

## 9. NOISE ELEMENT

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### A. Purpose

The purpose of the Noise Element is to protect the health and welfare of the community by promoting development which is compatible with established noise standards. This element has been prepared in conformance with Government Code Section 65302(f) and the guidelines adopted by the State Office of Noise Control, pursuant to Health and Safety Code Section 46050.1. Existing and future noise problems in the Planning Area are identified. Policies and implementation programs are provided to reduce the community's exposure to excessive noise levels. Accomplishing this task requires an evaluation of the noise generation from sources such as roads, highways, and stationary sources such as industrial facilities.

### B. Noise Characteristics

Noise is defined as unwanted sound. Airborne sound is a rapid fluctuation of air pressure above and below atmospheric pressure. Sound levels are usually measured and expressed in decibels (dB) with 0 dB corresponding roughly to the threshold of hearing. Decibels and other technical terms are defined in Table N-1.

Most of the sounds which we hear in the environment do not consist of a single frequency, but rather a broad band of frequencies, with each frequency differing in sound level. The intensities of each frequency add together to generate a sound. The method commonly used to quantify environmental sounds consists of evaluating all of the frequencies of a sound in accordance with a weighting that reflects the fact that human hearing is less sensitive at low frequencies and extreme high frequencies than in the mid-range frequency. This method is called weighting, and the decibel level so measured is called the A-weighted sound level (dBA). In practice, the level of a sound source is conveniently measured using a sound level meter that includes an electrical filter corresponding to the A-weighting curve.

Although the A-weighted noise level may adequately indicate the level of environmental noise at any instant in time, community noise levels vary continuously. Most environmental noise includes a conglomeration of noise from distant sources which create a relatively steady background noise, often called ambient noise, in which no particular source is identifiable. To describe the time-varying character of environmental noise, the statistical noise descriptors,  $L_{10}$ ,  $L_{50}$ , and  $L_{90}$ , are commonly used. They are the A-weighted noise levels equaled or exceeded during 10 percent, 50 percent, and 90 percent of a stated time period. A single number descriptor called the  $L_{eq}$  is now also widely used. The  $L_{eq}$  is the average A-weighted noise level during a stated period of time.

In determining the daily level of environmental noise, it is important to account for the difference in response of people to daytime and nighttime noises. During the nighttime, exterior background noises are generally lower than the daytime levels. However, most household noise also decreases at night and exterior noise becomes very noticeable. Further, sensitivity to noise increases when people sleep at night. To account for human sensitivity to nighttime noise levels, a descriptor, the  $L_{dn}$  (day/night average sound level) was developed. The  $L_{dn}$  divides the 24-hour day into the daytime of

7:00 AM to 10:00 PM and the nighttime of 10:00 PM to 7:00 AM. The nighttime noise level is weighted 10 dB higher than the daytime noise level.

**TABLE N-1  
DEFINITION OF ACOUSTICAL TERMS**

<b>Term</b>	<b>Definition</b>
Decibel (dB)	A unit describing the amplitude of sound, equal to 20 times the logarithm to the base 10 of the ratio of the pressure of the sound measured to the reference pressure, which is 20 micropascals (20 micronewtons per square meter).
Frequency (Hz)	The number of complete pressure fluctuations per second above and below the atmospheric pressure.
A-Weighed Sound Level (dBA)	The sound pressure level in decibels as measured on a sound level meter using the A-weighting filter network. The A-weighting filter de-emphasizes the very low and very high frequency components of the sound in a manner similar to the frequency response of the human ear and correlates well with subjective reactions to noise.
$L_{01}$ , $L_{10}$ , $L_{50}$ , $L_{90}$	The A-weighted noise levels that are exceeded by 1%, 10%, 50% and 90% of the time during the measurement period.
Equivalent Noise Level ( $L_{eq}$ )	The average A-weighted noise level during the measurement period.
$L_{dn}$	The average A-weighted noise level during a 24-hour day, obtained after addition of 10 decibels to levels measured in the night between 10:00 PM and 7:00 AM.
$L_{max}$ , $L_{min}$	The maximum and minimum A-weighted noise level during the measurement period.
Ambient Noise Level	The composite of noise from all sources near and far. The normal or existing level of environmental noise at a given location.
Intrusive	That noise which intrudes over and above the existing ambient noise at a given location. The relative intrusiveness of a sound depends upon its amplitude, duration, frequency, and time of occurrence and tonal or informational content as well as the prevailing ambient noise level.

