

5.10 Noise

5.10.1 INTRODUCTION

This Draft EIR section evaluates the potential noise and vibration impacts that would result from implementation of the proposed TVSP. It discusses the existing noise environment within and around the TVSP area as well as the regulatory framework for regulation of noise. This section analyzes the effect of the proposed Project on the existing ambient noise environment during demolition, construction, and operational activities; and evaluates the proposed Project's noise effects for consistency with relevant local agency noise policies and regulations. This section includes data from the following:

- *City of Redlands 2035 General Plan, 2017*
- *City of Redlands General Plan Update and Climate Action Plan Environmental Impact Report (GP EIR), 2017*
- *City of Redlands Municipal Code*
- *Transit Villages District and Specific Plan Noise Impact and Vibration Analysis, Urban Crossroads, 2022, Appendix G.*

Noise and Vibration Terminology

Various noise descriptors are utilized in this EIR analysis, and are summarized as follows:

dB: Decibel, the standard unit of measurement for sound pressure level.

dBA: A-weighted decibel, an overall frequency-weighted sound level in decibels that approximates the frequency response of the human ear.

Leq: The equivalent sound level, which is used to describe noise over a specified period of time, typically 1 hour, in terms of a single numerical value. The Leq of a time-varying signal and that of a steady signal are the same if they deliver the same acoustic energy over a given time. The Leq may also be referred to as the average sound level.

Lmax: The instantaneous maximum noise level experienced during a given period of time.

Lmin: The instantaneous minimum noise level experienced during a given period of time.

Lx: The sound level that is equaled or exceeded "x" percent of a specified time period. The "x" thus represents the percentage of time a noise level is exceeded. For instance, L50 and L90 represents the noise levels that are exceeded 50 percent and 90 percent of the time, respectively.

Ldn: Also termed the "day-night" average noise level (DNL), Ldn is a measure of the average of A-weighted sound levels occurring during a 24-hour period, accounting for the greater sensitivity of most people to nighttime noise by weighting noise levels at night (penalizing" nighttime noises). Noise between 10:00 p.m. and 7:00 a.m. is weighted by adding 10 dBA to take into account the greater annoyance of nighttime noises.

CNEL: The Community Noise Equivalent Level, which, similar to the Ldn, is the average A-weighted noise level during a 24-hour day that is obtained after an addition of 5 dBA to measured noise levels between the hours of 7:00 p.m. to 10:00 p.m. and after an addition of 10 dBA to noise levels between the hours of 10:00 p.m. to 7:00 a.m. to account for noise sensitivity in the evening and nighttime, respectively.

The "ambient noise level" is the background noise level associated with a given environment at a specified time and is usually a composite of sound from many sources from many directions.

Effects of Noise

Noise is generally loud, unpleasant, unexpected, or undesired sound that is typically associated with human activity that is a nuisance or disruptive. The effects of noise on people can be placed into four general categories:

- Subjective effects (e.g., dissatisfaction, annoyance)
- Interference effects (e.g., communication, sleep, and learning interference)
- Physiological effects (e.g., startle response)
- Physical effects (e.g., hearing loss)

Although exposure to high noise levels has been demonstrated to cause physical and physiological effects, the principal human responses to typical environmental noise exposure are related to subjective effects and interference with activities. Interference effects refer to interruption of daily activities and include interference with human communication activities, such as normal conversations, watching television, telephone conversations, and interference with sleep. Sleep interference effects can include both awakening and arousal to a lesser state of sleep. With regard to the subjective effects, the responses of individuals to similar noise events are diverse and are influenced by many factors, including the type of noise, the perceived importance of the noise, the appropriateness of the noise to the setting, the duration of the noise, the time of day and the type of activity during which the noise occurs, and individual noise sensitivity.

In general, the more a new noise level exceeds the previously existing ambient noise level, the less acceptable the new noise level will be by those hearing it. With regard to increases in A-weighted noise levels, the following relationships generally occur:

- Except in carefully controlled laboratory experiments, a change of 1 dBA cannot be perceived.
- Outside of the laboratory, a 3-dBA change in noise levels is considered to be a barely perceivable difference.
- A change in noise levels of 5 dBA is considered to be a readily perceivable difference.
- A change in noise levels of 10 dBA is subjectively heard as doubling of the perceived loudness.

Noise Attenuation

Stationary point sources of noise, including mobile sources such as idling vehicles, attenuate (lessen) at a rate of 6 dBA per doubling of distance from the source over hard surfaces to 7.5 dBA per doubling of distance from the source over hard surfaces, depending on the topography of the area and environmental conditions (e.g., atmospheric conditions, noise barriers [either vegetative or manufactured]). Thus, a noise measured at 90 dBA 50 feet from the source would attenuate to about 84 dBA at 100 feet, 78 dBA at 200 feet, 72 dBA at 400 feet, and so forth. Widely distributed noise, such as a large industrial facility spread over many acres or a street with moving vehicles, would typically attenuate at a lower rate, approximately 4 to 6 dBA per doubling of distance from the source.

Hard sites are those with a reflective surface between the source and the receiver, such as asphalt or concrete surfaces or smooth bodies of water. No excess ground attenuation is assumed for hard sites and the changes in noise levels with distance (drop-off rate) is simply the geometric spreading of the noise from the source. Soft sites have an absorptive ground surface such as soft dirt, grass, or scattered bushes and trees. In addition to geometric spreading, an excess ground attenuation value of 1.5 dBA (per doubling distance) is normally assumed for soft sites. Line sources (such as traffic noise from vehicles)

attenuate at a rate between 3 dBA for hard sites and 4.5 dBA for soft sites for each doubling of distance from the reference measurement.

Fundamentals of Vibration

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

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

5.10.2 REGULATORY SETTING

5.10.2.1 Federal Regulations

Federal Highway Administration

Proposed federal or federal-aid highway construction projects at a new location, or the physical alteration of an existing highway that significantly changes either the horizontal or vertical alignment, or increases the number of through-traffic lanes, requires an assessment of noise and consideration of noise abatement per 23 CFR Part 772, "Procedures for Abatement of Highway Traffic Noise and Construction Noise." The Federal Highway Administration (FHWA) has adopted noise abatement criteria (NAC) for sensitive receivers such as picnic areas, recreation areas, playgrounds, active sport areas, parks, residences, motels, hotels, schools, churches, libraries, and hospitals when "worst-hour" noise levels approach or exceed 67 dBA Leq. Caltrans has further defined approaching the NAC to be 1 dBA below the NAC for noise-sensitive receivers identified as Category B activity areas (e.g., 66 dBA Leq is considered approaching the NAC).

