EAST 10TH STREET AND CHESTNUT STREET DEVELOPMENT PROJECT ENVIRONMENTAL NOISE AND VIBRATION ASSESSMENT

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Gilroy, California

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INTRODUCTION

A commercial development is proposed for an approximately 6.6-acre site located at the northeast corner of East 10th Street and Chestnut Street in Gilroy, California. The project would be composed of six commercial buildings, including a convenience store and gas station, a 120 room hotel, a car wash, a coffee shop, and two quick-service restaurants. The site would be accessible via entrance and exit lanes along Chestnut Street, East 10th Street, and East 9th Street. Parking for the development would be provided in six surface lots throughout the site totaling 254 spaces. The site is currently occupied by a trucking company and the Chestnut Square shopping center. Adjacent to the site, at the corner of East 9th Street and Chestnut Street, are the Gilroy Fire Department and a currently vacant former auto shop building.

This report evaluates the project's potential to result in significant noise and vibration impacts with respect to applicable California Environmental Quality Act (CEQA) guidelines. The report is divided into three sections: 1) the Setting Section provides a brief description of the fundamentals of environmental noise, summarizes applicable regulatory criteria, and discusses existing noise data and modeling used to be used to characterize the noise environment at the project site; 2) the General Plan Consistency Section discusses noise and land use compatibility utilizing policies in the Gilroy General Plan; and 3) the Impacts and Mitigation Measures Section describes the significance criteria used to evaluate project impacts and provides a discussion of each project impact.

SETTING

Fundamentals of Environmental Noise

Noise may be defined as unwanted sound. Noise is usually objectionable because it is disturbing or annoying. The objectionable nature of sound could be caused by its *pitch* or its *loudness*. *Pitch* is the height or depth of a tone or sound, depending on the relative rapidity (*frequency*) of the vibrations by which it is produced. Higher pitched signals sound louder to humans than sounds with a lower pitch. *Loudness* is intensity of sound waves combined with the reception characteristics of the ear. Intensity may be compared with the height of an ocean wave in that it is a measure of the amplitude of the sound wave.

In addition to the concepts of pitch and loudness, there are several noise measurement scales which are used to describe noise in a particular location. A *decibel (dB)* is a unit of measurement which indicates the relative amplitude of a sound. The zero on the decibel scale is based on the lowest sound level that the healthy, unimpaired human ear can detect. Sound levels in decibels are calculated on a logarithmic basis. An increase of 10 decibels represents a ten-fold increase in acoustic energy, while 20 decibels is 100 times more intense, 30 decibels is 1,000 times more intense, etc. There is a relationship between the subjective noisiness or loudness of a sound and its intensity. Each 10 decibel increase in sound level is perceived as approximately a doubling of loudness over a fairly wide range of intensities. Technical terms are defined in Table 1.

There are several methods of characterizing sound. The most common in California is the *A-weighted sound level (dBA).* This scale gives greater weight to the frequencies of sound to which

the human ear is most sensitive. Representative outdoor and indoor noise levels in units of dBA are shown in Table 2. Because sound levels can vary markedly over a short period of time, a method for describing either the average character of the sound or the statistical behavior of the variations must be utilized. Most commonly, environmental sounds are described in terms of an average level that has the same acoustical energy as the summation of all the time-varying events. This *energy-equivalent sound/noise descriptor* is called L_{eq}. The most common averaging period is hourly, but L_{eq} can describe any series of noise events of arbitrary duration.

The scientific instrument used to measure noise is the *sound level meter*. Sound level meters can accurately measure environmental noise levels to within about plus or minus 1 dBA. Various computer models are used to predict environmental noise levels from sources, such as roadways and airports. The accuracy of the predicted models depends upon the distance the receptor is from the noise source. Close to the noise source, the models are accurate to within about plus or minus 1 to 2 dBA.

Since the sensitivity to noise increases during the evening and at night -- because excessive noise interferes with the ability to sleep -- 24-hour descriptors have been developed that incorporate artificial noise penalties added to quiet-time noise events. The *Community Noise Equivalent Level* (*CNEL*) is a measure of the cumulative noise exposure in a community, with a 5 dB penalty added to evening (7:00 p.m. - 10:00 p.m.) and a 10 dB addition to nocturnal (10:00 p.m. - 7:00 a.m.) noise levels. The *Day/Night Average Sound Level* (L_{dn}) is essentially the same as CNEL, with the exception that the evening time period is dropped and all occurrences during this three-hour period are grouped into the daytime period.

Effects of Noise

Sleep and Speech Interference

The thresholds for speech interference indoors are about 45 dBA if the noise is steady and above 55 dBA if the noise is fluctuating. Outdoors the thresholds are about 15 dBA higher. Steady noises of sufficient intensity (above 35 dBA) and fluctuating noise levels above about 45 dBA have been shown to affect sleep. Interior residential standards for single- and multi-family dwellings are set by the State of California at 45 dBA L_{dn}. Typically, the highest steady traffic noise level during the daytime is about equal to the L_{dn} and nighttime levels are 10 dBA lower. The standard is designed for sleep and speech protection and most jurisdictions apply the same criterion for all residential uses. Typical structural attenuation is 12 to 17 dBA with open windows. With closed windows in good condition, the noise attenuation factor is around 20 dBA for an older structure and 25 dBA for a newer dwelling. Sleep and speech interference is, therefore, possible when exterior noise levels are about 57 to 62 dBA L_{dn} with open windows and 65 to 70 dBA L_{dn} if the windows are closed. Levels of 55 to 60 dBA are common along collector streets and secondary arterials, while 65 to 70 dBA is a typical value for a primary/major arterial. Levels of 75 to 80 dBA are normal noise levels at the first row of development outside a freeway right-of-way. In order to achieve an acceptable interior noise environment, bedrooms facing secondary roadways need to be able to have their windows closed; those facing major roadways and freeways typically need special glass windows.

Annoyance

Attitude surveys are used for measuring the annoyance felt in a community for noises intruding into homes or affecting outdoor activity areas. In these surveys, it was determined that the causes for annoyance include interference with speech, radio and television, house vibrations, and interference with sleep and rest. The L_{dn} as a measure of noise has been found to provide a valid correlation of noise level and the percentage of people annoyed. People have been asked to judge the annoyance caused by aircraft noise and ground transportation noise. There continues to be disagreement about the relative annoyance of these different sources. When measuring the percentage of the population highly annoyed, the threshold for ground vehicle noise is about 50 dBA L_{dn}. At an L_{dn} of about 60 dBA, approximately 12 percent of the population is highly annoyed. When the L_{dn} increases to 70 dBA, the percentage of the population highly annoyed increases to about 25 to 30 percent of the population. There is, therefore, an increase of about 2 percent per dBA between an L_{dn} of 60 to 70 dBA. Between an L_{dn} of 70 to 80 dBA, each decibel increases by about 3 percent the percentage of the population highly annoyed. People appear to respond more adversely to aircraft noise. When the L_{dn} is 60 dBA, approximately 30 to 35 percent of the population is believed to be highly annoyed. Each decibel increase to 70 dBA adds about 3 percentage points to the number of people highly annoyed. Above 70 dBA, each decibel increase results in about a 4 percent increase in the percentage of the population highly annoyed.

Fundamentals of Groundborne Vibration

Ground vibration consists of rapidly fluctuating motions or waves with an average motion of zero. Several different methods are typically used to quantify vibration amplitude. One method is the Peak Particle Velocity (PPV). The PPV is defined as the maximum instantaneous positive or negative peak of the vibration wave. In this report, a PPV descriptor with units of mm/sec or in/sec is used to evaluate construction generated vibration for building damage and human complaints. Table 3 displays the reactions of people and the effects on buildings that continuous vibration levels produce.

The annoyance levels shown in Table 3 should be interpreted with care since vibration may be found to be annoying at much lower levels than those shown, depending on the level of activity or the sensitivity of the individual. To sensitive individuals, vibrations approaching the threshold of perception can be annoying. Low-level vibrations frequently cause irritating secondary vibration, such as a slight rattling of windows, doors, or stacked dishes. The rattling sound can give rise to exaggerated vibration complaints, even though there is very little risk of actual structural damage.

Construction activities can cause vibration that varies in intensity depending on several factors. The use of pile driving and vibratory compaction equipment typically generates the highest construction related groundborne vibration levels. Because of the impulsive nature of such activities, the use of the PPV descriptor has been routinely used to measure and assess groundborne vibration and almost exclusively to assess the potential of vibration to induce structural damage and the degree of annoyance for humans.

The two primary concerns with construction-induced vibration, the potential to damage a structure and the potential to interfere with the enjoyment of life, are evaluated against different vibration limits. Studies have shown that the threshold of perception for average persons is in the range of 0.008 to 0.012 in/sec PPV. Human perception to vibration varies with the individual and is a function of physical setting and the type of vibration. Persons exposed to elevated ambient vibration levels, such as people in an urban environment, may tolerate a higher vibration level.

