

# Noise and Vibration Analysis

## Idaho Maryland Mine

Nevada County, California

BAC Job # 2018-203

Prepared For:

Rise Grass Valley Inc.

Attn: Mr. Ben Mossman  
P.O. Box 271  
Grass Valley, California 95945

Prepared By:

**Bollard Acoustical Consultants, Inc.**



Paul Bollard, President

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## Introduction

Rise Grass Valley Inc. (Rise) proposes to reinitiate underground mining and gold mineralization processing of the Idaho-Maryland Mine (project) in unincorporated Nevada County (County). The proposed facilities and operations will be located on two properties owned by Rise, the Brunswick Industrial Site and the Centennial Industrial Site, also referred to herein as Brunswick Site and Centennial Site.

The project site is located in western unincorporated Nevada County, California. The Brunswick Industrial Site is approximately 2 miles from the center of the city of Grass Valley and State Route 49. The Centennial Industrial Site is adjacent to the Grass Valley city limits. The Centennial Industrial Site is accessed from Whispering Pines Lane and the Brunswick Industrial Site is accessed from Brunswick Road or East Bennett Road.

Figure 1 shows the project location.

Bollard Acoustical Consultants, Inc. (BAC) has been retained by Rise to prepare this evaluation of potential noise and vibration impacts related to the proposed project. It should be noted that blasting vibration impacts were evaluated separately by IDC-PBS (Intercontinental Development Corporation – Precision Blasting Services, Inc.) in a report dated September 27, 2019. As a result, this analysis does not contain an evaluation of blasting vibration impacts. Blasting related noise impacts are evaluated in this analysis.

## Objectives of this Analysis

The objectives of this analysis are as follows:

- To provide background information pertaining to the effects of noise and vibration.
- To identify existing sensitive land uses in the immediate project vicinity that may be affected by project related noise and vibration (referred to in this analysis as “receptors”).
- To quantify existing ambient noise and vibration levels at representative receptors nearest to the project sites and proposed haul routes for the establishment of baseline conditions.
- To identify California Environmental Quality Act (CEQA) standards of significance for this project.
- To utilize the SoundPlan 3D noise prediction model (V8.2) to predict project-related noise levels at the nearest receptor areas and to compare those levels against the project standards of significance.
- To utilize industry standard methodologies for predicting project generated vibration levels at the nearest receptor areas and to compare those levels against the project standards of significance.
- To evaluate mitigation measures where significant project-related noise or vibration impacts are identified.

Figure 1  
Idaho-Maryland Mine Project Site Location  
Nevada County, California



# Fundamentals and Terminology

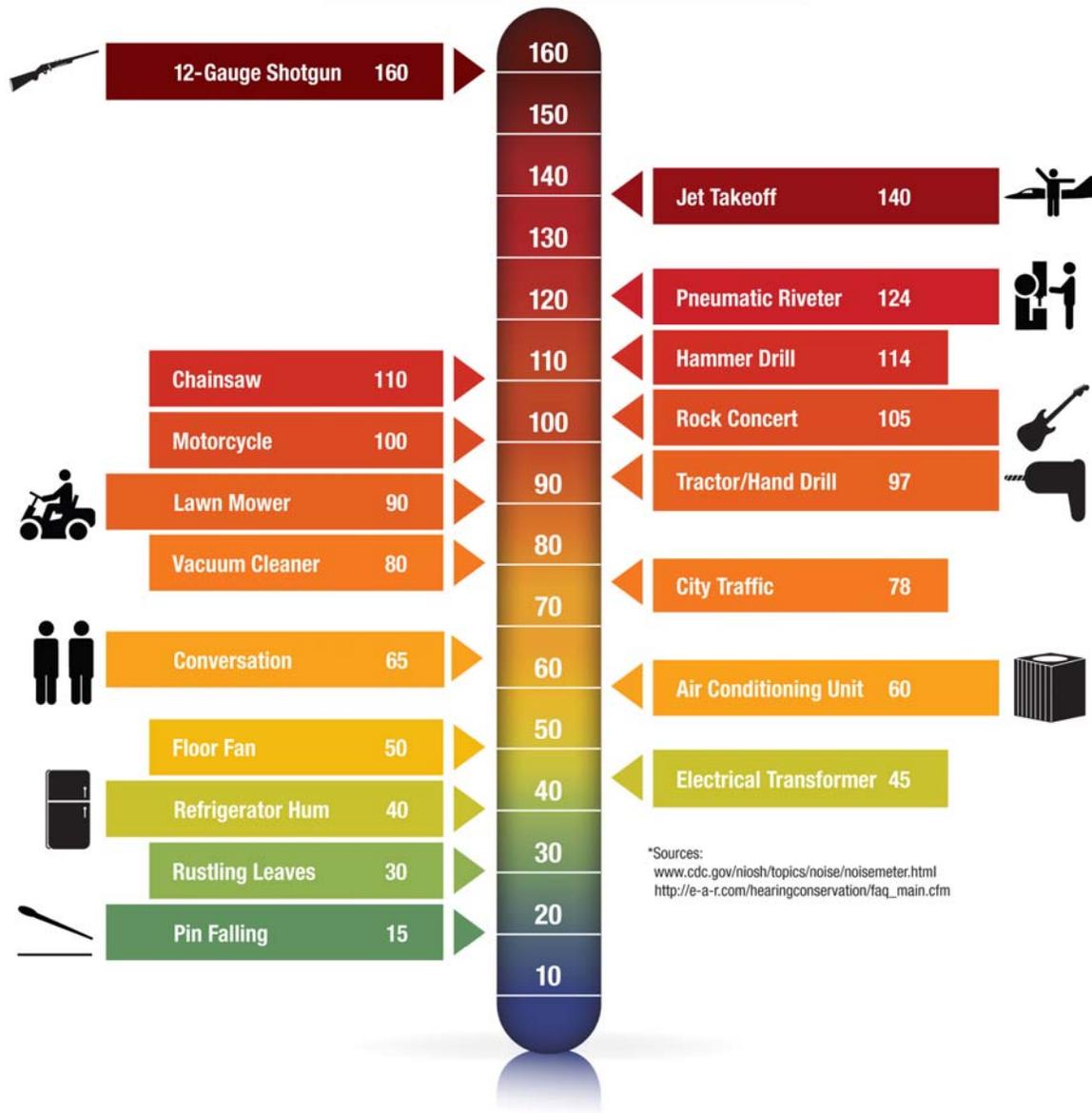
## Noise Fundamentals

Noise is often described as unwanted sound. Sound is defined as any pressure variation in air that the human ear can detect. If the pressure variations occur frequently enough (at least 20 times per second), they can be heard and hence are called sound. The number of pressure variations per second is called the frequency of sound, and is expressed as cycles per second, called Hertz (Hz). See Appendix A for definitions of acoustical terminology used in this report.

Measuring sound directly in terms of pressure would require a very large and awkward range of numbers. To avoid this, the decibel scale was devised. The decibel scale uses the hearing threshold (20 micropascals), as a point of reference, defined as 0 dB. Other sound pressures are then compared to the reference pressure, and the logarithm is taken to keep the numbers in a practical range. The decibel scale allows a million-fold increase in pressure to be expressed as 120 dB. Another useful aspect of the decibel scale is that changes in levels (dB) correspond closely to human perception of relative loudness.

The perceived loudness of sounds is dependent upon many factors, including sound pressure level and frequency content. However, within the usual range of environmental noise levels, perception of loudness is relatively predictable, and can be approximated by weighing the frequency response of a sound level meter by means of the standardized A-weighting network. There is a strong correlation between A-weighted sound levels (expressed as dBA) and community response to noise. For this reason, the A-weighted sound level has become the standard tool of environmental noise assessment. All noise levels reported in this section are in terms of A-weighted levels. Examples of common noise sources and corresponding noise levels are provided in Figure 2.

**Figure 2**  
**Noise Levels Associated with Common Noise Sources**  
**Decibel Scale (dBA)\***



Community noise is commonly described in terms of the ambient noise level, which is defined as the all-encompassing noise level associated with a given noise environment. A common statistical tool to measure the ambient noise level is the average, or equivalent, sound level ( $L_{eq}$ ), which corresponds to a steady-state A-weighted sound level containing the same total energy as a time-varying signal over a given time period (usually one hour). The  $L_{eq}$  is the foundation of the composite noise descriptor,  $L_{dn}$ , and shows very good correlation with community response to noise.

The Day-night Average Level ( $L_{dn}$ ) is based upon the average noise level over a 24-hour day, with a +10 decibel weighing applied to noise occurring during nighttime (10:00 p.m. to 7:00 a.m.) hours. The nighttime penalty is based upon the assumption that people react to nighttime noise exposures as though they were twice as loud as daytime exposures. Because  $L_{dn}$  represents a 24-hour average, it tends to disguise short-term variations in the noise environment.  $L_{dn}$  based noise standards are commonly used to assess noise impacts associated with traffic, railroad and aircraft noise sources.

The Nevada County noise standards, which are discussed in detail later in this report, are expressed in terms of the hourly average and single-event maximum noise level performance standards. In addition to applying the County's noise standards to this Project, the California Environmental Quality Act (CEQA) requires that noise impacts be assessed relative to ambient noise levels that are present without the project. As a result, ambient noise surveys were conducted, and comparisons of Project to No-Project noise levels were used to assess noise impacts (in addition to comparison to Nevada County noise standards). Specifically, individual maximum ( $L_{max}$ ) noise levels and hourly average ( $L_{eq}$ ) noise levels, both with and without the project, were compared so that the assessment of noise impacts was not based solely on an assessment of project-generated noise in terms of 24-hour averages ( $L_{dn}$ ), but also on short-term fluctuations in the ambient noise environment.

### **Audibility**

Audibility is not a test of significance according to CEQA. If this were the case, any project which added any audible amount of noise to the environment would be considered significant according to CEQA. Because every physical process creates noise, and because audibility is variable, the use of audibility alone as significance criteria would be unworkable. CEQA requires a **substantial** increase in noise levels before noise impacts are identified, not simply an audible change. The discussion of what constitutes a substantial change in noise environments is provided in the Regulatory Setting section of this report.

### **Effects of Distance on Sound Propagation**

As a general rule, sound from a localized source spreads out as it travels away from the source, and the sound pressure levels drop off with distance according to fundamental relationships. Sound from a localized source (i.e., point source) propagates uniformly outward in a spherical pattern. The sound level attenuates (i.e., decreases) at a rate of 6 dB for each doubling of distance from a point source. For this project, on-site activities and processing equipment are treated as a point source in the noise propagation calculations. Off-site truck traffic is treated as a moving point source in the propagation calculations, with a sound level decay rate of 4.5 dB per doubling of distance from the noise source.

### **Atmospheric (Molecular) Absorption and Anomalous Excess Attenuation**

Air absorbs sound energy. The amount of absorption is dependent on the temperature and humidity of the air, as well as the frequency of the sound. Families of curves have been developed which relate these variables to molecular absorption coefficients, frequently expressed in terms of dB per thousand feet. For standard day atmospheric conditions, defined as 59 degrees

Fahrenheit and 70% relative humidity, the molecular absorption coefficient at 1000 hertz is 1.5 dB per thousand feet. Molecular absorption is greater at higher frequencies, and reduced at lower frequencies. In addition, for drier conditions, the molecular absorption coefficients generally increase. Similarly, as temperature increases, molecular absorption coefficients typically increase as well.

Anomalous excess attenuation caused by variations in wind speed, wind direction, and thermal gradients in the air can typically be estimated using an attenuation rate of 1.5 dB per thousand feet for a noise source generating a 1000 hertz signal. As with molecular absorption, anomalous excess attenuation typically decrease with lower frequencies and increases with higher frequencies.

For this analysis, the SoundPlan Version 8.2 noise prediction model was used to project noise generated at the project site to the nearest residences. International Standards Organization (ISO) 9613-2 was employed as the sound propagation methodology within SoundPlan. ISO 9613-2 applies appropriate octave-band offsets for atmospheric absorption for various combinations of temperature and relative humidity for each noise source associated with the project.

### **Effects of Topographic Shielding**

A noise barrier is any impediment which intercepts the path of sound as it travels from source to receiver. Such impediments can be natural, such as a hill or other naturally occurring topographic feature which blocks the receiver's view of the source. Impediments can also be vegetative, such as heavy tree cover which similarly blocks the source from view of the receiver. Finally, impediments can be man-made, such as a solid wall, earthen berm, or structure constructed between the noise source and receiver. Regardless of the type of impediment, the physical properties of sound are such that, at the point where the line-of-sight between the source and receiver is interrupted by a barrier, a 5 dB reduction in sound occurs.

The effectiveness of a barrier is a function of the difference in distance sound travels on a straight-line path from source to receiver versus the distance it must travel from source to barrier, then barrier to receiver. This difference is referred to as the "path length difference", and is used to calculate the Fresnel Number. A barrier's effectiveness is a function of the Fresnel number and frequency content of the source. In general, the more acute the angle of the sound path created by the introduction of a barrier, the greater the noise reduction provided by the barrier.

For this project, more distant receptors will typically be shielded from view of most on-site activities, but closer receptors may not be shielded. Where such shielding would occur, the level of noise reaching the receiver would be lower than at unshielded receivers located the same distances from the source. To account for shielding of project noise sources by intervening topography, elevation data for the entire study area was input to the SoundPlan model to create a 3-dimensional base map. Noise source and receptor heights were input within the base map and the noise prediction model automatically computed the degree of acoustic shielding between each source and receptor.

### **Effects of Ground Cover**

Ground cover also affects sound propagation. For example, soft ground is more acoustically absorptive than paved surfaces and vegetated ground is more absorptive still. For this analysis, it was assumed that the project site would essentially consist of acoustically hard surfaces with little sound absorption. Conversely, the area surrounding the project site is heavily vegetated, primarily with pine trees. Using aerial imagery and project site plans, the SoundPlan model inputs for both hard surfaces, soft surfaces, and vegetated areas were applied. The degree of sound absorption applied to each noise source at each receptor varies depending on the type of ground cover and distance between the noise sources and receptors. The greater the distance between the project site and the sensitive receptors, the greater the amount of intervening vegetation and the higher the degree of sound absorption. Where the ground between the noise source and receptor consists primarily of hardscape, the model applied positive offsets to account for reflections of sound from those surfaces.

### **Attenuation by Proposed Buildings and Enclosures**

When equipment or processes are located within a building or enclosure, the noise generation of that equipment and processes is attenuated by the building walls and ceiling. The specific degree of attenuation provided by a building will depend on the building materials and construction, as well as the number and size of openings in the building, such as may be required for ventilation. With the exception of on-site mobile equipment, the significant stationary noise sources associated with the project are proposed to be located within insulated buildings. The noise attenuation provided by the proposed buildings varies by frequency, but will depend upon ultimate building design and construction. The wall construction for the buildings which will house the most significant noise generating equipment (generators, milling equipment, compressors, water treatment plant) will consist of R13 faced 202-96 insulation over the metal girts, 3 5/8 steel studs, with 1/2 inch gypsum board in the interior or an equivalent structure. The sound transmission loss of the proposed buildings range from 31 dB at 125 hertz to 75 dB at 4,000 hertz. The Sound Transmission Class (STC) rating of the proposed structures is 54 with an OITC rating of 39.

The proposed wall construction for the buildings which will house the less significant noise generating equipment (water treatment plant, warehouse, offices), will consist of R13 faced 202-96 insulation over the metal girts, without the additional furred steel stud wall. The sound transmission loss of the proposed buildings range from 13 dB at 125 hertz to 47 dB at 4,000 hertz. The Sound Transmission Class (STC) rating of the proposed structures is 29 with an OITC rating of 20. Appendix D contains the acoustical performance properties of the proposed buildings.

## Vibration Fundamentals

Vibration is like noise in that it involves a source, a transmission path, and a receiver. While vibration is related to noise, it differs in that noise is generally considered to be pressure waves transmitted through air, while vibration is usually associated with transmission through the ground or structures. As with noise, vibration consists of an amplitude and frequency. A person's response to vibration will depend on their individual sensitivity as well as the amplitude and frequency of the source.

Vibration can be described in terms of acceleration, velocity, or displacement. A common practice is to monitor vibration measures in terms of peak particle velocities (PPV, inches/second), or Velocity Decibels in terms of root-mean-square levels (VdB RMS). Standards pertaining to perception as well as potential damage to structures have been developed for vibration in terms of peak particle velocity as well as root-mean-square.

As vibrations travel outward from the source, they excite the particles of rock and soil through which they pass and cause them to oscillate. Differences in subsurface geologic conditions and distance from the source of vibration will result in different vibration levels characterized by different frequencies and intensities. In all cases, vibration amplitudes will decrease with increasing distance. The maximum rate or velocity of particle movement is the commonly accepted descriptor of the vibration "strength."

Human response to vibration is highly subjective and difficult to quantify. Vibration can be felt or heard well below the levels that produce any damage to structures. The duration of the event has an effect on human response, as does the frequency of occurrence of the vibration source. Generally, as the duration and vibration frequency of the events increase, the potential for adverse human response increases.

Blasting creates seismic waves that radiate along the surface of the earth and downward into the earth. If close enough to the blasting location, these surface waves can be felt as ground vibration. Ground vibration can result in effects ranging from annoyance of people to damage of structures. If a person is engaged in any type of physical activity, the vibration levels required for perception and annoyance is increased considerably.

# Evaluation of Existing Ambient Noise Environment

## Project Area Noise Environment

The existing ambient noise environment in the vicinity of the Brunswick and Centennial Sites is defined primarily by local and distant traffic, as is the noise environment along the proposed project haul routes.

## Project Area Sensitive Receptors

The nearest sensitive receptors to the Brunswick and Centennial sites, and haul routes are residences, with the greatest number located to the north, east and south of the Brunswick site. Residences in the vicinity of the Centennial site are very limited, and are located to the north and northeast of that site.

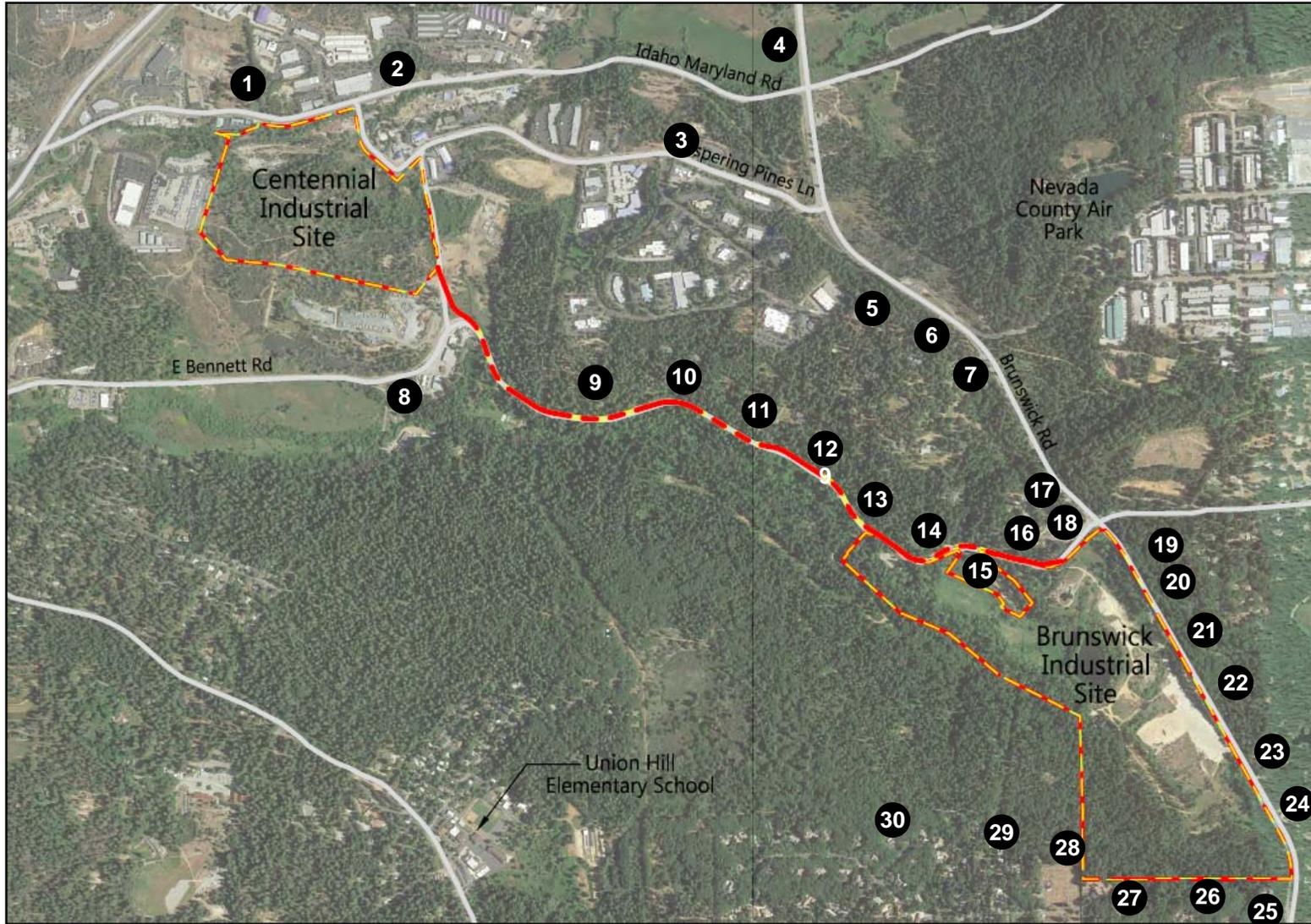
While it is recognized that there are several residences surrounding the Brunswick site, it is not necessary to assess potential project impacts at each and every individual residence. Rather, standard industry convention is to assess impacts at receptors which are representative of the nearest potentially affected residences to the project site (including residences located adjacent to project haul routes).

For this assessment, a total of 30 representative sensitive receptors were selected for analysis. Those receptors, which are illustrated on Figure 3, consist of the following locations:

- 17 residences surrounding the Brunswick site.
- 3 residences near the Centennial site.
- 1 residence along Whispering Pines Lane between Brunswick Road and Centennial Drive.
- 5 residences along Brunswick Road, north of East Bennett Road.
- 4 residences along East Bennett Road.

Not all project noise sources will affect each of the representative receptors selected for analysis. For example, at receptors 1 & 2, which are north of the Centennial site, noise generated at the Brunswick site is expected to be inaudible over background noise. As a result, receptors 1 & 2 were selected since they represent the nearest residences to the Centennial Industrial Site. Receptors 9-12 were selected to represent exposure of existing residences to noise generated during construction of the potable water pipeline along a portion of East Bennett Road. Receptors 3-7 were selected to represent residences exposed to project truck traffic noise, with receptor 4 representing future residences in the Loma Rica development. Receptors 13-30 were selected for analysis of on-site noise generation at the Brunswick site, with receptors 17-23 also used to assess potential truck traffic noise impacts.

Figure 3  
Nearest Representative Sensitive Receptors  
Idaho-Maryland Mine Project - Nevada County, California



# : Representative Sensitive Receptor Locations



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## Existing Ambient Noise Environment at Sensitive Receptors

The California Environmental Quality Act (CEQA) states that a project would result in a significant noise impact if it causes a substantial permanent or temporary increase in ambient noise levels. In order to determine the threshold at which a project would result in a substantial noise increase, the existing (pre-project) ambient conditions at potentially impacted noise-sensitive land uses must be established.

To quantify the existing ambient noise environment in the project vicinity continuous noise level measurements were conducted at 11 locations in the project vicinity. The noise measurement locations were selected to be representative of ambient noise conditions at receptors nearest to both the Brunswick and Centennial sites, at locations along East Bennett Road where the potable water system is to be installed, and at receptors along the proposed project haul routes. The ambient noise measurement locations are identified on Figure 4. That ambient noise data was supplemented with ambient noise level data collected by BAC in 2018 at the Loma Rica project site adjacent to Brunswick Road (Site 12).

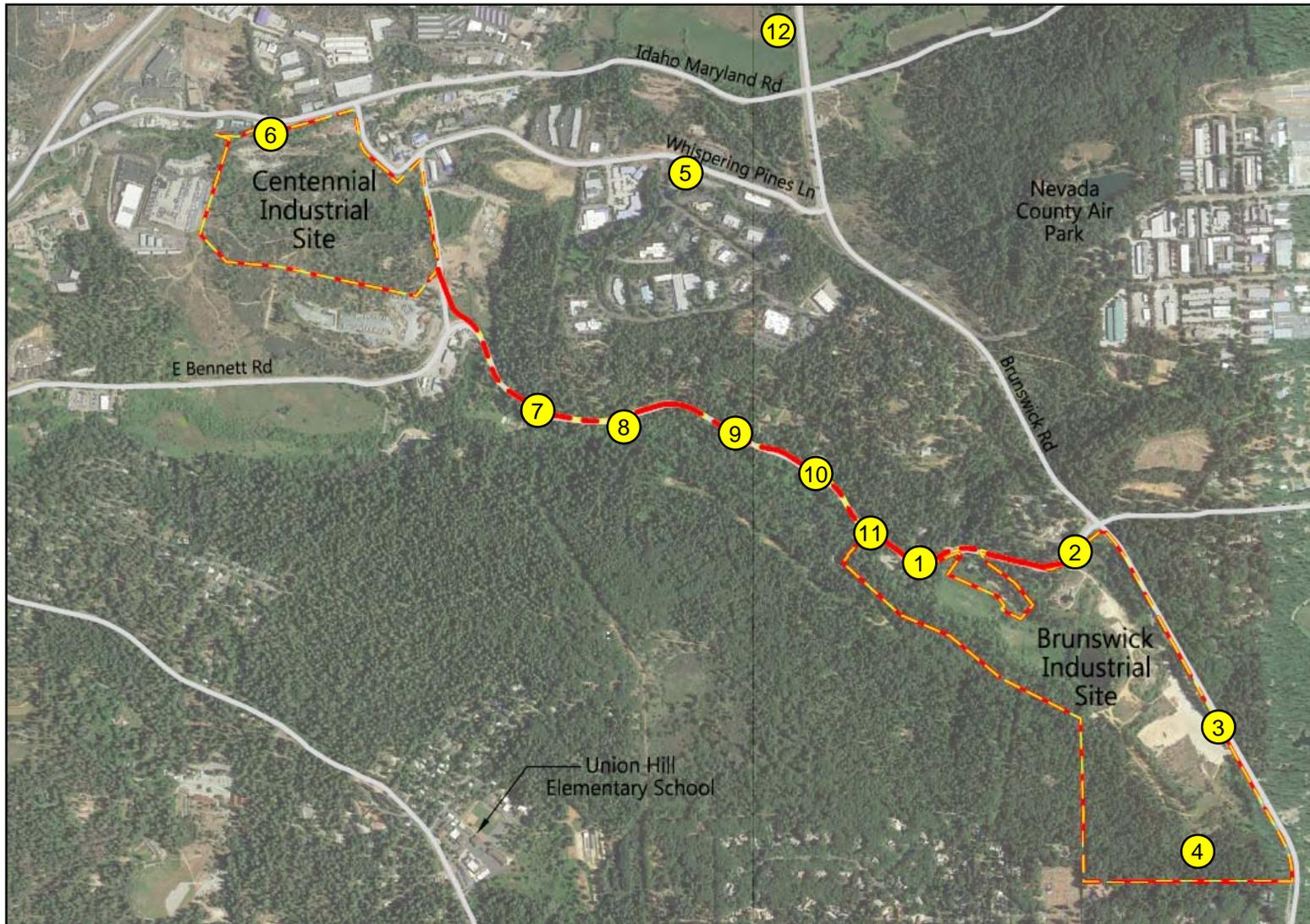
It is noted that continuous noise monitoring was not conducted at each of the 30 sensitive receptors evaluated in this study. Some of the monitoring locations are considered to be representative of ambient conditions at multiple receptor locations. For example, the data collected at monitoring site 3, which was located adjacent to Brunswick Road south of East Bennett Road, can be extrapolated to represent ambient noise conditions at receptors 19-25. Similarly, monitoring site 12 can be used to extrapolate ambient conditions at receptors adjacent to Brunswick Road north of East Bennett Road (receptors 4-7, 17 & 18).

The measurements nearest to the Brunswick site (sites 1-4) were conducted in June of 2017 prior to drilling operations at the Brunswick site. As a result, those ambient noise measurements do not include noise associated with drilling operations. Other sites, which were sufficiently far from the Brunswick site so as not to be affected by test drilling operations, were monitored in 2018 and 2019.

Weather conditions present during the monitoring program were typical for the seasons during which they were conducted. There were no adverse or anomalous weather conditions which would have caused measured ambient noise levels to be atypical. Larson Davis Laboratories (LDL) Model 820, LxT and 831 precision integrating sound level meters were used for the noise level measurement survey. The meters were calibrated before use with an LDL Model CAL200 acoustical calibrator to ensure the accuracy of the measurements. The equipment used meets all pertinent specifications of the American National Standards Institute for Type 1 sound level meters.

Numerical summaries of the ambient noise level measurements are provided in Table 1. Table 1 also contains the arithmetic mean of the average ( $L_{eq}$ ) and maximum ( $L_{max}$ ) data collected on each day of the survey. Graphs of the individual hourly average ( $L_{eq}$ ), maximum ( $L_{max}$ ), median ( $L_{50}$ ) and 90<sup>th</sup> percentile ( $L_{90}$ ) noise levels for each site and each day are presented in Appendix B.

