Appendix G: Noise Impact Analysis

NOISE IMPACT ANALYSIS

BROOKHURST AND CENTRAL GARDEN GROVE TOWNHOMES PROJECT

CITY OF GARDEN GROVE

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Project No. 23003

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ACRONYMS AND ABBREVIATIONS

ANSI	American National Standards Institute
Caltrans	California Department of Transportation
CEQA	California Environmental Quality Act
City	City of Garden Grove
cmu	concrete masonry unit
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
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
VdB	Vibration velocity level in decibels

1.0 INTRODUCTION

1.1 Purpose of Analysis and Study Objectives

This Noise Impact Analysis has been prepared to determine the potential noise impacts associated with the proposed Brookhurst and Central Garden Grove Townhomes project (proposed project). The following is provided in this report:

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

1.2 Site Location and Study Area

The project site is located at 13252 Brookhurst Street and 10052 Central Avenue in the southcentral portion of the City of Garden Grove (City). The approximately 1.22-acre project site is currently developed with a vacant 6,367 square foot restaurant building (Marie Callender's) that was previously damaged in a fire and has been red tagged by the City, a surface parking lot and a vacant lot. The project site is bounded by Central Avenue and single-family homes to the north, single-family homes to the east, and commercial uses to the south, and Brookhurst Street and both single-family and multi-family homes to the west. The project study area is shown in Figure 1.

Sensitive Receptors in Project Vicinity

The nearest sensitive receptors to the project site are single-family homes located as near as 5 feet east of the project site, there is also a single-family home located as near as 15 feet south of the project site, and single-family homes as near as 70 feet north of the project site. The nearest school is Sunnyside Elementary School that is located as near as 600 feet southwest of the project site.

1.3 Proposed Project Description

The proposed project would consist of demolition of the existing structure and surface parking lot on the project site and development of 30 residential townhomes. The townhomes would all be three stories with a maximum height of 35 feet and each townhomes would include a balcony and a ground level fenced private patio. The townhome structures would be setback a minimum of 25 feet from Brookhurst Street, 15 feet from Central Avenue, 19 feet from southern property line, and 15 feet from the eastern property line. The proposed project would also include a 4,322 square foot central active open space recreation area with shade structures, BBQs and ADA picnic tables, and raised herb garden areas. An additional approximately 9.578 square feet of open space landscape areas would be provided, including a paseo with bench seating and shade trees that would connect the central open space area to residences. The proposed site plan is shown in Figure 2.

There is currently a dilapidated wood fence on the east side of the project site and portions of the rest of the property lines have sections of chain-link fence. All of the existing fences on the property would be removed as part of the project and a 6-foot high concrete masonry unit (cmu) wall would be constructed on the east, south and west property lines. The north property line would have 3-foot 6-inch high cmu walls adjacent to the townhomes with openings in the walls for the two driveways and a walkway. The proposed wall plan is shown in Figure 3.

1.4 Executive Summary

Standard Noise Regulatory Conditions

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

City of Garden Grove Noise Regulations

The following lists the noise and vibration regulations from the *Garden Grove, California Municipal Code,* December, 2022.

- Section 8.47.040 – Operational Noise Levels; and
- Section 8.47.060(D) – Construction Noise Limits.

State of California Noise Regulations

The following lists the State of California noise regulations that are applicable, but not limited to the proposed project.

- California Vehicle Code Section 27200-27207 – On Road Vehicle Noise Limits
- California Vehicle Code Section 38365-38350 – Off-Road Vehicle Noise Limits

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.

Generation of a substantial temporary or permanent increase in ambient noise levels in the vicinity of the project in excess of standards established in the local general plan or noise ordinance, or applicable standards of other agencies?

Potentially significant impact. Mitigation Measure NOI-1 would reduce this impact to less than significant.

Generation of excessive groundborne vibration or groundborne noise levels?

Potentially significant impact. Mitigation Measure NOI-2 would reduce this impact to less than significant.

For a project located within the vicinity of a private airstrip or an airport land use plan or, where such a plan has not been adopted, within two miles of a public airport or public use airport, would the project expose people residing or working in the project area to excessive noise levels?

Less than significant impact.

Mitigation Measures for the Proposed Project

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

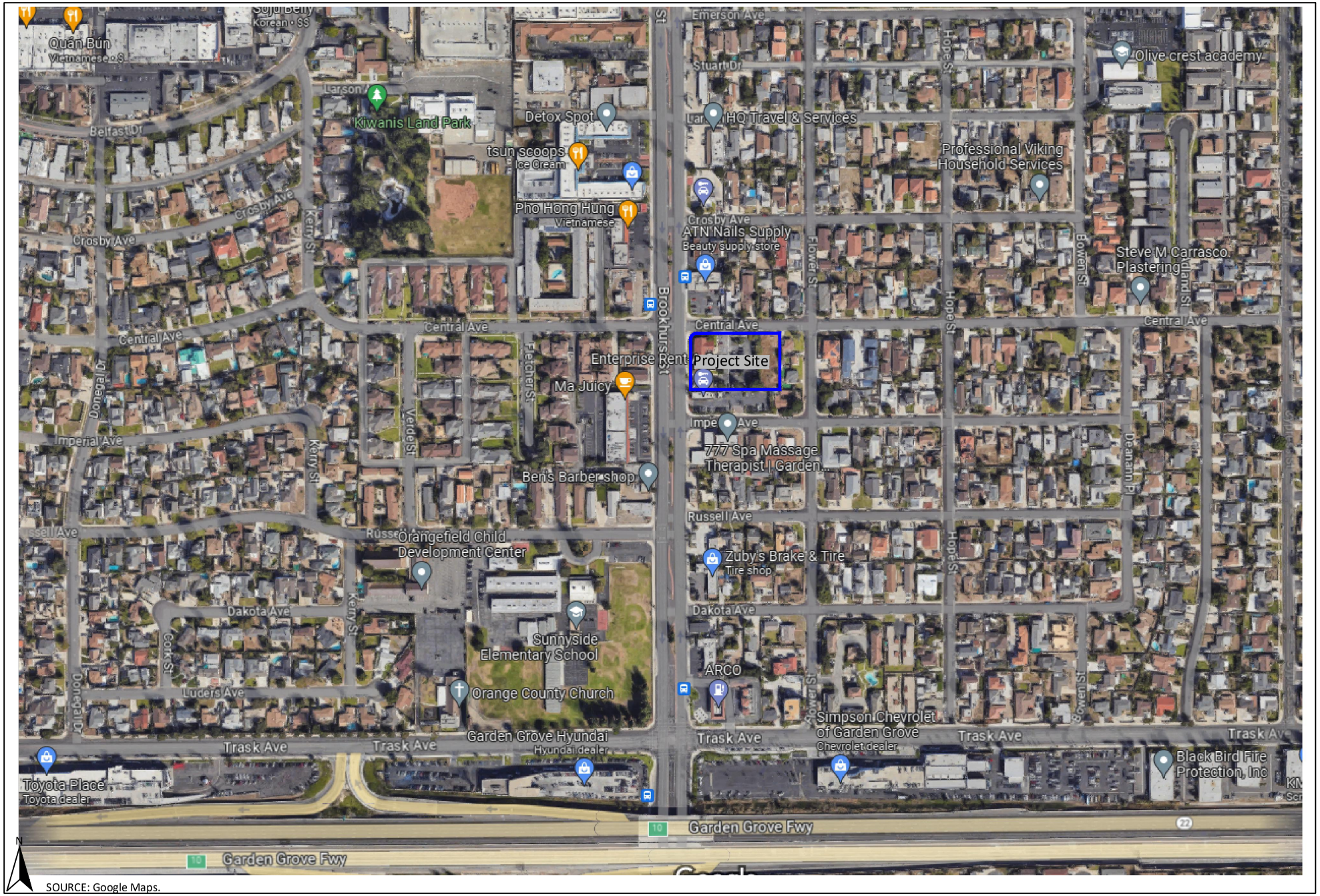
Mitigation Measure NOI-1:

The project plans, mechanical specifications, and occupancy permits shall require that the air conditioning condenser units for the proposed townhomes Nos: 23 to 30, which are located on the east side of the project site shall not exceed a manufacturer sound rating of 74 dBA at one meter; or shall include installation of a manufacturer developed sound blanket for air conditioning units with manufacturer sound ratings above 74 dBA at one meter. Installation of sound blanket kits on the air conditioning condenser units shall provide noise reduction to achieve 74 dBA at one meter.

Mitigation Measure NOI-2:

The project's grading and construction plans and permitting specifications shall include the following requirements:

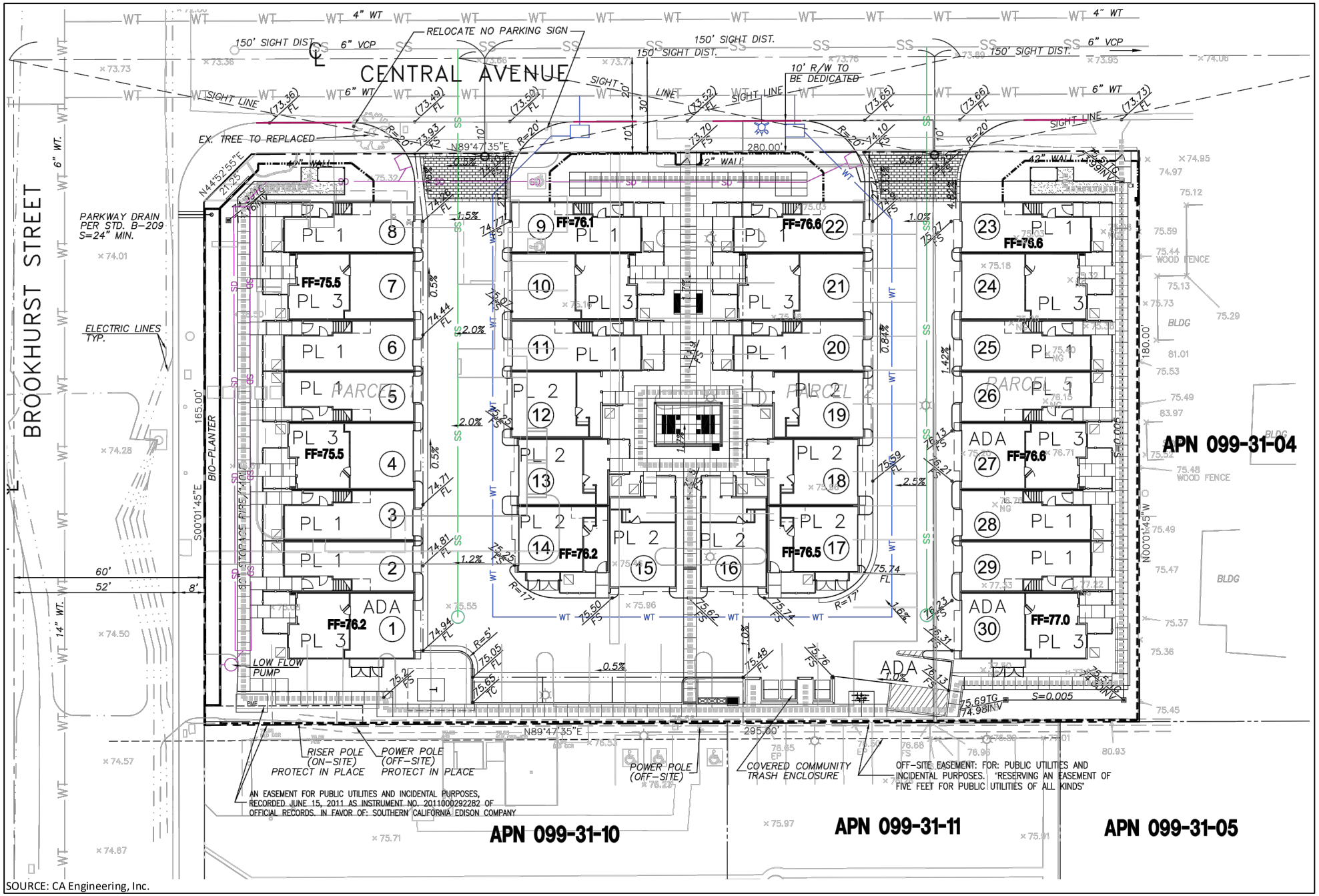
- Operation of all large bulldozers that are powered by a greater than 150 horsepower engine are restricted from operating within 10 feet of the eastern property line of the project site. The project construction plans and permitting specifications shall require the use of a small bulldozer (i.e., D1, D2, or D3 dozers) or other type of equipment that is less than 150 horsepower to perform all grading activities that are located within 10 feet of the eastern property line of the project site.
- All construction equipment, fixed or mobile, shall be equipped with properly operating and maintained mufflers, consistent with manufacturers' standards. The construction contractor shall place all stationary construction equipment so that emitted noise is directed away from the noise sensitive receiver nearest the project site.
- The construction contractor shall locate equipment staging in areas that will create the greatest distance between construction-related noise sources and noise-sensitive receivers nearest the project site during all construction.



SOURCE: Google Maps.

VISTA ENVIRONMENTAL

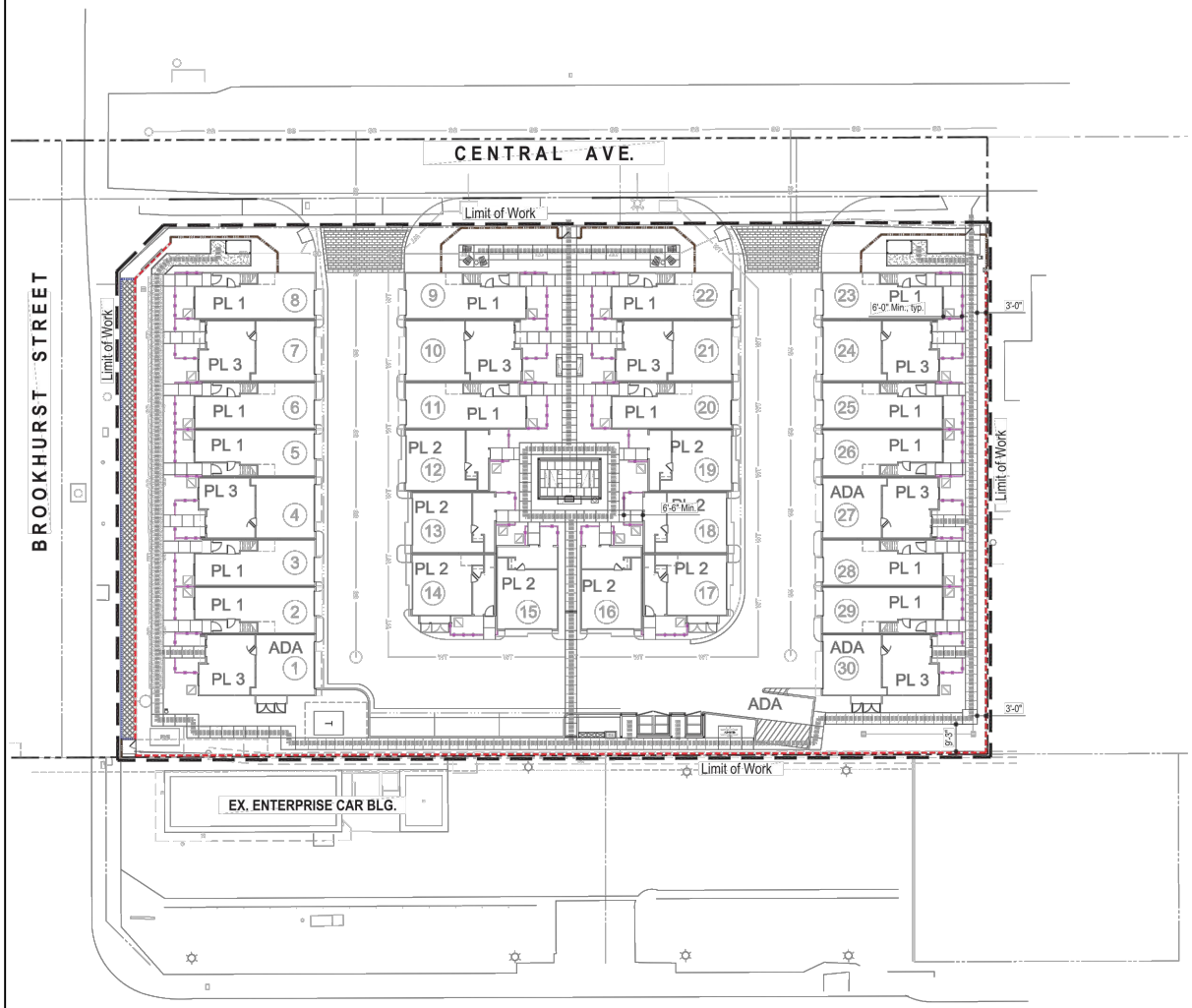
Figure 1
Project Location Map



SOURCE: CA Engineering, Inc.

VISTA ENVIRONMENTAL

Figure 2
Proposed Site Plan



Schematic Wall & Fence Plan

WALL LEGEND

1. 6'-0" High precision CMU wall, with 2" high precision cap (Borrego color; to match architecture).
2. 3'-6" High precision CMU frontage wall, with 2" high precision cap (Borrego color; to match architecture).
3. 3'-6" High precision CMU retaining bio-planter wall, with 2" high precision cap (Borrego color; to match architecture).
4. 3'-6" High vinyl horz. design patio fence (tan or cream color).
5. 6'-6" High (16" sq.) precision CMU pilaster, with 2" high precision cap (Borrego color; to match architecture).
6. 3'-6" High (at Central) & 5'-6" High (at Brookhurst) metal pedestrian (ADA accessible) gate, (black paint color).
7. Monument signage feature (black pin-mounted lettering on proposed 6'-0" high precision CMU wall)

ADA Path of Travel

*Conceptual Architectural Design Image - For Reference Only

ORCO Variegated CMU - "Borrego" Color

*Conceptual images (provided herein are conceptual and subject to change)

*Signage wall concept enlargement shown for reference only; subject to change.

0 10' 20' 40'
Scale: 1" = 20'

Melia Homes

SOURCE: L-3 Studio.

VISTA ENVIRONMENTAL

Figure 3
Proposed Wall 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 worst-hour traffic 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 Garden Grove 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 level of noise as the distance from the source increases. The manner in which the noise level 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) between source and receiver. 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 medium, 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 Garden Grove. Noise regulations are addressed by 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), which regulates transit noise, 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.

