

7 NOISE

7.1 Purpose of the Chapter

This chapter identifies sources of noise and existing and future noise levels in Tiburon and provides standards to address exposure to current and projected noise sources. The primary source of existing noise in Tiburon is vehicle traffic from Tiburon Boulevard. Commercial activity, outdoor music, recreation, construction, landscape maintenance, and truck loading and unloading are among the stationary sources that contribute to the noise environment. The purpose of the Noise chapter is to limit the community's exposure to excessive noise levels in noise-sensitive areas and at noise-sensitive times of day.

The Noise chapter includes the following sections.

7.2 Fundamentals of Noise. Describes the fundamentals of sound and noise-related terms.

7.3 Existing Noise Conditions. Discusses the most significant sources of noise in Tiburon, including roadways and stationary sources.

7.4 Noise and Land Use Compatibility Standards. Presents standards that should be used to evaluate compatibility between new land uses and infrastructure projects and noise levels in Tiburon.

7.5 Future Noise Environment. Describes future noise conditions expected with development projected under the General Plan.

7.6 Goals, Policies, and Programs. Identifies goals, policies, and programs to limit the community's exposure to noise and vibration.

7.2 Fundamentals of Noise

Noise is a subjective reaction to different types of sound. Noise is typically defined as sound that is loud, unpleasant, unexpected, or undesired.

The effects of noise on people can be placed in three categories:

- Subjective effects of annoyance, nuisance, and dissatisfaction;
- Interference with activities such as speech, sleep, and learning; and
- Physiological effects such as hearing loss or sudden startling.

Environmental noise typically produces effects in the first two categories. Workers can experience noise in the last category. A wide variation in individual thresholds of annoyance exists and different tolerances to noise tend to develop based on an individual's past experiences with noise.

A decibel (dB) is the fundamental unit of sound, and sound is measured on a decibel scale. The decibel scale is logarithmic, not linear, which means that an increase in 10 dB is 10 times greater than the base number. The perceived loudness of sound is dependent upon many factors, including sound pressure and frequency content. The A-weighted decibel scale is used to give greater weight to the frequencies of sound to which the human ear is most sensitive by de-emphasizing the very low and very high frequencies. The A-weighted sound level is expressed as dBA and is the most common method to characterize sound in California. Representative outdoor and indoor noise levels in units of dBA are shown in Figure N-1.

Figure N-1 Typical A-Weighted Sound Levels

Common Outdoor Activities	Noise Level (dBA)	Common Indoor Activities
	110	Rock Band
Jet fly-over at 1,000 ft	100	
Gas lawn mower at 3 ft	90	
Diesel truck at 50 ft. and 50 mph	80	Food blender at 3 ft
Gas lawn mower at 100 ft	70	Vacuum cleaner at 10 ft
Heavy traffic at 300 ft	60	Normal speech at 3 ft
	50	Dishwasher in next room
Quiet urban nighttime	40	
	30	Library
Quiet rural nighttime	20	Bedroom at night

Source: Caltrans, Technical Noise Supplement, Traffic Noise Analysis Protocol 2013.

The zero on the decibel scale is based on the lowest sound level that the healthy, unimpaired human ear can detect. Except in carefully controlled laboratory experiments, a change of 1 dBA cannot be perceived. Outside the laboratory, a 3 dBA change is a just-perceivable difference. Generally, a change in level of at least 5 dBA is required before any noticeable change in human response would be expected. A 10 dBA change sounds like the noise has approximately doubled.

Community noise is commonly described in terms of the ambient noise level, which is defined as the all-encompassing noise level of a given environment consisting of all noise sources audible at that location. A common statistical tool to measure ambient noise is average, or equivalent, sound level. The day/night average level (L_{dn}) is based on the average noise level over a 24-hour day, with a 10-decibel weighting applied to noise occurring during nighttime (10 p.m. to 7 a.m.) hours. The nighttime penalty is based upon the assumption that people react to nighttime noise exposures as though they were twice as loud as daytime exposures. Because L_{dn} represents a 24-hour average, it tends to disguise short-term variations in the noise environment.

Varying levels of noise can impact sleep and speech and cause annoyance. An important way of predicting a human reaction to a new noise environment is the way it compares to the existing environment to which one has adapted. In general, the more a noise exceeds the previously existing ambient noise level, the less acceptable the new noise will be judged by those hearing it.

7.3 Existing Noise Conditions

Existing traffic volumes and generally accepted noise modeling techniques were used to develop noise contours for the major roadways in the planning area. Figure N-2 shows noise contours for the 60 and 65 dBA levels along Tiburon and Trestle Glen Boulevards. The contours indicate maximum noise exposure assuming line-of-sight to the noise source and fall rapidly a short distance from the roadways since noise decreases exponentially with distance. These contours are intended for screening purposes to identify locations where site-specific noise studies may be required.

Figure N-2 Existing Noise Contours

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Predicted noise levels along major roadways at the nearest receptors were prepared for the General Plan Existing Conditions Report. Roadway segments where noise levels are at least 65 dBA L_{dn} at the closest receptor include locations between US 101 and Rock Hill Drive. Noise levels along Tiburon Boulevard in the Downtown are generally predicted between 60 and 65 dBA L_{dn} . The nearest receptors on these roadway segments include both residential and commercial uses.

Stationary Noise Sources

Commercial activity, construction, landscape maintenance, parking lots, loading docks, parks, and schools are among the stationary noise sources in Tiburon. Construction noise includes demolition,

excavation, grading, delivery of materials, and building on a project site or staging area. Stationary noise sources also include recreation activities and outdoor music; service and delivery trucks idling, loading, and unloading; and mechanical systems for heating, ventilation, and air conditioning. Town policy provides noise standards for heating, ventilation, and air conditioning units and similar noise-generating mechanical equipment. The Town also regulates the hours of use of leaf blowers and hedge trimmers.

