4.10 Noise

Issues (and Supporting Information Sources):		*Potentially Significant Impact*	*Less Than Significant with Mitigation Incorporation*	*Less Than Significant Impact*	*No Impact*
10.	**NOISE—Would the project:**				
a)	Result in exposure of persons to or generation of noise levels in excess of standards established in the local general plan or noise ordinance, or applicable standards of other agencies?	☒	☐	☐	☐
b)	Result in exposure of persons to or generation of excessive groundborne vibration or groundborne noise levels?	☒	☐	☐	☐
c)	Result in a substantial permanent increase in ambient noise levels in the project vicinity above levels existing without the project?	☒	☐	☐	☐
d)	Result in a substantial temporary or periodic increase in ambient noise levels in the project vicinity above levels existing without the project?	☒	☐	☐	☐
e)	For a project located within an airport land use plan area, or, where such a plan has not been adopted, in an area within two miles of a public airport or public use airport, would the project expose people residing or working in the area to excessive noise levels?	☐	☐	☒	☐
f)	For a project located in the vicinity of a private airstrip, would the project expose people residing or working in the project area to excessive noise levels?	☐	☐	☐	☒

4.10.1 Setting

This section addresses potential noise impacts from transportation sources, stationary, and mobile equipment associated with the project, and temporary construction due to the proposed project. This analysis uses typical construction equipment noise levels and current and projected vehicular traffic to estimate corresponding noise levels at the nearest sensitive receptor locations.

Noise Principles and Descriptors

Noise Background

Noise is defined as unwanted sound. Sound, traveling through the air as waves outward from a source, exerts a sound pressure level (referred to as sound level) that is measured in decibels (dB). Pressure waves traveling through air exert a force registered by the human ear as sound. Zero dB corresponds roughly to the threshold of human hearing and 120 to 140 dB corresponding to the threshold of pain. Continuous human exposure to sound above roughly 90 dB can cause permanent hearing loss.

The typical human ear is not equally sensitive to all frequencies of the audible sound spectrum. Consequently, when assessing potential noise impacts, sound is measured using an electronic

filter that de-emphasizes the frequencies below 1,000 Hz and above 5,000 Hz to imitate the human ear's decreased sensitivity to low and extremely high frequencies. This emulation of the human ear's frequency sensitivity is referred to as A-weighting and is expressed in units of A-weighted decibels (dBA). Frequency A-weighting follows an international standard method of frequency de-emphasis and is typically applied to community noise measurements. In practice, the specific sound level from a source is measured using a meter incorporating an electrical filter corresponding to the A-weighting curve.

Noise Exposure and Community Noise

An individual's noise exposure is a measure of sound experienced over a period of time. A noise level is a measure of noise at a given instant in time. Community noise varies continuously over a period of time with respect to the contributing sound sources of the community noise environment. Community noise is primarily the product of many distant noise sources, which constitute a relatively stable background noise exposure, with the individual contributors unidentifiable. Background noise levels change throughout a typical day, but do so gradually, corresponding with the addition and subtraction of distant noise sources such as traffic and wind. What makes community noise constantly variable throughout a day, besides the slowly changing background noise, is the addition of short duration single event noise sources such as aircraft flyovers, passing vehicles, sirens, etc., which are readily identifiable to the individual. These successive additions of sound to the community noise environment vary the community noise level from instant to instant, requiring the measurement of noise exposure over a period of time to legitimately characterize a community noise environment and evaluate cumulative noise impacts. This time-varying characteristic of environmental noise is described using statistical noise descriptors. The most frequently used noise descriptors are summarized below:

L_{eq}: the equivalent sound level is used to describe noise over a specified period of time, typically one hour, in terms of a single numerical value. The L_{eq} is the constant sound level that would contain the same acoustic energy as the varying sound level, during the same time period (i.e., the average noise exposure level for the given time period).

L_{max}: the instantaneous maximum noise level for a specified period of time.

L_{10}: the noise level that is equaled or exceeded 10 percent of the specified time period. The L_{10} is often considered the maximum noise level averaged over the specified time period.

Ldn: See DNL, the Ldn is the same as the DNL.

L_{90}: the noise level that is equaled or exceeded 90 percent of the specified time period. The L_{90} is often considered the background noise level averaged over the specified time period.

DNL: the Day/Night Average Sound Level is the 24-hour day and night A-weighed noise exposure level which accounts for the greater sensitivity of most people to nighttime noise by weighting noise levels at night. Noise between 10:00 p.m. and 7:00 a.m. is weighted (penalized) by adding 10 dBA to take into account the greater annoyance of nighttime noise. (Also called Ldn).

