

APPENDIX F:
NOISE DATA

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Fundamentals of Noise

NOISE

Noise is most often defined as unwanted sound; whether it is loud, unpleasant, unexpected, or otherwise undesirable. Although sound can be easily measured, the perception of noise and the physical response to sound complicate the analysis of its impact on people. People judge the relative magnitude of sound sensation in subjective terms such as “noisiness” or “loudness.”

Noise Descriptors

The following are brief definitions of terminology used in this chapter:

- **Sound.** A disturbance created by a vibrating object, which, when transmitted by pressure waves through a medium such as air, is capable of being detected by a receiving mechanism, such as the human ear or a microphone.
- **Noise.** Sound that is loud, unpleasant, unexpected, or otherwise undesirable.
- **Decibel (dB).** A unitless measure of sound, expressed on a logarithmic scale and with respect to a defined reference sound pressure. The standard reference pressure is 20 micropascals (20 μPa).
- **A-Weighted Decibel (dBA).** An overall frequency-weighted sound level in decibels that approximates the frequency response of the human ear.
- **Equivalent Continuous Noise Level (L_{eq}); also called the Energy-Equivalent Noise Level.** The value of an equivalent, steady sound level which, in a stated time period (often over an hour) and at a stated location, has the same A-weighted sound energy as the time-varying sound. Thus, the L_{eq} metric is a single numerical value that represents the equivalent amount of variable sound energy received by a receptor over the specified duration.
- **Statistical Sound Level (L_n).** The sound level that is exceeded “n” percent of time during a given sample period. For example, the L_{50} level is the statistical indicator of the time-varying noise signal that is exceeded 50 percent of the time (during each sampling period); that is, half of the sampling time, the changing noise levels are above this value and half of the time they are below it. This is called the “median sound level.” The L_{10} level, likewise, is the value that is exceeded 10 percent of the time (i.e., near the maximum) and this is often known as the “intrusive sound level.” The L_{90} is the sound level exceeded 90 percent of the time and is often considered the “effective background level” or “residual noise level.”
- **Maximum Sound Level (L_{max}).** The highest RMS sound level measured during the measurement period.
- **Root Mean Square Sound Level (RMS).** The square root of the average of the square of the sound pressure over the measurement period.

- **Day-Night Sound Level (L_{dn} or DNL).** The energy-average of the A-weighted sound levels occurring during a 24-hour period, with 10 dB added to the sound levels occurring during the period from 10:00 PM to 7:00 AM.
- **Community Noise Equivalent Level (CNEL).** The energy average of the A-weighted sound levels occurring during a 24-hour period, with 5 dB added from 7:00 PM to 10:00 PM and 10 dB from 10:00 PM to 7:00 AM. NOTE: For general community/environmental noise, CNEL and L_{dn} values rarely differ by more than 1 dB (with the CNEL being only slightly more restrictive – that is, higher than the L_{dn} value). As a matter of practice, L_{dn} and CNEL values are interchangeable and are treated as equivalent in this assessment.
- **Peak Particle Velocity (PPV).** The peak rate of speed at which soil particles move (e.g., inches per second) due to ground vibration.
- **Sensitive Receptor.** Noise- and vibration-sensitive receptors include land uses where quiet environments are necessary for enjoyment and public health and safety. Residences, schools, motels and hotels, libraries, religious institutions, hospitals, and nursing homes are examples.

Characteristics of Sound

When an object vibrates, it radiates part of its energy in the form of a pressure wave. Sound is that pressure wave transmitted through the air. Technically, airborne sound is a rapid fluctuation or oscillation of air pressure above and below atmospheric pressure that creates sound waves.

Sound can be described in terms of amplitude (loudness), frequency (pitch), or duration (time). Loudness or amplitude is measured in dB, frequency or pitch is measured in Hertz [Hz] or cycles per second, and duration or time variations is measured in seconds or minutes.

Amplitude

Unlike linear units such as inches or pounds, decibels are measured on a logarithmic scale. Because of the physical characteristics of noise transmission and perception, the relative loudness of sound does not closely match the actual amounts of sound energy. Table 1 presents the subjective effect of changes in sound pressure levels. Ambient sounds generally range from 30 dBA (very quiet) to 100 dBA (very loud). Changes of 1 to 3 dB are detectable under quiet, controlled conditions, and changes of less than 1 dB are usually not discernible (even under ideal conditions). A 3 dB change in noise levels is considered the minimum change that is detectable with human hearing in outside environments. A change of 5 dB is readily discernible to most people in an exterior environment, and a 10 dB change is perceived as a doubling (or halving) of the sound.

Table 1 Noise Perceptibility

Change in dB	Noise Level
± 3 dB	Barely perceptible increase
± 5 dB	Readily perceptible increase
± 10 dB	Twice or half as loud
± 20 dB	Four times or one-quarter as loud

Source: California Department of Transportation (Caltrans). 2013, September. Technical Noise Supplement ("TeNS").

Frequency

The human ear is not equally sensitive to all frequencies. Sound waves below 16 Hz are not heard at all, but are “felt” more as a vibration. Similarly, though people with extremely sensitive hearing can hear sounds as high as 20,000 Hz, most people cannot hear above 15,000 Hz. In all cases, hearing acuity falls off rapidly above about 10,000 Hz and below about 200 Hz.

