Arkansas Street Residential Development and Specific Plan

Noise Impact Study

City of Artesia, CA

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Sound Solutions for Planning and Design

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1.0 Introduction

1.1 Purpose of Analysis and Study Objectives

This noise assessment was prepared to evaluate the potential noise impacts for the Specific Plan and Phase 1 study area and to recommend noise mitigation measures, if necessary, to minimize the potential noise impacts. The assessment was conducted and compared to the noise standards set forth by the Federal, State, and Local agencies. Consistent with the City's Noise Guidelines, the Specific Plan and Phase 1 must demonstrate compliance to the applicable noise criterion as outlined within the City's Noise Element and Municipal Code.

The following is provided in this report:

- A description of the study area and the proposed projects
- Information regarding the fundamentals of noise
- A description of the local noise guidelines and standards
- An analysis of traffic noise impacts to and from the projects' sites
- An analysis of construction noise impacts

1.2 Site Location and Study Area

Specific Plan

The Specific Plan site area contains multiple landowners and uses, including an El Pollo Loco restaurant, Pioneer RV Storage, residential, light industrial, blighted property, and automobile uses. The site comprises of Tax Assessor parcel numbers – APNs 7014-003-015 through 7014-003-028 and the portion of Alburtis Avenue within the Specific Plan boundary proposed to be vacated.

Phase 1

The Phase 1 site is located at 11734 Arkansas Street in Artesia, California, as shown in Exhibit A. The site is currently zoned as Light Manufacturing and Industrial and Pioneer Boulevard Commercial. Phase 1 includes a Change of Zone to Arkansas Mixed Use. The Phase 1 proposed use is multi-family residential at approximately 22.26 dwelling units per acre.

1.3 Project Description

The project consists of a proposal by Kim Prijatel on behalf of City Ventures and the City of Artesia, to prepare a specific plan (Arkansas Street Specific Plan) of approximately 4.22 acres bounded to the north by Arkansas Street, to the east by Pioneer Boulevard, to the south by a single-family residential neighborhood and to the west by Alburtis Avenue. The site area contains multiple landowners and uses, including an El Pollo Loco restaurant, Pioneer RV Storage, residential, light industrial, blighted property, and automobile uses. The site comprises of Tax Assessor parcel numbers – APNs 7014-003-015 through 7014-003-028 and the portion of Alburtis Avenue within the Specific Plan boundary proposed to be vacated.

Included in the proposal are the following:

- General Plan Amendment to add the new Arkansas Street Specific Plan to the General Plan and change the land use designation from Light Manufacturing and Industrial and Pioneer Boulevard Commercial to Arkansas Mixed Use

- Specific Plan – Arkansas Street Specific Plan (4.22 acres)

- Change of Zone from Light Manufacturing and Industrial (M-1) and Commercial General (C-G) to Specific Plan (SP) Zone – Arkansas Specific Plan

- Phase 1 Development – the Arkansas Project (Case No. 2021-06) will include:
    - 59 units and 5,290-square-feet of commercial on 2.65 acres;
    - TTM-83442 – air space condominium map; and
    - Street Vacation for Alburtis Avenue.

- Future Phases – the remainder of the Specific Plan area will include:
    - 40 units and 34,190-square-feet of commercial on the remaining 1.57 acres based on a floor area ratio of 0.5 for commercial and 25 dwelling units per acre as specified in the specific plan.

Exhibit A
Location Map

= Specific Plan = Phase 1

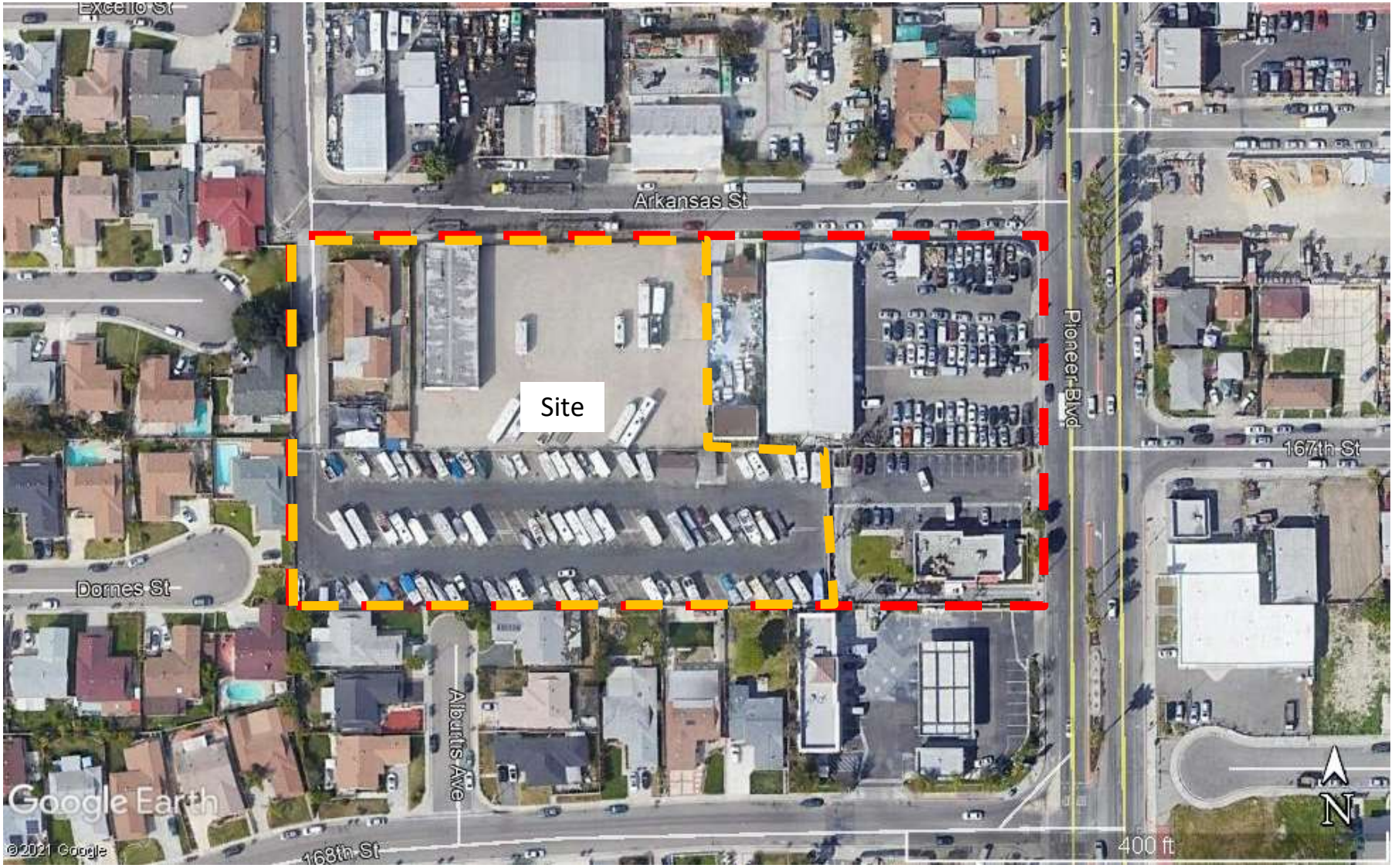
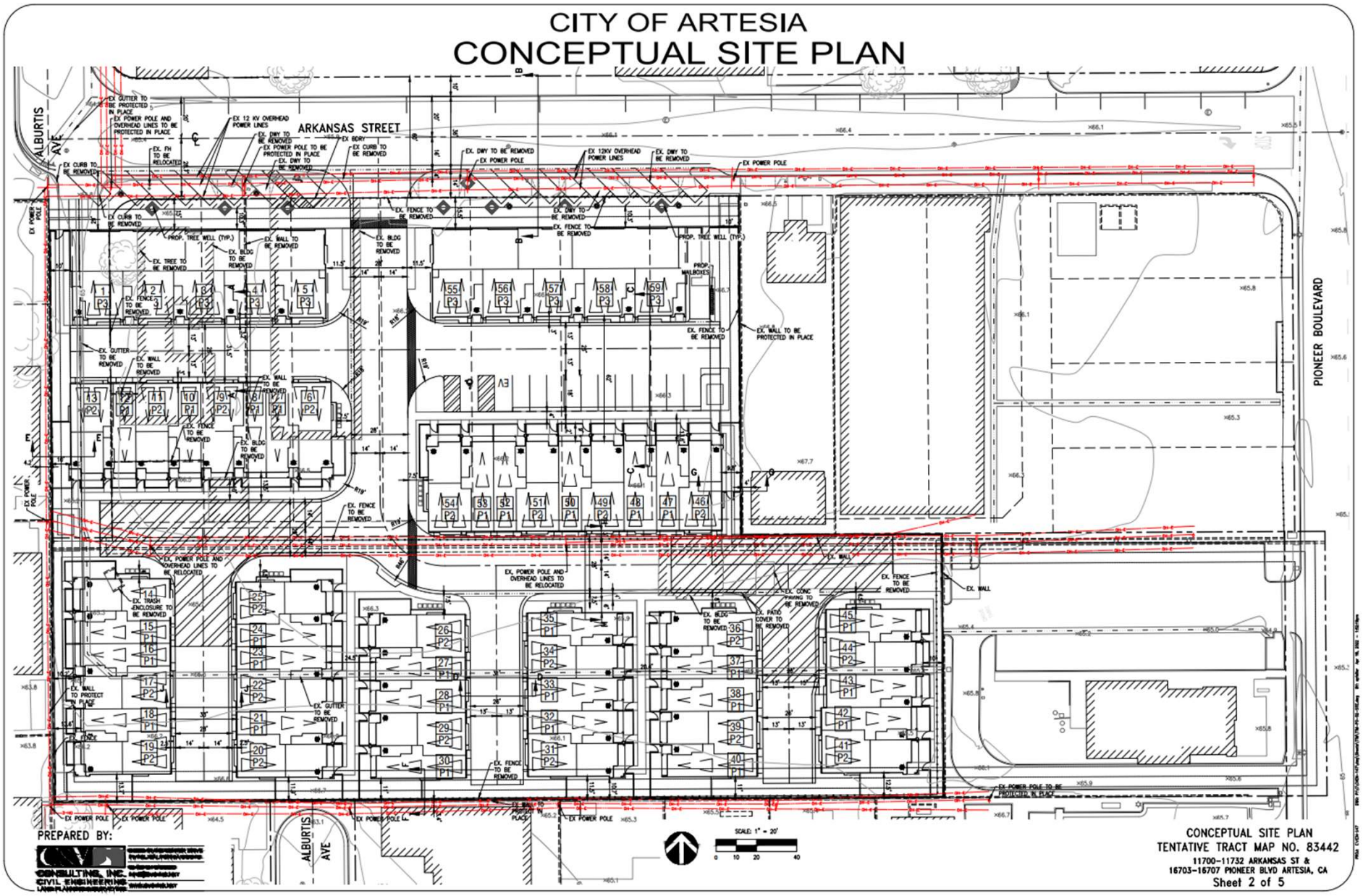


Exhibit B

Site Plan



2.0 Fundamentals of Noise

This section of the report provides basic information about noise and presents some of the terms used within the report.

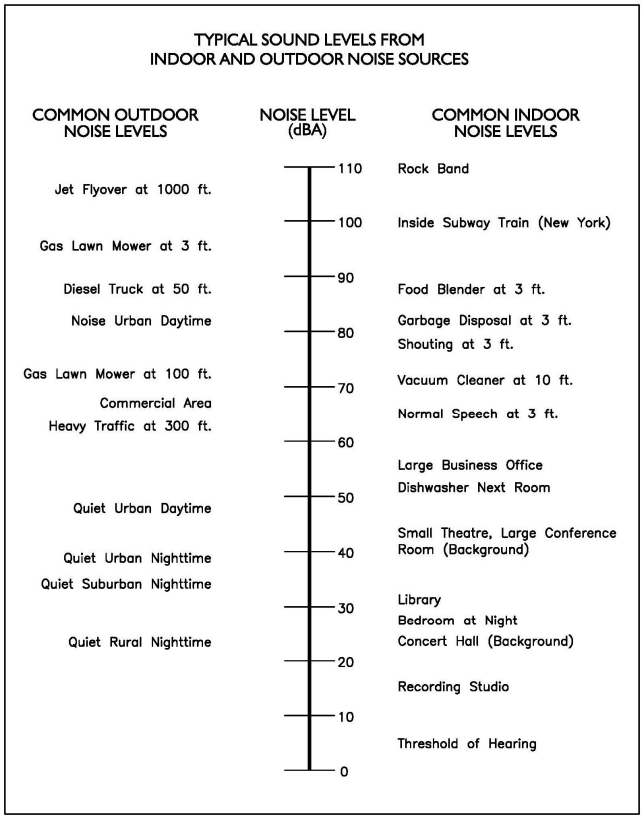
2.1 Sound, Noise, and Acoustics

Sound is a disturbance created by a moving or vibrating source and is capable of being detected by the hearing organs. Sound may be thought of as mechanical energy of a moving object transmitted by pressure waves through a medium to a human ear. For traffic or stationary noise, the medium of concern is air. *Noise* is defined as sound that is loud, unpleasant, unexpected, or unwanted.

2.2 Frequency and Hertz

A continuous sound is described by its *frequency* (pitch) and its *amplitude* (loudness). Frequency relates to the number of pressure oscillations per second. Low-frequency sounds are low in pitch (bass sounding) and high-frequency sounds are high in pitch (squeak). These oscillations per second (cycles) are commonly referred to as Hertz (Hz). The human ear can hear from the bass pitch starting at 20 Hz to the high pitch of 20,000 Hz.

Exhibit C: Typical A-Weighted Noise Levels



2.3 Sound Pressure Levels and Decibels

The *amplitude* of a sound determines its loudness. The loudness of sound increases or decreases as the amplitude increases or decreases. Sound pressure amplitude is measured in units of micro-Newton per square inch meter (N/m2), also called micro-Pascal (µPa). One µPa is approximately one hundred billionths (0.00000000001) of normal atmospheric pressure. Sound pressure level (SPL or L_p) is used to describe in logarithmic units the ratio of actual sound pressures to a reference pressure squared. These units are called decibels abbreviated dB. Exhibit C illustrates references sound levels for different noise sources.

2.4 Addition of Decibels

Because decibels are on a logarithmic scale, sound pressure levels cannot be added or subtracted by simple plus or minus addition. When two sounds or equal SPL are combined, they will produce an SPL 3 dB greater than the original single SPL. In other words, sound energy must be doubled to produce a 3 dB increase. If two sounds differ by approximately 10 dB, the higher sound level is the predominant sound.

