3.11
NOISE

This section of the Draft EIR includes a summary of relevant background information and applicable regulations, a description of existing ambient noise conditions, and an analysis of potential noise impacts of the proposed project. Feasible mitigation measures are recommended, as necessary, to reduce significant noise impacts. The information contained within this section is based on information and data from the *County of San Benito General Plan* (1994) and *Fairview Corners Residential Project Environmental Noise Assessment San Benito County, California* (Illingworth & Rodkin, Inc. 2010) (hereinafter "noise report") and a supplemental memo to the noise report, dated May 26, 2011 (Illingworth & Rodkin, Inc.). Copies of the noise report and supplemental memo can be found in Appendix J.

Acoustic Fundamentals

Sound is mechanical energy transmitted in the form of a wave because of a disturbance or vibration. Sound levels are described in terms of both amplitude and frequency. Amplitude is defined as the difference between ambient air pressure and the peak pressure of the sound wave. Amplitude is measured in decibels (dB) on a logarithmic scale. For example, a 65 dB source of sound, such as a truck, when joined by another 65 dB source results in a sound amplitude of 68 dB, not 130 dB (i.e., doubling the source strength increases the sound pressure by 3 dB). Amplitude is interpreted by the ear as corresponding to different degrees of loudness. Laboratory measurements correlate a 10 dB increase in amplitude with a perceived doubling of loudness and establish a 3 dB change in amplitude as the minimum audible difference perceptible to the average person.

Noise may be defined as unwanted sound. Noise is usually objectionable because it is disturbing or annoying. Noise is generated by many mobile sources (e.g., automobiles, trucks, and airplanes) and stationary sources (e.g., construction sites, machinery, and industrial operations).

Noise attenuates with distance from the noise source. The rate at which noise attenuates depends on the ground surface (whether soft or hard) and the number or types of objects between the noise source and the receiver (e.g., trees, buildings, walls).

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. Each 10-decibel increase in sound level is perceived as approximately a doubling of loudness over a fairly wide range of intensities. Therefore, an increase of 10 decibels represents a 10-fold increase in acoustic energy, while 20 decibels is 100 times more intense, 30 decibels is 1,000 times more intense, and so forth.

The most common method of characterizing sound in California is the A-weighted sound level or dBA. This scale gives greater weight to the frequencies of sound to which the human ear is most sensitive. 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. A comparison of noise levels to common sources is presented in Table 19, Typical Noise Levels in the Environment.

Sound levels can be reduced by placing barriers between the noise source and the receiver. In general, barriers contribute to decreasing noise levels only when the structure breaks the "line of sight" between the source and the receiver. Since sound is actually a fluctuation in air pressure, a sound barrier must be an air tight structure; hence, solid walls, earthen berms, or changes in topography are commonly used as effective sound barriers. Wooden fences or broad areas of dense foliage can also reduce noise, but are less effective than solid barriers.

Noise Descriptors

The intensity of environmental noise fluctuates over time, and several descriptors of time averaged noise levels are typically used when evaluating the impacts of noise. Sensitivity to noise increases during the evening and at night because excessive noise interferes with the ability to sleep; hence, 24-hour descriptors have been developed that incorporate artificial noise penalties added to quiet-time noise events. Many communities use 24-hour descriptors of noise levels to regulate noise.

Table 19 Typical Noise Levels in the Environment

Common Outdoor Noise Source	Noise Level (dBA)	Common Indoor Noise Source
	110	Rock Band
Jet Fly-over at 1,000 feet		
	100	
Gas Lawn Mower at 3 feet		
	90	
Diesel Truck at 50 feet Travelling 50 MPH		Food Blender at 3 feet
	80	Garbage Disposal at 3 feet
Noisy Urban Area, Daytime		
Gas Lawn Mower at 100 feet	70	Vacuum Cleaner at 10 feet
Commercial Area		Normal Speech at 3 feet
Heavy Traffic at 300 feet	60	
		Large Business Office
Quiet Urban Daytime	50	Dishwasher in Next Room
Quiet Urban Nighttime	40	Theater, Large Conference Room (Background)
Quiet Suburban Nighttime		
	30	Library
Quiet Rural Nighttime		Bedroom at night, Concert Hall (Background)
	20	
		Broadcast/Recording Studio
	10	
Lowest Threshold of Human Hearing	0	Lowest Threshold of Human Hearing

Source: Illingworth & Rodkin Inc. (2010), Technical Noise Supplement (TeNS), Caltrans (2009)

The three most commonly used descriptors are L_{eq}, L_{dn}, and CNEL. The energy-equivalent noise level, L_{eq}, is a measure of the average energy content (intensity) of noise over any given period. The day-night average noise level, L_{dn}, is the 24-hour average of the noise intensity, with a 10-dBA "penalty" added for nighttime noise (10 p.m. to 7 a.m.) to account for the greater sensitivity to noise during this period. CNEL, the community equivalent noise level, is similar to L_{dn} but adds an additional 5-dBA "penalty" for night-time noise (7 p.m. to 10 p.m.). Another descriptor that is commonly discussed is the single-event noise exposure level (SENEL), also referred to as

the sound exposure level (SEL). The SENEL/SEL describes a receiver's cumulative noise exposure from a single noise event, which is defined as an acoustical event of short duration (0.5 second), such as a backup beeper, the sound of an airplane traveling overhead, or a train whistle, and involves a change in sound pressure. Noise analyses may also depend on measurements of L_{max}, the maximum instantaneous noise level during a specific period of time, and L_{min}, the minimum instantaneous noise level during a specific period. Common noise level descriptors are summarized in Table 20, Definitions of Acoustical Terms.

Human Responses to Noise

The human response to environmental noise is subjective and varies considerably from individual to individual. Noise in the community has often been cited as a health problem, not in terms of actual physiological damage, such as hearing impairment, but in terms of inhibiting general well-being and contributing to undue stress and annoyance. The health effects of noise in the community arise from interference with human activities, including sleep, speech, recreation, and tasks that demand concentration or coordination. Hearing loss can occur at the highest noise intensity levels. When community noise interferes with human activities or contributes to stress, public annoyance with the noise source increases. The acceptability of noise and the threat to public well-being are the basis for land use planning policies preventing exposure to excessive community noise levels.