7.4 Noise and Land Use Compatibility Standards

The standards listed in Figure N-3 should be used to evaluate the compatibility between new land uses and future noise in Tiburon. The land use compatibility standards should be used in combination with Figures N-2 and N-4 to determine whether a proposed development or land use is located in an area that exceeds the normally acceptable noise exposure for that type of development or land use and therefore requires an acoustical analysis and/or special noise mitigating measures. The land use compatibility standards are also used as a guide to determine if noise from stationary sources is acceptable.

Figure N-3 Projected Future Noise Contours

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Land Use Category	Community Noise Exposure, Ldn or CNEL, in dB						
	55	60	65	70	75	80	85
Residential (interior noise levels not to exceed 45 dBA Ldn)	Diagonal lines	Diagonal lines	Light gray	Light gray	Dark gray	Dark gray	Dark gray
Transient Lodging, Motels, Hotels	Diagonal lines	Diagonal lines	Light gray	Light gray	Dark gray	Dark gray	Dark gray
Schools, Libraries, Churches, Hospitals, Nursing Homes	Diagonal lines	Diagonal lines	Light gray	Light gray	Dark gray	Dark gray	Dark gray
Auditoriums, Concert Halls, Amphitheaters	Light gray	Light gray	Light gray	Light gray	Dark gray	Dark gray	Dark gray
Sports Arenas, Outdoor Spectator Sports	Light gray	Light gray	Light gray	Light gray	Dark gray	Dark gray	Dark gray
Playgrounds, Neighborhood Parks, Tennis Courts, Outdoor Recreation	Diagonal lines	Diagonal lines	Diagonal lines	Diagonal lines	Dark gray	Dark gray	Dark gray
Water Recreation, Riding Stables, Golf Courses, Cemeteries	Diagonal lines	Diagonal lines	Diagonal lines	Diagonal lines	Dark gray	Dark gray	Dark gray
Office Buildings, Business, Commercial & Professional	Diagonal lines	Diagonal lines	Light gray	Light gray	Dark gray	Dark gray	Dark gray
Industrial, Manufacturing, Utilities, Agriculture	Diagonal lines	Diagonal lines	Diagonal lines	Diagonal lines	Dark gray	Dark gray	Dark gray
	Normally Acceptable: Specified land use is satisfactory, based upon the assumption that any buildings involved are of normal conventional construction, without any special noise insulation requirements.						
	Conditionally Acceptable: New construction or development should be undertaken only after a detailed analysis of the noise reduction requirements is made and needed noise insulation features included in the design.						
	Normally Unacceptable: New construction or development should be discouraged. If new construction or development does proceed, a detailed analysis of the noise reduction requirements must be made and needed noise insulation features included in the design.						
	Clearly Unacceptable: New construction or development clearly should not be undertaken.						

7.5 Future Noise Levels

Future noise levels will be largely attributable to vehicular traffic. Projected noise contours are shown in Figure N-4. This figure identifies areas that may be exposed to excessive noise levels, defined as those above 60 dBA L_{dn}. Policies and programs in this chapter address these noise issues through implementation of a variety of noise-mitigating measures and, where possible, conditioning future development to limit future noise exposure.

Figure N-4 Projected Future Noise Contours

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7.5 Goals, Policies, and Programs

Goal N-A Ensure that residential areas are quiet and that noise levels in public and commercial areas remain within acceptable limits.

Goal N-B Eliminate or reduce unnecessary, excessive, and offensive noises from all sources.

Policy N-1 Noise Impacts of New Development

Use the Noise and Land Use Compatibility Guidelines in Figure N-3 in land use decisions to determine what noise levels in the community are acceptable or unacceptable and to require noise attenuation methods as warranted in noise-impacted areas.

Policy N-2 Compatibility of New Land Uses

Use the Noise and Land Use Compatibility Guidelines in Figure N-3 to determine acceptable new land uses, and to require noise attenuation methods as warranted in noise-impacted areas.

Program N-a Acoustical Study Requirements

Require acoustical studies for projects that may be exposed to or create noise levels that exceed the Noise and Land Use Compatibility Guidelines in Figure N-3. Mitigation measures should be identified to ensure that noise levels remain at acceptable levels.

Program N-b Conditions of Approval

Establish conditions of approval through the development review process for activities with the potential to create noise conflicts and enforce these conditions once projects become operational.

Program N-c Construction Noise

Use the environmental review process to identify measures to minimize exposure of neighboring properties to excessive noise levels from construction activity.

Program N-d Recreational Facilities

Consider potential noise impacts from new or expanded recreational facilities on surrounding residential properties, requiring preparation of an acoustical report for projects which may create noise levels which exceed the Noise and Land Use Compatibility Guidelines in Figure N-3.

Policy N-3 Traffic Noise

Minimize exposure of residents to traffic noise through land use policies, law enforcement, street design and improvements and landscaping.

Program N-e Caltrans Noise Mitigation

Work with Caltrans to ensure that adequate noise studies are prepared, and noise mitigation measures are considered for modifications to Tiburon Boulevard.

Policy N-4 Sounds Walls

Discourage the use of sound walls if other noise reduction measures such as berms or landscaping are available. Any sound walls or solid barriers should be aesthetically compatible with the surrounding neighborhood, regularly maintained, and minimize the potential for reflected sound.

Policy N-5 Aircraft Noise

Attempt to reduce aircraft noise over the Tiburon Planning Area by working with the County of Marin, other cities and towns, and appropriate regulatory agencies.

Policy N-6 Vibration Impacts

Ensure that the potential for vibration from demolition and construction projects is considered and measures are taken to mitigate potential impacts.