3.9 NOISE

This section includes a description of ambient noise conditions, a summary of applicable regulations related to noise and vibration, and an analysis of potential short-term construction and long-term operational noise impacts of the project. Mitigation measures are recommended, as necessary, to reduce significant noise impacts.

A Setting

ACOUSTIC FUNDAMENTALS

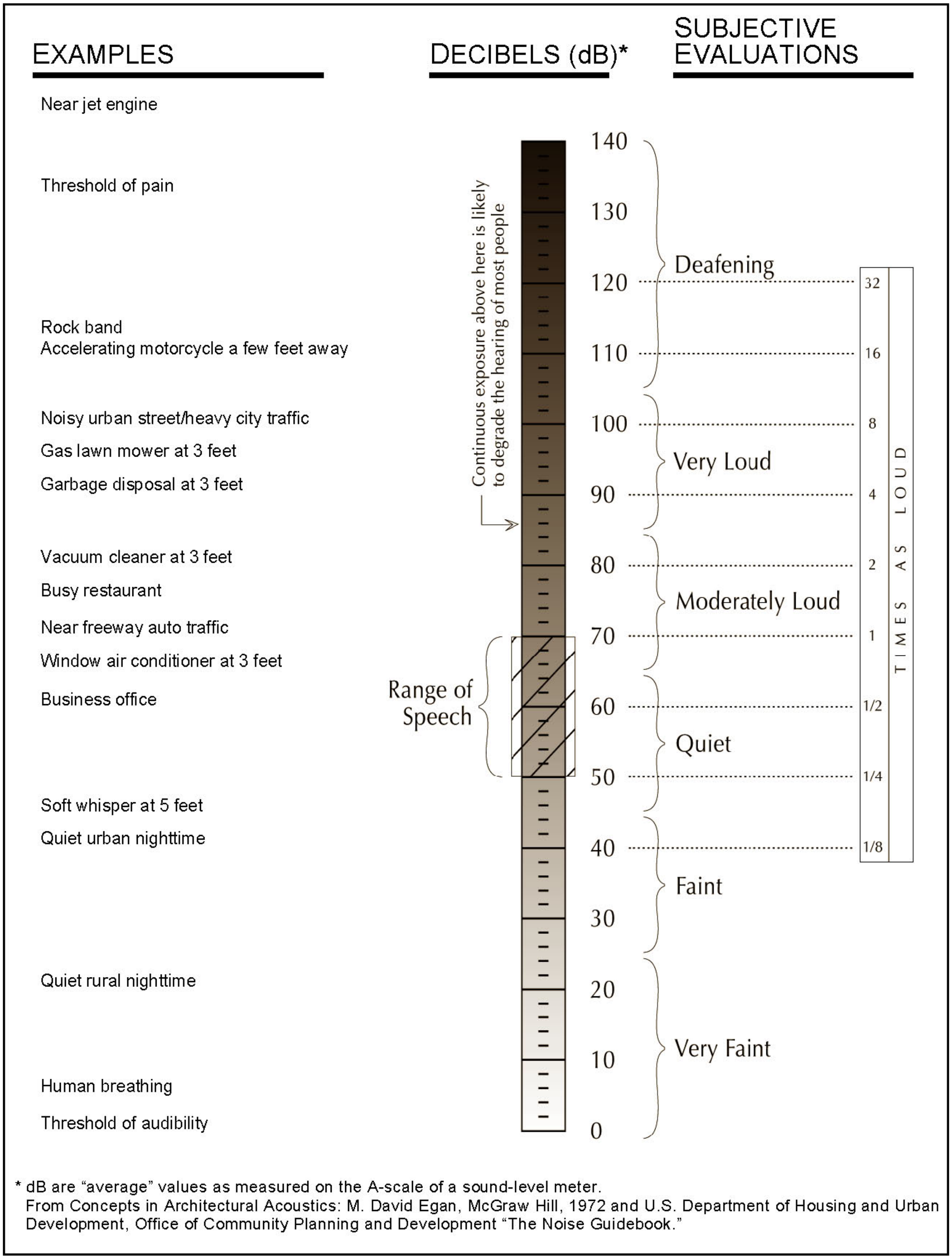
Acoustics is the scientific study that evaluates perception, propagation, absorption, and reflection of sound waves. Sound is a mechanical form of radiant energy, transmitted by a pressure wave through a solid, liquid, or gaseous medium. Sound that is loud, disagreeable, unexpected, or unwanted is generally defined as noise; consequently, the perception of sound is subjective in nature, and can vary substantially from person to person. Common sources of environmental noise and noise levels are presented in Figure 3.9-1.

A sound wave is initiated in a medium by a vibrating object (e.g., vocal chords, the string of a guitar, the diaphragm of a radio speaker). The wave consists of minute variations in pressure, oscillating above and below the ambient atmospheric pressure. The number of pressure variation cycles occurring per second is referred to as the frequency of the sound wave and is expressed in Hertz.

Directly measuring sound pressure fluctuations would require the use of a very large and cumbersome range of numbers. To avoid this and have a more useable numbering system, the decibel (dB) scale was introduced. A sound level expressed in decibels is the logarithmic ratio of two like pressure quantities, with one pressure quantity being a reference sound pressure. For sound pressure in air, the standard reference quantity is generally considered to be 20 micropascals, which directly corresponds to the threshold of human hearing. The use of the decibel is a convenient way to handle the million-fold range of sound pressures to which the human ear is sensitive. A decibel is logarithmic; it does not follow normal algebraic methods and cannot be directly added.

For example, a 65-dB source of sound, such as a truck, when joined by another 65-dB source results in a sound amplitude of 68 dB, not 130 dB (i.e., doubling the source strength increases the sound pressure by 3 dB). A sound level increase of 10 dB corresponds to 10 times the acoustical energy, and an increase of 20 dB equates to a hundredfold increase in acoustical energy.

The loudness of sound perceived by the human ear depends primarily on the overall sound pressure level and frequency content of the sound source. The human ear is not equally sensitive to loudness at all frequencies in the audible spectrum. To better relate overall sound levels and loudness to human perception, frequency-dependent weighting networks were developed. The standard weighting networks are identified as A–E. There is a strong correlation between the way humans perceive sound and A-weighted sound levels (dBA). For this reason the dBA can be used to predict community response to noise from the environment, including noise from transportation and stationary sources.



Source: Data compiled by AECOM in 2008

Figure 3.9-1: Common Noise Sources and Levels

Noise can be generated by mobile sources (transportation noise sources) such as automobiles, trucks, and airplanes and by stationary sources (nontransportation noise sources) such as construction sites, machinery, and commercial and industrial operations. As acoustic energy spreads through the atmosphere from the source to the receiver, noise levels attenuate (decrease) depending on ground absorption characteristics, atmospheric conditions, and the presence of physical barriers (walls, building facades, berms). Noise generated from mobile sources generally attenuate at a rate of 4.5 dB per doubling of distance (dB/DD). Stationary noise sources spread with more spherical dispersion patterns that attenuate at a rate of 6.0 to 7.5 dB/DD.

Atmospheric conditions such as wind speed, turbulence, temperature gradients, and humidity may additionally alter the propagation of noise and affect levels at a receiver. Furthermore, the presence of a large object (e.g., barrier, topographic features, and intervening building facades) between the source and the receptor can provide significant attenuation of noise levels at the receiver. The amount of noise level reduction or "shielding" provided by a barrier primarily depends on the size of the barrier, the location of the barrier in relation to the source and receivers, and the frequency spectra of the noise. Natural barriers such as berms, hills, or dense woods, and human-made features such as buildings and walls may be used as noise barriers.

