

Appendix C Noise and Vibration Analysis

Appendices

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LOCAL REGULATIONS AND STANDARDS

POLICIES

Principles

- 7-P.37** Use the City of Redlands Local Hazard Mitigation Plan and Emergency Operations Plan as the guides for disaster planning in the Redlands Planning Area.
- 7-P.38** Aim for City-level self-sufficiency in emergency response.

Actions

- 7-A.127** Use the City of Redlands Local Hazard Mitigation Plan as the guide for identifying hazard risks and vulnerabilities, identifying and prioritizing mitigation actions, encouraging the development of local mitigation, and providing technical support for these efforts.
- 7-A.128** Continue to update and revise the Local Hazard Mitigation Plan and Emergency Operations Plan as needed to reflect changes in the Planning Area and in emergency management techniques, including specific local hazards that may not be included in the plan.
- 7-A.129** Maintain and update the City's Emergency Plan, as required by State law.
- 7-A.130** Maintain ongoing emergency response coordination with surrounding jurisdictions.
- 7-A.131** Require all City staff to be adequately trained to respond to emergency situations and conduct regular emergency preparedness drills with local organizations including the City's Fire, Police, Quality of Life, Emergency Management, and Municipal & Utilities Engineering departments.

- 7-A.132** Establish community programs to train volunteers to assist police, fire, and civil defense personnel during and after a major earthquake, fire, flood, or other major disaster.
- 7-A.133** Develop a public awareness program on the nature and extent of natural hazards in the Planning Area, and ways of minimizing disasters.
- 7-A.134** Investigate and plan for changes in hazard conditions due to climate change. Develop strategies to address changing risks to life and property from flood, drought, fire and other potential hazards, including those related to monitoring, emergency preparedness, development policies, conservation, and community resilience, and ensure that the City's hazard information is up to date regarding climate trends.

7.5 NOISE

Noise is usually defined as unwanted sound. Noise consists of any sound that may produce physiological or psychological damage and/or interfere with communication, work, rest, recreation, and sleep. Future residential development and recreational land uses will need to meet the City's land use compatibility matrix and noise standards. Of particular attention to the City are noise levels near loud transportation corridors, including roadways, the airport, railways.

Noise Measurement

- **Level.** The decibel (dB) system of measuring sound gives a rough connection between the physical intensity of sound and its perceived loudness to the human ear. A 10 dB increase in sound level is perceived by the human ear as only a doubling of the loudness of the sound. Ambient sounds generally range from 30 A-weighted decibels (dBA) (very quiet) to 100 dBA (very loud).
- **Frequency.** Frequency is the composition or spectrum of the sound. Frequency is a measure of the pressure fluctuations per second.
- **Variation.** Variation is the sound level over time. Predominant rating scales for human communities in the State of California (State) are the Leq and the Community Noise Equivalent Level (CNEL) or the day-night average level (Ldn) based on A-weighted decibels. CNEL is the time-varying noise over a 24-hour period, with a 5 dBA weighting factor applied to the hourly Leq for noises occurring from 7:00 p.m. to 10:00 p.m. (defined as relaxation hours) and a 10 dBA weighting factor applied to noise occurring from 10:00 p.m. to 7:00 a.m. (defined as sleeping hours). Ldn is similar to the CNEL scale but without the adjustment for events occurring during the

evening hours. CNEL and Ldn are within 1 dBA of each other and are normally interchangeable. The noise adjustments are added to the noise events occurring during the more sensitive hours.

Noise Impacts

Noise impacts can be described in three categories. The first includes audible impacts, which refer to increases in noise levels noticeable to humans. Audible increases in noise levels generally refer to a change of 3 dB or greater, since this level has been found to be barely perceptible in exterior environments. The second category, potentially audible, refers to a change in the noise level between 1 and 3 dB. This range of noise levels has been found to be noticeable only in laboratory environments. The last category includes changes in noise level of less than 1 dB, which are inaudible to the human ear. Only audible changes in existing ambient or background noise levels are considered potentially significant.

Physiological Effects of Noise

Physical damage to human hearing begins at prolonged exposure to noise levels higher than 85 dBA. Exposure to high noise levels affects the entire system, with prolonged noise exposure in excess of 75 dBA increasing body tensions and thereby affecting blood pressure and functions of the heart and the nervous system. In comparison, extended periods of noise exposure above 90 dBA would result in permanent cell damage. When the noise level reaches 120 dBA, a tickling sensation occurs in the human ear, even with short-term exposure. This level of noise is called the threshold of feeling. As the sound reaches 140 dBA, the tickling sensation is replaced by the feeling of pain in the ear. This is called the threshold of pain. A sound level of 160 to 165 dBA will potentially result in dizziness or loss of equilibrium. The ambient or background noise problem is widespread and

generally more concentrated in urban areas than in outlying, less-developed areas. Table 7-9 shows common sound levels and their noise sources.

Noise Sources

Traffic Noise

Automobiles, buses, and trucks produce transportation noise in Redlands. Major transportation noise sources in Redlands include traffic on Interstate 10 (I-10), Interstate 210 (I-210), California Street, Alabama Street, Tennessee Street, Center Street, Cajon Street, 6th Street, Orange Street, Church Street, Ford Street, Lugonia Avenue, Colton Avenue, Citrus Avenue, Highland Avenue, 5th Avenue, San Bernardino Avenue, Judson Avenue, Wabash Avenue, and Redlands Boulevard. Figure 7-8 shows noise level existing contours along roadways and along I-10. Figure 7-9 shows future noise contours projected for 2035.

Rail Noise

The noise impacts associated with rail activities depend on a number of factors, including the type of train, the length of train, the use of a horn, the physical track conditions, the geometry and intervening structures between the rail line and its receptor, the number of trains operating, and the speed of the train.

Currently, two rail lines pass through portions of the city. The first is located along the Redlands Boulevard corridor and runs in an east-west direction generally following I-10, and runs through Downtown Redlands. This rail line is currently inactive, but the Redlands Passenger Rail Corridor project is now cleared for final design and construction along the right-of-way. The second rail line, which is currently active, is operated by Union Pacific. This rail line passes through the southwest and southern portion of the city, generally running parallel to San Timoteo Canyon Road. Based on the crossing inventory

completed on January 1, 2011, at the Alessandro Road intersection, typical operations included approximately 17 daytime trains and 20 nighttime trains ranging in speed from 45 to 65 mph.

