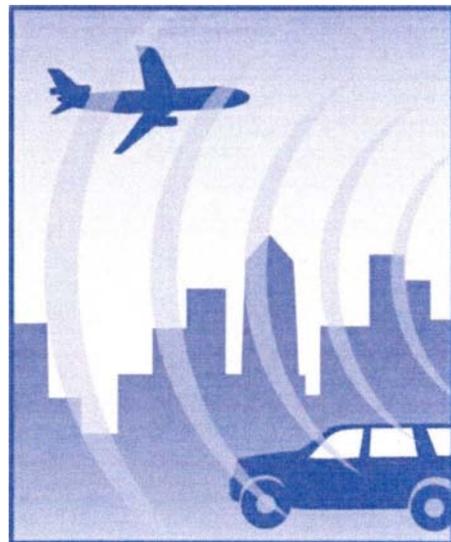




Noise Element





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6.0 NOISE ELEMENT

6.1 INTRODUCTION

The Noise Element of the General Plan is the basis for achieving and maintaining environmental noise control. It includes the following components:

- An overview of noise terminology
- A description of the potential effects of noise on humans
- Existing and future noise conditions in the City
- Goals, objectives, and policies designed to minimize existing and future noise impacts

The Noise Element is intended to be used as a guide in decision-making for both public and private developments where noise may be a concern and to provide adequate mitigation measures for noise-related impacts to existing and planned land uses.

6.1.1 Purpose and Function

The State of California mandates under Government Code Section 65302(f), that a General Plan contain a Noise Element that “identifies and appraises noise problems in the community”. The Government Code states that the ultimate purpose of the goals and policies established under the Noise Element is to “minimize the exposure of community residents to excessive noise”. The Element is required to recognize and evaluate noise issues under the guidelines of the Office of Noise Control of the California Department of Health Services. The Element must quantify, to the extent practical, current and future noise levels from the following sources:



- Highways and freeways
- Primary arterials and major local streets
- Rail operations and ground transit systems
- Airport operations, aircraft over flights, and all ground maintenance and other activities associated with airports
- Local industrial developments including rail classification yards
- Other stationary ground sources identified as contributing to the noise environment of the community



6.1.2 Related Plans and Programs

Grand Terrace Municipal Code

The Grand Terrace Municipal Code establishes the city's standards, guidelines, and procedures regarding the regulation of noise within the City limits. The Municipal Code includes Chapter 8.108, which establishes a Noise Ordinance (Ordinance No. 99). The Zoning Code section of the Municipal Code also establishes development guidelines and review procedures for noise generating land developments.

State Regulations

The California Department of Health Services (CDHS) has established the Office of Noise Control which has prepared studies associated with noise levels and their effects on various land uses. Based upon these studies, the State has established interior and exterior noise standards by land use category and standards for the compatibility of various land uses and noise levels. These standards are discussed in subsequent sections of this element.

Federal Regulations

Interstate 215 passes through the west portion of the City. This freeway is part of the Federal interstate highway system that is regulated by the Federal Highway Administration (FHWA). The FHWA has developed noise standards to be used for federally funded roadway projects or projects that require federal review.

In addition, the U.S. Environmental Protection Agency is charged with the regulation of noise generated from railroad lines and facilities under the federal Noise Control Act. These regulations are enforced by the Federal Railroad Administration. In addition, the federal government has established standards associated with airport noise.

6.1.3 Relationship to Other Elements

The Noise Element is closely related to the Land Use and Circulation Elements of the General Plan. Certain land uses, such as heavy industrial uses are potential sources of high noise levels, while residential and some institutional land uses such as schools and hospitals are noise sensitive. When planning for long range land uses, the potential impact of noise on or from adjacent land uses must be considered. In addition, many sources of high noise levels are mobile, including automobiles, heavy trucks, and trains. The location of primary transportation routes may impact sensitive noise receptors located near these routes. Therefore, the Circulation Element must consider noise-related impacts on adjacent land uses and proper mitigation measures.



6.1.4 Terminology

The following terms are commonly used when discussing noise:

Acceptable Exterior Noise Exposures: In general, exterior noise exposures at residential locations should not exceed a CNEL of 65 dB.

The Environmental Protection Agency (EPA) has recommended a policy stating that an Ldn (or CNEL) of 55 dB should not be exceeded within exterior living spaces. However, the EPA emphasizes that this level of exposure may not be economically feasible, or, in many cases, a practical level to achieve.

Acceptable Interior Noise Exposures: California's noise insulation standards were officially adopted by the California Commission of Housing and Community Development in 1974 and became effective on August 22, 1974. On November 14, 1988, the Building Standards Commission approved revisions to these standards (Title 24, Part 2, California Code of Regulations). The ruling states that, "Interior noise levels attributable to exterior sources shall not exceed 45 dB in any habitable room. The noise metric shall be either ... Ldn or ... CNEL, consistent with the noise element of the local general plan." Additionally, the Commission specifies that residential buildings or structures to be located within exterior CNEL (or Ldn) contours of 60 dB or greater of an existing or adopted freeway, expressway, parkway, major street, thoroughfare, rail line, rapid transit line, or industrial noise source shall require an acoustical analysis showing that the building has been designed to limit intruding noise to an interior CNEL of 45 dB.

Ambient Noise: The composite of noise from all sources near and far. In this context, the ambient noise level constitutes the normal or existing level of environmental noise at a given location.

Amplitude: A measure of the difference between atmospheric pressure (with no sound present) and the total pressure (with sound present). Although there are other measures of sound amplitude, sound pressure is the fundamental measure. The unit of sound pressure is the decibel, denoted dB.

A-Weighted Sound Pressure 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 a very high frequency component of the sound in a manner similar to the response of the human ear and gives good correlation with subjective reactions to noise.

To establish the A-weighted sound level, the acoustical signal is detected by the microphone and then filtered to weight those portions of the noise that are most annoying to individuals. This weighting of sound energy corresponds approximately to the relative annoyance experienced by humans from noise at various frequencies.

The A-weighted sound level of traffic noise and other long-term noise producing activities within and around a community varies considerably with time. Measures of this varying noise



level are accomplished by obtaining statistical samples. For the purposes of the General Plan, the following statistical values have been used:

- Leq:** The energy equivalent (average) sound level. This value is most representative of the long-term annoyance potential as well as other effects of the noise.
- Lmax:** The maximum sound level.
- Lmin:** The minimum sound level.
- Ln:** The sound level exceeded n% of the time (e.g., L25 is the sound level exceeded 25% of the time).

These measures may be recorded to obtain representative samples of the noise during certain time periods (e.g., peak traffic period, late evening, early morning, etc.).

