FLORENCE AVENUE CAR WASH NOISE IMPACT ANALYSIS

City of Huntington Park

October 13, 2021

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Traffic Engineering ● Transportation Planning ● Parking ● Noise & Vibration
Air Quality ● Global Climate Change ● Health Risk Assessment

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City of Huntington Park

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Project No. 19278

TABLE OF CONTENTS

LIST OF TABLES

LIST OF FIGURES

EXECUTIVE SUMMARY

The purpose of this report is to provide an assessment of the noise impacts associated with development and operation of the proposed Florence Avenue Car Wash project and to identify mitigation measures that may be necessary to reduce those impacts. The noise issues related to the proposed land use and development have been evaluated in light of applicable federal, state and local policies, including those of the City of Huntington Park.

Although this is a technical report, effort has been made to write the report clearly and concisely. A list of acronyms and glossary are provided in Appendix A and Appendix B of this report to assist the reader with technical terms related to noise analysis.

PROJECT LOCATION

The proposed project is located at 3100 East Florence Avenue in the City of Huntington Park, California. The project site is currently developed with a medical office building.

PROJECT DESCRIPTION

The proposed project involves redevelopment of the site with a proposed automatic car wash. Vehicular access is proposed at Florence Avenue.

PROJECT IMPACTS

Construction Impacts

Modeled unmitigated construction noise levels when combined with existing measured noise levels reached up to 67.7 dBA L_{eq} at the nearest residential property line to the northwest, 80.1 dBA L_{eq} at the nearest church/school property line to the northwest, 75.9 dBA L_{eq} at the nearest commercial property line to the north, 69.1 dBA L_{eq} at the nearest residential property line to the northeast, 75.6 dBA L_{eq} at the nearest commercial property line to the east, 84.7 dBA L_{eq} at the nearest residential property line to the south, and 80.9 dBA L_{eq} at the nearest commercial property line to the west of the project site.

Construction noise sources are regulated within Section 9-3.506 of the City's Municipal Code which prohibits construction activities between the hours of 7:00 PM and 7:00 AM on weekdays, including Saturdays, or at any time on Sundays or Federal holidays.

The City of Huntington Park has not adopted a numerical threshold that identifies what a substantial increase would be. For purposes of this analysis, the Federal Transit Administration (FTA) Transit Noise and Vibration Impact Assessment (2006) criteria will be used to establish significance thresholds. For residential uses, the daytime noise threshold is 80 dBA L_{eq} averaged over an 8-hour period ($L_{eq\ (8\text{-}hr)}$; and the nighttime noise threshold is 70 dBA $L_{eq\ (8\text{-}hr)}$. For commercial uses, the daytime and nighttime noise threshold is 85 dBA $L_{eq\ (8\text{-}hr)}$. In compliance with the City's Code, it is assumed that construction would not occur during the noise-sensitive nighttime hours.

Therefore, unmitigated project construction would be anticipated to exceed the FTA thresholds at the residential uses located to the south of the project site and mitigation is required. With incorporation of mufflers and/or enclosures or acoustical tents (as appropriate) that provide at least 10 dB of noise reduction, modeled mitigated construction noise levels when combined with existing measured noise levels would not be anticipated to exceed the FTA residential thresholds. Further, with compliance with the City's Code, it is assumed that construction would not occur during the noise-sensitive nighttime hours.

Therefore, with adherence to applicable Municipal Ordinances and incorporation of mitigation measures identified in Section 7 of this report, construction noise impacts would be less than significant.

Noise Impacts to Off-Site Receptors Due to Project Generated Trips

The largest peak hour traffic volume associated with the proposed project would occur during the late afternoon/early evening and would generate approximately 134 vehicle trips. Assuming that the vehicle mix associated with the proposed project is 97 percent automobiles, 2 percent medium trucks and 1 percent heavy trucks, and a speed of 35 miles per hour, noise levels associated with peak hour project generated vehicle traffic would reach up to 47 dBA L_{eq} at a distance of 50 feet. The quietest measured hour in the project vicinity was 58.1 dBA L_{eq} and occurred between 2:00 and 3:00 AM. The increase in ambient noise levels associated with project peak hour operation would not be readily noticeable over existing ambient noise levels. This impact would be less than significant. No mitigation is required.

Noise Impacts to Off-Site Receptors Due to On-Site Operational Noise

The SoundPLAN noise model was utilized to estimate project peak hour operational noise at noise measurement locations and at adjacent properties in order to determine if it is likely to exceed the City's noise thresholds at sensitive receptors. In summary, daytime (7:00 AM to 10:00 PM) operation of the proposed project would not violate City noise standards or result in substantial increases in measured ambient noise levels. Nighttime (10:00 PM and 7:00 AM) operation of the project would likely violate City noise standards at residential land uses located south of the project site and result in substantial increases in ambient noise levels. Implementation of a mitigation measure limiting project operational hours to 7:00 AM and 10:00 PM will reduce potential impacts to a level below significant.

Groundborne Vibration Impacts

Use of either a vibratory roller or a bulldozer would clearly be highly annoying to nearby sensitive receptors. Annoyance is expected to be short-term, occurring only during site grading and preparation. Use of vibratory roller equipment within 19 feet of the eastern and western property lines and 16 feet of the southern property line and bulldozers within 12 feet of the eastern and western property lines and 7 feet of the southern property line where adjacent residential and commercial structures are located could result in architectural damage. Mitigation measures to reduce potential impacts to nearby structures have been provided. Therefore, with incorporation of mitigation, impacts associated with construction activities would be less than significant.

CONSTRUCTION NOISE REDUCTION MEASURES

In addition to adherence to the City of Huntington Park Municipal Code which limits the construction hours of operation, the following measures are recommended to reduce construction noise and vibrations, emanating from the proposed project:

1. During all project construction phases on-site, construction contractors shall equip all construction equipment, fixed or mobile, with either properly operating and maintained mufflers or enclosures/acoustical tents (as appropriate) that achieve at least 10 dB reduction from noise level specifications presented in this report.

2. The contractor shall place all stationary construction equipment so that emitted noise is directed away from the noise sensitive receptors nearest the project site.

3. Equipment shall be shut off and not left to idle when not in use.

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

5. Jackhammers, pneumatic equipment and all other portable stationary noise sources shall be shielded and noise shall be directed away from sensitive receptors.

6. The project proponent shall mandate that the construction contractor prohibit the use of music or sound amplification on the project site during construction.

7. The construction contractor shall limit haul truck deliveries to the same hours specified for construction equipment.

8. Care should be used when using vibratory rollers and/or any other equivalent vibratory equipment within 19 feet of the eastern and western property lines and 16 feet of the southern property line and bulldozers within 12 feet of the eastern and western property lines and 7 feet of the southern property line where adjacent residential and commercial structures are located.

OPERATIONAL NOISE REDUCTION MEASURES

1. Operation of the proposed car wash shall be limited to the hours between 7:00 AM and 10:00 PM.

1. INTRODUCTION

This section describes the purpose of this noise impact analysis, project location, proposed development, and study area. Figure 1 shows the project location map and Figure 2 illustrates the project site plan.

PURPOSE AND OBJECTIVES

The purpose of this report is to provide an assessment of the noise impacts resulting from development of the proposed Florence Avenue Car Wash project and to identify mitigation measures that may be necessary to reduce those impacts. The noise issues related to the proposed land use and development have been evaluated in light of applicable federal, state and local policies, including those of the City of Huntington Park.

Although this is a technical report, effort has been made to write the report clearly and concisely. A list of acronyms and glossary are provided in Appendix A and Appendix B of this report to assist the reader with technical terms related to noise analysis.

PROJECT LOCATION

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PROJECT DESCRIPTION

The proposed project involves redevelopment of the site with a proposed automatic car wash. Vehicular access is proposed at Florence Avenue. Figure 2 illustrates the project site plan.

Figure 1
Project Location Map

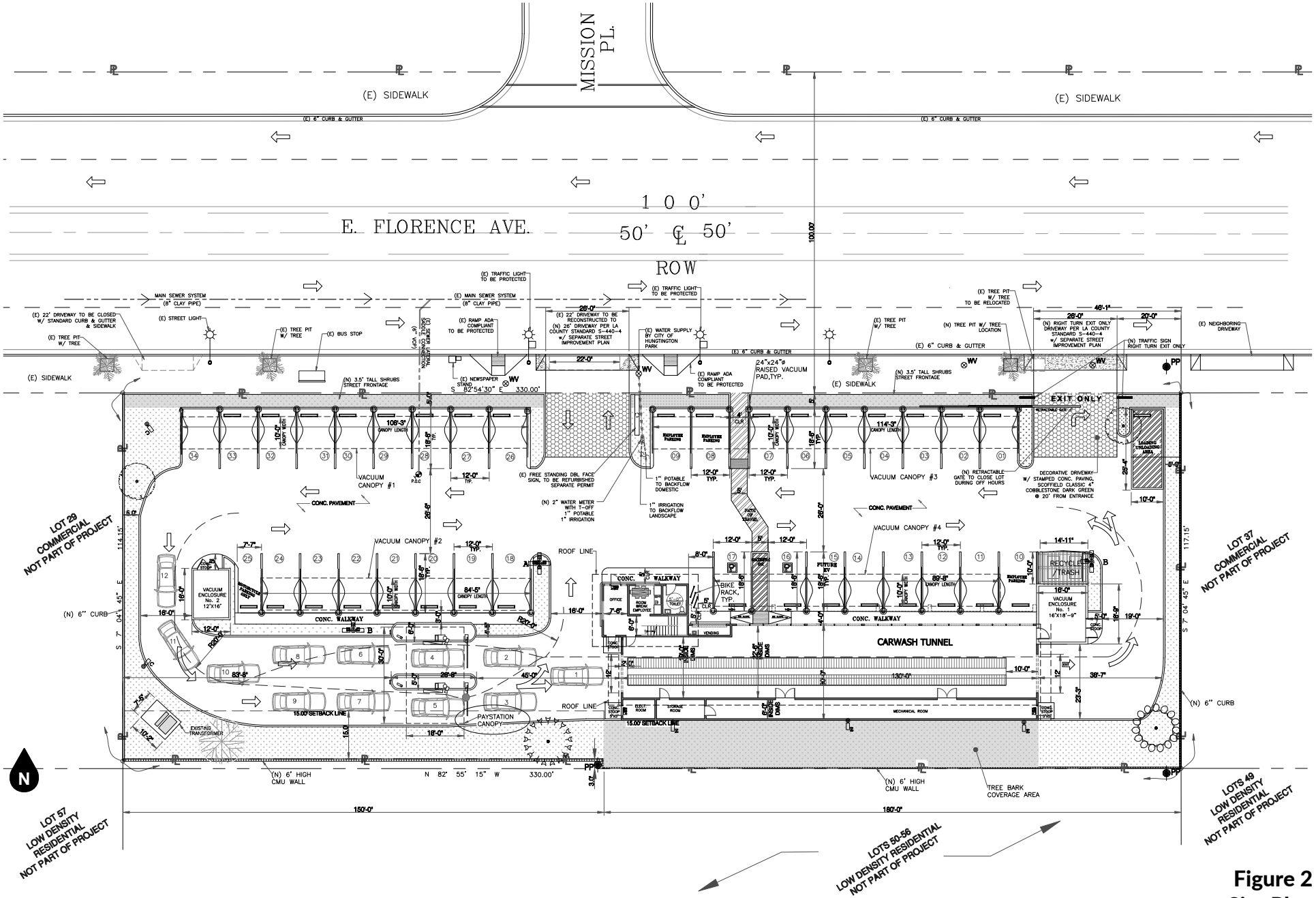


Figure 2
Site Plan

2. NOISE AND VIBRATION FUNDAMENTALS

NOISE FUNDAMENTALS

Sound is a pressure wave created by a moving or vibrating source that travels through an elastic medium such as air. Noise is defined as unwanted or objectionable sound. The effects of noise on people can include general annoyance, interference with speech communication, sleep disturbance, and in extreme circumstances, hearing impairment.

Commonly used noise terms are presented in Appendix B. The unit of measurement used to describe a noise level is the decibel (dB). The human ear is not equally sensitive to all frequencies within the sound spectrum. Therefore, the "A-weighted" noise scale, which weights the frequencies to which humans are sensitive, is used for measurements. Noise levels using A-weighted measurements are written dB(A) or dBA.

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, radiates uniformly outward as it travels away from the source in a spherical pattern. The noise drop-off rate associated with this geometric spreading is 6 dBA per each doubling of the distance (dBA/DD). Transportation noise sources such as roadways are typically analyzed as line sources, since at any given moment the receiver may be impacted by noise from multiple vehicles at various locations along the roadway. Because of the geometry of a line source, the noise drop-off rate associated with the geometric spreading of a line source is 3 dBA/DD.

Decibels are measured on a logarithmic scale, which quantifies sound intensity in a manner similar to the Richter scale used for earthquake magnitudes. Thus, a doubling of the energy of a noise source, such as a doubled traffic volume, would increase the noise levels by 3 dBA; halving of the energy would result in a 3 dBA decrease. Figure 3 shows the relationship of various noise levels to commonly experienced noise events.

Average noise levels over a period of minutes or hours are usually expressed as dBA L_{eq}, or the equivalent noise level for that period of time. For example, $L_{eq(3\text{-}hr)}$ would represent a 3-hour average. When no period is specified, a one-hour average is assumed.

Noise standards for land use compatibility are stated in terms of the Community Noise Equivalent Level (CNEL) and the Day-Night Average Noise Level (DNL). CNEL is a 24-hour weighted average measure of community noise. CNEL is obtained by adding five decibels to sound levels in the evening (7:00 PM to 10:00 PM), and by adding ten decibels to sound levels at night (10:00 PM to 7:00 AM). This weighting accounts for the increased human sensitivity to noise during the evening and nighttime hours. DNL is a very similar 24-hour average measure that weights only the nighttime hours.

It is widely accepted that the average healthy ear can barely perceive changes of 3 dBA; that a change of 5 dBA is readily perceptible, and that an increase (decrease) of 10 dBA sounds twice (half) as loud. This definition is recommended by the California Department of Transportation's Technical Noise Supplement to the Traffic Noise Analysis Protocol (2013).

VIBRATION FUNDAMENTALS

The way in which vibration is transmitted through the earth is called propagation. Propagation of earthborn vibrations is complicated and difficult to predict because of the endless variations in the soil through which waves travel. There are three main types of vibration propagation: surface, compression and shear waves. Surface waves, or Raleigh 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.

Compression waves, or P-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. Shear waves, or S-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 energy is spread over an ever-increasing area such that the energy level striking a given point is reduced with the distance from the energy source. This geometric spreading loss is inversely proportional to the square of the distance. Wave energy is also reduced with distance as a result of material damping in the form of internal friction, soil layering, and void spaces. The amount of attenuation provided by material damping varies with soil type and condition as well as the frequency of the wave.

Vibration amplitudes are usually expressed as either peak particle velocity (PPV) or the root mean square (RMS) velocity. The PPV is defined as the maximum instantaneous peak of the vibration signal in inches per second. The RMS of a signal is the average of the squared amplitude of the signal in vibration decibels (VdB), ref one micro-inch per second. The Federal Railroad Administration uses the abbreviation "VdB" for vibration decibels to reduce the potential for confusion with sound decibel.

PPV is appropriate for evaluating the potential of building damage and VdB is commonly used to evaluate human response. Decibel notation acts to compress the range of numbers required in measuring vibration. Similar to the noise descriptors, L_{eq} and L_{max} can be used to describe the average vibration and the maximum vibration level observed during a single vibration measurement interval. Figure 4 illustrates common vibration sources and the human and structural responses to ground-borne vibration. As shown in the figure, the threshold of perception for human response is approximately 65 VdB; however, human response to vibration is not usually substantial unless the vibration exceeds 70 VdB. Vibration tolerance limits for sensitive instruments such as magnetic resonance imaging (MRI) or electron microscopes could be much lower than the human vibration perception threshold.

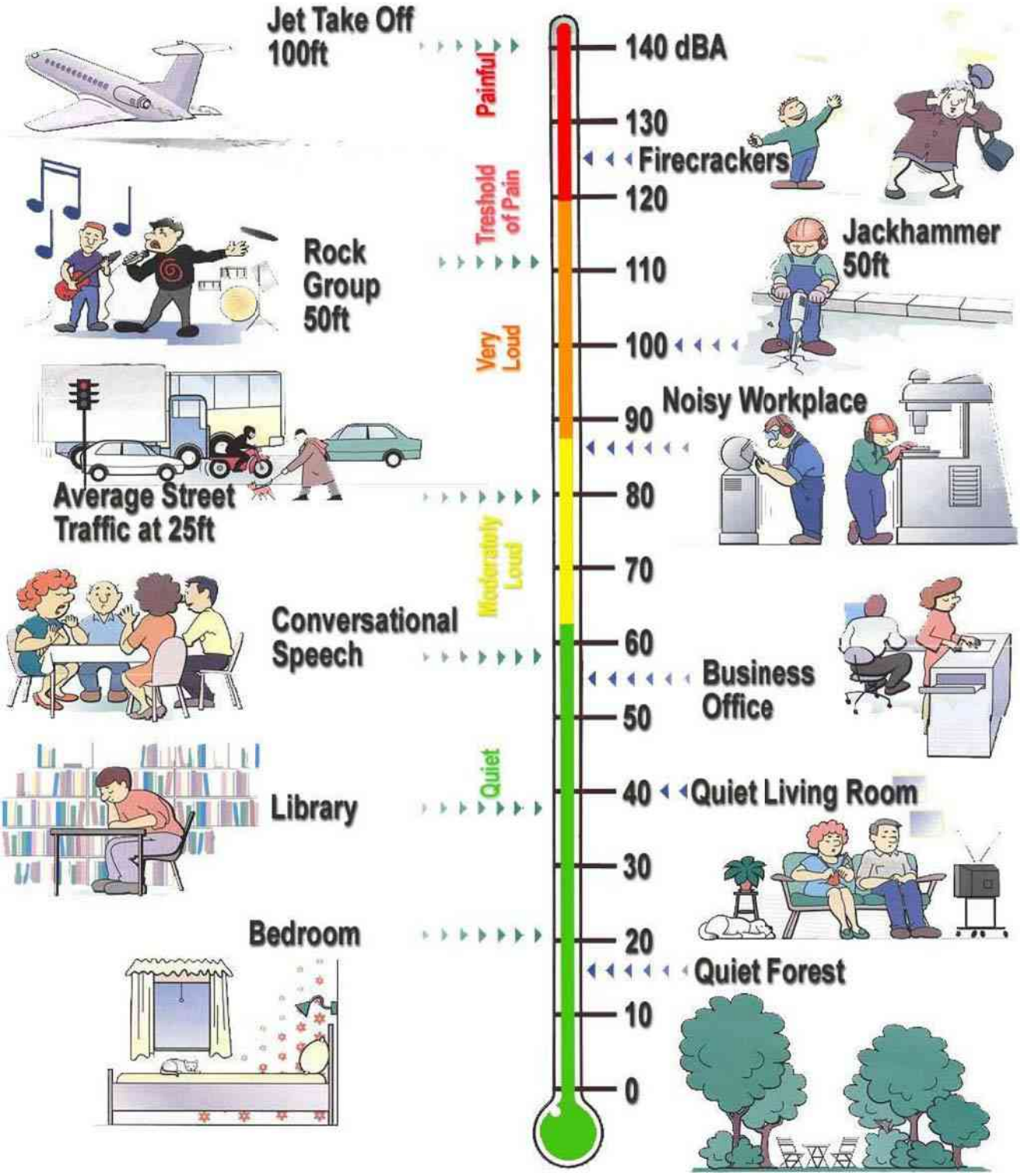
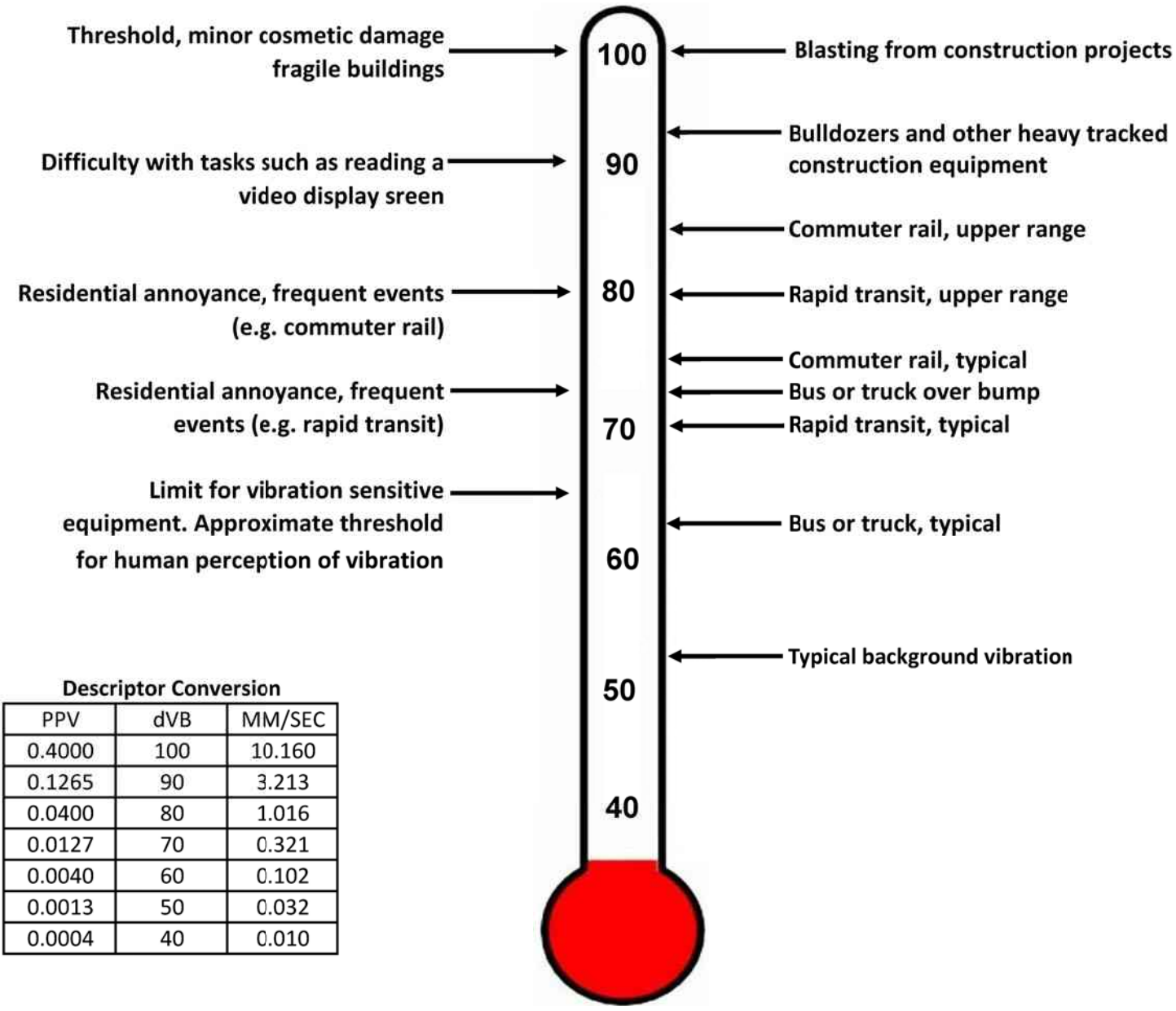


Figure 3
Weighted Sound Levels and Human Response

Source: Bruel & Kjaer 2001



Descriptor Conversion

PPV	dVB	MM/SEC
0.4000	100	10.160
0.1265	90	3.213
0.0400	80	1.016
0.0127	70	0.321
0.0040	60	0.102
0.0013	50	0.032
0.0004	40	0.010

Source: FRA, 2012. Federal Railroad Administration High-Speed Ground Transportation Noise and Vibration Impact Assessment. Office of Railroad Policy Development, Washington, D.C. DOT/FRA/ORD-12/15. September.

