IV. ENVIRONMENTAL IMPACT ANALYSIS
L. NOISE

INTRODUCTION

This section of the Revised Draft EIR provides a description of noise within the City, information on regulations and agencies with jurisdiction over the Project area, proposed General Plan policies relevant to noise, and an analysis of potential impacts related to noise resulting from implementation of the proposed General Plan. Information used to prepare this section was taken from the *Healdsburg 2030 General Plan Background Report* (January 2009 Draft), *Handbook of Environmental Acoustics*, *Transportation Related Earthborne Vibrations*, *SMART Memorandum*, *Sonoma County Comprehensive Airport Land Use Plan*, *Healdsburg 2025 General Plan Traffic Impact Study* (Whitlock & Weinberger Transportation, Inc., January 2008), and noise measurements conducted by Illingworth & Rodkin, Inc., September 2007.

ENVIRONMENTAL SETTING

Fundamentals of Sound and Environmental Noise

Sound is technically described in terms of amplitude (loudness) and frequency (pitch). The standard unit of sound amplitude measurement is the decibel (dB). The decibel scale is a logarithmic scale that describes the physical intensity of the pressure vibrations that make up any sound. The pitch of the sound is related to the frequency of the pressure vibration. Since the human ear is not equally sensitive to a given sound level at all frequencies, a special frequency-dependent rating scale has been devised to relate noise to human sensitivity. The A-weighted decibel scale (dBA) provides this compensation by discriminating against frequencies in a manner approximating the sensitivity of the human ear.

Noise, on the other hand, is typically defined as unwanted sound. A typical noise environment consists of a base of steady ambient noise that is the sum of many distant and indistinguishable noise sources. Superimposed on this background noise is the sound from individual local sources. These can vary from an occasional aircraft or train passing by to virtually continuous noise from, for example, traffic on a major highway. Table IV.L-1 illustrates representative noise levels in the environment.

Several rating scales have been developed to analyze the adverse effect of community noise on people. Because environmental noise fluctuates over time, these scales consider that the effect of noise upon people is largely dependent upon the total acoustical energy content of the noise, as well as the time of day when the noise occurs. The L_{eq} is a measure of ambient noise of an arbitrary duration, while the L_{dn} and Community Noise Exposure Levels (CNEL) are 24 hour average measures of community noise. Each is applicable to this analysis and defined as follows:

- L_{eq}, the equivalent energy noise level, is the average acoustic energy content of noise for a stated period of time. Thus, the L_{eq} of a time-varying noise and that of a steady noise are the same if they deliver the same acoustic energy to the ear during exposure. For evaluating community

impacts, this rating scale does not vary, regardless of whether the noise occurs during the day or the night.

Table IV.L-1
Representative Environmental Noise Levels

Common Outdoor Activities	Noise Level (dBA)	Common Indoor Activities
	110	Rock band
Jet fly-over at 100 feet		
	100	
Gas lawnmower at 3 feet		
	90	
		Food blender at 3 feet
Diesel truck going 50 mph at 50 feet	80	Garbage disposal at 3 feet
Noisy urban area during daytime		
Gas lawnmower at 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 area during daytime	50	Dishwasher in next room
Quiet urban area during nighttime	40	Theater, large conference room (background)
Quiet suburban area during nighttime		
	30	Library
Quiet rural area during nighttime		Bedroom at night, concert hall (background)
	20	
		Broadcast/recording studio
	10	
Lowest threshold of human hearing	0	Lowest threshold of human hearing
Source: California Department of Transportation, 1998.		

- L_{dn}, the Day-Night Average Level, is a 24-hour average L_{eq} with a 10 dBA "weighting" added to noise during the hours of 10:00 p.m. to 7:00 a.m. to account for noise sensitivity in the nighttime. The logarithmic effect of these additions is that a 60 dBA 24 hour L_{eq} would result in a measurement of 66.4 dBA L_{dn}.
- CNEL, the Community Noise Equivalent Level, is a 24-hour average L_{eq} with a 5 dBA "weighting" during the hours of 7:00 p.m. to 10:00 p.m. and a 10 dBA "weighting" added to noise during the hours of 10:00 p.m. to 7:00 a.m. to account for noise sensitivity in the evening and nighttime, respectively. The logarithmic effect of these additions is that a 60 dBA 24 hour L_{eq} would result in a measurement of 66.7 dBA CNEL.
- L_{min}, the minimum instantaneous noise level experienced during a given period of time.
- L_{max}, the maximum instantaneous noise level experienced during a given period of time.

Noise environments and consequences of human activities are usually well represented by median noise levels during the day, night, or over a 24-hour period. Environmental noise levels are generally considered low when the L_{dn} is below 60 dBA, moderate in the 60 to 70 dBA range, and high above 70 dBA. Noise levels greater than 85 dBA can cause temporary or permanent hearing loss. Examples of low daytime levels are isolated, natural settings with noise levels as low as 20 dBA and quiet suburban residential streets with noise levels around 40 dBA. Noise levels above 45 dBA at night can disrupt sleep. Examples of moderate level noise environments are urban residential or semi-commercial areas (typically 55 to 60 dBA) and commercial locations (typically 60 dBA). People may consider louder environments adverse, but some will accept the higher levels associated with more noisy urban residential or residential-commercial areas (60 to 75 dBA) or dense urban or industrial areas (65 to 80 dBA).

When evaluating changes in 24-hour community noise levels, a difference of less than 3 dBA is imperceptible to most people and is the generally accepted industry threshold for a "substantial" noise increase. A 5 dBA increase is readily noticeable, while a difference of 10 dBA would be perceived as a doubling of loudness.

Noise levels from a particular source decline as distance to the receptor increases. Other factors, such as the weather and reflecting or shielding, also help intensify or reduce the noise level at any given location. A commonly used rule of thumb for roadway noise is that for every doubling of distance from the source, the noise level is reduced by about 3 dBA at acoustically "hard" locations (i.e., the area between the noise source and the receptor is nearly complete asphalt, concrete, hard-packed soil, or other solid materials) and 4.5 dBA at acoustically "soft" locations (i.e., the area between the source and receptor is earth or has vegetation, including grass).

Noise from stationary or point sources is reduced by about 6 to 7.5 dBA for every doubling of distance at acoustically hard and soft locations, respectively. Noise levels may also be reduced by intervening structures; generally, a single row of buildings between the receptor and the noise source reduces the noise level by about 5 dBA, while a solid wall or berm reduces noise levels by 5 to 10 dBA. Standard California construction methods typically provide a reduction of exterior-to-interior noise levels of about 20 to 25 dBA with closed windows and about 15 dBA with open windows.

Community Response to Changes in Noise Levels

The potential for adverse community response tends to increase as an intrusive noise becomes more noticeable above existing background noise levels. For example, if an intrusive noise has an average level that is comparable to existing average ambient noise levels, then the intrusive sound would tend to blend in with the ambient noise. However, if the intrusive sound is significantly greater than the ambient noise, then the intrusive sound would be more noticeable and potentially more annoying as it can interfere with rest, working efficiency, social interaction and general tranquility.

In general, human sound perception is such that a change in sound level of less than 3 dB is imperceptible, a change of 5 dB clearly noticeable and a change of 10 dB would be perceived as a doubling (or halving) of loudness.[1]

Sleep Disruption

There is a significant amount of research in the area of sleep disruption due to noise and a variety of criteria have been developed. However, there is no one specific criterion that applies in all cases, due, in part, to the factors that must be considered such as the age of the person, the type of sound and habituation to the sound.

The U.S. Environmental Protection Agency (EPA) document entitled, "Levels Requisite to Protect Public Health and Welfare with an Adequate Margin of Safety," also known as the "Levels Document," suggests that a L_{eq} of 32 dBA indoors, during nighttime hours, should in most cases protect against sleep interference.[2] More recently, the World Health Organization publication, "Community Noise," recommends a L_{eq} of 30 dBA indoors for continuous noises with an L_{max} of 45 dBA.[3]

An editorial published in the Noise Control Engineering Journal from 1978 suggests, among other single event levels, that the L_{max} in sleeping areas should not exceed 50 dBA if outdoor levels exceed an L_{dn} of 65 dBA. Some Bay Area communities (e.g., cities of Pleasanton and Fremont), have adopted this 50 dBA L_{max} guideline as part of their general plans to address intermittent intrusive sounds in sleeping areas where there are frequent single events such as train pass-bys.

