NOISE AND VIBRATION IMPACT ANALYSIS

AGUA MANSA INDUSTRIAL PROJECT

CASE NUMBER: MA18008

JURUPA VALLEY, RIVERSIDE COUNTY, CALIFORNIA

LSA

September 2020

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JURUPA VALLEY, RIVERSIDE COUNTY, CALIFORNIA

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LSA

September 2020

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LIST OF ABBREVIATIONS AND ACRONYMS

AMIC	Agua Mansa Industrial Corridor
Caltrans	California Department of Transportation
City	City of Jurupa Valley
CNEL	Community Noise Equivalent Level
dB	decibel(s)
dBA	A-weighted decibel(s)
FHWA	Federal Highway Administration
ft	foot/feet
FTA	Federal Transit Administration
HVAC	heating, ventilation, and air conditioning
in/sec	inches per second
L_{dn}	day-night average noise level
L_{eq}	equivalent continuous sound level
L_{max}	maximum instantaneous noise level
LSA	LSA Associates, Inc.
L_V	velocity in decibels
mi	mile(s)
PPV	peak particle velocity
project	Agua Mansa Industrial Project
RIR	Flabob Airport
RMS	root-mean-square (velocity)
SBD	San Bernardino International Airport
STC	Sound Transmission Class
sf	square foot/feet
VdB	vibration velocity decibel(s)

INTRODUCTION

This noise impact analysis has been prepared to evaluate the potential noise impacts and identify feasible mitigation measures associated with the Agua Mansa Industrial Project (project) to be located in the Agua Mansa Industrial Corridor (AMIC) in Jurupa Valley, Riverside County, California. This report is intended to satisfy City of Jurupa Valley (City) requirements for a project-specific noise and vibration impact analysis by (1) examining the short-term and long-term noise impacts on noise-sensitive uses adjacent to the project site, (2) evaluating the effectiveness of noise and vibration control measures incorporated as part of the project design, and (3) proposing mitigation as necessary to reduce noise impacts.

PROJECT LOCATION AND DESCRIPTION

The project site is located at 12340 Agua Mansa Road in the AMIC of Jurupa Valley, as shown on Figure 1. The project site is currently vacant.

The project would construct two separate buildings on the project site for industrial uses. Building A would be 140,198 square feet (sf) on an 8.94-acre lot and Building B would be 194,804 sf on a 14.49-acre lot. The project would also include 234 parking spaces. Figure 2 depicts the project's site plan.

Consistent with the AMIC Specific Plan, the project would construct a 7 ft high wall at the portion of the property line adjacent to the residential uses to the north as a project design feature.

Although the project is located in Jurupa Valley, some land uses (residential and industrial uses) adjacent to the project site are located in San Bernardino County.

EXISTING SENSITIVE LAND USES IN THE PROJECT AREA

The project site is surrounded primarily by industrial and residential development. The areas adjacent to the project site include the following uses:

- **North:** Industrial and residential development in the AMIC in Jurupa Valley
- **Northeast:** Residential development in the AMIC in unincorporated San Bernardino County
- **East:** Industrial development in the AMIC in unincorporated San Bernardino County
- **South:** Industrial development in the AMIC in Jurupa Valley
- **West:** Industrial development and undeveloped land in the AMIC in Jurupa Valley

CHARACTERISTICS OF SOUND

Sound is increasing in the environment and can affect quality of life. Noise is usually defined as unwanted sound. Noise consists of any sound that may produce physiological or psychological damage and/or interfere with communication, work, rest, recreation, and sleep.

To the human ear, sound has two significant characteristics: pitch and loudness. Pitch is generally an annoyance, while loudness can affect the ability to hear. Pitch is the number of complete vibrations (or cycles per second) of a wave, resulting in the tone's range from high to low. Loudness is the strength of a sound and describes a noisy or quiet environment; it is measured by the amplitude of

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FIGURE 1

Agua Mansa Industrial Project

Project Location

SOURCE: Bing (2018); Agua Mansa (07/1986)

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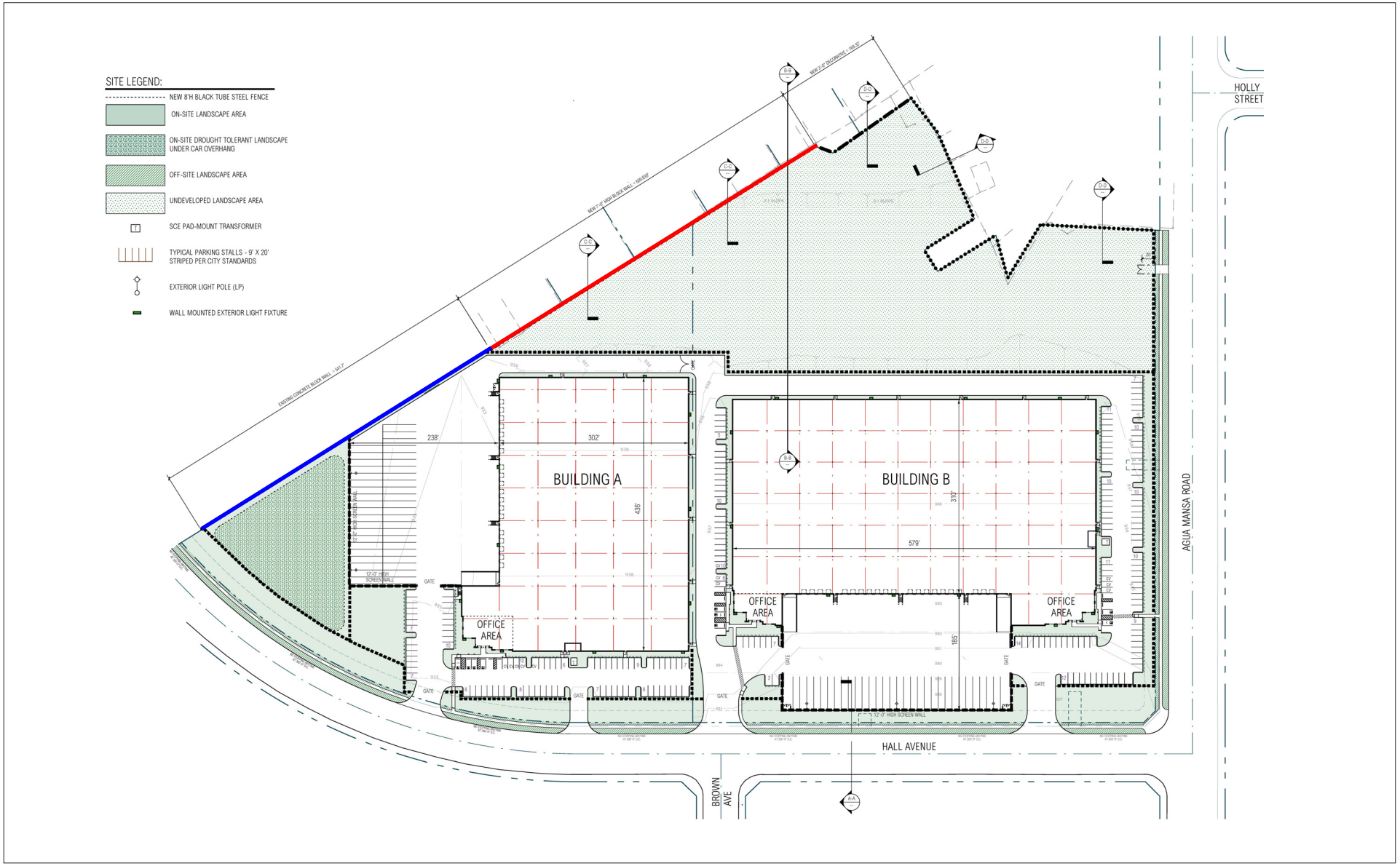

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LEGEND

Proposed 7 ft Block Wall

Existing Block Wall

FIGURE 2

N

0 110 220

FEET

SOURCE: RGA, 4/19

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Agua Mansa Industrial Project

Conceptual Site Plan

the sound wave. Loudness is determined by the intensity of the sound waves combined with the reception characteristics of the human ear. Sound intensity refers to how hard the sound wave strikes an object, which in turn produces the sound's effect. This characteristic of sound can be precisely measured with instruments. The analysis of a project defines the noise environment of the project area in terms of sound intensity and its effect on adjacent sensitive land uses.

Measurement of Sound

Sound intensity is measured through the A-weighted scale to correct for the relative frequency response of the human ear. That is, an A-weighted noise level de-emphasizes low and very high frequencies of sound similar to the human ear's de-emphasis of these frequencies. Unlike linear units, such as inches or pounds, decibels (dB) are measured on a logarithmic scale representing points on a sharply rising curve.

For example, 10 dB is 10 times more intense than 1 dB, 20 dB is 100 times more intense, and 30 dB is 1,000 times more intense. Thirty decibels (30 dB) represents 1,000 times as much acoustic energy as 1 dB. The decibel scale increases as the square of the change, representing the sound-pressure energy. A sound as soft as human breathing is about 10 times greater than 0 dB. The decibel system of measuring sound gives a rough connection between the physical intensity of sound and its perceived loudness to the human ear. A 10 dB increase in sound level is perceived by the human ear as only a doubling of the loudness of the sound. Ambient sounds generally range from 30 A-weighted decibels (dBA) (very quiet) to 100 dBA (very loud).

Sound levels are generated from a source, and their decibel level decreases as the distance from that source increases. Sound dissipates exponentially with distance from the noise source. For a single point source, sound levels decrease approximately 6 dB for each doubling of distance from the source. This drop-off rate is appropriate for noise generated by stationary equipment. If noise is produced by a line source, such as highway traffic or railroad operations, the sound decreases 3 dB for each doubling of distance in a hard site environment. Line source noise in a relatively flat environment with absorptive vegetation decreases 4.5 dB for each doubling of distance.

There are many ways to rate noise for various time periods, but an appropriate rating of ambient noise affecting humans also accounts for the annoying effects of sound. The equivalent continuous sound level (L_{eq}) is the total sound energy of time-varying noise over a sample period. However, the predominant rating scales for human communities in California are the L_{eq} and Community Noise Equivalent Level (CNEL) or the day-night average level (L_{dn}) based on dBA. CNEL is the time-varying noise over a 24-hour period, with a 5 dBA weighting factor applied to the hourly L_{eq} for noises occurring from 7:00 p.m. to 10:00 p.m. (defined as relaxation hours) and a 10 dBA weighting factor applied to noise occurring from 10:00 p.m. to 7:00 a.m. (defined as sleeping hours). L_{dn} is similar to the CNEL scale but without the adjustment for events occurring during the evening hours. CNEL and L_{dn} are within 1 dBA of each other and are normally interchangeable. The noise adjustments are added to the noise events occurring during the more sensitive hours.

Other noise rating scales of importance, when assessing the annoyance factor, include the maximum instantaneous noise level (L_{max}), which is the highest exponential time-averaged sound level that occurs during a stated time period. The noise environments discussed in this analysis are

specified in terms of L_{max} for short-term noise impacts. L_{max} reflects peak operating conditions and addresses the annoying aspects of intermittent noise.

Another noise scale often used together with the L_{max} in noise ordinances for enforcement purposes is noise standards in terms of percentile noise levels. For example, the L_{10} noise level represents the noise level exceeded 10 percent of the time during a stated period. The L_{50} noise level represents the median noise level. Half of the time the noise level exceeds this level, and half of the time it is less than this level. The L_{90} noise level represents the noise level exceeded 90 percent of the time and is considered the background noise level during a monitoring period. For a relatively constant noise source, the L_{eq} and L_{50} are approximately the same.

Noise impacts can be described in three categories. The first is audible impacts, which refers to increases in noise levels noticeable to humans. Audible increases in noise levels generally refer to a change of 3 dB or greater since this level has been found to be barely perceptible in exterior environments. The second category, potentially audible, refers to a change in the noise level between 1 and 3 dB. This range of noise levels has been found to be noticeable only in laboratory environments. The last category is changes in noise level of less than 1 dB, which are inaudible to the human ear. Only audible changes in existing ambient or background noise levels are considered potentially significant.

Physiological Effects of Noise

Physical damage to human hearing begins at prolonged exposure to noise levels higher than 85 dBA. Exposure to high noise levels affects the entire system, with prolonged noise exposure in excess of 75 dBA increasing body tensions and thereby affecting blood pressure and functions of the heart and the nervous system. In comparison, extended periods of noise exposure above 90 dBA would result in permanent cell damage. When the noise level reaches 120 dBA, a tickling sensation occurs in the human ear, even with short-term exposure. This level of noise is called the threshold of feeling. As the sound reaches 140 dBA, the tickling sensation is replaced by the feeling of pain in the ear. This is called the threshold of pain. A sound level of 160 to 165 dBA will potentially result in dizziness or loss of equilibrium. The ambient or background noise problem is widespread and generally more concentrated in urban areas than in outlying, less-developed areas.

Table A lists definitions of acoustical terms; Table B shows common sound levels and their noise sources; and Table C shows land use compatibility for exterior community noise, as recommended by the California Department of Health, Office of Noise Control.

Table A: Definitions of Acoustical Terms

Term	Definition
Decibel, dB	A unit of noise level that denotes the ratio between two quantities that are proportional to power; the number of decibels is 10 times the logarithm (to the base 10) of this ratio.
Frequency, Hz	Of a function periodic in time, the number of times that the quantity repeats itself in 1 second (i.e., number of cycles per second).
A-Weighted Sound Level, dBA	The sound level obtained by use of A-weighting. The A-weighting filter de-emphasizes the very low and very high-frequency components of the sound in a manner similar to the frequency response of the human ear and correlates well with subjective reactions to noise. (All sound levels in this report are A-weighted unless reported otherwise.)
L_2, L_8, L_{50}, L_{90}	The fast A-weighted noise levels that are equaled or exceeded by a fluctuating sound level 2 percent, 8 percent, 50 percent, and 90 percent of a stated time period.
Equivalent Continuous Noise Level, L_{eq}	The level of a steady sound that, in a stated time period and at a stated location, has the same A-weighted sound energy as the time-varying sound.
Community Noise Equivalent Level, CNEL	The 24-hour A-weighted average sound level from midnight to midnight, obtained after the addition of 5 dB to sound levels occurring in the evening from 7:00 p.m. to 10:00 p.m. and after the addition of 10 dB to sound levels occurring in the night between 10:00 p.m. and 7:00 a.m.
Day/Night Noise Level, L_{dn}	The 24-hour A-weighted average sound level from midnight to midnight, obtained after the addition of 10 dB to sound levels occurring in the night between 10:00 p.m. and 7:00 a.m.
L_{max}, L_{min}	The maximum and minimum A-weighted sound levels measured on a sound level meter during a designated time interval using fast-time averaging.
Ambient Noise Level	The all-encompassing noise associated with a given environment at a specified time; usually a composite of sound from many sources from many directions, near and far; no particular sound is dominant.
Intrusive	The noise that intrudes over and above the existing ambient noise at a given location. The relative intrusiveness of a sound depends on its amplitude, duration, frequency, time of occurrence, and tonal or informational content, as well as the prevailing ambient noise level.

Source: Handbook of Acoustical Measurement and Noise Control (Harris 1991).

Table B: Common Sound Levels and Their Noise Sources

Noise Source	A-Weighted Sound Level in Decibels	Noise Environments	Subjective Evaluations
Near Jet Engine	140	Deafening	128 times as loud
Civil Defense Siren	130	Threshold of Pain	64 times as loud
Hard Rock Band	120	Threshold of Feeling	32 times as loud
Accelerating Motorcycle a Few Feet Away	110	Very Loud	16 times as loud
Pile Driver; Noisy Urban Street/Heavy City Traffic	100	Very Loud	8 times as loud
Ambulance Siren; Food Blender	95	Very Loud	—
Garbage Disposal	90	Very Loud	4 times as loud
Freight Cars; Living Room Music	85	Loud	—
Pneumatic Drill; Vacuum Cleaner	80	Loud	2 times as loud
Busy Restaurant	75	Moderately Loud	—
Near-Freeway Auto Traffic	70	Moderately Loud	Reference Level
Average Office	60	Quiet	½ as loud
Suburban Street	55	Quiet	—
Light Traffic; Soft Radio Music in Apartment	50	Quiet	¼ as loud
Large Transformer	45	Quiet	—
Average Residence without Stereo Playing	40	Faint	⅛ as loud
Soft Whisper	30	Faint	—
Rustling Leaves	20	Very Faint	—
Human Breathing	10	Very Faint	Threshold of Hearing
—	0	Very Faint	—

Source: Compiled by LSA Associates, Inc. (2004).

Table C: Land Use Compatibility for Exterior Community Noise

Land Use Category	Noise Range (L_{dn} or CNEL), dB			
	I	II	III	IV
Passively used open spaces	50	50–55	55–70	70+
Auditoriums, concert halls, amphitheaters	45–50	50–65	65–70	70+
Residential, low-density single-family, duplex, mobile homes	50–55	55–70	70–75	75+
Residential multifamily	50–60	60–70	70–75	75+
Transient lodging, motels, hotels	50–60	60–70	70–80	80+
Schools, libraries, churches, hospitals, nursing homes	50–60	60–70	70–80	80+
Actively used open spaces, playgrounds, neighborhood parks	50–67	–	67–73	73+
Golf courses, riding stables, water recreation, cemeteries	50–70	–	70–80	80+
Office buildings, business commercial and professional	50–67	67–75	75+	–
Industrial, manufacturing, utilities, agriculture	50–70	70–75	75+	–

Source: California Department of Health, Office of Noise Control (1976).

Noise Range I—Normally Acceptable: Specified land use is satisfactory, based upon the assumption that any buildings involved are of normal conventional construction, without any special noise insulation requirements.

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

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

Noise Range IV—Clearly Unacceptable: New construction or development should generally not be undertaken.

CNEL = Community Noise Equivalent Level
dB = decibels
L_{dn} = day-night average noise level
L_{max} = maximum instantaneous noise level

FUNDAMENTALS OF VIBRATION

Vibration refers to ground-borne noise and perceptible motion. Ground-borne vibration is almost exclusively a concern inside buildings and is rarely perceived as a problem outdoors, where the motion may be discernible, but without the effects associated with the shaking of a building there is less adverse reaction. Vibration energy propagates from a source through intervening soil and rock layers to the foundations of nearby buildings. The vibration then propagates from the foundation throughout the remainder of the structure. Building vibration may be perceived by occupants as the motion of building surfaces, the rattling of items on shelves or hanging on walls, or a low-frequency rumbling noise. The rumbling noise is caused by the vibration of walls, floors, and ceilings that radiate sound waves. Annoyance from vibration often occurs when the vibration exceeds the threshold of perception by 10 dB or less. This is an order of magnitude below the damage threshold for normal buildings.