Figure 4  
Ambient Noise and Vibration Measurement Sites  
Idaho-Maryland Mine Project Vicinity - Nevada County, California



# : Ambient Noise and Vibration Monitoring Locations



Table 1 Summary of Long-term Noise Monitoring Results Idaho Maryland Mine Project								
Site <sup>1</sup>	Date	Ldn (dBA)	Average Measured Hourly Noise Levels (dBA)					
			Daytime <sup>2</sup>		Evening <sup>3</sup>		Nighttime <sup>4</sup>	
			Leq	Lmax	Leq	Lmax	Leq	Lmax
1	Tuesday, June 13, 2017	61	60	82	57	82	51	71
	Wednesday, June 14, 2017	61	61	83	59	85	52	75
	Thursday, June 15, 2017	61	59	80	57	79	52	76
	Friday, June 16, 2017	60	59	80	56	77	51	74
	Saturday, June 17, 2017	58	57	78	55	78	49	69
	Sunday, June 18, 2017	58	57	83	56	81	49	71
	<b>Average</b>	<b>60</b>	<b>59</b>	<b>81</b>	<b>57</b>	<b>80</b>	<b>51</b>	<b>73</b>
2	Tuesday, June 13, 2017	60	59	82	56	81	51	71
	Wednesday, June 14, 2017	60	59	82	56	83	51	73
	Thursday, June 15, 2017	60	59	81	56	79	51	73
	Friday, June 16, 2017	60	59	80	55	77	51	73
	Saturday, June 17, 2017	58	56	78	55	81	48	70
	Sunday, June 18, 2017	58	57	82	56	82	47	69
	<b>Average</b>	<b>59</b>	<b>58</b>	<b>81</b>	<b>56</b>	<b>81</b>	<b>50</b>	<b>72</b>
3	Tuesday, June 13, 2017	69	67	80	64	79	60	78
	Wednesday, June 14, 2017	68	67	81	64	84	59	77
	Thursday, June 15, 2017	68	67	82	64	81	59	79
	Friday, June 16, 2017	68	67	82	64	79	59	76
	Saturday, June 17, 2017	67	65	80	63	81	58	76
	Sunday, June 18, 2017	66	64	81	64	81	57	77
	<b>Average</b>	<b>68</b>	<b>66</b>	<b>81</b>	<b>64</b>	<b>81</b>	<b>59</b>	<b>77</b>
4	Tuesday, June 13, 2017	53	52	64	49	64	45	55
	Wednesday, June 14, 2017	52	51	64	49	61	44	56
	Thursday, June 15, 2017	53	51	62	50	65	45	57
	Friday, June 16, 2017	53	52	65	49	61	45	56
	Saturday, June 17, 2017	51	50	64	48	63	43	54
	Sunday, June 18, 2017	50	49	62	48	63	42	56
	<b>Average</b>	<b>52</b>	<b>51</b>	<b>64</b>	<b>49</b>	<b>63</b>	<b>44</b>	<b>56</b>
5	Tuesday, October 01, 2019	60	60	81	53	69	51	67
	Wednesday, October 02, 2019	60	61	82	52	73	51	70
	<b>Average</b>	<b>60</b>	<b>61</b>	<b>82</b>	<b>53</b>	<b>71</b>	<b>51</b>	<b>69</b>
6	Tuesday, October 01, 2019	66	65	80	60	76	59	73
	Wednesday, October 02, 2019	67	65	81	60	74	59	74
	Thursday, October 03, 2019	67	65	80	60	76	59	73
	<b>Average</b>	<b>63</b>	<b>63</b>	<b>81</b>	<b>56</b>	<b>73</b>	<b>55</b>	<b>71</b>
7	Friday, December 07, 2018	59	59	79	55	75	50	73
	Saturday, December 08, 2018	57	57	76	54	77	47	69
	Sunday, December 09, 2018	55	56	76	52	74	46	68
	Monday, December 10, 2018	57	58	77	53	74	48	69
	<b>Average</b>	<b>60</b>	<b>60</b>	<b>78</b>	<b>55</b>	<b>75</b>	<b>51</b>	<b>70</b>
8	Friday, December 07, 2018	57	57	76	54	73	47	70
	Saturday, December 08, 2018	55	55	74	54	77	45	67
	Sunday, December 09, 2018	54	54	74	51	72	44	65
	Monday, December 10, 2018	56	56	75	52	74	45	66
	<b>Average</b>	<b>56</b>	<b>57</b>	<b>76</b>	<b>53</b>	<b>74</b>	<b>47</b>	<b>68</b>
9	Friday, December 07, 2018	60	60	79	57	76	51	74
	Saturday, December 08, 2018	59	59	79	56	79	49	71
	Sunday, December 09, 2018	57	58	79	55	78	47	70

Table 1 Summary of Long-term Noise Monitoring Results Idaho Maryland Mine Project								
Site <sup>1</sup>	Date	Ldn (dBA)	Average Measured Hourly Noise Levels (dBA)					
			Daytime <sup>2</sup>		Evening <sup>3</sup>		Nighttime <sup>4</sup>	
			Leq	Lmax	Leq	Lmax	Leq	Lmax
	Monday, December 10, 2018	60	60	80	56	79	49	71
	<b>Average</b>	<b>58</b>	<b>58</b>	<b>78</b>	<b>55</b>	<b>77</b>	<b>48</b>	<b>70</b>
10	Friday, December 07, 2018	59	59	79	56	77	50	74
	Saturday, December 08, 2018	58	57	79	55	78	48	72
	Sunday, December 09, 2018	57	57	79	53	76	47	70
	Monday, December 10, 2018	58	59	79	55	77	48	71
	<b>Average</b>	<b>58</b>	<b>58</b>	<b>79</b>	<b>55</b>	<b>77</b>	<b>48</b>	<b>71</b>
11	Friday, December 07, 2018	59	59	77	56	75	50	73
	Saturday, December 08, 2018	57	57	76	56	78	48	70
	Sunday, December 09, 2018	56	57	78	53	75	47	70
	Monday, December 10, 2018	58	58	77	55	76	49	71
	<b>Average</b>	<b>58</b>	<b>58</b>	<b>78</b>	<b>55</b>	<b>76</b>	<b>48</b>	<b>71</b>
12	Thursday, July 26, 2018	63	55	72	53	65	56	70
	<b>Average</b>	<b>63</b>	<b>55</b>	<b>72</b>	<b>53</b>	<b>65</b>	<b>56</b>	<b>70</b>

1. Ambient noise monitoring locations are shown on Figure 4.  
2. Daytime = 7 am – 7 pm  
3. Evening = 7 pm – 10 pm  
4. Nighttime = 10 pm – 7 am

The Table 1 data indicate that ambient conditions vary depending primarily on the distance between the monitoring site and nearby roadways, with existing L<sub>dn</sub> levels as high as 68 dBA near Brunswick Road (site 3) and as low as 52 dBA at locations removed from roadway noise sources (site 4). The ambient noise level data were used to develop thresholds for determining significant project-generated noise level increases for on-site noise sources and activities. Those thresholds are discussed later in this report.

### Existing Traffic Noise Environment

As noted previously, the existing ambient noise environment in the project vicinity is defined primarily by existing traffic. To allow the evaluation of relative changes in off-site traffic noise levels which would result from the project, the existing traffic noise environment was quantified using the Federal Highway Administration Highway Traffic Noise Prediction Model (FHWA-RD-77-108) with the Calveno vehicle noise emission curves.

Inputs to the FHWA Model include traffic volume, speed, truck usage percentages and distance from centerline to receptor. The FHWA Model predicted hourly average noise levels. To predict traffic noise levels in terms of day/night average noise levels (L<sub>dn</sub>), the day/night distribution of traffic is required.

Existing and project-generated traffic data was provided by KD Anderson & Associates, Inc. Transportation Engineers. Truck usage percentages were obtained from BAC observations and published Caltrans traffic counts. Vehicle speeds were based on posted speed limits and BAC observations. The day/night distribution of traffic was obtained from the 24-hour ambient noise monitoring results described previously.

Table 2 shows the calculated existing traffic noise levels in terms of  $L_{dn}$  at the nearest representative residential receptors to each roadway segment. A complete listing of the FHWA Model input data for existing conditions are provided in Appendix C-1.

<b>Table 2 Existing Traffic Noise Levels at Nearest Representative Residential Receptors Idaho Maryland Mine Project Vicinity Roadways</b>					
#	Roadway	Segment	Distance (feet)	Ldn, dBA	60 dB Ldn Contour Distance (ft)
1	East Bennett Road	West of Brunswick Road	135	52.5	43
2	Brunswick Road	Brunswick Site Entrance to East Bennett Road	200	60.9	230
3	Brunswick Road	North of Whispering Pines Lane	100	66.6	275
4	Brunswick Road	South of Brunswick Site Entrance	150	62.8	230
5	Brunswick Road	Whispering Pines Lane to East Bennett Road	120	66.4	319
6	Empire Street	West of SR 174	50	59.8	49
7	Empire Street	East of South Auburn Street	50	61.1	59
8	Idaho Maryland Road	East of SR 49	90	61.5	113
9	State Route 174	West of Brunswick	50	67.8	166
10	Whispering Pines Lane	Crown Point Circle to Brunswick	70	57.8	50
11	Whispering Pines Lane	Centennial to Crown Point Circle	70	59.1	61

*Source: FHWA-RD-77-108 with inputs provided by KD Anderson, BAC and Caltrans*

## Evaluation of Existing Ambient Vibration Environment

As with the local noise environment, the ambient vibration environment is defined primarily by traffic on the local roadway network. No other appreciable sources of vibration were identified during BAC field surveys of the area. To quantify baseline vibration levels at representative locations in the project vicinity, BAC conducted short-term vibration measurements at the same locations as the ambient noise monitoring locations.

The vibration measurements were conducted using a Larson-Davis Laboratories Model LxT sound level meter fitted with a BRC SEN\_VEL Vibration Transducer (500 mV/ips). The test system is a Type I instrument designed for use in assessing vibration as perceived by humans, and meets the full requirements of ISO 8041:1990(E). A summary of the vibration measurement results is provided in Table 3.

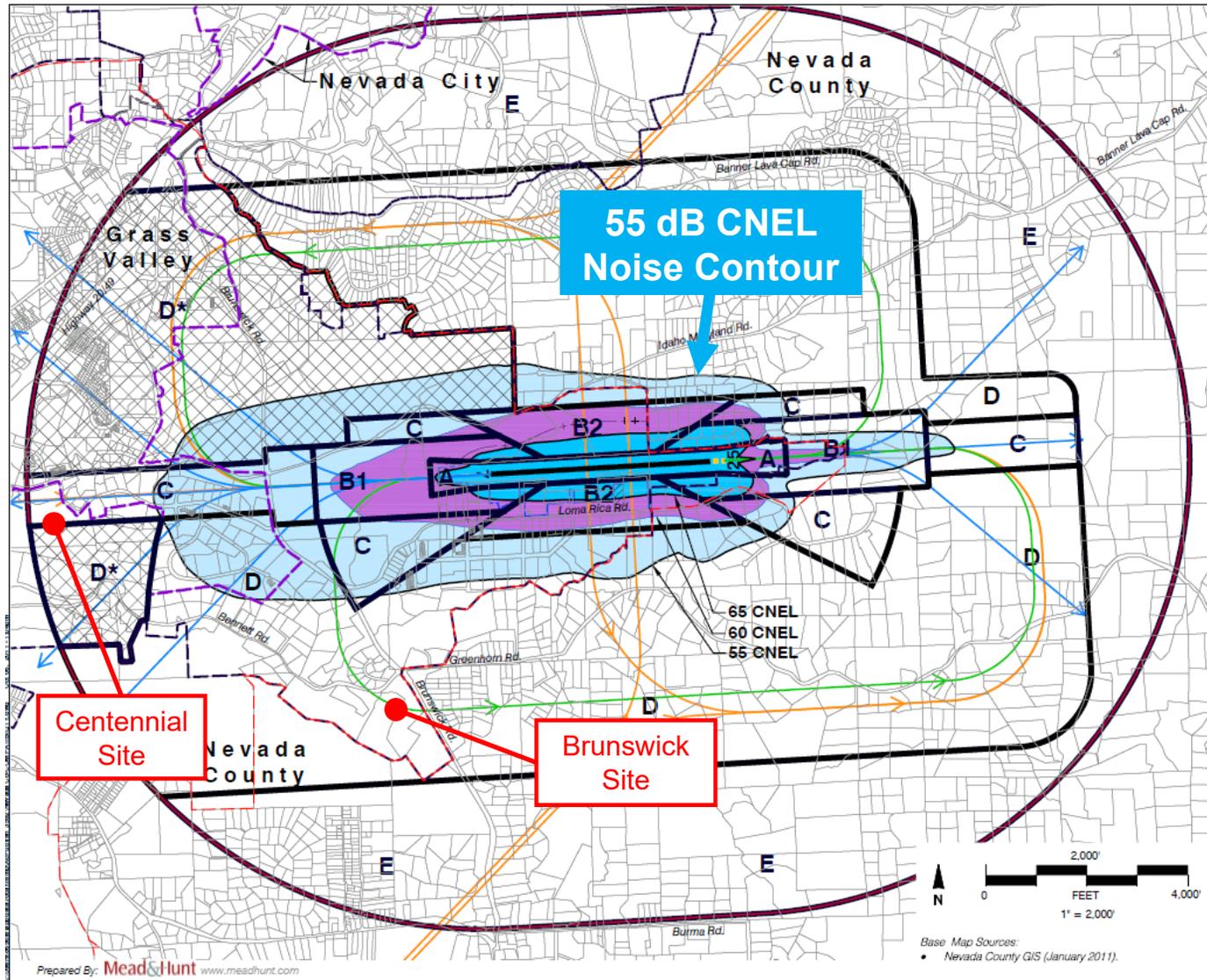
Measurement Site <sup>1</sup>	Measured Vibration Levels, VdB rms		
	Min	Average	Max
V1	31	41	64
V2	31	42	60
V3	31	47	60
V4	31	35	50
V5	31	34	48
V6	31	37	48
V7	31	38	54
V8	32	41	62
V9	31	39	54
V10	32	57	76
V11	31	46	66

1. Vibration measurement locations are shown on Figure 4.

## Evaluation of Existing Aircraft Noise Environment

The Nevada County Airport is located approximately 4,000 feet northeast of the Brunswick site and approximately 7,500 feet east of the Centennial site. Exhibit 3-5 of the Nevada County Airport Land Use Compatibility Plan shows the location of the airports 55, 60, and 65 dB CNEL contours. That Figure, which has been reproduced as Figure 5 of this report, indicates that the Brunswick Industrial and Centennial Sites are both located beyond the 55 dB CNEL contour for the airport.

Figure 5  
 Nevada County Airport Noise Contours  
 Nevada County, California



## Criteria for Acceptable Noise Exposure

The California Environmental Quality Act (CEQA) contains noise impact assessment guidelines. In addition, California cities and counties are required to adopt a Noise Element as part of the General Plan. Cities and counties typically also adopt a noise ordinance. The Project site is located in Nevada County, which has both a General Plan Noise Element and a County Code Noise Ordinance. In addition, the Whispering Pines Specific Plan contains development standards related to noise. Applicable CEQA Guidelines, Nevada County noise-level criteria, and appropriate criteria of other jurisdictions are discussed below.

### California Environmental Quality Act (CEQA) Guidelines

The State of California has established regulatory criteria that are applicable to this assessment. Specifically, Appendix G of the CEQA Guidelines are used to assess the potential significance of impacts pursuant to local General Plan policies, Municipal Code standards, or the applicable standards of other agencies. According to the CEQA guidelines, the project would result in a significant noise or vibration impact if the following occur:

- A. Generation of substantial temporary or permanent increase in ambient noise levels in the vicinity of the project in excess of standards established in the local general plan or noise ordinance, or in other applicable standards of other agencies?
- B. Generation of excessive groundborne vibration or groundborne noise levels?
- C. For a project located within the vicinity of a private airstrip or an airport land use plan or, where such a plan has not been adopted, within two miles of a public airport or public use airport, would the project expose people residing or working in the project area to excessive noise levels?

As noted in CEQA Criteria “A” above, a project’s noise impacts must be evaluated relative to both the **increase** in noise level which would result from the project as well as compliance with standards established in the local general plan or noise ordinance.

The Nevada County General Plan Noise Element and Noise Ordinance do not have a specific policy or standard for assessing noise impacts associated with **increases** in off-site ambient noise levels resulting from project-generated traffic on public roadways. The County’s General Plan and Ordinances do contain specific numeric standards for acceptable increases over ambient (5 dB per footnote D of Table 5 – discussed later in this section), but they do not contain numeric standards for **increases** in off-site traffic noise levels resulting from a project.

Because CEQA requires that the significance of noise impacts be evaluated relative to the **increase** in noise resulting from a project, where the local jurisdiction does not have such adopted thresholds, reasonable thresholds from other jurisdictions must be considered. As a result, the following section describes Federal thresholds for assessing the significance of project-related

increases in off-site heavy truck traffic using federal research conducted by the Federal Interagency Commission on Noise (FICON).

### Federal Criteria for Determination of Significant Noise Increases

The Federal Interagency Commission on Noise (FICON) has developed a graduated scale for use in the assessment of project-related noise level increases. The criteria shown in Table 4 was developed by FICON as a means of developing thresholds for impact identification for project-related noise level increases. The FICON standards have been used extensively in recent years by the authors of this section in the preparation of the noise sections of Environmental Impact Reports that have been certified in many California cities and counties.

The use of the FICON standards are considered conservative relative to thresholds used by other agencies in the State of California. For example, the California Department of Transportation (Caltrans) requires a project-related traffic noise level increase of 12 dB for a finding of significance, and the California Energy Commission (CEC) considers project-related noise level increases between 5 to 10 dB significant, depending on local factors. Therefore, the use of the FICON standards, which set the threshold for finding of significant noise impacts as low as 1.5 dB, provides a very conservative approach to impact assessment for this project.

<b>Table 4 Significance of Changes in Cumulative Noise Exposure</b>	
<b>Ambient Noise Level Without Project (Ldn or CNEL)</b>	<b>Change in Ambient Noise Level Due to Project</b>
<60 dB	+5.0 dB or more
60 to 65 dB	+3.0 dB or more
>65 dB	+1.5 dB or more
<i>Source: Federal Interagency Committee on Noise (FICON)</i>	

Based on the FICON research, as shown in Table 4, a 5 dB increase in noise levels due to a project is required for a finding of significant noise impact where ambient noise levels without the project are less than 60 dB. Where pre-project ambient conditions are between 60 and 65 dB, a 3 dB increase is applied as the standard of significance. Finally, in areas already exposed to higher noise levels, specifically pre-project noise levels in excess of 65 dB, a 1.5 dB increase is considered by FICON as the threshold of significance.

As noted previously, audibility is not a test of significance according to CEQA. If this were the case, any project which added any audible amount of noise to the environment would be considered significant according to CEQA. Because every physical process creates noise, whether by the addition of a single vehicle on a roadway, or a tractor in an agricultural field, the use of audibility alone as significance criteria would be unworkable. CEQA requires a substantial increase in ambient noise levels before noise impacts are identified, not simply an audible change.

## Nevada County Regulations

### Nevada County Noise Element

Chapter 9 of the Nevada County General Plan contains the County’s Noise Element. The Noise Element contains adopted Goals, Objectives and Policies pertaining to noise. The Noise Element Policies which are pertinent to this project are reproduced below.

**Policy 9.1.1** 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.

**Policy 9.1.2** The following noise standards, contained in Table 5 below (General Plan Noise Element Table 9.1), as performance standards and land use compatibility standards, shall apply to all discretionary and ministerial projects excluding permitted residential (including tentative maps) land uses.

<b>Table 5 Nevada County General Plan Noise Element Exterior Noise Limits</b>				
<b>Land Use Category</b>	<b>Zoning Districts</b>	<b>Time Period</b>	<b>Noise Level, dBA</b>	
			<b>Leq</b>	<b>Lmax</b>
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

- 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 affected 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 9.1.2.b. 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 9.1.2 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 9.1.2 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 will require a comprehensive noise analysis per Policy 9.1.12 and the Nevada County Noise Element Manual.

**Policy 9.1.3** The Nevada County Planning Department shall be the lead agency responsible for coordination of all local noise control activities and intergovernmental group activities and subsequent enforcement efforts.

**Policy 9.1.4** The County will continue an ongoing County-wide noise monitoring program. The purpose of this program is to assess the changing noise environment in the County in terms of the existing ambient noise level for typical rural, residential, commercial and industrial areas and to ensure that the Policy 9.1.1 standards realistically reflect the current needs of the County.

**Policy 9.1.5** This chapter of the General Plan shall be implemented, in part, through the incorporation of the Policy 9.1.1 noise standards within the Land Use and Development Code and the adoption of the Noise Element Manual providing detailed direction and implementation measures. This Manual is adopted as a part of the Plan and can be found in Volume 2, Section 3-Noise Analysis, Appendix A.

- Policy 9.1.6** Encourage public awareness of noise and its hazards and means to minimize its existing and future impacts.
- Policy 9.1.7** Encourage heavy truck traffic to those routes outside residential areas.
- Policy 9.1.8** Encourage cities within Nevada County to adopt noise control programs compatible with County efforts.
- Policy 9.1.9** Develop a realistic policy framework designed to function as a guide to planning for appropriate land uses in relation to hazardous and annoying noise.
- Policy 9.1.10** Strongly discourage those General Plan amendments and zone changes that would likely create land use conflicts relative to noise.
- Policy 9.1.11** Strongly encourage future noise sensitive land uses, including residences, schools, hospitals, nursing homes, churches, and libraries, to those location of the County where the impact of noise generators is limited so that compliance with standards found in Policy 9.1.2 will be maintained. This policy shall apply to the approval of all tentative maps for residentially zoned parcels.
- Policy 9.1.12** Limit future noise generating land use to those location of the County where their impacts on noise sensitive land uses will be minimized, consistent with the standards found in Program 9.1.
- Policy 9.1.13** 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 Program 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 9.1.14** 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.
- Policy 9.1.15** Strictly enforce the noise insulation standards for new construction as required by Title 24 of the California Administrative Code.
- Policy 9.1.16** Minimize the noise impact from automobiles, trucks, motorcycles, and off-road vehicles by continuing to request enforcement of those sections of the California Vehicle Code relative to vehicle exhaust system maintenance by the County Sheriff and State Highway Patrol.
- Policy 9.1.17** Where realistically possible, encourage noise sensitive land uses away from railroad operations.

- Policy 9.1.18** The routing and design of new or expanded transportation facilities by the County shall incorporate feasible measures necessary to mitigate increases in noise levels.
- Policy 9.1.19** Encourage the minimization of noise emission from all County-controlled activities consistent with Policy 9.1.1 standards.
- Policy 9.1.20** Protect the safety and general welfare of people in the vicinity of the Nevada County Airport and the Truckee Tahoe Airport port by implementing the appropriate noise compatibility policies to avoid the establishment of noise-sensitive land uses in the portion of the airport environs that are exposed to significant levels of aircraft noise.
- Policy 9.1.21** Ensure the development of compatible land uses adjacent to the Nevada County Airport by enforcing the noise criteria as found in the Nevada County Airport Land Use Compatibility Plan as adopted by the Nevada County Airport Land Use Commission on September 21, 2011, as those standards are in effect and may be hereafter amended. (See Figure 9.1 of the General Plan Noise Element – Incorporated by reference).
- Policy 9.1.22** Ensure the development of compatible land uses adjacent to the Truckee Tahoe Airport by implementing the noise criteria as found in the Truckee Tahoe Airport Land Use Compatibility Plan as adopted by the Truckee Tahoe Airport Land Use Commission on October 19, 2010, as those standards are in effect and may be hereafter amended.
- Policy 9.1.23** The County shall continue to enforce noise criteria standards consistent with the airport noise policies adopted by the Nevada County Airport Land Use Commission and the Truckee Tahoe Airport Land use Commission based on the considerations of the following factors:
- a. Established federal and state regulations and guidelines.
  - b. The ambient noise levels in the community. Ambient noise levels influence the potential intrusiveness of aircraft noise upon a particular land use and vary greatly between Community Regions and Rural Regions.
  - c. The extent to which noise would intrude upon and interrupt the activity associated with a particular use.
  - d. The extent to which the activity itself generates noise.
  - e. The extent which the activity itself generates itself generates noise.
  - f. The extent of outdoor activity associated with a particular land use.
  - e. The extent to which indoor uses associated with a particular land use may be made compatible with application of sound attenuation in accordance with the policies set forth for maximum acceptable interior noise levels.

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## **Whispering Pines Corporate Community Specific Plan**

The Whispering Pines Corporate Community Specific Plan and Master Environmental Impact Report (February of 1984) contains the following policies with respect to noise:

### E.2 Noise

- a. Noise environments within the Specific Plan boundaries shall be maintained at the following levels: 70 dB CNEL for industrial areas (outdoor) 65 dB CNEL for residential areas (outdoor) and 45 dB CNEL for residential areas (indoor).
- b. Activities which may emit continuous noise levels in excess of standards outlined in a. shall be required to mitigate noise levels to acceptable standards.
- c. Activities located adjacent to existing residences shall demonstrate that noise levels will not adversely affect the adjacent neighborhood.

The policies shown above are consistent with the Nevada County General Plan Noise Element Policies. As a result, satisfaction with the County noise policies within the Whispering Pines Specific Plan Area will ensure compliance with the Specific Plan noise policies.

## **Nevada County Zoning Ordinance**

Section L-22 4.1.7 of the Nevada County Land Use and Development Code (LUDC) pertains to noise. The adopted noise standards contained in Table L-II 4.1.7 (Exterior Noise Limits) are identical to those contained in the General Plan Noise Element (reproduced above in Table 5). Because the specific noise standards are identical, the Zoning Ordinance standards are not reproduced below. However, Section L-II 4.1.7.D.8 of the County Zoning Ordinance States the following with respect to construction noise:

**L-II 4.1.7.D.8** 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.

The provision above exempts construction noise from the Table 5 noise standards. An evaluation of construction noise is provided later in this analysis despite this exemption.

## **Adjustments to Nevada County Noise Standards for On-Site Noise Sources**

As noted above in the footnotes to Table 5, there are various adjustments to the County's noise limits which are to be applied if certain conditions are satisfied. The footnotes most applicable to this project are A, B, D and E. Adjustments to the County's noise standards shown in Table 5 for each of that table's footnotes are described below:

**Footnote A** Footnote A provides the methodology by which ambient conditions are established. Specifically, Footnote A states that compliance with the Table 5 standards shall be determined by measuring the noise level based on the *mean*

**average** (emphasis added) 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.

For this project, ambient noise monitoring periods ranged from 24-hours to 6 consecutive days. As a result, the requirements of Footnote A were satisfied.

**Footnote B** Footnote B states that where two different zoning districts abut, the standard applicable to the lower, or more restrictive, district plus 5 dBA shall apply.

Because the Brunswick site is zoned Industrial and the neighboring properties containing residences are zoned Residential, a 5 dB upward adjustment to the residential noise standards shown in Table 5 would be required for the residences nearest to the Brunswick Site.

At the Centennial site, the nearest residences (receptors 1, 2 & 8 on Figure 3) are located within an M1 zoning district. However, because these receptors are residences, this analysis conservatively applies the County's Residential district noise standards shown in Table 5 to these receptors. However, because the project site is located within the Nevada County M1 zoning district, which applies different standards than the Residential district, the residential standards of Table 5 are increased by 5 dB at receptors 1, 2 and 8, pursuant to Footnote "B".

**Footnote D** Footnote D of Table 5 states that if the measured ambient level exceeds that permitted in Table 5, then the allowable noise exposure standard shall be set at 5 dBA above the ambient. Because the ambient conditions vary throughout the project area, the application of the Footnote D offset is very complicated for this evaluation.

At ambient noise monitoring locations which correspond directly to the representative receptors analyzed in this study, no offsets to the ambient noise measurement results were required to establish ambient conditions at those receptors. However, at the other receptors, the ambient noise level data collected at the nearest monitoring sites was extrapolated to establish ambient conditions at the individual receptor location. For example, if a receptor is located 100 feet from a roadway which defines ambient conditions for that receptor, but the nearest noise monitoring site was located 50 feet from that same roadway, the measured ambient noise levels at that nearest monitoring site would be reduced by 5 dB to establish ambient conditions at the receptor. This process was performed for each representative receptor in the project vicinity evaluated for this study. Appropriate offsets were applied on a receptor-by-receptor basis pursuant to the Footnote "D" requirements, and those offsets are described following the discussion of the Footnote "E" adjustments.

**Footnote E** Footnote E states that the County reserves the right to provide for a more restrictive standard under certain conditions. However, the standard cannot be set below current ambient noise levels. Imposition of a noise level adjustment is only considered if one or more of the following conditions are found to exist:

- *The noise source 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.*

The applicant is proposing to utilize broad-band “squawker” type back-up warning devices rather than the traditional and highly tonal “beeper” warning devices. As a result, the project is not proposing any noise sources with specific tonal components. Therefore, no adjustments to the County noise standards for tonal noise sources are applied for this assessment of project noise impacts.

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

With the exception of periodic blasting activities which will occur below ground, the project does not propose any sources of noise which would be considered impulsive. In addition, no sources of noise containing speech or music are proposed. However, blasting vibration impacts were evaluated in a separate study prepared by IDC-PBS. As a result, vibration impacts related to blasting are not addressed in this evaluation. However, the impulsive nature of blasting noise would fall under this category.

- *The noise source is of a long duration.*

At both the Brunswick and Centennial sites, operations will be fairly constant during the proposed hours of operations. As a result, the noise standard applicable to on-site activities is set at 5 dB below the Table 5 standards after adjustment of those standards for both differing zoning (Footnote B) and elevated ambient conditions (Footnote D), but not below baseline ambient conditions.

- *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.*

In cases where baseline ambient noise levels at the representative receptors were 5 dB or more below the Table 5 standards after increasing those standards by 5 dB per the Footnote B provision, the standard was set at the baseline ambient level +5 dB. If baseline ambient levels were less than 5 dB below the Table 5 standards (after the +5 dB adjustment for Footnote B), no additional adjustment was applied.

### **Summary of Footnote A, B, D & E Adjustments to the Table 5 Standards**

As noted above, a +5 dB adjustment to the Table 5 standards would be applicable at all residential receptors due to the differing zoning districts per Footnote B. However, that +5 dB adjustment would be negated by a -5 dB adjustment to the Table 5 standards due to the project noise sources occurring for long durations (processing activities will be continuous during the proposed hours of operation). As a result, the only offsets applied to the Table 5 standards were based on ambient conditions.

Pursuant to Footnote D, application of standards 5 dB above the ambient are required where baseline ambient conditions currently *exceed* the Table 5 standards. Conversely, where baseline ambient levels are more than 5 dB *below* the Table 5 standards, the standard has been set at the baseline ambient level plus 5 dB. Finally, where ambient conditions are less than 5 dB below the Table 5 standards, no adjustment for ambient conditions is applied in this analysis. Table 6 shows the baseline ambient conditions at each representative receptor extrapolated from the ambient noise survey results and the corresponding maximum and average, daytime, evening, and nighttime noise level standards applicable at each representative receptor location after the appropriate adjustments to the Table 5 standards have been applied to account for the ambient conditions.