Structural damage can be classified as cosmetic only, such as minor cracking of building elements, or may threaten the integrity of the building. Safe vibration limits that can be applied to assess the potential for damaging a structure vary by researcher and there is no general consensus as to what amount of vibration may pose a threat for structural damage to the building. Construction-induced vibration that can be detrimental to the building is very rare and has only been observed in instances where the structure is at a high state of disrepair and the construction activity occurs immediately adjacent to the structure.

TABLE 1 Definition of Acoustical Terms Used in this Report

Term	Definition
Decibel, dB	A unit describing, the amplitude of sound, equal to 20 times the logarithm to the base 10 of the ratio of the pressure of the sound measured to the reference pressure. The reference pressure for air is 20 micro Pascals.
Sound Pressure Level	Sound pressure is the sound force per unit area, usually expressed in micro Pascals (or 20 micro Newtons per square meter), where 1 Pascal is the pressure resulting from a force of 1 Newton exerted over an area of 1 square meter. The sound pressure level is expressed in decibels as 20 times the logarithm to the base 10 of the ratio between the pressures exerted by the sound to a reference sound pressure (e. g., 20 micro Pascals). Sound pressure level is the quantity that is directly measured by a sound level meter.
Frequency, Hz	The number of complete pressure fluctuations per second above and below atmospheric pressure. Normal human hearing is between 20 Hz and 20,000 Hz. Infrasonic sound are below 20 Hz and Ultrasonic sounds are above 20,000 Hz.
A-Weighted Sound Level, dBA	The sound pressure level in decibels as measured on a sound level meter using the A-weighting filter network. 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 and correlates well with subjective reactions to noise.
Equivalent Noise Level, L_{eq}	The average A-weighted noise level during the measurement period.
L_{max}, L_{min}	The maximum and minimum A-weighted noise level during the measurement period.
L_{01}, L_{10}, L_{50}, L_{90}	The A-weighted noise levels that are exceeded 1%, 10%, 50%, and 90% of the time during the measurement period.
Day/Night Noise Level, L_{dn} or DNL	The average A-weighted noise level during a 24-hour day, obtained after addition of 10 decibels to levels measured in the night between 10:00 p.m. and 7:00 a.m.
Community Noise Equivalent Level, CNEL	The average A-weighted noise level during a 24-hour day, obtained after addition of 5 decibels in the evening from 7:00 p.m.to 10:00 p.m. and after addition of 10 decibels to sound levels measured in the night between 10:00 p.m. and 7:00 a.m.
Ambient Noise Level	The composite of noise from all sources near and far. The normal or existing level of environmental noise at a given location.
Intrusive	That noise which intrudes over and above the existing ambient noise at a given location. The relative intrusiveness of a sound depends upon its amplitude, duration, frequency, and time of occurrence and tonal or informational content as well as the prevailing ambient noise level.

Source: Handbook of Acoustical Measurements and Noise Control, Harris, 1998.

TABLE 2 Typical Noise Levels in the Environment

Common Outdoor Activities	Noise Level (dBA)	Common Indoor Activities
	110 dBA	Rock band
Jet fly-over at 1,000 feet		
	100 dBA	
Gas lawn mower at 3 feet		
	90 dBA	
Diesel truck at 50 feet at 50 mph		Food blender at 3 feet
	80 dBA	Garbage disposal at 3 feet
Noisy urban area, daytime		
Gas lawn mower, 100 feet	70 dBA	Vacuum cleaner at 10 feet
Commercial area		Normal speech at 3 feet
Heavy traffic at 300 feet	60 dBA	
		Large business office
Quiet urban daytime	50 dBA	Dishwasher in next room
Quiet urban nighttime	40 dBA	Theater, large conference room
Quiet suburban nighttime		
	30 dBA	Library
Quiet rural nighttime		Bedroom at night, concert hall (background)
	20 dBA	
		Broadcast/recording studio
	10 dBA	
	0 dBA	

Source: Technical Noise Supplement (TeNS), California Department of Transportation, September 2013.

TABLE 3 Reactions of People and Damage to Buildings from Continuous or Frequent Intermittent Vibration Levels

Velocity Level, PPV (in/sec)	Human Reaction	Effect on Buildings
0.01	Barely perceptible	No effect
0.04	Distinctly perceptible	Vibration unlikely to cause damage of any type to any structure
0.08	Distinctly perceptible to strongly perceptible	Recommended upper level of the vibration to which ruins and ancient monuments should be subjected
0.1	Strongly perceptible	Threshold at which there is a risk of damage to fragile buildings with no risk of damage to most buildings
0.25	Strongly perceptible to severe	Threshold at which there is a risk of damage to historic and some old buildings.
0.3	Strongly perceptible to severe	Threshold at which there is a risk of damage to older residential structures
0.5	Severe - Vibrations considered unpleasant	Threshold at which there is a risk of damage to new residential and modern commercial/industrial structures

Source: Transportation and Construction Vibration Guidance Manual, California Department of Transportation, September 2013.

Regulatory Background - Noise

The State of California and the City of Gilroy have established regulatory criteria that are applicable in this assessment. The State of California Environmental Quality Act (CEQA) Guidelines, Appendix G, are used to assess the potential significance of impacts pursuant to local General Plan policies, Municipal Code standards, or the applicable standards of other agencies. A summary of the applicable regulatory criteria is provided below.

State CEQA Guidelines. The CEQA contains guidelines to evaluate the significance of effects of environmental noise attributable to a proposed project. Under CEQA, noise impacts would be considered significant if the project would 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;

(b) Generation of excessive groundborne vibration or groundborne noise levels;

(c) For a project located within the vicinity of a private airstrip or an airport land use plan or where such a plan has not been adopted within two miles of a public airport

or public use airport, if the project would expose people residing or working in the project area to excessive noise levels.

Checklist items (a) and (b) are applicable to the proposed project. The project is not located within the vicinity of a private airstrip or a public airport and would not expose people residing or working in the project area to excessive aircraft noise levels; therefore, item (c) is not carried further in this analysis.

2019 California Building Code, Title 24, Part 2. The California Building Code (CBC) requires interior noise levels attributable to exterior environmental noise sources to be limited to a level not exceeding 45 dBA L_{dn} in any habitable room.

2019 California Green Building Standards Code (Cal Green Code). The State of California established exterior sound transmission control standards for new non-residential buildings as set forth in the 2019 California Green Building Standards Code (Section 5.507.4.1 and 5.507.4.2). Section 5.507 states that either the prescriptive (Section 5.507.4.1) or the performance method (Section 5.507.4.2) shall be used to determine environmental control at indoor areas. The prescriptive method is very conservative and not practical in most cases; however, the performance method can be quantitatively verified using exterior-to-interior calculations. For the purposes of this report, the performance method is utilized to determine consistency with the Cal Green Code. The sections that pertain to this project are as follows:

> **5.507.4.1 Exterior noise transmission, prescriptive method.** Wall and roof-ceiling assemblies exposed to the noise source making up the building envelope shall meet a composite STC rating of at least 50 or a composite OITC rating of no less than 40, with exterior windows of a minimum STC of 40 or OITC of 30 when the building falls within the 65 dBA L_{dn} noise contour of a freeway or expressway, railroad, industrial source or fixed-guideway noise source, as determined by the local general plan noise element.
>
> **5.507.4.2 Performance method.** For buildings located, as defined by Section 5.507.4.1, wall and roof-ceiling assemblies exposed to the noise source making up the building envelope shall be constructed to provide an interior noise environment attributable to exterior sources that does not exceed an hourly equivalent noise level ($L_{eq\ (1\text{-}hr)}$) of 50 dBA in occupied areas during any hour of operation.

The performance method, which establishes the acceptable interior noise level, is the method typically used when applying these standards.

Supplemental Annoyance and Sleep Disturbance Criteria. Though the City noise criteria are typically sufficient to achieve an acceptable interior noise environment with common environmental noise source, when dealing with loud intermittent noise sources, such as the sounding of train horns near railroad tracks or emergency vehicle sirens, the achievement of an L_{dn} of 45 dBA within habitable rooms may still result in maximum noise levels within interiors great enough to result in significant sleep disturbance and resident annoyance. Studies have been undertaken to determine the effect of short-term maximum noise levels on these issues. The

conclusions of the studies related to the sleep disturbance typically give a probability of sleep disturbance related to the maximum noise level of the event at the sleep location and the duration of the event. A review of these data shows that limiting maximum noise levels to 55 dBA L_{max} within rooms will limit the probability of waking hotel guests at the project site when emergency vehicles pass the site to less than five percent per occurrence[1]. Therefore, though this is not a City or State requirement, I&R recommends the adoption of additional interior sound level criteria limiting maximum noise levels from emergency vehicle sirens to 55 dBA L_{max} within guest rooms of the proposed hotel.

