

NOISE ELEMENT

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PURPOSE

The Noise Element is intended to help coordinate the community's various land uses with the existing and future noise environment, and to ensure that any negative effects of noise are minimized or avoided. It is the intent of this element to identify current noise problems within the planning area and to determine future noise impacts resulting from continued growth. As development continues, the City will review proposals to ensure that noise impacts are mitigated through land use planning and project design. Through the implementation of the policies and programs of this element, any current and future adverse noise impacts can be greatly reduced or avoided entirely, and the general health, safety and welfare of the community can be protected from significant noise impacts.

BACKGROUND

The Noise Element is directly related to the Land Use and Circulation Elements. The location of sensitive land uses, including housing, schools and medical facilities, is affected by issues addressed in the Noise Element. This element also has a direct relationship to the economic development policies in the Land Use Element, with the City's peaceful and quiet atmosphere a major community asset. Low noise levels are a basic element of the resort residential environment, with existing community noise being dominated by highway and local traffic, intermittent aircraft flyovers, and commercial operations and heating/ventilation equipment. In general, however, the residential neighborhoods of the community are quiet, with average noise levels typical of quiet rural areas. Occasional high noise levels from general and commercial aviation have a limited but intrusive impact on the community's noise environment.

The issues addressed in the Noise Element include those set forth in subsection (f) of the California Government Code Section 65302, which requires that the Noise Element identify and analyze noise problems in the community. The California Department of Health Services has prepared a Model Noise Element to assist local agencies in the development of guidelines to control and abate noise. The California Environmental Quality Act (CEQA), Section 21083.1, mandates adherence to the State Guidelines and empowers communities to determine whether or not a proposed project may have a "significant effect on the environment" with respect to noise. These significant impacts may range from excessive traffic noise in a residential neighborhood, to industrial manufacturing noise impacts on a hospital or convalescent home or other sensitive use.

Concern regarding the potential psychological and physiological impacts of noise has increased significantly in recent years. Excessive noise levels are not only a potential annoyance but can constitute a significant health threat resulting in temporary or permanent hearing loss and mental distress. The noise environment can also have a profound influence on the quality of life enjoyed by residents and visitors.

Community Noise Equivalent Level (CNEL) & Decibel Weighted Level (dba)

Noise is defined as unwanted or undesired sound. Airborne sound is the result of a very rapid change in air pressure from the surrounding "normal" atmospheric pressure. The combination of noise from all sources near and far is the Ambient Noise Level. For purposes of this discussion, the ambient noise level at a given location is termed "environmental noise".

Understanding environmental noise requires some familiarity with the physical description of noise. The important physical characteristics of sound include its frequency range, intensity/loudness and temporal/time-varying aspect. The decibel, (db), A-weighted level (dba), and Community Noise Equivalency Level (CNEL) are all units of measurement used to describe and numerically weight noise, and are defined below.

The decibel is a unit of measurement describing the amplitude or strength of sound. The Community Noise Equivalent Level (CNEL) is the weighted average of the intensity of sound, with corrections for time of day, and averaged over 24 hours. The time of day corrections require the addition of five decibels to sound levels in the evening from 7 p.m. to 10 p.m., and the addition of 10 decibels to sound levels at night between 10 p.m. and 7 a.m. These additions are made during these time periods because during the evening and night hours, with the decrease in overall amount and loudness of noise generated, when compared to daytime hours, there is an increased sensitivity to sounds. For this reason sounds seem louder and are weighted accordingly. Essentially, during these evening and night hours the maximum tolerable noise level should be 5 to 10 dba lower and the CNEL number is weighted to assure this bias.

A second measurement technique is a Maximum Decibel Weighted Level (dba) over a specific period of time, usually an hour. This measurement may be more appropriate to apply to some types of noise generators within the City of Big Bear Lake, as different times of day and uses represent differing noise environments. The City should protect its tranquil setting, with consideration to the community's varied activities.