Fundamentals of Environmental Ground-Borne Vibration

Ground-borne vibration is radiated through the ground, and is an oscillatory motion that can be described in terms of the displacement, velocity, or acceleration. The rumbling sound caused by the vibration of room surfaces is called ground-borne noise. This normally only occurs in subterranean rooms adjacent to subways. Sources of ground-borne vibrations include natural phenomena (e.g., earthquakes, volcanic eruptions, sea waves, landslides), or man-made causes (e.g., explosions, machinery, traffic, trains, construction equipment). Vibration sources may be continuous, such as factory machinery, traffic, trains, and most construction vibrations (with the exception of pile driving, blasting, and some other types of construction/demolition), or transient, such as explosions.[4]

---

1 *Cowen, Handbook of Environmental Acoustics, 1994.*

2 *U.S. Environmental Protection Agency, EPA Identifies Noise Levels Affecting Health and Welfare, website: http://www.epa.gov/history/topics/noise/01.htm, January 11, 2008.*

3 *Stockholm University and the Karolinska Institute, 1995.*

4 *California Department of Transportation, Transportation Related Earthborne Vibrations, Technical Advisory Number TAV-02-01-R9601, February 20, 2002.*

Ground motion caused by vibration can be measured as particle velocity in inches per second. The peak particle velocity (PPV) is defined as the maximum instantaneous positive or negative peak of the vibration signal. The PPV threshold of perception for humans falls approximately in the 0.006-0.019-in./sec. range[5]. Most perceptible indoor vibration is caused by sources within buildings, such as operation of mechanical equipment, movement of people, or the slamming of doors. Typical outdoor sources of perceptible ground-borne vibration are construction equipment, steel-wheeled trains, and traffic on rough roads. If a roadway is smooth, the ground-borne vibration from traffic is rarely perceptible.

Construction Vibration

The general human reaction to various continuous vibration levels, as well as their potential damage to buildings, is described in Table IV.L-2.

As shown in Table IV.L-2, 0.08 inch/second PPV is the level at which continuous vibrations are readily perceptible by people, and 0.10 inch/second PPV is the level at which continuous vibrations begin to annoy people in buildings. It should be noted, however, that the annoyance levels in Table IV.L-2 need to be interpreted with care. Depending on the activity (or inactivity) a person is engaged in, vibrations may be annoying at much lower levels than those shown in Table IV.L-2. In particular, elderly, retired, or ill people staying mostly at home, people reading in a quiet environment, and people involved in vibration-sensitive hobbies or other activities are but a few examples of people that are potentially annoyed by much lower vibration levels.[6]

Railroad Train Vibration

Railroad operations are potential sources of substantial ground vibration depending on distance, the type and the speed of trains, and the type of railroad track. Human response to ground vibration has been correlated best with the velocity of the ground. The velocity of the ground is expressed on the decibel scale. The reference velocity is 1×10^{-6} in./sec. RMS, which equals 0 VdB, and 1 in./sec. equals 120 VdB. Although not a universally accepted notation, the abbreviation "VdB" is used in this document for vibration decibels to reduce the potential for confusion with sound decibels.

One of the problems with developing suitable criteria for ground-borne vibration is the limited research into human response to vibration and more importantly human annoyance inside buildings. The U.S. Department of Transportation, Federal Transit Administration (FTA) has developed vibration limits that can be used to evaluate human annoyance to ground-borne vibration[7]. These criteria are primarily based on experience with passenger train operations, such as rapid transit and commuter rail systems. The main

---

[5] *Ibid.*

[6] *Ibid..*

[7] *U.S. Department of Transportation, Federal Transit Administration, Transit Noise and Vibration Impact Assessment, FTA-VA-90-1003-06, May 2006.*

difference between passenger and freight operations is the time duration of individual events; a passenger train may last a few seconds whereas a long freight train may last several minutes, depending on speed and length.

Table IV.L-2
Reaction of People and Damage to Buildings at Various Continuous Vibration Levels

Vibration Level (Peak Particle Velocity – in./sec.)[a]	Human Reaction	Effect on Buildings
0.006-0.019	Threshold of perception; possibility of intrusion.	Vibrations unlikely to cause damage of any type.
0.08	Vibrations readily perceptible.	Recommended upper level of the vibration to which ruins and ancient monuments should be subjected. This criterion level may also be used for historical buildings, or buildings that are in poor condition.
0.10	Level at which continuous vibrations begin to annoy people.	Virtually no risk of "architectural" damage to normal buildings.
0.20	Vibrations annoying to people in buildings (this agrees with the levels established for people standing on bridges and subjected to relatively short periods of vibrations).	Threshold at which there is a risk of "architectural" damage to normal dwelling-houses with plastered walls and ceilings. Special types of finish such as lining of walls, flexible ceiling treatment, etc., would minimize "architectural" damage.
0.4-0.6	Vibrations considered unpleasant by people subjected to continuous vibrations and unacceptable to some people walking on bridges.	Vibrations at a greater level than normally expected from traffic, but would cause "architectural" damage and possibly minor structural damage.

[a] *The vibration levels are based on peak particle velocity in the vertical direction. Where human reactions are concerned, the value is at the point at which the person is situated. For buildings, the value refers to the ground motion. No allowance is included for the amplifying effect, if any, of standard components.*

Source: California Department of Transportation, Transportation Related Earthborne Vibrations, Technical Advisory Number TAV-02-01-R9601, February 20, 2002.

Regulatory Setting

Federal

Noise

No federal plans, policies, regulations or laws related to noise are applicable to the proposed Project.

Ground-Borne Vibration – Railroad Trains

This analysis uses the FTA's vibration impact criteria for sensitive buildings, residences, and institutional land uses near railroads. The thresholds for residences and buildings where people normally sleep (e.g.,

nearby residences) are 72 VdB for frequent events (more than 70 events of the same source per day), 75 VdB for occasional events (30 to 70 vibration events of the same source per day), and 80 VdB for infrequent events (fewer than 30 vibration events of the same source per day).

State

Noise

The State's Guidelines for Noise and Land Use Compatibility Criteria, summarized in Table IV.L-3, are to be considered by local governments when setting standards for human exposure to noise and preparing noise elements for general plans.

As shown in Table IV.L-3, residential land uses and other noise-sensitive receptors generally should be located in areas where outdoor ambient noise levels do not exceed 65 to 70 dBA (L_{dn} or community noise equivalent level [CNEL]). For single-family, duplex, and mobile homes, an exterior noise level up to 60 dBA (L_{dn} or CNEL) is considered to be a "normally acceptable" noise level, which is based on the assumption that any buildings involved are of normal construction that would not require special noise insulation. For multi-family homes, motels, and hotels, an exterior noise level up to 65 dBA (L_{dn} or CNEL) is considered to be a "normally acceptable" noise level. Between these noise values and 70 dBA (L_{dn} or CNEL), exterior noise levels for these land uses would be considered to be "conditionally acceptable," where construction should only occur after a detailed analysis of the noise reduction requirements is made and needed noise attenuation features are included in the project. Conventional construction, but with closed windows and fresh air supply systems or air conditioning will normally suffice. For commercial uses, exterior noise levels up to 70 dBA (L_{dn} or CNEL) are considered to be a "normally acceptable" noise level, while exterior noise levels up to 77 dBA (L_{dn} or CNEL) are considered to be a "conditionally acceptable" noise level.

The State of California establishes minimum noise insulation performance standards for hotels, motels, dormitories, apartment houses, and dwellings other than detached single-family dwellings as set forth in the 2007 California Building Code (Chapter 12, Appendix Section 1207.11.2). The noise limit is a maximum interior noise level of 45 dBA L_{dn}. Where exterior noise levels exceed 60 dBA L_{dn}, a report must be submitted with the building plans describing the noise control measures that have been incorporated into the design of the project to meet the noise limit. The City of Healdsburg has not adopted these particular regulations.

Ground-Borne Vibration - Construction

No state plans, policies, regulations or laws related to ground-borne vibration are applicable to the proposed Project. However, Caltrans has adopted guidance for construction vibrations and this guidance is used in this analysis to address construction vibrations.

Table IV.L-3
Noise and Land Use Compatibility Criteria

Land Use	Community Noise Exposure (L_{dn} or CNEL, dB)			
	Normally Acceptable[a]	**Conditionally Acceptable[b]**	**Normally Unacceptable[c]**	**Clearly Unacceptable[d]**
Single-family, Duplex, Mobile Homes	50 - 60	55 - 70	70 - 75	above 70
Multi-Family Homes	50 - 65	60 - 70	70 - 75	above 70
Schools, Libraries, Churches, Hospitals, Nursing Homes	50 - 70	60 - 70	70 - 80	above 80
Transient Lodging – Motels, Hotels	50 - 65	60 - 70	70 - 80	above 80
Auditoriums, Concert Halls, Amphitheaters	---	50 - 70	---	above 65
Sports Arena, Outdoor Spectator Sports	---	50 - 75	---	above 70
Playgrounds, Neighborhood Parks	50 - 70	---	67 - 75	above 72
Golf Courses, Riding Stables, Water Recreation, Cemeteries	50 - 75	---	70 - 80	above 80
Office Buildings, Business and Professional Commercial	50 - 70	67 - 77	above 75	---
Industrial, Manufacturing, Utilities, Agriculture	50 - 75	70 - 80	above 75	---

[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 reduction requirements is made and needed noise insulation features included in the design. Conventional construction, but with closed windows and fresh air supply systems or air conditioning will normally suffice.*
[c] *Normally Unacceptable: New construction or development should generally be discouraged. If new construction or development does proceed, a detailed analysis of the noise reduction requirements must be made and needed noise insulation features included in the design.*
[d] *Clearly Unacceptable: New construction or development should generally not be undertaken.*

Source: Governor's Office of Planning and Research, General Plan Guidelines, 2003.

