Acoustical Assessment

Redlands Used Automobile Sales and Service Facility Project

City of Redlands, California

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May 2023

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LIST OF ABBREVIATED TERMS

ADT	average daily traffic
dBA	A-weighted sound level
CEQA	California Environmental Quality Act
CNEL	community equivalent noise level
L_{dn}	day-night noise level
dB	decibel
L_{eq}	equivalent noise level
FHWA	Federal Highway Administration
FTA	Federal Transit Administration
HVAC	heating ventilation and air conditioning
Hz	hertz
in/sec	inches per second
L_{max}	maximum noise level
µPa	micropascals
L_{min}	minimum noise level
PPV	peak particle velocity
RMS	root mean square
VdB	vibration velocity decibels

1 INTRODUCTION

This report documents the results of an Acoustical Assessment completed for the Redlands Used Automobile Sales and Service Facility Project ("Project" or "Proposed Project"). The purpose of this Acoustical Assessment is to evaluate the potential construction and operational noise and vibration levels associated with the Project and determine the level of impact the Project would have on the environment.

1.1 Project Location

The Project site is located northeast of the State Route 210 (SR-210) and Interstate 10 (I-10) interchange in the City of Redlands (City), California; refer to Exhibit 1: Regional Vicinity Map. The 18.56-acre Project site is specifically located directly west of the New York Street and W Brockton Avenue intersection and is comprised of Assessor's Parcel Numbers (APNs) 0169-011-38 and -39; refer to Exhibit 2: Site Vicinity Map. The Project site is generally surrounded by commercial uses. The site is bordered by a Home Depot store to the north, a surface parking lot and vacant land to the east, a Toyota dealership to the south, and the I-10/SR-210 interchange to the west; see Exhibit 2.

1.2 Project Description

The Project proposes the development of a Used Automobile Sales and Service Facility (49,491 square-foot) on a 18.56 acre parcel. The pre-owned automobiles will be sold to both retail and wholesale buyers. The Project will include a sales building, service building, Final Quality Control /auction building, a non-public carwash, private fuel tank/dispenser, automobile sales display area (retail), vehicle staging areas (reconditions, sales, inspection by wholesale auction buyers and pick-up/drop-off), public parking lots, driveways and associated landscaped areas. The parking area would be located on the eastern and southern side of the site. In addition to passenger vehicle parking, four car-carrier loading spaces would be provided in the southwestern portion of the lot. A paved and striped area known as the vehicle sales display area would be located along the northeast portion of the property and surrounded by a low guardrail system for security purposes. This sales display area is facility's "outdoor showroom" for vehicles available for retail purchase; refer to Exhibit 3: Conceptual site Plan.[1]

Store management will set operating hours closer to the opening date; however, the showroom (retail sales) areas are typically open to the public Monday through Saturday from 9:00 a.m. to 9:00 p.m. with more limited hours on Sundays, if permitted by local law. Associates will be present at the store several hours before and after the public operating hours. Service operations will be up to 24 hours a day, 7 days a week. Please note that this facility will support facility's operations only and will not be open to the general public. Landscaping will be incorporated into the public parking lot, around the perimeter of the site. Landscaping will include deciduous trees and shrubs, evergreen shrubs, sod, wood mulch, and rock mulch. All landscaping will be designed to meet the City's Water Efficient Landscape requirements.

The General Plan land use designation for the Project site is Commercial/Industrial and the zoning designation is General Commercial (EV/CG). The Project's proposed commercial uses are permitted within the existing land use designation and zoning classification. Construction is anticipated to occur over an approximately 18-month period beginning in 2023.

[1] It should be noted that there is vacant land in the northeastern portion of the Project site that is not planned for development as part of the proposed Project. This area is available for future parking needs and potential for vehicle staging expansion; however, this is not a component of the proposed Project and therefore is not included in this technical report.

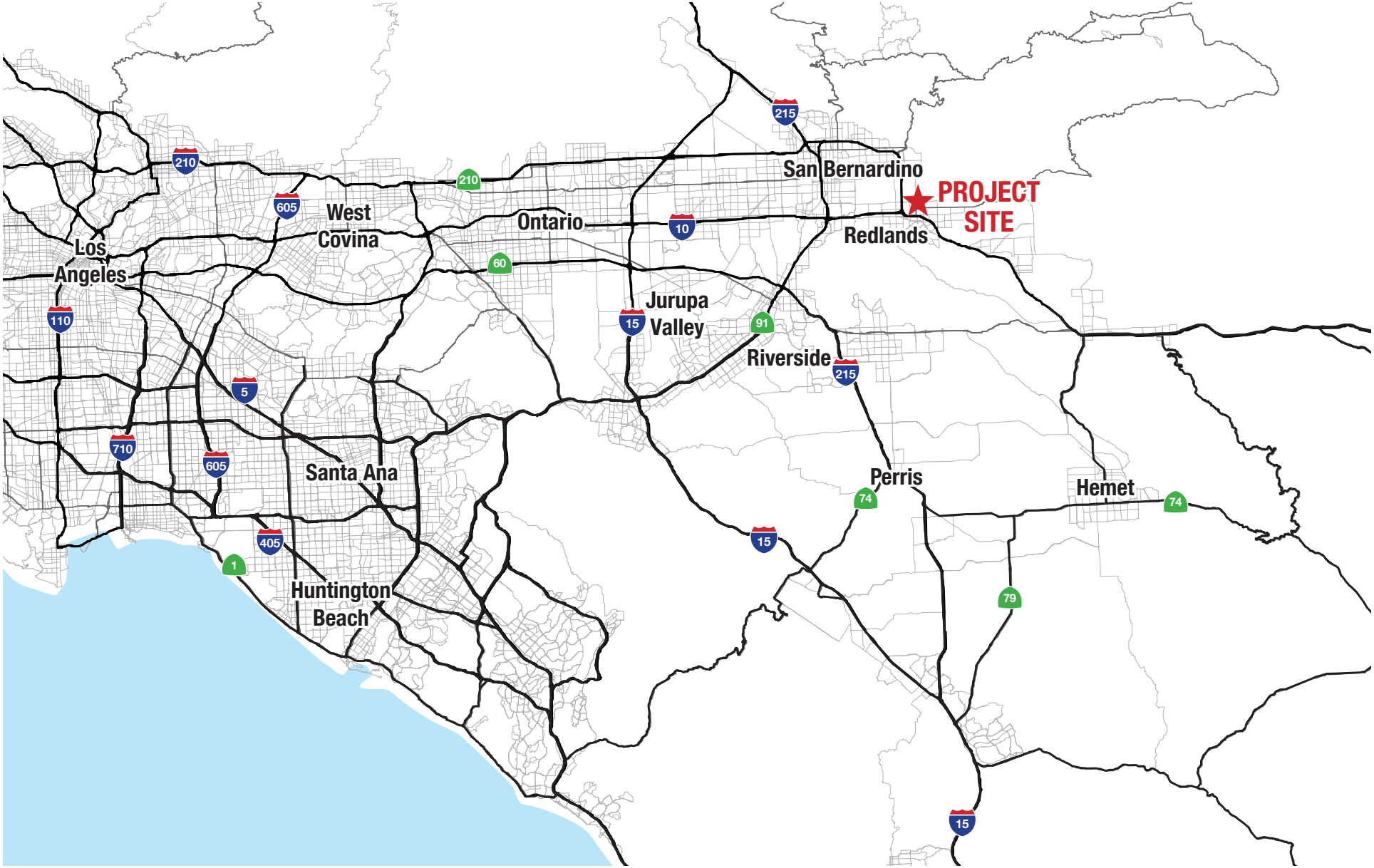

EXHIBIT 1: Regional Vicinity Map

Redlands Used Automobile Sales and **Service** Facility Project

City of Redlands

Not to Scale

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EXHIBIT 2: Site Vicinity Map

Redlands Used Automobile Sales and **Service** Facility Project

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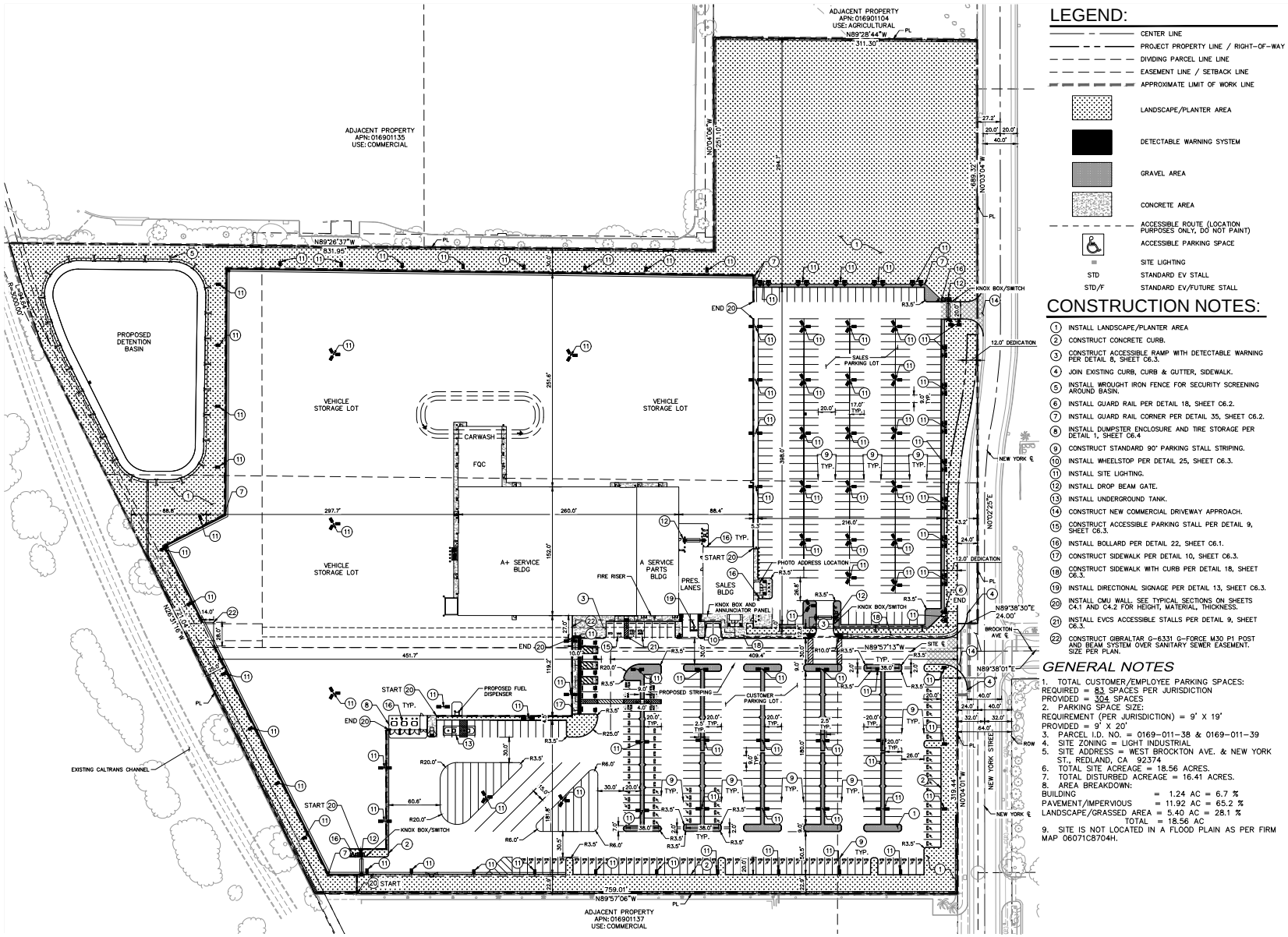

EXHIBIT 3: Conceptual Site Plan

Redlands Used Automobile Sales and **Service** Facility Project

City of Redlands

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2 ACOUSTIC FUNDAMENTALS

2.1 Sound and Environmental Noise

Acoustics is the science of sound. Sound can be described as the mechanical energy of a vibrating object transmitted by pressure waves through a medium (e.g., air) to human (or animal) ear. If the pressure variations occur frequently enough (at least 20 times per second), they can be heard and are called sound. The number of pressure variations per second is called the frequency of sound and is expressed as cycles per second, or hertz (Hz).

Noise is defined as loud, unexpected, or annoying sound. The fundamental acoustics model consists of a noise source, a receptor, and the propagation path between the two. The loudness of the noise source, obstructions, or atmospheric factors affecting the propagation path, determine the perceived sound level and noise characteristics at the receptor. Acoustics deal primarily with the propagation and control of sound. A typical noise environment consists of a base of steady background noise that is the sum of many distant and indistinguishable noise sources. The sound from individual local sources is superimposed on this background noise. These sources can vary from an occasional aircraft or train passing by to continuous noise from traffic on a major highway. Perceptions of sound and noise are highly subjective from person to person.

Measuring sound directly in terms of pressure would require a large range of numbers. To avoid this, the decibel (dB) scale was devised. The dB scale uses the hearing threshold of 20 micropascals (µPa) as a point of reference, defined as 0 dB. Other sound pressures are then compared to this reference pressure, and the logarithm is taken to keep the numbers in a practical range. The dB scale allows a million-fold increase in pressure to be expressed as 120 dB, and changes in levels correspond closely to human perception of relative loudness. Table 1: Typical Noise Levels provides typical noise levels.

Table 1: Typical Noise Levels

Common Outdoor Activities	Noise Level (dBA)	Common Indoor Activities
	– 110 –	Rock Band
Jet fly-over at 1,000 feet		
	– 100 –	
Gas lawnmower at 3 feet		
	– 90 –	
Diesel truck at 50 feet at 50 miles per hour		Food blender at 3 feet
	– 80 –	Garbage disposal at 3 feet
Noisy urban area, daytime		
Gas lawnmower, 100 feet	**– 70 –**	Vacuum cleaner at 10 feet
Commercial area		Normal Speech at 3 feet
Heavy traffic at 300 feet	**– 60 –**	
		Large business office
Quiet urban daytime	**– 50 –**	Dishwasher in next room
Quiet urban nighttime	**– 40 –**	Theater, large conference room (background)
Quiet suburban nighttime		
	– 30 –	Library
Quiet rural nighttime		Bedroom at night, concert hall (background)
	– 20 –	
		Broadcast/recording studio
	– 10 –	
Lowest threshold of human hearing	**– 0 –**	Lowest threshold of human hearing

Source: California Department of Transportation, *Technical Noise Supplement to the Traffic Noise Analysis Protocol*, September 2013.

Noise Descriptors

The dB scale alone does not adequately characterize how humans perceive noise. The dominant frequencies of a sound have a substantial effect on the human response to that sound. Several rating scales have been developed to analyze the adverse effect of community noise on people. Because environmental noise fluctuates over time, these scales consider that the effect of noise on people is largely dependent on the total acoustical energy content of the noise, as well as the time of day when the noise occurs. Most commonly, environmental sounds are described in terms of equivalent noise level (L_{eq}) that has the same acoustical energy as the summation of all the time-varying events. While L_{eq} represents the continuous sound pressure level over the measurement period, the day-night noise level (L_{dn}) and Community Equivalent Noise Level (CNEL) are measures of energy average during a 24-hour period, with dB weighted sound levels from 7:00 p.m. to 7:00 a.m. Each is applicable to this analysis and defined in Table 2: Definitions of Acoustical Terms.

