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MEMORANDUM

DATE: August 11, 2020

TO: Marc Lebanoff, Lebba, LLC

FROM: Jason Lui, Associate/Senior Noise Specialist

SUBJECT: Slover-Juniper Industrial Building Noise and Vibration Impact Analysis

INTRODUCTION

This noise and vibration impact analysis has been prepared to evaluate the potential noise and vibration impacts and reduction measures associated with the Slover-Juniper Industrial Building Project (project) in Fontana, California. This report is intended to satisfy the City of Fontana's (City) requirements and the California Environmental Quality Act (CEQA) for a project-specific noise and vibration impact analysis by examining the impacts of the proposed uses on the project site and evaluating the reduction measures that the project requires. All references cited in this memorandum are included in Attachment A.

Project Location

The project site is in the southern portion of Fontana, in southwestern San Bernardino County, California. The project site is in Section 19 of Township 1 South, Range 5 West of the San Bernardino Baseline and Meridian, as depicted on the United States Geological Survey 7.5-minute series *Fontana, California* quadrangle (1980). Specifically, the center of the project site is at latitude 34°03'49.04" N and longitude 117°26'21.68" W at an elevation of approximately 1,100 feet above mean sea level and consists of one parcel (Assessor's Parcel Number 0251-203-09-0-000).

The project site is 2.06 acres and is bounded by Slover Avenue to the south, Juniper Avenue to the west, nonconforming single-family residential properties to the north, and nonconforming single-family and manufactured mobile homes to the east. The nearest sensitive receptors to the project site are single-family homes immediately north of the project site and single-family manufactured mobile homes immediately east of the project site. Commercial retail centers are farther to the south and east, beyond Slover Avenue and Sierra Avenue, respectively. Figure 1 shows the regional and project location (all figures are provided in Attachment B of this document).

Project Description

The project includes development of an approximately 41,000-square-foot warehouse building, of which 5,000 square feet would be designated office space across two levels. The warehouse would include three freight truck loading docks and employee and trailer parking. Figure 2 shows the site plan. As stated previously, the project includes a General Plan Amendment from (C-G) Commercial

General to (I-L) Light Industrial and Zone Change from General Commercial (C-2) to Light Industrial (M-1).

Construction

The project site is predominately flat and lacks significant slopes. Planned construction activities include demolition of the existing residential structure and associated detached garage and removal of existing onsite fencing and vegetation, including overgrown grasses and shrubs. Construction would also include excavation, grading, paving, construction of the warehouse building and parking areas, and the installation of lighting, landscaping, and utility connections. During grading, on-site soils would be excavated and recompacted in accordance with the 2019 California Building Code to accommodate the proposed industrial building and parking areas.

Construction parking and staging would take place on site. Construction hours will conform to City standards and be limited to 7:00 a.m. to 6:00 p.m. Monday through Friday and 7:00 a.m. to 5:00 p.m. Saturday. According to the project conceptual grading plans, approximately 6,000 cubic yards of exported soil (cut) and 500 cubic yards of imported soil (fill) would be required for excavation, compaction, and rough grading. During project construction, it is possible there would be temporary lane closures and/or detours necessary along Juniper Avenue and/or Slover Avenue.

Project construction of the project is anticipated to commence in early 2021 and finish in the fall/winter of 2021, resulting in a total construction duration of approximately 9 months. Construction equipment anticipated to be used includes rubber-tired dozers, tractors/loaders/backhoes, excavators, graders, scrapers, cranes, forklifts, generators, welders, air compressors, pavers, rollers and paving equipment.

Site Access

Fencing surrounds the project site. Existing site access consists of a concrete driveway blocked by a locked gate off Slover Avenue and an unpaved driveway blocked by a locked gate along Juniper Avenue. In the existing condition, vehicular and pedestrian access to the site is restricted due to the locked gates and the lack of pedestrian facilities along Juniper Avenue.

Proposed vehicle and pedestrian access to the project site would be provided by two ingress/egress driveways respectively off Slover Avenue and Juniper Avenue and associated frontage improvements that would include sidewalks, street trees, and lighting. The existing Slover Avenue driveway would be demolished, and the proposed Slover Avenue driveway would be constructed 35 feet wide near the project site's southeastern boundary. The proposed Juniper Avenue driveway would be 40 feet wide near the project site's northwestern boundary. It is anticipated that passenger vehicles would enter and exit at either driveway, but freight trucks are expected to enter the site from the Juniper Avenue driveway, which is immediately adjacent to an onsite truck staging area, to ensure adequate turning radius capacity into the truck-loading area. A 30-foot-wide fire lane connecting the two driveways would facilitate internal access to parking areas and the office space and ensure adequate access for first responders to an emergency.

Entrances and exits to and from parking and loading facilities would be marked with appropriate directional signage, and all site access points and driveway aprons are designed and would be

constructed to adequate widths for public safety pursuant to City Municipal Code Section No. 30-550(H).

Parking

Parking at the project site will comply the City's minimum parking requirements as codified in Article XI (On-site street parking and loading regulations) of the City Municipal Code. The project site would include 56 passenger-vehicle parking stalls, 3 of which would be Americans with Disabilities Act-compliant spaces and 6 of which would be clean air/vanpool/electric vehicle spaces. Additionally, the project site would include a 12-foot by 52-foot trailer parking area, a truck staging area, and three dock doors in the northern portion of the site.

Pedestrian and Bicycle Connectivity

The project site is accessible from a nearby public bus stop near the Slover Avenue/Sierra Avenue intersection approximately 975 feet east of the site, as well as via other amenities such as Class 2 and 3 bicycle lanes along nearby major corridors. Pedestrian access to the project site would be via curb and sidewalks to be constructed and/or improved along the project frontage of Juniper Avenue and Slover Avenue.

Facility and Site Design

The project would be a modern industrial building approximately two stories in height. The industrial building would contain 5,000 square feet of office space and approximately 36,000 square feet of warehouse space. The building's design would be composed of tempered glazed aluminum and painted concrete. The southeast corner of the building would contain a parapet with a continuous glass façade, which would provide visual relief and varied massing. The project would include landscaped areas in accordance with Division 7 (Design Guidelines) of Article VII (Industrial Zoning Districts) of the City Municipal Code.

The project's design elements include landscaped setbacks and street trees along the site perimeter and on-site trees throughout the parking areas and internal drive aisles. Additionally, the project would include a 12-foot-high concrete or concrete masonry unit solid wall along the northern and eastern boundary of the site.

Light poles would be installed throughout the surface parking lot and along on-site pedestrian pathways. The warehouse building would have security lighting on the building façades. Additionally, streetlights would be installed along the project frontage of Juniper Avenue and Slover Avenue. All lighting on the project site will comply with Section No. 30-550(F) (Lighting) of the City Municipal Code, which requires light shielding, functional and aesthetic design, and compatibility with surrounding uses.

Landscaping

The City requires a minimum 15 percent of the site (excluding building area) to be landscaped, and the project includes 14,631 square feet of landscaping, which equates to 28.6 percent of the site. The project would incorporate landscape through a combination of accent plantings/groundcovers, hedges, and trees along the site perimeter and include additional trees throughout the parking area

and along the internal drive aisles. Enhanced landscaping would be installed throughout the project site pursuant to Section No. 30-551(E)(4) (Landscaping), which requires the Applicant to incorporate a three-tiered planning system compatible with the scale of adjacent structures, streets, and public spaces. Proposed landscaping would be drought-tolerant and complement existing natural and manmade features, including the dominant landscaping of surrounding areas.

Drainage

The majority of the project site consists of pervious surface area. Currently, stormwater generally sheet flows in a southwesterly direction and drains offsite onto Juniper Avenue and Slover Avenue where it enters the municipal storm drain system at the northeast and northwest corners of Slover Avenue and Juniper Avenue. The proposed project is expected to generally maintain the existing drainage pattern. Upon development of the site, all on-site storm water would be captured on site in accordance with Santa Ana Regional Water Quality Control Board Order Number R8-2010-0036, National Pollutant Discharge Elimination System Permit No. CAS618036, also known as the Municipal Separate Storm Sewer System, or MS4, permit. The runoff from the site would drain to multiple onsite catch basins and be pretreated with inlet filters and grate before draining to an underground infiltration system proposed in the truck staging area north of the proposed industrial building. Any discharges into the municipal storm drain system would be at volumes that do not exceed the existing, predeveloped condition.

Infrastructure and Off-site Improvements

The project will dedicate approximately 4 feet of right of way along the western project site frontage for the City to widen Juniper Avenue under a separate action. The project would include installation of curb, gutter, sidewalk, landscaping, streetlights, and trees along the project site frontage of Juniper Avenue and Slover Avenue. The project also would connect to existing sewer, water, gas, and telecommunication utilities within the Slover Avenue and Juniper Avenue right-of-way. In addition, the project would reconfigure the electrical utilities adjacent to the site by relocating the existing distribution circuit underground along Slover Avenue and Juniper Avenue.

CHARACTERISTICS OF SOUND

Sound is increasing to such disagreeable levels in the environment that it can threaten 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 that describes a noisy or quiet environment and is measured by the amplitude of 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. Decibels (dB), unlike the linear scale (e.g., inches or pounds), are measured on a logarithmic scale, which is a scale based on powers of 10.

For example, 10 decibels is 10 times more intense than 1 dB, 20 dB is 100 times more intense than 1 dB, and 30 dB is 1,000 times more intense than 1 dB. 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 dB (very quiet) to 100 dB (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 (e.g., highway traffic or railroad operations), the sound decreases 3 dB for each doubling of distance in a hard site environment; however, 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 the State of California are the L_{eq} and community noise equivalent level (CNEL) or the day-night average noise level (L_{dn}) based on A-weighted decibels (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 noises 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 City uses the CNEL noise scale for long-term noise impact assessment.