Local

City of Healdsburg General Plan

The current General Plan establishes Goal H in the Health and Safety Element, "…to protect the residents of Healdsburg from the harmful effects of exposure to excessive noise and to ensure noise exposure compatibility between neighboring land uses." Policies in support of Goal H include the following:

1. New development projects shall not be approved unless they are generally consistent with the Land Use Compatibility for Community Noise Environments guidelines contained in Figure II-6 and it is demonstrated that they will not violate the City's ordinance to regulate excessive noise.
2. A noise study, including field noise measurement, shall be required for any proposed project that would:
    a. Place a potentially intrusive noise source near an existing noise sensitive receptor, or

   b. Place a noise sensitive land use near an existing potentially intrusive noise source such as a freeway or arterial street or railroad.

3. The City shall encourage the inclusion of site design techniques for new construction to minimize noise impacts, including building placement, landscaped setbacks, orientation of noise-tolerant components (i.e. parking, utility areas, and maintenance facilities) between noise sources and the sensitive receptor areas.
4. The City shall encourage the use of architectural design techniques to meet noise attenuation requirements, such as:
   a. Using noise-tolerant rooms (garages, kitchens, bathrooms) to shield noise sensitive rooms or areas (living rooms, bedrooms).
   b. Using architectural design techniques and building façade materials that help shield noise.
5. Work with state and federal agencies to actively enforce regulations dealing with noise. Examples include the California Vehicle Code governing motor vehicle noise emissions and federal vehicle construction standards.
6. New equipment and vehicles purchased by the City shall comply with noise level performance standards consistent with the best available noise reduction technology.

The current General Plan includes land use compatibility standards for noise, measured in decibels. The General Plan's noise standards are further based on Day-Night Average Sound Level (L_{dn}). L_{dn} is the A-weighted average sound level in decibels during a 24-hour period with a 10 dB weighting applied to nighttime sound levels (10 p.m. to 7 a.m.). L_{dn} reflects noise exposure over an average day, with weighting to reflect nighttime sensitivity. The 24-hour day is divided into two intervals form 7:00 a.m. to 10:00 p.m., and the nighttime interval from 10:00 p.m. to 7:00 a.m. A 10 dB weighting factor is added to the sound levels occurring during the nighttime period interval to account for the greater sensitivity of people to noise during these hours.

As shown in Table IV.L-4, the City considers single-family residential land uses "normally acceptable" in noise environments of 60 dBA L_{dn} or less. Single-family residential land uses are considered "conditionally acceptable" in noise environments between 55 dBA L_{dn} and 70 dBA L_{dn}. In noise environments greater than 70 dBA L_{dn} but less than 75 dBA L_{dn}, residential land uses are considered "normally unacceptable." Residential land uses are considered "clearly unacceptable" in noise environments exceeding 75 dBA L_{dn}.

A summary of the noise policies proposed by the General Plan update can be found on pages IV.L-18 through IV.L-20.

Table IV.L-4
Current Healdsburg General Plan Figure II-6
Land Use Compatibility for Community Noise Environments

Land Use	Community Noise Exposure (L_{dn} or CNEL, dB)			
	Normally Acceptable[a]	**Conditionally Acceptable[b]**	**Normally Unacceptable[c]**	**Clearly Unacceptable[d]**
Residential – Low Density Single Family, Duplex, Mobile Home	<60	55-70	70-75	75+
Residential - Multifamily	<65	60-70	70-75	75+
Transient Lodging – Motel, Hotel	<65	60-70	70-80	80+
Schools, Libraries, Churches, Hospitals, Nursing Homes	<70	60-70	70-80	80+
Auditoriums, Concert Halls, Amphitheaters		<70	65+	
Sports Arena, Outdoor Spectator Sports		<75	70+	
Playgrounds, Neighborhood Parks	<70		67.5-75	72.5+
Golf Courses, Riding Stables, Water Recreation, Cemeteries	<75		70-80	80+
Office Building, Business Commercial, and Professional	<70	67.5-77.5	75+	
Industrial, Manufacturing, Utilities, Agriculture	<75	70-80	75+	

Notes: dBA = A-weighted decibels; Ldn = day-night average noise level

a Specified land use is satisfactory based on the assumption that any buildings involved are of normal conventional construction, without any special noise insulation requirements.

b New construction or development should be undertaken only after a detailed analysis of the noise reduction requirements is made and after needed noise insulation features are included in the design. Conventional construction, but with closed windows and fresh-air supply systems or air conditioning, will normally suffice.

c New construction or development should generally be discouraged. If new construction or development does proceed, a detailed analysis of the noise reduction requirements must be made and needed noise insulation features included in the design. Outdoor areas must be shielded.

d New construction or development should generally not be undertaken.

Source: Healdsburg General Plan.

City of Healdsburg Noise Ordinance

City Ordinance 1011 is a quantitative noise ordinance that prohibits excessive noise. Sections of Ordinance 1011 that will be applicable to projects developed under the proposed General Plan are as follows:

> *SECTION 5. Prohibition Against Excessive Noise.*
>
> *Notwithstanding any other provision of this ordinance and in addition thereto, it is unlawful for any person to willfully make, create, maintain or continue, or cause to be made or continued directly or indirectly any loud, excessive, unnecessary or unusual noise which disturbs the peace and quiet of any neighborhood or which causes discomfort or annoyance to any reasonable*

person of normal sensitiveness residing in the area or in any manner prohibited by or by not complying with the provisions of this ordinance, and shall be punishable as specified hereafter.

SECTION 7. Construction and Temporary Activities.

A. Noise sources associated with or vibration created by construction, repair, remodeling, or grading of any real property or during authorized seismic surveys are permitted, provided such activities do not take place between the nighttime hours of 6:00 p.m. and 7:30 a.m. daily, or at any time on Sunday or a legal holiday, and provided the noise level created by such activities and any vibration created does not endanger the public health, welfare and safety.

C. Nothing in this Section shall be construed to prohibit construction activities that do not exceed the ambient noise level by more than ten (10) dBA, such as painting or interior work.

SECTION 8. Standards for Maximum Sound Levels and Determining Violations.

Sound Level Standards

It is the objective of the City to require intruding noise levels not to exceed those listed in Table IV.L-5 to determine if a violation exists:

Table IV.L-5
City of Healdsburg Sound Level Standards

Receptor Land Use	Daytime Exterior Sound Level (dBA L_{10})	Nighttime Exterior Sound Level (dBA L_{10})
Residential zoned properties not located adjacent to Industrial zoned properties and Office zoned properties	60	55
Residential zoned properties located adjacent to Industrial zoned properties	65	55
Commercial zoned properties	65	60
Industrial zoned properties	75	70

Notes:
dBA = A-weighted decibel; L_{10} = the sound pressure level that is exceeded for 10% of the time for which the given sound is measured.

Source: City of Healdsburg, 2004.

Acoustical Environment

Much of the city consists of residential areas with a generally peaceful acoustical environment. Existing noise-sensitive land uses include residential, parks, schools, and the hospital. The main sources of noise affecting these noise-sensitive land uses include traffic, particularly along U.S. Highway 101 and arterials

such as Healdsburg Avenue, various industrial uses, certain downtown uses which collectively or intermittently create a higher than average sound level, and aircraft. The majority of ambient noise sources are located between U.S. Highway 101 to the west and Healdsburg Avenue to the east.

Table IV.L-6 indicates sound levels measured at locations in the city made between June and October of 2002. The locations, shown in Figure IV.L-1, were selected to examine diverse locales within the city, with emphasis on noise-sensitive land use areas. Some of these locations are noise-impacted areas because they exceed the normally-acceptable noise threshold defined by the General Plan. Due to a lack of information on the methodology used for these measurements and their age, additional noise measurements were made in September and October 2007 (see Appendix F for exact dates).

