Cactus Trail Improvements Project

Noise Impact Assessment

Rialto, California

Prepared For:

CITY OF RIALTO
335 W. RIALTO AVENUE
RIALTO, CA 92376

August 2018

ECORP Consulting, Inc.
ENVIRONMENTAL CONSULTANTS

ECORP Consulting, Inc. has assisted public and private land owners with environmental regulation compliance since 1987. We offer full service capability, from initial baseline environmental studies through environmental planning review, permitting negotiation, liaison to obtain legal agreements, mitigation design, and construction monitoring and reporting.

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1.0 INTRODUCTION

This report documents the results of a Noise Impact Assessment completed for the Cactus Trail Improvement Project (Project), which includes the construction of a 1.49-mile long multi-use path along the west side of Cactus Avenue, from Rialto Avenue to Baseline Road in Rialto. This report was prepared as a comparison of predicted Project noise levels to noise standards promulgated by the City of Rialto General Plan Safety and Noise Element and Municipal Code. The purpose of this report is to estimate Project-generated noise and to determine the level of impact the Project would have on the environment.

1.1 Project Description and Location

The Project Site is located in the City of Rialto, located in southwestern San Bernardino County (see **Figure 1**). The City of Rialto proposes to construct an approximately 1.49-mile-long multi-use path along the west side of Cactus Avenue, from Rialto Avenue to Baseline Road within the City of Rialto (see **Figure 2**). The bi-directional path would be buffered (separated) from automobiles and would connect with other pedestrian/bicycle pathways in the City. The buffer area would span 5 feet between Cactus Avenue and the proposed new path. Next to this buffer area would lie a 5-foot wide asphalt pedestrian pathway followed by an additional 2-foot of buffer beyond, separating the pedestrian path and an 8-foot wide bike lane. On the west side of the bike lane would lie a 2-foot compacted shoulder consisting of decomposed granite. In addition to this new pathway, the Project proposes to reconstruct curb ramps to be ADA compliant, construct small parking lot facilities at both the southwest corner of Cactus Avenue and Foothill Boulevard and southwest corner of Cactus Avenue and Baseline Road, modify fencing to provide trail access, and install a flashing beacon system with in-roadway warning lights for trail crossing.

In general, construction activities associated with development of the trail would include excavation and grading; construction of paved parking areas, curbs and gutters; installation of fencing, railing, trail delineators, and signage; painting of pavement striping and pavement markings; and construction of appurtenant features.

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Map Date: 7/26/2018

Service Layer Credits: Sources: Esri, HERE, Garmin, USGS, Intermap, INCREMENT P, NRCan, Esri Japan, METI, Esri China (Hong Kong), Esri Korea, Esri (Thailand), NGCC, © OpenStreetMap contributors, and the GIS User Community

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Figure 1. Project Vicinity Map

