NOISE IMPACT ANALYSIS
CARNEGIE AVENUE RESIDENTIAL PROJECT
CITY OF COSTA MESA

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PROJECT NO. 15072

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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
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 Carnegie Avenue Residential 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 and to the proposed homes.

1.2 Site Location and Study Area

The project site is located in the central portion of the City of Costa Mesa (City) on the northwest corner of Carnegie Avenue and Fair Drive. The approximately 1.66 acre project site is improved with a 20,745 square foot two-story commercial building that contains various businesses, including medical offices, bail bonds, a pizzeria and cyber café and a 165-space parking lot. The project site is bounded by a car dealership to the north, Carnegie Avenue and single-family homes to the east, Fair Drive and multi-family homes to the south, a gas station with a car wash and Harbor Boulevard to the west. The Project Location Map is shown in Figure 1.

Sensitive Receptors in Project Vicinity

The nearest offsite sensitive receptors to the project site consist of single-family homes, located as near as 80 feet east of the project site and multi-family homes, located as near as 110 feet south of the project site. The nearest schools to the project site are Orange Coast College, that is located as near as 1,500 feet northeast of the project site and College Park Elementary School that is located as near as 0.4 mile southeast of the project site.

1.3 Proposed Project Description

The proposed project would consist of demolition of the existing mixed-use commercial building and parking lot onsite and development of eight (8) three-story detached single-family homes with 2,020 square feet of living space and twenty (20) three-story attached single-family homes with 1,863 square feet of living space. Project demolition and grading is anticipated to begin early 2017 and project buildout is expected to be completed by mid 2018. 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 Costa Mesa and State of California.

City of Costa Mesa General Plan

The following lists the City of Costa Mesa General Policies that are applicable to new residential developments in the City.

Policy N-1A.2 – Maximum Exterior Noise Levels for Residential Areas

Policy N-1A.2 of the General Plan Noise Element limits exterior noise levels for residential areas to 65 dBA CNEL. Compliance with this policy will reduce the exterior noise impacts to the proposed homes.

Policy N-1A.6 – Maximum Interior Noise Levels for New Dwelling Units

Policy N-1A.6 of the General Plan Noise Element requires that all new residential structures are designed to meet the noise standards in Title 24 of the California Code of Regulations, which limit interior noise levels to 45 dBA CNEL. Compliance with this policy will reduce the interior noise impacts to the proposed homes.

City of Costa Mesa Municipal Code

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

Section 13-279 – Exceptions for Construction

Section 13-279 of the City's Municipal Code exempts construction noise that occurs between 7:00 a.m. and 7:00 p.m. Mondays through Fridays and between 9:00 a.m. and 6:00 p.m. on Saturdays from the stationary noise standards detailed in Section 13-280 of the Municipal Code. Compliance with this regulation will reduce the construction-related noise impacts to the nearby sensitive receptors.

Section 13-280 – Residential Exterior Noise Standards

Section 13-280(a) of the Municipal Code limits stationary noise sources to 55 dBA between 7:00 a.m. and 11:00 p.m. and 50 dBA between 11:00 p.m. and 7:00 a.m. and Section 13-280(c) of the Municipal Code states that if ambient noise levels exceed the stationary noise standards, than the stationary noise standards shall be increased to match the ambient noise standards. Compliance with this regulation will reduce operational noise impacts to the future residents of the proposed homes.

Section 13-281 – Residential Interior Noise Standards

Section 13-281 of the Municipal Code limits stationary noise sources to 55 dBA between 7:00 a.m. and 11:00 p.m. and 45 dBA between 11:00 p.m. and 7:00 a.m.. Compliance with this regulation will reduce operational noise impacts to the future residents of the proposed homes.

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. Compliance with this regulation will reduce the construction noise impacts to the nearby sensitive receptors.

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. Compliance with this regulation will reduce the construction noise impacts to the nearby sensitive receptors.

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, 3, and 4 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 Mitigation Measures Required for the Proposed Project

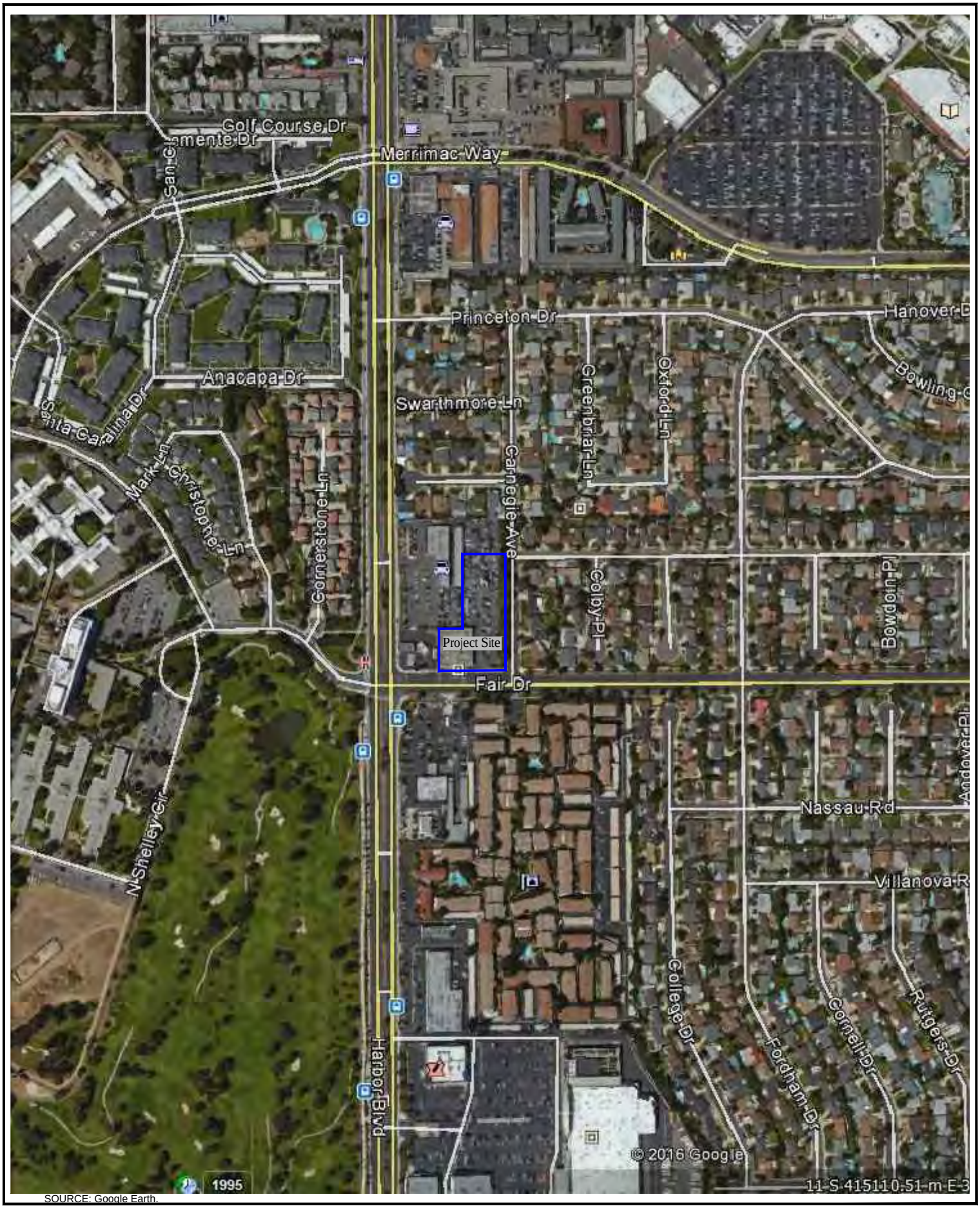
This analysis found that through adherence to the noise and vibration regulations detailed in Section 1.4 above and through implementation of the following mitigation all noise and vibration impacts would be reduced to less than significant levels.

Mitigation Measure 1:
The project applicant shall construct a minimum 5.0-foot high solid wall on the south side of the proposed private backyards for Units 8 through 13 that are adjacent to Fair Drive. The sound walls shall be required to be constructed of a solid material (e.g., concrete block or plaster) that are free of any cutouts or openings.

Mitigation Measure 2:
The project applicant shall provide a "windows closed" condition for each proposed home. 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 for each residential unit.

Mitigation Measure 3:
The project applicant shall construct a minimum 8.0-foot high solid wall along the west property line that is adjacent to the carwash. The sound wall shall be required to be constructed of a solid material (e.g., concrete block or plaster) that are free of any cutouts or openings.

Mitigation Measure 4:
The project applicant shall provide windows with a minimum Sound Transmission Class rating of 29 STC for all west facing windows on the proposed Units 13 and 14.



SOURCE: Google Earth.

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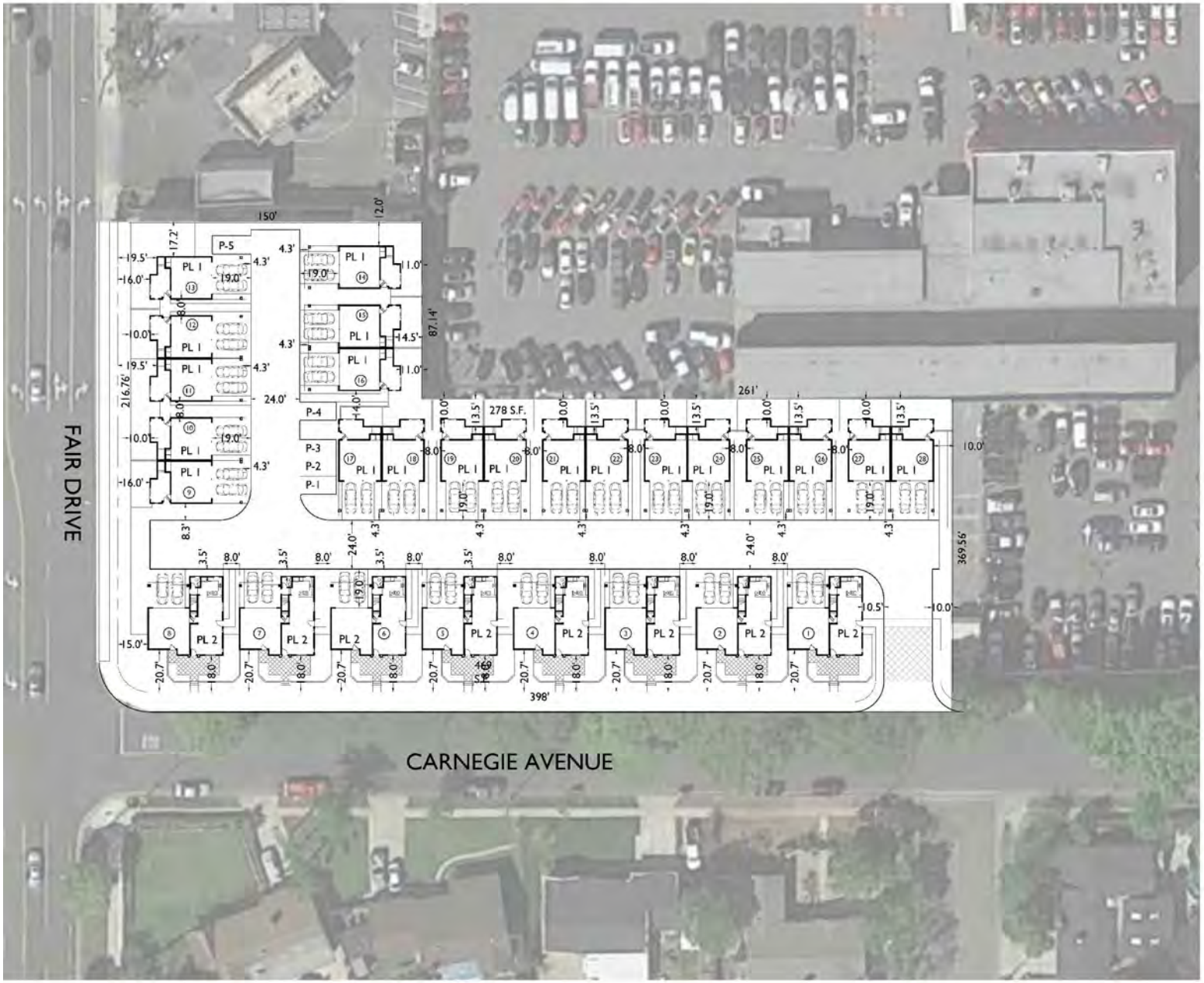
Figure 1
Project Location Map



SITE PLAN SUMMARY

OWNER:	SHELDON DEVELOPMENT, LLC. 901 DOVE STREET, SUITE 230 NEWPORT BEACH, CA 92660 PHONE: (949)777-9400
SITE ADDRESS:	FAIR DRIVE AT CARNEGIE
PROPOSED UNITS:	28 HOMES 20 - 3 STORY DUPLEX 8 - 2 STORY DETACHED
LOT AREA:	72,310 S.F. (1.66 ACRES)
DENSITY:	16.25 UNITS PER ACRE

SITE SUMMARY:

BLDG FOOTPRINTS:	21,060 S.F. (31.5%)
PRIV. STREETS/DRIVES:	24,150 S.F. (29.2%)
OPEN SPACE:	22,808 S.F. (31.5% AT GRADE)
BALCONIES	1,080 S.F. (2ND FLOOR)
ROOF DECKS	8,000 S.F.
TOTAL OPEN SPACE	31, 888 S.F. (44.0%)

PLAN SUMMARY:

		LIVABLE AREA
3 STORY - 4 BDRM		
PLAN 1	1ST FLR	166 S.F.
	2ND FLR	897 S.F.
	3RD FLR	809 S.F.
	TOTAL LIVABLE	1,872 S.F.
	GARAGE	471 S.F.
	BALCONY	54 S.F.
	ROOF DECK	400 S.F.
3 STORY - 3 BDRM		
PLAN 2	1ST FLR	609 S.F.
	2ND FLR	1,185 S.F.
	3RD FLR	300 S.F.
	TOTAL LIVABLE	2,094 S.F.
	GARAGE	453 S.F.

PARKING SUMMARY:

REQUIRED PARKING = 20 UNITS X 4 STALLS/UNIT = 80 STALLS
8 UNITS X 4 STALLS/UNIT = 32 STALLS
112 STALLS

PLAN 1	2 CAR ATTACHED GARAGE X 20 UNITS =	40 STALLS
PLAN 2	2 CAR ATTACHED GARAGE X 8 UNITS =	16 STALLS
GUEST	PRIVATE DRIVE STALLS =	56 STALLS
GUEST	ADD'L OPEN UNASSIGNED STALLS =	5 STALLS
		117 STALLS

BUILDING HEIGHT: 3 STORIES, 44'-0" MAXIMUM HEIGHT

SOURCE: Summa Architecture, May 2, 2016.

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Figure 2
Proposed Site Plan

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 Costa Mesa 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 Costa Mesa. 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 regularity 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 and which is shown below in Figure 3.

California Noise Insulation Standards

Section 1092 of Title 25, Chapter 1, Subchapter 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

Table N-3: Noise and Land Use Compatibility Matrix

Land Use Category	Community Noise Exposure Ldn or CNEL, dBA			
	Normally Acceptable	Conditionally Acceptable	Normally Unacceptable	Clearly Unacceptable
Residential: Low-Density	50-60	60-70	70-75	≥75
Residential: Multiple Family	50-65	65-70	70-75	≥75
Mixed use	50-65	65-70	70-75	≥75
Transient Lodging-Motel, Hotels	50-65	65-70	70-80	≥80
Schools, Libraries, Churches, Hospitals, Nursing Homes	50-60	60-65	65-80	≥80
Auditoriums, Concert Halls, Amphitheaters	NA	50-70	NA	≥80
Sports Arenas, Outdoor Spectator Sports	NA	50-75	NA	≥80
Playgrounds, Neighborhood Parks	50-67.5	NA	67.5-75	≥75
Golf Courses, Riding Stables, Water Recreation, Cemeteries	50-70	NA	70-80	≥80
Office Buildings, Business Commercial and Professional	50-67.5	67.5-77.5	77.5-85	≥85 unless appropriately insulated
Industrial, Manufacturing, Utilities, Agriculture	50-70	70-80	80-85	NA

Notes:

Normally Acceptable. *Specified land use is satisfactory, based upon the assumption that any buildings involved are of normal conventional construction, without any special noise insulation requirements.*

Conditionally Acceptable. *New construction or development should be undertaken only after a detailed analysis of the noise reduction requirements is made and needed noise insulation features included in the design. Conventional construction but with closed windows and fresh air supply systems or air conditioning will normally suffice.*

Normally Unacceptable. *New Construction or development should be discouraged. If new construction or development does proceed, a detailed analysis of the noise reduction requirements must be made and needed noise insulation features included in the design.*

Clearly Unacceptable. *New construction or development should generally not be undertaken.*

NA: *Not Applicable*

Source: Modified from U.S. Department of Housing and Urban Development Guidelines and State of California Standards.

SOURCE: City of Costa Mesa.

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 and transient 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 Costa Mesa General Plan and Municipal Code establishes the following applicable policies related to noise and vibration.

City of Costa Mesa General Plan

The City has the authority to set land use noise standards and place restrictions on private activities that generate excessive or intrusive noise. Chapter 7, Noise Element, of the General Plan states that "the control of noise, therefore, is an essential component in creating a safe, compatible, and productive environment." The City has adopted the State's Noise Compatibility Guidelines shown above in Figure 3 and although Figure 3 is shown in terms of Ldn or CNEL, the City prefers the use of CNEL, since it is more restrictive. The following goals and policies are set forth in the Noise Element of the General Plan.

Goal N-1 It is the goal of the City of Costa Mesa to protect its citizens and property from injury, damage, or destruction from noise hazards and to work towards improved noise abatement.

Objective N-1A: Control noise levels within the City for the protection of residential areas and other sensitive land uses from excessive and unhealthful noise.

N-1A.1 Require, as a part of the environmental review process, that full consideration be given to the existing and projected noise environment.

