NOISE AND VIBRATION IMPACT ANALYSIS

PHILADELPHIA STREET INDUSTRIAL DEVELOPMENT SITE AND EAST END ANNEXATION PROJECT

CHINO, SAN BERNARDINO COUNTY, CALIFORNIA

LSA

June 2023

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CHINO, SAN BERNARDINO COUNTY, CALIFORNIA

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LIST OF ABBREVIATIONS AND ACRONYMS

ADT	average daily traffic
ALUCP	Airport Land Use Compatibility Plan
CalEEMod	California Emissions Estimator Model
CEQA	California Environmental Quality Act
City	City of Chino
CNEL	Community Noise Equivalent Level
County	County of San Bernardino
dB	decibel
dBA	A-weighted decibels
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
ONT ALUCP	Ontario International Airport Land Use Compatibility Plan
ONT IAC	Ontario International Airport – Inter Agency Collaborative
PPV	peak particle velocity
project	Philadelphia Street Industrial Center Project
RMS	root-mean-square (velocity)
sf	square foot
VdB	vibration velocity decibels

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 construction and operation of the proposed Philadelphia Street Industrial Center Project (project) in Chino, California. This report is intended to satisfy City of Chino (City) requirements and the California Environmental Quality Act (CEQA) for a project-specific noise and vibration impact analysis by examining the impacts to adjacent land uses and identifying reduction measures that the project requires.

PROJECT LOCATION

The proposed project site is on the northwest corner of East End Avenue and Philadelphia Street, currently within unincorporated San Bernardino County. Annexation of the proposed project site will bring the proposed project under the jurisdiction of the City of Chino. The project location and vicinity are shown in Figure 1.

PROJECT DESCRIPTION

The proposed project would develop a 395,500-square-foot (sf) industrial warehouse building. The proposed warehouse project would include 6,000 sf of general office space, 6,000 sf of mezzanine, tractor trailer loading docks, and both auto and truck parking spaces. The proposed project construction schedule would begin in March 2023 and would be completed in August 2024.

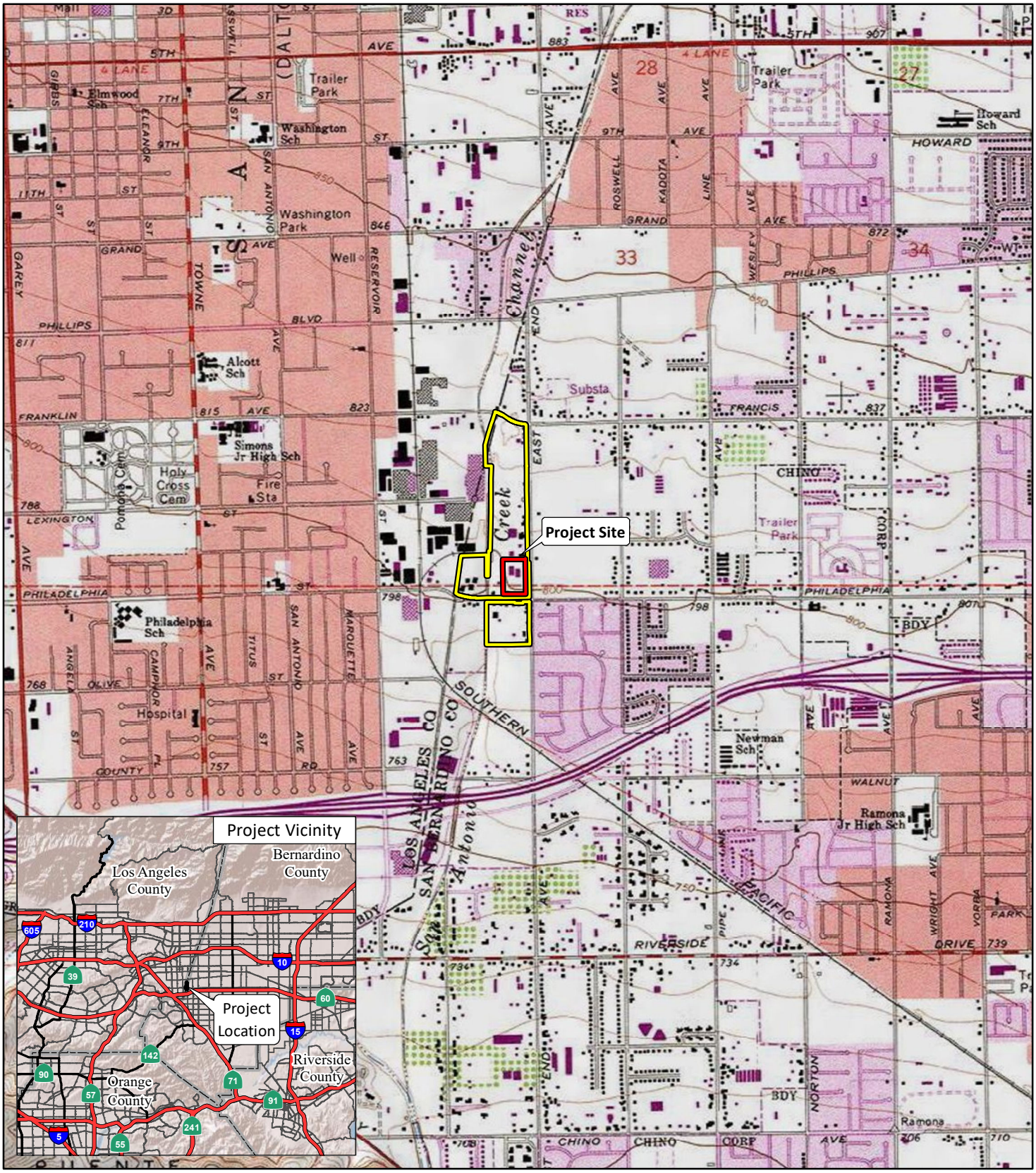
The proposed project is a light industrial center that includes three small tilt-up concrete style warehouses totaling 63,900 sf of gross building area on 3.59 acres. The proposed project includes a total of 99 parking spaces for the three buildings. Figure 2 shows the site plan.

The project includes the following entitlement actions:

1. Prezone and Annexation (PL 20-0003) to annex approximately 56.64 acres of land from San Bernardino County with zoning designations of Regional Industrial (IR), Community Industrial (IC), and Single-Family Residential (RS-20M) to the City of Chino and change the zone to Light Industrial (M1) and General Industrial (M2).

2. Site Approval (PL 20-0004) to allow construction of three industrial buildings totaling 63,900 sf, associated infrastructure, parking, sidewalk, and other site improvements required by the City.

3. Tentative Parcel Map No. 20174 (PL 20-0005) to subdivide 3.59 gross acres of land into three parcels for development of three light industrial warehouse buildings with office space.



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LEGEND

Project Location

East End Annexation Area

Industrial Development Site

FIGURE 1

0 1000 2000

FEET

SOURCE: USA Topo Maps (2022)

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Philadelphia Street Industrial Development Site and East End Annexation Project

Project Location and Regional Vicinity

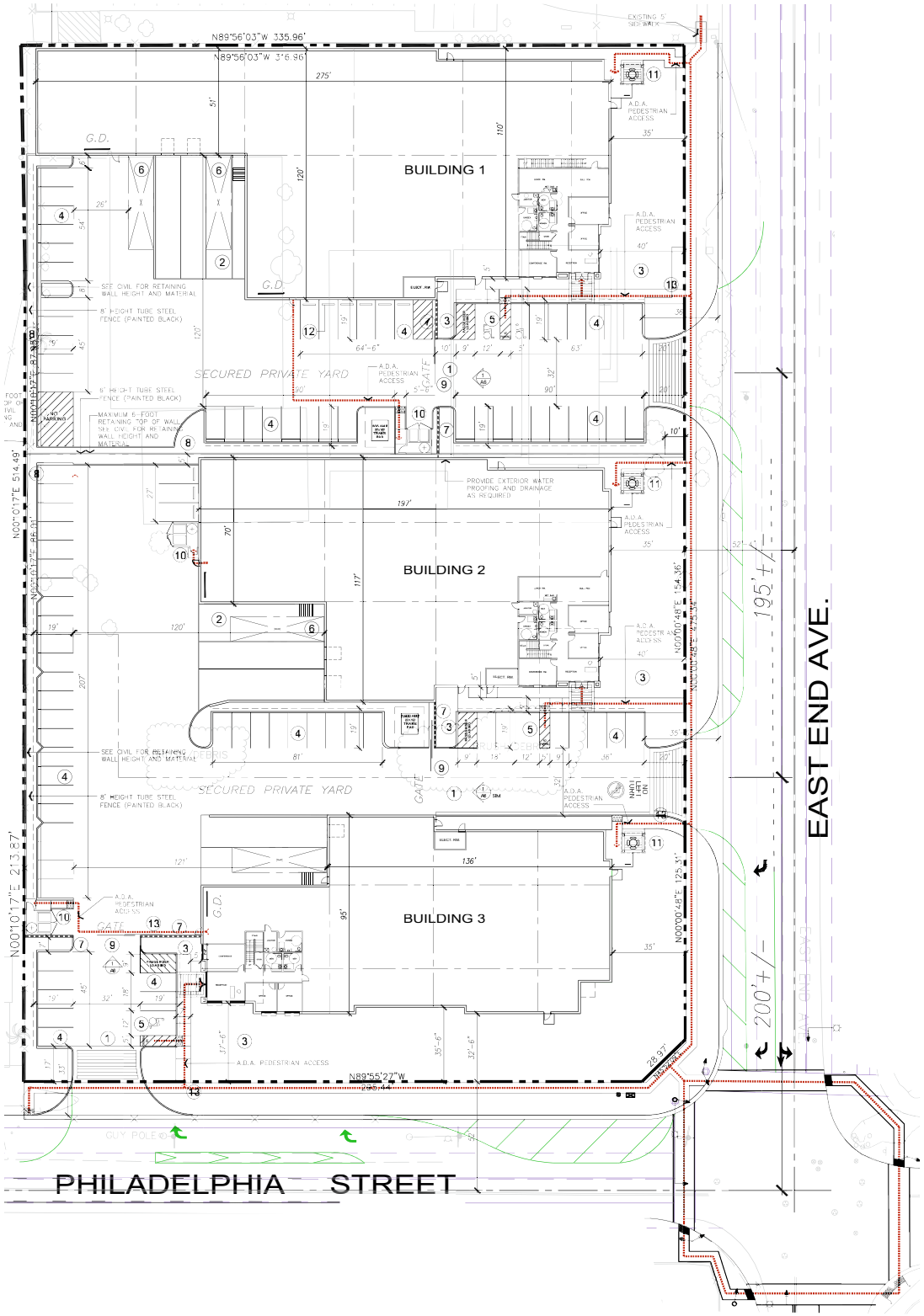

FIGURE 4

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N

0 50 100

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SOURCE: AO Architecture Design

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Philadelphia Street Industrial Development Site and East End Annexation Project

Proposed Industrial Development Site Plan

Land Uses in the Project Vicinity

Existing surrounding land uses within the project area consist of residential and industrial uses. Single-family residences are located to the east across East End Avenue, southeast across the East End Avenue and Philadelphia Street intersection, to the south across Philadelphia Street, and immediately west of the project site. Industrial uses are immediately north (Scott Brothers Dairy), south across Philadelphia Street (T&R Environmental Services), and immediately west (Southwest Rebar) of the project site. The residential and industrial uses to the south across Philadelphia Street and immediately north and west are in San Bernardino County and would be annexed to Chino as part of the project. Single-family residences located southeast across the East End Avenue and Philadelphia Street intersection are in Chino, and single-family residences east across East End Avenue would remain in San Bernardino County.

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 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 units of measurement that use a linear scale (e.g., inches or pounds), decibels use a scale based on powers of 10.

For example, 10 decibels (dB) is 10 times more intense than 0 dB, 20 dB is 100 times more intense than 0 dB, and 30 dB is 1,000 times more intense than 0 dB. Thirty decibels (30 dB) represents 1,000 times as much acoustic energy as 0 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 L_{eq} and the Community Noise Equivalent Level (CNEL) or the day-night average noise 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 relaxation 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 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, L_{eq} and L_{50} are approximately the same.

Noise impacts can be described in three categories. The first category, audible impacts, refers to increases in noise levels noticeable to humans. Audible increases in noise levels generally involve a change of 3 dB or greater because that level has been found to be barely perceptible in exterior environments. The second category, potentially audible impacts, 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 involves 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 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, and Table B shows common sound levels and their noise sources.

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 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 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 (2004).

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. Outdoors, 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 (FTA 2018). 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 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 velocity 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. The vibration velocity level in decibels is defined as the following:

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

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.

REGULATORY SETTING

Federal Guidelines

Federal Transit Administration

Vibration standards included in the Federal Transit Administration (FTA) *Transit Noise and Vibration Impact Assessment Manual* (FTA 2018) were used in this analysis because the City of Chino does not have construction vibration standards that have the potential to result in building damage. Table C lists the potential vibration building damage criteria associated with construction activities.