CNEL: similar to the DNL, the Community Noise Equivalent Level adds a 5 dBA penalty for the evening hours between 7:00 p.m. and 10:00 p.m. in addition to a 10 dBA penalty between the hours of 10:00 p.m. and 7:00 a.m.

SEL: a receiver's cumulative noise exposure from a single noise event. Often used to calculate L_{eq} and DNL values.

Effects of Noise on People

The effects of noise on people can be placed in three categories:

- subjective effects of annoyance, nuisance, dissatisfaction;
- interference with activities such as speech, sleep, learning; and
- physiological effects such as hearing loss or sudden startling.

Environmental noise typically produces effects in the first two categories. Workers in industrial plants can experience noise in the last category. There is no completely satisfactory way to measure the subjective effects of noise, or the corresponding reactions of annoyance and dissatisfaction. A wide variation in individual thresholds of annoyance exists, and different tolerances to noise tend to develop based on an individual's past experiences with noise.

Thus, an important way of predicting a human reaction to a new noise environment is the way it compares to the existing environment to which one has adapted: the so called "ambient noise" level. In general, the more a new noise exceeds the previously existing ambient noise level, the less acceptable the new noise will be judged by those hearing it. For increases in A-weighted noise level the following relationships occur (Caltrans, 1998):

- under controlled conditions in an acoustics laboratory, the trained healthy human ear is able to discern changes in sound levels of 1 dBA;
- outside of such controlled conditions, the trained ear can detect changes of 2 dBA in normal environmental noise;
- it is widely accepted that the average healthy ear, however, can barely perceive noise level changes of 3 dBA;
- a change in level of 5 dBA is a readily perceptible increase in noise level; and
- a 10 dBA change is recognized as twice as loud as the original source.

These relationships occur in part because of the logarithmic nature of sound and the decibel system. Because the decibel scale is based on logarithms, two noise sources do not combine in a simple linear fashion, but rather logarithmically. For example, if two identical noise sources produce noise levels of 50 dBA, the combined sound level would be 53 dBA, not 100 dBA.

Noise Attenuation

Stationary "point" sources of noise, including stationary mobile sources such as idling vehicles, attenuate (lessen) at a rate of 6 dBA to 7.5 dBA per doubling of distance from the source, depending on environmental conditions (i.e., atmospheric conditions and noise barriers, either vegetative or manufactured, etc.). Widely distributed noises, such as a large industrial facility spread over many acres or a street with moving vehicles (a "line" source), would typically attenuate at a lower rate, approximately 3 to 4.5 dBA per doubling distance from the source (also dependent on environmental conditions) (Caltrans, 1998). Noise from large construction sites would have characteristics of both "point" and "line" sources, so attenuation would generally range between 4.5 and 7.5 dBA per doubling of distance.

4.10.2 Regulatory Context

In most areas, automobile and truck traffic is the major source of environmental noise. Traffic activity generally produces an average sound level that remains fairly constant with time. Air and rail traffic and commercial and industrial activities are also major sources of noise in some areas.

Generally, the federal government sets noise standards for transportation-related noise sources that are closely linked to interstate commerce, such as aircraft, locomotives, and trucks, and, for those noise sources, the state government is preempted from establishing more stringent standards. The state government sets noise standards for those transportation noise sources that are not preempted from regulation, such as automobiles, light trucks, and motorcycles. Noise sources associated with industrial, commercial, and construction activities are generally subject to local control through noise ordinances and general plan policies.

Federal

Federal regulations establish noise limits for medium and heavy trucks (more than 4.5 tons, gross vehicle weight rating) under 40 CFR, Part 205, Subpart B. The federal truck pass-by noise standard is 80 dB at 15 meters from the vehicle pathway centerline. These controls are implemented through regulatory controls on truck manufacturers.

State

Title 4 of the California Code of Regulations provides guidelines for evaluating the compatibility of various land uses as a function of community noise exposure.

The State of California establishes noise limits for vehicles licensed to operate on public roads. For heavy trucks, the State pass-by standard is consistent with the federal limit of 80 dB. The State pass-by standard for light trucks and passenger cars (less than 4.5 tons, gross vehicle rating) is also 80 dB at 15 meters from the centerline. These standards are implemented through controls on vehicle manufacturers and by legal sanction of vehicle operators by state and local law enforcement officials.

Local

Local regulation of noise involves implementation of General Plan policies and Noise Ordinance standards. General Plans recognize that different types of land uses have different sensitivities toward their noise environment; residential areas are generally considered to be the most sensitive land use type to noise and industrial/commercial areas are generally considered to be the least sensitive. Noise Ordinances set forth the specific standards and procedures for addressing particular noise sources and activities. The City of Grass Valley noise regulations and standards apply to the land uses near the project sites, except for uses in the vicinity of the New Brunswick site, which would remain in the Nevada County jurisdiction.