Aircraft Noise

The Redlands Municipal Airport is a source of noise, primarily from takeoffs and landings. There are on average 120 inbound and outbound flights from this airport. Aircraft includes single and multi-engine airplanes, jet airplanes, helicopters, gliders, and ultralight aircrafts. Noise from the aircraft generates a relatively minor contribution to the overall noise environment. Existing aircraft noise contours are illustrated in Figure 7-8.

Stationary Noise Sources

Commercial-industrial and light-industrial land uses in the city have the potential to generate high noise levels and impact surrounding land uses with their equipment operation. Noise sources from these land uses include: air conditioning or refrigeration units, power tools, lawn equipment, generators, and other powered mechanical equipment.

TABLE 7-9: COMMON SOUND LEVELS AND THEIR NOISE SOURCES

Noise Source	A-Weighted Sound Level in Decibels	Noise Environments	Subjective Evaluations ¹
Near jet engine	140	Deafening	128 times as loud
Civil defense siren	130	Threshold of pain	64 times as loud
Hard rock band	120	Threshold of feeling	32 times as loud
Accelerating motorcycle a few feet away	110	Very Loud	16 times as loud
Pile driver; noisy urban street/heavy city traffic	100	Very Loud	8 times as loud
Ambulance siren; food blender	95	Very Loud	—
Garbage disposal	90	Very Loud	4 times as loud
Freight cars; living room music	85	Loud	—
Pneumatic drill; vacuum cleaner	80	Loud	2 times as loud
Busy restaurant	75	Moderately loud	—
Near freeway auto traffic	70	Moderately loud	Reference level
Average office	60	Quiet	½ as loud
Suburban street	55	Quiet	—
Light traffic; soft radio music in apartment	50	Quiet	¼ as loud
Large transformer	45	Quiet	—
Average residence without stereo playing	40	Faint	⅙ as loud
Soft whisper	30	Faint	—
Rustling leaves	20	Very faint	—
Human breathing	10	Very faint	Threshold of hearing
—	0	Very faint	—

Notes:

1. Subjective evaluations based on reference level of near freeway auto traffic.

Source: LSA Associates, 2015.

POLICIES

Principles

- 7-P.39** Support measures to reduce noise emissions by motor vehicles, aircraft, and trains.
- 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.
- 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.
- 7-P.42** Guide the location and design of transportation facilities, industrial uses, and other potential noise generators to minimize the effects of noise on adjacent land uses.
- 7-P.43** Ensure long-term compatibility between the Redlands Municipal Airport and surrounding land uses.

Actions

Land Use and Noise Compatibility

- 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.
- 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.
- 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.
- 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.

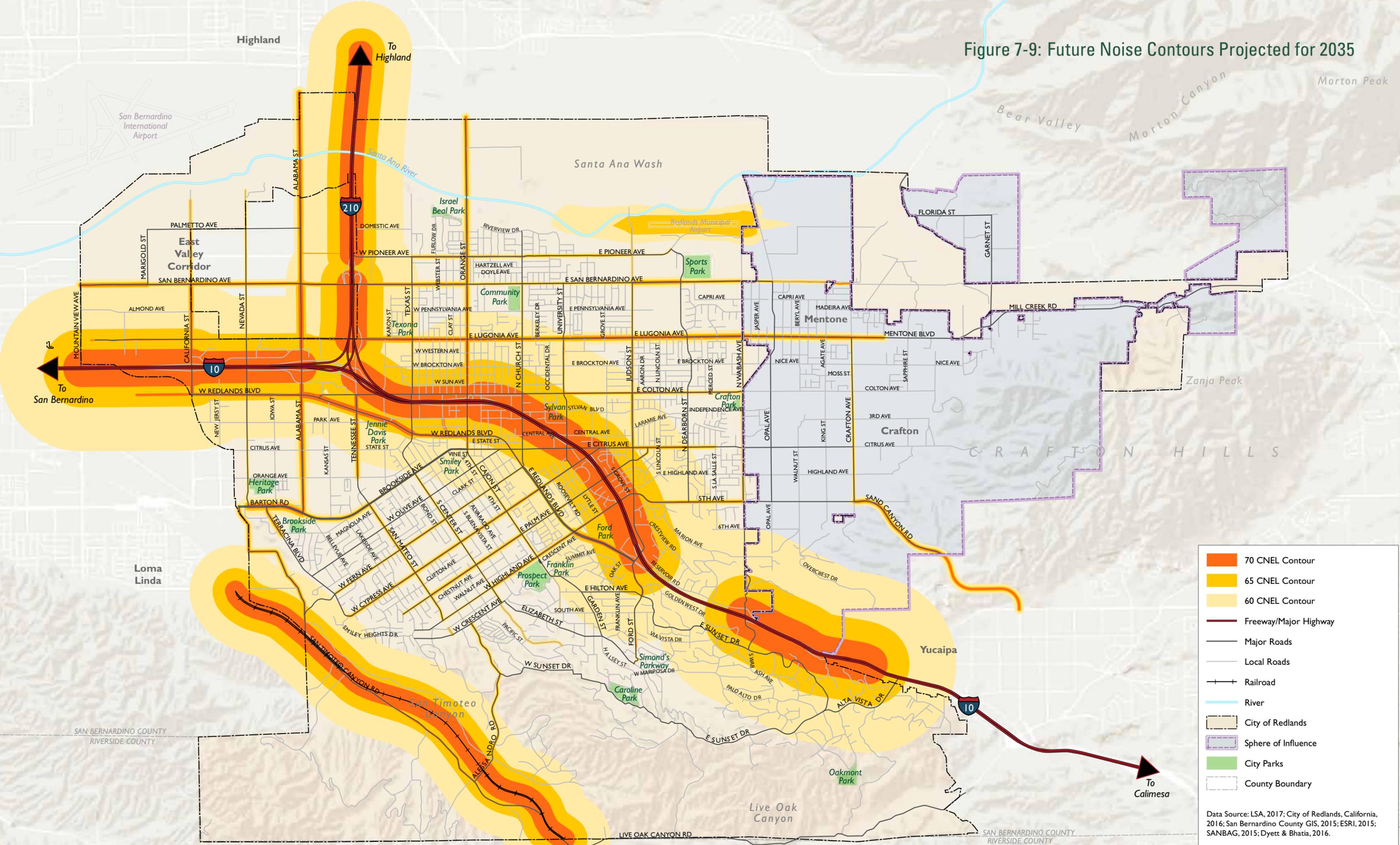
Railroad Noise

- 7-A.139** Work with SANBAG and other agencies to ensure that the Redlands Rail project incorporates mitigation to minimize potential impacts to the surrounding noise-sensitive uses once the final design is complete.
- 7-A.140** Coordinate with other agencies and private entities to implement a railroad quiet zone and other methods of reducing railroad noise impacts on surrounding uses along the Redlands Rail project and Southern Pacific Railroad.
- 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.

