

Appendix H: Noise Report

NOISE IMPACT ANALYSIS
NUTMEG RESIDENTIAL TOWNHOMES PROJECT
CITY OF ESCONDIDO

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PROJECT NO. 18034

MARCH 28, 2019

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ACRONYMS AND ABBREVIATIONS

ANSI	American National Standards Institute
Caltrans	California Department of Transportation
CEQA	California Environmental Quality Act
CNEL	Community Noise Equivalent Level
dB	Decibel
dBA	A-weighted decibels
DOT	Department of Transportation
FHWA	Federal Highway Administration
FTA	Federal Transit Administration
EPA	Environmental Protection Agency
Hz	Hertz
Ldn	Day-night average noise level
Leq	Equivalent sound level
Lmax	Maximum noise level
ONAC	Federal Office of Noise Abatement and Control
OSB	Oriented Strand Board
OSHA	Occupational Safety and Health Administration
PPV	Peak particle velocity
RMS	Root mean square
SEL	Single Event Level or Sound Exposure Level
STC	Sound Transmission Class
UMTA	Federal Urban Mass Transit Administration

1.0 INTRODUCTION

1.1 Purpose of Analysis and Study Objectives

This Noise Impact Analysis has been prepared to determine the noise impacts associated with the proposed Nutmeg Residential Townhomes project (proposed project). The following is provided in this report:

- A description of the study area and the proposed project;
- Information regarding the fundamentals of noise;
- Information regarding the fundamentals of vibration;
- A description of the local noise guidelines and standards;
- An evaluation of the current noise environment;
- An analysis of the potential short-term construction-related noise impacts from the proposed project; and,
- An analysis of long-term operations-related noise impacts from the proposed project.

1.2 Site Location and Study Area

The project site is located in the northern portion of the City of Escondido (City). The approximately 7.66-acre project site is currently vacant and undeveloped. The project site is bounded by undeveloped land to the north, Centre City Parkway and rural residential uses to the east, and Interstate 15, undeveloped land and rural residential uses to the south and west. The project study area is shown in Figure 1.

Sensitive Receptors in Project Vicinity

The nearest offsite sensitive receptors to the project site consist of residents at the single-family homes located as near as 610 feet west of the project site on the west side of Interstate 15. There are also single-family homes located as near as 725 feet to the east and 770 feet to the southeast. The nearest school to the project site is North Broadway School, which is located as near as 0.7 miles southeast of the project site.

1.3 Proposed Project Description

The proposed project would consist of the development of 137 residential townhomes on the 7.66-acre project site. The site to the north of Nutmeg Street will be developed with 39 residential townhomes and the site to the south of Nutmeg Street would be developed with 98 residential townhomes.

The proposed project would include grading of approximately 1.3 acres of adjacent Caltrans property in addition to the 7.66-acre project site. In total, this would result in 8.96 acres of area to be graded. During grading of the proposed project, approximately 189,700 cubic yards of dirt will be imported to the project site.

Currently, the project site's General Plan Designation is Office (O) and zoned Residential Estate (R-E). The proposed project is requesting a General Plan Amendment and zone change to change the General Plan and zoning designations onsite to Urban III (U3) and Planned Residential Development (PRD) to allow high density multi-family residential development at (18 DU/AC). The proposed site plan is shown in Figure 2.

1.4 Standard Noise Regulatory Conditions

The proposed project will be required to comply with the following regulatory conditions from the City of Escondido and State of California.

City of Escondido General Plan

The following lists the City of Escondido General Plan Policies that are applicable to all residential development projects in the City.

General Plan Noise Policy 5.1 Land Use Compatibility

The City's General Plan Noise Policy 5.1 requires all developments to meet the City's land use compatibility guidelines. The guidelines provide the following allowable noise exposure levels for multi-family developments: 50-65 dBA CNEL is normally acceptable, 60-70 dBA CNEL is conditionally acceptable, 70-75 dBA CNEL is normally unacceptable, and 75-85 dBA CNEL is clearly unacceptable.

General Plan Noise Policy 5.3 Incremental Noise Increases

The City's General Plan Noise Policy 5.3 requires noise attenuation for the nearby residential uses, where projected incremental increases in exterior noise exceeds: Plus 5 dB where the existing noise level is 50 dBA CNEL or less; Plus 3 dB where the existing noise level is 55 dBA CNEL or less; Plus 2 dB where the existing noise level is 60 dB CNEL or less; Plus 1 dB where the existing noise level is 70 dB CNEL or less; or any increase where the existing noise level is 75 dB CNEL or higher.

City of Escondido Municipal Code

The following lists the City of Escondido Municipal Code regulations that are applicable to all development projects in the City.

Section 17-234. Construction Equipment

Section 17-234(a) of the City's Municipal Code restricts the operation of construction equipment to between the hours of 7:00 a.m. and 6:00 p.m. Monday through Friday, and to between the hours of 9:00 a.m. and 5:00 p.m. on Saturdays. Section 17-234(b) prohibits construction work on Sundays or public holidays. Section 17-234(d) limits noise from the operation of construction equipment to 75 dB at any time. Compliance with this regulation will reduce the construction-related noise impacts to the nearby sensitive receptors.

Section 17-238. Grading

Section 17-238(a) of the City's Municipal Code restricts the grading at construction sites to between the hours of 7:00 a.m. and 6:00 p.m. Monday through Friday and to between 10:00 a.m. and 5:00 p.m. on Saturdays with the provision of a variance from the city manager. Section 17-238(c) limits the operation of equipment used for grading to a noise level of no greater than 75 dB at any time, unless a variance has been obtained in advance from the city manager. Compliance with this regulation will reduce the construction-related vibration impacts to the nearby sensitive receptors.

State of California Rules

The following lists the State of California rules that are applicable to all industrial projects in the State.

California Vehicle Code Section 27200-27207 – On-Road Vehicle Noise

California Vehicle Code Section 27200-27207 provides noise limits for vehicles operated in California. For vehicles over 10,000 pounds noise is limited to 88 dB for vehicles manufactured before 1973, 86 dB

for vehicles manufactured before 1975, 83 dB for vehicles manufactured before 1988, and 80 dB for vehicles manufactured after 1987. All measurements are based at 50 feet from the vehicle.

California Vehicle Section 38365-38380 – Off-Road Vehicle Noise

California Vehicle Code Section 38365-38380 provides noise limits for off-highway motor vehicles operated in California. 92 dBA for vehicles manufactured before 1973, 88 dBA for vehicles manufactured before 1975, 86 dBA for vehicles manufactured before 1986, and 82 dBA for vehicles manufactured after December 31, 1985. All measurements are based at 50 feet from the vehicle.

1.5 Summary of Analysis Results

The following is a summary of the proposed project’s impacts with regard to the State CEQA Guidelines noise checklist questions.

Expose persons to noise levels in excess of standards?

Potentially significant impact. Implementation of Mitigation Measures 1, 2, and 3 would reduce the impact to less than significant levels.

Expose persons to excessive groundborne vibration?

Less than significant impact.

Result in a substantial permanent increase in ambient noise levels above existing levels without the proposed project?

Less than significant impact.

Result in a substantial temporary increase in ambient noise levels above existing levels without the proposed project?

Less than significant impact.

Expose persons to excessive noise levels from aircraft?

Less than significant impact.

1.6 Project Design Features Incorporated into the Proposed Project

This analysis was based on implementation of the following project design features that are either already depicted on the proposed project site plan and architectural plans or are required from City and State Regulations.

Project Design Feature 1:

The project applicant shall provide a “windows closed” condition for each proposed residential townhome. A “window closed” condition is a term that means that a home is capable of providing adequate ventilation and temperature control without opening the windows. A “windows closed” condition requires a means of mechanical ventilation per Chapter 12, Section 1205 of the Uniform Building Code. This shall be achieved with a standard forced air conditioning and heating system with a filtered outside air intake vent for each residential unit.

Project Design Feature 2:

The project applicant shall construct a sound barrier on the portion of the site that is located on the south side of Nutmeg Street. The sound barrier shall run along the entire west property line that is

south of Nutmeg Street. The southern end of the barrier shall extend an additional 20 feet along the southern property line and the northern end of the barrier shall extend an additional 20 feet, in a northeasterly direction (approximately parallel to Nutmeg Street). The sound barrier shall be 8 feet high, except for the southernmost 180 feet of the sound barrier located on the west property line that shall be 9 feet high. The sound barrier shall be constructed with concrete masonry block or a combination of a berm and concrete masonry block.

1.7 Mitigation Measures for the Proposed Project

This analysis found that through adherence to the noise and vibration regulations detailed in Section 1.4 above and through implementation of the following mitigation all noise and vibration impacts would be reduced to less than significant levels.

Mitigation Measure 1:

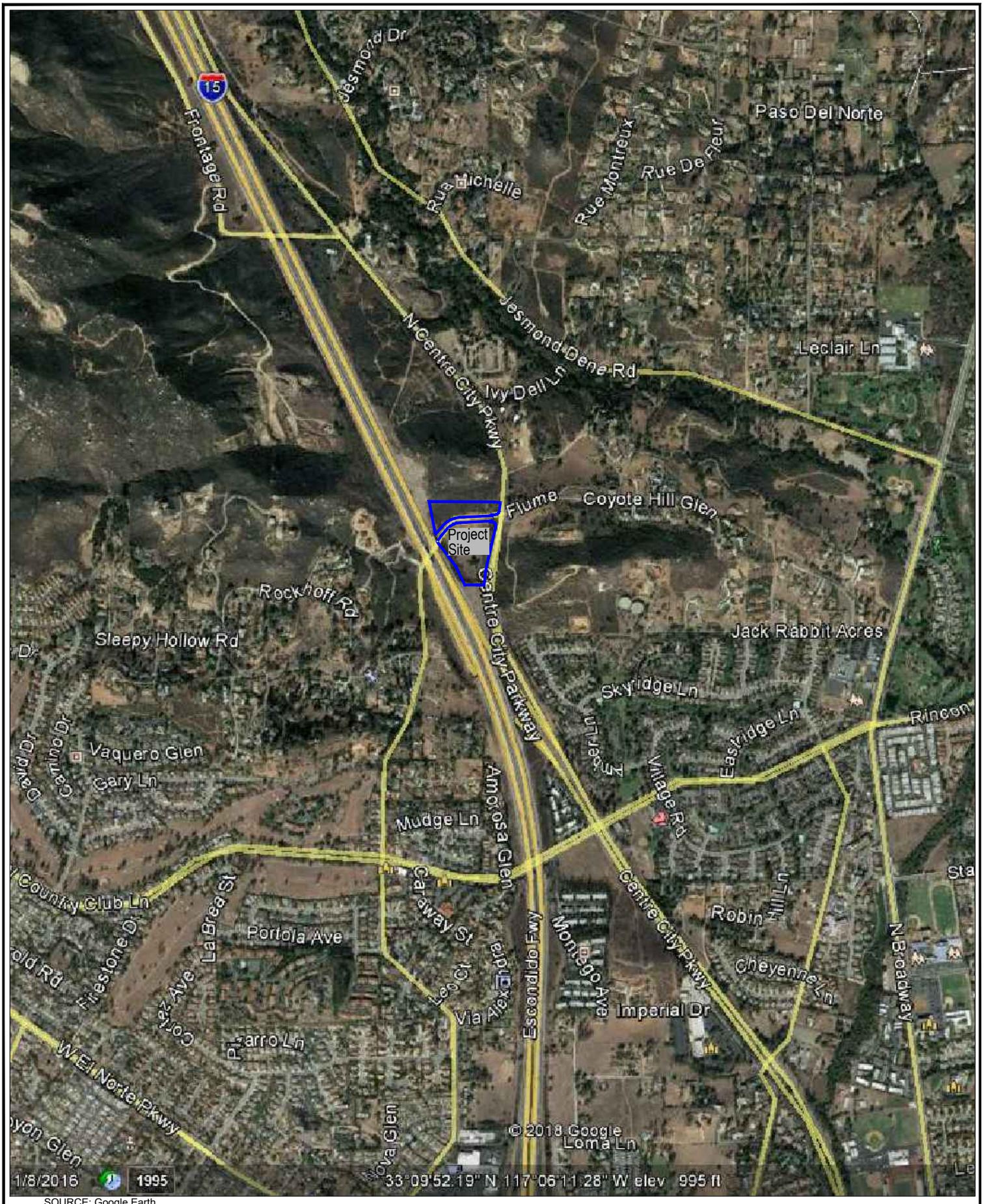
In order to reduce the noise levels at the two proposed outdoor recreation areas, the project applicant shall construct two 8-foot sound walls, with one located on the south side of the outdoor recreation area that is located on the north side of Nutmeg Street and the other wall located southwest of the outdoor recreation area that is located on the south side of Nutmeg Street. The sound walls and any doors placed in the sound walls shall be constructed of a solid material (e.g., glass, wood, concrete block, or plaster). The locations of the proposed outdoor recreation area sound walls are shown in Figure 3.

Mitigation Measure 2:

For the P1-Villas, the project applicant shall require all windows and exterior doors on the northwest, southwest, and southeast sides of Building 1 to have a minimum STC rating of 30 STC. The locations of the mitigated windows and doors is shown on Figure 3.

Mitigation Measure 3:

For the P2-Villas, the project applicant shall require all windows and exterior doors on the southwest side of Buildings 12 to 18, the northwest side of Building 18, and the northwest side of the westernmost unit of Buildings 16 and 17 to have a minimum STC rating of 35 STC. In addition, all windows and exterior doors on the northwest and southwest sides of Building 19 and the southeast and northwest sides of Buildings 12 to 18 that were not covered by the 35 STC requirement to have a minimum STC rating of 30 STC. The locations of the mitigated windows and doors is shown on Figure 3.



2.0 NOISE FUNDAMENTALS

Noise is defined as unwanted sound. Sound becomes unwanted when it interferes with normal activities, when it causes actual physical harm or when it has adverse effects on health. Sound is produced by the vibration of sound pressure waves in the air. Sound pressure levels are used to measure the intensity of sound and are described in terms of decibels. The decibel (dB) is a logarithmic unit which expresses the ratio of the sound pressure level being measured to a standard reference level. A-weighted decibels (dBA) approximate the subjective response of the human ear to a broad frequency noise source by discriminating against very low and very high frequencies of the audible spectrum. They are adjusted to reflect only those frequencies which are audible to the human ear.

2.1 Noise Descriptors

Noise Equivalent sound levels are not measured directly, but are calculated from sound pressure levels typically measured in A-weighted decibels (dBA). The equivalent sound level (Leq) represents a steady state sound level containing the same total energy as a time varying signal over a given sample period. The peak traffic hour Leq is the noise metric used by California Department of Transportation (Caltrans) for all traffic noise impact analyses.

The Day-Night Average Level (Ldn) is the weighted average of the intensity of a sound, with corrections for time of day, and averaged over 24 hours. The time of day corrections require the addition of ten decibels to sound levels at night between 10 p.m. and 7 a.m. While the Community Noise Equivalent Level (CNEL) is similar to the Ldn, except that it has another addition of 4.77 decibels to sound levels during the evening hours between 7 p.m. and 10 p.m. These additions are made to the sound levels at these time periods because during the evening and nighttime hours, when compared to daytime hours, there is a decrease in the ambient noise levels, which creates an increased sensitivity to sounds. For this reason the sound appears louder in the evening and nighttime hours and is weighted accordingly. The City of Escondido relies on the CNEL noise standard to assess transportation-related impacts on noise sensitive land uses.

2.2 Tone Noise

A pure tone noise is a noise produced at a single frequency and laboratory tests have shown that humans are more perceptible to changes in noise levels of a pure tone. For a noise source to contain a “pure tone,” there must be a significantly higher A-weighted sound energy in a given frequency band than in the neighboring bands, thereby causing the noise source to “stand out” against other noise sources. A pure tone occurs if the sound pressure level in the one-third octave band with the tone exceeds the average of the sound pressure levels of the two contiguous one-third octave bands by:

- 5 dB for center frequencies of 500 hertz (Hz) and above
- 8 dB for center frequencies between 160 and 400 Hz
- 15 dB for center frequencies of 125 Hz or less

2.3 Noise Propagation

From the noise source to the receiver, noise changes both in level and frequency spectrum. The most obvious is the decrease in noise as the distance from the source increases. The manner in which noise reduces with distance depends on whether the source is a point or line source as well as ground absorption, atmospheric effects and refraction, and shielding by natural and manmade features. Sound from point sources, such as air conditioning condensers, radiate uniformly outward as it travels away from the source in a spherical pattern. The noise drop-off rate associated with this geometric spreading is 6 dBA per each doubling of the distance (dBA/DD). Transportation noise sources such as roadways are typically analyzed

as line sources, since at any given moment the receiver may be impacted by noise from multiple vehicles at various locations along the roadway. Because of the geometry of a line source, the noise drop-off rate associated with the geometric spreading of a line source is 3 dBA/DD.

2.4 Ground Absorption

The sound drop-off rate is highly dependent on the conditions of the land between the noise source and receiver. To account for this ground-effect attenuation (absorption), two types of site conditions are commonly used in traffic noise models, soft-site and hard-site conditions. Soft-site conditions account for the sound propagation loss over natural surfaces such as normal earth and ground vegetation. For point sources, a drop-off rate of 7.5 dBA/DD is typically observed over soft ground with landscaping, as compared with a 6.0 dBA/DD drop-off rate over hard ground such as asphalt, concrete, stone and very hard packed earth. For line sources a 4.5 dBA/DD is typically observed for soft-site conditions compared to the 3.0 dBA/DD drop-off rate for hard-site conditions. Caltrans research has shown that the use of soft-site conditions is more appropriate for the application of the Federal Highway Administration (FHWA) traffic noise prediction model used in this analysis.

3.0 GROUND-BORNE VIBRATION FUNDAMENTALS

Ground-borne vibrations consist of rapidly fluctuating motions within the ground that have an average motion of zero. The effects of ground-borne vibrations typically only cause a nuisance to people, but at extreme vibration levels damage to buildings may occur. Although ground-borne vibration can be felt outdoors, it is typically only an annoyance to people indoors where the associated effects of the shaking of a building can be notable. Ground-borne noise is an effect of ground-borne vibration and only exists indoors, since it is produced from noise radiated from the motion of the walls and floors of a room and may also consist of the rattling of windows or dishes on shelves.

3.1 Vibration Descriptors

There are several different methods that are used to quantify vibration amplitude such as the maximum instantaneous peak in the vibrations velocity, which is known as the peak particle velocity (PPV) or the root mean square (rms) amplitude of the vibration velocity. Due to the typically small amplitudes of vibrations, vibration velocity is often expressed in decibels and is denoted as (L_v) and is based on the rms velocity amplitude. A commonly used abbreviation is “VdB”, which in this text, is when L_v is based on the reference quantity of 1 micro inch per second.

3.2 Vibration Perception

Typically, developed areas are continuously affected by vibration velocities of 50 VdB or lower. These continuous vibrations are not noticeable to humans whose threshold of perception is around 65 VdB. Off-site sources that may produce perceptible vibrations are usually caused by construction equipment, steel-wheeled trains, and traffic on rough roads, while smooth roads rarely produce perceptible ground-borne noise or vibration.

3.3 Vibration Propagation

The propagation of ground-borne vibration is not as simple to model as airborne noise. This is due to the fact that noise in the air travels through a relatively uniform median, while ground-borne vibrations travel through the earth which may contain significant geological differences. There are three main types of vibration propagation; surface, compression, and shear waves. Surface waves, or Rayleigh waves, travel along the ground’s surface. These waves carry most of their energy along an expanding circular wave front, similar to ripples produced by throwing a rock into a pool of water. P-waves, or compression waves, are body waves that carry their energy along an expanding spherical wave front. The particle motion in these waves is longitudinal (i.e., in a “push-pull” fashion). P-waves are analogous to airborne sound waves. S-waves, or shear waves, are also body waves that carry energy along an expanding spherical wave front. However, unlike P-waves, the particle motion is transverse or “side-to-side and perpendicular to the direction of propagation.”

As vibration waves propagate from a source, the vibration energy decreases in a logarithmic nature and the vibration levels typically decrease by 6 VdB per doubling of the distance from the vibration source. As stated above, this drop-off rate can vary greatly depending on the soil but has been shown to be effective enough for screening purposes, in order to identify potential vibration impacts that may need to be studied through actual field tests.

4.0 REGULATORY SETTING

The project site is located in the City of Escondido. Noise regulations are addressed through the efforts of various federal, state, and local government agencies. The agencies responsible for regulating noise are discussed below.

4.1 Federal Regulations

The adverse impact of noise was officially recognized by the federal government in the Noise Control Act of 1972, which serves three purposes:

- Promulgating noise emission standards for interstate commerce
- Assisting state and local abatement efforts
- Promoting noise education and research

The Federal Office of Noise Abatement and Control (ONAC) was initially tasked with implementing the Noise Control Act. However, the ONAC has since been eliminated, leaving the development of federal noise policies and programs to other federal agencies and interagency committees. For example, the Occupational Safety and Health Administration (OSHA) agency prohibits exposure of workers to excessive sound levels. The Department of Transportation (DOT) assumed a significant role in noise control through its various operating agencies. The Federal Aviation Administration (FAA) regulates noise of aircraft and airports. Surface transportation system noise is regulated by a host of agencies, including the Federal Transit Administration (FTA). Transit noise is regulated by the federal Urban Mass Transit Administration (UMTA), while freeways that are part of the interstate highway system are regulated by the Federal Highway Administration (FHWA). Finally, the federal government actively advocates that local jurisdictions use their land use regulatory authority to arrange new development in such a way that “noise sensitive” uses are either prohibited from being sited adjacent to a highway or, alternately that the developments are planned and constructed in such a manner that potential noise impacts are minimized.

Since the federal government has preempted the setting of standards for noise levels that can be emitted by the transportation sources, the City is restricted to regulating the noise generated by the transportation system through nuisance abatement ordinances and land use planning.

4.2 State Regulations

Noise Standards

California Department of Health Services Office of Noise Control

Established in 1973, the California Department of Health Services Office of Noise Control (ONC) was instrumental in developing regulatory tools to control and abate noise for use by local agencies. One significant model is the “Land Use Compatibility for Community Noise Environments Matrix,” which allows the local jurisdiction to clearly delineate compatibility of sensitive uses with various incremental levels of noise.

California Noise Insulation Standards

Title 24, Chapter 1, Article 4 of the California Administrative Code (California Noise Insulation Standards) requires noise insulation in new hotels, motels, apartment houses, and dwellings (other than single-family detached housing) that provides an annual average noise level of no more than 45 dBA CNEL. When such structures are located within a 60-dBA CNEL (or greater) noise contour, an acoustical analysis is required to ensure that interior levels do not exceed the 45-dBA CNEL annual threshold. In addition, Title 21,

Chapter 6, Article 1 of the California Administrative Code requires that all habitable rooms, hospitals, convalescent homes, and places of worship shall have an interior CNEL of 45 dB or less due to aircraft noise.

Government Code Section 65302

Government Code Section 65302 mandates that the legislative body of each county and city in California adopt a noise element as part of its comprehensive general plan. The local noise element must recognize the land use compatibility guidelines published by the State Department of Health Services. The guidelines rank noise land use compatibility in terms of normally acceptable, conditionally acceptable, normally unacceptable, and clearly unacceptable.

Vibration Standards

Title 14 of the California Administrative Code Section 15000 requires that all state and local agencies implement the California Environmental Quality Act (CEQA) Guidelines, which requires the analysis of exposure of persons to excessive groundborne vibration. However, no statute has been adopted by the state that quantifies the level at which excessive groundborne vibration occurs.

Caltrans issued the *Transportation- and Construction-Induced Vibration Guidance Manual* in 2004. The manual provides practical guidance to Caltrans engineers, planners, and consultants who must address vibration issues associated with the construction, operation, and maintenance of Caltrans projects. However, this manual is also used as a reference point by many lead agencies and CEQA practitioners throughout California, as it provides numeric thresholds for vibration impacts. Thresholds are established for continuous (construction-related) and transient (transportation-related) sources of vibration, which found that the human response becomes distinctly perceptible at 0.25 inch per second PPV for transient sources and 0.04 inch per second PPV for continuous sources.

4.3 Local Regulations

The City of Escondido General Plan and Municipal Code establishes the following applicable policies related to noise and vibration.

City of Escondido General Plan

The following applicable goals and policies to the proposed project are from the Noise Element of the General Plan.

Goal 5: Protection of the community from excessive noise exposure.

Noise Policy 5.1

Require development to meet acceptable exterior noise level standards as established in Figure VI-2, and use the future noise contour map (Figure VI-7) as a guide for evaluating the compatibility of new noise sensitive uses with projected noise levels.

Noise Policy 5.2

Apply a CNEL of 60 dB or less for single family and 65 dB or less for multi-family as goals where outdoor use is a major consideration (backyards and single-family housing developments, and recreation areas in multifamily housing developments) as discussed in Figure VI-13 (see Table A), and recognize that such levels may not necessarily be achievable in all residential areas.

Table A – City of Escondido Noise Measurement Guidelines

Guideline No.	Guideline Description
1	Noise measurements in residential areas should generally be applied at ten feet from the backyard property line. However, in certain cases such as on estate lots where backyards are typically very large, the 60 dBA goal could be applied approximately one half the distance between the back of the main residential structure and the rear property line.
2	The outdoor standard should not normally be applied to balconies or patios associated with residential uses.
3	Noise impacts of proposed projects on existing land uses should be evaluated in terms of potential for adverse community response, based on a significant increase in existing noise levels. For example, if an area currently is below the maximum normally acceptable level, an increase in noise up to the maximum should not necessarily be allowed. Projects increasing noise levels by 5 dB or greater should be considered as generating a significant impact and should require mitigation.

Source: Figure VI-13, City of Escondido General Plan, 2012.

Noise Policy 5.3

Require noise attenuation for outdoor spaces in all developments where projected incremental exterior noise levels exceed those shown in Figure VI-14 (See Table B).

**Table B – City of Escondido
Exterior Incremental Environmental Noise Impact Standards for Noise-Sensitive Uses (dBA)**

Residences and Buildings Where People Normally Sleep¹		Institutional Land Uses with Primarily Daytime and Evening Uses²	
Existing L_{dn}	Allowable Noise Increment	Existing Peak Hour L_{eq}	Allowable Noise Increment
45	8	45	12
50	5	50	9
55	3	55	6
60	2	60	5
65	1	65	3
70	1	70	3
75	0	75	1
80	0	80	0

Notes:

Noise levels are measured at the property line of the noise-sensitive use.

¹ This category includes homes, hospitals, and hotels where a nighttime sensitivity to noise is assumed to be of utmost importance.

² This category includes schools, libraries, theatres, and churches where it is important to avoid interference with such activities as speech, meditation, and concentration on reading material.

Sources: Federal Transit Administration, Transit Noise Impact and Vibration Assessment, May 2006 and Figure VI-14, City of Escondido General Plan, 2012.

Noise Policy 5.4

Require noise attenuation for new noise-sensitive uses which include residential, daycare facilities, schools, churches, transient lodging, hotels, motels, hospitals, health care facilities, and libraries if the projected interior noise standard of 45 dBA CNEL is exceeded.

Noise Policy 5.5

Require construction projects and new development to ensure acceptable vibration levels at nearby noise-sensitive uses based on Federal Transit Administration criteria.

Noise Policy 5.6

Require the preparation of noise studies, as deemed necessary by the Planning Department, to analyze potential noise impacts associated with new development which could significantly alter existing noise levels in accordance with provisions outlined in Figure VI-14.

Noise Policy 5.7

Encourage use of site and building design, noise barriers, and construction methods as outlined in Figure VI-15 (see Table C) to minimize impacts on and from new development.

Table C – City of Escondido Noise Reduction Strategies

Strategic Areas	Strategies
1) Site planning responsive to topography	<ul style="list-style-type: none">• Increase distances between noise sources and receivers;• Place non-noise-sensitive land uses such as utility areas, parking lots, and maintenance facilities between the source and the receiver;• Use non-noise-sensitive structures such as garages to shield noise-sensitive areas;• Orient buildings to shield outdoor spaces from a noise source.
2) Architecture responsive to noise sensitive spaces	<ul style="list-style-type: none">• Orient bedrooms away from noise sources• Limit openings and penetrations on portions of buildings impacted by noise
3) Barriers responsive to reduce noise levels	<ul style="list-style-type: none">• Ensure that line of sight is interrupted between noise source and the receptor when constructing noise walls.• Apply noise insulation to walls, roofs, doors, windows, and other penetrations.

Source: Figure VI-15, City of Escondido General Plan, 2012.

Noise Policy 5.8

Require that mixed use and multi-family residential developments demonstrate that the design of the structure will adequately isolate noise between adjacent uses (orientation, window insulation, separation of common walls, floors, and ceilings, etc.).

City of Escondido Municipal Code

The City of Escondido Municipal Code establishes the following applicable standards related to noise.

Sec. 17-229. Sound level limits.

(a) Unless a variance has been applied for and granted pursuant to this article, it shall be unlawful for any person to cause or allow the creation of any noise to the extent that the one-hour average sound level, at any point on or beyond the boundaries of the property on which the sound is produced, exceeds the applicable limits set forth in the following table (see Table D), except that the construction noise level limits shall be governed by Section 17-234 of this article.

Table D – City of Escondido Sound Level Limits

Zone	Time	Applicable Limit One-Hour Average Sound Level (Decibels)
Residential zones	7 a.m. to 10 p.m.	50
	10 p.m. to 7 a.m.	45
Multi-residential zones	7 a.m. to 10 p.m.	55
	10 p.m. to 7 a.m.	50
Commercial zones	7 a.m. to 10 p.m.	60
	10 p.m. to 7 a.m.	55
Light industrial/Industrial park zones	Anytime	70 ¹
General industrial zones	Anytime	75 ¹

Note:

¹ Subject to provisions of Section 17-229(c)(5)

Source: City of Escondido Municipal Code, Sec. 17-229, Table 17-229.

(b) Maximum Permissible Sound Levels by Receiving Land Use.

(4) No person shall operate or cause to be operated, any source of sound at any location within the city or allow the creation of any noise on property owned, leased, occupied or otherwise controlled by such person, which causes the noise level to exceed the environmental and/or nuisance interpretation of the applicable limits given in subsection (a) of this section.

(c) Corrections to Exterior Noise Level Limits

(1) If the noise is continuous, the Leq for any hour will be represented by any lesser time period within that hour. Noise measurements of a few minutes only will thus suffice to define the noise level.

(2) If the noise is intermittent, the Leq for any hour may be represented by a time period typical of the operating cycle. Measurement should be made of a representative number of noisy/quiet periods. A measurement period of not less than fifteen (15) minutes is, however, strongly recommended when dealing with intermittent noise.

(3) In the event the alleged offensive noise, as judged by the enforcement officer, contains a steady audible sound such as a whine, screech or hum, or contains a repetitive impulsive noise such as hammering or riveting, the standard limits set forth in Table 17-229 (see Table D) shall be reduced by ten (10) dB or to the ambient noise level when such noises are not occurring.

(4) If the measured ambient level exceeds the permissible in subsection (a) of this section, the allowable noise exposure standards shall be the ambient noise level. The ambient level shall be measured when the alleged noise violations source is not operating.

Sec. 17-234. Construction equipment.

Except for emergency work, it shall be unlawful for any person, including the City of Escondido, to operate construction equipment as follows:

(a) It shall be unlawful for any person, including the City of Escondido, to operate construction equipment at any construction site, except on Monday through Friday during a week between the hours of seven (7) a.m. and six (6) p.m. and on Saturdays between the hours of nine (9) a.m. and five (5) p.m., and provided that the operation of such construction equipment complies with the requirements of subsection (d) of this section.

(b) It shall be unlawful for any person, including the City of Escondido, to operate construction equipment at any construction site on Sundays and on days designated by the president, governor or city council as public holidays.

(d) No construction equipment or combination of equipment, regardless of age or date of acquisition, shall be operated so as to cause noise in excess of a one-hour average sound level limit of seventy-five (75) dB at any time, unless a variance has been obtained in advance from the city manager.

Sec. 17-238. Grading.

(a) It shall be unlawful for any person, including the City of Escondido, to do any authorized grading at any construction site, except on Mondays through Fridays during a week between the hours of seven (7) a.m. and six (6) p.m. and, provided a variance has been obtained in advance from the city manager, on Saturdays from ten (10) a.m. to five (5) p.m.

(b) For the purpose of this section, “grading” shall include but not be limited to compacting, drilling, rock crushing or splitting, bulldozing, clearing, dredging, digging, filling, and blasting.

(c) In addition, any equipment used for grading shall not be operated so as to cause noise in excess of a one hour sound level limit of seventy-five (75) dB at any time when measured at or within the property lines of any property which is developed and used in whole or in part for residential purposes, unless a variance has been obtained in advance from the city manager.

5.0 EXISTING NOISE CONDITIONS

To determine the existing noise level environment noise measurements have been taken in the vicinity of the project site. The field survey noted that noise within the proposed project area is generally characterized by vehicular traffic on Interstate 15, Centre City Parkway, and Nutmeg Street. The following describes the measurement procedures, measurement locations, noise measurement results, and the modeling of the existing noise environment.

5.1 Noise Measurement Equipment

The noise measurements were taken using two Extech Model 407780 Type 2 integrating sound level meters and two Larson Davis Model LXT1 Type 1 sound level meters. All sound level meters were programed in “slow” mode. The Extech meters recorded the sound pressure level at 3-second intervals and the Larson Davis meters recorded the sound pressure level at 1-second intervals. All sound level meters recorded noise levels for approximately 24 hours in “A” weighted form. In addition, the L_{eq} averaged over the entire measuring time and L_{max} were recorded with all sound level meters. The sound level meters and microphones were mounted on power on sign and light poles, trees, or fences approximately six feet above the ground and were equipped with windscreens during all measurements. The Extech sound level meters were calibrated before and after the monitoring using an Extech calibrator, Model 407766 and the Larson Davis meters were calibrated before and after the monitoring using a Larson Davis Cal200 calibrator. All noise level measurement equipment meets American National Standards Institute specifications for sound level meters (S1.4-1983 identified in Chapter 19.68.020.AA).

Noise Measurement Location

The noise monitoring locations were selected in order to obtain noise measurements of the current noise levels on the project site. The noise measurement sites were selected to provide a representative sampling of the noise levels created by nearby noise sources. Descriptions of the noise monitoring sites are provided below in Table E and are shown in Figure 4. Appendix A includes a photo index of the study area and noise level measurement locations.

Noise Measurement Timing and Climate

The noise measurements were recorded between 11:00 a.m. on Wednesday, June 13, 2018 and 12:00 p.m. on Thursday, June 14, 2018. When the noise measurements were started the sky was clear, the temperature was 83 degrees Fahrenheit, the humidity was 40 percent, barometric pressure was 28.85 inches of mercury, and the wind was blowing around four miles per hour. Overnight, the sky was clear and the temperature dropped to 58 degrees Fahrenheit. At the conclusion of the noise measurements, the sky was cloudy, the temperature was 83 degrees Fahrenheit, the humidity was 49 percent, barometric pressure was 28.89 inches of mercury, and the wind was blowing around six miles per hour.

5.2 Noise Measurement Results

The results of the noise level measurements are presented in Table E. The measured sound pressure levels in dBA have been used to calculate the minimum and maximum L_{eq} averaged over 1-hour intervals. Table E also shows the L_{eq} , L_{max} , and CNEL, based on the entire measurement time. The noise monitoring data printouts are included in Appendix B. Figure 5 shows a graph of the 24-hour noise measurements.

Table E – Existing (Ambient) Noise Level Measurements

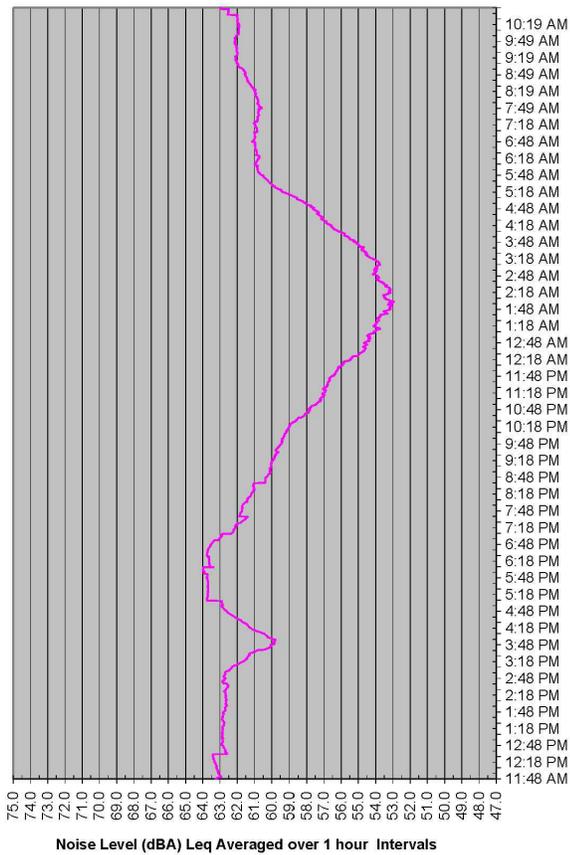
Site No.	Site Description	Average (dBA L_{eq})	Maximum (dBA L_{max})	Min. 1-Hour Interval (dBA L_{eq}/Time)	Max. 1-Hour Interval (dBA L_{eq}/Time)	Average (dBA CNEL)
1	Located near the northwest corner of the project site	63.6	83.7	55.5 2:01 AM	66.3 12:17 PM	68.1
2	Located on the west side of the project site approximately 100 feet south of the Nutmeg Street centerline	61.0	83.6	52.9 2:01 AM	64.0 5:56 PM	65.5
3	Located near the northeast corner of the project site	58.7	84.2	47.6 1:55 AM	63.7 7:58 AM	63.4
4	Located near the southeast corner of the project site	70.0	85.7	59.8 2:17 AM	74.1 5:08 PM	73.7

Source: Noise measurements were taken with two Extech Model 407780 Type 2 and two Larson Davis LXTI Type 1 integrating sound level meters between Wednesday, June 13 and Thursday, June 14, 2018.

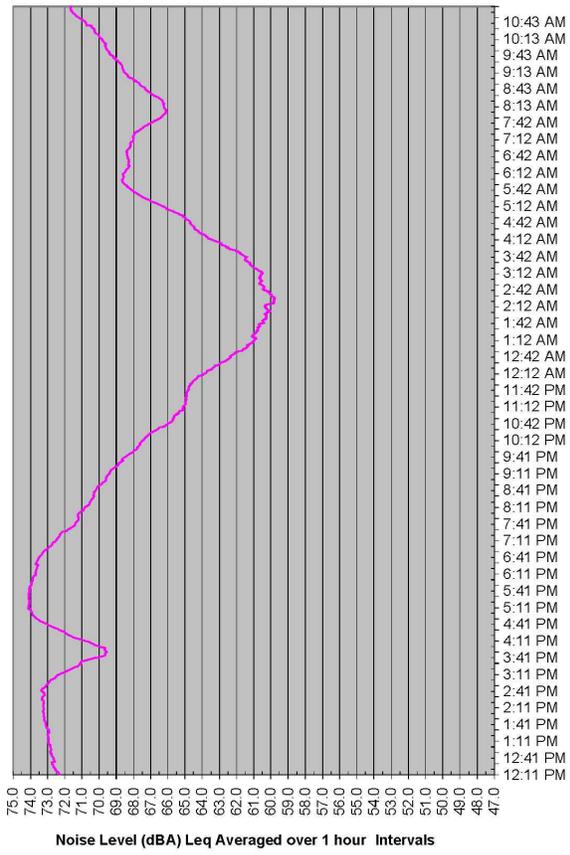


Figure 4
Noise Measurement Locations

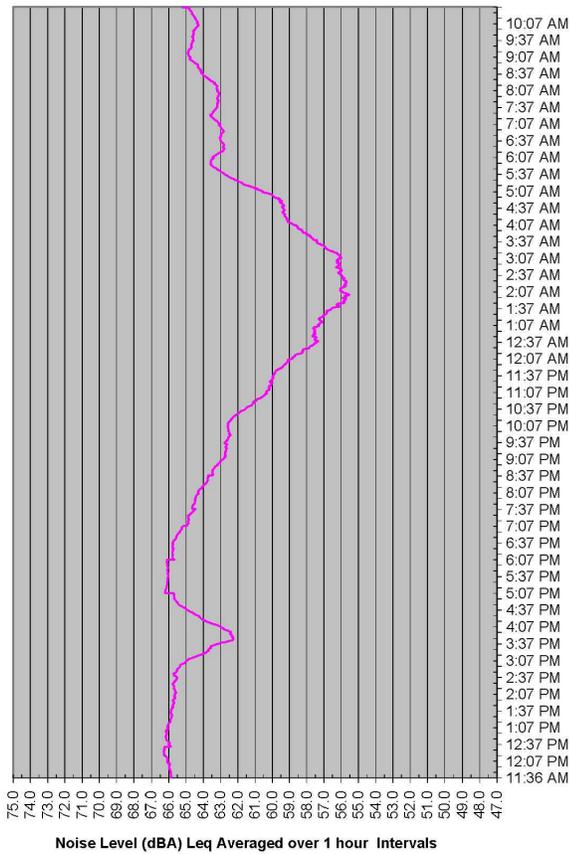
Site 2



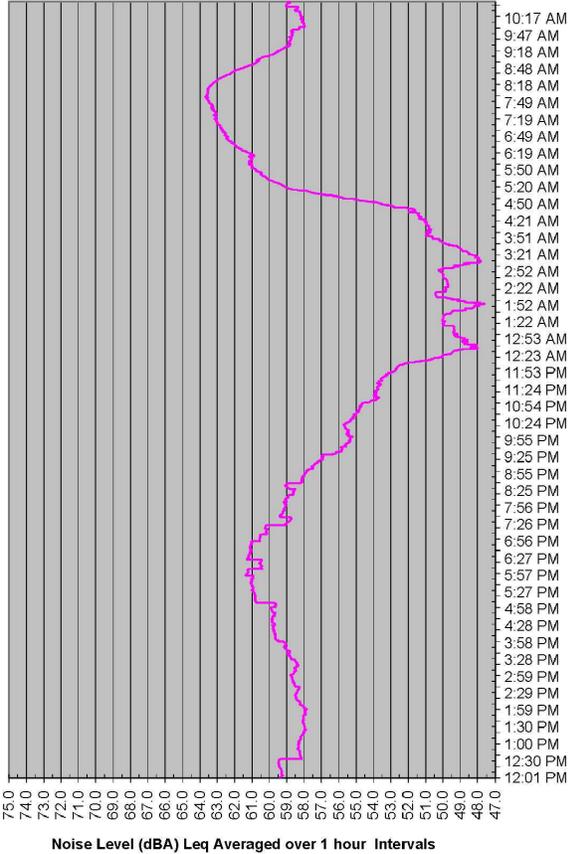
Site 4



Site 1



Site 3



SOURCE: Larson Davis Model LXT1, Type 1 Sound Level Meters for Sites 1 and 2; Extech Model 407780 Type 2 Sound Level Meters for Sites 3 and 4.

Figure 5
Field Noise Measurements Graphs

6.0 MODELING PARAMETERS AND ASSUMPTIONS

6.1 Construction Noise

The noise impacts from construction of the proposed project have been analyzed through use of the FHWA’s Roadway Construction Noise Model (RCNM). The FHWA compiled noise measurement data regarding the noise generating characteristics of several different types of construction equipment used during the Central Artery/Tunnel project in Boston. Table F below provides a list of the construction equipment anticipated to be used for each phase of construction as detailed in *Air Quality and Greenhouse Gas Emissions Impact Analysis Nutmeg Residential Townhomes Project* (Air Quality Analysis), prepared by Vista Environmental, March 26, 2019.

Table F – Construction Equipment Noise Emissions and Usage Factors

Equipment Description	Number of Equipment	Acoustical Use Factor ¹ (percent)	Spec 721.560 Lmax at 50 feet ² (dBA, slow ³)	Actual Measured Lmax at 50 feet ⁴ (dBA, slow ³)
Demolition				
Concrete/Industrial Saw	1	20	90	90
Excavators	3	40	85	81
Rubber Tired Dozer	2	40	85	82
Site Preparation				
Dozer	3	40	85	82
Tractor, Loader or Backhoe ⁵	4	40	84	N/A
Grading				
Excavator	2	40	85	81
Grader	1	40	85	83
Rubber Tired Dozer	1	40	85	82
Scraper	2	40	85	84
Tractor, Loader or Backhoe ⁵	3	40	84	N/A
Blasting ⁶	1	1	94	N/A
Building Construction				
Crane	1	16	85	81
Forklift (Gradall)	3	40	85	83
Generator	1	50	82	81
Welder	1	40	73	74
Tractor, Loader or Backhoe ⁵	3	40	84	N/A
Paving				
Paver	2	50	85	77
Paving Equipment	2	50	85	77
Roller	2	20	85	80
Architectural Coating				
Air Compressor	1	40	80	78

Notes:

¹ Acoustical use factor is the percentage of time each piece of equipment is operational during a typical workday.

² Spec 721.560 is the equipment noise level utilized by the RCNM program.

³ The “slow” response averages sound levels over 1-second increments. A “fast” response averages sound levels over 0.125-second increments.

⁴ Actual Measured is the average noise level measured of each piece of equipment during the Central Artery/Tunnel project in Boston, Massachusetts primarily during the 1990s.

⁵ For the tractor/loader/backhoe, the tractor noise level was utilized, since it is the loudest of the three types of equipment.

⁶ According to the Geotechnical Report (Geotek, 2018), the bedrock material on the north side of the project site may require blasting during grading activities.

Source: Federal Highway Administration, 2006 and CalEEMod default equipment mix.

Table F also shows the associated measured noise emissions for each piece of equipment from the RCNM model and measured percentage of typical equipment use per day. Construction noise impacts to the nearby sensitive receptors have been calculated according to the equipment noise levels and usage factors listed in Table F and through use of the RCNM. For each phase of construction, except for blasting, which was measured based on the nearest distance that it would occur to the nearby homes, the rest of the equipment was placed at the shortest distance of the proposed activity to the nearest home and each subsequent piece of equipment was placed an additional 50 feet away.

6.2 Operations-Related Noise

The proposed project would result in increases in traffic noise to the nearby roadways as well as introduce new sensitive receptors to the project site. The noise impacts to the proposed townhomes and offsite sensitive receptors were analyzed separately and the modeling procedures are detailed below.