Nevada County General Plan[1]

The County General Plan Noise Element goal, objective, and policies applicable to the project include:

- Goal 9.1: Provide for the health, safety, and welfare of the people of Nevada County through a set of policies designed to encourage an environment free of unnecessary and annoying noise.

- Objective 9.1: Determine the existing noise environment and continue to reassess this environment so that a realistic set of noise standards can be developed reflecting the varying nature of different land uses.

Directive Policies

- Policy 9.1: The following noise standards, as performance standards and land use compatibility standards, shall apply to all discretionary and ministerial projects excluding permitted residential (including tentative maps) land uses.

EXTERIOR NOISE LIMITS

Land Use Category	Zoning Districts	Time Period	Noise Level, dBA	
			L_{eq}	L_{max}
Rural	"A1" "TPZ"	7 am - 7 pm	55	75
	"AE" "OS"	7 pm - 10 pm	50	65
	"FR" "IDR"	10 pm - 7 am	40	55
Residential and Public	"RA" "R2"	7 am - 7 pm	55	75
	"R1" "R3"	7 pm - 10 pm	50	65
	"P"	10 pm - 7 am	45	60
Commercial and Recreation	"C1" "CH" "CS"	7 am - 7 pm	70	90
	"C2" "C3" "OP" "REC"	7 pm - 7 am	65	75
Business Park	"BP"	7 am - 7 pm	65	85
		7 pm - 7 am	60	70
Industrial	"M1" "M2"	any time	80	90

[1] Under the proposed project, Nevada County plans and policies would only apply to the New Brunswick site, which would not be annexed into the City of Grass Valley as part of this proposed project.

a. Compliance with the above standards shall be determined by measuring the noise level based on the mean average of not less than three (3) 20 minute measurements for any given time period. Additional noise measurements may be necessary to ensure that the ambient noise level is adequately determined.

b. Where two different zoning districts abut, the standard applicable to the lower, or more restrictive, district plus 5 dBA shall apply.

c. The above standards shall be measured only on property containing a noise sensitive land use as defined in Policy 9.8 and may be measured anywhere on the property containing said land use. However, this measurement standard may be amended to provide for measurement at the boundary of a recorded noise easement or as determined in a recorded letter of agreement between all effected property owners and approved by the County.

d. If the measured ambient level exceeds that permitted, then the allowable noise exposure standard shall be set at 5 dBA above the ambient.

e. Because of the unique nature of sound, the County reserves the right to provide for a more restrictive standard than shown in the Exterior Noise Limits table contained in this policy. The maximum adjustment shall be limited to be not less than the current ambient noise levels and shall not exceed the standards of this policy or as they may be further adjusted by Policy 9.1b. Imposition of a noise level adjustment shall only be considered if one or more of the following conditions are found to exist:

    1. Unique characteristics of the noise source:

        (a) The noise contains a very high or low frequency, is of a pure tone (a steady, audible tone such as a whine, screech, or hum), or contains a wide divergence in frequency spectra between the noise source and ambient level.

        (b) The noise is impulsive in nature (such as hammering, riveting, or explosions), or contains music or speech.

        (c) The noise source is of a long duration.

    2. Unique characteristics of the noise receptor when the ambient noise level is determined to be 5 dBA or more below the Policy 9.1 standard for those projects requiring a General Plan amendment, rezoning, and/or conditional use permit. In such instances, the new standard shall not exceed 10 dBA above the ambient or the Policy 9.1 standard, whichever is more restrictive.

f. The above standards shall not apply to those activities associated with the actual construction of a project or to those projects associated with the provision of emergency services or functions.

g. The standards of this policy shall be enforced through compliance inspections and/or complaints.

h. Recognizing that this chapter must work toward the solution to existing noise problems, those land uses that are inconsistent with the above standards and are therefore non-conforming in nature, shall comply with said standards as these land uses are upgraded or intensified or after abandonment through the use permit or site plan process. Said standards shall apply only to that portion of the land use requiring approval. In any event, the use or portion subject to a land use permit must meet the standards in the Exterior Noise Limits table in this policy and cumulatively the noise generated from the entire site must be equal to or less than the pre-land use permit

ambient noise level. All such projects analysis per Policy 9.10 and the Nevada County Noise Element Manual.

- Policy 9.5: Encourage heavy truck traffic to those routes outside residential areas.

- Policy 9.9: Limit future noise generating land uses to those locations of the County where their impacts on noise sensitive land uses will be minimized, consistent with the standards found in Policy 9.1.