Although the proposed project is not under the jurisdiction of the FTA, the *Transit Noise and Vibration Impact Assessment Manual* (FTA Manual), prepared by the FTA, September 2018, is a guidance document from a government agency that has defined what constitutes a significant noise impact from implementing a project. The FTA standards are based on extensive studies by the FTA and other governmental agencies on the human effects and reaction to noise and a summary of the FTA findings are provided below in Table A.

Table A – FTA Project Effects on Cumulative Noise Exposure

Existing Noise Exposure (dBA Leq or Ldn)	Allowable Noise Impact Exposure dBA Leq or Ldn		
	Project Only	Combined	Noise Exposure Increase
45	51	52	+7
50	53	55	+5
55	55	58	+3
60	57	62	+2
65	60	66	+1
70	64	71	+1
75	65	75	0

Source: Federal Transit Administration, 2018.

The FTA also provides guidance on construction noise and recommends developing construction noise criteria on a project-specific basis that utilizes local noise ordinances if possible. However, local noise ordinances, including the City of Garden Grove Municipal Code, only limit the time of day when construction activities may occur and for the times when construction activities are allowed, no construction noise level limits are provided. The FTA construction noise criteria has been utilized in this analysis to determine if the project would create a significant substantial temporary noise increase to the nearby sensitive receptors, which is a CEQA requirement. The FTA standards are based on extensive studies by the FTA and other governmental agencies on the human effects and reaction to noise and a summary of the FTA findings for a general construction noise assessment are provided below in Table B.

Table B – FTA General Assessment Construction Noise Criteria

Land Use	Day (dBA $Leq_{(1\text{-hour})}$)	Night (dBA $Leq_{(1\text{-hour})}$)
Residential	90	80
Commercial	100	100
Industrial	100	100

Source: Federal Transit Administration, 2018.

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.

California Noise Insulation Standards

Title 24, Chapter 1, Article 4 of the California Administrative Code (California Noise Insulation Standards) requires noise insulation in new hotels, motels, apartment houses, and dwellings (other than single-family detached housing) that provides an annual average noise level of no more than 45 dBA CNEL. When such structures are located within a 60-dBA CNEL (or greater) noise contour, an acoustical analysis is required to ensure that interior levels do not exceed the 45-dBA CNEL annual threshold. In addition, Title 21, Chapter 6, Article 1 of the California Administrative Code requires that all habitable rooms, hospitals, convalescent homes, and places of worship shall have an interior CNEL of 45 dB or less due to aircraft noise.

Government Code Section 65302

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

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

California Vehicle Code Section 27200-27207 provides noise limits for vehicles operated in California. For vehicles over 10,000 pounds noise is limited to 88 dB for vehicles manufactured before 1973, 86 dB for vehicles manufactured before 1975, 83 dB for vehicles manufactured before 1988, and 80 dB for vehicles manufactured after 1987. All measurements are based at 50 feet from the vehicle.

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

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

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.

The *Transportation and Construction Vibration Guidance Manual*, prepared by Caltrans, April 2020, 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 provided for both transient (mobile equipment) and continuous (pile driving) sources of vibration. The Guidance Manual provides thresholds for both building damage, where transient vibration sources may start to create damage to buildings at 0.5 inch per second PPV and from human response, where transient vibration sources become distinctly perceptible at 0.24 inch per second PPV.

4.3 Local Regulations

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

City of Garden Grove General Plan

The City of Garden Grove has developed its own land use compatibility standards based on recommended parameters from the California Governor's Office of Planning and Research that rate compatibility. Using the State's land use compatibility guidelines, the City has established the City's Land Use Compatibility standards that are presented in Table C.

Table C – City of Garden Grove 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, Single-Family, Duplex, Mobile Homes	50 – 60	55 – 70	70 – 75	75 – 85
Residential – Multiple Family	50 – 65	60 – 70	70 – 75	70 – 85
Transient Lodging – Motel, Hotels	50 -65	60 – 70	70 – 80	80 - 85
Schools, Libraries, Churches, Hospitals, Nursing Homes	50 – 70	60 – 70	70 – 80	80 – 85
Auditoriums, Concert Halls, Amphitheaters	NA	50 – 70	NA	65 – 85
Sports Arenas, Outdoor Spectator Sports	NA	50 – 75	NA	70 – 85
Playgrounds, Neighborhood Parks	50 – 70	NA	67.5 – 75	72.5 – 85
Golf Courses, Riding Stables, Water Recreation, Cemeteries	50 – 70	67.5 – 77.5	75 – 85	NA
Office Buildings, Business Commercial and Professional	50 – 70	67.5 – 77.5	75 – 85	NA
Industrial, Manufacturing, Utilities, Agriculture	50 – 75	70 – 80	75 – 85	NA

Notes:
NA: Not Applicable.
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
Source: City of Garden Grove General Plan Table 7-1.

The City's Noise Ordinance establishes the following daytime and nighttime noise standards that are defined in Table 7-2 of the General Plan and reprinted below in Table D.

Table D – City of Garden Grove Noise Ordinance Standards

Land Use Designation		Ambient Base Noise Level	Time of Day
Sensitive Uses	Residential Use	55 dBA	7:00 AM – 10:00 PM
		50 dBA	10:00 PM – 7:00 AM
Conditionally Sensitive Uses	Institutional Use	65 dBA	Any Time
	Office-Professional Use	65 dBA	Any Time
	Hotels and Motels	65 dBA	Any Time
Non-Sensitive Uses	Commercial Uses	70 dBA	Any Time
	Commercial/Industrial Uses within 150 feet of Residential Uses	65 dBA	7:00 AM – 10:00 PM
		50 dBA	10:00 PM – 7:00 AM
	Industrial Uses	70 dBA	Any Time

Source: City of Garden Grove General Plan Table 7-2.

Applicable goals and policies from the Noise Element of the General Plan are as follows:

Goal N-1: Noise considerations must be incorporated into land use planning decisions.

N-1 Policies

Policy N-1.1. Require all new residential construction in areas with an exterior noise level greater than 55 dBA to include sound attenuation measures.

Policy N-1.2. Incorporate a noise assessment study into the environmental review process, when needed for a specific project for the purposes of identifying potential noise impacts and noise abatement procedures.

Policy N-1.3. Require noise reduction techniques in site planning, architectural design, and construction, where noise reduction is necessary consistent with the standards in Tables 7-1 and 7-2, Title 24 of the California Code of Regulations, and Section 8.47 of the Municipal Code.

Policy N-1.4 Ensure acceptable noise levels are maintained near schools, hospitals, convalescent homes, churches and other noise sensitive areas.

Goal N-2: Maximized efficiency in noise abatement efforts through clear and effective policies and ordinances.

Policy N-2.2. Fully integrate noise considerations into land use planning decisions to prevent new noise/land use conflicts.

Policy N-2.3 Incorporate noise reduction features for items such as but not limited to parking and loading areas, ingress/egress point, and refuse collection areas, during site planning to mitigate anticipated noise impacts on affected noise sensitive land uses.

City of Garden Grove Municipal Code

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

8.47.040 Ambient Base Noise Levels

The ambient base noise levels contained in the following chart (see Table D above) shall be utilized as the basis for determining noise levels in excess of those allowed by this chapter unless the actual measured ambient noise level occurring at the same time as the noise under review is being investigated exceeds the ambient base noise level contained in the chart. When the actual measured ambient noise level exceeds the ambient base noise level, the actual measured ambient noise level shall be utilized as the basis for determining whether or not the subject noise exceeds the level allowed by this section. In situations where two adjoining properties exist within two different use designations, the most restrictive ambient base noise level will apply. This section permits any noise level that does not exceed either the ambient base noise level or the actual measured noise level by 5 dB(A), as measured at the property line of the noise generation property.

8.47.060 Special Noise Sources

D. Construction of Buildings and Projects. It shall be unlawful for any person within a residential area, or within a radius of 500 feet therefrom, to operate equipment or perform any outside construction or repair work on buildings, structures, or projects, or to operate any pile driver, power shovel, pneumatic hammer, derrick, power hoist, or any other construction type device between the hours of 10:00 p.m. of one day and 7:00 a.m. of the next day in such a manner that

a person of normal sensitiveness, as determined utilizing the criteria established in Section 8.47.050(B), is caused discomfort or annoyance unless such operations are of an emergency nature.

5.0 EXISTING NOISE CONDITIONS

To determine the existing noise levels, 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 vehicle traffic on Brookhurst Street that is adjacent to the west side of the project site and Central Avenue that is adjacent to the north side 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 four to six 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 Locations

The noise monitoring locations were selected in order to obtain noise levels in the vicinity of the project site. Descriptions of the noise monitoring sites are provided below in Table E and are shown in Figure 4. Appendix A includes a photo index of the study area and noise level measurement locations.

Noise Measurement Timing and Climate

The noise measurements were recorded between 12:19 p.m. on Tuesday, May 9, 2023 and 12:26 p.m. on Wednesday, May 10, 2023. At the start of the noise measurements, the sky was cloudy, the temperature was 67 degrees Fahrenheit, the humidity was 63 percent, barometric pressure was 29.89 inches of mercury, and the wind was blowing around two miles per hour. Overnight, the temperature dropped to 56 degrees Fahrenheit and the humidity peaked at 79 percent. At the conclusion of the noise measurements, the sky was partly cloudy, the temperature was 68 degrees Fahrenheit, the humidity was 57 percent, barometric pressure was 29.92 inches of mercury, and the wind was blowing around six miles per hour.

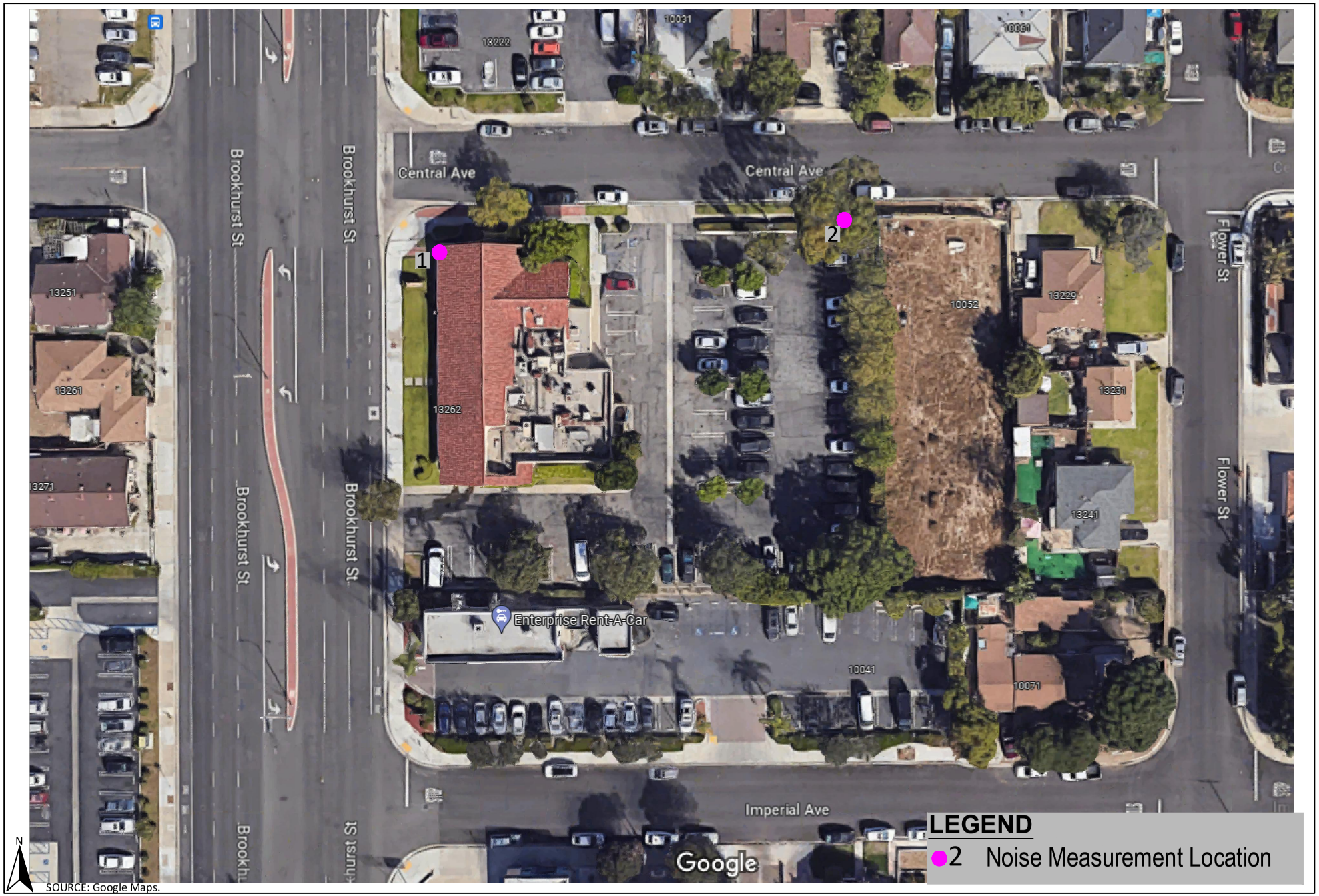
5.2 Noise Measurement Results

The results of the noise level measurements are presented in Table E. The measured sound pressure levels in dBA have been used to calculate the minimum and maximum L_{eq} averaged over 1-hour intervals. Table E also shows the L_{eq}, L_{max}, and CNEL, based on the entire measurement time. The CNEL was calculated through use of Equation 2-23 from *Technical Noise Supplement to the Traffic Noise Analysis Protocol* (TeNS), prepared by Caltrans, September 2013. The noise monitoring data printouts are included in Appendix B. Figure 5 shows a graph of the 24-hour noise measurements.

Table E – Existing (Ambient) Noise Measurement Results

Site No.	Site Description	Average (dBA L_{eq})	Maximum (dBA L_{max})	(dBA $L_{eq\ 1\text{-}hour}$/Time) Minimum	(dBA $L_{eq\ 1\text{-}hour}$/Time) Maximum	Average (dBA CNEL)
1	Located on the northwest corner of the existing structure on the project site, approximately 80 feet east of Brookhurst Street centerline and 40 feet south of Central Avenue centerline.	70.9	98.0	61.7 2:44 a.m.	74.2 4:11 p.m.	75.3
2	Located on the northwest corner of the fence that is located around vacant lot on east side of project site, approximately 30 feet south of Central Avenue centerline.	56.6	75.0	46.4 2:44 a.m.	60.5 7:21 p.m.	61.3

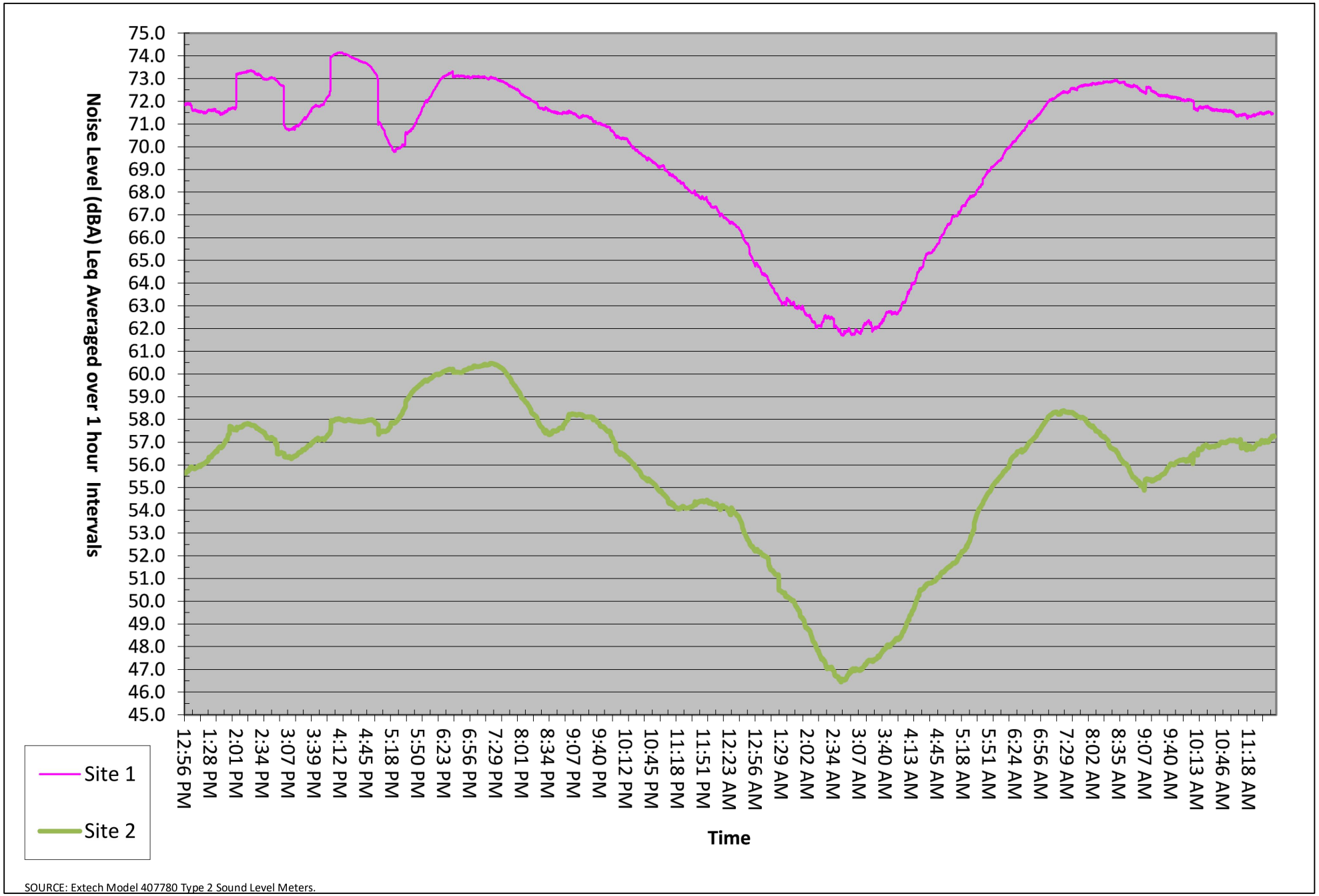
Source: Noise measurements were taken with two Extech Model 407780 Type 2 sound level meters from Tuesday, May 9, 2023 to Wednesday, May 10, 2023.



