APPENDIX R-J
Revised Noise Analysis

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PROJECT DESCRIPTION

The EMGOLD Mining Corporation (EMGOLD) through its wholly owned subsidiary Idaho-Maryland Mining Corp. seeks to reopen the historical Idaho-Maryland Mine, in accordance with all applicable federal, state, and local laws and regulations, for the purposes of:

- developing the gold ore deposits therein,
- processing the associated geological matrix residues to produce industrial tile via a proprietary process, and
- operating and maintaining these facilities for the life of the project (approximately 20 years).

The Idaho Maryland Mine Project will entail the staged construction and operation of a 2400 short ton per day (STPD) underground gold mine, and mill, as well as a 1200 STPD manufacturing plant for ceramic brick and tiles. The ceramics plant will use gold mine development rock and tailings as feedstock.

The three properties proposed to be developed for the project comprise a total of 146 acres and include: the New Brunswick site (37 acres); the one acre Round Hole site easement within the site's 8 acres; and the Idaho-Maryland (IM) site (101 acres). The IM site comprises 101 acres that combine the West BET 56 acre property and the 45-acre IMMC property that was formerly the Lausman sawmill site. The IM site is located south of Idaho-Maryland Road and Whispering Pines Lane, north of East Bennett Road and is roughly centered (east to west) on the intersection of Idaho-Maryland Road and Centennial Drive. The IM site is proposed to be developed for the mine and operations complex.

The IM site will be the location of a decline portal; two mine ventilation shafts, a new 20-foot diameter shaft and headframe, a mill, a ceramics plant, a warehouse and truck maintenance shops, a visitors' center, and ancillary facilities and infrastructure including parking, a storm water detention pond, and a mine water sedimentation pond.

The Round Hole property is located at the intersections of Idaho-Maryland Road, Brunswick Road, and Whispering Pines Drive. This property will be used as a ventilation shaft and alternative escape shaft. Ventilation fans will be placed underground to reduce noise. Occasionally, the Round Hole shaft will be used to deliver workers and materials. Ore or development rock will not be hoisted through the Round Hole shaft.

The New Brunswick site is located at the intersection of East Bennett Road and Brunswick Road. This property will be developed for the purposes of providing mine ventilation and emergency access and will be the location of the mine's dewatering activities.

The Idaho Maryland Mine Project will introduce new or additional noise sources on properties adjacent to residential, commercial and industrial land uses. The noise assessment will focus on the potential effects of these sources on noise-sensitive land uses.

REGULATORY SETTING

The California Environmental Quality Act (CEQA) requires that significant environmental impacts be identified, and that such impacts be eliminated or mitigated to the extent feasible. Section XI of Appendix G of CEQA Guidelines (Cal. Code Regs., tit. 14, App. G) sets forth some characteristics that may signify a potentially significant impact. Specifically, a significant effect from noise may exist if a project would result in:

a) exposure of persons to, or generation of, noise levels in excess of standards established in the local General Plan or noise ordinance, or applicable standards of other agencies;

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

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

d) a substantial temporary or periodic increase in ambient noise levels in the project vicinity above levels existing without the project.

General Plan Noise Standards

For fixed noise sources, the Noise Element of the City of Grass Valley General Plan requires that an acoustical analysis be performed where new development of fixed noise sources, or modification of existing fixed noise sources, is likely to produce noise levels exceeding the performance standards of Table I at noise sensitive land uses, and that noise mitigation be included in the project design.

TABLE I
NOISE LEVEL PERFORMANCE STANDARDS FOR FIXED NOISE SOURCES
City of Grass Valley

Noise Level Descriptor	Daytime (7 a.m. – 10 p.m.)	Nighttime (10 p.m. – 7 a.m.)
Hourly L_{eq}, dB [1]	55	50
Maximum level, dB	75	65

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

For transportation related noise sources, the Noise Element of the City of Grass Valley General Plan establishes the noise standards shown by Table II.

[1] For an explanation of acoustical terms, refer to Appendix A.

TABLE II
MAXIMUM ALLOWABLE NOISE EXPOSURES FOR TRANSPORTATION NOISE SOURCES
City of Grass Valley

Land Use	L_{dn} /CNEL, dB	Interior Spaces	
		L_{dn} /CNEL, dB	L_{eq}, dB[1]
Residential	60[2]	45	--
Transient Lodging	60[3]	45	--
Hospitals, Nursing Homes	60[2]	45	--
Theaters, Auditoriums, Music Halls	--	--	35
Churches, Meeting Halls	60[2]	--	40
Office Buildings	--	--	45
Schools, Libraries, Museums	--	--	45
Playgrounds, Neighborhood Parks	70	--	--

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

The City of Grass Valley does not consider industrial land uses to be noise sensitive.

City of Grass Valley City Code

The City of Grass Valley has adopted noise regulations in Chapter 13A of the City Code. These regulations contain no quantitative noise standards.

However, the regulations provide that it is unlawful to willfully make or continue a loud, unnecessary, or unusual noise which disturbs the peace or quiet of a neighborhood, or which causes discomfort or annoyance to a reasonable person of normal sensitivity residing in the area.

Changes in Ambient Noise Levels

For non-transportation noise sources affecting noise sensitive land uses, most jurisdictions consider an increase in ambient noise levels of 5 dBA to be potentially significant. This amount of change in environmental noise levels is generally considered to be clearly noticeable by most people.

Some additional guidance as to the significance of changes in ambient noise levels is provided by the 1992 findings of the Federal Interagency Committee on Noise (FICON), which assessed the annoyance effects of changes in ambient noise levels resulting from aircraft operations. The FICON findings are based upon studies that relate aircraft and traffic noise levels to the percentage of persons highly annoyed by the noise. Annoyance is a summary measure of the general adverse reaction of people to noise that generates speech interference, sleep disturbance, or interference with the desire for a tranquil environment.

The rationale for the FICON findings is that it is possible to consistently describe the annoyance of people exposed to transportation noise in terms of Ldn or CNEL. The changes in noise exposure that are shown in Table II are expected to result in equal changes in annoyance at sensitive land uses. The FICON findings were specifically developed to address aircraft noise impacts, and they are considered in this analysis as measures of potential traffic noise impacts.

TABLE II
POTENTIALLY SIGNIFICANT INCREASES IN CUMULATIVE NOISE EXPOSURE FOR TRANSPORTATION NOISE SOURCES

Ambient Noise Level Without Project (L_{dn} or CNEL)	Change in Ambient Noise Level Due to Project
<60 dB	+5.0 dB or more
60-65 dB	+3.0 dB or more
>65 dB	+1.5 dB or more

Source: Federal Interagency Committee on Noise (FICON), 1992, as applied by Brown-Buntin Associates, Inc.

Construction Noise Levels

Noise due to construction activities may be considered to be insignificant in terms of CEQA compliance if:

- the construction activity is temporary;
- use of heavy equipment and noisy activities is limited to daytime hours;
- no pile driving or surface blasting is planned; and
- all industry-standard noise abatement measures are implemented for noise-producing equipment.

These general parameters acknowledge that people are not as likely to be annoyed by activities that are perceived as being necessary for normal commerce, so long as the inconveniences due to noise are of relatively short duration, and that all practical measures are being implemented to reduce the impacts of noise-producing activities.

The City of Grass Valley Code states that it is unlawful within a residential zone, or within a radius of 500 feet of a residential zone, to operate equipment or perform outside construction or repair work on a building, structure, or project, or to operate a pile driver, steam shovel, pneumatic hammer, derrick, steam or electric hoist, or other construction type device between the hours of 6 p.m. and 6 a.m., on a Sunday or legal holiday in such a manner that a reasonable person of normal sensitivity residing in the area is caused discomfort or annoyance, unless prior permission has been granted by the Building Official in the interest of public convenience or necessity.

Noise Impact Thresholds

For this project, the thresholds of noise impacts are assumed to be:

- The noise standards of the City of Grass Valley General Plan Noise Element;
- Changes in transportation noise levels exceeding the FICON guidelines; and
- Changes in ambient noise levels due to non-transportation sources of 5 dBA or more.

NOISE IMPACT ASSESSMENT

Ambient Noise Levels

The project area includes industrial and residential land uses. To describe ambient noise levels in the project area, BBA conducted continuous noise level measurements at five locations. Four of these locations are described by Table IV, and are representative of residential areas near the project. Table IV lists the measured Day-Night Levels (L_{dn}) measured at each site over the period from July 30-August 1, 2004. Figure 1 shows the noise measurement sites.

TABLE IV
CONTINUOUS NOISE MEASUREMENT SITES AND RESULTS
Idaho-Maryland Residential Areas

Address	Measured L_{dn} , dB			Day/Night Noise Distribution (%)
	July 30, 2004	July 31, 2004	August 1, 2004	
1312 Whispering Pines	55.7	53.7	53.7	89/11
11007 Brunswick Drive	50.0	54.5	52.2	92/8
14316 Tim Burr Lane	48.7	50.1	48.2	94/6
12034 Cordell Court	49.7	46.2	47.5	83/17

An additional continuous noise measurement site was located on the project site about 400 feet north of E. Bennett Road. This site is near the Sierra Pre-Bilt truss manufacturing plant at 11352 E. Bennett Road. This facility produces noise due to use of saws and hammers, as well as vehicle movements. The Pacific Crest Door and Milling shop is also located nearby (at 11429 E. Bennett Road), where a planing mill and saws produce noise. Table V lists the Day-Night Levels (L_{dn}) measured at the E. Bennett Road site between September 17 and September 30, 2004.

TABLE V
MEASURED NOISE LEVELS
400 feet North of Bennett Road
Near Sierra Pre-Bilt and Pacific Crest Door and Milling

Date	Day of Week	L_{dn}, dB
9/17/04	Friday	52.3
9/18/04	Saturday	45.0
9/19/04	Sunday	46.3
9/20/04	Monday	51.4
9/21/04	Tuesday	52.3
9/22/04	Wednesday	53.3
9/23/04	Thursday	54.6
9/24/04	Friday	53.9
9/25/04	Saturday	49.9
8/26/04	Sunday	49.6
9/27/04	Monday	52.7
9/28/04	Tuesday	53.7
9/29/04	Wednesday	51.4
9/30/04	Thursday	52.1

The noise level measurement data obtained at the E. Bennett Road site show that noise from existing industrial operations is noticeable, and is significantly different from the background noise levels during weekends, when no industrial activity is present.

Figures B-1 through B-14 (in Appendix B) show the results of the continuous noise level measurements in terms of statistical descriptors of hourly noise levels. Figures B-13 and B-14 represent the hourly noise levels during the quietest and loudest days, respectively, observed at the E. Bennett Road site.

Roadway Traffic Noise

The traffic noise study was prepared using a combination of noise measurements and traffic noise modeling. Traffic noise measurements were performed at four sites to calibrate the Federal Highway Administration Highway Traffic Noise Prediction Model (FHWA-RD-77-108) for traffic on local roadways. In addition, noise measurements were performed over 24-hour periods at four locations to describe ambient noise levels in the project area, and to derive suitable day-night traffic noise distribution factors for traffic noise modeling in terms of L_{dn}. Noise measurements were performed in terms of the L_{eq} and other statistical descriptors.

Noise measurement equipment consisted of Larson Davis Laboratories (LDL) Model 820 precision integrating sound level meters, which were equipped with B&K Type 4176 ½" microphones. The measurement equipment was calibrated immediately before and after use, and meets the specifications of the American National Standards Institute (ANSI) for Type 1 sound measurement systems.

The Federal Highway Administration (FHWA) Highway Traffic Noise Prediction Model (FHWA RD-77-108) was employed for the prediction of traffic noise levels. The FHWA model is the analytical method currently favored for traffic noise prediction by most state and local agencies. It is applied to federal and state roadway projects by the California Department of Transportation (Caltrans). The model is based upon the CALVENO noise emission 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.

The FHWA model was developed to predict hourly L_{eq} values for free-flowing traffic conditions, and is considered to be accurate within 1.5 dB. To predict L_{dn} values, it is necessary to determine the day/night distribution of traffic and to adjust the traffic volume input data to yield an equivalent hourly traffic volume.

Sound level measurements and concurrent traffic counts were conducted over 15-minute periods at four sites in the project area. The measurements were conducted at a height of 5 feet above the ground to represent ground-level receivers. The purpose of the noise measurements was to determine the accuracy of the FHWA traffic noise prediction model in describing traffic noise levels in the project area. Figure 1 shows the calibration noise measurement sites.

The noise measurements were conducted in terms of the average noise level (L_{eq}), and the measured values were later compared to the values predicted by the FHWA model using observed traffic volumes, truck mix, speeds, roadway geometries and distances to the microphone. Table VI compares the measured and modeled noise levels for the observed traffic conditions.

TABLE VI
NOISE MEASUREMENT SUMMARY
AND FHWA MODEL CALIBRATION
August 2-4, 2004

Location	Time of Day	Distance to Centerline, feet	Posted Speed, mph	Observed Vehicles/Hour			L_{eq}, dB	
				Autos	Med. Trucks	Hvy. Trucks	Measured	Predicted by FHWA Model*
12621 Highway 174	1138	50	35	428	4	28	65.0	64.3
E. Bennett Road	1009	40	35	100	0	0	58.0	55.2
Brunswick Road - South	1034	50	50	572	16	28	69.3	67.9
Brunswick Road - North	1103	60	50	836	32	28	70.2	68.0
Idaho-Maryland Road	1108	60	35	868	24	16	66.4	63.9

* Assumes acoustically “soft” site

The FHWA model under predicted the noise levels for area roadways by about 2 dB to 3 dB. This was likely due to actual vehicle speeds exceeding the posted speed limits.

The data collected above were used with the FHWA model to predict traffic noise levels for existing conditions. Traffic volumes were obtained from the Nevada County Transportation Commission, Caltrans, and the Crane Transportation Group. Table VII shows the basic inputs to the FHWA model.

For this analysis, the day/night traffic distribution was based on the results of the continuous noise monitoring described by Table IV. Existing truck mix was estimated from the traffic counts conducted as described by Table VI, and from Caltrans data for Highway 174. To match the FHWA model calibration results, an offset of +2 dB was added to the noise levels predicted by the FHWA model for the roadways shown in Table VI.

Residences are located at varying distances from the roadway centerlines. For this analysis, it was assumed that a worst-case noise exposure would occur at a reference distance of 100 feet from the centerline of the roadways of concern.

Table VII lists the traffic modeling input assumptions for No-Project conditions.

