

NOISE IMPACT ANALYSIS

FLORENCE AVENUE TOWNHOMES PROJECT

CITY OF SANTA FE SPRINGS

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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 Santa Fe Springs
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
ONAC	Federal Office of Noise Abatement and Control
OSHA	Occupational Safety and Health Administration
PPV	Peak particle velocity
RMS	Root mean square
SEL	Single Event Level or Sound Exposure Level
STC	Sound Transmission Class
TTM	Tentative Tract Map
UMTA	Federal Urban Mass Transit Administration
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 noise impacts associated with the proposed Florence Avenue Townhomes project (proposed project). The following is provided in this report:

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

1.2 Site Location and Study Area

The project site is located in the western portion of the City of Santa Fe Springs (City). The approximately 3.02-acre project site currently contains an unoccupied 16,847 square foot church building and parking lot. The project site is bounded by Lake Center Athletic Park to the north, a church and multi-family homes to the east, Florence Avenue and multi-family homes to the south, and single-family homes to the west. In addition, the Southern Pacific Railroad is located as near as 75 feet to the southeast of the project site. The project study area is shown in Figure 1.

Sensitive Receptors in Project Vicinity

The nearest sensitive receptors to the project site are the single-family homes located as near as three feet to the west and the multi-family homes as near as five feet to the east. The nearest school is Lake Center Middle School that is located as near as 245 feet to the north of the project site.

1.3 Proposed Project Description

The proposed project would consist of demolition of the existing church building and parking lot and construction of and operation of a residential community with 63 townhomes. The proposed site plan is shown in Figure 2.

1.4 Executive Summary

Standard Noise and Vibration 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 Santa Fe Springs Noise and Vibration Regulations

The following lists the noise and vibration regulations from the Municipal Code that are applicable, but not limited to the proposed project.

- Section 155.424 Permitted noise levels;
- Section 155.425(B) Construction noise limits;
- Section 155.428 Vibration level 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 2700-27207 – 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?

Less than significant impact.

Generation of excessive groundborne vibration or groundborne noise levels?

Potentially significant impact. Implementation of Mitigation Measure 1 would reduce the impact to less than significant levels.

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.

1.5 Project Design Features Incorporated into the Proposed Project

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

Project Design Feature 1:

The project applicant shall construct all walls shown on the Proposed Fence and Wall (see Figure 3) that includes a 6-foot high concrete masonry unit (cmu) wall along the south and east sides of the project site.

Project Design Feature 2:

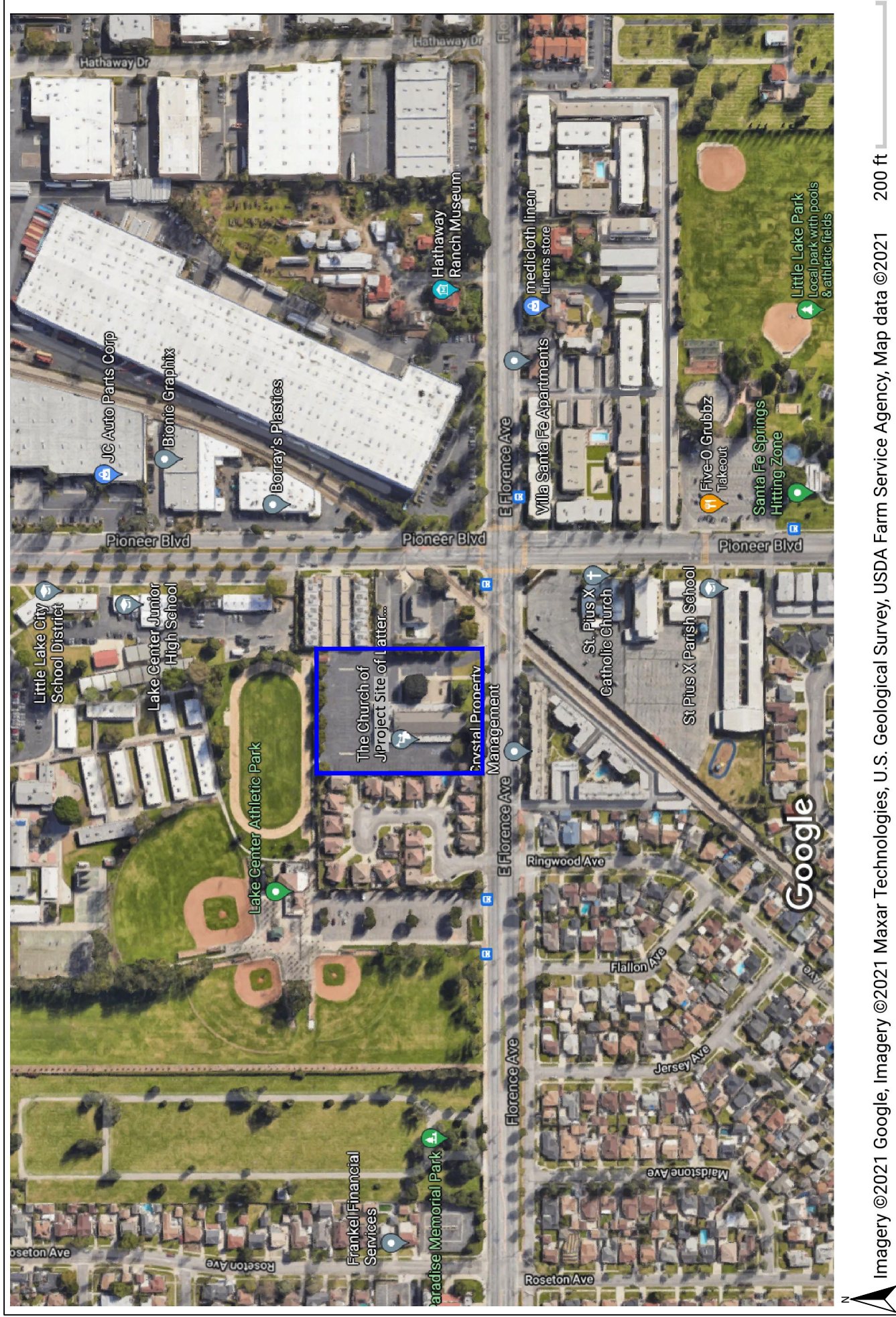
The project applicant shall construct a minimum 3.5 foot high barrier on all second floor balconies. The barrier shall be free of cut-outs or openings and shall be constructed of either a minimum 3/8-inch thick glass (tempered or laminate), 3/4-inch wood, or plaster or stucco.

1.6 Mitigation Measures for the Proposed Project

This analysis found that through adherence to the noise and vibration regulations detailed in Section 1.4 above, Project Design Features 1 and 2 detailed above in Section 1.5, and through implementation of the following mitigation all noise and vibration impacts would be reduced to less than significant levels.

Mitigation Measure 1:

The project applicant shall require that all construction contractors restrict the operation of any large bulldozers that is powered by a greater than 150 horse power engine from operating within 20 feet of any off-site residential structure. The project applicant 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 20 feet of any off-site residential structure.



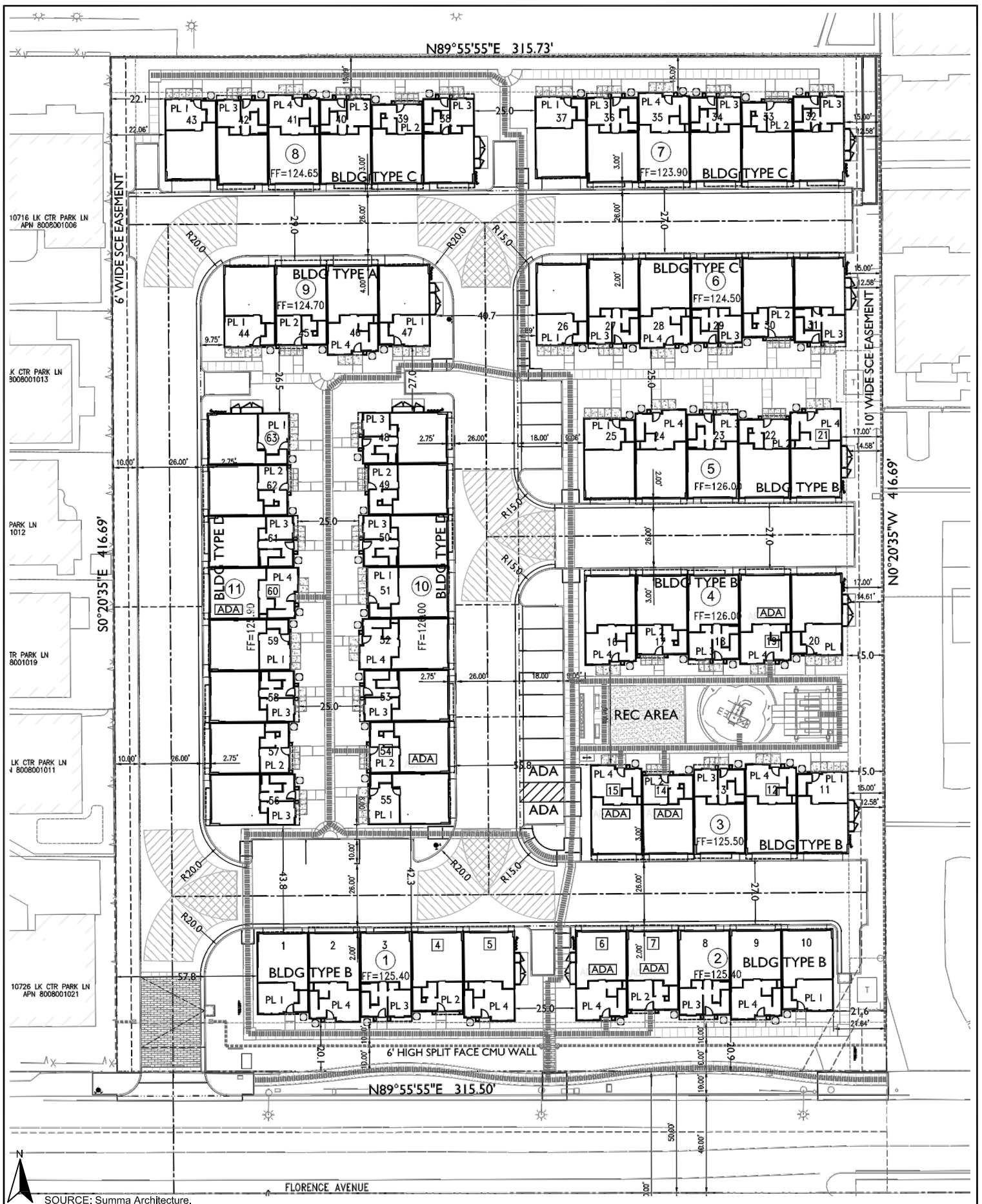
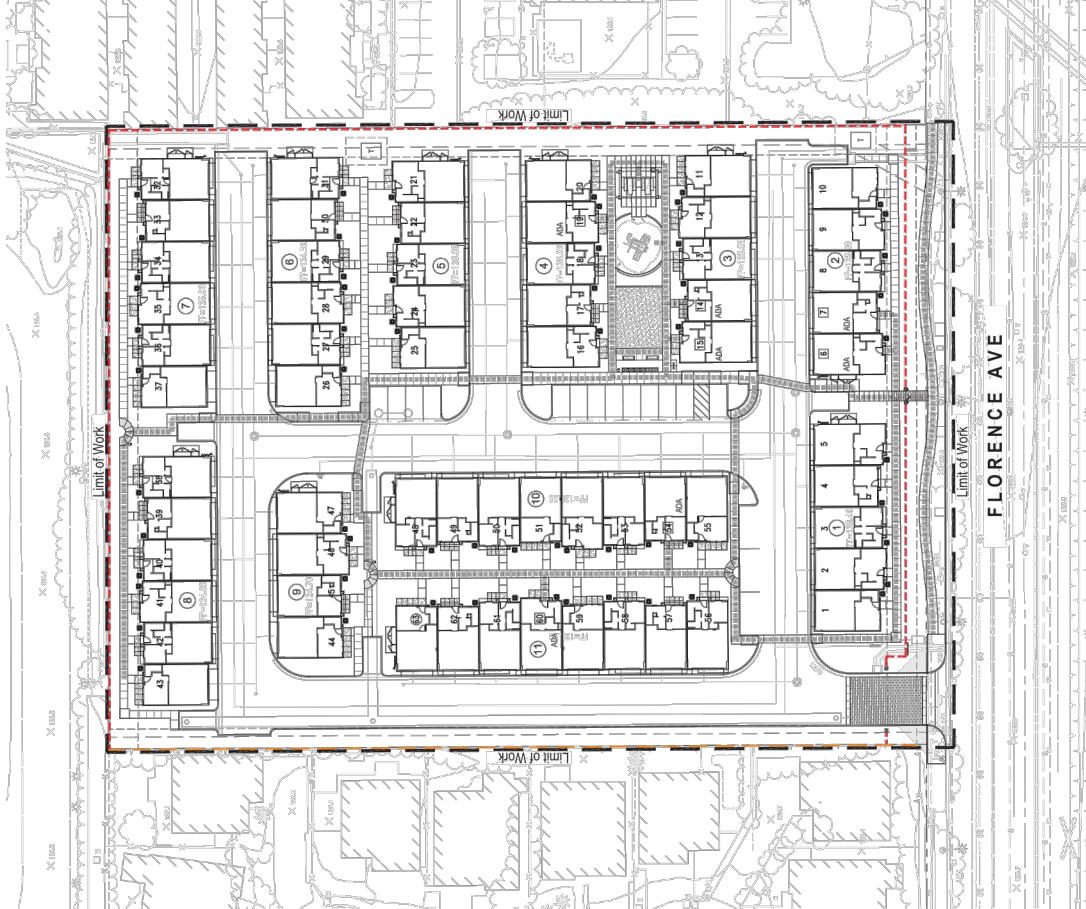
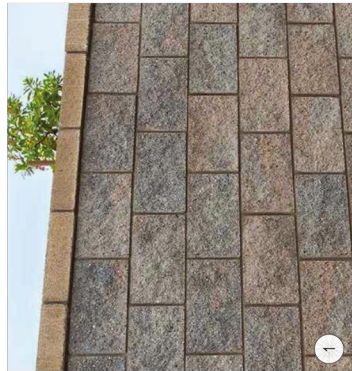
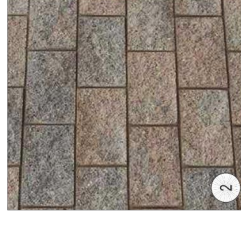
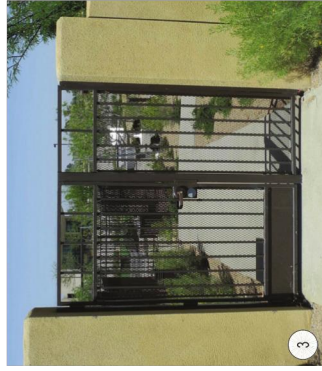
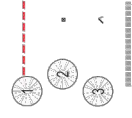


Figure 2
Proposed Site Plan



WALL LEGEND

- Existing +/- 6'-0" High property line wall, protect in place.
- 6'-0" High split-face CMU wall, with 2' high precision CMU cap (Borrego color).
- 6'-5" High (16' sq) split-face block plaster, with 16' sq split-face cap to match (Borrego color).
- 5'-6" High metal pedestrian gate (ADA accessible, non lockable).
- ADA Path of Travel



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



SOURCE: L3 Studio.

Schematic Wall and Fence Plan



Melita

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 Santa Fe Springs relies on the CNEL dB(A) noise standard to assess transportation-related impacts on noise sensitive land uses.

2.2 Tone Noise

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

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

2.3 Noise Propagation

From the noise source to the receiver, noise changes both in level and frequency spectrum. The most obvious is the decrease in noise as the distance from the source increases. The manner in which noise reduces with distance depends on whether the source is a point or line source as well as ground absorption, atmospheric effects and refraction, and shielding by natural and manmade features. Sound

from point sources, such as air conditioning condensers, radiate uniformly outward as it travels away from the source in a spherical pattern. The noise drop-off rate associated with this geometric spreading is 6 dBA per each doubling of the distance (dBA/DD) 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 Santa Fe Springs. Noise regulations are addressed through the efforts of various federal, state, and local government agencies. The agencies responsible for regulating noise are discussed below.

4.1 Federal Regulations

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

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

The Federal Office of Noise Abatement and Control (ONAC) was initially tasked with implementing the Noise Control Act. However, the ONAC has since been eliminated, leaving the development of federal noise policies and programs to other federal agencies and interagency committees. For example, the Occupational Safety and Health Administration (OSHA) agency prohibits exposure of workers to excessive sound levels. The Department of Transportation (DOT) assumed a significant role in noise control through its various operating agencies. The Federal Aviation Administration (FAA) regulates noise of aircraft and airports. Surface transportation system noise is regulated by a host of agencies, including the Federal Transit Administration (FTA), 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 Assessment Manual* (FTA Manual), prepared by the FTA, September 2018, is the only guidance document from a government agency that defines 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 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		
	Allowable Project Noise Exposure Before Moderate Impact	Allowable Combined Total Noise Exposure	Allowable Noise Exposure Increase Before Moderate Impact
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

As shown in Table A, the allowable cumulative noise level increase created from a project would range from 0 to 7 dBA, which is based on the existing (ambient) noise levels in the project vicinity. The justification for the sliding scale, is that people already exposed to high levels of noise should be expected to tolerate only a small increase in the amount of noise in their community. In contrast, if the existing noise levels are quite low, it is reasonable to allow a greater change in the community noise for the equivalent difference in annoyance.