US Environmental Protection Agency

In addition to FHWA standards, the United States Environmental Protection Agency (EPA) has identified the relationship between noise levels and human response. The EPA has determined that over a 24-hour period, an Leq of 70 dBA will result in some hearing loss. Interference with activity and annoyance will not occur if exterior levels are maintained at an Leq of 55 dBA and interior levels at or below 45 dBA. While these levels are relevant for planning and design and useful for informational purposes, they are not land

use planning criteria because they do not consider economic cost, technical feasibility, or the needs of the community.

The EPA also set 55 dBA Ldn as the basic goal for exterior residential noise intrusion. However, other federal agencies, in consideration of their own program requirements and goals, as well as difficulty of actually achieving a goal of 55 dBA Ldn, have settled on the 65 dBA Ldn level as their standard. At 65 dBA Ldn, activity interference is kept to a minimum, and annoyance levels are still low. It is also a level that can realistically be achieved.

Occupational Health and Safety Administration

The federal government regulates occupational noise exposure common in the workplace through the Occupational Health and Safety Administration (OSHA) under the EPA. Such limitations would apply to the operation of construction equipment and could also apply to any proposed industrial land uses. Noise exposure of this type is dependent on work conditions and is addressed through a facility's Health and Safety Plan, as required under OSHA, and is therefore not addressed further in this analysis.

US Department of Housing and Urban Development

The US Department of Housing and Urban Development (HUD) has set a goal of 65 dBA Ldn as a desirable maximum exterior standard for residential units developed under HUD funding. (This level is also generally accepted within the State of California.) While HUD does not specify acceptable interior noise levels, standard construction of residential dwellings typically provides in excess of 20 dBA of attenuation with the windows closed. Based on this premise, the interior Ldn should not exceed 45 dBA.

5.10.2.2 State Regulations

Title 24, California Building Code

State regulations related to noise include requirements for the construction of new hotels, motels, apartment houses, and dwellings other than detached single-family dwellings that are intended to limit the extent of noise transmitted into habitable spaces. These requirements are collectively known as the California Noise Insulation Standards and are found in California Code of Regulations, Title 24 (known as the Building Standards Administrative Code), Part 2 (known as the California Building Code), Appendix Chapters 12 and 12A. For limiting noise transmitted between adjacent dwelling units, the noise insulation standards specify the extent to which walls, doors, and floor ceiling assemblies must block or absorb sound. For limiting noise from exterior sources, the noise insulation standards set forth an interior standard of DNL 45 dBA in any habitable room and, where such units are proposed in areas subject to noise levels greater than DNL 60 dBA require an acoustical analysis demonstrating how dwelling units have been designed to meet this interior standard. If the interior noise level depends upon windows being closed, the design for the structure must also specify a ventilation or air conditioning system to provide a habitable interior environment.

The mandatory measures for non-residential buildings states that new construction shall provide an interior noise level that does not exceed an hourly equivalent level of 50 dBA Leq in occupied areas during any hour of operation. Title 24 standards are included in the City's Municipal Code in Chapter 15 and are enforced through the City's development permitting process.

5.10.1.3 Local Regulations

City of Redlands 2035 General Plan

The General Plan Healthy Community Element contains the following policies related to noise that are applicable to the Project:

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

Principle 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.

Action 7-A.135 Use the noise and land use compatibility matrix (Table 7-10) and Future Noise Contours map (Figure 7-9) 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.

Action 7-A.141 Require all future developments within the city that fall within the required noise screening distances, as specified in the Federal Transit Authority (FTA) Noise and Vibration Manual, of the Union Pacific railroad in San Timoteo Canyon to conduct a detailed noise analysis.

Table 7-10 (included as Table 5.10-1) of the General Plan Healthy Community Element identifies the specific criteria to evaluate proposed developments based on exterior and interior noise level limits for land uses and requires a noise analysis to determine needed mitigation measures if necessary. The Healthy Community Element identifies schools, hospitals, places of worship, and homes as a noise-sensitive land use.

Also, as shown on Table 5.10-2, the City of Redlands General Plan has an exterior (outdoor) noise standard of 60 dBA CNEL related to private yards of single-family residences as measured at the property line; multifamily private patios or balconies which is served by a means of exit from inside; mobile home parks; hospital patios; park picnic areas; school playgrounds; hotel and recreational areas. In addition, the General Plan includes an interior noise level limit of 45 dBA CNEL for residential land uses.

Measure U. The City of Redlands General Plan incorporates the implementing noise polices from Measure U. Measure U was certified by The City of Redlands in 1997 to address impacts from growth. The measure includes Project applicable provisions related to potential noise impacts and mitigation, as listed below.

Measure U 9.0e Use the criteria specified in GP Table 9.1 [Table 7-10] to assess the compatibility of proposed land uses with the projected noise environment and apply the noise standards in GP Table 9.2 [Table 7-11], which prescribe interior and exterior noise standards in relation to specific land uses. Do not approve projects that would not comply with the standards in GP Table 9.2 [Table 7-1]. These tables are the primary tools which allow the City to ensure noise-integrated planning for compatibility between land uses and outdoor noise.

Measure U 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 9.1 [Table 7-10] and on GP Figure 9.1 [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).

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

Measure U 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.

Measure U 9.0j Require the inclusion of noise mitigation measures in the design of new roadway projects.

Measure U 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.

Measure U 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.

Measure U 9.0u Require all new residential projects or replacement dwellings to be constructed near existing sources of non-transportation noise (including but not limited to commercial facilities or public parks with sports activities) to demonstrate via an acoustical study conducted by a Registered Engineer that the indoor noise levels will be consistent with the limits contained in the Community Noise Ordinance.

Measure U 9.0v Consider the following impacts as possibly "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 9.1 [Table 7-10] and GP Table 9.2 [Table 7-11];
- Any increase of six dB or more, due to the potential for adverse community response.

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

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

Table 5.10-1: City of Redlands General Plan Noise/Land Use Compatibility Matrix

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	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	C	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: City of Redlands General Plan Noise Element, Chapter 7 Healthy Community, Section 7.5 Noise, Table 7-10.

Table 5.10-2: City of Redlands General Plan Interior and Exterior Noise Standards

Land Use Categories Uses	Community Noise Equivalent Level (CNEL) Energy Average CNEL	
	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		
Hospital, 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 five decibels to sound levels in the evening from 7 pm to 10 pm and ten decibels to sound levels at night after 10 pm and before 7 am. 1. Indoor environment excluding bathrooms, toilets, closets, 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 level will not exceed 45 CNEL. 5. Except those areas affected by aircraft noise. See also Policy 9.0s		
Source: Mestres Greve Associates.		