2.5 Human Response to Changes in Noise Levels

In general, the healthy human ear is most sensitive to sounds between 1,000 Hz and 5,000 Hz, (A-weighted scale) and it perceives a sound within that range as being more intense than a sound with a higher or lower frequency with the same magnitude. For purposes of this report as well as with most environmental documents, the A-scale weighting is typically reported in terms of A-weighted decibel (dBA). Typically, the human ear can barely perceive a change in noise level of 3 dB. A change in 5 dB is readily perceptible, and a change in 10 dB is perceived as being twice or half as loud. As previously discussed, a doubling of sound energy results in a 3 dB increase in sound, which means that a doubling of sound energy (e.g. doubling the volume of traffic on a highway) would result in a barely perceptible change in sound level.

Changes in Intensity Level, dBA	Changes in Apparent Loudness
1	Not perceptible
3	Just perceptible
5	Clearly noticeable
10	Twice (or half) as loud

https://www.fhwa.dot.gov/environMent/noise/regulations_and_guidance/polguide/polguide02.cfm

2.6 Noise Descriptors

Noise in our daily environment fluctuates over time. Some noise levels occur in regular patterns, others are random. Some noise levels are constant while others are sporadic. Noise descriptors were created to describe the different time-varying noise levels.

A-Weighted Sound Level: The sound pressure level in decibels as measured on a sound level meter using the A-weighted filter network. The A-weighting filter de-emphasizes the very low and very high-frequency components of the sound in a manner similar to the response of the human ear. A numerical method of rating human judgment of loudness.

Ambient Noise Level: The composite of noise from all sources, near and far. In this context, the ambient noise level constitutes the normal or existing level of environmental noise at a given location.

Community Noise Equivalent Level (CNEL): The average equivalent A-weighted sound level during a 24-hour day, obtained after the addition of five (5) decibels to sound levels in the evening from 7:00 to 10:00 PM and after the addition of ten (10) decibels to sound levels in the night before 7:00 AM and after 10:00 PM.

Decibel (dB): A unit for measuring the amplitude of a sound, equal to 20 times the logarithm to the base 10 of the ratio of the pressure of the sound measured to the reference pressure, which is 20 micro-pascals.

dB(A): A-weighted sound level (see definition above).

Equivalent Sound Level (LEQ): The sound level corresponding to a steady noise level over a given sample period with the same amount of acoustic energy as the actual time-varying noise level. The energy average noise level during the sample period.

Habitable Room: Any room meeting the requirements of the Uniform Building Code or other applicable regulations which is intended to be used for sleeping, living, cooking, or dining purposes, excluding such enclosed spaces as closets, pantries, bath or toilet rooms, service rooms, connecting corridors, laundries, unfinished attics, foyers, storage spaces, cellars, utility rooms, and similar spaces.

L(n): The A-weighted sound level exceeded during a certain percentage of the sample time. For example, L10 in the sound level exceeded 10 percent of the sample time. Similarly L50, L90, L99, etc.

Noise: *A*ny unwanted sound or sound which is undesirable because it interferes with speech and hearing, is intense enough to damage hearing, or is otherwise annoying. The State Noise Control Act defines noise as "...excessive undesirable sound...".

Outdoor Living Area: Outdoor spaces that are associated with residential land uses typically used for passive recreational activities or other noise-sensitive uses. Such spaces include patio areas, barbecue areas, jacuzzi areas, etc. associated with residential uses; outdoor patient recovery or resting areas associated with hospitals, convalescent hospitals, or rest homes; outdoor areas associated with places of worship which have a significant role in services or other noise-sensitive activities; and outdoor school facilities routinely used for educational purposes which may be adversely impacted by noise. Outdoor areas usually not included in this definition are: front yard areas, driveways, greenbelts, maintenance areas and storage areas associated with residential land uses; exterior areas at hospitals that are not used for patient activities; outdoor areas associated with places of worship and principally used for short-term social gatherings; and, outdoor areas associated with school facilities that are not typically associated with educational uses prone to adverse noise impacts (for example, school play yard areas).

Percent Noise Levels: See L(n).

Sound Level (Noise Level): The weighted sound pressure level obtained by the use of a sound level meter having a standard frequency filter for attenuating part of the sound spectrum.

Sound Level Meter: An instrument, including a microphone, an amplifier, an output meter, and frequency weighting networks for the measurement and determination of noise and sound levels.

Single Event Noise Exposure Level (SENEL): The dB(A) level which, if it lasted for one second, would produce the same A-weighted sound energy as the actual event.

2.7 Traffic Noise Prediction

Noise levels associated with traffic depend on a variety of factors: (1) volume of traffic, (2) speed of traffic, (3) auto, medium truck (2 axle), and heavy truck percentage (3 axle and greater), and sound propagation. A greater volume of traffic, higher speeds, and higher truck percentages equate to a louder

volume of noise. A doubling of the Average Daily Traffic (ADT) along a roadway will increase noise levels by approximately 3 dB; the reasons for this are discussed in the sections above.

2.8 Sound Propagation

As sound propagates from a source it spreads geometrically. Sound from a small, localized source (i.e., a point source) radiates uniformly outward as it travels away from the source in a spherical pattern. The sound level attenuates at a rate of 6 dB per doubling of distance. The movement of vehicles down a roadway makes the source of the sound appear to propagate from a line (i.e., line source) rather than a point source. This line source results in the noise propagating from a roadway in a cylindrical spreading versus a spherical spreading that results from a point source. The sound level attenuates for a line source at a rate of 3 dB per doubling of distance.

As noise propagates from the source, it is affected by the ground and atmosphere. Noise models use hard site (reflective surfaces) and soft site (absorptive surfaces) to help calculate predicted noise levels. Hard site conditions assume no excessive ground absorption between the noise source and the receiver. Soft site conditions such as grass, soft dirt, or landscaping attenuate noise at a rate of 1.5 dB per doubling of distance. When added to the geometric spreading, the excess ground attenuation results in an overall noise attenuation of 4.5 dB per doubling of distance for a line source and 7.5 dB per doubling of distance for a point source.

Research has demonstrated that atmospheric conditions can have a significant effect on noise levels when noise receivers are located 200 feet from a noise source. Wind, temperature, air humidity, and turbulence can further impact have far sound can travel.

3.0 Ground-Bourne Vibration Fundamentals

3.1 Vibration Descriptors

Ground-borne vibrations consist of rapidly fluctuating motions within the ground that have an average motion of zero. The effects of ground-borne vibrations typically only cause a nuisance to people, but at extreme vibration levels, damage to buildings may occur. Although ground-borne vibration can be felt outdoors, it is typically only an annoyance to people indoors where the associated effects of the shaking of a building can be notable. Ground-borne noise is an effect of ground-borne vibration and only exists indoors since it is produced from noise radiated from the motion of the walls and floors of a room and may also consist of the rattling of windows or dishes on shelves.

Several different methods are used to quantify vibration amplitude.

PPV – Known as the peak particle velocity (PPV) which is the maximum instantaneous peak in vibration velocity, typically given in inches per second.

RMS – Known as root mean squared (RMS) can be used to denote vibration amplitude

VdB – A commonly used abbreviation to describe the vibration level (VdB) for a vibration source.

3.2 Vibration Perception

Typically, developed areas are continuously affected by vibration velocities of 50 VdB or lower. These continuous vibrations are not noticeable to humans whose threshold of perception is around 65 VdB. Outdoor sources that may produce perceptible vibrations are usually caused by construction equipment, steel-wheeled trains, and traffic on rough roads, while smooth roads rarely produce perceptible ground-borne noise or vibration. To counter the effects of ground-borne vibration, the Federal Transit Administration (FTA) has published guidance relative to vibration impacts. According to the FTA, fragile buildings can be exposed to ground-borne vibration levels of 0.3 inches per second without experiencing structural damage.

There are three main types of vibration propagation: surface, compression, and shear waves. Surface waves, or Rayleigh waves, travel along the ground's surface. These waves carry most of their energy along an expanding circular wavefront, similar to ripples produced by throwing a rock into a pool of water. P-waves, or compression waves, are body waves that carry their energy along an expanding spherical wavefront. The particle motion in these waves is longitudinal (i.e., in a "push-pull" fashion). P-waves are analogous to airborne sound waves. S-waves, or shear waves, are also body waves that carry energy along an expanding spherical wavefront. However, unlike P-waves, the particle motion is transverse, or side-to-side and perpendicular to the direction of propagation.

As vibration waves propagate from a source, the vibration energy decreases in a logarithmic nature and the vibration levels typically decrease by 6 VdB per doubling of the distance from the vibration source. This drop-off rate can vary greatly depending on the soil but has been shown to be effective enough for

screening purposes, in order to identify potential vibration impacts that may need to be studied through actual field tests.

4.0 Regulatory Setting

The proposed projects are located in the City of Artesia and noise regulations are addressed through the efforts of various federal, state, and local government agencies. The agencies responsible for regulating noise are discussed below.

4.1 Federal Regulations

The adverse impact of noise was officially recognized by the federal government in the Noise Control Act of 1972, which serves three purposes:

- Publicize noise emission standards for interstate commerce
- Assist state and local abatement efforts
- Promote noise education and research

The Federal Office of Noise Abatement and Control (ONAC) originally was tasked with implementing the Noise Control Act. However, it was eventually eliminated leaving other federal agencies and committees to develop noise policies and programs. Some examples of these agencies are as follows: The Department of Transportation (DOT) assumed a significant role in noise control through its various agencies. The Federal Aviation Agency (FAA) is responsible to regulate noise from aircraft and airports. The Federal Highway Administration (FHWA) is responsible to regulate noise from the interstate highway system. The Occupational Safety and Health Administration (OSHA) is responsible for the prohibition of excessive noise exposure to workers.

The federal government advocates that local jurisdiction use their land use regulatory authority to arrange new development in such a way that “noise sensitive” uses are either prohibited from being constructed adjacent to a highway or that the developments are planned and constructed in such a manner that potential noise impacts are minimized.

Since the federal government has preempted the setting of standards for noise levels that can be emitted by the transportation source, the City is restricted to regulating the noise generated by the transportation system through nuisance abatement ordinances and land use planning.

4.2 State Regulations

Established in 1973, the California Department of Health Services Office of Noise Control (ONC) was instrumental in developing regularity tools to control and abate noise for use by local agencies. One significant model is the “Land Use Compatibility for Community Noise Environments Matrix.” The matrix allows the local jurisdiction to clearly delineate the compatibility of sensitive uses with various incremental levels of noise.

The State of California has established noise insulation standards as outlined in Title 24 and the California Building Code (CBC) which in some cases require acoustical analyses to outline exterior noise levels and to ensure interior noise levels do not exceed the interior threshold. Nonresidential structures within 65 dBA CNEL contours must have a minimum envelope of STC 50 (or OITC 40) with STC 40 (or OITC 30)

windows OR be designed not to exceed an interior level of 50 dBA Leq(h) during operation. Assemblies separating tenants and tenants and public spaces must be at least STC 40. Wall assemblies separating dwelling and sleeping units from each other and from public spaces must have a minimum STC rating of 50. Floor-ceiling assemblies separating dwelling and sleeping units from each other and from public spaces must have a minimum STC rating of 50 unless above non-habitable spaces. Interior noise levels attributable to outdoor sources must not exceed 45 dBA CNEL.

The State mandates that the legislative body of each county and city adopt a noise element as part of its comprehensive general plan. The local noise element must recognize the land use compatibility guidelines published by the State Department of Health Services. The guidelines rank noise land use compatibility in terms of normally acceptable, conditionally acceptable, normally unacceptable, and clearly unacceptable as illustrated in Exhibit D.

Exhibit D: Land Use Compatibility Guidelines

Table N-2
Noise and Land Use Compatibility Matrix

Land Use Category	Community Noise Exposure (L_{dn} or CNEL, dBA)			
	Normally Acceptable	Conditionally Acceptable	Normally Unacceptable	Clearly Unacceptable
Residential - Low Density, Single-Family, Duplex, Mobile Homes	50 - 60	55 - 70	70-75	75-85
Residential - Multiple Family	50 - 65	60 - 70	70 - 75	70 – 85
Transient Lodging - Motel, Hotels	50 - 65	60 - 70	70 - 80	80 – 85
Schools, Libraries, Churches, Hospitals, Nursing Homes	50 - 70	60 - 70	70 - 80	80 – 85
Auditoriums, Concert Halls, Amphitheaters	NA	50 - 70	NA	65 – 85
Sports Arenas, Outdoor Spectator Sports	NA	50 - 75	NA	70 – 85
Playgrounds, Neighborhood Parks	50 - 70	NA	67.5 - 75	72.5 – 85
Golf Courses, Riding Stables, Water Recreation, Cemeteries	50 - 70	NA	70 - 80	80 – 85
Office Buildings, Business Commercial and Professional	50 - 70	67.5 - 77.5	75 - 85	NA
Industrial, Manufacturing, Utilities, Agriculture	50 - 75	70 - 80	75 - 85	NA

NA: Not Applicable

Source: Office of Planning and Research, California, *General Plan Guidelines*, October 2003.

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

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

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

Clearly Unacceptable – New construction or development should generally not be undertaken.

Artesia Noise Element

4.3 City of Artesia Noise Regulations

The City of Artesia outlines their noise regulations and standards within the Noise Element from the General Plan and the Noise Ordinance from the Municipal Code.

City of Artesia General Plan

Applicable policies and standards governing environmental noise in the City are set forth in the General Plan Noise Element. The City has outlined goals, policies, and implementation measures to reduce potential noise impacts which are presented below:

Goals, Policies, and Implementation Measures

Policies, goals, and actions from the Noise Element that would mitigate potential impacts on noise include the following:

Goal N 1: Land use planning decisions, including planning for new development, consider noise impacts.

Policy N 1.1: Permit only those new development or redevelopment projects that have incorporated appropriate mitigation measures, so that standards contained in the Noise Sub-Element or adopted ordinances are met.

Action N 1.1.1: Enforce noise standards, as contained in the City's Noise Ordinance.

Action N 1.1.2: Require a noise impact evaluation for projects, if determined necessary through the environmental review process. If noise abatement is found necessary, require implementation mitigation measures based on a technical study prepared by a qualified acoustical professional.

Action N 1.1.3: Implement noise mitigation by placing conditions of approval on development projects, and require a clear description of mitigation on subdivision maps, site plans, and building plans for inspection purposes

Policy N 1.2: Consider noise impacts associated with the development of non-residential uses in the vicinity of residential uses.

Action N 1.2.1: Require that any proposed development near existing residential land uses demonstrate compliance with the City's Noise Ordinance prior to the approval of the project.

Action N 1.2.3: Require the design of mixed use structures to incorporate techniques to prevent the transfer of noise and vibration from the non-residential to residential uses.

Action N 1.2.4: Encourage commercial uses that are not noise intensive in mixed use developments.

Action N 1.2.5: Orient residential uses away from major noise sources, particularly in mixed use areas.

Goal N 2: Incorporate noise considerations into land use planning decisions.

Policy N 2.2: Reduce noise impacts from transportation corridors under the City's jurisdiction.

Action N 2.2.3: Discourage through traffic on residential local streets to reduce noise.

Goal N 3: Noise impacts from non-transportation sources are minimized.

Policy N 3.1: Ensure non-transportation sources of noise have incorporated appropriate mitigation measures, so that standards contained in the Noise Sub-Element or adopted ordinances are met.