- Policy 9.10: Require the preparation of a comprehensive noise study for all land use projects determined to have a potential to create noise levels inconsistent with those standards found in Policy 9.1, and in accordance with the methodology identified in the Noise Element Manual contained in General Plan Volume 2, Section 3 - Noise Analysis Appendix A.

- Policy 9.11: Provide for adequate design controls to assist in mitigating on-site the significant adverse impacts of future noise generating land uses through increased setbacks, landscaping, earthen berms, and solid fencing.

City of Grass Valley General Plan

The City's General Plan recognizes noise pollution as a significant source of environmental degradation. The City's General Plan Noise Element identifies community noise goals and establishes actions to reduce noise pollution. The General Plan goal and actions applicable to the project include:

- Goal 1-NG: Protect Grass Valley's relatively quiet environment from unnecessary, annoying and potentially damaging noise.

Noise Implementation Actions and Strategies

- 2-NI: Require that noise created by new development of fixed noise sources be mitigated so as not to exceed the noise level standards of **Table 4.10-1** as measured immediately within the property line of lands designated for noise-sensitive land uses.

- 3-NI: Require that noise created by existing fixed noise sources which undergo modifications requiring City approval be mitigated so as not to exceed the noise level standards of **Table 4.10-1** as measured immediately within the property line of lands designated for noise-sensitive land uses. If the existing noise level due to those sources exceeds the standards, require that the noise level after modifications be mitigated so as to not exceed the existing noise level.

- 4-NI: Require that that an acoustical analysis be performed where new development of fixed noise sources, or modification of existing fixed noise sources, is likely to produce noise levels exceeding the performance standards of **Table 4.10-1,** and that noise mitigation be included in the project design.

- 6-NI: Require mitigation of noise created by new transportation noise sources so as not to exceed the noise levels specified in **Table 4.10-2** at designated outdoor activity areas and interior spaces of existing noise-sensitive land uses.

TABLE 4.10-1
NOISE LEVEL PERFORMANCE STANDARDS FOR FIXED NOISE SOURCES

Noise Descriptor	Daytime (7:00 a.m. to 10:00 p.m.)	Nighttime (10:00 p.m. to 7:00 a.m.)
Hourly Leq, dB	55	50
Maximum Level, dB	75	65

NOTE: Each of the noise levels specified above shall be lowered by five dB for simple tone noises, noises consisting primarily of speech or music, or for recurring impulsive noises (e.g., humming sounds, outdoor speaker systems, shooting ranges). These noise level standards do not apply to residential units established in conjunction with industrial or commercial uses (e.g., caretaker dwellings).

SOURCE: City of Grass Valley (1999)

TABLE 4.10-2
MAXIMUM ALLOWABLE NOISE EXPOSURES FOR TRANSPORTATION NOISE SOURCES

Land Use	Ldn/CNEL, dB	Interior Spaces	
		Ldn/CNEL, dB	Leq, dB[a]
Residential	60[b]	45	--
Transient Lodging	60[c]	45	--
Hospitals, Nursing Homes	60[b]	45	--
Theaters, Auditoriums, Music Halls	--	--	35
Churches, Meeting Halls	60[b]	--	40
Office Buildings	--	--	45
Schools, Libraries, Museums	--	--	45
Playgrounds, Neighborhood Parks	70	--	--

[a] As determined for a typical worst-case hour during periods of use.
[b] Where it is not possible to reduce noise in outdoor activity areas to 60 dB Ldn/CNEL using a practical application of the best-available noise reduction measures, an exterior noise level of up to 65 dB Ldn/CNEL may be allowed provided that available exterior noise level reduction measures have been implemented and interior noise levels are in compliance with this table.
[c] In the case of hotel/motel facilities or other transient lodging, there may be no designated outdoor activity areas (e.g., pool areas). In such cases, only the interior noise level criterion will apply.

SOURCE: City of Grass Valley (1999)

- 8-NI: Require an acoustical analysis and appropriate mitigation measures where new transportation noise sources are likely to produce noise levels exceeding the standards of **Table 4.10-2** at existing or planned noise-sensitive uses.

(City of Grass Valley, 1999)

City of Grass Valley Noise Ordinance

The City of Grass Valley has adopted noise regulations in Chapter 8.28 of the City Code. These regulations do not contain quantitative noise standards. However, the regulations provide that it is unlawful to willfully make or continue a loud, unnecessary, or unwanted noise which disturbs the peace or quiet of a neighborhood, or which causes discomfort or annoyance to a reasonable

person of normal sensitivity residing in the area. The Grass Valley City Code would also apply to the construction activities for this project, if they were to occur within 500 feet of a residential zone. The Code then prohibits construction between the hours of 7 p.m. and 7 a.m., on a Sunday or legal holiday in such a manner that a reasonable person of normal sensitivity residing in the area is caused discomfort or annoyance, unless prior permission has been granted by the Building Official in the interest of public convenience or necessity.