NOISE DESCRIPTORS

The intensity of environmental noise fluctuates over time, and several different descriptors of time-averaged noise levels are used. The selection of a proper noise descriptor for a specific source depends on the spatial and temporal distribution, duration, and fluctuation of both the noise source and the environment. The noise descriptors most often used to describe environmental noise are defined below:

- L_{max} *(Maximum Noise Level):* The highest A/B/C–weighted integrated noise level occurring during a specific period of time.
- L_{min} *(Minimum Noise Level):* The lowest A/B/C–weighted integrated noise level during a specific period of time.
- *Peak:* The highest weighted or unweighted instantaneous peak-to-peak value occurring during a measurement period.
- L_n *(Statistical Descriptor):* The noise level exceeded n% of a specific period of time, generally accepted as an hourly statistic. An L_{10} would be the noise level exceeded 10% of the measurement period.
- L_{eq} *(Equivalent Noise Level):* The energy mean (average) noise level. The steady-state sound level which, in a specified period of time contains the same acoustical energy as a varying sound level over the same time period.
- L_{dn} *(Day-Night Noise Level):* The 24-hour L_{eq} with a 10-dB "penalty" applied during nighttime noise-sensitive hours, 10:00 p.m. through 7:00 a.m. The L_{dn} attempts to account for the fact that noise during this specific period of time is a potential source of disturbance with respect to normal sleeping hours.
- *CNEL (Community Noise Equivalent Level):* A noise level similar to the L_{dn} described above, but with an additional 5-dB "penalty" for the noise-sensitive hours between 7:00 p.m. to 10:00 p.m., which are typically reserved for relaxation, conversation, reading,

and television. If using the same 24-hour noise data, the CNEL is typically 0.5 dB higher than the L_{dn}.

- *SEL (Sound Exposure Level):* A description of the cumulative exposure to sound energy over a stated period of time.
- *SENEL (Single Event Noise Exposure Level):* An SEL where the measurement period is defined by the start and end times of a single noise event, such as an automobile pass by, aircraft flyover, or individual industrial operations.

EFFECTS OF NOISE ON HUMANS

Excessive and chronic exposure to elevated noise levels can result in auditory and nonauditory effects in humans. Auditory effects of noise on people are those relating to temporary or permanent hearing loss caused by loud noises. Nonauditory effects of exposure to elevated noise levels are those relating to behavioral and physiological effects. The nonauditory behavioral effects of noise on humans are associated primarily with the subjective effects of annoyance, nuisance, and dissatisfaction; which lead to interference with activities such as communications, sleep, and learning. The nonauditory physiological health effects of noise on humans have been the subject of considerable research efforts attempting to discover correlations between exposure to elevated noise levels and health problems, such as hypertension and cardiovascular disease. The mass of research infers that noise-related health issues are primarily the result of behavioral stressors and not a direct noise-induced response. The extent to which noise contributes to nonauditory health effects remains a subject of considerable research, with no definitive conclusions.

The degree to which noise results in annoyance and interference is highly subjective and may be influenced by several nonacoustic factors. The number and effect of these nonacoustic environmental and physical factors varies depending on individual characteristics of the noise environment such as sensitivity, level of activity, location, time of day, and length of exposure. One key aspect in the prediction of human response to new noise environments is the individual level of adaptation to an existing noise environment. The greater the change in the noise levels that are attributed to a new noise source, relative to the environment an individual has become accustom too, the less tolerable the new noise source will be viewed.

A change in sound level of 1 dB is generally not perceivable by humans, excluding controlled conditions and pure tones. Outside of controlled laboratory conditions, the average human ear barely perceives a change of 3 dB. A change of 5 dB generally fosters a noticeable change in human response, and an increase of 10 dB is subjectively heard as a doubling of loudness.

VIBRATION

Vibration is the periodic oscillation of a medium or object with respect to a given reference point. Sources of vibration include natural phenomena (e.g., earthquakes, volcanic eruptions, sea waves, landslides) and those introduced by human activity (e.g., explosions, machinery, traffic, trains, construction equipment). Vibration sources may be continuous, such as operating factory machinery, or transient in nature, such as explosions. Vibration levels can be depicted in terms of amplitude and frequency, relative to displacement, velocity, and acceleration.

Vibration amplitudes are commonly expressed in peak-particle-velocity (PPV) or root-mean-square (RMS) vibration velocity. PPV is defined as the maximum instantaneous positive or negative peak of a vibration signal. PPV is typically used in the monitoring of transient and impact vibration and has been found to correlate well to the stresses experienced by buildings

(FTA 2006, Caltrans 2004). PPV and RMS vibration velocity are normally described in inches per second (in/sec).

Although PPV is appropriate for evaluating the potential for building damage, it is not always suitable for evaluating human response. The response of the human body to vibration relates well to average vibration amplitude; therefore, vibration impacts on humans are evaluated in terms of RMS vibration velocity. Similar to airborne sound, vibration velocity can be expressed in decibel notation as vibration decibels (VdB). The logarithmic nature of the decibel serves to compress the broad range of numbers required to describe vibration.

Typical outdoor sources of perceptible groundborne vibration include construction equipment, steel-wheeled trains, and traffic on rough roads. Although the effects of vibration may be imperceptible at low levels, effects may result in detectable vibrations and slight damage to nearby structures at moderate and high levels, respectively. At the highest levels of vibration, damage to structures is primarily architectural (e.g., loosening and cracking of plaster or stucco coatings) and rarely results in damage to structural components. The range of vibration important to the project occurs from approximately 50 VdB, which is the typical background vibration-velocity level, to 100 VdB, which is the general threshold where minor damage can occur in fragile buildings (FTA 2006).

REGIONAL SETTING

The project is proposed within a 6.5-mile reach of the Russian River located in the lower Alexander Valley in Sonoma County, southeast of Gill Creek and northwest of the Jimtown Bridge. The noise environment in the Alexander Valley includes transportation and nontransportation noise sources. The major transportation noise sources are U.S. Highway 101 (U.S. 101), State Route (SR) 128, Geyserville Avenue, the Cloverdale Municipal Airport and the Northwestern Pacific Railroad (NCRA). There is currently no active rail service within the project limits, however, Sonoma Marin Area Transit (SMART) plans to open commuter rail service to Cloverdale in 2014 on the NCRA tracks, and NCRA would like to resume freight service within the timeframe for the project (Peltz, pers. comm., 2009) The major nontransportation noise sources include wineries, agricultural uses, and light industrial uses (e.g., automotive repair, cabinetry, wood processing, welding, and steel fabrication).

LOCAL SETTING

The noise environment within the project vicinity also includes transportation and nontransportation noise sources. Transportation noise sources include U.S. 101, SR 128, Sonoma County (County) roads, and farm roads. Nontransportation noise sources include agricultural uses and rural residential activities. Noise from surrounding operations (e.g., light industrial) in addition to noise from outdoor activities (e.g., people talking, dogs barking, operation of landscaping and agricultural equipment) also contributes, to a lesser extent, to the existing noise environment.

Existing Noise-Sensitive Receptors

Noise-sensitive land uses generally include those uses where exposure to noise would result in adverse effects, as well as uses where quiet is an essential element of their intended purpose. Residential dwellings are of primary concern because of the potential for increased and prolonged exposure of individuals to both interior and exterior noise levels. Other noise-sensitive land uses include schools, hospitals, convalescent facilities, parks, hotels, places of worship, libraries, and other uses where low interior noise levels are essential.

Noise-sensitive receptors in the study area include single-family residential dwellings, some of which are immediately adjacent to the haul routes. Figures 3.7-1 through 3.7-3 in Section 3.7, "Air Quality," show the general locations of existing noise-sensitive receptors with respect to the mining sites. Sensitive receptors also occur along the proposed haul routes, including private and public roadways. Figures 3.7-1 through 3.7-3 identify individual sensitive receptors located adjacent to the roadways. The distances of sensitive receptors vary along the roadways, most of which are located within approximately 100 feet of the centerline of the proposed haul routes.