Ranges and Effects of Noise

The most common sounds vary between 40 dB (very quiet) and 100 dB (very loud). Normal conversation at three feet is roughly at 60 dB, while loud engine noise equate to 110 dB, which can cause serious discomfort. Due to the logarithmic nature of the sound measuring (decibel) scale, doubling the sound energy of a noise source only increases the decibel rating by 3 dB. However, due to the internal mechanism of the human ear and how it receives and processes noise, a sound must be nearly 10 dB higher than another sound to be judged twice as loud. Physical health, psychological well-being, social cohesion, property values and economic productivity can all be affected by excessive amount of noise.

The effects of noise on people can be grouped into three categories: subjective effects, such as annoyance and nuisance, interference with activities such as conversation and sleep, and physiological effects, for example, a startle or hearing loss. Adverse reactions to noise generally

increase with an increase in the difference between background or ambient noise and the noise generated from a particularly intrusive source such as a barking dog, traffic, aircraft or industrial operations. In most situations, noise control measures must reduce noise by 5 to 10 dBA in order to effectively lower the perceived sound. Therefore, loud, short duration noises from barking dogs and low-flying aircraft generally have little impact upon the CNEL levels of an area, due to the averaging techniques utilized to define CNEL.

EXISTING COMMUNITY NOISE ENVIRONMENT

In the City of Big Bear Lake, the primary source of noise is motor vehicle traffic, primarily along the Highway 18 - Big Bear Boulevard corridor. To a lesser but occasionally substantial degree, boats and other watercraft using the lake are a source of disruptive noise, and aircraft traffic also contributes an intrusive element to the noise environment. Other sources of community noise include mechanical equipment serving commercial land uses, resorts and major institutions, i. e., snowmaking machines. In addition, with the growing number of commercial entertainment venues, noise from amplified music and entertainment has become a concern to adjacent lodge owners and residential neighborhoods, particularly in the areas near the Lake where sound carries for long distances.

Motor Vehicle Noise (Landcraft)

The principal noise source measured (1997) within the community is vehicular traffic, including automobiles, trucks, buses, and motorcycles. The level of noise generated by vehicular traffic generally varies according to the volume of traffic, the percentage of trucks, and average traffic and other sources at several locations in the community on local noise environments. Table N-4 presents projected noise contours along arterial corridors at current traffic levels and at General Plan buildout.

Motor Vehicle Noise (Water craft)

The results of the 1997 noise survey conducted by Hersh Acoustical Engineering, Inc. have shown that along the lake shore, ambient noise readings can reach as high as 56 dB and this level is not uncommon during the water craft season. Noise levels from aircraft flying over the lake are generally higher than noise generated from water craft; however, boats with modified engines can significantly increase the noise level.

While noise stemming from the lake can be heard throughout the community, the noise levels adjacent to the lake are infrequently above the level considered compatible with residential uses. Most of the area adjacent to the lake is planned and zoned for residential uses, with the exception of several marinas and resorts.

Aircraft Noise

The Big Bear Lake Airport contributes intermittent aircraft noise to the noise environment. The overall level of air traffic, which is predominantly day time operations by single engine propeller aircraft, results in noise levels upwards of the 70 dB range primarily due to individual aircraft flying over the lake. This type of single event noise impact is difficult to mitigate with land use policies; however, noise attenuation measures can be taken in construction of sensitive uses, such as single family residential, to maintain acceptable interior noise levels.

Mechanical and Industrial Noise

In addition to noise generated by vehicular traffic and aircraft, there are other noise generators within the City which could create noise-related compatibility issues with adjacent sensitive uses. Industrial operations, construction, and use and repair of motorized equipment can create noise problems. Loading and materials transfer areas, outdoor materials warehousing operations and other acoustically unscreened operations will also contribute to issues of land use compatibility.

Another source of noise within the planning area comes from the operation of mechanical equipment, such as snowmaking equipment during the ski season and refrigerator units and heating/air conditioner equipment associated with commercial centers. Noise from roof-mounted equipment can penetrate into adjoining neighborhoods and impact sensitive receptors. The constant hum associated with fans and compressors can impact the enjoyment of the outdoors and adversely affect the resort residential quality of life. These impacts can be mitigated through the development review process by addressing equipment design and noise attenuation techniques. While some types of equipment noise associated with the area's recreation-based economy may be inevitable, such as snowmaking machines, these noise sources should be required to mitigate noise to the extent feasible by using the best available technology.