**Table 6  
Baseline Ambient Conditions and Adjusted Nevada County Noise Standards by Receptor  
Idaho Maryland Mine Project – Nevada County, California**

Receptor <sup>2</sup>	Baseline Ambient Conditions <sup>1</sup>						Applicable Standards After Adjustment for Ambient					
	Daytime <sup>3</sup>		Evening <sup>3</sup>		Nighttime <sup>3</sup>		Daytime		Evening		Nighttime	
	Leq	Lmax	Leq	Lmax	Leq	Lmax	Leq	Lmax	Leq	Lmax	Leq	Lmax
1	58	76	51	68	50	66	63	81	56	73	55	71
2	63	81	56	73	55	71	68	86	61	78	60	76
3	61	82	53	71	51	69	66	87	58	76	56	74
4	55	72	53	65	56	70	60	75	58	70	61	75
5	49	66	47	59	50	64	54	71	50	64	55	69
6	50	67	48	60	51	65	55	72	50	65	56	70
7	49	66	47	59	50	64	54	71	50	64	55	69
8	54	72	49	69	45	65	55	75	50	74	45	70
9	48	66	43	63	39	59	53	71	48	65	44	60
10	47	66	43	64	37	58	52	71	48	65	42	60
11	47	67	43	65	37	59	52	72	48	70	42	60
12	49	69	45	67	39	62	54	74	50	72	44	67
13	51	70	48	69	41	64	55	75	50	74	45	69
14	50	72	48	72	42	64	55	75	50	77	45	69
15	51	73	49	72	43	65	55	75	50	77	45	70
16	48	71	46	71	40	62	53	75	50	76	45	67
17	56	73	54	66	57	71	61	75	59	71	62	76
18	52	69	50	62	53	67	55	74	50	65	58	72
19	54	69	51	68	46	65	55	74	56	73	51	70
20	57	72	55	72	50	68	62	75	60	77	55	73
21	55	70	53	70	48	66	60	75	58	75	53	71
22	56	71	53	70	48	67	61	75	58	75	53	72
23	58	73	56	73	51	69	63	75	61	78	56	74
24	60	75	58	75	53	71	65	80	63	80	58	76
25	60	75	57	74	52	71	65	75	62	79	57	76
26	51	64	49	63	44	56	55	69	50	65	45	60
27	51	64	49	63	44	56	55	69	50	65	45	60
28	51	64	49	63	44	56	55	69	50	65	45	60
29	51	64	49	63	44	56	55	69	50	65	45	60
30	51	64	49	63	44	56	55	69	50	65	45	60

1. Baseline ambient conditions at each representative receptor were established through extrapolating the Table 1 data closest to each receptor using a 4.5 dB per doubling of distance decay rate.
2. Receptor locations are indicated on Figure 3
3. Daytime = 7 am – 7 pm. Evening = 7 pm – 10 pm. Nighttime = 10 pm – 7 am

## **City of Grass Valley**

The project is located within Nevada County but the Centennial site borders the City of Grass Valley. The City of Grass Valley noise level standards are identical to the Nevada County noise standards during daytime hours, and are 5 dB less restrictive than the Nevada County General Plan noise standards during nighttime hours. Because operations at the Centennial site are proposed to occur during daytime hours, the City and County noise standards are identical.

## **Noise Standards of Other Jurisdictions**

Appendix G of the CEQA Guidelines, Section XII (Noise) states that a project would result in a significant noise impact if it resulted 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.

As noted previously, Nevada County has adopted both a Noise Element and Noise Ordinance. The Noise Element contains reasonable numeric standards for the assessment of noise impacts, and the Noise Ordinance standards are consistent with the Noise Element. Because the County's noise standards have been developed specifically for Nevada County, and because those standards provide thresholds in terms of hourly average, and single-event maximum noise levels, they are also comprehensive. As a result, the use of standards developed for other jurisdictions in lieu of the adopted Nevada County noise standards is unnecessary.

Two areas where consideration of noise standards beyond those adopted by Nevada is warranted are with respect to project-related noise level increases and vibration impact assessment. Recommendations for appropriate thresholds for evaluation of increases in off-site traffic noise levels have been discussed previously in this section (Table 4). A discussion of standards relative to vibration impact assessment follows.

Because the project does not propose any nighttime heavy truck traffic, which is the only off-site noise sources associated with the project, and because the project's on-site noise sources must comply with the County's nighttime noise level standards, an evaluation of sleep disturbance is not warranted for this project.

## Criteria for Acceptable Vibration Exposure

The California Environmental Quality Act (CEQA) contains vibration impact assessment guidelines. The Nevada County Noise Element and Noise Ordinance do not contain criteria for acceptable vibration exposure applicable to this project. However, the Federal Transit Administration (FTA) and the California Department of Transportation (Caltrans) provide such criteria. Those criteria are discussed in the sections that follow.

### Federal Transit Authority Criteria for Acceptable Vibration Levels

Table 12-3 of the Federal Transit Administration (FTA) Noise and Vibration Manual, reproduced as Table 7 below, provides vibration levels at which damage to structures could occur. As shown in Table 7, a vibration level of 90 VdB is the minimum at which the onset of damage to extremely susceptible buildings could occur. As a result, this level was considered to be a conservative benchmark against which project-generated vibration levels were evaluated in this analysis.

<b>Building Category</b>	<b>Level, VdB<sup>1</sup></b>
I. Reinforced-concrete, steel or timber (no plaster)	102
II. Engineered concrete and masonry (no plaster)	98
III. Non-engineered timber and masonry buildings	94
IV. Buildings extremely susceptible to vibration damage	90
<sup>1</sup> RMS velocity in decibels (VdB) re 1 micro-inch/second	

In addition to providing guidance with respect to vibration levels which would cause damage to structures, the FTA guidelines also provide criteria for assessing the potential for annoyance related to vibration. Table 8-1 of the FTA Noise and Vibration Manual, reproduced in Table 8 below, provides vibration criteria for general assessment of impacts.

<b>Table 8 Groundborne Vibration Impact Criteria for General Assessment</b>			
<b>Land Use Category</b>	<b>Impact Levels (VdB)</b>		
	<b>Frequent Events<sup>a</sup></b>	<b>Occasional Events<sup>b</sup></b>	<b>Infrequent Events<sup>c</sup></b>
Category 1: Buildings where vibration would interfere with interior ops.	65 <sup>d</sup>	65 <sup>d</sup>	65 <sup>d</sup>
Category 2: Residences and buildings where people normally sleep	72	75	80
Category 3: Institutional land uses with primarily daytime uses	75	78	83
Source: Federal Transit Administration, Transit Noise Impact and Vibration Assessment, May 2006. Vibration levels are measured in or near the vibration-sensitive use. <ul style="list-style-type: none"> <li>a. "Frequent Events" is defined as more than 70 vibration events of the same source per day.</li> <li>b. "Occasional Events" is defined as between 30 and 70 vibration events of the same source per day.</li> <li>c. "Infrequent Events" is defined as fewer than 30 vibration events of the same source per day.</li> <li>d. This criterion limit is based on levels that are acceptable for most moderately-sensitive equipment such as optical microscopes. Vibration-sensitive manufacturing or research will require detailed evaluation to define the acceptable vibration levels.</li> </ul>			

According to Table 8, the general assessment impact level for frequent events applicable at residential uses is 72 VdB. Where vibration levels exceed this threshold, a detailed vibration assessment is recommended. Because project operations would essentially occur continuously during the proposed business hours, the FTA criteria applicable to "Frequent Events" is applied to this analysis of potential annoyance resulting from project activities. As noted previously, vibration impacts related to project blasting operations are evaluated in a separate study. This analysis analyzes the potential vibration impacts associated with the use of mobile equipment.

# Project Description

## Overview

The proposed use permit and reclamation plan proposes to allow the following:

- Operation of pumps and a water treatment facility to dewater the underground workings.
- Construction of a water pipeline to transport treated water to an outfall located in South Fork Wolf Creek.
- Construction of the necessary aboveground facilities at the Brunswick Industrial Site (e.g., headframes and hoists, surface structures, a mineral processing plant) to support underground mining and mineral processing.
- Construction of a new service shaft and ventilation shaft from the underground mine to surface at the Brunswick Industrial Site.
- Underground mining, including drilling, blasting, and gold mineralization removal.
- Gold mineralization and rock processing at the Brunswick Industrial Site and off-site transport of gold concentrate.
- Transport of engineered fill from the Brunswick Industrial Site and placement at the Centennial Industrial Site.
- Transport of engineered fill from the Brunswick Industrial Site to off-site customers.
- Placement of engineered fill at the Brunswick Industrial Site.
- Construction of a potable water pipeline to residences along a portion of East Bennett Road.

The majority of aboveground facilities, the access to the underground mining, the treated-water pipeline and outfall structure, and a portion of the engineered fill will be located on the Brunswick Industrial Site. Engineered fill will also be placed on the Centennial Industrial Site. Of the total 175 acres in surface land holdings, approximately 104 acres will be disturbed as a result of construction of the facilities proposed to support dewatering, mining, and processing at the Idaho-Maryland Mine. In addition, Rise owns approximately 2,585 acres of subsurface rights that encompass the historic Idaho-Maryland Mine workings and Idaho-Maryland Gold Project. Once the necessary aboveground facilities are constructed, Rise will begin dewatering the mine, performing advanced exploration, and mining the underground workings.

## Surrounding Land Uses

The Brunswick site is surrounded by residential land uses and undeveloped open space. The Centennial site is surrounded by commercial and industrial uses, with few residences to the north and northeast of the site.

The proposed haul route between the Brunswick and Centennial sites will include a portion of East Bennett Road from the northern site access to Brunswick Road; Brunswick Road from East Bennett Road to Whispering Pines Lane; and Whispering Pines Lane from Brunswick Road to Centennial Site access (before Centennial Drive). Noise-sensitive receptors located along these roadways consist of several residences adjacent to Brunswick Road and a single residence on

Whispering Pines Lane. Figure 3 shows the locations of the sensitive receptors along the Centennial haul route.

Once hauling to the Centennial site has been completed, engineered fill material will be hauled to off-site vendors via the same route, except that Brunswick Road will be used between East Bennett Road and Highway 49, and Whispering Pines Lane will no longer be used. Land uses along Brunswick Road between Whispering Pines Lane and Highway 49 currently consist of primarily open space and commercial uses with a few residences located approximately 400 feet or more from the roadway centerline. When the Loma Rica project is developed, additional residential land uses will be located adjacent to Brunswick Road.

### **Operations at the Brunswick Site**

The project site plan for the Brunswick Industrial Site comprises five areas: aboveground site facilities, underground mining, treated and potable water pipelines, the Brunswick engineered fill area, and outfall for the treated water to the South Fork of Wolf Creek. Figure 6 shows the proposed Brunswick Site Plan.

To support dewatering and underground mining, aboveground structures and processing facilities will need to be constructed and installed. Approximately 15 acres of previously disturbed land on the northeast side of the Brunswick Industrial Site will be graded to construct the ventilation system, headframe and hoist, water treatment plant, collar replacement, mineral processing plant, service shaft, various buildings, internal roads, and parking areas.

Noise will be generated at the Brunswick site during project construction, by aboveground processing equipment, by heavy equipment used to transfer the engineered fill to the storage area, by a surface ventilation fan which will be used until the service shaft is complete and the permanent underground ventilation fan can be installed, and by the water treatment equipment.

### **Dewatering**

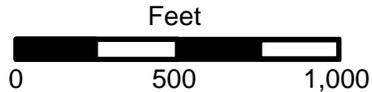
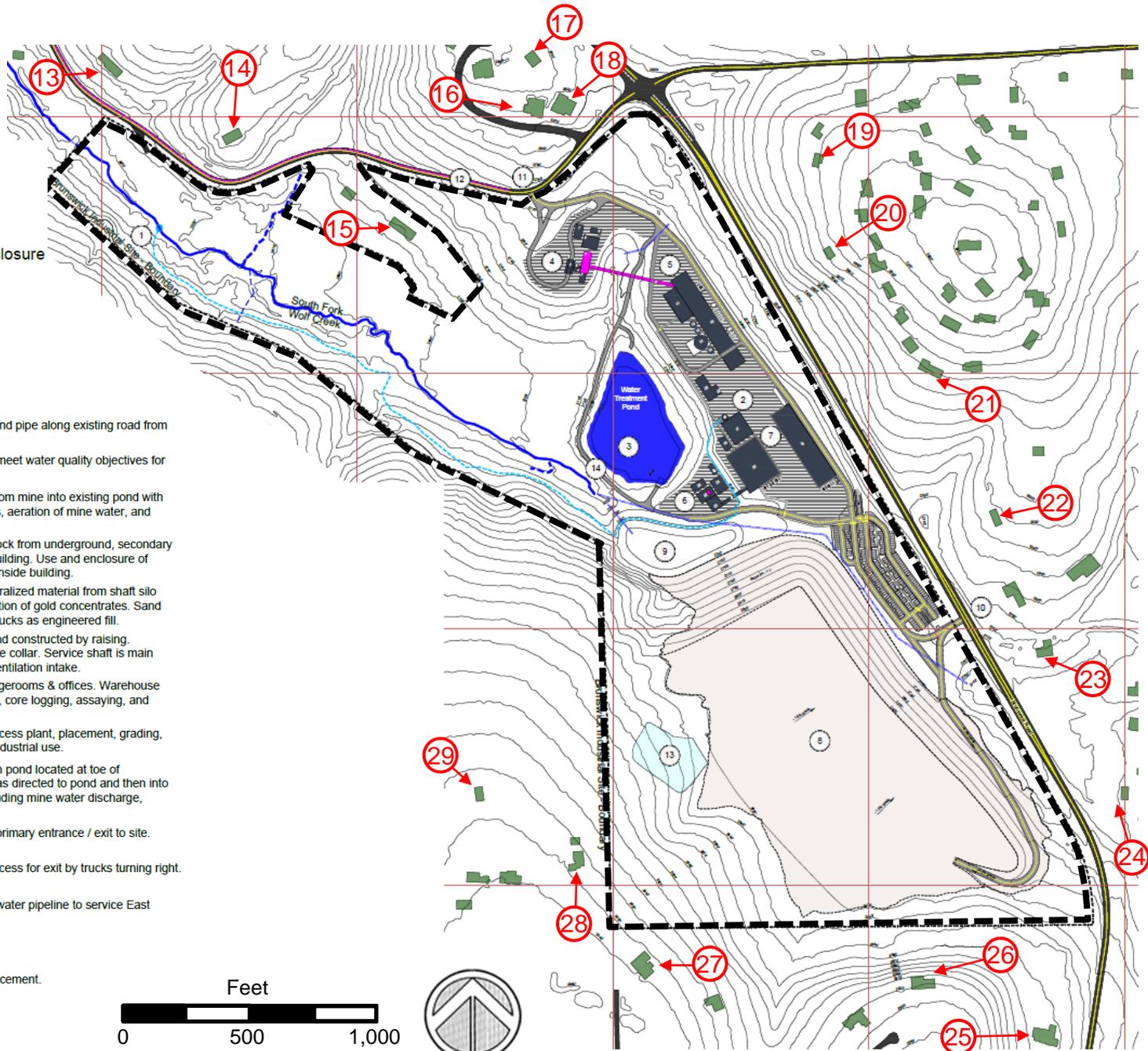
The existing Brunswick shaft located on the northeast side of the Brunswick Industrial Site will provide access to the underground workings for dewatering. Currently, groundwater has filled the underground workings to approximately 260 feet below ground surface, measured at the Brunswick Shaft. The groundwater will need to be removed to access the underground workings for mining.

Initial dewatering of the underground workings will be accomplished using submersible and staged centrifugal pumps. Approximately 2,500 acre-feet of groundwater will be pumped from the underground workings over an approximately 6-month period. The groundwater will be pumped via a pipeline to an existing clay-lined settling pond for water treatment. The headframe and hoist at the Brunswick shaft will be installed before initial dewatering begins.

**Figure 6**  
**Brunswick Site Plan**  
 Idaho Maryland Mine Project

-  Engineered Fill
-  Water Treatment Pond
-  Structure - Planned & ID number  
Remain onsite after mine closure
-  Structure - Planned & ID number  
Reclaimed and removed after mine closure
-  Structure - Industrial / Commercial
-  Structure - Residential
-  Receptor ID (See Figure 3)

-  South Fork Wolf Creek Discharge Point - Above ground pipe along existing road from Water Treatment Plant to discharge point.
-  Water Treatment Plant - Treatment of mine water to meet water quality objectives for discharge.
-  Water Treatment Pond - Discharge of groundwater from mine into existing pond with ~30 acre-feet working capacity for settlement of solids, aeration of mine water, and surge capacity.
-  Brunswick Shaft - Existing shaft utilized for hoisting rock from underground, secondary escape, and exhaust ventilation. New headframe & building. Use and enclosure of existing concrete silo. Barren rock loaded into trucks inside building.
-  Process Facility - Covered conveyor to transfer mineralized material from shaft silo into grinding section of process plant building. Production of gold concentrates. Sand tailings used as underground backfill or loaded into trucks as engineered fill.
-  Service Shaft & Headframe - New shaft to underground constructed by raising. Excavation to solid bedrock and installation of concrete collar. Service shaft is main entry to mine for personnel, materials, and fresh air ventilation intake.
-  Building Complex - New buildings for employee changerooms & offices. Warehouse with 8 bays for various uses, including supply storage, core logging, assaying, and equipment maintenance.
-  Engineered Fill - Transport of engineered fill from process plant, placement, grading, and compaction in lifts to create new area for future industrial use.
-  Storm Water Detention Pond - Storm water detention pond located at toe of engineered fill pile. Run-off from site and upslope areas directed to pond and then into South Fork Wolf Creek. Post project storm flows, including mine water discharge, mitigated to less than pre-project storm flows.
-  Brunswick Road Access - Use of existing access as primary entrance / exit to site. Controlled access by security fencing and gate.
-  East Bennett Road Access - Use of existing gated access for exit by trucks turning right. Controlled access by security fencing and gate.
-  Potable Water Extension - Extension of NID potable water pipeline to service East Bennett Road residential area.
-  Onsite septic field location for domestic water only.
-  Repair of southwest pond berm. Excavation and replacement.



### **Ventilation Fan**

Ventilation will be provided with a fan located on the surface and ducting into the Brunswick shaft until the service shaft is complete and the permanent underground ventilation fan can be installed. Aboveground facilities necessary to support pumping of fresh air underground include a primary ventilation fan and duct work. The primary ventilation fan will have housing on its sides and a silencer to reduce noise levels. The front of the ventilation fan will have a vent connected to duct work that will carry air underground. In addition, secondary fans will be installed underground to promote air circulation. The ventilation system will be electric. Once dewatering and the service shaft has been completed, the ventilation fan system for ongoing mining operations will be located underground.

### **Hoist and Headframe**

Installation of a new hoist and headframe is necessary to support the transport of employees, supplies, barren rock, and mineralized rock to the surface once the underground workings have been dewatered. The headframe and silo will be enclosed inside a pre-engineered metal building and the hoist will be housed in a separate pre-engineered building.

### **Rock Bin Conveyors and Barren Rock Loading Area**

The existing concrete rock silo will be reused. A chute and conveyor system will transfer barren rock from the silo into trucks for transport as engineered fill. The conveyor system and truck loading area will be inside a building adjacent to the headframe. A chute and covered conveyor system, approximately 335 feet long, will transfer gold mineralization from the silo to the process plant.

### **Underground Mining**

Exploration and mining of the underground workings will begin once dewatering is complete. Because the equipment and processes will be located far underground, with the exception of blasting, the transmission of noise from the underground operations is not expected to be audible at the surface. As a result, this evaluation focuses on the noise-generation of aboveground equipment and activities, and underground blasting activities. As noted previously, blasting vibration impacts were evaluated in a separate study prepared by IDC-PBS.

### **Process Plant**

Gold mineralization hoisted from the Brunswick shaft will be placed in the existing concrete silo located on the Brunswick property before processing begins. Gold material will be transported from the concrete silo using chutes and conveyors to a fully enclosed process plant. A covered conveyor system, approximately 335 feet long, will transfer mineralized rock from the silo to the process plant. Mineralized rock is conveyed from the silo to inside the processing plant and grinding mill where water is added and the rock is ground to size before the gold is recovered.

The slurry of crushed mineralized rock and water that results from this process is pumped to a second gold recovery system. The gold concentrate will be dewatered using thickeners and filter presses before it is bagged for off-site shipment. Approximately 20 tons of gold concentrate will be produced and bagged on-site per day.

Sand tailings (waste) from the gold recovery process will be dewatered and used for either backfill for the underground mine or stockpiled for transport and use as engineered fill. Sand tailings during backfilling will be transferred to the paste backfill plant, where the particles will be dewatered and mixed with cement into a paste. The paste will be pumped back underground and used to backfill mining voids. Sand tailings not used for backfill will be either directly loaded into trucks in the process plant or stockpiled inside the building. Stockpiled sand tailings will be loaded into transport trucks with a front-end loader during daytime hours. Sand tailings not used as underground backfill will be transported for use as engineered fill.

The process plant will be contained in a single building, with dimensions of approximately 425 by 70 by 65 feet (length by width by height). A thickener tank and paste feed tank, several water tanks, and cement silo will be located outside and behind the plant building and masked from view of Brunswick Road.

### **Engineered Fill Transport**

Barren rock hoisted from the Brunswick shaft will be placed in the existing concrete silo located on the Brunswick Industrial Site. The barren rock will be transported from the concrete silo using a series of chutes and conveyors to a fully enclosed truck loading area. Barren rock, if necessary, will be mixed with sands from the gold processing system or other waste rock to create an engineered fill that meets appropriate geotechnical specifications for construction of the development pad(s).

Engineered fill will initially be placed at the Brunswick and Centennial sites. For Centennial site fill operations, trucks will transport barren rock from the Brunswick Site to the Centennial Site. Transport of barren rock to the Centennial Industrial Site will occur 16 hours per day, 7 days per week. An approximately 44-acre area of the 56-acre Centennial Industrial Site will be filled using engineered fill from the Brunswick Industrial Site over approximately 5 years.

At the Brunswick Site, engineered fill will be transported from the truck loading area to an approximately 31-acre portion of the Brunswick Industrial Site (see Sheet 1). It will take approximately 6 years to fill the Brunswick Industrial Site fill area to design elevations. After fill activities are complete at both the Centennial and Brunswick Industrial site, the engineered fill produced will be utilized in the local and regional construction markets.

### **Parking**

A total of 217 parking spaces will be provided at the Brunswick Industrial Site.

## **Operations at the Centennial Site**

Rise will use the engineered fill generated as waste by-product of the gold mining process described above to fill and grade the Centennial Industrial Site. The fill and grading activities will disturb approximately 44 of the 56-acre Centennial Industrial Site. Figure 7 shows the Centennial site plan.

The engineered fill will be transported from the Brunswick Industrial Site to the Centennial Industrial Site using haul trucks. Approximately 1.6 million tons of engineered fill over a 5-year period will be trucked from the Brunswick Industrial Site to the Centennial Industrial Site for placement and compaction. The average daily transport of engineered fill will be 1,000 tons per day or 365,000 tons per year. A maximum transport rate of up to 2,000 tons of engineered fill per day is required to make up for periodic weather or operational delays. Truck payloads will be approximately 20 tons per truck and therefore will require up to 100 trips per day as a maximum and an average of 50 trips per day. Engineered fill from the Brunswick Industrial Site will be placed, graded, and compacted.

## **Potable Water Pipeline**

A buried potable water pipeline will be added to provide water to residences along a portion of East Bennett Road. The existing NID potable water pipeline will be extended on East Bennett Road to provide potable water service to residences currently on wells that may be affected by the project.

An approximately 1¼-mile-long by 2 feet-wide stretch of East Bennett Road will be temporarily disturbed to bury the potable water pipeline. Installation of the buried potable water pipeline will generally involve trenching, pipe placement, backfill, and cover replacement. Upon completion of trenching in a specific section of the route, the 8-inch pipeline will be installed.

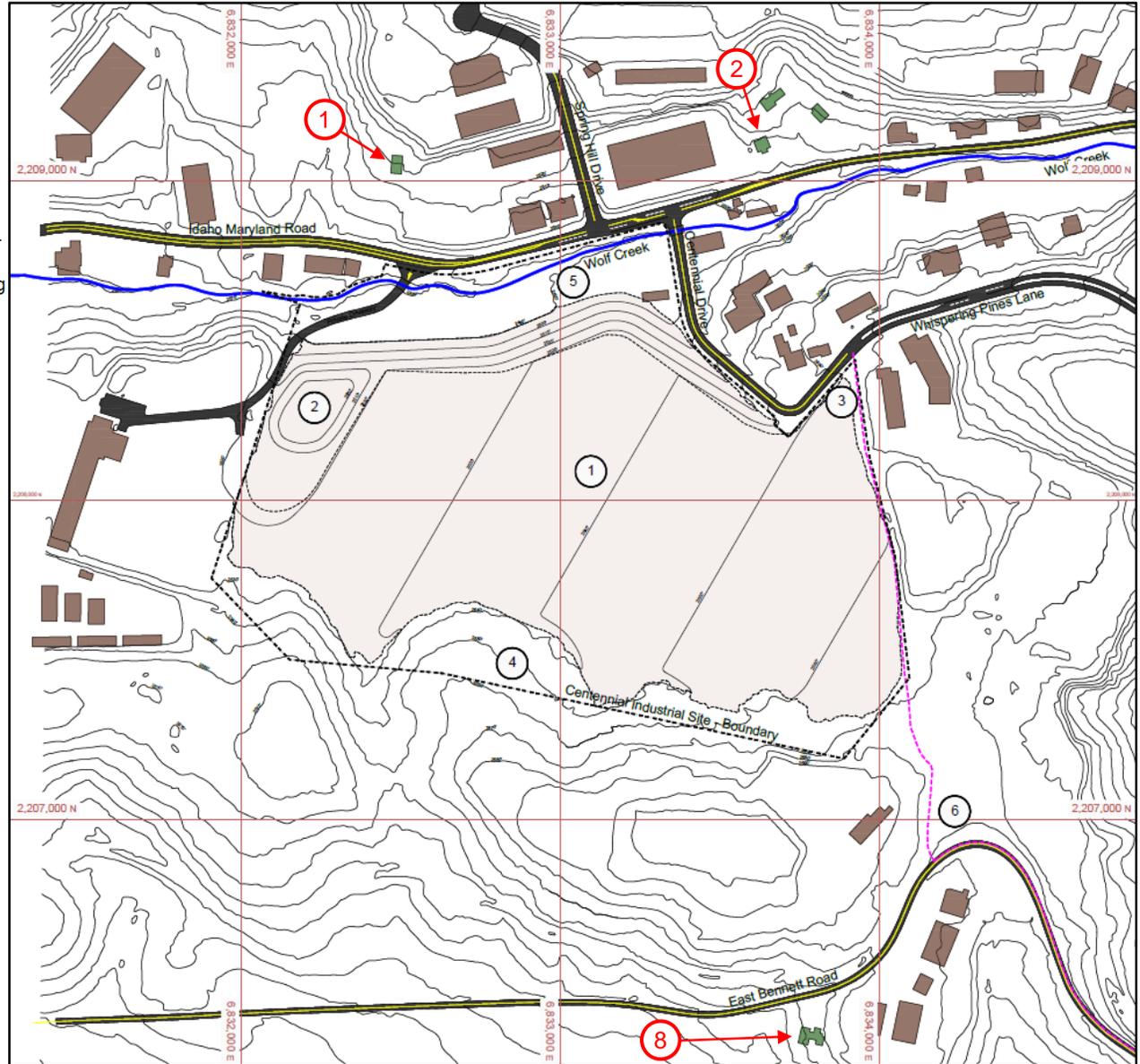
Residences on the streets of Cordell Court, Miskin Court, Amethyst Court, Emerald Court, Diamond Court, and Old Mine Road and several private driveways will be offered the opportunity to connect to this new potable water line. Residential connection to this new potable water line will be voluntary and at the property owner's discretion.

The pipeline will be installed within the County right-of-way in the streets named and stubbed at the property owner's property boundary in a location designated by the County. If the property owner decides to connect to the potable water line, Rise will fund the permitting and construction costs.

**Figure 7**  
**Centennial Site Plan**  
 Idaho Maryland Mine Project

- ① Engineered Fill - Transport of engineered fill from Brunswick Site, placement, grading, and compaction in lifts to create new area for future industrial use.
- ② Detention Pond - Construction of new storm water detention pond. Run-off directed to existing discharge point.
- ③ Site Access - Installation of new left turn lane on Whispering Pines Lane to access site.
- ④ Open space for special-status plant species.
- ⑤ Open space for Wolf Creek and 100 foot setback.
- ⑥ Potable water extension - Extension of NID potable water pipeline to service East Bennett Road residential area.

- Engineered Fill
- Structure - Industrial / Commercial
- Structure - Residential
- Paved Road - Existing
- Elevation Contour Line - 10 foot intervals
- Creek
- - - Centennial Industrial Site - Boundary
- - - Proposed NID potable water pipe extension
- Ⓝ Receptor ID (See Figure 3)



## Hours of Operation

Hours of operation will vary based on the project element. Table 9, “Hours of Operation,” provides the hours of operation and approximate duration.

Project Element	Hours of Operation	Duration <sup>1</sup>
Initial dewatering	24 hours a day, 7 days a week	6 months
Aboveground facility outside construction	7:00 a.m.–7:00 p.m., Monday–Saturday	18 months
Aboveground facility inside construction	24 hours a day, 7 days a week	18 months
Aboveground facility operations—gold mineralization processing	24 hours a day, 7 days a week	80 years
Underground exploration/mining	24 hours a day, 7 days a week	80 years
Off-site hauling—gold concentrate	6:00 am-10:00 pm, 7 days a week	80 years
Off-site hauling—engineered fill	6:00 am-10:00 pm, 7 days a week	80 years
On-site hauling – engineered fill <sup>2</sup>	7:00 am-7 pm, 7 days a week	6 years
Outside truck loading by loader	7:00 a.m.–7:00 p.m., 7 days a week	80 years
Placement, grading, and compaction of engineered fill at Centennial Industrial Site	7:00 a.m.–3:30 p.m., Monday-Friday	5 years
Placement, grading, and compaction of engineered fill at Brunswick Industrial Site	7:00 a.m.–3:30 p.m., Monday–Friday	6 years
<b>Notes:</b>		
<sup>1</sup> Durations are approximate and dependent on factors such as equipment and personnel availability, fluctuations in the economy, and technical details.		
<sup>2</sup> Hours during which engineered fill material will be transported on the Brunswick site.		

## Equipment

Expected equipment associated with underground mining, water treatment, gold mineralization processing, and engineered fill activities is provided in Table 10, “Typical Equipment.” The type of vehicles used will vary somewhat over time depending on availability and the introduction of new models to suit different conditions.