Sensitive Receptors and Existing Noise Environment

Sensitive Receptors

Some land uses are considered more sensitive to ambient noise levels than others, due to the amount of noise exposure (in terms of both exposure duration and insulation from noise) and the types of activities typically involved. Residences, motels and hotels, schools, libraries, churches, hospitals, nursing homes, auditoriums, and parks and other outdoor recreation areas generally are more sensitive to noise than are commercial and industrial land uses. There are residential sensitive receptors interspersed around the project area. The Sierra Nevada Hospital buildings are located about 2,000 feet northwest of the proposed decline portal.

Existing Noise Environment

The existing noise environment was described in the Environmental Noise Analysis prepared in 2004 by Brown-Buntin Associates (BBA). Ambient noise measurements collected by BBA at four different residences in the project vicinity ranged from approximately 46 to 56 Ldn, dB. Other industrial facilities (Sierra Pre-Bilt and Pacific Crest Door and Milling shops) in the project vicinity also contribute to the existing ambient noise environment (BBA, 2004).

4.10.3 Impacts Discussion

Methods

The effort to identify potential noise impacts in the project area included a field visit and review of existing documents and reference materials.

ESA reviewed the existing Draft Environmental Impact Report for the Idaho-Maryland Gold Mine Dewatering and Exploration Project (1995) by Wildan Associates and PMC, the Environmental Noise Analysis – Idaho-Maryland Mine Project (2004) developed by Brown-Buntin Associates (BBA), and the Expanded Environmental Assessment for the Proposed Idaho-Maryland Mine Project (2005) by MACTEC prior to visiting the project site. The field visit to the Idaho-Maryland Mine site assisted in understanding the site topography and layout of the project in relation to noise-sensitive receptors and other noise generating facilities and activities in the vicinity. After review of the BBA study and the site visit, ESA requested additional information from IMMC pertinent to the noise analysis.

Applicable information from the BBA analysis was summarized and incorporated into the MEA, in addition to data provided by IMMC in the Response to Data Requests (2006) and the Blasting Impacts Assessment for Proposed Idaho-Maryland Mine developed by Gordon Revey, P. E. Additional reference materials, including Environmental Noise Pollution (1977) by Patrick Cunniff, Traffic Noise Analysis Protocol for New Highway Construction and Reconstruction Projects (1998) by Caltrans, and the Nevada County and City of Grass Valley General Plans were a source of reference noise levels for construction equipment (Cunniff), a source for noise principles and descriptors (Caltrans), and sources for noise policies and standards (General Plans).

Significance Criteria

A project would result in a significant noise impact if it would:

- Expose persons to or generate noise levels in excess of standards established in any applicable plan or noise ordinance, or applicable standards of other agencies;
- Expose persons to or generation of excessive ground-borne vibration or ground-borne noise levels;
- 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 existing levels existing without the project;
- Expose people residing or working in the project area 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
- Expose people residing or working in the project area to excessive noise levels if the project is located in the vicinity of a private airstrip.

The proposed project sites are not located in the vicinity of a private airstrip. Therefore, the project would not expose persons working at the project sites to excessive noise levels as a result of proximity to an airstrip; private airstrip noise will not be addressed further in this document.

The significance of project-related noise impacts can be determined by comparing estimated project-related noise levels to existing no-project noise levels. An increase of at least 3 dBA is usually required before most people will perceive a change in noise levels, and an increase of 5 dBA is required before the change will be clearly noticeable. A common practice has been to assume that minimally perceptible to clearly noticeable increases of 3–5 dB represents a significant increase in ambient noise levels. A sliding scale is commonly used to identify the significance of noise increases, allowing greater increases at lower absolute sound levels than at higher sound levels. This approach is based on research that relates changes in noise to the

percentage of individuals that would be highly annoyed by the change. The significance criteria for changes in noise from project operations are as follows:

1. A 3 dBA Ldn increase in noise as a result of project transportation sources if the existing noise level already exceeds the normally acceptable threshold for the land use (60 dBA Ldn for residential uses, as shown in **Table 4.10-2**).
2. A 5 dBA Ldn increase in noise as a result of project transportation sources if the existing noise level is below the normally acceptable threshold and the resulting level is also below the normally acceptable threshold for the land use.
3. A resulting offsite noise level from non-transportation sources that exceeds 55 dBA Leq in the daytime (7:00 a.m. to 10:00 p.m.) or 50 dBA Leq in the nighttime (10:00 pm to 7:00 a.m.) at the property line of the receiving land use. These criteria are based on the noise level standards depicted in **Table 4.10-1**.