City of Gilroy General Plan. The noise-related goal of the City's General Plan is the, *"Protection of Gilroy residents from exposure to excessive noise and its effects through appropriate mitigation measures and responsive land use planning, especially in regard to noise-sensitive land uses such as schools, hospitals, and housing for seniors."* The following policies, applicable to the development of the site, are set forth in the General Plan to facilitate this goal:

26.02 **- Maximum Permissible Noise Levels.** Ensure that outdoor and indoor noise levels are within the maximum permitted levels (see Table 4). Prohibit further development in areas where noise levels currently exceed these standards or where such development will cause levels to exceed the permitted maximum.

TABLE 4 Typical Noise Levels in the Environment

Land Use Category	Maximum Outdoor L_{dn} (dBA)	Maximum Indoor L_{dn} (dBA)
Residential	60[1]	45
Commercial	65	61
Industrial	76	see note 2

[1] The Outdoor sound levels for residential properties shall be held to 60-dBA, or a maximum of 70-dBA if ALL of the following FINDINGS can be made:

- That potential noise levels, exceeding the 60 dBA standard, are generally limited to less than 10% of the entire project site;
- That reasonably accepted sound attenuation measures have been incorporated in the project design;
- That potential noise levels are part of the developer's disclosure to future residents;
- That interior noise limits established by the General Plan are strictly maintained; and
- Potential noise levels will jeopardize the health, safety, and general welfare of the public.

[2] The indoor standards for industrial land uses have been set by the Occupational Safety and Health Administration. The maximum level to be exceeded no more than 10 percent of the time (L_{10}) is 65 dBA, while the maximum level to be exceeded no more than 50 percent of the time (L_{50}) is 60 dBA.

26.04 **- Acoustical Design.** Consider the acoustical design of projects in the development review process to reduce noise to an acceptable level. Ensure that noise mitigation features are designed and implemented in an aesthetically pleasing and consistent manner.

Mitigation Measure 4.7-B. As part of normal City review and approval procedures for future projects the following measures should be incorporated to mitigate construction noise:

[1] Kryter Karl D., The effects of Noise on Man, Second Edition, Academic Press, Inc. London, 1985, p.444-446.

- Limit construction activity to weekdays between 7:00 a.m. and 7:00 p.m. and Saturdays and holidays between 9:00 a.m. and 7:00 p.m., with no construction on Sundays;

- Require that all internal combustion engine-driven equipment are equipped with mufflers which are in good condition and appropriate for the equipment;

- Locate stationary noise-generating equipment as far as possible from sensitive receptors when sensitive receptors adjoin or are near a construction project area; and

- Construct sound walls or other noise reduction measures prior to developing the project site.

City of Gilroy Zoning Ordinance. The City's zoning ordinance (Chapter 30, Section 41.31) contains quantitative noise limits for noise sources within the City of Gilroy based on the land use of the property receiving the noise. The noise ordinance establishes acceptable exterior noise levels and exemptions from the ordinance for special activities, such as emergency work and refuse and recycling collection. Special noise limits are also established for certain noise-generating activities. The City's zoning ordinance (Chapter 30, Section 41.31) reads as follows:

Section 41.31 Specific Provisions – Noise
It shall be unlawful to generate noise within the City limits that exceeds the limits established in this section of the Zoning Ordinance

(b) Maximum outdoor noise levels:

(1) Residential noise impacting residential properties.

Fixed-source outdoor mechanical equipment installed after July 1, 2007 (e.g. pool, spa, air conditioning or similar equipment) is limited to a maximum of 60 dBA measured at the property line or 70 dBA (L_{10}) measured at the property line.

(2) Commercial & Industrial noise impacting residential property

Noise emanating from properties that are zoned for uses other than residential is limited to a maximum of 70 dBA L_{10} measured at the residential property line. Such noise is limited to the hours of 7:00 a.m. to 10:00 p.m., and prohibited between the hours of 10:00 p.m. and 7:00 a.m.

(c) Exceptions to the exterior noise limits listed in subsection (b) above:

(1) Persons, equipment, vehicles, alarms, or sirens utilized in essential activities necessary to preserve, protect, or save lives or property from danger, loss, or harm;

(2) Refuse & recycling collection vehicles when operating between the hours of 5:00 a.m. and 6:00 p.m.;

(3) Special events operating in compliance with an approved Special Events Permit; and

(4) City approved activities on public properties.

Additionally, Chapter 16.38 of the City's Zoning Ordinance defines the allowable construction hours. This section states the following:

Section 16.38 Hours of Construction

(a) Unless otherwise provided for in a validly issued permit or approval, construction activities shall be limited to the hours of seven (7:00) a.m. and seven (7:00) p.m., Monday through Friday, and nine (9:00) a.m. to seven (7:00) p.m. on Saturday. Construction activities shall not occur on Sundays or City holidays, which include: New Year's Day, Independence Day, Labor Day, Thanksgiving Day and Christmas. "Construction activities" are defined as including but not limited to, excavation, grading, paving, demolitions, construction, alteration or repair of any building, site, street or highway, delivery or removal of construction material to a site, or movement of constriction materials on a site.

(b) In the event the chief building official or his or her designee determines that the public health and safety will not be impaired by the construction activities between the hours of seven (7:00) p.m. and seven (7:00) a.m., and that loss or inconvenience would result to any party in interest, the chief building official may grant permission for such work to be done between the hours of seven (7:00) p.m. and seven (7:00) a.m. upon an application being made at the time the permit for the work is issued or during the progress of the work.

Existing Noise Environment

The project site at the northeast corner of East 10th Street and Chestnut Street is located in a primarily commercial area, surrounded primarily by restaurants, retail stores, and outlet supply stores. The Gilroy DMV is located to the south across East 10th Street and the Gilroy Fire Department is located adjacent to the site at the southeast corner of East 9th Street and Chestnut street. The site is located about 275 feet west of El Camino Real/ U.S. Highway 101 (US 101).

Due to the COVID-19 pandemic, a current noise monitoring survey to characterize the noise environment of the site was unable to be conducted for this study. However, noise data was collected and traffic nose models were created by Illingworth & Rodkin, Inc. for the purpose of the City of Gilroy 2040 General Plan Draft Noise and Vibration Assessment.[2] These data are used to characterize the noise environment at the project site. As identified in the City of Gilroy 2040 General Plan Draft Noise and Vibration Assessment, traffic along highways and major local roadways make up the most prominent source of environmental noise in Gilroy. The project site is located next to two such sources: East 10th Street and US 101. Traffic along East 10th Street and US 101 would be the predominate sources of noise at the site.

Additional noise sources would include traffic along other local roadways such as East 9th Street and Chestnut Street, local commercial activities, and noise from alarm bells and firetruck sirens associated with the Gilroy Fire Department. Train activity would not generate substantial noise at the site, as the railroad is located approximately 1,200 feet west of the site with several intervening structures shielding the site from direct exposure. Fire department and local commercial noise sources such as parking lot activities and truck deliveries would make a minor contribution to the noise environment at the site. These additional sources would be temporary in nature and would mostly be notable during occasional periods of low traffic along US 101 and West 10th Street.

Illingworth & Rodkin, Inc. performed a noise survey of Gilroy, California from Tuesday December 3, 2013 to Friday, December 6, 2013. A long-term receptor was positioned approximately 85 feet from the centerline of West 10th Street. At this location, vehicular traffic along West 10th Street was the primary source of noise. The day/night average noise level at this site was measured to be 66 dBA L_{dn}. Daytime noise levels at this location were in the range of 62 to 66 dBA L_{eq}, with nighttime noise levels as low as 50 dBA L_{eq}. The measurement location relative to the project site is shown below in Figure 1.

A SoundPLAN model was created to model existing and future traffic noise within the City of Gilroy. SoundPLAN is a three-dimensional ray-tracing computer program that considers environmental geometry and sound propagation to model noise. The project site was added into this model under existing 2020 traffic conditions and calculations were made to estimate existing noise levels at proposed site buildings. Results of the model indicate the existing noise level at the site to be between 60 and 65 dBA L_{dn}, with noise levels decreasing towards the interior of the site and further away from US 101 and East 10th Street. Results of the model are consistent with the long-term noise measurements made in December 2013.

[2] Illingworth & Rodkin, Inc., "*City of Gilroy 2040 General Plan Draft Noise and Vibration Assessment.*", March 12, 2020.

FIGURE 1 Long-term Noise Measurement Location Relative to Site

Source: Google Earth 2020

GENERAL PLAN CONSISTENCY ANALYSIS

The impacts of site constraints such as exposure of the proposed project to excessive levels of noise and vibration are not considered under CEQA. This section addresses Noise and Land Use Compatibility for consistency with the policies set forth in the Gilroy General Plan.

Noise and Land Use Compatibility

Chapter 8 Section 26 of the City of Gilroy General Plan sets forth policies with the goal of protecting residents of Gilroy from exposure to excessive noise and its effects through appropriate mitigation measures and responsive land use planning, especially in regard to noise-sensitive land uses such as schools, hospitals, and housing for seniors. The applicable General Plan policies were presented in detail in the Regulatory Background section and are summarized below for the proposed project:

- For the proposed commercial land uses, the City's maximum permissible noise level standard is 65 dBA L_{dn} or less for outdoors and 61 dBA L_{dn} for indoors.