Typical sources of ground-borne vibration are construction activities (e.g., blasting, pile driving, and operating heavy-duty earthmoving equipment), steel-wheeled trains, and occasional traffic on rough roads. Problems with both ground-borne vibration and noise from these sources are usually localized to areas within approximately 100 feet (ft) from the vibration source, although there are examples of ground-borne vibration causing interference out to distances greater than 200 ft (Federal Transit Administration [FTA] 2006). When roadways are smooth, vibration from traffic, even heavy trucks, is rarely perceptible. It is assumed for most projects that the roadway surface will be smooth enough that ground-borne vibration from street traffic will not exceed the impact criteria; however, both construction of the project and the freight train operations could result in ground-borne vibration that may be perceptible and annoying.

Ground-borne noise is not likely to be a problem because noise arriving via the normal airborne path will usually be greater than ground-borne noise.

Ground-borne vibration has the potential to disturb people and damage buildings. Although it is very rare for train-induced ground-borne vibration to cause even cosmetic building damage, it is not uncommon for construction processes (e.g., blasting and pile driving) to cause vibration of sufficient amplitudes to damage nearby buildings (FTA 2018). Ground-borne vibration is usually measured in terms of vibration velocity, either the root-mean-square (RMS) velocity or peak particle velocity (PPV). The RMS is best for characterizing human response to building vibration, and PPV is used to characterize potential for damage. Decibel notation acts to compress the range of numbers required to describe vibration. Vibration velocity level in decibels is defined as:

$$L_v = 20 \log_{10} [V/V_{ref}]$$

where L_v is the vibration velocity in decibels (VdB), "V" is the RMS velocity amplitude, and "V_{ref}" is the reference velocity amplitude, or 1×10^{-6} inches/second (in/sec) used in the United States. Table D illustrates human response to various vibration levels, as described in the *Transit Noise and Vibration Impact Assessment Manual* (FTA 2018).

Table D: Human Response to Different Levels of Ground-Borne Noise and Vibration

Vibration Velocity Level	Noise Level		Human Response
	Low-Frequency[1]	Mid-Frequency[2]	
65 VdB	25 dBA	40 dBA	Approximate threshold of perception for many humans. Low-frequency sound usually inaudible; mid-frequency sound excessive for quiet sleeping areas.
75 VdB	35 dBA	50 dBA	Approximate dividing line between barely perceptible and distinctly perceptible. Many people find transit vibration at this level annoying. Low-frequency noise acceptable for sleeping areas; mid-frequency noise annoying in most quiet occupied areas.
85 VdB	45 dBA	60 dBA	Vibration acceptable only if there are an infrequent number of events per day. Low-frequency noise annoying for sleeping areas; mid-frequency noise annoying even for infrequent events with institutional land uses such as schools and churches.

Source: *Transit Noise and Vibration Impact Assessment Manual* (FTA 2018).
[1] Approximate noise level when vibration spectrum peak is near 30 Hz.
[2] Approximate noise level when vibration spectrum peak is near 60 Hz.
dBA = A-weighted decibels Hz = Hertz
FTA = Federal Transit Administration VdB = vibration velocity decibels

Factors that influence ground-borne vibration and noise include the following:

- **Vibration Source:** Vehicle suspension, wheel types and condition, railroad track/roadway surface, railroad track support system, speed, transit structure, and depth of vibration source
- **Vibration Path:** Soil type, rock layers, soil layering, depth to water table, and frost depth
- **Vibration Receiver:** Foundation type, building construction, and acoustical absorption

Among the factors listed above, there are significant differences in the vibration characteristics when the source is underground compared to at the ground surface. In addition, soil conditions are known to have a strong influence on the levels of ground-borne vibration. Among the most important factors are the stiffness and internal damping of the soil and the depth to bedrock.

Experience with ground-borne vibration indicates: (1) vibration propagation is more efficient in stiff, clay soils than in loose, sandy soils; and (2) shallow rock seems to concentrate the vibration energy close to the surface and can result in ground-borne vibration problems at large distances from a railroad track. Factors including layering of the soil and the depth to the water table can have significant effects on the propagation of ground-borne vibration. Soft, loose, sandy soils tend to attenuate more vibration energy than hard, rocky materials. Vibration propagation through groundwater is more efficient than through sandy soils.

REGULATORY SETTING

Noise Standards

Federal Transit Administration

The FTA *Transit Noise and Vibration Impact Assessment Manual* (September 2018) has established construction noise criteria for various land uses. For residential land uses under the detailed analysis, the daytime and nighttime 8-hour noise criteria are 80 dBA L_{eq} and 70 dBA L_{eq}, respectively. The FTA's construction noise criteria under the detailed analysis were used to evaluate potential construction noise impacts to residential land uses adjacent to the project because the City of Jurupa Valley Municipal Code does not have construction noise level standards.

Agua Mansa Industrial Corridor

Agua Mansa Industrial Corridor Specific Development Plan and Program Development Plan. The AMIC Specific Plan, Section 4.2.2, Development Standards, sets Performance Standards for residential uses within the AMIC.

Performance Standards: Noise. The AMIC Specific Plan, Section 4.2.2.C, has established an exterior noise standard of 55 dBA and 50 dBA for residentially zoned property within the AMIC during daytime (7:00 a.m. to 10:00 p.m.) and nighttime hours (10:00 p.m. to 7:00 a.m.). No person shall operate or cause to be operated any source of sound at any location or allow the creation of any noise on property owned, leased, occupied, or otherwise controlled by such person, which causes the noise level, when measured on any other property, either incorporated or unincorporated, to exceed any of the following:

a. The noise standard for that receiving land use for a cumulative period of more than 30 minutes in any hour

b. The noise standard plus 5 dBA for a cumulative period of more than 15 minutes in any hour

c. The noise standard plus 10 dBA for a cumulative period of more than 5 minutes in any hour

d. The noise standard plus 15 dBA for a cumulative period of more than 1 minute in any hour

e. The noise standard plus 20 dBA for any period of time

If the measured ambient level exceeds any of the first four noise limit categories above, the allowable noise exposure standard shall be increased to reflect said ambient noise level. If the ambient noise level exceeds the fifth noise limit category, the allowable noise exposure standard shall be increased to reflect the maximum ambient noise level. If the alleged offense consists entirely of impact noise or simple tone noise, the noise standard for the receiving land use shall be reduced by 5 dBA. The AMIC Specific Plan Performance Standards were used for the evaluation of potential noise impacts from stationary sources to off-site receivers.

Development Standards. The AMIC Specific Plan, Section 4, Table 11, requires heavy industrial developments adjacent to a residential area to construct a 7 ft masonry wall and maintain a 20 ft building setback from the side or rear yard.

City of Jurupa Valley

Noise Element of the General Plan. Below is a list of applicable policies from the Noise Element of the City's General Plan.

NE 1.1 Land Use/Noise Compatibility. Utilize the Land Use/Noise Compatibility Matrix found in Figure 7-3 of the City's General Plan [shown in Table E] to determine the compatibility of proposed development, including General Plan amendments, specific plan amendments, village plans, and rezonings, with existing land uses and/or noise exposure due to transportation sources.

NE 1.3 New or Modified Stationary Noise Sources**.** Noise created by new stationary noise sources, or by existing stationary noise sources that undergo modifications that may increase noise levels, shall be mitigated so as not exceed the noise level standards of Figure 7-3 [shown in Table E]. This policy does not apply to noise levels associated with agricultural operations existing in 2017.

NE 1.6 Protection of Noise-Sensitive Uses. Protect noise-sensitive land uses from high levels of noise by restricting noise-producing land uses from these areas. If the noise-producing land uses cannot be relocated, then measures such as building techniques, setbacks, landscaping, and noise walls should be considered.

NE 1.7 Noise-Tolerant Uses. Guide new or relocated noise-tolerant land uses into areas irrevocably committed to land uses that are noise producing, such as along major transportation corridors or within the projected noise contours of area airports.

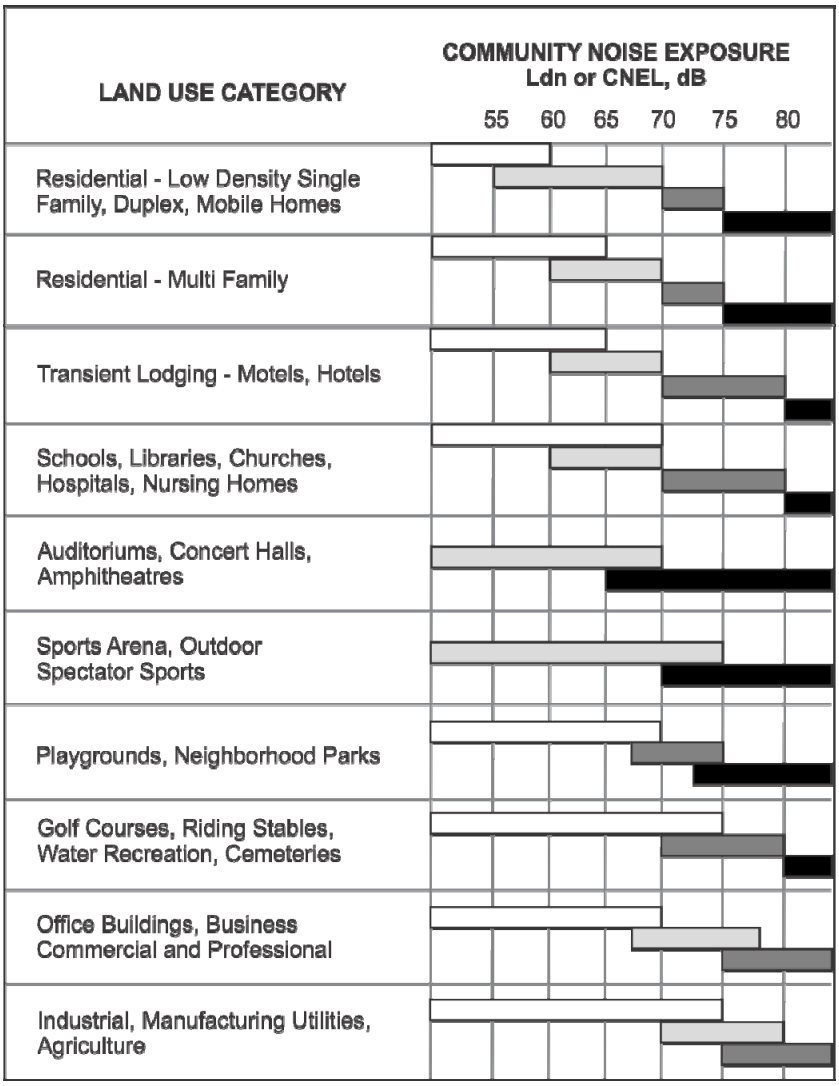
NE 1.9 Acoustic Site Planning and Design. Incorporate acoustic site planning into the design and placement of new development, particularly large scale, mixed-use, or master-planned development, including building orientation, berming, special noise-resistant walls, window and door assemblies, and other appropriate measures.

NE 2.2 Commercial Truck Deliveries. Require commercial or industrial truck delivery hours be limited to least-sensitive times of the day when adjacent to noise-sensitive land uses, unless there is no feasible alternative or there are overriding transportation benefits, as determined by the Planning Director.

NE 2.6 Noise Contours. Check all proposed development projects for possible location within roadway, railroad, and airport noise contours.

NE 2.10 Noise Walls. Noise mitigation walls (sound walls) should be used only when it is shown that preferred approaches are not effective or that it is not practical to use the preferred approaches consistent with other design criteria in the General Plan. Where noise walls are used, they should be designed to enhance community

Table E: City of Jurupa Valley Land Use Compatibility Matrix



NORMALLY ACCEPTABLE
Specified land use is satisfactory, based upon the assumption that any buildings involved are of normal conventional construction, without any special noise insulation requirements.

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

NORMALLY UNACCEPTABLE
New construction or development should generally be discouraged. If new construction or development does proceed, a detailed analysis of the noise reduction requirements must be made and needed noise reduction features included in the design.

CLEARLY UNACCEPTABLE
New construction or development should generally not be undertaken.

Source: City of Jurupa Valley General Plan (2017)
CNEL = Community Noise Equivalent Level
dB = decibels
L_{dn} = day-night average noise level
L_{max} = maximum instantaneous noise level

character, protect significant views, discourage graffiti, and help create an attractive pedestrian-friendly residential setting through features such as setbacks, changes in vertical and horizontal alignment, detail and texture, public art, walkways or trails, and landscaping. The height of such walls should be minimized, and where sound attenuation requires that a buffer that exceeds 10 feet in height, the sound buffer should consist of a combination of berms and a wall, or two or more retaining walls stepped back to allow intervening landscaping.

NE 3.1 Noise Analysis. Require that a noise analysis be conducted by an acoustical specialist for all proposed development projects that have the potential to generate significant noise near a noise-sensitive land use, or on or near land designated for noise-sensitive land uses, and ensure that recommended mitigation measures are implemented.

NE 3.2 Truck Loading, Shipping, and Parking. Require that the loading, shipping or parking facilities of commercial and industrial land uses that abut or are within 200 feet of residential parcels, be located and designed to minimize potential noise impacts upon residents. Overnight commercial truck parking areas shall be regulated in the Zoning Ordinance as a commercial use.

NE 3.3 Noise Buffers. Require major stationary noise-generating sources to install noise buffering or reduction mechanisms within their facilities to reduce noise generation levels to the lowest level practical as a condition of the approval or renewal of project entitlements.

NE 3.4 Construction Equipment. Require that all construction equipment utilize noise reduction features (i.e., mufflers and engine shrouds) that are at least as effective as those originally installed by the equipment's manufacturer.

NE 3.5 Construction Noise. Limit commercial construction activities adjacent to or within 200 feet of residential uses to weekdays, between 7:00 a.m. and 6:00 p.m., and limit high-noise-generating construction activities (e.g., grading, demolition, pile driving) near sensitive receptors to weekdays between 9:00 a.m. and 3:00 p.m.

NE 3.6 Commercial Truck Idling**.** Restrict truck idling near noise sensitive receptors.

NE 4.3 Truck Idling. Restrict truck idling near sensitive vibration receptors.

Municipal Code. Section 11.05.040 of the City's Municipal Code limits exterior noise attributable to stationary noise sources, as shown in Table F. This section states that no person shall create any sound, or allow the creation of any sound, on any property that causes the exterior sound level on any other occupied property to exceed the sound level standards applicable to the said land uses. However, Section 11.05.010 City's Municipal Code states that Chapter 11.05 is not intended to establish thresholds of significance for the purpose of any analysis required by the California Environmental Quality Act (Public Resources Code Section 21000 *et seq*.) and no such thresholds are established. Therefore, the AMIC Performance Standards alone were used for the evaluation of

potential noise impacts from stationary sources to off-site receivers within the City, which are also within the AMIC.

Table F: City of Jurupa Valley Sound Level Standards

Receiving Land Use	Time Period	L_{max} (Anytime)
Residential	7:00 a.m.–10: 00 p.m. (daytime)	55
	10:00 p.m.–7:00 a.m. (nighttime)	45
Commercial	7:00 a.m.–10: 00 p.m. (daytime)	65
	10:00 p.m.–7:00 a.m. (nighttime)	55
Light Industrial	7:00 a.m.–10: 00 p.m. (daytime)	75
	10:00 p.m.–7:00 a.m. (nighttime)	55
Heavy Industrial	7:00 a.m.–10: 00 p.m. (daytime)	75
	10:00 p.m.–7:00 a.m. (nighttime)	75

Source: City of Jurupa Valley Municipal Code, Section 11.05.040 (2012)
dBA = A-weighted decibels
L_{max} = maximum instantaneous noise level
min/mins = minute/minutes

Section 11.05.020 of the City's Municipal Code limits construction to between the hours of 6:00 a.m. and 6:00 p.m. during the months of June through September, and to 7:00 a.m. and 6:00 p.m. during the months of October through May, when the construction activities are located within 0.25 mile (mi) from an inhabited dwelling.

County of San Bernardino

The project is located in the County of Riverside. However, some of the residential receptors in the vicinity of the project are within the jurisdiction of San Bernardino County. Therefore, the following standards would be applicable to the project.

Noise Element of the General Plan. The County of San Bernardino General Plan identifies goals and policies and refers to the County Code Chapter 83.01 of the County Code of Ordinances for specific standards.

County Code of Ordinances. The San Bernardino County Code of Ordinances, Section 83.01.080(c), establishes noise standards for stationary sources as shown in Table G. Section 83.01.080(d) establishes noise standards for mobile sources as shown in Table H.

Section 83.01.080(g)(3) of the San Bernardino County Code of Ordinances exempts temporary construction, maintenance, repair, or demolition activities occurring between 7:00 a.m. and 7:00 p.m., excluding Sundays and federal holidays, from the regulations of Section 83.01.80.

Table G: County of San Bernardino Noise Standards for Stationary Noise Sources

Receiving Land Use	Time Period	L_{50} (30 mins)	L_{25} (15 mins)	L_8 (5 mins)	L_2 (1 min)	L_{max} (Anytime)
Residentially Zoned Property	7:00 a.m.–10: 00 p.m. (daytime)	55	60	65	70	75
	10:00 p.m.–7:00 a.m. (nighttime)	45	50	55	60	65
Professional Services	7:00 a.m.–10: 00 p.m. (daytime)	55	60	65	70	75
	10:00 p.m.–7:00 a.m. (nighttime)	55	60	65	70	75
Other Commercial	7:00 a.m.–10: 00 p.m. (daytime)	60	65	70	75	80
	10:00 p.m.–7:00 a.m. (nighttime)	60	65	70	75	80
Industrial	7:00 a.m.–10: 00 p.m. (daytime)	70	75	80	85	90
	10:00 p.m.–7:00 a.m. (nighttime)	70	75	80	85	90

Source: San Bernardino County Code (2014).
dBA = A-weighted decibels
L_{eq} = equivalent continuous sound level
mins = minutes

Table H: County of San Bernardino Noise Standards for Mobile Noise Sources

Categories	Land Use	Ldn or CNEL, dBA	
		Interior Standard	Exterior Standard
Residential	Single-family and multifamily, duplex, mobile homes	45	60[3]
Commercial	Hotel, motel, transient lodging	45	60[3]
	Commercial retail, bank, restaurant	50	NA
	Office building, research and development, professional offices	45	65
	Amphitheater, concert hall, auditorium, movie theater	45	NA
Institutional	Hospital, nursing home, school, classroom, church, library	45	65
Open Space	Hospital, nursing home, school, classroom, church, library	NA	65

Source: County of San Bernardino Development Code (2014).
[1] The indoor environment shall exclude bathrooms, kitchens, toilets, closets and corridors.
[2] Outdoor environment limited to: private yard of single-family dwellings, multifamily private patios or balconies, mobile home parks, hospital/office building patios, park picnic areas, school playgrounds, and hotel and motel recreation areas.
[3] An exterior noise level of up to 65 dB(A) (or CNEL) shall be allowed provided exterior noise levels have been substantially mitigated through a reasonable application of the best available noise reduction technology, and interior noise exposure does not exceed 45 dB(A) (or CNEL) with windows and doors closed. Requiring that windows and doors remain closed to achieve an acceptable interior noise level shall necessitate the use of air conditioning or mechanical ventilation.
CNEL = Community Noise Equivalent Level
dBA = A-weighted decibels
L_{dn} = day-night average noise level
NA = not applicable

Vibration Standards

Federal Transit Administration

Vibration standards included in the FTA *Transit Noise and Vibration Impact Assessment Manual* (FTA 2018) are used in this analysis for ground-borne vibration impacts on human annoyance, as shown in Table I. The criteria presented in Table I account for variation in project types as well as the frequency of events, which differ widely among projects. It is intuitive that when there will be fewer events per day, it should take higher vibration levels to evoke the same community response. This is

accounted for in the criteria by distinguishing between projects with frequent and infrequent events, in which the term "frequent events" is defined as more than 70 events per day.