Roadway Vehicle Traffic

As mentioned above, one of the dominant noise sources is vehicle traffic on area roadways. Existing vehicle traffic noise levels in the project area were modeled using the Federal Highway Administration (FHWA) Traffic Noise Prediction Model (FHWA-RD-77-108) with California Vehicle Noise Emission Levels (CALVENO) and traffic data obtained from the specific traffic report prepared for this project (see Section 3.6, "Traffic and Circulation"). The FHWA model is based on CALVENO reference noise factors for automobiles, medium trucks, and heavy trucks, with consideration given to vehicle volume, speed, distance to the receiver, and ground attenuation factors. Truck usage and vehicle speeds on roadways in the study area were estimated from field observations and California Department of Transportation (Caltrans) data where available. Table 3.9-1 summarizes the CNEL noise levels at 100 feet from the centerline and distance from the roadway centerline to the 60-, 65-, and 70-dBA CNEL contours for existing average daily traffic (ADT) volumes.

Table 3.9-1
Summary of Modeled Existing Traffic Noise Levels

Roadway	Segment Location	CNEL (dBA) 100 Feet from Centerline of Roadway	Distance (feet) from Roadway Centerline to CNEL (dBA) Contour		
		Existing	70	65	60
Geyserville Avenue	Canyon Road	50.0	5	10	22
Geyserville Avenue	Hamilton Lane	56.1	12	26	55
Geyserville Avenue	Bill Ferguson Road	54.3	9	19	42
Healdsburg Avenue	Lytton Springs Road	54.5	9	20	43
Lytton Station Road	Healdsburg Avenue	54.6	9	20	43
Hassett Lane	Lytton Station Road	47.2[1]	3	6	14
SR 101	S. Healdsburg Avenue	72.8	153	331	712
SR 101	Lytton Springs Road	72.1	138	298	641
SR 101	South Geyserville Ave	71.7	130	279	602

Notes: CNEL = community noise equivalent level; dBA = A-weighted decibels; SR = State Route
[1]Assumed ADT based on ambient noise measurement and field observations to establish a baseline for future project traffic noise evaluation. Refer to Appendix J for modeling input assumptions and output results.
Source: Modeling conducted by EDAW in 2007

Ambient-Noise Level

An ambient-noise survey was conducted in the project vicinity between October 10 and October 11, 2007, to measure the existing noise levels at various locations within the study area. Short- and long-term (i.e., continuous) noise-level measurements were conducted in accordance with the American National Standards Institute (ANSI) acoustic standards at five locations using LDL Model 820 precision integrating sound-level meters. The meters were calibrated before and after use with an LDL Model CAL200 acoustical calibrator to ensure that the measurements would be accurate. The equipment used meets all pertinent specifications of ANSI for Type 1 sound-level meters (ANSI S1.4).

Noise measurement locations were based on the presence and proximity of receptors to roadways. Table 3.9-2 shows the L_{eq}, L_{50}, and L_{max} values for Sites 1 through 5 using both short and long-term measurements.

Table 3.9-2
Summary of Measured Ambient Noise Levels

Site	Location	Distance from Roadway Centerline (Feet)	Date/Time	Average Measured Hourly Noise Levels, dBA						
				24-hour L_{dn}	Daytime (7 a.m.–10 p.m.)			Nighttime (10 p.m.–7 a.m.)		
					L_{eq}	L_{50}	L_{max}	L_{eq}	L_{50}	L_{max}
1	North of Healdsburg Avenue, southwest corner of existing residential side yard	65	10/10/07 – 10/11/07	63.2	60.7	55.6	80.5	55.3	50.6	72.6
2	South side of Alexander Valley Road, residential front yard (540 Alexander Valley Road)	75	10/10/07 – 10/11/07	66.1	63.9	55.4	80.2	58.2	45.4	77.6
3	East side of Geyserville Avenue and west of Hamilton Lane, residential front yard (20690 Geyserville Avenue)	90	10/10/07 – 10/11/07	63.4	57.1	54.8	77.9	52.3	45.1	72.0
4	West side of Hassett Lane, residential front yard	90	10/11/07 9:00 a.m.	NA	48.4	41.1	68.2	NA		
5	South side of Lytton Station Road, residential front yard	60	10/11/07 10:20 a.m.	NA	61.3	46.8	82.9	NA		

Notes: dBA = A-weighted decibels; L_{dn} = day-night average noise level; L_{eq} = the energy average noise level; L_{50} = the noise level exceeded 50% of a specific period of time, L_{max} = maximum noise level; NA = not applicable
Source: Data compiled by EDAW in 2007

Existing Groundborne Vibration

The dominant source of groundborne vibration in the study area is vehicular traffic on local and regional roadway network. Additional groundborne vibration is also attributable to heavy-truck passbys and seasonal agricultural operations. Representative traffic vibration levels generated by conservative groupings of heavy-truck passbys and vehicular traffic empirically do not exceed 2 millimeters per second PPV at distances greater than 5 meters (approximately 17 feet) (Caltrans 2002).

B. Regulatory Framework

Various private and public agencies have established noise guidelines and standards to protect citizens from potential hearing damage and various other adverse physiological and social effects associated with noise. Applicable standards and guidelines are discussed below.

FEDERAL PLANS, POLICIES, REGULATIONS, AND LAWS

The U.S. Environmental Protection Agency (EPA), Office of Noise Abatement and Control, was originally established to coordinate federal noise control activities. After inception, EPA's Office of Noise Abatement and Control issued the Federal Noise Control Act of 1972, establishing programs and guidelines to identify and address the effects of noise on public health and welfare, and the environment. Administrators of EPA determined in 1981 that subjective issues such as noise would be better addressed at lower levels of government. Consequently, in 1982 responsibilities for regulating noise control policies were transferred to state and local governments. However, noise control guidelines and regulations contained in the rulings by EPA in prior years remain upheld by designated federal agencies, allowing more individualized control for specific issues by designated federal, state, and local government agencies.

To address the human response to groundborne vibration, the Federal Transit Administration (FTA) has guidelines for maximum-acceptable vibration criteria for different types of land uses. These guidelines recommend 65 VdB, referenced to 1 microinch per second and based on the velocity amplitude for land uses where low ambient vibration is essential for interior operations (e.g., hospitals, high-tech manufacturing, laboratory facilities); 80 VdB for residential uses and buildings where people normally sleep; and 83 VdB for institutional land uses with primarily daytime operations (e.g., schools, churches, clinics, offices) (FTA 2006).

STATE PLANS, POLICIES, REGULATIONS, AND LAWS

The State of California has adopted noise standards in areas of regulation not preempted by the federal government. State standards regulate noise levels of motor vehicles, sound transmission through buildings, occupational noise control, and noise insulation.

Title 24 of the California Code of Regulations

Title 24 of the California Code of Regulations establishes standards that govern interior noise levels that apply to all new multifamily residential units in California. These standards require that acoustical studies be performed before construction begins at building locations where the existing noise levels exceed 60 dB L_{dn}. Acoustical studies are required to establish mitigation measures that will limit maximum levels to 45 dB L_{dn} in any habitable room. Although no generally applicable interior noise standards are pertinent to all uses, many communities in California have adopted 45 dB L_{dn} as an upper limit for interior noise in all residential units.