Local Regulations

City of Chino

General Plan Noise Element. The City's General Plan Noise Element (City of Chino 2010) lists objectives and policies to meet the City's noise-related goals and has established interior and exterior noise standards for various land uses shown in Table D. The following are the applicable goals, objectives, and policies for the proposed project.

Table C: 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) is 1 µin/sec.
µin/sec = microinches per second
FTA = Federal Transit Administration
in/sec = inches per second
L_V = vibration velocity in decibels
PPV = peak particle velocity
RMS = root-mean-square
VdB = vibration velocity decibels

Table D: City of Chino Interior and Exterior Noise Standards

Land Use Category	Uses	Noise Standard (dBA L_{dn})	
		Interior[1]	Exterior[2]
Residential	Single-family, duplex, multi-family	45[3]	65
	Mobile home	--	65[4]
Commercial, Industrial Institutional	Hotel, motel, transient lodging	45	65
	Commercial retail, bank, restaurant	55	--
	Office building, research and development, professional offices, City office building	50	--
	Amphitheatre, concert hall, auditorium, meeting hall	45	--
	Gymnasium (multipurpose)	50	--
	Sports club	55	--
	Manufacturing, warehousing, wholesale, utilities	65	--
	Movie theaters	45	--
Institutional	Hospital, schools, classroom	45	65
	Church, library	45	--
Open Space	Parks	--	65

Source: City of Chino General Plan 2025 Noise Element, Table N-3 (City of Chino 2010).
[1] Indoor environment excluding: bathrooms, toilets, closets, corridors.
[2] Outdoor environment limited to private yard of single-family or multi-family private patio or balcony which is served by a means of exit from inside, mobile home park, hospital patio, park's picnic area, school's playground, and hotel and motel recreation area.
[3] Noise level requirement with closed windows. Mechanical ventilation system or other means of natural ventilation shall be provided per the California Building Code.
[4] Exterior noise level should be such that interior noise levels will not exceed 45 dBA L_{dn}.
dBA = A-weighted decibels
L_{dn} = Day/night noise level

Goal N-1: Protect Chino Residents from excessive noise.

Objective N-1.1: Ensure appropriate exterior and interior noise levels for existing and new land uses.

P1. The City shall not locate noise-sensitive land uses (schools, medical centers and hospitals, senior centers, and residences) in areas with noise levels that exceed

those considered normally acceptable for each land use unless measures can be implemented to reduce noise to acceptable levels.

P2. The City shall require measures to ensure noise-sensitive uses have appropriate interior noise environments when located in areas adjacent to major noise generators.

P3. The City shall require measures that attenuate exterior and/or interior noise levels to acceptable levels to be incorporated into all development projects where current and/or future noise levels may be unacceptable.

P4. The City shall require a noise impact study to evaluate impacts of projects that may exceed 65 L_{dn} as part of the design review process.

P5. The City shall require an acoustical study for all new residential developments that lie within the 65 L_{dn} noise contour on the Future Noise Contour Map, to ensure indoor levels will not exceed City standards. In addition, the City shall continue to enforce the California Building Code for indoor noise levels.

P6. The City shall only approve projects which comply with adopted noise standards or meet the provisions of the California Environmental Quality Act.

P7. The City shall require noise reduction features to be used in the site planning process for new projects where current and/or future noise levels may be unacceptable. The focus of these efforts shall be site design techniques, so long as they do not conflict with the goals of the Community Character Element. Techniques include:

1. Designing landscaped building setbacks to serve as a buffer between the noise source and receptor.

2. Placing noise-tolerant land uses such as parking lots, maintenance facilities, and utility areas between the noise source and receptor.

3. Orienting buildings to shield noise-sensitive outdoor spaces from a noise source.

4. Locating bedrooms or balconies on the sides of buildings facing away from noise sources.

5. Utilizing noise barriers (e.g., fences, walls, or landscaped berms) to reduce adverse noise levels in noise-sensitive outdoor activity areas.

Objective N-1.3: Control sources of construction noise

P1. The City shall require a noise monitoring plan to be prepared and submitted prior to starting all construction projects. The noise monitoring plan shall identify

monitoring locations and frequency, instrumentation to be used, and appropriate noise control measures that will be incorporated.

P2. The City shall limit all construction in the vicinity of noise sensitive land uses, such as residences, hospitals, or senior centers, to daylight hours or 7:00 a.m. to 7:00 p.m. In addition, the following construction noise control measures shall be included as requirements at construction sites to minimize construction noise impacts:

- Equip all internal combustion engine-driven equipment with intake and exhaust mufflers that are in good condition and appropriate for the equipment.
- Ensure that during construction, trucks and equipment are running only when necessary.
- Shield all construction equipment with temporary noise barriers to reduce construction-related noise impacts.
- Locate stationary noise-generating equipment as far as possible from sensitive receptors when sensitive receptors adjoin or are near a construction area.
- Utilize "quiet" air compressors and similar equipment, where available.

P3. The City shall evaluate new development projects for potential construction related noise impacts.

Municipal Code. Section 9.40.040 of the City's Municipal Code states that the noise standards shown in Table E, unless otherwise specifically indicated, shall apply to all residential property with a designated noise zone. These criteria are given in terms of allowable noise levels for a given period of time at the residential property boundary. Higher noise levels are permitted during the day (7:00 a.m. to 10:00 p.m.) than during the night (10:00 p.m. to 7:00 a.m.). Table E shows the acceptable levels at residential land uses during the daytime and nighttime.

Section 9.40.060 of the City's Municipal Code exempts noise sources associated with or vibration created by construction, repair, remodeling or grading of any real property or during authorized seismic surveys, provided said activities do not take place outside the hours for construction as defined in Section 15.44.030 of this code, and provided the noise standard of 65 dBA plus the limits specified in Section 9.40.040(B)[1] as measured on residential property and any vibration created do not endanger the public health, welfare, and safety.

[1] Section 9.40.040(B) of the City's Municipal Code is shown in footnote no. 2 in Table E, which states, "The noise standard plus 5 dBA for a cumulative period of more than 15 minutes in any hour."

Table E: Exterior Noise Ordinance Standards

Maximum Time of Exposure	Noise Level Not To Exceed	
	Daytime (7:00 a.m. – 10:00 p.m.)	Nighttime (10:00 p.m. – 7:00 a.m.)
30 minutes/hour (L_{50})[1]	55 dBA	50 dBA
15 minutes/hour (L_{25})[2]	60 dBA	55 dBA
5 minutes/hour ($L_{8.3}$)[3]	65 dBA	60 dBA
1 minute/hour ($L_{1.7}$)[4]	70 dBA	65 dBA
Any period of time (L_{max})[5]	75 dBA	70 dBA

Source: City of Chino Municipal Code, Section 9.40.040 (2023).
Note: Each of the noise limits specified here shall be reduced by five dBA for impulse or simple tone noises, or for noises consisting of speech or music; provided, however, that if the ambient noise level exceeds the resulting standard, the ambient shall be the standard. In the event the ambient noise level exceeds any of the first four noise limit categories above, the cumulative period applicable to said category shall be increased to reflect said ambient noise level. In the event the ambient noise level exceeds the fifth noise category, the maximum allowable noise level under said category shall be increased to reflect the maximum ambient noise level. If the measurement location is on boundary between two different noise zones, the lower noise level standard applicable to the noise zone shall apply.

[1] The noise standard for a cumulative period of more than 30 minutes in any hour.
[2] The noise standard plus 5 dBA for a cumulative period of more than 15 minutes in any hour.
[3] The noise standard plus 10 dBA for a cumulative period of more than 5 minutes in any hour.
[4] The noise standard plus 15 dBA for a cumulative period of more than 1 minute in any hour.
[5] The noise standard plus 20 dBA for any period of time.

dBA = A-weighted decibels

Section 15.44.030(A) City's of the Municipal Code states construction shall occur only between the hours of 7:00 a.m. and 8:00 p.m. Monday through Saturday, with no construction allowed on Sundays and federal holidays. For the purposes of this section, construction shall mean any manmade change to improved or unimproved real estate, including but not limited to buildings or other structures, streets and other paving, utilities, filling, grading, excavation, mining, dredging, drilling operations, or pile driving.

Section 9.40.080 of the City's Municipal Code limits noise generated from air conditioning or a refrigeration system to 5 dBA above the noise standards in Table E.

Section 9.40.110 of the City's Municipal Code prohibits any person to create, maintain, or cause any ground vibration which is perceptible without instruments at any point on any affected property adjoining the property on which the vibration source is located. The perception threshold shall be presumed to be more than 0.05 inches per second RMS vertical velocity.

County of San Bernardino

County Code. Section 83.01.080(c) of the County Code establishes the noise standards for stationary noise sources that affect adjacent properties. Table F provides the County of San Bernadino's (County) noise standards based on the affected land use and the time period. The noise metric used for stationary sources is defined as noise levels that cannot be exceeded for certain percentages of time, or L_n.

Section 83.01.080(d) of the County Code establishes the interior and exterior noise standards for mobile noise sources that affect adjacent properties. Table G shows the County's interior and exterior noise standards for various land use categories.

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

Affected Land Use (Receiving Noise)	Time Period	L_{50} (30 min)	L_{25} (15 min)	L_8 (5 min)	L_2 (1 min)	L_{max} (Anytime)
Residential	7:00 a.m. to 10:00 p.m.	55	60	65	70	75
	10:00 p.m. to 7:00 a.m.	45	50	55	60	65
Professional Services	Anytime	55	60	65	70	75
Other Commercial	Anytime	60	65	70	75	80
Industrial	Anytime	70	75	80	85	90

Source: County of San Bernardino, County Code (2020).
Note: 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 the ambient noise level. If the ambient noise level exceeds the fifth noise limit category above, the maximum allowable noise level under this category shall be increased to reflect the maximum ambient noise level. If the alleged offense consists entirely of impact noise or simple tone noise, each of the noise levels shall be reduced by 5 dBA.
dBA = A-weighted decibel
min = minutes
L_2 = The noise standard plus 15 dBA for a cumulative period of more than 1 minute in any hour.
L_8 = The noise standard plus 10 dBA for a cumulative period of more than 5 minutes in any hour.
L_{25} = The noise standard plus 5 dBA for a cumulative period of more than 15 minutes in any hour.
L_{50} = The noise standard plus up to 5 dBA for a cumulative period of more than 30 minutes in any hour.
L_{max} = The noise standard plus 20 dBA or the maximum measured ambient noise level for any period of time.

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

Land Use Category	Uses	Noise Standard (dBA L_{dn} or CNEL)	
		Interior	Exterior
Residential	Single- and multifamily, duplex, mobile homes	45[1]	60[2]
Commercial	Hotel, motel, transient housing	45	60[3]
	Commercial retail, bank, restaurant	50	NA
	Office building, research and development, professional offices	45	65
	Amphitheatre, concert hall, auditorium, movie theater	45	NA
Institutional/Public	Hospital, nursing home, school classroom, religious institution, library	45	65
Open Space	Park	NA	65

Source: County of San Bernardino, County Code, Table 83-3 (County of San Bernardino 2022).
[1] The indoor environment shall exclude bathrooms, kitchens, toilets, closets, and corridors.
[2] The outdoor environment shall be limited to hospital/office building patios, hotel and motel recreation areas, mobile home parks, multi-family private patios or balconies, park picnic areas, private yard of single-family dwellings, school playgrounds.
[3] An exterior noise level of up to 65 dBA (L_{dn} 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 dBA (L_{dn} 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 noise level
NA = not applicable

Section 83.01.080(g)(3) of the County Code limits temporary construction, maintenance, repair, or demolition activities to between the hours of 7:00 a.m. and 7:00 p.m., except Sundays and federal holidays.

Section 83.01.090 of the County Code requires that no ground vibration shall be allowed that can be felt without the aid of instruments at or beyond the lot line, nor shall any vibration be allowed which produces a particle velocity greater than or equal to two-tenths (0.2) in/sec measured at or beyond the lot line. In addition, vibration generated from temporary construction, maintenance, repair, or demolition activities between 7:00 a.m. and 7:00 p.m. is exempt, except Sundays and Federal holidays.

EXISTING SETTING

Overview of the Existing Ambient Noise Environment

The primary existing noise sources in the project area are transportation facilities. Traffic on East End Avenue and Philadelphia Street are a steady source of ambient noise. Noise from motor vehicles is generated by engines, the interaction between the tires and the road, and the vehicles' exhaust systems. Other sources of noise in the project area include industrial activity, particularly west of the project site. Noise generated from industrial activities include forklifts, beeping, and sounds related to the movement of industrial materials.

Ambient Noise Level Measurement

Short-term Noise Level Measurement

Two short-term 20-minute noise level measurements were conducted on August 2, 2022, using a Larson Davis Model 831 Type 1 sound level meter. Table H shows the results of the short-term measurements along with a description of the measurement location and noise sources that occurred during the measurements. As shown in Table H, the measured average noise levels in the project vicinity ranged from 62.4 to 67.1 dBA L_{eq}, and the measured maximum noise levels ranged from 73.3 to 82.7 dBA L_{max}. Short-term noise level measurement survey sheets are provided in Appendix A. Figure 3 shows the short-term monitoring locations.