- The California Building Code requires interior noise levels attributable to exterior environmental noise sources to be limited to a level not exceeding 45 dBA L_{dn} in habitable rooms. This Code would be applicable to proposed hotel rooms.

- The Cal Green Code standards specify an interior noise environment attributable to exterior sources not to exceed an hourly equivalent noise level ($L_{eq\ (1\text{-}hr)}$) of 50 dBA in occupied areas of non-residential uses during any hour of operation.

- To minimize annoyance and sleep disturbance, I&R recommends a supplemental criterion limiting maximum noise levels from emergency vehicle sirens to 55 dBA L_{max} within hotel guest rooms.

The future noise environment at the project site would continue to result primarily from vehicular traffic along US 101 and East 10th Street. Localized commercial activity and traffic along local roadways will also contribute to the future noise environment.

Future Exterior Noise Environment

The proposed project would consist of six commercial buildings including a hotel, a convenience store and gas station, a coffee shop, two quick service restaurants, and a car wash. The maximum permissible exterior noise threshold established in the City's General Plan for new commercial uses is 65 dBA L_{dn}. According to the most recent site plan and project description, both dated September 15, 2020, outdoor use areas at the site will consist of a hotel pool, hotel outdoor seating, patios located at each of the quick service restaurants and at the coffee shop.

Project geometry was entered into the SoundPLAN model under future 2040 traffic conditions. Based on the results of the model, future noise levels are expected to reach 57 to 58 dBA L_{dn} at the hotel pool, 58 to 59 dBA L_{dn} at the hotel outdoor seating areas, 62 dBA L_{dn} at the coffee shop

patio, 58 dBA L_{dn} at the patio of the 3,500 square foot (s.f.) quick service restaurant nearest to East 10th Street, and 64 dBA L_{dn} at the patio of the 5,182 s.f. quick service restaurant nearest to the US 101 southbound off-ramp. Outdoor use noise levels are expected to be lowest at the hotel pool and at the patio of the 3,500 s.f. quick service restaurant as the proposed buildings would provide substantial shielding from noise originating from traffic along US 101 and East 10th Street. Noise levels at proposed outdoor use areas at the project site are not anticipated to exceed the City of Gilroy maximum permissible exterior noise threshold of 65 dBA L_{dn}.

The proposed car wash and accompanying 27 self-service vacuum stations would have the potential to generate noise throughout the project site. Using data from past car wash studies, car wash noise sources were modeled and resulting operational noise was calculated at proposed outdoor use spaces. The Noise Impacts and Mitigation Measures section of the report goes into further detail of how these calculations were made. Maps of the noise exposure generated by the project car wash and vacuum stations are shown in Figures 2 and 3. Noise resulting from car wash operations at outdoor use areas proposed by the project are summarized below in Table 5. Calculated Day/Night Average noise levels assume a worst-case scenario of continuous operation of the car wash blower dryer system and use of all vacuum stations throughout all hours of operation. Noise levels at proposed outdoor use areas of the hotel, quick service restaurants, and coffee shop would not exceed the maximum permissible exterior noise threshold of 65 dBA L_{dn}.

TABLE 5 Future Car Wash Operational Noise at Proposed Outdoor Use Areas

Proposed Outdoor Use	Distance from Car Wash (ft)	Future Noise Exposure (dBA)	
		Peak Hour ($L_{eq\ (1\text{-}hr)}$)	Day-Night Average (L_{dn})
Hotel Pool	310	39 to 41	38 to 39
Hotel Outdoor Seating	270	44 to 45	42 to 43
5,182 s.f. Quick Service Restaurant Patio	250	58	56
3,500 s.f. Quick Service Restaurant Patio	380	58	56
Coffee Shop Patio	550	52	51

Future Interior Noise Environment

The California Building Code requires that interior noise levels attributable to exterior environmental noise sources not exceed 45 dBA L_{dn} in any habitable room. The Cal Green Code requires that interior noise levels attributable to exterior sources not exceed 50 dBA $L_{eq\ (1\text{-}hr)}$ in occupied areas of non-residential uses during any hour of occupation. The City of Gilroy's maximum permissible limit for interior noise in commercial buildings is 61 dBA L_{dn}.

Future 2040 building façade noise exposures were calculated using the SoundPLAN model. Table 6 below lists the exterior and interior traffic noise levels at the façade with the greatest exposure to traffic noise of each proposed building. Interior noise exposures assume a 25 dBA noise reduction from exterior noise levels with standard commercial construction and windows in the

closed position. Forced-air ventilation would be required to allow occupants the option of keeping windows closed to control noise.

TABLE 6 Future Traffic Noise Exposure at Building Façades

Proposed Building	Floor	Future Exterior Noise Exposure (dBA)		Future Interior Noise Exposure (dBA)[1]	
		Peak Hour ($L_{eq\ (1\text{-}hr)}$)	Day-Night Average (L_{dn})	Peak Hour ($L_{eq\ (1\text{-}hr)}$)	Day-Night Average (L_{dn})
Hotel	1st	62	64	37	39
	2nd	64	66	39	41
	3rd	65	67	40	42
	4th	66	68	41	43
	5th	67	69	42	44
Convenience Store/Gas Station	1st	67	69	42	44
Coffee Shop	1st	65	67	40	42
3,500 s.f. Quick Service Restaurant	1st	65	67	40	42
5,182 s.f. Quick Service Restaurant	1st	65	67	40	42
Car Wash	1st	66	68	41	43

[1] Interior noise exposure assumes a 25 dBA noise reduction resulting from standard commercial construction with windows and doors closed.

Assuming standard commercial construction with windows closed, day/night average noise levels within site buildings would reach between 39 and 44 dBA L_{dn}. Peak hour noise levels would reach between 37 and 42 dBA L_{eq}. Noise levels within hotel rooms would reach up to 44 dBA L_{dn}. With inclusion of forced-air mechanical ventilation, future interior noise levels at the site would not exceed the California Building Code limit of 45 dBA L_{dn} for habitable rooms, the Cal Green Code limit of 50 dBA $L_{eq\ (1\text{-}hr)}$ for occupied areas of non-residential uses, or the City of Gilroy General Plan limit of 61 dBA L_{dn} for interior noise levels in commercial uses. The future interior noise environment would be compatible with the proposed use.

Past fire station studies completed by Illingworth & Rodkin[3] quantified maximum noise levels produced by emergency vehicles entering and exiting the station and from weekly maintenance activities. These activities can be expected to generate noise levels of 85 dBA L_{max} at a distance of 50 feet. The nearest entrance or exit to the Gilroy Fire Department is located approximately 335 feet from the western façade of the proposed hotel building. The existing building at 420 East 9th Street would shield the hotel from direct exposure to noise originating at the station. Noise levels from station activities and trucks exiting and entering the station would be expected to reach 63 to 68 dBA L_{max} at the western façade of the hotel. Assuming a 25 dBA exterior-to-interior noise reduction from standard construction with windows closed, noise from fire station activities would

[3] Illingworth & Rodkin, Inc., "*Fire Station 70 Noise and Vibration Assessment.*", November 30, 2017.

reach 38 to 43 dBA L_{max} within guest rooms. Therefore, fire station activities are not anticipated to result in sleep disturbance for guests at the proposed hotel.

Modeled noise levels at building façades with the greatest exposure to noise resulting from the proposed car wash operations are summarized below in Table 7. Noise from car wash operations at façades of proposed buildings would reach 49 to 75 dBA $L_{eq\ (1\text{-}hr)}$ during peak hours of operation, with day-night average levels of 47 to 74 dBA L_{dn}. Assuming a 25 dBA exterior-to-interior noise reduction from standard construction with windows closed, car wash operations would result in peak-hour noise levels of 24 to 50 dBA $L_{eq\ (1\text{-}hr)}$ and day-night average noise levels of 22 to 49 dBA L_{dn}.

Hotel rooms located along the building's eastern façade could be exposed to interior noise levels resulting from car wash operations exceeding the California Building Code standard of 45 dBA L_{dn} for habitable rooms. Detailed elevations showing construction materials and window placements for the hotel's eastern façade were not available as of this writing. Prototypical elevations of the hotel's southern façade were analyzed under the assumption similar materials and window areas will be used. Prototypical southern façade elevations indicate a mix of construction materials will be used, including brick and metal panels, and a window to wall ratio of about 47%. With a typical wall STC rating of 39 to 40, windows along the eastern façade were calculated as needing to meet an STC rating of 32 or greater in order to reduce car wash operational noise levels below 45 dBA L_{dn} within rooms. If eastern façade wall construction differs from that shown on the prototypical southern façade elevations using materials such as stucco and meets an STC rating of 46, with the same window to wall ratio of 47%, windows would need to meet an STC rating of 30 or greater to reduce noise within rooms to below 45 dBA L_{dn}. With provision of a forced-air mechanical ventilation system to allow building occupants to close windows in order to mitigate noise, car wash operations would not result in interior noise levels within rooms along any other hotel façade, either restaurant, the coffee shop, or the convenience store exceeding limits set in the California Building Code, Cal Green Code, or City of Gilroy General Plan.