The FTA Manual also provides specific guidance for construction noise. The FTA recommends developing construction noise criteria on a project-specific basis that utilizes local noise ordinances if possible. However, local noise ordinances usually relates to nuisance and hours of allowed activity and sometimes specify limits in terms of maximum levels, but are generally not practical for assessing the noise impacts of a construction project. Project construction noise criteria should take into account the existing noise environment, the absolute noise levels during construction activities, the duration of the construction, and the adjacent land uses. 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 Construction Noise Criteria

Land Use	Day (dBA Leq(8-hour))	Night (dBA Leq(8-hour))	30-day Average (dBA Ldn)
Residential	80	70	75
Commercial	85	85	80*
Industrial	90	90	85*

Notes:

* 24-hour Leq not Ldn.

Source: Federal Transit Administration, 2018.

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

4.2 State Regulations

Noise Standards

California Department of Health Services Office of Noise Control

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

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 established for continuous (construction-related) and transient (transportation-related) sources of vibration, which found that the human response becomes distinctly perceptible at 0.25 inch per second PPV for transient sources and 0.04 inch per second PPV for continuous sources.

4.3 Local Regulations

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

City of Santa Fe Springs General Plan Noise Element

Page 9 of the General Plan Noise Element states the following:

The standards and criteria shown in Tables 1 (see Figure 3) and 2 (see Table C) specify acceptable limits of noise for various land uses throughout the city. These standards and criteria will be incorporated into the land use planning process to reduce future noise and land use incompatibilities. Table 1 presents criteria for assessing the compatibility of proposed land uses with the noise environment. These criteria are the basis for the development of the specific noise standards presented in Table 2 and represent City policies related to land uses and acceptable noise levels. These tables are the primary tools that allow the City to ensure integrated planning for compatibility between land uses and outdoor noise.

The noise levels presented in Table 1 represent exterior noise levels. The primary purpose of the noise compatibility matrix is to identify potential conflicts between proposed land uses and the noise environment. The matrix is usually used at the General Plan or Zoning level of approvals. If a project falls within Zone A or Zone B the project is considered compatible with the noise environment. Zone A implies that no mitigation will be needed. Zone B implies that minor soundproofing of the structure may be needed and should be engineered before issuance of building permits. Zone C shows that substantial noise mitigation will be necessary, such as construction of noise barriers and substantial building sound insulation. However, projects in Zone C can be successfully mitigated. The project may be approved for land use and then would be mitigated as necessary to achieve City standards (Table 2) before issuance of grading permits, building permits, or other appropriate milestones. The most effective method to control community noise impacts from non-transportation noise sources is through application of the noise ordinance. The City will review its current ordinance for adequacy and will continue its enforcement.

Table C – Interior and Exterior Noise Standards for Transportation Impacts on Adjacent Land Uses

Land Use	Noise Standards ¹	
	Interior ^{2,3}	Exterior
Residential – Single family, multifamily, duplex, mobile homes	CNEL 45 dB	CNEL 65 dB ⁴
Residential – Transient lodging, hotels, motels, nursing homes, hospitals	CNEL 45 dB	CNEL 65 dB ⁴
Private offices, church sanctuaries, libraries, board rooms, conference rooms, theaters, auditoriums, concert halls, meeting halls, etc.	Leq(12) 45 dB(A)	--
Schools	Leq(12) 45 dB(A)	Leq(12) 67 dB(A) ⁵
General offices, reception, clerical, etc.	Leq(12) 50 dB(A)	--
Bank lobby, retail store, restaurant, typing pool, etc.	Leq(12) 55 dB(A)	--
Manufacturing, kitchen, warehousing, etc.	Leq(12) 65 dB(A)	--

Land Use	Noise Standards ¹	
	Interior ^{2,3}	Exterior
Parks, playgrounds	--	CNEL 65 dB ⁵
Golf courses, outdoor spectator sports, amusement parks	--	CNEL 75 dB ⁵

Notes:

¹ CNEL; Community Noise Equivalent Level.

Leq(12): The A-weighted equivalent sound level averaged over a 12-hour period (usually the hours of operation).

² Noise standard with windows closed. Mechanical ventilation shall be provided per UBC requirements to provide a habitable environment.

³ Indoor environment excluding bathrooms, toilets, closets and corridors.

⁴ Outdoor environment limited to rear yard of single family homes, multifamily patios and balconies (with a depth of 6' or more) and common recreation areas.

⁵ Outdoor environment limited to playground areas, picnic areas, and other areas of frequent human use.

Source: Table 2 from Santa Fe General Plan Noise Element.

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

Goal 2: Incorporate noise consideration into land use planning decisions.

Policy 2.3 Use noise/land use compatibility standards (Table 1 [see Figure 3]) as a guide for future planning and development.

Policy 2.4 Review proposed projects in terms of compatibility with nearby noise-sensitive land uses.

Goal 3: Develop measures to control non-transportation noise impacts.

Policy 3.2 Continue to minimize the impacts of construction noise on adjacent land uses through limiting the permitted hours of activity.

City of Santa Fe Springs Municipal Code

The City of Santa Fe Springs Municipal Code establishes the following applicable standards related to noise.

155.424 Permitted Noise Levels.

- (A) The noise level caused by any device, instrument, vehicle, machinery, operation, use or activity shall not exceed the levels set forth in the table set out in division (E) of this section except as further provided in this chapter.
- (B) In the event the ambient noise level exceeds a permitted noise level set forth in division (E) of this section, the permissible noise level for the corresponding duration and receiving area shall be the ambient level.
- (C) Noise of impulsive character (hammering, and the like) or that contains a pure tone (such as a whine, screech, or hum), shall only be permitted at levels five dB(A) less than the permitted levels determined under this section.
- (D) At a lot line separating properties with different permitted noise levels, the applicable permitted outdoor noise level shall be the arithmetic mean of the permitted outdoor noise levels set forth in division (E) of this section for the receiving areas on opposite sides of said lot line.
- (E) Noise level table (see Table D).

Table D – City of Santa Fe Springs Municipal Code Noise Level Table

Receiving Area Outdoor Noise at Lot Line of:	A-Weighted Sound Level in Decibels (dB(A) Maximum Cumulative Minutes Duration in any 1-hour period									
	Daytime (7:00 a.m. to 10:00 p.m.)					Nighttime (10:00 p.m. to 7:00 a.m.)				
	30	15	5	1	Absolute Max	30	15	5	1	Absolute Max
Any school, church or hospital	45	50	55	60	65	45	50	55	60	65
Any other use										
In the A-1, R-1 or R-3 Zone	50	55	60	65	70	45	50	55	60	65
In the C-1 or C-4 Zone	60	65	70	75	80	55	60	65	70	75
In the ML, PF or BP Zone	60	65	70	75	80	60	65	70	75	80
In the M-1 or M-2 Zone	70	75	80	85	90	70	75	80	85	90
Residential Building Interior:										
In the A-1 or R-1 Zone	45	50	55	60	65	45	50	55	60	65
In the R-3 Zone	45	50	55	60	65	45	50	55	60	65

Notes: Sound levels at or above each decibel level given in the table shall not occur for a duration longer than that given in the corresponding column heading.

Source: City of Santa Fe Springs Municipal Code Section 155.424 (E).

155.425 Special Noise Sources.

The following additional provisions shall apply to certain special noise sources:

- (B) *Construction of buildings and projects.* It shall be unlawful for any person within a residential zone, 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 7:00 p.m. of one day and 7:00 a.m. of the next day.
- (C) *Maintenance.* It shall be unlawful for any person, including city and utility crews, to perform maintenance of real property, other than emergency work, between 7:00 p.m. on one day and 7:00 a.m. of the following day, if such maintenance activity produces noise above the ambient level at any lot line of property within a residential zone.

155.428 Vibrations.

Every use shall be so operated that the ground vibration generated by said use is not harmful or injurious to the use or development of surrounding properties. No vibration shall be permitted which is perceptible without instruments at any use along the property line on which said use is located. For the purpose of this determination, the boundary of any lease agreement or operating unit or properties operating as a unit shall be considered the same as the property line.

Table 1

NOISE /LAND USE COMPATIBILITY MATRIX

Land Use Category	CNEL, dB						
	55	60	65	70	75	80	
Residential – Single family, multifamily, duplex	A	A	B	B	C		
Residential – Mobile homes	A	A	B	C	C		
Transient Lodging – Motels, hotels	A	A	B	B	C	C	
Schools, Libraries, Churches, Hospitals, Nursing Homes	A	A	B	C	C		
Auditoriums, Concert Halls, Amphitheaters, Meeting Halls	B	B	C	C			
Sports Arenas, Outdoor Spectator Sports, Amusement Parks	A	A	A	B	B		
Playgrounds, Neighborhood Parks	A	A	A	B	C		
Golf Courses, Riding Stables, Cemeteries	A	A	A	A	B	C	C
Office and Professional Buildings	A	A	A	B	B	C	
Commercial Retail, Banks, Restaurants, Theaters	A	A	A	A	B	B	C
Industrial, Manufacturing, Utilities, Wholesale, Service Stations	A	A	A	A	B	B	B
Agriculture	A	A	A	A	A	A	A

Legend

- A** **NORMALLY ACCEPTABLE**
Specified land use is satisfactory based on the assumption that any buildings involved are of normal conventional construction, without any special noise insulation requirements.
- B** **CONDITIONALLY ACCEPTABLE**
New construction or development should be undertaken only after a detailed analysis of the noise 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
- C** **NORMALLY UNACCEPTABLE**
New construction or development should generally be discouraged. If it does proceed, a detailed analysis of the noise reduction requirements must be made and needed noise insulation features included in the design.
- Clearly Unacceptable**
New construction or development should generally not be undertaken.

Source: Taken in part from *Aircraft Noise Impact Planning Guidelines for Local Agencies*, U.S. Dept. of Housing and Urban Development, TE/NA-472, November 1972.

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 Florence Avenue that is adjacent to the south side of the project site and train noise from the Southern Pacific Railroad that is located as near as 75 feet to the southeast of the project site. The following describes the measurement procedures, measurement locations, noise measurement results, and the modeling of the existing noise environment.

5.1 Noise Measurement Equipment

The noise measurements were taken using two Extech Model 407780 Type 2 integrating sound level meters programmed in “slow” mode to record the sound pressure level at 3-second intervals for approximately 24 hours in “A” weighted form. In addition, the L_{eq} averaged over the entire measuring time and L_{max} were recorded. The sound level meters and microphones were mounted approximately five 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 on 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 4:52 p.m. on Wednesday, March 31, 2021 and 5:02 p.m. on Thursday, April 1, 2021. At the start of the noise measurements, the sky was clear (no clouds), the temperature was 91 degrees Fahrenheit, the humidity was 17 percent, barometric pressure was 29.81 inches of mercury, and the wind was blowing around five miles per hour. Overnight, the temperature dropped to 59 degrees Fahrenheit and the humidity peaked at 55 percent. At the conclusion of the noise measurements, the sky was partly cloudy, the temperature was 86 degrees Fahrenheit, the humidity was 20 percent, barometric pressure was 29.65 inches of mercury, and there was no wind.

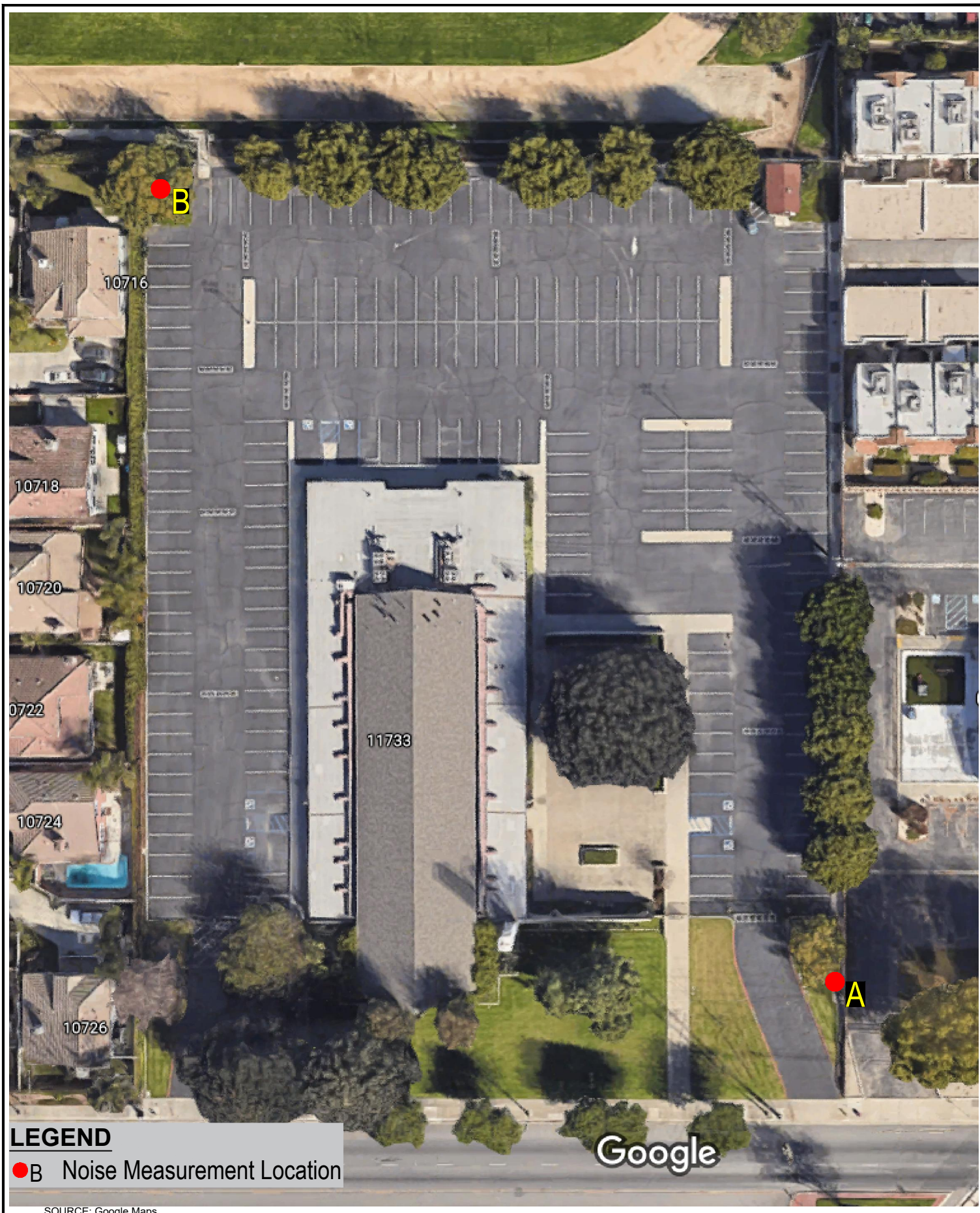
5.2 Noise Measurement Results

The results of the noise level measurements are presented in Table E. The measured sound pressure levels in dBA have been used to calculate the minimum and maximum L_{eq} averaged over 1-hour intervals. Table E also shows the L_{eq} , L_{max} , and CNEL, based on the entire measurement time. The noise monitoring data printouts are included in Appendix B. Figure 6 shows a graph of the 24-hour noise measurements.

Table E – Existing (Ambient) Noise Measurement Results

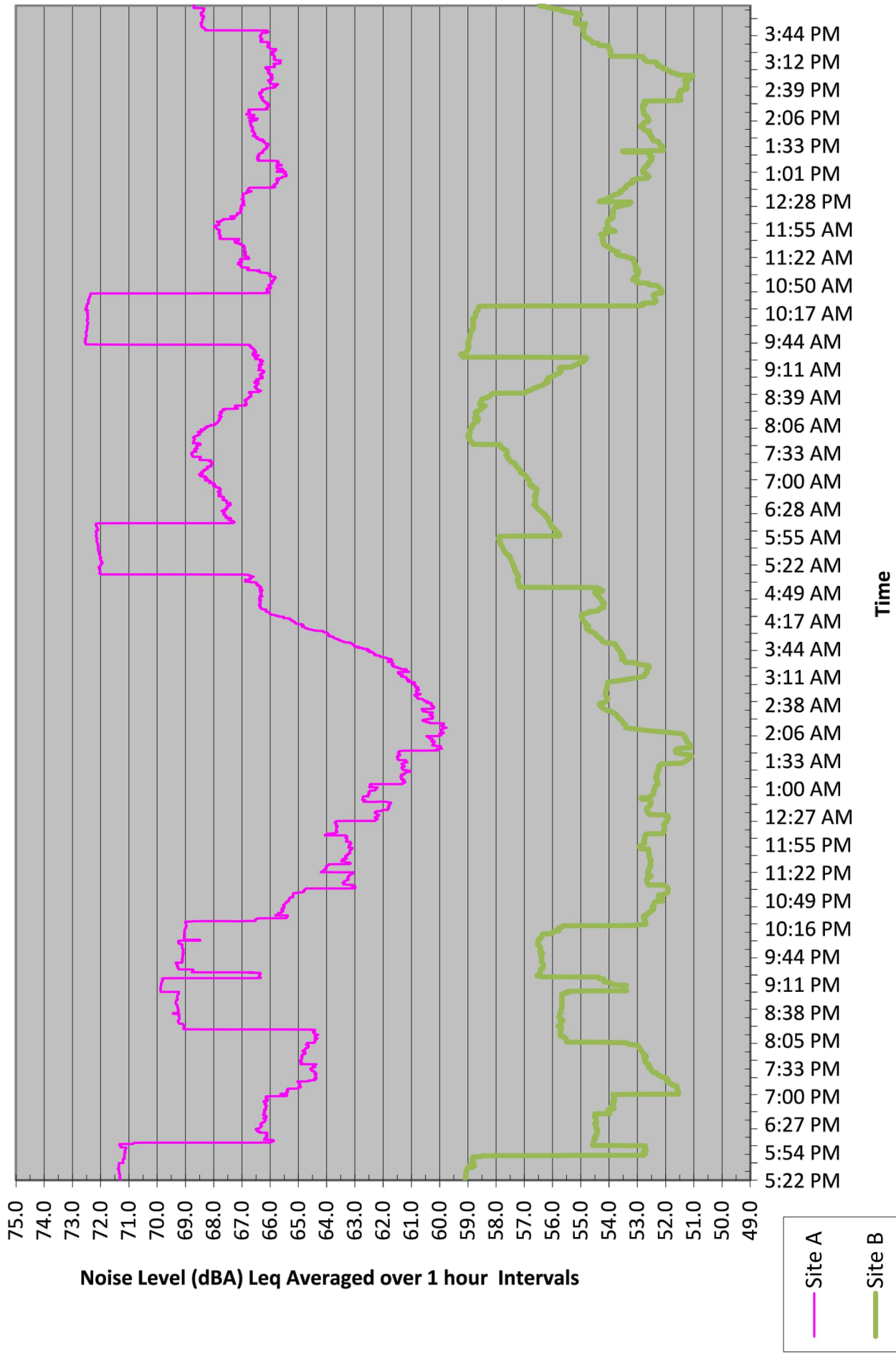
Site No.	Site Description	Average (dBA L _{eq})	Maximum (dBA L _{max})	(dBA L _{eq} 1-hour/Time)		Average (dBA CNEL)
				Minimum	Maximum	
A	Located on a power pole near the southeast corner of the project site, approximately 100 feet north of the Florence Avenue centerline and 110 feet northwest of the Railroad.	67.6	99.5	59.8 2:11 a.m.	72.6 9:42 a.m.	73.3
B	Located on a tree near the northwest corner of the project site, approximately 30 feet south of the running track at Lake Center Athletic Park.	55.3	84.2	51.0 3:09 p.m.	59.3 9:43 a.m.	61.3

Source: Noise measurements were taken with two Extech Model 407780 Type 2 sound level meters between Wednesday, March 31, 2021 to Thursday, April 1, 2021.