Results

Impact 4.10-1: Construction activities associated with the proposed project would temporarily and intermittently increase noise levels and ground-borne vibration at nearby sensitive receptor locations. This would be a potentially significant impact.

Future noise levels related to construction within and adjacent to the project site would fluctuate depending on the particular type, number, and duration of uses of various pieces of construction equipment and blasting at locations near the decline tunnel. Construction-related material haul trips would raise ambient noise levels along haul routes. **Table 4.10-3** provides typical noise levels, at a distance of 50 feet, produced by various types of construction equipment.

As identified in Table 3-4 of the Project Description, construction activities would occur over a four-year period from 2007 to 2011. Construction activities could substantially increase ambient noise levels and vibration at noise-sensitive locations throughout the four-year construction period in the vicinity of the project construction sites and along haul routes. The project proposes to restrict construction between 7 a.m. and 7 p.m. Monday through Friday.

Idaho-Maryland Site Construction

Decline Tunnel Construction

At the Idaho-Maryland site, during development of decline tunnel, noise could be produced by heavy truck movement and other equipment in and out of the shafts, forklifts operating at the tile storage area, operation of a portable crusher initially sited aboveground during construction of the decline tunnel, and operation of conveyor belt systems to remove materials. The crushing plant would generate noise when its rotating hammers hit the larger pieces of raw material fed into the crushing chamber. The intensity of sound from the rock crushers would vary depending on the composition of the material, humidity, and size of the rocks. The applicant's Expanded Environmental Assessment (2005) indicated that engine-powered equipment such as loaders and the portable crusher may be assumed to produce noise levels up to 86 dBA, which is generally

TABLE 4.10-3
TYPICAL NOISE LEVELS FROM CONSTRUCTION EQUIPMENT

Construction Equipment	Noise Level (dBA, Leq at 50 feet)
Dump Truck	88
Portable Air Compressor	81
Concrete Mixer (Truck)	85
Scraper	88
Jack Hammer	88
Dozer	87
Paver	89
Generator	76
Pile Driver	101
Backhoe	85

SOURCE: Cunniff (1977)

consistent with noise levels presented in Table 4.10-3 and levels measured by ESA as described below. Noise was measured by ESA staff at a sand and aggregate processing facility in Tracy.[2] At a distance of 100 feet, daytime hourly noise levels reached 78-80 dBA L_{eq} with a maximum noise level of about 98 dBA L_{max}. Noise from the portable crusher would decrease considerably as it is moved below ground during decline construction. However, the temporary operation of the crusher aboveground could potentially affect the nearest noise-sensitive receptors.

Noise from the conveyor belt system was estimated to be 50 to 60 dBA at a distance of 25 feet. This is less than the noise levels from other sources that would be operating at the same time and would probably not have an effect at offsite receptors even when operated near the opening to the decline.

Blasting Noise

As described in **Appendix C** (Blasting Appendix), the use of explosives to advance the decline tunnel could result in impacts from noise and vibration. Low-frequency blast noise (air overpressure) could result in an impact to hospital operations at a distance of 2,000 feet from the entrance to the decline. At the low frequencies, the noise would be perceived as vibration but it would be transmitted through the air. The air overpressure would need to be monitored closely to assure that it is within the regulatory limit of 133-dBL (0.014 psi) for air-overpressure measured with 2-Hz response seismographs as defined by USBM, in State of California regulations.

[2] Measurements were collected in 1993 and presented in the noise section of the *Granite Construction Company Vernalis Project EIR*, 1993 prepared for Stanislaus County. These measurements are comparable to similar noise measurements of processing plants that are presented in other environmental reviews, including the *DSS Engineering Contractors Proposed Koster Road Quarry Excavation Application (QX-96-1) Final Environmental Impact Report* (prepared by EDAW for San Joaquin County).

Blasting Vibration

Appendix C (Blasting Appendix) assumes that the maximum charge of explosive-per-delay in the access tunnel would be limited to 40 pounds or less. With such a charge, the intensities of ground motion at the nearest occupied building at a distance of 1,000 feet, the hospital at 1,950 feet, and the closest home when the tunnel is below it at a distance of 1,165 feet would likely not exceed 0.07 inches/second. The 40-lb charge-per-delay limit is not overly restrictive and the anticipated levels of ground motion would be barely perceptible to occupants of all buildings at locations of concern.

Rock Drilling Noise and Vibration

When hydraulic rock drills are used for the tunneling work near the surface, it is very likely that airborne A-scale noise levels may exceed nighttime noise limits mandated by the City of Grass Valley. Hence the contractor doing the drill blast work may be restricted from doing nighttime drilling work until the tunnels have advanced hundreds of feet under the ground. Once drilling work is isolated underground, some secondary audible noise created by the vertical component of ground vibrations would be caused by the drilling. This vibration and the secondary noise it creates typically occur within a narrow band frequency range between 70 and 125 Hz. During quiet periods of the day, the resulting drill noise heard by occupants of building located within 500 or so vertical feet from the tunnel may sound like a neighbor across the street is using a hammer drill.