Other noise rating scales of importance when assessing the annoyance factor include the maximum 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 for short-term noise impacts are specified in terms of maximum levels denoted by L_{max}, which reflects peak operating conditions and addresses the annoying aspects of intermittent noise. It is often used together with another noise scale, or noise standards in terms of percentile noise levels, in noise ordinances for enforcement purposes. 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 the time the noise level exceeds this level, and half 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 category includes audible impacts that refer to increases in noise levels noticeable to humans. Audible increases in noise levels generally refer to a change of 3 dB or greater because 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 dB and 3 dB. This range of noise levels has been found to be noticeable only in laboratory environments. The last category includes changes in noise levels 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, 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 (the threshold of pain). A sound level of 160–165 dBA will 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 area. Table A lists definitions of acoustical terms, and Table B shows common sound levels and their sources.

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 vibration velocity decibels (VdB) 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. 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 (see the Federal Transit Administration's [FTA] 2018 *Transit*

Table A: Definitions of Acoustical Terms

Term	Definitions
Decibel, dB	A unit of measurement 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 deemphasizes 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_{01}, L_{10}, L_{50}, L_{90}	The fast A-weighted noise levels that are equaled or exceeded by a fluctuating sound level 1%, 10%, 50%, and 90% 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 dBA to sound levels occurring in the evening from 7:00 PM to 10:00 PM and after the addition of 10 dBA to sound levels occurring in the night between 10:00 PM and 7:00 AM.
Day/Night Noise Level, L_{dn}	The 24-hour A-weighted average sound level from midnight to midnight, obtained after the addition of 10 dBA to sound levels occurring in the night between 10:00 PM and 7:00 AM.
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 at 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 upon its amplitude, duration, frequency, and time of occurrence and tonal or informational content, as well as the prevailing ambient noise level.

Source: *Handbook of Acoustical Measurements and Noise Control* (Harris 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 at 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	—
Average Office	60	Quiet	One-half as loud
Suburban Street	55	Quiet	—
Light Traffic; Soft Radio Music in Apartment	50	Quiet	One-quarter as loud
Large Transformer	45	Quiet	—
Average Residence without Stereo Playing	40	Faint	One-eighth 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. (2015).

Noise and Vibration Impact Assessment Manual). 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 a project and freight train operations on railroad tracks 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 cosmetic building damage, it is not uncommon for heavy duty 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 Lv is the VdB, "V" is the RMS velocity amplitude, and "Vref" is the reference velocity amplitude, or 1 x 10^{-6} inches/second (in/sec) used in the United States. Table C illustrates human response to various vibration levels, as described in the *Transit Noise and Vibration Impact Assessment Manual* (FTA 2018).

Table C: 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 Hertz.
[2] Approximate noise level when vibration spectrum peak is near 60 Hertz.
dBA = A-weighted decibels VdB = vibration velocity decibels
FTA = Federal Transit Administration

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

Federal Regulations

Federal Transit Administration

Vibration standards included in the FTA's *Transit Noise and Vibration Impact Assessment Manual* (2018) are used in this analysis for ground-borne vibration impacts on human annoyance. Table D provides the criteria for assessing the potential for interference or annoyance from vibration levels in a building.

Table D: Interpretation of Vibration Criteria for Detailed Analysis

Land Use	Maximum L_v (VdB)[1]	Description of Use
Workshop	90	Vibration that is distinctly felt. Appropriate for workshops and similar areas not as sensitive to vibration.
Office	84	Vibration that can be felt. Appropriate for offices and similar areas not as sensitive to vibration.
Residential Day	78	Vibration that is barely felt. Adequate for computer equipment and low-power optical microscopes (up to 20X).
Residential Night and Operating Rooms	72	Vibration is not felt, but ground-borne noise may be audible inside quiet rooms. Suitable for medium-power microscopes (100X) and other equipment of low sensitivity.

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

[1] As measured in 1/3-octave bands of frequency over the frequency range 8 to 80 Hertz.

FTA = Federal Transit Administration VdB = vibration velocity decibels

L_V = velocity in decibels

The criteria for environmental impact from ground-borne vibration and noise are based on the maximum levels for a single event. Table E lists the potential vibration building damage criteria associated with construction activities, as suggested in the FTA's *Transit Noise and Vibration Impact Assessment Manual* (2018). These FTA guidelines show that a vibration level of up to 102 VdB (equivalent to 0.5 in/sec in PPV [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 non-engineered timber and masonry buildings, the construction building vibration damage criterion is 94 VdB (0.2 in/sec in PPV).

Table E: 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 = microinches 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

Local Regulations

City of Fontana

Noise Element of the General Plan. The Noise Element of the City's General Plan lists the policies and actions required to meet the City's noise-related goals. The following lists the applicable goals, policies, and actions for the proposed project.

- **Goal 3.** Fontana's residents are protected from negative effects of "spillover" noise.
  - **Policy:** Residential land uses and areas identified as noise-sensitive shall be protected from excessive noise from non-transportation sources including industrial, commercial, and residential activities and equipment.
  - **Actions:**
    - Projects located in commercial areas shall not exceed stationary source noise standards at the property line of proximate residential or commercial uses.
    - Industrial uses shall not exceed commercial or residential stationary source noise standards at the most proximate land uses.
    - Non-transportation noise shall be considered in land use planning decisions.
    - Construction shall be performed as quietly as feasible when performed in proximity to residential or other noise-sensitive land uses.

To achieve Goal 1, the proposed project was assessed based on the requirements and noise standards in the City's Municipal Code, discussed below.

Municipal Code. Section 30-543(a) of the City's Municipal Code has established daytime (7:00 a.m. to 10:00 p.m.) and nighttime (10:00 p.m. to 7:00 a.m.) exterior noise standards of 70 dBA and 65 dBA, respectively, for residential-zoned property from industrial-zoned uses.

Similar to Section 30-543(a) as discussed above, Section 30-543(c) of the City's Municipal Code was used to evaluate potential vibration impacts from project operations. This section limits operational vibration levels that are created or caused to be created any activity that causes a vibration that can be felt beyond the property line with or without the aid of an instrument. Because the City does not specify the vibration level that can be felt, this analysis uses a vibration perception threshold of 65 VdB from the *Transit Noise and Vibration Impact Assessment Manual* (FTA 2018).

In addition, Section 18-63(b) of the City's Municipal Code states:

> Noises that are loud, excessive, impulsive, or intrusive sound or noise that annoys or disturbs persons of ordinary sensibilities from a distance of 50 ft or more from the edge of the property, structure, or unit in which the source is located, are declared to be in violation of this article, but such enumeration shall not be deemed to be exclusive. Applicable noises that are prohibited under this section include the following:
>
> - **Loading, Unloading or Opening Boxes:** The creation of a loud, excessive, impulsive or intrusive and excessive noise in connection with loading or unloading of any vehicle or the opening and destruction of bales, boxes, crates and containers.
> - **Construction or Repairing of Buildings or Structures:** The erection (including excavating), demolition, alteration or repair of any building or structure other than between the hours of 7:00 a.m. and 6:00 p.m. on weekdays and between the hours of 8:00 a.m. and 5:00 p.m. on Saturdays, except in case of urgent necessity in the interest of public health and safety, and then only with a permit from the building inspector, which permit may be granted for a period not to exceed three days or less while the emergency continues and which permit may be renewed for periods of three days or less while the emergency continues. If the building inspector should determine that the public health and safety will not be impaired by the erection, demolition, alteration or repair of any building or structure or the excavation of streets and highways within the hours of 6:00 p.m. and 7:00 a.m., and if he shall further determine that loss or inconvenience would result to any party in interest, he may grant permission for such work to be done on weekdays within the hours of 6:00 p.m. and 7:00 a.m., upon application being made at the time the permit for the work is awarded or during the progress of the work.

EXISTING SETTING

Sensitive Land Uses in the Project Vicinity

Existing land uses within the project area include residences and vacant land. Single-family residences are immediately north project site and southwest of the project site across the Slover Avenue and Juniper Avenue intersection. Manufactured mobile homes are immediately east of the project site. To the west, across Juniper Avenue from the project site, there is vacant land and the existing residences have been vacated to make way for a planned industrial warehouse unrelated to the Slover-Juniper Industrial Building. Vacant land is south of the project site across Slover Avenue and a hotel and restaurant is planned.

Overview of the Existing Noise Environment

The primary existing noise sources in the project area are transportation facilities. Traffic on Slover Avenue, Juniper Avenue, Sierra Avenue, Interstate 10 (I-10), and other local streets contribute to the ambient noise levels in the project vicinity. Noise from motor vehicles is generated by engines, the interaction between the tires and the road, and the vehicles' exhaust systems. In addition, train operations along the Union Pacific Railroad and aircraft noise from airports nearby contribute to the background ambient noise in the project vicinity.

Ambient Noise Measurements

Short-Term Noise Measurements

Short-term (20-minute) noise level measurements were conducted on June 17, 2020, using Larson Davis Model 831 Type 1 sound level meter. Table F shows the results of the short-term noise level measurements along with a description of the measurement location and noise sources that occurred during the measurement. It should be noted that the short-term noise level measurements were conducted during the stay-at-home order due to the COVID-19 pandemic, and the results of measured noise levels may be lower than typical conditions. As shown in Table F, the measured average noise levels in the project vicinity range from 52.1 to 53.8 dBA L_{eq}, and the instantaneous maximum noise levels range from 67.8 to 72.3 dBA L_{max}. Figure 3, Noise Monitoring Locations, shows the short-term monitoring locations.

Table F: Short-Term Ambient Noise Level Measurements

Monitor No.	Location	Date	Start Time	Noise Level (dBA)[1]			Noise Source(s)
				L_{eq}	L_{max}	L_{min}	
ST-1	Northeast corner of the project site, approximately 10 ft from the northern property line and 70 ft from the eastern property line	6/17/20	10:24 p.m.	52.1	67.8	42.4	Traffic on Slover Avenue and Juniper Avenue. Faint traffic on I-10.
ST-2	East side of the project site, approximately 10 ft from the eastern property line and third home from Slover Avenue	6/17/20	10:51 p.m.	53.8	72.3	46.9	Traffic on Slover Avenue and Juniper Avenue. Faint traffic on I-10.