SoundPlan Model Assumptions

The onsite noise impacts to the proposed residential townhomes and common recreation areas were analyzed through use of the SoundPlan Version 8.0 noise modeling software. The SoundPlan's road noise algorithms are based on the FHWA Traffic Noise Model (FHWA TNM Model). The SoundPlan Model requires the input of roadways and the locations of the receivers. Stationary noise sources with associated frequency spectrums, sound barriers, terrain contour lines, building placement, and specific ground coverage zones may be incorporated as well. The site plan and aerial photos were used to determine the placement of nearby roads in the project vicinity and the topographical lines from the grading plan were utilized to develop elevation contours of the project vicinity in the SoundPlan model. The default temperature of 20 degrees Celsius (68 degrees Fahrenheit) and default humidity of 50 percent, which can vary the propagation of noise, were used in the analysis and represent reasonable assumptions, since they are near the averages experienced in the project vicinity.

Roadway Assumptions

The SoundPlan model analyzed the noise impacts from the nearby roadways onto the project vicinity. Interstate 15 was based on separate single lane equivalent noise sources for each direction of travel, while Centre City Parkway and Nutmeg Street were analyzed based on a single lane equivalent noise source combining both directions of travel. The roadway parameters used for this study are presented in Table G. The roadway classifications are based on the City of Escondido General Plan Circulation Element. The roadway speeds are based on the posted speed limits. The average daily traffic volumes for Centre City Parkway and Nutmeg Street were calculated through use of the vehicle trips rates provided in *City of Escondido Noise Technical Report*, prepared by Atkins, December 8, 2011.

The traffic volumes for Interstate 15 were obtained from *2016 Annual Average Daily Truck Traffic on the California State Highway System*, prepared by Caltrans which found Interstate 15 had 129,000 ADT south of Deer Springs Road, which is the closest data point to the project site. In order to determine the traffic volumes for existing year 2018 and General Plan Buildout year 2035, the average annual increase over the last four years (2012 to 2016) were averaged together, which found that the traffic volume on Interstate 15 is growing at an average rate of 1.8 percent per year. This resulted in traffic volumes of 133,700 ADT in 2018 and 180,900 in 2035. The existing volumes were utilized to calibrate the model and the General Plan Buildout year 2035 volumes were utilized to calculate the anticipated worst-case noise impacts to the proposed homes and common recreation areas.

Table G – SoundPlan Model Roadway Parameters

Roadway	General Plan Classification	Near-Far Lane Distance (feet)	Vehicle Speed (MPH)	Average Daily Traffic	
				Existing	General Plan Buildout
Interstate 15 Northbound	Freeway	40	65/55 ¹	66,900	90,500
Interstate 15 Southbound	Freeway	40	65/55	66,900	90,500
Centre City Parkway North of Nutmeg Street	Collector	28	55	10,000	19,800
Centre City Parkway South of Nutmeg Street	Collector	28	55	7,200	14,000
Nutmeg Street	Local	18	35	4,200	9,300

Notes:

¹ Interstate 15 was modeled with autos at 65 miles per hour and trucks at 55 miles per hour.

Source: City of Escondido, 2012; Caltrans, 2018; Atkins, 2011.

The vehicle mixes used in the SoundPlan Model are shown in Table H. The vehicle mix for Interstate 15 is based on Caltrans data and Centre City Parkway and Nutmeg Street are based on the vehicle mix provided in in *City of Escondido Noise Technical Report*, prepared by Atkins, December 8, 2011. The daytime to nighttime ratio for Interstate 15 was calculated based on Caltrans Performance Measurement System. The daytime to nighttime ratio for Centre City Parkway and Nutmeg Street was calculated based on both the Caltrans data and noise measurements.

Table H – Roadway Vehicle Mixes

Vehicle Type	Traffic Flow Distributions			Overall
	Day (7 a.m. to 7 p.m.)	Evening (7 p.m. to 10 p.m.)	Night (10 p.m. to 7 a.m.)	
Interstate 15				
Automobiles	60.8%	7.8%	18.2%	86.8%
Medium Trucks	3.0%	0.5%	1.2%	4.7%
Heavy Trucks	5.2%	0.8%	2.6%	8.5%
Non-Freeway Roads				
Automobiles	67.1%	12.6%	15.5%	97.0%
Medium Trucks	1.3%	0.2%	0.5%	2.0%
Heavy Trucks	0.6%	0.1%	0.3%	1.0%

Source: Caltrans, 2018; Atkins, 2011.

Sound Wall Assumptions

The landscape plan for the proposed project shows that 6-foot high walls will be constructed along the property lines adjacent to Centre City Parkway. In addition, the Fire Plan requires an 8-foot high wall to be constructed along the wildland interface zone, which consists of the west, north and a portion of the eastern sides of the portion of the project site that is located on the north side of Nutmeg Street. Project Design Feature 2 is also provided that requires the construction of an 8 to 9 foot sound barrier along the west side of the portion of the project site located south of Nutmeg Street and extends 20 feet along the south property

line and 20 feet along the south side of Nutmeg Street. All sound walls were modeled in the SoundPlan model based on no reflection.

Modeling Calibration

Receivers were placed at the locations of the 24-hour noise measurement sites in order to assist in the calibration of the model as well as to verify the accuracy of the SoundPlan Model. Table I below provides a summary of the calculated results and a comparison to the measured results shown above in Table I. The SoundPlan Model printouts for the model calibration are provided in Appendix C.

Table I – SoundPlan Model Calibration to Existing Noise Levels

Site No.	Site Description	Calculated Noise Level ¹ (dBA CNEL)	Measured Noise Level ² (dBA CNEL)	Difference
1	Located near the northwest corner of the project site	68.5	68.1	0.4
2	Located on the west side of the project site approximately 100 feet south of the Nutmeg Street centerline	67.6	65.5	2.1
3	Located near the northwest corner of the project site	65.8	63.4	2.4
4	Located near the southeast corner of the project site	73.3	73.7	-0.4

¹ Noise Level Calculated from SoundPlan Version 8.0.

² Noise measurements taken on Wednesday, June 13 and Thursday, June 14, 2018.

Table I above shows that the SoundPlan Model is within 2.4 dBA of the field noise measurements, which is within the range of allowed tolerances as described in Section 5.4.1, Routine Model Calibration, of the *Technical Noise Supplement to the Traffic Noise Analysis Protocol (TeNS)*, prepared by Caltrans, 2013, for the multiple range of noise sources impacting the project site. Therefore, based on the noise measurements, the SoundPlan Model provides an accurate representation of the project area noise levels.

FHWA Model Methodology

The proposed project would result in increases in traffic noise to the nearby roadways. The project impacts to the offsite roadways were analyzed through use of the FHWA Traffic Noise Prediction Model - FHWA-RD-77-108 (FHWA Model). The FHWA Model arrives at a predicted noise level through a series of adjustments to the Reference Energy Mean Emission Level (REMEL). Adjustments are then made to the reference energy mean emission level to account for: the roadway active width (i.e., the distance between the center of the outermost travel lanes on each side of the roadway), the total average daily traffic (ADT) and the percentage of ADT which flows during the day, evening and night, the travel speed, the vehicle mix on the roadway, which is a percentage of the volume of automobiles, medium trucks and heavy trucks, the roadway grade, the angle of view of the observer exposed to the roadway and site conditions ("hard" or "soft" relates to the absorption of the ground, pavement or landscaping). The following section provides a discussion of the software and modeling input parameters used in this analysis and a discussion of the resultant existing noise model.

FHWA Model Traffic Noise Prediction Model Inputs

The roadway parameters used for this study are presented in Table J. The roadway classifications are based on the City's General Plan Circulation Element. The roadway speeds are based on the posted speed limits. The distance to the nearest sensitive receptor was determined by measuring the distance from the roadway

centerline to the nearest sensitive receptor. Since the study area is located in a suburban environment and landscaping or natural vegetation exists along the nearby roadways, soft site conditions were modeled.

Table J – FHWA Model Roadway Parameters

Roadway	Segment	General Plan Classification	Vehicle Speed (MPH)	Distance to Nearest Receptor (feet)
Nutmeg Street	West of Project Access	Local Collector	35	40
Centre City Parkway	South of Nutmeg Street	Collector	55	145
Centre City Parkway	South of Country Club Lane	Major	55	140
Centre City Parkway	South of Iris Lane	Major	55	100
Iris Lane	West of Centre City Parkway	Local Collector	30	50
El Norte Parkway	West of Iris Lane	Major	45	60

Source: Vista Environmental; and City of Escondido, 2012.

The average daily traffic (ADT) volumes were obtained from the *Nutmeg Residential Condominiums Project Traffic Impact Analysis Report* (Traffic Impact Analysis), prepared by Rick Engineering Company, February December 6, 2017. The ADT volumes have been provided for both without project and with project conditions for the existing and existing plus cumulative projects scenarios. The ADT volumes used in this analysis are shown in Table K.

Table K – FHWA Model Average Daily Traffic Volumes

Road	Road Segment	Average Daily Traffic Volumes			
		Existing	Existing + Project	Cumulative No Project	Cumulative + Project
Nutmeg Street	West of Project Access	2,992	3,359	2,992	3,359
Centre City Parkway	South of Nutmeg Street	7,947	8,743	8,425	9,221
Centre City Parkway	South of Country Club Lane	15,886	16,620	16,744	17,479
Centre City Parkway	South of Iris Lane	18,379	18,789	19,356	19,766
Iris Lane	West of Centre City Parkway	6,621	6,945	7,199	7,523
El Norte Parkway	West of Iris Lane	27,239	27,545	29,658	29,964

Source: Rick Engineering Company, 2019.

The vehicle mix used in the FHWA-RD-77-108 Model for all analyzed roadways were based on the Non-Freeway roads vehicle mix shown above in Table H.

FHWA Model Source Assumptions

To assess the roadway noise generation in a uniform manner, all vehicles are analyzed at the single lane equivalent acoustic center of the roadway being analyzed. In order to determine the height above the road grade where the noise is being emitted from, each type of vehicle has been analyzed independently with autos at road grade, medium trucks at 2.3 feet above road grade, and heavy trucks at 8 feet above road grade. These elevations were determined through a noise-weighted average of the elevation of the exhaust pipe, tires and mechanical parts in the engine, which are the primary noise emitters from a vehicle.

6.3 Exterior to Interior Attenuation Rates for the Proposed Townhomes

In order to calculate the exterior to interior attenuation rates for the proposed residential townhome units, the architectural plans were utilized to calculate the noise sensitive rooms for both the Villas and Row Homes. For each room the floor area covered by carpet or tile was calculated along with the total square footage of the ceilings and walls, in order to determine the sound absorption rate of the room. The area of exterior walls and windows were also calculated in order to determine the exterior transmission levels. The windows and exterior doors were based on standard dual pane windows and doors that have a 26 STC Rating as well as upgraded windows and doors that have a 30 STC rating and acoustic performance windows and doors that have a 35 STC rating. The walls were based on standard wall construction that includes a stucco exterior, ½-inch sheer panel, R-13 insulation, and ½-inch drywall on the interior. The exterior to interior noise reduction was then determined by combining the calculated room absorption rate to the exterior to interior transmission calculations.

Table L shows the calculated exterior to interior noise reduction rates for noise sensitive rooms for both the Villas and Row Homes. The spreadsheet showing the exterior to interior attenuation rate calculations are provided in Appendix D. The noise reduction rates provided in Table L are based on a “windows closed” condition, where a forced air heating and air conditioning system is provided so that the windows are not required for ventilation. In order to ensure that the “windows closed” condition is met, Project Design Feature 1 has been included in this analysis.

Table L – Exterior to Interior Residential Townhomes Rooms Noise Reduction Rates

Plan	Floor	Room Type	Exterior to Interior Noise Reduction (dBA)		
			STC 26 Windows/Doors ¹	STC 30 Windows/Doors ²	STC 35 Windows/Doors ³
Villas					
Plan 1	Third	Bedroom 1	32	36	40
	Third	Master Bedroom	31	34	38
	Second	Great Room/Kitchen	31	34	38
Plan 2	Third	Bedroom 1	30	34	39
	Third	Bedroom 2	30	34	38
	Third	Master Bedroom	32	36	40
	Second	Great Room/Kitchen	28	32	36
Plan 3	Third	Bedroom 1	32	36	40
	Third	Master Bedroom	30	34	38
	Second	Great Room/Kitchen	30	34	38
	First	Bedroom 2	32	36	40
Minimum Exterior to Interior Noise Reduction			28	32	36
Row Homes					
Plan 1	Third	Bedroom 1	29	--	--
	Third	Master Bedroom	29	--	--
	Second	Great Room/Kitchen	30	--	--
Plan 2	Third	Bedroom 1	32	--	--
	Third	Master Bedroom	31	--	--
	Second	Great Room/Kitchen	30	--	--
	Second	Bedroom 2	32	--	--
Plan 3	Second	Bedroom 1	31	--	--
	Second	Bedroom 2	31	--	--
	Second	Master Bedroom	34	--	--

First	Living Room/Kitchen	31	--	--
Minimum Exterior to Interior Noise Reduction		29	--	--

Notes:

¹ Based on standard dual pane windows with a 26 STC rating, which are required per Title 24 energy saving requirements.

² Based on upgraded dual pane windows with a 30 STC rating.

³ Based on acoustic performance dual pane windows with a 35 STC rating.

Source: Kinsler, 2000; Harris, 1994.

6.4 Vibration

Construction activity can result in varying degrees of ground vibration, depending on the equipment used on the site. Operation of construction equipment causes ground vibrations that spread through the ground and diminish in strength with distance. Buildings in the vicinity of the construction site respond to these vibrations with varying results ranging from no perceptible effects at the low levels to slight damage at the highest levels. Table M gives approximate vibration levels for particular construction activities. The data in Table M provides a reasonable estimate for a wide range of soil conditions.

Table M – Vibration Source Levels for Construction Equipment

Equipment		Peak Particle Velocity (inches/second)	Approximate Vibration Level (L _v)at 25 feet
Pile driver (impact)	Upper range	1.518	112
	typical	0.644	104
Pile driver (sonic)	Upper range	0.734	105
	typical	0.170	93
Clam shovel drop (slurry wall)		0.202	94
Vibratory Roller		0.210	94
Hoe Ram		0.089	87
Large bulldozer		0.089	87
Caisson drill		0.089	87
Loaded trucks		0.076	86
Jackhammer		0.035	79
Small bulldozer		0.003	58

Source: Federal Transit Administration, May 2006.

The construction-related and operational vibration impacts have been calculated through the vibration levels shown above in Table M and through typical vibration propagation rates. The equipment assumptions were based on the equipment lists provided above in Table F.

7.0 IMPACT ANALYSIS

7.1 CEQA Thresholds of Significance

Consistent with the California Environmental Quality Act (CEQA) and the State CEQA Guidelines, a significant impact related to noise would occur if a proposed project is determined to result in:

- Exposure of persons to or generation of noise levels in excess of standards established in the local General Plan or noise ordinance, or applicable standards of other agencies;
- Exposure of persons to or generation of excessive groundborne vibration or groundborne noise levels;
- A substantial permanent increase in ambient noise levels in the project vicinity above existing levels without the proposed project;
- A substantial temporary or periodic increase in ambient noise levels in the project vicinity above noise levels existing without the proposed project; or
- Exposure of persons residing or working in the project area to excessive noise levels from aircraft.

7.2 Generation of Noise Levels in Excess of Standards

The proposed project would not expose persons to or generate noise levels in excess of standards established in the General Plan or Noise Ordinance or applicable standards of other agencies. The following section calculates the potential noise emissions associated with the construction and operations of the proposed project and compares the noise levels to the City standards.

Construction-Related Noise

The construction activities for the proposed project are anticipated to include site preparation and grading of the 7.66-acre project site, building construction of 137 residential townhome units, paving of the onsite roads and parking areas, and application of architectural coatings. Noise impacts from construction activities associated with the proposed project would be a function of the noise generated by construction equipment, equipment location, sensitivity of nearby land uses, and the timing and duration of the construction activities. The nearest sensitive receptors to the project site are residents at the single-family homes located as near as 610 feet west of the project site on the west side of Interstate 15. There are also single-family homes located as near as 725 feet to the east and 770 feet to the southeast.

Section 17-234(a) of the City's Municipal Code restricts construction activities from occurring between the hours of 6:00 p.m. and 7:00 a.m. on weekdays or between the hours of 5:00 p.m. and 9:00 a.m. on Saturdays. Section 17-234(b) prohibits construction activities at any time on Sundays and public holidays. Additionally, Section 17-234(c) limits construction noise that occurs during the allowable times to 75 dB.

Construction noise impacts to the nearby sensitive receptors have been calculated through use of the RCNM and the parameters and assumptions detailed in Section 6.1 of this report including Table F – Construction Equipment Noise Emissions and Usage Factors. The results are shown below in Table N and the RCNM printouts are provided in Appendix E.

Table N – Worst Case Construction Noise Levels at Nearest Receptors

Construction Phase	Single-Family Homes to the West		Single-Family Homes to the East		Single-Family Homes to the Southeast	
	Distance (feet)	Noise Level (dBA Leq) ¹	Distance (feet)	Noise Level (dBA Leq) ¹	Distance (feet)	Noise Level (dBA Leq) ¹
Site Preparation ²	610	64	725	63	770	62
Grading ^{2,3}	610	64	725	63	770	62
Building Construction	660	64	745	63	820	62
Paving	660	58	725	57	800	57
Painting	660	51	745	50	820	49
City’s Construction Noise Threshold¹		75		75		75
Exceed Threshold?		No		No		No

Notes:

¹ City construction noise threshold from Section 17-234 Construction Equipment of the Municipal Code.

² Site preparation and grading activities would occur both onsite and offsite on approximately 1.3-acres of Caltrans property. The distances to the nearby homes for site preparation and grading activities are based on the nearest of onsite or offsite activities.

³ Grading noise levels includes possible blasting activities that may occur (Geotek, 2018).

Source: RCNM, Federal Highway Administration, 2006

Table N shows that the greatest noise impacts would occur during the site preparation, grading, and building construction phases of construction, with a noise level as high as 64 dBA at the single-family homes to the west of the project site. Table N also shows that none of the construction phases would exceed the City’s construction noise threshold of 75 dB. Therefore, the proposed project would not generate noise levels in excess of standards established in the General Plan or Noise Ordinance from construction of the proposed project. Impacts would be less than significant.

Operational-Related Noise

The proposed project would consist of the development of 137 residential townhome units. The proposed development would be adjacent to Interstate 15 and Centre City Parkway and is transected by Nutmeg Street. Traffic noise may create noise levels in excess of City’s exterior and interior noise standards at the proposed residential townhomes.

Exterior Noise Impacts

The City’s General Plan Policy 5.2 requires that noise levels do not exceed 65 dBA CNEL at the common recreation areas of the proposed multi-family development. It should be noted that General Policy 5.2 references Figure VI-13 of the General Plan that states that “The outdoor standard should not normally be applied to balconies or patios associated with residential uses.” As such, the exterior noise impact analysis has been limited to analyzing the noise level at the two proposed recreation areas.

In order to determine compliance with the 65 dBA CNEL exterior noise standard from the nearby roadway noise sources, the SoundPlan model was utilized to calculate the General Plan Buildout year 2035 conditions exterior noise levels at the two proposed common recreation areas. The parameters utilized in the SoundPlan model are detailed above in Section 6.1, which analyzed the noise impacts to the project site from Interstate 15, Centre City Parkway and Nutmeg Street. Table O provides a summary of the calculate outdoor common recreation areas noise levels, Figure 6 shows the General Plan Buildout year 2035 with project noise contours prior to mitigation and the SoundPlan printouts are provided in Appendix F.

Table O – Proposed Outdoor Common Recreation Areas Noise Levels Prior to Mitigation

Recreation Area	Recreation Area Location	Calculated Noise Level (dBA CNEL)	City Noise Standard (dBA CNEL)	Exceed City Standard?
1	North Side of Nutmeg Street – West	62.9	65	No
2	North Side of Nutmeg Street - East	66.8	65	Yes
3	South Side of Nutmeg Street – North	64.0	65	No
4	South Side of Nutmeg Street - South	67.8	65	Yes

Source: SoundPlan Model Version 8.0.

Table O shows that the noise level at both the eastern portion of the outdoor recreation area located on the north side of Nutmeg Street and the southern portion of the outdoor common recreation area located on the south side of Nutmeg Street would exceed the City’s 65 dBA CNEL noise standards. This would be considered a significant impact.

Mitigation Measure 1 is provided that would require the construction of two 8-foot sound walls, with one located on the south side of the outdoor recreation area that is located on the north side of Nutmeg Street and the other wall located southwest of the outdoor recreation area that is located on the south side of Nutmeg Street. The locations of the proposed outdoor recreation area sound walls are shown in Figure 3.

The SoundPlan model was re-run with the two proposed sound walls as depicted in Mitigation Measure 1 and Table P provides a summary of the calculated mitigated outdoor common recreation areas noise levels, Figure 7 shows the Mitigated General Plan Buildout year 2035 with project noise contours and the mitigated SoundPlan printouts are provided in Appendix G. Table P shows that with implementation of the Mitigation Measure 1, the noise levels at the outdoor recreation areas would be reduced to within the City’s 65 dBA CNEL exterior noise standard. Therefore, with implementation of Mitigation Measure 1, the outdoor recreation area exterior noise levels would be reduced to less than significant.

Table P – Mitigated Proposed Outdoor Common Recreation Areas Noise Levels

Recreation Area	Recreation Area Location	Calculated Noise Level (dBA CNEL)	City Noise Standard (dBA CNEL)	Exceed City Standard?
1	North Side of Nutmeg Street – West	59.3	65	No
2	North Side of Nutmeg Street - East	60.8	65	No
3	South Side of Nutmeg Street – North	63.3	65	No
4	South Side of Nutmeg Street - South	63.5	65	No

Source: SoundPlan Model Version 8.0.

Interior Noise Impacts

The City’s General Plan Policy 5.4 requires noise attenuation for new residential uses if the projected interior noise standard of 45 dBA CNEL is exceeded. In order to determine compliance with the City’s 45 dBA CNEL interior noise standard from the nearby roadways, the SoundPlan model was utilized to calculate the exterior noise levels at the facades of each of the proposed townhome structures. The exterior noise levels were then subtracted from the calculated exterior to interior attenuation rates (see Section 6.3) in order to determine the anticipated interior noise levels of the proposed residential townhomes. The parameters utilized in the SoundPlan model are detailed above in Section 6.2, which analyzed the noise impacts to the project site Nutmeg Street, Centre City Parkway, and Interstate 15.

In order to calculate the interior noise levels of the proposed townhomes, first, second, and third floor receivers were placed in the SoundPlan model at representative locations on the façades of each of the proposed townhome structures (see Appendix G) and the interior noise levels were calculated by subtracting the attenuation rates for each window/door type scenario from the exterior noise levels. Due to the large amount of data provided, the interior noise level calculations have been segmented into three tables, with the interior noise levels for the P1-Villas are shown in Table Q, the interior noise levels for the P2-Villas are shown in Table R, and the interior noise levels for the P3-Row Homes are shown in Table S.

Table Q – Proposed P1-Villas Interior Noise Levels

Receiver Location	Floor	Exterior Noise Level at Façade (dBA CNEL)	Interior Noise Levels (dBA CNEL)	
			26 STC Windows & Exterior Doors ¹	30 STC Windows & Exterior Doors ²
Building 1 – P1 Villas Southeast Side	1	71.9	43.9	39.9
	2	74.4	<u>46.4</u>	42.4
	3	74.8	<u>46.8</u>	42.8
Building 1 – P1 Villas Southwest Side	1	69.2	41.2	37.2
	2	74.8	<u>46.8</u>	42.8
	3	76.9	<u>48.9</u>	44.9
Building 2 – P1 Villas Southeast Side	1	69.9	41.9	37.9
	2	71.7	43.7	39.7
	3	72.1	44.1	40.1
Building 3 – P1 Villas Southwest Side	1	69.5	41.5	37.5
	2	71.4	43.4	39.4
	3	71.7	43.7	39.7
Building 4 – P1 Villas West Side	1	67.1	39.1	35.1
	2	69.3	41.3	37.3
	3	69.2	41.2	37.2
Building 8 – P1 Villas East Side	1	70.2	42.2	38.2
	2	70.3	42.3	38.3
	3	70.1	42.1	38.1
Building 8 – P1 Villas South Side	1	68.6	40.6	36.6
	2	69.4	41.4	37.4
	3	69.8	41.8	37.8
Building 9 – P1 Villas South Side	1	67.0	39.0	35.0
	2	68.6	40.6	36.6
	3	69.1	41.1	37.1
Building 10 – P1 Villas South Side	1	68.7	40.7	36.7
	2	70.5	42.5	38.5
	3	70.9	42.9	38.9
Building 11 – P1 Villas West Side	1	69.2	41.2	37.2
	2	71.5	43.5	39.5
	3	72.4	44.4	40.4
City Interior Noise Standard			45	45
Exceed City Standards?			Yes	No

Notes:

¹ A minimum 28 dBA noise reduction has been calculated for standard 26 STC windows (see Table L).

² A minimum 32 dBA noise reduction has been calculated for upgraded 30 STC windows (see Table L).

Exceedance of City 45 dBA CNEL noise standard shown in **bold and underline**.

Source: SoundPlan Model Version 8.0.

Table Q shows that for the P1-Villas (north side of Nutmeg Street), only the rooms on the southeast and southwest sides of Building 1 (closest building to I-15) would exceed the 45 dBA CNEL interior noise standard from General Plan Policy 5.4 with standard 26 STC windows and exterior doors. This would be considered a significant impact.

Mitigation Measure 2 is provided for the P1-Villas that requires all windows and exterior doors on the northwest, southwest, and southeast sides of Building 1 to have a minimum STC rating of 30 STC. The locations of the mitigated windows and doors is shown on Figure 3. Table Q shows that with implementation of Mitigation Measure 2, the interior noise levels of all P1-Villas townhomes would be reduced to within the 45 dBA CNEL interior noise standard. Therefore, with implementation of Mitigation Measure 2, the P1-Villas interior noise levels would be reduced to less than significant.

Table R – Proposed P2-Villas Interior Noise Levels

Receiver Location	Floor	Exterior Noise Level at Façade (dBA CNEL)	Interior Noise Levels (dBA CNEL)		
			26 STC Windows & Exterior Doors ¹	30 STC Windows & Exterior Doors ²	35 STC Windows & Exterior Doors ³
Building 12 – P2 Villas Southwest Side	1	73.4	45.4	41.4	37.4
	2	78.9	50.9	46.9	42.9
	3	79.1	51.1	47.1	43.1
Building 12 – P2 Villas Southeast Side	1	70.2	42.2	38.2	34.2
	2	74.2	46.2	42.2	38.2
	3	74.5	46.5	42.5	38.5
Building 13 – P2 Villas Southwest Side	1	74.6	46.6	42.6	38.6
	2	79.1	51.1	47.1	43.1
	3	79.2	51.2	47.2	43.2
Building 13 – P2 Villas Southeast Side	1	68.5	40.5	36.5	32.5
	2	75.2	47.2	43.2	39.2
	3	75.5	47.5	43.5	39.5
Building 14 – P2 Villas Northwest Side	1	76.2	48.2	44.2	40.2
	2	76.5	48.5	44.5	40.5
	3	76.6	48.6	44.6	40.6
Building 14 – P2 Villas Southwest Side	1	77.3	49.3	45.3	41.3
	2	78.9	50.9	46.9	42.9
	3	79.1	51.1	47.1	43.1
Building 15 – P2 Villas Southwest Side	1	75.3	47.3	43.3	39.3
	2	79.0	51.0	47.0	43.0
	3	79.1	51.1	47.1	43.1
Building 16 – P2 Villas Southwest Side	1	74.5	46.5	42.5	38.5
	2	80.0	52.0	48.0	44.0
	3	80.2	52.2	48.2	44.2
Building 17 – P2 Villas Southwest Side	1	74.5	46.5	42.5	38.5
	2	80.5	52.5	48.5	44.5
	3	80.6	52.6	48.6	44.6
Building 18 – P2 Villas Northwest Side	1	69.9	41.9	37.9	33.9
	2	78.6	50.6	46.6	42.6
	3	78.6	50.6	46.6	42.6
Building 18 – P2 Villas	1	72.9	44.9	40.9	36.9
	2	80.9	52.9	48.9	44.9

Table R – Proposed P2-Villas Interior Noise Levels

Receiver Location	Floor	Exterior Noise Level at Façade (dBA CNEL)	Interior Noise Levels (dBA CNEL)		
			26 STC Windows & Exterior Doors ¹	30 STC Windows & Exterior Doors ²	35 STC Windows & Exterior Doors ³
Southwest Side	3	81.0	<u>53.0</u>	<u>49.0</u>	45.0
Building 19 – P2 Villas	1	72.6	44.6	40.6	36.6
	2	75.4	<u>47.4</u>	43.4	39.4
Southwest Side	3	75.9	<u>47.9</u>	43.9	39.9
Building 20 – P2 Villas	1	70.0	42.0	38.0	34.0
	2	72.3	44.3	40.3	36.3
Northwest Side	3	72.9	44.9	40.9	36.9
Building 21 – P2 Villas	1	68.7	40.7	36.7	32.7
	2	72.0	44.0	40.0	36.0
Northwest Side	3	72.5	44.5	40.5	36.5
Building 22 – P2 Villas	1	70.4	42.4	38.4	34.4
	2	72.4	44.4	40.4	36.4
Southwest Side	3	72.3	44.3	40.3	36.3
City Interior Noise Standard			45	45	45
Exceed City Standards?			Yes	Yes	No

Notes:

¹ A minimum 28 dBA noise reduction has been calculated for standard 26 STC windows (see Table L).

² A minimum 32 dBA noise reduction has been calculated for upgraded 30 STC windows (see Table L).

³ A minimum 36 dBA noise reduction has been calculated for acoustic performance 35 STC windows (see Table L).

Exceedance of City 45 dBA CNEL noise standard shown in **bold and underline**.

Source: SoundPlan Model Version 8.0.

Table R shows that for the P2-Villas (western portion, south side of Nutmeg Street), that interior noise levels in Buildings 12 to 20 would exceed the 45 dBA CNEL interior noise standard from General Plan Policy 5.4 with standard 26 STC windows and exterior doors. This would be considered a significant impact.

Mitigation Measure 3 is provided for the P2-Villas that requires all windows and exterior doors on the southwest side of Buildings 12 to 18, the northwest side of Building 18, and the northwest side of the westernmost unit of Buildings 16 and 17 to have a minimum STC rating of 35 STC. In addition, Mitigation Measure 2 requires that all windows and exterior doors on the northwest and southwest sides of Building 19 and the southeast and northwest sides of Buildings 12 to 18 that were not covered by the 35 STC requirement to have a minimum STC rating of 30 STC. The locations of the mitigated windows and doors is shown on Figure 3. Table Q shows that with implementation of Mitigation Measure 3, the interior noise levels of all P2-Villas townhomes would be reduced to within the 45 dBA CNEL interior noise standard. Therefore, with implementation of Mitigation Measure 3, the P2-Villas interior noise levels would be reduced to less than significant.

Table S – Proposed Residential P3-Row Homes Interior Noise Levels

Receiver Location	Floor	Exterior Noise Level at Façade (dBA CNEL)	Interior Noise Levels (dBA CNEL)
			26 STC Windows ¹
Building 23 – P3 Row Homes West Side	1	67.0	38.0
	2	68.8	39.8
	3	69.5	40.5
Building 24 – P3 Row Homes North Side	1	66.6	37.6
	2	67.8	38.8
	3	68.0	39.0
Building 25 – P3 Row Homes North Side	1	68.7	39.7
	2	70.1	41.1
	3	69.9	40.9
Building 26 – P3 Row Homes East Side	1	71.8	42.8
	2	71.8	42.8
	3	71.6	42.6
Building 27 – P3 Row Homes East Side	1	67.8	38.8
	2	71.9	42.9
	3	71.5	42.5
Building 28 – P3 Row Homes East Side	1	67.8	38.8
	2	71.9	42.9
	3	71.6	42.6
Building 29 – P3 Row Homes East Side	1	68.0	39.0
	2	71.5	42.5
	3	71.3	42.3
Building 30 – P3 Row Homes East Side	1	65.8	36.8
	2	71.1	42.1
	3	71.2	42.2
Building 31 – P3 Row Homes East Side	1	68.9	39.9
	2	70.8	41.8
	3	70.7	41.7
Building 32 – P3 Row Homes West Side	1	72.4	43.4
	2	73.4	44.4
	3	73.6	44.6
Building 33 – P3 Row Homes West Side	1	66.8	37.8
	2	72.1	43.1
	3	72.2	43.2
Building 34 – P3 Row Homes West Side	1	62.8	33.8
	2	66.3	37.3
	3	67.0	38.0
City Interior Noise Standard			45
Exceed City Standards?			No

Notes:

¹ A minimum 28 dBA noise reduction has been calculated for standard 26 STC windows (see Table L).

Exceedance of City 45 dBA CNEL noise standard shown in **bold and underline**.

Source: SoundPlan Model Version 8.0.

Table S shows that for the P3-Row Homes, the highest interior noise level would occur in the rooms on the third floor of the west side of Building 32 with a noise level of 44.6 dBA CNEL. Table S shows that the

interior noise level at all P3-Row Homes would be within the 45 dBA CNEL interior noise standard from General Plan Policy 5.4 with standard 26 STC windows and exterior doors. The P3-Row Homes interior noise impacts would be less than significant.

Level of Significance Before Mitigation

Potentially significant impact.

Mitigation Measures

Mitigation Measure 1:

In order to reduce the noise levels at the two proposed outdoor recreation areas, the project applicant shall construct two 8-foot sound walls, with one located on the south side of the outdoor recreation area that is located on the north side of Nutmeg Street and the other wall located southwest of the outdoor recreation area that is located on the south side of Nutmeg Street. The sound walls shall be constructed of a solid material (e.g., glass, concrete block, or plaster). The locations of the proposed outdoor recreation area sound walls are shown in Figure 3.

Mitigation Measure 2:

For the P1-Villas, the project applicant shall require all windows and exterior doors on the northwest, southwest, and southeast sides of Building 1 to have a minimum STC rating of 30 STC. The locations of the mitigated windows and doors is shown on Figure 3.

Mitigation Measure 3:

For the P2-Villas, the project applicant shall require all windows and exterior doors on the southwest side of Buildings 12 to 18, the northwest side of Building 18, and the northwest side of the westernmost unit of Buildings 16 and 17 to have a minimum STC rating of 35 STC. In addition, all windows and exterior doors on the northwest and southwest sides of Building 19 and the southeast and northwest sides of Buildings 12 to 18 that were not covered by the 35 STC requirement to have a minimum STC rating of 30 STC. The locations of the mitigated windows and doors is shown on Figure 3.

Level of Significance After Mitigation

Less than significant impact.

7.3 Generation of Excessive Groundborne Vibration

The proposed project would not expose persons to or generation of excessive groundborne vibration or groundborne noise levels. The following section analyzes the potential vibration impacts associated with the construction and operations of the proposed project.

Construction-Related Vibration Impacts

The construction activities for the proposed project are anticipated to include site preparation and grading of the 7.66-acre project site, building construction of 137 residential townhome units, paving of the onsite roads and parking areas, and application of architectural coatings. Vibration impacts from construction activities associated with the proposed project would typically be created from the operation of heavy off-road equipment. The nearest sensitive receptors to the project site are residents at the single-family homes located as near as 610 feet west of the project site on the west side of Interstate 15. There are also single-family homes located as near as 725 feet to the east and 770 feet to the southeast.

Since neither the City's General Plan or Municipal Code do not provide a quantifiable vibration level threshold, Caltrans guidance that is detailed above in Section 4.2 has been utilized, which defines the threshold of perception from transient sources at 0.25 inch per second PPV.

The primary source of vibration during construction would be from the operation of a bulldozer. From Table M above a large bulldozer would create a vibration level of 0.089 inch per second PPV at 25 feet. Based on typical propagation rates, the vibration level at the nearest offsite receptor (610 feet away) would be 0.003 inch per second PPV. The vibration level at the nearest offsite receptor would be within the 0.25 inch per second PPV threshold detailed above. Impacts would be less than significant.

Operations-Related Vibration Impacts

The on-going operation of the proposed residential development would not include the operation of any known vibration sources. Therefore, a less than significant vibration impact is anticipated from the operation of the proposed project.

Level of Significance

Less than significant impact.

7.4 Permanent Noise Level Increase

The ongoing operation of the proposed project may result in a potential substantial permanent increase in ambient noise levels in the project vicinity above existing levels without the proposed project. Potential noise impacts associated with the operations of the proposed project would be from project-generated vehicular traffic on the project vicinity roadways.

Vehicle noise is a combination of the noise produced by the engine, exhaust and tires. The level of traffic noise depends on three primary factors (1) the volume of traffic, (2) the speed of traffic, and (3) the number of trucks in the flow of traffic. The proposed project does not propose any uses that would require a substantial number of truck trips and the proposed project would not alter the speed limit on any existing roadway so the proposed project's potential offsite noise impacts have been focused on the noise impacts associated with the change of volume of traffic that would occur with development of the proposed project.

General Plan Noise Policy 5.3 requires noise attenuation for the nearby residential uses, where projected incremental increases in exterior noise exceeds: Plus 5 dB where the existing noise level is 50 dBA CNEL or less; Plus 3 dB where the existing noise level is 55 dBA CNEL or less, Plus 2 dB where the existing noise level is 60 dB CNEL or less; Plus 1 dB where the existing noise level is 70 dB CNEL or less; or any increase where the existing noise level is 75 dB CNEL or higher.

The potential offsite traffic noise impacts created by the on-going operations of the proposed project have been analyzed through utilization of the FHWA model and parameters described above in Section 6.2 and the FHWA model noise calculation spreadsheets are provided in Appendix H. The proposed project's offsite traffic noise impacts have been analyzed for the existing and existing plus cumulative projects conditions that are discussed below.

Existing Conditions

The proposed project's potential offsite noise impacts have been calculated through a comparison of the Existing scenario to the Existing With Project Scenario. The results of this comparison are shown in Table T.

Table T – Existing Project Traffic Noise Contributions

Roadway	Segment	dBA CNEL at Nearest Receptor ¹			Increase Threshold ²
		Existing	Existing With Project	Project Contribution	
Nutmeg Street	West of Project Access	59.7	60.1	0.4	+2 dBA
Centre City Parkway	South of Nutmeg Street	61.1	61.5	0.4	+1 dBA
Centre City Parkway	South of Country Club Lane	64.5	64.6	0.1	+1 dBA
Centre City Parkway	South of Iris Lane	67.5	67.6	0.1	+1 dBA
Iris Lane	West of Centre City Parkway	59.7	59.8	0.1	+2 dBA
El Norte Parkway	West of Iris Lane	70.7	70.7	0.0	+0 dBA

Notes:

¹ Distance to nearest residential use shown in Table J. Noise levels do not take into account existing noise barriers.

² Increase Threshold obtained from General Plan Policy 5.3 detailed above in Table B.

Source: FHWA Traffic Noise Prediction Model FHWA-RD-77-108.

Table T shows that for the existing conditions, the proposed project’s permanent noise increases to the nearby homes from the generation of additional vehicular traffic would not exceed the noise increase thresholds provide in General Plan Noise Policy 5.3. Therefore, the proposed project would not result in a substantial permanent increase in ambient noise levels for the existing conditions. Impacts would be less than significant.

Existing Plus Cumulative Projects Conditions

The proposed project’s potential offsite noise impacts have been calculated through a comparison of the existing plus cumulative projects without project scenario to the existing plus cumulative projects with project scenario. The results of this comparison are shown in Table U.

Table U – Existing Plus Cumulative Projects Traffic Noise Contributions

Roadway	Segment	dBA CNEL at Nearest Receptor ¹			Increase Threshold ²
		Cumulative No Project	Cumulative With Project	Project Contribution	
Nutmeg Street	West of Project Access	59.7	60.1	0.4	+2 dBA
Centre City Parkway	South of Nutmeg Street	61.4	61.7	0.3	+1 dBA
Centre City Parkway	South of Country Club Lane	64.7	64.9	0.2	+1 dBA
Centre City Parkway	South of Iris Lane	67.7	67.8	0.1	+1 dBA
Iris Lane	West of Centre City Parkway	60.1	60.2	0.1	+1 dBA
El Norte Parkway	West of Iris Lane	71.1	71.1	0.0	+0 dBA

Notes:

¹ Distance to nearest residential use shown in Table J. Noise levels do not take into account existing noise barriers.

² Increase Threshold obtained from General Plan Policy 5.3 detailed above in Table B.

Source: FHWA Traffic Noise Prediction Model FHWA-RD-77-108.

Table U shows that for the existing plus cumulative projects conditions, the proposed project’s permanent noise increases to the nearby sensitive receptors from the generation of additional vehicular traffic would not exceed the noise increase thresholds provide in General Plan Noise Policy 5.3. Therefore, the proposed project would not result in a substantial permanent increase in ambient noise levels for the existing plus cumulative projects conditions. Impacts would be less than significant.

Level of Significance

Less than significant impact.

7.5 Temporary Noise Level Increase

The proposed project may create a substantial temporary or periodic increase in ambient noise levels in the project vicinity above noise levels existing without the proposed project. Construction activities may create temporary noise level increases from the onsite operation of off-road equipment or from the off-site operation of haul trucks and construction worker trips. The potential onsite and offsite construction noise level increases have been analyzed separately below.

Onsite Construction Noise

The construction activities for the proposed project are anticipated to include site preparation and grading of the 7.66-acre project site, building construction of 137 residential townhome units, paving of the onsite roads and parking areas, and application of architectural coatings. Onsite noise impacts from construction activities associated with the proposed project would be a function of the noise generated by construction equipment, equipment location, sensitivity of nearby land uses, and the timing and duration of the construction activities. The nearest sensitive receptors to the project site are residents at the single-family homes located as near as 610 feet west of the project site on the west side of Interstate 15. There are also single-family homes located as near as 725 feet to the east and 770 feet to the southeast.

The construction noise impacts to the nearby sensitive receptors has been previously analyzed above in Section 7.2, which found that that greatest onsite construction noise impacts would occur during the site preparation phase of construction, with a noise level as high as 64 dBA at the single-family homes to the west of the project site. Section 7.2 found that none of the construction phases would exceed the City's construction noise threshold of 75 dB. Therefore, through adherence to the limitations of construction activities provided in Section 17-234(a) of the City's Municipal Code, the proposed project would not create a substantial temporary or periodic increase in ambient noise levels from onsite construction noise. Impacts would be less than significant.

Offsite Construction Noise

The construction activities for the proposed project are anticipated to require the import of up to 189,700 cubic yards of dirt during the grading phase of construction activities. According to the Air Quality Analysis, the grading phase, including the import of dirt could be completed in as little as 3 months, which would require 352 haul truck trips per day. The Air Quality Analysis found that the grading phase would also generate 15 worker trips and 6 vendor truck trips per day.

The FHWA-RD-77-108 model was utilized to calculate the offsite construction noise impacts. Since the only designated truck route to the project site is via Centre City Parkway south of the project site, it was assumed all construction traffic would access the project site from Centre City Parkway. The proposed project's potential offsite construction noise impacts have been calculated through a comparison of the Existing scenario to the Existing Plus Construction Traffic Scenario. The results of this comparison are shown in Table T and the FHWA-RD-77-108 model printouts are provided in Appendix I.

Table V – Existing Plus Construction Traffic Noise Contributions

Roadway	Segment	dBA CNEL at Nearest Receptor ¹			Increase Threshold ²
		Existing	Existing With Construction	Project Contribution	
Centre City Parkway	South of Nutmeg Street	61.1	61.4	0.3	+1 dBA
Centre City Parkway	South of Country Club Lane	64.5	64.6	0.1	+1 dBA
Centre City Parkway	South of Iris Lane	67.5	67.6	0.1	+1 dBA

Notes:

¹ Distance to nearest residential use shown in Table J. Noise levels do not take into account existing noise barriers.

² Increase Threshold obtained from General Plan Policy 5.3 detailed above in Table B.

Table T shows that the worst-case construction activities, when the haul trucks are importing the dirt to the project site that the proposed project's temporary noise increases to the nearby homes from the generation of additional vehicular traffic would not exceed the noise increase thresholds provide in General Plan Policy 5.3. Therefore, construction of the proposed project would not result in a substantial temporary increase in ambient noise levels. Impacts would be less than significant.

Level of Significance

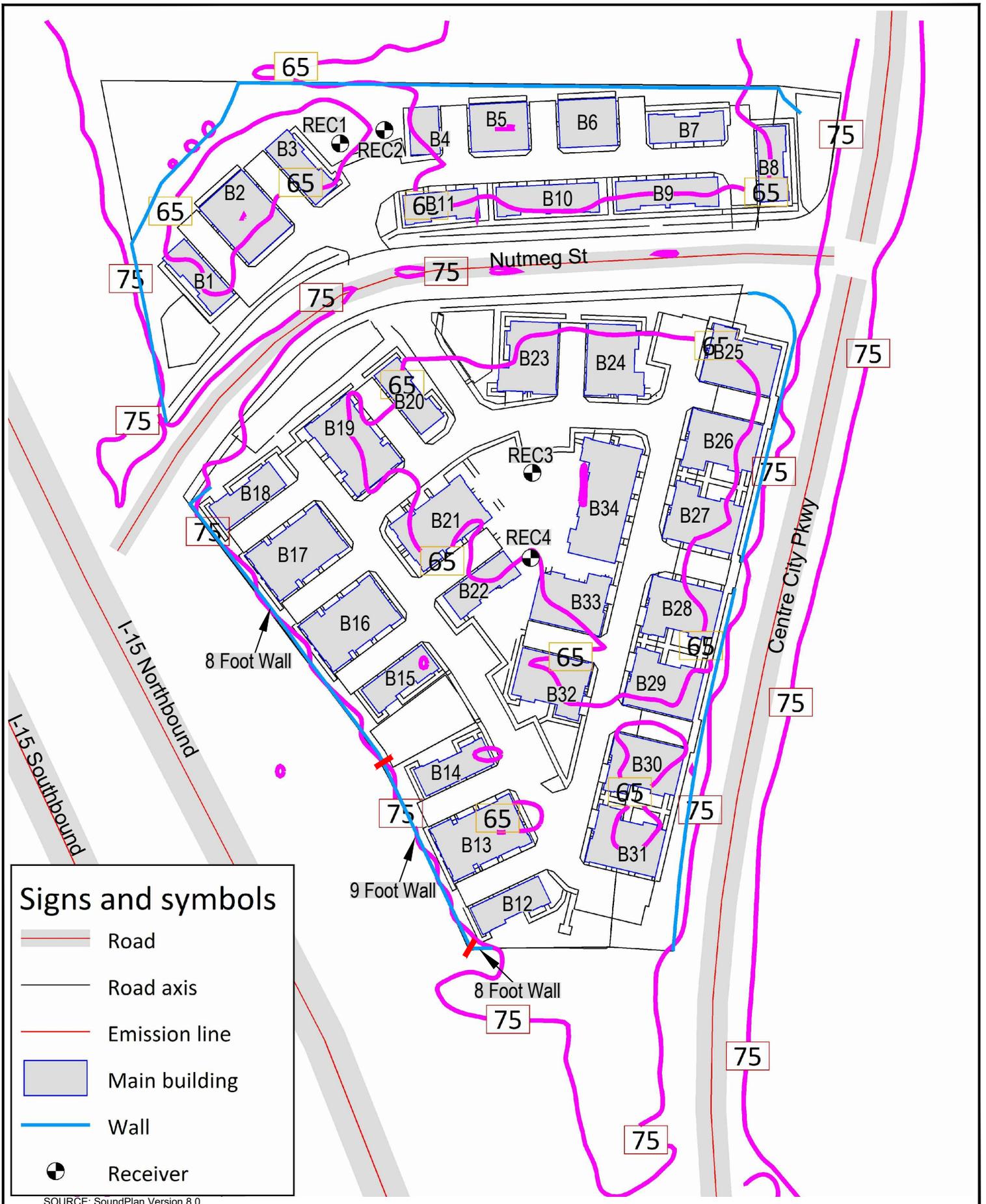
Less than significant impact.