Action N 3.1.1: Require that noise mitigation techniques are incorporated into all construction-related activities.

Action N 3.1.2: Enforce the Noise Ordinance to ensure that stationary noise and noise emanating from construction activities, private development, and/or special events are minimized.

Goal N 4: Noise impacts to noise sensitive receptors are minimized, ensuring that City and State interior and exterior noise levels are not exceeded.

Policy N 4.1: Ensure Community Noise Equivalent Levels (CNEL) for noise sensitive land uses meet normally acceptable levels, as defined by State standards.

Action N 4.1.1: Require buffers or appropriate mitigation of potential noise sources on noise sensitive areas.

Municipal Code

Section 5-2 of the Municipal Code outlines the Noise Ordinance. Exterior and interior levels in residential areas must not exceed either the ambient noise level or the limits presented in Table 1 below. The limit is decreased by 5 dBA if the noise is impact, simple tone, speech, or music.

Table 1: City of Artesia Noise Limits

Location	Time Period	L_{50}	L_{25}	L_8	L_2	L_{max}
Exterior	7 AM – 10 PM	55	60	65	70	75
	10 PM – 7 AM	50	55	60	65	70
Interior	7 AM – 10 PM	--	--	55	60	65
	10 PM – 7 AM	--	--	45	50	55

Section 5-2.06 of the Municipal Code outlines specific noise limitations for the following activities:

(c) Engines, Motors and Mechanical Devices Near Residential District. The sustained, continuous or repeated operation or use between the hours of 8:00 p.m. and 7:00 a.m. of any motor or engine or the repair, modification, reconstruction, testing or operation of any automobile, motorcycle, machine, contrivance, or mechanical device or other contrivance or facility unless such motor, engine, automobile, motorcycle, machine or mechanical device is enclosed within a sound insulated structure so as to prevent noise and sound from being plainly audible at: (1) a distance of fifty (50) feet or more from the property line of the property from which the noise, sound or vibration is emanating or (2) the exterior wall of any adjacent residence, whichever is less.

(e) Loading and Unloading. Loading, unloading, opening, closing or other handling of boxes, crates, containers, building materials, garbage cans or similar objects between the hours of 8:00 p.m. and 7:00 a.m. in volume sufficiently loud as to be plainly audible at a distance of fifty (50) feet or more from the property line of the property where the activity is occurring.

(f) Construction. Operating or causing the operation of any tools, equipment, impact devices, derricks or hoists used on construction, drilling, repair, alteration, demolition or earthwork, between the hours of 7:00 p.m. and 7:00 a.m. on weekdays or at any time on Sunday or Federal holiday.

(i) Commercial Establishments Adjacent to Residential Property. Continuous, repeated or sustained noise, sound or vibration from the premises of any commercial establishment, including any outdoor area that is a part or under the control of the establishment, which is licensed by the City and is adjacent to one or more residential dwelling units, between the hours of 10:00 p.m. and 7:00 a.m., that is plainly audible from the exterior wall of the adjacent residential dwelling unit.

5.0 Study Method and Procedure

The following section describes the noise modeling procedures and assumptions used for this assessment.

5.1 Noise Measurement Procedure and Criteria

Noise measurements are taken to determine the existing noise levels. A noise receiver or receptor is any location in the noise analysis in which noise might produce an impact. The following criteria are used to select measurement locations and receptors:

- Locations expected to receive the highest noise impacts, such as the first row of houses
- Locations that are acoustically representative and equivalent of the area of concern
- Human land usage
- Sites clear of major obstruction and contamination

MD conducted the sound level measurements in accordance with the City of Artesia Municipal Code which is similar to Caltrans technical noise specifications. All measurements equipment meets American National Standards Institute (ANSI) specifications for sound level meters (S1.4-1983 identified in Chapter 19.68.020.AA). The following gives a brief description of the Caltrans Technical Noise Supplement procedures for sound level measurements:

- Microphones for sound level meters were placed 5-feet above the ground for all measurements
- Sound level meters were calibrated (NTi XL2) before and after each measurement
- Following the calibration of equipment, a windscreen was placed over the microphone
- Frequency weighting was set on “A” and slow response
- Results of the long-term noise measurements were recorded on field data sheets
- During any short-term noise measurements, any noise contaminations such as barking dogs, local traffic, lawnmowers, or aircraft flyovers were noted
- Temperature and sky conditions were observed and documented

5.2 Noise Measurement Locations

Noise monitoring locations were selected based on the location of existing and future sensitive receptors. Short-term noise measurements were conducted near the corner portions of the Phase 1 site and are illustrated in Exhibit E. Appendix A includes photos, the field sheet, and measured noise data. Exhibit E illustrates the location of the measurements.

5.3 FHWA Traffic Noise Prediction Model

Traffic noise from vehicular traffic was projected using a computer program that replicates the FHWA Traffic Noise Prediction Model (FHWA-RD-77-108). The FHWA model arrives at the predicted noise level through a series of adjustments to the Reference Energy Mean Emission Level (REMEL). Roadway volumes and percentages correspond to the Phase 1 scoping agreement as prepared by TJW Engineering and roadway classification along with the entire Specific Plan trip generation. The referenced traffic data

was applied to the model and is in Appendix B. The following outlines the key adjustments made to the REMEL for the roadway inputs:

- Roadway classification – (e.g., freeway, major arterial, arterial, secondary, collector, etc.),
- Roadway Active Width – (distance between the center of the outermost travel lanes on each side of the roadway)
- Average Daily Traffic Volumes (ADT), Travel Speeds, Percentages of automobiles, medium trucks, and heavy trucks
- Roadway grade and angle of view
- Site Conditions (e.g., soft vs. hard)
- Percentage of total ADT which flows each hour throughout a 24-hour period

Table 2 indicates the roadway parameters and vehicle distribution utilized for this study.

Table 2: Roadway Parameters and Vehicle Distribution

Roadway	Segment	Existing ADT[1]	2030 ADT[2]	Existing + Phase 1 ADT	2030 + Phase 1 ADT	Existing + SP ADT	2030 + SP ADT	Speed (mph)
Pioneer Blvd	SR-91 to 166 St	27,156	29,335	27,677	29,856	29,186	31,886	35
Vehicle Distribution and Mix[3]								
Motor-Vehicle Type		**Daytime % (7 AM to 7 PM)**		**Evening % (7 PM to 10 PM)**		**Night % (10 PM to 7 AM)**		**Total % of Traffic Flow**
Automobiles		77.5		12.9		9.6		97.42
Medium Trucks		84.8		4.9		10.3		1.84
Heavy Trucks		86.5		2.7		10.8		0.74

Notes:
[1] Volumes are from the Traffic Signal Warrant Analysis Pioneer Boulevard and ITE Trip Generation (10th Edition, 2017).
[2] Volumes are from the City of Artesia's Circulation element and ITE Trip Generation (10th Edition, 2017).
[3] Vehicle distribution data is based on typical Southern California roadway vehicle percentages.

To determine the Phase 1 and Specific Plan's noise impact to the surrounding land uses, MD generated noise contours for Existing, Existing plus Phase 1, and Existing plus Specific Plan conditions. Noise contours are used to provide a characterization of sound levels experienced at a set distance from the centerline of a subject roadway. They are intended to represent a worst-case scenario and do not take into account structures, sound walls, topography, and/or other sound attenuating features that may further reduce the actual noise level. Noise contours are developed for comparative purposes and are used to demonstrate potential increases/decreases along subject roadways as a result of the projects.

In addition, this assessment calculates future traffic noise levels at the projects' sites associated with Pioneer Boulevard. For the purpose of Phase 1 evaluation, MD used the 2030 plus Phase 1 to represent the future noise level to the first row of the Phase 1 residential units with a direct line of sight to Pioneer Blvd. For the purpose of Specific Plan evaluation, MD used the 2030 plus Phase 1 plus Future Phases to represent the future noise level to the first row of Specific Plan residential units with a direct line of sight to Pioneer Blvd. The traffic noise calculation worksheet outputs are located in Appendix B.

5.4 Interior Noise Modeling

The interior noise level is the difference between the projected exterior noise level at the structure's facade and the noise reduction provided by the structure itself. Typical building construction will provide a conservative 12 dBA noise level reduction with a "windows open" condition and a very conservative 20 dBA noise level reduction with "windows closed". MD estimated the interior noise level by subtracting the building shell design from the predicted exterior noise level.

With the "windows closed" the projects will require mechanical fresh air ventilation (e.g., air conditioning) to the habitable dwelling units.

5.5 FHWA Roadway Construction Noise Model

The construction noise analysis utilizes the FHWA Roadway Construction Noise Model (RNCM), together with several key construction parameters. Key inputs include distance to the sensitive receiver, equipment usage, % usage factor, and baseline parameters for the projects' sites.

The projects were analyzed based on the different construction phases. Construction noise is expected to be loudest during the grading, concrete, and building phases of construction. The construction noise calculation output worksheet is located in Appendix C. The following assumptions relevant to short-term construction noise impacts were used:

- It is estimated that construction will occur over 24 months.

Exhibit E

Measurement Locations

X = Measurement location

6.0 Existing Noise Environment

Three (3) short-term ambient noise measurements were conducted at the Phase 1 site. The measurements measured the 15-minute Leq, Lmin, Lmax, and other statistical data (e.g., L_2, L_8). The noise measurement was taken to determine the existing baseline noise conditions. Measurements were taken during the AM peak hour to determine the maximum noise impact to the site.

6.1 Short-Term Noise Measurement Results

The results of the Short-term noise data are presented in Table 3.

Table 3: Short-Term Noise Measurement Data (dBA)[1]

Location	Date	Start Time	L_{eq}	L_{max}	L_{min}	L_2	L_8	L_{25}	L_{50}	Estimated CNEL
Site 1	5/19/2021	8:17 AM	56.1	72.7	52.1	63.9	55.8	54.1	53.5	58.7
Site 2	5/19/2021	8:35 AM	51.4	59.0	48.4	55.7	53.6	51.7	50.6	54.0
Site 3	5/19/2021	8:58 AM	50.4	58.9	47.1	53.5	52.0	50.9	50.1	53.0

Notes:
[1]. Measurements were taken over a fifteen-minute interval. Measurement locations are indicated in Exhibit E.

Short-term noise data indicates the ambient noise levels range between 50.4 to 56.1 dBA L_{eq}. The measured noise levels and field notes indicate that traffic noise and the auto repair center are the main sources of noise impacting the site. The noise measurements indicate that the area meets the exterior residential noise limits in Table 1 and the estimated CNEL levels are within the 50-60 dBA CNEL "normally acceptable" limits for single-family residential.

7.0 Future Noise Environment Impacts and Mitigation

This assessment analyzes future noise impacts to and from the projects and compares the results to the City's Noise Standards. The analysis details the estimated exterior noise levels associated with traffic from adjacent roadway sources.

7.1 Future Exterior Noise

The following outlines the exterior noise levels associated with the proposed projects.

7.1.1 Off-site Traffic Noise Impact

The potential off-site noise impacts caused by the increase in vehicular traffic as a result of the projects were calculated at a distance of 50 feet. The distance to the 55, 60, 65, and 70 dBA CNEL noise contours are also provided for reference. The noise level at 50 feet is representative of approximate distances to existing homes along the subject roadway. The noise contours were calculated for the following scenarios and conditions:

- Existing Condition: This scenario refers to the Existing traffic noise condition and is demonstrated in Tables 4 and 5.
- Existing + Phase 1 Condition: This scenario refers to the Existing plus Phase 1 traffic noise condition and is demonstrated in Table 4.
- Existing + Specific Plan Condition: This scenario refers to the Existing plus Specific Plan traffic noise condition and is demonstrated in Table 5.

Phase 1

Table 4 provides the Existing and Existing plus Phase 1 noise conditions and shows the change in noise level as a result of the proposed Phase 1 project. As shown in Table 4, the increase in traffic noise for the Existing and Existing + Phase 1 scenario would have a 0.1 dB increase at 50 feet from the centerline as a result of the Phase 1 project. This impact is **less than significant**.

Table 4: Existing Phase 1 Scenario – Noise Levels Along Roadways (dBA CNEL)

Existing Without Projects Exterior Noise Levels

Roadway	Segment	CNEL at 50 Ft (dBA)	Distance to Contour (Ft)			
			70 dBA CNEL	65 dBA CNEL	60 dBA CNEL	55 dBA CNEL
Pioneer Blvd	SR-91 to 166 St	70.6	58	183	580	1833

Existing + Phase 1 Exterior Noise Levels

Roadway	Segment	CNEL at 50 Ft (dBA)	Distance to Contour (Ft)			
			70 dBA CNEL	65 dBA CNEL	60 dBA CNEL	55 dBA CNEL
Pioneer Blvd	SR-91 to 166 St	70.7	59	187	591	1868

Change in Existing Noise Levels as a Result of Phase 1

Roadway	Segment	CNEL at 50 Feet dBA		
		Existing Without Projects	Existing With Phase 1	Change in Noise Level
Pioneer Blvd	SR-91 to 166 St	70.6	70.7	0.1

Notes:
[1] Exterior noise levels calculated at 5 feet above ground level.
[2] Noise levels were calculated 50 ft from the centerline of the subject roadway.

Specific Plan

Table 5 provides the Existing and Existing plus Specific Plan noise conditions and shows the change in noise level as a result of the entire proposed Specific Plan. As shown in Table 5, the increase in traffic noise for the Existing and Existing + Specific Plan scenario would have a 0.4 dB increase at 50 feet from the centerline as a result of the entire Specific Plan. This impact is **less than significant**.

Table 5: Existing Specific Plan Scenario – Noise Levels Along Roadways (dBA CNEL)

Existing Without Projects Exterior Noise Levels

Roadway	Segment	CNEL at 50 Ft (dBA)	Distance to Contour (Ft)			
			70 dBA CNEL	65 dBA CNEL	60 dBA CNEL	55 dBA CNEL
Pioneer Blvd	SR-91 to 166 St	70.6	58	183	580	1833

Existing + Specific Plan Exterior Noise Levels

Roadway	Segment	CNEL at 50 Ft (dBA)	Distance to Contour (Ft)			
			70 dBA CNEL	65 dBA CNEL	60 dBA CNEL	55 dBA CNEL
Pioneer Blvd	SR-91 to 166 St	71.0	62	197	623	1970

Change in Existing Noise Levels as a Result of Specific Plan

Roadway	Segment	CNEL at 50 Feet dBA		
		Existing Without Projects	Existing With Specific Plan	Change in Noise Level
Pioneer Blvd	SR-91 to 166 St	70.6	71.0	0.4

Notes:
[1] Exterior noise levels calculated at 5 feet above ground level.
[2] Noise levels were calculated 50 ft from the centerline of the subject roadway.

