	0.05	0.03	0.06	0.09
Overall Absorption Factor (Furnished Room)			0.8	0.56	0.54	0.59	0.93	1.18	0.87

Noise Reduction

	125	***250***	***500***	***1000***	***2000***	***4000***
Noise Reduction from Absorption based upon Floor Area	-19.4	-19.4	-19.4	-19.4	-19.4	-19.4
Noise Level Increase for Defects and Exposed Surface Area	16.6	16.6	16.6	16.6	16.6	16.6
Overall Reduction from Tranmission Loss + Room Absorption - Surface Exposure						29.8
Building Façade Noise Level (dBA CNEL)						73.0
Resultant Interior Noise Level (dBA CNEL)						**43**

* Corrections for Façade Level was accounted for in the modeling.

INTERIOR NOISE CALCULATIONS

Project Name:	Lemon Grove		Ldn Consulting, Inc.
Building (s)	All		
Floor Level	3	Date:	7/1/16
Arch Plan:	1		
Room Type:	Bonus	Project #	15-127

Exterior Noise Levels

		Frequency (Hz.)					
	dBA CNEL*	***125***	***250***	***500***	***1000***	***2000***	***4000***
Exterior Noise Level (Traffic Spectrum)	73.0	59.0	63.7	66.5	68.8	65.7	60.0

Transmission Loss (TL)

				Transmission Loss (dB)					
				Frequency (Hz.)					
Exterior Assembly	***Source***	***Area***	***STC***	***125***	***250***	***500***	***1000***	***2000***	***4000***
Stucco	NBS W-50-71	368	46	27	42	44	46	49	54
Windows	Starline	73	31	21	17	28	37	42	36
Fixed Window	Starline	0	31	24	19	29	36	37	35
Glass Doors	Starline	0	31	24	18	30	34	33	33
Exterior Door	NBS Monograph 77	0	28	18	16	25	32	38	28

Room Absorption (RA)

				Absorption Coefficients					
				Frequency (Hz.)					
Interior Characteristics	***Source***		***NRC***	***125***	***250***	***500***	***1000***	***2000***	***4000***
Carpet	Army TM 5-805-4		0.28	0.15	0.17	0.12	0.32	0.52	0.30
Furnishings	Army TM 5-805-4		0.45	0.32	0.29	0.42	0.58	0.60	0.48
Drywall	Netwell		0.07	0.09	0.08	0.05	0.03	0.06	0.09
Overall Absorption Factor (Furnished Room)			0.8	0.56	0.54	0.59	0.93	1.18	0.87

Noise Reduction

	125	***250***	***500***	***1000***	***2000***	***4000***
Noise Reduction from Absorption based upon Floor Area	-23.2	-23.2	-23.2	-23.2	-23.2	-23.2
Noise Level Increase for Defects and Exposed Surface Area	16.5	16.5	16.5	16.5	16.5	16.5
Overall Reduction from Tranmission Loss + Room Absorption - Surface Exposure						30.1
Building Façade Noise Level (dBA CNEL)						73.0
Resultant Interior Noise Level (dBA CNEL)						**43**

* Corrections for Façade Level was accounted for in the modeling.

INTERIOR NOISE CALCULATIONS

Project Name:	Lemon Grove		Ldn Consulting, Inc.
Building (s)	All		
Floor Level	1	Date:	7/1/16
Arch Plan:	2		
Room Type:	Master Bedroom 2	Project #	15-127

Exterior Noise Levels

		Frequency (Hz.)					
	dBA CNEL*	***125***	***250***	***500***	***1000***	***2000***	***4000***
Exterior Noise Level (Traffic Spectrum)	73.0	59.0	63.7	66.5	68.8	65.7	60.0

Transmission Loss (TL)

				Transmission Loss (dB)					
				Frequency (Hz.)					
Exterior Assembly	***Source***	***Area***	***STC***	***125***	***250***	***500***	***1000***	***2000***	***4000***
Stucco	NBS W-50-71	324	46	27	42	44	46	49	54
Windows	Starline	45	31	21	17	28	37	42	36
Fixed Window	Starline	0	31	24	19	29	36	37	35
Glass Doors	Starline	35	31	24	18	30	34	33	33
Exterior Door	NBS Monograph 77	0	28	18	16	25	32	38	28