2018-105 Cactus Trail Improvement Project

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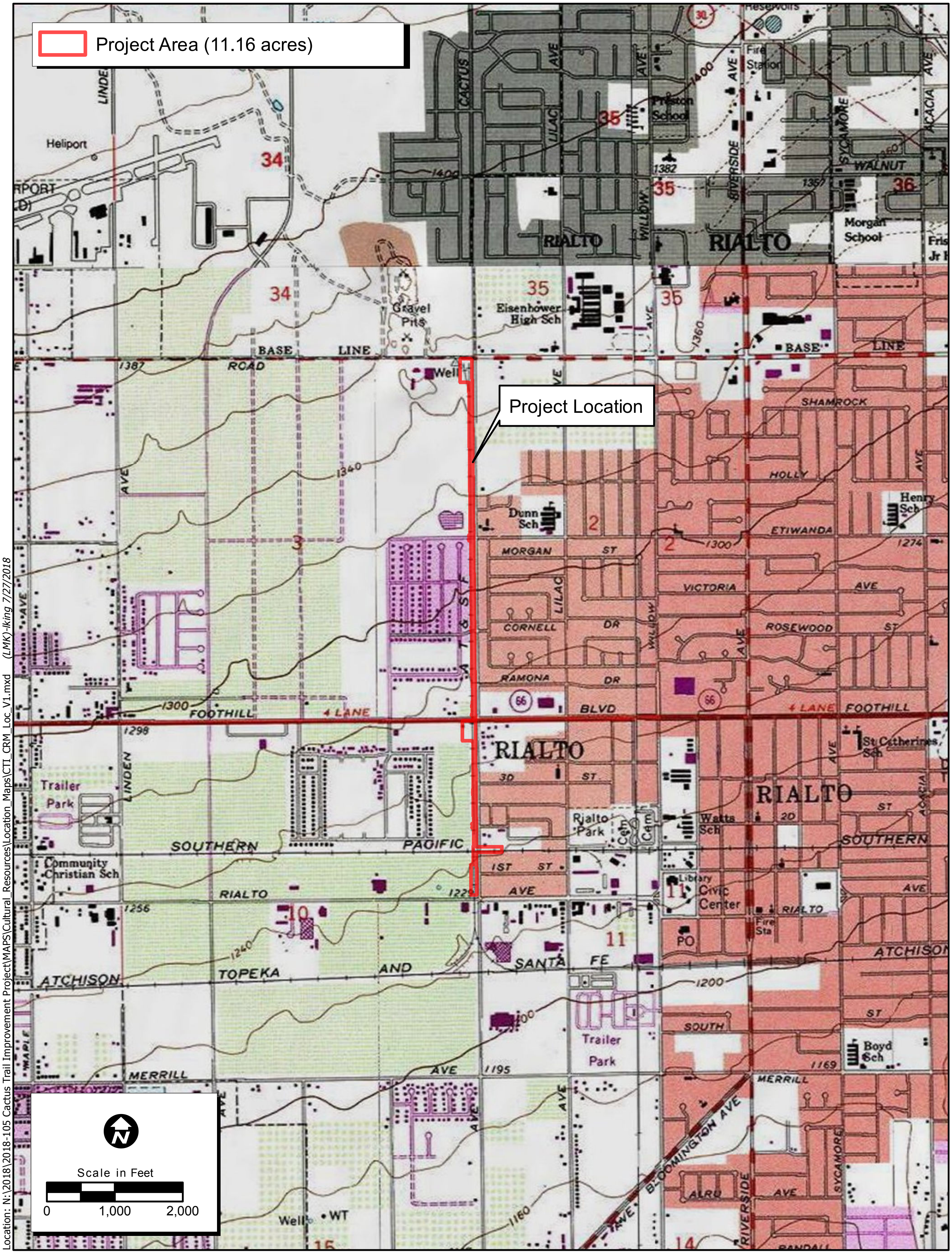

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Map Date: 7/27/2018

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Figure 2. Project Location Map