Unfortunately, there is no completely satisfactory way to measure the subjective effects of noise or of the corresponding reactions of annoyance and dissatisfaction. This is primarily because of the wide variation in individual thresholds of annoyance and habituation to noise over differing individual experiences with noise. Thus, an important way of determining a person's subjective reaction to a new noise is the comparison of it to the existing environment to which one has adapted: the so-called "ambient" environment. In general, the more a new noise exceeds the previously existing ambient noise level, the less acceptable the new noise will be judged.

Regarding increases in A-weighted noise levels, knowledge of the following relationships will be helpful in understanding this analysis:

- Except in carefully controlled laboratory experiments, 1-dB change cannot be perceived by humans.
- Outside of the laboratory, a 3-dB change is considered a just-perceivable difference.
- A change in level of at least 5 dB is required before any noticeable change in community response would be expected. An increase of 5 dB is typically considered substantial.
- A 10-dB change is subjectively heard as an approximate doubling in loudness and would almost certainly cause an adverse change in community response.

Table 20 Definitions of Acoustical Terms

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.
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, Leq	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 pm and 7:00 am.
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 pm to 10:00 pm and after addition of 10 decibels to sound levels measured in the night between 10:00 pm and 7:00 am.
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: Illingworth & Rodkin Inc. (2010)

A limitation of using a single noise-level increase value to evaluate noise impacts, as discussed above, is that it fails to account for pre-project noise conditions.

With this in mind, the Federal Interagency Committee on Noise (FICON) developed guidance to be used for the assessment of project-generated increases in noise levels that take into account the existing ambient noise level. Although the FICON recommendations were specifically developed to assess aircraft noise impacts, they are equally applicable to all sources of noise described in terms of cumulative noise exposure metrics. FICON-recommended noise evaluation criteria are summarized in Table 21, Recommended Criteria for Evaluation of Increases in Ambient Noise Levels.

Table 21 Recommended Criteria for Evaluation of Increases in Ambient Noise Levels

Ambient Noise Level Without Project	Increase Required For Significant Impact
<60 dB	5.0 dB, or greater
60-65 dB	3.0 dB, or greater
>65 dB	1.5 dB, or greater

Source: FAA, 2000

3.11.1 ENVIRONMENTAL SETTING

Existing Noise Environment

Noise-Sensitive Land Uses

Noise-sensitive land uses generally include those uses where exposure to noise would result in adverse effects, as well as uses where quiet is an essential element of their intended purpose. Noise-sensitive land uses typically include residential uses, hospitals, convalescent facilities, parks, hotels, churches, libraries, and schools.

The project site is undeveloped and therefore does not contain any noise-sensitive land uses. The only noise-sensitive land uses in the vicinity of the project site consist of residential uses, including those located on Harbern Way to the east, in the Cielo Vista subdivision west of Fairview Road and the two rural residential properties located north of the project site. The residential uses within the Cielo Vista subdivision are closest to the project site; these uses are separated from the project site by Fairview Road and are shielded from Fairview Road by an approximately six-foot tall wood and masonry fence.

Existing Ambient Noise

The project site is undeveloped. Existing sources of noise on the site consist of mechanical equipment used when the site is periodically mowed and disced, and in connection with the Sunnyslope agricultural water pumps near the northwest corner of the site. The noise report includes the results of an ambient noise monitoring survey conducted from March 21, 2008 to March 26, 2008, which serves as the basis for quantifying the existing noise environment at the project site and vicinity (Illingworth & Rodkin 2010). The report identifies vehicular traffic as the primary source of ambient noise on the site and in the vicinity. Based on past experience and noise measurements of various types of pumps, the noise consultant determined that the Sunnsylope facility is not a significant source of existing noise. Noise levels typically range from 60-70 dBA at a distance of three feet from this type of equipment. Additionally, noise from these types of facilities and ongoing agricultural operations are intermittent in nature and do not occur frequently enough to significantly increase day-night average noise levels at existing residences (Illingworth & Rodkin 2011).

Noise levels were monitored on Fairview Road near the Cielo Vista residential subdivision, approximately 33 feet from the centerline of Fairview Road, south of Cielo Vista Drive, which would receive the greatest volume of project-related traffic according to the project's traffic impact report and correspondingly, would be exposed to the greatest amount of project-related traffic noise.

Based on the monitoring conducted, existing ambient noise levels in the vicinity of the project site predominantly result from traffic along Airline Highway and Fairview Road. Hourly average noise levels measured at this location ranged from 68 to 70 dBA L_{eq} during the day, and from 54 to 68 dBA L_{eq} at night. Measured ambient noise values (i.e., L_{eq}, L_{max}, and L_{min}) are summarized in Table 22, Ambient Noise Levels. The calculated day-night average noise level on Fairview Road ranged from 70 to 72 dBA L_{dn} (Illingworth & Rodkin 2010). The calculated day-night average noise level at the monitoring location ranged from 70 to 72 dBA $L_{dn.}$

Table 22 Ambient Noise Levels

Location	Primary Noise Source	AM/PM	Measured Noise Levels (dBA)		
			Leq	Lmin	Lmax
Fairview Road at Cielo Vista Drive (33' from Centerline)	Vehicle Traffic	Day	69	68	70
		Night	61	54	68

Source: Illingworth & Rodkin, Inc. 2010

3.11.2 REGULATORY SETTING

San Benito County General Plan

The Noise Element of the County's General Plan sets forth noise compatibility standards for various land uses. For residential uses and school uses, noise levels of up to 60 dB CNEL/L_{dn} are "clearly acceptable," and noise levels of up to 65 dB CNEL/L_{dn} are "normally acceptable." Based on an average exterior-to-interior noise reduction afforded by common building construction, exterior noise levels within the "normally acceptable" range would be considered sufficient to ensure that interior noise levels remain within acceptable levels. For parks and playgrounds, noise levels of 55 dB CNEL/L_{dn} are considered "clearly acceptable" and levels of 65 dB CNEL/L_{dn} are considered "normally acceptable." For less noise-sensitive land uses, such as commercial uses, noise levels of up to 75 dBA CNEL/L_{dn} are considered "normally acceptable" (San Benito County 1984).

As it relates to traffic noise, the General Plan Noise Element generally notes that "…road noise becomes a concern when traffic counts approach 20,000 vehicles per day," and goes on to state that traffic flows under 20,000 vehicles per day may have noise levels of 65 dBA L_{dn} within 100 feet of the roadway and 60 dBA L_{dn} or less beyond 100 feet (page 9).