Source: City of Redlands General Plan Noise Element, Chapter 7 Healthy Community, Section 7.5 Noise, Table 7-11.

City of Redlands Municipal Code

The City of Redlands Municipal Code Chapter 8.06 establishes noise standards by land use. For the noise-sensitive residential uses, Municipal Code Section 8.06.070[A] identifies the base exterior noise level standard of 60 dBA Leq during the daytime hours (7:00 a.m. to 10:00 p.m.) and 50 dBA Leq during the nighttime (10:00 p.m. to 7:00 a.m.) hours. As shown on Table 5.10-3, higher noise levels are allowed for shorter periods of time.

Table 5.10-3: City of Redlands Operational Noise Standards

Land Use	Time Period	Exterior Noise Level Standards (dBA)				
		L ₅₀ (30 mins)	L ₂₅ (15 mins)	L ₈ (5 mins)	L ₂ (1 min)	L _{max} (0 min)
Residential	Daytime	60	65	70	75	80
	Nighttime	50	55	60	65	70
Commercial	Daytime	65	70	75	80	85
	Nighttime	60	65	70	75	80
Industrial	Anytime	75	80	85	90	95

Source: City of Redlands Municipal Code, Section 8.06.070 [A]-Table 1. Section 8.06.070[C] states that if the measured ambient level exceeds the allowable noise exposure standard within any of the first four noise limit categories above, the allowable noise exposure standard shall be adjusted in five dB increments in each category as appropriate to encompass or reflect said ambient noise level. The percent noise level is the level exceeded "n" percent of the time during the measurement period. L₅₀ is the noise level exceeded 50% of the time. "Daytime" = 7:00 a.m. to 10:00 p.m.; "Nighttime" = 10:00 p.m. to 7:00 a.m.

In addition, Municipal Code Section 8.06.080 identifies the maximum permissible interior noise levels. For noise-sensitive residential uses, Municipal Code Section 8.06.080[B] identifies the interior noise level standard of 45 dBA. For commercial uses, Municipal Code Section 8.06.080[B] identifies the interior noise level standard of 50 dBA.

In addition, Municipal Code Section 8.06.070[B] provides noise standards based on the volume of noise and the period of time of the noise, as listed below:

1. The exterior noise standard of the applicable land use category for a cumulative period of 30 minutes in any hour (L₅₀); or
2. The exterior noise standard of the applicable land use category, plus 5 dBA, for a cumulative period of more than 15 minutes in any hour (L₂₅); or
3. The exterior noise standard of the applicable land use category, plus 10 dBA, for a cumulative period of more than 5 minutes in any hour (L₈); or
4. The exterior noise standard of the applicable land use category, plus 15 dBA, for a cumulative period of more than 1 minute in any hour (L₂).
5. The exterior noise standard for the applicable land use category, plus 20 dBA, or the maximum measured ambient noise level, for any period of time (L_{max}).

In addition, Section 8.06.070[C] states that if the measured ambient level exceeds the allowable noise exposure standard within any of the first four noise limit categories above, the allowable noise exposure standard shall be adjusted in five dB increments in each category as appropriate to encompass or reflect said ambient noise level. In the event the ambient noise level exceeds the fifth noise limit category, the maximum allowable noise level under this category shall be increased to reflect the maximum ambient noise level. In effect, when the ambient noise levels exceed the base exterior noise level limits, the noise level standard shall be adjusted as appropriate to encompass or reflect the ambient noise level.

Municipal Code Section 8.06.090(F) states that construction activity is considered exempt from the noise level standards between the hours of 7:00 a.m. to 6:00 p.m. Monday to Saturdays; with no activity allowed on Sundays or holidays.

Municipal Code, Section 8.06.020, defines the vibration perception threshold as 0.01 inches per second (in/sec) RMS.

5.10.3 ENVIRONMENTAL SETTING

Sensitive Receptors

Noise sensitive receptors are generally defined as locations where people reside or where the presence of unwanted sound could otherwise adversely affect the use of the land. Noise-sensitive land uses are generally considered to include: residences, schools, hospitals, and recreation areas. Sensitive receptors are located throughout the TVSP area.

Existing Noise Levels

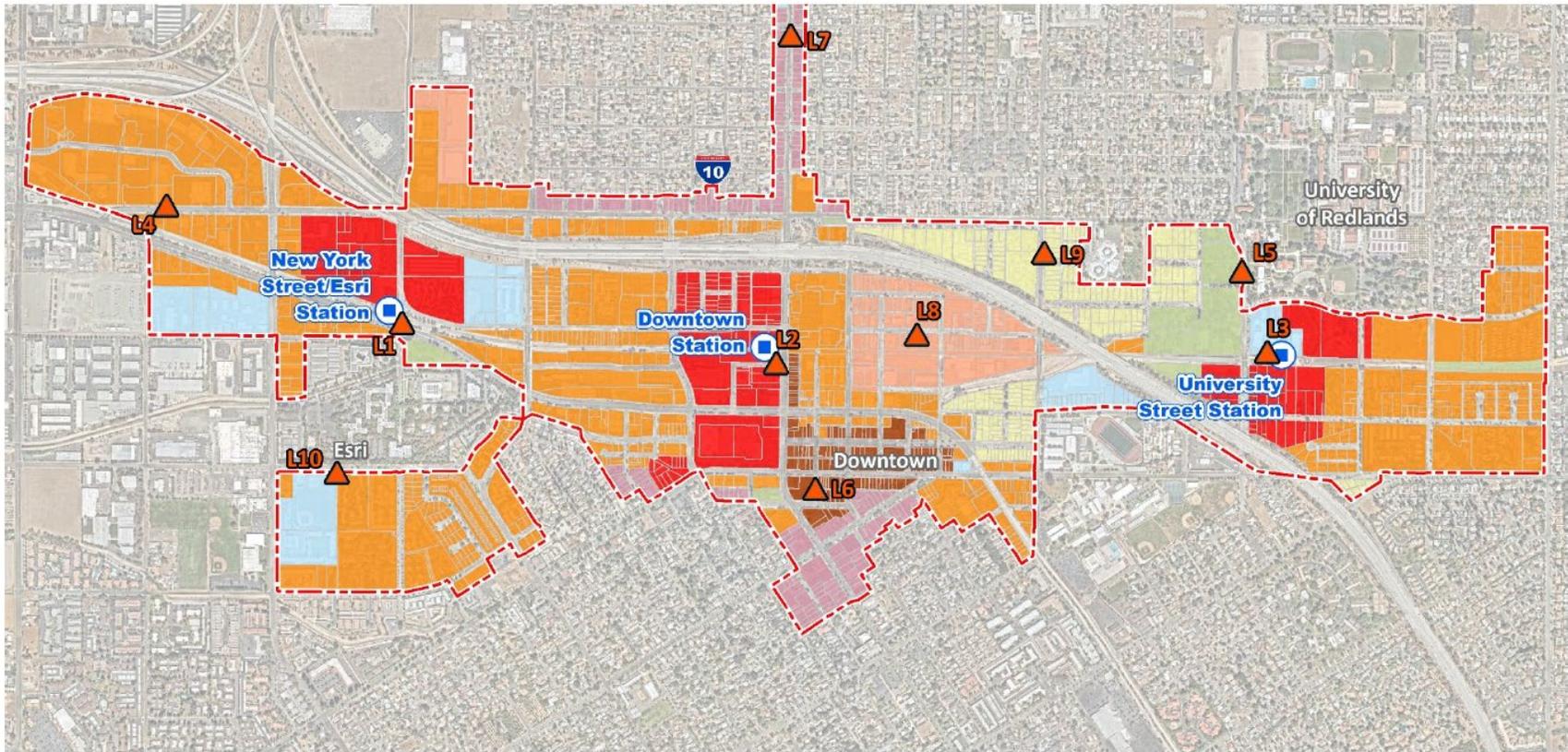
To assess the existing noise levels, 24-hour noise level measurements were taken at 10 locations near sensitive receivers in the vicinity of the TVSP area as shown in Figure 5.10-1. The field survey noted that noise within the TVSP area is generally characterized by vehicle traffic on area roadways and operation of the rail line and transit stations. A description of these locations and the existing noise levels are provided in Table 5.10-4. As shown, ambient noise levels range from 62.9 to 73.4 CNEL throughout the TVSP area.