Table 2: Definitions of Acoustical Terms

Term	Definitions
Decibel (dB)	A unit describing the amplitude of sound, equal to 20 times the logarithm to the base 10 of the ratio of the pressure of the sound measured to the reference pressure. The reference pressure for air is 20.
Sound Pressure Level	Sound pressure is the sound force per unit area, usually expressed in µPa (or 20 micronewtons per square meter), where 1 pascal is the pressure resulting from a force of 1 newton exerted over an area of 1 square meter. The sound pressure level is expressed in dB as 20 times the logarithm to the base 10 of the ratio between the pressures exerted by the sound to a reference sound pressure (e.g., 20 µPa). Sound pressure level is the quantity that is directly measured by a sound level meter.
Frequency (Hz)	The number of complete pressure fluctuations per second above and below atmospheric pressure. Normal human hearing is between 20 Hz and 20,000 Hz. Infrasonic sound are below 20 Hz and ultrasonic sounds are above 20,000 Hz.
A-Weighted Sound Level (dBA)	The sound pressure level in dB as measured on a sound level meter using the A-weighting filter network. The A-weighting filter de-emphasizes the very low and very high frequency components of the sound in a manner similar to the frequency response of the human ear and correlates well with subjective reactions to noise.
Equivalent Noise Level (L_{eq})	The average acoustic energy content of noise for a stated period of time. Thus, the L_{eq} of a time-varying noise and that of a steady noise are the same if they deliver the same acoustic energy to the ear during exposure. For evaluating community impacts, this rating scale does not vary, regardless of whether the noise occurs during the day or the night.
Maximum Noise Level (L_{max}) Minimum Noise Level (L_{min})	The maximum and minimum dBA during the measurement period.
Exceeded Noise Levels (L_{01}, L_{10}, L_{50}, L_{90})	The dBA values that are exceeded 1%, 10%, 50%, and 90% of the time during the measurement period.
Day-Night Noise Level (L_{dn})	A 24-hour average L_{eq} with a 10 dBA weighting added to noise during the hours of 10:00 p.m. to 7:00 a.m. to account for noise sensitivity at nighttime. The logarithmic effect of these additions is that a 60 dBA 24-hour L_{eq} would result in a measurement of 66.4 dBA L_{dn}.
Community Noise Equivalent Level (CNEL)	A 24-hour average L_{eq} with a 5 dBA weighting during the hours of 7:00 a.m. to 10:00 a.m. and a 10 dBA weighting added to noise during the hours of 10:00 p.m. to 7:00 a.m. to account for noise sensitivity in the evening and nighttime, respectively. The logarithmic effect of these additions is that a 60 dBA 24-hour L_{eq} would result in a measurement of 66.7 dBA CNEL.
Ambient Noise Level	The composite of noise from all sources near and far. The normal or existing level of environmental noise at a given location.
Intrusive	That noise which intrudes over and above the existing ambient noise at a given location. The relative intrusiveness of a sound depends on its amplitude, duration, frequency, and time of occurrence and tonal or informational content as well as the prevailing ambient noise level.

Because sound levels can vary markedly over a short period of time, a method for describing either the sound's average character (L_{eq}) or the variations' statistical behavior (L_{XX}) must be utilized. The scientific instrument used to measure noise is the sound level meter. Sound level meters can accurately measure environmental noise levels to within about plus or minus 1 dBA. Various computer models are used to predict environmental noise levels from sources, such as roadways and airports. The predicted models' accuracy depends on various factors, such as the distance between the noise receptor and the noise source, the character of the ground surface (e.g., hard or soft), and the presence or absence of structures (e.g., walls or buildings) or topography, and how well model inputs reflect these conditions.

A-Weighted Decibels

The perceived loudness of sounds is dependent on many factors, including sound pressure level and frequency content. However, within the usual range of environmental noise levels, perception of loudness is relatively predictable and can be approximated by dBA values. There is a strong correlation between dBA and the way the human ear perceives sound. For this reason, the dBA has become the standard tool of environmental noise assessment. All noise levels reported in this document are in terms of dBA, but are expressed as dB, unless otherwise noted.

Addition of Decibels

The dB scale is logarithmic, not linear, and therefore sound levels cannot be added or subtracted through ordinary arithmetic. Two sound levels 10 dB apart differ in acoustic energy by a factor of 10.[2] When the standard logarithmic dB is A-weighted, an increase of 10 dBA is generally perceived as a doubling in loudness. For example, a 70-dBA sound is half as loud as an 80-dBA sound and twice as loud as a 60-dBA sound.[3] When two identical sources are each producing sound of the same loudness, the resulting sound level at a given distance would be 3 dBA higher than one source under the same conditions.[4] Under the dB scale, three sources of equal loudness together would produce an increase of approximately 5 dBA.

Sound Propagation and Attenuation

Sound spreads (propagates) uniformly outward in a spherical pattern, and the sound level decreases (attenuates) at a rate of approximately 6 dB for each doubling of distance from a stationary or point source. Sound from a line source, such as a highway, propagates outward in a cylindrical pattern. Sound levels attenuate at a rate of approximately 3 dB for each doubling of distance from a line source, such as a roadway, depending on ground surface characteristics.[5] No excess attenuation is assumed for hard surfaces like a parking lot or a body of water. Soft surfaces, such as soft dirt or grass, can absorb sound, so an excess ground-attenuation value of 1.5 dB per doubling of distance is normally assumed in this report.

Noise levels may also be reduced by intervening structures; generally, a single row of buildings between the noise receptor and the noise source reduces the noise level by about 5 dBA, while a solid wall or berm can reduce noise levels by 5 to 15 dBA.[6] The way older homes in California were constructed generally

[2] California Department of Transportation, Technical Noise Supplement to the Traffic Noise Analysis Protocol, September 2013.

[3] *Noise Sources and Their Effects*. Available at: https://www.chem.purdue.edu/chemsafety/Training/PPETrain/dblevels.htm

[4] FHWA, *Noise Fundamentals,* 2017. Available at: https://www.fhwa.dot.gov/environMent/noise/regulations_and_guidance/polguide/polguide02.cfm

[5] California Department of Transportation, *Technical Noise Supplement to the Traffic Noise Analysis Protocol*, Page 2-29, September 2013.

[6] Federal Highway Administration, Highway Traffic and Construction Noise - Problem and Response**,** April 2006.

provides a reduction of exterior-to-interior noise levels of about 20 to 25 dBA with closed windows. The exterior-to-interior reduction of newer residential units is generally 30 dBA or more.

Human Response to Noise

The human response to environmental noise is subjective and varies considerably from individual to individual. Noise in the community has often been cited as a health problem, not in terms of actual physiological damage, such as hearing impairment, but in terms of inhibiting general well-being and contributing to undue stress and annoyance. The health effects of noise in the community arise from interference with human activities, including sleep, speech, recreation, and tasks that demand concentration or coordination. Hearing loss can occur at the highest noise intensity levels.

Noise environments and consequences of human activities are usually well represented by median noise levels during the day or night or over a 24-hour period. Environmental noise levels are generally considered low when the CNEL is below 60 dBA, moderate in the 60 to 70 dBA range, and high above 70 dBA. Examples of low daytime levels are isolated, natural settings with noise levels as low as 20 dBA and quiet, suburban, residential streets with noise levels around 40 dBA.[7] Noise levels above 45 dBA at night can disrupt sleep. Examples of moderate-level noise environments are urban residential or semi-commercial areas (typically 55 to 60 dBA) and commercial locations (typically 60 dBA). People may consider louder environments adverse, but most will accept the higher levels associated with noisier urban residential or residential-commercial areas (60 to 75 dBA) or dense urban or industrial areas (65 to 80 dBA). Regarding increases in dBA, the following relationships should be noted[8]:

- Except in carefully controlled laboratory experiments, a 1-dBA change cannot be perceived by humans.
- Outside of the laboratory, a 3-dBA change is considered a just-perceivable difference.
- A minimum 5-dBA change is required before any noticeable change in community response would be expected. A 5-dBA increase is typically considered substantial.
- A 10-dBA change is subjectively heard as an approximate doubling in loudness and would almost certainly cause an adverse change in community response.

Effects of Noise on People

Hearing Loss. While physical damage to the ear from an intense noise impulse is rare, a degradation of auditory acuity can occur even within a community noise environment. Hearing loss occurs mainly due to chronic exposure to excessive noise but may be due to a single event such as an explosion. Natural hearing loss associated with aging may also be accelerated from chronic exposure to loud noise. The Occupational Safety and Health Administration has a noise exposure standard that is set at the noise threshold where hearing loss may occur from long-term exposures. The maximum allowable level is 90 dBA averaged over 8 hours. If the noise is above 90 dBA, the allowable exposure time is correspondingly shorter.[9]

Annoyance. Attitude surveys are used for measuring the annoyance felt in a community for noises intruding into homes or affecting outdoor activity areas. In these surveys, it was determined that causes

[7] Compiled from James P. Cowan, *Handbook of Environmental Acoustics,* 1994 and Cyril M. Harris, Handbook of Noise Control, 1979.

[8] Compiled from California Department of Transportation, *Technical Noise Supplement to the Traffic Noise Analysis Protocol*, September 2013, and FHWA, *Noise Fundamentals,* 2017.

[9] U.S. Department of Labor, Occupational Safety and Health Standards, *29 CFR 1910* (Occupational Noise Exposure).

for annoyance include interference with speech, radio and television, house vibrations, and interference with sleep and rest. The L_{dn} as a measure of noise has been found to provide a valid correlation of noise level and the percentage of people annoyed. People have been asked to judge the annoyance caused by aircraft noise and ground transportation noise. There continues to be disagreement about the relative annoyance of these different sources. A noise level of about 55 dBA L_{dn} is the threshold at which a substantial percentage of people begin to report annoyance[10].

2.2 Ground-Borne Vibration

Sources of groundborne vibrations include natural phenomena (earthquakes, volcanic eruptions, sea waves, landslides, etc.) or man-made causes (explosions, machinery, traffic, trains, construction equipment, etc.). Vibration sources may be continuous (e.g., factory machinery) or transient (e.g., explosions or heavy equipment use during construction). Ground vibration consists of rapidly fluctuating motions or waves with an average motion of zero. Several different methods are typically used to quantify vibration amplitude. One is the peak particle velocity (PPV); another is the root mean square (RMS) velocity. The PPV is defined as the maximum instantaneous positive or negative peak of the vibration wave and is expressed in terms of inches-per- second (in/sec). The RMS velocity is defined as the average of the squared amplitude of the signal and is expressed in terms of velocity decibels (VdB). The PPV and RMS vibration velocity amplitudes are used to evaluate human response to vibration.

Table 3: Human Reaction and Damage to Buildings for Continuous or Frequent Intermittent Vibrations, displays the reactions of people and the effects on buildings produced by continuous vibration levels. The annoyance levels shown in the table should be interpreted with care since vibration may be found to be annoying at much lower levels than those listed, depending on the level of activity or the individual's sensitivity. To sensitive individuals, vibrations approaching the threshold of perception can be annoying. Low-level vibrations frequently cause irritating secondary vibration, such as a slight rattling of windows, doors, or stacked dishes. The rattling sound can give rise to exaggerated vibration complaints, even though there is very little risk of actual structural damage. In high noise environments, which are more prevalent where groundborne vibration approaches perceptible levels, this rattling phenomenon may also be produced by loud airborne environmental noise causing induced vibration in exterior doors and windows.

Ground vibration can be a concern in instances where buildings shake, and substantial rumblings occur. However, it is unusual for vibration from typical urban sources such as buses and heavy trucks to be perceptible. Common sources for groundborne vibration are planes, trains, and construction activities such as earth-moving which requires the use of heavy-duty earth moving equipment. For the purposes of this analysis, a PPV descriptor with units of inches per second (in/sec) is used to evaluate construction-generated vibration for building damage and human complaints.

[10] Federal Interagency Committee on Noise, Federal Agency Review of Selected Airport Noise Analysis Issues, August 1992.

Table 3: Human Reaction and Damage to Buildings for Continuous or Frequent Intermittent Vibrations

Maximum PPV (in/sec)	Vibration Annoyance Potential Criteria	Vibration Damage Potential Threshold Criteria	FTA Vibration Damage Criteria
0.008	--	Extremely fragile historic buildings, ruins, ancient monuments	--
0.01	Barely Perceptible	--	--
0.04	Distinctly Perceptible	--	--
0.1	Strongly Perceptible	Fragile buildings	--
0.12	--	--	Buildings extremely susceptible to vibration damage
0.2	--	--	Non-engineered timber and masonry buildings
0.25	--	Historic and some old buildings	--
0.3	--	Older residential structures	Engineered concrete and masonry (no plaster)
0.4	Severe	--	--
0.5	--	New residential structures, Modern industrial/commercial buildings	Reinforced-concrete, steel or timber (no plaster)

PPV = peak particle velocity; in/sec = inches per second; FTA = Federal Transit Administration

Source: California Department of Transportation, *Transportation and Construction Vibration Guidance Manual*, 2020, and Federal Transit administration, *Transit Noise and Vibration Assessment Manual*, 2018.

3 REGULATORY SETTING

To limit population exposure to physically 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.

3.1 State of California

California Government Code

California Government Code Section 65302(f) mandates that the legislative body of each county and city adopt a noise element as part of its comprehensive general plan. The local noise element must recognize the land use compatibility guidelines established by the State Department of Health Services. The guidelines rank noise land use compatibility in terms of "normally acceptable", "conditionally acceptable", "normally unacceptable", and "clearly unacceptable" noise levels for various land use types. Single-family homes are "normally acceptable" in exterior noise environments up to 60 CNEL and "conditionally acceptable" up to 70 CNEL. Multiple-family residential uses are "normally acceptable" up to 65 CNEL and "conditionally acceptable" up to 70 CNEL. Schools, libraries, and churches are "normally acceptable" up to 70 CNEL, as are office buildings and business, commercial, and professional uses.

Title 24 – Building Code

The State's noise insulation standards are codified in the California Code of Regulations, Title 24: Part 1, Building Standards Administrative Code, and Part 2, California Building Code. These noise standards are applied to new construction in California for interior noise compatibility from exterior noise sources. The regulations specify that acoustical studies must be prepared when noise-sensitive structures, such as residential buildings, schools, hotel rooms, or hospitals, are located near major transportation noise sources, and where such noise sources create an exterior noise level of 65 dBA CNEL or higher. Acoustical studies that accompany building plans must demonstrate that the structure has been designed to limit interior noise in habitable rooms to acceptable noise levels. For new multi-family residential buildings and habitable rooms (including hotels), the acceptable interior noise limit for new construction is 45 dBA CNEL.

3.2 Local

City of Redlands General Plan

The City of Redlands General Plan (RGP) Healthy Communities – Noise Element (Chapter 7.5) identifies several policies and actions to minimize the impacts of excessive noise levels throughout the community. The Noise Element provides policy guidance which addresses the generation, mitigation, avoidance, and the control of excessive noise. The noise policies specified in the Noise Element provides the guidelines necessary to satisfy these goals. The City of Redlands Community Noise Control Ordinance (Chapter 8.06 of the Municipal Code) and the Noise Element specify the maximum acceptable levels of noise for residential uses in the City. These standards indicate that noise levels at residential locations should not exceed a CNEL of 60 dBA from 7:00 a.m. – 10 p.m. and 50 dBA from 10:00 p.m. to 7:00 a.m. RGP also indicates that noise level at residential locations should not exceed a CNEL of 45 dBA in any habitable room with open windows. The following presents the goals and policies for noise related issues in the City of Redlands:

Policies

Policy 7-P.39 Support measures to reduce noise emissions by motor vehicles, aircraft, and trains.

Policy 7-P.40 Protect public health and welfare by eliminating noise problems where feasible and by preventing significant degradation of the future acoustic environment.

Policy 7-P.41 Ensure that new development is compatible with the noise environment by continuing to use potential noise exposure as a criterion in land use planning.

Policy 7-P.42 Guide the location and design of transportation facilities, industrial uses, and other potential noise generators to minimize the effects of noise on adjacent land uses.

