ENVIRONMENTAL NOISE ANALYSIS

GRANITE ESPARTO AGGREGATE PLANT

Yolo County, California

BBA Project No. 07-222

Prepared For

Granite Construction Company
4001 Bradshaw Road
Sacramento, CA 95827

Revised
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Prepared By

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SETTING

To describe the project setting in terms of ambient noise levels, Brown-Buntin Associates, Inc. (BBA) conducted noise measurements at four locations in the project vicinity. Noise measurements were conducted continuously over a twenty-four hour period, and the results were summarized on an hourly basis. Two of the noise monitoring sites were selected to represent existing noise levels in noise-sensitive areas that are potentially affected by noise associated with project activity. The other two sites were selected to describe noise levels due to the existing Granite Capay aggregate plant, located immediately west of the proposed project site. The noise monitoring sites are shown by Figure 1.

Ambient noise measurements were conducted in terms of A-weighted sound pressure levels[1] (sound levels) in decibels re: 20 micropascals. A-weighted sound pressure levels are well correlated with human response to the loudness and pitch of sounds, and are commonly used to assess the reaction of people to environmental noise.

Noise measurements were performed using Larson Davis Model 820 precision integrating sound level meters fitted with Bruel & Kjaer (B&K) Type 4176 microphones and random incidence correctors. The microphones were protected with B&K windscreens, and were mounted on booms or tripods at a height of about 5 feet above ground, in a vertical orientation. The sound level meters were calibrated before use with a B&K Type 4230 acoustical calibrator certified by its manufacturer to be consistent with reference sound pressure levels maintained by the National Bureau of Standards.

Weather during the May 15-17, 2007, measurement period was moderate and dry, with daytime high temperatures in the range of 75 degrees F. Winds were light.

Measurement site 1 was located near the residence at the Capay Canyon Ranch. During the measurement period, it was noted that the grass near the monitoring unit was mowed. This activity accounted for the elevated noise levels during some daytime hours.

Measurement site 2 was located at the north property line of the nearest residence on Road 19A. There were no apparent unusual noise events at that site.

At both of these noise measurement sites, noise levels were elevated during nighttime hours, apparently due to insect sounds. Background noise levels in both cases were due to local and distant traffic and, potentially, existing aggregate plant operations.

Measurement site 3 was located at the northeast property line of the existing Granite Capay aggregate plant. This measurement site allowed a clear line of sight to the aggregate plant and truck traffic.

Measurement site 4 was located at the south property line of the existing Granite Capay aggregate plant. This measurement site also allowed a clear line of sight to the aggregate plant, but was shielded from most truck traffic.

[1] See Appendix A for definitions of acoustical terminology.

During the measurement period, the Capay aggregate plant was reported to be operating from 5:00 a.m. to noon each day.

At Site 4, at the south property boundary of the Capay aggregate plant, the noise measurement data indicated elevated noise levels during a two-hour period between 10 p.m. and midnight on May 16, 2007. This caused the CNEL value for that date to be substantially higher than measured on the date before. The noise source responsible for these elevated noise levels could not be identified, but was not likely to have been caused by Granite activities, as the plant was not operating, and no Granite staff members were on the site at that time.

Graphical illustrations of the hourly noise level statistics for these sites are provided by Figures B-1 through B-14 in Appendix B. Tables I through IV summarize the noise measurement data at each site in terms of the hourly equivalent level (L_{eq}) and the Community Noise Equivalent Level (CNEL) for each full 24-hour period.

Figure 1
Noise Measurement and Receiver Sites
Granite Esparto Plant Vicinity: May 14-17, 2007

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Table I Measured Noise Levels Capay Canyon Ranch (Site 1)			
Date	**Hour**	**Hourly Leq, dB**	**Daily CNEL, dB**
May 15, 2007	10:00:00	52.5	N/A
	11:00:00	53.0	
	12:00:00	54.0	
	13:00:00	53.5	
	14:00:00	49.7	
	15:00:00	50.6	
	16:00:00	50.4	
	17:00:00	47.2	
	18:00:00	44.1	
	19:00:00	46.6	
	20:00:00	45.3	
	21:00:00	46.8	
	22:00:00	46.0	
	23:00:00	47.5	
May 16, 2007	0:00:00	41.3	60.4
	1:00:00	41.2	
	2:00:00	35.3	
	3:00:00	35.2	
	4:00:00	40.4	
	5:00:00	57.7	
	6:00:00	59.5	
	7:00:00	65.3	
	8:00:00	55.5	
	9:00:00	55.0	
	10:00:00	60.9	
	11:00:00	61.9	
	12:00:00	54.6	
	13:00:00	57.6	
	14:00:00	63.5	
	15:00:00	55.8	
	16:00:00	54.6	
	17:00:00	48.1	
	18:00:00	46.9	
	19:00:00	44.8	
	20:00:00	42.9	
	21:00:00	41.9	
	22:00:00	42.9	
	23:00:00	39.7	
May 17, 2007	0:00:00	38.0	N/A
	1:00:00	36.6	
	2:00:00	38.6	
	3:00:00	37.4	
	4:00:00	40.6	
	5:00:00	58.0	
	6:00:00	66.6	
	7:00:00	51.3	

Table II Measured Noise Levels Residence at Road 19A (Site 2)			
Date	**Hour**	**Hourly Leq, dB**	**Daily CNEL, dB**
May 15, 2007	10:00:00	45.0	N/A
	11:00:00	39.9	
	12:00:00	37.3	
	13:00:00	41.9	
	14:00:00	40.8	
	15:00:00	39.9	
	16:00:00	41.4	
	17:00:00	38.2	
	18:00:00	42.1	
	19:00:00	42.8	
	20:00:00	53.9	
	21:00:00	56.7	
	22:00:00	54.8	
	23:00:00	56.7	
May 16, 2007	0:00:00	56.3	58.5
	1:00:00	54.9	
	2:00:00	36.7	
	3:00:00	36.5	
	4:00:00	38.7	
	5:00:00	43.0	
	6:00:00	46.2	
	7:00:00	43.3	
	8:00:00	41.0	
	9:00:00	41.1	
	10:00:00	40.6	
	11:00:00	39.3	
	12:00:00	38.5	
	13:00:00	40.6	
	14:00:00	38.4	
	15:00:00	35.5	
	16:00:00	37.0	
	17:00:00	35.5	
	18:00:00	37.3	
	19:00:00	39.0	
	20:00:00	51.5	
	21:00:00	56.4	
	22:00:00	56.6	
	23:00:00	53.9	
May 17, 2007	0:00:00	54.6	N/A
	1:00:00	55.9	
	2:00:00	54.3	
	3:00:00	54.6	
	4:00:00	51.2	
	5:00:00	44.4	
	6:00:00	46.1	
	7:00:00	42.1	

Table III Measured Noise Levels Capay Plant: Northeast Property Boundary (Site 3)			
Date	**Hour**	**Hourly Leq, dB**	**Daily CNEL, dB**
May 14, 2007	11:00:00	53.3	N/A
	12:00:00	53.4	
	13:00:00	51.2	
	14:00:00	54.0	
	15:00:00	44.8	
	16:00:00	40.2	
	17:00:00	44.5	
	18:00:00	53.3	
	19:00:00	49.3	
	20:00:00	49.1	
	21:00:00	44.2	
	22:00:00	44.3	
	23:00:00	45.6	
May 15, 2007	0:00:00	45.0	57.6
	1:00:00	44.8	
	2:00:00	42.0	
	3:00:00	42.1	
	4:00:00	44.8	
	5:00:00	53.2	
	6:00:00	58.4	
	7:00:00	60.9	
	8:00:00	54.8	
	9:00:00	52.2	
	10:00:00	52.4	
	11:00:00	50.9	
	12:00:00	49.1	
	13:00:00	46.7	
	14:00:00	49.7	
	15:00:00	44.6	
	16:00:00	48.7	
	17:00:00	52.7	
	18:00:00	49.6	
	19:00:00	43.1	
	20:00:00	50.9	
	21:00:00	43.9	
	22:00:00	44.6	
	23:00:00	41.3	
May 16, 2007	0:00:00	43.3	N/A
	1:00:00	45.5	
	2:00:00	42.7	
	3:00:00	42.3	
	4:00:00	46.3	
	5:00:00	53.8	
	6:00:00	59.8	
	7:00:00	56.9	
	8:00:00	55.6	
	9:00:00	54.8	

Table III Measured Noise Levels Capay Plant: Northeast Property Boundary (Site 3)			
Date	**Hour**	**Hourly Leq, dB**	**Daily CNEL, dB**
	10:00:00	50.6	
	11:00:00	52.1	
	12:00:00	51.8	
	13:00:00	50.6	
	14:00:00	48.0	
	15:00:00	43.1	
	16:00:00	44.2	
	17:00:00	47.4	
	18:00:00	45.7	
	19:00:00	45.0	
	20:00:00	50.8	
	21:00:00	46.8	
	22:00:00	51.2	
	23:00:00	51.4	
May 17, 2007	0:00:00	45.0	N/A
	1:00:00	39.5	
	2:00:00	41.3	
	3:00:00	42.3	
	4:00:00	44.0	
	5:00:00	53.9	
	6:00:00	57.6	
	7:00:00	55.4	

Table IV Measured Noise Levels Capay Plant: South Property Boundary at West End of Berm (Site 4)			
Date	**Hour**	**Hourly Leq, dB**	**Daily CNEL, dB**
May 14, 2007	11:00:00	58.6	N/A
	12:00:00	55.5	
	13:00:00	53.6	
	14:00:00	52.2	
	15:00:00	46.6	
	16:00:00	41.7	
	17:00:00	39.4	
	18:00:00	34.2	
	19:00:00	37.6	
	20:00:00	38.9	
	21:00:00	43.8	
	22:00:00	45.1	
	23:00:00	43.9	
May 15, 2007	0:00:00	43.5	56.3
	1:00:00	42.6	
	2:00:00	43.7	
	3:00:00	41.1	
	4:00:00	43.3	
	5:00:00	54.0	
	6:00:00	56.6	
	7:00:00	55.2	

Table IV Measured Noise Levels Capay Plant: South Property Boundary at West End of Berm (Site 4)			
Date	**Hour**	**Hourly Leq, dB**	**Daily CNEL, dB**
	8:00:00	55.3	
	9:00:00	55.8	
	10:00:00	54.9	
	11:00:00	54.8	
	12:00:00	49.1	
	13:00:00	47.2	
	14:00:00	46.7	
	15:00:00	43.9	
	16:00:00	36.3	
	17:00:00	42.9	
	18:00:00	38.2	
	19:00:00	37.6	
	20:00:00	41.4	
	21:00:00	40.6	
	22:00:00	42.4	
	23:00:00	39.4	
May 16, 2007	0:00:00	38.6	67.3
	1:00:00	44.3	
	2:00:00	42.7	
	3:00:00	40.8	
	4:00:00	45.0	
	5:00:00	55.8	
	6:00:00	57.4	
	7:00:00	58.0	
	8:00:00	57.0	
	9:00:00	56.6	
	10:00:00	56.5	
	11:00:00	55.5	
	12:00:00	51.0	
	13:00:00	48.1	
	14:00:00	47.9	
	15:00:00	42.8	
	16:00:00	41.2	
	17:00:00	40.1	
	18:00:00	39.8	
	19:00:00	45.3	
	20:00:00	40.6	
	21:00:00	52.6	
	22:00:00	67.2	
	23:00:00	68.0	
May 17, 2007	0:00:00	56.2	N/A
	1:00:00	39.1	
	2:00:00	40.3	
	3:00:00	40.6	
	4:00:00	42.2	
	5:00:00	53.9	
	6:00:00	55.9	
	7:00:00	56.0	

Traffic Noise:

Traffic on Roads 19 and 87 is a noticeable noise source in the project vicinity. Noise levels due to traffic on Roads 19 and 87 were predicted using the Federal Highway Administration Highway Traffic Noise Prediction Model (FHWA-RD-77-108). The FHWA model is an analytical method that has long been favored for traffic noise prediction by state and local agencies, and has been applied to numerous federal and state roadway projects by the California Department of Transportation (Caltrans). The model is based upon the CALVENO (California/Nevada) 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} or CNEL values, it is necessary to determine the day/evening/night distribution of traffic and to adjust the traffic volume input data to yield an equivalent hourly traffic volume.