## C. The Existing and Future Noise Environment

Fort Bragg experiences noise from autos and trucks on Highway One, Highway 20, local arterials, the railroad, and several industrial uses, including the Georgia-Pacific operations and the Baxman aggregate processing facility. Existing and year 2011 traffic noise ( $L_{dn}$ ) contour distances from major thoroughfares are shown on Tables N-2 and N-3.

**TABLE N-2  
EXISTING TRAFFIC NOISE ( $L_{dn}$ ) CONTOUR DISTANCES**

Roadway	Noise Level 50 ft. from Centerline ( $L_{dn}$ )	Contour Distances (in feet from Centerline)		
		70 $L_{dn}$	65 $L_{dn}$	60 $L_{dn}$
Hwy. One (Ocean View Drive to Hwy. 20)	72	65	140	305
Hwy One (Cypress St. to Ocean View Dr.)	73	75	165	350
Hwy. One (Chestnut St. to Cypress St.)	70	50	110	240
Hwy. One (Oak St. to Chestnut St.)	69	45	100	215
Hwy. One (Redwood Ave. to Oak St.)	69	45	95	205
Hwy. One (Laurel St. to Redwood Ave.)	69	40	90	190
Hwy. One (Pine St. to Laurel St.)	68	40	80	175
Hwy. One (Elm St. to Pine St.)	68	40	80	175
Hwy. One (Pudding Creek Rd. to Elm St.)	68	35	75	160
Franklin St. (South of Chestnut St.)	60	---	---	50
Franklin St. (Oak St. to Chestnut St.)	61	---	---	55
Franklin St. (Redwood Ave. to Oak St.)	60	---	---	50
Franklin St. (Laurel St. to Redwood Ave.)	60	---	---	50
Hwy. (at Hwy. One)	62	---	40	70
Ocean View Drive (East of Hwy. One)	60	---	---	50
Chestnut St.(East of Hwy. One)	59	---	---	45
Chestnut St.(East of Franklin St.)	58	---	---	35
Elm St. (West of Hwy. One)	61	---	---	60

Source: Illingworth & Rodkin, Inc., February, 2002

**TABLE N-3  
FUTURE (YEAR 2011) TRAFFIC NOISE (L<sub>dn</sub>) CONTOUR DISTANCES**

<b>Roadway</b>	<b>Noise Level 50 ft. from Centerline (L<sub>dn</sub>)</b>	<b>Contour Distances (in feet from Centerline)</b>		
		<b>70 L<sub>dn</sub></b>	<b>65 L<sub>dn</sub></b>	<b>60 L<sub>dn</sub></b>
Hwy. One (Ocean View Drive to Hwy. 20)	73	80	175	380
Hwy. One (Cypress St. to Ocean View Dr.)	74	100	205	450
Hwy. One (Chestnut St. to Cypress St.)	71	55	125	270
Hwy. One (Oak St. to Chestnut St.)	70	50	115	245
Hwy. One (Redwood Ave. to Oak St.)	70	50	105	225
Hwy. One (Laurel St. to Redwood Ave.)	69	45	90	205
Hwy. One (Pine St. to Laurel St.)	69	45	90	200
Hwy. One (Elm St. to Pine St.)	69	45	95	195
Hwy. One (Pudding Creek Rd. to Elm St.)	69	45	95	195
Franklin St. (South of Chestnut St.)	61	---	---	55
Franklin St. (Oak St. to Chestnut St.)	62	---	---	60
Franklin St. (Redwood Ave. to Oak St.)	60	---	---	55
Franklin St. (Laurel St. to Redwood Ave.)	60	---	---	50
Franklin St. (Pine St. to Laurel St.)	61	---	---	55
Hwy. 20 (at Hwy. One)	63	---	40	85
Ocean View Drive (East of Hwy. One)	61	---	---	55
Ocean View Drive (West of Hwy. One)	61	---	---	55
Chestnut St. (East of Hwy. One)	60	---	---	50
Chestnut St. (East of Franklin St.)	61	---	---	60
Oak St. (East of Hwy. One)	61	---	---	60
Oak St. (East of Franklin St.)	60	---	---	50
Redwood Ave. (West of Hwy. One)	64	---	45	100
Laurel St. (West of Hwy. One)	61	---	---	55
Elm St. (West of Hwy. One)	64	---	45	95