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

[1] Measured noise levels were conducted during the stay-at-home order due to the COVID-19 pandemic; therefore, the results of measured noise levels may be lower than typical conditions.

dBA = A-weighted decibel
ft = foot/feet
I-10 = Interstate 10
L_{eq} = equivalent continuous sound level
L_{max} = maximum measured sound level
L_{min} = minimum measured sound level

Long-Term Noise Measurements

Two long-term (24-hour) noise level measurements were conducted from June 17 to 18, 2020, using Larson Davis Spark 706RC Dosimeters. Tables G and H show the hourly L_{eq}, L_{max}, and L_{min} results from the long-term noise level measurements, and Table I shows the calculated CNEL level from the long-term noise level measurements. It should be noted that the long-term noise level measurements were conducted during the stay-at-home order due to the COVID-19 pandemic, and the results of measured noise levels may be lower than before the order. As shown in Table I, the calculated CNEL levels at LT-1 and LT-2 are 65.0 dBA CNEL and 69.4 dBA CNEL, respectively. Figure 3 shows the long-term monitoring locations.

Existing Aircraft Noise

Ontario International Airport and Flabob Airport are 8.1 miles west and 5.3 miles southeast of the project site, respectively. The Compatibility Policy Map: Noise Impact Zones from the *LA/Ontario International Airport Land Use Compatibility Plan* (City of Ontario 2011) shows that the project site is outside the 60 to 65 dBA CNEL noise contour. Also, the noise compatibility contours for the Flabob Airport in the *Riverside County Airport Land Use Compatibility Plan* (Riverside County Airport Land Use Commission 2004) show that the project site is outside the 55 dBA CNEL noise contour.

Existing Traffic Noise

The guidelines included in the Federal Highway Administration (FHWA) Highway Traffic Noise Prediction Model (1977; FHWA RD-77-108) were used to evaluate highway 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 resultant noise levels are weighted and summed over 24-hour periods to determine the CNEL values. The existing (2020) average daily traffic (ADT) volumes were derived from the Focused Traffic Impact Analysis for the Transwestern Building 1 Project (LSA 2020a) and the project's Trip Generation Memorandum (LSA 2020b). The standard vehicle mix for southern California roadways was used for traffic on these roadway segments. Table J provides the existing traffic noise levels in the project vicinity. 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. Attachment C provides the specific assumptions used in developing these noise levels and model printouts.

Table J shows that traffic noise levels along Boyle Avenue and Juniper Avenue are low whereas traffic noise levels are high along Slover Avenue. Also, Table J shows that the 70, 65, and 60 dBA CNEL distances for Juniper Avenue are confined within the roadway right-of-way, whereas the 70, 65, and 60 dBA CNEL for Slover Avenue impact zones extend up to 60 ft, 116 ft, and 242 ft, respectively, from the roadway centerline.

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

	Start Time	Date	Noise Level (dBA) [1]		
			L_{eq}	L_{max}	L_{min}
1	11:00 AM	6/17/20	59.3	81.0	49.8
2	12:00 PM	6/17/20	58.0	79.9	49.4
3	1:00 PM	6/17/20	59.4	88.7	48.9
4	2:00 PM	6/17/20	60.1	87.0	51.0
5	3:00 PM	6/17/20	60.8	89.3	51.2
6	4:00 PM	6/17/20	61.0	86.1	51.7
7	5:00 PM	6/17/20	62.1	84.0	53.4
8	6:00 PM	6/17/20	62.0	82.4	53.1
9	7:00 PM	6/17/20	60.9	79.7	54.3
10	8:00 PM	6/17/20	60.4	81.7	51.4
11	9:00 PM	6/17/20	60.2	77.2	52.3
12	10:00 PM	6/17/20	57.6	83.6	47.2
13	11:00 PM	6/17/20	57.3	80.7	47.7
14	12:00 AM	6/18/20	55.3	77.9	49.2
15	1:00 AM	6/18/20	55.0	71.0	48.4
16	2:00 AM	6/18/20	54.2	69.5	48.1
17	3:00 AM	6/18/20	56.8	73.8	48.5
18	4:00 AM	6/18/20	60.1	84.4	50.7
19	5:00 AM	6/18/20	59.3	84.5	50.4
20	6:00 AM	6/18/20	58.8	82.0	50.8
21	7:00 AM	6/18/20	59.7	79.6	50.8
22	8:00 AM	6/18/20	60.2	80.5	51.2
23	9:00 AM	6/18/20	58.2	77.8	49.4
24	10:00 AM	6/18/20	61.6	88.5	50.0

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

[1] Measured noise levels were conducted during the stay-at-home order due to the COVID-19 pandemic; therefore, the results of measured noise levels may be lower than before the order.

dBA L_{eq} = equivalent continuous sound level measured in A-weighted decibels

L_{max} = maximum measured sound level

L_{min} = minimum measured sound level

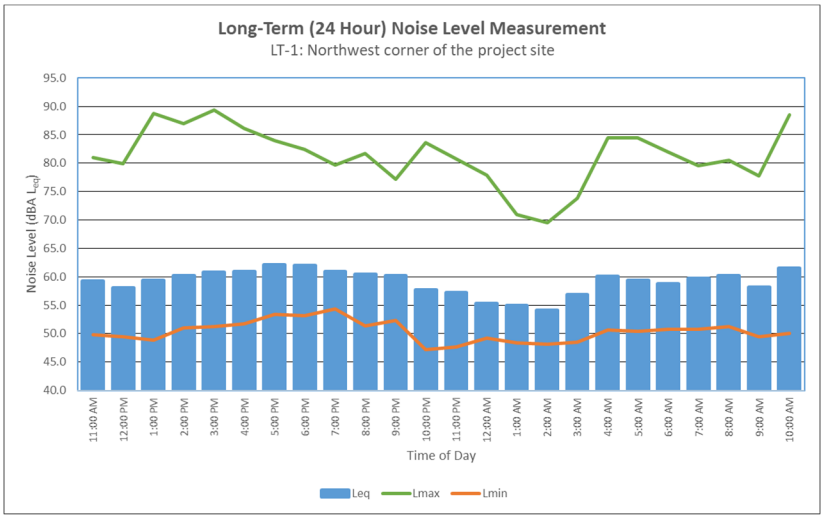


Table H: Long-Term (24-Hour) Noise Level Measurement Results at LT-2

	Start Time	Date	Noise Level (dBA)[1]		
			L_{eq}	L_{max}	L_{min}
1	11:00 AM	6/17/20	66.6	90.9	45.7
2	12:00 PM	6/17/20	66.8	91.7	45.7
3	1:00 PM	6/17/20	65.9	85.1	46.1
4	2:00 PM	6/17/20	66.0	86.8	48.0
5	3:00 PM	6/17/20	65.9	85.2	46.4
6	4:00 PM	6/17/20	67.6	87.7	48.1
7	5:00 PM	6/17/20	67.6	88.9	50.4
8	6:00 PM	6/17/20	67.4	86.1	49.9
9	7:00 PM	6/17/20	65.9	83.8	49.8
10	8:00 PM	6/17/20	64.5	92.0	48.4
11	9:00 PM	6/17/20	63.0	86.6	48.4
12	10:00 PM	6/17/20	61.3	80.0	45.2
13	11:00 PM	6/17/20	59.8	91.6	43.8
14	12:00 AM	6/18/20	57.5	87.7	43.3
15	1:00 AM	6/18/20	57.4	80.1	42.6
16	2:00 AM	6/18/20	56.7	82.0	42.8
17	3:00 AM	6/18/20	58.6	79.3	43.7
18	4:00 AM	6/18/20	65.1	80.9	44.9
19	5:00 AM	6/18/20	63.7	90.9	44.8
20	6:00 AM	6/18/20	64.5	88.1	45.5
21	7:00 AM	6/18/20	65.8	79.7	45.4
22	8:00 AM	6/18/20	66.1	88.8	46.5
23	9:00 AM	6/18/20	65.5	86.5	44.6
24	10:00 AM	6/18/20	65.4	89.3	45.5

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

[1] Measured noise levels were conducted during the stay-at-home order due to the COVID-19 pandemic; therefore, the results of measured noise levels may be lower than before the order.

dBA L_{eq} = equivalent continuous sound level measured in A-weighted decibels

L_{max} = maximum measured sound level

L_{min} = minimum measured sound level

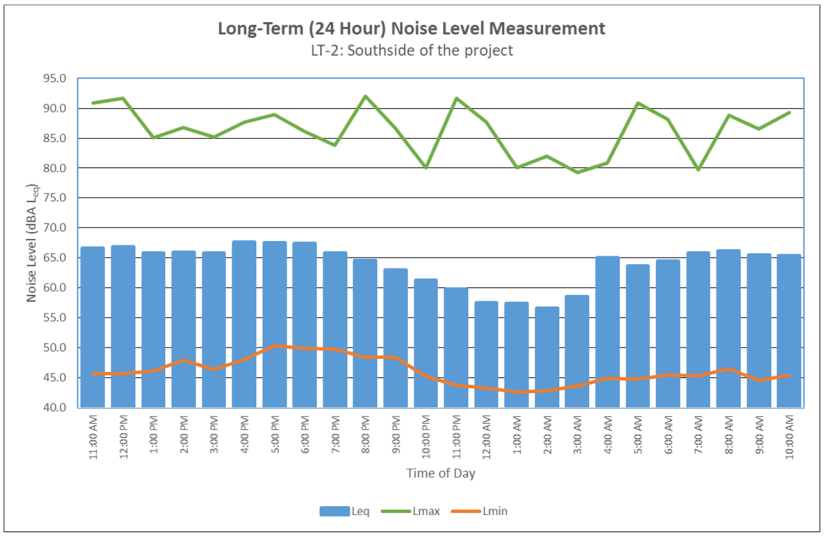


Table I: Long-Term Ambient Noise Monitoring Results

Monitoring No.	Location	Start Date	Start Time	Duration (hours)	Noise Level (dBA)		Noise Source(s)
					L_{eq}	CNEL	
LT-1	Northwestern corner of the project site, on a wooden electrical pole	6/17/20	11:00 AM	24	59.6	65.0	Traffic on Slover Avenue and Juniper Avenue
LT-2	South of the project site, on a wooden pole to the right facing the property at the existing driveway	6/17/20	11:00 AM	24	64.9	69.4	Traffic on Slover Avenue and Juniper Avenue