Figure 4
Typical Levels of Groundborne Vibration

3. EXISTING NOISE ENVIRONMENT

EXISTING LAND USES AND SENSITIVE RECEPTORS

The project site is bordered by Florence Avenue to the north, commercial uses to the east and west, and residential uses to the south.

The State of California defines sensitive receptors as those land uses that require serenity or are otherwise adversely affected by noise events or conditions. Schools, libraries, churches, hospitals, single and multiple-family residential, including transient lodging, motels and hotel uses make up the majority of these areas. Furthermore, the City of Huntington Park 2030 General Plan considers hospitals and convalescent homes, churches, libraries, schools, and child care facilities to be noise sensitive uses and more specifically identifies the City's schools, Huntington Park Convalescent Hospital, the library, parks, and residential areas as the noise sensitive uses within the City.

Sensitive land uses that may be affected by project noise include the existing single-family detached residential dwelling units located adjacent to the south of the project site and approximately 235 feet northeast of the project site. In addition, St Mathias Catholic Church and St Mathias School are located as close as approximately 100 feet to the north of the project site.

AMBIENT NOISE MEASUREMENTS

An American National Standards Institute (ANSI Section SI4 2013 Class 1) Larson Davis model LxT sound level meter was used to document existing ambient noise levels. In order to document existing ambient noise levels in the project area, five (5) 15-minute daytime noise measurements were taken between 2:16 PM and 4:38 PM on August 3, 2020. In addition, one (1) long-term 24-hour noise measurement was also taken from August 3, 2020 to August 4, 2020. Field worksheets and noise measurement output data are included in Appendix C.

As shown on Figure 5, the noise measurements were taken at the south of the project site near the single-family residential uses located adjacent to the south of the project site (STNM1), near the residential dwelling units to the northeast of the project site (along Benson Street) (STNM2), near the church use to the north of the project site (along Florence Avenue) (STNM3), near the single-family residential dwelling units located to the northeast of the project site (along Cedar Street) (STNM4), near the single-family residential uses located adjacent to the south of the project site (along Walnut Street), and at the south of the project site near the single-family residential uses located adjacent to the south of the project site (LTNM1). Table 1 provides a summary of the short-term ambient noise data. Table 2 provides hourly interval ambient noise data from the long-term noise measurement. Short-term ambient noise levels were measured between 58.5 and 76.9 dBA L_{eq}. Long-term hourly noise measurement ambient noise levels ranged from 51.8 to 61.8 dBA L_{eq}. The dominant noise sources were from vehicles traveling along Florence Avenue, Benson Street, Cedar Street, Walnut Street, and other surrounding roadways as well as ambulance sirens.

Table 1
Short-Term Noise Measurement Summary (dBA)

Daytime Measurements[1,2]								
Site Location	Time Started	Leq	Lmax	Lmin	L(2)	L(8)	L(25)	L(50)
STNM1	2:16 PM	60.6	74.3	48.5	67.0	64.2	61.5	59.0
STNM2	2:47 PM	62.1	82.2	50.5	68.5	64.6	61.6	58.7
STNM3	3:15 PM	76.9	101.1	56.5	79.7	76.9	74.6	71.3
STNM4	3:39 PM	61.0	75.8	51.2	69.4	65.4	60.1	57.2
STNM5	4:23 PM	58.5	73.2	43.8	66.9	63.8	58.1	52.5

Notes:
(1) See Figure 5 for noise measurement locations. Each noise measurement was performed over a 15-minute duration.
(2) Noise measurements performed on August 3, 2020.

Table 2
Long-Term Noise Measurement Summary (dBA)

24-Hour Ambient Noise[1,2]								
Hourly Measurements	Time Started	Leq	Lmax	Lmin	L(2)	L(8)	L(25)	L(50)
Overall Summary	7:00 PM	59.0	89.4	37.6	64.8	62.0	59.2	56.0
1	7:00 PM	59.2	71.7	44.5	64.9	62.7	60.5	58.2
2	8:00 PM	61.8	85.7	46.9	68.3	63.2	60.8	58.5
3	9:00 PM	61.8	89.4	44.7	66.6	62.9	60.1	57.2
4	10:00 PM	60.3	84.8	43.6	65.9	62.4	59.2	55.9
5	11:00 PM	57.1	73.4	41.6	63.7	60.9	57.9	53.7
6	12:00 AM	54.7	69.2	40.6	62.2	59.6	55.8	50.7
7	1:00 AM	53.6	74.4	38.8	60.7	57.8	53.5	49.6
8	2:00 AM	51.8	69.8	37.9	59.7	56.8	51.6	47.2
9	3:00 AM	52.9	65.8	37.9	61.3	58.0	53.4	47.2
10	4:00 AM	55.2	67.4	37.6	62.4	60.2	56.5	50.9
11	5:00 AM	57.7	69.7	39.9	64.3	62.1	59.1	55.1
12	6:00 AM	58.5	70.5	39.7	64.4	62.9	60.2	56.3
13	7:00 AM	59.5	77.1	41.8	65.4	63.3	60.8	57.7
14	8:00 AM	59.5	71.2	40.4	64.6	62.9	60.9	58.6
15	9:00 AM	58.4	73.9	42.8	64.0	61.9	59.8	57.3
16	10:00 AM	60.3	82.5	43.9	64.9	62.2	59.8	57.3
17	11:00 AM	59.1	81.6	43.6	65.0	61.6	59.2	56.9
18	12:00 PM	61.2	85.2	42.6	67.5	62.6	58.9	56.7
19	1:00 PM	57.4	73.0	41.6	63.6	60.9	58.3	55.9
20	2:00 PM	60.0	82.7	43.6	66.0	61.5	58.9	56.8
21	3:00 PM	61.1	85.6	44.4	64.9	61.4	59.4	57.3
22	4:00 PM	59.8	80.6	44.6	66.1	62.5	59.7	57.4
23	5:00 PM	59.4	78.6	46.2	64.8	61.8	59.4	57.6
24	6:00 PM	59.6	74.6	45.5	65.7	62.6	60.4	58.2

Notes:

(1) See Figure 5 for noise measurement locations. Noise measurement was performed over a 24-hour duration.

(2) Noise measurement performed from August 3, 2020 to August 4, 2020.

Legend

⊕ NM 1	Noise Measurement Location
ST NM	Short-Term Noise Measurement
LT NM	Long-Term Noise Measurement
##	Leq Noise Level

Figure 5
Noise Measurement Location Map

4. REGULATORY SETTING

FEDERAL REGULATION

Federal Noise Control Act of 1972

The U.S. Environmental Protection Agency (EPA) Office of Noise Abatement and Control was originally established to coordinate federal noise control activities. After its inception, EPA's Office of Noise Abatement and Control issued the Federal Noise Control Act of 1972, establishing programs and guidelines to identify and address the effects of noise on public health, welfare, and the environment. In response, the EPA published Information on Levels of Environmental Noise Requisite to Protect Public Health and Welfare with an Adequate Margin of Safety (Levels of Environmental Noise). The Levels of Environmental Noise recommended that the Ldn should not exceed 55 dBA outdoors or 45 dBA indoors to prevent significant activity interference and annoyance in noise-sensitive areas.

In addition, the Levels of Environmental Noise identified five (5) dBA as an "adequate margin of safety" for a noise level increase relative to a baseline noise exposure level of 55 dBA Ldn (i.e., there would not be a noticeable increase in adverse community reaction with an increase of five dBA or less from this baseline level). The EPA did not promote these findings as universal standards or regulatory goals with mandatory applicability to all communities, but rather as advisory exposure levels below which there would be no risk to a community from any health or welfare effect of noise.

In 1981, EPA administrators determined that subjective issues such as noise would be better addressed at lower levels of government. Consequently, in 1982 responsibilities for regulating noise control policies were transferred to State and local governments. However, noise control guidelines and regulations contained in EPA rulings in prior years remain in place by designated Federal agencies, allowing more individualized control for specific issues by designated Federal, State, and local government agencies.

STATE REGULATIONS

State of California General Plan Guidelines 2017

Though not adopted by law, the State of California General Plan Guidelines 2017, published by the California Governor's Office of Planning and Research (OPR) (OPR Guidelines), provides guidance for the compatibility of projects within areas of specific noise exposure. The OPR Guidelines identify the suitability of various types of construction relative to a range of outdoor noise levels and provide each local community some flexibility in setting local noise standards that allow for the variability in community preferences. Findings presented in the Levels of Environmental Noise Document (EPA 1974) influenced the recommendations of the OPR Guidelines, most importantly in the choice of noise exposure metrics (i.e., Ldn or CNEL) and in the upper limits for the normally acceptable outdoor exposure of noise-sensitive uses.

The OPR Guidelines include a Noise and Land Use Compatibility Matrix which identifies acceptable and unacceptable community noise exposure limits for various land use categories. Where the "normally acceptable" range is used, it is defined as the highest noise level that should be considered for the construction of the buildings which do not incorporate any special acoustical treatment or noise mitigation. The "conditionally acceptable" or "normally unacceptable" ranges include conditions calling for detailed acoustical study prior to the construction or operation of the proposed project. The City of Huntington Park has not adopted specific land use compatibility guidelines; therefore, for the purposes of this analysis, the State Land Use Compatibility Guidelines for land use planning has been used to assess potential transportation noise impacts to proposed land uses (see Table 3).

California Environmental Quality Act

The California Environmental Quality Act Guidelines (Appendix G) establishes thresholds for noise impact analysis. This noise study includes analysis of noise and vibration impacts necessary to assess the project in light of the following Appendix G Checklist Thresholds.

Would the project result in:

a) 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?

Substantial increases in ambient noise levels are usually associated with project construction noise (temporary) and project operational noise (permanent).

Project Construction Noise: Construction noise sources are regulated within the City of Huntington Park under Section 9-3.506 of the City's Municipal Code which prohibits construction activities between the hours of 7:00 PM and 7:00 AM on weekdays, including Saturdays, or at any time on Sundays or Federal holidays.

Although construction activity may be exempt from the noise standards in the City's Code, CEQA requires that potential noise impacts still be evaluated for significance.

The City of Huntington Park has not adopted a numerical threshold that identifies what a substantial increase would be. For purposes of this analysis, the Federal Transit Administration (FTA) Transit Noise and Vibration Impact Assessment (2018) criteria will be used to establish significance thresholds. The FTA provides reasonable criteria for assessing construction noise impacts based on the potential for adverse community reaction. For residential uses, the daytime noise threshold is 80 dBA L_{eq} averaged over an 8-hour period ($L_{eq\ (8\text{-}hr)}$; and the nighttime noise threshold is 70 dBA $L_{eq\ (8\text{-}hr)}$. For commercial uses, the daytime and nighttime noise threshold is 85 dBA $L_{eq\ (8\text{-}hr)}$. In compliance with the City's Code, it is assumed that construction would not occur during the noise-sensitive nighttime hours.

Project Operational Noise (permanent): The proposed project has the potential to generate on-site and off-site noise. For on-site generated noise, the City of Huntington Park has not identified noise level standards. For the purposes of this analysis, for stationary noise sources, an increase of 5 dB or greater than the ambient noise level will be considered to be substantial.

For off-site project generated noise, increases in ambient noise along affected roadways due to project generated vehicle traffic is considered substantial if they result in an increase of at least 5 dBA CNEL and: (1) the existing noise levels already exceed the applicable land use compatibility standard for the affected sensitive receptors set forth in the State Land Use Compatibility Guidelines; or (2) the project increases noise levels by at least 5 dBA CNEL and raises the ambient noise level from below the applicable standard to above the applicable standard.

b) Generate excessive groundborne vibration or groundborne noise levels?

As shown in Table 4, the threshold at which there is a risk to "architectural" damage to historic and some older buildings is a peak particle velocity (PPV) of 0.3, at older residential structures a PPV of 0.3, and at new residential structures a PPV of 0.5. Table 5 shows that a PPV of 0.04 is the threshold at which groundborne vibration becomes distinctly perceptible in regards to annoyance. Impacts would be significant if construction activities result in groundborne vibration of 0.25 PPV or higher at a sensitive receptor.

California Department of Transportation (Caltrans)

The California Department of Transportation has published one of the seminal works for the analysis of ground-borne noise and vibration relating to transportation- and construction-induced vibrations and although the project is not subject to these regulations, it serves as useful tools to evaluate vibration impacts. These guidelines recommend that a standard of 0.25 inches per second (in/sec) PPV not be exceeded for the protection of historic and some old buildings (California Department of Transportation, 2020).

LOCAL REGULATIONS

City of Huntington Park 2030 General Plan

The City of Huntington Park 2030 General Plan Health and Safety Element includes the following policies in regards to noise which apply to the proposed project.

Issue: Noise & Land Use

Policy 25: The City of Huntington Park shall ensure acceptable noise levels near schools, hospitals, convalescent homes, and other noise-sensitive areas.

Policy 27: The City of Huntington Park shall require noise-reduction techniques in site planning, architectural design, and construction where noise reduction is necessary.

Issue: Non-Transportation Control Measures

Policy 30: The City of Huntington Park shall reduce noise generated by building activities by requiring sound attenuation devices on construction equipment.

City of Huntington Park Municipal Code

Article 5 Noise Standards of the City's Municipal Code establishes noise standards in order to protect the health, safety, welfare and living/working environments of those living and working in the City. The City's Ordinance also refers to the noise compatibility criteria found in the City's General Plan Noise Element regarding the compatibility of specific categories of land uses and noise levels within the community. The purpose of the noise compatibility criteria is to identify potential conflicts between new development projects and the existing noise environment. The Noise Element should be consulted during the project formulation stage in order to determine the compatibility between the proposed land use, the proposed site and the surrounding neighborhood.

Section 9-3.504 Excessive noise prohibited.
It shall be unlawful for any person to willfully make or continue, or willfully cause to be made or continue, any loud, unnecessary or unusual noise that disturbs the peace or quiet of any neighborhood or constitutes a public nuisance.

9-3.505 Noise determination standards.
The standards which may be considered in determining whether a violation of the provisions of this Article exists shall include, but not be limited to, the following:

1. The loudness of the noise;
2. The purpose for which the noise is produced;
3. Whether the nature of the noise is usual/natural or unusual/unnatural;
4. The proximity of the noise to residential sleeping facilities;
5. The time of the day or night the noise occurs;
6. The duration of the noise and whether the noise is recurrent, intermittent or continuous; and

7. Whether the noise is produced by a residential or nonresidential activity.

Section 9-3.506 Exceptions to provisions.

Exemptions that apply to the proposed project are listed below.

1. Noise sources associated with construction, repair, remodeling or grading of any real property, provided the activities do not take place between the hours of 7:00 PM and 7:00 AM on weekdays, including Saturdays, or at any time on Sundays or Federal holidays;

2. Noise sources associated with the maintenance of real property, provided the activities do not take place between 8:00 PM and 7:00 AM on weekdays, including Saturdays, or earlier than 9:00 AM on Sundays and Federal holidays; and

3. Vehicle Repairs and Testing. No person shall cause or permit the repairing, rebuilding, modifying or testing of any motor vehicle, motorcycle or motorboat in a manner as to cause a noise disturbance between the hours of 8:00 p.m. and 7:00 a.m. within or adjacent to any residential area.

4. Parking and Landscape Areas. Parking and landscape area activities (i.e., mechanical sweeping, mechanical grass cutting and mechanical blowing) shall not impact residential uses. No parking area or landscape maintenance shall occur between the hours of 8:00 p.m. and 7:00 a.m. which would cause a noise disturbance to a residential area.

Section 9-3.507 Specific requirements.

Specific requirements that will apply to operation of the proposed project are listed below.

1. Radios, Television Sets and Similar Devices. Any noise level from the use or operation of any radio receiving set, musical instrument, phonograph, television set or other machine or device for the producing or reproducing of sound between 10:00 p.m. and 8:00 a.m., which exceeds the noise limit of sixty-five (65) dBA established by the General Plan at the property line shall be a violation of this chapter.

2. Loading and Unloading. No person shall cause the loading, unloading, opening, closing or other handling of boxes, crates, containers, building materials, garbage cans or similar objects between the hours of 8:00 PM and 7:00 AM in a manner which would cause a noise disturbance to a residential area.

3. Vehicle Repairs and Testing. No person shall cause or permit the repairing, rebuilding, modifying or testing of any motor vehicle, motorcycle or motorboat in a manner as to cause a noise disturbance between the hours of 8:00 p.m. and 7:00 a.m. within or adjacent to any residential area.

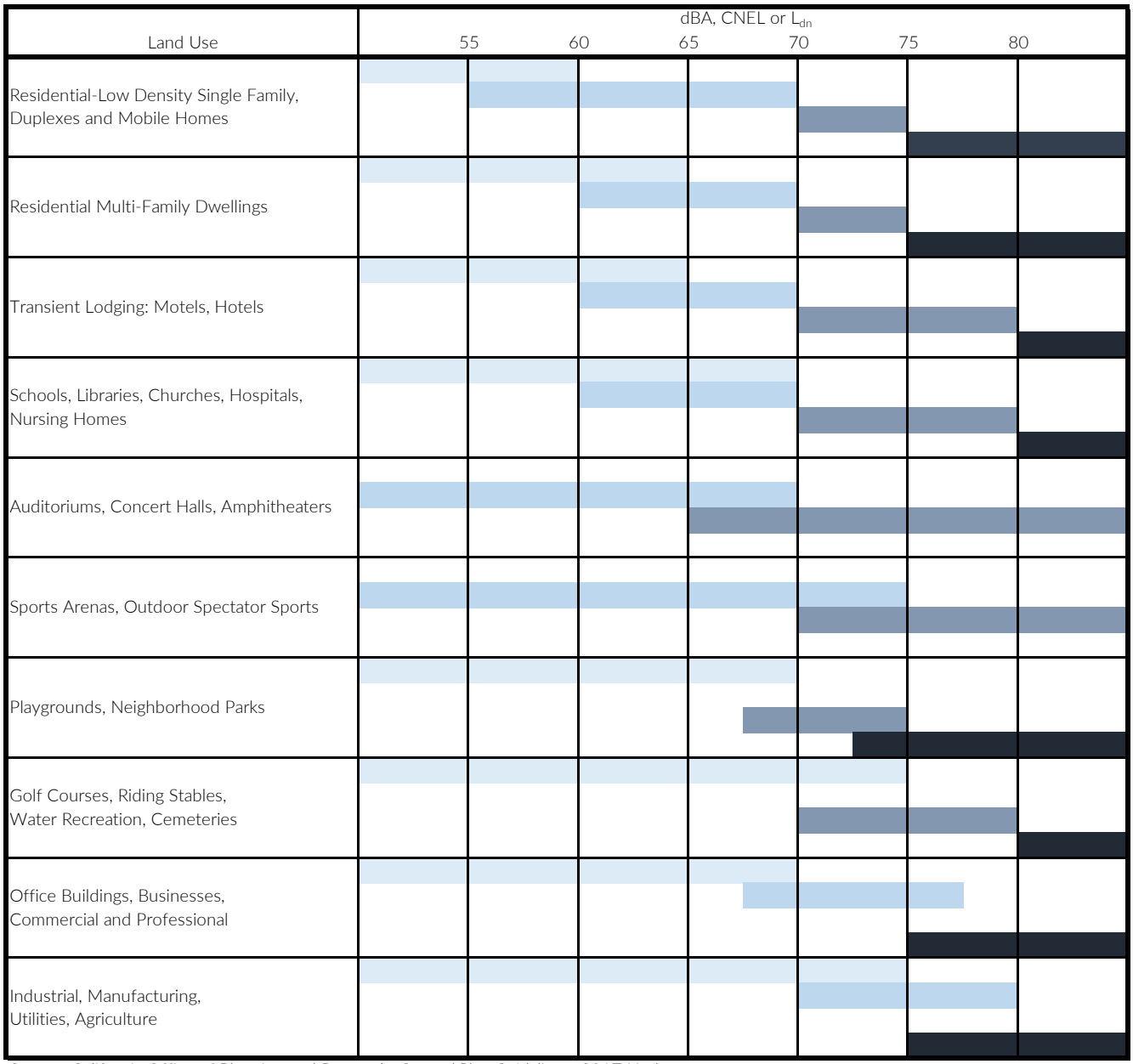
4. Parking and Landscape Areas. Parking and landscape area activities (i.e., mechanical sweeping, mechanical grass cutting and mechanical blowing) shall not impact residential uses. No parking area or landscape maintenance shall occur between the hours of 8:00 p.m. and 7:00 a.m. which would cause a noise disturbance to a residential area.

Section 9-4.203 Zoning District Development Standards.

Noise from one land use crossing the property line of an adjacent property, are regulated by Section 9-4.203 Zoning District Development Standards of the Municipal Code. The applicable standards depend on the type of land use and the duration of sound event during any particular hour. These standards are presented in

Table 6. Per Municipal Code Section 9-4.203, if the ambient sound levels within the nearby occupiable areas exceed the applicable standards for the cumulative period specified, the applicable standards for that period shall be the ambient sound level. In summary, the measured ambient sound level shall be the applicable standard. The adjusted thresholds per measured ambient noise levels are presented in Table 7.

Table 3
Land Use Compatibility for Community Noise Exposure



Source: California Office of Planning and Research, *General Plan Guidelines* , 2017 Update.

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

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

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

Clearly Unacceptable: New construction or development should generally not be undertaken. Construction costs to make the indoor environment acceptable would be prohibitive and the outdoor environment would not be usable.

Table 4
Guideline Vibration Damage Potential Threshold Criteria

Structure Condition	Maximum PPV (in/sec)	
	Transient Sources	Continuous/Frequent Intermittent Sources
Extremely fragile historic buildings, ruins, anceint monuments	0.12	0.08
Fragile buildings	0.2	0.1
Historic and some old buildings	0.5	0.25
Older residential structures	0.5	0.3
New residential structures	1.0	0.5
Modern industrial/commercial buildings	2.0	0.5

Notes:

Source: California Department of Transportation. Transportation and Construction Vibration Guidance Manual, Chapter 7 Table 19, April 2020.

(1) Transient sources create a single isolated vibration event, such as blasting or drop balls. Continuous/frequent intermittent sources include impact pile drivers, pogo-stick compactors, crack-and-seat equipment, vibratory pile drivers, and vibratory compaction equipment.

Table 5
Guideline Vibration Annoyance Potential Criteria

Human Response	Maximum PPV (in/sec)	
	Transient Sources	Continuous/Frequent Intermittent Sources
Barely perceptible	0.04	0.01
Distinctly perceptible	0.25	0.04
Strongly perceptible	0.9	0.10
Severe	2.0	0.4

Notes:

Source: California Department of Transportation. Transportation and Construction Vibration Guidance Manual, Chapter 7 Table 20, April 2020.

(1) Transient sources create a single isolated vibration event, such as blasting or drop balls. Continuous/frequent intermittent sources include impact pile drivers, pogo-stick compactors, crack-and-seat equipment, vibratory pile drivers, and vibratory compaction equipment.

Table 6
City of Huntington Beach Stationary Noise Standards

Nature or Character of Intrusive Noise	Commercial Areas, dB(A)	Residential Areas, dB(A)
Cumulative period of 30 minutes in any hour	45	40
Cumulative period of 15 minutes in any hour	50	50
Cumulative period of 5 minutes in any hour	55	50
Cumulative period of 1 minute in any hour	60	55
Anytime	65	60

Source: City of Huntington Park Municipal Ordinance 9-4.203.

Note: If the ambient sound level within the adjacent area exceeds the applicable standards for the cumulative period specified in subsection (2) of this subsection, the applicable standards for that period shall be the ambient sound level.