Room Absorption (RA)

				Absorption Coefficients					
				Frequency (Hz.)					
Interior Characteristics	***Source***		***NRC***	***125***	***250***	***500***	***1000***	***2000***	***4000***
Carpet	Army TM 5-805-4		0.28	0.15	0.17	0.12	0.32	0.52	0.30
Furnishings	Army TM 5-805-4		0.45	0.32	0.29	0.42	0.58	0.60	0.48
Drywall	Netwell		0.07	0.09	0.08	0.05	0.03	0.06	0.09
Overall Absorption Factor (Furnished Room)			0.8	0.56	0.54	0.59	0.93	1.18	0.87

Noise Reduction

	125	***250***	***500***	***1000***	***2000***	***4000***
Noise Reduction from Absorption based upon Floor Area	-21.9	-21.9	-21.9	-21.9	-21.9	-21.9
Noise Level Increase for Defects and Exposed Surface Area	17.6	17.6	17.6	17.6	17.6	17.6
Overall Reduction from Tranmission Loss + Room Absorption - Surface Exposure						27.8
Building Façade Noise Level (dBA CNEL)						73.0
Resultant Interior Noise Level (dBA CNEL)						**45**

* Corrections for Façade Level was accounted for in the modeling.

INTERIOR NOISE CALCULATIONS

Project Name:	Lemon Grove		Ldn Consulting, Inc.
Building (s)	All		
Floor Level	2	Date:	7/1/16
Arch Plan:	2		
Room Type:	Living/Dining	Project #	15-127

Exterior Noise Levels

		Frequency (Hz.)					
	dBA CNEL*	***125***	***250***	***500***	***1000***	***2000***	***4000***
Exterior Noise Level (Traffic Spectrum)	73.0	59.0	63.7	66.5	68.8	65.7	60.0

Transmission Loss (TL)

				Transmission Loss (dB)					
				Frequency (Hz.)					
Exterior Assembly	***Source***	***Area***	***STC***	***125***	***250***	***500***	***1000***	***2000***	***4000***
Stucco	NBS W-50-71	666	46	27	42	44	46	49	54
Windows	Starline	80	31	21	17	28	37	42	36
Fixed Window	Starline	0	31	24	19	29	36	37	35
Glass Doors	Starline	48	31	24	18	30	34	33	33
Exterior Door	NBS Monograph 77	0	28	18	16	25	32	38	28

Room Absorption (RA)

				Absorption Coefficients					
				Frequency (Hz.)					
Interior Characteristics	***Source***		***NRC***	***125***	***250***	***500***	***1000***	***2000***	***4000***
Carpet	Army TM 5-805-4		0.28	0.15	0.17	0.12	0.32	0.52	0.30
Furnishings	Army TM 5-805-4		0.45	0.32	0.29	0.42	0.58	0.60	0.48
Drywall	Netwell		0.07	0.09	0.08	0.05	0.03	0.06	0.09
Overall Absorption Factor (Furnished Room)			0.8	0.56	0.54	0.59	0.93	1.18	0.87

Noise Reduction

	125	***250***	***500***	***1000***	***2000***	***4000***
Noise Reduction from Absorption based upon Floor Area	-24.5	-24.5	-24.5	-24.5	-24.5	-24.5
Noise Level Increase for Defects and Exposed Surface Area	18.1	18.1	18.1	18.1	18.1	18.1
Overall Reduction from Tranmission Loss + Room Absorption - Surface Exposure						28.2
Building Façade Noise Level (dBA CNEL)						73.0
Resultant Interior Noise Level (dBA CNEL)						**45**

* Corrections for Façade Level was accounted for in the modeling.