In addition, the San Benito County General Plan Noise Element contains the following applicable policies:

Noise Element

> **Goal 2: To Reduce Ground Transportation Related Noise Impacts.**
>
> **Policy 7.** To require the installation of noise attenuation features when new residential developments are located adjacent to freeways, highways, arterials, railroad rights of way, and other noise generating uses.
>
> **Goal 4: To Reduce Construction Related Noise Impacts.**
>
> **Policy 1.** It will be the County's continuing policy to control the operation of construction equipment at specific sound intensities and frequencies during specified hours.
>
> **Policy 2.** The County will encourage the use of barriers or enclosures for equipment having high noise emissions.

San Benito County Code

San Benito County Noise Ordinance: Section 25.37.035 of the San Benito County Code, and the Noise Control Regulations, Chapter 19.39 of Title 19 of the San Benito County Code, identify maximum acceptable noise standards for noise emanating from any source (unless otherwise exempted), as it affects surrounding properties. Typical noise regulated by these ordinances includes heating, ventilation, air conditioning, and pool equipment. The Noise Control Regulations ordinance specifies that agricultural and rural residential land uses shall not be exposed to noise over a period of one hour in excess of 45 dBA L_{dn} during the day and 35 dBA L_{dn} during the nighttime. Residential land uses shall not be exposed to noise over a one-hour period in excess of 50 dBA L_{dn} during the day and 40 dBA L_{dn} during the nighttime. Industrial land uses shall not be exposed to noise levels in excess of 70 dBA L_{eq} during the day, and 60 dBA L_{eq} during the nighttime. Commercial land uses shall not be exposed to noise levels in excess of 65 dBA L_{eq} during the day, and 55 dBA L_{eq} during the nighttime. Sections 19.39.009(H) and 25.37.035(E)(2) state that temporary construction, demolition or maintenance of structures shall be limited to the hours between 7:00 a.m. and 7:00 p.m., except Sundays and federal holidays.

Groundborne Vibration

There are no federal, state, or local regulatory standards for groundborne vibration. However, various criteria have been established to assist in the evaluation of vibration impacts. For instance, the California Department of Transportation (Caltrans) has developed vibration criteria based on potential structural damage risks and human annoyance. The groundborne vibration criteria recommended by Caltrans for evaluation of potential structural damage is based on building classifications, which take into account the age and condition of the building. The criteria differentiate between transient and continuous/frequent intermittent sources. Transient sources of groundborne vibration include isolated events, such as blasting. Continuous/frequent intermittent events include the operations of certain types of equipment such as impact pile drivers, pogo-stick compactors, chip-seal equipment, vibratory pile drivers, and vibratory compaction equipment, and vehicle traffic on roadways (Caltrans 2002).

For residential structures and newer buildings, Caltrans considers a minimum peak-particle velocity (ppv) threshold of 0.25 inches per second (in/sec) for transient sources and 0.04 in/sec for continuous/frequent sources to be sufficient to protect against building damage. Continuous groundborne vibration levels below approximately 0.02 in/sec ppv are unlikely to cause damage to any structure. In terms of human annoyance, continuous vibrations in excess of 0.04 in/sec ppv and vibrations from transient sources in excess of 0.25 in/sec ppv are identified by Caltrans as the minimum perceptible level for ground vibration. Short periods of ground vibration in excess of 2.0 in/sec ppv can be expected to result in severe annoyance to people. Short periods of

ground vibration in excess of 0.1 in/sec ppv (0.2 in/sec ppv within buildings) can be expected to result in increased levels of annoyance (Caltrans 2002).

Caltrans-recommended criteria for the evaluation of groundborne vibration levels, with regard to structural damage and human annoyance, based on continuous and/or frequency of intermittent sources, are summarized in Table 23, Damage Potential to Buildings at Various Groundborne Vibration Levels, and Table 24, Annoyance Potential to People at Various Groundborne Vibration Levels, respectively.

Table 23 Damage Potential to Buildings at Various Groundborne Vibration Levels

Structure and Condition	Vibration Level (in/sec ppv)	
	Transient Sources	Continuous/Frequent Intermittent Sources
Extremely Fragile Historic Buildings, Ruins, Ancient 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

Source: Caltrans (2004)

Table 24 Annoyance Potential to People at Various Groundborne Vibration Levels

Human Response	Vibration Level (in/sec ppv)	
	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

Source: Caltrans 2004

Notes: 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, chip-seal equipment, vibratory pile drivers, and vibratory compaction equipment.

3.11.3 STANDARDS OF SIGNIFICANCE

The following significance thresholds used for the assessment of noise-related impacts are based on the California Environmental Quality Act (CEQA) Guidelines and County noise standards. Noise impacts resulting from implementation of the proposed project would be considered significant if the project would cause:

- Exposure of persons to or generation of noise levels in excess of standards established in the local general plan or noise ordinance, or applicable standards of other agencies;
- Exposure of persons to or generation of excessive groundborne vibration or groundborne noise levels (Because the project does not involve uses that would generate groundborne noise levels, this topic was not evaluated further in this Draft EIR; see Section 5.0, Effects Found Not to be Significant);
- A substantial permanent increase in ambient noise levels in the project vicinity above levels existing without the project;
- A substantial temporary or periodic increase in ambient noise levels in the project vicinity above levels existing without the project;
- Expose people residing or working in the project area to excessive noise levels for a project located within 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 (because the project site is not located within an airport land use plan or within two miles of an airport, this topic is not discussed further; see Section 5, Effects Found Not To Be Significant); and
- Expose people residing or working in the project area to excessive noise levels for a project within the vicinity of a private airstrip (because the project site is not located within the vicinity of a private airstrip, this topic is not discussed further; see Section 5, Effects Found Not To Be Significant).

For purposes of this analysis, the following thresholds are used to determine whether noise increases would be treated as "substantial," thereby causing a significant impact.

For short-term construction noise impacts, a substantial increase in ambient noise levels would be defined as construction-related hourly average noise levels received at noise-sensitive land uses that last for more than 12 months and: (1) exceed 60 dBA L_{eq}, and (2) increase the without-project ambient noise level by 5 dBA L_{eq} or more. Significant noise impacts would also result from construction if noise levels are sufficiently high to interfere with speech, sleep, or other normal residential activities during the more noise-sensitive evening and nighttime hours (i.e., 7:00 p.m. to 7:00 a.m.).