Table 7
Adjusted City of Huntington Beach Stationary Noise Standards

Nature or Character of Intrusive Noise	Commercial and Residential Areas, dB(A) Daytime				
	Measured Noise Levels R1	Measured Noise Levels R2	Measured Noise Levels R3	Measured Noise Levels R4	Measured Noise Levels R5
Cumulative period of 30 minutes in any hour	59.0	58.7	71.3	57.2	52.5
Cumulative period of 15 minutes in any hour	61.5	61.6	74.6	60.1	58.1
Cumulative period of 5 minutes in any hour	64.2	64.6	76.9	65.4	63.8
Cumulative period of 1 minute in any hour	67.0	68.5	79.7	69.4	66.9
Anytime	74.3	82.2	101.1	75.8	73.2

Nature or Character of Intrusive Noise	Commercial and Residential Areas, dB(A) Most Quiet Nighttime Measurement[1]
Cumulative period of 30 minutes in any hour	51.8
Cumulative period of 15 minutes in any hour	51.6
Cumulative period of 5 minutes in any hour	56.8
Cumulative period of 1 minute in any hour	59.7
Anytime	67.4

Notes:

(1) See Table 2.

5. ANALYTICAL METHODOLOGY AND MODEL PARAMETERS

This section discusses the analysis methodologies used to assess noise impacts.

CONSTRUCTION NOISE MODELING

Construction noise associated with the proposed project was calculated at the sensitive receptor locations, utilizing methodology presented in the Federal Transit Administration (FTA) Transit Noise and Vibration Impact Assessment Manual (2018) together with several key construction parameters including: distance to each sensitive receiver, equipment usage, percent usage factor, and baseline parameters for the project site. Distances to receptors were based on the acoustical center of the project site. The equipment list used to calculate the construction noise levels for each phase were based on assumptions provided in draft CalEEMod modeling data prepared for the project. For construction noise purposes, the distance measured from the project site to sensitive receptors was assumed to be the acoustical center of the project site to the property line of residential properties with existing residential buildings. Construction noise worksheets are provided in Appendix D.

FEDERAL HIGHWAY ADMINISTRATION (FHWA) TRAFFIC NOISE PREDICTION MODEL

Existing and Existing Plus project traffic noise levels were modeled for roadways affected by project generated traffic utilizing the FHWA Traffic Noise Prediction Model FHWA-RD-77-108 in order to quantify the proposed project's contribution to increases in ambient noise levels.

The FHWA Traffic Noise Prediction 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 REMEL to account for: total average daily traffic volumes, roadway classification, width, speed and truck mix, roadway grade and site conditions (hard or soft ground surface). Surfaces adjacent to all modeled roadways were assumed to have a "hard site" to predict worst-case, conservative noise levels. A hard site, such as pavement, is highly reflective and does not attenuate noise as quickly as grass or other soft sites. Possible reductions in noise levels due to intervening topography and buildings were not accounted for in this analysis.

Existing and Existing Plus Project vehicle mix were obtained from the project's traffic study (Ganddini Group 2020). Existing Plus Project vehicle mixes were calculated by adding the proposed project trips to existing conditions. FHWA spreadsheets are included in Appendix E.

SOUNDPLAN NOISE MODEL

The SoundPLAN acoustical modeling software was utilized to model project operational worst-case stationary noise impacts from the proposed project to adjacent sensitive uses (e.g., residences). SoundPLAN is capable of evaluating stationary noise sources (e.g., parking lots, drive-thru menus, car wash equipment, vacuums, etc.) as well as mobile noise sources (e.g. vehicle traffic and train noise). The SoundPLAN software utilizes algorithms (based on the inverse square law) to calculate noise level projections. The software allows the user to input specific noise sources, spectral content, sound barriers, building placement, topography, and sensitive receptor locations. In addition to the information provided below, noise modeling input and output assumptions are provided in Appendix F.

Peak hour operational noise levels were modeled utilizing representative sound levels in the SoundPLAN model. Modeled noise sources include car wash drying equipment, vacuum equipment, and HVAC equipment. All noise sources were modeled to be in full operation for an entire hour. This is a conservative modeling effort, given that in actuality, the noise sources are not in operation continuously for an entire hour.

Car Wash Drying Equipment Noise

The car wash drying system is by far the loudest noise source associated with the car wash tunnel. Sound specifications for an Aerodry drying system were utilized to model car wash tunnel noise. Specifically, a representative sound level of 75 dBA L_{eq}[1] at a distance of 20 feet, or a sound power level of 98.7 dBA L_{eq}. A point noise source was placed inside the car wash tunnel, 5 feet from the exit at a height of 8 feet to represent dryer noise. Sound specifications are provided in Appendix F.

Vacuum Equipment Noise

The project proposes installation and use two vacuum producers to be located within cinder block buildings with hoses extending to individual vacuum stations. Two Vacutech producers (FT-DD-T340HP4) will be enclosed in each cinder block building located near each end of the car wash. Representative sound level data show that each producer is expected to generate a sound level of 43 dBA at a distance of 3 feet of the concrete building that they will be enclosed within. Both producers working simultaneously are expected to generate a noise level of 46 dBA at a distance of 3 feet from each enclosure. The noise associated with the vacuum producers will not be noticeable over the existing noise environment or over the car wash drying system. For this reason, they are not included in the SoundPLAN modeling effort.

A distribution of hoses will extend to vacuum stations where a sound level of approximately 76.7 dBA will be emitted from each hose end (as measured at a distance of 3-feet) when in use based on representative sound level measurements[2]. A sound power level of 84.7 was utilized to mode sound associated with each of the proposed vacuum/blower hose ends proposed throughout the site.

Mechanical Equipment (HVAC Units) Noise

A noise reference level of 67.7 dBA at 3 feet (sound power level of 86.7 dB) was utilized to represent rooftop 5 Ton Carrier HVAC units[3]. A rooftop HVAC plan is not available at the time of this analysis so the exact location and number of units per building were estimated. A total of 2 rooftop units were modeled on the proposed rooftops. The noise source height for each HVAC unit was assumed at 1 meter above the roof top. Roof top is assumed to be approximately 6 meters (~18.3 feet) above grade.

[1] Representative Noise Measurements provided by D.L. Adams Associates, August 11, 2016.

[2] Noise Measurements taken at Fast Five Car Wash Murrieta. Kunzman Associates. November 7, 2017.

[3] MD Acoustics, LLC Noise Measurement Data for RTU –Carrier 50TFQ0006 and car alarm.

6. IMPACT ANALYSIS

This impact discussion analyzes the potential for noise and/or groundborne vibration impacts to cause the exposure of a person to, or generation of, noise levels in excess of established City of Huntington Park standards related to: construction, operation, and transportation noise related impacts to, or from, the proposed project.

IMPACTS RELATED TO CONSTRUCTION NOISE

The existing residential uses located to the south and northeast as well as the church/school uses to the north of the project site may be affected by short-term noise impacts associated with construction noise. Construction noise will vary depending on the construction process, type of equipment involved, location of the construction site with respect to sensitive receptors, the schedule proposed to carry out each task (e.g., hours and days of the week) and the duration of the construction work.

The construction phases for the proposed project are anticipated to include grading, building construction, paving and architectural coating. A summary of noise level data for a variety of construction equipment compiled by the U.S. Department of Transportation is presented in Table 8. Typical operating cycles for these types of construction equipment may involve one or two minutes of full power operation followed by three to four minutes at lower power settings.

Construction noise associated with the proposed project was calculated utilizing methodology presented in the Federal Transit Administration (FTA) Transit Noise and Vibration Impact Assessment Manual (2018) together with several key construction parameters including: distance to each sensitive receiver, equipment usage, percent usage factor, and baseline parameters for the project site. Distances to receptors were based on the acoustical center of the proposed construction activity. Construction noise levels were calculated for each phase. Anticipated noise levels during each construction phase are presented in Table 9. Worksheets for each phase are included as Appendix D.

A comparison of existing noise levels and existing plus project construction noise levels is also presented in Table 9. STNM4 was chosen to represent noise levels at the property lines of the single-family residential uses to the northwest of the project site, STNM3 was chosen to represent noise levels at the property line of the church and school use to the northwest of the project site, STNM2 was chosen to represent noise levels at the property line of the commercial use to the north of the project site, STNM2 was chosen to represent noise levels at the property lines of the single-family residential uses to the northeast of the project site, STNM1 was chosen to represent noise levels at the property lines of the commercial uses to the east and west of the project site, and STNM1 was chosen to represent noise levels at the property lines of the single-family residential uses to the south of the project site.

Modeled unmitigated construction noise levels when combined with existing measured noise levels reached up to 67.7 dBA L_{eq} at the nearest residential property line to the northwest, 80.1 dBA L_{eq} at the nearest church/school property line to the northwest, 75.9 dBA L_{eq} at the nearest commercial property line to the north, 69.1 dBA L_{eq} at the nearest residential property line to the northeast, 75.6 dBA L_{eq} at the nearest commercial property line to the east, 84.7 dBA L_{eq} at the nearest residential property line to the south, and 80.9 dBA L_{eq} at the nearest commercial property line to the west of the project site.

As discussed earlier, construction noise sources are regulated within Section 9-3.506 of the City of Huntington Park Municipal Code which prohibits construction activities between the hours of 7:00 PM and 7:00 AM on weekdays, including Saturdays, or at any time on Sundays or Federal holidays.

As stated previously, per FTA daytime construction noise levels should not exceed 80 dBA L_{eq} for an 8-hour period at residential uses and 85 dBA L_{eq} for an 8-hour period at commercial uses. Therefore, unmitigated project construction would be anticipated to exceed the FTA thresholds at the residential uses located to the south of the project site. Therefore, mitigation is required.

As shown in Table 9, with incorporation of mufflers and/or enclosures or acoustical tents (as appropriate) that provide at least 10 dB of noise reduction, modeled mitigated construction noise levels when combined with existing measured noise levels reach up to 62.3 dBA L_{eq} at the nearest residential property line to the northwest, 77.3 dBA L_{eq} at the nearest church/school property line to the northwest, 67.3 dBA L_{eq} at the nearest commercial property line to the north, 63.6 dBA L_{eq} at the nearest residential property line to the northeast, 66.7 dBA L_{eq} at the nearest commercial property line to the east, 74.9 dBA L_{eq} at the nearest residential property line to the south, and 71.3 dBA L_{eq} at the nearest commercial property line to the west of the project site.

Therefore, mitigated project construction noise levels would not be anticipated to exceed the FTA residential thresholds. Further, with compliance with the City's Code, it is assumed that construction would not occur during the noise-sensitive nighttime hours.

Therefore, with adherence to the above Municipal Ordinances and incorporation of mitigation measures identified in Section 7 of this report, construction noise impacts would be less than significant.

Noise Impacts to Off-Site Receptors Due to Project Generated Trips

The largest peak hour traffic volume associated with the proposed project would occur during the late afternoon/early evening and would generate approximately 134 vehicle trips. Assuming that the vehicle mix associated with the proposed project is 97 percent automobiles, 2 percent medium trucks and 1 percent heavy trucks, and a speed of 35 miles per hour, noise levels associated with peak hour project generated vehicle traffic would reach up to 47 dBA L_{eq} at a distance of 50 feet. The quietest measured hour in the project vicinity was 58.1 dBA L_{eq} and occurred between 2:00 and 3:00 AM. The increase in ambient noise levels associated with project peak hour operation would not be readily noticeable over existing ambient noise levels. This impact would be less than significant. No mitigation is required.

Noise Impacts to Off-Site Receptors Due to On-Site Operational Noise

As discussed previously, sensitive land uses that may be affected by project noise include the existing single-family detached residential dwelling units located adjacent to the south of the project site, approximately 235 feet northeast of the project site and the church uses located approximately 100 feet to the north of the project site. The City has established noise standards that apply to commercial land uses as well, so the adjacent land uses are also discussed below. For the purposes of this study, the residential noise standards were applied to the church located north of the project site and Florence Avenue.

The SoundPLAN noise model was utilized to estimate project peak hour operational noise at affected receptors in order to determine if it is likely to exceed the City's noise standards at nearby "occupiable areas" per Municipal Code Section 9-4.203 (See Table 6). Per Municipal Code if the ambient sound levels within the nearby occupiable areas exceed the applicable standards for the cumulative period specified in Table 6, the applicable standards for that period shall be the ambient sound level. In summary, the measured ambient sound level shall be the applicable standard. The adjusted thresholds per measured ambient noise levels are presented in Table 7.

Adjacent Commercial Properties

The adjacent commercial building east of the proposed project is occupied by commercial businesses and medical offices. Operational noise levels outside of this building at the project's eastern property line are expected to reach up to 65 dBA L_{eq} (see Figure 6). Representative measured daytime sound levels for this

location ranged between 52 and 62 dBA L_{eq}. Vehicle traffic noise associated with Florence Avenue is the dominant noise source. There are no outdoor use areas located in this area. The affected commercial building wall is constructed out concrete block and devoid of windows and doors. Interior noise levels are expected to reach up to 45 dBA L_{eq}. Although the proposed project would result in an increase in ambient noise levels and therefore exceed the adjusted noise standards presented in Table 7, this impact would be less than significant. No mitigation is required.

The adjacent commercial building west of the proposed project is also occupied by commercial businesses and medical offices. Operational noise levels outside of this building at the project's eastern property line are expected to reach up to 57 dBA L_{eq} (see Figure 6). The representative measured sound level for this location is 76.9 dBA L_{eq}. Vehicle traffic noise associated with Florence Avenue is the dominant noise source. Project generated noise at the commercial/medical building located just west of the proposed project would not exceed adjusted noise standards presented in Table 7. This impact would be less than significant. No mitigation is required. Further, there are no outdoor use areas at these locations and interior noise levels are expected to be approximately 20 dBA lower due to concrete building walls. This impact would be less than significant. No mitigation is required.

Further, a finding can be made that project generated on-site operational noise would not result in substantial increases in ambient noise levels at the adjacent commercial land uses. This impact is less than significant and no mitigation is required.

Church North of the Project Site

As shown on Figure 6, daytime peak hour project operational noise is expected to reach up to 55 dBA L_{eq} at the existing church located north of the project site and would not exceed the adjusted City's adjusted noise standards presented in Table 7. This impact would be less than significant. No mitigation is required for daytime (7:00 AM-10:00 PM) operation of the proposed project.

Operation of the proposed project would not result in substantial increases in ambient noise levels. No mitigation is required.

Residential Land Uses to the South

As shown on Figure 6, daytime peak hour project operational noise is expected to range between 48 and 59 dBA L_{eq} at existing single family residential land uses located south of the project site and would not exceed the adjusted City's adjusted noise standards presented in Table 7. This impact would be less than significant. No mitigation is required.

Nighttime operation of the proposed car wash however, is likely to exceed the adjusted City standards presented in Table 7 and result in a substantial increase in ambient noise levels at existing residential uses south of the project site. This impact would be significant. A mitigation measure limiting the hours of operation of the proposed car wash to between 7:00 AM and 10:00 PM would reduce potential impacts to less than significant.

In summary, daytime (7:00 AM to 10:00 PM) operation of the proposed project would not violate City noise standards or result in substantial increases in measured ambient noise levels. Nighttime (10:00 PM and 7:00 AM) operation of the project would likely violate City noise standards and result in substantial increases in ambient noise levels. Implementation of a mitigation measure limiting project operational hours to 7:00 AM and 10:00 PM will reduce potential impacts to a level below significant.

GROUNDBORNE VIBRATION IMPACTS

There are several types of construction equipment that can cause vibration levels high enough to annoy persons in the vicinity and/or result in architectural or structural damage to nearby structures and

improvements. For example, as shown in Table 10 a vibratory roller could generate up to 0.21 PPV at a distance of 25 feet; and operation of a large bulldozer (0.089 PPV) at a distance of 25 feet (two of the most vibratory pieces of construction equipment). Groundborne vibration at sensitive receptors associated with this equipment would drop off as the equipment moves away. For example, as the vibratory roller moves further than 100 feet from the sensitive receptors, the vibration associated with it would drop below 0.0026 PPV. It should be noted that these vibration levels are reference levels and may vary slightly depending upon soil type and specific usage of each piece of equipment.

Annoyance to Persons

The primary effect of perceptible vibration is often a concern. However, secondary effects, such as the rattling of a china cabinet, can also occur, even when vibration levels are well below perception. Any effect (primary perceptible vibration, secondary effects, or a combination of the two) can lead to annoyance. The degree to which a person is annoyed depends on the activity in which they are participating at the time of the disturbance. For example, someone sleeping or reading will be more sensitive than someone who is running on a treadmill. Reoccurring primary and secondary vibration effects often lead people to believe that the vibration is damaging their home, although vibration levels are well below minimum thresholds for damage potential. (California Department of Transportation, 2020)

As shown in Table 5 vibration becomes distinctly perceptible to people in buildings at a PPV of 0.04.

At approximately one foot, which is the distance to the closest off-site commercial buildings to both the east and the west, use of a vibratory roller would be expected to generate a PPV of 26.25 and a bulldozer would be expected to generate a PPV of 11.125.

At approximately five feet, which is the distance to the nearest residential buildings adjacent to the south of the project site, use of a vibratory roller would be expected to generate a PPV of 2.35 and a bulldozer would be expected to generate a PPV of 0.995.

Use of either a vibratory roller or a bulldozer would clearly be highly annoying to nearby sensitive receptors. Annoyance is expected to be short-term, occurring only during site grading and preparation. Mitigation measures to reduce potential impacts related to annoyance are presented in Section 7 of this report.

Architectural Damage

Vibration generated by construction activity generally has the potential to damage structures. This damage could be structural damage, such as cracking of floor slabs, foundations, columns, beams, or wells, or cosmetic architectural damage, such as cracked plaster, stucco, or tile. (California Department of Transportation, 2020)

Table 4 identifies a PPV level of 0.25 as the threshold at which there is a risk to "architectural" damage to historic and some older buildings and a PPV level of 0.3 for older residential structures. Use of vibratory roller equipment within 19 feet and bulldozer equipment within 12 feet of the eastern and western property lines could result in architectural damage. In addition, use of vibratory equipment with 16 feet and bulldozer equipment within 7 feet of the southern property line could result in architectural damage.

Mitigation measures to reduce potential impacts to residential dwelling units and commercial structures are presented in Section 7 of this report. Vibration worksheets are included in Appendix G.

Table 8 (1 of 2)
CA/T Equipment Noise Emissions and Acoustical Usage Factor Database

Equipment Description	Impact Device?	Acoustical Use Factor (%)	Spec. Lmax @ 50ft (dBA, slow)	Actual Measured Lmax @ 50ft (dBA, slow)	No. of Actual Data Samples (Count)
All Other Equipment > 5 HP	No	50	85	-N/A-	0
Auger Drill Rig	No	20	85	84	36
Backhoe	No	40	80	78	372
Bar Bender	No	20	80	-N/A-	0
Blasting	Yes	-N/A-	94	-N/A-	0
Boring Jack Power Unit	No	50	80	83	1
Chain Saw	No	20	85	84	46
Clam Shovel (dropping)	Yes	20	93	87	4
Compactor (ground)	No	20	80	83	57
Compressor (air)	No	40	80	78	18
Concrete Batch Plant	No	15	83	-N/A-	0
Concrete Mixer Truck	No	40	85	79	40
Concrete Pump Truck	No	20	82	81	30
Concrete Saw	No	20	90	90	55
Crane	No	16	85	81	405
Dozer	No	40	85	82	55
Drill Rig Truck	No	20	84	79	22
Drum Mixer	No	50	80	80	1
Dump Truck	No	40	84	76	31
Excavator	No	40	85	81	170
Flat Bed Truck	No	40	84	74	4
Forklift[2,3]	No	50	n/a	61	n/a
Front End Loader	No	40	80	79	96
Generator	No	50	82	81	19
Generator (<25KVA, VMS signs)	No	50	70	73	74
Gradall	No	40	85	83	70
Grader	No	40	85	-N/A-	0
Grapple (on backhoe)	No	40	85	87	1
Horizontal Boring Hydr. Jack	No	25	80	82	6
Hydra Break Ram	Yes	10	90	-N/A-	0
Impact Pile Driver	Yes	20	95	101	11
Jackhammer	Yes	20	85	89	133
Man Lift	No	20	85	75	23
Mounted Impact hammer (hoe ram)	Yes	20	90	90	212
Pavement Scarafier	No	20	85	90	2
Paver	No	50	85	77	9
Pickup Truck	No	50	85	77	9
Paving Equipment	No	50	85	77	9
Pneumatic Tools	No	50	85	85	90

Table 8 (2 of 2)
CA/T Equipment Noise Emissions and Acoustical Usage Factor Database

Equipment Description	Impact Device?	Acoustical Use Factor (%)	Spec. Lmax @ 50ft (dBA, slow)	Actual Measured Lmax @ 50ft (dBA, slow)	No. of Actual Data Samples (Count)
Pumps	No	50	77	81	17
Refrigerator Unit	No	100	82	73	3
Rivit Buster/chipping gun	Yes	20	85	79	19
Rock Drill	No	20	85	81	3
Roller	No	20	85	80	16
Sand Blasting (Single Nozzle)	No	20	85	96	9
Scraper	No	40	85	84	12
Shears (on backhoe)	No	40	85	96	5
Slurry Plant	No	100	78	78	1
Slurry Trenching Machine	No	50	82	80	75
Soil Mix Drill Rig	No	50	80	-N/A-	0
Tractor	No	40	84	-N/A-	0
Vacuum Excavator (Vac-truck)	No	40	85	85	149
Vacuum Street Sweeper	No	10	80	82	19
Ventilation Fan	No	100	85	79	13
Vibrating Hopper	No	50	85	87	1
Vibratory Concrete Mixer	No	20	80	80	1
Vibratory Pile Driver	No	20	95	101	44
Warning Horn	No	5	85	83	12
Welder/Torch	No	40	73	74	5

Notes:

(1) Source: FHWA Roadway Construction Noise Model User's Guide January 2006.

(2) Warehouse & Forklift Noise Exposure - NoiseTesting.info Carl Stautins, November 4, 2014 http://www.noisetesting.info/blog/carl-strautins/page-3/

(3) Data provided Leq as measured at the operator. Sound Level at 50 feet is calculated using Inverse Square Law.

