ACOUSTICAL ANALYSIS

COLD CANYON LANDFILL
SAN LUIS OBISPO COUNTY, CALIFORNIA

BBA Report No. 10-001

PREPARED FOR

SAN LUIS OBISPO COUNTY
ENVIRONMENTAL AND RESOURCE MANAGEMENT DIVISION
976 OSOS STREET, ROOM 200
SAN LUIS OBISPO, CALIFORNIA 93408

PREPARED BY

BROWN-BUNTIN ASSOCIATES, INC.
VISALIA, CALIFORNIA

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INTRODUCTION

The Cold Canyon Landfill (landfill) is located at 2268 Carpenter Canyon Road (SR 227) within San Luis Obispo County. The project site is located in a hilly area bordered by SR 227 on the west and Patchett Road on the south. There are scattered residences and agricultural uses surrounding the project site. The applicant is proposing to expand the landfill footprint, increase permitted tonnage limits, increase landfill capacity, expand and relocate the resource recovery park, composting operation and materials recovery facility, change hours of operation and construct a new entrance.

A Draft Environmental Impact Report (DEIR) has been prepared for the proposed landfill expansion. The noise study for the DEIR was prepared by Brown-Buntin Associates, Inc. (BBA), and was based upon noise level measurements conducted during March of 2008. Most of those measurements were conducted at the Cold Canyon Landfill site. However, the wood waste grinder was not being operated on the site at the time of that study. It was therefore necessary to conduct measurements at another facility that utilizes a similar grinder for noise assessment purposes. Additionally, the Scarab was not in use at the time of the DEIR noise study and it was necessary to test the Scarab in a stationary position at the landfill site.

It is the purpose of this analysis to provide additional information on existing and potential noise sources and levels at the landfill, and to reevaluate the extent and type of noise mitigation that may be required. The study included noise measurements conducted over a two-week period starting on January 29, 2010. All significant noise-producing equipment associated with the landfill operated for at least part of the time during the noise monitoring period. Noise measurements were conducted at five (5) long-term sites that were at or near existing residential uses, and at a series of short-term sites at various locations to document noise levels from specific landfill activities.

Appendix A provides a description of the acoustical terminology used in this report. Unless otherwise stated, all sound levels reported are in A-weighted decibels (dB). A-weighting de-emphasizes the very low and very high frequencies of sound in a manner similar to the human ear. Most community noise standards utilize A-weighting, as it provides a high degree of correlation with human annoyance and health effects.

CRITERIA FOR ACCEPTABLE NOISE EXPOSURE

Section 3.3 of the San Luis Obispo County Noise Element establishes land use compatibility criteria for proposed noise sources or existing noise sources that will undergo modifications as they may affect nearby noise-sensitive land uses. Noise-sensitive uses include residences, schools, hospitals and churches. For transportation noise sources, the County's standard is 60 dB DNL at the exterior of noise-sensitive uses. Transportation noise sources include vehicles operated on public roadways, railroad operations and aircraft operations. Project-related traffic on public roadways was addressed in the DEIR and will not be discussed further in this report.

Acceptable noise levels from non-transportation noise sources (also referred to as stationary noise sources) are assessed using the hourly L_{eq} (energy average) and L_{max} (maximum) noise

level metrics. Stationary noise sources include all project-related activities that will occur within the landfill site. According to the Noise Element, stationary noise level standards are to be applied at the noise-sensitive receptor property line. *Property-line noise standards are not typical in rural residential areas where the noise-sensitive use on the property may be located at some distance from the property line.* The County's noise standards are summarized in Table I.

TABLE I

NOISE LEVEL STANDARDS
SAN LUIS OBISPO COUNTY
NOISE-SENSITIVE USES

		Non-Transportation (Stationary) Sources			
	Transportation Sources	Hourly L_{eq}, dBA		Hourly L_{max}, dBA	
	DNL, dB	7a-10p	10p-7a	7a-10p	10p-7a
Exterior Exposure	60	50	45	70	65
Interior Exposure	45	--	--	--	--

Source: San Luis Obispo County Noise Element, adopted 1992.

LANDFILL EQUIPMENT AND OPERATIONS

Existing operations at the Cold Canyon Landfill include an 88-acre landfill, a resource recovery park (RRP), a composting operation and a materials recovery facility (MRF). Noise producing activities associated with the landfill operation include the movement of trucks between the landfill entrance and active disposal site and heavy equipment used to spread, compact and cover the waste material. Heavy equipment used in the landfill operation includes a Caterpillar D7R bulldozer, Aljon 525 compactor and Caterpillar 627F earthmover. Landfill activities move around within the permitted landfill area over the life of the landfill site, but are generally focused in a single area at any given time. Landfill operations currently occur between the hours of 7:00 a.m. and 4:30 p.m.

The RRP is presently located near the public entrance to the site off of SR 227. Noise producing activities at the RRP include the movement of vehicles within the site as materials are being delivered to the site and the operation of heavy equipment used to sort, transfer and store materials within the site. Heavy equipment used within the RRP includes front loaders (Caterpillar IT18B and IT14G) and a Caterpillar 312C excavator. Recovered paper, cardboard and plastic is transported to the MRF located near the southeast corner of the landfill site for processing and baling. The RRP is currently open between 7:30 a.m. and 4:30 p.m.

The composting operation is located near the center of the landfill site. Noise producing activities include the transport of raw materials to the site and processed materials from the site, truck loading activities, compost processing activities and water truck movements for dust control. Heavy equipment used in the composting operation includes a 760 horsepower Moorbark XL 1200 tub grinder powered by a Caterpillar 3412 engine, 525 horsepower 18-foot Scarab compost row turner powered by a Caterpillar C15 Acert engine, Trommel screen, front loaders (Caterpillar IT28) and diesel-powered water truck. Noise-producing activities within the compost processing area presently occur between the hours of 7:30 a.m. and 4:30 p.m.

The MRF is located within a large building near the southeast corner of the landfill site. The facility processes recyclable materials from curbside residential pickup and commercial/industrial sources. It also processes materials from the on-site RRP as noted above. Noise producing activities associated with the MRF include truck movements to and from the facility, glass cleaning equipment located outside the east side of the building, forklift movements and other activities within the building, and ventilation fans on the south end of the building. Current hours of operation for the MRF are 7:30 a.m. to 4:30 p.m.

Other noise producing activities associated with the landfill operation include vehicle back up warning bells and bird whistles. Both activities occur at various times throughout the day, and are not necessarily associated with a specific area of the landfill. Bird whistles are intended to clear birds from the active dumping area, and are fired off throughout the day during times of high bird activity. Backup warning bells are required for worker safety.