Source: Compiled by LSA Associates, Inc. (2020).
CNEL = Community Noise Equivalent Level
dBA = A-weighted decibels
L_{eq} = equivalent continuous sound level

Table J: Existing (2020) Traffic Noise Levels

Roadway Segment	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
Juniper Avenue between Project Driveway 1 and Slover Avenue	465	< 50	< 50	< 50	47.4
Slover Avenue Between Cypress Avenue and Juniper Avenue	14,045	< 50	98	203	66.5
Slover Avenue Between Juniper Avenue and Project Driveway 2	18,493	60	116	242	67.7
Slover Avenue Between Project Driveway 2 and Sierra Avenue	18,493	60	116	242	67.7

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
CNEL = Community Noise Equivalent Level
dBA = A-weighted decibels
ft = foot/feet

IMPACTS

Short-Term Construction Noise Impacts

Two types of short-term noise impacts would occur during project construction. The first type would be from construction crew commutes and the transport of construction equipment and materials to the project site and would incrementally raise noise levels on access roads leading to the site. The pieces of construction equipment for construction activities would move on site, would remain for the duration of each construction phase, and would not add to the daily traffic volume in the project vicinity. 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 ambient noise levels would be small because the number of daily construction-related vehicle trips is small compared to existing daily traffic volume on Juniper Avenue and Slover Avenue. The grading phase would generate the most trips out of all of the construction phases, at 155 trips per day based on the California Emissions Estimator Model

(Version 2016.3.2). Roadways that would be used to access the project site are Juniper Avenue and Slover Avenue. Based on Table J, Juniper Avenue and Slover Avenue have estimated existing daily traffic volumes of 465 and 14,045, respectively, near the project site. Based on the maximum daily trips generated by construction-related traffic, construction-related traffic would increase noise by up to 1.3 dBA. A noise level increase of less than 3 dBA would not be perceptible to the human ear in an outdoor environment. Therefore, no short-term, construction-related impacts associated with worker commutes and transport of construction equipment and material to the project site would occur, and no noise reduction measures would be required.

The second type of short-term noise impact is related noise generated from construction activities. The proposed project anticipates demolition, site preparation, grading, building construction, paving, and architectural coating phases of construction. 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 change the character of the noise generated on a project site. Therefore, the noise levels vary 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 K lists the L_{max} recommended for noise impact assessments for typical construction equipment included in the FHWA *Highway Construction Noise Handbook* (FHWA 2006), based on a distance of 50 ft between the equipment and a noise receptor.

Typical noise levels range up to 88 dBA L_{max} at 50 ft during the noisiest construction phases. The demolition and site preparation phase, which includes excavation and grading of the site, 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.

Project construction is expected to require the use of graders, bulldozers, and water trucks/pickup trucks. Noise associated with the use of each type of construction equipment for the site preparation 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. As shown in Table K, the maximum noise level generated by each grader is assumed to be approximately 85 dBA L_{max} at 50 ft. Each bulldozer would generate approximately 85 dBA L_{max} at 50 ft. The maximum noise level generated by water trucks/pickup trucks is approximately 55 dBA L_{max} at 50 ft from these vehicles. Each doubling of the sound sources with equal strength increases the noise level by 3 dBA. Assuming that each piece of construction equipment operates at some distance from the other equipment, the worst-case combined noise level during this phase of construction would be 88 dBA L_{max} at a distance of 50 ft from the active construction area. Based on a usage factor of 40 percent, the worst-case combined noise level during this phase of construction would be 84 dBA L_{eq} at a distance of 50 ft from the active construction area.

Table K: Typical Construction Equipment Noise Levels

Equipment Description	Acoustical Usage Factor[1] (%)	Maximum Noise Level (L_{max}) at 50 ft[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
Pavement Scarifier	20	85
Paver	50	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: Table 9.1, *FHWA Highway Construction Noise Handbook* (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 Specification 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
FHWA = Federal Highway Administration
ft = foot/feet
L_{max} = maximum instantaneous noise level

The closest residential property lines are within 50 ft of the project construction boundary to the north, east, and west and may be subject to short-term construction noise reaching 88 dBA L_{max} (84 dBA L_{eq}) or higher generated by construction activities in the project area. Ambient noise levels at the closest residential property line north and east of the project site range between 56.7 and 67.6 dBA L_{eq} and 79.3 and 92.0 dBA L_{max} based on the long-term noise level measurement at LT-1 shown in Table G. Although the noise generated by project construction activities would be higher than the ambient noise levels and may result in a temporary increase in the ambient noise levels, construction noise would stop once project construction is completed. The proposed project would be required to comply with the construction hours allowed under the City's Municipal Code Noise Ordinance and standard construction best practices listed below. Therefore, no noise impacts from construction activities would occur. No noise reduction measures are required.

- The construction contractor shall limit construction activities to between the hours of 7:00 a.m. and 7:00 p.m. on weekdays and between the hours of 8:00 a.m. and 5:00 p.m. on Saturdays. Construction is prohibited outside of these hours.

- During all project site excavation and grading, the project contractors shall equip all construction equipment, fixed or mobile, with properly operating and maintained mufflers consistent with manufacturers' standards.

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

- The construction contractor shall place all stationary construction equipment so that the emitted noise is directed away from the sensitive receptors nearest the project site. Sensitive receptors nearest to the project site include residences south of the project site across Boyle Avenue.

Short-Term Construction Vibration Impacts

This construction vibration impact analysis discusses the level of human annoyance using vibration levels in VdB and assesses the potential for building damage using vibration levels in PPV (in/sec). Vibration levels calculated in RMS are best for characterizing human response to building vibration, whereas vibration levels in PPV are best for characterizing damage potential. As shown in Table E, the FTA guidelines indicate that a vibration level up to 102 VdB (equivalent to 0.5 PPV [in/sec]) is considered safe for buildings consisting of reinforced concrete, steel, or timber (no plaster), and would not result in any construction vibration damage (FTA 2018). For a non-engineered timber and masonry building, the construction vibration damage criterion is 94 VdB (0.2 PPV [in/sec]). For a fragile building, the construction vibration damage criterion is 90 VdB (0.12 PPV [in/sec]).

Table L 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* (2018). Outdoor demolition, site preparation, and grading for the proposed project are expected to require the use of a large bulldozer and loaded trucks, which would generate ground-borne vibration of up to 87 VdB (0.089 PPV [in/sec]) and 86 VdB (0.076 PPV [in/sec]), respectively, when measured at 25 ft.

Table L: 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[2]	**0.210**	**94**
Hoe Ram	0.089	87
Large Bulldozer	0.089	87
Caisson Drilling	0.089	87
Loaded Trucks	**0.076**	**86**
Jackhammer	0.035	79
Small Bulldozer	0.003	58

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

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

[2] Equipment shown in **bold** is expected to be used on site.

µin/sec = micro-inches per second
ft = foot/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 greatest vibration levels are anticipated to occur during the demolition, site preparation, and grading phase. All other phases are expected to result in lower vibration levels. The distance to the nearest buildings for vibration impact analysis is measured between the nearest off-site buildings and the project boundary (assuming the construction equipment would be used at or near the project boundary), because vibration impacts normally occur within the buildings.

The formulas for vibration transmission are provided below.

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

$$PPV_{equip} = PPV_{ref}\ x\ (25/D)^{1.5}$$

Table M lists the projected vibration levels from various construction equipment expected to be used on the project site to the closest buildings in the project vicinity. As shown in Table M, the closest structures are residences and mobile homes approximately 10 ft to the north and 8 ft to east from the project construction boundary and would experience a vibration level of 99 VdB (0.352 PPV [in/sec]) and 102 VdB (0.492 PPV [in/sec]), respectively. These vibration levels would result in community annoyance because they exceed the FTA's community annoyance threshold of 78 VdB for daytime residences. In addition, these vibration levels would have the potential to affect the residential buildings immediately to the north and the east because vibration levels would exceed the FTA vibration damage threshold of 94 VdB (0.2 PPV [in/sec]). The implementation of vibration reduction measures to restrict heavy construction equipment (e.g., large bulldozers) or require the use of light construction equipment (e.g., small bulldozers and trucks) within 5 ft of the northern project construction boundary (15 ft from the residential structure) and 7 ft of the eastern project construction boundary (15 ft from the residential structure) would reduce construction vibration levels to 94 VdB (0.191 PPV [in/sec]).

Table M: Summary of Construction Vibration Levels

Land Use	Direction	Equipment/ Activity	Reference Vibration Level at 25 ft		Distance to Structure (ft)	Maximum Vibration Level	
			VdB	PPV (in/sec)		VdB	PPV (in/sec)
Residential	North	Large Bulldozer	87	0.089	10	99	0.352
		Loaded Truck	86	0.076	10	98	0.300
Mobile Home	East	Large Bulldozer	87	0.089	8	102	0.492
		Loaded Truck	86	0.076	8	101	0.420
Residential	Southwest	Large Bulldozer	87	0.089	160	63	0.005
		Loaded Truck	86	0.076	160	62	0.005
Residential (Future Planned Warehouse)[1]	West	Large Bulldozer	87	0.089	50	78	0.031
		Loaded Truck	86	0.076	50	77	0.027

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

Note: The FTA-recommended building damage threshold is 94 VdB (0.2 PPV [in/sec]) at the receiving building structure.