Table 9
Construction Noise Levels (L_{eq})

Phase	Receptor Location	Existing Ambient Noise Levels (Leq)[2]	Construction Noise Levels (Leq)	Combined Noise Levels (Leq)	Increase (dB)	Reduction with Mitigation[3] (dB)	Mitigated Construction Noise Levels (Leq)	Mitigated Existing Plus Construction Noise Levels (Leq)	Mitigated Increase in Ambient Noise Levels (Leq)
Demolition	Northwest (Residential)	61	66.6	67.7	6.7	10	56.6	62.3	1.3
	Northwest (Church/School)	76.9	77.2	80.1	3.2	10	67.2	77.3	0.4
	North (Commercial)	62.1	75.7	75.9	13.8	10	65.7	67.3	5.2
	Northeast (Residential)	62.1	66.4	67.8	5.7	10	56.4	63.1	1.0
	East (Commercial)	60.6	71.5	71.8	11.2	10	61.5	64.1	3.5
	South (Residential)	60.6	81.5	81.5	20.9	10	71.5	71.8	11.2
	West (Commercial)	60.6	80.9	80.9	20.3	10	70.9	71.3	10.7
Site Preparation	Northwest (Residential)	61	63.4	65.4	4.4	10	53.4	61.7	0.7
	Northwest (Church/School)	76.9	73.2	78.4	1.5	10	63.2	77.1	0.2
	North (Commercial)	62.1	73.3	73.6	11.5	10	63.3	65.8	3.7
	Northeast (Residential)	62.1	65.8	67.3	5.2	10	55.8	63.0	0.9
	East (Commercial)	60.6	73.2	73.4	12.8	10	63.2	65.1	4.5
	South (Residential)	60.6	82.7	82.7	22.1	10	72.7	73.0	12.4
	West (Commercial)	60.6	73.2	73.4	12.8	10	63.2	65.1	4.5
Grading	Northwest (Residential)	61	65.8	67.0	6.0	10	55.8	62.1	1.1
	Northwest (Church/School)	76.9	75.5	79.3	2.4	10	65.5	77.2	0.3
	North (Commercial)	62.1	75.7	75.9	13.8	10	65.7	67.3	5.2
	Northeast (Residential)	62.1	68.1	69.1	7.0	10	58.1	63.6	1.5
	East (Commercial)	60.6	75.5	75.6	15.0	10	65.5	66.7	6.1
	South (Residential)	60.6	84.7	84.7	24.1	10	74.7	74.9	14.3
	West (Commercial)	60.6	75.5	75.6	15.0	10	65.5	66.7	6.1
Building Construction	Northwest (Residential)	61	63.5	65.4	4.4	10	53.5	61.7	0.7
	Northwest (Church/School)	76.9	73.3	78.5	1.6	10	63.3	77.1	0.2
	North (Commercial)	62.1	73.5	73.8	11.7	10	63.5	65.9	3.8
	Northeast (Residential)	62.1	65.9	67.4	5.3	10	55.9	63.0	0.9
	East (Commercial)	60.6	73.3	73.5	12.9	10	63.3	65.2	4.6
	South (Residential)	60.6	82.8	82.8	22.2	10	72.9	73.1	12.5
	West (Commercial)	60.6	73.3	73.5	12.9	10	63.3	65.2	4.6
Paving	Northwest (Residential)	61	64.2	65.9	4.9	10	54.2	61.8	0.8
	Northwest (Church/School)	76.9	74.0	78.7	1.8	10	64.0	77.1	0.2
	North (Commercial)	62.1	74.1	74.4	12.3	10	64.1	66.2	4.1
	Northeast (Residential)	62.1	66.6	67.9	5.8	10	56.6	63.2	1.1
	East (Commercial)	60.6	74.0	74.2	13.6	10	64.0	65.6	5.0
	South (Residential)	60.6	83.5	83.5	22.9	10	73.5	73.7	13.1
	West (Commercial)	60.6	74.0	74.2	13.6	10	64.0	65.6	5.0
Architectural Coating	Northwest (Residential)	61	55.9	62.2	1.2	10	45.9	61.1	0.1
	Northwest (Church/School)	76.9	65.7	77.2	0.3	10	55.7	76.9	0.0
	North (Commercial)	62.1	65.8	67.3	5.2	10	55.8	63.0	0.9
	Northeast (Residential)	62.1	58.2	63.6	1.5	10	48.2	62.3	0.2
	East (Commercial)	60.6	65.7	66.9	6.3	10	55.7	61.8	1.2
	South (Residential)	60.6	75.2	75.3	14.7	10	65.2	66.5	5.9
	West (Commercial)	60.6	65.7	66.9	6.3	10	55.7	61.8	1.2

Notes:
(1) Construction noise worksheets are provided in Appendix D.
(2) Per measured existing ambient noise levels. STNM4 was used for residential receptors to the northwest, STNM3 for church/school receptors to the northwest, STNM2 for commercial and residential receptors to the north and northeast, and STNM1 for commercial and residential receptors to the east, south, and west.

Table 10
Construction Equipment Vibration Source Levels

Equipment		PPV at 25 ft, in/sec	Approximate Lv* at 25 ft
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
Hydromill (slurry wall)	in soil	0.008	66
	in rock	0.017	75
Vibratory Roller		0.210	94
Hoe Ram		0.089	87
Large Bulldozer		0.089	87
Caisson Drilling		0.089	87
Loaded Trucks		0.076	86
Jackhammer		0.035	79
Small Bulldozer		0.003	58

Source: Federal Transit Administration: Transit Noise and Vibration Impact Assessment Manual, 2018.

*RMS velocity in decibels, VdB re 1 micro-in/sec

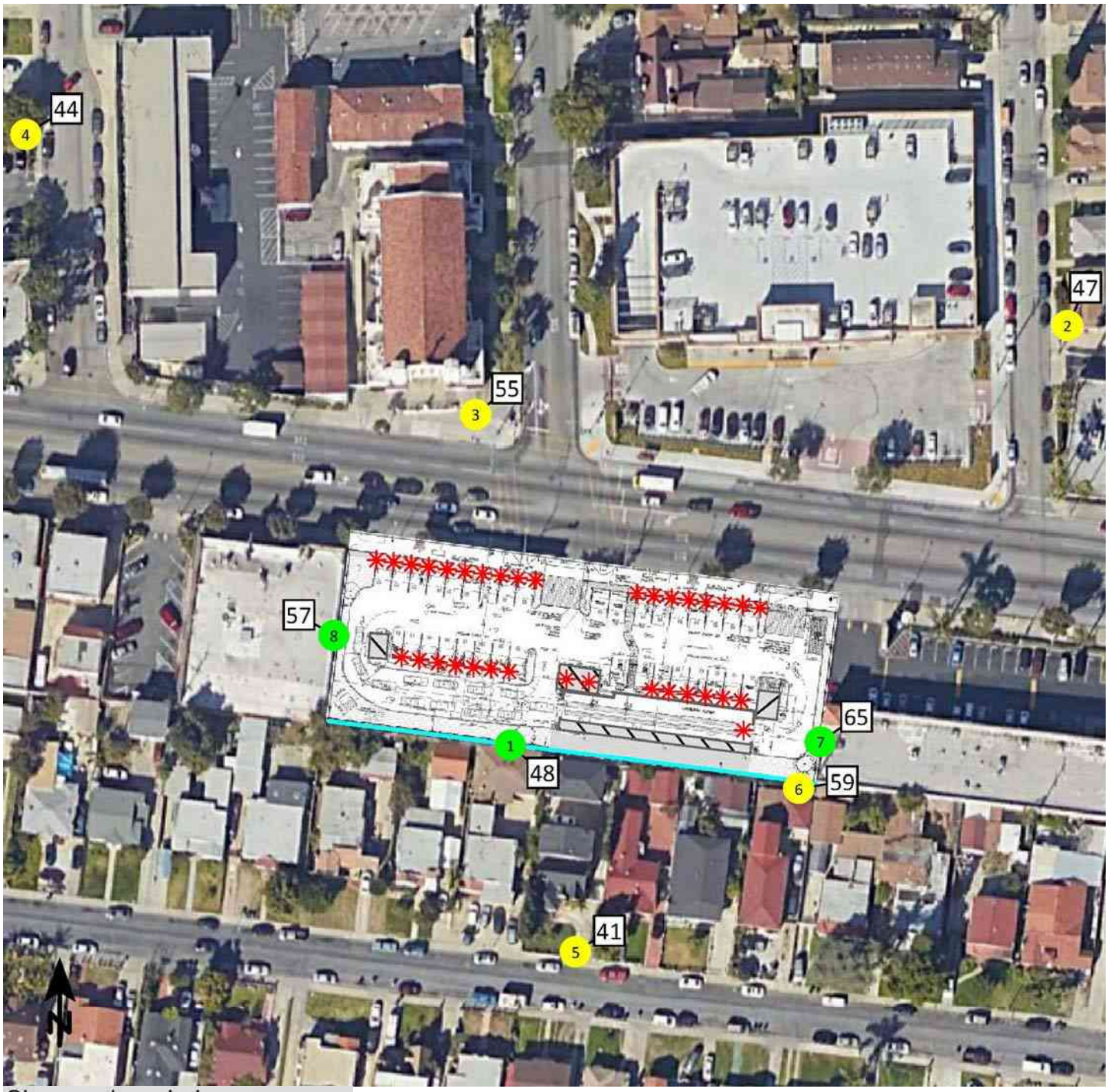


Figure 6
Peak Hour Operational Noise Levels

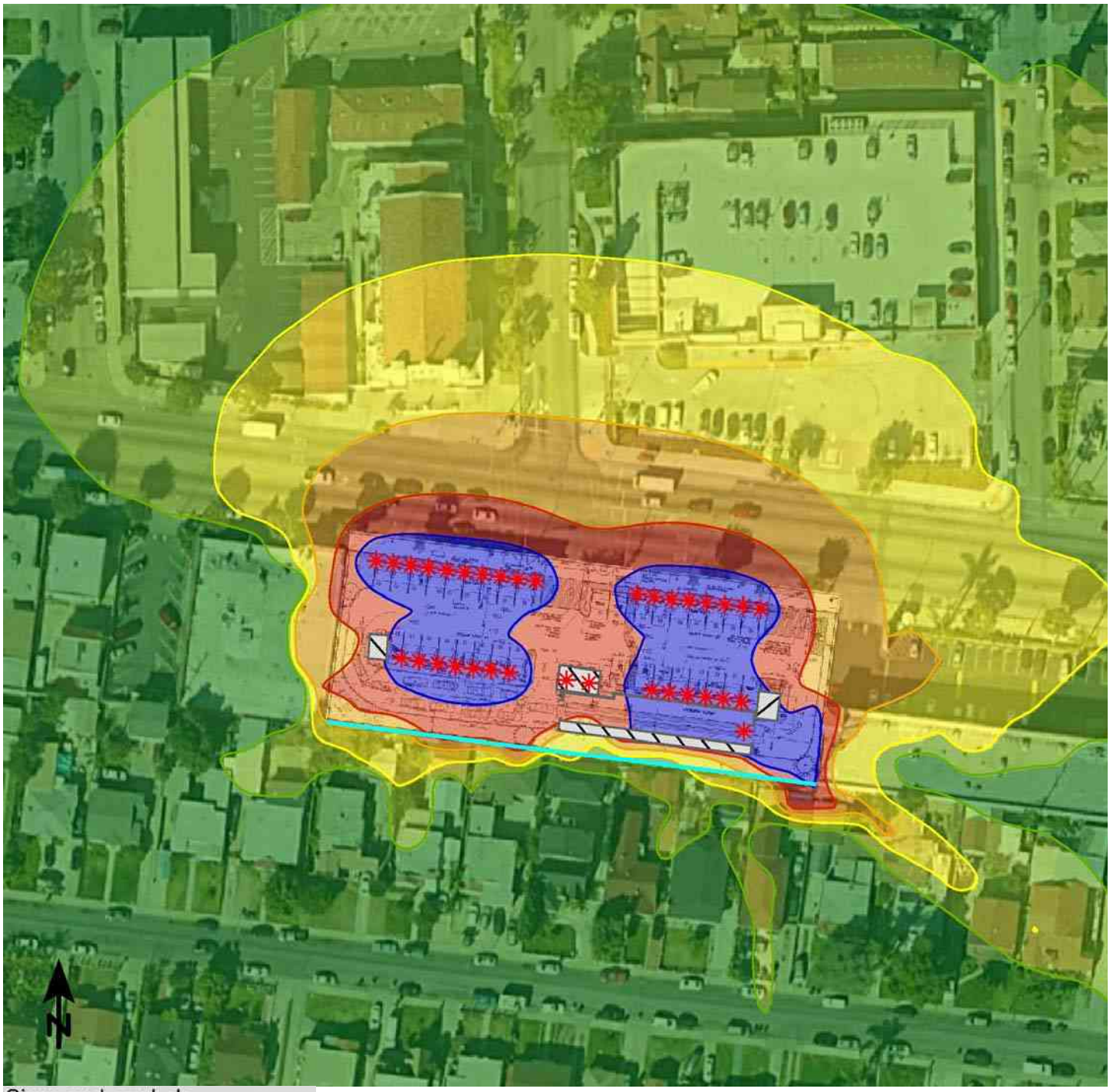


Figure 7
Peak Hour Operational Noise Level Contours

7. MEASURES TO REDUCE IMPACTS

CONSTRUCTION NOISE REDUCTION MEASURES

In addition to adherence to the City of Huntington Park Municipal Code which limits the construction hours of operation, the following measures are recommended to reduce construction noise and vibrations, emanating from the proposed project:

1. During all project construction phases on-site, construction contractors shall equip all construction equipment, fixed or mobile, with either properly operating and maintained mufflers or enclosures/acoustical tents (as appropriate) that achieve at least 10 dB reduction from noise level specifications presented in Table 5 of this report.

2. The contractor shall place all stationary construction equipment so that emitted noise is directed away from the noise sensitive receptors nearest the project site.

3. Equipment shall be shut off and not left to idle when not in use.

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

5. Jackhammers, pneumatic equipment and all other portable stationary noise sources shall be shielded and noise shall be directed away from sensitive receptors.

6. The project proponent shall mandate that the construction contractor prohibit the use of music or sound amplification on the project site during construction.

7. The construction contractor shall limit haul truck deliveries to the same hours specified for construction equipment.

8. Care should be used when using vibratory rollers and/or any other equivalent vibratory equipment within 19 feet of the eastern and western property lines and 16 feet of the southern property line and bulldozers within 12 feet of the eastern and western property lines and 7 feet of the southern property line where adjacent residential and commercial structures are located.

OPERATIONAL NOISE REDUCTION MEASURES

1. Operation of the proposed car wash shall be limited to the hours between 7:00 AM and 10:00 PM.

8. REFERENCES

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APPENDICES

Appendix A List of Acronyms
Appendix B Glossary
Appendix C Noise Measurement Field Worksheet
Appendix D Construction Noise Modeling
Appendix E Project Generated Trips FHWA Worksheets
Appendix F SoundPLAN Worksheets
Appendix G Vibration Worksheets

APPENDIX A

LIST OF ACRONYMS

Term	Definition
ADT	Average Daily Traffic
ANSI	American National Standard Institute
CEQA	California Environmental Quality Act
CNEL	Community Noise Equivalent Level
D/E/N	Day / Evening / Night
dB	Decibel
dBA or dB(A)	Decibel "A-Weighted"
dBA/DD	Decibel per Double Distance
dBA L_{eq}	Average Noise Level over a Period of Time
EPA	Environmental Protection Agency
FHWA	Federal Highway Administration
L_{02},L_{08},L_{50},L_{90}	A-weighted Noise Levels at 2 percent, 8 percent, 50 percent, and 90 percent, respectively, of the time period
DNL	Day-Night Average Noise Level
$L_{eq(x)}$	Equivalent Noise Level for '"x" period of time
L_{eq}	Equivalent Noise Level
L_{max}	Maximum Level of Noise (measured using a sound level meter)
L_{min}	Minimum Level of Noise (measured using a sound level meter)
LOS C	Level of Service C
OPR	California Governor's Office of Planning and Research
PPV	Peak Particle Velocities
RCNM	Road Construction Noise Model
REMEL	Reference Energy Mean Emission Level
RMS	Root Mean Square

APPENDIX B

GLOSSARY

Term	Definition
Ambient Noise Level	The all-encompassing noise environment associated with a given environment, at a specified time, usually a composite of sound from many sources, at many directions, near and far, in which usually no particular sound is dominant.
A-Weighted Sound Level, dBA	The sound level obtained by use of A-weighting. The A-weighting filter de-emphasizes the very low and very high frequency components of the sound in a manner similar to the frequency response of the human ear.
CNEL	Community Noise Equivalent Level. CNEL is a weighted 24-hour noise level that is obtained by adding five decibels to sound levels in the evening (7:00 PM to 10:00 PM), and by adding ten decibels to sound levels at night (10:00 PM to 7:00 AM). This weighting accounts for the increased human sensitivity to noise during the evening and nighttime hours.
Decibel, dB	A logarithmic unit of noise level measurement that relates the energy of a noise source to that of a constant reference level; the number of decibels is 10 times the logarithm (to the base 10) of this ratio.
DNL, Ldn	Day Night Level. The DNL, or Ldn is a weighted 24-hour noise level that is obtained by adding ten decibels to sound levels at night (10:00 PM to 7:00 AM). This weighting accounts for the increased human sensitivity to noise during the nighttime hours.
Equivalent Continuous Noise Level, L_{eq}	A level of steady state sound that in a stated time period, and a stated location, has the same A-weighted sound energy as the time-varying sound.
Fast/Slow Meter Response	The fast and slow meter responses are different settings on a sound level meter. The fast response setting takes a measurement every 100 milliseconds, while a slow setting takes one every second.
Frequency, Hertz	In a function periodic in time, the number of times that the quantity repeats itself in one second (i.e., the number of cycles per second).
L_{02}, L_{08}, L_{50}, L_{90}	The A-weighted noise levels that are equaled or exceeded by a fluctuating sound level, 2 percent, 8 percent, 50 percent, and 90 percent of a stated time period, respectively.
L_{max}, L_{min}	L_{max} is the RMS (root mean squared) maximum level of a noise source or environment measured on a sound level meter, during a designated time interval, using fast meter response. L_{min} is the minimum level.
Offensive/ Offending/ Intrusive Noise	The noise that intrudes over and above the existing ambient noise at a given location. The relative intrusiveness of sound depends on its amplitude, duration, frequency, and time of occurrence, and tonal information content as well as the prevailing ambient noise level.
Root Mean Square (RMS)	A measure of the magnitude of a varying noise source quantity. The name derives from the calculation of the square root of the mean of the squares of the values. It can be calculated from either a series of lone values or a continuous varying function.

APPENDIX C

NOISE MEASUREMENT FIELD WORKSHEET

Noise Measurement
Field Data

Project Name: Florence Avenue Car Wash, City of Huntington Park. **Date:** August 3, 2020

Project #: JN 19278

Noise Measurement #: STNM1 Run Time: 15 minutes (1 x 15 minutes) **Technician:** Ian Gallagher

Nearest Address or Cross Street: 3100 Florence Avenue, Huntington Park, California.

Site Description (Type of Existing Land Use and any other notable features): Project site: Site developed with 2-story commercial medical office building & parking lot. Bordered by Florence Ave to north, residential to south, commercial to east & west. Noise Meeasurement Site: Project site with parking lot & medical building to north & residential to south.

Weather: Sunny, clear blue skies. **Settings:** SLOW FAST

Temperature: 81 deg F **Wind:** 5-10mph **Humidity:** 54% **Terrain:** Flat

Start Time: 2:16 PM **End Time:** 2:31 PM **Run Time:**

Leq: 60.6 dB

Lmax 74.3 dB

L2 67.0 dB

L8 64.2 dB

L25 61.5 dB

L50 59.0 dB

Primary Noise Source: Traffic noise from 486 vehicles traveling along Florence Ave during 15 minute measurement. Traffic ambiance from other roads.

Secondary Noise Sources: Low altitude full size commercial aircraft, about 1 every 5 minutes. Residential ambiance from nearby residences (children playing). Bird song.

NOISE METER:	SoundTrack LXT Class 1	**CALIBRATOR:**	Larson Davis CAL250
MAKE:	Larson Davis	**MAKE:**	Larson Davis
MODEL:	LXT1	**MODEL:**	Cal 250
SERIAL NUMBER:	3099	**SERIAL NUMBER:**	2733
FACTORY CALIBRATION DATE:	4/9/2020	**FACTORY CALIBRATION DATE:**	4/2/2020
FIELD CALIBRATION DATE:	8/3/2020		

Noise Measurement
Field Data

PHOTOS:

STNM1 looking N past 3100 Florence Ave towards Florence Ave & Mission Pl intersection.

STNM1 looking E across asphalt parking lot towards shops and businesses. Florence Ave on the left, residences on the right.

Summary	
File Name on Meter	LxT_Data.043
File Name on PC	SLM_0003099_LxT_Data_043.00.ldbin
Serial Number	0003099
Model	SoundTrack LxT®
Firmware Version	2.402
User	Ian Edward Gallagher
Location	STNM1 JN 19278 Florence Ave Car Wash 33°58'20.85"N 118°12'44.81"W
Job Description	15 minute noise measurement (1 x 15 minutes)

Measurement	
Start	2020-08-03 14:16:24
Stop	2020-08-03 14:31:24
Duration	00:15:00.0
Run Time	00:15:00.0
Pause	00:00:00.0
Pre Calibration	2020-08-03 14:13:20
Post Calibration	None

Overall Settings	
RMS Weight	A Weighting
Peak Weight	Z Weighting
Detector	Slow
Preamp	PRMLxT1L
Microphone Correction	Off
Integration Method	Linear
OBA Range	Low
OBA Bandwidth	1/1 and 1/3
OBA Freq. Weighting	Z Weighting
OBA Max Spectrum	Bin Max
Overload	122.6 dB

Results			
LA_{eq}	60.6		
LAE	90.2		
EA	115.103	µPa²h	
EA8	3.683	mPa²h	
EA40	18.416	mPa²h	
$LZ_{peak\ (max)}$	2020-08-03 14:27:51	95.0	dB
LAS_{max}	2020-08-03 14:28:03	74.3	dB
LAS_{min}	2020-08-03 14:17:14	48.5	dB
SEA	-99.9	dB	

			Statistics	
LC_{eq}	70.9	dB	**LAI2.00**	67.0 dB
LA_{eq}	60.6	dB	**LAI8.00**	64.2 dB
LC_{eq} - LA_{eq}	10.3	dB	**LAI25.00**	61.5 dB
LAI_{eq}	62.8	dB	**LAI50.00**	59.0 dB
LA_{eq}	60.6	dB	**LAI66.60**	57.0 dB
LAI_{eq} - LA_{eq}	2.2	dB	**LAI90.00**	52.8 dB
# Overloads	0			

Noise Measurement
Field Data

Project Name: Florence Avenue Car Wash, City of Huntington Park. **Date:** August 3, 2020

Project #: JN 19278

Noise Measurement #: STNM2 Run Time: 15 minutes (1 x 15 minutes) **Technician:** Ian Gallagher

Nearest Address or Cross Street: 7132 Benson Street, Huntington Park, California.

Site Description (Type of Existing Land Use and any other notable features): Project site: Site developed with 2-story commercial medical office building & parking lot. Bordered by Florence Ave to north, residential to south, commercial to east & west. Noise Measurement Site: Benson St to west with commercial further west, residential to east, & commercial to southeast.

Weather: Sunny, clear blue skies. **Settings:** SLOW FAST

Temperature: 81 deg F **Wind:** 5-10mph **Humidity:** 54% **Terrain:** Flat

Start Time: 2:47 PM **End Time:** 3:02 PM **Run Time:**

Leq: 62.1 dB

Lmax 82.2 dB

L2 68.5 dB

L8 64.6 dB

L25 61.6 dB

L50 58.7 dB

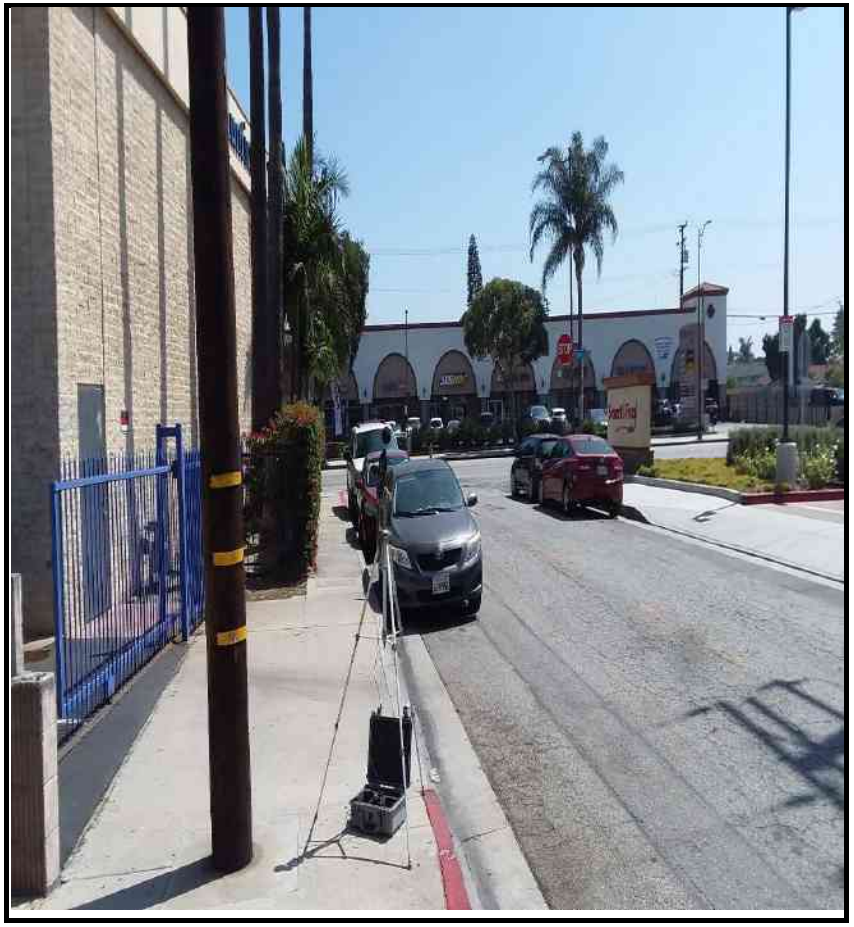
Primary Noise Source: Traffic noise from 472 vehicles traveling along Florence Ave during 15 minute measurement, 8 vehicles along Benson St. Traffic ambiance from other roads.