Additional Idaho Maryland Mine Surface Construction

Other major construction in this area would include clearing of trees and grading the site and construction of other buildings including the gold processing plant and ceramics plant.

Round Hole Site Construction

The Round Hole site would be developed as an underground ventilation shaft, an alternative worker emergency exit, and used to deliver workers and materials, as needed. The Round Hole site is generally vacant with the exception of a now covered underground shaft that provided access to the mine. The adjacent properties are vacant lands, with the exception of buildings located to the southwest along Whispering Pines Lane. Ventilation fans would be placed underground in the shaft area to reduce the fans' mechanical noise levels. Construction noise would be limited by hour restrictions.

New Brunswick Site Construction

Dewatering of the New Brunswick Site would involve the operation of submersible electric pumps that would be placed in a pump station about 1,300 feet below ground. Construction noise would be limited by hour restrictions.

Impact 4.10-2: Operational activities (stationary and off-road mobile equipment) associated with the proposed project could increase ambient noise levels at nearby residences. This would be a potentially significant impact.

Non-transportation noise sources associated with project operations include aboveground stationary and off-road mobile equipment. **Table 4.10-4** lists the above ground off-road equipment proposed to be used during project operations and **Table 4.10-5** shows IMMC's proposed mitigation that would be implemented as part of the project to reduce noise impacts associated with facility equipment.

TABLE 4.10-4
ABOVE GROUND OFF-ROAD OPERATIONAL EQUIPMENT

Equipment	Expected Quantity	Expected Engine Size (HP)	Expected Hourly Use (Minutes)	Expected Use Location
Graders	1	300	20-40	General - 95% IM Site
Excavators	2	200	20-40	General - 95% IM Site
Front End Loaders	2	300	20-40	General - 95% IM Site
Bulldozers	2	400	20-40	Stockpiles - 100% IM Site
Mobile Cranes	2	150	Infrequent	General - All Sites
Mobile Gensets	2	200	Infrequent	General - All Sites
Water Tanker	1	300	20-40	Roads - 95% IM Site
Light duty trucks, service trucks	10	150	20-15	General - 90% IM Site
Compressors, pumps, lighting, other small engine equipment	20	50	Infrequent	General - All Sites

SOURCE: IMMC (2005)

Production Blasting

Production blasting is of more concern than blasting for the decline tunnel because larger explosives are expected for production blasting. The Blasting Appendix (**Appendix C**) assumed that up to 200 pounds-per-delay would be used in production blasting. At this level the intensity of ground motion would likely not exceed 0.17 in/s. Motion of this level would not cause damage but it would certainly be felt by occupants of buildings. To minimize disturbance to surface residents, mine production blasting should be limited to daytime hours between 8:00 a.m. and 8:00 p.m., when residents are not sleeping.

Idaho-Maryland Site Operations

The Idaho-Maryland site would be the center for aboveground processing. Most of the processing would be in fully enclosed buildings with the exception of the operation of a portable crusher which would initially be sited aboveground during construction of the decline tunnel. Uses at the site would include the ceramics plant, the gold process/mill building, the Visitors' center, the Administration office and dry space, and Employee and Visitor's Center parking area. The uses with potential for noise effects would be the ceramics plant and the gold process/mill building.

TABLE 4.10-5
PROJECT FACILITY EQUIPMENT AND PROPOSED NOISE MITIGATION

Potential Noise Generating Equipment	Proposed Mitigation
Ceramics Plant	
Kiln and Dryer Burners	Inside fully enclosed and insulated building
Fans and Blowers	Inside fully enclosed and insulated building
Vacuum Pumps	Inside fully enclosed and insulated building, exhaust silencers, sound insulated enclosures
Air Compressors	Inside fully enclosed, insulated building, intake silencers, sound insulated enclosures
HVAC Units	Sound insulated enclosures
Forklifts	Electric powered
Gold Process Plant	
Crushers	Inside fully enclosed and insulated building
Dryer Burners	Inside fully enclosed and insulated building
Fans and Blowers	Inside fully enclosed and insulated building
Pumps	Inside fully enclosed and insulated building
Air Compressors	Inside fully enclosed and insulated building, intake and exhaust silencers, sound insulated enclosures
HVAC Units	Sound insulated enclosures
Water Treatment Plant	
Blowers	Sound insulated enclosures
Pumps	Sound insulated enclosures
Air Compressors	Intake silencers, sound insulated enclosures

SOURCE: IMMC (2005)

Noise sources at the ceramics plant include size reduction equipment, belt and screw conveyors, bucket elevators, mixers, dryers, calciners, extruders, table conveyors, furnaces, product packaging equipment, product handling and stacking equipment, dust collection equipment, air compressors, fans, warning sirens and alarms, overhead cranes, and fork lifts.