Source: Illingworth & Rodkin, Inc., February, 2002

Noise from traffic on local roadways, distant industrial activities, and neighborhood activities are the most significant sources of community noise in the majority of the City.

Noise from industrial uses was audible during the evening and nighttime hours at most noise sites that were monitored. Background noise levels in the areas of Fort Bragg which generally contain noise sensitive land uses would be considered to be moderately quiet and compatible with the City's noise exposure standards.




The principal areas that are affected by excessive noise are along both sides on Highway One throughout the City (ranging from 160-350 feet on either side of the highway) and along Franklin Street and several east-west arterials (ranging from 35-70 feet from the road edge). See the Draft EIR for a more detailed discussion of the existing and projected noise environment in the City.

## D. Noise and Land Use Compatibility Standards

The standards listed in Table N-4 shall be used to evaluate the compatibility between land uses and future noise in Fort Bragg.

**TABLE N-4  
NOISE AND LAND USE COMPATIBILITY STANDARDS**

Land Use Category	Exterior Noise Exposure L <sub>dn</sub> dB					
	55	60	65	70	75	80
Residential, Hotels and Motels		Conditionally Acceptable	Conditionally Acceptable	Conditionally Acceptable	Conditionally Acceptable	Unacceptable
Outdoor Sports and Recreation, Neighborhood Parks and Playgrounds			Conditionally Acceptable	Conditionally Acceptable	Conditionally Acceptable	Unacceptable
"Noise Sensitive" - Schools, Libraries, Museums, Hospitals, Personal Care, Meeting Halls, Churches		Conditionally Acceptable	Conditionally Acceptable	Conditionally Acceptable	Conditionally Acceptable	Unacceptable
Office Buildings, Business Commercial and Professional				Conditionally Acceptable	Conditionally Acceptable	Unacceptable
Auditoriums, Concert Halls, Amphitheaters	Conditionally Acceptable	Conditionally Acceptable	Conditionally Acceptable	Conditionally Acceptable	Conditionally Acceptable	Unacceptable

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**Normally Acceptable**  
 Specified land use is satisfactory, based upon the assumption that any buildings involved are of normal, conventional construction, without any special insulation requirements.
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**Conditionally Acceptable**  
 Specified land use may be permitted only after a detailed analysis of the noise reduction requirements and needed noise insulation features included in the design.
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**Unacceptable**  
 New construction or development should generally not be undertaken because mitigation is usually not feasible to comply with noise element policies.

Source: Illingworth & Rodkin, Inc., March, 2002

## **E. Explanation of Table N-4: Land Use Compatibility for Community Noise**

### **1. Noise Source Characteristics**

Table N-4 shows the ranges of exterior noise exposure which are considered acceptable, conditionally acceptable, or unacceptable for the specified land use. Table N-4 is used to determine whether the noise exposure requires mitigation in order to achieve a compatible noise environment.

Where the noise exposure is acceptable for the intended land use, new development may occur without requiring an evaluation of the noise environment.

Where the noise exposure would be conditionally acceptable, a specified land use may be permitted only after a detailed analysis is made of the noise impacts, and the needed noise insulation features are included in the design to protect people from exposure to excessive noise. Such noise insulation features may include measures to protect noise sensitive outdoor activity areas (e.g. at residences, schools, or parks) or may include building sound insulation treatments such as sound-rated windows to protect interior spaces in residences, schools, hospitals, or other buildings which are sensitive to noise. Noise reduction measures should be focused on reducing noise where it would have an adverse effect for the specified land use, outdoors and/or indoors depending upon the land use.

For areas where the existing noise environment is unacceptable, new development should generally not be undertaken, because there may not be sufficient noise reduction measures to bring the development into compliance with the noise policies of this Element.

