ACOUSTICAL ANALYSIS REPORT

Winter Gardens Apartments Record ID: STP14-013

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TABLE OF CONTENTS

			<u>Page</u>	
	EXE	CUTIVE SUMMARY	1	
1.0	INTR	RODUCTION	2	
	1.1 1.2 1.3	Project Description Environmental Settings and Existing Conditions Methodology and Equipment		
2.0	NOIS	SE SENSITIVE LAND USES AFFECTED BY AIRBORNE NOISE	7	
	2.1 2.2 2.3	Guidelines for Determination of Significance Potential Noise Impacts Off-Site Direct and Cumulative Impacts		
3.0	PRO	JECT-GENERATED AIRBORNE NOISE	11	
	3.1 3.2 3.3	Guidelines for Determination of Significance Potential Operational Noise Impacts Temporary Construction Noise		
4.0	CON	CLUSION	16	
5.0	CERTIFICATION			
6.0	REFERENCES 1			

FIGURES

- 1. Vicinity Map
- 2. Assessor's Parcel Map
- 3. Satellite Aerial Photograph
- 4. Topographic Map
- 5. Site Plan Showing Current Traffic CNEL Contours and Noise Measurement Location
- 6. Site Plan Showing Future Traffic CNEL Contours and Noise Measurement Location
- 7. Site Plan Showing Future Traffic CNEL Impacts at Outdoor Use Areas
- 8. Site Plan Showing Future Traffic CNEL Impacts at Building Facades
- 9. Satellite Aerial Photograph Showing Unmitigated Equipment Noise Contours and Receiver Locations
- 10. Satellite Aerial Photograph Showing Mitigated Equipment Noise Contours and Receiver Locations Screen Walls
- 11. Satellite Aerial Photograph Showing Construction Equipment Noise Source and Worst-Case Receiver Locations

APPENDICES

- A. Project Plans
- B. Pertinent Sections of KOA Traffic Study
- C. Traffic Noise Model (TNM) Data and Results
- D. Pertinent Sections of the County of San Diego Noise Element, Report Format, and Noise Ordinance
- E. Project-Generated Traffic Noise Calculations
- F. Manufacturer Data Sheets
- G. Cadna Analysis Data and Results
- H. Construction Equipment Noise Calculations

EXECUTIVE SUMMARY

The proposed project, known as the Winter Gardens Apartments, consists of the construction of a 60-unit apartment complex on a primarily vacant site. The project site is located on Winter Gardens Boulevard, south of Rockcrest Road, in the unincorporated community of Lakeside, County of San Diego, California.

The primary noise source in the vicinity of the project site is automobile and truck traffic noise from Winter Gardens Boulevard. For multifamily residential sites, noise levels at common outdoor use areas should not exceed 65 CNEL, according to the County of San Diego Noise Compatibility Guidelines. Calculations show that, as designed, noise levels at the outdoor use areas for this project are expected to be less than the 65 CNEL requirement, and therefore, no mitigation would be required for attenuating exterior noise in these locations. Building facade noise impacts at some proposed building facades are expected to exceed 60 CNEL, and therefore, an interior noise analysis will be required for the project 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 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 standards of the County of San Diego Noise Ordinance. Mechanical noise sources to be located on site include air conditioning units at the proposed apartments and pool equipment at the common outdoor use area. It has been determined that screen walls around some of the proposed equipment would be required to mitigate noise from air conditioning units and the pool equipment at surrounding property lines. With the screen walls in place as indicated within and with pool equipment located at a setback of at least five feet from the nearest property line, all mechanical noise sources are expected to be adequately controlled at surrounding property lines. In the event that the applicant does not wish to incorporate these elements into the final design, the exact equipment type, configuration, and placement can be evaluated prior to the issuance of building permits in order to reevaluate the need for and type of mitigation required using project-specific details.

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 that 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. 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 also 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, 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 permit 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 65 CNEL or less at outdoor usable areas, in compliance with the County of San Diego noise regulations. Additionally, noise impacts from proposed project-generated traffic and 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.

1.1 Project Description

The proposed project, known as Winter Gardens Apartments, consists of the construction of a 60-unit apartment complex on a lot that is primarily vacant. Existing structures will be demolished prior to the construction of the project buildings. The complex will consist of eight buildings of two stories each and will include garage and surface parking and common outdoor useable space. The subject site is currently zoned RU (Urban Residential) with a General Plan designation of Village Residential (VR) 20. Neighboring properties to the north and west are zoned RS with a General Plan designation of VR-4.3. Properties to the south and east (across Winter Gardens Boulevard) are zoned RV with a General Plan designation of VR-4.3. Please refer to project plans provided as Appendix A for more details.

1.2 Environmental Settings & Existing Conditions

1.2.1 Project Location

The project site is located on Winter Gardens Boulevard, south of Rockcrest Road, in the unincorporated community of Lakeside, County of San Diego, California. The Assessor's Parcel Numbers (APNs) for the property are 382-191-40, -44, and -49. 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.

1.2.2 Existing Traffic Volumes

The primary noise source in the vicinity of the project site is automobile and truck traffic noise from Winter Gardens Boulevard. No other noise source is considered significant.

Winter Gardens Boulevard is a four-lane, two-way roadway, classified as a Major Road (4.1A) in the County Mobility Element. The roadway runs generally north-south along the east boundary of the project site. The posted speed limit is 45 mph, although the minimum design speed specified by the County Mobility Element is 55 mph. According to 2014 traffic counts in the project traffic study prepared by KOA Corporation, Winter Gardens Boulevard, in the vicinity of the project site, currently carries a traffic volume of approximately 14,499 Average Daily Trips (ADT). Pertinent sections of the project traffic study are provided as Appendix B.

Truck percentages were not available for Winter Gardens Boulevard, but based on neighboring and surrounding land use, roadway classification, professional experience and on-site observations, a truck percentage mix of 1.5% medium and 1.5% heavy trucks was used.

Without mitigation or proposed project structures, the project site is currently exposed to noise levels of 56 CNEL to 69 CNEL at ground level. The noise contours are irregularly shaped due to site and roadway topography. For a graphical representation of these contours, please refer to Figure 5: Site Plan Showing Current Traffic CNEL Contours and Noise Measurement Location, and for additional information, please refer to Appendix C: Traffic Noise Model (TNM) Data and Results.

1.2.3 Measured Noise Level

An on-site inspection and traffic noise measurement were made on the afternoon of Thursday, January 15, 2015. The weather conditions were as follows: clear skies, low humidity, temperatures in the mid 70's with little to no measurable wind. A noise measurement was made at the eastern edge of the project site, approximately 35 feet from the Winter Gardens Boulevard centerline. The majority of vehicles were observed to be traveling at approximately 50 mph. The microphone position was approximately five feet above grade. Traffic volumes were recorded for automobiles, medium-size trucks, and large trucks on Winter Gardens Boulevard 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 1. More information can be found in Appendix C: Traffic Noise Model (TNM) Data and Results.

Table 1. On-Site Noise Measurement Conditions and Results				
Date Thursday, January 15, 2015				
Time	1:40 p.m 1:55 p.m.			
Conditions	Clear skies, little to no measurable wind, temperature in the mid 70's, low humidity			
Measured Noise Level	72.5 dBA L _{EQ}			

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.

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 levels (LEQ) were 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 72.5 dBA L_{EQ} was compared to the calculated (modeled) noise level of 72.1 dBA L_{EQ}, for the same conditions and traffic flow. As there was only a 0.4 dBA difference between the measured and the calculated noise level, no adjustment was deemed necessary to model future noise levels for this location. Please refer to Table 2 for further evaluation.

Table 2. Calculated versus Measured Traffic Noise Data				
Location	Calculated	Measured	Difference	Correction
35 feet from Winter Gardens Blvd CL	72.1 dBA L _{EQ}	72.5 dBA L _{EQ}	0.4 dB	None Applied

1.3.3 Cadna Noise Modeling

Modeling of the outdoor noise environment to determine air conditioning and pool equipment noise impacts is accomplished using Cadna Version 4.5, 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.

In order to validate the results of the Cadna noise prediction model, the noise impacts from the air conditioning and pool equipment were manually calculated as attenuation by distance at four representative receivers. These values were compared to those predicted by Cadna. The calculated values were all found to be within 1.0 dB of the Cadna noise level. The Cadna model

includes additional attenuation due to ground absorption, to which the minor differences in modeled and calculated noise levels are attributed. Proposed project buildings were not included in this model as they will have little to no effect on mechanical noise levels at worst-case receivers. This data is summarized in Table 3 and Cadna data sheets are provided in Appendix G.

Table 3. Calculated Noise Levels for Model Comparison								
Noise Source	Receiver	Receiver Location	Distance from Source (ft) ¹ /# of Units	Calculated Noise Level ² (dBA)	Cadna Model Noise Level ³ (dBA)	Difference (dB)		
	R1	North PL	31 / 2 AC units 88 / 2 AC units	45.0	44.9	0.1		
AC Units,	R2	East PL	114 / 6 AC units 144 / 2 AC units	38.7	37.7	1.0		
Pool Equipment	R3	South PL	10 / 2 AC units 72 / 2 AC units	54.2	53.2	1.0		
	R6	South PL	5 / Pool Equipment	55.2	54.2	1.0		

¹Distances shown to nearest clusters of AC units.

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:

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

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

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

Attenuation Due To Distance

Attenuation due to distance is calculated by the equation:

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

where SPL_1 = Known sound pressure level at known distance,

 SPL_2 = Calculated sound pressure level at distance,

 D_1 = Distance from source to location of known sound pressure level, and

 D_2 = Distance from source to location of calculated sound pressure level.

²Calculated as attenuation by distance only (see Section 1.3.4)

³As predicted by Cadna model

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:

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

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.

Barrier Insertion Loss

When a barrier is placed between a source and receiver, sound attenuation can be achieved. The amount of attenuation is dependent on the height of the barrier, the wavelength of the sound, and the distance between source and receiver, source and barrier, and barrier and receiver. The amount of attenuation achieved is known as "insertion loss." The maximum amount of sound attenuation that can be achieved by a barrier is usually between 15 and 20 dB. Further information can be provided upon request.

1.3.5 Measurement Equipment

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

- Larson Davis Sound Expert LxT Type 1 Sound Level Meter, Serial # 4084
- Larson Davis Model CA250 Calibrator, Serial # 1081

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.4-1983 (R2001). 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 multifamily property should not exceed 65 CNEL at common outdoor use areas. In the event that noise levels exceed 65 CNEL, mitigation must be proposed to bring noise levels into compliance. In addition, the interior noise levels of the 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 volume was determined using the San Diego County General Plan Update 2050 Base Forecast for the Lakeside/Bostonia area, provided by County Noise Specialist Emmet Aquino. According to Mr. Aquino, the adjusted forecasted volume should be used in the analysis. The adjusted traffic volume of Winter Gardens Boulevard for the year 2050 in the vicinity of the project site is expected to be 12,300 ADT. As previously mentioned, the minimum design speed of 55 mph was also considered in the future noise environment.

2.2.1.1 Exterior

The future exterior noise impacts at the project site are primarily the result of automobile and truck traffic traveling on Winter Gardens Boulevard. Without mitigation or proposed project structures, the project site will be exposed to noise levels of 58 CNEL to 71 CNEL at ground level in the future noise environment. The noise contours are irregularly shaped due to site and roadway topography. For a graphical representation of these contours, please refer to Figure 6: Site Plan Showing Future Traffic CNEL Contours and Noise Measurement Location, and for additional information, please refer to Appendix C: Traffic Noise Model (TNM) Data and Results.

As explained above, noise levels at outdoor use areas of multifamily properties must have noise levels of 65 CNEL or less. Receivers have been placed in the Traffic Noise Model at the proposed common outdoor use areas designated on the site plan, as well as in the two primary "courtyard" areas on project plans (between Buildings 2 and 3 and between Buildings 4 and 5), which also could potentially be outdoor use areas. The model included proposed project structures. Please refer to Table 4 for calculated unmitigated traffic noise levels at the outdoor use areas. For a graphical representation of the receiver locations, please refer to Figure 7.

Table 4. Future Traffic Noise Levels at Common Outdoor Use Areas					
Receiver	Location	Exterior Traffic Noise Level (CNEL)			
OU1	Pool Area	56.9			
OU2	Group Area	53.1			
OU3	Courtyard (Buildings 2 and 3)	42.1			
OU4	Courtyard (Buildings 4 and 5)	41.5			

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 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.

Noise levels were calculated for building facades using future traffic data. Noise levels at building facades were calculated to range from approximately 36.6 CNEL at the west facade of Building 8 on the first floor to 68.9 CNEL at the east facade of Building 1 on the second floor. The results are shown in Table 5, and receiver locations are shown in Figure 8.

Table 5. Future Traffic Noise Levels at Building Facades					
Duilding	Bossiyer	Location	Exterior Traffic Noise Level (CNEL		
Building	Receiver	Location	First Floor	Second Floor	
	1-1	East	67.8	68.9	
	1-2	East	66.3	68.8	
1	1-3	South	61.7	65.3	
1	1-4	West	54.4	54.9	
	1-5	West	56.5	56.8	
	1-6	North	66.3	66.0	
	2-1	East	60.3	61.3	
2	2-2	South	47.0	50.9	
2	2-3	West	49.7	51.3	
	2-4	North	57.4	57.0	
	3-1	East	61.5	63.2	
	3-2	South	60.8	62.5	
0	3-3	South	59.3	60.7	
3	3-4	West	50.7	51.1	
	3-5	West	41.1	45.4	
	3-6	North	42.3	46.7	
	4-1	East	42.0	46.1	
	4-2	South	42.1	47.0	
4	4-3	West	41.1	42.4	
	4-4	North	53.7	52.8	
	5-1	East	54.6	56.1	
_	5-2	South	55.3	57.4	
5	5-3	West	44.5	44.6	
	5-4	North	39.9	44.9	
	6-1	East	59.7	60.5	
_	6-2	South	58.7	59.3	
6	6-3	West	48.5	46.6	
	6-4	North	51.7	53.4	
	7-1	East	50.8	51.7	
_	7-2	South	55.0	55.6	
7	7-3	West	36.9	43.2	
	7-4	North	54.4	54.2	
	8-1	East	53.0	54.0	
_	8-2	South	54.2	55.3	
8	8-3	West	36.6	41.8	
	8-4	North	53.1	52.9	

2.2.2 Design Considerations & Mitigation Measures

2.2.2.1 Exterior

As currently designed, traffic noise levels at proposed outdoor use areas for the project site are anticipated to remain in compliance with the County of San Diego requirement for noise levels of 65 CNEL or less at multifamily outdoor use areas. No mitigation is deemed necessary.

2.2.2.2 Interior

As detailed above, many of the proposed units on site are expected to be exposed to noise levels exceeding 60 CNEL in the future noise environment, and therefore, will require an interior noise analysis to determine mitigation measures necessary to achieve interior noise levels of 45 CNEL. An analysis can be prepared for these apartments at the time of building permit application.

2.3 Off-Site Direct and Cumulative Impacts

In the traffic study prepared by KOA Corporation, three intersections have been evaluated in depth to determine AM/PM peak hour and estimated daily traffic volumes. These intersections include Winter Gardens Boulevard and Woodside Avenue; Winter Gardens Boulevard and Wintercrest Drive; and Winter Gardens Boulevard and Lemon Crest Drive. All intersections have been evaluated to determine existing volumes and existing plus project volumes. No cumulative or future traffic volumes have been evaluated, per the request of the County of San Diego. 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. The maximum increase in noise levels at any intersection was found to be approximately 0.1 dB. 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 as the maximum impact falls below this threshold.

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. 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 Municipal Code 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 properties zoned RS or RV with a General Plan Land Use Designation density of less than 10.9 dwelling units per acre. Noise levels shall not exceed 55 dBA between the hours of 7 a.m. and 10 p.m. and 50 dBA between the hours of 10 p.m. and 7 a.m. at properties zoned RU with a General Plan Land Use Designation density of 10.9 or more dwelling units per acre. The code states that, at a boundary between two zones, the applicable noise limit would be the arithmetic mean of the respective limits for the two zones. As the more stringent noise limit would be applicable at the zones of all surrounding properties and the less stringent limit would be applicable at the subject property itself, the appropriate noise limit at all surrounding properties would be 47.5 dBA, the average of the two nighttime noise limits.

Section 36.409 of the County of San Diego Noise Ordinance states that 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. None of this activity is anticipated to take place on the project site, and therefore, impulsive activity has not been evaluated in any further depth.

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

3.2 Potential Operational Noise Impacts

3.2.1 Potential Build-Out Noise Conditions

Anticipated operational noise impacts from the proposed project include HVAC units at the proposed apartments and pool equipment at the common outdoor use area. The proposed HVAC units are expected to be manufactured by Carrier, and are assumed to be typical of model number CA13NA030 (2.5-ton capacity units). Sound power levels have been provided by the manufacturer in octave band values and a sound rating value. As the sum of octave band noise levels given was found to be slightly less than the given sound rating, the octave band noise levels were increased accordingly such that the total sum was equal to the sound rating. The resultant estimated spectrum for the unit is shown below in Table 6. Manufacturer data sheets have been provided as Appendix F.

Table 6. Sound Power Levels of Carrier CA13NA030 (2.5-ton Unit)								
Source		Sound F	ower at O	ctave Band	d Frequenc	cy (dBA)		Total
Source	125	250	500	1K	2K	4K	8K	(dBA)
Carrier CA13NA030	52.7	62.2	66.2	67.2	65.2	60.2	55.2	72

Pool equipment will also be placed on site. The exact make/model of the pump and associated equipment is unknown, as is the proposed location on site. In order to estimate noise levels generated by pool equipment on the subject property, noise measurements made of pool equipment at a condominium complex in Del Mar were used. Although the pool equipment measured for this analysis is larger in size than that which is expected to be used at the subject property, this noise level is expected to be representative of equipment that will be used on site. Measured sound pressure levels are shown in Table 7.

Table 7. Sound Pressure Levels of Typical Pool Equipment, at 1 Foot from Source									
Source		Sou	ınd Powe	r at Octavo	e Band Fr	equency (dB)		Total
Jource	63	125	250	500	1K	2K	4K	8K	(dBA)
Pool Equipment	63.5	69.1	65.2	66.6	64.1	61.6	58.1	52.5	69.2

According to Stu Wilson, project proponent, air conditioning units will be placed in the private patios of ground floor units located behind each unit. Air conditioning units servicing second floor apartments will also be placed on the ground floor. For purposes of this analysis, it is assumed that the pool equipment will be located at a distance of at least five feet from the southeast property line, near the southeast corner of the pool deck. Noise levels have been calculated using Cadna at the nearest surrounding noise-sensitive receivers considering this placement. All other receivers are located at a greater distance from proposed air conditioning units or pool equipment and therefore will be exposed to lesser impacts due to distance attenuation and intervening structures and/or topography. This includes receivers to the west, which are located beyond an undeveloped portion of the subject parcel. Results are shown in Table 8. 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	47.5	44.9		
R-2	East Property Line	47.5	37.7		
R-3	South Property Line (1)	47.5	53.2		
R-4	South Property Line (2)	47.5	54.0		
R-5	South Property Line (3)	47.5	55.1		
R-6	South Property Line (4)	47.5	54.2		

3.2.2 Design Considerations & Mitigation Measures

As shown above, noise levels from stationary equipment sources on site are expected to exceed the nighttime noise limits set within the County of San Diego Noise Ordinance without mitigation at properties to the south. In order to mitigate these noise levels, screen walls will be required around

some air conditioning units and the pool equipment. Pool equipment must also be located at a setback of at least five feet from the nearest property line.

Noise levels were calculated with four-foot high screen walls placed around units at the following locations: all units serving Building 3, units serving the easternmost two apartments of Building 5, and all units serving Building 6. A three-sided screen wall was also placed around the north, east, and south sides of the pool equipment (leaving the west side open) that extended one foot above the height of the equipment (six-foot high, for purposes of this analysis which assumes five-foot high pool equipment). Results are shown in Table 9 and a graphical representation of mitigated noise contours and the four-foot high screen wall and pool equipment screen wall locations is shown in Figure 10.