LOCAL

Sonoma County General Plan

The Noise Element of the *Sonoma County General Plan* (County General Plan) contains policies designed to protect the citizens of Sonoma County from the harmful effects of exposure of excessive noise, and to confine the noise impacts from transportation facilities to the smallest feasible land areas and to assure that any development therein be compatible with the level of noise exposure. Infrequent single events such as passage of a train, truck, or airplane may interfere with adjacent uses even though the cumulative noise exposure is within acceptable limits. These events call for a single event noise standard. The potential for sleep disturbance is often the main concern in these cases. The Noise Element contains the following policies that relate to the project:

- **Policy NE-1a:** Designate areas within Sonoma County as noise impacted if they are exposed to existing or projected exterior noise levels exceeding 60 dB L_{dn}, 60 dB CNEL, or the performance standards of Table [3.9-3]).
- **Policy NE-1b:** Avoid noise sensitive land use development in noise impacted areas unless effective measures are included to reduce noise levels. For noise due to traffic on public roadways, railroads and airports, reduce exterior noise to 60 dB L_{dn} or less in outdoor activity areas and interior noise levels to 45 dB L_{dn} or less with windows and doors closed. Where it is not possible to meet this 60 dB L_{dn} standard using a practical application of the best available noise reduction technology, a maximum level of up to 65 dB L_{dn} may be allowed but interior noise level shall be maintained so as not to exceed 45 dB L_{dn}.
- **Policy NE-1c:** Control non transportation related noise from new projects. The total noise level resulting from new sources and ambient noise shall not exceed the standards in Table [3.9-3] as measured at the exterior property line of any affected residential land use.
    1) If the ambient noise level exceeds the standard in Table [3.9-3], adjust the standard to equal the ambient level.
    2) Reduce the applicable standards in Table [3.9-3] by five dBA for simple tone noises, noises consisting primarily of speech or music, or for recurring impulsive noises.
    3) Reduce the applicable standards in Table [3.9-3] by five decibels if they exceed the ambient level by 10 or more decibels.
- **Policy NE-1d:** Consider requiring an acoustical analysis prior to approval of any discretionary project involving a potentially significant new noise source or a noise sensitive land use in a noise impacted area. The analysis shall:
    1) be the responsibility of the applicant
    2) be prepared by a qualified acoustical consultant
    3) include noise measurements adequate to describe local conditions
    4) include estimated noise levels in terms of L_{dn} and or the standards of Table [3.9-3] for existing and projected future (20 years hence) conditions, with a comparison made to the adopted policies of the Noise Element

5) recommend measures to achieve compliance with this element. Where the noise source consists of intermittent single events, address the effects of maximum noise levels on sleep disturbance

6) include estimates of noise exposure after these measures have been implemented

Table 3.9-3 (Table NE-2 from 1989 General Plan)
Noise Level Performance Standards in the Sonoma County General Plan

Category	Maximum Exterior Noise Level Standards, dBA		
	Cumulative Duration of Noise Event in any 1-Hour Period	Daytime 7 a.m. to 10 p.m.	Nighttime 10 p.m. to 7 a.m.
1	30–60 minutes	50	45
2	15–30 minutes	55	50
3	5–15 minutes	60	55
4	1–5 minutes	65	60
5	0–1 minutes	70	65

Note: dBA = A-weighted decibels

- **Policy NE-1m:** Consider requiring the monitoring of noise levels for discretionary projects to determine if noise levels are in compliance with required standards. The cost of monitoring shall be the responsibility of the applicant.
- **Policy NE-2b:** Encourage installation of sound barriers along roadways in non industrial urban areas where an exterior noise level of 65 dB L_{dn} or more is attained and residences or other noise sensitive uses exist.
- **Policy NE-2c:** Consider using truck routing, speed limits, signal timing and other traffic control measures to reduce impacts on noise sensitive uses.

Aggregate Resource Management Plan

The ARM Plan establishes noise thresholds for aggregate mining operations conducted in the County of Sonoma. New mining activities have the potential to increase ambient noise levels at noise sensitive receptors by adding heavy truck trips on local roadways and by the operation of stationary noise source mining equipment. Thresholds for transportation noise sources must comply with the Sonoma County General Plan Noise Element exterior noise standard of 60 dB L_{dn} or less in outdoor activity areas and interior noise levels standards of 45 dB L_{dn} or less with windows and doors closed. Significant impacts from any mining project may occur if related noise levels increase three decibels in areas adjacent to haul roads and are raised above the performance standards set forth in the General Plan Noise Element for sensitive receptors, or if net noise levels increase 3-dB in adjacent areas which are currently designated as noise impacted. Thresholds for operational noise sources must comply with Sonoma County General Plan Noise Element performance standards shown in Table 3.9-3.

Sonoma County Surface Mining and Reclamation Ordinance

Chapter 26A, "Surface Mining," of the Sonoma County Surface Mining and Reclamation Ordinance (SMARO)(Sonoma County 1975) includes the following provision:

> Sec. 26A-09-010. General Standards for mining permit and operations.
>
> (i) Noise Control. The maximum acceptable noise levels for all aggregate operations shall be as set forth in the noise element of the General Plan.
>
> More stringent noise standards may be required as permit conditions when particular local circumstances warrant additional protection of potentially affected areas. Any noise control measures prescribed as condition of a permit shall in no manner be interpreted as to preclude the application to the surface mining site of future noise control measures adopted by the county subsequent to the granting of the permit.
>
> (j) Hours of Operation. Unless otherwise provided by conditions of the permit, the permit granted hereunder shall authorize operations of mining, processing and related activities as follows:
>
> (1) Monday through Friday: 6:00 a.m. through 10:00 p.m.;
>
> (2) Saturday: 6:00 a.m. until 4:30 p.m. Instream operations conducted on Saturdays are limited to processing outside the ordinary high water mark;
>
> (3) Sunday and national holidays: no mining or processing unless authorized as a condition of the permit;
>
> (4) Exceptions to these time limitations may be authorized by the director upon written request of the operator in conjunction with special contracts or other circumstances which require unusual hours of operation;
>
> (5) In the event of emergencies involving catastrophe, or threat to public safety or property, these time limitations shall not apply;
>
> (6) These time limitations shall not apply to the normal activities relating to maintenance of stationary or mobile equipment and delivery of supplies.

C. Potential Impacts and Mitigation Measures

CRITERIA USED FOR DETERMINING IMPACT SIGNIFICANCE

According to Appendix G of the State CEQA Guidelines, a project would result in significant noise impacts if the project would:

- expose persons to or generate noise levels in excess of the following standards established in the local general plan or applicable standards of other agencies:
- expose persons to or generate excessive groundborne vibration ;
- result in a substantial permanent increase in ambient noise levels in the project vicinity above levels existing without the project;

- result in a substantial temporary or periodic increase in ambient noise levels in the project vicinity above levels existing without the project; or
- expose people residing or working in the study area to excessive aircraft-generated noise levels.

For the purposes of this EIR, and to remain consistent with noise standards contained in the Sonoma County General Plan and the ARM Plan, the following would constitute a significant impact:

- noise generated from the project's on-site sources (mining equipment) that exceeds the County's General Plan noise level performance standards (Table 3.9-3, Policy NE-1c); or
- noise generated from haul trucks on public roads between the mining sites and the processing plant that increases existing noise levels by 3 dBA in areas adjacent to public haul roads, and are raised above the performance standards set forth in the Sonoma County General Plan Noise Element (Policy NE1-b); or
- noise generated from haul trucks on private roads between the mining sites and the processing plant that increase existing noise levels by 3 dBA and above the performance standards set forth on the Sonoma County General Plan Noise Element (Policy NE-1c and Table 3.9-3).

Impacts Not Discussed Further in this EIR

The project includes a River Enhancement Plan (REP). Construction equipment would be used to enhance the mined areas, but these activities would be short term and would not be conducted in conjunction with mining activities. Traffic increases (maximum of 10 daily truck trips) required to complete the REP would be nominal and would not generate traffic noise impacts at sensitive receptors.