Typical A-weighted noise levels are shown in Table 6.1.

Community Noise Equivalent Level (CNEL): It is recognized that a given level of noise may be more or less tolerable depending on the duration of exposure and the time of day during which the noise is experienced. There are several measures of noise exposure that consider not only the variation of noise level but also include temporal characteristics. Of these, the State Department of Aeronautics and the California Commission of Housing and Community Development have adopted the CNEL.

This measure weights the average noise level for the evening hours (from 7:00 p.m. to 10:00 p.m.) by 5 dB, and the late evening and early morning hours (from 10:00 p.m. to 7:00 a.m.) by 10 dB. The un-weighted daytime noise levels are combined with these weighted levels and averaged to obtain a CNEL value.

Day-Night Sound Level (Ldn): The measure of noise exposure used by the EPA, HUD, FAA and the Department of Defense. It is the same as CNEL except that the weighting considered (in CNEL) between the hours from 7:00 pm to 10:00 pm is eliminated. Throughout this General Plan, Ldn and CNEL are assumed to be the same measure. This is consistent with the recommended practice of the State of California Office of Noise Control.

Decibel (dB): A unit for describing the amplitude of sound, equal to 20 times the logarithm to the base 10 of the ratio of the pressure of the measured sound to the reference pressure, which is 20 micro Pascals. Because they are logarithmic, decibels are not additive. If two similar noise sources produce the same amount of noise (e.g., 100 decibels each), the total noise level will be 103 dB, not 200 dB. An increase in noise level of 10 dB is generally perceived as being twice as loud.

Exterior Living Space: Open area designed for outdoor living and/or recreation.



Maximum Noise Level: The maximum instantaneous noise level that occurs during a specific time interval. In acoustics, the maximum sound pressure level is understood to be for single events unless some other kind of level is specified.

Noise: Is commonly defined as an unwanted sound. A given level of noise may be more, or less tolerable depending on the sound level, duration of exposure, character of the noise sources, the time of day during which the noise is experienced, and the activity affected by the noise. For example, noise that occurs at night tends to be more disturbing than that which occurs during the day because sleep may be disturbed. Additionally, rest at night is a critical requirement in the recovery from exposure to high noise levels during the day. In consideration of these factors, different measures of noise exposure have been developed to quantify the extent of the effects anticipated from these activities

Noise Barrier: A structure designed to mitigate the impact generated by a noise source (e.g. an arterial or rail line) at an adjacent noise-sensitive location. Barriers should be continuous structures without gaps and should be constructed of a material that is impervious to noise (e.g., concrete block, stucco on wood, 1/4" tempered glass, earthen berm, or any combination of these materials).

Noise Contour: A line drawn around a noise source indicating constant levels of noise exposure. CNEL is the metric utilized herein to describe community exposure to noise.

Noise Impact Area: A specific area exposed to significant levels of noise.

Noise Reduction: The ability of a material to reduce the noise level from one place to another or between one room and another. Noise reduction is specified in decibels.

Noise-Sensitive Land Uses: Noise-sensitive land uses include, but are not limited to: residences, schools, libraries, hospitals, churches, offices, hotels, motels, and outdoor recreational areas. These typify land uses where suitability is restricted by intrusive noises. Hence, they are termed "noise-sensitive". Noise sensitivity factors include interference with speech communication, subjective judgment of noise acceptability and relative noisiness, need for freedom from noise intrusion, and sleep interference criteria. The Land Use Element of the General Plan provides a description of the residential areas throughout the city and is considered the source for the inventory of noise-sensitive areas.

Sound: As used herein, sound is a reaction in the ear caused by radiant energy being transmitted from a source by longitudinal pressure waves in air or some other elastic medium.

Sound Level Meter: A measurement instrument containing a microphone, an amplifier, an output meter, and one or more frequency weighting networks. It is used for the determination of sound levels.



**Table 6.1
Typical A-Weighted Noise Levels**

| Common Outdoor Activities | Noise Level (dBA) | Common Indoor Activities |
|-----------------------------------|----------------------|------------------------------------------------|
| | — 110 — | Rock band |
| Jet fly-over at 1000 feet | | |
| | — 100 — | |
| Gas lawn mower at 3 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 | | |
| Gas lawn mower, 100 feet | — 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 |
| | — 20 — | |
| | | Broadcast/recording studio |
| | — 10 — | |
| Lowest threshold of human hearing | — 0 — | Lowest threshold of human hearing |



6.1.5 Effects of Noise

In general, noise may affect the average individual in the following ways:

- **General Hearing Loss or Damage:** Sound levels which exceed 85 dB (A), when experienced for long durations during each working day, may result in severe temporary or even permanent hearing loss. State and federal safety and health regulations currently protect workers at levels of exposure that exceed 90 dB (A) for each 8-hour workday.
- **Interference with Oral Communication:** Speech intelligibility is impaired when sound levels exceed 60 dB (A). The amount of interference increases with sound level and distance between speaker and listener.
- **Sleep Interference:** Sound levels that exceed 40 to 45 dB (A) are generally considered to be excessive for sleeping areas within a residence.

Noise has a significant effect on the quality of life. An individual's reaction to a particular noise depends on many factors such as the source of the noise, its loudness relative to the background noise level, and the time of day. The reaction to noise can also be highly subjective; the perceived effect of a particular noise can vary widely among individuals in a community. Because of the nature of the human ear, a sound must be about 10 dBA greater than the reference sound to be judged as twice as loud. In general, a 3 dBA change in community noise levels is perceivable, while 1 to 2 dBA changes generally are not perceived. Although the reaction to noise may vary, it is clear that noise is a significant component of the environment, and excessively noisy conditions can affect an individual's health and well-being. The effects of noise are often only transitory, but adverse effects can be cumulative with prolonged or repeated exposure. The effects of noise on a community can be organized into six broad categories: sleep disturbance; permanent hearing loss; human performance and behavior; social interaction of communication; extra-auditory health effects; and general annoyance.



6.2 NOISE STANDARDS

Table 6.2 identifies typical interior and exterior noise standards accepted by local, state, and federal agencies for various land use types. As indicated, interior noise standards for residential uses are 45 dB while external standards are 65 dB. More intense industrial, commercial, and recreational uses maintain a higher acceptable noise level.