[1] This residential structure was evaluated because the structure was present at the time of this analysis even though a future industrial warehouse is planned.

ft = foot/feet
in/sec = inches per second
VdB = vibration velocity decibels
FTA = Federal Transit Administration
PPV = peak particle velocity

Other nearby buildings are farther away and would experience a vibration level of up to 78 VdB (0.031 PPV [in/sec]). This vibration level would not result in annoyance because vibration levels would not exceed the FTA's annoyance threshold of 78 VdB for daytime residences. In addition, this vibration level would not result in building damage because vibration levels would not exceed the FTA damage threshold of 94 (0.2 PPV [in/sec]) and the residential building was observed to be constructed of nonengineered timber and masonry. Therefore, no construction vibration impacts would occur with implementation of the vibration reduction measures described above.

Long-Term Aircraft Noise Impacts

As discussed above, the Ontario International Airport and Flabob Airport are 8.1 miles west and 5.3 miles southeast of the project site, respectively. The Compatibility Policy Map: Noise Impact Zones from the *LA/Ontario International Airport Land Use Compatibility Plan* (City of Ontario 2011) shows that the project site is outside of the 60 to 65 dBA CNEL noise contour. Also, the noise compatibility contours for Flabob Airport in the *Riverside County Airport Land Use Compatibility Plan* (Riverside County Airport Land Use Commission 2004) show that the project site is outside of the 55 dBA CNEL noise contour. Therefore, the project would not expose people working in the project area to excessive noise levels.

Long-Term Traffic Noise Impacts

The guidelines included in the *FHWA Highway Traffic Noise Prediction Model* (1977; FHWA RD-77-108) were used to evaluate highway 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 resultant noise levels are weighted and summed over 24-hour periods to determine the CNEL values. The existing (2020) and opening year (2021) ADT volumes were derived from the Focused Traffic Impact Analysis for the Transwestern Building 1 Project (LSA 2020a) and the project's Trip Generation Memorandum (LSA 2020b). The standard vehicle mix for Southern California roadways was used for traffic on these roadway segments under the without project scenario. Under the with project scenario, the vehicle mix was adjusted based on the project's vehicle mix. Tables N and O show the existing (2020) and opening year (2021) traffic noise levels without and with the project along roadways in the project vicinity. 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. Attachment C provides the specific assumptions used in developing these noise levels and model printouts.

Tables N and O show that the project-related traffic noise would increase by up to 1.6 dBA. This noise level increase is less than 3 dBA and it would not be perceptible to the human ear in an outdoor environment. Therefore, no traffic noise impacts from project-related traffic on off-site sensitive receptors would occur. No noise reduction measures are required.

Table N: Existing (2020) 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
Juniper Avenue between Project Driveway 1 and Slover Avenue	465	< 50	< 50	< 50	47.4	567	< 50	< 50	< 50	49.0	1.6
Slover Avenue Between Cypress Avenue and Juniper Avenue	14,045	< 50	98	203	66.5	14,125	< 50	98	203	66.5	0.0
Slover Avenue Between Juniper Avenue and Project Driveway 2	18,493	60	116	242	67.7	18,595	60	116	243	67.7	0.0
Slover Avenue Between Project Driveway 2 and Sierra Avenue	18,493	60	116	242	67.7	18,616	60	116	244	67.7	0.0

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 CNEL = Community Noise Equivalent Level dBA = A-weighted decibels ft = foot/feet

Table O: Opening Year (2021) 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
Juniper Avenue between Project Driveway 1 and Slover Avenue	917	< 50	< 50	< 50	50.3	1,019	< 50	< 50	< 50	50.9	0.6
Slover Avenue Between Cypress Avenue and Juniper Avenue	16,058	< 50	106	221	67.1	16,138	< 50	106	222	67.1	0.0
Slover Avenue Between Juniper Avenue and Project Driveway 2	20,869	64	125	263	68.2	20,971	64	125	263	68.2	0.0
Slover Avenue Between Project Driveway 2 and Sierra Avenue	20,869	64	125	263	68.2	20,992	64	125	264	68.2	0.0

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 CNEL = Community Noise Equivalent Level dBA = A-weighted decibels ft = foot/feet

Long-Term Stationary Noise Impacts

Delivery trucks/truck loading and unloading activities, parking activities, and heating, ventilation, and air conditioning (HVAC) equipment associated with the project would potentially affect the existing off-site sensitive land uses. The following provides a detailed noise analysis and discussion of each stationary noise source.

Truck Delivery and Truck Loading and Unloading Activities

Truck delivery and truck loading/unloading activities for the proposed project would be located on the northeast corner of the proposed building, as shown on Figure 2. These activities would take place both during daytime and nighttime hours. Noise levels generated from these activities would result in a maximum noise similar to noise readings from truck delivery and truck loading and unloading activities for other projects measures by LSA, which were determined to generate a noise level of 75 dBA L_{max} at 50 ft. Although a typical truck-unloading process takes an average of 15–20 minutes, this maximum noise level occurs in a much shorter period of time (less than 5 minutes). Also, it is estimated that there would be approximately five delivery trucks per hour and that each truck would generate the maximum noise level for a cumulative period of 5 minutes, which would result in a cumulative period of 25 minutes in any hour. Based on the assumptions above, truck delivery and truck loading and unloading activities would generate a noise level of 71.2 dBA L_{eq} at 50 ft. The closest residential property lines to the project's truck delivery and truck loading/unloading activities are approximately 140 ft north, 95 ft east, and 350 ft southwest of the project site. The proposed 12 ft high wall on the north and the east sides of the project site would provide a minimum noise reduction of 14 dBA for the single-family residences north of the project site and mobile homes east of the project site. Also, the proposed building would be approximately 35 ft in height and would provide a minimum noise reduction of 14 dBA due to shielding for residences southwest of the project site.

Parking Lot Activity

The proposed project would include surface parking on the north and the east sides of the project site for employees. Noise generated from parking lot activities would include noise generated by vehicles traveling at slow speeds, engine start-up noise, 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. It is assumed that parking activities would generate the maximum noise level for a cumulative period of 15 minutes in any hour and that parking activities would generate a noise level of 64.0 dBA L_{eq} at 50 ft. The closest residential property line to the project's employee parking lot are approximately 12 ft north, 12 ft east, and 365 ft southwest of the project site. The proposed 12 ft high wall on the north and the east sides of the project site would provide a minimum noise reduction of 14 dBA for the single-family residences north of the project site and mobile homes east of the project site.

HVAC Equipment

The proposed project would include up to two rooftop HVAC units with 4 ft high parapets. The HVAC equipment could operate 24 hours per day. Each rooftop HVAC unit would generate a noise level of 66.6 dBA L_{eq} at a distance of 5 ft. A total of two HVAC units operating simultaneously would generate a noise level of 69.6 dBA L_{eq} at a distance of 5 ft. At a distance of 50 ft, HVAC noise levels

would be 49.6 dBA L_{eq}. The closest residential property lines to the proposed rooftop HVAC equipment are approximately 80 ft north, 115 ft east, and 205 ft southwest of the project site. The rooftop HVAC equipment would be shielded by the roofline and 4 ft high parapet, which would provide a minimum noise reduction of 8 dBA.

Table P shows the individual stationary noise source from delivery and truck loading and unloading activities, employee parking activities, and rooftop HVAC equipment at each residential property line as well as the distance attenuation, noise reduction from shielding, and the combined stationary noise level at each residential property line. As shown in Table P, the combined stationary noise level is 62.6, 62.8, and 47.7 dBA L_{eq} at the residential property lines to the north, the east, and the southwest, respectively. These noise levels would not exceed the City's exterior daytime and nighttime noise standards of 70 dBA and 65 dBA, respectively. Therefore, no noise impacts from project operations would occur. No noise reduction measures are required.

Long-Term Vibration Impacts

The proposed project would not generate vibration. In addition, vibration levels generated from project-related traffic on the adjacent roadways (Juniper Avenue and Slover Avenue) are unusual for on-road vehicles because the rubber tires and suspension systems of on-road vehicles provide vibration isolation. Therefore, no vibration impacts from project-related operations would occur, and no vibration reduction measures are required.

STANDARD CONDITIONS

Implementation of the following best construction practices would further minimize construction noise:

- The construction contractor shall limit construction activities to between the hours of 7:00 a.m. and 7:00 p.m. on weekdays and between the hours of 8:00 a.m. and 5:00 p.m. on Saturdays. Construction is prohibited outside of these hours.

- During all project site excavation and grading, the project contractors shall equip all construction equipment, fixed or mobile, with properly operating and maintained mufflers consistent with manufacturers' standards.

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

- The construction contractor shall place all stationary construction equipment so that the emitted noise is directed away from the sensitive receptors nearest the project site. Sensitive receptors nearest to the project site include residences south of the project site across Boyle Avenue.

Table P: Stationary Noise Levels

Land Use	Direction	Noise Source	Reference Noise Level at 50 ft (dBA L_{eq})	Distance from Source to Receptor (ft)	Distance Attenuation (dBA)	Shielding (dBA)	Noise Level (dBA L_{eq})	Combined Noise Level (dBA L_{eq})
Residential	North	Truck Delivery and Truck Loading and Unloading Activities	71.2	140	8.9	14[1]	48.3	62.6
		Parking Activities	64.0	12	-12.4	14[1]	62.4	
		HVAC Noise	49.6	80	4.1	8[2]	37.5	
Residential	East	Truck Delivery and Truck Loading and Unloading Activities	71.2	95	5.6	14[1]	51.6	62.8
		Parking Activities	64.0	12	-12.4	14[1]	62.4	
		HVAC Noise	49.6	115	27.2	8[2]	34.4	
Residential	Southwest	Truck Delivery and Truck Loading and Unloading Activities	71.2	350	16.9	14[3]	40.3	47.7
		Parking Activities	64.0	365	17.3	0	46.7	
		HVAC Noise	49.6	205	12.3	8[2]	29.3	

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

[1] The proposed 12 ft high wall would provide a minimum noise reduction of 14 dBA.

[2] The 4 ft high parapet and roofline would provide a minimum noise reduction of 8 dBA.