Table I: Ground-Borne Vibration and Ground-Borne Noise Impact Criteria for General Assessment

Land Use Category	Ground-Borne Vibration Impact Levels (VdB re 1 µin/sec)			Ground-Borne Noise Impact Levels (dB re 20 µPa)		
	Frequent Events[1]	Occasional Events[2]	Infrequent Events[3]	Frequent Events[1]	Occasional Events[2]	Infrequent Events[3]
Category 1: Buildings where vibration would interfere with interior operations.	65 VdB[4]	65 VdB[4]	65 VdB[4]	–[5]	–[5]	–[5]
Category 2: Residences and buildings where people normally sleep.	72 VdB	75 VdB	80 VdB	35 dBA	38 dBA	43 dBA
Category 3: Institutional land uses with primarily daytime use.	75 VdB	78 VdB	83 VdB	40 dBA	43 dBA	48 dBA

Source: *Transit Noise and Vibration Impact Assessment Manual* (FTA 2018).

[1] Frequent events are defined as more than 70 vibration events of the same source per day. Most rapid transit projects fall into this category.

[2] Occasional events are defined as between 30 and 70 vibration events of the same source per day. Most commuter trunk lines have this many operations.

[3] Infrequent events are defined as fewer than 30 vibration events of the same kind per day. This category includes most commuter rail branch lines.

[4] This criterion limit is based on levels that are acceptable for most moderately sensitive equipment, such as optical microscopes. Vibration-sensitive manufacturing or research will require detailed evaluation to define the acceptable vibration levels. Ensuring lower vibration levels in a building often requires special design of the HVAC systems and stiffened floors.

[5] Vibration-sensitive equipment is generally not sensitive to ground-borne noise.

µin/sec = micro-inches per second
µPa = micro-Pascals
dB = decibels
dBA = A-weighted decibels
FTA = Federal Transit Administration
HVAC = heating, ventilation, and air conditioning
VdB = vibration velocity decibels

The criteria for environmental impact from ground-borne vibration and noise are based on the maximum levels for a single event. Table J lists the potential vibration building damage criteria associated with construction activities, as suggested in the *Transit Noise and Vibration Impact Assessment Manual* (FTA 2018).

Table J: Construction Vibration Damage Criteria

Building Category	PPV (in/sec)	Approximate L_V (VdB)[1]
Reinforced concrete, steel, or timber (no plaster)	0.50	102
Engineered concrete and masonry (no plaster)	0.30	98
Non-engineered timber and masonry buildings	0.20	94
Buildings extremely susceptible to vibration damage	0.12	90

Source: *Transit Noise and Vibration Impact Assessment Manual* (FTA 2018).

[1] RMS vibration velocity in decibels (VdB) re 1 µin/sec.

µin/sec = micro-inches per second
FTA = Federal Transit Administration
in/sec = inches per second
L_V = velocity in decibels
PPV = peak particle velocity
RMS = root-mean-square
VdB = vibration velocity decibels

FTA guidelines show that a vibration level of up to 102 VdB (equivalent to 0.5 PPV [in/sec]) (FTA 2018) is considered safe for buildings consisting of reinforced concrete, steel, or timber (no plaster), and would not result in any construction vibration damage. For a non-engineered timber and masonry building, the construction building vibration damage criterion is 94 VdB (0.2 PPV [in/sec]). The PPV values for building damage thresholds referenced above are also shown in Table K, taken from the *Transportation and Construction Vibration Guidance Manual* (Caltrans 2013), which included additional building definition and vibration building damage thresholds.

Table K: Guideline Vibration Damage Potential Threshold Criteria

Structure and Condition	Maximum PPV (in/sec)	
	Transient Sources[1]	Continuous/Frequent Intermittent Sources[2]
Extremely fragile historic buildings, ruins, and ancient monuments	0.12	0.08
Fragile buildings	0.20	0.10
Historic and some old buildings	0.50	0.25
Older residential structures	0.50	0.30
New residential structures	1.00	0.50
Modern industrial/commercial buildings	2.00	0.50

Source: *Transportation and Construction Vibration Guidance Manual* (Caltrans 2013).
[1] Transient sources create a single, isolated vibration event, such as blasting or drop balls.
[2] Continuous/frequent intermittent sources include impact pile drivers, pogo-stick compactors, crack-and-seat equipment, vibratory pile drivers, and vibratory compaction equipment.
Caltrans = California Department of Transportation
in/sec = inches per second
PPV = peak particle velocity

EXISTING SETTING

Existing Sensitive Land Uses in the Project Area

The project site is surrounded primarily by industrial and residential development. The property lines of the closest residential and industrial uses are located immediately north of the proposed project site. These land uses would be exposed to noise generated during construction and operation of the project.

Overview of the Existing Ambient Noise Environment

The primary existing noise sources in the project area are existing industrial uses, including those in the residentially zoned properties north of the project site, and transportation facilities. Traffic on Agua Mansa Road, Hall Avenue, and other local streets contributes to the ambient noise levels in the project vicinity. Noise from motor vehicles is generated by engine vibrations, the interaction between the tires and the road, and the vehicles' exhaust systems.

Ambient Noise Measurements

LSA conducted two short-term (20-minute) noise level measurements and one long-term (24-hour) measurement to document the existing noise environment in the project area.

Short-Term Noise Measurements

Short-term (20-minute) noise level measurements were conducted on November 5, 2018, using a Larson Davis Model 831 Type 1 sound level meter. Table L shows the results of the short-term measurements along with a description of the measurement location and noise sources that occurred during the measurement. As shown in Table L, the measured average noise levels in the project vicinity ranged from 57.5 to 70.9 dBA L_{eq} and the measured maximum noise levels ranged from 72.3 to 82.2 dBA L_{max}. Figure 3 shows the short-term monitoring locations.

Table L: Short-Term Ambient Noise Level Measurements

Location Number	Location	Date	Start Time	Noise Level			Noise Source(s)
				dBA L_{eq}	dBA L_{max}	dBA L_{min}	
ST-1	Across the street from 1175 Hall Avenue. Approximately 45 feet northeast of chainlike fence.	11/5/18	1:08 p.m.	57.5	72.3	49.4	Traffic on Agua Mansa Road, light traffic on Hall Avenue, machine/ engine running at 1203 Hall Avenue.
ST-2	West of Agua Mansa Road, across the street from 12212 Holly Street.	11/5/18	12:15 p.m.	70.9	82.2	48.1	Traffic on Agua Mansa Road (many loud trucks), saw and forklifts running across the street at lumberyard.

Source: Compiled by LSA Associates, Inc. (2020).
dBA = A-weighted decibels
L_{eq} = equivalent continuous sound level
L_{max} = maximum measured sound level
L_{min} = minimum measured sound level

Long-Term Noise Measurements

The long-term (24-hour) noise level measurement was conducted on November 5 and 6, 2018, using a 3M Quest NoisePro DLX Dosimeter. Table M shows hourly L_{eq} results from the long-term measurement, and Table N shows the calculated CNEL level from the long-term noise level measurement. As shown in Table N, the calculated CNEL level is 57 dBA CNEL. Figure 3 shows the long-term monitoring location.

Existing Aircraft Noise

Airport-related noise levels are primarily associated with aircraft engine noise made while aircraft are taking off, landing, or running their engines while still on the ground. The closest sources of aircraft noise are Flabob Airport (RIR), approximately 3.2 mi southwest of the project site, and San Bernardino International Airport (SBD), approximately 8 mi northeast of the project site. Aircraft noise is rarely audible at the project site. No portion of the project site lies within the 65 dBA CNEL noise contours of RIR or SBD, according to the Riverside County Airport Land Use Compatibility Plan Policy Document (2004) and the Airport Layout Plan Narrative Report for SBD (2010).

LSA

LEGEND

Project Location

Short-Term Monitoring Location

Long-Term Monitoring Location

FIGURE 3

N

0 150 300

FEET

SOURCE: USGS 7.5' Quad - Fontana (1980); San Bernardino South (1980)

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Agua Mansa Industrial Project

Noise Monitoring Locations

Table M: Long-Term (24-Hour) Noise Level Measurement Results at LT-1

	Start Time	Date	Noise Level (dBA L_{eq})
1	12:00 PM	11/5/18	48
2	1:00 PM	11/5/18	50
3	2:00 PM	11/5/18	50
4	3:00 PM	11/5/18	54
5	4:00 PM	11/5/18	53
6	5:00 PM	11/5/18	50
7	6:00 PM	11/5/18	49
8	7:00 PM	11/5/18	50
9	8:00 PM	11/5/18	52
10	9:00 PM	11/5/18	49
11	10:00 PM	11/5/18	49
12	11:00 PM	11/5/18	48
13	12:00 AM	11/6/18	46
14	1:00 AM	11/6/18	47
15	2:00 AM	11/6/18	50
16	3:00 AM	11/6/18	48
17	4:00 AM	11/6/18	49
18	5:00 AM	11/6/18	48
19	6:00 AM	11/6/18	57
20	7:00 AM	11/6/18	48
21	8:00 AM	11/6/18	54
22	9:00 AM	11/6/18	49
23	10:00 AM	11/6/18	49
24	11:00 AM	11/6/18	48

Source: Compiled by LSA Associates, Inc. (2020).
dBA L_{eq} = equivalent continuous sound level measured in A-weighted decibels

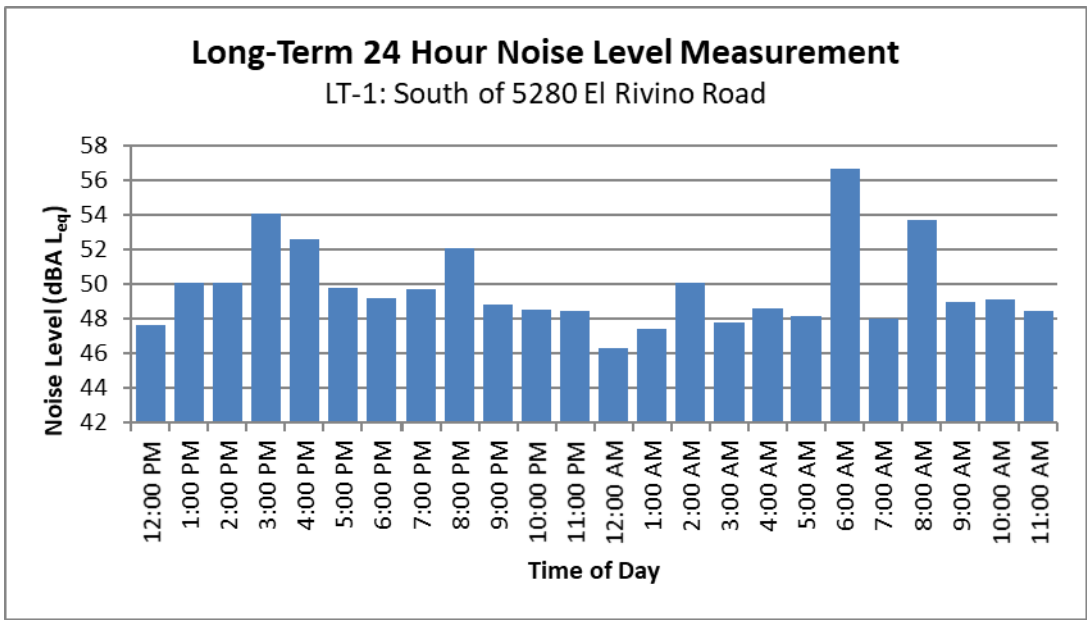

Table N: Long-Term Ambient Noise Monitoring Results

Monitoring No.	Location	Start Date	Start Time	Duration (hours)	Noise Level (dBA CNEL)	Noise Source(s)
LT-1	South of 5280 El Rivino Road	11/12/18	12:00 p.m.	24	57	Industrial noise to the west and north and faint traffic noise on Agua Mansa Road and Hall Avenue.

Source: Compiled by LSA Associates, Inc. (2020).
dBA = A-weighted decibels
CNEL = Community Noise Equivalent Level

Existing Traffic Noise

The Federal Highway Administration (FHWA) Highway Traffic Noise Prediction Model (FHWA RD-77-108) was used to evaluate traffic-related noise conditions along roadway segments in the project vicinity. This model requires various parameters, including traffic volumes, vehicle mix, vehicle speed, and roadway geometry, to compute typical equivalent noise levels during daytime, evening, and nighttime hours. The resulting noise levels are weighted and summed over 24-hour periods to determine the CNEL values. Traffic volumes were obtained from the *Traffic Impact Analysis* (LSA 2020).

A vehicle mix of 73.47 percent automobiles, 7.63 percent medium trucks, and 18.90 percent heavy trucks was used for Agua Mansa Road, and a vehicle mix of 97.07 percent automobiles, 1.61 percent medium trucks, and 1.32 percent heavy trucks was used for Hall Avenue based on traffic counts taken on October 11, 2018 by Counts Unlimited, Inc.

Table O lists the existing traffic noise levels on these roadways in the project vicinity. These noise levels represent the worst-case scenario, which assumes that no shielding is provided between traffic and the location where the noise contours are drawn. Table O indicates that the existing traffic noise levels in the project vicinity are low to moderate. The specific assumptions used in developing these noise levels and the model printouts are provided in Appendix A.

Table O: Existing Traffic Noise Levels

Roadway Segment	ADT	Centerline to 70 CNEL (ft)	Centerline to 65 CNEL (ft)	Centerline to 60 CNEL (ft)	CNEL (dBA) 50 ft from Centerline of Outermost Lane
Agua Mansa Road between Riverside Avenue and Hall Avenue	13,448	137	292	628	74.3
Agua Mansa Road between Hall Avenue and Brown Avenue	11,948	127	270	580	73.8
Agua Mansa Road between Brown Avenue and A. Nelson Driveway	10,362	115	246	528	73.6
Agua Mansa Road between A. Nelson Driveway and Market Street	12,952	133	285	612	74.6
Hall Avenue west of Project Driveway 1	1,080	< 50	< 50	< 50	57.1
Hall Avenue between Project Driveway 1 and Project Driveway 2	1,080	< 50	< 50	< 50	56.6
Hall Avenue between Project Driveway 2 and Project Driveway 3/ Brown Avenue	1,080	< 50	< 50	< 50	56.6

Table O: Existing Traffic Noise Levels

Roadway Segment	ADT	Centerline to 70 CNEL (ft)	Centerline to 65 CNEL (ft)	Centerline to 60 CNEL (ft)	CNEL (dBA) 50 ft from Centerline of Outermost Lane
Hall Avenue between Project Driveway 3/Brown Avenue and Project Driveway 4	1,090	< 50	< 50	< 50	56.7
Hall Avenue between Project Driveway 4 and Hall Avenue	1,100	< 50	< 50	< 50	56.7

Source: Compiled by LSA Associates, Inc. (2020).
Note: Traffic noise within 50 ft of the roadway centerline should be evaluated with site-specific information.
ADT = average daily traffic dBA = A-weighted decibels
CNEL = Community Noise Equivalent Level ft = feet

IMPACTS

Short-Term Construction Noise Impacts

Short-term noise impacts would be associated with site preparation, grading, building erection, and tenant improvements within the building. Construction-related short-term noise levels would be higher than existing ambient noise levels in the project area but would no longer occur once construction of the project is complete.

Two types of short-term noise impacts could occur during construction on the project site. First, construction crew commutes and the transport of construction equipment and materials to the site for the proposed project would incrementally increase noise levels on access roads leading to the site. Although there would be a relatively high single-event noise exposure potential causing intermittent noise nuisance (passing trucks at 50 ft would generate up to a maximum of 84 dBA), the effect on longer-term (hourly or daily) ambient noise levels would be small.

The building construction phase would generate the most trips out of all of the construction phases, at 60 vehicles per hour (596 vehicles per day). Roadways that would be used to access the project site are Hall Avenue and Agua Mansa Road, which have estimated existing hourly/daily traffic volumes of 109/1,088 and 1,345/13,448, respectively, near the project site. Construction-related traffic would increase traffic noise levels by 1.9 dBA along Hall Avenue and 0.2 dBA along Agua Mansa Road. A noise level increase of less than 3 dBA would not be perceptible to the human ear in an outdoor environment. Therefore, short-term construction-related impacts associated with worker commute and equipment transport to the project site would be less than significant.

The second type of short-term noise impact is related to noise generated during site preparation, grading, building erection, and tenant improvements within the building. Construction is performed in discrete steps, each of which has its own mix of equipment and consequently its own noise characteristics. These various sequential phases would change the character of the noise generated as well as the noise levels on the project site as construction progresses. Despite the variety in the type and size of construction equipment, similarities in the dominant noise sources and patterns of operation allow construction-related noise ranges to be categorized by work phase. Table P lists

construction noise levels (L_{max}) included in the FHWA *Highway Construction Noise Handbook* (2006), based on a distance of 50 ft between the equipment and a noise receptor.