When describing sound and its effect on a human population, A-weighted (dBA) sound levels are typically used to approximate the response of the human ear. The A-weighted noise level has been found to correlate well with people’s judgments of the “noisiness” of different sounds and has been used for many years as a measure of community and industrial noise. Although the A-weighted scale and the energy-equivalent metric are commonly used to quantify the range of human response to individual events or general community sound levels, the degree of annoyance or other response also depends on several other perceptibility factors, including:

- Ambient (background) sound level
- General nature of the existing conditions (e.g., quiet rural or busy urban)
- Difference between the magnitude of the sound event level and the ambient condition
- Duration of the sound event
- Number of event occurrences and their repetitiveness
- Time of day that the event occurs

Duration

Time variation in noise exposure is typically expressed in terms of a steady-state energy level equal to the energy content of the time varying period (called L_{eq}), or alternately, as a statistical description of the sound level that is exceeded over some fraction of a given observation period. For example, the L_{50} noise level represents the noise level that is exceeded 50 percent of the time; half the time the noise level exceeds this level and half the time the noise level is less than this level. This level is also representative of the level that is exceeded 30 minutes in an hour. Similarly, the L_2 , L_8 and L_{25} values represent the noise levels that are exceeded 2, 8, and 25 percent of the time or 1, 5, and 15 minutes per hour, respectively. These “n” values are typically used to demonstrate compliance for stationary noise sources with many cities’ noise ordinances. Other values typically noted during a noise survey are the L_{min} and L_{max} . These values represent the minimum and maximum root-mean-square noise levels obtained over the measurement period, respectively.

Because community receptors are more sensitive to unwanted noise intrusion during the evening and at night, state law and many local jurisdictions use an adjusted 24-hour noise descriptor called the Community Noise Equivalent Level (CNEL) or Day-Night Noise Level (L_{dn}). The CNEL descriptor requires that an artificial increment (or “penalty”) of 5 dBA be added to the actual noise level for the hours from 7:00 PM to 10:00 PM and 10 dBA for the hours from 10:00 PM to 7:00 AM. The L_{dn} descriptor uses the same methodology except that there is no artificial increment added to the hours between 7:00 PM and 10:00 PM. Both descriptors give roughly the same 24-hour level, with the CNEL being only slightly more restrictive (i.e., higher). The CNEL or L_{dn} metrics are commonly applied to the assessment of roadway and airport-related noise sources.

Sound Propagation

Sound dissipates exponentially with distance from the noise source. This phenomenon is known as “spreading loss.” For a single-point source, sound levels decrease by approximately 6 dB for each doubling of distance from the source (conservatively neglecting ground attenuation effects, air absorption factors, and barrier shielding). For example, if a backhoe at 50 feet generates 84 dBA, at 100 feet the noise level would be 79 dBA, and at 200 feet it would be 73 dBA. This drop-off rate is appropriate for noise generated by on-site operations from stationary equipment or activity at a project site. If noise is produced by a line source, such as highway traffic, the sound decreases by 3 dB for each doubling of distance over a reflective (“hard site”) surface such as concrete or asphalt. Line source noise in a relatively flat environment with ground-level absorptive vegetation decreases by an additional 1.5 dB for each doubling of distance.

Psychological and 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, thereby affecting blood pressure and functions of the heart and the nervous system. Extended periods of noise exposure above 90 dBA results in permanent cell damage, which is the main driver for employee hearing protection regulations in the workplace. For community environments, the ambient or background noise problem is widespread, through generally worse in urban areas than in outlying, less-developed areas. Elevated ambient noise levels can result in noise interference (e.g., speech interruption/masking, sleep disturbance, disturbance of concentration) and cause annoyance. Since most people do not routinely work with decibels or A-weighted sound levels, it is often difficult to appreciate what a given sound pressure level number means. To help relate noise level values to common experience, Table 2 shows typical noise levels from familiar sources.

Table 2 **Typical Noise Levels**

Common Outdoor Activities	Noise Level (dBA)	Common Indoor Activities
Onset of physical discomfort	120+	
	110	Rock Band (near amplification system)
Jet Flyover at 1,000 feet		
	100	
Gas Lawn Mower at three feet		
	90	
Diesel Truck at 50 feet, at 50 mph		Food Blender at 3 feet
	80	Garbage Disposal at 3 feet
Noisy Urban Area, Daytime		
	70	Vacuum Cleaner at 10 feet
Commercial Area		Normal speech at 3 feet
Heavy Traffic at 300 feet	60	
		Large Business Office
Quiet Urban Daytime	50	Dishwasher Next Room
Quiet Urban Nighttime	40	Theater, Large Conference Room (background)
Quiet Suburban Nighttime		
	30	Library
Quiet Rural Nighttime		Bedroom at Night, Concert Hall (background)
	20	
		Broadcast/Recording Studio
	10	
Lowest Threshold of Human Hearing	0	Lowest Threshold of Human Hearing

Source: California Department of Transportation (Caltrans). 2013, September. Technical Noise Supplement ("TeNS").

Vibration Fundamentals

Vibration is an oscillatory motion through a solid medium in which the motion's amplitude can be described in terms of displacement, velocity, or acceleration. Vibration is normally associated with activities stemming from operations of railroads or vibration-intensive stationary sources, but can also be associated with construction equipment such as jackhammers, pile drivers, and hydraulic hammers. As with noise, vibration can be described by both its amplitude and frequency. Vibration displacement is the distance that a point on a surface moves away from its original static position; velocity is the instantaneous speed that a point on a surface moves; and acceleration is the rate of change of the speed. Each of these descriptors can be used to correlate vibration to human response, building damage, and acceptable equipment vibration levels. During construction, the operation of construction equipment can cause groundborne vibration. During the operational phase of a project, receptors may be subject to levels of vibration that can cause annoyance due to noise generated from vibration of a structure or items within a structure.

Vibration amplitudes are usually described in terms of either the peak particle velocity (PPV) or the root mean square (RMS) velocity. PPV is the maximum instantaneous peak of the vibration signal and RMS is the

square root of the average of the squared amplitude of the signal. PPV is more appropriate for evaluating potential building damage and RMS is typically more suitable for evaluating human response.

As with airborne sound, annoyance with vibrational energy is a subjective measure, depending on the level of activity and the sensitivity of the individual. To sensitive individuals, vibrations approaching the threshold of perception can be annoying. Persons accustomed to elevated ambient vibration levels, such as in an urban environment, may tolerate higher vibration levels. Table 3 displays the human response and the effects on buildings resulting from continuous vibration (in terms of various levels of PPV).