Table 9. Mitigated Mechanical Equipment Noise Levels at Surrounding Receivers						
Receiver	Location	Noise Limit (dBA)	Equipment Noise Level (dBA)			
R3	South Property Line (1)	47.5	46.2			
R4	South Property Line (2)	47.5	47.4			
R5	South Property Line (3)	47.5	47.5			
R6	South Property Line (4)	47.5	46.8			

Additional Considerations

With the screen walls in place as indicated within and constructed to the standards in the following paragraph, mechanical noise levels are expected to be adequately controlled at surrounding property lines; however, in the event that the developer does not wish to incorporate these elements into the final design, the exact equipment type, configuration, and placement can be evaluated prior to the issuance of building permits in order to reevaluate the need for and type of mitigation required using project-specific details.

In order to provide sufficient noise attenuation, the screen walls 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. The air conditioning unit screen walls must be at least four feet in height relative to project grade. The pool equipment screen wall must extend at least one foot above the height of the equipment itself and shall be solid on the north, south, and east sides of the enclosure. A covered enclosure would be permissible provided any openings in the enclosure are located on the west side of the structure. Any seams or cracks in walls 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.

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 north, south, east, and west, with the nearest affected receivers to the north and south.

An anticipated construction schedule was formulated using information provided by Stu Wilson, project proponent. According to Mr. Wilson, there will be approximately 7,500 cubic yards of fill and 8,850 cubic yards of cut, resulting in a total of 1,350 cubic yards to be exported from the site. This consideration was taken into account when making typical equipment assumptions. The entire process is expected to take six months. The anticipated construction schedule is shown in Table 10.

Table 10. Anticipated Construction Schedule					
Scope of Work	Estimated Duration	Anticipated Large Equipment			
Site Work (Grading, Utilities)	1 month	Dump Truck, Dozer, Loader, Backhoe			
Foundations and Pads	1 month	Concrete Mixer Truck, Concrete Pump			
Framing and Completion	4 months	Forklift, Compressor, Paver, Roller			

Please refer to Table 11 for typical noise levels of construction equipment expected to be used on site, as described above.

Table 11. Typical Construction Equipment Noise Levels ¹					
Noise Source	Duty Cycle (%)	Calculated Noise Level (L _{MAX}) at 50 feet (dBA)			
Dozer	40%	77			
Backhoe	40%	64			
Loader	40%	76			
Dump Truck	40%	75			
Concrete Mixer Truck	40%	76			
Concrete Pump	20%	74			
Paver	50%	71			
Roller	20%	69			
Forklift	40%	74			
Compressor	40%	61			

¹Source: UK Department for Environment, Food, and Rural Affairs (DEFRA) Construction Noise Database.

Receivers to the north and south were calculated for all phases of construction detailed above. In order to evaluate anticipated noise levels in these two worst-case locations, the site was divided

into four different areas from east to west. During the various phases of construction, it was assumed that all pieces of equipment would be operating simultaneously (considering duty cycle) near the center of each area, approximately 92 feet away from the north and south property line receivers in the worst-case location. This method should account for the varying distance from source to receiver as equipment moves around the site. Noise levels at east and west property lines will be less than those expected at the north and south property lines as receivers at these locations will be separated from site activity by either the unused space at the west end of the property or Winter Gardens Boulevard.

Noise levels of construction at the locations described above are shown in Table 12. Detailed calculations can be found in Appendix H: Construction Equipment Noise Calculations. A graphical representation of the source and receiver locations is shown in Figure 11.

Table 12. Temporary Construction Noise Levels at Neighboring Properties to North & South			
Phase	Equipment Used	8-Hour Average Noise Level (dBA)	
Site Work (Grading, Utilities)	Dump Truck, Dozer, Loader, Backhoe	71.7	
Foundations and Pads	Concrete Mixer Truck, Concrete Pump	67.9	
Framing and Completion	Forklift, Compressor, Paver, Roller	67.4	

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 for on-site activity.

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.

4.0 CONCLUSION

For multifamily residential sites, noise levels at common outdoor use areas should not exceed 65 CNEL, according to the County of San Diego Noise Compatibility Guidelines. Calculations show that, as designed, noise levels at the outdoor use areas for this project are expected to be less than the 65 CNEL requirement, and therefore, no mitigation would be required for attenuating exterior noise in these locations. Building facade noise impacts at some proposed building facades are expected to exceed 60 CNEL, and therefore, an interior noise analysis will be required for the project 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 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 standards of the County of San Diego Noise Ordinance. Mechanical noise sources to be located on site include air conditioning units at the proposed apartments and pool equipment at the common outdoor use area. It has been determined that screen walls around some of the proposed equipment would be required to mitigate noise from air conditioning units and the pool equipment at surrounding property lines. With the screen walls in place as indicated within and with pool equipment located at a setback of at least five feet from the nearest property line, all mechanical noise sources are expected to be adequately controlled at surrounding property lines. In the event that the applicant does not wish to incorporate these elements into the final design, the exact equipment type, configuration, and placement can be evaluated prior to the issuance of building permits in order to reevaluate the need for and type of mitigation required using project-specific details.

It is determined that typical construction activities will not exceed the County of San Diego temporary construction noise limit of 75 dBA at adjacent property lines during the construction activity. General good practice measures should be followed to ensure that noise levels remain below the County of San Diego construction noise limits, 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.

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 Winter Gardens Apartments, located on Winter Gardens Boulevard, south of Rockcrest Road, in the unincorporated community of Lakeside, County of San Diego, California. This report was prepared by Amy Hool and Jonathan Brothers.

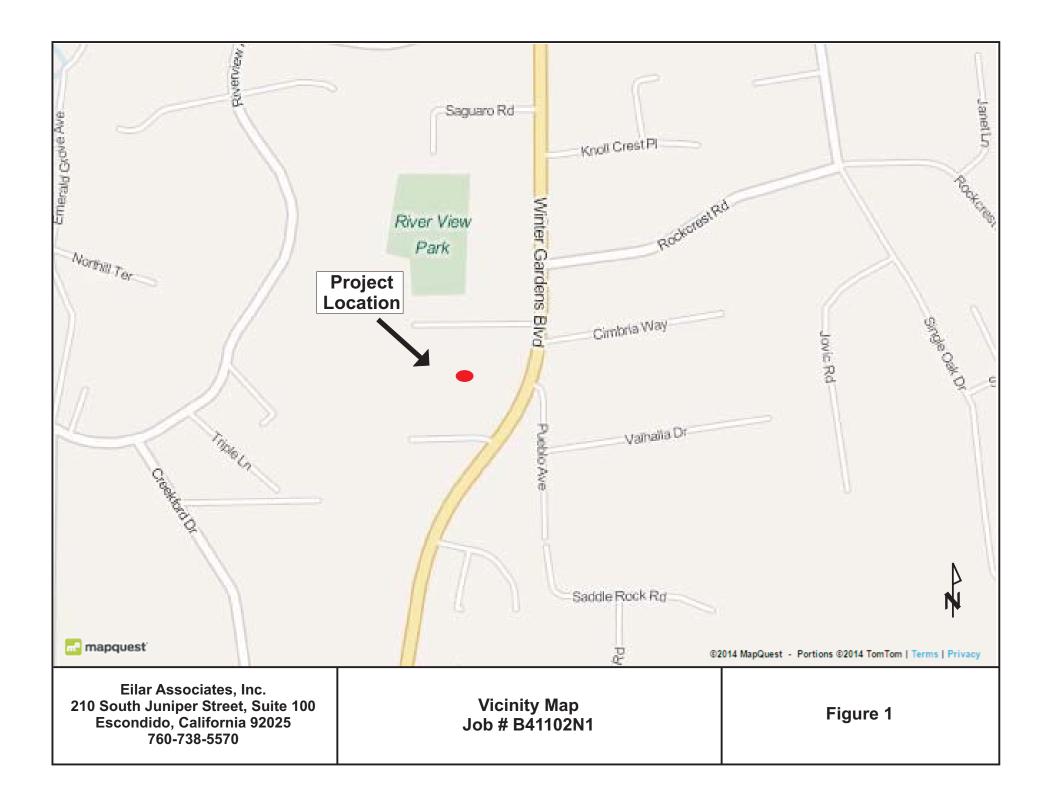
Amy Hool, Principal Acoustical Consultant

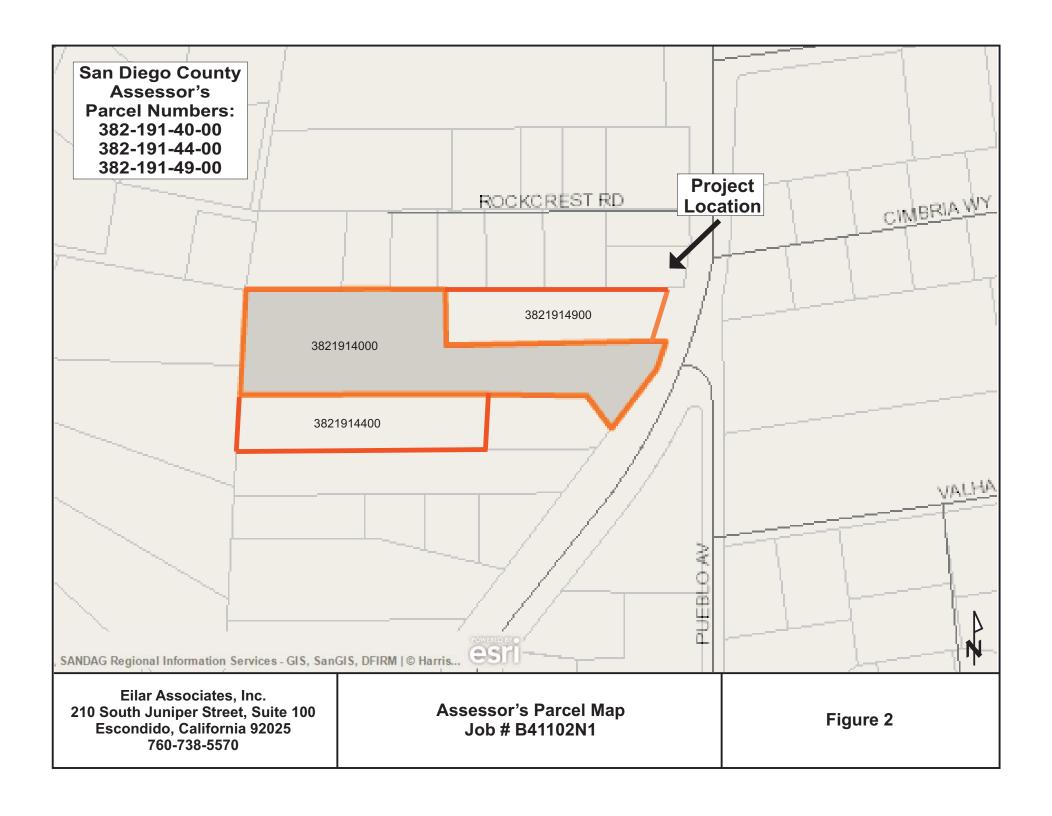
Jonathan Brothers, Senior Acoustical Consultant

6.0 REFERENCES

- 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. Irvine, Leland K., Richards, Roy L., Acoustics and Noise Control Handbook for Architects and Builders, Kreiger Publishing Company, 1998.
- 7. United States Department of Transportation Federal Highway Administration, Highway Construction Noise Handbook, Section 9.0 "Construction Equipment Noise Levels and Ranges," August 2006.
- 8. Wyle Laboratories, Development of Ground Transportation Systems Noise Contours for the San Diego Region, December, 1973
- 9. Traffic Distribution Study, by Katz-Okitsu and Associates Traffic Engineers, 1986.
- 10. UK Department for Environment, Food, and Rural Affairs (DEFRA) Construction Noise Database.
- 11. Focused Traffic Analysis for Winter Gardens Apartments, KOA Corporation, 2015.





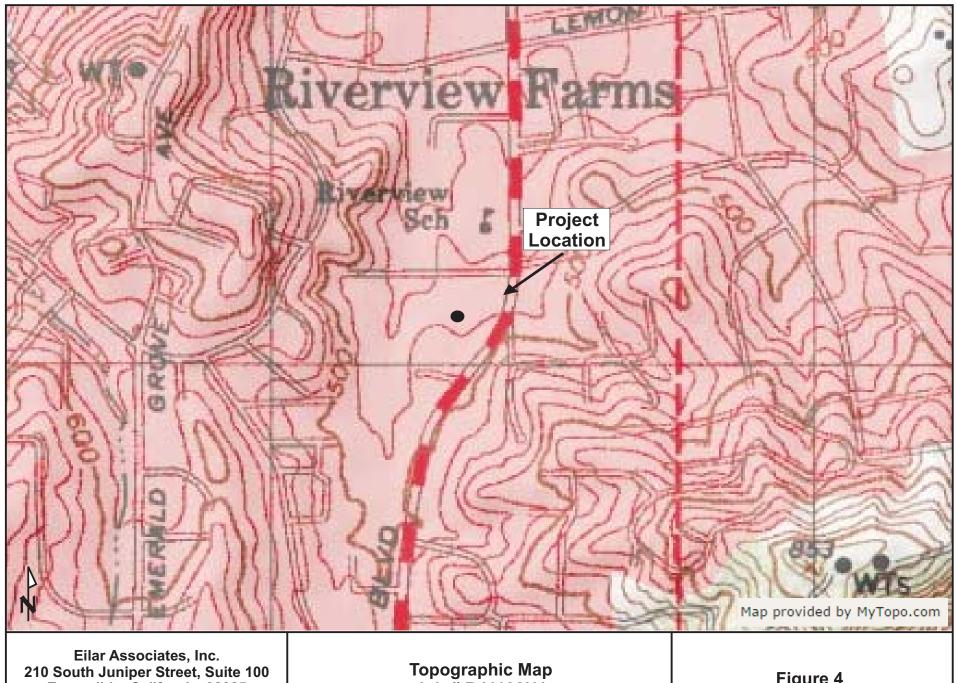




Eilar Associates, Inc. 210 South Juniper Street, Suite 100 Escondido, California 92025 760-738-5570

Satellite Aerial Photograph Job # B41102N1

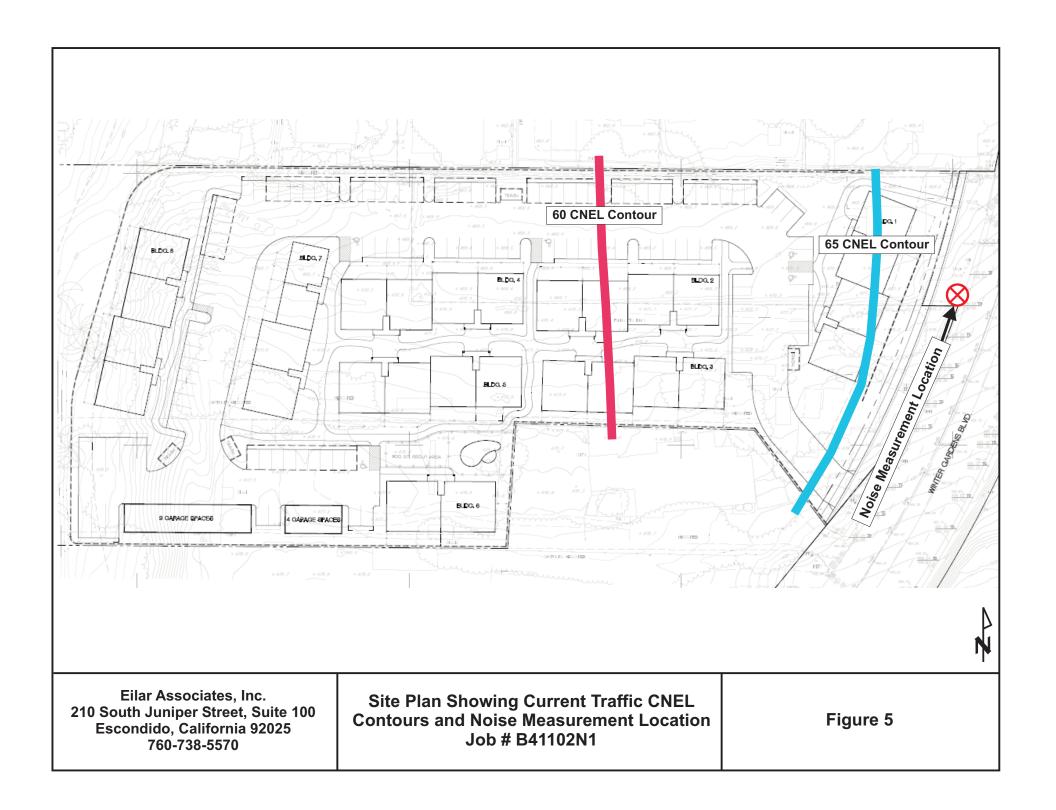
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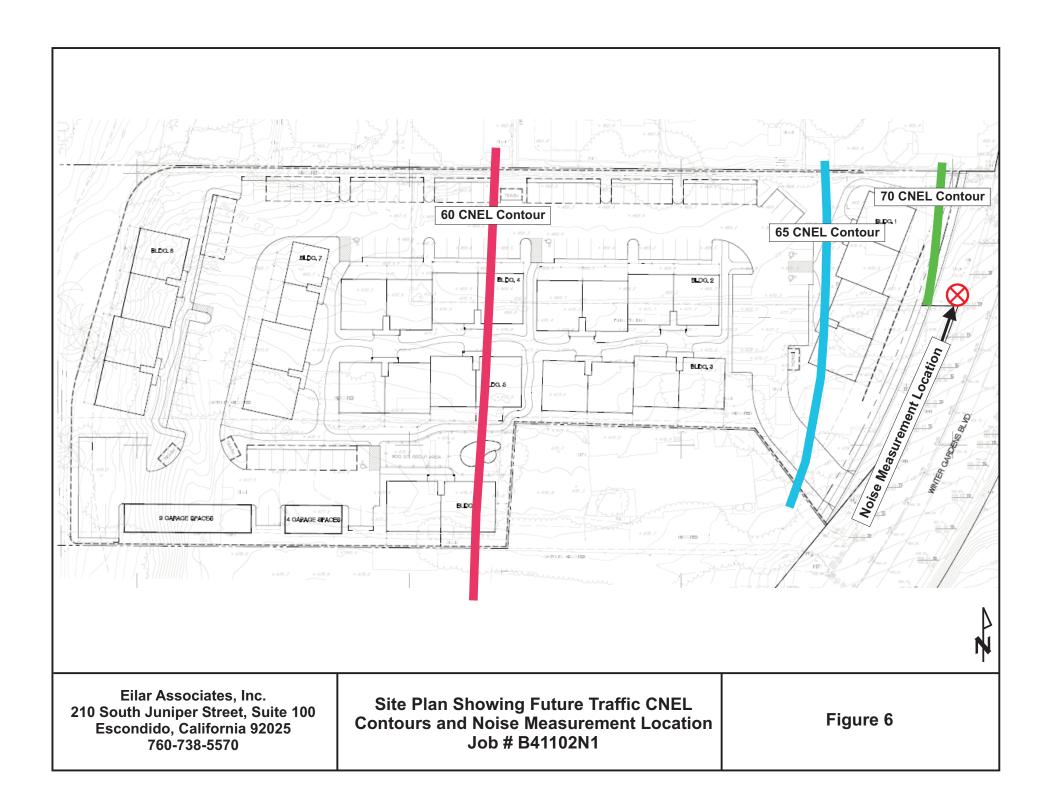


