Glendale-Los Angeles Garden River Bridge

NOISE ANALYSIS

CITY OF GLENDALE

PREPARED BY:

William Maddux
bmaddux@urbanxroads.com
(619) 778-1971

MAY 19, 2025

This page was intentionally left blank.

TABLE OF CONTENTS

APPENDICES

LIST OF EXHIBITS

LIST OF TABLES

LIST OF ABBREVIATED TERMS

(1)	Reference
ADT	Average Daily Traffic
ANSI	American National Standards Institute
Calveno	California Vehicle Noise
CEQA	California Environmental Quality Act
CNEL	Community Noise Equivalent Level
dBA	A-weighted decibels
EPA	Environmental Protection Agency
FHWA	Federal Highway Administration
FTA	Federal Transit Administration
INCE	Institute of Noise Control Engineering
L_{eq}	Equivalent continuous (average) sound level
LACFCD	Los Angeles County Flood Control District
LADWP	Los Angeles Department of Water and Power
mph	Miles per hour
OPR	Office of Planning and Research
PPV	Peak particle velocity
Project	Glendale-Los Angeles Garden River Bridge
REMEL	Reference Energy Mean Emission Level
RMS	Root-mean-square
SCE	Southern California Edison
VdB	Vibration Decibels

This page was intentionally left blank.

EXECUTIVE SUMMARY

Urban Crossroads, Inc. has prepared this construction noise analysis to determine the potential noise impacts due to the proposed Glendale-Los Angeles Garden River Bridge development ("Project"). The Project site is generally located north of N. Zoo Drive, in the City of Los Angeles, and south of the intersection of Flower Street and Fairmont Avenue in the City of Glendale.

The Project is not noise-sensitive and would not be impacted by aircraft noise. This noise analysis has been prepared to satisfy the applicable City of Glendale and the City of Los Angeles construction noise standards and significance criteria based on Appendix G of the California Environmental Quality Act (CEQA) Guidelines. (1)

SUMMARY OF CEQA SIGNIFICANCE FINDINGS

The results of this Noise Analysis are summarized below based on the significance criteria in Section 4 of this report consistent with Appendix G of the California Environmental Quality Act (CEQA) Guidelines.(1) (1) Table ES-1 shows the findings of significance for each potential noise and/or vibration impact under CEQA before and after any required mitigation measures.

TABLE ES-1: SUMMARY OF CEQA SIGNIFICANCE FINDINGS

Analysis	Report Section	Significance Findings	
		Unmitigated	Mitigated
Operational Noise	9	*No Impact*	-
Construction Noise	10	*Less Than Significant*	-
Construction Vibration	10	*Less Than Significant*	-

This page was intentionally left blank.

1 INTRODUCTION

This noise analysis has been completed to determine the construction noise impacts associated with the development of the proposed Glendale-Los Angeles Garden River Bridge ("Project"). This noise analysis briefly describes the proposed Project, provides information regarding noise fundamentals, sets out the local regulatory setting, and presents the study methods and procedures for short-term construction noise and vibration impacts.

1.1 SITE LOCATION

The Project site is generally located north of N. Zoo Drive, in the City of Los Angeles, and south of the intersection of Flower Street and Fairmont Avenue in the City of Glendale as shown in Exhibit 1-A. The proposed residential Project site is located within a commercial area, with the nearest existing single-family residential homes approximately 1,360 feet to the northeast. The John Ferraro Athletic Fields, Los Angeles Zoo, and other community resources within Los Angeles are located south of the Project site.

1.2 PROJECT DESCRIPTION

The City of Glendale, as lead agency, in cooperation with the City of Los Angeles, as responsible agency, proposes the construction of a three-span, curvilinear, landscaped bridge for use by pedestrians and bicyclists, as shown in Exhibit 1-B. The intent of this multi-community resource is to increase access to Glendale Narrows Riverwalk, and Griffith Park; to improve connections; and to increase the safety of paths used for pedestrians and cyclists. Dedicated access across the Los Angeles River at this key location would improve public safety and accessibility to important community resources by creating a connection between the Cities of Glendale and Los Angeles across the Los Angeles River for pedestrians and cyclists.

The proposed bridge would be concrete with two supporting piers in the Los Angeles River. It would feature extensive landscaping on the approaches, as well as on the bridge itself, and is thus named the "Garden River Bridge." A number of raised planting beds on the bridge would create dedicated zones for bicycle and pedestrian circulation, shade structures, canopied seating areas, dispersed gathering spaces, and scenic views of the Los Angeles River.

The City of Los Angeles owns, operates, and maintains the south side of the Los Angeles River, located within the southern portion of the proposed Project area; also within this area, Southern California Edison (SCE) holds a fifteen-foot easement along Zoo Drive and overhead facilities on Los Angeles Department of Water and Power (LADWP) poles. On the north bank of the Los Angeles River, parcels within the northern portion of the proposed Project limits are owned by the City of Glendale, the City of Los Angeles, and the Los Angeles County Flood Control District (LACFCD). Furthermore, easements that cross the proposed Project area on the northern side are held by the City of Glendale for utility purposes (e.g., poles, sewers and related structures), and for the existing Riverwalk pedestrian/bike trail.

EXHIBIT 1-A: LOCATION MAP

EXHIBIT 1-B: PROJECT SITE

The proposed Project would include overall temporary impacts of approximately 2.94 acres and approximately 1.4 acres of permanent impacts. Temporary impacts would include water diversion activities, excavation activities, and areas of access and staging. Permanent impacts would include the bridge, Riverwalk bike path reconstruction adjacent to the bridge, a new connection from the bridge to Zoo Drive, and the realignment of Zoo Drive; see Exhibit 2. The realignment of Zoo Drive would be to permit the construction of stairs and a ramp leading up to the LA River Bike Path and the proposed bridge. Trees between Zoo Drive and the Los Angeles River Bike Path would be removed, and a new curb would be installed as part of proposed street improvements. Additionally, a sidewalk would be installed to facilitate access from the bridge to the John Ferraro Athletic Fields to the south via a new raised crosswalk across Zoo Drive.

Construction is anticipated to begin in the Fall of 2025 and would last approximately 2.5 years, ending in the Spring of 2028. The proposed Project would occur in six (6) phases, and shown and summarized below.

Phase 0: Mobilization – The initial phase of the proposed Project would include requests for information, preparing and reviewing submittals, and procuring materials.

Phase 1: North Abutment and Approaches – Approach work, bike path work, and abutment work.

Phase 2: Bridge Substructure – Construct bents within the LA River.

Phase 3: South Abutment and Approaches – Construct the south abutment and connections to Zoo Drive; realign Zoo Drive.

Phase 4: Bridge Superstructure – Construct the bridge superstructure using falsework within the LA River.

Phase 5: Architectural Elements/Landscaping – Construct the architectural elements (e.g., canopies, landscaping, etc.) on the bridge and approaches.

The bridge abutments would be constructed to be higher than the existing elevation of the channel walls and would not touch the levee walls. The abutments would be supported by deep foundations consisting of cast-in-drilled-hole concrete piles; the abutments would not be supported by the channel walls. In order to address drainage from the bridge deck, pipes would be hung inside of the bridge and tie into existing drainage pipes or water treatment features on both sides of the Los Angeles River channel. Activities associated with the realignment of Zoo Drive would include the removal of trees along the Los Angeles River Bike Path along Zoo Drive, within the southern portion of the proposed Project's footprint in the City of LA.

The demolition and excavation phases of the proposed Project are expected to generate the most construction traffic and require the most equipment. In-river construction would occur during the dry season (April through October) when flood flows are very unlikely. The construction equipment used during different portions of the proposed Project would include work trucks, concrete trucks, cast-in-drilled-hole concrete pile drilling rigs, mobile cranes, and excavators. The construction contractor would be required to lay down timber mats to protect the Los Angeles River bottom and prevent potential impacts to the Los Angeles River bottom during construction.

While variable, an average of 15 people would be on site daily for the duration of construction activities. Construction access to the proposed Project site would be provided from Zoo Drive on the City of Los Angeles side of the proposed Project and from Flower Street on the Glendale side of the Project, with intermittent temporary lane closures and or reduced access. Due to the lack of suitable access ramps within close proximity to the proposed Project site, the construction contractor may construct a temporary ramp from Zoo Drive down the sloped levee into the channel bottom. The temporary construction staging area would be located in the City of Los Angeles and the City of Glendale at the southern and northern areas of the proposed Project; specifically, one of the staging areas would be on the north side of Zoo Drive within the shoulder of the road. Additional staging would occur within the Los Angeles River's northern bank and southern bank during construction of the bridge's piers. Any rights of entry and/or temporary easements would be negotiated as part of the final design phase prior to the start of construction. Noise levels from construction activities would conform to the City of Glendale's Municipal Code 8.36.080, which prohibits construction from 7:00 PM to 7:00 AM every night and from 7:00 PM on Saturday to 7:00 AM on Monday. The existing pedestrian and bike path use on the Riverwalk and the Los Angeles River Bike Path would require temporary intermittent detours during construction activities. The City of Glendale would be responsible for the construction of the proposed Project. The cities of Glendale and Los Angeles are currently negotiating an agreement to address shared ownership, operation, and maintenance of the proposed Project.

This page was intentionally left blank.

2 FUNDAMENTALS

Noise is simply defined as "unwanted sound." Sound becomes unwanted when it interferes with normal activities, when it causes actual physical harm, or when it has adverse effects on health. Noise is measured on a logarithmic scale of sound pressure level known as a decibel (dB). A-weighted decibels (dBA) approximate the subjective response of the human ear to broad frequency noise source by discriminating against very low and very high frequencies of the audible spectrum. They are adjusted to reflect only those frequencies which are audible to the human ear. Exhibit 2-A presents a summary of the typical noise levels and their subjective loudness and effects, which are described in more detail below.

EXHIBIT 2-A: TYPICAL NOISE LEVELS

COMMON OUTDOOR ACTIVITIES	COMMON INDOOR ACTIVITIES	A - WEIGHTED SOUND LEVEL dBA	SUBJECTIVE LOUDNESS	EFFECTS OF NOISE
THRESHOLD OF PAIN		140	INTOLERABLE OR DEAFENING	HEARING LOSS
NEAR JET ENGINE		130		
		120		
JET FLY-OVER AT 300m (1000 ft)	ROCK BAND	110		
LOUD AUTO HORN		100	VERY NOISY	
GAS LAWN MOWER AT 1m (3 ft)		90		
DIESEL TRUCK AT 15m (50 ft), at 80 km/hr (50 mph)	FOOD BLENDER AT 1m (3 ft)	80		SPEECH INTERFERENCE
NOISY URBAN AREA, DAYTIME	VACUUM CLEANER AT 3m (10 ft)	70	LOUD	
HEAVY TRAFFIC AT 90m (300 ft)	NORMAL SPEECH AT 1m (3 ft)	60		
QUIET URBAN DAYTIME	LARGE BUSINESS OFFICE	50	MODERATE	SLEEP DISTURBANCE
QUIET URBAN NIGHTTIME	THEATER, LARGE CONFERENCE ROOM (BACKGROUND)	40		
QUIET SUBURBAN NIGHTTIME	LIBRARY	30	FAINT	NO EFFECT
QUIET RURAL NIGHTTIME	BEDROOM AT NIGHT, CONCERT HALL (BACKGROUND)	20		
	BROADCAST/RECORDING STUDIO	10	VERY FAINT	
LOWEST THRESHOLD OF HUMAN HEARING	LOWEST THRESHOLD OF HUMAN HEARING	0		

Source: Environmental Protection Agency Office of Noise Abatement and Control, Information on Levels of Environmental Noise Requisite to Protect Public Health and Welfare with an Adequate Margin of Safety (EPA/ONAC 550/9-74-004) March 1974.

2.1 RANGE OF NOISE

Since the range of intensities that the human ear can detect is so large, the scale frequently used to measure intensity is a scale based on multiples of 10, the logarithmic scale. The scale for measuring intensity is the decibel scale. Each interval of 10 decibels indicates a sound energy ten times greater than before, which is perceived by the human ear as being roughly twice as loud. (2) The most common sounds vary between 40 dBA (very quiet) to 100 dBA (very loud). Normal conversation at three feet is roughly at 60 dBA, while loud jet engine noises equate to 110 dBA at approximately 100 feet, which can cause serious discomfort. (3) Another important aspect of noise is the duration of the sound and the way it is described and distributed in time.

2.2 NOISE DESCRIPTORS

Environmental noise descriptors are generally based on averages, rather than instantaneous, noise levels. The most used figure is the equivalent level (L_{eq}). Equivalent sound levels are not measured directly but are calculated from sound pressure levels typically measured in A-weighted decibels (dBA). The equivalent sound level (L_{eq}) represents a steady-state sound level containing the same total energy as a time-varying signal over a given sample period (typically one hour). It is commonly used to describe the “energy average” noise levels within the environment.

While useful, peak hour or equivalent noise levels do not completely describe a given noise environment. Noise levels lower than peak hour may be disturbing if they occur when quiet is most desirable, namely evening and nighttime (sleeping) hours. The Community Noise Equivalent Level (CNEL), representing a composite 24-hour noise level, is utilized to account for this. The CNEL is the weighted average of the intensity of a sound, with corrections for time of day, and averaged over 24 hours. The time-of-day corrections require the addition of 5 decibels to dBA L_{eq} sound levels in the evening from 7:00 p.m. to 10:00 p.m. and the addition of 10 decibels to dBA L_{eq} sound levels at night between 10:00 p.m. and 7:00 a.m. These additions account for the noise-sensitive time periods during the evening and night hours when sound appears louder. CNEL does not represent the actual sound level heard at any time but rather represents the total sound exposure. The City of Glendale relies on the 24-hour CNEL level to assess land use compatibility with transportation-related noise sources.

2.3 SOUND PROPAGATION

When sound propagates over a distance, it changes in level and frequency content. Based on guidance from the U.S. Department of Transportation, Federal Highway Administration (FHWA), Office of Environment and Planning, Noise and Air Quality Branch, how noise reduces with distance depends on the following factors.