TABLE 7 Future Car Wash Operational Noise Exposure at Building Façades

Proposed Building	Floor	Future Exterior Noise Exposure (dBA)		Future Interior Noise Exposure (dBA)[1]	
		Peak Hour ($L_{eq\ (1\text{-}hr)}$)	Day-Night Average (L_{dn})	Peak Hour ($L_{eq\ (1\text{-}hr)}$)	Day-Night Average (L_{dn})
Hotel Eastern Façade	1st	75	74	50	49
	2nd	75	73	50	48
	3rd	75	73	50	48
	4th	74	73	49	48
	5th	74	72	49	47
Convenience Store/Gas Station	1st	49	47	24	22
Coffee Shop	1st	54	52	29	27
3,500 s.f. Quick Service Restaurant	1st	56	54	31	29
5,182 s.f. Quick Service Restaurant	1st	61	59	36	34

[1] Interior noise exposure assumes a 25 dBA noise reduction resulting from standard commercial construction with windows and doors closed.

A high-speed rail network is currently being planned to pass through and operate a station within Gilroy. Two alternatives exist for the alignment of the rail line: one along the existing Union Pacific Railroad line and one through East Gilroy. While high-speed rail would have the potential to increase noise levels in the City, the potential alignments would not pass near the project site and would not be expected to generate substantial noise at the site above what would be characterized by roadway traffic.

Recommended Conditions of Approval:

- Provide all occupied areas and habitable rooms of proposed site buildings with a forced-air mechanical ventilation system to allow for windows to be closed to control noise at the occupant's discretion.

- As design of the hotel building continues, require that construction of the eastern façade make use of materials which would provide sufficient noise reduction to bring interior noise in rooms to levels not exceeding 45 dBA L_{dn}. Preliminary calculations show that a total noise reduction of 27 to 29 dBA L_{dn} will be needed along the eastern façade, which under conditions similar to those shown in prototype elevations, would require windows with a minimum STC rating of 32 with typical metal panel or wood siding wall construction, or a minimum STC rating of 30 with stucco wall construction. Additional noise reduction methods such as decreasing the eastern façade's overall window to wall area ratio should also be considered.

NOISE IMPACTS AND MITIGATION MEASURES

This section describes the significance criteria used to evaluate project impacts under CEQA, provides a discussion of each project impact, and presents mitigation measures, where necessary, to reduce project impacts to less-than-significant levels.

Significance Criteria

The following criteria were used to evaluate the significance of environmental noise and vibration resulting from the project:

- **Temporary or Permanent Noise Increases in Excess of Established Standards.** A significant noise impact would be identified if the project would generate a substantial temporary or permanent noise level increase in ambient noise levels at existing noise-sensitive receptors in excess of the applicable noise standards presented in the General Plan or Municipal Code, as follows:

    - Temporary Noise Increase. A significant noise impact would be identified if construction-related noise would temporarily increase ambient noise levels at sensitive receptors. Gilroy General Plan Mitigation Measure 4.7-B and Municipal Code Zoning Ordinance Section 16.38 establish construction best practices to be followed to reduce the impact of construction noise on adjacent or nearby properties.

    - Permanent Noise Increase. A significant permanent noise impact would be identified if project traffic would result in a noise increase in excess of General Plan standards at outdoor activity areas of noise-sensitive uses.

    - Operational Noise in Excess of Standards. General Plan Policy 26.02 establishes maximum permissible outdoor and indoor noise levels at residential, commercial, and industrial uses. Municipal Code Chapter 30 Section 41.31 establishes limits for noise emanating from commercially zoned properties applied at the nearest residential property line.

- **Generation of Excessive Groundborne Vibration.** A significant impact would be identified if the construction of the project would expose persons to excessive vibration levels. The California Department of Transportation recommends vibration limits for vulnerable structures as described in Table 3.

Impact 1a: **Temporary Construction Noise.** Existing noise-sensitive land uses would be exposed to a temporary increase in ambient noise levels due to project construction activities. The incorporation of construction best management practices would result in a **less-than-significant** temporary noise impact.

Temporary noise increases resulting from construction vary depending upon the noise levels generated by various pieces of construction equipment, the timing and duration of noise-generating

activities, the distance between construction noise sources and noise-sensitive areas, and the presence of intervening shielding features such as buildings or terrain. Construction noise impacts primarily result when construction activities occur during noise-sensitive times of the day (e.g., early morning, evening, or nighttime hours), the construction occurs in areas immediately adjoining noise-sensitive land uses, or when construction lasts over extended periods of time.

Construction activities for individual projects are typically carried out in stages. During each stage of construction, there would be a different mix of equipment operating, and noise levels would vary by stage and vary within stages, based on the amount of equipment in operation and the location at which the equipment is operating. Typical construction noise levels at a distance of 50 feet are shown in Tables 8 and 9. Table 8 shows the average noise level ranges by construction phase, and Table 9 shows the maximum noise level ranges for different construction equipment. Construction-generated noise levels drop off at a rate of about 6 dBA per doubling of the distance between the source and receptor. Shielding by buildings or terrain can provide an additional 5 to 10 dBA noise reduction at distant receptors.

TABLE 8 Typical Ranges of Construction Noise Levels at 50 Feet, L_{eq} (dBA)

	Domestic Housing		Office Building, Hotel, Hospital, School, Public Works		Industrial Parking Garage, Religious Amusement & Recreations, Store, Service Station		Public Works Roads & Highways, Sewers, and Trenches	
	I	II	I	II	I	II	I	II
Ground Clearing	83	83	84	84	84	83	84	84
Excavation	88	75	89	79	89	71	88	78
Foundations	81	81	78	78	77	77	88	88
Erection	81	65	87	75	84	72	79	78
Finishing	88	72	89	75	89	74	84	84

I - All pertinent equipment present at site.
II - Minimum required equipment present at site.

Source: U.S.E.P.A., Legal Compilation on Noise, Vol. 1, p. 2-104, 1973.

TABLE 9 Construction Equipment 50-foot Noise Emission Limits

Equipment Category	L_{max} Level (dBA)[1,2]	Impact/Continuous
Arc Welder	73	Continuous
Auger Drill Rig	85	Continuous
Backhoe	80	Continuous
Bar Bender	80	Continuous
Boring Jack Power Unit	80	Continuous
Chain Saw	85	Continuous
Compressor[3]	70	Continuous
Compressor (other)	80	Continuous
Concrete Mixer	85	Continuous
Concrete Pump	82	Continuous
Concrete Saw	90	Continuous
Concrete Vibrator	80	Continuous
Crane	85	Continuous
Dozer	85	Continuous
Excavator	85	Continuous
Front End Loader	80	Continuous
Generator	82	Continuous
Generator (25 KVA or less)	70	Continuous
Gradall	85	Continuous
Grader	85	Continuous
Grinder Saw	85	Continuous
Horizontal Boring Hydro Jack	80	Continuous
Hydra Break Ram	90	Impact
Impact Pile Driver	105	Impact
Insitu Soil Sampling Rig	84	Continuous
Jackhammer	85	Impact
Mounted Impact Hammer (hoe ram)	90	Impact
Paver	85	Continuous
Pneumatic Tools	85	Continuous
Pumps	77	Continuous
Rock Drill	85	Continuous
Scraper	85	Continuous
Slurry Trenching Machine	82	Continuous
Soil Mix Drill Rig	80	Continuous
Street Sweeper	80	Continuous
Tractor	84	Continuous
Truck (dump, delivery)	84	Continuous
Vacuum Excavator Truck (vac-truck)	85	Continuous
Vibratory Compactor	80	Continuous
Vibratory Pile Driver	95	Continuous
All other equipment with engines larger than 5 HP	85	Continuous

Notes:

1 Measured at 50 feet from the construction equipment, with a “slow” (1 sec.) time constant.

2 Noise limits apply to total noise emitted from equipment and associated components operating at full power while engaged in its intended operation.

3 Portable Air Compressor rated at 75 cfm or greater and that operates at greater than 50 psi.

Source: Mitigation of Nighttime Construction Noise, Vibrations and Other Nuisances, National Cooperative Highway Research Program, 1999.

Project construction is anticipated to take place over a period of about 13 months, from January 2021 to February 2022. The construction of the proposed project would involve demolition of existing site improvements including the Chestnut Square shopping center and Trans Valley Transport building, site preparation, grading and excavation, trenching, building erection, interior/architectural coating, and paving. Table 10 shows the anticipated construction noise levels at surrounding receptors calculated throughout all phases of construction based on the provided equipment list. Construction noise levels were calculated using the Federal Highway Administration (FHWA) Roadway Construction Noise Model (RCNM). Pile driving would not be used as a method of construction.