SOURCE: Google Maps.

VISTA ENVIRONMENTAL

Figure 4
Field Noise Monitoring Locations



SOURCE: Extech Model 407780 Type 2 Sound Level Meters.

VISTA ENVIRONMENTAL

Figure 5
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 F below provides a list of the construction equipment anticipated to be used for each phase of construction that was obtained from the *Air Quality, Energy, and Greenhouse Gas Impact Analysis for the Brookhurst and Central Garden Grove Townhome Project* (Air Quality Analysis), prepared by EPD Solutions, Inc., July, 2023.

Table F – Construction Equipment Noise Emissions and Usage Factors

Equipment Description	Number of Equipment	Acoustical Use Factor[1] (percent)	Spec 721.560 Lmax at 50 feet[2] (dBA, slow[3])	Actual Measured Lmax at 50 feet[4] (dBA, slow[3])
Demolition				
Concrete/Industrial Saw	1	20	90	90
Rubber Tired Dozer	1	40	85	82
Backhoe	1	40	80	78
Front End Loader	1	40	80	79
Tractor	1	40	84	N/A
Site Preparation				
Grader	1	40	85	83
Rubber Tired Dozer	1	40	85	82
Tractor	1	40	84	N/A
Grading				
Grader	1	40	85	83
Rubber Tired Dozer	1	40	85	82
Tractor	2	40	84	N/A
Building Construction				
Crane	1	16	85	81
Forklift (Gradall)	1	40	85	83
Generator	1	50	82	81
Tractor	1	40	84	N/A
Welder	3	40	73	74
Paving				
Cement and Mortar Mixer	1	40	85	79
Paver	1	50	85	77
Paving Equipment	1	50	85	77
Rollers	1	20	85	80
Tractor	1	40	84	N/A
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.
Source: Federal Highway Administration, 2006.

Table F shows the associated measured noise emissions for each piece of equipment from the RCNM model and measured percentage of typical equipment use per day. Construction noise impacts to the nearby sensitive receptors have been calculated according to the equipment noise levels and usage factors listed in Table F and through use of the RCNM. For each phase of construction, all construction equipment was analyzed based on being placed in the middle of the project site, per the FTA Manual for a General Assessment, and is based on the rationale that mobile equipment would likely move around the entire project site in a typical workday. As such, the middle of project site would provide the acoustical average noise level created over a typical workday. However, in order to provide a conservative analysis, all equipment for each phase of construction were analyzed as operating simultaneously, instead of just the two nosiest pieces of equipment as detailed in the FTA Manual. The RCNM model printouts are provided in Appendix C.

6.2 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 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, 2018.

The construction-related 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 F.

7.0 IMPACT ANALYSIS

7.1 CEQA Thresholds of Significance

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

- Generation of a substantial temporary or permanent increase in ambient noise levels in the vicinity of the project in excess of standards established in the local general plan or noise ordinance, or applicable standards of other agencies;
- Generation of excessive groundborne vibration or groundborne noise levels; or
- For a project located within the vicinity of a private airstrip or an airport land use plan or, where such a plan has not been adopted, within two miles of a public airport or public use airport, would the project expose people residing or working in the project area to excessive noise levels.

7.2 Generation of Noise Levels in Excess of Standards

The proposed project would not generate a substantial temporary or permanent increase in ambient noise levels in the vicinity of the project in excess of standards established in the local general plan or noise ordinance, or applicable standards of other agencies. The following section calculates the potential noise emissions associated with the temporary construction activities and long-term 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 restaurant structure and surface parking lot, site preparation and grading of the 1.22-acre project site, building construction of the 30-unit residential townhome complex, paving of the onsite driveways, parking areas, sidewalks and hardscapes, 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 5 feet east of the project site, there is also a single-family home located as near as 15 feet south of the project site, and single-family homes as near as 70 feet north of the project site.

Section 8.47.060(D) of the City's Municipal Code allows construction noise to exceed the City noise standards provided that construction activities occur between 7:00 a.m. and 10:00 p.m. All construction activities associated with the proposed project would occur during the allowable hours for construction activities as detailed in Section 8.47.060(D) of the Municipal Code. Because the City's ordinance does not include construction noise standards, the FTA construction noise criteria thresholds detailed above in Section 4.1 have been utilized. For these purposes a significant construction noise impact would occur if construction noise exceeds 90 dBA Leq during the Day (defined as 7 a.m. to 10 p.m.) at any of the nearby sensitive receptors.

Construction noise impacts to the nearby sensitive receptors have been calculated through use of the RCNM and the parameters and assumptions detailed in Section 6.1 of this report including Table F – Construction Equipment Noise Emissions and Usage Factors. Table H that shows the anticipated

construction equipment per phase. The results are shown below in Table H and the RCNM printouts are provided in Appendix C.

Table H – Construction Noise Levels at the Nearby Sensitive Receptors

Construction Phase	Construction Noise Level (dBA Leq) at:		
	Homes to East[1]	Homes to South[2]	Homes to North
Demolition	76	79	76
Site Preparation	75	78	74
Grading	76	79	76
Building Construction	76	79	76
Paving	73	76	73
Painting	64	67	63
FTA Construction Noise Threshold	**90**	**90**	**90**
Exceed Threshold?	**No**	**No**	**No**

[1] The homes to the east are located as near as 153 feet from the center of the project site.
[2] The homes to the south are located as near as 108 feet from the center of the project site.
[3] The home to the north are located as near as 163 feet from the center of the project site.
Source: RCNM, Federal Highway Administration, 2006 (see Section 6.1 above for detailed description of modeling assumptions)

Table H shows that the greatest noise impacts would occur during the demolition, grading, and building construction phases, with noise levels as high as 76 dBA Leq at the homes to the east, 79 dBA Leq at the homes to the south and 76 dBA Leq at the homes to the north. Typically, the analyzed phases of construction would occur sequentially, however it should be noted that due to the logarithmic properties of addition of two distinct noise sources, the most that the noise may be increased if two construction phases occurred concurrently would be an additional 3 dB above the higher construction phase noise. As such, the worst-case noise level that may occur with two construction phases occurring simultaneously would be 82 dBA Leq at the homes to the south. Table H also shows that none of the construction phases (or from two phases occurring simultaneously) would exceed the FTA construction noise standard of 90 dBA for residential uses. Therefore, allowable construction times provided in 8.47.060(D) of the Municipal Code, the construction activities for the proposed project would not create a substantial temporary increase in ambient noise levels that are in excess of applicable noise standards. Impacts would be less than significant.

Operational-Related Noise

The proposed project would consist of development of a 30-unit residential townhome complex. Potential noise impacts associated with the operations of the proposed project would be from project-generated vehicular traffic on the nearby roadways and from onsite noise sources to the nearby sensitive receptors. The noise impacts created from project generated vehicular traffic on the nearby roadways and from onsite noise sources to the nearby homes have been analyzed separately below.

Roadway Vehicular Noise Impact to Nearby Sensitive Receptors

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

impacts associated with the change of volume of traffic that would occur with development of the proposed project.

Neither the General Plan nor the Municipal Code defines what constitutes a "substantial permanent increase to ambient noise levels". As such, this impact analysis has utilized guidance from the Federal Transit Administration for a moderate impact that has been detailed above in Table A that shows that the project contribution to the noise environment can range between 0 and 7 dB, which is dependent on the existing roadway noise levels.

According to the *Brookhurst and Central Garden Grove Townhome Project Level of Service (LOS) Screening Analysis*, prepared by EPD Solutions, Inc., July 13, 2023, the long-term operation of the proposed project would generate 216 daily vehicle trips. According to the *City of Garden Grove Focused General Plan Update and Zoning Amendments Draft Environmental Impact Report,* August 18, 2021, Brookhurst Street in the vicinity of the project site had 52,057 daily trips in the year 2020, which included operation of the existing restaurant building on the project site. The proposed project would contribute up to 0.4 percent of the daily trips on Brookhurst Street. In order for project-generated vehicular traffic to increase the noise level on any of the nearby roadways by 3 dB[1], the ADT would have to double, or by 1.5 dB, the ADT would have to increase by 50 percent. As such, the proposed project's roadway noise impacts would be negligible and would not result in a quantitative increase in roadway noise levels. Therefore, operational roadway noise impacts to the nearby sensitive receptors would be less than significant.

Onsite Noise Impacts

The operation of the proposed project may create an increase in onsite noise levels from noise created from the proposed air conditioner condenser units and parking lot areas. The proposed project would also include a central active open space recreation area; however, this area would be located in the middle of the project site and would be surrounded by homes. As such, any noise created from the central open space area would not impact the nearby existing residential properties and no further analysis of this noise source is provided. Section 8.47.040 of the City's Municipal Code limits noise created on the project site to the nearby sensitive receptors to 55 dBA between 7:00 a.m. and 10:00 p.m. and 50 dBA between 10:00 p.m. and 7:00 a.m.

In order to determine the noise impacts from the proposed parking lot area a reference noise measurement was taken at the edge of the parking area for a multi-family residential complex in the City of Rancho Cucamonga and the noise measurement printouts are provided in Appendix D. For the air conditioning equipment, the location of the condenser unit is shown on the site plan, which would be located on the ground in the private patio area for each townhome. The project applicant has stated that no specific air conditioning systems have been identified for the project, but that the standard types of outdoor compressor units for the air conditioner system include a 2.5 ton Carrier Model No: CA15NA03-0-A and a 3 ton Carrier Model No: CA15NA036-0-A. According to the Carrier Product Data sheet (see Appendix D), the 2.5 ton model produces a noise level of 73 dBA and the 3 ton model produces a noise level of 75 dBA at one meter. Although the use of the above air conditioning model is the best information available at this time, it should be noted that due to changes in Title 24 requirements that occur every three years that another air conditioner unit may be required to be used at the time of construction of the project.

[1] In a normal noise environment, it is generally accepted that the average healthy ear can barely perceive a noise level change of 3 dBA. A 3 dB increase is typically referred to as the threshold of perception (Caltrans, 2013)

In order to account for the noise reduction provided by the 6-foot-high sound walls on the east and south property lines, the wall attenuation equations from the *Technical Noise Supplement to the Traffic Noise Analysis Protocol* (TeNS), prepared by Caltrans, September 2013, were utilized and the noise calculation spreadsheet along with the reference noise measurements are provided in Appendix D. Table I shows the anticipated noise level from each source at the homes on the east, south and north sides of the project site and compares the calculated noise levels to the City noise standards.

Table I – Project Onsite Operational Noise Levels at Nearby Homes Prior to Mitigation

	Operational Noise Levels (dBA Leq) at:		
Noise Source	**Homes to East**	**Homes to South**	**Homes to North**
Air Conditioning Compressor Units[1]	50.4	48.1	36.9
Parking Lot[2]	21.8	32.0	18.3
Combined Noise Level	50.4	48.2	37.0
City Noise Standard[3] (Day/Night)	55/50	55/50	55/50
Exceed Standard (Day/Night)?	No/**Yes**	No/No	No/No

Notes:
[1] Air conditioning based on a 3 ton compressor unit (Carrier Model CA15NA036-0-A) that produces a noise level of 75 dBA at 1 meter.
[2] Parking lot is based on a reference noise measurement of 52.1 dBA at 5 feet.
[3] From Section 8.47.040 of the City's Municipal Code.

Table I shows that the proposed project's worst-case operational noise from the simultaneous operation of all noise sources on the project site would create a noise level of 50.4 dBA at the single-family homes on the east side of the project site. The worst-case operational noise level of 50.4 dBA would be within the City's residential noise standard of 55 dBA between 7 a.m. and 10 p.m., however it would exceed the City's residential noise standard of 50 dBA between 10 p.m. and 7 a.m. This would be considered a potentially significant impact.

Mitigation Measure NOI-1 is provided that requires the air conditioning condenser units for the proposed townhomes Nos: 23 to 30, which are located on the east side of the project site to not exceed a manufacturer sound rating of 74 dBA. For the standard Carrier Model Nos: CA15NA03-0-A or CA15NA036-0-A, this sound rating may be achieved through installation of the Carrier Sound Blanket kits on the air conditioning condenser units. According to the Carrier Product Data sheet (see Appendix D), with the Carrier Sound Blanket installed, the 2.5 ton model produces a noise level of 72 dBA and the 3 ton model produces a noise level of 73 dBA at one meter.

The operational noise impacts from onsite sources was recalculated at the homes to the east with implementation of Mitigation Measure NOI-1 and the results are shown in Table J. As shown in Table J, the combined noise level at the homes to the east would be reduced to 49.4 dBA Leq with implementation of Mitigation Measure NOI-1. An operational noise level of 49.4 dBA is within both the City's residential noise standards of 55 dBA between 7 a.m. and 10 p.m. and 50 dBA between 10 p.m. and 7 a.m. Therefore, with implementation of Mitigation Measure NOI-1, the onsite operational noise impacts would be less than significant.

Table J – Mitigated Project Onsite Operational Noise Levels at Nearby Homes

Noise Source	Operational Noise Levels (dBA Leq) at:		
	Homes to East	Homes to South	Homes to North
Air Conditioning Compressor Units[1]	49.4	48.1	36.9
Parking Lot[2]	21.8	32.0	18.3
Combined Noise Level	49.4	48.2	37.0
City Noise Standard[3] (Day/Night)	55/50	55/50	55/50
Exceed Standard (Day/Night)?	No/No	No/No	No/No

Notes:
[1] Air conditioning for homes to east based on implementation of Mitigation Measure NOI-1 that limits the condenser units on the east side of project site to 74 dBA at 1 meter.
[2] Parking lot is based on a reference noise measurement of 52.1 dBA at 5 feet.
[3] From Section 8.47.040 of the City's Municipal Code.

Level of Significance Before Mitigation

Potentially significant impact.

Mitigation Measures

Mitigation Measure NOI-1:

The project plans, mechanical specifications, and occupancy permits shall require that the air conditioning condenser units for the proposed townhomes Nos: 23 to 30, which are located on the east side of the project site shall not exceed a manufacturer sound rating of 74 dBA at one meter; or shall include installation of a manufacturer developed sound blanket for air conditioning units with manufacturer sound ratings above 74 dBA at one meter. Installation of sound blanket kits on the air conditioning condenser units shall provide noise reduction to achieve 74 dBA at one meter.

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 restaurant structure and surface parking lot, site preparation and grading of the 1.22-acre project site, building construction of the 30-unit residential townhome complex, paving of the onsite driveways, parking areas, sidewalks and hardscapes, 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 are single-family homes located as near as 5 feet east of the project site.

Caltrans guidance that is detailed above in Section 4.2, defines the threshold for building damage to older residential structures and other older buildings to 0.5 inch per second PPV and the threshold for distinctly perceptible human annoyance of 0.24 inch per second PPV from transient sources.

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 (5 feet to the east) would be 0.52 inch per second PPV. The vibration level at the nearest offsite home would exceed both the 0.5 inch per second PPV threshold for damage to structures and the human annoyance threshold of 0.24 inch per second PPV. This would be considered a potentially significant impact.

Mitigation Measure NOI-2 is provided that would require that the project construction permitting include restriction using a large dozer within 10 feet of the east property line (at 10 feet from east property line the nearest home would be 15 feet away from dozer). For all grading activities that occur within 10 feet of the east property line, the applicant shall require the use of a small dozer or other type of equipment that is less than 150 horsepower. From Table G above a small bulldozer (defined as less than 150 horsepower) would create a vibration level of 0.003 inch-per-second PPV at 25 feet. Based on typical propagation rates, the vibration level at the nearest home from a small bulldozer operating at the property line would be 0.02 inch per second PPV and from a large bulldozer operating at 15 feet from the nearest residences would create a vibration level of 0.16 inch per second PPV. Both of these vibration levels would be below both the damage to structures threshold of 0.5 inch per second PPV and the distinctly perceptible human annoyance 0.24 inch per second PPV threshold detailed above. Therefore, with implementation of Mitigation Measure NOI-2, construction-related vibration impacts would be less than significant.

Operations-Related Vibration Impacts

The proposed project would consist of the development of a 30-unit residential townhome complex. The ongoing operation of the proposed project would not include the operation of any known vibration sources other than typical onsite vehicle operations for a residential development. Therefore, a less than significant vibration impact is anticipated from operation of the proposed project.

Level of Significance Before Mitigation

Potentially significant impact.

Mitigation Measures

Mitigation Measure NOI-2:

The project's grading and construction plans and permitting specifications shall include the following requirements:

- Operation of all large bulldozers that are powered by a greater than 150 horsepower engine are restricted from operating within 10 feet of the eastern property line of the project site. The project construction plans and permitting specifications shall require the use of a small bulldozer (i.e., D1, D2, or D3 dozers) or other type of equipment that is less than 150 horsepower to perform all grading activities that are located within 10 feet of the eastern property line of the project site.
- All construction equipment, fixed or mobile, shall be equipped with properly operating and maintained mufflers, consistent with manufacturers' standards. The construction contractor shall place all stationary construction equipment so that emitted noise is directed away from the noise sensitive receiver nearest the project site.

- The construction contractor shall locate equipment staging in areas that will create the greatest distance between construction-related noise sources and noise-sensitive receivers nearest the project site during all construction.

Level of Significance after Mitigation

Less than significant impact.

7.4 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 Joint Forces Training Base Los Alamitos, located approximately five miles west of the project site. The project site is located outside of the 60 dBA CNEL noise contours of this airport. Impacts would be less than significant.

Level of Significance

Less than significant impact.

8.0 REFERENCES

California Department of Transportation (Caltrans), *Technical Noise Supplement to the Traffic Noise Analytics Protocol*, September 2013.

California Department of Transportation, *Transportation and Construction Vibration Guidance Manual*, April 2020.

City of Garden Grove, *City of Garden Grove Focused General Plan Update and Zoning Amendments Draft Environmental Impact Report*, August 18, 2021.

City of Garden Grove, *Garden Grove General Plan 2030*, May 2008.

City of Garden Grove, *Garden Grove Municipal Code,* 2022.

EPD Solutions, Inc., *Brookhurst and Central Garden Grove Townhome Project Level of Service (LOS) Screening Analysis*, July 13, 2023.

EPD Solutions, Inc., *Air Quality, Energy, and Greenhouse Gas Impact Analysis for the Brookhurst and Central Garden Grove Townhome Project*, July, 2023.