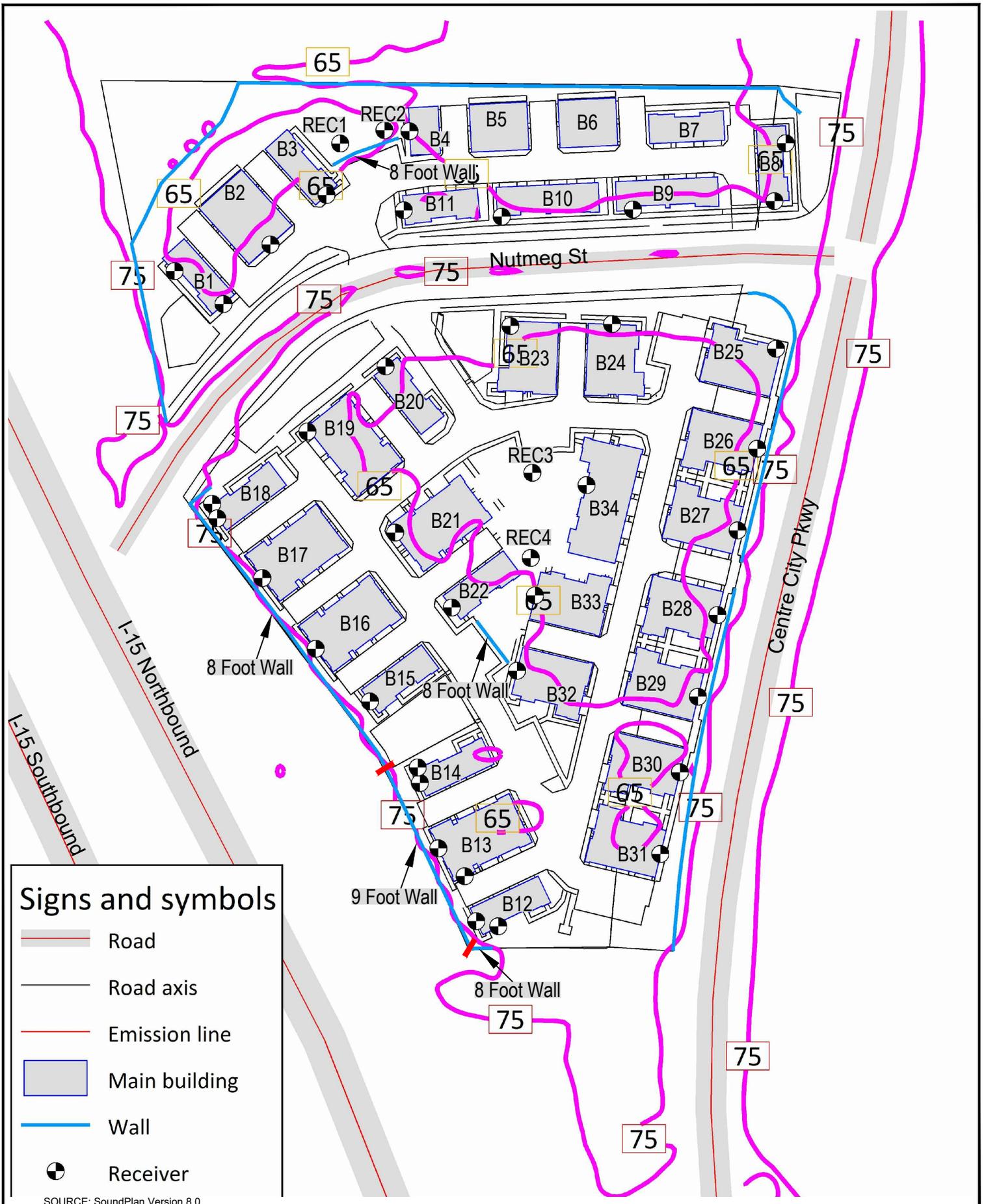
7.6 Aircraft Noise

The proposed project would not expose people residing or working in the project area to excessive noise levels from aircraft. The nearest airport is the McClellan-Palomar Airport, located approximately 10.3 miles southwest of the project site. The project site is located outside of the 60 dBA CNEL noise contours of this airport and the site observations during the noise measurements found that although aircraft noise is occasionally audible at the project site, the noise created by the aircraft is not loud enough to measurably increase the ambient noise levels, which is primarily created by traffic on Interstate 15, Nutmeg Street, and Centre City Parkway. Impacts would be less than significant.

Level of Significance

Less than significant impact.





8.0 REFERENCES

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Geotek, *Geotechnical Evaluation for Proposed Multi-Family Residential Development APNs 224-260-23, -46, and -47 City of Escondido, California*, June 15, 2018.

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APPENDIX A

Study Area Photo Index



Noise Measurement Site 1 - looking north



Noise Measurement Site 1 - looking northeast



Noise Measurement Site 1 - looking east



Noise Measurement Site 1 - looking southeast



Noise Measurement Site 1 - looking south



Noise Measurement Site 1 - looking southwest



Noise Measurement Site 1 - looking west



Noise Measurement Site 1 - looking northwest



Noise Measurement Site 2 - looking north



Noise Measurement Site 2 - looking northeast



Noise Measurement Site 2 - looking east



Noise Measurement Site 2 - looking southeast



Noise Measurement Site 2 - looking south



Noise Measurement Site 2 - looking southwest



Noise Measurement Site 2 - looking west



Noise Measurement Site 2 - looking northwest



Noise Measurement Site 3 - looking north



Noise Measurement Site 3 - looking northeast



Noise Measurement Site 3 - looking east



Noise Measurement Site 3 - looking southeast



Noise Measurement Site 3 - looking south



Noise Measurement Site 3 - looking southwest



Noise Measurement Site 3 - looking west



Noise Measurement Site 3 - looking northwest



Noise Measurement Site 4 - looking north



Noise Measurement Site 4 - looking northeast



Noise Measurement Site 4 - looking east



Noise Measurement Site 4 - looking southeast



Noise Measurement Site 4 - looking south



Noise Measurement Site 4 - looking southwest



Noise Measurement Site 4 - looking west



Noise Measurement Site 4 - looking northwest

APPENDIX B

Field Noise Measurement Printouts

Site 1 - Near Northwest Corner of Project Site				Site 2 - On West Side of Project Site, 100' South of Nutmeg				Site 3 - Near Northeast Corner of Project Site				Site 4 - Near Southeast Corner of Project Site							
Date	Time=06/13/18	11:06:59 AM		Date	Time=06/13/18	11:18:20 AM		Date	Time=06/13/18	11:31:00 AM		Date	Time=06/13/18	11:41:00 AM					
Sampling	1	Freq Weighting=A		Sampling	1	Freq Weighting=A		Sampling	Time=3	Weighting=A		Sampling	Time=3	Freq Weighting=A					
Record Num =	86402	Detector=Slow CNEL(24hr)	68.1	Record Num =	86402	Detector=Slow CNEL(24hr)	65.5	Record Num =	29400	Weighting=Slow CNEL(24hr)=	63.4	Record Num =	29200	Weighting=Slow CNEL(24hr)=	73.7				
Leq =	63.6	Ldn(24hr)=	67.8	Leq =	61.0	Ldn(24hr)=	65.2	Leq	58.7 SEL	Value=108.3	Ldn(24hr)=	63.1	Leq	70.0 SEL	Value=119.5	Ldn(24hr)=	73.1		
Max =	83.7	Min Leq1hr =	55.5	2:01 AM	Max =	83.6	Min Leq1hr =	52.9	2:01 AM	MAX	84.2	Min Leq1hr =	47.6	1:55 AM	MAX	85.7	Min Leq1hr =	59.8	2:17 AM
Min =	33.7	Max Leq9hr =	66.3	12:17 PM	Min =	33.9	Max Leq9hr =	64.0	5:06 PM	MIN	32.2	Max Leq9hr =	63.7	7:58 AM	MIN	39	Max Leq9hr =	74.1	5:08 PM
Site 1 - Near Northwest Corner of Project Site				Site 2 - On West Side of Project Site, 100' South of Nutmeg				Site 3 - Near Northeast Corner of Project Site				Site 4 - Near Southeast Corner of Project Site							
SPL	Time	Leq (1 hour Avg.)	Ldn CNEL	SPL	Time	Leq (1 hour Avg.)	Ldn CNEL	SPL	Time	Leq (1 hour Avg.)	Ldn CNEL	SPL	Time	Leq (1 hour Avg.)	Ldn CNEL				
64.7	11:06:59		64.7	80.0	11:18:20		60.0	60.0	11:31:00		60.0	60.0	74.3	11:41:00		74.3			
66.4	11:07:00		66.4	60.3	11:18:21		60.3	60.3	60.3	11:31:01		60.3	60.3	72.7	11:41:01		72.7		
66.0	11:07:01		66.0	61.1	11:18:22		61.1	61.1	61.1	11:31:02		61.1	61.1	70.9	11:41:02		70.9		
67.2	11:07:02		67.2	68.9	11:18:23		68.9	68.9	68.9	11:31:03		68.9	68.9	70.4	11:41:03		70.4		
67.2	11:07:03		67.2	69.6	11:18:24		69.6	69.6	69.6	11:31:04		69.6	69.6	71.3	11:41:04		71.3		
66.5	11:07:04		66.5	70.4	11:18:25		70.4	70.4	70.4	11:31:05		70.4	70.4	72.6	11:41:05		72.6		
68.1	11:07:05		68.1	69.1	11:18:26		69.1	69.1	69.1	11:31:06		69.1	69.1	70.7	11:41:06		70.7		
69.6	11:07:06		69.6	67.5	11:18:27		67.5	67.5	67.5	11:31:07		67.5	67.5	68.5	11:41:07		68.5		
70.5	11:07:07		70.5	63.3	11:18:28		63.3	63.3	64.8	11:31:08		64.8	64.8	70.8	11:41:08		70.8		
71.3	11:07:08		71.3	69.1	11:18:29		69.1	69.1	60.1	11:31:09		60.1	60.1	72.5	11:41:09		72.5		
67.9	11:07:09		67.9	65.1	11:18:30		65.1	65.1	61.1	11:31:10		61.1	61.1	70.3	11:41:10		70.3		
68.4	11:07:10		68.4	61.0	11:18:31		61.0	61.0	58.8	11:31:11		58.8	58.8	74	11:41:11		74		
68.9	11:07:11		68.9	67.8	11:18:32		67.8	67.8	59.2	11:31:12		59.2	59.2	73.3	11:41:12		73.3		
68.1	11:07:12		68.1	65.0	11:18:33		65.0	65.0	60.5	11:31:13		60.5	60.5	75.2	11:41:13		75.2		
69.9	11:07:13		69.9	67.4	11:18:34		67.4	67.4	64.7	11:31:14		64.7	64.7	73.4	11:41:14		73.4		
65.7	11:07:14		65.7	64.5	11:18:35		64.5	64.5	63.6	11:31:15		63.6	63.6	73	11:41:15		73		
71.7	11:07:15		71.7	65.0	11:18:36		65.0	65.0	63	11:31:16		63	63	72.7	11:41:16		72.7		
68.5	11:07:16		68.5	63.0	11:18:37		63.0	63.0	63.1	11:31:17		63.1	63.1	72.6	11:41:17		72.6		
64.8	11:07:17		64.8	67.8	11:18:38		67.8	67.8	66.3	11:31:18		66.3	66.3	73.4	11:41:18		73.4		
71.8	11:07:18		71.8	68.3	11:18:39		68.3	68.3	67.5	11:31:19		67.5	67.5	73.4	11:41:19		73.4		
69.1	11:07:19		69.1	67.3	11:18:40		67.3	67.3	61.2	11:31:20		61.2	61.2	74.2	11:41:20		74.2		
66.2	11:07:20		66.2	64.5	11:18:41		64.5	64.5	59.4	11:31:21		59.4	59.4	73.9	11:41:21		73.9		
66.2	11:07:21		66.2	65.5	11:18:42		65.5	65.5	62.2	11:31:22		62.2	62.2	74.1	11:41:22		74.1		
66.8	11:07:22		66.8	64.6	11:18:43		64.6	64.6	61.7	11:31:23		61.7	61.7	72.7	11:41:23		72.7		
66.2	11:07:23		66.2	63.6	11:18:44		63.6	63.6	58.3	11:31:24		58.3	58.3	69.4	11:41:24		69.4		
66.2	11:07:24		66.2	63.2	11:18:45		63.2	63.2	58.1	11:31:25		58.1	58.1	71.2	11:41:25		71.2		
65.8	11:07:25		65.8	63.5	11:18:46		63.5	63.5	67.8	11:31:26		67.8	67.8	69.7	11:41:26		69.7		
66.6	11:07:26		66.6	65.2	11:18:47		65.2	65.2	63.3	11:31:27		63.3	63.3	72.6	11:41:27		72.6		
66.4	11:07:27		66.4	65.5	11:18:48		65.5	65.5	60.8	11:31:28		60.8	60.8	73.4	11:41:28		73.4		
68.0	11:07:28		68.0	68.0	11:18:49		68.0	68.0	67.6	11:31:29		67.6	67.6	71.1	11:41:29		71.1		
67.8	11:07:29		67.8	63.6	11:18:50		63.6	63.6	63.2	11:31:30		63.2	63.2	72.5	11:41:30		72.5		
67.7	11:07:30		67.7	62.4	11:18:51		62.4	62.4	59.5	11:31:31		59.5	59.5	72.3	11:41:31		72.3		
67.6	11:07:31		67.6	61.5	11:18:52		61.5	61.5	61.6	11:31:32		61.6	61.6	73.1	11:41:32		73.1		
69.2	11:07:32		69.2	62.4	11:18:53		62.4	62.4	56.4	11:31:33		56.4	56.4	74.6	11:41:33		74.6		
67.5	11:07:33		67.5	62.0	11:18:54		62.0	62.0	61.9	11:31:34		61.9	61.9	74.7	11:41:34		74.7		
66.0	11:07:34		66.0	61.5	11:18:55		61.5	61.5	64.5	11:31:35		64.5	64.5	69.8	11:41:35		69.8		
65.0	11:07:35		65.0	63.2	11:18:56		63.2	63.2	56.4	11:31:36		56.4	56.4	69.8	11:41:36		69.8		
64.2	11:07:36		64.2	61.5	11:18:57		61.5	61.5	56	11:31:37		56	56	70.4	11:41:37		70.4		
63.7	11:07:37		63.7	62.3	11:18:58		62.3	62.3	53.5	11:31:38		53.5	53.5	71.4	11:41:38		71.4		
64.2	11:07:38		64.2	61.0	11:18:59		61.0	61.0	53.6	11:31:39		53.6	53.6	71.5	11:41:39		71.5		
64.4	11:07:39		64.4	64.4	11:19:00		64.4	64.4	57	11:31:40		57	57	70	11:41:40		70		
64.6	11:07:40		64.6	64.2	11:19:01		64.2	64.2	56.9	11:31:41		56.9	56.9	72.8	11:41:41		72.8		
68.3	11:07:41		68.3	68.3	11:19:02		68.3	68.3	55.6	11:31:42		55.6	55.6	74.7	11:41:42		74.7		
67.1	11:07:42		67.1	67.1	11:19:03		67.1	67.1	68.4	11:31:43		68.4	68.4	71	11:41:43		71		
66.2	11:07:43		66.2	65.2	11:19:04		65.2	65.2	65.5	11:31:44		65.5	65.5	73.7	11:41:44		73.7		
65.0	11:07:44		65.0	65.0	11:19:05		65.0	65.0	65.5	11:31:45		65.5	65.5	71.9	11:41:45		71.9		
65.9	11:07:45		65.9	65.9	11:19:06		65.9	65.9	64.3	11:31:46		64.3	64.3	71.6	11:41:46		71.6		
66.4	11:07:46		66.4	64.3	11:19:07		64.3	64.3	65.1	11:31:47		65.1	65.1	73.8	11:41:47		73.8		
66.6	11:07:47		66.6	60.3	11:19:08		60.3	60.3	53.9	11:31:48		53.9	53.9	73.3	11:41:48		73.3		
65.7	11:07:48		65.7	60.7	11:19:09		60.7	60.7	61.1	11:31:49		61.1	61.1	71.2	11:41:49		71.2		
65.7	11:07:49		65.7	63.5	11:19:10		63.5	63.5	59.2	11:31:50		59.2	59.2	72.4	11:41:50		72.4		
65.9	11:07:50		65.9	62.6	11:19:11		62.6	62.6	62.6	11:31:51		62.6	62.6	70.7	11:41:51		70.7		
66.5	11:07:51		66.5	62.1	11:19:12		62.1	62.1	64.1	11:31:52		64.1	64.1	69.6	11:41:52		69.6		
68.1	11:07:52		68.1	63.9	11:19:13		63.9	63.9	61.8	11:31:53		61.8	61.8	70.7	11:41:53		70.7		
68.3	11:07:53		68.3	63.5	11:19:14		63.5	63.5	61.5	11:31:54		61.5	61.5	69.7	11:41:54		69.7		
66.8	11:07:54		66.8	63.8	11:19:15		63.8	63.8	57.9	11:31:55		57.9	57.9	69.3	11:41:55		69.3		
65.3	11:07:55		65.3	65.5	11:19:16		65.5	65.5	59.4	11:31:56		59.4	59.4	66.1	11:41:56		66.1		
64.6	11:07:56		64.6	61.2	11:19:17		61.2	61.2	61.2	11:31:57		61.2	61.2	67.6	11:41:57		67.6		
66.5	11:07:57		66.5	66.5	11:19:18		66.5	66.5	53.9	11:31:58		53.9	53.9	69.5	11:41:58		69.5		
69.1	11:07:58		69.1	65.2	11:19:19		65.2	65.2	51.5	11:31:59		51.5	51.5	71.1	11:41:59		71.1		
69.3	11:07:59		69.3	63.9	11:19:20		63.9	63.9	61.2	11:32:00		61.2	61.2	65.7	11:42:00		65.7		
69.2	11:08:00		69.2	63.7	11:19:21		63.7	63.7	50.4	11:32:01		50.4	50.4	70.4	11:42:01		70.4		
69.9	11:08:01		69.9	62.4	11:19:22		62.4	62.4	49.4	11:32:02		49.4	49.4	69.4	11:42:02		69.4		
69.4	11:08:02		69.4	64.2	11:19:23		64.2	64.2	54.5	11:32:03		54.5	54.5	72.1	11:42:03		72.1		
68.8	11:08:03		68.8	64.8	11:19:24		64.8	64.8	56.8	11:32:04		56.8	56.8	71.1	11:42:04		71.1		
68.1	11:08:04		68.1	63.8	11:19:25		63.8	63.8	62.8	11:32:05		62.8	62.8	66.9	11:42:05		66.9		
66.6	11:08:05		66.6	63.3	11:19:26		63.3	63.3	62.3	11:32:06		62.3	62.3	72.1	11:42:06		72.1		
66.0	11:08																		

Site 1 - Near Northwest Corner of Project Site				Site 2 - On West Side of Project Site, 100' South of Nutmeg				Site 3 - Near Northeast Corner of Project Site				Site 4 - Near Southeast Corner of Project Site			
SPL	Time	Leq (1 hour Avg.)	Ldn CNEL	SPL	Time	Leq (1 hour Avg.)	Ldn CNEL	SPL	Time	Leq (1 hour Avg.)	Ldn CNEL	SPL	Time	Leq (1 hour Avg.)	Ldn CNEL
68.2	11:09:49		68.2 68.2	61.7	11:21:10		61.7 61.7	54.4	11:39:30		54.4 54.4	70.6	11:50:00		70.6 70.6
68.6	11:09:50		68.6 68.6	63.9	11:21:11		63.9 63.9	51.5	11:39:33		51.5 51.5	68.7	11:49:33		68.7 68.7
65.5	11:09:51		65.5 65.5	63.6	11:21:12		63.6 63.6	54.1	11:39:36		54.1 54.1	64.1	11:49:36		64.1 64.1
64.7	11:09:52		64.7 64.7	63.8	11:21:13		63.8 63.8	53.8	11:39:39		53.8 53.8	69.3	11:49:39		69.3 69.3
66.5	11:09:53		66.5 66.5	64.7	11:21:14		64.7 64.7	58.3	11:39:42		58.3 58.3	71.1	11:49:42		71.1 71.1
66.9	11:09:54		66.9 66.9	67.0	11:21:15		67.0 67.0	59.8	11:39:45		59.8 59.8	69.4	11:49:45		69.4 69.4
65.6	11:09:55		65.6 65.6	66.0	11:21:16		66.0 66.0	52.5	11:39:48		52.5 52.5	70.7	11:49:48		70.7 70.7
64.5	11:09:56		64.5 64.5	63.8	11:21:17		63.8 63.8	52.9	11:39:51		52.9 52.9	71.6	11:49:51		71.6 71.6
64.7	11:09:57		64.7 64.7	63.3	11:21:18		63.3 63.3	54.2	11:39:54		54.2 54.2	74.2	11:49:54		74.2 74.2
62.7	11:09:58		62.7 62.7	62.8	11:21:19		62.8 62.8	57.9	11:39:57		57.9 57.9	70.6	11:49:57		70.6 70.6
60.3	11:09:59		60.3 60.3	62.7	11:21:20		62.7 62.7	59.7	11:40:00		59.7 59.7	71.1	11:50:00		71.1 71.1
60.8	11:10:00		60.8 60.8	63.9	11:21:21		63.9 63.9	55.9	11:40:03		55.9 55.9	67.5	11:50:03		67.5 67.5
62.4	11:10:01		62.4 62.4	65.6	11:21:22		65.6 65.6	58.7	11:40:06		58.7 58.7	70.5	11:50:06		70.5 70.5
63.1	11:10:02		63.1 63.1	68.1	11:21:23		68.1 68.1	58	11:40:09		58 58	70.1	11:50:09		70.1 70.1
61.9	11:10:03		61.9 61.9	64.5	11:21:24		64.5 64.5	54.9	11:40:12		54.9 54.9	72.7	11:50:12		72.7 72.7
59.0	11:10:04		59.0 59.0	67.3	11:21:25		67.3 67.3	53.1	11:40:15		53.1 53.1	72.8	11:50:15		72.8 72.8
57.6	11:10:05		57.6 57.6	76.1	11:21:26		76.1 76.1	57	11:40:18		57 57	70.5	11:50:18		70.5 70.5
59.5	11:10:06		59.5 59.5	81.2	11:21:27		81.2 81.2	62.2	11:40:21		62.2 62.2	63.2	11:50:21		63.2 63.2
63.6	11:10:07		63.6 63.6	77.1	11:21:28		77.1 77.1	59.1	11:40:24		59.1 59.1	69.7	11:50:24		69.7 69.7
67.1	11:10:08		67.1 67.1	74.0	11:21:29		74.0 74.0	56.4	11:40:27		56.4 56.4	70.5	11:50:27		70.5 70.5
67.8	11:10:09		67.8 67.8	72.5	11:21:30		72.5 72.5	76.5	11:40:30		76.5 76.5	55.1	11:50:30		55.1 55.1
66.3	11:10:10		66.3 66.3	68.6	11:21:31		68.6 68.6	51.2	11:40:33		51.2 51.2	73.3	11:50:33		73.3 73.3
64.9	11:10:11		64.9 64.9	65.0	11:21:32		65.0 65.0	52.1	11:40:36		52.1 52.1	72.2	11:50:36		72.2 72.2
63.7	11:10:12		63.7 63.7	61.6	11:21:33		61.6 61.6	52.8	11:40:39		52.8 52.8	70.6	11:50:39		70.6 70.6
63.7	11:10:13		63.7 63.7	59.4	11:21:34		59.4 59.4	59.8	11:40:42		59.8 59.8	71.3	11:50:42		71.3 71.3
63.8	11:10:14		63.8 63.8	59.0	11:21:35		59.0 59.0	57.9	11:40:45		57.9 57.9	72.6	11:50:45		72.6 72.6
62.4	11:10:15		62.4 62.4	60.4	11:21:36		60.4 60.4	60.2	11:40:48		60.2 60.2	71.8	11:50:48		71.8 71.8
62.2	11:10:16		62.2 62.2	61.3	11:21:37		61.3 61.3	59.3	11:40:51		59.3 59.3	63.8	11:50:51		63.8 63.8
63.6	11:10:17		63.6 63.6	61.8	11:21:38		61.8 61.8	60	11:40:54		60 60	67.4	11:50:54		67.4 67.4
65.4	11:10:18		65.4 65.4	62.3	11:21:39		62.3 62.3	53.9	11:40:57		53.9 53.9	68.4	11:50:57		68.4 68.4
66.5	11:10:19		66.5 66.5	63.4	11:21:40		63.4 63.4	64.7	11:41:00		64.7 64.7	54.7	11:51:00		54.7 54.7
67.3	11:10:20		67.3 67.3	65.0	11:21:41		65.0 65.0	57.6	11:41:03		57.6 57.6	67.7	11:51:03		67.7 67.7
68.6	11:10:21		68.6 68.6	66.0	11:21:42		66.0 66.0	57.5	11:41:06		57.5 57.5	72	11:51:06		72 72
69.2	11:10:22		69.2 69.2	64.6	11:21:43		64.6 64.6	64.8	11:41:09		64.8 64.8	54.7	11:51:09		54.7 54.7
68.3	11:10:23		68.3 68.3	65.4	11:21:44		65.4 65.4	52.3	11:41:12		52.3 52.3	71.9	11:51:12		71.9 71.9
67.3	11:10:24		67.3 67.3	62.9	11:21:45		62.9 62.9	57.1	11:41:15		57.1 57.1	69.7	11:51:15		69.7 69.7
66.5	11:10:25		66.5 66.5	61.4	11:21:46		61.4 61.4	59.7	11:41:18		59.7 59.7	69.7	11:51:18		69.7 69.7
64.2	11:10:26		64.2 64.2	60.2	11:21:47		60.2 60.2	58.3	11:41:21		58.3 58.3	73.3	11:51:21		73.3 73.3
62.2	11:10:27		62.2 62.2	61.1	11:21:48		61.1 61.1	56	11:41:24		56 56	71.9	11:51:24		71.9 71.9
60.9	11:10:28		60.9 60.9	61.2	11:21:49		61.2 61.2	58.3	11:41:27		58.3 58.3	75.1	11:51:27		75.1 75.1
60.1	11:10:29		60.1 60.1	60.6	11:21:50		60.6 60.6	64.8	11:41:30		64.8 64.8	72.6	11:51:30		72.6 72.6
60.9	11:10:30		60.9 60.9	59.9	11:21:51		59.9 59.9	61.7	11:41:33		61.7 61.7	71.4	11:51:33		71.4 71.4
59.2	11:10:31		59.2 59.2	56.7	11:21:52		56.7 56.7	56.8	11:41:36		56.8 56.8	70.9	11:51:36		70.9 70.9
59.3	11:10:32		59.3 59.3	59.7	11:21:53		59.7 59.7	56.8	11:41:39		56.8 56.8	72.2	11:51:39		72.2 72.2
66.2	11:10:33		66.2 66.2	59.4	11:21:54		59.4 59.4	61.7	11:41:42		61.7 61.7	71.3	11:51:42		71.3 71.3
59.8	11:10:34		59.8 59.8	59.7	11:21:55		59.7 59.7	56.1	11:41:45		56.1 56.1	71.2	11:51:45		71.2 71.2
64.5	11:10:35		64.5 64.5	59.7	11:21:56		59.7 59.7	59	11:41:48		59 59	71.6	11:51:48		71.6 71.6
64.5	11:10:36		64.5 64.5	59.7	11:21:57		59.7 59.7	56.6	11:41:51		56.6 56.6	72.8	11:51:51		72.8 72.8
63.8	11:10:37		63.8 63.8	59.2	11:21:58		59.2 59.2	52.5	11:41:54		52.5 52.5	74.4	11:51:54		74.4 74.4
62.2	11:10:38		62.2 62.2	58.7	11:21:59		58.7 58.7	57.9	11:41:57		57.9 57.9	75.9	11:51:57		75.9 75.9
61.0	11:10:39		61.0 61.0	60.3	11:22:00		60.3 60.3	60.6	11:42:00		60.6 60.6	74.4	11:52:00		74.4 74.4
61.3	11:10:40		61.3 61.3	62.1	11:22:01		62.1 62.1	59.3	11:42:03		59.3 59.3	73.4	11:52:03		73.4 73.4
60.3	11:10:41		60.3 60.3	63.6	11:22:02		63.6 63.6	64.8	11:42:06		64.8 64.8	73.3	11:52:06		73.3 73.3
60.3	11:10:42		60.3 60.3	62.5	11:22:03		62.5 62.5	58.1	11:42:09		58.1 58.1	73.3	11:52:09		73.3 73.3
61.1	11:10:43		61.1 61.1	60.6	11:22:04		60.6 60.6	61.3	11:42:12		61.3 61.3	74.5	11:52:12		74.5 74.5
61.7	11:10:44		61.7 61.7	60.1	11:22:05		60.1 60.1	60.5	11:42:15		60.5 60.5	72.2	11:52:15		72.2 72.2
63.5	11:10:45		63.5 63.5	61.0	11:22:06		61.0 61.0	59.1	11:42:18		59.1 59.1	72	11:52:18		72 72
65.7	11:10:46		65.7 65.7	60.6	11:22:07		60.6 60.6	61.1	11:42:21		61.1 61.1	69	11:52:21		69 69
66.7	11:10:47		66.7 66.7	61.1	11:22:08		61.1 61.1	58.1	11:42:24		58.1 58.1	70.3	11:52:24		70.3 70.3
66.7	11:10:48		66.7 66.7	61.6	11:22:09		61.6 61.6	54.9	11:42:27		54.9 54.9	69.5	11:52:27		69.5 69.5
66.6	11:10:49		66.6 66.6	63.0	11:22:10		63.0 63.0	55.1	11:42:30		55.1 55.1	66.6	11:52:30		66.6 66.6
67.2	11:10:50		67.2 67.2	64.4	11:22:11		64.4 64.4	54.9	11:42:33		54.9 54.9	68	11:52:33		68 68
67.4	11:10:51		67.4 67.4	66.4	11:22:12		66.4 66.4	53.7	11:42:36		53.7 53.7	71.9	11:52:36		71.9 71.9
66.7	11:10:52		66.7 66.7	67.1	11:22:13		67.1 67.1	59	11:42:39		59 59	70.2	11:52:39		70.2 70.2
66.4	11:10:53		66.4 66.4	66.4	11:22:14		66.4 66.4	56.6	11:42:42		56.6 56.6	71.7	11:52:42		71.7 71.7
66.2	11:10:54		66.2 66.2	64.4	11:22:15		64.4 64.4	50.5	11:42:45		50.5 50.5	71.5	11:52:45		71.5 71.5
65.9	11:10:55		65.9 65.9	62.6	11:22:16		62.6 62.6	62.1	11:42:48		62.1 62.1	74.5	11:52:48		74.5 74.5
65.9	11:10:56		65.9 65.9	62.7	11:22:17		62.7 62.7	63	11:42:51		63 63	73.7	11:52:51		73.7 73.7
64.0	11:10:57		64.0 64.0	63.3	11:22:18		63.3 63.3	55.6	11:42:54		55.6 55.6	73.4	11:52:54		73.4 73.4
60.9	11:10:58		60.9 60.9	64.1	11:22:19		64.1 64.1	54	11:42:57		54 54	71.4	11:52:57		71.4 71.4
58.4	11:10:59		58.4 58.4	65.5	11:22:20		65.5 65.5	56.7	11:43:00		56.7 56.7	70.9	11:53:00		70.9 70.9
60.4	11:11:00		60.4 60.4	64.5	11:22:21		64.5 64.5	56.5	11:43:03		56.5 56.5	70.2	11:53:03		70.2 70.2
63.6	11:11:01		63.6 63.6	62.3	11:22:22		62.3 62.3	54.4	11:43:06		54.4 54.4	70.6	11:53:06		70.6 70.6
61.1	11:11:02		61.1 61.1	60.2	11:22:23		60.2 60.2	58.1	11:43:09		58.1 58.1				

Site 1 - Near Northwest Corner of Project Site				Site 2 - On West Side of Project Site, 100' South of Nutmeg				Site 3 - Near Northeast Corner of Project Site				Site 4 - Near Southeast Corner of Project Site				
SPL	Time	Leq (1 hour Avg.)	Ldn CNEL	SPL	Time	Leq (1 hour Avg.)	Ldn CNEL	SPL	Time	Leq (1 hour Avg.)	Ldn CNEL	SPL	Time	Leq (1 hour Avg.)	Ldn CNEL	
63.2	11:25:11		63.2	63.2	59.9	11:24:12	59.9	59.9	51.1	11:48:36	51.1	51.1	67.7	11:58:36	67.7	67.7
62.1	11:25:12		62.1	62.1	62.1	11:24:13	62.1	62.1	52.4	11:48:39	52.4	52.4	66.7	11:58:39	66.7	66.7
60.3	11:25:13		60.3	60.3	62.6	11:24:14	62.6	62.6	58.3	11:48:42	58.3	58.3	67.5	11:58:42	67.5	67.5
60.4	11:25:14		60.4	60.4	61.6	11:24:15	61.6	61.6	56.8	11:48:45	56.8	56.8	68.3	11:58:45	68.3	68.3
61.5	11:25:15		61.5	61.5	60.8	11:24:16	60.8	60.8	52.3	11:48:48	52.3	52.3	68.8	11:58:48	68.8	68.8
63.2	11:25:16		63.2	63.2	60.7	11:24:17	60.7	60.7	62.7	11:48:51	62.7	62.7	67.1	11:58:51	67.1	67.1
63.5	11:25:17		63.5	63.5	60.1	11:24:18	60.1	60.1	56.6	11:48:54	56.6	56.6	68.1	11:58:54	68.1	68.1
63.8	11:25:18		63.8	63.8	60.4	11:24:19	60.4	60.4	53.6	11:48:57	53.6	53.6	67.9	11:58:57	67.9	67.9
63.5	11:25:19		63.5	63.5	60.1	11:24:20	60.1	60.1	59.3	11:49:00	59.3	59.3	68.5	11:59:00	68.5	68.5
63.1	11:30:01		63.1	63.1	59.1	11:24:21	59.1	59.1	61.8	11:49:03	61.8	61.8	61.5	11:59:03	61.5	61.5
63.1	11:30:01		63.1	63.1	58.6	11:24:22	58.6	58.6	60.3	11:49:06	60.3	60.3	68.9	11:59:06	68.9	68.9
61.2	11:30:02		61.2	61.2	59.3	11:24:23	59.3	59.3	57.6	11:49:09	57.6	57.6	67.6	11:59:09	67.6	67.6
60.3	11:30:03		60.3	60.3	59.7	11:24:24	59.7	59.7	61.7	11:49:12	61.7	61.7	69.7	11:59:12	69.7	69.7
61.6	11:30:04		61.6	61.6	60.2	11:24:25	60.2	60.2	60.2	11:49:15	60.2	60.2	68.6	11:59:15	68.6	68.6
64.0	11:30:05		64.0	64.0	59.0	11:24:26	59.0	59.0	59.0	11:49:18	59.0	59.0	62.9	11:59:18	62.9	62.9
64.2	11:30:06		64.2	64.2	57.1	11:24:27	57.1	57.1	52	11:49:21	52	52	68.4	11:59:21	68.4	68.4
63.8	11:30:07		63.8	63.8	55.5	11:24:28	55.5	55.5	53.1	11:49:24	53.1	53.1	70.3	11:59:24	70.3	70.3
63.7	11:30:08		63.7	63.7	59.3	11:24:29	59.3	59.3	59.4	11:49:27	59.4	59.4	72.6	11:59:27	72.6	72.6
66.2	11:30:09		66.2	66.2	55.7	11:24:30	55.7	55.7	58.1	11:49:30	58.1	58.1	71.7	11:59:30	71.7	71.7
66.5	11:30:10		66.5	66.5	56.7	11:24:31	56.7	56.7	57.9	11:49:33	57.9	57.9	69	11:59:33	69	69
65.4	11:30:11		65.4	65.4	56.7	11:24:32	56.7	56.7	58.7	11:49:36	58.7	58.7	54.6	11:59:36	54.6	54.6
64.2	11:30:12		64.2	64.2	56.0	11:24:33	56.0	56.0	53	11:49:39	53	53	67.4	11:59:39	67.4	67.4
63.5	11:30:13		63.5	63.5	56.2	11:24:34	56.2	56.2	61	11:49:42	61	61	72.1	11:59:42	72.1	72.1
63.7	11:30:14		63.7	63.7	56.9	11:24:35	56.9	56.9	60.8	11:49:45	60.8	60.8	71.6	11:59:45	71.6	71.6
65.4	11:30:15		65.4	65.4	56.7	11:24:36	56.7	56.7	60.1	11:49:48	60.1	60.1	69.1	11:59:48	69.1	69.1
67.9	11:30:16		67.9	67.9	55.8	11:24:37	55.8	55.8	56	11:49:51	56	56	69.6	11:59:51	69.6	69.6
66.6	11:30:17		66.6	66.6	56.3	11:24:38	56.3	56.3	59.9	11:49:54	59.9	59.9	71.3	11:59:54	71.3	71.3
65.8	11:30:18		65.8	65.8	57.8	11:24:39	57.8	57.8	52.4	11:49:57	52.4	52.4	71.2	11:59:57	71.2	71.2
66.2	11:30:19		66.2	66.2	60.6	11:24:40	60.6	60.6	53.7	11:50:00	53.7	53.7	69.2	12:00:00	69.2	69.2
67.0	11:30:20		67.0	67.0	64.3	11:24:41	64.3	64.3	54	11:50:03	54	54	66.1	12:00:03	66.1	66.1
66.2	11:30:21		66.2	66.2	65.1	11:24:42	65.1	65.1	62.1	11:50:06	62.1	62.1	60.2	12:00:06	60.2	60.2
66.5	11:30:22		66.5	66.5	64.7	11:24:43	64.7	64.7	63.1	11:50:09	63.1	63.1	69.3	12:00:09	69.3	69.3
66.3	11:30:23		66.3	66.3	63.6	11:24:44	63.6	63.6	58.8	11:50:12	58.8	58.8	69.4	12:00:12	69.4	69.4
65.1	11:30:24		65.1	65.1	63.8	11:24:45	63.8	63.8	64.3	11:50:15	64.3	64.3	64.3	12:00:15	64.3	64.3
62.5	11:30:25		62.5	62.5	63.7	11:24:46	63.7	63.7	54.1	11:50:18	54.1	54.1	70.6	12:00:18	70.6	70.6
59.7	11:30:26		59.7	59.7	62.7	11:24:47	62.7	62.7	58.9	11:50:21	58.9	58.9	65.5	12:00:21	65.5	65.5
57.4	11:30:27		57.4	57.4	61.4	11:24:48	61.4	61.4	62.4	11:50:24	62.4	62.4	62.4	12:00:24	62.4	62.4
56.2	11:30:28		56.2	56.2	59.3	11:24:49	59.3	59.3	55.5	11:50:27	55.5	55.5	71.1	12:00:27	71.1	71.1
56.5	11:30:29		56.5	56.5	57.8	11:24:50	57.8	57.8	54.5	11:50:30	54.5	54.5	70.3	12:00:30	70.3	70.3
58.4	11:30:30		58.4	58.4	57.2	11:24:51	57.2	57.2	57.6	11:50:33	57.6	57.6	69.3	12:00:33	69.3	69.3
62.5	11:30:31		62.5	62.5	58.0	11:24:52	58.0	58.0	52.2	11:50:36	52.2	52.2	68.8	12:00:36	68.8	68.8
63.2	11:30:32		63.2	63.2	57.1	11:24:53	57.1	57.1	53.4	11:50:39	53.4	53.4	69.5	12:00:39	69.5	69.5
62.4	11:30:33		62.4	62.4	56.9	11:24:54	56.9	56.9	60.8	11:50:42	60.8	60.8	71.6	12:00:42	71.6	71.6
61.7	11:30:34		61.7	61.7	57.1	11:24:55	57.1	57.1	54.6	11:50:45	54.6	54.6	73.1	12:00:45	73.1	73.1
60.6	11:30:35		60.6	60.6	58.0	11:24:56	58.0	58.0	52.8	11:50:48	52.8	52.8	73.7	12:00:48	73.7	73.7
59.4	11:30:36		59.4	59.4	57.7	11:24:57	57.7	57.7	51.7	11:50:51	51.7	51.7	71.3	12:00:51	71.3	71.3
60.0	11:30:37		60.0	60.0	58.2	11:24:58	58.2	58.2	52.4	11:50:54	52.4	52.4	72.4	12:00:54	72.4	72.4
61.9	11:30:38		61.9	61.9	60.0	11:24:59	60.0	60.0	53.2	11:50:57	53.2	53.2	71.1	12:00:57	71.1	71.1
62.1	11:30:39		62.1	62.1	61.4	11:25:00	61.4	61.4	53.9	11:51:00	53.9	53.9	70.2	12:01:00	70.2	70.2
62.1	11:30:40		62.1	62.1	60.8	11:25:01	60.8	60.8	54.4	11:51:03	54.4	54.4	71	12:01:03	71	71
63.1	11:30:41		63.1	63.1	59.1	11:25:02	59.1	59.1	59.2	11:51:06	59.2	59.2	75	12:01:06	75	75
65.5	11:30:42		65.5	65.5	57.6	11:25:03	57.6	57.6	63.7	11:51:09	63.7	63.7	73.2	12:01:09	73.2	73.2
64.6	11:30:43		64.6	64.6	57.6	11:25:04	57.6	57.6	58.3	11:51:12	58.3	58.3	68.3	12:01:12	68.3	68.3
64.0	11:30:44		64.0	64.0	58.9	11:25:05	58.9	58.9	57.4	11:51:15	57.4	57.4	71.1	12:01:15	71.1	71.1
61.9	11:30:45		61.9	61.9	59.5	11:25:06	59.5	59.5	55.4	11:51:18	55.4	55.4	71.9	12:01:18	71.9	71.9
60.8	11:30:46		60.8	60.8	59.1	11:25:07	59.1	59.1	53.3	11:51:21	53.3	53.3	71.9	12:01:21	71.9	71.9
60.8	11:30:47		60.8	60.8	59.4	11:25:08	59.4	59.4	52.8	11:51:24	52.8	52.8	72.9	12:01:24	72.9	72.9
58.9	11:30:48		58.9	58.9	59.1	11:25:09	59.1	59.1	53.1	11:51:27	53.1	53.1	73.4	12:01:27	73.4	73.4
58.3	11:30:49		58.3	58.3	58.1	11:25:10	58.1	58.1	53.3	11:51:30	53.3	53.3	72.3	12:01:30	72.3	72.3
59.1	11:30:50		59.1	59.1	57.4	11:25:11	57.4	57.4	54.7	11:51:33	54.7	54.7	72.3	12:01:33	72.3	72.3
59.9	11:30:51		59.9	59.9	56.8	11:25:12	56.8	56.8	60	11:51:36	60	60	73.3	12:01:36	73.3	73.3
61.0	11:30:52		61.0	61.0	56.8	11:25:13	56.8	56.8	58.3	11:51:39	58.3	58.3	74.3	12:01:39	74.3	74.3
61.5	11:30:53		61.5	61.5	56.5	11:25:14	56.5	56.5	53.4	11:51:42	53.4	53.4	68.1	12:01:42	68.1	68.1
60.7	11:30:54		60.7	60.7	55.1	11:25:15	55.1	55.1	51.9	11:51:45	51.9	51.9	69.9	12:01:45	69.9	69.9
58.1	11:30:55		58.1	58.1	54.1	11:25:16	54.1	54.1	51.4	11:51:48	51.4	51.4	68.2	12:01:48	68.2	68.2
55.7	11:30:56		55.7	55.7	54.9	11:25:17	54.9	54.9	51.5	11:51:51	51.5	51.5	67.4	12:01:51	67.4	67.4
54.7	11:30:57		54.7	54.7	55.3	11:25:18	55.3	55.3	51.3	11:51:54	51.3	51.3	69	12:01:54	69	69
58.6	11:30:58		58.6	58.6	57.2	11:25:19	57.2	57.2	55.2	11:51:57	55.2	55.2	72.3	12:01:57	72.3	72.3
61.1	11:30:59		61.1	61.1	55.1	11:25:20	55.1	55.1	51.2	11:52:00	51.2	51.2	72.4	12:02:00	72.4	72.4
60.0	11:40:00		60.0	60.0	56.2	11:25:21	56.2	56.2	58.1	11:52:03	58.1	58.1	70.3	12:02:03	70.3	70.3
59.7	11:40:01		59.7	59.7	57.4	11:25:22	57.4	57.4	56.5	11:52:06	56.5	56.5	71.6	12:02:06	71.6	71.6
59.4	11:40:02		59.4	59.4	58.5	11:25:23	58.5	58.5	62.8	11:52:09	62.8	62.8	71.1	12:02:09	71.1	