2.3.1 GEOMETRIC SPREADING

Sound from a localized source (i.e., a stationary point source) propagates uniformly outward in a spherical pattern. The sound level attenuates (or decreases) at a rate of 6 dB for each doubling of distance from a point source. Highways consist of several localized noise sources on a defined path and hence can be treated as a line source, which approximates the effect of several point sources. Noise from a line source propagates outward in a cylindrical pattern, often referred to as cylindrical spreading. Sound levels attenuate at a rate of 3 dB for each doubling of distance from a line source. (2)

2.3.2 GROUND ABSORPTION

The propagation path of noise from a highway to a receiver is usually very close to the ground. Noise attenuation from ground absorption and reflective wave canceling adds to the attenuation associated with geometric spreading. Traditionally, the excess attenuation has also been expressed in terms of attenuation per doubling of distance. This approximation is usually sufficiently accurate for distances of less than 200 ft. For acoustically hard sites (i.e., sites with a reflective surface between the source and the receiver, such as a parking lot or body of water), no excess ground attenuation is assumed. For acoustically absorptive or soft sites (i.e., those sites with an absorptive ground surface between the source and the receiver, such as soft dirt, grass, or scattered bushes and trees), an excess ground attenuation value of 1.5 dB per doubling of distance is normally assumed. When added to the cylindrical spreading, the excess ground attenuation results in an overall drop-off rate of 4.5 dB per doubling of distance from a line source. (4)

2.3.3 ATMOSPHERIC EFFECTS

Receivers located downwind from a source can be exposed to increased noise levels relative to calm conditions, whereas locations upwind can have lowered noise levels. Sound levels can be increased at large distances (e.g., more than 500 feet) due to atmospheric temperature inversion (i.e., increasing temperature with elevation). Other factors, such as air temperature, humidity, and turbulence, can also have significant effects. (2)

2.3.4 SHIELDING

A large object or barrier in the path between a noise source and a receiver can substantially attenuate noise levels at the receiver. The amount of attenuation provided by shielding depends on the size of the object and the frequency content of the noise source. Shielding by trees and other such vegetation typically only has an "out of sight, out of mind" effect. That is, the perception of noise impact tends to decrease when vegetation blocks the line of sight to nearby residents. However, for vegetation to provide a substantial, or even noticeable, noise reduction, the vegetation area must be at least 15 feet in height, 100 feet wide, and dense enough to completely obstruct the line of sight between the source and the receiver. This size of vegetation may provide up to 5 dBA of noise reduction. The Federal Highway Administration (FHWA) does not consider the planting of vegetation to be a noise abatement measure. (4)

2.3.5 REFLECTION

Field studies conducted by the FHWA have shown that the reflection from barriers and buildings does not substantially increase noise levels. (4) If all the noise striking a structure were reflected back to a given receiving point, the increase would be theoretically limited to 3 dBA. Further, not all the acoustical energy is reflected back to the same point. Some of the energy would go over the structure, some is reflected to points other than the given receiving point, some is scattered by ground coverings (e.g., grass and other plants), and some is blocked by intervening structures and/or obstacles (e.g., the noise source itself). Additionally, some reflected energy is lost due to the longer path the noise must travel. FHWA measurements made to quantify reflective increases in traffic noise have not shown an increase of greater than 1-2 dBA; an increase that is not perceptible to the average human ear.

2.4 NOISE CONTROL

Noise control is the process of obtaining an acceptable noise environment for an observation point or receiver by controlling the noise source, transmission path, receiver, or all three. This concept is known as the source-path-receiver concept. In general, noise control measures can be applied to these three elements.

2.5 NOISE BARRIER ATTENUATION

Effective noise barriers can reduce noise levels by up to 10 to 15 dBA, cutting the loudness of traffic noise in half. A noise barrier is most effective when placed close to the noise source or receiver. Noise barriers, however, do have limitations. For a noise barrier to work, it must be high enough and long enough to block the path of the noise source. (4)

2.6 LAND USE COMPATIBILITY WITH NOISE

Some land uses are more tolerant of noise than others. For example, schools, hospitals, churches, and residences are more sensitive to noise intrusion than are commercial or industrial developments and related activities. As ambient noise levels affect the perceived amenity or livability of a development, so too can the mismanagement of noise impacts impair the economic health and growth potential of a community by reducing the area's desirability as a place to live, shop, and work. For this reason, land use compatibility with the noise environment is an important consideration in the planning and design process. The FHWA encourages State and Local government to regulate land development so that noise-sensitive land uses are either prohibited from being located adjacent to a highway, or that the developments are planned, designed, and constructed so that noise impacts are minimized. (5)

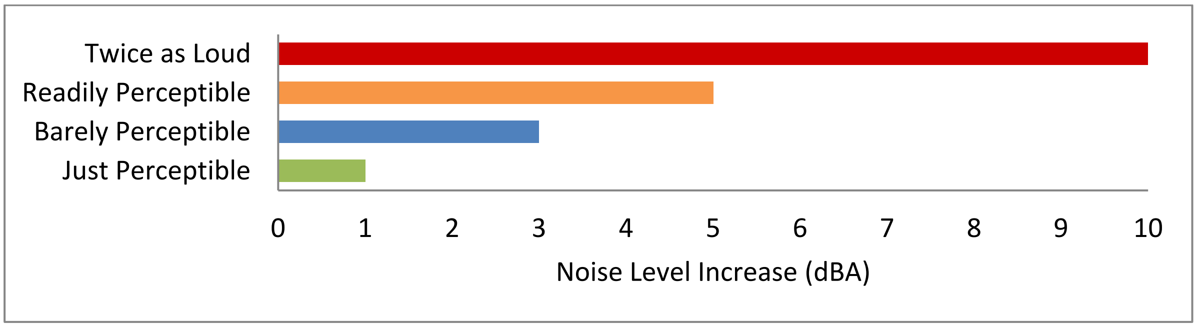
2.7 COMMUNITY RESPONSE TO NOISE

Community responses to noise vary depending upon everyone's susceptibility to noise and personal attitudes about noise. Several factors are related to the level of community annoyance, including:

- Fear associated with noise-producing activities.
- Socio-economic status and educational level.
- Perception that those affected are being unfairly treated.
- Attitudes regarding the usefulness of the noise-producing activity.
- Belief that the noise source can be controlled.

Approximately ten percent of the population has a very low tolerance for noise and will object to any noise, not of their making. Consequently, even in the quietest environment, some complaints will occur. Twenty-five percent of the population will not complain even in very severe noise environments. Thus, a variety of reactions can be expected from people exposed to any given noise environment. (6) Surveys have shown that about ten percent of the people exposed to traffic noise of 60 dBA will report being highly annoyed with the noise, and each increase of one dBA is associated with approximately two percent more people being highly annoyed. When traffic noise exceeds 60 dBA or aircraft noise exceeds 55 dBA, people may begin to complain. (6) Despite this variability in behavior on an individual level, the population can be expected to exhibit the following responses to changes in noise levels, as shown in Exhibit 2-B. A change of 3 dBA is considered *barely perceptible*, and changes of 5 dBA are considered *readily perceptible*. (4)

EXHIBIT 2-B: NOISE LEVEL INCREASE PERCEPTION



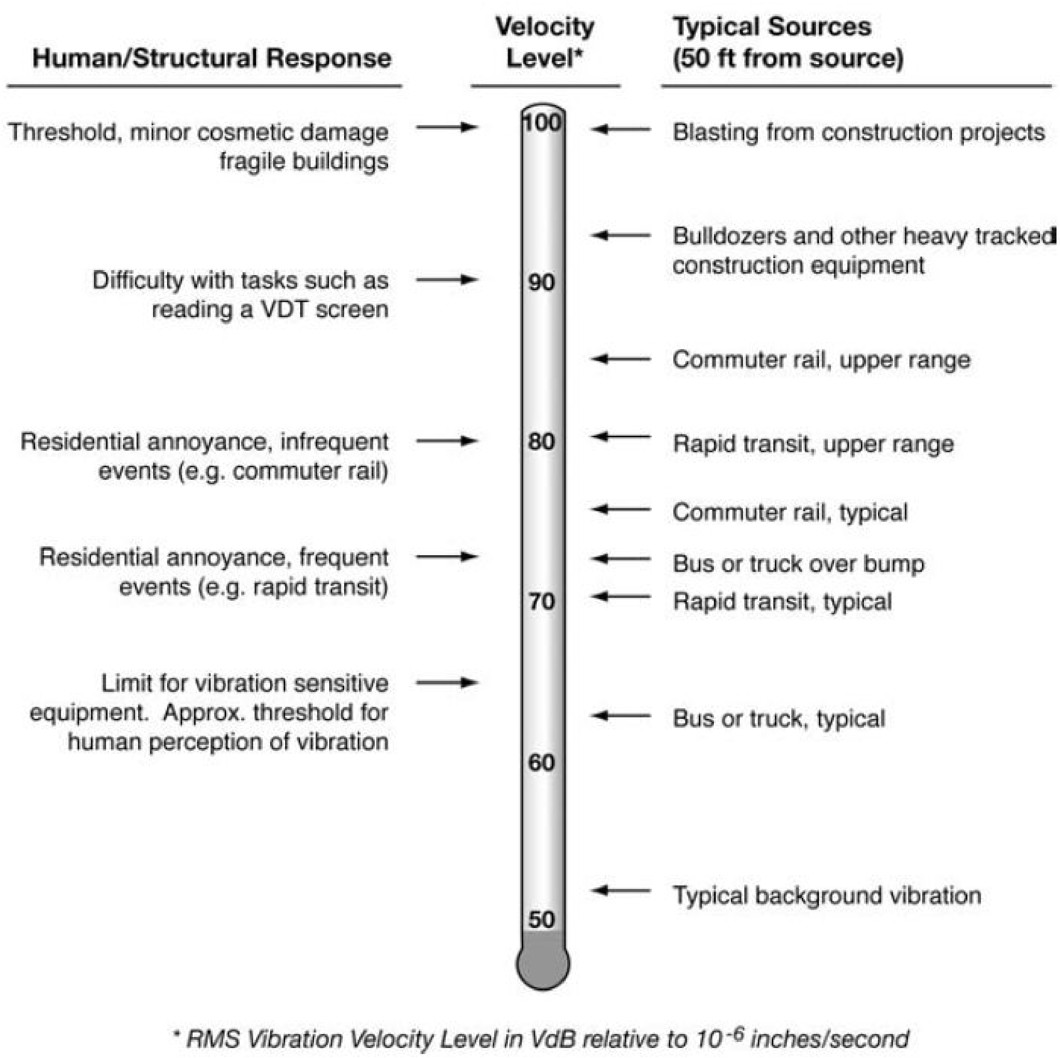
2.8 VIBRATION

Per the Federal Transit Administration (FTA) *Transit Noise and Vibration Impact Assessment Manual* (7), vibration is the periodic oscillation of a medium or object. The rumbling sound caused by the vibration of room surfaces is called structure-borne noise. Sources of ground-borne vibrations include natural phenomena (e.g., earthquakes, volcanic eruptions, sea waves, landslides) or human-made causes (e.g., explosions, machinery, traffic, trains, construction equipment). Vibration sources may be continuous, such as factory machinery, or transient, such as explosions. As is the case with airborne sound, ground-borne vibrations may be described by amplitude and frequency.

Several different methods are used to quantify vibration. The peak particle velocity (PPV) is defined as the maximum instantaneous peak of the vibration signal. The PPV is most frequently used to describe vibration impacts to buildings but is not always suitable for evaluating human response (annoyance) because it takes some time for the human body to respond to vibration signals. Instead, the human body responds to average vibration amplitude, often described as the root mean square (RMS). The RMS amplitude is defined as the average of the squared amplitude of the signal and is most frequently used to describe the effect of vibration on the human body. Decibel notation (VdB) is commonly used to measure RMS. Decibel notation (VdB) serves to reduce the range of numbers used to describe human response to vibration. Typically, ground-borne vibration generated by man-made activities attenuates rapidly with distance from the source of the vibration. Sensitive receivers for vibration include structures (especially older masonry structures), people (especially residents, the elderly, and the sick), and vibration-sensitive equipment and/or activities.

The background vibration-velocity level in residential areas is generally 50 VdB. Ground-borne vibration is normally perceptible to humans at approximately 65 VdB. For most people, a vibration-velocity level of 75 VdB is the approximate dividing line between barely perceptible and distinctly perceptible levels. Typical outdoor sources of perceptible ground-borne vibration are construction equipment, steel-wheeled trains, and traffic on rough roads. If a roadway is smooth, the ground-borne vibration is rarely perceptible. The range of interest is from approximately 50 VdB, which is the typical background vibration-velocity level, to 100 VdB, which is the general threshold where minor damage can occur in fragile buildings. Exhibit 2-C illustrates common vibration sources and the human and structural response to ground-borne vibration.

EXHIBIT 2-C: TYPICAL LEVELS OF GROUND-BORNE VIBRATION



Source: Federal Transit Administration (FTA) Transit Noise and Vibration Impact Assessment Manual.

3 REGULATORY SETTING

To limit population exposure to physically and/or psychologically damaging as well as intrusive noise levels, the federal government, the State of California, various county governments, and most municipalities in the state have established standards and ordinances to control noise. In most areas, automobile and truck traffic is the major source of environmental noise. Traffic activity generally produces an average sound level that remains constant with time. Air and rail traffic, as well as commercial and industrial activities, are also major sources of noise in some areas. Federal, state, and local agencies regulate different aspects of environmental noise. Federal and state agencies generally set noise standards for mobile sources such as aircraft and motor vehicles, while regulation of stationary sources is left to local agencies.

3.1 STATE OF CALIFORNIA NOISE REQUIREMENTS

The State of California regulates freeway noise, sets standards for sound transmission, provides occupational noise control criteria, identifies noise standards, and provides guidance for local land use compatibility. State law requires each county and city to adopt a General Plan that includes a Noise Element to be prepared per guidelines adopted by the Governor's Office of Planning and Research (OPR). (8) The purpose of the Noise Element is to *limit the exposure of the community to excessive noise levels*. In addition, the California Environmental Quality Act (CEQA) requires that all known environmental effects of a project be analyzed, including environmental noise impacts.

3.2 CITY OF GLENDALE NOISE STANDARDS

CONSTRUCTION NOISE STANDARDS

To analyze noise impacts originating from the construction of the Glendale-Los Angeles Garden River Bridge within the City of Glendale, noise from construction activities is typically evaluated against standards established under a City's Municipal Code. The City of Glendale Municipal Code, Section 8.36.080, included in Appendix 3.1, states *it is unlawful for any person within a residential zone, or within a radius of 500 feet therefrom, to operate equipment or perform any outside construction or repair work on buildings, structures or projects within the city between the hours of 7:00 p.m. on one day and 7:00 a.m. of the next day or from 7:00 p.m. on Saturday to 7:00 a.m. on Monday or from 7:00 p.m. preceding a holiday, as designated in Chapter 3.08 of this code, to 7:00 a.m. following such holiday unless beforehand a permit therefor has been duly obtained from the building official. No permit shall be required to perform emergency work as defined in this chapter.* (9) While section 8.36.080, limits the hours of construction, it does not exempt construction from the noise limit of the noise ordinance.

VIBRATION STANDARDS

Construction activity can result in varying degrees of ground-borne vibration, depending on the equipment and methods used, distance to the affected structures, and soil type. Construction vibration is generally associated with pile driving and rock blasting. Other construction equipment, such as air compressors, light trucks, hydraulic loaders, etc., generates little or no ground vibration. (3)

To analyze vibration impacts originating from the operation and construction of the Project, vibration-generating activities are appropriately evaluated against standards established under a City's Municipal Code. Section 8.36.210 states "*Operating or permitting the operation of any device that creates a vibration which is above the vibration perception threshold of an individual at or beyond the property boundary of the source if on private property or at one hundred fifty feet from the source if on a public space or public right-of-way shall be a violation."* The municipal code states "*the perception shall be presumed to be a motion velocity of 0.01 in./sec. over the range of one to one hundred Hz*." Since this is based on the human perception threshold, the motion velocity threshold is assumed to be 0.01 RMS (in/sec), which can also be translated to 0.04 PPV (in/sec).

3.3 CITY OF LOS ANGELES

CONSTRUCTION NOISE STANDARDS

Section 112.05 of the City's Municipal Code identifies exterior noise level limits for construction equipment and states: *in any residential zone or within 500 feet thereof, no person shall operate or cause to be operated any powered equipment or powered hand tool that produces a maximum noise level exceeding the following noise limits at a distance of 50 feet therefrom*: (10)

- *75dB(A) for construction, industrial, and agricultural machinery including crawler-tractors, dozers, rotary drills and augers, loaders, power shovels, cranes, derricks, motor graders, paving machines, off-highway trucks, ditchers, trenchers, compactors, scrapers, wagons, pavement breakers, compressors and pneumatic or other powered equipment.*

The nearest residential zone to the Project site is 1,360 feet to the northeast. Therefore, the City of Los Angeles Municipal Code noise level limits do not apply to the Project.