7.1.2 On-Site Traffic Noise Impact

Traffic noise from the local roadway network was evaluated and compared to the City's Exterior Noise Standard. Per the City's Exterior Noise Standard (Table N-2 from the City's General Plan, Noise Element), the single-family residential normally acceptable range is 50-60 dBA CNEL, and the multiple-family normally acceptable range is 50-65 dBA CNEL.

Phase 1

At the eastern Phase 1 property line closest to Pioneer Road, the 2030 Plus Phase 1 traffic noise level projection is 57 dBA CNEL taking into account the existing property line walls. Phase 1, therefore, falls within the 50-60 dBA CNEL contour and within the "normally acceptable" range for single-family residential use. Buildings in future phases will further block traffic noise from Pioneer Road. The traffic noise impact to Phase 1 is **less than significant**.

Future Phases

The future phases fall outside the 70 dBA CNEL contour and within the "normally unacceptable" range for single-family multi-family uses. The specific plan has the potential for impact. Multi-family outdoor residential recreational areas must be set back 215 feet from the centerline of Pioneer Blvd or must be shielded by a noise barrier or building to ensure all usable outdoor areas are 65 dBA CNEL or less. Single-family outdoor residential recreational areas must be shielded by a noise barrier or building to ensure all usable outdoor areas are 60 dBA CNEL or less. A future noise study must be done to ensure that all outdoor multi-family residential recreational areas within the Future Phases area are 65 dBA CNEL or less and single-family residential recreational areas within the Future Phases area are 60 dBA CNEL or less. The impact is **less than significant with mitigation:**

MM NOI-1: Outdoor residential recreational areas must be set back from the centerline of Pioneer Boulevard or must be shielded by a noise barrier or building to ensure all usable outdoor areas are 65 dBA CNEL or less for multi-family uses and 60 dBA CNEL or less for single-family uses.

MM NOI-2: A future noise study shall be required for all future residential projects to ensure that all outdoor recreational areas within the Future Phases area are 65 dBA CNEL or less for multi-family uses and 60 dBA CNEL or less for single-family uses.

7.1.3 Stationary Source Impacts

Phase 1

There are no anticipated on-site significant stationary noise sources. In the case that a noise-producing tenant moves into a commercial unit within the Phase 1 area, they must ensure that they will comply with the interior and exterior sound limits laid out in the municipal code. Compliance with the City's Codes, General Plan, and the proposed Arkansas Street Specific Plan will ensure a **less than significant impact**.

Future Phases

There are no anticipated on-site significant stationary noise sources. In the case that a noise-producing tenant moves into a commercial unit within the Specific Plan area, they must ensure that they will comply with the interior and exterior sound limits laid out in the municipal code. Compliance with the City's Codes, General Plan, and the proposed Arkansas Street Specific Plan will ensure a **less than significant impact**.

7.2 Interior Noise Levels

Phase 1

Per the traffic prediction model, the peak hourly level at the commercial buildings will be 57 dBA Leq(h). The building requires a 7 dB reduction to meet the State 50 dBA Leq(h) requirement which will be met by any type of building design.

The future residential interior noise level was calculated for the sensitive receptor locations using a typical "windows open" and "windows closed" condition. A "windows open" condition assumes 12 dBA of noise attenuation from the exterior noise level. A "windows closed" condition" assumes 20 dBA of noise attenuation from the exterior noise level. Table 6 indicates the 1st- through 3rd-floor interior noise levels for the Phase 1 site from roadway noise without building or wall shielding.

Table 6: Phase 1 Interior Noise Levels (dBA CNEL)

Location	Roadway Noise Source	Exterior Facade Study Location	Noise Level at Building Facade[1]	Interior Noise Reduction Required to Meet Interior Noise Standard of 45 dBA CNEL	Interior Noise Level w/ Typical Residential Windows (STC≥ 25)		STC Rating for Windows Facing Subject Roadway[4]
					Window Open[2]	Windows Closed[3]	
1st Row Units Along Eastern Property Line	Pioneer Blvd	1st-3rd Floor	63	18	51	43	23

Notes:
1. 2030 plus Phase 1 level from Table 5 and worksheets Appendix B.
2. A minimum of 12 dBA noise reduction is assumed with a "windows open" condition.
3. A minimum of 20 dBA noise reduction is assumed with a "windows closed" condition.
4. Indicates the required STC rating to meet the interior noise standard.

As shown in Table 6, the interior noise level will be 51 dBA CNEL with the windows open and 43 dBA CNEL with the windows closed with typical STC 25 residential windows.

To meet the State's interior 45 dBA CNEL standard a "windows closed" condition is required. The Phase 1 windows and sliding glass doors will require a minimum STC rating of 23 for all floors, which a typical residential window will meet or exceed. A "windows closed" condition simply means that in order to achieve a 45 dBA CNEL interior noise level, the windows must be closed and does not mean the windows must be fixed. Residential units further from Pioneer Boulevard will have a lower CNEL level. The impact is **less than significant with mitigation**:

MM NOI-9: Windows and sliding glass doors shall be a minimum STC rating of 23 for all residential units.

Future Phases

The 1st-row units along the eastern property line of the Future Phases have the potential to reach up to 71 dBA CNEL depending on the location of the future units. A future noise study must be done to ensure that the interior levels do not exceed 45 dBA CNEL. The impact is **less than significant with mitigation**.

MM NOI-3: Prior to issuance of building permits, a future noise study is required to ensure that the residential interior levels do not exceed 45 dBA CNEL and the commercial interior levels do not exceed 50 dBA Leq(h).

8.0 Construction Noise Impact

The degree of construction noise may vary for different areas of the projects' sites and also vary depending on the construction activities. Noise levels associated with the construction will vary with the different phases of construction. The construction noise and vibration level projections are provided in the sections below.

8.1 Construction Noise

The Environmental Protection Agency (EPA) has compiled data regarding the noise-generated characteristics of typical construction activities. The data is presented in Table 7.

Table 7: Typical Construction Noise Levels[1]

Equipment Powered by Internal Combustion Engines

Type	Noise Levels (dBA) at 50 Feet
Earth Moving	
Compactors (Rollers)	73 - 76
Front Loaders	73 - 84
Backhoes	73 - 92
Tractors	75 - 95
Scrapers, Graders	78 - 92
Pavers	85 - 87
Trucks	81 - 94
Materials Handling	
Concrete Mixers	72 - 87
Concrete Pumps	81 - 83
Cranes (Movable)	72 - 86
Cranes (Derrick)	85 - 87
Stationary	
Pumps	68 - 71
Generators	71 - 83
Compressors	75 - 86

Impact Equipment

Type	Noise Levels (dBA) at 50 Feet
Saws	71 - 82
Vibrators	68 - 82

Notes:
[1] Referenced Noise Levels from the Environmental Protection Agency (EPA)

Typical operating cycles for these types of construction equipment may involve one or two minutes of full power operation followed by three to four minutes at lower power settings. Noise levels will be the loudest during the demolition and paving phases.

Construction noise is considered a short-term impact and would be considered significant if construction activities occur during the times as described in the City's municipal code (Section 5-2.06), between the hours of 7:00 p.m. and 7:00 a.m. on weekdays or at any time on Sundays or Federal holidays.

Construction noise will have a temporary or periodic increase in the ambient noise level above the existing within the projects' vicinities.

To ensure that construction activities do not disrupt the adjacent land uses, the following noise reduction measures shall be taken as best practices for construction on the Phase 1 and Future Phases areas:

MM NOI-4: Construction shall not occur between the hours of 7:00 p.m. and 7:00 a.m. on weekdays or at any time on Sundays or Federal holidays.

MM NOI-5: Stationary construction noise sources such as generators or pumps shall be located as far as feasibly possible from any existing adjacent residential units, as feasible.

MM NOI-6: Construction staging areas shall be located as far as feasibly possible from any adjacent sensitive land uses, as feasible.

MM NOI-7: During construction, the contractor shall ensure all construction equipment is equipped with appropriate noise attenuating devices.

MM NOI-8: Equipment shall be maintained so that vehicles and their loads are secured from rattling and banging.

Phase 1

Table 8 presents the noise levels at various locations and phases during the construction of Phase 1.

Table 8: Phase 1 Construction Noise Levels

Location	Phase	Noise Levels at Nearest Sensitive Receptor (dBA, Leq)
South Residential	Demolition	77
	Site Preparation	75
	Grading	75
	Building Construction	77
	Paving	77
	Finish	66
West Residential	Demolition	73
	Site Preparation	72
	Grading	72
	Building Construction	73
	Paving	74
	Finish	63
Note: Construction Modeling Worksheets are provided in Appendix C.		

As shown in Table 8, the construction noise levels from Phase 1 will range between 63 dBA and 77 dBA at the adjacent residential sites. The impact will be **less than significant with mitigation** as outlined above.

Future Phases

Table 9 presents the noise levels at various locations and phases during the construction of Future Phases. The construction noise levels for future phases have been modeled as if the rest of the Specific Plan area was being developed in one phase as a worst-case scenario.

Table 9: Future Phases Construction Noise Levels

Location	Phase	Noise Levels at Nearest Sensitive Receptor (dBA, Leq)
East Residential	Demolition	73
	Site Preparation	71
	Grading	72
	Building Construction	72
	Paving	73
	Finish	63
Phase 1	Demolition	78
	Site Preparation	76
	Grading	76
	Building Construction	76
	Paving	78
	Finish	67
Note: Construction Modeling Worksheets are provided in Appendix C.		

As shown in Table 9, the construction noise levels from the Future Phases will range between 63 dBA and 78 dBA at the adjacent residential sites. The impact will be **less than significant with mitigation** as outlined above.

8.2 Construction Vibration

Construction activities can produce vibration that may be felt by adjacent land uses. The construction of the proposed projects would not require the use of equipment such as pile drivers, which are known to generate substantial construction vibration levels. The primary vibration source during construction may be from a bulldozer. A large bulldozer has a vibration impact of 0.089 inches per second peak particle velocity (PPV) at 25 feet which is perceptible but below any risk of architectural damage.

The fundamental equation used to calculate vibration propagation through average soil conditions and distance is as follows:

$$PPV_{equipment} = PPV_{ref} (100/D_{rec})^n$$

Where: PPV_{ref} = reference PPV at 100ft.
D_{rec} = distance from equipment to receiver in ft.
n = 1.1 (the value related to the attenuation rate through the ground)

The thresholds from the Caltrans Transportation and Construction Induced Vibration Guidance Manual in Table 10 (below) provide general thresholds and guidelines as to the vibration damage potential from vibratory impacts.

Table 10: Guideline Vibration Damage Potential Threshold Criteria

Structure and Condition	Maximum PPV (in/sec)	
	Transient Sources	Continuous/Frequent Intermittent Sources
Extremely fragile historic buildings, ruins, ancient monuments	0.12	0.08
Fragile buildings	0.2	0.1
Historic and some old buildings	0.5	0.25
Older residential structures	0.5	0.3
New residential structures	1.0	0.5
Modern industrial/commercial buildings	2.0	0.5

Source: Table 19, Transportation and Construction Vibration Guidance Manual, Caltrans, Sept. 2013.
Note: Transient sources create a single isolated vibration event, such as blasting or drop balls. Continuous/frequent intermittent sources include impact pile drivers, pogo-stick compactors, crack-and-seat equipment, vibratory pile drivers, and vibratory compaction equipment.

Table 11 gives approximate vibration levels for particular construction activities. This data provides a reasonable estimate for a wide range of soil conditions.

Table 11: Vibration Source Levels for Construction Equipment[1]

Equipment	Peak Particle Velocity (inches/second) at 25 feet	Approximate Vibration Level LV (dVB) at 25 feet
Pile driver (impact)	1.518 (upper range)	112
	0.644 (typical)	104
Pile driver (sonic)	0.734 upper range	105
	0.170 typical	93
Clam shovel drop (slurry wall)	0.202	94
Hydromill	0.008 in soil	66
(slurry wall)	0.017 in rock	75
Vibratory Roller	0.21	94
Hoe Ram	0.089	87
Large bulldozer	0.089	87
Caisson drill	0.089	87
Loaded trucks	0.076	86
Jackhammer	0.035	79
Small bulldozer	0.003	58

[1] Source: Transit Noise and Vibration Impact Assessment, Federal Transit Administration, Feb 2018.

Phase 1

Construction equipment has the potential to pass as close as 25 feet from adjacent buildings. At a distance of 25 feet, a vibratory roller would yield a worst-case 0.21 PPV (in/sec) which is perceptible but below any risk of damage to residential buildings. The impact is **less than significant**.

Future Phases

Construction equipment has the potential to pass as close as 25 feet from adjacent buildings. At a distance of 25 feet, a vibratory roller would yield a worst-case 0.21 PPV (in/sec) which is perceptible but below any risk of damage to residential buildings. The impact is **less than significant**.

9.0 References

State of California General Plan Guidelines: 1998. Governor's Office of Planning and Research

City of Artesia: Noise Element.

City of Artesia: Noise Ordinance.