NOISE AND LAND USE COMPATIBILITY

Based upon the State's Model Noise Element, a CNEL of 65 dBA is used as a standard for maximum outdoor noise levels in residential areas and CNEL of 60 dBA is used as a standard for maximum outdoor noise levels in natural and manmade recreational outdoor environs. As discussed below, a variety of design and construction techniques are available to substantially reduce noise impacts. The compatibility of different land uses with adjacent land uses and surrounding environs is directly related to the user's sensitivity to noise and the potential for impacts to be mitigated.

Noise-sensitive land uses include residences, schools, libraries, churches, hospitals and other medical facilities. Sensitive natural and manmade environs include parks, lakes, canyons, streams, creeks, trails and other areas of outdoor activity. Uses less sensitive to excessive noise disturbances include commercial and light industrial uses, conventional hotels and motels, children's play areas, playgrounds, neighborhood ballparks, and other outdoor spectator sport arenas. Uses least sensitive to noise disturbances are heavy commercial and industrial uses, transportation, communication and





utility land uses. Table N-1 illustrates the ranges of recommended exterior noise levels for various land uses.

**TABLE N - 1
COMMUNITY NOISE AND LAND USE COMPATIBILITY**

LAND USES	CNEL (dBA)						
	50	55	60	65	70	75	80
Residential Land Uses: Single & Multi-Family Dwellings, Group Quarters, Mobile Homes	A	B	C	D			
Transient Lodging: Hotels & Motels	A				C	D	
School Classrooms, Libraries, Churches, Hospitals, Nursing Homes & Convalescent Hospitals	A	B	C	D			
Recreation Land Uses: Golf Courses, Open Spaces (with walking, bicycling or horseback riding trails, etc.)	A	B	C	D			
Office Building, Personal Business, and Professional Services	A		B		C	D	
Commercial Land Uses: Retail Trade, Movie Theaters, Restaurants, Bars, Entertainment Activities, Services	A	B			C	D	
Heavy Commercial/Industrial: Wholesale, Manufacturing, Utilities, Transportation, Communications	A				C	D	
Auditoriums, Concert Halls, Amphitheaters, Music Shells (may be sensitive receptors or generators)	B			D			
Sports Arenas, Outdoor Spectacular Sports	B			D			

Source: Federal Highway Program Manual Vol. 7, Ch. 7, Sec. 3, 1982

- Explanatory Notes -

-  Normally Acceptable: With no special noise reduction requirements assuming standard construction.
-  Conditionally Acceptable: New construction or development should be undertaken only after a detailed analysis of the noise reduction requirement is made and needed noise insulation features included in the design.
-  Generally Unacceptable: New construction is discouraged. If new construction does proceed, a detailed analysis of noise reduction requirements must be made and needed noise insulation features included in the design.
-  Land Use Discouraged: New construction or development should generally not be undertaken.

NOISE MEASUREMENTS AND COMPUTER MODELING: EXISTING AND PROJECTED FUTURE NOISE LEVELS

In order to understand and evaluate the impacts of land use patterns, traffic and individual developments on the noise environment within the planning area, a variety of data has been collected, sites have been monitored and existing and future impacts have been modeled. Existing conditions have been specifically monitored and assessed at various areas of special focus or concern, including in the vicinity of schools, residential neighborhoods, commercial areas and along major arterial roadways. Table N-4 shows existing and projected General Plan buildout conditions at specific locations and along major roadway segments.

Most transportation noise is highly predictable if specific data concerning operating characteristics are available. Computer models and simulations are used to compute the noise environment along transportation routes based upon the vehicles' operating characteristics and the number of vehicles utilizing that particular transportation route. These predictions, provided by existing quantitative models, have been verified by sound measurements at strategic and sensitive receptor locations in the planning area. The noise monitoring section identifies the noise monitor site locations.