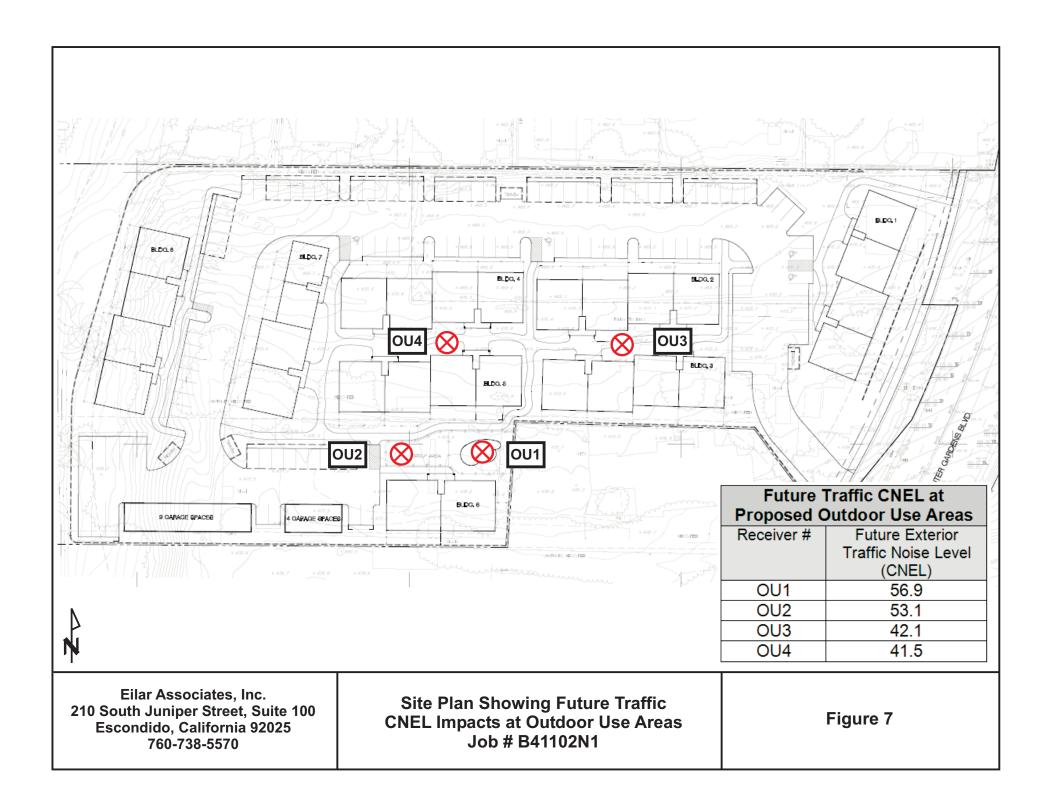
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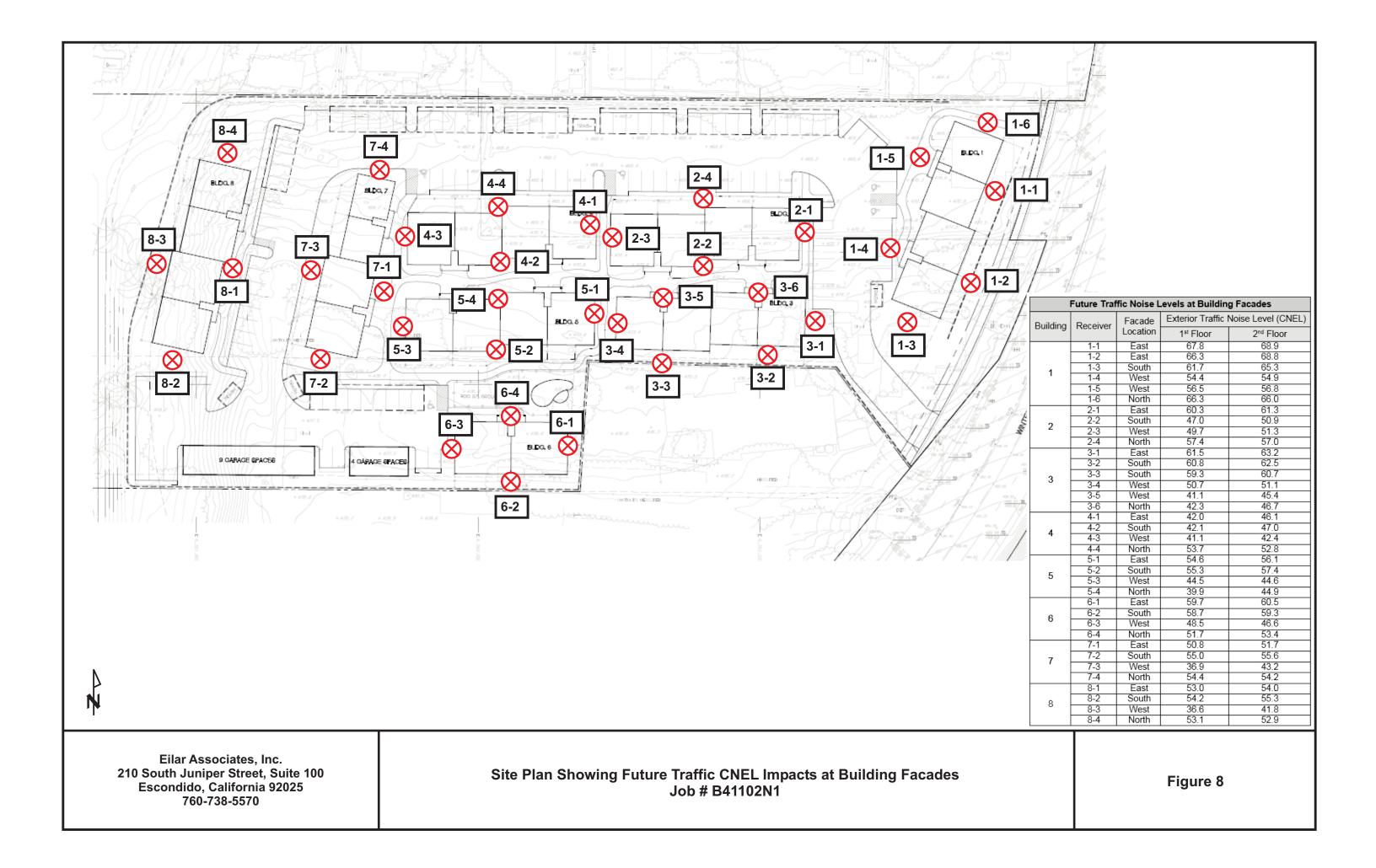
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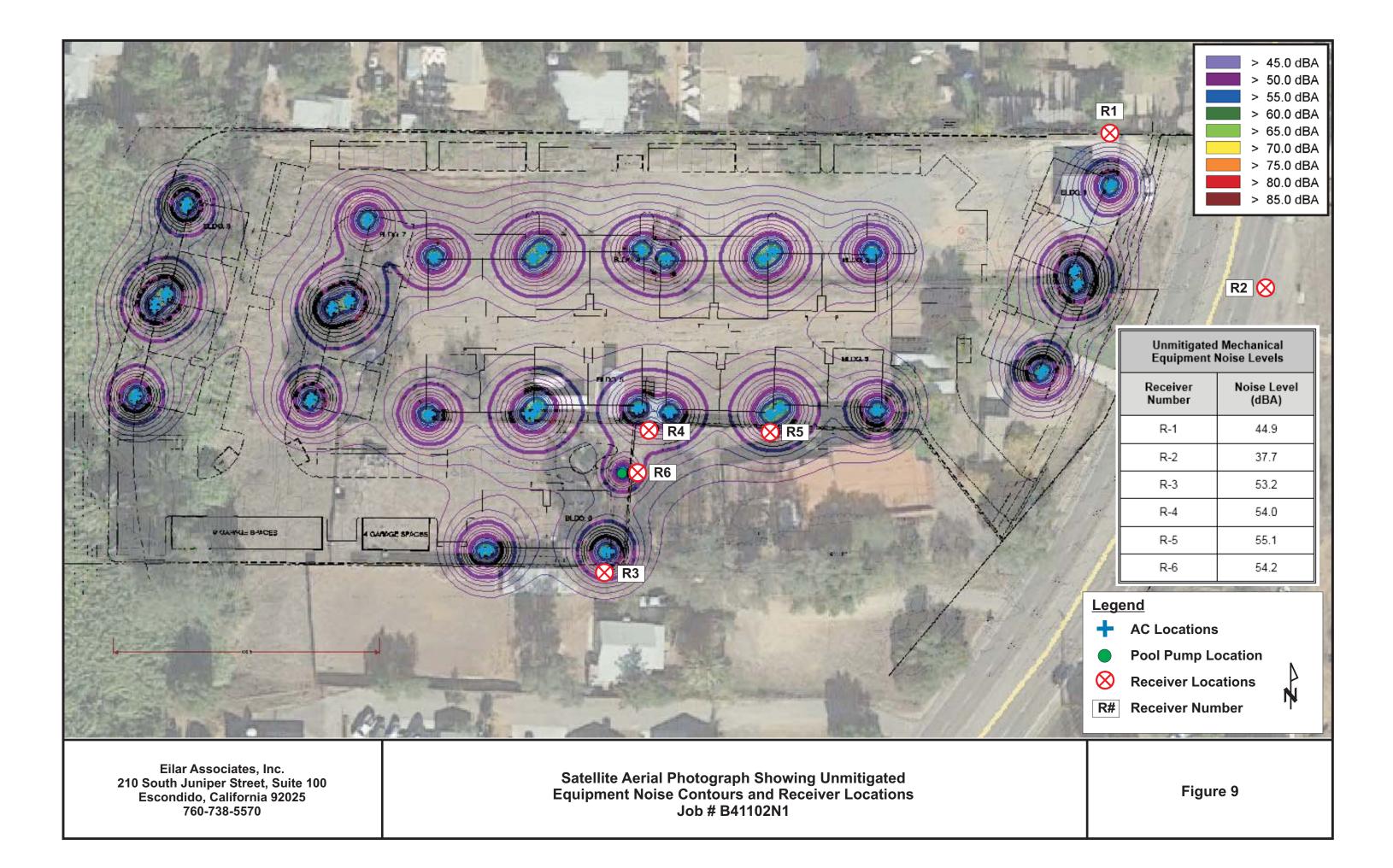
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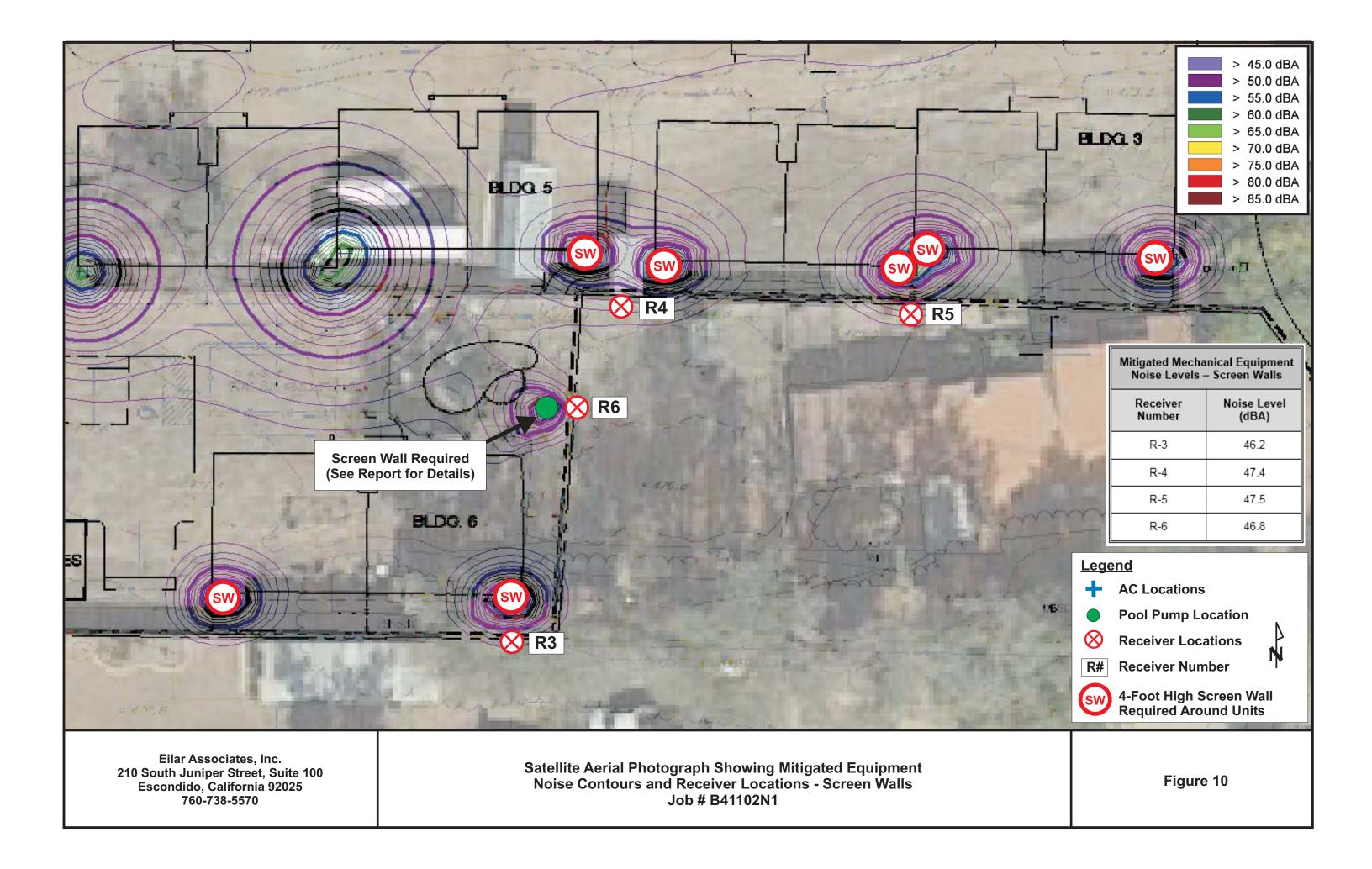


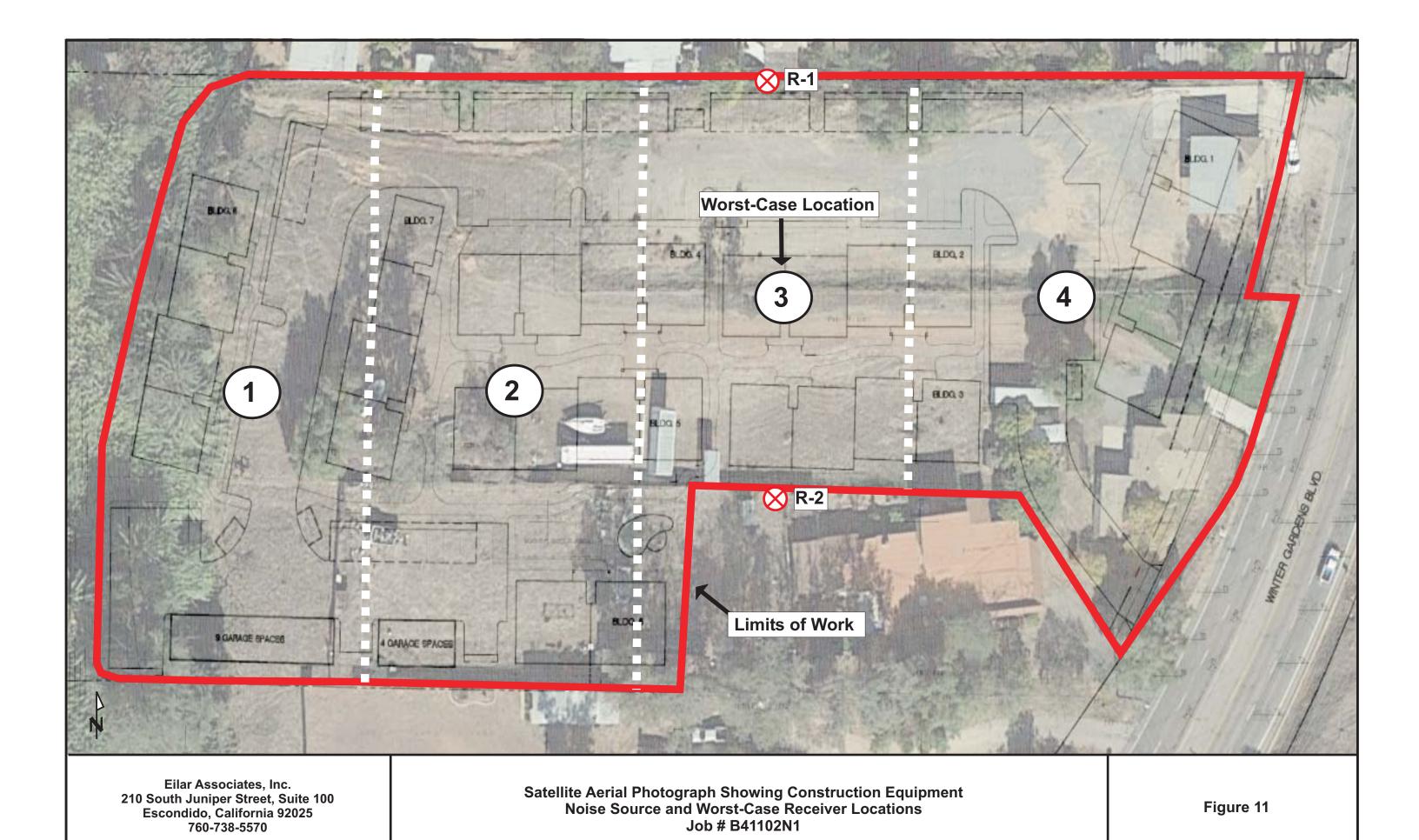






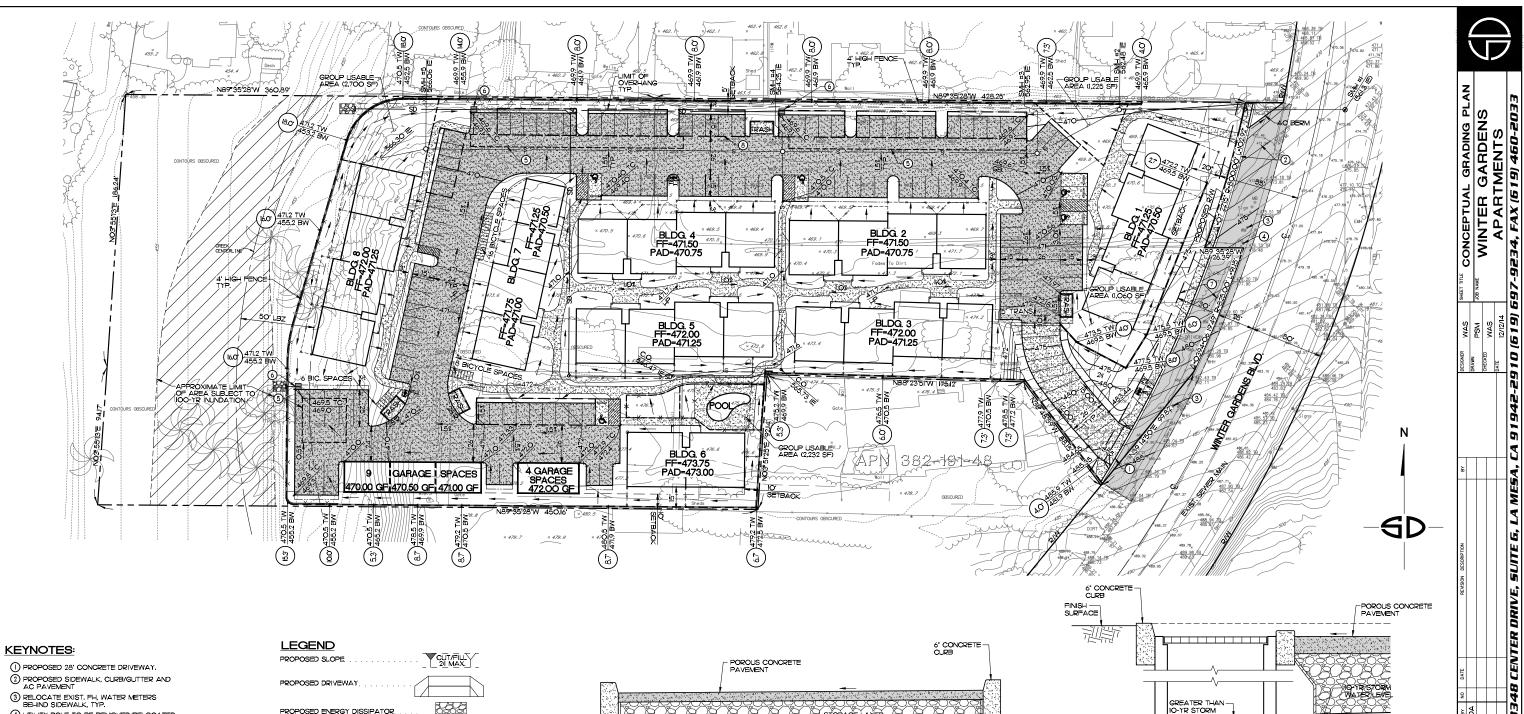






APPENDIX A

Project Plans



- 2 PROPOSED SIDEWALK, CURB/GUTTER AND AC PAVEMENT
- 4 UTILITY POLE TO BE REMOVED/RELOCATED.
- 5 PROPOSED SUBSURFACE INFILTRATION TRENCH W/IMPERMEABLE LINER.
- PROPOSED BMP OUTLET STRUCTURE WITH HYDROMODIFICATION CONTROL ORIFICE. 7 PROPOSED STREET DEDICATION.
- (8) PROPOSED CARPORTS.