[3] The proposed building would be approximately 35 ft in height and would provide a minimum noise reduction of 14 dBA.

dBA = A-weighted decibels

ft = feet

HVAC = heating, ventilation, and air conditioning

L_{eq} = equivalent continuous sound level

REDUCTION MEASURES

Short-Term Construction Noise Impacts

No noise reduction measures are required.

Short-Term Construction Vibration Impacts

The following measure would minimize short-term construction-related vibration impacts resulting from the proposed project:

- The construction contractor shall restrict heavy construction (e.g., large bulldozers) or require the use of light construction equipment (e.g., small bulldozers and trucks) within 5 ft of the northern project construction boundary (15 ft from the residential structure) and 7 ft of the eastern project construction boundary (15 ft from the residential structure). Temporary on-site signage in the immediate proximity of the northern and eastern project construction boundary shall be erected notifying construction personnel of the prohibition. The erection of appropriate signage shall be verified by an acoustical engineer on the first day of demolition and construction activities and pursuant to a weekly schedule thereafter. This measure shall be implemented to the satisfaction of the City Building Official and Community Development Department.

Aircraft Noise Impacts

No noise reduction measures are required.

Traffic Noise Impacts

No noise reduction measures are required.

Long-Term Stationary Noise Impacts

No noise reduction measures are required.

Long-Term Vibration Impacts

No vibration reduction measures are required.

Attachments: A: References
B: Figures
C: FHWA Traffic Noise Model Printouts

ATTACHMENT A

REFERENCES

City of Fontana. 2018. *General Plan Update 2015–2035, Noise Element*. November 13.

_____. 2020. *Municipal Code*. May.

City of Ontario. 2011. *LA/Ontario International Airport Land Use Compatibility Plan.* April 19. Website: http://www.ontarioplan.org/wp-content/uploads/sites/4/pdfs/ALUCP_FULL.pdf (accessed July 2020.)

Federal Highway Administration (FHWA). 1977. *Highway Traffic Noise Prediction Model*, FHWA RD 77 108.

_____. 2006. *Highway Construction Noise Handbook*. Roadway Construction Noise Model, FHWA-HEP-06-015. DOT-VNTSC-FHWA-06-02. NTIS No. PB2006-109012. August.

Federal Transit Administration (FTA). 2018. *Transit Noise and Vibration Impact Assessment Manual*. FTA Report No. 0123. September. Website: https://www.transit.dot.gov/sites/fta.dot.gov/files/docs/research-innovation/118131/transit-noise-and-vibration-impact-assessment-manual-fta-report-no-0123_0.pdf (accessed July 2020).

Harris, Cyril M., editor. 1991. *Handbook of Acoustical Measurements and Noise Control*. Third Edition.

LSA Associates, Inc. 2020a. *Focused Traffic Impact Analysis for the Transwestern Building 1 Project*. May.

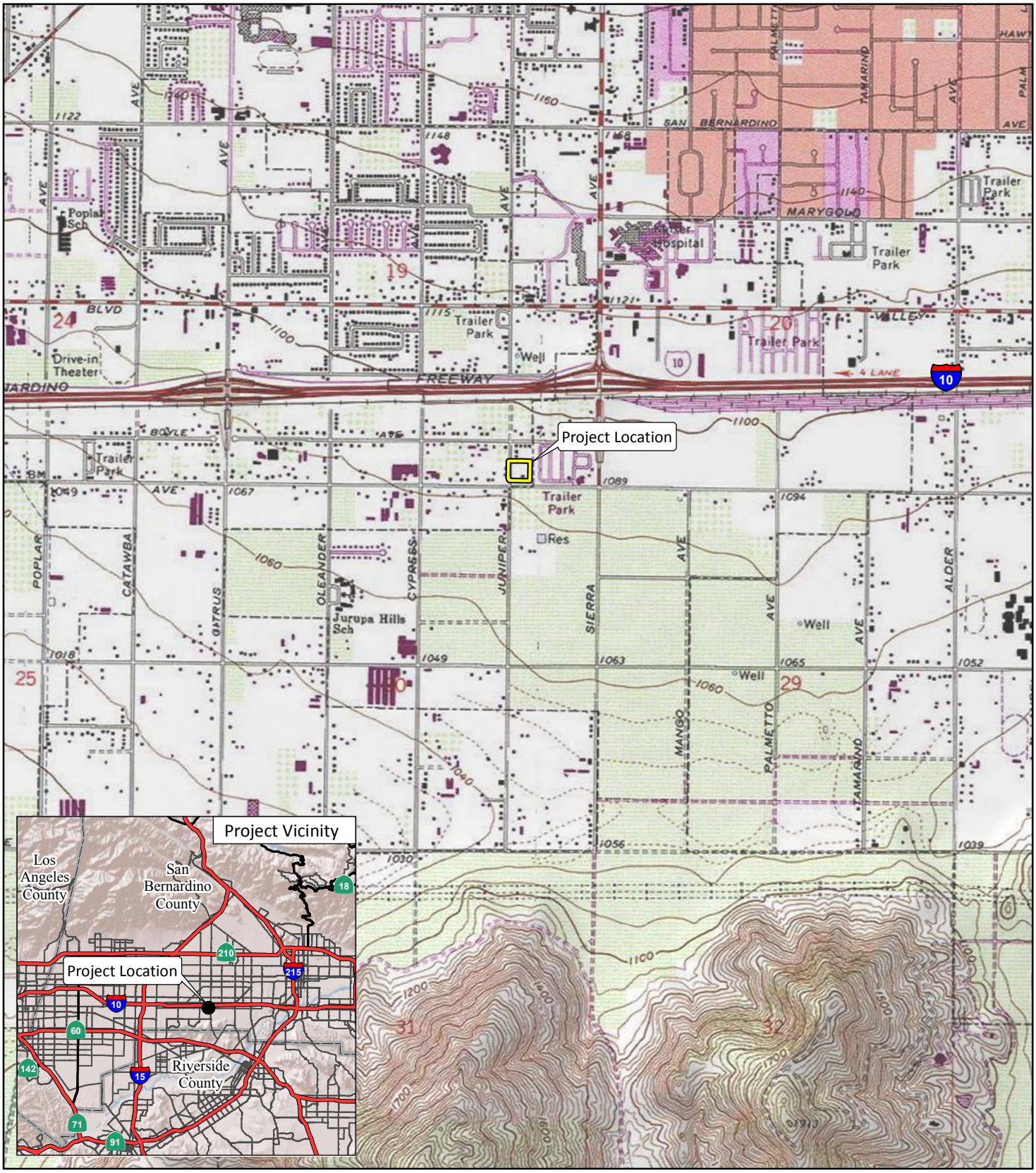
_____. 2020b. *Slover-Juniper Industrial Building Project Trip Generation Memorandum*. July 15.

Riverside County Airport Land Use Commission. 2004. *Riverside County Airport Land Use Compatibility Plan*, October 14. Website: http://www.rcaluc.org/Plans/New-Compatibility-Plan (accessed July 2020).

United States Geological Survey. 1980. 7.5-Minute Series *Fontana, California* Quadrangle.

ATTACHMENT B

FIGURES



LSA

LEGEND

Project Location

FIGURE 1

N

0 1000 2000

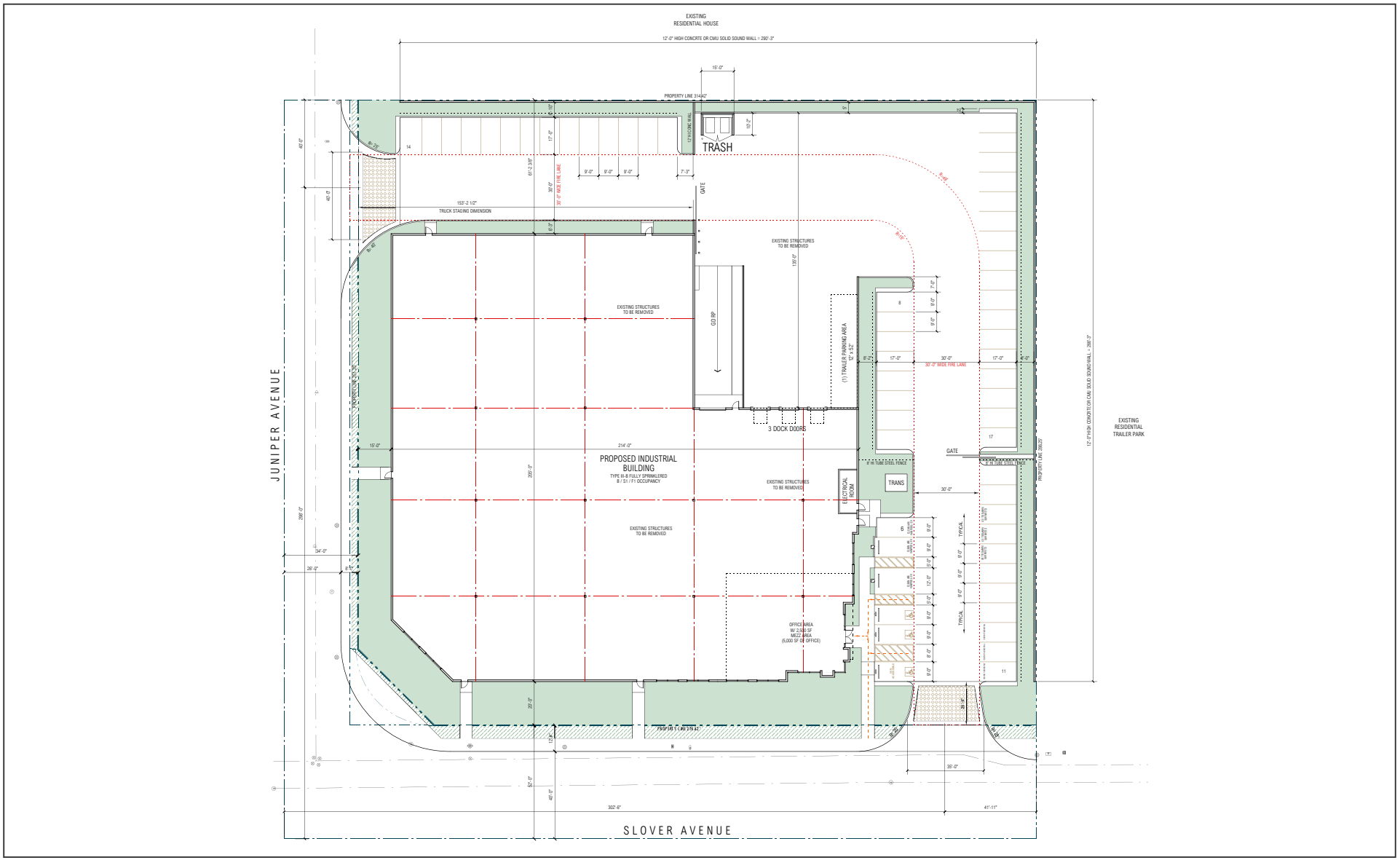
FEET

Slover-Juniper Industrial Building Project

Regional and Project Location

SOURCE: USGS 7.5' Quad - *Fontana* (1980), CA

I:\LBB2001\GIS\MXD\ProjectLocation_USGS.mxd (6/17/2020)