LEGEND

● B Noise Measurement Location



SOURCE: Exttech Model 407780 Type 2 Sound Level Meters.

Figure 6
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 Florence Avenue Townhomes Development* (Air Quality Analysis), prepared by EPD Solutions, Inc., May 5, 2021.

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 Saws	1	40	85	82
Excavators	3	40	85	81
Rubber Tired Dozers	2	40	85	82
Site Preparation				
Rubber Tired Dozers	3	40	85	82
Tractor, Loader, or Backhoes	4	40	84	N/A
Grading				
Excavator	1	40	85	81
Grader	1	40	85	83
Rubber Tired Dozer	1	40	85	82
Crawler Tractors (Dozer)	3	40	85	82
Building Construction				
Crane	1	16	85	81
Forklift (Gradall)	3	40	85	83
Generator	1	50	82	81
Tractor, Loader or Backhoes	3	40	84	N/A
Welder	1	40	73	74
Paving				
Cement and Mortar Mixers	2	50	85	77
Paver	1	50	85	77
Paving Equipment	2	50	85	77
Roller	2	20	85	80
Tractor, Loader or Backhoe	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 and CalEEMod default equipment mix.

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 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, which is based on the analysis methodology detailed in FTA Manual for a General Assessment. However, in order to provide a conservative analysis, all equipment was analyzed, instead of just the two noisiest pieces of equipment as detailed in the FTA Manual. The RCNM model printouts are provided in Appendix C.

6.2 Operations-Related Noise

FHWA Model Methodology

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

FHWA Model Traffic Noise Prediction Model Inputs

The roadway parameters used for this study are presented in Table G. The roadway classifications are based on the City's General Plan Circulation Element. The roadway speeds are based on the posted speed limits. The distance to the nearest sensitive receptor was determined by measuring the distance from the roadway centerline to the nearest residence. Since the study area is located in a suburban environment and landscaping exists along the sides of all analyzed roadways, soft site conditions were modeled.

Table G – FHWA Model Roadway Parameters

Roadway	Segment	General Plan Classification	Vehicle Speed (MPH)	Distance to Nearest Receptor ¹ (feet)
Florence Avenue	West of Pioneer Boulevard	Major 6-Lane	35	70

Notes:

¹ Distance measured from nearest offsite residential structure to centerline of roadway.

Source: City of Santa Fe Springs, 1994.

The average daily traffic (ADT) volumes were obtained from the *Trip Generation and Level of Service Analysis for Florence Avenue Townhomes Development*, (Trip Generation Memo), prepared by EPD Solutions, Inc., April 29, 2021. The Trip Generation Memo provides the existing volume for Florence Avenue as well as the total project generated trips, which were added to the existing traffic volumes to

obtain the existing with project traffic volumes. The ADT volumes used in this analysis are shown in Table H.

Table H – Average Daily Traffic Volumes

Roadway	Segment	Average Daily Traffic Volumes	
		Existing	Existing + Project
Florence Avenue	West of Pioneer Boulevard	9,750	10,093

Source: EPD Solutions, Inc., 2021.

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

Table I – Arterial Roadway Vehicle Mix

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

Source: Vista Environmental.

FHWA Model Source Assumptions

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

Railroad Noise Modeling Methodology

The Southern Pacific Railroad is located as near as 75 feet to the southeast of the project site and there are railroad crossings in the immediate vicinity of the project site at both Florence Avenue and Pioneer Boulevard. As such, the primary railroad noise impact is from the trains blowing their horns prior to traveling across these roads.

In order to determine the railroad noise level on the project site, the contribution of roadway noise to Noise Measurement Site A, was calculated through the use of the FHWA Model, described above and the FHWA Model printouts are provided in Appendix D. The FHWA Model calculated that roadway noise at Noise Measurement Site A is 58.3 dBA CNEL, while the measured noise level at Site A is 73.3 dBA CNEL, which results in the roadway noise being 15 dB lower than the measured noise level. According to *Technical Noise Supplement to the Traffic Noise Analysis Protocol*, prepared by Caltrans, September 2013,

when a noise source is more than 10 dB below the ambient noise level, the noise source does not provide a quantitative contribution to the overall noise level. As such, the noise level measured at Site A, is entirely created by train noise. Since the train noise is primarily created by horn blowing, that is created for a few seconds prior to the train crossing the nearby roads, the train noise in this instance, would be most properly modeled as a point source. As such, the train noise levels at the proposed townhomes were calculated by standard geometric spreading of noise from a point source of a drop-off rate of 6 dB per doubling of distance, with the Noise Measurement Site A utilized as the reference noise level of 73.3 dBA CNEL at 110 feet from the railroad.

6.3 Exterior to Interior Attenuation Rates for the Proposed Townhomes

All new townhomes homes constructed in Southern California are required to be designed to meet Title 24 Part 6 building energy efficiency requirements, that require the installation of standard dual pane windows that have a minimum sound transmission class (STC) rating of 26 STC as well as walls with ½-inch drywall on the interior, minimum R-13 insulation, ½-inch sheer panel, a vapor layer, and a stucco exterior. New townhomes built to meet the Title 24 standards have a minimum of 25 dB of exterior to interior noise reduction rate.

The architectural plans were utilized to calculate the exterior to interior noise reduction rates of the rooms in Plan 1, since the Plan 1 units are the easternmost units that are closest to the railroad and would have the greatest noise exposure from train noise. For each analyzed room, the floor area covered by carpet or vinyl was calculated along with the total square footage of the ceilings and walls, in order to determine the sound absorption rate of the room. The area of exterior walls, windows and exterior doors were also calculated in order to determine the exterior transmission levels. The windows and walls were based on the Title 24 minimum requirements (described above). The exterior to interior noise reduction was then determined by combining the calculated room absorption rate to the exterior to interior transmission calculations.

Table J shows the calculated exterior to interior noise reduction rates for the rooms in Plan 1. The spreadsheet showing the exterior to interior attenuation rate calculations are shown in Appendix E.

Table J – Proposed Townhomes Exterior to Interior Noise Reduction Rates

Plan	Floor	Room Type	Exterior to Interior Noise Reduction with STC 26 Windows/Doors ¹ (dBA)
1	First	Den	30
	Second	Living Room/Kitchen	30
	Third	Master Bedroom	32
	Third	Bedroom 2	31
Minimum Exterior to Interior Noise Reduction			30

Notes:

¹ Based on standard dual pane windows and exterior doors with a 26 STC rating, which are required per Title 24 energy saving requirements. Source: Kinsler, 2000; Harris, 1994.

6.3 Vibration

Construction activity can result in varying degrees of ground vibration, depending on the equipment used on the site. Operation of construction equipment causes ground vibrations that spread through the ground and diminish in strength with distance. Buildings in the vicinity of the construction site respond

to these vibrations with varying results ranging from no perceptible effects at the low levels to slight damage at the highest levels. Table K gives approximate vibration levels for particular construction activities. The data in Table K provides a reasonable estimate for a wide range of soil conditions.

Table K – Vibration Source Levels for Construction Equipment

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

Source: Federal Transit Administration, May 2006.

The construction-related vibration impacts have been calculated through the vibration levels shown above in Table K 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 church structure and parking lot, site preparation and grading of the project site, building construction of the 63 townhomes, paving of the onsite roads and driveways, 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 the single-family homes located as near as three feet to the west and the multi-family homes as near as five feet to the east. There is also a church located as near as 65 feet to the east.

Section 155.425(B) of the Municipal Code restricts construction activities from occurring between the hours of 7:00 p.m. and 7:00 a.m.. Through adherence to the construction-related noise requirements provided in the City's Noise Ordinance, construction-related noise levels would not exceed any noise standards established in the general plan or noise ordinance. However, the City construction noise standards do not provide any limits to the noise levels that may be created from construction activities; and, even with adherence to the City standards, the resultant construction noise levels may result in a significant substantial temporary noise increase to the nearby sensitive receptors

In order to determine if the proposed construction activities would create a significant substantial temporary noise increase, the FTA construction noise criteria thresholds detailed above in Section 4.1 have been utilized, which shows that a significant construction noise impact would occur if construction noise exceeds 80 dBA during the daytime at any of the nearby homes and church.

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 that shows the anticipated construction equipment per phase. The results are shown below in Table L and the RCNM printouts are provided in Appendix C.

Table L – Construction Noise Levels at the Nearest Sensitive Receptors

Construction Phase	Construction Noise Level (dBA Leq) at:		
	Nearest Homes to the West ¹	Nearest Homes to the East ²	Nearest Church to the East ³
Demolition	76	73	73
Site Preparation	76	73	72
Grading	76	73	72
Building Construction	77	74	73
Paving	74	71	71
Painting	64	61	60
FTA Construction Noise Threshold⁴	80	80	80
Exceed Thresholds?	No	No	No

¹ The nearest homes to the west are located as near as 160 feet from the center of the project site.

² The nearest homes to the east are located as near as 225 feet from the center of the project site.

³ The nearest church to the east is located as near as 250 feet from the center of the project site.

⁴ The FTA Construction noise thresholds are detailed above in Table B.

Source: RCNM, Federal Highway Administration, 2006

Table L shows that the greatest noise impacts would occur during the building construction phase, with a noise level as high as 77 dBA Leq at the nearest homes to the west. Table L also shows that none of the construction phases would exceed the FTA noise standard of 80 dB at the nearby homes and church. Therefore, through adherence to allowable construction times provided in Section 155.425(B) 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 the development of 63 townhomes. Potential noise impacts associated with the operations of the proposed project would be from project-generated vehicular traffic on the nearby roadways. In addition, the proposed development would be adjacent to Florence Avenue and in close proximity to the Southern Pacific Railroad, which may create exterior and interior noise levels in excess of City standards at the proposed homes. The noise impacts to the nearby existing homes and proposed homes have been analyzed separately below.

Roadway Vehicular Noise Impact to Nearby Homes

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.

Goal 2 of the City's General Plan Noise Element requires the City to incorporate noise consideration into land use planning decisions. However, neither the General Plan nor the CEQA Guidelines define 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 noise levels.

The potential offsite traffic noise impacts created by the on-going operations of the proposed project have been analyzed through utilization of the FHWA model and parameters described above in Section 6.2 and the FHWA model traffic noise calculation spreadsheets are provided in Appendix D. The proposed project's offsite traffic noise impacts have been calculated through a comparison of the without project scenario to the with project scenario. The results of this comparison are shown in Table M.

Table M – Proposed Project Traffic Noise Contributions to Nearby Homes

Roadway	Segment	dBA CNEL at Nearest Receptor ¹			Increase Threshold ²
		Without Project	With Project	Project Contribution	
Florence Avenue	West of Pioneer Boulevard	61.4	61.6	+0.2	+2 dBA

Notes:

¹ Distance to nearest residential use shown in Table G, does not take into account existing noise barriers.

² Increase Threshold obtained from the FTA's allowable noise impact exposures detailed above in Table A..

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

Table M shows that the proposed project's permanent noise increases to the nearby homes from the generation of additional vehicular traffic would not exceed the traffic noise increase thresholds detailed above. Therefore, the proposed project would not result in a substantial permanent increase in ambient noise levels. Impacts would be less than significant.

Transportation Noise Impacts to Proposed Townhomes

The proposed project would consist of the development of a residential community with 63 townhomes. Table 2 from the General Plan Noise Element (see Table C above) limits the noise level from transportation noise sources at new homes in the City to 45 dBA at the interior of the homes and 65 dBA at the exterior of the homes.

It is anticipated that the primary source of transportation noise impacts to the project site will be from train noise created from the Southern Pacific Railroad that is located as near as 75 feet to the southeast of the project site. There would also be traffic noise impacts from Florence Avenue, where the proposed townhomes would be located as near as 70 feet from the centerline of Florence Avenue, which is the same distance that was analyzed above in Table M, which found that roadway noise impacts would be as high as 61.6 dBA CNEL without accounting for the noise reduction provided by the proposed sound wall adjacent to Florence Avenue. Since the calculated roadway noise is well below the City's 65 dBA CNEL exterior noise standard, this analysis has been limited to analyzing the train noise impacts to the proposed townhomes. The exterior and interior noise impacts to the proposed homes have been analyzed separately below.

Transportation Noise Impacts to the Exterior of the Proposed Townhomes

Table 2 from the General Plan Noise Element details that the exterior area for multifamily homes is defined as patios and balconies with a depth of 6 feet or more and common recreation areas. A review

of the proposed plans for the project determined that the common recreation area would be located between the second and third row of townhomes from the south side, that would be as near as 220 feet from the Railroad.

The architectural plans for the project were also reviewed for patios and balconies and it was determined that only Plan 3 would have a patio or balcony that has a depth greater than 6 feet, which would occur at the second floor balcony that has a depth of 6 feet 5.5 inches. The proposed locations of the Plan 3 townhomes are shown on Figure 5, which shows that only the balconies of units 3, 8, 18, and 29 would have direct line-of-sight view to the Railroad located to the southeast of the project site. As such, these Plan 3 townhomes would be the only units that would have a potential noise impact from train noise. The calculated noise levels from train noise at the common recreation area and the Lot 3 second floor balconies are shown in Table N and train noise calculation spreadsheet is shown in Appendix F.

Table N – Proposed Townhomes Exterior Noise Impacts from Train Noise

Receiver Location ¹	Exterior Noise Levels (dBA CNEL)		Sound Barrier Height ² (feet)
	Without Sound Barrier	With Sound Barrier	
Common Recreation Area	66	61	6.0
Lot 3 Balcony	65	61	3.5
Lot 8 Balcony	69	64	3.5
Lot 18 Balcony	65	61	3.5
Lot 29 Balcony	63	58	3.5

Notes:

¹ Receiver locations shown in Figure 7.

² Includes a 6-foot high cmu wall along the south and east sides of the project site and 3.5-foot high walls on the second floor balconies.

Meeting or exceedance of City's 65 dBA CNEL residential exterior noise standard shown in **bold**.

Source: FHWA RD-77-108 Model.

Table N shows that with implementation of Project Design Feature 1 that requires a 6 foot high cmu wall to be constructed along the south and east sides of the project site and Project Design Feature 2 that requires a 3.5-foot high solid sound barrier on the second floor balconies of units 3, 8, and 18, the noise levels at all proposed residential exterior areas would be below the City's 65 dBA CNEL residential exterior noise standard. Impacts would be less than significant with implementation of these wall Project Design Features.

Transportation Noise Impacts to the Interior of the Proposed Townhomes

The nearest proposed townhomes to the Railroad have been analyzed, which are both Plan 1 townhomes. The exterior noise levels at the facades of the townhomes were calculated based on the same methodology utilized for the exterior train noise analysis and the exterior noise levels at the facades are shown in Table O. Table O also shows the calculated interior noise levels based on 30 dB of attenuation, which is the minimum exterior to interior noise reduction for the rooms that was calculated above in Table J and is based on the minimum exterior to interior noise reduction rate for new homes that are constructed to meet the required California Code of Regulations Title 24, Part 6 building energy-efficiency standards that require the installation of dual-paned windows as well as enhanced insulation requirements.



Figure 7
Proposed Plan 3 Townhomes Locations

Table O – Proposed Townhomes Interior Noise Impacts from Train Noise

Lot Number¹	Exterior Noise Level at Building Façade (dBA CNEL)	Interior Noise Level² (dBA CNEL)	Residential Interior Noise Standard³ (dBA CNEL)	Exceed Standard?
10	74.1	44.1	45	No
11	70.9	40.9	45	No

Notes:

¹ The locations of the Lots are shown in Figure 1.

² A minimum 30 dBA noise reduction has been calculated (see Table J above), which is based on standard dual pane windows and doors with a 26 STC rating, which are required per Title 24 energy saving requirements.

³ Interior noise standard from Table 2 from the General Plan Noise Element.

Table O shows that the interior noise levels at the proposed townhomes would be within the City's residential interior noise standards of 45 dBA CNEL. Therefore, the proposed project would comply with the City's residential interior noise standards. Impacts would be less than significant.

Level of Significance

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 church structure and parking lot, site preparation and grading of the project site, building construction of the 63 townhomes, paving of the onsite roads and driveways, and application of architectural coatings. Vibration impacts from construction activities associated with the proposed project would typically be created from the operation of heavy off-road equipment. The nearest sensitive receptors to the project site are the single-family homes located adjacent to the west side of the project site, where the nearest residential structure is as near as 3 feet east of the project site.