2018-105 Cactus Trail Improvement Project

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2.0 NOISE BACKGROUND

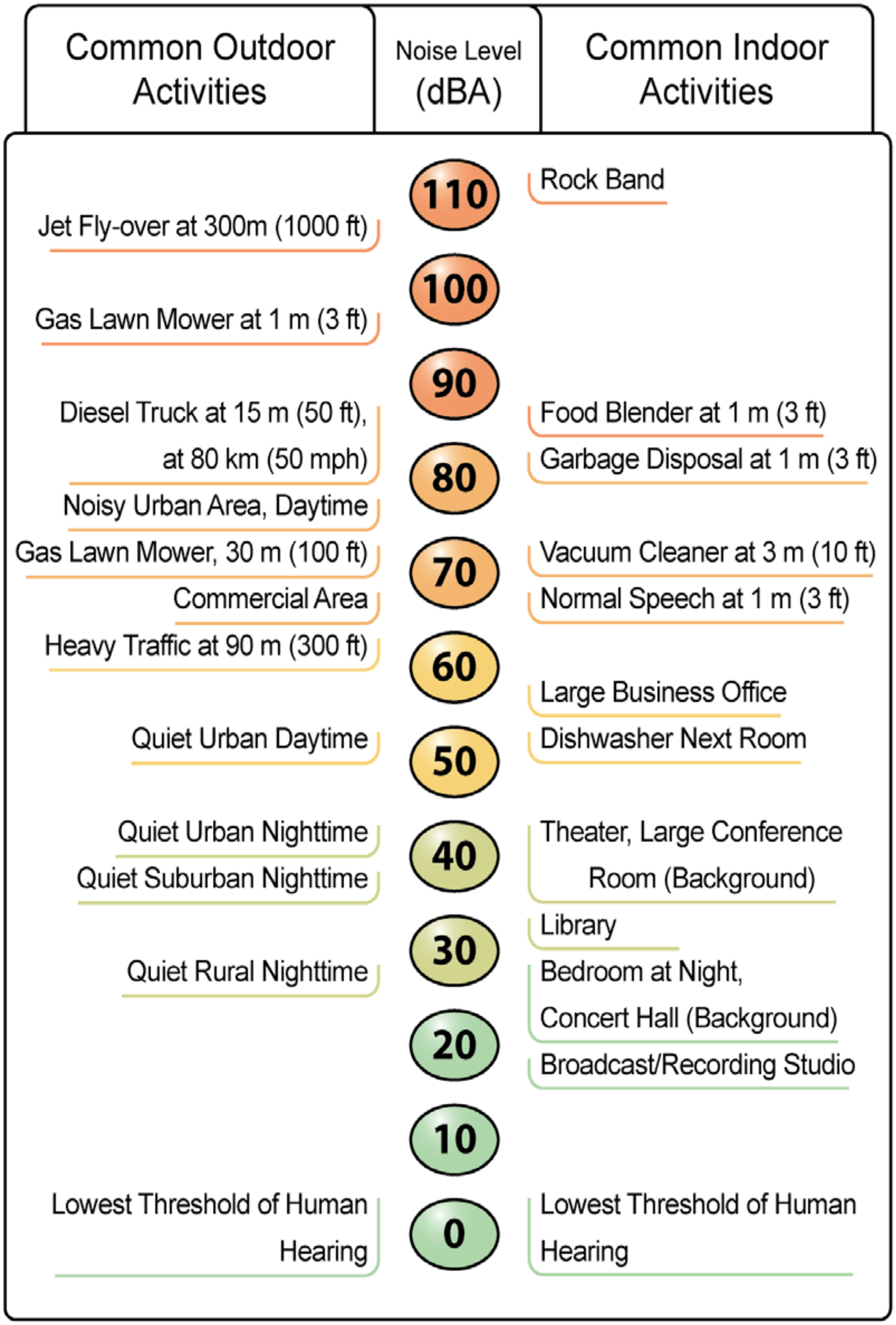
2.1 Fundamentals of Sound and Environmental Noise

Addition of Decibels

The decibel (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. When the standard logarithmic decibel is A-weighted (dBA), 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. When two identical sources are each producing sound of the same loudness, the resulting sound level at a given distance would be 3 dB higher than one source under the same conditions (FTA 2006). For example, a 65 dB source of sound, such as a truck, when joined by another 65 dB source results in a sound amplitude of 68 dB, not 130 dB (i.e., doubling the source strength increases the sound pressure by 3 dB). Under the decibel scale, three sources of equal loudness together would produce an increase of 5 dB.

Typical noise levels associated with common noise sources are depicted in **Figure 3**.

FIGURE 3. COMMON NOISE LEVELS



Source: Caltrans 2012

Sound Propagation and Attenuation

Noise can be generated by a number of sources, including mobile sources, such as automobiles, trucks and airplanes, and stationary sources, such as construction sites, machinery, and industrial operations. 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, often referred to as cylindrical spreading. 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 (FHWA 2011). 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. For line sources, an overall attenuation rate of 3 dB per doubling of distance is assumed (FHWA 2011).

Noise levels may also be reduced by intervening structures; generally, a single row of detached buildings between the receptor and the noise source reduces the noise level by about 5 dBA (FHWA 2006), while a solid wall or berm generally reduces noise levels by 10 to 20 dBA (FHWA 2011). However, noise barriers or enclosures specifically designed to reduce site-specific construction noise can provide a sound reduction 35 dBA or greater (WEAL 2000). To achieve the most potent noise-reducing effect, a noise enclosure/barrier must physically fit in the available space, must completely break the “line of sight” between the noise source and the receptors, must be free of degrading holes or gaps, and must not be flanked by nearby reflective surfaces. Noise barriers must be sizable enough to cover the entire noise source, and extend length-wise and vertically as far as feasibly possible to be most effective. The limiting factor for a noise barrier is not the component of noise transmitted through the material, but rather the amount of noise flanking around and over the barrier. In general, barriers contribute to decreasing noise levels only when the structure breaks the "line of sight" between the source and the receiver.

The manner in which older homes in California were constructed generally 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.

Noise Descriptors

The decibel 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. The L_{eq} is a measure of ambient noise, while the L_{dn} and CNEL (Community Noise Equivalent Level) are measures of community noise. Each is applicable to this analysis and defined in **Table 1**.