PRELIMINARY GRADING PLAN NOTE

I. 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 ANY APPROVAL TO PERFORM ANY GRADING SHOWN HEREON, AND AGREES TO OBTAIN A VALID GRADING PERMIT BEFORE COMMENCING SUCH ACTIVITY.

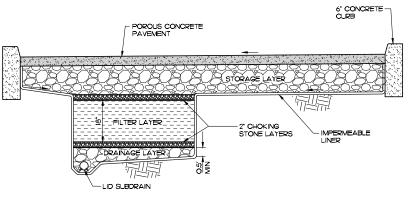
EARTHWORK QUANTITIES

GRADING

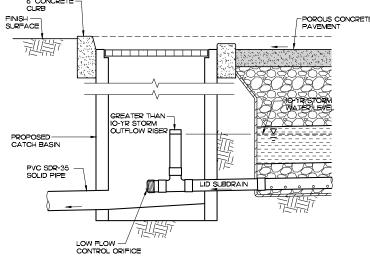
EXCAVATE:	8,850	С
FILL	7,500	C.
EXPORT:	1,350	C.

PROPOSED SLOPE	CUT/FILL 21 MAX.
PROPOSED DRIVEWAY	
PROPOSED ENERGY DISSIPATOR ROCK RIP RAP	
PROPOSED 6" CONC. CURB	
PROPOSED CATCH BASIN	
PROPOSED CLEANOUT,	٥
PROPOSED SEWER MANHOLE	\circ
PROPOSED FIRE HYDRANT	>04
PROPOSED STORM DRAIN	sp
PROPOSED SEWER LINE	s
PROPOSED WATER LINE	v
PROPOSED RETAINING WALL	
PROPOSED PERVIOUS	
PROPOSED CONCRETE	

PROPOSED A.C. PAVEMENT.



TYPICAL: SUBSURFACE INFILTRATION TRENCH NO SCALE



TYPICAL DETAIL - BMP OUTLET STRUCTURE



ENGINEER OF WORK

Snipes-Dye associates civil engineers and land surveyors 8348 Center Drive, STD. G, LA MESA, CA 91942 TELEPHONE (949) 697–8234 FAX (619) 460–2033



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APPENDIX B

Pertinent Sections of KOA Traffic Study

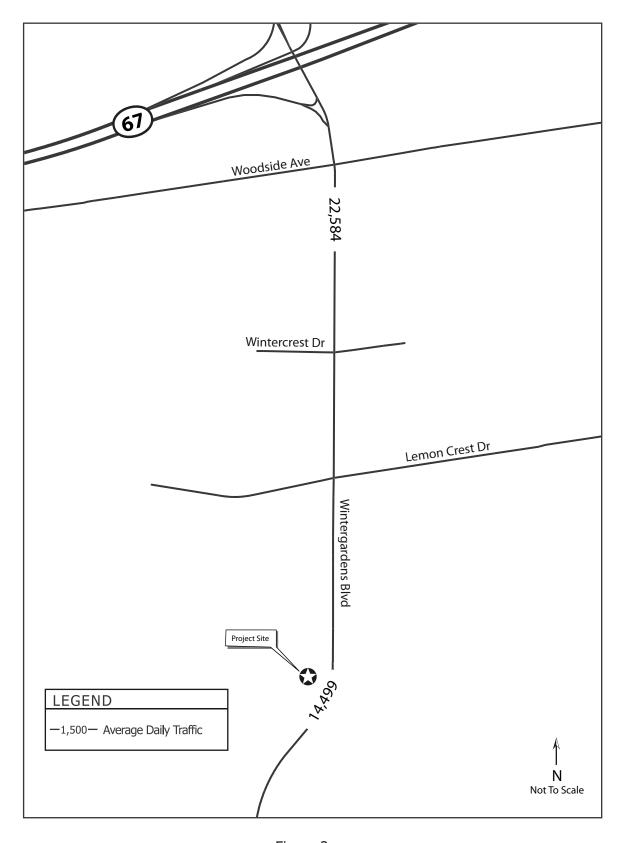


Figure 2
Existing Average Daily Traffic Segments

KOA Corporation January 2015

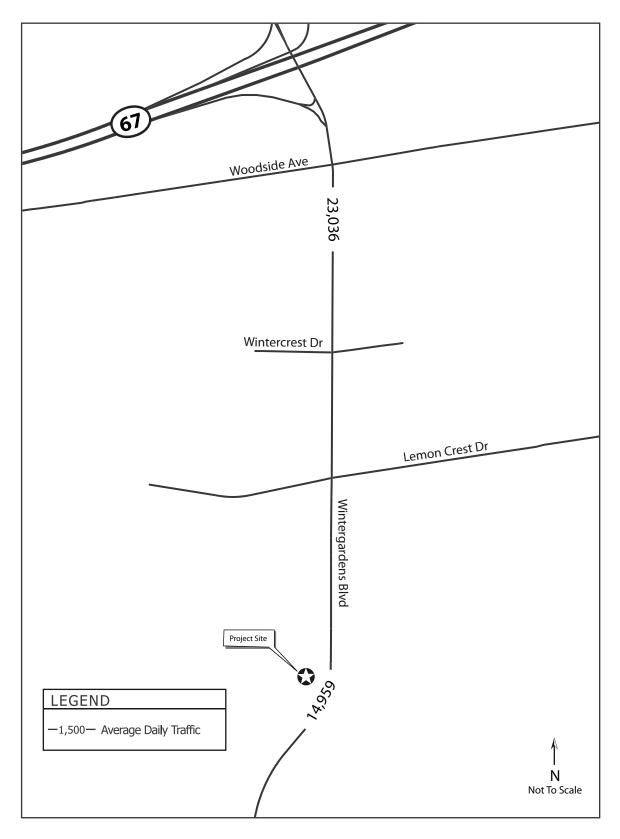


Figure 3
Existing With Project Average Daily Traffic Segments

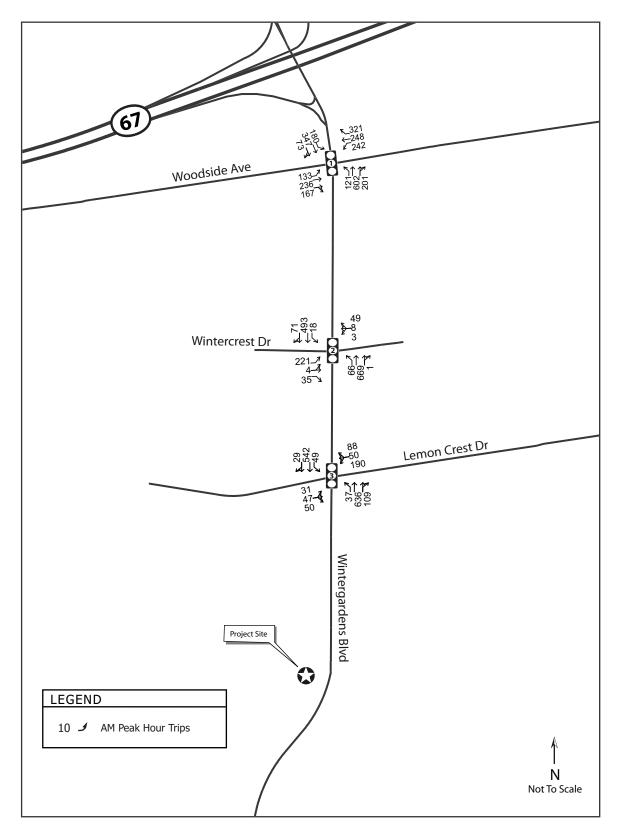


Figure 5
Existing AM Peak Turn Movements

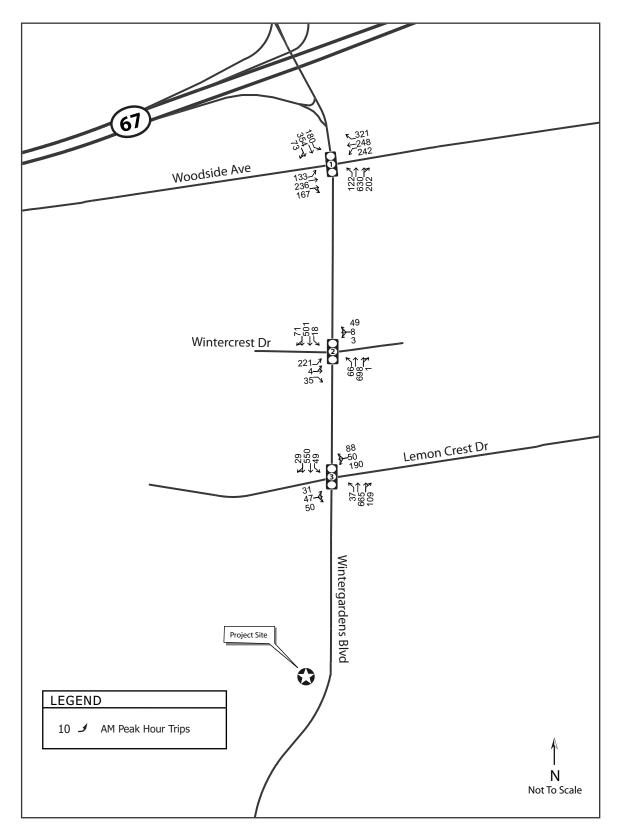


Figure 6
Existing With Project AM Peak Turn Movements

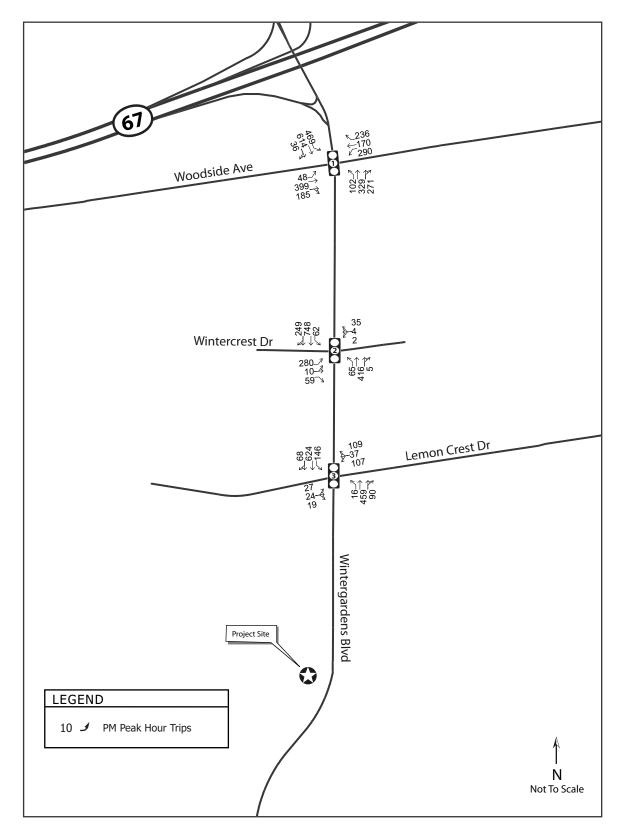


Figure 7
Existing PM Peak Turn Movements

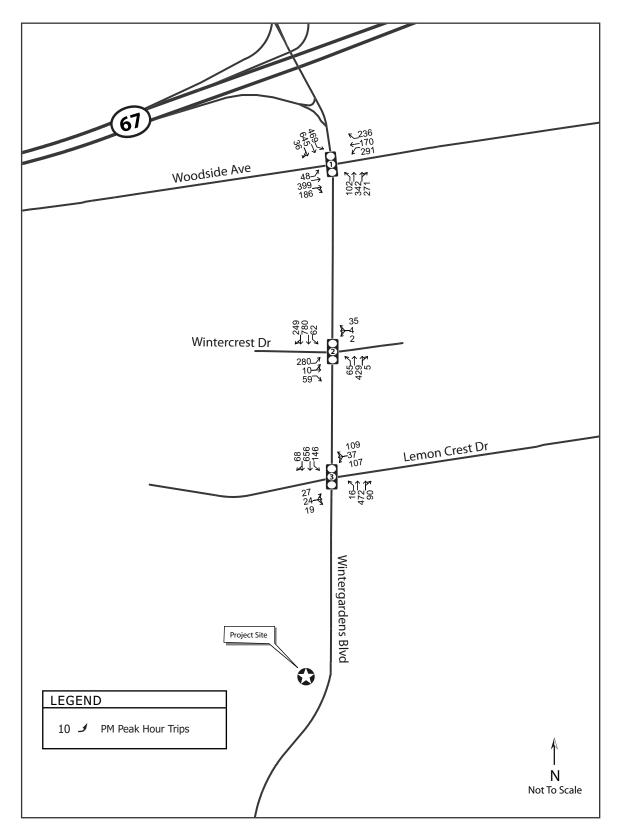


Figure 8
Existing With Project PM Peak Turn Movements

APPENDIX C

Traffic Noise Model (TNM) Data and Results

INPUT: ROADWAYS			7		,		B4110	02N1 Winterg	ardens		
Eilar Associates					27 January 2	2015					
AH					TNM 2.5	2013					
АП					I INIVI 2.3						
INPUT: ROADWAYS							Average	pavement typ	e shall be ι	used unles	S
PROJECT/CONTRACT:	B41102N	1 Winterga	rdens				a State h	ighway agend	y substant	iates the u	se
RUN:	Calibratio	n					of a diffe	rent type with	the approv	al of FHW	Α
Roadway		Points									-
Name	Width	Name	No.	Coordinates	(pavement)	-	Flow Cor	ntrol		Segment	
				X	Υ	Z	Control	Speed	Percent	Pvmt	On
							Device	Constraint	Vehicles	Туре	Struct?
									Affected		
	m			m	m	m		km/h	%		
NB Wintergardens	7.3	point1	1	235.1	-83.4	150.60				Average	
		point2	2	257.4	-0.7	150.30				Average	
		point3	3	297.3	49.3	150.30				Average	
		point4	4	324.6	82.5	149.10				Average	
		point5	5	342.4	115.2	147.80				Average	
		point6	6	362.0	169.9	144.50				Average	
		point7	7	366.7	196.6	144.50				Average	
		point8	8								
SB Wintergardens	7.3	point9	9			144.50				Average	
		point10	10							Average	
		point11	11							Average	
		point12	12							Average	
		point13	13							Average	
		point14	14							Average	
		point15	15							Average	
		point16	16	224.2	-80.5	150.60					

INPUT: TRAFFIC FOR LAeq1h Volumes						В	41102N1	Winter	gardens	-		
						_						
Eilar Associates					uary 201	5						
АН				TNM 2	.5 ∣							
INPUT: TRAFFIC FOR LAeq1h Volumes												
PROJECT/CONTRACT:	B41102N1 V	Vintergar	dens		1							
RUN:	Calibration	_										
Roadway	Points											
Name	Name	No.	Segmen	ıt								
			Autos		MTrucks	5	HTrucks	•	Buses		Motorcy	cles
			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
NB Wintergardens	point1	1	410									0
	point2	2								_		_
	point3	3										
	point4	4	410						_	0		_
	point5	5	410								_	
	point6	6							_	0		
	point7	7	410	80	6	80	6	80	0	0	0	0
	point8	8										
SB Wintergardens	point9	9	410	80	6				_	0	0	
	point10	10	410	80	6	80	6	80	0	0	0	0
	point11	11	410	80						0	0	
	point12	12							_	_		
	point13	13	410	80	6	80	6	80	0	0	0	0
	point14	14	410	80	6	80	6	80	0	0	0	0
	point15	15	410	80	6	80	6	80	0	0	0	0
	point16	16										

INPUT: RECEIVERS								B41102N1	Wintergar	dens	
Eilar Associates						27 Januar	y 2015				
АН						TNM 2.5					
INPUT: RECEIVERS											
PROJECT/CONTRACT:	B4	11102N1 W	intergardens		'						
RUN:	Ca	alibration									
Receiver											
Name	No	o. #DUs	Coordinates	(ground)		Height	Input Sou	nd Levels a	and Criteria	ā	Active
			X	Υ	Z	above	Existing	Impact Cri	iteria	NR	in
						Ground	LAeq1h	LAeq1h	Sub'l	Goal	Calc.
			m	m	m	m	dBA	dBA	dB	dB	
Calibration		1 1	342.2	153.9	146.00	1.52	0.00	66	10.0	8.0	Υ

RESULTS: SOUND LEVELS				T			B41102N1	Wintergar	dens				
Eilar Associates							27 Januar	y 2015					
AH							TNM 2.5						
							Calculate	d with TNN	1 2.5				
RESULTS: SOUND LEVELS													
PROJECT/CONTRACT:		B41102	N1 Winter	gardens									
RUN:		Calibra	tion										
BARRIER DESIGN:		INPUT	HEIGHTS					Average	pavement typ	e shall be use	d unles	s	
								a State hi	ghway agenc	y substantiat	es the u	se	
ATMOSPHERICS:		20 deg	C, 50% RH	ł				of a differ	ent type with	approval of F	HWA.		
Receiver													
Name	No.	#DUs	Existing	No Barrier					With Barrier				
			LAeq1h	LAeq1h		Increase over	existing	Туре	Calculated	Noise Reduc	ction		
				Calculated	Crit'n	Calculated	Crit'n	Impact	LAeq1h	Calculated	Goal	Calculat	ted
							Sub'l Inc					minus	
												Goal	
			dBA	dBA	dBA	dB	dB		dBA	dB	dB	dB	
Calibration	1	1 1	0.0	72.	1 66	72.1	1 10	Snd Lvl	72.1	0.0)	8	-8.0
Dwelling Units		# DUs	Noise Re	duction									
			Min	Avg	Max								
			dB	dB	dB								
All Selected		1	0.0	0.0	0.0	D							
All Impacted		1	0.0	0.0	0.0	D							
All that meet NR Goal		0	0.0	0.0	0.0	D							