Airport Noise

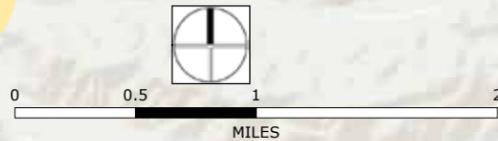
- 7-A.142** For projects within the Redlands Municipal Airport Influence Area, utilize the noise standards contained in the Redlands Municipal Airport ALUCP, as well as the noise standards contained in this element.
- 7-A.143** Periodically update the noise contours at the Redlands Municipal Airport or upon a major change in airport flight patterns.

Figure 7-9: Future Noise Contours Projected for 2035



- 70 CNEL Contour
- 65 CNEL Contour
- 60 CNEL Contour
- Freeway/Major Highway
- Major Roads
- Local Roads
- Railroad
- River
- City of Redlands
- Sphere of Influence
- City Parks
- County Boundary

Data Source: LSA, 2017; City of Redlands, California, 2016; San Bernardino County GIS, 2015; ESRI, 2015; SANBAG, 2015; Dyett & Bhatia, 2016.



MEASURE U POLICIES

IMPLEMENTING POLICIES: Noise

Introduction: In addition to the provisions of the following sections 9.0e through 9.0z, it is the policy of the City of Redlands that no land use adjacent to existing residential land shall generate noise in excess of the residential CNEL levels specified in Table 9.1 [Table 7-10] and Table 9.2 [Table 7-11] of this Noise Element unless appropriate mitigation measures are imposed to reduce the noise level on adjacent residential property to the standards set forth in Tables 9.1 [Table 7-10] and 9.2 [Table 7-11].

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.

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).

9.0g Consider establishing a periodic noise monitoring program to identify progress in achieving noise abatement objectives and to perform necessary updating of the Noise Element and community noise standards.

The California Department of Health Services recommended that noise elements be updated every five years.

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

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.

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

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

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

A Community Noise Ordinance establishes noise limits, typical of a quiet residential area, that can not be exceeded at the property line of the noise-creating use. The types of noise to be controlled include sources such as amplified sound, street sales, animals, construction and demolition, vibration, powered model vehicles, emergency signaling devices, power tools, air conditioning, and vehicles on private property.

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

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

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

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

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

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

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.

The Uniform Building Code (specifically, the California Administrative Code, Title 24, Part 6, Division T25, Chapter 1, Subchapter 1, Article 4, Sections T25 28) requires that "Interior community noise levels (CNEL/ LDN) with windows closed, attributable to exterior sources shall not exceed an annual CNEL or LDN of 45 dB in any habitable room." The code requires that this standard be applied to all new hotels, motels, apartment houses and dwellings other than detached single family dwellings.

Policy 9-s sets the maximum acceptable interior noise level at 45 CNEL. The Noise Referral Zones (65 CNEL) delineate areas within which tests to ensure compliance are to be required for new structures.

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.

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.

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.

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

9.0x Work with Caltrans to establish sound walls along freeways where appropriate.

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.

9.0z Coordinate with the San Bernardino International Airport Authority to minimize potential noise impacts to the City of Redlands which may result from overflights as specific airport operations and flight patterns are established.



I-10 and I-210 move through Redlands and are significant sources of noise.

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

Land Use Categories		Community Noise Equivalent Level (CNEL)							
Categories	Uses	<	60	65	70	75	80	85	>
RESIDENTIAL	Single Family, Duplex Multiple Family	A	C	C	C	D	D	D	
RESIDENTIAL	Mobile Homes	A	C	C	C	D	D	D	
COMMERCIAL Regional, District	Hotel, Motel, Transient Lodging	A	A	B	B	C	C	D	
COMMERCIAL Regional, Village District, Special	Commercial Retail, Bank, Restaurant, Movie Theater	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: Mestre Greve Associates; Guidelines for the Preparation and Content of the Noise Element of the General Plan, prepared by the California Department of Health Services in coordination with The Governor's Office of Planning and Research. Adapted to the City of Redlands' standards.

**TABLE 7-11: INTERIOR AND EXTERIOR NOISE STANDARDS
(MEASURE U TABLE 9.2)**

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: Mestre Greve Associates.



Smiley Park is a quiet, peaceful place for residents and University students to take a break.

CHAPTER 8.06

COMMUNITY NOISE CONTROL

SECTION:

8.06.010: Purpose

8.06.020: Definitions

8.06.030: General Noise Regulations

8.06.040: Enforcement Authority

8.06.050: Noise Measurement Procedure

8.06.060: Noise Measurement Methodology

8.06.070: Exterior Noise Limits

8.06.080: Interior Noise Standards

8.06.090: Noise Disturbances Prohibited

8.06.100: Residential Air Conditioning Or Air Handling Equipment

8.06.110: Tampering

8.06.120: Exemptions

8.06.130: Preexisting Noise Sources

8.06.140: Violation; Penalty

8.06.010: PURPOSE:

The purpose of this chapter is to implement the noise control provisions of the Redlands general plan by establishing comprehensive regulations for the control of noise within the city. (Ord. 2579 § 1, 2004)

8.06.020: DEFINITIONS:

The following words and phrases shall have the meanings set out in this section. All terminology used in this chapter, not defined below, shall be in conformance with applicable publications of the American National Standards Institute (ANSI) or its successor body.

A-WEIGHTED SOUND LEVEL: The sound level in decibels as measured on a sound level meter using the A-weighting network. The level so read is designated dBA.

AMBIENT NOISE LEVEL: The all encompassing noise level associated with a given environment, being a composite of sounds from all sources, excluding the alleged offensive noise, at the location and approximate time at which a comparison with the alleged offensive noise is to be made.

COMMERCIAL: Generally consisting of uses permitted in the commercial zones as set forth in title 18 of this code or adopted specific plans.

CONSTRUCTION: Any site preparation, grading, assembly, erection, substantial repair, alteration and related material handling and disposition, or similar activity, for or on public or private rights of way, structures, utilities or public or private property.

CUMULATIVE PERIOD: An additive period of time composed of individual time segments that may be continuous or interrupted.