The A weighted decibel sound level scale gives greater weight to the frequencies of sound to which the human ear is most sensitive. Because sound levels can vary markedly over a short period of time, a method for describing either the average character of the sound or the statistical behavior of the variations must be utilized. Most commonly, environmental sounds are described in terms of an average level that has the same acoustical energy as the summation of all the time-varying events.

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 accuracy of the predicted models depends on the distance between the receptor and the noise source. Close to the noise source, the models are accurate to within about plus or minus 1 to 2 dBA.

Table 1. Common Acoustical Descriptors

Descriptor	Definition
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 micropascals (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 decibels 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 micropascals). 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 decibels 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, Leq	The average acoustic energy content of noise for a stated period of time. Thus, the Leq 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.
Lmax, Lmin	The maximum and minimum A-weighted noise level during the measurement period.
L01, L10, L50, L90	The A-weighted noise levels that are exceeded 1%, 10%, 50%, and 90% of the time during the measurement period.
Day/Night Noise Level, Ldn or DNL	A 24-hour average Leq 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 in the nighttime. The logarithmic effect of these additions is that a 60 dBA 24-hour Leq would result in a measurement of 66.4 dBA Ldn.
Community Noise Equivalent Level, CNEL	A 24-hour average Leq with a 5 dBA “weighting” during the hours of 7:00 p.m. to 10:00 p.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 Leq 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.
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.

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. 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 A-weighted noise levels (dBA), the following relationships should be noted in understanding this analysis:

- Except in carefully controlled laboratory experiments, a change of 1 dBA cannot be perceived by humans.
- Outside of the laboratory, a 3 dBA change is considered a just-perceivable difference.
- A change in level of at least 5 dBA is required before any noticeable change in community response would be expected. An increase of 5 dBA 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 (OSHA) 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.

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 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. For ground vehicles, a noise level of about 55 dBA L_{dn} is the threshold at which a substantial percentage of people begin to report annoyance.

2.2 Fundamentals of Environmental Groundborne Vibration

Sources of earthborne 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).

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. The RMS velocity is defined as the average of the squared amplitude of the signal. The PPV and RMS vibration velocity amplitudes are used to evaluate human response to vibration.

Table 2 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 sensitivity of the individual. 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.

Table 2. Human Reaction and Damage to Buildings for Continuous or Frequent Intermittent Vibration Levels			
Peak Particle Velocity (inches/second)	Approximate Vibration Velocity Level (VdB)	Human Reaction	Effect on Buildings
0.006–0.019	64–74	Range of threshold of perception	Vibrations unlikely to cause damage of any type
0.08	87	Vibrations readily perceptible	Recommended upper level to which ruins and ancient monuments should be subjected
0.1	92	Level at which continuous vibrations may begin to annoy people, particularly those involved in vibration sensitive activities	Virtually no risk of architectural damage to normal buildings
0.2	94	Vibrations may begin to annoy people in buildings	Threshold at which there is a risk of architectural damage to normal dwellings
0.4–0.6	98–104	Vibrations considered unpleasant by people subjected to continuous vibrations and unacceptable to some people walking on bridges	Architectural damage and possibly minor structural damage

Source: Caltrans 2004

2.3 Existing Environmental Noise Setting

Noise Sensitive Land Uses

Noise-sensitive land uses are generally considered to include those uses where noise exposure could result in health-related risks to individuals, as well as places where quiet is an essential element of their intended purpose. Residential dwellings are of primary concern because of the potential for increased and prolonged exposure of individuals to both interior and exterior noise levels. Additional land uses such as parks, historic sites, cemeteries, and recreation areas are considered sensitive to increases in exterior noise levels. Schools, churches, hotels, libraries, and other places where low interior noise levels are essential are also considered noise-sensitive land uses.

Nearby noise-sensitive land uses consist of single-family residences on either side of Cactus Avenue.

Existing Ambient Noise Environment

In Rialto, street and freeway traffic represent the primary source of noise. The State Route 210 freeway, which traverses the northern portion of the City, and Interstate 10, which runs through the southern portion, represent dominate sources of noise in the City. Other significant sources of noise include arterial roadways and intersections, as well as the Union Pacific Railroad lines running adjacent to Interstate 10 and Metrolink, which runs directly through the City's downtown.

The noise environment in the proposed Project area is impacted by various noise sources. Mobile sources of noise, especially cars and trucks traveling on Cactus Avenue, are the most common and significant sources of noise in Project area. Other sources of noise are typical activities associated with residential neighborhoods (barking dogs, lawnmowers, neighborhood automobile movements). The Project site is located outside of the established noise contours of the Rialto Municipal Airport (San Bernardino County ALUC 1991).