Table P: Typical Construction Equipment Noise Levels

Equipment Description	Acoustical Usage Factor[1]	Maximum Noise Level (L_{max}) at 50 Feet[2]
Backhoe	40	80
Compactor (ground)	20	80
Compressor	40	80
Crane	16	85
Dozer	40	85
Dump Truck	40	84
Excavator	40	85
Flatbed Truck	40	84
Forklift	20	85
Front-End Loader	40	80
Grader	40	85
Impact Pile Driver	20	95
Jackhammer	20	85
Pickup Truck	40	55
Pneumatic Tools	50	85
Pump	50	77
Rock Drill	20	85
Roller	20	85
Scraper	40	85
Tractor	40	84
Welder	40	73

Source: *FHWA Highway Construction Noise Handbook,* Table 9.1 (FHWA 2006).
Note: The noise levels reported in this table are rounded to the nearest whole number.
[1] Usage factor is the percentage of time during a construction noise operation that a piece of construction equipment is operating at full power.
[2] Maximum noise levels were developed based on Spec 721.560 from the CA/T program to be consistent with the City of Boston, Massachusetts, Noise Code for the "Big Dig" project.
CA/T = Central Artery/Tunnel
L_{max} = maximum instantaneous noise level
FHWA = Federal Highway Administration

Typical noise levels range up to 88 dBA L_{max} at 50 ft during the noisiest construction phases. The demolition, site preparation, and grading phase tends to generate the highest noise levels because the noisiest construction equipment is earthmoving equipment. Earthmoving equipment includes excavating machinery such as backfillers, bulldozers, draglines, and front-end loaders. Earthmoving and compacting equipment includes compactors, scrapers, and graders.

Construction of the proposed project is expected to require the use of scrapers, dozers, water trucks, and pickup trucks during the noisiest construction phase. Noise associated with the use of each type of construction equipment for the nosiest construction phase is estimated to be between 55 dBA L_{max} and 85 dBA L_{max} at a distance of 50 ft from the active construction area.

Based on the Maximum Noise Level (L_{max}) at 50 ft column in Table P, the maximum noise level generated by scrapers is assumed to be 85 dBA L_{max} at 50 ft. The maximum noise level generated by dozers is approximately 85 dBA L_{max} at 50 ft. The maximum noise level generated by water trucks is

approximately 55 dBA L_{max} at 50 ft. The maximum noise level generated by pickup trucks is approximately 55 dBA L_{max} at 50 ft. Combined with these activities occurring at the same time, with a scraper (85 dBA), a dozer (85 dBA), a water truck (55 dBA), and a pickup truck (55 dBA), the active construction area would result in approximately 88 dBA L_{max} (i.e., 85 dBA + 85 dBA + 55 dBA +55 dBA) at a distance of 50 ft. Construction noise levels would be 84 dBA L_{eq} at a distance of 50 ft with a usage factor of 40 percent for each piece of construction equipment.

The closest residential property line is located within 50 ft north of the project site and would be subject to short-term noise reaching 88 dBA L_{max} (84 dBA L_{eq}) or greater at the property line. This noise level would exceed the FTA's daytime and nighttime 8-hour construction noise criteria of 80 dBA L_{eq} and 70 dBA L_{eq}, respectively. The implementation of mitigation measures listed below, which include the compliance with the allowable construction hours and installation of temporary construction barriers with a minimum height of 12 ft, would be required to reduce potential construction noise impacts. A minimum temporary construction barrier height of 12 ft located along the northern construction boundary would reduce noise levels by 8 dBA or more and construction noise levels would be reduced to 80 dBA L_{max} (88 dBA – 8 dBA = 80 dBA) or 76 dBA L_{eq} (84 dBA – 8 dBA = 76 dBA) at a distance of 50 ft or lower. Therefore, the implementation of a minimum temporary construction barrier height of 12 ft and other mitigation measures listed below would reduce construction noise impacts to less than significant.

The following mitigation measures are required:

- The project construction contractor shall limit construction activities between the hours of 7:00 a.m. and 6:00 p.m., Monday through Saturday. Construction is prohibited outside these hours or at any time on Sunday or a federal holiday.
- The project construction contractor shall limit high-noise-generating construction activities (e.g., grading, demolition, or pile driving) within 200 ft of residential uses from 9:00 a.m. to 3:00 p.m., Monday through Friday. High-noise-generating construction activities are prohibited outside these hours or at any time on Sunday or a federal holiday.
- The project construction contractor shall equip all construction equipment, fixed or mobile, with properly operating and maintained noise mufflers consistent with manufacturer's standards.
- The project construction contractor shall locate staging areas away from off-site sensitive uses during the later phases of project development.
- The project construction contractor shall place all stationary construction equipment so that the emitted noise is directed away from the sensitive receptors nearest the project site.
- Construction haul truck and materials delivery traffic shall avoid residential areas whenever feasible.
- The project construction contractor shall place a temporary construction barrier with a minimum height of 12 ft along the northern construction boundary such that the line-of-sight from ground-level construction equipment and sensitive receptors would be blocked. The temporary construction barrier may be a 0.5-inch thick plywood fence or another material that has a minimum Sound Transmission Class (STC) rating of 28.

Short-Term Construction Vibration Impacts

Ground-borne noise and vibration from construction activity would be mostly low to moderate. Table Q shows the reference vibration levels at a distance of 25 ft for each type of standard construction equipment from the FTA's *Transit Noise and Vibration Impact Assessment Manual* (FTA 2018). The proposed project would use large bulldozers, loaded trucks, and jackhammers that would generate ground-borne vibration of up to 87 VdB when measured at 25 ft. This range of ground-borne vibration levels would dissipate with distance from the project site. Below is the formula for vibration transmission (FTA 2018).

$$LvdB\ (D) = LvdB\ (25\ ft) - 30\ Log\ (D/25)$$

Table Q: Vibration Source Amplitudes for Construction Equipment

Equipment	Reference PPV/L_V at 25 ft	
	PPV (in/sec)	L_V (VdB)[1]
Pile Driver (Impact), Typical	0.644	104
Pile Driver (Sonic), Typical	0.170	93
Vibratory Roller	0.210	94
Hoe Ram	0.089	87
Large Bulldozer[2]	**0.089**	**87**
Caisson Drilling	0.089	87
Loaded Trucks	**0.076**	**86**
Jackhammer	0.035	79
Small Bulldozer	0.003	58

Sources: *Transit Noise and Vibration Impact Assessment Manual* (FTA 2018).
[1] RMS vibration velocity in decibels (VdB) are 1 µin/sec.
[2] Equipment shown in **bold** is expected to be used on site.

µin/sec = micro-inches per second
ft = feet
FTA = Federal Transit Administration
in/sec = inches per second
L_V = velocity in decibels
PPV = peak particle velocity
RMS = root-mean-square
VdB = vibration velocity decibels

The closest building structure to the project construction boundary is a masonry industrial structure located approximately 10 ft to the north. A vibration level at 10 ft is 12 VdB higher than the vibration level at 25 ft. Table R shows that vibration at this structure would reach 99 VdB (or 0.191 PPV [in/sec]) (87 VdB + 12 VdB = 99 VdB). This ground-borne vibration level would exceed the FTA damage threshold of 98 VdB (0.3 PPV [in/sec]) and would potentially damage the closest building structure because it is constructed of engineered concrete and masonry. The implementation of a mitigation measure to either limit the use of heavy equipment (e.g., large tracked bulldozers or loaded trucks) or use light construction equipment (e.g. small rubber tire bulldozers or pickup trucks) within 15 ft from the northern project construction boundary would reduce construction vibration levels to below the FTA's vibration damage threshold. Light construction equipment such as a small rubber tire bulldozer would generate a vibration level of 58 VdB (0.003 PPV [in/sec]) at 25 ft and would reduce vibration levels to 70 VdB (0.012 PPV [in/sec]), which would be below FTA's vibration damage threshold of 98 VdB (0.3 PPV [in/sec]) for buildings constructed of engineered concrete and masonry.

Table R: Summary of Construction Equipment and Maximum Vibration Levels

Land Use	Direction	Equipment/Activity	Reference Vibration Level (VdB) at 25 Ft	Reference Vibration Level (PPV) at 25 Ft	Distance (ft)[1]	Maximum Vibration Level (VdB)	Maximum Vibration Level (PPV)
Industrial	North	Large bulldozers	87	0.089	10	99	0.191
		Loaded trucks	86	0.076	10	98	0.164
Storage	North	Large bulldozers	87	0.089	40	81	0.044
		Loaded trucks	86	0.076	40	80	0.038
Residential	North	Large bulldozers	87	0.089	460	49	0.001
		Loaded trucks	86	0.076	460	48	0.001

Source: Compiled by LSA Associates, Inc. (2020).

[1] Distances reflect the nearest structure of each land use category to the nearest project construction boundary. All other structures of each land use category would experience lower vibration levels.

Note: The FTA-recommended building damage threshold is 90 VdB (or 0.12 PPV [in/sec]) at the receiving fragile storage structure, 94 VdB (0.2 PPV [in/sec]) at the receiving non-engineered timber and masonry residential structure and 98 VdB (0.3 PPV [in/sec]) at the receiving engineered concrete and masonry building industrial structure.

ft = foot/feet
FTA = Federal Transit Administration
PPV = peak particle velocity
VdB = vibration velocity decibels

The closest non-engineered or fragile building structure is a storage shed located approximately 40 ft from the northern project construction boundary. A vibration level at 40 ft is 6 VdB lower than the vibration level at 25 ft. As shown in Table R, ground-borne vibration levels at this structure would reach up to 81 VdB (or 0.044 PPV [in/sec]) (87 VdB - 6 VdB = 81 VdB). This vibration level would not exceed the threshold of 90 VdB (or 0.12 PPV [in/sec]) that would potentially damage vibration-sensitive buildings.

The closest residential structure is located approximately 460 ft from the northern project construction boundary. A vibration level at 460 ft is 38 VdB lower than the vibration level at 25 ft. As shown Table R, ground-borne vibration levels at this structure would reach up to 49 VdB (87 VdB - 38 VdB = 49 VdB). This ground-borne vibration level would not exceed the vibration threshold of 72 VdB that would result in annoyance or interfere with sleep at residential land uses. In addition, this vibration level would not exceed the threshold of 94 VdB (or 0.2 PPV [in/sec]) that would potentially damage non-engineered timber and masonry buildings. Therefore, no short-term construction vibration impacts would occur with the implementation of mitigation measures.

Long-Term Aircraft Noise Impacts

RIR is located approximately 3.2 mi southwest of the project site, and SBD is located approximately 8 mi northeast of the project site. A review of the Riverside County Airport Land Use Compatibility Plan Policy Document (2004) and the Airport Layout Plan Narrative Report for SBD (2010) confirms that the project site is located outside of the 65 dBA CNEL noise contours of these airports. In addition, the project site is not located within the vicinity of a private airstrip. Therefore, the proposed project would not expose people residing or working in the project area to excessive noise

levels from aircraft. Therefore, no impacts would occur and no mitigation measures would be required.

Long-Term Traffic Noise Impacts

The FHWA Highway Traffic Noise Prediction Model (FHWA RD-77-108) was used to evaluate traffic-related noise conditions along street segments in the project vicinity. This model requires various parameters, including traffic volumes, vehicle mix, vehicle speed, and roadway geometry, to compute typical equivalent noise levels during daytime, evening, and nighttime hours. The resulting noise levels are weighted and summed over 24-hour periods to determine the CNEL values. Traffic volumes were obtained from the *Traffic Impact Analysis* (LSA 2020). Vehicle distributions on Agua Mansa Road and Hall Avenue were calculated from existing traffic counts. Tables S, T, and U list the traffic noise levels for the Existing (2018), Opening Year (2022), and Cumulative Opening Year (2022) baseline and with project scenarios, respectively. These noise levels represent the worst-case scenario, which assumes that no shielding is provided between the traffic and the location where the noise contours are drawn. The specific assumptions used in developing these noise levels and the model printouts are provided in Appendix A.

Off-Site Traffic Noise Impacts

Off-site project-related traffic noise impacts would occur with a project-related traffic noise increase of 3 dBA or greater. As discussed in the Measurement of Sound section, a noise level change of 3 dBA or less is generally considered to be below the threshold of noticeable hearing. Tables S, T, and U show that the proposed project would have a project-related traffic noise increase of up to 0.3 dBA along Agua Mansa road and up to 3.4 dBA along Hall Avenue in the project vicinity. Although the project-related noise level increase would be greater than 3 dBA along segments of Hall Avenue between Project Driveway 3/Brown Avenue and Agua Mansa Road in the Existing Year (2018) and Opening Year (2022) scenarios, no off-site traffic noise impacts would occur because there are no noise-sensitive uses along Hall Avenue east of Project Driveway 1. Therefore, no mitigation measures are required.

Long-Term Stationary Source Noise Impacts

Potential long-term noise impacts would be associated with stationary sources proposed on the project site. Stationary noise sources from the proposed project would include noise generated from on-site truck delivery; truck loading and unloading activities; heating, ventilation, and air conditioning (HVAC) noise; and parking lot activities. The buildings' hours of operation are not known; therefore, the buildings would potentially operate during nighttime hours (10:00 p.m. to 7:00 a.m.). Further discussion on the potential long-term noise impacts from stationary noise sources are discussed below.

Truck Delivery and Truck Loading/Unloading Activities

Delivery trucks and truck loading/unloading activities (including forklift) operations for the proposed project would result in maximum noise readings similar to those of loading and unloading activities, which generate a noise level of 85 dBA L_{max} at 50 ft, as shown in Table P. Although typical truck loading and unloading processes take an average of 15 to 20 minutes, this maximum noise level

Table S: Existing (2018) Traffic Noise Levels Without and With Project

Roadway Segment	Without Project Traffic Conditions					With Project Traffic Conditions					
	ADT	Centerline to 70 dBA CNEL (ft)	Centerline to 65 dBA CNEL (ft)	Centerline to 60 dBA CNEL (ft)	CNEL (dBA) 50 ft from Centerline of Outermost Lane	ADT	Centerline to 70 dBA CNEL (ft)	Centerline to 65 dBA CNEL (ft)	Centerline to 60 dBA CNEL (ft)	CNEL (dBA) 50 ft from Centerline of Outermost Lane	Increase from Baseline Conditions
Agua Mansa Road between Riverside Avenue and Hall Avenue	13,448	137	292	628	74.3	13,636	139	295	634	74.3	0.0
Agua Mansa Road between Hall Avenue and Brown Avenue	11,948	127	270	580	73.8	12,552	131	279	599	74.0	0.2
Agua Mansa Road between Brown Avenue and A. Nelson Driveway	10,362	115	246	528	73.6	11,231	121	259	557	73.9	0.3
Agua Mansa Road between A. Nelson Driveway and Market Street	12,952	133	285	612	74.6	13,821	139	297	639	74.8	0.2
Hall Avenue west of Project Driveway 1	1,080	< 50	< 50	< 50	57.1	1,520	< 50	< 50	< 50	58.6	1.5
Hall Avenue between Project Driveway 1 and Project Driveway 2	1,080	< 50	< 50	< 50	56.6	1,810	< 50	< 50	58	58.9	2.3
Hall Avenue between Project Driveway 2 and Project Driveway 3/Brown Avenue	1,080	< 50	< 50	< 50	56.6	2,030	< 50	< 50	62	59.4	2.8
Hall Avenue between Project Driveway 3/ Brown Avenue and Project Driveway 4	1,090	< 50	< 50	< 50	56.7	2,240	< 50	< 50	66	59.8	3.1
Hall Avenue between Project Driveway 4 and Hall Avenue	1,100	< 50	< 50	< 50	56.7	2,370	< 50	< 50	69	60.1	3.4

Source: Compiled by LSA Associates, Inc. (2020).
ADT = average daily traffic
CNEL = Community Noise Equivalent Level
dBA = A-weighted decibels
ft = feet

Table T: Opening Year (2022) Traffic Noise Levels Without and With Project

Roadway Segment	Without Project Traffic Conditions					With Project Traffic Conditions					
	ADT	Centerline to 70 dBA CNEL (ft)	Centerline to 65 dBA CNEL (ft)	Centerline to 60 dBA CNEL (ft)	CNEL (dBA) 50 ft from Centerline of Outermost Lane	ADT	Centerline to 70 dBA CNEL (ft)	Centerline to 65 dBA CNEL (ft)	Centerline to 60 dBA CNEL (ft)	CNEL (dBA) 50 ft from Centerline of Outermost Lane	Increase from Baseline Conditions
Agua Mansa Road between Riverside Avenue and Hall Avenue	14,524	144	307	661	74.6	14,712	146	310	666	74.7	0.1
Agua Mansa Road between Hall Avenue and Brown Avenue	12,904	134	284	611	74.1	13,478	138	293	629	74.3	0.2
Agua Mansa Road between Brown Avenue and A. Nelson Driveway	11,191	121	258	556	73.9	12,060	127	272	584	74.2	0.3
Agua Mansa Road between A. Nelson Driveway and Market Street	13,988	140	300	645	74.9	14,857	146	312	671	75.2	0.3
Hall Avenue west of Project Driveway 1	1,170	< 50	< 50	< 50	57.5	1,610	< 50	< 50	53	58.9	1.4
Hall Avenue between Project Driveway 1 and Project Driveway 2	1,170	< 50	< 50	< 50	57.0	1,900	< 50	< 50	60	59.1	2.1
Hall Avenue between Project Driveway 2 and Project Driveway 3/Brown Avenue	1,165	< 50	< 50	< 50	57.0	2,115	< 50	< 50	64	59.6	2.6
Hall Avenue between Project Driveway 3/ Brown Avenue and Project Driveway 4	1,175	< 50	< 50	< 50	57.0	2,325	< 50	< 50	68	60.0	3.0
Hall Avenue between Project Driveway 4 and Hall Avenue	1,190	< 50	< 50	< 50	57.1	2,460	< 50	< 50	70	60.2	3.1

Source: Compiled by LSA Associates, Inc. (2020).
ADT = average daily traffic
CNEL = Community Noise Equivalent Level
dBA = A-weighted decibels
ft = feet

Table U: Cumulative Opening Year (2022) Traffic Noise Levels Without and With Project

Roadway Segment	Without Project Traffic Conditions					With Project Traffic Conditions					
	ADT	Centerline to 70 dBA CNEL (ft)	Centerline to 65 dBA CNEL (ft)	Centerline to 60 dBA CNEL (ft)	CNEL (dBA) 50 ft from Centerline of Outermost Lane	ADT	Centerline to 70 dBA CNEL (ft)	Centerline to 65 dBA CNEL (ft)	Centerline to 60 dBA CNEL (ft)	CNEL (dBA) 50 ft from Centerline of Outermost Lane	Increase from Baseline Conditions
Agua Mansa Road between Riverside Avenue and Hall Avenue	19,350	174	372	800	75.9	19,538	175	374	805	75.9	0.0
Agua Mansa Road between Hall Avenue and Brown Avenue	17,154	161	343	738	75.3	17,728	164	351	755	75.5	0.2
Agua Mansa Road between Brown Avenue and A. Nelson Driveway	16,101	154	329	708	75.5	16,970	159	341	733	75.7	0.2
Agua Mansa Road between A. Nelson Driveway and Market Street	19,104	172	369	793	76.2	19,973	177	380	817	76.4	0.2
Hall Avenue west of Project Driveway 1	2,620	< 50	< 50	72	61.0	3,060	< 50	< 50	79	61.7	0.7
Hall Avenue between Project Driveway 1 and Project Driveway 2	2,620	< 50	< 50	73	60.5	3,350	< 50	< 50	85	61.6	1.1
Hall Avenue between Project Driveway 2 and Project Driveway 3/Brown Avenue	2,615	< 50	< 50	73	60.5	3,565	< 50	< 50	89	61.8	1.3
Hall Avenue between Project Driveway 3/Brown Avenue and Project Driveway 4	2,575	< 50	< 50	72	60.4	3,725	< 50	< 50	91	62.0	1.6
Hall Avenue between Project Driveway 4 and Hall Avenue	2,590	< 50	< 50	72	60.4	3,860	< 50	< 50	93	62.2	1.8

Source: Compiled by LSA Associates, Inc. (2020).
ADT = average daily traffic
CNEL = Community Noise Equivalent Level
dBA = A-weighted decibels
ft = feet

occurs in a much shorter period of time (i.e., just a few minutes). In addition, the California Air Resources Board has adopted a regulation that requires that all truck idling be limited to 5 minutes or less. Therefore, it is not expected that truck loading/unloading activities on site would last for more than 5 minutes for each truck trip.