CONSTRUCTION VIBRATION STANDARDS

Construction activity can result in varying degrees of ground-borne vibration, depending on the equipment and methods used, distance to the affected structures, and soil type. Construction vibration is generally associated with pile driving and rock blasting. Other construction equipment, such as air compressors, light trucks, hydraulic loaders, etc., generates little or no ground vibration. Occasionally, large bulldozers and loaded trucks can cause perceptible vibration levels in close proximity.

To analyze vibration impacts originating from the operation and construction of Glendale-Los Angeles Garden River Bridge, vibration-generating activities are appropriately evaluated against standards established under a City's Municipal Code, if such standards exist. However, the City of Glendale does not identify specific vibration level limits. Therefore, for analysis purposes, the Caltrans *Transportation and Construction Vibration Guidance Manual*, (11 p. 38) Table 19, vibration damage is used in this noise analysis to assess potential temporary construction-related impacts at adjacent building locations.

The construction vibration damage potential criteria include consideration of the building conditions. (3 p. 182) Since the existing buildings in the Project vicinity can best be described as a combination of older residential structures, commercial buildings, or historic buildings representing a variety of structure types with several different construction methods, such as wood frame and unreinforced masonry with a maximum acceptable continuous vibration threshold of 0.25 PPV (in/sec).

3.7 THRESHOLDS OF SIGNIFICANCE

In 2006, the City of Los Angeles adopted the L.A. CEQA Thresholds Guide that outlines significance thresholds to assist in determining whether a project's impacts would be presumed to be significant under normal circumstances. According to Section I of the CEQA Thresholds Guide, a project would normally have a significant impact on noise levels from construction if:

- Construction activities lasting more than one day would exceed existing ambient exterior noise levels by 10 dBA or more at a noise-sensitive use;
- Construction activities lasting more than 10 days in a three-month period would exceed existing ambient exterior noise levels by 5 dBA or more at a noise-sensitive use; or
- Construction activities would exceed the ambient noise level by 5 dBA at a noise-sensitive use between the hours of 9:00 p.m. and 7:00 a.m. Monday through Friday, before 8:00 a.m. or after 6:00 p.m. on Saturday, or at anytime on Sunday.

This page was intentionally left blank.

4 SIGNIFICANCE CRITERIA

The following significance criteria are based on currently adopted guidance provided by Appendix G of the California Environmental Quality Act (CEQA) Guidelines. (12) For the purposes of this report, impacts would be potentially significant if the Project results in or causes:

A. Generation of a substantial temporary or permanent increase in ambient noise levels in the vicinity of the project in excess of standards established in the local general plan or noise ordinance, or applicable standards of other agencies?

B. Generation of excessive ground-borne vibration or ground-borne noise levels?

C. For a project located within the vicinity of a private airstrip or an airport land use plan or, where such a plan has not been adopted, within two miles of a public airport or public use airport, would the project expose people residing or working in the project area to excessive noise levels?

4.1 NOISE LEVEL INCREASES (THRESHOLD A)

Noise level increases resulting from the Project are evaluated based on the Appendix G CEQA Guidelines described above at the closest sensitive receiver locations. Under CEQA, consideration must be given to the magnitude of the increase, the existing baseline ambient noise levels, and the location of noise-sensitive receivers to determine if a noise increase represents a significant adverse environmental impact. This approach *recognizes that there is no single noise increase that renders the noise impact significant.* (13) This is primarily because of the wide variation in individual thresholds of annoyance and differing individual experiences with noise. Thus, an important way of determining a person's subjective reaction to a new noise is the comparison of it to the existing environment to which one has adapted—the so-called *ambient* environment.

In general, the more a new noise exceeds the previously existing ambient noise level, the less acceptable the new noise will typically be judged. The Federal Interagency Committee on Noise (FICON) (14) developed guidance to be used for the assessment of project-generated increases in noise levels that consider the ambient noise level. The FICON recommendations are based on studies that relate aircraft noise levels to the percentage of persons highly annoyed by aircraft noise. Although the FICON recommendations were specifically developed to assess aircraft noise impacts, these recommendations are often used in environmental noise impact assessments involving the use of cumulative noise exposure metrics, such as the average-daily noise level (CNEL) and equivalent continuous noise level (L_{eq}).

The FICON guidance provides an established source of criteria to assess the impacts of substantial temporary or permanent increase in baseline ambient noise levels. Based on the FICON criteria, the amount to which a given noise level increase is considered acceptable is reduced when the noise levels without Project (baseline) are already shown to exceed certain land-use-specific exterior noise level criteria. The specific levels are based on typical responses to noise level increases of 5 dBA or *readily perceptible*, 3 dBA or *barely perceptible*, and 1.5 dBA depending on the underlying without Project noise levels for noise-sensitive uses. These levels of increase and their perceived acceptance are consistent with guidance provided by both the Federal Highway Administration (7) and Caltrans (15 p. 2_48).

4.3 VIBRATION (THRESHOLD B)

As described in Section 3.3, the vibration impacts originating from the construction of the Project, vibration-generating activities are appropriately evaluated by the thresholds of significance outlined in the Caltrans *Transportation and Construction Vibration Guidance Manual*, (11 p. 38) Since the existing buildings in the Project vicinity can best be described as a combination of older residential structures, commercial buildings, or historic buildings representing a variety of structure types with several different construction methods, such as wood frame and unreinforced masonry with a maximum acceptable continuous vibration threshold of 0.25 PPV (in/sec).

4.3 EVALUATION CRITERIA SUMMARY

Noise impacts shall be considered significant if any of the following occur as a direct result of the proposed development. Table 4-1 shows the significance criteria summary matrix.

TABLE 4-1: SIGNIFICANCE CRITERIA SUMMARY

Jurisdiction	Analysis	Condition(s)	Significance Criteria	
			Daytime	Nighttime
City of Glendale	Construction	Noise Level Threshold[2]	80 dBA L_{eq}	n/a
		Vibration Level Threshold[3]	0.25 PPV (in/sec)	n/a
City of Los Angeles	Los Angeles Construction	Exterior Noise Level Standards	Existing Ambient Noise Level plus 5 dBA L_{eq}[5]	
		Vibration Level Threshold	0.25 PPV (in/sec)[4]	n/a

[1] Ficon 1995
[2] Federal Transit Administration, Transit Noise and Vibration Impact Assessment Manual.
[3] Maximum continuous vibration levels for historic buildings representing a variety of structure types with several different construction methods, such as wood frame and unreinforced masonry. Caltrans Transportation and Construction Vibration Manual, April 2020 Table 19.
[4] City of Los Angeles Municipal Code, Section 112.05 (Appendix 3.1).
[5] L.A. CEQA Thresholds Guide 2006.
"Daytime" = 7:00 a.m. - 10:00 p.m.; "Nighttime" = 10:00 p.m. - 7:00 a.m.; "PPV" = Peak Particle Velocity

5 EXISTING NOISE LEVEL MEASUREMENTS

To assess the existing noise level environment, 24-hour noise level measurements were taken at three locations in the Project study area. The receiver locations were selected to describe and document the existing noise environment within the Project study area. Exhibit 5-A provides the boundaries of the Project study area and the noise level measurement locations. To fully describe the existing noise conditions, noise level measurements were collected by Urban Crossroads, Inc. on Thursday, December 22, 2022. Appendix 5.1 includes study area photos.

5.1 MEASUREMENT PROCEDURE AND CRITERIA

To describe the existing noise environment, the hourly noise levels were measured during typical weekday conditions over a 24-hour period. By collecting individual hourly noise level measurements, it is possible to describe the equivalent daytime and nighttime hourly noise levels. The long-term noise readings were recorded using Piccolo Type 2 integrating sound level meter and dataloggers. The Piccolo sound level meters were calibrated using a Larson-Davis calibrator, Model CAL 150. All noise meters were programmed in "slow" mode to record noise levels in "A" weighted form. The sound level meters and microphones were equipped with a windscreen during all measurements. All noise level measurement equipment satisfies the American National Standards Institute (ANSI) standard specifications for sound level meters ANSI S1.4-2014/IEC 61672-1:2013. (16)

5.2 NOISE MEASUREMENT LOCATIONS

The long-term noise level measurements were positioned as close to the nearest sensitive receiver locations as possible to assess the existing ambient hourly noise levels surrounding the Project site. Both Caltrans and the FTA recognize that it is not reasonable to collect noise level measurements that can fully represent every part of a private yard, patio, deck, or balcony normally used for human activity when estimating impacts for new projects. This is demonstrated in the Caltrans general site location guidelines, which indicate that *sites must be free of noise contamination by sources other than sources of interest. Avoid sites located near sources such as barking dogs, lawnmowers, pool pumps, and air conditioners unless it is the express intent of the analyst to measure these sources*. (2) Further, FTA guidance states, t*hat it is not necessary nor recommended that existing noise exposure be determined by measuring at every noise-sensitive location in the project area. Rather, the recommended approach is to characterize the noise environment for clusters of sites based on measurements or estimates at representative locations in the community*. (7)

Based on recommendations of Caltrans and the FTA, it is not necessary to collect measurements at each individual building or residence because each receiver measurement represents a group of buildings that share acoustical equivalence. (7) In other words, the area represented by the receiver shares similar shielding, terrain, and geometric relationship to the reference noise source. Receivers represent the location of noise-sensitive areas and are used to estimate future noise level impacts. Collecting reference ambient noise level measurements at the nearby sensitive receiver locations allows for a comparison of the before and after Project noise levels and is necessary to assess potential noise impacts due to the Project's contribution to the ambient noise levels.

5.3 NOISE MEASUREMENT RESULTS

The noise measurements presented below focus on the equivalent or the hourly energy average sound levels (L_{eq}). The equivalent sound level (L_{eq}) represents a steady-state sound level containing the same total energy as a time-varying signal over a given sample period. Table 5-1 identifies the hourly daytime (8:00 a.m. to 10:00 p.m.) and nighttime (10:01 p.m. to 7:59 a.m.) noise levels at each noise level measurement location.

TABLE 5-1: 24-HOUR AMBIENT NOISE LEVEL MEASUREMENTS

Location[1]	Description	Energy Average Noise Level (dBA L_{eq})[2]	
		Daytime	Nighttime
L1	Located south of the Project site within the existing park.	65.3	64.2
L2	Located Northeast of the site near the residence located at 810 Pelanconi Ave.	62.6	62.1
L3	Located northwest of the site near the Office Complex located at 1000 Flower St.	65.6	60.0

[1] See Exhibit 5-A for the noise level measurement locations.
[2] Energy (logarithmic) equivalent levels. The long-term 24-hour measurement worksheets are included in Appendix 5.2.
"Daytime" = 8:00 a.m. to 10:00 p.m.; "Nighttime" = 10:01 p.m. to 7:59 a.m.

Table 5-1 provides the equivalent noise levels used to describe the daytime and nighttime ambient conditions. These daytime and nighttime equivalent noise levels represent the energy average of all hourly noise levels observed during these time periods expressed as a single number. Appendix 5.2 provides summary worksheets of the noise levels for each of the daytime and nighttime hours.

EXHIBIT 5-A: NOISE MEASUREMENT LOCATIONS

This page was intentionally left blank.

6 SENSITIVE RECEIVER LOCATIONS

The following sensitive receiver locations, as shown in Exhibit 5-A, were identified as representative locations for analysis to assess the potential for construction and operational noise impacts. Sensitive receivers are generally defined as locations where people reside or where the presence of unwanted sound could otherwise adversely affect the land use. Noise-sensitive land uses are generally considered to include schools, hospitals, single-family dwellings, mobile home parks, churches, libraries, and recreation areas.

Moderately noise-sensitive land uses typically include multi-family dwellings, hotels, motels, dormitories, outpatient clinics, cemeteries, golf courses, country clubs, athletic/tennis clubs, and equestrian clubs. Land uses that are considered relatively insensitive to noise include business, commercial, and professional developments. Land uses that are typically not affected by noise include: industrial, manufacturing, utilities, agriculture, undeveloped land, parking lots, warehousing, liquid and solid waste facilities, salvage yards, and transit terminals.

The selection of receiver locations is based on FHWA guidelines and is consistent with additional guidance provided by Caltrans and the FTA, as previously described in Section 5.2. Other sensitive land uses in the Project study area that are located at greater distances than those identified in this noise analysis will experience lower noise levels than those presented in this report due to the additional attenuation from distance and the shielding of intervening structures. Distance is measured in a straight line from the project boundary to each receiver location. To describe the potential off-site Project noise levels, three receiver locations in the vicinity of the Project site were identified. All distances are measured from the Project site boundary to the outdoor living areas (e.g., private backyards) or at the building façade, whichever is closer to the Project site.

R1: Location R1 represents the John Ferraro Athletic Fields south of the Project site along Zoo Drive. R1 is placed approximately 318 feet west of the Project site at the play structure nearest the Project site.

R2: Location R2 represents the existing noise-sensitive residence located at 810 Pelanconi Avenue, approximately 1,238 feet northeast of the Project site. R2 is placed in the private outdoor living areas (backyard) facing the Project site.

R3: Location R3 represents an outdoor seating area of an office structure located at 1000 Flower Street, approximately 422 northwest of the Project site. R3 is placed at the outdoor use areas nearest the Project site.

R4: Location R4 represents the John Ferraro Athletic Field soccer field located approximately 13 feet south of the Project site. R4 is placed at the goal area nearest the Project site.

R5: Location R5 represents the John Ferraro Athletic Field soccer field located approximately 101 feet southwest of the Project site. R5 is placed at the spectator area nearest the Project site.

EXHIBIT 6-A: RECEIVER LOCATIONS

N

LEGEND:

Receiver Locations — Distance from receiver to Project site boundary (in feet) Site Boundary

7 OPERATIONAL NOISE IMPACTS

The Project does not include any operational noise sources. Therefore, the Project would not result in any long-term noise level increase due to Project operations.

This page was intentionally left blank.

8 CONSTRUCTION IMPACTS

This section analyzes potential impacts resulting from the short-term construction activities associated with the development of the Project. Exhibit 8-A shows the construction noise source locations in relation to the nearby sensitive receiver locations previously described in Section 5. To prevent high levels of construction noise from impacting noise-sensitive land uses, Section 25-68, of the City of Glendale Municipal Code limits construction activities to the hours from 7:00 a.m. to 7:00 p.m.

8.1 CONSTRUCTION NOISE LEVELS

Noise generated by the Project construction equipment will include a combination of trucks, power tools, concrete mixers, and portable generators that, when combined, can reach high levels. The number and mix of construction equipment are expected to occur in the following stages:

- North Abutment & Approaches
- Bridge Substructure (Bent Construction)
- South Abutment & Approaches
- Bridge Superstructure
- Architectural Elements/Landscaping

8.2 CONSTRUCTION REFERENCE NOISE LEVELS

To describe construction noise activities, this construction noise analysis was prepared using reference construction equipment noise levels from the Federal Highway Administration (FHWA) published the Roadway Construction Noise Model (RCNM), which includes a national database of construction equipment reference noise emission levels. (17) The RCNM equipment database provides a comprehensive list of the noise-generating characteristics of specific types of construction equipment. In addition, the database provides a, whichn acoustical usage factor to estimate the fraction of time each piece of construction equipment is operating at full power (i.e., its loudest condition) during a construction operation. According to the EPA, FTA, and FHWA, the overall construction noise level is governed primarily by the noisiest pieces of equipment. The quieter pieces do not affect the overall level, but they do reduce the magnitude of the fluctuations in the noise level. Therefore, a rough estimate of the noise level need only include the noisiest pieces of equipment expected at the site. (18) (19) (20) Consistent with FHWA and FTA guidance for detailed construction noise assessment, Table 8-1 presents the combined noise levels for the loudest construction activities expected for each stage, assuming all equipment operates simultaneously.