For long-term stationary source noise impacts, a substantial increase would be defined as an increase in ambient noise levels at noise-sensitive land uses that would exceed the County's noise standards for residential land uses, which are 50 and 40 dBA L_{eq}, daytime and nighttime, respectively.

For long-term transportation-related noise impacts, a substantial increase is defined in Table 25, Significant Noise Increases, as an increase of 5 dBA in areas where ambient noise levels are less than 60 dBA CNEL/L_{dn}; an increase of 3 dBA where ambient noise levels range from 60 to 65 dBA CNEL/L_{dn}; and an increase of 1.5 dBA where ambient noise levels exceed 65 dBA CNEL/L_{dn}.

Table 25 Significant Noise Increases

Ambient Noise Level Without Project (DNL/CNEL)	Significance Threshold
<60 dB	+ 5 dB or greater
60-65 dB	+ 3 dB or greater
>65 dB	+1.5 dB or greater

Source: Illingworth & Rodkin Inc. (2010), FAA (2000), San Benito County General Plan (1984)

For purposes of assessing compatibility of proposed land uses with projected noise levels, the project's impact would be considered substantial if it exceeded the County's General Plan noise compatibility standard of up to 65 dB CNEL/L_{dn} ("normally acceptable") for residential uses and parks/playground uses.

For impacts related to groundborne vibration, excessive vibration would be defined as levels that exceed the vibration impact thresholds as set forth in Caltrans Transportation- and Construction-Induced Vibration Guidance Manual. As discussed above, these thresholds are as follows:

- 0.04 in/sec ppv for continuous/frequent intermittent sources
- 0.25 in/sec ppv for transient sources

If any of these conditions occurs as a result of the project, the impact would be considered significant and mitigation measures would be required to reduce the sound levels to acceptable levels.

Methodology

A combination of a review of existing literature, noise level measurements, and modeling (using the Federal Highway Administration's (FHWA) Traffic Noise Model and the cumulative trip

generation and traffic volumes presented in the project's traffic report) were used to predict transportation-related and stationary noise levels and to evaluate the project's noise impacts. As discussed more fully in the noise report, traffic noise levels were calculated using the FHWA roadway noise prediction model based on California vehicle reference noise levels and traffic data obtained from the traffic report. Predicted noise levels were calculated at a distance of 33 feet and 100 feet from the near-travel-lane centerline, as well as the distance to a predicted CNEL noise contour of 65 dBA. Increases in traffic noise levels attributable to the proposed project were determined based on a comparison of predicted noise levels, with and without project implementation. The noise modeling data for the project is included in Appendix J.

The noise report found that the proposed project would not result in short-term and long-term groundborne vibration impacts or noise impacts from airport or airstrip operations. Stationary source noise levels at nearby land uses were calculated based on distance from the source and assuming an average noise attenuation rate of six (6) dB per doubling of distance. Predicted noise levels were compared to the noise standards and other applicable thresholds, as described above, to determine impact significance (Illingworth & Rodkin 2010).

3.11.4 IMPACTS AND MITIGATION MEASURES

Short Term Construction Noise Impacts

Impact NOISE-1: Construction activities associated with the proposed project may expose nearby land uses to excessive noise levels, a substantial temporary or periodic increase in ambient noise levels above noise levels existing without the project. As a result, noise-generating construction activities would be considered to have a **potentially significant short-term impact**.

Construction noise would result in a short-term increase in ambient noise levels. Noise impacts from construction activities associated with the proposed project would be a function of the noise generated by the construction equipment, equipment location, sensitivity of nearby land uses, and the timing and duration of the construction activities. As described above, for short-term construction noise impacts, the County does not have any specific standards. Therefore, based on technical expertise and consistent with industry standards, the noise analysis defines a substantial increase in ambient noise levels as construction-related hourly average noise levels received at noise-sensitive land uses that last for more than 12 months and: (1) exceed 60 dBA Leq, and (2) increase the without-project ambient noise level by 5 dBA Leq or more. Therefore, temporary noise generated by construction that both exposes sensitive receptors to unacceptable noise and lasts for more than 12 months would be a potentially significant impact.

According to the noise report, worst-case hourly average construction source noise levels during busy construction periods would be 88 dBA L_{eq} measured at a distance of 50 feet. The noise level standard used was 60 dBA L_{eq}, based upon typical ambient noise levels for residential receivers. A 5 dBA Leq above the ambient would be 65 dBA. The noise report determined that construction noise levels would drop from 88 dBA to 65 dBA at a distance of approximately 700 feet from the source, based on the typical construction noise drop-off rate (six dBA per doubling of distance, as described previously). In sum, without any noise attenuation or shielding, the proposed project would expose sensitive receptors within 700 feet of construction areas to noise levels greater than 65 dBA, which represents an increase of five dBA and exceeds the County's noise threshold (Illingworth & Rodkin 2010). This would include adjacent residences on Harbern Way and the two residences on Old Ranch Road, in addition to the closest receptors west of Fairview Road. Assuming no noise shielding from either natural or human-made features (e.g., trees, terrain, buildings, fences), outdoor areas for the closest noise-sensitive receptors (within 100 feet) could experience noise levels ranging from 75 to 92 dBA during construction.

Build-out of the project may occur over a period of five to 16 years. Therefore, some residences, both off-site and on-site, may be subject to unacceptable construction noise levels that could last for more than 12 months, depending on the type and nature of the construction activity. Construction noise in any one particular area would be temporary and would include noise from activities such as excavation, site preparation, truck hauling of material, pouring of concrete, and use of power hand tools. Construction activities generate a considerable amount of noise that varies depending on the specific activities occurring at the site. Construction-related noise levels are less acute during building framing, finishing, and landscaping phases, and more acute during times when excavation equipment, material handlers, and portable generators are used.

Figure 23, Preliminary Phasing Plan, presents the conceptual phasing plan (See Section 2.0, Project Description). It is anticipated that Phase I would contain grading, drainage, and roadway backbone infrastructure, and that construction of the project could occur over a period of five to 16 years. Development would occur first near Fairview Road, with successive phases or sub-phases progressing eastward across the site. According to Article 7.0 of the Specific Plan (Implementation Plan), the development phases are expected to occur sequentially (Phase I, then Phase II) although the construction phases could also occur concurrently. Development of each phase would include all infrastructure, services, facilities, and amenities, both public and private, needed to serve the uses and structures within that phase, which would be completed in accordance with the applicable provisions of the Specific Plan and relevant required master plans, as discussed throughout this document. The ultimate site plan and related phasing for individual development projects would be more precisely defined through the first subdivision application process. Given that the proposed project would be constructed in phases over a number of years, future project residents who occupy earlier phases of development could also

be subjected to unacceptable noise levels for a period longer than 12 months, as construction progresses in the later phases on the site (Illingworth & Rodkin 2010).