Secondary Noise Sources: Low altitude full size commercial aircraft, about 1 every 5 minutes. Residential ambiance. Bird song.

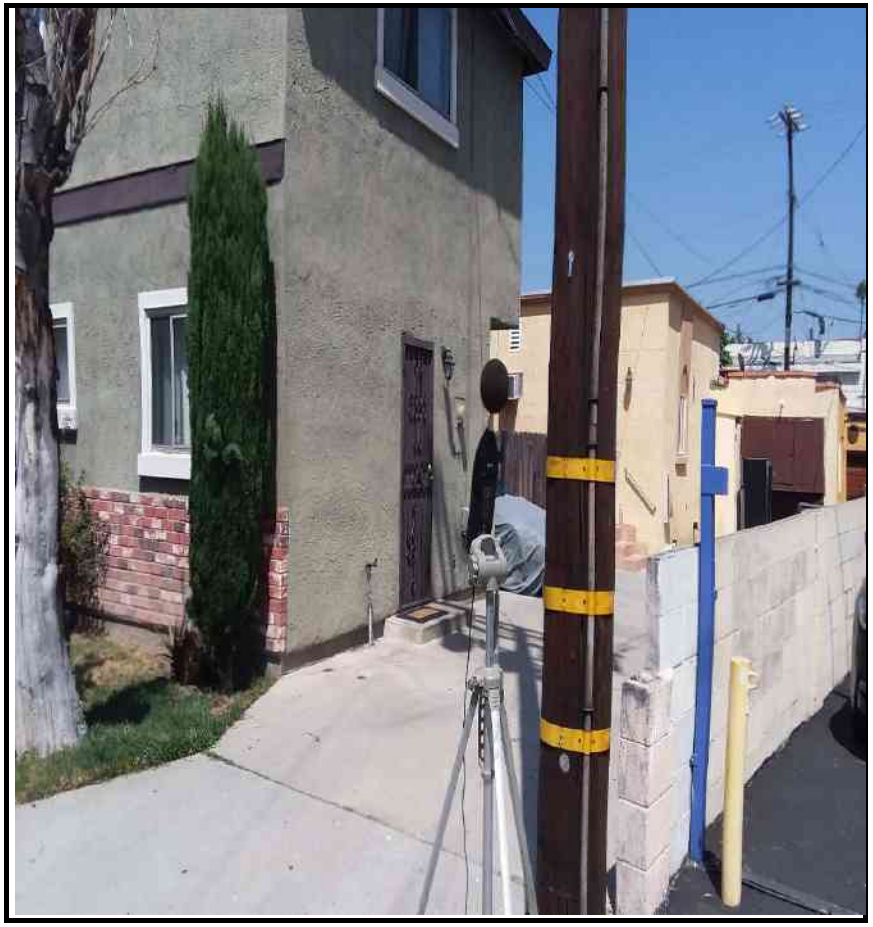
NOISE METER:	SoundTrack LXT Class 1	**CALIBRATOR:**	Larson Davis CAL250
MAKE:	Larson Davis	**MAKE:**	Larson Davis
MODEL:	LXT1	**MODEL:**	Cal 250
SERIAL NUMBER:	3099	**SERIAL NUMBER:**	2733
FACTORY CALIBRATION DATE:	4/9/2020	**FACTORY CALIBRATION DATE:**	4/2/2020
FIELD CALIBRATION DATE:	8/3/2020		

Noise Measurement
Field Data

PHOTOS:



STNM2 looking S down Benson St towards Florence Ave intersection.



STNM2 looking NE towards residence 7132 Benson St, Huntington Park.

Summary					
File Name on Meter	LxT_Data.044				
File Name on PC	SLM_0003099_LxT_Data_044.00.ldbin				
Serial Number	0003099				
Model	SoundTrack LxT®				
Firmware Version	2.402				
User	Ian Edward Gallagher				
Location	STNM2 JN 19278 Florence Ave Car Wash 33°58'23.38"N 118°12'40.51"W				
Job Description	15 minute noise measuremnt (1 x 15 minutes)				
Measurement					
Start	2020-08-03 14:47:48				
Stop	2020-08-03 15:02:48				
Duration	00:15:00.0				
Run Time	00:15:00.0				
Pause	00:00:00.0				
Pre Calibration	2020-08-03 14:46:07				
Post Calibration	None				
Overall Settings					
RMS Weight	A Weighting				
Peak Weight	Z Weighting				
Detector	Slow				
Preamp	PRMLxT1L				
Microphone Correction	Off				
Integration Method	Linear				
OBA Range	Low				
OBA Bandwidth	1/1 and 1/3				
OBA Freq. Weighting	Z Weighting				
OBA Max Spectrum	Bin Max				
Overload	122.6 dB				
Results					
LA_{eq}	62.1				
LAE	91.7				
EA	163.764 µPa²h				
EA8	5.240 mPa²h				
EA40	26.202 mPa²h				
$LZ_{peak\ (max)}$	2020-08-03 15:00:21	99.3 dB			
LAS_{max}	2020-08-03 14:49:34	82.2 dB			
LAS_{min}	2020-08-03 15:02:11	50.5 dB			
SEA	-99.9 dB				
			Statistics		
LC_{eq}	73.7 dB		**LAI2.00**	68.5 dB	
LA_{eq}	62.1 dB		**LAI8.00**	64.6 dB	
LC_{eq} - LA_{eq}	11.5 dB		**LAI25.00**	61.6 dB	
LAI_{eq}	64.4 dB		**LAI50.00**	58.7 dB	
LA_{eq}	62.1 dB		**LAI66.60**	57.0 dB	
LAI_{eq} - LA_{eq}	2.3 dB		**LAI90.00**	53.5 dB	
# Overloads	0				

Noise Measurement
Field Data

Project Name: Florence Avenue Car Wash, City of Huntington Park. **Date:** August 3, 2020

Project #: JN 19278

Noise Measurement #: STNM3 Run Time: 15 minutes (1 x 15 minutes) **Technician:** Ian Gallagher

Nearest Address or Cross Street: 7125 Mission Pl, Huntington Park, California.

Site Description (Type of Existing Land Use and any other notable features): Project site: 2 story commercial building W end of site, surrounded by asphalt parking lot covering the remaining area throughout site. Adjacent: Church and school across Florence Ave N & NW of site, businesses E & NE, elsewhere residential.

Weather: Sunny, clear blue skies. **Settings:** SLOW FAST

Temperature: 81 deg F **Wind:** 5-10mph **Humidity:** 54% **Terrain:** Flat

Start Time: 3:15 PM **End Time:** 3:30 PM **Run Time:**

Leq: 76.9 dB

Lmax 101.1 dB

L2 79.7 dB

L8 76.9 dB

L25 74.6 dB

L50 71.3 dB

Primary Noise Source: Traffic noise from 490 vehicles travelling along Florence Ave during 15 minute measurement. Traffic ambiance from other roads. Lmax ambulance siren at 3:22PM

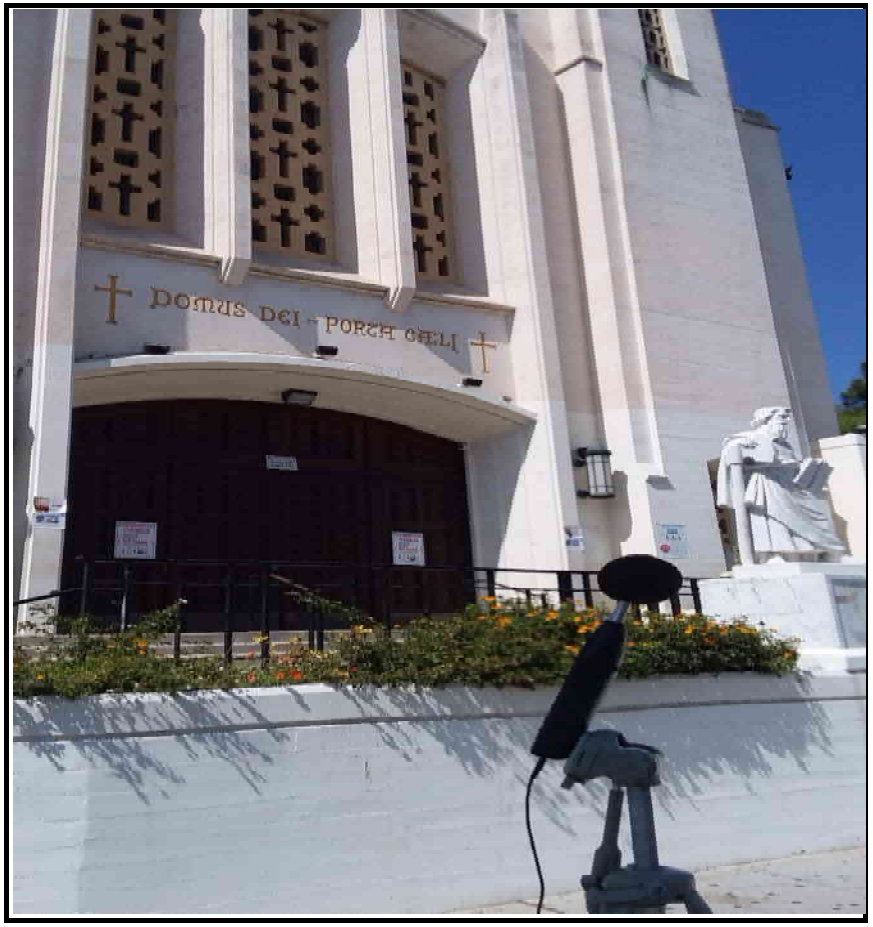
Secondary Noise Sources: Low altitude full size commercial aircraft, about 1 every 5 minutes. Residential ambiance . Bird song.

NOISE METER:	SoundTrack LXT Class 1	**CALIBRATOR:**	Larson Davis CAL250
MAKE:	Larson Davis	**MAKE:**	Larson Davis
MODEL:	LXT1	**MODEL:**	Cal 250
SERIAL NUMBER:	3099	**SERIAL NUMBER:**	2733
FACTORY CALIBRATION DATE:	4/9/2020	**FACTORY CALIBRATION DATE:**	4/2/2020
FIELD CALIBRATION DATE:	8/3/2020		

Noise Measurement
Field Data

PHOTOS:

STNM3 looking ESE down Florance Ave towards Mission Place intersection (20 yards).



STNM3 looking N towards church building enyrance 7125 Mission Place, Huntington Park.

Summary		
File Name on Meter	LxT_Data.045	
File Name on PC	SLM_0003099_LxT_Data_045.00.ldbin	
Serial Number	0003099	
Model	SoundTrack LxT®	
Firmware Version	2.402	
User	Ian Edward Gallagher	
Location	STNM3 JN 19278 Florence Ave Car Wash 33°58'22.87"N 118°12'45.34"W	
Job Description	15 minute noise measurement (1 x 15 minutes)	
Measurement		
Start	2020-08-03 15:15:04	
Stop	2020-08-03 15:30:04	
Duration	00:15:00.0	
Run Time	00:15:00.0	
Pause	00:00:00.0	
Pre Calibration	2020-08-03 15:14:51	
Post Calibration	None	
Overall Settings		
RMS Weight	A Weighting	
Peak Weight	Z Weighting	
Detector	Slow	
Preamp	PRMLxT1L	
Microphone Correction	Off	
Integration Method	Linear	
OBA Range	Low	
OBA Bandwidth	1/1 and 1/3	
OBA Freq. Weighting	Z Weighting	
OBA Max Spectrum	Bin Max	
Overload	122.8 dB	
Results		
LA_{eq}	76.9	
LAE	106.5	
EA	4.915 mPa^2h	
EA8	157.291 mPa^2h	
EA40	786.453 mPa^2h	
$LZ_{peak\ (max)}$	2020-08-03 15:21:42 113.3 dB	
LAS_{max}	2020-08-03 15:21:43 101.1 dB	
LAS_{min}	2020-08-03 15:22:54 56.5 dB	
SEA	-99.9 dB	

		Statistics	
LC_{eq}	81.3 dB	**LAI2.00**	79.7 dB
LA_{eq}	76.9 dB	**LAI8.00**	76.9 dB
LC_{eq} - LA_{eq}	4.3 dB	**LAI25.00**	74.6 dB
LAI_{eq}	80.1 dB	**LAI50.00**	71.3 dB
LA_{eq}	76.9 dB	**LAI66.60**	69.1 dB
LAI_{eq} - LA_{eq}	3.2 dB	**LAI90.00**	64.1 dB
# Overloads	0		

Noise Measurement
Field Data

Project Name: Florence Avenue Car Wash, City of Huntington Park. **Date:** August 3, 2020

Project #: JN 19278

Noise Measurement #: STNM4 Run Time: 15 minutes (1 x 15 minutes) **Technician:** Ian Gallagher

Nearest Address or Cross Street: 7125 Cedar Street, Huntington Park, California.

Site Description (Type of Existing Land Use and any other notable features): Project site: Site developed with 2-story commercial medical office building & parking lot. Bordered by Florence Ave to north, residential to south, commercial to east & west. Noise Measurement Site: Cedar St to east with church school uses further east, residential to west and north, parking lot to south with commercial buildings further south.

Weather: Sunny, clear blue skies. **Settings:** SLOW FAST

Temperature: 81 deg F **Wind:** 5-10mph **Humidity:** 54% **Terrain:** Flat

Start Time: 3:39 PM **End Time:** 3:54 PM **Run Time:**

Leq: 61 dB

Lmax 75.8 dB

L2 69.4 dB

L8 65.4 dB

L25 60.1 dB

L50 57.2 dB

Primary Noise Source: Traffic noise from vehicles traveling along Florence Ave. Traffic noise from 8 vehicles traveling along Cedar St during measurement. Ambulance siren at 3:50PM.

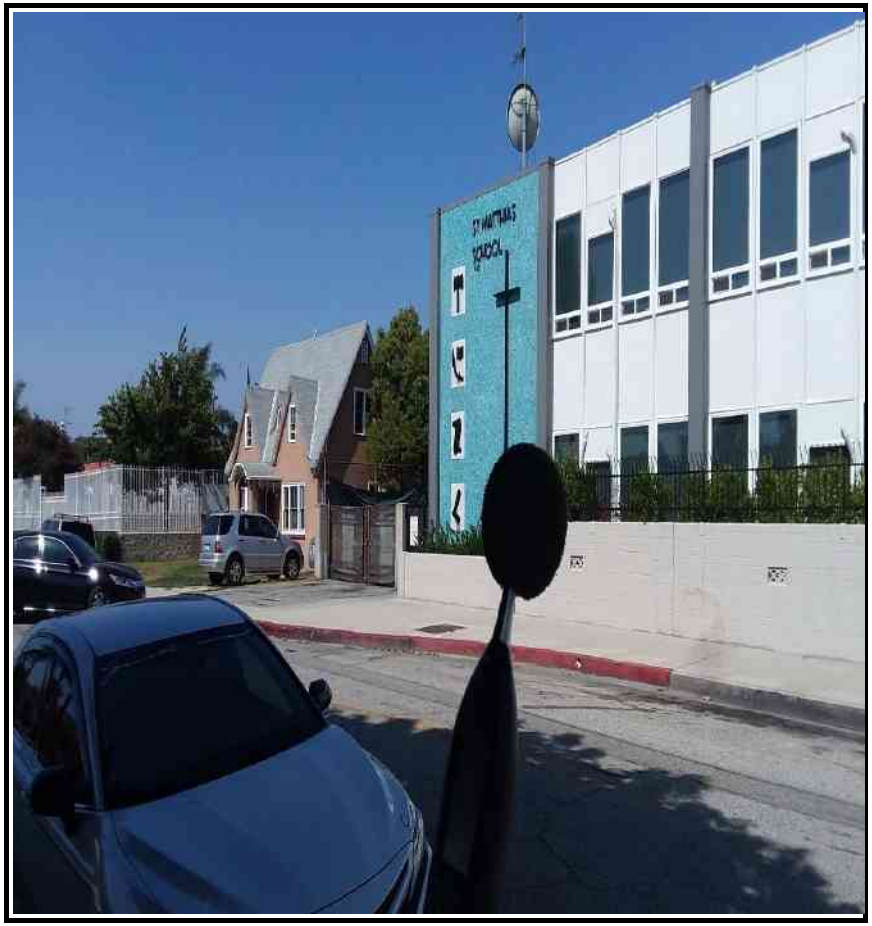
Secondary Noise Sources: Low altitude full size commercial aircraft, about 1 every 5 minutes. Residential ambiance, soft music playing. Bird song.

NOISE METER:	SoundTrack LXT Class 1	**CALIBRATOR:**	Larson Davis CAL250
MAKE:	Larson Davis	**MAKE:**	Larson Davis
MODEL:	LXT1	**MODEL:**	Cal 250
SERIAL NUMBER:	3099	**SERIAL NUMBER:**	2733
FACTORY CALIBRATION DATE:	4/9/2020	**FACTORY CALIBRATION DATE:**	4/2/2020
FIELD CALIBRATION DATE:	8/3/2020		

Noise Measurement
Field Data

PHOTOS:

STNM4 looking S down Cedar Street towards Florence Avenue intersection.



STNM4 looking NE towards school building 7130 Cedar Street, Huntington Park.

Summary				
File Name on Meter	LxT_Data.046			
File Name on PC	SLM_0003099_LxT_Data_046.00.ldbin			
Serial Number	0003099			
Model	SoundTrack LxT®			
Firmware Version	2.402			
User	Ian Edward Gallagher			
Location	STNM4 JN 19278 Florence Ave Car Wash 33°58'24.76"N 118°12'48.60"W			
Job Description	15 minute noise measurement (1 x 15 minutes)			
Measurement				
Start	2020-08-03 15:39:17			
Stop	2020-08-03 15:54:17			
Duration	00:15:00.0			
Run Time	00:15:00.0			
Pause	00:00:00.0			
Pre Calibration	2020-08-03 15:39:05			
Post Calibration	None			
Overall Settings				
RMS Weight	A Weighting			
Peak Weight	Z Weighting			
Detector	Slow			
Preamp	PRMLxT1L			
Microphone Correction	Off			
Integration Method	Linear			
OBA Range	Low			
OBA Bandwidth	1/1 and 1/3			
OBA Freq. Weighting	Z Weighting			
OBA Max Spectrum	Bin Max			
Overload	122.7 dB			
Results				
LA_{eq}	61.0			
LAE	90.5			
EA	125.800 µPa²h			
EA8	4.026 mPa²h			
EA40	20.128 mPa²h			
$LZ_{peak\ (max)}$	2020-08-03 15:40:18	93.0 dB		
LAS_{max}	2020-08-03 15:49:57	75.8 dB		
LAS_{min}	2020-08-03 15:44:50	51.2 dB		
SEA	-99.9 dB			
			Statistics	
LC_{eq}	70.1 dB		**LAI2.00**	69.4 dB
LA_{eq}	61.0 dB		**LAI8.00**	65.4 dB
LC_{eq} - LA_{eq}	9.1 dB		**LAI25.00**	60.1 dB
LAI_{eq}	63.5 dB		**LAI50.00**	57.2 dB
LA_{eq}	61.0 dB		**LAI66.60**	56.0 dB
LAI_{eq} - LA_{eq}	2.5 dB		**LAI90.00**	53.9 dB
# Overloads	0			

Noise Measurement
Field Data

Project Name: Florence Avenue Car Wash, City of Huntington Park. **Date:** August 3, 2020

Project #: JN 19278

Noise Measurement #: STNM5 Run Time: 15 minutes (1 x 15 minutes) **Technician:** Ian Gallagher

Nearest Address or Cross Street: 3099 Walnut Street, Huntington Park, California.

Site Description (Type of Existing Land Use and any other notable features): Project site: Site developed with 2-story commercial medical office building & parking lot. Bordered by Florence Ave to north, residential to south, commercial to east & west. Noise Measurement Site: Walnut St to south with residential uses surrouding the noise measurement site.

Weather: Sunny, clear blue skies. **Settings:** SLOW FAST

Temperature: 81 deg F **Wind:** 5-10mph **Humidity:** 54% **Terrain:** Flat

Start Time: 4:23 PM **End Time:** 4:38 PM **Run Time:**

Leq: 58.5 dB

Lmax 73.2 dB

L2 66.9 dB

L8 63.8 dB

L25 58.1 dB

L50 52.5 dB

Primary Noise Source: Traffic noise from 18 vehicles traveling along Walnut Street during noise measurement.

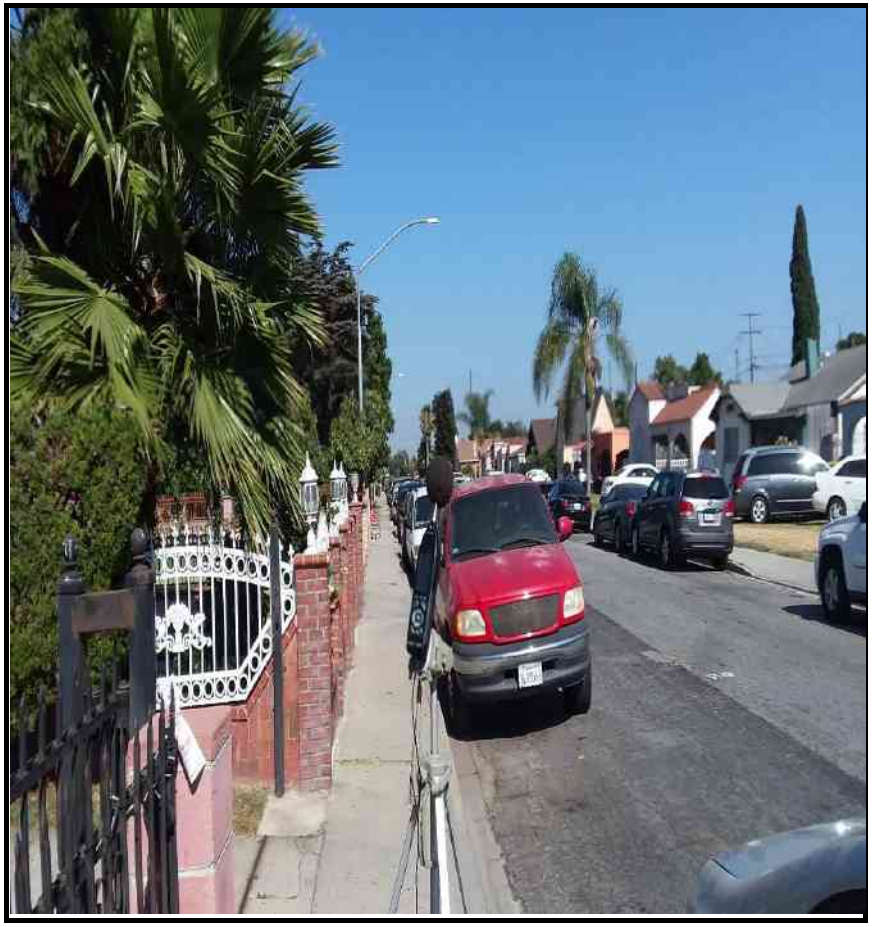
Secondary Noise Sources: Low altitude full size commercial aircraft, about 1 every 5 minutes. Residential ambiance. Bird song.