8.3 CONSTRUCTION NOISE ANALYSIS

Construction projects involve various stages, and activities frequently shift from one location to another. For example, during site preparation and grading, noise-generating activities may concentrate in an area for a short period to remove an obstruction, while the majority of the grading involves the equipment moving back and forth in a predictable pattern throughout the site; building construction and foundation work generally concentrate near the building footprint, while paving generally involves a predictable pattern of movement throughout the site. Therefore, construction activities are best evaluated as multiple moving point sources within the construction area since the speed and power of the equipment vary, and the equipment constantly changes position in terms of its distance and direction relative to the receivers. (19) (21) Using the reference construction equipment noise levels and the CadnaA noise prediction model, calculations of the Project construction noise level impacts by phase at the nearby sensitive receiver locations were completed. To account for the dynamic nature of construction activities, the CadnaA construction noise analysis evaluates the noise source activities as multiple moving point sources, or construction crews, within the limits of construction. Construction impacts are based on the loudest activity and the highest noise level calculated at each receiver location. As shown in Table 8-2, the highest construction noise levels are expected to range from 42.6 to 67.7 dBA L_{eq} at the identified receiver locations. Appendix 8.1 includes the detailed CadnaA construction noise model inputs.

TABLE 8-1: CONSTRUCTION REFERENCE NOISE LEVELS

Construction Stage	Reference Construction Activity[1]	Reference Noise Level @ 50 Feet (dBA L_{eq})	Combined Reference Noise Level (dBA L_{eq})
North Abutment & Approaches	Auger Drill Rig	77.0	81.2
	Excavator	77.0	
	Concrete Mixer Truck	75.0	
Bridge Substructure (Bent Construction)	Auger Drill Rig	77.0	81.8
	Excavator	77.0	
	Concrete Mixer Truck	75.0	
	Crane	73.0	
South Abutment & Approaches	Auger Drill Rig	77.0	82.0
	Excavator	77.0	
	Concrete Mixer Truck	75.0	
	Paver	74.0	
Bridge Superstructure	Crane	73.0	77.1
	Concrete Mixer Truck	75.0	
Architectural Elements/ Landscaping	Crane	73.0	77.1
	Concrete Mixer Truck	75.0	

[1] Update of noise database for prediction of noise on construction and open site expressed in hourly average L_{eq} based on estimated usage factor.

EXHIBIT 8-A: TYPICAL CONSTRUCTION NOISE SOURCE LOCATIONS

The construction noise analysis presents a conservative approach since it uses the highest noise-level-producing activities of any stage of the Project construction and assesses those levels at the nearest sensitive receiver locations. As other stages of construction generate lower noise levels, the reported noise levels likely overstate the construction noise levels that will be experienced at each receiver location. The analysis is further conservative since the model does not include any intervening obstructions, such as buildings or walls, that would serve to further reduce noise levels at receiver locations.

TABLE 8-2: CONSTRUCTION EQUIPMENT NOISE LEVEL SUMMARY

Receiver Location[1]	Construction Noise Levels (dBA L_{eq})					
	North Abutment & Approaches	Bridge Substructure (Bent Construction)	South Abutment & Approaches	Bridge Superstructure	Architectural Elements/ Landscaping	Highest Levels[2]
R1	54.1	54.7	54.9	50.0	50.0	54.9
R2	46.7	47.3	47.5	42.6	42.6	47.5
R3	53.6	54.2	54.4	49.5	49.5	54.4
R4	66.9	67.5	67.7	62.8	62.8	67.7
R5	60.4	61.0	61.2	56.3	56.3	61.2

[1] Construction noise source and receiver locations are shown on Exhibit 8-A.
[2] Construction noise level calculations based on distance from the project site boundaries (construction activity area) to nearby receiver locations. CadnaA construction noise model inputs are included in Appendix 8.1.

8.4 CITY OF GLENDALE CONSTRUCTION NOISE LEVEL COMPLIANCE

To evaluate whether the Project will generate potentially significant short-term noise levels at the nearest receiver locations, a construction-related daytime noise level threshold of 80 dBA L_{eq} is used as a reasonable threshold to assess the daytime construction noise level impacts. The construction noise analysis shows that the nearest receiver locations will satisfy the reasonable daytime 80 dBA L_{eq} significance threshold during Project construction activities, as shown in Table 8-3. Therefore, the noise impacts due to Project construction noise are considered *less than significant* at all receiver locations.

TABLE 8-3: CONSTRUCTION NOISE LEVEL COMPLIANCE - CITY OF GLENDALE

Receiver Location[1]	Construction Noise Levels (dBA L_{eq})		
	Highest Construction Noise Levels[2]	Threshold[3]	Threshold Exceeded?[4]
R2	47.5	80	No
R3	54.4	80	No

[1] Noise receiver locations are shown in Exhibit 9-A.
[2] Highest construction noise level from the primary Project construction activity area to nearby receiver locations.
[3] Federal Transit Administration, Transit Noise and Vibration Impact Assessment Manual.
[4] Do the estimated Project construction noise levels exceed the construction noise level threshold?

8.5 CITY OF LOS ANGELES TEMPORARY CONSTRUCTION NOISE LEVEL INCREASES

To describe the temporary Project construction noise level increases to the existing ambient noise environment within the City of Los Angeles, the Project construction noise levels were combined with the existing ambient noise levels measurement at the off-site receiver locations R1, R4, and R5 in the City of Los Angeles. The difference between the combined Project-construction and ambient noise levels are used to describe the construction noise level increases. The lowest recorded daytime ambient measurement in the Project site vicinity in the City of Los Angeles was measured as 65.3 dBA L_{eq} (see Table 5-1), which would result in a daytime construction noise significance criterion of 70.3 dBA L_{eq}, based on the *L.A. CEQA Thresholds Guide*. (22)

Temporary noise level increases that would be experienced at sensitive receiver locations when the Project construction-source noise is added to the ambient daytime noise are presented in Table 8-4. Based on the *L.A. CEQA Thresholds Guide*, a temporary noise level increase of 5 dBA is considered a potentially significant impact between the hours of 9:00 p.m. and 7:00 a.m. Monday through Friday, before 8:00 a.m. or after 6:00 p.m. on Saturday, or at any time on Sunday.

TABLE 8-4: TEMPORARY CONSTRUCTION NOISE LEVEL INCREASES (LEQ) - CITY OF LOS ANGELES

Receiver Location[1]	Total Construction Noise Level[2]	Measurement Location[3]	Reference Ambient Noise Levels[4]	Combined Project and Ambient[5]	Project Increase[6]	Increase Criteria[7]	Increase Criteria Exceeded?[7]
R1	54.9	L1	65.3	65.7	0.4	5	No
R4	67.7	L1	65.3	69.7	4.4	5	No
R5	61.2	L1	65.3	66.7	1.4	5	No

[1] See Exhibit 6-A for the receiver locations.
[2] Highest construction noise levels as shown in Table 8-2.
[3] Reference noise level measurement locations as shown in Exhibit 5-A.
[4] Highest hourly equivalent daytime ambient noise levels as shown in Table 5-1.
[5] Represents the combined ambient conditions plus the Project construction activities.
[6] The noise level increase expected with the addition of the proposed Project construction activities.
[7] Significance increase criteria as shown in Table 4-1.

As indicated in Table 8-4, the Project will contribute a construction noise level increase of 4.4 dBA L_{eq} at the nearest sensitive receiver location in the City of Los Angeles. The construction noise analysis shows that the Project-related construction noise level increases will satisfy the *L.A. CEQA Thresholds Guide* significance criteria. Therefore, the incremental Project construction noise level increase is considered *less than significant* at the City of Los Angeles receiver locations.

8.6 CONSTRUCTION VIBRATION IMPACTS

Construction activity can result in varying degrees of ground vibration, depending on the equipment and methods used, distance to the affected structures, and soil type. Since the Project does not include any explosive blasting or pile driving activities, it is expected that ground-borne vibration from Project construction activities would cause only intermittent, localized intrusion. Ground vibration levels associated with various types of construction equipment are summarized in Table 8-6. Based on the representative vibration levels presented for various construction equipment types, it is possible to estimate the potential Project construction vibration levels using the following vibration assessment methods defined by Caltrans (11). To describe the vibration levels at various distances, Caltrans provides the following equation: $PPV_{equip} = PPV_{ref} \times (25/D)^{1.5}$

TABLE 8-6: VIBRATION SOURCE LEVELS FOR CONSTRUCTION EQUIPMENT

Equipment	PPV (in/sec) at 25 feet
Small bulldozer	0.003
Loaded Trucks	0.076
Large bulldozer	0.089

Source: Federal Transit Administration, Transit Noise and Vibration Impact Assessment Manual

Table 8-7 presents the expected Project-related vibration levels at the nearby receiver locations. At distances ranging from 336 to 1,305 feet from the Project construction activities, construction vibration levels are estimated to range from less than 0.001 to 0.002 PPV (in/sec). Based on the maximum acceptable vibration threshold of 0.25 PPV (in/sec), the typical Project construction vibration levels will satisfy thresholds at all receiver locations. Therefore, the Project-related vibration impacts are considered less than significant during the construction activities at the Project site. In addition, the typical construction vibration levels at the nearest sensitive receiver locations are unlikely to be sustained during the entire construction period but will occur rather only during the times that heavy construction equipment is operating adjacent to the Project site boundaries.

TABLE 8-7: PROJECT CONSTRUCTION VIBRATION LEVELS

Receiver[1]	Location	Distance to Const. Activity (Feet)[3]	Typical Construction Vibration Levels PPV (in/sec)[4]				Thresholds PPV (in/sec)[5]	Thresholds Exceeded?
			Small bulldozer	Jack-hammer	Loaded Trucks	Highest Vibration Level		
R1	Sports Field	101'	0.000	0.004	0.009	0.009	0.25	No
R2	Residence	1,238'	0.000	0.000	0.000	0.000	0.25	No
R3	Residence	422'	0.000	0.001	0.001	0.001	0.25	No
R4	Sports Field	318'	0.000	0.001	0.002	0.002	0.25	No
R5	Sports Field	13'	0.008	0.093	0.203	0.203	0.25	No

[1] Receiver locations are shown on Exhibit 9-A.
[2] Distance from receiver location to Project construction boundary.
[3] Based on the Vibration Source Levels of Construction Equipment (Table 10-2).
[4] Maximum continuous vibration levels for historic buildings representing a variety of structure types with several different construction methods, such as wood frame and unreinforced masonry. Caltrans Transportation and Construction Vibration Manual, April 2020 Table 19.
"PPV" = Peak Particle Velocity

9 REFERENCES

1. **State of California.** *California Environmental Quality Act, Appendix G.* 2018.
2. **California Department of Transportation Environmental Program.** *Technical Noise Supplement - A Technical Supplement to the Traffic Noise Analysis Protocol.* Sacramento, CA : s.n., September 2013.
3. **Environmental Protection Agency Office of Noise Abatement and Control.** *Information on Levels of Environmental Noise Requisite to Protect Public Health and Welfare with an Adequate Margin of Safety.* March 1974. EPA/ONAC 550/9/74-004.
4. **U.S. Department of Transportation, Federal Highway Administration, Office of Environment and Planning, Noise and Air Quality Branch.** *Highway Traffic Noise Analysis and Abatement Policy and Guidance.* December 2011.
5. **U.S. Department of Transportation, Federal Highway Administration.** *Highway Traffic Noise in the United States, Problem and Response.* April 2000. p. 3.
6. **U.S. Environmental Protection Agency Office of Noise Abatement and Control.** *Noise Effects Handbook-A Desk Reference to Health and Welfare Effects of Noise.* October 1979 (revised July 1981). EPA 550/9/82/106.
7. **U.S. Department of Transportation, Federal Transit Administration.** *Transit Noise and Vibration Impact Assessment Manual, FTA Report No. 0123.* September 2018.
8. **Office of Planning and Research.** *State of California General Plan Guidelines.* October 2017.
9. **City of Glendale.** *Municipal Code, Sections 8.36.080.*
10. **City of Los Angeles.** *Municipal Code, Chapter XI - Noise Regulation.*
11. **California Department of Transportation.** *Transportation and Construction Vibration Guidance Manual.* April 2020.
12. **Council on Environmental Quality.** *National Environmental Policy Act Implementing Regulations.* 2020.
13. **California Court of Appeal.** *Gray v. County of Madera, F053661.* 167 Cal.App.4th 1099; - Cal.Rptr.3d, October 2008.
14. **Federal Interagency Committee on Noise.** *Federal Agency Review of Selected Airport Noise Analysis Issues.* August 1992.
15. **California Department of Transportation.** *Technical Noise Supplement.* November 2009.
16. **American National Standards Institute (ANSI).** *Specification for Sound Level Meters ANSI S1.4-2014/IEC 61672-1:2013.*
17. **U.S. Department of Transportation, Federal Highway Administration, Office of Environment and Planning.** *FHWA Roadway Construction Noise Model.* January, 2006.
18. **U.S. Environmental Protection Agency.** *Noise from Construction Equipment and Operations, Building Equipment, and Home Appliances.* 1971. NTID300.1.
19. **U.S. Department of Transportation, Federal Transit Administration.** *Transit Noise and Vibration Impact Assessment Manual, FTA Report No. 0123.* September 2018.
20. **U.S. Department of Transportation, Federal Highway Administration.** Special Report - Measurement, Prediction, and Mitigation. *Office of Planning, Environment, and Realty - Environment - Noise.* [Online] 2017. https://www.fhwa.dot.gov/environment/noise/construction_noise/special_report/hcn00.cfm.

21. —. *FHWA Highway Construction Noise Handbook.* Final Report August 2006.

22. **City of Los Angeles.** *L.A. CEQA Thresholds Guide.* 2006.

10 CERTIFICATION

The contents of this noise analysis report represent an accurate depiction of the noise environment and impacts associated with the proposed. Glendale-Los Angeles Garden River Bridge Project. The information contained in this noise analysis report is based on the best available data at the time of preparation. If you have any questions, please contact me directly at (619) 788-1971.

William Maddux, INCE
Senior Associate
URBAN CROSSROADS, INC.
(619) 788-1971
bmaddux@urbanxroads.com

EDUCATION

Bachelor of Science in Urban and Regional Planning
California Polytechnic State University, Pomona • June 2000

PROFESSIONAL AFFILIATIONS

ASA – Acoustical Society of America
APA – American Planning Association
AWMA – Air and Waste Management Association
INCE – Institute of Noise Control Engineers

PROFESSIONAL CERTIFICATIONS

Approved Acoustical Consultant • County of San Diego
FHWA Traffic Noise Model of Training • November 2004
CadnaA Basic and Advanced Training Certificate • October 2008.

This page was intentionally left blank.