TABLE VII
FHWA HIGHWAY TRAFFIC NOISE PREDICTION MODEL INPUTS
Without Idaho-Maryland Mine Project

Roadway	Segment	Average Daily Traffic		Vehicle Mix (%)			Day/Night Traffic Distribution	Speed, mph
		Existing	Future	Auto	Med. Trucks	Hvy. Trucks		
Spring Hill Drive	No. of Idaho-Maryland Road	1,380	1,620	87	3	10	90%/10%	35
Idaho-Maryland Road	West of Spring Hill Drive	11,170	14,050	87	3	10	90%/10%	35
Idaho-Maryland Road	East of Centennial Drive	8,740	13,200	88	3	9	90%/10%	35
Centennial Drive	So. of Idaho-Maryland Road	3,390	6,350	87	3	10	90%/10%	35
Centennial Drive	So. of Whispering Pines Lane	0	4,290	87	3	10	90%/10%	35
East Bennett Road	West of Centennial Drive	1,360	4,910	98	1	1	90%/10%	35
East Bennett Road	East of Centennial Drive	1,360	2,000	98	1	1	90%/10%	35
Brunswick	South of Project	9,790	17,210	92	3	5	90%/10%	50
Brunswick	North of Project	11,450	20,080	93	4	3	90%/10%	50
SR 174	Near Project	6,491	9,405	94	2	4	90%/10%	35

Based upon the traffic analysis prepared by Crane Transportation Group, the assumptions for future traffic were adjusted, and the FHWA model was run again for the subject roadways. The project would result in slightly higher numbers of heavy trucks on Centennial Drive and Idaho-Maryland Road. Table VIII lists the input assumptions for project-related conditions.

TABLE VIII
FHWA HIGHWAY TRAFFIC NOISE PREDICTION MODEL INPUTS
With Idaho-Maryland Mine Project

Roadway	Segment	Average Daily Traffic		Vehicle Mix (%)			Day/Night Traffic Distribution	Speed, mph
		Existing	Future	Auto	Med. Trucks	Hvy. Trucks		
Spring Hill Drive	No. of Idaho-Maryland Road	1,520	1,620	87	3	10	90%/10%	35
Idaho-Maryland Road	West of Spring Hill Drive	12,390	14,140	87	3	10	90%/10%	35
Idaho-Maryland Road	East of Centennial Drive	11,510	13,230	88	3	9	90%/10%	35
Centennial Drive	So. of Idaho-Maryland Road	6,080	6,470	86	3	11	90%/10%	35
Centennial Drive	So. of Whispering Pines Lane	4,250	4,620	87	3	10	90%/10%	35
East Bennett Road	West of Centennial Drive	4,830	5,200	98	1	1	90%/10%	35
East Bennett Road	East of Centennial Drive	1,900	2,040	98	1	1	90%/10%	35
Brunswick	South of Project	9,790	17,210	92	3	5	90%/10%	50
Brunswick	North of Project	11,450	20,080	93	4	3	90%/10%	50
SR 174	Near Project	6,491	9,405	92	2	4	90%/10%	35

Table IX shows the predicted traffic noise levels for existing and future conditions on each roadway with and without the project, at the reference distance of 100 feet from the centerline.

TABLE IX
PREDICTED FUTURE TRAFFIC NOISE LEVELS

Roadway	Segment	L_{dn}, dB, At 100 Feet from Roadway Centerline			
		Existing	Future – No Project	Future – With Project	Project minus No Project
Spring Hill Drive	No. of Idaho-Maryland Road	55.2	55.9	55.9	0.0
Idaho-Maryland Road	West of Spring Hill Drive	66.3	67.3	67.3	0.0
Idaho-Maryland Road	East of Centennial Drive	64.9	66.7	66.7	0.0
Centennial Drive	So. of Idaho-Maryland Road	59.1	61.8	62.2	0.4
Centennial Drive	So. of Whispering Pines Lane	N/A	60.1	60.5	0.4
East Bennett Road	West of Centennial Drive	52.3	57.9	58.1	0.2
East Bennett Road	East of Centennial Drive	52.3	54.0	54.0	0
Brunswick - South	South of Project	66.6	69.1	69.1	0
Brunswick-North	North of Project	66.7	69.1	69.1	0
SR 174	Near Project	61.4	63.0	63.0	0

Table IX shows that noise associated with existing and future traffic would exceed the 60 dB L_{dn} standard of the City of Grass Valley Noise Element at residences immediately adjacent to all of the roadways listed above, except for Spring Hill Drive and East Bennett Road. This condition would occur with or without the project, and would not be an effect of the project.

A new roadway (the extension of Centennial Drive) would be introduced between Whispering Pines Lane and East Bennett Road. Noise exposures due to the new roadway would be considered less than significant because it would not pass near any sensitive land uses.

Regional noise levels due to future traffic without the project would increase by about 1 to 6 dB, as compared to existing conditions. This condition would not be an effect of the project.

Traffic associated with the project would increase traffic noise levels along the roadways in the project vicinity by less than 1 dB as compared to the No Project condition. Using the FICON guidance, the predicted changes in traffic noise levels due to the project would be less than significant.

Noise Associated with Project Facilities and Equipment

Construction Noise

During the construction phase of the project, noise from construction would dominate the noise environment in the immediate area. Equipment used for construction would generate noise levels as indicated in Table X. Maximum noise levels from different types of equipment under different operating conditions could range from 70 dBA to 90 dBA at a distance of 50 feet. Construction activities would be temporary in nature, occurring during normal working hours. Construction noise impacts could be significant, as nighttime operations or use of unusually noisy equipment could result in annoyance or sleep disruption for nearby residences. However, the temporary nature of construction noise would result in a less than significant effect.

TABLE X
Reference Noise Emission Levels and Usage Factors for Construction Equipment

Equipment Description	Impact Device ?	Typical Use Factor %	Predicted Lmax @ 50 ft (dBA, slow)	Average Measured Lmax @ 50 ft (dBA, slow)	No. of Data Samples
All Other Equipment > 5 HP	No	50	85	-- N/A --	0
Auger Drill Rig	No	20	85	84	36
Backhoe	No	40	80	78	372
Bar Bender	No	20	80	-- N/A --	0
Blasting	Yes	-- N/A --	94	-- N/A --	0
Boring Jack Power Unit	No	50	80	83	1
Compactor (ground)	No	20	80	83	57
Compressor (air)	No	40	80	78	18
Concrete Mixer Truck	No	40	85	79	40
Concrete Pump Truck	No	20	82	81	30
Concrete Saw	No	20	90	90	55
Crane	No	16	85	81	405
Dozer	No	40	85	82	55
Drill Rig Truck	No	20	84	79	22
Drum Mixer	No	50	80	80	1
Dump Truck	No	40	84	76	31
Excavator	No	40	85	81	170
Flat Bed Truck	No	40	84	74	4
Front End Loader	No	40	80	79	96
Generator	No	50	82	81	19
Generator (<25KVA, VMS signs)	No	50	70	73	74
Gradall	No	40	85	83	70
Grader 19	No	40	85	-- N/A --	0
Horizontal Boring Hydr. Jack	No	25	80	82	6
Jackhammer	Yes	20	85	89	133
Man Lift	No	20	85	89	133
Mounted Impact Hammer (hoe ram)	Yes	20	90	90	212
Pavement Scarifier	No	20	85	90	2
Paver	No	50	85	77	9
Pickup Truck	No	40	55	75	1
Pneumatic Tools	No	50	85	85	90
Pumps	No	50	77	81	17
Refrigerator Unit	No	100	82	73	3
Rivit Buster/chipping gun	Yes	20	85	79	19
Rock Drill	No	20	85	81	3
Roller	No	20	85	80	16
Sand Blasting (Single Nozzle)	No	20	85	96	9
Scraper	No	40	85	84	12
Shears (on backhoe)	No	40	85	96	5
Slurry Plant	No	100	78	78	1
Slurry Trenching Machine	No	50	82	80	75
Soil Mix Drill Rig	No	50	80	-- N/A --	0
Tractor	No	40	84	-- N/A --	0

TABLE X
Reference Noise Emission Levels and Usage Factors for Construction Equipment

Equipment Description	Impact Device ?	Typical Use Factor %	Predicted Lmax @ 50 ft (dBA, slow)	Average Measured Lmax @ 50 ft (dBA, slow)	No. of Data Samples
Vacuum Excavator (Vac-truck)	No	40	85	85	149
Vacuum Street Sweeper	No	10	80	82	19
Ventilation Fan	No	100	85	79	13
Vibrating Hopper	No	50	85	87	1
Vibratory Concrete Mixer	No	20	80	80	1
Vibratory Pile Driver	No	20	95	101	44
Warning Horn	No	5	85	83	12
Welder / Torch	No	40	73	74	5

Source: FHWA Roadway Construction Noise Model, February 15, 2006.

The most wide-spread project-generated construction noise source would be truck traffic associated with transport of heavy materials and equipment. This noise increase would be of short duration and limited primarily to daytime hours, and thus the impacts are considered less than significant.

Construction of the new 20-foor diameter shaft on the IM site is a potentially significant noise source. This would occur in Phase II of the project, and would likely be preceded by development of an underground drift to intersect the planned shaft. The shaft would be located approximately 1,100 feet from the nearest existing residence, which is located southeast of the shaft. The nearest property line is about 600 feet from the shaft, and is adjacent to existing office uses. The nearest office building is about 800 feet from the shaft.

Construction activities at the shaft would occur in two general phases: above- and below-ground. There are at least two possible approaches to the shaft construction.

One approach to construction of the shaft is the conventional drill-and-blast technique. In this approach, the drill rig would be placed on the surface, and would be used to drill a series of holes for explosives. The explosives would be detonated using small charges in a time-delay sequence so as to direct the blast energy toward the center of the shaft, ensuring the structural integrity of the shaft. Blast vibration would be monitored using seismographs to prevent structural damage and annoyance at the adjacent land uses.

After the first blast sequence, the hole would be cleared using the electric hoist mounted in the headframe, and the waste would be dumped into a bin for removal. Drilling for the next blast sequence would occur below ground, likely at a depth of 12 feet or more. Subsequent drilling would occur at greater depths, as the drill would be placed at the bottom of the shaft each time. With this method, above-ground activities would initially consist of operation of the drill rig and surface blasting, over a period of a few days.

In another approach, a drill rig on the surface would be used to drill a pilot hole down to the drift. Inside the drift, underground, a larger bit would be fitted to the drill rig, and the bit would be raised back up the shaft in a technique called raise-boring. The hole beneath the bit would be mucked out by personnel and equipment in the drift. This activity could occur on 24-hour basis over a period of several days. With this method, above-ground activities would primarily consist of operation of the drill rig over a period of several days. After the bore is completed from the drift up to ground level, subsequent excavation would be performed using conventional drilling and blasting techniques underground.

For both methods of shaft construction, waste materials would be hauled out of the shaft using the electric hoist in the headframe, which would be relatively quiet. Materials would be dumped into a bin; the impact sounds due to the dumping could be relatively loud, especially immediately after the bin is emptied. Hoist operations could occur throughout the 24-hour day.

In both approaches to the shaft construction, trucks would be used to haul the waste rock to the temporary storage area, which could be as close as about 700 feet to the nearest house. The waste materials would ultimately be used as feedstock to the mill or ceramics plant, or could be used as backfill inside the mine. Rock hauling could occur at any time of the day or night. The noise due to truck movements and audible back-up warning devices could be significant at the nearest houses, especially at night.

IM Site

The IM site will be the site of one decline, a new 20-foot diameter shaft and headframe, a mill, stockpiled decline materials, a ceramics plant, a warehouse and truck maintenance shop, a visitors' center, and ancillary facilities and infrastructure, including parking, a storm water detention pond, and a mine water sedimentation pond. There will also be two temporary storage areas, one of which would be associated with construction of the new shaft in Phase II, as noted above.

Potentially significant noise sources associated with ongoing project activity at these sites are expected to include wheel loaders, forklifts, heavy trucks, conveyor belts, milling equipment and cyclones or fans at the ceramics building. Except for during construction of the new shaft, blasting would be confined underground, so it would not be expected to produce an air blast with significant sound levels.

In the initial phases of project development, a portable crusher would be operated near the decline opening. Later, primary crushing would occur below ground.

For the noise analysis, it was assumed that two loaders could be operating at a use factor of 40% in the vicinity of the decline materials stockpiles. It is also assumed that forklifts could be operating at a use factor of 40% at the temporary storage area in the central portion of the site. Based upon Table X, engine-powered equipment such as loaders may be assumed to produce noise levels of about 80 dBA at a distance of 50 feet. BBA noise measurement data indicates that propane-powered forklifts are typically quieter than loaders, producing about 75 dBA at a distance of 50 feet. Electric forklifts are even quieter, producing less than 65 dBA at a distance of 25 feet. The portable crusher is assumed to produce about 86 dBA at 50 feet.

Heavy trucks are projected to operate on the site at a rate of about 5 trucks per hour; a typical passage of a heavy truck would generate a sound exposure level (SEL) of about 90 dBA at a distance of 50 feet. Assuming ten total trips in an hour, the average heavy truck noise level (L_{eq}) would be 64 dBA at a distance of 50 feet. These same values were assumed for heavy truck movements to and from the shaft construction temporary storage area. It was assumed that no more than three forklifts would be operating in the temporary decline storage area at a given time.

To predict project-related noise levels at sensitive receivers, it was assumed that powered equipment would be used in the approximate center of the work area. For most sources, the nearest residence is located on the south side of E. Bennett Road; for sources at the temporary storage area for the shaft construction, the nearest house is on Cordell Court.

Noise propagation from activities at the project site would be affected by local topography and by buildings at the project site. Where there would be no direct line of sight from the noise source to a receiver, it was assumed that the shielding provided by topography, large buildings and stockpiled materials would reduce the noise level by 10 dBA.

Table XI summarizes the predicted hourly average noise levels for the above equipment use at selected locations adjacent to the project site. Assuming continuous operations over a 24-hour period, the Day-Night Level (L_{dn}) for each cell in the table would be 6 dB higher than the hourly L_{eq}.

TABLE XI
PREDICTED UNMITIGATED PROJECT NOISE LEVELS
Idaho-Maryland Mine Site

Noise Source	Predicted Average Noise Levels, dB, at Receiver Location (L_{eq})			
	North Project Boundary	Milco Development Boundary	Nearest House on E. Bennett Road	Nearest House on Cordell Court
Loaders at Stockpiles	52	54	37	36
Propane-powered Forklifts at Temporary Decline Storage Area	49	50	34	33
Trucks at Temporary Decline Storage Area	64[1]	64[1]	25	25
Portable Crusher	65	62	42	41
Trucks at Temporary Shaft Storage Area	64[1]	64[1]	40	31

[1] - Assumes vehicles could operate within 50 feet of the property line.

The predicted noise levels due to onsite use of engine-powered equipment at the IM site would be less than significant at the adjacent industrial land uses, which are not considered to be noise sensitive. At the nearest houses on E. Bennett Road and Cordell Court, the noise levels predicted for the project would be less than significant in terms of compliance with the City of Grass Valley Noise Element nighttime noise standard, and in terms of the increase in noise levels as compared to ambient conditions.

It should be noted that this analysis did not account for shielding provided by buildings or stored materials, such as the stockpiles and ceramic tiles in the temporary storage area. The presence of such features would further reduce noise levels at receivers where they block line of sight to the noise sources.