Table 5.10-4: Existing Ambient Noise Measurement Results

Location	TVSP Land Use		Description	Energy Average Noise Level (dBA Leq)		CNEL
				Daytime	Nighttime	
L1	Village General	(VG)	Located southwest of the New York Street/ESRI Station north of Redlands Boulevard.	69.6	63.6	72.0
L2	Village Center	(VC)	Located near Historic Redlands Train Station at 383-389 Orange Street.	69.9	63.1	71.7
L3	Special District 1	(SD1)	Located west of the University Street Station north Park Avenue near Frederick Loewe Theatre.	57.1	57.6	64.4
L4	Village General	(VG)	Located north of Colton Avenue in the Tri City Shopping Center south of the CVS Pharmacy.	66.4	62.0	69.7
L5	Civic Space	(CS)	Located northwest of the University Street Station near Sylvan Park at 601 North University Street.	64.6	64.0	70.7
L6	Downtown	(DT)	Located north of East Vine Street and south of East Citrus Avenue.	57.6	56.0	62.9
L7	Village Corridor	(COR)	Located near the single-family residence at 1154 Orange Street.	70.2	65.5	73.4
L8	Neighborhood General 2	(NG2)	Located near the single-family residence at 410 East Stuart Street.	63.1	59.3	66.9
L9	Neighborhood General 1	(NG1)	Located near the single-family residence at 801 Stillman Avenue.	65.1	59.2	67.5
L10	Special District 1	(SD1)	Located south of the ESRI campus near the Redlands Adventist Academy at 130 Tennessee Street.	64.4	55.3	65.0

Source: Noise Study, 2022. Appendix G.

Figure 5.10-1: Noise Measurement Locations



LEGEND:



-  Measurement Locations
-  Transit Villages Specific Plan (TVSP) Boundary
-  Arrow Rail Stations

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The noise measurements identified that ambient noise levels range from 62.9 to 73.4 CNEL throughout the TVSP area. Table 5.10-5 summarizes the existing ambient noise level conditions in relation to the General Plan Noise/Land Use Compatibility Matrix listed in Table 5.10-1.

Table 5.10-5: Existing Noise and Land Use Compatibility

Location	TVSP Land Use		CNEL	General Plan Land Use Category	General Plan Noise/Land Use Compatibility
L1	Village General	(VG)	72.0	Commercial	Zone A - Clearly Compatible
L2	Village Center	(VC)	71.7	Commercial	Zone A - Clearly Compatible
L3	Special District 1	(SD1)	64.4	Commercial	Zone A - Clearly Compatible
L4	Village General	(VG)	69.7	Commercial	Zone A - Clearly Compatible
L5	Civic Space	(CS)	70.7	Open Space	Zone B - Normally Compatible
L6	Downtown	(DT)	62.9	Commercial	Zone A - Clearly Compatible
L7	Village Corridor	(COR)	73.4	Residential	Zone C - Normally Incompatible
				Commercial	Zone A - Clearly Compatible
L8	Neighborhood General 2	(NG2)	66.9	Residential	Zone C - Normally Incompatible
				Commercial	Zone A - Clearly Compatible
L9	Neighborhood General 1	(NG1)	67.5	Residential	Zone C - Normally Incompatible
				Commercial	Zone A - Clearly Compatible
L10	Special District 1	(SD1)	65.0	Public/Institutional	Zone A - Clearly Compatible

Source: Noise Study, 2022. Appendix G.

Table 5.10-5 shows that within the existing ambient noise environment, the TVSP commercial land uses are considered clearly compatible with the Noise/Land Use Compatibility Matrix. Clearly compatible land use is considered satisfactory with normal conventional construction without any special noise insulation requirements.

The existing noise level measurements also show that the future residential land uses located within the Village Corridor, Neighborhood General 1 and Neighborhood General 2 would be considered normally incompatible and new construction or development requires a detailed analysis of noise reduction features to reduce ambient noise upon the new residential development. Commercial uses located within the Village Corridor, Neighborhood General 1, and Neighborhood General 2 would be considered Clearly Compatible.

San Bernardino International Airport

The San Bernardino International Airport is located approximately 2.4 miles northwest of the TVSP area, which is within the Airport Influence Area. The latest aircraft noise contour boundaries for the airport were published as part of the Eastgate Air Cargo Facility Final Environmental Assessment and are included as Figure 5.10-2, which shows the 2024 CNEL contours with approximately 87,500 annual aircraft operations.