According to Article 7.0 of the Specific Plan and as reflected in Figure 23, Preliminary Phasing Plan, Phase I would consist generally of the western one-half of the site and Phase II would consist of the eastern one-half of the site. The distance between the west and east property lines of the site is approximately 1,670 feet. Correspondingly, sensitive receptors in the Cielo Vista residential subdivision west of Fairview Road within 700 feet of construction would be exposed to construction noise generated by construction activity of Phase I, but only to construction-related traffic noise during the construction of Phase II. The existing sound wall along the west side of Fairview Road is expected to provide some shielding of construction noise for the nearest existing residences located west of the project site, across Fairview Road.

Sensitive receptors in residences to the east along or near Harbern Way within 700 feet of the site would be exposed to unacceptable levels of construction noise during the Phase I construction of backbone infrastructure called for in Article 7.0 of the Specific Plan, and to construction of residences during implementation of Phase II. Receptors on Harbern Way would not experience unacceptable noise levels during development of Phase I parcels, which are located across the site a distance greater than 700 feet to the west. The two residences on Old Ranch Road would be exposed to unacceptable construction during both Phases when activity would occur within 700 feet of the residences.

As noted above, newly constructed residences would also be exposed to unacceptable construction noise from construction activity conducted within 700 feet of new residences. This potential impact is anticipated to affect the greatest number of receptors during construction of Phase I, which could include higher residential density (refer to Figures 10-12) than Phase II development. However, the new residences would also serve as a buffer between existing receptors west of Fairview Road, which would reduce noise levels and exposures as Phase I construction proceeds at greater distances. Compliance with the preliminary phasing plan generally as described in Article 7.0 of the Specific Plan would reduce the duration of exposure to unacceptable construction noise for off-site receptors within 700 feet of construction activity, but not to new receptors introduced to the site.

As noted above, the County Code prohibits construction activities during the nighttime hours (7 p.m. to 7 a.m.) when loud noise would be most disruptive and intrusive. Compliance with the County's noise ordinances would ensure that the project would not result in nighttime construction noise that could result in increased levels of annoyance and potential sleep disruption for occupants of nearby existing noise-sensitive land uses.

The project's construction-related noise would exceed the applicable thresholds for a period longer than 12 months, and expose sensitive receptors to prolonged construction noise.

However, given the location of these off-site sensitive receptors within 700 feet of the project site, the following mitigation measures are recommended by the noise consultant (Illingworth and Rodkin 2010) to reduce the project's impacts To the extent feasible.

MM NOISE-1: During all project construction activities, the following mitigation measures shall be incorporated into construction documents and shall be implemented by the project developer:

a. Restrict noise-generating activities at the construction site or in areas adjacent to the construction site to the hours of 7:00 a.m. to 7:00 p.m. Construction-related noise-generating activities shall be prohibited on Sundays and federally-recognized holidays.

b. Properly maintain construction equipment and equip all internal combustion engine driven machinery with intake and exhaust mufflers and engine shrouds that are in good condition and appropriate for the equipment. Equipment engine shrouds shall be closed during equipment operation.

c. Construction vehicles and equipment shall not be left idling for longer than 5 minutes when not in use.

d. Locate stationary noise generating equipment such as air compressors or portable power generators as far as possible from sensitive receptors. Construct temporary noise barriers to screen stationary noise generating equipment when located near adjoining sensitive land uses. Temporary noise barriers could reduce construction noise levels by 5 dBA.

e. Utilize "quiet" air compressors and other stationary noise sources where technology exists.

f. Route all construction traffic to and from the project site via designated truck routes where feasible. Prohibit construction-related heavy truck traffic in residential areas where feasible.

g. Control noise from construction workers' radios to a point that they are not audible at existing residences bordering the project site.

h. Prior to issuance of any grading and/or building permits, the contractor shall prepare and submit to the County for approval a detailed construction plan identifying the schedule for major noise-generating construction activities.

i. Designate a "disturbance coordinator" who would be responsible for responding to any local complaints about construction noise. The disturbance coordinator shall

determine the cause of the noise complaint (e.g., starting too early, bad muffler, etc.) and shall require that reasonable measures warranted to correct the problem be implemented. Conspicuously post a telephone number for the disturbance coordinator at the construction site and include it in the notice sent to neighbors regarding the construction schedule.

Implementation of the above mitigation measures would reduce construction-related noise levels during the day, and would prohibit construction activities during the more noise-sensitive nighttime hours to the extent feasible. However, because the distance between the site and homes is less than 700 feet, implementation of MM NOISE-1 would reduce construction-related noise impacts, but not to a less than significant level. Therefore, the project's construction-related noise impacts as they relate to existing off-site residences and future on-site residences would be considered **significant and unavoidable.**

Long-Term Stationary Noise Impacts

Impact NOISE-2: Stationary noise generated by the project could expose persons to noise levels in excess of applicable County noise standards at existing noise-sensitive land uses adjacent to the project site and newly developed noise-sensitive residential land uses within the project site. This is a **less than significant impact**.

The proposed residential development would generate stationary noise that could affect the noise environment within the proposed project and nearby existing rural and residential uses. As noted above, for long-term stationary source noise impacts, a substantial increase would be defined as an increase in ambient noise levels at noise-sensitive land uses that would exceed the County's noise standards for residential land uses, which are 50 and 40 dBA L_{eq}, daytime and nighttime, respectively.

Noise from Proposed Residential Development

Stationary-source noise associated with residential development is primarily associated with the operation of landscape maintenance equipment, central air conditioning units, amplified music, and vehicle noise (car doors slamming, etc.). Noise in residential areas would be generated by vehicles on roadways, engine starts, door slams, and by the sound of human voices and children playing. However, increases in existing ambient noise levels from such sources are typically intermittent and are generally limited to the less noise-sensitive daytime hours. Implementation of the proposed project would not result in the operation of any major on-site stationary noise sources within the project site. According to the project noise consultant (Illingworth & Rodkin 2011), the proposed residential project would not introduce any significant source of noise that could exceed the County's Noise Ordinance or the Noise Control Regulations Ordinance at

nearby sensitive receptors, based on past field measurements and study of residential developments similar to the proposed project. Additionally, to the extent the proposed project includes the placement of larger residential lots, open space, and recreational uses along the north and east side of the project site between existing rural residential uses and proposed residences, this may help serve as a further noise buffer to those existing uses. Stationary-source noise impacts associated with proposed residential land uses would therefore be considered **less than significant.**

No mitigation is required.