N-1A.2 The maximum acceptable exterior noise levels for residential areas is 65 CNEL.

N-1A.5 Ensure that appropriate site design measures are incorporated into residential developments, when required by an acoustical study, to obtain appropriate exterior and interior noise levels. When necessary, require field testing at the time of project completion to demonstrate compliance.

N-1A.6 Apply the standards contained in Title 24 of the California Code of Regulations as applicable to the construction of all new dwelling units.

City of Costa Mesa Municipal Code

The Costa Mesa Municipal Code establishes the following applicable standards related to noise.

13-279- Exceptions for Construction.

The provisions of this chapter shall not apply to the following:

a) Emergency machinery, vehicles, or work; or

b) Construction equipment, vehicles, or work between the following approved hours, provided that all required permits for such construction, repair, or remodeling have been obtained from the appropriate city departments.

Table A – City of Costa Mesa Allowable Times for Construction Activities

Hours for Construction Activities	Days for Construction Activities
7:00 a.m. through 7:00 p.m.	Mondays through Fridays
9:00 a.m. through 6:00 p.m.	Saturdays
Prohibited all hours	Sundays and the following specified federal holidays: New Year's Day, Memorial Day, Independence Day, Labor Day, Thanksgiving Day, and Christmas Day

Source: City of Costa Mesa Municipal Code Section 13-279.

c) Waiver procedure. An applicant may request approval of a minor modification for a temporary waiver for construction equipment, vehicles, or work outside these permitted hours. The minor modification may be granted by the development services director or his/her designee. Any temporary waiver shall take into consideration the unusual circumstances requiring construction activity outside the permitted hours and the short-term impacts upon nearby residential and business communities.

Minor modification findings shall indicate whether or not the extended construction hours will be materially detrimental to the health, safety, and general welfare of persons residing or working within the immediate vicinity of the construction site.

Unless a temporary waiver is approved, construction activity outside the permitted hours shall still be subject to the city's noise regulations.

13-280. Exterior Noise Standards.

a) The following noise standards, unless otherwise specifically indicated, shall apply to all residential property within the City:

Table B – City of Costa Mesa's Residential Exterior Noise Standards

Noise Level	Time Period
55 dB(A)	7:00 a.m. – 11:00 p.m.
50 dB(A)	11:00 p.m. – 7:00 a.m.

Source: City of Costa Mesa Municipal Code Section 13-280.

In the event that the alleged offensive noise consists entirely of impact noise, simple tone noise, speech, music, or any combination thereof, each of the noise levels shall be reduced by five (5) dBA.

b) It shall unlawful for any person at any location within the city to create any noise, or to allow the creation of any noise on property owned, leased, occupied, or otherwise controlled by such person, when the foregoing causes the noise level, when measured on any other residential property, either within or outside the city, to exceed:
   1. The noise standard for a cumulative period of more than thirty (30) minutes in any hour;
   2. The noise standard plus five (5) dB(A) for a cumulative period of more than fifteen (15) minutes in any hour;
   3. The noise standard plus ten (10) dB(A) for a cumulative period of more than five (5) minutes in any hour;
   4. The noise standard plus fifteen (15) dB(A) for a cumulative period of more than one (1) minute in any hour; or
   5. The noise standard plus twenty (20) dB(A) for any period of time.

c) In the event the ambient noise level exceeds any of the first four noise limit categories above, the cumulative period applicable to said category shall be increased to reflect said ambient noise level. In the event measured ambient level exceeds the fifth noise limit category, the maximum allowable noise level under said category shall be increased to reflect the maximum ambient noise level.

d) The exterior noise standards shown in subsection (a) shall not apply to the following exterior areas of multi-family residential development or live/work units located within a mixed-use overlay district where the base zoning district nonresidential, approved pursuant to a master plan, and subject to the land use regulations of an urban plan:
   1. Private balconies or patios regardless of size;
   2. Private or community roof decks/roof terraces;
   3. Internal courtyards and landscaped walkways that do not include residential-serving, active recreational uses such as community pool, spa, tennis courts, barbeques, and picnic areas.

13-281. Interior Noise Standards.

a) The following interior noise standards, unless otherwise specifically indicated, shall apply to all residential property within the City:

Table C – City of Costa Mesa's Residential Interior Noise Standards

Noise Level	Time Period
55 dB(A)	7:00 a.m. – 11:00 p.m.
45 dB(A)	11:00 p.m. – 7:00 a.m.

Source: City of Costa Mesa Municipal Code Section 13-280.

In the event that the alleged offensive noise consists entirely of impact noise, simple tone noise, speech, music, or any combination thereof, each of the noise levels shall be reduced by five (5) dB(A).

b) It shall unlawful for any person at any location within the city to create any noise, or to allow the creation of any noise on property owned, leased, occupied, or otherwise controlled by such person, when the foregoing causes the noise level, when measured on any other residential property, either within or outside the city, to exceed:
   1. The interior noise standard for a cumulative period of more than five (5) minutes in any hour;
   2. The interior noise standard plus five (5) dB(A) for a cumulative period of more than one (1) minute in any hour;
   3. The noise standard plus ten (10) dB(A) for any period of time;

c) In the event the ambient noise level exceeds either of the first two (2) noise limit categories above, the cumulative period applicable to said category shall be increased to reflect said ambient noise level. In the event measured ambient level exceeds the third noise limit category, the maximum allowable noise level under said category shall be increased to reflect the maximum ambient noise level.

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 Fair Drive and Harbor Boulevard and from noise generated by the carwash located west of the project site. 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 programmed in "slow" mode to record the sound pressure level at 3-second intervals for approximately 24 hours in "A" weighted form. In addition, the L_{eq} averaged over the entire measuring time and L_{max} were recorded. The sound level meters and microphones were mounted approximately five to seven feet above the ground and were equipped with a windscreen. The sound level meters were calibrated before and after the monitoring using an Extech calibrator, Model 407766. The 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 in the project study area and to provide a baseline for any potential noise impacts that may be created by development of the proposed project. 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 D. 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 12:09 p.m. on Wednesday May 25, 2016 and 12:25 p.m. on Thursday, May 26, 2016. When the noise measurements were started the sky was partly cloudy, the temperature was 69 degrees Fahrenheit, the humidity was 58 percent, barometric pressure was 29.99 inches of mercury, and the wind was blowing around five miles per hour. Overnight, there were low clouds and the temperature dropped to 56 degrees Fahrenheit. At the conclusion of the noise measurements, the sky was partly cloudy, the temperature was 68 degrees Fahrenheit, the humidity was 49 percent, barometric pressure was 29.95 inches of mercury, and the wind was blowing around seven miles per hour.

5.2 Noise Measurement Results

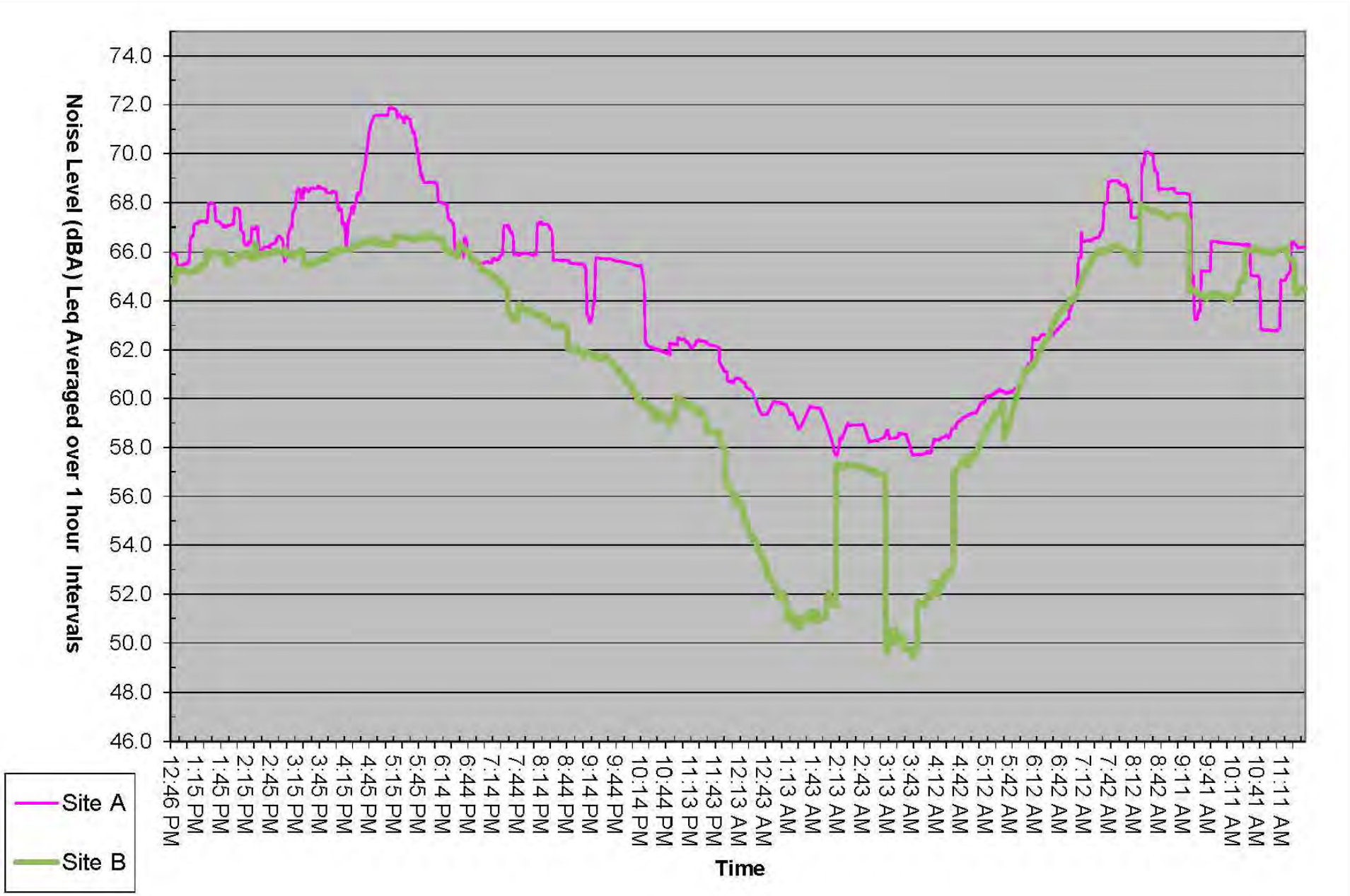
The results of the noise level measurements are presented in Table D. The measured sound pressure levels in dBA have been used to calculate the minimum and maximum L_{eq} averaged over 1-hour intervals. Table D also shows the Leq, Lmax, and CNEL, based on the entire measurement time. The noise monitoring data printouts are included in Appendix B. Figure 4 shows a graph of the 24-hour noise measurements.

Table D – 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)
A	Located on a wall on the west property line, approximately 30 feet northeast of a carwash, 160 feet north of Fair Drive centerline and 200 feet of Harbor Boulevard centerline.	65.9	90.8	57.7 2:09 AM	71.9 5:08 PM	69.4
B	Located on a tree near the southeast corner of the project site, approximately 30 feet west of Carnegie Avenue centerline and 95 feet north of Fair drive centerline.	63.8	91.3	49.4 3:45 AM	67.9 8:20 AM	67.0

Source: Noise measurements taken with two Extech Model 407780 Type 2 integrating sound level meters between Wednesday May 25, 2016 and Thursday May 26, 2016.

Table D shows that currently both Sites A and B exceed the City exterior residential noise standard of 65 dBA CNEL.



SOURCE: Extech Model 407780 Type 2 Integrated Sound Level Meters.

VISTA ENVIRONMENTAL

Figure 4
Field Noise Measurements Graph

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 E 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 Carnegie Avenue Residential Project*, prepared by Vista Environmental, June 3, 2016.

Table E – 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 Saw	1	20	90	90
Dozer	1	40	85	82
Tractor, Loader or Backhoe[5]	3	40	84	N/A
Grading				
Grader	1	40	85	83
Dozer	1	40	85	82
Tractor, Loader or Backhoe[5]	1	40	84	N/A
Building Construction				
Crane	1	16	85	81
Forklift (Gradall)	1	40	85	83
Generator	1	50	82	81
Welder	3	40	73	74
Tractor, Loader or Backhoe[5]	1	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.
Source: Federal Highway Administration, 2006 and CalEEMod default equipment mix.

Table E 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 E and through use of the RCNM. For each phase of construction, the nearest piece of equipment was placed at the shortest distance of the proposed activity to the nearest offsite residence and each subsequent piece of equipment was placed an additional 50 feet away.

6.2 Operations-Related Noise

The proposed project would introduce new sensitive receptors to the project site that may be impacted by vehicular noise created by Fair Drive and Harbor Boulevard. The onsite noise impacts to the proposed residential units were analyzed through use of the FHWA Traffic Noise Prediction Model - FHWA-RD-77-108 (FHWA Model). The following section provides a discussion of the software and modeling input parameters used in this analysis.

FHWA Model Methodology

In order to quantify the potential noise impacts to the proposed residential units from Fair Drive and Harbor Boulevard, the General Plan Buildout with project roadway noise environment was modeled using the 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.

<u>FHWA Model Traffic Noise Prediction Model Inputs</u>

The roadway parameters used for the analysis of Fair Drive are detailed below:

- General Plan Classification: Primary Arterial
- Vehicle speed: 35 miles per hour
- General Plan Buildout daily traffic volume: 38,000
- Right-of-way distance: 74 feet
- Near-far-lane distance: 48 feet
- Site conditions: soft (landscaping on sides of roadway)

The roadway parameters used for the analysis of Harbor Boulevard are detailed below:

- General Plan Classification: Major Arterial
- Vehicle speed: 40 miles per hour
- General Plan Buildout daily traffic volume: 54,000
- Right-of-way distance: 100 feet
- Near-far-lane distance: 72 feet
- Site conditions: soft (landscaping on sides of roadway)

The vehicle mix used in the FHWA-RD-77-108 Model are shown in Table C and is based on typical vehicle mixes observed for arterial roadways in Southern California. The vehicle mix provides the hourly distribution percentages of automobiles, medium trucks, and heavy trucks for input into the FHWA model.

Table F – Roadway Vehicle Mix

Vehicle Type	Traffic Flow Distributions			
	Day (7 a.m. to 7 p.m.)	Evening (7 p.m. to 10 p.m.)	Night (10 p.m. to 7 a.m.)	Overall
Automobiles	69.50%	12.90%	9.60%	92.00%
Medium Trucks	1.44%	0.06%	1.50%	3.00%
Heavy Trucks	2.40%	0.10%	2.50%	5.00%

Source: Vista Environmental, 2016.

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 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 G gives approximate vibration levels for particular construction activities. The data in Table G provides a reasonable estimate for a wide range of soil conditions.

Table G – 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 G and through typical vibration propagation rates. The equipment assumptions were based on the equipment lists provided above in Table E.

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 demolition of the existing commercial building and parking lot, grading of the 1.66-acre project site, building construction of the eight detached single-family homes and 20 attached single-family homes, paving of the onsite roads, 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 single-family homes, located as near as 80 feet east of the project site.

Section 13-279 of the City's Municipal Code exempts construction noise that occurs between 7:00 a.m. and 7:00 p.m. Mondays through Fridays and between 9:00 a.m. and 6:00 p.m. on Saturdays from the daytime stationary noise standard of 55 dBA at the nearby residential property lines. Through adherence to the limitation of allowable construction times provided in Section 13-279, construction-related noise levels would not exceed any standards. Impact would be less than significant.

Operational-Related Noise

The proposed project would consist of the development of eight detached single-family homes and 20 attached single-family homes. The proposed development would be adjacent to Fair Drive, near Harbor Boulevard, and adjacent to a carwash which may create noise levels in excess of City standards at the proposed residential uses. The roadway and carwash noise impacts have been analyzed separately below.

Operational Roadway Noise Impacts to the Proposed Homes

Proposed Homes Exterior Roadway Noise Impacts

Objective N-1A.2 of the General Plan requires that the maximum acceptable exterior noise levels for residential areas from all noise sources is 65 dBA CNEL. The anticipated noise levels have been calculated for the nearest proposed private backyards of each proposed home to Fair Drive and Harbor Boulevard. Carnegie Avenue is designated as a local roadway in the General Plan and the posted speed limit is 25 miles per hour. For these reasons, the roadway noise levels created by Carnegie Avenue is not anticipated to exceed the City's noise standards and, as such, has not been quantitatively analyzed.

The noise levels were calculated at a location half way between the proposed sound walls and building structures and five feet above ground level. A summary of the results are shown below in Table H and the FHWA model printouts of the proposed exterior backyard noise calculations are provided in Appendix C.

Table H – Proposed Residential Exterior Backyard Noise Levels from Nearby Roads

Roadway	Analyzed Units	Exterior Backyard Noise Levels (dBA CNEL)		Minimum Sound Wall Height (feet)
		Without Sound Wall	With Sound Wall	
Fair Drive	8	**66**	61	5
Fair Drive	9 – 13	**68**	63	5
Harbor Boulevard	13 – 14	63	--	0
Harbor Boulevard	18 – 28	60	--	0

Notes:
Exceedance of City's 65 dBA CNEL noise standard shown in bold.
Source: FHWA RD-77-108 Model.

Table H shows that the exterior private backyard noise levels for proposed units 8 through 13 that are adjacent to Fair Drive would exceed the City's 65 dBA CNEL noise standard, while the all of the other proposed private backyards would be within the City's residential exterior noise standard. This would result in a significant impact.

Mitigation Measure 1 is provided that would require the applicant to construct a minimum 5.0-foot high solid wall on the south side of the proposed private backyards for Units 8 through 13 that are adjacent to Fair Drive. The sound walls shall be required to be constructed of a solid material (e.g., concrete block, or plaster) that are free of any cutouts or openings.

The exterior backyard levels have been recalculated based on construction of a minimum 5.0-foot high solid wall adjacent to Fair Drive that is detailed in Mitigation Measure 1 and the results are shown above in Table H. Table H shows that with application of the sound walls specified in Mitigation Measure 1, the noise levels at the proposed private backyards would be reduced to within the City's exterior residential noise standard. Impacts would be less than significant after implementation of the recommended mitigation.