Table H: Short-Term Ambient Noise Monitoring Results

Monitoring No	Location	Date	Start Time	Duration (minutes)	Noise Level (dBA)			Noise Source(s)
					L_{eq}	L_{max}	L_{min}	
ST-1	Near 3702 Calaveras Court. Just outside of the backyard's retaining wall facing Philadelphia Street and East End Avenue.	8/2/22	11:57 a.m.	20	67.1	82.7	50.7	Traffic noise on Philadelphia Street and East End Avenue. Noise from trucks passing by.
ST-2	Located on the northwest corner of the project site. Near a chain-link fence.	8/2/22	11:13 a.m.	20	62.4	73.3	53.6	Noise from industrial activities such as hammering and forklifts.

Source: Compiled by LSA (2022).
dBA = A-weighted decibels
ft = foot/feet
L_{eq} = equivalent continuous sound level
L_{max} = maximum instantaneous noise level
L_{min} = minimum instantaneous noise level

Long-Term Noise Measurements

Three long-term (24-hour) noise level measurements were conducted from August 2 to August 4, 2022, using three Larson Davis Spark 706RC Dosimeters. Tables I, J, and K show the hourly L_{eq} results

from the long-term noise level measurements, and Table L shows the calculated L_{dn} from the long-term noise level measurements. As shown in Table L, the measured L_{dn} is 71.1 dBA at LT-1 , 70.7 dBA at LT-2, and 70.1 dBA at LT-3. Long-term noise level measurement survey sheets are provided in Appendix A. Figure 3 shows the long-term monitoring locations.

Existing Aircraft Noise

Brackett Field Airport, Cable Airport, and Ontario International Airport are 4.7 miles northwest, 5.4 miles north, and 6.1 miles east of the project site, respectively. The noise compatibility contours in the Brackett Field Airport Land Use Compatibility Plan (ALUCP 2015) show that the project site is outside the 55 dBA CNEL noise contours for Brackett Field Airport. The Cable Airport Comprehensive Airport Land Use Plan (1981) and Ontario International Airport Land Use Compatibility Plan (ONT ALUCP 2011) show that the project site is outside the 60 dBA CNEL noise contours for Cable Airport and Ontario International Airport, respectively. Additionally, there are no helipads or private airstrips within 2 miles of the project area. Therefore, the project would not expose people working in the project area to excessive noise levels, and this topic is not further discussed.

LSA

LEGEND

- Project Site Boundary
- ST-1 - Short-Term Noise Monitoring Location
- LT-1 - Long-Term Noise Monitoring Location

N

0 100 200

FEET

SOURCE: Google Earth 2021

I:\GMS2201\G\Noise_Locs.ai (8/9/22)

FIGURE 3

Philadelphia Street Industrial Development Site and East End Annexation Project

Noise Monitoring Locations

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

	Hour	Date	Noise Level (dBA)		
			L_{eq}	L_{max}	L_{min}
1	11:00 AM	8/2/22	67.0	85.7	50.0
2	12:00 PM	8/2/22	67.3	84.4	52.7
3	1:00 PM	8/2/22	67.3	86.5	52.3
4	2:00 PM	8/2/22	66.6	84.4	51.9
5	3:00 PM	8/2/22	67.8	87.6	51.2
6	4:00 PM	8/2/22	68.0	87.9	52.0
7	5:00 PM	8/2/22	66.6	83.3	51.5
8	6:00 PM	8/2/22	65.5	83.9	50.1
9	7:00 PM	8/2/22	64.5	81.8	48.1
10	8:00 PM	8/2/22	64.2	83.2	48.1
11	9:00 PM	8/2/22	64.4	85.4	47.6
12	10:00 PM	8/2/22	62.1	79.9	45.9
13	11:00 PM	8/2/22	62.8	88.3	45.0
14	12:00 AM	8/3/22	58.0	76.1	44.9
15	1:00 AM	8/3/22	58.4	84.4	44.3
16	2:00 AM	8/3/22	58.7	80.1	44.6
17	3:00 AM	8/3/22	58.7	79.2	45.2
18	4:00 AM	8/3/22	63.0	83.7	47.9
19	5:00 AM	8/3/22	65.6	83.8	50.4
20	6:00 AM	8/3/22	66.6	87.6	50.8
21	7:00 AM	8/3/22	67.9	82.7	52.9
22	8:00 AM	8/3/22	66.7	86.4	50.9
23	9:00 AM	8/3/22	68.4	87.9	51.2
24	10:00 AM	8/3/22	67.5	83.4	50.0

Source: Compiled by LSA (2022).
dBA = A-weighted decibels
L_{eq} = equivalent continuous sound level
L_{max} = maximum instantaneous noise level
L_{min} = minimum instantaneous noise level

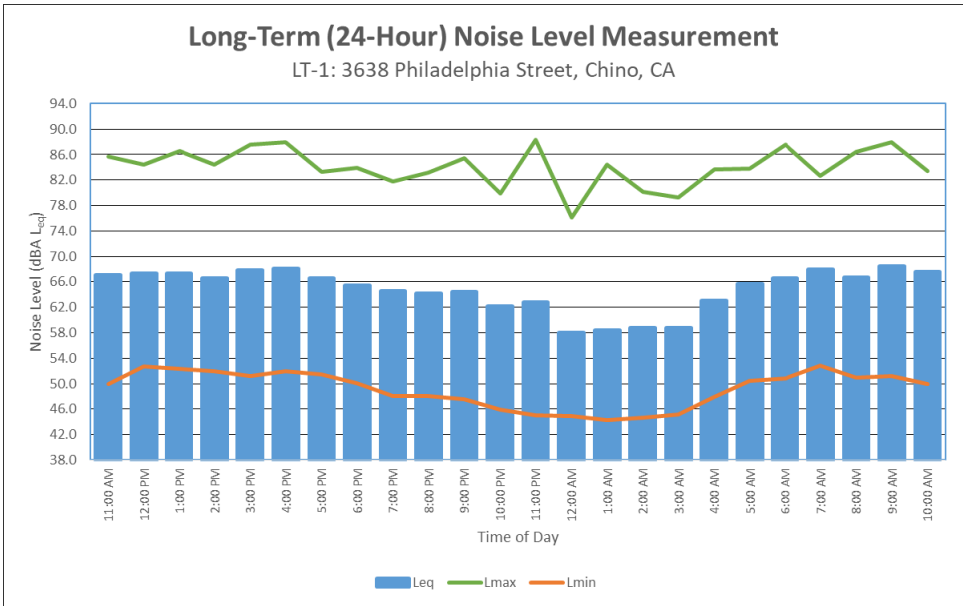

Table J: Long-Term (24-Hour) Noise Level Measurement Results at LT-2

	Hour	Date	Noise Level (dBA)		
			L_{eq}	L_{max}	L_{min}
1	11:00 AM	8/2/22	66.3	86.8	47.6
2	12:00 PM	8/2/22	66.3	83.2	50.0
3	1:00 PM	8/2/22	66.2	86.3	49.2
4	2:00 PM	8/2/22	65.7	82.6	49.3
5	3:00 PM	8/2/22	66.5	84.8	48.4
6	4:00 PM	8/2/22	67.2	88.1	48.4
7	5:00 PM	8/2/22	66.1	85.8	48.5
8	6:00 PM	8/2/22	64.3	79.2	47.2
9	7:00 PM	8/2/22	63.8	80.7	45.6
10	8:00 PM	8/2/22	64.9	90.4	45.2
11	9:00 PM	8/2/22	63.4	81.2	45.1
12	10:00 PM	8/2/22	61.5	79.7	44.5
13	11:00 PM	8/2/22	61.5	84.2	43.8
14	12:00 AM	8/3/22	57.1	74.9	42.9
15	1:00 AM	8/3/22	57.6	82.5	42.6
16	2:00 AM	8/3/22	61.0	88.0	43.0
17	3:00 AM	8/3/22	58.2	79.7	44.4
18	4:00 AM	8/3/22	63.3	88.7	46.4
19	5:00 AM	8/3/22	64.8	81.8	48.8
20	6:00 AM	8/3/22	65.8	84.3	48.9
21	7:00 AM	8/3/22	67.0	88.2	50.8
22	8:00 AM	8/3/22	65.9	85.4	49.2
23	9:00 AM	8/3/22	69.0	93.3	49.1
24	10:00 AM	8/3/22	66.8	83.3	48.2

Source: Compiled by LSA (2022).
dBA = A-weighted decibels
L_{eq} = equivalent continuous sound level
L_{max} = maximum instantaneous noise level
L_{min} = minimum instantaneous noise level

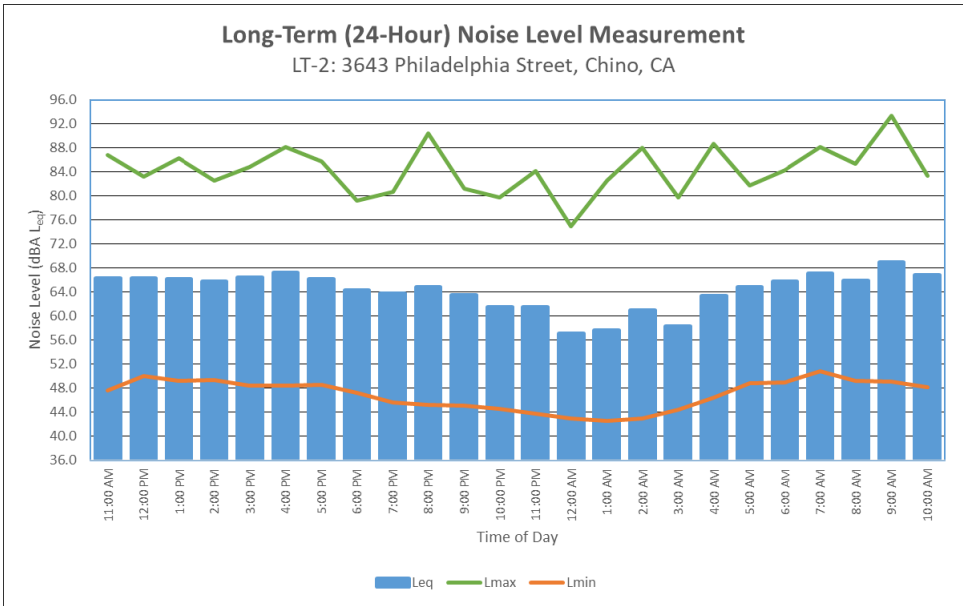

Table K: Long-Term (24-Hour) Noise Level Measurement Results at LT-3

	Hour	Date	Noise Level (dBA)		
			L_{eq}	L_{max}	L_{min}
1	12:00 PM	8/2/22	66.8	84.5	50.5
2	1:00 PM	8/2/22	67.8	85.0	50.5
3	2:00 PM	8/2/22	67.7	86.1	50.6
4	3:00 PM	8/2/22	67.7	85.9	52.4
5	4:00 PM	8/2/22	68.1	88.4	52.8
6	5:00 PM	8/2/22	67.3	86.1	52.7
7	6:00 PM	8/2/22	65.6	85.0	51.8
8	7:00 PM	8/2/22	64.1	80.7	51.9
9	8:00 PM	8/2/22	63.9	82.1	48.2
10	9:00 PM	8/2/22	60.9	79.2	46.4
11	10:00 PM	8/2/22	60.7	78.3	45.5
12	11:00 PM	8/2/22	59.1	78.6	45.1
13	12:00 AM	8/2/22	56.5	77.5	44.1
14	1:00 AM	8/3/22	54.8	76.0	43.6
15	2:00 AM	8/3/22	58.6	80.6	43.6
16	3:00 AM	8/3/22	56.0	76.6	44.1
17	4:00 AM	8/3/22	61.3	81.8	45.2
18	5:00 AM	8/3/22	63.7	81.1	49.6
19	6:00 AM	8/3/22	66.4	84.2	51.0
20	7:00 AM	8/3/22	67.0	84.1	51.7
21	8:00 AM	8/3/22	66.1	82.4	49.9
22	9:00 AM	8/3/22	67.8	84.1	49.4
23	10:00 AM	8/3/22	67.6	86.0	47.5
24	11:00 AM	8/3/22	67.7	84.5	49.5

Source: Compiled by LSA (2022).
dBA = A-weighted decibels
L_{eq} = equivalent continuous sound level
L_{max} = maximum instantaneous noise level
L_{min} = minimum instantaneous noise level