NOISE MONITORING PROGRAM

Overview:

Long-term noise measurements were conducted during a two-week period beginning on January 29, 2010 at four (4) potentially noise-sensitive locations around the landfill site. A fifth long-term site was added starting on February 2, 2010. Long-term noise measurement locations were selected by BBA after consultation with San Luis Obispo County to represent existing residential uses or rural residential property lines near the landfill. Figure 1 shows the locations of the long-term noise measurement sites (Sites A through E) with reference to the landfill site.

Noise levels were measured continuously at the long-term sites using automated noise monitoring equipment. It is important to note that noise levels from *all* sources affecting the long-term sites were measured during the study. This includes landfill activities, traffic on public roadways, aircraft over-flights, agricultural operations, residential maintenance activities and other sources.

BBA staff visited each of the long-term sites several or more times during the long-term noise monitoring program to identify the sources of noise that were audible at the sites and to note the noise levels being generated by specific landfill equipment and/or operations. BBA staff also discussed landfill operations and noise levels with property owners at each of the long-term sites to gain an understanding of the landfill noise sources that potentially impact each site.

Noise measurements were also conducted by BBA at additional short-term sites for the purpose of documenting noise levels generated by landfill equipment and/or operations without interference from other noise sources such as vehicular traffic. The short-term noise monitoring sites were located relatively close to the landfill property or within the landfill site. The general locations of the short-term noise monitoring sites are shown in Figure 2 (Sites 1 through 8). BBA used noise level data from both the long- and short-term sites to quantify noise levels produced by the landfill operation for comparison to noise level data previously gathered for noise impact assessment purposes in the DEIR.

Weather conditions during the noise measurement period consisted of a combination of clear and cloudy skies with temperatures ranging from approximately 35-45°F during early morning hours to approximately 55-65°F during the mid-afternoon. Moderate amounts of precipitation fell during the first weekend of monitoring. Winds were generally light to moderate with sustained high winds occurring throughout the day on February 5th, affecting measured noise levels. Data collected from the monitoring sites on February 5th are considered to be invalid.

Instrumentation:

Noise monitoring equipment consisted of Larson-Davis Laboratories Model LDL 820 sound level analyzers equipped with Bruel & Kjaer (B&K) Type 4176 ½˝ microphones. Microphones were mounted on tripods at approximately five (5) feet above the ground and were situated so that there was a clear view of the landfill site. Where appropriate, microphones were fitted with random incidence correctors so that noise from sources in all directions could be accurately measured. Instrumentation was calibrated prior to use with a B&K Type 4230 acoustical calibrator to ensure the accuracy of the measurements. The equipment complies with applicable specifications of the American National Standards Institute (ANSI) for Type 1 sound measurement systems.

Long-term Noise Monitoring Data:

Following are discussions of the findings of the long-term noise monitoring program at each site. Included in the discussions are descriptions of the site, noise sources affecting the site and measured noise levels. An hourly noise level chart is included for each site that graphically depicts measured noise levels at the site on a representative day when landfill activities affecting the site were known to occur. A complete summary of long-term noise monitoring data for each day of the noise monitoring period is included in the Appendix of this report.

Noise level descriptors utilized in the following discussions and in the Appendices include the DNL for each full 24-hour measurement day and hourly maximum (L_{max}), energy average (L_{eq}), and selected (L_n) values. L_n values are statistical descriptors used to define noise levels exceeded "n" percent of the time during each hourly noise measurement period. For example, the L_{50} defines the noise level exceeded 50% of the time during each one-hour period (i.e. 30 minutes).

Reported maximum noise levels were most likely caused by localized activities near the microphone, occasional aircraft over-flights or roadway traffic at all of the long-term sites. Since hourly L_{eq} values represent energy average noise levels, they can be significantly affected by occasional noise events that may or may not be related to landfill activities. This was most likely the case at Sites A, C and E. Hourly L_{eq} values measured at Sites B and D are assumed to be generally representative of landfill activities due to their locations relatively close to landfill noise sources and at some distance from major traffic noise sources.

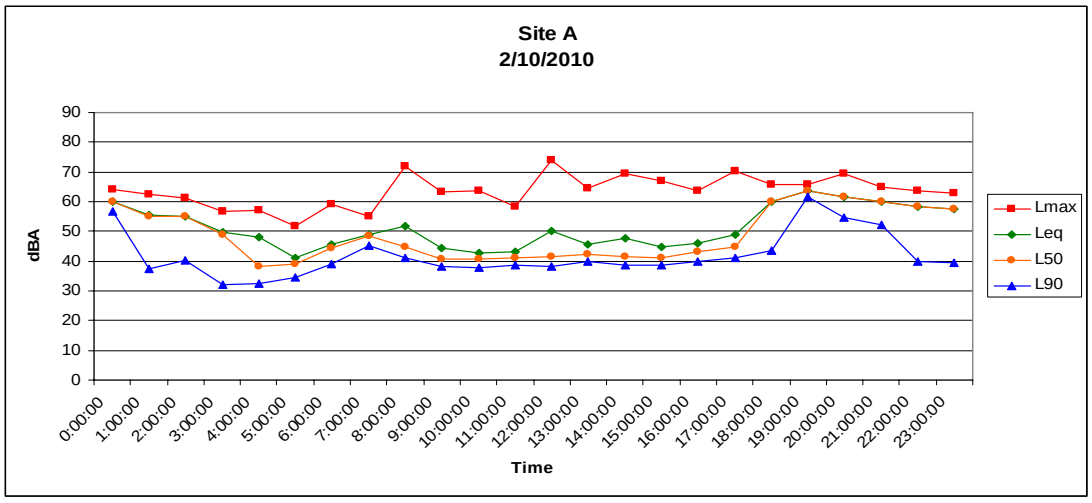
The L_{50} and L_{90} statistical descriptors are particularly useful when interpreting long-term noise monitoring data for sites exposed to intermittent noise sources. Those descriptors have therefore been utilized to help differentiate between noise caused by intermittent and more-or-less constant noise sources.

Site A

Site A was located west of the landfill at 125 Tolosa Road. Landfill-related noise sources affecting Site A include heavy equipment operations at the active landfill face, trucks entering and exiting the facility, RRP activities and bird whistles. The site is also exposed to noise from traffic on SR 227, aircraft operations and localized residential activities. It was noted that bullfrogs in an adjacent pond generate significant noise levels during certain times of the evening and night. Long-term monitoring was begun on January 29th, but an equipment failure resulted in the first 7 days of monitoring data being lost. Daily DNL values for February 4-10, 2010, including noise from all sources, ranged from 49.2-57.7 dB. The chart below shows hourly noise monitoring data on a typical day during the study.