General Plan Monitoring Sites

Measurements were taken at seven selected locations to address land use compatibility issues with respect to the General Plan. Sites included major transportation corridors, land use transition areas, lake shore and other sensitive receptors and residential neighborhoods. Monitoring was conducted during the day and nighttime hours in September 1997. Each measurement converted fifteen minute samples and was comprised of 900 individual samples. Each of the sites monitored is briefly described below.

Site 1

Vacant lot on the southerly side of Big Bear Boulevard, 50 feet from the centerline of the street, approximately 100 feet westerly of the intersection with Lark Trail. Ambient (average) noise levels at this location were in the 61 to 66 dB range and were due to automobile and truck traffic on Big Bear Boulevard. Intrusive noise levels were in the 73 to 76 dB range and were due to large engine individual vehicles passing by the measurement location. The nighttime background noise level was below 35 dB and minimum noise levels were 30 dB or lower during lulls between vehicles.

Site 2

Approximately 50 feet from the lake shore at the northerly end of Fisher Drive. Ambient noise levels were in the 49 to 56 dB range and were due to aircraft overflights and boating activities on the lake. Intrusive noise levels were in the 58 to 70 dB range and were due to individual aircraft overflights and occasional autos passing close to the measurement location. The nighttime background noise levels were in the 41 to 43 dB range.

Site 3

Front lawn of the Big Bear Elementary School, 50 feet from the center of Village Drive. Ambient noise was approximately 60 dB. Intrusive noise was approximately 75 dB and was due to several heavy trucks turning onto Knickerbocker Road from Village Drive.

Site 4

Front Lawn of Big Bear Middle School, approximately 50 feet from the center of Big Bear Boulevard. Ambient noise was approximately 70 dB and was due to automobile and truck traffic on Big Bear Boulevard. Intrusive noise levels exceeded 76 dB and were due to individual vehicles passing by the measurement location. Background noise was approximately 60 dB during periods when traffic was stopped by the signal at Georgia Street.

Site 5

Approximately 10 feet from the lake shore in Meadow Park, westerly of the swim lagoon. Ambient noise levels were in the 46 to 58 dB range and were due to aircraft overflights, boating activities on the lake and patrons in the park. Intrusive noise levels were in the 59 to 68 dB range and were due to individual aircraft overflights. Nighttime background noise levels were in the 40 to 53 dB range.

Site 6

Front lawn of Big Bear Community Hospital, approximately 30 feet from the center of Garstin Drive. Ambient noise levels were in the 55 to 60 dB range were due to sporadic traffic on Garstin Drive in front of the measurement site. Intrusive noise was in the 67 to 71 dB range and was due to individual vehicles passing by the measurement location. Nighttime background noise levels were in the 39 to 45 dB range.

Site 7

Parking area on the northerly side of Big Bear Boulevard, 50 feet from the centerline of the street, westerly of the end of the boardwalk. Ambient noise levels were in the 68 to 69 dB range due to traffic on Big Bear Boulevard. Intrusive noise levels were approximately 74 dB due to individual vehicles passing the measurement position. Nighttime background noise levels were in the 53 to 58 dB range.

General Plan Buildout Noise Environment

Future noise impacts to the community are expected to be primarily generated by increasing traffic volumes. From the Circulation Element, we can extract the future volumes projected on major roadways. In order to make the projected traffic noise data more accurate, the average posted speed limits and a percentage mix of light and heavy truck traffic along the roadways are included in the modeling data. This information was supplied through City and SANBAG traffic counts, counts prepared for intersection improvement analyses, and for General Plan traffic modeling. Computer modeling was used to estimate noise impacts due to the increased traffic volumes.