The mill would be completely enclosed, and would house a cone crusher, a high pressure grinding roll, and a tower mill. The loudest of the noise sources is the cone crusher, which is reported to produce from 95 to 106 dBA at a distance of 3 feet. The high pressure grinding roll and tower mill are reported to produce about 85 dBA at 3 feet, primarily from the operation of electric motors. Noise from these sources would be controlled to the maximum practical extent inside the building to ensure compliance with OSHA employee noise exposure standards.

Mill equipment noise received outside the building would be reduced significantly by the insulated metal-clad mill building walls. Noise could be emitted through ventilation openings, but could be reduced by the use of silencers, acoustical louvers, or lined ducts incorporating 90-degree bends. The noise level of the enclosed milling equipment is expected to remain below 50 dB L_{eq} at the nearest project boundary, and would be less than significant.

Noise sources associated with the ceramic plant may include burners and blowers. In addition, air pollution control equipment may include fans and cyclones. Most of this equipment would be located inside the building, though it is possible that some air pollution control fans and cyclones would be located on the outside of the building. These noise sources are potentially significant.

During the initial development of the declines, noise could be produced by heavy truck movements in and out of the shafts, and by movements of other construction equipment. Normal activities at the declines would consist of underground operation of engine-powered equipment and blasting, at depths of 200 feet and more. Materials would be removed from the decline by conveyor belt systems, which typically produce noise levels in the range of 50 to 60 dBA at a distance of 25 feet.

Noise from normal operations at the decline is therefore not expected to be significant off the project site.

Round Hole

The Round Hole property is located at the intersections of Idaho-Maryland Road, Brunswick Road, and Whispering Pines Drive. This property will be used as a ventilation shaft and alternative escape shaft.

The ventilation shaft will be outfitted with a ventilation fan located several hundred feet below the surface. The largest fan that is being considered is reported to produce about 115 dBA at a distance of 5 feet. Assuming the fan is located about 250 feet down the shaft, the noise level would be reduced by about 34 dB at the collar of the shaft, to about 81 dBA. If additional fans were located in close proximity, the total sound level would increase. The frequency information available for the fan indicates that a simple tone noise could be produced at about 500 Hz.

The ventilation shaft opening would be located about 200 feet from the nearest property boundary. At that distance, the predicted fan noise level would be 45 dB $L_{eq.}$ Assuming that a simple tone noise would be produced, the City of Grass Valley Noise Element standard would be 45 dB at the nearest property line. The noise due to the ventilation fan(s) would be less than significant since it would comply with the Noise Element standard.

Since the median ambient noise levels at residential properties in the project area may be as low as 25 to 35 dBA, noise from the ventilation fans could exceed ambient nighttime noise levels, and could be audible during the quietest hours of the night, depending on the proximity of the receiver to the Round Hole site. The nearest noise sensitive land use is a house on Whispering Pines Lane, about 1,500 feet from the ventilation shaft. The predicted fan noise level at that distance is 27 dBA. Therefore, no significant impact from ventilation fan noise is expected at this time.

New Brunswick

The New Brunswick site is located at the intersection of East Bennett Road and Brunswick Road. This property will be developed for additional mine ventilation and emergency access, and will be the location of the mine’s dewatering activities. The project does not anticipate operation of ventilation fans at this location.

Dewatering of the mine would involve operation of submersible electric pumps. Because this type of pump is generally very quiet, the noise due to operation of the dewatering pumps is expected to be less than significant.

A pump station would also be operated in the mine to pump water up to the dewatering site. This type of station is reported to be relatively noisy, but it would be located about 1300 feet below ground. Therefore, the noise from the underground pumping station is expected to be less than significant at above-ground receivers.

Noise Mitigation Measures

Noise due to truck movements in the temporary shaft waste storage area could be annoying at the nearest houses during nighttime hours, especially if audible warning devices (back-up beepers) were used. The potential for noise impacts could therefore be reduced to a less than significant level by limiting truck movements to and from the temporary shaft waste storage area to daytime hours (7 a.m. to 10 p.m.). Alternatively, the potential for annoyance due to nighttime truck movements could be reduced by requiring the use of strobe lights in place of warning “beepers”, or by requiring the use of object-sensing technology coupled with focused warning horns producing sound at lower frequencies. Both of these technologies are reported to have been approved by MSHA.

Noise due to fans or cyclones at the ceramics plant could become significant, depending on the design of the air pollution control system. To ensure that noise from the air pollution control equipment would be less than significant at the nearest potentially affected residence, the noise level from fans or cyclones should be limited to about 80 dBA at a distance of 50 feet.

Construction noise effects may be minimized by requiring that all powered equipment comply with applicable local, state and federal regulations, and that all such equipment shall be fitted with adequate mufflers according to the manufacturer's specifications.

The Grass Valley City Code would apply to the construction activities for this project, if they were to occur within 500 feet of a residential zone. The Code then prohibits construction between the hours of 6 p.m. and 6 a.m., on a Sunday or legal holiday in such a manner that a reasonable person of normal sensitivity residing in the area is caused discomfort or annoyance, unless prior permission has been granted by the Building Official in the interest of public convenience or necessity. A requirement to ensure compliance with the requirements of the City Code with respect to construction activities would provide mitigation of potential construction noise impacts.

Respectfully submitted,
Brown-Buntin Associates, Inc.

Jim Buntin
Vice President

APPENDIX J

NOISE ANALYSIS

ENVIRONMENTAL NOISE ANALYSIS

IDAHO-MARYLAND MINE PROJECT

Grass Valley, California

BBA Project No. 04-231

Prepared For

Idaho-Maryland Mining Corporation
P.O. Box 1836
Grass Valley, CA 95945

December 13, 2004

Prepared By

Brown-Buntin Associates, Inc.
Fair Oaks, California

PROJECT DESCRIPTION

The EMGOLD Mining Corporation (EMGOLD) through its wholly owned subsidiary Idaho-Maryland Mining Corp. seeks to reopen the historical Idaho-Maryland Mine, in accordance with all applicable federal, state, and local laws and regulations, for the purposes of:

- developing the gold ore deposits therein,
- processing the associated geological matrix residues to produce industrial tile via a proprietary process, and
- operating and maintaining these facilities for the life of the project (approximately 20 years).

The Idaho Maryland Mine Project will entail the staged construction and operation of a 2400 STPD underground gold mine, and mill, as well as a 1600 STPD manufacturing plant for ceramic brick and tiles. The ceramics plant will use gold mine tailings as feedstock.

The four properties proposed to be developed for the project comprise a total of 151 acres and include the New Brunswick site (37 acres), the Brenner Property site (45 acres), hereafter referred to as the Idaho-Maryland Mine Corporation (IMMC) property,, the Round Hole Property site (13 acres), and the Mill Site Property, hereafter referred to as the West BET site (56 acres).

The West BET and IMMC sites are contiguous properties and comprise a 101 acre area to be developed for the mine and operations complex. The West BET site is located south of Idaho-Maryland Road, east of the intersection of Centennial Dive and Whispering Pines Lane. The IMMC site is located north of Bennett Road, south of the intersection of Centennial Drive and Whispering Pine Lane. The West BET and IMMC sites will be the location of two declines; a mill; a ceramics plant; maintenance shops; a visitors' center; and ancillary facilities and infrastructure including parking and a sedimentation pond.

The Round Hole property is located at the intersections of Idaho-Maryland Road, Brunswick Road, and Whispering Pines Drive. This property will be used as a ventilation shaft and alternative escape shaft. Ventilation fans will placed underground to reduce noise. Occasionally, the Round Hole shaft will be used to deliver workers and materials. Ore or development rock will not be hoisted through the Round Hole shaft.

The New Brunswick site is located at the intersection of East Bennett Road and Brunswick Road. This property will be developed for the purposes of providing mine ventilation and emergency access and will be the location of the mine's dewatering activities.

The Idaho Maryland Mine Project will introduce new or additional noise sources on properties adjacent to residential, commercial and industrial land uses. The noise assessment will focus on the potential effects of these sources on noise-sensitive land uses.

REGULATORY SETTING

The California Environmental Quality Act (CEQA) requires that significant environmental impacts be identified, and that such impacts be eliminated or mitigated to the extent feasible. Section XI of Appendix G of CEQA Guidelines (Cal. Code Regs., tit. 14, App. G) sets forth some characteristics that may signify a potentially significant impact. Specifically, a significant effect from noise may exist if a project would result in:

a) exposure of persons to, or generation of, noise levels in excess of standards established in the local General Plan or noise ordinance, or applicable standards of other agencies;

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

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

d) a substantial temporary or periodic increase in ambient noise levels in the project vicinity above levels existing without the project.

General Plan Noise Standards

For fixed noise sources, the Noise Element of the City of Grass Valley General Plan requires that an acoustical analysis be performed where new development of fixed noise sources, or modification of existing fixed noise sources, is likely to produce noise levels exceeding the performance standards of Table I at noise sensitive land uses, and that noise mitigation be included in the project design.

TABLE I
NOISE LEVEL PERFORMANCE STANDARDS FOR FIXED NOISE SOURCES
City of Grass Valley

Noise Level Descriptor	Daytime (7 a.m. – 10 p.m.)	Nighttime (10 p.m. – 7 a.m.)
Hourly L_{eq}, dB [1]	55	50
Maximum level, dB	75	65

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

For transportation related noise sources, the Noise Element of the City of Grass Valley General Plan establishes the noise standards shown by Table II.

[1] For an explanation of acoustical terms, refer to Appendix A.

TABLE II MAXIMUM ALLOWABLE NOISE EXPOSURES FOR TRANSPORTATION NOISE SOURCES City of Grass Valley			
Land Use	**L_{dn} /CNEL, dB**	**Interior Spaces**	
		L_{dn} /CNEL, dB	**L_{eq}, dB[1]**
Residential	60[2]	45	--
Transient Lodging	60[3]	45	--
Hospitals, Nursing Homes	60[2]	45	--
Theaters, Auditoriums, Music Halls	--	--	35
Churches, Meeting Halls	60[2]	--	40
Office Buildings	--	--	45
Schools, Libraries, Museums	--	--	45
Playgrounds, Neighborhood Parks	70	--	--

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

The City of Grass Valley does not consider industrial land uses to be noise sensitive.

City of Grass Valley City Code

The City of Grass Valley has adopted noise regulations in Chapter 13A of the City Code. These regulations contain no quantitative noise standards.

However, the regulations provide that it is unlawful to willfully make or continue a loud, unnecessary, or unusual noise which disturbs the peace or quiet of a neighborhood, or which causes discomfort or annoyance to a reasonable person of normal sensitivity residing in the area.

Changes in Ambient Noise Levels

Some guidance as to the significance of changes in ambient noise levels is provided by the 1992 findings of the Federal Interagency Committee on Noise (FICON), which assessed the annoyance effects of changes in ambient noise levels resulting from aircraft operations. The FICON recommendations are based upon studies that relate aircraft and traffic noise levels to the percentage of persons highly annoyed by the noise. Annoyance is a summary measure of the general adverse reaction of people to noise that generates speech interference, sleep disturbance, or interference with the desire for a tranquil environment.

The rationale for the FICON recommendations is that it is possible to consistently describe the annoyance of people exposed to transportation noise in terms of L_{dn}. The changes in noise exposure that are shown in Table III are expected to result in equal changes in annoyance at sensitive land uses. Although the FICON recommendations were specifically developed to address aircraft noise impacts, they are used in this analysis for traffic noise described in terms of L_{dn}.

TABLE III MEASURES OF SUBSTANTIAL INCREASE FOR TRANSPORTATION NOISE EXPOSURE	
Ambient Noise Level Without Project (Ldn)	Significant Impact Assumed to Occur if the Project Increases Ambient Noise Levels By:
<60 dB	+ 5 dB or more
60-65 dB	+3 dB or more
>65 dB	+2 dB or more
Source: FICON as applied by Brown-Buntin Associates, Inc.	

For non-transportation noise sources affecting noise sensitive land uses, an increase in ambient noise levels of 5 dBA is considered to be potentially significant.

Construction Noise Levels

Noise due to construction activities may be considered to be insignificant in terms of CEQA compliance if:

- the construction activity is temporary;
- use of heavy equipment and noisy activities is limited to daytime hours;
- no pile driving or surface blasting is planned; and
- all industry-standard noise abatement measures are implemented for noise-producing equipment.

The City of Grass Valley Code states that it is unlawful within a residential zone, or within a radius of 500 feet of a residential zone, to operate equipment or perform outside construction or repair work on a building, structure, or project, or to operate a pile driver, steam shovel, pneumatic hammer, derrick, steam or electric hoist, or other construction type device between the hours of 6 p.m. and 6 a.m., on a Sunday or legal holiday in such a manner that a reasonable person of normal sensitivity residing in the area is caused discomfort or annoyance, unless prior permission has been granted by the Building Official in the interest of public convenience or necessity.

NOISE IMPACT ASSESSMENT

Ambient Noise Levels

The project area includes industrial and residential land uses. To describe ambient noise levels in the project area, BBA conducted continuous noise level measurements at five locations. Four of these locations are described by Table IV, and are representative of residential areas near the project. Table IV lists the measured Day-Night Levels (L_{dn}) measured at each site over the period from July 30-August 1, 2004. Figure 1 shows the noise measurement sites.

TABLE IV CONTINUOUS NOISE MEASUREMENT SITES AND RESULTS Idaho-Maryland Residential Areas				
Address	Measured L_{dn}, dB			Day/Night Noise Distribution (%)
	July 30, 2004	July 31, 2004	August 1, 2004	
1312 Whispering Pines	55.7	53.7	53.7	89/11
11007 Brunswick Drive	50.0	54.5	52.2	92/8
14316 Tim Burr Lane	48.7	50.1	48.2	94/6
12034 Cordell Court	49.7	46.2	47.5	83/17

An additional continuous noise measurement site was located on the project site about 400 feet north of E. Bennett Road. This site is near the Sierra Pre-Bilt truss manufacturing plant at 11352 E. Bennett Road. This facility produces noise due to use of saws and hammers, as well as vehicle movements. The Pacific Crest Door and Milling shop is also located nearby (at 11429 E. Bennett Road), where a planing mill and saws produce noise. Table V lists the Day-Night Levels (L_{dn}) measured at the E. Bennett Road site between September 17 and September 30, 2004.

TABLE V MEASURED NOISE LEVELS 400 feet North of Bennett Road Near Sierra Pre-Bilt and Pacific Crest Door and Milling		
Date	Day of Week	L_{dn}, dB
9/17/04	Friday	52.3
9/18/04	Saturday	45.0
9/19/04	Sunday	46.3
9/20/04	Monday	51.4
9/21/04	Tuesday	52.3
9/22/04	Wednesday	53.3
9/23/04	Thursday	54.6
9/24/04	Friday	53.9
9/25/04	Saturday	49.9
8/26/04	Sunday	49.6
9/27/04	Monday	52.7
9/28/04	Tuesday	53.7
9/29/04	Wednesday	51.4
9/30/04	Thursday	52.1

The noise level measurement data obtained at the E. Bennett Road site show that noise from existing industrial operations is noticeable, and is significantly different from the background noise levels during weekends, when no industrial activity is present.