Site 1 - Near Northwest Corner of Project Site				Site 2 - On West Side of Project Site, 100' South of Nutmeg				Site 3 - Near Northeast Corner of Project Site				Site 4 - Near Southeast Corner of Project Site			
SPL	Time	Leq (1 hour Avg.)	Ldn CNEL	SPL	Time	Leq (1 hour Avg.)	Ldn CNEL	SPL	Time	Leq (1 hour Avg.)	Ldn CNEL	SPL	Time	Leq (1 hour Avg.)	Ldn CNEL
62.8	11:19:27		60.8	60.9	59.5	11:30:47	59.5	12:08:21		59.3	59.6	59.6	71.8	12:18:30	72.5
63.1	11:19:28		61.1	61.2	59.8	11:30:48	59.8	12:08:22		59.3	59.6	59.6	71.8	12:18:31	72.5
63.3	11:19:29		61.3	61.4	59.9	11:30:50	59.9	12:08:23		59.3	59.9	59.9	71.8	12:18:32	72.5
63.6	11:19:30		61.6	61.7	59.9	11:30:51	59.9	12:08:24		59.3	59.9	59.9	71.8	12:18:33	72.5
63.9	11:19:31		61.9	62.0	59.9	11:30:52	59.9	12:08:25		59.3	59.9	59.9	71.8	12:18:34	72.5
64.2	11:19:32		62.2	62.3	59.9	11:30:53	59.9	12:08:26		59.3	59.9	59.9	71.8	12:18:35	72.5
64.5	11:19:33		62.5	62.6	59.9	11:30:54	59.9	12:08:27		59.3	59.9	59.9	71.8	12:18:36	72.5
63.9	11:19:34		63.9	63.9	54.5	11:30:55	54.5	12:08:28		59.3	53	53	74.6	12:18:45	72.5
63.9	11:19:35		63.9	63.9	54.7	11:30:57	54.7	12:08:29		59.3	54.7	54.7	74.6	12:18:46	72.5
64.1	11:19:36		64.1	64.1	54.7	11:30:58	54.7	12:08:30		59.3	54.7	54.7	74.6	12:18:47	72.5
64.3	11:19:37		64.3	64.3	54.7	11:30:59	54.7	12:08:31		59.3	54.7	54.7	74.6	12:18:48	72.5
64.5	11:19:38		64.5	64.5	54.7	11:31:00	54.7	12:08:32		59.3	54.7	54.7	74.6	12:18:49	72.5
64.7	11:19:39		64.7	64.7	54.7	11:31:01	54.7	12:08:33		59.3	54.7	54.7	74.6	12:18:50	72.5
64.9	11:19:40		64.9	64.9	54.7	11:31:02	54.7	12:08:34		59.3	54.7	54.7	74.6	12:18:51	72.5
65.1	11:19:41		65.1	65.1	54.7	11:31:03	54.7	12:08:35		59.3	54.7	54.7	74.6	12:18:52	72.5
65.3	11:19:42		65.3	65.3	54.7	11:31:04	54.7	12:08:36		59.3	54.7	54.7	74.6	12:18:53	72.5
65.5	11:19:43		65.5	65.5	54.7	11:31:05	54.7	12:08:37		59.3	54.7	54.7	74.6	12:18:54	72.5
65.7	11:19:44		65.7	65.7	54.7	11:31:06	54.7	12:08:38		59.3	54.7	54.7	74.6	12:18:55	72.5
65.9	11:19:45		65.9	65.9	54.7	11:31:07	54.7	12:08:39		59.3	54.7	54.7	74.6	12:18:56	72.5
66.1	11:19:46		66.1	66.1	54.7	11:31:08	54.7	12:08:40		59.3	54.7	54.7	74.6	12:18:57	72.5
66.3	11:19:47		66.3	66.3	54.7	11:31:09	54.7	12:08:41		59.3	54.7	54.7	74.6	12:18:58	72.5
66.5	11:19:48		66.5	66.5	54.7	11:31:10	54.7	12:08:42		59.3	54.7	54.7	74.6	12:18:59	72.5
66.7	11:19:49		66.7	66.7	54.7	11:31:11	54.7	12:08:43		59.3	54.7	54.7	74.6	12:19:00	72.5
66.9	11:19:50		66.9	66.9	54.7	11:31:12	54.7	12:08:44		59.3	54.7	54.7	74.6	12:19:01	72.5
67.1	11:19:51		67.1	67.1	54.7	11:31:13	54.7	12:08:45		59.3	54.7	54.7	74.6	12:19:02	72.5
67.3	11:19:52		67.3	67.3	54.7	11:31:14	54.7	12:08:46		59.3	54.7	54.7	74.6	12:19:03	72.5
67.5	11:19:53		67.5	67.5	54.7	11:31:15	54.7	12:08:47		59.3	54.7	54.7	74.6	12:19:04	72.5
67.7	11:19:54		67.7	67.7	54.7	11:31:16	54.7	12:08:48		59.3	54.7	54.7	74.6	12:19:05	72.5
67.9	11:19:55		67.9	67.9	54.7	11:31:17	54.7	12:08:49		59.3	54.7	54.7	74.6	12:19:06	72.5
68.1	11:19:56		68.1	68.1	54.7	11:31:18	54.7	12:08:50		59.3	54.7	54.7	74.6	12:19:07	72.5
68.3	11:19:57		68.3	68.3	54.7	11:31:19	54.7	12:08:51		59.3	54.7	54.7	74.6	12:19:08	72.5
68.5	11:19:58		68.5	68.5	54.7	11:31:20	54.7	12:08:52		59.3	54.7	54.7	74.6	12:19:09	72.5
68.7	11:19:59		68.7	68.7	54.7	11:31:21	54.7	12:08:53		59.3	54.7	54.7	74.6	12:19:10	72.5
68.9	11:20:00		68.9	68.9	54.7	11:31:22	54.7	12:08:54		59.3	54.7	54.7	74.6	12:19:11	72.5
69.1	11:20:01		69.1	69.1	54.7	11:31:23	54.7	12:08:55		59.3	54.7	54.7	74.6	12:19:12	72.5
69.3	11:20:02		69.3	69.3	54.7	11:31:24	54.7	12:08:56		59.3	54.7	54.7	74.6	12:19:13	72.5
69.5	11:20:03		69.5	69.5	54.7	11:31:25	54.7	12:08:57		59.3	54.7	54.7	74.6	12:19:14	72.5
69.7	11:20:04		69.7	69.7	54.7	11:31:26	54.7	12:08:58		59.3	54.7	54.7	74.6	12:19:15	72.5
69.9	11:20:05		69.9	69.9	54.7	11:31:27	54.7	12:08:59		59.3	54.7	54.7	74.6	12:19:16	72.5
70.1	11:20:06		70.1	70.1	54.7	11:31:28	54.7	12:09:00		59.3	54.7	54.7	74.6	12:19:17	72.5
70.3	11:20:07		70.3	70.3	54.7	11:31:29	54.7	12:09:01		59.3	54.7	54.7	74.6	12:19:18	72.5
70.5	11:20:08		70.5	70.5	54.7	11:31:30	54.7	12:09:02		59.3	54.7	54.7	74.6	12:19:19	72.5
70.7	11:20:09		70.7	70.7	54.7	11:31:31	54.7	12:09:03		59.3	54.7	54.7	74.6	12:19:20	72.5
70.9	11:20:10		70.9	70.9	54.7	11:31:32	54.7	12:09:04		59.3	54.7	54.7	74.6	12:19:21	72.5
71.1	11:20:11		71.1	71.1	54.7	11:31:33	54.7	12:09:05		59.3	54.7	54.7	74.6	12:19:22	72.5
71.3	11:20:12		71.3	71.3	54.7	11:31:34	54.7	12:09:06		59.3	54.7	54.7	74.6	12:19:23	72.5
71.5	11:20:13		71.5	71.5	54.7	11:31:35	54.7	12:09:07		59.3	54.7	54.7	74.6	12:19:24	72.5
71.7	11:20:14		71.7	71.7	54.7	11:31:36	54.7	12:09:08		59.3	54.7	54.7	74.6	12:19:25	72.5
71.9	11:20:15		71.9	71.9	54.7	11:31:37	54.7	12:09:09		59.3	54.7	54.7	74.6	12:19:26	72.5
72.1	11:20:16		72.1	72.1	54.7	11:31:38	54.7	12:09:10		59.3	54.7	54.7	74.6	12:19:27	72.5
72.3	11:20:17		72.3	72.3	54.7	11:31:39	54.7	12:09:11		59.3	54.7	54.7	74.6	12:19:28	72.5
72.5	11:20:18		72.5	72.5	54.7	11:31:40	54.7	12:09:12		59.3	54.7	54.7	74.6	12:19:29	72.5
72.7	11:20:19		72.7	72.7	54.7	11:31:41	54.7	12:09:13		59.3	54.7	54.7	74.6	12:19:30	72.5
72.9	11:20:20		72.9	72.9	54.7	11:31:42	54.7	12:09:14		59.3	54.7	54.7	74.6	12:19:31	72.5
73.1	11:20:21		73.1	73.1	54.7	11:31:43	54.7	12:09:15		59.3	54.7	54.7	74.6	12:19:32	72.5
73.3	11:20:22		73.3	73.3	54.7	11:31:44	54.7	12:09:16		59.3	54.7	54.7	74.6	12:19:33	72.5
73.5	11:20:23		73.5	73.5	54.7	11:31:45	54.7	12:09:17		59.3	54.7	54.7	74.6	12:19:34	72.5
73.7	11:20:24		73.7	73.7	54.7	11:31:46	54.7	12:09:18		59.3	54.7	54.7	74.6	12:19:35	72.5
73.9	11:20:25		73.9	73.9	54.7	11:31:47	54.7	12:09:19		59.3	54.7	54.7	74.6	12:19:36	72.5
74.1	11:20:26		74.1	74.1	54.7	11:31:48	54.7	12:09:20		59.3	54.7	54.7	74.6	12:19:37	72.5
74.3	11:20:27		74.3	74.3	54.7	11:31:49	54.7	12:09:21		59.3	54.7	54.7	74.6	12:19:38	72.5
74.5	11:20:28		74.5	74.5	54.7	11:31:50	54.7	12:09:22		59.3	54.7	54.7	74.6	12:19:39	72.5
74.7	11:20:29		74.7	74.7	54.7	11:31:51	54.7	12:09:23		59.3	54.7	54.7	74.6	12:19:40	72.5
74.9	11:20:30		74.9	74.9	54.7	11:31:52	54.7	12:09:24		59.3	54.7	54.7	74.6	12:19:41	72.5
75.1	11:20:31		75.1	75.1	54.7	11:31:53	54.7	12:09:25		59.3	54.7	54.7	74.6	12:19:42	72.5
75.3	11:20:32		75.3	75.3	54.7	11:31:54	54.7	12:09:26		59.3	54.7	54.7	74.6	12:19:43	72.5
75.5	11:20:33		75.5	75.5	54.7	11:31:55	54.7	12:09:27		59.3	54.7	54.7	74.6	12:19:44	72.5
75.7	11:20:34		75.7	75.7	54.7	11:31:56	54.7	12:09:28		59.3	54.7	54.7	74.6	12:19:45	72.5
75.9	11:20:35		75.9	75.9	54.7	11:31:57	54.7	12:09:29		59.3	54.7	54.7	74.6	12:19:46	72.5
76.1	11:20:36		76.1	76.1	54.7	11:31:58	54.7	12:09:30		59.3	54.7	54.7	74.6	12:19:47	72.5
76.3	11:20:37		76.3	76.3	54.7	11:31:59	54.7	12:09:31		59.3	54.7	54.7	74.6	12:19:48	72.5
76.5	11:20:38		76.5	76.5	54.7	11:32:00	54.7	12:09:32		59.3	54.7	54.7	74.6	12:19:49	72.5
76.7	11:20:39		76.7	76.7	54.7	11:32:01	54.7	12:09:33		59.3	54.7	54.7	74.6	12:19:50	72.5
76.9	11:20:40		76.9	76.9	54.7	11:32:02	54.7	12:09:34		59.3	54.7	54.7	74.6	12:19:51	72.5
77.1	11:20:41		77.1	77.1	54.7	11:32:03	54.7	12:09:35		59.3	54.7	54.7	74.6	12:19:52	72.5
77.3	11:20:42		77.3	77.3	54.7	11:32:04	54.7	12:09:36		59.3	54.7	54.7	74.6	12:19:53	72.5
77.5	11:20:43		77.5	77.5	54.7	11:32:05	54.7	12:09:37		59.3	54.7	54.7	74.6	12:19:54	72.5
77.7	11:20:44		77.7	77.7	54.7	11:32:06	54.7	12:09:38		59.3	54.7	54.7	74.6	12:19:55	72.5
77.9</															

Site 1 - Near Northwest Corner of Project Site				Site 2 - On West Side of Project Site, 100' South of Nutmeg				Site 3 - Near Northeast Corner of Project Site				Site 4 - Near Southeast Corner of Project Site			
SPL	Time	Leq (1 hour Avg.)	Ldn CNEL	SPL	Time	Leq (1 hour Avg.)	Ldn CNEL	SPL	Time	Leq (1 hour Avg.)	Ldn CNEL	SPL	Time	Leq (1 hour Avg.)	Ldn CNEL
62.4	11:22:21	62.4	62.4	58.6	11:33:41	58.6	58.6	56.5	12:17:03	56.5	56.5	76.7	12:27:03	76.7	76.7
63.6	11:22:21	63.6	63.6	58.0	11:33:42	58.0	58.0	56.5	12:17:06	56.5	56.5	73.8	12:27:06	73.8	73.8
63.6	11:22:22	63.6	63.6	57.6	11:33:43	57.6	57.6	55.5	12:17:09	55.5	55.5	74.2	12:27:09	74.2	74.2
63.3	11:22:23	63.3	63.3	62.0	11:33:44	62.0	62.0	53.9	12:17:12	53.9	53.9	73.9	12:27:12	73.9	73.9
63.2	11:22:24	63.2	63.2	63.6	11:33:45	63.6	63.6	56.4	12:17:15	56.4	56.4	74.7	12:27:15	74.7	74.7
64.3	11:22:25	64.3	64.3	63.3	11:33:46	63.3	63.3	54.5	12:17:18	54.5	54.5	73.2	12:27:18	73.2	73.2
64.9	11:22:26	64.9	64.9	61.9	11:33:47	61.9	61.9	54.7	12:17:21	54.7	54.7	72.7	12:27:21	72.7	72.7
65.9	11:22:27	65.9	65.9	60.4	11:33:48	60.4	60.4	55.7	12:17:24	55.7	55.7	72.4	12:27:24	72.4	72.4
68.9	11:22:28	68.9	68.9	59.3	11:33:49	59.3	59.3	61	12:17:27	61	61	73.2	12:27:27	73.2	73.2
72.1	11:22:29	72.1	72.1	59.0	11:33:50	59.0	59.0	58.8	12:17:30	58.8	58.8	69.7	12:27:30	69.7	69.7
70.1	11:22:30	70.1	70.1	58.9	11:33:51	58.9	58.9	60.8	12:17:33	60.8	60.8	68.2	12:27:33	68.2	68.2
66.9	11:22:31	66.9	66.9	59.7	11:33:52	59.7	59.7	62.4	12:17:36	62.4	62.4	62.4	12:27:36	62.4	62.4
64.5	11:22:32	64.5	64.5	60.6	11:33:53	60.6	60.6	54.6	12:17:39	54.6	54.6	71.8	12:27:39	71.8	71.8
64.0	11:22:33	64.0	64.0	62.7	11:33:54	62.7	62.7	52.9	12:17:42	52.9	52.9	70.5	12:27:42	70.5	70.5
64.2	11:22:34	64.2	64.2	63.4	11:33:55	63.4	63.4	54.1	12:17:45	54.1	54.1	72.5	12:27:45	72.5	72.5
67.8	11:22:35	67.8	67.8	62.8	11:33:56	62.8	62.8	56.3	12:17:48	56.3	56.3	69.7	12:27:48	69.7	69.7
70.1	11:22:36	70.1	70.1	61.7	11:33:57	61.7	61.7	55	12:17:51	55	55	74.3	12:27:51	74.3	74.3
67.7	11:22:37	67.7	67.7	60.5	11:33:58	60.5	60.5	51.2	12:17:54	51.2	51.2	75.1	12:27:54	75.1	75.1
65.3	11:22:38	65.3	65.3	60.9	11:33:59	60.9	60.9	53.8	12:17:57	53.8	53.8	73	12:27:57	73	73
63.4	11:22:39	63.4	63.4	61.7	11:34:00	61.7	61.7	62.1	12:18:00	62.1	62.1	72.2	12:28:00	72.2	72.2
61.5	11:22:40	61.5	61.5	61.4	11:34:01	61.4	61.4	53.9	12:18:03	53.9	53.9	69.3	12:28:03	69.3	69.3
63.0	11:22:41	63.0	63.0	60.9	11:34:02	60.9	60.9	56.8	12:18:06	56.8	56.8	69.8	12:28:06	69.8	69.8
64.8	11:22:42	64.8	64.8	61.0	11:34:03	61.0	61.0	55.1	12:18:09	55.1	55.1	72.4	12:28:09	72.4	72.4
65.6	11:22:43	65.6	65.6	60.2	11:34:04	60.2	60.2	59.2	12:18:12	59.2	59.2	72.2	12:28:12	72.2	72.2
64.9	11:22:44	64.9	64.9	60.1	11:34:05	60.1	60.1	53.9	12:18:15	53.9	53.9	73.9	12:28:15	73.9	73.9
62.4	11:22:45	62.4	62.4	59.9	11:34:06	59.9	59.9	53.7	12:18:18	53.7	53.7	73.5	12:28:18	73.5	73.5
60.3	11:22:46	60.3	60.3	58.9	11:34:07	58.9	58.9	54.5	12:18:21	54.5	54.5	72.1	12:28:21	72.1	72.1
59.4	11:22:47	59.4	59.4	57.7	11:34:08	57.7	57.7	55.7	12:18:24	55.7	55.7	75.5	12:28:24	75.5	75.5
60.3	11:22:48	60.3	60.3	57.8	11:34:09	57.8	57.8	53.4	12:18:27	53.4	53.4	73	12:28:27	73	73
62.7	11:22:49	62.7	62.7	58.8	11:34:10	58.8	58.8	52.5	12:18:30	52.5	52.5	70.1	12:28:30	70.1	70.1
65.9	11:22:50	65.9	65.9	59.2	11:34:11	59.2	59.2	53.4	12:18:33	53.4	53.4	70.3	12:28:33	70.3	70.3
66.5	11:22:51	66.5	66.5	57.3	11:34:12	57.3	57.3	57.6	12:18:36	57.6	57.6	70.6	12:28:36	70.6	70.6
69.4	11:22:52	69.4	69.4	58.5	11:34:13	58.5	58.5	55.6	12:18:39	55.6	55.6	67.1	12:28:39	67.1	67.1
69.0	11:22:53	69.0	69.0	58.5	11:34:14	58.5	58.5	52.7	12:18:42	52.7	52.7	66.6	12:28:42	66.6	66.6
68.5	11:22:54	68.5	68.5	57.4	11:34:15	57.4	57.4	53.2	12:18:45	53.2	53.2	65	12:28:45	65	65
67.9	11:22:55	67.9	67.9	56.5	11:34:16	56.5	56.5	58.4	12:18:48	58.4	58.4	66.7	12:28:48	66.7	66.7
68.4	11:22:56	68.4	68.4	60.4	11:34:17	60.4	60.4	59.8	12:18:51	59.8	59.8	58.2	12:28:51	58.2	58.2
67.9	11:22:57	67.9	67.9	56.0	11:34:18	56.0	56.0	55.3	12:18:54	55.3	55.3	70.6	12:28:54	70.6	70.6
66.7	11:22:58	66.7	66.7	55.9	11:34:19	55.9	55.9	53.6	12:18:57	53.6	53.6	69.2	12:28:57	69.2	69.2
64.7	11:22:59	64.7	64.7	56.4	11:34:20	56.4	56.4	53.7	12:19:00	53.7	53.7	68.6	12:29:00	68.6	68.6
62.9	11:23:00	62.9	62.9	62.7	11:34:21	62.7	62.7	61.1	12:19:03	61.1	61.1	71.2	12:29:03	71.2	71.2
61.6	11:23:01	61.6	61.6	56.6	11:34:22	56.6	56.6	56.4	12:19:06	56.4	56.4	75.4	12:29:06	75.4	75.4
62.7	11:23:02	62.7	62.7	57.7	11:34:23	57.7	57.7	61.4	12:19:09	61.4	61.4	75.3	12:29:09	75.3	75.3
63.1	11:23:03	63.1	63.1	57.9	11:34:24	57.9	57.9	59.8	12:19:12	59.8	59.8	74.2	12:29:12	74.2	74.2
63.8	11:23:04	63.8	63.8	58.1	11:34:25	58.1	58.1	54.7	12:19:15	54.7	54.7	72.4	12:29:15	72.4	72.4
63.3	11:23:05	63.3	63.3	60.2	11:34:26	60.2	60.2	55.5	12:19:18	55.5	55.5	70.5	12:29:18	70.5	70.5
61.1	11:23:06	61.1	61.1	62.1	11:34:27	62.1	62.1	57.6	12:19:21	57.6	57.6	72.2	12:29:21	72.2	72.2
60.5	11:23:07	60.5	60.5	63.0	11:34:28	63.0	63.0	60.2	12:19:24	60.2	60.2	72.3	12:29:24	72.3	72.3
62.1	11:23:08	62.1	62.1	62.4	11:34:29	62.4	62.4	59.2	12:19:27	59.2	59.2	69.2	12:29:27	69.2	69.2
64.7	11:23:09	64.7	64.7	63.3	11:34:30	63.3	63.3	60.7	12:19:30	60.7	60.7	73.4	12:29:30	73.4	73.4
64.5	11:23:10	64.5	64.5	63.2	11:34:31	63.2	63.2	61.8	12:19:33	61.8	61.8	72.9	12:29:33	72.9	72.9
65.3	11:23:11	65.3	65.3	62.8	11:34:32	62.8	62.8	56.3	12:19:36	56.3	56.3	74.4	12:29:36	74.4	74.4
65.6	11:23:12	65.6	65.6	62.6	11:34:33	62.6	62.6	54.9	12:19:39	54.9	54.9	75.2	12:29:39	75.2	75.2
64.8	11:23:13	64.8	64.8	60.0	11:34:34	60.0	60.0	53.7	12:19:42	53.7	53.7	73.7	12:29:42	73.7	73.7
64.8	11:23:14	64.8	64.8	58.0	11:34:35	58.0	58.0	53.1	12:19:45	53.1	53.1	70.4	12:29:45	70.4	70.4
65.4	11:23:15	65.4	65.4	57.1	11:34:36	57.1	57.1	53.4	12:19:48	53.4	53.4	70.1	12:29:48	70.1	70.1
64.8	11:23:16	64.8	64.8	57.3	11:34:37	57.3	57.3	59.3	12:19:51	59.3	59.3	67.2	12:29:51	67.2	67.2
65.4	11:23:17	65.4	65.4	57.6	11:34:38	57.6	57.6	59.7	12:19:54	59.7	59.7	67.7	12:29:54	67.7	67.7
66.2	11:23:18	66.2	66.2	58.2	11:34:39	58.2	58.2	52.7	12:19:57	52.7	52.7	70.6	12:29:57	70.6	70.6
65.4	11:23:19	65.4	65.4	59.8	11:34:40	59.8	59.8	51.8	12:20:00	51.8	51.8	72.1	12:30:00	72.1	72.1
63.9	11:23:20	63.9	63.9	60.6	11:34:41	60.6	60.6	53.6	12:20:03	53.6	53.6	74	12:30:03	74	74
61.8	11:23:21	61.8	61.8	61.0	11:34:42	61.0	61.0	59.2	12:20:06	59.2	59.2	72.2	12:30:06	72.2	72.2
60.1	11:23:22	60.1	60.1	63.0	11:34:43	63.0	63.0	55	12:20:09	55	55	72.6	12:30:09	72.6	72.6
59.2	11:23:23	59.2	59.2	64.2	11:34:44	64.2	64.2	51.8	12:20:12	51.8	51.8	70.9	12:30:12	70.9	70.9
60.9	11:23:24	60.9	60.9	64.1	11:34:45	64.1	64.1	52.9	12:20:15	52.9	52.9	70.7	12:30:15	70.7	70.7
60.5	11:23:25	60.5	60.5	62.7	11:34:46	62.7	62.7	54	12:20:18	54	54	69.4	12:30:18	69.4	69.4
59.9	11:23:26	59.9	59.9	60.7	11:34:47	60.7	60.7	55.5	12:20:21	55.5	55.5	70.4	12:30:21	70.4	70.4
61.2	11:23:27	61.2	61.2	58.7	11:34:48	58.7	58.7	58.3	12:20:24	58.3	58.3	71.7	12:30:24	71.7	71.7
64.6	11:23:28	64.6	64.6	57.5	11:34:49	57.5	57.5	58.8	12:20:27	58.8	58.8	71.8	12:30:27	71.8	71.8
66.0	11:23:29	66.0	66.0	57.8	11:34:50	57.8	57.8	54.7	12:20:30	54.7	54.7	67.4	12:30:30	67.4	67.4
66.7	11:23:30	66.7	66.7	58.9	11:34:51	58.9	58.9	55.7	12:20:33	55.7	55.7	73.6	12:30:33	73.6	73.6
65.8	11:23:31	65.8	65.8	60.5	11:34:52	60.5	60.5	56.8	12:20:36	56.8	56.8	72.4	12:30:36	72.4	72.4
64.4	11:23:32	64.4	64.4	62.3	11:34:53	62.3	62.3	51.9	12:20:39	51.9	51.9	69.9	12:30:39	69.9	69.9
63.9	11:23:33	63.9	63.9	64.5	11:34:54	64.5	64.5	54.5	12:20						

Site 1 - Near Northwest Corner of Project Site

SPL	Time	Leq (1 hour Avg.)	Ldn CNEL
67.5	11:25:02		67.5
67.0	11:25:03		67.0
65.8	11:25:04		65.8
64.9	11:25:05		64.9
65.0	11:25:06		65.0
66.0	11:25:07		66.0
66.4	11:25:08		66.4
65.0	11:25:09		65.0
63.4	11:25:10		63.4
64.8	11:25:11		64.8
66.1	11:25:12		66.1
65.5	11:25:13		65.5
66.0	11:25:14		66.0
66.5	11:25:15		66.5
68.0	11:25:16		68.0
66.3	11:25:17		66.3
64.7	11:25:18		64.7
63.7	11:25:19		63.7
62.9	11:25:20		62.9
64.0	11:25:21		64.0
63.8	11:25:22		63.8
63.9	11:25:23		63.9
65.0	11:25:24		65.0
65.2	11:25:25		65.2
64.7	11:25:26		64.7
65.3	11:25:27		65.3
65.4	11:25:28		65.4
65.4	11:25:29		65.4
65.0	11:25:30		65.0
64.7	11:25:31		64.7
64.4	11:25:32		64.4
64.8	11:25:33		64.8
65.4	11:25:34		65.4
65.3	11:25:35		65.3
65.0	11:25:36		65.0
66.0	11:25:37		66.0
67.0	11:25:38		67.0
67.8	11:25:39		67.8
67.3	11:25:40		67.3
67.7	11:25:41		67.7
67.8	11:25:42		67.8
67.0	11:25:43		67.0
66.2	11:25:44		66.2
66.4	11:25:45		66.4
67.0	11:25:46		67.0
67.3	11:25:47		67.3
67.7	11:25:48		67.7
66.2	11:25:49		66.2
64.2	11:25:50		64.2
63.6	11:25:51		63.6
65.1	11:25:52		65.1
66.2	11:25:53		66.2
67.6	11:25:54		67.6
67.6	11:25:55		67.6
63.7	11:25:57		63.7
62.7	11:25:58		62.7
61.0	11:25:59		61.0
60.0	11:26:00		60.0
59.9	11:26:01		59.9
61.1	11:26:02		61.1
63.0	11:26:03		63.0
64.1	11:26:04		64.1
64.2	11:26:05		64.2
69.0	11:26:06		69.0
71.3	11:26:07		71.3
72.9	11:26:08		72.9
70.7	11:26:09		70.7
68.2	11:26:10		68.2
66.2	11:26:11		66.2
63.6	11:26:12		63.6
61.7	11:26:13		61.7
61.6	11:26:14		61.6
63.5	11:26:15		63.5
63.5	11:26:16		63.5
65.7	11:26:17		65.7
67.3	11:26:18		67.3
66.5	11:26:19		66.5
68.0	11:26:20		68.0
67.0	11:26:21		67.0
66.0	11:26:22		66.0
66.1	11:26:23		66.1
68.0	11:26:24		68.0
67.1	11:26:25		67.1
67.2	11:26:26		67.2
65.5	11:26:27		65.5
64.8	11:26:28		64.8
65.0	11:26:29		65.0
65.9	11:26:30		65.9
66.1	11:26:31		66.1
65.1	11:26:32		65.1
64.4	11:26:33		64.4
64.3	11:26:34		64.3
65.1	11:26:35		65.1
65.5	11:26:36		65.5
64.0	11:26:37		64.0
65.0	11:26:38		65.0
66.1	11:26:39		66.1
65.2	11:26:40		65.2
64.5	11:26:41		64.5
64.5	11:26:42		64.5
64.4	11:26:43		64.4
62.3	11:26:44		62.3
62.9	11:26:45		62.9
64.3	11:26:46		64.3
64.0	11:26:47		64.0
64.1	11:26:48		64.1
65.0	11:26:49		65.0
66.2	11:26:50		66.2
64.5	11:26:51		64.5
64.4	11:26:52		64.4
63.8	11:26:53		63.8
62.6	11:26:54		62.6
61.8	11:26:55		61.8
61.0	11:26:56		61.0
61.5	11:26:57		61.5
62.3	11:26:58		62.3
62.2	11:26:59		62.2
61.6	11:27:00		61.6
60.2	11:27:01		60.2
60.3	11:27:02		60.3
60.8	11:27:03		60.8
62.4	11:27:04		62.4
64.8	11:27:05		64.8
64.7	11:27:06		64.7
64.4	11:27:07		64.4
64.1	11:27:08		64.1
63.3	11:27:09		63.3
64.3	11:27:10		64.3
64.8	11:27:11		64.8
65.9	11:27:12		65.9
65.1	11:27:13		65.1
64.2	11:27:14		64.2
65.7	11:27:15		65.7
65.2	11:27:16		65.2
64.7	11:27:17		64.7
65.6	11:27:18		65.6
66.5	11:27:19		66.5
65.9	11:27:20		65.9
65.0	11:27:21		65.0
63.9	11:27:22		63.9
63.2	11:27:23		63.2
61.9	11:27:24		61.9
62.1	11:27:25		62.1
64.8	11:27:26		64.8
65.8	11:27:27		65.8
66.2	11:27:28		66.2
66.0	11:27:29		66.0
64.6	11:27:30		64.6
66.1	11:27:31		66.1
66.3	11:27:32		66.3
66.4	11:27:33		66.4
66.1	11:27:34		66.1
67.5	11:27:35		67.5
65.1	11:27:36		65.1
64.5	11:27:37		64.5
64.3	11:27:38		64.3
65.5	11:27:39		65.5
67.4	11:27:40		67.4
66.8	11:27:41		66.8

Site 2 - On West Side of Project Site, 100' South of Nutmeg

SPL	Time	Leq (1 hour Avg.)	Ldn CNEL
58.9	11:25:09		58.9
59.6	11:25:10		59.6
61.3	11:25:11		61.3
63.2	11:25:12		63.2
66.2	11:25:13		66.2
68.5	11:25:14		68.5
67.4	11:25:15		67.4
66.2	11:25:16		66.2
64.3	11:25:17		64.3
63.1	11:25:18		63.1
62.1	11:25:19		62.1
61.1	11:25:20		61.1
59.8	11:25:21		59.8
59.6	11:25:22		59.6
60.0	11:25:23		60.0
60.0	11:25:24		60.0
60.1	11:25:25		60.1
59.6	11:25:26		59.6
59.2	11:25:27		59.2
59.5	11:25:28		59.5
59.0	11:25:29		59.0
57.8	11:25:30		57.8
57.1	11:25:31		57.1
57.8	11:25:32		57.8
59.5	11:25:33		59.5
60.3	11:25:34		60.3
60.4	11:25:35		60.4
58.5	11:25:36		58.5
57.4	11:25:37		57.4
57.4	11:25:38		57.4
59.5	11:25:39		59.5
59.4	11:25:40		59.4
62.3	11:25:41		62.3
64.1	11:25:42		64.1
59.2	11:25:43		59.2
59.7	11:25:44		59.7
57.9	11:25:45		57.9
56.4	11:25:46		56.4
56.2	11:25:47		56.2
55.2	11:25:48		55.2
54.2	11:25:49		54.2
53.3	11:25:50		53.3
53.5	11:25:51		53.5
52.7	11:25:52		52.7
54.5	11:25:53		54.5
53.1	11:25:54		53.1
56.8	11:25:55		56.8
61.7	11:25:56		61.7
59.5	11:25:57		59.5
56.1	11:25:58		56.1
54.1	11:25:59		54.1
54.6	11:26:00		54.6
55.3	11:26:01		55.3
56.2	11:26:02		56.2
58.9	11:26:03		58.9
62.4	11:26:04		62.4
55.3	11:26:05		55.3
51.5	11:26:06		51.5
54.8	11:26:07		54.8
54.1	11:26:08		54.1
58.6	11:26:09		58.6
55.8	11:26:10		55.8
53.7	11:26:11		53.7
52.5	11:26:12		52.5
53.1	11:26:13		53.1
52.5	11:26:14		52.5
54.7	11:26:15		54.7
54.6	11:26:16		54.6
53.7	11:26:17		53.7
52.5	11:26:18		52.5
52.2	11:26:19		52.2
52.2	11:26:20		52.2
51.5	11:26:21		51.5
54.2	11:26:22		54.2
54.8	11:26:23		54.8
54.1	11:26:24		54.1
58.6	11:26:25		58.6
55.8	11:26:26		55.8
53.7	11:26:27		53.7
52.5	11:26:28		52.5
53.1	11:26:29		53.1
52.5	11:26:30		52.5
54.7	11:26:31		54.7
54.6	11:26:32		54.6
53.7	11:26:33		53.7
52.5	11:26:34		52.5
52.2	11:26:35		52.2
52.2	11:26:36		52.2
51.5	11:26:37		51.5
54.2	11:26:38		54.2
54.8	11:26:39		54.8
54.1	11:26:40		54.1
58.6	11:26:41		58.6
55.8	11:26:42		55.8
53.7	11:26:43		53.7
52.5	11:26:44		52.5
53.1	11:26:45		53.1
52.5	11:26:46		52.5
54.7	11:26:47		54.7
54.6	11:26:48		54.6
53.7	11:26:49		53.7
52.5	11:26:50		52.5
52.2	11:26:51		52.2
52.2	11:26:52		52.2
51.5	11:26:53		51.5
54.2	11:26:54		54.2
54.8	11:26:55		54.8
54.1	11:26:56		54.1
58.6	11:26:57		58.6
55.8	11:26:58		55.8
53.7	11:26:59		53.7
52.5	11:27:00		52.5
53.1	11:27:01		53.1
52.5	11:27:02		52.5
54.7	11:27:03		54.7
54.6	11:27:04		54.6
53.7	11:27:05		53.7
52.5	11:27:06		52.5
52.2	11:27:07		52.2
52.2	11:27:08		52.2
51.5	11:27:09		51.5
54.2	11:27:10		54.2
54.8	11:27:11		54.8
54.1	11:27:12		54.1
58.6	11:27:13		58.6
55.8	11:27:14		55.8
53.7	11:27:15		53.7
52.5	11:27:16		52.5
53.1	11:27:17		53.1
52.5	11:27:18		52.5
54.7	11:27:19		54.7
54.6	11:27:20		54.6
53.7	11:27:21		53.7
52.5	11:27:22		52.5
52.2	11:27:23		52.2
52.2	11:27:24		52.2
51.5	11:27:25		51.5
54.2	11:27:26		54.2
54.8	11:27:27		54.8
54.1	11:27:28		54.1
58.6	11:27:29		58.6
55.8	11:27:30		55.8
53.7	11:27:31		53.7
52.5	11:		

Site 1 - Near Northwest Corner of Project Site				Site 2 - On West Side of Project Site, 100' South of Nutmeg				Site 3 - Near Northeast Corner of Project Site				Site 4 - Near Southeast Corner of Project Site					
SPL	Time	Leq (1 hour Avg.)	Ldn CNEL	SPL	Time	Leq (1 hour Avg.)	Ldn CNEL	SPL	Time	Leq (1 hour Avg.)	Ldn CNEL	SPL	Time	Leq (1 hour Avg.)	Ldn CNEL		
67.5	11:27:44		67.5	67.5	55.3	11:39:05	55.3	55.3	52.2	12:43:15	59.4	52.2	55.2	72	12:43:15	72	72
65.8	11:27:45		65.8	65.8	56.0	11:39:06	56.0	56.0	51.8	12:33:18	59.4	51.8	51.8	73.2	12:43:18	72.7	73.2
64.2	11:27:46		64.2	64.2	55.7	11:39:07	55.7	55.7	51.7	12:33:21	59.4	51.7	51.7	74.2	12:43:21	72.7	74.2
64.0	11:27:47		64.0	64.0	55.3	11:39:08	55.3	55.3	51.6	12:33:24	59.4	51.6	51.6	74.3	12:43:24	72.7	74.3
64.8	11:27:48		64.8	64.8	57.4	11:39:09	57.4	57.4	54.3	12:33:27	59.4	54.3	54.3	72.8	12:43:27	72.7	72.8
64.9	11:27:49		64.9	64.9	57.7	11:39:10	57.7	57.7	54.3	12:33:30	59.4	54.3	54.3	71.3	12:43:30	72.7	71.3
65.5	11:27:50		65.5	65.5	58.2	11:39:11	58.2	58.2	54.3	12:33:33	59.4	54.3	54.3	72	12:43:33	72.7	72
65.4	11:27:51		65.4	65.4	58.9	11:39:12	58.9	58.9	62.8	12:33:36	59.4	62.8	62.8	70.4	12:43:36	72.7	70.4
65.5	11:27:52		65.5	65.5	58.6	11:39:13	58.6	58.6	61.4	12:33:39	59.4	61.4	61.4	70.7	12:43:39	72.7	70.7
65.2	11:27:53		65.2	65.2	58.4	11:39:14	58.4	58.4	54.9	12:33:42	59.4	54.9	54.9	70.6	12:43:42	72.7	70.6
63.3	11:27:54		63.3	63.3	59.7	11:39:15	59.7	59.7	54.1	12:33:45	59.4	54.1	54.1	74.5	12:43:45	72.7	74.5
62.1	11:27:55		62.1	62.1	61.3	11:39:16	61.3	61.3	69.9	12:33:48	59.4	69.9	69.9	75.2	12:43:48	72.7	75.2
63.8	11:27:56		63.8	63.8	63.0	11:39:17	63.0	63.0	57.1	12:33:51	59.4	57.1	57.1	74.5	12:43:51	72.7	74.5
63.7	11:27:57		63.7	63.7	64.5	11:39:18	64.5	64.5	60.8	12:33:54	59.4	60.8	60.8	74	12:43:54	72.7	74
62.7	11:27:58		62.7	62.7	64.8	11:39:19	64.8	64.8	57.3	12:33:57	59.4	57.3	57.3	74.9	12:43:57	72.7	74.9
63.1	11:27:59		63.1	63.1	63.8	11:39:20	63.8	63.8	62.1	12:34:00	59.4	62.1	62.1	74.9	12:44:00	72.7	74.9
63.7	11:28:00		63.7	63.7	61.7	11:39:21	61.7	61.7	53.6	12:34:03	59.4	53.6	53.6	73.6	12:44:03	72.7	73.6
65.1	11:28:01		65.1	65.1	60.1	11:39:22	60.1	60.1	52.7	12:34:06	59.4	52.7	52.7	74.9	12:44:06	72.7	74.9
68.5	11:28:02		68.5	68.5	59.4	11:39:23	59.4	59.4	54.4	12:34:09	59.3	54.4	54.4	75.4	12:44:09	72.7	75.4
69.6	11:28:03		69.6	69.6	59.6	11:39:24	59.6	59.6	55.5	12:34:12	59.3	55.5	55.5	75.4	12:44:12	72.7	75.4
68.4	11:28:04		68.4	68.4	59.4	11:39:25	59.4	59.4	56.2	12:34:15	59.0	56.2	56.2	74.8	12:44:15	72.7	74.8
67.5	11:28:05		67.5	67.5	58.4	11:39:26	58.4	58.4	59	12:34:18	58.6	59	59	72.9	12:44:18	72.7	72.9
67.0	11:28:06		67.0	67.0	57.1	11:39:27	57.1	57.1	58.7	12:34:21	58.4	58.7	58.7	71.4	12:44:21	72.7	71.4
66.3	11:28:07		66.3	66.3	56.2	11:39:28	56.2	56.2	58.9	12:34:24	58.2	58.9	58.9	71.2	12:44:24	72.7	71.2
66.6	11:28:08		66.6	66.6	57.6	11:39:29	57.6	57.6	60.2	12:34:27	58.0	60.2	60.2	72.7	12:44:27	72.7	72.7
66.1	11:28:09		66.1	66.1	59.1	11:39:31	59.1	59.1	58	12:34:33	58.1	58	58	68.8	12:44:33	72.7	68.8
65.6	11:28:10		65.6	65.6	60.4	11:39:32	60.4	60.4	56.4	12:34:36	58.1	56.4	56.4	72.3	12:44:36	72.7	72.3
65.9	11:28:11		65.9	65.9	61.8	11:39:33	61.8	61.8	54.1	12:34:39	58.1	54.1	54.1	71.1	12:44:39	72.7	71.1
64.7	11:28:12		64.7	64.7	62.7	11:39:34	62.7	62.7	59.5	12:34:42	58.1	59.5	59.5	73.1	12:44:42	72.7	73.1
66.1	11:28:14		66.1	66.1	64.1	11:39:35	64.1	64.1	56.2	12:34:45	58.1	56.2	56.2	73.1	12:44:45	72.7	73.1
66.2	11:28:15		66.2	66.2	65.1	11:39:36	65.1	65.1	61.2	12:34:48	58.1	61.2	61.2	73	12:44:48	72.7	73
66.1	11:28:16		66.1	66.1	64.5	11:39:37	64.5	64.5	59.2	12:34:51	58.1	59.2	59.2	72.2	12:44:51	72.7	72.2
66.5	11:28:17		66.5	66.5	64.2	11:39:38	64.2	64.2	57.6	12:34:54	58.1	57.6	57.6	75.2	12:44:54	72.7	75.2
66.9	11:28:18		66.9	66.9	65.3	11:39:39	65.3	65.3	56.6	12:34:57	58.1	56.6	56.6	71.7	12:44:57	72.7	71.7
66.5	11:28:19		66.5	66.5	66.0	11:39:40	66.0	66.0	56	12:35:00	58.1	56	56	69.4	12:45:00	72.7	69.4
65.2	11:28:20		65.2	65.2	66.7	11:39:41	66.7	66.7	53.8	12:35:03	58.1	53.8	53.8	75.7	12:45:03	72.7	75.7
64.6	11:28:21		64.6	64.6	66.5	11:39:42	66.5	66.5	62.2	12:35:06	58.1	62.2	62.2	69.6	12:45:06	72.7	69.6
65.2	11:28:22		65.2	65.2	65.6	11:39:43	65.6	65.6	53.3	12:35:09	58.1	53.3	53.3	67.6	12:45:09	72.7	67.6
66.5	11:28:23		66.5	66.5	64.7	11:39:44	64.7	64.7	57.6	12:35:12	58.1	57.6	57.6	66.3	12:45:12	72.7	66.3
67.4	11:28:24		67.4	67.4	64.8	11:39:45	64.8	64.8	58.2	12:35:15	58.1	58.2	58.2	68.3	12:45:15	72.7	68.3
66.5	11:28:25		66.5	66.5	64.2	11:39:46	64.2	64.2	53.6	12:35:18	58.1	53.6	53.6	71.2	12:45:18	72.7	71.2
65.1	11:28:26		65.1	65.1	62.8	11:39:47	62.8	62.8	54.1	12:35:21	58.1	54.1	54.1	69	12:45:21	72.7	69
64.4	11:28:27		64.4	64.4	61.0	11:39:48	61.0	61.0	56.7	12:35:24	58.1	56.7	56.7	72.2	12:45:24	72.8	72.2
64.8	11:28:28		64.8	64.8	60.2	11:39:49	60.2	60.2	60.2	12:35:27	58.1	60.2	60.2	74.9	12:45:27	72.8	74.9
67.2	11:28:29		67.2	67.2	61.0	11:39:50	61.0	61.0	64.1	12:35:30	58.1	64.1	64.1	71.9	12:45:30	72.8	71.9
67.7	11:28:30		67.7	67.7	62.0	11:39:51	62.0	62.0	57.1	12:35:33	58.1	57.1	57.1	72.3	12:45:33	72.8	72.3
67.7	11:28:31		67.7	67.7	61.9	11:39:52	61.9	61.9	59.6	12:35:36	58.1	59.6	59.6	73.8	12:45:36	72.8	73.8
67.3	11:28:32		67.3	67.3	62.9	11:39:53	62.9	62.9	61.1	12:35:39	58.1	61.1	61.1	71.7	12:45:39	72.8	71.7
66.9	11:28:33		66.9	66.9	64.2	11:39:54	64.2	64.2	56.3	12:35:42	58.1	56.3	56.3	72.6	12:45:42	72.8	72.6
65.1	11:28:34		65.1	65.1	64.2	11:39:55	64.2	64.2	55.4	12:35:45	58.1	55.4	55.4	72.6	12:45:45	72.8	72.6
64.6	11:28:35		64.6	64.6	63.6	11:39:56	63.6	63.6	56.5	12:35:48	58.1	56.5	56.5	72.7	12:45:48	72.8	72.7
65.0	11:28:36		65.0	65.0	62.5	11:39:57	62.5	62.5	56	12:35:51	58.1	56	56	73.7	12:45:51	72.8	73.7
65.0	11:28:37		65.0	65.0	62.4	11:39:58	62.4	62.4	57.4	12:35:54	58.1	57.4	57.4	74.6	12:45:54	72.8	74.6
65.0	11:28:38		65.0	65.0	61.6	11:39:59	61.6	61.6	60.8	12:35:57	58.1	60.8	60.8	74.9	12:45:57	72.8	74.9
65.0	11:28:39		65.0	65.0	61.4	11:40:00	61.4	61.4	63.7	12:36:00	58.1	63.7	63.7	74.8	12:46:00	72.8	74.8
67.7	11:28:40		67.7	67.7	60.8	11:40:01	60.8	60.8	59	12:36:03	58.1	59	59	72.3	12:46:03	72.8	72.3
69.1	11:28:41		69.1	69.1	59.9	11:40:02	59.9	59.9	61.5	12:36:06	58.1	61.5	61.5	72.4	12:46:06	72.8	72.4
68.5	11:28:42		68.5	68.5	58.8	11:40:03	58.8	58.8	56.6	12:36:09	58.1	56.6	56.6	72.9	12:46:09	72.8	72.9
67.6	11:28:43		67.6	67.6	58.7	11:40:04	58.7	58.7	55.2	12:36:12	58.1	55.2	55.2	71.8	12:46:12	72.8	71.8
66.5	11:28:44		66.5	66.5	58.6	11:40:05	58.6	58.6	54.2	12:36:15	58.1	54.2	54.2	73.4	12:46:15	72.8	73.4
65.2	11:28:45		65.2	65.2	58.7	11:40:06	58.7	58.7	53.8	12:36:18	58.1	53.8	53.8	75.7	12:46:18	72.8	75.7
65.8	11:28:46		65.8	65.8	58.7	11:40:07	58.7	58.7	53.8	12:36:21	58.1	53.8	53.8	75.2	12:46:21	72.8	75.2
66.6	11:28:47		66.6	66.6	59.8	11:40:08	59.8	59.8	54.6	12:36:24	58.1	54.6	54.6	76.6	12:46:24	72.8	76.6
67.2	11:28:48		67.2	67.2	60.6	11:40:09	60.6	60.6	56.6	12:36:27	58.1	56.6	56.6	76.1	12:46:27	72.8	76.1
67.5	11:28:49		67.5	67.5	62.0	11:40:10	62.0	62.0	58.2	12:36:30	58.1	58.2	58.2	75.2	12:46:30	72.8	75.2
67.5	11:28:50		67.5	67.5	64.7	11:40:11	64.7	64.7	70.6	12:36:33	58.2	70.6	70.6	75.4	12:46:33	72.8	75.4
66.5	11:28:51		66.5	66.5	66.2	11:40:12	66.2	66.2	61.8	12:36:36	58.2	61.8	61.8	76.3	12:46:36	72.8	76.3
64.7	11:28:52		64.7	64.7	67.2	11:40:13	67.2	67.2	61	12:36:39	58.2	61	61	77.1	12:46:39	72.8	77.1
62.3	11:28:53		62.3	62.3	6												