For the traffic noise impact analysis, it was assumed that a representative noise exposure would occur at a reference distance of 50 feet from the centerline of the roadway, which is about the closest to the roadway that a residence might be located.

The traffic analysis prepared by TPG Consulting, Inc. was used to calculate Annual Average Daily Traffic (ADT) volumes for Roads 19 and 87 for existing conditions. Truck mix was estimated from observations of existing traffic distributions. Day/evening/night distribution of traffic noise was assumed to be 86.9%/0.5%/12.6% for existing and future conditions, based on the ambient noise measurement results at the Capay Valley Ranch. Average vehicle speed was assumed to be 55 mph.

Table V lists the traffic noise modeling results in terms of the Community Noise Equivalent Level (CNEL).

TABLE V
PREDICTED TRAFFIC NOISE LEVELS
Existing Conditions

Roadway	Predicted CNEL, dB, at 50 feet from Centerline				Distances from Centerline to CNEL Contours, feet		
	Autos	Medium Trucks	Heavy Trucks	Total	60 dB	65 dB	70 dB
Road 87 south of site	54.1	51.9	51.8	57.5	34	16	7
Road 87 north of site	54.1	51.3	66.7	67.1	149	69	32
Road 19	51.5	52.3	69.2	69.3	210	97	45

The predicted distances to the CNEL 60 dB and 65 dB contours indicate that the noise from traffic on Roads 19 and 87 dominates the noise environment at receivers located immediately adjacent to the roadway, north of the project site. Noise levels along Road 87 north of the

project driveway are elevated in general due to the existing truck traffic from the Granite Capay plant. Noise levels along Road 19 are elevated in general due to the existing truck traffic from the Granite Capay aggregate plant and the Teichert aggregate plant.

REGULATORY SETTING

State of California

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. A significant effect from noise may exist if a project would result in:

- exposure of persons to, or generation of, noise levels in excess of standards established in the local General Plan or noise ordinance, or applicable standards of other agencies;
- exposure of persons to or generation of excessive groundborne vibration or groundborne noise levels;
- a substantial permanent increase in ambient noise levels in the project vicinity above levels existing without the project; or
- a substantial temporary or periodic increase in ambient noise levels in the project vicinity above levels existing without the project.

Local Standards

Local jurisdiction standards include the Yolo County Off-Channel Surface Mining Ordinance, adopted July 30, 1996. The specific standards of concern at the property boundary and adjacent uses are found in the following sections

Section 10-4.421. Noise: General standard.

From 6:00 a.m. to 6:00 p.m., noise levels shall not exceed an average noise level equivalent (Leq) of eighty (80) decibels (dBA) measured at the property boundaries of the site. However, noise levels shall not exceed an average noise level equivalent (Leq) of sixty (60) decibels (dBA) for any nearby off-site residences or other noise-sensitive land uses.

From 6:00 p.m. to 6:00 a.m., noise levels shall not exceed an average noise level equivalent (Leq) of sixty-five (65) decibels (dBA) measured at the property boundaries of the site.

At no time shall noise levels exceed a community noise equivalent (CNEL) of sixty (60) decibels (dBA) for any existing residence or other noise-sensitive land use. An existing residence shall be considered the property line of any residentially zoned area or, in the case of agricultural land, any occupied off-site residential structures. Achieving the noise standards may involve setbacks, the use of quieter equipment adjacent to residences, the construction of landscaped berms between mining activities and residences, or other appropriate measures.

Section 10-4.422. Noise Sonic safety devices.

If mining occurs within fifteen hundred (1500) feet of residences, equipment used during nighttime activities shall be equipped with non-sonic warning devices consistent with the California Office of Safety Hazard Administration (Cal OSHA) regulations, which may include fencing of the area to avoid pedestrian traffic, adequate lighting of the area, and placing an observer in clear view of the equipment operator to direct backing operations. Prior to commencement of operations without sonic warning devices, operators shall file a variance request with the California OSHA Standards Board showing that the proposed operation would provide equivalent safety to adopted safety procedures, including sonic warning devices.

Section 10-4.423. Noise: Traffic.

Operators shall provide acoustical analysis for future truck and traffic noise associated with the individual operations along County roadways identified as experiencing significant impacts due to increased traffic noise. The study shall identify noise levels at adjacent noise-sensitive receptors and ways to control the noise to the "normally acceptable" goal of a CNEL of sixty (60) dB and reduce the increase over existing conditions to five (5) dB or less. Typical measures that can be employed include the construction of noise barriers (wood or masonry), earthen berms, or re-routing of truck traffic.

Measures of Changes in Ambient Noise Levels

For non-transportation noise sources affecting noise sensitive land uses, many jurisdictions consider an increase in ambient noise levels of 5 dB to be potentially significant. This amount of change in environmental noise levels is generally considered to be the minimum required to be clearly noticeable by most people. This measure may be applied to median or energy-average ambient noise levels, whichever is a better measure of potential annoyance in the noise environment.

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 VI are expected to result in equal changes in annoyance at sensitive land uses.

TABLE VI 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.	

CRITERIA FOR DETERMINING SIGNIFICANCE

Adverse impacts related to noise are considered significant if the proposed project would:

- Expose persons to or generate noise levels in excess of standards established in the local general plan or noise ordinance, or applicable standards of other federal or state agencies.
- Result in a substantial permanent increase in ambient noise levels in the project vicinity above levels existing without the project; or
- Result in a substantial temporary or periodic increase in ambient noise levels in the project vicinity above levels existing without the project.

The relevant local standards for this project are:

- During daytime hours (6 a.m. to 6 p.m.), the noise level standard at the project boundary is 80 dB L_{eq}.
- During daytime hours (6 a.m. to 6 p.m.), the noise level standard at off-site residences or noise sensitive uses is 60 dB L_{eq}.
- During nighttime hours (6 p.m. to 6 a.m.), the noise level standard at the project boundary is 65 dB L_{eq}.
- The cumulative noise level standard for any existing residence or other noise-sensitive land use is 60 dB CNEL.

Substantial increases in ambient noise levels are defined for this project as:

- For non-transportation noise sources affecting noise sensitive land uses, an increase in ambient median noise levels of 5 dB or more.
- Changes in ambient traffic noise levels exceeding the values listed in Table VI.

PROJECT NOISE IMPACT ANALYSIS

Mine Operations

The project noise impact analysis for the Granite Esparto Plant was prepared by applying the measured noise levels and frequency content of representative noise sources to the Environmental Noise Model (ENM). The ENM is a commercially-available noise propagation model that accepts input of noise levels and frequency content for a number of sources, located on a topographic base map of the project vicinity. The ENM then predicts noise propagation in term of noise levels at selected receivers, or in terms of noise contours, accounting for the effects of atmospheric and ground absorption of sound, and of the shielding provided by topography.

Noise level data for the sources expected to be used at the Esparto Plant were obtained primarily from noise measurements conducted in 2007 at the existing Granite Construction aggregate processing plant in Capay, California. Noise sources that were quantified at the Capay plant included crushers and screens, and aggregate truck loading. Additional data for a scraper and bulldozer were obtained from BBA file data for other Granite operations in California and Nevada.

The equipment used for the noise and frequency content measurements was a Larson Davis Model 824 precision integrating sound level meter and frequency analyzer fitted with a Larson Davis Model 2541 free-field microphone, meeting the specifications of the American National Standards Institute (ANSI) for Type 1 sound measurement systems. The noise measurement system was calibrated before use with a Larson Davis Model CA-250 acoustical calibrator certified by its manufacturer to be consistent with reference values maintained by the National Bureau of Standards.

It was assumed for this analysis that the Esparto aggregate processing plant would be similar in design to the Granite Capay plant. The plant would include three large crushers and four small screens. The highest noise source would be the primary crusher and screen, with the highest point (the screens) placed about 72 feet above ground.

To prepare the data for use in the ENM, the measured noise levels were entered into the ENM in terms of octave band sound pressure levels, referring to the measurement distance. The ENM was then calibrated for each source to predict the same value in each octave band as was measured in the field. For most noise sources, the data were entered as hourly equivalent noise levels (L_{eq}). For sound sources that were not continuous in nature, such as loader operations, the data were entered as Sound Exposure Levels (SEL), and adjustments were made to derive the L_{eq} based upon the projected numbers of operations per hour at the Esparto Plant. Table VII summarizes the noise measurement data used for this analysis.

To provide a topographic base map for the ENM, BBA assumed that the ground was essentially level. The noise sources were placed on the ENM base map at representative heights above the ground surface, based upon the equipment observed at the Capay Plant and other similar project sites. The receiver sites selected for this analysis are the four nearest residences, two of which

were the noise monitoring locations assessed in the noise setting portion of this report. This method allows comparison of predicted project-related and ambient noise levels.

The ENM accounts for atmospheric absorption of sound, considering the factors of temperature and relative humidity. It can also account for the effects of wind speed and direction, and for the presence of inversions. To provide a consistent basis for noise level predictions, a standard temperature of 20 degree Celsius (68 degrees Fahrenheit) was assumed, and the relative humidity was taken to be 30%. The wind was assumed to be still, and a normal lapse rate (no inversions) was assumed.

The effects of changes in temperature and humidity upon sound propagation are generally slight, so that variations in predicted noise levels within the range of temperature and relative humidity found in the project area would be insubstantial.

Winds can affect sound propagation, generally by increasing noise levels downwind, and decreasing noise levels upwind. However, wind effects are difficult to predict reliably, as the range of wind speeds and directions experienced during even one night can be quite broad.

Similarly, inversions or wind gradients can enhance sound propagation at distances of ¼ mile or more, but the variables affecting inversion or gradient altitudes are unpredictable. Experience has shown that noise levels measured at large distances (greater than ¼ mile) from industrial noise sources can vary over a range of 5 to 10 dB when inversions are present. In some cases, the noise source may be noticeable at one receiver, and absent at a receiver closer to the source.

The noise level predictions made for this project assume a uniform atmosphere with no wind. It should be recognized that atmospheric effects may cause the actual project noise levels to be either higher or lower than predicted by the ENM. However, the modeled noise levels provide a reasonable basis for judging the likely noise impacts of this project.

TABLE VII
SOURCE NOISE LEVEL MEASUREMENT ASSUMPTIONS SUMMARY
Esparto Plant Project

Source	Distance, feet	Sound Pressure Level, dB at Octave Band Center Frequency, Hz*										
		16	31.5	63	125	250	500	1K	2K	4K	8K	16K
SC1 crusher + screens	80	--	88.4	83.4	77.8	77.7	75.3	73.9	74.3	73.4	68.2	58.9
SC3 crusher + screens	30	--	78.6	78.2	77.6	76.8	73.4	71.7	73.0	71.4	67.5	59.9
SC4 crusher + screens	50	--	78.8	75.9	72.9	72.8	71.6	73.6	74.1	73.9	70.5	61.4
C25 screen	60	--	81.4	79.9	77.0	73.4	71.5	71.5	71.7	71.0	66.8	59.3
C22 screen	50	--	81.0	78.3	77.2	76.2	72.8	72.4	72.4	71.9	67.5	57.6
C38 screen	25	--	77.6	74.8	73.5	75.2	72.6	73.4	75.6	74.3	74.3	68.6
C39 screen	25	--	76.4	76.2	74.7	74.3	72.9	74.9	77.6	76.4	71.6	64.8
Load Aggregate Truck**	150	--	98.3	96.3	95.4	90.6	87.4	86.7	84.3	84.3	83.1	73.1
Cat Bulldozer	50	--	72	93	80	79	78	76	73	70	63	54
Scrapers**	50	--	94.4	93.2	93.6	92.5	92.4	89.8	88.5	84.2	76.9	71.1

* Leq unless otherwise indicated.
** Sound Exposure Level (SEL) for one event
Note: 16 Hz data not reported, as the ENM does not predict levels at frequencies below 25 Hz.