Figures B-1 through B-14 (in Appendix B) show the results of the continuous noise level measurements in terms of statistical descriptors of hourly noise levels. Figures B-13 and B-14 represent the hourly noise levels during the quietest and loudest days, respectively, observed at the E. Bennett Road site.

Roadway Traffic Noise

The traffic noise study was prepared using a combination of noise measurements and traffic noise modeling. Traffic noise measurements were performed at four sites to calibrate the Federal Highway Administration Highway Traffic Noise Prediction Model (FHWA-RD-77-108) for traffic on local roadways. In addition, noise measurements were performed over 24-hour periods at four locations to describe ambient noise levels in the project area, and to derive suitable day-night traffic noise distribution factors for traffic noise modeling in terms of L_{dn}. Noise measurements were performed in terms of the L_{eq} and other statistical descriptors.

Noise measurement equipment consisted of Larson Davis Laboratories (LDL) Model 820 precision integrating sound level meters, which were equipped with B&K Type 4176 ½" microphones. The measurement equipment was calibrated immediately before and after use, and meets the specifications of the American National Standards Institute (ANSI) for Type 1 sound measurement systems.

The Federal Highway Administration (FHWA) Highway Traffic Noise Prediction Model (FHWA RD-77-108) was employed for the prediction of traffic noise levels. The FHWA model is the analytical method currently favored for traffic noise prediction by most state and local agencies. It is applied to federal and state roadway projects by the California Department of Transportation (Caltrans). The model is based upon the CALVENO noise emission 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.

The FHWA model was developed to predict hourly L_{eq} values for free-flowing traffic conditions, and is considered to be accurate within 1.5 dB. To predict L_{dn} values, it is necessary to determine the day/night distribution of traffic and to adjust the traffic volume input data to yield an equivalent hourly traffic volume.

Sound level measurements and concurrent traffic counts were conducted over 15-minute periods at four sites in the project area. The measurements were conducted at a height of 5 feet above the ground to represent ground-level receivers. The purpose of the noise measurements was to determine the accuracy of the FHWA traffic noise prediction model in describing traffic noise levels in the project area. Figure 1 shows the calibration noise measurement sites.

The noise measurements were conducted in terms of the average noise level (L_{eq}), and the measured values were later compared to the values predicted by the FHWA model using observed traffic volumes, truck mix, speeds, roadway geometries and distances to the microphone. Table VI compares the measured and modeled noise levels for the observed traffic conditions.

TABLE VI NOISE MEASUREMENT SUMMARY AND FHWA MODEL CALIBRATION August 2-4, 2004								
Location	Time of Day	Distance to Centerline, feet	Posted Speed, mph	Observed Vehicles/Hour			L_{eq}, dB	
				Autos	Med. Trucks	Hvy. Trucks	Measured	Predicted by FHWA Model*
12621 Highway 174	1138	50	35	428	4	28	65.0	64.3
E. Bennett Road	1009	40	35	100	0	0	58.0	55.2
Brunswick Road - South	1034	50	50	572	16	28	69.3	67.9
Brunswick Road - North	1103	60	50	836	32	28	70.2	68.0
Idaho-Maryland Road	1108	60	35	868	24	16	66.4	63.9
* Assumes acoustically "soft" site								

The FHWA model under predicted the noise levels for area roadways by about 2 dB to 3 dB. This was likely due to actual vehicle speeds exceeding the posted speed limits.

The data collected above were used with the FHWA model to predict traffic noise levels for existing conditions. Traffic volumes were obtained from the Nevada County Transportation Commission and Caltrans. Table VII shows the basic inputs to the FHWA model.

For this analysis, the day/night traffic distribution was based on the results of the continuous noise monitoring described by Table IV. Existing truck mix was estimated from the traffic counts conducted as described by Table VI, and from Caltrans data for Highway 174. To match the FHWA model calibration results, an offset of +2 dB was added to the noise levels predicted by the FHWA model.

TABLE VII FHWA HIGHWAY TRAFFIC NOISE PREDICTION MODEL INPUTS Idaho-Maryland Mine Project							
Roadway	Average Daily Traffic		Vehicle Mix (%)			Day/Night Traffic Distribution	Speed, mph
	Existing	Future	Auto	Med. Trucks	Hvy. Trucks		
Idaho-Maryland	8,140	15,410	95	3	2	90%/10%	35
E. Bennett	2,260	7,130	98	1	1	90%/10%	35
Brunswick - South	9,790	17,210	92	3	5	90%/10%	50
Brunswick - North	11,450	20,080	93	4	3	90%/10%	50
SR 174	6,491	9,405	92	2	4	90%/10%	35

Residences are located at varying distances from the roadway centerlines. For this analysis, it was assumed that a worst-case noise exposure would occur at a reference distance of 100 feet from the centerline of the roadways of concern.

Based upon the traffic analysis prepared by Crane Transportation Group, the assumptions for future traffic were adjusted, and the FHWA model was run again for the subject roadways. The project would result in about 27% less overall traffic volume, but the percentages of heavy trucks would increase on Idaho Maryland Road. For a worst-case assessment, future traffic volumes were assumed to be unchanged on Idaho-Maryland Road, Brunswick Road, and SR 174. The total future traffic volume on E. Bennett Road was reduced by only 20%. Table VIII lists the input assumptions.

TABLE VIII
FHWA HIGHWAY TRAFFIC NOISE PREDICTION MODEL INPUTS
Future Traffic: Idaho-Maryland Mine Project

Roadway	Average Daily Traffic		Vehicle Mix (%)			Day/Night Split	Speed, mph
	Future – No Project	Future – With Project	Auto	Med. Trucks	Hvy. Trucks		
Idaho-Maryland	15,410	15,410	94	3	3	90%/10%	35
E. Bennett	7,130	5,700	98	1	1	90%/10%	35
Brunswick - South	17,210	17,210	92	3	5	90%/10%	50
Brunswick - North	20,080	20,080	93	4	3	90%/10%	50
SR 174	9,405	9,405	92	2	4	90%/10%	35

Table IX shows the predicted traffic noise levels for future conditions on each roadway with and without the project, at the reference distance of 100 feet from the centerline.

TABLE IX
PREDICTED FUTURE TRAFFIC NOISE LEVELS

Roadway	L_{dn}, dB, At 100 Feet from Roadway Centerline			
	Existing	Future – No Project	Future – With Project	Future Difference, dB
Idaho-Maryland	61.3	64.1	64.7	+0.6
E. Bennett	54.5	59.5	58.5	-1.0
Brunswick - South	66.6	69.1	69.1	0
Brunswick- North	66.7	69.1	69.1	0
SR 174	61.4	63.0	63.0	0

Table VII shows that noise associated with existing and future traffic would exceed the 60 dB L_{dn} standard of the City of Grass Valley Noise Element at residences immediately adjacent to the affected roadways, except along E. Bennett Road. This condition would occur with or without the project, and would not be an effect of the project.

Regional noise levels due to future traffic without the project would increase by about 3 dB, as compared to existing conditions. Traffic associated with the project would increase traffic noise levels along Idaho-Maryland Road between Highway 49 and Centennial Drive by about 1 dB as compared to the No Project condition, the result of the project-related increase in truck traffic. Traffic noise levels along the other roads in the project area would remain about the same or be reduced by about 1 dB with or without the project. Using the FICON criteria, the predicted changes in traffic noise levels due to the project would be insignificant.

Noise Associated with Project Facilities and Equipment

Construction Noise

During the construction phase of the project, noise from construction would dominate the noise environment in the immediate area. Equipment used for construction would generate noise levels as indicated in Table X. Maximum noise levels from different types of equipment under different operating conditions could range from 70 dBA to 90 dBA at a distance of 50 feet. Construction activities would be temporary in nature, typically occurring during normal working hours. Construction noise impacts could be significant, as nighttime operations or use of unusually noisy equipment could result in annoyance or sleep disruption for nearby residences. However, the temporary nature of construction noise would result in a less than significant effect.

TABLE X
TYPICAL CONSTRUCTION NOISE LEVELS

Type of Equipment	Maximum Noise Level, dBA at 50 feet
Scrapers	88
Bulldozers	87
Heavy Trucks	88
Backhoe	85
Pneumatic Tools	85

The most important project-generated construction traffic noise source would be truck traffic associated with transport of heavy materials and equipment. This noise increase would be of short duration and limited primarily to daytime hours, thus the impacts are considered less-than-significant.

West BET and IMMC

The West BET and IMMC sites are contiguous properties and will be the site of two declines, a mill, stockpiled materials, a ceramics plant, maintenance shops, a visitors' center, and ancillary facilities and infrastructure, including parking and a sedimentation pond.

Potentially significant noise sources associated with project activity at these sites are expected to include wheel loaders, forklifts, heavy trucks, conveyor belts, milling equipment and cyclones or fans at the ceramics building. Blasting would be confined underground, so it would not be expected to produce a potentially significant air blast.

In the initial phases of project development, a portable crusher would be operated near the decline opening. Later, all crushing would occur below ground.

For the noise analysis, it was assumed that two loaders and/or forklifts could be operating at all times in the vicinity of the stockpiles, and at the tile storage area. Engine-powered equipment such as loaders, forklifts and the portable crusher may be assumed to produce noise levels of up to 86 dBA at a distance of 50 feet. Heavy trucks are projected to operate on the site at a rate of about 5 trucks per hour; a typical passage of a heavy truck would generate a sound exposure level (SEL) of about 90 dBA at a distance of 50 feet. Assuming ten total trips in an hour, the average heavy truck noise level (L_{eq}) would be 64 dBA at a distance of 50 feet.

Noise propagation from activities at the project site would be affected by local topography and by buildings at the project site. Where there would be no direct line of sight from the noise source to a receiver, it was assumed that the shielding provided by topography or large buildings would reduce the noise level by 10 dBA.

Table XI summarizes the predicted hourly average noise levels for the above equipment use at selected locations adjacent to the project site. Assuming continuous operations over a 24-hour period, the Day-Night Level (L_{dn}) for each cell in the table would be 6 dB higher than the hourly L_{eq}.

TABLE XI
PREDICTED UNMITIGATED PROJECT NOISE LEVELS
West BET And IMMC Sites

Noise Source	Predicted Average Noise Levels, dB, at Receiver Location (L_{eq})			
	No. Fork of Wolf Creek	Milco Development	E. Bennett Road	Nearest House on E. Bennett Road
Loaders/Forklifts at Stockpiles	65	48	51	44
Loaders/Forklifts at Tile Storage Area	N/A	89*	77	64
Heavy Truck Passage	64	64*	27	23
Portable Crusher	62	45	48	41

* - Assumes vehicles could operate continuously within 50 feet of the Milco property line.

The predicted noise levels due to onsite use of engine-powered equipment at the West BET and IMMC site would be less than significant at the adjacent industrial land uses, which are not considered to be noise sensitive. At the nearest house on E. Bennett Road, the noise levels predicted for use of loaders and/or forklifts at the tile storage area would be significant in terms of compliance with the City of Grass Valley Noise Element standards, and in terms of the increase in noise levels as compared to ambient conditions. The noise due to the other sources identified above would be less than significant.

It should be noted that this analysis did not account for shielding provided by stored materials, such as the ceramic tiles in the storage area. The potential for noise impacts due to loader operations at the ceramic storage area is limited to situations where the loaders would be visible from the nearest house. Thus the noise impacts would be due to loaders operating near the south boundary of the tile storage area.

The mill would be completely enclosed, and would house a cone crusher, a high pressure grinding roll, and a tower mill. The loudest of the noise sources is the cone crusher, which is reported to produce from 95 to 106 dBA at a distance of 3 feet. The high pressure grinding roll and tower mill are reported to produce about 85 dBA at 3 feet, primarily from the operation of electric motors. Noise from these sources would be controlled to the maximum practical extent inside the building to ensure compliance with OSHA employee noise exposure standards.

Mill equipment noise received outside the building would be reduced significantly by the insulated metal clad mill building walls. Noise could be emitted through ventilation openings, but could be reduced by the use of silencers, acoustical louvers, or lined ducts incorporating 90-degree bends. The noise level of the enclosed milling equipment is expected to remain below 50 dB L_{eq} at the nearest project boundary, and would be less than significant.

Noise sources associated with the ceramic plant may include burners and blowers. In addition, air pollution control equipment may include fans and cyclones. Most of this equipment would be located inside the building, though it is possible that some air pollution control fans and cyclones would be located on the outside of the building. These noise sources are potentially significant.

During the initial development of the declines, noise could be produced by heavy truck movements in and out of the shafts, and by movements of other construction equipment. Normal activities at the declines would consist of underground operation of engine-powered equipment and blasting, at depths of 200 feet and more. Materials would be removed from the declines by conveyor belt systems, which typically produce noise levels in the range of 50 to 60 dBA at a distance of 25 feet. Noise from normal operations at the declines is not expected to be significant off the project site.

Round Hole

The Round Hole property is located at the intersections of Idaho-Maryland Road, Brunswick Road, and Whispering Pines Drive. This property will be used as a ventilation shaft and alternative escape shaft.

The ventilation shaft will be outfitted with multiple fans, located about 200 feet down the decline. The largest fan that is being considered is reported to produce about 115 dBA at a distance of 5 feet. This would be reduced by about 30 dB at the mouth of the decline due to distance, to about 85 dBA for a single fan. Additional fans located in close proximity would increase the total sound level. The frequency information available for the fan indicates that a simple tone noise could be produced at about 500 Hz

The ventilation shaft opening would be located about 200 feet from the nearest property boundary. At that distance, the predicted fan noise level (assuming two fans in close proximity) would be 42 dB $L_{eq.}$ Assuming that simple tone noise may be produced, the City of Grass Valley Noise Element standard would be 45 dB at the nearest noise sensitive property. The noise due to the ventilation fan(s) is likely to be less than significant in terms of compliance with the Noise Element standard.

Since the median ambient noise levels at residential properties in the project area may be as low as 25 to 35 dBA, it would be possible for noise from the ventilation fans to become audible during the quietest hours of the night, depending on the proximity of the receiver to the Round Hole site. However, no significant impact from ventilation fan noise is expected at this time.

New Brunswick

The New Brunswick site is located at the intersection of East Bennett Road and Brunswick Road. This property will be developed for additional mine ventilation and emergency access, and will be the location of the mine’s dewatering activities. The project does not anticipate operation of ventilation fans at this location.

Dewatering of the mine would involve operation of submersible electric pumps. Because this type of pump is generally very quiet, the noise due to operation of the dewatering pumps is expected to be less than significant.

A pump station would also be operated in the mine to pump water up to the dewatering site. This type of station is reported to be relatively noisy, but it would be located about 1300 feet below ground. Therefore, the noise from the underground pumping station is expected to be less than significant at above-ground receivers.