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

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

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

APPENDIX A

Field Noise Measurements Photo Index

Noise Measurement Site 1 - looking north


Noise Measurement Site 1 - looking northeast


Noise Measurement Site 1 - looking east


Noise Measurement Site 1 - looking southeast

Noise Measurement Site 1 - looking south


Noise Measurement Site 1 - looking southwest

Noise Measurement Site 1 - looking west


Noise Measurement Site 1 - looking northwest

Noise Measurement Site 2 - looking north

Noise Measurement Site 2 - looking northeast

Noise Measurement Site 2 - looking east

Noise Measurement Site 2 - looking southeast

Noise Measurement Site 2 - looking south

Noise Measurement Site 2 - looking southwest

Noise Measurement Site 2 - looking west

Noise Measurement Site 2 - looking northwest

APPENDIX B

Field Noise Measurements Printouts

Site 1 - Near NW Corner of Project Site

Date	Time=05/09/23	12:19:00 PM			
Sampling	Time=3	Weighting=A			
Record	Num=	28800	Weighting=Slow	CNEL(24hr)=	75.3
Leq	70.9	SEL	Value=120.2	Ldn(24hr)=	74.7
MAX	98.0		Min Leq1hr =	61.7	2:44 AM
MIN	40.3		Max Leq1hr =	74.2	4:11 PM

Site 1 - Near NW Corner of Project Site

SPL	Time	Leq (1 hour Avg.)	Ldn	CNEL
59	12:19:00		59	59
64.1	12:19:03		64.1	64.1
70.3	12:19:06		70.3	70.3
70.8	12:19:09		70.8	70.8
73.6	12:19:12		73.6	73.6
73.5	12:19:15		73.5	73.5
71.7	12:19:18		71.7	71.7
71.8	12:19:21		71.8	71.8
74.4	12:19:24		74.4	74.4
72.6	12:19:27		72.6	72.6
71.4	12:19:30		71.4	71.4
71.2	12:19:33		71.2	71.2
72.5	12:19:36		72.5	72.5
70.8	12:19:39		70.8	70.8
71	12:19:42		71	71
74.3	12:19:45		74.3	74.3
71.7	12:19:48		71.7	71.7
76.7	12:19:51		76.7	76.7
73.8	12:19:54		73.8	73.8
74.8	12:19:57		74.8	74.8
76.2	12:20:00		76.2	76.2
75.7	12:20:03		75.7	75.7
71.1	12:20:06		71.1	71.1
69.6	12:20:09		69.6	69.6
73.4	12:20:12		73.4	73.4
68.8	12:20:15		68.8	68.8
74.1	12:20:18		74.1	74.1
73.5	12:20:21		73.5	73.5
69.6	12:20:24		69.6	69.6
70.2	12:20:27		70.2	70.2
67	12:20:30		67	67
64.8	12:20:33		64.8	64.8
64.6	12:20:36		64.6	64.6
68.1	12:20:39		68.1	68.1
68.7	12:20:42		68.7	68.7
66.4	12:20:45		66.4	66.4
64.4	12:20:48		64.4	64.4
63.8	12:20:51		63.8	63.8
69.9	12:20:54		69.9	69.9
72.6	12:20:57		72.6	72.6
68	12:21:00		68	68
65.4	12:21:03		65.4	65.4
71.1	12:21:06		71.1	71.1
72.6	12:21:09		72.6	72.6
71.1	12:21:12		71.1	71.1
73.4	12:21:15		73.4	73.4
74	12:21:18		74	74
71	12:21:21		71	71
72.5	12:21:24		72.5	72.5
73.6	12:21:27		73.6	73.6
72	12:21:30		72	72
70.4	12:21:33		70.4	70.4
72.2	12:21:36		72.2	72.2
67.7	12:21:39		67.7	67.7
67	12:21:42		67	67
66.4	12:21:45		66.4	66.4
65.2	12:21:48		65.2	65.2
63.8	12:21:51		63.8	63.8
64.9	12:21:54		64.9	64.9
68.5	12:21:57		68.5	68.5
76.4	12:22:00		76.4	76.4
74.5	12:22:03		74.5	74.5
76.6	12:22:06		76.6	76.6
74.3	12:22:09		74.3	74.3
73.6	12:22:12		73.6	73.6
73.6	12:22:15		73.6	73.6
73.3	12:22:18		73.3	73.3
73.4	12:22:21		73.4	73.4
74.2	12:22:24		74.2	74.2
74.9	12:22:27		74.9	74.9
72.3	12:22:30		72.3	72.3
69.8	12:22:33		69.8	69.8
70.6	12:22:36		70.6	70.6
70.4	12:22:39		70.4	70.4
70	12:22:42		70	70
68.2	12:22:45		68.2	68.2
65.7	12:22:48		65.7	65.7

Site 2 - North Side of Project Site (NW Corner of Vacant Lot)

Date	Time=05/09/23	12:26:00 PM			
Sampling	Time=3	Freq Weighting=A			
Record	Num=	28600	Weighting=Slow	CNEL(24hr)=	61.3
Leq	56.6	SEL	Value=105.9	Ldn(24hr)=	60.7
MAX	75.0		Min Leq1hr =	46.4	2:44 AM
MIN	37.7		Max Leq1hr =	60.5	7:21 PM

Site 2 - North Side of Project Site (NW Corner of Vacant Lot)

SPL	Time	Leq (1 hour Avg.)	Ldn	CNEL
60.1	12:26:00		60.1	60.1
60	12:26:03		60	60
58.7	12:26:06		58.7	58.7
60.9	12:26:09		60.9	60.9
60.7	12:26:12		60.7	60.7
49.8	12:26:15		49.8	49.8
59.9	12:26:18		59.9	59.9
62.5	12:26:21		62.5	62.5
62.2	12:26:24		62.2	62.2
61.4	12:26:27		61.4	61.4
58.6	12:26:30		58.6	58.6
57.6	12:26:33		57.6	57.6
59.4	12:26:36		59.4	59.4
55.2	12:26:39		55.2	55.2
53.9	12:26:42		53.9	53.9
54.7	12:26:45		54.7	54.7
53.2	12:26:48		53.2	53.2
54.5	12:26:51		54.5	54.5
53	12:26:54		53	53
52	12:26:57		52	52
54.9	12:27:00		54.9	54.9
56	12:27:03		56	56
60.2	12:27:06		60.2	60.2
60.3	12:27:09		60.3	60.3
60.4	12:27:12		60.4	60.4
55.8	12:27:15		55.8	55.8
56.4	12:27:18		56.4	56.4
61.2	12:27:21		61.2	61.2
59.1	12:27:24		59.1	59.1
62.3	12:27:27		62.3	62.3
56.9	12:27:30		56.9	56.9
58.6	12:27:33		58.6	58.6
54.6	12:27:36		54.6	54.6
55.2	12:27:39		55.2	55.2
54.3	12:27:42		54.3	54.3
54.2	12:27:45		54.2	54.2
55.1	12:27:48		55.1	55.1
51.9	12:27:51		51.9	51.9
52.1	12:27:54		52.1	52.1
52.7	12:27:57		52.7	52.7
58.7	12:28:00		58.7	58.7
56.4	12:28:03		56.4	56.4
51.4	12:28:06		51.4	51.4
50.5	12:28:09		50.5	50.5
51.8	12:28:12		51.8	51.8
51.5	12:28:15		51.5	51.5
50.7	12:28:18		50.7	50.7
49.5	12:28:21		49.5	49.5
50.5	12:28:24		50.5	50.5
50.8	12:28:27		50.8	50.8
51.4	12:28:30		51.4	51.4
51.8	12:28:33		51.8	51.8
49.7	12:28:36		49.7	49.7
49.9	12:28:39		49.9	49.9
51.7	12:28:42		51.7	51.7
51.7	12:28:45		51.7	51.7
53.8	12:28:48		53.8	53.8
53.8	12:28:51		53.8	53.8
54.9	12:28:54		54.9	54.9
54.6	12:28:57		54.6	54.6
62	12:29:00		62	62
55	12:29:03		55	55
53.1	12:29:06		53.1	53.1
52.5	12:29:09		52.5	52.5
51.8	12:29:12		51.8	51.8
51.7	12:29:15		51.7	51.7
51.4	12:29:18		51.4	51.4
51.8	12:29:21		51.8	51.8
53.1	12:29:24		53.1	53.1
52.7	12:29:27		52.7	52.7
53.8	12:29:30		53.8	53.8
52.1	12:29:33		52.1	52.1
53.2	12:29:36		53.2	53.2
51.7	12:29:39		51.7	51.7
54.9	12:29:42		54.9	54.9
57.9	12:29:45		57.9	57.9
51.2	12:29:48		51.2	51.2

Site 1 - Near NW Corner of Project Site					Site 2 - North Side of Project Site (NW Corner of Vacant Lot)				
SPL	Time	Leq (1 hour Avg.)	Ldn	CNEL	SPL	Time	Leq (1 hour Avg.)	Ldn	CNEL
67.7	12:22:51		67.7	67.7	52.8	12:29:51		52.8	52.8
65.6	12:22:54		65.6	65.6	50.2	12:29:54		50.2	50.2
63.3	12:22:57		63.3	63.3	50.3	12:29:57		50.3	50.3
69.2	12:23:00		69.2	69.2	52	12:30:00		52	52
67.5	12:23:03		67.5	67.5	56.1	12:30:03		56.1	56.1
64.9	12:23:06		64.9	64.9	55.1	12:30:06		55.1	55.1
72.9	12:23:09		72.9	72.9	64	12:30:09		64	64
66.4	12:23:12		66.4	66.4	54.1	12:30:12		54.1	54.1
62.1	12:23:15		62.1	62.1	53.2	12:30:15		53.2	53.2
61.9	12:23:18		61.9	61.9	51	12:30:18		51	51
65.6	12:23:21		65.6	65.6	53.5	12:30:21		53.5	53.5
61.9	12:23:24		61.9	61.9	56.8	12:30:24		56.8	56.8
60.5	12:23:27		60.5	60.5	64.3	12:30:27		64.3	64.3
72.3	12:23:30		72.3	72.3	53.8	12:30:30		53.8	53.8
68.5	12:23:33		68.5	68.5	50.1	12:30:33		50.1	50.1
72.8	12:23:36		72.8	72.8	49.6	12:30:36		49.6	49.6
73	12:23:39		73	73	49.9	12:30:39		49.9	49.9
71.2	12:23:42		71.2	71.2	50.7	12:30:42		50.7	50.7
71.1	12:23:45		71.1	71.1	53.2	12:30:45		53.2	53.2
74.5	12:23:48		74.5	74.5	54.4	12:30:48		54.4	54.4
74.1	12:23:51		74.1	74.1	58.4	12:30:51		58.4	58.4
70.8	12:23:54		70.8	70.8	52.3	12:30:54		52.3	52.3
71.1	12:23:57		71.1	71.1	48.6	12:30:57		48.6	48.6
70.2	12:24:00		70.2	70.2	49	12:31:00		49	49
68.8	12:24:03		68.8	68.8	49.8	12:31:03		49.8	49.8
68.5	12:24:06		68.5	68.5	55.1	12:31:06		55.1	55.1
72.4	12:24:09		72.4	72.4	50.1	12:31:09		50.1	50.1
74.8	12:24:12		74.8	74.8	52.7	12:31:12		52.7	52.7
76.4	12:24:15		76.4	76.4	53.2	12:31:15		53.2	53.2
77.6	12:24:18		77.6	77.6	54.1	12:31:18		54.1	54.1
73	12:24:21		73	73	55.5	12:31:21		55.5	55.5
72	12:24:24		72	72	55.4	12:31:24		55.4	55.4
73	12:24:27		73	73	60.5	12:31:27		60.5	60.5
72.4	12:24:30		72.4	72.4	57.6	12:31:30		57.6	57.6
80	12:24:33		80	80	53.5	12:31:33		53.5	53.5
76.2	12:24:36		76.2	76.2	54.1	12:31:36		54.1	54.1
72.5	12:24:39		72.5	72.5	54.4	12:31:39		54.4	54.4
73.2	12:24:42		73.2	73.2	54.6	12:31:42		54.6	54.6
74.5	12:24:45		74.5	74.5	54.4	12:31:45		54.4	54.4
72.5	12:24:48		72.5	72.5	54.5	12:31:48		54.5	54.5
70.9	12:24:51		70.9	70.9	54.7	12:31:51		54.7	54.7
69.3	12:24:54		69.3	69.3	56.4	12:31:54		56.4	56.4
68.8	12:24:57		68.8	68.8	60.9	12:31:57		60.9	60.9
69.3	12:25:00		69.3	69.3	55.3	12:32:00		55.3	55.3
66.5	12:25:03		66.5	66.5	55	12:32:03		55	55
66.2	12:25:06		66.2	66.2	55	12:32:06		55	55
64.6	12:25:09		64.6	64.6	54.6	12:32:09		54.6	54.6
63.4	12:25:12		63.4	63.4	54.5	12:32:12		54.5	54.5
64.6	12:25:15		64.6	64.6	55.3	12:32:15		55.3	55.3
62	12:25:18		62	62	53.4	12:32:18		53.4	53.4
63	12:25:21		63	63	52.7	12:32:21		52.7	52.7
63	12:25:24		63	63	56.5	12:32:24		56.5	56.5
64	12:25:27		64	64	54.6	12:32:27		54.6	54.6
68.1	12:25:30		68.1	68.1	52.8	12:32:30		52.8	52.8
71.8	12:25:33		71.8	71.8	54.4	12:32:33		54.4	54.4
68.8	12:25:36		68.8	68.8	56.9	12:32:36		56.9	56.9
64.1	12:25:39		64.1	64.1	51.8	12:32:39		51.8	51.8
60.1	12:25:42		60.1	60.1	51.9	12:32:42		51.9	51.9
63	12:25:45		63	63	51.1	12:32:45		51.1	51.1
60.7	12:25:48		60.7	60.7	52.8	12:32:48		52.8	52.8
62.1	12:25:51		62.1	62.1	51.6	12:32:51		51.6	51.6
67.9	12:25:54		67.9	67.9	51.1	12:32:54		51.1	51.1
69.2	12:25:57		69.2	69.2	50.8	12:32:57		50.8	50.8
73.3	12:26:00		73.3	73.3	50.1	12:33:00		50.1	50.1
74	12:26:03		74	74	51.9	12:33:03		51.9	51.9
70.4	12:26:06		70.4	70.4	53.6	12:33:06		53.6	53.6
72.7	12:26:09		72.7	72.7	54.6	12:33:09		54.6	54.6
71.4	12:26:12		71.4	71.4	49.7	12:33:12		49.7	49.7
71.6	12:26:15		71.6	71.6	53.2	12:33:15		53.2	53.2
71.8	12:26:18		71.8	71.8	52.6	12:33:18		52.6	52.6
67.4	12:26:21		67.4	67.4	53.2	12:33:21		53.2	53.2
70.2	12:26:24		70.2	70.2	52.4	12:33:24		52.4	52.4
70.3	12:26:27		70.3	70.3	50.4	12:33:27		50.4	50.4
75	12:26:30		75	75	53.3	12:33:30		53.3	53.3
75.9	12:26:33		75.9	75.9	52.7	12:33:33		52.7	52.7
75.4	12:26:36		75.4	75.4	52.1	12:33:36		52.1	52.1
74.4	12:26:39		74.4	74.4	52.7	12:33:39		52.7	52.7
74.9	12:26:42		74.9	74.9	52.3	12:33:42		52.3	52.3
75.2	12:26:45		75.2	75.2	53	12:33:45		53	53
74.5	12:26:48		74.5	74.5	53.3	12:33:48		53.3	53.3
72.9	12:26:51		72.9	72.9	58.5	12:33:51		58.5	58.5
74.8	12:26:54		74.8	74.8	56.8	12:33:54		56.8	56.8
75.4	12:26:57		75.4	75.4	55.4	12:33:57		55.4	55.4
73.2	12:27:00		73.2	73.2	55.9	12:34:00		55.9	55.9
72.4	12:27:03		72.4	72.4	55.2	12:34:03		55.2	55.2
73.1	12:27:06		73.1	73.1	54.6	12:34:06		54.6	54.6
73.5	12:27:09		73.5	73.5	54.2	12:34:09		54.2	54.2
74.2	12:27:12		74.2	74.2	56.5	12:34:12		56.5	56.5
71.6	12:27:15		71.6	71.6	64.5	12:34:15		64.5	64.5