**Table 6.2
Interior & Exterior Noise Standards**

| Land Use | CNEL | |
|-----------------------------------------------------------------------------------------------------------------------|-----------------------|-----------------------|
| | Interior ¹ | Exterior ² |
| Residential- Single family, Multi-family, Duplex, Mobile Home | 45 dB | 65 dB |
| Residential – Transient Lodging, Hotels, Motels, Nursing Homes | 45 dB | 65 dB |
| Private Offices, Church Sanctuaries, Libraries, Conference Rooms, Theaters, Auditoriums, Concert Halls, Meeting Halls | 45 dB | -- |
| School | 45 dB | 65 dB |
| General Offices, Reception/Clerical Areas | 50 dB | -- |
| Bank Lobbies, Retail Stores, Restaurants | 55 dB | -- |
| Manufacturing, Kitchens, Warehouses | 65 dB | -- |
| Parks, Playgrounds | -- | 65 dB |
| Golf Courses, Outdoor Spectator Sports, Amusement Parks | -- | 65 dB |

¹ Standard applies to all habitable interior areas. Standard to be achieved with windows and doors closed. Mechanical ventilation shall be provided as required by the Uniform Building Code.

² Standard applies to all habitable exterior living areas including private yards, private patios and balconies, common recreation

Table 6.3 identifies the compatibility of land uses with different noise levels. As indicated, noise levels in the 55 to 60 dB range are normally acceptable to all land use types, while higher levels in the 70 to 80 dB ranges are typically unacceptable to certain land use types.

**Table 6.3
Noise/Land Use Compatibility Matrix**

| Land Use | CNEL (dB) | | | | | | |
|--------------------------------------------------------|-----------|----|----|----|----|----|----|
| | 50 | 55 | 60 | 65 | 70 | 75 | 80 |
| Residential – Single Family, Multi-family, Duplex | A | A | B | C | C | D | D |
| Residential – Mobile Homes | A | A | B | C | C | D | D |
| Transient Lodging - Hotels, Motels | A | A | B | B | C | C | D |
| Schools, Libraries, Churches, Hospitals, Nursing Homes | A | A | B | C | C | D | D |
| Auditoriums, Concert Halls, Amphitheaters | B | B | C | C | D | D | D |



| Land Use | CNEL (dB) | | | | | | |
|---------------------------------------------------------------------|-----------|----|----|----|----|----|----|
| | 50 | 55 | 60 | 65 | 70 | 75 | 80 |
| Sports Arenas, Outdoor Spectator Sports, Amusement Parks | A | A | A | B | B | D | D |
| Playgrounds, Neighborhood Parks | A | A | A | B | C | D | D |
| Golf Courses, Riding Stables, Cemeteries | A | A | A | A | B | C | C |
| Office and Professional Buildings | A | A | A | B | B | C | D |
| Retail Commercial, Banks, Restaurants | A | A | A | A | B | B | C |
| Industrial, Manufacturing, Utilities, Service Stations, Warehousing | A | A | A | A | B | B | B |
| Agriculture | A | A | A | A | A | A | A |

- A 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.
- B Conditionally Acceptable:** New construction or development should be undertaken only after a detailed analysis of the noise requirements is made and needed noise insulation features included in the design. Conventional construction, but with closed windows and fresh air systems or air conditioning will normally suffice.
- C Normally Unacceptable:** New construction or development should generally be discouraged. If it does proceed, a detailed analysis of the noise reduction requirements must be made and needed noise insulation features included in the design.
- D Clearly Unacceptable:** New construction or development should generally not be undertaken.

6.3 EXISTING CONDITIONS

6.3.1 Major Noise Sources

The City of Grand Terrace is characterized as a predominantly urban environment. Much of the City has been developed with residential, commercial and industrial land uses. Transportation related noise is the primary noise source in the City. Other noise sources include noise generated from commercial, residential and recreational activities.

Noise measurements were conducted with the purpose of establishing baseline ambient noise levels for transportation and non-transportation noise generators throughout the City of Grand Terrace.

A total of eleven short-term (15-minute) representative measurements were conducted to provide a basis for understanding the overall existing noise environment of the City. A 15-minute sample is considered a “snapshot” of the baseline noise environment at a given time; the sound level may vary depending on time, day or season.



Table 6.4 lists the eleven noise measurement locations with corresponding land uses and 15 minute noise levels. As shown in this table, noise levels of commercial and industrial land uses near I-215 and the rail lines are the highest (66-69 dBA), with industrial land uses not near I-215, significantly lower. Ambient noise levels are much lower at public and single and multiple family residential areas (51-63 dBA). In general, ambient noise levels decrease as distance from I-215 is gained.

Table 6.4
Existing Noise Levels

| # | Major Noise Sources | Existing Land Use | Noise Level (Leq dBA) ¹ |
|----|----------------------------|--------------------------------------------------|------------------------------------|
| 1 | Vivienda Avenue/I-215 | Single Family | 63 |
| 2 | Canal Street/Newport | Multiple Family | 62 |
| 3 | Van Buren/W of Michigan | Industrial | 61 |
| 4 | SW corner Vivienda/Tanager | Single Family | 51 |
| 5 | NE Corner Lark/ Oriole | Single Family | 60 |
| 6 | Mt Vernon/Barton Road | Commercial | 66 |
| 7 | Grand Terrace/Mt Vernon | Passive Park, Single/Multiple Family Residential | 59 |
| 8 | Grand Terrace High School | Public | 51 |
| 9 | Barton/I-215 | Commercial | 69 |
| 10 | City Hall Parking Lot | Public | 51 |
| 11 | Vivienda/BNSF line | Industrial | 69 |

¹ All noise levels are short-term (15-minute) measurements and are rounded to nearest tenth.

6.3.1.1 Non-Transportation Noise

Commercial/Industrial Noise

Non-transportation related noise generators are commonly called “stationary,” “fixed,” “area,” or “point” sources of noise. Industrial processing, mechanical equipment, pumping stations, and heating, ventilating, and air conditioning (HVAC) equipment are examples of fixed location, non-transportation noise sources. Some non-transportation sources are not stationary but are typically assessed as point or area sources due to the limited area in which they operate, such as truck deliveries. Noise generated by industrial and commercial operations, maintenance, manufacturing, truck traffic (loading docks), and warehousing noise can affect surrounding noise sensitive land use.

In general, commercial/industrial noise within the City of Grand Terrace is not considered excessive. However, where residential locations are adjacent to industrial zones or trucking operations, a significant impact may exist.



Temporary and/or Nuisance Noise

Intermittent or temporary neighborhood noise from amplified music, public address systems, barking dogs, landscape maintenance, stand-by power generators, and construction activities are disturbing to residents but are difficult to attenuate and control. These noise sources could result in a significant impact if they violate the Noise Ordinance contained in the City's Municipal Code.