<b>Table 10 Typical Equipment Idaho Maryland Mine – Nevada County</b>	
<b>Equipment<sup>1</sup></b>	<b>Uses</b>
<b>UNDERGROUND MINING OPERATIONS</b>	
Jaw crusher	Primary crushing of gold mineralization and barren rock before hoisting to the surface
Drills	Drill holes for explosives placement and core drilling. Electric-Hydraulic and pneumatic.
Jumbo drill carriages	Wheeled carriers and hydraulic lifts for jumbo drills
Load/haul/dump vehicles and rail cars	Load barren and mineralized rock. Move mined barren and mineralized rock to rock bins
Personnel vehicles	Small wheeled vehicles for person transport.
Headframes, hoists, and skips	Hoist barren and mineralized rock to the surface and deposit in concrete silo. Hoist people, materials, and equipment from underground to surface.
Water pumps	Pump water from underground workings to surface for dewatering
Ventilation fans	Maintain air circulation in the underground workings
Alimak	Lift for drilling and placing explosives to create raises
Shotcrete machine	Spray concrete into the walls of the galleries to prevent rockfall
Explosives loader	Transport and load explosives
Compressor	Provides compressed air to underground mine
<b>WATER TREATMENT PLANT</b>	
Pressure Vessels	Manganese Dioxide filtration and activated carbon
Pumps	Transfer of water for treatment and discharge
Turbine Aerator	Aeration of water in treatment pond
<b>MINERAL PROCESSING OPERATIONS</b>	
Conveyor belts	Convey gold mineralization from the concrete storage silo to the gold recovery processing plant. Convey barren rock into truck loading building
SAG mill (16'x8', 1250hp)	Primary grinding of gold mineralization
Ball mill (11'x18', 1250hp)	Secondary grinding of gold mineralization
Gravity gold concentrator	Initial removal of gold from mineralized rock
Gold Recovery	Shaking tables and doré furnace
Sulfide flotation cell	Secondary removal of gold from mineralized rock
Cyclone and screens	Classification of materials by size
Thickeners	Settling of solids and removal of water.
Filter Presses	Dewatering of concentrate and sand tailings
Paste backfill plant	Dewater fines and combine with cement for backfill in abandoned underground workings
Pumps	Various slurry pumps to transfer material between processes
Compressor	Provides compressed air for process plant
<b>ENGINEERING FILL OPERATIONS</b>	
Dozer (CAT D8 or similar)	Move, grade, and compact engineered fill
Grader (CAT 140H or similar)	
Excavator (CAT 385 or similar)	
Roller compactor	
Haul trucks (20 ton)	Haul and dump engineered fill
Water truck	Water haul roads and fill areas
Front-end loader (CAT 980 or similar)	Mix barren rock and sand into engineered fill and load engineered fill into haul trucks for off-site transport
Mobile auger blending plant	Mobile plant for blending rock and sand

<b>Table 10 Typical Equipment Idaho Maryland Mine – Nevada County</b>	
<b>Equipment<sup>1</sup></b>	<b>Uses</b>
Mobile tire washing plant	Washing of truck tires leaving non paved sites
<b>BRUNSWICK SURFACE MISCELLANEOUS</b>	
Pick-up trucks	Transport materials and people
Service truck (mechanical)	Service mobile and stationary equipment
Skid steer/forklift	Move smaller material
Manlift	Elevate workers
Grove rough terrain crane	Pick-and-carry operations and off-road and “rough terrain” applications
Portable generator	Provide backup electricity and
Welder	For repairs to machinery
<b>Notes:</b>	
<sup>1</sup> Equipment will be purchased at the time it is needed and may differ from equipment listed.	

## Project Truck Trip Generation

Access to the Brunswick Industrial Site is provided by gated entrances on both East Bennett Road and Brunswick Road. The primary entrance/exit for employees, vendors, and haul trucks will be from Brunswick Road. The East Bennett Road entrance will be used as an exit for haul trucks and large delivery trucks turning right onto East Bennett Road, for emergency personnel and, as necessary, for equipment movement.

Access to the Centennial Industrial Site is located at Whispering Pines Lane. Only employees and haul trucks will use this entrance. Engineered fill from the Brunswick Industrial Site will be hauled to the Centennial Industrial Site via Brunswick Road and Whispering Pines Lane. Engineered fill from the Brunswick Industrial Site to other customers will be hauled using Brunswick Road to State Route 20/49. Off-site haul of gold concentrate will average one truck trip per a day using Brunswick Road to State Route 20/49. Table 11 shows the projected truck trip generation estimates in terms of round trips. It should be noted that each round trip results in 2 individual one-way trips. For purposes of the traffic noise impact assessment the number of round trips was doubled so that each individual truck passby on the local roadway network was analyzed.

<b>Table 11 Project Truck Trip Generation Estimates Idaho Maryland Mine – Nevada County</b>							
<b>Uses</b>	<b>Axles</b>	<b>Average Daily Round Trips</b>	<b>Max Daily Round Trips</b>	<b>Am Peak Hour Trips</b>		<b>Pm Peak Hour Trips</b>	
				<b>Entering</b>	<b>Exiting</b>	<b>Entering</b>	<b>Exiting</b>
Haul trucks with engineered fill <sup>1</sup>	5	50	100	8	8	8	8
Haul truck with gold concentrate	5	1	5	0	0	0	0
Fuel trucks <sup>2</sup>	5	1	2	0	0	0	0
Freight Trucks	5	1	3	0	0	0	0
Outside services <sup>3</sup>	2	3	4	0	0	0	0

**Notes:**

<sup>1</sup> Based on estimate of maximum 2,000 tons per day of engineered fill and off-site transport using 20-ton highway haul trucks (or approximately 100 trips per day).

<sup>2</sup> Fuel consumption is estimated at maximum 12,000 gallons per day, which, using a 7,500-gallon tanker, equals 11.2 trips per week, or approximately 2 trips per day and none during peak hours. This is a worst-case scenario that assumes operations need to rely on generator power for a period of time.

<sup>3</sup> Outside services includes vendors, deliveries, and other ancillary vehicle traffic to support operations

<sup>4</sup> Each round trip generates 2 one-way trips.

## Project Employee Trip Generation

Rise anticipates employing approximately 312 direct employees during full mining operations. At full operations, approximately 44 employees will work regular 8-hour days, 5 days per week, and approximately 268 employees will work 12-hour shifts, 7 days on and 7 days off. Shift change for 12-hour employees will be 7 a.m. and 7 p.m. Work shifts for 8-hour employees will be from 7 a.m. to 3:30 p.m.

The Brunswick site will generate a maximum of 174 employee round trips per day while the Centennial site will generate a maximum of 4 employee round trips per day. This computes to a total of 356 daily one-way employee trips.

## Evaluation of Project Noise Impacts

The major noise producing components of the project evaluated in this study are as follows:

- Construction (on-site facilities and off-site potable water pipeline construction).
- Off-site haul truck traffic / engineered fill transport.
- Engineered fill placement and compaction.
- Dewatering & mineral processing.
- Shaft ventilation fan.
- Wastewater treatment plant.

The noise generation of each of these noise sources is evaluated in the following sections. Noise levels are predicted at the nearest representative receptors to each source and the resulting noise levels are compared against the appropriate project noise standards. In addition to evaluating the potential noise impacts of the project, this analysis also evaluates the potential impacts of the local aircraft noise environment upon the project site.

### Impact Evaluation 1: Project Construction Noise

Site preparation activities at both the Brunswick and Centennial sites will include site clearing, grading, paving, and building construction. In addition, construction of the potable water pipeline along East Bennett Road will include trenching, pipeline installation, and compaction activities.

The Federal Highway Administration (FHWA) Roadway Construction Noise Model (RCNM) was used to quantify worst-case construction noise levels for the project. For this assessment, it was assumed that a bulldozer, grader, excavator, front-end loader and compactor would be used for the various stages of site preparation at both the Brunswick and Centennial project sites. It was also assumed that mobile equipment would not utilize traditional backup warning devices (beepers) during construction activities when operating in reverse as the broadband “squawker” type devices are proposed. For the pipeline installation, less equipment would be required.

Table 12 provides the maximum noise levels reported by the RCNM for equipment commonly used in general construction projects at full-power operation at a distance of 50 feet. Not all of these construction activities would be required of this project.

Assuming a bulldozer, grader, excavator, front-end loader and compactor were operating concurrently at the Brunswick and Centennial construction sites during site preparation, the combined noise exposure from the effective noise center of those operations would be 85 dBA  $L_{eq}$  and 85 dB  $L_{max}$  at a distance of 50 feet from the operations. However, the earthmoving equipment would be at various locations on the project sites rather than grouped in a small portion of the sites. To provide a conservative but reasonable assessment of project construction noise generation at the Brunswick and Centennial sites, it was assumed that all of this equipment could be operating concurrently but that the equipment would be spread out over the sites during the site clearing / construction operations. As a result, average noise levels were predicted for the Brunswick and Centennial site preparation activities assuming the noise sources were distributed throughout the sites whereas maximum noise levels were predicted based on the closest proximity of the equipment to the sensitive receptor locations.

It should be noted that an average noise level of 80 dBA  $L_{eq}$  at 50 feet was used to assess construction noise generation of the proposed pipeline installation along Bennett Road. This level is 5 dB lower than the 85 dBA  $L_{eq}$  level used for the assessment of construction noise generation at the Brunswick and Centennial sites because less heavy earthmoving equipment would be required for the water pipeline installation component of the project than the site preparation and construction operations at the Brunswick and Centennial sites.

The reference construction noise levels cited above were projected to the representative receptor locations shown on Figure 3 using the SoundPlan model. The results of the construction noise projections are presented in Table 13.

<b>Table 12 Typical Construction Equipment Noise</b>	
<b>Equipment Description</b>	<b>Maximum Noise Level at 50 Feet, dBA</b>
Auger drill rig	85
Backhoe	80
Compactor (ground)	80
Compressor (air)	80
Concrete batch plant	83
Concrete mixer truck	85
Concrete pump truck	82
Concrete saw	90
Crane (mobile or stationary)	85
Dozer	85
Dump truck	84
Excavator	85
Front end loader	80
Generator (more than 25 kVA)	82
Grader	85
Jackhammer	85
Mounted impact hammer	90
Paver	85
Pumps	77
Rock drill	85
Scraper	85
Soil mix rig	80
<i>Source: Federal Highway Administration (FHWA)</i>	

**Table 13  
Predicted Construction Noise Levels at Nearest Receptors  
Centennial and Brunswick Site Construction Activities & Pipeline Installation**

Receptor	Predicted Noise Level		Daytime Noise Criteria <sup>1</sup>		Daytime Noise Criteria Exceeded? <sup>2</sup>		Mitigation Recommended?
	Leq	Lmax	Leq	Lmax	Leq	Lmax	
1	54	61	63	81	No	No	No
2	50	60	68	86	No	No	No
3	39	39	66	87	No	No	No
4	37	36	60	75	No	No	No
5	37	28	54	71	No	No	No
6	36	28	55	72	No	No	No
7	36	29	54	71	No	No	No
8	44	42	55	75	No	No	No
9	58	54	53	71	Yes	No	Yes
10	65	65	52	71	Yes	No	Yes
11	61	62	52	72	Yes	No	Yes
12	60	59	54	74	Yes	No	Yes
13	67	67	55	75	Yes	No	Yes
14	64	62	55	75	Yes	No	Yes
15	63	62	55	75	Yes	No	Yes
16	56	61	53	75	Yes	No	Yes
17	51	54	61	75	No	No	No
18	55	65	55	74	No	No	No
19	49	52	55	74	No	No	No
20	53	58	62	75	No	No	No
21	51	55	60	75	No	No	No
22	54	62	61	75	No	No	No
23	56	67	63	75	No	No	No
24	50	61	65	80	No	No	No
25	50	62	65	75	No	No	No
26	52	63	55	69	No	No	No
27	48	52	55	69	No	No	No
28	49	52	55	69	No	No	No
29	47	45	55	69	No	No	No
30	44	39	55	69	No	No	No

1. As noted in Table 9, above ground outside project construction activities would be limited to daytime hours. As a result, only the daytime criteria are utilized for the assessment of potential noise impacts for this activity.

2. Because the Nevada County Zoning Ordinance exempts construction activities from the Table 5 noise standards, these criteria are not applicable to this component of the project. They are provided to give an indication as to whether or not construction noise increases would be substantial relative to existing ambient conditions at these nearest receptors.

Source: FHWA Roadway Construction Noise Model (RCNM) reference noise levels and SoundPlan model results.

As noted in the project criteria section, construction noise is exempt from the Nevada County noise standards. In addition, project construction activities involving heavy earthmoving equipment are proposed only during daytime hours and construction in any given area would be temporary. As a result, no significant construction noise impacts are identified for this project relative to the applicable Nevada County noise standards.

Table 13 does indicate, however, that the construction activities would result in substantial temporary increases in daytime noise exposure at eight receptors in the project vicinity. The cause of these substantial increases is the fresh water pipeline installation along Bennett Road, not site preparation activities at either the Centennial or Brunswick sites. Nonetheless, because the water pipeline installation could result in short-term increases in daytime ambient noise levels at receptors along Bennett Road, the following recommendations are made to reduce the potential for annoyance during the pipeline installation.

**Pipeline Construction Noise Abatement Options:**

- Provide advanced notification of pipeline construction dates and durations to each of the residences located along the construction corridor.
- Ensure that all equipment utilizing internal combustion engines are fitted with working mufflers in good repair.
- Utilize the quietest equipment capable of performing the required construction.
- Locate construction staging areas as far as possible from existing residences.
- If portable generators or air compressors are to be used, locate that equipment as far as feasibly possible from existing residences and, if possible, shield it from view of those residences using intervening topography or vehicles.

The construction activities in close proximity to the nearest residences along East Bennett Road during the pipeline installation will be of a short duration with the equipment present only for the duration required to dig the trench, install the pipeline, and refill the trench. As with the other outdoor construction activities, the pipeline construction would only occur during daytime hours and would be exempt from the County noise standards. With implementation of the noise abatement options cited above, noise impacts associated with the pipeline installation, as with the site preparation activities at the Centennial and Brunswick sites, are predicted to be ***less than significant***.

**Impact Evaluation 2: Off-Site Project Traffic**

To quantitatively assess traffic noise levels associated with the Project, the Federal Highway Administration Highway Traffic Noise Prediction Model (FHWA RD-77-108) was used. The Model is based on the Calveno reference noise factors for automobiles, medium trucks, and heavy trucks, with consideration given to vehicle volume, speed, roadway configuration, distance to the receiver, and the acoustical characteristics of the site. Project generated traffic inputs to the FWWA Model were obtained from the project traffic impact analysis prepared by KD Anderson & Associates, Inc. Transportation Engineers.

Maximum project heavy truck traffic noise levels were assessed for the delivery of engineered fill material to the Centennial site as well as to off-site vendors via Highway 20/49. Specifically, this analysis assumed 200 heavy truck trips per day (100 round trips), for the maximum production level rather than the 100 truck trips per day under the average condition (50 round trips). The FHWA Model heavy truck input data for each of the project scenarios is provided in Appendix E. As noted previously, the project is anticipated to generate approximately 356 daily employee trips. The project trip distribution routes were obtained from Table 13 of the project Traffic Impact Analysis.

Tables 14 and 15 show the predicted existing no-project and existing plus-project traffic noise levels at the nearest residences to each roadway segment for both project heavy trucks and employee vehicles, the project-related increase in traffic noise levels, the impact assessment threshold for each roadway segment (based on the Table 4 criteria), and determinations as to whether or not the project-related increases are substantial or result in noise impacts.

It should be noted that the FHWA Model results do not include any effects of Jake brakes on the prediction of either existing or proposed traffic noise levels. In the event that engine brakes are used by project haul trucks operating between the Brunswick and Centennial Sites, it is possible that a substantial increase in ambient noise levels could result at the sensitive receptors located along East Bennett Road and Whispering Pines Lane.

**Table 14**  
**Traffic Noise Levels (Ldn, dB) at Nearest Residences along Haul Routes used for Fill Placement Activities at Centennial Idaho Maryland Mine Project – Nevada County, CA**

Roadway	Description	Baseline	Baseline Plus Project	Increase	Significance Threshold	Substantial Increase?	Impact?
Bennett Road	Site Entrance to Brunswick	52.5	54.9	2.4	5.0	no	no
Brunswick Road	South of Project Site Entrance	62.8	62.8	0.0	3.0	no	no
Brunswick Road	Site Entrance to Bennett	60.9	61.2	0.3	3.0	no	no
Brunswick Road	Bennet to Whispering Pines	66.4	66.7	0.3	1.5	no	no
Brunswick Road	Whispering Pines to Idaho Maryland Rd.	66.6	66.7	0.1	1.5	no	no
Brunswick Road	Idaho Maryland Road to 49	65.7	65.7	0.0	1.5	no	no
Empire Street	West of SR 174	59.8	60.0	0.1	5.0	no	no
Empire Street	East of Auburn	61.1	61.2	0.1	3.0	no	no
Idaho Maryland Road	SR 49 to Brunswick	61.5	61.6	0.1	3.0	no	no
State Route 174	West of Brunswick	67.8	67.8	0.0	1.5	no	no
Whispering Pines Lane	Brunswick to Crown Point	57.8	60.4	2.6	5.0	no	no
Whispering Pines Lane	Crown Point to Centennial	59.1	61.2	2.1	5.0	no	no

Source: FHWA-RD-77-108 with inputs from KD Anderson, Bollard Acoustical Consultants, Inc. (BAC), and Caltrans

**Table 15**  
**Traffic Noise Levels (Ldn, dB) at Nearest Residences along Haul Routes used for Offsite Hauling of Fill Via Highway 20/49 Idaho Maryland Mine Project – Nevada County, CA**

Roadway	Description	Baseline	Baseline Plus Project	Increase	Significance Threshold	Substantial Increase?	Impact?
Bennett Road	Site Entrance to Brunswick	52.5	54.9	2.4	5.0	no	no
Brunswick Road	South of Project Site Entrance	62.8	62.8	0.0	3.0	no	no
Brunswick Road	Site Entrance to Bennett	60.9	61.2	0.3	3.0	no	no
Brunswick Road	Bennet to Whispering Pines	66.4	66.7	0.3	1.5	no	no
Brunswick Road	Whispering Pines to Idaho Maryland Rd.	66.6	67.0	0.4	1.5	no	no
Brunswick Road	Idaho Maryland Road to 49	65.7	66.2	0.5	1.5	no	no
Empire Street	West of SR 174	59.8	60.0	0.2	5.0	no	no
Empire Street	East of Auburn	61.1	61.2	0.1	3.0	no	no
Idaho Maryland Road	East of SR 49	61.5	61.6	0.1	3.0	no	no
State Route 174	West of Brunswick	67.8	67.8	0.0	1.5	no	no
Whispering Pines Lane	Crown Point to Brunswick	57.8	57.8	0.0	5.0	no	no
Whispering Pines Lane	Centennial to Crown Point	59.1	59.1	0.0	5.0	no	no

Source: FHWA-RD-77-108 with inputs from KDAnderson, Bollard Acoustical Consultants, Inc. (BAC), and Caltrans

The Table 14 and 15 data indicate that the project related traffic noise level increases on each roadway segment would be below the applicable threshold for a finding of a significant noise impact. In addition, hourly average traffic noise levels are also predicted to be below baseline ambient conditions at the sensitive receptors located along the project haul routes. Furthermore, noise generated by employee traffic on the roadways other than the proposed truck haul routes are predicted to be below 50 dB L<sub>dn</sub> at all sensitive receptors in the general project vicinity and well below existing ambient conditions. As a result, off-site traffic noise increases resulting from project heavy truck and employee traffic are predicted to be **less than significant**.

Future traffic volumes on the project area roadways evaluated in Table 14 and 15 will increase over time relative to existing levels due to general growth of the region. However, the project-generated truck traffic will remain constant, not increasing over time. As a result, the incremental increase in overall traffic noise levels resulting from the project will decrease relative to the increases shown in Tables 14 and 15 over time. Because the future project-related traffic noise level increases would remain below the project's thresholds, this impact is also considered to be **less than significant** relative to future (cumulative) traffic conditions.

In the event that engine brakes are used along the haul route between the Brunswick and Centennial Sites, it is possible that a substantial increase in traffic noise levels could occur at sensitive receptors located adjacent to that haul route. **In such a case, this impact would be considered potentially significant.**

Mitigation Measure for Impact 2:

- Haul truck operators shall be required to operate their trucks in such a manner so as to not require the use of Jake brakes along the project haul routes. Rise Grass Valley, Inc. shall post signage at the exits of both the Centennial and Brunswick sites informing drivers that the use of jake brakes are not permitted. Additionally, drivers employed by Rise Grass Valley, Inc. shall be required to abstain from use of jake brakes as a company policy, and any contract drivers shall be subject to the same requirement by written agreement. In the event that jake brake usage associated with project-related heavy truck traffic is observed, Rise Grass Valley, Inc. shall implement additional measures to educate drivers regarding the safe operation of their vehicles without the use of jake brakes or take disciplinary action if required.

### **Impact Evaluation 3: Engineered Fill Placement and Compaction**

Engineered fill placement and compaction activities at both the Brunswick Industrial and Centennial Industrial sites will utilize heavy earthmoving equipment similar to that used to evaluate project site construction noise levels. As noted in Table 10 the following equipment will be utilized for the engineered fill activities:

- Bulldozer
- Motor Grader
- Excavator
- Compactor

- Haul Trucks
- Water Truck
- Front-end Loader
- Mobile Auger Blending Plant
- Mobile Tire Washing Plant

The Table 12 data from the FHWA Roadway Construction Noise Model (RCNM) was used to quantify typical noise generation for this aspect of the project. For this assessment, it was assumed that a bulldozer, grader, excavator, front-end loader and compactor would be used concurrently and that traditional backup warning devices would not be a component of the construction noise generation (the broadband warning devices are proposed). Based on these assumptions, the RCNM predicts maximum and average noise levels of 85 dBA  $L_{max}$  and 85 dBA  $L_{eq}$  at a reference distance of 50 feet from the operations. These levels were projected to the nearest receptors using industry standard sound propagation algorithms at the Centennial Site and the SoundPlan model at the Brunswick Site.

**Centennial Site Engineered Fill Delivery and Placement Activities**

The nearest sensitive receptors (residences) to the Centennial site are receptors 1, 2 & 8. Those receptors are located approximately 500 to 1,000 feet from the nearest locations on the Centennial project site where the engineered fill activities would take place. Based on maximum and average construction noise levels of 85 dBA  $L_{max}$  and 85 dBA  $L_{eq}$  at a reference distance of 50 feet, average and maximum noise levels were computed at the nearest receptors using the SoundPlan Model. For modelling purposes, maximum noise levels were predicted based on the closest proximity of the heavy equipment to each receptor whereas average noise levels were predicted based on the assumption that the earthmoving equipment would be spread out on the project site. Table 16-A shows the predicted engineered fill activity noise levels at each representative receptor.

Table 16-A Predicted Engineered Fill Activity Noise Levels at Nearest Receptors Centennial Site Operations								
Receptor	Minimum Distance	Predicted Noise Level		Daytime <sup>1</sup> Noise Criteria <sup>2</sup>		Criteria Exceeded?		Impact?
		Leq	Lmax	Leq	Lmax	Leq	Lmax	
1	500	54	61	63	81	No	No	No
2	600	50	60	68	86	No	No	No
8	1000	44	42	55	75	No	No	No

1. As noted in Table 9 engineered fill placement, grading and compaction activities would be limited to daytime hours. As a result, only the daytime criteria are utilized for the assessment of potential noise impacts for this activity.  
Source: FHWA Roadway Construction Noise Model (RCNM) reference maximum levels.

As indicated in Table 16, ongoing engineered fill placement and compaction activities at the Centennial site are predicted to generate noise levels below the noise criteria applicable to each of the nearest receptors. As a result, this impact is considered ***less than significant***.

Although engineered fill placement and compaction activities would only occur during daytime hours at the Centennial Site, transport of engineered fill material from the Brunswick Site to the Centennial Site would occur between the hours of 6 am and 10 pm, as indicated on Table 9. As a result, the nighttime criteria would be applicable to the transport of materials to the Centennial Site, but only the daytime standards would be applicable to the placement and compaction operations. As indicated in Table 11, approximately 8 loads of fill material would be transported from the Brunswick to Centennial Sites during the peak hour.

To quantify the noise generation of trucks arriving at the Centennial Site, depositing the fill material and departing the site, BAC utilized the SoundPlan model assuming 16 heavy truck operations at the Centennial Site per hour (8 arrivals loaded and 8 departures empty). The results of the analysis are presented in Table 16-B.

<b>Table 16-B                      Predicted Engineered Fill Delivery Noise Levels at Nearest Receptors                      Centennial Site Operations</b>								
Receptor	Minimum Distance	Predicted Noise Level		Nighttime <sup>1</sup> Noise Criteria <sup>2</sup>		Criteria Exceeded?		Impact?
		Leq	Lmax	Leq	Lmax	Leq	Lmax	
1	500	47	61	55	71	No	No	No
2	600	43	59	60	76	No	No	No
8	1000	24	38	45	70	No	No	No

1. As noted in Table 9 engineered fill delivery to the Centennial Site would occur between the hours of 6 am and 10 pm. As a result, the nighttime criteria are utilized for the assessment of potential noise impacts for this activity.  
 Source: FHWA TNM 2.5 through SoundPlan Version 8.2

The Table 16-B modelling results indicate that noise generated by deliveries of fill material to the Centennial Site during nighttime hours would be well below the nighttime noise criteria at the nearest sensitive receptors. As a result, this impact is considered ***less than significant***.

**Brunswick Site Engineered Fill Delivery and Placement Activities**

As indicated in Figure 3, there are multiple sensitive receptors located around the perimeter of the Brunswick site. The distances from those receptors to the nearest onsite engineered fill placement area range from 400 to 1,800 feet. Based on maximum and average construction noise levels of 85 dBA L<sub>max</sub> and 85 dBA L<sub>eq</sub> at a reference distance of 50 feet, average and maximum noise levels were computed at the nearest receptors to the Brunswick Industrial site. Table 17 shows the predicted noise levels at each representative receptor.

Receptor	Minimum Distance	Predicted Noise Level		Daytime <sup>1</sup> Noise Criteria <sup>2</sup>		Criteria Exceeded?		Impact?
		Leq	Lmax	Leq	Lmax	Leq	Lmax	
15	1400	45	45	55	75	no	no	no
16	1600	46	46	53	75	no	no	no
17	2000	40	40	61	75	no	no	no
18	1600	47	47	55	74	no	no	no
19	1300	40	40	55	74	no	no	no
20	1000	46	46	62	75	no	no	no
21	700	47	47	60	75	no	no	no
22	500	52	52	61	75	no	no	no
23	400	55	55	63	75	no	no	no
24	350	50	50	65	80	no	no	no
25	650	50	50	65	75	no	no	no
26	300	51	51	55	69	No	no	no
27	600	46	46	55	69	no	no	no
28	500	47	47	55	69	no	no	no
29	1200	40	40	55	69	no	no	no
30	1800	32	32	55	69	no	no	no

1. As noted in Table 9, engineered fill transport, placement, grading and compaction activities would be limited to daytime hours. As a result, only the daytime criteria are utilized for the assessment of potential noise impacts for this activity.  
Source: Bollard Acoustical Consultants, Inc. (BAC)

The Table 17 data indicate that the transport, placement, grading and compaction of engineered fill at the Brunswick Industrial site would generate noise levels below the project’s standards of significance at each of the nearest sensitive receptor locations. As a result, this impact is considered ***less than significant***.

**Impact Evaluation 4: Mineral Processing**

As noted in the project description section, the project processing equipment located within the processing building will consist of the SAG mill (primary grinding), ball mill (secondary grinding), concentrator, cyclones and screens, and filter presses. Using information provided by the project applicant for similar facilities, the noise generation of this equipment is predicted to be 105 dBA Leq within the Mill Building with maximum noise levels of approximately 110 dBA Lmax.

The processing and dewatering equipment will be located within engineered, insulated metal buildings. As noted previously, the sound transmission loss of the proposed metal buildings range from 31 dB at 125 hertz to 75 dB at 4,000 hertz. In addition, the metal building housing the processing equipment will have double doors (airlock) to prevent sound escaping when one set of exterior doors are open. The reference noise level data for both the noise source and building enclosure were used as inputs to the SoundPlan model to project mill building operations to the nearest receptors. The results of those calculations are provided in Table 18. Because these

processes will occur 24/7, the most restrictive noise criteria (nighttime) were applied to this impact evaluation.

Receptor	Minimum Distance	Predicted Noise Level		Nighttime <sup>1</sup> Noise Criteria <sup>2</sup>		Criteria Exceeded?		Impact?
		Leq	Lmax	Leq	Lmax	Leq	Lmax	
15	1000	25	30	45	70	no	no	no
16	800	32	37	45	67	no	no	no
17	1000	25	30	61	75	no	no	no
18	800	33	38	58	72	no	no	no
19	650	32	37	51	70	no	no	no
20	500	36	41	55	73	no	no	no
21	700	30	35	53	71	no	no	no
22	1100	25	30	53	72	no	no	no
23	1600	21	26	56	74	no	no	no
24	2200	22	27	58	76	no	no	no
25	2850	24	29	57	76	no	no	no
26	2500	25	30	45	60	no	no	no
27	2300	24	29	45	60	no	no	no
28	2000	24	29	45	60	no	no	no
29	2350	24	29	45	60	no	no	no
30	2700	21	26	45	60	no	no	no

1. As noted in Table 9, processing operations would occur 24-hours per day. As a result, the most restrictive nighttime criteria were utilized for the assessment of potential noise impacts for this activity.  
Source: Bollard Acoustical Consultants, Inc. (BAC)

The Table 18 data indicate that the mineral processing operations are predicted to generate noise levels below the project’s nighttime standards of significance at each of the nearest sensitive receptor locations. As a result, this impact is considered ***less than significant***.

**Impact Evaluation 5: Shaft Ventilation Fan Noise**

As noted in the project description, a surface ventilation fan will be used to ventilate the shaft until the service shaft is complete and the permanent underground ventilation fan can be installed. Aboveground facilities necessary to support pumping of fresh air underground include a primary ventilation fan and duct work. The primary ventilation fan will have housing on its sides and a silencer to reduce noise levels. The front of the ventilation fan will have a vent connected to duct work that will carry air underground. In addition, secondary fans will be installed underground to promote air circulation. The ventilation system will be electric.

The sound level generated by the ventilation fans depends primarily on the fan input power and type. The shaft ventilation fan proposed for use at the Brunswick site will be centrifugal type rated at 275 hp (205 kW). At a distance of 5 feet, the sound pressure level (SPL) as a function of fan power (kW) is approximated by:

$$SPL = 90 + 10 \times \text{Log}(\text{fan kW})^1$$

Based on the fan power rating and the above formula, the sound pressure level for the proposed ventilation fan computes to 113 dBA at a distance of 5 feet. This reference noise level was projected to the nearest representative receptors to the Brunswick site, including the effects of a silencer providing comparable sound attenuation as the other industrial buildings proposed at the site. The results of those calculations are provided in Table 19. Because the fan will operate continuously, the most restrictive noise criteria (nighttime) were applied to this impact evaluation. Due to the steady-state nature of the fan operations, maximum noise levels are predicted to be equivalent to average sound levels for this fan. It should be noted that custom silencer which will be fabricated for the temporary surface ventilation fan can be engineered to provide the required degree of sound attenuation as well as oriented with the fan inlet facing away from the nearest receptors.

<b>Table 19</b> <b>Predicted Ventilation Fan Noise Levels at Nearest Receptors</b> <b>Idaho Maryland Mine – Nevada County, CA</b>								
Receptor	Distance	Predicted Noise Level		Nighttime <sup>1</sup> Noise Criteria <sup>2</sup>		Criteria Exceeded?		Impact?
		Leq	Lmax	Leq	Lmax	Leq	Lmax	
15	650	24	24	45	70	no	no	no
16	600	29	29	45	67	no	no	no
17	800	23	23	62	76	no	no	no
18	600	31	31	58	72	no	no	no
19	950	23	23	51	70	no	no	no
20	950	25	25	55	73	no	no	no
21	1400	20	20	53	71	no	no	no
22	1850	15	15	53	72	no	no	no
23	2350	15	15	56	74	no	no	no
24	2950	12	12	58	76	no	no	no
25	3450	14	14	57	76	no	no	no
26	3100	15	15	45	60	no	no	no
27	2700	13	13	45	60	no	no	no
28	2300	14	14	45	60	no	no	no
29	2300	15	15	45	60	no	no	no
30	2600	13	13	45	60	no	no	no

1. As noted in Table 9, processing operations would occur 24-hours per day. As a result, the most restrictive nighttime criteria were utilized for the assessment of potential noise impacts for this activity.  
 Source: Bollard Acoustical Consultants, Inc. (BAC)

<sup>1</sup> Howes, M.J. "Ventilation and Cooling Design for Long Declines (Auxiliary Fans)." Proceedings of the 8<sup>th</sup> International Mine Ventilation Congress, AusIMM, Brisbane, QLD, Australia, 2005.