Noise from Proposed Parks and Open Space

The proposed project may include development of public-use parks, recreational trails and other recreational facilities, dispersed throughout the project site. These park facilities may include active and passive facilities including a small par course in the eastern portion of the site, tot-lots, a linear perimeter trail and a seven-acre habitat conservation area near the northeastern corner of the site. Additional recreational and open space areas are also proposed, including landscaped corridors and retention basins during the non-rainy season. The specific facilities to be included in the proposed parks have not yet been identified; however, more intense recreational uses, such as volleyball courts, baseball/soccer fields, and basketball courts that would attract spectators and increase vehicle traffic are not proposed and amplified music is not anticipated. The Specific Plan includes provisions to connect to public recreational facilities on the adjoining Gavilan College San Benito Campus. As noted above, noise typically associated with play areas and related parking lots include children at play and vehicle noise (e.g., car doors slamming, etc.). According to the project noise consultant (Illingworth & Rodkin 2011), past field measurements and study of passive park uses similar to those proposed typically generate noise levels ranging from 55 to 65 dBA L_{eq} at 24 feet. Additionally, the proposed project includes provisions for open space and trails around the perimeter of the site (refer to Figure 13), and would not place pocket or community parks that might generate unacceptable levels of noise in proposed open space areas. Noise levels associated with such uses are often intermittent and do not typically result in substantial increases in daytime ambient noise levels. In order for noise to exceed the County's noise thresholds (50/40 dBA L_{eq}),for nearby rural uses along Harbern Way or Old Ranch Road the sound would have to exceed the limit for more than 15 minutes over a period of one hour, measured at the property line or within the receiving use (County Code Section 19.39.006). For the reasons listed above, the proposed project would not exceed the County's noise standards for rural residential uses.

The operation of landscape maintenance equipment, such as gasoline-powered lawn mowers and leaf blowers, could result in intermittent increases in ambient noise levels. In the event landscape maintenance activities were to occur during the more noise-sensitive early morning

hours, the intermittent noise associated with the landscape maintenance equipment could result in increased levels of annoyance and potential sleep disruption to occupants of nearby residential dwellings, and would be considered potentially significant. As a result, noise impacts generated by the new parks are considered **potentially significant**. Implementation of the following mitigation measure will reduce the potentially significant impacts discussed above to a level of **less than significant with mitigation incorporated**:

MM NOISE-2a: Noise-generating landscape and facility maintenance activities shall be prohibited on the premises of the common parks and open space areas between 7 p.m. and 7 a.m. as an ongoing operational requirement within the project site.

MM NOISE-2b: The recreational use of the common parks and open space areas shall be limited to between 7 a.m. and 7 p.m., and amplified music shall be prohibited at the common parks and open space areas.

Long-Term Transportation-Related Noise Impacts

Impact NOISE-3: Implementation of the proposed project would not result in a substantial permanent increase in ambient transportation-related source noise levels above noise levels existing without the project, and would not exceed the applicable noise standards at existing noise-sensitive land uses adjacent to the project site and newly developed noise-sensitive residential land uses within the project site. As a result, this impact is considered **less than significant**.

The proposed project would generate transportation-related noise as a result of project-related vehicular traffic, particularly along Fairview Road, Airline Highway, Union Road, and the other roadway segments identified in Section 3.14 Transportation and Circulation. Ambient noise levels would increase as a result of this additional traffic. To determine the level of noise impacts of this additional project-related traffic, the noise report compared project traffic volumes to existing traffic volumes using information provided by the traffic consultant.

As identified by the traffic consultant and discussed above, Fairview Road would carry most of the project traffic and the intersection of Fairview Road and the Cielo Vista Drive extension would be the most significantly impacted by transportation-related noise as a result. As noted previously, the noise analysis determined existing hourly average noise levels measured on Fairview Road near its intersection with the Cielo Vista Drive extension range from 68 to 70 dBA L_{eq} during the day, and from 54 to 68 dBA L_{eq} at night (refer to Table 22, Ambient Noise Levels). The calculated day-night average noise level at this location ranges from 70 to 72 dBA L_{dn} (Illingworth & Rodkin 2010).

Predicted noise levels were calculated for both existing and existing plus project conditions using the FHWA roadway noise prediction model. Assuming maximum buildout, project-related traffic would increase ambient noise levels by 1 dBA L_{dn} or less (Illingworth & Rodkin 2010) at the intersection of Fairview Drive and the Cielo Vista Drive extension, which would be expected to experience the most traffic-related noise from the project. A traffic noise increase of 1 dBA L_{dn} is not typically perceptible and the impact of this increase is not considered substantial under the applicable threshold since it is less than 1.5 dBA (Illingworth & Rodkin 2010). Therefore, the noise impacts from project-related traffic would be **less than significant**.

No mitigation is required.

Compatibility of Proposed Land Uses with Projected Noise Levels

Under CEQA, the potential physical impacts of the project on the environment must be evaluated. However, CEQA does not require that *the environment's impacts on the project* be evaluated. Nevertheless, because the County's General Plan contains noise compatibility standards, this Draft EIR considers impacts of off-site traffic noise and noise generated by the outdoor sporting activities at the future adjoining Gavilan College San Benito Campus site for purposes of evaluating compatibility issues.

Impact NOISE-4: Predicted exterior noise levels at the proposed residences along Fairview Road could expose persons to noise levels in excess of the applicable noise standards. As a result, this noise impact on the proposed new development would be considered **potentially significant.**

Based on the modeling conducted using the FHWA Traffic Noise Model and cumulative trip generation and traffic volumes provided by the traffic consultant, and based upon the buildout scenarios of the City of Hollister and County of San Benito General Plans, it has been determined that proposed land uses within the project site would be primarily affected by traffic noise from Fairview Road. Planned on-site roadways would also result in traffic noise that could adversely affect proposed land uses. Predicted exterior exposures to traffic noise are presented in Table 26, Predicted Noise Levels.