Noise Mitigation Measures

Noise due to continuous operation of loaders and/or forklifts at the tile storage area would be significant at the nearest house on E. Bennett Road. This analysis assumed that such equipment could produce up to 86 dBA at a distance of 50 feet. Modern loaders and forklifts are capable of producing lower noise levels; recent experience with loaders used for nighttime public works projects indicates that it is possible for such equipment to comply with a noise standard of 75 dBA at a distance of 50 feet. Therefore it is possible to reduce noise levels due to loaders and/or forklifts by 10 dBA or more by specifying the use of modern, quieter equipment. This would reduce the noise impact of these operations to a less than significant level during daytime hours.

If quieter equipment is used, the potential for significant noise impacts from operations at the tile storage area would occur during nighttime activity at the southern boundary of the tile storage area, where the stored tile would not provide any shielding to the homes nearest the site. The potential for noise impacts could therefore be reduced to a less than significant level by limiting loader/forklift activity at the southern boundary to daytime hours (7 a.m. to 10 p.m.).

Noise due to fans or cyclones at the ceramics plant could become significant, depending on the design of the air pollution control system. To ensure that noise from the air pollution control equipment would be less than significant at the nearest potentially affected residence, the noise level from fans or cyclones should be limited to about 80 dBA at a distance of 50 feet.

Construction noise effects may be minimized by requiring that all powered equipment comply with applicable local, state and federal regulations, and that all such equipment shall be fitted with adequate mufflers according to the manufacturer's specifications.

The Grass Valley City Code would apply to the construction activities for this project, if they were to occur within 500 feet of a residential zone. The Code then prohibits construction between the hours of 6 p.m. and 6 a.m., on a Sunday or legal holiday in such a manner that a reasonable person of normal sensitivity residing in the area is caused discomfort or annoyance, unless prior permission has been granted by the Building Official in the interest of public convenience or necessity. A requirement to ensure compliance with the requirements of the City Code with respect to construction activities would provide mitigation of potential construction noise impacts.

APPENDIX A

ACOUSTICAL TERMINOLOGY

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

CNEL: Community Noise Equivalent Level. The average equivalent sound level during a 24-hour day, obtained after addition of approximately five decibels to sound levels in the evening from 7:00 p.m. to 10:00 p.m. and ten decibels to sound levels in the night before 7:00 a.m. and after 10:00 p.m.

DECIBEL, dB: A unit for describing the amplitude of sound, equal to 20 times the logarithm to the base 10 of the ratio of the pressure of the sound measured to the reference pressure, which is 20 micropascals (20 micronewtons per square meter).

DNL/L_{dn}: Day/Night Average Sound Level. The average equivalent sound level during a 24-hour day, obtained after addition of ten decibels to sound levels in the night after 10:00 p.m. and before 7:00 a.m.

L_{eq}: Equivalent Sound Level. The sound level containing the same total energy as a time varying signal over a given sample period. L_{eq} is typically computed over 1, 8 and 24-hour sample periods.

NOTE: The CNEL and DNL represent daily levels of noise exposure averaged on an annual basis, while L_{eq} represents the average noise exposure for a shorter time period, typically one hour.

L_{max}: The maximum noise level recorded during a noise event.

L_n: The sound level exceeded "n" percent of the time during a sample interval (L_{90}, L_{50}, L_{10}, etc.). For example, L_{10} equals the level exceeded 10 percent of the time.

ACOUSTICAL TERMINOLOGY

NOISE EXPOSURE CONTOURS: Lines drawn about a noise source indicating constant levels of noise exposure. CNEL and DNL contours are frequently utilized to describe community exposure to noise.

NOISE LEVEL REDUCTION (NLR): The noise reduction between indoor and outdoor environments or between two rooms that is the numerical difference, in decibels, of the average sound pressure levels in those areas or rooms. A measurement of noise level reduction combines the effect of the transmission loss performance of the structure plus the effect of acoustic absorption present in the receiving room.

SEL or SENEL: Sound Exposure Level or Single Event Noise Exposure Level. The level of noise accumulated during a single noise event, such as an aircraft overflight, with reference to a duration of one second. More specifically, it is the time-integrated A-weighted squared sound pressure for a stated time interval or event, based on a reference pressure of 20 micropascals and a reference duration of one second.

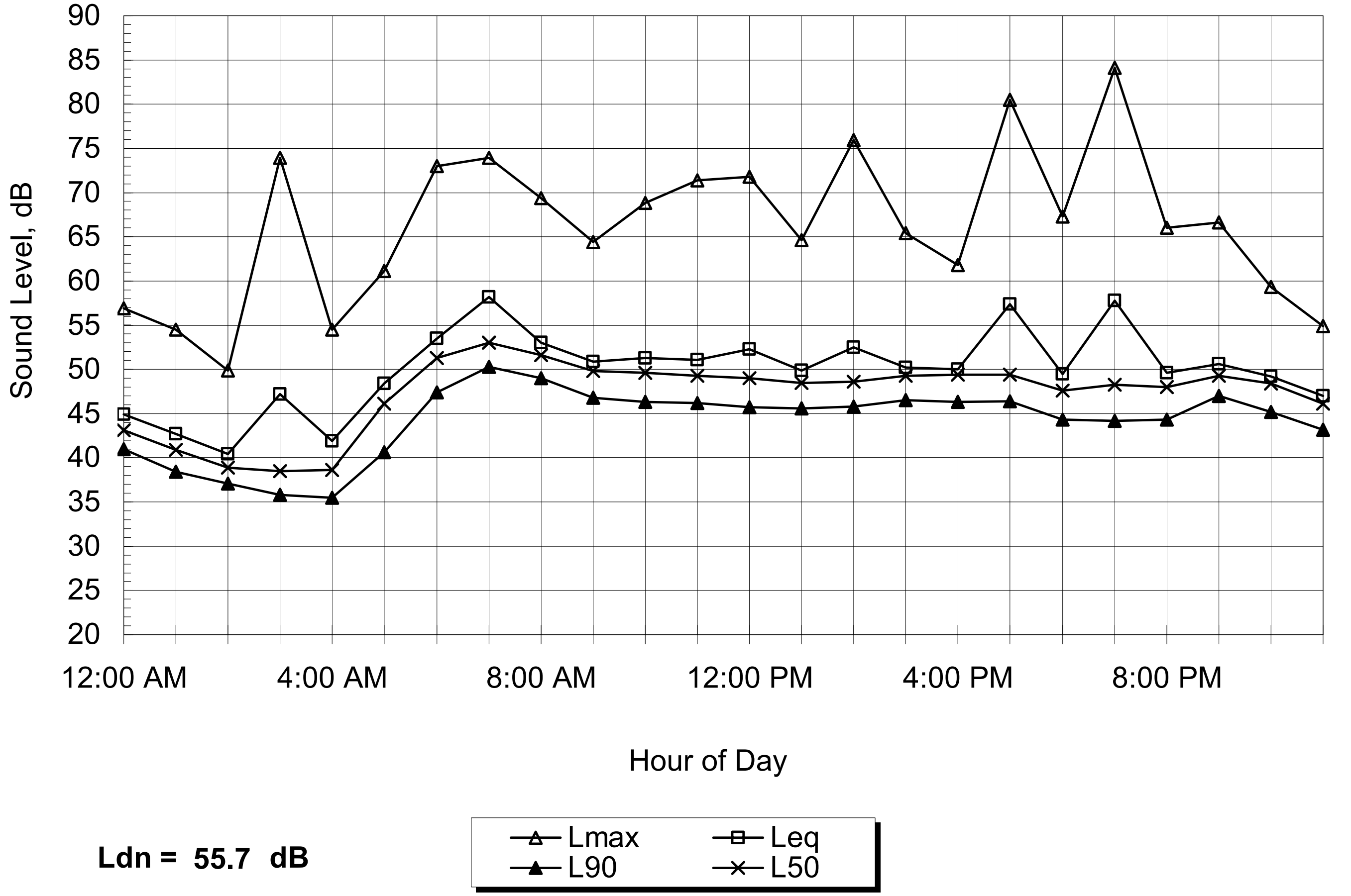
SOUND LEVEL: The sound pressure level in decibels as measured on a sound level meter using the A-weighting filter network. The A-weighting filter de-emphasizes the very low and very high frequency components of the sound in a manner similar to the response of the human ear and gives good correlation with subjective reactions to noise.

SOUND TRANSMISSION CLASS (STC): The single-number rating of sound transmission loss for a construction element (window, door, etc.) over a frequency range where speech intelligibility is of concern.