The following factors were used to adjust the SEL values to reflect typical hourly activity levels and to calculate L_{eq} values:

- Aggregate truck loading cycle: 17 per hour
- Scraper use at mining area: 42 trips per hour

Average Hourly Noise Levels

Three cases of noise modeling have been prepared for the Esparto Plant using the ENM. The cases were selected to include mining at the existing ground surface near the property boundaries closest to residences. The first case represents mining in the eastern portion of Phase 1B. In this case, mining occurs near the northeast project boundary. The second case represents mining in the northeast portion of Phase 2, and mining occurs near the east project boundary near Road 19A. The third case represents mining in the southeast portion of Phase 2, where mining occurs in the southwest corner of the phase boundary, nearest the houses south of Cache Creek.

For all three cases, the aggregate plant was assumed to be centered near the southwest boundary of the project site. It was also assumed that the project design would include an 18-foot high

berm at the south side of the plant site, and a 6-foot high landscape berm along Road 87. Figure 2 shows the assumed phase and plant locations.

For each case, the ENM was run to predict hourly noise levels assuming that the equipment was in continuous use, except as noted for the aggregate loading and scraper operations.

The predicted average noise levels for each of the above project phases at each of the nearest residences are listed in Tables VIII through X. The receiver sites are shown by Figure 1.

The ambient noise level data for each of the sites listed in Tables VIII through X were carefully reviewed to select reasonable bases for comparison to the relatively steady-state noise levels produced by the proposed mining operation (as perceived at a distance). For this purpose, the ambient noise level was assumed to be represented by measured hourly median noise levels (L_{50}) at the quietest part of the day between 6 a.m. and 6 p.m. The assumed ambient noise level was the arithmetic average of the hourly median noise levels of the quietest contiguous 4-hour period of the quietest day.

In Tables VIII through X, the shaded cells indicate the locations where the project is predicted to cause potentially significant changes in hourly noise levels.

Figure 2
Project Boundaries and Phases
Granite Esparto Plant

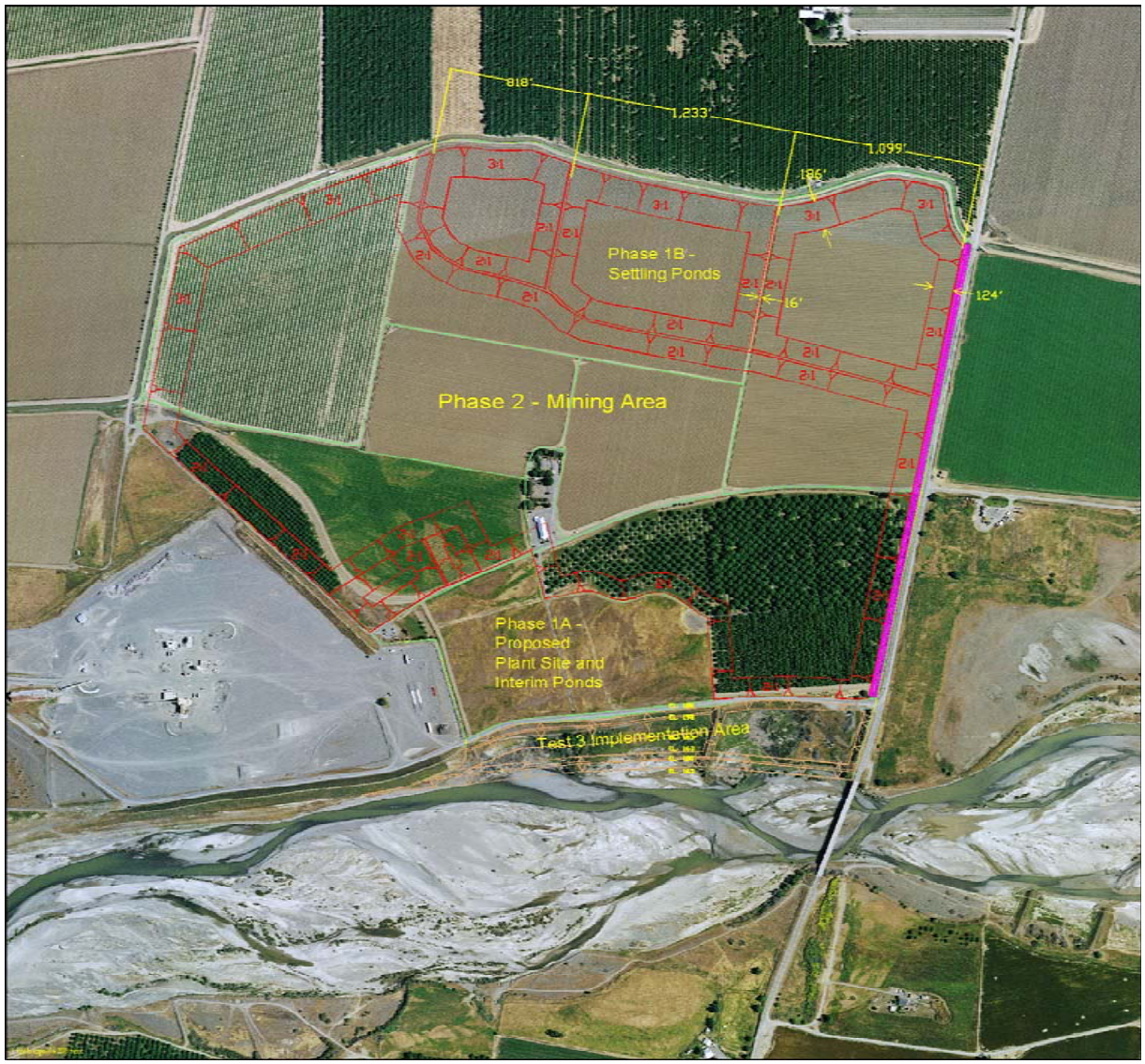

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TABLE VIII
COMPARISON OF PREDICTED AND AMBIENT HOURLY NOISE LEVELS
PHASE 1B - Eastern Settling Pond
Esparto Plant Project

Receiver	Description	Project Leq, dB	Ambient L50, dB	Project + Ambient, dB	Change, dB	Date of Ambient Measurements	Time Period
1	Capay Valley Ranch	47.2	47	50.1	3.1	5/16/07	2 p.m. to 6 p.m.
2	Residence - Road 19A	45.8	34	46.1	12.1	5/16/07	2 p.m. to 6 p.m.
3	Residence south of site - east	48.4	40	49.0	9.0	Est.	
4	Residence south of site - west	43.3	40	45.0	1.7	Est.	

TABLE IX
COMPARISON OF PREDICTED AND AMBIENT HOURLY NOISE LEVELS
PHASE 2 – Northeast Portion
Esparto Plant Project

Receiver	Description	Project Leq, dB	Ambient L50, dB	Project + Ambient, dB	Change, dB	Date of Ambient Measurements	Time Period
1	Capay Valley Ranch	42.5	47	48.3	1.3	5/16/07	2 p.m. to 6 p.m.
2	Residence - Road 19A	47.7	34	47.9	13.9	5/16/07	2 p.m. to 6 p.m.
3	Residence south of site - east	48.5	40	49.1	9.1	Est.	
4	Residence south of site - west	43.4	40	45.0	5.0	Est.	

TABLE X
COMPARISON OF PREDICTED AND AMBIENT HOURLY NOISE LEVELS
PHASE 2 – Southeast Portion
Esparto Plant Project

Receiver	Description	Project Leq, dB	Ambient L50, dB	Project + Ambient, dB	Change, dB	Date of Ambient Measurements	Time Period
1	Capay Valley Ranch	41.5	47	48.1	1.1	5/16/07	2 p.m. to 6 p.m.
2	Residence - Road 19A	44.2	34	44.6	10.6	5/16/07	2 p.m. to 6 p.m.
3	Residence south of site – east	48.8	40	49.3	9.3	Est.	
4	Residence south of site - west	43.5	40	45.1	5.1	Est.	

The ENM was also used to prepare noise contours for the above scenarios in terms of the average noise level (L_{eq}). The 60 dB, 65 dB and 80 dB L_{eq} contours are depicted by Figures 3, 4, and 5. These contours show that the 80 dB L_{eq} daytime noise standard and the 65 dB L_{eq} nighttime noise standard are satisfied by the aggregate plant on the project site.

No residences are located within the 60 dB L_{eq} noise contours.

The data presented in Tables VIII-X indicate that the project would result in significant changes in ambient noise levels at certain of the nearest houses when mining begins in Phases 1B, and 2. These scenarios assume that the mining occurs at existing ground level. In practice, this condition would be of relatively short duration, as the mining would cause the noise sources to move lower into the mined area. The mining noise sources would soon be shielded by the excavation, so that the mining noise levels would be reduced by 5 to 10 dB after the mine reaches a depth of 10 feet or so. At that point, mining noise would be less than significant.

After the mine depth reaches about 45 feet below existing ground, the bulldozers and scrapers would be replaced by a drag line or dredge similar to that used at the existing Capay mining area west of the project site. This is not expected to be a significant noise source.

At the houses south of Cache Creek (Sites 3 and 4), the dominant noise sources after the mining sources move below ground would be the highest screens and crushers. These noise sources are expected to cause the noise levels to exceed ambient noise levels by 6 to 10 dB. This would be a potentially significant impact, but would be limited to the hours of plant operation. That is, only one hour of the nighttime period would be affected (6 a.m. to 7 a.m.), with the remainder of the increased noise exposure occurring during daytime hours.

Figure 3
Hourly Average Noise Level (Leq) Contours
Granite Esparto Plant
Phase 1B Operations at Northeast Corner

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Figure 4
Hourly Average Noise Level (Leq) Contours
Granite Esparto Plant
Phase 2 Operations at Northeast Corner

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Figure 5
Hourly Average Noise Level (Leq) Contours
Granite Esparto Plant
Phase 2 Operations in Southeast Portion

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Community Noise Equivalent Levels (CNEL)

For assessment of noise levels in terms of the Day-Night Level (L_{dn}), it was necessary to make certain assumptions about the hours of operation for the Esparto Plant. For this analysis, it was assumed that the plant would be in operation from 6 a.m. to 6 p.m. on any given day. Given these assumptions, the CNEL values would be about 0.6 dB lower than the L_{eq} values shown by Tables XII-XIV. Similarly, 0.6 dB should be subtracted from the L_{eq} contours, so that the 60 dB L_{eq} contour represents 59.4 dB CNEL, and the 65 dB L_{eq} contour represents 64.4 dB CNEL.

Ambient CNEL values were taken to be the quietest daily CNEL value observed during the continuous noise measurement periods.

Table XI through XIII list the predicted CNEL values for the proposed Esparto Plant operations in Phases 1B and 2, and provide a comparison to the measured ambient CNEL values. Based upon these values, the project is not predicted to cause potentially significant changes in ambient CNEL values.

TABLE XI
COMPARISON OF PREDICTED AND CNEL VALUES
PHASE 1B - Eastern Settling Pond
Esparto Plant Project

Receiver	Description	Project CNEL, dB	Ambient CNEL, dB	Project + Ambient, dB	Change, dB	Date of Ambient Measurements	Time Period
1	Capay Valley Ranch	46.6	60.4	60.6	0.2	5/16/07	24-hour
2	Residence - Road 19A	45.2	58.5	58.7	0.2	5/16/07	24-hour
3	Residence south of site – east	47.8	60	60.3	0.3	Est.	
4	Residence south of site - west	42.7	60	60.0	0	Est.	

TABLE XII
COMPARISON OF PREDICTED AND CNEL VALUES
PHASE 2 – Northeast Portion
Esparto Plant Project

Receiver	Description	Project CNEL, dB	Ambient CNEL, dB	Project + Ambient, dB	Change, dB	Date of Ambient Measurements	Time Period
1	Capay Valley Ranch	41.9	60.4	60.4	0	5/16/07	24-hour
2	Residence - Road 19A	47.1	58.5	58.8	0.3	5/16/07	24-hour
3	Residence south of site – east	47.9	60	60.3	0.3	Est.	
4	Residence south of site - west	42.8	60	60.1	0.1	Est.	