The Table 19 data indicate that the shaft ventilation fan is predicted to generate noise levels below the project's nighttime standards of significance at each of the nearest sensitive receptor locations. As a result, this impact is considered ***less than significant***.

### **Impact Evaluation 6: Exterior Pumps**

Several tanks are located outside adjacent to process plant buildings. The tanks are shielded by the 65 ft high process plant building to the northeast and by the 25 ft high addition building to the northwest. The clean and process water tanks would have electric centrifugal pumps located at the bottom of the tanks. The thickener tank and paste filter feed tanks would have peristaltic hose pumps mounted on the bottom of the tanks. The cement silo would transfer cement into the plant with a mechanical auger. The thickener tank would have a rotating rake and the paste filter feed tank would have a rotating impeller, both of which are within the fluid of the tank.

The equipment used in the outside tanks are reportedly very low noise emissions. The horsepower of the exterior pumps will range from 15-30 hp. Based on this range of pump horsepower, combined pump noise levels are predicted to be 65 dBA at a reference distance of 50 feet. The nearest receptor to the exterior pump area is receptor 20, located 550 feet to the east. At that distance, pump noise would be reduced to 44 dBA by distance alone. After accounting for ground attenuation and vegetation, as well as shielding provided by the intervening 25-foot high process building, pump noise levels at the nearest receptors are predicted to be approximately 26 dBA. Because the predicted pump noise levels are well below even the most restrictive nighttime noise criteria at the nearest receptors this impact is considered ***less than significant***.

### **Impact Evaluation 7: Water Treatment Plant**

The project proposes a water treatment plant at the location indicated on Figure 6. The primary noise source associated with the water treatment plant will be the pumps and turbine aerator. The aerator is located inside the building. Several pumps are located outside adjacent to the building and at the pump platform on the water treatment pond. The distance from the water treatment plant and the nearest residence (receptor 20) is approximately 900 feet.

Noise level measurements conducted by BAC at the Auburn California wastewater treatment plant indicate that average noise levels of approximately 50 dBA were recorded at a distance of 500 feet from the plant. That noise was generated primarily by pumps and the aeration system. As noted above, however, the aeration system will be located inside a building providing a high degree of sound reduction. Using the SoundPlan model with an assumed interior noise level of 75 dBA within the treatment plant building and the previously described noise attenuation provided by the building, water treatment plant noise was predicted to be approximately 28 dBA or less at the nearest receptors. This predicted level is well below the daytime, evening, and nighttime thresholds of 62, 60, and 55 dB  $L_{eq}$  applicable at the nearest residences. As a result, this impact is considered to be ***less than significant***.

### Impact Evaluation 8: Backup Generators

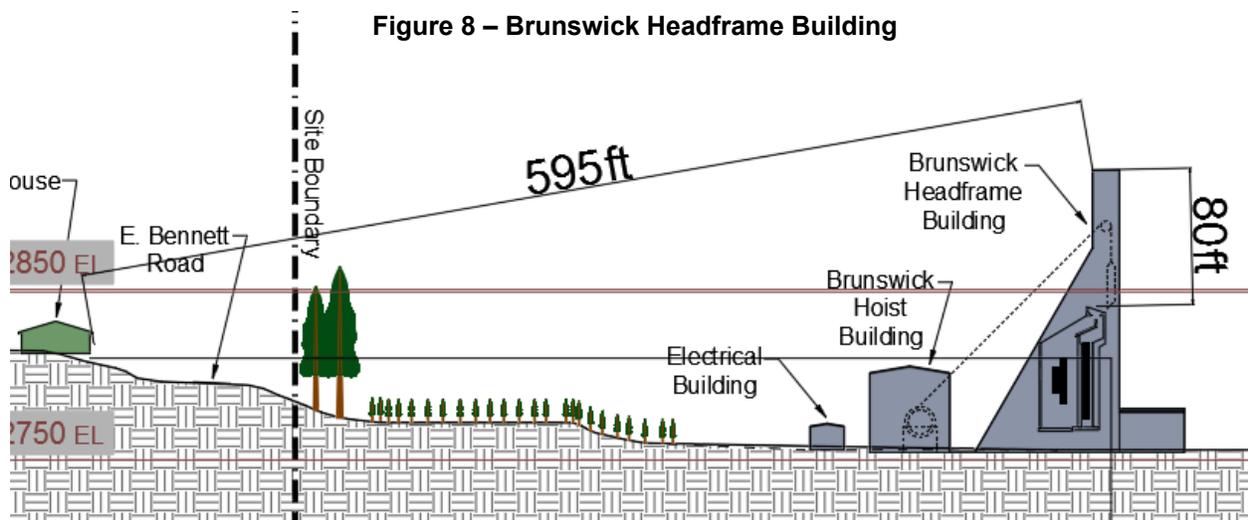
The project proposes to have four diesel generators inside of a building adjacent to the water treatment plant. The generators would be used for power generation during interruptions to line power from PG&E, which is expected to occur infrequently. Noise level data for similar generators indicate that the generators would produce a combined sound pressure level of approximately 105 dBA within the generator building. Due to the substantial noise attenuation provided by the proposed industrial building which will house the generators, the noise levels predicted using the SoundPlan model at the nearest residences are predicted to be below 25 dBA  $L_{eq}$ . Because the predicted generator noise levels are well below the applicable day, evening and nighttime noise standards, this impact is considered ***less than significant***.

### Impact Evaluation 9: Mine Compressor

The mine air compressor would be located inside a building adjacent to the Brunswick Shaft and have a rated capacity of 4,000 cfm at 800 hp. The noise generation of this compressor is estimated to be approximately 110 dBA at a reference distance of 3 feet. This reference level assumes no manufacturer acoustical casing or other noise control, which would reduce this level. Assuming an overall interior noise level of 105 dB within the compressor building, the SoundPlan model predicts average noise levels of less than 35 dBA at the nearest sensitive receptors (receptor 18). Because the predicted compressor sound levels would satisfy the nighttime noise level criteria at the nearest receptors, this impact is considered ***less than significant***.

### Impact Evaluation 10: Brunswick Shaft Skipping

Rock would be hoisted up the Brunswick shaft in skips and dropped into the concrete silo. The headframe and headframe building cladding surrounds shaft silo. The top of the headframe building at is approximately 165 ft above ground is open and skips would drop rock into the silo chute at a height of approximately 85 feet above ground. As a result, the headframe building is predicted to substantially reduce noise generated by the shaft skipping operations at the nearest residences. The orientation of the Brunswick shaft headframe relative to the nearest residence is illustrated in Figure 8 below.



Rock hoisted into the headframe building will drop approximately 2 feet onto a steel chute located within the concrete sleeve of the silo where it will slide until falling onto the surge pile of rock. The falling rock is predicted to generate a maximum noise level of approximately 120 dBA within the headframe building. Shielding provided by the concrete sleeve of the silo and the headframe building itself is predicted to reduce maximum noise levels substantially. At the nearest residence located 595 feet to the north (receptor 16), the SoundPlan model predicts a maximum noise level of less than 50 dBA  $L_{max}$ . The nighttime noise level criteria applicable at this receptor is 67 dBA  $L_{max}$ . Because the maximum noise generation of the shaft skipping operations would be below that maximum noise level, this impact is considered ***less than significant***.

### Impact Evaluation 11: Parking Lot Noise

During the busiest shift change (7 am), approximately 107 employee vehicles are forecast to arrive at the site and 67 employee vehicles would depart the site for a total of 174 parking lot movements. As a means of determining noise generation related to parking lot activities, a series of individual noise measurements were conducted of multiple vehicle types arriving and departing a typical parking area, including engines starting and stopping, car doors opening and closing, and persons conversing as they entered and exited the vehicles. The results of those measurements revealed that individual parking lot movements generated mean sound exposure levels of 70 dB SEL at a reference distance of 50 feet. The maximum noise level associated with parking lot activity typically did not exceed 65 dB  $L_{max}$  at the same reference distance. Parking area noise exposure was determined using the following equation:

$$Peak\ Hour\ L_{eq} = 70 + 10 * \log(N) - 35.6$$

Where 70 is the SEL for a single automobile parking operation at a reference distance of 50 feet, N is the number of parking area operations in a peak hour (174), and 35.6 is 10 times the logarithm of the number of seconds in an hour. The resulting parking lot noise level at a reference distance of 50 feet computes to 57 dBA  $L_{eq}$  and 65 dB  $L_{max}$ .

The nearest receptor to the parking area is located approximately 300 feet to the east (between receptors 22 and 23). At this distance, parking lot generated noise computes to 41 dBA  $L_{eq}$  and 49 dBA  $L_{max}$ . The nighttime noise level criteria applicable at this receptor is 53 dB  $L_{eq}$  and 72 dBA  $L_{max}$ . Because the average and maximum noise generation of the employee parking lot activities would be below those average and maximum noise criteria, this impact is considered ***less than significant***.

## Evaluation of Aircraft Noise Impacts

### Impact Evaluation 12: Aircraft Noise Impacts upon the Project

Because the project does not proposed the development of noise-sensitive land uses assessing aircraft noise impacts for this project may not be required. Nonetheless, Figure 5 shows that both the Brunswick and Centennial sites are located outside of the future 55 dB CNEL noise contour for the Nevada County Airport. This level is well below the County's 75 dB CNEL level considered normally acceptable for industrial uses. As a result, the project site and the proposed operations

will not be adversely affected by aircraft noise and this impact is **considered less than significant**.

## Evaluation of Blasting Noise Impacts

### Impact Evaluation 13: Blasting

A blasting analysis was prepared for this project by IDC-PBS. That study, which is incorporated by reference, focused primarily on assessing vibration impacts associated with project blasting activities. That analysis concluded that vibration impacts associated with underground blasting activities at the project site would be negligible, and in almost all situations will be unnoticeable and undetectable. The IDC-PBS study did not, however, assess noise impacts related to project blasting.

To assess the potential for noise impacts associated with project blasting activities, BAC utilized long-term blasting noise level data collected by BAC over the course of 30 days of operations at the Sutter Gold underground gold mine in Amador County, California in 2013. During that survey, noise monitoring was conducted at 5 locations concurrently with the nearest being 220 feet from the main mine portal. Over the course of the survey, 62 blasting events were captured at that nearest location. The average noise level computed from the 62 blast events was 75 dBA  $L_{max}$  at the location 200 feet from the mine portal.

There will be two entrances to the vertical mine shafts at the Brunswick site. The main shaft is at the northern portion of the site approximately 550 feet from the nearest receptor (receptor 16). The service shaft is located more centrally at the Brunswick site approximately 1,000 feet from the nearest receptor (receptor 21). Because the Idaho Maryland Mine (IMM) is a vertical shaft mine whereas the portal to the Sutter Gold mine where the noise monitoring was performed was accessed via a horizontal portal, and because the IMM portals are smaller than the Sutter Gold portal, blasting noise levels at the IMM are expected to be considerably lower than those measured at the Sutter Gold site. The difference in maximum noise levels at the two sites is estimated to be at least 20 dB.

If the 75 dBA  $L_{max}$  level collected at Sutter Gold is conservatively reduced by 20 dB to assess blasting noise impacts at the Brunswick site, worst-case maximum noise levels at the nearest receptors would range from 52 to 57 dBA  $L_{max}$  on average. This range of predicted worst-case blasting noise levels of 52-57 dBA  $L_{max}$  are below the daytime 75 dBA  $L_{max}$  criteria at the nearest receptors, as well as below the evening and nighttime noise criteria.

Although the blasting report prepared by IDC-PBS was not tasked with predicting blasting related noise levels on the surface, page 27 of the report states the following:

“Air overpressure is caused by numerous factors including the explosive detonation, movement, and collapse of a mine face which are in open air. In underground mining, especially the type proposed at the Idaho-Maryland Mine, there would be no air overpressure produced on the surface. The blast would not cause this pressure wave to

form or an audible sound produced. ***The air overpressure from the underground blasting at the proposed mine would be zero.***

In light of the blasting report's conclusions regarding air overpressures and audible sound at the mine surface, and the considerably more conservative use of data collected the Sutter Gold site, this impact is considered ***less than significant***.

## Evaluation of Project Vibration Impacts

### Impact Evaluation 14: Construction Vibration Impacts

Table 20 shows reference peak particle velocity (PPV) and VdB (rms) vibration levels for the types of heavy earthmoving equipment which will be utilized for the project. The Table 20 data is provided in terms of both peak particle velocity and VdB at a reference distance of 25 feet.

<b>Source</b>	<b>Peak Particle Velocity (PPV) inches/second</b>	<b>RMS Velocity in Decibels (VdB)</b>
Water Trucks	0.001	57
Scraper	0.002	58
Bulldozer - Small	0.003	58
Backhoe	0.051	82
Excavator	0.051	82
Grader	0.051	82
Loader	0.051	82
Loaded Trucks	0.076	86
Bulldozer - Large	0.089	87

Source: FTA and FHWA

The nearest receptor to either the Centennial or Brunswick site is approximately 350 feet from the locations where the most significant vibration would be generated. To project the vibration levels from the reference distance of 25 feet shown in Table 20 to the nearest receptor, the following formula is applied:

$$PPV = PPV_{ref} * (25 / D)^n \text{ (inches/second)}$$

Where:

- PPV = Desired vibration level at receptor located D feet from the vibration source
- D = Distance from vibration source to sensitive receptor (feet)
- n = Vibration attenuation rate through ground.

According to Chapter 12 of the Federal Transit Administration (FTA) Transit Noise and Vibration Impact Assessment (Federal Transit Administration, 2006) manual, an “n” value of 1.5 is recommended to calculate vibration propagation through typical soil conditions.

Using the formula provided above, the vibration level at the nearest sensitive receptor located 350 feet from the project area vibration generation computes to 0.002 inches/second ppv, or approximately 58 VdB.

In addition to vibration generated by on-site sources, vibration would be generated by off-site heavy truck traffic transporting engineered fill material to the Centennial Site. Table 3 indicates that measured typical vibration levels along the local roadway network, which included passages of heavy trucks, ranged from 34 to 57 VdB. These levels are below the thresholds for both annoyance and damage to structures and included heavy truck passbys. As a result, project heavy truck passbys are not anticipated to generate higher vibration levels than currently experiences during existing truck passbys.

Because both the on-site and off-site vibration levels are below the FTA thresholds for both human annoyance and damage to structures, this impact is considered ***less than significant***.

# Cumulative Noise Impacts from all Sources

## Impact Evaluation 15: Cumulative Noise From all Sources

The extent by which noise sources related to project operations will combine to result in higher noise levels than those predicted for the noise sources individually depends on the relative locations of the noise sources and their individual magnitude. For example, due to the considerable distance and topographic shielding between the Centennial and Brunswick sites, noise sources present at one site would not result in any additive change in the noise environment at the other site. However, at the Brunswick site there are several noise sources which, when combined, would result in higher noise levels at the nearest receptors than the individual sources alone.

To predict cumulative project noise exposure, noise contours were developed for both daytime and nighttime periods using the SoundPlan model. Each of the aforementioned individual noise sources were included in the combined SoundPlan model runs. The noise contours for daytime and nighttime periods are provided in Figures 9 and 10, respectively. Tables 21 and 22 provide the computed daytime and nighttime cumulative noise exposure from all sources which would be in operation during those hours and a comparison of that exposure to the applicable noise criteria at each receptor.

Examination of the Table 21 and 22 data, as well as the Figure 9 and 10 contours, indicates that the cumulative project noise exposure is predicted to be below both the daytime and nighttime noise criteria at the nearest receptors. As a result, no cumulative project noise impacts are anticipated for this project. Nonetheless, because the project will include multiple processes which generated noise, and because compliance with the Nevada County noise standards is required, the following specific measures are recommended to ensure satisfaction with those standards and to reduce the potential for annoyance resulting from the proposed project.

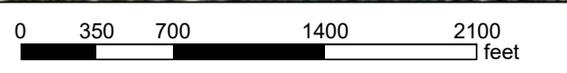
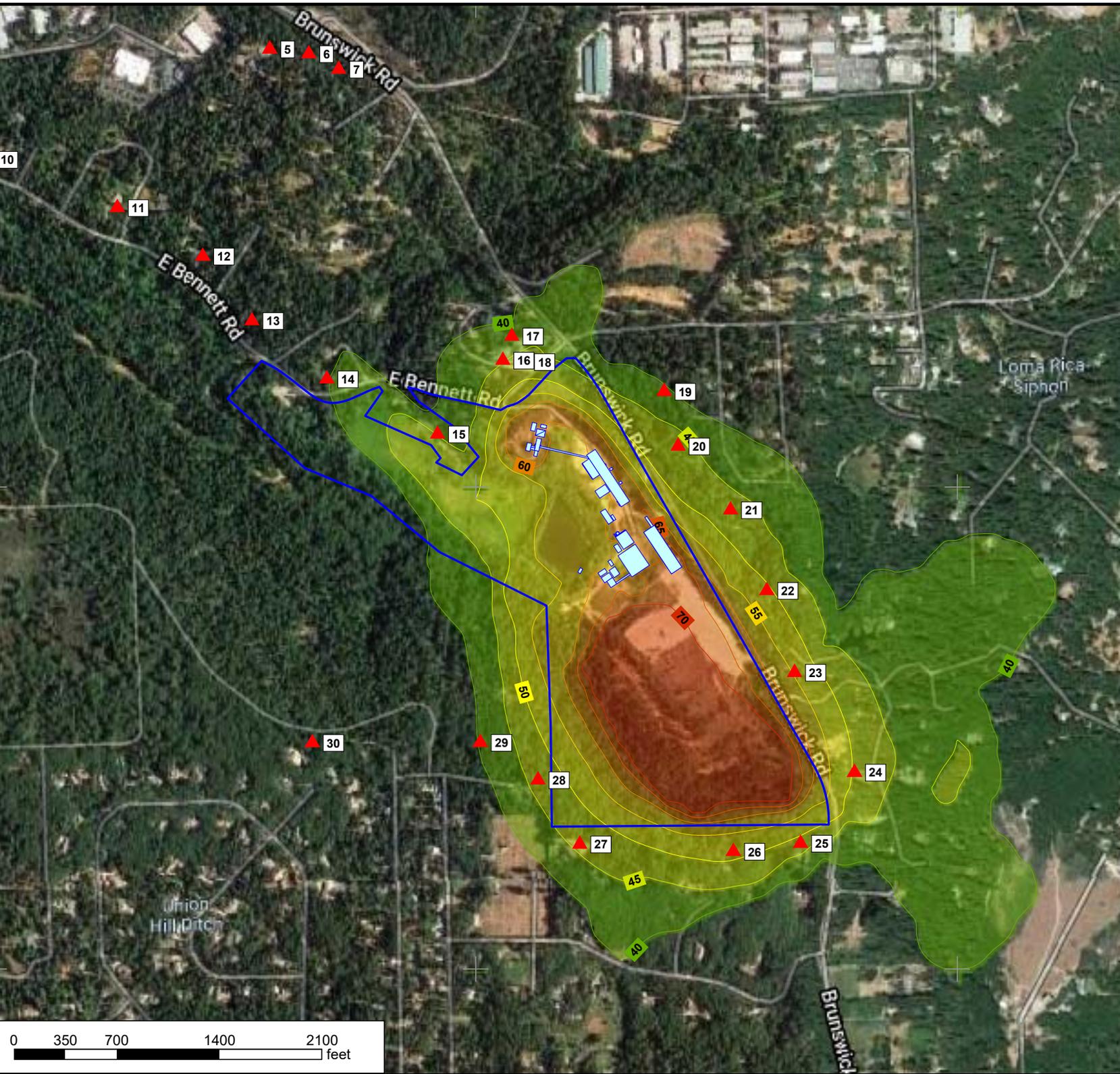
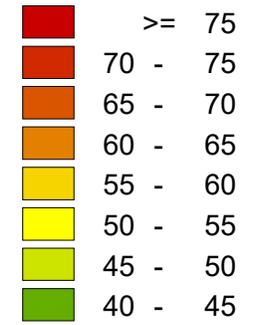
### Recommended Mitigation Measures:

1. All on-site mobile equipment shall be fitted with broad-band “growler” type back-up warning devices rather than the conventional “beeper” devices which are tonal in nature and frequently cited as a source of annoyance.
2. All above ground outside project construction activities should be limited to daytime hours.
3. A comprehensive noise survey should be conducted of each facet of the operation to both verify the modelling assumptions of this analysis and to ensure that compliance with the applicable Nevada County noise standards is being achieved at the nearby sensitive receptors. If the survey results indicate that the County noise standards are being exceeded either by individual equipment or processes, or cumulative noise generation of the entire facility, operations should cease until additional engineering controls can be implemented as needed. Such measures could take the form of noise barriers, installation of sound absorbing materials, use of additional silencers, etc.

**Figure 9**  
**Idaho Maryland Mine**  
**Daytime Leq**

**Cumulative Operation  
of All Equipment  
& Processes**

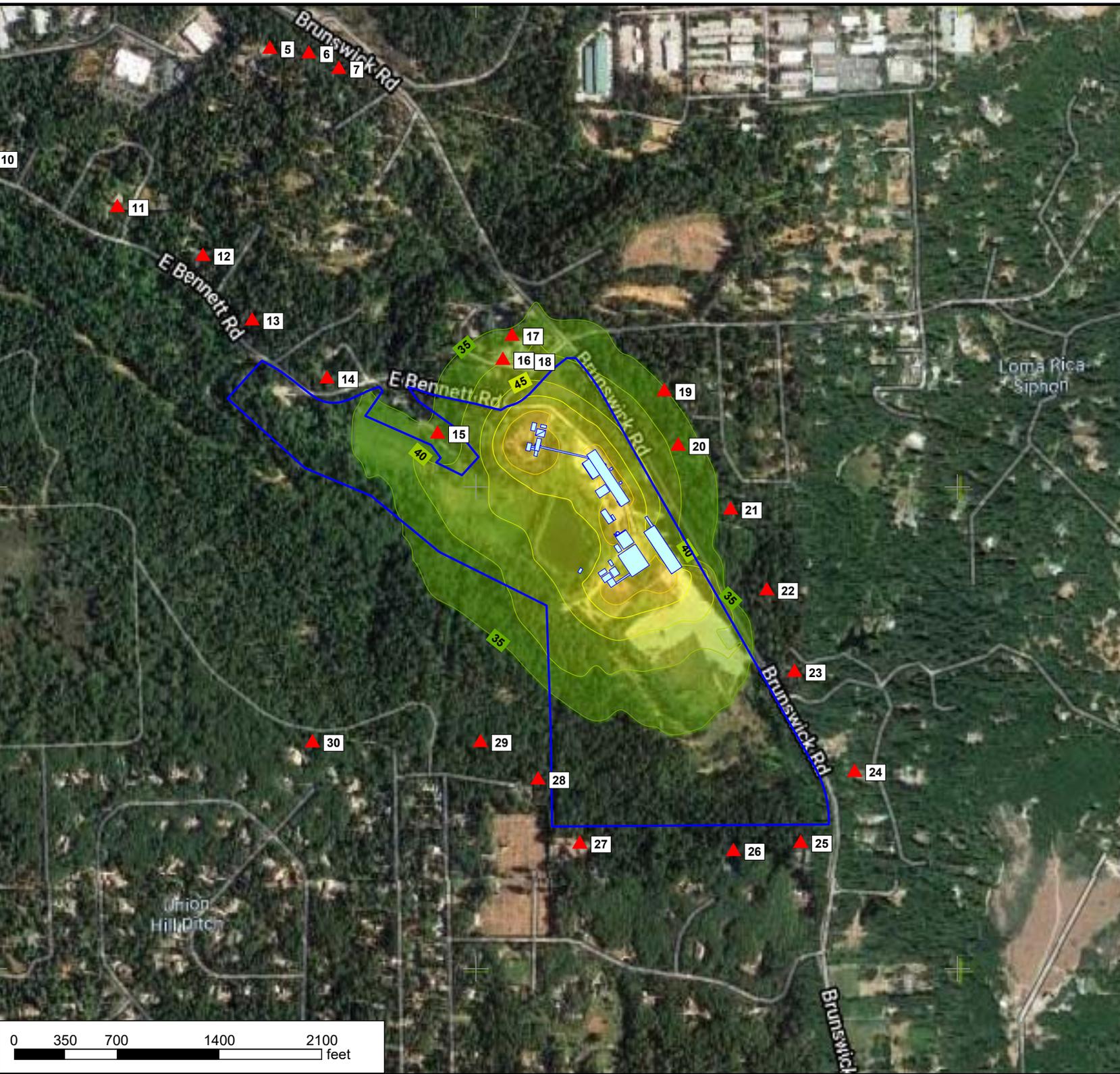
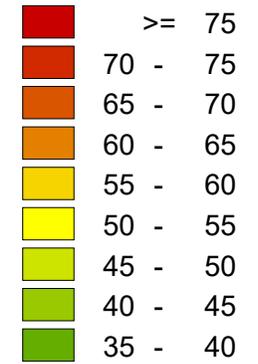
Daytime Average  
Noise level  
(Leq, dBA)



**Figure 10**  
**Idaho Maryland Mine**  
**Nighttime Leq**

**Cumulative Operation**  
**of All Equipment**  
**and Processes**  
**Except Engineered**  
**Fill Placement**  
**& Trucks**

Nighttime Average  
 Noise level  
 (Leq, dBA)



**Table 21  
 Predicted Cumulative Noise Levels from All Daytime Sources at Nearest Receptors  
 Idaho Maryland Mine – Nevada County, CA**

Receptor	Project Daytime Noise Generation		Daytime Noise Criteria		Criteria Exceeded?		Impact?
	Leq	Lmax	Leq	Lmax	Leq	Lmax	
1	56	68	63	81	No	No	No
2	54	67	68	86	No	No	No
3	39	46	66	87	No	No	No
4	37	43	60	75	No	No	No
5	29	34	54	71	No	No	No
6	29	34	55	72	No	No	No
7	29	33	54	71	No	No	No
8	38	48	55	75	No	No	No
9	35	41	53	71	No	No	No
10	34	40	52	71	No	No	No
11	34	42	52	72	No	No	No
12	33	41	54	74	No	No	No
13	34	43	55	75	No	No	No
14	41	48	55	75	No	No	No
15	44	55	55	75	No	No	No
16	45	51	53	75	No	No	No
17	43	49	61	75	No	No	No
18	47	53	55	74	No	No	No
19	41	50	55	74	No	No	No
20	47	55	62	75	No	No	No
21	47	58	60	75	No	No	No
22	51	62	61	75	No	No	No
23	55	67	63	75	No	No	No
24	50	66	65	80	No	No	No
25	49	67	65	75	No	No	No
26	51	68	55	69	No	No	No
27	46	57	55	69	No	No	No
28	46	57	55	69	No	No	No
29	40	50	55	69	No	No	No
30	34	39	55	69	No	No	No

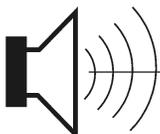
Source: Bollard Acoustical Consultants, Inc. (BAC)

<p align="center"><b>Table 22</b>  <b>Predicted Cumulative Noise Levels from All Nighttime Sources at Nearest Receptors</b>  <b>Idaho Maryland Mine – Nevada County, CA</b></p>							
Receptor	Project Nighttime Noise Generation		Nighttime Noise Criteria		Criteria Exceeded?		Impact?
	Leq	Lmax	Leq	Lmax	Leq	Lmax	
1	14	15	55	71	No	No	No
2	14	16	60	76	No	No	No
3	17	21	56	74	No	No	No
4	17	20	61	75	No	No	No
5	13	17	55	69	No	No	No
6	14	18	56	70	No	No	No
7	17	19	55	69	No	No	No
8	14	16	45	70	No	No	No
9	20	25	44	60	No	No	No
10	19	25	42	60	No	No	No
11	20	26	42	60	No	No	No
12	18	20	44	67	No	No	No
13	22	28	45	69	No	No	No
14	31	39	45	69	No	No	No
15	36	45	45	70	No	No	No
16	40	48	45	67	No	No	No
17	36	45	62	76	No	No	No
18	41	49	58	72	No	No	No
19	36	42	51	70	No	No	No
20	39	43	55	73	No	No	No
21	33	37	53	71	No	No	No
22	28	30	53	72	No	No	No
23	24	27	56	74	No	No	No
24	23	27	58	76	No	No	No
25	25	28	57	76	No	No	No
26	26	31	45	60	No	No	No
27	25	29	45	60	No	No	No
28	26	29	45	60	No	No	No
29	26	30	45	60	No	No	No
30	24	28	45	60	No	No	No

Source: Bollard Acoustical Consultants, Inc. (BAC)