Caltrans Noise Technical Manual. 2013

FTA Transit Noise and Vibration Manual

TJW: Scoping Agreement for Traffic Impact Analysis. 2021

Appendix A:

Field Measurement Data

MD ACOUSTICS
Sound Solutions for Planning and Design
www.mdacoustics.com

AZ Office
4960 S. Gilbert Rd, Ste 1-461
Chandler, AZ 85249

CA Office
1197 E Los Angeles Ave, C-256
Simi Valley, CA 93065

15-Minute Continuous Noise Measurement Datasheet

Project: Artesia Noise
Site Address/Location: Arkansas St, Artesia, CA
Date: 5/19/2021
Field Tech/Engineer: Jason Schuyler

Site Observations:

General Location:
Sound Meter: NTi Audio **SN:** A2A-07095-E0
Settings: A-weighted, slow, 1-sec, 10-minute interval
Meteorological Con.:
Site ID: ST1, ST2, ST3

Site Topo:
Ground Type: Gravel, Grass

Noise Source(s) w/ Distance:

Figure 1: Monitoring Locations

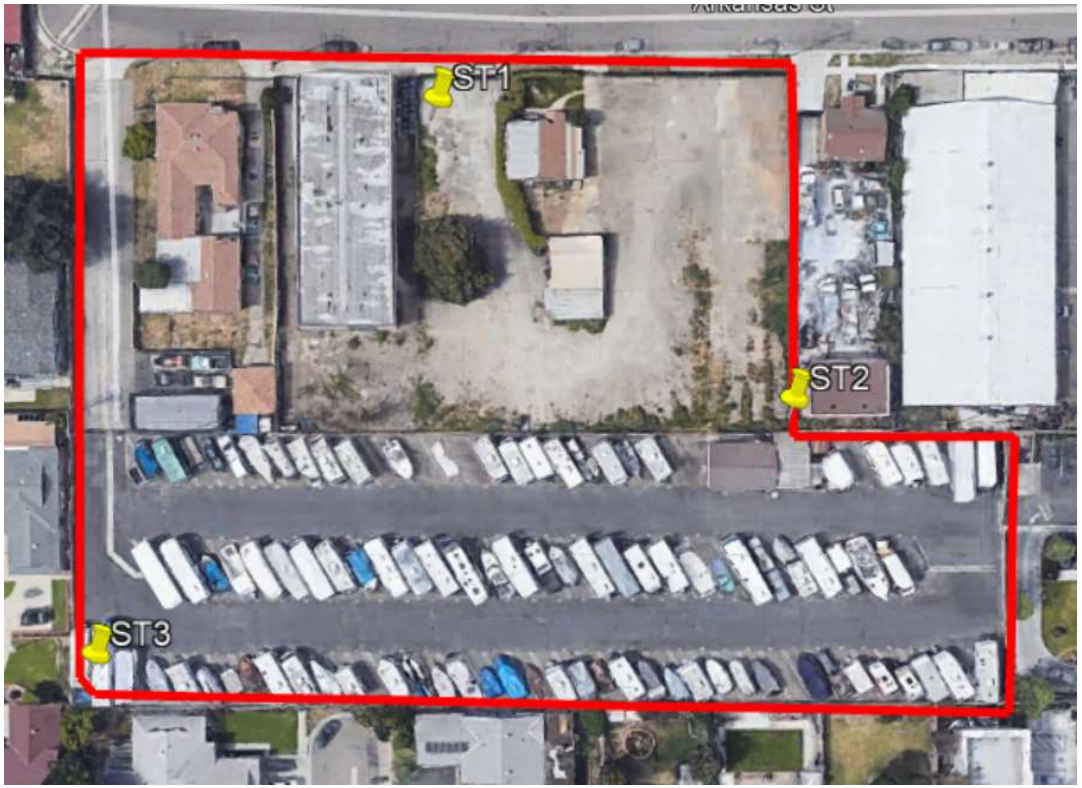
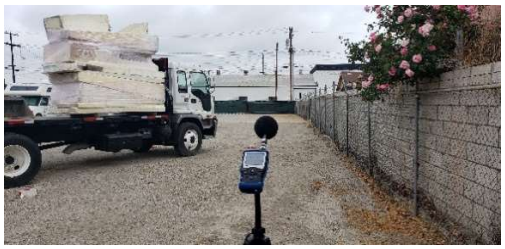


Figure 2: ST-1 Photo

Figure 3: ST-2 Photo



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4960 S. Gilbert Rd, Ste 1-461
Chandler, AZ 85249

CA Office
1197 E Los Angeles Ave, C-256
Simi Valley, CA 93065

15-Minute Continuous Noise Measurement Datasheet

Project: Artesia Noise
Site Address/Location: Arkansas St, Artesia, CA
Site ID: ST1, ST2, ST3

Figure 4: ST-3 Photo

Table 1: Baseline Noise Measurement Summary

Location	Start	Stop	Leq	Lmax	Lmin	L2	L8	L25	L50	L90
1	8:17 AM	8:32 AM	56.1	72.7	52.1	63.9	55.8	54.1	53.5	52.8
2	8:35 AM	8:50 AM	51.4	59.0	48.4	55.7	53.6	51.7	50.6	49.5
3	8:58 AM	9:13 AM	50.4	58.9	47.1	53.5	52.0	50.9	50.1	48.4

City Noise Limit				75.0		70.0	65.0	60.0	55.0	

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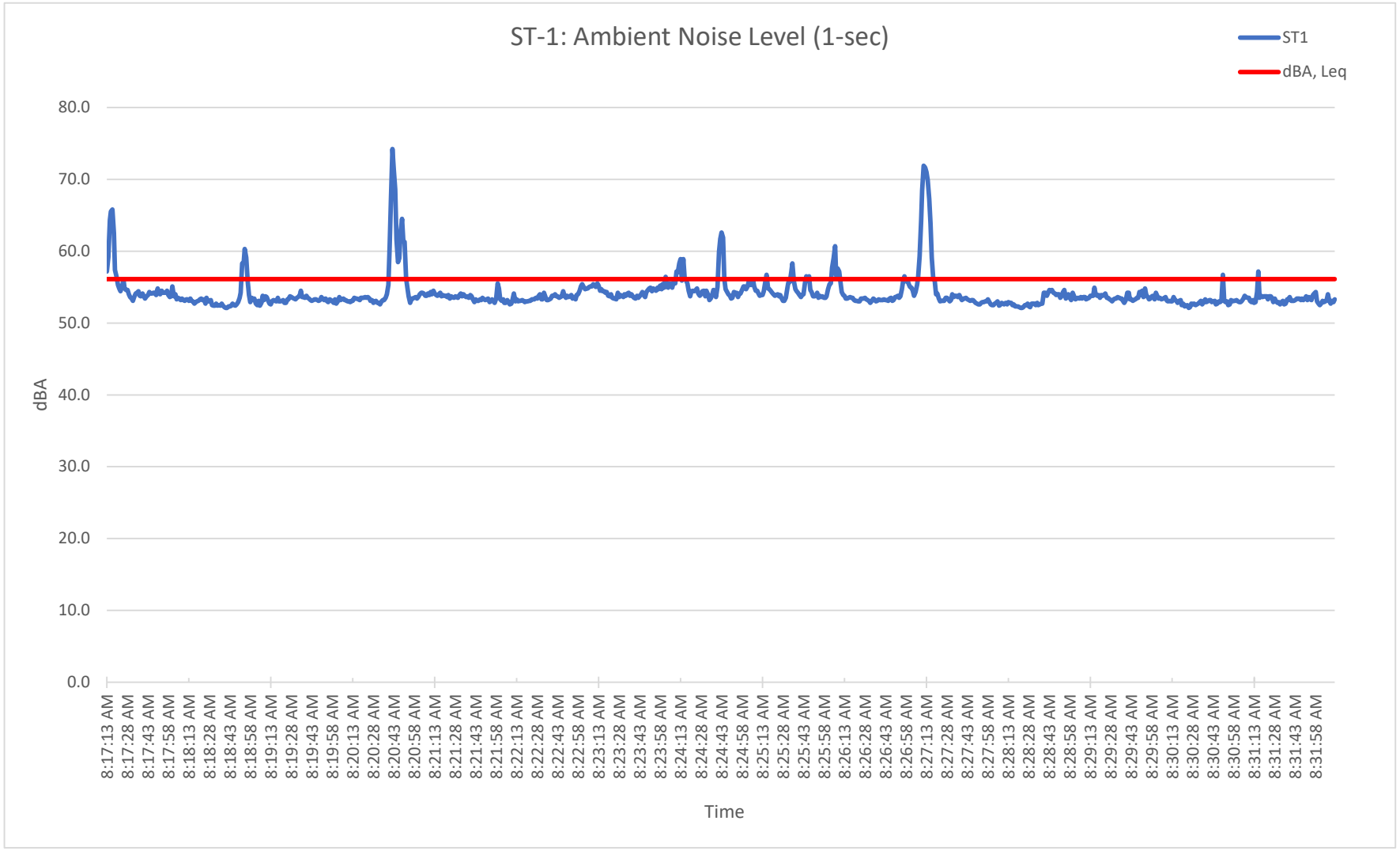
Chandler, AZ 85249

CA Office
1197 E Los Angeles Ave, C-256
Simi Valley, CA 93065

15-Minute Continuous Noise Measurement Datasheet

Project: Artesia Noise
Site Address/Location: Arkansas St, Artesia, CA
Site ID: ST-1



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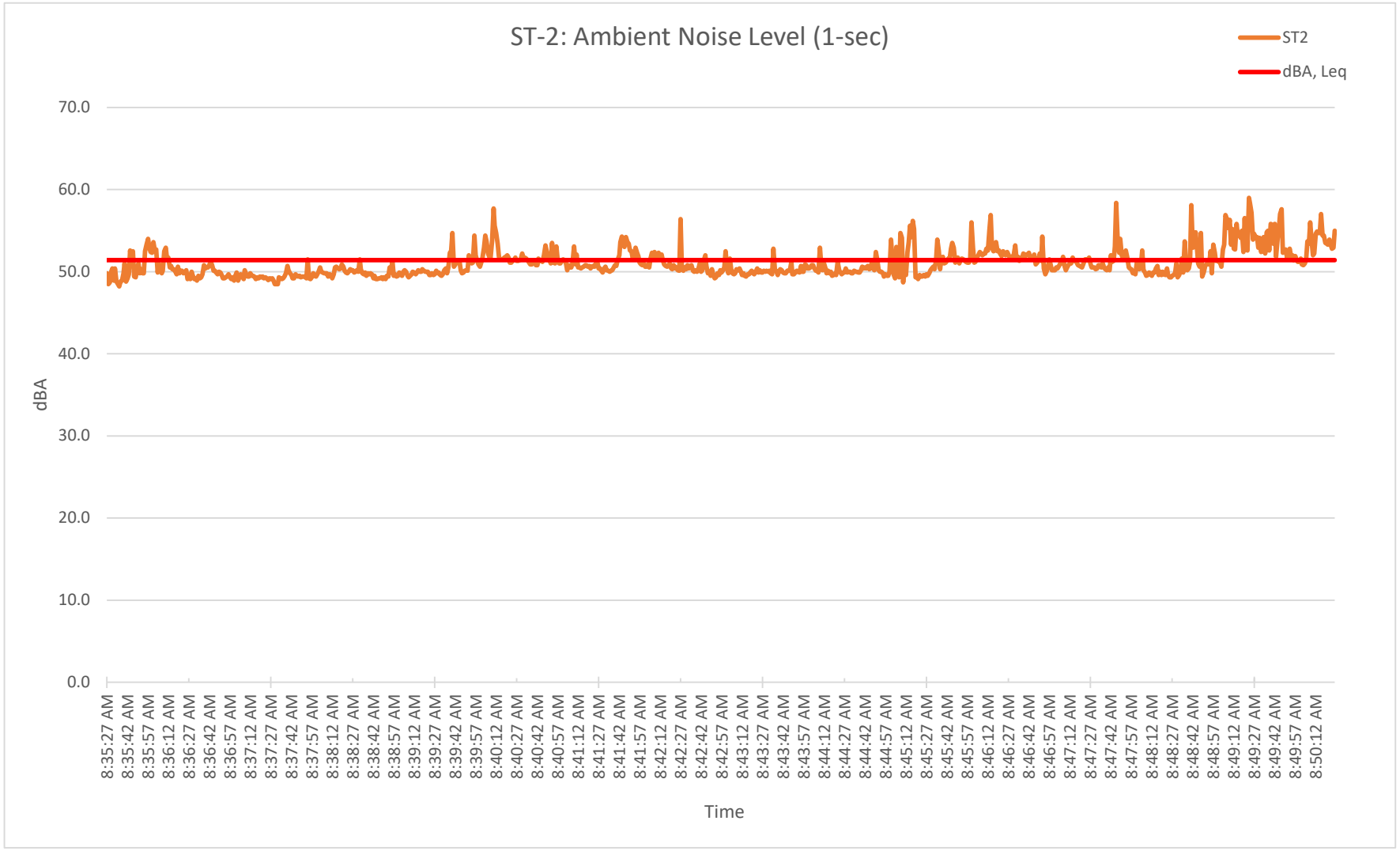
CA Office
1197 E Los Angeles Ave, C-256
Simi Valley, CA 93065

15-Minute Continuous Noise Measurement Datasheet

Project: Artesia Noise
Site Address/Location: Arkansas St, Artesia, CA
Site ID: ST-2



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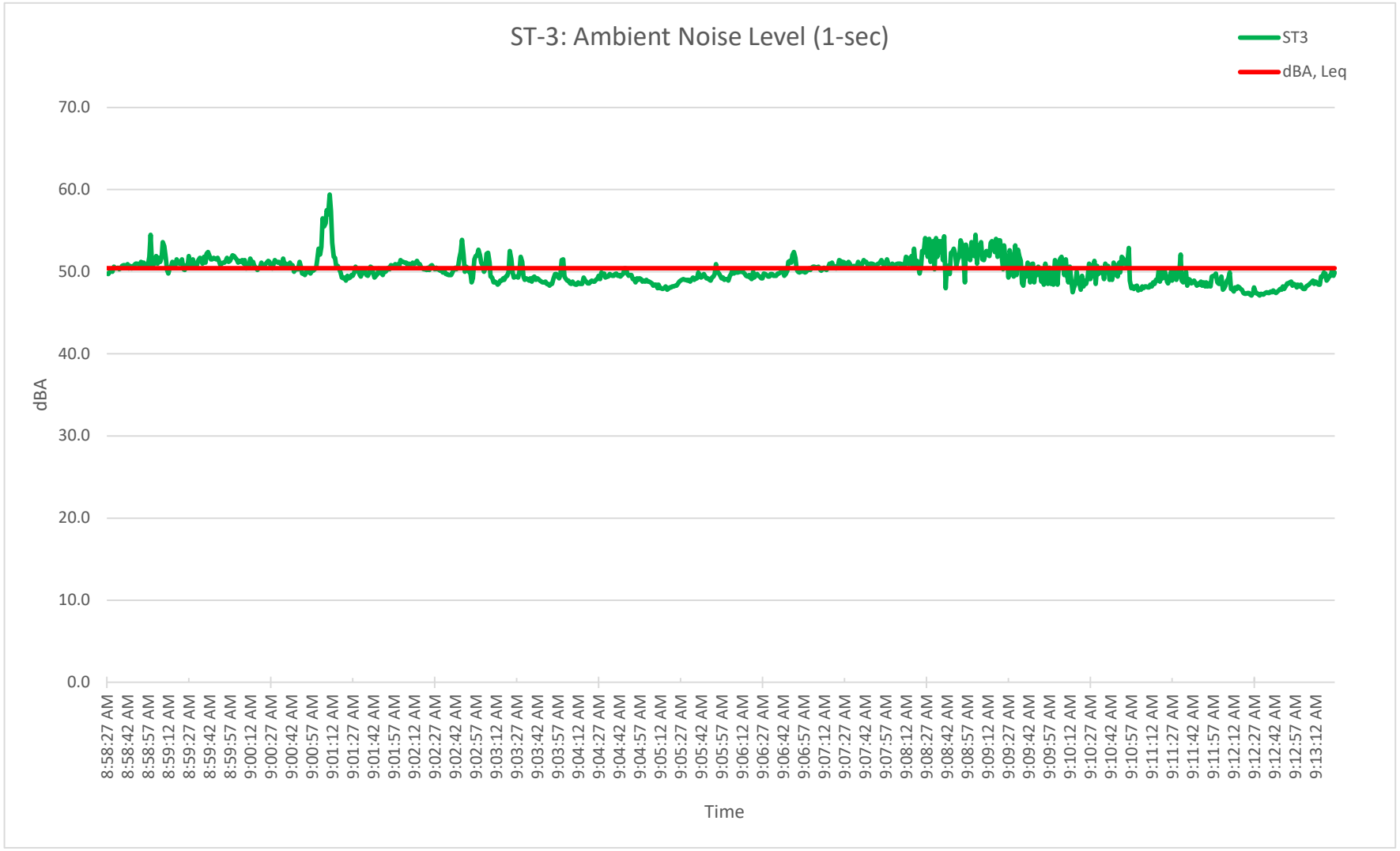
CA Office
1197 E Los Angeles Ave, C-256
Simi Valley, CA 93065