TABLE 10 Calculated Construction Noise Levels at Surrounding Receptors

Receptor Location	Distance from Site[1] (ft)	Calculated Construction Noise Level (dBA)	
		Hourly Average Noise Level (L_{eq})	Maximum Noise Level (L_{max})
420 East 9th Street	185	62 – 75	66 – 78
Gilroy Fire Department	235	60 – 73	64 – 76
Papé Machinery	385	56 – 69	60 – 72
The Carpet Outlet	425	55 – 68	59 – 71
Department of Motor Vehicles and Shopping Center	425	55 – 68	59 – 71
El Pollo Loco	430	55 – 68	59 – 71
McDonald's	475	54 – 67	58 – 70
Nearest Residential Property Line	620	52 – 65	56 – 68

[1] Relative to the approximate center of construction at the project site.

Noise sensitive uses surrounding the site include the Gilroy Fire Department; commercial uses at 420 East 9th Street, Papé Machinery at 415 East 9th Street, The Carpet Outlet at 7100 Chestnut Street, the Department of Motor Vehicles and shopping center at 6900 Chestnut Street, El Pollo Loco at 6986 Chestnut Street, McDonald's at 6990 Automall Parkway; and residences to the north along East 8th Street. As seen above in Table 10, project construction would have the potential to temporarily increase ambient noise levels in the site vicinity.

General Plan Mitigation Measure 4.7-B and Municipal Code Zoning Ordinance Section 16.38 establish allowed hours of construction and construction best practices to be followed to reduce the impact of construction noise on adjacent or nearby properties. These, and additional recommended best practices which would further ensure project construction would not result in excessive noise levels at surrounding receptors, are listed below:

- Construction activities shall be limited to the hours of seven (7:00) a.m. and seven (7:00) p.m., Monday through Friday, and nine (9:00) a.m. to seven (7:00) p.m. on Saturday. Construction activities shall not occur on Sundays or City holidays.

- Equip all internal combustion engine-driven equipment with mufflers which are in good condition and appropriate for the equipment;

- Locate stationary noise-generating equipment as far as possible from sensitive receptors when sensitive receptors adjoin or are near a construction project area;

- Construct sound walls or other noise reduction measures prior to developing the project site;

- Prohibit unnecessary idling of internal combustion engines;

- Utilize "quiet" air compressors and other stationary noise sources where technology exists;

- The contractor shall prepare a detailed construction plan identifying the schedule for major noise-generating construction activities. The construction plan shall identify a procedure for coordination with nearby residential land uses so that construction activities can be scheduled to minimize noise disturbance.

Implementation of the above measures would reduce this impact to a **less-than-significant** level.

Mitigation Measure 1a: None required.

Impact 1b: Permanent Noise Level Increase. The proposed project is not expected to cause a substantial permanent noise level increase at the existing residential or commercial land uses in the project vicinity. **This is a less-than-significant impact.**

The City of Gilroy General Plan and Municipal Code do not provide standards for which to determine an impact from increases in traffic noise. In other nearby Bay Area cities, an increase of 3 dBA L_{dn} is often considered significant for areas where traffic noise levels already exceed standards, and 5 dBA L_{dn} for areas where traffic noise levels are at or below standards. These criteria will be used in this analysis.

The traffic study prepared for the project by Hexagon Transportation Consultants, Inc. included peak hour turning movements for ten affected intersections in the project vicinity. By comparing future cumulative traffic levels with and without the project, the project's contribution to the future noise level increase was determined. The project would result in traffic noise increases of 0 to 2 dBA L_{dn} along all studied roadway segments, with the exception of East 9th Street located east of Chestnut Street.

The segment of East 9th Street east of Chestnut Street is bordered by the project site and by non-noise sensitive commercial uses. Traffic volumes are considerably lower than those on the surrounding roads, even under cumulative plus project conditions, and noise levels in this area would continue to be dominated by traffic along US 101, the US 101 off-ramp, and Chestnut Street. Given the existing traffic noise environment generated by more heavily traveled roadways, the small contribution of traffic onto East 9th Street is calculated to result in overall traffic noise increases of 1 to 2 dBA L_{dn} at land uses adjoining the roadway.

Project-generated traffic would not result in a significant increase in noise levels at any noise-sensitive uses. This is a **less-than-significant impact**.

Mitigation Measure 1b: None required.

Impact 1c: Noise Levels in Excess of Standards. The proposed project would not generate noise in excess of standards established in the City's General Plan and Municipal Code at nearby sensitive receptors. **This is a less-than-significant impact.**

General Plan Policy 26.02 establishes maximum permissible outdoor and indoor noise levels at residential, commercial, and industrial uses, as seen in Table 4 of the Setting Section. Project operations would be prohibited from generating outdoor noise levels of 60 dBA L_{dn} at the nearest residences, 65 dBA L_{dn} at the nearest commercial uses, and 76 dBA L_{dn} at the nearest industrial use. Project operations would be prohibited from generating indoor noise levels of 45 dBA L_{dn} at the nearest residences, 61 dBA L_{dn} at the nearest commercial uses, and 65 dBA L_{10} at the nearest industrial use.

Municipal Code Chapter 30 Section 41.31 establishes limits for noise emanating from commercially zoned properties. Project operational noise would be limited to a maximum of 70 dBA L_{10} measured at the nearest residential property line. Project operational noise would be limited to the hours of 7:00 a.m. to 10:00 p.m.

Sources of operational noise from the project would include car wash operations, mechanical equipment such as that used for heating, ventilation, and air conditioning (HVAC), backup emergency generators, truck deliveries, and parking lot activities. Project noise sources were input into the SoundPLAN model and noise levels at surrounding uses were calculated.

Car Wash Noise

The proposed project would construct an automated drive-through car wash and 27 self-service vacuum stations. The car wash and vacuums would be operational seven days a week from 7:00 a.m. to 8:00 p.m., within the allowable hours stated in the Municipal Code. Vehicles would enter the car wash through a door along the eastern façade of the building and exit through a door along the western façade.

The primary noise source associated with a drive-through car wash is typically the blower dryer system used at the exit of the cycle. Based on data from past car wash noise studies, the blower dryer system can produce noise levels of 91 dBA at a distance of 10 feet, and 77 dBA at a distance of 50 feet. These systems can be equipped with optional silencers when necessary. Based on the relative difference in overall sound power level at the entrance and exit doors of other car wash studies, the entrance door is assumed to have 3 dBA lower overall sound power level than at the exit door. Manufacturer data used for vacuum stations in other studies indicate that an individual vacuum station when in use generates a noise level of about 66 dBA at a distance of 3 feet. Minimal noise is generated when vacuum hoses are hooked. Exact locations for the 27 self-service vacuum stations were not available at the time of this analysis.

Car wash noise sources were entered into the SoundPLAN noise model and calculations were made to determine operational noise generated at surrounding sensitive uses. The modeled scenario assumes a worst-case of continuous use of the car wash and all vacuum stalls for the full 13 hours of daily operation. Realistically, levels of car wash use would vary throughout the day, and the blower dryer system would not be in continuous operation. Based on past car wash studies, peak hour use of the automated drive-through would see around 50 to 60 vehicles, with 250 to 350 total vehicles daily. Results of car wash noise modeling are summarized in Table 11. Maps of the noise exposure generated by the project on the surrounding area are shown in Figures 2 and 3.

TABLE 11 Future Car Wash Operational Noise Exposure at Surrounding Receptors

Receptor Location	Receptor Number	Future Noise Exposure (dBA)	
		Peak Hour ($L_{eq\ (1\text{-}hr)}$)	Day-Night Average (L_{dn})
Nearest Residential Property Line	R1	51	49
	R2	54	52
	R3	57	56
The Carpet Outlet	R4	41	40
Papé Machinery	R5	44	42
MG Reupholstery	R6	49	47
Fire Department Property Line	R7	40	38
420 East 9th Street	R8	40	39
California Highway Patrol Office	R9	48	46
McDonald's	R10	48	46
El Pollo Loco	R11	48	47
Department of Motor Vehicles and Shopping Center	R12	49	47

FIGURE 2 Noise Exposure Resulting from Car Wash Operations – Peak Hour (L_{eq})