## Appendix A Acoustical Terminology

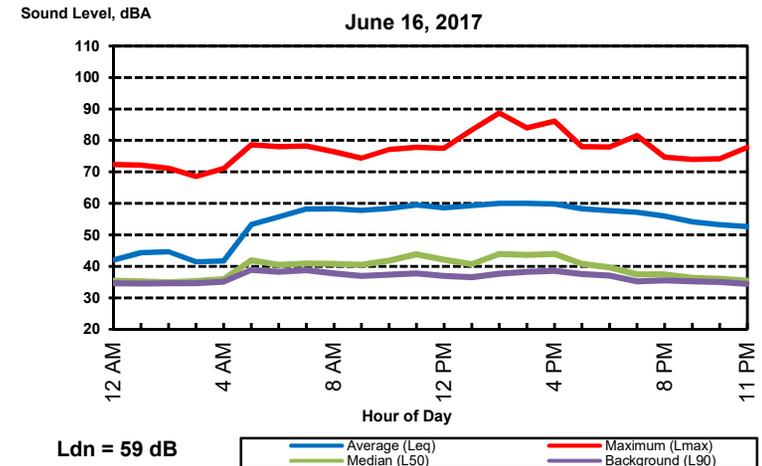
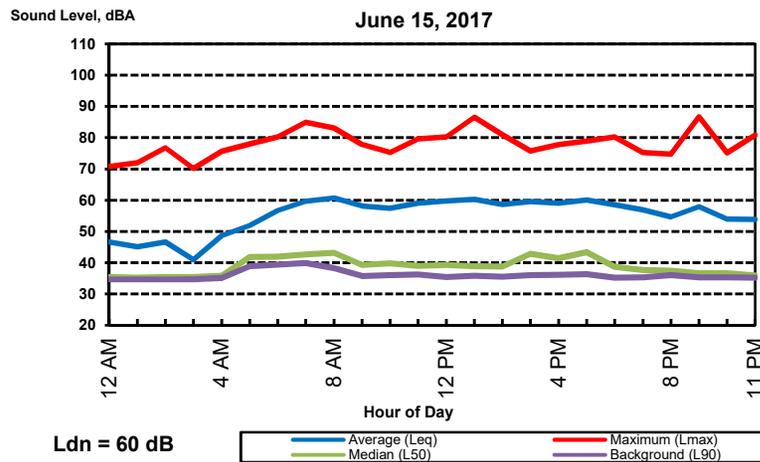
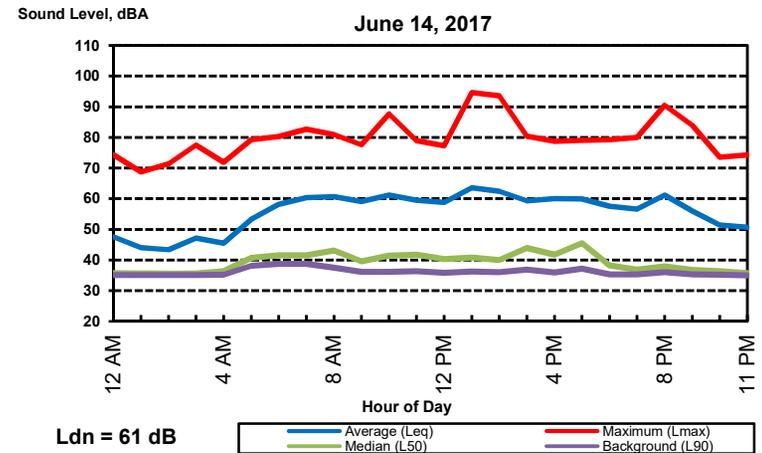
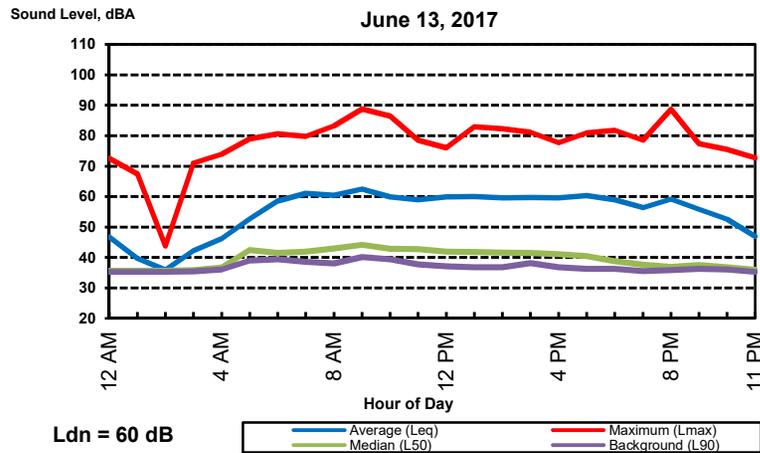
<b>Acoustics</b>	The science of sound.
<b>Ambient Noise</b>	The distinctive acoustical characteristics of a given space consisting of all noise sources audible at that location. In many cases, the term ambient is used to describe an existing or pre-project condition such as the setting in an environmental noise study.
<b>Attenuation</b>	The reduction of an acoustic signal.
<b>A-Weighting</b>	A frequency-response adjustment of a sound level meter that conditions the output signal to approximate human response.
<b>Decibel or dB</b>	Fundamental unit of sound, A Bell is defined as the logarithm of the ratio of the sound pressure squared over the reference pressure squared. A Decibel is one-tenth of a Bell.
<b>CNEL</b>	Community Noise Equivalent Level. Defined as the 24-hour average noise level with noise occurring during evening hours (7 - 10 p.m.) weighted by a factor of three and nighttime hours weighted by a factor of 10 prior to averaging.
<b>Frequency</b>	The measure of the rapidity of alterations of a periodic signal, expressed in cycles per second or hertz.
<b>L<sub>dn</sub></b>	Day/Night Average Sound Level. Similar to CNEL but with no evening weighting.
<b>Leq</b>	Equivalent or energy-averaged sound level.
<b>L<sub>max</sub></b>	The highest root-mean-square (RMS) sound level measured over a given period of time.
<b>Loudness</b>	A subjective term for the sensation of the magnitude of sound.
<b>Masking</b>	The amount (or the process) by which the threshold of audibility is for one sound is raised by the presence of another (masking) sound.
<b>Noise</b>	Unwanted sound.
<b>Peak Noise</b>	The level corresponding to the highest (not RMS) sound pressure measured over a given period of time. This term is often confused with the Maximum level, which is the highest RMS level.
<b>RT<sub>60</sub></b>	The time it takes reverberant sound to decay by 60 dB once the source has been removed.
<b>Sabin</b>	The unit of sound absorption. One square foot of material absorbing 100% of incident sound has an absorption of 1 sabin.
<b>SEL</b>	A rating, in decibels, of a discrete event, such as an aircraft flyover or train passby, that compresses the total sound energy of the event into a 1-s time period.
<b>Threshold of Hearing</b>	The lowest sound that can be perceived by the human auditory system, generally considered to be 0 dB for persons with perfect hearing.
<b>Threshold of Pain</b>	Approximately 120 dB above the threshold of hearing.



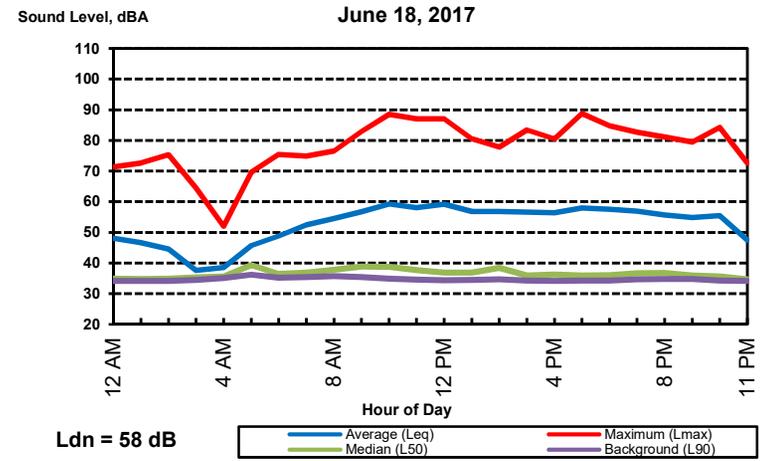
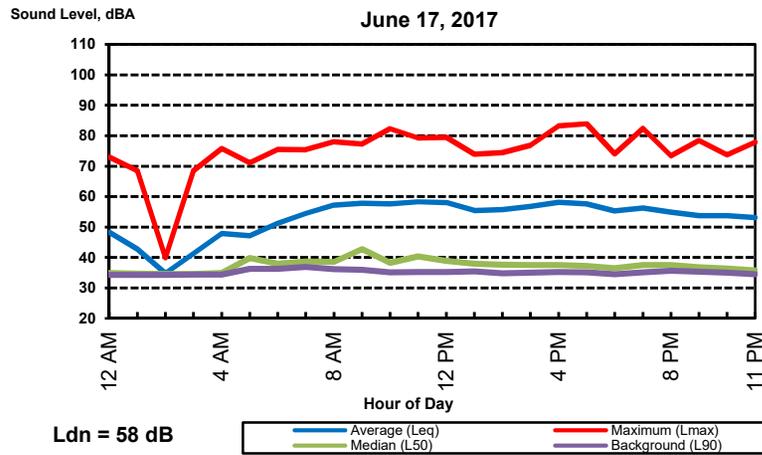
B O L L A R D

Acoustical Consultants

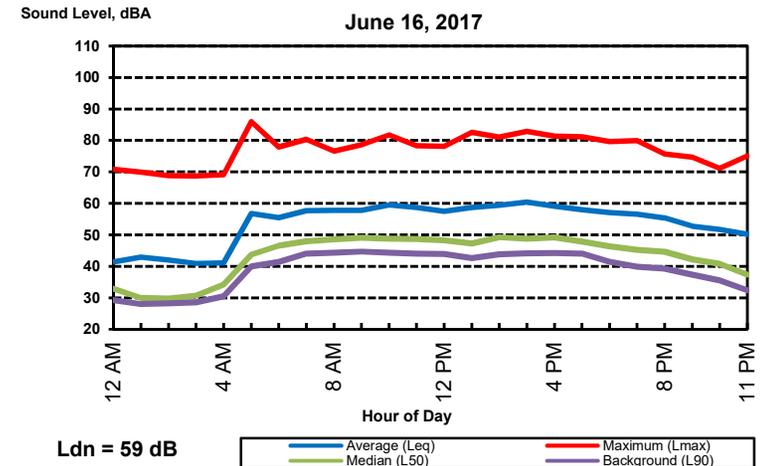
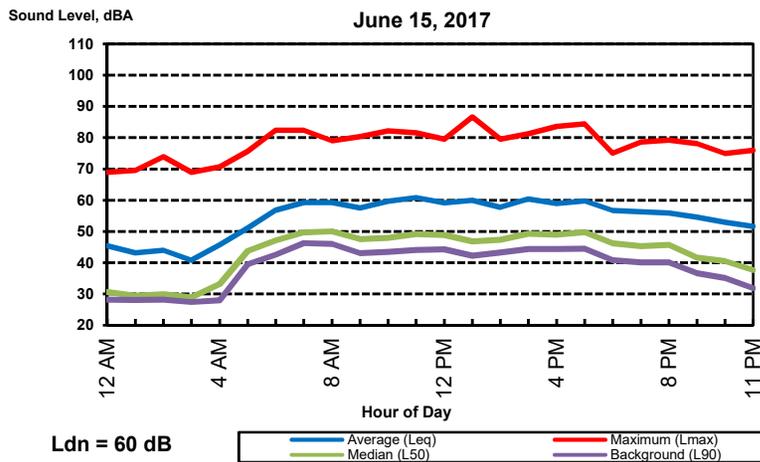
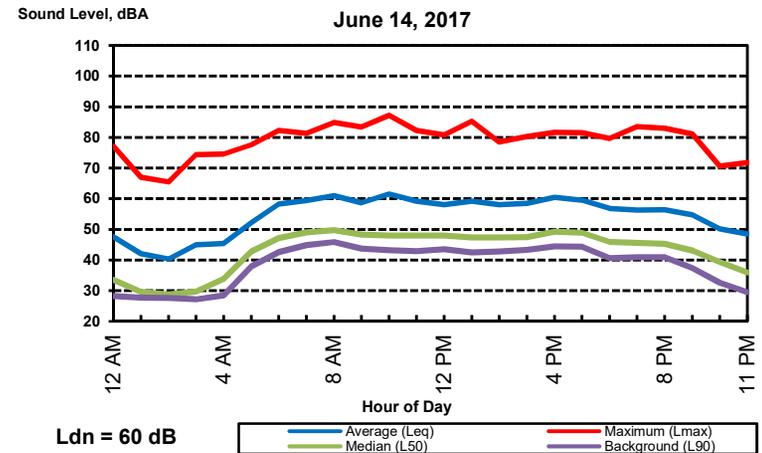
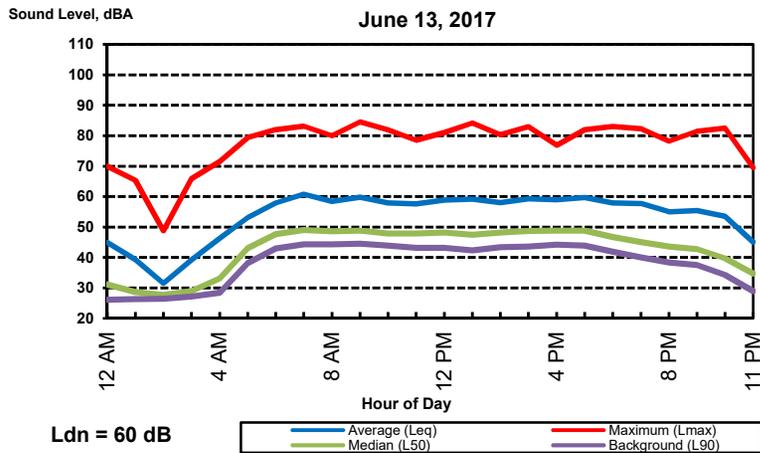
# Appendix B-1 Ambient Noise Monitoring Results Idaho Maryland Mine Project Site 1: June 13, 2017 - June 16, 2017



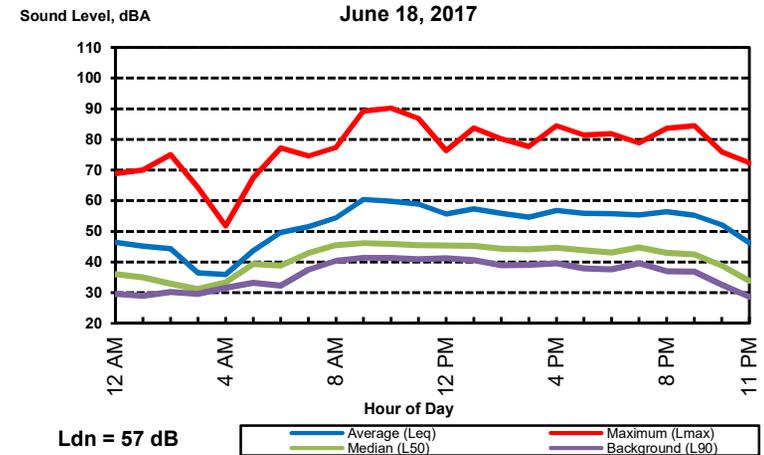
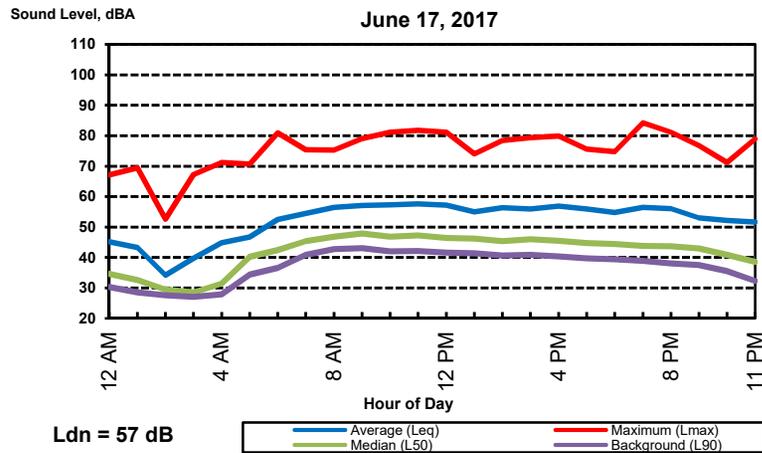
## Appendix B-2 Ambient Noise Monitoring Results Idaho Maryland Mine Project Site 1: June 17, 2017 - June 18, 2017



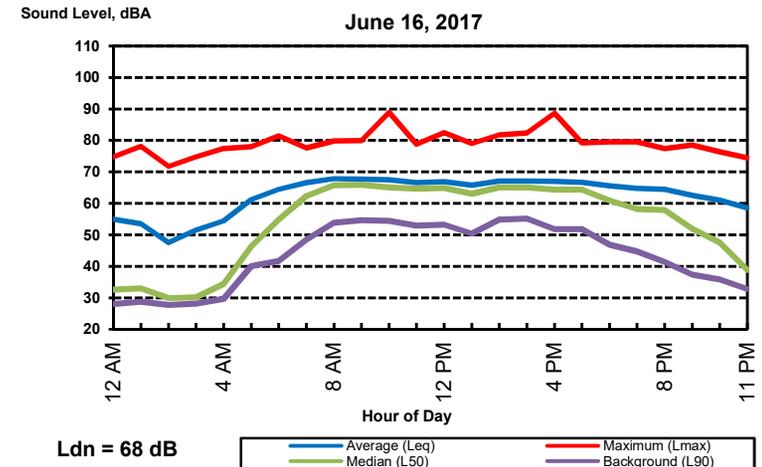
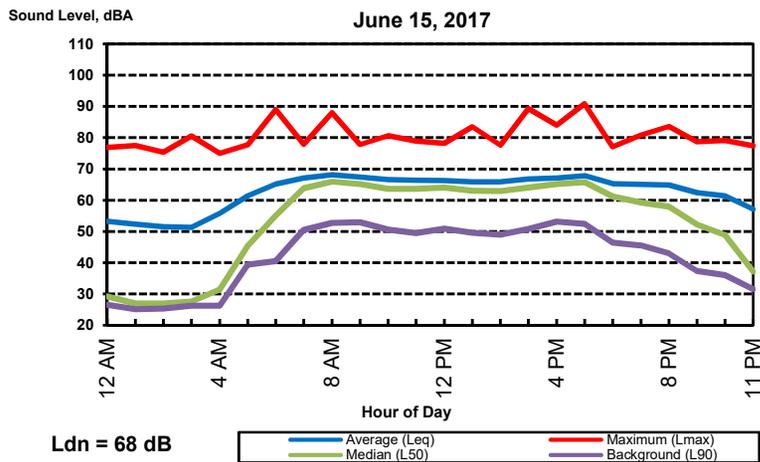
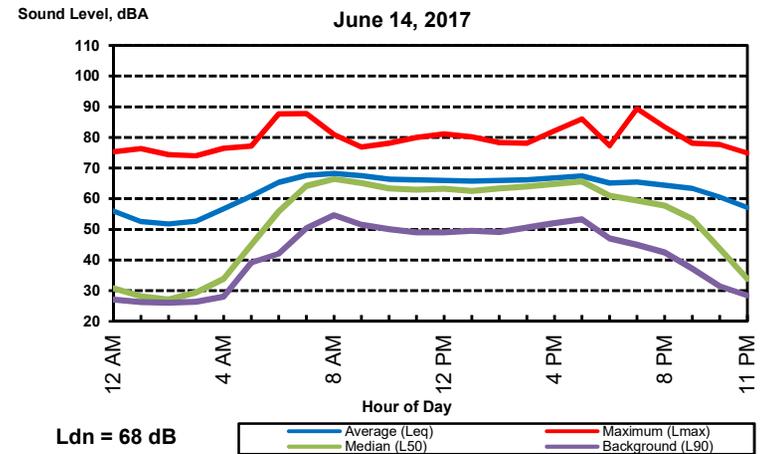
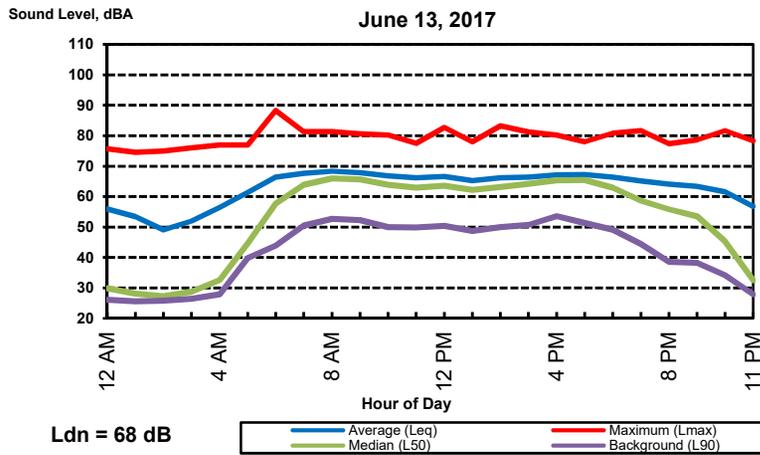
# Appendix B-3 Ambient Noise Monitoring Results Idaho Maryland Mine Project Site 2: June 13, 2017 - June 16, 2017



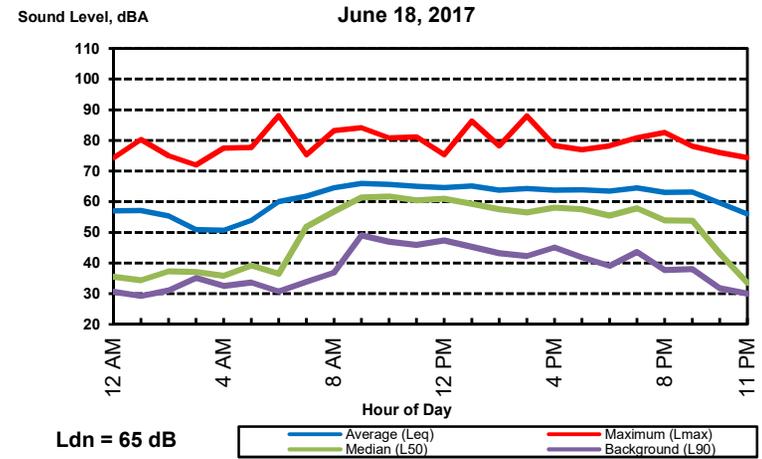
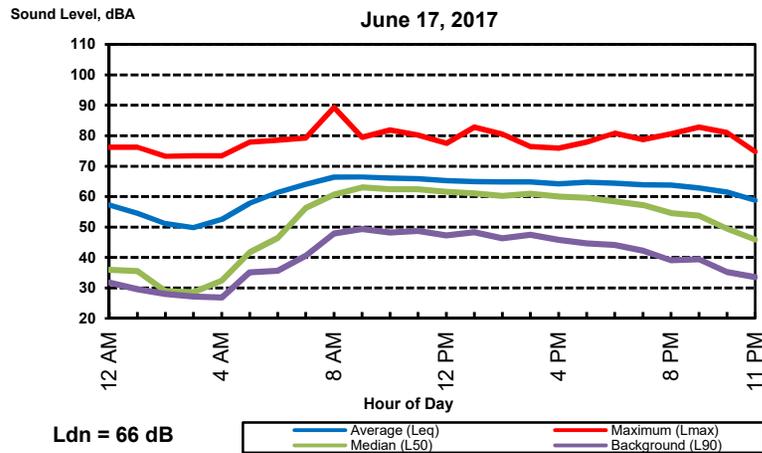
## Appendix B-4 Ambient Noise Monitoring Results Idaho Maryland Mine Project Site 2: June 17, 2017 - June 18, 2017



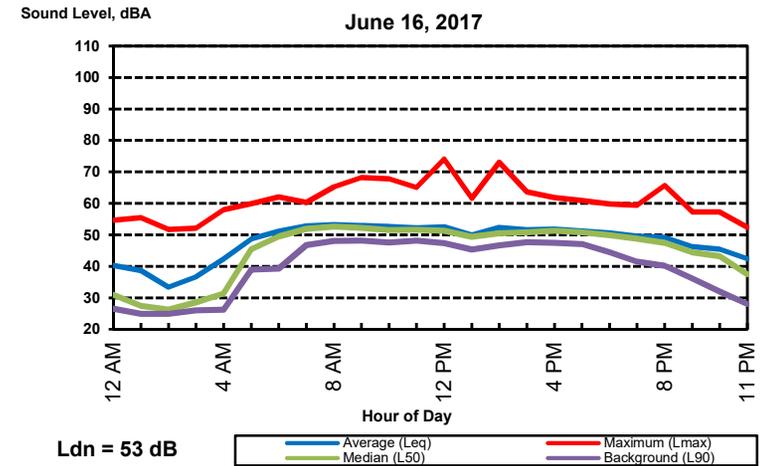
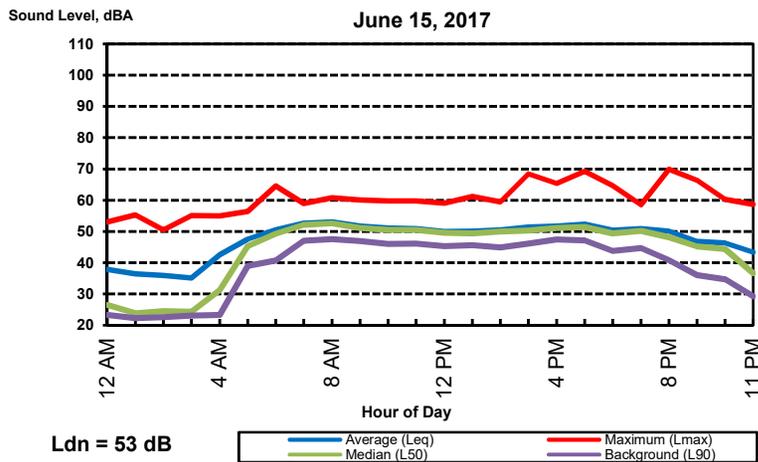
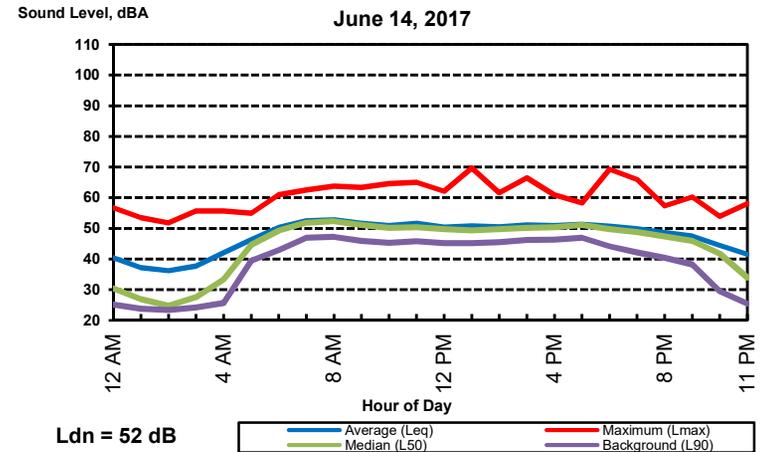
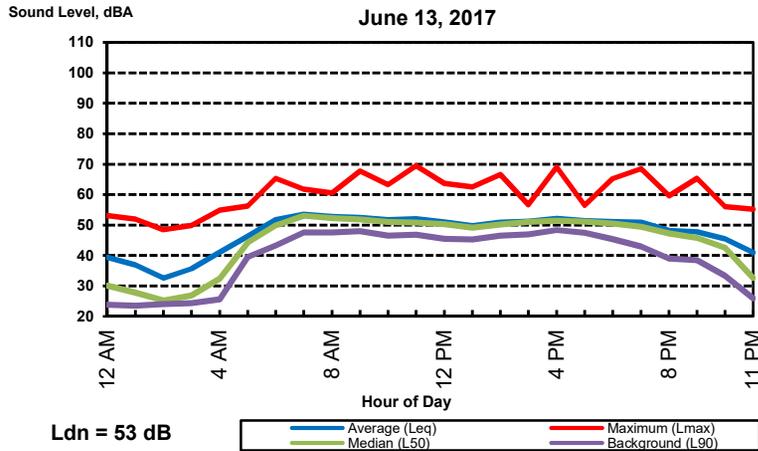
# Appendix B-5 Ambient Noise Monitoring Results Idaho Maryland Mine Project Site 3: June 13, 2017 - June 16, 2017



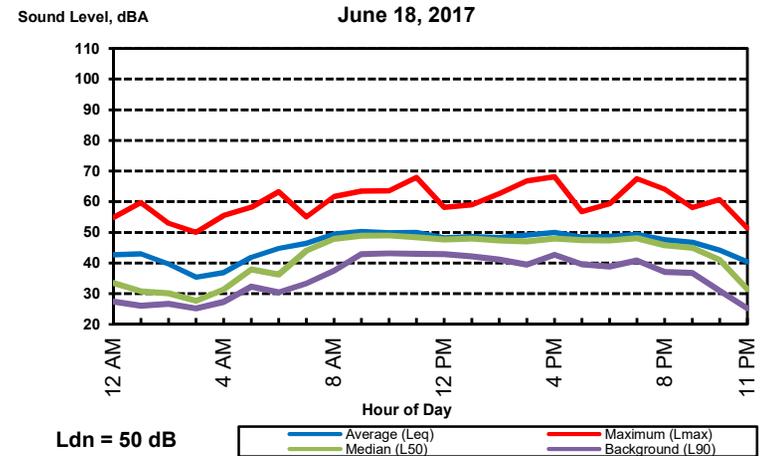
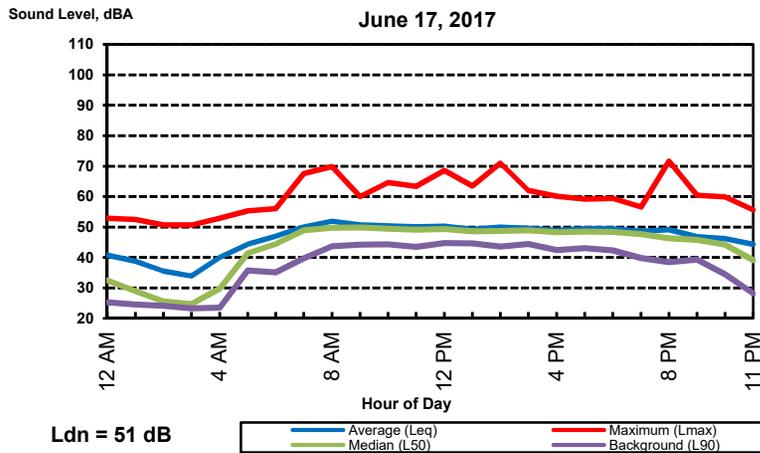
## Appendix B-6 Ambient Noise Monitoring Results Idaho Maryland Mine Project Site 3: June 17, 2017 - June 18, 2017



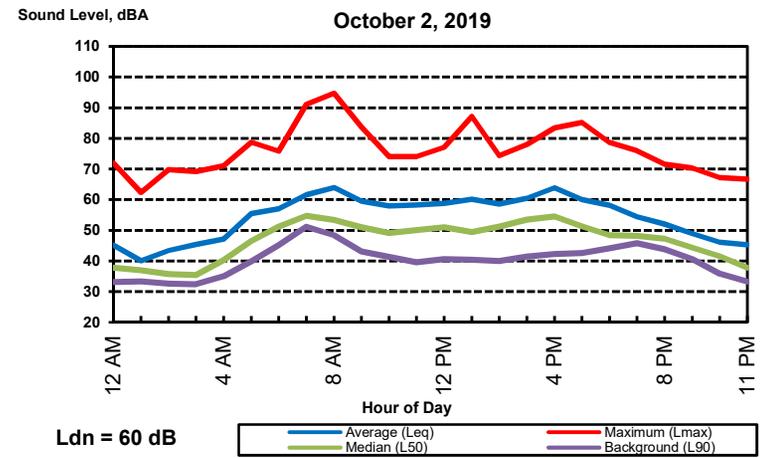
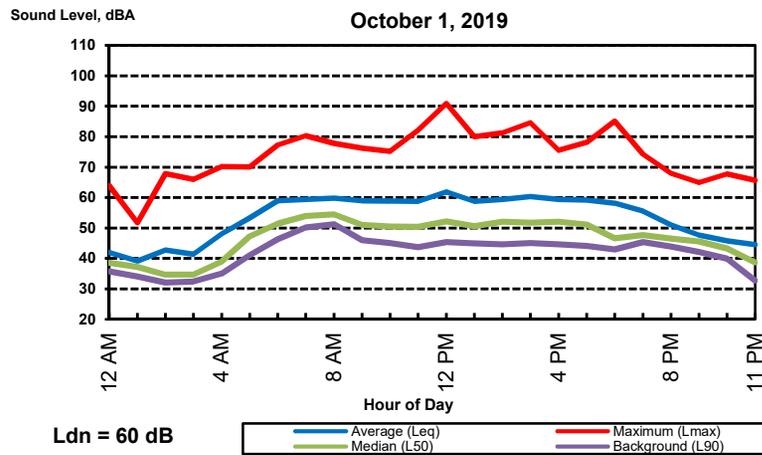
# Appendix B-7 Ambient Noise Monitoring Results Idaho Maryland Mine Project Site 4: June 13, 2017 - June 16, 2017