Section 155.428 of the Municipal Code limits the generation of vibration to a level that is not harmful or injurious to the use of surrounding properties and no vibration is permitted which is perceptible at the adjacent properties. Since the City's Municipal does not provide a quantifiable vibration level for construction activities, Caltrans guidance that is detailed above in Section 4.2 has been utilized, which defines the threshold of perception from transient sources at 0.25 inch per second PPV.

The primary source of vibration during construction would be from the operation of a bulldozer. From Table K 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 sensitive receptors (single-family homes as near as 3 feet to the west) would be 0.92 inch per second PPV, which would exceed the 0.25 inch per second PPV threshold detailed above. This would be considered a significant impact.

Mitigation Measure 1 is provided that would require that the applicant to restrict the use of a large dozer within 20 feet of any offsite home. For all grading activities that occur within 20 feet of any offsite home, the applicant shall require the use of a small dozer or other type of equipment that is less than 150

horsepower. From Table K above a small bulldozer would create a vibration level of 0.003 inch-per-second PPV at 25 feet. Based on typical propagation rates, the vibration level from a small dozer at the nearest home (3 feet away) would be 0.03 inch per second PPV, which would be below the 0.25 inch per second PPV threshold. Therefore, with implementation of Mitigation Measure 1, a less than significant vibration impact is anticipated from construction of the proposed project.

Operations-Related Vibration Impacts

The proposed project would consist of the development of 63 townhomes. The on-going 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 1:

The project applicant shall require that all construction contractors restrict the operation of any large bulldozers that is powered by a greater than 150 horsepower engine from operating within 20 feet of any off-site residential structure. The project applicant 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 20 feet of any off-site residential structure.

Level of Significance after Mitigation

Less than significant impact.

7.4 Aircraft Noise

The proposed project may expose people residing in the project area to excessive noise levels from aircraft. The nearest airport is Compton/Woodley Airport that is located 9.4 miles west of the project site. The project site is located outside of the 60 dBA CNEL noise contours of this airport. Therefore, the proposed townhomes would not be exposed to excessive aircraft noise. Impacts would be less than significant.

Level of Significance

Less than significant impact.

8.0 REFERENCES

California Department of Transportation, *2016 Annual Average Daily Truck Traffic on the California State Highway System*, 2018.

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 Santa Fe Springs, *The General Plan of the City of Santa Fe Springs, California Noise Element*, February 24, 1994.

City of Santa Fe Springs, *The General Plan of the City of Santa Fe Springs, California Circulation Element*, January 11, 1994.

City of Santa Fe Springs, *City of Santa Fe Springs, California Code of Ordinances*, August 13, 2020.

EPD Solutions, Inc., *Air Quality, Energy, and Greenhouse Gas Impact Analysis for the Florence Avenue Townhomes Development*, May 5, 2021.

EPD Solutions, Inc., *Trip Generation and Level of Service Analysis for Florence Avenue Townhomes Development*, April 29, 2021.

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.

APPENDIX A

Field Noise Measurements Photo Index



Noise Measurement Site A - looking north



Noise Measurement Site A - looking northeast



Noise Measurement Site A - looking east



Noise Measurement Site A - looking southeast



Noise Measurement Site A - looking south



Noise Measurement Site A - looking southwest



Noise Measurement Site A - looking west



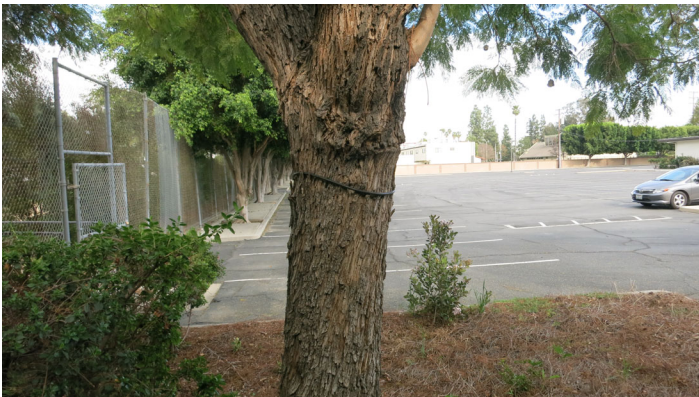
Noise Measurement Site A - looking northwest



Noise Measurement Site B - looking north



Noise Measurement Site B - looking northeast



Noise Measurement Site B - looking east



Noise Measurement Site B - looking southeast



Noise Measurement Site B - looking south



Noise Measurement Site B - looking southwest



Noise Measurement Site B - looking west



Noise Measurement Site B - looking northwest

APPENDIX B

Field Noise Measurements Printouts

Site A - On Power Pole Near SE Corner of Project Site

Date Time=03/31/21 4:52:00 PM
 Sampling Time=3 Weighting=A
 Record Num= 29000 Weighting=Slow CNEL(24hr)= 73.3
 Leq 67.6 SEL Value=118.8 Ldn(24hr)= 72.9
 MAX 99.5 Min Leq1hr = 59.8 2:11 AM
 MIN 42.6 Max Leq1hr = 72.6 9:42 AM

Site A - On Power Pole Near SE Corner of Project Site

SPL	Time	Leq (1 hour Avg.)	Ldn	CNEL
63.1	16:52:00		63.1	63.1
63.6	16:52:03		63.6	63.6
62.1	16:52:06		62.1	62.1
64.5	16:52:09		64.5	64.5
66.5	16:52:12		66.5	66.5
67.2	16:52:15		67.2	67.2
65.6	16:52:18		65.6	65.6
60.2	16:52:21		60.2	60.2
65.5	16:52:24		65.5	65.5
65.7	16:52:27		65.7	65.7
61.9	16:52:30		61.9	61.9
64.6	16:52:33		64.6	64.6
62.5	16:52:36		62.5	62.5
62.2	16:52:39		62.2	62.2
61.9	16:52:42		61.9	61.9
54.4	16:52:45		54.4	54.4
59.1	16:52:48		59.1	59.1
63.6	16:52:51		63.6	63.6
61.3	16:52:54		61.3	61.3
59.7	16:52:57		59.7	59.7
58.6	16:53:00		58.6	58.6
58.1	16:53:03		58.1	58.1
60.6	16:53:06		60.6	60.6
62.9	16:53:09		62.9	62.9
68.4	16:53:12		68.4	68.4
66.2	16:53:15		66.2	66.2
65.4	16:53:18		65.4	65.4
70.9	16:53:21		70.9	70.9
66.5	16:53:24		66.5	66.5
65.3	16:53:27		65.3	65.3
68.4	16:53:30		68.4	68.4
65.8	16:53:33		65.8	65.8
63.3	16:53:36		63.3	63.3
70.6	16:53:39		70.6	70.6
65.7	16:53:42		65.7	65.7
62.5	16:53:45		62.5	62.5
63.6	16:53:48		63.6	63.6
60.9	16:53:51		60.9	60.9
66.7	16:53:54		66.7	66.7
58.8	16:53:57		58.8	58.8
58.2	16:54:00		58.2	58.2
54.5	16:54:03		54.5	54.5
55.1	16:54:06		55.1	55.1
54.8	16:54:09		54.8	54.8
55.9	16:54:12		55.9	55.9
55.6	16:54:15		55.6	55.6
55.9	16:54:18		55.9	55.9
55.6	16:54:21		55.6	55.6
54.7	16:54:24		54.7	54.7
53.6	16:54:27		53.6	53.6
55.8	16:54:30		55.8	55.8
55	16:54:33		55	55.0
55.6	16:54:36		55.6	55.6
54.7	16:54:39		54.7	54.7
56.4	16:54:42		56.4	56.4
56.3	16:54:45		56.3	56.3
60.3	16:54:48		60.3	60.3
63	16:54:51		63	63.0
64.4	16:54:54		64.4	64.4
65	16:54:57		65	65.0
63	16:55:00		63	63.0
62	16:55:03		62	62.0
60.1	16:55:06		60.1	60.1
61.6	16:55:09		61.6	61.6
66	16:55:12		66	66.0
67.3	16:55:15		67.3	67.3
66	16:55:18		66	66.0
68.2	16:55:21		68.2	68.2
68.4	16:55:24		68.4	68.4
64.2	16:55:27		64.2	64.2
65.4	16:55:30		65.4	65.4
65.6	16:55:33		65.6	65.6
66.8	16:55:36		66.8	66.8
67.1	16:55:39		67.1	67.1
61.9	16:55:42		61.9	61.9
57.1	16:55:45		57.1	57.1
59.6	16:55:48		59.6	59.6

Site B - On Tree Near NW Corner of Project Site

Date Time=03/31/21 5:02:00 PM
 Sampling Time=3 Freq Weighting=A
 Record Num= 29000 Weighting=Slow CNEL(24hr): 61.3
 Leq 55.3 SEL Value=105.3 Ldn(24hr)= 61.1
 MAX 84.2 Min Leq1hr = 51.0 3:09 PM
 MIN 42.4 Max Leq1hr = 59.3 9:43 AM

Site B - On Tree Near NW Corner of Project Site

SPL	Time	Leq (1 hour Avg.)	Ldn	CNEL
51.5	17:02:00		51.5	51.5
58.1	17:02:03		58.1	58.1
60.7	17:02:06		60.7	60.7
57.5	17:02:09		57.5	57.5
58.1	17:02:12		58.1	58.1
54.6	17:02:15		54.6	54.6
58.5	17:02:18		58.5	58.5
56.6	17:02:21		56.6	56.6
55.7	17:02:24		55.7	55.7
58.2	17:02:27		58.2	58.2
60.9	17:02:30		60.9	60.9
59.6	17:02:33		59.6	59.6
55.3	17:02:36		55.3	55.3
56.7	17:02:39		56.7	56.7
59.8	17:02:42		59.8	59.8
56.9	17:02:45		56.9	56.9
61.8	17:02:48		61.8	61.8
60.3	17:02:51		60.3	60.3
59	17:02:54		59	59
60.8	17:02:57		60.8	60.8
54.3	17:03:00		54.3	54.3
56.1	17:03:03		56.1	56.1
55.7	17:03:06		55.7	55.7
56.6	17:03:09		56.6	56.6
57.4	17:03:12		57.4	57.4
56.6	17:03:15		56.6	56.6
61	17:03:18		61	61
62	17:03:21		62	62
64.6	17:03:24		64.6	64.6
63	17:03:27		63	63
56.2	17:03:30		56.2	56.2
55.9	17:03:33		55.9	55.9
59.9	17:03:36		59.9	59.9
58.4	17:03:39		58.4	58.4
52.5	17:03:42		52.5	52.5
49.2	17:03:45		49.2	49.2
49.7	17:03:48		49.7	49.7
52.4	17:03:51		52.4	52.4
50.4	17:03:54		50.4	50.4
52.5	17:03:57		52.5	52.5
52	17:04:00		52	52
51	17:04:03		51	51
50.8	17:04:06		50.8	50.8
50.7	17:04:09		50.7	50.7
50.4	17:04:12		50.4	50.4
49.6	17:04:15		49.6	49.6
50.4	17:04:18		50.4	50.4
48.7	17:04:21		48.7	48.7
47.9	17:04:24		47.9	47.9
48.4	17:04:27		48.4	48.4
49.9	17:04:30		49.9	49.9
48.2	17:04:33		48.2	48.2
48.3	17:04:36		48.3	48.3
48	17:04:39		48	48
48.2	17:04:42		48.2	48.2
48.4	17:04:45		48.4	48.4
50.3	17:04:48		50.3	50.3
49.5	17:04:51		49.5	49.5
50.9	17:04:54		50.9	50.9
48.6	17:04:57		48.6	48.6
48.3	17:05:00		48.3	48.3
48.7	17:05:03		48.7	48.7
49.3	17:05:06		49.3	49.3
49.7	17:05:09		49.7	49.7
50.8	17:05:12		50.8	50.8
49.8	17:05:15		49.8	49.8
50.9	17:05:18		50.9	50.9
51.7	17:05:21		51.7	51.7
51	17:05:24		51	51
50.9	17:05:27		50.9	50.9
53.2	17:05:30		53.2	53.2
54.6	17:05:33		54.6	54.6
55.5	17:05:36		55.5	55.5
55.7	17:05:39		55.7	55.7
58.4	17:05:42		58.4	58.4
54.7	17:05:45		54.7	54.7
52.8	17:05:48		52.8	52.8

Site A - On Power Pole Near SE Corner of Project Site				Site B - On Tree Near NW Corner of Project Site			
SPL	Time	Leq (1 hour Avg.)	Ldn CNEL	SPL	Time	Leq (1 hour Avg.)	Ldn CNEL
61	16:55:51		61	53.1	17:05:51		53.1
61.7	16:55:54		61.7	55	17:05:54		55
62.5	16:55:57		62.5	51.4	17:05:57		51.4
57.7	16:56:00		57.7	53.3	17:06:00		53.3
55.2	16:56:03		55.2	52.9	17:06:03		52.9
53.4	16:56:06		53.4	52.6	17:06:06		52.6
54	16:56:09		54	52.6	17:06:09		52.6
54	16:56:12		54	54.9	17:06:12		54.9
54.8	16:56:15		54.8	49.6	17:06:15		49.6
56.5	16:56:18		56.5	48.8	17:06:18		48.8
60.1	16:56:21		60.1	48.9	17:06:21		48.9
58.8	16:56:24		58.8	49.4	17:06:24		49.4
57.6	16:56:27		57.6	50.8	17:06:27		50.8
55.1	16:56:30		55.1	51	17:06:30		51
55.5	16:56:33		55.5	50.5	17:06:33		50.5
61.8	16:56:36		61.8	49.8	17:06:36		49.8
67.6	16:56:39		67.6	49.6	17:06:39		49.6
67.5	16:56:42		67.5	48.7	17:06:42		48.7
68.8	16:56:45		68.8	49.5	17:06:45		49.5
66.4	16:56:48		66.4	50.8	17:06:48		50.8
70.1	16:56:51		70.1	52.2	17:06:51		52.2
69.2	16:56:54		69.2	51	17:06:54		51
66.5	16:56:57		66.5	48.9	17:06:57		48.9
66.5	16:57:00		66.5	48.4	17:07:00		48.4
67.6	16:57:03		67.6	49.1	17:07:03		49.1
68.8	16:57:06		68.8	51.1	17:07:06		51.1
66.4	16:57:09		66.4	51.2	17:07:09		51.2
66	16:57:12		66	50.4	17:07:12		50.4
66.4	16:57:15		66.4	51.9	17:07:15		51.9
65.3	16:57:18		65.3	52.9	17:07:18		52.9
63	16:57:21		63	50.8	17:07:21		50.8
60.2	16:57:24		60.2	50.7	17:07:24		50.7
57.9	16:57:27		57.9	50.9	17:07:27		50.9
53.5	16:57:30		53.5	51	17:07:30		51
51.8	16:57:33		51.8	51	17:07:33		51
51.5	16:57:36		51.5	49.8	17:07:36		49.8
61.6	16:57:39		61.6	49.5	17:07:39		49.5
64.4	16:57:42		64.4	49.4	17:07:42		49.4
62.2	16:57:45		62.2	50.1	17:07:45		50.1
55.6	16:57:48		55.6	49.3	17:07:48		49.3
53.4	16:57:51		53.4	50.8	17:07:51		50.8
51.8	16:57:54		51.8	49.1	17:07:54		49.1
52	16:57:57		52	49.6	17:07:57		49.6
63	16:58:00		63	50.2	17:08:00		50.2
66.8	16:58:03		66.8	50.5	17:08:03		50.5
59.1	16:58:06		59.1	49.3	17:08:06		49.3
55	16:58:09		55	49	17:08:09		49
52.1	16:58:12		52.1	49.2	17:08:12		49.2
53.3	16:58:15		53.3	50.6	17:08:15		50.6
58.4	16:58:18		58.4	51.8	17:08:18		51.8
62.5	16:58:21		62.5	54.1	17:08:21		54.1
62.7	16:58:24		62.7	52.5	17:08:24		52.5
63	16:58:27		63	50.9	17:08:27		50.9
63.3	16:58:30		63.3	51.1	17:08:30		51.1
67.2	16:58:33		67.2	50	17:08:33		50
65.7	16:58:36		65.7	49.6	17:08:36		49.6
65.7	16:58:39		65.7	50.2	17:08:39		50.2
64.6	16:58:42		64.6	49.2	17:08:42		49.2
65	16:58:45		65	50.4	17:08:45		50.4
65.8	16:58:48		65.8	49.6	17:08:48		49.6
65.5	16:58:51		65.5	49.2	17:08:51		49.2
64.3	16:58:54		64.3	49.6	17:08:54		49.6
64.2	16:58:57		64.2	50.3	17:08:57		50.3
64.8	16:59:00		64.8	51.9	17:09:00		51.9
63.8	16:59:03		63.8	51.8	17:09:03		51.8
62.8	16:59:06		62.8	50.2	17:09:06		50.2
59.1	16:59:09		59.1	51.2	17:09:09		51.2
57.7	16:59:12		57.7	51.9	17:09:12		51.9
59.3	16:59:15		59.3	52.7	17:09:15		52.7
55.3	16:59:18		55.3	52.4	17:09:18		52.4
57.9	16:59:21		57.9	53.2	17:09:21		53.2
63	16:59:24		63	55.9	17:09:24		55.9
58.3	16:59:27		58.3	53.3	17:09:27		53.3
60.2	16:59:30		60.2	53	17:09:30		53
60.9	16:59:33		60.9	54.3	17:09:33		54.3
59.4	16:59:36		59.4	54.6	17:09:36		54.6
56.5	16:59:39		56.5	56.2	17:09:39		56.2
56	16:59:42		56	55.5	17:09:42		55.5
56.1	16:59:45		56.1	53.8	17:09:45		53.8
53.9	16:59:48		53.9	53.9	17:09:48		53.9
52.6	16:59:51		52.6	54.9	17:09:51		54.9
52.1	16:59:54		52.1	51.6	17:09:54		51.6
50.1	16:59:57		50.1	52.6	17:09:57		52.6
50.8	17:00:00		50.8	52.3	17:10:00		52.3
51	17:00:03		51	52.1	17:10:03		52.1
62.5	17:00:06		62.5	50.7	17:10:06		50.7
65	17:00:09		65	49.8	17:10:09		49.8
66.2	17:00:12		66.2	50.1	17:10:12		50.1