Proposed Homes Interior Roadway Noise Impacts

Objective N-1A.6 of the General Plan requires that all new residential structures are designed to meet the noise standards in Title 24 of the California Code of Regulations, which limit interior noise levels to 45 dBA CNEL. To assess the interior noise levels related to compliance with the City's 45 dBA CNEL interior noise standard, the same units analyzed for the exterior private backyard analysis were also analyzed for their interior noise levels. According to *Highway Traffic Noise: Analysis and Abatement*

Guidance, prepared by U.S. Department of Transportation, December, 2011, a new residential building provides a minimum of 10 dB of noise attenuation with windows open and a minimum of 25 dB of noise attenuation with windows closed and dual-paned windows. The proposed residential structures will be required to be designed to meet the CCR Title 24, Part 6: California's Energy Efficiency Standards for Residential and Nonresidential Buildings 2013 Building Standards, that require the installation of dual paned windows in the climate zone where the proposed project is located. The exterior noise level at the façade of the first floor and possible second floors were calculated for each analyzed unit and are shown below in Table I and the FHWA model printouts are provided in Appendix C.

Table I – Proposed Residential Interior Noise Levels from Nearby Roads

Roadway	Unit(s)	Floor	Exterior Noise Level at Façade (dBA CNEL)	Interior Noise Levels (dBA CNEL) Windows Open	Interior Noise Levels (dBA CNEL) Windows Closed
Fair Drive	8	1	61	**51**	36
		2	66	**56**	41
		3	65	**55**	40
Fair Drive	9-13	1	63	**53**	38
		2	67	**57**	42
		3	67	**57**	42
Harbor Boulevard	13-14	1	63	**53**	38
		2	63	**53**	38
		3	63	**53**	38
Harbor Boulevard	18-28	1	60	**50**	35
		2	60	**50**	35
		3	60	**50**	35

Notes: Exceedance of City's residential interior noise standard shown in **bold**.
Source: FHWA RD-77-108 Model.

Table I shows that all of the analyzed homes would exceed the City's 45 dBA CNEL interior noise standard for the windows open condition. This would result in a significant impact.

Mitigation Measure 2 is provided that would require all proposed homes to be designed for a "windows closed" condition. 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 for each residential unit. Table I shows that with implementation of Mitigation Measure 2 the interior areas of the proposed homes would be mitigated to less than significant levels.

Operational Carwash Noise Impacts to the Proposed Homes

The USA Gas Station located adjacent to the west side of the project site has a carwash located as near six feet west of the project site. The exterior and interior noise impacts from the carwash to the proposed homes have been analyzed below.

Proposed Homes Exterior Carwash Noise Impacts

Section 13-280(a) of the Municipal Code limits stationary noise impacts to the proposed homes private backyards to 55 dBA between 7:00 a.m. and 11:00 p.m. and 50 dBA between 11:00 p.m. and 7:00 a.m. and Section 13-280(c) of the Municipal Code states that if ambient noise levels exceed the stationary noise standards, than the stationary noise standards shall be increased to match the ambient noise standards.

Although it is not possible to measure the noise created by the carwash without also capturing the nearby traffic noise on Harbor Boulevard and Fair Drive, Noise Measurement Site A (detailed above in Section 5.2) that was taken approximately 30 feet northeast of the carwash, provides a worst-case estimate of the noise created by the carwash and measured a noise level of 69.4 dBA CNEL. The nearest proposed private backyard to the carwash would be located at Unit 13, where the backyard wall is located as near as eight feet from the south opening on the carwash and 16 feet from the center of the private backyard. Based on a standard noise propagation rate of (drop-off rate) of 6 dBA per doubling of distance, the carwash would create a noise level of 75 dBA CNEL in the nearest proposed private backyard (unit 13).

A carwash noise level of 75 dBA CNEL would exceed the stationary exterior noise standard of 55 dBA between 7:00 a.m. and 11:00 p.m. and 50 dBA between 11:00 p.m. and 7:00 a.m. detailed in Section 13-280(a) of the Municipal Code. In order to determine if it would exceed the ambient noise level that would occur without operation of the carwash in the private backyard of Unit 13, the calculated roadway noise impacts to the proposed backyards shown above in Table H, was utilized which found that with implementation of Mitigation Measure 1 that requires a minimum 5-foot high adjacent to Fair Drive, Fair Drive would create a noise level of 63 dBA CNEL at the backyard of Unit 13. Table H also shows that Harbor Boulevard would create a noise level of 63 dBA CNEL at the backyard of Unit 13. As such, a carwash noise level of 75 dBA CNEL would also exceed the ambient noise level standard of 63 dBA CNEL that is detailed in Section 13-280(c) of the Municipal Code. This would result in a significant impact.

Mitigation Measure 3 is provided that would require the applicant to construct a minimum 8.0-foot high solid wall along the west property line that is adjacent to the carwash. The sound wall shall be required to be constructed of a solid material (e.g., concrete block, or plaster) that are free of any cutouts or openings.

The exterior backyard noise levels have been recalculated based on construction of the 8.0-foot high solid wall that is detailed in Mitigation Measure 3, through utilization of the sound wall attenuation calculation methodology provided in Caltrans Technical Noise Supplement (Caltrans, 2013), which found that the 8-foot sound wall would reduce the noise level in the backyard of unit 13 to 63 dBA CNEL (see Appendix D). Therefore, with implementation of Mitigation Measure 3, the noise created from the carwash would be reduced to within the City's stationary exterior residential noise standard. Impacts would be less than significant after implementation of the recommended mitigation.

Proposed Homes Interior Carwash Noise Impacts

Section 13-281(a) of the Municipal Code limits stationary noise impacts to the interior of the proposed homes to 55 dBA between 7:00 a.m. and 11:00 p.m. and 45 dBA between 11:00 p.m. and 7:00 a.m.. As detailed above, the worst-case carwash noise is 69.4 dBA CNEL at 30 feet and the nearest proposed home to the carwash would be Unit 13 that is located as near as 16 feet from the south opening of the carwash. Based on a standard noise propagation rate of (drop-off rate) of 6 dBA per doubling of distance, the carwash would create a noise level of 71 dBA CNEL at the façade of the nearest proposed home (unit 13). As detailed above in the roadway noise interior impacts to the proposed homes, a new residential building provides a minimum of 10 dB of noise attenuation with windows open, which would result in an interior noise level from the carwash of 61 dBA CNEL. The noise created by the carwash would exceed the interior noise standards detailed in Section 13-281 of the Municipal Code. This would result in a significant impact.

Mitigation Measure 2 has been provided above that would require all proposed homes to be designed for a "windows closed" condition and is based on the use of standard dual-paned windows that have a sound transmission class rating (STC) of 26 STC. Implementation of Mitigation Measure 2 would increase the exterior to interior noise attenuation of the proposed homes to 25 dB and would result in the carwash

creating an interior noise level of 46 dBA at the nearest home, which would still exceed the interior noise standards detailed in Section 13-281 of the Municipal Code. Mitigation Measure 4 has also been provided that requires the applicant to install windows with a minimum STC Rating of 29 STC for all west facing windows on Units 13 and 14. Application of Mitigation Measure 4 would increase the anticipated exterior to interior noise attenuation to 28 dB and would result in the carwash creating an interior noise level of 43 dBA at the nearest home, which would meet the interior noise level requirements detailed in Section 13-281 of the Municipal Code. Therefore, with implementation of Mitigation Measures 2 and 4 carwash noise impacts to the interior areas of the proposed homes would be mitigated to less than significant levels.

Level of Significance Before Mitigation

Potentially significant impact.

Mitigation Measures

Mitigation Measure 1:
The project applicant shall construct a minimum 5.0-foot high solid wall on the south side of the proposed private backyards for Units 8 through 13 that are adjacent to Fair Drive. The sound walls shall be required to be constructed of a solid material (e.g., concrete block or plaster) that are free of any cutouts or openings.

Mitigation Measure 2:
The project applicant shall provide a "windows closed" condition for each proposed home. 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 for each residential unit.

Mitigation Measure 3:
The project applicant shall construct a minimum 8.0-foot high solid wall along the west property line that is adjacent to the carwash. The sound wall shall be required to be constructed of a solid material (e.g., concrete block or plaster) that are free of any cutouts or openings.

Mitigation Measure 4:
The project applicant shall provide windows with a minimum Sound Transmission Class rating of 29 STC for all west facing windows on the proposed Units 13 and 14.

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 demolition of the existing commercial building and parking lot, grading of the 1.66-acre project site, building construction of the eight detached single-family homes and 20 attached single-family homes, paving of the onsite roads, 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 single-family homes, located as near as 80 feet east of the project site.

Since neither the City's Municipal Code nor the General Plan provide a quantifiable vibration 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 has been utilized in this analysis.

The primary source of vibration during construction would be from the operation of a bulldozer. From Table G 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 home (80 feet away) would be 0.014 inch per second PPV. The vibration level at the nearest home would be below the 0.2 inch per second PPV threshold detailed above. Therefore, a less than significant vibration impact is anticipated from construction of the proposed project.

Operations-Related Vibration Impacts

The on-going operation of the proposed project would consist of normal activities associated with homes and 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.

The Traffic Impact Analysis, prepared by Infrastructure Group, Inc. found that development of the proposed project would generate 213 daily trips, which does not account for the existing daily trips that are currently generated by the project site, so the actual "new" daily trips would be lower.

According to the *Costa Mesa General Plan Update Traffic Analysis* (Stantec, 2016), Fair Drive in the vicinity of the project site currently has 38,000 daily vehicle trips. In order for project generated vehicular traffic to increase the noise level of Fair Drive, by 3 dB, the roadway traffic would have to double, and for the roadway noise levels to increase by 1.5 dB, the roadway traffic would have to increase by 50 percent. Since the proposed project would only result in a maximum of a 0.6 percent increase in traffic volumes on Fair Drive, the project-related roadway noise increase is anticipated to be negligible. Therefore, the proposed project would not result in a substantial permanent increase in ambient noise levels from project-related vehicular traffic. 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. The construction activities for the proposed project are anticipated to include demolition of the existing commercial building and parking lot, grading of the 1.66-acre project site, building construction of the eight detached single-family

homes and 20 attached single-family homes, paving of the onsite roads, and application of architectural coatings. The nearest sensitive receptors to the project site are single-family homes, located as near as 80 feet east of the project site.

Section 13-279 of the City's Municipal Code exempts construction noise that occurs between 7:00 a.m. and 7:00 p.m. Mondays through Fridays and between 9:00 a.m. and 6:00 p.m. on Saturdays from the daytime stationary noise standard of 55 dBA at the nearby residential property lines. The analysis above in Section 7.2 found that the proposed project would conform to the City construction noise standards. However, the City construction noise standards do not provide any limits to the noise levels that may be created during construction activities at the nearby sensitive receptors and even with adherence to the City standards, the resultant construction noise levels may result in a significant substantial temporary noise increase at the nearby sensitive receptors.

In order to determine if the proposed construction activities would create a significant substantial temporary noise increase, Caltrans provides a definition for what constitutes a substantial increase in noise of 12 dB between existing and with project conditions in *Traffic Noise Analysis Protocol*, May 2011. It should be noted that Caltrans provides exceptions to where the use of the 12 increase threshold may not be appropriate and they consist of quiet rural environments or noisy urban environments, and the proposed project is not located in either of these exempted areas. The nearest offsite sensitive receptor to the proposed construction activities are the senior apartments, located as near as 60 feet south of the project site. As detailed above in Section 5.2, the nearest noise measurement taken in the vicinity of the senior apartments would be Noise Measurement Site B that measured a maximum noise level of 91.3 dBA L_{max} and maximum hourly noise level of 67.9 $dBA_{(Leq\ 1\text{-}hour)}$ (the maximum hourly noise level was utilized, since active construction activities are not anticipated to occur at one location on the project site for more than one hour at a time). This results in construction-related noise standards of 79.9 dBA L_{eq} and 103.3 L_{max}.

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 E – Construction Equipment Noise Emissions and Usage Factors. The results are shown below in Table J and the RCNM printouts are provided in Appendix E.

Table J – Worst-Case Construction Noise Levels at Nearest Offsite Residences

Construction Phase	Distance to Nearest Offsite Residence[1] (feet)	Construction Noise Levels	
		dBA $L_{eq\ (hourly)}$	dBA L_{max}
Demolition	100	78	84
Grading	80	78	81
Building Construction	100	74	75
Paving	80	73	73
Painting	100	68	72
	Threshold	**79.9**	**103.3**

Notes:
[1] The nearest offsite residence are single-family homes as near as 80 feet east of the project site.
Source: RCNM, Federal Highway Administration, 2006

Table J shows that greatest noise impacts would occur during the demolition phase of construction, with noise levels as high as 78 dBA L_{eq} and 84 dBA L_{max} at the nearest offsite residential use. Table J also shows that none of the construction phases would exceed the Caltrans noise standard for a substantial increase in noise of existing noise levels plus 12 dB. 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 John Wayne Airport, located approximately 2.4 miles east of the project site. The project site is located outside of the 65 dBA CNEL noise contour of these airports 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 vehicle traffic on Fair Drive and Harbor Boulevard. Impacts would be less than significant.

Level of Significance

Less than significant impact.

8.0 REFERENCES

California Department of Transportation (Caltrans), *Technical Noise Supplement*, September, 2013.

California Department of Transportation, *Transportation- and Construction-Induced Vibration Guidance Manual*, June, 2004

California Department of Transportation, *Traffic Noise Analysis Protocol*, May, 2011

City of Costa Mesa, *City of Costa Mesa 2000 General Plan,* January 2002.

City of Costa Mesa, *Costa Mesa Municipal Code,* March 29, 2016.

Federal Transit Administration, *Transit Noise and Vibration Impact Assessment,* May 2006.

U.S. Department of Transportation, *Highway Traffic Noise: Analysis and Abatement Guidance,* December 2011.

U.S. Department of Transportation, *FHWA Roadway Construction Noise Model User's Guide,* January, 2006.

Vista Environmental, *Air Quality and Greenhouse Gas Emissions Impact Analysis Carnegie Avenue Residential Project City of Costa Mesa,* June 3, 2016.

APPENDIX A

Study Area Photo Index

Noise Measurement Site A - looking north

Noise Measurement Site A - looking northeast

Noise Measurement Site A - looking east

Noise Measurement Site A - looking southeast

Noise Measurement Site A - looking south

Noise Measurement Site A - looking southwest

Noise Measurement Site A - looking west

Noise Measurement Site A - looking northwest

Noise Measurement Site B - looking north

Noise Measurement Site B - looking northeast

Noise Measurement Site B - looking east

Noise Measurement Site B - looking southeast

Noise Measurement Site B - looking south

Noise Measurement Site B - looking southwest

Noise Measurement Site B - looking west

Noise Measurement Site B - looking northwest

APPENDIX B

Field Noise Measurement Printouts

Site A - West Side of Project Site Near Carwash

Date	Time=05/25/16		12:09:00 PM		
Sampling	Time=3		Weighting=A		
Record	Num=	29000	Weighting=Slow	CNEL(24hr)=	69.4
Leq	65.9	SEL	Value=115.3	Ldn(24hr)=	68.8
MAX	90.8		Min Leq1hr =	57.7	2:09 AM
MIN	36.5		Max Leqhr =	71.9	5:08 PM