Table IV.L-6
Sound Level Measurements in dBA at Selected Locations in Healdsburg – 2002

Location	CNEL	Comments
Lupine Road	53	South side of Lupine Road/NE corner of Sunnyvale
Spruce Way	58	SW corner of Sunnyvale/Spruce
1300 Block of Prentice Drive	59	Healdsburg General Hospital
Ferraro and Lupine	56	Area of new homes
435 Allan Court	60	City offices
97 Kennedy Lane	57	Mobile homes
204 Tucker Street	56	Residential
1272 Orchard Street	54	Residential
1300 Pinon Drive	55	Residential
208 Almond Drive	62	Residential
800 Canary Court	57	Residential (near city pumps)
Badger Park	59	Park
118 North Street	61	Commercial
220 Matheson Street	61	Across from Healdsburg Museum
Chiquita Road (US 101)	72	South side of Chiquita, 200 feet east of US 101
Burgundy Road (US 101)	71	South end of Burgundy Road
Chardonnay Drive (US 101)	72	50 feet from US 101

Source: Healdsburg 2030 General Plan Background Report - January 2009. Original Source: Lumina Technology, November 7, 2002.

These updated measurements included a combination of 6 long-term (minimum 48-hour duration) measurements conducted during the daytime, evening, and nighttime, and 10 short-term (10-minute spot) measurements throughout the city. Standard measuring practices were followed: precision sound level meters were calibrated before and after each survey, microphones were fitted with windscreens, and data were gathered during good weather.

The locations of the long-term (LT) and short-term (ST) noise measurements and the results of the measurements are summarized in Tables IV.L-7 and IV.L-8. Additional noise measurements conducted in the city within the last several years have also been included in the data summary. The ranges of noise

Figure IV.L-1 Noise Measurement Locations

This page intentionally left blank.

levels are presented during the daytime hours (7:00 a.m. to 10:00 p.m.) and the nighttime hours (10:00 p.m. to 7:00 a.m.), as well as the 24-hour day/night of hourly average noise levels (L_{dn}). The detailed results of each long-term measurement are shown in Figures A-2 through A-27 in Appendix F to this Revised Draft EIR. The noise measurement results reflect the variety of noise environments encountered throughout the city.

Table IV.L-7
Long-Term Noise Measurement Summary

Site	Location	Dates	Noise Level (dBA)		
			Daytime Range of Hourly Average Noise Levels (L_{eq})	Nighttime Range of Hourly Average Noise Levels (L_{eq})	L_{dn}
LT-1	~115 feet from the center of Highway 101 on West Matheson.	(9/25/07 to 9/27/07)	69-73	63-73	75
LT-2	~135 feet from the centerline of Healdsburg Avenue.	(9/25/07 to 9/27/07)	57-62	48-62	64
LT-3	South property line of Badger Park.	(9/27/07 to 10/1/07)	40-54	38-53	53-55
LT-4	~50 feet from the center of Matheson Street at Second Street.	(9/27/07 to 10/1/07)	53-66	44-61	60-63
LT-5	~90 feet from the center of University Street at Lincoln Street.	(9/27/07 to 10/1/07)	45-63	38-57	56-58
LT-6	~50 feet from the center of Powell Avenue at Brown Street.	(9/27/07 to 10/1/07)	51-65	45-60	62-64
LT-2003a - Saggio Hills	Proposed setback of nearest residential units from Healdsburg Avenue.	(6/12/03 to 6/16/03)	45-55	39-49	55
LT-2003b	~70 feet from the centerline of Healdsburg Avenue at Paul Wittke Drive.	(6/26/03 to 6/30/03)	63-68	54-65	68
LT-2004a	Southwest of Syar Industries	(9/30/04 to 10/1/04)	57-60	43-59	60
LT-2004b	~55 feet from the centerline of Healdsburg Avenue north of Grant Avenue.	(9/30/04 to 10/1/04)	63-72	56-70	72

Source: Illingworth & Rodkin, 2003, 2004, and 2007.

Vehicle Traffic

The loudest source of noise in the Planning Area is U.S. Highway 101. Noise levels measured at the edge of the highway right-of-way, approximately 115 feet from its center, yielded a day-night average noise level of 75 dBA L_{dn}. The primary north-south arterial roadway is Healdsburg Avenue, where noise levels were measured to be 64 dBA L_{dn} at 135 feet from the center of the roadway. When adjusted for distance,

vehicle traffic along Healdsburg Avenue generates a day-night average noise level of 70 dBA L_{dn} at 50 feet. Noise levels along primary north-south and east-west collector streets including University Street, Powell Avenue, and Matheson Street ranged from 61 to 64 L_{dn} at a distance of 50 feet. The Planning Area remains quiet away from streets carrying substantial through traffic.

Table IV.L-8
Short-Term Noise Measurement Summary

Site	Location	Date/Time	Noise Level (dBA)					
			$L_{(1)}$	$L_{(10)}$	$L_{(50)}$	$L_{(90)}$	L_{eq}	Estimated L_{dn}
ST-1	~115 feet from the center of Healdsburg Avenue	9/27/07 9:10 a.m.	72	66	56	48	62	66
ST-2	~525 feet from the North Bound Edge of Highway 101	9/27/07 9:10 a.m.	60	58	54	49	55	57
ST-3	~300 feet from the northbound edge of Highway 101	9/27/07 9:42 a.m.	73	66	61	56	63	63
ST-4	~75 feet from the center of Grove Street at Carson Warner Skatepark	9/27/07 10:02 a.m.	68	60	51	45	56	61
ST-5	~50 feet from the center of Healdsburg Avenue at Palm Avenue	9/27/07 10:40 a.m.	76	68	56	52	64	65
ST-6	~60 feet from the center of Parkland Farms Boulevard at Appaloosa Trail	9/27/07 2:40 p.m.	69	63	45	42	58	59
ST-7	~50 feet from the center of March Avenue at Lupine Road	9/27/07 3:00 p.m.	72	67	62	52	64	64
ST-8	~50 feet from the center of Piper Street at Johnson Street, east of the Library	9/27/07 3:24 p.m.	69	64	58	51	60	60
ST-9	~50 feet from the center of Fitch Street at Plaza Street	9/27/07 3:40 p.m.	65	60	52	48	56	56
ST-10	~50 feet from the Center of Front Street	9/27/07 4:00 p.m.	70	64	58	52	61	61

Source: Illingworth & Rodkin, 2007.

Northwest Pacific Railroad

The Northwest Pacific Railroad (NWP) roughly parallels Healdsburg Avenue throughout the City. Freight service has not operated on the NWP since 2001. The North Coast Railroad Authority (NCRA) and Sonoma Marin Area Rail Transit (SMART) propose to re-activate the line with the addition of freight and commute trains. NCRA estimates that freight service could eventually grow to three round trips per day, six days per week, with one 25-car train and two 60-car trains[8]. An EIR is currently under preparation by NCRA. On July 16, 2008, the SMART Board of Directors certified a Supplemental EIR

[8] *SMART Memorandum, IX. NCRA Background Information, July 19, 2007.*

for the SMART rail project that analyzed noise and vibration impacts resulting from passenger rail service anticipated to begin in 2013 with weekday (twelve round trips per day) and weekend (four round trips per day) passenger rail service, as well as a cumulative scenario including potential freight activity. Although the line is not currently a noise source in the community, planned activation of the NWP will result in elevated noise levels at receivers located along the line and in the vicinity of "at-grade" rail crossings. Train warning whistles can generate maximum noise levels of approximately 105 dBA at 100 feet and would be audible throughout the community. Trains are also a source of perceptible ground-borne vibration within approximately 100 feet of the tracks.

Aircraft

Aircraft using Healdsburg Municipal Airport intermittently contribute to ambient noise levels in the city. This general aviation airport is located approximately one mile northwest of the city. The airport averages about 86 aircraft operations per day.[9] Approximately 80 percent of aircraft operations are local general aviation, and 20 percent are transient general aviation. Aircraft based at the field include 61 single-engine light aircraft and two twin-engine aircraft. The length of the runway precludes jet activity at the airport. The City promotes noise reduction practices by airport users, including avoiding flying over sensitive areas, reducing engine power when safe, and limiting practice landings.

Charles M. Schulz Sonoma County Airport is located approximately six miles south-southeast of the City. General aviation aircraft and corporate jets intermittently fly over the city on approach to or after departure from this airport. In 2007, a commercial air carrier (Horizon Air) resumed commercial air service with flights to Los Angeles, Portland, and Seattle. Currently, the number of aircraft operations associated with Charles M. Schulz Sonoma County Airport over the City is low and noise generated by these events does not measurably contribute to ambient daily average noise levels.