Site 1 - Near NW Corner of Project Site					Site 2 - North Side of Project Site (NW Corner of Vacant Lot)				
SPL	Time	Leq (1 hour Avg.)	Ldn	CNEL	SPL	Time	Leq (1 hour Avg.)	Ldn	CNEL
66.4	12:27:18		66.4	66.4	54.5	12:34:18		54.5	54.5
60.5	12:27:21		60.5	60.5	53.5	12:34:21		53.5	53.5
58.4	12:27:24		58.4	58.4	54.9	12:34:24		54.9	54.9
67.7	12:27:27		67.7	67.7	53.9	12:34:27		53.9	53.9
68.7	12:27:30		68.7	68.7	54.3	12:34:30		54.3	54.3
68.6	12:27:33		68.6	68.6	53.3	12:34:33		53.3	53.3
72.4	12:27:36		72.4	72.4	52.5	12:34:36		52.5	52.5
67.2	12:27:39		67.2	67.2	56.6	12:34:39		56.6	56.6
65.2	12:27:42		65.2	65.2	62.4	12:34:42		62.4	62.4
66.4	12:27:45		66.4	66.4	56.9	12:34:45		56.9	56.9
66	12:27:48		66	66	56.3	12:34:48		56.3	56.3
64.8	12:27:51		64.8	64.8	60.5	12:34:51		60.5	60.5
60.2	12:27:54		60.2	60.2	52.7	12:34:54		52.7	52.7
56.7	12:27:57		56.7	56.7	52.7	12:34:57		52.7	52.7
63.8	12:28:00		63.8	63.8	51.6	12:35:00		51.6	51.6
60.6	12:28:03		60.6	60.6	52.4	12:35:03		52.4	52.4
57.7	12:28:06		57.7	57.7	52.2	12:35:06		52.2	52.2
58	12:28:09		58	58	58	12:35:09		58	58
69.2	12:28:12		69.2	69.2	55.9	12:35:12		55.9	55.9
65.4	12:28:15		65.4	65.4	57.2	12:35:15		57.2	57.2
66.4	12:28:18		66.4	66.4	59	12:35:18		59	59
72.5	12:28:21		72.5	72.5	66.9	12:35:21		66.9	66.9
75.2	12:28:24		75.2	75.2	61	12:35:24		61	61
75.1	12:28:27		75.1	75.1	53.5	12:35:27		53.5	53.5
74.1	12:28:30		74.1	74.1	49.8	12:35:30		49.8	49.8
75.8	12:28:33		75.8	75.8	50.9	12:35:33		50.9	50.9
71.5	12:28:36		71.5	71.5	52.2	12:35:36		52.2	52.2
68.5	12:28:39		68.5	68.5	52.8	12:35:39		52.8	52.8
68.2	12:28:42		68.2	68.2	52.1	12:35:42		52.1	52.1
68.2	12:28:45		68.2	68.2	54.8	12:35:45		54.8	54.8
70.1	12:28:48		70.1	70.1	53.4	12:35:48		53.4	53.4
70.6	12:28:51		70.6	70.6	53.3	12:35:51		53.3	53.3
73.8	12:28:54		73.8	73.8	52.1	12:35:54		52.1	52.1
74.8	12:28:57		74.8	74.8	53.3	12:35:57		53.3	53.3
75.1	12:29:00		75.1	75.1	53.7	12:36:00		53.7	53.7
73.7	12:29:03		73.7	73.7	57.4	12:36:03		57.4	57.4
74.6	12:29:06		74.6	74.6	60.9	12:36:06		60.9	60.9
74	12:29:09		74	74	60.7	12:36:09		60.7	60.7
70.6	12:29:12		70.6	70.6	56.3	12:36:12		56.3	56.3
69.6	12:29:15		69.6	69.6	54	12:36:15		54	54
69.4	12:29:18		69.4	69.4	54.6	12:36:18		54.6	54.6
72.4	12:29:21		72.4	72.4	54.8	12:36:21		54.8	54.8
73.7	12:29:24		73.7	73.7	58.2	12:36:24		58.2	58.2
68.2	12:29:27		68.2	68.2	55.2	12:36:27		55.2	55.2
68.5	12:29:30		68.5	68.5	56.1	12:36:30		56.1	56.1
71	12:29:33		71	71	54.6	12:36:33		54.6	54.6
74.3	12:29:36		74.3	74.3	54.5	12:36:36		54.5	54.5
70.5	12:29:39		70.5	70.5	55	12:36:39		55	55
66.9	12:29:42		66.9	66.9	54.7	12:36:42		54.7	54.7
70.5	12:29:45		70.5	70.5	54.3	12:36:45		54.3	54.3
67.2	12:29:48		67.2	67.2	54.6	12:36:48		54.6	54.6
61.8	12:29:51		61.8	61.8	54.4	12:36:51		54.4	54.4
60.4	12:29:54		60.4	60.4	54.4	12:36:54		54.4	54.4
63.7	12:29:57		63.7	63.7	53	12:36:57		53	53
66.7	12:30:00		66.7	66.7	52.4	12:37:00		52.4	52.4
65.1	12:30:03		65.1	65.1	53.9	12:37:03		53.9	53.9
65.5	12:30:06		65.5	65.5	54.9	12:37:06		54.9	54.9
62.4	12:30:09		62.4	62.4	61.5	12:37:09		61.5	61.5
61.4	12:30:12		61.4	61.4	56.8	12:37:12		56.8	56.8
63.4	12:30:15		63.4	63.4	58.4	12:37:15		58.4	58.4
70	12:30:18		70	70	66.6	12:37:18		66.6	66.6
68.7	12:30:21		68.7	68.7	57	12:37:21		57	57
69.3	12:30:24		69.3	69.3	54.3	12:37:24		54.3	54.3
66.6	12:30:27		66.6	66.6	53.3	12:37:27		53.3	53.3
62.2	12:30:30		62.2	62.2	53.1	12:37:30		53.1	53.1
66.8	12:30:33		66.8	66.8	55	12:37:33		55	55
64.1	12:30:36		64.1	64.1	53.6	12:37:36		53.6	53.6
72	12:30:39		72	72	53.8	12:37:39		53.8	53.8
65.1	12:30:42		65.1	65.1	53.8	12:37:42		53.8	53.8
66.3	12:30:45		66.3	66.3	53.8	12:37:45		53.8	53.8
70.1	12:30:48		70.1	70.1	53.8	12:37:48		53.8	53.8
70.8	12:30:51		70.8	70.8	52.6	12:37:51		52.6	52.6
70.4	12:30:54		70.4	70.4	53.9	12:37:54		53.9	53.9
74.7	12:30:57		74.7	74.7	53	12:37:57		53	53
73.8	12:31:00		73.8	73.8	53.7	12:38:00		53.7	53.7
74.4	12:31:03		74.4	74.4	53.4	12:38:03		53.4	53.4
70.9	12:31:06		70.9	70.9	55.3	12:38:06		55.3	55.3
76.5	12:31:09		76.5	76.5	54.5	12:38:09		54.5	54.5
74.6	12:31:12		74.6	74.6	54.8	12:38:12		54.8	54.8
76	12:31:15		76	76	55.1	12:38:15		55.1	55.1
74.1	12:31:18		74.1	74.1	54.3	12:38:18		54.3	54.3
74.8	12:31:21		74.8	74.8	53.7	12:38:21		53.7	53.7
76.5	12:31:24		76.5	76.5	53.2	12:38:24		53.2	53.2
72.7	12:31:27		72.7	72.7	53.7	12:38:27		53.7	53.7
70	12:31:30		70	70	55	12:38:30		55	55
73.4	12:31:33		73.4	73.4	55.6	12:38:33		55.6	55.6
74.5	12:31:36		74.5	74.5	65.5	12:38:36		65.5	65.5
74.1	12:31:39		74.1	74.1	56	12:38:39		56	56
74.3	12:31:42		74.3	74.3	53.3	12:38:42		53.3	53.3

Site 1 - Near NW Corner of Project Site					Site 2 - North Side of Project Site (NW Corner of Vacant Lot)				
SPL	Time	Leq (1 hour Avg.)	Ldn	CNEL	SPL	Time	Leq (1 hour Avg.)	Ldn	CNEL
72.3	12:31:45		72.3	72.3	53.2	12:38:45		53.2	53.2
72.9	12:31:48		72.9	72.9	53.6	12:38:48		53.6	53.6
72.5	12:31:51		72.5	72.5	54	12:38:51		54	54
72	12:31:54		72	72	51.6	12:38:54		51.6	51.6
67.8	12:31:57		67.8	67.8	51.3	12:38:57		51.3	51.3
67.7	12:32:00		67.7	67.7	51.2	12:39:00		51.2	51.2
71.3	12:32:03		71.3	71.3	50.9	12:39:03		50.9	50.9
67.5	12:32:06		67.5	67.5	51	12:39:06		51	51
68.9	12:32:09		68.9	68.9	51.2	12:39:09		51.2	51.2
69.7	12:32:12		69.7	69.7	50.5	12:39:12		50.5	50.5
69.7	12:32:15		69.7	69.7	51.4	12:39:15		51.4	51.4
67.6	12:32:18		67.6	67.6	52.4	12:39:18		52.4	52.4
68.1	12:32:21		68.1	68.1	59.3	12:39:21		59.3	59.3
71.1	12:32:24		71.1	71.1	53.5	12:39:24		53.5	53.5
64.9	12:32:27		64.9	64.9	51.6	12:39:27		51.6	51.6
60.6	12:32:30		60.6	60.6	51.3	12:39:30		51.3	51.3
65.8	12:32:33		65.8	65.8	54.3	12:39:33		54.3	54.3
67.8	12:32:36		67.8	67.8	53.4	12:39:36		53.4	53.4
64.8	12:32:39		64.8	64.8	52.3	12:39:39		52.3	52.3
67.5	12:32:42		67.5	67.5	53	12:39:42		53	53
63.8	12:32:45		63.8	63.8	50.9	12:39:45		50.9	50.9
67.5	12:32:48		67.5	67.5	50.8	12:39:48		50.8	50.8
67.3	12:32:51		67.3	67.3	50.7	12:39:51		50.7	50.7
71.5	12:32:54		71.5	71.5	50.9	12:39:54		50.9	50.9
71.8	12:32:57		71.8	71.8	51.7	12:39:57		51.7	51.7
69.3	12:33:00		69.3	69.3	60.5	12:40:00		60.5	60.5
70.1	12:33:03		70.1	70.1	55.5	12:40:03		55.5	55.5
70.5	12:33:06		70.5	70.5	58.4	12:40:06		58.4	58.4
70.4	12:33:09		70.4	70.4	50.7	12:40:09		50.7	50.7
70.7	12:33:12		70.7	70.7	48.9	12:40:12		48.9	48.9
71	12:33:15		71	71	48.7	12:40:15		48.7	48.7
70.9	12:33:18		70.9	70.9	49.4	12:40:18		49.4	49.4
70.1	12:33:21		70.1	70.1	50.6	12:40:21		50.6	50.6
75.9	12:33:24		75.9	75.9	51.2	12:40:24		51.2	51.2
75.5	12:33:27		75.5	75.5	50.5	12:40:27		50.5	50.5
70.2	12:33:30		70.2	70.2	49.4	12:40:30		49.4	49.4
73.1	12:33:33		73.1	73.1	51.7	12:40:33		51.7	51.7
74.1	12:33:36		74.1	74.1	52.7	12:40:36		52.7	52.7
73.2	12:33:39		73.2	73.2	53.6	12:40:39		53.6	53.6
74.9	12:33:42		74.9	74.9	53.6	12:40:42		53.6	53.6
76.6	12:33:45		76.6	76.6	53.7	12:40:45		53.7	53.7
83.5	12:33:48		83.5	83.5	52.8	12:40:48		52.8	52.8
75.7	12:33:51		75.7	75.7	53.5	12:40:51		53.5	53.5
72.7	12:33:54		72.7	72.7	52.3	12:40:54		52.3	52.3
73.7	12:33:57		73.7	73.7	52	12:40:57		52	52
72.3	12:34:00		72.3	72.3	53.1	12:41:00		53.1	53.1
73.7	12:34:03		73.7	73.7	55.3	12:41:03		55.3	55.3
70.1	12:34:06		70.1	70.1	53.9	12:41:06		53.9	53.9
72.5	12:34:09		72.5	72.5	55.8	12:41:09		55.8	55.8
74.1	12:34:12		74.1	74.1	54	12:41:12		54	54
80	12:34:15		80	80	53.9	12:41:15		53.9	53.9
73.8	12:34:18		73.8	73.8	54.6	12:41:18		54.6	54.6
67.8	12:34:21		67.8	67.8	56.4	12:41:21		56.4	56.4
63.6	12:34:24		63.6	63.6	54	12:41:24		54	54
67.6	12:34:27		67.6	67.6	53.7	12:41:27		53.7	53.7
69.6	12:34:30		69.6	69.6	55	12:41:30		55	55
68.7	12:34:33		68.7	68.7	53.1	12:41:33		53.1	53.1
64	12:34:36		64	64	50.8	12:41:36		50.8	50.8
63.6	12:34:39		63.6	63.6	53	12:41:39		53	53
69.2	12:34:42		69.2	69.2	50	12:41:42		50	50
67	12:34:45		67	67	49.9	12:41:45		49.9	49.9
66.5	12:34:48		66.5	66.5	50.3	12:41:48		50.3	50.3
71.4	12:34:51		71.4	71.4	49.9	12:41:51		49.9	49.9
86.4	12:34:54		86.4	86.4	50	12:41:54		50	50
80.4	12:34:57		80.4	80.4	50.9	12:41:57		50.9	50.9
69.2	12:35:00		69.2	69.2	50.7	12:42:00		50.7	50.7
63.8	12:35:03		63.8	63.8	48.5	12:42:03		48.5	48.5
71	12:35:06		71	71	48.9	12:42:06		48.9	48.9
67.9	12:35:09		67.9	67.9	49	12:42:09		49	49
67.1	12:35:12		67.1	67.1	49.9	12:42:12		49.9	49.9
71.8	12:35:15		71.8	71.8	49.2	12:42:15		49.2	49.2
73.5	12:35:18		73.5	73.5	51.8	12:42:18		51.8	51.8
73	12:35:21		73	73	49.7	12:42:21		49.7	49.7
69.9	12:35:24		69.9	69.9	49.2	12:42:24		49.2	49.2
68.5	12:35:27		68.5	68.5	48.9	12:42:27		48.9	48.9
71.3	12:35:30		71.3	71.3	49.6	12:42:30		49.6	49.6
71	12:35:33		71	71	49.4	12:42:33		49.4	49.4
70.1	12:35:36		70.1	70.1	52.4	12:42:36		52.4	52.4
81	12:35:39		81	81	50.1	12:42:39		50.1	50.1
79.3	12:35:42		79.3	79.3	51.3	12:42:42		51.3	51.3
72.8	12:35:45		72.8	72.8	51	12:42:45		51	51
73.7	12:35:48		73.7	73.7	53.1	12:42:48		53.1	53.1
73.4	12:35:51		73.4	73.4	52.6	12:42:51		52.6	52.6
73.6	12:35:54		73.6	73.6	52.3	12:42:54		52.3	52.3
75	12:35:57		75	75	53.6	12:42:57		53.6	53.6
75.4	12:36:00		75.4	75.4	53.8	12:43:00		53.8	53.8
75.6	12:36:03		75.6	75.6	55.2	12:43:03		55.2	55.2
72.6	12:36:06		72.6	72.6	59.3	12:43:06		59.3	59.3
71.6	12:36:09		71.6	71.6	58.7	12:43:09		58.7	58.7

Site 1 - Near NW Corner of Project Site					Site 2 - North Side of Project Site (NW Corner of Vacant Lot)				
SPL	Time	Leq (1 hour Avg.)	Ldn	CNEL	SPL	Time	Leq (1 hour Avg.)	Ldn	CNEL
74.2	12:36:12		74.2	74.2	55.6	12:43:12		55.6	55.6
73.4	12:36:15		73.4	73.4	53.7	12:43:15		53.7	53.7
73.3	12:36:18		73.3	73.3	54.4	12:43:18		54.4	54.4
73.6	12:36:21		73.6	73.6	57.3	12:43:21		57.3	57.3
73.9	12:36:24		73.9	73.9	57.2	12:43:24		57.2	57.2
73.7	12:36:27		73.7	73.7	57.3	12:43:27		57.3	57.3
71.6	12:36:30		71.6	71.6	55.1	12:43:30		55.1	55.1
70.5	12:36:33		70.5	70.5	54.5	12:43:33		54.5	54.5
72.1	12:36:36		72.1	72.1	55.6	12:43:36		55.6	55.6
73.1	12:36:39		73.1	73.1	56.1	12:43:39		56.1	56.1
72.8	12:36:42		72.8	72.8	55.6	12:43:42		55.6	55.6
69.6	12:36:45		69.6	69.6	54.4	12:43:45		54.4	54.4
66.8	12:36:48		66.8	66.8	54.9	12:43:48		54.9	54.9
63.2	12:36:51		63.2	63.2	55.8	12:43:51		55.8	55.8
61.4	12:36:54		61.4	61.4	53.4	12:43:54		53.4	53.4
66.8	12:36:57		66.8	66.8	53.1	12:43:57		53.1	53.1
68	12:37:00		68	68	53.6	12:44:00		53.6	53.6
68.2	12:37:03		68.2	68.2	52.8	12:44:03		52.8	52.8
72.2	12:37:06		72.2	72.2	51.7	12:44:06		51.7	51.7
68.6	12:37:09		68.6	68.6	53.6	12:44:09		53.6	53.6
67.5	12:37:12		67.5	67.5	53.4	12:44:12		53.4	53.4
67.8	12:37:15		67.8	67.8	53.3	12:44:15		53.3	53.3
70.5	12:37:18		70.5	70.5	53.5	12:44:18		53.5	53.5
68.8	12:37:21		68.8	68.8	51.2	12:44:21		51.2	51.2
65.8	12:37:24		65.8	65.8	51.7	12:44:24		51.7	51.7
74.8	12:37:27		74.8	74.8	51.7	12:44:27		51.7	51.7
69.8	12:37:30		69.8	69.8	51.5	12:44:30		51.5	51.5
71.8	12:37:33		71.8	71.8	50.8	12:44:33		50.8	50.8
72.8	12:37:36		72.8	72.8	53.6	12:44:36		53.6	53.6
74.9	12:37:39		74.9	74.9	51.9	12:44:39		51.9	51.9
72.6	12:37:42		72.6	72.6	51.6	12:44:42		51.6	51.6
72.3	12:37:45		72.3	72.3	51.6	12:44:45		51.6	51.6
72.8	12:37:48		72.8	72.8	51.7	12:44:48		51.7	51.7
71.7	12:37:51		71.7	71.7	52	12:44:51		52	52
71	12:37:54		71	71	54.1	12:44:54		54.1	54.1
69	12:37:57		69	69	53.5	12:44:57		53.5	53.5
68.7	12:38:00		68.7	68.7	55	12:45:00		55	55
69.8	12:38:03		69.8	69.8	60.5	12:45:03		60.5	60.5
70.9	12:38:06		70.9	70.9	55.5	12:45:06		55.5	55.5
70.7	12:38:09		70.7	70.7	56.1	12:45:09		56.1	56.1
71	12:38:12		71	71	62.2	12:45:12		62.2	62.2
70.3	12:38:15		70.3	70.3	56.1	12:45:15		56.1	56.1
70.8	12:38:18		70.8	70.8	54.8	12:45:18		54.8	54.8
69.1	12:38:21		69.1	69.1	55	12:45:21		55	55
68.6	12:38:24		68.6	68.6	55.2	12:45:24		55.2	55.2
65.2	12:38:27		65.2	65.2	53.6	12:45:27		53.6	53.6
64.7	12:38:30		64.7	64.7	57.3	12:45:30		57.3	57.3
66.2	12:38:33		66.2	66.2	64	12:45:33		64	64
65.4	12:38:36		65.4	65.4	60.8	12:45:36		60.8	60.8
64.7	12:38:39		64.7	64.7	54.2	12:45:39		54.2	54.2
65.4	12:38:42		65.4	65.4	55.8	12:45:42		55.8	55.8
65.7	12:38:45		65.7	65.7	55.4	12:45:45		55.4	55.4
65.4	12:38:48		65.4	65.4	55.9	12:45:48		55.9	55.9
64.9	12:38:51		64.9	64.9	58.5	12:45:51		58.5	58.5
64.9	12:38:54		64.9	64.9	55.8	12:45:54		55.8	55.8
67.7	12:38:57		67.7	67.7	60.7	12:45:57		60.7	60.7
67.1	12:39:00		67.1	67.1	55.7	12:46:00		55.7	55.7
68.4	12:39:03		68.4	68.4	59.5	12:46:03		59.5	59.5
71	12:39:06		71	71	55.3	12:46:06		55.3	55.3
68.6	12:39:09		68.6	68.6	54.9	12:46:09		54.9	54.9
68	12:39:12		68	68	55.6	12:46:12		55.6	55.6
68.5	12:39:15		68.5	68.5	56	12:46:15		56	56
66.5	12:39:18		66.5	66.5	54.3	12:46:18		54.3	54.3
65.8	12:39:21		65.8	65.8	53.3	12:46:21		53.3	53.3
64.1	12:39:24		64.1	64.1	59.1	12:46:24		59.1	59.1
71.7	12:39:27		71.7	71.7	54.2	12:46:27		54.2	54.2
65.7	12:39:30		65.7	65.7	53.8	12:46:30		53.8	53.8
65.5	12:39:33		65.5	65.5	52.8	12:46:33		52.8	52.8
74.1	12:39:36		74.1	74.1	52.7	12:46:36		52.7	52.7
77.1	12:39:39		77.1	77.1	52.2	12:46:39		52.2	52.2
68	12:39:42		68	68	52.6	12:46:42		52.6	52.6
60	12:39:45		60	60	51.9	12:46:45		51.9	51.9
58.6	12:39:48		58.6	58.6	52.7	12:46:48		52.7	52.7
69.6	12:39:51		69.6	69.6	53.1	12:46:51		53.1	53.1
71.6	12:39:54		71.6	71.6	52.4	12:46:54		52.4	52.4
68.8	12:39:57		68.8	68.8	52.8	12:46:57		52.8	52.8
67.6	12:40:00		67.6	67.6	53	12:47:00		53	53
64.8	12:40:03		64.8	64.8	52.8	12:47:03		52.8	52.8
69.3	12:40:06		69.3	69.3	52.4	12:47:06		52.4	52.4
70.9	12:40:09		70.9	70.9	52.5	12:47:09		52.5	52.5
72.5	12:40:12		72.5	72.5	50.7	12:47:12		50.7	50.7
73	12:40:15		73	73	53.9	12:47:15		53.9	53.9
73.1	12:40:18		73.1	73.1	54.4	12:47:18		54.4	54.4
70.6	12:40:21		70.6	70.6	52.3	12:47:21		52.3	52.3
70.7	12:40:24		70.7	70.7	50.5	12:47:24		50.5	50.5
69.1	12:40:27		69.1	69.1	52.2	12:47:27		52.2	52.2
71.2	12:40:30		71.2	71.2	54.7	12:47:30		54.7	54.7
76.5	12:40:33		76.5	76.5	54.9	12:47:33		54.9	54.9
76.4	12:40:36		76.4	76.4	56	12:47:36		56	56