LSA

FIGURE 2

N

0 40 80

FEET

SOURCE: RGA Office of Architecture and Design

I:\LBB2001\G\Site_Plan.ai (7/15/2020)

Slover-Juniper Industrial Building Project

Site Plan

LSA

LEGEND

Project Location

LT-1 Long-term Noise Monitoring Location

ST-1 Short-term Noise Monitoring Location

FIGURE 3

N

0 75 150

FEET

SOURCE: Google Earth, 2020

Slover-Juniper Industrial Building Project

Noise Monitoring Locations

I:\LBB2001\G\Noise_Monitoring_Locs.ai (8/11/2020)

ATTACHMENT C

FHWA HIGHWAY TRAFFIC NOISE MODEL PRINTOUTS

TABLE Existing NP-01
FHWA ROADWAY NOISE LEVEL ANALYSIS

RUN DATE: 07/14/2020
ROADWAY SEGMENT: Juniper Avenue between Project Driveway 1 and Slover Avenue
NOTES: Slover-Juniper Industrial Building - Existing NP

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* * ASSUMPTIONS * *

AVERAGE DAILY TRAFFIC: 465 SPEED (MPH): 25 GRADE: .5

TRAFFIC DISTRIBUTION PERCENTAGES

	DAY	EVENING	NIGHT
AUTOS	75.51	12.57	9.34
M-TRUCKS	1.56	0.09	0.19
H-TRUCKS	0.64	0.02	0.08

ACTIVE HALF-WIDTH (FT): 6 SITE CHARACTERISTICS: SOFT

---

* * CALCULATED NOISE LEVELS * *

CNEL AT 50 FT FROM NEAR TRAVEL LANE CENTERLINE (dB) = 47.40

DISTANCE (FEET) FROM ROADWAY CENTERLINE TO CNEL

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

TABLE Existing NP-02
FHWA ROADWAY NOISE LEVEL ANALYSIS

RUN DATE: 07/14/2020
ROADWAY SEGMENT: Slover Avenue Between Cypress Avenue and Juniper Avenue
NOTES: Slover-Juniper Industrial Building - Existing NP

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* * ASSUMPTIONS * *

AVERAGE DAILY TRAFFIC: 14045 SPEED (MPH): 45 GRADE: .5

TRAFFIC DISTRIBUTION PERCENTAGES

	DAY	EVENING	NIGHT
AUTOS	75.51	12.57	9.34
M-TRUCKS	1.56	0.09	0.19
H-TRUCKS	0.64	0.02	0.08

ACTIVE HALF-WIDTH (FT): 30 SITE CHARACTERISTICS: SOFT

---

* * CALCULATED NOISE LEVELS * *

CNEL AT 50 FT FROM NEAR TRAVEL LANE CENTERLINE (dB) = 66.48

DISTANCE (FEET) FROM ROADWAY CENTERLINE TO CNEL

70 CNEL	65 CNEL	60 CNEL	55 CNEL
0.0	97.7	202.6	432.5

TABLE Existing NP-03
FHWA ROADWAY NOISE LEVEL ANALYSIS

RUN DATE: 07/14/2020
ROADWAY SEGMENT: Slover Avenue Between Juniper Avenue and Project Driveway 2
NOTES: Slover-Juniper Industrial Building - Existing NP

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* * ASSUMPTIONS * *

AVERAGE DAILY TRAFFIC: 18493 SPEED (MPH): 45 GRADE: .5

TRAFFIC DISTRIBUTION PERCENTAGES

	DAY	EVENING	NIGHT
AUTOS	75.51	12.57	9.34
M-TRUCKS	1.56	0.09	0.19
H-TRUCKS	0.64	0.02	0.08

ACTIVE HALF-WIDTH (FT): 30 SITE CHARACTERISTICS: SOFT

---

* * CALCULATED NOISE LEVELS * *

CNEL AT 50 FT FROM NEAR TRAVEL LANE CENTERLINE (dB) = 67.67

DISTANCE (FEET) FROM ROADWAY CENTERLINE TO CNEL

70 CNEL	65 CNEL	60 CNEL	55 CNEL
59.9	115.7	242.5	519.1

TABLE Existing NP-04
FHWA ROADWAY NOISE LEVEL ANALYSIS

RUN DATE: 07/14/2020
ROADWAY SEGMENT: Slover Avenue Between Project Driveway 2 and Sierra Avenue
NOTES: Slover-Juniper Industrial Building - Existing NP

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* * ASSUMPTIONS * *

AVERAGE DAILY TRAFFIC: 18493 SPEED (MPH): 45 GRADE: .5

TRAFFIC DISTRIBUTION PERCENTAGES

	DAY	EVENING	NIGHT
AUTOS	75.51	12.57	9.34
M-TRUCKS	1.56	0.09	0.19
H-TRUCKS	0.64	0.02	0.08

ACTIVE HALF-WIDTH (FT): 30 SITE CHARACTERISTICS: SOFT

---

* * CALCULATED NOISE LEVELS * *

CNEL AT 50 FT FROM NEAR TRAVEL LANE CENTERLINE (dB) = 67.67

DISTANCE (FEET) FROM ROADWAY CENTERLINE TO CNEL

70 CNEL	65 CNEL	60 CNEL	55 CNEL
59.9	115.7	242.5	519.1

TABLE Existing P-01
FHWA ROADWAY NOISE LEVEL ANALYSIS

RUN DATE: 07/14/2020
ROADWAY SEGMENT: Juniper Avenue between Project Driveway 1 and Slover Avenue
NOTES: Slover-Juniper Industrial Building - Existing P

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* * ASSUMPTIONS * *

AVERAGE DAILY TRAFFIC: 567 SPEED (MPH): 25 GRADE: .5

TRAFFIC DISTRIBUTION PERCENTAGES

	DAY	EVENING	NIGHT
AUTOS	75.09	12.47	9.28
M-TRUCKS	1.72	0.08	0.22
H-TRUCKS	1.00	0.02	0.13

ACTIVE HALF-WIDTH (FT): 6 SITE CHARACTERISTICS: SOFT

---

* * CALCULATED NOISE LEVELS * *

CNEL AT 50 FT FROM NEAR TRAVEL LANE CENTERLINE (dB) = 49.01

DISTANCE (FEET) FROM ROADWAY CENTERLINE TO CNEL

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

TABLE Existing P-02
FHWA ROADWAY NOISE LEVEL ANALYSIS

RUN DATE: 07/14/2020
ROADWAY SEGMENT: Slover Avenue Between Cypress Avenue and Juniper Avenue
NOTES: Slover-Juniper Industrial Building - Existing P

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* * ASSUMPTIONS * *

AVERAGE DAILY TRAFFIC: 14125 SPEED (MPH): 45 GRADE: .5

TRAFFIC DISTRIBUTION PERCENTAGES

	DAY	EVENING	NIGHT
AUTOS	75.51	12.57	9.34
M-TRUCKS	1.56	0.09	0.19
H-TRUCKS	0.64	0.02	0.08

ACTIVE HALF-WIDTH (FT): 30 SITE CHARACTERISTICS: SOFT

---

* * CALCULATED NOISE LEVELS * *

CNEL AT 50 FT FROM NEAR TRAVEL LANE CENTERLINE (dB) = 66.50

DISTANCE (FEET) FROM ROADWAY CENTERLINE TO CNEL

70 CNEL	65 CNEL	60 CNEL	55 CNEL
0.0	98.0	203.3	434.1

TABLE Existing P-03
FHWA ROADWAY NOISE LEVEL ANALYSIS

RUN DATE: 07/14/2020
ROADWAY SEGMENT: Slover Avenue Between Juniper Avenue and Project Driveway 2
NOTES: Slover-Juniper Industrial Building - Existing P

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* * ASSUMPTIONS * *

AVERAGE DAILY TRAFFIC: 18595 SPEED (MPH): 45 GRADE: .5

TRAFFIC DISTRIBUTION PERCENTAGES

	DAY	EVENING	NIGHT
AUTOS	75.51	12.57	9.34
M-TRUCKS	1.56	0.09	0.19
H-TRUCKS	0.64	0.02	0.08

ACTIVE HALF-WIDTH (FT): 30 SITE CHARACTERISTICS: SOFT

---

* * CALCULATED NOISE LEVELS * *

CNEL AT 50 FT FROM NEAR TRAVEL LANE CENTERLINE (dB) = 67.69

DISTANCE (FEET) FROM ROADWAY CENTERLINE TO CNEL

70 CNEL	65 CNEL	60 CNEL	55 CNEL
60.1	116.1	243.3	521.0

TABLE Existing P-04
FHWA ROADWAY NOISE LEVEL ANALYSIS

RUN DATE: 07/14/2020
ROADWAY SEGMENT: Slover Avenue Between Project Driveway 2 and Sierra Avenue
NOTES: Slover-Juniper Industrial Building - Existing P