C:\TNM25\B41102N1 1 27 January 2015

INPUT: TRAFFIC FOR LAeq1h Volumes						В	41102N1	Winter	gardens	S	_	
Files Accesiates				07 15		_						
Eilar Associates					uary 201	5						
АН				TNM 2	.5 _		I					
INDUT TRAFFIC FOR LANGUE VILL												
INPUT: TRAFFIC FOR LAeq1h Volumes												
PROJECT/CONTRACT:	B41102N1 Wir		dens									
RUN:	Current Conto	ours		J.								
Roadway	Points											
Name	Name	No.	Segmen	ıt								
			Autos		MTruck	5	HTrucks	5	Buses		Motorc	ycles
			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
NB Wintergardens	point1	1	408	72	6	72	6			0 0	(0 0
	point2	2	408	72	6	72	6	72		0 0	(0 0
	point3	3	408	72	6	72	6	72		0 0	(0 0
	point4	4	408	72	6	72	6	72		0 0		0 0
	point5	5	408	72	6	72	6	72		0 0	(0 0
	point6	6	408	72	6	72	6	72		0 0	(0 0
	point7	7	408	72	6	72	6	72		0 0	(0 0
	point8	8										
SB Wintergardens	point9	9	408	72	6	72	6	72		0 0	(0 0
	point10	10	408	72	6	72	6	72		0 0	(0 0
	point11	11	408	72	6	72	6	72		0 0	(0 0
	point12	12	408	72	6	72	6	72		0 0	(0 0
	point13	13	408	72	6	72	6	72		0 0	(0 0
	point14	14	408	72	6	72	6	72		0 0	(0 0
	point15	15	408	72	6	72	6	72		0 0	(0 0
	point16	16										

INPUT: RECEIVERS		i e	T		T	·	·	B41102N1	Wintergar	dens	
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AH						TNM 2.5	,				
INPUT: RECEIVERS											
PROJECT/CONTRACT:	B4110	2N1 W	intergardens								
RUN:	Currer	nt Cont	tours								
Receiver											
Name	No.	#DUs	Coordinates	(ground)		Height	Input Sou	nd Levels	and Criteria	a	Active
			X	Υ	Z	above	Existing	Impact Cr	iteria	NR	in
						Ground	LAeq1h	LAeq1h	Sub'l	Goal	Calc.
			m	m	m	m	dBA	dBA	dB	dB	
Calibration	1	1	342.2	153.9	146.00	1.52	0.00	66	10.0	8.0	Y
1	3	1	343.0	180.8	143.56	1.52	0.00	66	10.0	8.0) Y
2	4	1	343.2	165.7	143.56	1.52	0.00	66	10.0	8.0) Y
3	5	1	327.1	181.3	143.56	1.52	0.00	66	10.0	8.0) Y
4	6	1	327.0	165.6	143.56	1.52	0.00	66	10.0	8.0) Y
5	7	1	327.1	150.5	143.56	1.52	0.00	66	10.0	8.0) Y
6	8	1	327.0	135.5	143.56	1.52	0.00	66	10.0	8.0) Y
7	9	1	311.7	181.1	143.56	1.52	0.00	66	10.0	8.0) Y
8	10	1	311.8	165.8	143.56	1.52	0.00	66	10.0	8.0) Y
9	11	1	311.5	150.8	143.56	1.52	0.00	66	10.0	8.0	
10	12	1	312.1	135.5	143.56	1.52	0.00	66	10.0	8.0) Y
11	13	1	311.8	120.4	143.56	1.52	0.00	66	10.0	8.0	
12	14	1	296.5	181.2	143.56	1.52	0.00	66	10.0	8.0	
13	15										
14	16										
15	17	1									
16	19										
17	20	1									
18	21	1									
19	22	1									
20	23	1						66			
21	24	1	281.4	120.2	143.56	1.52	0.00	66	10.0	8.0) Y

INPUT: RECEIVERS							В4	1102N1 Wi	ntergarden	s	
22	25	1	266.7	181.7	143.56	1.52	0.00	66	10.0	8.0	Υ
23	26	1	266.0	166.1	143.56	1.52	0.00	66	10.0	8.0	Υ
24	27	1	265.9	151.3	143.56	1.52	0.00	66	10.0	8.0	Υ
25	28	1	266.2	136.1	143.56	1.52	0.00	66	10.0	8.0	Υ
26	29	1	266.3	120.3	143.56	1.52	0.00	66	10.0	8.0	Υ
27	30	1	251.3	181.1	143.56	1.52	0.00	66	10.0	8.0	Υ
28	31	1	250.8	165.8	143.56	1.52	0.00	66	10.0	8.0	Υ
29	32	1	250.6	151.1	143.56	1.52	0.00	66	10.0	8.0	Υ
30	33	1	250.8	135.9	143.56	1.52	0.00	66	10.0	8.0	Υ
31	34	1	251.5	120.4	143.56	1.52	0.00	66	10.0	8.0	Υ
32	35	1	235.9	181.3	143.56	1.52	0.00	66	10.0	8.0	Υ
33	36	1	236.1	166.6	143.56	1.52	0.00	66	10.0	8.0	Υ
34	37	1	235.9	151.9	143.56	1.52	0.00	66	10.0	8.0	Υ
35	39	1	236.1	135.7	143.56	1.52	0.00	66	10.0	8.0	Υ
36	40	1	236.1	121.0	143.56	1.52	0.00	66	10.0	8.0	Υ
37	41	1	235.7	105.5	143.56	1.52	0.00	66	10.0	8.0	Υ
38	42	1	221.0	181.5	143.56	1.52	0.00	66	10.0	8.0	Υ
39	43	1	220.4	165.8	143.56	1.52	0.00	66	10.0	8.0	Υ
40	44	1	220.6	151.3	143.56	1.52	0.00	66	10.0	8.0	Υ
41	45	1	220.8	135.9	143.56	1.52	0.00	66	10.0	8.0	Υ
42	46	1	220.0	120.2	143.56	1.52	0.00	66	10.0	8.0	Υ
43	47	1	220.8	105.5	143.56	1.52	0.00	66	10.0	8.0	Υ
44	48	1	205.5	181.1	143.56	1.52	0.00	66	10.0	8.0	Υ
45	49	1	205.5	166.0	143.56	1.52	0.00	66	10.0	8.0	Υ
46	50	1	205.5	151.1	143.56	1.52	0.00	66	10.0	8.0	Υ
47	51	1	205.5	136.6	143.56	1.52	0.00	66	10.0	8.0	Υ
48	53	1	205.7	121.4	143.56	1.52	0.00	66	10.0	8.0	Υ
49	54	1	205.5	105.3	143.56	1.52	0.00	66	10.0	8.0	Υ
50	55	1	190.6	181.9	143.56	1.52	0.00	66	10.0	8.0	Υ
51	56	1	189.9	166.0	143.56	1.52	0.00	66	10.0	8.0	Υ
52	57	1	190.6	151.1	143.56	1.52	0.00	66	10.0	8.0	Υ
53	58	1	190.1	135.9	143.56	1.52	0.00	66	10.0	8.0	Υ
54	59	1	190.4	120.8	143.56	1.52	0.00	66	10.0	8.0	Υ
55	60	1	190.4	104.8	143.56	1.52	0.00	66	10.0	8.0	Υ
56	61	1	175.0	181.7	143.56	1.52	0.00	66	10.0	8.0	Υ
57	62	1	175.2	166.2	143.56	1.52	0.00	66	10.0	8.0	Υ

INPUT: RECEIVERS B41102N1 Wintergardens

5	8	63	1	175.2	151.3	143.56	1.52	0.00	66	10.0	8.0	Y
5	9	64	1	175.2	136.1	143.56	1.52	0.00	66	10.0	8.0	Y
6	0	65	1	175.6	120.8	143.56	1.52	0.00	66	10.0	8.0	Y
6	1	66	1	175.0	105.5	143.56	1.52	0.00	66	10.0	8.0	Y

RESULT	S: SO	UND L	EVELS
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NEGOLIO. GOOND ELVELO				+			D-1102111	vviiitei gai	uciis				
Files Accesiates							27 Januar	204 <i>E</i>					
Eilar Associates							27 Januar	y 2015					
AH							TNM 2.5		405				
DECLII TO, COUND I EVEL C							Calculate	awith INN	/1 2.5				
RESULTS: SOUND LEVELS		D 44400	NIA Winter										
PROJECT/CONTRACT:			N1 Winter	gardens									
RUN:			t Contours								ļ		
BARRIER DESIGN:		INPUI	HEIGHTS						pavement type				
ATMOORUEDIOO		00 1	O 500/ DI						ghway agenc	-		se .	
ATMOSPHERICS:		20 deg	C, 50% RF		+	+		of a differ	ent type with	approval of F	HWA.		
Receiver													
Name	No.	#DUs	Existing	No Barrier					With Barrier				
			LAeq1h	LAeq1h		Increase over	existing	Туре	Calculated	Noise Reduc	tion		
				Calculated	Crit'n	Calculated	Crit'n	Impact	LAeq1h	Calculated	Goal	Calcula	ated
							Sub'l Inc					minus	
												Goal	
			dBA	dBA	dBA	dB	dB		dBA	dB	dB	dB	
Calibration	1	1 1	0.0	70.8	66	70.8	10	Snd Lvl	70.8	0.0	,	8	-8.0
1	3	3 1	0.0	67.1	66	67.1	10	Snd Lvl	67.1	0.0	,	8	-8.0
2	4	1 1	0.0	67.6	66	67.6	10	Snd Lvl	67.6	0.0	,	8	-8.0
3	5	5 1	0.0	63.6	66	63.6	10		63.6	0.0	,	8	-8.0
4	6	6 1	0.0	63.5	66	63.5	10		63.5	0.0	,	8	-8.0
5	7	7 1	0.0	63.4	- 66	63.4	10		63.4	0.0	,	8	-8.0
6	8	3 1	0.0	63.0	66	63.0	10		63.0	0.0	,	8	-8.0
7	9	9 1	0.0	61.5	66	61.5	10		61.5	0.0	,	8	-8.0
8	10) 1	0.0	61.5	66	61.5	10		61.5	0.0	,	8	-8.0
9	11	1	0.0	61.6	66	61.6	10		61.6	0.0		8	-8.0
10	12	2 1	0.0	61.8	66	61.8	10		61.8	0.0		8	-8.0
11	13	3 1	0.0	61.4	- 66	61.4	10		61.4	0.0	,	8	-8.0
12	14	1 1	0.0	60.1	66	60.1	10		60.1	0.0	,	8	-8.0
13	15	5 1	0.0	60.2	66	60.2	10		60.2	0.0	,	8	-8.0
14	16	5 1	0.0	60.2	66	60.2	10		60.2	0.0	,	8	-8.0
15	17	7 1	0.0	60.4	- 66	60.4	10		60.4	0.0	,	8	-8.0
16	19		0.0	60.6	66	60.6	10		60.6	0.0	,	8	-8.0
17	20		0.0	59.0	66				59.0	0.0		8	-8.0
18	21		0.0						59.0			8	-8.0
19	22		0.0						59.1			8	-8.0
20	23		0.0						59.2			8	-8.0
21	24		0.0	59.5	66	59.5	10		59.5	0.0		8	-8.0
22	25		0.0						58.0			8	-8.0
23	26	5 1	0.0	58.1	66	58.1	10		58.1	0.0		8	-8.0

RESULTS: SOUND LEVELS							B41102N1 V	Vintergar	dens			
24	27	1	0.0		58.0 60	58.0	10		58.0	0.0	8	-8.0
25	28	1	0.0		58.3 60	58.3	10		58.3	0.0	8	-8.0
26	29	1	0.0		58.5 60	58.5	10		58.5	0.0	8	-8.0
27	30	1	0.0		57.1 60	57.1	10		57.1	0.0	8	-8.0
28	31	1	0.0		57.0 60	57.0	10		57.0	0.0	8	-8.0
29	32	1	0.0		57.1 60	57.1	10		57.1	0.0	8	-8.0
30	33	1	0.0		57.4 60	57.4	10		57.4	0.0	8	-8.0
31	34	1	0.0		57.8 60	57.8	10		57.8	0.0	8	-8.0
32	35	1	0.0		56.1 60	56.1	10		56.1	0.0	8	-8.0
33	36	1	0.0		56.3 60	56.3	10		56.3	0.0	8	-8.0
34	37	1	0.0		56.5 60	56.5	10		56.5	0.0	8	-8.0
35	39	1	0.0		56.6	56.6	10		56.6	0.0	8	-8.0
36	40	1	0.0		56.9 60	56.9	10		56.9	0.0	8	-8.0
37	41	1	0.0		57.0 60	57.0	10		57.0	0.0	8	-8.0
38	42	1	0.0		55.6 60	55.6	10		55.6	0.0	8	-8.0
39	43	1	0.0		55.6 60	55.6	10		55.6	0.0	8	-8.0
40	44	1	0.0		55.8 60	55.8	10		55.8	0.0	8	-8.0
41	45	1	0.0		56.0 60	56.0	10		56.0	0.0	8	-8.0
42	46	1	0.0		56.0 60	56.0	10		56.0	0.0	8	-8.0
43	47	1	0.0		56.4 60	56.4	10		56.4	0.0	8	-8.0
44	48	1	0.0		54.8 60	54.8	10		54.8	0.0	8	-8.0
45	49	1	0.0		55.0 60	55.0	10		55.0	0.0	8	-8.0
46	50	1	0.0		55.1 60	55.1	10		55.1	0.0	8	-8.0
47	51	1	0.0		55.3 60	55.3	10		55.3	0.0	8	-8.0
48	53	1	0.0		55.4 60	55.4	10		55.4	0.0	8	-8.0
49	54	1	0.0		55.7 60	55.7	10		55.7	0.0	8	-8.0
50	55	1	0.0		54.3 60	54.3	10		54.3	0.0	8	-8.0
51	56	1	0.0		54.3 60	54.3	10		54.3	0.0	8	-8.0
52	57	1	0.0		54.6 60	54.6	10		54.6	0.0	8	-8.0
53	58	1	0.0		54.7 60	54.7	10		54.7	0.0	8	-8.0
54	59	1	0.0		54.7 60	54.7	10		54.7	0.0	8	-8.0
55	60	1	0.0		55.1 60	55.1	10		55.1	0.0	8	-8.0
56	61	1	0.0		53.7 60	53.7	10		53.7	0.0	8	-8.0
57	62	1	0.0		53.8 60		10		53.8	0.0	8	-8.0
58	63	1	0.0		54.0 60	54.0	10		54.0	0.0	8	-8.0
59	64	1	0.0		54.1 60	54.1	10		54.1	0.0	8	-8.0
60	65	1	0.0		54.2 60	54.2	10		54.2	0.0	8	-8.0
61	66	1	0.0		54.4 60	54.4	10		54.4	0.0	8	-8.0
Dwelling Units		# DUs	Noise Rec	duction								
			Min	Avg	Max							
			dB	dB	dB							

All Selected	62	0.0	0.0	0.0	
All Impacted	3	0.0	0.0	0.0	
All that meet NR Goal	0	0.0	0.0	0.0	

INPUT: TRAFFIC FOR LAeq1h Volumes			,		В	41102N1	Winter	gardens				
Eilar Associates				27 Jan	uary 201	5						
АН				TNM 2	.5							
INPUT: TRAFFIC FOR LAeq1h Volumes												
PROJECT/CONTRACT:	B41102N1 \	Nintergar	dens									
RUN:	Future Con	tours										
Roadway	Points											
Name	Name	No.	Segmen	t								
			Autos		MTrucks	3	HTrucks	3	Buses		Motorcy	cles
			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
NB Wintergardens	point1	1	346	89	5	89	5	89	C	0	0	0
	point2	2	346	89	5	89	5	89	C	0	0	0
	point3	3	346	89	5	89	5	89	C	0	0	0
	point4	4	346	89	5	89	5	89	C	0	0	0
	point5	5	346	89	5	89	5	89	C	0	0	0
	point6	6	346	89	5	89	5	89	C	0	0	0
	point7	7	346	89	5	89	5	89	C	0	0	0
	point8	8										
SB Wintergardens	point9	9	346	89	5	89	5	89	C	0	0	0
	point10	10	346	89	5	89	5	89	C	0	0	0
	point11	11	346	89	5	89	5	89	C	0	0	0
	point12	12	346	89	5	89	5	89	C	0	0	0
	point13	13	346	89	5	89	5	89	C	0	0	0
	point14	14	346	89	5	89	5	89	C	0	0	0
	point15	15	346	89	5	89	5	89	C	0	0	0
	point16	16										

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RESOLIS. SOCIAD ELVELS							DTITUZINI	vviiiteigai	uciis				
Files Accesiates							07 Januar	n. 204 <i>E</i>					
Eilar Associates							27 Januar	y 2015					
АН							TNM 2.5		405				
DECLUTE: COUND LEVEL C							Calculate	d with TNN	/1 2.5				
RESULTS: SOUND LEVELS		D 44400	NIA Winter										
PROJECT/CONTRACT:			N1 Winter	gardens									
RUN:			Contours								١		
BARRIER DESIGN:		INPUI	HEIGHTS						pavement typ				
ATMOORUEDIOO		00 1	O 500/ DI	_					ghway agenc	-		3 e	
ATMOSPHERICS:		20 deg	C, 50% RF	1		-		of a differ	rent type with	approval of F	HWA.		
Receiver													
Name	No.	#DUs	Existing	No Barrier					With Barrier				
			LAeq1h	LAeq1h		Increase over	existing	Туре	Calculated	Noise Reduc	tion		
				Calculated	Crit'n	Calculated	Crit'n	Impact	LAeq1h	Calculated	Goal	Calcula	ated
							Sub'l Inc					minus	
												Goal	
			dBA	dBA	dBA	dB	dB		dBA	dB	dB	dB	
Calibration	1	1	0.0	72.7	66	72.7	10	Snd Lvl	72.7	0.0	,	8	-8.0
1	3	3 1	0.0	69.1	66	69.1	10	Snd Lvl	69.1	0.0	,	8	-8.0
2	4	1 1	0.0	69.4	66	69.4	10	Snd Lvl	69.4	0.0	,	8	-8.0
3	5	5 1	0.0	65.5	66	65.5	10		65.5	0.0	,	8	-8.0
4	6	3 1	0.0	65.4	66	65.4	10		65.4	0.0	,	8	-8.0
5	7	1	0.0	65.2	66	65.2	2 10		65.2	0.0	,	8	-8.0
6	8	3 1	0.0	64.6	66	64.6	10		64.6	0.0	,	8	-8.0
7	9) 1	0.0	63.4	66	63.4	10		63.4	0.0	,	8	-8.0
8	10) 1	0.0	63.4	66	63.4	10		63.4	0.0	,	8	-8.0
9	11	1	0.0	63.4	66	63.4	10		63.4	0.0	,	8	-8.0
10	12	2 1	0.0	63.5	66	63.5	10		63.5	0.0		8	-8.0
11	13	3 1	0.0	62.9	66	62.9	10		62.9	0.0	,	8	-8.0
12	14	1	0.0	62.0	66	62.0	10		62.0	0.0	,	8	-8.0
13	15	5 1	0.0	62.1	66	62.1	10		62.1	0.0)	8	-8.0
14	16	5 1	0.0	62.0	66	62.0	10		62.0	0.0		8	-8.0
15	17	1	0.0	62.1	66	62.1	10		62.1	0.0		8	-8.0
16	19		0.0	62.3	66				62.3	0.0		8	-8.0
17	20		0.0	60.8	66	60.8	10		60.8	0.0		8	-8.0
18	21		0.0	60.9					60.9	0.0		8	-8.0
19	22		0.0						60.9	0.0		8	-8.0
20	23		0.0	61.0					61.0	0.0		8	-8.0
21	24		0.0	61.2	66	61.2	2 10		61.2	0.0		8	-8.0
22	25		0.0						59.8			8	-8.0
23	26	3 1	0.0	59.9	66	59.9	10		59.9	0.0	,	8	-8.0