NOISE METER:	SoundTrack LXT Class 1	**CALIBRATOR:**	Larson Davis CAL250
MAKE:	Larson Davis	**MAKE:**	Larson Davis
MODEL:	LXT1	**MODEL:**	Cal 250
SERIAL NUMBER:	3099	**SERIAL NUMBER:**	2733
FACTORY CALIBRATION DATE:	4/9/2020	**FACTORY CALIBRATION DATE:**	4/2/2020
FIELD CALIBRATION DATE:	8/3/2020		

Noise Measurement
Field Data

PHOTOS:

STNM5 looking N towards residence 3099 Walnut Street, Huntington Park.



STNM5 looking E down Walnut Street towards State Street intersection.

Summary				
File Name on Meter		LxT_Data.047		
File Name on PC	SLM_0003099_LxT_Data_047.00.ldbin			
Serial Number		0003099		
Model		SoundTrack LxT®		
Firmware Version		2.402		
User	Ian Edward Gallagher			
Location	STNM5 JN 19278 Florence Ave Car Wash 33°58'19.34"N 118°12'44.45"W			
Job Description	15 minute noise measurement (1 x 15 minutes)			
Measurement				
Start		2020-08-03 16:23:31		
Stop		2020-08-03 16:38:31		
Duration		00:15:00.0		
Run Time		00:15:00.0		
Pause		00:00:00.0		
Pre Calibration		2020-08-03 16:23:20		
Post Calibration		None		
Overall Settings				
RMS Weight		A Weighting		
Peak Weight		Z Weighting		
Detector		Slow		
Preamp		PRMLxT1L		
Microphone Correction		Off		
Integration Method		Linear		
OBA Range		Low		
OBA Bandwidth		1/1 and 1/3		
OBA Freq. Weighting		Z Weighting		
OBA Max Spectrum		Bin Max		
Overload		122.7 dB		
Results				
LA_{eq}		58.5		
LAE		88.1		
EA		70.980 µPa²h		
EA8		2.271 mPa²h		
EA40		11.357 mPa²h		
$LZ_{peak\ (max)}$	2020-08-03 16:34:27	99.6 dB		
LAS_{max}	2020-08-03 16:35:27	73.2 dB		
LAS_{min}	2020-08-03 16:27:10	43.8 dB		
SEA		-99.9 dB		
			Statistics	
LC_{eq}		69.0 dB	**LAI2.00**	66.9 dB
LA_{eq}		58.5 dB	**LAI8.00**	63.8 dB
LC_{eq} - LA_{eq}		10.5 dB	**LAI25.00**	58.1 dB
LAI_{eq}		61.7 dB	**LAI50.00**	52.5 dB
LA_{eq}		58.5 dB	**LAI66.60**	50.1 dB
LAI_{eq} - LA_{eq}		3.2 dB	**LAI90.00**	46.7 dB
# Overloads		0		

Noise Measurement
Field Data

Project Name: Florence Avenue Car Wash, City of Huntington Park. **Date:** Aug 03 to 04, 2020

Project #: JN 19278

Noise Measurement #: LTNM1 Run Time: 24 hours (24 x 1 hours) **Technician:** Ian Gallagher

Nearest Address or Cross Street: 3099 Walnut Street, Huntington Park, California.

Site Description (Type of Existing Land Use and any other notable features): Project site: Site developed with 2-story commercial medical office building & parking lot. Bordered by Florence Ave to north, residential to south, commercial to east & west. Noise Meeasurement Site: Project site with parking lot to north & residential to south.

Weather: Clear skies, sunset/rise 7:51PM/6:06AM **Settings:** SLOW FAST

Temperature: 67 to 81 deg F **Wind:** 5-10mph **Humidity:** 54 to 71% **Terrain:** Flat

Start Time: 7:00 PM **End Time:** 7:00 PM **Run Time:**

Leq: 59 dB **Primary Noise Source:** Traffic noise from vehicles traveling along Florence Avenue.

Lmax 89.4 dB

L2 64.8 dB **Secondary Noise Sources:** Low altitude full size commercial aircraft, about 1 every 5 minutes.

L8 62.0 dB Residential ambiance. Bird song by day.

L25 59.2 dB

L50 56.0 dB

NOISE METER:	SoundTrack LXT Class 1	**CALIBRATOR:**	Larson Davis CAL250
MAKE:	Larson Davis	**MAKE:**	Larson Davis
MODEL:	LXT1	**MODEL:**	Cal 250
SERIAL NUMBER:	3099	**SERIAL NUMBER:**	2733
FACTORY CALIBRATION DATE:	4/9/2020	**FACTORY CALIBRATION DATE:**	4/2/2020
FIELD CALIBRATION DATE:	8/3/2020		

Noise Measurement
Field Data

PHOTOS:

LTNM1 looking at microphone situated in tree, southern edge of site.

LTNM1 looking at location of microphone in site parking lot.

Summary				
File Name on Meter	LxT_Data.048			
File Name on PC	SLM_0003099_LxT_Data_048.00.ldbin			
Serial Number	0003099			
Model	SoundTrack LxT®			
Firmware Version	2.402			
User	Ian Edward Gallagher			
Location	LTNM1 JN 19278 Florence Ave Car Wash 33°58'20.62"N 118°12'43.49"W			
Job Description	24 hour noise measurement (24 x 1 hours)			
Measurement				
Start	2020-08-03 19:00:00			
Stop	2020-08-04 19:00:00			
Duration	24:00:00.0			
Run Time	24:00:00.0			
Pause	00:00:00.0			
Pre Calibration	2020-08-03 17:35:58			
Post Calibration	None			
Overall Settings				
RMS Weight	A Weighting			
Peak Weight	A Weighting			
Detector	Slow			
Preamp	PRMLxT1L			
Microphone Correction	Off			
Integration Method	Linear			
OBA Range	Normal			
OBA Bandwidth	1/1 and 1/3			
OBA Freq. Weighting	A Weighting			
OBA Max Spectrum	Bin Max			
Overload	122.7 dB			
Results				
LA_{eq}	59.0			
LAE	108.4			
EA	7.674 mPa^2h			
EA8	2.558 mPa^2h			
EA40	12.791 mPa^2h			
$LA_{peak\ (max)}$	2020-08-03 21:41:00	102.0 dB		
LAS_{max}	2020-08-03 21:41:01	89.4 dB		
LAS_{min}	2020-08-04 04:34:52	37.6 dB		
SEA	-99.9 dB			
			Statistics	
LC_{eq}	69.1 dB		**LAI2.00**	64.8 dB
LA_{eq}	59.0 dB		**LAI8.00**	62.0 dB
LC_{eq} - LA_{eq}	10.1 dB		**LAI25.00**	59.2 dB
LAI_{eq}	61.0 dB		**LAI50.00**	56.0 dB
LA_{eq}	59.0 dB		**LAI90.00**	45.8 dB
LAI_{eq} - LA_{eq}	2.0 dB		**LAI99.00**	39.7 dB
# Overloads	0			

Record #	Date	Time	Run Duration	Run Time	Pause	LAeq	LASmin	LASmin Time	LASmax	LASmax Time	LAS2.00	LAS8.00	LAS25.00	LAS50.00	LAS90.00	LAS99.00
1	2020-08-03	19:00:00	01:00:00.0	01:00:00.0	00:00:00.0	59.2	44.5	19:53:32	71.7	19:45:08	64.9	62.7	60.5	58.2	50.3	46.6
2	2020-08-03	20:00:00	01:00:00.0	01:00:00.0	00:00:00.0	61.8	46.9	20:01:47	85.7	20:29:49	68.3	63.2	60.8	58.5	52.1	49.3
3	2020-08-03	21:00:00	01:00:00.0	01:00:00.0	00:00:00.0	61.8	44.7	21:25:59	89.4	21:41:01	66.6	62.9	60.1	57.2	50.1	45.9
4	2020-08-03	22:00:00	01:00:00.0	01:00:00.0	00:00:00.0	60.3	43.6	22:56:45	84.8	22:18:16	65.9	62.4	59.2	55.9	49.1	44.5
5	2020-08-03	23:00:00	01:00:00.0	01:00:00.0	00:00:00.0	57.1	41.6	23:44:23	73.4	23:27:04	63.7	60.9	57.9	53.7	45.2	42.6
6	2020-08-04	00:00:00	01:00:00.0	01:00:00.0	00:00:00.0	54.7	40.6	00:59:57	69.2	00:25:23	62.2	59.6	55.8	50.7	43.6	42.1
7	2020-08-04	01:00:00	01:00:00.0	01:00:00.0	00:00:00.0	53.6	38.8	01:59:22	74.4	01:22:27	60.7	57.8	53.5	49.6	40.4	39.3
8	2020-08-04	02:00:00	01:00:00.0	01:00:00.0	00:00:00.0	51.8	37.9	02:59:28	69.8	02:57:26	59.7	56.8	51.6	47.2	39.4	38.5
9	2020-08-04	03:00:00	01:00:00.0	01:00:00.0	00:00:00.0	52.9	37.9	03:00:56	65.8	03:58:37	61.3	58.0	53.4	47.2	40.8	38.6
10	2020-08-04	04:00:00	01:00:00.0	01:00:00.0	00:00:00.0	55.2	37.6	04:34:52	67.4	04:46:37	62.4	60.2	56.5	50.9	41.5	38.7
11	2020-08-04	05:00:00	01:00:00.0	01:00:00.0	00:00:00.0	57.7	39.9	05:30:35	69.7	05:42:13	64.3	62.1	59.1	55.1	44.6	41.4
12	2020-08-04	06:00:00	01:00:00.0	01:00:00.0	00:00:00.0	58.5	39.7	06:39:10	70.5	06:00:04	64.4	62.9	60.2	56.3	46.3	42.1
13	2020-08-04	07:00:00	01:00:00.0	01:00:00.0	00:00:00.0	59.5	41.8	07:47:06	77.1	07:59:51	65.4	63.3	60.8	57.7	49.2	44.1
14	2020-08-04	08:00:00	01:00:00.0	01:00:00.0	00:00:00.0	59.5	40.4	08:47:07	71.2	08:02:22	64.6	62.9	60.9	58.6	49.9	43.4
15	2020-08-04	09:00:00	01:00:00.0	01:00:00.0	00:00:00.0	58.4	42.8	09:31:09	73.9	09:11:44	64.0	61.9	59.8	57.3	49.7	45.2
16	2020-08-04	10:00:00	01:00:00.0	01:00:00.0	00:00:00.0	60.3	43.9	10:23:42	82.5	10:48:42	64.9	62.2	59.8	57.3	50.5	45.8
17	2020-08-04	11:00:00	01:00:00.0	01:00:00.0	00:00:00.0	59.1	43.6	11:47:48	81.6	11:14:33	65.0	61.6	59.2	56.9	49.8	45.5
18	2020-08-04	12:00:00	01:00:00.0	01:00:00.0	00:00:00.0	61.2	42.6	12:23:09	85.2	12:57:13	67.5	62.6	58.9	56.7	49.8	45.0
19	2020-08-04	13:00:00	01:00:00.0	01:00:00.0	00:00:00.0	57.4	41.6	13:25:14	73.0	13:18:25	63.6	60.9	58.3	55.9	48.6	45.0
20	2020-08-04	14:00:00	01:00:00.0	01:00:00.0	00:00:00.0	60.0	43.6	14:01:35	82.7	14:50:14	66.0	61.5	58.9	56.8	50.0	45.0
21	2020-08-04	15:00:00	01:00:00.0	01:00:00.0	00:00:00.0	61.1	44.4	15:47:00	85.6	15:06:41	64.9	61.4	59.4	57.3	50.1	46.9
22	2020-08-04	16:00:00	01:00:00.0	01:00:00.0	00:00:00.0	59.8	44.6	16:10:57	80.6	16:15:34	66.1	62.5	59.7	57.4	50.5	45.9
23	2020-08-04	17:00:00	01:00:00.0	01:00:00.0	00:00:00.0	59.4	46.2	17:13:16	78.6	17:35:25	64.8	61.8	59.4	57.6	51.9	48.5
24	2020-08-04	18:00:00	01:00:00.0	01:00:00.0	00:00:00.0	59.6	45.5	18:56:58	74.6	18:45:20	65.7	62.6	60.4	58.2	51.9	48.1

APPENDIX D

CONSTRUCTION NOISE MODELING

Receptor - Residential to Northwest

Construction Phase Equipment Item	# of Items	Item Lmax at 50 feet, dBA[1]	Distance to Receptor[3]	Item Usage Percent	Usage Factor	Dist. Correction dB	Usage Adj. dB	Receptor Item Lmax, dBA	Receptor Item Leq, dBA	Required Mitigation	Mitigated Noise Level	Reduction (dBA Leq)
Demolition												
Concrete/Industrial Saws	1	76	429	20	0.20	-18.7	-7.0	57.3	50.3	Enclosure or Acoustic Tent (10 dB Reduction)	40.3	
Rubber Tired Dozers	1	85	429	40	0.40	-18.7	-4.0	66.3	62.4	Muffler (10 dB Reduction)	52.4	10.0
Tractors/Loaders/Backhoes	2	84	429	40	0.80	-18.7	-1.0	65.3	64.4	Muffler (10 dB Reduction)	54.4	
								Log Sum	66.6		56.6	
Site Preparation												
Grader	1	85	508	40	0.40	-20.1	-4.0	64.9	60.9	Muffler (10 dB Reduction)	50.9	
Tractors/Loaders/Backhoes	1	84	508	40	0.40	-20.1	-4.0	63.9	59.9	Muffler (10 dB Reduction)	49.9	10.0
								Log Sum	63.4		53.4	
Grading												
Concrete/Industrial Saws	1	85	508	20	0.20	-20.1	-7.0	64.9	57.9	Enclosure or Acoustic Tent (10 dB Reduction)	47.9	
Rubber Tired Dozers	1	85	508	40	0.40	-20.1	-4.0	64.9	60.9	Muffler (10 dB Reduction)	50.9	10.0
Tractors/Loaders/Backhoes	2	84	508	40	0.80	-20.1	-1.0	63.9	62.9	Muffler (10 dB Reduction)	52.9	
								Log Sum	65.8		55.8	
Building Construction												
Cranes	1	83	508	16	0.16	-20.1	-8.0	62.9	54.9	Muffler (10 dB Reduction)	44.9	
Forklifts [2]	2	48	508	40	0.80	-20.1	-1.0	27.9	26.9	n/a	26.9	10.0
Tractors/Loaders/Backhoes	2	84	508	40	0.80	-20.1	-1.0	63.9	62.9	Muffler (10 dB Reduction)	52.9	
								Log Sum	63.5		53.5	
Paving												
Cement and Mortar Mixers	4	79	508	40	1.60	-20.1	2.0	58.9	60.9	Muffler (10 dB Reduction)	50.9	
Pavers	1	77	508	50	0.50	-20.1	-3.0	56.9	53.9	Muffler (10 dB Reduction)	43.9	
Rollers	1	80	508	20	0.20	-20.1	-7.0	59.9	52.9	Muffler (10 dB Reduction)	42.9	10.0
Tractors/Loaders/Backhoes	1	84	508	40	0.40	-20.1	-4.0	63.9	59.9	Muffler (10 dB Reduction)	49.9	
								Log Sum	64.2		54.2	
Architectural Coating												
Air Compressors	1	80	508	40	0.40	-20.1	-4.0	59.9	55.9	Enclosure or Acoustic Tent (10 dB Reduction)	45.9	10.0
								Log Sum	55.9		45.9	

Notes:

(1) Source: Referenced noise levels from the Federal Transit Administration (FTA) Transit Noise and Vibration Impact Assessment Manual (September 2018) and the FHWA Roadway Construciton Noise Model User's Guide (January 2006)

(2) Source: SoundPLAN reference list.

(3) Distance to receptor calculated from center of site. Construction noise projected from the center of the project site to nearest sensitive use (structure).

Receptor - Church & School to Northwest

Construction Phase Equipment Item	# of Items	Item Lmax at 50 feet, dBA[1]	Distance to Receptor[3]	Item Usage Percent	Usage Factor	Dist. Correction dB	Usage Adj. dB	Receptor Item Lmax, dBA	Receptor Item Leq, dBA	Required Mitigation	Mitigated Noise Level	Reduction (dBA Leq)
Demolition												
Concrete/Industrial Saws	1	76	127	20	0.20	-8.1	-7.0	67.9	60.9	Enclosure or Acoustic Tent (10 dB Reduction)	50.9	
Rubber Tired Dozers	1	85	127	40	0.40	-8.1	-4.0	76.9	72.9	Muffler (10 dB Reduction)	62.9	10.0
Tractors/Loaders/Backhoes	2	84	127	40	0.80	-8.1	-1.0	75.9	74.9	Muffler (10 dB Reduction)	64.9	
								Log Sum	77.2		67.2	
Site Preparation												
Grader	1	85	165	40	0.40	-10.4	-4.0	74.6	70.7	Muffler (10 dB Reduction)	60.7	
Tractors/Loaders/Backhoes	1	84	165	40	0.40	-10.4	-4.0	73.6	69.7	Muffler (10 dB Reduction)	59.7	10.0
								Log Sum	73.2		63.2	
Grading												
Concrete/Industrial Saws	1	85	165	20	0.20	-10.4	-7.0	74.6	67.6	Enclosure or Acoustic Tent (10 dB Reduction)	57.6	
Rubber Tired Dozers	1	85	165	40	0.40	-10.4	-4.0	74.6	70.7	Muffler (10 dB Reduction)	60.7	10.0
Tractors/Loaders/Backhoes	2	84	165	40	0.80	-10.4	-1.0	73.6	72.7	Muffler (10 dB Reduction)	62.7	
								Log Sum	75.5		65.5	
Building Construction												
Cranes	1	83	165	16	0.16	-10.4	-8.0	72.6	64.7	Muffler (10 dB Reduction)	54.7	
Forklifts [2]	2	48	165	40	0.80	-10.4	-1.0	37.6	36.7	n/a	36.7	10.0
Tractors/Loaders/Backhoes	2	84	165	40	0.80	-10.4	-1.0	73.6	72.7	Muffler (10 dB Reduction)	62.7	
								Log Sum	73.3		63.3	
Paving												
Cement and Mortar Mixers	4	79	165	40	1.60	-10.4	2.0	68.6	70.7	Muffler (10 dB Reduction)	60.7	
Pavers	1	77	165	50	0.50	-10.4	-3.0	66.6	63.6	Muffler (10 dB Reduction)	53.6	
Rollers	1	80	165	20	0.20	-10.4	-7.0	69.6	62.6	Muffler (10 dB Reduction)	52.6	10.0
Tractors/Loaders/Backhoes	1	84	165	40	0.40	-10.4	-4.0	73.6	69.7	Muffler (10 dB Reduction)	59.7	
								Log Sum	74.0		64.0	
Architectural Coating												
Air Compressors	1	80	165	40	0.40	-10.4	-4.0	69.6	65.7	Enclosure or Acoustic Tent (10 dB Reduction)	55.7	10.0
								Log Sum	65.7		55.7	

Notes:

(1) Source: Referenced noise levels from the Federal Transit Administration (FTA) Transit Noise and Vibration Impact Assessment Manual (September 2018) and the FHWA Roadway Construciton Noise Model User's Guide (January 2006)

(2) Source: SoundPLAN reference list.

(3) Distance to receptor calculated from center of site. Construction noise projected from the center of the project site to nearest sensitive use (structure).

Receptor - Commercial to North

Construction Phase Equipment Item	# of Items	Item Lmax at 50 feet, dBA[1]	Distance to Receptor[3]	Item Usage Percent	Usage Factor	Dist. Correction dB	Usage Adj. dB	Receptor Item Lmax, dBA	Receptor Item Leq, dBA	Required Mitigation	Mitigated Noise Level	Reduction (dBA Leq)
Demolition												
Concrete/Industrial Saws	1	76	150	20	0.20	-9.5	-7.0	66.5	59.5	Enclosure or Acoustic Tent (10 dB Reduction)	49.5	
Rubber Tired Dozers	1	85	150	40	0.40	-9.5	-4.0	75.5	71.5	Muffler (10 dB Reduction)	61.5	10.0
Tractors/Loaders/Backhoes	2	84	150	40	0.80	-9.5	-1.0	74.5	73.5	Muffler (10 dB Reduction)	63.5	
								Log Sum	75.7		65.7	
Site Preparation												
Grader	1	85	162	40	0.40	-10.2	-4.0	74.8	70.8	Muffler (10 dB Reduction)	60.8	
Tractors/Loaders/Backhoes	1	84	162	40	0.40	-10.2	-4.0	73.8	69.8	Muffler (10 dB Reduction)	59.8	10.0
								Log Sum	73.3		63.3	
Grading												
Concrete/Industrial Saws	1	85	162	20	0.20	-10.2	-7.0	74.8	67.8	Enclosure or Acoustic Tent (10 dB Reduction)	57.8	
Rubber Tired Dozers	1	85	162	40	0.40	-10.2	-4.0	74.8	70.8	Muffler (10 dB Reduction)	60.8	10.0
Tractors/Loaders/Backhoes	2	84	162	40	0.80	-10.2	-1.0	73.8	72.8	Muffler (10 dB Reduction)	62.8	
								Log Sum	75.7		65.7	
Building Construction												
Cranes	1	83	162	16	0.16	-10.2	-8.0	72.8	64.8	Muffler (10 dB Reduction)	54.8	
Forklifts [2]	2	48	162	40	0.80	-10.2	-1.0	37.8	36.8	n/a	36.8	10.0
Tractors/Loaders/Backhoes	2	84	162	40	0.80	-10.2	-1.0	73.8	72.8	Muffler (10 dB Reduction)	62.8	
								Log Sum	73.5		63.5	
Paving												
Cement and Mortar Mixers	4	79	162	40	1.60	-10.2	2.0	68.8	70.8	Muffler (10 dB Reduction)	60.8	
Pavers	1	77	162	50	0.50	-10.2	-3.0	66.8	63.8	Muffler (10 dB Reduction)	53.8	
Rollers	1	80	162	20	0.20	-10.2	-7.0	69.8	62.8	Muffler (10 dB Reduction)	52.8	10.0
Tractors/Loaders/Backhoes	1	84	162	40	0.40	-10.2	-4.0	73.8	69.8	Muffler (10 dB Reduction)	59.8	
								Log Sum	74.1		64.1	
Architectural Coating												
Air Compressors	1	80	162	40	0.40	-10.2	-4.0	69.8	65.8	Enclosure or Acoustic Tent (10 dB Reduction)	55.8	10.0
								Log Sum	65.8		55.8	

Notes:

(1) Source: Referenced noise levels from the Federal Transit Administration (FTA) Transit Noise and Vibration Impact Assessment Manual (September 2018) and the FHWA Roadway Construciton Noise Model User's Guide (January 2006)

(2) Source: SoundPLAN reference list.

(3) Distance to receptor calculated from center of site. Construction noise projected from the center of the project site to nearest sensitive use (structure).