Table 26 Predicted Traffic Day/Night Average Noise Level

Location	Cielo Vista Drive Extension	Fairview Road
Predicted Noise Levels (Ldn)	57	67
Distance From Centerline	70 feet	100 feet

Source: Illingworth & Rodkin, Inc. 2010

Note: The Federal Highway Administration Traffic Noise Model was used to calculate future traffic noise levels.

On-Site Exposure to Traffic Noise: Cielo Vista Drive Extension

Traffic noise exposures from the Cielo Vista Drive Extension would be greatest in proximity to the roadway. As shown in Table 26, above, proposed residential and on-site passive recreational uses located within 70 feet from the center of the Cielo Vista Drive extension would be exposed to day-night average noise levels of approximately 57 dBA L_{dn} (Illingworth & Rodkin 2010) which meets the County's exterior noise standard of 65 dBA CNEL/L_{dn}. Interior noise levels for residences within 70 feet of the new Cielo Vista Drive extension would be 42 dBA L_{dn}, also consistent with County requirements. Therefore the impacts of mobile source noise exposures to new residences on the site from traffic on Cielo Vista Drive extension would be **less than significant.**

No mitigation is required.

On-Site Exposure to Traffic Noise: Fairview Road

As shown in Table 26 above, predicted exterior noise levels at the nearest proposed residential land uses located adjacent to Fairview Road, if left unmitigated, would be approximately 67 dBA L_{dn}, which exceeds the County's noise compatibility standard of 65 dBA CNEL/L_{dn} (normally acceptable). Without attenuation, placement of residences within 100 feet of Fairview Road would result in a significant noise impact (Illingworth & Rodkin 2010). As a result, this impact of traffic noise on proposed residential uses along Fairview Road would be considered **potentially significant**.

Interior noise levels are typically 15 decibels lower than outdoor noise levels due to the attenuating effect of building construction. The noise standards reflect this difference; since noise levels would exceed standards in outdoor areas, this analysis also assumes they would exceed the County's standard of 45 dBA L_{dn} for indoor areas. Therefore, interior noise levels for residences within 100 feet of Fairview Road would be about 52 dBA L_{dn}, which exceeds the County's standard by seven dBA, assuming standard construction with the windows open for ventilation. Without attenuation, the impact is considered **potentially significant**.

Preliminary barrier calculations indicate that a six-foot solid barrier, relative to the residential pad elevation, would be required to reduce exterior noise levels at residential outdoor use areas proposed adjacent to Fairview Road to an acceptable level. Correspondingly, placement of this six-foot barrier would reduce ground level interior noise to 45 dBA L_{dn}, which is consistent with County standards for interior noise levels. However, second story interiors would remain exposed to noise levels that exceed the 45 dBA L_{dn} standard. Table 27, Future Exterior L_{dn} Noise Levels (dBA) With Mitigation, summarizes the future exterior noise levels of homes along Fairview Road assuming noise barrier heights ranging between 6 feet and 10 feet.

Table 27 Future Exterior Ldn Noise Levels (dBA) With Mitigation

Noise source	Sound Barrier					
	No Barrier	6 foot	7 foot	8 foot	9 foot	10 foot
Fairview Road	67	60	58	57	56	55

Source: Illingworth & Rodkin, Inc. 2010

The project would be required to implement a number of policies and measures that are set forth in the Fairview Corners Residential Specific Plan which are designed to reduce noise impacts, as follows:

- Set development back from roads and lots dependent on development density and lot size. (Policy LU-9.1)
- Two-story residences within 100 feet of the Fairview Road center line will require acoustical analyses, pursuant to the requirements of the San Benito County Code, and the project's conditions of approval to ensure that interior noise levels on the second floor will be reduced to 45 dBA Ldn or lower. Building design shall include provisions for forced-air mechanical ventilation so that windows can be kept closed to control noise. The conclusions and recommendations of the specific analyses, including the description of the necessary noise control treatments, shall be submitted to the County along with the building plans for review and approval prior to issuance of a building permit. (Policy LU-9.1, Action #5)
- A minimum six-foot sound barrier may be required along Fairview Road. (Policy LU-10.2, Action #3).

These policies are consistent with the recommendations in the noise report. In particular, the noise report recommends providing forced-air mechanical ventilation for residential units adjacent to Fairview Road, specifies the type of materials and height of any required sound barrier, and discusses appropriate construction techniques.

Implementation of the above Specific Plan policies as well as MM AES-1 (Section 3.1, Aesthetics) would reduce the project's compatibility-related noise impacts. To ensure these impacts are reduced to a less than significant level, implementation of the following additional mitigation measures is recommended.

MM NOISE-4a: For residences placed within 100 feet of Fairview Road, the project developer shall comply with Policy LU-9.1, Measure #5 and Policy LU-10.2, Measure #3, found in Article 2.0 of the Fairview Corners Residential Specific Plan (Land Use). Compliance

with Article 2.0 shall be subject to the review and approval of the County in accordance with Article 7.0 of the Specific Plan (Implementation Plan), as part of the project's design and site review process. Specifically, in the event that multi-story residences are proposed adjacent to Fairview Road, an acoustical study shall be prepared by the project developer and reviewed and approved by the County, including mitigation measures to ensure that interior noise levels within upper floor areas of the dwelling units will maintain an acceptable noise level of 45 dBA CNEL/L_{dn}, or less. The study shall be submitted to the San Benito County Planning and Building Department in conjunction with the first associated building permit application for the multi-story residences at issue. The developer shall implement all recommended mitigation measures in the study prior to issuance of any certificates of occupancy for the multi-story residences.

MM NOISE-4b: If residences are placed within 100 feet of Fairview Road, sound attenuation features shall be required in accordance with the recommendations set forth in the approved acoustical report, and shall, at a minimum, include the following:

a. A minimum six-foot noise barrier shall be constructed to reduce noise levels in outdoor use areas along Fairview Road.

b. The barriers shall be constructed solidly over the entire surface and the base, and shall not contain openings or gaps between barrier materials or the ground which would decrease the reduction provided by the noise barrier.

c. Suitable materials for barrier construction shall have a minimum surface weight of 3 lbs./ft2. (such as one-inch thick wood, masonry block, concrete, or metal), and shall be consistent with MM AES-1.

d. The final design of noise barriers shall be completed and approved during design review for the project when detailed site plans and grading plans are available.