**Table N-2
1997 and General Plan Buildout
Projected Noise Contours on Major Roadways
(Distance to CNEL Contours in Feet from Centerline)**

Roadway Segment	Current Traffic (measured in dB)				General Plan Buildout (measured in dB)			
	60	65	70	75	60	65	70	75
Big Bear Blvd./Cienega to Edgemoor	431	186	73	26	651	298	127	53
Big Bear Blvd./Edgemoor to Lakeview	534	237	93	36	698	330	134	37
Big Bear Blvd./Lakeview to Village	606	268	108	41	721	340	142	59
Paine Rd./Village to Lakeview	528	234	92	34	664	314	128	55
Lakeview Dr./Big Bear to Pine Knot	528	226	92	34	645	295	122	51
Big Bear Blvd./Pine Knot to Summit	565	252	102	45	728	354	148	61
Big Bear Blvd./Summit to Moonridge	616	274	114	49	795	385	159	68
Big Bear Blvd./Moonridge to Stanfield	559	250	102	45	760	369	153	64
SR-18/Stanfield to Division	527	234	92	34	658	311	127	53
Village Dr./Big Bear to Pine Knot	88	33	--	--	133	54	--	--
Pine Knot/Big Bear to Village	131	51	--	--	175	70	28	--
Summit Blvd./Brownie to Evergreen	25	--	--	--	59	--	--	--
Moonridge Rd./Big Bear to Sunset	151	62	--	--	201	85	--	--
Moonridge Rd./south of Sunset	131	51	--	--	171	67	24	--
Fox Farm Rd./Big Bear to Starvation Flats	--	--	--	--	34	--	--	--
Fox Farm Rd./Starvation Flats to Division City of Big Bear Lake General Plan	--	--	--	--	--	--	--	--
Stanfield Cutoff/North Shore to Big Bear	47	--	--	--	272	110	44	--

It is important to note that special attention to project-specific site design may substantially reduce noise impacts below projected levels, and therefore, these estimates are considered to be conservative and unmitigated. A wide range of design criteria affecting roadway engineering and traffic noise abatement include differences in final grade between the roadbed and the top of walls, spacing of intersections, parkway widths and land configuration. Table N-2 lists the current and projected General Plan buildout noise contours along the City's major roadways.

MANAGING THE NOISE ENVIRONMENT

There are a variety of strategies available for managing the City's noise environment and preserving those qualities of peace and quiet that are essential in maintaining a high quality of life. Land use planning, transportation planning, project design mitigation, construction materials and techniques, and acoustical barriers are available strategies to mitigate noise impacts.

In areas subject to potentially significant noise impacts, site planning and design standards can be used to reduce noise impacts. Applied mitigation measures may include but not be limited to the use of buffer zones containing earthen berms, walls and landscaping between sensitive land uses and roadways or other noise sources. In addition, site planning and building orientation can provide shielding of outdoor living spaces, and windows may be oriented away from noise sources. Acoustical materials can also be incorporated into building windows and walls to attenuate outdoor noise to acceptable indoor levels.

FUTURE DIRECTIONS

Generally, the City of Big Bear Lake enjoys a relatively quiet environment consistent with its character as a resort residential community. However, the noise environment within the planning area is impacted by highway and major roadway noise sources. Future efforts to mitigate noise impacts should focus on preserving the peaceful and quiet atmosphere which residents and visitors to the community now enjoy.

Existing and future noise abatement and mitigation will have varying levels of effectiveness, depending upon the noise type and its source, site conditions, geography and land uses. Noise issues have been carefully considered in the development of the Land Use Element and land use distributions. Zoning designations provide another level of land use control, which assure appropriate uses near significant noise sources, and development standards and guidelines will reduce impacts and enhance compatibility of uses. The Circulation Element has also been designed, where possible, to protect the City's residential areas from excessive traffic noise and to assure compatible noise levels.

**NOISE
GOALS, POLICIES AND PROGRAMS**

GOAL N 1

Protection of the community from excessive noise levels and maintenance of a low-level noise environment complementary to and consistent with the City's role as a resort and vacation destination and high quality residential environment.

Policy N 1.1

Utilize appropriate land use and transportation planning to achieve noise compatibility between adjacent land uses and noise sources.

Program N 1.1.1

On the land use and zoning maps, designate noise-sensitive uses in areas away from noise generators, and locate noise-compatible uses near existing and future air and highway transportation noise sources, to the extent feasible.