Site 1 - Near Northwest Corner of Project Site				Site 2 - On West Side of Project Site, 100' South of Nutmeg				Site 3 - Near Northeast Corner of Project Site				Site 4 - Near Southeast Corner of Project Site			
SPL	Time	Leq (1 hour Avg.)	Ldn CNEL	SPL	Time	Leq (1 hour Avg.)	Ldn CNEL	SPL	Time	Leq (1 hour Avg.)	Ldn CNEL	SPL	Time	Leq (1 hour Avg.)	Ldn CNEL
68.2	11:30:26	68.2	68.2	62.9	11:41:47	62.9	62.9	56	12:41:21	56	56	70.5	12:51:21	70.5	70.5
67.5	11:30:27	67.5	67.5	64.0	11:41:48	64.0	64.0	66.2	12:41:24	66.2	66.2	71.2	12:51:24	71.2	71.2
66.1	11:30:28	66.1	66.1	63.1	11:41:49	63.1	63.1	63.1	12:41:27	63.1	63.1	71.5	12:51:27	71.5	71.5
66.0	11:30:29	66.0	66.0	63.2	11:41:50	63.2	63.2	58.7	12:41:30	58.7	58.7	72.8	12:51:30	72.8	72.8
64.4	11:30:30	64.4	64.4	63.0	11:41:51	63.0	63.0	56.5	12:41:33	56.5	56.5	72.7	12:51:33	72.7	72.7
61.9	11:30:31	61.9	61.9	62.7	11:41:52	62.7	62.7	53.3	12:41:36	53.3	53.3	73.3	12:51:36	73.3	73.3
61.5	11:30:32	61.5	61.5	62.1	11:41:53	62.1	62.1	53.2	12:41:39	53.2	53.2	70.2	12:51:39	70.2	70.2
61.9	11:30:33	61.9	61.9	61.0	11:41:54	61.0	61.0	52.8	12:41:42	52.8	52.8	70.5	12:51:42	70.5	70.5
62.8	11:30:34	62.8	62.8	60.7	11:41:55	60.7	60.7	51.4	12:41:45	51.4	51.4	71.3	12:51:45	71.3	71.3
64.3	11:30:35	64.3	64.3	61.2	11:41:56	61.2	61.2	51.5	12:41:48	51.5	51.5	72.3	12:51:48	72.3	72.3
62.9	11:30:36	62.9	62.9	61.4	11:41:57	61.4	61.4	53.7	12:41:51	53.7	53.7	68.9	12:51:51	68.9	68.9
62.5	11:30:37	62.5	62.5	60.9	11:41:58	60.9	60.9	44.8	12:41:54	44.8	44.8	68.2	12:51:54	68.2	68.2
65.5	11:30:38	65.5	65.5	60.5	11:41:59	60.5	60.5	52.5	12:41:57	52.5	52.5	65.2	12:51:57	65.2	65.2
65.9	11:30:39	65.9	65.9	59.8	11:42:00	59.8	59.8	53.8	12:42:00	53.8	53.8	70.1	12:52:00	70.1	70.1
66.3	11:30:40	66.3	66.3	59.7	11:42:01	59.7	59.7	53.9	12:42:03	53.9	53.9	72.8	12:52:03	72.8	72.8
68.6	11:30:41	68.6	68.6	60.0	11:42:02	60.0	60.0	56	12:42:06	56	56	72.1	12:52:06	72.1	72.1
68.4	11:30:42	68.4	68.4	61.5	11:42:03	61.5	61.5	55.6	12:42:09	55.6	55.6	72.9	12:52:09	72.9	72.9
67.0	11:30:43	67.0	67.0	63.5	11:42:04	63.5	63.5	56.2	12:42:12	56.2	56.2	74.3	12:52:12	74.3	74.3
65.3	11:30:44	65.3	65.3	65.6	11:42:05	65.6	65.6	56.7	12:42:15	56.7	56.7	73.7	12:52:15	73.7	73.7
64.3	11:30:45	64.3	64.3	65.3	11:42:06	65.3	65.3	56.8	12:42:18	56.8	56.8	71.8	12:52:18	71.8	71.8
62.6	11:30:46	62.6	62.6	66.8	11:42:07	66.8	66.8	56.3	12:42:21	56.3	56.3	71.3	12:52:21	71.3	71.3
60.7	11:30:47	60.7	60.7	67.7	11:42:08	67.7	67.7	60.4	12:42:24	60.4	60.4	73.8	12:52:24	73.8	73.8
60.4	11:30:48	60.4	60.4	67.7	11:42:09	67.7	67.7	55.8	12:42:27	55.8	55.8	76.1	12:52:27	76.1	76.1
61.5	11:30:49	61.5	61.5	65.6	11:42:10	65.6	65.6	56.5	12:42:30	56.5	56.5	73.5	12:52:30	73.5	73.5
62.1	11:30:50	62.1	62.1	65.0	11:42:11	65.0	65.0	58.5	12:42:33	58.5	58.5	74	12:52:33	74	74
63.5	11:30:51	63.5	63.5	63.6	11:42:12	63.6	63.6	57.8	12:42:36	57.8	57.8	75	12:52:36	75	75
65.0	11:30:52	65.0	65.0	62.8	11:42:13	62.8	62.8	60.9	12:42:39	60.9	60.9	75.5	12:52:39	75.5	75.5
66.1	11:30:53	66.1	66.1	62.7	11:42:14	62.7	62.7	63.6	12:42:42	63.6	63.6	75.1	12:52:42	75.1	75.1
66.6	11:30:54	66.6	66.6	62.1	11:42:15	62.1	62.1	59	12:42:45	59	59	75.3	12:52:45	75.3	75.3
65.0	11:30:55	65.0	65.0	61.5	11:42:16	61.5	61.5	61.2	12:42:48	61.2	61.2	75.4	12:52:48	75.4	75.4
65.2	11:30:56	65.2	65.2	61.1	11:42:17	61.1	61.1	62.3	12:42:51	62.3	62.3	73.6	12:52:51	73.6	73.6
67.5	11:30:57	67.5	67.5	62.4	11:42:18	62.4	62.4	60.8	12:42:54	60.8	60.8	73.8	12:52:54	73.8	73.8
68.1	11:30:58	68.1	68.1	60.9	11:42:19	60.9	60.9	61.2	12:42:57	61.2	61.2	72.8	12:52:57	72.8	72.8
68.7	11:30:59	68.7	68.7	60.0	11:42:20	60.0	60.0	57	12:43:00	57	57	73.5	12:53:00	73.5	73.5
68.8	11:31:00	68.8	68.8	58.8	11:42:21	58.8	58.8	58	12:43:03	58	58	74	12:53:03	74	74
68.9	11:31:01	68.9	68.9	58.9	11:42:22	58.9	58.9	54.7	12:43:06	54.7	54.7	73.5	12:53:06	73.5	73.5
69.4	11:31:02	69.4	69.4	61.0	11:42:23	61.0	61.0	54.8	12:43:09	54.8	54.8	72.9	12:53:09	72.9	72.9
67.7	11:31:03	67.7	67.7	60.7	11:42:24	60.7	60.7	52.9	12:43:12	52.9	52.9	73.5	12:53:12	73.5	73.5
66.0	11:31:04	66.0	66.0	60.0	11:42:25	60.0	60.0	56.8	12:43:15	56.8	56.8	73.9	12:53:15	73.9	73.9
65.4	11:31:05	65.4	65.4	59.5	11:42:26	59.5	59.5	56.5	12:43:18	56.5	56.5	72.8	12:53:18	72.8	72.8
64.2	11:31:06	64.2	64.2	58.9	11:42:27	58.9	58.9	54.3	12:43:21	54.3	54.3	74.3	12:53:21	74.3	74.3
62.0	11:31:07	62.0	62.0	58.6	11:42:28	58.6	58.6	57	12:43:24	57	57	71.7	12:53:24	71.7	71.7
60.1	11:31:08	60.1	60.1	57.7	11:42:29	57.7	57.7	58.7	12:43:27	58.7	58.7	74.1	12:53:27	74.1	74.1
59.9	11:31:09	59.9	59.9	57.3	11:42:30	57.3	57.3	61.7	12:43:30	61.7	61.7	74.1	12:53:30	74.1	74.1
59.7	11:31:10	59.7	59.7	56.9	11:42:31	56.9	56.9	57.5	12:43:33	57.5	57.5	67.5	12:53:33	67.5	67.5
60.4	11:31:11	60.4	60.4	55.3	11:42:32	55.3	55.3	58.8	12:43:36	58.8	58.8	71.4	12:53:36	71.4	71.4
60.6	11:31:12	60.6	60.6	55.3	11:42:33	55.3	55.3	57.5	12:43:39	57.5	57.5	72.1	12:53:39	72.1	72.1
61.9	11:31:13	61.9	61.9	55.8	11:42:34	55.8	55.8	56.9	12:43:42	56.9	56.9	72.8	12:53:42	72.8	72.8
63.4	11:31:14	63.4	63.4	57.1	11:42:35	57.1	57.1	54.8	12:43:45	54.8	54.8	74.8	12:53:45	74.8	74.8
63.9	11:31:15	63.9	63.9	57.6	11:42:36	57.6	57.6	57	12:43:48	57	57	74.3	12:53:48	74.3	74.3
63.3	11:31:16	63.3	63.3	58.2	11:42:37	58.2	58.2	58.4	12:43:51	58.4	58.4	73.6	12:53:51	73.6	73.6
63.8	11:31:17	63.8	63.8	60.3	11:42:38	60.3	60.3	58.4	12:43:54	58.4	58.4	71.7	12:53:54	71.7	71.7
63.4	11:31:18	63.4	63.4	60.3	11:42:39	60.3	60.3	57.4	12:43:57	57.4	57.4	68.9	12:53:57	68.9	68.9
64.5	11:31:19	64.5	64.5	63.8	11:42:40	63.8	63.8	56.4	12:44:00	56.4	56.4	71.2	12:54:00	71.2	71.2
66.5	11:31:20	66.5	66.5	63.6	11:42:41	63.6	63.6	53.7	12:44:03	53.7	53.7	71.4	12:54:03	71.4	71.4
67.1	11:31:21	67.1	67.1	63.2	11:42:42	63.2	63.2	53.1	12:44:06	53.1	53.1	71.9	12:54:06	71.9	71.9
67.5	11:31:22	67.5	67.5	62.4	11:42:43	62.4	62.4	54.7	12:44:09	54.7	54.7	73.5	12:54:09	73.5	73.5
66.6	11:31:23	66.6	66.6	61.8	11:42:44	61.8	61.8	60.2	12:44:12	60.2	60.2	69.8	12:54:12	69.8	69.8
65.0	11:31:24	65.0	65.0	60.6	11:42:45	60.6	60.6	58.3	12:44:15	58.3	58.3	72	12:54:15	72	72
64.2	11:31:25	64.2	64.2	59.7	11:42:46	59.7	59.7	61.7	12:44:18	61.7	61.7	75.1	12:54:18	75.1	75.1
62.8	11:31:26	62.8	62.8	60.8	11:42:47	60.8	60.8	58.2	12:44:21	58.2	58.2	74.8	12:54:21	74.8	74.8
61.3	11:31:27	61.3	61.3	61.0	11:42:48	61.0	61.0	61.8	12:44:24	61.8	61.8	73.9	12:54:24	73.9	73.9
62.7	11:31:28	62.7	62.7	60.2	11:42:49	60.2	60.2	60	12:44:27	60	60	72.9	12:54:27	72.9	72.9
62.1	11:31:29	62.1	62.1	59.2	11:42:50	59.2	59.2	58.2	12:44:30	58.2	58.2	75.8	12:54:30	75.8	75.8
62.2	11:31:30	62.2	62.2	59.0	11:42:51	59.0	59.0	57.2	12:44:33	57.2	57.2	77.5	12:54:33	77.5	77.5
64.3	11:31:31	64.3	64.3	61.4	11:42:52	61.4	61.4	57.1	12:44:36	57.1	57.1	74.9	12:54:36	74.9	74.9
66.8	11:31:32	66.8	66.8	64.1	11:42:53	64.1	64.1	56.3	12:44:39	56.3	56.3	74.9	12:54:39	74.9	74.9
69.0	11:31:33	69.0	69.0	66.0	11:42:54	66.0	66.0	58.8	12:44:42	58.8	58.8	74.9	12:54:42	74.9	74.9
68.9	11:31:34	68.9	68.9	65.6	11:42:55	65.6	65.6	58	12:44:45	58	58	76.1	12:54:45	76.1	76.1
69.0	11:31:35	69.0	69.0	65.0	11:42:56	65.0	65.0	59.2	12:44:48	59.2	59.2	75.2	12:54:48	75.2	75.2
66.3	11:31:36	66.3	66.3	63.4	11:42:57	63.4	63.4	61.4	12:44:51	61.4	61.4	73.3	12:54:51	73.3	73.3
65.0	11:31:37	65.0	65.0	61.4	11:42:58	61.4	61.4	63.1	12:44:54	63.1	63.1	71.4	12:54:54	71.4	71.4
66.8	11:31:38	66.8	66.8	59.9	11:42:59	59.9	59.9	61.8	12:44:57	61.8	61.8	70.2	12:54:57	70.2	70.2
67.9	11:31:39	67.9	67.9	59.8	11:43:00	59.8	59.8	59.5	12:45:00	59.5	59.5	71.4			

Site 1 - Near Northwest Corner of Project Site				Site 2 - On West Side of Project Site, 100' South of Nutmeg				Site 3 - Near Northeast Corner of Project Site				Site 4 - Near Southeast Corner of Project Site					
SPL	Time	Leq (1 hour Avg.)	Ldn CNEL	SPL	Time	Leq (1 hour Avg.)	Ldn CNEL	SPL	Time	Leq (1 hour Avg.)	Ldn CNEL	SPL	Time	Leq (1 hour Avg.)	Ldn CNEL		
69.0	11:33:08		69.0	69.0	55.6	11:44:29	55.6	58.6	58.3	12:59:27	58.3	58.6	58.6	72.7	12:59:27	72.7	72.7
67.6	11:33:09		67.6	67.6	54.3	11:44:30	54.3	54.3	60.6	12:59:30	58.3	60.6	60.6	73.7	12:59:30	72.8	73.7
66.1	11:33:10		66.1	66.1	53.3	11:44:31	53.3	53.3	61.2	12:59:33	58.3	58.3	58.3	74.2	12:59:33	73.4	74.2
64.7	11:33:11		64.7	64.7	54.6	11:44:32	54.6	54.6	58.4	12:59:36	58.3	58.4	58.4	71.8	12:59:36	72.8	71.8
65.2	11:33:12		65.2	65.2	55.4	11:44:33	55.4	55.4	56.9	12:59:39	58.3	56.9	56.9	71.5	12:59:39	72.8	71.5
64.8	11:33:13		64.8	64.8	56.9	11:44:34	56.9	56.9	61.1	12:59:42	58.3	61.1	61.1	68.4	12:59:42	72.8	68.4
65.9	11:33:14		65.9	65.9	56.8	11:44:35	56.8	56.8	61.2	12:59:45	58.3	61.2	61.2	70.4	12:59:45	72.8	70.4
64.5	11:33:15		64.5	64.5	59.6	11:44:36	59.6	59.6	61.3	12:59:48	58.3	61.3	61.3	74.8	12:59:48	72.8	74.8
65.3	11:33:16		65.3	65.3	60.5	11:44:37	60.5	60.5	62.8	12:59:51	58.3	62.8	62.8	74.1	12:59:51	72.8	74.1
65.3	11:33:17		65.3	65.3	60.5	11:44:38	60.5	60.5	62.4	12:59:54	58.3	62.4	62.4	71.2	12:59:54	72.8	71.2
64.1	11:33:18		64.1	64.1	60.4	11:44:39	60.4	60.4	62	12:59:57	58.3	62	62	70.9	12:59:57	72.8	70.9
65.4	11:33:19		65.4	65.4	60.9	11:44:40	60.9	60.9	60.2	12:59:59	58.3	60.2	60.2	75.2	13:00:02	72.8	75.2
65.6	11:33:20		65.6	65.6	61.4	11:44:41	61.4	61.4	63.2	12:59:03	58.3	63.2	63.2	72.2	13:00:03	72.8	72.2
65.0	11:33:21		65.0	65.0	61.8	11:44:42	61.8	61.8	62.1	12:59:06	58.3	62.1	62.1	71.1	13:00:06	72.8	71.1
64.4	11:33:22		64.4	64.4	62.6	11:44:43	62.6	62.6	63.1	12:59:09	58.3	63.1	63.1	72.5	13:00:09	72.8	72.5
65.4	11:33:23		65.4	65.4	62.6	11:44:44	62.6	62.6	60	12:59:12	58.3	60	60	73.1	13:00:12	72.8	73.1
65.7	11:33:24		65.7	65.7	62.8	11:44:45	62.8	62.8	53.4	12:59:15	58.3	53.4	53.4	75	13:00:15	72.8	75
65.8	11:33:25		65.8	65.8	62.9	11:44:46	62.9	62.9	54.2	12:59:18	58.3	54.2	54.2	72.3	13:00:18	72.8	72.3
66.4	11:33:26		66.4	66.4	63.9	11:44:47	63.9	63.9	55.8	12:59:21	58.3	55.8	55.8	70.6	13:00:21	72.8	70.6
65.1	11:33:27		65.1	65.1	64.2	11:44:48	64.2	64.2	55.6	12:59:24	58.3	55.6	55.6	72.5	13:00:24	72.8	72.5
63.8	11:33:28		63.8	63.8	64.2	11:44:49	64.2	64.2	54.4	12:59:27	58.3	54.4	54.4	70.4	13:00:27	72.8	70.4
64.1	11:33:29		64.1	64.1	64.0	11:44:50	64.0	64.0	55.1	12:59:30	58.3	55.1	55.1	68.8	13:00:30	72.8	68.8
64.1	11:33:30		64.1	64.1	63.0	11:44:51	63.0	63.0	53.8	12:59:33	58.3	53.8	53.8	69.6	13:00:33	72.8	69.6
64.2	11:33:31		64.2	64.2	61.7	11:44:52	61.7	61.7	61.7	12:59:36	58.3	61.7	61.7	72.2	13:00:36	72.8	72.2
66.6	11:33:32		66.6	66.6	60.8	11:44:53	60.8	60.8	56.6	13:00:39	58.3	56.6	56.6	68.8	13:00:39	72.8	68.8
70.1	11:33:33		70.1	70.1	59.8	11:44:54	59.8	59.8	56.4	13:00:42	58.3	56.4	56.4	69.9	13:00:42	72.9	69.9
68.1	11:33:34		68.1	68.1	59.5	11:44:55	59.5	59.5	57	13:00:45	58.3	57	57	70.3	13:00:45	72.9	70.3
65.1	11:33:35		65.1	65.1	55.1	11:44:56	55.1	55.1	55.1	13:00:48	58.3	55.1	55.1	70.8	13:00:48	72.9	70.8
65.2	11:33:36		65.2	65.2	58.5	11:44:57	58.5	58.5	60.2	13:00:51	58.3	60.2	60.2	69.8	13:00:51	72.9	69.8
64.0	11:33:37		64.0	64.0	57.6	11:44:58	57.6	57.6	62.7	13:00:54	58.3	62.7	62.7	70.4	13:00:54	72.9	70.4
63.9	11:33:38		63.9	63.9	57.0	11:44:59	57.0	57.0	63.9	13:00:57	58.3	63.9	63.9	72	13:00:57	72.9	72
63.5	11:33:39		63.5	63.5	56.3	11:45:00	56.3	56.3	60.9	13:01:00	58.3	60.9	60.9	70.1	13:01:00	72.9	70.1
63.5	11:33:40		63.5	63.5	57.4	11:45:01	57.4	57.4	59.6	13:01:03	58.3	59.6	59.6	72.3	13:01:03	72.9	72.3
64.5	11:33:41		64.5	64.5	58.3	11:45:02	58.3	58.3	63.2	13:01:06	58.3	63.2	63.2	70.6	13:01:06	72.9	70.6
66.2	11:33:42		66.2	66.2	58.9	11:45:03	58.9	58.9	58.1	13:01:09	58.3	58.1	58.1	69.9	13:01:09	72.9	69.9
66.1	11:33:43		66.1	66.1	58.6	11:45:04	58.6	58.6	54	13:01:12	58.3	54	54	70.4	13:01:12	72.9	70.4
66.5	11:33:44		66.5	66.5	57.1	11:45:05	57.1	57.1	54.8	13:01:15	58.3	54.8	54.8	73.1	13:01:15	72.9	73.1
66.1	11:33:45		66.1	66.1	56.8	11:45:06	56.8	56.8	53.7	13:01:18	58.3	53.7	53.7	73.5	13:01:18	72.8	73.5
64.8	11:33:46		64.8	64.8	57.4	11:45:07	57.4	57.4	56.4	13:01:21	58.3	56.4	56.4	73.4	13:01:21	72.8	73.4
64.0	11:33:47		64.0	64.0	56.9	11:45:08	56.9	56.9	58.5	13:01:24	58.3	58.5	58.5	74.4	13:01:24	72.8	74.4
61.9	11:33:48		61.9	61.9	56.7	11:45:09	56.7	56.7	63	13:01:27	58.3	63	63	73.7	13:01:27	72.8	73.7
61.7	11:33:49		61.7	61.7	56.6	11:45:10	56.6	56.6	61	13:01:30	58.3	61	61	74.3	13:01:30	72.8	74.3
64.1	11:33:50		64.1	64.1	56.8	11:45:11	56.8	56.8	57.5	13:01:33	58.3	57.5	57.5	72.2	13:01:33	72.8	72.2
64.9	11:33:51		64.9	64.9	57.9	11:45:12	57.9	57.9	55.9	13:01:36	58.3	55.9	55.9	71.8	13:01:36	72.8	71.8
63.3	11:33:52		63.3	63.3	60.0	11:45:13	60.0	60.0	62.3	13:01:39	58.3	62.3	62.3	72.8	13:01:39	72.8	72.8
60.8	11:33:53		60.8	60.8	61.2	11:45:14	61.2	61.2	55.7	13:01:42	58.3	55.7	55.7	75.2	13:01:42	72.8	75.2
59.1	11:33:54		59.1	59.1	61.1	11:45:15	61.1	61.1	56.6	13:01:45	58.3	56.6	56.6	75	13:01:45	72.8	75
61.8	11:33:55		61.8	61.8	61.2	11:45:16	61.2	61.2	55.5	13:01:48	58.3	55.5	55.5	71.4	13:01:48	72.8	71.4
62.4	11:33:56		62.4	62.4	60.7	11:45:17	60.7	60.7	60.7	13:01:51	58.3	60.7	60.7	72.2	13:01:51	72.8	72.2
62.9	11:33:57		62.9	62.9	63.2	11:45:18	63.2	63.2	55.6	13:01:54	58.4	55.6	55.6	73.5	13:01:54	72.9	73.5
61.9	11:33:58		61.9	61.9	66.6	11:45:19	66.6	66.6	62.3	13:01:57	58.4	62.3	62.3	72	13:01:57	72.9	72
62.6	11:33:59		62.6	62.6	67.2	11:45:20	67.2	67.2	59.7	13:02:00	58.4	59.7	59.7	73.9	13:02:00	72.9	73.9
75.4	11:34:00		75.4	75.4	65.6	11:45:21	65.6	65.6	57.4	13:02:03	58.4	57.4	57.4	71.5	13:02:03	72.9	71.5
66.2	11:34:01		66.2	66.2	65.7	11:45:22	65.7	65.7	57	13:02:06	58.4	57	57	70.8	13:02:06	72.9	70.8
65.3	11:34:02		65.3	65.3	65.5	11:45:23	65.5	65.5	58	13:02:09	58.4	58	58	70.9	13:02:09	72.9	70.9
64.4	11:34:03		64.4	64.4	65.5	11:45:24	65.5	65.5	57.3	13:02:12	58.4	57.3	57.3	71.9	13:02:12	72.9	71.9
62.9	11:34:04		62.9	62.9	65.2	11:45:25	65.2	65.2	60.4	13:02:15	58.4	60.4	60.4	70.1	13:02:15	72.9	70.1
62.6	11:34:05		62.6	62.6	63.5	11:45:26	63.5	63.5	55.7	13:02:18	58.4	55.7	55.7	69.5	13:02:18	72.9	69.5
65.3	11:34:06		65.3	65.3	61.1	11:45:27	61.1	61.1	55.7	13:02:21	58.4	55.7	55.7	65.9	13:02:21	72.9	65.9
64.2	11:34:07		64.2	64.2	59.9	11:45:28	59.9	59.9	56.2	13:02:24	58.4	56.2	56.2	63.6	13:02:24	72.9	63.6
65.8	11:34:08		65.8	65.8	60.2	11:45:29	60.2	60.2	54.7	13:02:27	58.4	54.7	54.7	66.6	13:02:27	72.9	66.6
66.5	11:34:09		66.5	66.5	61.8	11:45:30	61.8	61.8	53.8	13:02:30	58.4	53.8	53.8	63.6	13:02:30	72.9	63.6
68.0	11:34:10		68.0	68.0	63.2	11:45:31	63.2	63.2	55.4	13:02:33	58.4	55.4	55.4	70.5	13:02:33	72.9	70.5
68.2	11:34:11		68.2	68.2	62.9	11:45:32	62.9	62.9	53.7	13:02:36	58.4	53.7	53.7	70.2	13:02:36	72.8	70.2
67.9	11:34:12		67.9	67.9	62.7	11:45:33	62.7	62.7	54	13:02:39	58.4	54	54	71.4	13:02:39	72.8	71.4
65.0	11:34:13		65.0	65.0	63.3	11:45:34	63.3	63.3	53.5	13:02:42	58.4	53.5	53.5	71.6	13:02:42	72.8	71.6
63.4	11:34:14		63.4	63.4	63.6	11:45:35	63.6	63.6	57.3	13:02:45	58.4	57.3	57.3	71.6	13:02:45	72.8	71.6
66.0	11:34:15		66.0	66.0	63.2	11:45:36	63.2	63.2	55.3	13:02:48	58.4	55.3	55.3	71.1	13:02:48	72.8	71.1
66.1	11:34:16		66.1	66.1	62.4	11:4											

APPENDIX C

SoundPlan Model Existing Noise Calculations

Nutmeg Townhomes
Assessed receiver levels
Existing Noise Levels

2

Receiver	Usage	Fl	Dir	X m	Y m	Z m	CNEL dB(A)	Ld dB(A)	Le dB(A)	Ln dB(A)
A	RS	G		12.4	180.9	278.50	68.5	64.3	60.6	61.9
B	RS	G		43.5	99.0	268.40	67.6	63.2	59.6	61.0
C	RS	G		185.0	214.1	270.80	65.8	62.2	59.3	58.8
D	RS	G		149.9	-10.4	276.00	73.3	69.2	65.5	66.6

	Vista Environmental	1
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Nutmeg Townhomes

16

Emission calculation road - Existing Noise Levels

Road	KM	ADT Veh/24h	MSVges Day Veh/h	MSVges Night Veh/h	MSVges Evening Veh/h	Pavement type	Gradient %
I-15 Northbound	0.000	66900	3843.90	1633.99	2022.40	Average (of DGAC and PCC)	1.6
I-15 Southbound	0.000	66900	3843.90	1633.99	2022.40	Average (of DGAC and PCC)	-1.9
Centre City Parkway South of Nutmeg St	0.000	7200	421.85	132.56	314.92	Average (of DGAC and PCC)	5.3
Centre City Pkwy North of Nutmeg St	0.000	10000	585.90	184.11	437.39	Average (of DGAC and PCC)	-6.1
Nutmeg St west of Centre City	0.000	4200	246.08	77.33	183.70	Average (of DGAC and PCC)	-1.2

Vista Environmental

1

APPENDIX D

Proposed Townhomes Exterior to Interior Attenuation Calculations

Interior Noise Calculations With 26 STC Windows

Project Name: [Nutmeg Townhomes](#)

Plan: [Villa Plan 1](#)

Floor: [3](#)

Room: [Bedroom 1](#)

Room Absorption

Type of Surface	Area (Sq ft)	Sound Absorption Coefficient, Hz				Sound Absorption (Sabins)							
		125	250	500	1000	2000	4000	125	250	500	1000	2000	4000
Floor - Carpet*	112	0.1	0.4	0.62	0.7	0.63	0.88	11.198	44.79	69.425	78.383	70.544	98.538
Floor - Linoleum	0	0.02	0.03	0.03	0.03	0.02	0	0	0	0	0	0	0
Ceiling - Gypsum Board	112	0.29	0.1	0.05	0.04	0.07	0.09	32.473	11.198	5.5988	4.479	7.8383	10.078
Wall - Gypsum board	298	0.29	0.1	0.05	0.04	0.07	0.09	86.478	29.82	14.91	11.928	20.874	26.838
Total	522							130.15	85.808	89.933	94.79	99.257	135.45

$$10 \cdot \log(S/A) = \text{Exterior wall area, A} = \text{Sound Absorption}$$

Sound Source Adjustment Factor

Correction Factor for A-Weighted Sound Levels

A-Weighted Sound Absorption Level

dBA Noise Absorption Level

0.3

Exterior-Interior Transmission Calculations

Type of Surface	Area (Sq ft)	STC Rating	Fractional Area (Area/10*(STC/10))
Stucco Wall	82	46	0.0021
Window	24	26	0.0603
Door	0	26	0
Total	106		0.0006
Transmission Loss			32.3
26 STC = Standard dual pane windows			

Exterior-Interior Noise Reduction

(Transmission Loss - Sound Absorption Level)

32 dBA

*Carpet analyzed consisted of 3/8" Loop Pile with Pad

Sources:

Fundamentals of Acoustics 4th Edition, Lawrence E. Kinsler, 2000.

Noise Control in Buildings, Cyril M. Harris, 1994.

Interior Noise Calculations With 26 STC Windows

Project Name: [Nutmeg Townhomes](#) Plan: [Villa Plan 1](#) Floor: [3](#) Room: [Master Bedroom](#)

Room Absorption

Type of Surface	Area (Sq ft)	Sound Absorption Coefficient, Hz				Sound Absorption (Sabins)							
		125	250	500	1000	2000	4000	125	250	500	1000	2000	4000
Floor - Carpet*	132	0.1	0.4	0.62	0.7	0.63	0.88	13.2	52.8	81.84	92.4	83.16	116.16
Floor - Linoleum	0	0.02	0.03	0.03	0.03	0.02	0	0	0	0	0	0	0
Ceiling - Gypsum Board	132	0.29	0.1	0.05	0.04	0.07	0.09	38.28	13.2	6.6	5.28	9.24	11.88
Wall - Gypsum board	324	0.29	0.1	0.05	0.04	0.07	0.09	93.96	32.4	16.2	12.96	22.68	29.16
Total	588							145.44	98.4	104.64	110.64	115.08	157.2

10*log(S/A) S=Exterior wall area, A= Sound Absorption

Sound Source Adjustment Factor -6.00 -6.00 -6.00 -6.00 -6.00 -6.00

Correction Factor for A-Weighted Sound Levels -16.10 -8.60 -3.20 0.00 1.20 1.00

A-Weighted Sound Absorption Level -20.08 -10.88 -5.75 -2.79 -1.76 -3.31

dBA Noise Absorption Level **3.0**

Exterior-Interior Transmission Calculations

Type of Surface	Area (Sq ft)	STC Rating	Fractional Area (Area/10*(STC/10))
Stucco Wall	196	46	0.0049
Window	36	26	0.0904
Door	0	26	0
Total	232		0.0004

46 STC = Standard stucco wall construction

2 - 3'x6' windows

26 STC = Standard dual pane windows

Transmission Loss 33.9

Exterior-Interior Noise Reduction

(Transmission Loss - Sound Absorption Level)
31 dBA

*Carpet analyzed consisted of 3/8" Loop Pile with Pad

Sources:
Fundamentals of Acoustics 4th Edition , Lawrence E. Kinsler, 2000.
Noise Control in Buildings , Cyril M. Harris, 1994.

Interior Noise Calculations With 26 STC Windows

Project Name: [Nutmeg Townhomes](#) Plan: [Villa Plan 1](#) Floor: [2](#) Room: [Great Room/Kitchen](#)

Room Absorption

Type of Surface	Area (Sq ft)	Sound Absorption Coefficient, Hz				Sound Absorption (Sabins)							
		125	250	500	1000	2000	4000	125	250	500	1000	2000	4000
Floor - Carpet*	239	0.1	0.4	0.62	0.7	0.63	0.88	23.9	95.6	148.18	167.3	150.57	210.32
Floor - Tile	132	0.01	0.01	0.015	0.02	0.02	0.02	1.32	1.32	1.98	2.64	2.64	2.64
Ceiling - Gypsum Board	419	0.29	0.1	0.05	0.04	0.07	0.09	121.53	41.906	20.953	16.762	29.334	37.715
Wall - Gypsum board	423	0.29	0.1	0.05	0.04	0.07	0.09	122.54	42.255	21.128	16.902	29.579	38.03
Total	1213							269.29	181.08	192.24	203.6	212.12	288.7

$$10 \cdot \log(S/A) = \text{Exterior wall area, A} = \text{Sound Absorption}$$

Sound Source Adjustment Factor

Correction Factor for A-Weighted Sound Levels

A-Weighted Sound Absorption Level

dBA Noise Absorption Level

3.5

Exterior-Interior Transmission Calculations

Type of Surface	Area (Sq ft)	STC Rating	Fractional Area (Area/10*(STC/10))
Stucco Wall	399	46	0.01
Window	24	26	0.0603
Door	46	26	0.1143
Total	469		0.0004
Transmission Loss			34.0

46 STC = Standard stucco wall construction

1 - 4'x6' windows

1 - 7'x6.5' glass door

26 STC = Standard dual pane windows

Exterior-Interior Noise Reduction

(Transmission Loss - Sound Absorption Level)

31 dBA

*Carpet analyzed consisted of 3/8" Loop Pile with Pad

Sources:

Fundamentals of Acoustics 4th Edition, Lawrence E. Kinsler, 2000.

Noise Control in Buildings, Cyril M. Harris, 1994.

Interior Noise Calculations With 26 STC Windows

Project Name: [Nutmeg Townhomes](#)

Plan: [Villa Plan 2](#)

Floor: [3](#)

Room: [Bedroom 1](#)

Room Absorption

Type of Surface	Area (Sq ft)	Sound Absorption Coefficient, Hz				Sound Absorption (Sabins)							
		125	250	500	1000	2000	4000	125	250	500	1000	2000	4000
Floor - Carpet*	116	0.1	0.4	0.62	0.7	0.63	0.88	11.55	46.2	71.61	80.85	72.765	101.64
Floor - Linoleum	0	0.02	0.03	0.03	0.03	0.02	0.02	0	0	0	0	0	0
Ceiling - Gypsum Board	116	0.29	0.1	0.05	0.04	0.07	0.09	33.495	11.55	5.775	4.62	8.085	10.395
Wall - Gypsum board	297	0.29	0.1	0.05	0.04	0.07	0.09	86.13	29.7	14.85	11.88	20.79	26.73
Total	528							131.18	87.45	92.235	97.35	101.64	138.77

$$10 \cdot \log(S/A) = \text{Exterior wall area, A} = \text{Sound Absorption}$$

Sound Source Adjustment Factor

Correction Factor for A-Weighted Sound Levels

A-Weighted Sound Absorption Level

dBA Noise Absorption Level

0.2

Exterior-Interior Transmission Calculations

Type of Surface	Area (Sq ft)	STC Rating	Fractional Area (Area/10 ⁴ (STC/10))
Stucco Wall	70	46	0.0018
Window	36	26	0.0904
Door	0	26	0
Total	106		0.0009

46 STC = Standard stucco wall construction
2 - 3'x6' windows
26 STC = Standard dual pane windows

Transmission Loss **30.6**

Exterior-Interior Noise Reduction

(Transmission Loss - Sound Absorption Level)

30 dBA

*Carpet analyzed consisted of 3/8" Loop Pile with Pad

Sources:

Fundamentals of Acoustics 4th Edition, Lawrence E. Kinsler, 2000.
Noise Control in Buildings, Cyril M. Harris, 1994.

Interior Noise Calculations With 26 STC Windows

Project Name: [Nutmeg Townhomes](#)

Plan: [Villa Plan 2](#)

Floor: [3](#)

Room: [Bedroom 2](#)

Room Absorption

Type of Surface	Area (Sq ft)	Sound Absorption Coefficient, Hz				Sound Absorption (Sabins)							
		125	250	500	1000	2000	4000	125	250	500	1000	2000	4000
Floor - Carpet*	100	0.1	0.4	0.62	0.7	0.63	0.88	10	40	62	70	63	88
Floor - Linoleum	0	0.02	0.03	0.03	0.03	0.02	0.02	0	0	0	0	0	0
Ceiling - Gypsum Board	100	0.29	0.1	0.05	0.04	0.07	0.09	29	10	5	4	7	9
Wall - Gypsum board	243	0.29	0.1	0.05	0.04	0.07	0.09	70.47	24.3	12.15	9.72	17.01	21.87
Total	443							109.47	74.3	79.15	83.72	87.01	118.87

$10 \cdot \log(S/A)$ S=Exterior wall area, A= Sound Absorption
 Sound Source Adjustment Factor -6.00 -6.00 -6.00 -6.00 -6.00 -6.00
 Correction Factor for A-Weighted Sound Levels -16.10 -8.60 -3.20 0.00 1.20 1.00
 A-Weighted Sound Absorption Level -22.42 -13.24 -8.11 -5.16 -4.12 -5.68
 dBA Noise Absorption Level **0.7**

Exterior-Interior Transmission Calculations

Type of Surface	Area (Sq ft)	STC Rating	Fractional Area (Area/10*(STC/10))
Stucco Wall	66	46	0.0017
Window	36	26	0.0904
Door	0	26	0
Total	102		0.0009

46 STC = Standard stucco wall construction
 2 - 3'x6' windows
 26 STC = Standard dual pane windows
 Transmission Loss **30.4**

Exterior-Interior Noise Reduction

(Transmission Loss - Sound Absorption Level)
30 dBA

*Carpet analyzed consisted of 3/8" Loop Pile with Pad

Sources:

Fundamentals of Acoustics 4th Edition, Lawrence E. Kinsler, 2000.
Noise Control in Buildings, Cyril M. Harris, 1994.

Interior Noise Calculations With 26 STC Windows

Project Name: [Nutmeg Townhomes](#) Plan: [Villa Plan 2](#) Floor: [3](#) Room: [Master Bedroom](#)

Room Absorption

Type of Surface	Area (Sq ft)	Sound Absorption Coefficient, Hz				Sound Absorption (Sabins)							
		125	250	500	1000	2000	4000	125	250	500	1000	2000	4000
Floor - Carpet*	137	0.1	0.4	0.62	0.7	0.63	0.88	13.65	54.6	84.63	95.55	85.995	120.12
Floor - Linoleum	0	0.02	0.03	0.03	0.03	0.02	0	0	0	0	0	0	0
Ceiling - Gypsum Board	137	0.29	0.1	0.05	0.04	0.07	0.09	39.585	13.65	6.825	5.46	9.555	12.285
Wall - Gypsum board	282	0.29	0.1	0.05	0.04	0.07	0.09	81.78	28.2	14.1	11.28	19.74	25.38
Total	555							135.02	96.45	105.56	112.29	115.29	157.79

$10 \cdot \log(S/A)$ S=Exterior wall area, A= Sound Absorption
 Sound Source Adjustment Factor -6.00 -6.00 -6.00 -6.00 -6.00
 Correction Factor for A-Weighted Sound Levels -16.10 -8.60 -3.20 0.00 1.20 1.00
 A-Weighted Sound Absorption Level -19.97 -11.01 -6.00 -3.07 -1.98 -3.55
 dBA Noise Absorption Level **2.8**

Exterior-Interior Transmission Calculations

Type of Surface	Area (Sq ft)	STC Rating	Fractional Area (Area/10 ⁴ (STC/10))
Stucco Wall	197	46	0.0049
Window	24	26	0.0603
Door	0	26	0
Total	221		0.0003

46 STC = Standard stucco wall construction
 1 - 4'x6' windows
 26 STC = Standard dual pane windows
Transmission Loss 35.3

Exterior-Interior Noise Reduction

(Transmission Loss - Sound Absorption Level)
32 dBA

*Carpet analyzed consisted of 3/8" Loop Pile with Pad
 Sources:
Fundamentals of Acoustics 4th Edition , Lawrence E. Kinsler, 2000.
Noise Control in Buildings , Cyril M. Harris, 1994.

Interior Noise Calculations With 26 STC Windows

Project Name: [Nutmeg Townhomes](#) Plan: [Villa Plan 2](#) Floor: [2](#) Room: [Great Room/Kitchen](#)

Room Absorption

Type of Surface	Area (Sq ft)	Sound Absorption Coefficient, Hz				Sound Absorption (Sabins)							
		125	250	500	1000	2000	4000	125	250	500	1000	2000	4000
Floor - Carpet*	207	0.1	0.4	0.62	0.7	0.63	0.88	20.69	82.76	128.28	144.83	130.35	182.07
Floor - Tile	279	0.01	0.01	0.015	0.02	0.02	0.02	2.7928	2.7928	4.1891	5.5855	5.5855	5.5855
Ceiling - Gypsum Board	541	0.29	0.1	0.05	0.04	0.07	0.09	156.94	54.118	27.059	21.647	37.882	48.706
Wall - Gypsum board	473	0.29	0.1	0.05	0.04	0.07	0.09	137.03	47.25	23.625	18.9	33.075	42.525
Total	1500							317.45	186.92	183.15	190.96	206.89	278.89

$10 \cdot \log(S/A)$ S=Exterior wall area, A= Sound Absorption
 Sound Source Adjustment Factor -6.00 -6.00 -6.00 -6.00 -6.00 -6.00
 Correction Factor for A-Weighted Sound Levels -16.10 -8.60 -3.20 0.00 1.20 1.00
 A-Weighted Sound Absorption Level -20.04 -10.24 -4.75 -1.73 -0.88 -2.38
 dBA Noise Absorption Level **4.0**

Exterior-Interior Transmission Calculations

Type of Surface	Area (Sq ft)	STC Rating	Fractional Area (Area/10*(STC/10))
Stucco Wall	377	46	0.0095
Window	114	26	0.2864
Door	20	26	0.049
Total	510		0.0007
Transmission Loss			31.7

46 STC = Standard stucco wall construction
 5 - 3'x6' windows & 1 - 4'x6' window
 1 - 3'x6.5' glass door
 26 STC = Standard dual pane windows

Exterior-Interior Noise Reduction
 (Transmission Loss - Sound Absorption Level)
28 dBA

*Carpet analyzed consisted of 3/8" Loop Pile with Pad
 Sources:
Fundamentals of Acoustics 4th Edition, Lawrence E. Kinsler, 2000.
Noise Control in Buildings, Cyril M. Harris, 1994.