The closest loading dock on the northwest side of Building A would be located approximately 480 ft from the outdoor use area of the closest residence in Jurupa Valley to the closest proposed loading dock. The distance attenuation would provide a noise level reduction of 20 dBA, and the shielding provided by the existing 8 ft high masonry wall of an adjacent industrial use and the project's contiguous 7 ft high masonry wall (which would be located on the shared property line of the proposed project site and the adjacent existing residences, as shown in Figure 2) would provide a minimum 5 dBA noise level reduction. Based on the above, noise generated from truck loading/ unloading activities at the closest residence would be reduced to 60 dBA L_{max} or lower (85 dBA – 20 dBA – 5 dBA = 60 dBA), as shown in Table V. This noise level would not exceed the AMIC Specific Plan exterior daytime (7:00 a.m. to 10:00 p.m.) and nighttime (10:00 a.m. to 7:00 p.m.) 5-minute (L_8) noise standard of 65 and 60 dBA, respectively, for residential uses.

Table V: Summary of Truck Delivery and Truck Loading/ Unloading Activity Noise Levels

Land Use	Direction	Location	Distance from Loading Dock(s) (ft)	Reference Noise Level (dBA L_{max}) at 50 ft	Distance Attenuation (dBA)	Shielding (dBA)	Maximum Noise Level (dBA L_{max})
Residential	North	AMIC, Jurupa Valley	480	85	20	5	60
Residential	Northeast	AMIC, San Bernardino County	990, 1245	85	26, 28	5, 10	54, 47
Industrial	Southeast	AMIC, San Bernardino County	335	85	17	10	58

Source: Compiled by LSA Associates, Inc. (2020).
AMIC = Agua Mansa Industrial Corridor
dBA L_{eq} = average A-weighted hourly noise level
dBA L_{max} = maximum A-weighted instantaneous sound level
ft = foot/feet
L_{max} = maximum instantaneous noise level

The outdoor use area of the closest residence in San Bernardino County would be located to the northeast, approximately 990 ft from the closest proposed loading dock of Building A and 1,245 ft from the closest proposed loading dock of Building B. The distance attenuation would provide noise level reductions of 26 and 28 dBA, respectively, and the shielding provided by the structure of the project buildings would provide 5 and 10 dBA noise level reductions. Noise generated from truck loading/unloading activities at the closest residence would be reduced to 54 dBA L_{max} (85 dBA – 26 dBA – 5 dBA = 54 dBA) and 47 dBA L_{max} (85 dBA – 28 dBA – 10 dBA = 47 dBA), respectively. These noise levels would not exceed the AMIC Specific Plan exterior daytime and nighttime 5-minute (L_8) noise standard of 65 and 60 dBA, respectively, for residential uses. In addition, these noise levels would not exceed the County of San Bernardino's exterior daytime and nighttime 5-minute (L_8) noise standard of 75 and 65 dBA, respectively, for residential uses.

The closest industrial use to the proposed truck loading docks in San Bernardino County would be located approximately 335 ft from the closest proposed truck loading dock of Building B. The

distance attenuation would provide noise level reduction of 17 dBA and the shielding provided by the structure of the project building would provide a minimum noise reduction of 10 dBA. Noise generated from truck loading/unloading activities at the closest industrial use would be reduced to 58 dBA L_{max}. This noise level would not exceed the County of San Bernardino's exterior daytime and nighttime 5-minute noise standard of 80 dBA for industrial land uses. Therefore, long-term stationary source noise impacts from truck delivery and truck loading/unloading activities would not occur, and no mitigation measures would be required.

HVAC Noise

The proposed project would include rooftop HVAC equipment and would generate noise levels ranging from 75 to 82 dBA L_{eq} at 3 ft (Trane 2002). It is assumed that, as a worst-case scenario, HVAC equipment would operate 24 hours per day.

The outdoor use area of the closest residence in Jurupa Valley is located approximately 465 ft from the northwest corner of Building A, where an HVAC unit could potentially be located. The distance attenuation would provide a noise level reduction of 44 dBA, and the roofline and parapet would provide a 5 dBA noise level reduction. Based on the above discussion, HVAC noise at the closest residence would be reduced to 33 dBA L_{eq} (82 dBA – 44 dBA – 5 dBA = 33 dBA). This noise level would not exceed the AMIC Specific Plan exterior daytime (7:00 a.m. to 10:00 p.m.) and nighttime (10:00 p.m. to 7:00 a.m.) 30-minute (L_{50}) noise standard of 55 and 50 dBA, respectively, for residential uses.

The outdoor use area of the closest residence in San Bernardino County would be located to the northeast, approximately 910 ft from the closest edge of Building A, where an HVAC unit could potentially be located. The distance attenuation would provide a noise level reduction of 50 dBA, and the roofline and parapet would provide a 5 dBA noise level reduction. Based on the above, HVAC noise at the closest residence would be reduced to 27 dBA L_{eq} (82 dBA – 50 dBA – 5 dBA = 27 dBA) would not exceed the AMIC Specific Plan exterior daytime and nighttime 30-minute (L_{50}) noise standard of 55 and 50 dBA, respectively, for residential uses. In addition, this noise level would also not exceed the County of San Bernardino's exterior daytime and nighttime 30-minute (L_{50}) noise standard of 55 and 45 dBA, respectively, for residential land uses.

The closest industrial use in San Bernardino County would be located to the northeast, approximately 190 ft from the closest edge of Building B, where an HVAC unit could potentially be located. The distance attenuation would provide a noise level reduction of 36 dBA, and the roofline and parapet would provide a 5 dBA noise level reduction. The reduced noise level of 41 dBA L_{eq} (82 dBA – 36 dBA – 5 dBA = 41 dBA) would not exceed the County of San Bernardino's exterior daytime and nighttime 30-minute (L_{50}) noise standard of 70 dBA for industrial uses. Therefore, long-term stationary source noise impacts from HVAC noise would not occur, and no mitigation measures would be required.

Parking Lot Activities

The project would include parking lots. Noise generated from parking activities would include noise generated by vehicles traveling at slow speeds, engine start-up noise, vehicle idling, car door slams, car horns, car alarms, and tire squeals. Representative parking activities would generate

approximately 60 to 70 dBA L_{max} at 50 ft. Noise levels generated from parking activities are intermittent in nature. The outdoor use area of the closest residence in Jurupa Valley is approximately 720 ft from the proposed surface parking lot on the west side of Building B and approximately 740 ft from the proposed surface parking lot to the south and west of Building A. At a distance of 720 ft and 740 ft, noise would be attenuated by 23 dBA compared to the noise level measured at 50 ft from the source. The shielding provided by the existing 8 ft high masonry wall of an adjacent industrial use and the project's contiguous 7 ft high masonry wall (shown on Figure 2) would provide a minimum 5 dBA noise level reduction and the proposed project buildings would provide a further 5 dBA and 3 dBA noise level reduction from the activities at the Building B western parking lot and the Building A parking lot, respectively. Noise levels at the outdoor use area of the closest residence generated by parking lot activities would reach 39 dBA L_{max} (70 dBA – 23 dBA – 5 dBA – 3 dBA = 39 dBA) and 37 dBA L_{max} (70 dBA – 23 dBA – 5 dBA – 5 dBA = 37 dBA) from the Building A southwestern parking lot and the Building B western parking lot, respectively. Intermittent noise levels from parking activities would not exceed the AMIC Specific Plan exterior daytime (7:00 a.m. to 10:00 p.m.) and nighttime (10:00 a.m. to 7:00 p.m.) maximum anytime noise standard of 75 and 70 dBA L_{max}, respectively, for residential uses.

The outdoor use area of the closest residence in the County of San Bernardino would be 940 ft from the proposed surface parking on the west side of Building B, exposing the residence to exterior noise levels of 45 dBA L_{max} after a distance attenuation of 25 dBA and no shielding (70 dBA – 25 dBA = 45 dBA). The exterior noise level of 45 dBA L_{max} would not exceed the would not exceed the AMIC Specific Plan exterior daytime and nighttime maximum anytime noise standard of 75 dBA and 70 dBA L_{max}, respectively, for residential uses. In addition, this noise level would not exceed the County of San Bernardino's exterior daytime and nighttime maximum anytime noise standard of 75 and 65 dBA L_{max}, respectively, for residential uses.

The closest industrial uses in the County of San Bernardino would be 235 ft and 130 ft from the proposed surface parking on the east side of Building B. Industrial uses would be exposed to noise levels of 57 dBA L_{max} (70 dBA – 13 dBA = 57 dBA) and 62 dBA L_{max} (70 dBA – 8 dBA = 62 dBA) after distance attenuations of 13 and 8 dBA, respectively, which would not exceed the County of San Bernardino's exterior daytime and nighttime maximum anytime noise standard of 90 dBA L_{max} for industrial uses. Therefore, no off-site noise impacts would occur from on-site parking activities. No mitigation measures would be required.

Long-Term Ground-Borne Noise and Vibration from Vehicular Traffic

The proposed industrial buildings would not generate vibration. In addition, vibration levels generated from project-related traffic on the adjacent roadways (Agua Mansa Road and Hall Avenue) are unusual for on-road vehicles because the rubber tires and suspension systems of on-road vehicles provide vibration isolation. Vibration generated from project-related traffic on the adjacent roadways would be less than significant, and no mitigation measures are required.

MITIGATION MEASURES

Short-Term Construction Noise Impacts

The following mitigation measures are required:

- The project construction contractor shall limit construction activities between the hours of 7:00 a.m. and 6:00 p.m., Monday through Saturday. Construction is prohibited outside these hours or at any time on Sunday or a federal holiday.
- The project construction contractor shall limit high-noise-generating construction activities (e.g., grading, demolition, or pile driving) within 200 ft of residential uses from 9:00 a.m. to 3:00 p.m., Monday through Friday. High-noise-generating construction activities are prohibited outside these hours or at any time on Sunday or a federal holiday.
- The project construction contractor shall equip all construction equipment, fixed or mobile, with properly operating and maintained noise mufflers consistent with manufacturer's standards.
- The project construction contractor shall locate staging areas away from off-site sensitive uses during the later phases of project development.
- The project construction contractor shall place all stationary construction equipment so that the emitted noise is directed away from the sensitive receptors nearest the project site.
- Construction haul truck and materials delivery traffic shall avoid residential areas whenever feasible.
- The project construction contractor shall place a temporary construction barrier with a minimum height of 12 ft along the northern construction boundary such that the line-of-sight from ground-level construction equipment and sensitive receptors would be blocked. The temporary construction barrier may be a 0.5-inch thick plywood fence or another material that has a minimum Sound Transmission Class (STC) rating of 28.

Short-Term Construction Vibration Impacts

The following mitigation measure is required:

- The construction contractor shall limit the use of heavy equipment (e.g., large tracked bulldozers or loaded trucks) or use light construction equipment (e.g. small rubber tire bulldozers or pickup trucks) within 15 ft from the northern project construction boundary.

Long-Term Aircraft Noise Impacts

No mitigation measures are required.

Long-Term Traffic Noise Impacts

No mitigation measures are required.

Long-Term Stationary Noise Impacts

No mitigation measures are required.

Long-Term Vibration Impacts

No mitigation measures are required.

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APPENDIX A

FHWA HIGHWAY TRAFFIC NOISE MODEL PRINTOUTS

TABLE Existing Without Project-01
FHWA ROADWAY NOISE LEVEL ANALYSIS

RUN DATE: 03/11/2020
ROADWAY SEGMENT: Agua Mansa Road between Riverside Avenue and Hall Avenue
NOTES: Agua Mansa Industrial Project - Existing Without Project

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* * ASSUMPTIONS * *

AVERAGE DAILY TRAFFIC: 13448 SPEED (MPH): 45 GRADE: .5

TRAFFIC DISTRIBUTION PERCENTAGES

	DAY	EVENING	NIGHT
AUTOS	56.95	9.48	7.04
M-TRUCKS	6.47	0.37	0.79
H-TRUCKS	16.35	0.51	2.04

ACTIVE HALF-WIDTH (FT): 24 SITE CHARACTERISTICS: SOFT

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* * CALCULATED NOISE LEVELS * *

CNEL AT 50 FT FROM NEAR TRAVEL LANE CENTERLINE (dB) = 74.29

DISTANCE (FEET) FROM ROADWAY CENTERLINE TO CNEL

70 CNEL	65 CNEL	60 CNEL	55 CNEL
137.3	292.2	627.7	1351.3

TABLE Existing Without Project-02
FHWA ROADWAY NOISE LEVEL ANALYSIS

RUN DATE: 03/11/2020
ROADWAY SEGMENT: Agua Mansa Road between Hall Avenue and Brown Avenue
NOTES: Agua Mansa Industrial Project - Existing Without Project

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* * ASSUMPTIONS * *

AVERAGE DAILY TRAFFIC: 11948 SPEED (MPH): 45 GRADE: .5

TRAFFIC DISTRIBUTION PERCENTAGES

	DAY	EVENING	NIGHT
AUTOS	56.95	9.48	7.04
M-TRUCKS	6.47	0.37	0.79
H-TRUCKS	16.35	0.51	2.04

ACTIVE HALF-WIDTH (FT): 24 SITE CHARACTERISTICS: SOFT

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* * CALCULATED NOISE LEVELS * *

CNEL AT 50 FT FROM NEAR TRAVEL LANE CENTERLINE (dB) = 73.78

DISTANCE (FEET) FROM ROADWAY CENTERLINE TO CNEL

70 CNEL	65 CNEL	60 CNEL	55 CNEL
127.2	270.2	580.2	1248.9

TABLE Existing Without Project-03
FHWA ROADWAY NOISE LEVEL ANALYSIS

RUN DATE: 03/11/2020
ROADWAY SEGMENT: Agua Mansa Road between Brown Avenue and Wilson Street
NOTES: Agua Mansa Industrial Project - Existing Without Project

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* * ASSUMPTIONS * *

AVERAGE DAILY TRAFFIC: 10362 SPEED (MPH): 45 GRADE: .5

TRAFFIC DISTRIBUTION PERCENTAGES	DAY	EVENING	NIGHT
AUTOS	56.95	9.48	7.04
M-TRUCKS	6.47	0.37	0.79
H-TRUCKS	16.35	0.51	2.04

ACTIVE HALF-WIDTH (FT): 18 SITE CHARACTERISTICS: SOFT

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* * CALCULATED NOISE LEVELS * *

CNEL AT 50 FT FROM NEAR TRAVEL LANE CENTERLINE (dB) = 73.59

DISTANCE (FEET) FROM ROADWAY CENTERLINE TO CNEL	70 CNEL	65 CNEL	60 CNEL	55 CNEL
	115.1	245.6	527.8	1136.4

TABLE Existing Without Project-04
FHWA ROADWAY NOISE LEVEL ANALYSIS

RUN DATE: 03/11/2020
ROADWAY SEGMENT: Agua Mansa Road between Wilson Street and Market Street
NOTES: Agua Mansa Industrial Project - Existing Without Project

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* * ASSUMPTIONS * *

AVERAGE DAILY TRAFFIC: 12952 SPEED (MPH): 45 GRADE: .5

TRAFFIC DISTRIBUTION PERCENTAGES

	DAY	EVENING	NIGHT
AUTOS	56.95	9.48	7.04
M-TRUCKS	6.47	0.37	0.79
H-TRUCKS	16.35	0.51	2.04

ACTIVE HALF-WIDTH (FT): 18 SITE CHARACTERISTICS: SOFT

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* * CALCULATED NOISE LEVELS * *

CNEL AT 50 FT FROM NEAR TRAVEL LANE CENTERLINE (dB) = 74.56

DISTANCE (FEET) FROM ROADWAY CENTERLINE TO CNEL

70 CNEL	65 CNEL	60 CNEL	55 CNEL
133.1	284.7	612.4	1318.6

TABLE Existing Without Project-05
FHWA ROADWAY NOISE LEVEL ANALYSIS

RUN DATE: 03/11/2020
ROADWAY SEGMENT: Hall Avenue west of Project Driveway 1
NOTES: Agua Mansa Industrial Project - Existing Without Project

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* * ASSUMPTIONS * *

AVERAGE DAILY TRAFFIC: 1080 SPEED (MPH): 45 GRADE: .5

TRAFFIC DISTRIBUTION PERCENTAGES

	DAY	EVENING	NIGHT
AUTOS	75.24	12.52	9.31
M-TRUCKS	1.37	0.08	0.17
H-TRUCKS	1.14	0.04	0.14

ACTIVE HALF-WIDTH (FT): 12 SITE CHARACTERISTICS: SOFT

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* * CALCULATED NOISE LEVELS * *

CNEL AT 50 FT FROM NEAR TRAVEL LANE CENTERLINE (dB) = 57.14

DISTANCE (FEET) FROM ROADWAY CENTERLINE TO CNEL

70 CNEL	65 CNEL	60 CNEL	55 CNEL
0.0	0.0	0.0	85.3

TABLE Existing Without Project-06
FHWA ROADWAY NOISE LEVEL ANALYSIS

RUN DATE: 03/11/2020
ROADWAY SEGMENT: Hall Avenue between Project Driveway 1 and Project Driveway 2
NOTES: Agua Mansa Industrial Project - Existing Without Project