Two municipal airports operate in the vicinity of the study area. Cloverdale Municipal Airport is approximately 5.17 miles to the north and Healdsburg Municipal Airport is approximately 2.91 miles southwest of the study area. The project site is located outside the sphere of influence for both airports. As a result, the project would not expose people, residents, or employees in the study area to excessive aircraft-generated noise levels.

The project includes the use of a crane to construct and remove temporary bridges for access to construction areas. The crane would be used for one day to install the temporary bridges at the start of the mining season, and one day at the end of the season to remove the bridges. Construction noise associated with the short-term and temporary use of the crane would not be significant.

The project would require mitigation to reduce traffic related impacts including repairing and widening of the haul routes. These road improvement projects would be temporary and similar to regular maintenance of the roads within Sonoma County. The minor road improvements would be subject to an Encroachment Permit from the County. Encroachment permits include traffic control measures and hours restrictions as standards. Any minor noise created as a result of the minor improvements would be short term and construction-related, and would not result in significant noise impacts.

Methodology

This section includes an analysis of potential operational (long-term) noise impacts associated with the project. Data included in Chapter 1, "Introduction and Project Description," and obtained during on-site noise monitoring were used to determine potential locations of noise-sensitive receptors and potential noise-generating land uses near the project site. Noise-sensitive land uses and major noise sources were identified based on existing documentation (e.g., equipment noise levels and attenuation rates) and site reconnaissance data

Operational Source Noise

AECOM assessed potential long-term noise impacts from long-term mining by identifying sensitive receptors and their relative exposure (considering intervening building façades and distance). Operational noise generated by mining was predicted using the Federal Transit Noise and Vibration Impact Assessment methodology for construction noise prediction (FTA 2006:5-1 through 5-29, 10-1 through 10-12). Reference noise emissions levels and usage factors are based on the FHWA Roadway Construction Noise Model (FHWA 2006:3). Noise levels of specific construction equipment operated and resultant noise levels at sensitive receptor locations have been calculated. Mining equipment would likely include bulldozers, loaders, graders, cranes, and other miscellaneous pieces of equipment (Perry, pers. comm., 2007).

Transportation Source Noise

AECOM conducted traffic noise modeling based on worst-case, peak-hour traffic turning movements obtained from the traffic analysis for this project prepared by Dowling & Associates, Inc., as discussed in Section 3.6, "Traffic and Circulation." Peak hour turning movements were used to calculate roadway segment volumes for modeling input. The FHWA Highway Traffic Noise Prediction Model (FHWA RD 77-108) (FHWA 1978) was used to calculate the change in traffic noise levels along affected roadways, based on the trip distribution estimates and modeling condition. AECOM determined the project's contribution to the existing traffic noise levels along area roadways by comparing the predicted noise levels at a reference distance of 100 feet from the roadway centerline, with and without project-generated traffic for existing and cumulative conditions.

AECOM compared predicted noise levels with applicable standards to determine significance. Mitigation measures have been developed for significant and potentially significant noise impacts.

Groundborne vibration impacts were qualitatively assessed based on existing documentation (e.g., vibration levels produced by specific construction equipment operations) and the distance of sensitive receptors from the given source.

PROJECT IMPACTS

Impact 3.9-1 Project operations would expose sensitive receptors to noise from equipment used on-site.

Worst-case noise levels from on-site heavy-duty equipment during project operations at the proposed mining sites were also modeled based on the typical operations equipment noise levels (see Table 3.9-4); see Appendix J for the modeling methodology.

Table 3.9-4 **Typical Equipment Noise Levels**		
Type of Equipment	Reference Emission Noise Levels (L_{max}) at 50 feet[1]	Usage Factor[2]
Grader	85	0.48
Dozer	85	0.54
Front-End Loader	80	0.43
Water Truck	84	0.2

Notes:
L_{max} = maximum noise level
[1] Obtained from the FHWA Roadway Construction Noise Model, January 2006
[2] Based on information provided by Syar Industries
Sources: FTA 2006

Table 3.9-6 summarizes the modeled project-generated on-site noise levels from heavy-duty mining equipment at the proposed mining sites relative to the locations of the nearest sensitive receptors (see Figures 3.7-1 through 3.7-3 in Section 3.7, "Air Quality"). Noise impacts were determined by comparing these modeling results with applicable County standards (see Table NE-2 of the General Plan [Sonoma County 1989] and standards in the ARM Plan PEIR). Hourly noise levels, maximum noise levels, and noise levels occurring for 10% of an hour were modeled. As shown in Table 3.9-3, not all of the County's nontransportation-noise-level threshold categories can be calculated for comparison of compliance. The L_{eq}, L_{10}, and L_{max} estimates were determined using the FHWA Roadway Construction Noise Model, and the remaining County non-transportation noise level thresholds would require field measurements of the proposed instream mining activity. An existing instream mining site was not available for actual noise measurements; thus, AECOM used the modeled noise levels to evaluate project impacts. The noise metrics used in Table 3.9-6 effectively account for the other noise metrics because under normal operating conditions instream mining noise levels would not exceed the other L_n metrics shown in Table 3.9-3.

As described in Chapter 1, "Introduction and Project Description," instream mining and reclamation activities may occur simultaneously, but the number and pieces of heavy construction equipment outlined in Table 3.9-4 would not increase because of simultaneous activities. It is assumed that similar noise levels for reclamation activities would be experienced at the nearest noise sensitive receptors, as shown in Table 3.9-5.

Based on modeling results (Table 3.9-5), worst-case project-generated noise levels from heavy-duty mining equipment (e.g., loaders, dozers, and graders) could exceed the County's daytime and nighttime performance standards of 50 and 45 dBA L_{eq}, the 60 and 55 dBA L_{10}, and the 70 and 65 dBA L_{max}, respectively, if operations were to occur near noise-sensitive receptors (see Table 3.9-5 for noise levels at the nearest sensitive receptors). Noise levels would exceed the daytime standard of 50 dBA L_{eq} (between 7 a.m. and 10 p.m.) at 10 sensitive receptors (the receptors nearest Bars S-9 and S-10). Noise levels would exceed the nighttime standard of 45 dBA L_{eq} (between 10 p.m. and 7 a.m.) at 14 sensitive receptors (the receptors nearest Bars SD-2, S-7, and S-8 through S-10). Based on modeling results (Table 3.9-5), worst-case project-generated noise levels from heavy-duty mining equipment would exceed the County's nighttime maximum noise level performance standards (65 dBA L_{max}) at one proposed mining site. Noise levels would exceed the nighttime standard of 65 dBA L_{max} (between 10 p.m. and 7 a.m.) at one sensitive receptor (the receptor nearest Bar S-10) if work were to occur prior to 7 a.m.