Site 1 - Near NW Corner of Project Site					Site 2 - North Side of Project Site (NW Corner of Vacant Lot)				
SPL	Time	Leq (1 hour Avg.)	Ldn	CNEL	SPL	Time	Leq (1 hour Avg.)	Ldn	CNEL
75.8	12:40:39		75.8	75.8	62.8	12:47:39		62.8	62.8
75.4	12:40:42		75.4	75.4	63.3	12:47:42		63.3	63.3
73.8	12:40:45		73.8	73.8	54.4	12:47:45		54.4	54.4
73.2	12:40:48		73.2	73.2	55.1	12:47:48		55.1	55.1
77	12:40:51		77	77	52.6	12:47:51		52.6	52.6
77.5	12:40:54		77.5	77.5	52.8	12:47:54		52.8	52.8
74.3	12:40:57		74.3	74.3	51.1	12:47:57		51.1	51.1
73.6	12:41:00		73.6	73.6	54.9	12:48:00		54.9	54.9
74.3	12:41:03		74.3	74.3	51.3	12:48:03		51.3	51.3
70.5	12:41:06		70.5	70.5	54.5	12:48:06		54.5	54.5
71.2	12:41:09		71.2	71.2	55.6	12:48:09		55.6	55.6
70.2	12:41:12		70.2	70.2	53.4	12:48:12		53.4	53.4
64.9	12:41:15		64.9	64.9	53.3	12:48:15		53.3	53.3
69.2	12:41:18		69.2	69.2	55	12:48:18		55	55
65.4	12:41:21		65.4	65.4	53.6	12:48:21		53.6	53.6
63.9	12:41:24		63.9	63.9	54.4	12:48:24		54.4	54.4
64.3	12:41:27		64.3	64.3	51.4	12:48:27		51.4	51.4
73.8	12:41:30		73.8	73.8	52.5	12:48:30		52.5	52.5
65.4	12:41:33		65.4	65.4	53.6	12:48:33		53.6	53.6
58.3	12:41:36		58.3	58.3	53.3	12:48:36		53.3	53.3
55.5	12:41:39		55.5	55.5	53.1	12:48:39		53.1	53.1
64.3	12:41:42		64.3	64.3	57.3	12:48:42		57.3	57.3
62.1	12:41:45		62.1	62.1	54.3	12:48:45		54.3	54.3
65.3	12:41:48		65.3	65.3	55.1	12:48:48		55.1	55.1
68.3	12:41:51		68.3	68.3	56	12:48:51		56	56
65.7	12:41:54		65.7	65.7	58.5	12:48:54		58.5	58.5
63.5	12:41:57		63.5	63.5	57.4	12:48:57		57.4	57.4
54.9	12:42:00		54.9	54.9	55.7	12:49:00		55.7	55.7
61.8	12:42:03		61.8	61.8	57.3	12:49:03		57.3	57.3
68	12:42:06		68	68	59.1	12:49:06		59.1	59.1
71	12:42:09		71	71	57.3	12:49:09		57.3	57.3
69.7	12:42:12		69.7	69.7	60.1	12:49:12		60.1	60.1
67.7	12:42:15		67.7	67.7	58.5	12:49:15		58.5	58.5
68.4	12:42:18		68.4	68.4	55.6	12:49:18		55.6	55.6
75.5	12:42:21		75.5	75.5	57.6	12:49:21		57.6	57.6
70.6	12:42:24		70.6	70.6	59.5	12:49:24		59.5	59.5
71.7	12:42:27		71.7	71.7	52.6	12:49:27		52.6	52.6
71.3	12:42:30		71.3	71.3	50.3	12:49:30		50.3	50.3
70.5	12:42:33		70.5	70.5	49.3	12:49:33		49.3	49.3
69.5	12:42:36		69.5	69.5	56.4	12:49:36		56.4	56.4
73	12:42:39		73	73	55.4	12:49:39		55.4	55.4
75.3	12:42:42		75.3	75.3	56.5	12:49:42		56.5	56.5
73.5	12:42:45		73.5	73.5	51.2	12:49:45		51.2	51.2
71.9	12:42:48		71.9	71.9	54.7	12:49:48		54.7	54.7
73.8	12:42:51		73.8	73.8	54.1	12:49:51		54.1	54.1
75.7	12:42:54		75.7	75.7	54.9	12:49:54		54.9	54.9
76.6	12:42:57		76.6	76.6	51.9	12:49:57		51.9	51.9
75.8	12:43:00		75.8	75.8	53.4	12:50:00		53.4	53.4
75.5	12:43:03		75.5	75.5	53.6	12:50:03		53.6	53.6
70.6	12:43:06		70.6	70.6	54.2	12:50:06		54.2	54.2
72.5	12:43:09		72.5	72.5	53.3	12:50:09		53.3	53.3
75.7	12:43:12		75.7	75.7	55.6	12:50:12		55.6	55.6
73.5	12:43:15		73.5	73.5	53.2	12:50:15		53.2	53.2
75.1	12:43:18		75.1	75.1	53.9	12:50:18		53.9	53.9
73.4	12:43:21		73.4	73.4	53.6	12:50:21		53.6	53.6
72.6	12:43:24		72.6	72.6	52.8	12:50:24		52.8	52.8
70.8	12:43:27		70.8	70.8	56.9	12:50:27		56.9	56.9
69.8	12:43:30		69.8	69.8	55.7	12:50:30		55.7	55.7
74.8	12:43:33		74.8	74.8	51.6	12:50:33		51.6	51.6
70.1	12:43:36		70.1	70.1	52.2	12:50:36		52.2	52.2
69	12:43:39		69	69	53	12:50:39		53	53
71.9	12:43:42		71.9	71.9	55.6	12:50:42		55.6	55.6
69.9	12:43:45		69.9	69.9	51.7	12:50:45		51.7	51.7
68.7	12:43:48		68.7	68.7	61.2	12:50:48		61.2	61.2
68.6	12:43:51		68.6	68.6	58.3	12:50:51		58.3	58.3
63.9	12:43:54		63.9	63.9	51.3	12:50:54		51.3	51.3
61.8	12:43:57		61.8	61.8	52.2	12:50:57		52.2	52.2
64.7	12:44:00		64.7	64.7	51.6	12:51:00		51.6	51.6
61.3	12:44:03		61.3	61.3	52.7	12:51:03		52.7	52.7
66.6	12:44:06		66.6	66.6	53.4	12:51:06		53.4	53.4
65.9	12:44:09		65.9	65.9	56.4	12:51:09		56.4	56.4
63.4	12:44:12		63.4	63.4	56.7	12:51:12		56.7	56.7
56.9	12:44:15		56.9	56.9	50.9	12:51:15		50.9	50.9
53.8	12:44:18		53.8	53.8	51.5	12:51:18		51.5	51.5
53	12:44:21		53	53	50.9	12:51:21		50.9	50.9
67.8	12:44:24		67.8	67.8	49.2	12:51:24		49.2	49.2
72.4	12:44:27		72.4	72.4	50.7	12:51:27		50.7	50.7
72.3	12:44:30		72.3	72.3	49.6	12:51:30		49.6	49.6
67.4	12:44:33		67.4	67.4	48	12:51:33		48	48
73.5	12:44:36		73.5	73.5	48.6	12:51:36		48.6	48.6
71.4	12:44:39		71.4	71.4	49	12:51:39		49	49
74.3	12:44:42		74.3	74.3	47.9	12:51:42		47.9	47.9
70.8	12:44:45		70.8	70.8	50.1	12:51:45		50.1	50.1
71.7	12:44:48		71.7	71.7	48.1	12:51:48		48.1	48.1
72.3	12:44:51		72.3	72.3	49.6	12:51:51		49.6	49.6
71.8	12:44:54		71.8	71.8	50.8	12:51:54		50.8	50.8
71.2	12:44:57		71.2	71.2	49.9	12:51:57		49.9	49.9
70.3	12:45:00		70.3	70.3	52	12:52:00		52	52
74	12:45:03		74	74	53.3	12:52:03		53.3	53.3
71	12:45:06		71	71	50.4	12:52:06		50.4	50.4
70.4	12:45:09		70.4	70.4	53.9	12:52:09		53.9	53.9
74.9	12:45:12		74.9	74.9	54.8	12:52:12		54.8	54.8
76.5	12:45:15		76.5	76.5	50.7	12:52:15		50.7	50.7
73.1	12:45:18		73.1	73.1	52.2	12:52:18		52.2	52.2
73.8	12:45:21		73.8	73.8	51.9	12:52:21		51.9	51.9

Site 1 - Near NW Corner of Project Site					Site 2 - North Side of Project Site (NW Corner of Vacant Lot)				
SPL	Time	Leq (1 hour Avg.)	Ldn	CNEL	SPL	Time	Leq (1 hour Avg.)	Ldn	CNEL
75.2	12:45:24		75.2	75.2	52.1	12:52:24		52.1	52.1
75.2	12:45:27		75.2	75.2	52.8	12:52:27		52.8	52.8
72.8	12:45:30		72.8	72.8	52.8	12:52:30		52.8	52.8
73.1	12:45:33		73.1	73.1	51.7	12:52:33		51.7	51.7
73.4	12:45:36		73.4	73.4	52.3	12:52:36		52.3	52.3
72.3	12:45:39		72.3	72.3	50.6	12:52:39		50.6	50.6
72.4	12:45:42		72.4	72.4	52.2	12:52:42		52.2	52.2
73.3	12:45:45		73.3	73.3	54.8	12:52:45		54.8	54.8
73.8	12:45:48		73.8	73.8	52.4	12:52:48		52.4	52.4
73.3	12:45:51		73.3	73.3	53.4	12:52:51		53.4	53.4
71.2	12:45:54		71.2	71.2	56	12:52:54		56	56
70.1	12:45:57		70.1	70.1	54.6	12:52:57		54.6	54.6
66.8	12:46:00		66.8	66.8	52.7	12:53:00		52.7	52.7
65.5	12:46:03		65.5	65.5	53.3	12:53:03		53.3	53.3
66.6	12:46:06		66.6	66.6	59.2	12:53:06		59.2	59.2
68.4	12:46:09		68.4	68.4	65.8	12:53:09		65.8	65.8
64.3	12:46:12		64.3	64.3	56.5	12:53:12		56.5	56.5
62.9	12:46:15		62.9	62.9	53.5	12:53:15		53.5	53.5
64.3	12:46:18		64.3	64.3	55.1	12:53:18		55.1	55.1
63.2	12:46:21		63.2	63.2	54.4	12:53:21		54.4	54.4
64.6	12:46:24		64.6	64.6	54	12:53:24		54	54
60.4	12:46:27		60.4	60.4	52	12:53:27		52	52
63	12:46:30		63	63	53.8	12:53:30		53.8	53.8
69.1	12:46:33		69.1	69.1	50.3	12:53:33		50.3	50.3
65.6	12:46:36		65.6	65.6	51.6	12:53:36		51.6	51.6
70.7	12:46:39		70.7	70.7	52.2	12:53:39		52.2	52.2
65.6	12:46:42		65.6	65.6	53.6	12:53:42		53.6	53.6
62.8	12:46:45		62.8	62.8	51.6	12:53:45		51.6	51.6
64.6	12:46:48		64.6	64.6	50.8	12:53:48		50.8	50.8
71.9	12:46:51		71.9	71.9	50.9	12:53:51		50.9	50.9
69.7	12:46:54		69.7	69.7	52.7	12:53:54		52.7	52.7
64.7	12:46:57		64.7	64.7	59	12:53:57		59	59
74.1	12:47:00		74.1	74.1	57.5	12:54:00		57.5	57.5
73	12:47:03		73	73	56.2	12:54:03		56.2	56.2
72.7	12:47:06		72.7	72.7	54.5	12:54:06		54.5	54.5
74.7	12:47:09		74.7	74.7	56.5	12:54:09		56.5	56.5
70.9	12:47:12		70.9	70.9	55.4	12:54:12		55.4	55.4
70.2	12:47:15		70.2	70.2	54.6	12:54:15		54.6	54.6
73.3	12:47:18		73.3	73.3	54.3	12:54:18		54.3	54.3
71.7	12:47:21		71.7	71.7	54.3	12:54:21		54.3	54.3
68	12:47:24		68	68	55.4	12:54:24		55.4	55.4
68.9	12:47:27		68.9	68.9	56.8	12:54:27		56.8	56.8
69.6	12:47:30		69.6	69.6	56.9	12:54:30		56.9	56.9
73.6	12:47:33		73.6	73.6	56.7	12:54:33		56.7	56.7
72.4	12:47:36		72.4	72.4	55	12:54:36		55	55
74	12:47:39		74	74	55.3	12:54:39		55.3	55.3
73.6	12:47:42		73.6	73.6	56.9	12:54:42		56.9	56.9
72	12:47:45		72	72	57.1	12:54:45		57.1	57.1
73.5	12:47:48		73.5	73.5	55.1	12:54:48		55.1	55.1
73.7	12:47:51		73.7	73.7	55	12:54:51		55	55
73.7	12:47:54		73.7	73.7	55.9	12:54:54		55.9	55.9
73.4	12:47:57		73.4	73.4	54.1	12:54:57		54.1	54.1
70.2	12:48:00		70.2	70.2	52.6	12:55:00		52.6	52.6
73	12:48:03		73	73	57.1	12:55:03		57.1	57.1
72.7	12:48:06		72.7	72.7	55.1	12:55:06		55.1	55.1
73.7	12:48:09		73.7	73.7	54.7	12:55:09		54.7	54.7
71	12:48:12		71	71	60.7	12:55:12		60.7	60.7
73.6	12:48:15		73.6	73.6	63.9	12:55:15		63.9	63.9
73.2	12:48:18		73.2	73.2	55	12:55:18		55	55
69.8	12:48:21		69.8	69.8	54.3	12:55:21		54.3	54.3
68.5	12:48:24		68.5	68.5	54.2	12:55:24		54.2	54.2
72.9	12:48:27		72.9	72.9	54.5	12:55:27		54.5	54.5
71.3	12:48:30		71.3	71.3	53.7	12:55:30		53.7	53.7
65.7	12:48:33		65.7	65.7	54.1	12:55:33		54.1	54.1
65.5	12:48:36		65.5	65.5	53.2	12:55:36		53.2	53.2
66.6	12:48:39		66.6	66.6	53.9	12:55:39		53.9	53.9
68.5	12:48:42		68.5	68.5	51	12:55:42		51	51
68.8	12:48:45		68.8	68.8	53.2	12:55:45		53.2	53.2
65.5	12:48:48		65.5	65.5	54	12:55:48		54	54
62.6	12:48:51		62.6	62.6	53.3	12:55:51		53.3	53.3
67	12:48:54		67	67	51.6	12:55:54		51.6	51.6
67.8	12:48:57		67.8	67.8	53.7	12:55:57		53.7	53.7
70.2	12:49:00	71.9	70.2	70.2	51.2	12:56:00	55.7	51.2	51.2
65.6	12:49:03	71.9	65.6	65.6	51.6	12:56:03	55.7	51.6	51.6
62.1	12:49:06	71.9	62.1	62.1	51.4	12:56:06	55.7	51.4	51.4
62	12:49:09	71.9	62	62	50.1	12:56:09	55.7	50.1	50.1
68.7	12:49:12	71.9	68.7	68.7	50	12:56:12	55.7	50	50
64	12:49:15	71.9	64	64	51.6	12:56:15	55.7	51.6	51.6
76.2	12:49:18	71.9	76.2	76.2	49.3	12:56:18	55.7	49.3	49.3
73.3	12:49:21	71.9	73.3	73.3	50.2	12:56:21	55.7	50.2	50.2
74.7	12:49:24	71.9	74.7	74.7	48.9	12:56:24	55.7	48.9	48.9
72.6	12:49:27	71.9	72.6	72.6	49.6	12:56:27	55.6	49.6	49.6
71.7	12:49:30	71.9	71.7	71.7	51.8	12:56:30	55.6	51.8	51.8
73.8	12:49:33	71.9	73.8	73.8	59.6	12:56:33	55.6	59.6	59.6
73	12:49:36	71.9	73	73	55.9	12:56:36	55.6	55.9	55.9
74	12:49:39	71.9	74	74	50.2	12:56:39	55.6	50.2	50.2
73.2	12:49:42	71.9	73.2	73.2	49.5	12:56:42	55.6	49.5	49.5
74.6	12:49:45	71.9	74.6	74.6	49.5	12:56:45	55.6	49.5	49.5
72.9	12:49:48	71.9	72.9	72.9	51	12:56:48	55.6	51	51
73.7	12:49:51	71.9	73.7	73.7	54.1	12:56:51	55.6	54.1	54.1
73.8	12:49:54	71.9	73.8	73.8	53.5	12:56:54	55.6	53.5	53.5
74.7	12:49:57	71.9	74.7	74.7	51.8	12:56:57	55.6	51.8	51.8
74.6	12:50:00	71.9	74.6	74.6	56.7	12:57:00	55.7	56.7	56.7
74.2	12:50:03	71.9	74.2	74.2	53.8	12:57:03	55.7	53.8	53.8
73	12:50:06	71.9	73	73	57.2	12:57:06	55.7	57.2	57.2
71.5	12:50:09	71.9	71.5	71.5	54.4	12:57:09	55.6	54.4	54.4
73.4	12:50:12	71.9	73.4	73.4	59.6	12:57:12	55.6	59.6	59.6
73.6	12:50:15	71.9	73.6	73.6	57.3	12:57:15	55.6	57.3	57.3
72.2	12:50:18	71.9	72.2	72.2	55.6	12:57:18	55.6	55.6	55.6
73.5	12:50:21	71.9	73.5	73.5	52.8	12:57:21	55.6	52.8	52.8
73.4	12:50:24	71.9	73.4	73.4	53.8	12:57:24	55.6	53.8	53.8
69.9	12:50:27	71.9	69.9	69.9	52.4	12:57:27	55.6	52.4	52.4
70.3	12:50:30	71.9	70.3	70.3	56.5	12:57:30	55.6	56.5	56.5