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* * ASSUMPTIONS * *

AVERAGE DAILY TRAFFIC: 1080 SPEED (MPH): 45 GRADE: .5

TRAFFIC DISTRIBUTION PERCENTAGES

	DAY	EVENING	NIGHT
AUTOS	75.24	12.52	9.31
M-TRUCKS	1.37	0.08	0.17
H-TRUCKS	1.14	0.04	0.14

ACTIVE HALF-WIDTH (FT): 18 SITE CHARACTERISTICS: SOFT

---

* * CALCULATED NOISE LEVELS * *

CNEL AT 50 FT FROM NEAR TRAVEL LANE CENTERLINE (dB) = 56.64

DISTANCE (FEET) FROM ROADWAY CENTERLINE TO CNEL

70 CNEL	65 CNEL	60 CNEL	55 CNEL
0.0	0.0	0.0	86.3

TABLE Existing Without Project-07
FHWA ROADWAY NOISE LEVEL ANALYSIS

RUN DATE: 03/11/2020
ROADWAY SEGMENT: Hall Avenue between Project Driveway 2 and Project Driveway 3/Brown Avenue
NOTES: Agua Mansa Industrial Project - Existing Without Project

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* * ASSUMPTIONS * *

AVERAGE DAILY TRAFFIC: 1080 SPEED (MPH): 45 GRADE: .5

TRAFFIC DISTRIBUTION PERCENTAGES

	DAY	EVENING	NIGHT
AUTOS	75.24	12.52	9.31
M-TRUCKS	1.37	0.08	0.17
H-TRUCKS	1.14	0.04	0.14

ACTIVE HALF-WIDTH (FT): 18 SITE CHARACTERISTICS: SOFT

---

* * CALCULATED NOISE LEVELS * *

CNEL AT 50 FT FROM NEAR TRAVEL LANE CENTERLINE (dB) = 56.64

DISTANCE (FEET) FROM ROADWAY CENTERLINE TO CNEL

70 CNEL	65 CNEL	60 CNEL	55 CNEL
0.0	0.0	0.0	86.3

TABLE Existing Without Project-08
FHWA ROADWAY NOISE LEVEL ANALYSIS

RUN DATE: 03/11/2020
ROADWAY SEGMENT: Hall Avenue between Project Driveway 3/Brown Avenue and Project Driveway 4
NOTES: Agua Mansa Industrial Project - Existing Without Project

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* * ASSUMPTIONS * *

AVERAGE DAILY TRAFFIC: 1090 SPEED (MPH): 45 GRADE: .5

TRAFFIC DISTRIBUTION PERCENTAGES

	DAY	EVENING	NIGHT
AUTOS	75.24	12.52	9.31
M-TRUCKS	1.37	0.08	0.17
H-TRUCKS	1.14	0.04	0.14

ACTIVE HALF-WIDTH (FT): 18 SITE CHARACTERISTICS: SOFT

---

* * CALCULATED NOISE LEVELS * *

CNEL AT 50 FT FROM NEAR TRAVEL LANE CENTERLINE (dB) = 56.68

DISTANCE (FEET) FROM ROADWAY CENTERLINE TO CNEL

70 CNEL	65 CNEL	60 CNEL	55 CNEL
0.0	0.0	0.0	86.8

TABLE Existing Without Project-09
FHWA ROADWAY NOISE LEVEL ANALYSIS

RUN DATE: 03/11/2020
ROADWAY SEGMENT: Hall Avenue between Project Driveway 4 and Agua Mansa Road
NOTES: Agua Mansa Industrial Project - Existing Without Project

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* * ASSUMPTIONS * *

AVERAGE DAILY TRAFFIC: 1100 SPEED (MPH): 45 GRADE: .5

	TRAFFIC DISTRIBUTION PERCENTAGES		
	DAY	EVENING	NIGHT
AUTOS	75.24	12.52	9.31
M-TRUCKS	1.37	0.08	0.17
H-TRUCKS	1.14	0.04	0.14

ACTIVE HALF-WIDTH (FT): 18 SITE CHARACTERISTICS: SOFT

---

* * CALCULATED NOISE LEVELS * *

CNEL AT 50 FT FROM NEAR TRAVEL LANE CENTERLINE (dB) = 56.72

DISTANCE (FEET) FROM ROADWAY CENTERLINE TO CNEL			
70 CNEL	65 CNEL	60 CNEL	55 CNEL
0.0	0.0	0.0	87.3

TABLE Existing With Project-01
FHWA ROADWAY NOISE LEVEL ANALYSIS

RUN DATE: 03/11/2020
ROADWAY SEGMENT: Agua Mansa Road between Riverside Avenue and Hall Avenue
NOTES: Agua Mansa Industrial Project - Existing With Project

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* * ASSUMPTIONS * *

AVERAGE DAILY TRAFFIC: 13636 SPEED (MPH): 45 GRADE: .5

TRAFFIC DISTRIBUTION PERCENTAGES

	DAY	EVENING	NIGHT
AUTOS	56.95	9.48	7.04
M-TRUCKS	6.47	0.37	0.79
H-TRUCKS	16.35	0.51	2.04

ACTIVE HALF-WIDTH (FT): 24 SITE CHARACTERISTICS: SOFT

---

* * CALCULATED NOISE LEVELS * *

CNEL AT 50 FT FROM NEAR TRAVEL LANE CENTERLINE (dB) = 74.35

DISTANCE (FEET) FROM ROADWAY CENTERLINE TO CNEL

70 CNEL	65 CNEL	60 CNEL	55 CNEL
138.5	294.9	633.6	1363.9

TABLE Existing With Project-02
FHWA ROADWAY NOISE LEVEL ANALYSIS

RUN DATE: 03/11/2020
ROADWAY SEGMENT: Agua Mansa Road between Hall Avenue and Brown Avenue
NOTES: Agua Mansa Industrial Project - Existing With Project

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* * ASSUMPTIONS * *

AVERAGE DAILY TRAFFIC: 12522 SPEED (MPH): 45 GRADE: .5

TRAFFIC DISTRIBUTION PERCENTAGES

	DAY	EVENING	NIGHT
AUTOS	56.95	9.48	7.04
M-TRUCKS	6.47	0.37	0.79
H-TRUCKS	16.35	0.51	2.04

ACTIVE HALF-WIDTH (FT): 24 SITE CHARACTERISTICS: SOFT

---

* * CALCULATED NOISE LEVELS * *

CNEL AT 50 FT FROM NEAR TRAVEL LANE CENTERLINE (dB) = 73.98

DISTANCE (FEET) FROM ROADWAY CENTERLINE TO CNEL

70 CNEL	65 CNEL	60 CNEL	55 CNEL
131.1	278.7	598.6	1288.6

TABLE Existing With Project-03
FHWA ROADWAY NOISE LEVEL ANALYSIS

RUN DATE: 03/11/2020
ROADWAY SEGMENT: Agua Mansa Road between Brown Avenue and Wilson Street
NOTES: Agua Mansa Industrial Project - Existing With Project

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* * ASSUMPTIONS * *

AVERAGE DAILY TRAFFIC: 11231 SPEED (MPH): 45 GRADE: .5

TRAFFIC DISTRIBUTION PERCENTAGES

	DAY	EVENING	NIGHT
AUTOS	56.95	9.48	7.04
M-TRUCKS	6.47	0.37	0.79
H-TRUCKS	16.35	0.51	2.04

ACTIVE HALF-WIDTH (FT): 18 SITE CHARACTERISTICS: SOFT

---

* * CALCULATED NOISE LEVELS * *

CNEL AT 50 FT FROM NEAR TRAVEL LANE CENTERLINE (dB) = 73.94

DISTANCE (FEET) FROM ROADWAY CENTERLINE TO CNEL

70 CNEL	65 CNEL	60 CNEL	55 CNEL
121.3	259.0	556.9	1199.1

TABLE Existing With Project-04
FHWA ROADWAY NOISE LEVEL ANALYSIS

RUN DATE: 03/11/2020
ROADWAY SEGMENT: Agua Mansa Road between Wilson Street and Market Street
NOTES: Agua Mansa Industrial Project - Existing With Project

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* * ASSUMPTIONS * *

AVERAGE DAILY TRAFFIC: 13821 SPEED (MPH): 45 GRADE: .5

TRAFFIC DISTRIBUTION PERCENTAGES			
	DAY	EVENING	NIGHT
AUTOS	56.95	9.48	7.04
M-TRUCKS	6.47	0.37	0.79
H-TRUCKS	16.35	0.51	2.04

ACTIVE HALF-WIDTH (FT): 18 SITE CHARACTERISTICS: SOFT

---

* * CALCULATED NOISE LEVELS * *

CNEL AT 50 FT FROM NEAR TRAVEL LANE CENTERLINE (dB) = 74.84

DISTANCE (FEET) FROM ROADWAY CENTERLINE TO CNEL			
70 CNEL	65 CNEL	60 CNEL	55 CNEL
138.9	297.3	639.4	1376.9

TABLE Existing With Project-05
FHWA ROADWAY NOISE LEVEL ANALYSIS

RUN DATE: 03/11/2020
ROADWAY SEGMENT: Hall Avenue west of Project Driveway 1
NOTES: Agua Mansa Industrial Project - Existing With Project

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* * ASSUMPTIONS * *

AVERAGE DAILY TRAFFIC: 1520 SPEED (MPH): 45 GRADE: .5

TRAFFIC DISTRIBUTION PERCENTAGES

	DAY	EVENING	NIGHT
AUTOS	75.24	12.52	9.31
M-TRUCKS	1.37	0.08	0.17
H-TRUCKS	1.14	0.04	0.14

ACTIVE HALF-WIDTH (FT): 12 SITE CHARACTERISTICS: SOFT

---

* * CALCULATED NOISE LEVELS * *

CNEL AT 50 FT FROM NEAR TRAVEL LANE CENTERLINE (dB) = 58.62

DISTANCE (FEET) FROM ROADWAY CENTERLINE TO CNEL

70 CNEL	65 CNEL	60 CNEL	55 CNEL
0.0	0.0	0.0	106.7

TABLE Existing With Project-06
FHWA ROADWAY NOISE LEVEL ANALYSIS

RUN DATE: 03/11/2020
ROADWAY SEGMENT: Hall Avenue between Project Driveway 1 and Project Driveway 2
NOTES: Agua Mansa Industrial Project - Existing With Project

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* * ASSUMPTIONS * *

AVERAGE DAILY TRAFFIC: 1810 SPEED (MPH): 45 GRADE: .5

TRAFFIC DISTRIBUTION PERCENTAGES

	DAY	EVENING	NIGHT
AUTOS	75.24	12.52	9.31
M-TRUCKS	1.37	0.08	0.17
H-TRUCKS	1.14	0.04	0.14

ACTIVE HALF-WIDTH (FT): 18 SITE CHARACTERISTICS: SOFT

---

* * CALCULATED NOISE LEVELS * *

CNEL AT 50 FT FROM NEAR TRAVEL LANE CENTERLINE (dB) = 58.89

DISTANCE (FEET) FROM ROADWAY CENTERLINE TO CNEL

70 CNEL	65 CNEL	60 CNEL	55 CNEL
0.0	0.0	58.1	120.4

TABLE Existing With Project-07
FHWA ROADWAY NOISE LEVEL ANALYSIS

RUN DATE: 03/11/2020
ROADWAY SEGMENT: Hall Avenue between Project Driveway 2 and Project Driveway 3/Brown Avenue
NOTES: Agua Mansa Industrial Project - Existing With Project

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* * ASSUMPTIONS * *

AVERAGE DAILY TRAFFIC: 2030 SPEED (MPH): 45 GRADE: .5

	TRAFFIC DISTRIBUTION PERCENTAGES		
	DAY	EVENING	NIGHT
AUTOS	75.24	12.52	9.31
M-TRUCKS	1.37	0.08	0.17
H-TRUCKS	1.14	0.04	0.14

ACTIVE HALF-WIDTH (FT): 18 SITE CHARACTERISTICS: SOFT

---

* * CALCULATED NOISE LEVELS * *

CNEL AT 50 FT FROM NEAR TRAVEL LANE CENTERLINE (dB) = 59.38

DISTANCE (FEET) FROM ROADWAY CENTERLINE TO CNEL			
70 CNEL	65 CNEL	60 CNEL	55 CNEL
0.0	0.0	62.3	129.7

TABLE Existing With Project-08
FHWA ROADWAY NOISE LEVEL ANALYSIS

RUN DATE: 03/11/2020
ROADWAY SEGMENT: Hall Avenue between Project Driveway 3/Brown Avenue and Project Driveway 4
NOTES: Agua Mansa Industrial Project - Existing With Project

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* * ASSUMPTIONS * *

AVERAGE DAILY TRAFFIC: 2240 SPEED (MPH): 45 GRADE: .5

TRAFFIC DISTRIBUTION PERCENTAGES

	DAY	EVENING	NIGHT
AUTOS	75.24	12.52	9.31
M-TRUCKS	1.37	0.08	0.17
H-TRUCKS	1.14	0.04	0.14

ACTIVE HALF-WIDTH (FT): 18 SITE CHARACTERISTICS: SOFT

---

* * CALCULATED NOISE LEVELS * *

CNEL AT 50 FT FROM NEAR TRAVEL LANE CENTERLINE (dB) = 59.81

DISTANCE (FEET) FROM ROADWAY CENTERLINE TO CNEL

70 CNEL	65 CNEL	60 CNEL	55 CNEL
0.0	0.0	66.2	138.4

TABLE Existing With Project-09
FHWA ROADWAY NOISE LEVEL ANALYSIS

RUN DATE: 03/11/2020
ROADWAY SEGMENT: Hall Avenue between Project Driveway 4 and Agua Mansa Road
NOTES: Agua Mansa Industrial Project - Existing With Project

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* * ASSUMPTIONS * *

AVERAGE DAILY TRAFFIC: 2370 SPEED (MPH): 45 GRADE: .5

TRAFFIC DISTRIBUTION PERCENTAGES

	DAY	EVENING	NIGHT
AUTOS	75.24	12.52	9.31
M-TRUCKS	1.37	0.08	0.17
H-TRUCKS	1.14	0.04	0.14

ACTIVE HALF-WIDTH (FT): 18 SITE CHARACTERISTICS: SOFT

---

* * CALCULATED NOISE LEVELS * *

CNEL AT 50 FT FROM NEAR TRAVEL LANE CENTERLINE (dB) = 60.06

DISTANCE (FEET) FROM ROADWAY CENTERLINE TO CNEL

70 CNEL	65 CNEL	60 CNEL	55 CNEL
0.0	0.0	68.5	143.6

TABLE Opening Year Without Project-01
FHWA ROADWAY NOISE LEVEL ANALYSIS

RUN DATE: 03/11/2020
ROADWAY SEGMENT: Agua Mansa Road between Riverside Avenue and Hall Avenue
NOTES: Agua Mansa Industrial Project - Opening Year Without Project

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* * ASSUMPTIONS * *

AVERAGE DAILY TRAFFIC: 14524 SPEED (MPH): 45 GRADE: .5

TRAFFIC DISTRIBUTION PERCENTAGES

	DAY	EVENING	NIGHT
AUTOS	56.95	9.48	7.04
M-TRUCKS	6.47	0.37	0.79
H-TRUCKS	16.35	0.51	2.04

ACTIVE HALF-WIDTH (FT): 24 SITE CHARACTERISTICS: SOFT

---

* * CALCULATED NOISE LEVELS * *

CNEL AT 50 FT FROM NEAR TRAVEL LANE CENTERLINE (dB) = 74.62

DISTANCE (FEET) FROM ROADWAY CENTERLINE TO CNEL

70 CNEL	65 CNEL	60 CNEL	55 CNEL
144.3	307.5	660.7	1422.5

TABLE Opening Year Without Project-02
FHWA ROADWAY NOISE LEVEL ANALYSIS

RUN DATE: 03/11/2020
ROADWAY SEGMENT: Agua Mansa Road between Hall Avenue and Brown Avenue
NOTES: Agua Mansa Industrial Project - Opening Year Without Project

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* * ASSUMPTIONS * *

AVERAGE DAILY TRAFFIC: 12904 SPEED (MPH): 45 GRADE: .5

TRAFFIC DISTRIBUTION PERCENTAGES

	DAY	EVENING	NIGHT
AUTOS	56.95	9.48	7.04
M-TRUCKS	6.47	0.37	0.79
H-TRUCKS	16.35	0.51	2.04

ACTIVE HALF-WIDTH (FT): 24 SITE CHARACTERISTICS: SOFT

---

* * CALCULATED NOISE LEVELS * *

CNEL AT 50 FT FROM NEAR TRAVEL LANE CENTERLINE (dB) = 74.11

DISTANCE (FEET) FROM ROADWAY CENTERLINE TO CNEL

70 CNEL	65 CNEL	60 CNEL	55 CNEL
133.7	284.3	610.7	1314.7

TABLE Opening Year Without Project-03
FHWA ROADWAY NOISE LEVEL ANALYSIS

RUN DATE: 03/11/2020
ROADWAY SEGMENT: Agua Mansa Road between Brown Avenue and Wilson Street
NOTES: Agua Mansa Industrial Project - Opening Year Without Project

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* * ASSUMPTIONS * *

AVERAGE DAILY TRAFFIC: 11191 SPEED (MPH): 45 GRADE: .5

TRAFFIC DISTRIBUTION PERCENTAGES

	DAY	EVENING	NIGHT
AUTOS	56.95	9.48	7.04
M-TRUCKS	6.47	0.37	0.79
H-TRUCKS	16.35	0.51	2.04

ACTIVE HALF-WIDTH (FT): 18 SITE CHARACTERISTICS: SOFT

---

* * CALCULATED NOISE LEVELS * *

CNEL AT 50 FT FROM NEAR TRAVEL LANE CENTERLINE (dB) = 73.92

DISTANCE (FEET) FROM ROADWAY CENTERLINE TO CNEL

70 CNEL	65 CNEL	60 CNEL	55 CNEL
121.0	258.4	555.6	1196.2

TABLE Opening Year Without Project-04
FHWA ROADWAY NOISE LEVEL ANALYSIS

RUN DATE: 03/11/2020
ROADWAY SEGMENT: Agua Mansa Road between Wilson Street and Market Street
NOTES: Agua Mansa Industrial Project - Opening Year Without Project

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* * ASSUMPTIONS * *

AVERAGE DAILY TRAFFIC: 13988 SPEED (MPH): 45 GRADE: .5

TRAFFIC DISTRIBUTION PERCENTAGES

	DAY	EVENING	NIGHT
AUTOS	56.95	9.48	7.04
M-TRUCKS	6.47	0.37	0.79
H-TRUCKS	16.35	0.51	2.04

ACTIVE HALF-WIDTH (FT): 18 SITE CHARACTERISTICS: SOFT

---

* * CALCULATED NOISE LEVELS * *

CNEL AT 50 FT FROM NEAR TRAVEL LANE CENTERLINE (dB) = 74.89

DISTANCE (FEET) FROM ROADWAY CENTERLINE TO CNEL

70 CNEL	65 CNEL	60 CNEL	55 CNEL
140.0	299.7	644.6	1388.0

TABLE Opening Year Without Project-05
FHWA ROADWAY NOISE LEVEL ANALYSIS

RUN DATE: 03/11/2020
ROADWAY SEGMENT: Hall Avenue west of Project Driveway 1
NOTES: Agua Mansa Industrial Project - Opening Year Without Project