Table 3.9-5
Summary of Modeled Noise Levels Generated from Project Equipment

Receptor[1]	Proposed Bar	Distance to Receptor (feet)	Exterior		
			dBA L_{eq}	dBA L_{10}	dBA L_{max}
1	S-10	450	***61.7***	**58.7**	**65.4**
2	S-10	720	***56.4***	53.4	60.1
3	S-10	1,050	***52.2***	49.2	55.9
4	S-9	1,015	***52.6***	49.6	56.3
5	S-9	500	***60.5***	**57.5**	64.2
6	S-9	715	***56.5***	53.5	60.2
7	S-9	530	***59.8***	**56.8**	63.6
8	S-9	925	***53.6***	50.6	57.3
9	S-9	900	***53.9***	50.9	57.6
10	S-9	1,050	***52.2***	49.2	55.9
11	S-8	1,500	**48.2**	45.2	51.9
12	S-8	1,480	**48.4**	45.4	52.1
13	S-7	2,275	43.6	40.6	47.3
14	S-7	1800	**46.2**	43.2	49.9
15	S-7	1,950	**45.3**	42.3	49.0
16	S-6	2,700	41.6	38.6	45.4
17	S-5	2,300	43.4	40.4	47.2
18	S-4	2,080	44.6	41.6	48.3
19	S-4	2,000	45.0	42.0	48.7
20	SD-4	1,775	**46.3**	43.3	50.1
21	SD-4	3,560	38.6	35.6	42.3
22	SD-2	1,500	**48.2**	45.2	51.9
23	SD-2	2,265	43.6	40.6	47.3
24	SD-1	2,590	42.1	39.1	45.8
25	SD-1	2,600	42.1	39.1	45.8
Significance Threshold Daytime/Nighttime (Sonoma County General Plan maximum exterior noise level standard)			50/45	60/55	70/65

***Italics* = exceedance of the daytime threshold for the outdoor activity area**

Bold = exceedance of the nighttime threshold for the outdoor activity area

Notes: dBA = A-weighted decibels; L_{10} = the noise level exceeded 10% of the measurement period; L_{max} = maximum noise level

[1] Refer to Figures 3.7-1 through 3.7-3 in Section 3.7, “Air Quality,” for locations of sensitive receptors.

[2] Modeled project-generated, mining-related noise levels include loaders, dozers, and graders as sources.

[3] Modeled levels account for reductions only from equipment properly maintained and equipped with noise control devices.

Refer to Appendix K for modeling input assumptions and output results.

Source: Modeling conducted by AECOM in 2010

The modeled noise levels shown in Table 3.9-5 are considered conservative, and actual noise levels experienced at noise-sensitive receptors would likely be lower because of changes in wind direction, shielding provided by the riverbank, and the duration of daily instream mining activities. In addition, it should be noted that ambient noise levels in the project vicinity are presumed to increase during seasonal agricultural activities utilizing heavy-duty agricultural equipment (e.g., tractors and sprayers). However, as stated above, the ARM Plan PEIR's and County's hourly and maximum noise-level performance standards are used to evaluate compliance of project-generated operational noise levels.

As stated above, noise levels from equipment used during project operations would exceed the County's performance standards for nontransportation sources at the noise-sensitive receptor locations stated above. As a result, this impact would be significant.

Mitigation Measure

3.9-1 **Implement Noise Abatement Measures for On-Site Equipment Use.** Syar shall implement noise abatement measures:

- Operation of heavy-duty equipment at Bars SD-2, S-7, and S-8 through S-10 shall be limited to the daytime hours, starting at 7:00 a.m.
- All heavy equipment shall be equipped with noise control devices (e.g., mufflers) in accordance with manufacturers' specifications.
- All heavy equipment shall be inspected periodically to ensure proper maintenance and presence of noise control devices (e.g., lubrication, non-leaking mufflers, and shrouding).
- Temporary noise blankets shall be used to shield the noise-sensitive receptors adjacent to Bars S-9 (Receptors 4-10) and S-10 (Receptors 1-3) if the above measures do not adequately reduce the operational noise levels to within acceptable nontransportation-noise-level performance standards shown in Table 3.9-3, unless the owner(s) and occupant(s) of the sensitive receptors object to the use of temporary blankets to shield their residences from noise. Noise blankets shall be placed in the direct line of sight from the bar to the receptor. Height and length of the noise blankets shall depend upon the size and orientation of the operational portion of the bar in relation to the sensitive receptor, and the equipment to be shielded. The blankets shall generally be no higher than 12 feet, nor longer than 300 feet. Noise blankets shall be removed as soon as the mining of the bar is complete.

Impact Significance After Mitigation

Limiting the operation of heavy-duty equipment to the daytime hours would reduce to less than significant nighttime noise impacts at the 16 receptors identified in Table 3.9-5. Implementation of the other provisions of Mitigation Measure 3.9-1 would reduce on-site equipment noise by 5 to 8 dB. As a result, daytime noise levels would be less than significant at receptors 3, 4, 8, 9, and 10, and possibly receptors 2 and 6 as well, unless the relevant property owner(s) and occupant(s) object to the use of temporary blankets to shield their residences from noise. Impacts would remain significant and unavoidable at receptors 1, 5, 7, and possibly 2 and 6..

Impact 3.9-2 Project operations would expose sensitive receptors to vibration.

Project-related activities would result in vibration from travel by heavy-duty trucks on proposed haul routes for materials transport, from bridge construction, and from heavy-duty equipment at the proposed mining sites. Worst-case vibration levels generated by project-related instream mining were modeled; the results are shown in Table 3.9-6. Vibration impacts were determined by comparing these vibration levels at existing nearby sensitive receptors with applicable standards.

Table 3.9-6
Typical Construction-Equipment Vibration Levels

Equipment	PPV at 25 Feet (in/sec)	Approximate L_v at 25 Feet
Dozer, Front-end Loader, Grader	0.089	87
Loaded Trucks	0.076	86
Significance Threshold (Caltrans and FTA)	0.2/0.08[a]	80

Notes:

L_v = velocity level in decibels referenced to 1 microinch per second and based on the root mean square velocity amplitude; PPV = peak particle velocity

[a] For normal residential buildings and for buildings more susceptible to structural damage, respectively.

Sources: Caltrans 2002, FTA 2006

According to FTA, vibration levels associated with the use of trucks and bulldozers are 0.076 and 0.089 in/sec PPV and 86 and 87 VdB at 25 feet, respectively (see Table 3.9-6). The nearest sensitive receptor to the haul truck routes, the proposed gravel bars, and the proposed temporary bridge north of Alexander Valley Road would be exposed to project-related vibration levels of 70 VdB or 0.037 in/sec PPV at 90 feet (the nearest sensitive receptor is located at the corner of Hassett Lane and Olivier). Vibration levels during project operations would not exceed Caltrans's recommended standard with respect to the prevention of structural damage (0.08 in/sec PPV for more susceptible buildings) or FTA's maximum-acceptable vibration standard of 80 VdB with respect to human annoyance for residential uses at existing nearby sensitive receptors. Thus, implementation of the project would not generate and expose persons to excessive groundborne vibration. As a result, this impact would be less than significant.

Mitigation Measure

None

Impact 3.9-3 Project haul trucks would expose existing sensitive receptors to traffic noise along public roadway segments.

AECOM modeled noise from roadway traffic associated with project operations (e.g., heavy-duty truck travel) on public roadways in the area using the FHWA Traffic Noise Prediction Model (FHWA-RD-77-108) with CALVENO and data obtained from the traffic study prepared for this project (see Section 3.6, "Traffic and Circulation"). Input data used in the model included average daily traffic levels for nearby area roadways, fleet mixes (percentages of automobiles, medium-duty trucks, and heavy-duty trucks during daytime, evening, and nighttime hours), vehicle speeds, ground attenuation factors, roadway grades, and roadway widths. The project would generate a maximum of 20 round trip truck trips per hour during a 12-hour workday. This would account for an additional 480 one way truck trips per haul route. Appendix J provides the modeling input assumptions and output results for the traffic noise analysis, as well as the modeling methodology.

Table 3.9-7 summarizes the modeled noise levels at 100 feet from the roadway centerline and distance from the roadway centerline to the 70-, 65-, and 60-dBA L_{dn} contours for each affected roadway segment in the study area under project conditions. Table 3.9-7 also includes the net change in existing noise levels from existing to with project. The roadway noise levels, shown in Table 3.9-7, represent worst-case, peak-hour potential noise exposure, which assumes no natural or artificial shielding or reflection from existing or proposed structures or topography. Actual noise levels would vary from day to day, depending on factors such as local traffic volumes, shielding from existing and proposed structures, variations in attenuation rates resulting from changes in surface parameters, and meteorological conditions.