Therefore, with mitigation as described above, predicted exterior traffic noise levels at proposed residential land uses would not exceed the County's "conditionally acceptable" exterior noise standard of 65 dBA CNEL/L_{dn} and interior noise levels would be maintained within acceptable levels. This impact is considered **less than significant with mitigation incorporated**.

Noise Exposure from College Events

The project proposes residences in close proximity to the planned Gavilan College San Benito Campus. Planned campus athletic fields, include a soccer field, softball and baseball diamonds, and a football field surrounded by a track and bleachers. The athletic fields would include lighting and would be expected to generate noise in the late evening hours during sporting

events. Actively-used playfields could potentially be a significant source of community noise at residential receptors within the project. Noise would primarily result from players, spectators, and public address systems.

Noise levels resulting from the use from these athletic fields would be highest during highly-attended football games. Most home football games are expected to occur on Saturday nights at 7:00 p.m. It is assumed that there would be five regularly scheduled home games per year and the possibility of an additional scrimmage game. The proposed bleachers would accommodate 2,000 to 5,000 spectators; however, average attendance is expected to range from 500 to 2,000 spectators (Illingworth & Rodkin 2010).

A credible worst-case assessment of potential noise from sporting activities at the junior college campus was made using noise data collected and extrapolated from a high-school football game (Illingworth & Rodkin 2010). High-school sporting events are generally attended by more spectators than junior college events. Worst-case average noise levels resulting from a football game would be approximately 61 to 63 dBA L_{eq} at a distance of 465 feet from the center of the field and would include noise sources such as the cheering of the crowd, referee's whistles, the public address system, horns, bands, and other amplified music. Maximum noise levels generated by these individual sources would typically range from 60 to 74 dBA L_{max} at a distance of 465 feet. Noise levels generated by baseball, softball, track and field, and swimming events would be lower than those generated by football events (Illingworth & Rodkin 2010).

The nearest noise-sensitive receiver on the project site would be located about 620 feet northeast of the center of the football field. Worst-case average noise levels generated by a football game with about 500 spectators would range from about 51 to 53 dBA L_{eq} at the nearest residences, and maximum noise levels would range from about 50 to 64 dBA L_{max}. Worst-case average noise levels generated by a football game with about 2,000 spectators would range from about 57 to 59 dBA Leq at the nearest residences. Maximum noise levels would range from about 56 to 70 dBA L_{max}. Noise levels generated by a football game would exceed ambient noise levels by 10 to 20 dBA Leq at nearby residential land uses. Noise levels generated by the use of the soccer field, softball and baseball diamonds, and track would be less given the reduced expected attendance at such events (Illingworth & Rodkin 2010).

Although the proposed project would expose new residences to ambient noise levels in excess of the General Plan noise and land use compatibility standard during well attended football games, these events would occur on five nights a year or less for about three hours during evenings and night. Due to the low frequency of these events and the limited duration when noise levels would be elevated, this would be considered a **less than significant impact**.

No mitigation is required.

Exposure to Groundborne Vibration

Impact NOISE-5: Predicted groundborne vibration levels would not be anticipated to expose persons to or generate excessive groundborne vibration, in excess of applicable thresholds for human annoyance or structural damage. Therefore, groundborne vibration impacts would be considered **less than significant.**

No major groundborne vibration sources were identified in the vicinity of the project site. Long-term operational activities associated with residential uses would not be anticipated to include the use of any equipment or processes that would result in potentially significant levels of ground vibration. Increases in groundborne vibration levels attributable to the proposed project would be primarily associated with short-term construction-related activities.

Construction activities that result in high levels of vibration are not proposed as part of the project. However, some construction activity could generate perceptible vibration levels at adjacent residences. Table 28, Vibration Source Amplitudes for Construction Equipment, presents standard vibration source levels for common construction equipment at an industry standard distance of 25 feet.

Table 28 Vibration Source Amplitudes for Construction Equipment

Equipment	Reference PPV at 25 feet (in/sec)
Vibrational Rollers	0.210
Large Bulldozers	0.089
Caisson Drilling	0.089
Loaded Trucks	0.076
Jackhammer	0.035
Small Bulldozers	0.003
Crack-and Seat-Operations*	2.4

Source: Illingworth & Rodkin 2011

*_**Note:**_ Vibrational rollers and crack and seat operations are not anticipated with this project.

According to the noise consultant (Illingworth & Rodkin 2010 and 2011), ground vibration levels diminish in strength with increased distance from the source. Predicted vibration levels at a distance of 50 feet from the source are anticipated to be less than 0.04 in/sec PPV. New buildings would be separated from construction areas by the roadway infrastructure constructed during Phase I. The proposed minimum 60-foot width for internal rights-of-way for public streets

would further reduce the vibrational effects of construction. Therefore, predicted vibration levels at the nearest buildings on- and off-site would not exceed applicable standards for structural damage or human annoyance (refer to Tables 22 and 23, respectively). Short-term groundborne vibration impacts would be considered **less than significant**.

No mitigation is required.

3.11.4 CUMULATIVE IMPACTS AND MITIGATION MEASURES

Contribution to Future Cumulative Noise Levels

Impact NOISE-6: Implementation of the proposed project in combination with past, present and reasonably foreseeable, probable future projects would not result in a cumulatively considerable contribution to future cumulative noise levels. As a result, this impact would be considered **less than significant**.

The geographic extent of the cumulative setting includes consideration of past, present and reasonably foreseeable, probable future development, including traffic volumes (see modeling results in the project's traffic analysis), combined with the project. The primary factor for cumulative noise impact analysis is the consideration of future traffic volumes. These volumes would be associated with the Cumulative Projects presented in Section 3.0.

Long-term noise generated by the project, as experienced at nearby land uses, would be primarily associated with increases in vehicle traffic on area roadways. As discussed in Impact NOISE-3, predicted near-term increases in traffic noise levels attributable to the proposed project would not contribute to a significant increase in ambient noise levels at nearby existing noise-sensitive land uses, and would not exceed applicable noise thresholds. The project's contribution to a cumulative increase in traffic noise was also studied in the noise report, which concluded that the project would contribute less than 1 dBA increase in cumulative traffic noise. Outside of a controlled environment, a 1 dBA noise increase is generally not perceptible to the human ear, and a gradual increase of less than 1 dBA over time would likewise be imperceptible (Illingworth & Rodkin 2010). Therefore, the project's contribution to ambient noise levels would not be substantial (i.e., greater than 1.5 dBA above existing levels) and, therefore, is **not cumulatively considerable**.