DECIBEL: A unit for measuring the amplitude of a sound, equal to twenty (20) times the logarithm to the base ten (10) of the ratio of the pressure of the sound measured to the reference pressure, which is twenty (20) micropascals.

DEMOLITION: Any dismantling, intentional destruction or removal of structures, utilities, public or private right of way surfaces or similar improvements on public or private property.

EMERGENCY WORK: Any work performed for the purpose of preventing or alleviating the physical trauma or property damage which requires immediate mitigation.

FIXED NOISE SOURCE: A stationary device which creates sounds while fixed or motionless including, but not limited to, residential, agricultural, industrial and commercial machinery and equipment, pumps, fans, compressors, air conditioners or refrigeration equipment.

INDUSTRIAL: Generally consisting of uses permitted in the industrial zones as set forth in title 18 of this code or adopted specific plans.

LICENSED: The possession of a license or a permit issued by the appropriate jurisdictional authority; or, where no permits or licenses are issued, the sanctioning of the activity by the jurisdiction as noted in public record.

MOBILE NOISE SOURCE: Any noise source other than a fixed noise source.

MOTOR VEHICLE: Shall include any and all self-propelled vehicles as defined in the California Vehicle Code.

MUFFLER OR SOUND DISSIPATIVE DEVICE: A device consisting of a series of chambers or baffle plates, or other mechanical design, for the purpose of receiving exhaust gas from an internal combustion engine and effective in reducing noise.

NOISE CONTROL OFFICER ("NCO"): The code enforcement division of the city or such other employees of the city so designated by the city manager to enforce this chapter.

NOISE DISTURBANCE: Any sound not in compliance with the quantitative standards as listed herein which either:

- A. Endangers or injures the safety or health of human beings or animals;
- B. Annoys or disturbs reasonable persons of normal sensitivities;
- C. Endangers or injures personal or real property; or
- D. Violates section 8.06.030 or 8.06.090 of this chapter.

NOISE SENSITIVE ZONE: Any area designated as such pursuant to this chapter for the purpose of ensuring exceptional quiet.

NOISE ZONE: Any defined areas or regions of a generally consistent land use wherein the ambient noise levels are within a range of five (5) dB.

PERSON: Any individual, association, partnership or corporation, and includes any officer, employee, department, agency or instrumentality of a state or any political subdivision of a state.

POWERED MODEL VEHICLE: Any self-propelled, airborne, waterborne or landborne plane, vessel or vehicle which is not designed to carry persons including, but not limited to, any model airplane, boat, car or rocket.

PUBLIC RIGHT OF WAY: Any street, avenue, boulevard, highway, sidewalk, alley or similar place owned or controlled by a governmental entity.

PUBLIC SPACE: Any real property or structure thereon which is owned or controlled by a governmental entity.

RESIDENTIAL: Generally consisting of uses as permitted in the residential zones as set forth in title 18 of this code or adopted specific plans.

SOUND AMPLIFYING EQUIPMENT: Any device for the amplification of the human voice, music or any other sound, excluding standard automobile radios or stereo systems when used and heard only by the occupants of the vehicle in which the radio or stereo system is installed, excluding warning devices on authorized emergency vehicles or horns or other warning devices on any vehicle used only for traffic safety purposes.

SOUND LEVEL METER: An instrument, including a microphone, amplifier, output meter and frequency weighting networks for the measurement of sound levels which meets or exceeds the requirements of the American National Standard Institute's S1.4-1971, or the most recent revision thereof, for type 1 or type 2 sound level meters.

SOUND TRUCK: Any motor vehicle regardless of motive power, whether in motion or stationary, having mounted thereon or attached thereto, any sound amplifying equipment.

VIBRATION PERCEPTION THRESHOLD: The minimum ground or structure borne vibrational motion necessary to cause a normal person to be aware of the vibration by such direct means as, but not limited to, sensation by touch or visual observation of moving objects. The perception threshold shall be presumed to be a motion velocity of 0.01 inches per second over the range of one to one hundred (100) Hz.

WEEKDAY: Any day, Monday through Friday, which is not a legal holiday. (Ord. 2579 § 1, 2004)

8.06.030: GENERAL NOISE REGULATIONS:

It shall be unlawful for any person to wilfully or negligently make, or cause to be made, any loud, unnecessary or unusual noise which disturbs the peace and quiet of any neighborhood or which causes discomfort or annoyance to a reasonable person of normal sensitivity in the area. The factors that may be considered in determining whether a violation of this chapter exists include, but are not limited to, the following:

- A. The sound level of the objectionable noise;
- B. The sound level of the ambient noise;
- C. The proximity of the noise to residential living or sleeping facilities;
- D. The nature and zoning of the area within which the noise emanates;
- E. The number of persons affected by the noise;
- F. The time of day or night the noise occurs;
- G. The duration of the noise;
- H. The tonal, informational or musical content of the noise;
- I. Whether the noise is continuous, recurrent or intermittent;
- J. Whether the noise is produced by a commercial or noncommercial activity;
- K. Whether the nature of the noise is usual or unusual;
- L. Whether the origin of the noise is natural or unnatural; and
- M. Whether the noise occurs on a weekday, weekend or a holiday. (Ord. 2579 § 1, 2004)

8.06.040: ENFORCEMENT AUTHORITY:

A. The NCO and the NCO's duly authorized representatives may enforce the provisions of this chapter.

B. The NCO and its authorized representatives shall have satisfactorily completed an instructional program as recommended by the measuring instrument's manufacturer.

C. No person shall interfere with, oppose or resist the NCO or any authorized person charged with the enforcement of this chapter when such persons are engaged in the performance of their duties. (Ord. 2579 § 1, 2004)

8.06.050: NOISE MEASUREMENT PROCEDURE:

The NCO, equipped with sound level measurement equipment satisfying the requirements in section 8.06.020 of this chapter, may investigate any complaint relating to a violation of this chapter. The investigation shall consist of a measurement and the gathering of data to adequately define the noise problem and include, but not be limited to, the following:

- A. Type of noise source;
- B. Location of noise source relative to the complainant's property;
- C. Time period during which noise source is considered by complainant to be intrusive;
- D. Total duration of noise produced by noise source; and
- E. Date and time of noise measurement survey. (Ord. 2579 § 1, 2004)

8.06.060: NOISE MEASUREMENT METHODOLOGY:

A. Utilizing the A-weighting scale of the sound level meter and the "slow" meter response (use "fast" response for impulsive type sounds), the noise level shall be measured at a position or positions at any point on the receiver's property deemed appropriate to determine whether the noise level complies with this chapter.