6.3.1.2 Mobile Noise

Traffic noise, including automobiles, trucks, and other motor vehicles is the most pervasive source of noise in the City Grand Terrace. There are several key factors associated with roadway or traffic noise, including: traffic volumes; the speed of the traffic; the type or "mix" of vehicles using a particular roadway; and pavement conditions. The roadway network in the City consists of a state highway, regional arterials, local public roads, and private roads.

Highways and arterials generally accommodate high speed, high volume traffic, and are designed to provide for the movement of people and goods between and within communities in the City. Interstate 215 (I-215) traverses the western portion of the City from north to south. Examples of roadways within the City that would accommodate either higher speeds or higher traffic volumes include Barton Road, De Berry Street, La Cadena Drive, Michigan Avenue, and Mount Vernon Avenue.

Local roads serve lower speed, lower volume traffic and provide access to local residential neighborhoods and commercial and industrial areas in each of the communities throughout the City. Local roads also feed traffic onto the larger highways and arterials. Private roads are generally not available to the public and serve a limited number of travelers. Examples of private roads include private driveways or maintenance roads.

The representative noise measurements indicate that commercial and industrial land uses near I-215 and the rail lines are the highest (66-69 dBA.) and that in general, ambient noise levels decrease as distance from I-215 is gained. These levels are higher than is considered acceptable and will compromise the welfare of residents exposed to the noise for a long period of time. Exhibit 6-2 depicts the noise level contours from the I-215 Freeway.

Table 6.5 shows modeled existing roadway noise, modeled General Plan build-out roadway noise and the projected noise level





increase due to General Plan build-out. It is important to note that modeled roadway noise only includes vehicular noise and measured existing noise may be much higher due to the contribution of other noise sources and cumulative noise. As shown, traffic volume increases associated with General Plan build-out will result in increases in noise levels of up to 16.9 dBA. A noise level increase is considered substantial if 1) the existing noise levels exceed the objectives presented in Table 6.3 (65 dBA for residential and noise sensitive areas) and the proposed project would increase this noise level by 3 dBA CNEL (barely noticeable in an exterior environment) or more); or 2) the noise level with the implementation of the proposed project would remain within the objectives shown in Table 6.3, but the project adds 5 dBA CNEL (noticeable to most people) or more to the pre-project noise levels. General Plan build-out will result in traffic volumes that result in noise level increases of 5 dB or greater along most Circulation Element roadways. Where noise level increases are less than 5 dBA but more than 3 dBA, it is likely that the projected increase will cause ambient noise levels to exceed objective noise levels in Table 6.3.

Table 6.5
Increase in Noise Levels Associated with General Plan Build-out Traffic Volumes

| Circulation Roadways | Modeled General Plan Noise Levels @100 feet from Centerline | Modeled Existing Noise Levels @ 100 feet from Centerline | Modeled Increase in Noise Levels due to General Plan Build-out |
|------------------------------|--------------------------------------------------------------------|-----------------------------------------------------------------|-----------------------------------------------------------------------|
| Newport Road | 62.80 | 54.47 | 8.33 |
| Grand Terrace Road | 62.80 | 54.47 | 8.33 |
| Canal Street | 62.80 | 54.47 | 8.33 |
| Van Buren Street | 62.80 | 54.47 | 8.33 |
| Pico Street | 62.80 | 54.47 | 8.33 |
| Preston Street | 62.80 | 54.47 | 8.33 |
| Observation Street | 62.80 | 54.47 | 8.33 |
| Palm Ave | 62.80 | 57.03 | 5.77 |
| De Berry Street | 62.80 | 57.70 | 5.10 |
| Main Street E. of Mt. Vernon | 62.80 | 58.09 | 4.71 |
| Michigan Ave S. of Van Buren | 62.80 | 60.71 | 2.09 |
| La Cadena Drive | 71.23 | 68.74 | 2.49 |
| Commerce Way W. of Michigan | 71.41 | 54.47 | 16.94 |
| Mt. Vernon Ave | 71.41 | 67.87 | 3.54 |
| Michigan Ave N. of Van Buren | 71.41 | 66.79 | 4.62 |
| Main Street W. of Mt. Vernon | 71.41 | 58.09 | 13.32 |
| Barton Road | 72.75 | 70.34 | 2.41 |
| Commerce Way E. of Michigan | 72.75 | 54.47 | 18.28 |



Air and Rail Line Transportation Noise

Railroads

Three railroad providers operate on two railroad line corridors within the City of Grand Terrace. The two rail lines are the Burlington Northern Santa Fe Railroad (BNSF) and the Union Pacific (UPRR) Rail Line, and they traverse on the west portion of the City.

The Riverside Industrial Lead (RIL) of the UPRR runs along Taylor Street. There is also an approximate 900 foot long spur that runs south of Pico Street. The predominant cargo inbound is lumber, while outbound trains frequently carry recyclable materials. While train operations can vary, there are on average two trains currently operating each weekday. The trains operate at no greater than 20 mph.

There are three Amtrack and ten Metrolink passenger trains and up to 65 freight trains that operate on the BNSF track. Actual train volumes can vary by day, week, or month. However, future train activity along the BNSF railroad is anticipated to increase 120 freight trains and 100 passenger trains per day to by the year 2025. Train activity for the UPRR is not expected to increase in the near future.

There are several at-grade crossings along this rail line within the City of Grand Terrace. To alert motorists and pedestrians to the presence of an approaching train and to avoid accidents at at-grade crossings, locomotive engineers are required to sound a train-mounted horn as they approach the intersection. Locomotive engineers begin sounding the temporal (long-long-short-long) sequence that characterizes the warning signal approximately ¼ mile prior to reaching an at-grade crossing. Federal regulations require the train horn to be at least 96 dB, 100 feet in front of the train in its direction of travel.

Future rail noise was modeled using the Federal Transit Administration General Transit Noise Assessment. Projected volumes are presented in Exhibit 6-2. Train horns typically generate maximum noise levels of 85-100 dBA L_{max}. This level of noise would result in unintelligible speech and annoyance. Consequently, outdoor activities near the grade crossings may experience temporary disruption during train horn events. Interior noise levels would also be affected by train horn soundings. Building structures typically provide 20-25 dB attenuation from exterior to interior noise levels with windows closed. With windows open a 12 dB reduction can be expected. Assuming the maximum noise attenuation (windows closed), noise level intrusions due to train horns are expected to range between 61-66 dBA at structures near the rail line.