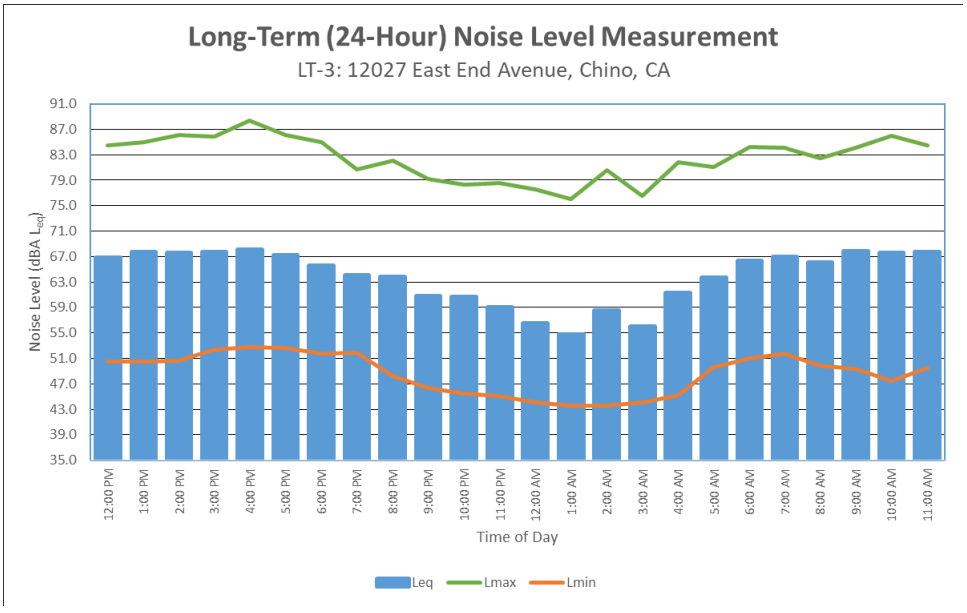

Table L: Long-Term Ambient Noise Monitoring Results

Monitoring No	Location	Noise Level (dBA)					Noise Source(s)
		Daytime		Nighttime		L_{dn}	
		L_{eq}	L_{max}	L_{eq}	L_{max}		
LT-1	Southwest corner of the project site on a powerline pole. Just east of 3638 Philadelphia Street.	64.2-68.4 (67.3)[1]	81.8-87.9	58.0-66.6 (63.1)[2]	76.1-88.3	71.1	Traffic on Philadelphia Street. Faint noise from forklift activity.
LT-2	3643 Philadelphia Street. In the front yard on the tree.	63.4-69.0 (66.6)[1]	79.2-93.3	57.1-65.8 (62.7)[2]	74.9-88.7	70.7	Traffic on Philadelphia Street.
LT-3	12027 East End Avenue. In the front yard of the single-family residence on the tree.	60.9-68.1 (67.3)[1]	79.2-88.4	54.8-66.4 (61.8)[2]	76.0-84.2	70.1	Traffic on East End Avenue.

Source: Compiled by LSA (2022).
Note: Long-term (24-hour) noise level measurements were conducted from August 2, 2022, to August 3, 2022.
[1] Average daytime noise level.
[2] Average nighttime noise level.
CNEL = Community Noise Equivalent Level
dBA = A-weighted decibels
ft = foot/feet
L_{dn} = Day/night noise level
L_{eq} = equivalent continuous sound level
L_{max} =maximum instantaneous noise level

Existing Traffic Noise

The Federal Highway Administration (FHWA) Highway Traffic Noise Prediction Model (FHWA RD-77-108) (FHWA 1977) 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. Existing average daily traffic (ADT) volumes in the project area were obtained from the *Philadelphia Street Industrial Center Traffic Impact Analysis Report* (LLG 2023). In addition, the vehicle mix for each roadway in the project area was obtained from the traffic counts contained in the *Supplemental Traffic Impact Analysis for the Proposed Philadelphia Street Industrial Center Project* (LLG 2023). Table M lists the existing traffic noise levels on roadways in the project area. 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. The specific assumptions used in developing these noise levels and the model printouts are provided in Appendix B.

As shown in Table M, traffic noise levels along East End Avenue are moderate with the 70 dBA CNEL impact zone located less than 50 ft from the roadway centerline, and the 65 and 60 dBA CNEL impact zone would extend up to 126 ft and 272 ft from the roadway centerline, respectively. Traffic noise levels along Philadelphia Street are moderate with the 70, 65, and 60 dBA CNEL impact zones extending up to 69 ft and 148 ft, respectively, from the roadway centerline.

Table M: Existing 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 the Centerline of the Outermost Lane
East End Avenue North of Philadelphia Street	7,889	59	126	272	70.3
East End Avenue South of Philadelphia Street	8,579	52	111	238	69.5
Philadelphia Street West of East End Avenue	6,884	< 50	53	113	64.6
Philadelphia Street East of East End Avenue	6,963	< 50	69	148	66.4

Source: Compiled by LSA (2023).
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 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 project would incrementally increase noise levels on roadways 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 volumes in the project area. The building construction phase would generate the most trips out of all of the construction phases, at 75 trips per day based on the California Emissions Estimator Model (CalEEMod) (Version 2022.1) results (LSA 2023). Roadways that would be used to access the project site are Philadelphia Street and East End Avenue. Based on Table M, East End Avenue and Philadelphia Street have an existing ADT volume of 7,889 and 6,884, respectively, near the project site. Based on the information above, construction-related traffic would increase by up to 0.05 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 to noise generated from construction activities. Construction is performed in discrete steps, each of which has its own mix of equipment and, consequently, its own noise characteristics. The project anticipates site preparation, grading, building construction, paving, and architectural coating phases of construction. 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 N 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.

Table N: 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
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] The usage factor is the percentage of time during a construction noise operation that a piece of construction equipment is operating at full power.
[2] The 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 site preparation and grading phase tends to generate the highest noise levels because the noisiest construction equipment is earthmoving equipment. Project construction during these phases of 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 and grading 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 near the center of the project site. As shown in Table N, 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 near the center of the project site. 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 near the center of the project site.

Table O shows the estimated construction noise level at the closest residential property line surrounding the project site would range from 70.7 dBA L_{eq} (74.7 dBA L_{max}) to 84.0 dBA L_{eq} (88.0 dBA L_{max}) along with the distance from the residential property line to the active construction area near the center of the project site and the distance attenuation. These noise levels would exceed the City's construction noise standard of 70 dBA (the noise standard of 65 dBA plus 5 dBA for a cumulative period of more than 15 minutes in any hour). Temporary construction barriers with a minimum height of 6 ft along the eastern and southeastern project construction boundaries, 8 ft along the southern project construction boundary, and 14 ft along the western project construction boundary would provide a noise reduction of 5 dBA, 5 dBA, 6 dBA, and 14 dBA, respectively, and would reduce noise levels to the construction noise standard of 70 dBA or below. The noise level reduction calculations provided by the temporary construction barrier at the closest residential property line surrounding the project site are provided in Appendix C. It should be noted that the residence east of the project site would remain in San Bernardino County and was evaluated using the City of Chino construction noise standard for a conservative analysis.

Table O: Construction Noise Levels

Land Use	Direction	Reference Noise Level at 50 ft (dBA)		Distance (ft)[1]	Distance Attenuation (dBA)	Noise Level (dBA)	
		L_{max}	L_{eq}			L_{max}	L_{eq}
Residential	East	88	84	150	9.5	78.5	74.5
Residential	Southeast	88	84	230	13.3	74.7	70.7
Residential	South	88	84	130	8.3	79.7	75.7
Residential	West	88	84	50	0.0	88.0	84.0

Source: Compiled by LSA (2022).
[1] Distance from the residential property line to the active construction area.
dBA = A-weighted decibels
ft = foot/feet
L_{eq} = equivalent continuous sound level
L_{max} = maximum instantaneous noise level

Implementation of the following noise reduction measures pursuant to Policy P3 under Objective N-1.3 in the City of Chino General Plan Noise Element, Section 15.44.030(A) of the City of Chino Municipal Code, and Section 83.01.080(g)(3) of the San Bernardino County Code would reduce construction noise impacts:

- The construction contractor shall limit construction activities to between the hours of 7:00 a.m. and 7:00 p.m. Monday through Saturday. Construction activities shall be prohibited outside of these hours or anytime on Sundays and federal holidays.

- The construction contractor shall equip all internal combustion engine-driven equipment with intake and exhaust mufflers that are in good condition and appropriate for the equipment.

- The construction contractor shall ensure that during construction, trucks and equipment are running only when necessary.

- The construction contractor shall erect a minimum 6 ft high temporary construction barrier along the eastern and southeastern project construction boundary, a minimum 8 ft high temporary construction barrier along the southern construction boundary, and a minimum 10 ft high temporary construction barrier along the western project construction boundary where there are existing residences to reduce construction noise levels. The barrier shall be continuous with no gaps or holes and may be any material that has a minimum Sound Transmission Class (STC) rating of 28.

- The construction contractor shall locate stationary noise-generating equipment as far as possible from sensitive receptors when sensitive receptors adjoin or are near a construction area.

- The construction contractor shall utilize "quiet" air compressors and similar equipment, where available.

Therefore, no construction noise impacts would occur with the implementation of noise reduction measures.

Short-Term Construction Vibration Impacts

This construction vibration impact analysis discusses the level of human annoyance using vibration levels in RMS (in/sec) and assesses the potential for building damage using vibration levels in PPV (in/sec). Vibration levels calculated in RMS velocity are best for characterizing human response to building vibration, whereas vibration levels in PPV are best for characterizing damage potential.

Table P shows the reference vibration levels at a distance of 25 ft for each type of standard construction equipment from the *Transit Noise and Vibration Impact Assessment Manual* (FTA 2018). Project construction is expected to require the use of large bulldozers and loaded trucks, which would generate ground-borne vibration levels of up to 87 VdB (0.089 in/sec [PPV]) and 86 VdB (0.076 in/sec [PPV]), respectively, when measured at 25 ft.

The greatest vibration levels are anticipated to occur during the 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 formula for vibration transmission is provided below:

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

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

Table P: 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[2]	**0.076**	**86**
Jackhammer	0.035	79
Small Bulldozer	0.003	58

Source: *Transit Noise and Vibration Impact Assessment Manual* (FTA 2018).
[1] RMS vibration velocity in decibels (VdB) is 1 µin/sec.
[2] The equipment shown in **bold** is expected to be used on site.
µin/sec = microinches per second
ft = foot/feet
FTA = Federal Transit Administration
in/sec = inches per second
L_V = vibration velocity in decibels
PPV = peak particle velocity
RMS = root-mean-square
VdB = vibration velocity decibels

Table Q lists the projected vibration levels from various construction equipment expected to be used on the project site in the active construction area near the center of the project site to the nearest buildings in the project vicinity. As shown in Table Q, the residential building to the east in San Bernardino County is approximately 175 ft from the active project construction area near the center of the project site and would experience an average vibration level of up to 0.005 in/sec. This vibration level would not result in annoyance because vibration levels would not exceed the City's vibration standard of 0.05 in/sec (RMS) for a conservative analysis even though construction vibration levels are exempt in San Bernardino County. The closest residential building in Chino is west of the project site approximately 55 ft from the active project construction area near the center of the project site and would experience a vibration level of up to 0.027 in/sec. This vibration level would not result in annoyance because vibration levels would not exceed the City's vibration standard of 0.05 in/sec (RMS). Other building structures that surround the project site would experience lower vibration levels because they are farther away.

Similarly, Table R lists the projected vibration levels from various construction equipment expected to be used on the project site at the project construction boundary to the nearest buildings in the project vicinity. As shown in Table R, the residential building to the west is approximately 5 ft from the project construction boundary and would experience a vibration level of up to 0.995 in/sec (PPV). This vibration level would have the potential to result in building damage because the residential building would be constructed equivalent to non-engineered timber and masonry and vibration levels would not exceed the FTA vibration damage threshold of 0.20 in/sec (PPV). 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 10 ft of the project construction boundary (15 ft from the residential structure) would reduce construction vibration levels to 0.191 in/sec (PPV) or below.

Table Q: Potential Construction Vibration Annoyance

Land Use	Jurisdiction	Direction	Equipment/ Activity	Reference Vibration Level at 25 ft	Distance to Structure (ft)[1]	Vibration Level (in/sec)
				PPV (in/sec)		
Industrial	Chino	North	Large bulldozers	0.089	110	0.010
			Loaded trucks	0.076	110	0.008
Residence	San Bernardino County	East	Large bulldozers	0.089	175	0.005
			Loaded trucks	0.076	175	0.004
Residence	Chino	Southeast	Large Bulldozers	0.089	270	0.003
			Loaded Trucks	0.076	270	0.002
Residence	Chino	South	Large bulldozers	0.089	160	0.005
			Loaded trucks	0.076	160	0.005
Residence	Chino	West	Large bulldozers	0.089	55	0.027
			Loaded trucks	0.076	55	0.023

Source: Compiled by LSA (2022).
Note: The potential for construction vibration annoyance was assessed using the City's vibration standard of 0.05 in/sec RMS.
[1] Distance from the active construction area near the center of the project site to the building structure.
ft = foot/feet
in/sec = inches per second
PPV = peak particle velocity
RMS = root-mean-square
VdB = vibration velocity decibels

Table R: Potential Construction Vibration Damage

Land Use	Jurisdiction	Direction	Equipment/ Activity	Reference Vibration Level at 25 ft	Distance to Structure (ft)[1]	Vibration Level
				PPV (in/sec)		PPV (in/sec)
Industrial	Chino	North	Large bulldozers	0.089	54	0.028
			Loaded trucks	0.076	54	0.024
Residence	San Bernardino County	East	Large bulldozers	0.089	125	0.008
			Loaded trucks	0.076	125	0.007
Residence	Chino	Southeast	Large bulldozers	0.089	205	0.004
			Loaded trucks	0.076	205	0.003
Residence	Chino	South	Large bulldozers	0.089	100	0.011
			Loaded trucks	0.076	100	0.010
Residence	Chino	West	Large bulldozers	0.089	5	0.995
			Loaded trucks	0.076	5	0.850

Source: Compiled by LSA (2022).
Note: The FTA-recommended building damage threshold is 0.20 in/sec (PPV) at the receiving non-engineered timber and masonry building.
[1] Distance from the project construction boundary to the building structure.
ft = foot/feet
FTA = Federal Transit Administration
in/sec = inches per second
PPV = peak particle velocity
VdB = vibration velocity decibels

Other building structures that surround the project site are 54 ft or more from the project construction boundary and would experience a vibration level of up to 0.028 in/sec (PPV). This

vibration level would not result in building damage because the surrounding buildings would be constructed equivalent to or better than non-engineered timber and masonry and vibration levels would not exceed the FTA vibration damage threshold of 0.20 in/sec (PPV). Therefore, no construction vibration impacts would occur during project construction with 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 10 ft of the project construction boundary (15 ft from the residential structure).