B. The microphone shall be located four (4) to five feet (5') above the ground; ten feet (10') or more from the nearest reflective surface, where possible. However, in those cases where another elevation is deemed appropriate, the latter shall be utilized. If the noise complaint is related to interior noise levels, interior noise measurements shall be made within the affected residential building or unit. The measurements shall be made at a point at least four feet (4') from the wall, ceiling or floor nearest the noise source, with the windows closed.

C. Calibration of the measurement equipment, utilizing an acoustic calibrator, shall be performed immediately prior to recording any noise data. Standard maintenance of the measuring equipment shall be in accordance with the manufacturer's recommendations.

- D. No outdoor measurements shall be taken:
 1. During periods when wind speeds (including gusts) exceed fifteen (15) miles per hour;
 2. Without a windscreen, as recommended by the measuring instrument's manufacturer, properly attached to the measuring instrument;
 3. Under any condition that allows the measuring instrument to become wet (e.g., rain or condensation); or
 4. When the ambient temperature is out of the range of the tolerance of the measuring instrument. (Ord. 2579 § 1, 2004)

8.06.070: EXTERIOR NOISE LIMITS:

A. The noise standards for the categories of land uses identified in table 1 of this section shall, unless otherwise specifically indicated, apply to all such property within a designated zone.

TABLE 1

MAXIMUM PERMISSIBLE SOUND LEVELS BY RECEIVING LAND USE

Receiving Land Use Category	Time Period	Noise Level - dBA
Single-family residential districts	10:00 P.M. – 7:00 A.M.	50
	7:00 A.M. – 10:00 P.M.	60
Multi-family residential districts; public space; institutional	10:00 P.M. – 7:00 A.M.	50
	7:00 A.M. – 10:00 P.M.	60
Commercial	10:00 P.M. – 7:00 A.M.	60
	7:00 A.M. – 10:00 P.M.	65
Industrial	Any time	75

B. No person shall operate, or cause to be operated, any source of sound at any location within the city or allow the creation of any noise on property owned, leased, occupied or otherwise controlled by such person which causes the noise level when measured on any other property to exceed:

1. The noise standard for that land use specified in table 1 of this section for a cumulative period of more than thirty (30) minutes in any hour; or
2. The noise standard specified in table 1 of this section plus five (5) dB for a cumulative period of more than fifteen (15) minutes in any hour; or
3. The noise standard specified in table 1 of this section plus ten (10) dB for a cumulative period of more than five (5) minutes in any hour; or
4. The noise standard specified in table 1 of this section plus fifteen (15) dB for a cumulative period of more than one minute in any hour; or
5. The noise standard specified in table 1 of this section plus twenty (20) dB or the maximum measured ambient level, for any period of time.

C. If the measured ambient level exceeds the allowable noise exposure standard within any of the first four (4) noise limit categories above, the allowable noise exposure standard shall be adjusted in five (5) 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.

D. The ambient noise shall be measured at the same location along the property line utilized in subsection 8.06.060B of this chapter, with the alleged offending noise source inoperative. If the alleged offending noise source cannot be shut down, the ambient noise shall be estimated by performing a measurement in the same general area of the source but at a sufficient distance that the noise from the source is at least ten (10) dB below the ambient in order that only the ambient level be measured. If the difference between the ambient and the noise source is five (5) to ten (10) dB, then the level of the ambient itself can be reasonably determined by subtracting a one decibel correction to account for the contribution of the source.

E. In the event the alleged offensive noise contains a steady, audible tone such as a whine, screech, hum, or is a repetitive noise such as hammering or riveting, or contains music or speech conveying informational content, the standard limits set forth in table 1 of this section shall be reduced by five (5) dB. (Ord. 2579 § 1, 2004)

8.06.080: INTERIOR NOISE STANDARDS:

A. No person shall operate or cause to be operated any source of sound, or allow the creation of any noise, which causes the noise level when measured inside a neighboring receiving occupied building to exceed the following standards:

1. The noise standard for that land use specified in table 2 of this section for a cumulative period of more than five (5) minutes in any hour.

2. The noise standard for that land use specified in table 2 of this section plus five (5) dB for a cumulative period of more than one minute in any hour.

3. The noise standard for that land use specified in table 2 of this section plus ten (10) dB for the maximum measured ambient noise level for any period of time.

B. If the measured ambient level exceeds the allowable exterior noise exposure standard in table 1 of this chapter, the allowable interior noise exposure level shall be adjusted in five (5) dB increments as appropriate to reflect the ambient noise level.

TABLE 2

MAXIMUM PERMISSIBLE INTERIOR SOUND LEVELS BY RECEIVING LAND USE

Receiving Land Use Category	Time Period	Noise Level - dBA
Single-family residential districts	Any time	45
Multi-family residential districts; institutional; hotels	Any time	45
Commercial	Any time	50
Industrial	Any time	60

(Ord. 2579 § 1, 2004)

8.06.090: NOISE DISTURBANCES PROHIBITED:

The following acts, and the causing or permitting thereof, are declared to be in violation of this chapter:

A. Radio, Television Set, Etc.: Operating, playing, or permitting the operation or playing of any radio, television set, phonograph, drum, musical instrument or similar device which produces or reproduces sound:

1. Between the hours of ten o'clock (10:00) P.M. and seven o'clock (7:00) A.M. in such a manner as to create a noise disturbance across a residential or commercial real property line or at any time to violate the provisions of section 8.06.030 or 8.06.070 of this chapter.

2. In such a manner as to exceed the levels set forth for public space in table 1 of this chapter, measured at a distance of at least fifty feet (50') from such device operating on a public right of way or public space.

B. Loudspeaker Or Stereo Systems: Using or operating for any purpose any loudspeaker, loudspeaker system, stereo system or similar device between the hours of ten o'clock (10:00) P.M. and seven o'clock (7:00) A.M., such that the sound therefrom creates a noise disturbance across a residential property line, or at any time violates the provisions of section 8.06.030 or 8.06.070 of this chapter, except for noncommercial public speaking, public assembly or activity for which an exemption has been provided for in either this section or section 8.06.120 of this chapter.

C. Street Sales: Offering for sale, selling anything, or advertising by shouting or outcry within the city except by permit issued by the city. This subsection shall not be construed to prohibit the selling by outcry of merchandise, food or beverages at licensed sporting events, parades, fairs, circuses or other similar licensed public entertainment events.