As shown on Figure 5.10-2 the TVSP area is located outside of the airport's 60 dBA CNEL noise level contours in 2024 and is considered normally acceptable by the General Plan Community Noise and Land Use Compatibility guidelines (Table 5.10-1).

5.10.4 THRESHOLDS OF SIGNIFICANCE

Appendix G of State CEQA Guidelines indicates that a project could have a significant effect if it were to:

- NOI-1 Generation of a substantial temporary or permanent increase in ambient noise levels in excess of standards established in the local general plan or noise ordinance, or applicable standards of other agencies;
- NOI-2 Generate excessive groundborne vibration or groundborne noise levels;
- NOI-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 Initial Study established that the proposed Project would result in less than significant impacts related to Threshold NOI-3. No further assessment of these impacts is required in this Draft EIR.

Construction Noise and Vibration

- If Project related construction activities:
 - Occur between the hours of 6:00 p.m. and 7:00 a.m. of the next day, on Sundays or federal holidays (Municipal Code Section 8.06.090(F)); or
 - Create noise levels which exceed the 80 dBA Leq acceptable noise level threshold at the nearby sensitive receiver locations (FTA, 2006);
- If Project-related construction activities generate vibration levels which exceed the Municipal Code, Section 8.06.020, vibration threshold of 0.1 in/sec RMS at receiver locations.

Operational Noise

- If Project related operational increase in ambient noise levels:
 - 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 9.1 [Table 7-10] and GP Table 9.2 [Table 7-11];
 - Any increase of six dB or more, due to the potential for adverse community response (Measure U Policy 9.0v).

5.10.5 METHODOLOGY

Construction Noise

To identify the temporary construction noise contribution to the existing ambient noise environment, the construction noise levels anticipated from usage of construction equipment needed to implement the TVSP were analyzed through comparison of construction noise levels to the thresholds listed previously to assess the level of significance associated with temporary construction noise level impacts.

Operational Noise

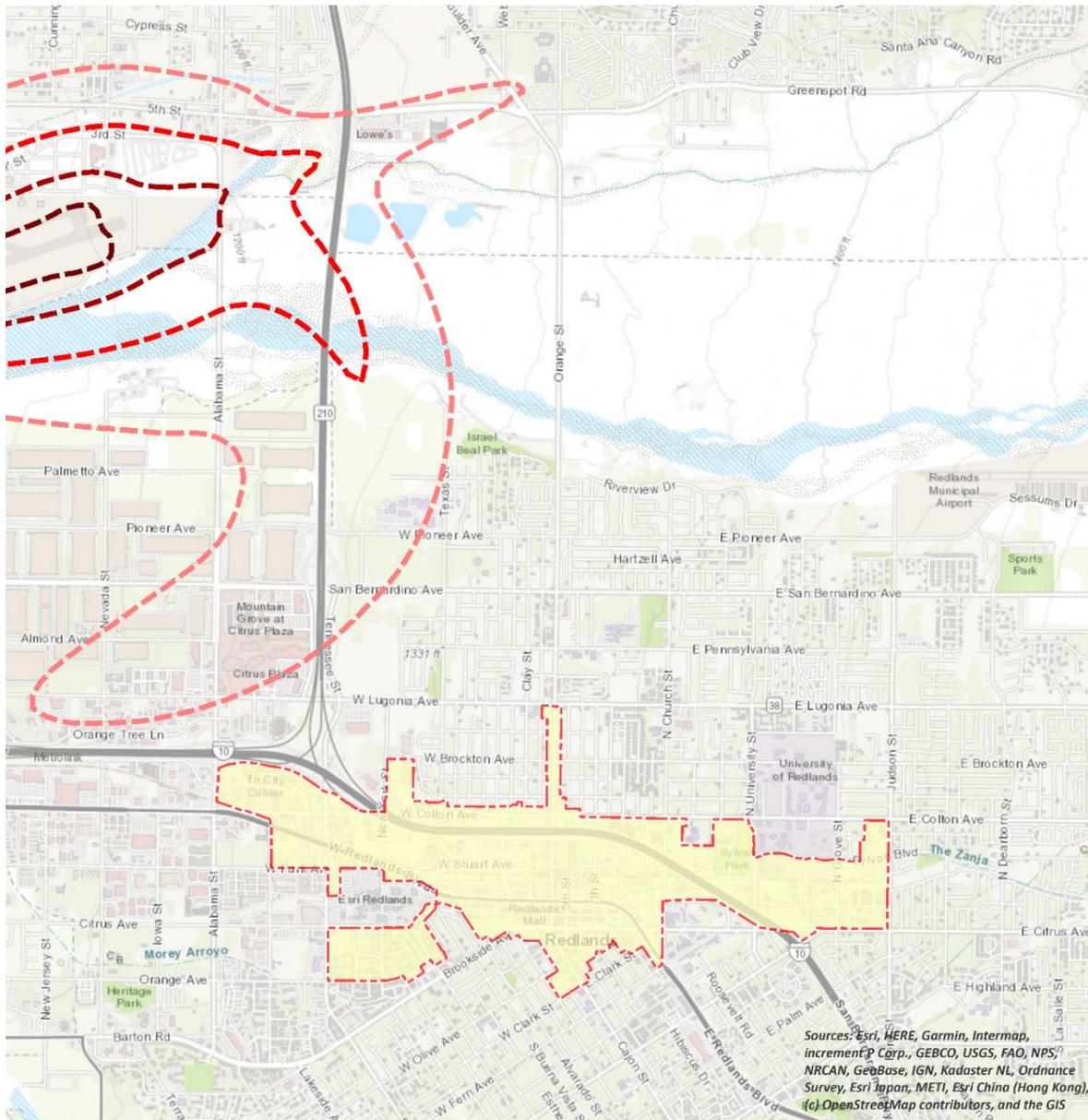
The primary source of noise associated with the operation of the TVSP would be from vehicular trips and new stationary sources (such as heating, ventilation, and air conditioning units) associated with the new site-specific development that would occur by the TVSP. The increase in noise levels generated by these activities have been quantitatively estimated and compared to the applicable noise standards listed previously.

Vibration

Aside from noise levels, groundborne vibration would also be generated during construction of the Project by various construction-related activities and equipment; and could be generated by truck traffic traveling to and from the TVSP area. The potential ground-borne vibration levels resulting from construction activities occurring from the TVSP were estimated by data published by the Federal Transit Administration (FTA). Thus, the groundborne vibration levels generated by these sources have also been quantitatively estimated and compared to the applicable thresholds of significance listed previously.