Aircraft Noise from San Bernardino International Airport

Overflights to and from San Bernardino International Airport are audible in the City and vicinity. The San Bernardino International Airport is operated by the San Bernardino International Airport Authority, a joint powers authority comprised of the County of San Bernardino and the Cities of San Bernardino, Colton, Loma Linda and Highland. San Bernardino International has been



converted to a commercial airport from its previous use as Norton Air Force Base and is seeking to establish itself as an alternative destination for both passenger and cargo carriers.

According to the San Bernardino Airport, the Ultimate 65 dBA CNEL noise contour for the airport does not encroach into the City of Grand Terrace.

6.3.1.3 Construction Noise

The impact of construction noise that occurs during the daytime is considered minimal for no more than two or three months of activity. However, late night and weekend disturbances caused by construction noise may create a significant impact when experienced at nearby residential locations; however, adherence to the City's Noise Ordinance which regulates construction activities will reduce potential noise impacts.



6.3.1.4 Ground-borne Vibration and Noise

Vibration consists of waves transmitted through solid material. Ground-borne vibration propagates from the source through the ground to adjacent buildings by surface waves. Vibration may be comprised of a single pulse, a series of pulses, or a continuous oscillatory motion. The frequency of a vibrating object describes how rapidly it is oscillating, measured in Hertz (Hz). The normal frequency range of most ground-borne vibration that can be felt generally starts from a low frequency of less than 1 Hz to a high of about 200 Hz. Vibration energy spreads out as it travels through the ground, causing the vibration amplitude to decrease with distance away from the source.

Ground-borne vibration can be a concern for nearby neighbors of a transit system route or maintenance facility by causing buildings to shake and rumbling sounds to be heard. In contrast to airborne noise, ground-borne vibration is not a common environmental problem. It is unusual for vibration from sources such as buses and trucks to be perceptible, even in locations close to major roads. Some common sources of ground-borne vibration are trains, buses on rough roads, and construction activities such as blasting, pile-driving and the operation of heavy earthmoving equipment. The rumbling sound caused by the vibration of equipment during construction building structures is referred to as ground-borne noise.

6.3.2 Noise Sensitive Receptors

In general, the sound levels at noise-sensitive non-residential locations within the City are not considered excessive. However, the following areas are located within an existing or future 65 dB CNEL contour:



- Terrace Hills Junior High School
- Private school on Barton Road east of Mt. Vernon Avenue
- The private school on Mt. Vernon Avenue north of Barton Road (Keystone School)
- Grand Terrace Elementary School on Barton Road
- Grand Terrace Library.

6.3.3 Community Noise Equivalent Contours (CNEL)

In order to establish current noise levels throughout the City, noise measurement readings were taken at 15 representative locations within the City. Exhibit 6-1 illustrates the existing CNEL noise contours while Exhibit 6-2 illustrates projected Year 2030 CNEL noise contours. As indicated, it is projected that noise will continue to increase along City arterial streets, Interstate 215, and the BNSF rail line, all reflective of increased traffic.