APPENDIX 3.1:

CITY OF GLENDALE NOISE ORDINANCE

This page was intentionally left blank.

Title 8. Health and Safety

Chapter 8.36. NOISE CONTROL

Article I. General Provisions

§ 8.36.010. Purpose.

It is declared to be the policy of the city to prohibit unnecessary, excessive and annoying noise from all sources. At certain levels, noises are detrimental to the health and welfare of the citizenry and in the public interest must be systematically proscribed.
(Prior code § 11-50; Ord. 4973 § 1, 1991)

§ 8.36.020. Definitions.

For the purposes of this chapter, the following words and phrases shall have the meanings ascribed to them unless otherwise noted:

"A-band level" means the total sound level of all noise as measured with a sound-level meter using the A-weighting network. The unit is the dbA.

"Acoustic calibrator" means an instrument which measures the accuracy of a sound-level meter.

"Ambient noise" means the composite of noise from all sources near and far in a given environment, exclusive of occasional and transient intrusion noise sources and of the particular noise source or sources to be measured.

"Accelerometer" means an instrument for measuring vibration.

"Amplified sound" means any sound created by the use of sound-amplifying equipment.

"Commercial purpose" means the use, operation or maintenance of any sound-amplifying equipment for the purpose of advertising any business, goods or services, or for the purpose of attracting the attention to, advertising for or soliciting patronage or customers to or for any performance, show, entertainment, exhibition or event, or for the purpose of demonstrating such sound equipment.

"Construction" means any site preparation, assembly, erection, substantial repair, alteration, demolition or similar action, for or of public or private rights-of-way structures, utilities or similar property and includes the transportation or delivery of any materials, tools or equipment to or from the site of any construction project or the loading or unloading or use of such materials, tools or equipment.

"Decibel (db)" means a unit of level which denotes the ratio between two quantities that are proportional to the power; the number of decibels corresponding to the ratio of two amounts of power ten times the logarithm to the base 10 of this ratio.

"Emergency machinery or vehicle" means any inanimate device used to protect, provide or restore safe conditions in the community or for the citizenry.

“Emergency work” means work made necessary to restore property to a safe condition following a public calamity, work required to protect persons or property from exposure to danger, or work by private or public utilities when restoring utility services.

“Equivalent sound level (Leq)” means the A-weighted sound level corresponding to a steady state sound level containing the same total sound energy as the time varying signal over a given period of time. The equivalent sound level shall be determined using an integrating sound level meter as set forth in American National Standards for Sound Level Meters SI.4-1971.

“Fixed noise source” means a stationary device which creates sounds while fixed or motionless, including but not limited to, residential, agricultural, industrial and commercial machinery and equipment, pumps, fans, compressors, air conditioners and refrigeration equipment.

“Grading” means any excavating, filling of earth material or any combination thereof conducted at a site to prepare such site for construction or other improvements thereon.

“Health care institution” means any hospital, convalescent home or other similar facility which provides health care medical treatment, room, board or other services for health, recovery or convalescence.

“Impulsive sound” means any sound of short duration, usually less that one second, with an abrupt onset and rapid decay. Examples of sources of impulsive sound include explosions, drum beats, drop forge impacts, firecrackers, discharge of firearms and one object striking another.

“Mobile noise source” means any noise source other than a fixed noise source.

“Motor vehicle” means and includes any and all self-propelled vehicles as defined in the California **Vehicle Code**, including all on-highway type motor vehicles, subject to registration under such code, and all off-highway type motor vehicles subject to identification under such code.

“Nighttime” means the hours from and after ten p.m. until seven a.m. of the following day.

“Noise” means any sound which exceeds the appropriate actual or presumed ambient noise level or which annoys or tends to disturb humans or which causes or tends to cause an adverse psychological or physiological effect on humans.

“Noise disturbance” means any sound which:

1. Endangers or injures the safety or health of human beings or animals; or
2. Annoys or disturbs reasonable persons of normal sensitivities; or
3. Endangers or injures personal or real property; or
4. Violates the provision of this chapter.

“Noncommercial purpose” means the use, operation or maintenance of any sound equipment for other than “commercial purpose.” “Noncommercial purpose” means and includes, but shall not be limited to, philanthropic, political, patriotic and charitable purposes.

“Powered model vehicle” means any self-propelled, airborne, waterborne or landborne plane, vessel or vehicle, which is not designed to carry persons, including but not limited to, any model airplane, boat, car or rocket.

“Public right-of-way” means any street, avenue, boulevard, highway, sidewalk or alley or similar place which is owned or controlled by a governmental entity.

“Public space” means the real property or structures thereon which are owned or controlled by a governmental entity.

“Pure tone” means any sound which can be judged as audible as a single pitch or a set of single pitches by any person. Examples of a pure tone are whines, screeches or hums.

"Single event" means any sound which is continuous for a period lasting between an impulse sound and five minutes.

"Sound-amplifying equipment" means any machine or device for the amplification of the human voice, music or any other sound.

"Sound level" means the sound measured with the A-weighing and slow responses by a sound level meter, except for impulsive or rapidly varying sound for when the fast response shall be used.

"Sound level meter" means an instrument including a microphone, an amplifier, an output meter, and frequency weighing networks for the measurements of noise and sound levels in a specified manner.

"Sound truck" means any motor vehicle, or other vehicle regardless of mode of power, whether in motion or stationary, having mounted thereon or attached thereto, any sound-amplifying equipment.

"Supplementary definitions of technical terms" means those definitions of technical terms not defined in this section which shall be obtained from the American Standard Acoustical Terminology which is currently in effect at the time of the taking of the noise measurement. Such document is incorporated in this section by reference.

"Vibration perception threshold" means the minimal ground or structure borne vibrational motion necessary to cause a normal person to be aware of the vibration by such direct means as, but not limited to, sensation by touch or visual observation of moving objects. The perception shall be presumed to be a motion velocity of 0.01 in./sec. over the range of one to one hundred Hz.

"Voice sound" means any sound emitted from the vocal cords or speaking mechanisms of any animate object.
(Prior code § 11-51; Ord. 4973 § 2, 1991)

§ 8.36.030. Decibel measurement criteria.

A. Any sound level measurement made pursuant to the provisions of this chapter shall be measured with a sound level meter using the A-weighing.

B. Exterior noise measurements shall be taken where possible, at any location on the property line and, except when impractical, the microphone shall be located four to five feet above the ground and ten or more feet from the nearest reflective surface. However, in those cases where another elevation is determined appropriate, the latter shall be utilized.

C. Interior sound level measurements shall be made at a point at least four feet from the wall, ceiling or floor nearest the noise source within the affected dwelling unit.

D. Ambient noise shall be averaged over a period of at least five minutes at a location and time of day comparable to that during which the measurement is taken of the particular noise source being measured.

E. In order to obtain the ambient level, the intrusive noise source which is being tested to determine whether a violation exists shall be eliminated either by bringing to a cessation such noise source or moving to a similar location which does not have the offending noise source and obtaining the ambient noise of that location.

F. The ambient noise level shall be the numerical average of noise measurements taken at a given location during at least a five-minute period of time.

G. Calibration of the sound level meter, utilizing an acoustic calibrator, shall be performed immediately prior to recording any sound level data.

H. Measurements shall be made in decibels using the A-weighted scale with slow response, following the manufacturer's instructions, except the fast response shall be used for impulsive sounds or rapidly varying sounds.

I. Except as provided in subsection **J** of this section, measurement of the particular noise being measured shall be done for a five-minute period of time. The sound level shall be the equivalent sound level (Leq) measured.

J. The measurement of any "single event" as defined in Section **8.36.020**, shall be taken during the entire single event.

K. In the event the alleged offensive noise contains a pure tone, an impulsive sound or a rapidly varying sound, the standard set forth in Section **8.36.040** shall be reduced by five dbA.

L. Vibrations shall be measured by an accelerometer at the point of maximum perceived vibration.
(Prior code § 11-52; Ord. 4973 § 3, 1991)

§ 8.36.040. Presumed noise standards.

A. The following exterior noise standards, unless otherwise specifically indicated, shall apply to all property within a designated zone:

Zone	Decibels	Time
Cemetery and residential (single family and duplex)	45 dbA	Nighttime
Cemetery and residential (single family and duplex)	55 dbA	Daytime
Residential (multifamily, hotels, motels and transient lodgings)	60 dbA	Anytime
Central business district and commercial	65 dbA	Anytime
Industrial	70 dbA	Anytime

B. The following interior noise standards, unless otherwise specially indicated, shall apply to all residential property within a designated zone:

Zone	Decibels	TimeRes
Residential	45 dbA	Nighttime
Residential	55 dbA	All other times

C. In any overlay zones, the underlying zone shall determine the presumed ambient noise level.
(Prior code § 11-53; Ord. 4973 § 4, 1991)

§ 8.36.050. Minimum and maximum ambient noise levels.

A. Where the actual ambient is less than the presumed ambient, the actual ambient shall control and any noise in excess of the actual ambient, plus five dbA, shall be a violation.

B. Where the actual ambient is equal to or more than the presumed ambient, the actual ambient shall control and any noise may not exceed the actual ambient by more than five dbA; however, in no event may the actual ambient exceed the presumed noise standards by five dbA.

C. At the boundary line between two zones, the arithmetic average of the presumed ambient noise levels shall be used.
(Prior code § 11-54; Ord. 4973 § 5, 1991)

§ 8.36.060. Violations.

It is unlawful for any person to operate any machinery, equipment, pump, fan, voice, air-conditioning apparatus or similar mechanical device in any manner or to allow or cause sounds, so as to create any noise or vibration which would cause the noise level as specified above to be exceeded unless a variance, exemption or some other exception allows for a greater noise.
(Prior code § 11-55; Ord. 4973 § 6, 1991)

§ 8.36.070. Animals.

It is unlawful for any person to keep, maintain or permit the keeping, upon any premises owned, occupied or controlled by such person, any animal or fowl, otherwise permitted to be kept, which by any sound, cry or behavior shall cause annoyance or discomfort to a reasonable person of normal sensitiveness in any residential neighborhood.
(Prior code § 11-56; Ord. 4973 § 7, 1991)

§ 8.36.080. Construction on buildings, structures and projects.

It is unlawful for any person within a residential zone, or within a radius of five hundred feet therefrom, to operate equipment or perform any outside construction or repair work on buildings, structures or projects within the city between the hours of seven p.m. on one day and seven a.m. of the next day or from seven p.m. on Saturday to seven a.m. on Monday or from seven p.m. preceding a holiday, as designated in Chapter **3.08** of this code, to seven a.m. following such holiday unless beforehand a permit therefor has been duly obtained from the building official. No permit shall be required to perform emergency work as defined in this chapter.
(Prior code § 11-57; Ord. 4973 § 8, 1991)

§ 8.36.090. Exhaust pipe required.

No person having charge or control of any engine in which gas, gasoline, distillate or other similar substance is used as a motive power, shall run or operate such engine, or cause the same to be run or operated, without having the exhaust pipe thereof connected with an underground air chamber or having attached to such exhaust pipe a muffler or other device so constructed as to deaden the sound of the exhaust of such engine and effectually prevent such exhaust from making any loud noise or disturbing the peace and quiet of persons in its vicinity. This section shall apply to the engine of a motor vehicle if its exhaust equipment is not regulated by state law.
(Prior code § 11-58; Ord. 4973 § 9, 1991)

§ 8.36.100. Loading and unloading.

It is unlawful for any person to load, unload, open, close or otherwise handle boxes, crates, containers, building materials, garbage cans or similar objects during nighttime in such a manner as to cause a noise disturbance, discomfort or annoyance to a reasonably sensitive person or which interferes with the comfort, peace, quiet, repose or endangers the health of inhabitants of the area.
(Prior code § 11-59; Ord. 4973 § 10, 1991)

§ 8.36.110. Loud or unusual noises.

It is unlawful for any person to wilfully make, continue or cause to be made or continued any loud, unnecessary or unusual noise which disturbs the comfort, peace, quiet or repose or endangers the health of inhabitants of any neighborhood or which causes discomfort or annoyance to any reasonable person of normal sensitiveness residing in the area. The standard which shall be considered in determining whether a violation of this section exists shall include, but shall not be limited to, the following:

A. The volume of the noise;

B. The intensity of the noise;

C. Whether the nature of the noise is usual or unusual;

D. Whether the origin of the noise is natural or unnatural;

E. The volume of the noise to residential sleeping facilities;

F. The nature and zoning of the area within which the noise emanates;

G. The density of the inhabitation of the area within which the noise emanates;

H. The time of day or night the noise occurs;

I. The duration of the noise;

J. Whether the noise is recurrent, intermittent, or constant; and

K. Whether the noise is produced by a commercial or noncommercial activity.
(Prior code § 11-60; Ord. 4973 § 11, 1991)

§ 8.36.120. Motor-driven vehicles.

It is unlawful for any person to operate any motor-driven vehicle within the city in such a manner that a reasonable person of normal sensitiveness residing in the area is caused discomfort or annoyance; or which interferes with the comfort, repose, peace or which endangers the health of inhabitants of the area; provided, however, that any such vehicle which is operated upon any public highway, street or right-of-way shall be excluded from regulation under this section.
(Prior code § 11-61; Ord. 4973 § 12, 1991)

§ 8.36.130. Powered model vehicles.

It is unlawful to operate or permit the operation of powered model vehicles so as to create a noise disturbance across a residential real property boundary during nighttime in such a manner as to cause a noise disturbance, discomfort or annoyance to a reasonably sensitive person or which interferes with the comfort, peace, quiet, repose or which endangers the health of inhabitants of the area.
(Prior code § 11-62; Ord. 4973 § 13, 1991)

§ 8.36.140. Proposed development project.

If at any time the director of community development or the building official has reason to believe that a new development project, addition, modification or any other changes thereto may not conform with the permitted noise level standards, the director of community development or the building official may require as a condition of approval an acoustic analysis as part of the building permit process or other approval procedures.
(Prior code § 11-63; Ord. 4973 § 14, 1991; Ord. 5803 § 16, 2013)

§ 8.36.150. Public entertainment.

Operating, playing or permitting the operation or playing of any radio, television, phonograph, drum, musical instrument, sound amplifier or similar device which reproduces or produces or amplifies sound in any place of public entertainment at a sound level greater than ninety-five dbA at a place of business normally occupied by customers shall be a violation unless a conspicuous and legible sign is located outside such place or near each public entrance, stating, “WARNING: SOUND LEVEL MAY CAUSE HEARING IMPAIRMENT.”
(Prior code § 11-64; Ord. 4973 § 15, 1991)

§ 8.36.160. Radios, television sets and similar devices.

It is unlawful for any person within any residential zone of the city to use or operate any radio receiving set, musical instrument, phonograph, television set or other machine or device for the producing or reproducing of sound during nighttime in such a manner as to disturb the comfort, peace, quiet or repose or endanger the health of neighboring residents or of any reasonable person of normal sensitiveness residing in the area.
(Prior code § 11-65; Ord. 4973 § 16, 1991)

§ 8.36.170. Schools, health care institutions and churches.

It is unlawful for any person to create any noise on any street, sidewalk or public space or public right-of-way adjacent to any school, library, health care institution or church while the same are in use, which unreasonably

interferes with the workings of such institution, or which disturbs the peace, quiet, repose or health of the inhabitants, provided conspicuous signs are displayed in such street, sidewalk, public space or public right-of-way, indicating that the same is an area upon which a school, library, health care institution or church is located.
(Prior code § 11-66; Ord. 4973 § 17, 1991)

§ 8.36.180. Service or maintenance vehicles.