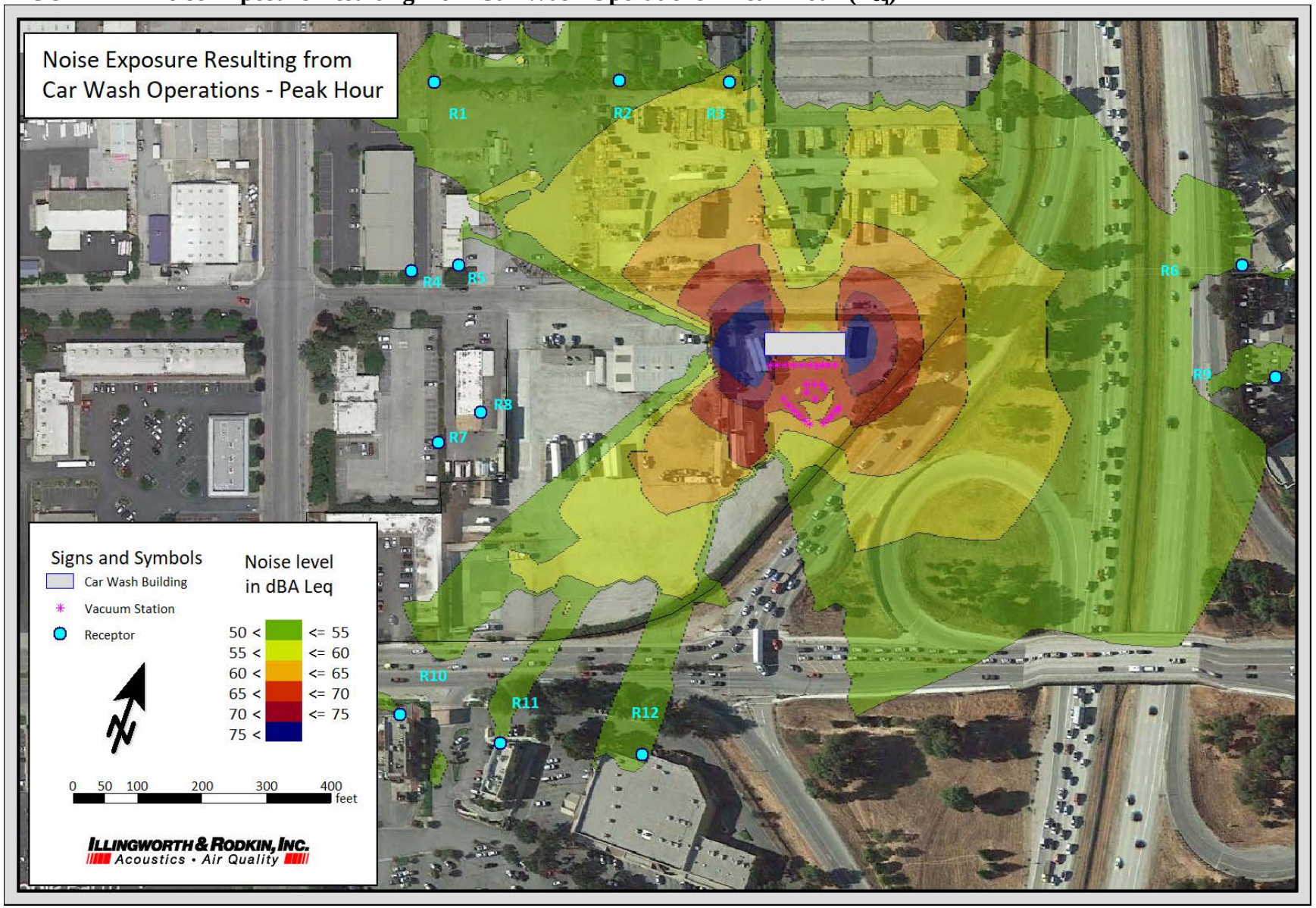
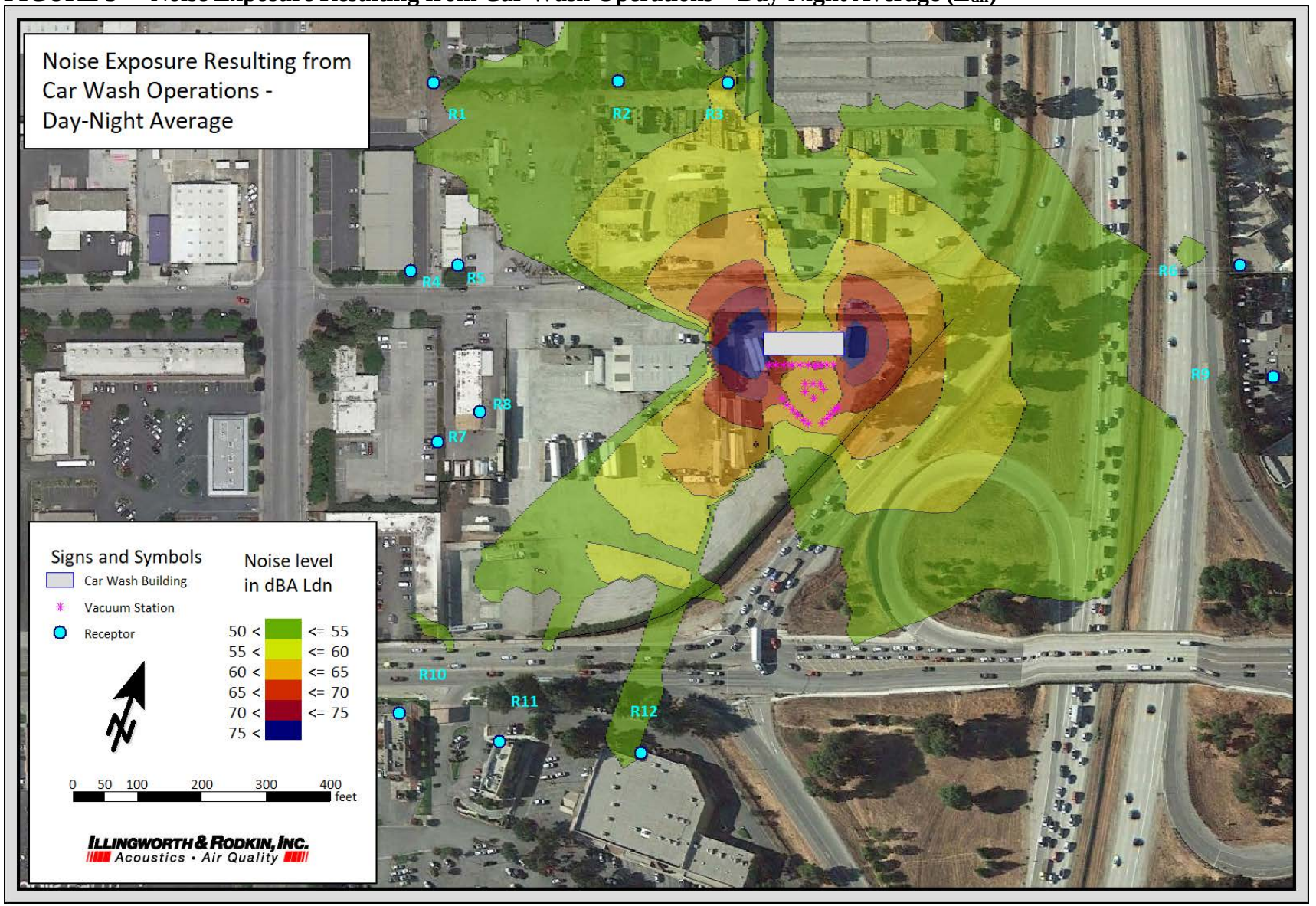


FIGURE 3 Noise Exposure Resulting from Car Wash Operations – Day-Night Average (L_{dn})



As indicated in Table 11 and Figures 2 and 3, noise resulting from worst-case car wash operations would not exceed 60 dBA L_{dn} at the nearest residences, 65 dBA L_{dn} at the nearest commercial uses, or 76 dBA L_{dn} at the nearest industrial uses. Peak-hour noise levels would reach up to 57 dBA L_{eq} at the nearest residential property line. As modeled peak-hour noise levels are representative of a worst case of continuous operation of all car wash noise source simultaneously, modeled hourly equivalent levels would be approximately the same as maximum levels or levels not to be exceeded more than ten percent of the time. Therefore, the car wash would not generate noise levels of 70 dBA L_{10} or greater at the nearest residential property line. Assuming 15 dBA of exterior-to-interior noise reduction at surrounding buildings, interior noise levels would not exceed 45 dBA L_{dn} within the nearest residences. As exterior noise levels at commercial and industrial uses would not exceed interior limits, car wash noise would not exceed interior noise limits at any commercial or industrial uses in the project vicinity. Car wash operations would occur during the hours of 7:00 a.m. and 8:00 p.m. and therefore would not generate noise outside of allowed hours under Municipal Code Chapter 30 Section 41.31.

Mechanical Equipment Noise

While during most daytime hours, noise originating from the project site would be dominated by car wash activities, there would be periods of low car wash use and nighttime hours when other sources such as HVAC equipment may become the predominant noise source. HVAC units are expected to be located at all of the proposed site buildings; however, the number of units, specifications, and location of these units are not available at this time. For the purpose of this study, it is assumed that all HVAC equipment would be located on the roof of each building. Typical HVAC equipment for a restaurant or commercial use such as those proposed for the project generates noise levels in the range of 50 to 60 dBA at a distance of 50 feet from the equipment. Assuming worst case conditions, no screening or other shielding is taken into account in this analysis.