Field observations at Site A by BBA staff indicated that noise levels from heavy equipment operations and truck movements at the active landfill site were typically in the range of 40-50 dBA. Intermittent noise levels in the range of 50-57 dBA were observed due to trucks entering or leaving the facility or materials being dumped or moved around within the RRP. Bird whistles produced intermittent noise levels in the range of 57-61 dBA.

Based upon BBA's analysis of long-term noise measurement data and field observations at Site A, hourly energy average (L_{eq}) values from all normal landfill-related activities are in the range of 42-46 dBA. Maximum noise levels (L_{max}) from intermittent landfill-related activities are in the range of 55-60 dBA. Such levels do *not* exceed the County's noise standards. However, noise levels from the landfill are at times clearly audible at Site A, especially during certain activities at the RRP and when bird whistles are being deployed.



Site B

Site B was located northeast of the landfill at 2225 Corbett Canyon Road. The monitor was located near a shop building about 300 feet south of the house. Landfill-related noise sources affecting Site B include the MRF, composting operation, bird whistles and occasional soil scraping activities near the top of the landfill. Site B is also affected by noise from aircraft over-flights and localized residential and agricultural activities. Long-term noise monitoring was conducted at Site B from January 29 through February 10, 2010. Daily DNL values, including noise from all sources, ranged from 44.3-55.3 dB. The chart below shows hourly noise monitoring data for January 29th. The compost grinder was in operation on that day between the hours of approximately 9:00 a.m.-11:00 a.m. The Scarab was in operation immediately following that period.

Field observations on several different days at Site B by BBA staff indicated that the composting operation (including the grinder and Scarab) produced noise levels of 40-59 dBA, with L_{eq} values in the range of 42-55 dBA, depending upon equipment location and acoustic shielding by terrain. Bird whistles produced maximum noise levels in the range of 47-51 dBA. Soil scraping activities were observed on February 2, and produced noise levels in the range of 50-60 dBA. Noise levels were also measured at the Site B property line at approximately 450 feet from the grinder. Grinder noise levels at that location ranged from 64-75 dBA, with an L_{eq} of 73 dBA.

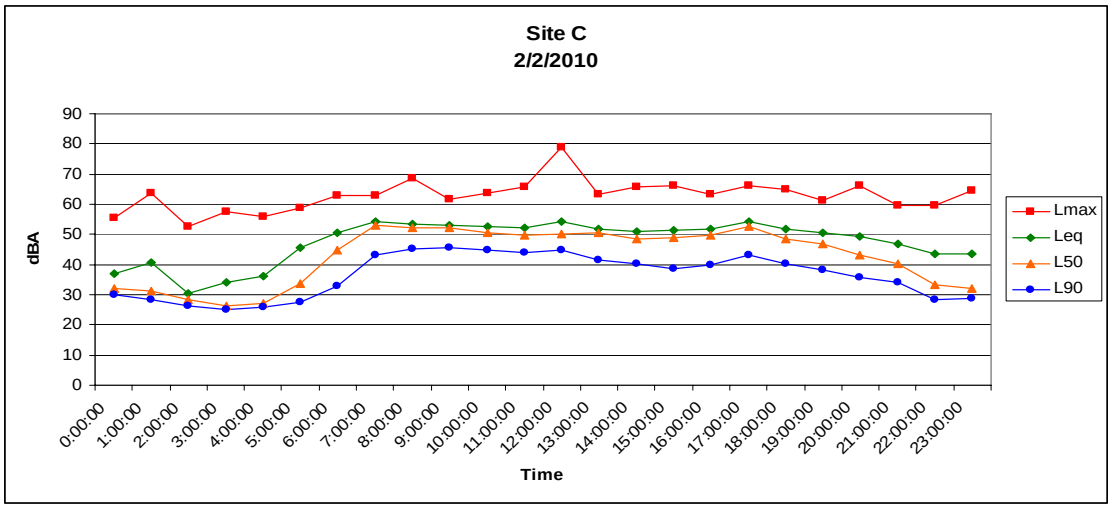
Based upon BBA's analysis of long-term noise measurement data and field observations at Site B, hourly energy average (L_{eq}) values from composting activities have the potential to exceed the County's hourly Leq 50 dBA standard, depending upon where the equipment is being operated. Maximum noise levels were not observed to exceed the County's 70 dBA standard at Site B.

Site C

Site C was located southeast of the landfill at 1966 Vineyard View Lane. The noise monitor was located next to the house facing the landfill. Audible sources of noise at Site C originating from within the landfill include composting activities, general landfill activities and bird whistles. Site C is predominantly exposed to noise generated by traffic on State Route 227, including trucks en-route to or from the landfill. Long-term noise measurements were taken over the two-week period beginning on January 29, 2010. Daily measured DNL values, including noise from all sources, ranged from 50.4-54.5 dB. The chart below shows hourly noise monitoring data on a typical during the study period.

Field observations were conducted at Site C by BBA staff on several occasions during the long-term monitoring period. Field observations indicated that the majority of landfill activity was not audible above traffic noise from State Route 227. Noise levels produced during composting operations and general landfill activities were occasionally audible above background noise levels, and were in the range of 40-48 dBA. Noise levels produced by bird whistles ranged from 42-43 dBA.

Based upon BBA's analysis of long-term noise measurement data and field observations at Site C, it was determined that landfill-related noise is occasionally audible above traffic noise from State Route 227, but that such levels do not exceed the County's hourly L_{eq} or L_{max} standards.

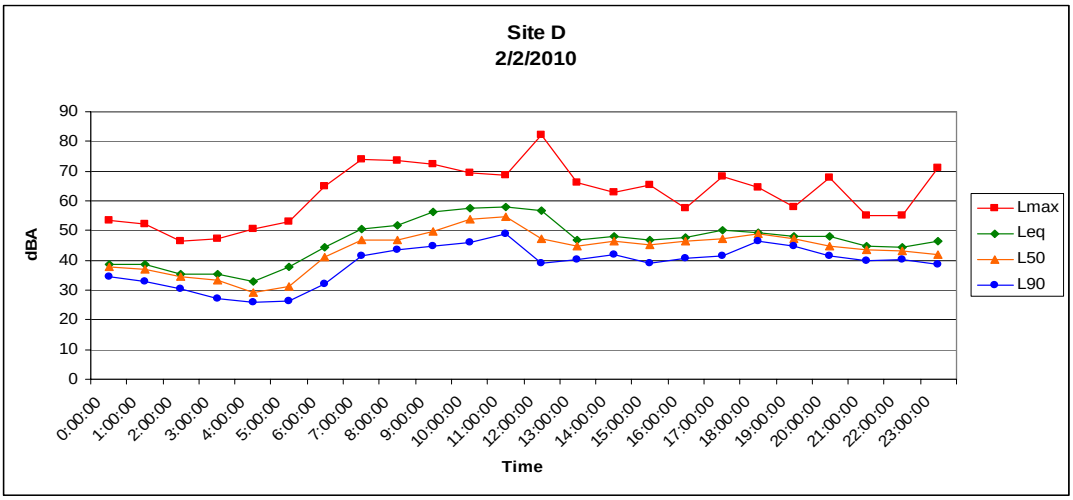


Site D

Site D was located south of the landfill next to Patchett Road. Landfill-related noise sources affecting Site D include heavy equipment operations and truck movements at the active landfill face, composting activities, MRF activities, backup warning bells and bird whistles. The site is also exposed to noise generated by traffic on State Route 227, aircraft operations and localized residential and/or commercial activities. Long-term noise measurements were conducted at Site D from January 29 to February 10, 2010. Measured daily DNL values, including noise from all sources, ranged from 50.1 to 54.5 dB. The chart below shows hourly noise monitoring data on a typical day during the study. February 2nd was chosen because it included observed composting activity.