Table 3 Human Reaction to Typical Vibration Levels

Vibration Level, PPV (in/sec)	Human Reaction	Effect on Buildings
0.006–0.019	Threshold of perception, possibility of intrusion	Vibrations unlikely to cause damage of any type
0.08	Vibrations readily perceptible	Recommended upper level of vibration to which ruins and ancient monuments should be subjected
0.10	Level at which continuous vibration begins to annoy people	Virtually no risk of “architectural” (i.e. not structural) damage to normal buildings
0.20	Vibrations annoying to people in buildings	Threshold at which there is a risk to “architectural” damage to normal dwelling – houses with plastered walls and ceilings
0.4–0.6	Vibrations considered unpleasant by people subjected to continuous vibrations and unacceptable to some people walking on bridges	Vibrations at a greater level than normally expected from traffic, but would cause “architectural” damage and possibly minor structural damage

Source: California Department of Transportation (Caltrans). 2013, September. Transportation and Construction Vibration Guidance Manual.

LOCAL REGULATIONS AND STANDARDS

NOISE

The noise environment is an accumulation of many different sources, ranging from human voices to major sources such as freeway traffic. The degree to which noise becomes an annoyance depends on a variety of factors including noise level, time of day, background sounds, and surrounding land use.

COMMUNITY NOISE FUNDAMENTALS

The three elements of community noise are noise level, noise spectrum, and variation in noise level with time. Noise level is measured in decibels (dB). Noise is composed of various frequencies within a noise spectrum that define the character of the noise. Since human hearing is more sensitive to the higher speech frequencies, the A-weighted frequency network is applied, in accordance with national and international standards, to adjust the measured noise level to more closely relate to human perception of loudness.

Noise environments have different characteristics that vary with duration and time of day; for instance a freeway may emit a fairly constant noise level for long periods while an airport may emit many short-term high level noise events punctuated by extended periods of quiet. To provide a standard measure for community noise exposure that takes into account the time-varying characteristics, the State of California adopted the Community Noise Equivalent Level (CNEL) as the standard metric. The CNEL is a 24-hour energy average metric that penalizes evening and nighttime noise, and provides a uniform measure for time-varying noise environments.

NOISE ENVIRONMENT

The noise environment can generally be divided into two categories: transportation-related and non-transportation related noise. Traffic noise is the greatest contributor to noise pollution in Cupertino and one of the most difficult to control through local effort. Two major freeways (Interstate 280 and Highway 85) and four major corridors (Stevens Creek Boulevard, De Anza Boulevard, Homestead Road, and Foothill Boulevard) cross Cupertino. These roadways are utilized not only by local residents and employees, but also by commuters to destinations beyond Cupertino. Heavy-duty trucking operations to and from the Hanson Permanente Cement Plant and Stevens Creek Quarry located in the western foothills near Stevens Creek Boulevard and Foothill Boulevard are also a significant transportation-related noise contributor.

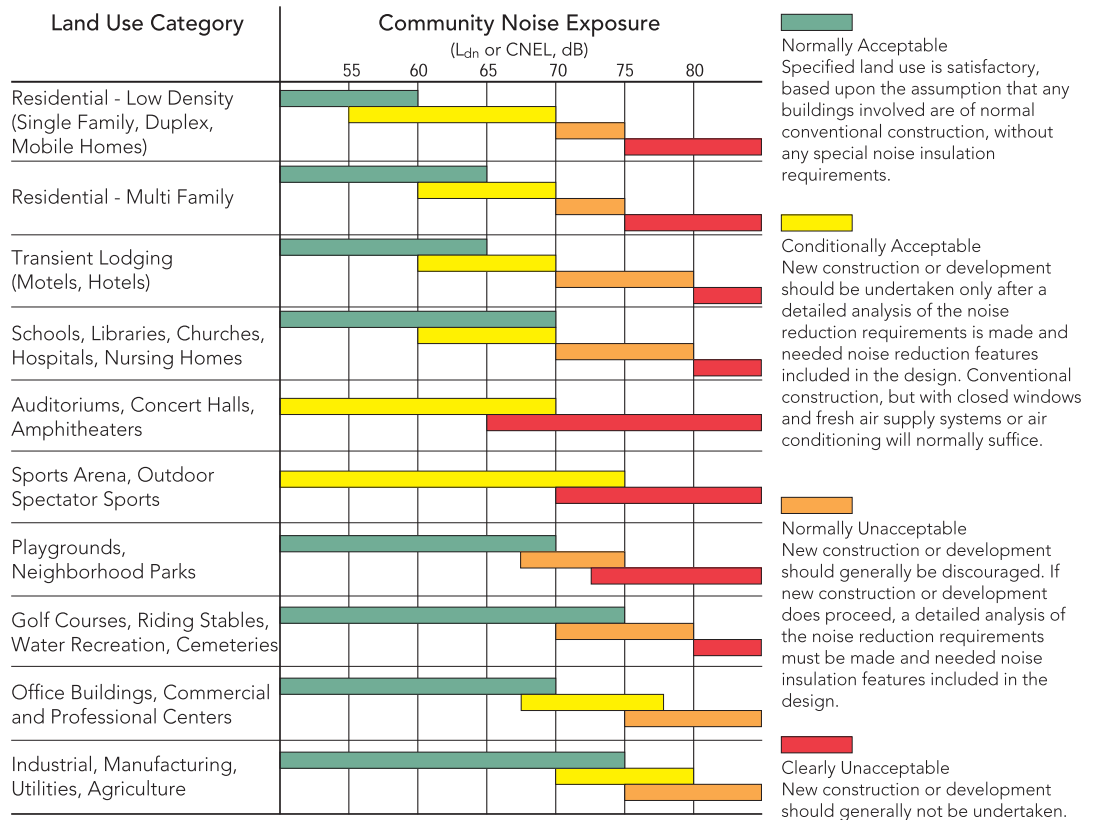
Cupertino receives some aircraft noise from facilities within the region including San Jose International Airport, Moffett Federal Airfield and Palo Alto Airport; however, the Cupertino city limit does not fall within the identified noise contours of any airport. One railroad line passes through the Monta Vista neighborhood and connects with the Hanson Permanente Cement Plant. This freight railway operates at very low frequencies, with approximately three train trips in each direction per week, usually during the daytime or early evening.