15-Minute Continuous Noise Measurement Datasheet

Project: Artesia Noise
Site Address/Location: Arkansas St, Artesia, CA
Site ID: ST-3



Appendix B:

Traffic Data

Artesia General Plan Update Roadway Segment Analysis

Segment	Location	Existing Classification (# Lanes)	LOS E Capacity [1]	Existing Conditons			Buildout of GPLU Conditions (Year 2030)						Change in V/C
				ADT	V/C	LOS	*20-Year GF* [2]	*ADT with GF*	*Total GPLU Trips*	ADT with GF+GPLU	V/C	LOS	
Alburtis Ave.	North of 183rd St.	Collector (2)	8,000	3,127	0.391	A	*NA*	*NA*	*646*	3,773	0.472	A	0.081
Pioneer Blvd.	North of SR-91	Primary Arterial (4)	40,000	24,491	0.612	B	*1.085*	*26,563*	*2,772*	29,335	0.733	C	0.121
	SR-91 to Artesia Blvd.	Primary Arterial (4)	40,000	32,581	0.815	D	*1.085*	*35,337*	*6,256*	**41,593**	**1.040**	**F**	**0.225**
	Artesia Blvd. to 183rd St.	Primary Arterial (4)	40,000	22,325	0.558	A	*1.085*	*24,214*	*4,485*	28,699	0.717	C	0.159
	183rd St. to 186th St.	Primary Arterial (4)	40,000	16,410	0.410	A	*1.085*	*17,798*	*3,670*	21,468	0.537	A	0.126
	186th St. to 187th St.	Primary Arterial (4)	40,000	16,821	0.421	A	*1.085*	*18,244*	*3,537*	21,781	0.545	A	0.124
	187th St. to 188th St.	Primary Arterial (4)	40,000	14,142	0.354	A	*1.085*	*15,338*	*3,139*	18,477	0.462	A	0.108
	188th St. to South St.	Primary Arterial (4)	40,000	15,225	0.381	A	*1.085*	*16,513*	*3,144*	19,657	0.491	A	0.111
	South of South St.	Primary Arterial (4)	40,000	16,637	0.416	A	*1.085*	*18,044*	*907*	18,951	0.474	A	0.058
Norwalk Boulevard	South of South St.	Secondary Arterial (4)	30,000	24,472	0.816	D	*1.085*	*26,542*	*1,731*	**28,273**	**0.942**	**E**	**0.127**
176th Street	West of Pioneer Blvd.	Collector (2)	8,000	4,500	0.563	A	*NA*	*NA*	*646*	5,146	0.643	B	0.081
183rd Street	East of Norwalk Blvd.	Secondary Arterial (4)	30,000	14,219	0.474	A	*1.085*	*15,422*	*776*	16,198	0.540	A	0.066
South Street	West of Pioneer Blvd.	Primary Arterial (4)	40,000	22,889	0.572	A	*1.085*	*24,825*	*2,132*	26,957	0.674	B	0.102
	Pioneer Blvd. to Norwalk Blvd.	Primary Arterial (4)	40,000	24,087	0.602	B	*1.085*	*26,125*	*1,708*	27,833	0.696	B	0.094
	East of Norwalk Blvd.	Primary Arterial (4)	40,000	23,438	0.586	A	*1.085*	*25,421*	*1,433*	26,854	0.671	B	0.085

Note: Deficient level of service indicated in **bold**.

NA = Not Applicable

[1] The SANDAG CMP roadway segment level of service capacity thresholds are applied to City of Artesia General Plan Update analysis.

[2] The 20-year general growth factor suggested for the Gateway Regional Statistical Area in the LA County CMP Guidelines is approximately 1.14. The growth factor shown in this table includes a 40% reduction of the general growth factor. This reduction takes into account that the general growth factor includes growth in the immediate area as well as regional growth.

Proposed Land Use[1]	Qty	Unit[2]	Daily Trips (ADTs)		AM Peak Hour					PM Peak Hour				
			Rate	Volume	Rate	In:Out Split	Volume			Rate	In:Out Split	Volume		
							In	Out	Total			In	Out	Total
Project Area (2.65 acres)														
Multi-Family Housing - Mid-Rise (221)	59.00	DU	5.44	321	0.36	26:74	5	16	21	0.44	61:39	16	10	26
Shopping Center (820)	5.29	TSF	37.75	200	0.94	62:38	3	2	5	3.81	48:52	10	10	20
Subtotal				521			9	17	26			25	21	46
Non-Project Area (1.57 acres)														
Multi-Family Housing - Mid-Rise (221)[3]	40.00	DU	5.44	218	0.36	26:74	4	10	14	0.44	61:39	11	7	18
Shopping Center (820)[3]	34.19	TSF	37.75	1,291	0.94	62:38	20	12	32	3.81	48:52	62	68	130
Subtotal				1,509			23	23	46			73	75	148
Total Specific Plan Area				**2,030**			**32**	**40**	**72**			**99**	**95**	**194**

1: Rates from ITE Trip Generation (10th Edition, 2017)

2: DU=Dwelling Unit; TSF=Thousand Square Feet

3: Non-Project Area (1.57 acres) based on FAR 0.5 for commercial use and 25 DU per acre as specified in the specific plan

FHWA-RD-77-108 HIGHWAY NOISE PREDICTION MODEL

PROJECT: Artesia Noise
ROADWAY: Pioneer Blvd
LOCATION: East PL (2030+Ph1)

JOB #: 0163-2021-04
DATE: 19-Apr-22
ENGINEER: C Pincock

NOISE INPUT DATA

ROADWAY CONDITIONS

ADT =	29,856
SPEED =	35
PK HR % =	10
NEAR LANE/FAR LANE DIS	65
ROAD ELEVATION =	0.0
GRADE =	1.0 %
PK HR VOL =	2,986

RECEIVER INPUT DATA

RECEIVER DISTANCE =		225
DIST C/L TO WALL =		220
RECEIVER HEIGHT =		5.0
WALL DISTANCE FROM RECEIVER		5
PAD ELEVATION =		0.5
ROADWAY VIEW:	LF ANGLE=	-90
	RT ANGLE=	90
	DF ANGLE=	180

SITE CONDITIONS

AUTOMOBILES =	10	
MEDIUM TRUCKS =	10	(10 = HARD SITE, 15 = SOFT SITE)
HEAVY TRUCKS =	10	

WALL INFORMATION

HTH WALL	6.0	
AMBIENT=	0.0	
BARRIER =	0	(0 = WALL, 1 = BERM)

VEHICLE MIX DATA

VEHICLE TYPE	DAY	EVENING	NIGHT	DAILY
AUTOMOBILES	0.775	0.129	0.096	0.9742
MEDIUM TRUCK	0.848	0.049	0.103	0.0184
HEAVY TRUCKS	0.865	0.027	0.108	0.0074

MISC. VEHICLE INFO

VEHICLE TYPE	HEIGHT	SLE DISTANCE	GRADE ADJUSTMENT
AUTOMOBILES	2.0	222.73	- -
MEDIUM TRUCKS	4.0	222.70	- -
HEAVY TRUCKS	8.0	222.69	0.00

NOISE OUTPUT DATA

NOISE IMPACTS (WITHOUT TOPO OR BARRIER SHIELDING)

VEHICLE TYPE	PK HR LEQ	DAY LEQ	EVEN LEQ	NIGHT LEQ	LDN	CNEL
AUTOMOBILES	62.4	60.5	58.8	52.7	61.3	62.0
MEDIUM TRUCKS	54.9	53.4	47.1	45.5	54.0	54.2
HEAVY TRUCKS	56.2	54.8	45.7	47.0	55.3	55.5
NOISE LEVELS (dBA)	63.9	62.2	59.3	54.4	62.9	63.4

NOISE IMPACTS (WITH TOPO AND BARRIER SHIELDING)

VEHICLE TYPE	PK HR LEQ	DAY LEQ	EVEN LEQ	NIGHT LEQ	LDN	CNEL
AUTOMOBILES	56.3	54.4	52.7	46.6	55.2	55.9
MEDIUM TRUCKS	48.9	47.4	41.1	39.5	48.0	48.2
HEAVY TRUCKS	50.4	49.0	39.9	41.2	49.5	49.7
NOISE LEVELS (dBA)	57.9	56.1	53.2	48.3	56.9	57.4

NOISE CONTOUR (FT)				
NOISE LEVELS	70 dBA	65 dBA	60 dBA	55 dBA
CNEL	49	155	491	1553
LDN	44	139	440	1390

FHWA-RD-77-108 HIGHWAY NOISE PREDICTION MODEL

PROJECT: Artesia Noise
ROADWAY: Pioneer Blvd
LOCATION: East PL (2030+Ph1) Floor 1

JOB #: 0163-2021-04
DATE: 7-Oct-21
ENGINEER: C Pincock

NOISE INPUT DATA

ROADWAY CONDITIONS

ADT =	29,856	
SPEED =	35	
PK HR % =	10	
NEAR LANE/FAR LANE DIS	65	
ROAD ELEVATION =	0.0	
GRADE =	1.0	%
PK HR VOL =	2,986	

RECEIVER INPUT DATA

RECEIVER DISTANCE =	230	
DIST C/L TO WALL =	220	
RECEIVER HEIGHT =	5.0	
WALL DISTANCE FROM RECEIVER	10	
PAD ELEVATION =	0.5	
ROADWAY VIEW: LF ANGLE=	-90	
RT ANGLE=	90	
DF ANGLE=	180	

SITE CONDITIONS

AUTOMOBILES =	10	(10 = HARD SITE, 15 = SOFT SITE)
MEDIUM TRUCKS =	10	
HEAVY TRUCKS =	10	

WALL INFORMATION

HTH WALL	0.0	
AMBIENT=	0.0	
BARRIER =	0	(0 = WALL, 1 = BERM)

VEHICLE MIX DATA

VEHICLE TYPE	DAY	EVENING	NIGHT	DAILY
AUTOMOBILES	0.775	0.129	0.096	0.9742
MEDIUM TRUCK	0.848	0.049	0.103	0.0184
HEAVY TRUCKS	0.865	0.027	0.108	0.0074

MISC. VEHICLE INFO

VEHICLE TYPE	HEIGHT	SLE DISTANCE	GRADE ADJUSTMENT
AUTOMOBILES	2.0	227.72	- -
MEDIUM TRUCKS	4.0	227.70	- -
HEAVY TRUCKS	8.0	227.71	0.00

NOISE OUTPUT DATA

NOISE IMPACTS (WITHOUT TOPO OR BARRIER SHIELDING)

VEHICLE TYPE	PK HR LEQ	DAY LEQ	EVEN LEQ	NIGHT LEQ	LDN	CNEL
AUTOMOBILES	62.3	60.4	58.7	52.6	61.2	61.9
MEDIUM TRUCKS	54.8	53.3	47.0	45.4	53.9	54.1
HEAVY TRUCKS	56.1	54.7	45.6	46.9	55.2	55.4
NOISE LEVELS (dBA)	63.9	62.1	59.2	54.3	62.8	63.3

NOISE IMPACTS (WITH TOPO AND BARRIER SHIELDING)

VEHICLE TYPE	PK HR LEQ	DAY LEQ	EVEN LEQ	NIGHT LEQ	LDN	CNEL
AUTOMOBILES	62.3	60.4	58.7	52.6	61.2	61.9
MEDIUM TRUCKS	54.8	53.3	47.0	45.4	53.9	54.1
HEAVY TRUCKS	56.1	54.7	45.6	46.9	55.2	55.4
NOISE LEVELS (dBA)	63.9	62.1	59.2	54.3	62.8	63.3

NOISE CONTOUR (FT)				
NOISE LEVELS	70 dBA	65 dBA	60 dBA	55 dBA
CNEL	49	155	491	1552
LDN	44	139	440	1390

FHWA-RD-77-108 HIGHWAY NOISE PREDICTION MODEL

PROJECT: Artesia Noise
ROADWAY: Pioneer Blvd
LOCATION: East PL (2030+Ph1) Floor 2

JOB #: 0163-2021-04
DATE: 7-Oct-21
ENGINEER: C Pincock

NOISE INPUT DATA

ROADWAY CONDITIONS

ADT =	29,856	
SPEED =	35	
PK HR % =	10	
NEAR LANE/FAR LANE DIS	65	
ROAD ELEVATION =	0.0	
GRADE =	1.0	%
PK HR VOL =	2,986	

RECEIVER INPUT DATA

RECEIVER DISTANCE =	230	
DIST C/L TO WALL =	220	
RECEIVER HEIGHT =	15.0	
WALL DISTANCE FROM RECEIVER	10	
PAD ELEVATION =	0.5	
ROADWAY VIEW: LF ANGLE=	-90	
RT ANGLE=	90	
DF ANGLE=	180	

SITE CONDITIONS

AUTOMOBILES =	10	(10 = HARD SITE, 15 = SOFT SITE)
MEDIUM TRUCKS =	10	
HEAVY TRUCKS =	10	

WALL INFORMATION

HTH WALL	0.0	
AMBIENT=	0.0	
BARRIER =	0	(0 = WALL, 1 = BERM)

VEHICLE MIX DATA

VEHICLE TYPE	DAY	EVENING	NIGHT	DAILY
AUTOMOBILES	0.775	0.129	0.096	0.9742
MEDIUM TRUCK	0.848	0.049	0.103	0.0184
HEAVY TRUCKS	0.865	0.027	0.108	0.0074

MISC. VEHICLE INFO

VEHICLE TYPE	HEIGHT	SLE DISTANCE	GRADE ADJUSTMENT
AUTOMOBILES	2.0	228.09	- -
MEDIUM TRUCKS	4.0	227.98	- -
HEAVY TRUCKS	8.0	227.82	0.00

NOISE OUTPUT DATA

NOISE IMPACTS (WITHOUT TOPO OR BARRIER SHIELDING)

VEHICLE TYPE	PK HR LEQ	DAY LEQ	EVEN LEQ	NIGHT LEQ	LDN	CNEL
AUTOMOBILES	62.3	60.4	58.7	52.6	61.2	61.8
MEDIUM TRUCKS	54.8	53.3	47.0	45.4	53.9	54.1
HEAVY TRUCKS	56.1	54.7	45.6	46.9	55.2	55.4
NOISE LEVELS (dBA)	63.8	62.1	59.2	54.3	62.8	63.3

NOISE IMPACTS (WITH TOPO AND BARRIER SHIELDING)

VEHICLE TYPE	PK HR LEQ	DAY LEQ	EVEN LEQ	NIGHT LEQ	LDN	CNEL
AUTOMOBILES	62.3	60.4	58.7	52.6	61.2	61.8
MEDIUM TRUCKS	54.8	53.3	47.0	45.4	53.9	54.1
HEAVY TRUCKS	56.1	54.7	45.6	46.9	55.2	55.4
NOISE LEVELS (dBA)	63.8	62.1	59.2	54.3	62.8	63.3