D. Animals And Birds: Owning, possessing or harboring any animal or bird which frequently, or for long duration, howls, barks, meows, squawks or makes other sound which creates a noise disturbance across a residential or commercial real property line or within a noise sensitive zone.

E. Loading And Unloading: Loading, unloading, opening, closing or other handling of boxes, crates, containers, building materials, refuse containers or similar objects between the hours of ten o'clock

(10:00) P.M. and six o'clock (6:00) A.M. in such a manner as to cause a noise disturbance across a residential real property line or at any time to violate section 8.06.030 of this chapter.

F. Construction And/Or Demolition: Operating or causing the operation of any tools or equipment used in construction, drilling, repair, alteration or demolition work between weekday hours of six o'clock (6:00) P.M. and seven o'clock (7:00) A.M., including Saturdays, or at any time on Sundays or holidays, such that the sound therefrom creates a noise disturbance across a residential or commercial real property line, except for emergency work by public service utilities, the city or another governmental entity. All mobile or stationary internal combustion engine powered equipment or machinery shall be equipped with exhaust and air intake silencers in proper working order, or suitable to meet the standards set forth herein.

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

H. Powered Model Vehicles: Operating or permitting the operation of powered model vehicles:

1. Between the hours of seven o'clock (7:00) P.M. and seven o'clock (7:00) A.M. so as to create a noise disturbance across a residential or commercial real property line or at any time in violation of section 8.06.030 of this chapter.

2. In such a manner as to exceed the levels set forth for public space land use in table 1 of this chapter measured at a distance not less than one hundred feet (100') from any point on the path of a vehicle operating on public space or public right of way.

I. Stationary, Nonemergency Signaling Devices:

1. Sounding or permitting the sounding of any electronically amplified signal from any stationary bell, chime, siren, whistle or similar device intended primarily for nonemergency purposes, from any place for more than ten (10) seconds in any hourly period.

2. Places of worship and public and private schools shall be exempt from the operation of this subsection.

J. Emergency Signaling Devices:

1. Alarms, Sirens, Whistles: The intentional sounding or permitting the sounding outdoors of any fire, burglar or civil defense alarm, siren, whistle or similar stationary emergency signaling device, except for emergency purposes or for testing as provided in subsection J2 of this section.

2. Testing:

a. Testing of a stationary emergency signaling device shall not occur before seven o'clock (7:00) A.M. or after seven o'clock (7:00) P.M. Any such testing shall use only the minimum cycle test time. In no case shall such test time exceed sixty (60) seconds.

b. Testing of the complete emergency signaling system, including the functioning of the signaling device, and the personnel response to the signaling device, shall not occur more than once in each calendar month. Such testing shall not occur before seven o'clock (7:00) A.M. or after ten o'clock (10:00) P.M. The time limit specified in subsection J2a of this section shall not apply to such complete system testing.

3. Burglar, Fire, Motor Vehicle Alarms: Sounding or permitting the sounding of any exterior burglar or fire alarm or any motor vehicle burglar alarm unless such alarm is terminated within five (5) minutes of activation.

K. Noise Sensitive Zones: Creating or causing the creation of any sound within any noise sensitive zone, so as to exceed the specified land use noise standards set forth in table 1 of this chapter and

subsection 8.06.070B of this chapter, or so as to interfere with the functions of such activity or annoy the occupants in the activity, provided that conspicuous signs are displayed indicating the presence of the zone.

L. Domestic Power Tools And Machinery:

1. Operating or permitting the operation of any mechanically powered saw, sander, drill, grinder, lawn or garden tool, or similar tool between ten o'clock (10:00) P.M. and seven o'clock (7:00) A.M., so as to create a noise disturbance across a residential or commercial real property line.

2. Motor, machinery and pumps, such as swimming pool equipment, shall be sufficiently enclosed or muffled and maintained so as not to create a noise disturbance in accordance with table 1, section 8.06.070 of this chapter.

M. Places Of Public Entertainment: Operating or permitting the operation or playing of any loudspeaker, musical instrument or other source of sound in any place of public entertainment that exceeds ninety five (95) dBA as read on the slow response of a sound level meter at any point normally occupied by a customer, without a conspicuous and legible sign with minimum one inch (1") letter height stating:

WARNING! SOUND LEVELS WITHIN MAY CAUSE HEARING IMPAIRMENT.

(Ord. 2579 § 1, 2004)

8.06.100: RESIDENTIAL AIR CONDITIONING OR AIR HANDLING EQUIPMENT:

It shall be unlawful to operate or permit the operation of any air conditioning or air handling equipment in such a manner as to exceed the sound levels set forth in table 1, section 8.06.070 of this chapter. (Ord. 2579 § 1, 2004)

8.06.110: TAMPERING:

The following acts or the causing thereof are prohibited:

A. The removal or rendering inoperative, other than for purposes of maintenance, repair or replacement, of any noise control device or element thereof of any product required to meet specified noise emission limits under federal, state or local law.

B. The removal of any noise label from any product identified in subsection A of this section.

C. The use of a product identified in subsection A of this section, which has had a noise control device or element thereof or noise label removed or rendered inoperative. (Ord. 2579 § 1, 2004)

8.06.120: EXEMPTIONS:

A. Emergency Exemption: This chapter shall not apply to:

1. The emission of sound for the purpose of alerting persons to the existence of an emergency such as, but not limited to, loudspeakers, horns, sirens, whistles or other similar devices which emit sound, only for the time required to make notification of the emergency condition; or

2. The emission of sound in the performance of emergency work or the temporary provision of essential services such as, but not limited to, utility system repairs or upgrades, infrastructure repairs, structural repairs and other unscheduled, infrequent and nonrecurring activities, required to protect persons and property from physical harm or loss of essential services.

B. Warning Devices: This chapter shall not apply to warning devices necessary for the protection of public safety. Police, fire and ambulance sirens and train horns are exempt from this chapter.

C. Outdoor Activities: This chapter shall not apply to occasional outdoor public gatherings, public dances, shows, and sporting and entertainment events conducted within city parks and city owned facilities, including events conducted at the Redlands Bowl, provided such events are conducted pursuant to a permit or license issued by the city.

D. **School Activities:** This chapter shall not apply to activities and operations conducted on the grounds of any public or private elementary, intermediate or secondary school or colleges and universities.

E. **Hospital:** This chapter shall not apply to activities and operations conducted within the grounds of the Redlands Community Hospital provided that said activities and operations are in compliance with the acoustical provisions of the hospital's conditional use permit.