Interior Noise Calculations With 26 STC Windows

Project Name: [Nutmeg Townhomes](#)

Plan: [Villa Plan 3](#)

Floor: [3](#)

Room: [Bedroom 1](#)

Room Absorption

Type of Surface	Area (Sq ft)	Sound Absorption Coefficient, Hz				Sound Absorption (Sabins)							
		125	250	500	1000	2000	4000	125	250	500	1000	2000	4000
Floor - Carpet*	162	0.1	0.4	0.62	0.7	0.63	0.88	16.15	64.6	100.13	113.05	101.75	142.12
Floor - Linoleum	0	0.02	0.03	0.03	0.03	0.02	0.02	0	0	0	0	0	0
Ceiling - Gypsum Board	162	0.29	0.1	0.05	0.04	0.07	0.09	46.835	16.15	8.075	6.46	11.305	14.535
Wall - Gypsum board	324	0.29	0.1	0.05	0.04	0.07	0.09	93.96	32.4	16.2	12.96	22.68	29.16
Total	647							156.95	113.15	124.41	132.47	135.73	185.82

$10 \cdot \log(S/A)$ S=Exterior wall area, A= Sound Absorption

Sound Source Adjustment Factor

Correction Factor for A-Weighted Sound Levels

A-Weighted Sound Absorption Level

dBA Noise Absorption Level

-0.7

Exterior-Interior Transmission Calculations

Type of Surface	Area (Sq ft)	STC Rating	Fractional Area (Area/10*(STC/10))
Stucco Wall	81	46	0.002
Window	36	26	0.0904
Door	0	26	0
Total	117		0.0008
Transmission Loss			31.0
26 STC = Standard dual pane windows			

Exterior-Interior Noise Reduction

(Transmission Loss - Sound Absorption Level)

32 dBA

*Carpet analyzed consisted of 3/8" Loop Pile with Pad

Sources:

Fundamentals of Acoustics 4th Edition, Lawrence E. Kinsler, 2000.
Noise Control in Buildings, Cyril M. Harris, 1994.

Interior Noise Calculations With 26 STC Windows

Project Name: [Nutmeg Townhomes](#) Plan: [Villa Plan 3](#) Floor: [3](#) Room: [Master Bedroom](#)

Room Absorption

Type of Surface	Area (Sq ft)	Sound Absorption Coefficient, Hz				Sound Absorption (Sabins)							
		125	250	500	1000	2000	4000	125	250	500	1000	2000	4000
Floor - Carpet*	149	0.1	0.4	0.62	0.7	0.63	0.88	14.85	59.4	92.07	103.95	93.555	130.68
Floor - Linoleum	0	0.02	0.03	0.03	0.03	0.02	0	0	0	0	0	0	0
Ceiling - Gypsum Board	149	0.29	0.1	0.05	0.04	0.07	0.09	43.065	14.85	7.425	5.94	10.395	13.365
Wall - Gypsum board	386	0.29	0.1	0.05	0.04	0.07	0.09	111.8	38.55	19.275	15.42	26.985	34.695
Total	683						169.71	112.8	118.77	125.31	130.94	178.74	

$$10 \cdot \log(S/A) = \text{Exterior wall area, A} = \text{Sound Absorption}$$

Sound Source Adjustment Factor	-6.00	-6.00	-6.00	-6.00	-6.00
Correction Factor for A-Weighted Sound Levels	-16.10	-8.60	-3.20	0.00	1.20
A-Weighted Sound Absorption Level	-20.70	-11.43	-6.25	-3.29	-2.28
dBA Noise Absorption Level			2.5		

Exterior-Interior Transmission Calculations

Type of Surface	Area (Sq ft)	STC Rating	Fractional Area (Area/10 ⁴ (STC/10))	Notes
Stucco Wall	183	46	0.0046	46 STC = Standard stucco wall construction
Window	51	26	0.1281	1 - 5.5'x6' window & 1 - 3'x6' window
Door	0	26	0	
Total	234		0.0006	26 STC = Standard dual pane windows
Transmission Loss			32.5	

Exterior-Interior Noise Reduction

(Transmission Loss - Sound Absorption Level)
30 dBA

*Carpet analyzed consisted of 3/8" Loop Pile with Pad

Sources:

Fundamentals of Acoustics 4th Edition, Lawrence E. Kinsler, 2000.
Noise Control in Buildings, Cyril M. Harris, 1994.

Interior Noise Calculations With 26 STC Windows

Project Name: [Nutmeg Townhomes](#) Plan: [Villa Plan 3](#) Floor: [2](#) Room: [Great Room/Kitchen](#)

Room Absorption

Type of Surface	Area (Sq ft)	Sound Absorption Coefficient, Hz				Sound Absorption (Sabins)							
		125	250	500	1000	2000	4000	125	250	500	1000	2000	4000
Floor - Carpet*	408	0.1	0.4	0.62	0.7	0.63	0.88	40.8	163.2	252.96	285.6	257.04	359.04
Floor - Tile	80	0.01	0.01	0.015	0.02	0.02	0.02	0.8	0.8	1.2	1.6	1.6	1.6
Ceiling - Gypsum Board	540	0.29	0.1	0.05	0.04	0.07	0.09	156.6	54	27	21.6	37.8	48.6
Wall - Gypsum board	459	0.29	0.1	0.05	0.04	0.07	0.09	133.11	45.9	22.95	18.36	32.13	41.31
Total	1487							331.31	263.9	304.11	327.16	328.57	450.55

$10 \cdot \log(S/A)$ S=Exterior wall area, A= Sound Absorption
 Sound Source Adjustment Factor -6.00
 Correction Factor for A-Weighted Sound Levels -16.10
 A-Weighted Sound Absorption Level -19.95 -11.47 -6.68 -3.80 -2.62 -4.19
 dBA Noise Absorption Level **2.2**

Exterior-Interior Transmission Calculations

Type of Surface	Area (Sq ft)	STC Rating	Fractional Area (Area/10*(STC/10))
Stucco Wall	414	46	0.0104
Window	90	26	0.2261
Door	39	26	0.098
Total	543		0.0006

46 STC = Standard stucco wall construction
 5 - 3'x6' windows
 1 - 6'x6.5' glass door
 26 STC = Standard dual pane windows
Transmission Loss 32.1

Exterior-Interior Noise Reduction
 (Transmission Loss - Sound Absorption Level)
30 dBA

*Carpet analyzed consisted of 3/8" Loop Pile with Pad
 Sources:
Fundamentals of Acoustics 4th Edition , Lawrence E. Kinsler, 2000.
Noise Control in Buildings , Cyril M. Harris, 1994.

Interior Noise Calculations With 26 STC Windows

Project Name: [Nutmeg Townhomes](#)

Plan: [Villa Plan 3](#)

Floor: [1](#)

Room: [Bedroom 2](#)

Room Absorption

Type of Surface	Area (Sq ft)	Sound Absorption Coefficient, Hz				Sound Absorption (Sabins)							
		125	250	500	1000	2000	4000	125	250	500	1000	2000	4000
Floor - Carpet*	105	0.1	0.4	0.62	0.7	0.63	0.88	10.45	41.8	64.79	73.15	65.835	91.96
Floor - Linoleum	0	0.02	0.03	0.03	0.03	0.02	0	0	0	0	0	0	0
Ceiling - Gypsum Board	105	0.29	0.1	0.05	0.04	0.07	0.09	30.305	10.45	5.225	4.18	7.315	9.405
Wall - Gypsum board	291	0.29	0.1	0.05	0.04	0.07	0.09	84.39	29.1	14.55	11.64	20.37	26.19
Total	500							125.15	81.35	84.565	88.97	93.52	127.56

$10 \cdot \log(S/A)$ S=Exterior wall area, A= Sound Absorption
 Sound Source Adjustment Factor -6.00 -6.00 -6.00 -6.00
 Correction Factor for A-Weighted Sound Levels -16.10 -8.60 -3.20 0.00 1.20 1.00
 A-Weighted Sound Absorption Level -23.99 -14.62 -9.39 -6.41 -5.42 -6.97
 dBA Noise Absorption Level **-0.6**

Exterior-Interior Transmission Calculations

Type of Surface	Area (Sq ft)	STC Rating	Fractional Area (Area/10*(STC/10))
Stucco Wall	57	46	0.0014
Window	24	26	0.0603
Door	0	26	0
Total	81		0.0008

46 STC = Standard stucco wall construction
 1 - 4'x6' windows
 26 STC = Standard dual pane windows
 Transmission Loss **31.2**

Exterior-Interior Noise Reduction

(Transmission Loss - Sound Absorption Level)
32 dBA

*Carpet analyzed consisted of 3/8" Loop Pile with Pad

Sources:

Fundamentals of Acoustics 4th Edition, Lawrence E. Kinsler, 2000.
Noise Control in Buildings, Cyril M. Harris, 1994.

Interior Noise Calculations With 26 STC Windows

Project Name: [Nutmeg Townhomes](#) Plan: [RowHome Plan 1](#) Floor: [3](#) Room: [Bedroom 1](#)

Room Absorption

Type of Surface	Area (Sq ft)	Sound Absorption Coefficient, Hz				Sound Absorption (Sabins)							
		125	250	500	1000	2000	4000	125	250	500	1000	2000	4000
Floor - Carpet*	123	0.1	0.4	0.62	0.7	0.63	0.88	12.25	49	75.95	85.75	77.175	107.8
Floor - Linoleum	0	0.02	0.03	0.03	0.03	0.02	0	0	0	0	0	0	0
Ceiling - Gypsum Board	123	0.29	0.1	0.05	0.04	0.07	0.09	35.525	12.25	6.125	4.9	8.575	11.025
Wall - Gypsum board	284	0.29	0.1	0.05	0.04	0.07	0.09	82.215	28.35	14.175	11.34	19.845	25.515
Total	529							129.99	89.6	96.25	101.99	105.6	144.34

$10 \cdot \log(S/A)$ S=Exterior wall area, A= Sound Absorption
 Sound Source Adjustment Factor -6.00 -6.00 -6.00 -6.00 -6.00
 Correction Factor for A-Weighted Sound Levels -16.10 -8.60 -3.20 0.00 1.20 1.00
 A-Weighted Sound Absorption Level -20.27 -11.16 -6.07 -3.12 -2.07 -3.63
 dBA Noise Absorption Level **2.7**

Exterior-Interior Transmission Calculations

Type of Surface	Area (Sq ft)	STC Rating	Fractional Area (Area/10 ⁴ (STC/10))
Stucco Wall	144	46	0.0036
Window	54	26	0.1356
Door	0	26	0
Total	198		0.0007

46 STC = Standard stucco wall construction
 3 - 3'x6' windows
 26 STC = Standard dual pane windows
Transmission Loss 31.5

Exterior-Interior Noise Reduction
 (Transmission Loss - Sound Absorption Level)
29 dBA

*Carpet analyzed consisted of 3/8" Loop Pile with Pad
 Sources:
Fundamentals of Acoustics 4th Edition , Lawrence E. Kinsler, 2000.
Noise Control in Buildings , Cyril M. Harris, 1994.

Interior Noise Calculations With 26 STC Windows

Project Name: [Nutmeg Townhomes](#) Plan: [RowHome Plan 1](#) Floor: [3](#) Room: [Master Bedroom](#)

Room Absorption

Type of Surface	Area (Sq ft)	Sound Absorption Coefficient, Hz				Sound Absorption (Sabins)							
		125	250	500	1000	2000	4000	125	250	500	1000	2000	4000
Floor - Carpet*	156	0.1	0.4	0.62	0.7	0.63	0.88	15.6	62.4	96.72	109.2	98.28	137.28
Floor - Linoleum	0	0.02	0.03	0.03	0.03	0.02	0	0	0	0	0	0	0
Ceiling - Gypsum Board	156	0.29	0.1	0.05	0.04	0.07	0.09	45.24	15.6	7.8	6.24	10.92	14.04
Wall - Gypsum board	311	0.29	0.1	0.05	0.04	0.07	0.09	90.045	31.05	15.525	12.42	21.735	27.945
Total	623							150.89	109.05	120.05	127.86	130.94	179.27

$10 \cdot \log(S/A)$ S=Exterior wall area, A= Sound Absorption
 Sound Source Adjustment Factor -6.00 -6.00 -6.00 -6.00 -6.00
 Correction Factor for A-Weighted Sound Levels -16.10 -8.60 -3.20 0.00 1.20 1.00
 A-Weighted Sound Absorption Level -19.87 -10.96 -5.98 -3.05 -1.96 -3.52
 dBA Noise Absorption Level **2.8**

Exterior-Interior Transmission Calculations

Type of Surface	Area (Sq ft)	STC Rating	Fractional Area (Area/10*(STC/10))
Stucco Wall	180	46	0.0045
Window	72	26	0.1809
Door	0	26	0
Total	252		0.0007

46 STC = Standard stucco wall construction
 4 - 3'x6' window
 26 STC = Standard dual pane windows
Transmission Loss 31.3

Exterior-Interior Noise Reduction
 (Transmission Loss - Sound Absorption Level)
29 dBA

*Carpet analyzed consisted of 3/8" Loop Pile with Pad
 Sources:
Fundamentals of Acoustics 4th Edition , Lawrence E. Kinsler, 2000.
Noise Control in Buildings , Cyril M. Harris, 1994.

Interior Noise Calculations With 26 STC Windows

Project Name: [Nutmeg Townhomes](#) Plan: [RowHome Plan 1](#) Floor: [2](#) Room: [Great Room/Kitchen](#)

Room Absorption

Type of Surface	Area (Sq ft)	Sound Absorption Coefficient, Hz				Sound Absorption (Sabins)							
		125	250	500	1000	2000	4000	125	250	500	1000	2000	4000
Floor - Carpet*	238	0.1	0.4	0.62	0.7	0.63	0.88	23.75	95	147.25	166.25	149.63	209
Floor - Tile	68	0.01	0.01	0.015	0.02	0.02	0.02	0.6804	0.6804	1.0206	1.3608	1.3608	1.3608
Ceiling - Gypsum Board	348	0.29	0.1	0.05	0.04	0.07	0.09	100.92	34.8	17.4	13.92	24.36	31.32
Wall - Gypsum board	405	0.29	0.1	0.05	0.04	0.07	0.09	117.45	40.5	20.25	16.2	28.35	36.45
Total	1059							242.8	170.98	185.92	197.73	203.7	278.13

$10 \cdot \log(S/A)$ S=Exterior wall area, A= Sound Absorption

Sound Source Adjustment Factor -6.00 -6.00 -6.00 -6.00 -6.00 -6.00

Correction Factor for A-Weighted Sound Levels -16.10 -8.60 -3.20 0.00 1.20 1.00

A-Weighted Sound Absorption Level -20.69 -11.67 -6.63 -3.70 -2.63 -4.18

dBA Noise Absorption Level **2.2**

Exterior-Interior Transmission Calculations

Type of Surface	Area (Sq ft)	STC Rating	Fractional Area (Area/10 ⁴ (STC/10))
Stucco Wall	261	46	0.0066
Window	36	26	0.0904
Door	39	26	0.098
Total	336		0.0006

46 STC = Standard stucco wall construction
2 - 3'x6' windows
1 - 6'x6.5' glass door
26 STC = Standard dual pane windows

Transmission Loss **32.4**

Exterior-Interior Noise Reduction
(Transmission Loss - Sound Absorption Level)
30 dBA

*Carpet analyzed consisted of 3/8" Loop Pile with Pad
Sources:
Fundamentals of Acoustics 4th Edition , Lawrence E. Kinsler, 2000.
Noise Control in Buildings , Cyril M. Harris, 1994.

Interior Noise Calculations With 26 STC Windows

Project Name: [Nutmeg Townhomes](#) Plan: [RowHome Plan 2](#) Floor: [3](#) Room: [Bedroom 1](#)

Room Absorption

Type of Surface	Area (Sq ft)	Sound Absorption Coefficient, Hz				Sound Absorption (Sabins)							
		125	250	500	1000	2000	4000	125	250	500	1000	2000	4000
Floor - Carpet*	166	0.1	0.4	0.62	0.7	0.63	0.88	16.575	66.3	102.77	116.03	104.42	145.86
Floor - Linoleum	0	0.02	0.03	0.03	0.03	0.02	0	0	0	0	0	0	0
Ceiling - Gypsum Board	166	0.29	0.1	0.05	0.04	0.07	0.09	48.068	16.575	8.2875	6.63	11.603	14.918
Wall - Gypsum board	441	0.29	0.1	0.05	0.04	0.07	0.09	127.89	44.1	22.05	17.64	30.87	39.69
Total	773							192.53	126.98	133.1	140.3	146.9	200.47

$10 \cdot \log(S/A)$ S=Exterior wall area, A= Sound Absorption
 Sound Source Adjustment Factor -6.00 -6.00 -6.00 -6.00 -6.00 -6.00
 Correction Factor for A-Weighted Sound Levels -16.10 -8.60 -3.20 0.00 1.20 1.00
 A-Weighted Sound Absorption Level -24.26 -14.96 -9.76 -6.79 -5.79 -7.34
 dBA Noise Absorption Level **-1.0**

Exterior-Interior Transmission Calculations

Type of Surface	Area (Sq ft)	STC Rating	Fractional Area (Area/10*(STC/10))
Stucco Wall	81	46	0.002
Window	36	26	0.0904
Door	0	26	0
Total	117		0.0008

46 STC = Standard stucco wall construction
 1 - 6'x6' windows
 26 STC = Standard dual pane windows

Exterior-Interior Noise Reduction
 (Transmission Loss - Sound Absorption Level)
32 dBA

*Carpet analyzed consisted of 3/8" Loop Pile with Pad
 Sources:
Fundamentals of Acoustics 4th Edition, Lawrence E. Kinsler, 2000.
Noise Control in Buildings, Cyril M. Harris, 1994.

Interior Noise Calculations With 26 STC Windows

Project Name: [Nutmeg Townhomes](#) Plan: [RowHome Plan 2](#) Floor: [3](#) Room: [Master Bedroom](#)

Room Absorption

Type of Surface	Area (Sq ft)	Sound Absorption Coefficient, Hz				Sound Absorption (Sabins)							
		125	250	500	1000	2000	4000	125	250	500	1000	2000	4000
Floor - Carpet*	191	0.1	0.4	0.62	0.7	0.63	0.88	19.075	76.3	118.27	133.53	120.17	167.86
Floor - Linoleum	0	0.02	0.03	0.03	0.03	0.02	0.02	0	0	0	0	0	0
Ceiling - Gypsum Board	191	0.29	0.1	0.05	0.04	0.07	0.09	55.318	19.075	9.5375	7.63	13.353	17.168
Wall - Gypsum board	374	0.29	0.1	0.05	0.04	0.07	0.09	108.32	37.35	18.675	14.94	26.145	33.615
Total	755							182.71	132.73	146.48	156.1	159.67	218.64

$10 \cdot \log(S/A)$ S=Exterior wall area, A= Sound Absorption
 Sound Source Adjustment Factor -6.00 -6.00 -6.00 -6.00 -6.00 -6.00
 Correction Factor for A-Weighted Sound Levels -16.10 -8.60 -3.20 0.00 1.20 1.00
 A-Weighted Sound Absorption Level -20.94 -12.05 -7.08 -4.16 -3.06 -4.62
 dBA Noise Absorption Level **1.7**

Exterior-Interior Transmission Calculations

Type of Surface	Area (Sq ft)	STC Rating	Fractional Area (Area/10 ⁴ (STC/10))
Stucco Wall	185	46	0.0046
Window	54	26	0.1356
Door	0	26	0
Total	239		0.0006

46 STC = Standard stucco wall construction
 2 - 2'x6' windows & 1 - 5' x 6' window
 26 STC = Standard dual pane windows
Transmission Loss 32.3

Exterior-Interior Noise Reduction
 (Transmission Loss - Sound Absorption Level)
31 dBA

*Carpet analyzed consisted of 3/8" Loop Pile with Pad
 Sources:
Fundamentals of Acoustics 4th Edition , Lawrence E. Kinsler, 2000.
Noise Control in Buildings , Cyril M. Harris, 1994.

Interior Noise Calculations With 26 STC Windows

Project Name: [Nutmeg Townhomes](#) Plan: [RowHome Plan 2](#) Floor: [2](#) Room: [Great Room/Kitchen](#)

Room Absorption

Type of Surface	Area (Sq ft)	Sound Absorption Coefficient, Hz				Sound Absorption (Sabins)							
		125	250	500	1000	2000	4000	125	250	500	1000	2000	4000
Floor - Carpet*	210	0.1	0.4	0.62	0.7	0.63	0.88	21	84	130.2	147	132.3	184.8
Floor - Tile	94	0.01	0.01	0.015	0.02	0.02	0.02	0.94	0.94	1.41	1.88	1.88	1.88
Ceiling - Gypsum Board	321	0.29	0.1	0.05	0.04	0.07	0.09	92.945	32.05	16.025	12.82	22.435	28.845
Wall - Gypsum board	234	0.29	0.1	0.05	0.04	0.07	0.09	67.86	23.4	11.7	9.36	16.38	21.06
Total	859							182.75	140.39	159.34	171.06	173	236.59

$10 \cdot \log(S/A)$ S=Exterior wall area, A= Sound Absorption
 Sound Source Adjustment Factor -6.00 -6.00 -6.00 -6.00 -6.00
 Correction Factor for A-Weighted Sound Levels -16.10 -8.60 -3.20 0.00 1.20 1.00
 A-Weighted Sound Absorption Level -19.12 -10.48 -5.63 -2.74 -1.58 -3.14
 dBA Noise Absorption Level **3.2**

Exterior-Interior Transmission Calculations

Type of Surface	Area (Sq ft)	STC Rating	Fractional Area (Area/10*(STC/10))
Stucco Wall	302	46	0.0076
Window	45	26	0.113
Door	16	26	0.0408
Total	363		0.0004

46 STC = Standard stucco wall construction
 3 - 2.5'x6' windows
 1 - 2.5'x6.5' glass door
 26 STC = Standard dual pane windows
Transmission Loss 33.5

Exterior-Interior Noise Reduction

(Transmission Loss - Sound Absorption Level)
30 dBA

*Carpet analyzed consisted of 3/8" Loop Pile with Pad
 Sources:
Fundamentals of Acoustics 4th Edition , Lawrence E. Kinsler, 2000.
Noise Control in Buildings , Cyril M. Harris, 1994.

Interior Noise Calculations With 26 STC Windows

Project Name: [Nutmeg Townhomes](#)

Plan: [RowHome Plan 2](#)

Floor: [2](#)

Room: [Bedroom 2](#)

Room Absorption

Type of Surface	Area (Sq ft)	Sound Absorption Coefficient, Hz				Sound Absorption (Sabins)							
		125	250	500	1000	2000	4000	125	250	500	1000	2000	4000
Floor - Carpet*	152	0.1	0.4	0.62	0.7	0.63	0.88	15.15	60.6	93.93	106.05	95.445	133.32
Floor - Linoleum	0	0.02	0.03	0.03	0.03	0.02	0.02	0	0	0	0	0	0
Ceiling - Gypsum Board	152	0.29	0.1	0.05	0.04	0.07	0.09	43.935	15.15	7.575	6.06	10.605	13.635
Wall - Gypsum board	392	0.29	0.1	0.05	0.04	0.07	0.09	113.54	39.15	19.575	15.66	27.405	35.235
Total	695							172.62	114.9	121.08	127.77	133.46	182.19

$$10 \cdot \log(S/A) = \text{Exterior wall area, A} = \text{Sound Absorption}$$

Sound Source Adjustment Factor

Correction Factor for A-Weighted Sound Levels

A-Weighted Sound Absorption Level

dBA Noise Absorption Level

-1.5

Exterior-Interior Transmission Calculations

Type of Surface	Area (Sq ft)	STC Rating	Fractional Area (Area/10 ⁴ (STC/10))
Stucco Wall	59	46	0.0015
Window	36	26	0.0904
Door	0	26	0
Total	95		0.001

46 STC = Standard stucco wall construction
1 - 6'x6' windows
26 STC = Standard dual pane windows

Transmission Loss **30.1**

Exterior-Interior Noise Reduction

(Transmission Loss - Sound Absorption Level)

32 dBA

*Carpet analyzed consisted of 3/8" Loop Pile with Pad

Sources:

Fundamentals of Acoustics 4th Edition, Lawrence E. Kinsler, 2000.

Noise Control in Buildings, Cyril M. Harris, 1994.

Interior Noise Calculations With 26 STC Windows

Project Name: [Nutmeg Townhomes](#) Plan: [RowHome Plan 3](#) Floor: [2](#) Room: [Bedroom 1](#)

Room Absorption

Type of Surface	Area (Sq ft)	Sound Absorption Coefficient, Hz				Sound Absorption (Sabins)							
		125	250	500	1000	2000	4000	125	250	500	1000	2000	4000
Floor - Carpet*	131	0.1	0.4	0.62	0.7	0.63	0.88	13.1	52.4	81.22	91.7	82.53	115.28
Floor - Linoleum	0	0.02	0.03	0.03	0.03	0.02	0	0	0	0	0	0	0
Ceiling - Gypsum Board	131	0.29	0.1	0.05	0.04	0.07	0.09	37.99	13.1	6.55	5.24	9.17	11.79
Wall - Gypsum board	356	0.29	0.1	0.05	0.04	0.07	0.09	103.1	35.55	17.775	14.22	24.885	31.995
Total	618						154.19	101.05	105.55	111.16	116.59	159.07	

$10 \cdot \log(S/A)$ S=Exterior wall area, A= Sound Absorption
 Sound Source Adjustment Factor -6.00 -6.00 -6.00 -6.00 -6.00
 Correction Factor for A-Weighted Sound Levels -16.10 -8.60 -3.20 0.00 1.20 1.00
 A-Weighted Sound Absorption Level -23.83 -14.50 -9.28 -6.31 -5.32 -6.87
 dBA Noise Absorption Level **-0.5**

Exterior-Interior Transmission Calculations

Type of Surface	Area (Sq ft)	STC Rating	Fractional Area (Area/10*(STC/10))
Stucco Wall	68	46	0.0017
Window	36	26	0.0904
Door	0	26	0
Total	104		0.0009

46 STC = Standard stucco wall construction
 1 - 6'x6' windows
 26 STC = Standard dual pane windows
Transmission Loss 30.5

Exterior-Interior Noise Reduction
 (Transmission Loss - Sound Absorption Level)
31 dBA

*Carpet analyzed consisted of 3/8" Loop Pile with Pad
 Sources:
Fundamentals of Acoustics 4th Edition , Lawrence E. Kinsler, 2000.
Noise Control in Buildings , Cyril M. Harris, 1994.

Interior Noise Calculations With 26 STC Windows

Project Name: [Nutmeg Townhomes](#)

Plan: [RowHome Plan 3](#)

Floor: [2](#)

Room: [Bedroom 2](#)

Room Absorption

Type of Surface	Area (Sq ft)	Sound Absorption Coefficient, Hz				Sound Absorption (Sabins)							
		125	250	500	1000	2000	4000	125	250	500	1000	2000	4000
Floor - Carpet*	130	0.1	0.4	0.62	0.7	0.63	0.88	13	52	80.6	91	81.9	114.4
Floor - Linoleum	0	0.02	0.03	0.03	0.03	0.02	0.02	0	0	0	0	0	0
Ceiling - Gypsum Board	130	0.29	0.1	0.05	0.04	0.07	0.09	37.7	13	6.5	5.2	9.1	11.7
Wall - Gypsum board	365	0.29	0.1	0.05	0.04	0.07	0.09	105.71	36.45	18.225	14.58	25.515	32.805
Total	625							156.41	101.45	105.33	110.78	116.52	158.91

$10 \cdot \log(S/A)$ S=Exterior wall area, A= Sound Absorption
 Sound Source Adjustment Factor -1.99 -0.11 -0.27 -0.49 -0.71 -2.06
 Correction Factor for A-Weighted Sound Levels -6.00 -6.00 -6.00 -6.00 -6.00 -6.00
 A-Weighted Sound Absorption Level -16.10 -8.60 -3.20 0.00 1.20 1.00
 dBA Noise Absorption Level -24.09 -14.71 -9.47 -6.49 -5.51 -7.06
dBA Noise Absorption Level -0.7

Exterior-Interior Transmission Calculations

Type of Surface	Area (Sq ft)	STC Rating	Fractional Area (Area/10*(STC/10))
Stucco Wall	63	46	0.0016
Window	36	26	0.0904
Door	0	26	0
Total	99		0.0009

46 STC = Standard stucco wall construction
 1 - 6'x6' windows
 26 STC = Standard dual pane windows

Transmission Loss **30.3**

Exterior-Interior Noise Reduction

(Transmission Loss - Sound Absorption Level)
31 dBA

*Carpet analyzed consisted of 3/8" Loop Pile with Pad

Sources:

Fundamentals of Acoustics 4th Edition, Lawrence E. Kinsler, 2000.
Noise Control in Buildings, Cyril M. Harris, 1994.

Interior Noise Calculations With 26 STC Windows

Project Name: [Nutmeg Townhomes](#) Plan: [RowHome Plan 3](#) Floor: [2](#) Room: [Master Bedroom](#)

Room Absorption

Type of Surface	Area (Sq ft)	Sound Absorption Coefficient, Hz				Sound Absorption (Sabins)							
		125	250	500	1000	2000	4000	125	250	500	1000	2000	4000
Floor - Carpet*	194	0.1	0.4	0.62	0.7	0.63	0.88	19.375	77.5	120.13	135.63	122.06	170.5
Floor - Linoleum	0	0.02	0.03	0.03	0.03	0.02	0	0	0	0	0	0	0
Ceiling - Gypsum Board	194	0.29	0.1	0.05	0.04	0.07	0.09	56.188	19.375	9.6875	7.75	13.563	17.438
Wall - Gypsum board	408	0.29	0.1	0.05	0.04	0.07	0.09	118.32	40.8	20.4	16.32	28.56	36.72
Total	796							193.88	137.68	150.21	159.7	164.19	224.66

$10 \cdot \log(S/A)$ S=Exterior wall area, A= Sound Absorption
 Sound Source Adjustment Factor -6.00 -6.00 -6.00 -6.00 -6.00 -6.00
 Correction Factor for A-Weighted Sound Levels -16.10 -8.60 -3.20 0.00 1.20 1.00
 A-Weighted Sound Absorption Level -24.13 -15.14 -10.12 -7.19 -6.11 -7.67
 dBA Noise Absorption Level **-1.3**

Exterior-Interior Transmission Calculations

Type of Surface	Area (Sq ft)	STC Rating	Fractional Area (Area/10*(STC/10))
Stucco Wall	98	46	0.0024
Window	24	26	0.0603
Door	0	26	0
Total	122		0.0005

46 STC = Standard stucco wall construction
 1 - 4'x6' window
 26 STC = Standard dual pane windows
 Transmission Loss **32.9**

Exterior-Interior Noise Reduction

(Transmission Loss - Sound Absorption Level)
34 dBA

*Carpet analyzed consisted of 3/8" Loop Pile with Pad

Sources:

Fundamentals of Acoustics 4th Edition, Lawrence E. Kinsler, 2000.
Noise Control in Buildings, Cyril M. Harris, 1994.

Interior Noise Calculations With 26 STC Windows

Project Name: [Nutmeg Townhomes](#) Plan: [RowHome Plan 3](#) Floor: [1](#) Room: [Great Room/Kitchen](#)

Room Absorption

Type of Surface	Area (Sq ft)	Sound Absorption Coefficient, Hz				Sound Absorption (Sabins)							
		125	250	500	1000	2000	4000	125	250	500	1000	2000	4000
Floor - Carpet*	253	0.1	0.4	0.62	0.7	0.63	0.88	25.25	101	156.55	176.75	159.08	222.2
Floor - Tile	76	0.01	0.01	0.015	0.02	0.02	0.02	0.756	0.756	1.134	1.512	1.512	1.512
Ceiling - Gypsum Board	370	0.29	0.1	0.05	0.04	0.07	0.09	107.16	36.95	18.475	14.78	25.865	33.255
Wall - Gypsum board	567	0.29	0.1	0.05	0.04	0.07	0.09	164.43	56.7	28.35	22.68	39.69	51.03
Total	1265							297.59	195.41	204.51	215.72	226.14	308

$10 \cdot \log(S/A)$ S=Exterior wall area, A= Sound Absorption
 Sound Source Adjustment Factor -6.00 -6.00 -6.00 -6.00 -6.00
 Correction Factor for A-Weighted Sound Levels -16.10 -8.60 -3.20 0.00 1.20 1.00
 A-Weighted Sound Absorption Level -23.55 -14.23 -9.02 -6.06 -5.06 -6.60
 dBA Noise Absorption Level **-0.2**

Exterior-Interior Transmission Calculations

Type of Surface	Area (Sq ft)	STC Rating	Fractional Area (Area/10*(STC/10))
Stucco Wall	140	46	0.0035
Window	54	26	0.1356
Door	20	26	0.049
Total	213		0.0009

46 STC = Standard stucco wall construction
 3 - 3'x6' windows
 1 - 3'x6.5' glass door
 26 STC = Standard dual pane windows

Transmission Loss **30.5**

Exterior-Interior Noise Reduction

(Transmission Loss - Sound Absorption Level)
31 dBA

*Carpet analyzed consisted of 3/8" Loop Pile with Pad
 Sources:
Fundamentals of Acoustics 4th Edition , Lawrence E. Kinsler, 2000.
Noise Control in Buildings , Cyril M. Harris, 1994.

Interior Noise Calculations With 30 STC Windows

Project Name: [Nutmeg Townhomes](#)

Plan: [Villa Plan 1](#)

Floor: [3](#)

Room: [Bedroom 1](#)

Room Absorption

Type of Surface	Area (Sq ft)	Sound Absorption Coefficient, Hz				Sound Absorption (Sabins)							
		125	250	500	1000	2000	4000	125	250	500	1000	2000	4000
Floor - Carpet*	112	0.1	0.4	0.62	0.7	0.63	0.88	11.198	44.79	69.425	78.383	70.544	98.538
Floor - Linoleum	0	0.02	0.03	0.03	0.03	0.02	0	0	0	0	0	0	0
Ceiling - Gypsum Board	112	0.29	0.1	0.05	0.04	0.07	0.09	32.473	11.198	5.5988	4.479	7.8383	10.078
Wall - Gypsum board	298	0.29	0.1	0.05	0.04	0.07	0.09	86.478	29.82	14.91	11.928	20.874	26.838
Total	522							130.15	85.808	89.933	94.79	99.257	135.45

$$10 \cdot \log(S/A) = \text{Exterior wall area, A} = \text{Sound Absorption}$$

Sound Source Adjustment Factor

Correction Factor for A-Weighted Sound Levels

A-Weighted Sound Absorption Level

dBA Noise Absorption Level

0.3

Exterior-Interior Transmission Calculations

Type of Surface	Area (Sq ft)	STC Rating	Fractional Area (Area/10*(STC/10))
Stucco Wall	82	46	0.0021
Window	24	30	0.024
Door	0	30	0
Total	106		0.0002
Transmission Loss			36.1
30 STC = Upgraded dual pane windows			

Exterior-Interior Noise Reduction

(Transmission Loss - Sound Absorption Level)

36 dBA

*Carpet analyzed consisted of 3/8" Loop Pile with Pad

Sources:

Fundamentals of Acoustics 4th Edition, Lawrence E. Kinsler, 2000.
Noise Control in Buildings, Cyril M. Harris, 1994.

Interior Noise Calculations With 30 STC Windows

Project Name: [Nutmeg Townhomes](#) Plan: [Villa Plan 1](#) Floor: [3](#) Room: [Master Bedroom](#)

Room Absorption

Type of Surface	Area (Sq ft)	Sound Absorption Coefficient, Hz				Sound Absorption (Sabins)							
		125	250	500	1000	2000	4000	125	250	500	1000	2000	4000
Floor - Carpet*	132	0.1	0.4	0.62	0.7	0.63	0.88	13.2	52.8	81.84	92.4	83.16	116.16
Floor - Linoleum	0	0.02	0.03	0.03	0.03	0.02	0.02	0	0	0	0	0	0
Ceiling - Gypsum Board	132	0.29	0.1	0.05	0.04	0.07	0.09	38.28	13.2	6.6	5.28	9.24	11.88
Wall - Gypsum board	324	0.29	0.1	0.05	0.04	0.07	0.09	93.96	32.4	16.2	12.96	22.68	29.16
Total	588							145.44	98.4	104.64	110.64	115.08	157.2

10*log(S/A) S=Exterior wall area, A= Sound Absorption

Sound Source Adjustment Factor -6.00 -6.00 -6.00 -6.00 -6.00 -6.00

Correction Factor for A-Weighted Sound Levels -16.10 -8.60 -3.20 0.00 1.20 1.00

A-Weighted Sound Absorption Level -20.08 -10.88 -5.75 -2.79 -1.76 -3.31

dBA Noise Absorption Level **3.0**

Exterior-Interior Transmission Calculations

Type of Surface	Area (Sq ft)	STC Rating	Fractional Area (Area/10*(STC/10))
Stucco Wall	196	46	0.0049
Window	36	30	0.036
Door	0	30	0
Total	232		0.0002

46 STC = Standard stucco wall construction
2 - 3'x6' windows

30 STC = Upgraded dual pane windows

Transmission Loss **37.5**

Exterior-Interior Noise Reduction

(Transmission Loss - Sound Absorption Level)
34 dBA

*Carpet analyzed consisted of 3/8" Loop Pile with Pad

Sources:
Fundamentals of Acoustics 4th Edition , Lawrence E. Kinsler, 2000.
Noise Control in Buildings , Cyril M. Harris, 1994.

Interior Noise Calculations With 30 STC Windows

Project Name: [Nutmeg Townhomes](#) Plan: [Villa Plan 1](#) Floor: [2](#) Room: [Great Room/Kitchen](#)

Room Absorption

Type of Surface	Area (Sq ft)	Sound Absorption Coefficient, Hz				Sound Absorption (Sabins)							
		125	250	500	1000	2000	4000	125	250	500	1000	2000	4000
Floor - Carpet*	239	0.1	0.4	0.62	0.7	0.63	0.88	23.9	95.6	148.18	167.3	150.57	210.32
Floor - Tile	132	0.01	0.01	0.015	0.02	0.02	0.02	1.32	1.32	1.98	2.64	2.64	2.64
Ceiling - Gypsum Board	419	0.29	0.1	0.05	0.04	0.07	0.09	121.53	41.906	20.953	16.762	29.334	37.715
Wall - Gypsum board	423	0.29	0.1	0.05	0.04	0.07	0.09	122.54	42.255	21.128	16.902	29.579	38.03
Total	1213							269.29	181.08	192.24	203.6	212.12	288.7

$10 \cdot \log(S/A)$ S=Exterior wall area, A= Sound Absorption

Sound Source Adjustment Factor -6.00 -6.00 -6.00 -6.00 -6.00 -6.00

Correction Factor for A-Weighted Sound Levels -16.10 -8.60 -3.20 0.00 1.20 1.00

A-Weighted Sound Absorption Level -19.70 -10.47 -5.33 -2.38 -1.36 -2.90

dBA Noise Absorption Level **3.5**

Exterior-Interior Transmission Calculations

Type of Surface	Area (Sq ft)	STC Rating	Fractional Area (Area/10*(STC/10))
Stucco Wall	399	46	0.01
Window	24	30	0.024
Door	46	30	0.0455
Total	469		0.0002

46 STC = Standard stucco wall construction
1 - 4'x6' windows
1 - 7'x6.5' glass door
30 STC = Upgraded dual pane windows

Transmission Loss **37.7**

Exterior-Interior Noise Reduction

(Transmission Loss - Sound Absorption Level)
34 dBA

*Carpet analyzed consisted of 3/8" Loop Pile with Pad
Sources:
Fundamentals of Acoustics 4th Edition , Lawrence E. Kinsler, 2000.
Noise Control in Buildings , Cyril M. Harris, 1994.

Interior Noise Calculations With 30 STC Windows

Project Name: [Nutmeg Townhomes](#)

Plan: [Villa Plan 2](#)

Floor: [3](#)

Room: [Bedroom 1](#)

Room Absorption

Type of Surface	Area (Sq ft)	Sound Absorption Coefficient, Hz				Sound Absorption (Sabins)							
		125	250	500	1000	2000	4000	125	250	500	1000	2000	4000
Floor - Carpet*	116	0.1	0.4	0.62	0.7	0.63	0.88	11.55	46.2	71.61	80.85	72.765	101.64
Floor - Linoleum	0	0.02	0.03	0.03	0.03	0.02	0.02	0	0	0	0	0	0
Ceiling - Gypsum Board	116	0.29	0.1	0.05	0.04	0.07	0.09	33.495	11.55	5.775	4.62	8.085	10.395
Wall - Gypsum board	297	0.29	0.1	0.05	0.04	0.07	0.09	86.13	29.7	14.85	11.88	20.79	26.73
Total	528							131.18	87.45	92.235	97.35	101.64	138.77

$$10 \cdot \log(S/A) = \text{Exterior wall area, A} = \text{Sound Absorption}$$

Sound Source Adjustment Factor

Correction Factor for A-Weighted Sound Levels

A-Weighted Sound Absorption Level

dBA Noise Absorption Level

0.2

Exterior-Interior Transmission Calculations

Type of Surface	Area (Sq ft)	STC Rating	Fractional Area (Area/10 ⁴ (STC/10))
Stucco Wall	70	46	0.0018
Window	36	30	0.036
Door	0	30	0
Total	106		0.0004
Transmission Loss			34.5
30 STC = Upgraded dual pane windows			

Exterior-Interior Noise Reduction

(Transmission Loss - Sound Absorption Level)

34 dBA

*Carpet analyzed consisted of 3/8" Loop Pile with Pad

Sources:

Fundamentals of Acoustics 4th Edition, Lawrence E. Kinsler, 2000.
Noise Control in Buildings, Cyril M. Harris, 1994.

Interior Noise Calculations With 30 STC Windows

Project Name: [Nutmeg Townhomes](#)

Plan: [Villa Plan 2](#)

Floor: [3](#)

Room: [Bedroom 2](#)

Room Absorption

Type of Surface	Area (Sq ft)	Sound Absorption Coefficient, Hz				Sound Absorption (Sabins)							
		125	250	500	1000	2000	4000	125	250	500	1000	2000	4000
Floor - Carpet*	100	0.1	0.4	0.62	0.7	0.63	0.88	10	40	62	70	63	88
Floor - Linoleum	0	0.02	0.03	0.03	0.03	0.02	0.02	0	0	0	0	0	0
Ceiling - Gypsum Board	100	0.29	0.1	0.05	0.04	0.07	0.09	29	10	5	4	7	9
Wall - Gypsum board	243	0.29	0.1	0.05	0.04	0.07	0.09	70.47	24.3	12.15	9.72	17.01	21.87
Total	443							109.47	74.3	79.15	83.72	87.01	118.87

$10 \cdot \log(S/A)$ S=Exterior wall area, A= Sound Absorption
 Sound Source Adjustment Factor -6.00 -6.00 -6.00 -6.00 -6.00 -6.00
 Correction Factor for A-Weighted Sound Levels -16.10 -8.60 -3.20 0.00 1.20 1.00
 A-Weighted Sound Absorption Level -22.42 -13.24 -8.11 -5.16 -4.12 -5.68
 dBA Noise Absorption Level **0.7**

Exterior-Interior Transmission Calculations

Type of Surface	Area (Sq ft)	STC Rating	Fractional Area (Area/10 ⁴ (STC/10))
Stucco Wall	66	46	0.0017
Window	36	30	0.036
Door	0	30	0
Total	102		0.0004

46 STC = Standard stucco wall construction
 2 - 3'x6' windows
 30 STC = Upgraded dual pane windows
 Transmission Loss **34.3**

Exterior-Interior Noise Reduction

(Transmission Loss - Sound Absorption Level)
34 dBA

*Carpet analyzed consisted of 3/8" Loop Pile with Pad

Sources:

Fundamentals of Acoustics 4th Edition, Lawrence E. Kinsler, 2000.
Noise Control in Buildings, Cyril M. Harris, 1994.

Interior Noise Calculations With 30 STC Windows

Project Name: [Nutmeg Townhomes](#) Plan: [Villa Plan 2](#) Floor: [3](#) Room: [Master Bedroom](#)

Room Absorption

Type of Surface	Area (Sq ft)	Sound Absorption Coefficient, Hz				Sound Absorption (Sabins)							
		125	250	500	1000	2000	4000	125	250	500	1000	2000	4000
Floor - Carpet*	137	0.1	0.4	0.62	0.7	0.63	0.88	13.65	54.6	84.63	95.55	85.995	120.12
Floor - Linoleum	0	0.02	0.03	0.03	0.03	0.02	0.02	0	0	0	0	0	0
Ceiling - Gypsum Board	137	0.29	0.1	0.05	0.04	0.07	0.09	39.585	13.65	6.825	5.46	9.555	12.285
Wall - Gypsum board	282	0.29	0.1	0.05	0.04	0.07	0.09	81.78	28.2	14.1	11.28	19.74	25.38
Total	555							135.02	96.45	105.56	112.29	115.29	157.79

$10 \cdot \log(S/A)$ S=Exterior wall area, A= Sound Absorption
 Sound Source Adjustment Factor -6.00 -6.00 -6.00 -6.00 -6.00
 Correction Factor for A-Weighted Sound Levels -16.10 -8.60 -3.20 0.00 1.20 1.00
 A-Weighted Sound Absorption Level -19.97 -11.01 -6.00 -3.07 -1.98 -3.55
 dBA Noise Absorption Level **2.8**

Exterior-Interior Transmission Calculations

Type of Surface	Area (Sq ft)	STC Rating	Fractional Area (Area/10*(STC/10))
Stucco Wall	197	46	0.0049
Window	24	30	0.024
Door	0	30	0
Total	221		
Transmission Loss		38.8	

46 STC = Standard stucco wall construction
 1 - 4'x6' windows
 30 STC = Upgraded dual pane windows

Exterior-Interior Noise Reduction

(Transmission Loss - Sound Absorption Level)
36 dBA

*Carpet analyzed consisted of 3/8" Loop Pile with Pad
 Sources:
Fundamentals of Acoustics 4th Edition , Lawrence E. Kinsler, 2000.
Noise Control in Buildings , Cyril M. Harris, 1994.