Field observations by BBA staff at Site D indicated that noise levels from activities at the active landfill site are typically in the range of 42-49 dBA. Composting activities (including the compost grinder and the Scarab) are in the range of 44-63 dBA with L_{eq} values of 50-55 dBA. Noise levels from the MRF were observed to be in the range of 42-46 dBA. Bird whistles and backup warning bells produced maximum noise levels of 53-62 and 52-53 dBA, respectively.

Based upon BBA's analysis of long-term noise measurement data and field observations, hourly energy average (L_{eq}) values from landfill-related activities at Site D are in the range of 45-55 dBA, depending upon the type and location of equipment in use. Landfill noise levels, especially on days when the Scarab is being operated, may exceed the County's 50 dBA hourly L_{eq} standard. Intermittent maximum noise levels (L_{max}) from the Scarab and bird whistles are in the range of 53-63 dBA. Such levels do not exceed the County's L_{max} 70 dBA standard.



Site E

Site E was located west of the landfill at 2245 Carpenter Canyon road. Landfill-related noise sources affecting Site E include heavy equipment operations at the active landfill face, trucks entering and exiting the facility, RRP activities, composting activities, backup warning bells and bird whistles. The site is also exposed to noise from traffic on State Route 227, aircraft over-flights and localized residential activities. Long-term noise monitoring occurred at Site E for a period of nine days, beginning on February 2, 2010. Measured daily DNL values, including noise from all sources, ranged from 48.3-60.0 dB. The chart below shows hourly noise monitoring data on a typical day during the study period.

Field observations conducted at Site E by BBA staff indicated that noise levels from heavy equipment and truck operations at the active landfill were typically in the range of 40-50 dBA. Intermittent noise levels in the range of 50-57 dBA were observed due to unloading of materials at the RRP. Bird whistles and backup warning bells produced maximum noise levels of 66-73 and 40-52 dBA, respectively.

Based upon BBA's analysis of long-term noise measurement data and field observations at Site E, hourly L_{eq} values from a combination of all landfill-related activities are in the range of 45-50 dBA. Such levels approach but do not exceed the County's 50 dBA L_{eq} standard. Intermittent maximum noise levels from bird whistles may occasionally exceed the County's 70 dBA L_{max} standard. The dominant source of noise affecting the site is traffic on State Route 227.

COMPARISON OF MEASURED NOISE LEVELS

The DEIR presents an analysis of potential project-related noise impacts. As previously stated, it is the purpose of this study to provide additional information concerning noise levels generated by landfill equipment and/or operations. Noise monitoring conducted for the this study occurred over a longer period of time than for the DEIR study, and noise levels generated by equipment not in use during the DEIR study have been documented.

Landfill Disposal Noise Levels:

For the DEIR noise study, noise measurements were conducted during the combined operation of disposal trucks, the dozer, compactor and earthmover at a distance of 200-300 feet from the equipment. Measured noise levels were 65-77 dBA with an L_{eq} of 70 dBA. Measurements were also conducted at a distance of 2,500 feet from the active landfill and noise levels were observed to be in the range of 42-48 dBA. Noise levels were also measured during the DEIR study for the earthmover while scraping cover soil. At a distance of 200 feet, measured noise levels were 68-80 dBA with an L_{eq} of 72 dBA.

For the present study, noise levels associated with landfill disposal activities were measured at Sites A and E, at distances of 3,200 and 2,700 feet from the active disposal site, respectively. Measured noise levels at Site A were in the range of 40-45 dBA. Measured noise levels at Site E were in the range of 40-50 dBA with L_{eq} values of 44-46 dBA. Noise levels were also measured at Site B while the earthmover was scraping cover soil near the top of the landfill site. The measured noise levels at a distance of about 800 feet from the earthmover were 50-60 dBA.

The noise levels measured during the present study were determined to be consistent with the noise level data used to assess potential landfill noise impacts in the DEIR. However, noise levels reported for earthmover scraping activities in the DEIR are somewhat higher than were measured during the present study. This is probably due to the fact that the earthmover was slightly shielded by topography with reference to Site B during the present study.

Resource Recovery Park:

According to the DEIR noise study, the RRP operation produces L_{eq} and L_{max} values of approximately 69 and 75 dBA, respectively, at 100-200 feet from loaders engaged in the movement and sorting of materials. Maximum noise levels are generally caused by backup alarms and/or materials being dumped into sorting bins.

For the present study, noise levels associated with RRP were measured at Sites A and E and 1. The most definitive measurement data were collected at Site 1 where measured noise levels at a distance of 375 feet ranged from 47-59 dBA with an L_{eq} of 51.4 dBA during normal RRP activities. Noise levels measured at Sites A and E were in the range of 40-53 dBA. The noise levels measured during the present study are lower than used to assess potential RRP noise impacts in the DEIR noise study.

Composting Operation:

For the DEIR noise study, it was not possible to conduct noise measurements from the wood waste grinder on-site. It was also not possible to conduct noise measurements while the Scarab row turner was in use on the site. Noise measurement data were therefore obtained for a similar wood waste tub grinder at another facility near Visalia and for the Scarab while it was operated in a stationary position. It was determined for the DEIR study that the tub grinder produces an L_{eq} of 81 dBA at 100 feet and that the Scarab row turner produces an L_{eq} of 84 dBA at 100 feet.

Noise levels measured in close proximity to the tub grinder and Scarab were used as reference data in the DEIR noise study for the calculation of noise levels at greater distances from the equipment. Such calculations accounted for the normal attenuation of sound with increasing distance from a "point" noise source, but did not include adjustments for shielding by terrain, atmospheric absorption or excess attenuation of sound over the ground. Such factors can be significant at greater distances from a noise source, meaning that the methodology utilized for the DEIR noise study would be expected to provide a conservative (worst-case) assessment of noise levels at distances of more than a few hundred feet from the source.