Sensitive receptors are land uses which are sensitive to noise such as hospitals, convalescent homes, schools, and libraries.

### **2. Acceptable Noise Environments**

Another consideration, which in some communities is an overriding factor, is the desire for an acceptable outdoor noise environment. When this is the case, more restrictive standards for land use compatibility, typically below the maximum considered normally acceptable for that land use category, may be appropriate.

The following are the Noise and Land Use Compatibility Standards for noise exposure:

1. The standard for maximum outdoor noise level permitted in residential areas is a  $L_{dn}$  of 60 dB. This standard is applied where outdoor use is a major consideration, such as backyards in single-family housing developments and recreation areas in multi-family developments. This standard should not be applied to outdoor areas such as small decks and balconies typically associated with multi-family residential developments, which can have a higher exposure of 65 dB  $L_{dn}$ .
2. The maximum acceptable interior noise level in new multi-family residential development required by the State of California Noise Insulation Standards is a  $L_{dn}$  of 45 dB. This standard is also applied to single-family and all other residential development.
3. For projects occurring within noise environments that are conditionally acceptable, studies must be conducted to show how noise levels will be reduced in the areas that people use (which is generally the interior of offices, stores, industrial buildings, auditoriums, etc.). For

non-residential projects, no maximum outdoor standard is established other than the exterior environment cannot exceed the lower limit of the unacceptable range, since noise mitigation is not feasible at these noise exposure levels. Building construction will incorporate noise reduction measures recommended by an acoustic engineer to reduce interior noise levels to an acceptable level. For non-residential projects, the interior noise level is what is important. The conditionally acceptable noise levels indicate that interior noise levels can be reduced to an acceptable level given noise reduction implementation. Non-residential projects may be allowed even if the exterior noise environment is within the conditionally acceptable range. No standards are established for industrial uses since the exterior noise environment is not important for such uses.

### **Map N-1, Sensitive Noise Receptors**

4. Sensitive receptors are land uses that are sensitive to noise such as hospitals, convalescent homes, schools, and libraries. Exterior noise levels for these types of uses where the uses include outdoor use locations (e.g., such as schools) should not exceed those allowed as normally acceptable in Table N-4. For those uses where the use areas are within buildings (e.g., hospitals, halls, and churches), interior noise levels should be reduced as described under No. 3 above, but projects can be permitted with exterior noise levels within the conditionally acceptable range. Map N-1: Noise Sensitive Receptors shows the location of some noise sensitive uses in the City.
5. These standards are not intended to be applied reciprocally. In other words, if an area is currently below the desired noise standard, a project that causes an increase in noise up to the maximum should not necessarily be permitted. The impact of a proposed project on existing land use should be evaluated in terms of the potential for adverse community response, based on existing community noise levels, regardless of the compatibility standards.
6. The Noise and Land Use Compatibility Standards should be reviewed in relation to the specific source of noise. These standards are based on measurement systems which average noise over a 24-hour period and do not take into account single-event noise sources. Different noise sources yielding the same composite noise exposure do not necessarily create the same environment. Additional standards may be applied on a case-by-case basis where supported by acoustical analysis to assess the effects of single-event noise sources.

## **F. Goals, Policies and Programs**

**Goal N-1      Protect City residents from harmful and annoying effects of exposure to excessive noise.**

Policy N-1.1    General Noise Levels: The maximum allowable noise levels are established in this Element.

Policy N-1.2    Reduce Noise Impacts: Avoid or reduce noise impacts first through site planning and project design. Barriers and structural changes may be used as mitigation techniques only when planning and design prove insufficient.

Program N-1.2.1: Adopt and use a Noise Ordinance in environmental review of all development proposals and incorporate project design measures to reduce noise to allowable limits. The Noise Ordinance should include the noise standards described in this Element as

well as consider other noise concerns, including but not limited to, allowable hours for grading and construction, allowable noise levels for electronic sound devices (e.g., radios, stereos, etc.), time restrictions on the use of mechanical devices (e.g., leafblowers and other power equipment), and requirements for the placement of fixed equipment (e.g., air conditioners and condensers).