Policy 7-P.43 Ensure long-term compatibility between the Redlands Municipal Airport and surrounding uses.

Actions

Land Use and Noise Compatibility

Action 7-A.135 Use the noise and land use compatibility matrix (Table 7-10 in the RGP) and Future Noise Contours Map (Figure 7-9 in the RGP) as criteria to determine the acceptability of a given land use, including the improvement/construction of streets, railroads, freeways, and highways. Do not permit new noise-sensitive uses – including schools, hospitals, places of worship, and homes – where noise levels are "normally unacceptable" or higher, if alternative locations are available for the uses in the City.

Action 7-A.136 Require a noise analysis be conducted for all development proposals located where projected noise exposure would be other than "clearly" or "normally compatible" as specified in Table 7-10.

Action 7-A.137 For all projects that have noise exposure levels that exceed the standards in Table 7-10, require site planning and architecture to incorporate noise-attenuating features. With mitigation, development should meet the allowable outdoor and indoor noise exposure standards in Table 7-11. When a building's openings to the exterior are required to be closed to meet the interior noise standard, mechanical ventilation shall be provided.

Action 7-A.138 Continue to maintain performance standards in the Municipal code to ensure that noise generated by proposed projects is compatible with surrounding land uses.

Measure U Policies

The City of Redlands' Measure U adds that no land use adjacent to existing residential land shall generate noise in excess of the residential CNEL levels specified in Table 7-10 (Exhibit 4: Noise/Land Use Compatibility Matrix and Interpretation) and Table 7-11 (Table 4: City of Redlands Interior and Exterior Noise Standards) of the Noise Element unless appropriate mitigation measures are imposed to reduce the noise level on adjacent residential property to the standards set forth in Table 7-10 9 (Exhibit 4) and Table 7-11 (Table 4).

Policy 9.0e Use the criteria specified in GP Table 7-10 to assess the compatibility of proposed land uses with the projected noise environment, and apply the noise standards in GP Table 7-11, which prescribe interior and exterior noise standards in relation to specified land uses. Do not approve projects that would not comply with the standards in GP Table 7-1.

Policy 9.0f Require a noise impact evaluation based on noise measurements at the site for all projects in Noise Referral Zones (B, C, or D) as shown on GP Table 7-10 and on GP Figure 7-9 or as determined from tables in the Appendix, as part of the project review process. Should measurements indicate that unacceptable noise levels will be created or experienced, require mitigation measures based on a detailed technical study prepared by a qualified acoustical engineer (i.e., a Registered Professional Engineer in the State of California with a minimum of three years experience in acoustics).

Policy 9.0h Minimize potential transportation noise through proper design of street circulation, coordination of routing, and other traffic control measures.

Policy 9.0i Require construction of barriers to mitigate sound emissions where necessary or where feasible, and encourage use of walls and berms to protect residential or other noise sensitive land uses that are adjacent to major roads, commercial, or industrial areas.

Policy 9.0k Ensure the effective enforcement of City, State, and federal noise levels by all appropriate City departments.

Policy 9.0l Adopt and enforce a new Community Noise Ordinance to mitigate noise conflicts between adjacent land uses, to ensure that City residents are not exposed to excessive noise levels from existing and new stationary noise sources, and to educate the public regarding noise issues.

Policy 9.0m Designate one agency or department in the City to act as the noise control coordinator, to ensure the continued operation of the City's noise enforcement efforts, and to establish and maintain coordination among the City agencies involved in noise abatement.

Policy 9.0n Ensure the effective enforcement of City, State, and federal noise levels by all appropriate City departments, and provide quick response to complaints and rapid abatement of noise nuisances within the scope of the City's police power.

Policy 9.0o Establish noise guidelines for City purchasing policy to take advantage of federal regulations and labeling requirements.

Policy 9.0p Coordinate with the California Occupational Safety and Health Administration (Cal OSHA) to provide information on and enforcement of occupational noise requirements within the City.

Policy 9.0q Provide for continued evaluation of truck movements in the City to provide effective separation from residential or other noise sensitive land uses.

Policy 9.0r Encourage the enforcement of State Motor Vehicle noise standards for cars, trucks, and motorcycles through coordination with the California Highway Patrol and Redlands Police Department.

Policy 9.0s Require mitigation to ensure that indoor noise levels for residential living spaces not exceed 45 dB LDN/CNEL due to the combined effect of all exterior noise sources.

Policy 9.0t Require proposed commercial projects near existing residential land use to demonstrate compliance with the Community Noise Ordinance prior to approval of the project.

Policy 9.0v Consider the following impacts as possible "significant":

- An increase in exposure of four or more dB if the resulting noise level would exceed that described as clearly compatible for the affected land use, as established in GP Table 7-10 and Table 7-11;
- Any increase of six dB or more, due to the potential for adverse community response.

Policy 9.0w Limit hours for all construction or demolition work where site-related noise is audible beyond the site boundary.

Policy 9.0y Minimize impacts of loud trucks by requiring that maximum noise levels to single events be controlled to 50 dB in bedrooms and 55 dB in other habitable spaces.

Table 7-10 of the Redlands General Plan provides noise criteria to evaluate the land use compatibility of noise; see Exhibit 4. The compatibility criteria indicate that residential land uses for residential uses (single family, duplex, multi-family) are considered clearly compatible below 60 dBA L_{dn}.

Table 7-11of the General Plan identifies a maximum allowable exterior noise level of 60 dBA CNEL and an interior noise level limit of 45 dBA CNEL for new residential developments; see Table 4. The City identifies exterior noise level limits for residential, commercial, industrial, institutional, and open space uses.

Exhibit 4: Noise/Land Use Compatibility Matrix and Interpretation

TABLE 7-10: NOISE/LAND USE COMPATIBILITY MATRIX AND INTERPRETATION (MEASURE U TABLE 9.1)

Land Use Categories		Community Noise Equivalent Level (CNEL)						
Categories	**Uses**	**<**	**60**	**65**	**70**	**75**	**80**	**85**	**>**
RESIDENTIAL	Single Family, Duplex Multiple Family	A	C	C	C	D	D	D
RESIDENTIAL	Mobile Homes	A	C	C	C	D	D	D
COMMERCIAL Regional, District	Hotel, Motel, Transient Lodging	A	A	B	B	C	C	D
COMMERCIAL Regional, Village District, Special	Commercial Retail, Bank, Restaurant, Movie Theater, Mixed Uses with residential units	A	A	A	A	B	B	C
COMMERCIAL INDUSTRIAL INSTITUTIONAL	Office Building, Research & Dev., Professional Offices, City Office Building	A	A	A	B	B	C	D
COMMERCIAL Recreation INSTITUTIONAL Civic Center	Amphitheater, Concert Hall, Auditorium, Meeting Hall	B	B	C	C	D	D	D
COMMERCIAL Recreation	Childrens Amusement Park, Miniature Golf Course, Go-cart Track, Equestrian Center, Sports Club	A	A	A	A	B	B	B
COMMERCIAL General, Special INDUSTRIAL, INSTITUTIONAL	Automobile Service Station, Auto Dealership, Manufacturing, Warehousing, Wholesale, Utilities	A	A	A	A	B	B	B
INSTITUTIONAL General	Hospital, Church, Library, Schools Classroom	A	A	B	C	D	D	D
OPEN SPACE	Parks	A	A	A	B	C	D	D
OPEN SPACE	Golf Course, Cemeteries, Nature Centers, Wildlife Reserves, Wildlife Habitat	A	A	A	A	B	C	C
AGRICULTURE	Agriculture	A	A	A	A	A	A	A

Zone A CLEARLY COMPATIBLE	Specified land use is satisfactory, based upon the assumption that any buildings involved are of normal conventional construction without any special noise insulation requirements.
ZONE B NORMALLY COMPATIBLE	New construction or development should be undertaken only after detailed analysis of the noise reduction requirements are made and needed noise insulation features in the design are determined. Conventional construction, with closed windows and fresh air supply systems or air conditioning, will normally suffice.
ZONE C NORMALLY INCOMPATIBLE	New construction or development should generally be discouraged. If new construction or development does proceed, a detailed analysis of noise reduction requirements must be made and needed noise insulation features included in the design.
ZONE D CLEARLY INCOMPATIBLE	New construction or development should generally not be undertaken.

Source: Mestre Greve Associates; Guidelines for the Preparation and Content of the Noise Element of the General Plan, prepared by the California Department of Health Services in coordination with The Governor's Office of Planning and Research. Adapted to the City of Redlands' standards.

Table 4: City of Redlands Interior and Exterior Noise Standards		
Land Use Categories	**Community Noise Equivalent Level (CNEL) Energy Average CNEL**	
Uses	**Interior[1]**	**Exterior[2]**
Residential		
Single Family, Duplex, Multiple Family	45[3]	60
Mobile Home	--	60[4]
Commercial, Industrial, Institutional		
Hotel, Motel, Transient Lodging	45	65[5]
Commercial Retail, Bank, Restaurant	55	--
Office Building, Research & Development, Professional Offices, City Office Building	50	--
Amphitheater, Concert Hall, Auditorium, Meeting Hall	45	--
Gymnasium (Multipurpose)	50	--
Sports Club	55	--
Manufacturing, Warehousing, Wholesale, Utilities	60	--
Movie Theaters	45	--
Institutional		
Hospitals, Schools, Classrooms	45	60
Open Space		
Parks	--	60
Notes: **CNEL (Community Noise Equivalent Level) – The average equivalent A-weighted sound level during a 24-hour day, obtained after addition of approximately 5 decibels to sound levels in the evening from 7 p.m. to 10 p.m. and ten decibels to sound levels at night after 10 p.m. and before 7 a.m.* 1. Indoor environment excluding bathrooms, toilets, closets, and corridors. 2. Outdoor environment limited to private yard of single family as measured at the property line; multifamily private patio or balcony which is served by a means of exit from inside; mobile home park; hospital patio; park picnic area; school playground; hotel and recreational area. 3. Noise level requirement with open windows if they are used to meet natural ventilation requirement. 4. Exterior noise level should be such that interior noise level will not exceed 45 CNEL. 5. Except those areas affected by aircraft noise.		
Source: City of Redlands, *Healthy Communities Noise Element*.		

City of Redlands Municipal Code

Redlands Municipal Code Section 8.06

The City of Redlands Municipal Code (RMC) Community Noise Control Ordinance (Chapter 8.06) includes regulations to control the negative effects of nuisance noise. Pursuant to Chapter 8.06 of RMC, allowable daytime (7:00 a.m. to 10:00 p.m.) and nighttime (10:00 p.m. to 7:00 a.m.) noise levels are as follows: Table 5: City of Redlands Maximum Permissible Exterior Sound Levels by Receiving Land Use and Table 6: City of Redlands Maximum Permissible Interior Sound Levels by Receiving Land Use.

Table 5: City of Redlands Maximum Permissible Exterior Sound Levels by Receiving Land Use		
Receiving Land Use Category	**Time Period**	**Noise Level - dBA**
Single-family residential districts	10:00 p.m. – 7:00 a.m. 7:00 a.m. – 10:00 p.m.	50 60
Multi-family residential districts; public space; institutional	10:00 p.m. – 7:00 a.m. 7:00 a.m. – 10:00 p.m.	50 60
Commercial	10:00 p.m. – 7:00 a.m. 7:00 a.m. – 10:00 p.m.	60 65
Industrial	Any time	75
Source: City of Redlands, *Redlands Municipal Code, Chapter 8.06.070 Exterior Noise Limits*.		

Table 6: City of Redlands Maximum Permissible Interior Sound Levels by Receiving Land Use		
Receiving Land Use Category	**Time Period**	**Noise Level - dBA**
Single-family residential districts	Any time	45
Multi-family residential districts; institutional; hotels	Any time	45
Commercial	Any time	50
Industrial	Any time	60
Source: City of Redlands, *Redlands Municipal Code, Chapter 8.06.080 Interior Noise Limits*.		

Additionally, Section 8.06.070 prohibits any source of sound when measure on any other property to exceed the following standards:

1. The noise standard for that land use specified in Table 4 for a cumulative period of more than thirty (30) minutes in any hour; or

2. The noise standard specified in Table 4 plus five (5) dB for a cumulative period of more than fifteen (15) minutes in any hour; or

3. The noise standard specified in Table 4 plus ten (10) dB for a cumulative period of more than five (5) minutes in any hour; or

4. The noise standard specified in Table 4 plus fifteen (15) dB for a cumulative period of more than one minute in any hour; or

5. The noise standard specified in Table 4 plus twenty (20) dB or the maximum measured ambient level, for any period of time.

RMC § 8.06.090 states that operating or causing the operation of any tools or equipment used in construction, repair, alteration, or demolition work between weekday hours of 6:00 p.m. and 7:00 a.m., including Saturdays, or at any time on Sundays or holidays, such that the sound therefrom creates a noise disturbance across a residential or commercial real property line, except for emergency work by public service utilities, the City, or another governmental entity, is prohibited. All mobile or stationary internal combustion engine powered equipment, or machinery shall be equipped with exhaust and air intake silencers in proper working order, or suitable to meet the standards set in RMC Chapter 8.06.

RMC § 8.06.090 also states that the following acts, and the causing of permitting thereof, are prohibited:

- Loading and unloading: Loading, unloading, opening, closing, or other handling of boxes, crates, containers, building materials, refuse containers, or similar objects between the hours of 10:00 p.m. and 6:00 a.m. in such a manner as to cause a noise disturbance across a residential real property line.

- Vibration: Operating or permitting the operation of any device that creates a vibration which is above the vibration perception is above the vibration threshold of an individual at or beyond the property boundary of the source if on private property or at 150 feet from the source if on a public space or public right of way.

- Powered Model Vehicles: Operating or permitting the operation of powered model vehicles between the hours of 7:00 p.m. and 7:00 a.m. so as to create a noise disturbance across a residential or commercial real property line or in such a manner to exceed the levels set forth for

public space's exterior noise standards measured at a distance not less than 100 feet from any point on the path of a vehicle operating on public space or public right-of-way.

- Domestic power tools and machinery: Operating or permitting the operation of any mechanically powered saw, sander, drill, grinder, lawn or garden tool, or similar tool between 10:00 p.m. and 7:00 a.m.

However, RMC § 8.06.120 states that the following exemptions apply, and therefore, are not applicable to the restrictions stated above:

- Construction activity: Chapter 8.06 of the RMC shall not apply to noise sources associated with new construction, remodeling, rehabilitation or grading of any property provided such activities take place between the hours of 7:00 a.m. and 6:00 p.m. on weekdays, including Saturdays, with no activities taking place on Sundays or federal holidays. All motorized equipment used in such activity shall be equipped with functioning mufflers.

4 EXISTING CONDITIONS

4.1 Existing Noise Sources

The City of Redlands is characterized as a predominately urban environment. Much of the City has been developed with residential, commercial and industrial land uses. Mobile sources of noise, especially cars and trucks, are the most common and significant sources of noise in most communities. Other sources of noise are the various land uses (i.e., residential, commercial, institutional, and recreational and parks activities) throughout the City that generate stationary-source noise. Existing mobile source noise in the Project area is generated from vehicles traveling along I-10, SR-210, New York Street, and Brockton Avenue. The primary sources of stationary noise near the Project are those associated with the operations of adjacent parking lots and commercial retail uses. Noise sources from commercial uses typically include mechanical equipment such as HVAC, automobile-related noise such as cars starting and doors slamming, landscaping equipment, and idling vehicles. The noise associated with these sources may represent a single-event noise occurrence, short-term, or long-term continuous noise.