Site A - West Side of Project Site Near Carwash

SPL	Time	Leq (1 hour Avg.)	Ldn	CNEL
59.4	12:09:00		59.4	59.4
59.9	12:09:03		59.9	59.9
61.2	12:09:06		61.2	61.2
67.9	12:09:09		67.9	67.9
68.7	12:09:12		68.7	68.7
61.3	12:09:15		61.3	61.3
64.2	12:09:18		64.2	64.2
64	12:09:21		64	64
68.2	12:09:24		68.2	68.2
63.9	12:09:27		63.9	63.9
64.8	12:09:30		64.8	64.8
62.3	12:09:33		62.3	62.3
63.5	12:09:36		63.5	63.5
60.4	12:09:39		60.4	60.4
62.3	12:09:42		62.3	62.3
65.1	12:09:45		65.1	65.1
64.8	12:09:48		64.8	64.8
63.8	12:09:51		63.8	63.8
63.7	12:09:54		63.7	63.7
68.3	12:09:57		68.3	68.3
68.4	12:10:00		68.4	68.4
67.1	12:10:03		67.1	67.1
67.7	12:10:06		67.7	67.7
69.6	12:10:09		69.6	69.6
66.7	12:10:12		66.7	66.7
68.6	12:10:15		68.6	68.6
65.2	12:10:18		65.2	65.2
64.9	12:10:21		64.9	64.9
69.8	12:10:24		69.8	69.8
64	12:10:27		64	64
64.8	12:10:30		64.8	64.8
61.6	12:10:33		61.6	61.6
66.8	12:10:36		66.8	66.8
69.1	12:10:39		69.1	69.1
64.4	12:10:42		64.4	64.4
66	12:10:45		66	66
64	12:10:48		64	64
61.8	12:10:51		61.8	61.8
60.8	12:10:54		60.8	60.8
61	12:10:57		61	61
59.7	12:11:00		59.7	59.7
60.5	12:11:03		60.5	60.5
60.3	12:11:06		60.3	60.3
60.8	12:11:09		60.8	60.8
60.2	12:11:12		60.2	60.2
60	12:11:15		60	60
60.2	12:11:18		60.2	60.2
59.8	12:11:21		59.8	59.8
60.5	12:11:24		60.5	60.5
63.2	12:11:27		63.2	63.2
62.6	12:11:30		62.6	62.6
64.4	12:11:33		64.4	64.4
63.7	12:11:36		63.7	63.7
64.8	12:11:39		64.8	64.8
63.4	12:11:42		63.4	63.4
64.1	12:11:45		64.1	64.1
64.8	12:11:48		64.8	64.8
63.4	12:11:51		63.4	63.4
63.5	12:11:54		63.5	63.5
63.5	12:11:57		63.5	63.5
62.6	12:12:00		62.6	62.6
65.3	12:12:03		65.3	65.3
64.7	12:12:06		64.7	64.7
63.9	12:12:09		63.9	63.9
63.9	12:12:12		63.9	63.9
63.9	12:12:15		63.9	63.9
63.4	12:12:18		63.4	63.4
62.3	12:12:21		62.3	62.3
61.3	12:12:24		61.3	61.3
62.2	12:12:27		62.2	62.2
61.8	12:12:30		61.8	61.8
63.3	12:12:33		63.3	63.3
63.2	12:12:36		63.2	63.2
62.7	12:12:39		62.7	62.7
63.4	12:12:42		63.4	63.4
62.8	12:12:45		62.8	62.8
64.5	12:12:48		64.5	64.5
63	12:12:51		63	63
61.8	12:12:54		61.8	61.8
65.1	12:12:57		65.1	65.1
64.9	12:13:00		64.9	64.9
64.1	12:13:03		64.1	64.1
61.9	12:13:06		61.9	61.9
63.3	12:13:09		63.3	63.3
62.1	12:13:12		62.1	62.1
64	12:13:15		64	64
62	12:13:18		62	62
63	12:13:21		63	63
63.8	12:13:24		63.8	63.8
64.7	12:13:27		64.7	64.7
62.4	12:13:30		62.4	62.4
64.6	12:13:33		64.6	64.6
64.9	12:13:36		64.9	64.9
67.5	12:13:39		67.5	67.5
64.5	12:13:42		64.5	64.5
64.1	12:13:45		64.1	64.1
65.8	12:13:48		65.8	65.8
64.8	12:13:51		64.8	64.8
62.7	12:13:54		62.7	62.7
64.2	12:13:57		64.2	64.2
66.8	12:14:00		66.8	66.8
67.1	12:14:03		67.1	67.1
62.6	12:14:06		62.6	62.6
64	12:14:09		64	64
64.9	12:14:12		64.9	64.9
61.9	12:14:15		61.9	61.9
62.3	12:14:18		62.3	62.3
64	12:14:21		64	64
67.2	12:14:24		67.2	67.2
66.4	12:14:27		66.4	66.4
62.3	12:14:30		62.3	62.3
61.7	12:14:33		61.7	61.7
61	12:14:36		61	61
62.6	12:14:39		62.6	62.6
61.2	12:14:42		61.2	61.2
61.5	12:14:45		61.5	61.5
62.7	12:14:48		62.7	62.7
61.6	12:14:51		61.6	61.6
63.4	12:14:54		63.4	63.4
62.5	12:14:57		62.5	62.5
62.8	12:15:00		62.8	62.8
63	12:15:03		63	63
63.4	12:15:06		63.4	63.4
62.7	12:15:09		62.7	62.7
63.2	12:15:12		63.2	63.2
63.1	12:15:15		63.1	63.1
63.4	12:15:18		63.4	63.4
62.6	12:15:21		62.6	62.6
63.2	12:15:24		63.2	63.2
64.8	12:15:27		64.8	64.8
62.6	12:15:30		62.6	62.6
63.4	12:15:33		63.4	63.4

Site B - Near Southeast Corner of Project site

Date	Time=05/25/16		12:16:00 PM		
Sampling	Time=3		Freq Weighting=A		
Record	Num=	29000	Weighting=Slow	CNEL(24hr)=	67.0
Leq	63.8	SEL	Value=115.2	Ldn(24hr)=	66.5
MAX	91.3		Min Leq1hr =	49.4	3:45 AM
MIN	38.1		Max Leqhr =	67.9	8:20 AM

Site B - Near Southeast Corner of Project site

SPL	Time	Leq (1 hour Avg.)	Ldn	CNEL
54.2	12:16:00		54.2	54.2
60.2	12:16:03		60.2	60.2
58.4	12:16:06		58.4	58.4
58.5	12:16:09		58.5	58.5
59.7	12:16:12		59.7	59.7
64.3	12:16:15		64.3	64.3
61.3	12:16:18		61.3	61.3
65	12:16:21		65	65
63.5	12:16:24		63.5	63.5
64.5	12:16:27		64.5	64.5
53.3	12:16:30		53.3	53.3
60.7	12:16:33		60.7	60.7
67.2	12:16:36		67.2	67.2
60.7	12:16:39		60.7	60.7
62.3	12:16:42		62.3	62.3
62.8	12:16:45		62.8	62.8
65.2	12:16:48		65.2	65.2
62.6	12:16:51		62.6	62.6
67.4	12:16:54		67.4	67.4
61.3	12:16:57		61.3	61.3
66.5	12:17:00		66.5	66.5
65.1	12:17:03		65.1	65.1
66.6	12:17:06		66.6	66.6
66.2	12:17:09		66.2	66.2
63.2	12:17:12		63.2	63.2
65.7	12:17:15		65.7	65.7
59.2	12:17:18		59.2	59.2
59.4	12:17:21		59.4	59.4
67.2	12:17:24		67.2	67.2
66.9	12:17:27		66.9	66.9
60.5	12:17:30		60.5	60.5
53.6	12:17:33		53.6	53.6
51.7	12:17:36		51.7	51.7
50.4	12:17:39		50.4	50.4
51.4	12:17:42		51.4	51.4
62.2	12:17:45		62.2	62.2
66.5	12:17:48		66.5	66.5
63	12:17:51		63	63
67.2	12:17:54		67.2	67.2
55.9	12:17:57		55.9	55.9
50.7	12:18:00		50.7	50.7
50.3	12:18:03		50.3	50.3
53.5	12:18:06		53.5	53.5
57.6	12:18:09		57.6	57.6
64.7	12:18:12		64.7	64.7
66.5	12:18:15		66.5	66.5
62.8	12:18:18		62.8	62.8
55.9	12:18:21		55.9	55.9
59	12:18:24		59	59
67	12:18:27		67	67
70.1	12:18:30		70.1	70.1
71.8	12:18:33		71.8	71.8
71.9	12:18:36		71.9	71.9
70.3	12:18:39		70.3	70.3
59.8	12:18:42		59.8	59.8
66.5	12:18:45		66.5	66.5
57.8	12:18:48		57.8	57.8
68.1	12:18:51		68.1	68.1
65.8	12:18:54		65.8	65.8
55.4	12:18:57		55.4	55.4
54.4	12:19:00		54.4	54.4
54.8	12:19:03		54.8	54.8
54.9	12:19:06		54.9	54.9
58	12:19:09		58	58
60.1	12:19:12		60.1	60.1
58.2	12:19:15		58.2	58.2
65.4	12:19:18		65.4	65.4
70.4	12:19:21		70.4	70.4
63.5	12:19:24		63.5	63.5
68.6	12:19:27		68.6	68.6
58.6	12:19:30		58.6	58.6
52.1	12:19:33		52.1	52.1
55.9	12:19:36		55.9	55.9
66.2	12:19:39		66.2	66.2
61.7	12:19:42		61.7	61.7
54	12:19:45		54	54
56.9	12:19:48		56.9	56.9
61.6	12:19:51		61.6	61.6
66.2	12:19:54		66.2	66.2
56.8	12:19:57		56.8	56.8
63.3	12:20:00		63.3	63.3
65.6	12:20:03		65.6	65.6
61	12:20:06		61	61
66.4	12:20:09		66.4	66.4
72	12:20:12		72	72
68.2	12:20:15		68.2	68.2
59.7	12:20:18		59.7	59.7
56.7	12:20:21		56.7	56.7
71	12:20:24		71	71
68.1	12:20:27		68.1	68.1
66.1	12:20:30		66.1	66.1
57.5	12:20:33		57.5	57.5
61.9	12:20:36		61.9	61.9
52.3	12:20:39		52.3	52.3
51.5	12:20:42		51.5	51.5
53.6	12:20:45		53.6	53.6
60.2	12:20:48		60.2	60.2
59.3	12:20:51		59.3	59.3
53.6	12:20:54		53.6	53.6
51.6	12:20:57		51.6	51.6
52.6	12:21:00		52.6	52.6
54.7	12:21:03		54.7	54.7
61.4	12:21:06		61.4	61.4
58.4	12:21:09		58.4	58.4
60.8	12:21:12		60.8	60.8
57.2	12:21:15		57.2	57.2
61.9	12:21:18		61.9	61.9
66	12:21:21		66	66
59.7	12:21:24		59.7	59.7
53.7	12:21:27		53.7	53.7
51.9	12:21:30		51.9	51.9
49.9	12:21:33		49.9	49.9
50.5	12:21:36		50.5	50.5
52.4	12:21:39		52.4	52.4
52.5	12:21:42		52.5	52.5
62	12:21:45		62	62
68.5	12:21:48		68.5	68.5
63.3	12:21:51		63.3	63.3
63.2	12:21:54		63.2	63.2
63.7	12:21:57		63.7	63.7
62.9	12:22:00		62.9	62.9
60.8	12:22:03		60.8	60.8
64.3	12:22:06		64.3	64.3
62.6	12:22:09		62.6	62.6
68.1	12:22:12		68.1	68.1
68.6	12:22:15		68.6	68.6
65.4	12:22:18		65.4	65.4
68.3	12:22:21		68.3	68.3
63.8	12:22:24		63.8	63.8
67.4	12:22:27		67.4	67.4
65	12:22:30		65	65
66.6	12:22:33		66.6	66.6

Site A - West Side of Project Site Near Carwash					Site B - Near Southeast Corner of Project site				
SPL	Time	Leq (1 hour Avg.)	Ldn	CNEL	SPL	Time	Leq (1 hour Avg.)	Ldn	CNEL
62.7	12:15:36		62.7	62.7	66.4	12:22:36		66.4	66.4
62.8	12:15:39		62.8	62.8	69.4	12:22:39		69.4	69.4
62.9	12:15:42		62.9	62.9	69.6	12:22:42		69.6	69.6
61	12:15:45		61	61	62.8	12:22:45		62.8	62.8
60.6	12:15:48		60.6	60.6	62.6	12:22:48		62.6	62.6
62.8	12:15:51		62.8	62.8	60.1	12:22:51		60.1	60.1
62.6	12:15:54		62.6	62.6	59.3	12:22:54		59.3	59.3
62.6	12:15:57		62.6	62.6	58.6	12:22:57		58.6	58.6
61.7	12:16:00		61.7	61.7	68.9	12:23:00		68.9	68.9
62	12:16:03		62	62	60.4	12:23:03		60.4	60.4
60.7	12:16:06		60.7	60.7	56.2	12:23:06		56.2	56.2
61.2	12:16:09		61.2	61.2	63.7	12:23:09		63.7	63.7
61.4	12:16:12		61.4	61.4	64.4	12:23:12		64.4	64.4
60.6	12:16:15		60.6	60.6	62.7	12:23:15		62.7	62.7
60	12:16:18		60	60	69.1	12:23:18		69.1	69.1
59.7	12:16:21		59.7	59.7	67.6	12:23:21		67.6	67.6
60.7	12:16:24		60.7	60.7	65.3	12:23:24		65.3	65.3
60.2	12:16:27		60.2	60.2	65	12:23:27		65	65
60.5	12:16:30		60.5	60.5	67.9	12:23:30		67.9	67.9
60.2	12:16:33		60.2	60.2	67	12:23:33		67	67
59.8	12:16:36		59.8	59.8	65.8	12:23:36		65.8	65.8
59.9	12:16:39		59.9	59.9	64.2	12:23:39		64.2	64.2
60.6	12:16:42		60.6	60.6	65.4	12:23:42		65.4	65.4
59.9	12:16:45		59.9	59.9	62.8	12:23:45		62.8	62.8
60.1	12:16:48		60.1	60.1	66.6	12:23:48		66.6	66.6
60.6	12:16:51		60.6	60.6	60.2	12:23:51		60.2	60.2
60	12:16:54		60	60	67.3	12:23:54		67.3	67.3
60.6	12:16:57		60.6	60.6	63.5	12:23:57		63.5	63.5
60.8	12:17:00		60.8	60.8	70.7	12:24:00		70.7	70.7
61.8	12:17:03		61.8	61.8	64	12:24:03		64	64
64.5	12:17:06		64.5	64.5	69.3	12:24:06		69.3	69.3
63.6	12:17:09		63.6	63.6	67.3	12:24:09		67.3	67.3
65.7	12:17:12		65.7	65.7	59.1	12:24:12		59.1	59.1
65.3	12:17:15		65.3	65.3	57.6	12:24:15		57.6	57.6
64.8	12:17:18		64.8	64.8	65.2	12:24:18		65.2	65.2
67.8	12:17:21		67.8	67.8	58.5	12:24:21		58.5	58.5
66.3	12:17:24		66.3	66.3	52.8	12:24:24		52.8	52.8
64.9	12:17:27		64.9	64.9	52.5	12:24:27		52.5	52.5
62.9	12:17:30		62.9	62.9	53.2	12:24:30		53.2	53.2
63.6	12:17:33		63.6	63.6	55.1	12:24:33		55.1	55.1
65.4	12:17:36		65.4	65.4	55.9	12:24:36		55.9	55.9
63.4	12:17:39		63.4	63.4	59.7	12:24:39		59.7	59.7
61.6	12:17:42		61.6	61.6	69	12:24:42		69	69
62	12:17:45		62	62	58.4	12:24:45		58.4	58.4
61.6	12:17:48		61.6	61.6	56.8	12:24:48		56.8	56.8
62.9	12:17:51		62.9	62.9	56.9	12:24:51		56.9	56.9
60.3	12:17:54		60.3	60.3	61.9	12:24:54		61.9	61.9
60.5	12:17:57		60.5	60.5	59	12:24:57		59	59
60.5	12:18:00		60.5	60.5	53.4	12:25:00		53.4	53.4
62.2	12:18:03		62.2	62.2	50.8	12:25:03		50.8	50.8
60.9	12:18:06		60.9	60.9	52	12:25:06		52	52
61	12:18:09		61	61	53.2	12:25:09		53.2	53.2
60.6	12:18:12		60.6	60.6	49.8	12:25:12		49.8	49.8
61.3	12:18:15		61.3	61.3	50.2	12:25:15		50.2	50.2
61.2	12:18:18		61.2	61.2	53.6	12:25:18		53.6	53.6
62.4	12:18:21		62.4	62.4	62.7	12:25:21		62.7	62.7
64.3	12:18:24		64.3	64.3	57.8	12:25:24		57.8	57.8
60.8	12:18:27		60.8	60.8	56.2	12:25:27		56.2	56.2
61.9	12:18:30		61.9	61.9	67.2	12:25:30		67.2	67.2
63.8	12:18:33		63.8	63.8	66.9	12:25:33		66.9	66.9
62.8	12:18:36		62.8	62.8	60	12:25:36		60	60
64.4	12:18:39		64.4	64.4	57.8	12:25:39		57.8	57.8
64.1	12:18:42		64.1	64.1	60.7	12:25:42		60.7	60.7
63.1	12:18:45		63.1	63.1	65.7	12:25:45		65.7	65.7
62.6	12:18:48		62.6	62.6	65.4	12:25:48		65.4	65.4
65.4	12:18:51		65.4	65.4	70.3	12:25:51		70.3	70.3
65.6	12:18:54		65.6	65.6	72.7	12:25:54		72.7	72.7
66.5	12:18:57		66.5	66.5	68.7	12:25:57		68.7	68.7
64.2	12:19:00		64.2	64.2	70.2	12:26:00		70.2	70.2
76.4	12:19:03		76.4	76.4	65.8	12:26:03		65.8	65.8
67.5	12:19:06		67.5	67.5	65.3	12:26:06		65.3	65.3
63.9	12:19:09		63.9	63.9	67.1	12:26:09		67.1	67.1
65.2	12:19:12		65.2	65.2	66.9	12:26:12		66.9	66.9
66.4	12:19:15		66.4	66.4	62.5	12:26:15		62.5	62.5
65	12:19:18		65	65	66.8	12:26:18		66.8	66.8
65.6	12:19:21		65.6	65.6	60.6	12:26:21		60.6	60.6
66.5	12:19:24		66.5	66.5	63.4	12:26:24		63.4	63.4
66.3	12:19:27		66.3	66.3	67.6	12:26:27		67.6	67.6
65	12:19:30		65	65	57.7	12:26:30		57.7	57.7
68.2	12:19:33		68.2	68.2	54.7	12:26:33		54.7	54.7
65.5	12:19:36		65.5	65.5	54.4	12:26:36		54.4	54.4
63.7	12:19:39		63.7	63.7	61.6	12:26:39		61.6	61.6
64.1	12:19:42		64.1	64.1	56.9	12:26:42		56.9	56.9
64.4	12:19:45		64.4	64.4	56.2	12:26:45		56.2	56.2
64.3	12:19:48		64.3	64.3	70.4	12:26:48		70.4	70.4
65.8	12:19:51		65.8	65.8	60.5	12:26:51		60.5	60.5
64.4	12:19:54		64.4	64.4	58.6	12:26:54		58.6	58.6
63.5	12:19:57		63.5	63.5	60.4	12:26:57		60.4	60.4
62.7	12:20:00		62.7	62.7	61.3	12:27:00		61.3	61.3
61.7	12:20:03		61.7	61.7	54.1	12:27:03		54.1	54.1
65.1	12:20:06		65.1	65.1	52	12:27:06		52	52
65.5	12:20:09		65.5	65.5	55	12:27:09		55	55
70.4	12:20:12		70.4	70.4	54.9	12:27:12		54.9	54.9
65.2	12:20:15		65.2	65.2	57.8	12:27:15		57.8	57.8
65.8	12:20:18		65.8	65.8	59	12:27:18		59	59
66.7	12:20:21		66.7	66.7	68.1	12:27:21		68.1	68.1
66.7	12:20:24		66.7	66.7	68.3	12:27:24		68.3	68.3
65.4	12:20:27		65.4	65.4	62.3	12:27:27		62.3	62.3
66.2	12:20:30		66.2	66.2	67.9	12:27:30		67.9	67.9
62.3	12:20:33		62.3	62.3	69.9	12:27:33		69.9	69.9
67	12:20:36		67	67	71.1	12:27:36		71.1	71.1
68.5	12:20:39		68.5	68.5	68.1	12:27:39		68.1	68.1
65.1	12:20:42		65.1	65.1	65.5	12:27:42		65.5	65.5
64.3	12:20:45		64.3	64.3	65.2	12:27:45		65.2	65.2
67.2	12:20:48		67.2	67.2	70.7	12:27:48		70.7	70.7
68.7	12:20:51		68.7	68.7	61.6	12:27:51		61.6	61.6
66.7	12:20:54		66.7	66.7	64.9	12:27:54		64.9	64.9
66.2	12:20:57		66.2	66.2	63.3	12:27:57		63.3	63.3
64	12:21:00		64	64	66	12:28:00		66	66
64.9	12:21:03		64.9	64.9	73	12:28:03		73	73
65.7	12:21:06		65.7	65.7	67.7	12:28:06		67.7	67.7
65.5	12:21:09		65.5	65.5	58	12:28:09		58	58
63.9	12:21:12		63.9	63.9	67.8	12:28:12		67.8	67.8
63.4	12:21:15		63.4	63.4	57.4	12:28:15		57.4	57.4
67.8	12:21:18		67.8	67.8	55	12:28:18		55	55
68.1	12:21:21		68.1	68.1	54.3	12:28:21		54.3	54.3
65.5	12:21:24		65.5	65.5	54.5	12:28:24		54.5	54.5
68.3	12:21:27		68.3	68.3	54.9	12:28:27		54.9	54.9
71.5	12:21:30		71.5	71.5	53.9	12:28:30		53.9	53.9
73.8	12:21:33		73.8	73.8	51.9	12:28:33		51.9	51.9
73	12:21:36		73	73	53.4	12:28:36		53.4	53.4
75	12:21:39		75	75	55.9	12:28:39		55.9	55.9
74.7	12:21:42		74.7	74.7	60.4	12:28:42		60.4	60.4
69.7	12:21:45		69.7	69.7	59.3	12:28:45		59.3	59.3
69.2	12:21:48		69.2	69.2	56	12:28:48		56	56
69.1	12:21:51		69.1	69.1	54.2	12:28:51		54.2	54.2
81.9	12:21:54		81.9	81.9	53.9	12:28:54		53.9	53.9
72.4	12:21:57		72.4	72.4	53.2	12:28:57		53.2	53.2
69.5	12:22:00		69.5	69.5	53.9	12:29:00		53.9	53.9
67.1	12:22:03		67.1	67.1	55.4	12:29:03		55.4	55.4
67.4	12:22:06		67.4	67.4	56.2	12:29:06		56.2	56.2
67.3	12:22:09		67.3	67.3	61.1	12:29:09		61.1	61.1
67.2	12:22:12		67.2	67.2	65.2	12:29:12		65.2	65.2
68.3	12:22:15		68.3	68.3	70.5	12:29:15		70.5	70.5
68.9	12:22:18		68.9	68.9	65.1	12:29:18		65.1	65.1
67.9	12:22:21		67.9	67.9	58.4	12:29:21		58.4	58.4
67.5	12:22:24		67.5	67.5	58	12:29:24		58	58
67.1	12:22:27		67.1	67.1	65.6	12:29:27		65.6	65.6
66.9	12:22:30		66.9	66.9	65.6	12:29:30		65.6	65.6
66.8	12:22:33		66.8	66.8	64.1	12:29:33		64.1	64.1
68.2	12:22:36		68.2	68.2	59.1	12:29:36		59.1	59.1
67.8	12:22:39		67.8	67.8	69.7	12:29:39		69.7	69.7
65	12:22:42		65	65	69.5	12:29:42		69.5	69.5