Non-transportation noise varies from stationary equipment (e.g., air conditioning units) to construction activity. Regulation to minimize excessive noise from non-transportation sources includes compliance with the City's noise standards that limit certain noise-generating activity during evening and early morning, when ambient noise levels tend to be lower. Advancements in technology to muffle sound also reduce noise from construction equipment and stationary equipment such as compressors and generators.

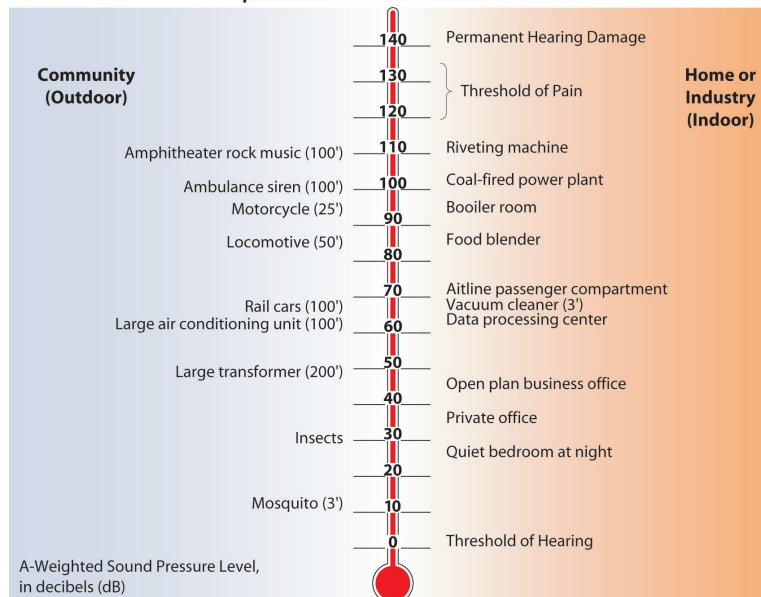
LAND USE COMPATIBILITY

The Cupertino Municipal Code, Title 10, outlines the maximum noise levels on receiving properties based upon land use types (**Figure HS-8**). Land use decisions and the development review process play a large role in minimizing noise impacts on sensitive land uses. Noise compatibility may be achieved by avoiding the location of conflicting land uses adjacent to one another and incorporating buffers and noise control techniques including setbacks, landscaping, building transitions, site design, and building construction techniques. Selection of the appropriate noise control technique will vary depending on the level of noise that needs to be reduced as well as the location and intended land use.

**FIGURE HS-8
LAND USE COMPATIBILITY FOR
COMMUNITY NOISE ENVIRONMENTS**



Representative Sounds and Sound Levels



LOOKING FORWARD

As Cupertino's resident and employee population grows, the City must identify ways to ensure public safety and support the community's high quality of life. Innovative site design and construction techniques are needed to reduce noise in developments near major corridors and where uses are mixed to ensure compatibility. Fire protection and public safety should be enhanced in a manner that provides a high quality of service while continuing to be fiscally responsible. The following are ways the City will address key challenges and opportunities facing Cupertino:

1

NOISE.

As State, regional and local policies encourage mixed-use development near corridors, the City should look to ways to reduce noise impacts on residences near and in such developments through site design, landscaping and construction techniques. Additionally, the City should review locations and site design for sensitive uses including schools, childcare facilities and hospitals to ensure that they are not negatively impacted by noise.

2

PROJECT DESIGN AND OPERATIONS.

Measures such as project and building design, emergency access, operations and maintenance of property, can help developments promote public and fire safety. Such measures will also allow the providers to maintain a high service level, while accommodating future growth.

3

COMMUNITY PARTICIPATION.

The City and service providers should enhance community participation through new and existing programs such as neighborhood watch, emergency preparedness and school programs.

4

SHARED RESOURCES.

The City can enhance emergency, fire safety and public safety services by coordinating programs with service providers and neighboring cities through shared services, mutual aid and agreements.



GOAL HS-8

Minimize noise impacts on the community and maintain a compatible noise environment for existing and future land use

NOISE

The City seeks to ensure that the community continues to enjoy a high quality of life through reduce noise pollution, effective project design and noise management operations.

POLICY HS-8.1: LAND USE DECISION EVALUATION

Use the Land Use Compatibility for Community Noise Environments chart, the Future Noise Contour Map (see Figure D-1 in Appendix D) and the City Municipal Code to evaluate land use decisions.

POLICY HS-8.2: BUILDING AND SITE DESIGN

Minimize noise impacts through appropriate building and site design.

STRATEGIES:

HS-8.2.1: Commercial Delivery Areas.

Locate delivery areas for new commercial and industrial developments away from existing or planned homes.

HS-8.2.2: Noise Control Techniques.

Require analysis and implementation of techniques to control the effects of noise from industrial equipment and processes for projects near low-intensity residential uses.

HS-8.2.3: Sound Wall Requirements.

Exercise discretion in requiring sound walls to be sure that all other measures of noise control have been explored and that the sound wall blends with the neighborhood. Sound walls should be designed and landscaped to fit into the environment.

POLICY HS-8.3: CONSTRUCTION AND MAINTENANCE ACTIVITIES

Regulate construction and maintenance activities. Establish and enforce reasonable allowable periods of the day, during weekdays, weekends and holidays for construction activities. Require construction contractors to use the best available technology to minimize excessive noise and vibration from construction equipment such as pile drivers, jack hammers, and vibratory rollers.

POLICY HS-8.4: FREEWAY DESIGN AND NEIGHBORHOOD NOISE

Ensure that roads and development along Highway 85 and Interstate 280 are designed and improved in a way that minimizes neighborhood noise.

POLICY HS-8.5: NEIGHBORHOODS

Review residents' needs for convenience and safety and prioritize them over the convenient movement of commute or through traffic where practical.