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Figure 5.10-2: San Bernardino International Airport Noise Contours



Sources: Esri, HERE, Garmin, Intermap, increment P Corp., GEBCO, USGS, FAO, NPS, NRCAN, GeoBase, IGN, Kadaster NL, Ordnance Survey, Esri Japan, METI, Esri China (Hong Kong), (c) OpenStreetMap contributors, and the GIS

LEGEND:

San Bernardino International (SBD) Airport Future Noise Level Contour Boundaries

- Project Site Boundary
- 60 dBA CNEL
- 65 dBA CNEL
- 70 dBA CNEL
- 75 dBA CNEL



Source: Figure 4-6 of the Eastgate Air Cargo Facility Final Environmental Assessment published by the SBIAA on July 2, 2019.

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5.10.6 ENVIRONMENTAL IMPACTS

IMPACT NOI-1: THE PROJECT WOULD NOT GENERATE A SUBSTANTIAL TEMPORARY OR PERMANENT INCREASE IN AMBIENT NOISE LEVELS IN EXCESS OF STANDARDS ESTABLISHED IN THE LOCAL GENERAL PLAN OR NOISE ORDINANCE, OR APPLICABLE STANDARDS OF OTHER AGENCIES.

Construction

Less than Significant with Mitigation Incorporated. The timing of development and various construction activities pursuant to the TVSP would be dependent upon market conditions and development applications for new projects. Thus, construction activities associated with buildout of the proposed TVSP would likely occur sporadically over an 18-year period or longer and include different project specific construction activities. Table 5.10-6 lists construction equipment that would be used during construction of TVSP development projects.

Table 5.10-6: Construction Equipment Assumptions

Construction Activity	Equipment
Demolition	Concrete/Industrial Saws
	Excavators
	Rubber Tired Dozers
Site Preparation	Crawler Tractors
	Rubber Tired Dozers
Grading	Crawler Tractors
	Excavators
	Graders
	Rubber Tired Dozers
Building Construction	Scrapers
	Cranes
	Forklifts
	Generator Sets
	Tractors/Loaders/Backhoes
Paving	Welders
	Pavers
	Paving Equipment
Architectural Coating	Rollers
	Air Compressors

Source: EIR Section 5.2, Air Quality, Table 5.2-6 and (Appendix G)

Noise generated by the Project construction equipment will include a combination of trucks, power tools, concrete mixers, and portable generators that when combined can reach noise levels ranging from approximately 68 dBA to more than 80 dBA when measured at 50 feet. Hard site conditions are used in the construction noise analysis which result in noise levels that attenuate (or decrease) at a rate of 6 dBA for each doubling of distance from a point source (i.e., construction equipment). For example, a noise level of 80 dBA measured at 50 feet from the noise source to the receiver would be reduced to 74 dBA at 100 feet from the source to the receiver and would be further reduced to 68 dBA at 200 feet from the source to the receiver.

Section 8.06.090(F) of the City's Municipal Code allows construction noise to exceed the City noise standards provided that construction activities occur between 7:00 a.m. and 6:00 p.m., Monday through Saturday, and not on Sundays and Federal holidays. However, the City construction noise standards do not provide any limits to the noise levels that may be created from construction activities and even with adherence to the City standards, the resultant construction noise levels may result in a significant substantial temporary noise increase to the nearby residents. Therefore, in order to determine if construction activities

would create a significant substantial temporary noise increase, the FTA construction noise criteria threshold detailed above has been utilized, which shows that a significant construction noise impact would occur if construction noise exceeds 80 dBA during the daytime at a sensitive receiver, such as a residence.

Because the TVSP includes development of residential uses and existing residential units are located throughout the TVSP area, construction of new developments pursuant to the TVSP that are infill and redevelopment projects could occur adjacent to sensitive receptors, and temporary intermittent construction noise impacts could occur. Therefore, Mitigation Measures NOI-1 through NOI-4 have been included to provide construction measures to reduce potential impacts to a less than significant level.

Operation

Ambient Traffic Noise Impacts to Proposed Sensitive Receptors

Less than Significant with Mitigation Incorporated. The proposed TVSP would consist of infill and redevelopment of new mixed uses, including residential, within the Project area. The primary source of noise impacts to the new development within the TVSP would be from the Arrow commuter rail line, and traffic-related noise from the I-10 Freeway, and key arterial roadways such as New York Street, Eureka Street, Orange Street, Church Street, Grove Street, Judson Street, Colton Avenue, Park Avenue, Redlands Boulevard, State Street, and Citrus Avenue.

New noise sensitive land uses adjacent to the Arrow commuter rail line, the I-10 Freeway and these key arterial roadways would experience future unmitigated exterior noise levels greater than 65 dBA CNEL, which represents normally incompatible for residential uses based on the General Plan Noise/Land Use Compatibility Matrix (Table 5.10-1). Therefore, based on the proximity of future noise sensitive land uses, traffic-related noise impacts at future residential uses within the TVSP would be potentially significant and require noise mitigation to reduce potential impacts to less than significant level. Mitigation Measure NOI-5 requires that prior to the issuance of a building permit for new residential dwelling units within the TVSP, the Project plans and specifications shall demonstrate compliance with the General Plan 60 dBA CNEL exterior noise level standard, such as through an acoustical analysis.

Interior Noise Impacts to Proposed Sensitive Receptors

Less than Significant with Mitigation Incorporated. The proposed TVSP would consist of infill and redevelopment of lands within the Project area that would provide new residential units that could be within mixed-use buildings adjacent to an arterial roadway or the Arrow commuter rail line.

Typical building construction provides a noise reduction of approximately 12 dBA with "windows open" and a minimum 25 dBA noise reduction with "windows closed." The use of central air conditioning provides noise reduction benefits by permitting windows to be kept closed. Typical noise reducing construction methods include: 1) weather-stripped solid core exterior doors; 2) upgraded dual glazed windows; 3) mechanical ventilation/air conditioning; and 4) exterior wall/roof assemblies free of cut outs or openings. Each of these methods are included in State Title 24 construction standards that are verified as implemented by the City during the construction permitting process.

Because the exterior noise levels from future noise sensitive land uses adjacent to the arrow commuter rail line, the I-10 Freeway and key arterial roadways exceed 60 dBA CNEL, detailed interior noise analysis based on site-specific architectural floor plans and elevations would be required for future developments that include residential uses to satisfy the City of Redlands General Plan Noise Element, Table 7-11 (Table 5.10-2), 45 dBA CNEL interior noise level standard for residential dwelling units. Therefore, Mitigation Measure NOI-6 is included to require new development projects to demonstrate compliance with the 45 dBA CNEL interior noise level standard, such as through provision of an acoustical analysis, to ensure that impacts would be less than significant.