3.0 REGULATORY FRAMEWORK

Federal

Occupational Safety and Health Act of 1970

The Federal Occupational Safety and Health Administration (OSHA) regulates on-site noise levels and protects workers from occupational noise exposure. To protect hearing, worker noise exposure is limited to 90 decibels with A-weighting (dBA) over an 8-hour work shift (29 Code of Regulations [CFR] 1910.95). Employers are required to develop a hearing conservation program when employees are exposed to noise levels exceeding 85 dBA. These programs include provision of hearing protection devices and testing employees for hearing loss on a periodic basis.

State

State of California General Plan Guidelines

The State of California regulates vehicular and freeway noise affecting classrooms, sets standards for sound transmission and occupational noise control, and identifies noise insulation standards and airport noise/land-use compatibility criteria. The State of California General Plan Guidelines (State of California 2003), published by the Governor's Office of Planning and Research (OPR), also provides guidance for the acceptability of projects within specific CNEL/L_{dn} contours. The guidelines also present adjustment factors that may be used in order to arrive at noise acceptability standards that reflect the noise control goals of the community, the particular community's sensitivity to noise, and the community's assessment of the relative importance of noise pollution.

State Office of Planning and Research Noise Element Guidelines

The State Office of Planning and Research Noise Element Guidelines include recommended exterior and interior noise level standards for local jurisdictions to identify and prevent the creation of incompatible land uses due to noise. The Noise Element Guidelines contain a land use compatibility table that describes the compatibility of various land uses with a range of environmental noise levels in terms of the CNEL.

Local

City of Rialto General Plan: Safety and Noise Chapter

Because Rialto is largely built out and the street system well established, the City faces challenges in separating noise-sensitive land uses from primary noise sources. Thus, the Safety and Noise Chapter establishes policies to guard against creation of any new noise/land use conflicts and to minimize the impact of existing noise sources on the community. The Noise Element identifies noise-sensitive land uses and noise sources, and defines areas of noise impact for the purpose of developing programs to ensure that residents in the City will be protected from excessive noise intrusion.

As development proposals are submitted to the City, each is evaluated with respect to the policy provisions in the Safety and Noise Chapter to ensure that noise impacts are reduced through planning and project design. Through implementation of the policies of the Safety and Noise Chapter, the City of Rialto seeks to reduce or avoid adverse noise impacts for the purposes of protecting the general health, safety, and welfare of the community.

The most basic planning strategy to minimize adverse impacts on new land uses due to noise is to avoid designating certain land uses at locations within the City that would negative affect noise sensitive land uses. Uses such as schools, hospitals, child care, senior care, congregate care, churches, and all types of residential use should be located outside of any area anticipated to exceed acceptable noise levels as defined by the Noise and Land Use Compatibility Guidelines, or should be protected from noise through sound attenuation measures such as site and architectural design and sound walls. The City has adopted these guidelines in a modified form as a basis for planning decisions based on noise considerations. These guidelines are shown in **Table 3**. In the case that the noise levels identified at a proposed project site fall within levels considered normally acceptable, the project is considered compatible with the existing noise environment.

Table 3. Land Use Compatibility for Community Noise Environments

Land Use Category	Community Noise Exposure (CNEL), dB			
	Normally Acceptable	Conditionally Acceptable	Normally Unacceptable	Clearly Unacceptable
R2 - Residential 2, R6 - Residential 6	50-60	60-65	65-70	70-85
R12 - Residential 12	50-60	60-65	65-70	70-85
R21 - Residential 21, R45 - Residential 45	50-60	60-70	70-75	75-85
DMU - Downtown Mixed-Use	50-60	60-75	75-80	80-85
CC - Community Commercial	50-65	65-75	75-80	80-85
GC - General Commercial	50-65	65-75	75-80	80-85
BP - Business Park, O - Office	50-65	65-75	75-80	80-85
LI - Light Industrial	50-70	70-75	75-80	80-85

Table 3. Land Use Compatibility for Community Noise Environments				
Land Use Category	Community Noise Exposure (CNEL), dB			
	Normally Acceptable	Conditionally Acceptable	Normally Unacceptable	Clearly Unacceptable
GI - General Industrial	50-75	75-85	N/A	N/A
P - Public Facility, P - School Facility	50-60	60-65	65-70	70-85
Open Space - Recreation	50-75	N/A	75-80	80-85
Open Space - Resources	50-75	N/A	75-80	80-85

Source: City of Rialto 2010

Notes:

Normally Acceptable – Specified land use is satisfactory, assuming buildings are of conventional construction

Conditionally Acceptable – New development should be undertaken only after detailed analysis of noise reduction requirements are made.