RESULTS: SOUND LEVELS							E	341102N1 W	/intergard	dens			
24	27	1	0.0		59.8	66	59.8	10		59.8	0.0	8	-8.0
25	28	1	0.0		60.0	66	60.0	10		60.0	0.0	8	-8.0
26	29	1	0.0		60.2	66	60.2	10		60.2	0.0	8	-8.0
27	30	1	0.0		58.9	66	58.9	10		58.9	0.0	8	-8.0
28	31	1	0.0		58.8	66	58.8	10		58.8	0.0	8	-8.0
29	32	1	0.0		58.9	66	58.9	10		58.9	0.0	8	-8.0
30	33	1	0.0		59.2	66	59.2	10		59.2	0.0	8	-8.0
31	34	1	0.0		59.5	66	59.5	10		59.5	0.0	8	-8.0
32	35	1	0.0		58.0	66	58.0	10		58.0	0.0	8	-8.0
33	36	1	0.0		58.1	66	58.1	10		58.1	0.0	8	-8.0
34	37	1	0.0		58.2	66	58.2	10		58.2	0.0	8	-8.0
35	39	1	0.0		58.4	66	58.4	10		58.4	0.0	8	-8.0
36	40	1	0.0		58.6	66	58.6	10		58.6	0.0	8	-8.0
37	41	1	0.0		58.7	66	58.7	10		58.7	0.0	8	-8.0
38	42	1	0.0		57.4	66	57.4	10		57.4	0.0	8	-8.0
39	43	1	0.0		57.4	66	57.4	10		57.4	0.0	8	-8.0
40	44	1	0.0		57.6	66	57.6	10		57.6	0.0	8	-8.0
41	45	1	0.0		57.8	66	57.8	10		57.8	0.0	8	-8.0
42	46	1	0.0		57.8	66	57.8	10		57.8	0.0	8	
43	47	1	0.0		58.1	66	58.1	10		58.1	0.0	8	-8.0
44	48	1	0.0		56.6	66	56.6	10		56.6	0.0	8	-8.0
45	49	1	0.0		56.8	66	56.8	10		56.8	0.0	8	-8.0
46	50	1	0.0		56.9	66	56.9	10		56.9	0.0	8	-8.0
47	51	1	0.0		57.1	66	57.1	10		57.1	0.0	8	-8.0
48	53	1	0.0		57.1	66	57.1	10		57.1	0.0	8	-8.0
49	54	1	0.0		57.5	66	57.5	10		57.5	0.0	8	-8.0
50	55	1	0.0		56.1	66	56.1	10		56.1	0.0	8	-8.0
51	56	1	0.0		56.1	66	56.1	10		56.1	0.0	8	-8.0
52	57	1	0.0		56.3	66	56.3	10		56.3	0.0	8	-8.0
53	58	1	0.0		56.5	66	56.5	10		56.5	0.0	8	-8.0
54	59	1	0.0		56.4	66	56.4	10		56.4	0.0	8	-8.0
55	60	1	0.0		56.8	66	56.8	10		56.8	0.0	8	
56	61	1	0.0		55.5	66	55.5	10		55.5	0.0	8	-8.0
57	62	1	0.0			66	55.6	10		55.6	0.0	8	-8.0
58	63	1	0.0		55.8	66	55.8	10		55.8	0.0	8	
59	64					66	55.8	10		55.8	0.0	8	
60	65	1	0.0			66	55.9	10		55.9	0.0	8	
61	66	1	0.0			66	56.1	10		56.1	0.0	8	
Dwelling Units		# DUs	Noise Red	duction									
=			Min	Avg	Max								
1				dB	dB								

RESULTS: SOUND LEVELS

All Selected	62	0.0	0.0	0.0	
All Impacted	3	0.0	0.0	0.0	
All that meet NR Goal	0	0.0	0.0	0.0	

INFUI. BARRIERS	<u> </u>								D411	02141 4411	itergardens			1				
Files Associates					27 Janu	am. 204	 											
Eilar Associates					27 Janu	-	15											
AH					TNM 2.5	•												
INPUT: BARRIERS																		
PROJECT/CONTRACT:	B4110	02N1 Wii	ntergard	ens														
RUN:	Futur	e OU & F	acades															
Barrier			 		<u> </u>				Points									
Name	Type	Height		If Wall	If Berm			Add'tnl	Name	No.	Coordinates	(bottom)		Height	Segment			
	.,,,,	Min	Max	\$ per		Тор	Run:Rise	_			X		Z	at	Seg Ht Pe	rturbs	On	Important
				Unit		Width		Unit						Point	Incre- #Up		_	
				Area	Vol.			Length							ment			tions?
		m	m		\$/cu m	m	m:m	\$/m			m	m	m	m	m			
Bldg 1	W	0.00	30.48	-				0.00	point1	1		176.2	143.56	6.10	0.00	0 ()	
2.09 1		0.00	00.10	0.00				0.00	point2	2		158.5)	
									point3	3		158.0)	
									point4	4)	
									point5	5		136.4)	
									point6	6		154.7)	
									point7	7		155.2)	
									point8	8		172.7)	
									point9	9		176.2						
Bldg 2	W	0.00	30.48	0.00				0.00	· ·	10		158.6				0 ()	
									point11	11		148.1	143.56			0 ()	
									point12	12	270.3	148.2	143.56	6.10	0.00	0 ()	
									point13	13	270.3	146.8	143.56	6.10	0.00	0 ()	
									point14	14	250.6	147.0	143.56	6.10	0.00	0 ()	
									point15	15	250.9	157.6	143.56	6.10	0.00	0 ()	
									point16	16	270.3	157.4	143.56	6.10	0.00	0 ()	
									point17	17	270.4	158.7	143.56	6.10	0.00	0 ()	
									point18	18	290.4	158.6	143.56	6.10				
Bldg 3	W	0.00	30.48	0.00				0.00	point19	19	291.5	141.2	143.56	6.10	0.00	0 ()	
									point20	20	291.3	130.7	143.56	6.10	0.00	0 ()	
									point21	21	271.5	131.2	143.56	6.10	0.00	0 ()	
									point22	22	271.6	130.0	143.56	6.10	0.00	0 (D	
									point23	23	251.8	130.2	143.56	6.10	0.00	0 ()	
									point24	24)	
									point25	25			143.56)	
									point26	26						0 ()	
									point27	27		141.2						
Bldg 4	W	0.00	30.48	0.00				0.00	l .	28		158.1	143.56)	
									point29	29		158.0				-)	
									point30	30						-)	
									point31	31		159.1	143.56			-)	
									point32	32		148.2				-)	
									point33	33		148.6				-)	
									point34	34		147.1)	
									point35	35	208.1	147.3	143.56	6.10	0.00	0 (

INPUT: BARRIERS B41102N1 Wintergardens

IN OI. DANNERS						D-1	102141 ******	er gar uerra							
						point36	36	208.2	158.1	143.56	6.10				
Bldg 5	W	0.00	30.48	0.00	0.00	point37	37	207.9	140.4	143.56	6.10	.00	0 ()	
						point38	38	207.8	129.8	143.56	6.10	.00	0 ()	
						point39	39	227.8	129.6	143.56	6.10	.00	0 ()	
						point40	40	228.0	130.9	143.56	6.10	.00	0 ()	
						point41	41	247.5	130.8	143.56	6.10	.00	0 ()	
						point42	42	247.4	141.6	143.56	6.10	.00	0 ()	
						point43	43	227.7	141.6	143.56	6.10	.00	0 ()	
						point44	44	227.6	140.2	143.56	6.10	.00	0 ()	
						point45	45	207.8	140.6	143.56	6.10	.00	0 ()	
						point46	46	207.9	140.4	143.56	6.10				
Bldg 6	W	0.00	30.48	0.00	0.00	point47	47	218.2	115.4	143.56	6.10	.00	0 ()	
						point48	48	218.0	104.9	143.56	6.10	.00	0 ()	
						point49	49	241.6	104.7	143.56	6.10	.00	0 ()	
						point50	50	241.4	115.2	143.56	6.10	.00	0 ()	
						point51	51	218.2	115.4	143.56	6.10				
Bldg 7	W	0.00	30.48	0.00	0.00	point52	52	197.7	165.8	143.56	6.10	.00	0 ()	
						point53	53	193.9	148.6	143.56	6.10	.00	0 ()	
						point54	54	191.1	149.1	143.56	6.10	.00	0 ()	
						point55	55	186.9	130.6	143.56	6.10	.00	0 ()	
						point56	56	197.5	128.1	143.56	6.10	.00	0 ()	
						point57	57	205.7	164.1	143.56	6.10	.00	0 ()	
						point58	58	197.7	165.8	143.56	6.10				
Bldg 8	W	0.00	30.48	0.00	0.00	point59	59	164.6	168.8	143.56	6.10	.00	0 ()	
						point67	67	162.6	159.3	143.56	6.10	.00	0 ()	
						point60	60	160.5	149.8	143.56	6.10	.00	0 ()	
						point61	61	158.6	150.1	143.56		.00	0 ()	
						point62	62	154.7	131.4	143.56	6.10	.00	0 ()	
						point63	63	165.4	129.2	143.56	6.10	.00	0 ()	
						point64	64	169.7	147.9	143.56		.00	0 ()	
						point65	65	175.1	166.7	143.56	6.10	.00	0 ()	
						point66	66	164.6	168.8	143.56	6.10				

INPUT: RECEIVERS	·		·	1				B41102N1	Wintergar	dens	
Eilar Associates						27 Januar	y 2015				
АН						TNM 2.5					
INPUT: RECEIVERS											
PROJECT/CONTRACT:	B4110	2N1 W	intergardens		1						
RUN:			Facades								
Receiver											
Name	No.	#DUs	Coordinates	(ground)		Height	Input Sou	nd Levels	and Criteri	a	Active
			X	Y	Z	above	Existing	Impact Cr	iteria	NR	in
						Ground	LAeq1h	LAeq1h	Sub'l	Goal	Calc.
							ID A	ID A	ID.	ID.	
			m	m	m	m	dBA	dBA	dB	dB	
Calibration	1	1	_								-
OU1	68										
OU2	69			121.4							
OU3	70	1									
OU4	71	1	_								
1-1-1	74	1	330.2	164.2	143.56	1.52	0.00	66	10.0	8.	
1-2-1	75	1			143.56	1.52	0.00	66	10.0	8.	
1-3-1	76	1	316.0	137.1	143.56	1.52	0.00	66	10.0	8.	0 Y
1-4-1	77	1	312.6	151.2	143.56	1.52	0.00	66	10.0	8.	0 Y
1-5-1	78	1	318.1	167.8	143.56	1.52	0.00	66	10.0	8.	0 Y
1-6-1	79	1	328.4	175.3	143.56	1.52	0.00	66	10.0	8.	0 Y
1-1-2	80	1	330.4	164.3	143.56	4.57	0.00	66	10.0	8.	0 Y
1-2-2	81	1	323.6	144.9	143.56	4.57	0.00	66	10.0	8.	0 Y
1-3-2	82	1	316.0	137.2	143.56	4.57	0.00	66	10.0	8.	0 Y
1-4-2	83	1	312.7	151.3	143.56	4.57	0.00	66	10.0	8.	0 Y
1-5-2	84	1	318.1	168.1	143.56	6 4.57	0.00	66	10.0	8.	0 Y
1-6-2	85	1	328.2	175.3	143.56	6 4.57	0.00	66	10.0	8.	0 Y
2-1-1	86	1	291.3	154.1	143.56	1.52	0.00	66	10.0	8.	0 Y
2-2-1	87	1	271.4	146.9	143.56	1.52	0.00	66	10.0	8.	0 Y
2-3-1	88	1	250.0	152.5	143.56	1.52	0.00	66	10.0	8.	0 Y
2-4-1	89	1	269.3	159.0	143.56	1.52	0.00	66	10.0	8.	0 Y
2-1-2	90	1	291.5	154.2	143.56	6 4.57	0.00	66	10.0	8.	0 Y

INPUT: RECEIVERS							В	41102N1 Wi	ntergarden	s	
2-2-2	91	1	271.1	147.2	143.56	4.57	0.00	66	10.0	8.0	Υ
2-3-2	92	1	249.7	152.7	143.56	4.57	0.00	66	10.0	8.0	Υ
2-4-2	93	1	269.4	159.0	143.56	4.57	0.00	66	10.0	8.0	Υ
3-1-1	94	1	292.1	135.8	143.56	1.52	0.00	66	10.0	8.0	Υ
3-2-1	95	1	284.4	130.2	143.56	1.52	0.00	66	10.0	8.0	Υ
3-3-1	96	1	259.3	129.6	143.56	1.52	0.00	66	10.0	8.0	Υ
3-4-1	97	1	251.4	135.1	143.56	1.52	0.00	66	10.0	8.0	Υ
3-5-1	98	1	260.4	140.9	143.56	1.52	0.00	66	10.0	8.0	Υ
3-6-1	99	1	283.4	142.3	143.56	1.52	0.00	66	10.0	8.0	Υ
3-1-2	100	1	292.1	135.8	143.56	4.57	0.00	66	10.0	8.0	Υ
3-2-2	101	1	284.4	129.9	143.56	4.57	0.00	66	10.0	8.0	Υ
3-3-2	102	1	259.2	129.7	143.56	4.57	0.00	66	10.0	8.0	Υ
3-4-2	103	1	251.5	134.9	143.56	4.57	0.00	66	10.0	8.0	Υ
3-5-2	104	1	260.2	141.2	143.56	4.57	0.00	66	10.0	8.0	Υ
3-6-2	105	1	283.4	142.4	143.56	4.57	0.00	66	10.0	8.0	Υ
4-1-1	107	1	247.6	153.2	143.56	1.52	0.00	66	10.0	8.0	Υ
4-2-1	108	1	229.5	147.5	143.56	1.52	0.00	66	10.0	8.0	Υ
4-3-1	109	1	208.1	152.4	143.56	1.52	0.00	66	10.0	8.0	Υ
4-4-1	110	1	225.6	158.1	143.56	1.52	0.00	66	10.0	8.0	Υ
4-1-2	111	1	247.6	153.2	143.56	4.57	0.00	66	10.0	8.0	Υ
4-2-2	112	1	229.1	148.0	143.56	4.57	0.00	66	10.0	8.0	Υ
4-3-2	113	1	207.7	152.2	143.56	4.57	0.00	66	10.0	8.0	Υ
4-4-2	114	1	225.8	158.3	143.56	4.57	0.00	66	10.0	8.0	Υ
5-1-1	115	1	247.8	135.8	143.56	1.52	0.00	66	10.0	8.0	Υ
5-2-1	116	1	228.9	129.7	143.56	1.52	0.00	66	10.0	8.0	Υ
5-3-1	117	1	206.9	135.8	143.56	1.52	0.00	66	10.0	8.0	Υ
5-4-1	118	1	227.0	142.1	143.56	1.52	0.00	66	10.0	8.0	Υ
5-1-2	119	1	247.8	136.0	143.56	4.57	0.00	66	10.0	8.0	Υ
5-2-2	120	1	228.7	129.6	143.56	4.57	0.00	66	10.0	8.0	Υ
5-3-2	121	1	207.1	136.2	143.56	4.57	0.00	66	10.0	8.0	Υ
5-4-2	122	1	226.6	141.9	143.56	4.57	0.00	66	10.0	8.0	Υ
6-1-1	123	1	242.7	109.9	143.56	1.52	0.00	66	10.0	8.0	Υ
6-2-1	124	1	229.1	103.6	143.56	1.52	0.00	66	10.0	8.0	Υ
6-3-1	125	1	217.1	109.9	143.56	1.52	0.00	66	10.0	8.0	Υ
6-4-1	126	1	229.7	116.6	143.56	1.52	0.00	66	10.0	8.0	Υ
6-1-2	127	1	242.9	109.7	143.56	4.57	0.00	66	10.0	8.0	Υ
								I			

27 January :

INPUT: RECEIVERS					B41102N1	Wintergard	dens				
6-2-2	128	1	229.3	103.4	143.56	4.57	0.00	66	10.0	8.0	Υ
6-3-2	129	1	217.5	110.1	143.56	4.57	0.00	66	10.0	8.0	Υ
6-4-2	130	1	229.5	117.0	143.56	4.57	0.00	66	10.0	8.0	Υ
7-1-1	131	1	202.0	143.7	143.56	1.52	0.00	66	10.0	8.0	Υ
7-2-1	132	1	192.3	128.2	143.56	1.52	0.00	66	10.0	8.0	Υ
7-3-1	133	1	189.8	147.9	143.56	1.52	0.00	66	10.0	8.0	Υ
7-4-1	134	1	202.2	166.1	143.56	1.52	0.00	66	10.0	8.0	Υ
7-1-2	135	1	202.0	143.7	143.56	4.57	0.00	66	10.0	8.0	Υ
7-2-2	136	1	192.5	128.4	143.56	4.57	0.00	66	10.0	8.0	Υ
7-3-2	137	1	189.2	148.0	143.56	4.57	0.00	66	10.0	8.0	Υ
7-4-2	138	1	202.0	166.3	143.56	4.57	0.00	66	10.0	8.0	Υ
8-1-1	139	1	170.3	146.3	143.56	1.52	0.00	66	10.0	8.0	Υ
8-2-1	140	1	159.1	129.6	143.56	1.52	0.00	66	10.0	8.0	Υ
8-3-1	141	1	157.9	151.4	143.56	1.52	0.00	66	10.0	8.0	Υ
8-4-1	142	1	169.7	168.9	143.56	1.52	0.00	66	10.0	8.0	Υ
8-1-2	143	1	170.3	146.1	143.56	4.57	0.00	66	10.0	8.0	Υ
8-2-2	144	1	159.1	129.6	143.56	4.57	0.00	66	10.0	8.0	Υ
8-3-2	145	1	158.1	151.4	143.56	4.57	0.00	66	10.0	8.0	Υ
8-4-2	146	1	169.9	169.1	143.56	4.57	0.00	66	10.0	8.0	Υ

RESULTS: SOUND LEVELS							B41102N1	Wintergard	dens		1	
Eilar Associates							27 Januar	y 2015				
АН							TNM 2.5					
							Calculate	d with TNN	1 2.5			
RESULTS: SOUND LEVELS												
PROJECT/CONTRACT:			2N1 Wintero									
RUN:		Future	OU & Faca	des								
BARRIER DESIGN:		INPUT	HEIGHTS							shall be use		
										y substantiate		ie
ATMOSPHERICS:		20 deg	C, 50% RF	l				of a differ	ent type with	approval of F	HWA.	
Receiver												
Name	No.	#DUs	Existing	No Barrier					With Barrier			
			LAeq1h	LAeq1h		Increase over	existing	Туре	Calculated	Noise Reduc	tion	
				Calculated	Crit'n	Calculated	Crit'n	Impact	LAeq1h	Calculated	Goal	Calculated
							Sub'l Inc					minus
												Goal
			dBA	dBA	dBA	dB	dB		dBA	dB	dB	dB
Calibration	1	1	0.0	72.7	66	72.7	10	Snd Lvl	72.7	0.0		8 -8.0
OU1	68	1	0.0	54.9	66	54.9	10		54.9	0.0		8 -8.0
OU2	69	1	0.0	51.1	66	51.1	10		51.1	0.0		8 -8.0
OU3	70	1	0.0	40.1	66	40.1	10		40.1	0.0		8 -8.0
OU4	71	1	0.0	39.5	66	39.5	10		39.5	0.0		8 -8.0
1-1-1	74	1	0.0	65.8	66	65.8	10		65.8	0.0		8 -8.0
1-2-1	75	1	0.0	64.3	66	64.3	10		64.3	0.0		8 -8.0
1-3-1	76	1	0.0	59.7	66	59.7	10		59.7	0.0		8 -8.0
1-4-1	77	1	0.0	52.4	66	52.4	10		52.4	0.0		8 -8.0
1-5-1	78	1	0.0	54.5	66	54.5	10		54.5	0.0		8 -8.0
1-6-1	79	1	0.0	64.3	66	64.3	10		64.3	0.0		8 -8.0
1-1-2	80	1	0.0	66.9	66	66.9	10	Snd Lvl	66.9	0.0		8 -8.0
1-2-2	81	1	0.0	66.8	66	66.8	3 10	Snd Lvl	66.8	0.0		8 -8.0
1-3-2	82	1	0.0	63.3	66	63.3	3 10		63.3	0.0		8 -8.0
1-4-2	83	1	0.0	52.9	66	52.9	10		52.9	0.0		8 -8.0
1-5-2	84	1	0.0	54.8	66	54.8	3 10		54.8	0.0		8 -8.0
1-6-2	85	1	0.0	64.0	66	64.0	10		64.0	0.0		8 -8.0
2-1-1	86	1	0.0	58.3	66	58.3	3 10		58.3	0.0		8 -8.0
2-2-1	87	1	0.0	45.0	66	45.0	10		45.0	0.0		8 -8.0
2-3-1	88	1	0.0	47.7	66	47.7	10		47.7	0.0		8 -8.0