APPENDIX C

RCNM Model Construction Noise Calculation Printouts

Roadway Construction Noise Model (RCNM),Version 1.1

Report date: 7/18/2023
Case Description: Brookhurst & Central Townhomes - Demolition

---- Receptor #1 ----

Description	Land Use	Baselines (dBA) Daytime	Evening	Night
Homes to East	Residential	56.6	56.6	56.6

Description	Impact Device	Usage(%)	Equipment Spec Lmax (dBA)	Actual Lmax (dBA)	Receptor Distance (feet)	Estimated Shielding (dBA)
Concrete Saw	No	20		89.6	153	0
Dozer	No	40		81.7	153	0
Backhoe	No	40		77.6	153	0
Front End Loader	No	40		79.1	153	0
Tractor	No	40	84		153	0

		Calculated (dBA)		Results Noise Limits (dBA) Day		Evening	
Equipment		*Lmax	Leq	Lmax	Leq	Lmax	Leq
Concrete Saw		79.9	72.9	N/A	N/A	N/A	N/A
Dozer		72.0	68.0	N/A	N/A	N/A	N/A
Backhoe		67.8	63.9	N/A	N/A	N/A	N/A
Front End Loader		69.4	65.4	N/A	N/A	N/A	N/A
Tractor		74.3	70.3	N/A	N/A	N/A	N/A
	Total	**80**	**76**	N/A	N/A	N/A	N/A

*Calculated Lmax is the Loudest value.

Roadway Construction Noise Model (RCNM),Version 1.1

Report date: 7/18/2023
Case Description: Brookhurst & Central Townhomes - Demolition

---- Receptor #2 ----

Description	Land Use	Baselines (dBA) Daytime	Evening	Night
Homes to South	Residential	56.6	56.6	56.6

Description	Impact Device	Usage(%)	Equipment Spec Lmax (dBA)	Actual Lmax (dBA)	Receptor Distance (feet)	Estimated Shielding (dBA)
Concrete Saw	No	20		89.6	108	0
Dozer	No	40		81.7	108	0
Backhoe	No	40		77.6	108	0
Front End Loader	No	40		79.1	108	0
Tractor	No	40	84		108	0

Equipment	Calculated (dBA) *Lmax	Leq	Results Noise Limits (dBA) Day Lmax	Day Leq	Evening Lmax	Evening Leq
Concrete Saw	82.9	75.9	N/A	N/A	N/A	N/A
Dozer	75.0	71.0	N/A	N/A	N/A	N/A
Backhoe	70.9	66.9	N/A	N/A	N/A	N/A
Front End Loader	72.4	68.4	N/A	N/A	N/A	N/A
Tractor	77.3	73.3	N/A	N/A	N/A	N/A
Total	**83**	**79**	N/A	N/A	N/A	N/A

*Calculated Lmax is the Loudest value.

Roadway Construction Noise Model (RCNM),Version 1.1

Report date: 7/18/2023
Case Description: Brookhurst & Central Townhomes - Demolition

				---- Receptor #3 ----			
		Baselines (dBA)					
Description	Land Use	Daytime	Evening	Night			
Homes to North	Residential	56.6	56.6	56.6			

			Equipment Spec	Actual	Receptor	Estimated
	Impact		Lmax	Lmax	Distance	Shielding
Description	Device	Usage(%)	(dBA)	(dBA)	(feet)	(dBA)
Concrete Saw	No	20		89.6	163	0
Dozer	No	40		81.7	163	0
Backhoe	No	40		77.6	163	0
Front End Loader	No	40		79.1	163	0
Tractor	No	40	84		163	0

			Results			
	Calculated (dBA)		Noise Limits (dBA)			
			Day		Evening	
Equipment	*Lmax	Leq	Lmax	Leq	Lmax	Leq
Concrete Saw	79.3	72.3	N/A	N/A	N/A	N/A
Dozer	71.4	67.4	N/A	N/A	N/A	N/A
Backhoe	67.3	63.3	N/A	N/A	N/A	N/A
Front End Loader	68.8	64.9	N/A	N/A	N/A	N/A
Tractor	73.7	69.8	N/A	N/A	N/A	N/A
Total	**79**	**76**	N/A	N/A	N/A	N/A

*Calculated Lmax is the Loudest value.

Roadway Construction Noise Model (RCNM),Version 1.1

Report date: 7/18/2023
Case Description: Brookhurst & Central Townhomes - Site Preparation

---- Receptor #1 ----

Description	Land Use	Baselines (dBA) Daytime	Evening	Night
Homes to East	Residential	56.6	56.6	56.6

Description	Impact Device	Usage(%)	Equipment Spec Lmax (dBA)	Actual Lmax (dBA)	Receptor Distance (feet)	Estimated Shielding (dBA)
Grader	No	40	85		153	0
Dozer	No	40		81.7	153	0
Tractor	No	40	84		153	0

		Results Calculated (dBA)		Noise Limits (dBA) Day		Evening	
Equipment		*Lmax	Leq	Lmax	Leq	Lmax	Leq
Grader		75.3	71.3	N/A	N/A	N/A	N/A
Dozer		72.0	68.0	N/A	N/A	N/A	N/A
Tractor		74.3	70.3	N/A	N/A	N/A	N/A
	Total	**75**	**75**	N/A	N/A	N/A	N/A

*Calculated Lmax is the Loudest value.

---- Receptor #2 ----

Description	Land Use	Baselines (dBA) Daytime	Evening	Night
Homes to South	Residential	56.6	56.6	56.6

Description	Impact Device	Usage(%)	Equipment Spec Lmax (dBA)	Actual Lmax (dBA)	Receptor Distance (feet)	Estimated Shielding (dBA)
Grader	No	40	85		108	0
Dozer	No	40		81.7	108	0
Tractor	No	40	84		108	0

		Results Calculated (dBA)		Noise Limits (dBA) Day		Evening	
Equipment		*Lmax	Leq	Lmax	Leq	Lmax	Leq
Grader		78.3	74.3	N/A	N/A	N/A	N/A
Dozer		75.0	71.0	N/A	N/A	N/A	N/A
Tractor		77.3	73.3	N/A	N/A	N/A	N/A
	Total	**78**	**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: 7/18/2023
Case Description: Brookhurst & Central Townhomes - Site Preparation

---- Receptor #3 ----

		Baselines (dBA)		
Description	Land Use	Daytime	Evening	Night
Homes to North	Residential	56.6	56.6	56.6

Description	Impact Device	Usage(%)	Equipment Spec Lmax (dBA)	Actual Lmax (dBA)	Receptor Distance (feet)	Estimated Shielding (dBA)
Grader	No	40	85		163	0
Dozer	No	40		81.7	163	0
Tractor	No	40	84		163	0

	Results					
	Calculated (dBA)		Noise Limits (dBA)			
			Day		Evening	
Equipment	*Lmax	Leq	Lmax	Leq	Lmax	Leq
Grader	74.7	70.8	N/A	N/A	N/A	N/A
Dozer	71.4	67.4	N/A	N/A	N/A	N/A
Tractor	73.7	69.8	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: 7/18/2023
Case Description: Brookhurst & Central Townhomes - Grading

---- Receptor #1 ----

Description	Land Use	Baselines (dBA) Daytime	Evening	Night
Homes to East	Residential	56.6	56.6	56.6

Description	Impact Device	Usage(%)	Equipment Spec Lmax (dBA)	Actual Lmax (dBA)	Receptor Distance (feet)	Estimated Shielding (dBA)
Grader	No	40	85		153	0
Dozer	No	40		81.7	153	0
Tractor	No	40	84		153	0
Tractor	No	40	84		153	0

Equipment		Calculated (dBA) *Lmax	Leq	Results Noise Limits (dBA) Day Lmax	Leq	Evening Lmax	Leq
Grader		75.3	71.3	N/A	N/A	N/A	N/A
Dozer		72.0	68.0	N/A	N/A	N/A	N/A
Tractor		74.3	70.3	N/A	N/A	N/A	N/A
Tractor		74.3	70.3	N/A	N/A	N/A	N/A
	Total	**75**	**76**	N/A	N/A	N/A	N/A

*Calculated Lmax is the Loudest value.

Roadway Construction Noise Model (RCNM),Version 1.1

Report date: 7/18/2023
Case Description: Brookhurst & Central Townhomes - Grading

---- Receptor #2 ----

		Baselines (dBA)		
Description	Land Use	Daytime	Evening	Night
Homes to South	Residential	56.6	56.6	56.6

Description	Impact Device	Usage(%)	Equipment Spec Lmax (dBA)	Actual Lmax (dBA)	Receptor Distance (feet)	Estimated Shielding (dBA)
Grader	No	40	85		108	0
Dozer	No	40		81.7	108	0
Tractor	No	40	84		108	0
Tractor	No	40	84		108	0

		Calculated (dBA)		Results Noise Limits (dBA)			
				Day		Evening	
Equipment		*Lmax	Leq	Lmax	Leq	Lmax	Leq
Grader		78.3	74.3	N/A	N/A	N/A	N/A
Dozer		75.0	71.0	N/A	N/A	N/A	N/A
Tractor		77.3	73.3	N/A	N/A	N/A	N/A
Tractor		77.3	73.3	N/A	N/A	N/A	N/A
	Total	**78**	**79**	N/A	N/A	N/A	N/A

*Calculated Lmax is the Loudest value.

Roadway Construction Noise Model (RCNM),Version 1.1

Report date: 7/18/2023
Case Description: Brookhurst & Central Townhomes - Grading

---- Receptor #3 ----

		Baselines (dBA)		
Description	Land Use	Daytime	Evening	Night
Homes to North	Residential	56.6	56.6	56.6

Description	Impact Device	Usage(%)	Equipment Spec Lmax (dBA)	Actual Lmax (dBA)	Receptor Distance (feet)	Estimated Shielding (dBA)
Grader	No	40	85		163	0
Dozer	No	40		81.7	163	0
Tractor	No	40	84		163	0
Tractor	No	40	84		163	0

		Results					
		Calculated (dBA)		Noise Limits (dBA)			
				Day		Evening	
Equipment		*Lmax	Leq	Lmax	Leq	Lmax	Leq
Grader		74.7	70.8	N/A	N/A	N/A	N/A
Dozer		71.4	67.4	N/A	N/A	N/A	N/A
Tractor		73.7	69.8	N/A	N/A	N/A	N/A
Tractor		73.7	69.8	N/A	N/A	N/A	N/A
	Total	**75**	**76**	N/A	N/A	N/A	N/A

*Calculated Lmax is the Loudest value.

Roadway Construction Noise Model (RCNM),Version 1.1

Report date: 7/18/2023
Case Description: Brookhurst & Central Townhomes - Building Construction

---- Receptor #1 ----

Description	Land Use	Baselines (dBA) Daytime	Evening	Night
Homes to East	Residential	56.6	56.6	56.6

Description	Impact Device	Usage(%)	Equipment Spec Lmax (dBA)	Actual Lmax (dBA)	Receptor Distance (feet)	Estimated Shielding (dBA)
Crane	No	16		80.6	153	0
Gradall	No	40		83.4	153	0
Gradall	No	40		83.4	153	0
Generator	No	50		80.6	153	0
Tractor	No	40	84		153	0
Front End Loader	No	40		79.1	153	0

		Calculated (dBA)		Results Noise Limits (dBA) Day		Evening	
Equipment		*Lmax	Leq	Lmax	Leq	Lmax	Leq
Crane		70.8	62.9	N/A	N/A	N/A	N/A
Gradall		73.7	69.7	N/A	N/A	N/A	N/A
Gradall		73.7	69.7	N/A	N/A	N/A	N/A
Generator		70.9	67.9	N/A	N/A	N/A	N/A
Tractor		74.3	70.3	N/A	N/A	N/A	N/A
Front End Loader		69.4	65.4	N/A	N/A	N/A	N/A
	Total	**74**	**76**	N/A	N/A	N/A	N/A

*Calculated Lmax is the Loudest value.

Roadway Construction Noise Model (RCNM),Version 1.1

Report date: 7/18/2023
Case Description: Brookhurst & Central Townhomes - Building Construction

---- Receptor #2 ----

		Baselines (dBA)		
Description	Land Use	Daytime	Evening	Night
Homes to South	Residential	56.6	56.6	56.6

Description	Impact Device	Usage(%)	Equipment Spec Lmax (dBA)	Actual Lmax (dBA)	Receptor Distance (feet)	Estimated Shielding (dBA)
Crane	No	16		80.6	108	0
Gradall	No	40		83.4	108	0
Gradall	No	40		83.4	108	0
Generator	No	50		80.6	108	0
Tractor	No	40	84		108	0
Front End Loader	No	40		79.1	108	0

	Calculated (dBA)		Results Noise Limits (dBA) Day		Evening	
Equipment	*Lmax	Leq	Lmax	Leq	Lmax	Leq
Crane	73.9	65.9	N/A	N/A	N/A	N/A
Gradall	76.7	72.7	N/A	N/A	N/A	N/A
Gradall	76.7	72.7	N/A	N/A	N/A	N/A
Generator	73.9	70.9	N/A	N/A	N/A	N/A
Tractor	77.3	73.3	N/A	N/A	N/A	N/A
Front End Loader	72.4	68.4	N/A	N/A	N/A	N/A
Total	**77**	**79**	N/A	N/A	N/A	N/A

*Calculated Lmax is the Loudest value.

Roadway Construction Noise Model (RCNM),Version 1.1

Report date: 7/18/2023
Case Description: Brookhurst & Central Townhomes - Building Construction

---- Receptor #3 ----

		Baselines (dBA)		
Description	Land Use	Daytime	Evening	Night
Homes to North	Residential	56.6	56.6	56.6

Description	Impact Device	Usage(%)	Equipment Spec Lmax (dBA)	Actual Lmax (dBA)	Receptor Distance (feet)	Estimated Shielding (dBA)
Crane	No	16		80.6	163	0
Gradall	No	40		83.4	163	0
Gradall	No	40		83.4	163	0
Generator	No	50		80.6	163	0
Tractor	No	40	84		163	0
Front End Loader	No	40		79.1	163	0

		Calculated (dBA)		Results Noise Limits (dBA)			
				Day		Evening	
Equipment		*Lmax	Leq	Lmax	Leq	Lmax	Leq
Crane		70.3	62.3	N/A	N/A	N/A	N/A
Gradall		73.1	69.2	N/A	N/A	N/A	N/A
Gradall		73.1	69.2	N/A	N/A	N/A	N/A
Generator		70.4	67.4	N/A	N/A	N/A	N/A
Tractor		73.7	69.8	N/A	N/A	N/A	N/A
Front End Loader		68.8	64.9	N/A	N/A	N/A	N/A
	Total	**74**	**76**	N/A	N/A	N/A	N/A

*Calculated Lmax is the Loudest value.