Site A - On Power Pole Near SE Corner of Project Site				Site B - On Tree Near NW Corner of Project Site				
SPL	Time	Leq (1 hour Avg.)	Ldn CNEL	SPL	Time	Leq (1 hour Avg.)	Ldn CNEL	
67.9	17:00:15		67.9	67.9	50.4	17:10:15	50.4	50.4
67.4	17:00:18		67.4	67.4	50.5	17:10:18	50.5	50.5
65.9	17:00:21		65.9	65.9	51.7	17:10:21	51.7	51.7
65.3	17:00:24		65.3	65.3	49.5	17:10:24	49.5	49.5
68.5	17:00:27		68.5	68.5	50.2	17:10:27	50.2	50.2
64.4	17:00:30		64.4	64.4	51.5	17:10:30	51.5	51.5
63	17:00:33		63	63.0	51	17:10:33	51	51
61.4	17:00:36		61.4	61.4	53.2	17:10:36	53.2	53.2
60.4	17:00:39		60.4	60.4	53.1	17:10:39	53.1	53.1
66.5	17:00:42		66.5	66.5	53.6	17:10:42	53.6	53.6
68.9	17:00:45		68.9	68.9	52.6	17:10:45	52.6	52.6
66.6	17:00:48		66.6	66.6	50.4	17:10:48	50.4	50.4
66	17:00:51		66	66.0	48.4	17:10:51	48.4	48.4
67.9	17:00:54		67.9	67.9	49.6	17:10:54	49.6	49.6
68.7	17:00:57		68.7	68.7	49.8	17:10:57	49.8	49.8
68.9	17:01:00		68.9	68.9	50	17:11:00	50	50
65	17:01:03		65	65.0	52.5	17:11:03	52.5	52.5
63	17:01:06		63	63.0	50.6	17:11:06	50.6	50.6
67.5	17:01:09		67.5	67.5	52	17:11:09	52	52
67.9	17:01:12		67.9	67.9	50.8	17:11:12	50.8	50.8
63.5	17:01:15		63.5	63.5	51	17:11:15	51	51
62.3	17:01:18		62.3	62.3	50.2	17:11:18	50.2	50.2
60.6	17:01:21		60.6	60.6	50.8	17:11:21	50.8	50.8
62.7	17:01:24		62.7	62.7	51.2	17:11:24	51.2	51.2
61.6	17:01:27		61.6	61.6	52.9	17:11:27	52.9	52.9
64.2	17:01:30		64.2	64.2	53.7	17:11:30	53.7	53.7
61.2	17:01:33		61.2	61.2	57.7	17:11:33	57.7	57.7
59.3	17:01:36		59.3	59.3	51.9	17:11:36	51.9	51.9
60	17:01:39		60	60.0	51.1	17:11:39	51.1	51.1
61.2	17:01:42		61.2	61.2	52	17:11:42	52	52
58.8	17:01:45		58.8	58.8	52.7	17:11:45	52.7	52.7
55.7	17:01:48		55.7	55.7	54.3	17:11:48	54.3	54.3
57	17:01:51		57	57.0	56.4	17:11:51	56.4	56.4
55.8	17:01:54		55.8	55.8	51.7	17:11:54	51.7	51.7
55	17:01:57		55	55.0	50.1	17:11:57	50.1	50.1
54.8	17:02:00		54.8	54.8	48.7	17:12:00	48.7	48.7
54.8	17:02:03		54.8	54.8	50.2	17:12:03	50.2	50.2
54.7	17:02:06		54.7	54.7	55.4	17:12:06	55.4	55.4
63.2	17:02:09		63.2	63.2	52.2	17:12:09	52.2	52.2
61.2	17:02:12		61.2	61.2	52.6	17:12:12	52.6	52.6
63.6	17:02:15		63.6	63.6	55	17:12:15	55	55
62.7	17:02:18		62.7	62.7	55.2	17:12:18	55.2	55.2
66.4	17:02:21		66.4	66.4	55.1	17:12:21	55.1	55.1
64	17:02:24		64	64.0	53.6	17:12:24	53.6	53.6
64	17:02:27		64	64.0	53	17:12:27	53	53
66	17:02:30		66	66.0	56.8	17:12:30	56.8	56.8
66.6	17:02:33		66.6	66.6	51.2	17:12:33	51.2	51.2
65.9	17:02:36		65.9	65.9	51.3	17:12:36	51.3	51.3
67.8	17:02:39		67.8	67.8	49.9	17:12:39	49.9	49.9
65.6	17:02:42		65.6	65.6	52.1	17:12:42	52.1	52.1
64.8	17:02:45		64.8	64.8	50	17:12:45	50	50
67.2	17:02:48		67.2	67.2	52.2	17:12:48	52.2	52.2
65.2	17:02:51		65.2	65.2	49.2	17:12:51	49.2	49.2
64	17:02:54		64	64.0	49.7	17:12:54	49.7	49.7
64.5	17:02:57		64.5	64.5	50.9	17:12:57	50.9	50.9
63.4	17:03:00		63.4	63.4	50.4	17:13:00	50.4	50.4
62.9	17:03:03		62.9	62.9	51.2	17:13:03	51.2	51.2
59.3	17:03:06		59.3	59.3	50	17:13:06	50	50
54.6	17:03:09		54.6	54.6	51.5	17:13:09	51.5	51.5
51.1	17:03:12		51.1	51.1	51.4	17:13:12	51.4	51.4
58.2	17:03:15		58.2	58.2	51.9	17:13:15	51.9	51.9
61.6	17:03:18		61.6	61.6	50.9	17:13:18	50.9	50.9
58.9	17:03:21		58.9	58.9	50.5	17:13:21	50.5	50.5
58.8	17:03:24		58.8	58.8	51.4	17:13:24	51.4	51.4
55.4	17:03:27		55.4	55.4	48.7	17:13:27	48.7	48.7
53.9	17:03:30		53.9	53.9	49.1	17:13:30	49.1	49.1
53.8	17:03:33		53.8	53.8	50.4	17:13:33	50.4	50.4
58.9	17:03:36		58.9	58.9	50.7	17:13:36	50.7	50.7
62.4	17:03:39		62.4	62.4	53	17:13:39	53	53
60.4	17:03:42		60.4	60.4	56	17:13:42	56	56
62.3	17:03:45		62.3	62.3	51	17:13:45	51	51
66.2	17:03:48		66.2	66.2	49.7	17:13:48	49.7	49.7
63.3	17:03:51		63.3	63.3	50.2	17:13:51	50.2	50.2
64.7	17:03:54		64.7	64.7	48.5	17:13:54	48.5	48.5
65.8	17:03:57		65.8	65.8	49.5	17:13:57	49.5	49.5
63.7	17:04:00		63.7	63.7	50.4	17:14:00	50.4	50.4
64.6	17:04:03		64.6	64.6	49.7	17:14:03	49.7	49.7
58.8	17:04:06		58.8	58.8	49.7	17:14:06	49.7	49.7
59.4	17:04:09		59.4	59.4	50.5	17:14:09	50.5	50.5
62.3	17:04:12		62.3	62.3	50.5	17:14:12	50.5	50.5
64.2	17:04:15		64.2	64.2	50.5	17:14:15	50.5	50.5
63.2	17:04:18		63.2	63.2	51.9	17:14:18	51.9	51.9
61.6	17:04:21		61.6	61.6	51	17:14:21	51	51
59.7	17:04:24		59.7	59.7	52	17:14:24	52	52
58.8	17:04:27		58.8	58.8	52.4	17:14:27	52.4	52.4
57	17:04:30		57	57.0	51.5	17:14:30	51.5	51.5
57.7	17:04:33		57.7	57.7	51.1	17:14:33	51.1	51.1
58.4	17:04:36		58.4	58.4	56	17:14:36	56	56

Site A - On Power Pole Near SE Corner of Project Site				Site B - On Tree Near NW Corner of Project Site			
SPL	Time	Leq (1 hour Avg.)	Ldn CNEL	SPL	Time	Leq (1 hour Avg.)	Ldn CNEL
60.9	17:04:39		60.9	52.7	17:14:39		52.7
59.2	17:04:42		59.2	50.6	17:14:42		50.6
60.5	17:04:45		60.5	52.1	17:14:45		52.1
57.7	17:04:48		57.7	54.4	17:14:48		54.4
54.9	17:04:51		54.9	51.8	17:14:51		51.8
52.7	17:04:54		52.7	51.2	17:14:54		51.2
51.2	17:04:57		51.2	52.3	17:14:57		52.3
51.1	17:05:00		51.1	53.5	17:15:00		53.5
54.3	17:05:03		54.3	55.7	17:15:03		55.7
61.7	17:05:06		61.7	63.5	17:15:06		63.5
62.6	17:05:09		62.6	59.5	17:15:09		59.5
60.9	17:05:12		60.9	55.8	17:15:12		55.8
61.6	17:05:15		61.6	53.5	17:15:15		53.5
62.1	17:05:18		62.1	53	17:15:18		53
63.2	17:05:21		63.2	51	17:15:21		51
62.3	17:05:24		62.3	48.8	17:15:24		48.8
71.7	17:05:27		71.7	49.1	17:15:27		49.1
73	17:05:30		73.0	49.1	17:15:30		49.1
72.7	17:05:33		72.7	49.2	17:15:33		49.2
67.6	17:05:36		67.6	48.7	17:15:36		48.7
65	17:05:39		65.0	47.9	17:15:39		47.9
68.1	17:05:42		68.1	48.5	17:15:42		48.5
68.4	17:05:45		68.4	48.7	17:15:45		48.7
69.6	17:05:48		69.6	50.4	17:15:48		50.4
66.6	17:05:51		66.6	49.7	17:15:51		49.7
65.6	17:05:54		65.6	49.5	17:15:54		49.5
68.3	17:05:57		68.3	50	17:15:57		50
68.8	17:06:00		68.8	51.1	17:16:00		51.1
76.2	17:06:03		76.2	51.3	17:16:03		51.3
69.2	17:06:06		69.2	52.6	17:16:06		52.6
61.1	17:06:09		61.1	50.9	17:16:09		50.9
57.4	17:06:12		57.4	52	17:16:12		52
62.3	17:06:15		62.3	52.9	17:16:15		52.9
62.3	17:06:18		62.3	53.1	17:16:18		53.1
61.2	17:06:21		61.2	55.9	17:16:21		55.9
59.2	17:06:24		59.2	55.6	17:16:24		55.6
59	17:06:27		59.0	55.3	17:16:27		55.3
58.4	17:06:30		58.4	54.9	17:16:30		54.9
58	17:06:33		58.0	55.7	17:16:33		55.7
60.7	17:06:36		60.7	57.3	17:16:36		57.3
60.7	17:06:39		60.7	55.6	17:16:39		55.6
55.4	17:06:42		55.4	55.6	17:16:42		55.6
53.9	17:06:45		53.9	53.8	17:16:45		53.8
54	17:06:48		54.0	54.5	17:16:48		54.5
54.1	17:06:51		54.1	58.5	17:16:51		58.5
55.3	17:06:54		55.3	54.4	17:16:54		54.4
57.1	17:06:57		57.1	52.4	17:16:57		52.4
56.8	17:07:00		56.8	50.2	17:17:00		50.2
58.6	17:07:03		58.6	51.2	17:17:03		51.2
62.5	17:07:06		62.5	49	17:17:06		49
69.3	17:07:09		69.3	49.6	17:17:09		49.6
63.9	17:07:12		63.9	47.8	17:17:12		47.8
61.4	17:07:15		61.4	47.5	17:17:15		47.5
65.6	17:07:18		65.6	47.4	17:17:18		47.4
64.5	17:07:21		64.5	47.6	17:17:21		47.6
66	17:07:24		66.0	47.6	17:17:24		47.6
63.6	17:07:27		63.6	49	17:17:27		49
63.2	17:07:30		63.2	49.8	17:17:30		49.8
64.3	17:07:33		64.3	50	17:17:33		50
66.6	17:07:36		66.6	49.8	17:17:36		49.8
65.3	17:07:39		65.3	49.5	17:17:39		49.5
64.6	17:07:42		64.6	49.3	17:17:42		49.3
63.5	17:07:45		63.5	49.2	17:17:45		49.2
66.4	17:07:48		66.4	49.2	17:17:48		49.2
64.4	17:07:51		64.4	49.6	17:17:51		49.6
61.2	17:07:54		61.2	51	17:17:54		51
65	17:07:57		65.0	51.8	17:17:57		51.8
67.5	17:08:00		67.5	51.8	17:18:00		51.8
63	17:08:03		63.0	51.1	17:18:03		51.1
59.6	17:08:06		59.6	51.9	17:18:06		51.9
56.6	17:08:09		56.6	53.2	17:18:09		53.2
54.6	17:08:12		54.6	51.1	17:18:12		51.1
63.3	17:08:15		63.3	51.8	17:18:15		51.8
62.1	17:08:18		62.1	51.6	17:18:18		51.6
59.4	17:08:21		59.4	51.4	17:18:21		51.4
61.1	17:08:24		61.1	52.4	17:18:24		52.4
59.7	17:08:27		59.7	52.7	17:18:27		52.7
59.1	17:08:30		59.1	52.4	17:18:30		52.4
58	17:08:33		58.0	53.6	17:18:33		53.6
57.9	17:08:36		57.9	52.4	17:18:36		52.4
54.7	17:08:39		54.7	51.6	17:18:39		51.6
52	17:08:42		52.0	51.6	17:18:42		51.6
53.9	17:08:45		53.9	51.5	17:18:45		51.5
54.5	17:08:48		54.5	53.6	17:18:48		53.6
54.4	17:08:51		54.4	57.3	17:18:51		57.3
57.6	17:08:54		57.6	56	17:18:54		56
60	17:08:57		60.0	56.7	17:18:57		56.7
61.5	17:09:00		61.5	57.4	17:19:00		57.4