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* * ASSUMPTIONS * *

AVERAGE DAILY TRAFFIC: 18616 SPEED (MPH): 45 GRADE: .5

TRAFFIC DISTRIBUTION PERCENTAGES

	DAY	EVENING	NIGHT
AUTOS	75.51	12.57	9.34
M-TRUCKS	1.56	0.09	0.19
H-TRUCKS	0.64	0.02	0.08

ACTIVE HALF-WIDTH (FT): 30 SITE CHARACTERISTICS: SOFT

---

* * CALCULATED NOISE LEVELS * *

CNEL AT 50 FT FROM NEAR TRAVEL LANE CENTERLINE (dB) = 67.70

DISTANCE (FEET) FROM ROADWAY CENTERLINE TO CNEL

70 CNEL	65 CNEL	60 CNEL	55 CNEL
60.1	116.1	243.5	521.4

TABLE 2021 NP-01
FHWA ROADWAY NOISE LEVEL ANALYSIS

RUN DATE: 07/14/2020
ROADWAY SEGMENT: Juniper Avenue between Project Driveway 1 and Slover Avenue
NOTES: Slover-Juniper Industrial Building - 2021 NP

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* * ASSUMPTIONS * *

AVERAGE DAILY TRAFFIC: 917 SPEED (MPH): 25 GRADE: .5

TRAFFIC DISTRIBUTION PERCENTAGES

	DAY	EVENING	NIGHT
AUTOS	75.51	12.57	9.34
M-TRUCKS	1.56	0.09	0.19
H-TRUCKS	0.64	0.02	0.08

ACTIVE HALF-WIDTH (FT): 6 SITE CHARACTERISTICS: SOFT

---

* * CALCULATED NOISE LEVELS * *

CNEL AT 50 FT FROM NEAR TRAVEL LANE CENTERLINE (dB) = 50.35

DISTANCE (FEET) FROM ROADWAY CENTERLINE TO CNEL

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

TABLE 2021 NP-02
FHWA ROADWAY NOISE LEVEL ANALYSIS

RUN DATE: 07/14/2020
ROADWAY SEGMENT: Slover Avenue Between Cypress Avenue and Juniper Avenue
NOTES: Slover-Juniper Industrial Building - 2021 NP

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* * ASSUMPTIONS * *

AVERAGE DAILY TRAFFIC: 16058 SPEED (MPH): 45 GRADE: .5

TRAFFIC DISTRIBUTION PERCENTAGES

	DAY	EVENING	NIGHT
AUTOS	75.51	12.57	9.34
M-TRUCKS	1.56	0.09	0.19
H-TRUCKS	0.64	0.02	0.08

ACTIVE HALF-WIDTH (FT): 30 SITE CHARACTERISTICS: SOFT

---

* * CALCULATED NOISE LEVELS * *

CNEL AT 50 FT FROM NEAR TRAVEL LANE CENTERLINE (dB) = 67.06

DISTANCE (FEET) FROM ROADWAY CENTERLINE TO CNEL

70 CNEL	65 CNEL	60 CNEL	55 CNEL
0.0	106.0	221.1	472.7

TABLE 2021 NP-03
FHWA ROADWAY NOISE LEVEL ANALYSIS

RUN DATE: 07/14/2020
ROADWAY SEGMENT: Slover Avenue Between Juniper Avenue and Project Driveway 2
NOTES: Slover-Juniper Industrial Building - 2021 NP

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* * ASSUMPTIONS * *

AVERAGE DAILY TRAFFIC: 20869 SPEED (MPH): 45 GRADE: .5

TRAFFIC DISTRIBUTION PERCENTAGES

	DAY	EVENING	NIGHT
AUTOS	75.51	12.57	9.34
M-TRUCKS	1.56	0.09	0.19
H-TRUCKS	0.64	0.02	0.08

ACTIVE HALF-WIDTH (FT): 30 SITE CHARACTERISTICS: SOFT

---

* * CALCULATED NOISE LEVELS * *

CNEL AT 50 FT FROM NEAR TRAVEL LANE CENTERLINE (dB) = 68.20

DISTANCE (FEET) FROM ROADWAY CENTERLINE TO CNEL

70 CNEL	65 CNEL	60 CNEL	55 CNEL
63.7	124.7	262.5	562.5

TABLE 2021 NP-04
FHWA ROADWAY NOISE LEVEL ANALYSIS

RUN DATE: 07/14/2020
ROADWAY SEGMENT: Slover Avenue Between Project Driveway 2 and Sierra Avenue
NOTES: Slover-Juniper Industrial Building - 2021 NP

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* * ASSUMPTIONS * *

AVERAGE DAILY TRAFFIC: 20869 SPEED (MPH): 45 GRADE: .5

TRAFFIC DISTRIBUTION PERCENTAGES

	DAY	EVENING	NIGHT
AUTOS	75.51	12.57	9.34
M-TRUCKS	1.56	0.09	0.19
H-TRUCKS	0.64	0.02	0.08

ACTIVE HALF-WIDTH (FT): 30 SITE CHARACTERISTICS: SOFT

---

* * CALCULATED NOISE LEVELS * *

CNEL AT 50 FT FROM NEAR TRAVEL LANE CENTERLINE (dB) = 68.20

DISTANCE (FEET) FROM ROADWAY CENTERLINE TO CNEL

70 CNEL	65 CNEL	60 CNEL	55 CNEL
63.7	124.7	262.5	562.5

TABLE 2021 P-01
FHWA ROADWAY NOISE LEVEL ANALYSIS

RUN DATE: 07/14/2020
ROADWAY SEGMENT: Juniper Avenue between Project Driveway 1 and Slover Avenue
NOTES: Slover-Juniper Industrial Building - 2021 P

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* * ASSUMPTIONS * *

AVERAGE DAILY TRAFFIC: 1019 SPEED (MPH): 25 GRADE: .5

TRAFFIC DISTRIBUTION PERCENTAGES

	DAY	EVENING	NIGHT
AUTOS	76.47	11.98	8.91
M-TRUCKS	1.54	0.08	0.19
H-TRUCKS	0.72	0.02	0.09

ACTIVE HALF-WIDTH (FT): 6 SITE CHARACTERISTICS: SOFT

---

* * CALCULATED NOISE LEVELS * *

CNEL AT 50 FT FROM NEAR TRAVEL LANE CENTERLINE (dB) = 50.92

DISTANCE (FEET) FROM ROADWAY CENTERLINE TO CNEL

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

TABLE 2021 P-02
FHWA ROADWAY NOISE LEVEL ANALYSIS

RUN DATE: 07/14/2020
ROADWAY SEGMENT: Slover Avenue Between Cypress Avenue and Juniper Avenue
NOTES: Slover-Juniper Industrial Building - 2021 P

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* * ASSUMPTIONS * *

AVERAGE DAILY TRAFFIC: 16138 SPEED (MPH): 45 GRADE: .5

TRAFFIC DISTRIBUTION PERCENTAGES

	DAY	EVENING	NIGHT
AUTOS	75.53	12.56	9.33
M-TRUCKS	1.56	0.09	0.19
H-TRUCKS	0.64	0.02	0.08

ACTIVE HALF-WIDTH (FT): 30 SITE CHARACTERISTICS: SOFT

---

* * CALCULATED NOISE LEVELS * *

CNEL AT 50 FT FROM NEAR TRAVEL LANE CENTERLINE (dB) = 67.08

DISTANCE (FEET) FROM ROADWAY CENTERLINE TO CNEL

70 CNEL	65 CNEL	60 CNEL	55 CNEL
0.0	106.3	221.7	474.2

TABLE 2021 P-03
FHWA ROADWAY NOISE LEVEL ANALYSIS

RUN DATE: 07/14/2020
ROADWAY SEGMENT: Slover Avenue Between Juniper Avenue and Project Driveway 2
NOTES: Slover-Juniper Industrial Building - 2021 P

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* * ASSUMPTIONS * *

AVERAGE DAILY TRAFFIC: 20971 SPEED (MPH): 45 GRADE: .5

TRAFFIC DISTRIBUTION PERCENTAGES

	DAY	EVENING	NIGHT
AUTOS	75.52	12.56	9.33
M-TRUCKS	1.56	0.09	0.19
H-TRUCKS	0.64	0.02	0.08

ACTIVE HALF-WIDTH (FT): 30 SITE CHARACTERISTICS: SOFT

---

* * CALCULATED NOISE LEVELS * *

CNEL AT 50 FT FROM NEAR TRAVEL LANE CENTERLINE (dB) = 68.22

DISTANCE (FEET) FROM ROADWAY CENTERLINE TO CNEL

70 CNEL	65 CNEL	60 CNEL	55 CNEL
63.9	125.1	263.3	564.2

TABLE 2021 P-04
FHWA ROADWAY NOISE LEVEL ANALYSIS

RUN DATE: 07/14/2020
ROADWAY SEGMENT: Slover Avenue Between Project Driveway 2 and Sierra Avenue
NOTES: Slover-Juniper Industrial Building - 2021 P

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* * ASSUMPTIONS * *

AVERAGE DAILY TRAFFIC: 20992 SPEED (MPH): 45 GRADE: .5

TRAFFIC DISTRIBUTION PERCENTAGES

	DAY	EVENING	NIGHT
AUTOS	75.51	12.57	9.34
M-TRUCKS	1.56	0.09	0.19
H-TRUCKS	0.64	0.02	0.08

ACTIVE HALF-WIDTH (FT): 30 SITE CHARACTERISTICS: SOFT

---

* * CALCULATED NOISE LEVELS * *

CNEL AT 50 FT FROM NEAR TRAVEL LANE CENTERLINE (dB) = 68.22

DISTANCE (FEET) FROM ROADWAY CENTERLINE TO CNEL

70 CNEL	65 CNEL	60 CNEL	55 CNEL
63.9	125.2	263.5	564.8