Exhibit 6-1 – Existing CNEL Noise Contours

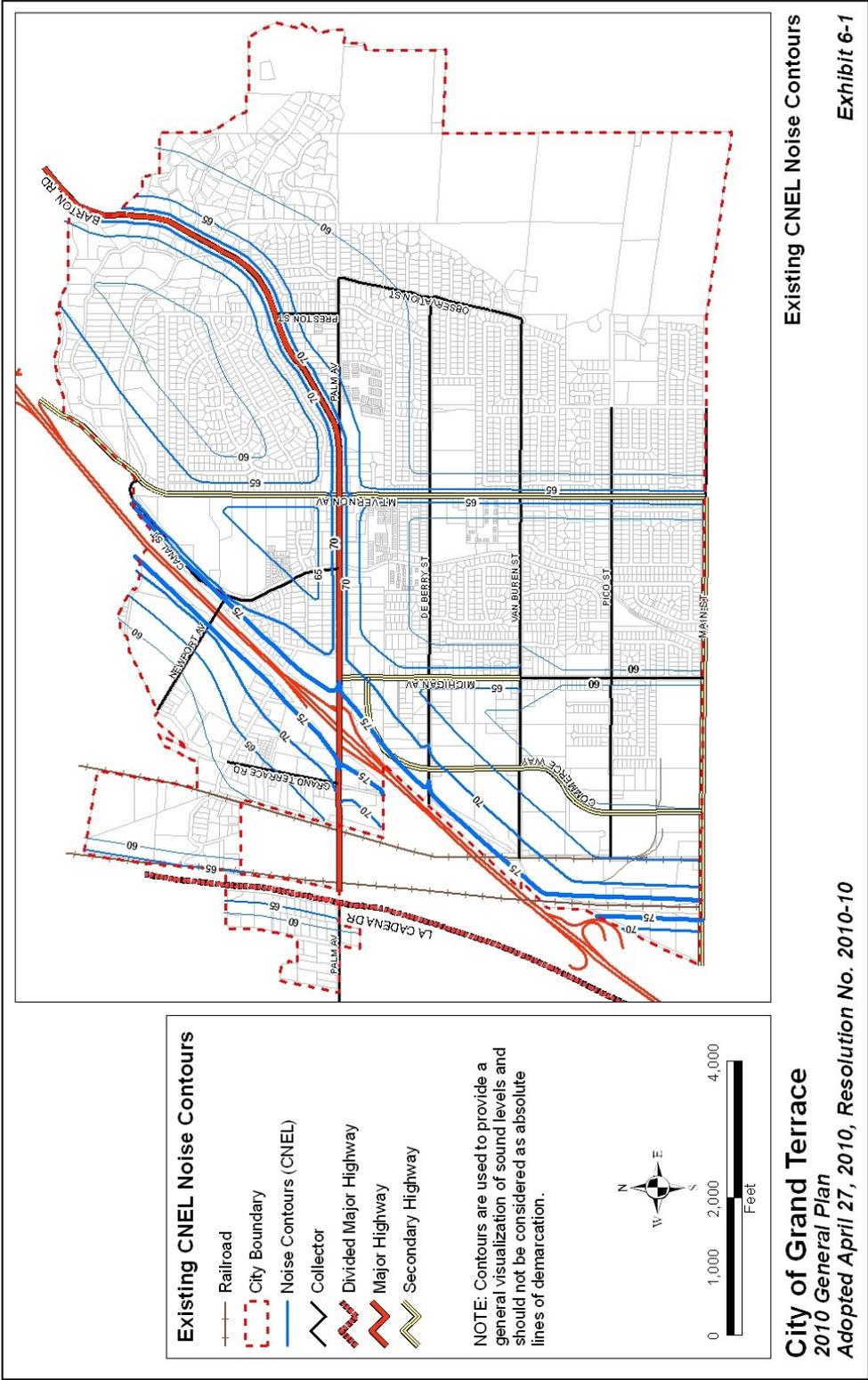
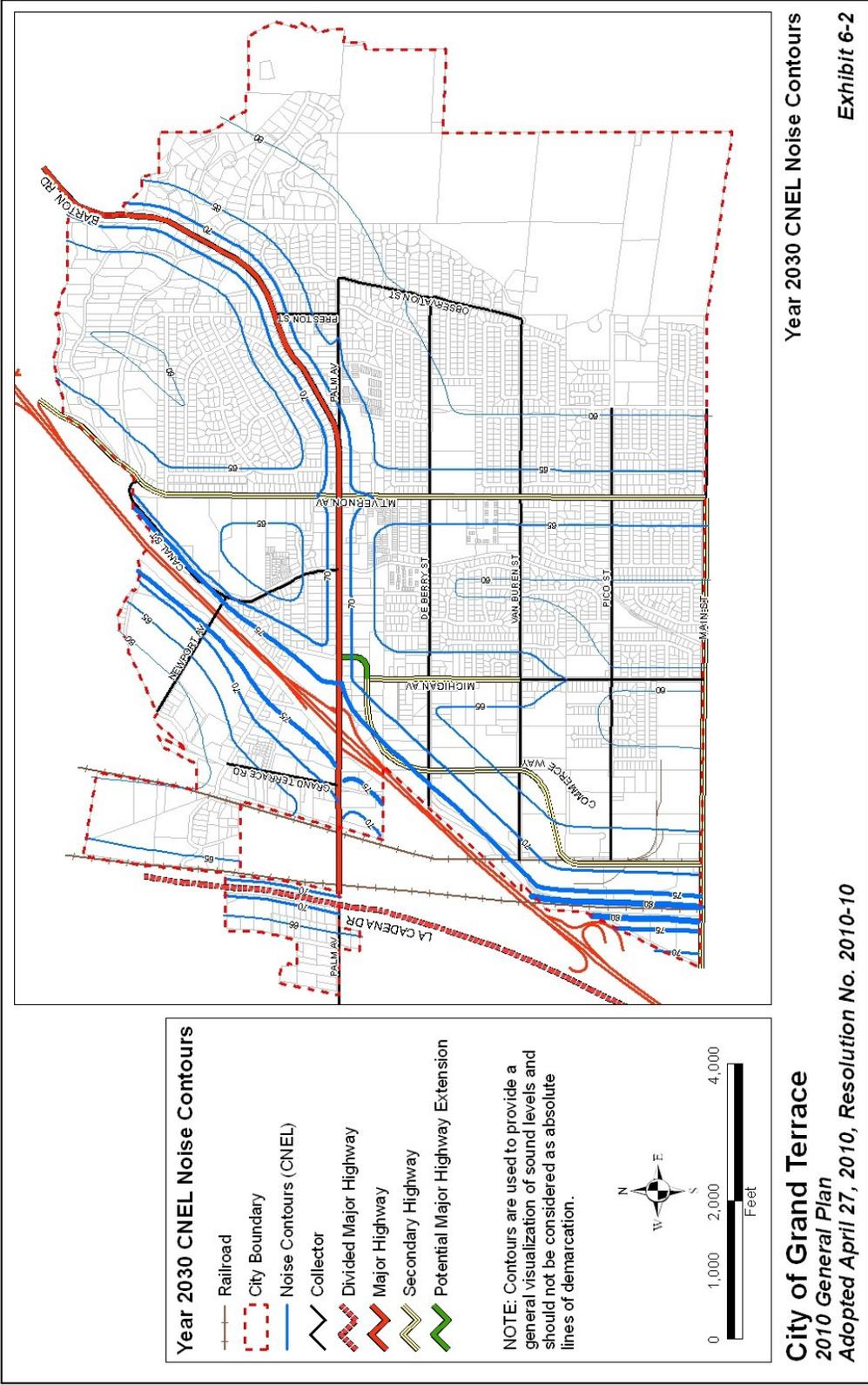




Exhibit 6-2 – Year 2030 CNEL Contours





6.4 GOALS AND POLICIES

A substantial portion of the city is affected by various sources of noise. The following goals and policies are intended to address identified noise issues in the community.

NON-TRANSPORT NOISE CONTROL

Goal 6.1: Protect the citizens of Grand Terrace and sensitive land uses from annoying and excessive noise generated by non-transportation oriented uses and activities.

Policy 6.1.1 The City shall periodically review and update its Noise Ordinance and City policies and regulations affecting noise.

Policy 6.1.2: Construction noise on adjacent land uses shall be minimized by limiting the permitted hours of activity.

Policy 6.1.3: City departments shall observe state and federal occupational safety and health noise standards.

Policy 6.1.4: When purchasing new equipment and vehicles purchased, the City shall comply with noise performance standards consistent with available noise reduction technology.

Goal 6.2: Prevent and mitigate the adverse impacts of excessive exposure to residential and commercial land uses.

Policy 6.2.1 The City shall evaluate potential noise impacts as part of the land use planning process to mitigate or avoid detrimental impacts and enforce the local noise ordinance.

Policy 6.2.2 The City shall establish acceptable noise standards for various land uses throughout the City of Grand Terrace through the adoption of ordinances and standards.

Policy 6.2.3: New residential developments located in close proximity to existing commercial/industrial operations shall be evaluated for potential noise impacts and interior noise mitigation.

Policy 6.2.4: Commercial uses developed as part of any mixed-use project including residential component shall not be noise intensive. Mixed-use structures shall be designed to prevent commercial noise impacts to the project's residential uses.



- Policy 6.2.5: New commercial/industrial operations located in proximity to existing or proposed residential areas shall incorporate noise mitigation into project design.
- Policy 6.2.6: Impacts of construction noise on adjacent land uses shall be regulated through limiting the permitted hours of activity.
- Policy 6.2.7: The City shall evaluate potential ground-borne vibration impacts as part of the land use planning process to mitigate or avoid detrimental impacts on adjacent land uses.

TRANSPORTATION NOISE CONTROL

Goal 6.3: Protect the residents of Grand Terrace from excessive noise generated by transportation-oriented sources.