Rooftop equipment noise was propagated to the receiving uses nearest the site. The calculated noise levels are summarized in Table 12. Typically, HVAC units cycle on and off throughout a 24-hour period. Therefore, the estimated noise levels in Table 12 would represent hourly average noise attributable to HVAC equipment during daytime and nighttime hours. As HVAC noise is relatively steady and constant while operating, the L_{10} level generated would be similar to calculated hourly average noise levels in Table 12. The Municipal Code standard of 70 dBA L_{10} would not be exceeded at the nearest residences to the north. Noise from HVAC equipment would not result in exceedances of any exterior or interior General Plan limits.

TABLE 12 Estimated HVAC Equipment Noise Levels at Surrounding Uses

Receptor	Distance to Receiving Use (ft)	Estimated Noise Levels (dBA)
420 East 9th Street	100	44 – 54
McDonald's	135	41 – 51
Fire Department Property Line	160	40 – 50
Papé Machinery	175	39 – 49
El Pollo Loco, Wendy's, Pizza Factory	215	37 – 47
The Carpet Outlet, Taco Bell, Department of Motor Vehicles and Shopping Center	235	37 – 47
Nearest Residential Property Line	390	32 – 42

Emergency Generator Noise

Hotels of this size would typically require emergency generators with a capacity of about 750 kW. Generators of this size typically generate noise levels of about 89 dBA at 23 feet if a weather enclosure is included or ranging from about 75 to 81 dBA at 23 feet if a Level 1 or Level 2 sound enclosure is included. During emergency situations, the running of generators would be exempt from City noise restrictions; however, generators are typically tested during the daytime for a period of up to two hours every month. A worst-case placement of a rooftop generator with a weather enclosure set 10 feet back from the edge of the roof was added to the SoundPLAN model. With a two-hour test of the generator, an hourly average noise level of 33 to 37 dBA L_{eq} and a day-night average level of 31 to 35 dBA L_{dn} would be expected at the nearest residential property line. Under these assumptions, it is not expected that testing of a typical emergency generator would result in an exceedance of the Municipal Code limit of 70 dBA L_{10} at the nearest residential property line.

Parking Lot and Gas Station Noise

A total of 271 surface parking spaces are proposed as part of the project. Six gasoline pumps totaling 12 fueling positions would operate 24 hours a day at the proposed gas station located at the southwest corner of the site. Gasoline pumps would include similar noise sources as parking spaces, which would include vehicular circulation, louder engines, car alarms, door slams, and human voices. These sources typically generate noise levels ranging from 53 to 63 dBA L_{max} at a distance of 50 feet.

These are isolated, maximum instantaneous noise sources, which would be compared to the Municipal Code limit of 70 dBA L_{10} at the nearest residential property line. The residential property line property line nearest the site is located approximately 410 feet from the nearest parking space. At this distance, parking lot and gas station activities would generate maximum noise levels of approximately 35 to 45 dBA L_{max}. Noise levels would not exceed 70 dBA at the nearest property line for ten percent or greater of any hour, and the Municipal Code limit would not be exceeded.

Truck Delivery Noise

Gas Station

Gas stations require heavy truck deliveries for fuel deposits. Similarly sized gas station projects have estimated approximately 13,000 gallons of fuel to be sold daily. The typical fuel truck carries about 9,000 gallons, which would result in about 1.5 truck deliveries per day. Therefore, on the worst day, two fuel truck deliveries would be assumed. Additionally, smaller vender truck deliveries would occur at the convenience store. For purposes of this analysis, two heavy fuel truck deliveries and one vender truck delivery is assumed in one day. This would represent the worst-case scenario.

It is assumed that these trucks would access the site from East 10th Street or Chestnut Street, park at the eastern portion of the site, and dispense the fuel into tanks. Depositing the fuel into the tanks would not generate measurable noise levels. Noise due to low speed truck maneuvering results from a combination of engine, exhaust, and tire noise, as well as the intermittent sounds of back-up alarms and releases of compressed air associated with truck/trailer air brakes. For the heavy fuel trucks, maximum instantaneous noise levels would typically range from 70 to 75 dBA L_{max} at a distance of 50 feet. Smaller vender trucks typically generate maximum noise levels of 60 to 65 dBA L_{max} at the same distance. While the length of time to dispense the fuel in the tanks or unload supplies could take as long as one hour or so, typically, delivery trucks are stationary during this time with the engine off. The total time when these maximum noise levels would occur would typically be for less than 3 minutes in any one hour.

The residential property line nearest the project site is located approximately 680 feet north of the nearest gas station truck delivery and unloading area. At this distance, maximum instantaneous noise levels associated with deliveries would reach 47 to 52 dBA L_{max}. These noise levels would be reached for less than ten percent of any hour, and therefore the Municipal Code limit of 70 dBA L_{10} would not be exceeded.

Hotel and Commercial Uses

Large trucks would make regular deliveries to other proposed uses at the site including the hotel, coffee shop, and restaurants. Maximum instantaneous noise levels similar to those described above for gas station deliveries would be expected from maneuvering of trucks at other site buildings. The potential truck accessway nearest to the residential property line to the north would be located near the proposed hotel along East 9th Street. This would place truck noise sources approximately 370 feet from the nearest residential property line. At this distance, maximum instantaneous noise levels from deliveries would reach 53 to 58 dBA L_{max}. Similar to gas station deliveries, these noise levels would be reached for less than ten percent of any hour and would not exceed the municipal code limit of 70 dBA L_{10}.

Mitigation Measure 1c: **None required**.

Impact 2: **Exposure to Excessive Groundborne Vibration due to Construction.** Construction-related vibration levels are not expected to exceed applicable vibration thresholds at nearby sensitive land uses. **This is a less-than-significant impact.**

The City of Gilroy does not specify a construction vibration limit. For structural damage, the California Department of Transportation recommends a vibration limit of 0.5 in/sec PPV for modern commercial and industrial structures (see Table 3). The 0.5 in/sec PPV vibration limit is applicable to most properties in the vicinity of the project site. The California Department of Transportation recommends a vibration limit of 0.25 in/sec PPV for historic and some old buildings. The City of Gilroy Historic Resources Inventory identifies one historic building within 1,000 feet of the project site, located at 99 East 8th Street.

Demolition and construction activities often generate perceptible vibration levels and levels that could affect nearby structures when heavy equipment or impact tools (e.g. jackhammers, pile drivers, hoe rams) are used in the vicinity of nearby sensitive land uses. Building damage generally falls into three categories. Cosmetic damage (also known as threshold damage) is defined as hairline cracking in plaster, the opening of old cracks, the loosening of paint or the dislodging of loose objects. Minor damage is defined as hairline cracking in masonry or the loosening of plaster. Major structural damage is defined as wide cracking or the shifting of foundation or bearing walls.

Table 13 presents typical vibration levels from construction equipment at 25 feet. Vibration levels would vary depending on soil conditions, construction methods, and equipment used. Table 13 also presents construction vibration levels at representative distances from the construction equipment located at the closest property line to the nearest structures. Calculations were made to estimate vibration levels at distances from site property lines of 35 feet to represent the distance to the commercial building at 420 East 9th Street, a distance of 100 feet to represent the distance to the Papé Machinery building at 415 East 9th Street, a distance of 115 feet to represent the distance to the McDonald's at 6990 Automall Parkway and the Gilroy Fire Department at 7070 Chestnut, and at a distance of 700 feet to represent the distance to the nearest historic structure at 99 East 8th Street. Vibration levels are highest close to the source, and then attenuate with increasing distance at the rate $(D_{ref}/D)^{1.1}$, where D is the distance from the source in feet and D_{ref} is the reference distance of 25 feet.

TABLE 13 Vibration Levels for Construction Equipment at Various Distances

Equipment		PPV at 25 ft. (in/sec)	PPV at 35 ft. (in/sec)	PPV at 100 ft. (in/sec)	PPV at 115 ft. (in/sec)	PPV at 700 ft. (in/sec)
Clam shovel drop		0.202	0.140	0.044	0.038	0.005
Hydromill (slurry wall)	in soil	0.008	0.006	0.002	0.001	0.000
	in rock	0.017	0.012	0.004	0.003	0.000
Vibratory Roller		0.210	0.145	0.046	0.039	0.005
Hoe Ram		0.089	0.061	0.019	0.017	0.002
Large bulldozer		0.089	0.061	0.019	0.017	0.002
Caisson drilling		0.089	0.061	0.019	0.017	0.002
Loaded trucks		0.076	0.052	0.017	0.014	0.002
Jackhammer		0.035	0.024	0.008	0.007	0.001
Small bulldozer		0.003	0.002	0.001	0.001	0.000

Source: Transit Noise and Vibration Impact Assessment, United States Department of Transportation, Office of Planning and Environment, Federal Transit Administration, May 2006 as modified by Illingworth & Rodkin, Inc., July 2020.

As indicated in Table 13, construction activities associated with the proposed project would not result in vibration levels exceeding 0.5 in/sec PPV at any nearby structures of modern commercial and industrial construction or 0.25 in/sec PPV at any nearby historic or old buildings. This is a **less-than-significant impact**.

Mitigation Measure 2: None required.