Program N-1.2.2: Consider requiring an acoustical study and mitigation measures for projects that would cause a “substantial increase” in noise as defined by the following criteria or would generate unusual noise which could cause significant adverse community response:

- a) cause the  $L_{dn}$  in existing residential areas to increase by 3 dB or more;
- b) cause the  $L_{dn}$  in existing residential areas to increase by 2 dB or more if the  $L_{dn}$  would exceed 70 dB; or
- c) cause the  $L_{dn}$  resulting exclusively from project-generated traffic to exceed an  $L_{dn}$  of 60 dB at any existing residence.

Program N-1.2.3: Consider requiring an acoustical study and mitigation measures for proposed projects that City staff finds may generate unusual noise that would cause significant adverse community response, such as, but not limited to, night-time, single-event noise or recurring impulse noise.

Policy N-1.3 Noise and Land Use Compatibility Standards: Ensure that all new noise sensitive development proposals be reviewed with respect to Table N-4: Noise and Land Use Compatibility Standards. Noise exposure shall be determined through actual on-site noise measurements.

Policy N-1.4 Residential and Noise Sensitive Land Use Standards: Require a standard of 45  $L_{dn}$  for indoor noise level for all new residential development including hotels and motels, and a standard of 60  $L_{dn}$  for outdoor noise at residences. These limits shall be reduced by 5 dB for senior housing and residential care facilities.

Program N-1.4.1: Use the standards in Policy N-1.2.2 to determine the need for noise studies and require new developments to provide noise attenuation features as a condition of approving new projects.

Program N-1.4.2: Require an acoustical study for all new residential projects with a future  $L_{dn}$  noise exposure of 60  $L_{dn}$  or greater. The study shall describe how the project will comply with the Noise and Land Use Compatibility Standards. The studies shall also satisfy the requirements set forth in Title 24, part 2 of the California Code of Regulations, Noise Insulation Standards, for multi-family attached dwellings, hotels, motels, etc. regulated by Title 24.

Policy N-1.5 Non-Transportation Noise Generation: For new non-transportation noise generators, Table N-5 describes the maximum noise level at the nearest residential property line:

**TABLE N-5  
NOISE LEVEL PERFORMANCE STANDARDS FOR NEW PROJECTS AFFECTED BY OR INCLUDING  
NON-TRANSPORTATION NOISE SOURCES**

Noise Level Descriptor	Daytime (7 A.M. to 10 P.M.)	Nighttime (10 P.M. to 7 A.M.)
Hourly Leq dB	55	45
Maximum level, dB	75	65

Note: These noise levels apply to the residential property line nearest the project. Each of the noise levels shall be lowered by five dB for simple tone noises, noises consisting primarily of speech or music, or for recurring impulsive noises. These noise level standards do not apply to residential units established in conjunction with industrial or commercial uses (e.g., caretaker dwellings).

Policy N-1.6 Mitigate Noise Impacts: Mitigate noise impacts to the maximum feasible extent.

Program N-1.6.1: Require acoustical studies and noise reduction measures, when warranted, for new developments and roadway improvements which affect noise sensitive uses such as residences, schools, hospitals, libraries, and convalescent homes.

Program N-1.6.2: Require acoustical studies and noise reduction measures for any project that would potentially generate non-transportation noise levels in a residential area such that noise levels would exceed the planning standards set forth in Program N-1.2.2 and/or Table N-5.

Program N-1.6.3: Work with Caltrans to ensure that adequate noise studies are prepared and alternative noise mitigation measures are considered when State and Federal funds are available.

Program N-1.6.4: Consider and carefully evaluate the noise impacts of all street, highway, and other transportation projects.

Program N-1.6.5: Recommend acoustical studies and noise reduction measures for all projects that would be exposed to noise levels in excess of those deemed normally acceptable, as defined in Table N-4.

Program N-1.6.6: Consider developing an ordinance that regulates the allowable hours of construction activities.

Program N-1.6.7: Consider requiring post-construction testing and sign-off by an acoustical engineer for residential projects exposed to an  $L_{dn}$  in excess of 65 dB to ensure compliance with applicable exterior and interior standards in the Noise and Land Use Compatibility Standards.

Program N-1.6.8: Restrict truck traffic to designated routes.