Long-Term Traffic Noise Impacts

The FHWA Highway Traffic Noise Prediction Model (FHWA RD-77-108) (FHWA 1977) 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 resultant noise levels are weighted and summed over 24-hour periods to determine the CNEL values. Traffic volumes were obtained from the *Supplemental Traffic Impact Analysis for the Proposed Philadelphia Street Industrial Center Project* (LLG 2023). In addition, the vehicle mix for each roadway in the project area was obtained from the traffic counts contained in the *Supplemental Traffic Impact Analysis for the Proposed Philadelphia Street Industrial Center Project* (LSA 2023). Under the with project condition, the vehicle mix was adjusted based on the project's vehicle mix. Tables S and T show the existing and 2025 traffic noise levels with and without project conditions. 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. The specific assumptions used in developing these noise levels and the model printouts are provided in Appendix B.

Tables S and T show that the proposed project would result in a project-related traffic noise increase of up to 0.4 dBA. A noise increase of less than 3 dBA would not be perceptible to the human ear in an outdoor environment. Therefore, no off-site traffic noise impacts would occur, and no noise reduction measures are required.

Long-Term Stationary-Source Noise Impacts

Truck delivery and truck loading and unloading activities; automobile 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 and unloading activities for the project would take place at the loading docks for each of the three proposed warehouse buildings, as shown in Figure 2. These activities would take place both during daytime and nighttime hours. Noise levels generated from these activities include truck movement, docking at loading dock doors, backup alarms, air brakes, idling, and unloading activities. These activities would result in a maximum noise similar to noise readings from truck delivery and truck-unloading activities for other projects, which would generate a noise level of 75 dBA L_{max} at 50 ft. Based on the project trip generation obtained from the

Table S: Existing 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 (dBA)
East End Avenue North of Philadelphia Street	7,889	59	126	272	70.3	7,903	59	127	274	70.4	0.1
East End Avenue South of Philadelphia Street	8,579	52	111	238	69.5	8,587	52	112	240	69.5	0.0
Philadelphia Street West of East End Avenue	6,884	< 50	53	113	64.6	6,955	< 50	56	119	65.0	0.4
Philadelphia Street East of East End Avenue	6,963	< 50	69	148	66.4	7,008	< 50	69	149	66.4	0.0

Source: Compiled by LSA (2023).
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 decibel
ft = foot/feet

Table T: 2025 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 (dBA)
East End Avenue North of Philadelphia Street	8,280	61	131	281	70.5	8,294	61	130	281	70.5	0.0
East End Avenue South of Philadelphia Street	8,954	53	114	245	69.7	8,962	53	114	245	69.7	0.0
Philadelphia Street West of East End Avenue	7,322	< 50	55	118	64.9	7,393	< 50	59	126	65.3	0.4
Philadelphia Street East of East End Avenue	7,426	< 50	72	154	66.6	7,471	< 50	72	155	66.7	0.1

Source: Compiled by LSA (2023).
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 decibel
ft = foot/feet

Supplemental Traffic Impact Analysis for the Proposed Philadelphia Street Industrial Center Project (LLG 2023), it is estimated that there would be a maximum of 3 deliveries per hour during daytime hours and 1 delivery per hour during nighttime hours. Also, it is estimated that each truck would generate the maximum noise level for a cumulative period of 5 minutes, which would result in a cumulative period of 15 minutes in any hour during daytime hours and a cumulative period of 5 minutes in any hour during nighttime hours. Based on the assumptions above, truck delivery and truck loading and unloading activities would generate a noise level of 67.2 dBA L_{eq} at 50 ft during daytime hours and 64.2 dBA L_{eq} at 50 ft during nighttime hours.

The proposed warehouse buildings would shield the residential property lines to the east, southeast, and south from the truck loading dock at each of the three proposed warehouse buildings. The noise level reduction calculation provided by each of the three proposed warehouse buildings are provided in Appendix C.

Parking Activities

The project would include surface parking for automobiles and trucks. Noise generated from parking 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. In addition, noise generated from truck parking would include backup alarms and air brakes. Representative parking activities would generate approximately 60 to 70 dBA L_{max} at 50 ft. Based on the project trip generation obtained from the *Supplemental Traffic Impact Analysis for the Proposed Philadelphia Street Industrial Center Project (LLG 2023)*, it is estimated that automobile parking would generate the maximum noise level for a cumulative period of 3 minutes during daytime hours and 1 minute during nighttime hours. Also, it is estimated that truck parking activities would generate the maximum noise level for a cumulative period of 1 minute during both daytime and nighttime hours. Based on the assumptions above, automobile parking activities would generate a noise level of 57.0 dBA L_{eq} at 50 ft during daytime hours and 52.2 dBA L_{eq} at 50 ft during nighttime hours. Truck parking activities would generate a noise level of 52.2 dBA L_{eq} at 50 ft during daytime and nighttime hours.

The proposed warehouse buildings would shield the residential property lines to the east, southeast, and south from truck parking activities at each of the three proposed warehouse buildings. The noise level reduction calculation provided by each of the proposed warehouse buildings are provided in Appendix C.

Heating, Ventilation, and Air Conditioning Noise

The project would include two rooftop HVAC units for the office portion at each of the three proposed warehouse buildings (total of six rooftop HVAC units). The office portions of the proposed warehouse buildings are shown in Figure 2. The HVAC equipment could operate 24 hours per day. Each HVAC unit would generate a noise level of 56.4 dBA L_{eq} at a distance of 50 ft. A total of two HVAC units operating simultaneously would generate a noise level of 59.4 dBA L_{eq} at a distance of 50 ft.

The roof line and parapet would shield the residential property lines to the east, southeast, south, and west from the rooftop HVAC equipment at each of the three proposed warehouse buildings.

The noise level reduction calculation provided by the roof line and parapet at each of the proposed warehouse buildings are provided in Appendix C.

Stationary Noise Impacts Summary

Tables U and V show the individual stationary noise sources from truck delivery and truck loading and unloading activities, automobile parking activities, truck parking activities, and rooftop HVAC equipment at the closest residential property lines from the project site as well as the distance attenuation, noise reduction from shielding, and the combined stationary noise level.

As shown in Tables U and V, noise levels generated at the residential property line east of the project site in San Bernardino County from project operations would reach up to combined daytime and nighttime stationary noise levels of 51.5 dBA L_{eq} and 48.8 dBA L_{eq}, respectively. The combined daytime noise levels would not exceed the County's daytime 30-minute (L_{50}) noise standard of 55 dBA. Although the combined nighttime noise levels would exceed the County's nighttime 30-minute (L_{50}) noise standard of 45 dBA, the ambient noise level would increase by 0.2 dBA based on the measured average nighttime noise level of 61.8 dBA L_{eq} at LT-3 shown in Table L. This increase in noise is less than 3 dBA and would not be perceptible to the human ear in an outdoor environment. The maximum instantaneous noise levels generated at the residential property line east of the project site in San Bernardino County from project operations would reach up to 62.5 dBA L_{max}. This noise level would not exceed the County's daytime and nighttime maximum anytime noise standards of 75 dBA L_{max} and 65 dBA L_{max}, respectively.

Noise levels generated at the residential property lines southeast, south, and west of the project site in the City from project operations would reach up to combined daytime stationary noise levels of 45.3 dBA L_{eq}, 54.5 dBA L_{eq}, and 65.1 dBA L_{eq}, respectively. These noise levels would not exceed the City's daytime 30-minute (L_{50}) noise standard of 55 dBA except for the residence west of the project site. Although the combined daytime noise level would exceed the City's daytime 30-minute (L_{50}) noise standard of 55 dBA, the ambient noise level would increase by 2 dBA based on the measured average nighttime noise level of 67.3 dBA L_{eq} at LT-1 as shown in Table L. This increase in noise is less than 3 dBA and would not be perceptible to the human ear in an outdoor environment.

Similarly, noise levels generated at the residential property lines southeast, south, and west of the project site in the City from project operations would reach up to combined nighttime stationary noise levels of 43.1 dBA L_{eq}, 51.6 dBA L_{eq}, and 61.9 dBA L_{eq}, respectively. Noise levels at the residential property line southeast of the project site would not exceed the City's nighttime 30-minute (L_{50}) noise standard of 45 dBA, while noise levels at the residential property lines south and west of the project site would exceed the City's nighttime 30-minute (L_{50}) noise standard of 45 dBA. Although the combined nighttime noise level would exceed the City's nighttime 30-minute (L_{50}) noise standard of 45 dBA, the ambient noise level would increase by 0.3 dBA and 2.5 dBA based on the measured average nighttime noise level of 62.7 dBA L_{eq} and 63.1 dBA L_{eq} at LT-2 and LT-1, respectively, as shown in Table L. This increase in noise is less than 3 dBA and would not be perceptible to the human ear in an outdoor environment.

Table U: Daytime Stationary Noise Levels

Land Use	Jurisdiction	Direction	Noise Source	Reference Noise Level at 50 ft (dBA)		Distance[1] (ft)	Distance Attenuation (dBA)	Shielding[2] (dBA)	Noise Level (dBA)		Combined Noise Level (dBA L_{eq})
				L_{max}	L_{eq}				L_{max}	L_{eq}	
Residence	San Bernardino County	East	Truck (Building 1)	75	67.2	329	16.4	15	43.6	35.8	51.5
			Truck (Building 2)	75	67.2	272	14.7	15	45.3	37.5	
			Truck (Building 3)	75	67.2	275	14.8	15	45.2	37.4	
			Auto Parking	70	57.0	118	7.5	0	62.5	49.5	
			Truck Parking (Building 1)	70	52.2	315	16.0	15	39.0	21.2	
			Truck Parking (Building 2)	70	52.2	270	14.6	15	40.4	22.6	
			Truck Parking (Building 2)	70	52.2	275	14.8	15	40.2	22.4	
			HVAC (Building 1)	--	59.4	146	9.3	8	--	42.1	
			HVAC (Building 2)	--	59.4	146	9.3	8	--	42.1	
			HVAC (Building 3)	--	59.4	308	15.8	6	--	37.6	
Residence	Chino	Southeast	Truck (Building 1)	75	67.2	329	16.4	15	43.6	35.8	45.3
			Truck (Building 2)	75	67.2	595	21.5	15	38.5	30.7	
			Truck (Building 3)	75	67.2	402	18.1	15	41.9	34.1	
			Auto Parking	70	57.0	294	15.4	0	54.6	41.6	
			Truck Parking (Building 1)	70	52.2	595	21.5	15	33.5	15.7	
			Truck Parking (Building 2)	70	52.2	420	18.5	15	36.5	18.7	
			Truck Parking (Building 2)	70	52.2	345	16.8	15	38.2	20.4	
			HVAC (Building 1)	--	59.4	517	20.3	6	--	33.1	
			HVAC (Building 2)	--	59.4	338	16.6	6	--	36.8	
			HVAC (Building 3)	--	59.4	329	16.4	6	--	37.0	
Residence	Chino	South	Truck (Building 1)	75	67.2	458	19.2	0	49.8	42.0	53.4
			Truck (Building 2)	75	67.2	257	14.2	15	45.8	38.0	
			Truck (Building 3)	75	67.2	186	11.4	15	48.6	40.8	
			Auto Parking	70	57.0	91	5.2	0	64.8	51.8	
			Truck Parking (Building 1)	70	52.2	470	19.5	0	44.5	26.7	
			Truck Parking (Building 2)	70	52.2	280	15	15	40.0	22.2	
			Truck Parking (Building 2)	70	52.2	174	10.8	15	44.2	26.4	
			HVAC (Building 1)	--	59.4	477	19.6	6	--	33.8	
			HVAC (Building 2)	--	59.4	292	15.3	6	--	38.1	
			HVAC (Building 3)	--	59.4	116	7.3	6	--	44.1	
Residence	Chino	West	Truck (Building 1)	75	67.2	316	16	0	59.0	51.2	65.1
			Truck (Building 2)	75	67.2	137	8.8	0	66.2	58.4	