F. **Minor Maintenance Of Residential Property:** This chapter shall not apply to noise sources associated with the minor maintenance of residential property, provided such activities take place between the hours of seven o'clock (7:00) A.M. to eight o'clock (8:00) P.M. on weekdays, and seven o'clock (7:00) A.M. to eight o'clock (8:00) P.M. on weekends and legal holidays, and provided that such activities generate no more than ninety (90) dBA at or within the real property line of the residential property. Activities covered under this provision include, but are not limited to, maintenance of landscaping and minor repair of residential dwellings or ancillary structures.

G. **Construction Activity:** This chapter shall not apply to noise sources associated with new construction, remodeling, rehabilitation or grading of any property provided such activities take place between the hours of seven o'clock (7:00) A.M. and six o'clock (6:00) P.M. on weekdays, including Saturdays, with no activities taking place at any time on Sundays or federal holidays. All motorized equipment used in such activity shall be equipped with functioning mufflers.

H. **Agricultural Operations:** This chapter shall not apply to mobile noise sources associated with agricultural operations for use in maintenance, cultivation, planting and harvesting of agricultural areas provided said activities take place between the hours of seven o'clock (7:00) A.M. to eight o'clock (8:00) P.M. on weekdays, including Saturdays, with no activities taking place at any time on Sundays or federal holidays. All motorized equipment used in such activity shall be equipped with functioning mufflers.

I. **Chapter Application:** This chapter shall not apply to any activity in which state or federal law has preempted the regulation of such activity. (Ord. 2579 § 1, 2004)

8.06.130: PREEXISTING NOISE SOURCES:

Those commercial and industrial operations in existence prior to the date of adoption hereof, if in compliance with the city's zoning laws, may be granted a period from such date within which to comply with this chapter.

A. Such compliance period shall be based on the estimated cost to make the equipment comply, as follows:

1. If the cost is one thousand dollars (\$1,000.00) or less, ninety (90) days;
2. If the cost is one thousand dollars (\$1,000.00) to five thousand dollars (\$5,000.00), one year;
3. If the cost is five thousand dollars (\$5,000.00) to twenty thousand dollars (\$20,000.00), two (2) years; or
4. If the cost is greater than twenty thousand dollars (\$20,000.00) or more, three (3) years.

B. At the time of request for extended compliance periods in subsections A2 through A4 of this section, any person requesting such extension shall submit a plan for such compliance, including temporary mitigation of such noise levels to within five (5) dBA of the complying level. Such extended period and temporary mitigation shall not exceed one year beyond the initial compliance period. If the compliance period is granted, mitigation measures included in the plan must be completed within ninety (90) days from the date of approval of the compliance period.

C. If, at the end of the compliance period, it is shown that compliance with the provisions herein constitute a hardship in terms of technical and economical feasibility, additional applications for exception may be granted on an annual basis until such time as compliance may be effected, provided the temporary mitigation remains in place.

D. Requests for extended compliance periods or exceptions shall be submitted to the city's planning commission with the submittal of plans and other information as required by the community development director. Such applications shall be filed by the owner of the property affected thereby or the owner's authorized agent, with the community development director, on forms furnished by the director, which shall set forth fully the nature of the proposed use, and the facts sufficient to justify the granting of the compliance period in accordance with the provisions of this chapter.

E. The applicant shall furnish to the director an accurate list of the names and addresses of all property owners to whom notice must be given as provided in this chapter.

F. Each such application shall be accompanied by a filing and processing fee in the amount established by resolution of the city council. Any applicant may withdraw his application by filing a written request to do so at any time prior to final action thereon, provided that there shall be no refund of fees. (Ord. 2579 § 1, 2004)

8.06.140: VIOLATION; PENALTY:

- A. It is illegal to use, occupy or maintain property in violation of this chapter.
- B. Violation of this chapter shall be a misdemeanor, but may be prosecuted as either a misdemeanor or an infraction in the discretion of the city attorney.
- C. Any person who violates the provisions of this chapter is guilty of a separate offense for each day, or portion thereof, during which the violation continues.
- D. Violation of this chapter that threatens to be continuing in nature is a public nuisance which may be abated or enjoined in accordance with the law. (Ord. 2579 § 1, 2004)

CONSTRUCTION NOISE MODELING

Rus-13 Construction Noise Modeling Attenuation Calculations

Off-site Exterior Levels in dBA Leq

Phase	RCNM			
	Reference Noise Level	Residence to south	Residences to west	Residences to northeast
<i>Distance in feet</i>	50	475	500	1,000
Site Preparation	80	60	60	54
Rough Grading	81	61	61	54
Fine Grading	81	61	61	54
<i>Distance in feet</i>	50	NA	65	760
Utility Trenching	81		79	58
<i>Distance in feet</i>	50	190	240	850
Building Construction	81	70	68	57
Architectural Coating	74	62	60	49
<i>Distance in feet</i>	50	85	360	1250
Asphalt Paving	77	72	60	49
<i>Distance in feet</i>	50	190	600	970
Asphalt Demolition	85	73	63	59

Attenuation calculated through Inverse Square Law: $L_p(R2) = L_p(R1) - 20\log(R2/R1)$

On-site Exterior Levels in dBA Leq

Phase	RCNM	
	Reference Noise Level	Classrooms to east
<i>Distance in feet</i>	50	750
Site Preparation	80	56
Rough Grading	81	57
Fine Grading	81	57
<i>Distance in feet</i>	50	750
Utility Trenching	81	58
<i>Distance in feet</i>	50	750
Building Construction	81	58
Architectural Coating	74	50
<i>Distance in feet</i>	50	750
Asphalt Paving	77	53
<i>Distance in feet</i>	50	750
Asphalt Demolition	85	61

RUS-13 Vibration Annoyance Attenuation Calculations

Levels in VdB

		Residences to south	Residences to west	Residences to northeast
<i>Distance in feet</i>	Vibration @ 25 ft	475	500	1000
Clam shovel	94.0	56	55	46
Hoe Ram	87.0	49	48	39
Large Bulldozer	87.0	49	48	39
Caisson Drilling	87.0	49	48	39
Loaded Trucks	86.0	48	47	38
Jackhammer	79.0	41	40	31
Small Bulldozer	58.0	20	19	10
		Residence to south	Residences to west	Residences to northeast
<i>Distance in feet</i>	Vibration @ 25 ft	130	400	280
Vibratory Roller Paving	94.0	72.5	57.9	62.5