Receptor - Residential to Northeast

Construction Phase Equipment Item	# of Items	Item Lmax at 50 feet, dBA[1]	Distance to Receptor[3]	Item Usage Percent	Usage Factor	Dist. Correction dB	Usage Adj. dB	Receptor Item Lmax, dBA	Receptor Item Leq, dBA	Required Mitigation	Mitigated Noise Level	Reduction (dBA Leq)
Demolition												
Concrete/Industrial Saws	1	76	438	20	0.20	-18.9	-7.0	57.1	50.2	Enclosure or Acoustic Tent (10 dB Reduction)	40.2	
Rubber Tired Dozers	1	85	438	40	0.40	-18.9	-4.0	66.1	62.2	Muffler (10 dB Reduction)	52.2	10.0
Tractors/Loaders/Backhoes	2	84	438	40	0.80	-18.9	-1.0	65.1	64.2	Muffler (10 dB Reduction)	54.2	
								Log Sum	66.4		56.4	
Site Preparation												
Grader	1	85	388	40	0.40	-17.8	-4.0	67.2	63.2	Muffler (10 dB Reduction)	53.2	
Tractors/Loaders/Backhoes	1	84	388	40	0.40	-17.8	-4.0	66.2	62.2	Muffler (10 dB Reduction)	52.2	10.0
								Log Sum	65.8		55.8	
Grading												
Concrete/Industrial Saws	1	85	388	20	0.20	-17.8	-7.0	67.2	60.2	Enclosure or Acoustic Tent (10 dB Reduction)	50.2	
Rubber Tired Dozers	1	85	388	40	0.40	-17.8	-4.0	67.2	63.2	Muffler (10 dB Reduction)	53.2	10.0
Tractors/Loaders/Backhoes	2	84	388	40	0.80	-17.8	-1.0	66.2	65.2	Muffler (10 dB Reduction)	55.2	
								Log Sum	68.1		58.1	
Building Construction												
Cranes	1	83	388	16	0.16	-17.8	-8.0	65.2	57.2	Muffler (10 dB Reduction)	47.2	
Forklifts [2]	2	48	388	40	0.80	-17.8	-1.0	30.2	29.2	n/a	29.2	10.0
Tractors/Loaders/Backhoes	2	84	388	40	0.80	-17.8	-1.0	66.2	65.2	Muffler (10 dB Reduction)	55.2	
								Log Sum	65.9		55.9	
Paving												
Cement and Mortar Mixers	4	79	388	40	1.60	-17.8	2.0	61.2	63.2	Muffler (10 dB Reduction)	53.2	
Pavers	1	77	388	50	0.50	-17.8	-3.0	59.2	56.2	Muffler (10 dB Reduction)	46.2	
Rollers	1	80	388	20	0.20	-17.8	-7.0	62.2	55.2	Muffler (10 dB Reduction)	45.2	10.0
Tractors/Loaders/Backhoes	1	84	388	40	0.40	-17.8	-4.0	66.2	62.2	Muffler (10 dB Reduction)	52.2	
								Log Sum	66.6		56.6	
Architectural Coating												
Air Compressors	1	80	388	40	0.40	-17.8	-4.0	62.2	58.2	Enclosure or Acoustic Tent (10 dB Reduction)	48.2	10.0
								Log Sum	58.2		48.2	

Notes:

(1) Source: Referenced noise levels from the Federal Transit Administration (FTA) Transit Noise and Vibration Impact Assessment Manual (September 2018) and the FHWA Roadway Construciton Noise Model User's Guide (January 2006)

(2) Source: SoundPLAN reference list.

(3) Distance to receptor calculated from center of site. Construction noise projected from the center of the project site to nearest sensitive use (structure).

Receptor - Commercial to East

Construction Phase Equipment Item	# of Items	Item Lmax at 50 feet, dBA[1]	Distance to Receptor[3]	Item Usage Percent	Usage Factor	Dist. Correction dB	Usage Adj. dB	Receptor Item Lmax, dBA	Receptor Item Leq, dBA	Required Mitigation	Mitigated Noise Level	Reduction (dBA Leq)
Demolition												
Concrete/Industrial Saws	1	76	245	20	0.20	-13.8	-7.0	62.2	55.2	Enclosure or Acoustic Tent (10 dB Reduction)	45.2	
Rubber Tired Dozers	1	85	245	40	0.40	-13.8	-4.0	71.2	67.2	Muffler (10 dB Reduction)	57.2	10.0
Tractors/Loaders/Backhoes	2	84	245	40	0.80	-13.8	-1.0	70.2	69.2	Muffler (10 dB Reduction)	59.2	
								Log Sum	71.5		61.5	
Site Preparation												
Grader	1	85	165	40	0.40	-10.4	-4.0	74.6	70.7	Muffler (10 dB Reduction)	60.7	
Tractors/Loaders/Backhoes	1	84	165	40	0.40	-10.4	-4.0	73.6	69.7	Muffler (10 dB Reduction)	59.7	10.0
								Log Sum	73.2		63.2	
Grading												
Concrete/Industrial Saws	1	85	165	20	0.20	-10.4	-7.0	74.6	67.6	Enclosure or Acoustic Tent (10 dB Reduction)	57.6	
Rubber Tired Dozers	1	85	165	40	0.40	-10.4	-4.0	74.6	70.7	Muffler (10 dB Reduction)	60.7	10.0
Tractors/Loaders/Backhoes	2	84	165	40	0.80	-10.4	-1.0	73.6	72.7	Muffler (10 dB Reduction)	62.7	
								Log Sum	75.5		65.5	
Building Construction												
Cranes	1	83	165	16	0.16	-10.4	-8.0	72.6	64.7	Muffler (10 dB Reduction)	54.7	
Forklifts [2]	2	48	165	40	0.80	-10.4	-1.0	37.6	36.7	n/a	36.7	10.0
Tractors/Loaders/Backhoes	2	84	165	40	0.80	-10.4	-1.0	73.6	72.7	Muffler (10 dB Reduction)	62.7	
								Log Sum	73.3		63.3	
Paving												
Cement and Mortar Mixers	4	79	165	40	1.60	-10.4	2.0	68.6	70.7	Muffler (10 dB Reduction)	60.7	
Pavers	1	77	165	50	0.50	-10.4	-3.0	66.6	63.6	Muffler (10 dB Reduction)	53.6	
Rollers	1	80	165	20	0.20	-10.4	-7.0	69.6	62.6	Muffler (10 dB Reduction)	52.6	10.0
Tractors/Loaders/Backhoes	1	84	165	40	0.40	-10.4	-4.0	73.6	69.7	Muffler (10 dB Reduction)	59.7	
								Log Sum	74.0		64.0	
Architectural Coating												
Air Compressors	1	80	165	40	0.40	-10.4	-4.0	69.6	65.7	Enclosure or Acoustic Tent (10 dB Reduction)	55.7	10.0
								Log Sum	65.7		55.7	

Notes:

(1) Source: Referenced noise levels from the Federal Transit Administration (FTA) Transit Noise and Vibration Impact Assessment Manual (September 2018) and the FHWA Roadway Construciton Noise Model User's Guide (January 2006)

(2) Source: SoundPLAN reference list.

(3) Distance to receptor calculated from center of site. Construction noise projected from the center of the project site to nearest sensitive use (structure).

Receptor - Residential to South

Construction Phase Equipment Item	# of Items	Item Lmax at 50 feet, dBA[1]	Distance to Receptor[3]	Item Usage Percent	Usage Factor	Dist. Correction dB	Usage Adj. dB	Receptor Item Lmax, dBA	Receptor Item Leq, dBA	Required Mitigation	Mitigated Noise Level	Reduction (dBA Leq)
Demolition												
Concrete/Industrial Saws	1	76	77	20	0.20	-3.8	-7.0	72.2	65.3	Enclosure or Acoustic Tent (10 dB Reduction)	55.3	
Rubber Tired Dozers	1	85	77	40	0.40	-3.8	-4.0	81.2	77.3	Muffler (10 dB Reduction)	67.3	10.0
Tractors/Loaders/Backhoes	2	84	77	40	0.80	-3.8	-1.0	80.2	79.3	Muffler (10 dB Reduction)	69.3	
								Log Sum	81.5		71.5	
Site Preparation												
Grader	1	85	55	40	0.40	-0.8	-4.0	84.2	80.2	Muffler (10 dB Reduction)	70.2	
Tractors/Loaders/Backhoes	1	84	55	40	0.40	-0.8	-4.0	83.2	79.2	Muffler (10 dB Reduction)	69.2	10.0
								Log Sum	82.7		72.7	
Grading												
Concrete/Industrial Saws	1	85	76	20	0.20	-3.6	-7.0	81.4	74.4	Enclosure or Acoustic Tent (10 dB Reduction)	64.4	
Rubber Tired Dozers	1	85	55	40	0.40	-0.8	-4.0	84.2	80.2	Muffler (10 dB Reduction)	70.2	10.0
Tractors/Loaders/Backhoes	2	84	55	40	0.80	-0.8	-1.0	83.2	82.2	Muffler (10 dB Reduction)	72.2	
								Log Sum	84.7		74.7	
Building Construction												
Cranes	1	83	55	16	0.16	-0.8	-8.0	82.2	74.2	Muffler (10 dB Reduction)	64.2	
Forklifts [2]	2	48	55	40	0.80	-0.8	-1.0	47.2	46.2	n/a	46.2	10.0
Tractors/Loaders/Backhoes	2	84	55	40	0.80	-0.8	-1.0	83.2	82.2	Muffler (10 dB Reduction)	72.2	
								Log Sum	82.8		72.9	
Paving												
Cement and Mortar Mixers	4	79	55	40	1.60	-0.8	2.0	78.2	80.2	Muffler (10 dB Reduction)	70.2	
Pavers	1	77	55	50	0.50	-0.8	-3.0	76.2	73.2	Muffler (10 dB Reduction)	63.2	
Rollers	1	80	55	20	0.20	-0.8	-7.0	79.2	72.2	Muffler (10 dB Reduction)	62.2	10.0
Tractors/Loaders/Backhoes	1	84	55	40	0.40	-0.8	-4.0	83.2	79.2	Muffler (10 dB Reduction)	69.2	
								Log Sum	83.5		73.5	
Architectural Coating												
Air Compressors	1	80	55	40	0.40	-0.8	-4.0	79.2	75.2	Enclosure or Acoustic Tent (10 dB Reduction)	65.2	10.0
								Log Sum	75.2		65.2	

Notes:

(1) Source: Referenced noise levels from the Federal Transit Administration (FTA) Transit Noise and Vibration Impact Assessment Manual (September 2018) and the FHWA Roadway Construciton Noise Model User's Guide (January 2006)

(2) Source: SoundPLAN reference list.

(3) Distance to receptor calculated from center of site. Construction noise projected from the center of the project site to nearest sensitive use (structure).

Receptor - Commercial to West

Construction Phase Equipment Item	# of Items	Item Lmax at 50 feet, dBA[1]	Distance to Receptor[3]	Item Usage Percent	Usage Factor	Dist. Correction dB	Usage Adj. dB	Receptor Item Lmax, dBA	Receptor Item Leq, dBA	Required Mitigation	Mitigated Noise Level	Reduction (dBA Leq)
Demolition												
Concrete/Industrial Saws	1	76	83	20	0.20	-4.4	-7.0	71.6	64.6	Enclosure or Acoustic Tent (10 dB Reduction)	54.6	
Rubber Tired Dozers	1	85	83	40	0.40	-4.4	-4.0	80.6	76.6	Muffler (10 dB Reduction)	66.6	10.0
Tractors/Loaders/Backhoes	2	84	83	40	0.80	-4.4	-1.0	79.6	78.6	Muffler (10 dB Reduction)	68.6	
								Log Sum	80.9		70.9	
Site Preparation												
Grader	1	85	165	40	0.40	-10.4	-4.0	74.6	70.7	Muffler (10 dB Reduction)	60.7	
Tractors/Loaders/Backhoes	1	84	165	40	0.40	-10.4	-4.0	73.6	69.7	Muffler (10 dB Reduction)	59.7	10.0
								Log Sum	73.2		63.2	
Grading												
Concrete/Industrial Saws	1	85	165	20	0.20	-10.4	-7.0	74.6	67.6	Enclosure or Acoustic Tent (10 dB Reduction)	57.6	
Rubber Tired Dozers	1	85	165	40	0.40	-10.4	-4.0	74.6	70.7	Muffler (10 dB Reduction)	60.7	10.0
Tractors/Loaders/Backhoes	2	84	165	40	0.80	-10.4	-1.0	73.6	72.7	Muffler (10 dB Reduction)	62.7	
								Log Sum	75.5		65.5	
Building Construction												
Cranes	1	83	165	16	0.16	-10.4	-8.0	72.6	64.7	Muffler (10 dB Reduction)	54.7	
Forklifts [2]	2	48	165	40	0.80	-10.4	-1.0	37.6	36.7	n/a	36.7	10.0
Tractors/Loaders/Backhoes	2	84	165	40	0.80	-10.4	-1.0	73.6	72.7	Muffler (10 dB Reduction)	62.7	
								Log Sum	73.3		63.3	
Paving												
Cement and Mortar Mixers	4	79	165	40	1.60	-10.4	2.0	68.6	70.7	Muffler (10 dB Reduction)	60.7	
Pavers	1	77	165	50	0.50	-10.4	-3.0	66.6	63.6	Muffler (10 dB Reduction)	53.6	
Rollers	1	80	165	20	0.20	-10.4	-7.0	69.6	62.6	Muffler (10 dB Reduction)	52.6	10.0
Tractors/Loaders/Backhoes	1	84	165	40	0.40	-10.4	-4.0	73.6	69.7	Muffler (10 dB Reduction)	59.7	
								Log Sum	74.0		64.0	
Architectural Coating												
Air Compressors	1	80	165	40	0.40	-10.4	-4.0	69.6	65.7	Enclosure or Acoustic Tent (10 dB Reduction)	55.7	10.0
								Log Sum	65.7		55.7	

Notes:

(1) Source: Referenced noise levels from the Federal Transit Administration (FTA) Transit Noise and Vibration Impact Assessment Manual (September 2018) and the FHWA Roadway Construciton Noise Model User's Guide (January 2006)

(2) Source: SoundPLAN reference list.

(3) Distance to receptor calculated from center of site. Construction noise projected from the center of the project site to nearest sensitive use (structure).

APPENDIX E

PROJECT GENERATED TRIPS FHWA WORKSHEETS

FHWA Sound32 Spreadsheet

Project Traffic Noise

	DAYTIME			NIGHTTIME									
	AUTOS	M.TRUCKS	H.TRUCKS	AUTOS	M.TRUCKS	H.TRUCKS							
INPUT PARAMETERS													
Vehicles per hour	2.71	0.06	0.03	2.71	0.06	0.03							
Speed in MPH	35.00	35.00	35.00	35.00	35.00	35.00							
Left angle	-90.00	-90.00	-90.00	-90.00	-90.00	-90.00							
Right angle	90.00	90.00	90.00	90.00	90.00	90.00							
NOISE CALCULATIONS													
Reference levels	65.11	74.83	80.05	65.11	74.83	80.05							
ADJUSTMENTS													
Flow	-1.42	-18.28	-21.29	-1.42	-18.28	-21.29							
Distance	-0.07	-0.07	-0.07	-0.07	-0.07	-0.07							
Finite Roadway	0.00	0.00	0.00	0.00	0.00	0.00							
Barrier	0.00	0.00	0.00	0.00	0.00	0.00							
Grade	0.00	0.00	0.00	0.00	0.00	0.00							
Constant	-25.00	-25.00	-25.00	-25.00	-25.00	-25.00							
LEQ	38.62	31.48	33.69	38.62	31.48	33.69							
	DAY LEQ	40.42		NIGHT LEQ	40.42								

ADT	134.00	#VALUE!				
SPEED	35.00					
DISTANCE	50.00					
		0.32				
% A	97.00	% DAY	50.00	48.50		77.60
		% NIGHT	50.00	48.50		4.85
						14.55
% MT	2.00	% DAY	50.00	1.00		1.60
		% NIGHT	50.00	1.00		0.10
						0.30
% HT	1.00	% DAY	50.00	0.50		0.80
		% NIGHT	50.00	0.50		0.05
						0.15
LEFT	-90.00					
RIGHT	90.00					
Ldn	46.83					
DAY LEQ	40.42					
Day hour	89.00					
Absorbtive?	no	TO TURN ON, COPY K2 TO J2				
Use hour?	no	TO TURN OFF, ENTER ADTS IN J2				
		GRADE dB	0.00			

APPENDIX F

SOUNDPLAN WORKSHEETS

Noise emissions of industry sources

Source name	Refere	Level		Frequency spectrum [dB(A)]																															Correcti		
			dB(A	20 Hz	25 Hz	31 Hz	40 Hz	50 Hz	63 Hz	80 Hz	10(Hz	12! Hz	16(Hz	20(Hz	25(Hz	31! Hz	40(Hz	50(Hz	63(Hz	80(Hz	1 kH:	1.3 kH:	1.6 kH:	2 kH:	2.5 kH:	3.2 kH:	4 kH:	5 kH:	6.3 kH:	8 kH:	10 kH:	12. kH:	16 kH:	20 kH:	Cwa dB	C dE	CT dE
Car Wash Dryin	Lw/unit	Day	98.7	-	45.	52.	58.	64.	73.	75.	71.	72.	77.	77.	75.	85.	95.	92.	85.	82.	80.	82.	83.	83.	83.	80.	78.	77.	73.	71.	68.	63.	56.	45.	-	-	-
Blower/Vacuum	Lw/unit	Day	84.7	-	-	-	-	-	42.	46.	58.	61.	63.	78.	81.	83.	74.	75.	77.	75.	76.	76.	76.	76.	76.	75.	75.	74.	70.	69.	-	-	-	-	-	-	-
Blower/Vacuum	Lw/unit	Day	84.7	-	-	-	-	-	42.	46.	58.	61.	63.	78.	81.	83.	74.	75.	77.	75.	76.	76.	76.	76.	76.	75.	75.	74.	70.	69.	-	-	-	-	-	-	-
Blower/Vacuum	Lw/unit	Day	84.7	-	-	-	-	-	42.	46.	58.	61.	63.	78.	81.	83.	74.	75.	77.	75.	76.	76.	76.	76.	76.	75.	75.	74.	70.	69.	-	-	-	-	-	-	-
Blower/Vacuum	Lw/unit	Day	84.7	-	-	-	-	-	42.	46.	58.	61.	63.	78.	81.	83.	74.	75.	77.	75.	76.	76.	76.	76.	76.	75.	75.	74.	70.	69.	-	-	-	-	-	-	-
Blower/Vacuum	Lw/unit	Day	84.7	-	-	-	-	-	42.	46.	58.	61.	63.	78.	81.	83.	74.	75.	77.	75.	76.	76.	76.	76.	76.	75.	75.	74.	70.	69.	-	-	-	-	-	-	-
Blower/Vacuum	Lw/unit	Day	84.7	-	-	-	-	-	42.	46.	58.	61.	63.	78.	81.	83.	74.	75.	77.	75.	76.	76.	76.	76.	76.	75.	75.	74.	70.	69.	-	-	-	-	-	-	-
Blower/Vacuum	Lw/unit	Day	84.7	-	-	-	-	-	42.	46.	58.	61.	63.	78.	81.	83.	74.	75.	77.	75.	76.	76.	76.	76.	76.	75.	75.	74.	70.	69.	-	-	-	-	-	-	-
Blower/Vacuum	Lw/unit	Day	84.7	-	-	-	-	-	42.	46.	58.	61.	63.	78.	81.	83.	74.	75.	77.	75.	76.	76.	76.	76.	76.	75.	75.	74.	70.	69.	-	-	-	-	-	-	-
Blower/Vacuum	Lw/unit	Day	84.7	-	-	-	-	-	42.	46.	58.	61.	63.	78.	81.	83.	74.	75.	77.	75.	76.	76.	76.	76.	76.	75.	75.	74.	70.	69.	-	-	-	-	-	-	-
Blower/Vacuum	Lw/unit	Day	84.7	-	-	-	-	-	42.	46.	58.	61.	63.	78.	81.	83.	74.	75.	77.	75.	76.	76.	76.	76.	76.	75.	75.	74.	70.	69.	-	-	-	-	-	-	-
Blower/Vacuum	Lw/unit	Day	84.7	-	-	-	-	-	42.	46.	58.	61.	63.	78.	81.	83.	74.	75.	77.	75.	76.	76.	76.	76.	76.	75.	75.	74.	70.	69.	-	-	-	-	-	-	-
Blower/Vacuum	Lw/unit	Day	84.7	-	-	-	-	-	42.	46.	58.	61.	63.	78.	81.	83.	74.	75.	77.	75.	76.	76.	76.	76.	76.	75.	75.	74.	70.	69.	-	-	-	-	-	-	-
Blower/Vacuum	Lw/unit	Day	84.7	-	-	-	-	-	42.	46.	58.	61.	63.	78.	81.	83.	74.	75.	77.	75.	76.	76.	76.	76.	76.	75.	75.	74.	70.	69.	-	-	-	-	-	-	-
Blower/Vacuum	Lw/unit	Day	84.7	-	-	-	-	-	42.	46.	58.	61.	63.	78.	81.	83.	74.	75.	77.	75.	76.	76.	76.	76.	76.	75.	75.	74.	70.	69.	-	-	-	-	-	-	-
Blower/Vacuum	Lw/unit	Day	84.7	-	-	-	-	-	42.	46.	58.	61.	63.	78.	81.	83.	74.	75.	77.	75.	76.	76.	76.	76.	76.	75.	75.	74.	70.	69.	-	-	-	-	-	-	-
Blower/Vacuum	Lw/unit	Day	84.7	-	-	-	-	-	42.	46.	58.	61.	63.	78.	81.	83.	74.	75.	77.	75.	76.	76.	76.	76.	76.	75.	75.	74.	70.	69.	-	-	-	-	-	-	-
Blower/Vacuum	Lw/unit	Day	84.7	-	-	-	-	-	42.	46.	58.	61.	63.	78.	81.	83.	74.	75.	77.	75.	76.	76.	76.	76.	76.	75.	75.	74.	70.	69.	-	-	-	-	-	-	-
Blower/Vacuum	Lw/unit	Day	84.7	-	-	-	-	-	42.	46.	58.	61.	63.	78.	81.	83.	74.	75.	77.	75.	76.	76.	76.	76.	76.	75.	75.	74.	70.	69.	-	-	-	-	-	-	-
Blower/Vacuum	Lw/unit	Day	84.7	-	-	-	-	-	42.	46.	58.	61.	63.	78.	81.	83.	74.	75.	77.	75.	76.	76.	76.	76.	76.	75.	75.	74.	70.	69.	-	-	-	-	-	-	-
Blower/Vacuum	Lw/unit	Day	84.7	-	-	-	-	-	42.	46.	58.	61.	63.	78.	81.	83.	74.	75.	77.	75.	76.	76.	76.	76.	76.	75.	75.	74.	70.	69.	-	-	-	-	-	-	-
Blower/Vacuum	Lw/unit	Day	84.7	-	-	-	-	-	42.	46.	58.	61.	63.	78.	81.	83.	74.	75.	77.	75.	76.	76.	76.	76.	76.	75.	75.	74.	70.	69.	-	-	-	-	-	-	-
Blower/Vacuum	Lw/unit	Day	84.7	-	-	-	-	-	42.	46.	58.	61.	63.	78.	81.	83.	74.	75.	77.	75.	76.	76.	76.	76.	76.	75.	75.	74.	70.	69.	-	-	-	-	-	-	-
Blower/Vacuum	Lw/unit	Day	84.7	-	-	-	-	-	42.	46.	58.	61.	63.	78.	81.	83.	74.	75.	77.	75.	76.	76.	76.	76.	76.	75.	75.	74.	70.	69.	-	-	-	-	-	-	-
Blower/Vacuum	Lw/unit	Day	84.7	-	-	-	-	-	42.	46.	58.	61.	63.	78.	81.	83.	74.	75.	77.	75.	76.	76.	76.	76.	76.	75.	75.	74.	70.	69.	-	-	-	-	-	-	-
Blower/Vacuum	Lw/unit	Day	84.7	-	-	-	-	-	42.	46.	58.	61.	63.	78.	81.	83.	74.	75.	77.	75.	76.	76.	76.	76.	76.	75.	75.	74.	70.	69.	-	-	-	-	-	-	-
Blower/Vacuum	Lw/unit	Day	84.7	-	-	-	-	-	42.	46.	58.	61.	63.	78.	81.	83.	74.	75.	77.	75.	76.	76.	76.	76.	76.	75.	75.	74.	70.	69.	-	-	-	-	-	-	-
Blower/Vacuum	Lw/unit	Day	84.7	-	-	-	-	-	42.	46.	58.	61.	63.	78.	81.	83.	74.	75.	77.	75.	76.	76.	76.	76.	76.	75.	75.	74.	70.	69.	-	-	-	-	-	-	-
Blower/Vacuum	Lw/unit	Day	84.7	-	-	-	-	-	42.	46.	58.	61.	63.	78.	81.	83.	74.	75.	77.	75.	76.	76.	76.	76.	76.	75.	75.	74.	70.	69.	-	-	-	-	-	-	-
Blower/Vacuum	Lw/unit	Day	84.7	-	-	-	-	-	42.	46.	58.	61.	63.	78.	81.	83.	74.	75.	77.	75.	76.	76.	76.	76.	76.	75.	75.	74.	70.	69.	-	-	-	-	-	-	-
Blower/Vacuum	Lw/unit	Day	84.7	-	-	-	-	-	42.	46.	58.	61.	63.	78.	81.	83.	74.	75.	77.	75.	76.	76.	76.	76.	76.	75.	75.	74.	70.	69.	-	-	-	-	-	-	-
Blower/Vacuum	Lw/unit	Day	84.7	-	-	-	-	-	42.	46.	58.	61.	63.	78.	81.	83.	74.	75.	77.	75.	76.	76.	76.	76.	76.	75.	75.	74.	70.	69.	-	-	-	-	-	-	-
Blower/Vacuum	Lw/unit	Day	84.7	-	-	-	-	-	42.	46.	58.	61.	63.	78.	81.	83.	74.	75.	77.	75.	76.	76.	76.	76.	76.	75.	75.	74.	70.	69.	-	-	-	-	-	-	-
Blower/Vacuum	Lw/unit	Day	67.7	11.	14.	20.	24.	37.	42.	36.	47.	49.	48.	50.	50.	52.	53.	54.	58.	59.	55.	57.	58.	56.	57.	54.	55.	53.	53.	48.	43.	41.	37.	31.	-	-	-
Blower/Vacuum	Lw/unit	Day	67.7	11.	14.	20.	24.	37.	42.	36.	47.	49.	48.	50.	50.	52.	53.	54.	58.	59.	55.	57.	58.	56.	57.	54.	55.	53.	53.	48.	43.	41.	37.	31.	-	-	-