Table U: Daytime Stationary Noise Levels

Land Use	Jurisdiction	Direction	Noise Source	Reference Noise Level at 50 ft (dBA)		Distance[1] (ft)	Distance Attenuation (dBA)	Shielding[2] (dBA)	Noise Level (dBA)		Combined Noise Level (dBA L_{eq})
				L_{max}	L_{eq}				L_{max}	L_{eq}	
			Truck (Building 3)	75	67.2	93	5.4	0	69.6	61.8	
Residence	Chino	West	Auto Parking	70	57.0	40	-1.9	0	71.9	58.9	65.1
			Truck Parking (Building 1)	70	52.2	325	16.3	0	53.7	35.9	
			Truck Parking (Building 2)	70	52.2	168	10.5	0	59.5	41.7	
			Truck Parking (Building 2)	70	52.2	100	6	0	64.0	46.2	
			HVAC (Building 1)	--	59.4	398	18	6	--	35.4	
			HVAC (Building 2)	--	59.4	271	14.7	6	--	38.7	
			HVAC (Building 3)	--	59.4	91	5.2	8	--	46.2	

Source: Compiled by LSA (2023).
[1] Distance from the source to the residential property line.
[2] The calculated noise reduction from the proposed 35 ft high warehouse buildings and the roof line/parapet are provided in Appendix C.
dBA = A-weighted decibels
ft = foot/feet
HVAC = heating, ventilation, and air conditioning
L_{eq} = equivalent continuous sound level
L_{max} = maximum instantaneous noise level

Table V: Nighttime Stationary-Source Noise Levels

Land Use	Jurisdiction	Direction	Noise Source	Reference Noise Level at 50 ft (dBA)		Distance[1] (ft)	Distance Attenuation (dBA)	Shielding[2] (dBA)	Noise Level (dBA)		Combined Noise Level (dBA L_{eq})
				L_{max}	L_{eq}				L_{max}	L_{eq}	
Residence	San Bernardino County	East	Truck (Building 1)	75	64.2	329	16.4	15	43.6	32.8	48.8
			Truck (Building 2)	75	64.2	272	14.7	15	45.3	34.5	
			Truck (Building 3)	75	64.2	275	14.8	15	45.2	34.4	
			Auto Parking	70	52.2	118	7.5	0	62.5	44.7	
			Truck Parking (Building 1)	70	52.2	315	16.0	15	39.0	21.2	
			Truck Parking (Building 2)	70	52.2	270	14.6	15	40.4	22.6	
			Truck Parking (Building 2)	70	52.2	275	14.8	15	40.2	22.4	
			HVAC (Building 1)3	--	59.4	146	9.3	8	--	42.1	
			HVAC (Building 2)	--	59.4	146	9.3	8	--	42.1	
			HVAC (Building 3)	--	59.4	308	15.8	6	--	37.6	
Residence	Chino	Southeast	Truck (Building 1)	75	64.2	329	16.4	15	43.6	32.8	43.1
			Truck (Building 2)	75	64.2	595	21.5	15	38.5	27.7	
			Truck (Building 3)	75	64.2	402	18.1	15	41.9	31.1	
			Auto Parking	70	52.2	294	15.4	0	54.6	36.8	
			Truck Parking (Building 1)	70	52.2	595	21.5	15	33.5	15.7	
			Truck Parking (Building 2)	70	52.2	420	18.5	15	36.5	18.7	
			Truck Parking (Building 2)	70	52.2	345	16.8	15	38.2	20.4	
			HVAC (Building 1)	--	59.4	517	20.3	6	--	33.1	
			HVAC (Building 2)	--	59.4	338	16.6	6	--	36.8	
			HVAC (Building 3)	--	59.4	329	16.4	6	--	37.0	
Residence	Chino	South	Truck (Building 1)	75	64.2	458	19.2	6	49.8	39.0	50.1
			Truck (Building 2)	75	64.2	257	14.2	15	45.8	35.0	
			Truck (Building 3)	75	64.2	186	11.4	15	48.6	37.8	
			Auto Parking	70	52.2	91	5.2	0	64.8	47.0	
			Truck Parking (Building 1)	70	52.2	470	19.5	6	44.5	26.7	
			Truck Parking (Building 2)	70	52.2	280	15	15	40.0	22.2	
			Truck Parking (Building 2)	70	52.2	174	10.8	15	44.2	26.4	
			HVAC (Building 1)	--	59.4	477	19.6	6	--	33.8	
			HVAC (Building 2)	--	59.4	292	15.3	6	--	38.1	
			HVAC (Building 3)	--	59.4	116	7.3	6	--	44.1	
Residence	Chino	West	Truck (Building 1)	75	64.2	316	16	0	59.0	48.2	61.9
			Truck (Building 2)	75	64.2	137	8.8	0	66.2	55.4	

Table V: Nighttime Stationary-Source Noise Levels

Land Use	Jurisdiction	Direction	Noise Source	Reference Noise Level at 50 ft (dBA)		Distance[1] (ft)	Distance Attenuation (dBA)	Shielding[2] (dBA)	Noise Level (dBA)		Combined Noise Level (dBA L_{eq})
				L_{max}	L_{eq}				L_{max}	L_{eq}	
			Truck (Building 3)	75	64.2	93	5.4	0	69.6	58.8	
Residence	Chino	West	Auto Parking	70	52.2	40	-1.9	0	71.9	54.1	61.9
			Truck Parking (Building 1)	70	52.2	325	16.3	0	53.7	35.9	
			Truck Parking (Building 2)	70	52.2	168	10.5	0	59.5	41.7	
			Truck Parking (Building 2)	70	52.2	100	6	0	64.0	46.2	
			HVAC (Building 1)	--	59.4	398	18	6	--	35.4	
			HVAC (Building 2)	--	59.4	271	14.7	6	--	38.7	
			HVAC (Building 3)	--	59.4	91	5.2	8	--	46.2	

Source: Compiled by LSA (2023).
[1] Distance from the source to the residential property line.
[2] The calculated noise reduction from the proposed 35 ft high warehouse buildings and the roof line/parapet are provided in Appendix C.
dBA = A-weighted decibels
ft = foot/feet
HVAC = heating, ventilation, and air conditioning
L_{eq} = equivalent continuous sound level
L_{max} = maximum instantaneous noise level

The maximum instantaneous noise levels generated at the residential property line southeast, south, and west of the project site in the City from project operations would reach up to 54.6 dBA L_{max}, 64.8 dBA L_{max}, and 71.9 dBA L_{max}, respectively. These noise levels would not exceed the City's daytime and nighttime maximum anytime noise standards of 75 dBA L_{max} and 70 dBA L_{max}, respectively, except for the residence west of the project site during nighttime. However, the measured nighttime maximum noise levels at the residence west of the project site are above 70 dBA L_{max}, and range from 76.1 to 88.3 dBA L_{max} at LT-1 as shown in Table L. Therefore, no noise impacts from project operations would occur. No noise reduction measures are required.

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

The project would not generate vibration. In addition, vibration levels generated from project-related traffic on the adjacent roadways (Philadelphia Street and East End Avenue) would be 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.

REDUCTION MEASURES

Short-Term Construction Noise Impacts

The following noise reduction measures pursuant to Policy P3 under Objective N-1.3 in the City of Chino General Plan Noise Element, Section 15.44.030(A) of the City of Chino Municipal Code, and Section 83.01.080(g)(3) of the San Bernardino County Code would reduce construction noise impacts.

- The construction contractor shall limit construction activities to between the hours of 7:00 a.m. and 7:00 p.m. Monday through Saturday. Construction activities shall be prohibited outside of these hours or anytime on Sundays and federal holidays.

- The construction contractor shall equip all internal combustion engine-driven equipment with intake and exhaust mufflers that are in good condition and appropriate for the equipment.

- The construction contractor shall ensure that during construction, trucks and equipment are running only when necessary.

- The construction contractor shall erect a minimum 6 ft high temporary construction barrier along the eastern and southeastern project construction boundary, a minimum 8 ft high temporary construction barrier along the southern construction boundary, and a minimum 14 ft high temporary construction barrier along the western project construction boundary where there are existing residences to reduce construction noise levels. The barrier shall be continuous with no gaps or holes and may be any material that has a minimum Sound Transmission Class (STC) rating of 28.

- The construction contractor shall locate stationary noise-generating equipment as far as possible from sensitive receptors when sensitive receptors adjoin or are near a construction area.

- The construction contractor shall utilize "quiet" air compressors and similar equipment, where available.

Short-Term Construction Vibration Impacts

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

- The construction contractor shall restrict heavy construction (e.g., large bulldozers and loaded trucks) or require the use of light construction equipment (e.g., small bulldozers and pick-up trucks) within 10 ft from the project construction boundary (15 ft from the residential structure).

Long-Term Aircraft Noise Impacts

No noise reduction measures are required.

Long-Term 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.

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APPENDIX A

NOISE SURVEY SHEETS

Noise Measurement Survey

Project Number: GMS2201
Project Name: Philadelphia Industrial
Test Personnel: Kevin Nguyendo
Equipment: Larson Davis 831

Site Number: ST-1 Date: 8/2/22 Time: From 11:57 am To 12:17 pm

Site Location: Near property 3702 Calaveras Court. Just outside of the backyard's retaining wall facing Philadelphia Street and East End Avenue. Approximately 8 ft from the retaining wall.

Primary Noise Sources: Traffic noise on Philadelphia Street and East End Avenue. Heavy trucks passing by.

Measurement Results:

	dBA
L_{eq}	67.1
L_{max}	82.7
L_{min}	50.7
L_{peak}	105.9
L_2	75.0
L_8	70.9
L_{25}	66.3
L_{50}	62.9
SEL	--

Atmospheric Conditions:

Maximum Wind Velocity (mph)	9.1
Average Wind Velocity (mph)	3.0
Temperature (F)	87.0
Relative Humidity (%)	38.7
Comments:	

Comments: The retaining wall is 4 ft 4 inches high (each retaining wall block is 8 inches high).

Traffic Description:

Roadway	# Lanes	Speeds	NB/EB Counts			SB/WB Counts		
			Auto	MT	HT	Auto	MT	HT

Diagram:

Location Photo:

Noise Measurement Survey

Project Number: GMS2201
Project Name: Philadelphia Industrial
Test Personnel: Kevin Nguyendo
Equipment: Larson Davis 831

Site Number: ST-2 Date: 8/2/22 Time: From 11:13 am To 11:33 pm

Site Location: Located on the northwest corner of the project site. Near a chain-link fence.

Primary Noise Sources: Industrial activity noises such as hammering and forklifts.

Measurement Results:

	dBA
L_{eq}	62.4
L_{max}	73.3
L_{min}	53.6
L_{peak}	102.9
L_2	69.2
L_8	66.5
L_{25}	63.1
L_{50}	60.0
SEL	--

Atmospheric Conditions:

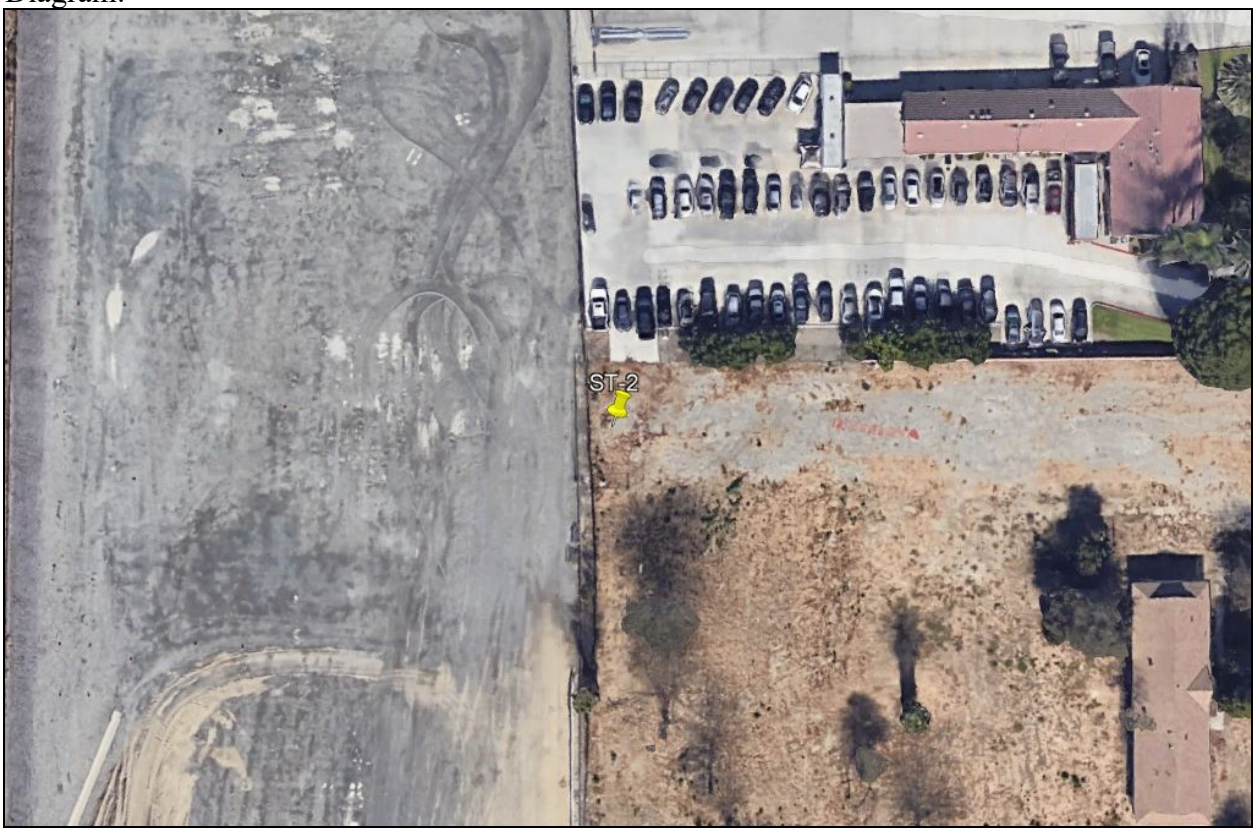
Maximum Wind Velocity (mph)	8.4
Average Wind Velocity (mph)	3.0
Temperature (F)	88.5
Relative Humidity (%)	45.8
Comments:	

Comments:

Traffic Description:

Roadway	# Lanes	Speeds	NB/EB Counts			SB/WB Counts		
			Auto	MT	HT	Auto	MT	HT

Diagram:



Location Photo:

Noise Measurement Survey – 24 HR

Project Number: GMS2201
Project Name: Philadelphia Industrial

Test Personnel: Kevin Nguyendo
Equipment: Spark 706RC (SN:18905)

Site Number: LT-1 Date: 8/2/2022

Time: From 11:00 a.m. To 11:00 a.m.