Table 3.9-7
Summary of Modeled Existing Traffic Noise Levels under Existing and Project Conditions on Public Roadways

Roadway	Segment Location		L_{dn} (dBA) 100 Feet from Centerline of Roadway		Net Change (dBA)	Distance (feet) from Roadway Centerline to L_{dn} (dBA) Contour		
	From	To	Existing	Project		70	65	60
Geyserville Avenue	Canyon Road	the north	49.7	60.7	+11.0	24	52	111
Geyserville Avenue	Hamilton Lane	Banti Lane	55.8	61.6	+5.9	28	60	129
Geyserville Avenue	Bill Ferguson Road	Souverain Road	53.9	61.2	+7.3	26	56	121
Healdsburg Avenue	Lytton Springs Road	Lytton Station Road	54.1	61.3	+7.1	26	57	122
Lytton Station Road	Healdsburg Avenue	Hassett Lane	54.2	61.3	+7.1	26	57	122
Hassett Lane	Lytton Station Road	Olivier Road	47.2	60.6	+13.4	23	51	109

Notes: CNEL = community noise equivalent level; dBA = A-weighted decibels
Refer to Appendix J for modeling input assumptions and output results.
Source: Modeling conducted by EDAW in 2009

As shown in Table 3.9-7, noise levels from travel of heavy-duty trucks on public roadways associated with project operations on proposed haul routes would result in traffic noise increases ranging from 5.9 to 13.4 dBA at 100 feet, relative to existing conditions. The table also shows that the distance from the haul routes to the 70-, 65-, and 60-dBA noise contours would range from a minimum of 23 feet to a maximum of 129 feet. The measured existing ambient noise levels along Healdsburg Avenue, Geyserville Avenue, and Lytton Station Road are 63.2 dB L_{dn}, 63.4 dB L_{dn}, and 61.3 dB L_{eq}, respectively as shown previously in Table 3.9-2[1]. The modeled versus measured traffic noise levels along these roadways indicate that traffic noise emanating from U.S. 101 also contribute to the overall measured noise levels because of the

[1] Measurements have different units due to the time lengths of the sampling period.

proximity of the roadways to U.S. 101, along with neighborhood activities and errant stationary sources (heating, ventilation, and air conditioning [HVAC]).

As shown in Table 3.9-7, all public roadways (but not necessarily receptors – see discussion below) designated as haul routes for the project would experience a greater than +3 dB traffic noise level increase in areas adjacent to the roads.

Three significance thresholds apply for noise on public roadways: 1) the General Plan criteria of 60dB L_{dn} for noise at outdoor activity areas (which increases to 65 dB L_{dn} for noise impacted areas); (2) the General Plan criteria of 45 dB L_{dn} for interior noise; 3) the ARM Plan criteria of a 3 dB increase in areas adjacent to haul roads if/and noise levels are raised above the performance standards in the General Plan; or, a 3 dB increase in adjacent areas that are currently designated as noise impacted. The modeled traffic noise levels in Table 3.9-7 show an increase of 5.9 to 13.4 dB at various distances from the roadway centerlines that do not necessarily correspond to the location of sensitive receptors along the roadway. Figures 3.7-1 through 3.7-3 in Section 3.7, “Air Quality,” show existing noise-sensitive receptors that occur along the public roads used as haul routes. Table 3.9-8 shows the noise modeling results for heavy-truck hauling activities at the outdoor activity areas of sensitive receptors located adjacent to the public haul routes. Project haul traffic noise predictions show that, without mitigation, seven sensitive receptors would be exposed to noise level increases of 3 dB or more that would exceed the County’s exterior transportation-noise-level standard of 60 dB L_{dn} in outdoor activity areas. Noise level increases also likely would exceed the County’s interior standard of 45 dB Ldn, given the estimated 15-dB exterior-to-interior attenuation from residential facades with doors and windows closed.

Six of the seven receptors are not noise impacted, and would exceed the relevant thresholds by just 0.5 to 1.6 dB. The final receptor, Receptor I on Geyserville Avenue, is just 40 feet from the road, and thus currently exceeds 60 dB L_{dn}, and is considered noise impacted. As a result, Policy NE-1b states that a maximum noise level of 65 L_{dn} may be allowed, while the ARM Plan states that net noise should not increase by more than 3 decibels (or to 64.7 dBA).

As can be seen by Table 3.9-8, all the receptors exceed their applicable threshold by less than 4 dB, and all but Receptor I would exceed the standard by just 0.5 to 1.6 dBA. These results are conservative and likely overstate the actual impact. Nevertheless, absent mitigation, the impact is considered significant.

Table 3.9-8
Summary of Modeled Project Traffic Noise Levels from Heavy-Duty Truck Travel on Public Haul Routes at Residential Outdoor Activity Area Locations

Roadway	Receptor	Distance to Centerline (feet)	Exterior Traffic Noise Level at Residential Outdoor Activity Area in dBA, Ldn		
			Existing	Standard (Exterior Threshold)	Plus Project
Geyserville Avenue	D	150	47.1	60	**60.5**
	E	150	47.1	60	**60.5**
	F	100	55.8	60	**61.6**
	G	125	54.3	60	**60.2**
	H	100	55.8	60	**61.6**
	I	40	**61.7**	64.7	**67.6**
	J	165	52.5	60	58.4
	K	225	50.5	60	56.4
	K	125	52.4	60	59.7
	N	120	52.7	60	60.0
	O	140	51.7	60	59.0
Healdsburg Avenue	DD	235	48.6	60	55.7
	EE	245	48.3	60	55.4
Lytton Station	CC	100	54.2	60	**61.3**
	DD	325	46.6	60	53.6
Hassett Lane	R	120	46.0	60	59.4
	S	180	43.3	60	56.7
	T	325	39.5	60	52.9
	U	1,050	31.8	60	45.2
	V	390	38.3	60	51.7
	W	135	45.2	60	58.6
	X	210	42.3	60	55.7

Notes: [1] Refer to Figures 3.7-1 through 3.7-3 in Section 3.7, "Air Quality," for locations of sensitive receptors.
Bold = exceedance of county transportation outdoor activity area exterior noise level threshold
Source: Modeling conducted by EDAW in 2007

Mitigation Measure

3.9-3a **Implement Noise Abatement Measures for Public Roadways.** Syar shall meet the relevant exterior noise standard at each potentially impacted residence. To meet the standard, Syar shall implement noise abatement measures, including but not limited to the following measures, on public roadways in the project vicinity:

- All heavy trucks shall be equipped with noise control devices (e.g., mufflers) in accordance with manufacturers' specifications.
- All heavy trucks shall be inspected periodically to ensure proper maintenance and presence of noise control devices (e.g., lubrication, non-leaking mufflers, and shrouding).

- All hauling shall be limited to daytime hours, starting at 7:00 a.m.
- Compression release engine air brakes ("jake brakes") shall not be used while operating haul trucks in residential areas.
- Trucks shall reduce speeds to 5 mph below posted speed limit.
- Syar shall secure all loose chains and other mechanical items on trucks that may otherwise create unnecessary noise.

Impact Significance After Mitigation

Implementation of Mitigation Measure 3.9-3a would reduce project-generated off-site traffic noise on public roads to below the relevant exterior standards, and reduce impacts to less than significant. Implementation of Mitigation Measure 3.9-3a does not appear sufficient to mitigate interior noise at Receptor I to the General Plan standard of 45 dB L_{dn}, however, interior noise likely already exceeds 45 dB at Receptor I. As a result, the following Mitigation Measure 3.9-3b shall apply to Receptor I:

3.9-3b **Implement a detailed interior noise study at Receptor I**. Prior to the use of Haul Route 5, the operator shall seek the consent of the owner(s) and/or occupant(s) of the residence at Receptor I and conduct a detailed interior noise study of the residence. The façade of the residence shall be tested for the amount of exterior-to-interior noise reduction provided by the existing residential façade to ensure that the assumption of a 15-dB reduction with windows and doors closed is accurate.