TABLE XIII
COMPARISON OF PREDICTED AND CNEL VALUES
PHASE 2 – Southeast Portion
Esparto Plant Project

Receiver	Description	Project CNEL, dB	Ambient CNEL, dB	Project + Ambient, dB	Change, dB	Date of Ambient Measurements	Time Period
1	Capay Valley Ranch	40.9	60.4	60.4	0	5/16/07	24-hour
2	Residence - Road 19A	43.6	58.5	58.6	0.1	5/16/07	24-hour
3	Residence south of site – east	48.2	60	60.3	0.3	Est.	
4	Residence south of site - west	42.9	60	60.1	0.1	Est.	

Traffic Noise

As noted in the Setting section of this document, traffic on Roads 19 and 87 is a potentially significant noise source. In general, traffic noise levels are highest in working hours after 5 a.m., and lowest from midnight to 4 a.m. The highest traffic noise level is expected to occur between 7 and 8 a.m., due to relatively high hourly traffic volumes.

Noise levels due to future (Year 2029) traffic on Roads 19 and 87 were predicted using the Federal Highway Administration Highway Traffic Noise Prediction Model (FHWA-RD-77-108). The FHWA model is an analytical method that has long been favored for traffic noise prediction by state and local agencies, and has been applied to numerous federal and state roadway projects by the California Department of Transportation (Caltrans). The model is based upon the CALVENO (California/Nevada) 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 CNEL values, it is necessary to determine the day/evening/night distribution of traffic and to adjust the traffic volume input data to yield an equivalent hourly traffic volume.

The traffic analysis prepared by TPG Consulting, Inc. was used to calculate Annual Average Daily Traffic (ADT) volumes for Roads 19 and 87 for future (Year 2029) conditions. Truck mix was estimated from observations of existing traffic distributions, and was adjusted for the future case to reflect the increase in truck traffic due to the project. Day/evening/night distribution of traffic noise was assumed to be 86.9%/0.5%/12.6% for existing and future conditions, based on the ambient noise measurement results at the Capay Valley Ranch. Average vehicle speed was assumed to be 55 mph.

Table XIV lists the future No Project traffic noise modeling results in terms of the Community Noise Equivalent Level (CNEL).

TABLE XIV
PREDICTED TRAFFIC NOISE LEVELS
Year 2029: No Project

Roadway	Predicted CNEL, dB, at 50 feet from Centerline				Distances from Centerline to CNEL Contours, feet		
	Autos	Medium Trucks	Heavy Trucks	Total	60 dB	65 dB	70 dB
Road 87 south of site	56.0	53.7	53.7	59.4	45	21	10
Road 87 north of site	55.0	52.3	67.7	68.1	173	80	37
Road 19	52.7	53.5	70.4	70.6	253	117	55

The project would introduce about 410 truck trips per day, or about 41 truck trips in a peak hour, which would enter and leave the site at Road 87. Assuming that 410 truck trips would occur per day, the change in traffic noise levels may be calculated using the FHWA model.

Table XV lists the traffic noise modeling results for the future case with the Project in terms of the Community Noise Equivalent Level (CNEL).

TABLE XV
PREDICTED TRAFFIC NOISE LEVELS
Year 2029: With Project

Roadway	Predicted CNEL, dB, at 50 feet from Centerline				Distances from Centerline to CNEL Contours, feet		
	Autos	Medium Trucks	Heavy Trucks	Total	60 dB	65 dB	70 dB
Road 87 south of site	56.2	54.0	53.9	59.6	47	22	10
Road 87 north of site	54.9	53.5	69.8	70.0	232	108	50
Road 19	52.5	54.5	71.6	71.7	302	140	65

Based upon Table XV, project-related truck traffic would cause the predicted CNEL at the reference distance of 50 feet from the centerline of Road 87 north of the project site to increase by up to 1.9 dB. This would be a potentially significant increase. However, there are no noise sensitive receivers located within 50 feet of the Road 87 centerline, nor are there any noise sensitive receivers in close proximity to that roadway. As a result, the changes in traffic noise levels would be less than significant.

Project-related truck traffic would cause the predicted CNEL at the reference distance of 50 feet from the centerline of Road 87 south of the project site to increase by 0.2 dB, and would cause the predicted CNEL at the reference distance of 50 feet from the centerline of Road 19 to increase by 1.1 dB. These changes in traffic noise levels would be less than significant.

IMPACTS AND MITIGATION

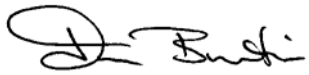
Noise-1:

Noise produced by the aggregate plant would cause potentially significant increases in ambient hourly noise levels at the two nearest houses south of Cache Creek during the hours of plant operation. The changes in ambient noise levels would be considered noticeable, and the frequency content of the sound would be different from that of the background noise. However, the resulting noise levels would be well below the Yolo County hourly noise standard of 60 dB L_{eq}, and the cumulative standard of 60 dB CNEL. The fact that the resulting cumulative noise levels are well within the range of acceptable noise exposures for noise sensitive uses indicates that these noise exposures would be less than significant.

Mitigation-1:

If it is desired to reduce the noise produced by the Esparto Plant at the houses south of Cache Creek, it may be feasible to provide enclosures for the elevated screens that are predicted to be the dominant noise sources. Noise measurements conducted by BBA for enclosed aggregate processing equipment indicate that the overall noise level produced by screens may be reduced by 10 dB by enclosing the screens in a simple metal housing. Implementation of such a measure for the highest screens on the primary crusher would ensure that the noise from that equipment would be limited to an increase of less than 5 dB at the nearest residences, as compared to ambient noise levels.

Respectfully Submitted,
Brown-Buntin Associates, Inc.



Jim Buntin
Vice President

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.

A-2

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 largely occurs.

APPENDIX B
AMBIENT NOISE MEASUREMENT DATA
MAY 14-17, 2007

Figure B-1: Measured Hourly Noise Levels

Capay Canyon Ranch

May 15, 2007

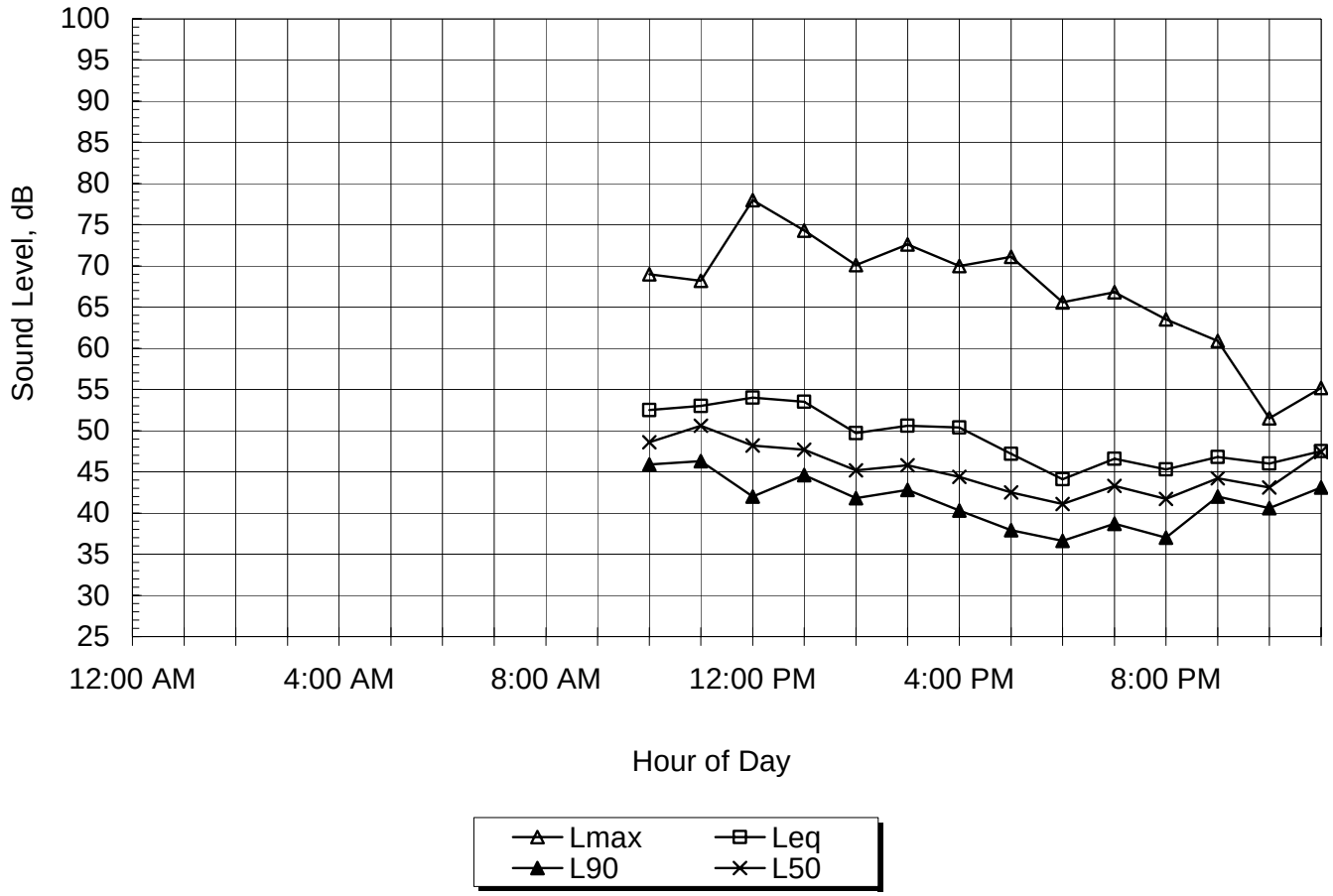


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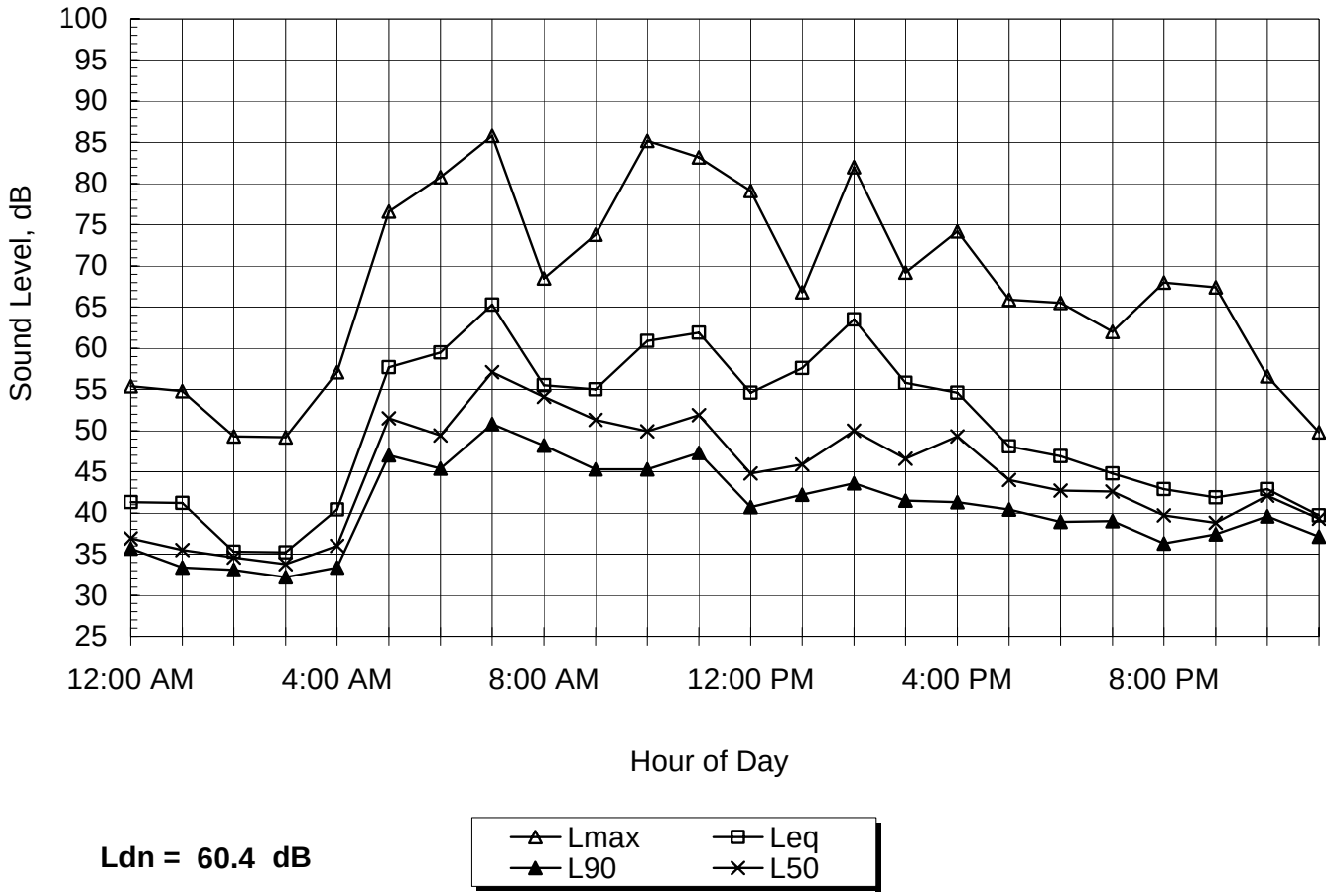
Figure B-2: Measured Hourly Noise Levels