Site Location: Southwest corner of the project site on a powerline pole, just east of 3638 Philadelphia Street, Chino, CA 91710.

Primary Noise Sources: Traffic noise on Philadelphia Street. Faint forklift activity noise.

Comments: Residence at 3638 Philadelphia Street, Chino, CA 91710

Photo:

Noise Measurement Survey – 24 HR

Project Number: GMS2201
Project Name: Philadelphia Industrial

Test Personnel: Kevin Nguyendo
Equipment: Spark 706RC (SN:18906)

Site Number: LT-2 Date: 8/2/2022

Time: From 11:00 a.m. To 11:00 a.m.

Site Location: Southwest corner of the project site on a front yard tree, just north of home on 3643 Philadelphia Street, Chino, CA 91710.

Primary Noise Sources: Traffic on Philadelphia Street.

Comments: Residence at 3643 Philadelphia Street, Chino, CA 91710

Photo:

Noise Measurement Survey – 24 HR

Project Number: GMS2201
Project Name: Philadelphia Industrial

Test Personnel: Kevin Nguyendo
Equipment: Spark 706RC (SN:18907)

Site Number: LT-3 Date: 8/3/2022

Time: From 12:00 p.m. To 12:00 p.m.

Site Location: Eastern edge of the project site on a front yard tree, just west of a single-family residence at 12027 East End Avenue, Chino, CA 91710.

Primary Noise Sources: Traffic on East End Avenue.

Comments: Residence at 12027 East End Avenue, Chino, CA 91710

Photo:

APPENDIX B

FHWA HIGHWAY TRAFFIC NOISE MODEL PRINTOUTS

TABLE Existing No Project-01
FHWA ROADWAY NOISE LEVEL ANALYSIS

RUN DATE: 06/21/2023
ROADWAY SEGMENT: East End Avenue North of Philadelphia Street
NOTES: Philadelphia Street Industrial Center - Existing No Project

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* * ASSUMPTIONS * *

AVERAGE DAILY TRAFFIC: 7889 SPEED (MPH): 45 GRADE: .5

TRAFFIC DISTRIBUTION PERCENTAGES

	DAY	EVENING	NIGHT
AUTOS	66.74	11.11	8.25
M-TRUCKS	6.19	0.36	0.75
H-TRUCKS	5.71	0.18	0.71

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

---

* * CALCULATED NOISE LEVELS * *

CNEL AT 50 FT FROM NEAR TRAVEL LANE CENTERLINE (dB) = 70.34

DISTANCE (FEET) FROM ROADWAY CENTERLINE TO CNEL

70 CNEL	65 CNEL	60 CNEL	55 CNEL
58.9	126.4	272.1	586.0

TABLE Existing No Project-02
FHWA ROADWAY NOISE LEVEL ANALYSIS

RUN DATE: 06/21/2023
ROADWAY SEGMENT: East End Avenue South of Philadelphia Street
NOTES: Philadelphia Street Industrial Center - Existing No Project

---

* * ASSUMPTIONS * *

AVERAGE DAILY TRAFFIC: 8579 SPEED (MPH): 45 GRADE: .5

TRAFFIC DISTRIBUTION PERCENTAGES

	DAY	EVENING	NIGHT
AUTOS	70.92	11.81	8.77
M-TRUCKS	3.14	0.18	0.38
H-TRUCKS	4.15	0.13	0.52

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

---

* * CALCULATED NOISE LEVELS * *

CNEL AT 50 FT FROM NEAR TRAVEL LANE CENTERLINE (dB) = 69.47

DISTANCE (FEET) FROM ROADWAY CENTERLINE TO CNEL

70 CNEL	65 CNEL	60 CNEL	55 CNEL
51.6	110.6	238.0	512.6

TABLE Existing No Project-03
FHWA ROADWAY NOISE LEVEL ANALYSIS

RUN DATE: 06/21/2023
ROADWAY SEGMENT: Philadelphia Street West of East End Street
NOTES: Philadelphia Street Industrial Center - Existing No Project

---

* * ASSUMPTIONS * *

AVERAGE DAILY TRAFFIC: 6884 SPEED (MPH): 40 GRADE: .5

	TRAFFIC DISTRIBUTION PERCENTAGES		
	DAY	EVENING	NIGHT
AUTOS	74.10	12.34	9.17
M-TRUCKS	2.97	0.17	0.36
H-TRUCKS	0.78	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) = 64.63

DISTANCE (FEET) FROM ROADWAY CENTERLINE TO CNEL			
70 CNEL	65 CNEL	60 CNEL	55 CNEL
0.0	52.9	113.4	244.0

TABLE Existing No Project-04
FHWA ROADWAY NOISE LEVEL ANALYSIS

RUN DATE: 06/21/2023
ROADWAY SEGMENT: Philadelphia Street East of East End Street
NOTES: Philadelphia Street Industrial Center - Existing No Project

---

* * ASSUMPTIONS * *

AVERAGE DAILY TRAFFIC: 6963 SPEED (MPH): 40 GRADE: .5

	TRAFFIC DISTRIBUTION PERCENTAGES		
	DAY	EVENING	NIGHT
AUTOS	72.55	12.08	8.97
M-TRUCKS	2.97	0.17	0.36
H-TRUCKS	2.51	0.08	0.31

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

---

* * CALCULATED NOISE LEVELS * *

CNEL AT 50 FT FROM NEAR TRAVEL LANE CENTERLINE (dB) = 66.37

DISTANCE (FEET) FROM ROADWAY CENTERLINE TO CNEL			
70 CNEL	65 CNEL	60 CNEL	55 CNEL
0.0	68.9	148.0	318.6

TABLE Existing with Project-01
FHWA ROADWAY NOISE LEVEL ANALYSIS

RUN DATE: 06/21/2023
ROADWAY SEGMENT: East End Avenue North of Philadelphia Street
NOTES: Philadelphia Street Industrial Center - Existing with Project

---

* * ASSUMPTIONS * *

AVERAGE DAILY TRAFFIC: 7903 SPEED (MPH): 45 GRADE: .5

TRAFFIC DISTRIBUTION PERCENTAGES	DAY	EVENING	NIGHT
AUTOS	66.73	11.10	8.25
M-TRUCKS	6.19	0.35	0.75
H-TRUCKS	5.72	0.18	0.73

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

---

* * CALCULATED NOISE LEVELS * *

CNEL AT 50 FT FROM NEAR TRAVEL LANE CENTERLINE (dB) = 70.38

DISTANCE (FEET) FROM ROADWAY CENTERLINE TO CNEL			
70 CNEL	65 CNEL	60 CNEL	55 CNEL
59.3	127.3	274.0	590.0

TABLE Existing with Project-02
FHWA ROADWAY NOISE LEVEL ANALYSIS

RUN DATE: 06/21/2023
ROADWAY SEGMENT: East End Avenue South of Philadelphia Street
NOTES: Philadelphia Street Industrial Center - Existing with Project

---

* * ASSUMPTIONS * *

AVERAGE DAILY TRAFFIC: 8587 SPEED (MPH): 45 GRADE: .5

TRAFFIC DISTRIBUTION PERCENTAGES

	DAY	EVENING	NIGHT
AUTOS	70.91	11.81	8.77
M-TRUCKS	3.13	0.17	0.38
H-TRUCKS	4.16	0.13	0.54

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

---

* * CALCULATED NOISE LEVELS * *

CNEL AT 50 FT FROM NEAR TRAVEL LANE CENTERLINE (dB) = 69.52

DISTANCE (FEET) FROM ROADWAY CENTERLINE TO CNEL

70 CNEL	65 CNEL	60 CNEL	55 CNEL
52.0	111.5	239.9	516.7

TABLE Existing with Project-03
FHWA ROADWAY NOISE LEVEL ANALYSIS

RUN DATE: 06/21/2023
ROADWAY SEGMENT: Philadelphia Street West of East End Street
NOTES: Philadelphia Street Industrial Center - Existing with Project

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* * ASSUMPTIONS * *

AVERAGE DAILY TRAFFIC: 6955 SPEED (MPH): 40 GRADE: .5

	TRAFFIC DISTRIBUTION PERCENTAGES		
	DAY	EVENING	NIGHT
AUTOS	73.98	12.31	9.14
M-TRUCKS	2.98	0.17	0.36
H-TRUCKS	0.91	0.01	0.14

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

---

* * CALCULATED NOISE LEVELS * *

CNEL AT 50 FT FROM NEAR TRAVEL LANE CENTERLINE (dB) = 64.96

DISTANCE (FEET) FROM ROADWAY CENTERLINE TO CNEL			
70 CNEL	65 CNEL	60 CNEL	55 CNEL
0.0	55.7	119.4	256.9

TABLE Existing with Project-04
FHWA ROADWAY NOISE LEVEL ANALYSIS

RUN DATE: 06/21/2023
ROADWAY SEGMENT: Philadelphia Street East of East End Street
NOTES: Philadelphia Street Industrial Center - Existing with Project

---

* * ASSUMPTIONS * *

AVERAGE DAILY TRAFFIC: 7008 SPEED (MPH): 40 GRADE: .5

TRAFFIC DISTRIBUTION PERCENTAGES

	DAY	EVENING	NIGHT
AUTOS	72.49	12.07	8.96
M-TRUCKS	2.98	0.17	0.36
H-TRUCKS	2.58	0.09	0.30

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

---

* * CALCULATED NOISE LEVELS * *

CNEL AT 50 FT FROM NEAR TRAVEL LANE CENTERLINE (dB) = 66.39

DISTANCE (FEET) FROM ROADWAY CENTERLINE TO CNEL

70 CNEL	65 CNEL	60 CNEL	55 CNEL
0.0	69.2	148.6	320.0

TABLE 2025 No Project-01
FHWA ROADWAY NOISE LEVEL ANALYSIS

RUN DATE: 06/21/2023
ROADWAY SEGMENT: East End Avenue North of Philadelphia Street
NOTES: Philadelphia Street Industrial Center - 2025 No Project

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* * ASSUMPTIONS * *

AVERAGE DAILY TRAFFIC: 8280 SPEED (MPH): 45 GRADE: .5

TRAFFIC DISTRIBUTION PERCENTAGES

	DAY	EVENING	NIGHT
AUTOS	66.74	11.11	8.25
M-TRUCKS	6.19	0.36	0.75
H-TRUCKS	5.71	0.18	0.71

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

---

* * CALCULATED NOISE LEVELS * *

CNEL AT 50 FT FROM NEAR TRAVEL LANE CENTERLINE (dB) = 70.55

DISTANCE (FEET) FROM ROADWAY CENTERLINE TO CNEL

70 CNEL	65 CNEL	60 CNEL	55 CNEL
60.8	130.6	281.0	605.2

TABLE 2025 No Project-02
FHWA ROADWAY NOISE LEVEL ANALYSIS

RUN DATE: 06/21/2023
ROADWAY SEGMENT: East End Avenue South of Philadelphia Street
NOTES: Philadelphia Street Industrial Center - 2025 No Project

---

* * ASSUMPTIONS * *

AVERAGE DAILY TRAFFIC: 8954 SPEED (MPH): 45 GRADE: .5

	TRAFFIC DISTRIBUTION PERCENTAGES		
	DAY	EVENING	NIGHT
AUTOS	70.92	11.81	8.77
M-TRUCKS	3.14	0.18	0.38
H-TRUCKS	4.15	0.13	0.52