4.2 Noise Measurements

The Project area is primarily occupied by commercial uses. To quantify existing ambient noise levels in the Project area, Kimley-Horn conducted four short-term noise measurements on March 28, 2023; see Appendix A: Existing Ambient Noise Measurements. The noise measurement sites were representative of typical existing noise exposure within and immediately adjacent to the project site. The 10-minute measurements were taken between 11:33 a.m. and 12:43 p.m. on a Tuesday. Measurements of L_{eq} are considered representative of the noise levels throughout the day. The average noise levels and sources of noise measured at each location are listed in Table 7: Existing Noise Measurements and shown on Exhibit 5: Noise Measurement Locations.

Table 7: Existing Noise Measurements

Site	Location	Measurement Period	Duration	L_{eq} (dBA)
ST-1	Along the west side of Karon Street, approximately 120 feet north of W Lugonia Avenue.	11:33 a.m. – 11:43 a.m.	10 Minutes	60.3
ST-2	Along Carlotta Court in residential neighborhood, approximately 500 feet west of Texas Street.	11:50 a.m. – 12:00 p.m.	10 Minutes	52.0
ST-3	Southeast corner of the Project site, near New York Street.	12:06 p.m. – 12:16 p.m.	10 Minutes	66.1
ST-4	Approximately 200 feet north of the Project site, east of the Home Depot parking lot.	12:33 p.m. – 12:43 p.m.	10 Minutes	59.9

Source: Noise measurements taken by Kimley-Horn, March 28, 2023. See Appendix A for noise measurement results.

EXHIBIT 5: Noise Measurement Locations

Redlands Used Automobile Sales and **Service** Facility Project

City of Redlands

Not to Scale

Kimley»Horn

Expect More. Experience Better.

4.3 Sensitive Receptors

Noise exposure goals for various types of land uses reflect the varying noise sensitivities associated with those uses. Noise sensitive uses typically include residences, hospitals, schools, childcare facilities, and places of assembly. Vibration sensitive receivers are generally similar to noise sensitive receivers but may also include businesses, such as research facilities and laboratories that use vibration-sensitive equipment. The Project site is mainly surrounded by commercial land uses to the north, east, and south, and vacant land and the I-10 and SR-210 freeways to the west. Noise sensitive land uses nearest to the Project site are listed in Table 8: Sensitive Receptors**.**

Table 8: Sensitive Receptors

Receptor Description	Distance and Direction from the Project Site
Single-family Residences	657 feet to the east
Single-family Residences	740 feet to the northeast

Source: Google Earth, 2023.

5 SIGNIFICANCE CRITERIA AND METHODOLOGY

5.1 CEQA Thresholds

Appendix G of the California Environmental Quality Act (CEQA) Guidelines contains analysis guidelines related to noise and vibration impacts. These guidelines have been used by the City to develop thresholds of significance for this analysis. A project would create a significant environmental impact if it would:

- Generate 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;
- Generate excessive ground-borne vibration or ground-borne noise levels; and
- 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, expose people residing or working in the project area to excessive noise levels.

Thresholds

Construction Noise

The City of Redlands does not establish quantitative construction noise standards and only limits the construction activities timeframe to the hours of 7:00 a.m. and 6:00 p.m. on weekdays, including Saturdays, with no activities taking place on Sundays or federal holidays; therefore, this analysis conservatively uses the FTA's threshold of 80 dBA (8-hour L_{eq}) for residential uses and 85 dBA (8-hour L_{eq}) for non-residential uses to evaluate construction noise impacts.[11]

Operational Noise

Operational noise is evaluated based on the standards within the RMC and General Plan. RMC Chapter 8.06 identifies a daytime (7:00 a.m. – 10:00 p.m.) standard of 45 dBA (interior) and 60 dBA (exterior) for residential receptors and a nighttime (10:00 p.m. – 7:00 a.m.) standard of 45 dBA (interior) and 50 dBA (exterior); refer to Table 5 and Table 6.

The City provides noise and land use compatibility standards (i.e., noise standards using a 24-hour metric such as L_{dn} or CNEL and with Clearly Compatible, Normally Compatible, Normally Incompatible, and Clearly Incompatible designations) in the General Plan; refer to Exhibit 4. In accordance with General Plan Policy 9.0v, a potentially significant impact would occur if the Project would cause ambient noise levels to increase by 4 dBA or more and the resulting noise level exceeds the Clearly Compatible land use compatibility standard for the receiving land use. Noise levels up to 60 dBA CNEL are considered Clearly Compatible and noise levels above 65 dBA CNEL are considered Normally Incompatible for residential uses. The environmental baseline is the Without Project condition.

[11] Federal Transit Administration, *Transit Noise and Vibration Impact Assessment Manual*, Table 7-2, Page 179, September 2018.

Vibration

The City currently does not have a significance threshold to assess vibration impacts. The Caltrans *2020 Transportation and Construction Vibration Guidance Manual* identifies the vibration threshold for human annoyance of 0.4 in/sec begin to cause annoyance and levels of 0.2 in/sec is used for building damage.

5.2 Methodology

Construction

Construction noise levels were based on typical noise levels generated by construction equipment published by the Federal Transit Administration (FTA) and the Federal Highway Administration (FHWA). Construction noise is assessed in dBA L_{eq}. This unit is appropriate because L_{eq} can be used to describe noise level from operation of each piece of equipment separately, and levels can be combined to represent the noise level from all equipment operating during a given period.

Construction noise modeling was conducting using the FHWA Roadway Construction Noise Model (RCNM). Reference noise levels are used to estimate operational noise levels at nearby noise-sensitive receptors based on a standard noise attenuation rate of 6 dB per doubling of distance (line-of-sight method of sound attenuation for point sources of noise). Noise level estimates do not account for the presence of intervening structures or topography, which may reduce noise levels at receptor locations. Therefore, the noise levels presented herein represent a conservative, reasonable worst-case estimate of actual temporary construction noise. The City of Redlands does not establish quantitative construction noise standards. As noted above, this analysis conservatively uses the FTA's threshold of 80 dBA (8-hour L_{eq}) for residential uses and 85 dBA (8-hour L_{eq}) for commercial/non-residential uses to evaluate construction noise impacts.

Operations

The analysis of the traffic noise environments is based on noise prediction modeling and empirical observations. Reference noise level data are used to estimate the Project operational noise impacts from stationary sources. Noise levels were collected from published sources from similar types of activities and used to estimate noise levels expected with the Project's stationary sources. The reference noise levels are used to represent a worst-case noise environment as noise level from stationary sources can vary throughout the day. Operational noise is evaluated based on the standards within the RMC and General Plan.

Vibration

Ground-borne vibration levels associated with Project construction-related activities were evaluated utilizing typical ground-borne vibration levels associated with construction equipment, obtained from FTA published data for construction equipment. Potential ground-borne vibration impacts related to building/structure damage and interference with sensitive existing operations were evaluated, considering the distance from construction activities to nearby land uses and typically applied criteria.

6 POTENTIAL IMPACTS AND MITIGATION

6.1 Acoustical Impacts

Threshold 6.1 Would the Project generate 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?

Construction

Construction noise typically occurs intermittently and varies depending on the nature or phase of construction (e.g., land clearing, grading, excavation, paving). Noise generated by construction equipment, including earth movers, material handlers, and portable generators, can reach high levels. During construction, exterior noise levels could affect the residential uses surrounding the construction site. However, it is acknowledged that construction activities would occur throughout the project site and would not be concentrated at a single point near sensitive receptors.

Construction activities would include site preparation, grading, infrastructure improvements, building construction, paving, and architectural coating. Such activities could require dozers and tractors during site preparation; excavators, graders, dozers, tractors, and scrapers during grading; tractors, pavers, and rollers during infrastructure improvements; cranes, generators, tractors, and welders during building construction; pavers, rollers, and a pavement scarafier during paving; and air compressors during architectural coating. Typical operating cycles for these types of construction equipment may involve 1 or 2 minutes of full power operation followed by 3 to 4 minutes at lower power settings. Other primary sources of acoustical disturbance would be random incidents, which would last less than one minute (such as dropping large pieces of equipment or the hydraulic movement of machinery lifts). Typical noise levels associated with individual construction equipment are listed in Table 9: Typical Construction Noise Levels.

Table 9: Typical Construction Noise Levels

Equipment	Typical Noise Level (dBA) at 50 feet from Source	Typical Noise Level (dBA) at 657 feet from Source[1]
Air Compressor	80	57.6
Backhoe	80	57.6
Compactor	82	59.6
Concrete Mixer	85	62.6
Concrete Pump	82	59.6
Concrete Vibrator	76	53.6
Crane, Mobile	83	60.6
Dozer	85	62.6
Generator	82	59.6
Grader	85	62.6
Impact Wrench	85	62.6
Jack Hammer	88	65.6
Loader	80	57.6
Paver	85	62.6
Pneumatic Tool	85	62.6
Pump	77	54.6

Table 9: Typical Construction Noise Levels		
Equipment	**Typical Noise Level (dBA) at 50 feet from Source**	**Typical Noise Level (dBA) at 657 feet from Source[1]**
Roller	85	62.6
Saw	76	53.6
Scraper	85	62.6
Shovel	82	59.6
Truck	84	61.6
Notes: 1. Calculated using the inverse square law formula for sound attenuation: $dBA_2 = dBA_1+20Log(d_1/d_2)$ Where: dBA_2 = estimated noise level at receptor; dBA_1 = reference noise level; d_1 = reference distance; d_2 = receptor location distance		
Source: Federal Transit Administration, *Transit Noise and Vibration Impact Assessment Manual*, September 2018.		

Sensitive uses in the Project site vicinity include existing residential uses to the east and northeast that could be exposed to elevated noise levels during Project construction. As indicated in Table 9, exterior noise levels could affect the nearest existing sensitive receptors in the Project vicinity (residential uses 657 feet to the east). FTA's methodology for quantitative construction noise assessments, FHWA's Roadway Construction Noise Model (RCNM) was used to predict construction noise at the nearest residential and commercial uses to Project construction. Per the FTA Transit Noise and Vibration Manual, when calculating construction noise, all construction equipment is assumed to operate simultaneously at the center of the active construction zone. In reality, equipment would be operating throughout the site and not all of the equipment would be operating at the point closest to off-site receptors; thus, considering the distance between the center of the Project site and the nearest receptors is a reasonable assumption. Therefore, the distance used in the RCNM model was approximately 1,100 from the center of the Project site to the nearest residential uses to the east and 400 feet to the Home Depot to the north; refer to Appendix A for RCNM modeling results.

The noise levels calculated in Table 10: Project Construction Noise Levels, show the exterior construction noise at the nearest sensitive receptor and nearest non-sensitive commercial receptor conservatively without accounting for attenuation from existing physical barriers and improvements in the technology of construction equipment, which today generate less noise. Construction equipment was assumed to operate simultaneously to represent a worst-case noise scenario as construction activities would routinely be spread throughout the construction site and would operate at different intervals.

As shown in Table 10, construction noise levels would not exceed the applicable FTA construction thresholds. The highest exterior noise level at the nearest residential receptors would occur during the building construction stage and would be 62.5 dBA which is below the FTA's 80 dBA threshold for residential uses. At the adjacent commercial use (north of the Project site located approximately 400 feet from the center of the construction area), maximum construction noise levels of 71.3 dBA would not exceed the FTA's threshold of 85 dBA for commercial uses.

Table 10: Project Construction Noise Levels					
Construction Phase	**Receptor Location**		**Worst Case Modeled Exterior Noise Level (dBA L_{eq})**	**Noise Threshold (dBA L_{eq})[2]**	**Exceeded?**
	Land Use	**Distance (feet)[1]**			
Site Preparation	Residential (East of the Project site)	1,100	60.8	80	No
Grading			61.4		No
Building Construction			62.5		No
Paving			59.7		No
Architectural Coating			46.9		No
Site Preparation	Commercial (North of the Project site)	400	69.6	85	No
Grading			70.2		No
Building Construction			71.3		No
Paving			68.5		No
Architectural Coating			55.7		No
Note: 1. Distance measured from the center of the Project site to the receptor's nearest property line. 2. Threshold from Federal Transit Administration, *Transit Noise and Vibration Impact Assessment Manual,* Table 7-3, 2018.					
Source: Federal Highway Administration, *Roadway Construction Noise Model,* 2006. Refer to Appendix A for noise modeling results.					

Construction activities may also cause increased noise along site access routes due to movement of equipment and workers. Compliance with the RMC would minimize impacts from construction noise, as construction would be limited to daytime hours on weekdays and Saturdays.

As discussed above, construction noise levels from the Project would not exceed the FTA's construction noise thresholds and would be required to comply with the RMC standards and allowable construction timeframe, therefore would result in a less than significant noise impact.

Operations

Implementation of the proposed Project would create new sources of noise in the project vicinity. The major noise sources associated with the project including the followings:

- Mechanical equipment (i.e., trash compactors, air conditioners, etc.);
- Parking lot noise (i.e., car door slamming, car radios, engine start-up, and car pass-by); and
- Off-Site Traffic Noise.
- Truck Delivery Noise
- Car Wash Operations Noise

Mechanical Equipment. The nearest sensitive receptors to the Project site are the residences located 657 feet east of the Project site boundary. Potential stationary noise sources related to long-term operation of the project site would include mechanical equipment. Mechanical equipment (e.g., heating ventilation and air conditioning [HVAC] equipment) typically generates noise levels of approximately 52 dBA at 50 feet.[12] At the closest sensitive receptors located approximately 657 feet away from the proposed buildings, mechanical equipment noise would attenuate to 29.6 dBA, which is below the City's 60 dBA exterior daytime, 50 dBA exterior nighttime, and 45 dBA interior standards. At the nearest commercial

[12] Elliott H. Berger, Rick Neitzel, and Cynthia A. Kladden, *Noise Navigator Sound Level Database with Over 1700 Measurement Values*, July 6, 2010.

use, mechanical equipment located at least 150 feet away would attenuate to 42.5 dBA, which is below the City's 65 dBA (exterior daytime threshold), 60 dBA (exterior nighttime thresholds), and 50 dBA (interior threshold) for commercial uses. Operation of mechanical equipment would not exceed allowable noise levels reaching receptors. Therefore, the proposed Project would result in a less than significant impact related to mechanical equipment levels.

Parking Noise. The Project would provide approximately 600 parking stalls for passenger vehicles for sales display and customer/employee parking. Parking stalls would be located to the east and southeast of the proposed Project site. According to the *Scoping Letter Agreement for Traffic Study for the Proposed Used Automobile Sales and Service Facility Project in the City of Redlands* prepared by Kimley-Horn (May 2023) (Traffic Scoping Agreement), the Project would generate up to 70 trips during the peak hour. For the purpose of providing a conservative, quantitative estimate of the noise levels that would be generated from the vehicles entering and exiting the parking lot, the methodology recommended by FTA for the general assessment of stationary transit noise sources is used. Using the methodology, the Project's peak hourly noise level that would be generated by the on-site parking levels was estimated using the following FTA equation for a parking lot:

$$L_{eq(h)} = SEL_{ref} + 10 \log (NA/1{,}000) - 35.6$$

Where:

$L_{eq(h)}$ = hourly L_{eq} noise level at 50 feet

SEL_{ref} = reference noise level for stationary noise source represented in sound exposure level (SEL) at 50 feet

NA = number of automobiles per hour

35.6 is a constant in the formula, calculated as 10 times the logarithm of the number of seconds in an hour

Using the FTA's reference noise level of 92 dBA SEL[13] at 50 feet from the noise source, the Project's highest peak hour vehicle trips would generate noise levels of approximately 44.9 dBA L_{eq} at 50 feet from the parking lot. The nearest sensitive receptor is located approximately 657 feet from the parking lot. Conservatively assuming that all vehicles would park at a location nearest to sensitive receptors rather than dispersed throughout all available parking and based strictly on distance attenuation, parking lot noise at the nearest receptor would be 22.5 dBA, which is below the City's 60 dBA daytime and 50 dBA nighttime standards for residential uses. At the adjacent commercial use, parking lot noise would attenuate to 35.4 dBA, which is below the City's 65 dBA and 60 dBA daytime and nighttime thresholds, respectively, for commercial uses. Parking lot noise also currently occurs at the adjacent properties under existing conditions. Parking lot noise would be consistent with the existing noise in the vicinity and would be partially masked by background noise from traffic along area roadways. Noise associated with parking lot activities is not anticipated to exceed the City's noise standards during operation. Therefore, noise impacts from parking lots would be less than significant.