Figure B-1: Measured Hourly Noise Levels

!312 Whispering Pines

July 30, 2004

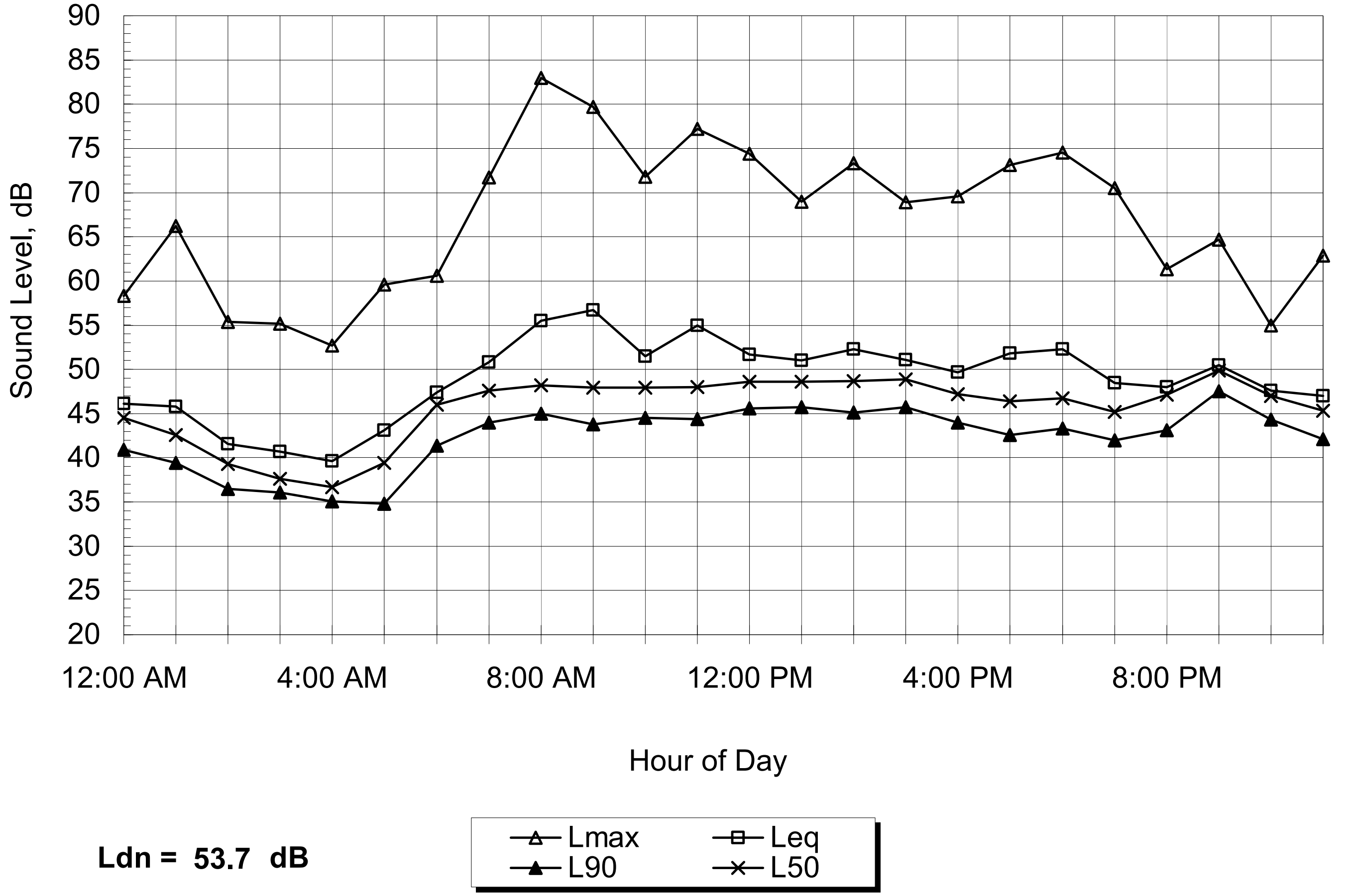


Ldn = 55.7 dB

Figure B-2: Measured Hourly Noise Levels

!312 Whispering Pines

July 31, 2004

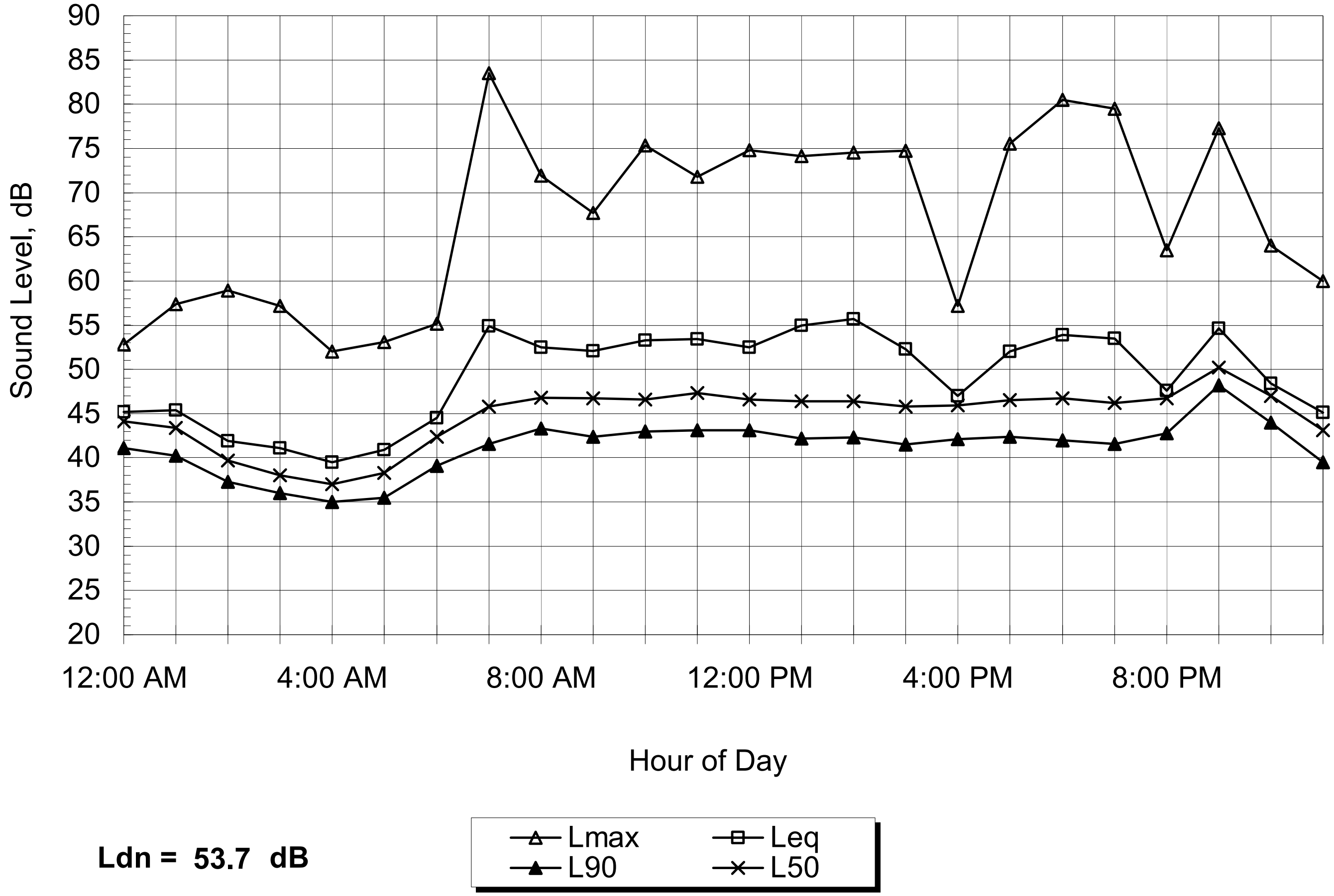


Ldn = 53.7 dB

Figure B-3: Measured Hourly Noise Levels

!312 Whispering Pines

August 1, 2004

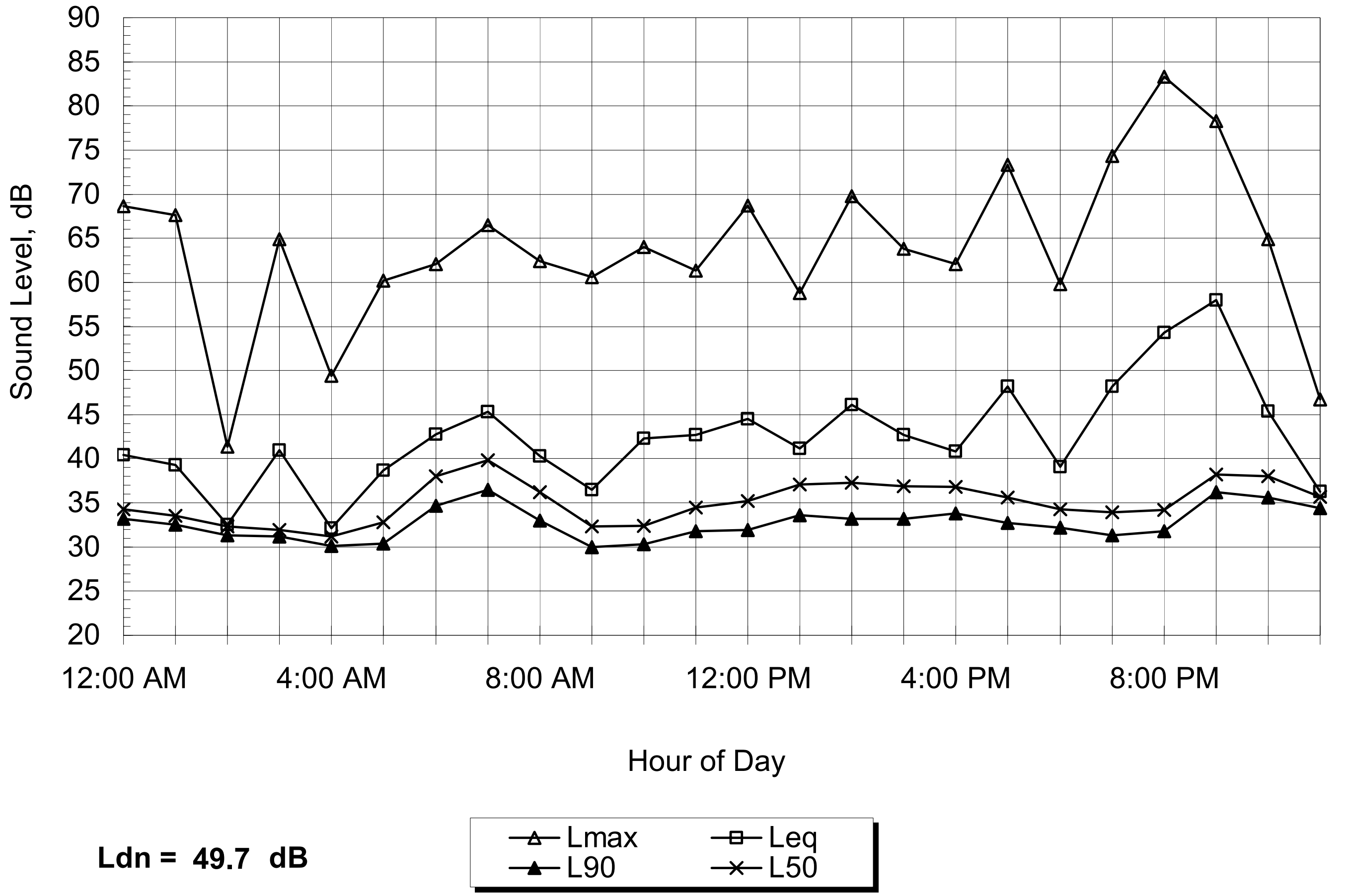


Ldn = 53.7 dB

Figure B-4: Measured Hourly Noise Levels

11007 Brunswick Drive

July 30, 2004

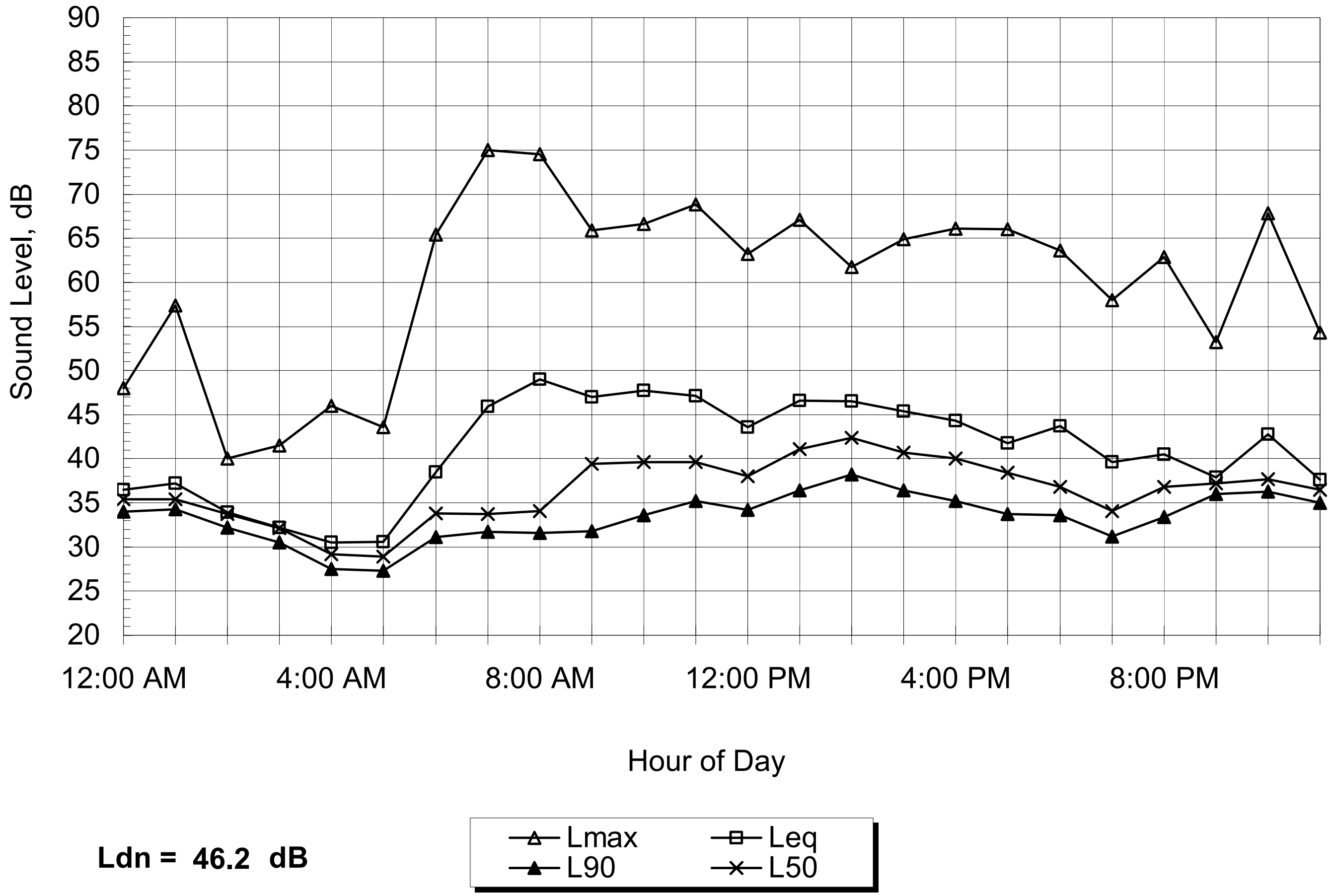


Ldn = 49.7 dB

Figure B-5: Measured Hourly Noise Levels

11007 Brunswick Drive

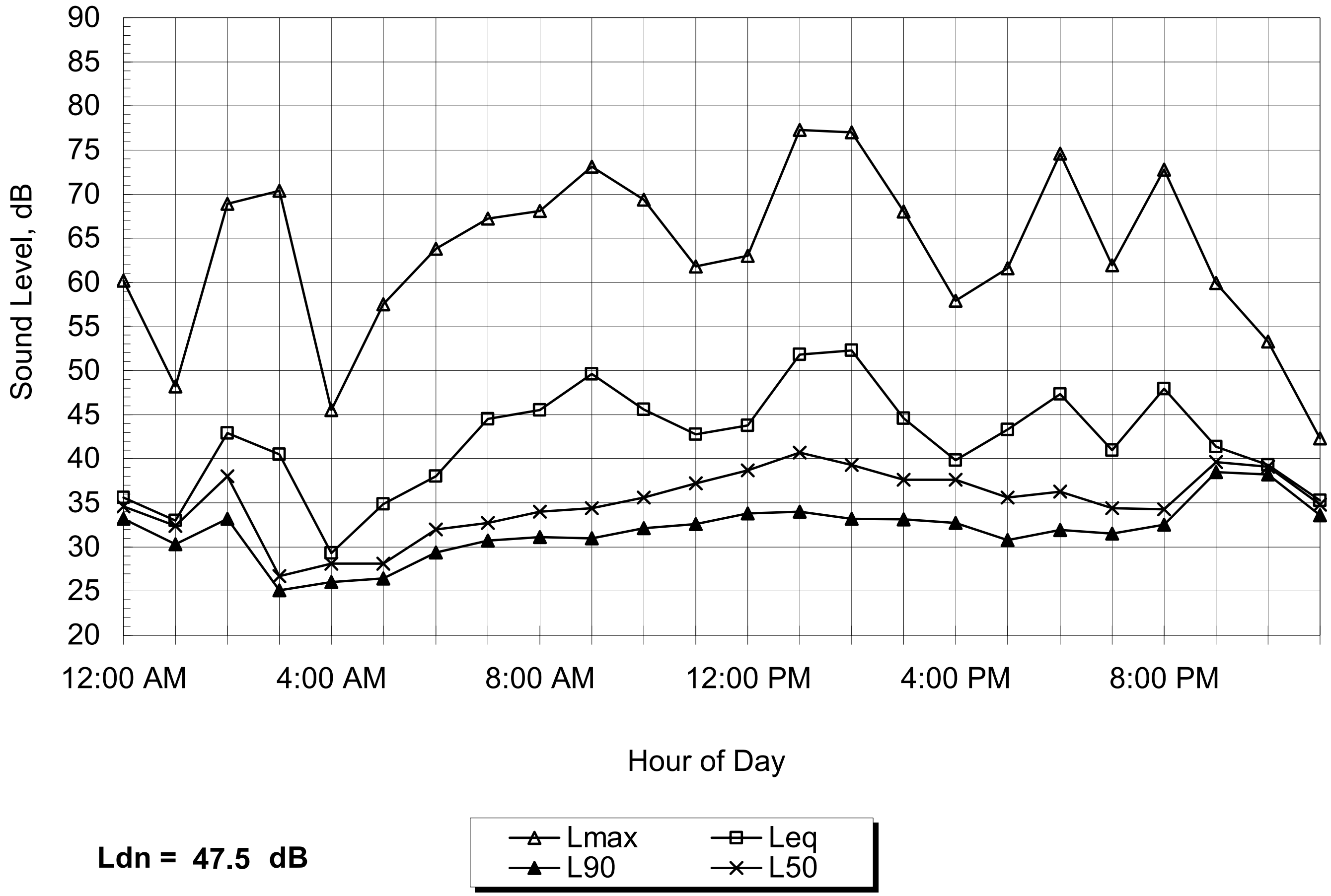