# Appendix B-8 Ambient Noise Monitoring Results Idaho Maryland Mine Project Site 4: June 17, 2017 - June 18, 2017



# Appendix B-9 Ambient Noise Monitoring Results Idaho Maryland Mine Project Site 5: October 1, 2019 - October 2, 2019

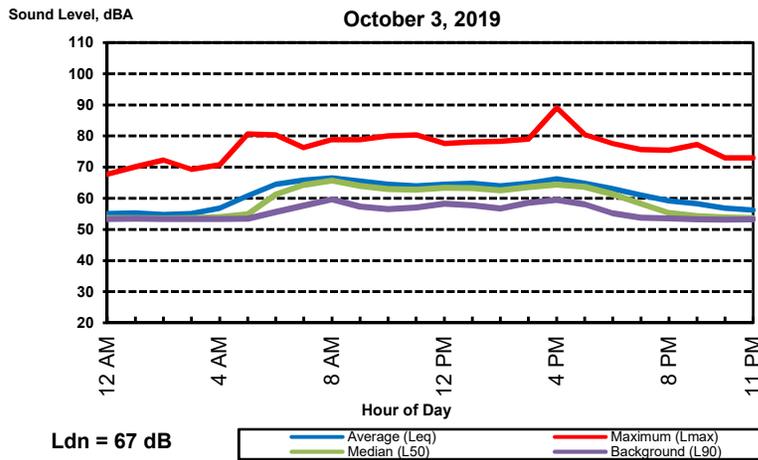
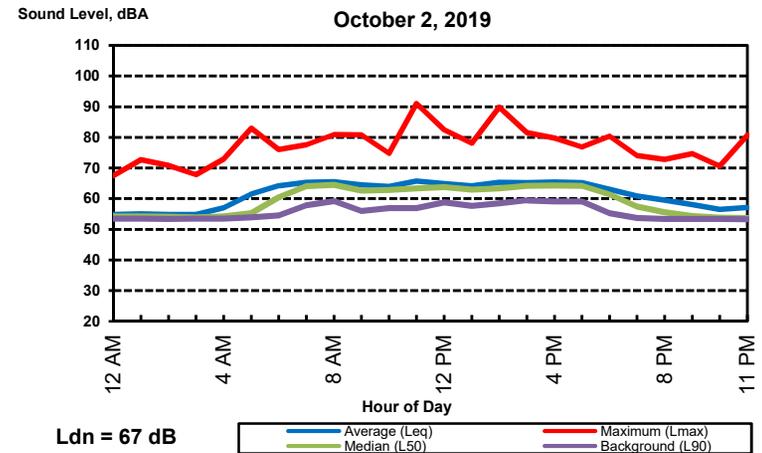
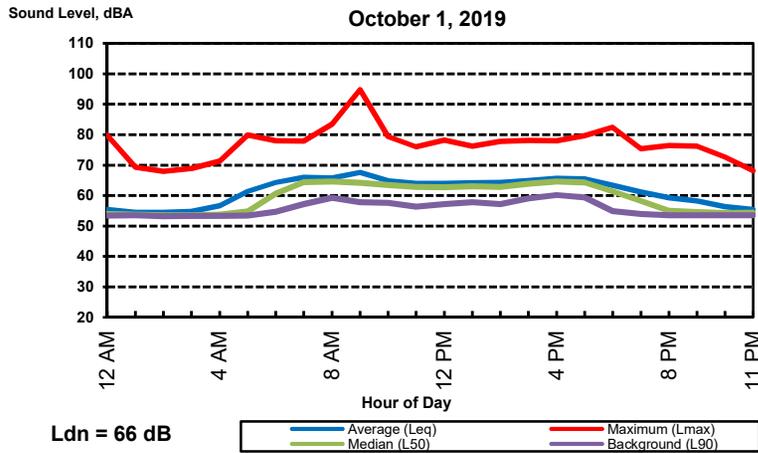


# Appendix B-10

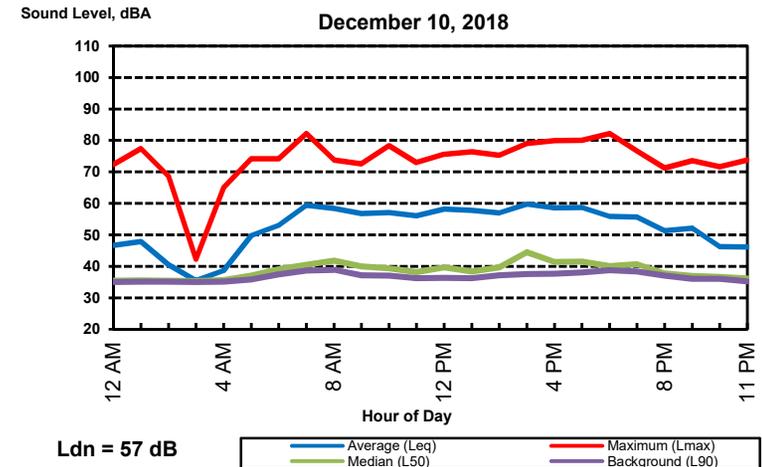
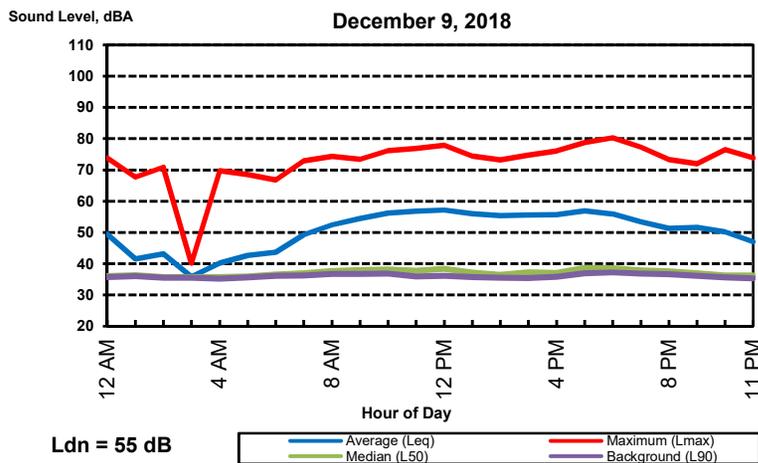
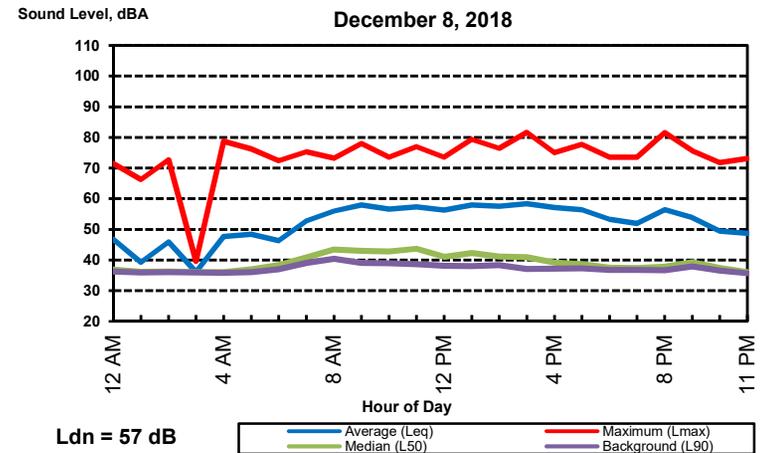
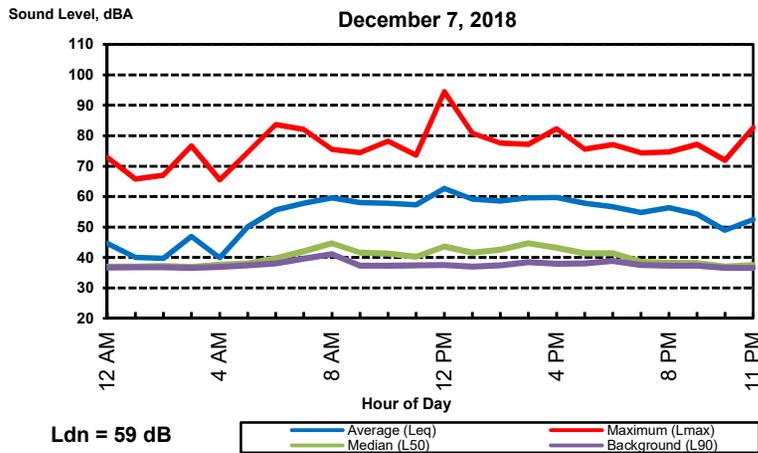
## Ambient Noise Monitoring Results

### Idaho Maryland Mine Project

#### Site 6: October 1, 2019 - October 3, 2019



# Appendix B-11 Ambient Noise Monitoring Results Idaho Maryland Mine Project Site 7: December 7, 2018 - December 10, 2018

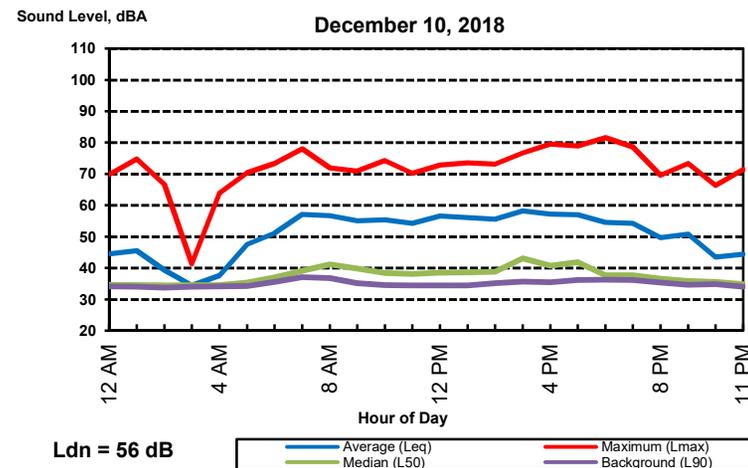
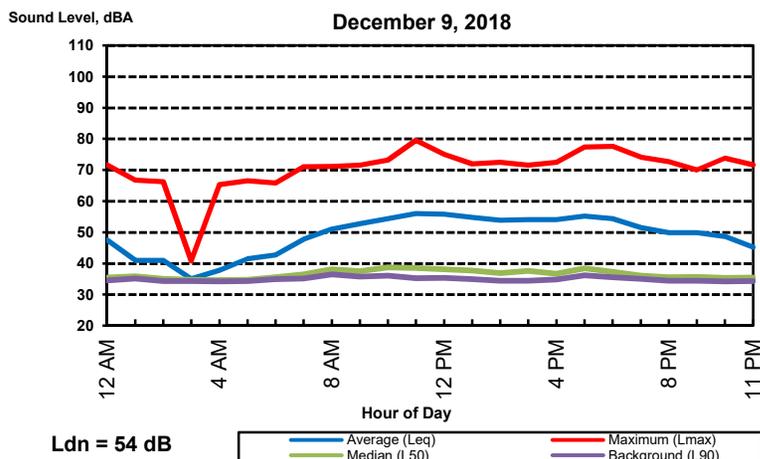
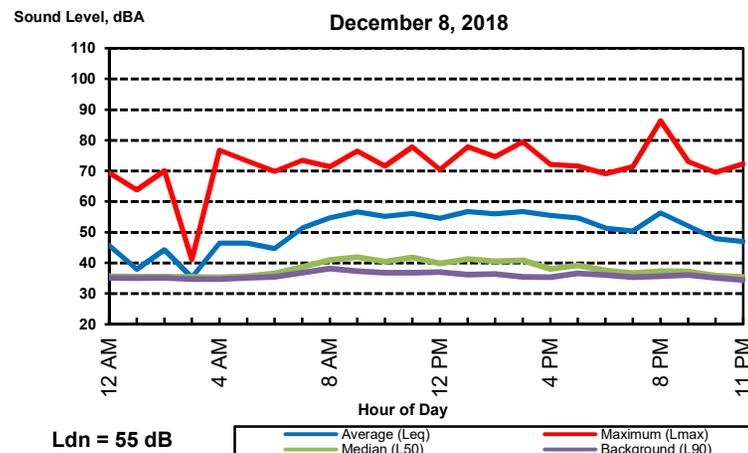
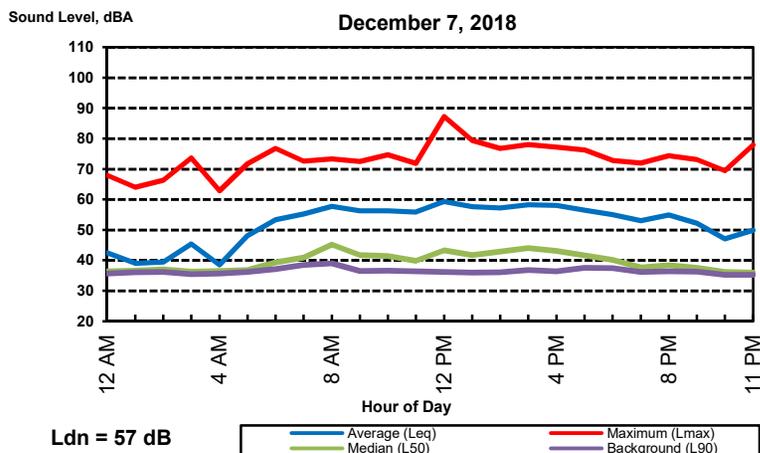


# Appendix B-12

## Ambient Noise Monitoring Results

### Idaho Maryland Mine Project

#### Site 8: December 7, 2018 - December 10, 2018

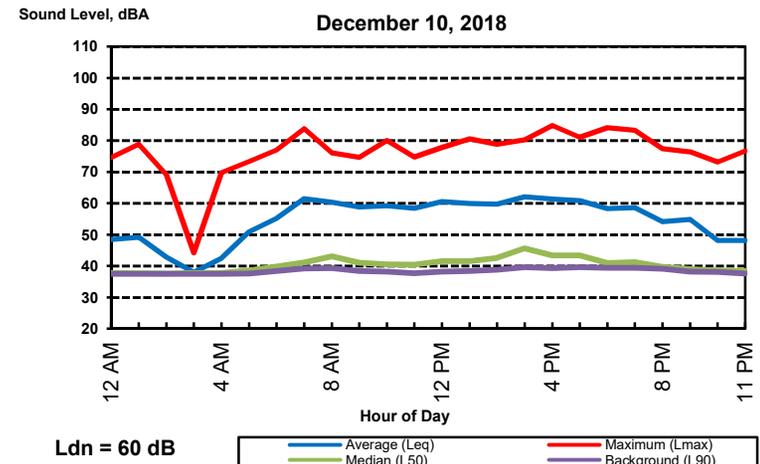
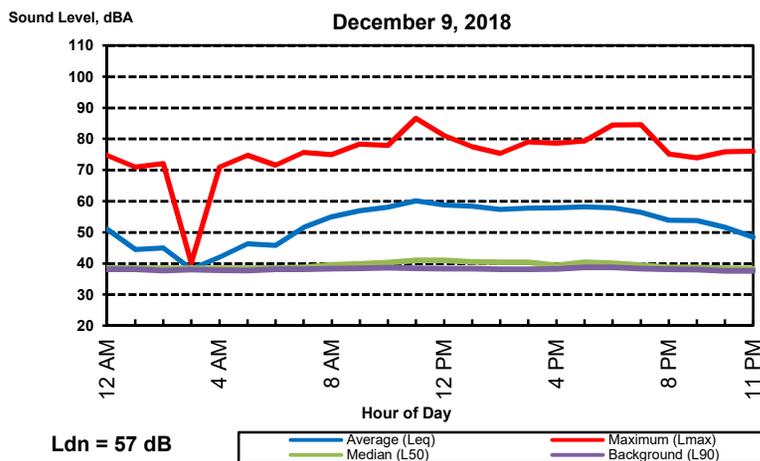
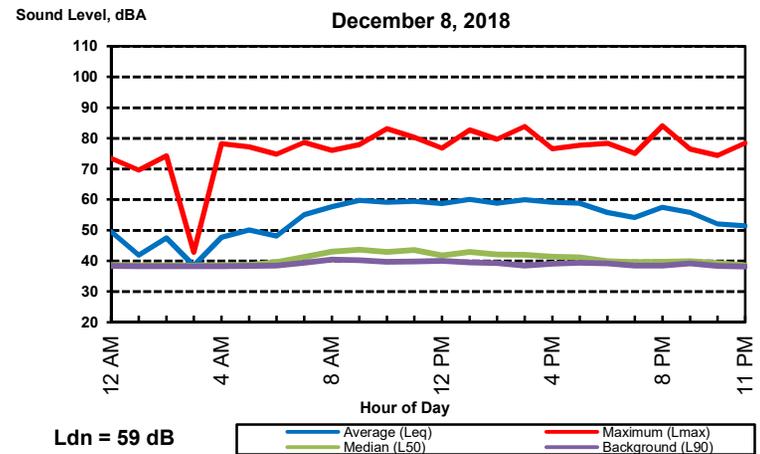
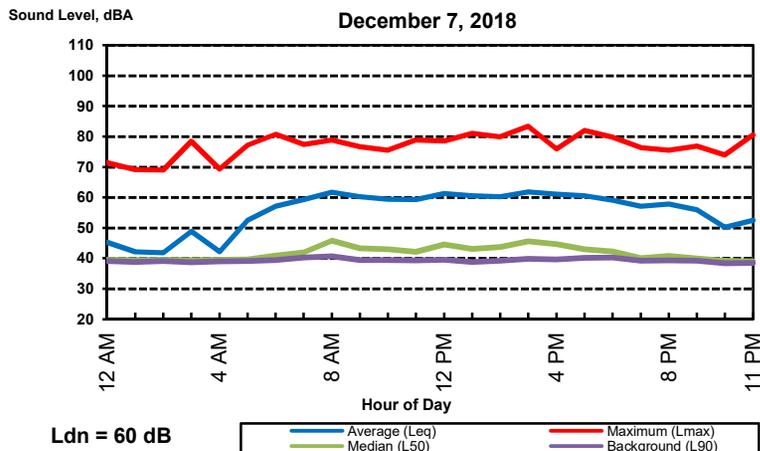


# Appendix B-13

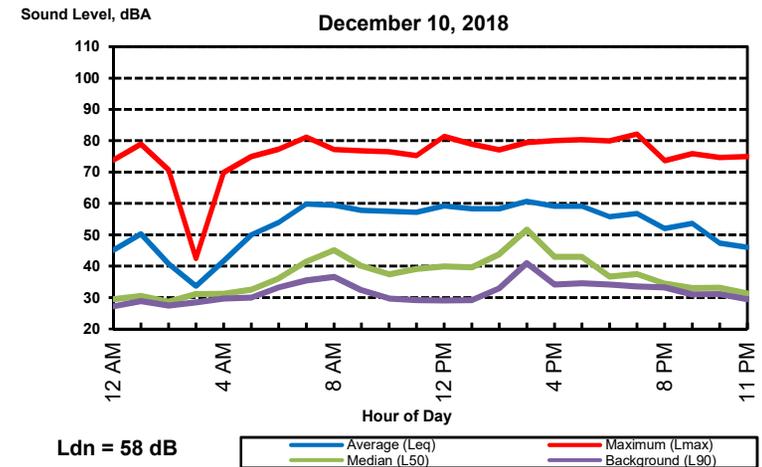
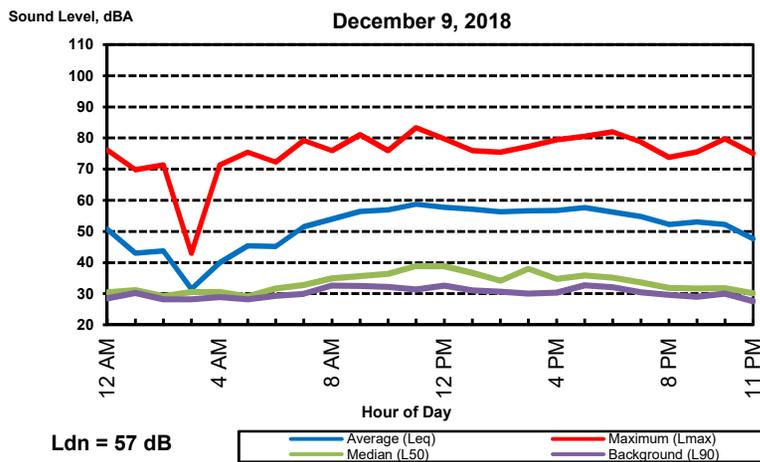
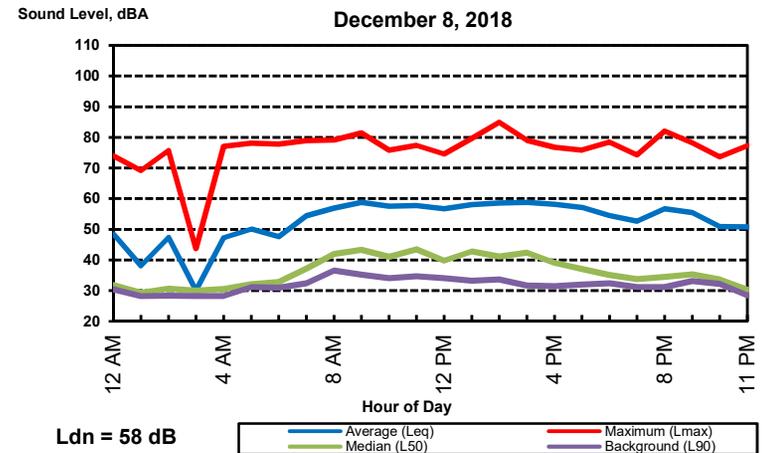
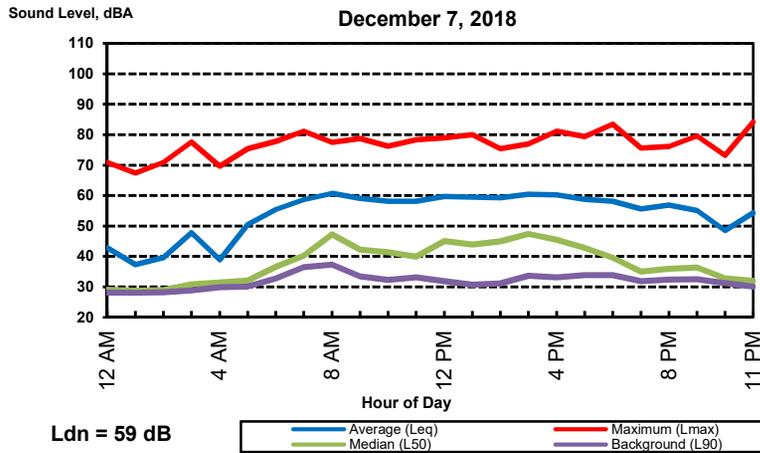
## Ambient Noise Monitoring Results

### Idaho Maryland Mine Project

#### Site 9: December 7, 2018 - December 10, 2018



# Appendix B-14 Ambient Noise Monitoring Results Idaho Maryland Mine Project Site 10: December 7, 2018 - December 10, 2018

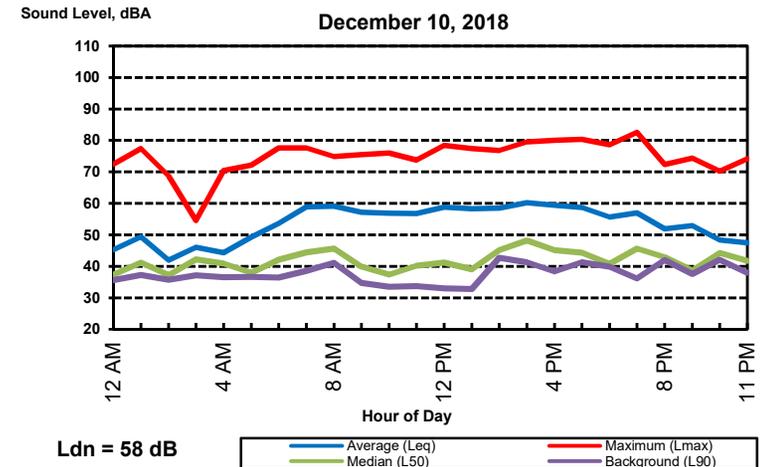
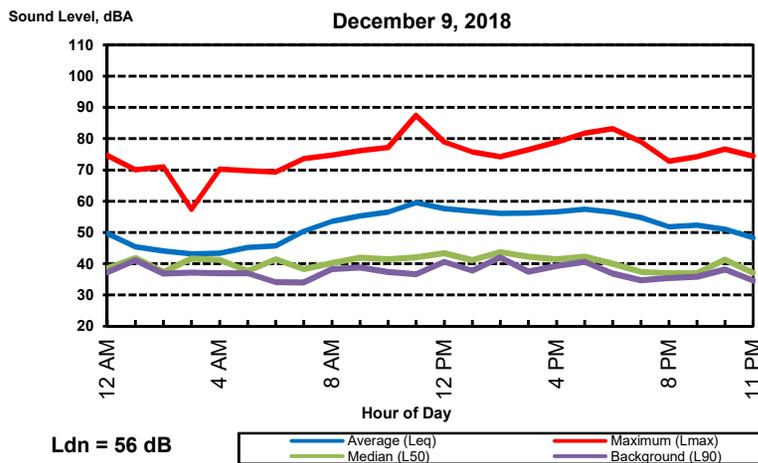
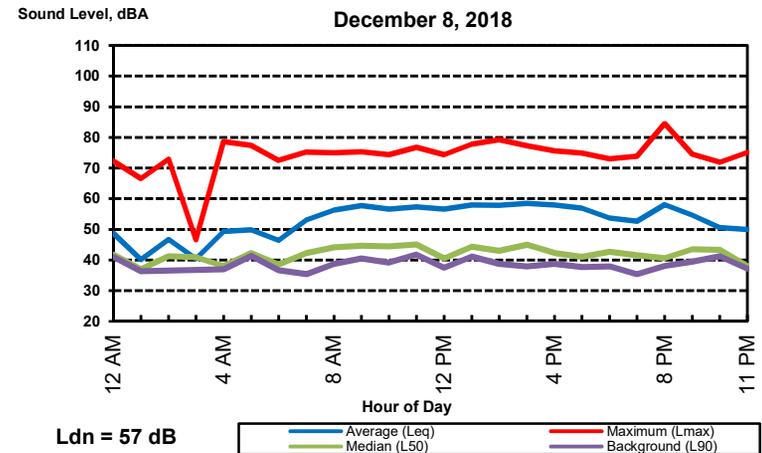
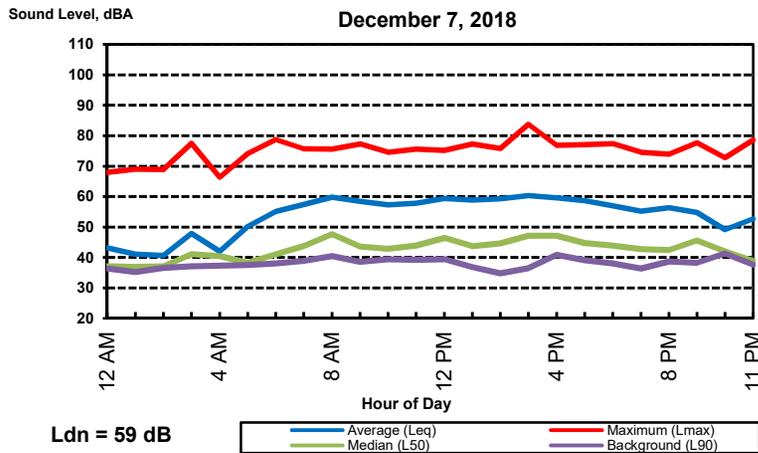


# Appendix B-15

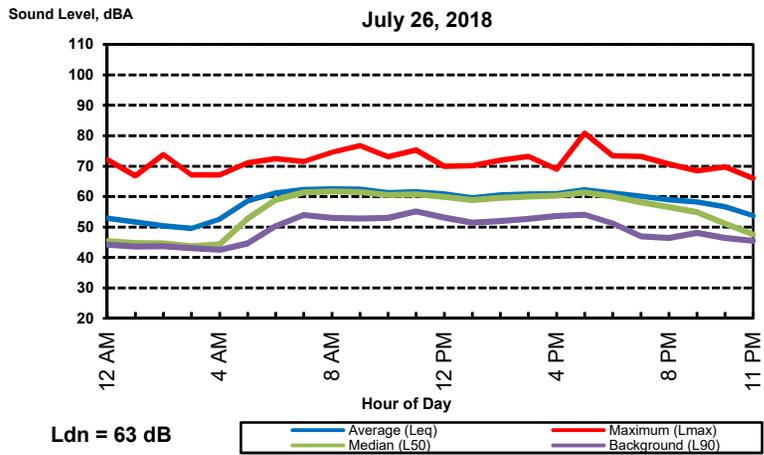
## Ambient Noise Monitoring Results

### Idaho Maryland Mine Project

#### Site 11: December 7, 2018 - December 10, 2018



**Appendix B-16**  
**Ambient Noise Monitoring Results**  
**Idaho Maryland Mine Project**  
**Site 12: July 26, 2018**



**Appendix C-1**  
**FHWA Highway Traffic Noise Prediction Model Inputs**  
**Idaho Maryland Mine Project**  
**File Name: FHWA - Existing**



#	Roadway	Segment	ADT	Day %	Night %	% Med. Trucks	% Hvy. Trucks	Speed	Distance
1	Bennett Road	West of Brunswick	1,486	85	15	2	1	45	135
2	Brunswick Road	Project Site Entrance to Bennet	9,436	85	15	2	3	55	200
3	Brunswick Road	Whispering Pines to Idaho Maryland Rd	12,294	85	15	2	3	55	100
4	Brunswick Road	South of Project Site Entrance	9,418	85	15	2	3	55	150
5	Brunswick Road	Whispering Pines to Bennet	15,366	85	15	2	3	55	120
6	Empire Street	West of SR 174	4,225	85	15	2	1	30	50
7	Empire Street	East of Auburn	5,635	85	15	2	1	30	50
8	Idaho Maryland Road	East of SR 49	7,348	85	15	2	2	40	90
9	State Route 174	West of Brunswick	8,292	85	15	2	6	40	50
10	Whispering Pines Lane	Crown Point to Brunswick	2,515	85	15	2	1	40	70
11	Whispering Pines Lane	Centennial to Crown Point	3,352	85	15	2	1	40	70
12	Brunswick Road	Idaho Maryland Rd to 49	9,950	85	15	2	3	55	100