Off-Site Traffic Noise. According to the Traffic Scoping Agreement, the Project would result in a maximum of 715 vehicle trips to the Project site and traffic would result in noise increases on Project area roadways. In general, a traffic noise increase of 3 dBA is barely perceptible to people, while a 5-dBA increase is readily noticeable. Generally, traffic volumes on Project area roadways would have to approximately double for

[13] Federal Transit Administration, *Transit Noise and Vibration Impact Assessment Manual*, September 2018.

the resulting traffic noise levels to increase by 3 dBA.[14] According to traffic data obtained from Replica, New York Street experiences approximately 3,704 average daily trips (ADT) between Lugonia Avenue and Colton Avenue.[15] As such, Project-generated traffic (715 daily trips) would not generate enough traffic to result in a permanent 3-dBA increase in ambient noise levels. Impacts would be less than significant.

Truck Delivery Noise. During car loading and unloading activities, noise would be generated by the trucks' diesel engines, exhaust systems, and brakes during low gear shifting braking activities; backing up; dropping down the dock ramps; and maneuvering away from the loading area. Loading or unloading activities would occur near the parking lot in the eastern and southern portion of the Project site. Truck access to the site would occur via New York Street.

Typically, heavy truck operations generate a noise level of 70 dBA at a distance of 50 feet.[16] As the closest commercial use is located at least 550 feet north of the proposed parking area (truck maneuvering area), truck delivery and loading activities noise would be approximately 49.2 dBA,[17] which is below the City's 65 dBA (exterior daytime threshold) and 50 dBA (interior threshold) for commercial uses. The nearest residential receptors are located approximately 657 feet east of the proposed parking area. At this distance, truck delivery and loading activities noise would be approximately 47.6 dBA, which is below the City's 60 dBA daytime standards for residential uses. It should be noted that truck delivery and loading activities would be performed only during daytime hours (7:00 am to 10:00 pm) and therefore nighttime noise standards are not applicable in this matter.

As discussed above, noise levels associated with trucks and loading/unloading activities would not exceed the City's noise standards and would comply with the provisions of the City's Code. Therefore, noise impacts from truck and loading activities noise would be less than significant.

Truck Back-Up Alarms**.** Medium and heavy-duty trucks reversing into the loading areas would produce noise from back-up alarms (also known as back-up beepers). Back-up beepers produce a typical volume of 97 dBA at one meter from the source.[18] The nearest commercial use would be located at least 550 feet north of the truck maneuvering area where trucks would be reversing and loading the cars. At this distance, exterior noise levels from back-up beepers would be approximately 46.7 dBA,[19] which is below the City's 65 dBA (exterior daytime threshold) and 50 dBA (interior threshold) for commercial uses. The nearest residential receptors are located at least 657 feet east of the truck maneuvering area. At this distance, exterior noise levels from back-up beepers would be approximately 50.2 dBA, which is below the City's 60 dBA daytime exterior standard and 45 dBA interior standard for residential uses.[20]

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[14] According to the California Department of Transportation, *Technical Noise Supplement to Traffic Noise Analysis Protocol* (September 2013), it takes a doubling of traffic to create a noticeable (i.e., 3 dBA) noise increase.

[15] https://studio.replicahq.com/

[16] Elliott H. Berger, Rick Neitzel, and Cynthia A. Kladden, *Noise Navigator Sound Level Database with Over 1700 Measurement Values*, June 26, 2015.

[17] Based on the inverse square law of sound propagation and assuming a minimum 5 dBA reduction from the proposed 10-foot-high perimeter screen wall along the northern boundary of the project site.

[18] Environmental Health Perspectives, *Vehicle Motion Alarms: Necessity, Noise Pollution, or Both?* https://www.ncbi.nlm.nih.gov/pmc/articles/PMC3018517/, accessed May 2023.

[19] Based on the inverse square law of sound propagation and assuming a minimum 5 dBA reduction from the proposed 10-foot-high perimeter screen wall along the northern boundary of the project site.

[20] Assuming an exterior-interior sound reduction of 25 dBA from standard construction practices, per the United States Department of Housing and Urban Development, *Noise Guidebook*, available at: https://www.hudexchange.info/resource/313/hud-noise-guidebook/ (2009).

Therefore, back-up beeper noise would not exceed the City's applicable noise standards and noise impacts from back-up beepers would be less than significant.

Car Wash Operations Noise. The automated drive-thru car wash would typically include a conveyor wash tunnel with a vacuum and a dryer system. Car wash operations would occur during daytime hours (7:00 a.m. to 10:00 p.m.). In general, a common dryer system would generate 89 dBA at a distance of 10 feet from the source.[21] Because the drying cycle represents a small portion of the overall wash, the dryers are anticipated to operate for no more than 30 minutes during any given hour. The calculated Hourly L_{eq} given 30 minute usage of the dryer cycle at the exit of the drive-thru car wash tunnel would be 89 dBA at a reference distance of 10 feet. A standard car wash vacuum unit commonly generates 72 dBA at a distance of 10 feet.[22] The nearest receptors (commercial building to the north and residential use to the east) are located approximately 250 feet and 1,100 feet from the car wash unit respectively; Table 11: Car Wash Noise Levels shows the combined car wash noise level at the nearest receptors. As shown in Table 11, car wash operations would generate a combined noise level of 46.5 dBA and 33.8 dBA at the nearest commercial and residential use receptors respectively, which would not exceed the City's daytime exterior noise standard (65 dBA) and interior threshold (50 dBA) for commercial uses, nor the exterior noise standard (60 dBA) or interior threshold (45 dBA)[23] for residential uses. Therefore, noise levels generated by car wash operations would be less than significant.

Table 11: Car Wash Noise Levels

Source	Reference Noise Level[1]	Reference Distance	Nearest Receptor Distance from Source (feet)[2]	Building Row Attenuation[3]	Modeled Exterior Noise Level at Nearest Sensitive Receptor (dBA)
Commercial Receptor					
Dryers	89 dBA	10 Feet	250 Feet	15	43.0
Vacuum	72 dBA	10 Feet	250 Feet	NA	44.0
				Car Wash Combined Noise Level	***46.5***
				Noise Threshold (dBA)[4]	*65*
				Threshold Exceeded?	***No***
Residential Receptor					
Dryers	89 dBA	10	1,100	15	30.2
Vacuum	72 dBA	10	1,100	NA	31.2
				Car Wash Combined Noise Level	***33.8***
				Noise Threshold (dBA)[4]	50
				Threshold Exceeded?	***No***

NA = Not Applicable

1. Noise level specifications for the dryer system and vacuum have been used based on data from other similar projects.
2. The nearest commercial and residential uses are to the north and east respectively.
3. Building row attenuation assumes partial obstruction as the dryers would be inside the car wash building. Refer to Appendix A for barrier calculations.
4. The car wash would operate during daytime hours, between 7:00 a.m. to 10:00 p.m. Therefore, the City's daytime exterior noise standard for commercial uses (65 dBA) and residential uses (60 dBA) were applied.

[21] According to Mark VII Clean Cars Inc., AquaDri Dryers Specifications, 2015.

[22] Ibid.

[23] Assuming an exterior-interior sound reduction of 25 dBA from standard construction practices, per the United States Department of Housing and Urban Development, *Noise Guidebook*, available at: https://www.hudexchange.info/resource/313/hud-noise-guidebook/ (2009).

Mitigation Measures: No mitigation is required.

Level of Significance: Less than significant impact.

Threshold 6.2 Would the Project generate excessive ground-borne vibration or ground-borne noise levels?

Increases in ground-borne vibration levels attributable to the proposed Project would be primarily associated with short-term construction-related activities. Construction on the Project site would have the potential to result in varying degrees of temporary ground-borne vibration, depending on the specific construction equipment used and the operations involved.

The FTA has published standard vibration velocities for construction equipment operations in their 2018 *Transit Noise and Vibration Impact Assessment Manual*. The types of construction vibration impacts include human annoyance and building damage. In general, the FTA architectural damage criterion for continuous vibrations (i.e., 0.2 in/sec) appears to be conservative. The types of construction vibration impacts include human annoyance and building damage. Human annoyance occurs when construction vibration rises significantly above the threshold of human perception for extended periods of time (0.20 in/sec annoyance threshold).[24] Building damage can be cosmetic or structural. Ordinary buildings that are not particularly fragile would not experience any cosmetic damage (e.g., plaster cracks) at distances beyond 30 feet. This distance can vary substantially depending on the soil composition and underground geological layer between vibration source and receiver. In addition, not all buildings respond similarly to vibration generated by construction equipment. For example, for a building that is constructed with reinforced concrete with no plaster, the FTA guidelines show that a vibration level of up to 0.20 in/sec is considered safe and would not result in any construction vibration damage.

The nearest structure to the Project site is the Home Depot building located approximately 70 feet to the north of the Project boundary line. The nearest residential structure is located approximately 657 feet east of the Project boundary line. Table 12: Typical Construction Equipment Vibration Levels, lists vibration levels at 25 feet and 70 feet for typical construction equipment.

Table 12: Typical Construction Equipment Vibration Levels

Equipment	Peak Particle Velocity at 25 Feet (in/sec)	Peak Particle Velocity at 70 Feet (in/sec)[1]
Large Bulldozer	0.089	0.0190
Caisson Drilling	0.089	0.0190
Loaded Trucks	0.076	0.0162
Jackhammer	0.035	0.0075
Small Bulldozer/Tractors	0.003	0.0006

Notes:
1. Calculated using the following formula: $PPV_{equip} = PPV_{ref} \times (25/D)^{1.5}$, where: PPV_{equip} = the peak particle velocity in in/sec of the equipment adjusted for the distance; PPV_{ref} = the reference vibration level in in/sec from Table 7-4 of the Federal Transit Administration, *Transit Noise and Vibration Impact Assessment Manual*, 2018; D = the distance from the equipment to the receiver.

Source: Federal Transit Administration, *Transit Noise and Vibration Impact Assessment Manual*, 2018.

Ground-borne vibration generated by construction equipment spreads through the ground and diminishes in magnitude with increases in distance. As indicated in Table 12, based on FTA data, vibration velocities from typical heavy construction equipment operations that could be used during Project

[24] California Department of Transportation, *Transportation and Construction Vibration Guidance Manual*, Table 5, April 2020.

construction range from 0.0006 to 0.0190 in/sec PPV at 70 feet from the source of activity (the distance from active construction zone to the nearest structure to the north), which is below the FTA's 0.20 PPV threshold for structural damage and Caltrans 0.4 in/sec PPV threshold for annoyance. The closest residential uses are approximately 657 feet east of the Project site; at this distance, vibration velocities from typical heavy construction equipment would be far lower than those calculated for the in Table 12. Once operational, the Project would not be a significant source of ground-borne vibration. It is also acknowledged that construction activities would occur throughout the project site and would not be concentrated at the point closest to the nearest structure. Therefore, vibration impacts associated with the Project construction would be less than significant.

Mitigation Measures: No mitigation is required.

Level of Significance: Less than significant impact.

Threshold 6.3 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?

The nearest airport to the Project site is the San Bernardino International Airport, located approximately 2.70 miles to the northwest. The Project is not within 2.0 miles of a public airport, private airfield, or within an airport land use plan. Therefore, the Project would not expose people residing or working in the Project area to excessive airport- or airstrip-related noise levels and no mitigation is required.

Mitigation Measures: No mitigation is required.

Level of Significance: Less than significant impact.

6.2 Cumulative Noise Impacts

Cumulative Construction Noise

The Project's construction activities would not result in a substantial temporary increase in ambient noise levels. Construction noise would be periodic and temporary noise impacts would cease upon completion of construction activities. The Project would contribute to other proximate construction project noise impacts if construction activities were conducted concurrently. However, based on the noise analysis above, the Project's construction-related noise impacts would be less than significant following compliance with the RMC.

Construction activities at other planned and approved projects near the Project site would be required to comply with applicable City rules related to noise and would take place during daytime hours on the days permitted by the RMC, and projects requiring discretionary City approvals would be required to evaluate construction noise impacts, comply with the City's standard conditions of approval, and implement mitigation, if necessary, to minimize noise impacts. Construction noise impacts are by nature localized. Based on the fact that noise dissipates as it travels away from its source, noise impacts would be limited to the Project site and vicinity. Therefore, Project construction would not result in a cumulatively considerable contribution to significant cumulative impacts, assuming such a cumulative impact existed, and impacts in this regard are not cumulatively considerable.

Cumulative Operational Noise

Stationary noise sources of the proposed Project would result in an incremental increase in non-transportation noise sources in the Project vicinity. However, as discussed above, operational noise caused by the proposed Project would be less than significant. Other planned and approved projects would be required to mitigate for stationary noise impacts at nearby sensitive receptors, if necessary. As stationary noise sources are generally localized, there is a limited potential for other projects to contribute to cumulative noise impacts.

No known past, present, or reasonably foreseeable projects would combine with the operational noise levels generated by the Project to increase noise levels above acceptable standards because each project must comply with applicable City regulations that limit operational noise. Therefore, the Project, together with other projects, would not create a significant cumulative impact, and even if there was such a significant cumulative impact, the Project would not make a cumulatively considerable contribution to significant cumulative operational noises.

Given that noise dissipates as it travels away from its source, operational noise impacts from on-site activities and other stationary sources would be limited to the Project site and vicinity. Thus, cumulative operational noise impacts from related projects, in conjunction with Project specific noise impacts, would not be cumulatively significant.

Mitigation Measures: No mitigation is required.

Level of Significance: Less than significant impact.

7 REFERENCES

1. California Department of Transportation, *California Vehicle Noise Emission Levels*, 1987.
2. California Department of Transportation, *Traffic Noise Analysis Protocol*, 2011.
3. California Department of Transportation, *Technical Noise Supplement to the Traffic Noise Analysis Protocol*, 2013.
4. California Department of Transportation, *Transportation Related Earthborne Vibrations*, 2002.
5. California Department of Transportation, *Transportation and Construction Vibration Guidance Manual*, 2013.
6. California Department of Transportation, *Transportation and Construction Vibration Guidance Manual,* 2020.
7. City of Redlands, *General Plan 2035*, 2018.
8. City of Redlands, *Redlands Municipal Code*, 2023.
9. Elliott H. Berger, Rick Neitzel, and Cynthia A. Kladden, *Noise Navigator Sound Level Database with Over 1700 Measurement Values*, July 6, 2010
10. Environmental Health Perspectives, *Vehicle Motion Alarms: Necessity, Noise Pollution, or Both?* https://www.ncbi.nlm.nih.gov/pmc/articles/PMC3018517/, accessed May 2023.
11. Federal Highway Administration, *Noise Fundamentals,* 2017.
12. Federal Highway Administration, *Roadway Construction Noise Model*, 2006.
13. Federal Highway Administration, *Roadway Construction Noise Model User's Guide Final Report*, 2006.
14. Federal Interagency Committee on Noise, *Federal Agency Review of Selected Airport Noise Analysis Issues*, 1992.
15. Federal Transit Administration, *Transit Noise and Vibration Impact Assessment Manual*, 2018.
16. James P. Cowan, *Handbook of Environmental Acoustics,* 1994.
17. Kimley-Horn, *Scoping Letter Agreement for Traffic Study for the Proposed Used Automobile Sales and Service Facility Project in the City of Redlands*, May 2023.
18. Replica, *Redlands Annual Average Daily Traffic (AADT)*, https://studio.replicahq.com/data/downloads, accessed May 25, 2023.
19. United States Department of Housing and Urban Development, *Noise Guidebook*, available at: https://www.hudexchange.info/resource/313/hud-noise-guidebook/ (2009).
20. United States Environmental Protection Agency, *Protective Noise Levels (EPA 550/9-79-100)*, 1979.