Site A - On Power Pole Near SE Corner of Project Site				Site B - On Tree Near NW Corner of Project Site			
SPL	Time	Leq (1 hour Avg.)	Ldn CNEL	SPL	Time	Leq (1 hour Avg.)	Ldn CNEL
61.1	17:09:03		61.1 61.1	57.1	17:19:03		57.1 57.1
62.5	17:09:06		62.5 62.5	52.4	17:19:06		52.4 52.4
62.1	17:09:09		62.1 62.1	49.7	17:19:09		49.7 49.7
64.7	17:09:12		64.7 64.7	50.8	17:19:12		50.8 50.8
70.3	17:09:15		70.3 70.3	50.5	17:19:15		50.5 50.5
71.1	17:09:18		71.1 71.1	50.3	17:19:18		50.3 50.3
67.6	17:09:21		67.6 67.6	55.2	17:19:21		55.2 55.2
66.1	17:09:24		66.1 66.1	57.5	17:19:24		57.5 57.5
64.5	17:09:27		64.5 64.5	56.5	17:19:27		56.5 56.5
64.4	17:09:30		64.4 64.4	51.8	17:19:30		51.8 51.8
64.2	17:09:33		64.2 64.2	52.6	17:19:33		52.6 52.6
63.9	17:09:36		63.9 63.9	51	17:19:36		51 51
62.7	17:09:39		62.7 62.7	54.3	17:19:39		54.3 54.3
65.1	17:09:42		65.1 65.1	54.6	17:19:42		54.6 54.6
64.4	17:09:45		64.4 64.4	57	17:19:45		57 57
68.4	17:09:48		68.4 68.4	54.3	17:19:48		54.3 54.3
63.9	17:09:51		63.9 63.9	51.3	17:19:51		51.3 51.3
67.3	17:09:54		67.3 67.3	50.8	17:19:54		50.8 50.8
65.4	17:09:57		65.4 65.4	51.1	17:19:57		51.1 51.1
65.6	17:10:00		65.6 65.6	49.4	17:20:00		49.4 49.4
67.1	17:10:03		67.1 67.1	49.6	17:20:03		49.6 49.6
65.5	17:10:06		65.5 65.5	49.7	17:20:06		49.7 49.7
67.4	17:10:09		67.4 67.4	51.3	17:20:09		51.3 51.3
66.3	17:10:12		66.3 66.3	53.7	17:20:12		53.7 53.7
65.1	17:10:15		65.1 65.1	53.8	17:20:15		53.8 53.8
62.5	17:10:18		62.5 62.5	56.3	17:20:18		56.3 56.3
64.4	17:10:21		64.4 64.4	57	17:20:21		57 57
63.6	17:10:24		63.6 63.6	55.5	17:20:24		55.5 55.5
61	17:10:27		61 61.0	55.6	17:20:27		55.6 55.6
58.1	17:10:30		58.1 58.1	51	17:20:30		51 51
60.5	17:10:33		60.5 60.5	54.9	17:20:33		54.9 54.9
61.9	17:10:36		61.9 61.9	55.1	17:20:36		55.1 55.1
62.2	17:10:39		62.2 62.2	54.1	17:20:39		54.1 54.1
62.4	17:10:42		62.4 62.4	50.4	17:20:42		50.4 50.4
60.4	17:10:45		60.4 60.4	54.5	17:20:45		54.5 54.5
59.8	17:10:48		59.8 59.8	54.4	17:20:48		54.4 54.4
59.8	17:10:51		59.8 59.8	54.9	17:20:51		54.9 54.9
59.9	17:10:54		59.9 59.9	55.1	17:20:54		55.1 55.1
60.1	17:10:57		60.1 60.1	53.2	17:20:57		53.2 53.2
65.6	17:11:00		65.6 65.6	57.7	17:21:00		57.7 57.7
68.7	17:11:03		68.7 68.7	57.3	17:21:03		57.3 57.3
66.3	17:11:06		66.3 66.3	54.8	17:21:06		54.8 54.8
66.3	17:11:09		66.3 66.3	56.9	17:21:09		56.9 56.9
65.9	17:11:12		65.9 65.9	59.5	17:21:12		59.5 59.5
65.5	17:11:15		65.5 65.5	58.1	17:21:15		58.1 58.1
69.6	17:11:18		69.6 69.6	58.1	17:21:18		58.1 58.1
72.1	17:11:21		72.1 72.1	67	17:21:21		67 67
69.1	17:11:24		69.1 69.1	67	17:21:24		67 67
74	17:11:27		74 74.0	70.1	17:21:27		70.1 70.1
65.1	17:11:30		65.1 65.1	68.8	17:21:30		68.8 68.8
64.8	17:11:33		64.8 64.8	66.1	17:21:33		66.1 66.1
67.1	17:11:36		67.1 67.1	65.5	17:21:36		65.5 65.5
67.7	17:11:39		67.7 67.7	60.3	17:21:39		60.3 60.3
67.2	17:11:42		67.2 67.2	59.4	17:21:42		59.4 59.4
72.3	17:11:45		72.3 72.3	57.4	17:21:45		57.4 57.4
86.7	17:11:48		86.7 86.7	58.8	17:21:48		58.8 58.8
71	17:11:51		71 71.0	53.4	17:21:51		53.4 53.4
62.3	17:11:54		62.3 62.3	54.3	17:21:54		54.3 54.3
64.4	17:11:57		64.4 64.4	53.9	17:21:57		53.9 53.9
63.6	17:12:00		63.6 63.6	53.7	17:22:00		53.7 53.7
65.4	17:12:03		65.4 65.4	53.9	17:22:03		53.9 53.9
61.3	17:12:06		61.3 61.3	58.4	17:22:06		58.4 58.4
61.9	17:12:09		61.9 61.9	56.1	17:22:09		56.1 56.1
63.7	17:12:12		63.7 63.7	62.4	17:22:12		62.4 62.4
68.2	17:12:15		68.2 68.2	57.3	17:22:15		57.3 57.3
63.7	17:12:18		63.7 63.7	51.2	17:22:18		51.2 51.2
59.7	17:12:21		59.7 59.7	53.8	17:22:21		53.8 53.8
57.7	17:12:24		57.7 57.7	55.9	17:22:24		55.9 55.9
57.7	17:12:27		57.7 57.7	60.5	17:22:27		60.5 60.5
54.3	17:12:30		54.3 54.3	57.2	17:22:30		57.2 57.2
52.3	17:12:33		52.3 52.3	59.3	17:22:33		59.3 59.3
53	17:12:36		53 53.0	55.8	17:22:36		55.8 55.8
50.9	17:12:39		50.9 50.9	56.4	17:22:39		56.4 56.4
51.4	17:12:42		51.4 51.4	56.5	17:22:42		56.5 56.5
56.1	17:12:45		56.1 56.1	58.6	17:22:45		58.6 58.6
63.7	17:12:48		63.7 63.7	55.8	17:22:48		55.8 55.8
65	17:12:51		65 65.0	57.2	17:22:51		57.2 57.2
63	17:12:54		63 63.0	56.6	17:22:54		56.6 56.6
60.8	17:12:57		60.8 60.8	58.5	17:22:57		58.5 58.5
60.3	17:13:00		60.3 60.3	55.5	17:23:00		55.5 55.5
61.1	17:13:03		61.1 61.1	57.7	17:23:03		57.7 57.7
63.6	17:13:06		63.6 63.6	58.8	17:23:06		58.8 58.8
65.1	17:13:09		65.1 65.1	52.9	17:23:09		52.9 52.9
71.2	17:13:12		71.2 71.2	56.6	17:23:12		56.6 56.6
64.2	17:13:15		64.2 64.2	54.9	17:23:15		54.9 54.9
59.6	17:13:18		59.6 59.6	53.9	17:23:18		53.9 53.9
57.3	17:13:21		57.3 57.3	52.8	17:23:21		52.8 52.8
56.6	17:13:24		56.6 56.6	57.3	17:23:24		57.3 57.3

Site A - On Power Pole Near SE Corner of Project Site				Site B - On Tree Near NW Corner of Project Site			
SPL	Time	Leq (1 hour Avg.)	Ldn CNEL	SPL	Time	Leq (1 hour Avg.)	Ldn CNEL
57.5	17:13:27		57.5	59.6	17:23:27		59.6
57.8	17:13:30		57.8	58.2	17:23:30		58.2
57.6	17:13:33		57.6	50.5	17:23:33		50.5
63.1	17:13:36		63.1	50.9	17:23:36		50.9
68.2	17:13:39		68.2	52.4	17:23:39		52.4
62.8	17:13:42		62.8	52.9	17:23:42		52.9
63.9	17:13:45		63.9	54.1	17:23:45		54.1
62	17:13:48		62	56.1	17:23:48		56.1
62.1	17:13:51		62.1	55.9	17:23:51		55.9
57.6	17:13:54		57.6	58	17:23:54		58
57	17:13:57		57	58.2	17:23:57		58.2
56	17:14:00		56	54.9	17:24:00		54.9
55.8	17:14:03		55.8	56.6	17:24:03		56.6
58.5	17:14:06		58.5	56.9	17:24:06		56.9
63.6	17:14:09		63.6	54	17:24:09		54
72.9	17:14:12		72.9	54.2	17:24:12		54.2
67.3	17:14:15		67.3	57.4	17:24:15		57.4
63.6	17:14:18		63.6	58.6	17:24:18		58.6
65.6	17:14:21		65.6	57.7	17:24:21		57.7
68.4	17:14:24		68.4	56.6	17:24:24		56.6
70	17:14:27		70	58.2	17:24:27		58.2
70.9	17:14:30		70.9	52.5	17:24:30		52.5
68	17:14:33		68	54.2	17:24:33		54.2
65.3	17:14:36		65.3	52.1	17:24:36		52.1
64.5	17:14:39		64.5	57.2	17:24:39		57.2
66.1	17:14:42		66.1	58.4	17:24:42		58.4
66.7	17:14:45		66.7	58.7	17:24:45		58.7
66.5	17:14:48		66.5	58.1	17:24:48		58.1
65.4	17:14:51		65.4	52	17:24:51		52
68.1	17:14:54		68.1	54.9	17:24:54		54.9
70.1	17:14:57		70.1	57.3	17:24:57		57.3
64.5	17:15:00		64.5	56.2	17:25:00		56.2
60.8	17:15:03		60.8	60	17:25:03		60
64.4	17:15:06		64.4	61	17:25:06		61
62.8	17:15:09		62.8	63.7	17:25:09		63.7
64.9	17:15:12		64.9	61.9	17:25:12		61.9
59.5	17:15:15		59.5	60.4	17:25:15		60.4
58.1	17:15:18		58.1	60.3	17:25:18		60.3
54.3	17:15:21		54.3	57.2	17:25:21		57.2
53.8	17:15:24		53.8	54.5	17:25:24		54.5
54.9	17:15:27		54.9	56.1	17:25:27		56.1
55.4	17:15:30		55.4	55.6	17:25:30		55.6
57.3	17:15:33		57.3	57	17:25:33		57
57.1	17:15:36		57.1	58	17:25:36		58
55.8	17:15:39		55.8	57.9	17:25:39		57.9
56.5	17:15:42		56.5	56.6	17:25:42		56.6
57.7	17:15:45		57.7	56.5	17:25:45		56.5
57.7	17:15:48		57.7	55.3	17:25:48		55.3
57.3	17:15:51		57.3	56	17:25:51		56
57.8	17:15:54		57.8	58.1	17:25:54		58.1
57.3	17:15:57		57.3	53	17:25:57		53
56.9	17:16:00		56.9	53.5	17:26:00		53.5
59.8	17:16:03		59.8	55.1	17:26:03		55.1
63.5	17:16:06		63.5	53.6	17:26:06		53.6
67.5	17:16:09		67.5	53	17:26:09		53
68.7	17:16:12		68.7	54.8	17:26:12		54.8
72.6	17:16:15		72.6	54.2	17:26:15		54.2
68.8	17:16:18		68.8	54.7	17:26:18		54.7
68	17:16:21		68	55.2	17:26:21		55.2
68.7	17:16:24		68.7	56.3	17:26:24		56.3
70.4	17:16:27		70.4	57.7	17:26:27		57.7
77.2	17:16:30		77.2	53.6	17:26:30		53.6
75.3	17:16:33		75.3	52.3	17:26:33		52.3
75.2	17:16:36		75.2	53.3	17:26:36		53.3
68.4	17:16:39		68.4	53.4	17:26:39		53.4
67.6	17:16:42		67.6	53.3	17:26:42		53.3
72.4	17:16:45		72.4	51.2	17:26:45		51.2
73.4	17:16:48		73.4	54.7	17:26:48		54.7
70.9	17:16:51		70.9	54.5	17:26:51		54.5
71	17:16:54		71	53.3	17:26:54		53.3
69.8	17:16:57		69.8	53.3	17:26:57		53.3
66.8	17:17:00		66.8	54.9	17:27:00		54.9
65.6	17:17:03		65.6	56.7	17:27:03		56.7
56.8	17:17:06		56.8	56.4	17:27:06		56.4
54.1	17:17:09		54.1	53.2	17:27:09		53.2
56.8	17:17:12		56.8	57	17:27:12		57
57.8	17:17:15		57.8	51.4	17:27:15		51.4
57.5	17:17:18		57.5	50.9	17:27:18		50.9
55.2	17:17:21		55.2	52.6	17:27:21		52.6
54.4	17:17:24		54.4	53	17:27:24		53
55.9	17:17:27		55.9	56.6	17:27:27		56.6
60.3	17:17:30		60.3	56.2	17:27:30		56.2
58	17:17:33		58	54.7	17:27:33		54.7
54.7	17:17:36		54.7	55.6	17:27:36		55.6
59.1	17:17:39		59.1	54.8	17:27:39		54.8
60.2	17:17:42		60.2	56.6	17:27:42		56.6
57.3	17:17:45		57.3	56.7	17:27:45		56.7
54.3	17:17:48		54.3	54	17:27:48		54
54.7	17:17:51		54.7	54.8	17:27:51		54.8
54.9	17:17:54		54.9	50.9	17:27:54		50.9
60.1	17:17:57		60.1	53.3	17:27:57		53.3
65.3	17:18:00		65.3	54.4	17:28:00		54.4
63.5	17:18:03		63.5	57.7	17:28:03		57.7
63.2	17:18:06		63.2	60.5	17:28:06		60.5
62.8	17:18:09		62.8	54.7	17:28:09		54.7

Site A - On Power Pole Near SE Corner of Project Site				Site B - On Tree Near NW Corner of Project Site			
SPL	Time	Leq (1 hour Avg.)	Ldn CNEL	SPL	Time	Leq (1 hour Avg.)	Ldn CNEL
62.8	1/18:12		62.8	57.7	1/28:12		57.7
61.9	1/18:15		61.9	57.6	1/28:15		57.6
62.1	1/18:18		62.1	56.2	1/28:18		56.2
64	1/18:21		64	54.4	1/28:21		54.4
64.9	1/18:24		64.9	57	1/28:24		57
63.5	1/18:27		63.5	55.3	1/28:27		55.3
59	1/18:30		59	56.3	1/28:30		56.3
58.4	1/18:33		58.4	58	1/28:33		58
60	1/18:36		60	49.6	1/28:36		49.6
60	1/18:39		60	49.7	1/28:39		49.7
59.2	1/18:42		59.2	48.3	1/28:42		48.3
58.1	1/18:45		58.1	48.6	1/28:45		48.6
59.3	1/18:48		59.3	49.4	1/28:48		49.4
60.4	1/18:51		60.4	49.3	1/28:51		49.3
65.4	1/18:54		65.4	50.1	1/28:54		50.1
72.7	1/18:57		72.7	49.8	1/28:57		49.8
64.5	1/19:00		64.5	50.2	1/29:00		50.2
58.7	1/19:03		58.7	53.8	1/29:03		53.8
60.1	1/19:06		60.1	53.2	1/29:06		53.2
56.2	1/19:09		56.2	55.1	1/29:09		55.1
53.4	1/19:12		53.4	58.6	1/29:12		58.6
52.6	1/19:15		52.6	55.9	1/29:15		55.9
52.4	1/19:18		52.4	53.2	1/29:18		53.2
53.7	1/19:21		53.7	56.2	1/29:21		56.2
57.3	1/19:24		57.3	55.2	1/29:24		55.2
61.2	1/19:27		61.2	51.6	1/29:27		51.6
69.4	1/19:30		69.4	53.6	1/29:30		53.6
69.1	1/19:33		69.1	51.9	1/29:33		51.9
71.9	1/19:36		71.9	52.5	1/29:36		52.5
68.7	1/19:39		68.7	54.2	1/29:39		54.2
65.2	1/19:42		65.2	56.7	1/29:42		56.7
62.4	1/19:45		62.4	59.8	1/29:45		59.8
63.6	1/19:48		63.6	59.3	1/29:48		59.3
61.7	1/19:51		61.7	56.2	1/29:51		56.2
62	1/19:54		62	52.6	1/29:54		52.6
61.8	1/19:57		61.8	51	1/29:57		51
62.1	1/20:00		62.1	50.5	1/30:00		50.5
63.7	1/20:03		63.7	50.1	1/30:03		50.1
62	1/20:06		62	52.2	1/30:06		52.2
61.5	1/20:09		61.5	55.3	1/30:09		55.3
60.5	1/20:12		60.5	57.2	1/30:12		57.2
61.1	1/20:15		61.1	54.8	1/30:15		54.8
62.3	1/20:18		62.3	56.6	1/30:18		56.6
61.2	1/20:21		61.2	53.2	1/30:21		53.2
59.2	1/20:24		59.2	56	1/30:24		56
58.1	1/20:27		58.1	56.4	1/30:27		56.4
56.5	1/20:30		56.5	52.9	1/30:30		52.9
60.4	1/20:33		60.4	53.6	1/30:33		53.6
63.1	1/20:36		63.1	50.7	1/30:36		50.7
60.2	1/20:39		60.2	56.2	1/30:39		56.2
59.3	1/20:42		59.3	55.6	1/30:42		55.6
57.8	1/20:45		57.8	54.5	1/30:45		54.5
58.2	1/20:48		58.2	56.5	1/30:48		56.5
60.7	1/20:51		60.7	55.4	1/30:51		55.4
56.4	1/20:54		56.4	55.2	1/30:54		55.2
54.8	1/20:57		54.8	57.8	1/30:57		57.8
55	1/21:00		55	57.5	1/31:00		57.5
54.7	1/21:03		54.7	60.9	1/31:03		60.9
55	1/21:06		55	59.6	1/31:06		59.6
56.6	1/21:09		56.6	55.7	1/31:09		55.7
56.9	1/21:12		56.9	54.5	1/31:12		54.5
56.3	1/21:15		56.3	55.1	1/31:15		55.1
61.9	1/21:18		61.9	57.8	1/31:18		57.8
62.7	1/21:21		62.7	57.6	1/31:21		57.6
67.2	1/21:24		67.2	54.6	1/31:24		54.6
71.4	1/21:27		71.4	53.8	1/31:27		53.8
73.8	1/21:30		73.8	54.3	1/31:30		54.3
67.7	1/21:33		67.7	53.1	1/31:33		53.1
67.6	1/21:36		67.6	58.7	1/31:36		58.7
71.9	1/21:39		71.9	55.3	1/31:39		55.3
66.6	1/21:42		66.6	54.9	1/31:42		54.9
66.2	1/21:45		66.2	51	1/31:45		51
64.1	1/21:48		64.1	51.7	1/31:48		51.7
65.8	1/21:51		65.8	57.6	1/31:51		57.6
64.1	1/21:54		64.1	60.5	1/31:54		60.5
66.8	1/21:57		66.8	53.1	1/31:57		53.1
68.7	1/22:00	71.3	68.7	55.6	1/32:00	59.2	55.6
75.4	1/22:03	71.3	75.4	55.5	1/32:03	59.2	55.5
69.4	1/22:06	71.3	69.4	54.4	1/32:06	59.2	54.4
68.6	1/22:09	71.3	68.6	51.8	1/32:09	59.2	51.8
64.2	1/22:12	71.3	64.2	52.1	1/32:12	59.2	52.1
66.4	1/22:15	71.3	66.4	51	1/32:15	59.2	51
71.3	1/22:18	71.3	71.3	49.5	1/32:18	59.2	49.5
63.3	1/22:21	71.3	63.3	49.6	1/32:21	59.2	49.6
61.6	1/22:24	71.3	61.6	49.1	1/32:24	59.2	49.1
63.1	1/22:27	71.3	63.1	50.5	1/32:27	59.2	50.5
61.5	1/22:30	71.3	61.5	49.2	1/32:30	59.2	49.2
59.6	1/22:33	71.3	59.6	48.2	1/32:33	59.2	48.2
62.4	1/22:36	71.3	62.4	49	1/32:36	59.2	49
61.8	1/22:39	71.3	61.8	52.6	1/32:39	59.2	52.6
61.7	1/22:42	71.3	61.7	50.6	1/32:42	59.2	50.6
59.2	1/22:45	71.3	59.2	50.8	1/32:45	59.1	50.8
56.8	1/22:48	71.3	56.8	50.8	1/32:48	59.1	50.8
56.5	1/22:51	71.3	56.5	53.4	1/32:51	59.1	53.4
57.7	1/22:54	71.3	57.7	49.4	1/32:54	59.1	49.4
56.4	1/22:57	71.3	56.4	49.1	1/32:57	59.1	49.1
57.6	1/23:00	71.3	57.6	51.5	1/33:00	59.1	51.5
57.1	1/23:03	71.3	57.1	50.3	1/33:03	59.1	50.3
58.7	1/23:06	71.3	58.7	51.6	1/33:06	59.1	51.6
56.2	1/23:09	71.3	56.2	50.5	1/33:09	59.1	50.5
56	1/23:12	71.3	56	50.2	1/33:12	59.1	50.2
56	1/23:15	71.3	56	50.1	1/33:15	59.1	50.1
59	1/23:18	71.3	59	51.1	1/33:18	59.1	51.1
57.6	1/23:21	71.3	57.6	53.2	1/33:21	59.1	53.2
56.6	1/23:24	71.3	56.6	51.3	1/33:24	59.1	51.3