Roadway Construction Noise Model (RCNM),Version 1.1

Report date: 7/18/2023
Case Description: Brookhurst & Central Townhomes - Paving

---- Receptor #1 ----

Description	Land Use	Baselines (dBA) Daytime	Evening	Night
Homes to East	Residential	56.6	56.6	56.6

Description	Impact Device	Usage(%)	Equipment Spec Lmax (dBA)	Actual Lmax (dBA)	Receptor Distance (feet)	Estimated Shielding (dBA)
Concrete Mixer Truck	No	40		78.8	153	0
Paver	No	50		77.2	153	0
Paver	No	50		77.2	153	0
Roller	No	20		80.0	153	0
Tractor	No	40	84		153	0

Equipment		Calculated (dBA) *Lmax	Leq	Results Noise Limits (dBA) Day Lmax	Leq	Evening Lmax	Leq
Concrete Mixer Truck		69.1	65.1	N/A	N/A	N/A	N/A
Paver		67.5	64.5	N/A	N/A	N/A	N/A
Paver		67.5	64.5	N/A	N/A	N/A	N/A
Roller		70.3	63.3	N/A	N/A	N/A	N/A
Tractor		74.3	70.3	N/A	N/A	N/A	N/A
	Total	**74**	**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: 7/18/2023
Case Description: Brookhurst & Central Townhomes - Paving

---- Receptor #2 ----

		Baselines (dBA)		
Description	Land Use	Daytime	Evening	Night
Homes to South	Residential	56.6	56.6	56.6

Description	Impact Device	Usage(%)	Equipment Spec Lmax (dBA)	Actual Lmax (dBA)	Receptor Distance (feet)	Estimated Shielding (dBA)
Concrete Mixer Truck	No	40		78.8	108	0
Paver	No	50		77.2	108	0
Paver	No	50		77.2	108	0
Roller	No	20		80.0	108	0
Tractor	No	40	84		108	0

	Calculated (dBA)		Results Noise Limits (dBA)			
			Day		Evening	
Equipment	*Lmax	Leq	Lmax	Leq	Lmax	Leq
Concrete Mixer Truck	72.1	68	N/A	N/A	N/A	N/A
Paver	70.5	67.5	N/A	N/A	N/A	N/A
Paver	70.5	67.5	N/A	N/A	N/A	N/A
Roller	73.3	66.3	N/A	N/A	N/A	N/A
Tractor	77.3	73.3	N/A	N/A	N/A	N/A
Total	**77**	**76**	N/A	N/A	N/A	N/A

*Calculated Lmax is the Loudest value.

Roadway Construction Noise Model (RCNM),Version 1.1

Report date: 7/18/2023
Case Description: Brookhurst & Central Townhomes - Paving

---- Receptor #3 ----

		Baselines (dBA)		
Description	Land Use	Daytime	Evening	Night
Homes to North	Residential	56.6	56.6	56.6

Description	Impact Device	Usage(%)	Equipment Spec Lmax **(dBA)**	Actual Lmax (dBA)	Receptor Distance (feet)	Estimated Shielding (dBA)
Concrete Mixer Truck	No	40		78.8	163	0
Paver	No	50		77.2	163	0
Paver	No	50		77.2	163	0
Roller	No	20		80	163	0
Tractor	No	40	84		163	0

		Results					
		Calculated (dBA)		Noise Limits (dBA)			
				Day		Evening	
Equipment		*Lmax	Leq	Lmax	Leq	Lmax	Leq
Concrete Mixer Truck		68.5	64.6	N/A	N/A	N/A	N/A
Paver		67.0	63.9	N/A	N/A	N/A	N/A
Paver		67.0	63.9	N/A	N/A	N/A	N/A
Roller		69.7	62.7	N/A	N/A	N/A	N/A
Tractor		73.7	69.8	N/A	N/A	N/A	N/A
	Total	**74**	**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: 7/18/2023
Case Description: Brookhurst & Central Townhomes - Painting

---- Receptor #1 ----

Description	Land Use	Baselines (dBA) Daytime	Evening	Night
Homes to East	Residential	56.6	56.6	56.6

Description	Impact Device	Usage(%)	Equipment Spec Lmax (dBA)	Actual Lmax (dBA)	Receptor Distance (feet)	Estimated Shielding (dBA)
Compressor (air)	No	40		77.7	153	0

		Results Calculated (dBA)		Noise Limits (dBA) Day		Evening	
Equipment		*Lmax	Leq	Lmax	Leq	Lmax	Leq
Compressor (air)		68.0	64.0	N/A	N/A	N/A	N/A
	Total	**68**	**64**	N/A	N/A	N/A	N/A

*Calculated Lmax is the Loudest value.

---- Receptor #2 ----

Description	Land Use	Baselines (dBA) Daytime	Evening	Night
Homes to South	Residential	56.6	56.6	56.6

Description	Impact Device	Usage(%)	Equipment Spec Lmax (dBA)	Actual Lmax (dBA)	Receptor Distance (feet)	Estimated Shielding (dBA)
Compressor (air)	No	40		77.7	108	0

		Results Calculated (dBA)		Noise Limits (dBA) Day		Evening	
Equipment		*Lmax	Leq	Lmax	Leq	Lmax	Leq
Compressor (air)		71.0	67.0	N/A	N/A	N/A	N/A
	Total	**71**	**67**	N/A	N/A	N/A	N/A

*Calculated Lmax is the Loudest value.

Roadway Construction Noise Model (RCNM),Version 1.1

Report date: 7/18/2023
Case Description: Brookhurst & Central Townhomes - Painting

---- Receptor #3 ----

Description	Land Use	Baselines (dBA) Daytime	Evening	Night
Homes to North	Residential	56.6	56.6	56.6

Description	Impact Device	Usage(%)	Equipment Spec Lmax (dBA)	Actual Lmax (dBA)	Receptor Distance (feet)	Estimated Shielding (dBA)
Compressor (air)	No	40		77.7	163	0

		Results Calculated (dBA)		Noise Limits (dBA) Day		Evening	
Equipment		*Lmax	Leq	Lmax	Leq	Lmax	Leq
Compressor (air)		67.4	63.4	N/A	N/A	N/A	N/A
	Total	**67**	**63**	N/A	N/A	N/A	N/A

*Calculated Lmax is the Loudest value.

APPENDIX D

Operational Reference Noise Measurements and Noise Calculation Printouts

Summary					
File Name	831_Data.002				
Serial Number	0002509				
Model	Model 831				
Firmware Version	2.301				
User	GT				
Location	At 7080 Mayten Ave - Edge of MFR Parking Lot				
Job Description	Mayten & Foothill				
Note					
Measurement Description					
Start	2015-09-10 15:54:09				
Stop	2015-09-10 16:10:10				
Duration	0:16:00.5				
Run Time	0:16:00.5				
Pause	0:00:00.0				
Pre Calibration	2015-09-10 15:32:49				
Post Calibration	None				
Calibration Deviation	---				
Overall Settings					
RMS Weight	A Weighting				
Peak Weight	A Weighting				
Detector	Slow				
Preamp	PRM831				
Microphone Correction	Off				
Integration Method	Linear				
OBA Range	High				
OBA Bandwidth	1/1 and 1/3				
OBA Freq. Weighting	Z Weighting				
OBA Max Spectrum	Bin Max				
Gain	0.0 dB				
Overload	143.1 dB				
		A	**C**	**Z**	
Under Range Peak		**75.6**	72.6	77.6 dB	
Under Range Limit		**26.1**	26.4	31.8 dB	
Noise Floor		17.0	17.3	22.5 dB	
Results					
LAeq	52.1 dB				
LAE	81.9 dB				
EA	17.242 µPa²h				
LApeak (max)	2015-09-10 16:03:36	98.6 dB			
LASmax	2015-09-10 16:03:36	74.6 dB			
LASmin	2015-09-10 15:54:57	41.3 dB			
SEA	-99.9 dB				
LAS > 65.0 dB (Exceedance Counts / Duration)	6	11.6 s			

LAS > 85.0 dB (Exceedance Counts / Duration)	0	0.0	s
LApeak > 135.0 dB (Exceedance Counts / Duration)	0	0.0	s
LApeak > 137.0 dB (Exceedance Counts / Duration)	0	0.0	s
LApeak > 140.0 dB (Exceedance Counts / Duration)	0	0.0	s

Community Noise	**Ldn**	**:00-23:00**	**3:00-07:00**	**Lden**
	52.1	52.1	-99.9	52.1
LCeq	65.0	dB		
LAeq	52.1	dB		
LCeq - LAeq	12.9	dB		
LAleq	61.6	dB		
LAeq	52.1	dB		
LAleq - LAeq	9.5	dB		
# Overloads	0			
Overload Duration	0.0	s		
# OBA Overloads	0			
OBA Overload Duration	0.0	s		

Statistics		
LAS5.00	55.0	dB
LAS10.00	53.4	dB
LAS33.30	49.1	dB
LAS50.00	47.1	dB
LAS66.60	45.8	dB
LAS90.00	43.9	dB

Calibration History

Preamp	**Date**	**re. 1V/Pa**	**6.3**
PRM831	2015-09-10 15:32:49	-25.6	73.9
PRM831	2015-08-14 17:54:36	-26.3	36.4
PRM831	2015-08-05 20:29:18	-24.7	64.2
PRM831	2015-07-24 14:47:10	-25.6	60.9
PRM831	2015-05-05 14:56:20	-25.8	61.2
PRM831	2015-04-22 8:42:55	-26.3	58.2
PRM831	2015-04-17 11:29:03	-26.3	21.3
PRM831	2015-04-17 9:59:48	-26.0	30.6
PRM831	2015-04-17 8:00:28	-26.0	9.4
PRM831	2061-08-11 15:40:00	-26.0	44.2
PRM831	2014-10-15 14:30:38	-26.0	72.4

CA15NA
Single–Stage Air Conditioner with Puron® Refrigerant
1–1/2 To 5 Tons

Carrier
turn to the experts

Product Data

INDUSTRY LEADING FEATURES / BENEFITS

Efficiency

- 14.0 SEER / 11.7 – 12.2 EER (based on tested combination)
- Microtube Technology™ refrigeration system

Reliability

- Puron® refrigerant
- Scroll compressor
- Internal pressure relief valve
- Internal thermal overload
- Filter drier

Durability

WeatherArmor™ protection package:

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

Applications

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

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

ACCESSORY THERMOSTATS

PART NUMBER	PROGRAM	GAS	ELECTRIC	HEAT PUMP	HEAT	COOL
TC–PAC01	5–2 Day	√	√		1	1
TC–NAC01	NP	√	√		1	1
TCSNAC01	NP	√	√		1	1

THERMOSTAT ACCESSORIES		
PART NUMBER	**DESCRIPTION**	**THERMOSTATS USED WITH**
TSTATXXCNV10‡	Thermostat Conversion Kit (4 to 5 wire) – 10 pack	All Carrier® branded thermostats
TX–LBP01	Large Decorative Backplate	TP–Pxx, TP–Nxx, TC–Pxx
TX–MBP01	Medium Decorative Backplate	TC–Nxx, TB–Pxx

ACCESSORIES

Accessory Kit Number	Description	018	024	030	036	042	048	060
HC32GE234	MOTOR,FAN	X						
HC34GE239	MOTOR,FAN		X	X				
HC38GE219	MOTOR,FAN				X	X		
HC40GE226	MOTOR,FAN						X	X
HH07AT212	BASE,THERM/SUB	X	X	X	X	X	X	X
KAACF1001MED	FILTER KIT	X	X	X	X			
KAACF1101LRG	FILTER KIT					X	X	X
KAACH1201AAA	CRKC HTR KIT					X	X	X
KAACH1401AAA	CRKC HTR KIT	X	X	X	X			
KAACS0201PTC	KIT PTC	X	X	X	X	X	X	X
KAAFT0101AAA	FRZ THERM KIT	X	X	X	X	X	X	X
KAAHI0501PUR	HIGH PRESSURE SW KIT	X	X	X	X	X	X	X
KAALP0401PUR	LOW PRESSURE SW KIT	X	X	X	X	X	X	X
KAALS0201LLS	SOL VALVE KIT	X	X	X	X	X	X	X
KAATD0101TDR	TIME DELAY KIT	X	X	X	X	X	X	X
KAAWS0101AAA	WINTER START KIT	X	X	X	X	X	X	X
KSACY0101AAA	CYCLE PROTRECTOR KIT	X	X	X	X	X	X	X
KSAHS1501AAA	HARD START KIT	X	X	X	X	X	X	X
KSALA0301410	LOW AMBIENT KIT	X	X	X	X	X	X	X
KSALA0601AAA	MOTORMASTER KIT	X	X	X	X	X	X	X
KSASH0601COP	SOUND BLKT KIT				X	X	X	
KSASH1801COP	SOUND BLKT KIT	X	X	X				
KSASH2101COP	SOUND BLKT KIT							X
KSATX0201PUR	TXV KIT	X	X	X				
KSATX0301PUR	TXV KIT				X	X		
KSATX0401PUR	TXV KIT						X	
KSATX0501PUR	TXV KIT							X
KSBTX0201PUR	TXV KIT	X	X	X				
KSBTX0301PUR	TXV KIT				X	X		
KSBTX0401PUR	TXV KIT						X	
TSTATXXSEN01	SENSOR	X	X	X	X	X	X	X

X = Accessory

ELECTRICAL DATA

UNIT SIZE – SERIES	V/PH	OPER VOLTS*		COMPR		FAN	MCA	MAX FUSE† or CKT BRK AMPS
		MAX	MIN	LRA	RLA	FLA		
18–A	208/230/1–60	253	197	47.5	9.0	0.40	11.7	20
24–A				62.9	10.9	0.50	14.1	20
30–A				67.8	12.8	0.75	16.8	25
36–A				79.0	13.6	1.10	18.1	30
42–A				109.0	16.7	1.40	22.3	35
48–A				105.7	15.6	1.40	20.9	35
60–A				127.1	20.8	1.52	27.5	40

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

† Time–Delay fuse.

FLA – Full Load Amps

LRA – Locked Rotor Amps

MCA – Minimum Circuit Amps

RLA – Rated Load Amps

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

Complies with 2010 requirements of ASHRAE Standards 90.1

A–WEIGHTED SOUND POWER (dBA)

UNIT SIZE – SERIES	Standard Rating (dBA)	TYPICAL OCTAVE BAND SPECTRUM (dBA without tone adjustment)						
		125	250	500	1000	2000	4000	8000
18–A	75	46.0	55.0	59.5	64.0	60.5	54.5	48.5
24–A	71	50.5	53.5	58.5	60.5	60.0	56.5	52.5
30–A	73	49.5	56.0	62.5	64.0	60.5	57.5	53.5
36–A	75	49.0	57.0	62.5	66.0	61.0	58.5	52.0
42–A	75	52.5	63.0	64.0	63.0	62.0	58.0	52.0
48–A	76	53.0	61.0	64.0	65.5	62.0	59.5	50.5
60–A	75	53.5	57.0	62.5	63.5	61.5	57.5	51.0

NOTE: Tested in compliance with AHRI 270–1995 (not listed with AHRI)

A–WEIGHTED SOUND POWER (dBA) WITH SOUND SHIELD

UNIT SIZE – SERIES	Standard Rating (dBA)	TYPICAL OCTAVE BAND SPECTRUM (dBA without tone adjustment)						
		125	250	500	1000	2000	4000	8000
18–A	75	46.5	55.5	59.5	63.5	60.0	54.0	47.0
24–A	71	47.5	53.5	58.0	59.5	60.0	55.5	49.0
30–A	72	49.0	56.5	61.5	62.5	60.0	57.0	52.0
36–A	73	49.5	57.0	62.0	64.0	60.0	58.0	51.0
42–A	74	53.5	64.0	64.0	62.5	61.0	56.5	50.5
48–A	73	54.5	61.0	63.5	62.5	60.0	56.5	47.5
60–A	73	53.5	59.0	63.0	62.5	59.5	56.0	48.0

NOTE: Tested in compliance with AHRI 270–1995 (not listed with AHRI)

METERING DEVICE

UNIT SIZE – SERIES	INDOOOR	REQUIRED SUBCOOLING °F (°C)
18–A	TXV*	13 (7.22)
24–A		10 (5.56)
30–A		12 (6.67)
36–A		11 (6.11)
42–A		11 (6.11)
48–A		11 (6.11)
60–A		13 (7.22)

* TXV must be ordered separately when indoor coil is not equipped with a TXV. TXV must be hard–shutoff type.

Stationary Noise Calculations - Single-Family Homes East of Project Site

Stationary Unmitigated	Reference Distance	Leq	At Homes Distance	Leq
Air Conditioner	3.28	75.0	17	60.7
Auto Parking Lot	5	52.1	65	29.8
Mitigated	**Distance**	**Leq**	**Distance**	**Leq**
Air Conditioner	3.28	74.0	17	59.7
Auto Parking Lot	5	52.1	65	29.8

1 (Line Source: hard=0, soft=.5; Point Source: hard=1, soft=1.5)
(eq. N-2141.2 of TeNS)

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
Air Conditioner	5	12	6	60.7	**50.4**	3	5	800	5.099	12.369	17.117	0.351	1	0.999	-10.27
Auto Parking Lot	5	60	6	29.8	**21.8**	3	5	800	5.099	60.075	65.031	0.143	1	0.407	-8
Unmitigated Combined Noise Levels					**50.4**										
Air Conditioner	5	12	6	59.7	**49.4**	3	5	800	5.099	12.369	17.117	0.351	1	0.999	-10.27
Auto Parking Lot	5	60	6	29.8	**21.8**	3	5	800	5.099	60.075	65.031	0.143	1	0.407	-8
Mitigated Combined Noise Levels					**49.4**										

Stationary Noise Calculations - Single-Family Homes South of Project Site

Stationary Noise Sources	Reference Distance	Reference Leq	At Homes Distance	At Homes Leq	
Air Conditioner	3.28	75.0	25	57.4	1 (Line Source: hard=0, soft=.5; Point Source: hard=1, soft=1.5)
Auto Parking Lot	5	52.1	15	42.6	(eq. N-2141.2 of TeNS)

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
Air Conditioner	5	20	6	57.4	**48.1**	3	5	800	5.099	20.224	25.080	0.243	1	0.691	-9.27
Auto Parking Lot	5	10	6	42.6	**32.0**	3	5	800	5.099	10.440	15.133	0.407	1	1.156	-10.6

Combined Noise Levels **48.2**

Stationary Noise Calculations - Single-Family Homes North of Project Site

Stationary Noise Sources	Reference Distance	Reference Leq	At Homes Distance	At Homes Leq
Air Conditioner	3.28	75.0	80	47.3
Auto Parking Lot	5	52.1	75	28.6

1 (Line Source: hard=0, soft=.5; Point Source: hard=1, soft=1.5)
(eq. N-2141.2 of TeNS)

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
Air Conditioner	5	75	3	47.3	**36.9**	3	5	800	5.385	75.000	80.025	0.360	1	1.024	-10.34
Auto Parking Lot	5	70	3	28.6	**18.3**	3	5	800	5.385	70.000	75.027	0.359	1	1.020	-10.32

Combined Noise Levels **37.0**