Aircraft noise in California is described in terms of the CNEL, which is approximately equivalent to the day/night average noise level (L_{dn}) but includes a 5 dB weighting factor for the evening hours (7:00 p.m. to 10:00 p.m.). The 60 dBA CNEL noise contours[10] generated by Healdsburg Municipal Airport and Charles M. Schulz Sonoma County Airport do not extend to the City. Intermittent aircraft noise is considered compatible with existing sensitive uses.

Stationary Noise Sources

The predominant stationary noise source in the City is Syar Industries' gravel and sand processing operation near the Russian River. Noise measurements were conducted in 2007 at Badger Park approximately 800 feet north of the plant to quantify operational noise levels. The average noise level

---

[9] *FAA Information for Healdsburg Municipal Airport, website: www.airnav.com/airport/O31, October 25, 2007.*

[10] *Sonoma County Comprehensive Airport Land Use Plan, Sonoma County Airport Land Use Commission, adopted January 2001, amended October 2001.*

was about 55 dBA L_{eq} during busy operational periods at the plant, which is within the General Plan guidelines. The plant generates audible noise levels within several thousand feet.

Noise is also generated on individual parcels whether designated as industrial, commercial or residential (e.g., office equipment and industrial machinery). These noise sources are regulated by the City's Noise Ordinance and in general do not negatively affect the overall noise environment throughout the community.

PROPOSED GENERAL PLAN POLICIES AND IMPLEMENTATION MEASURES

Proposed General Plan policies and implementation measures that affect or pertain to noise are listed below.

Policies

- *LU-C-4:* Development at the interface of different land use designations shall be designed to ensure compatibility between the uses.
- *S-G-1:* New development shall not be approved unless it is generally consistent with the Land Use Compatibility for Community Noise Environments guidelines contained in General Plan Figure 10 and it is demonstrated that the new development will not violate the City's ordinance regulating excessive noise.
- *S-G-2:* The City will require the inclusion of design techniques in new construction that minimize noise impacts, including building location and orientation, building design features, and placement of noise-tolerant components (i.e., parking, utility areas, and maintenance facilities) between noise sources and the sensitive receptor areas where necessary to meet the Land Use Compatibility for Community Noise Environments guidelines contained in General Plan Figure 10.
- *S-G-3:* New equipment and vehicles purchased by the City shall have the best available noise reduction technology.
- *S-G-4:* The City will promote compliance with state and federal noise regulations.
- *S-G-5:* The City will work to minimize noise impacts related to passenger or freight rail service, if necessary.

Policy Implementation Measures

- *S-16:* Require a noise study, including field noise measurements, for any proposed project that would place a potentially-intrusive noise source near an existing noise-sensitive use or place a noise-sensitive land use near an existing or potentially-intrusive noise source such as a freeway, arterial street or railroad.

- *S-17:* Purchase new equipment and vehicles that has the best available noise reduction technology.
- *S-18:* Work with state and federal agencies to actively enforce regulations dealing with noise, such as the California Vehicle Code governing motor vehicle noise emissions and federal construction vehicle standards.
- *S-19:* Work with entities providing passenger or freight rail service to utilize equipment and operate in a manner that minimizes noise impacts to the community to the maximum feasible extent. Seek the installation of supplementary safety measures at highway-rail grade crossings in order to apply for Quiet Zones in the city.
- *S-20:* Where necessary, require the provision of sound-proofing and other similar noise-attenuating measures in residential development when proximate to noise sources.
- *S-21:* Require that prospective purchasers and tenants of residential units proximate to non-residential uses are advised of potential noise and other elements typically associated with such uses.
- *S-22:* Review the City's noise ordinance and revise as necessary to ensure consistency with the noise standards contained in Table IV.L-9.
- *S-23:* Use the Federal Transit Administration's vibration impact criteria to evaluate the land use compatibility of sensitive uses proposed along the railroad using the best available information (without active railroad operations) or site-specific analyses (with active railroad operations). Developers of sensitive uses shall demonstrate that potential impacts of existing or potential vibration have been minimized to the maximum feasible extent.
- *S-24:* Enforce provisions in the City's waste collection franchisee agreement regarding collection hours and noise generated by collection vehicles.
- *S-25:* Where construction occurs that would result in a potentially-significant impact on noise-sensitive uses, require use of noise-reducing measures that may include the following:
    a. Equip internal combustion engine-driven equipment with intake and exhaust mufflers that are in good condition and are appropriate for the equipment.
    b. Locate stationary noise-generating equipment as far as possible from sensitive receptors in the vicinity.
    c. Utilize "quiet" air compressors and other stationary noise sources where technology exists.
    d. Erect temporary noise control blanket barriers in a manner to shield noise-sensitive uses.
    e. Control noise levels from workers' amplified music so that sounds are not audible sensitive receptors in the vicinity.

Table IV.L-9
Proposed General Plan
Land Use Compatibility for Community Noise Environments

Land Use Category	Community Noise Exposure (dBA L_{dn})			
	Normally Acceptable[1]	**Conditionally Acceptable[2]**	**Normally Unacceptable[3]**	**Clearly Unacceptable[4]**
Residential - Low Density Single Family, Duplex, Mobile Home	<60[5]	55–70	70–75	75+
Residential - Multifamily	<65[6]	60–70	70–75	75+
Residential - Interior	≤45	≤45	>45	
Transient Lodging - Motels, Hotels	<65	60–70	70–80	80+
Schools, Libraries, Churches, Hospitals, Nursing Homes	<70	60–70	70–80	80+
Auditoriums		<70	65+	
Outdoor Spectator Sports		<75	70+	
Playgrounds, Neighborhood Parks	<70		67.5–75	72.5+
Golf Courses, Water Recreation, Cemeteries	<75		70–80	80+
Commercial – Retail, Offices, Services	<70	67.5–77.5	75+	
Industrial, Utilities, Agriculture	<75	70–80	75+	

Notes: dBA = A-weighted decibels; L_{dn} = day-night average noise level

[1] *Specified land use is satisfactory based on the assumption that any buildings involved are of normal conventional construction, without any special noise insulation requirements.*

[2] *New construction or development should be undertaken only after a detailed analysis of the noise reduction requirements is made and after needed noise insulation features are included in the design. Conventional construction, but with closed windows and fresh-air supply systems or air conditioning, will normally suffice.*

[3] *New construction or development should generally be discouraged. If new construction or development does proceed, a detailed analysis of the noise reduction requirements must be made and needed noise insulation features included in the design. Outdoor areas must be shielded.*

[4] *New construction or development should generally not be undertaken.*

[5] *Private use areas*

[6] *Outdoor areas, excluding balconies*

f. Designate a "disturbance coordinator" responsible for responding to complaints about project construction noise and taking reasonable measures to correct the problem. Conspicuously post a telephone number for the disturbance coordinator at the construction site and include it in any notice sent to neighbors regarding the construction schedule.

ENVIRONMENTAL IMPACTS

Methodology

The potential development allowed by the proposed General Plan was reviewed to identify areas where temporary construction noise impacts could occur. Traffic noise levels throughout Healdsburg were modeled to determine how changes in vehicular traffic volumes will affect traffic noise levels along existing roadways. The modeling reflected information contained in the proposed General Plan and the Traffic Impact Analysis prepared for the proposed Project, as well as ambient noise data gathered during the noise monitoring survey. The compatibility of proposed land uses was then compared to future noise and vibration levels expected with the implementation of the proposed General Plan. The proposed General Plan policies were reviewed to determine if the proposed policies adequately mitigated impacts resulting from the implementation of the proposed General Plan. Where additional mitigation is required, additional policies have been recommended.

Thresholds of Significance

In accordance with Appendix G to the CEQA Guidelines, the proposed Project would result in significant noise impacts if it would result in:

(a) Exposure of persons to or generation of noise levels in excess of standards established in any applicable plan or noise ordinance, or applicable standards of other agencies;

(b) Exposure of persons to or generation of excessive ground-borne vibration or ground-borne noise levels;

(c) A substantial permanent increase in ambient noise levels in the project vicinity above levels existing without the project;

(d) A substantial temporary or periodic increase in ambient noise levels in the project vicinity above levels existing without the project;[11]

(e) Exposure of people residing or working in the project vicinity to excessive noise levels if the project is located within an area covered by an airport land use plan, or where such plan has not been adopted, within two miles of a public airport or public use airport; or

(f) Exposure of people residing or working in the project vicinity to excessive noise levels if the project is located in the vicinity of a private airstrip.