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* * ASSUMPTIONS * *

AVERAGE DAILY TRAFFIC: 1170 SPEED (MPH): 45 GRADE: .5

TRAFFIC DISTRIBUTION PERCENTAGES

	DAY	EVENING	NIGHT
AUTOS	75.24	12.52	9.31
M-TRUCKS	1.37	0.08	0.17
H-TRUCKS	1.14	0.04	0.14

ACTIVE HALF-WIDTH (FT): 12 SITE CHARACTERISTICS: SOFT

---

* * CALCULATED NOISE LEVELS * *

CNEL AT 50 FT FROM NEAR TRAVEL LANE CENTERLINE (dB) = 57.48

DISTANCE (FEET) FROM ROADWAY CENTERLINE TO CNEL

70 CNEL	65 CNEL	60 CNEL	55 CNEL
0.0	0.0	0.0	89.9

TABLE Opening Year Without Project-06
FHWA ROADWAY NOISE LEVEL ANALYSIS

RUN DATE: 03/11/2020
ROADWAY SEGMENT: Hall Avenue between Project Driveway 1 and Project Driveway 2
NOTES: Agua Mansa Industrial Project - Opening Year Without Project

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* * ASSUMPTIONS * *

AVERAGE DAILY TRAFFIC: 1170 SPEED (MPH): 45 GRADE: .5

TRAFFIC DISTRIBUTION PERCENTAGES

	DAY	EVENING	NIGHT
AUTOS	75.24	12.52	9.31
M-TRUCKS	1.37	0.08	0.17
H-TRUCKS	1.14	0.04	0.14

ACTIVE HALF-WIDTH (FT): 18 SITE CHARACTERISTICS: SOFT

---

* * CALCULATED NOISE LEVELS * *

CNEL AT 50 FT FROM NEAR TRAVEL LANE CENTERLINE (dB) = 56.99

DISTANCE (FEET) FROM ROADWAY CENTERLINE TO CNEL

70 CNEL	65 CNEL	60 CNEL	55 CNEL
0.0	0.0	0.0	90.8

TABLE Opening Year Without Project-07
FHWA ROADWAY NOISE LEVEL ANALYSIS

RUN DATE: 03/11/2020
ROADWAY SEGMENT: Hall Avenue between Project Driveway 2 and Project Driveway 3/Brown Avenue
NOTES: Agua Mansa Industrial Project - Opening Year Without Project

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* * ASSUMPTIONS * *

AVERAGE DAILY TRAFFIC: 1165 SPEED (MPH): 45 GRADE: .5

TRAFFIC DISTRIBUTION PERCENTAGES

	DAY	EVENING	NIGHT
AUTOS	75.24	12.52	9.31
M-TRUCKS	1.37	0.08	0.17
H-TRUCKS	1.14	0.04	0.14

ACTIVE HALF-WIDTH (FT): 18 SITE CHARACTERISTICS: SOFT

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* * CALCULATED NOISE LEVELS * *

CNEL AT 50 FT FROM NEAR TRAVEL LANE CENTERLINE (dB) = 56.97

DISTANCE (FEET) FROM ROADWAY CENTERLINE TO CNEL

70 CNEL	65 CNEL	60 CNEL	55 CNEL
0.0	0.0	0.0	90.5

TABLE Opening Year Without Project-08
FHWA ROADWAY NOISE LEVEL ANALYSIS

RUN DATE: 03/11/2020
ROADWAY SEGMENT: Hall Avenue between Project Driveway 3/Brown Avenue and Project Driveway 4
NOTES: Agua Mansa Industrial Project - Opening Year Without Project

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* * ASSUMPTIONS * *

AVERAGE DAILY TRAFFIC: 1175 SPEED (MPH): 45 GRADE: .5

TRAFFIC DISTRIBUTION PERCENTAGES

	DAY	EVENING	NIGHT
AUTOS	75.24	12.52	9.31
M-TRUCKS	1.37	0.08	0.17
H-TRUCKS	1.14	0.04	0.14

ACTIVE HALF-WIDTH (FT): 18 SITE CHARACTERISTICS: SOFT

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* * CALCULATED NOISE LEVELS * *

CNEL AT 50 FT FROM NEAR TRAVEL LANE CENTERLINE (dB) = 57.01

DISTANCE (FEET) FROM ROADWAY CENTERLINE TO CNEL

70 CNEL	65 CNEL	60 CNEL	55 CNEL
0.0	0.0	0.0	91.0

TABLE Opening Year Without Project-09
FHWA ROADWAY NOISE LEVEL ANALYSIS

RUN DATE: 03/11/2020
ROADWAY SEGMENT: Hall Avenue between Project Driveway 4 and Agua Mansa Road
NOTES: Agua Mansa Industrial Project - Opening Year Without Project

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* * ASSUMPTIONS * *

AVERAGE DAILY TRAFFIC: 1190 SPEED (MPH): 45 GRADE: .5

TRAFFIC DISTRIBUTION PERCENTAGES		
DAY	EVENING	NIGHT
AUTOS		
75.24	12.52	9.31
M-TRUCKS		
1.37	0.08	0.17
H-TRUCKS		
1.14	0.04	0.14

ACTIVE HALF-WIDTH (FT): 18 SITE CHARACTERISTICS: SOFT

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* * CALCULATED NOISE LEVELS * *

CNEL AT 50 FT FROM NEAR TRAVEL LANE CENTERLINE (dB) = 57.06

DISTANCE (FEET) FROM ROADWAY CENTERLINE TO CNEL			
70 CNEL	65 CNEL	60 CNEL	55 CNEL
0.0	0.0	0.0	91.8

TABLE Opening Year With Project-01
FHWA ROADWAY NOISE LEVEL ANALYSIS

RUN DATE: 03/11/2020
ROADWAY SEGMENT: Agua Mansa Road between Riverside Avenue and Hall Avenue
NOTES: Agua Mansa Industrial Project - Opening Year With Project

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* * ASSUMPTIONS * *

AVERAGE DAILY TRAFFIC: 14712 SPEED (MPH): 45 GRADE: .5

TRAFFIC DISTRIBUTION PERCENTAGES

	DAY	EVENING	NIGHT
AUTOS	56.95	9.48	7.04
M-TRUCKS	6.47	0.37	0.79
H-TRUCKS	16.35	0.51	2.04

ACTIVE HALF-WIDTH (FT): 24 SITE CHARACTERISTICS: SOFT

---

* * CALCULATED NOISE LEVELS * *

CNEL AT 50 FT FROM NEAR TRAVEL LANE CENTERLINE (dB) = 74.68

DISTANCE (FEET) FROM ROADWAY CENTERLINE TO CNEL

70 CNEL	65 CNEL	60 CNEL	55 CNEL
145.5	310.1	666.4	1434.7

TABLE Opening Year With Project-02
FHWA ROADWAY NOISE LEVEL ANALYSIS

RUN DATE: 03/11/2020
ROADWAY SEGMENT: Agua Mansa Road between Hall Avenue and Brown Avenue
NOTES: Agua Mansa Industrial Project - Opening Year With Project

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* * ASSUMPTIONS * *

AVERAGE DAILY TRAFFIC: 13478 SPEED (MPH): 45 GRADE: .5

TRAFFIC DISTRIBUTION PERCENTAGES

	DAY	EVENING	NIGHT
AUTOS	56.95	9.48	7.04
M-TRUCKS	6.47	0.37	0.79
H-TRUCKS	16.35	0.51	2.04

ACTIVE HALF-WIDTH (FT): 24 SITE CHARACTERISTICS: SOFT

---

* * CALCULATED NOISE LEVELS * *

CNEL AT 50 FT FROM NEAR TRAVEL LANE CENTERLINE (dB) = 74.30

DISTANCE (FEET) FROM ROADWAY CENTERLINE TO CNEL

70 CNEL	65 CNEL	60 CNEL	55 CNEL
137.5	292.6	628.7	1353.4

TABLE Opening Year With Project-03
FHWA ROADWAY NOISE LEVEL ANALYSIS

RUN DATE: 03/11/2020
ROADWAY SEGMENT: Agua Mansa Road between Brown Avenue and Wilson Street
NOTES: Agua Mansa Industrial Project - Opening Year With Project

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* * ASSUMPTIONS * *

AVERAGE DAILY TRAFFIC: 12060 SPEED (MPH): 45 GRADE: .5

TRAFFIC DISTRIBUTION PERCENTAGES

	DAY	EVENING	NIGHT
AUTOS	56.95	9.48	7.04
M-TRUCKS	6.47	0.37	0.79
H-TRUCKS	16.35	0.51	2.04

ACTIVE HALF-WIDTH (FT): 18 SITE CHARACTERISTICS: SOFT

---

* * CALCULATED NOISE LEVELS * *

CNEL AT 50 FT FROM NEAR TRAVEL LANE CENTERLINE (dB) = 74.25

DISTANCE (FEET) FROM ROADWAY CENTERLINE TO CNEL

70 CNEL	65 CNEL	60 CNEL	55 CNEL
127.1	271.6	583.9	1257.3

TABLE Opening Year With Project-04
FHWA ROADWAY NOISE LEVEL ANALYSIS

RUN DATE: 03/11/2020
ROADWAY SEGMENT: Agua Mansa Road between Wilson Street and Market Street
NOTES: Agua Mansa Industrial Project - Opening Year With Project

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* * ASSUMPTIONS * *

AVERAGE DAILY TRAFFIC: 14857 SPEED (MPH): 45 GRADE: .5

TRAFFIC DISTRIBUTION PERCENTAGES

	DAY	EVENING	NIGHT
AUTOS	56.95	9.48	7.04
M-TRUCKS	6.47	0.37	0.79
H-TRUCKS	16.35	0.51	2.04

ACTIVE HALF-WIDTH (FT): 18 SITE CHARACTERISTICS: SOFT

---

* * CALCULATED NOISE LEVELS * *

CNEL AT 50 FT FROM NEAR TRAVEL LANE CENTERLINE (dB) = 75.15

DISTANCE (FEET) FROM ROADWAY CENTERLINE TO CNEL

70 CNEL	65 CNEL	60 CNEL	55 CNEL
145.7	311.9	671.0	1444.9

TABLE Opening Year With Project-05
FHWA ROADWAY NOISE LEVEL ANALYSIS

RUN DATE: 03/11/2020
ROADWAY SEGMENT: Hall Avenue west of Project Driveway 1
NOTES: Agua Mansa Industrial Project - Opening Year With Project

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* * ASSUMPTIONS * *

AVERAGE DAILY TRAFFIC: 1610 SPEED (MPH): 45 GRADE: .5

TRAFFIC DISTRIBUTION PERCENTAGES

	DAY	EVENING	NIGHT
AUTOS	75.24	12.52	9.31
M-TRUCKS	1.37	0.08	0.17
H-TRUCKS	1.14	0.04	0.14

ACTIVE HALF-WIDTH (FT): 12 SITE CHARACTERISTICS: SOFT

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* * CALCULATED NOISE LEVELS * *

CNEL AT 50 FT FROM NEAR TRAVEL LANE CENTERLINE (dB) = 58.87

DISTANCE (FEET) FROM ROADWAY CENTERLINE TO CNEL

70 CNEL	65 CNEL	60 CNEL	55 CNEL
0.0	0.0	52.5	110.8

TABLE Opening Year With Project-06
FHWA ROADWAY NOISE LEVEL ANALYSIS

RUN DATE: 03/11/2020
ROADWAY SEGMENT: Hall Avenue between Project Driveway 1 and Project Driveway 2
NOTES: Agua Mansa Industrial Project - Opening Year With Project

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* * ASSUMPTIONS * *

AVERAGE DAILY TRAFFIC: 1900 SPEED (MPH): 45 GRADE: .5

TRAFFIC DISTRIBUTION PERCENTAGES

	DAY	EVENING	NIGHT
AUTOS	75.24	12.52	9.31
M-TRUCKS	1.37	0.08	0.17
H-TRUCKS	1.14	0.04	0.14

ACTIVE HALF-WIDTH (FT): 18 SITE CHARACTERISTICS: SOFT

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* * CALCULATED NOISE LEVELS * *

CNEL AT 50 FT FROM NEAR TRAVEL LANE CENTERLINE (dB) = 59.10

DISTANCE (FEET) FROM ROADWAY CENTERLINE TO CNEL

70 CNEL	65 CNEL	60 CNEL	55 CNEL
0.0	0.0	59.8	124.2

TABLE Opening Year With Project-07
FHWA ROADWAY NOISE LEVEL ANALYSIS

RUN DATE: 03/11/2020
ROADWAY SEGMENT: Hall Avenue between Project Driveway 2 and Project Driveway 3/Brown Avenue
NOTES: Agua Mansa Industrial Project - Opening Year With Project

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* * ASSUMPTIONS * *

AVERAGE DAILY TRAFFIC: 2115 SPEED (MPH): 45 GRADE: .5

TRAFFIC DISTRIBUTION PERCENTAGES

	DAY	EVENING	NIGHT
AUTOS	75.24	12.52	9.31
M-TRUCKS	1.37	0.08	0.17
H-TRUCKS	1.14	0.04	0.14

ACTIVE HALF-WIDTH (FT): 18 SITE CHARACTERISTICS: SOFT

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* * CALCULATED NOISE LEVELS * *

CNEL AT 50 FT FROM NEAR TRAVEL LANE CENTERLINE (dB) = 59.56

DISTANCE (FEET) FROM ROADWAY CENTERLINE TO CNEL

70 CNEL	65 CNEL	60 CNEL	55 CNEL
0.0	0.0	63.9	133.3

TABLE Opening Year With Project-08
FHWA ROADWAY NOISE LEVEL ANALYSIS

RUN DATE: 03/11/2020
ROADWAY SEGMENT: Hall Avenue between Project Driveway 3/Brown Avenue and Project Driveway 4
NOTES: Agua Mansa Industrial Project - Opening Year With Project

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* * ASSUMPTIONS * *

AVERAGE DAILY TRAFFIC: 2325 SPEED (MPH): 45 GRADE: .5

TRAFFIC DISTRIBUTION PERCENTAGES

	DAY	EVENING	NIGHT
AUTOS	75.24	12.52	9.31
M-TRUCKS	1.37	0.08	0.17
H-TRUCKS	1.14	0.04	0.14

ACTIVE HALF-WIDTH (FT): 18 SITE CHARACTERISTICS: SOFT

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* * CALCULATED NOISE LEVELS * *

CNEL AT 50 FT FROM NEAR TRAVEL LANE CENTERLINE (dB) = 59.97

DISTANCE (FEET) FROM ROADWAY CENTERLINE TO CNEL

70 CNEL	65 CNEL	60 CNEL	55 CNEL
0.0	0.0	67.7	141.8

TABLE Opening Year With Project-09
FHWA ROADWAY NOISE LEVEL ANALYSIS

RUN DATE: 03/11/2020
ROADWAY SEGMENT: Hall Avenue between Project Driveway 4 and Agua Mansa Road
NOTES: Agua Mansa Industrial Project - Opening Year With Project

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* * ASSUMPTIONS * *

AVERAGE DAILY TRAFFIC: 2460 SPEED (MPH): 45 GRADE: .5

TRAFFIC DISTRIBUTION PERCENTAGES

	DAY	EVENING	NIGHT
AUTOS	75.24	12.52	9.31
M-TRUCKS	1.37	0.08	0.17
H-TRUCKS	1.14	0.04	0.14

ACTIVE HALF-WIDTH (FT): 18 SITE CHARACTERISTICS: SOFT

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* * CALCULATED NOISE LEVELS * *

CNEL AT 50 FT FROM NEAR TRAVEL LANE CENTERLINE (dB) = 60.22

DISTANCE (FEET) FROM ROADWAY CENTERLINE TO CNEL

70 CNEL	65 CNEL	60 CNEL	55 CNEL
0.0	0.0	70.1	147.1

TABLE Cumulative Opening Year Without Project-01

FHWA ROADWAY NOISE LEVEL ANALYSIS

RUN DATE: 03/11/2020
ROADWAY SEGMENT: Agua Mansa Road between Riverside Avenue and Hall Avenue
NOTES: Agua Mansa Industrial Project - Cumulative Opening Year Without Project

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* * ASSUMPTIONS * *

AVERAGE DAILY TRAFFIC: 19350 SPEED (MPH): 45 GRADE: .5

TRAFFIC DISTRIBUTION PERCENTAGES			
	DAY	EVENING	NIGHT
AUTOS	56.95	9.48	7.04
M-TRUCKS	6.47	0.37	0.79
H-TRUCKS	16.35	0.51	2.04

ACTIVE HALF-WIDTH (FT): 24 SITE CHARACTERISTICS: SOFT

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* * CALCULATED NOISE LEVELS * *

CNEL AT 50 FT FROM NEAR TRAVEL LANE CENTERLINE (dB) = 75.87

DISTANCE (FEET) FROM ROADWAY CENTERLINE TO CNEL			
70 CNEL	65 CNEL	60 CNEL	55 CNEL
174.0	371.9	799.8	1722.2

TABLE Cumulative Opening Year Without Project-02

FHWA ROADWAY NOISE LEVEL ANALYSIS

RUN DATE: 03/11/2020
ROADWAY SEGMENT: Agua Mansa Road between Hall Avenue and Brown Avenue
NOTES: Agua Mansa Industrial Project - Cumulative Opening Year Without Project

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* * ASSUMPTIONS * *

AVERAGE DAILY TRAFFIC: 17154 SPEED (MPH): 45 GRADE: .5

TRAFFIC DISTRIBUTION PERCENTAGES

	DAY	EVENING	NIGHT
AUTOS	56.95	9.48	7.04
M-TRUCKS	6.47	0.37	0.79
H-TRUCKS	16.35	0.51	2.04

ACTIVE HALF-WIDTH (FT): 24 SITE CHARACTERISTICS: SOFT

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* * CALCULATED NOISE LEVELS * *

CNEL AT 50 FT FROM NEAR TRAVEL LANE CENTERLINE (dB) = 75.35

DISTANCE (FEET) FROM ROADWAY CENTERLINE TO CNEL

70 CNEL	65 CNEL	60 CNEL	55 CNEL
160.8	343.4	738.2	1589.3

TABLE Cumulative Opening Year Without Project-03

FHWA ROADWAY NOISE LEVEL ANALYSIS

RUN DATE: 03/11/2020
ROADWAY SEGMENT: Agua Mansa Road between Brown Avenue and Wilson Street
NOTES: Agua Mansa Industrial Project - Cumulative Opening Year Without Project