POLICY HS-8.6: TRAFFIC CALMING SOLUTIONS TO STREET NOISE

Evaluate solutions to discourage through traffic in neighborhoods through enhanced paving and modified street design.

STRATEGY:

HS-8.6.1: Local Improvement.

Modify street design to minimize noise impact to neighbors.

POLICY HS-8.7: REDUCTION OF NOISE FROM TRUCKING OPERATIONS

Work to carry out noise mitigation measures to diminish noise along Foothill and Stevens Creek Boulevards from the quarry and cement plant trucking operations. These measures include regulation of truck speed, the volume of truck activity, and trucking activity hours to avoid late evening and early morning. Alternatives to truck transport, specifically rail, are strongly encouraged when feasible.

STRATEGIES:

HS-8.7.1: Restrictions in the County's Use Permit.

Coordinate with the County to restrict the number of trucks, their speed and noise levels along Foothill and Stevens Creek Boulevards, to the extent allowed in the Use Permit. Ensure that restrictions are monitored and enforced by the County.

HS-8.7.2: Road Improvements to Reduce Truck Impacts.

Consider road improvements such as medians, landscaping, noise attenuating asphalt, and other methods to reduce quarry truck impacts.

[Print](#)

Cupertino, CA Municipal Code

CHAPTER 10.48: COMMUNITY NOISE CONTROL*

Section

- 10.48.010 Definitions.
- 10.48.011 Notice of violation.
- 10.48.013 Multiple section application.
- 10.48.014 Other remedies.
- 10.48.020 Lead agency/official.
- 10.48.021 Powers of the Noise Control Officer.
- 10.48.022 Duties of the Noise Control Officer.
- 10.48.023 Duties and responsibilities of other departments.
- 10.48.029 Homeowner or resident conducted construction work exception.
- 10.48.030 Emergency exception.
- 10.48.031 Special exceptions.
- 10.48.032 Appeals.
- 10.48.040 Daytime and nighttime maximum noise levels.
- 10.48.050 Brief daytime incidents.
- 10.48.051 Landscape maintenance activities.
- 10.48.052 Outdoor public events.
- 10.48.053 Grading, construction and demolition.
- 10.48.054 Interior noise in multiple-family dwellings.
- 10.48.055 Motor vehicle idling.
- 10.48.056 Noise from registered motor vehicles.
- 10.48.057 Noise from off-road recreational vehicles.
- 10.48.060 Noise disturbances.
- 10.48.061 Animals and birds.
- 10.48.062 Nighttime deliveries and pickups.
- 10.48.070 Violation–Penalty.

* Prior ordinance history: Ords. 1022, 1066, 1107, 1149, 1179 and 1278.

10.48.010 Definitions.

For purposes of this chapter:

“Commercial area” means commercially-zoned property as defined in the community zoning ordinance.

“Commercial establishment” means any store, factory, manufacturing or industrial plant used for the sale, manufacturing, fabrication, assembly or storage of goods, wares and merchandise.

“Construction” means any site preparation, assembly, erection, repair, substantial alteration, or similar action, of public or private property, rights-of-way, structures, utilities or similar property, including vehicle pick-up or delivery of construction materials or demolition debris but excluding demolition and grading.

“Daytime” means the period from seven a.m. to eight p.m. on weekdays, and the period from nine a.m. to six p.m. on weekends.

“Decibel (dB)” means a unit for measuring relative sound pressure, logarithmically referenced to a pressure of twenty micronewtons per square meter.

“Demolition” means any dismantling, intentional destruction or removal of structures, utilities, public or private right-of-way surfaces, or similar property.

“Emergency” means any occurrence or set of circumstances involving actual or imminent physical danger, crisis, trauma, or property damage which demands immediate action.

“Emergency work” means any work performed for the purpose of preventing or alleviating the physical danger, trauma, or property damage threatened or caused by an emergency, or restoration of conditions and property to their status prior to the emergency.

“Holidays” means the following days: New Year’s Day, Memorial Day, Independence Day, Labor Day, Thanksgiving Day, Christmas Day.

“Industrial area” means industrially-zoned property as defined in the community zoning ordinance.

“Muffler” means a device for reducing or dissipating the sound of escaping gases, or other types of noise, from a mechanical device or engine.

“Multiple-family dwelling unit” means a residential structure containing separate living quarters for two or more families, each unit with similar and common access to the outside.

“NCO” means noise control officer.

“Nighttime” means periods of weekdays from eight p.m. to twelve midnight, and from midnight to seven a.m., and periods on weekends from six p.m. to midnight and from midnight to nine a.m.

“Noise” means any sound which annoys or disturbs humans or which causes or tends to cause an adverse psychological or physiological effect on humans.

“Noise Control Officer (NCO)” means the municipal agency, department or individual having lead responsibility for implementation and enforcement of this chapter, as designated by the City Manager and approved by the City Council.

“Noise disturbance” means any sound which:

1. Endangers or injures the safety or health of humans or animals; or
2. Annoys or disturbs a reasonable person of normal sensitivities; or
3. Endangers or damages personal or real property.

“Noise level” means the same as sound level.

“Nonresidential area” means land zoned for other than residential uses, such as commercial, professional office, industrial or public, as defined in the zoning ordinance, but not including public rights-of-way.

“Person” means any individual, association, partnership, corporation, or public agency, and includes any associated officer, employee or department.

“Property boundary” means an imaginary line along the ground surface, and its vertical extension, which separates the real property owned by one person from that owned by another person.

“Public area” means any property or structures thereon which are owned, utilized, or controlled by a governmental entity.

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

“Residential area” means residentially zoned land as defined in the community zoning ordinance.

“Sound” means a rapid variation in air pressure, which, because of its magnitude and frequency, can be heard by a human with average hearing ability.

“Sound level” means the maximum continuous or repeated peak value measured by the use of a sound level meter and the “A” weighting network, as specified in American National Standards Institute specifications for sound level meters (ANSI S 1A - 1971, or the latest revision). The reading obtained in decibels is designated dBA. If the meter response characteristic is not indicated, “SLOW” response shall be used.