Site A - West Side of Project Site Near Carwash

SPL	Time	Leq (1 hour Avg.)	Ldn	CNEL
63.9	12:22:45		63.9	63.9
64.9	12:22:48		64.9	64.9
64.6	12:22:51		64.6	64.6
64.8	12:22:54		64.8	64.8
62.6	12:22:57		62.6	62.6
64.5	12:23:00		64.5	64.5
64.8	12:23:03		64.8	64.8
64.6	12:23:06		64.6	64.6
64.7	12:23:09		64.7	64.7
63.2	12:23:12		63.2	63.2
65.4	12:23:15		65.4	65.4
63.1	12:23:18		63.1	63.1
66.3	12:23:21		66.3	66.3
65.2	12:23:24		65.2	65.2
67.7	12:23:27		67.7	67.7
67.4	12:23:30		67.4	67.4
63.8	12:23:33		63.8	63.8
63.2	12:23:36		63.2	63.2
61	12:23:39		61	61
62.6	12:23:42		62.6	62.6
64	12:23:45		64	64
65.2	12:23:48		65.2	65.2
65.8	12:23:51		65.8	65.8
67.6	12:23:54		67.6	67.6
63.4	12:23:57		63.4	63.4
63.5	12:24:00		63.5	63.5
64.4	12:24:03		64.4	64.4
66.4	12:24:06		66.4	66.4
65.1	12:24:09		65.1	65.1
64.4	12:24:12		64.4	64.4
64.1	12:24:15		64.1	64.1
67.5	12:24:18		67.5	67.5
65.2	12:24:21		65.2	65.2
65.1	12:24:24		65.1	65.1
63.5	12:24:27		63.5	63.5
65.9	12:24:30		65.9	65.9
65.5	12:24:33		65.5	65.5
66.7	12:24:36		66.7	66.7
65.9	12:24:39		65.9	65.9
63.8	12:24:42		63.8	63.8
63.5	12:24:45		63.5	63.5
67.6	12:24:48		67.6	67.6
63.9	12:24:51		63.9	63.9
65	12:24:54		65	65
65.2	12:24:57		65.2	65.2
63.1	12:25:00		63.1	63.1
63.7	12:25:03		63.7	63.7
64.8	12:25:06		64.8	64.8
63.6	12:25:09		63.6	63.6
62.5	12:25:12		62.5	62.5
60.8	12:25:15		60.8	60.8
61	12:25:18		61	61
60.9	12:25:21		60.9	60.9
64.4	12:25:24		64.4	64.4
63.9	12:25:27		63.9	63.9
63.9	12:25:30		63.9	63.9
61	12:25:33		61	61
62.4	12:25:36		62.4	62.4
60.5	12:25:39		60.5	60.5
60.4	12:25:42		60.4	60.4
60.1	12:25:45		60.1	60.1
60.4	12:25:48		60.4	60.4
60.1	12:25:51		60.1	60.1
60.5	12:25:54		60.5	60.5
60.7	12:25:57		60.7	60.7
61.2	12:26:00		61.2	61.2
61.9	12:26:03		61.9	61.9
62.4	12:26:06		62.4	62.4
64.6	12:26:09		64.6	64.6
63.5	12:26:12		63.5	63.5
64.8	12:26:15		64.8	64.8
64	12:26:18		64	64
66.1	12:26:21		66.1	66.1
67	12:26:24		67	67
64.6	12:26:27		64.6	64.6
64.2	12:26:30		64.2	64.2
67.4	12:26:33		67.4	67.4
65.6	12:26:36		65.6	65.6
64.3	12:26:39		64.3	64.3
65.2	12:26:42		65.2	65.2
62.5	12:26:45		62.5	62.5
63.2	12:26:48		63.2	63.2
63.9	12:26:51		63.9	63.9
63.1	12:26:54		63.1	63.1
62.8	12:26:57		62.8	62.8
63.9	12:27:00		63.9	63.9
61.8	12:27:03		61.8	61.8
61.8	12:27:06		61.8	61.8
60.9	12:27:09		60.9	60.9
61.2	12:27:12		61.2	61.2
60.9	12:27:15		60.9	60.9
60.1	12:27:18		60.1	60.1
60.1	12:27:21		60.1	60.1
61.1	12:27:24		61.1	61.1
60.6	12:27:27		60.6	60.6
60.5	12:27:30		60.5	60.5
59.8	12:27:33		59.8	59.8
60.1	12:27:36		60.1	60.1
61.2	12:27:39		61.2	61.2
60	12:27:42		60	60
59.5	12:27:45		59.5	59.5
60.2	12:27:48		60.2	60.2
60.5	12:27:51		60.5	60.5
60.3	12:27:54		60.3	60.3
61.1	12:27:57		61.1	61.1
61.9	12:28:00		61.9	61.9
65.4	12:28:03		65.4	65.4
65.9	12:28:06		65.9	65.9
65.3	12:28:09		65.3	65.3
64.4	12:28:12		64.4	64.4
64.2	12:28:15		64.2	64.2
64.3	12:28:18		64.3	64.3
69.6	12:28:21		69.6	69.6
68.2	12:28:24		68.2	68.2
64.5	12:28:27		64.5	64.5
64.6	12:28:30		64.6	64.6
64.1	12:28:33		64.1	64.1
63.4	12:28:36		63.4	63.4
66.1	12:28:39		66.1	66.1
63.4	12:28:42		63.4	63.4
63.7	12:28:45		63.7	63.7
67.6	12:28:48		67.6	67.6
66.8	12:28:51		66.8	66.8
60.8	12:28:54		60.8	60.8
60.6	12:28:57		60.6	60.6
60.8	12:29:00		60.8	60.8
60.6	12:29:03		60.6	60.6
60.7	12:29:06		60.7	60.7
60.8	12:29:09		60.8	60.8
60.6	12:29:12		60.6	60.6
61	12:29:15		61	61
60.4	12:29:18		60.4	60.4
61.1	12:29:21		61.1	61.1
62.1	12:29:24		62.1	62.1
65.3	12:29:27		65.3	65.3
68.9	12:29:30		68.9	68.9
65.1	12:29:33		65.1	65.1
63.5	12:29:36		63.5	63.5
63.5	12:29:39		63.5	63.5
62	12:29:42		62	62
62.2	12:29:45		62.2	62.2
66	12:29:48		66	66
63	12:29:51		63	63

Site B - Near Southeast Corner of Project site

SPL	Time	Leq (1 hour Avg.)	Ldn	CNEL
67.7	12:29:45		67.7	67.7
63.9	12:29:48		63.9	63.9
64	12:29:51		64	64
72.8	12:29:54		72.8	72.8
68.4	12:29:57		68.4	68.4
62.7	12:30:00		62.7	62.7
71.3	12:30:03		71.3	71.3
72.2	12:30:06		72.2	72.2
63.3	12:30:09		63.3	63.3
59.7	12:30:12		59.7	59.7
67.6	12:30:15		67.6	67.6
64.5	12:30:18		64.5	64.5
56.7	12:30:21		56.7	56.7
53.4	12:30:24		53.4	53.4
54.8	12:30:27		54.8	54.8
67.9	12:30:30		67.9	67.9
62.6	12:30:33		62.6	62.6
67	12:30:36		67	67
56.5	12:30:39		56.5	56.5
53.4	12:30:42		53.4	53.4
55.7	12:30:45		55.7	55.7
63.3	12:30:48		63.3	63.3
55.8	12:30:51		55.8	55.8
52.4	12:30:54		52.4	52.4
54.9	12:30:57		54.9	54.9
60.5	12:31:00		60.5	60.5
63.9	12:31:03		63.9	63.9
60.1	12:31:06		60.1	60.1
61	12:31:09		61	61
57.9	12:31:12		57.9	57.9
63.5	12:31:15		63.5	63.5
67.4	12:31:18		67.4	67.4
58.5	12:31:21		58.5	58.5
58.2	12:31:24		58.2	58.2
68.1	12:31:27		68.1	68.1
69.8	12:31:30		69.8	69.8
68.7	12:31:33		68.7	68.7
62.7	12:31:36		62.7	62.7
73.6	12:31:39		73.6	73.6
74	12:31:42		74	74
65.1	12:31:45		65.1	65.1
64.3	12:31:48		64.3	64.3
63.4	12:31:51		63.4	63.4
55.8	12:31:54		55.8	55.8
53.9	12:31:57		53.9	53.9
54.2	12:32:00		54.2	54.2
56.6	12:32:03		56.6	56.6
65.3	12:32:06		65.3	65.3
66.2	12:32:09		66.2	66.2
56.9	12:32:12		56.9	56.9
54.4	12:32:15		54.4	54.4
66.2	12:32:18		66.2	66.2
58.8	12:32:21		58.8	58.8
53.2	12:32:24		53.2	53.2
51.4	12:32:27		51.4	51.4
51.1	12:32:30		51.1	51.1
51	12:32:33		51	51
51.8	12:32:36		51.8	51.8
50.4	12:32:39		50.4	50.4
51.7	12:32:42		51.7	51.7
54.9	12:32:45		54.9	54.9
60.8	12:32:48		60.8	60.8
60.4	12:32:51		60.4	60.4
60.8	12:32:54		60.8	60.8
62.4	12:32:57		62.4	62.4
69.1	12:33:00		69.1	69.1
69.8	12:33:03		69.8	69.8
70.4	12:33:06		70.4	70.4
70.9	12:33:09		70.9	70.9
65.8	12:33:12		65.8	65.8
57	12:33:15		57	57
58.6	12:33:18		58.6	58.6
62.6	12:33:21		62.6	62.6
62	12:33:24		62	62
64.8	12:33:27		64.8	64.8
66	12:33:30		66	66
64.3	12:33:33		64.3	64.3
63.8	12:33:36		63.8	63.8
70.8	12:33:39		70.8	70.8
67	12:33:42		67	67
61.4	12:33:45		61.4	61.4
62.8	12:33:48		62.8	62.8
72.3	12:33:51		72.3	72.3
64.4	12:33:54		64.4	64.4
57.5	12:33:57		57.5	57.5
58.8	12:34:00		58.8	58.8
54.3	12:34:03		54.3	54.3
53.7	12:34:06		53.7	53.7
59.7	12:34:09		59.7	59.7
59.7	12:34:12		59.7	59.7
56.3	12:34:15		56.3	56.3
60.7	12:34:18		60.7	60.7
63.2	12:34:21		63.2	63.2
65.9	12:34:24		65.9	65.9
60.6	12:34:27		60.6	60.6
66.7	12:34:30		66.7	66.7
73.4	12:34:33		73.4	73.4
67.2	12:34:36		67.2	67.2
60.5	12:34:39		60.5	60.5
63.2	12:34:42		63.2	63.2
55	12:34:45		55	55
55.9	12:34:48		55.9	55.9
63.5	12:34:51		63.5	63.5
63.7	12:34:54		63.7	63.7
64.9	12:34:57		64.9	64.9
69.4	12:35:00		69.4	69.4
69.2	12:35:03		69.2	69.2
67.2	12:35:06		67.2	67.2
67.2	12:35:09		67.2	67.2
71.4	12:35:12		71.4	71.4
70.3	12:35:15		70.3	70.3
69.1	12:35:18		69.1	69.1
69.9	12:35:21		69.9	69.9
64	12:35:24		64	64
64.3	12:35:27		64.3	64.3
68	12:35:30		68	68
62.1	12:35:33		62.1	62.1
57.2	12:35:36		57.2	57.2
65.1	12:35:39		65.1	65.1
64.8	12:35:42		64.8	64.8
68	12:35:45		68	68
58.7	12:35:48		58.7	58.7
53.6	12:35:51		53.6	53.6
53.7	12:35:54		53.7	53.7
59.2	12:35:57		59.2	59.2
60	12:36:00		60	60
53.3	12:36:03		53.3	53.3
52.7	12:36:06		52.7	52.7
54.4	12:36:09		54.4	54.4
58.5	12:36:12		58.5	58.5
64.4	12:36:15		64.4	64.4
54.4	12:36:18		54.4	54.4
52	12:36:21		52	52
54.4	12:36:24		54.4	54.4
62.3	12:36:27		62.3	62.3
65.4	12:36:30		65.4	65.4
59.7	12:36:33		59.7	59.7
60.8	12:36:36		60.8	60.8
67.6	12:36:39		67.6	67.6
66.8	12:36:42		66.8	66.8
68.3	12:36:45		68.3	68.3
67.9	12:36:48		67.9	67.9
68.4	12:36:51		68.4	68.4