Interior Noise Calculations With 30 STC Windows

Project Name: [Nutmeg Townhomes](#) Plan: [Villa Plan 2](#) Floor: [2](#) Room: [Great Room/Kitchen](#)

Room Absorption

Type of Surface	Area (Sq ft)	Sound Absorption Coefficient, Hz				Sound Absorption (Sabins)							
		125	250	500	1000	2000	4000	125	250	500	1000	2000	4000
Floor - Carpet*	207	0.1	0.4	0.62	0.7	0.63	0.88	20.69	82.76	128.28	144.83	130.35	182.07
Floor - Tile	279	0.01	0.01	0.015	0.02	0.02	0.02	2.7928	2.7928	4.1891	5.5855	5.5855	5.5855
Ceiling - Gypsum Board	541	0.29	0.1	0.05	0.04	0.07	0.09	156.94	54.118	27.059	21.647	37.882	48.706
Wall - Gypsum board	473	0.29	0.1	0.05	0.04	0.07	0.09	137.03	47.25	23.625	18.9	33.075	42.525
Total	1500							317.45	186.92	183.15	190.96	206.89	278.89

$10 \cdot \log(S/A)$ S=Exterior wall area, A= Sound Absorption
 Sound Source Adjustment Factor -6.00 -6.00 -6.00 -6.00 -6.00 -6.00
 Correction Factor for A-Weighted Sound Levels -16.10 -8.60 -3.20 0.00 1.20 1.00
 A-Weighted Sound Absorption Level -20.04 -10.24 -4.75 -1.73 -0.88 -2.38
 dBA Noise Absorption Level **4.0**

Exterior-Interior Transmission Calculations

Type of Surface	Area (Sq ft)	STC Rating	Fractional Area (Area/10*(STC/10))
Stucco Wall	377	46	0.0095
Window	114	30	0.114
Door	20	30	0.0195
Total	510		0.0003

46 STC = Standard stucco wall construction
 5 - 3'x6' windows & 1 - 4'x6' window
 1 - 3'x6.5' glass door
 30 STC = Upgraded dual pane windows

Transmission Loss **35.5**

Exterior-Interior Noise Reduction
 (Transmission Loss - Sound Absorption Level)
32 dBA

*Carpet analyzed consisted of 3/8" Loop Pile with Pad
 Sources:
Fundamentals of Acoustics 4th Edition , Lawrence E. Kinsler, 2000.
Noise Control in Buildings , Cyril M. Harris, 1994.

Interior Noise Calculations With 30 STC Windows

Project Name: [Nutmeg Townhomes](#) Plan: [Villa Plan 3](#) Floor: [3](#) Room: [Bedroom 1](#)

Room Absorption

Type of Surface	Area (Sq ft)	Sound Absorption Coefficient, Hz				Sound Absorption (Sabins)							
		125	250	500	1000	2000	4000	125	250	500	1000	2000	4000
Floor - Carpet*	162	0.1	0.4	0.62	0.7	0.63	0.88	16.15	64.6	100.13	113.05	101.75	142.12
Floor - Linoleum	0	0.02	0.03	0.03	0.03	0.02	0.02	0	0	0	0	0	0
Ceiling - Gypsum Board	162	0.29	0.1	0.05	0.04	0.07	0.09	46.835	16.15	8.075	6.46	11.305	14.535
Wall - Gypsum board	324	0.29	0.1	0.05	0.04	0.07	0.09	93.96	32.4	16.2	12.96	22.68	29.16
Total	647							156.95	113.15	124.41	132.47	135.73	185.82

$10 \cdot \log(S/A)$ S=Exterior wall area, A= Sound Absorption
 Sound Source Adjustment Factor -6.00 -6.00 -6.00 -6.00 -6.00 -6.00
 Correction Factor for A-Weighted Sound Levels -16.10 -8.60 -3.20 0.00 1.20 1.00
 A-Weighted Sound Absorption Level -23.38 -14.45 -9.47 -6.54 -5.44 -7.01
 dBA Noise Absorption Level **-0.7**

Exterior-Interior Transmission Calculations

Type of Surface	Area (Sq ft)	STC Rating	Fractional Area (Area/10*(STC/10))
Stucco Wall	81	46	0.002
Window	36	30	0.036
Door	0	30	0
Total	117		0.0003

46 STC = Standard stucco wall construction
 2 - 3'x6' windows
 30 STC = Upgraded dual pane windows
Transmission Loss 34.9

Exterior-Interior Noise Reduction

(Transmission Loss - Sound Absorption Level)
36 dBA

*Carpet analyzed consisted of 3/8" Loop Pile with Pad
 Sources:
Fundamentals of Acoustics 4th Edition , Lawrence E. Kinsler, 2000.
Noise Control in Buildings , Cyril M. Harris, 1994.

Interior Noise Calculations With 30 STC Windows

Project Name: [Nutmeg Townhomes](#) Plan: [Villa Plan 3](#) Floor: [3](#) Room: [Master Bedroom](#)

Room Absorption

Type of Surface	Area (Sq ft)	Sound Absorption Coefficient, Hz				Sound Absorption (Sabins)							
		125	250	500	1000	2000	4000	125	250	500	1000	2000	4000
Floor - Carpet*	149	0.1	0.4	0.62	0.7	0.63	0.88	14.85	59.4	92.07	103.95	93.555	130.68
Floor - Linoleum	0	0.02	0.03	0.03	0.03	0.02	0	0	0	0	0	0	0
Ceiling - Gypsum Board	149	0.29	0.1	0.05	0.04	0.07	0.09	43.065	14.85	7.425	5.94	10.395	13.365
Wall - Gypsum board	386	0.29	0.1	0.05	0.04	0.07	0.09	111.8	38.55	19.275	15.42	26.985	34.695
Total	683						169.71	112.8	118.77	125.31	130.94	178.74	

$$10 \cdot \log(S/A) = \text{Exterior wall area, A} = \text{Sound Absorption}$$

Sound Source Adjustment Factor

Correction Factor for A-Weighted Sound Levels

A-Weighted Sound Absorption Level

dBA Noise Absorption Level

2.5

Exterior-Interior Transmission Calculations

Type of Surface	Area (Sq ft)	STC Rating	Fractional Area (Area/10 ⁴ (STC/10))	Notes
Stucco Wall	183	46	0.0046	46 STC = Standard stucco wall construction
Window	51	30	0.051	1 - 5.5'x6' window & 1 - 3'x6' window
Door	0	30	0	
Total	234		0.0002	30 STC = Upgraded dual pane windows
Transmission Loss				36.2

Exterior-Interior Noise Reduction

(Transmission Loss - Sound Absorption Level)

34 dBA

*Carpet analyzed consisted of 3/8" Loop Pile with Pad

Sources:

Fundamentals of Acoustics 4th Edition, Lawrence E. Kinsler, 2000.
Noise Control in Buildings, Cyril M. Harris, 1994.

Interior Noise Calculations With 30 STC Windows

Project Name: [Nutmeg Townhomes](#)

Plan: [Villa Plan 3](#)

Floor: [2](#)

Room: [Great Room/Kitchen](#)

Room Absorption

Type of Surface	Area (Sq ft)	Sound Absorption Coefficient, Hz				Sound Absorption (Sabins)							
		125	250	500	1000	2000	4000	125	250	500	1000	2000	4000
Floor - Carpet*	408	0.1	0.4	0.62	0.7	0.63	0.88	40.8	163.2	252.96	285.6	257.04	359.04
Floor - Tile	80	0.01	0.01	0.015	0.02	0.02	0.02	0.8	0.8	1.2	1.6	1.6	1.6
Ceiling - Gypsum Board	540	0.29	0.1	0.05	0.04	0.07	0.09	156.6	54	27	21.6	37.8	48.6
Wall - Gypsum board	459	0.29	0.1	0.05	0.04	0.07	0.09	133.11	45.9	22.95	18.36	32.13	41.31
Total	1487							331.31	263.9	304.11	327.16	328.57	450.55

$$10 \cdot \log(S/A) = \text{Exterior wall area, } A = \text{Sound Absorption}$$

Sound Source Adjustment Factor

Correction Factor for A-Weighted Sound Levels

A-Weighted Sound Absorption Level

dBA Noise Absorption Level

2.2

Exterior-Interior Transmission Calculations

Type of Surface	Area (Sq ft)	STC Rating	Fractional Area (Area/10 ⁴ (STC/10))
Stucco Wall	414	46	0.0104
Window	90	30	0.09
Door	39	30	0.039
Total	543		0.0003
Transmission Loss			35.9

46 STC = Standard stucco wall construction
 5 - 3'x6' windows
 1 - 6'x6.5' glass door
 30 STC = Upgraded dual pane windows

Exterior-Interior Noise Reduction

(Transmission Loss - Sound Absorption Level)

34 dBA

*Carpet analyzed consisted of 3/8" Loop Pile with Pad

Sources:

Fundamentals of Acoustics 4th Edition, Lawrence E. Kinsler, 2000.
Noise Control in Buildings, Cyril M. Harris, 1994.

Interior Noise Calculations With 30 STC Windows

Project Name: [Nutmeg Townhomes](#)

Plan: [Villa Plan 3](#)

Floor: [1](#)

Room: [Bedroom 2](#)

Room Absorption

Type of Surface	Area (Sq ft)	Sound Absorption Coefficient, Hz				Sound Absorption (Sabins)							
		125	250	500	1000	2000	4000	125	250	500	1000	2000	4000
Floor - Carpet*	105	0.1	0.4	0.62	0.7	0.63	0.88	10.45	41.8	64.79	73.15	65.835	91.96
Floor - Linoleum	0	0.02	0.03	0.03	0.03	0.02	0.02	0	0	0	0	0	0
Ceiling - Gypsum Board	105	0.29	0.1	0.05	0.04	0.07	0.09	30.305	10.45	5.225	4.18	7.315	9.405
Wall - Gypsum board	291	0.29	0.1	0.05	0.04	0.07	0.09	84.39	29.1	14.55	11.64	20.37	26.19
Total	500							125.15	81.35	84.565	88.97	93.52	127.56

$10 \cdot \log(S/A)$ S=Exterior wall area, A= Sound Absorption
 Sound Source Adjustment Factor -1.89 -0.02 -0.19 -0.41 -0.62 -1.97
 Correction Factor for A-Weighted Sound Levels -6.00 -6.00 -6.00 -6.00 -6.00 -6.00
 A-Weighted Sound Absorption Level -16.10 -8.60 -3.20 0.00 1.20 1.00
 dBA Noise Absorption Level -23.99 -14.62 -9.39 -6.41 -5.42 -6.97
dBA Noise Absorption Level -0.6

Exterior-Interior Transmission Calculations

Type of Surface	Area (Sq ft)	STC Rating	Fractional Area (Area/10*(STC/10))
Stucco Wall	57	46	0.0014
Window	24	30	0.024
Door	0	30	0
Total	81		0.0003

46 STC = Standard stucco wall construction
 1 - 4'x6' windows
 30 STC = Upgraded dual pane windows
Transmission Loss 35.0

Exterior-Interior Noise Reduction

(Transmission Loss - Sound Absorption Level)
36 dBA

*Carpet analyzed consisted of 3/8" Loop Pile with Pad

Sources:

Fundamentals of Acoustics 4th Edition, Lawrence E. Kinsler, 2000.
Noise Control in Buildings, Cyril M. Harris, 1994.

Interior Noise Calculations With 35 STC Windows

Project Name: [Nutmeg Townhomes](#)

Plan: [Villa Plan 1](#)

Floor: [3](#)

Room: [Bedroom 1](#)

Room Absorption

Type of Surface	Area (Sq ft)	Sound Absorption Coefficient, Hz				Sound Absorption (Sabins)							
		125	250	500	1000	2000	4000	125	250	500	1000	2000	4000
Floor - Carpet*	112	0.1	0.4	0.62	0.7	0.63	0.88	11.198	44.79	69.425	78.383	70.544	98.538
Floor - Linoleum	0	0.02	0.03	0.03	0.03	0.02	0	0	0	0	0	0	0
Ceiling - Gypsum Board	112	0.29	0.1	0.05	0.04	0.07	0.09	32.473	11.198	5.5988	4.479	7.8383	10.078
Wall - Gypsum board	298	0.29	0.1	0.05	0.04	0.07	0.09	86.478	29.82	14.91	11.928	20.874	26.838
Total	522						130.15	85.808	89.933	94.79	99.257	135.45	

$10 \cdot \log(S/A)$ S=Exterior wall area, A= Sound Absorption
 Sound Source Adjustment Factor -6.00 -6.00 -6.00 -6.00 -6.00 -6.00
 Correction Factor for A-Weighted Sound Levels -16.10 -8.60 -3.20 0.00 1.20 1.00
 A-Weighted Sound Absorption Level -22.98 -13.67 -8.48 -5.51 -4.51 -6.06
 dBA Noise Absorption Level **0.3**

Exterior-Interior Transmission Calculations

Type of Surface	Area (Sq ft)	STC Rating	Fractional Area (Area/10*(STC/10))
Stucco Wall	82	46	0.0021
Window	24	35	0.0076
Door	0	35	0
Total	106	9E-05	40.4

46 STC = Standard stucco wall construction
 1 - 4'x6' windows
 35 STC = Acoustic Performance dual pane windows

Exterior-Interior Noise Reduction

(Transmission Loss - Sound Absorption Level)
40 dBA

*Carpet analyzed consisted of 3/8" Loop Pile with Pad

Sources:

Fundamentals of Acoustics 4th Edition, Lawrence E. Kinsler, 2000.
Noise Control in Buildings, Cyril M. Harris, 1994.

Interior Noise Calculations With 35 STC Windows

Project Name: [Nutmeg Townhomes](#) Plan: [Villa Plan 1](#) Floor: [3](#) Room: [Master Bedroom](#)

Room Absorption

Type of Surface	Area (Sq ft)	Sound Absorption Coefficient, Hz				Sound Absorption (Sabins)							
		125	250	500	1000	2000	4000	125	250	500	1000	2000	4000
Floor - Carpet*	132	0.1	0.4	0.62	0.7	0.63	0.88	13.2	52.8	81.84	92.4	83.16	116.16
Floor - Linoleum	0	0.02	0.03	0.03	0.03	0.02	0	0	0	0	0	0	0
Ceiling - Gypsum Board	132	0.29	0.1	0.05	0.04	0.07	0.09	38.28	13.2	6.6	5.28	9.24	11.88
Wall - Gypsum board	324	0.29	0.1	0.05	0.04	0.07	0.09	93.96	32.4	16.2	12.96	22.68	29.16
Total	588						145.44	98.4	104.64	110.64	115.08	157.2	

$10 \cdot \log(S/A)$ S=Exterior wall area, A= Sound Absorption
 Sound Source Adjustment Factor -6.00 -6.00 -6.00 -6.00
 Correction Factor for A-Weighted Sound Levels -16.10 -8.60 -3.20 0.00 1.20 1.00
 A-Weighted Sound Absorption Level -20.08 -10.88 -5.75 -2.79 -1.76 -3.31
 dBA Noise Absorption Level **3.0**

Exterior-Interior Transmission Calculations

Type of Surface	Area (Sq ft)	STC Rating	Fractional Area (Area/10*(STC/10))
Stucco Wall	196	46	0.0049
Window	36	35	0.0114
Door	0	35	0
Total	232		
Transmission Loss		7E-05	41.5

46 STC = Standard stucco wall construction
 2 - 3'x6' windows
 35 STC = Acoustic Performance dual pane windows

Exterior-Interior Noise Reduction
 (Transmission Loss - Sound Absorption Level)
38 dBA

*Carpet analyzed consisted of 3/8" Loop Pile with Pad
 Sources:
Fundamentals of Acoustics 4th Edition , Lawrence E. Kinsler, 2000.
Noise Control in Buildings , Cyril M. Harris, 1994.

Interior Noise Calculations With 35 STC Windows

Project Name: [Nutmeg Townhomes](#) Plan: [Villa Plan 1](#) Floor: [2](#) Room: [Great Room/Kitchen](#)

Room Absorption

Type of Surface	Area (Sq ft)	Sound Absorption Coefficient, Hz				Sound Absorption (Sabins)							
		125	250	500	1000	2000	4000	125	250	500	1000	2000	4000
Floor - Carpet*	239	0.1	0.4	0.62	0.7	0.63	0.88	23.9	95.6	148.18	167.3	150.57	210.32
Floor - Tile	132	0.01	0.01	0.015	0.02	0.02	0.02	1.32	1.32	1.98	2.64	2.64	2.64
Ceiling - Gypsum Board	419	0.29	0.1	0.05	0.04	0.07	0.09	121.53	41.906	20.953	16.762	29.334	37.715
Wall - Gypsum board	423	0.29	0.1	0.05	0.04	0.07	0.09	122.54	42.255	21.128	16.902	29.579	38.03
Total	1213							269.29	181.08	192.24	203.6	212.12	288.7

$10 \cdot \log(S/A)$ S=Exterior wall area, A= Sound Absorption
 Sound Source Adjustment Factor -6.00 -6.00 -6.00 -6.00 -6.00
 Correction Factor for A-Weighted Sound Levels -16.10 -8.60 -3.20 0.00 1.20 1.00
 A-Weighted Sound Absorption Level -19.70 -10.47 -5.33 -2.38 -1.36 -2.90
 dBA Noise Absorption Level **3.5**

Exterior-Interior Transmission Calculations

Type of Surface	Area (Sq ft)	STC Rating	Fractional Area (Area/10*(STC/10))
Stucco Wall	399	46	0.01
Window	24	35	0.0076
Door	46	35	0.0144
Total	469		7E-05

46 STC = Standard stucco wall construction
 1 - 4'x6' windows
 1 - 7'x6.5' glass door
 35 STC = Acoustic Performance dual pane windows
 Transmission Loss **41.7**

Exterior-Interior Noise Reduction
 (Transmission Loss - Sound Absorption Level)
38 dBA

*Carpet analyzed consisted of 3/8" Loop Pile with Pad
 Sources:
Fundamentals of Acoustics 4th Edition , Lawrence E. Kinsler, 2000.
Noise Control in Buildings , Cyril M. Harris, 1994.

Interior Noise Calculations With 35 STC Windows

Project Name: [Nutmeg Townhomes](#)

Plan: [Villa Plan 2](#)

Floor: [3](#)

Room: [Bedroom 1](#)

Room Absorption

Type of Surface	Area (Sq ft)	Sound Absorption Coefficient, Hz				Sound Absorption (Sabins)							
		125	250	500	1000	2000	4000	125	250	500	1000	2000	4000
Floor - Carpet*	116	0.1	0.4	0.62	0.7	0.63	0.88	11.55	46.2	71.61	80.85	72.765	101.64
Floor - Linoleum	0	0.02	0.03	0.03	0.03	0.02	0	0	0	0	0	0	0
Ceiling - Gypsum Board	116	0.29	0.1	0.05	0.04	0.07	0.09	33.495	11.55	5.775	4.62	8.085	10.395
Wall - Gypsum board	297	0.29	0.1	0.05	0.04	0.07	0.09	86.13	29.7	14.85	11.88	20.79	26.73
Total	528							131.18	87.45	92.235	97.35	101.64	138.77

$$10 \cdot \log(S/A) = \text{Exterior wall area, A} = \text{Sound Absorption}$$

Sound Source Adjustment Factor

Correction Factor for A-Weighted Sound Levels

A-Weighted Sound Absorption Level

dBA Noise Absorption Level

0.2

Exterior-Interior Transmission Calculations

Type of Surface	Area (Sq ft)	STC Rating	Fractional Area (Area/10 ⁴ (STC/10))
Stucco Wall	70	46	0.0018
Window	36	35	0.0114
Door	0	35	0
Total	106		0.0001
Transmission Loss			
39.1			

46 STC = Standard stucco wall construction
2 - 3'x6' windows
35 STC = Acoustic Performance dual pane windows

Exterior-Interior Noise Reduction

(Transmission Loss - Sound Absorption Level)

39 dBA

*Carpet analyzed consisted of 3/8" Loop Pile with Pad

Sources:

Fundamentals of Acoustics 4th Edition, Lawrence E. Kinsler, 2000.
Noise Control in Buildings, Cyril M. Harris, 1994.

Interior Noise Calculations With 35 STC Windows

Project Name: [Nutmeg Townhomes](#)

Plan: [Villa Plan 2](#)

Floor: [3](#)

Room: [Bedroom 2](#)

Room Absorption

Type of Surface	Area (Sq ft)	Sound Absorption Coefficient, Hz				Sound Absorption (Sabins)							
		125	250	500	1000	2000	4000	125	250	500	1000	2000	4000
Floor - Carpet*	100	0.1	0.4	0.62	0.7	0.63	0.88	10	40	62	70	63	88
Floor - Linoleum	0	0.02	0.03	0.03	0.03	0.02	0.02	0	0	0	0	0	0
Ceiling - Gypsum Board	100	0.29	0.1	0.05	0.04	0.07	0.09	29	10	5	4	7	9
Wall - Gypsum board	243	0.29	0.1	0.05	0.04	0.07	0.09	70.47	24.3	12.15	9.72	17.01	21.87
Total	443							109.47	74.3	79.15	83.72	87.01	118.87

$10 \cdot \log(S/A)$ S=Exterior wall area, A= Sound Absorption
 Sound Source Adjustment Factor -6.00 -6.00 -6.00 -6.00 -6.00 -6.00
 Correction Factor for A-Weighted Sound Levels -16.10 -8.60 -3.20 0.00 1.20 1.00
 A-Weighted Sound Absorption Level -22.42 -13.24 -8.11 -5.16 -4.12 -5.68
 dBA Noise Absorption Level **0.7**

Exterior-Interior Transmission Calculations

Type of Surface	Area (Sq ft)	STC Rating	Fractional Area (Area/10*(STC/10))
Stucco Wall	66	46	0.0017
Window	36	35	0.0114
Door	0	35	0
Total	102		0.0001

46 STC = Standard stucco wall construction
 2 - 3'x6' windows
 35 STC = Acoustic Performance dual pane windows
Transmission Loss 38.9

Exterior-Interior Noise Reduction

(Transmission Loss - Sound Absorption Level)
38 dBA

*Carpet analyzed consisted of 3/8" Loop Pile with Pad

Sources:

Fundamentals of Acoustics 4th Edition, Lawrence E. Kinsler, 2000.
Noise Control in Buildings, Cyril M. Harris, 1994.

Interior Noise Calculations With 35 STC Windows

Project Name: [Nutmeg Townhomes](#) Plan: [Villa Plan 2](#) Floor: [3](#) Room: [Master Bedroom](#)

Room Absorption

Type of Surface	Area (Sq ft)	Sound Absorption Coefficient, Hz				Sound Absorption (Sabins)							
		125	250	500	1000	2000	4000	125	250	500	1000	2000	4000
Floor - Carpet*	137	0.1	0.4	0.62	0.7	0.63	0.88	13.65	54.6	84.63	95.55	85.995	120.12
Floor - Linoleum	0	0.02	0.03	0.03	0.03	0.02	0.02	0	0	0	0	0	0
Ceiling - Gypsum Board	137	0.29	0.1	0.05	0.04	0.07	0.09	39.585	13.65	6.825	5.46	9.555	12.285
Wall - Gypsum board	282	0.29	0.1	0.05	0.04	0.07	0.09	81.78	28.2	14.1	11.28	19.74	25.38
Total	555							135.02	96.45	105.56	112.29	115.29	157.79

$10 \cdot \log(S/A)$ S=Exterior wall area, A= Sound Absorption
 Sound Source Adjustment Factor -6.00 -6.00 -6.00 -6.00 -6.00
 Correction Factor for A-Weighted Sound Levels -16.10 -8.60 -3.20 0.00 1.20 1.00
 A-Weighted Sound Absorption Level -19.97 -11.01 -6.00 -3.07 -1.98 -3.55
 dBA Noise Absorption Level **2.8**

Exterior-Interior Transmission Calculations

Type of Surface	Area (Sq ft)	STC Rating	Fractional Area (Area/10 ⁴ (STC/10))
Stucco Wall	197	46	0.0049
Window	24	35	0.0076
Door	0	35	0
Total	221		6E-05

46 STC = Standard stucco wall construction
 1 - 4'x6' windows
 35 STC = Acoustic Performance dual pane windows
Transmission Loss 42.5

Exterior-Interior Noise Reduction
 (Transmission Loss - Sound Absorption Level)
40 dBA

*Carpet analyzed consisted of 3/8" Loop Pile with Pad
 Sources:
Fundamentals of Acoustics 4th Edition , Lawrence E. Kinsler, 2000.
Noise Control in Buildings , Cyril M. Harris, 1994.

Interior Noise Calculations With 35 STC Windows

Project Name: [Nutmeg Townhomes](#) Plan: [Villa Plan 2](#) Floor: [2](#) Room: [Great Room/Kitchen](#)

Room Absorption

Type of Surface	Area (Sq ft)	Sound Absorption Coefficient, Hz				Sound Absorption (Sabins)							
		125	250	500	1000	2000	4000	125	250	500	1000	2000	4000
Floor - Carpet*	207	0.1	0.4	0.62	0.7	0.63	0.88	20.69	82.76	128.28	144.83	130.35	182.07
Floor - Tile	279	0.01	0.01	0.015	0.02	0.02	0.02	2.7928	2.7928	4.1891	5.5855	5.5855	5.5855
Ceiling - Gypsum Board	541	0.29	0.1	0.05	0.04	0.07	0.09	156.94	54.118	27.059	21.647	37.882	48.706
Wall - Gypsum board	473	0.29	0.1	0.05	0.04	0.07	0.09	137.03	47.25	23.625	18.9	33.075	42.525
Total	1500							317.45	186.92	183.15	190.96	206.89	278.89

$10 \cdot \log(S/A)$ S=Exterior wall area, A= Sound Absorption
 Sound Source Adjustment Factor -6.00 -6.00 -6.00 -6.00 -6.00
 Correction Factor for A-Weighted Sound Levels -16.10 -8.60 -3.20 0.00 1.20 1.00
 A-Weighted Sound Absorption Level -20.04 -10.24 -4.75 -1.73 -0.88 -2.38
 dBA Noise Absorption Level **4.0**

Exterior-Interior Transmission Calculations

Type of Surface	Area (Sq ft)	STC Rating	Fractional Area (Area/10*(STC/10))
Stucco Wall	377	46	0.0095
Window	114	35	0.036
Door	20	35	0.0062
Total	510		0.0001

46 STC = Standard stucco wall construction
 5 - 3'x6' windows & 1 - 4'x6' window
 1 - 3'x6.5' glass door
 35 STC = Acoustic Performance dual pane windows

Transmission Loss **39.9**

Exterior-Interior Noise Reduction
 (Transmission Loss - Sound Absorption Level)
36 dBA

*Carpet analyzed consisted of 3/8" Loop Pile with Pad
 Sources:
Fundamentals of Acoustics 4th Edition , Lawrence E. Kinsler, 2000.
Noise Control in Buildings , Cyril M. Harris, 1994.

Interior Noise Calculations With 35 STC Windows

Project Name: [Nutmeg Townhomes](#) Plan: [Villa Plan 3](#) Floor: [3](#) Room: [Bedroom 1](#)

Room Absorption

Type of Surface	Area (Sq ft)	Sound Absorption Coefficient, Hz				Sound Absorption (Sabins)							
		125	250	500	1000	2000	4000	125	250	500	1000	2000	4000
Floor - Carpet*	162	0.1	0.4	0.62	0.7	0.63	0.88	16.15	64.6	100.13	113.05	101.75	142.12
Floor - Linoleum	0	0.02	0.03	0.03	0.03	0.02	0.02	0	0	0	0	0	0
Ceiling - Gypsum Board	162	0.29	0.1	0.05	0.04	0.07	0.09	46.835	16.15	8.075	6.46	11.305	14.535
Wall - Gypsum board	324	0.29	0.1	0.05	0.04	0.07	0.09	93.96	32.4	16.2	12.96	22.68	29.16
Total	647							156.95	113.15	124.41	132.47	135.73	185.82

$10 \cdot \log(S/A)$ S=Exterior wall area, A= Sound Absorption
 Sound Source Adjustment Factor -6.00 -6.00 -6.00 -6.00 -6.00 -6.00
 Correction Factor for A-Weighted Sound Levels -16.10 -8.60 -3.20 0.00 1.20 1.00
 A-Weighted Sound Absorption Level -23.38 -14.45 -9.47 -6.54 -5.44 -7.01
 dBA Noise Absorption Level **-0.7**

Exterior-Interior Transmission Calculations

Type of Surface	Area (Sq ft)	STC Rating	Fractional Area (Area/10 ⁴ (STC/10))
Stucco Wall	81	46	0.002
Window	36	35	0.0114
Door	0	35	0
Total	117		0.0001
Transmission Loss			39.4

46 STC = Standard stucco wall construction
 2 - 3'x6' windows
 35 STC = Acoustic Performance dual pane windows

Exterior-Interior Noise Reduction
 (Transmission Loss - Sound Absorption Level)
40 dBA

*Carpet analyzed consisted of 3/8" Loop Pile with Pad
 Sources:
Fundamentals of Acoustics 4th Edition , Lawrence E. Kinsler, 2000.
Noise Control in Buildings , Cyril M. Harris, 1994.

Interior Noise Calculations With 35 STC Windows

Project Name: [Nutmeg Townhomes](#) Plan: [Villa Plan 3](#) Floor: [3](#) Room: [Master Bedroom](#)

Room Absorption

Type of Surface	Area (Sq ft)	Sound Absorption Coefficient, Hz				Sound Absorption (Sabins)							
		125	250	500	1000	2000	4000	125	250	500	1000	2000	4000
Floor - Carpet*	149	0.1	0.4	0.62	0.7	0.63	0.88	14.85	59.4	92.07	103.95	93.555	130.68
Floor - Linoleum	0	0.02	0.03	0.03	0.03	0.02	0	0	0	0	0	0	0
Ceiling - Gypsum Board	149	0.29	0.1	0.05	0.04	0.07	0.09	43.065	14.85	7.425	5.94	10.395	13.365
Wall - Gypsum board	386	0.29	0.1	0.05	0.04	0.07	0.09	111.8	38.55	19.275	15.42	26.985	34.695
Total	683						169.71	112.8	118.77	125.31	130.94	178.74	

$$10 \cdot \log(S/A) = \text{Exterior wall area, A} = \text{Sound Absorption}$$

Sound Source Adjustment Factor -6.00 -6.00 -6.00 -6.00 -6.00 -6.00
 Correction Factor for A-Weighted Sound Levels -16.10 -8.60 -3.20 0.00 1.20 1.00
 A-Weighted Sound Absorption Level -20.70 -11.43 -6.25 -3.29 -2.28 -3.83
 dBA Noise Absorption Level **2.5**

Exterior-Interior Transmission Calculations

Type of Surface	Area (Sq ft)	STC Rating	Fractional Area (Area/10*(STC/10))
Stucco Wall	183	46	0.0046
Window	51	35	0.0161
Door	0	35	0
Total	234		9E-05
Transmission Loss 40.5			
35 STC = Acoustic Performance dual pane windows			

Exterior-Interior Noise Reduction
 (Transmission Loss - Sound Absorption Level)
38 dBA

*Carpet analyzed consisted of 3/8" Loop Pile with Pad
 Sources:
Fundamentals of Acoustics 4th Edition, Lawrence E. Kinsler, 2000.
Noise Control in Buildings, Cyril M. Harris, 1994.

Interior Noise Calculations With 35 STC Windows

Project Name: [Nutmeg Townhomes](#) Plan: [Villa Plan 3](#) Floor: [2](#) Room: [Great Room/Kitchen](#)

Room Absorption

Type of Surface	Area (Sq ft)	Sound Absorption Coefficient, Hz				Sound Absorption (Sabins)							
		125	250	500	1000	2000	4000	125	250	500	1000	2000	4000
Floor - Carpet*	408	0.1	0.4	0.62	0.7	0.63	0.88	40.8	163.2	252.96	285.6	257.04	359.04
Floor - Tile	80	0.01	0.01	0.015	0.02	0.02	0.02	0.8	0.8	1.2	1.6	1.6	1.6
Ceiling - Gypsum Board	540	0.29	0.1	0.05	0.04	0.07	0.09	156.6	54	27	21.6	37.8	48.6
Wall - Gypsum board	459	0.29	0.1	0.05	0.04	0.07	0.09	133.11	45.9	22.95	18.36	32.13	41.31
Total	1487							331.31	263.9	304.11	327.16	328.57	450.55

$10 \cdot \log(S/A)$ S=Exterior wall area, A= Sound Absorption
 Sound Source Adjustment Factor -6.00 -6.00 -6.00 -6.00 -6.00 -6.00
 Correction Factor for A-Weighted Sound Levels -16.10 -8.60 -3.20 0.00 1.20 1.00
 A-Weighted Sound Absorption Level -19.95 -11.47 -6.68 -3.80 -2.62 -4.19
 dBA Noise Absorption Level **2.2**

Exterior-Interior Transmission Calculations

Type of Surface	Area (Sq ft)	STC Rating	Fractional Area (Area/10*(STC/10))
Stucco Wall	414	46	0.0104
Window	90	35	0.0285
Door	39	35	0.0123
Total	543		9E-05

46 STC = Standard stucco wall construction
 5 - 3'x6' windows
 1 - 6'x6.5' glass door
 35 STC = Acoustic Performance dual pane windows

Transmission Loss **40.3**

Exterior-Interior Noise Reduction
 (Transmission Loss - Sound Absorption Level)
38 dBA

*Carpet analyzed consisted of 3/8" Loop Pile with Pad
 Sources:
Fundamentals of Acoustics 4th Edition , Lawrence E. Kinsler, 2000.
Noise Control in Buildings , Cyril M. Harris, 1994.

Interior Noise Calculations With 35 STC Windows

Project Name: [Nutmeg Townhomes](#)

Plan: [Villa Plan 3](#)

Floor: [1](#)

Room: [Bedroom 2](#)

Room Absorption

Type of Surface	Area (Sq ft)	Sound Absorption Coefficient, Hz				Sound Absorption (Sabins)							
		125	250	500	1000	2000	4000	125	250	500	1000	2000	4000
Floor - Carpet*	105	0.1	0.4	0.62	0.7	0.63	0.88	10.45	41.8	64.79	73.15	65.835	91.96
Floor - Linoleum	0	0.02	0.03	0.03	0.03	0.02	0.02	0	0	0	0	0	0
Ceiling - Gypsum Board	105	0.29	0.1	0.05	0.04	0.07	0.09	30.305	10.45	5.225	4.18	7.315	9.405
Wall - Gypsum board	291	0.29	0.1	0.05	0.04	0.07	0.09	84.39	29.1	14.55	11.64	20.37	26.19
Total	500							125.15	81.35	84.565	88.97	93.52	127.56

$10 \cdot \log(S/A)$ S=Exterior wall area, A= Sound Absorption
 Sound Source Adjustment Factor -6.00 -6.00 -6.00 -6.00
 Correction Factor for A-Weighted Sound Levels -16.10 -8.60 -3.20 0.00 1.20 1.00
 A-Weighted Sound Absorption Level -23.99 -14.62 -9.39 -6.41 -5.42 -6.97
 dBA Noise Absorption Level **-0.6**

Exterior-Interior Transmission Calculations

Type of Surface	Area (Sq ft)	STC Rating	Fractional Area (Area/10*(STC/10))
Stucco Wall	57	46	0.0014
Window	24	35	0.0076
Door	0	35	0
Total	81		0.0001

46 STC = Standard stucco wall construction
 1 - 4'x6' windows
 35 STC = Acoustic Performance dual pane windows
Transmission Loss 39.5

Exterior-Interior Noise Reduction

(Transmission Loss - Sound Absorption Level)
40 dBA

*Carpet analyzed consisted of 3/8" Loop Pile with Pad

Sources:

Fundamentals of Acoustics 4th Edition, Lawrence E. Kinsler, 2000.
Noise Control in Buildings, Cyril M. Harris, 1994.

APPENDIX E

RCNM Model Construction Noise Calculations

Roadway Construction Noise Model (RCNM), Version 1.1

Report date: 7/6/2018
 Case Description: Nutmeg Townhomes - Site Preparation

---- Receptor #1 ----

Description	Land Use	Baselines (dBA)		
		Daytime	Evening	Night
Nearest Home to West	Residential	63.6	63.6	63.6

Description	Impact Device	Usage(%)	Equipment		Receptor Distance (feet)	Estimated Shielding (dBA)	
			Spec Lmax (dBA)	Actual Lmax (dBA)			
Dozer	No	40			81.7	610	0
Dozer	No	40			81.7	660	0
Dozer	No	40			81.7	710	0
Tractor	No	40		84		760	0
Tractor	No	40		84		810	0
Tractor	No	40		84		860	0
Tractor	No	40		84		910	0

Equipment	Results						
	Calculated (dBA)			Noise Limits (dBA)			
	*Lmax	Leq	Day Lmax	Leq	Evening Lmax	Leq	
Dozer	59.9	56.0	N/A	N/A	N/A	N/A	
Dozer	59.3	55.3	N/A	N/A	N/A	N/A	
Dozer	58.6	54.6	N/A	N/A	N/A	N/A	
Tractor	60.4	56.4	N/A	N/A	N/A	N/A	
Tractor	59.8	55.8	N/A	N/A	N/A	N/A	
Tractor	59	55	N/A	N/A	N/A	N/A	
Tractor	58.8	54.8	N/A	N/A	N/A	N/A	
Total	60	64	N/A	N/A	N/A	N/A	

*Calculated Lmax is the Loudest value.

---- Receptor #2 ----

Description	Land Use	Baselines (dBA)		
		Daytime	Evening	Night
Nearest Home to East	Residential	58.7	58.7	58.7

Description	Impact Device	Usage(%)	Equipment		Receptor Distance (feet)	Estimated Shielding (dBA)	
			Spec Lmax (dBA)	Actual Lmax (dBA)			
Dozer	No	40			81.7	725	0
Dozer	No	40			81.7	775	0
Dozer	No	40			81.7	825	0
Tractor	No	40		84		875	0
Tractor	No	40		84		925	0
Tractor	No	40		84		975	0
Tractor	No	40		84		1025	0

Equipment	Results					
	Calculated (dBA)			Noise Limits (dBA)		
	*Lmax	Leq	Day Lmax	Leq	Evening Lmax	Leq
Dozer	58.4	54.5	N/A	N/A	N/A	N/A
Dozer	57.9	53.9	N/A	N/A	N/A	N/A
Dozer	57.3	53.3	N/A	N/A	N/A	N/A
Tractor	59	55	N/A	N/A	N/A	N/A
Tractor	58.7	54.7	N/A	N/A	N/A	N/A
Tractor	58.2	54.2	N/A	N/A	N/A	N/A
Tractor	57.8	53.8	N/A	N/A	N/A	N/A
Total	59	63	N/A	N/A	N/A	N/A

*Calculated Lmax is the Loudest value.

---- Receptor #3 ----

Description	Land Use	Baselines (dBA)		
		Daytime	Evening	Night
Nearest Home to South	Residential	70	70	70

Description	Impact Device	Usage(%)	Equipment		Receptor Distance (feet)	Estimated Shielding (dBA)	
			Spec Lmax (dBA)	Actual Lmax (dBA)			
Dozer	No	40			81.7	770	0
Dozer	No	40			81.7	820	0
Dozer	No	40			81.7	870	0
Tractor	No	40		84		920	0
Tractor	No	40		84		970	0
Tractor	No	40		84		1020	0
Tractor	No	40		84		1070	0

Equipment	Results					
	Calculated (dBA)			Noise Limits (dBA)		
	*Lmax	Leq	Day Lmax	Leq	Evening Lmax	Leq
Dozer	57.9	53.9	N/A	N/A	N/A	N/A
Dozer	57	53	N/A	N/A	N/A	N/A
Dozer	56.9	52.9	N/A	N/A	N/A	N/A
Tractor	59	55	N/A	N/A	N/A	N/A
Tractor	58	54	N/A	N/A	N/A	N/A
Tractor	58	54	N/A	N/A	N/A	N/A
Tractor	57	53	N/A	N/A	N/A	N/A
Total	59	62	N/A	N/A	N/A	N/A

*Calculated Lmax is the Loudest value.

Roadway Construction Noise Model (RCNM), Version 1.1

Report date: 2/1/2019
 Case Description: Nutmeg Townhomes - Grading

---- Receptor #1 ----

Description	Land Use	Baselines (dBA)		
		Daytime	Evening	Night
Nearest Home to West	Residential	63.6	63.6	63.6

Description	Impact Device	Usage(%)	Equipment		Receptor Distance (feet)	Estimated Shielding (dBA)
			Spec Lmax (dBA)	Actual Lmax (dBA)		
Excavator	No	40		80.7	610	0
Grader	No	40	85		660	0
Dozer	No	40		81.7	710	0
Tractor	No	40	84		760	0
Tractor	No	40	84		810	0
Tractor	No	40	84		860	0
Blasting	Yes	1	94		800	0

Results

Equipment	Calculated (dBA)			Noise Limits (dBA)			
	*Lmax	Leq	Day Lmax	Evening		Night	
				Leq	Lmax	Leq	Lmax
Excavator	59.0	55.0	N/A	N/A	N/A	N/A	N/A
Grader	62.6	58.6	N/A	N/A	N/A	N/A	N/A
Dozer	58.6	54.6	N/A	N/A	N/A	N/A	N/A
Tractor	60.4	56.4	N/A	N/A	N/A	N/A	N/A
Tractor	59.8	55.8	N/A	N/A	N/A	N/A	N/A
Tractor	59.3	55.3	N/A	N/A	N/A	N/A	N/A
Blasting	69.9	49.9	N/A	N/A	N/A	N/A	N/A
Total	70	64	N/A	N/A	N/A	N/A	N/A

*Calculated Lmax is the Loudest value.

---- Receptor #2 ----

Description	Land Use	Baselines (dBA)		
		Daytime	Evening	Night
Nearest Home to East	Residential	58.7	58.7	58.7

Description	Impact Device	Usage(%)	Equipment		Receptor Distance (feet)	Estimated Shielding (dBA)	
			Spec Lmax (dBA)	Actual Lmax (dBA)			
Excavator	No	40			80.7	725	0
Grader	No	40	85			775	0
Dozer	No	40			81.7	825	0
Tractor	No	40	84			875	0
Tractor	No	40	84			925	0
Tractor	No	40	84			975	0
Blasting	Yes	1	94			900	0

Equipment	Results					
	Calculated (dBA)			Noise Limits (dBA)		
	*Lmax	Leq	Day Lmax	Leq	Evening Lmax	Leq
Excavator	57.5	53.5	N/A	N/A	N/A	N/A
Grader	61.2	57.2	N/A	N/A	N/A	N/A
Dozer	57.3	53.3	N/A	N/A	N/A	N/A
Tractor	59.1	55.2	N/A	N/A	N/A	N/A
Tractor	58.7	54.7	N/A	N/A	N/A	N/A
Tractor	58.2	54.2	N/A	N/A	N/A	N/A
Blasting	68.9	48.9	N/A	N/A	N/A	N/A
Total	69	63	N/A	N/A	N/A	N/A

*Calculated Lmax is the Loudest value.

---- Receptor #3 ----

Description	Land Use	Baselines (dBA)		
		Daytime	Evening	Night
Nearest Home to Southeast	Residential	70	70	70

Description	Impact Device	Usage(%)	Equipment		Receptor Distance (feet)	Estimated Shielding (dBA)	
			Spec Lmax (dBA)	Actual Lmax (dBA)			
Excavator	No	40			80.7	770	0
Grader	No	40	85			820	0
Dozer	No	40			81.7	870	0
Tractor	No	40	84			920	0
Tractor	No	40	84			970	0
Tractor	No	40	84			1020	0
Blasting	Yes	1	94			1400	0

Equipment	Results					
	Calculated (dBA)		Noise Limits (dBA)			
	*Lmax	Leq	Day Lmax	Day Leq	Evening Lmax	Evening Leq
Excavator	57.0	53.0	N/A	N/A	N/A	N/A
Grader	60.7	56.7	N/A	N/A	N/A	N/A
Dozer	56.9	52.9	N/A	N/A	N/A	N/A
Tractor	58.7	54.7	N/A	N/A	N/A	N/A
Tractor	58.2	54.3	N/A	N/A	N/A	N/A
Tractor	57.8	53.8	N/A	N/A	N/A	N/A
Blasting	65.1	45.1	N/A	N/A	N/A	N/A
Total	65	62	N/A	N/A	N/A	N/A

*Calculated Lmax is the Loudest value.

Roadway Construction Noise Model (RCNM),Version 1.1

Report date: 7/6/2018
 Case Description: Nutmeg Townhomes - Building Construction

---- Receptor #1 ----

Description	Land Use	Baselines (dBA)		
		Daytime	Evening	Night
Nearest Home to West	Residential	63.6	63.6	63.6

Description	Impact Device	Usage(%)	Equipment			
			Spec Lmax (dBA)	Actual Lmax (dBA)	Receptor Distance (feet)	Estimated Shielding (dBA)
Crane	No	16		80.6	660	0
Gradall	No	40		83.4	710	0
Gradall	No	40		83.4	760	0
Gradall	No	40		83.4	810	0
Generator	No	50		80.6	860	0
Welder / Torch	No	40		74	910	0
Tractor	No	40	84		960	0
Tractor	No	40	84		1010	0
Tractor	No	40	84		1060	0

Results

Equipment	Calculated (dBA)			Noise Limits (dBA)			
	*Lmax	Leq	Day	Leq	Evening		
			Lmax		Lmax	Leq	
Crane	58.1	50.2	N/A	N/A	N/A	N/A	
Gradall	60.4	56.4	N/A	N/A	N/A	N/A	
Gradall	59.8	55.8	N/A	N/A	N/A	N/A	
Gradall	59.2	55.2	N/A	N/A	N/A	N/A	
Generator	55.9	52.9	N/A	N/A	N/A	N/A	
Welder / Torch	48.8	44.8	N/A	N/A	N/A	N/A	
Tractor	58.3	54.4	N/A	N/A	N/A	N/A	
Tractor	57.9	53.9	N/A	N/A	N/A	N/A	
Tractor	57.5	53.5	N/A	N/A	N/A	N/A	
Total	60	64	N/A	N/A	N/A	N/A	

*Calculated Lmax is the Loudest value.

---- Receptor #2 ----

Description	Land Use	Baselines (dBA)		
		Daytime	Evening	Night
Nearest Home to East	Residential	58.7	58.7	58.7

Description	Impact Device	Usage(%)	Equipment			
			Spec Lmax (dBA)	Actual Lmax (dBA)	Receptor Distance (feet)	Estimated Shielding (dBA)
Crane	No	16		80.6	745	0
Gradall	No	40		83.4	795	0
Gradall	No	40		83.4	845	0
Gradall	No	40		83.4	895	0
Generator	No	50		80.6	945	0
Welder / Torch	No	40		74	995	0
Tractor	No	40	84		1045	0
Tractor	No	40	84		1095	0
Tractor	No	40	84		1145	0

Equipment	Results						
	Calculated (dBA)			Noise Limits (dBA)			
	*Lmax	Leq	Day Lmax	Leq	Evening		
Crane	57.1	49.1	N/A	N/A	N/A	N/A	N/A
Gradall	59.4	55.4	N/A	N/A	N/A	N/A	N/A
Gradall	58.8	54.9	N/A	N/A	N/A	N/A	N/A
Gradall	58.3	54.4	N/A	N/A	N/A	N/A	N/A
Generator	55.1	52.1	N/A	N/A	N/A	N/A	N/A
Welder / Torch	48.0	44.0	N/A	N/A	N/A	N/A	N/A
Tractor	57.6	53.6	N/A	N/A	N/A	N/A	N/A
Tractor	57.2	53.2	N/A	N/A	N/A	N/A	N/A
Tractor	56.8	52.8	N/A	N/A	N/A	N/A	N/A
Total	59	63	N/A	N/A	N/A	N/A	N/A

*Calculated Lmax is the Loudest value.