Capay Canyon Ranch

May 16, 2007



Ldn = 60.4 dB

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Figure B-3: Measured Hourly Noise Levels

Capay Canyon Ranch

May 17, 2007

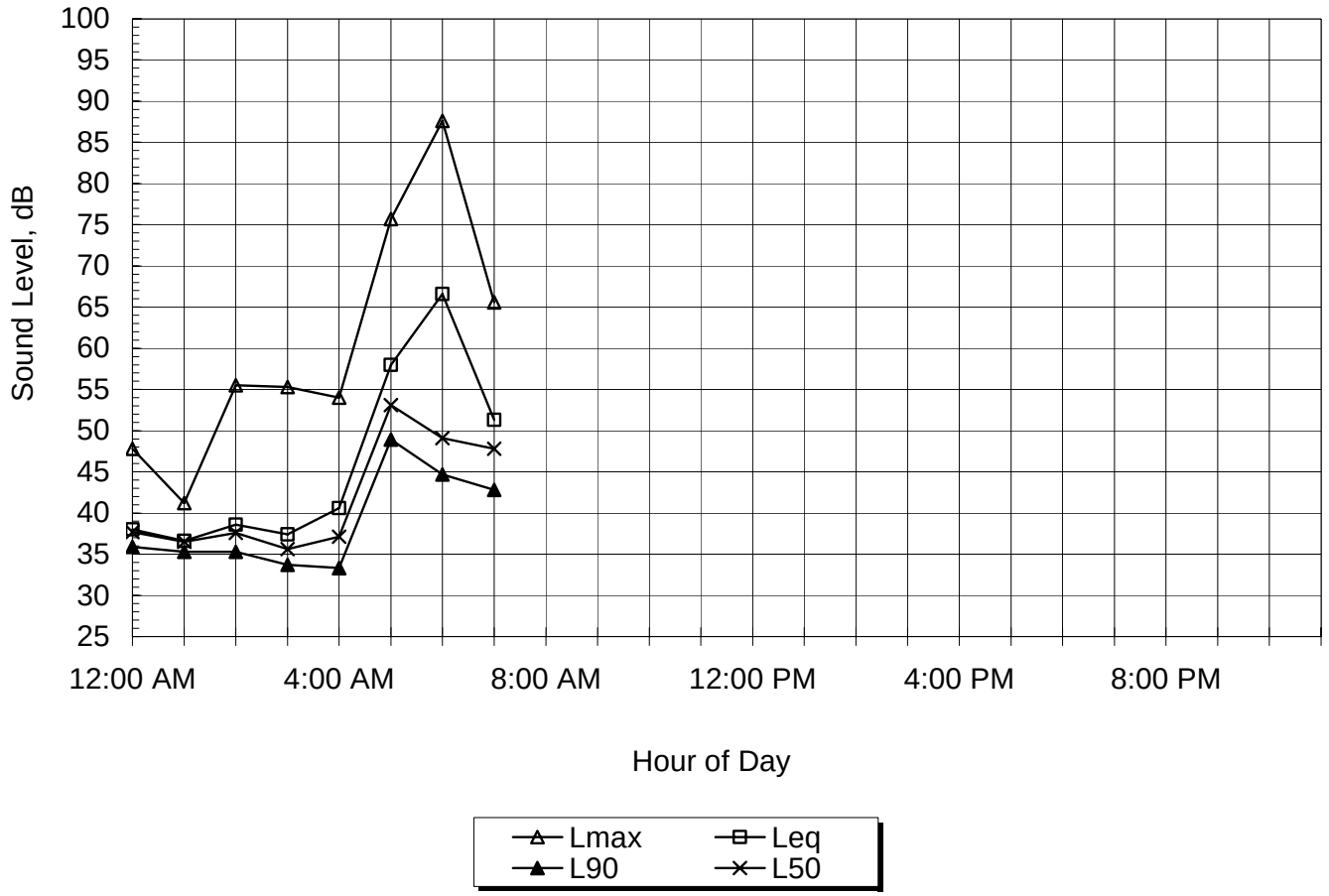

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Figure B-4: Measured Hourly Noise Levels

Residence on Road 19A

May 15, 2007

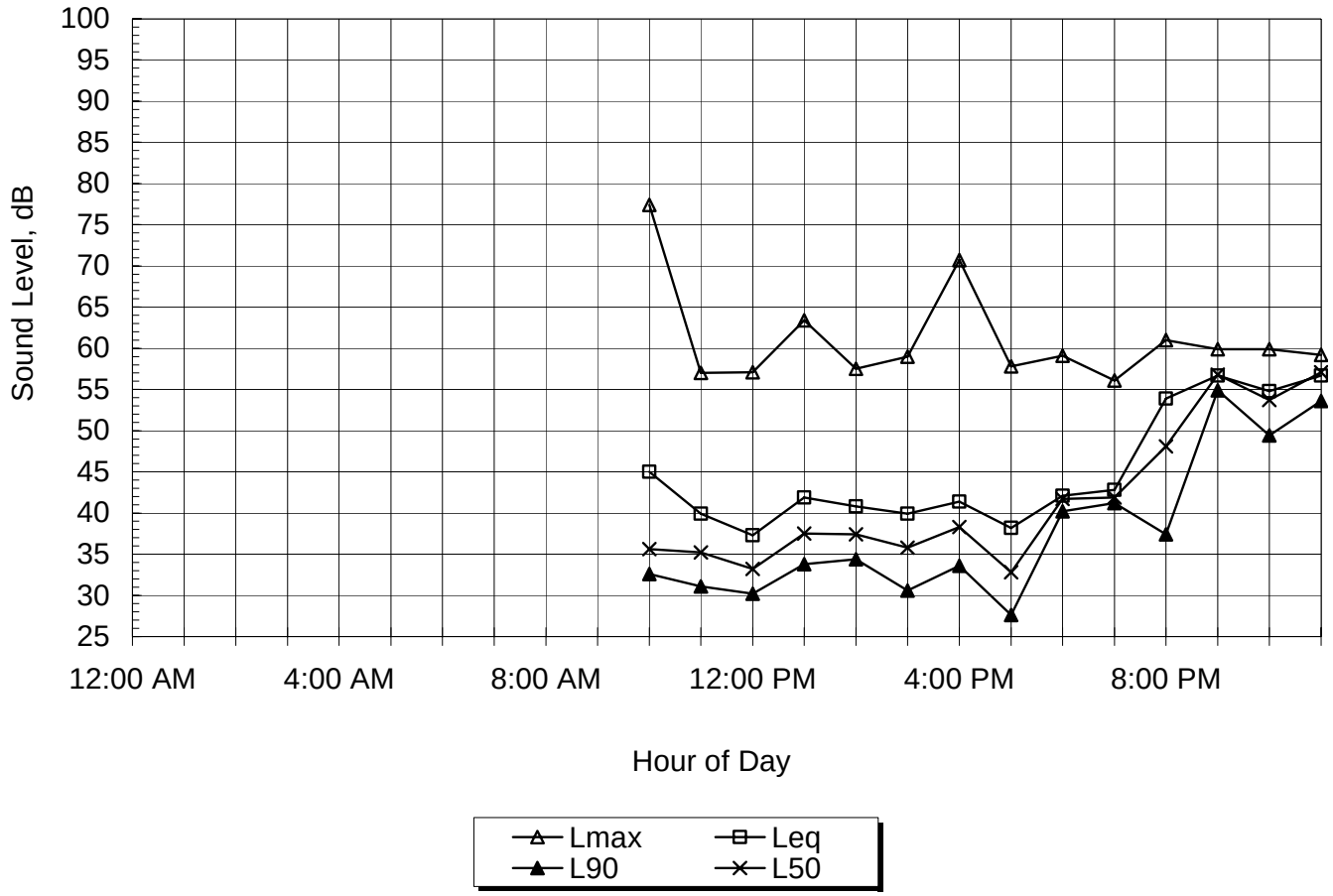

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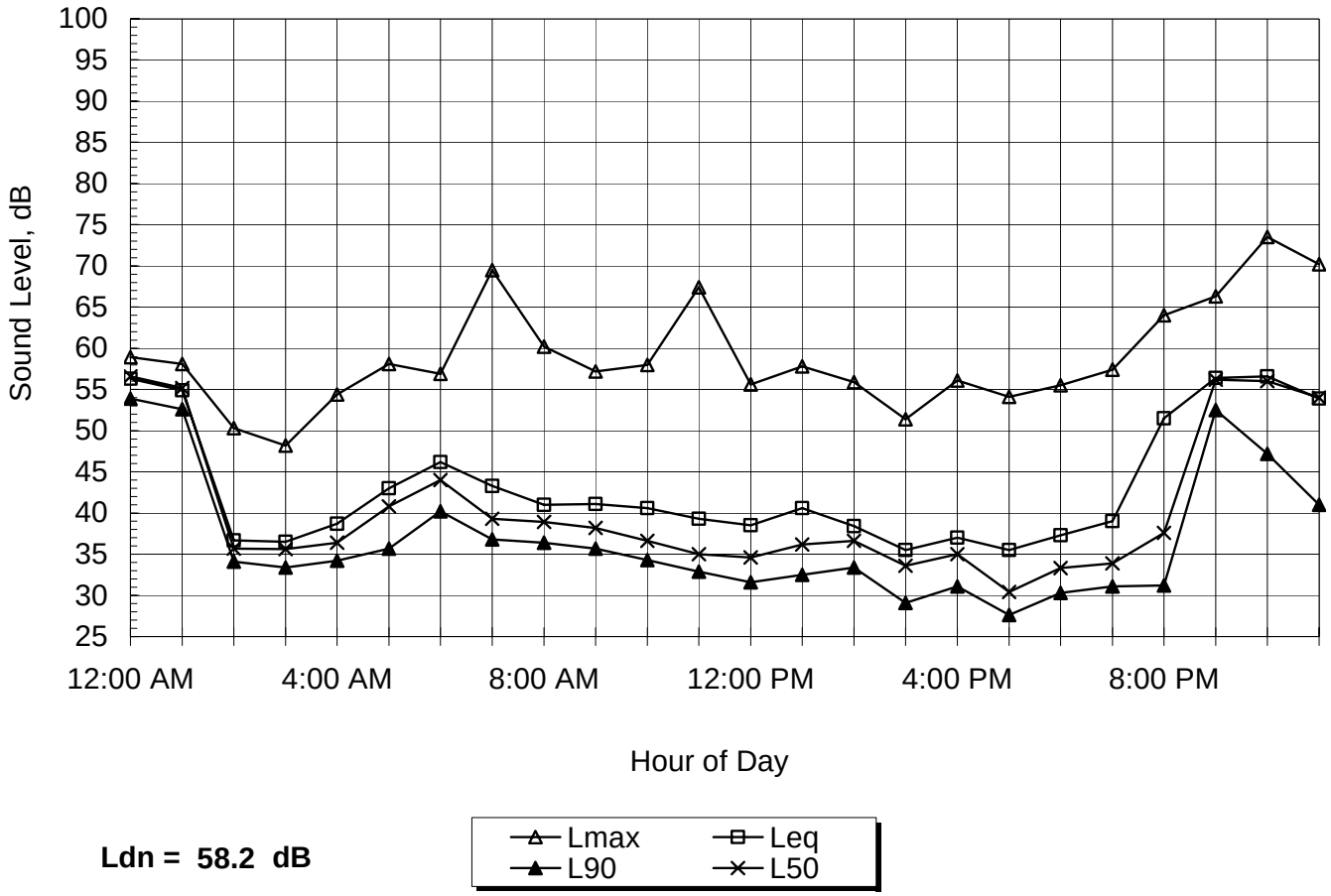
Figure B-5: Measured Hourly Noise Levels