INTERIOR NOISE CALCULATIONS

Project Name:	Lemon Grove		Ldn Consulting, Inc.
Building (s)	All		
Floor Level	3	Date:	7/1/16
Arch Plan:	2		
Room Type:	Master Bedroom	Project #	15-127

Exterior Noise Levels

		Frequency (Hz.)					
	dBA CNEL*	***125***	***250***	***500***	***1000***	***2000***	***4000***
Exterior Noise Level (Traffic Spectrum)	73.0	59.0	63.7	66.5	68.8	65.7	60.0

Transmission Loss (TL)

				Transmission Loss (dB)					
				Frequency (Hz.)					
Exterior Assembly	***Source***	***Area***	***STC***	***125***	***250***	***500***	***1000***	***2000***	***4000***
Stucco	NBS W-50-71	208	46	27	42	44	46	49	54
Windows	Starline	8	31	21	17	28	37	42	36
Fixed Window	Starline	0	31	24	19	29	36	37	35
Glass Doors	Starline	48	31	24	18	30	34	33	33
Exterior Door	NBS Monograph 77	0	28	18	16	25	32	38	28

Room Absorption (RA)

				Absorption Coefficients					
				Frequency (Hz.)					
Interior Characteristics	***Source***		***NRC***	***125***	***250***	***500***	***1000***	***2000***	***4000***
Carpet	Army TM 5-805-4		0.28	0.15	0.17	0.12	0.32	0.52	0.30
Furnishings	Army TM 5-805-4		0.45	0.32	0.29	0.42	0.58	0.60	0.48
Drywall	Netwell		0.07	0.09	0.08	0.05	0.03	0.06	0.09
Overall Absorption Factor (Furnished Room)			0.8	0.56	0.54	0.59	0.93	1.18	0.87

Noise Reduction

	125	***250***	***500***	***1000***	***2000***	***4000***
Noise Reduction from Absorption based upon Floor Area	-21.9	-21.9	-21.9	-21.9	-21.9	-21.9
Noise Level Increase for Defects and Exposed Surface Area	16.9	16.9	16.9	16.9	16.9	16.9
Overall Reduction from Tranmission Loss + Room Absorption - Surface Exposure						29.0
Building Façade Noise Level (dBA CNEL)						73.0
Resultant Interior Noise Level (dBA CNEL)						**44**

* Corrections for Façade Level was accounted for in the modeling.

INTERIOR NOISE CALCULATIONS

Project Name:	Lemon Grove		Ldn Consulting, Inc.
Building (s)	All		
Floor Level	3	Date:	7/1/16
Arch Plan:	2		
Room Type:	Bedroom 3	Project #	15-127

Exterior Noise Levels

		Frequency (Hz.)					
	dBA CNEL*	***125***	***250***	***500***	***1000***	***2000***	***4000***
Exterior Noise Level (Traffic Spectrum)	73.0	59.0	63.7	66.5	68.8	65.7	60.0

Transmission Loss (TL)

				Transmission Loss (dB)					
				Frequency (Hz.)					
Exterior Assembly	***Source***	***Area***	***STC***	***125***	***250***	***500***	***1000***	***2000***	***4000***
Stucco	NBS W-50-71	128	46	27	42	44	46	49	54
Windows	Starline	26	31	21	17	28	37	42	36
Fixed Window	Starline	0	31	24	19	29	36	37	35
Glass Doors	Starline	0	31	24	18	30	34	33	33
Exterior Door	NBS Monograph 77	0	28	18	16	25	32	38	28

Room Absorption (RA)

				Absorption Coefficients					
				Frequency (Hz.)					
Interior Characteristics	***Source***		***NRC***	***125***	***250***	***500***	***1000***	***2000***	***4000***
Carpet	Army TM 5-805-4		0.28	0.15	0.17	0.12	0.32	0.52	0.30
Furnishings	Army TM 5-805-4		0.45	0.32	0.29	0.42	0.58	0.60	0.48
Drywall	Netwell		0.07	0.09	0.08	0.05	0.03	0.06	0.09
Overall Absorption Factor (Furnished Room)			0.8	0.56	0.54	0.59	0.93	1.18	0.87

Noise Reduction

	125	***250***	***500***	***1000***	***2000***	***4000***
Noise Reduction from Absorption based upon Floor Area	-20.9	-20.9	-20.9	-20.9	-20.9	-20.9
Noise Level Increase for Defects and Exposed Surface Area	15.5	15.5	15.5	15.5	15.5	15.5
Overall Reduction from Tranmission Loss + Room Absorption - Surface Exposure						32.3
Building Façade Noise Level (dBA CNEL)						73.0
Resultant Interior Noise Level (dBA CNEL)						**41**

* Corrections for Façade Level was accounted for in the modeling.