55.4

59.3

48.9

49.3

66

66

66

66

55.4

59.3

48.9

49.3

10

10

10

10

55.4

59.3

48.9

49.3

0.0

0.0

0.0

0.0

-8.0

-8.0

-8.0

-8.0

89

90

91

92

1

1

0.0

0.0

0.0

0.0

2-4-1

2-1-2

2-2-2

2-3-2

RESULTS: SOUND LEVELS			B41102N1 Wintergardens												
2-4-2	93	1	0.0	55.0	66	55.0	10		55.0	0.0	8	-8.0			
3-1-1	94	1	0.0	59.5	66	59.5	10		59.5	0.0	8	-8.0			
3-2-1	95	1	0.0	58.8	66	58.8	10		58.8	0.0	8	-8.0			
3-3-1	96	1	0.0	57.3	66	57.3	10		57.3	0.0	8	-8.0			
3-4-1	97	1	0.0	48.7	66	48.7	10		48.7	0.0	8	-8.0			
3-5-1	98	1	0.0	39.1	66	39.1	10		39.1	0.0	8	-8.0			
3-6-1	99	1	0.0	40.3	66	40.3	10		40.3	0.0	8	-8.0			
3-1-2	100	1	0.0	61.2	66	61.2	10		61.2	0.0	8	-8.0			
3-2-2	101	1	0.0	60.5	66	60.5	10		60.5	0.0	8	-8.0			
3-3-2	102	1	0.0	58.7	66	58.7	10		58.7	0.0	8	-8.0			
3-4-2	103	1	0.0	49.1	66	49.1	10		49.1	0.0	8	-8.0			
3-5-2	104	1	0.0	43.4	66	43.4	10		43.4	0.0	8	-8.0			
3-6-2	105	1	0.0	44.7	66	44.7	10		44.7	0.0	8	-8.0			
4-1-1	107	1	0.0	40.0	66	40.0	10		40.0	0.0	8	-8.0			
4-2-1	108	1	0.0	40.1	66	40.1	10		40.1	0.0	8	-8.0			
4-3-1	109	1	0.0	39.1	66	39.1	10		39.1	0.0	8	-8.0			
4-4-1	110	1	0.0	51.7	66	51.7	10		51.7	0.0	8	-8.0			
4-1-2	111	1	0.0	44.1	66	44.1	10		44.1	0.0	8	-8.0			
4-2-2	112	1	0.0	45.0	66	45.0	10		45.0	0.0	8	-8.0			
4-3-2	113	1	0.0	40.4	66	40.4	10		40.4	0.0	8	-8.0			
4-4-2	114	1	0.0	50.8	66	50.8	10		50.8	0.0	8	-8.0			
5-1-1	115	1	0.0	52.6	66	52.6	10		52.6	0.0	8	-8.0			
5-2-1	116	1	0.0	53.3	66	53.3	10		53.3	0.0	8	-8.0			
5-3-1	117	1	0.0	42.5	66	42.5	10		42.5	0.0	8	-8.0			
5-4-1	118	1	0.0	37.9	66	37.9	10		37.9	0.0	8	-8.0			
5-1-2	119	1	0.0	54.1	66	54.1	10		54.1	0.0	8	-8.0			
5-2-2	120	1	0.0	55.4	66	55.4	10		55.4	0.0	8	-8.0			
5-3-2	121	1	0.0	42.6	66	42.6	10		42.6	0.0	8	-8.0			
5-4-2	122	1	0.0	42.9	66	42.9	10		42.9	0.0	8	-8.0			
6-1-1	123	1	0.0	57.7	66	57.7	10		57.7	0.0	8	-8.0			
6-2-1	124	1	0.0	56.7	66	56.7	10		56.7	0.0	8	-8.0			
6-3-1	125	1	0.0	46.5	66	46.5	10		46.5	0.0	8	-8.0			
6-4-1	126	1	0.0	49.7	66	49.7	10		49.7	0.0	8	-8.0			
6-1-2	127	1	0.0	58.5	66	58.5	10		58.5	0.0	8	-8.0			
6-2-2	128	1	0.0	57.3	66	57.3	10		57.3	0.0	8	-8.0			
6-3-2	129	1	0.0	44.6	66	44.6	10		44.6	0.0	8	-8.0			
6-4-2	130	1	0.0	51.4	66	51.4	10		51.4	0.0	8	-8.0			
7-1-1	131	1	0.0	48.8	66	48.8	10		48.8	0.0	8	-8.0			
7-2-1	132	1	0.0	53.0	66	53.0	10		53.0	0.0	8	-8.0			
7-3-1	133	1	0.0	34.9	66	34.9	10		34.9	0.0	8	-8.0			
7-4-1	134	1	0.0	52.4	66	52.4	10		52.4	0.0	8	-8.0			

RESULTS: SOUND LEVELS	B41102N1 Wintergardens										
7-1-2	135	1	0.0	49.7	66	49.7	10	 49.7	0.0	8	-8.0
7-2-2	136	1	0.0	53.6	66	53.6	10	 53.6	0.0	8	-8.0
7-3-2	137	1	0.0	41.2	66	41.2	10	 41.2	0.0	8	-8.0
7-4-2	138	1	0.0	52.2	66	52.2	10	 52.2	0.0	8	-8.0
8-1-1	139	1	0.0	51.0	66	51.0	10	 51.0	0.0	8	-8.0
8-2-1	140	1	0.0	52.2	66	52.2	10	 52.2	0.0	8	-8.0
8-3-1	141	1	0.0	34.6	66	34.6	10	 34.6	0.0	8	-8.0
8-4-1	142	1	0.0	51.1	66	51.1	10	 51.1	0.0	8	-8.0
8-1-2	143	1	0.0	52.0	66	52.0	10	 52.0	0.0	8	-8.0
8-2-2	144	1	0.0	53.3	66	53.3	10	 53.3	0.0	8	-8.0
8-3-2	145	1	0.0	39.8	66	39.8	10	 39.8	0.0	8	-8.0
8-4-2	146	1	0.0	50.9	66	50.9	10	 50.9	0.0	8	-8.0
Dwelling Units		# DUs	Noise Re	duction							
			Min	Avg	Max						
			dB	dB	dB						
All Selected		77	0.0	0.0	0.0						
All Impacted		3	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.

COUNTY OF SAN DIEGO

Table N-1 Noise Compatibility Guidelines												
Land Use Category		55			Exterior Noise			Level (CNEL)		75		80
А	Residential—single family residences, mobile homes, senior housing, convalescent homes											
В	Residential—multi-family residences, mixed-use (commercial/residential)											
С	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 <u>Guidelines for the Determination of Significance</u> (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. <u>Corridors, hallways, stairwells, closets, bathrooms, or any room</u> with a volume less than 490 cubic feet.

2.2 <u>Potential Noise Impacts</u>

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 <u>36.409</u> 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 <u>Table 36.404</u>, 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,	7 a.m. to 10 p.m.	50
S80, S81, S90, S92, RV, and RU with a General Plan Land Use Designation density of less than 10.9 dwelling units per acre.	10 p.m. to 7 a.m.	45
(2) RRO, RC, RM, S86, V5, RV	7 a.m. to 10 p.m.	55
and RU with a General Plan Land Use Designation density of 10.9 or more dwelling units per acre.	10 p.m. to 7 a.m.	50
(3) S94, V4, and all commercial	7 a.m. to 10 p.m.	60
zones.	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 <u>Table</u> 36.404 above that apply in an S88 zone depend on the use being made of the property. The limits in <u>Table</u> 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 <u>Table 36.404</u>, 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 <u>36.402</u> 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 <u>36.404</u> and the limitations on construction equipment in section <u>36.409</u>, 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 <u>Table 36.410A</u>, 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 <u>Table 36.410A</u> 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 <u>Table 36.410B</u>, 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 <u>Table 36.410B</u> 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: Wintergardens Apts

Project #: B41102N1 **Date:** 1/27/2015

Intersection: Wintergardens & Woodside

AM Peak Hour Traffic

Approach	Existing		Existing + Project		
	<u>Volume</u>	<u>Total</u>	<u>Volume</u>	<u>Total</u>	
North Right	73		73		
North Straight	347	1656	354	1691	
North Left	180		180		
East Right	321		321		
East Straight	248	1428	248	1429	
East Left	242		242		
South Right	201		202		
South Straight	602	1680	630	1717	
South Left	121		122		
West Right	167		167		
West Straight	236	978	236	979	
West Left	133		133		

Direct: Existing vs.		
Existing + Project		
North	0.1	
East	0.0	
South	0.1	
West	0.0	

Project-Generated Traffic Noise Impact Calculations

Project: Wintergardens Apts

Project #: B41102N1 **Date:** 1/27/2015

Intersection: Wintergardens & Woodside

PM Peak Hour Traffic

Approach	Existing		Existing + Project		
	<u>Volume</u>	<u>Total</u>	<u>Volume</u>	<u>Total</u>	
North Right	36		36		
North Straight	614	1732	645	1776	
North Left	469		469		
East Right	236		236		
East Straight	170	1835	170	1836	
East Left	290		291		
South Right	271		271		
South Straight	329	1791	342	1837	
South Left	102		102		
West Right	185		186		
West Straight	399	940	399	941	
West Left	48		48	Ĭ	

Direct: Existing vs.			
Existing + Project			
North	0.1		
East 0.0			
South	0.1		
West	0.0		

Project-Generated Traffic Noise Impact Calculations

Project: Wintergardens Apts

Project #: B41102N1 **Date:** 1/27/2015

Intersection: Wintergardens & Wintercrest

AM Peak Hour Traffic

Approach	Existing		Existing + Project		
	<u>Volume</u>	<u>Total</u>	<u>Volume</u>	<u>Total</u>	
North Right	71		71		
North Straight	493	1521	501	1558	
North Left	18		18		
East Right	49		49		
East Straight	8	83	8	83	
East Left	3		3		
South Right	1		1		
South Straight	669	1267	698	1304	
South Left	66		66		
West Right	35		35		
West Straight	4	405	4	405	
West Left	221	1	221		

Direct: Existing vs.		
Existing + Project		
North	0.1	
East	0.0	
South	0.1	
West	0.0	

Project-Generated Traffic Noise Impact Calculations

Project: Wintergardens Apts

Project #: B41102N1 **Date:** 1/27/2015

Intersection: Wintergardens & Wintercrest

PM Peak Hour Traffic

Approach	Existing		Existing + Project		
	<u>Volume</u>	<u>Total</u>	<u>Volume</u>	<u>Total</u>	
North Right	249		249		
North Straight	748	1790	780	1835	
North Left	62		62		
			•		
East Right	35		35		
East Straight	4	118	4	118	
East Left	2		2		
1 1					
South Right	5		5		
South Straight	416	1295	429	1340	
South Left	65		65	Ĭ	
West Right	59		59		
West Straight	10	667	10	667	
West Left	280		280		

Direct: Existing vs.								
Existing + Project								
North	0.1							
East	0.0							
South	0.1							
West	0.0							

Project-Generated Traffic Noise Impact Calculations

Project: Wintergardens Apts

Project #: B41102N1 **Date:** 1/27/2015

Intersection: Wintergardens & Lemon Crest

AM Peak Hour Traffic

Approach	Exis	ting	Existing + Project						
	<u>Volume</u> <u>Total</u>		<u>Volume</u>	<u>Total</u>					
North Right	29		29						
North Straight	542	1375	550	1412					
North Left	49		49						
East Right	88		88						
East Straight	50	533	50	533					
East Left	190		190						
South Right	109		109						
South Straight	636	1564	665	1601					
South Left	37		37						
West Right	50		50						
West Straight	47	244	47	244					
West Left	31		31						

Direct:	Direct: Existing vs.							
Existi	ng + Project							
North	0.1							
East	0.0							
South	0.1							
West	0.0							

Project-Generated Traffic Noise Impact Calculations

Project: Wintergardens Apts

Project #: B41102N1 **Date:** 1/27/2015

Intersection: Wintergardens & Lemon Crest

PM Peak Hour Traffic

Approach	Exis	ting	Existing + Project				
	<u>Volume</u> <u>Total</u>		<u>Volume</u>	<u>Total</u>			
North Right	68		68				
North Straight	624	1433	656	1478			
North Left	146		146				
East Right	109		109				
East Straight	37	513	37	513			
East Left	107		107	Ĭ			
South Right	90		90				
South Straight	459	1315	472	1360			
South Left	16		16	T I			
West Right	19		19	_			
West Straight	24	191	24	191			
West Left	27		27]			

Direct: Existing vs.								
Existing + Project								
North	0.1							
East	0.0							
South	0.1							
West	0.0							

APPENDIX F

Manufacturer Data Sheets



Product Data



Carrier's CA13 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.

INDUSTRY LEADING FEATURES / BENEFITS

Efficiency

- 13.0 SEER / 10.9 11 EER (based on tested combination)
- Microtube Technology[™] refrigeration system
- Energy Star® combinations

Reliability

- Puron® refrigerant environmentally sound, won't deplete the ozone layer and low lifetime servce cost.
- Scroll compressor
- Internal pressure relief valve
- Internal thermal overload
- Filter drier

Durability

WeatherArmor™ protection package:

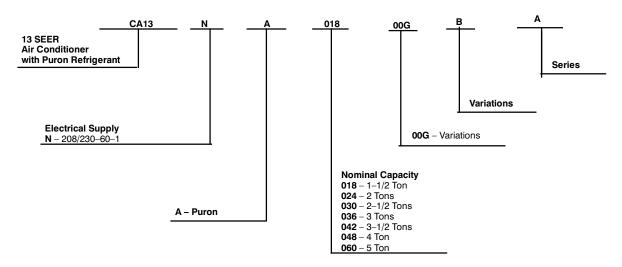
- Solid, durable sheet metal construction
- Dense wire coil guard

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

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.

PRODUCT NUMBER NOMENCLATURE







Use of the AHRI Certified TM Mark indicates a manufacturer's participation in the program For verification of certification for individual products, go to www.ahridirectory.org.





This product has been designed and manufactured to meet Energy Star® criteria for energy efficiency when matched with appropriate coil components. However, proper refrigerant charge and proper air flow are critical to achieve rated capacity and efficiency. Installation of this product should follow all manufacturing refrigerant charging and air flow instructions. Failure to confirm proper charge and air flow may reduce energy efficiency and shorten equipment life.

A-WEIGHTED SOUND POWER (dBA)

UNIT SIZE – SERIES	Standard		TYPICAL OCTAVE BAND SPECTRUM (dBA without tone adjustment)										
UNIT SIZE - SERIES	Rating (dBA)	125 250		500	500 1000		4000	8000					
018–A	71	49.5	59.0	63.0	66.5	62.5	58.5	54.0					
024–A	73	50.5	61.0	67.0	68.0	65.0	60.0	55.5					
030-A	72	52.0	61.5	65.5	66.5	64.5	59.5	54.5					
036-C	74	53.5	63.5	68.5	69.5	67.0	65.0	58.5					
042-A	75	56.0	64.5	69.5	71.0	66.0	64.0	59.0					
048-C	76	54.0	63.0	69.5	71.5	70.0	66.0	58.5					
060-C	79	57.5	67.0	72.0	75.0	72.5	68.0	61.0					

NOTE: Tested in compliance with AHRI 270-2008 (not listed with AHRI)

A-WEIGHTED SOUND POWER (dBA) WITH SOUND SHIELD

UNIT SIZE - SERIES	Standard	TYPICAL OCTAVE BAND SPECTRUM (dBA without tone adjustment)									
UNIT SIZE - SERIES	Rating (dBA)	125	250	500	1000	2000	4000	8000			
018–A	70	53.5	60.0	62.0	65.5	62.0	57.5	52.5			
024–A	73	53.0	62.0	67.5	68.0	65.0	60.0	53.5			
030-A	71	54.0	61.5	65.5	66.0	63.5	58.5	52.0			
036-C	74	54.0	63.5	68.0	69.0	66.5	64.0	58.5			
042-A	74	55.5	64.0	69.0	69.5	65.5	63.5	57.5			
048-C	76	55.0	63.0	69.5	71.0	68.5	65.0	58.0			
060-C	79	57.5	68.0	72.5	74.5	72.5	68.0	60.5			

NOTE: Tested in compliance with AHRI 270-2008 (not listed with AHRI)

METERING DEVICE

UNIT SIZE – SERIES	INDOOOR	REQUIRED SUBCOOLING °F (°C)				
18–A		10 (5.6)				
24–A		10 (5.6)				
30-A		10 (5.6)				
36–C	TXV*	12 (6.7)				
42-A		10 (5.6)				
48–C		15 (8.3)				
60-C		15 (8.3)				

^{*} TXV must be ordered separately when indoor coil is not equipped with a TXV. TXV must be hard-shutoff type.