---

[11] *CEQA does not define substantial or temporary. To evaluate temporary construction impacts, criteria was developed based on available literature regarding speech and activity interference (i.e., 60 dBA Leq and 5 dBA Leq above ambient for more than one year).*

The State CEQA Guidelines do not define the levels at which ground-borne vibration or ground-borne noises are considered "excessive." This analysis uses the FTA's vibration impact criteria for sensitive buildings, residences, and institutional land uses. The thresholds for residences and buildings where people normally sleep (e.g., nearby residences) are 72 VdB for frequent events (more than 70 events of the same source per day), 75 VdB for occasional events (30 to 70 vibration events of the same source per day), and 80 VdB for infrequent events (less than 30 vibration events of the same source per day).

The CEQA Guidelines do not define the levels at which permanent increases in ambient noise are considered "substantial." As discussed previously in this section, a noise level increase of 3 dBA is barely perceptible to most people, a 5 dBA increase is readily noticeable, and a difference of 10 dBA would be perceived as a doubling of loudness. Based on this information, an increase in the L_{dn} noise level resulting from the proposed Project at noise-sensitive land uses of 3 dBA L_{dn} or greater would be considered a significant impact when projected noise levels would exceed those considered satisfactory for the affected land use (e.g., 60 dBA L_{dn} for single-family residential land uses). If the noise environment at the sensitive land use would remain below normally acceptable noise levels, a 5 dBA L_{dn} increase in noise levels would be considered significant.

The CEQA Guidelines also do not define the levels at which temporary increases in ambient noise are considered "substantial." Noise resulting from construction would be an example of a temporary noise source. These noises are treated somewhat differently than permanent noise sources. A significant noise impact would occur if noise from construction activities would exceed 60 dBA L_{eq} and the ambient noise environment by 5 dBA L_{eq} or more for a period greater than one construction season.

Project Impacts

Impact IV.L-1: The proposed Project would not result in the exposure of persons to or generation of noise levels in excess of standards established in any applicable plan or noise ordinance for residential uses exposed to stationary noise sources, or applicable standards of other agencies.

Applicable noise ordinances include exterior noise limits of 60 dBA L_{dn}, as specified in the City of Healdsburg General Plan, for residential uses exposed to transportation noise sources, and the standards listed in the City Municipal Code (refer to Table IV.L-5) for residential uses exposed to stationary (i.e., non-transportation) noise sources (e.g., daytime and nighttime exterior noise limits of 60 and 55 dBA L_{10}, respectively).

Temporary Construction Noise Increase

The proposed Project will allow growth within the Planning Area. Residences and businesses located adjacent to proposed development will be affected by construction noise during buildout. Construction noise impacts primarily result when construction activities occur during noise-sensitive times of the day (early morning, evening, or nighttime hours), the construction occurs in areas immediately adjoining noise-sensitive land uses, or when construction durations last over extended periods of time.

Major noise-generating construction activities will include removal of existing pavement and structures, site grading and excavation, the construction of the building core and shell, paving, and landscaping. These activities will temporarily elevate noise levels by 15 to 20 dBA or higher at adjacent businesses and residences. The highest construction noise levels will be generated during grading and excavation because of the use of heavy equipment, with lower noise levels occurring during building construction.

The EPA has compiled data regarding the noise-generating characteristics of specific types of construction equipment and typical construction activities, which are represented in Tables IV.L-10 and IV.L-11. Large pieces of earth-moving equipment, such as graders, scrapers, and bulldozers, generate maximum noise levels of 85 to 90 dBA L_{max} at a distance of 50 feet. Typical hourly average construction-generated noise levels are about 80 to 85 dBA L_{eq} measured at a distance of 50 feet from the site during busy construction periods. During each stage of development, there will be a different mix of equipment operating and noise levels will vary based on the amount of equipment in operation and the location of the activity. These noise levels drop off at a rate of about 6 dBA per doubling of distance. Intervening structures or terrain will result in lower noise levels. In some cases, the distance between construction activities and noise-sensitive receptors will be less than 100 feet.

Table IV.L-10
Noise Ranges of Typical Construction Equipment

Construction Equipment	Noise Levels in dBA L_{eq} at 50 feet[a]
Front Loader	73–86
Trucks	82–95
Cranes (moveable)	75–88
Cranes (derrick)	86–89
Vibrator	68–82
Saws	72–82
Pneumatic Impact Equipment	83–88
Jackhammers	81–98
Pumps	68–72
Generators	71–83
Compressors	75–87
Concrete Mixers	75–88
Concrete Pumps	81–85
Back Hoe	73–95
Pile Driving (peaks)	95–107
Tractor	77–98
Scraper/Grader	80–93
Paver	85–88

[a] *Machinery equipped with noise control devices or other noise-reducing design features does not generate the same level of noise emissions as that shown in this table.*

Source: U.S. Environmental Protection Agency, 1971.

Table IV.L-11
Typical Outdoor Construction Noise Levels

Construction Phase	Noise Levels at 50 Feet with Mufflers (dBA L_{eq})	Noise Levels at 60 Feet with Mufflers (dBA L_{eq})	Noise Levels at 100 Feet with Mufflers (dBA L_{eq})	Noise Levels at 200 Feet with Mufflers (dBA L_{eq})
Ground Clearing	82	80	76	70
Excavation, Grading	86	84	80	74
Foundations	77	75	71	65
Structural	83	81	77	71
Finishing	86	84	80	74
Source: U.S. Environmental Protection Agency, 1971.				

The City's Noise Ordinance limits construction activities to between the hours of 7:30 a.m. and 6:00 p.m., Monday through Saturday provided the noise level created by such activities and any vibration created does not endanger the public health, welfare and safety. Quantitative noise limits for construction are not established in the ordinance. Construction activities are not expected to generate noise levels exceeding 60 dBA L_{eq} and increase the ambient noise environment by 5 dBA L_{eq} or more at a particular receiver for periods exceeding one construction season because the City's Noise Ordinance limits construction activities to between the hours of 7:30 a.m. and 6:00 p.m., Monday through Saturday.. However, if construction occurs that would result in a potentially-significant impact on noise-sensitive uses, proposed General Plan Implementation Measure S-25 will require use of noise-reducing measures that may include the following:

- Equip internal combustion engine-driven equipment with intake and exhaust mufflers that are in good condition and are appropriate for the equipment.
- Locate stationary noise-generating equipment as far as possible from sensitive receptors in the vicinity.
- Utilize "quiet" air compressors and other stationary noise sources where technology exists.
- Erect temporary noise control blanket barriers in a manner to shield noise-sensitive uses.
- Control noise levels from workers' amplified music so that sounds are not audible to sensitive receptors in the vicinity.
- Designate a "disturbance coordinator" responsible for responding to complaints about project construction noise and taking reasonable measures to correct the problem. Conspicuously post a telephone number for the disturbance coordinator at the construction site and include it in any notice sent to neighbors regarding the construction schedule..

Noise and Land Use Compatibility – New Sensitive Uses

Under the proposed Project, new noise-sensitive development (e.g., guest lodging, nursing homes, and churches) could occur throughout the city, and in some cases, in noisy areas. Distances to future traffic noise contours along major Healdsburg roadways are shown in Table IV.L-12. The traffic noise contours presented in this table are considered worst-case as the calculations do not account for shielding from buildings or barriers or excess attenuation provided by ground- or molecular-absorption. A map of future noise contours (Figure IV.L-2) was generated with the SoundPLAN computer model, which is a three-dimensional ray-tracing program that takes into account the sources of noise, the frequency spectra, the topography of the area, and shielding provided by buildings. Inputs to the model included the City's GIS data for roadway geometries, topography, buildings, and future roadway traffic volumes. The future roadway traffic volumes used for this analysis of potential impacts were based on the Project as proposed under the original proposed General Plan and included a greater amount of development in Planning Sub-Area C than analyzed in this Revised Draft EIR. The analysis was not updated after the modification to Sub-Area C development made by the Saggio Hills approvals, and therefore represents a conservative analysis which overestimates by two percent the trips (and resultant traffic noise) compared to traffic noise which is now anticipated. Therefore, future noise contours as shown in Table IV.L-12 and Figure IV.L-2 would be incrementally smaller (closer to the roadway) than as presented. However, the two percent reduction in trips and subsequent decrease in noise from development projected under the current proposed General Plan is not large enough to change any of the results in Table IV.L-12 and Figure IV.L-2 or the significance conclusions described in this analysis.

The City should use the noise contours map, Table IV.L-12, and Table IV.L-4 as guides to determine where additional noise studies are needed. New residential land uses proposed within the 60 dBA L_{dn} traffic noise contours would be exposed to noise levels exceeding those considered compatible with the proposed use. New noise-sensitive development proposed in the vicinity of the railroad may also be exposed to incompatible noise levels.