Normally Unacceptable – New development should be generally discouraged, if not, a detailed analysis of noise reduction requirements must be made.

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

R2 - Residential 2 (Density: 0-2 du/ac); R6 - Residential 6 (Density: 2.1-6 du/ac); R12 - Residential 12 (Density: 6.1-12 du/ac); R21 - Residential 21 (Density: 12.1-21 du/ac); R30 - Residential 30 (Density: 22.1-30 du/ac); O - Office (Intensity: maximum 0.75 FAR); DMU - Downtown Mixed Use (Intensity: 6.1- 60 du/ac; maximum 1.50 FAR); CC - Community Commercial (Intensity: maximum 0.35 FAR); GC - General Commercial (Intensity: maximum 0.50 FAR); BP - Business Park (Intensity: maximum 1.0 FAR); LI - Light Industrial (Intensity: maximum 1.0 FAR); GI - General Industrial (Intensity: maximum 1.0 FAR); P - Public Facility (Intensity: maximum 1.0 FAR).

The Safety and Noise Chapter also contains goals and policies that must be used to guide decisions concerning land uses that are common sources of excessive noise levels. The following relevant and applicable goals and policies from the City’s Safety and Noise Chapter have been identified for the Project:

Goal 5-10: Minimize the impact of point source and ambient noise levels throughout the community.

Policy 5-10.2: Consider noise impacts as part of the development review process, particularly the location of parking, ingress/egress/loading, and refuse collection areas relative to surrounding residential development and other noise-sensitive land uses.

Policy 5-10.3: Ensure that acceptable noise levels are maintained near schools, hospitals, and other noise sensitive areas in accordance with the Municipal Code and noise standards.

Policy 5-10.5: Require all exterior noise sources (construction operations, air compressors, pumps, fans and leaf blowers) to use available noise suppression devices and techniques to reduce exterior noise to acceptable levels that are compatible with adjacent land uses.

Goal 5-11: Minimize the impacts of transportation-related noise.

> **Policy 5-11.1:** Work with responsible Federal and State agencies to minimize the impact of transportation-related noise, including noise associated with freeways, major arterials, and Metrolink and other rail lines.

<u>City of Rialto Municipal Code</u>

Per Section 9.50.070 of the City's Municipal Code, no person shall be engaged or employed, or cause any other person to be engaged or employed, in any work of construction, erection, alteration, repair, addition, movement, demolition, or improvement to any building or structure except within the following hours:

October 1st through April 30th:

- Monday-Friday: 7:00 a.m. to 5:30 p.m.
- Saturday: 8:00 a.m. to 5:00 p.m.
- Sunday: No permissible hours
- State holidays: No permissible hours

May 1st through September 30th:

- Monday-Friday: 6:00 a.m. to 7:00 p.m.
- Saturday: 8:00 a.m. to 5:00 p.m.
- Sunday: No permissible hours
- State holidays: No permissible hours

4.0 IMPACT ASSESSMENT

Thresholds of Significance

Criteria for determining the significance of noise impacts were developed based on information contained in the CEQA Guidelines Appendix G. According to the guidelines, a project may have a significant effect on the environment if it would result in the following conditions:

a) Exposure of persons to, or generation of, noise levels in excess of standards established in the local general plan or noise ordinance, or of applicable standards of other agencies.

b) A substantial temporary or periodic increase in ambient noise levels in the project vicinity above levels existing without the project.

c) A substantial permanent increase in ambient noise levels in the project vicinity above levels existing without the project.

d) Exposure of persons to or generation of excessive groundborne vibration or groundborne noise levels.

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

f) For a project within the vicinity of a private airstrip, would the project expose people residing or working in the Project area to excessive noise levels.

For purposes of this analysis and where applicable, the City of Rialto noise standards were used for evaluation of Project-related noise impacts.

Methodology

Short-Term Construction Groundborne Vibration

Groundborne vibration levels associated with construction-related activities for the Project were evaluated utilizing typical groundborne vibration levels associated with construction equipment, obtained from the Caltrans guidelines. Potential groundborne vibration impacts related to structural damage and human annoyance were evaluated taking into account the distance from construction activities to nearby land uses and typically applied criteria for structural damage and human annoyance.