Site A - West Side of Project Site Near Carwash

SPL	Time	Leq (1 hour Avg.)	Ldn	CNEL
65.4	12:29:54		65.4	65.4
66	12:29:57		66	66
63.1	12:30:00		63.1	63.1
65.2	12:30:03		65.2	65.2
66	12:30:06		66	66
67.9	12:30:09		67.9	67.9
66.3	12:30:12		66.3	66.3
64.4	12:30:15		64.4	64.4
65	12:30:18		65	65
65.9	12:30:21		65.9	65.9
65	12:30:24		65	65
64	12:30:27		64	64
62.3	12:30:30		62.3	62.3
62.6	12:30:33		62.6	62.6
64.9	12:30:36		64.9	64.9
64	12:30:39		64	64
63.8	12:30:42		63.8	63.8
62.8	12:30:45		62.8	62.8
62.7	12:30:48		62.7	62.7
62.1	12:30:51		62.1	62.1
63.5	12:30:54		63.5	63.5
60.9	12:30:57		60.9	60.9
59.9	12:31:00		59.9	59.9
60.1	12:31:03		60.1	60.1
60.5	12:31:06		60.5	60.5
59.8	12:31:09		59.8	59.8
59.7	12:31:12		59.7	59.7
59.7	12:31:15		59.7	59.7
59.8	12:31:18		59.8	59.8
59.5	12:31:21		59.5	59.5
60.6	12:31:24		60.6	60.6
60	12:31:27		60	60
60.9	12:31:30		60.9	60.9
60.9	12:31:33		60.9	60.9
60.9	12:31:36		60.9	60.9
61	12:31:39		61	61
65.1	12:31:42		65.1	65.1
64.6	12:31:45		64.6	64.6
64.2	12:31:48		64.2	64.2
63.9	12:31:51		63.9	63.9
63.3	12:31:54		63.3	63.3
66.1	12:31:57		66.1	66.1
66.6	12:32:00		66.6	66.6
66.2	12:32:03		66.2	66.2
64.2	12:32:06		64.2	64.2
64.7	12:32:09		64.7	64.7
64.3	12:32:12		64.3	64.3
65.3	12:32:15		65.3	65.3
62.6	12:32:18		62.6	62.6
62.6	12:32:21		62.6	62.6
61.7	12:32:24		61.7	61.7
61.2	12:32:27		61.2	61.2
60.8	12:32:30		60.8	60.8
61.9	12:32:33		61.9	61.9
60.6	12:32:36		60.6	60.6
62.2	12:32:39		62.2	62.2
60.7	12:32:42		60.7	60.7
62.1	12:32:45		62.1	62.1
60.5	12:32:48		60.5	60.5
60.2	12:32:51		60.2	60.2
60.3	12:32:54		60.3	60.3
60.7	12:32:57		60.7	60.7
61.1	12:33:00		61.1	61.1
61.3	12:33:03		61.3	61.3
61.7	12:33:06		61.7	61.7
61.1	12:33:09		61.1	61.1
60.4	12:33:12		60.4	60.4
60.5	12:33:15		60.5	60.5
60.3	12:33:18		60.3	60.3
60.8	12:33:21		60.8	60.8
60.3	12:33:24		60.3	60.3
63	12:33:27		63	63
63.6	12:33:30		63.6	63.6
64.3	12:33:33		64.3	64.3
63.8	12:33:36		63.8	63.8
63.1	12:33:39		63.1	63.1
63.9	12:33:42		63.9	63.9
65.6	12:33:45		65.6	65.6
64.6	12:33:48		64.6	64.6
64.2	12:33:51		64.2	64.2
61.6	12:33:54		61.6	61.6
62.8	12:33:57		62.8	62.8
62.8	12:34:00		62.8	62.8
63.3	12:34:03		63.3	63.3
64.5	12:34:06		64.5	64.5
65.5	12:34:09		65.5	65.5
64.4	12:34:12		64.4	64.4
63	12:34:15		63	63
64.6	12:34:18		64.6	64.6
61.3	12:34:21		61.3	61.3
60.5	12:34:24		60.5	60.5
61	12:34:27		61	61
60.8	12:34:30		60.8	60.8
61.4	12:34:33		61.4	61.4
64.8	12:34:36		64.8	64.8
61.6	12:34:39		61.6	61.6
60.4	12:34:42		60.4	60.4
60.8	12:34:45		60.8	60.8
60.4	12:34:48		60.4	60.4
60.6	12:34:51		60.6	60.6
61.4	12:34:54		61.4	61.4
62	12:34:57		62	62
60.8	12:35:00		60.8	60.8
61.5	12:35:03		61.5	61.5
62.2	12:35:06		62.2	62.2
62.7	12:35:09		62.7	62.7
64.7	12:35:12		64.7	64.7
65.8	12:35:15		65.8	65.8
62.7	12:35:18		62.7	62.7
60.7	12:35:21		60.7	60.7
60.7	12:35:24		60.7	60.7
62	12:35:27		62	62
62.2	12:35:30		62.2	62.2
62.7	12:35:33		62.7	62.7
64.5	12:35:36		64.5	64.5
66.2	12:35:39		66.2	66.2
64.4	12:35:42		64.4	64.4
64.1	12:35:45		64.1	64.1
64.2	12:35:48		64.2	64.2
65.6	12:35:51		65.6	65.6
66.7	12:35:54		66.7	66.7
63.9	12:35:57		63.9	63.9
64.5	12:36:00		64.5	64.5
63.7	12:36:03		63.7	63.7
66.1	12:36:06		66.1	66.1
62.4	12:36:09		62.4	62.4
61	12:36:12		61	61
61.2	12:36:15		61.2	61.2
62	12:36:18		62	62
61.9	12:36:21		61.9	61.9
60.6	12:36:24		60.6	60.6
60.2	12:36:27		60.2	60.2
61.7	12:36:30		61.7	61.7
61.5	12:36:33		61.5	61.5
60.6	12:36:36		60.6	60.6
59.8	12:36:39		59.8	59.8
60.9	12:36:42		60.9	60.9
61.9	12:36:45		61.9	61.9
62.3	12:36:48		62.3	62.3
61.6	12:36:51		61.6	61.6
61.6	12:36:54		61.6	61.6
62	12:36:57		62	62
63.2	12:37:00		63.2	63.2
61.3	12:37:03		61.3	61.3
61.4	12:37:06		61.4	61.4
62.1	12:37:09		62.1	62.1
62.6	12:37:12		62.6	62.6
63.6	12:37:15		63.6	63.6
63.5	12:37:18		63.5	63.5
62.5	12:37:21		62.5	62.5
62.3	12:37:24		62.3	62.3
62.5	12:37:27		62.5	62.5
64	12:37:30		64	64
64.9	12:37:33		64.9	64.9
65.5	12:37:36		65.5	65.5
64.7	12:37:39		64.7	64.7

Site B - Near Southeast Corner of Project site

SPL	Time	Leq (1 hour Avg.)	Ldn	CNEL
68.3	12:36:54		68.3	68.3
62.1	12:36:57		62.1	62.1
59.5	12:37:00		59.5	59.5
67.5	12:37:03		67.5	67.5
56.1	12:37:06		56.1	56.1
54.5	12:37:09		54.5	54.5
54.5	12:37:12		54.5	54.5
54.5	12:37:15		54.5	54.5
56.8	12:37:18		56.8	56.8
59.4	12:37:21		59.4	59.4
58.8	12:37:24		58.8	58.8
59.1	12:37:27		59.1	59.1
63	12:37:30		63	63
59	12:37:33		59	59
62.1	12:37:36		62.1	62.1
57.4	12:37:39		57.4	57.4
57.3	12:37:42		57.3	57.3
66.5	12:37:45		66.5	66.5
61.8	12:37:48		61.8	61.8
65	12:37:51		65	65
60.4	12:37:54		60.4	60.4
59.5	12:37:57		59.5	59.5
62.4	12:38:00		62.4	62.4
54.6	12:38:03		54.6	54.6
52.7	12:38:06		52.7	52.7
55	12:38:09		55	55
63.7	12:38:12		63.7	63.7
65.8	12:38:15		65.8	65.8
64.6	12:38:18		64.6	64.6
64.1	12:38:21		64.1	64.1
73.6	12:38:24		73.6	73.6
61.3	12:38:27		61.3	61.3
64.9	12:38:30		64.9	64.9
64	12:38:33		64	64
62.6	12:38:36		62.6	62.6
72.2	12:38:39		72.2	72.2
70.1	12:38:42		70.1	70.1
66.6	12:38:45		66.6	66.6
57.4	12:38:48		57.4	57.4
55.5	12:38:51		55.5	55.5
54.1	12:38:54		54.1	54.1
55.3	12:38:57		55.3	55.3
55.6	12:39:00		55.6	55.6
55.1	12:39:03		55.1	55.1
57.3	12:39:06		57.3	57.3
57.7	12:39:09		57.7	57.7
65.6	12:39:12		65.6	65.6
58.2	12:39:15		58.2	58.2
56	12:39:18		56	56
56	12:39:21		56	56
56.7	12:39:24		56.7	56.7
59.5	12:39:27		59.5	59.5
56.6	12:39:30		56.6	56.6
56.4	12:39:33		56.4	56.4
56.3	12:39:36		56.3	56.3
60	12:39:39		60	60
60	12:39:42		60	60
55.6	12:39:45		55.6	55.6
64.1	12:39:48		64.1	64.1
69.3	12:39:51		69.3	69.3
63.3	12:39:54		63.3	63.3
68.9	12:39:57		68.9	68.9
65.7	12:40:00		65.7	65.7
56.4	12:40:03		56.4	56.4
60.4	12:40:06		60.4	60.4
62.8	12:40:09		62.8	62.8
55.1	12:40:12		55.1	55.1
55.1	12:40:15		55.1	55.1
64.1	12:40:18		64.1	64.1
61.7	12:40:21		61.7	61.7
63.1	12:40:24		63.1	63.1
65.4	12:40:27		65.4	65.4
67.5	12:40:30		67.5	67.5
63.6	12:40:33		63.6	63.6
66.4	12:40:36		66.4	66.4
70	12:40:39		70	70
71.2	12:40:42		71.2	71.2
68	12:40:45		68	68
71.4	12:40:48		71.4	71.4
70.8	12:40:51		70.8	70.8
72	12:40:54		72	72
67.4	12:40:57		67.4	67.4
67.3	12:41:00		67.3	67.3
63.3	12:41:03		63.3	63.3
62.1	12:41:06		62.1	62.1
66.8	12:41:09		66.8	66.8
67.9	12:41:12		67.9	67.9
67.4	12:41:15		67.4	67.4
65.2	12:41:18		65.2	65.2
65.4	12:41:21		65.4	65.4
58.2	12:41:24		58.2	58.2
57.6	12:41:27		57.6	57.6
63	12:41:30		63	63
69.8	12:41:33		69.8	69.8
60.9	12:41:36		60.9	60.9
57.3	12:41:39		57.3	57.3
63.2	12:41:42		63.2	63.2
62.4	12:41:45		62.4	62.4
55.2	12:41:48		55.2	55.2
52.3	12:41:51		52.3	52.3
53.4	12:41:54		53.4	53.4
55	12:41:57		55	55
60.3	12:42:00		60.3	60.3
55.7	12:42:03		55.7	55.7
54.2	12:42:06		54.2	54.2
53.2	12:42:09		53.2	53.2
53.4	12:42:12		53.4	53.4
56.4	12:42:15		56.4	56.4
62.8	12:42:18		62.8	62.8
65.6	12:42:21		65.6	65.6
68.4	12:42:24		68.4	68.4
69.5	12:42:27		69.5	69.5
69	12:42:30		69	69
66.6	12:42:33		66.6	66.6
58.4	12:42:36		58.4	58.4
55.6	12:42:39		55.6	55.6
66.6	12:42:42		66.6	66.6
59.7	12:42:45		59.7	59.7
59.6	12:42:48		59.6	59.6
54.7	12:42:51		54.7	54.7
53.5	12:42:54		53.5	53.5
55.2	12:42:57		55.2	55.2
62.5	12:43:00		62.5	62.5
58.9	12:43:03		58.9	58.9
64.6	12:43:06		64.6	64.6
57.7	12:43:09		57.7	57.7
54.5	12:43:12		54.5	54.5
55.2	12:43:15		55.2	55.2
55.2	12:43:18		55.2	55.2
58.1	12:43:21		58.1	58.1
62.4	12:43:24		62.4	62.4
56	12:43:27		56	56
52.6	12:43:30		52.6	52.6
54.8	12:43:33		54.8	54.8
50.9	12:43:36		50.9	50.9
51	12:43:39		51	51
53.9	12:43:42		53.9	53.9
55.2	12:43:45		55.2	55.2
61.8	12:43:48		61.8	61.8
59.3	12:43:51		59.3	59.3
68.5	12:43:54		68.5	68.5
59.2	12:43:57		59.2	59.2
62.9	12:44:00		62.9	62.9
67.2	12:44:03		67.2	67.2
63.8	12:44:06		63.8	63.8
68	12:44:09		68	68
70.9	12:44:12		70.9	70.9
64.5	12:44:15		64.5	64.5
71.5	12:44:18		71.5	71.5
67.3	12:44:21		67.3	67.3
65.7	12:44:24		65.7	65.7
61.6	12:44:27		61.6	61.6
69.3	12:44:30		69.3	69.3
68.7	12:44:33		68.7	68.7
69	12:44:36		69	69
70.3	12:44:39		70.3	70.3

Site A - West Side of Project Site Near Carwash

SPL	Time	Leq (1 hour Avg.)	Ldn	CNEL
63.1	12:37:42		63.1	63.1
64	12:37:45		64	64
62.5	12:37:48		62.5	62.5
63	12:37:51		63	63
64.3	12:37:54		64.3	64.3
65.9	12:37:57		65.9	65.9
65.2	12:38:00		65.2	65.2
62.1	12:38:03		62.1	62.1
61.1	12:38:06		61.1	61.1
79.8	12:38:09		79.8	79.8
63.9	12:38:12		63.9	63.9
61.3	12:38:15		61.3	61.3
64.2	12:38:18		64.2	64.2
61.5	12:38:21		61.5	61.5
61.5	12:38:24		61.5	61.5
60.3	12:38:27		60.3	60.3
61.5	12:38:30		61.5	61.5
61	12:38:33		61	61
61.2	12:38:36		61.2	61.2
62.3	12:38:39		62.3	62.3
64.5	12:38:42		64.5	64.5
62.3	12:38:45		62.3	62.3
62.6	12:38:48		62.6	62.6
64.2	12:38:51		64.2	64.2
62.2	12:38:54		62.2	62.2
62.5	12:38:57		62.5	62.5
63.5	12:39:00	65.7	63.5	63.5
65.6	12:39:03	65.7	65.6	65.6
65.3	12:39:06	65.7	65.3	65.3
65.3	12:39:09	65.7	65.3	65.3
64.9	12:39:12	65.7	64.9	64.9
65.2	12:39:15	65.7	65.2	65.2
64	12:39:18	65.7	64	64
65.9	12:39:21	65.7	65.9	65.9
65.4	12:39:24	65.7	65.4	65.4
66.3	12:39:27	65.7	66.3	66.3
67	12:39:30	65.7	67	67
66	12:39:33	65.7	66	66
67.4	12:39:36	65.7	67.4	67.4
67.7	12:39:39	65.7	67.7	67.7
67.9	12:39:42	65.7	67.9	67.9
65.2	12:39:45	65.7	65.2	65.2
67.7	12:39:48	65.7	67.7	67.7
63.6	12:39:51	65.7	63.6	63.6
62.9	12:39:54	65.7	62.9	62.9
62.8	12:39:57	65.7	62.8	62.8
61.4	12:40:00	65.7	61.4	61.4
61.2	12:40:03	65.7	61.2	61.2
60.7	12:40:06	65.7	60.7	60.7
60.5	12:40:09	65.7	60.5	60.5
61.2	12:40:12	65.7	61.2	61.2
60.7	12:40:15	65.7	60.7	60.7
60.4	12:40:18	65.7	60.4	60.4
61.2	12:40:21	65.7	61.2	61.2
61.4	12:40:24	65.7	61.4	61.4
61.1	12:40:27	65.7	61.1	61.1
62.3	12:40:30	65.7	62.3	62.3
61.1	12:40:33	65.7	61.1	61.1
63.9	12:40:36	65.7	63.9	63.9
65.2	12:40:39	65.7	65.2	65.2
64.4	12:40:42	65.7	64.4	64.4
61.7	12:40:45	65.7	61.7	61.7
63.3	12:40:48	65.7	63.3	63.3
63.4	12:40:51	65.7	63.4	63.4
64.3	12:40:54	65.7	64.3	64.3
64.9	12:40:57	65.7	64.9	64.9
63.8	12:41:00	65.7	63.8	63.8
65.6	12:41:03	65.7	65.6	65.6
65.4	12:41:06	65.7	65.4	65.4
63.5	12:41:09	65.7	63.5	63.5
62.2	12:41:12	65.7	62.2	62.2
63.5	12:41:15	65.7	63.5	63.5
64.1	12:41:18	65.7	64.1	64.1
62	12:41:21	65.7	62	62
62.9	12:41:24	65.7	62.9	62.9
64.4	12:41:27	65.7	64.4	64.4
62.2	12:41:30	65.7	62.2	62.2
61.2	12:41:33	65.7	61.2	61.2
61.3	12:41:36	65.7	61.3	61.3
63.5	12:41:39	65.7	63.5	63.5
62.5	12:41:42	65.7	62.5	62.5
64.4	12:41:45	65.7	64.4	64.4
64	12:41:48	65.7	64	64
61.3	12:41:51	65.7	61.3	61.3
61.6	12:41:54	65.7	61.6	61.6
61	12:41:57	65.7	61	61
60.9	12:42:00	65.7	60.9	60.9
60.8	12:42:03	65.7	60.8	60.8
60.3	12:42:06	65.7	60.3	60.3
60.8	12:42:09	65.7	60.8	60.8
61.6	12:42:12	65.7	61.6	61.6
63	12:42:15	65.7	63	63
62.5	12:42:18	65.7	62.5	62.5
64.3	12:42:21	65.7	64.3	64.3
63.5	12:42:24	65.7	63.5	63.5
62.7	12:42:27	65.7	62.7	62.7
62.1	12:42:30	65.7	62.1	62.1
62.1	12:42:33	65.7	62.1	62.1
63.8	12:42:36	65.7	63.8	63.8
63.4	12:42:39	65.7	63.4	63.4
63	12:42:42	65.7	63	63
63.3	12:42:45	65.7	63.3	63.3
62.2	12:42:48	65.7	62.2	62.2
63.9	12:42:51	65.7	63.9	63.9
63.3	12:42:54	65.7	63.3	63.3
62.4	12:42:57	65.7	62.4	62.4
62.8	12:43:00	65.7	62.8	62.8
63.2	12:43:03	65.8	63.2	63.2
62.6	12:43:06	65.8	62.6	62.6
62.7	12:43:09	65.8	62.7	62.7
63.5	12:43:12	65.8	63.5	63.5
61.4	12:43:15	65.8	61.4	61.4
62.7	12:43:18	65.8	62.7	62.7
61.7	12:43:21	65.8	61.7	61.7
60.6	12:43:24	65.8	60.6	60.6
60.8	12:43:27	65.8	60.8	60.8
60	12:43:30	65.8	60	60
59.8	12:43:33	65.8	59.8	59.8
60	12:43:36	65.8	60	60
59.4	12:43:39	65.8	59.4	59.4
60.1	12:43:42	65.8	60.1	60.1
60	12:43:45	65.8	60	60
59.9	12:43:48	65.8	59.9	59.9
60	12:43:51	65.8	60	60
61.5	12:43:54	65.8	61.5	61.5
60.2	12:43:57	65.8	60.2	60.2
60.1	12:44:00	65.8	60.1	60.1
60.3	12:44:03	65.8	60.3	60.3
61.7	12:44:06	65.8	61.7	61.7
60.5	12:44:09	65.8	60.5	60.5
61.3	12:44:12	65.8	61.3	61.3
61.6	12:44:15	65.8	61.6	61.6
60	12:44:18	65.9	60	60
60.5	12:44:21	65.9	60.5	60.5
60	12:44:24	65.9	60	60
62.7	12:44:27	65.9	62.7	62.7
61.2	12:44:30	65.9	61.2	61.2
64.4	12:44:33	65.9	64.4	64.4
63.8	12:44:36	65.9	63.8	63.8
64.1	12:44:39	65.9	64.1	64.1
64.8	12:44:42	65.9	64.8	64.8
62.8	12:44:45	65.9	62.8	62.8
62.8	12:44:48	65.9	62.8	62.8
63	12:44:51	65.9	63	63
64.8	12:44:54	65.9	64.8	64.8
64.4	12:44:57	65.9	64.4	64.4
65.8	12:45:00	65.9	65.8	65.8
62.9	12:45:03	65.9	62.9	62.9
63.9	12:45:06	65.9	63.9	63.9
65.3	12:45:09	65.9	65.3	65.3
64.8	12:45:12	65.9	64.8	64.8
63.2	12:45:15	65.9	63.2	63.2
63	12:45:18	65.9	63	63
61.7	12:45:21	65.9	61.7	61.7
60.5	12:45:24	65.9	60.5	60.5
61.7	12:45:27	65.9	61.7	61.7
60.8	12:45:30	65.9	60.8	60.8
61.9	12:45:33	65.9	61.9	61.9
61.1	12:45:36	65.9	61.1	61.1
60.2	12:45:39	65.9	60.2	60.2
59.7	12:45:42	65.9	59.7	59.7
60.5	12:45:45	65.9	60.5	60.5
60.4	12:45:48	65.9	60.4	60.4
61.2	12:45:51	65.9	61.2	61.2
63.5	12:45:54	65.9	63.5	63.5
61.7	12:45:57	65.9	61.7	61.7