There are four General Plan Land Use Map amendments proposed for individual properties by the proposed Project. The first amendment would reclassify APN 089-071-003 from Highway Commercial to Industrial. This site is already used for industrial purposes and therefore there would be no change in noise impacts as a result of this reclassification. The second amendment would reclassify portions of a property from Very Low Residential to Open Space. Noise-related impacts would not be expected as a result of this reclassification. The third amendment would reclassify APNs 089-270-001/-026 from Professional Office/High Density Residential to Medium High Density Residential. Since these properties are already developed with residential uses, there would be no change in potential noise impacts. The fourth amendment would reclassify APN 089-130-060 from Professional Office/High Density Residential to High Density Residential. However, this reclassification would result only in a narrowing of the potential uses on the site (i.e., office uses would no longer be allowed); therefore, there would be no change in potential noise impacts.

Table IV.L-12
Future Noise Level Contours

Roadway	Segment	Distance from Roadway Center (feet)		
		70 dBA L_{dn}	65 dBA L_{dn}	60 dBA L_{dn}
U.S. Highway 101		240	520	1130
Grove Street	North of Dry Creek Road	--	90	200
	South of Dry Creek Road	--	60	130
	South of Grant Street	--	60	130
Vine Street	North of Matheson Street	--	60	120
	South of Matheson Street	--	80	160
Healdsburg Avenue	North of Parkland Farms Blvd.	50	100	230
	South of Parkland Farms Blvd.	70	140	310
	South of Grove Street	50	100	220
	South of Sunnyvale Drive	50	110	230
	South of Dry Creek Road	60	130	290
	South of Powell Avenue	60	120	270
	South of Grant Street	50	110	250
	South of Piper Street	60	120	260
	South of North Street	60	130	270
	South of Matheson Street	50	110	240
	South of Exchange Avenue	50	110	250
	West of Front Street	--	70	160
	East of Front Street	--	90	200
University Street	South of March Avenue	--	--	60
	South of Powell Avenue	--	--	70
	South of Grant Street	--	--	70
	South of Matheson Street	--	--	60
Front Street	North of Healdsburg Avenue	--	--	70
Parkland Farms	East of Healdsburg Avenue	--	--	90
Dry Creek Road/ March Avenue	West of Grove Street	--	90	200
	East of Grove Street	--	80	170
	East of Healdsburg Avenue	--	50	100
	West of University Street	--	--	60
Powell Avenue	East of Healdsburg Avenue	--	--	90
	East of Fitch Street	--	50	100
	East of University Street	--	--	80
Piper Street	East of Healdsburg Avenue	--	--	50
Matheson Street	West of Vine Street	--	60	130
	East of Vine Street	--	50	100
	East of Healdsburg Avenue	--	50	110
	East of Fitch Street	--	--	90
	East of University Street	--	50	100

** Data not reported within 50 feet of roadway centerline.*
Source: Illingworth & Rodkin, 2007.

Figure IV.L-2 Future Noise Contours

This page intentionally left blank.

Noise and Land Use Compatibility – New Noise-Generating Uses

New manufacturing, commercial, office, and other noise-generating uses to be developed under the proposed Project could substantially increase noise levels at existing noise-sensitive land uses or could expose persons to noise levels that exceed the City's Noise Ordinance. Typical noise conflicts would be caused by noise sources such as outdoor dining areas or bars, mechanical equipment, outdoor maintenance areas, truck loading docks, and parking lots. Development under the proposed Project would introduce new noise-generating sources adjacent to existing noise-sensitive areas and new noise-sensitive uses adjacent to existing noise-generating sources.

Proposed General Plan Policies S-G-1 and S-G-2 require that measures be incorporated into all new development to attenuate exterior and interior noise levels to those considered normally acceptable for the land use. Implementation Measure S-16 requires a noise study where a noise-sensitive land use is proposed near an existing or potentially-intrusive noise source such as a freeway, arterial street, railroad, or stationary noise source. Implementation Measure S-19 states that the City will work to minimize noise impacts to the community from the reactivation of the railroad to the maximum feasible extent. . Implementation Measure S-20 requires the provision of sound-proofing and other similar noise-attenuating measures in residential development when proximate to noise sources.

The Land Use Compatibility for Community Noise Environment guidelines presented in Figure 10 of the proposed General Plan would be used by the City to evaluate noise-sensitive land use proposals in the vicinity of known noise sources. Although these policies require project-level analyses to reduce exterior noise levels to acceptable levels, it is only inferred that interior noise levels must also be maintained at acceptable levels. New noise-generating development that could occur under the proposed General Plan will be subject to the City's Noise Ordinance, ensuring that existing residences and other noise-sensitive land uses would not be exposed to excessive noise. Policies LU-C-4, S-G-1, and S-G-2, and Implementation Measure S-16 will reduce the impacts of noise-producing land uses. Therefore, the impact resulting from the exposure of persons to or generation of noise levels in excess of standards established in any applicable plan or noise ordinance is ***less than significant***.

Impact IV.L-2: The proposed Project would not result in the exposure of persons to or generation of excessive ground-borne vibration or ground-borne noise levels.

Development under the proposed Project would not introduce new permanent sources of ground-borne vibration. Perceptible ground-borne vibration may result on an infrequent basis during construction activities. Ground-borne vibration generated during construction may be perceptible near construction sites, but the expected levels would be well below thresholds for potential cosmetic or structural damage to buildings. Specifically, if construction generated levels exceed Caltrans recommended standard of 0.2 in/sec PPV with respect to the prevention of structural damage for normal buildings or, for railroad trains, if FTA's maximum-acceptable vibration standards of 80, 75, or 72 VdB as appropriate at nearby vibration-sensitive land uses.

However, potential ground-borne vibration issues could result if vibration-sensitive development, such as a residence, is proposed close to the railroad if the NWP resumes operations. Sensitive developments proposed within approximately 100 feet of a railroad may be exposed to vibration levels exceeding the FTA's criteria. Implementation Measure S-24 will require the use of the FTA vibration impact criteria to evaluate the land use compatibility of sensitive uses proposed along the railroad using the best available information (without active railroad operations) or site-specific analyses (with active railroad operations). Developers of sensitive uses will also be required to demonstrate that potential impacts of existing or potential vibration have been minimized to the maximum feasible extent.

Therefore, the exposure of persons to or generation of excessive ground-borne vibration or ground-borne noise levels is considered a ***less-than-significant*** impact.

Impact IV.L-3: The proposed Project would result in a substantial permanent increase in ambient noise levels in the project vicinity above levels existing without the project.

As identified in Section IV.O (Traffic/Circulation), approximately daily 56,459 vehicular trips could be added to roadways in the city as development occurs under the General Plan. The traffic increases projected in Section IV.O will over time increase noise levels throughout the community. The relative increases in traffic noise along affected roadway segments are shown in Table IV.L-13. Noise levels will increase substantially (3 dBA L_{dn} or greater) along portions of Grove Street and Healdsburg Avenue.

The future roadway traffic volumes used for this analysis of potential noise impacts were based on the Project as proposed under the original proposed General Plan and included a greater amount of development in Planning Sub-Area C than analyzed in this Revised Draft EIR. The analysis was not updated after the modification to Sub-Area C development made by the Saggio Hills approvals, and therefore represents a conservative analysis which overestimates by two percent the trips (and resultant traffic noise) compared to traffic noise which is now anticipated. Therefore, future noise contours as shown in Table IV.L-12 and Figure IV.L-2 would be incrementally smaller (closer to the roadway) than as presented. However, the two percent reduction in trips and subsequent decrease in noise from development projected under the current proposed General Plan is not large enough to change any of the results in Table IV.L-12 and Figure IV.L-2 or the significance conclusions described in this analysis, with the exception of the noise increase anticipated on Parkland Farms Boulevard. The noise level along this street was projected to increase by 4 dBA based on the original project description that included 574 potential single-family units in Sub-Area C. However, the subsequent approval of the Saggio Hills project resulted in a significant reduction in potential vehicle trips for this sub-area. Therefore, the noise increase for Parkland Farms Boulevard is projected at 2 dBA.