“Sound level meter” means an instrument which includes a microphone, amplifier, RMS detector, integrator or time averager, output meter, and weighting networks used to measure sound levels, and meets American National Standards Institute specification S 1.4 - 1971, or latest revision, for Type 1, Type 2 or Type 2A operation.

“Weekday” means any day, Monday through Friday, that is not one of the holidays.

“Weekend” means Saturdays and Sundays that are not holidays.

“Vehicular deliveries or pickups” means the delivery or pickup or the arrival for the delivery or pickup of goods, wares, merchandise and waste material by the use of motor vehicles, including, but not limited to, the operation of motorized commercial ground-sweeping or waste-removal machinery, whether portable or self-propelled.

(Ord. 1871, (part), 2001)

10.48.011 Notice of Violation.

Except in the case where there is clear evidence that a person is acting in good faith and with all deliberate speed to comply with provisions of this chapter after a verbal or written warning of a violation, the continuing violation shall be cause for either a citation, complaint, or an abatement order to be issued by the Noise Control Officer, or other responsible official.

(Ord. 1871, (part), 2001)

10.48.013 Multiple Section Application.

In the event that more than one section of this chapter apply generally and simultaneously to a given noise source or incident, the least restrictive regulation shall be in effect, and the most restrictive limit shall not be

invoked, except as sources and incidents are specifically identified in the most restrictive limit which is applicable.

(Ord. 1871, (part), 2001)

10.48.014 Other Remedies.

No provision of this chapter shall be construed to impair any common law or statutory cause of action, or legal remedy therefrom, of any person for injury or damage arising from any violation of this chapter or from other law. The provisions of this chapter are not intended to affect in any manner, violations or arrests of persons for a violation of Section 415 of the California Penal Code or any other provision of State law. The unavailability of a sound level meter to enforce the provisions of this chapter does not preclude the enforcement of any provision of State law.

(Ord. 1871, (part), 2001)

10.48.020 Lead Agency/Official.

The noise control program established by this chapter shall be administered by and the responsibility of, the Noise Control Officer (NCO).

(Ord. 1871, (part), 2001)

10.48.021 Powers of the Noise Control Officer.

In order to implement and enforce this chapter and for the general purpose of noise abatement and control, the NCO shall have, in addition to any other vested authority, the power to:

A. Review of Public and Private Projects. Review of public and private projects, subject to mandatory review or approval by other departments, for compliance with this ordinance, if such projects are likely to cause noise in violation of this chapter;

B. Inspections. Upon presentation of proper credentials and with permission of the property owner or occupant, enter and investigate a potential ordinance violation on any property or place, and inspect any report or records at any reasonable time. If permission is refused or cannot be obtained, a search warrant may be obtained from a court of competent jurisdiction upon showing of probable cause to believe that a violation of this chapter may exist. Such inspection may include administration of any necessary tests.

(Ord. 1871, (part), 2001)

10.48.022 Duties of the Noise Control Officer.

In order to implement and enforce this chapter effectively, the NCO shall within a reasonable time after the effective date of the ordinance codified in this chapter:

A. Guidelines, Testing Methods and Procedures. Develop and promulgate guidelines, testing methods and procedures as required. Any noise measurement procedure used in enforcement of this chapter which tends to underestimate the actual noise level of the source being measured shall not invalidate the enforcement action;

B. Investigate and Pursue Violations. In consonance with provisions of this chapter, investigate and pursue possible violations;

C. Delegation of Authority. Delegate functions, where appropriate under this chapter, to other personnel and to other departments, subject to approval of the City Manager.

(Ord. 1871, (part), 2001)

10.48.023 Duties and Responsibilities of Other Departments.

A. Departmental Actions. All City departments shall, to the fullest extent consistent with other law, carry out their programs in such a manner as to further the policy and intent of this chapter.

B. Project Approval. All departments whose duty it is to review and approve new projects, or changes to existing projects, that may result in the production of disturbing noise, shall consult with the NCO prior to any such approval.

C. Contracts. Any written contract, agreement, purchase order, or other instrument whereby the City is committed to the expenditure of five thousand dollars or more in return for goods or services, and which involves noise-producing activities, shall contain provisions requiring compliance with this chapter.

(Ord. 1871, (part), 2001)

10.48.029 Homeowner or Resident-Conducted Construction Work Exception.

Construction conducted by the homeowner or resident of a single dwelling, using domestic construction tools is allowed on holidays between the hours of nine a.m. and six p.m.

(Ord. 1871, (part), 2001)

10.48.030 Emergency Exception.

The provisions of this chapter shall not apply to the emission of sound for the purpose of alerting persons to the existence of an emergency, or the emission of sound in the performance of emergency work.

(Ord. 1871, (part), 2001)

10.48.031 Special Exceptions.

A. The NCO shall have the authority, consistent with this section, to grant special exceptions which may be requested.

B. Any person seeking a special exception pursuant to this section shall file an application with the NCO. The application shall contain information which demonstrates that bringing the source of sound, or activity for which the special exception is sought, into compliance with this chapter would constitute an unreasonable hardship on the applicant, on the community, or on other persons. Prior to issuance of an exception, the NCO shall notify owners and/or occupants of nearby properties which may be affected by such exceptions. Any individual who claims to be adversely affected by allowance of the special exceptions may file a statement with the NCO containing any information to support his claim. If the NCO finds that a sufficient controversy exists regarding an application, a public hearing may be held.

C. In determining whether to grant or deny the application, the NCO shall balance the hardship to the applicant, the community, and other persons of not granting the special exception against the adverse impact on the health, safety, and welfare of persons affected, the adverse impact on property affected, and any other adverse impacts of granting the special exception. Applicants for special exceptions and persons

contesting special exceptions may be required to submit any information the NCO may reasonably require. In granting or denying an application, the NCO shall place on public file a copy of the decision and the reasons for denying or granting the special exception.