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* * ASSUMPTIONS * *

AVERAGE DAILY TRAFFIC: 16101 SPEED (MPH): 45 GRADE: .5

TRAFFIC DISTRIBUTION PERCENTAGES

	DAY	EVENING	NIGHT
AUTOS	56.95	9.48	7.04
M-TRUCKS	6.47	0.37	0.79
H-TRUCKS	16.35	0.51	2.04

ACTIVE HALF-WIDTH (FT): 18 SITE CHARACTERISTICS: SOFT

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* * CALCULATED NOISE LEVELS * *

CNEL AT 50 FT FROM NEAR TRAVEL LANE CENTERLINE (dB) = 75.50

DISTANCE (FEET) FROM ROADWAY CENTERLINE TO CNEL

70 CNEL	65 CNEL	60 CNEL	55 CNEL
153.6	329.0	707.9	1524.4

TABLE Cumulative Opening Year Without Project-04

FHWA ROADWAY NOISE LEVEL ANALYSIS

RUN DATE: 03/11/2020
ROADWAY SEGMENT: Agua Mansa Road between Wilson Street and Market Street
NOTES: Agua Mansa Industrial Project - Cumulative Opening Year Without Project

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* * ASSUMPTIONS * *

AVERAGE DAILY TRAFFIC: 19104 SPEED (MPH): 45 GRADE: .5

TRAFFIC DISTRIBUTION PERCENTAGES

	DAY	EVENING	NIGHT
AUTOS	56.95	9.48	7.04
M-TRUCKS	6.47	0.37	0.79
H-TRUCKS	16.35	0.51	2.04

ACTIVE HALF-WIDTH (FT): 18 SITE CHARACTERISTICS: SOFT

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* * CALCULATED NOISE LEVELS * *

CNEL AT 50 FT FROM NEAR TRAVEL LANE CENTERLINE (dB) = 76.24

DISTANCE (FEET) FROM ROADWAY CENTERLINE TO CNEL

70 CNEL	65 CNEL	60 CNEL	55 CNEL
171.9	368.7	793.3	1708.5

TABLE Cumulative Opening Year Without Project-05

FHWA ROADWAY NOISE LEVEL ANALYSIS

RUN DATE: 03/11/2020
ROADWAY SEGMENT: Hall Avenue west of Project Driveway 1
NOTES: Agua Mansa Industrial Project - Cumulative Opening Year Without Project

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* * ASSUMPTIONS * *

AVERAGE DAILY TRAFFIC: 2620 SPEED (MPH): 45 GRADE: .5

TRAFFIC DISTRIBUTION PERCENTAGES			
	DAY	EVENING	NIGHT
AUTOS	75.24	12.52	9.31
M-TRUCKS	1.37	0.08	0.17
H-TRUCKS	1.14	0.04	0.14

ACTIVE HALF-WIDTH (FT): 12 SITE CHARACTERISTICS: SOFT

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* * CALCULATED NOISE LEVELS * *

CNEL AT 50 FT FROM NEAR TRAVEL LANE CENTERLINE (dB) = 60.99

DISTANCE (FEET) FROM ROADWAY CENTERLINE TO CNEL			
70 CNEL	65 CNEL	60 CNEL	55 CNEL
0.0	0.0	71.8	152.9

TABLE Cumulative Opening Year Without Project-06

FHWA ROADWAY NOISE LEVEL ANALYSIS

RUN DATE: 03/11/2020
ROADWAY SEGMENT: Hall Avenue between Project Driveway 1 and Project Driveway 2
NOTES: Agua Mansa Industrial Project - Cumulative Opening Year Without Project

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* * ASSUMPTIONS * *

AVERAGE DAILY TRAFFIC: 2620 SPEED (MPH): 45 GRADE: .5

TRAFFIC DISTRIBUTION PERCENTAGES

	DAY	EVENING	NIGHT
AUTOS	75.24	12.52	9.31
M-TRUCKS	1.37	0.08	0.17
H-TRUCKS	1.14	0.04	0.14

ACTIVE HALF-WIDTH (FT): 18 SITE CHARACTERISTICS: SOFT

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* * CALCULATED NOISE LEVELS * *

CNEL AT 50 FT FROM NEAR TRAVEL LANE CENTERLINE (dB) = 60.49

DISTANCE (FEET) FROM ROADWAY CENTERLINE TO CNEL

70 CNEL	65 CNEL	60 CNEL	55 CNEL
0.0	0.0	73.0	153.4

TABLE Cumulative Opening Year Without Project-07

FHWA ROADWAY NOISE LEVEL ANALYSIS

RUN DATE: 03/11/2020
ROADWAY SEGMENT: Hall Avenue between Project Driveway 2 and Project Driveway 3/Brown Avenue
NOTES: Agua Mansa Industrial Project - Cumulative Opening Year Without Project

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* * ASSUMPTIONS * *

AVERAGE DAILY TRAFFIC: 2615 SPEED (MPH): 45 GRADE: .5

TRAFFIC DISTRIBUTION PERCENTAGES

	DAY	EVENING	NIGHT
AUTOS	75.24	12.52	9.31
M-TRUCKS	1.37	0.08	0.17
H-TRUCKS	1.14	0.04	0.14

ACTIVE HALF-WIDTH (FT): 18 SITE CHARACTERISTICS: SOFT

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* * CALCULATED NOISE LEVELS * *

CNEL AT 50 FT FROM NEAR TRAVEL LANE CENTERLINE (dB) = 60.48

DISTANCE (FEET) FROM ROADWAY CENTERLINE TO CNEL

70 CNEL	65 CNEL	60 CNEL	55 CNEL
0.0	0.0	72.9	153.2

TABLE Cumulative Opening Year Without Project-08

FHWA ROADWAY NOISE LEVEL ANALYSIS

RUN DATE: 03/11/2020
ROADWAY SEGMENT: Hall Avenue between Project Driveway 3/Brown Avenue and Project Driveway 4
NOTES: Agua Mansa Industrial Project - Cumulative Opening Year Without Project

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* * ASSUMPTIONS * *

AVERAGE DAILY TRAFFIC: 2575 SPEED (MPH): 45 GRADE: .5

TRAFFIC DISTRIBUTION PERCENTAGES

	DAY	EVENING	NIGHT
AUTOS	75.24	12.52	9.31
M-TRUCKS	1.37	0.08	0.17
H-TRUCKS	1.14	0.04	0.14

ACTIVE HALF-WIDTH (FT): 18 SITE CHARACTERISTICS: SOFT

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* * CALCULATED NOISE LEVELS * *

CNEL AT 50 FT FROM NEAR TRAVEL LANE CENTERLINE (dB) = 60.42

DISTANCE (FEET) FROM ROADWAY CENTERLINE TO CNEL

70 CNEL	65 CNEL	60 CNEL	55 CNEL
0.0	0.0	72.2	151.6

TABLE Cumulative Opening Year Without Project-09

FHWA ROADWAY NOISE LEVEL ANALYSIS

RUN DATE: 03/11/2020
ROADWAY SEGMENT: Hall Avenue between Project Driveway 4 and Agua Mansa Road
NOTES: Agua Mansa Industrial Project - Cumulative Opening Year Without Project

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* * ASSUMPTIONS * *

AVERAGE DAILY TRAFFIC: 2590 SPEED (MPH): 45 GRADE: .5

TRAFFIC DISTRIBUTION PERCENTAGES

	DAY	EVENING	NIGHT
AUTOS	75.24	12.52	9.31
M-TRUCKS	1.37	0.08	0.17
H-TRUCKS	1.14	0.04	0.14

ACTIVE HALF-WIDTH (FT): 18 SITE CHARACTERISTICS: SOFT

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* * CALCULATED NOISE LEVELS * *

CNEL AT 50 FT FROM NEAR TRAVEL LANE CENTERLINE (dB) = 60.44

DISTANCE (FEET) FROM ROADWAY CENTERLINE TO CNEL

70 CNEL	65 CNEL	60 CNEL	55 CNEL
0.0	0.0	72.4	152.2

TABLE Cumulative Opening Year With Project-01

FHWA ROADWAY NOISE LEVEL ANALYSIS

RUN DATE: 03/11/2020
ROADWAY SEGMENT: Agua Mansa Road between Riverside Avenue and Hall Avenue
NOTES: Agua Mansa Industrial Project - Cumulative Opening Year With Project

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* * ASSUMPTIONS * *

AVERAGE DAILY TRAFFIC: 19538 SPEED (MPH): 45 GRADE: .5

TRAFFIC DISTRIBUTION PERCENTAGES			
	DAY	EVENING	NIGHT
AUTOS	56.95	9.48	7.04
M-TRUCKS	6.47	0.37	0.79
H-TRUCKS	16.35	0.51	2.04

ACTIVE HALF-WIDTH (FT): 24 SITE CHARACTERISTICS: SOFT

---

* * CALCULATED NOISE LEVELS * *

CNEL AT 50 FT FROM NEAR TRAVEL LANE CENTERLINE (dB) = 75.91

DISTANCE (FEET) FROM ROADWAY CENTERLINE TO CNEL			
70 CNEL	65 CNEL	60 CNEL	55 CNEL
175.1	374.3	805.0	1733.3

TABLE Cumulative Opening Year With Project-02

FHWA ROADWAY NOISE LEVEL ANALYSIS

RUN DATE: 03/11/2020
ROADWAY SEGMENT: Agua Mansa Road between Hall Avenue and Brown Avenue
NOTES: Agua Mansa Industrial Project - Cumulative Opening Year With Project

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* * ASSUMPTIONS * *

AVERAGE DAILY TRAFFIC: 17728 SPEED (MPH): 45 GRADE: .5

	TRAFFIC DISTRIBUTION PERCENTAGES DAY	EVENING	NIGHT
AUTOS	56.95	9.48	7.04
M-TRUCKS	6.47	0.37	0.79
H-TRUCKS	16.35	0.51	2.04

ACTIVE HALF-WIDTH (FT): 24 SITE CHARACTERISTICS: SOFT

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* * CALCULATED NOISE LEVELS * *

CNEL AT 50 FT FROM NEAR TRAVEL LANE CENTERLINE (dB) = 75.49

DISTANCE (FEET) FROM ROADWAY CENTERLINE TO CNEL 70 CNEL	65 CNEL	60 CNEL	55 CNEL
164.3	350.9	754.5	1624.6

TABLE Cumulative Opening Year With Project-03

FHWA ROADWAY NOISE LEVEL ANALYSIS

RUN DATE: 03/11/2020
ROADWAY SEGMENT: Agua Mansa Road between Brown Avenue and Wilson Street
NOTES: Agua Mansa Industrial Project - Cumulative Opening Year With Project

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* * ASSUMPTIONS * *

AVERAGE DAILY TRAFFIC: 16970 SPEED (MPH): 45 GRADE: .5

TRAFFIC DISTRIBUTION PERCENTAGES

	DAY	EVENING	NIGHT
AUTOS	56.95	9.48	7.04
M-TRUCKS	6.47	0.37	0.79
H-TRUCKS	16.35	0.51	2.04

ACTIVE HALF-WIDTH (FT): 18 SITE CHARACTERISTICS: SOFT

---

* * CALCULATED NOISE LEVELS * *

CNEL AT 50 FT FROM NEAR TRAVEL LANE CENTERLINE (dB) = 75.73

DISTANCE (FEET) FROM ROADWAY CENTERLINE TO CNEL

70 CNEL	65 CNEL	60 CNEL	55 CNEL
159.0	340.7	733.1	1578.8

TABLE Cumulative Opening Year With Project-04

FHWA ROADWAY NOISE LEVEL ANALYSIS

RUN DATE: 03/11/2020
ROADWAY SEGMENT: Agua Mansa Road between Wilson Street and Market Street
NOTES: Agua Mansa Industrial Project - Cumulative Opening Year With Project

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* * ASSUMPTIONS * *

AVERAGE DAILY TRAFFIC: 19973 SPEED (MPH): 45 GRADE: .5

TRAFFIC DISTRIBUTION PERCENTAGES

	DAY	EVENING	NIGHT
AUTOS	56.95	9.48	7.04
M-TRUCKS	6.47	0.37	0.79
H-TRUCKS	16.35	0.51	2.04

ACTIVE HALF-WIDTH (FT): 18 SITE CHARACTERISTICS: SOFT

---

* * CALCULATED NOISE LEVELS * *

CNEL AT 50 FT FROM NEAR TRAVEL LANE CENTERLINE (dB) = 76.44

DISTANCE (FEET) FROM ROADWAY CENTERLINE TO CNEL

70 CNEL	65 CNEL	60 CNEL	55 CNEL
177.0	379.7	817.2	1759.9

TABLE Cumulative Opening Year With Project-05

FHWA ROADWAY NOISE LEVEL ANALYSIS

RUN DATE: 03/11/2020
ROADWAY SEGMENT: Hall Avenue west of Project Driveway 1
NOTES: Agua Mansa Industrial Project - Cumulative Opening Year With Project

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* * ASSUMPTIONS * *

AVERAGE DAILY TRAFFIC: 3060 SPEED (MPH): 45 GRADE: .5

	TRAFFIC DISTRIBUTION PERCENTAGES		
	DAY	EVENING	NIGHT
AUTOS	75.24	12.52	9.31
M-TRUCKS	1.37	0.08	0.17
H-TRUCKS	1.14	0.04	0.14

ACTIVE HALF-WIDTH (FT): 12 SITE CHARACTERISTICS: SOFT

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* * CALCULATED NOISE LEVELS * *

CNEL AT 50 FT FROM NEAR TRAVEL LANE CENTERLINE (dB) = 61.66

DISTANCE (FEET) FROM ROADWAY CENTERLINE TO CNEL			
70 CNEL	65 CNEL	60 CNEL	55 CNEL
0.0	0.0	79.4	169.4

TABLE Cumulative Opening Year With Project-06

FHWA ROADWAY NOISE LEVEL ANALYSIS

RUN DATE: 03/11/2020
ROADWAY SEGMENT: Hall Avenue between Project Driveway 1 and Project Driveway 2
NOTES: Agua Mansa Industrial Project - Cumulative Opening Year With Project

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* * ASSUMPTIONS * *

AVERAGE DAILY TRAFFIC: 3350 SPEED (MPH): 45 GRADE: .5

TRAFFIC DISTRIBUTION PERCENTAGES

	DAY	EVENING	NIGHT
AUTOS	75.24	12.52	9.31
M-TRUCKS	1.37	0.08	0.17
H-TRUCKS	1.14	0.04	0.14

ACTIVE HALF-WIDTH (FT): 18 SITE CHARACTERISTICS: SOFT

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* * CALCULATED NOISE LEVELS * *

CNEL AT 50 FT FROM NEAR TRAVEL LANE CENTERLINE (dB) = 61.56

DISTANCE (FEET) FROM ROADWAY CENTERLINE TO CNEL

70 CNEL	65 CNEL	60 CNEL	55 CNEL
0.0	0.0	85.2	180.3

TABLE Cumulative Opening Year With Project-07

FHWA ROADWAY NOISE LEVEL ANALYSIS

RUN DATE: 03/11/2020
ROADWAY SEGMENT: Hall Avenue between Project Driveway 2 and Project Driveway 3/Brown Avenue
NOTES: Agua Mansa Industrial Project - Cumulative Opening Year With Project

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* * ASSUMPTIONS * *

AVERAGE DAILY TRAFFIC: 3565 SPEED (MPH): 45 GRADE: .5

	TRAFFIC DISTRIBUTION PERCENTAGES		
	DAY	EVENING	NIGHT
AUTOS	75.24	12.52	9.31
M-TRUCKS	1.37	0.08	0.17
H-TRUCKS	1.14	0.04	0.14

ACTIVE HALF-WIDTH (FT): 18 SITE CHARACTERISTICS: SOFT

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* * CALCULATED NOISE LEVELS * *

CNEL AT 50 FT FROM NEAR TRAVEL LANE CENTERLINE (dB) = 61.83

DISTANCE (FEET) FROM ROADWAY CENTERLINE TO CNEL			
70 CNEL	65 CNEL	60 CNEL	55 CNEL
0.0	0.0	88.7	187.9

TABLE Cumulative Opening Year With Project-08

FHWA ROADWAY NOISE LEVEL ANALYSIS

RUN DATE: 03/11/2020
ROADWAY SEGMENT: Hall Avenue between Project Driveway 3/Brown Avenue and Project Driveway 4
NOTES: Agua Mansa Industrial Project - Cumulative Opening Year With Project

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* * ASSUMPTIONS * *

AVERAGE DAILY TRAFFIC: 3725 SPEED (MPH): 45 GRADE: .5

TRAFFIC DISTRIBUTION PERCENTAGES			
	DAY	EVENING	NIGHT
AUTOS	75.24	12.52	9.31
M-TRUCKS	1.37	0.08	0.17
H-TRUCKS	1.14	0.04	0.14

ACTIVE HALF-WIDTH (FT): 18 SITE CHARACTERISTICS: SOFT

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* * CALCULATED NOISE LEVELS * *

CNEL AT 50 FT FROM NEAR TRAVEL LANE CENTERLINE (dB) = 62.02

DISTANCE (FEET) FROM ROADWAY CENTERLINE TO CNEL			
70 CNEL	65 CNEL	60 CNEL	55 CNEL
0.0	0.0	91.2	193.4

TABLE Cumulative Opening Year With Project-09

FHWA ROADWAY NOISE LEVEL ANALYSIS

RUN DATE: 03/11/2020
ROADWAY SEGMENT: Hall Avenue between Project Driveway 4 and Agua Mansa Road
NOTES: Agua Mansa Industrial Project - Cumulative Opening Year With Project

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* * ASSUMPTIONS * *

AVERAGE DAILY TRAFFIC: 3860 SPEED (MPH): 45 GRADE: .5

TRAFFIC DISTRIBUTION PERCENTAGES

	DAY	EVENING	NIGHT
AUTOS	75.24	12.52	9.31
M-TRUCKS	1.37	0.08	0.17
H-TRUCKS	1.14	0.04	0.14

ACTIVE HALF-WIDTH (FT): 18 SITE CHARACTERISTICS: SOFT

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* * CALCULATED NOISE LEVELS * *

CNEL AT 50 FT FROM NEAR TRAVEL LANE CENTERLINE (dB) = 62.17

DISTANCE (FEET) FROM ROADWAY CENTERLINE TO CNEL

70 CNEL	65 CNEL	60 CNEL	55 CNEL
0.0	0.0	93.3	198.0