It is unlawful for service or maintenance vehicles of a nonemergency nature to be operated in residential areas during nighttime.
(Prior code § 11-67; Ord. 4973 § 18, 1991)

§ 8.36.190. Street sales.

Offering for sale, selling anything, or advertising by shouting or outcry within a residential or commercial zone or central business district of the city in a manner to disturb a reasonably sensitive person or which interferes with the comfort, peace, quiet, repose or endangers the health of inhabitants of the area shall constitute a violation. The provisions of this section shall not be construed to prohibit the selling by outcry of merchandise, food and beverages at licensed sporting events, parades, fairs, circuses or other similar licensed public entertainment events.
(Prior code § 11-68; Ord. 4973 § 19, 1991)

§ 8.36.200. Vehicle repair in residential areas.

It in unlawful for any person within the city to repair, rebuild or modify or test any motor vehicle during nighttime within any residential area in such a manner that a reasonable person of normal sensitiveness residing in that area is caused discomfort or annoyance or which endangers the comfort, repose, peace or health of residents of the area.
(Prior code § 11-69; Ord. 4973 § 20, 1991)

§ 8.36.210. Vibration.

Operating or permitting the operation of any device that creates a vibration which is above the vibration perception threshold of an individual at or beyond the property boundary of the source if on private property or at one hundred fifty feet from the source if on a public space or public right-of-way shall be a violation.
(Prior code § 11-70; Ord. 4973 § 21, 1991)

§ 8.36.220. Yelling and shouting.

It is unlawful for any person to yell, shout, cause loud or raucous yelling, shouting, whistling or singing which causes discomfort or annoyance to persons of reasonable sensitivity; or which interferes with the comfort, peace, quiet or repose or which endangers the health of inhabitants of the area.
(Prior code § 11-71; Ord. 4973 § 22, 1991)

This page was intentionally left blank.

APPENDIX 3.2:

CITY OF LOS ANGELES NOISE ORDINANCE

This page was intentionally left blank.

ARTICLE 1

GENERAL PROVISIONS

SEC. 111.00. DECLARATION OF POLICY.

It is hereby declared to be the policy of the City to prohibit unnecessary, excessive and annoying noises from all sources subject to its police power. At certain levels noises are detrimental to the health and welfare of the citizenry and in the public interests shall be systematically proscribed.

SEC. 111.01. DEFINITIONS.

Unless the context otherwise clearly indicates, the words and phrases used in this chapter are defined as follows:

(a) "**Ambient Noise**" is the composite of noise from all sources near and far in a given environment, exclusive of occasional and transient intrusive noise sources and of the particular noise source or sources to be measured. Ambient noise shall be averaged over a period of at least 15 minutes at a location and time of day comparable to that during which the measurement is taken of the particular noise source being measured. **(Amended by Ord. No. 156,363, Eff. 3/29/82.)**

(b) "**Commercial Purpose**" is the use, operation, or maintenance of any sound amplifying equipment for the purpose of advertising any business, goods, or services, or for the purpose of attracting the attention of the public to, advertising for, or soliciting patronage or customers to or for any performance, show, entertainment, exhibition, or event, or for the purpose of demonstrating such sound equipment. **(Amended by Ord. No. 156,363, Eff. 3/29/82.)**

(c) "**Decibel**" (dB) is a unit of level which denotes the ratio between two (2) quantities which are proportional to power; the number of decibels corresponding to the ratio of two (2) amounts of power is ten (10) times the logarithm to the base (10) of this ratio. **(Amended by Ord. No. 156,363, Eff. 3/29/82.)**

(d) "**Emergency Work**" is work made necessary to restore property to a safe condition following a public calamity or work required to protect persons or property from an imminent exposure to danger, or work by private or public utilities when restoring utility service. **(Amended by Ord. No. 156,363, Eff. 3/29/82.)**

(e) "**Impulsive Sound**" is sound of short duration, usually less than one second, with an abrupt onset and rapid decay. By way of example "**impulsive sound**" shall include, but shall not be limited to, explosions, musical base drum beats, or the discharge of firearms. **(Amended by Ord. No. 156,363, Eff. 3/29/82.)**

(f) "**Motor Vehicle**" includes, but shall not be limited to, automobiles, trucks, motorcycles, minibikes and go-carts. **(Amended by Ord. No. 156,363, Eff. 3/29/82.)**

(g) "**Noncommercial Purpose**" is the use, operation, or maintenance of any sound equipment for other than a "commercial purpose". "Noncommercial purpose" shall mean and include, but shall not be limited to, philanthropic, political, patriotic, and charitable purposes. **(Amended by Ord. No. 156,363, Eff. 3/29/82.)**

(h) "**Octave Band Noise Analyzer**" is an instrument for measurement of sound levels in octave frequency bands which satisfies the pertinent requirements for Class II octave band analyzers of the American National Standard Specifications for Octave, Half-Octave, and Third-Octave Band Filters, S1.11-1966 or the most recent revision thereof. **(Amended by Ord. No. 156,363, Eff. 3/29/82.)**

(i) "**Person**" is a person, firm, association, co-partnership, joint venture, corporation, or any entity, private or public in nature. **(Amended by Ord. No. 156,363, Eff. 3/29/82.)**

(j) "**Sound Amplifying Equipment**" **(Amended by Ord. No. 156,363, Eff. 3/29/82.)** is any machine or device for the amplification of the human voice, music or any other sound, but shall not include:

1. Automobile radios, stereo players or television receivers when used and heard only by the occupants of the vehicle in which the same is installed.

2. Radio, stereo players, phonographs or television receivers used in any house or apartment within any residential zone or within 500 feet thereof.

3. Warning devices on emergency vehicles.

4. Horns or other warning devices authorized by law on any vehicle when used for traffic purposes.

(k) "**Sound Level**" (Noise level) in decibels (dB) is the sound measured with the "A" weighting and slow responses by a sound level meter; except for impulsive or rapidly varying sounds, the fast response shall be used. **(Amended by Ord. No. 156,363, Eff. 3/29/82.)**

(l) "**Sound Level Meter**" is an instrument including a microphone, an amplifier, an output meter, and "A" frequency weighting network for the measurement of sound levels which satisfies the pertinent requirements for Type S2A meters in American Standard Specifications for sound level meters in S1.4-1971 or the most recent revision thereof. **(Amended by Ord. No. 156,363, Eff. 3/29/82.)**

(m) "**Sound Truck**" is any motor vehicle, or any other vehicle regardless of motive power, whether in motion or stationary, which carries, is equipped with, or which has mounted thereon, or attached thereto, any sound amplifying equipment. **(Amended by Ord. No. 156,363, Eff. 3/29/82.)**

(n) **Supplementary Definitions of Technical Terms**. Definitions of technical terms not defined herein shall be obtained from American Standard Acoustical Terminology S1-1-1971 or the most recent revision thereof. **(Amended by Ord. No. 156,363, Eff. 3/29/82.)**

SEC. 111.02. SOUND LEVEL MEASUREMENT PROCEDURE AND CRITERIA.

(Title amended by Ord. No. 156,363, Eff. 3/29/82.)

(a) **(Amended by Ord. No. 156,363, Eff. 3/29/82.)** Any sound level measurement made pursuant to the provisions of this chapter shall be measured with a sound level meter using the "A" weighting and response as indicated in Section 111.01(k) of this article.

Except when impractical, the microphone shall be located four to five feet above the ground and ten feet or more from the nearest reflective surface. However, in those cases where another elevation is deemed appropriated, the latter shall be utilized.

Interior sound level measurements shall be made at a point at least four feet from the wall, ceiling, or floor nearest the noise source.

Calibration of the sound level meter, utilizing an acoustic calibrator shall be performed immediately prior to recording any sound level data. The ambient noise level and the level of a particular noise being measured shall be the numerical average of noise measurements taken at a given location during a given time period.

(b) **(Amended by Ord. No. 156,363, Eff. 3/29/82.)** Where the sound alleged to be offending is of a type or character set forth below, the following values shall be added to the sound level measurement of the offending noise:

1. Except for noise emanating from any electrical transformer or gas metering and pressure control equipment existing and installed prior to the effective date of the ordinance enacting this chapter, any steady tone with audible fundamental frequency or overtones have 200 Hz.....+5

2. Repeated impulsive noise.....+5

3. Noise occurring more than 5 but less than 15 minutes in any period of 60 consecutive minutes between the hours of 7:00 a.m. and 10:00 p.m. of any day.....-5

4. Noise occurring five minutes or less in any period of 60 consecutive minutes, between the hours of 7:00 a.m. and 10:00 p.m. of any day.....-5 **(Amended by Ord. No. 161,574, Eff. 9/8/86.)**

(c) For those cases where an objectionable noise is clearly audible, but where the level of ambient noise does not permit direct quantative sound level "A" measurements of the objectionable noise, sound measurements may be performed utilizing an octave band sound analyzer to determine sound level "A" limits as indicated in the Table I below. This table is used to convert the sound pressure level meter readings in dB for each band to SPL in dB(A) for each band.

TABLE I
OCTAVE BAND NOISE VALUES CORRESPONDING TO SOUND LEVEL "A" VALUES

Sound Level	Octave Band Sound Pressure Level, dB re .0002 dyne/cm^2 Octave Band Center Frequency in Hz								
"A"	31.5	63	125	250	500	1000	2000	4000	8000
35	58	50	42	35	32	29	26	23	20
40	61	54	46	40	37	34	31	28	25
45	64	58	51	45	42	39	36	33	30
50	67	61	55	50	47	44	41	38	35
55	70	64	60	55	52	49	46	43	40
60	73	68	64	60	57	54	51	48	45
65	76	72	68	65	62	59	56	53	50
70	79	76	73	70	67	64	61	58	55
75	84	81	78	75	72	69	66	63	60

(d) For those cases where a sound level measurement has been made pursuant to the provisions of this chapter and two or more provisions of this chapter apply, the provision establishing the lower or lowest noise level, respectively, shall be used. **(Added by Ord. No. 156,363, Eff. 3/29/82.)**

SEC. 111.03. MINIMUM AMBIENT NOISE LEVEL.

(Amended by Ord. No. 156,363, Eff. 3/29/82.)

Where the ambient noise level is less than the presumed ambient noise level designated in this section, the presumed ambient noise level in this section shall be deemed to be the minimum ambient noise level for purposes of this chapter.

TABLE II
SOUND LEVEL "A" DECIBELS

(In this chart, daytime levels are to be used from 7:00 a.m. to 10:00 p.m. and nighttime levels from 10:00 p.m. to 7:00 a.m.)

ZONE	PRESUMED AMBIENT NOISE LEVEL (dB(A))	
	DAY	NIGHT
A1, A2, RA, RE, RS, RD, RW1, RW2, R1, R2, R3, R4, and R5	50	40
P, PB, CR, C1, C1.5, C2, C4, C5, and CM	60	55
M1, MR1, and MR2	60	55
M2 and M3	65	65

At the boundary line between two zones, the presumed ambient noise level of the quieter zone shall be used.

SEC. 111.04. VIOLATIONS: ADDITIONAL REMEDIES, INJUNCTIONS.

As an additional remedy, the operation or maintenance of any device, instrument, vehicle, or machinery in violation of any provision of this chapter, which operation or maintenance causes discomfort or annoyance to reasonable persons or which endangers the comfort, repose, health, or peace of residents in the area, shall be deemed and is declared to be.a public nuisance and may be subject to abatement summarily by a restraining order or injunction issued by a court order of competent jurisdiction. **(Amended by Ord. No. 156,363, Eff. 3/29/82.)**

SEC. 111.05. ENFORCEMENT, CITATIONS.

(Added by Ord. No. 156,363, Eff. 3/29/82.)

(a) The Department of Building and Safety shall have the power and duty to enforce the following noise control provisions of this Code: Section 12.14 A.6.(h), Section 12.19 A.4.(b)(1), Section 112.02 and Section 112.04(c). **(Amended by Ord. No. 172,086, Eff. 7/30/98.)**

(b) The Police Department shall have the power and duty to enforce the following noise control provisions of this Code: Section 41.32, Section 41.40, Section 41.42, Section 41.44, Section 41.57, Section 63.51(m), Section 112.01, Section 112.04, Section 112.05, Section 112.06, Section 113.01, Section 114.01 through Section 114.05, inclusive, Section 115.02 through Section 115.03, inclusive, and Section 116.01. **(Amended by Ord. No. 185,601, Eff. 7/18/18.)**

(c) Any Building Mechanical Inspector assigned to noise enforcement inspection shall have the power, authority and immunity of a public officer and employee, as set forth in the Penal Code of the State of California, Section 836.5, to make arrests without a warrant whenever such employee has reasonable cause to believe that the person to be arrested has committed a misdemeanor in his presence which is a violation of any provision set forth in Section 111.05(a) of this chapter. The provisions of said Penal Code section regarding issuance of a written promise to appear shall be applicable to arrests authorized herein.

APPENDIX 5.1:

STUDY AREA PHOTOS

This page was intentionally left blank.

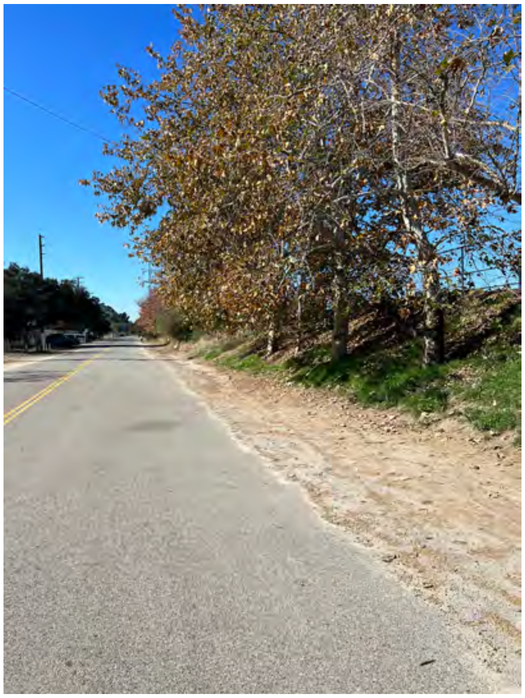
14238 - Glendale Garden Bridge

14238_L1_A 1.North
34, 9' 20.340000"118, 16' 58.620000"

14238_L1_A 2.South
34, 9' 20.340000"118, 16' 58.570000"

14238_L1_A 3.East
34, 9' 20.320000"118, 16' 58.540000"

14238_L1_A 4.West
34, 9' 20.250000"118, 16' 58.820000"



14238 - Glendale Garden Bridge

14238_L2_B 1.North
34, 9' 33.660000"118, 16' 45.190000"

14238_L2_B 2.South
34, 9' 33.650000"118, 16' 45.140000"