July 31, 2004



Ldn = 46.2 dB

Figure B-6: Measured Hourly Noise Levels

11007 Brunswick Drive
August 1, 2004

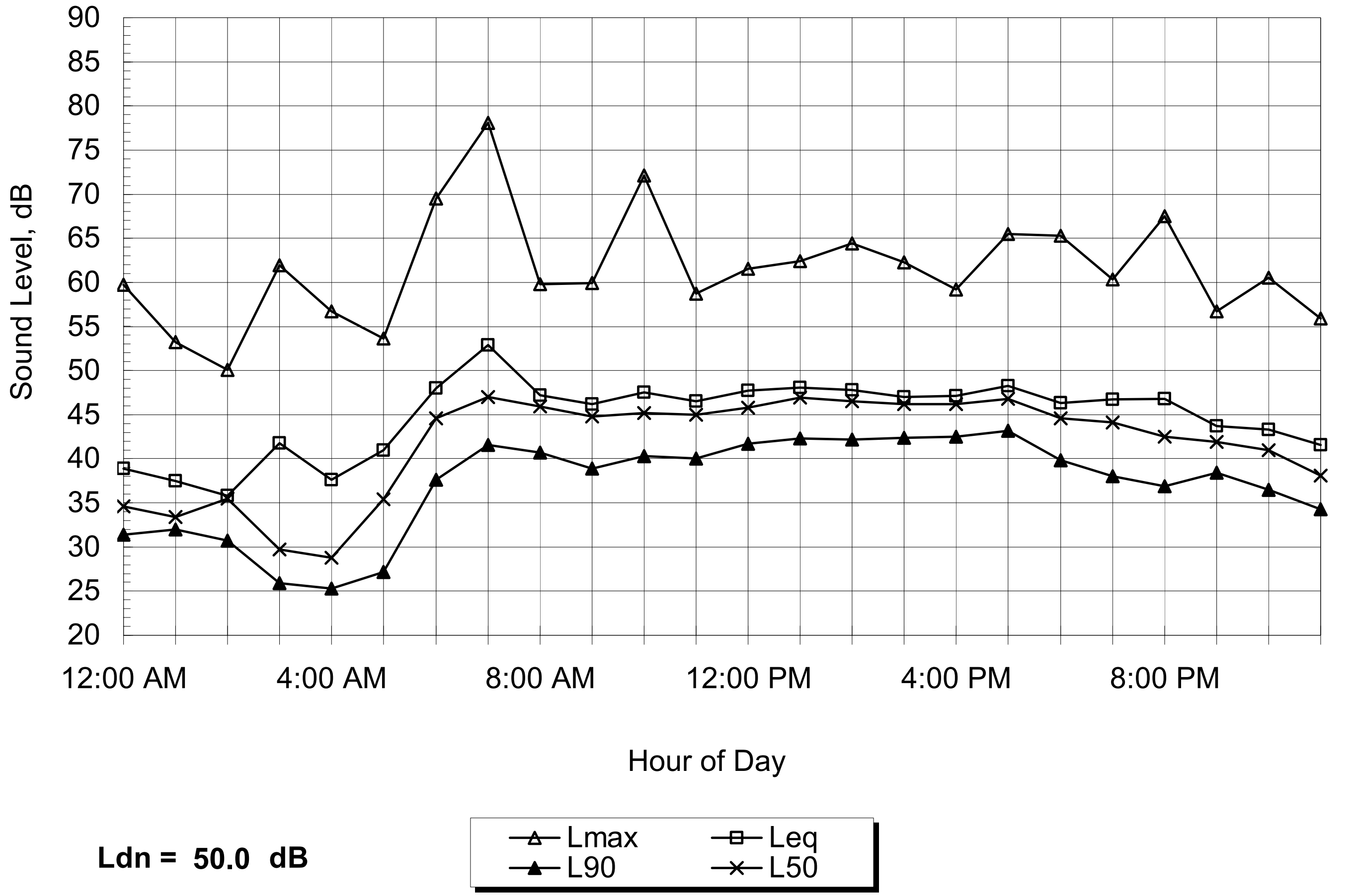


Ldn = 47.5 dB

Figure B-7: Measured Hourly Noise Levels

14316 Tim Burr Lane

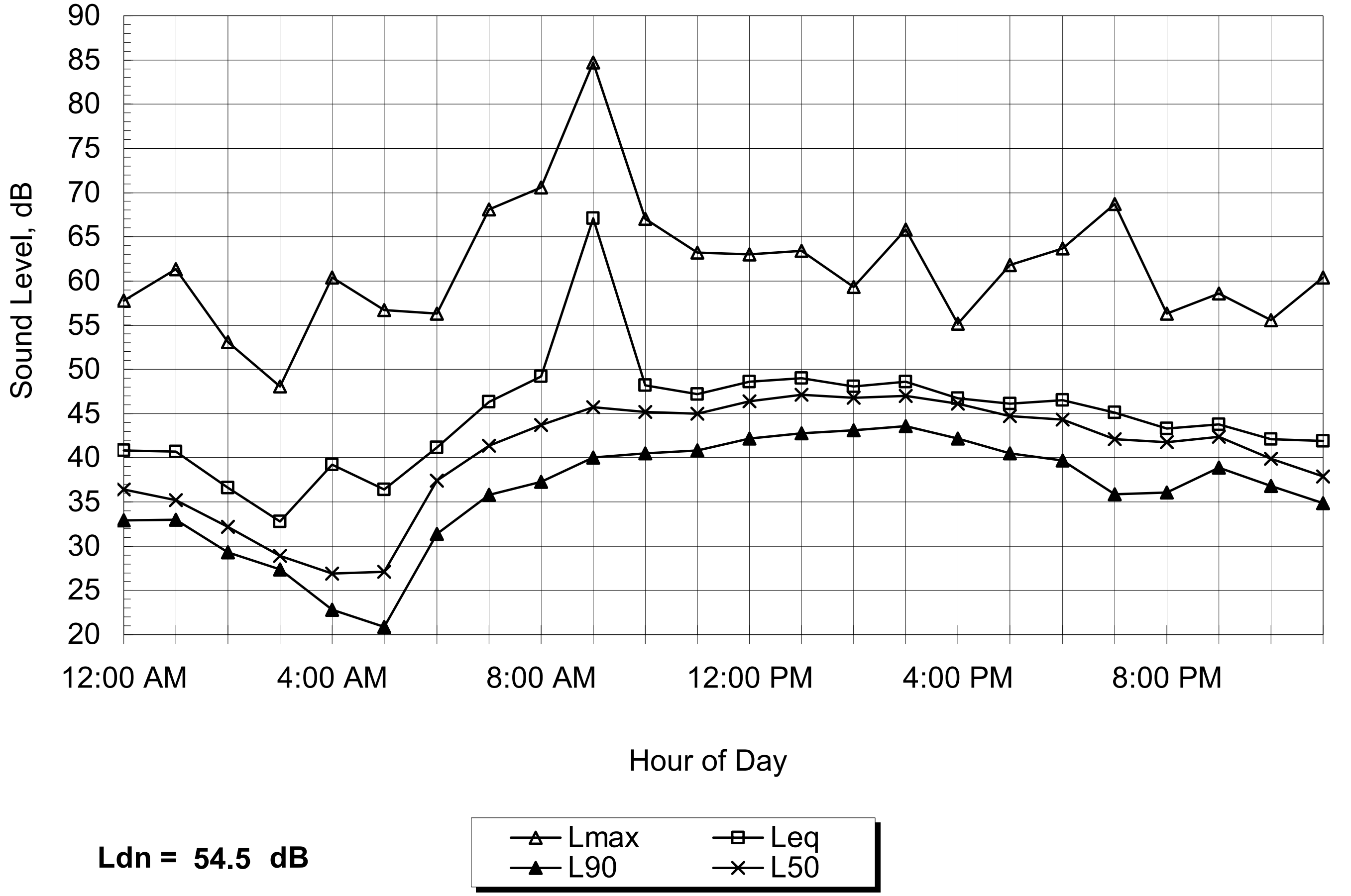
July 30, 2004



Ldn = 50.0 dB

Figure B-8: Measured Hourly Noise Levels

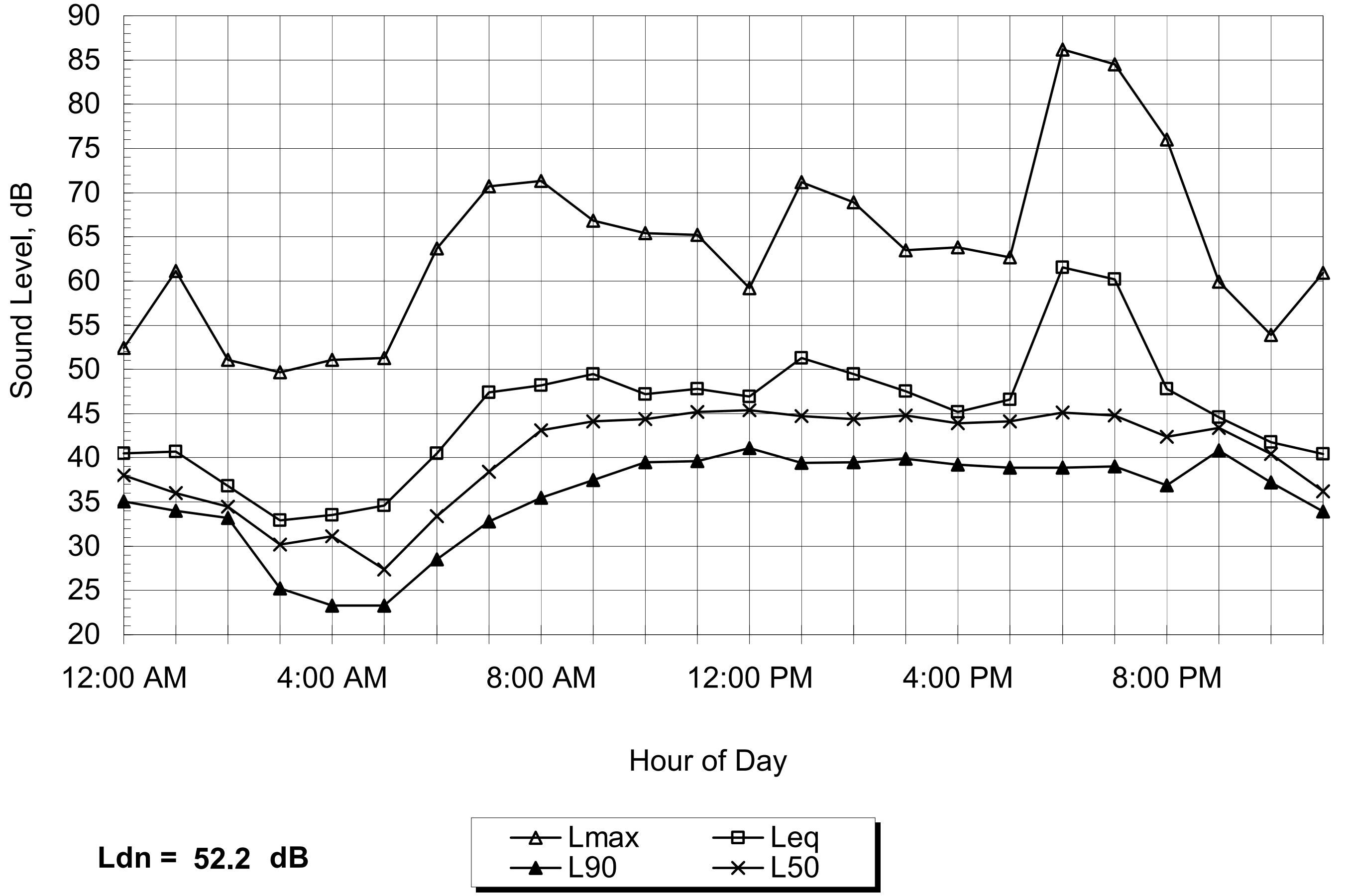
14316 Tim Burr Lane
July 31, 2004



Ldn = 54.5 dB

Figure B-9: Measured Hourly Noise Levels

14316 Tim Burr Lane
August 1, 2004

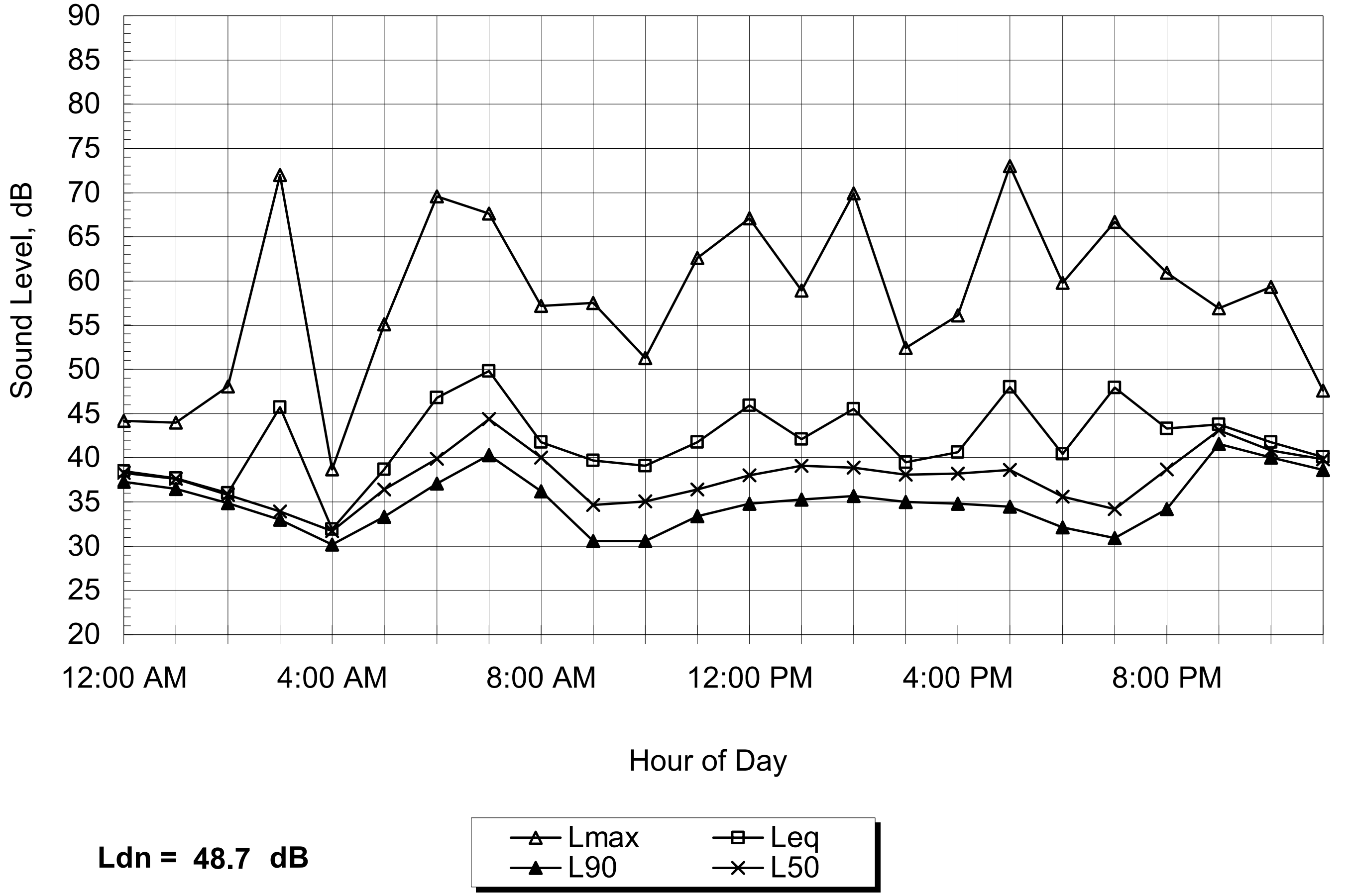


Ldn = 52.2 dB

Figure B-10: Measured Hourly Noise Levels

12034 Cordell Court

July 30, 2004