APPENDIX C

RCNM Model Construction Noise Calculation Printouts

Roadway Construction Noise Model (RCNM), Version 1.1

Report date: 5/20/2021
Case Description: Florence Avenue Townhomes - Demolition

---- Receptor #1 ----

Description	Land Use	Baselines (dBA)		
		Daytime	Evening	Night
Nearest Homes to West	Residential	55.3	55.3	55.3

Description	Impact Device	Usage(%)	Equipment Spec	Actual	Receptor	Estimated
			Lmax (dBA)	Lmax (dBA)	Distance (feet)	Shielding (dBA)
Concrete Saw	No	20		89.6	160	0
Excavator	No	40		80.7	160	0
Excavator	No	40		80.7	160	0
Excavator	No	40		80.7	160	0
Dozer	No	40		81.7	160	0
Dozer	No	40		81.7	160	0

Results

Equipment	Calculated (dBA)		Day Lmax	Noise Limits (dBA)		
	*Lmax	Leq		Leq	Evening Lmax	Leq
Concrete Saw	79.5	72.5	N/A	N/A	N/A	N/A
Excavator	70.6	66.6	N/A	N/A	N/A	N/A
Excavator	70.6	66.6	N/A	N/A	N/A	N/A
Excavator	70.6	66.6	N/A	N/A	N/A	N/A
Dozer	71.6	67.6	N/A	N/A	N/A	N/A
Dozer	71.6	67.6	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: 5/20/2021
Case Description: Florence Avenue Townhomes - Demolition

---- Receptor #2 ----

Description	Land Use	Baselines (dBA)		
		Daytime	Evening	Night
Nearest Homes to East	Residential	55.3	55.3	55.3

Description	Impact Device	Usage(%)	Equipment Spec	Actual	Receptor	Estimated
			Lmax (dBA)	Lmax (dBA)	Distance (feet)	Shielding (dBA)
Concrete Saw	No	20		89.6	225	0
Excavator	No	40		80.7	225	0
Excavator	No	40		80.7	225	0
Excavator	No	40		80.7	225	0
Dozer	No	40		81.7	225	0
Dozer	No	40		81.7	225	0

Equipment	Calculated (dBA)		Results		Noise Limits (dBA)	
	*Lmax	Leq	Day Lmax	Leq	Evening Lmax	Leq
Concrete Saw	76.5	69.5	N/A	N/A	N/A	N/A
Excavator	67.6	63.7	N/A	N/A	N/A	N/A
Excavator	67.6	63.7	N/A	N/A	N/A	N/A
Excavator	67.6	63.7	N/A	N/A	N/A	N/A
Dozer	68.6	64.6	N/A	N/A	N/A	N/A
Dozer	68.6	64.6	N/A	N/A	N/A	N/A
Total	77	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: 5/20/2021
Case Description: Florence Avenue Townhomes - Demolition

---- Receptor #3 ----

Description	Land Use	Baselines (dBA)		
		Daytime	Evening	Night
Nearest Church to East	Commercial	67.6	67.6	67.6

Description	Impact Device	Usage(%)	Equipment		Receptor Distance (feet)	Estimated Shielding (dBA)
			Spec Lmax (dBA)	Actual Lmax (dBA)		
Concrete Saw	No	20		89.6	250	0
Excavator	No	40		80.7	250	0
Excavator	No	40		80.7	250	0
Excavator	No	40		80.7	250	0
Dozer	No	40		81.7	250	0
Dozer	No	40		81.7	250	0

Equipment	Calculated (dBA)		Results		Noise Limits (dBA)	
	*Lmax	Leq	Day Lmax	Leq	Evening Lmax	Leq
Concrete Saw	75.6	68.6	N/A	N/A	N/A	N/A
Excavator	66.7	62.8	N/A	N/A	N/A	N/A
Excavator	66.7	62.8	N/A	N/A	N/A	N/A
Excavator	66.7	62.8	N/A	N/A	N/A	N/A
Dozer	67.7	63.7	N/A	N/A	N/A	N/A
Dozer	67.7	63.7	N/A	N/A	N/A	N/A
Total	76	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: 5/20/2021

Case Description: Florence Avenue Townhomes - Site Preparation

---- Receptor #1 ----

Description	Land Use	Baselines (dBA)	
		Daytime	Evening
Nearest Homes to West	Residential	55.3	55.3

Equipment

Description	Impact Device	Usage(%)	Spec	Actual	Receptor	Estimated
			Lmax (dBA)	Lmax (dBA)	Distance (feet)	Shielding (dBA)
Dozer	No	40		81.7	160	0
Dozer	No	40		81.7	160	0
Dozer	No	40		81.7	160	0
Tractor	No	40	84		160	0
Front End Loader	No	40		79.1	160	0
Backhoe	No	40		77.6	160	0
Tractor	No	40	84		160	0

Results

Equipment	Calculated (dBA)		Noise Limits (dBA)			
	*Lmax	Leq	Day	Evening		
			Lmax	Leq	Lmax	Leq
Dozer	71.6	67.6	N/A	N/A	N/A	N/A
Dozer	71.6	67.6	N/A	N/A	N/A	N/A
Dozer	71.6	67.6	N/A	N/A	N/A	N/A
Tractor	73.9	69.9	N/A	N/A	N/A	N/A
Front End Loader	69.0	65.0	N/A	N/A	N/A	N/A
Backhoe	67.5	63.5	N/A	N/A	N/A	N/A
Tractor	73.9	69.9	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: 5/20/2021

Case Description: Florence Avenue Townhomes - Site Preparation

---- Receptor #2 ----

Description	Land Use	Baselines (dBA)	
		Daytime	Evening
Nearest Homes to East	Residential	55.3	55.3

Equipment

Description	Impact Device	Usage(%)	Spec Lmax (dBA)	Actual Lmax (dBA)	Receptor Distance (feet)	Estimated Shielding (dBA)
Dozer	No	40		81.7	225	0
Dozer	No	40		81.7	225	0
Dozer	No	40		81.7	225	0
Tractor	No	40	84		225	0
Front End Loader	No	40		79.1	225	0
Backhoe	No	40		77.6	225	0
Tractor	No	40	84		225	0

Results

Equipment	Calculated (dBA)		Noise Limits (dBA)			
	*Lmax	Leq	Day	Evening		
			Lmax	Leq	Lmax	Leq
Dozer	69	65	N/A	N/A	N/A	N/A
Dozer	69	65	N/A	N/A	N/A	N/A
Dozer	69	65	N/A	N/A	N/A	N/A
Tractor	71	67	N/A	N/A	N/A	N/A
Front End Loader	66	62	N/A	N/A	N/A	N/A
Backhoe	65	61	N/A	N/A	N/A	N/A
Tractor	71	67	N/A	N/A	N/A	N/A
Total	71	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: 5/20/2021

Case Description: Florence Avenue Townhomes - Site Preparation

---- Receptor #3 ----

Description	Land Use	Baselines (dBA)	
		Daytime	Evening
Nearest Church to East	Commercial	67.6	67.6

Equipment

Description	Impact Device	Usage(%)	Spec Lmax (dBA)	Actual Lmax (dBA)	Receptor Distance (feet)	Estimated Shielding (dBA)
Dozer	No	40		81.7	250	0
Dozer	No	40		81.7	250	0
Dozer	No	40		81.7	250	0
Tractor	No	40	84		250	0
Front End Loader	No	40		79.1	250	0
Backhoe	No	40		77.6	250	0
Tractor	No	40	84		250	0

Results

Equipment	Calculated (dBA)		Noise Limits (dBA)			
	*Lmax	Leq	Day Lmax	Leq	Evening	
					Lmax	Leq
Dozer	67.7	63.7	N/A	N/A	N/A	N/A
Dozer	67.7	63.7	N/A	N/A	N/A	N/A
Dozer	67.7	63.7	N/A	N/A	N/A	N/A
Tractor	70.0	66.0	N/A	N/A	N/A	N/A
Front End Loader	65.1	61.2	N/A	N/A	N/A	N/A
Backhoe	63.6	59.6	N/A	N/A	N/A	N/A
Tractor	70.0	66.0	N/A	N/A	N/A	N/A
Total	70	72	N/A	N/A	N/A	N/A

*Calculated Lmax is the Loudest value.

Roadway Construction Noise Model (RCNM), Version 1.1

Report date: 5/20/2021
Case Description: Florence Avenue Townhomes - Grading

---- Receptor #1 ----

Description	Land Use	Baselines (dBA)	
		Daytime	Evening
Nearest Homes to West	Residential	55.3	55.3

Description	Impact Device	Usage(%)	Equipment		Receptor Distance (feet)	Estimated Shielding (dBA)
			Spec Lmax (dBA)	Actual Lmax (dBA)		
Excavator	No	40		80.7	160	0
Grader	No	40	85		160	0
Dozer	No	40		81.7	160	0
Dozer	No	40		81.7	160	0
Dozer	No	40		81.7	160	0
Dozer	No	40		81.7	160	0

Equipment	Calculated (dBA)		Results			
	*Lmax	Leq	Day		Noise Limits (dBA) Evening	
			Lmax	Leq	Lmax	Leq
Excavator	70.6	66.6	N/A	N/A	N/A	N/A
Grader	74.9	70.9	N/A	N/A	N/A	N/A
Dozer	71.6	67.6	N/A	N/A	N/A	N/A
Dozer	71.6	67.6	N/A	N/A	N/A	N/A
Dozer	71.6	67.6	N/A	N/A	N/A	N/A
Dozer	71.6	67.6	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: 5/20/2021
Case Description: Florence Avenue Townhomes - Grading

---- Receptor #2 ----

Description	Land Use	Baselines (dBA)	
		Daytime	Evening
Nearest Homes to East	Residential	55.3	55.3

Description	Impact Device	Usage(%)	Equipment		Receptor Distance (feet)	Estimated Shielding (dBA)
			Spec Lmax (dBA)	Actual Lmax (dBA)		
Excavator	No	40		80.7	225	0
Grader	No	40	85		225	0
Dozer	No	40		81.7	225	0
Dozer	No	40		81.7	225	0
Dozer	No	40		81.7	225	0
Dozer	No	40.0		81.7	225	0

Equipment	Calculated (dBA)		Results		Noise Limits (dBA)	
	*Lmax	Leq	Day Lmax	Leq	Evening Lmax	Leq
Excavator	67.6	63.7	N/A	N/A	N/A	N/A
Grader	71.9	68.0	N/A	N/A	N/A	N/A
Dozer	68.6	64.6	N/A	N/A	N/A	N/A
Dozer	68.6	64.6	N/A	N/A	N/A	N/A
Dozer	68.6	64.6	N/A	N/A	N/A	N/A
Dozer	68.6	64.6	N/A	N/A	N/A	N/A
Total	72	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: 5/20/2021
Case Description: Florence Avenue Townhomes - Grading

---- Receptor #3 ----

Description	Land Use	Baselines (dBA)	
		Daytime	Evening
Nearest Church to East	Commercial	67.6	67.6

Equipment

Description	Impact Device	Usage(%)	Spec	Actual	Receptor	Estimated
			Lmax (dBA)	Lmax (dBA)	Distance (feet)	Shielding (dBA)
Excavator	No	40	85	80.7	250	0
Grader	No	40		250	0	
Dozer	No	40		81.7	250	0
Dozer	No	40		81.7	250	0
Dozer	No	40		81.7	250	0
Dozer	No	40		81.7	250	0

Results

Equipment	Calculated (dBA)		Day Lmax	Noise Limits (dBA)		
	*Lmax	Leq		Leq	Evening Lmax	Leq
Excavator	66.7	62.8	N/A	N/A	N/A	N/A
Grader	71.0	67.0	N/A	N/A	N/A	N/A
Dozer	67.7	63.7	N/A	N/A	N/A	N/A
Dozer	67.7	63.7	N/A	N/A	N/A	N/A
Dozer	67.7	63.7	N/A	N/A	N/A	N/A
Dozer	67.7	63.7	N/A	N/A	N/A	N/A
Total	71	72	N/A	N/A	N/A	N/A

*Calculated Lmax is the Loudest value.

Roadway Construction Noise Model (RCNM), Version 1.1

Report date: 5/20/2021
Case Description: Florence Avenue Townhomes - Building Construction

---- Receptor #1 ----

		Baselines (dBA)		
Description	Land Use	Daytime	Evening	Night
Nearest Homes to West	Residential	55.3	55.3	55.3

Description	Impact Device	Usage(%)	Equipment		Receptor Distance (feet)	Estimated Shielding (dBA)
			Spec Lmax (dBA)	Actual Lmax (dBA)		
Crane	No	16		80.6	160	0
Gradall	No	40		83.4	160	0
Gradall	No	40		83.4	160	0
Gradall	No	40		83.4	160	0
Generator	No	50		80.6	160	0
Tractor	No	40	84		160	0
Front End Loader	No	40		79.1	160	0
Backhoe	No	40		77.6	160	0
Welder / Torch	No	40		74	160	0

Equipment	Calculated (dBA)		Results			
	*Lmax	Leq	Day		Evening	
			Lmax	Leq	Lmax	Leq
Crane	70.4	62.5	N/A	N/A	N/A	N/A
Gradall	73.3	69.3	N/A	N/A	N/A	N/A
Gradall	73.3	69.3	N/A	N/A	N/A	N/A
Gradall	73.3	69.3	N/A	N/A	N/A	N/A
Generator	70.5	67.5	N/A	N/A	N/A	N/A
Tractor	73.9	69.9	N/A	N/A	N/A	N/A
Front End Loader	69.0	65.0	N/A	N/A	N/A	N/A
Backhoe	67.5	63.5	N/A	N/A	N/A	N/A
Welder / Torch	63.9	59.9	N/A	N/A	N/A	N/A
Total	74	77	N/A	N/A	N/A	N/A

*Calculated Lmax is the Loudest value.

Roadway Construction Noise Model (RCNM), Version 1.1

Report date: 5/20/2021
Case Description: Florence Avenue Townhomes - Building Construction

---- Receptor #2 ----

Description	Land Use	Baselines (dBA)		
		Daytime	Evening	Night
Nearest Homes to East	Residential	55.3	55.3	55.3

Description	Impact Device	Usage(%)	Equipment		Receptor Distance (feet)	Estimated Shielding (dBA)
			Spec Lmax (dBA)	Actual Lmax (dBA)		
Crane	No	16		80.6	225	0
Gradall	No	40		83.4	225	0
Gradall	No	40		83.4	225	0
Gradall	No	40		83.4	225	0
Generator	No	50		80.6	225	0
Tractor	No	40	84		225	0
Front End Loader	No	40		79.1	225	0
Backhoe	No	40		77.6	225	0
Welder / Torch	No	40		74	225	0

Equipment	Calculated (dBA)		Results			
	*Lmax	Leq	Day		Evening	
			Lmax	Leq	Lmax	Leq
Crane	67.5	59.5	N/A	N/A	N/A	N/A
Gradall	70.3	66.4	N/A	N/A	N/A	N/A
Gradall	70.3	66.4	N/A	N/A	N/A	N/A
Gradall	70.3	66.4	N/A	N/A	N/A	N/A
Generator	67.6	64.6	N/A	N/A	N/A	N/A
Tractor	70.9	67.0	N/A	N/A	N/A	N/A
Front End Loader	66.0	62.1	N/A	N/A	N/A	N/A
Backhoe	64.5	60.5	N/A	N/A	N/A	N/A
Welder / Torch	60.9	57.0	N/A	N/A	N/A	N/A
Total	71	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: 5/20/2021
Case Description: Florence Avenue Townhomes - Building Construction

---- Receptor #3 ----

Description	Land Use	Baselines (dBA)		
		Daytime	Evening	Night
Nearest Church to East	Commercial	67.6	67.6	67.6

Description	Impact Device	Usage(%)	Equipment		Receptor Distance (feet)	Estimated Shielding (dBA)
			Spec Lmax (dBA)	Actual Lmax (dBA)		
Crane	No	16		80.6	250	0
Gradall	No	40		83.4	250	0
Gradall	No	40		83.4	250	0
Gradall	No	40		83.4	250	0
Generator	No	50		80.6	250	0
Tractor	No	40	84		250	0
Front End Loader	No	40		79.1	250	0
Backhoe	No	40		77.6	250	0
Welder / Torch	No	40		74	250	0

Equipment	Calculated (dBA)		Results			
	*Lmax	Leq	Noise Limits (dBA)		Evening Lmax	Leq
			Day Lmax	Leq		
Crane	66.6	58.6	N/A	N/A	N/A	N/A
Gradall	69.4	65.4	N/A	N/A	N/A	N/A
Gradall	69.4	65.4	N/A	N/A	N/A	N/A
Gradall	69.4	65.4	N/A	N/A	N/A	N/A
Generator	66.7	63.6	N/A	N/A	N/A	N/A
Tractor	70.0	66.0	N/A	N/A	N/A	N/A
Front End Loader	65.1	61.2	N/A	N/A	N/A	N/A
Backhoe	63.6	59.6	N/A	N/A	N/A	N/A
Welder / Torch	60.0	56.0	N/A	N/A	N/A	N/A
Total	70	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: 5/20/2021
Case Description: Florence Avenue Townhomes - Paving