For the present study, noise levels associated with the composting operation were measured at a number of long- and short-term sites including Sites B, C, D, 3, 4, 6, 7 and 8. With reference to a distance of 100 feet from the operating equipment, the tub grinder produced L_{eq} and L_{max} values of 84.6 and 89.5 dBA, respectively, while grinding wood waste. When green waste was being processed the tub grinder produced noise levels 1-2 dB lower at the same measurement location. At more distant sites, the wood waste grinding operation was observed to produce noise levels in the range of 44-58 dBA, with an L_{eq} of 52 dBA, at Site D (1,600 feet away). The Scarab produced L_{eq} and L_{max} values of 68.0 and 70.6 dBA, respectively, at a distance of 600 feet. The Scarab was also was observed to produce noise levels in the range of 52-63 dBA at Site D (1,000 feet away), 40-49 dBA at Site 6 (4,500 feet away) and 42-48 dBA at Site 7 (6,700 feet away).

Based on the above, it would appear that the DEIR may have understated potential noise impacts and mitigation requirements due to the wood waste grinding operation. However, as noted above, the DEIR used a conservative approach to calculating the attenuation of noise over distance from the source. Tub grinder noise levels measured at off-site locations during the present study were found to be consistent with the noise levels used for noise impact assessment purposes in the DEIR. The noise level data used to assess Scarab noise levels in the DEIR were also found to be consistent with the present study.

Materials Recovery Facility:

For the DEIR noise study, noise measurements were conducted at several locations to the north and east of the MRF building. Noise sources included vehicle movements, ventilation fans, sorting operations inside the building and the glass cleaner located outside the building. Measured noise levels at 150 feet east of the building were L_{eq} and L_{max} values of 66.3 and 67.4 dBA, respectively. The glass cleaner was observed to produce a maximum noise level of 80 dBA when measured at a distance 50 feet.

For the present study, noise levels associated with the MRF were conducted at Site 5 at a distance of 175 feet from the east side of the building. Noise sources observed during the noise monitoring period included truck movements, ventilation fans and cleaning and sorting activities. Measured noise levels were in the range of 56-67 dBA with an L_{eq} of 59 dBA. Maximum noise levels were caused by trucks dumping loads of material to be processed. At Sites D and E, MRF activities were observed to produce noise levels in the range of 44-46 dBA.

Noise measurements collected in close proximity to the MRF during the present study are consistent with the data used in the DEIR to assess noise impacts from the MRF.

Back-up Warning Devices:

Noise levels produced by backup alarms were not specifically documented by the DEIR noise study. Backup alarms are required for worker safety and are utilized on nearly all mobile equipment at the landfill and other similar facilities. The frequency content of noise produced by backup alarms is intended to be clearly audible above other sources of work-site noise. For that reason, they are often distinctly audible at some distance from the equipment in use.

Backup alarm noise levels were measured at Sites D and E at distances of approximately 1,250 and 2,500 feet, respectively, from where the alarms were being sounded. Measured maximum noise levels were in the range of 52-53 at Site D and 40-52 at Site E. Noise levels from backup alarms operating on equipment within the landfill are variable due to distance from the source, wind direction, equipment orientation, intervening terrain and other factors.

Noise levels due to backup alarms would not be expected to exceed the County's noise standards at off-site locations. However, as noted above, backup alarms are at times distinctly audible in the vicinity of the landfill operation.

Bird Whistles:

Bird whistles are intended to clear birds from the active dumping area, and may be launched throughout the day during times of high bird activity. Bird whistles were not observed at the time the DEIR noise study was prepared and were not identified as a potential significant noise source.

During the present study, noise from bird whistles was measured at a number of sites including all of the long-term sites and Sites 6 and 7. Measured noise levels were found to be variable due to distance from the launch site, intervening terrain, weather conditions and other factors. Maximum noise levels from bird whistles at Site E were in the range of 66-73 dBA. Two of the three measurement samples at Site E exceeded the County's 70 dBA L_{max} standard. At the other sites, measured maximum noise levels during individual bird whistle launches were in the range of 40-62 dBA. Bird whistles can be clearly audible in the vicinity of the landfill due their distinctive sound.

NOISE MITIGATION

DEIR Noise Mitigation and Findings of Significance:

The Cold Canyon Landfill Expansion project would expand the area of the landfill operation, expand and relocate the compost operation, expand and relocate the Resource Recovery Park, expand the Materials Recovery Facility, extend hours of operation, relocate the main entrance road and increase traffic on SR227. Noise mitigation measures are directed at the "project" as identified in the DEIR and *not* at the resolution of existing noise-related conflicts around the landfill.

The DEIR presents a discussion of required noise mitigation based upon noise measurement data collected in March 2008, information provided by the project applicant *and the assumption that noise mitigation should focus on compliance with the County's standards at the locations of noise-sensitive receptors*. As discussed above, noise measurement data collected for the present study over a two-week period were found to be consistent with the DEIR noise data with the exception that bird whistles were not identified as a landfill-related noise source when the DEIR noise study was prepared.

The DEIR noise study concluded that noise levels from the landfill expansion project would result in noise levels exceeding the County's 50 dBA hourly L_{eq} standard at the closest existing homes to the south, east and north of the landfill site. That finding remains unchanged.

The DEIR noise study also concluded that maximum noise levels due to the project would not exceed the County's 70 dBA hourly L_{max} standard. That finding needs to be revised since the present study determined that intermittent bird whistles have the potential to exceed 70 dBA at the closest homes to the west of the site. There are no known noise mitigation measures for bird whistles and that impact will most likely remain significant and unavoidable.

Figure 3 shows proposed noise mitigation measures from the DEIR noise study. Mitigation measures include the construction of earthen berms near the southeast boundary of the landfill site. The DEIR did not specify how tall the berms (or other types of noise barriers) should be, but stated that they would have to interrupt line-of-sight between the noise source(s) and receiver(s) of concern in order to provide useful noise mitigation. It was assumed that the relocated RRP would be depressed below the existing grade to provide acoustic shielding between the RRP and closest homes to the east.

Noise Mitigation at Property Lines:

As noted above, the DEIR noise analysis focused on noise mitigation at the location of noise-sensitive receptors and not residential property lines. However, the San Luis Obispo County Noise Element specifies that hourly noise standards for stationary noise sources should be applied at the receiving land use property line. This presents a dilemma in that the design of effective noise mitigation at the property line may not provide effective mitigation at other locations within the property where the noise-sensitive uses are located. This is especially true in rural residential areas where individual homes are located on large land parcels with varying terrain.