---- Receptor #3 ----

Description	Land Use	Baselines (dBA)		
		Daytime	Evening	Night
Nearest Home to Southe	Residential	70	70	70

Description	Impact Device	Usage(%)	Equipment			
			Spec Lmax (dBA)	Actual Lmax (dBA)	Receptor Distance (feet)	Estimated Shielding (dBA)
Crane	No	16		80.6	820	0
Gradall	No	40		83.4	870	0
Gradall	No	40		83.4	920	0
Gradall	No	40		83.4	970	0
Generator	No	50		80.6	1020	0
Welder / Torch	No	40		74	1070	0
Tractor	No	40	84		1120	0
Tractor	No	40	84		1170	0
Tractor	No	40	84		1220	0

Equipment	Results						
	Calculated (dBA)			Noise Limits (dBA)			
	*Lmax	Leq	Day Lmax	Leq	Evening		
Crane	56.3	48.3	N/A	N/A	N/A	N/A	N/A
Gradall	58.6	54.6	N/A	N/A	N/A	N/A	N/A
Gradall	58.1	54.1	N/A	N/A	N/A	N/A	N/A
Gradall	57.6	53.7	N/A	N/A	N/A	N/A	N/A
Generator	54.4	51.4	N/A	N/A	N/A	N/A	N/A
Welder / Torch	47.4	43.4	N/A	N/A	N/A	N/A	N/A
Tractor	57.0	53.0	N/A	N/A	N/A	N/A	N/A
Tractor	56.6	52.6	N/A	N/A	N/A	N/A	N/A
Tractor	56.3	52.3	N/A	N/A	N/A	N/A	N/A
Total	59	62	N/A	N/A	N/A	N/A	N/A

*Calculated Lmax is the Loudest value.

Roadway Construction Noise Model (RCNM), Version 1.1

Report date: 7/6/2018
 Case Description: Nutmeg Townhomes - Paving

---- Receptor #1 ----

Description	Land Use	Baselines (dBA)		
		Daytime	Evening	Night
Nearest Home to West	Residential	63.6	63.6	63.6

Description	Impact Device	Usage(%)	Equipment		Receptor Distance (feet)	Estimated Shielding (dBA)
			Spec Lmax (dBA)	Actual Lmax (dBA)		
Paver	No	50		77.2	660	0
Paver	No	50		77.2	710	0
Paver	No	50		77.2	760	0
Paver	No	50		77.2	810	0
Roller	No	20		80	860	0
Roller	No	20		80	910	0

Equipment	Results				Noise Limits (dBA)		
	Calculated (dBA)		Day		Evening		
	*Lmax	Leq	Lmax	Leq	Lmax	Leq	
Paver	54.8	51.8	N/A	N/A	N/A	N/A	N/A
Paver	54.2	51.2	N/A	N/A	N/A	N/A	N/A
Paver	53.6	50.6	N/A	N/A	N/A	N/A	N/A
Paver	53.0	50.0	N/A	N/A	N/A	N/A	N/A
Roller	55.3	48.3	N/A	N/A	N/A	N/A	N/A
Roller	54.8	47.8	N/A	N/A	N/A	N/A	N/A
Total	55	58	N/A	N/A	N/A	N/A	N/A

*Calculated Lmax is the Loudest value.

---- Receptor #2 ----

Description	Land Use	Baselines (dBA)		
		Daytime	Evening	Night
Nearest Home to East	Residential	59	59	58.7

Description	Impact Device	Usage(%)	Equipment		Receptor Distance (feet)	Estimated Shielding (dBA)
			Spec Lmax (dBA)	Actual Lmax (dBA)		
Paver	No	50	77.2	77.2	725	0
Paver	No	50	77.2	77.2	775	0
Paver	No	50	77.2	77.2	825	0
Paver	No	50	77.2	77.2	875	0
Roller	No	20	80	80	925	0
Roller	No	20	80	80	975	0

Equipment	Calculated (dBA)		Results			
	*Lmax	Leq	Day		Evening	
			Lmax	Leq	Lmax	Leq
Paver	54	51	N/A	N/A	N/A	N/A
Paver	53	50	N/A	N/A	N/A	N/A
Paver	53	50	N/A	N/A	N/A	N/A
Paver	52	49	N/A	N/A	N/A	N/A
Roller	55	48	N/A	N/A	N/A	N/A
Roller	54	47	N/A	N/A	N/A	N/A
Total	55	57	N/A	N/A	N/A	N/A

*Calculated Lmax is the Loudest value.

---- Receptor #3 ----

Description	Land Use	Baselines (dBA)		
		Daytime	Evening	Night
Nearest Home to South	Residential	70	70	70

Description	Impact Device	Usage(%)	Equipment		Receptor Distance (feet)	Estimated Shielding (dBA)
			Spec Lmax (dBA)	Actual Lmax (dBA)		
Paver	No	50	77.2	77.2	800	0
Paver	No	50	77.2	77.2	850	0
Paver	No	50	77.2	77.2	900	0
Paver	No	50	77.2	77.2	950	0
Roller	No	20	80	80	1000	0
Roller	No	20	80	80	1050	0

Equipment	Calculated (dBA)		Results			
	*Lmax	Leq	Day		Evening	
			Lmax	Leq	Lmax	Leq
Paver	53	50	N/A	N/A	N/A	N/A
Paver	53	50	N/A	N/A	N/A	N/A
Paver	52	49	N/A	N/A	N/A	N/A
Paver	52	49	N/A	N/A	N/A	N/A
Roller	54	47	N/A	N/A	N/A	N/A
Roller	54	47	N/A	N/A	N/A	N/A
Total	54	57	N/A	N/A	N/A	N/A

*Calculated Lmax is the Loudest value.

Roadway Construction Noise Model (RCNM), Version 1.1

Report date: 7/6/2018
 Case Description: Nutmeg Townhomes - Architectural Coating

---- Receptor #1 ----

Description	Land Use	Baselines (dBA)		
		Daytime	Evening	Night
Nearest Home to West	Residential	63.6	63.6	63.6

Description	Impact Device	Usage(%)	Equipment			
			Spec Lmax (dBA)	Actual Lmax (dBA)	Receptor Distance (feet)	Estimated Shielding (dBA)
Compressor (air)	No	40	77.7	660	0	

Equipment	Calculated (dBA)	Results					
		Day		Noise Limits (dBA)			
		*Lmax	Leq	Day Lmax	Leq	Evening Lmax	Leq
Compressor (air)	55.3	51.3	N/A	N/A	N/A	N/A	
Total	55	51		0		0	

*Calculated Lmax is the Loudest value.

---- Receptor #2 ----

Description	Land Use	Baselines (dBA)		
		Daytime	Evening	Night
Nearest Home to East	Residential	59	59	58.7

Description	Impact Device	Usage(%)	Equipment			
			Spec Lmax (dBA)	Actual Lmax (dBA)	Receptor Distance (feet)	Estimated Shielding (dBA)
Compressor (air)	No	40	77.7	745	0	

Equipment	Calculated (dBA)	Results					
		Day		Noise Limits (dBA)			
		*Lmax	Leq	Day Lmax	Leq	Evening Lmax	Leq
Compressor (air)	54	50	N/A	N/A	N/A	N/A	
Total	54	50	N/A	N/A	N/A	N/A	

*Calculated Lmax is the Loudest value.

---- Receptor #3 ----

Description	Land Use	Baselines (dBA)		
		Daytime	Evening	Night
Nearest Home to Southe	Residential	70	70	70

Description	Impact Device	Usage(%)	Equipment	Actual	Receptor	Estimated
			Spec Lmax (dBA)	Lmax (dBA)	Distance (feet)	Shielding (dBA)
Compressor (air)	No	40		77.7	820	0

Equipment	Calculated (dBA)	Results					
		Day		Noise Limits (dBA)			
		Lmax	Leq	Day Lmax	Leq	Evening Lmax	Leq
Compressor (air)		53	49	N/A	N/A	N/A	N/A
Total		53	49	N/A	N/A	N/A	N/A

*Calculated Lmax is the Loudest value.

APPENDIX F

SoundPlan Model General Plan Buildout Year 2035 Without Recreation Area Sound Walls Noise
Calculations

Nutmeg Townhomes
 Assessed receiver levels
 Year 2035 With Project Noise Levels

2

Receiver	Fl	Dir	X m	Y m	Z m	CNEL dB(A)	Ld dB(A)	Le dB(A)	Ln dB(A)
Park North - Rec 1	G		66.9	225.6	276.90	62.9	58.8	55.2	56.2
Park North - Rec 2	G		79.2	229.4	276.76	66.8	62.7	59.0	60.2
Park South - Rec 3	G		120.5	133.6	276.68	64.0	59.8	56.1	57.3
Park South - Rec 4	G		120.0	109.9	276.77	67.8	63.6	59.9	61.2

	Vista Environmental	1
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Nutmeg Townhomes

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Emission calculation road - Year 2035 With Project Noise Levels

Road	KM km	ADT Veh/24h	MSVges Day Veh/h	MSVges Evening Veh/h	MSVges Night Veh/h	Pavement type	Gradient %
I-15 Northbound	0.000	90500	5199.90	2735.84	2210.41	Average (of DGAC and PCC)	1.6
I-15 Southbound	0.000	90500	5199.90	2735.84	2210.41	Average (of DGAC and PCC)	-1.9
Centre City Parkway South of Nutmeg St	0.000	14000	820.26	612.35	257.76	Average (of DGAC and PCC)	5.3
Centre City Pkwy North of Nutmeg St	0.000	19800	1160.09	866.04	364.54	Average (of DGAC and PCC)	-6.1
Nutmeg St west of Centre City	0.000	9300	544.89	406.77	171.22	Average (of DGAC and PCC)	-1.2

Vista Environmental

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APPENDIX G

SoundPlan Model General Plan Buildout Year 2035 With Sound Walls Noise Calculations

Nutmeg Townhomes
Assessed receiver levels - Year 2035 With Project Noise

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Name	Floor	X m	Dir	Y m	Z m	CNEL dB(A)	Ld dB(A)	Le dB(A)	Ln dB(A)
Building 1 - P1 Villas	G	34.3	SE	180.8	276.8	71.9	67.8	64.3	65.1
	F2				279.6	74.4	70.4	66.7	67.7
	F3				282.4	74.8	70.8	67.1	68.1
Building 1 - P1 Villas	G	20.6	SW	190.0	276.8	69.2	65.0	61.3	62.6
	F2				279.6	74.8	70.7	66.9	68.1
	F3				282.4	76.9	72.9	69.0	70.2
Building 2 - P1 Villas	G	47.4	SE	197.4	276.9	69.9	65.9	62.4	63.2
	F2				279.7	71.7	67.8	64.1	65.0
	F3				282.5	72.1	68.1	64.5	65.4
Building 3 - P1 Villas	G	63.0	SE	211.3	277.2	69.5	65.5	61.8	62.8
	F2				280.0	71.4	67.4	63.7	64.6
	F3				282.8	71.7	67.8	64.1	65.0
Building 4 - P1 Villas	G	86.2	W	229.1	277.3	67.1	63.1	59.3	60.4
	F2				280.1	69.3	65.3	61.6	62.6
	F3				282.9	69.2	65.2	61.4	62.5
Building 8 - P1 Villas	G	188.0	S	209.5	275.0	68.6	65.3	62.6	61.4
	F2				277.8	69.4	66.0	63.3	62.2
	F3				280.6	69.8	66.4	63.6	62.6
Building 8 - P1 Villas	G	191.1	E	225.7	275.0	70.2	67.1	64.5	62.9
	F2				277.8	70.3	67.2	64.6	63.0
	F3				280.6	70.1	67.0	64.4	62.8
Building 9 - P1 Villas	G	148.5	S	207.2	275.6	67.0	63.5	60.6	60.0
	F2				278.4	68.6	65.0	61.9	61.6
	F3				281.2	69.1	65.5	62.4	62.2
Building 10 - P1 Villas	G	111.9	S	205.2	276.2	68.7	64.9	61.7	61.8
	F2				279.0	70.5	66.7	63.3	63.7
	F3				281.8	70.9	67.0	63.6	64.0
Building 11 - P1 Villas	G	84.6	W	207.0	276.4	69.2	65.1	61.5	62.5
	F2				279.2	71.5	67.5	63.8	64.8
	F3				282.0	72.4	68.4	64.7	65.7
Building 12 - P2 Villas	G	104.8	SW	8.3	277.0	73.4	69.2	65.5	66.8
	F2				279.8	78.9	74.8	71.0	72.2
	F3				282.6	79.1	75.0	71.2	72.4
Building 12 - P2 Villas	G	111.0	SE	6.9	277.0	70.2	66.1	62.5	63.5
	F2				279.8	74.2	70.2	66.4	67.5
	F3				282.6	74.5	70.5	66.8	67.8
Building 13 - P2 Villas	G	94.2	SW	28.7	276.9	74.6	70.4	66.6	67.9

Nutmeg Townhomes
Assessed receiver levels - Year 2035 With Project Noise

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Name	Floor	X m	Dir	Y m	Z m	CNEL dB(A)	Ld dB(A)	Le dB(A)	Ln dB(A)
Building 13 - P2 Villas	F2	101.6	SE	20.9	279.7	79.1	75.1	71.2	72.5
	F3				282.5	79.2	75.2	71.3	72.6
	G				276.9	68.4	64.2	60.5	61.7
	F2				279.7	75.2	71.2	67.3	68.5
	F3				282.5	75.5	71.4	67.6	68.8
Building 14 - P2 Villas	G	88.5	NW	51.3	276.5	76.2	72.2	68.3	69.6
	F2				279.3	76.5	72.5	68.6	69.8
	F3				282.1	76.6	72.5	68.7	69.9
Building 14 - P2 Villas	G	89.1	SW	47.0	276.5	77.3	73.1	69.3	70.6
	F2				279.3	78.9	74.8	71.0	72.2
	F3				282.1	79.1	75.0	71.2	72.4
Building 15 - P2 Villas	G	75.2	SW	69.7	276.2	75.3	71.0	67.3	68.7
	F2				279.0	79.0	74.9	71.1	72.3
	F3				281.8	79.1	75.1	71.2	72.5
Building 16 - P2 Villas	G	60.1	SW	84.4	276.6	74.5	70.3	66.5	67.9
	F2				279.4	80.0	76.0	72.1	73.3
	F3				282.2	80.2	76.1	72.3	73.5
Building 17 - P2 Villas	G	45.1	SW	104.2	276.6	74.5	70.2	66.5	67.9
	F2				279.4	80.5	76.4	72.6	73.8
	F3				282.2	80.6	76.6	72.8	74.0
Building 18 - P2 Villas	G	32.6	SW	120.9	276.4	72.9	68.6	64.9	66.3
	F2				279.2	80.9	76.9	73.0	74.2
	F3				282.0	81.0	77.0	73.2	74.3
Building 18 - P2 Villas	G	31.2	NW	125.0	276.4	69.9	65.7	62.1	63.2
	F2				279.2	78.6	74.6	70.8	71.9
	F3				282.0	78.6	74.6	70.8	71.9
Building 19 - P2 Villas	G	57.7	SW	145.2	276.2	72.6	68.5	64.7	65.9
	F2				279.0	75.4	71.4	67.6	68.7
	F3				281.8	75.9	71.9	68.1	69.2
Building 20 - P2 Villas	G	79.5	NW	163.4	276.5	70.0	66.0	62.5	63.2
	F2				279.3	72.3	68.4	64.7	65.5
	F3				282.1	72.9	69.0	65.3	66.2
Building 21 - P2 Villas	G	82.2	SW	116.9	276.6	68.7	64.4	60.7	62.1
	F2				279.4	72.0	67.9	64.1	65.3
	F3				282.2	72.5	68.5	64.7	65.9
Building 22 - P2 Villas	G	98.0	SW	96.0	276.6	70.4	66.2	62.5	63.8
	F2				279.4	72.4	68.3	64.5	65.8

Nutmeg Townhomes
Assessed receiver levels - Year 2035 With Project Noise

21

Name	Floor	X m	Dir	Y m	Z m	CNEL dB(A)	Ld dB(A)	Le dB(A)	Ln dB(A)
	F3				282.2	72.3	68.3	64.5	65.7
Building 23 - P3 RowHomes	G	114.3	W	174.7	276.6	67.0	63.2	59.9	60.1
	F2				279.4	68.8	65.0	61.6	62.0
	F3				282.2	69.5	65.6	62.2	62.7
Building 24 - P3 RowHomes	G	142.7	N	175.2	276.7	66.6	63.0	60.1	59.6
	F2				279.5	67.8	64.2	61.2	60.7
	F3				282.3	68.0	64.4	61.4	61.0
Building 25 - P3 RowHomes	G	188.4	N	168.3	276.8	68.7	65.5	62.8	61.4
	F2				279.6	70.1	67.0	64.4	62.8
	F3				282.4	69.9	66.7	64.1	62.6
Building 26 - P3 RowHomes	G	183.2	E	140.4	277.0	71.8	68.6	66.0	64.5
	F2				279.8	71.8	68.6	66.1	64.5
	F3				282.6	71.6	68.4	65.8	64.2
Building 27 - P3 RowHomes	G	177.7	E	117.6	277.3	67.8	64.5	61.8	60.5
	F2				280.1	71.9	68.7	66.1	64.5
	F3				282.9	71.5	68.4	65.7	64.3
Building 28 - P3 RowHomes	G	172.1	E	93.9	277.4	67.8	64.5	61.8	60.6
	F2				280.2	71.7	68.5	65.9	64.4
	F3				283.0	71.6	68.4	65.8	64.3
Building 29 - P3 RowHomes	G	166.6	E	71.0	277.6	68.0	64.7	62.0	60.8
	F2				280.4	71.5	68.3	65.7	64.2
	F3				283.2	71.3	68.1	65.5	64.1
Building 30 - P3 RowHomes	G	161.6	E	50.0	277.5	65.8	62.3	59.5	58.8
	F2				280.3	71.1	67.9	65.3	63.8
	F3				283.1	71.2	68.0	65.4	63.9
Building 31 - P3 RowHomes	G	156.2	E	27.2	277.5	68.9	65.1	61.8	62.1
	F2				280.3	70.8	67.5	64.9	63.5
	F3				283.1	70.7	67.5	64.9	63.5
Building 32 - P3 RowHomes	G	116.2	W	78.3	277.3	72.4	68.2	64.4	65.7

Nutmeg Townhomes
Assessed receiver levels - Year 2035 With Project Noise

Name	Floor	X m	Dir	Y m	Z m	CNEL dB(A)	Ld dB(A)	Le dB(A)	Ln dB(A)
	F2				280.1	73.4	69.3	65.5	66.7
	F3				282.9	73.6	69.5	65.7	66.9
Building 33 - P3 RowHomes	G	121.2	W	99.4	277.2	66.8	62.5	58.8	60.2
	F2				280.0	72.1	68.0	64.2	65.4
	F3				282.8	72.2	68.2	64.3	65.5
Building 34 - P3 RowHomes	G	135.5	W	130.2	277.1	62.8	58.5	54.8	56.2
	F2				279.9	66.3	62.2	58.4	59.6
	F3				282.7	67.0	63.0	59.2	60.4
Park North - Rec 1	G	66.9		225.6	276.9	59.3	55.1	51.4	52.6
Park North - Rec 2	G	79.2		229.4	276.8	60.8	56.6	52.9	54.2
Park South - Rec 3	G	120.5		133.6	276.7	63.3	59.0	55.4	56.7
Park South - Rec 4	G	120.0		109.9	276.8	63.5	59.3	55.6	56.9

Nutmeg Townhomes

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Emission calculation road - Year 2035 With Project Noise Levels - With Sound Walls

Road	ADT Veh/24h	MSVges Day Veh/h	MSVges Evening Veh/h	MSVges Night Veh/h	Pavement type	Gradient %
I-15 Northbound	90500	5199.90	2735.84	2210.41	Average (of DGAC and PCC)	1.6
I-15 Southbound	90500	5199.90	2735.84	2210.41	Average (of DGAC and PCC)	-1.9
Centre City Parkway South of Nutmeg St	14000	820.26	612.35	257.76	Average (of DGAC and PCC)	5.3
Centre City Pkwy North of Nutmeg St	19800	1160.09	866.04	364.54	Average (of DGAC and PCC)	-6.1
Nutmeg St west of Centre City	9300	544.89	406.77	171.22	Average (of DGAC and PCC)	-1.2

Vista Environmental

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APPENDIX H

FHWA Model Operational Traffic Noise Contour Calculations

FHWA-RD-77-108 HIGHWAY TRAFFIC NOISE PREDICTION MODEL

Scenario: EXISTING CONDITIONS

Project: Nutmeg Townhomes
Site Conditions: Soft

Vehicle Type	Vehicle Mix 1 (Local)			Vehicle Mix 2 (Not Used)			Vehicle Mix 3 (I-15)		
	Day	Evening	Night	Day	Evening	Night	Day	Evening	Night
Automobiles	67.10%	12.60%	15.50%	69.50%	12.90%	9.60%	60.76%	7.81%	18.23%
Medium Trucks	1.30%	0.20%	0.50%	1.44%	0.06%	1.50%	3.03%	0.47%	1.16%
Heavy Trucks	0.60%	0.10%	0.30%	2.40%	0.10%	2.50%	5.21%	0.77%	2.56%
			1.00%			5.00%			8.54%

Road Name: Nutmeg Street		Segment: West of Project Access		Vehicle Speed: 35 MPH		Vehicle Mix: 1		Roadway Classification: Local Collector		
Average Daily Traffic: 2992 Vehicles										
NOISE PARAMETERS AT 40 FEET FROM CENTERLINE (Equiv. Lane Dist: 39.38 ft)										
Noise Adjustments					Unmitigated Noise Levels					
Vehicle Type	REMEL Traffic Adj.	Dist Adj.	Finite Adj.	Leq Peak	Leq Day	Leq Eve.	Leq Night	Ldn	CNEL	
Automobiles	65.11	-6.12	1.45	59.24	56.72	55.48	51.60	59.15	59.62	
Medium Trucks	74.83	-22.98	1.45	52.10	32.45	30.34	29.55	36.43	36.71	
Heavy Trucks	80.05	-25.99	1.45	54.31	31.30	29.54	29.54	36.19	36.44	
Total:				61.05	56.75	55.50	51.66	59.19	59.67	
				70 dBA:		8		8		
				65 dBA:		16		18		
				60 dBA:		35		38		
				55 dBA:		76		82		

Road Name: Centre City Parkway		Segment: South of Nutmeg Street		Vehicle Speed: 55 MPH		Vehicle Mix: 1		Roadway Classification: Collector		
Average Daily Traffic: 7947 Vehicles										
NOISE PARAMETERS AT 145 FEET FROM CENTERLINE (Equiv. Lane Dist: 143 ft)										
Noise Adjustments					Unmitigated Noise Levels					
Vehicle Type	REMEL Traffic Adj.	Dist Adj.	Finite Adj.	Leq Peak	Leq Day	Leq Eve.	Leq Night	Ldn	CNEL	
Automobiles	72.73	-3.84	-6.95	60.74	58.21	56.97	53.10	60.64	61.12	
Medium Trucks	79.85	-20.70	-6.95	51.01	31.36	29.25	28.45	35.33	35.61	
Heavy Trucks	83.81	-23.71	-6.95	51.96	28.95	27.19	27.19	33.84	34.09	
Total:				61.67	58.23	56.98	53.12	60.66	61.14	
				70 dBA:		35		37		
				65 dBA:		75		80		
				60 dBA:		161		173		
				55 dBA:		346		372		

Road Name: Centre City Parkway		Segment: South of Country Club Lane		Vehicle Speed: 55 MPH		Vehicle Mix: 1		Roadway Classification: Major		
Average Daily Traffic: 15886 Vehicles										
NOISE PARAMETERS AT 140 FEET FROM CENTERLINE (Equiv. Lane Dist: 136.41 ft)										
Noise Adjustments					Unmitigated Noise Levels					
Vehicle Type	REMEL Traffic Adj.	Dist Adj.	Finite Adj.	Leq Peak	Leq Day	Leq Eve.	Leq Night	Ldn	CNEL	
Automobiles	72.73	-0.83	-6.64	64.05	61.53	60.29	56.41	63.96	64.43	
Medium Trucks	79.85	-17.69	-6.64	54.32	34.67	32.56	31.77	38.65	38.93	
Heavy Trucks	83.81	-20.70	-6.64	55.27	32.26	30.50	30.50	37.15	37.40	
Total:				64.98	61.54	60.30	56.44	63.98	64.45	
				70 dBA:		56		60		
				65 dBA:		120		129		
				60 dBA:		258		277		
				55 dBA:		555		598		

FHWA-RD-77-108 HIGHWAY TRAFFIC NOISE PREDICTION MODEL

Scenario: EXISTING CONDITIONS

Project: Nutmeg Townhomes
Site Conditions: Soft

Road Name: Centre City Parkway **Segment:** South of Iris Lane **Roadway Classification:** Major
Average Daily Traffic: 18379 Vehicles Vehicle Speed: 55 MPH Vehicle Mix: 1

Vehicle Type	NOISE PARAMETERS AT 100 FEET FROM CENTERLINE (Equiv. Lane Dist: 94.91 ft)					Centerline Distance to Noise Contour (in feet)					
	REMEL Traffic Adj.	Dist Adj.	Finite Adj.	Leq Peak	Leq Day	Leq Eve.	Leq Night	Ldn	CNEL		
Automobiles	72.73	-0.20	-4.28	-1.20	67.05	64.52	63.28	59.41	66.95	67.43	70 dBA: 63
Medium Trucks	79.85	-17.06	-4.28	-1.20	57.32	37.67	35.56	34.77	41.65	41.93	65 dBA: 135
Heavy Trucks	83.81	-20.07	-4.28	-1.20	58.27	35.26	33.50	33.50	40.15	40.40	60 dBA: 292
Total:											
					67.98	64.54	63.29	59.44	66.97	67.45	55 dBA: 628

Road Name: Iris Lane

Segment: West of Centre City Parkway

Average Daily Traffic: 6621 Vehicles Vehicle Speed: 30 MPH Vehicle Mix: 1 **Roadway Classification:** Local Collector

Vehicle Type	NOISE PARAMETERS AT 50 FEET FROM CENTERLINE (Equiv. Lane Dist: 49.51 ft)					Centerline Distance to Noise Contour (in feet)					
	REMEL Traffic Adj.	Dist Adj.	Finite Adj.	Leq Peak	Leq Day	Leq Eve.	Leq Night	Ldn	CNEL		
Automobiles	62.51	-2.00	-0.04	-1.20	59.27	56.75	55.51	51.63	59.18	59.65	70 dBA: 10
Medium Trucks	73.11	-18.86	-0.04	-1.20	53.02	33.37	31.26	30.47	37.35	37.63	65 dBA: 21
Heavy Trucks	80.26	-21.87	-0.04	-1.20	57.15	34.14	32.38	32.38	39.03	39.28	60 dBA: 45
Total:											
					61.95	56.79	55.54	51.72	59.25	59.72	55 dBA: 96

Road Name: El Norte Parkway

Segment: West of Iris Lane

Average Daily Traffic: 27239 Vehicles Vehicle Speed: 45 MPH Vehicle Mix: 1 **Roadway Classification:** Major

Vehicle Type	NOISE PARAMETERS AT 60 FEET FROM CENTERLINE (Equiv. Lane Dist: 51.07 ft)					Centerline Distance to Noise Contour (in feet)					
	REMEL Traffic Adj.	Dist Adj.	Finite Adj.	Leq Peak	Leq Day	Leq Eve.	Leq Night	Ldn	CNEL		
Automobiles	69.34	2.38	-0.24	-1.20	70.29	67.76	66.52	62.65	70.19	70.67	70 dBA: 67
Medium Trucks	77.62	-14.48	-0.24	-1.20	61.71	42.05	39.95	39.15	46.03	46.31	65 dBA: 134
Heavy Trucks	82.14	-17.49	-0.24	-1.20	63.22	40.20	38.44	38.44	45.10	45.34	60 dBA: 288
Total:											
					71.54	67.78	66.53	62.68	70.22	70.69	55 dBA: 621

FHWA-RD-77-108 HIGHWAY TRAFFIC NOISE PREDICTION MODEL

Scenario: EXISTING WITH PROJECT CONDITIONS

Project: Nutmeg Townhomes
Site Conditions: Soft

Road Name: Centre City Parkway **Segment:** South of Iris Lane **Roadway Classification:** Major
Average Daily Traffic: 18872 Vehicles Vehicle Speed: 55 MPH Vehicle Mix: 1

Vehicle Type	NOISE PARAMETERS AT 100 FEET FROM CENTERLINE (Equiv. Lane Dist: 94.91 ft)				Centerline Distance to Noise Contour (in feet)							
	REME L Traffic Adj.	Dist Adj.	Finite Adj	Leq Peak	Leq Day	Leq Eve.	Leq Night	Ldn	CNEL			
Automobiles	72.73	-0.08	-4.28	-1.20	67.16	64.64	63.40	59.53	67.07	67.54	70 dBA: 64	69
Medium Trucks	79.85	-16.94	-4.28	-1.20	57.43	37.78	35.67	34.88	41.76	42.04	65 dBA: 138	148
Heavy Trucks	83.81	-19.95	-4.28	-1.20	58.39	35.38	33.61	33.61	40.27	40.51	60 dBA: 297	319
Total:											55 dBA: 640	688

Road Name: Iris Lane

Segment: West of Centre City Parkway

Average Daily Traffic: 6785 Vehicles Vehicle Speed: 30 MPH Vehicle Mix: 1 **Roadway Classification:** Local Collector

Vehicle Type	NOISE PARAMETERS AT 50 FEET FROM CENTERLINE (Equiv. Lane Dist: 49.51 ft)				Centerline Distance to Noise Contour (in feet)							
	REME L Traffic Adj.	Dist Adj.	Finite Adj	Leq Peak	Leq Day	Leq Eve.	Leq Night	Ldn	CNEL			
Automobiles	62.51	-1.89	-0.04	-1.20	59.38	56.86	55.61	51.74	59.28	59.76	70 dBA: 10	10
Medium Trucks	73.11	-18.75	-0.04	-1.20	53.12	33.47	31.36	30.57	37.45	37.73	65 dBA: 21	23
Heavy Trucks	80.26	-21.76	-0.04	-1.20	57.26	34.25	32.49	32.49	39.14	39.39	60 dBA: 45	49
Total:											55 dBA: 98	105

Road Name: El Norte Parkway

Segment: West of Iris Lane

Average Daily Traffic: 27513 Vehicles Vehicle Speed: 45 MPH Vehicle Mix: 1 **Roadway Classification:** Major

Vehicle Type	NOISE PARAMETERS AT 60 FEET FROM CENTERLINE (Equiv. Lane Dist: 51.07 ft)				Centerline Distance to Noise Contour (in feet)							
	REME L Traffic Adj.	Dist Adj.	Finite Adj	Leq Peak	Leq Day	Leq Eve.	Leq Night	Ldn	CNEL			
Automobiles	69.34	2.43	-0.24	-1.20	70.33	67.80	66.56	62.69	70.23	70.71	70 dBA: 62	67
Medium Trucks	77.62	-14.43	-0.24	-1.20	61.75	42.10	39.99	39.20	46.08	46.36	65 dBA: 135	145
Heavy Trucks	82.14	-17.44	-0.24	-1.20	63.26	40.25	38.49	38.49	45.14	45.39	60 dBA: 290	312
Total:											55 dBA: 625	672

FHWA-RD-77-108 HIGHWAY TRAFFIC NOISE PREDICTION MODEL

Scenario: EXISTING PLUS CUMULATIVE PROJECTS WITHOUT PROJECT CONDITIONS

Project: Nutmeg Townhomes
Site Conditions: Soft

Road Name: Centre City Parkway **Segment: South of Iris Lane**
Average Daily Traffic: 19417 Vehicles Vehicle Speed: 55 MPH Vehicle Mix: 1 Roadway Classification: Major

Vehicle Type	NOISE PARAMETERS AT 100 FEET FROM CENTERLINE (Equiv. Lane Dist: 94.91 ft)				Centerline Distance to Noise Contour (in feet)								
	REME L Traffic Adj.	Dist Adj.	Finite Adj	Leq Peak	Leq Day	Leq Eve.	Leq Night	Ldn	CNEL				
Automobiles	72.73	0.04	-4.28	-1.20	67.29	64.76	63.52	59.65	67.19	67.67	70 dBA:	65	70
Medium Trucks	79.85	-16.82	-4.28	-1.20	57.56	37.91	35.80	35.01	41.88	42.16	65 dBA:	140	151
Heavy Trucks	83.81	-19.83	-4.28	-1.20	58.51	35.50	33.74	33.74	40.39	40.64	60 dBA:	303	326
Total:											55 dBA:	652	701

Road Name: Iris Lane **Segment: West of Centre City Parkway**

Average Daily Traffic: 7199 Vehicles Vehicle Speed: 30 MPH Vehicle Mix: 1 Roadway Classification: Local Collector

Vehicle Type	NOISE PARAMETERS AT 50 FEET FROM CENTERLINE (Equiv. Lane Dist: 49.51 ft)				Centerline Distance to Noise Contour (in feet)								
	REME L Traffic Adj.	Dist Adj.	Finite Adj	Leq Peak	Leq Day	Leq Eve.	Leq Night	Ldn	CNEL				
Automobiles	62.51	-1.64	-0.04	-1.20	59.64	57.11	55.87	52.00	59.54	60.02	70 dBA:	10	11
Medium Trucks	73.11	-18.49	-0.04	-1.20	53.38	33.73	31.62	30.83	37.71	37.99	65 dBA:	22	24
Heavy Trucks	80.26	-21.50	-0.04	-1.20	57.52	34.51	32.75	32.75	39.40	39.64	60 dBA:	47	51
Total:											55 dBA:	101	109

Road Name: El Norte Parkway **Segment: West of Iris Lane**

Average Daily Traffic: 29672 Vehicles Vehicle Speed: 45 MPH Vehicle Mix: 1 Roadway Classification: Major

Vehicle Type	NOISE PARAMETERS AT 60 FEET FROM CENTERLINE (Equiv. Lane Dist: 51.07 ft)				Centerline Distance to Noise Contour (in feet)								
	REME L Traffic Adj.	Dist Adj.	Finite Adj	Leq Peak	Leq Day	Leq Eve.	Leq Night	Ldn	CNEL				
Automobiles	69.34	2.75	-0.24	-1.20	70.66	68.13	66.89	63.02	70.56	71.04	70 dBA:	66	71
Medium Trucks	77.62	-14.10	-0.24	-1.20	62.08	42.43	40.32	39.52	46.40	46.68	65 dBA:	142	152
Heavy Trucks	82.14	-17.11	-0.24	-1.20	63.59	40.58	38.82	38.82	45.47	45.71	60 dBA:	305	328
Total:											55 dBA:	657	707

FHWA-RD-77-108 HIGHWAY TRAFFIC NOISE PREDICTION MODEL

Scenario: EXISTING PLUS CUMULATIVE PROJECTS WITH PROJECT CONDITIONS

Project: Nutmeg Townhomes
Site Conditions: Soft

Vehicle Type	Vehicle Mix 1 (Local)			Vehicle Mix 2 (Not Used)			Vehicle Mix 3 (I-15)					
	Day	Evening	Night	Day	Evening	Night	Day	Evening	Night			
Automobiles	67.10%	12.60%	15.50%	97.00%	69.50%	12.90%	9.60%	92.00%	60.76%	7.81%	18.23%	86.80%
Medium Trucks	1.30%	0.20%	0.50%	2.00%	1.44%	0.06%	1.50%	3.00%	3.03%	0.47%	1.16%	4.66%
Heavy Trucks	0.60%	0.10%	0.30%	1.00%	2.40%	0.10%	2.50%	5.00%	5.21%	0.77%	2.56%	8.54%

Road Name: Nutmeg Street **Segment:** West of Project Access **Roadway Classification:** Local Collector

Average Daily Traffic: 3321 Vehicles Vehicle Speed: 35 MPH Vehicle Mix: 1

Vehicle Type	NOISE PARAMETERS AT 40 FEET FROM CENTERLINE			Unmitigated Noise Levels			Centerline Distance to Noise Contour (in feet)		
	REML Traffic Adj.	Dist Adj.	Finite Adj.	Leq Peak	Leq Day	Leq Eve.	Leq Night	Ldn	CNEL
Automobiles	65.11	-5.67	1.45	59.70	57.17	55.93	52.06	59.60	60.08
Medium Trucks	74.83	-22.52	1.45	52.56	32.90	30.80	30.00	36.88	37.16
Heavy Trucks	80.05	-25.53	1.45	54.76	31.75	29.99	29.99	36.64	36.89
Total:				61.50	57.20	55.95	52.11	59.64	60.12

Road Name: Centre City Parkway **Segment:** South of Nutmeg Street **Roadway Classification:** Collector

Average Daily Traffic: 9115 Vehicles Vehicle Speed: 55 MPH Vehicle Mix: 1

Vehicle Type	NOISE PARAMETERS AT 145 FEET FROM CENTERLINE			Unmitigated Noise Levels			Centerline Distance to Noise Contour (in feet)		
	REML Traffic Adj.	Dist Adj.	Finite Adj.	Leq Peak	Leq Day	Leq Eve.	Leq Night	Ldn	CNEL
Automobiles	72.73	-3.24	-6.95	61.33	58.81	57.57	53.69	61.24	61.71
Medium Trucks	79.85	-20.10	-6.95	51.60	31.95	29.84	29.05	35.93	36.21
Heavy Trucks	83.81	-23.11	-6.95	52.55	29.54	27.78	27.78	34.43	34.68
Total:				62.26	58.82	57.58	53.72	61.26	61.73

Road Name: Centre City Parkway **Segment:** South of Country Club Lane **Roadway Classification:** Major

Average Daily Traffic: 17462 Vehicles Vehicle Speed: 55 MPH Vehicle Mix: 1

Vehicle Type	NOISE PARAMETERS AT 140 FEET FROM CENTERLINE			Unmitigated Noise Levels			Centerline Distance to Noise Contour (in feet)		
	REML Traffic Adj.	Dist Adj.	Finite Adj.	Leq Peak	Leq Day	Leq Eve.	Leq Night	Ldn	CNEL
Automobiles	72.73	-0.42	-6.64	64.46	61.94	60.70	56.83	64.37	64.84
Medium Trucks	79.85	-17.28	-6.64	54.73	35.08	32.97	32.18	39.06	39.34
Heavy Trucks	83.81	-20.29	-6.64	55.69	32.68	30.91	30.91	37.57	37.81
Total:				65.39	61.95	60.71	56.85	64.39	64.86

FHWA-RD-77-108 HIGHWAY TRAFFIC NOISE PREDICTION MODEL

Scenario: EXISTING PLUS CUMULATIVE PROJECTS WITH PROJECT CONDITIONS

Project: Nutmeg Townhomes
Site Conditions: Soft

Road Name: Centre City Parkway **Segment:** South of Iris Lane **Roadway Classification:** Major
Average Daily Traffic: 19910 Vehicles Vehicle Speed: 55 MPH Vehicle Mix: 1

Vehicle Type	NOISE PARAMETERS AT 100 FEET FROM CENTERLINE (Equiv. Lane Dist: 94.91 ft)				Centerline Distance to Noise Contour (in feet)							
	REME L Traffic Adj.	Dist Adj.	Finite Adj.	Leq Peak	Leq Day	Leq Eve.	Leq Night	Ldn	CNEL			
Automobiles	72.73	0.15	-4.28	-1.20	67.40	64.87	63.63	59.76	67.30	67.78	70 dBA: 66	71
Medium Trucks	79.85	-16.71	-4.28	-1.20	57.67	38.01	35.91	35.11	41.99	42.27	65 dBA: 143	154
Heavy Trucks	83.81	-19.72	-4.28	-1.20	58.62	35.61	33.85	33.85	40.50	40.74	60 dBA: 308	331
Total:											55 dBA: 663	713

Road Name: Iris Lane Segment: West of Centre City Parkway

Average Daily Traffic: 7363 Vehicles Vehicle Speed: 30 MPH Vehicle Mix: 1 Roadway Classification: Local Collector

Vehicle Type	NOISE PARAMETERS AT 50 FEET FROM CENTERLINE (Equiv. Lane Dist: 49.51 ft)				Centerline Distance to Noise Contour (in feet)							
	REME L Traffic Adj.	Dist Adj.	Finite Adj.	Leq Peak	Leq Day	Leq Eve.	Leq Night	Ldn	CNEL			
Automobiles	62.51	-1.54	-0.04	-1.20	59.74	57.21	55.97	52.10	59.64	60.12	70 dBA: 10	11
Medium Trucks	73.11	-18.40	-0.04	-1.20	53.48	33.83	31.72	30.93	37.81	38.09	65 dBA: 22	24
Heavy Trucks	80.26	-21.41	-0.04	-1.20	57.62	34.61	32.84	32.84	39.50	39.74	60 dBA: 48	51
Total:											55 dBA: 103	111

Road Name: El Norte Parkway Segment: West of Iris Lane

Average Daily Traffic: 29946 Vehicles Vehicle Speed: 45 MPH Vehicle Mix: 1 Roadway Classification: Major

Vehicle Type	NOISE PARAMETERS AT 60 FEET FROM CENTERLINE (Equiv. Lane Dist: 51.07 ft)				Centerline Distance to Noise Contour (in feet)							
	REME L Traffic Adj.	Dist Adj.	Finite Adj.	Leq Peak	Leq Day	Leq Eve.	Leq Night	Ldn	CNEL			
Automobiles	69.34	2.79	-0.24	-1.20	70.70	68.17	66.93	63.06	70.60	71.08	70 dBA: 66	71
Medium Trucks	77.62	-14.06	-0.24	-1.20	62.12	42.47	40.36	39.56	46.44	46.72	65 dBA: 142	153
Heavy Trucks	82.14	-17.07	-0.24	-1.20	63.63	40.62	38.86	38.86	45.51	45.75	60 dBA: 307	330
Total:											55 dBA: 661	711

APPENDIX I

FHWA Model Construction Traffic Noise Contour Calculations

FHWA-RD-77-108 HIGHWAY TRAFFIC NOISE PREDICTION MODEL

Scenario: EXISTING WITH PROJECT HAUL TRUCKS CONDITIONS

Project: Nutmeg Townhomes
Site Conditions: Soft

Vehicle Type	Vehicle Mix 1 (Without Project)			Vehicle Mix 2 (With Haul Trucks)			Vehicle Mix 3 (I-15)		
	Day	Evening	Night	Day	Evening	Night	Day	Evening	Night
Automobiles	67.10%	12.60%	15.50%	67.32%	12.60%	15.50%	60.76%	7.81%	18.23%
Medium Trucks	1.30%	0.20%	0.50%	1.38%	0.20%	0.50%	3.03%	0.47%	1.16%
Heavy Trucks	0.60%	0.10%	0.30%	5.03%	0.10%	0.30%	5.21%	0.77%	2.56%
			1.00%			5.43%			8.54%

Road Name: Centre City Parkway **Segment:** South of Nutmeg Street **Roadway Classification:** Collector

Average Daily Traffic: 8320 Vehicles Vehicle Speed: 55 MPH Vehicle Mix: 2

Vehicle Type	NOISE PARAMETERS AT 145 FEET FROM CENTERLINE (Equiv. Lane Dist: 143 ft)						Centerline Distance to Noise Contour (in feet)			
	RETEL Traffic Adj.	Dist Adj.	Finite Adj.	Leq Peak	Leq Day	Leq Eve.	Leq Night	Ldn	CNEL	
Automobiles	72.73	-3.71	-6.95	-1.20	60.87	58.36	57.10	53.23	60.77	61.25
Medium Trucks	79.85	-20.34	-6.95	-1.20	51.37	31.96	29.61	28.82	35.75	36.02
Heavy Trucks	83.81	-16.16	-6.95	-1.20	59.51	45.73	34.73	34.73	44.80	44.92
Total:					63.52	58.60	57.13	53.30	60.89	61.36

Road Name: Centre City Parkway **Segment:** South of Country Club Lane **Roadway Classification:** Major

Average Daily Traffic: 16259 Vehicles Vehicle Speed: 55 MPH Vehicle Mix: 2

Vehicle Type	NOISE PARAMETERS AT 140 FEET FROM CENTERLINE (Equiv. Lane Dist: 136.41 ft)						Centerline Distance to Noise Contour (in feet)			
	RETEL Traffic Adj.	Dist Adj.	Finite Adj.	Leq Peak	Leq Day	Leq Eve.	Leq Night	Ldn	CNEL	
Automobiles	72.73	-0.80	-6.64	-1.20	64.08	61.57	60.32	56.44	63.99	64.47
Medium Trucks	79.85	-17.43	-6.64	-1.20	54.58	35.18	32.82	32.03	38.96	39.24
Heavy Trucks	83.81	-13.25	-6.64	-1.20	62.72	48.95	37.95	37.95	48.02	48.14
Total:					66.74	61.81	60.35	56.52	64.11	64.58

Road Name: Centre City Parkway **Segment:** South of Iris Lane **Roadway Classification:** Major

Average Daily Traffic: 18752 Vehicles Vehicle Speed: 55 MPH Vehicle Mix: 2

Vehicle Type	NOISE PARAMETERS AT 100 FEET FROM CENTERLINE (Equiv. Lane Dist: 94.91 ft)						Centerline Distance to Noise Contour (in feet)			
	RETEL Traffic Adj.	Dist Adj.	Finite Adj.	Leq Peak	Leq Day	Leq Eve.	Leq Night	Ldn	CNEL	
Automobiles	72.73	-0.18	-4.28	-1.20	67.07	64.55	63.30	59.43	66.97	67.45
Medium Trucks	79.85	-16.81	-4.28	-1.20	57.57	38.16	35.81	35.01	41.94	42.22
Heavy Trucks	83.81	-12.63	-4.28	-1.20	65.71	51.93	40.93	40.93	51.00	51.12
Total:					69.72	64.80	63.33	59.50	67.09	67.56