RUS-13 Vibration Annoyance Attenuation Calculations

Levels in in/sec PPV

<i>Distance in feet</i>	Vibration Reference Level	Residential to south	Residential to west	Commercial to west
	at 25 feet	<i>78</i>	<i>250</i>	<i>250</i>
Vibratory Roller	0.21	0.038	0.007	0.007
Hoe Ram	0.089	0.016	0.003	0.003
Large Bulldozer	0.089	0.016	0.003	0.003
Caisson Drilling	0.089	0.016	0.003	0.003
Loaded Trucks	0.076	0.014	0.002	0.002
Jackhammer	0.035	0.006	0.001	0.001
Small Bulldozer	0.003	0.001	0.000	0.000

TRAFFIC NOISE INCREASE CALCULATIONS

RUS-13

Traffic Noise Calculations

Roadway Segment	ADT Volumes				dBA CNEL Increase		
	Existing No Project	Existing Plus Project	Future No Project	Future Plus Project	Project Noise Increase	Cumulative Increase	Project Cumulative Contribution
Colton Avenue							
West of Wabash Ave	6,000	6,360	6,600	6,960	0.3	0.6	0.2
Wabash to Opal	4,800	5,610	5,300	6,110	0.7	1.0	0.6
Opal to Beryl	5,200	6,240	5,700	6,740	0.8	1.1	0.7
Beryl to Agate	4,700	4,990	5,200	5,490	0.3	0.7	0.2
Agate to Crafton	3,800	4,090	4,200	4,490	0.3	0.7	0.3
East of Crafton	2,200	2,290	2,400	2,490	0.2	0.5	0.2
Mentone Boulevard							
West of Opal	20,000	20,270	22,100	22,370	0.1	0.5	0.1
Opal to Beryl	19,100	19,170	21,100	21,170	0.0	0.4	0.0
Beryl to Agate	18,300	18,340	20,200	20,240	0.0	0.4	0.0
East of Agate	17,400	17,490	19,200	19,290	0.0	0.4	0.0
Citrus Avenue							
West of Opal	3,000	3,180	3,300	3,480	0.3	0.6	0.2
Opal to Agate	3,300	3,320	3,600	3,620	0.0	0.4	0.0
East of Agate	3,200	3,290	3,500	3,590	0.1	0.5	0.1
Wabash Avenue							
North of Colton	7,900	8,170	8,700	8,970	0.1	0.6	0.1
South of Colton	6,600	6,780	7,300	7,480	0.1	0.5	0.1
Opal Avenue							
North of Mentone	2,300	2,320	2,500	2,520	0.0	0.4	0.0
Mentone to Colton	1,300	1,520	1,400	1,620	0.7	1.0	0.6
Colton to Citrus	1,600	1,820	1,800	2,020	0.6	1.0	0.5
South of Citrus	1,300	1,320	1,400	1,420	0.1	0.4	0.1
Beryl Avenue							
North of Mentone	1,900	1,920	2,100	2,120	0.0	0.5	0.0
Mentone to Colton	1,200	1,330	1,300	1,430	0.4	0.8	0.4
Agate Avenue							
North of Mentone	2,300	2,320	2,500	2,520	0.0	0.4	0.0
Mentone to Colton	1,900	1,970	2,100	2,170	0.2	0.6	0.1
Colton to Citrus	1,400	1,490	1,500	1,590	0.3	0.6	0.3
South of Citrus	1,000	1,020	1,100	1,120	0.1	0.5	0.1
Crafton Avenue							
North of Colton	6,800	6,980	7,500	7,680	0.1	0.5	0.1
South of Colton	6,700	6,720	7,400	7,420	0.0	0.4	0.0

SOUNDPLAN MODELING OUTPUTS

Run info Single receiver Details + graphics Sources

Receiver	Usage	Fl	Dir		Lr,lim	Lr,lim	Lr,lim	Ldn	Leq,d
				dB(A)	dB(A)	dB(A)	dB(A)	dB(A)	dB(A)
R1 North	SCR	G						63.5	56.9
R10 Southwest	SCR	G						69.1	62.4
R11 Southwest	SCR	G						67.9	61.2
R12 Southwest	SCR	G						66.3	59.6
R13 Southwest	SCR	G						64.9	58.2
R14 Southwest	SCR	G						63.5	56.9
R15 Southwest	SCR	G						67.0	60.4
R16 Southwest	SCR	G						64.7	58.0
R17 Southwest	SCR	G						63.9	57.2
R18 Southwest	SCR	G						62.7	56.0
R19 South	SCR	G						68.9	62.2
R2 North	SCR	G						62.0	55.3
R20 South	SCR	G						69.4	62.8
R21 South	SCR	G						69.7	63.0
R22 South	SCR	G						70.8	64.1
R23 South	SCR	G						70.5	63.9
R3 North	SCR	G						61.1	54.4
R4 North	SCR	G						60.1	53.4
R5 North	SCR	G						59.4	52.7
R6 North	SCR	G						58.6	51.9
R7 North	SCR	G						58.1	51.4
▶ R9 Southwest	SCR	G						70.5	63.8

Run info Single receiver Details + graphics Sources

Receiver	Usage	Fl	Dir		Lr,lim dB(A)	Lr,lim dB(A)	Lr,lim dB(A)	Ldn dB(A)	Leq,d dB(A)
▶ R1 North	SCR	G						64.9	58.2
R2 North	SCR	G						63.4	56.7
R3 North	SCR	G						62.5	55.8
R4 North	SCR	G						61.5	54.9
R5 North	SCR	G						60.8	54.1
R6 North	SCR	G						60.1	53.4
R7 North	SCR	G						59.6	52.9
R8 North	SCR	G						59.0	52.4
R8 North	SCR	G						57.5	50.8
R9 Southwest	SCR	G						71.6	64.9
R10 Southwest	SCR	G						70.2	63.5
R11 Southwest	SCR	G						69.0	62.4
R12 Southwest	SCR	G						67.5	60.8
R13 Southwest	SCR	G						66.2	59.5
R14 Southwest	SCR	G						64.9	58.2
R15 Southwest	SCR	G						68.2	61.5
R16 Southwest	SCR	G						65.9	59.2
R17 Southwest	SCR	G						65.2	58.5
R18 Southwest	SCR	G						64.0	57.4
R19 South	SCR	G						70.1	63.4
R20 South	SCR	G						70.7	64.0
R21 South	SCR	G						71.1	64.4
R22 South	SCR	G						72.2	65.5
R23 South	SCR	G						71.9	65.3