Site B - Near Southeast Corner of Project site

SPL	Time	Leq (1 hour Avg.)	Ldn	CNEL
63.5	12:44:42		63.5	63.5
58.5	12:44:45		58.5	58.5
63.1	12:44:48		63.1	63.1
64.6	12:44:51		64.6	64.6
60.1	12:44:54		60.1	60.1
58	12:44:57		58	58
59.5	12:45:00		59.5	59.5
63.8	12:45:03		63.8	63.8
60.8	12:45:06		60.8	60.8
65	12:45:09		65	65
66.9	12:45:12		66.9	66.9
63.5	12:45:15		63.5	63.5
64	12:45:18		64	64
64.8	12:45:21		64.8	64.8
61.8	12:45:24		61.8	61.8
65.2	12:45:27		65.2	65.2
57.3	12:45:30		57.3	57.3
57.2	12:45:33		57.2	57.2
59.1	12:45:36		59.1	59.1
64.9	12:45:39		64.9	64.9
62	12:45:42		62	62
57.2	12:45:45		57.2	57.2
56.5	12:45:48		56.5	56.5
62	12:45:51		62	62
55.1	12:45:54		55.1	55.1
52.7	12:45:57		52.7	52.7
59.2	12:46:00	64.8	59.2	59.2
67.3	12:46:03	64.8	67.3	67.3
67.8	12:46:06	64.8	67.8	67.8
68.3	12:46:09	64.8	68.3	68.3
62.3	12:46:12	64.8	62.3	62.3
63.1	12:46:15	64.8	63.1	63.1
66.4	12:46:18	64.8	66.4	66.4
63	12:46:21	64.8	63	63
66	12:46:24	64.8	66	66
59.5	12:46:27	64.8	59.5	59.5
68.1	12:46:30	64.8	68.1	68.1
73.5	12:46:33	64.8	73.5	73.5
72.2	12:46:36	64.8	72.2	72.2
60	12:46:39	64.8	60	60
52.9	12:46:42	64.8	52.9	52.9
54.1	12:46:45	64.8	54.1	54.1
53.9	12:46:48	64.8	53.9	53.9
53.3	12:46:51	64.8	53.3	53.3
51.5	12:46:54	64.8	51.5	51.5
51.1	12:46:57	64.8	51.1	51.1
50.6	12:47:00	64.8	50.6	50.6
50.8	12:47:03	64.8	50.8	50.8
50.6	12:47:06	64.8	50.6	50.6
51.2	12:47:09	64.8	51.2	51.2
50.6	12:47:12	64.8	50.6	50.6
49.9	12:47:15	64.8	49.9	49.9
53.4	12:47:18	64.8	53.4	53.4
55.4	12:47:21	64.8	55.4	55.4
59.6	12:47:24	64.8	59.6	59.6
57.5	12:47:27	64.8	57.5	57.5
61.9	12:47:30	64.8	61.9	61.9
56.2	12:47:33	64.8	56.2	56.2
61.4	12:47:36	64.8	61.4	61.4
63.4	12:47:39	64.8	63.4	63.4
62.7	12:47:42	64.8	62.7	62.7
65.4	12:47:45	64.8	65.4	65.4
67.2	12:47:48	64.8	67.2	67.2
71.9	12:47:51	64.8	71.9	71.9
66.9	12:47:54	64.8	66.9	66.9
67.6	12:47:57	64.8	67.6	67.6
63.4	12:48:00	64.8	63.4	63.4
62.7	12:48:03	64.8	62.7	62.7
60.2	12:48:06	64.8	60.2	60.2
61.4	12:48:09	64.8	61.4	61.4
68.3	12:48:12	64.8	68.3	68.3
68.2	12:48:15	64.8	68.2	68.2
65.9	12:48:18	64.8	65.9	65.9
65	12:48:21	64.8	65	65
57.8	12:48:24	64.8	57.8	57.8
56.7	12:48:27	64.8	56.7	56.7
69.8	12:48:30	64.8	69.8	69.8
63.9	12:48:33	64.8	63.9	63.9
64.2	12:48:36	64.8	64.2	64.2
62.3	12:48:39	64.8	62.3	62.3
69.6	12:48:42	64.8	69.6	69.6
61.9	12:48:45	64.8	61.9	61.9
56.2	12:48:48	64.8	56.2	56.2
54.5	12:48:51	64.8	54.5	54.5
56.1	12:48:54	64.8	56.1	56.1
67	12:48:57	64.8	67	67
54.7	12:49:00	64.8	54.7	54.7
50.6	12:49:03	64.8	50.6	50.6
51.3	12:49:06	64.8	51.3	51.3
52.9	12:49:09	64.8	52.9	52.9
56.1	12:49:12	64.8	56.1	56.1
60.5	12:49:15	64.8	60.5	60.5
66.9	12:49:18	64.8	66.9	66.9
64	12:49:21	64.8	64	64
55.7	12:49:24	64.8	55.7	55.7
55.5	12:49:27	64.8	55.5	55.5
61	12:49:30	64.8	61	61
62.2	12:49:33	64.8	62.2	62.2
61.8	12:49:36	64.8	61.8	61.8
56.8	12:49:39	64.8	56.8	56.8
54.9	12:49:42	64.8	54.9	54.9
58.2	12:49:45	64.8	58.2	58.2
68.6	12:49:48	64.8	68.6	68.6
71.1	12:49:51	64.8	71.1	71.1
71.2	12:49:54	64.8	71.2	71.2
67.9	12:49:57	64.8	67.9	67.9
69.5	12:50:00	64.8	69.5	69.5
69.2	12:50:03	64.8	69.2	69.2
63.8	12:50:06	64.8	63.8	63.8
55.6	12:50:09	64.8	55.6	55.6
55.3	12:50:12	64.8	55.3	55.3
55.5	12:50:15	64.8	55.5	55.5
55.4	12:50:18	64.8	55.4	55.4
61.5	12:50:21	64.8	61.5	61.5
57.8	12:50:24	64.8	57.8	57.8
64.9	12:50:27	64.8	64.9	64.9
57.6	12:50:30	64.8	57.6	57.6
64.1	12:50:33	64.8	64.1	64.1
63.6	12:50:36	64.8	63.6	63.6
67.2	12:50:39	64.8	67.2	67.2
59.6	12:50:42	64.8	59.6	59.6
54	12:50:45	64.8	54	54
53.2	12:50:48	64.8	53.2	53.2
54.9	12:50:51	64.8	54.9	54.9
52.1	12:50:54	64.8	52.1	52.1
55	12:50:57	64.8	55	55
65.6	12:51:00	64.8	65.6	65.6
56	12:51:03	64.8	56	56
62.1	12:51:06	64.8	62.1	62.1
58	12:51:09	64.8	58	58
57.5	12:51:12	64.8	57.5	57.5
68.4	12:51:15	64.8	68.4	68.4
69	12:51:18	64.8	69	69
63.9	12:51:21	64.8	63.9	63.9
69.7	12:51:24	64.8	69.7	69.7
63.4	12:51:27	64.8	63.4	63.4
63.5	12:51:30	64.8	63.5	63.5
68.6	12:51:33	64.9	68.6	68.6
62.9	12:51:36	64.9	62.9	62.9
64.4	12:51:39	64.9	64.4	64.4
67.9	12:51:42	64.9	67.9	67.9
66.2	12:51:45	64.9	66.2	66.2
66.4	12:51:48	64.9	66.4	66.4
63.8	12:51:51	64.9	63.8	63.8
70	12:51:54	64.9	70	70
70.4	12:51:57	64.9	70.4	70.4
68.8	12:52:00	64.9	68.8	68.8
66.1	12:52:03	64.9	66.1	66.1
63.7	12:52:06	65.0	63.7	63.7
59.1	12:52:09	65.1	59.1	59.1
65	12:52:12	65.3	65	65
56.5	12:52:15	65.3	56.5	56.5
64.3	12:52:18	65.3	64.3	64.3
65	12:52:21	65.3	65	65
55.7	12:52:24	65.3	55.7	55.7
54.2	12:52:27	65.3	54.2	54.2
64.2	12:52:30	65.3	64.2	64.2
54.8	12:52:33	65.3	54.8	54.8
54.7	12:52:36	65.3	54.7	54.7
52.8	12:52:39	65.3	52.8	52.8
51	12:52:42	65.3	51	51
51.3	12:52:45	65.3	51.3	51.3
50	12:52:48	65.3	50	50
53.6	12:52:51	65.3	53.6	53.6
54.4	12:52:54	65.3	54.4	54.4
60.9	12:52:57	65.3	60.9	60.9

APPENDIX C

FHWA Model Traffic Noise Calculations

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

Road Name: Fair Drive
Building: Unit 8

Project Name: Carnegie Ave MFR
Job Number: 15072

NOISE MODEL INPUTS

Highway Data

Average Daily Traffic:	38,000	vehicles
Peak Hour Volume:	3,800	vehicles
Vehicle Speed:	35	mph
Near/Far Lane Distance:	48	feet

Vehicle Mix

	Day	Evening	Night	Daily
Autos:	69.5%	12.9%	9.6%	92.0%
Medium Trucks:	1.4%	0.1%	1.5%	3.0%
Heavy Trucks:	2.4%	0.1%	2.5%	5.0%

Site Data

Barrier Height:	**5**	**feet**
Barrier Type(Wall/Berm):	Wall	
Site Conditions(Hard/Soft):	Soft	
Centerline (C.L.) Dist. to Barrier:	74	feet
C.L. Dist. To Observer (Backyard):	79	feet
Barrier Dist. To Observer (Backyard):	5	feet
C.L. Dist. To Observer (Structure):	84	feet
Barrier Dist. To Observer (Structure):	10	feet
Road Grade:	0.00	%
Left View:	-90	degrees
Right View:	90	degrees

Elevations

Barrier Base Elevation:	0.0	feet
Road Elevation:	0.0	feet
Noise Source Elevation above Road		
Autos:	0	feet
Med Trucks:	2.3	feet
Hvy Trucks:	8	feet
Pad Elevation:	0.0	feet
Observer Heights Above Pad Elevation		
Exterior:	5	feet
First Floor:	5.5	feet
Second Floor:	14	feet

FHWA NOISE MODEL CALCULATIONS

	REMEL	Traffic Flow	Distance	Finite Road	Grade	Barrier Attenuation Exterior	1st Flr	2nd Flr
Autos:	65.11	4.69	-2.78	-1.20	0.00	-5.2	-4.9	0
Med Trucks:	74.83	-10.18	-2.78	-1.20	0.00	-4.9	-4.9	0
Hvy Trucks:	80.05	-7.96	-2.78	-1.20	0.00	-4.9	-3.8	0

UNMITIGATED NOISE LEVELS (with topographical and existing barrier attenuation)

	Leq Peak Hour	Leq Day	Leq Evening	Leq Night	Ldn	CNEL
Autos:	65.8	63.4	62.2	56.1	64.5	65.2
Med Trucks:	60.7	41.5	33.7	42.9	49.0	49.1
Hvy Trucks:	68.1	51.1	43.3	52.5	58.7	58.7
Traffic Noise:	**70.6**	**63.7**	**62.2**	**57.8**	**65.6**	**66.1**

MITIGATED NOISE LEVELS (Backyard)

	Leq Peak Hour	Leq Day	Leq Evening	Leq Night	Ldn	CNEL
Autos:	60.6	58.2	57.0	50.9	59.3	60.0
Med Trucks:	55.8	36.6	28.8	38.0	44.1	44.2
Hvy Trucks:	63.2	46.2	38.4	47.6	53.8	53.8
Traffic Noise:	**65.6**	**58.5**	**57.0**	**52.7**	**60.5**	**61.0**

MITIGATED NOISE LEVELS (First Floor)

	Leq Peak Hour	Leq Day	Leq Evening	Leq Night	Ldn	CNEL
Autos:	60.5	58.1	56.8	50.8	59.2	59.8
Med Trucks:	55.3	36.1	28.3	37.5	43.7	43.7
Hvy Trucks:	63.9	46.9	39.1	48.3	54.5	54.5
Traffic Noise:	**65.9**	**58.4**	**56.9**	**52.8**	**60.5**	**61.0**

MITIGATED NOISE LEVELS (Second Floor)

	Leq Peak Hour	Leq Day	Leq Evening	Leq Night	Ldn	CNEL
Autos:	65.3	62.9	61.6	55.6	64.0	64.6
Med Trucks:	60.1	40.9	33.2	42.4	48.5	48.5
Hvy Trucks:	67.6	50.6	42.8	52.0	58.2	58.2
Traffic Noise:	**70.1**	**63.2**	**61.7**	**57.3**	**65.1**	**65.6**

MITIGATED NOISE LEVELS (Third Floor)

	Leq Peak Hour	Leq Day	Leq Evening	Leq Night	Ldn	CNEL
Autos:	65.1	62.8	61.5	55.4	63.8	64.5
Med Trucks:	60.0	40.8	33.0	42.2	48.4	48.4
Hvy Trucks:	67.4	50.4	42.6	51.9	58.0	58.0
Traffic Noise:	**69.9**	**63.0**	**61.5**	**57.1**	**64.9**	**65.4**

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

Road Name: Fair Drive
Building: Unitts 9 - 13

Project Name: Carnegie Ave MFR
Job Number: 15072

NOISE MODEL INPUTS

Highway Data

Average Daily Traffic:	38,000	vehicles
Peak Hour Volume:	3,800	vehicles
Vehicle Speed:	35	mph
Near/Far Lane Distance:	48	feet

Vehicle Mix

	Day	Evening	Night	Daily
Autos:	69.5%	12.9%	9.6%	92.0%
Medium Trucks:	1.4%	0.1%	1.5%	3.0%
Heavy Trucks:	2.4%	0.1%	2.5%	5.0%

Site Data

Barrier Height:	**5**	**feet**
Barrier Type(Wall/Berm):	Wall	
Site Conditions(Hard/Soft):	Soft	
Centerline (C.L.) Dist. to Barrier:	56	feet
C.L. Dist. To Observer (Backyard):	61	feet
Barrier Dist. To Observer (Backyard):	5	feet
C.L. Dist. To Observer (Structure):	66	feet
Barrier Dist. To Observer (Structure):	10	feet
Road Grade:	0.00	%
Left View:	-90	degrees
Right View:	90	degrees

Elevations

Barrier Base Elevation:	0.0	feet
Road Elevation:	0.0	feet
Noise Source Elevation above Road		
Autos:	0	feet
Med Trucks:	2.3	feet
Hvy Trucks:	8	feet
Pad Elevation:	0.0	feet
Observer Heights Above Pad Elevation		
Exterior:	5	feet
First Floor:	5.5	feet
Second Floor:	14	feet

FHWA NOISE MODEL CALCULATIONS

	REMEL	Traffic Flow	Distance	Finite Road	Grade	Barrier Attenuation Exterior	1st Flr	2nd Flr
Autos:	65.11	4.69	-0.88	-1.20	0.00	-5.3	-5.1	0
Med Trucks:	74.83	-10.18	-0.88	-1.20	0.00	-5.1	-4.9	0
Hvy Trucks:	80.05	-7.96	-0.88	-1.20	0.00	-4.8	-3.3	0

UNMITIGATED NOISE LEVELS (with topographical and existing barrier attenuation)

	Leq Peak Hour	Leq Day	Leq Evening	Leq Night	Ldn	CNEL
Autos:	67.7	65.4	64.1	58.0	66.4	67.1
Med Trucks:	62.6	43.4	35.6	44.8	50.9	51.0
Hvy Trucks:	70.0	53.0	45.2	54.4	60.6	60.6
Traffic Noise:	**72.5**	**65.6**	**64.1**	**59.7**	**67.5**	**68.0**

MITIGATED NOISE LEVELS (Backyard)

	Leq Peak Hour	Leq Day	Leq Evening	Leq Night	Ldn	CNEL
Autos:	62.4	60.1	58.8	52.7	61.1	61.8
Med Trucks:	57.5	38.3	30.5	39.7	45.8	45.9
Hvy Trucks:	65.2	48.2	40.4	49.6	55.8	55.8
Traffic Noise:	**67.5**	**60.4**	**58.8**	**54.6**	**62.3**	**62.8**