Residence on Road 19A

May 16, 2007



Ldn = 58.2 dB

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Figure B-6: Measured Hourly Noise Levels

Residence on Road 19A

May 17, 2007

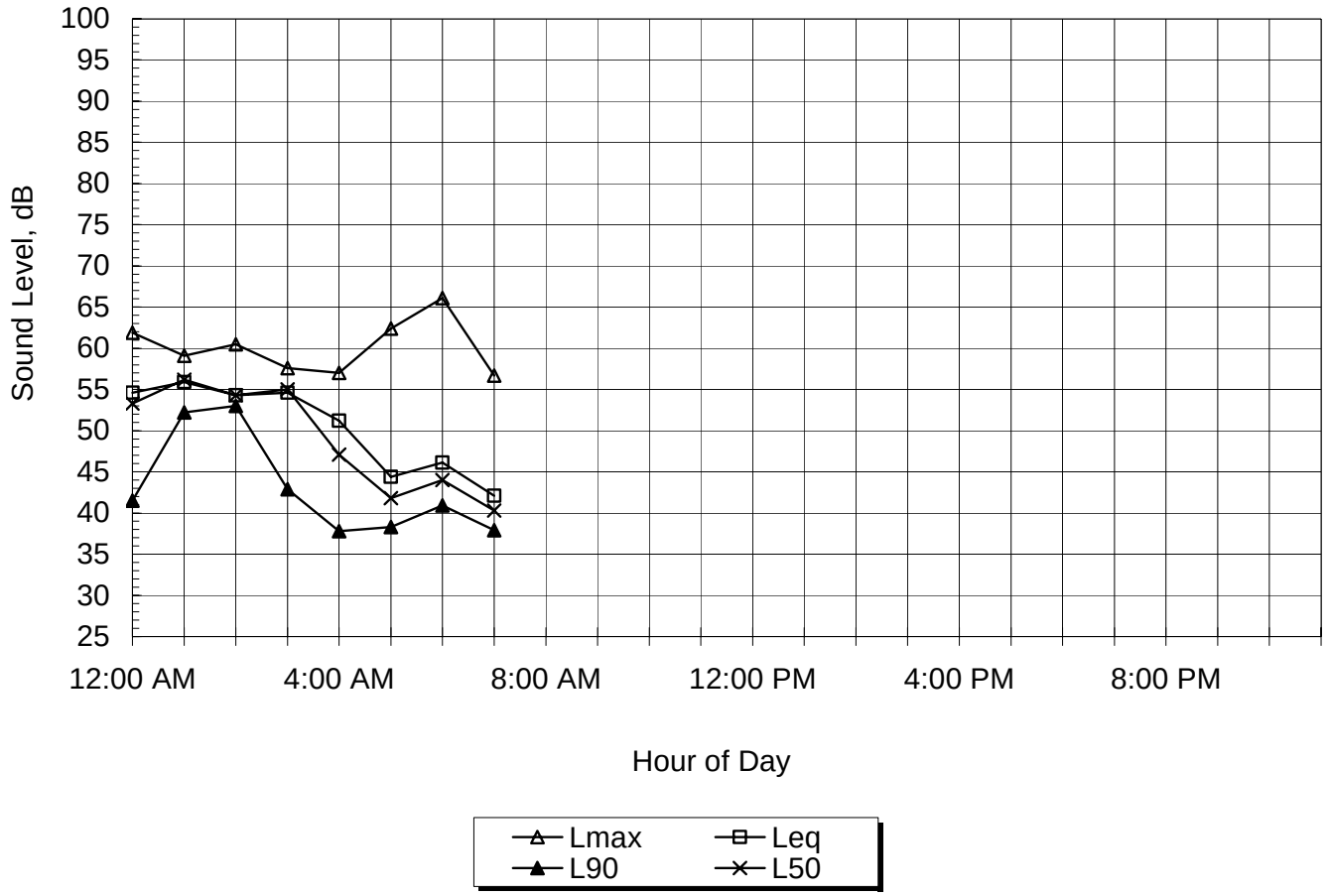

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Figure B-7: Measured Hourly Noise Levels

Northeast Property Corner

May 14, 2007

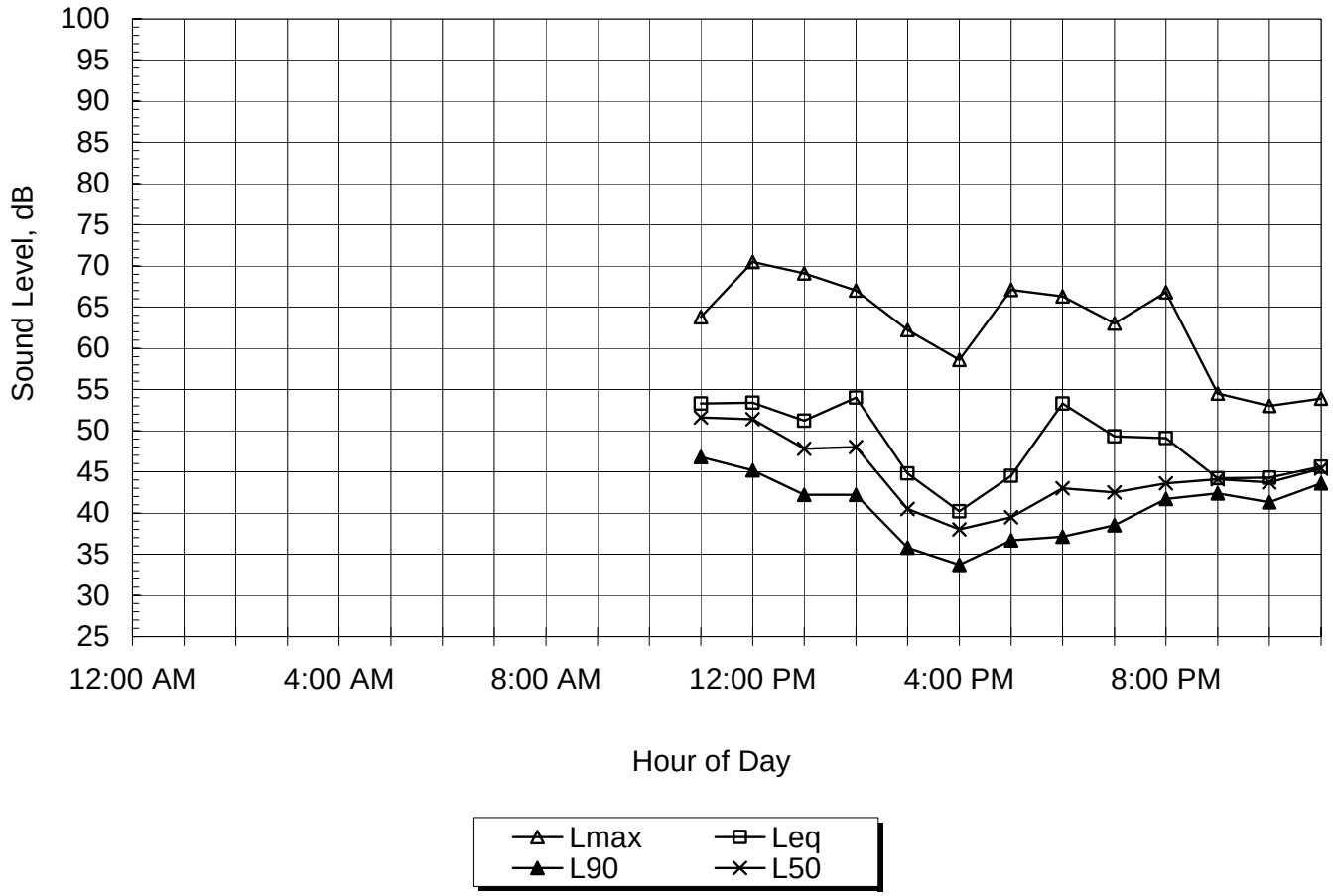

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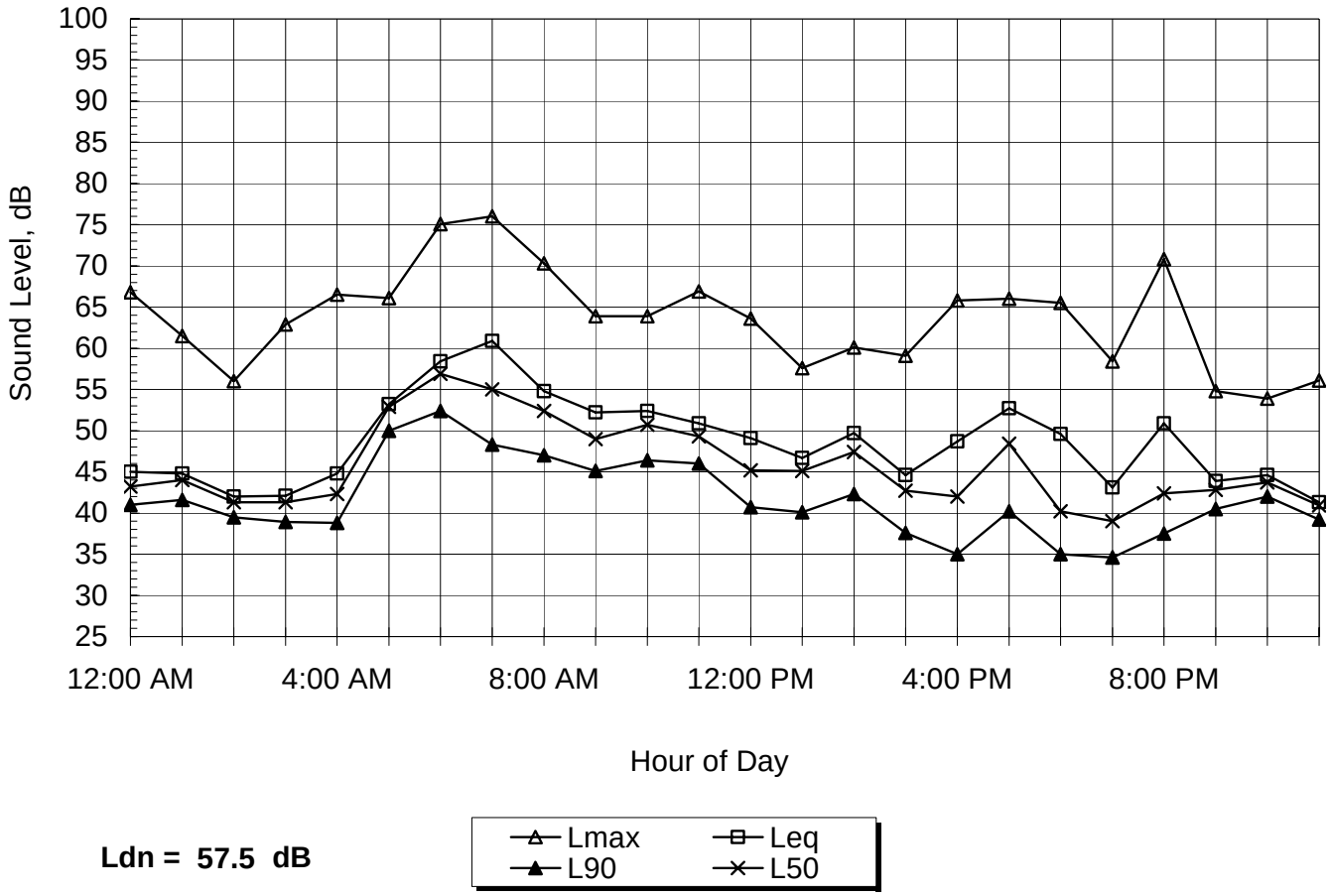
Figure B-8: Measured Hourly Noise Levels