- Policy 6.3.1: The City shall be actively involved in improvements programs for I-215 to promote noise mitigation along the freeway corridor through the City.
- Policy 6.3.2: The City shall enforce the California Vehicle Code noise standards within the City.
- Policy 6.3.3: The City shall consider noise impacts to residential neighborhoods when designating truck routes and major circulation corridors.
- Policy 6.3.4: The City shall work with Riverside and San Bernardino Counties to establish bus routes that meet public transportation needs while minimizing bus noise impacts to residential areas.
- Policy 6.3.5: Encourage, where feasible, noise mitigation measures, such as noise barriers and realignments, in the design and construction of new roadway projects in the City of Grand Terrace.
- Policy 6.3.6: The City shall work with the BNSF and UPRR railroads to assess the feasibility of the construction of noise barriers along rail lines that pass adjacent to residential areas.
- Policy 6.3.7: The City shall work with the Public Utilities Commission, the BNSF Rail Company, the Union Pacific Railroad, and Southern California Regional Rail Authority to minimize the level of noise produced by train movements and whistle noise within the City.
- Policy 6.3.8: The City shall monitor activities associated with future aircraft and rail movements that may result in noise impacts to the City.



6.5 IMPLEMENTATION PROGRAM

Table 6.7 presents the implementation plan designed to implement the policies of the Land Use Element. One or more implementation programs are provided for each policy. The implementation programs identify:

- The individual policy and proposed action,
- Its relationship to specific projects or overall City policy,
- Primary and secondary responsibility for implementation,
- Potential funding sources, and
- Implementation priority.

The General Plan Implementation Program is presented in a table format. Each policy of the General Plan is presented with the following information:

- **Policy Number:** Shows each policy number by General Plan Element.
- **Action Type:** Indicates whether the policy is project review specific or requires other administrative or judicial actions.
- **Policy Action:** Describes the policy and proposed actions for its implementation.
- **Primary Responsibility:** Indicates what agency is primarily responsible for implementation of the proposed action.
- **Support Responsibility:** Indicates what agencies are responsible for supporting the primary agency.
- **Funding Source:** Indicates the general sources of funding for the implementation action.
- **Priority:** Indicates the level of priority given to the implementation action.

The following codes are used throughout the Implementation Program table:

**Table 6.6
Implementation Table Codes**

| Code | Definition |
|-----------------------------|---------------------|
| Responsible Agencies | |
| SOC | State of California |
| CA | City Attorney |
| CC | City Council |
| COC | City of Colton |



**Table 6.6
Implementation Table Codes**

| Code | Definition |
|------------------------|-----------------------------------------------------------------------------------------------------------------------------------------------|
| COSB | County of San Bernardino |
| CD | Community Development Department |
| CJUSD | Colton Joint Unified School District |
| CM | City Manager |
| CS | Community Services Department |
| ENG | City Engineer |
| FCD | County Flood Control District |
| FD | Fire Department |
| FIN | Finance Department |
| GTF | Grand Terrace Foundation |
| PW | Public Works/Building & Safety Department |
| RHWC | Riverside Highland Water Company |
| SANBAG | San Bernardino Association of Governments |
| SCAG | Southern California Association of Governments |
| SD | Sheriff's Department |
| US | United States Federal Government |
| Funding Sources | |
| CFD | Community Facilities District |
| FG | Federal Grants |
| GF | City General Fund |
| ISF | Impact/Service Fee |
| LMD | Landscape Maintenance District |
| PP | Public/Private Partnership |
| RDA | Redevelopment Agency |
| SG | State Grants |
| UAF | User/Application Fees |
| Priorities | |
| 1 | Current. Action already implemented. |
| 2 | Urgent. Action should be undertaken within the next fiscal year. It is either required by law or is critical to the City. |
| 3 | Important. Action should be taken in the near future. It may be necessary for the completion of other actions. |
| 4 | Ongoing. Action is continuous or is the continuation of an existing action or program. It requires no further action to implement. |
| 5 | Desirable. Action would benefit the community, but does not require short term implementation or may require other actions to be taken first. |
| 6 | Optional. Action has a relatively low priority, but is desirable. It is not critical to other actions. |



| Policy | Project Review | Initiative | Policy/Action | Primary Responsibility | Support Responsibility | Funding Source | Priority |
|------------------------------------------------------------------------------------------------------------------------------------------------------------------------|----------------|------------|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|------------------------|------------------------|----------------|----------|
| Noise Element | | | | | | | |
| Goal 6.1: Protect the citizens of Grand Terrace and sensitive land uses from annoying and excessive noise generated by non-transportation oriented uses and activities | | | | | | | |
| 6.1.1 | | X | Implement a review process of the City's noise ordinance and City policies and regulations affecting noise. | | | | |
| | | | a. As part of the 5-year General Plan review, review the policies and regulations regarding noise to assure compliance with the most recent state guidelines and local conditions. | CD | PW, CA | GF | 4 |
| 6.1.2 | | X | Minimize the impacts of construction noise on adjacent land uses by limiting the permitted hours of activity. | | | | |
| | | | a. Review the City Noise Ordinance to assure compliance with current guidelines and standards. | CD | PW, ENG | GF | 4 |
| | | | b. Condition all new construction projects to comply with the construction noise standards of the City Noise Ordinance. | CD | PW, ENG | GF | 4 |
| 6.1.3 | | X | Require City departments to observe state and federal occupational safety and health noise standards. | | | | |
| | | | a. Implement an internal employee training program regarding noise standards relative to City operations. | CS | PW | GF | 4 |
| 6.1.4 | | X | Require new equipment and vehicles purchased by the City to comply with noise performance standards consistent with available noise reduction technology. | | | | |
| | | | a. Implement an equipment purchasing program that requires that all new equipment meet current state and federal noise standards. | CS | CM, FD | GF, SG, FG | 4 |
| Goal 6.2: Prevent and mitigate the adverse impacts of excessive exposure to residential and commercial land uses. | | | | | | | |
| 6.2.1 | X | | Incorporate noise considerations into land use planning decisions to minimize or avoid detrimental impacts, reduce encroachment of non-residential land uses, and enforce the local noise ordinance. | | | | |
| | | | a. Review all new development projects relative to potential noise impacts generated | CD | PW | GF, | 4 |