Responsible Agency: Planning Division, Planning Commission, City Council

Schedule: 1998 and ongoing

Program N 1.1.2

Designate primary truck routes and clearly mark those routes through the City; these routes should be limited to Highway 18 and major arterials.

Responsible Agency: Planning and Public Works Divisions, with City Council approval

Schedule: Ongoing

Program N 1.1.3

In planning for circulation, design a road network which routes the majority of through traffic along arterial roads and the highway, and preserves the residential character of neighborhoods by routing traffic around these areas.

Responsible Agency: Planning Division, Planning Commission, City Council

Schedule: 1998 and ongoing

Program N 1.1.4

Protect from intrusion of new noise sources those areas which have value to the community because of their scenic beauty, resource conservation, viewshed, residential character, or other amenity considered to be important to the City.

Responsible Agency: Planning Division through the development review process, and reviewing authority.

Schedule: Ongoing

Policy N 1.2

Ensure that existing and potential noise impacts are identified and mitigated to non-significant levels through environmental review and assure compliance with mitigation measures for new development projects.

Program N 1.2.1

Review new land use proposals with respect to potential noise impacts pursuant to the California Environmental Quality Act.

Responsible Agency: Planning Division and reviewing authority

Schedule: Ongoing

Program N 1.2.2

Monitor noise sources within the community, including Big Bear Airport; revise land use plans and noise standards as needed to ensure that noise impacts are mitigated, and coordinate with Big Bear Airport and the FAA to establish and update policies for reduction of noise impacts to the community.

Responsible Agency: Planning Division

Schedule: Ongoing

Program N 1.2.3

Require that interior noise levels for residential development do not exceed 45 CNEL, and require additional noise attenuation measures on individual projects as needed which may include but are not limited to double-paned windows, insulation, sound walls, berms, window placement and building orientation.

Responsible Agency: Planning and Building and Safety Divisions, and reviewing authority

Schedule: Ongoing

Program N 1.2.4

For projects on which additional acoustical analysis is required prior to approval, provide an outline of the minimum requirements for noise studies, including an analysis of project impacts and proposed mitigation measures, and analysis of the effectiveness of the proposed mitigation.

Responsible Agency: Planning Division

Schedule: Ongoing

Program N 1.2.5

Regulate production of noise within the City by adopting and enforcing a Noise Ordinance, which may include but not be limited to the following issues:

- A. Noise levels and hours of operation for sound from entertainment venues, outdoor stadiums, special events, amphitheaters, stages, pavilions, tents, or other outdoor activities which have the potential for creation of noise above the normal ambient level;
- B. Noise levels for equipment or machinery where it has the potential to adversely impact adjacent noise-sensitive uses;

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- C. Regulations for location and operation of construction staging areas, which should be located away from adjacent sensitive uses, with construction activities limited to the hours of 7:00 a.m. to 7:00 p.m.;
- D. Noise regulations for various activities may vary based upon time of day, and may be based upon a one-hour noise level rather than the 24-hour community noise equivalency level; and
- E. Audible alarms on houses and vehicles, addressing duration and decibel level.

Responsible Agency: Planning Division for ordinance preparation; Planning Commission and City Council for ordinance adoption; Code Compliance Division for implementation.

Schedule: Adoption FY 1999-2000; implementation ongoing

Policy N 1.3

Coordinate with other agencies having jurisdiction over noise sources which impact the City, to seek cooperation on reasonable mitigation of these impacts.

Program N 1.3.1

Coordinate with Big Bear Airport District to seek cooperation on flight controls to mitigate noise impacts on sensitive uses within the overflight area.

Responsible Agency: Planning Division, Code Compliance Division

Schedule: Ongoing

Program N 1.3.2

Coordinate with the Municipal Water District to seek cooperation on water craft controls to mitigate noise impacts on sensitive uses around Big Bear Lake.

Responsible Agency: Planning Division, Code Compliance Division

Program N 1.3.3

Coordinate with owners of mountain resorts to encourage the use of best available technology for use of snowmaking equipment in order to mitigate noise impacts to the community.

Responsible Agency: Planning Division, Code Compliance Division

Schedule: Ongoing