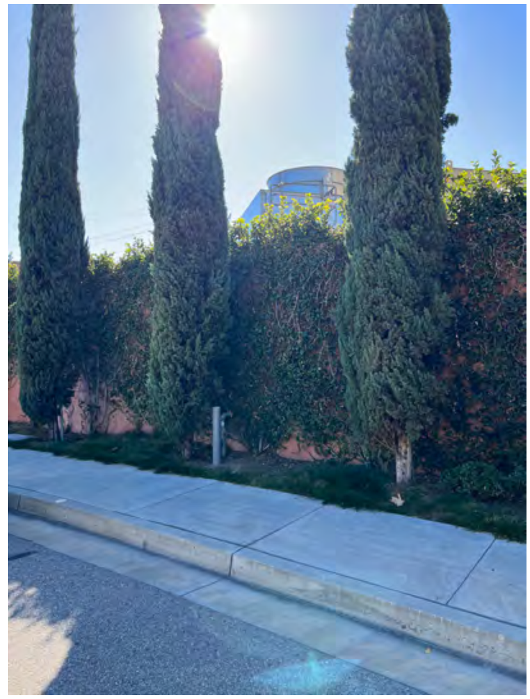
14238_L2_B 3.East
34, 9' 33.420000"118, 16' 44.970000"

14238_L2_B 4.West
34, 9' 33.420000"118, 16' 45.030000"

14238 - Glendale Garden Bridge

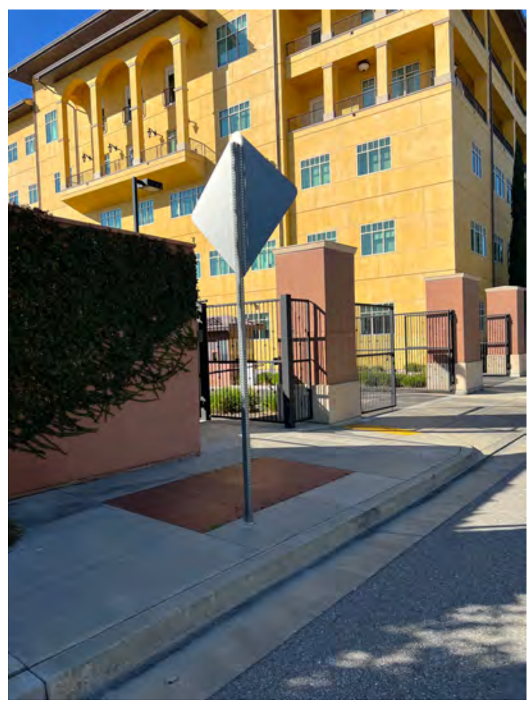
14238_L3_C 1.North
34, 9' 25.100000"118, 17' 0.550000"

14238_L3_C 2.South
34, 9' 25.120000"118, 17' 0.570000"



14238_L3_C 3.East
34, 9' 25.100000"118, 17' 0.550000"

14238_L3_C 4.West
34, 9' 25.120000"118, 17' 0.570000"



This page was intentionally left blank.

APPENDIX 5.2:

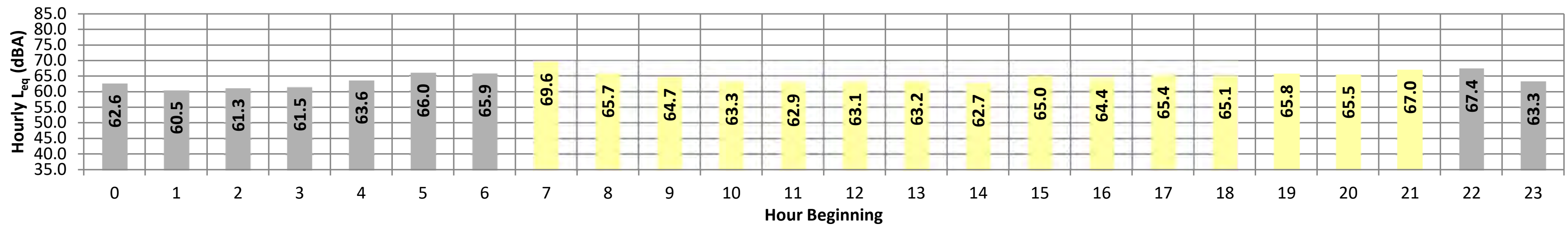
NOISE LEVEL MEASUREMENT WORKSHEETS

This page was intentionally left blank.

24-Hour Noise Level Measurement Summary

Date: Thursday, December 22, 2022
Project: Glendale Garden River Bridge
Location: L1 - Located approximately 336 feet south of the site near the
Source: Tot Lot located in the John Ferraro Athletic Fields
Meter: Piccolo II
JN: 14238
Analyst: B. Lawson

Hourly L_{eq} dBA Readings (unadjusted)



Timeframe	*Hour*	*L_{eq}*	*L_{max}*	*L_{min}*	*L1%*	*L2%*	*L5%*	*L8%*	*L25%*	*L50%*	*L90%*	*L95%*	*L99%*	*L_{eq}*	*Adj.*	*Adj. L_{eq}*
Night	0	62.6	67.3	60.2	67.1	66.9	65.9	65.0	62.9	62.0	60.8	60.6	60.3	62.6	10.0	72.6
	1	60.5	64.7	57.8	64.4	64.1	63.2	62.5	60.9	60.0	58.5	58.2	57.9	60.5	10.0	70.5
	2	61.3	64.1	59.3	63.9	63.6	63.0	62.6	61.8	61.1	59.9	59.6	59.4	61.3	10.0	71.3
	3	61.5	65.9	59.4	65.6	65.3	63.9	63.2	61.9	61.1	60.0	59.7	59.5	61.5	10.0	71.5
	4	63.6	68.8	61.5	68.6	68.2	66.8	65.5	63.6	63.0	62.1	61.8	61.6	63.6	10.0	73.6
	5	66.0	71.1	64.0	70.9	70.5	69.2	68.1	66.1	65.2	64.4	64.3	64.0	66.0	10.0	76.0
	6	65.9	70.3	64.3	70.1	69.8	68.7	67.7	66.0	65.3	64.6	64.5	64.3	65.9	10.0	75.9
Day	7	69.6	75.8	64.4	75.5	75.2	74.2	73.4	70.2	68.5	65.1	64.8	64.5	69.6	0.0	69.6
	8	65.7	72.3	62.3	72.1	71.6	70.3	69.2	66.0	64.0	62.8	62.6	62.4	65.7	0.0	65.7
	9	64.7	71.5	60.3	71.3	70.9	69.6	68.6	65.2	62.6	60.8	60.6	60.4	64.7	0.0	64.7
	10	63.3	70.8	57.5	70.5	70.1	68.8	67.7	64.2	60.4	58.0	57.8	57.6	63.3	0.0	63.3
	11	62.9	70.4	58.2	70.1	69.7	68.3	67.1	63.2	60.1	58.6	58.4	58.2	62.9	0.0	62.9
	12	63.1	70.7	58.1	70.5	70.0	68.4	67.3	63.5	60.4	58.6	58.4	58.2	63.1	0.0	63.1
	13	63.2	71.9	57.1	71.6	71.2	69.4	67.8	63.2	59.8	57.5	57.3	57.1	63.2	0.0	63.2
	14	62.7	70.6	58.0	70.4	70.0	68.4	67.0	62.7	59.9	58.5	58.3	58.1	62.7	0.0	62.7
	15	65.0	76.1	58.7	75.0	74.2	71.8	70.4	63.3	60.8	59.1	58.9	58.7	65.0	0.0	65.0
	16	64.4	71.2	61.4	71.0	70.6	69.0	67.8	64.2	62.7	61.8	61.7	61.5	64.4	0.0	64.4
	17	65.4	72.1	61.8	71.8	71.4	69.9	68.8	65.7	63.7	62.2	62.1	61.9	65.4	0.0	65.4
	18	65.1	71.0	62.2	70.8	70.4	69.1	68.2	65.6	63.8	62.6	62.5	62.3	65.1	0.0	65.1
	19	65.8	72.3	62.5	72.1	71.7	70.5	69.5	65.8	64.2	62.9	62.7	62.5	65.8	5.0	70.8
	20	65.5	71.7	63.4	71.5	71.0	69.1	67.6	65.4	64.6	63.8	63.6	63.4	65.5	5.0	70.5
	21	67.0	77.7	63.3	77.0	75.9	72.1	69.5	65.8	64.6	63.7	63.5	63.4	67.0	5.0	72.0
Night	22	67.4	77.7	62.9	77.3	76.9	73.4	71.1	65.9	64.4	63.3	63.2	63.0	67.4	10.0	77.4
	23	63.3	67.5	61.4	67.3	67.0	66.0	65.3	63.6	62.7	61.9	61.7	61.5	63.3	10.0	73.3

Timeframe	*Hour*	*L_{eq}*	*L_{max}*	*L_{min}*	*L1%*	*L2%*	*L5%*	*L8%*	*L25%*	*L50%*	*L90%*	*L95%*	*L99%*
Day	Min	62.7	70.4	57.1	70.1	69.7	68.3	67.0	62.7	59.8	57.5	57.3	57.1
	Max	69.6	77.7	64.4	77.0	75.9	74.2	73.4	70.2	68.5	65.1	64.8	64.5
Energy Average		65.3	Average:		72.1	71.6	69.9	68.7	64.9	62.7	61.1	60.9	60.7
Night	Min	60.5	64.1	57.8	63.9	63.6	63.0	62.5	60.9	60.0	58.5	58.2	57.9
	Max	67.4	77.7	64.3	77.3	76.9	73.4	71.1	66.1	65.3	64.6	64.5	64.3
Energy Average		64.2	Average:		68.3	68.0	66.7	65.7	63.6	62.7	61.7	61.5	61.3

24-Hour CNEL	*Leq (dBA) Daytime (7am-10pm)*	*Leq (dBA) Nighttime (10pm-7am)*
71.2	**65.3**	**64.2**

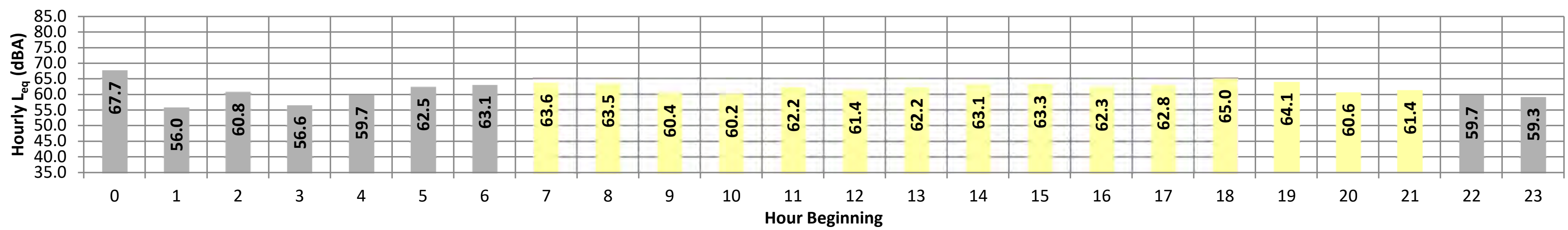
URBAN CROSSROADS

24-Hour Noise Level Measurement Summary

Date: Thursday, December 22, 2022 | *Location:* L2 - Located Northeast of the site near residence located at 810 Pelanconi Ave. | *Meter:* Piccolo II | *JN:* 14238

Project: Glendale Garden River Bridge | *Source:* | *Analyst:* B. Lawson

Hourly L_{eq} dBA Readings (unadjusted)



Timeframe	Hour	L_{eq}	L_{max}	L_{min}	L1%	L2%	L5%	L8%	L25%	L50%	L90%	L95%	L99%	L_{eq}	Adj.	Adj. L_{eq}
Night	0	67.7	83.1	55.7	81.9	79.9	74.2	69.1	60.8	58.9	56.2	56.0	55.8	67.7	10.0	77.7
	1	56.0	61.2	53.1	60.9	60.5	59.2	58.3	56.3	55.2	53.8	53.5	53.2	56.0	10.0	66.0
	2	60.8	67.3	56.7	67.0	66.7	65.7	65.1	60.3	59.1	57.3	57.0	56.7	60.8	10.0	70.8
	3	56.6	61.3	54.4	60.9	60.5	59.3	58.5	57.0	56.1	54.9	54.7	54.5	56.6	10.0	66.6
	4	59.7	63.5	57.7	63.2	62.9	62.0	61.5	60.1	59.2	58.2	58.0	57.8	59.7	10.0	69.7
	5	62.5	66.2	60.6	66.0	65.7	64.8	64.2	62.7	62.0	61.0	60.9	60.7	62.5	10.0	72.5
	6	63.1	67.7	61.2	67.4	67.1	66.1	65.4	63.2	62.5	61.6	61.4	61.2	63.1	10.0	73.1
Day	7	63.6	70.9	60.1	70.4	69.9	68.2	67.1	63.8	62.0	60.6	60.4	60.2	63.6	0.0	63.6
	8	63.5	70.5	59.0	70.2	69.8	68.3	67.2	63.7	61.8	59.8	59.4	59.1	63.5	0.0	63.5
	9	60.4	68.4	54.4	67.9	67.2	65.5	64.3	60.9	58.5	55.4	54.9	54.5	60.4	0.0	60.4
	10	60.2	70.3	52.4	69.7	68.7	64.8	63.3	60.5	58.1	53.6	53.1	52.6	60.2	0.0	60.2
	11	62.2	76.0	50.1	74.9	73.5	68.5	65.0	59.3	56.6	52.0	51.1	50.3	62.2	0.0	62.2
	12	61.4	69.3	52.3	68.9	68.4	66.4	64.9	61.9	60.3	53.9	53.1	52.4	61.4	0.0	61.4
	13	62.2	70.2	52.3	69.8	69.2	67.6	66.1	62.7	60.7	55.1	53.9	52.7	62.2	0.0	62.2
	14	63.1	71.6	52.7	71.2	70.1	68.3	66.6	63.8	61.6	55.5	54.0	52.9	63.1	0.0	63.1
	15	63.3	71.2	53.1	70.6	70.0	68.4	67.2	64.2	61.5	55.7	54.4	53.3	63.3	0.0	63.3
	16	62.3	74.1	51.5	73.7	72.6	69.1	65.9	60.7	57.9	53.2	52.3	51.6	62.3	0.0	62.3
	17	62.8	72.8	53.2	72.5	72.0	70.5	68.7	60.7	58.1	54.4	54.0	53.3	62.8	0.0	62.8
	18	65.0	76.1	55.8	75.3	74.2	73.2	70.0	62.4	59.7	56.7	56.3	56.0	65.0	0.0	65.0
	19	64.1	77.9	56.1	76.6	74.9	70.1	66.1	61.4	59.2	56.6	56.4	56.2	64.1	5.0	69.1
	20	60.6	66.2	57.5	65.8	65.3	64.2	63.4	61.2	59.6	58.0	57.8	57.6	60.6	5.0	65.6
	21	61.4	68.4	57.0	68.1	67.5	66.2	65.2	61.8	59.5	57.6	57.4	57.1	61.4	5.0	66.4
Night	22	59.7	65.5	56.5	65.1	64.8	63.7	62.9	60.2	58.4	56.9	56.7	56.6	59.7	10.0	69.7
	23	59.3	66.1	56.5	65.6	64.8	62.9	61.8	59.5	58.0	56.9	56.7	56.6	59.3	10.0	69.3

Timeframe	Hour	L_{eq}	L_{max}	L_{min}	L1%	L2%	L5%	L8%	L25%	L50%	L90%	L95%	L99%
Day	Min	60.2	66.2	50.1	65.8	65.3	64.2	63.3	59.3	56.6	52.0	51.1	50.3
	Max	65.0	77.9	60.1	76.6	74.9	73.2	70.0	64.2	62.0	60.6	60.4	60.2
Energy Average		62.6	Average:		71.0	70.2	67.9	66.1	61.9	59.7	55.9	55.2	54.7
Night	Min	56.0	61.2	53.1	60.9	60.5	59.2	58.3	56.3	55.2	53.8	53.5	53.2
	Max	67.7	83.1	61.2	81.9	79.9	74.2	69.1	63.2	62.5	61.6	61.4	61.2
Energy Average		62.1	Average:		66.4	65.9	64.2	63.0	60.0	58.8	57.4	57.2	57.0