NOISE CONTOUR (FT)				
NOISE LEVELS	70 dBA	65 dBA	60 dBA	55 dBA
CNEL	49	155	490	1550
LDN	44	139	439	1388

FHWA-RD-77-108 HIGHWAY NOISE PREDICTION MODEL

PROJECT: Artesia Noise
ROADWAY: Pioneer Blvd
LOCATION: East PL (2030+Ph1) Floor 3

JOB #: 0163-2021-04
DATE: 7-Oct-21
ENGINEER: C Pincock

NOISE INPUT DATA

ROADWAY CONDITIONS

ADT =	29,856	
SPEED =	35	
PK HR % =	10	
NEAR LANE/FAR LANE DIS	65	
ROAD ELEVATION =	0.0	
GRADE =	1.0	%
PK HR VOL =	2,986	

RECEIVER INPUT DATA

RECEIVER DISTANCE =	230	
DIST C/L TO WALL =	220	
RECEIVER HEIGHT =	25.0	
WALL DISTANCE FROM RECEIVER	10	
PAD ELEVATION =	0.5	
ROADWAY VIEW: LF ANGLE=	-90	
RT ANGLE=	90	
DF ANGLE=	180	

SITE CONDITIONS

AUTOMOBILES =	10	(10 = HARD SITE, 15 = SOFT SITE)
MEDIUM TRUCKS =	10	
HEAVY TRUCKS =	10	

WALL INFORMATION

HTH WALL	0.0	
AMBIENT=	0.0	
BARRIER =	0	(0 = WALL, 1 = BERM)

VEHICLE MIX DATA

VEHICLE TYPE	DAY	EVENING	NIGHT	DAILY
AUTOMOBILES	0.775	0.129	0.096	0.9742
MEDIUM TRUCK	0.848	0.049	0.103	0.0184
HEAVY TRUCKS	0.865	0.027	0.108	0.0074

MISC. VEHICLE INFO

VEHICLE TYPE	HEIGHT	SLE DISTANCE	GRADE ADJUSTMENT
AUTOMOBILES	2.0	228.90	- -
MEDIUM TRUCKS	4.0	228.71	- -
HEAVY TRUCKS	8.0	228.36	0.00

NOISE OUTPUT DATA

NOISE IMPACTS (WITHOUT TOPO OR BARRIER SHIELDING)

VEHICLE TYPE	PK HR LEQ	DAY LEQ	EVEN LEQ	NIGHT LEQ	LDN	CNEL
AUTOMOBILES	62.3	60.4	58.7	52.6	61.2	61.8
MEDIUM TRUCKS	54.8	53.3	46.9	45.4	53.9	54.1
HEAVY TRUCKS	56.1	54.7	45.6	46.9	55.2	55.4
NOISE LEVELS (dBA)	63.8	62.1	59.1	54.2	62.8	63.3

NOISE IMPACTS (WITH TOPO AND BARRIER SHIELDING)

VEHICLE TYPE	PK HR LEQ	DAY LEQ	EVEN LEQ	NIGHT LEQ	LDN	CNEL
AUTOMOBILES	62.3	60.4	58.7	52.6	61.2	61.8
MEDIUM TRUCKS	54.8	53.3	46.9	45.4	53.9	54.1
HEAVY TRUCKS	56.1	54.7	45.6	46.9	55.2	55.4
NOISE LEVELS (dBA)	63.8	62.1	59.1	54.2	62.8	63.3

NOISE CONTOUR (FT)				
NOISE LEVELS	70 dBA	65 dBA	60 dBA	55 dBA
CNEL	49	154	489	1545
LDN	44	138	438	1384

FHWA-RD-77-108 HIGHWAY NOISE PREDICTION MODEL

PROJECT:	Artesia Noise	JOB #:	0163-2021-04
ROADWAY:	Pioneer Blvd	DATE:	25-Jul-22
LOCATION:	50 ft (Existing)	ENGINEER:	C Pincock

NOISE INPUT DATA

ROADWAY CONDITIONS

ADT =	27,156	
SPEED =	35	
PK HR % =	10	
NEAR LANE/FAR LANE DIS	65	
ROAD ELEVATION =	0.0	
GRADE =	1.0	%
PK HR VOL =	2,716	

RECEIVER INPUT DATA

RECEIVER DISTANCE =		50
DIST C/L TO WALL =		50
RECEIVER HEIGHT =		5.0
WALL DISTANCE FROM RECEIVER		0
PAD ELEVATION =		0.5
ROADWAY VIEW:	LF ANGLE=	-90
	RT ANGLE=	90
	DF ANGLE=	180

SITE CONDITIONS

AUTOMOBILES =	10	
MEDIUM TRUCKS =	10	(10 = HARD SITE, 15 = SOFT SITE)
HEAVY TRUCKS =	10	

WALL INFORMATION

HTH WALL	0.0	
AMBIENT=	0.0	
BARRIER =	0	(0 = WALL, 1 = BERM)

VEHICLE MIX DATA

VEHICLE TYPE	DAY	EVENING	NIGHT	DAILY
AUTOMOBILES	0.775	0.129	0.096	0.9742
MEDIUM TRUCK	0.848	0.049	0.103	0.0184
HEAVY TRUCKS	0.865	0.027	0.108	0.0074

MISC. VEHICLE INFO

VEHICLE TYPE	HEIGHT	SLE DISTANCE	GRADE ADJUSTMENT
AUTOMOBILES	2.0	38.16	- -
MEDIUM TRUCKS	4.0	38.03	- -
HEAVY TRUCKS	8.0	38.08	0.00

NOISE OUTPUT DATA

NOISE IMPACTS (WITHOUT TOPO OR BARRIER SHIELDING)

VEHICLE TYPE	PK HR LEQ	DAY LEQ	EVEN LEQ	NIGHT LEQ	LDN	CNEL
AUTOMOBILES	69.7	67.8	66.0	60.0	68.6	69.2
MEDIUM TRUCKS	62.2	60.7	54.3	52.8	61.2	61.5
HEAVY TRUCKS	63.4	62.0	53.0	54.2	62.6	62.7
NOISE LEVELS (dBA)	71.2	69.4	66.5	61.6	70.2	70.6

NOISE IMPACTS (WITH TOPO AND BARRIER SHIELDING)

VEHICLE TYPE	PK HR LEQ	DAY LEQ	EVEN LEQ	NIGHT LEQ	LDN	CNEL
AUTOMOBILES	69.7	67.8	66.0	60.0	68.6	69.2
MEDIUM TRUCKS	62.2	60.7	54.3	52.8	61.2	61.5
HEAVY TRUCKS	63.4	62.0	53.0	54.2	62.6	62.7
NOISE LEVELS (dBA)	71.2	69.4	66.5	61.6	70.2	70.6

NOISE CONTOUR (FT)				
NOISE LEVELS	70 dBA	65 dBA	60 dBA	55 dBA
CNEL	58	183	580	1833
LDN	52	164	519	1642

FHWA-RD-77-108 HIGHWAY NOISE PREDICTION MODEL

PROJECT: Artesia Noise
ROADWAY: Pioneer Blvd
LOCATION: 50 ft (Existing+Ph1)

JOB #: 0163-2021-04
DATE: 25-Jul-22
ENGINEER: C Pincock

NOISE INPUT DATA

ROADWAY CONDITIONS

ADT =	27,677	
SPEED =	35	
PK HR % =	10	
NEAR LANE/FAR LANE DIS	65	
ROAD ELEVATION =	0.0	
GRADE =	1.0	%
PK HR VOL =	2,768	

RECEIVER INPUT DATA

RECEIVER DISTANCE =		50
DIST C/L TO WALL =		50
RECEIVER HEIGHT =		5.0
WALL DISTANCE FROM RECEIVER		0
PAD ELEVATION =		0.5
ROADWAY VIEW:	LF ANGLE=	-90
	RT ANGLE=	90
	DF ANGLE=	180

SITE CONDITIONS

AUTOMOBILES =	10	
MEDIUM TRUCKS =	10	(10 = HARD SITE, 15 = SOFT SITE)
HEAVY TRUCKS =	10	

WALL INFORMATION

HTH WALL	0.0	
AMBIENT=	0.0	
BARRIER =	0	(0 = WALL, 1 = BERM)

VEHICLE MIX DATA

VEHICLE TYPE	DAY	EVENING	NIGHT	DAILY
AUTOMOBILES	0.775	0.129	0.096	0.9742
MEDIUM TRUCK	0.848	0.049	0.103	0.0184
HEAVY TRUCKS	0.865	0.027	0.108	0.0074

MISC. VEHICLE INFO

VEHICLE TYPE	HEIGHT	SLE DISTANCE	GRADE ADJUSTMENT
AUTOMOBILES	2.0	38.16	- -
MEDIUM TRUCKS	4.0	38.03	- -
HEAVY TRUCKS	8.0	38.08	0.00

NOISE OUTPUT DATA

NOISE IMPACTS (WITHOUT TOPO OR BARRIER SHIELDING)

VEHICLE TYPE	PK HR LEQ	DAY LEQ	EVEN LEQ	NIGHT LEQ	LDN	CNEL
AUTOMOBILES	69.8	67.9	66.1	60.1	68.7	69.3
MEDIUM TRUCKS	62.3	60.8	54.4	52.9	61.3	61.6
HEAVY TRUCKS	63.5	62.1	53.1	54.3	62.7	62.8
NOISE LEVELS (dBA)	71.3	69.5	66.6	61.7	70.2	70.7

NOISE IMPACTS (WITH TOPO AND BARRIER SHIELDING)

VEHICLE TYPE	PK HR LEQ	DAY LEQ	EVEN LEQ	NIGHT LEQ	LDN	CNEL
AUTOMOBILES	69.8	67.9	66.1	60.1	68.7	69.3
MEDIUM TRUCKS	62.3	60.8	54.4	52.9	61.3	61.6
HEAVY TRUCKS	63.5	62.1	53.1	54.3	62.7	62.8
NOISE LEVELS (dBA)	71.3	69.5	66.6	61.7	70.2	70.7

NOISE CONTOUR (FT)				
NOISE LEVELS	70 dBA	65 dBA	60 dBA	55 dBA
CNEL	59	187	591	1868
LDN	53	167	529	1673

FHWA-RD-77-108 HIGHWAY NOISE PREDICTION MODEL

PROJECT:	Artesia Noise	JOB #:	0163-2021-04
ROADWAY:	Pioneer Blvd	DATE:	25-Jul-22
LOCATION:	50 ft (Existing+SP)	ENGINEER:	C Pincock

NOISE INPUT DATA

ROADWAY CONDITIONS

ADT =	29,186	
SPEED =	35	
PK HR % =	10	
NEAR LANE/FAR LANE DIS	65	
ROAD ELEVATION =	0.0	
GRADE =	1.0	%
PK HR VOL =	2,919	

RECEIVER INPUT DATA

RECEIVER DISTANCE =		50
DIST C/L TO WALL =		50
RECEIVER HEIGHT =		5.0
WALL DISTANCE FROM RECEIVER		0
PAD ELEVATION =		0.5
ROADWAY VIEW:	LF ANGLE=	-90
	RT ANGLE=	90
	DF ANGLE=	180

SITE CONDITIONS

AUTOMOBILES =	10	
MEDIUM TRUCKS =	10	(10 = HARD SITE, 15 = SOFT SITE)
HEAVY TRUCKS =	10	

WALL INFORMATION

HTH WALL	0.0	
AMBIENT=	0.0	
BARRIER =	0	(0 = WALL, 1 = BERM)

VEHICLE MIX DATA

VEHICLE TYPE	DAY	EVENING	NIGHT	DAILY
AUTOMOBILES	0.775	0.129	0.096	0.9742
MEDIUM TRUCK	0.848	0.049	0.103	0.0184
HEAVY TRUCKS	0.865	0.027	0.108	0.0074

MISC. VEHICLE INFO

VEHICLE TYPE	HEIGHT	SLE DISTANCE	GRADE ADJUSTMENT
AUTOMOBILES	2.0	38.16	- -
MEDIUM TRUCKS	4.0	38.03	- -
HEAVY TRUCKS	8.0	38.08	0.00

NOISE OUTPUT DATA

NOISE IMPACTS (WITHOUT TOPO OR BARRIER SHIELDING)

VEHICLE TYPE	PK HR LEQ	DAY LEQ	EVEN LEQ	NIGHT LEQ	LDN	CNEL
AUTOMOBILES	70.0	68.1	66.3	60.3	68.9	69.5
MEDIUM TRUCKS	62.5	61.0	54.6	53.1	61.5	61.8
HEAVY TRUCKS	63.8	62.3	53.3	54.5	62.9	63.0
NOISE LEVELS (dBA)	71.5	69.7	66.8	61.9	70.5	71.0

NOISE IMPACTS (WITH TOPO AND BARRIER SHIELDING)

VEHICLE TYPE	PK HR LEQ	DAY LEQ	EVEN LEQ	NIGHT LEQ	LDN	CNEL
AUTOMOBILES	70.0	68.1	66.3	60.3	68.9	69.5
MEDIUM TRUCKS	62.5	61.0	54.6	53.1	61.5	61.8
HEAVY TRUCKS	63.8	62.3	53.3	54.5	62.9	63.0
NOISE LEVELS (dBA)	71.5	69.7	66.8	61.9	70.5	71.0

NOISE CONTOUR (FT)				
NOISE LEVELS	70 dBA	65 dBA	60 dBA	55 dBA
CNEL	62	197	623	1970
LDN	56	176	558	1764

Appendix C:

Construction Noise Modeling Output

Receptor - Industrial Uses

Future Phases

A	B	C	D	E	F	G	H	I	J
Construction Phase Equipment Item	# of Items	Item Lmax at 50 feet, dBA	Dist. To Recptr.	Item Usage Percent	Usage Factor	Dist. Correction dB	Usage Adj. dB	Recptr. Item Lmax, dBA	Recptr. Item Leq, dBA
DEMO									
1. Concrete/Industrial Saws	1	90	200	20	0.20	-12.0	-7.0	78.0	71.0
2. Rubber Tired Dozers	1	85	200	40	0.40	-12.0	-4.0	73.0	69.0
3. Tractors/Loaders/Backhoes	3	80	200	40	1.20	-12.0	0.8	68.0	68.8
							Log Sum	79.5	74.5
SITE PREPARATION									
1. Graders	1	85	200	40	0.40	-12.0	-4.0	73.0	69.0
2. Tractors/Loaders/Backhoes	1	80	200	40	0.40	-12.0	-4.0	68.0	64.0
3. Scrapers	1	85	200	40	0.40	-12.0	-4.0	73.0	69.0
							Log Sum	76.6	72.6
GRADE									
1. Rubber Tired Dozers	1	85	200	40	0.40	-12.0	-4.0	73.0	69.0
2. Tractors/Loaders/Backhoes	2	80	200	40	0.80	-12.0	-1.0	68.0	67.0
3. Graders	1	85	200	40	0.40	-12.0	-4.0	73.0	69.0
							Log Sum	73.0	73.2
BUILD									
1. Generator Sets	1	82	200	50	0.50	-12.0	-3.0	70.0	66.9
2. Cranes	1	85	200	16	0.16	-12.0	-8.0	73.0	65.0
3. Forklifts	1	85	200	40	0.40	-12.0	-4.0	73.0	69.0
4. Tractors/Loaders/Backhoes	1	80	200	40	0.40	-12.0	-4.0	68.0	64.0
5. Welders	3	73	200	40	1.20	-12.0	0.8	61.0	61.8
							Log Sum	77.6	73.0
PAVING									
1. Cement and Mortar Mixers	1	85	200	40	0.40	-12.0	-4.0	73.0	69.0
2. Pavers	1	85	200	50	0.50	-12.0	-3.0	73.0	69.9
3. Rollers	1	85	200	20	0.20	-12.0	-7.0	73.0	66.0
4. Tractors/Loaders/Backhoes	1	80	200	40	0.40	-12.0	-4.0	68.0	64.0
5. Paving Equipment	1	85	200	20	0.20	-12.0	-7.0	73.0	66.0
							Log Sum	79.3	74.5
FINISH									
1. Air Compressor (portable)	1	80	200	40	0.40	-12.0	-4.0	68.0	64.0
							Log Sum	68.0	64.0