Appendix A

NOISE DATA

Noise Measurement Field Data

Project:	Redlands Used Automobile Sales & Service Facility	**Job Number:**	195440002
Site No.:	ST-1	**Date:**	3/28/2023
Analyst:	Sarah Miller and Skye Hansen	**Time:**	11:33-11:43 AM
Location:	Along the west side of Karon Street, approximately 120 feet north of W Lugonia Avenue.		
Noise Sources:	Car traffic		

Results (dBA):

Leq:	Lmin:	Lmax:	Peak:
60.3	51.3	71.7	85.1

Equipment	
Sound Level Meter:	LD SoundExpert LxT
Calibrator:	CAL200
Response Time:	Slow
Weighting:	A
Microphone Height:	5 feet

Weather	
Temp. (degrees F):	64°
Wind (mph):	4
Sky:	Clear
Bar. Pressure:	30.07"
Humidity:	29%

Photo:

Kimley»Horn

Summary

File Name on Meter	ST-.072.s
File Name on PC	LxTse_0007061-20230328 113309-ST-.072.ldbin
Serial Number	0007061
Model	SoundExpert® LxT
Firmware Version	2.404
User	
Location	
Job Description	
Note	

Measurement

Description	
Start	2023-03-28 11:33:09
Stop	2023-03-28 11:43:09
Duration	00:10:00.0
Run Time	00:10:00.0
Pause	00:00:00.0
Pre-Calibration	2023-03-23 11:12:03
Post-Calibration	None
Calibration Deviation	---

Overall Settings

RMS Weight	A Weighting
Peak Weight	A Weighting
Detector	Slow
Preamplifier	PRMLxT1L
Microphone Correction	FF:90 2116
Integration Method	Linear
OBA Range	Normal
OBA Bandwidth	1/1 and 1/3
OBA Frequency Weighting	A Weighting
OBA Max Spectrum	At LMax
Overload	122.4 dB

	A	C	Z	
Under Range Peak	**78.9**	75.9	80.9	dB
Under Range Limit	**24.2**	25.2	31.3	dB
Noise Floor	15.1	16.1	22.2	dB

	First	Second	Third
Instrument Identification	1100 W. Town&Country Rd, #700 , CA 92868		

Results

LAeq	60.3	dB	
LAE	88.1	dB	
EA	71.435	µPa²h	
LApeak (max)	2023-03-28 11:36:37	85.1	dB
LASmax	2023-03-28 11:36:37	71.7	dB
LASmin	2023-03-28 11:37:11	51.3	dB
SEA	-99.9	dB	

	Exceedance Counts	Duration	
LAS > 85.0 dB	0	0.0	s
LAS > 115.0 dB	0	0.0	s
LApeak > 135.0 dB	0	0.0	s
LApeak > 137.0 dB	0	0.0	s
LApeak > 140.0 dB	0	0.0	s

Community Noise	**Ldn 7:00-22:00**	**2:00-07:00**		**Lden 7:00-19:00**	**9:00-22:00**	**2:00-07:00**		
	60.3	60.3	-99.9	60.3	60.3	-99.9	-99.9	dB

LCeq	71.8	dB
LAeq	60.3	dB
LCeq - LAeq	11.5	dB
LAleq	61.9	dB
LAeq	60.3	dB
LAleq - LAeq	1.6	dB

	A		C		Z	
	dB	**Time Stamp**	**dB**	**Time Stamp**	**dB**	**Time Stamp**
Leq	60.3		71.8			
Ls(max)	71.7	/03/28 11:36:37				
Ls(min)	51.3	/03/28 11:37:11				
Lpeak(max)	85.1	/03/28 11:36:37				

Overload Count	0	
Overload Duration	0.0	s
OBA Overload Count	0	
OBA Overload Duration	0.0	s

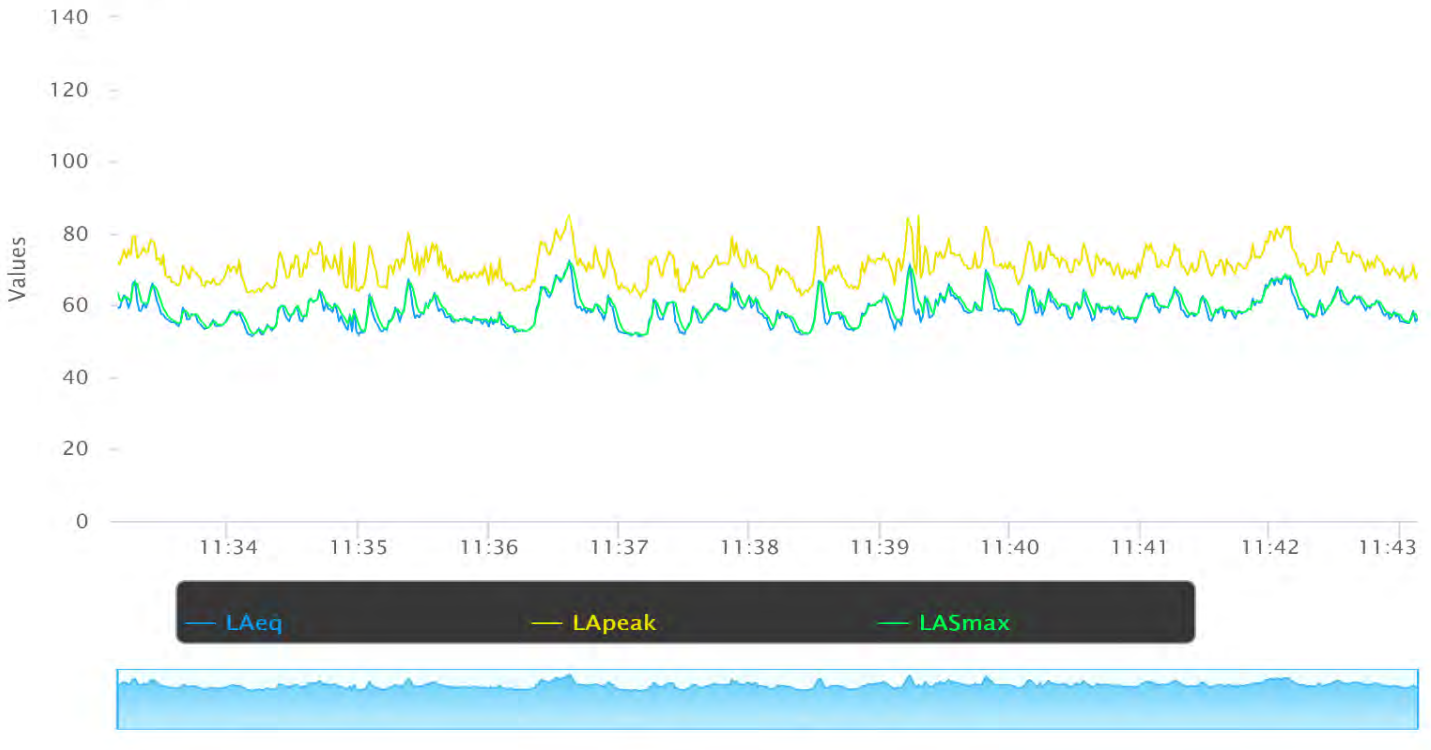
Statistics

LA 5.00	65.3	dB
LA 10.00	63.3	dB
LA 33.30	59.7	dB
LA 50.00	58.4	dB
LA 66.60	57.0	dB
LA 90.00	53.7	dB

Calibration History

Preamp	**Date**	**Time**	**re. 1V/Pa**	**6.3**	**8.0**	**10.0**	**12.5**	**16.0**	**20.0**	**25.0**	**31.5**	**40.0**	**50.0**	**63.0**	**80.0**	**100**	**125**	**160**	**200**	**250**	**315**	**400**	**500**	**630**	**800**	**1000**	**1250**	**1600**	**2000**	**2500**	**3150**	**4000**	**5000**	**6300**	**8000**	**10000**	**12500**	**16000**	**20000**
PRMLxT1L	2023-03-23	11:12:03	-28.64	85.31	79.29	90.61	86.30	70.84	59.75	49.68	55.70	49.91	50.95	48.87	52.84	43.24	41.01	42.06	36.63	36.36	33.27	32.34	32.59	24.67	29.35	114.50	49.32	19.71	65.93	21.50	60.96	25.73	31.48	22.22	22.45	22.77	23.94	27.72	30.95
PRMLxT1L	2023-03-23	09:47:22	-29.16	2.44	1.41	32.70	38.97	44.48	57.43	60.24	55.69	60.63	63.35	61.10	60.73	59.37	59.85	60.69	59.04	59.25	53.23	51.50	53.63	54.72	56.60	113.38	59.95	55.36	65.18	52.76	60.50	50.96	50.44	49.70	47.53	45.08	41.92	43.21	42.89
PRMLxT1L	2023-03-19	06:43:46	-28.55	45.86	53.64	50.36	48.48	39.74	43.36	37.33	33.88	37.19	37.19	31.45	34.66	34.27	25.71	15.68	19.38	17.03	16.81	17.00	15.82	14.83	27.25	113.92	48.20	18.86	66.16	20.06	59.01	24.32	29.82	21.46	21.83	21.87	22.93	26.83	30.35
PRMLxT1L	2023-03-17	08:13:23	-28.49	67.24	63.76	62.84	55.22	65.39	64.43	66.90	63.56	61.30	58.28	56.83	54.69	52.88	51.62	46.03	64.35	62.64	57.92	57.90	58.43	39.36	32.56	113.97	48.52	24.49	66.30	20.77	59.12	23.20	29.79	22.25	21.93	22.00	23.02	26.81	30.45
PRMLxT1L	2023-03-08	09:41:26	-28.48	63.94	68.89	69.29	67.88	62.26	63.46	59.19	67.50	65.47	62.43	61.68	72.02	62.64	61.15	64.79	57.33	58.87	53.83	51.83	48.41	44.42	32.26	114.14	48.74	20.37	65.89	21.13	60.39	26.94	31.06	21.77	22.38	22.62	23.27	27.08	30.91
PRMLxT1L	2023-03-08	09:31:17	-28.63	65.51	57.73	60.78	65.33	69.35	62.91	63.35	61.91	69.32	63.08	63.81	62.18	62.37	60.06	63.75	61.27	63.49	54.78	58.03	54.64	47.00	38.60	113.92	48.41	23.36	65.36	21.63	60.09	26.59	30.92	21.42	22.03	21.54	23.15	27.12	30.37
PRMLxT1L	2023-03-07	15:44:29	-28.57	61.89	59.62	59.69	59.85	56.75	50.43	50.14	47.52	46.28	40.09	34.87	34.15	31.88	39.06	36.59	39.08	34.13	33.19	28.66	21.55	23.05	29.36	114.45	49.29	20.72	65.96	20.91	60.82	25.87	31.10	22.38	22.55	22.47	23.70	27.62	30.79
PRMLxT1L	2023-03-07	10:07:14	-29.03	65.35	66.48	63.00	62.67	52.81	62.37	57.48	61.99	60.59	59.40	60.18	57.85	50.22	47.06	38.90	44.52	30.11	27.41	37.36	26.81	19.99	28.33	113.62	48.39	20.12	65.44	20.46	59.88	25.24	30.97	21.59	21.62	21.67	23.18	26.60	30.27
PRMLxT1L	2023-03-06	17:33:30	-28.67	62.71	63.59	55.23	49.05	42.12	47.10	45.49	45.56	40.75	36.48	36.50	29.77	34.89	33.92	34.29	36.99	31.16	28.64	27.36	19.08	16.26	28.18	113.98	48.84	20.01	65.51	20.28	60.36	25.74	30.76	21.61	22.06	22.20	23.64	27.12	30.60
PRMLxT1L	2023-02-08	07:36:29	-28.67	61.37	51.98	65.16	55.04	51.14	52.74	43.98	48.60	40.89	38.28	37.83	42.69	66.97	57.31	51.01	59.56	51.48	55.87	57.39	58.30	51.10	35.99	114.59	49.36	22.61	66.12	21.44	61.03	25.98	31.59	22.62	22.56	22.58	23.98	27.82	31.30
PRMLxT1L	2023-02-01	12:49:09	-29.28	58.23	73.09	64.93	71.38	69.09	71.22	71.01	68.62	63.85	66.40	64.74	65.39	63.95	62.97	61.00	61.89	59.18	55.69	49.09	40.95	31.27	29.22	114.01	48.79	20.20	64.39	20.70	60.39	24.56	31.58	22.83	23.05	22.39	23.38	27.45	30.94

Time History



Noise Measurement Field Data

Project:	Redlands Used Automobile Sales & Service Facility	**Job Number:**	195440002
Site No.:	ST-2	**Date:**	3/28/2023
Analyst:	Sarah Miller and Skye Hansen	**Time:**	11:50 AM-12:00 PM
Location:	Along Carlotta Court in residential neighborhood, approximately 500 feet west of Texas Street.		
Noise Sources:	Car traffic and residential pedestrians		

Results (dBA):

Leq:	Lmin:	Lmax:	Peak:
52.0	50.0	58.0	85.0

Equipment	
Sound Level Meter:	LD SoundExpert LxT
Calibrator:	CAL200
Response Time:	Slow
Weighting:	A
Microphone Height:	5 feet

Weather	
Temp. (degrees F):	65°
Wind (mph):	4
Sky:	Clear
Bar. Pressure:	30.07"
Humidity:	27%

Photo:

Kimley»Horn

Summary

File Name on Meter	ST-.073.s
File Name on PC	LxTse_0007061-20230328 115053-ST-.073.ldbin
Serial Number	0007061
Model	SoundExpert® LxT
Firmware Version	2.404
User	
Location	
Job Description	
Note	

Measurement

Description	
Start	2023-03-28 11:50:53
Stop	2023-03-28 12:00:53
Duration	00:10:00.0
Run Time	00:10:00.0
Pause	00:00:00.0
Pre-Calibration	2023-03-23 11:12:03
Post-Calibration	None
Calibration Deviation	---

Overall Settings

RMS Weight	A Weighting
Peak Weight	A Weighting
Detector	Slow
Preamplifier	PRMLxT1L
Microphone Correction	FF:90 2116
Integration Method	Linear
OBA Range	Normal
OBA Bandwidth	1/1 and 1/3
OBA Frequency Weighting	A Weighting
OBA Max Spectrum	At LMax
Overload	122.4 dB

	A	C	Z	
Under Range Peak	**78.9**	75.9	80.9	dB
Under Range Limit	**24.2**	25.2	31.3	dB
Noise Floor	15.1	16.1	22.2	dB

	First	Second	Third
Instrument Identification	1100 W. Town&Country Rd, #700 , CA 92868		

Results

LAeq	52.0	dB
LAE	79.8	dB
EA	10.566	µPa²h
LApeak (max)	2023-03-28 11:51:03	85.0 dB
LASmax	2023-03-28 11:50:53	58.0 dB
LASmin	2023-03-28 11:56:52	50.0 dB
SEA	-99.9	dB