24-Hour CNEL	Leq (dBA) Daytime (7am-10pm)	Leq (dBA) Nighttime (10pm-7am)
68.8	62.6	62.1

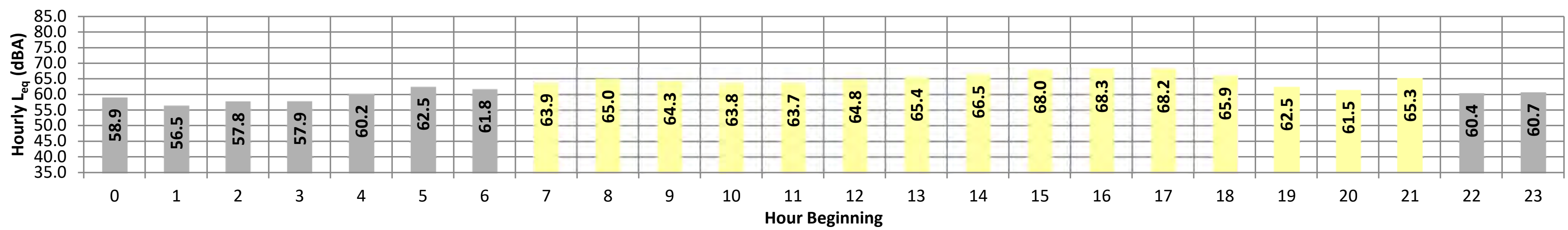
Z:\Shared\UcJobs_14100-14500_14200\14238\04_Noise\fieldwork\Measurements\14238_L2_B

URBAN CROSSROADS

24-Hour Noise Level Measurement Summary

Date: Thursday, December 22, 2022
Project: Glendale Garden River Bridge
Location: L3 - Located northwest of the site near Office Complex located
Source: at 1000 Flower St.
Meter: Piccolo II
JN: 14238
Analyst: B. Lawson

Hourly L_{eq} dBA Readings (unadjusted)



Timeframe	Hour	L_{eq}	L_{max}	L_{min}	L1%	L2%	L5%	L8%	L25%	L50%	L90%	L95%	L99%	L_{eq}	Adj.	Adj. L_{eq}
Night	0	58.9	66.1	55.9	65.8	65.3	63.4	61.8	58.8	57.4	56.4	56.2	56.0	58.9	10.0	68.9
	1	56.5	63.7	53.8	63.5	63.1	61.4	59.7	55.8	54.9	54.2	54.0	53.9	56.5	10.0	66.5
	2	57.8	63.2	55.3	62.9	62.6	61.3	60.2	58.0	56.9	55.7	55.5	55.4	57.8	10.0	67.8
	3	57.9	63.2	55.9	62.8	62.3	61.1	60.0	57.9	57.2	56.3	56.2	56.0	57.9	10.0	67.9
	4	60.2	68.0	56.9	67.6	66.9	65.0	63.7	59.8	58.6	57.4	57.2	57.0	60.2	10.0	70.2
	5	62.5	70.6	57.8	70.3	69.8	68.5	67.1	62.2	59.5	58.1	58.0	57.8	62.5	10.0	72.5
	6	61.8	69.8	57.8	69.6	69.1	67.3	65.6	61.4	59.4	58.2	58.1	57.9	61.8	10.0	71.8
Day	7	63.9	71.6	57.3	71.3	70.9	69.3	68.1	64.6	61.4	57.9	57.6	57.4	63.9	0.0	63.9
	8	65.0	73.4	57.1	73.1	72.5	71.0	69.7	65.6	61.8	57.8	57.4	57.2	65.0	0.0	65.0
	9	64.3	72.3	56.1	72.1	71.6	70.3	69.0	65.0	61.4	56.8	56.4	56.2	64.3	0.0	64.3
	10	63.8	73.0	55.5	72.7	72.3	70.6	69.1	63.6	59.3	56.1	55.8	55.6	63.8	0.0	63.8
	11	63.7	72.4	56.1	72.1	71.5	69.6	68.2	64.2	60.0	56.7	56.4	56.1	63.7	0.0	63.7
	12	64.8	73.1	56.6	72.7	72.1	70.4	69.3	65.6	61.8	57.4	57.0	56.7	64.8	0.0	64.8
	13	65.4	73.3	56.7	73.0	72.6	71.0	70.0	66.4	62.4	57.7	57.2	56.8	65.4	0.0	65.4
	14	66.5	74.4	57.6	74.1	73.5	72.0	70.9	67.5	64.1	58.9	58.2	57.7	66.5	0.0	66.5
	15	68.0	74.7	58.8	74.4	74.0	72.8	72.0	69.4	66.4	60.4	59.5	58.9	68.0	0.0	68.0
	16	68.3	75.1	58.9	74.8	74.3	73.0	72.3	69.7	66.5	60.5	59.7	59.1	68.3	0.0	68.3
	17	68.2	75.9	58.3	75.5	75.0	73.4	72.5	69.3	66.1	59.9	59.0	58.4	68.2	0.0	68.2
	18	65.9	73.5	57.7	73.2	72.7	71.5	70.6	67.1	62.8	58.4	58.1	57.8	65.9	0.0	65.9
	19	62.5	70.8	57.1	70.5	70.0	68.3	67.0	62.3	59.5	57.6	57.4	57.2	62.5	5.0	67.5
	20	61.5	69.7	57.5	69.4	68.9	67.1	65.5	61.1	58.9	57.9	57.7	57.6	61.5	5.0	66.5
	21	65.3	75.6	57.1	74.8	73.8	72.0	70.3	65.3	59.6	57.4	57.3	57.1	65.3	5.0	70.3
Night	22	60.4	67.4	57.3	67.2	66.8	65.1	63.8	60.3	58.7	57.6	57.5	57.4	60.4	10.0	70.4
	23	60.7	68.6	56.4	68.4	68.0	66.4	65.0	60.4	57.9	56.7	56.6	56.4	60.7	10.0	70.7

Timeframe	Hour	L_{eq}	L_{max}	L_{min}	L1%	L2%	L5%	L8%	L25%	L50%	L90%	L95%	L99%
Day	Min	61.5	69.7	55.5	69.4	68.9	67.1	65.5	61.1	58.9	56.1	55.8	55.6
	Max	68.3	75.9	58.9	75.5	75.0	73.4	72.5	69.7	66.5	60.5	59.7	59.1
Energy Average		65.6	Average:		72.9	72.4	70.8	69.6	65.8	62.1	58.1	57.6	57.3
Night	Min	56.5	63.2	53.8	62.8	62.3	61.1	59.7	55.8	54.9	54.2	54.0	53.9
	Max	62.5	70.6	57.8	70.3	69.8	68.5	67.1	62.2	59.5	58.2	58.1	57.9
Energy Average		60.0	Average:		66.4	66.0	64.4	63.0	59.4	57.8	56.7	56.6	56.4

24-Hour CNEL	Leq (dBA) Daytime (7am-10pm)	Leq (dBA) Nighttime (10pm-7am)
68.2	65.6	60.0

URBAN CROSSROADS

This page was intentionally left blank.

APPENDIX 8.1:

CADNAA CONSTRUCTION NOISE MODEL INPUTS

This page was intentionally left blank.

14238 - Gelndale Garden Bridge - Construction

CadnaA Noise Prediction Model: 14238-08_Construction.cna
Date: 17.05.24
Analyst: B. Maddux

Calculation Configuration

Configuration	
Parameter	**Value**
General	
Max. Error (dB)	**0.00**
Max. Search Radius (#(Unit,LEN))	**2000.01**
Min. Dist Src to Rcvr	**0.00**
Partition	
Raster Factor	**0.50**
Max. Length of Section (#(Unit,LEN))	**999.99**
Min. Length of Section (#(Unit,LEN))	**1.01**
Min. Length of Section (%)	**0.00**
Proj. Line Sources	**On**
Proj. Area Sources	**On**
Ref. Time	
Daytime Penalty (dB)	**0.00**
Recr. Time Penalty (dB)	**5.00**
Night-time Penalty (dB)	**10.00**
DTM	
Standard Height (m)	**0.00**
Model of Terrain	**Triangulation**
Reflection	
max. Order of Reflection	**2**
Search Radius Src	**100.00**
Search Radius Rcvr	**100.00**
Max. Distance Source - Rcvr	**1000.00 1000.00**
Min. Distance Rvcr - Reflector	**1.00 1.00**
Min. Distance Source - Reflector	**0.10**
Industrial (ISO 9613)	
Lateral Diffraction	**some Obj**
Obst. within Area Src do not shield	**On**
Screening	**Incl. Ground Att. over Barrier**
	Dz with limit (20/25)
Barrier Coefficients C1,2,3	**3.0 20.0 0.0**
Temperature (#(Unit,TEMP))	**10**
rel. Humidity (%)	**70**
Ground Absorption G	**0.50**
Wind Speed for Dir. (#(Unit,SPEED))	**3.0**
Roads (TNM)	
Railways (FTA/FRA)	
Aircraft (???)	
Strictly acc. to AzB	

Receiver Noise Levels

Name	M.	ID	Level Lr			Limit. Value			Land Use			Height		Coordinates		
			Day	Night	CNEL	Day	Night	CNEL	Type	Auto	Noise Type			X	Y	Z
			(dBA)	(dBA)	(dBA)	(dBA)	(dBA)	(dBA)				(ft)		(ft)	(ft)	(ft)
R1		R1	54.7	-45.3	51.7	0.0	0.0	0.0		x	Total	5.00	a	5947180.68	2369656.23	5.00
R2		R2	47.3	-52.7	44.3	0.0	0.0	0.0		x	Total	5.00	a	5947789.83	2371486.27	5.00
R3		R3	54.2	-45.8	51.2	0.0	0.0	0.0		x	Total	5.00	a	5946082.39	2370775.97	5.00
R4		R4	67.5	-32.5	64.5	0.0	0.0	0.0		x	Total	5.00	a	5946492.75	2370021.51	5.00
R5		R5	61.0	-39.0	58.0	0.0	0.0	0.0		x	Total	5.00	a	5946379.81	2369917.35	5.00

Point Source(s)

Name	M.	ID	Result. PWL			Lw / Li			Operating Time			Height		Coordinates		
			Day	Evening	Night	Type	Value	norm.	Day	Special	Night			X	Y	Z
			(dBA)	(dBA)	(dBA)			dB(A)	(min)	(min)	(min)	(ft)		(ft)	(ft)	(ft)

Line Source(s)

Name	M.	ID	Result. PWL			Result. PWL'			Lw / Li			Operating Time			Moving Pt. Src				Height	
			Day	Evening	Night	Day	Evening	Night	Type	Value	norm.	Day	Special	Night	Number			Speed		
			(dBA)	(dBA)	(dBA)	(dBA)	(dBA)	(dBA)			dB(A)	(min)	(min)	(min)	Day	Evening	Night	(mph)	(ft)	

Name	ID	Height				Coordinates			
		Begin		End		x	y	z	Ground
		(ft)		(ft)		(ft)	(ft)	(ft)	(ft)

Area Source(s)

Name	M.	ID	Result. PWL			Result. PWL''			Lw / Li			Operating Time			Height	
			Day	Evening	Night	Day	Evening	Night	Type	Value	norm.	Day	Special	Night	(ft)	
			(dBA)	(dBA)	(dBA)	(dBA)	(dBA)	(dBA)			dB(A)	(min)	(min)	(min)		
SITEBOUNDARY		SITEBOUNDARY00001	113.6	13.6	13.6	68.9	-31.1	-31.1	PWL-Pt	113.6					8	a

Name	ID	Height				Coordinates			
		Begin		End		x	y	z	Ground
		(ft)		(ft)		(ft)	(ft)	(ft)	(ft)
SITEBOUNDARY	SITEBOUNDARY00001	8.00	a			5946877.38	2370526.65	8.00	0.00
						5947001.94	2370498.01	8.00	0.00
						5947079.20	2370472.83	8.00	0.00
						5947065.31	2370439.85	8.00	0.00
						5946929.81	2370481.23	8.00	0.00
						5946894.78	2370244.68	8.00	0.00
						5946941.66	2370164.38	8.00	0.00
						5947019.35	2370139.64	8.00	0.00
						5947083.15	2370111.00	8.00	0.00
						5947116.57	2370089.73	8.00	0.00
						5947036.71	2369939.56	8.00	0.00
						5946868.96	2370024.99	8.00	0.00
						5946796.82	2370026.82	8.00	0.00
						5946413.32	2370036.36	8.00	0.00
						5946364.70	2370017.27	8.00	0.00
						5946277.90	2370019.00	8.00	0.00
						5946270.95	2370251.64	8.00	0.00
						5946409.84	2370258.59	8.00	0.00
						5946403.42	2370501.48	8.00	0.00
						5946705.94	2370511.90	8.00	0.00
						5946758.45	2370542.28	8.00	0.00
						5946800.12	2370540.11	8.00	0.00

Barrier(s)

Name	Sel.	M.	ID	Absorption		Z-Ext.	Cantilever		Height		Coordinates			
				left	right		horz.	vert.	Begin	End	x	y	z	Ground
						(ft)	(ft)	(ft)	(ft)	(ft)	(ft)	(ft)	(ft)	(ft)

Building(s)

Name	Sel.	M.	ID	RB	Residents	Absorption	Height	Coordinates			
							Begin	x	y	z	Ground
							(ft)	(ft)	(ft)	(ft)	(ft)

Ground Absorption(s)

Name	Sel.	M.	ID	G	Coordinates	
					x	y
					(ft)	(ft)

Contour(s)

Name	Sel.	M.	ID	OnlyPts	Height		Coordinates		
					Begin	End	x	y	z
					(ft)	(ft)	(ft)	(ft)	(ft)

Vertical Area Source(s)

Name	ID	Height				Coordinates			
		Begin		End		x	y	z	Ground
		(ft)		(ft)		(ft)	(ft)	(ft)	(ft)

Rail

Name	Sel.	M.	ID	Lw'		Train Class	Correct.	Vmax
				Day	Night		Track	
				(dBA)	(dBA)		(dB)	(km(mph)

Sound Level Spectra

Name	ID	Type	Oktave Spectrum (dB)												Source
			Weight.	31.5	63	125	250	500	1000	2000	4000	8000	A	lin	

Roads

Name	Sel.	M.	ID	Lme			Count Data		exact Count Data						Speed Limit		SCS	Surface		Gradient	Mult. Reflection		
				Day	Evening	Night	DTV	Str.class.	M			p (%)			Auto	Truck	Dist.	Dstro	Type		Drefl	Hbuild	Dist.
				(dBA)	(dBA)	(dBA)			Day	Evening	Night	Day	Evening	Night	(mph)	(mph)		(dB)		(%)	(dB)	(ft)	(ft)

RoadsGeo

Name	Height				Coordinates				Dist	LSlope
	Begin		End		x	y	z	Ground	(ft)	(%)
	(ft)		(ft)		(ft)	(ft)	(ft)	(ft)		

This page was intentionally left blank.