Mitigation of noise at the property line requires that either some form of noise barrier be constructed around the expanded landfill operation or that the noise produced by landfill activities be reduced at the source. It may also be possible to reduce noise affecting nearby residential receptors and property lines by constructing on-site noise attenuation enclosures around noise generating activities, such as the wood waste grinding operation. There are practical limitations on how much noise generated by heavy equipment may be reduced at the equipment source without compromising the performance and safety of the equipment. Additionally, there are federal and state safety regulations that require audible warning devices on many types of heavy equipment.

Following are discussions of additional noise mitigation measures that could be utilized to reduce project-related noise impacts at the closest noise-sensitive receptors *and* at the closest property lines of parcels within which such uses are located.

Landfill Disposal Operations

The DEIR noise analysis recommended that an earthen berm be constructed along the southeast boundary of the project site as shown in Figure 3. A berm at that location would acoustically shield the property lines to the southeast of the landfill and the closest homes on those properties from landfill disposal, composting and MRF activities. The DEIR analysis did not state specifically how tall the berm should be.

One of the complicating factors with the landfill disposal expansion area is that the active landfill face will move around over time and become higher in elevation as expansion area modules are completed. Ultimately, that active landfill face in the expansion area could be 100-200 feet higher than the elevations of the closest homes to the southeast. An earthen berm 25 feet high would effectively mitigate noise levels from landfill disposal operations affecting nearby property lines to the southeast of the expansion area, but would not completely mitigate noise at the closest homes on those properties.

It is concluded that noise-sensitive receptors located within 1,500 feet of the active landfill face, and that have an unobstructed view of the active landfill face (with the recommended berms in place), may occasionally be exposed to hourly noise levels in excess of the County's 50 dBA hourly L_{eq} standard.

Composting Operation

Mitigation of noise from the composting operation at nearby property lines to the north and east would require that noise from the tub grinder and Scarab be reduced at their sources. Since it is not practical to reduce the noise produced by the tub grinder, a fixed grinding location could be established that is acoustically shielded from nearby homes and property lines by a combination of existing terrain and on-site noise barriers. This means that wood and green waste material would have to be transported to the established grinding location. Noise barriers around the grinding location could be constructed of earth, concrete, hay bales or any acoustically dense material. Hay bales have been effectively used for noise attenuation enclosures for aircraft maintenance run-ups at the San Luis Obispo County and Fresno Airports.

The height of the barrier required to effectively mitigate tub grinder noise would depend on how close to the tub grinder the barrier could be located and the relative elevations of nearby

receptors. A 12 foot-high barrier would be effective in reducing noise levels from the tub grinder by 5-10 dB, depending upon the location and elevation of the receptor of concern. It is likely that noise from the tub grinder could still exceed the County's 50 dBA hourly L_{eq} standard at some nearby property lines, even with an effective on-site noise barrier in place.

The Scarab row turner presents a difficult situation for effective noise mitigation. The equipment must operate over a wide area and the closest receiving property lines and homes are generally located at a higher elevation than the existing compost turning area. It is recommended that the project applicant consider modifications that would reduce the noise level generated by the Scarab at the equipment source. Such modifications could include more effective mufflers and/or shielding of noise-producing mechanical equipment. It is unknown how much noise from the Scarab could be reduced by such modifications. It is concluded that noise from the Scarab remains a significant impact that can not be reasonably mitigated at nearby property lines.

Resource Recovery Park (RRP)

The RRP would be relocated with the project to an area to the east of the MRF. The DEIR noise analysis concluded that the RRP would be acoustically shielded from the closest homes to the east since the facility would be recessed into the hillside. Due to the fact that the RRP would be cut into the hillside, the closest property lines to the east would directly overlook the facility. It would not be practical to construct a property line noise barrier along the east boundary of the RRP site and a barrier would provide limited effectiveness since the terrain slopes upward rather steeply.

Noise from the RRP could potentially be reduced at the closest property lines to the east by enclosing the operation in a covered structure. It is unknown whether this is feasible or by how much noise levels could be reduced. Noise reduction potential would depend on the final design of the structure. It is concluded that noise from the relocated RRP is a significant impact that can not be reasonably mitigated at nearby property lines.