	Exceedance Counts	Duration	
LAS > 85.0 dB	0	0.0	s
LAS > 115.0 dB	0	0.0	s
LApeak > 135.0 dB	0	0.0	s
LApeak > 137.0 dB	0	0.0	s
LApeak > 140.0 dB	0	0.0	s

Community Noise	Ldn 7:00-22:00	2:00-07:00		Lden 7:00-19:00	9:00-22:00	2:00-07:00		
	52.0	52.0	-99.9	52.0	52.0	-99.9	-99.9	dB

LCeq	65.7	dB
LAeq	52.0	dB
LCeq - LAeq	13.7	dB
LAleq	54.7	dB
LAeq	52.0	dB
LAleq - LAeq	2.7	dB

	A		C		Z	
	dB	Time Stan	dB	Time Stan	dB	Time Stamp
Leq	52.0		65.7			
Ls(max)	58.0	03/28 11:50:53				
Ls(min)	50.0	03/28 11:56:52				
Lpeak(max)	85.0	03/28 11:51:03				

Overload Count	0	
Overload Duration	0.0	s
OBA Overload Count	0	
OBA Overload Duration	0.0	s

Statistics

LA 5.00	54.2	dB
LA 10.00	53.4	dB
LA 33.30	51.9	dB
LA 50.00	51.6	dB
LA 66.60	51.4	dB
LA 90.00	51.0	dB

Calibration History

Preamp	Date	Time	re. 1V/Pa	6.3	8.0	10.0	12.5	16.0	20.0	25.0	31.5	40.0	50.0	63.0	80.0	100	125	160	200	250	315	400	500	630	800	1000	1250	1600	2000	2500	3150	4000	5000	6300	8000	10000	12500	16000	20000
PRMLxT1L	2023-03-23	11:12:03	-28.64	85.31	79.29	90.61	86.30	70.84	59.75	49.68	55.70	49.91	50.95	48.87	52.84	43.24	41.01	42.06	36.63	36.36	33.27	32.34	32.59	24.67	29.35	114.50	49.32	19.71	65.93	21.50	60.96	25.73	31.48	22.22	22.45	22.77	23.94	27.72	30.95
PRMLxT1L	2023-03-23	09:47:22	-29.16	2.44	1.41	32.70	38.97	44.48	57.43	60.24	55.69	60.63	63.35	61.10	60.73	59.37	59.85	60.69	59.04	59.25	53.23	51.50	53.63	54.72	56.60	113.38	59.95	55.36	65.18	52.76	60.50	50.96	50.44	49.70	47.53	45.08	41.92	43.21	42.89
PRMLxT1L	2023-03-19	06:43:46	-28.55	45.86	53.64	50.36	48.48	39.74	43.36	37.33	33.88	37.19	37.19	31.45	34.66	34.27	25.71	15.68	19.38	17.03	16.81	17.00	15.82	14.83	27.25	113.92	48.20	18.86	66.16	20.06	59.01	24.32	29.82	21.46	21.83	21.87	22.93	26.83	30.35
PRMLxT1L	2023-03-17	08:13:23	-28.49	67.24	63.76	62.84	55.22	65.39	64.43	66.90	63.56	61.30	58.28	56.83	54.69	52.88	51.62	46.03	64.35	62.64	57.92	57.90	58.43	39.36	32.56	113.97	48.52	24.49	66.30	20.77	59.12	23.20	29.79	22.25	21.93	22.00	23.02	26.81	30.45
PRMLxT1L	2023-03-08	09:41:26	-28.48	63.94	68.89	69.29	67.88	62.26	63.46	59.19	67.50	65.47	62.43	61.68	72.02	62.64	61.15	64.79	57.33	58.87	53.83	51.83	48.41	44.42	32.26	114.14	48.74	20.37	65.89	21.13	60.39	26.94	31.06	21.77	22.38	22.62	23.27	27.08	30.91
PRMLxT1L	2023-03-08	09:31:17	-28.63	65.51	57.73	60.78	65.33	69.35	62.91	63.35	61.91	69.32	63.08	63.81	62.18	62.37	60.06	63.75	61.27	63.49	54.78	58.03	54.64	47.00	38.60	113.92	48.41	23.36	65.36	21.63	60.09	26.59	30.92	21.42	22.03	21.54	23.15	27.12	30.37
PRMLxT1L	2023-03-07	15:44:29	-28.57	61.89	59.62	59.69	59.85	56.75	50.43	50.14	47.52	46.28	40.09	34.87	34.15	31.88	39.06	36.59	39.08	34.13	33.19	28.66	21.55	23.05	29.36	114.45	49.29	20.72	65.96	20.91	60.82	25.87	31.10	22.38	22.55	22.47	23.70	27.62	30.79
PRMLxT1L	2023-03-07	10:07:14	-29.03	65.35	66.48	63.00	62.67	52.81	62.37	57.48	61.99	60.59	59.40	60.18	57.85	50.22	47.06	38.90	44.52	30.11	27.41	37.36	26.81	19.99	28.33	113.62	48.39	20.12	65.44	20.46	59.88	25.24	30.97	21.59	21.62	21.67	23.18	26.60	30.27
PRMLxT1L	2023-03-06	17:33:30	-28.67	62.71	63.59	55.23	49.05	42.12	47.10	45.49	45.56	40.75	36.48	36.50	29.77	34.89	33.92	34.29	36.99	31.16	28.64	27.36	19.08	16.26	28.18	113.98	48.84	20.01	65.51	20.28	60.36	25.74	30.76	21.61	22.06	22.20	23.64	27.12	30.60
PRMLxT1L	2023-02-08	07:36:29	-28.67	61.37	51.98	65.16	55.04	51.14	52.74	43.98	48.60	40.89	38.28	37.83	42.69	66.97	57.31	51.01	59.56	51.48	55.87	57.39	58.30	51.10	35.99	114.59	49.36	22.61	66.12	21.44	61.03	25.98	31.59	22.62	22.56	22.58	23.98	27.82	31.30
PRMLxT1L	2023-02-01	12:49:09	-29.28	58.23	73.09	64.93	71.38	69.09	71.22	71.01	68.62	63.85	66.40	64.74	65.39	63.95	62.97	61.00	61.89	59.18	55.69	49.09	40.95	31.27	29.22	114.01	48.79	20.20	64.39	20.70	60.39	24.56	31.58	22.83	23.05	22.39	23.38	27.45	30.94

Time History

Noise Measurement Field Data

Project:	Redlands Used Automobile Sales & Service Facility	**Job Number:**	195440002
Site No.:	ST-3	**Date:**	3/28/2023
Analyst:	Sarah Miller and Skye Hansen	**Time:**	12:06-12:16 PM
Location:	Southeast corner of the project Project site, near New York Street.		
Noise Sources:	Car traffic		
Comments:	Car alarm at 12:06 PM		

Results (dBA):

Leq:	Lmin:	Lmax:	Peak:
66.1	56.4	86.0	99.0

Equipment	
Sound Level Meter:	LD SoundExpert LxT
Calibrator:	CAL200
Response Time:	Slow
Weighting:	A
Microphone Height:	5 feet

Weather	
Temp. (degrees F):	66°
Wind (mph):	5
Sky:	Clear
Bar. Pressure:	30.05"
Humidity:	27%

Photo:

Kimley»Horn

Summary

File Name on Meter	ST-.074.s
File Name on PC	LxTse_0007061-20230328 120619-ST-.074.ldbin
Serial Number	0007061
Model	SoundExpert® LxT
Firmware Version	2.404
User	
Location	
Job Description	
Note	

Measurement

Description	
Start	2023-03-28 12:06:19
Stop	2023-03-28 12:16:19
Duration	00:10:00.0
Run Time	00:10:00.0
Pause	00:00:00.0
Pre-Calibration	2023-03-23 11:12:03
Post-Calibration	None
Calibration Deviation	---

Overall Settings

RMS Weight	A Weighting
Peak Weight	A Weighting
Detector	Slow
Preamplifier	PRMLxT1L
Microphone Correction	FF:90 2116
Integration Method	Linear
OBA Range	Normal
OBA Bandwidth	1/1 and 1/3
OBA Frequency Weighting	A Weighting
OBA Max Spectrum	At LMax
Overload	122.4 dB

	A	C	Z	
Under Range Peak	**78.9**	75.9	80.9	dB
Under Range Limit	**24.2**	25.2	31.3	dB
Noise Floor	15.1	16.1	22.2	dB

	First	Second	Third
Instrument Identification	1100 W. Town&Country Rd, #700 , CA 92868		

Results

LAeq	66.1	dB
LAE	93.9	dB
EA	271.587	µPa²h
LApeak (max)	2023-03-28 12:06:40	99.0 dB
LASmax	2023-03-28 12:06:41	86.0 dB
LASmin	2023-03-28 12:08:31	56.4 dB
SEA	-99.9	dB

	Exceedance Counts	Duration	
LAS > 85.0 dB	1	1.4	s
LAS > 115.0 dB	0	0.0	s
LApeak > 135.0 dB	0	0.0	s
LApeak > 137.0 dB	0	0.0	s
LApeak > 140.0 dB	0	0.0	s

Community Noise	Ldn 7:00-22:00	2:00-07:00		Lden 7:00-19:00	9:00-22:00	2:00-07:00		
	66.1	66.1	-99.9	66.1	66.1	-99.9	-99.9	dB
LCeq	72.7	dB						
LAeq	66.1	dB						
LCeq - LAeq	6.6	dB						
LAleq	68.3	dB						
LAeq	66.1	dB						
LAleq - LAeq	2.2	dB						

	A		C		Z	
	dB	Time Stamp	dB	Time Stamp	dB	Time Stamp
Leq	66.1		72.7			
Ls(max)	86.0	03/28 12:06:41				
Ls(min)	56.4	03/28 12:08:31				
Lpeak(max)	99.0	03/28 12:06:40				

Overload Count	0
Overload Duration	0.0 s
OBA Overload Count	0
OBA Overload Duration	0.0 s

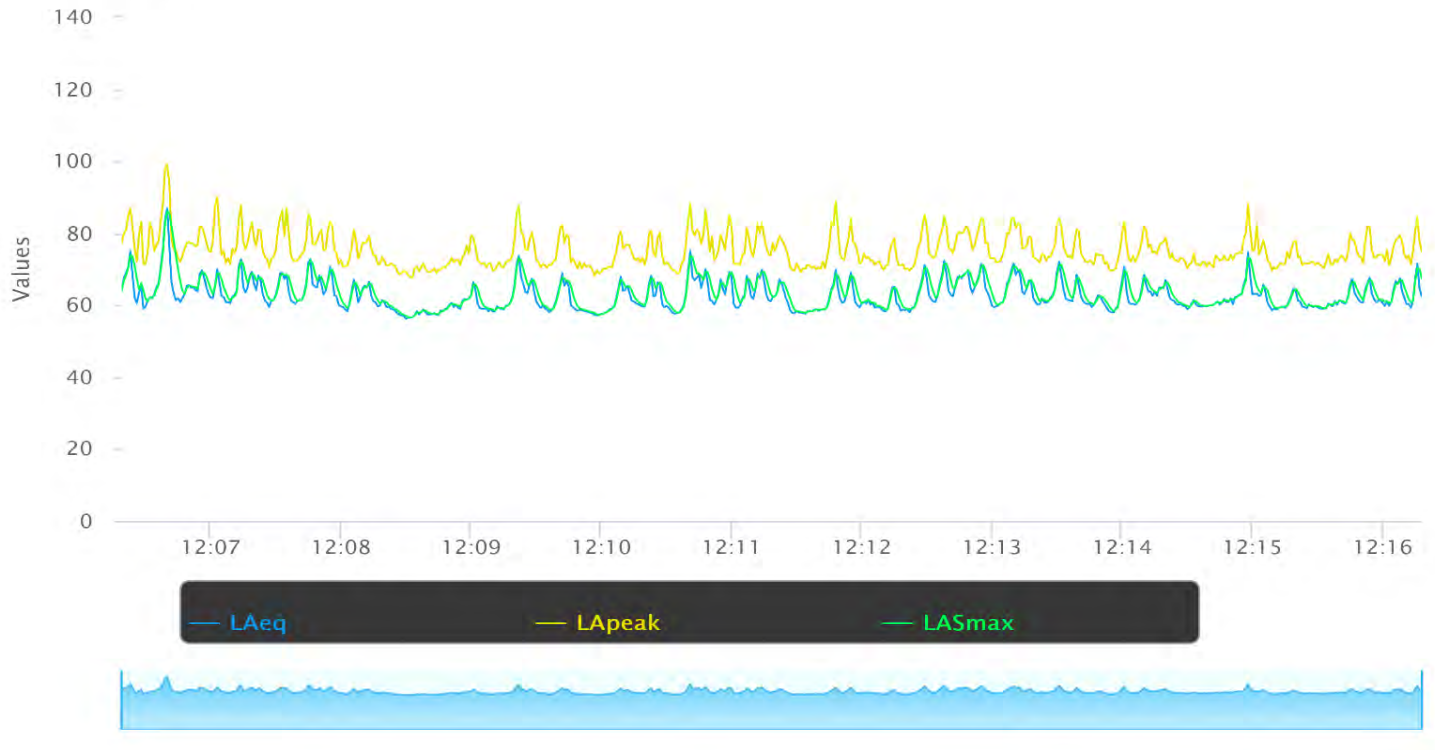
Statistics

LA 5.00	69.5	dB
LA 10.00	68.0	dB
LA 33.30	64.4	dB
LA 50.00	62.2	dB
LA 66.60	60.6	dB
LA 90.00	58.6	dB