Northeast Property Corner

May 15, 2007



Ldn = 57.5 dB

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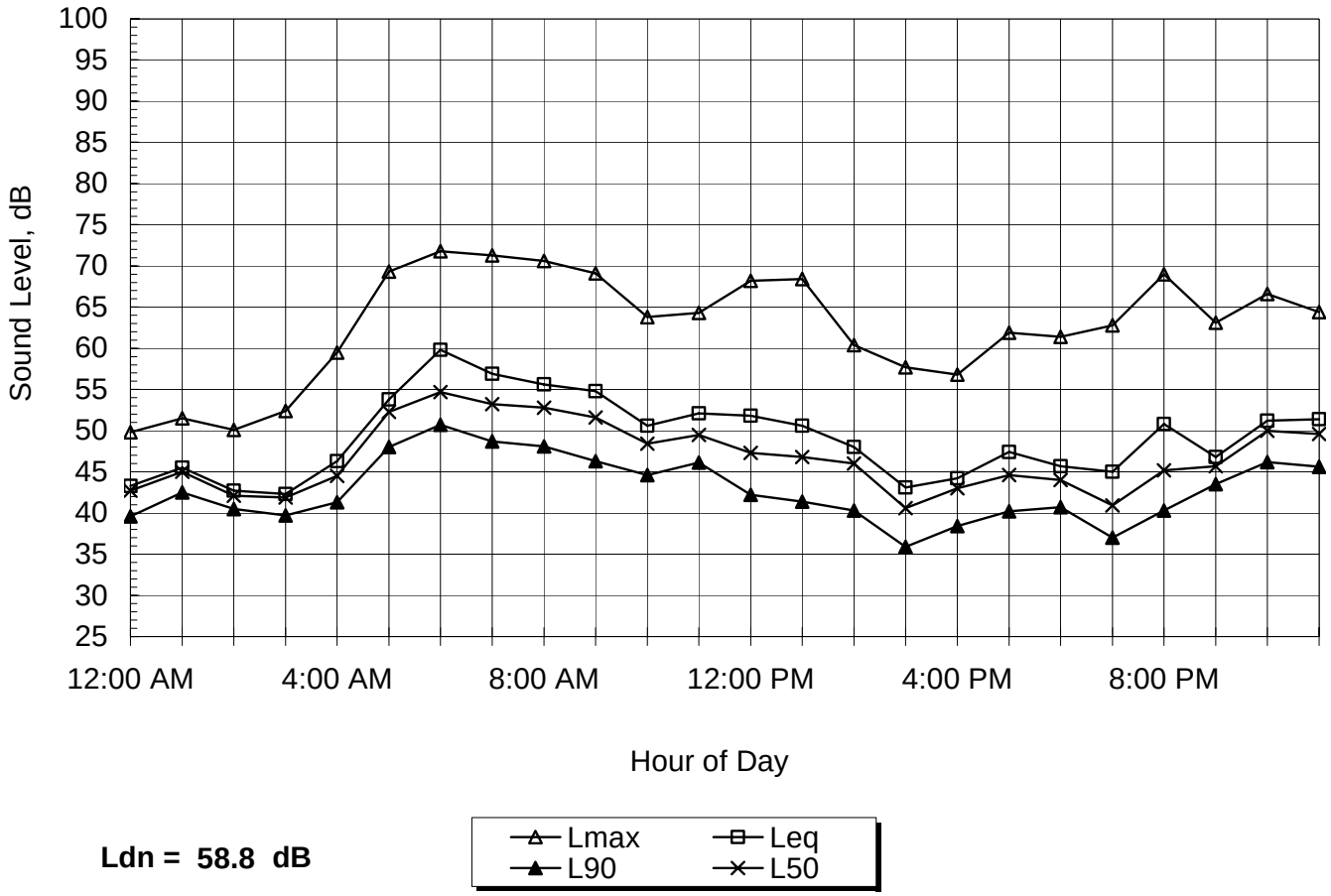
Figure B-9: Measured Hourly Noise Levels

Northeast Property Corner

May 16, 2007



Ldn = 58.8 dB

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Figure B-10: Measured Hourly Noise Levels

Northeast Property Corner

May 17, 2007

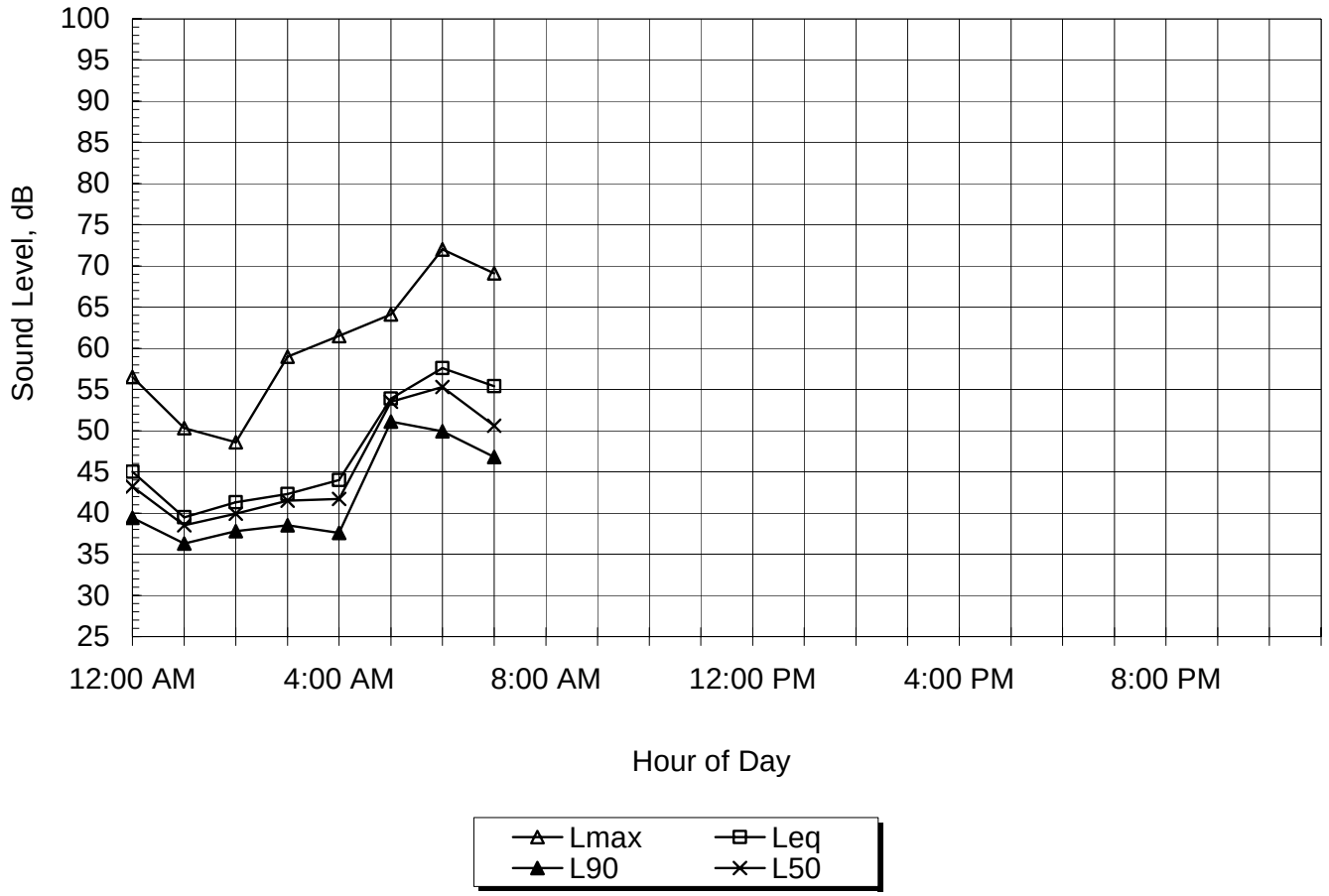

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Figure B-11: Measured Hourly Noise Levels