Non-Residential Noise Generation

Implementation of the proposed TVSP would include a combination of noise sources related to the proposed residential, commercial, recreation, and other uses included in the TVSP. Buildout of the TVSP would result in noise sources that would include air conditioning units, loading dock activities, parking lots, trash enclosures, and outdoor activities in park and recreation areas. These Project-related noise sources are consistent with existing noise sources observed in the TVSP area. However, new operation of non-residential uses developed pursuant to the TVSP could result in nuisance noise source activity that could increase the ambient noise levels at sensitive receptors. Therefore, Mitigation Measure NOI-7 is included to ensure future project compliance with Municipal Code Section 8.06.090(F), through conduct of a noise impact analysis, which would ensure that operational noise impacts would be less than significant.

IMPACT NOI-2: THE PROJECT WOULD NOT GENERATE EXCESSIVE GROUND-BORNE VIBRATION OR GROUNDBORNE NOISE LEVELS.

Construction

Less than Significant with Mitigation Incorporated. Construction activities for the infill and redevelopment projects that would occur pursuant to the TVSP are anticipated to include demolition, site preparation, grading, building construction, paving, and application of architectural coatings. Vibration impacts from these construction activities would typically be created from the operation of heavy off-road equipment. Because the TVSP includes development of residential uses and existing residential units are located throughout the TVSP area, construction of new developments pursuant to the TVSP that are infill and redevelopment projects could occur adjacent to sensitive receptors.

As described previously Section 8.06.090(F) of the City's Municipal Code limits construction to occur between 7:00 a.m. and 6:00 p.m., Monday through Saturday, which also limits the time that construction vibration could occur. Also, Section 8.06.020 identifies the vibration threshold as 0.01 in/sec RMS.

Ground vibration levels associated with various types of construction equipment are summarized in Table 5.10-7. Based on the representative vibration levels presented for various construction equipment types, it is possible to estimate the potential Project construction vibration levels using the following vibration assessment methods defined by the FTA. To describe the human response (annoyance) associated with vibration impacts the FTA provides the following equation: $PPV_{equip} = PPV_{ref} \times (25/D)$.

Table 5.10-7: Vibration Source Levels for Construction Equipment

Equipment	PPV (in/sec) at 25 feet
Small bulldozer	0.003
Jackhammer	0.035
Loaded Trucks	0.076
Large bulldozer	0.089

Source: Noise, 2022. Appendix G

The primary source of vibration during infill and redevelopment construction would be from the operation of a bulldozer. As shown in Table 5.10-7, a large bulldozer would create a vibration level of 0.089 inch per second PPV at 25 feet. To describe the RMS vibration level and demonstrate compliance with the Municipal Code perceptible vibration threshold of 0.01 in/sec RMS, PPV velocities are converted to RMS vibration levels based on the Caltrans *Transportation and Construction Vibration Guidance Manual* conversion factor of 0.71.

Table 5.10-8 lists that anticipated construction related vibration levels at distances ranging from 25 to 150 feet from construction activity. As shown, construction vibration levels would range from 0.004 to 0.063 in/sec RMS that would exceed the perceptible vibration threshold of 0.01 in/sec RMS at distances of less than 100 feet. Therefore, Mitigation Measures NOI-8 and NOI-9 are included to reduce potential

vibration impacts to below the vibration threshold of 0.01 in/sec RMS, which would reduce impacts to a less than significant level.

Table 5.10-8: Construction Equipment Vibration Levels

Distance to Const. Activity (Feet)	Receiver Levels (in/sec) PPV					Velocity Levels (in/sec) RMS	Threshold (in/sec) RMS	Threshold Exceeded?
	Small Bulldozer	Jack-hammer	Loaded Trucks	Large Bulldozer	Peak Vibration			
25'	0.0030	0.0350	0.0760	0.0890	0.0890	0.063	0.01	Yes
50'	0.0011	0.0124	0.0269	0.0315	0.0315	0.022	0.01	Yes
100'	0.0004	0.0044	0.0095	0.0111	0.0111	0.008	0.01	No
125'	0.0003	0.0031	0.0068	0.0080	0.0080	0.006	0.01	No
150'	0.0002	0.0024	0.0052	0.0061	0.0061	0.004	0.01	No

Source: Noise, 2022. Appendix G

Operation

Less than Significant. The proposed Project would consist of infill and redevelopment within the TVSP with new residential, commercial, and mixed-use projects. The on-going operation of these types of land uses do not include the operation of any vibration sources other than typical onsite vehicle and truck operations. Therefore, impacts related to operational vibration would be less than significant.

5.10.7 CUMULATIVE IMPACTS

Cumulative noise assessment considers development of the proposed Project in combination with ambient growth and other development projects within the vicinity of the TVSP area. As noise is a localized phenomenon, and drastically reduces in magnitude as distance from the source increases, only projects and ambient growth in the nearby area could combine with the activities of the TVSP to result in cumulative noise impacts.

Buildout of the TVSP in combination with the related projects would result in an increase in construction-related and traffic-related noise. However, Municipal Code Section 8.06.090(F) requires construction activities to not occur within the hours of 6:00 p.m. and 7:00 a.m. on weekdays or anytime on Sundays and federal holidays. Also, construction noise and vibration are localized in nature and decreases substantially with distance. Consequently, in order to achieve a substantial cumulative increase in construction noise and vibration levels, more than one source emitting high levels of construction noise would need to be in close proximity to TVSP construction activity. As the timing of development and various construction activities pursuant to the TVSP would be dependent upon market conditions and development applications for new projects. Construction activities associated with buildout of the proposed TVSP would likely occur sporadically over an 18-year period or longer. Thus, its currently unknown if construction projects would occur adjacent to one another. However, implementation of the construction and vibration mitigation measures provided herein would reduce the potential of noise and vibration levels from different construction projects combining to become cumulatively considerable to a less than significant level. Therefore, with implementation of mitigation, cumulative noise and vibration impacts associated with construction activities would be less than significant.

Development anticipated by the TVSP in combination with other nearby projects would result in an increase in ambient noise. However, all development projects would be subject to the operational noise standards established by the General Plan and Municipal Code, which would ensure that noise from new uses in the TVSP area would stay below City standards and therefore not combine with other development projects to be cumulatively significant. Thus, operational noise from new land uses in the proposed Specific Plan area would result in less than significant cumulative noise impacts.