If the detailed interior-noise survey concludes that noise at Receptor I would exceed the interior-noise-level standard of 45 dB Ldn, mitigation shall be provided through installation of noise insulation (window package upgrades that increase the sound transmission class per window by 10 dBA). The project applicant shall offer to compensate the property owner(s) for window upgrades for habitable rooms facing Geyserville Avenue. The property owner(s) shall be responsible for acquiring competitive bids from three (3) qualified contractors to purchase and install the windows. The applicant shall compensate the resident for the cost of the lowest bid after installation of the windows, but shall not be held liable for additional costs that may be incurred during window replacement (dry rot, termite damage, or repairs required to bring the window installation up to code).

This measure shall not apply if Receptor I is not occupied for residential use during the mining season in which Haul Route 5 is utilized.

Impact Significance After Mitigation

Implementation of Mitigation Measure 3.9-3b would reduce the impact at Receptor I to elevated interior-noise levels to a less-than-significant level. If the relevant property owner does not agree to a retrofit their home, the impact would be significant and unavoidable.

Impact 3.9-4 Project haul trucks along private roads would expose existing sensitive receptors to noise.

Noise from roadway traffic (e.g., heavy-duty truck travel) associated with project operations also would be generated on private roadways not maintained by the County, where existing traffic data were not currently available. For such instances, noise levels were modeled (see Appendix

J for the modeling methodology). The modeling assumed a speed limit of 15 mph, 40 peak-hour trips, and a mean SEL of 84 dB at 50 feet, as referenced by the FHWA Roadway Construction Model. Table 3.9-9 summarizes the modeled noise levels at the nearest off-site noise-sensitive receptor from project-generated trucks on private roadways. Noise impacts were determined by comparing these modeling results with applicable standards. The calculated noise level for 40 peak-hour haul trips on private roadways is approximately 56.6 dBA L_{eq} at 50 feet. The nearest noise-sensitive receptor along a private roadway is 115 feet from the centerline of the proposed haul route (see Table 3.9-9); the resulting noise level for 40 hourly haul truck trips would be 51.2 dBA at 115 feet.

Table 3.9-9
Summary of Modeled Project Traffic Noise Levels
from Heavy-Duty Truck Travel on Private (non–County Maintained) Haul Routes

Hourly Haul Truck Trips	SEL_{ref}	Speed (mph)	Peak Hour L_{eq} dBA	Peak-Hour L_{eq} dBA Nearest Noise-Sensitive Receptor[1]	Resulting L_{dn} dBA	Modeled L_{dn} (dBA) at Nearest Noise-Sensitive Receptor[1]
40	84	15	56.6	51.2	56.0	50.6

Notes:
ARM Plan = dB = decibels; dBA = A-weighted decibels; L_{dn} = day-night noise level; L_{eq} = equivalent noise level; mph = miles per hour; SEL_{ref} = reference sound exposure level; SMARO = Sonoma County Surface Mining and Reclamation Ordinance
[1] The nearest noise-sensitive receptor is located approximately 115 feet from haul route centerline behind the residence located along Bill Ferguson Road (haul route 3), receptor M
Source: Modeling conducted by AECOM in 2009

Although hauling activities associated with the project would be limited seasonally (from June 1 to November 1 of each year), such activities would last the duration of the mining permit (i.e., 15 years). The same access routes would not be used for the entire 15-year duration, but could be used for multiple years. Table 3.9-10 shows the haul truck noise levels on private roadways at individual receptors along haul routes with identified sensitive receptors (haul routes 3 and 8).

Table 3.9-10 shows that project haul truck trips on private roadways would comply with the County's daytime operational noise source threshold of 50 dBA $L_{eq,}$ 60 dBA L_{10}, and 70 dBA L_{max} (see Table 3.9-3). Note that distances to a receptor may vary between Tables 3.9-9 and 3.9-10 due to difference in measurements from haul route centerline to house façade and to the back yard of the residence (outdoor activity area). The modeling analysis found that noise levels from haul trucks on private haul roads would increase by at least 3 dB, and would exceed General Plan performance standards at night (i.e., before 7:00 a.m.) for L_{eq} thresholds and for L_{max} thresholds. Mitigation Measure 3.9-3a already precludes haul truck traffic before 7:00 a.m., however. With implementation of this measure, no significant impacts would occur pertaining to noise restriction at night. Because L_{max} thresholds would be exceeded at receptor L and M according to the modeling, this is a potentially significant impact.

Table 3.9-10
Summary of Modeled Project Traffic Noise Levels from Heavy-Duty Truck Travel on Private Haul Routes at Residential Outdoor Activity Area Locations

Receptor[1]	Haul Route	Distance to Centerline (feet)	Resulting Noise Levels With 40 One-Way Trips per Hour, dBA		
			L_{eq}	L_{10}	L_{max}
A	8	585	40.6	37.6	68.0
B	8	760	38.8	35.8	66.3
C	8	435	42.5	39.5	69.9
L	3	175	48.4	45.4	*75.8*
M[2]	3	140	49.9	46.9	*77.3*
Significance Threshold Daytime/Nighttime (Sonoma County General Plan maximum exterior noise level standard)			50/45	60/55	70/65

***Italics* = exceedance of the daytime threshold for the outdoor activity area (no exceedance of the nighttime thresholds with implementation of Mitigation Measure 3.9-3a)**
Notes: [1] Refer to Figures 3.7-1 through 3.7-3 in Section 3.7, "Air Quality," for locations of sensitive receptors.
[2] The nearest outdoor activity area is located approximately 140 feet from haul route centerline behind the residence located along Bill Ferguson Road (haul route 3), receptor M
Source: Modeling conducted by AECOM in 2007

Mitigation Measures

3.9-4 Implement Noise Abatement Measures for Private Roadways. Syar shall meet the relevant exterior noise standards at Receptors L and M by either:

- Precluding use of Haul Route 3;
- Implementing temporary noise barriers as close to Receptors L and M as possible to break the line of sight between haul trucks and the receptors, and reduce noise levels up to 10 dBA and into conformance with County noise standards, unless the owner(s) and occupant(s) of Receptors L and M object to the use of temporary barriers to shield their residences. Temporary barriers shall meet the following requirements:

(1) The materials used for temporary barriers shall be sufficient to last through the duration of the mining season and shall be in good condition.

(2) The barriers shall be constructed of three-quarter-inch Medium Density Overlay (MDO) plywood sheeting, or other acceptable material having a surface weight of 2 pounds per square foot or greater, and a demonstrated Sound Transmission Class rating of 25 or greater as defined by American Society for Testing and Materials Test Method E90.

(3) The MDO barriers shall be lined on one side (noise source side) with glass fiber, mineral wood, or other similar noise-absorbing material at least 2 inches thick with a noise reduction coefficient rating of NRC-0.85 or greater, based on certified sound absorption coefficient data taken according to American Society for Testing and Materials (ASTM) Test Method C423.

(4) When barrier units are joined together, the mating surfaces shall be flush with each other. Gaps between barrier units, and between the bottom edge of barrier

panels and the ground, shall be closed with material that will completely close the gaps and be dense enough to fully attenuate noise.

Impact Significance After Mitigation

Implementation of Mitigation Measure 3.9-4a would reduce project-generated off-site traffic noise on private roads to below the relevant exterior standards, and reduce impacts to less than significant. Impacts would remain significant and unavoidable only if the relevant property owner(s) and occupant(s) voluntarily object to the use of temporary noise impacts.

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