Short-Term Construction Noise

Predicted noise levels at nearby noise-sensitive land uses were calculated using typical noise levels and usage rates associated with construction equipment, derived from data obtained from the Federal Highway Administration's Roadway Construction Noise Model. Construction noise levels were predicted assuming an average noise attenuation rate of 6 dB per doubling of distance from the source.

Long-Term Operations

Long-term operational noise was qualitatively analyzed based on the estimated daily trips and proposed trail activities.

Impact Analysis

PROJECT CONSTRUCTION NOISE

Would the Project Result in Short-Term Construction-Generated Noise in Excess of Noise Standards?

Construction noise associated with the proposed Project would be temporary and would vary depending on the nature of the activities being performed. Noise generated would primarily be associated with the operation of off-road equipment for on-site construction activities as well as construction vehicle traffic on area roadways. Construction noise typically occurs intermittently and varies depending on the nature or phase of construction (e.g., demolition, grading, paving). Noise generated by construction equipment, including earth movers, material handlers, and portable generators, can reach high levels. 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). During construction, exterior noise levels could negatively affect sensitive receptors in the vicinity of the construction site.

Table 4 indicates the anticipated noise levels of construction equipment. The average noise levels presented in **Table 4** are based on the quantity, type, and acoustical use factor for each type of equipment that is anticipated to be used.

Table 4. Maximum Noise Levels Generated by Construction Equipment

Type of Equipment	Maximum Noise (L_{max}) at 50 Feet (dBA)	Maximum 8-Hour Noise (L_{eq}) at 50 Feet (dBA)
Crane	80.6	72.6
Dozer	81.7	77.7
Excavator	80.7	76.7
Generator	80.6	77.6
Grader	85.0	81.0
Paver	77.2	74.2
Roller	80.0	73.0
Tractor	84.0	80.0
Dump Truck	76.5	72.5
Concrete Pump Truck	81.4	74.4
Welder	74.0	70.0

Source: Federal Highway Administration, Roadway Construction Noise Model (FHWA-HEP-05-054), dated January 2006.

As depicted in **Table 4**, noise levels generated by individual pieces of construction equipment typically range from approximately 70.0 dBA L_{eq} to 81.0 dBA L_{eq} at 50 feet. During construction, exterior noise levels could affect the nearest existing sensitive receptors in the vicinity, located approximately 25 feet from the Project site. Based on the construction equipment noise levels listed in **Table 4** and assuming an average noise attenuation rate of 6 dB per doubling of distance from the source, predicted maximum 8-hour noise levels would range from approximately 76 dBA L_{eq} to 88 dBA L_{eq} at vicinity residences.

Per Section 9.50.070 of the City's Municipal Code, no person shall be engaged or employed, or cause any other person to be engaged or employed, in any work of construction, erection, alteration, repair, addition, movement, demolition, or improvement to any building or structure except within the following hours:

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- Monday-Friday: 7:00 a.m. to 5:30 p.m.
- Saturday: 8:00 a.m. to 5:00 p.m.
- Sunday: No permissible hours
- State holidays: No permissible hours

May 1st through September 30th:

- Monday-Friday: 6:00 a.m. to 7:00 p.m.
- Saturday: 8:00 a.m. to 5:00 p.m.
- Sunday: No permissible hours
- State holidays: No permissible hours

Therefore, with adherence to the City's Municipal Code, construction-noise would be less than significant.

Would Project Construction Result in a Temporary or Periodic Increase in Ambient Noise Levels in the Project Vicinity Above Levels Existing Without the Project?

Construction noise associated with the proposed Project would be temporary and would and cease once construction is complete. The City of Rialto is a built, urban community and construction activities within urban areas are generally expected and tolerated by residents as a typical occurrence. Furthermore, as previously described, construction noise associated with the Project would adhere to all City standards surrounding construction activities. For instance, the Proposed Project would adhere to Section 9.50.070 of the City's Municipal Code, limiting hours of construction, erection, alteration, repair, addition, movement, demolition, or improvement to any building or structure to 7:00 a.m. to 5:30 p.m. (Monday-Friday- October 1st through April 30th), 6:00 a.m. to 7:00 p.m. (Monday-Friday- May 1st through September 30th), 8:00 a.m. to 5:00 p.m. (Saturday), with no activities taking place at any time on Sundays or state holidays. The proposed Project would result in a less than significant impact related to a substantial temporary or periodic increase in ambient noise levels.