Also, as described above, the TVSP area is located outside of the 60 dBA CNEL noise contour boundaries of the San Bernardino International Airport, and developments within the proposed TVSP area would not result in exposure of people residing or working in the area to excessive noise levels from operation of an airport and would not result in an impact that could cumulatively combine. Hence, cumulative impacts related to airport noise would not occur.

5.10.8 EXISTING REGULATIONS, STANDARD CONDITIONS, AND PLANS, PROGRAMS, OR POLICIES

Existing Regulations

- California Code of Regulations, Title 24 included in the City's Municipal Code in Chapter 18.
- City's Municipal Code Section 8.06.090(F), all construction activities shall be limited to the daytime hours of between 7:00 a.m. to 6:00 p.m. Monday to Saturdays; with no activity allowed on Sundays or holidays
- City's Municipal Code Section 8.06.020, defines the vibration perception threshold as 0.01 inches per second (in/sec) RMS.

Standard Conditions

None.

Plans, Programs, or Policies

None.

5.10.9 LEVEL OF SIGNIFICANCE BEFORE MITIGATION

Without mitigation, the following impacts would be **potentially significant**:

Impact NOI-1: Buildout of the proposed TVSP could generate of a substantial temporary or permanent increase in ambient noise levels in excess of standards established in the local general plan or noise ordinance.

Impact NOI-2: Buildout of the proposed TVSP could generate excessive groundborne vibration or groundborne noise levels.

5.10.10 MITIGATION MEASURES

Mitigation Measure NOI-1: Construction Equipment: Prior to the issuance of a demolition, grading, or construction permit for new development within the TVSP, the project plans and specifications shall require that construction contractors equip all construction equipment, fixed or mobile, with properly operating and maintained mufflers, consistent with manufacturers' standards, and all stationary construction equipment shall be placed so that emitted noise is directed away from the noise-sensitive use nearest the construction activity.

Mitigation Measure NOI-2: Construction Staging: Prior to the issuance of a demolition, grading, or construction permit for new development within the TVSP, the project plans and specifications shall require that the construction contractor shall locate equipment staging in areas that will create the greatest distance between construction-related noise sources and noise-sensitive receiver nearest to the construction activity.

Mitigation Measure NOI-3: Construction Noise Levels: Prior to the issuance of a demolition, grading, or construction permit for new development within the TVSP, the project plans and specifications shall demonstrate that all construction activity within the TVSP will satisfy the exterior construction noise level of 80 dBA L_{eq} at a sensitive receiver (e.g., residential).

Mitigation Measure NOI-4: Construction Noise Barriers: Prior to the issuance of a demolition, grading, or construction permit for new development within the TVSP that could exceed the exterior construction noise level of 80 dBA L_{eq} at a sensitive receiver (e.g. residential), the project plans and specifications shall detail the installation of temporary construction noise barriers for occupied noise-sensitive uses for the duration of construction activities that could exceed the TVSP construction noise level thresholds. The noise control barrier(s) must provide a solid face from top to bottom and shall:

- Provide a minimum transmission loss of 20 dBA and be constructed with an acoustical blanket (e.g., vinyl acoustic curtains or quilted blankets) attached to the construction site perimeter fence or equivalent temporary fence posts;
- Be maintained and any damage promptly repaired. Gaps, holes, or weaknesses in the barrier or openings between the barrier and the ground shall be promptly repaired; and
- Be removed and the site appropriately restored upon the conclusion of the construction activity.

Mitigation Measure NOI-5: Residential Exterior Noise: Prior to the issuance of a building permit for new residential dwelling units within the TVSP, the Project plans and specifications shall demonstrate compliance with the 60 dBA CNEL exterior noise level standard as defined by Table 7-11 of the City of Redlands General Plan Healthy Community Element through preparation of an acoustical analysis. The outdoor environment is 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 as intended by the General Plan Healthy Community Element.

Mitigation Measure NOI-6: Residential Interior Noise: Prior to the issuance of a building permit for new residential dwelling units within the TVSP, the Project plans and specifications shall demonstrate compliance with the 45 dBA CNEL interior noise level standard as defined by Table 7-11 of the General Plan Healthy Community Element and by Title 24, Part 2, of the California Building Code through preparation of an acoustical analysis.

Mitigation Measure NOI-7: Non-Residential Developments: Prior to the issuance of a building permit for a non-residential development within the TVSP that has the potential to impact noise sensitive residential land uses, the project plans and specifications shall demonstrate compliance with Municipal Code Section 8.06.090(F).

Mitigation Measure NOI-8: Construction Vibration: Prior to approval of a demolition permit, grading plans, and/or issuance of building permits for construction activities within 100 feet of existing residential structures or occupied noise-sensitive uses that require the use of large bulldozers, large loaded trucks, jackhammers, pile drivers, and/or caisson drills, the City of Redlands Building and Safety Division shall ensure that construction plans and specifications state that the use of such vibratory equipment shall be prohibited within 100 feet of existing residential structures or occupied noise-sensitive uses. Instead, small rubber-tired bulldozers shall be used within this area during demolition and/or grading operations to reduce vibration effects. If the use of large bulldozers, loaded trucks, jackhammers, pile drivers, and/or caisson drills is necessary within 100 feet of existing residential structures or occupied noise-sensitive uses,

the project Applicant/Developer shall demonstrate compliance with Municipal Code, Section 8.06.020 vibration perception threshold as 0.01 inches per second (in/sec) RMS.

Mitigation Measure NOI-9: Construction Vibration Near Fragile Historic: Any site-specific development project within 25 feet of an extremely fragile historic building shall engage a qualified structural engineer to conduct a pre-construction assessment of the structural integrity of the nearby historic structure(s) and submit evidence to the City of Redlands Building and Safety Division detailing that the operation of vibration-generating equipment associated with the new development would not result in structural damage to the adjacent historic building(s). If recommended by the pre-construction assessment, groundborne vibration monitoring of nearby historic structures shall be required.

5.10.11 LEVEL OF SIGNIFICANCE AFTER MITIGATION

Impact NOI-1: After implementation of Mitigation Measures NOI-1 through NOI-7, buildout of the TVSP would not result in a substantial temporary or permanent increase in ambient noise levels in excess of standards established in the local general plan or noise ordinance. Thus, impacts would be less than significant.

Impact NOI-2: After implementation of Mitigation Measures NOI-8 and NOI-9, buildout of the TVSP would not result in excessive groundborne vibration or groundborne noise levels. Thus, impacts would be less than significant.

Therefore, no significant unavoidable adverse impacts related to noise or vibration would occur.

REFERENCES

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