Table IV.L-13
Roadways Experiencing Substantial Future Traffic Noise Level Increases

Roadway	Segment	Noise Level (L_{dn}, dBA)		
		Existing Noise Level at 50 feet from centerline	Future Noise Level at 50 feet from centerline	Noise Level Increase*
U.S. Highway 101		78	80	2
Grove Street	North of Dry Creek Road	65	69	**4**
	South of Dry Creek Road	64	66	2
	South of Grant Street	62	66	**4**
Vine Street	North of Matheson Street	65	67	2
	South of Matheson Street	67	68	1
Healdsburg Avenue	North of Parkland Farms Blvd.	67	70	**3**
	South of Parkland Farms Blvd.	69	72	**3**
	South of Grove Street	68	70	2
	South of Sunnyvale Drive	68	70	2
	South of Dry Creek Road	70	71	1
	South of Powell Avenue	70	71	1
	South of Grant Street	69	71	2
	South of Piper Street	69	70	1
	South of North Street	69	71	2
	South of Matheson Street	69	70	1
	South of Exchange Avenue	70	70	0
	West of Front Street	65	67	2
	East of Front Street	67	69	2
University Street	South of March Avenue	60	61	1
	South of Powell Avenue	61	62	1
	South of Grant Street	61	62	1
	South of Matheson Street	60	61	1
Front Street	North of Healdsburg Avenue	61	62	1
Parkland Farms Blvd.	East of Healdsburg Avenue	60	62[1]	2[1]
Dry Creek Road/ March Avenue	West of Grove Street	67	69	2
	East of Grove Street	66	68	2
	East of Healdsburg Avenue	64	65	1
	West of University Street	60	61	1
Powell Avenue	East of Healdsburg Avenue	63	64	1
	East of Fitch Street	64	65	1
	East of University Street	62	63	1
Piper Street	East of Healdsburg Avenue	60	60	0
Matheson Street	West of Vine Street	66	66	0
	East of Vine Street	64	65	1
	East of Healdsburg Avenue	65	65	0
	East of Fitch Street	63	64	1
	East of University Street	63	64	1

** Substantial noise level increases (i.e., 3 dBA L_{dn} or greater) are indicated in **bold** font and all such increases are in proximity to existing or potential noise-sensitive uses.*

[1] *Source: Saggio Hills Project EIR, Table 3.9-8. This estimate is based on the cumulative traffic analysis for the Saggio Hills Project and is therefore a more accurate assessment of the potential noise increase for Parkland Farms Boulevard than the traffic analysis included in Section IV.O of this Revised Draft EIR. Section IV.O assumes a higher level of traffic based on the potential addition of 574 dwelling units to Sub-Area C, rather than the Saggio Hills project, which is projected to have lower traffic volumes on Parkland Farms Boulevard. The source for all other noise estimates is Illingworth & Rodkin, 2007.*

Noise level increases anticipated along portions of Grove Street will be most apparent along the roadway frontage where Grove Street traffic is the predominant noise source. In areas away from the Grove Street frontage, these projected increases will be less because the contribution of Grove Street traffic noise falls to levels at or below U.S. Highway 101 traffic noise levels. Traffic noise level increases anticipated along portions Healdsburg Avenue will mostly affect office, commercial, and retail land uses. Traffic noise level increases anticipated along Parkland Farms Boulevard will mostly affect residential land uses.

A combination of mitigation measures such as the repaving of area roadways, replacement or construction of noise barriers, traffic calming, and sound insulation could be implemented to reduce the effects of increased traffic noise generated by development under the proposed General Plan. These mitigation measures could be implemented along identified segments of Grove Street and Healdsburg Avenue where noise levels will be substantially increased with the proposed Project.

Case studies have shown that the replacement of dense grade asphalt (standard type) with open-grade or rubberized asphalt can reduce traffic noise levels along residential-type streets by 2 to 3 dBA L_{dn}. Repavement of affected roadways would provide enough attenuation to reduce significant noise increases (3 dBA or more) to less-than-significant levels. A possible noise reduction of 2 dBA would be expected using conservative engineering assumptions, and future traffic noise increases could be mitigated to a less-than-significant level by repaving roadways with "quieter pavements." To be a permanent mitigation, subsequent repaving would also have to use "quieter" pavements.

Existing residences located along affected roadway segments either front the roadway (private outdoor use areas are located behind the homes) or have outdoor use areas adjacent to the roadway that may or may not be shielded by fences or noise barriers. Noise barriers would not be feasible at single-family residences that front these roadways due to access requirements. In situations where private outdoor use areas are located adjacent to the roadway, new or larger noise barriers could be constructed to provide the additional necessary noise attenuation in private use areas. Typically, increasing the height of an existing barrier results in approximately one dBA of attenuation per one foot of additional barrier height. The design of such noise barriers would require additional analysis. Traffic calming could also be implemented to reduce noise levels expected with the proposed Project. Each five mph reduction in average speed provides approximately one dBA of noise reduction on an average basis (L_{eq}/L_{dn}). Traffic calming measures that regulate speed improve the noise environment by smoothing out noise levels.

Residences could also be provided with sound insulation treatments if further study finds that interior noise levels within the affected residential units would exceed 45 dBA L_{dn} assuming future traffic conditions. Treatments to the homes may include the replacement of existing windows and doors with sound-rated windows and doors and the provision of a suitable form of forced-air mechanical ventilation to allow the occupants the option of controlling noise to by closing the windows. The specific treatments for each affected residential unit would be identified on a case-by-case basis.

Each of these mitigation measures involves other non-acoustical considerations. Other engineering issues may dictate continued use of dense grade asphalt. Noise barriers and sound insulation treatments must be done on private property necessitating agreements with each property owner. It may not be reasonable or feasible to reduce Project-generated traffic noise at all affected receivers. Therefore, the potential permanent increase in ambient noise levels would be considered a ***significant and unavoidable*** impact.

Impact IV.L-4: The proposed Project would not result in a substantial temporary or periodic increase in ambient noise levels in the Project vicinity above levels existing without the project.

The proposed Project will result in construction within the Planning Area. Residences and businesses located adjacent to proposed development will be affected by construction noise during buildout of various projects in the planning area. Construction noise impacts primarily result when construction activities occur during noise-sensitive times of the day (early morning, evening, or nighttime hours), the construction occurs in areas immediately adjoining noise-sensitive land uses, or when construction durations last over extended periods of time. Under the proposed Project, construction could occur immediately adjacent to businesses and residences. However, the City's Noise Ordinance limits construction activities to non-legal holidays between the hours of 7:30 a.m. and 6:00 p.m., Monday through Saturday and prohibits the noise levels associated with these activities from endangering the public health, welfare or safety. Additionally, proposed General Plan Implementation Measure S-25 will require all construction projects to follow best management practices to minimize construction noise.

Therefore due to construction hour limitations and implementation of best management practices, impacts related to a substantial temporary or periodic increase in ambient noise levels are considered ***less than significant***.

Impact IV.L-5: The proposed Project would not result in the exposure of people residing or working in the Project vicinity to excessive noise levels within an area covered by an airport land use plan.

Aircraft operations associated with Healdsburg Municipal Airport and Charles M. Schulz Sonoma County Airport are sources of intermittent noise in the city. New noise-sensitive uses are not planned in areas within the 60 or 65 dBA CNEL noise contours for either airport. Therefore, impacts related to noise generated by an airport would be ***less than significant***.

The Charles M. Schulz Sonoma County Airport Master Plan proposes to extend Runways 14 and 19 to accommodate larger commercial jet aircraft. The addition of larger jet aircraft or increased operations could affect the noise environment in Healdsburg. The City should continue to monitor proposals at the Airport that could affect the City's noise environment through active participation on the County's Airport Land Use Commission and other available forums.

Impact IV.L-6: The proposed Project would not result in the exposure of people residing or working in the project vicinity to excessive noise levels if the project is located in the vicinity of a private airstrip.

The proposed Project is not located within the vicinity of a private airstrip. As such, ***no impact*** would occur.

CUMULATIVE IMPACTS

The proposed Project will generate a substantial permanent increase in noise at existing sensitive land uses along portions of Grove Street and Healdsburg Avenue,. Since the proposed General Plan traffic analysis assumes cumulative development in and around Healdsburg, the significant proposed Project impact would also be cumulatively significant. Mitigation measures described in Impact IV.L-3 could be implemented if feasible on a case-by-case basis. As described in the analysis for Impact IV.L-3 above, the estimated noise level increases as described herein represent the most conservative or worst-case scenario because they over-estimate by two percent the vehicle trips from new development projected in this Revised Draft EIR because of changes to Sub-Area C compared to the prior proposed General Plan. However, the two percent reduction in trips and subsequent decrease in noise as proposed under the current proposed General Plan is not large enough to change any of the results in this analysis or the conclusions described above, and cumulative impacts regarding noise would remain ***significant and unavoidable***.

MITIGATION MEASURES

With implementation of applicable regulations and the proposed General Plan policies and implementation measures listed above, no mitigation measures are required for Impacts IV.L-1, IV.L-2, IV.L-4, IV.L-5, and IV.L-6.

Regarding Impact IV.L-3, measures to reduce noise for existing sensitive land use uses along portions of Grove Street and Healdsburg Avenue, such as barriers and sound insulation treatments, would have to be done on private property, necessitating agreements with each property owner. It would not be reasonable or feasible to reduce Project-generated traffic noise at all affected receivers. Therefore, there are no mitigation measures available to reduce impacts related to substantial permanent increases in noise to a less-than-significant level.