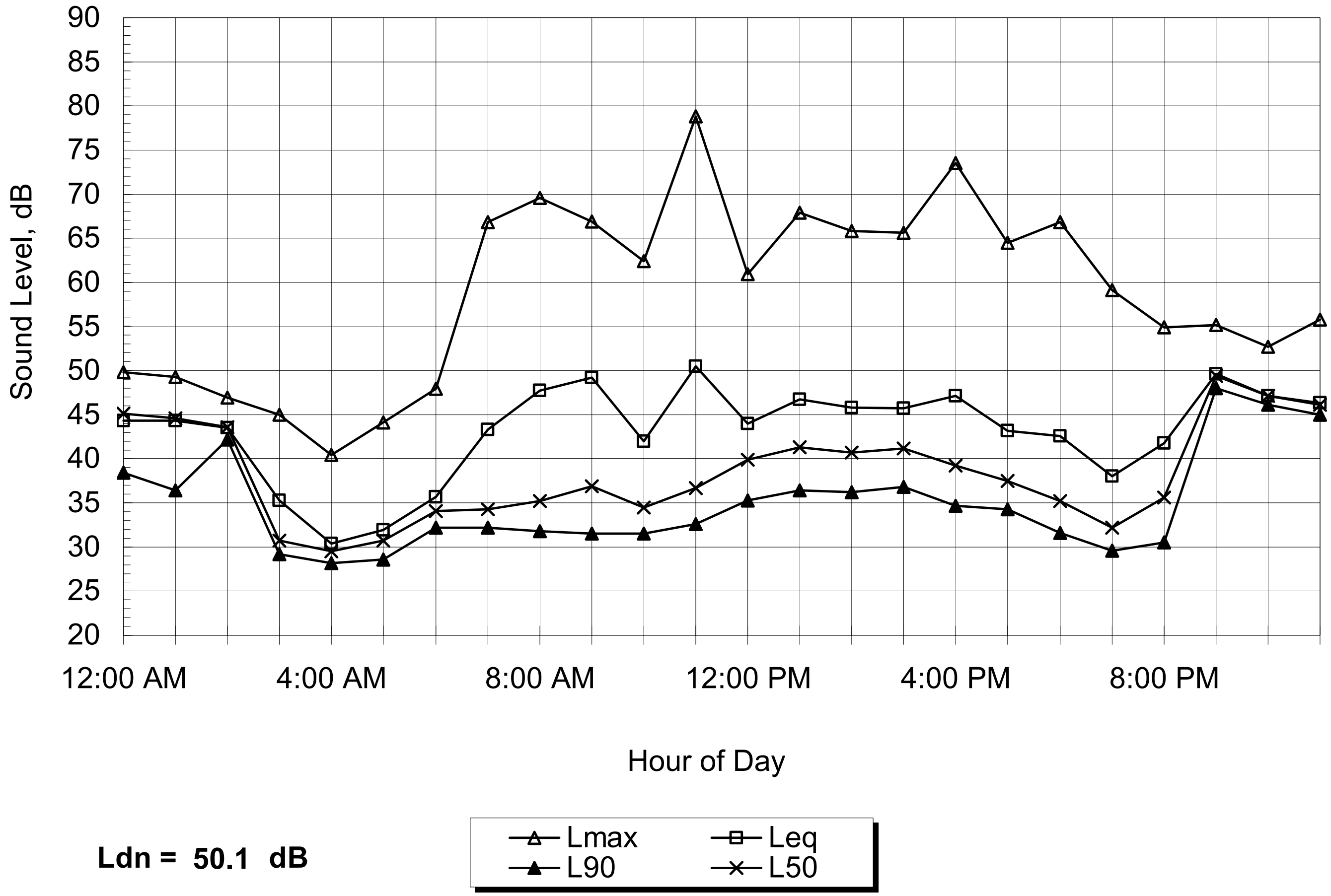


Ldn = 48.7 dB

Figure B-11: Measured Hourly Noise Levels

12034 Cordell Court

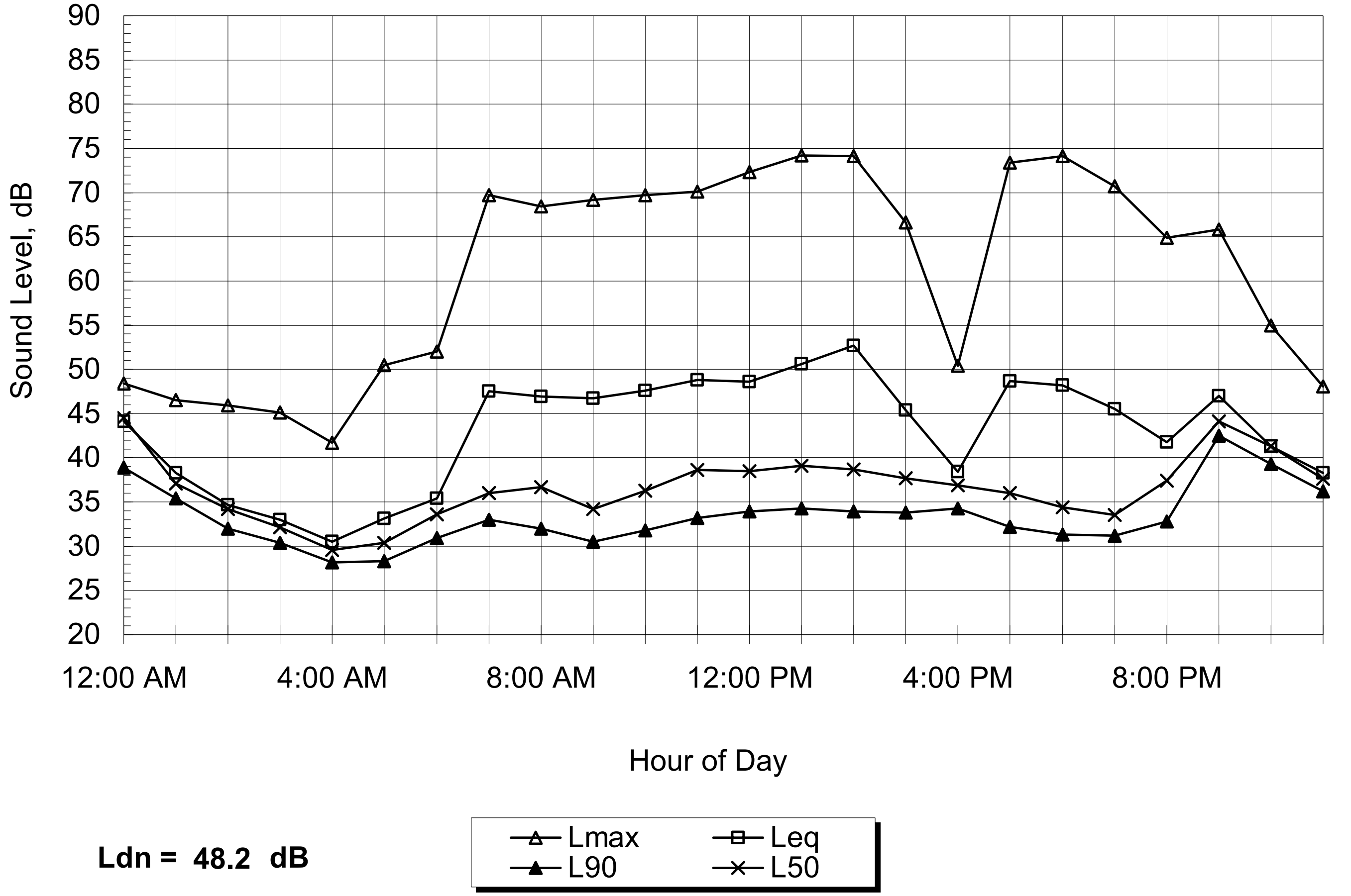
July 31, 2004



Ldn = 50.1 dB

Figure B-12: Measured Hourly Noise Levels

12034 Cordell Court
August 1, 2004

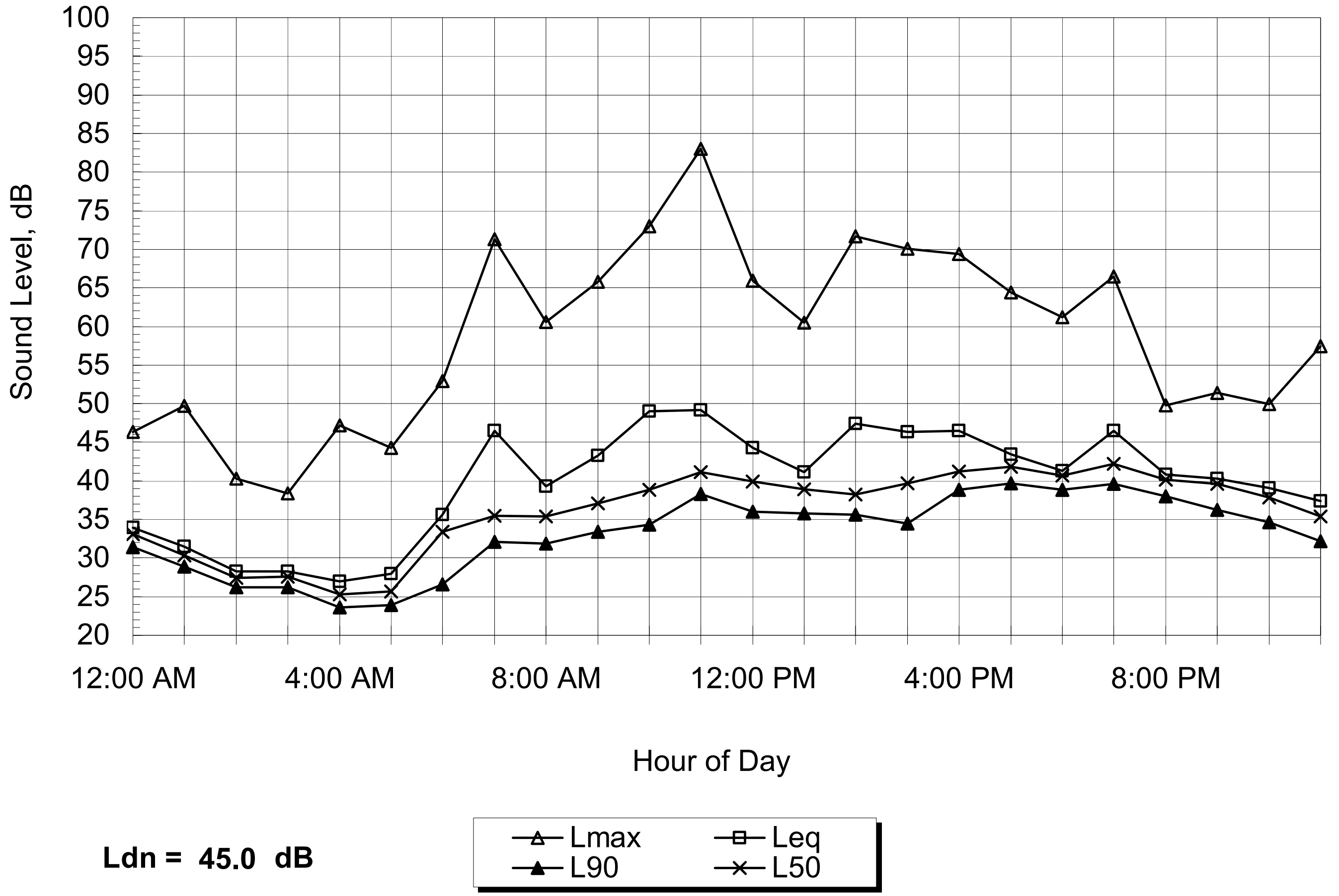


Ldn = 48.2 dB

Figure B-13: Measured Hourly Noise Levels

400 Feet No. of E. Bennett Road

September 18, 2004

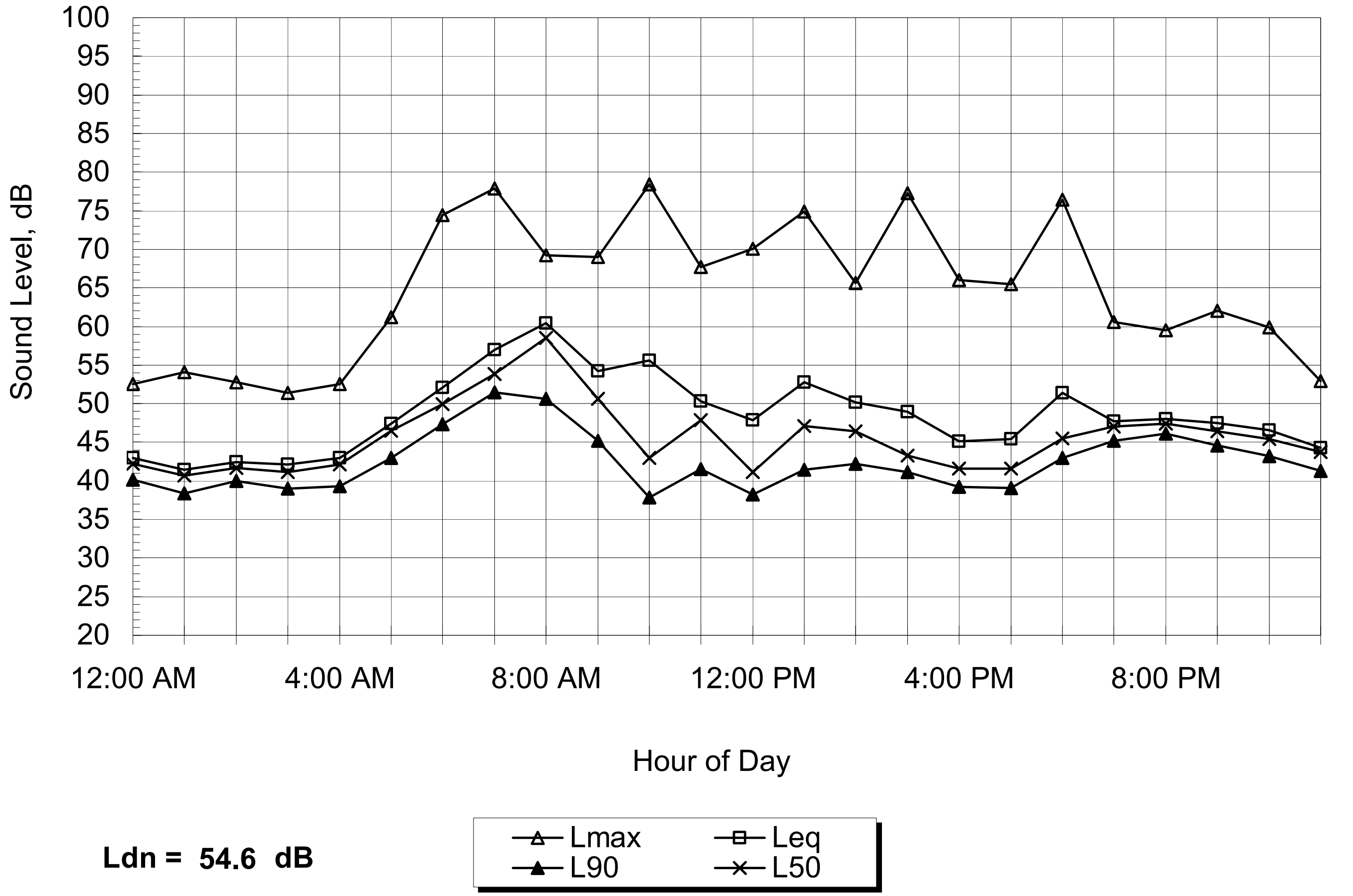


Ldn = 45.0 dB

Figure B-14: Measured Hourly Noise Levels

400 Feet No. of E. Bennett Road

September 23, 2004



Ldn = 54.6 dB

Figure 1
Ambient Noise Measurement Sites
Idaho-Maryland Mine Project