D. Special exceptions shall be granted by notice to the applicant containing all necessary conditions, including a time limit on the permitted activity. The special exception shall not become effective until all conditions are agreed to by the applicant. Noncompliance with any condition of the special exception shall terminate it and subject the person holding it to those provisions of this chapter regulating the source of sound or activity for which the special exception was granted.

E. Application for extension of time limits specified in special exceptions or for modification of other substantial conditions shall be treated like applications for initial special exceptions under subsection B of this section.

(Ord. 1871, (part), 2001)

10.48.032 Appeals.

Appeals of any decision of the NCO shall be made to the City Council.

(Ord. 1871, (part), 2001)

10.48.040 Daytime and Nighttime Maximum Noise Levels.

Individual noise sources, or the combination of a group of noise sources located on the same property, shall not produce a noise level exceeding those specified on property zoned as follows, unless specifically provided in another section of this chapter:

Land Use at Point of Origin	Maximum Noise Level at Complaint Site of Receiving Property	
	Nighttime	Daytime
Residential	50 dBA	60 dBA
Nonresidential	55 dBA	65 dBA

(Ord. 1921, (part), 2003; Ord. 1871, (part), 2001)

10.48.050 Brief Daytime Incidents.

A. During the daytime period only, brief noise incidents exceeding limits in other sections of this chapter are allowed; providing, that the sum of the noise duration in minutes plus the excess noise level does not exceed twenty in a two-hour period. For example, the following combinations would be allowable:

Noise Increment Above Normal Standard	Noise Duration in 2-Hour Period

5 dBA	15 minutes
10 dBA	10 minutes
15 dBA	5 minutes
19 dBA	1 minute

B. For multifamily dwelling interior noise, Section 10.48.054, the sum of excess noise level and duration in minutes of a brief daytime incident shall not exceed ten in any two-hour period, measured at the receiving location.

C. Section 10.48.050A does not apply to Section 10.48.055 (Motor Vehicle Idling).

(Ord. 1871, (part), 2001)

10.48.051 Landscape Maintenance Activities.

The use of motorized equipment for landscape maintenance activities shall be limited to the hours of 8:00 a.m. to 8:00 p.m. on weekdays, and 9:00 a.m. to 6:00 p.m. on weekends and holidays, with the exception of landscape maintenance activities for public schools, public and private golf courses, and public facilities, which are allowed to begin at 7:00 a.m. The use of motorized equipment for landscape maintenance activities during these hours is exempted from the limits of Section 10.48.040; provided, that reasonable efforts are made by the user to minimize the disturbances to nearby residents by, for example, installation of appropriate mufflers or noise baffles, running equipment only the minimal period necessary, and locating equipment so as to generate minimum noise levels on adjoining properties.

(Ord. 1921, (part), 2003; Ord. 1871, (part), 2001)

10.48.052 Outdoor Public Events.

A. Outdoor events open to the general public on nonresidential property, such as parades, rallies, fairs, concerts and special sales and promotional events, involving generation of noise levels higher than would normally occur, by use of the human voice, public address systems, musical instruments, electronic amplification systems, and similar soundproducing activities, are allowed upon obtaining an appropriate permit from the city, and subject to the following general limitations:

1. The event shall not produce noise levels above seventy dBA on any residential property for a period longer than three hours during daytime.
2. The event shall not produce noise levels above sixty dBA on any residential property during the period from eight p.m. to eleven p.m., and above fifty-five dBA for any other nighttime period.
3. Continuous or repeated peak noise levels above ninety-five dBA shall not be produced at any location where persons may be continuously exposed.

B. The conditions imposed upon the event or activity in the permit issued by the City, regarding maximum noise level, location of noise sources, or duration of activity, for example, may be more limiting than this section, to protect certain individuals, areas or nearby activities which would otherwise be disturbed, and these permit conditions, when in conflict with this section, are overriding.

(Ord. 1871, (part), 2001)

10.48.053 Grading, Construction and Demolition.

A. Grading, construction and demolition activities shall be allowed to exceed the noise limits of Section 10.48.040 during daytime hours; provided, that the equipment utilized has high-quality noise muffler and abatement devices installed and in good condition, and the activity meets one of the following two criteria:

1. No individual device produces a noise level more than eighty-seven dBA at a distance of twenty-five feet (7.5 meters); or
2. The noise level on any nearby property does not exceed eighty dBA.

B. Notwithstanding Section 10.48.053A, it is a violation of this chapter to engage in any grading, street construction, demolition or underground utility work within seven hundred fifty feet of a residential area on Saturdays, Sundays and holidays, and during the nighttime period, except as provided in Section 10.48.030.

C. Construction, other than street construction, is prohibited on holidays, except as provided in Sections 10.48.029 and 10.48.030.

D. Construction, other than street construction, is prohibited during nighttime periods unless it meets the nighttime standards of Section 10.48.040.

E. The use of helicopters as a part of a construction and/or demolition activity shall be restricted to between the hours of nine a.m. and six thirty p.m. Monday through Friday only, and prohibited on the weekends and holidays. The notice shall be given at least twenty-four hours in advance of said usage. In cases of emergency, the twenty-four hour period may be waived.

(Ord. 1871, (part), 2001)

10.48.054 Interior Noise in Multiple-Family Dwellings.

Noise produced in any multiple-family dwelling unit shall not produce a noise level exceeding 45 dBA five feet from any wall in any adjoining unit during the period between seven a.m. and ten p.m., or exceeding 40 dBA during hours from ten p.m. to seven a.m. the following day.

(Ord. 1871, (part), 2001)

10.48.055 Motor Vehicle Idling.

Motor vehicles, including automobiles, trucks, motorcycles, motor scooters and trailers or other equipment towed by a motor vehicle, shall not be allowed to remain in one location with the engine or auxiliary motors running for more than three minutes in any hour, in an area other than on a public right-of-way, unless:

- A. The regular noise limits of Section 10.48.040 are met while the engine and/or auxiliary motors are running; or
- B. The vehicle is in use for provision of police, fire, medical, or other emergency services.