---- Receptor #1 ----

Description	Land Use	Baselines (dBA)		
		Daytime	Evening	Night
Nearest Homes to West	Residential	55.3	55.3	55.3

Description	Impact Device	Usage(%)	Equipment		Receptor Distance (feet)	Estimated Shielding (dBA)
			Spec Lmax (dBA)	Actual Lmax (dBA)		
Concrete Mixer Truck	No	40		78.8	160	0
Concrete Mixer Truck	No	40		78.8	160	0
Paver	No	50		77.2	160	0
Paver	No	50		77.2	160	0
Paver	No	50		77.2	160	0
Roller	No	20		80	160	0
Roller	No	20		80	160	0
Tractor	No	40		84	160	0

Results

Equipment	Calculated (dBA)		Noise Limits (dBA)			
	*Lmax	Leq	Day		Evening	
			Lmax	Leq	Lmax	Leq
Concrete Mixer Truck	68.7	64.7	N/A	N/A	N/A	N/A
Concrete Mixer Truck	68.7	64.7	N/A	N/A	N/A	N/A
Paver	67.1	64.1	N/A	N/A	N/A	N/A
Paver	67.1	64.1	N/A	N/A	N/A	N/A
Paver	67.1	64.1	N/A	N/A	N/A	N/A
Roller	69.9	62.9	N/A	N/A	N/A	N/A
Roller	69.9	62.9	N/A	N/A	N/A	N/A
Tractor	73.9	69.9	N/A	N/A	N/A	N/A
Total	74	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: 5/20/2021
Case Description: Florence Avenue Townhomes - Paving

---- Receptor #2 ----

Description	Land Use	Baselines (dBA)		Night
		Daytime	Evening	
Nearest Homes to East	Residential	55.3	55.3	55.3

Description	Impact Device	Usage(%)	Equipment Spec	Actual	Receptor Distance	Estimated Shielding
			Lmax (dBA)	Lmax (dBA)	(feet)	(dBA)
Concrete Mixer Truck	No	40		78.8	225	0
Concrete Mixer Truck	No	40		78.8	225	0
Paver	No	50		77.2	225	0
Paver	No	50		77.2	225	0
Paver	No	50		77.2	225	0
Roller	No	20		80	225	0
Roller	No	20		80	225	0
Tractor	No	40.0	84		225	0

Equipment	Calculated (dBA)		Results			
			Day		Evening	
	*Lmax	Leq	Lmax	Leq	Lmax	Leq
Concrete Mixer Truck	65.7	61.8	N/A	N/A	N/A	N/A
Concrete Mixer Truck	65.7	61.8	N/A	N/A	N/A	N/A
Paver	64.2	61.1	N/A	N/A	N/A	N/A
Paver	64.2	61.1	N/A	N/A	N/A	N/A
Paver	64.2	61.1	N/A	N/A	N/A	N/A
Roller	66.9	59.9	N/A	N/A	N/A	N/A
Roller	66.9	59.9	N/A	N/A	N/A	N/A
Tractor	70.9	67.0	N/A	N/A	N/A	N/A
Total	71	71	N/A	N/A	N/A	N/A

*Calculated Lmax is the Loudest value.

Roadway Construction Noise Model (RCNM), Version 1.1

Report date: 5/20/2021
Case Description: Florence Avenue Townhomes - Paving

---- Receptor #3 ----

Description	Land Use	Baselines (dBA)		Night
		Daytime	Evening	
Nearest Church to East	Commercial	67.6	67.6	67.6

Description	Impact Device	Usage(%)	Equipment Spec	Actual	Receptor	Estimated
			Lmax (dBA)	Lmax (dBA)	Distance (feet)	Shielding (dBA)
Concrete Mixer Truck	No	40		78.8	250	0
Concrete Mixer Truck	No	40		78.8	250	0
Paver	No	50		77.2	250	0
Paver	No	50		77.2	250	0
Paver	No	50		77.2	250	0
Roller	No	20		80	250	0
Roller	No	20		80	250	0
Tractor	No	40	84		250	0

Equipment	Calculated (dBA)		Results			
	*Lmax	Leq	Day		Evening	
			Lmax	Leq	Lmax	Leq
Concrete Mixer Truck	64.8	60.8	N/A	N/A	N/A	N/A
Concrete Mixer Truck	64.8	60.8	N/A	N/A	N/A	N/A
Paver	63.2	60.2	N/A	N/A	N/A	N/A
Paver	63.2	60.2	N/A	N/A	N/A	N/A
Paver	63.2	60.2	N/A	N/A	N/A	N/A
Roller	66.0	59.0	N/A	N/A	N/A	N/A
Roller	66.0	59.0	N/A	N/A	N/A	N/A
Tractor	70.0	66.0	N/A	N/A	N/A	N/A
Total	70	71	N/A	N/A	N/A	N/A

*Calculated Lmax is the Loudest value.

Roadway Construction Noise Model (RCNM), Version 1.1

Report date: 5/20/2021
Case Description: Florence Avenue Townhomes - Painting

---- Receptor #1 ----

Description	Land Use	Baselines (dBA)		Night			
		Daytime	Evening		Equipment Spec Lmax (dBA)	Actual Lmax (dBA)	Receptor Distance (feet)
Nearest Homes to West	Residential	55.3	55.3	55.3			
		Impact Device	Usage(%)				Estimated Shielding (dBA)
Compressor (air)		No	40			77.7	160
		Calculated (dBA)		Results			
				Noise Limits (dBA)			
				Day	Evening		
		*Lmax	Leq	Lmax	Leq	Lmax	Leq
Compressor (air)		67.6	63.6	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)		Night			
		Daytime	Evening		Equipment Spec Lmax (dBA)	Actual Lmax (dBA)	Receptor Distance (feet)
Nearest Homes to East	Residential	55.3	55.3	55.3			
		Impact Device	Usage(%)				Estimated Shielding (dBA)
Compressor (air)		No	40			77.7	225
		Calculated (dBA)		Results			
				Noise Limits (dBA)			
				Day	Evening		
		*Lmax	Leq	Lmax	Leq	Lmax	Leq
Compressor (air)		64.6	60.6	N/A	N/A	N/A	N/A
Total		65	61	N/A	N/A	N/A	N/A

*Calculated Lmax is the Loudest value.

Roadway Construction Noise Model (RCNM), Version 1.1

Report date: 5/20/2021
Case Description: Florence Avenue Townhomes - Painting

---- Receptor #3 ----

Description	Land Use	Baselines (dBA)		
		Daytime	Evening	Night
Nearest Church to East	Commercial	67.6	67.6	67.6

Description	Impact Device	Usage(%)	Equipment Spec	Actual	Receptor	Estimated
			Lmax (dBA)	Lmax (dBA)	Distance (feet)	Shielding (dBA)
Compressor (air)	No	40		77.7	250	0

Equipment		Calculated (dBA)		Results			
		*Lmax	Leq	Day		Noise Limits (dBA) Evening	
				Lmax	Leq	Lmax	Leq
Compressor (air)		63.7	59.7	N/A	N/A	N/A	N/A
	Total	64	60	N/A	N/A	N/A	N/A

*Calculated Lmax is the Loudest value.

APPENDIX D

FHWA Model Traffic Noise Calculation Printouts

Scenario: EXISTING CONDITIONS

Vehicle Mix 2 (Arterial)

Road Name:	Florence Avenue	Segment:	West of Pioneer Boulevard
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NOISE PARAMETERS AT 70 FEET FROM CENTERLINE		(Equiv. Lane Dist: 62.76 ft)	Centerline Distance to
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Road Name:	Florence Avenue	Segment:	Noise Measurement Site A
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NOISE PARAMETERS AT 100 FEET FROM CENTERLINE		(Equiv. Lane Dist: 95.07 ft)	Centerline Distance to
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Vehicle Type	Noise Adjustments			Unmitigated Noise Levels							Noise Contour (in feet)	
	REMEL Traffic Adj.	Dist Adj.	Finite Adj	Leq Peak	Leq Day	Leq Eve.	Leq Night	Ldn	CNEL	Ldn	CNEL	
Automobiles	65.11	-0.97	-4.29	-1.20	58.65	56.53	55.21	49.20	57.62	58.25	70 dBA: 15	
Medium Trucks	74.83	-18.21	-4.29	-1.20	51.13	29.88	35.90	17.61	30.75	33.50	65 dBA: 32	
Heavy Trucks	80.05	-22.16	-4.29	-1.20	52.39	27.04	23.64	28.29	34.49	34.59	60 dBA: 70	
	Total:				60.15	56.54	55.27	49.24	57.65	58.28	55 dBA: 150	

Project: Florence Ave Townhomes
Site Conditions: Soft

Average Daily Traffic: 10093 Vehicles		Vehicle Speed: 35 MPH			Vehicle Mix: 2			Roadway Classification: Major 6-Lane						
		NOISE PARAMETERS AT 70 FEET FROM CENTERLINE (Equiv. Lane Dist: 62.76 ft)						Centerline Distance to						
		Noise Adjustments			Unmitigated Noise Levels									
		REME L	Traffic Adj.	Dist Adj.	Finite Adj.	Leq Peak	Leq Day	Leq Eve.	Leq Night	Ldn	CNEL	Noise Contour (in feet)		
Vehicle Type														
Automobiles		65.11	-1.07	-1.58	-1.20	61.26	58.89	57.59	51.54	59.97	60.60	70 dBA:	18	19
Medium Trucks		74.83	-15.93	-1.58	-1.20	56.11	36.90	29.12	38.33	44.48	44.52	65 dBA:	38	41
Heavy Trucks		80.05	-13.72	-1.58	-1.20	63.55	46.56	38.77	47.98	54.14	54.17	60 dBA:	83	89
		Total:				66.03	59.16	57.66	53.27	61.07	61.58	55 dBA:	178	192

APPENDIX E

Proposed Townhomes Exterior to Interior Attenuation Calculations

Interior Noise Calculations With 26 STC Windows

Project Name: Florence Ave Townhomes Plan: 1 Floor: 1 Room: Den

Room Absorption

Type of Surface	Area (Sq ft)	125	250	500	1000	2000	4000	125	250	500	1000	2000	4000
Floor - Carpet*	188	0.1	0.4	0.62	0.7	0.63	0.88	18.75	75	116.25	131.25	118.13	165
Floor - Linoleum	0	0.02	0.03	0.03	0.03	0.03	0.02	0	0	0	0	0	0
Ceiling - Gypsum Board	188	0.29	0.1	0.05	0.04	0.07	0.09	54.375	18.75	9.375	7.5	13.125	16.875
Wall - Gypsum board	403	0.29	0.1	0.05	0.04	0.07	0.09	116.73	40.25	20.125	16.1	28.175	36.225
Total	778							189.85	134	145.75	154.85	159.43	218.1
10*log(S/A) S=Exterior wall area, A= Sound Absorption													
Sound Source Adjustment Factor													
Correction Factor for A-Weighted Sound Levels													
A-Weighted Sound Absorption Level													
dBA Noise Absorption Level													
2.2													

Exterior-Interior Transmission Calculations

Type of Surface	Area (Sq ft)	STC	Fractional Area Rating (Area/10^(STC/10))
Stucco Wall	208	46	0.0052
Window	40	26	0.1005
Door	20	26	0.049
Total	267		0.0006
Transmission Loss		32.4	
		26 STC = Standard dual pane windows	

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

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

Interior Noise Calculations With 26 STC Windows

Project Name: Florence Ave Townhomes Plan: 1 Floor: 2 Room: Living Room/Kitchen

Room Absorption

Type of Surface	Area (Sq ft)	125	250	500	1000	2000	4000	125	250	500	1000	2000	4000
Floor - Carpet*	265	0.1	0.4	0.62	0.7	0.63	0.88	26.518	106.07	164.41	185.63	167.06	233.36
Floor - Linoleum	109	0.02	0.03	0.03	0.03	0.03	0.02	2.1825	3.2738	3.2738	3.2738	3.2738	2.1825
Ceiling - Gypsum Board	374	0.29	0.1	0.05	0.04	0.07	0.09	108.55	37.431	18.715	14.972	26.201	33.687
Wall - Gypsum board	649	0.29	0.1	0.05	0.04	0.07	0.09	188.21	64.9	32.45	25.96	45.43	58.41
Total	1398							325.46	211.68	218.85	229.83	241.97	327.64
10*log(S/A) S=Exterior wall area, A= Sound Absorption													
Sound Source Adjustment Factor													
Correction Factor for A-Weighted Sound Levels													
A-Weighted Sound Absorption Level													
dBA Noise Absorption Level													
3.6													

Exterior-Interior Transmission Calculations

Type of Surface	Area (Sq ft)	STC	Fractional Area Rating (Area/10^(STC/10))
Stucco Wall	466	46	0.0117
Window	44	26	0.1105
Door	39	26	0.098
Total	549		
Transmission Loss		26 STC = Standard dual pane windows	
		34.0	

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

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

Interior Noise Calculations With 26 STC Windows

Project Name: Florence Ave Townhomes Plan: 1 Floor: 3 Room: Master Bedroom

Room Absorption

Type of Surface	Area (Sq ft)	125	250	500	1000	2000	4000	125	250	500	1000	2000	4000
Floor - Carpet*	156	0.1	0.4	0.62	0.7	0.63	0.88	15.621	62.483	96.849	109.35	98.411	137.46
Floor - Linoleum	0	0.02	0.03	0.03	0.03	0.03	0.02	0	0	0	0	0	0
Ceiling - Gypsum Board	156	0.29	0.1	0.05	0.04	0.07	0.09	45.3	15.621	7.8104	6.2483	10.935	14.059
Wall - Gypsum board	385	0.29	0.1	0.05	0.04	0.07	0.09	111.65	38.5	19.25	15.4	26.95	34.65
Total	697							172.57	116.6	123.91	130.99	136.3	186.17
10*log(S/A) S=Exterior wall area, A= Sound Absorption													
Sound Source Adjustment Factor													
Correction Factor for A-Weighted Sound Levels													
A-Weighted Sound Absorption Level													
dBA Noise Absorption Level													
2.2													

Exterior-Interior Transmission Calculations

Type of Surface	Area (Sq ft)	STC	Fractional Area Rating (Area/10^(STC/10))
Stucco Wall	195	46	0.0049
Window	30	26	0.0754
Door	0	26	0
Total	225		0.0004
Transmission Loss		26 STC = Standard dual pane windows	
		34.5	

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

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

Interior Noise Calculations With 26 STC Windows

Project Name: Florence Ave Townhomes Plan: 1 Floor: 3 Room: Bedroom 2

Room Absorption

Type of Surface	Area (Sq ft)	125	250	500	1000	2000	4000	125	250	500	1000	2000	4000
Floor - Carpet*	169	0.1	0.4	0.62	0.7	0.63	0.88	16.875	67.5	104.63	118.13	106.31	148.5
Floor - Linoleum	0	0.02	0.03	0.03	0.03	0.03	0.02	0	0	0	0	0	0
Ceiling - Gypsum Board	169	0.29	0.1	0.05	0.04	0.07	0.09	48.938	16.875	8.4375	6.75	11.813	15.188
Wall - Gypsum board	393	0.29	0.1	0.05	0.04	0.07	0.09	113.97	39.3	19.65	15.72	27.51	35.37
Total	731							179.78	123.68	132.71	140.6	145.64	199.06
10*log(S/A) S=Exterior wall area, A= Sound Absorption													
Sound Source Adjustment Factor													
Correction Factor for A-Weighted Sound Levels													
A-Weighted Sound Absorption Level													
dBA Noise Absorption Level													
2.1													

Exterior-Interior Transmission Calculations

Type of Surface	Area (Sq ft)	STC	Fractional Area Rating (Area/10^(STC/10))
Stucco Wall	194	46	0.0049
Window	40	26	0.1005
Door	0	26	0
Total	234		0.0005
Transmission Loss		26 STC = Standard dual pane windows	
		33.5	

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

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

APPENDIX F

Train Noise Calculation Printouts

Train Noise Calculations - At Proposed Project

Reference Train				At Receiver	
Train Noise at:	Distance	Noise Leq	Distance	Noise Leq	
Common Recreation Area	110	73.3	220	67.3 (eq. N-2141.2 of TeNS)	1 (Line Source: hard=0, soft= 5; Point Source: hard=1, soft=1.5)
Lot 3 Balcony	110	73.3	240	66.5	
Lot 8 Balcony	110	73.3	150	70.6	
Lot 18 Balcony	110	73.3	235	66.7	
Lot 29 Balcony	110	73.3	330	63.8	
Lot 10 Façade	110	73.3	100	74.1	29.1
Lot 11 Façade	110	73.3	145	70.9	

Stationary Noise Sources	Distance from Receptor to Wall	Distance from source to Wall	Without Wall Noise		With Wall Noise		Exterior Observer Height (feet)	Source Height (feet)	Source Frequency (hz)	Left-Right Adjustment	barrier to receiver - b (all)	path difference		line of sight (slope)	Barrier Atten
			Height of Wall (feet)	Level at Property	Level at Property	Property						source to barrier - a	source to receiver - c		
Common Recreatic	10	210	6	66	61	61	16	5	800	-1.249387	10.05	210.24	220.27	1	0.04
Lot 3 Balcony	10	240	13.5	65	61	61	16	13	800	-1.249387	10.01	240.01	250.02	-1	-0.02
Lot 8 Balcony	10	150	13.5	69	65	65	16	13	800	-1.249387	10.01	150.02	160.03	-1	-0.01
Lot 18 Balcony	10	235	13.5	65	61	61	16	13	800	-1.249387	10.01	235.01	245.02	-1	-0.02
Lot 29 Balcony	10	330	13.5	63	58	58	16	13	800	-1.249387	10.01	330.01	340.01	-1	-0.02

* Balcony Wall height 3.5 feet plus 10 feet of elevation for second floor location.