**Appendix C-2**  
**FHWA Highway Traffic Noise Prediction Model Inputs**  
**Idaho Maryland Mine Project**  
**File Name: FHWA - Project Trucks - Centennial**



#	Roadway	Segment	ADT	Day %	Night %	% Med. Trucks	% Hvy. Trucks	Speed	Distance
1	Bennett Road	West of Brunswick	111	93.8	6.3	0.0	100.0	30	135
2	Brunswick Road	Project Site Entrance to Bennet	111	93.8	6.3	0.0	100.0	40	200
3	Brunswick Road	Whispering Pines to Idaho Maryland Rd	24	93.8	6.3	0.0	100.0	40	100
4	Brunswick Road	South of Project Site Entrance	12	93.8	6.3	0.0	100.0	45	150
5	Brunswick Road	Whispering Pines to Bennet	222	93.8	6.3	0.0	100.0	40	120
6	Empire Street	West of SR 174	6	93.8	6.3	0.0	100.0	30	50
7	Empire Street	East of Auburn	6	93.8	6.3	0.0	100.0	30	50
8	Idaho Maryland Road	East of SR 49	0	93.8	6.3	0.0	100.0	40	90
9	State Route 174	West of Brunswick	0	93.8	6.3	0.0	100.0	40	50
10	Whispering Pines Lane	Crown Point to Brunswick	202	93.8	6.3	0.0	100.0	35	70
11	Whispering Pines Lane	Centennial to Crown Point	202	93.8	6.3	0.0	100.0	35	70
12	Brunswick Road	Idaho Maryland Rd to 49	24	93.8	6.3	0.0	100.0	40	100

**Appendix C-3**  
**FHWA Highway Traffic Noise Prediction Model Inputs**  
**Idaho Maryland Mine Project**  
**File Name: FHWA - Project Trucks - Highway 49**



#	Roadway	Segment	ADT	Day %	Night %	% Med. Trucks	% Hvy. Trucks	Speed	Distance
1	Bennett Road	West of Brunswick	111	93.8	6.3	0.0	100.0	30	135
2	Brunswick Road	Project Site Entrance to Bennet	111	93.8	6.3	0.0	100.0	40	200
3	Brunswick Road	Whispering Pines to Idaho Maryland Rd	222	93.8	6.3	0.0	100.0	40	100
4	Brunswick Road	South of Project Site Entrance	12	93.8	6.3	0.0	100.0	45	150
5	Brunswick Road	Whispering Pines to Bennet	222	93.8	6.3	0.0	100.0	40	120
6	Empire Street	West of SR 174	6	93.8	6.3	0.0	100.0	30	50
7	Empire Street	East of Auburn	6	93.8	6.3	0.0	100.0	30	50
8	Idaho Maryland Road	East of SR 49	0	93.8	6.3	0.0	100.0	40	90
9	State Route 174	West of Brunswick	0	93.8	6.3	0.0	100.0	40	50
10	Whispering Pines Lane	Crown Point to Brunswick	0	93.8	6.3	0.0	100.0	35	70
11	Whispering Pines Lane	Centennial to Crown Point	0	93.8	6.3	0.0	100.0	35	70
12	Brunswick Road	Idaho Maryland Rd to 49	222	93.8	6.3	0.0	100.0	40	100

**Appendix C-4**  
**FHWA Highway Traffic Noise Prediction Model Inputs**  
**Idaho Maryland Mine Project**  
**File Name: FHWA - Project Employee and Other Vehicles**



#	Roadway	Segment	ADT	Day %	Night %	% Med. Trucks	% Hvy. Trucks	Speed	Distance
1	Bennett Road	West of Brunswick	46	85	15	0.01	0.01	45	135
2	Brunswick Road	Project Site Entrance to Bennet	278	85	15	0.01	0.01	55	200
3	Brunswick Road	Whispering Pines to Idaho Maryland Rd	242	85	15	0.01	0.01	55	100
4	Brunswick Road	South of Project Site Entrance	70	85	15	0.01	0.01	55	150
5	Brunswick Road	Whispering Pines to Bennet	234	85	15	0.01	0.01	55	120
6	Empire Street	West of SR 174	18	85	15	0.01	0.01	30	50
7	Empire Street	East of Auburn	18	85	15	0.01	0.01	30	50
8	Idaho Maryland Road	East of SR 49	152	85	15	0.01	0.01	40	90
9	State Route 174	West of Brunswick	18	85	15	0.01	0.01	40	50
10	Whispering Pines Lane	Crown Point to Brunswick	8	85	15	0.01	0.01	40	70
11	Whispering Pines Lane	Centennial to Crown Point	8	85	15	0.01	0.01	40	70
12	Brunswick Road	Idaho Maryland Rd to 49	35	85	15	0.01	0.01	40	70

INSULATION  
FACTS  
#58

**NAIMA**  
NORTH AMERICAN INSULATION  
MANUFACTURERS ASSOCIATION

# The Facts About the Acoustical Performance of Metal Building Insulation

*Metal Building insulation greatly reduces the level of both exterior and interior noise by preventing transmission of exterior sounds to the interior of the building and absorbing reverberating sounds within the building. This fact sheet discusses the fundamentals of acoustical performance and shows how to improve sound control in typical wall and roof assemblies through the use of fiber glass insulation.*

**M**etal building insulation has been used for many years to thermally insulate the walls and roofs of metal buildings. An additional benefit is that it provides a better acoustical environment both inside and outside the building. Metal building insulation can absorb interior noise to provide a quieter work environment. It can also decrease the amount of noise transmitted into or out of a building.

Because of the porous nature of metal building insulation, it is an excellent absorber of sound. It can reduce noise levels in a building up to 5-6 dB. This same sound absorbing property is used to reduce the amount of sound that is transmitted through a wall or roof. Thus, it can reduce equipment noise transmitted to neighbors. It can also reduce outside noise so that building occupants are not disturbed by exterior noise sources such as traffic.

## Sound Absorption Coefficient

The sound absorption properties of a material are expressed in

terms of a sound absorption coefficient. This coefficient typically ranges from 0.05 to 1.20. The higher the coefficient the better the material absorbs sound.

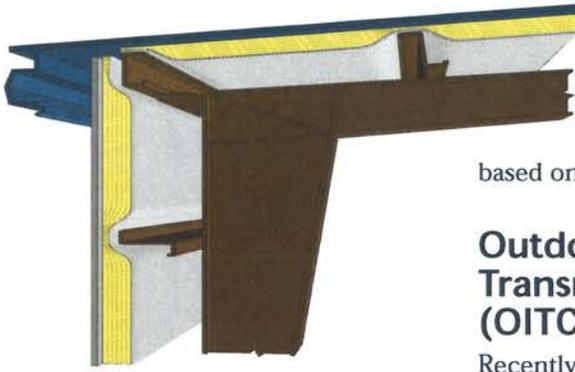
Sound absorption coefficients are measured at several frequencies since it varies with frequency. A material with an absorption coefficient of 0.66 at a particular frequency, means that 66% of the sound that strikes that material is absorbed or conversely 34% of the sound is reflected back into the room.

Metal building insulation is an excellent sound absorber with coefficients ranging from 0.20 to 1.20.

## Noise Reduction Coefficient (NRC)

A single number rating has been established to express the ability of a material to absorb sound at multiple frequencies. This single number rating is called the noise reduction coefficient (NRC). Again, the higher the NRC value, the better a material absorbs sound. NRC values for faced metal building insulation range from about 0.75 to 0.90.





20 to a high of 55. The STC rating has been in existence for many years and is based on speech sounds.

### Sound Transmission Loss

The ability of a wall or roof to reduce the amount of sound transmitted through it is called sound transmission loss. Sound transmission loss is expressed in decibels (dB) and it also varies with frequency. Most materials and constructions reduce the transmission of high frequency sounds more than low frequency sounds.

When building a wall or roof it is imperative that there are no air (sound) leaks in the construction. Sound leaks can drastically reduce the effectiveness of a wall to reduce the transmission of sound from one space to another. The construction should be as tight as possible. Where gaps exist, they should be filled with a flexible sealant such as a non-curing Butyl, siliconized acrylic latex or an acrylic latex.

### Sound Transmission Class (STC)

A single number rating system used to express the sound transmission loss properties of a wall or roof is the sound transmission class (STC). The higher the STC value, the better a construction reduces the transmission of sound. In a typical metal building construction the values for STC range from a low of about

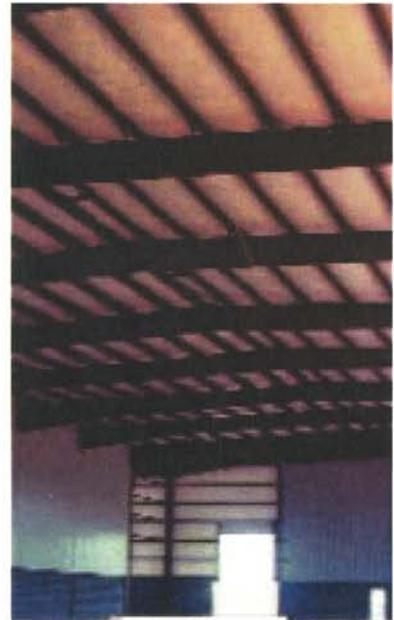
### Outdoor-Indoor Transmission Class (OITC)

Recently a new single number rating has been introduced. It is called the outdoor-indoor transmission class (OITC). It is used to specify the sound transmission loss properties of exterior building elements such as walls and windows. The OITC uses outside noise sources such as traffic, aircraft and trains to calculate a single number rating. The OITC is the preferred rating for exterior walls and roofs of metal buildings.

### Conclusion

Noise is becoming an indoor environmental pollution issue as it can effect the health and performance of the building occupants. Construction techniques to reduce sound are becoming increasingly important and many builders and architects are looking for cost-effective ways to further reduce sound transmission in metal buildings.

Adding faced metal building insulation alone to the metal building construction can reduce noise levels in a metal building by 5-6 dB. However, construction techniques do impact the way sound travels. To maximize a metal building's acoustical performance, the wall and/or roof panels should include at least one layer of faced metal building insulation, and one layer of unfaced metal building insulation. Additionally, the construction should be tight, with attention to detail such as filling gaps with flexible sealants to assure that sound does not transit via air leaks from one space to another.



Vapor Retarder Facing	Noise Reduction Coefficients (NRC)
PSK Light Duty	.85
PSK Standard Duty	.85
PSK Heavy Duty	.75
FSK Heavy Duty	.80
PSF	.90
Vinyl	.85

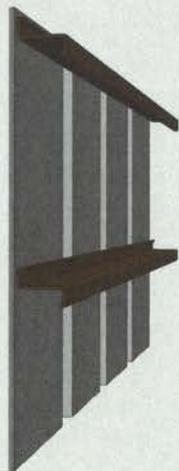
NRC rating is for facing laminated to R10 and R19 fiber glass. Tested in accordance with ASTM C423 on an "A" mounting.

STC and OITC Ratings for Typical Metal Building Constructions

Walls

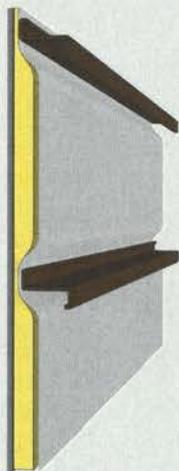
**STC 21 / OITC 17**

No Insulation



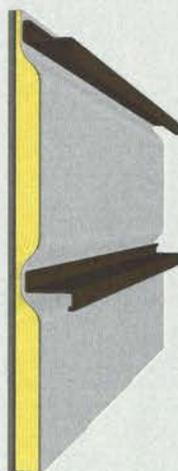
**STC 28 / OITC 20**

R-10 Faced 202-96 Insulation Over the Girts



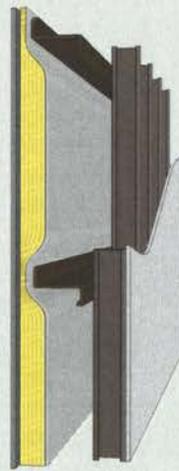
**STC 29 / OITC 20**

R-13 Faced 202-96 Insulation Over the Girts



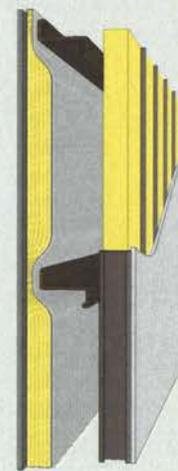
**STC 50 / OITC 35**

R-13 Faced 202-96 Insulation Over the Girts  
3 5/8" Steel Studs on 24" Centers with 1/2" Gyp. Board on Interior



**STC 54 / OITC 39**

R-13 Faced 202-96 Insulation Over the Girts  
3 5/8" Steel Studs on 24" Centers with R-11 Batts and 1/2" Gyp. Board on Interior



Roofs

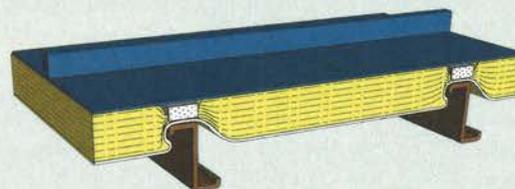
**STC 24 / OITC 18**

No Insulation



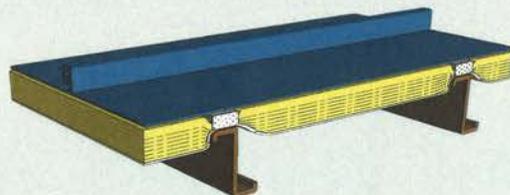
**STC 32 / OITC 22**

R-19 Faced Insulation Over the Purlins



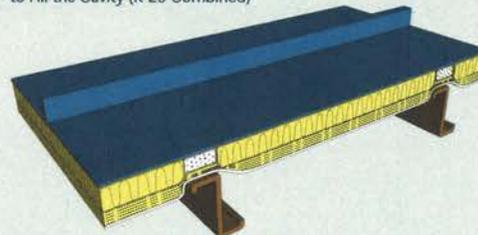
**STC 29 / OITC 20**

R-10 Faced 202-96 Insulation Over the Purlins



**STC 36 / OITC 24**

202-96 Insulation Over and Between the Purlins to Fill the Cavity (R-25 Combined)



Assemblies tested in accordance with ASTM E 90.  
STC rating determined in accordance with ASTM E 413.  
OITC ratings determined in accordance with ASTM E 1332.  
Roof Construction is 24 ga. standing seam roof with 8" Z purlins on 5' centers.  
Wall Construction is 26 ga. wall panels screwed to 8" Z purlins on 7' centers.

## Metal Building Acoustical Performance

Sound Transmission Loss									
	Construction Type	Transmission Loss -dB at Octave Band Frequencies						STC Rating	OITC Rating
		125	250	500	1000	2000	4000		
Roofs	No Insulation	12	13	19	24	30	32	24	18
	R-10 Faced 202-96 (Rev. 2000) insulation over the purlins	12	16	26	37	45	49	29	20
	R-19 Faced 202-96 (Rev. 2000) insulation over the purlins	13	20	30	41	49	51	32	22
	202-96 (Rev. 2000) insulation over the purlin and between the purlin to fill the cavity (R25 combined)	14	24	34	44	53	56	36	24
Walls	No Insulation	12	14	19	19	20	27	21	17
	R10 faced 202-96 (Rev. 2000) insulation over the girts	13	16	25	32	37	46	28	20
	R13 faced 202-96 (Rev. 2000) insulation over the girts	13	17	26	33	36	47	29	20
	R13 faced 202-96 (Rev. 2000) insulation over the girts, 3 5/8" steel studs on 24" centers with 1/2" gyp. board on interior	26	40	51	60	64	65	50	35
	R13 faced 202-96 (Rev. 2000) insulation over the girts, 3 5/8" steel studs on 24" centers with R-11 Batts and 1/2" gyp. board on interior	31	43	55	68	73	75	54	39

Sound Transmission Class (STC) in accordance with ASTM E 90.

Roof construction is 24 ga standing seam roof with 8" Z purlins on 5' centers.

Wall construction is 26 ga wall panels screwed to 8" Z girts placed on 7' centers.

Interior metal furring wall studs were 3 5/8" by 25 ga on 24" centers.

Sound Absorption							
R19 Insulation Laminated with Vapor Retarder Facing	Absorption Coefficients @ Octave Band Frequencies						
	125	250	500	1000	2000	4000	NRC
PSK Light Duty Facing	1.06	1.2	0.93	0.8	0.51	0.3	0.85
PSK Standard Duty Facing	1.04	1.23	0.91	0.78	0.49	0.28	0.85
PSK Heavy Duty Facing	1.07	1.17	0.83	0.63	0.35	0.2	0.75
FSK Heavy Duty Facing	1.06	1.17	0.89	0.72	0.43	0.24	0.80
PSK Facing	1.06	1.22	0.93	0.83	0.57	0.34	0.90
Vinyl Facing	0.95	1.2	0.94	0.73	0.52	0.37	0.85
Unfaced	0.89	1.22	1.02	0.98	1.01	1.00	1.05

Sound Absorption Coefficient in accordance with ASTM C 423 using an "A" mounting.

### About NAIMA

NAIMA is the association for North American manufacturers of fiber glass, rock wool, and slag wool insulation products. Its role is to promote energy efficiency and environmental preservation through the use of fiber glass, rock wool, and slag wool insulation, and to encourage the safe production and use of these materials.

For additional information on metal building insulation, contact:

**NAIMA**  
 44 Canal Center Plaza, Suite 310  
 Alexandria, VA 22314  
 Tel: 703/684-0084  
 Fax: 703/684-0427  
 E-mail: [insulation@naima.org](mailto:insulation@naima.org)  
 Website: <http://www.naima.org>

NAIMA Metal Building Committee Members:

CertainTeed Corp.  
 P.O. Box 860, Valley Forge, PA 19482  
 800-233-8990

Johns Manville Corp.  
 P.O. Box 5108, Denver, CO 80217  
 800-654-3103

Knauf Fiber Glass  
 One Knauf Drive, Shelbyville, IN 46176  
 800-825-4434

Owens Corning  
 One Owens Corning Parkway, Toledo, OH 43659  
 800-GET-PINK



# Appendix E

## SounPlan Model Receiver Analysis Parameters

### Project description

Project title: Idaho Maryland Mine  
Project No.:  
Project engineer:  
Customer:

Description:

### Run description

Calculation type: Single Point Sound  
Title: All Sources  
Group: Receiver Calcs  
Run file: RunFile.runx  
Result number: 60  
Local calculation (ThreadCount=3)  
Calculation start: 11/1/2020 12:28:45 PM  
Calculation end: 11/1/2020 12:29:14 PM  
Calculation time: 00:24:980 [m:s:ms]  
No. of points: 30  
No. of calculated points: 30  
Kernel version: SoundPLAN 8.2 (9/25/2020) - 32 bit

Description:  
Mill Building Only - Check of levels at receivers

### Run parameters

Reflection order: 3  
Maximum reflection distance to receiver: 200 m  
Maximum reflection distance to source: 50 m  
Search radius: 5000 m  
Weighting: dB(A)  
Allowed tolerance (per individual source): 0.100 dB  
Create ground effect areas from road surfaces: Yes

#### Standards:

Road: TNM 3.0  
Emission according to: TNM 2.5  
Air absorption: ISO 9613-1  
Side diffraction: disabled  
Environment:  
Air pressure: 1013.3 mbar  
rel. humidity: 50.0 %  
Temperature: 20.0 °C

#### Dissection parameters:

Distance to diameter factor: 8  
Minimal distance: 1 m

#### Attenuation

Foliage: ISO 9613-2  
Built-up area: ISO 9613-2  
Industrial site: ISO 9613-2

# Appendix E

## SounPlan Model Receiver Analysis Parameters

Industry: ISO 9613-2: 1996  
 Air absorption: ISO 9613-1  
 regular ground effect (chapter 7.3.1), for sources without a spectrum automatically alternative ground effect  
 Limitation of screening loss:  
     single/multiple      20.0 dB /25.0 dB  
 Side diffraction: Improved method (no side diffraction if terrain blocks line of sight) - ISO17534-3 compliant  
 Use Eqn (Abar=Dz-Max(Agr,0)) instead of Eqn (12) (Abar=Dz-Agr) for insertion loss  
 Environment:  
     Air pressure              1013.3 mbar  
     rel. humidity            70.0 %  
     Temperature            10.0 °C  
     Meteo. corr. C0(7-22h)[dB]=0.0; C0(22-7h)[dB]=0.0;  
     Ignore Cmet for Lmax industry calculation:      No  
 Parameter for screening:      C2=20.0  
 Dissection parameters:  
     Distance to diameter factor                              8  
     Minimal distance    1 m  
     Max. difference ground effect + diffraction            1.0 dB  
     Max. number of iterations                                  4  
 Attenuation  
     Foliage:                      ISO 9613-2  
     Built-up area:                ISO 9613-2  
     Industrial site:                ISO 9613-2  
  
 Assessment:                      Leq  
 Reflection of "own" facade is suppressed

### Geometry data

030 Receiver Analysis - All Sources - Grouped.sit                              10/27/2020 4:59:08 PM  
 - contains:  
     000 Boundary - dxf.geo              10/27/2020 10:16:22 AM  
     000 Buildings (existing 2) - dxf.geo                              9/14/2020 2:10:20 AM  
     000 Buildings (existing - OSM).geo                              9/14/2020 2:10:20 AM  
     000 Calculation Area - Medium Aerial.geo                      9/16/2020 6:46:32 AM  
     000 Elevation Contours (inside - reduced).geo                9/13/2020 9:19:22 PM  
     000 Elevation Contours (outside) - dxf.geo                    10/27/2020 10:16:22 AM  
     000 Fill Outline - dxf.geo            9/27/2020 5:20:56 PM  
     000 Ground Attenuation.geo        9/15/2020 7:00:40 AM  
     000 Pine Trees.geo                  10/27/2020 10:16:22 AM  
     000 Receivers - Old Numbering.geo                              9/15/2020 6:48:32 AM  
     001 Barrier Walls Around Shaft Skipping.geo                9/28/2020 11:19:48 AM  
     001 Compressor Building.geo                                    10/11/2020 9:49:20 PM  
     001 Engineered Fill - Brunswick.geo                            10/27/2020 5:10:06 PM  
     001 Exterior Pumps.geo              9/28/2020 12:05:48 PM  
     001 Forklift.geo                      10/11/2020 9:20:52 PM  
     001 Generator Building.geo        10/11/2020 9:46:54 PM  
     001 Mill Building.geo                10/11/2020 9:49:20 PM  
     001 Shaft Skipping 3 - Point Source.geo                      10/11/2020 11:22:26 PM  
     001 Truck Movements - Brunswick.geo                        10/24/2020 11:19:10 AM  
     001 Ventilation Fan.geo            10/11/2020 9:46:54 PM  
     001 Wastewater Treatment Plant.geo                            10/11/2020 4:00:16 PM  
 RDGM0003.dgm                              9/13/2020 8:49:40 PM

## Appendix F Noise Source Information Idaho Maryland Mine Project

Name	Source type	l or A m,m <sup>2</sup>	Li dB(A)	R'w dB	L'w dB(A)	Lw dB(A)	KI dB	KT dB	LwMax dB(A)	DO-Wall dB	Time histogram	Emission spectrum	63Hz dB(A)	125Hz dB(A)	250Hz dB(A)	500Hz dB(A)	1kHz dB(A)	2kHz dB(A)	4kHz dB(A)	8kHz dB(A)
001 Exterior Pump 1	Point				88.0	88.0	0.0	0.0		0	100%/24h	Exterior Pumps	75.8	76.8	77.8	79.8	79.8	82.8	79.8	69.8
001 Exterior Pump 2	Point				88.0	88.0	0.0	0.0		0	100%/24h	Exterior Pumps	75.8	76.8	77.8	79.8	79.8	82.8	79.8	69.8
001 Forklift	Point				100.0	100.0	0.0	0.0		0	Engineered Fill Operations	Diesel forklift, average work	81.6	85.6	89.5	92.6	95.6	93.6	88.6	83.6
001 Generator Building - Generator Building	Area	333.32	105.0	53.0	54.8	80.0	0.0	0.0		0	100%/24h	Generator	65.8	78.8	71.8	65.8	52.8	46.8	47.8	51.8
001 Generator Building - Generator Building	Area	114.21	105.0	53.0	54.8	75.3	0.0	0.0		3	100%/24h	Generator	61.2	74.2	67.2	61.2	48.2	42.2	43.2	47.2
001 Generator Building - Generator Building	Area	296.67	105.0	53.0	54.8	79.5	0.0	0.0		3	100%/24h	Generator	65.3	78.3	71.3	65.3	52.3	46.3	47.3	51.3
001 Generator Building - Generator Building	Area	109.51	105.0	53.0	54.8	75.2	0.0	0.0		3	100%/24h	Generator	61.0	74.0	67.0	61.0	48.0	42.0	43.0	47.0
001 Generator Building - Generator Building	Area	299.39	105.0	53.0	54.8	79.5	0.0	0.0		3	100%/24h	Generator	65.4	78.4	71.4	65.4	52.4	46.4	47.4	51.4
001 Shaft Skipping 3 - point Source	Point				120.0	120.0	0.0	0.0		0	100%/24h	Shaft Skipping	87.0	97.0	104.0	110.0	113.0	114.0	114.0	112.0
001 Wastewater Treatment Plant - Wastewater Treatment Plant	Area	789.33	75.0	35.0	44.2	73.1	0.0	0.0		0	100%/24h	Wastewater Treatment Plant	70.1	67.2	64.7	63.1	52.3	38.5	32.3	25.2
001 Wastewater Treatment Plant - Wastewater Treatment Plant	Area	308.75	75.0	29.0	48.0	72.9	0.0	0.0		3	100%/24h	Wastewater Treatment Plant	67.0	64.1	67.6	67.0	59.2	51.4	37.2	30.1
001 Wastewater Treatment Plant - Wastewater Treatment Plant	Area	256.00	75.0	29.0	48.0	72.1	0.0	0.0		3	100%/24h	Wastewater Treatment Plant	66.2	63.3	66.8	66.2	58.4	50.6	36.4	29.3
001 Wastewater Treatment Plant - Wastewater Treatment Plant	Area	304.73	75.0	29.0	48.0	72.8	0.0	0.0		3	100%/24h	Wastewater Treatment Plant	67.0	64.1	67.5	66.9	59.2	51.4	37.1	30.1
001 Wastewater Treatment Plant - Wastewater Treatment Plant	Area	258.67	75.0	29.0	48.0	72.1	0.0	0.0		3	100%/24h	Wastewater Treatment Plant	66.3	63.4	66.8	66.2	58.5	50.7	36.4	29.3
Compressor Building - Compressor Building	Area	133.98	105.0	53.0	61.7	83.0	0.0	0.0		3	100%/24h	Screw air compressor (mobile, diesel eng	74.9	81.9	70.9	61.9	49.9	42.9	37.9	
Compressor Building - Compressor Building	Area	133.98	105.0	53.0	61.7	83.0	0.0	0.0		3	100%/24h	Screw air compressor (mobile, diesel eng	74.9	81.9	70.9	61.9	49.9	42.9	37.9	

## Appendix F Noise Source Information Idaho Maryland Mine Project

Name	Source type	l or A m,m <sup>2</sup>	Li dB(A)	R'w dB	L'w dB(A)	Lw dB(A)	KI dB	KT dB	LwMax dB(A)	DO-Wall dB	Time histogram	Emission spectrum	63Hz dB(A)	125Hz dB(A)	250Hz dB(A)	500Hz dB(A)	1kHz dB(A)	2kHz dB(A)	4kHz dB(A)	8kHz dB(A)	
Compressor Building - Compressor Building	Area	72.30	105.0	53.0	61.7	80.3	0.0	0.0		3	100%/24h	Screw air compressor (mobile, diesel eng	72.2	79.2	68.2	59.2	47.2	40.2	35.2		
Compressor Building - Compressor Building	Area	151.35	105.0	53.0	61.7	83.5	0.0	0.0		0	100%/24h	Screw air compressor (mobile, diesel eng	75.4	82.4	71.4	62.4	50.4	43.4	38.4		
Compressor Building - Compressor Building	Area	72.30	105.0	53.0	64.7	83.3	0.0	0.0		0	100%/24h	Screw air compressor (mobile, diesel eng	75.2	82.2	71.2	62.2	50.2	43.2	38.2		
Engineered Fill - Brunswick	Area	119174.0 0			69.2	120.0	0.0	0.0	120.0	0	Engineered Fill Operations	Bulldozer (diesel engine)	103.4	101.4	109.4	112.4	116.4	113.4	107.4		
Mill Building Main - Mill Main	Area	2563.04	105.0	53.0	54.3	88.4	0.0	0.0		3	100%/24h	Mill Interior Noise Level	86.0	82.0	80.0	74.8	65.0	55.0	48.0	38.0	
Mill Building Main - Mill Main	Area	397.19	105.0	53.0	54.3	80.3	0.0	0.0		3	100%/24h	Mill Interior Noise Level	77.9	73.9	71.9	66.7	56.9	46.9	39.9	29.9	
Mill Building Main - Mill Main	Area	2580.06	105.0	53.0	54.3	88.4	0.0	0.0		3	100%/24h	Mill Interior Noise Level	86.1	82.1	80.1	74.8	65.1	55.1	48.1	38.1	
Mill Building Main - Mill Main	Area	411.68	105.0	53.0	54.3	80.5	0.0	0.0		3	100%/24h	Mill Interior Noise Level	78.1	74.1	72.1	66.9	57.1	47.1	40.1	30.1	
Mill Building Main - Mill Main - Roof	Area	2595.49	105.0	53.0	54.3	88.5	0.0	0.0		0	100%/24h	Mill Interior Noise Level	86.1	82.1	80.1	74.9	65.1	55.1	48.1	38.1	
Ventilation Fan - Ventilation building/Silencer	Area	74.50	110.0	53.0	66.0	84.8	0.0	0.0		0	100%/24h	Ventilation Fan	69.2	82.8	79.8	67.2	52.4	48.6	43.9	40.3	
Ventilation Fan - Ventilation building/Silencer	Area	51.21	110.0	53.0	66.0	83.1	0.0	0.0		3	100%/24h	Ventilation Fan	67.6	81.2	78.2	65.6	50.8	47.0	42.3	38.7	
Ventilation Fan - Ventilation building/Silencer	Area	93.12	110.0	53.0	66.0	85.7	0.0	0.0		3	100%/24h	Ventilation Fan	70.2	83.8	80.8	68.2	53.4	49.6	44.9	41.3	
Ventilation Fan - Ventilation building/Silencer	Area	51.21	110.0	53.0	66.0	83.1	0.0	0.0		3	100%/24h	Ventilation Fan	67.6	81.2	78.2	65.6	50.8	47.0	42.3	38.7	
Ventilation Fan - Ventilation building/Silencer	Area	93.12	110.0	53.0	66.0	85.7	0.0	0.0		3	100%/24h	Ventilation Fan	70.2	83.8	80.8	68.2	53.4	49.6	44.9	41.3	