Noise sources at the gold process/mill building include grinding mills, dynamic screens, belt conveyors, pumps, agitators, concentrators, air compressors, fans, warning sirens and alarms, overhead cranes, and forklifts.

For the most part, noise from the ceramics plant and the gold process/mill building would be contained within the buildings; however, Appendix J of the Application identified potential impacts for outside operations related to the ceramics plant. Loaders and forklifts in the tile storage area could potentially affect the nearest house on East Bennett Road and also Milco Development. Heavy truck passage from project operations could also affect Milco Development.

Round Hole Site Operations

The ventilation fan is estimated to have a noise level of 45 DBA Leq at the nearest property boundary (200 feet from the ventilation shaft), and be in compliance with the Grass Valley Noise Element standard (MACTEC, Expanded Environmental Assessment, 2005). The Round Hole site is approximately 1,000 feet from the nearest residence (IMMC, Data Request #1).

New Brunswick Site Operations

Dewatering of the New Brunswick Site would involve the operation of submersible electric pumps that would be placed in a pump station about 1,300 feet below ground. The noise at the nearest residence is expected to be less than significant (MACTEC, Expanded Environmental Assessment, 2005). The New Brunswick site is approximately 500 feet from the nearest residence (IMMC, Data Request #1). The New Brunswick site would also have ventilation fans (IMMC, Data Request #1). Using the noise estimates from the Round Hole site, noise from the fans would be approximately 45 dBA, Leq at a distance of 200 feet.

Impact 4.10-3: Operational activities (transportation) associated with the project could increase ambient noise levels at nearby residences. This would be a potentially significant impact.

Analysis of the project traffic noise impact will need to be based on the revised traffic study, which will fill in the data gaps identified in Section 4.14, *Transportation and Traffic*, included in this document. If the trip generation information is altered, the Federal Highway Administration (FHWA) Traffic Noise Prediction Model will be calibrated using BBA data and used with the revised traffic trips to calculate traffic noise levels on the roadway network in the project vicinity.

As discussed in Section 3.9.5 of this document, outbound truck traffic to the west would use the Idaho-Maryland Road on-ramp to the Frontage Street to the South Auburn Street on-ramp. Noise generated by project-related truck traffic could potentially affect the noise-sensitive receptors, including residences and a new hotel along Frontage Street.

Impact 4.10-4: The project sites are located within two miles of a public airport or public use airport but would not expose people working in the project area to excessive noise levels. This would be a less than significant impact.

The project sites are located approximately 1.5 miles from the Nevada County Airport, which is located at 13083 John Bauer Avenue in Grass Valley. The 65 dB CNEL contour for this airport does not extend to any portion of the project sites. Therefore, the project would not expose people at the project sites to excessive noise levels from the Nevada County Airport.

4.10.4 Data Gaps

1. Traffic noise analysis will need to be updated when additional traffic trip volumes become available.

2. CEQA analysis will require more detailed mapping of off-site sensitive receptors, distance of proposed site operations to those receptors, existing noise measurements at those locations and topography between site operations and those receptors. Maps are needed to show sensitive noise receptor locations including receptors potentially affected by construction and operations. The location of proposed projects near the project site should also be indicated.

3. Revisions are needed for the noise level estimates from aboveground off-road mobile equipment based on the types of equipment and potential proximity to nearby receptors. Also, noise levels of diesel powered versus electric powered forklifts will be needed for comparison to determine if the equipment noise levels generated at the tile storage area in the BBA report were overestimated, since electric forklifts have been proposed as mitigation in **Table 4.10-5**.

References – Noise

Brown-Buntin Associates, 2004. *Environmental Noise Analysis – Idaho-Maryland Mine Project*, December 2004

Caltrans, 1998. *Traffic Noise Analysis Protocol for New Highway Construction and Reconstruction Projects*, October 1998.

City of Grass Valley, 1999. *City of Grass Valley 2020 General Plan, Noise Element*, November 1999.

Cunniff, Patrick, 1977. *Environmental Noise Pollution*, 1977.

Idaho-Maryland Mining Corp. (IMMC), 2006. *Response to Data Requests*, January 2006.

Revey, Gordon, 2006. *Blasting Impacts Assessment for Proposed Idaho-Maryland Mine.* Included in this document as Appendix C – "Blasting Appendix".