(Ord. 1871, (part), 2001)

10.48.056 Noise from Registered Motor Vehicles.

A. It is a violation of this chapter to own or operate a motor vehicle, including automobiles, trucks, motorcycles and other similar devices of a type subject to registration, as defined in California Vehicle Code, which has a faulty, defective, deteriorated, modified, replaced, or no exhaust and/or muffler system,

and which produces an excessive and disturbing noise level, as defined in California Vehicle Code Sections 27150 and 27151.

B. The Stationary Vehicle Test Procedure, as adopted by the California Highway Patrol, may be utilized as prima facie evidence of violation of this section.

(Ord. 1871, (part), 2001)

10.48.057 Noise from Off-Road Recreational Vehicles.

It is a violation of this chapter to own or operate:

A. Any off-road recreational vehicle, including all-terrain vehicles, dirt bikes, dune buggies and other similar devices, as defined in Division 16.5 of the California Vehicle Code, which has a faulty, defective, deteriorated, modified, replaced, or no exhaust and/or muffler system, and which produces an excessive and disturbing noise level, as specified in California Vehicle Code Section 38365;

B. Any off-road recreational vehicle producing a noise level:

1. Exceeding ninety-eight dBA within twenty inches of any component at an intermediate engine speed of two thousand to four thousand revolutions per minute in a stationary position; or

2. Exceeding eighty dBA under any condition of acceleration, speed, grade, and load at a distance of fifty feet. At greater or lesser measurement distances, the maximum noise level changes by four dB for each doubling or halving of distance. The sound level meter shall be set for FAST response for this measurement.

(Ord. 1871, (part), 2001)

10.48.060 Noise Disturbances.

No person shall unreasonably make, continue, or cause to be made or continued, any noise disturbance as defined in Section 10.48.010.

(Ord. 1871, (part), 2001)

10.48.061 Animals and Birds.

It is unlawful and a nuisance for any person to keep, maintain or permit upon any lot or parcel of land within the City under his control any animal, including any fowl, which by any sound or cry shall habitually disturb the peace and comfort of any person in the reasonable and comfortable enjoyment of life or property.

(Ord. 1871, (part), 2001)

10.48.062 Nighttime Deliveries and Pickups.

It is unlawful and a nuisance for any person to make or allow vehicular deliveries or pickups to or from commercial establishments (defined as any store, factory, manufacturing, or industrial plant used for the sale, manufacturing, fabrication, assembly or storage of goods, wares and merchandise) by the use of private roads, alleys or other ways located on either side or the back of any building housing the commercial establishment where such private road, alley or other way lies between the building and any

adjacent parcel of land zoned for residential purposes, between the hours of eight p.m. and eight a.m. weekdays (Monday through Friday) and six p.m. and nine a.m. on weekends (Saturday and Sunday) and holidays except as may be permitted under Section 10.48.029.

(Ord. 1871, (part), 2001)

10.48.070 Violation–Penalty.

Any person who violates the provisions of this chapter shall be guilty of a misdemeanor and upon conviction thereof shall be punished as provided in Chapter 1.12.

(Ord. 1886, (part), 2001; Ord. 1871, (part), 2001)

CONSTRUCTION NOISE MODELING

Attenuation Calculation, L10

	RCNM Reference		Sensitive Receptors to South	
Construction Activities	dBA L10	distance (ft)	dBA L10	distance (ft)
Demolition	88.3	50	85.4	70
Site Preparation	88.0		85.1	
Grading	87.6		84.7	
Building Construction	85.5		82.6	
	Sensitive Receptors to South		Sensitive Receptors to North	
Construction Activities	dBA L10	distance (ft)	dBA L10	distance (ft)
Demolition	85.4	70	79.7	135
Site Preparation	85.1		79.4	
Grading	84.7		79.0	
Building Construction	82.6	50	76.9	150
Paving	87.8		78.3	
	Sensitive Receptors to South		Sensitive Receptors to Southeast	
Construction Activities	dBA L10	distance (ft)	dBA L10	distance (ft)
Demolition	85.4	70	76.9	185
Site Preparation	85.1		76.6	
Grading	84.7		76.2	
Building Construction	82.6	50	74.1	175
Paving	87.8		76.9	
	Sensitive Receptors to South		Sensitive Receptors to West	
Construction Activities	dBA L10	distance (ft)	dBA L10	distance (ft)
Demolition	85.4	70	74.3	250
Site Preparation	85.1		74.0	
Grading	84.7		73.6	
Building Construction	82.6	50	71.5	240
Paving	87.8		74.2	

Attenuation calculated through Inverse Square Law: $Lp(R2) = Lp(R1) - 20\text{Log}(R2/R1)$

Attenuation Calculation, Leq				
Construction Activities	RCNM Reference		Sensitive Receptors to South	
	dBA Leq	distance (ft)	dBA Leq	distance (ft)
Demolition	85.3	50	82.4	70
Site Preparation	85		82.1	
Grading	84.6		81.7	
Building Construction	82.5		79.6	
Sensitive Receptors to South			Sensitive Receptors to North	
Construction Activities	dBA Leq	distance (ft)	dBA Leq	distance (ft)
Demolition	82.4	70	76.7	135
Site Preparation	82.1		76.4	
Grading	81.7		76.0	
Building Construction	79.6		73.9	
Paving	84.8	50	75.3	150
Sensitive Receptors to South			Sensitive Receptors to Southeast	
Construction Activities	dBA Leq	distance (ft)	dBA Leq	distance (ft)
Demolition	82.4	70	73.9	185
Site Preparation	82.1		73.6	
Grading	81.7		73.2	
Building Construction	79.6		71.1	
Paving	84.8	50	73.9	175
Sensitive Receptors to South			Sensitive Receptors to West	
Construction Activities	dBA Leq	distance (ft)	dBA Leq	distance (ft)
Demolition	82.4	70	71.3	250
Site Preparation	82.1		71.0	
Grading	81.7		70.6	
Building Construction	79.6		68.5	
Paving	84.8	50	71.2	240

Attenuation calculated through Inverse Square Law: $L_p(R2) = L_p(R1) - 20\text{Log}(R2/R1)$