PROJECT GROUNDBORNE VIBRATION

Would the Project Expose Structures to Substantial Groundborne Vibration During Construction?

Project construction would have the potential to result in varying degrees of temporary groundborne vibration, depending on the specific construction equipment used and the operations involved. Vibration generated by construction equipment spreads through the ground and diminishes in magnitude with increases in distance. Ground vibration caused by temporary construction or demolition not regulated by the City. For comparative purposes, this impact discussion utilizes Caltrans's (2002) recommended standard of 0.2 inches per second (in/sec) peak particle velocity (PPV) with respect to the prevention of structural damage for normal buildings. **Table 5** displays vibration levels for typical construction equipment.

Table 5. Representative Vibration Source Levels for Construction Equipment	
Equipment Type	Peak Particle Velocity at 25 Feet (inches per second)
Large Bulldozer	0.089
Caisson Drilling	0.089
Loaded Trucks	0.076
Jackhammer	0.035
Small Bulldozer/Tractor	0.003

Source: Caltrans 2013

The nearest existing structures to any construction activity area are approximately 25 feet away (residences along the proposed trail). Based on the vibration levels presented in **Table 5**, ground vibration generated by heavy-duty equipment at the nearest structure would not be anticipated to exceed approximately 0.089 in/sec PPV. Therefore, the use of virtually any type of construction equipment would most likely not result in a groundborne vibration velocity level above 0.2 in/sec and predicted vibration levels at the nearest structure would not exceed recommended criteria. Additionally, this would be a temporary impact and would cease completely when construction ends.

Would the Project Expose Structures to Substantial Groundborne Vibration During Operations?

Project operations would not include the use of any stationary equipment that would result in excessive vibration levels. Therefore, the Project would result in no groundborne vibration impacts during operations.

PROJECT OPERATIONAL NOISE

Would the Project Result in Operational Noise in Excess of County Standards? Would the Project Result in a Substantial Permanent Increase in Ambient Noise Levels in the Project Vicinity Above Levels Existing Without the Project?

Project Operations

The proposed Project involves the construction of an approximately 1.49-mile-long multi-use path along the west side of Cactus Avenue, from Rialto Avenue to Baseline Road. While it is anticipated that the Project would increase traffic due to the new parking lots along the trail, the increase would be negligible. People using the trail for recreational activities (e.g., walking, running, cycling) would be the main source of noise for the Project. However, the trail users will be continuously moving along the trail and would not be concentrated at the point closest to the sensitive receptors. Furthermore, noise generated by people using the trail would be lower than ambient noise levels currently experienced from existing vehicular traffic, so nearby sensitive receptors will not notice a change in noise levels. Impacts in this regard would be less than significant.

Would the Project Expose People Residing or Working in the Project Area to Excessive Noise Levels?

The nearest airport to the Project site is Municipal Rialto Airport, located approximately 1-mile northwest of the Project site. The Project site is located outside of the established noise contours of the Rialto Municipal Airport (San Bernardino County ALUC 1991). There are no private airstrips located within the vicinity of the Project site.

CUMULATIVE NOISE IMPACTS

Cumulative Construction Noise Impacts

Construction activities associated with the proposed Project and other construction projects in the area may overlap, resulting in cumulative construction noise in the area. However, construction noise impacts primarily affect the areas immediately adjacent to the construction site. Construction noise for the proposed Project was determined to be less than significant following compliance with the City's Municipal Code and General Plan Safety and Noise Chapter. Cumulative development in the vicinity of the Project site could result in elevated construction noise levels at sensitive receptors in the Project area. However, each project would be required to comply with the applicable City's Municipal Code limitations on allowable construction noise limits. Therefore, the Project would not contribute to cumulative impacts and impacts in this regard are not cumulatively considerable.

Cumulative Operational Noise Impacts

Long-term noise sources associated with of the development at the Project, including vehicular traffic and trail activities, combined with other cumulative projects could cause local noise level increases. Noise levels associated with the proposed Project and related cumulative projects together could result in higher noise levels than considered separately. However, related cumulative projects would be required to comply with the City's noise level standards and include mitigation measures if this standard is exceeded. Therefore, cumulative noise impacts would be considered less than significant.

5.0 REFERENCES

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