West End of Berm at So. PL

May 14, 2007

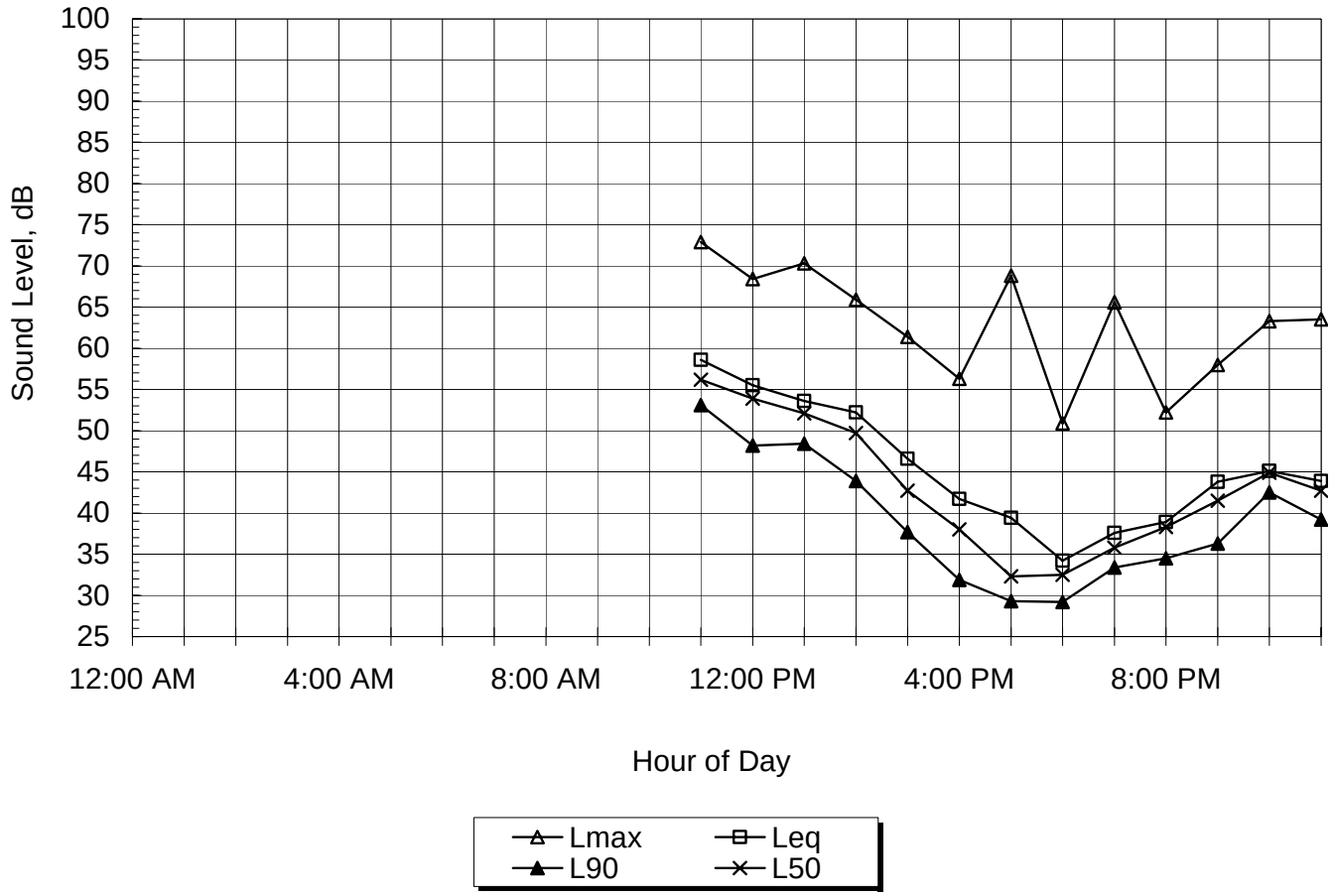

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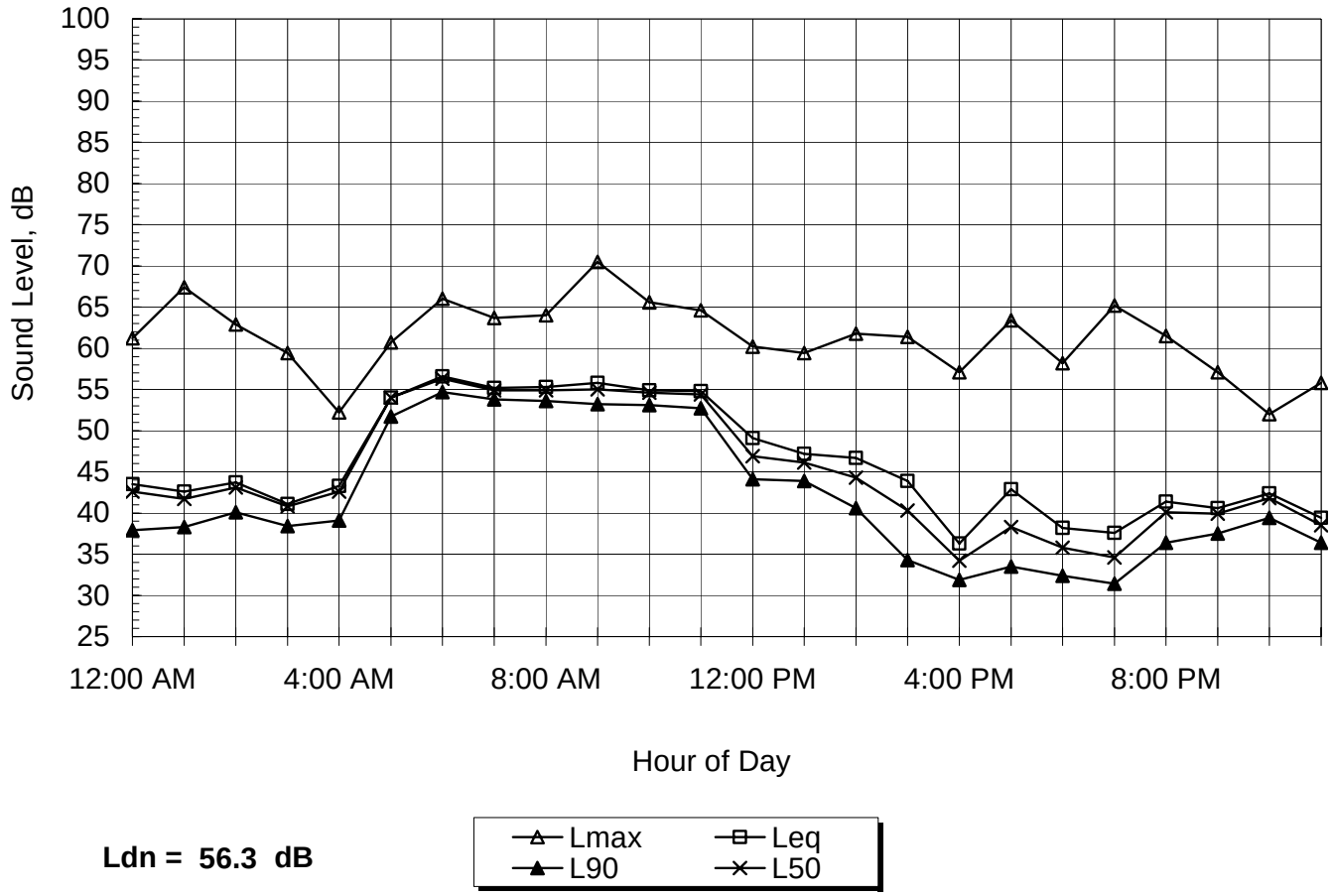
Figure B-12: Measured Hourly Noise Levels

West End of Berm at So. PL

May 15, 2007



Ldn = 56.3 dB

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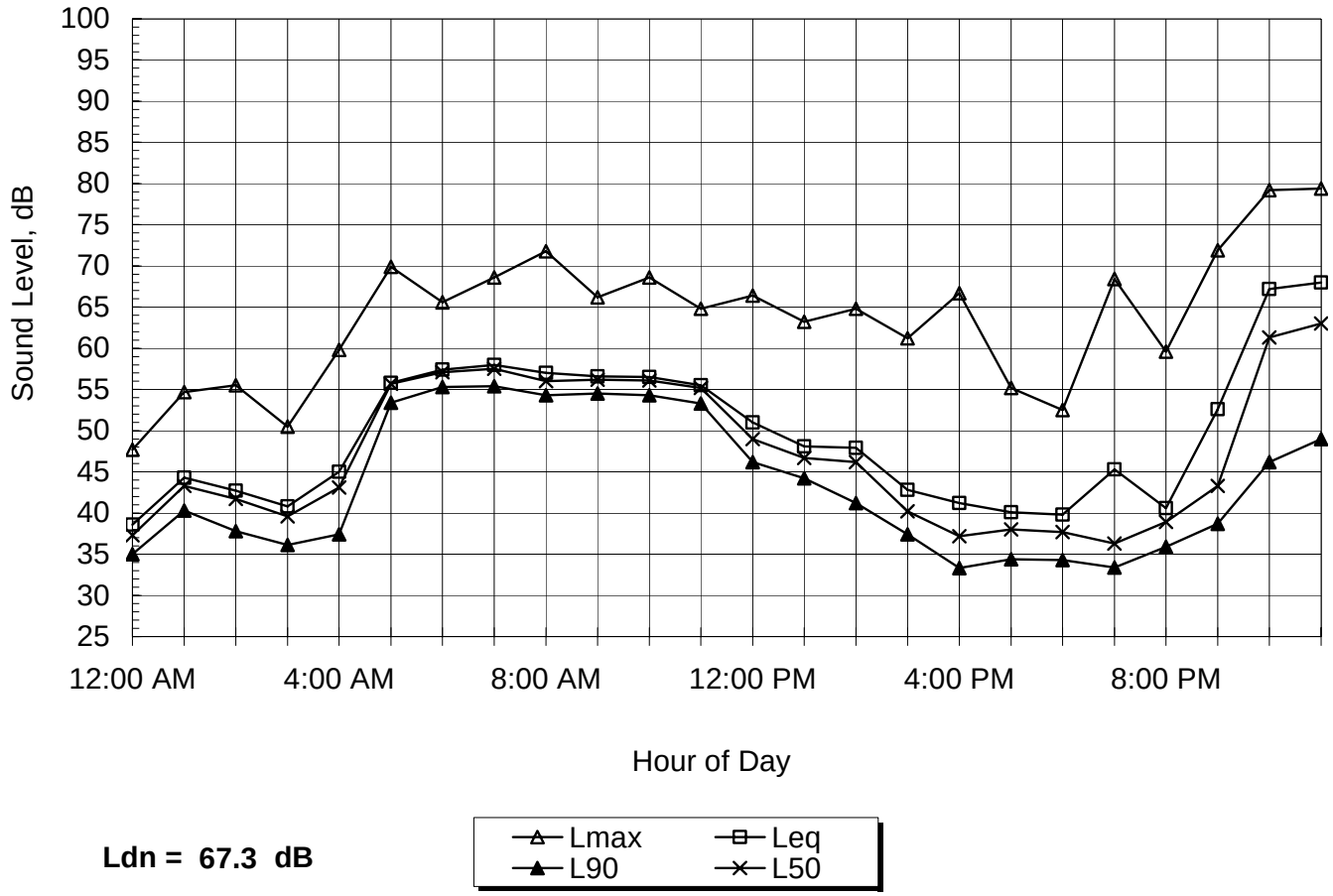
Figure B-13: Measured Hourly Noise Levels

West End of Berm at So. PL

May 16, 2007



Ldn = 67.3 dB

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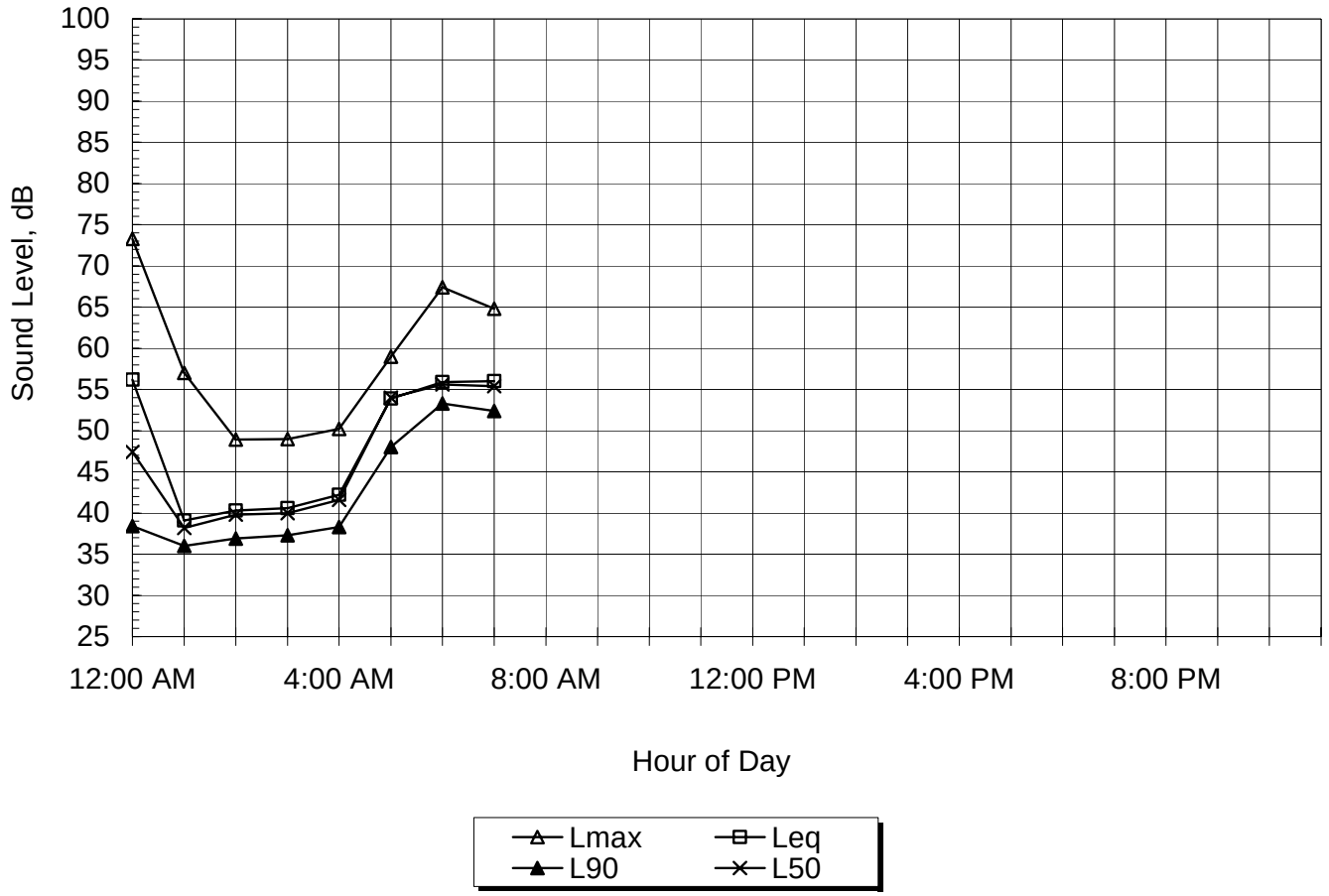
Figure B-14: Measured Hourly Noise Levels

West End of Berm at So. PL

May 17, 2007



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