FIGURE 1: LONG TERM NOISE MONITORING SITES

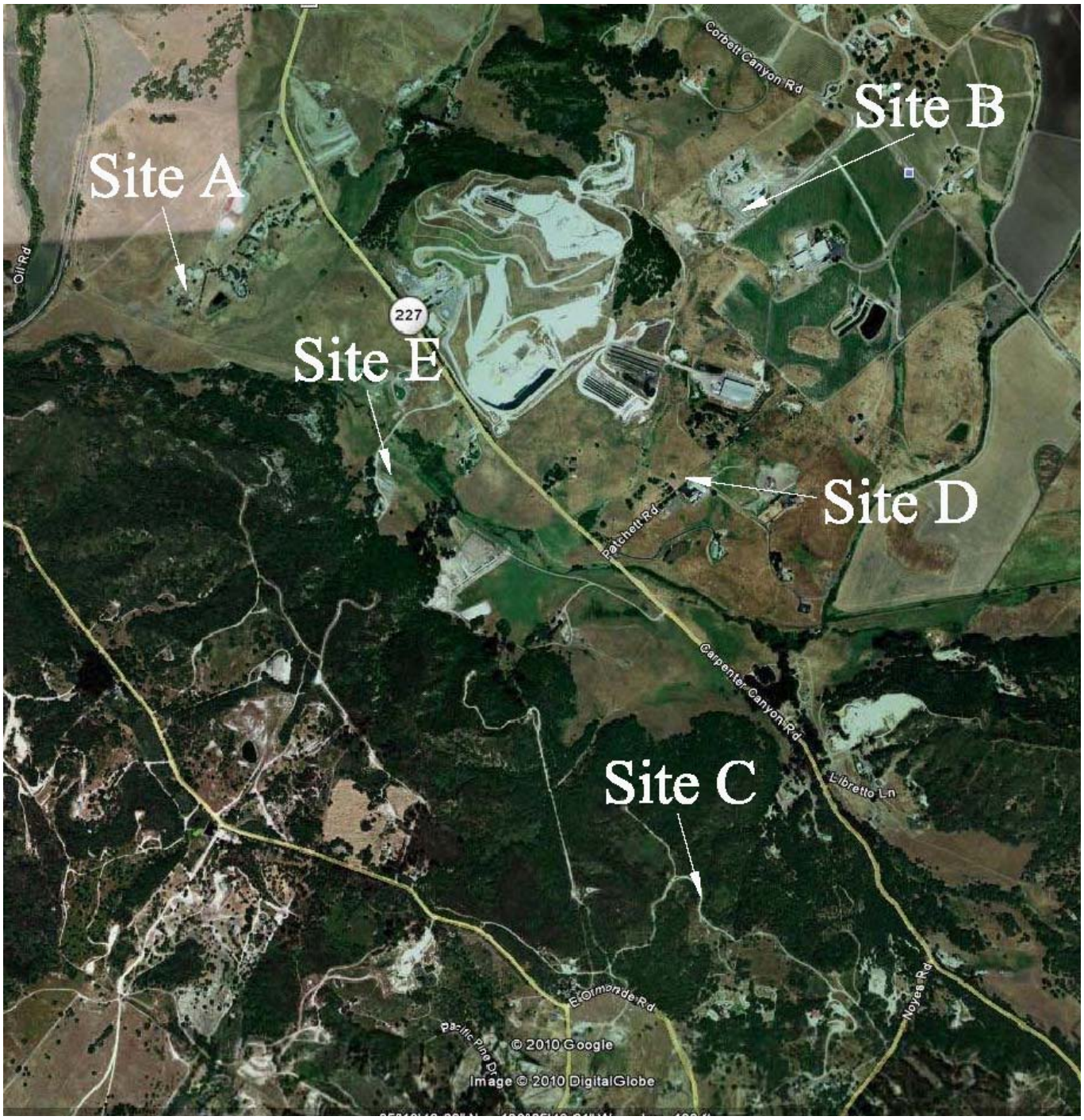
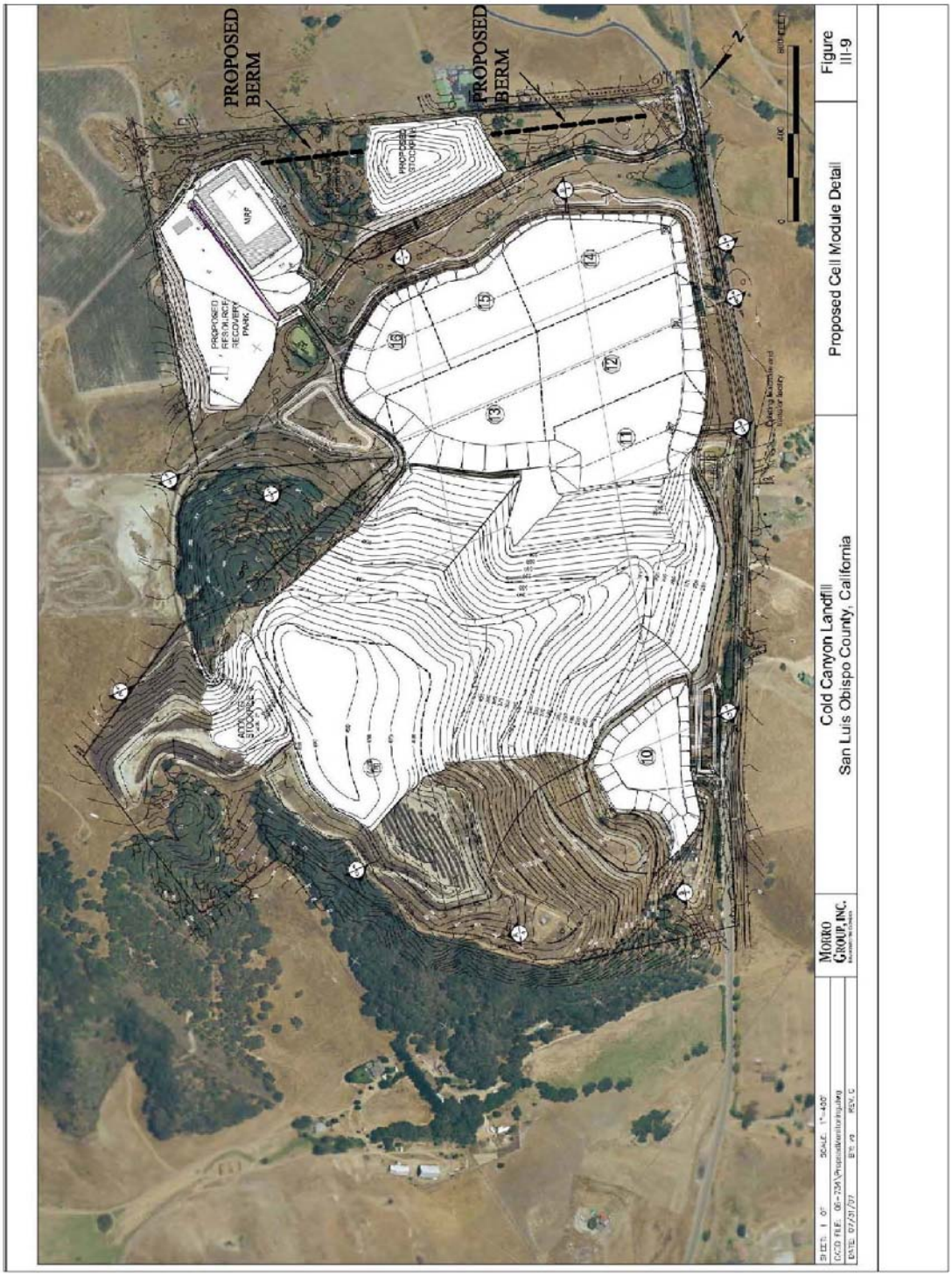


FIGURE 2: SHORT TERM NOISE MONITORING SITES

FIGURE 3: POTENTIAL NOISE MITIGATION MEASURES



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 Anoise 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

HOURLY NOISE LEVEL SUMMARIES

MEASURED DAILY DNL VALUES AND HOURLY NOISE LEVELS[1]
FEBRUARY 4-10, 2010
SITE A

Date	Day	DNL	7:00 am-4:59 pm (Landfill Hours)				5:00 pm-6:59 am			
			L_{max}	L_{eq}	L_{50}	L_{90}	L_{max}	L_{eq}	L_{50}	L_{90}
2/4/10	Thu	49.2	58-78	45-52	42-50	39-46	49-67	35-55	32-52	29-41
2/5/10[2]	Fri	51.7	58-92	41-60	38-49	35-45	52-71	41-56	39-57	36-42
2/6/10	Sat	55.8	57-71	41-52	37-47	36-45	55-67	42-64	37-64	30-62
2/7/10	Sun	55.3	59-81	44-53	36-42	33-39	55-77	43-61	38-61	34-58
2/8/10	Mon	56.3	61-71	44-49	40-45	36-42	55-71	45-65	36-65	31-64
2/9/10	Tues	57.7	53-73	40-49	38-45	36-42	56-67	43-65	42-65	28-64
2/10/10	Wed	55.8	55-74	43-52	41-48	38-45	52-70	41-64	38-64	32-62

[1]Includes noise from *all* sources affecting the site, including the landfill operation, traffic and aircraft.
[2] Sustained high winds occurred on 2/5/10, affecting measured noise levels. Data collected on 2/5/10 are considered to be invalid.
Source: Brown-Buntin Associates, Inc.