Receptor - South Gas Station

Future Phases

A	B	C	D	E	F	G	H	I	J
Construction Phase Equipment Item	# of Items	Item Lmax at 50 feet, dBA	Dist. To Recptr.	Item Usage Percent	Usage Factor	Dist. Correction dB	Usage Adj. dB	Recptr. Item Lmax, dBA	Recptr. Item Leq, dBA
DEMO									
1. Concrete/Industrial Saws	1	90	155	20	0.20	-9.8	-7.0	80.2	73.2
2. Rubber Tired Dozers	1	85	155	40	0.40	-9.8	-4.0	75.2	71.2
3. Tractors/Loaders/Backhoes	3	80	155	40	1.20	-9.8	0.8	70.2	71.0
							Log Sum	81.7	76.7
SITE PREPARATION									
1. Graders	1	85	155	40	0.40	-9.8	-4.0	75.2	71.2
2. Tractors/Loaders/Backhoes	1	80	155	40	0.40	-9.8	-4.0	70.2	66.2
3. Scrapers	1	85	155	40	0.40	-9.8	-4.0	75.2	71.2
							Log Sum	78.8	74.8
GRADE									
1. Rubber Tired Dozers	1	85	155	40	0.40	-9.8	-4.0	75.2	71.2
2. Tractors/Loaders/Backhoes	2	80	155	40	0.80	-9.8	-1.0	70.2	69.2
3. Graders	1	85	155	40	0.40	-9.8	-4.0	75.2	71.2
							Log Sum	75.2	75.4
BUILD									
1. Generator Sets	1	82	155	50	0.50	-9.8	-3.0	72.2	69.2
2. Cranes	1	85	155	16	0.16	-9.8	-8.0	75.2	67.2
3. Forklifts	1	85	155	40	0.40	-9.8	-4.0	75.2	71.2
4. Tractors/Loaders/Backhoes	1	80	155	40	0.40	-9.8	-4.0	70.2	66.2
5. Welders	3	73	155	40	1.20	-9.8	0.8	63.2	64.0
							Log Sum	79.8	75.2
PAVING									
1. Cement and Mortar Mixers	1	85	155	40	0.40	-9.8	-4.0	75.2	71.2
2. Pavers	1	85	155	50	0.50	-9.8	-3.0	75.2	72.2
3. Rollers	1	85	155	20	0.20	-9.8	-7.0	75.2	68.2
4. Tractors/Loaders/Backhoes	1	80	155	40	0.40	-9.8	-4.0	70.2	66.2
5. Paving Equipment	1	85	155	20	0.20	-9.8	-7.0	75.2	68.2
							Log Sum	81.5	76.7
FINISH									
1. Air Compressor (portable)	1	80	155	40	0.40	-9.8	-4.0	70.2	66.2
							Log Sum	70.2	66.2

Receptor - East Residences

Future Phases

A	B	C	D	E	F	G	H	I	J
Construction Phase Equipment Item	# of Items	Item Lmax at 50 feet, dBA	Dist. To Recptr.	Item Usage Percent	Usage Factor	Dist. Correction dB	Usage Adj. dB	Recptr. Item Lmax, dBA	Recptr. Item Leq, dBA
DEMO									
1. Concrete/Industrial Saws	1	90	235	20	0.20	-13.4	-7.0	76.6	69.6
2. Rubber Tired Dozers	1	85	235	40	0.40	-13.4	-4.0	71.6	67.6
3. Tractors/Loaders/Backhoes	3	80	235	40	1.20	-13.4	0.8	66.6	67.3
							Log Sum	78.1	73.1
SITE PREPARATION									
1. Graders	1	85	235	40	0.40	-13.4	-4.0	71.6	67.6
2. Tractors/Loaders/Backhoes	1	80	235	40	0.40	-13.4	-4.0	66.6	62.6
3. Scrapers	1	85	235	40	0.40	-13.4	-4.0	71.6	67.6
							Log Sum	75.2	71.2
GRADE									
1. Rubber Tired Dozers	1	85	235	40	0.40	-13.4	-4.0	71.6	67.6
2. Tractors/Loaders/Backhoes	2	80	235	40	0.80	-13.4	-1.0	66.6	65.6
3. Graders	1	85	235	40	0.40	-13.4	-4.0	71.6	67.6
							Log Sum	71.6	71.8
BUILD									
1. Generator Sets	1	82	235	50	0.50	-13.4	-3.0	68.6	65.5
2. Cranes	1	85	235	16	0.16	-13.4	-8.0	71.6	63.6
3. Forklifts	1	85	235	40	0.40	-13.4	-4.0	71.6	67.6
4. Tractors/Loaders/Backhoes	1	80	235	40	0.40	-13.4	-4.0	66.6	62.6
5. Welders	3	73	235	40	1.20	-13.4	0.8	59.6	60.3
							Log Sum	76.2	71.6
PAVING									
1. Cement and Mortar Mixers	1	85	235	40	0.40	-13.4	-4.0	71.6	67.6
2. Pavers	1	85	235	50	0.50	-13.4	-3.0	71.6	68.5
3. Rollers	1	85	235	20	0.20	-13.4	-7.0	71.6	64.6
4. Tractors/Loaders/Backhoes	1	80	235	40	0.40	-13.4	-4.0	66.6	62.6
5. Paving Equipment	1	85	235	20	0.20	-13.4	-7.0	71.6	64.6
							Log Sum	77.9	73.1
FINISH									
1. Air Compressor (portable)	1	80	235	40	0.40	-13.4	-4.0	66.6	62.6
							Log Sum	66.6	62.6

Receptor - West Project

Future Phases

A	B	C	D	E	F	G	H	I	J
Construction Phase Equipment Item	# of Items	Item Lmax at 50 feet, dBA	Dist. To Recptr.	Item Usage Percent	Usage Factor	Dist. Correction dB	Usage Adj. dB	Recptr. Item Lmax, dBA	Recptr. Item Leq, dBA
DEMO									
1. Concrete/Industrial Saws	1	90	140	20	0.20	-8.9	-7.0	81.1	74.1
2. Rubber Tired Dozers	1	85	140	40	0.40	-8.9	-4.0	76.1	72.1
3. Tractors/Loaders/Backhoes	3	80	140	40	1.20	-8.9	0.8	71.1	71.8
							Log Sum	82.6	77.6
SITE PREPARATION									
1. Graders	1	85	140	40	0.40	-8.9	-4.0	76.1	72.1
2. Tractors/Loaders/Backhoes	1	80	140	40	0.40	-8.9	-4.0	71.1	67.1
3. Scrapers	1	85	140	40	0.40	-8.9	-4.0	76.1	72.1
							Log Sum	79.7	75.7
GRADE									
1. Rubber Tired Dozers	1	85	140	40	0.40	-8.9	-4.0	76.1	72.1
2. Tractors/Loaders/Backhoes	2	80	140	40	0.80	-8.9	-1.0	71.1	70.1
3. Graders	1	85	140	40	0.40	-8.9	-4.0	76.1	72.1
							Log Sum	76.1	76.3
BUILD									
1. Generator Sets	1	82	140	50	0.50	-8.9	-3.0	73.1	70.0
2. Cranes	1	85	140	16	0.16	-8.9	-8.0	76.1	68.1
3. Forklifts	1	85	140	40	0.40	-8.9	-4.0	76.1	72.1
4. Tractors/Loaders/Backhoes	1	80	140	40	0.40	-8.9	-4.0	71.1	67.1
5. Welders	3	73	140	40	1.20	-8.9	0.8	64.1	64.8
							Log Sum	80.7	76.1
PAVING									
1. Cement and Mortar Mixers	1	85	140	40	0.40	-8.9	-4.0	76.1	72.1
2. Pavers	1	85	140	50	0.50	-8.9	-3.0	76.1	73.0
3. Rollers	1	85	140	20	0.20	-8.9	-7.0	76.1	69.1
4. Tractors/Loaders/Backhoes	1	80	140	40	0.40	-8.9	-4.0	71.1	67.1
5. Paving Equipment	1	85	140	20	0.20	-8.9	-7.0	76.1	69.1
							Log Sum	82.4	77.6
FINISH									
1. Air Compressor (portable)	1	80	140	40	0.40	-8.9	-4.0	71.1	67.1
							Log Sum	71.1	67.1

Receptor - Industrial Uses

Phase 1

A	B	C	D	E	F	G	H	I	J
Construction Phase Equipment Item	# of Items	Item Lmax at 50 feet, dBA	Dist. To Recptr.	Item Usage Percent	Usage Factor	Dist. Correction dB	Usage Adj. dB	Recptr. Item Lmax, dBA	Recptr. Item Leq, dBA
DEMO									
1. Concrete/Industrial Saws	1	90	200	20	0.20	-12.0	-7.0	78.0	71.0
2. Rubber Tired Dozers	1	85	200	40	0.40	-12.0	-4.0	73.0	69.0
3. Tractors/Loaders/Backhoes	3	80	200	40	1.20	-12.0	0.8	68.0	68.8
							Log Sum	79.5	74.5
SITE PREPARATION									
1. Graders	1	85	200	40	0.40	-12.0	-4.0	73.0	69.0
2. Tractors/Loaders/Backhoes	1	80	200	40	0.40	-12.0	-4.0	68.0	64.0
3. Scrapers	1	85	200	40	0.40	-12.0	-4.0	73.0	69.0
							Log Sum	76.6	72.6
GRADE									
1. Rubber Tired Dozers	1	85	200	40	0.40	-12.0	-4.0	73.0	69.0
2. Tractors/Loaders/Backhoes	2	80	200	40	0.80	-12.0	-1.0	68.0	67.0
3. Graders	1	85	200	40	0.40	-12.0	-4.0	73.0	69.0
							Log Sum	73.0	73.2
BUILD									
1. Generator Sets	1	82	200	50	0.50	-12.0	-3.0	70.0	66.9
2. Cranes	1	85	200	16	0.16	-12.0	-8.0	73.0	65.0
3. Forklifts	2	85	200	40	0.80	-12.0	-1.0	73.0	72.0
4. Tractors/Loaders/Backhoes	1	80	200	40	0.40	-12.0	-4.0	68.0	64.0
5. Welders	3	73	200	40	1.20	-12.0	0.8	61.0	61.8
							Log Sum	77.6	74.5
PAVING									
1. Cement and Mortar Mixers	1	85	200	40	0.40	-12.0	-4.0	73.0	69.0
2. Pavers	1	85	200	50	0.50	-12.0	-3.0	73.0	69.9
3. Rollers	2	85	200	20	0.40	-12.0	-4.0	73.0	69.0
4. Tractors/Loaders/Backhoes	1	80	200	40	0.40	-12.0	-4.0	68.0	64.0
5. Paving Equipment	1	85	200	20	0.20	-12.0	-7.0	73.0	66.0
							Log Sum	79.3	75.1
FINISH									
1. Air Compressor (portable)	1	80	200	40	0.40	-12.0	-4.0	68.0	64.0
							Log Sum	68.0	64.0

Receptor - Auto Repair & House

Phase 1

A	B	C	D	E	F	G	H	I	J
Construction Phase Equipment Item	# of Items	Item Lmax at 50 feet, dBA	Dist. To Recptr.	Item Usage Percent	Usage Factor	Dist. Correction dB	Usage Adj. dB	Recptr. Item Lmax, dBA	Recptr. Item Leq, dBA
DEMO									
1. Concrete/Industrial Saws	1	90	120	20	0.20	-7.6	-7.0	82.4	75.4
2. Rubber Tired Dozers	1	85	120	40	0.40	-7.6	-4.0	77.4	73.4
3. Tractors/Loaders/Backhoes	3	80	120	40	1.20	-7.6	0.8	72.4	73.2
							Log Sum	83.9	78.9
SITE PREPARATION									
1. Graders	1	85	120	40	0.40	-7.6	-4.0	77.4	73.4
2. Tractors/Loaders/Backhoes	1	80	120	40	0.40	-7.6	-4.0	72.4	68.4
3. Scrapers	1	85	120	40	0.40	-7.6	-4.0	77.4	73.4
							Log Sum	81.0	77.1
GRADE									
1. Rubber Tired Dozers	1	85	120	40	0.40	-7.6	-4.0	77.4	73.4
2. Tractors/Loaders/Backhoes	2	80	120	40	0.80	-7.6	-1.0	72.4	71.4
3. Graders	1	85	120	40	0.40	-7.6	-4.0	77.4	73.4
							Log Sum	77.4	77.6
BUILD									
1. Generator Sets	1	82	120	50	0.50	-7.6	-3.0	74.4	71.4
2. Cranes	1	85	120	16	0.16	-7.6	-8.0	77.4	69.4
3. Forklifts	2	85	120	40	0.80	-7.6	-1.0	77.4	76.4
4. Tractors/Loaders/Backhoes	1	80	120	40	0.40	-7.6	-4.0	72.4	68.4
5. Welders	3	73	120	40	1.20	-7.6	0.8	65.4	66.2
							Log Sum	82.0	78.9
PAVING									
1. Cement and Mortar Mixers	1	85	120	40	0.40	-7.6	-4.0	77.4	73.4
2. Pavers	1	85	120	50	0.50	-7.6	-3.0	77.4	74.4
3. Rollers	2	85	120	20	0.40	-7.6	-4.0	77.4	73.4
4. Tractors/Loaders/Backhoes	1	80	120	40	0.40	-7.6	-4.0	72.4	68.4
5. Paving Equipment	1	85	120	20	0.20	-7.6	-7.0	77.4	70.4
							Log Sum	83.7	79.5
FINISH									
1. Air Compressor (portable)	1	80	120	40	0.40	-7.6	-4.0	72.4	68.4
							Log Sum	72.4	68.4