| Policy | Project Review | Initiative | Policy/Action | Primary Responsibility | Support Responsibility | Funding Source | Priority |
|--------|----------------|------------|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|------------------------|------------------------|----------------|----------|
| | | | by the project on adjacent land uses or the impacts of adjacent noise generators on the project in compliance with CEQA guidelines. | | | UAF | |
| | | | b. Review proposed projects in terms of compatibility with nearby noise-sensitive land use with the intent of reducing noise impacts. | CD | PW | UAF | 4 |
| | | | c. The City shall enforce the General Plan Noise Element Interior Noise Standards presented in Table 6.2 by requiring submittal of evidence/documentation showing that interior noise levels will not exceed 45 dBA. | CD | PW | UAF | 4 |
| 6.2.2 | X | X | Adopt planning guidelines that establish acceptable noise standards for various land uses throughout the City of Grand Terrace | | | | |
| | | | a. Review the City Zoning Code and Noise Ordinance and revise to reflect current noise standards. | CD | PW, CA | GF | 3 |
| | | | b.. The City shall utilize the Land Use/Noise Compatibility Matrix and Interior and Exterior Noise Standards contained in Tables 2 and 3, in establishing noise standards. | CD | PW | UAF | 3 |
| 6.2.3 | X | | New residential developments located in close proximity to existing commercial/industrial operations shall be evaluated for potential noise impacts and interior noise mitigation. | | | | |
| | | | a. Review all new residential developments relative to potential noise impacts generated by the project on adjacent land uses or the impacts of adjacent noise generators on the project in compliance with CEQA guidelines. | CD | PW | UAF | 4 |
| 6.2.4 | X | | Commercial uses developed as part of any mixed-use project including residential component shall not be noise intensive. Mixed-use structures shall be designed to prevent commercial noise impacts to the project's residential uses. | | | | |
| | | | a. Review all new mixed use development projects relative to noise impacts to proposed residential uses from planned commercial uses in compliance with CEQA guidelines. | CD | PW | UAF | 4 |
| 6.2.5 | X | | New commercial/industrial operations located in proximity to existing or proposed residential areas shall incorporate noise mitigation into project design. | | | | |
| | | | a. Review all new commercial development projects relative to noise impacts to local residential uses in compliance with CEQA guidelines. | CD | PW | UAF | 4 |



| Policy | Project Review | Initiative | Policy/Action | Primary Responsibility | Support Responsibility | Funding Source | Priority |
|---------------------------------------------------------------------------------------------------------------------|----------------|------------|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|------------------------|------------------------|----------------|----------|
| | | | b. Encourage the replacement of significant noise generating land uses with lesser or non-noise generating land uses when areas are re-developed. | CD | PW | UAF | 4 |
| 6.2.6 | X | | Impacts of construction noise and vibration on adjacent land uses shall be regulated through limiting the permitted hours of activity. | | | | |
| | | | a. Review the City’s Noise Ordinance relative to construction noise and vibration, and enforce it for all construction activities. | CD | PW, CS | GF | 3 |
| 6.2.7 | X | | The City shall evaluate potential ground-borne vibration impacts as part of the land use planning process to mitigate or avoid detrimental impacts on adjacent land uses. | | | | |
| | | | a. For Land Use Categories defined in Table 8, a ground-borne vibration technical study shall be required for proposed land uses within the following distances from the either the UPRR or BNSF rail line rights-of-way and the property line: 600 feet of a Category 1 Land Use, 200 feet of a Category 2 Land Use, and 120 feet of a Category 3 Land Use. Any mitigation measures identified in the technical study shall be required as conditions of approval. | CD | PW | UAF | 4 |
| Goal 6.3: Protect the residents of Grand Terrace from excessive noise generated by transportation-oriented sources. | | | | | | | |
| 6.3.1 | | X | The City shall be actively involved in improvements programs for I-215 to promote noise mitigation along the freeway corridor through the City. | | | | |
| | | | a. Coordinate with Caltrans regarding proposed improvement projects for I-215 through the City and to include noise barriers along adjacent residential neighborhoods. | CD | PW | GF | 4 |
| | | | b. Pursue construction of new barriers or the augmentation of existing barriers, to reduce noise impacts along the 1-215 Freeway along segments directly next to residential areas and Grand Terrace Elementary School | CD | CM, PW | GF, FG | 4 |
| 6.3.2 | | X | The City shall enforce the California Vehicle Code noise standards within the City. | | | | |
| | | | a. Coordinate with the San Bernardino County Sheriff’s Department to enforce the California Vehicle Code relative to excessive vehicle noise. | CS | CD, CA | GF | 3 |



| Policy | Project Review | Initiative | Policy/Action | Primary Responsibility | Support Responsibility | Funding Source | Priority |
|--------|----------------|------------|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|------------------------|------------------------|----------------|----------|
| 6.3.3 | | X | The City shall consider noise impacts to residential neighborhoods when designating truck routes and major circulation corridors. | | | | |
| | | | a. All efforts to designate truck routes through the City shall include an evaluation of potential noise impacts to local residential neighborhoods. | CS | CD, PW, CM | GF | 3 |
| 6.3.4 | | X | The City shall promote the establishment of bus routes that meet public transportation needs while minimizing bus noise impacts to residential areas. | | | | |
| | | | a. Work with the OmniTrans and Riverside Transit Agency to identify bus routes and bus stop locations within the City that minimize noise impacts to residential neighborhoods. | PW | CD, CM | GF | 5 |
| 6.3.5 | | X | Encourage, where feasible, noise mitigation measures, such as noise barriers and realignments, in the design and construction of new roadway projects in the City of Grand Terrace. | | | | |
| | | | a. Include an evaluation of potential noise impacts to sensitive land uses when performing feasibility studies and design engineering for new roads within the City, and incorporate appropriate mitigation measures in the design of the project. | PW | CD, CS | GF, SG, FG | 4 |
| 6.3.6 | | X | The City shall promote the construction of noise barriers along rail lines that pass adjacent to residential areas. | | | | |
| | | | a. Work with the BNSF and UPRR to identify potential locations for noise barriers to protect residential neighborhoods. Determine the feasibility and potential funding sources for proposed barriers. | PW | CD, CS | GF | 3 |
| 6.3.7 | | X | The City shall encourage a reduction in the level of noise produced by train movements and whistle noise within the City. | | | | |
| | | | a. The City shall work with the Public Utilities Commission, the BNSF Rail Company, the Union Pacific Railroad, and Southern California Regional Rail Authority to determine the feasibility of reducing noise generated by rail movements through the City. | PW | CD, CS | GF | 3 |
| 6.3.8 | | X | The City shall monitor activities associated with future aircraft and rail movements that may result in noise impacts to the City. | | | | |



| Policy | Project Review | Initiative | Policy/Action | Primary Responsibility | Support Responsibility | Funding Source | Priority |
|--------|----------------|------------|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|------------------------|------------------------|----------------|----------|
| | | | a. Provide ongoing coordination with airport and rail transportation providers to assess future impacts of increase rail and air transportation services on the City. | CD | PW, CS | GF | 5 |
| | | | b. Encourage citizen participation and City involvement on committees that could influence future aircraft and rail activities in Riverside and San Bernardino Counties. | CM | CD, PW | GF | 5 |