Receiver list

No.	Receiver name	Building side	Floor	Limit Day dB(A)	Level w/o NP Day dB(A)	Level w NP Day dB(A)	Difference Day dB	Conflict Day dB
1	1	North	1.Fl	-	48.4	0.0	-48.4	-
2	2	-	1.Fl	-	46.9	0.0	-46.9	-
3	3	-	1.Fl	-	55.1	0.0	-55.1	-
4	4	-	1.Fl	-	43.9	0.0	-43.9	-
5	5	-	1.Fl	-	41.4	0.0	-41.4	-
6	6	-	1.Fl	-	58.9	0.0	-58.9	-
7	7	West	1.Fl	-	65.2	0.0	-65.2	-
8	8	East	1.Fl	-	56.6	0.0	-56.6	-

Contribution levels of the receivers

Source name			Traffic lane	Level w/o NP Day dB(A)	Level w NP Day dB(A)
1	1.Fl	48.4	0.0		
Blower/Vacuum End1			-	35.9	-
Blower/Vacuum End2			-	36.5	-
Blower/Vacuum End3			-	36.8	-
Blower/Vacuum End4			-	37.7	-
Blower/Vacuum End5			-	38.7	-
Blower/Vacuum End6			-	39.3	-
Blower/Vacuum End7			-	39.8	-
Blower/Vacuum End8			-	21.3	-
Blower/Vacuum End9			-	20.5	-
Blower/Vacuum End10			-	19.8	-
Blower/Vacuum End11			-	19.2	-
Blower/Vacuum End12			-	18.7	-
Blower/Vacuum End13			-	18.1	-
Blower/Vacuum End14			-	20.8	-
Blower/Vacuum End15			-	21.0	-
Blower/Vacuum End16			-	21.2	-
Blower/Vacuum End17			-	21.4	-
Blower/Vacuum End18			-	21.8	-
Blower/Vacuum End19			-	21.9	-
Blower/Vacuum End20			-	22.3	-
Blower/Vacuum End21			-	22.7	-
Blower/Vacuum End22			-	33.0	-
Blower/Vacuum End23			-	32.8	-
Blower/Vacuum End24			-	32.5	-
Blower/Vacuum End25			-	32.3	-
Blower/Vacuum End26			-	32.0	-
Blower/Vacuum End27			-	31.7	-
Blower/Vacuum End28			-	31.3	-
Blower/Vacuum End29			-	31.4	-
Blower/Vacuum End30			-	32.3	-
Blower/Vacuum End31			-	32.1	-
Blower/Vacuum End33			-	17.7	-
Blower/Vacuum End34			-	16.4	-
Car Wash Drying System			-	38.3	-
2	1.Fl	46.9	0.0		
Blower/Vacuum End1			-	29.8	-
Blower/Vacuum End2			-	29.8	-
Blower/Vacuum End3			-	29.6	-
Blower/Vacuum End4			-	29.7	-
Blower/Vacuum End5			-	29.7	-
Blower/Vacuum End6			-	29.8	-
Blower/Vacuum End7			-	30.0	-
Blower/Vacuum End8			-	33.1	-
Blower/Vacuum End9			-	33.3	-
Blower/Vacuum End10			-	33.5	-
Blower/Vacuum End11			-	33.7	-
Blower/Vacuum End12			-	33.9	-
Blower/Vacuum End13			-	32.0	-
Blower/Vacuum End14			-	33.3	-
Blower/Vacuum End15			-	33.0	-
Blower/Vacuum End16			-	33.6	-
Blower/Vacuum End17			-	32.5	-
Blower/Vacuum End18			-	33.5	-
Blower/Vacuum End19			-	33.2	-
Blower/Vacuum End20			-	33.0	-
Blower/Vacuum End21			-	32.8	-
Blower/Vacuum End22			-	31.5	-
Blower/Vacuum End23			-	31.4	-
Blower/Vacuum End24			-	31.2	-
Blower/Vacuum End25			-	29.3	-
Blower/Vacuum End26			-	29.2	-
Blower/Vacuum End27			-	28.9	-

Contribution levels of the receivers

Source name	Traffic lane	Level w/o NP Day dB(A)	Level w NP Day dB(A)
Blower/Vacuum End28	-	28.7	-
Blower/Vacuum End29	-	28.5	-
Blower/Vacuum End30	-	28.3	-
Blower/Vacuum End31	-	28.1	-
Blower/Vacuum End33	-	9.9	-
Blower/Vacuum End34	-	12.5	-
Car Wash Drying System	-	35.6	-
3 1.Fl 55.1 0.0			
Blower/Vacuum End1	-	39.7	-
Blower/Vacuum End2	-	38.4	-
Blower/Vacuum End3	-	38.5	-
Blower/Vacuum End4	-	38.8	-
Blower/Vacuum End5	-	38.8	-
Blower/Vacuum End6	-	38.3	-
Blower/Vacuum End7	-	38.6	-
Blower/Vacuum End8	-	38.0	-
Blower/Vacuum End9	-	37.6	-
Blower/Vacuum End10	-	37.3	-
Blower/Vacuum End11	-	36.9	-
Blower/Vacuum End12	-	36.6	-
Blower/Vacuum End13	-	37.4	-
Blower/Vacuum End14	-	36.2	-
Blower/Vacuum End15	-	36.6	-
Blower/Vacuum End16	-	37.1	-
Blower/Vacuum End17	-	37.5	-
Blower/Vacuum End18	-	37.1	-
Blower/Vacuum End19	-	37.6	-
Blower/Vacuum End20	-	39.1	-
Blower/Vacuum End21	-	39.6	-
Blower/Vacuum End22	-	42.0	-
Blower/Vacuum End23	-	42.4	-
Blower/Vacuum End24	-	42.7	-
Blower/Vacuum End25	-	43.0	-
Blower/Vacuum End26	-	43.1	-
Blower/Vacuum End27	-	43.1	-
Blower/Vacuum End28	-	43.0	-
Blower/Vacuum End29	-	42.7	-
Blower/Vacuum End30	-	42.4	-
Blower/Vacuum End31	-	41.9	-
Blower/Vacuum End33	-	18.0	-
Blower/Vacuum End34	-	18.9	-
Car Wash Drying System	-	38.7	-
4 1.Fl 43.9 0.0			
Blower/Vacuum End1	-	18.3	-
Blower/Vacuum End2	-	22.6	-
Blower/Vacuum End3	-	28.9	-
Blower/Vacuum End4	-	28.7	-
Blower/Vacuum End5	-	28.5	-
Blower/Vacuum End6	-	28.3	-
Blower/Vacuum End7	-	28.2	-
Blower/Vacuum End8	-	29.2	-
Blower/Vacuum End9	-	29.0	-
Blower/Vacuum End10	-	28.9	-
Blower/Vacuum End11	-	28.7	-
Blower/Vacuum End12	-	28.5	-
Blower/Vacuum End13	-	29.5	-
Blower/Vacuum End14	-	26.4	-
Blower/Vacuum End15	-	26.5	-
Blower/Vacuum End16	-	28.2	-
Blower/Vacuum End17	-	28.4	-
Blower/Vacuum End18	-	28.6	-
Blower/Vacuum End19	-	27.2	-
Blower/Vacuum End20	-	27.4	-

Contribution levels of the receivers

Source name	Traffic lane	Level w/o NP Day dB(A)	Level w NP Day dB(A)
Blower/Vacuum End21	-	27.6	-
Blower/Vacuum End22	-	28.8	-
Blower/Vacuum End23	-	29.0	-
Blower/Vacuum End24	-	29.2	-
Blower/Vacuum End25	-	29.4	-
Blower/Vacuum End26	-	29.6	-
Blower/Vacuum End27	-	29.8	-
Blower/Vacuum End28	-	30.0	-
Blower/Vacuum End29	-	30.2	-
Blower/Vacuum End30	-	30.5	-
Blower/Vacuum End31	-	30.7	-
Blower/Vacuum End33	-	7.8	-
Blower/Vacuum End34	-	9.3	-
Car Wash Drying System	-	32.8	-
5 1.Fl 41.4 0.0			
Blower/Vacuum End1	-	20.5	-
Blower/Vacuum End2	-	20.5	-
Blower/Vacuum End3	-	20.8	-
Blower/Vacuum End4	-	20.2	-
Blower/Vacuum End5	-	20.8	-
Blower/Vacuum End6	-	27.2	-
Blower/Vacuum End7	-	27.1	-
Blower/Vacuum End8	-	17.2	-
Blower/Vacuum End9	-	15.8	-
Blower/Vacuum End10	-	16.2	-
Blower/Vacuum End11	-	15.5	-
Blower/Vacuum End12	-	15.4	-
Blower/Vacuum End13	-	16.2	-
Blower/Vacuum End14	-	18.5	-
Blower/Vacuum End15	-	18.5	-
Blower/Vacuum End16	-	18.6	-
Blower/Vacuum End17	-	18.6	-
Blower/Vacuum End18	-	18.7	-
Blower/Vacuum End19	-	20.2	-
Blower/Vacuum End20	-	20.7	-
Blower/Vacuum End21	-	19.6	-
Blower/Vacuum End22	-	21.4	-
Blower/Vacuum End23	-	22.5	-
Blower/Vacuum End24	-	22.3	-
Blower/Vacuum End25	-	21.7	-
Blower/Vacuum End26	-	23.1	-
Blower/Vacuum End27	-	21.6	-
Blower/Vacuum End28	-	21.1	-
Blower/Vacuum End29	-	20.4	-
Blower/Vacuum End30	-	22.3	-
Blower/Vacuum End31	-	21.8	-
Blower/Vacuum End33	-	12.6	-
Blower/Vacuum End34	-	14.7	-
Car Wash Drying System	-	39.9	-
6 1.Fl 58.9 0.0			
Blower/Vacuum End1	-	20.9	-
Blower/Vacuum End2	-	20.9	-
Blower/Vacuum End3	-	21.1	-
Blower/Vacuum End4	-	21.4	-
Blower/Vacuum End5	-	21.7	-
Blower/Vacuum End6	-	19.2	-
Blower/Vacuum End7	-	18.5	-
Blower/Vacuum End8	-	22.4	-
Blower/Vacuum End9	-	23.2	-
Blower/Vacuum End10	-	24.3	-
Blower/Vacuum End11	-	27.2	-
Blower/Vacuum End12	-	28.4	-
Blower/Vacuum End13	-	29.8	-

Contribution levels of the receivers

Source name	Traffic lane	Level w/o NP Day dB(A)	Level w NP Day dB(A)
Blower/Vacuum End14	-	34.4	-
Blower/Vacuum End15	-	34.0	-
Blower/Vacuum End16	-	32.4	-
Blower/Vacuum End17	-	32.5	-
Blower/Vacuum End18	-	29.1	-
Blower/Vacuum End19	-	28.9	-
Blower/Vacuum End20	-	27.5	-
Blower/Vacuum End21	-	26.6	-
Blower/Vacuum End22	-	20.3	-
Blower/Vacuum End23	-	19.8	-
Blower/Vacuum End24	-	19.5	-
Blower/Vacuum End25	-	19.3	-
Blower/Vacuum End26	-	18.1	-
Blower/Vacuum End27	-	17.9	-
Blower/Vacuum End28	-	17.7	-
Blower/Vacuum End29	-	18.6	-
Blower/Vacuum End30	-	18.5	-
Blower/Vacuum End31	-	18.4	-
Blower/Vacuum End33	-	11.7	-
Blower/Vacuum End34	-	11.9	-
Car Wash Drying System	-	58.8	-
7 1.Fl 65.2	0.0		
Blower/Vacuum End1	-	28.4	-
Blower/Vacuum End2	-	26.3	-
Blower/Vacuum End3	-	25.8	-
Blower/Vacuum End4	-	25.9	-
Blower/Vacuum End5	-	25.5	-
Blower/Vacuum End6	-	25.1	-
Blower/Vacuum End7	-	24.4	-
Blower/Vacuum End8	-	31.9	-
Blower/Vacuum End9	-	32.9	-
Blower/Vacuum End10	-	34.8	-
Blower/Vacuum End11	-	29.2	-
Blower/Vacuum End12	-	31.1	-
Blower/Vacuum End13	-	38.8	-
Blower/Vacuum End14	-	43.8	-
Blower/Vacuum End15	-	43.1	-
Blower/Vacuum End16	-	42.4	-
Blower/Vacuum End17	-	41.7	-
Blower/Vacuum End18	-	36.5	-
Blower/Vacuum End19	-	34.5	-
Blower/Vacuum End20	-	33.5	-
Blower/Vacuum End21	-	32.2	-
Blower/Vacuum End22	-	29.8	-
Blower/Vacuum End23	-	29.6	-
Blower/Vacuum End24	-	29.4	-
Blower/Vacuum End25	-	29.2	-
Blower/Vacuum End26	-	29.2	-
Blower/Vacuum End27	-	22.7	-
Blower/Vacuum End28	-	22.2	-
Blower/Vacuum End29	-	22.6	-
Blower/Vacuum End30	-	22.4	-
Blower/Vacuum End31	-	22.2	-
Blower/Vacuum End33	-	14.9	-
Blower/Vacuum End34	-	10.6	-
Car Wash Drying System	-	65.0	-
8 1.Fl 56.6	0.0		
Blower/Vacuum End1	-	42.2	-
Blower/Vacuum End2	-	41.6	-
Blower/Vacuum End3	-	41.0	-
Blower/Vacuum End4	-	40.2	-
Blower/Vacuum End5	-	38.7	-
Blower/Vacuum End6	-	38.0	-

Contribution levels of the receivers

Source name	Traffic lane	Level w/o NP Day dB(A)	Level w NP Day dB(A)
Blower/Vacuum End7	-	36.2	-
Blower/Vacuum End8	-	22.1	-
Blower/Vacuum End9	-	22.3	-
Blower/Vacuum End10	-	22.3	-
Blower/Vacuum End11	-	22.2	-
Blower/Vacuum End12	-	22.1	-
Blower/Vacuum End13	-	22.9	-
Blower/Vacuum End14	-	30.3	-
Blower/Vacuum End15	-	33.4	-
Blower/Vacuum End16	-	33.8	-
Blower/Vacuum End17	-	34.2	-
Blower/Vacuum End18	-	34.7	-
Blower/Vacuum End19	-	35.5	-
Blower/Vacuum End20	-	36.4	-
Blower/Vacuum End21	-	36.6	-
Blower/Vacuum End22	-	40.3	-
Blower/Vacuum End23	-	41.3	-
Blower/Vacuum End24	-	42.1	-
Blower/Vacuum End25	-	43.1	-
Blower/Vacuum End26	-	44.0	-
Blower/Vacuum End27	-	45.0	-
Blower/Vacuum End28	-	46.0	-
Blower/Vacuum End29	-	47.1	-
Blower/Vacuum End30	-	48.1	-
Blower/Vacuum End31	-	49.0	-
Blower/Vacuum End33	-	17.0	-
Blower/Vacuum End34	-	15.2	-
Car Wash Drying System	-	40.3	-

APPENDIX G

VIBRATION WORKSHEETS

GROUNDBORNE VIBRATION ANALYSIS			
Project:	19278 Florence Avenue Car Wash	Date:	8/7/20
Source:	Large Bulldozer		
Scenario:	Unmitigated		
Location:	Commercial to East & West		
Address:			
PPV = PPVref(25/D)^n (in/sec)			
INPUT			
Equipment Type	2	Large Bulldozer	INPUT SECTION IN GREEN
PPVref =	0.089	Reference PPV (in/sec) at 25 ft.	
D =	1.00	Distance from Equipment to Receiver (ft)	
n =	1.50	Vibration attenuation rate through the ground	
Note: Based on reference equations from Vibration Guidance Manual, California Department of Transportation, 2006, pgs 38-43.			
RESULTS			
PPV =	11.125	IN/SEC	OUTPUT IN BLUE

GROUNDBORNE VIBRATION ANALYSIS			
Project:	19278 Florence Avenue Car Wash	Date:	8/7/20
Source:	Large Bulldozer		
Scenario:	Unmitigated		
Location:	Residential to South		
Address:			
PPV = PPVref(25/D)^n (in/sec)			
INPUT			
Equipment Type =	2	Large Bulldozer	INPUT SECTION IN GREEN
PPVref =	0.089	Reference PPV (in/sec) at 25 ft.	
D =	5.00	Distance from Equipment to Receiver (ft)	
n =	1.50	Vibration attenuation rate through the ground	
Note: Based on reference equations from Vibration Guidance Manual, California Department of Transportation, 2006, pgs 38-43.			
RESULTS			
PPV =	0.995	IN/SEC	OUTPUT IN BLUE

GROUNDBORNE VIBRATION ANALYSIS			
Project:	19278 Florence Avenue Car Wash		Date: 8/21/20
Source:	Large Bulldozer		
Scenario:	Unmitigated		
Location:	Residential to South		
Address:			
PPV = PPVref(25/D)^n (in/sec)			
INPUT			
Equipment Type =	2	Large Bulldozer	INPUT SECTION IN GREEN
PPVref =	0.089	Reference PPV (in/sec) at 25 ft.	
D =	12.00	Distance from Equipment to Receiver (ft)	
n =	1.50	Vibration attenuation rate through the ground	
Note: Based on reference equations from Vibration Guidance Manual, California Department of Transportation, 2006, pgs 38-43.			
RESULTS			
PPV =	0.268	IN/SEC	OUTPUT IN BLUE

GROUNDBORNE VIBRATION ANALYSIS

Project:	19278 Florence Avenue Car Wash	Date:	8/21/20
Source:	Large Bulldozer		
Scenario:	Unmitigated		
Location:	Commercial to East & West		
Address:			

PPV = PPVref(25/D)^n (in/sec)

INPUT

Equipment Type =	2	Large Bulldozer	INPUT SECTION IN GREEN
PPVref =	0.089	Reference PPV (in/sec) at 25 ft.	
D =	13.00	Distance from Equipment to Receiver (ft)	
n =	1.50	Vibration attenuation rate through the ground	

Note: Based on reference equations from Vibration Guidance Manual, California Department of Transportation, 2006, pgs 38-43.

RESULTS

PPV =	0.237	IN/SEC	OUTPUT IN BLUE

GROUNDBORNE VIBRATION ANALYSIS			
Project:	19278 Florence Avenue Car Wash	Date:	8/7/20
Source:	Vibratory Roller		
Scenario:	Unmitigated		
Location:	Commercial to East & West		
Address:			
PPV = PPVref(25/D)^n (in/sec)			
INPUT			
Equipment Type =	1	Vibratory Roller	INPUT SECTION IN GREEN
PPVref =	0.21	Reference PPV (in/sec) at 25 ft.	
D =	1.00	Distance from Equipment to Receiver (ft)	
n =	1.50	Vibration attenuation rate through the ground	
Note: Based on reference equations from Vibration Guidance Manual, California Department of Transportation, 2006, pgs 38-43.			
RESULTS			
PPV =	26.250	IN/SEC	OUTPUT IN BLUE

GROUNDBORNE VIBRATION ANALYSIS			
Project:	19278 Florence Avenue Car Wash	Date:	8/7/20
Source:	Vibratory Roller		
Scenario:	Unmitigated		
Location:	Residential to South		
Address:			
PPV = PPVref(25/D)^n (in/sec)			
INPUT			
Equipment Type	1	Vibratory Roller	INPUT SECTION IN GREEN
PPVref =	0.21	Reference PPV (in/sec) at 25 ft.	
D =	5.00	Distance from Equipment to Receiver (ft)	
n =	1.50	Vibration attenuation rate through the ground	
Note: Based on reference equations from Vibration Guidance Manual, California Department of Transportation, 2006, pgs 38-43.			
RESULTS			
PPV =	2.348	IN/SEC	OUTPUT IN BLUE

GROUNDBORNE VIBRATION ANALYSIS			
Project:	19278 Florence Avenue Car Wash		Date: 8/21/20
Source:	Vibratory Roller		
Scenario:	Unmitigated		
Location:	Residential to South		
Address:			
PPV = PPVref(25/D)^n (in/sec)			
INPUT			
Equipment Type =	1	Vibratory Roller	INPUT SECTION IN GREEN
PPVref =	0.21	Reference PPV (in/sec) at 25 ft.	
D =	20.00	Distance from Equipment to Receiver (ft)	
n =	1.50	Vibration attenuation rate through the ground	
Note: Based on reference equations from Vibration Guidance Manual, California Department of Transportation, 2006, pgs 38-43.			
RESULTS			
PPV =	0.293	IN/SEC	OUTPUT IN BLUE

GROUNDBORNE VIBRATION ANALYSIS			
Project:	19278 Florence Avenue Car Wash		Date: 8/21/20
Source:	Vibratory Roller		
Scenario:	Unmitigated		
Location:	Commercial to East & West		
Address:			
PPV = PPVref(25/D)^n (in/sec)			
INPUT			
Equipment Type =	1	Vibratory Roller	INPUT SECTION IN GREEN
PPVref =	0.21	Reference PPV (in/sec) at 25 ft.	
D =	23.00	Distance from Equipment to Receiver (ft)	
n =	1.50	Vibration attenuation rate through the ground	
Note: Based on reference equations from Vibration Guidance Manual, California Department of Transportation, 2006, pgs 38-43.			
RESULTS			
PPV =	0.238	IN/SEC	OUTPUT IN BLUE

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