APPENDIX G Cadna Analysis Data and Results

Sound Power Level to Sound Pressure Level Analysis

Source to Receiver Distance: dsR = 31.0 (ft)

Path Calculation

Source to Receiver Direct Path Distance: r = 31.1 (ft)

Project Name: Winter Gardens Project Number: B41102N1 Date: 1/27/2015

Source Description: AC Noise Path Description: North

Sound Power to Sound Pressure Calculations

Octave Band <u>125</u> <u>250</u> <u>500</u> <u>1000</u> <u>2000</u> <u>4000</u> <u>8000</u> (Hz)

Sound Power Level: Lw 52.7 62.2 66.2 67.2 65.2 60.2 55.2 (dBA)

Sound Pressure Level: Lp = Lw - 20 log (r) - 0.75 **22.1 31.6 35.6 36.6 34.6 29.6 24.6** (dBA) at 31.1 (ft)

Combined Sound Pressure Level at Receiver

Total Sound Pressure Level: 41.4 (dBA)

of sources

Combined Sound Pressure Level: 44.4 (dBA) at 31.1 (ft)

Total Sound Pressure Level at Receiver 45.0 dBA

Sound Power Level to Sound Pressure Level Analysis

Source to Receiver Distance: $d_{SR} = 88.0$ (ft)

Path Calculation

Source to Receiver Direct Path Distance: r = 88.0 (ft)

Project Name: Winter Gardens Project Number: B41102N1 Date: 1/27/2015

Source Description: AC Noise Path Description: North

Sound Power to Sound Pressure Calculations

Octave Band 125 250 500 1000 2000 4000 8000 (Hz) Sound Power Level: Lw 52.7 62.2 66.2 67.2 65.2 60.2 55.2 (dBA)

Sound Pressure Level: $L_p = L_w - 20 log(r) - 0.75$ 13.1 22.6 26.6 27.6 25.6 20.6 15.6 (dBA) at 88.0 (ft)

Combined Sound Pressure Level at Receiver

Total Sound Pressure Level: 32.4 (dBA)

of sources 2

Combined Sound Pressure Level: 35.4 (dBA) at 88.0 (ft)

Sound Power Level to Sound Pressure Level Analysis

Distances Source Height: 3.0 (ft) Receiver Height: 5.0 (ft)

Source to Receiver Distance: dsr = 114.0(ft)

Project Name: Winter Gardens Project Number: B41102N1 Date: 1/27/2015 Source Description: AC Noise Path Description: East

Path Calculation

Source to Receiver Direct Path Distance: r = 114.0(ft)

Sound Power to Sound Pressure Calculations

Octave Band 125 <u>4000</u> (Hz)

Sound Power Level: Lw 52.7 62.2 66.2 60.2 55.2 (dBA)

Sound Pressure Level: $L_p = L_w - 20 \log(r) - 0.75$ **10.8** 20.3 24.3 25.3 23.3 18.3 13.3 (dBA) at 114.0 (ft)

Combined Sound Pressure Level at Receiver

Total Sound Pressure Level: 30.1 (dBA)

of sources

Combined Sound Pressure Level: 37.9 (dBA) at 114.0 (ft)

Total Sound Pressure Level at Receiver 38.7 dBA

Sound Power Level to Sound Pressure Level Analysis

Source to Receiver Distance: dsR = 144.0 (ft)

Path Calculation

Source to Receiver Direct Path Distance: r = 144.0 (ft)

Project Name: Winter Gardens Project Number: B41102N1 Date: 1/27/2015

Source Description: AC Noise Path Description: East

Sound Power to Sound Pressure Calculations

Octave Band 125 250 500 1000 2000 4000 8000 (Hz) Sound Power Level: Lw 52.7 62.2 66.2 67.2 65.2 60.2 55.2 (dBA)

Sound Pressure Level: $L_p = L_w - 20 log(r) - 0.75$ 8.8 18.3 22.3 23.3 21.3 16.3 11.3 (dBA) at 144.0 (ft)

Combined Sound Pressure Level at Receiver

Total Sound Pressure Level: 28.1 (dBA)

of sources 2

Combined Sound Pressure Level: 31.1 (dBA) at 144.0 (ft)

Sound Power Level to Sound Pressure Level Analysis

Source to Receiver Distance: dsR = 10.0 (ft)

Path Calculation

Source to Receiver Direct Path Distance: r = 10.2 (ft)

Project Name: Winter Gardens Project Number: B41102N1 Date: 8/11/2015

Source Description: AC Noise Path Description: South

Sound Power to Sound Pressure Calculations Octave Band 125 <u>4000</u> (Hz) Sound Power Level: Lw 52.7 62.2 66.2 60.2 55.2 (dBA) Sound Pressure Level: $L_p = L_w - 20 \log(r) - 0.75$ 31.8 41.3 45.3 46.3 44.3 39.3 34.3 (dBA) at 10.2 (ft)

Combined Sound Pressure Level at Receiver

Total Sound Pressure Level: 51.1 (dBA)

of sources 2

Combined Sound Pressure Level: 54.1 (dBA) at 10.2 (ft)

Total Sound Pressure Level at Receiver 54.2 dBA

Sound Power Level to Sound Pressure Level Analysis

Source to Receiver Distance: dsR = 72.0 (ft)

Path Calculation

Source to Receiver Direct Path Distance: r = 72.0 (ft)

Project Name: Winter Gardens Project Number: B41102N1 Date: 8/11/2015

Source Description: AC Noise Path Description: South

Sound Power to Sound Pressure Calculations

Octave Band 125 250 500 1000 2000 4000 8000 (Hz) Sound Power Level: Lw 52.7 62.2 66.2 67.2 65.2 60.2 55.2 (dBA)

Sound Pressure Level: Lp = Lw - 20 log(r) - 0.75 14.8 24.3 28.3 29.3 27.3 22.3 17.3 (dBA) at 72.0 (ft)

Combined Sound Pressure Level at Receiver

Total Sound Pressure Level: 34.1 (dBA)

of sources 2

Combined Sound Pressure Level: 37.1 (dBA) at 72.0 (ft)

Sound Power Level to Sound Pressure Level Analysis

Distances

Source Height: hs = 5.0 (ft)

Receiver Height: $h_R = 5.0$ (ft)

Source to Receiver Distance: $d_{SR} = 5.0$ (ft)

Project Name: Wintergardens Project Number: B41102N1 Date: 8/11/2015 Source Description: Pool Pump Path Description: South PL (R6)

Path Calculation

Source to Receiver Direct Path Distance: r = 5.0 (ft)

Sound Power to Sound Pressure Calculations											
Octave Band Sound Power Level: Lw	 <u>125</u> 69.9	<u>250</u> 66.0	<u>500</u> 67.4	1000 64.9	2000 62.4	<u>4000</u> 58.9	 TOTAL 74.4	(Hz) (dB)			
Sound Pressure Level: L _P = L _w - 20 log(r) - 0.75 A-Weighting							59.7	(dB)	at	5.0	(ft)
A-Weighted Sound Pressure Level		42.6					55.2	(dBA)	at	5.0	(ft)

Combined Sound Pressure Level at Receiver

Total Sound Pressure Level: 59.7 (dB)

Total A-Weighted Sound Pressure Level: 55.2

of sources 1

Combined Sound Pressure Level: 59.7 (dB) at 5.0 (ft)

Combined A-Weighted Sound Pressure Level: **55.2** (dBA) at 5.0 (ft)

Cadna Noise Model - Sound Levels														
Name	ID	Type		Oktave Spectrum (dB)								Source		
			Weight	63	125	250	500	1000	2000	4000	8000	Α	lin	
Carrier CA13NA030	L_1	Lw	Α		52.7	62.2	66.2	67.2	65.2	60.2	55.2	72.0	75.7	Manufacturer
Pool Equip	L_2	Lw (c)		64	69.6	65.7	67.1	64.6	62.1	58.6	53	69.7	74.2	Measurement

		Cadna N	oise Mod	del - Point So	ources (1 of 2)			
Name	ID	Result. PWL	L	.w / Li	Height		Coordinates	
		Day	Туре	Value		Х	Υ	Z
		(dBA)			(m)	(m)	(m)	(m)
AC 1	S_1	72.0	Lw	L_1	0.91	333.40	171.65	0.91
AC 2	S_2	72.0	Lw	L_1	0.91	333.09	170.97	0.91
AC 3	S_3	72.0	Lw	L_1	0.91	326.84	156.06	0.91
AC 4	S_4	72.0	Lw	L_1	0.91	326.52	155.37	0.91
AC 5	S_5	72.0	Lw	L_1	0.91	327.42	153.48	0.91
AC 6	S_6	72.0	Lw	L_1	0.91	327.1	152.8	0.91
AC 7	S_7	72.0	Lw	L_1	0.91	320.91	137.52	0.91
AC 8	S_8	72.0	Lw	L_1	0.91	320.49	136.89	0.91
AC 9	S_9	72.0	Lw	L_1	0.91	289.87	159.02	0.91
AC 10	S_10	72.0	Lw	L_1	0.91	289.19	159.02	0.91
AC 11	S_11	72.0	Lw	L_1	0.91	271.75	159.28	0.91
AC 12	S_12	72.0	Lw	L_1	0.91	270.97	159.28	0.91
AC 13	S_13	72.0	Lw	L_1	0.91	269.92	157.81	0.91
AC 14	S_14	72.0	Lw	L_1	0.91	269.29	157.81	0.91
AC 15	S_15	72.0	Lw	L_1	0.91	252.19	157.86	0.91
AC 16	S_16	72.0	Lw	L_1	0.91	251.35	157.86	0.91
AC 17	S_17	72.0	Lw	L_1	0.91	290.76	130.14	0.91
AC 18	S_18	72.0	Lw	L_1	0.91	290.18	130.14	0.91
AC 19	S_19	72.0	Lw	L_1	0.91	273.06	130.56	0.91
AC 20	S_20	72.0	Lw	L_1	0.91	272.43	130.61	0.91
AC 21	S_21	72.0	Lw	L_1	0.91	271.33	129.35	0.91
AC 22	S_22	72.0	Lw	L_1	0.91	270.59	129.35	0.91
AC 23	S_23	72.0	Lw	L_1	0.91	252.69	129.77	0.91
AC 24	S_24	72.0	Lw	L_1	0.91	252.11	129.77	0.91
AC 25	S_25	72.0	Lw	L_1	0.91	247.49	159.45	0.91
AC 26	S_26	72.0	Lw	L_1	0.91	247.04	159.49	0.91
AC 27	S_27	72.0	Lw	L_1	0.91	229.28	159.61	0.91
AC 28	S_28	72.0	Lw	L_1	0.91	228.74	159.65	0.91
AC 29	S_29	72.0	Lw	L_1	0.91	227.62	158.03	0.91
AC 30	S_30	72.0	Lw	L_1	0.91	227.08	158.03	0.91

		Cadna N	oise Mod	del - Point So	ources (2 of 2)			
Name	ID	Result. PWL	L	.w/Li	Height		Coordinates	
		Day	Type	Value		Х	Υ	Z
		(dBA)			(m)	(m)	(m)	(m)
AC 31	S_31	72.0	Lw	L_1	0.91	209.57	158.28	0.91
AC 32	S_32	72.0	Lw	L_1	0.91	208.91	158.28	0.91
AC 33	S_33	72.0	Lw	L_1	0.91	247.03	130.54	0.91
AC 34	S_34	72.0	Lw	L_1	0.91	246.28	130.5	0.91
AC 35	S_35	72.0	Lw	L_1	0.91	227.86	130.71	0.91
AC 36	S_36	72.0	Lw	L_1	0.91	228.45	130.71	0.91
AC 37	S_37	72.0	Lw	L_1	0.91	226.32	129.34	0.91
AC 38	S_38	72.0	Lw	L_1	0.91	227.36	129.29	0.91
AC 39	S_39	72.0	Lw	L_1	0.91	207.9	129.29	0.91
AC 40	S_40	72.0	Lw	L_1	0.91	208.53	129.34	0.91
AC 41	S_41	72.0	Lw	L_1	0.91	241.27	104.15	0.91
AC 42	S_42	72.0	Lw	L_1	0.91	240.43	104.2	0.91
AC 43	S_43	72.0	Lw	L_1	0.91	219.32	104.41	0.91
AC 44	S_44	72.0	Lw	L_1	0.91	218.11	104.36	0.91
AC 45	S_45	72.0	Lw	L_1	0.91	197.05	165.48	0.91
AC 46	S_46	72.0	Lw	L_1	0.91	196.79	164.69	0.91
AC 47	S_47	72.0	Lw	L_1	0.91	193.68	150.47	0.91
AC 48	S_48	72.0	Lw	L_1	0.91	193.48	149.81	0.91
AC 49	S_49	72.0	Lw	 L_1	0.91	190.57	149.21	0.91
AC 50	S_50	72.0	Lw	 L_1	0.91	190.24	148.42	0.91
AC 51	S_51	72.0	Lw	L_1	0.91	186.66	132.47	0.91
AC 52	S_52	72.0	Lw	L_1	0.91	186.33	131.61	0.91
AC 53	S_53	72.0	Lw	L_1	0.91	163.88	168.26	0.91
AC 54	S_54	72.0	Lw	 L_1	0.91	163.69	167.33	0.91
AC 55	S_55	72.0	Lw	L_1	0.91	160.18	151.79	0.91
AC 56	S_56	72.0	Lw	L_1	0.91	159.98	151	0.91
AC 57	S_57	72.0	Lw	L_1	0.91	158.13	149.94	0.91
AC 58	S_58	72.0	Lw	 L_1	0.91	157.86	148.94	0.91
AC 59	S_59	72.0	Lw	 L_1	0.91	154.49	133.07	0.91
AC 60	S_60	72.0	Lw	L_1	0.91	154.29	132.27	0.91
Pool Pump	S_61	69.7	Lw	 L_2	1.52	243.89	118.75	1.52

Cadna Noise Model - Barriers							
Name	ID	C	oordinates				
		Х	Y	Z			
		(m)	(m)	(m)			
		217.89	104.84	1.22			
		220.11	104.83	1.22			
4-foot screen (Bldg 6, 1)	BA_2	220.11	103.96	1.22			
		217.85	103.95	1.22			
		217.9	104.84	1.22			
		239.56	104.68	1.22			
		241.78	104.66	1.22			
4-foot screen (Bldg 6, 2)	BA_3	241.78	103.8	1.22			
		239.52	103.78	1.22			
		239.57	104.68	1.22			
		245.41	131.18	1.22			
		247.63	131.17	1.22			
4-foot screen (Bldg 5)	BA_4	247.63	130.3	1.22			
		245.37	130.29	1.22			
		245.43	131.18	1.22			
	BA_5	251.51	130.34	1.22			
		253.73	130.33	1.22			
4-foot screen (Bldg 6, 1)		253.73	129.46	1.22			
		251.47	129.45	1.22			
		251.52	130.34	1.22			
		269.57	129.93	1.22			
		271.79	129.92	1.22			
4-foot screen (Bldg 6, 2)	BA_6	271.79	129.05	1.22			
		269.53	129.04	1.22			
		269.58	129.93	1.22			
		271.9	131.23	1.22			
		274.12	131.22	1.22			
4-foot screen (Bldg 6, 3)	BA_7	274.12	130.35	1.22			
		271.86	130.34	1.22			
		271.92	131.23	1.22			
		289.34	130.65	1.22			
		291.56	130.63	1.22			
4-foot screen (Bldg 6, 4)	BA_8	291.56	129.77	1.22			
(0 - 7)		289.3	129.76	1.22			
		289.36	130.65	1.22			
		243.58	119.05	1.83			
Dool Dump Cores	DA C	244.1	119.04	1.83			
Pool Pump Screen	BA_9	244.07	118.44	1.83			
		243.59	118.44	1.83			

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	44.9	1.52	333.09	180.56	1.52		
East	R_2	37.7	1.52	362.05	152.38	1.52		
South 1	R_3	53.2	1.52	240.86	100.79	1.52		
South 2	R_4	54.0	1.52	249.24	126.72	1.52		
South 3	R_5	55.1	1.52	271.52	126.09	1.52		
South 4	R_6	54.2	1.52	245.74	118.69	1.52		

Cadna Noise Model - Noise Levels at Receivers (Mitigated)								
Name	ID	Level Lr	Height	Coordinates				
		Day		X Y Z				
		(dBA)	(m)	(m)	(m)	(m)		
North	R_1	44.8	1.52	333.09	180.56	1.52		
East	R_2	37.3	1.52	362.05	152.38	1.52		
South 1	R_3	46.2	1.52	240.86	100.79	1.52		
South 2	R_4	47.4	1.52	249.24	126.72	1.52		
South 3	R_5	47.5	1.52	271.52	126.09	1.52		
South 4	R_6	46.8	1.52	245.74	118.69	1.52		

APPENDIX H

Construction Equipment Noise Calculations

Noise Attenuation by Distance Calculation Job: Wintergardens Job #: B41102N1 Date: 1/13/2015 Source: Dozer Receiver: North/South - Site Work **Noise Source** Noise Level (dBA) 77 at 50 feet Distances Source Elevation ____ feet above grade feet Receiver Elevation: 0 feet above grade feet Source to Receiver Distance: 92 feet Path Calculation Source to Receiver Direct Path Distance: 92 feet **Sound Pressure Level** 71.7 92 feet Hours of Use: 8 Duty Cycle (%): Level During 8 Hour day: Summation Number of Sources: 4

Level during 8 hour day: _____71.7___

Job: Wintergardens
Job #: B41102N1
Date: 1/13/2015
Source: Backhoe

Receiver: North/South - Site Work

				_
Noise Source				
Noise Level (dBA) 64	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: 92	feet	-		_
Path Calculation				
Source to Receiver Direct Path Distance:	92	feet		
Sound Pressure Level 58.7	at	92	feet	1
Hours of Use: 8				
Duty Cycle (%): 40				
Level During 8 Hour day: 54.7				

Job: Wintergardens
Job #: B41102N1
Date: 1/13/2015
Source: Loader

Receiver: North/South - Site Work

Noise Source				
Noise Level (dBA)76	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: 92	feet	•		_
Path Calculation				
Source to Receiver Direct Path Distance:	92	feet		
Sound Pressure Level 70.7	at	92	feet	1
Hours of Use: 8				
Duty Cycle (%): 40				
Level During 8 Hour day: 66.7				

Job: Wintergardens
Job #: B41102N1
Date: 1/13/2015
Source: Dump Truck

Receiver: North/South - Site Work

Noise Source				1
Noise Level (dBA) 75	at	50	feet	
Distances				_
Source Elevation0	feet	at	5	_feet above grade
Receiver Elevation: 0	feet	at	5	feet above grade
Source to Receiver Distance: 92	feet			
Path Calculation				
Source to Receiver Direct Path Distar	nce: 92	feet		
Sound Pressure Level 69.7	7 at	92	feet	7
Hours of Use: 8				
Level During 8 Hour day: 65.7	7			

Noise Attenuation by Distance Calculation Job: Wintergardens Job #: B41102N1 Date: 1/13/2015 Source: **Concrete Mixer** Receiver: North/South - Foundations **Noise Source** Noise Level (dBA) 76 at 50 feet Distances Source Elevation ____ feet above grade feet Receiver Elevation: 0 feet above grade feet Source to Receiver Distance: 92 feet Path Calculation Source to Receiver Direct Path Distance: 92 feet **Sound Pressure Level** 70.7 92 feet Hours of Use: 8 Duty Cycle (%): Level During 8 Hour day: Summation Number of Sources: 2

Level during 8 hour day: 67.9

Job: Wintergardens
Job #: B41102N1
Date: 1/13/2015
Source: Concrete Pump

Receiver: North/South - Foundations

Noise Source]
Noise Level (dBA)74	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: 92	feet	· -		_
Path Calculation				
Source to Receiver Direct Path Distance:	92	_ feet		
Sound Pressure Level 68.7	at	92	feet	1
Hours of Use: 8				
Duty Cycle (%): 20				
Level During 8 Hour day: 61.7				

Noise Attenuation by Distance Calculation Job: Wintergardens Job #: B41102N1 Date: 1/13/2015 Source: Paver Receiver: North/South - Framing/Completion **Noise Source** Noise Level (dBA) 71 at 50 feet Distances Source Elevation ____ feet above grade feet Receiver Elevation: 0 feet above grade feet Source to Receiver Distance: 92 feet Path Calculation Source to Receiver Direct Path Distance: 92 feet **Sound Pressure Level** 65.7 92 feet Hours of Use: 8 Duty Cycle (%): **50** Level During 8 Hour day: 62.7 Summation Number of Sources: 4 Level during 8 hour day: 67.4

Job: Wintergardens
Job #: B41102N1
Date: 1/13/2015
Source: Roller

Receiver: North/South - Framing/Completion

				_
Noise Source				
Noise Level (dBA) 69	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: 92	feet	-		-
Path Calculation				
Source to Receiver Direct Path Distance: _	92	feet		
Sound Pressure Level 63.7	at	92	feet	1
Hours of Use: 8	aı	92	ieet	
Duty Cycle (%): 20				
Level During 8 Hour day: 56.7				

Job: Wintergardens
Job #: B41102N1
Date: 1/13/2015
Source: Forklift

Receiver: North/South - Framing/Completion

Noise Source				
Noise Level (dBA)74	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: 92	feet	·		_
Path Calculation				
Source to Receiver Direct Path Distance:	92	feet		
Sound Pressure Level 68.7	at	92	feet	1
Hours of Use: 8		_		
Duty Cycle (%): 40				
Level During 8 Hour day: 64.7				

Job: Wintergardens
Job #: B41102N1
Date: 1/13/2015
Source: Air Compressor

Receiver: North/South - Framing/Completion

Noise Source	ce				
	Noise Level (dBA)	61	_ at _	50	feet
Diotonooo					
Distances	Cauras Elevation	0	f+	-4	_

Source Elevation 0 feet at 5 feet above grade
Receiver Elevation: 0 feet at 5 feet above grade
Source to Receiver Distance: 92 feet

Path Calculation

Source to Receiver Direct Path Distance: _____ feet

Sound Pressure Level 55.7 at 92 feet

Hours of Use: 8
Duty Cycle (%): 40
Level During 8 Hour day: 51.7