MITIGATED NOISE LEVELS (First Floor)

	Leq Peak Hour	Leq Day	Leq Evening	Leq Night	Ldn	CNEL
Autos:	62.0	59.7	58.4	52.3	60.7	61.4
Med Trucks:	57.1	37.9	30.1	39.3	45.4	45.5
Hvy Trucks:	66.1	49.1	41.3	50.5	56.7	56.7
Traffic Noise:	**67.9**	**60.0**	**58.4**	**54.7**	**62.3**	**62.7**

MITIGATED NOISE LEVELS (Second Floor)

	Leq Peak Hour	Leq Day	Leq Evening	Leq Night	Ldn	CNEL
Autos:	67.0	64.6	63.3	57.3	65.7	66.3
Med Trucks:	61.8	42.6	34.8	44.0	50.2	50.2
Hvy Trucks:	69.3	52.3	44.5	53.7	59.9	59.9
Traffic Noise:	**71.7**	**64.9**	**63.4**	**59.0**	**66.8**	**67.3**

MITIGATED NOISE LEVELS (Third Floor)

	Leq Peak Hour	Leq Day	Leq Evening	Leq Night	Ldn	CNEL
Autos:	66.7	64.3	63.0	57.0	65.4	66.0
Med Trucks:	61.6	42.3	34.6	43.8	49.9	50.0
Hvy Trucks:	69.0	52.0	44.2	53.4	59.6	59.6
Traffic Noise:	**71.5**	**64.6**	**63.1**	**58.7**	**66.5**	**67.0**

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

Road Name: Harbor Boulevard
Building: Units 13 & 14

Project Name: Carnegie Ave MFR
Job Number: 15072

NOISE MODEL INPUTS

Highway Data

Average Daily Traffic:	54,000	vehicles
Peak Hour Volume:	5,400	vehicles
Vehicle Speed:	40	mph
Near/Far Lane Distance:	72	feet

Vehicle Mix

	Day	Evening	Night	Daily
Autos:	69.5%	12.9%	9.6%	92.0%
Medium Trucks:	1.4%	0.1%	1.5%	3.0%
Heavy Trucks:	2.4%	0.1%	2.5%	5.0%

Site Data

Barrier Height:	**0**	**feet**
Barrier Type(Wall/Berm):	Wall	
Site Conditions(Hard/Soft):	Soft	
Centerline (C.L.) Dist. to Barrier:	200	feet
C.L. Dist. To Observer (Backyard):	205	feet
Barrier Dist. To Observer (Backyard):	5	feet
C.L. Dist. To Observer (Structure):	210	feet
Barrier Dist. To Observer (Structure):	10	feet
Road Grade:	0.00	%
Left View:	-90	degrees
Right View:	90	degrees

Elevations

Barrier Base Elevation:	0.0	feet
Road Elevation:	3.0	feet
Noise Source Elevation above Road		
Autos:	0	feet
Med Trucks:	2.3	feet
Hvy Trucks:	8	feet
Pad Elevation:	0.0	feet
Observer Heights Above Pad Elevation		
Exterior:	5	feet
First Floor:	5.5	feet
Second Floor:	14	feet

FHWA NOISE MODEL CALCULATIONS

	REMEL	Traffic Flow	Distance	Finite Road	Grade	Barrier Attenuation Exterior	1st Flr	2nd Flr
Autos:	67.36	5.64	-9.19	-1.20	0.00	0	0	0
Med Trucks:	76.31	-9.23	-9.19	-1.20	0.00	0	0	0
Hvy Trucks:	81.16	-7.01	-9.19	-1.20	0.00	0	0	0

UNMITIGATED NOISE LEVELS (with topographical and existing barrier attenuation)

	Leq Peak Hour	Leq Day	Leq Evening	Leq Night	Ldn	CNEL
Autos:	62.6	60.2	58.9	52.9	61.3	61.9
Med Trucks:	56.7	37.5	29.7	38.9	45.1	45.1
Hvy Trucks:	63.8	46.8	39.0	48.2	54.3	54.4
Traffic Noise:	**66.7**	**60.4**	**59.0**	**54.3**	**62.2**	**62.7**

MITIGATED NOISE LEVELS (Backyard)

	Leq Peak Hour	Leq Day	Leq Evening	Leq Night	Ldn	CNEL
Autos:	62.6	60.2	58.9	52.9	61.3	61.9
Med Trucks:	56.7	37.5	29.7	38.9	45.1	45.1
Hvy Trucks:	63.8	46.8	39.0	48.2	54.3	54.4
Traffic Noise:	**66.7**	**60.4**	**59.0**	**54.3**	**62.2**	**62.7**

MITIGATED NOISE LEVELS (First Floor)

	Leq Peak Hour	Leq Day	Leq Evening	Leq Night	Ldn	CNEL
Autos:	62.4	60.1	58.8	52.7	61.2	61.8
Med Trucks:	56.5	37.3	29.5	38.7	44.9	44.9
Hvy Trucks:	63.6	46.6	38.8	48.0	54.2	54.2
Traffic Noise:	**66.5**	**60.3**	**58.8**	**54.1**	**62.0**	**62.6**

MITIGATED NOISE LEVELS (Second Floor)

	Leq Peak Hour	Leq Day	Leq Evening	Leq Night	Ldn	CNEL
Autos:	62.4	60.1	58.8	52.7	61.1	61.8
Med Trucks:	56.5	37.3	29.5	38.7	44.9	44.9
Hvy Trucks:	63.6	46.6	38.8	48.0	54.2	54.2
Traffic Noise:	**66.5**	**60.3**	**58.8**	**54.1**	**62.0**	**62.6**

MITIGATED NOISE LEVELS (Third Floor)

	Leq Peak Hour	Leq Day	Leq Evening	Leq Night	Ldn	CNEL
Autos:	62.4	60.0	58.7	52.7	61.1	61.8
Med Trucks:	56.5	37.3	29.5	38.7	44.9	44.9
Hvy Trucks:	63.6	46.6	38.8	48.0	54.2	54.2
Traffic Noise:	**66.5**	**60.3**	**58.8**	**54.1**	**62.0**	**62.5**

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

Road Name: Harbor Boulevard
Lot Number: Units 18 - 28

Project Name: Carnegie Ave MFR
Job Number: 15072

NOISE MODEL INPUTS

Highway Data

Average Daily Traffic:	54,000	vehicles
Peak Hour Volume:	5,400	vehicles
Vehicle Speed:	40	mph
Near/Far Lane Distance:	72	feet

Vehicle Mix

	Day	Evening	Night	Daily
Autos:	69.5%	12.9%	9.6%	92.0%
Medium Trucks:	1.4%	0.1%	1.5%	3.0%
Heavy Trucks:	2.4%	0.1%	2.5%	5.0%

Site Data

Barrier Height:	**0**	**feet**
Barrier Type(Wall/Berm):	Wall	
Site Conditions(Hard/Soft):	Soft	
Centerline (C.L.) Dist. to Barrier:	290	feet
C.L. Dist. To Observer (Backyard):	295	feet
Barrier Dist. To Observer (Backyard):	5	feet
C.L. Dist. To Observer (Structure):	300	feet
Barrier Dist. To Observer (Structure):	10	feet
Road Grade:	0.00	%
Left View:	-90	degrees
Right View:	90	degrees

Elevations

Barrier Base Elevation:	0.0	feet
Road Elevation:	3.0	feet
Noise Source Elevation above Road		
Autos:	0	feet
Med Trucks:	2.3	feet
Hvy Trucks:	8	feet
Pad Elevation:	0.0	feet
Observer Heights Above Pad Elevation		
Exterior:	5	feet
First Floor:	5.5	feet
Second Floor:	14	feet

FHWA NOISE MODEL CALCULATIONS

	REMEL	Traffic Flow	Distance	Finite Road	Grade	Barrier Attenuation Exterior	1st Flr	2nd Flr
Autos:	67.36	5.64	-11.62	-1.20	0.00	0	0	0
Med Trucks:	76.31	-9.23	-11.62	-1.20	0.00	0	0	0
Hvy Trucks:	81.16	-7.01	-11.62	-1.20	0.00	0	0	0

UNMITIGATED NOISE LEVELS (with topographical and existing barrier attenuation)

	Leq Peak Hour	Leq Day	Leq Evening	Leq Night	Ldn	CNEL
Autos:	60.2	57.8	56.5	50.5	58.9	59.5
Med Trucks:	54.3	35.1	27.3	36.5	42.6	42.7
Hvy Trucks:	61.3	44.3	36.6	45.8	51.9	52.0
Traffic Noise:	**64.3**	**58.0**	**56.6**	**51.9**	**59.8**	**60.3**

MITIGATED NOISE LEVELS (Backyard)

	Leq Peak Hour	Leq Day	Leq Evening	Leq Night	Ldn	CNEL
Autos:	60.2	57.8	56.5	50.5	58.9	59.5
Med Trucks:	54.3	35.1	27.3	36.5	42.6	42.7
Hvy Trucks:	61.3	44.3	36.6	45.8	51.9	52.0
Traffic Noise:	**64.3**	**58.0**	**56.6**	**51.9**	**59.8**	**60.3**

MITIGATED NOISE LEVELS (First Floor)

	Leq Peak Hour	Leq Day	Leq Evening	Leq Night	Ldn	CNEL
Autos:	60.1	57.7	56.4	50.3	58.8	59.4
Med Trucks:	54.2	34.9	27.2	36.4	42.5	42.6
Hvy Trucks:	61.2	44.2	36.4	45.7	51.8	51.8
Traffic Noise:	**64.1**	**57.9**	**56.5**	**51.7**	**59.7**	**60.2**

MITIGATED NOISE LEVELS (Second Floor)

	Leq Peak Hour	Leq Day	Leq Evening	Leq Night	Ldn	CNEL
Autos:	60.1	57.7	56.4	50.3	58.8	59.4
Med Trucks:	54.1	34.9	27.2	36.4	42.5	42.6
Hvy Trucks:	61.2	44.2	36.4	45.7	51.8	51.8
Traffic Noise:	**64.1**	**57.9**	**56.4**	**51.7**	**59.7**	**60.2**

MITIGATED NOISE LEVELS (Third Floor)

	Leq Peak Hour	Leq Day	Leq Evening	Leq Night	Ldn	CNEL
Autos:	60.1	57.7	56.4	50.3	58.8	59.4
Med Trucks:	54.1	34.9	27.1	36.4	42.5	42.5
Hvy Trucks:	61.2	44.2	36.4	45.6	51.8	51.8
Traffic Noise:	**64.1**	**57.9**	**56.4**	**51.7**	**59.6**	**60.2**

APPENDIX D

Carwash Noise Calculations

Carwash Noise Calculations -At Nearest Proposed Home

Noise Source	Reference Distance	Reference CNEL	Nearest Residential Property Line Distance	Leq	
					1 (Line Source: hard=0, soft=.5; Point Source: hard=1, soft=1.5)
Carwash @Lot 13	30	69.4	16	**75**	(eq. N-2141.2 of TeNS)
Carwash @Lot 14	30	69.4	40	**67**	
Lot 13 @ façade	30	69.4	25	**71**	

Stationary Noise Sources	Distance from Receptor to Wall	Distance from source to Wall	Height of Wall (feet)	Without Wall Noise Level at Residence	With Wall Noise Level at Residence	Source Height (feet)	Exterior Observer Height (feet)	Source Frequency (hz)	barrier to receiver - b (all)	source to barrier - a	source to receiver - c	path difference y =a+b-c (auto)	line of sight (slope)	fresnel	Barrier Atten
Carwash @Lot 13	8.0	8.0	8	75	**63**	6.0	5	700	8.5440	8.246211	16.03122	0.7590	1	1.889055	-12.06
Carwash @Lot 14	6.0	34.0	8	67	**55**	6.0	5	700	6.7082	34.05877	40.0125	0.7545	1	1.877813	-12.04

APPENDIX E

RCNM Model Construction Noise Calculations

Roadway Construction Noise Model (RCNM),Version 1.1

Report date: 6/7/2016
Case Description: Carnegie Ave Residential - Demolition

---- Receptor #1 ----

Description	Land Use	Baselines (dBA) Daytime	Evening	Night
SFH to east	Residential	63.8	63.8	63.8

Description	Impact Device	Usage(%)	Equipment Spec Lmax (dBA)	Actual Lmax (dBA)	Receptor Distance (feet)	Estimated Shielding (dBA)
Concrete Saw	No	20		89.6	100	0
Dozer	No	40		81.7	150	0
Tractor	No	40	84		200	0
Tractor	No	40	84		250	0
Tractor	No	40	84		300	0

Equipment		Calculated (dBA) *Lmax	Leq	Results Day Lmax	Day Leq	Noise Limits (dBA) Evening Lmax	Evening Leq
Concrete Saw		83.6	76.6	N/A	N/A	N/A	N/A
Dozer		72.1	68.1	N/A	N/A	N/A	N/A
Tractor		72.0	68.0	N/A	N/A	N/A	N/A
Tractor		70.0	66.0	N/A	N/A	N/A	N/A
Tractor		68.4	64.5	N/A	N/A	N/A	N/A
	Total	**84**	**78**	N/A	N/A	N/A	N/A

*Calculated Lmax is the Loudest value.

Roadway Construction Noise Model (RCNM),Version 1.1

Report date: 6/7/2016
Case Description: Carnegie Ave Residential - Grading

---- Receptor #1 ----

Description	Land Use	Baselines (dBA) Daytime	Evening	Night
SFH to east	Residential	63.8	63.8	63.8

Description	Impact Device	Usage(%)	Equipment Spec Lmax (dBA)	Actual Lmax (dBA)	Receptor Distance (feet)	Estimated Shielding (dBA)
Grader	No	40	85		80	0
Dozer	No	40		81.7	130	0
Tractor	No	40	84		180	0

Results

	Calculated (dBA)		Noise Limits (dBA)			
			Day		Evening	
Equipment	*Lmax	Leq	Lmax	Leq	Lmax	Leq
Grader	80.9	76.9	N/A	N/A	N/A	N/A
Dozer	73.4	69.4	N/A	N/A	N/A	N/A
Tractor	72.9	68.9	N/A	N/A	N/A	N/A
Total	**81**	**78**	N/A	N/A	N/A	N/A

*Calculated Lmax is the Loudest value.

Roadway Construction Noise Model (RCNM),Version 1.1

Report date: 6/7/2016
Case Description: Carnegie Ave Residential - Building Construction

---- Receptor #1 ----

Description	Land Use	Baselines (dBA) Daytime	Evening	Night
SFH to east	Residential	63.8	63.8	63.8

Description	Impact Device	Usage(%)	Equipment Spec Lmax (dBA)	Actual Lmax (dBA)	Receptor Distance (feet)	Estimated Shielding (dBA)
Crane	No	16		80.6	100	0
Gradall	No	40		83.4	150	0
Tractor	No	40	84		200	0
Generator	No	50		80.6	250	0
Welder / Torch	No	40		74	300	0
Welder / Torch	No	40		74	350	0
Welder / Torch	No	40		74	400	0

Equipment	Calculated (dBA) *Lmax	Leq	Results Day Lmax	Day Leq	Noise Limits (dBA) Evening Lmax	Evening Leq
Crane	74.5	66.6	N/A	N/A	N/A	N/A
Gradall	73.9	69.9	N/A	N/A	N/A	N/A
Tractor	72.0	68.0	N/A	N/A	N/A	N/A
Generator	66.7	63.6	N/A	N/A	N/A	N/A
Welder / Torch	58.4	54.5	N/A	N/A	N/A	N/A
Welder / Torch	57.1	53.1	N/A	N/A	N/A	N/A
Welder / Torch	55.9	52.0	N/A	N/A	N/A	N/A
Total	**75**	**74**	N/A	N/A	N/A	N/A

*Calculated Lmax is the Loudest value.

Roadway Construction Noise Model (RCNM),Version 1.1

Report date: 6/7/2016
Case Description: Carnegie Ave Residential - Paving

---- Receptor #1 ----

Description	Land Use	Baselines (dBA) Daytime	Evening	Night
SFH to east	Residential	63.8	63.8	63.8

Description	Impact Device	Usage(%)	Equipment Spec Lmax (dBA)	Actual Lmax (dBA)	Receptor Distance (feet)	Estimated Shielding (dBA)
Paver	No	50		77.2	80	0
Paver	No	50		77.2	130	0
Paver	No	50		77.2	180	0
Paver	No	50		77.2	230	0
Roller	No	20		80	280	0
Roller	No	20		80	330	0

Equipment	Calculated (dBA) *Lmax	Leq	Results Noise Limits (dBA) Day Lmax	Day Leq	Evening Lmax	Evening Leq
Paver	73.1	70.1	N/A	N/A	N/A	N/A
Paver	68.9	65.9	N/A	N/A	N/A	N/A
Paver	66.1	63.1	N/A	N/A	N/A	N/A
Paver	64.0	61.0	N/A	N/A	N/A	N/A
Roller	65.0	58.0	N/A	N/A	N/A	N/A
Roller	63.6	56.6	N/A	N/A	N/A	N/A
Total	**73**	**73**	N/A	N/A	N/A	N/A

*Calculated Lmax is the Loudest value.

Roadway Construction Noise Model (RCNM),Version 1.1

Report date: 6/7/2016
Case Description: Carnegie Ave Residential - Painting

---- Receptor #1 ----

Description	Land Use	Baselines (dBA) Daytime	Evening	Night
SFH to east	Residential	63.8	63.8	63.8

Description	Impact Device	Usage(%)	Equipment Spec Lmax (dBA)	Actual Lmax (dBA)	Receptor Distance (feet)	Estimated Shielding (dBA)
Compressor (air)	No	40		77.7	100	0

Equipment	Calculated (dBA) *Lmax	Leq	Results Day Lmax	Day Leq	Evening Lmax	Evening Leq
Compressor (air)	71.6	67.7	N/A	N/A	N/A	N/A
Total	**72**	**68**	N/A	N/A	N/A	N/A

Noise Limits (dBA)

*Calculated Lmax is the Loudest value.