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

---

* * CALCULATED NOISE LEVELS * *

CNEL AT 50 FT FROM NEAR TRAVEL LANE CENTERLINE (dB) = 69.65

DISTANCE (FEET) FROM ROADWAY CENTERLINE TO CNEL			
70 CNEL	65 CNEL	60 CNEL	55 CNEL
53.1	113.8	244.9	527.4

TABLE 2025 No Project-03
FHWA ROADWAY NOISE LEVEL ANALYSIS

RUN DATE: 06/21/2023
ROADWAY SEGMENT: Philadelphia Street West of East End Street
NOTES: Philadelphia Street Industrial Center - 2025 No Project

---

* * ASSUMPTIONS * *

AVERAGE DAILY TRAFFIC: 7322 SPEED (MPH): 40 GRADE: .5

TRAFFIC DISTRIBUTION PERCENTAGES

	DAY	EVENING	NIGHT
AUTOS	74.10	12.34	9.17
M-TRUCKS	2.97	0.17	0.36
H-TRUCKS	0.78	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) = 64.90

DISTANCE (FEET) FROM ROADWAY CENTERLINE TO CNEL

70 CNEL	65 CNEL	60 CNEL	55 CNEL
0.0	55.1	118.1	254.2

TABLE 2025 No Project-04
FHWA ROADWAY NOISE LEVEL ANALYSIS

RUN DATE: 06/21/2023
ROADWAY SEGMENT: Philadelphia Street East of East End Street
NOTES: Philadelphia Street Industrial Center - 2025 No Project

---

* * ASSUMPTIONS * *

AVERAGE DAILY TRAFFIC: 7426 SPEED (MPH): 40 GRADE: .5

TRAFFIC DISTRIBUTION PERCENTAGES

	DAY	EVENING	NIGHT
AUTOS	72.55	12.08	8.97
M-TRUCKS	2.97	0.17	0.36
H-TRUCKS	2.51	0.08	0.31

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

---

* * CALCULATED NOISE LEVELS * *

CNEL AT 50 FT FROM NEAR TRAVEL LANE CENTERLINE (dB) = 66.65

DISTANCE (FEET) FROM ROADWAY CENTERLINE TO CNEL

70 CNEL	65 CNEL	60 CNEL	55 CNEL
0.0	71.9	154.5	332.5

TABLE 2025 With Project-01
FHWA ROADWAY NOISE LEVEL ANALYSIS

RUN DATE: 06/21/2023
ROADWAY SEGMENT: East End Avenue North of Philadelphia Street
NOTES: Philadelphia Street Industrial Center - 2025 With Project

---

* * ASSUMPTIONS * *

AVERAGE DAILY TRAFFIC: 8294 SPEED (MPH): 45 GRADE: .5

TRAFFIC DISTRIBUTION PERCENTAGES

	DAY	EVENING	NIGHT
AUTOS	66.73	11.10	8.25
M-TRUCKS	6.20	0.36	0.75
H-TRUCKS	5.73	0.18	0.70

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

---

* * CALCULATED NOISE LEVELS * *

CNEL AT 50 FT FROM NEAR TRAVEL LANE CENTERLINE (dB) = 70.54

DISTANCE (FEET) FROM ROADWAY CENTERLINE TO CNEL

70 CNEL	65 CNEL	60 CNEL	55 CNEL
60.8	130.4	280.7	604.5

TABLE 2025 With Project-02
FHWA ROADWAY NOISE LEVEL ANALYSIS

RUN DATE: 06/21/2023
ROADWAY SEGMENT: East End Avenue South of Philadelphia Street
NOTES: Philadelphia Street Industrial Center - 2025 With Project

---

* * ASSUMPTIONS * *

AVERAGE DAILY TRAFFIC: 8962 SPEED (MPH): 45 GRADE: .5

TRAFFIC DISTRIBUTION PERCENTAGES

	DAY	EVENING	NIGHT
AUTOS	70.91	11.81	8.77
M-TRUCKS	3.14	0.18	0.38
H-TRUCKS	4.16	0.13	0.52

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

---

* * CALCULATED NOISE LEVELS * *

CNEL AT 50 FT FROM NEAR TRAVEL LANE CENTERLINE (dB) = 69.66

DISTANCE (FEET) FROM ROADWAY CENTERLINE TO CNEL

70 CNEL	65 CNEL	60 CNEL	55 CNEL
53.2	113.9	245.1	527.9

TABLE 2025 With Project-03
FHWA ROADWAY NOISE LEVEL ANALYSIS

RUN DATE: 06/21/2023
ROADWAY SEGMENT: Philadelphia Street West of East End Street
NOTES: Philadelphia Street Industrial Center - 2025 With Project

---

* * ASSUMPTIONS * *

AVERAGE DAILY TRAFFIC: 7393 SPEED (MPH): 40 GRADE: .5

TRAFFIC DISTRIBUTION PERCENTAGES

	DAY	EVENING	NIGHT
AUTOS	73.99	12.32	9.14
M-TRUCKS	2.98	0.16	0.35
H-TRUCKS	0.89	0.01	0.16

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

---

* * CALCULATED NOISE LEVELS * *

CNEL AT 50 FT FROM NEAR TRAVEL LANE CENTERLINE (dB) = 65.30

DISTANCE (FEET) FROM ROADWAY CENTERLINE TO CNEL

70 CNEL	65 CNEL	60 CNEL	55 CNEL
0.0	58.6	125.6	270.3

TABLE 2025 With Project-04
FHWA ROADWAY NOISE LEVEL ANALYSIS

RUN DATE: 06/21/2023
ROADWAY SEGMENT: Philadelphia Street East of East End Street
NOTES: Philadelphia Street Industrial Center - 2025 With Project

---

* * ASSUMPTIONS * *

AVERAGE DAILY TRAFFIC: 7471 SPEED (MPH): 40 GRADE: .5

TRAFFIC DISTRIBUTION PERCENTAGES

	DAY	EVENING	NIGHT
AUTOS	72.49	12.07	8.96
M-TRUCKS	2.98	0.17	0.36
H-TRUCKS	2.58	0.09	0.30

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

---

* * CALCULATED NOISE LEVELS * *

CNEL AT 50 FT FROM NEAR TRAVEL LANE CENTERLINE (dB) = 66.67

DISTANCE (FEET) FROM ROADWAY CENTERLINE TO CNEL

70 CNEL	65 CNEL	60 CNEL	55 CNEL
0.0	72.2	155.1	333.9

APPENDIX C

NOISE REDUCTION CALCULATIONS

Temporary Construction Barrier Noise Reduction Calculation

No.	Land Use	Jurisdiction	Direction	Wall Height (ft)	Wall Base Elevation	Recepter Base Elevation	Receptor Height (ft)	Source Base Elevation	Source Height (ft)	Source to Barrier Distance (ft)	Receptor to Source Distance (ft)	Receptor to Barrier Distance (ft)	d1	d2	d3	delta	N	Noise Reduction	Noise Reduction Applied to Noise Analysis
2	Residential	San Bernardino	East	6	0	0	5	0	5	75	150	75	150	75.00667	75.00667	0.013333	0.013045	5.1	5
3	Residential	Chino	Southeast	6	0	0	5	0	5	97.5	195	97.5	195	97.50513	97.50513	0.010256	0.010035	5.1	5
4	Residential	Chino	South	8	0	0	5	0	5	67.5	135	67.5	135	67.56663	67.56663	0.133268	0.130392	6.2	6
5	Residential	Chino	West	14	0	0	5	0	5	40	50	10	50	13.45362	41	4.453624	4.357514	14.8	14

Noise Reduction Calculation for Stationary Noise Sources

Land Use	Noise Source	Land Use	Jurisdiction	Direction	Wall Height (ft)	Wall Base Elevation	Recepter Base Elevation	Receptor Height (ft)	Source Base Elevation	Source Height (ft)	Source to Barrier Distance (ft)	Receptor to Source Distance (ft)	Receptor to Barrier Distance (ft)	d1	d2	d3	delta	N	Calculated Noise Reduction	Noise Reduction Applied to Noise Analysis
	Truck (Building 1)	Residential	San Bernardino	East	35	0	0	5	0	5	25	329	304	329	305.4767	39.05125	15.52793	15.19283	17.1	15
	Truck (Building 2)	Residential	San Bernardino	East	35	0	0	5	0	5	25	272	247	272	248.8152	39.05125	15.86644	15.52404	17.1	15
	Truck (Building 3)	Residential	San Bernardino	East	35	0	0	5	0	5	25	275	250	275	251.7936	39.05125	15.84481	15.50288	17.1	15
	Truck Parking (Building 1)	Residential	San Bernardino	East	35	0	0	5	0	5	25	315	290	315	291.5476	39.05125	15.59884	15.26222	17.1	15
Residential	Truck Parking (Building 2)	Residential	San Bernardino	East	35	0	0	5	0	5	25	270	245	270	246.8299	39.05125	15.88115	15.53843	17.1	15
	Truck Parking (Building 3)	Residential	San Bernardino	East	35	0	0	5	0	5	25	275	250	275	251.7936	39.05125	15.84481	15.50288	17.1	15
	HVAC (Building 1)	Residential	San Bernardino	East	4	31	0	5	31	3	10	146	136	148.8523	139.2695	10.04988	0.467123	0.457042	8.3	8
	HVAC (Building 2)	Residential	San Bernardino	East	4	31	0	5	31	3	10	146	136	148.8523	139.2695	10.04988	0.467123	0.457042	8.3	8
	HVAC (Building 3)	Residential	San Bernardino	East	4	31	0	5	31	3	10	308	298	309.3622	299.5063	10.04988	0.193889	0.189705	6.6	6
	Truck (Building 1)	Residential	Chino	Southeast	35	0	0	5	0	5	25	329	304	329	305.4767	39.05125	15.52793	15.19283	17.1	15
	Truck (Building 2)	Residential	Chino	Southeast	35	0	0	5	0	5	25	595	570	595	570.7889	39.05125	14.84018	14.51992	17.1	15
	Truck (Building 3)	Residential	Chino	Southeast	35	0	0	5	0	5	25	402	377	402	378.1918	39.05125	15.243	14.91405	17.1	15
	Truck Parking (Building 1)	Residential	Chino	Southeast	35	0	0	5	0	5	25	595	570	595	570.7889	39.05125	14.84018	14.51992	17.1	15
Residential	Truck Parking (Building 2)	Residential	Chino	Southeast	35	0	0	5	0	5	25	420	395	420	396.1376	39.05125	15.18885	14.86107	17.1	15
	Truck Parking (Building 3)	Residential	Chino	Southeast	35	0	0	5	0	5	25	345	320	345	321.4032	39.05125	15.45442	15.12091	17.1	15
	HVAC (Building 1)	Residential	Chino	Southeast	4	31	0	5	31	3	10	517	507	517.8127	507.8868	10.04988	0.123967	0.121291	6.2	6
	HVAC (Building 2)	Residential	Chino	Southeast	4	31	0	5	31	3	10	338	328	339.2418	329.3691	10.04988	0.177168	0.173345	6.6	6
	HVAC (Building 3)	Residential	Chino	Southeast	4	31	0	5	31	3	10	329	319	330.2756	320.4076	10.04988	0.181786	0.177863	6.6	6
	Truck (Building 1)	Residential	Chino	South	8	0	0	5	0	5	25	458	433	458	433.0104	25.17936	0.189749	0.185654	6.6	6
	Truck (Building 2)	Residential	Chino	South	35	0	0	5	0	5	25	257	232	257	233.9316	39.05125	15.98286	15.63795	17.1	15
	Truck (Building 3)	Residential	Chino	South	35	0	0	5	0	5	25	186	161	186	163.7712	39.05125	16.82243	16.4594	17.1	15
	Truck Parking (Building 1)	Residential	Chino	South	8	0	0	5	0	5	25	470	445	470	445.0101	25.17936	0.189469	0.18538	6.6	6
Residential	Truck Parking (Building 2)	Residential	Chino	South	35	0	0	5	0	5	25	280	255	280	256.7586	39.05125	15.80989	15.46871	17.1	15
	Truck Parking (Building 3)	Residential	Chino	South	35	0	0	5	0	5	25	174	149	174	151.9901	39.05125	17.04138	16.67362	17.1	15
	HVAC (Building 1)	Residential	Chino	South	4	31	0	5	31	3	10	477	467	477.8807	467.9626	10.04988	0.131743	0.1289	6.2	6
	HVAC (Building 2)	Residential	Chino	South	4	31	0	5	31	3	10	292	282	293.4365	283.5913	10.04988	0.204596	0.200181	6.8	6
	HVAC (Building 3)	Residential	Chino	South	4	31	0	5	31	3	10	116	106	119.5701	110.1635	10.04988	0.643327	0.629444	9.1	8
	HVAC (Building 1)	Residential	Chino	West	4	31	0	5	31	3	10	398	388	399.0551	389.1581	10.04988	0.152807	0.14951	6.3	6
Residential	HVAC (Building 2)	Residential	Chino	West	4	31	0	5	31	3	10	271	261	272.5472	262.7185	10.04988	0.221113	0.216341	6.9	6
	HVAC (Building 3)	Residential	Chino	West	4	31	0	5	31	3	10	91	81	95.50916	86.37708	10.04988	0.917794	0.897988	10.0	8