Calibration History

Preamp	Date	re. 1V/Pa	6.3	8.0	10.0	12.5	16.0	20.0	25.0	31.5	40.0	50.0	63.0	80.0	100	125	160	200	250	315	400	500	630	800	1000	1250	1600	2000	2500	3150	4000	5000	6300	8000	10000	12500	16000	20000
PRMLxT1L	2023-03-23 11:12:03	-28.64	85.31	79.29	90.61	86.30	70.84	59.75	49.68	55.70	49.91	50.95	48.87	52.84	43.24	41.01	42.06	36.63	36.36	33.27	32.34	32.59	24.67	29.35	114.50	49.32	19.71	65.93	21.50	60.96	25.73	31.48	22.22	22.45	22.77	23.94	27.72	30.95
PRMLxT1L	2023-03-23 09:47:22	-29.16	2.44	1.41	32.70	38.97	44.48	57.43	60.24	55.69	60.63	63.35	61.10	60.73	59.37	59.85	60.69	59.04	59.25	53.23	51.50	53.63	54.72	56.60	113.38	59.95	55.36	65.18	52.76	60.50	50.96	50.44	49.70	47.53	45.08	41.92	43.21	42.89
PRMLxT1L	2023-03-19 06:43:46	-28.55	45.86	53.64	50.36	48.48	39.74	43.36	37.33	33.88	37.19	37.19	31.45	34.66	34.27	25.71	15.68	19.38	17.03	16.81	17.00	15.82	14.83	27.25	113.92	48.20	18.86	66.16	20.06	59.01	24.32	29.82	21.46	21.83	21.87	22.93	26.83	30.35
PRMLxT1L	2023-03-17 08:13:23	-28.49	67.24	63.76	62.84	55.22	65.39	64.43	66.90	63.56	61.30	58.28	56.83	54.69	52.88	51.62	46.03	64.35	62.64	57.92	57.90	58.43	39.36	32.56	113.97	48.52	24.49	66.30	20.77	59.12	23.20	29.79	22.25	21.93	22.00	23.02	26.81	30.45
PRMLxT1L	2023-03-08 09:41:26	-28.48	63.94	68.89	69.29	67.88	62.26	63.46	59.19	67.50	65.47	62.43	61.68	72.02	62.64	61.15	64.79	57.33	58.87	53.83	51.83	48.41	44.42	32.26	114.14	48.74	20.37	65.89	21.13	60.39	26.94	31.06	21.77	22.38	22.62	23.27	27.08	30.91
PRMLxT1L	2023-03-08 09:31:17	-28.63	65.51	57.73	60.78	65.33	69.35	62.91	63.35	61.91	69.32	63.08	63.81	62.18	62.37	60.06	63.75	61.27	63.49	54.78	58.03	54.64	47.00	38.60	113.92	48.41	23.36	65.36	21.63	60.09	26.59	30.92	21.42	22.03	21.54	23.15	27.12	30.37
PRMLxT1L	2023-03-07 15:44:29	-28.57	61.89	59.62	59.69	59.85	56.75	50.43	50.14	47.52	46.28	40.09	34.87	34.15	31.88	39.06	36.59	39.08	34.13	33.19	28.66	21.55	23.05	29.36	114.45	49.29	20.72	65.96	20.91	60.82	25.87	31.10	22.38	22.55	22.47	23.70	27.62	30.79
PRMLxT1L	2023-03-07 10:07:14	-29.03	65.35	66.48	63.00	62.67	52.81	62.37	57.48	61.99	60.59	59.40	60.18	57.85	50.22	47.06	38.90	44.52	30.11	27.41	37.36	26.81	19.99	28.33	113.62	48.39	20.12	65.44	20.46	59.88	25.24	30.97	21.59	21.62	21.67	23.18	26.60	30.27
PRMLxT1L	2023-03-06 17:33:30	-28.67	62.71	63.59	55.23	49.05	42.12	47.10	45.49	45.56	40.75	36.48	36.50	29.77	34.89	33.92	34.29	36.99	31.16	28.64	27.36	19.08	16.26	28.18	113.98	48.84	20.01	65.51	20.28	60.36	25.74	30.76	21.61	22.06	22.20	23.64	27.12	30.60
PRMLxT1L	2023-02-08 07:36:29	-28.67	61.37	51.98	65.16	55.04	51.14	52.74	43.98	48.60	40.89	38.28	37.83	42.69	66.97	57.31	51.01	59.56	51.48	55.87	57.39	58.30	51.10	35.99	114.59	49.36	22.61	66.12	21.44	61.03	25.98	31.59	22.62	22.56	22.58	23.98	27.82	31.30
PRMLxT1L	2023-02-01 12:49:09	-29.28	58.23	73.09	64.93	71.38	69.09	71.22	71.01	68.62	63.85	66.40	64.74	65.39	63.95	62.97	61.00	61.89	59.18	55.69	49.09	40.95	31.27	29.22	114.01	48.79	20.20	64.39	20.70	60.39	24.56	31.58	22.83	23.05	22.39	23.38	27.45	30.94

Time History



Noise Measurement Field Data

Project:	Redlands Used Automobile Sales & Service Facility	**Job Number:**	195440002
Site No.:	ST-4	**Date:**	3/28/2023
Analyst:	Sarah Miller and Skye Hansen	**Time:**	12:33-12:43 PM
Location:	Approximately 200 feet north of the Project site, east of the Home Depot parking lot.		
Noise Sources:	Idling trucks in parking lot (Commercial Pickup and Concrete Mixer)		

Results (dBA):

Leq:	Lmin:	Lmax:	Peak:
59.9	52.5	71.8	89.2

Equipment	
Sound Level Meter:	LD SoundExpert LxT
Calibrator:	CAL200
Response Time:	Slow
Weighting:	A
Microphone Height:	5 feet

Weather	
Temp. (degrees F):	66°
Wind (mph):	5
Sky:	Clear
Bar. Pressure:	30.04"
Humidity:	26%

Photo:

Kimley»Horn

Summary

File Name on Meter	ST-.075.s
File Name on PC	LxTse_0007061-20230328 122320-ST-.075.ldbin
Serial Number	0007061
Model	SoundExpert® LxT
Firmware Version	2.404
User	
Location	
Job Description	
Note	

Measurement

Description	
Start	2023-03-28 12:23:20
Stop	2023-03-28 12:33:20
Duration	00:10:00.0
Run Time	00:10:00.0
Pause	00:00:00.0
Pre-Calibration	2023-03-23 11:12:03
Post-Calibration	None
Calibration Deviation	---

Overall Settings

RMS Weight	A Weighting
Peak Weight	A Weighting
Detector	Slow
Preamplifier	PRMLxT1L
Microphone Correction	FF:90 2116
Integration Method	Linear
OBA Range	Normal
OBA Bandwidth	1/1 and 1/3
OBA Frequency Weighting	A Weighting
OBA Max Spectrum	At LMax
Overload	122.4 dB

	A	C	Z	
Under Range Peak	**78.9**	75.9	80.9	dB
Under Range Limit	**24.2**	25.2	31.3	dB
Noise Floor	15.1	16.1	22.2	dB

	First	Second	Third
Instrument Identification	1100 W. Town&Country Rd, #700 , CA 92868		

Results

LAeq	59.9	dB	
LAE	87.7	dB	
EA	65.149	µPa²h	
LApeak (max)	2023-03-28 12:29:03	89.2	dB
LASmax	2023-03-28 12:24:02	71.8	dB
LASmin	2023-03-28 12:32:22	52.5	dB
SEA	-99.9	dB	

	Exceedance Counts	Duration	
LAS > 85.0 dB	0	0.0	s
LAS > 115.0 dB	0	0.0	s
LApeak > 135.0 dB	0	0.0	s
LApeak > 137.0 dB	0	0.0	s
LApeak > 140.0 dB	0	0.0	s

Community Noise	Ldn 7:00-22:00	2:00-07:00		Lden 7:00-19:00	9:00-22:00	2:00-07:00		
	59.9	59.9	-99.9	59.9	59.9	-99.9	-99.9	dB

LCeq	71.7	dB
LAeq	59.9	dB
LCeq - LAeq	11.8	dB
LAleq	61.4	dB
LAeq	59.9	dB
LAleq - LAeq	1.5	dB

	A		C		Z	
	dB	Time Stai	dB	Time Stai	dB	Time Stamp
Leq	59.9		71.7			
Ls(max)	71.8	/03/28 12:24:02				
Ls(min)	52.5	/03/28 12:32:22				
Lpeak(max)	89.2	/03/28 12:29:03				

Overload Count	0	
Overload Duration	0.0	s
OBA Overload Count	0	
OBA Overload Duration	0.0	s

Statistics

LA 5.00	62.4	dB
LA 10.00	61.5	dB
LA 33.30	60.2	dB
LA 50.00	59.3	dB
LA 66.60	57.2	dB
LA 90.00	54.5	dB

Calibration History

Preamp	Date	re. 1V/Pa	6.3	8.0	10.0	12.5	16.0	20.0	25.0	31.5	40.0	50.0	63.0	80.0	100	125	160	200	250	315	400	500	630	800	1000	1250	1600	2000	2500	3150	4000	5000	6300	8000	10000	12500	16000	20000
PRMLxT1L	2023-03-23 11:12:03	-28.64	85.31	79.29	90.61	86.30	70.84	59.75	49.68	55.70	49.91	50.95	48.87	52.84	43.24	41.01	42.06	36.63	36.36	33.27	32.34	32.59	24.67	29.35	114.50	49.32	19.71	65.93	21.50	60.96	25.73	31.48	22.22	22.45	22.77	23.94	27.72	30.95
PRMLxT1L	2023-03-23 09:47:22	-29.16	2.44	1.41	32.70	38.97	44.48	57.43	60.24	55.69	60.63	63.35	61.10	60.73	59.37	59.85	60.69	59.04	59.25	53.23	51.50	53.63	54.72	56.60	113.38	59.95	55.36	65.18	52.76	60.50	50.96	50.44	49.70	47.53	45.08	41.92	43.21	42.89
PRMLxT1L	2023-03-19 06:43:46	-28.55	45.86	53.64	50.36	48.48	39.74	43.36	37.33	33.88	37.19	37.19	31.45	34.66	34.27	25.71	15.68	19.38	17.03	16.81	17.00	15.82	14.83	27.25	113.92	48.20	18.86	66.16	20.06	59.01	24.32	29.82	21.46	21.83	21.87	22.93	26.83	30.35
PRMLxT1L	2023-03-17 08:13:23	-28.49	67.24	63.76	62.84	55.22	65.39	64.43	66.90	63.56	61.30	58.28	56.83	54.69	52.88	51.62	46.03	64.35	62.64	57.92	57.90	58.43	39.36	32.56	113.97	48.52	24.49	66.30	20.77	59.12	23.20	29.79	22.25	21.93	22.00	23.02	26.81	30.45
PRMLxT1L	2023-03-08 09:41:26	-28.48	63.94	68.89	69.29	67.88	62.26	63.46	59.19	67.50	65.47	62.43	61.68	72.02	62.64	61.15	64.79	57.33	58.87	53.83	51.83	48.41	44.42	32.26	114.14	48.74	20.37	65.89	21.13	60.39	26.94	31.06	21.77	22.38	22.62	23.27	27.08	30.91
PRMLxT1L	2023-03-08 09:31:17	-28.63	65.51	57.73	60.78	65.33	69.35	62.91	63.35	61.91	69.32	63.08	63.81	62.18	62.37	60.06	63.75	61.27	63.49	54.78	58.03	54.64	47.00	38.60	113.92	48.41	23.36	65.36	21.63	60.09	26.59	30.92	21.42	22.03	21.54	23.15	27.12	30.37
PRMLxT1L	2023-03-07 15:44:29	-28.57	61.89	59.62	59.69	59.85	56.75	50.43	50.14	47.52	46.28	40.09	34.87	34.15	31.88	39.06	36.59	39.08	34.13	33.19	28.66	21.55	23.05	29.36	114.45	49.29	20.72	65.96	20.91	60.82	25.87	31.10	22.38	22.55	22.47	23.70	27.62	30.79
PRMLxT1L	2023-03-07 10:07:14	-29.03	65.35	66.48	63.00	62.67	52.81	62.37	57.48	61.99	60.59	59.40	60.18	57.85	50.22	47.06	38.90	44.52	30.11	27.41	37.36	26.81	19.99	28.33	113.62	48.39	20.12	65.44	20.46	59.88	25.24	30.97	21.59	21.62	21.67	23.18	26.60	30.27
PRMLxT1L	2023-03-06 17:33:30	-28.67	62.71	63.59	55.23	49.05	42.12	47.10	45.49	45.56	40.75	36.48	36.50	29.77	34.89	33.92	34.29	36.99	31.16	28.64	27.36	19.08	16.26	28.18	113.98	48.84	20.01	65.51	20.28	60.36	25.74	30.76	21.61	22.06	22.20	23.64	27.12	30.60
PRMLxT1L	2023-02-08 07:36:29	-28.67	61.37	51.98	65.16	55.04	51.14	52.74	43.98	48.60	40.89	38.28	37.83	42.69	66.97	57.31	51.01	59.56	51.48	55.87	57.39	58.30	51.10	35.99	114.59	49.36	22.61	66.12	21.44	61.03	25.98	31.59	22.62	22.56	22.58	23.98	27.82	31.30
PRMLxT1L	2023-02-01 12:49:09	-29.28	58.23	73.09	64.93	71.38	69.09	71.22	71.01	68.62	63.85	66.40	64.74	65.39	63.95	62.97	61.00	61.89	59.18	55.69	49.09	40.95	31.27	29.22	114.01	48.79	20.20	64.39	20.70	60.39	24.56	31.58	22.83	23.05	22.39	23.38	27.45	30.94

Time History

Project: Redlands Used Auto sales and service facility

Construction Noise Impact on Sensitive Receptors

Parameters

Construction Hours:	8	Daytime hours (7 am to 7 pm)
	0	Evening hours (7 pm to 10 pm)
	0	Nighttime hours (10 pm to 7 am)
Leq to L10 factor	3	

	Receptor (Land Use, Direction)	Distance (feet)	Shielding	Direction
1	Residential to the east	1,100	0	East
2	Commercial to the north	400	0	North
3				
4				
5				
6				
7				

Construction Phase	Equipment Type	No. of Equip.	Acoustical Usage Factor	Reference Noise Level at 50ft per Unit, Lmax	RECEPTOR 1 Noise Level at Receptor 1, Lmax	RECEPTOR 1 Noise Level at Receptor 1, Leq	RECEPTOR 2 Noise Level at Receptor 2, Lmax	RECEPTOR 2 Noise Level at Receptor 2, Leq
Site Preperation								
	Dozer	3	40%	82	59.6	55.6	68.4	64.4
	Tractor	4	40%	84	63.2	59.2	72.0	68.0
Combined LEQ						**60.8**		**69.6**
Grading								
	Grader	1	40%	85	58.2	54.2	66.9	63.0
	Excavator	2	40%	81	56.9	52.9	65.6	61.7
	Tractor	2	40%	84	60.2	56.2	68.9	65.0
	Scraper	2	40%	84	59.8	55.8	68.5	64.6
	Dozer	1	40%	82	54.9	50.9	63.6	59.7
Combined LEQ						**61.4**		**70.2**
Building Construction								
	All Other Equipment > 5 HP	3	50%	85	62.9	59.9	71.7	68.7
	Generator	1	50%	81	53.8	50.7	62.5	59.5
	Crane	1	16%	81	53.8	45.8	62.5	54.6
	Welder/Torch	1	40%	74	47.2	43.2	55.9	52.0
	Tractor	3	40%	84	61.9	57.9	70.7	66.7
Combined LEQ						**62.5**		**71.3**
Paving								
	Paver	2	50%	77	53.4	50.4	62.1	59.1
	Pavement Scarafier	2	20%	90	65.7	58.7	74.4	67.5
	Roller	2	20%	80	56.2	49.2	64.9	58.0
Combined LEQ						**59.7**		**68.5**
Architectural Coating								
	Compressor (air)	1	40%	78	50.9	46.9	59.6	55.7
Combined LEQ						**46.9**		**55.7**
Maximum Noise Level						**62.5**		**71.3**

Source for Ref. Noise Levels: RCNM, 2005

Car Wash Dryer

	Noise Level	Reference Dist. (feet)	Dist. to Property Line (feet)	Building Row	Distance Attenuation	Duration (minutes)	anti-log	Total Noise Energy	Noise Level No Ambient
Car Wash Dryers	89	10	250	15	46.0	30	40190.18	1205705.487	43.0

The maximum throughput of the automated car wash system is roughly one car every six minutes.
This equates to a worst-case scenario of 10 cars per hour, with a maximum drying cycle time of one minute per car, or 10 minutes during each hour of continuous operation.
Building row attenuation assumes partial obstruction as the dryers would be inside the car wash building.

Barrier/Intervening Structure

Distance Calculation

$d_1 = \sqrt{h^2} + {d_3}^2$

$d_2 = \sqrt{h^2} + (d - d_3)^2$

h =	5	barrier height above point D
d_3 =	3.28	segement of d between the source and the barrier
d =	238	distance between the source and receiver
d1 =	5.97983	
d2 =	234.773	

Fresnel Number Calculation

$$N = \frac{2}{w}(d_1 + d_2 - d)$$

N =	8.31244	Fresnel Number
w =	0.6624	wavelength
d_1 =	5.97983	distance between source and top of the barrier
d_2 =	234.773	distance between receiver and top of the barrier
d =	238	distance between the source and receiver
d_3 =	3.28	segement of d between the source and the barrier

Noise Source	Reference Level (dBA)	Reference Distance (feet)	Distance to Receptor (feet)	Level at Receptor (dBA)[4]	Ambient Level (dBA)[5]	Combined Noise at Receptor (dBA)	Incremental Increase (dBA)	Significant?
Car Wash Vacuum[7]	72	10	250	44.0	60.7	60.8	0.1	No