MEASURED DAILY DNL VALUES AND HOURLY NOISE LEVELS[1]
JANUARY 29-FEBRUARY 10, 2010
SITE B

Date	Day	DNL	7:00 am-4:59 pm (Landfill Hours)				5:00 pm-6:59 am			
			L_{max}	L_{eq}	L_{50}	L_{90}	L_{max}	L_{eq}	L_{50}	L_{90}
1/29/10	Fri	48.4	58-79	45-53	38-48	35-42	43-69	34-46	33-41	31-38
1/30/10	Sat	47.6	55-74	38-54	33-42	28-36	44-72	30-47	29-41	26-38
1/31/10	Sun	45.1	56-69	39-47	32-37	27-31	44-65	33-45	29-39	25-35
2/1/10	Mon	45.7	52-74	39-51	33-41	29-37	42-72	31-48	30-38	28-36
2/2/10	Tues	48.5	57-81	42-56	35-46	32-41	40-71	31-49	30-40	27-37
2/3/10	Wed	48.2	59-69	42-49	34-46	29-40	40-72	30-54	30-48	27-42
2/4/10	Thu	51.8	53-71	39-49	37-44	34-40	43-73	31-53	29-49	27-43
2/5/10[2]	Fri	55.3	68-80	48-59	42-54	37-50	48-71	37-53	26-50	34-45
2/6/10	Sat	49.1	58-72	38-55	33-49	30-45	43-73	32-49	31-39	29-36
2/7/10	Sun	45.8	55-68	38-49	33-38	29-35	42-72	33-47	28-35	34-33
2/8/10	Mon	44.3	54-72	37-48	35-44	31-37	37-68	28-46	26-39	23-35
2/9/10	Tues	47.8	57-73	38-48	33-41	30-38	43-70	30-48	28-46	26-39
2/10/10	Wed	46.6	59-73	40-52	36-46	32-42	41-69	31-49	30-41	26-37

[1]Includes noise from *all* sources affecting the site, including the landfill operation, traffic and aircraft.
Source: Brown-Buntin Associates, Inc.
[2] Sustained high winds occurred on 2/5/10, affecting measured noise levels. Data collected on 2/5/10 are considered to be invalid.
Source: Brown-Buntin Associates, Inc.

MEASURED DAILY DNL VALUES AND HOURLY NOISE LEVELS[1]
JANUARY 29-FEBRUARY 10, 2010
SITE C

Date	Day	DNL	7:00 am-4:59 pm (Landfill Hours)				5:00 pm-6:59 am			
			L_{max}	L_{eq}	L_{50}	L_{90}	L_{max}	L_{eq}	L_{50}	L_{90}
1/29/10	Fri	52.9	61-75	51-55	48-53	38-45	56-71	31-55	26-53	24-44
1/30/10	Sat	52.4	61-82	49-56	38-52	32-44	54-65	34-52	26-49	23-41
1/31/10	Sun	50.4	61-81	46-54	37-49	30-38	55-74	37-52	25-47	23-37
2/1/10	Mon	52.7	60-81	51-54	47-52	37-43	54-68	34-54	27-52	24-43
2/2/10	Tues	52.9	62-79	51-54	49-53	39-46	53-62	31-54	27-53	25-43
2/3/10	Wed	53.5	61-71	51-55	47-53	39-48	54-68	33-56	27-54	25-46
2/4/10	Thu	52.1	62-66	51-54	47-52	36-42	58-71	34-53	25-51	23-39
2/5/10[2]	Fri	54.5	61-79	51-55	49-51	37-45	54-67	44-53	31-52	28-45
2/6/10	Sat	52.0	59-82	50-56	46-52	36-47	56-66	36-51	24-47	22-40
2/7/10	Sun	50.9	56-67	34-56	26-54	24-45	59-78	46-54	38-49	32-41
2/8/10	Mon	53.7	62-70	52-55	49-53	41-45	56-67	34-56	26-54	24-45
2/9/10	Tues	54.0	62-69	51-55	47-54	37-46	57-69	35-54	24-51	22-46
2/10/10	Wed	53.9	62-71	52-54	50-54	41-47	55-75	32-56	27-55	25-47

[1]Includes noise from *all* sources affecting the site, including the landfill operation, traffic and aircraft.
[2] Sustained high winds occurred on 2/5/10, affecting measured noise levels. Data collected on 2/5/10 are considered to be invalid.
Source: Brown-Buntin Associates, Inc.

MEASURED DAILY DNL VALUES AND HOURLY NOISE LEVELS[1]
JANUARY 29-FEBRUARY 10, 2010
SITE D

Date	Day	DNL	7:00 am-4:59 pm (Landfill Hours)				5:00 pm-6:59 am			
			L_{max}	L_{eq}	L_{50}	L_{90}	L_{max}	L_{eq}	L_{50}	L_{90}
1/29/10	Fri	50.9	65-74	48-53	45-48	40-44	54-74	39-53	36-48	32-44
1/30/10	Sat	50.3	61-75	42-55	39-52	34-45	46-74	32-52	29-49	25-44
1/31/10	Sun	50.1	52-79	33-52	26-46	23-43	52-79	33-52	26-46	23-43
2/1/10	Mon	51.6	60-86	47-57	41-49	35-43	50-75	35-51	34-48	30-44
2/2/10	Tues	52.5	57-82	47-58	45-55	39-49	47-71	33-50	29-49	26-46
2/3/10	Wed	52.3	62-90	46-59	43-49	39-46	50-78	34-56	33-49	29-44
2/4/10	Thu	51.8	61-81	44-53	41-46	36-42	43-78	29-52	26-45	24-30
2/5/10[2]	Fri	54.5	64-77	45-56	43-51	39-47	53-75	41-52	39-49	65-42
2/6/10	Sat	52.8	67-77	46-60	38-54	31-48	49-79	33-50	28-44	26-41
2/7/10	Sun	50.5	63-75	43-51	38-47	33-43	49-82	34-51	30-43	28-39
2/8/10	Mon	51.6	62-77	48-57	46-55	40-50	48-75	30-50	29-47	26-41
2/9/10	Tues	53.8	60-82	48-55	44-49	39-45	48-76	28-52	26-49	23-39
2/10/10	Wed	52.9	63-83	49-56	46-50	41-47	47-84	33-61	30-49	26-41

[1]Includes noise from *all* sources affecting the site, including the landfill operation, traffic and aircraft.
[2] Sustained high winds occurred on 2/5/10, affecting measured noise levels. Data collected on 2/5/10 are considered to be invalid.
Source: Brown-Buntin Associates, Inc.

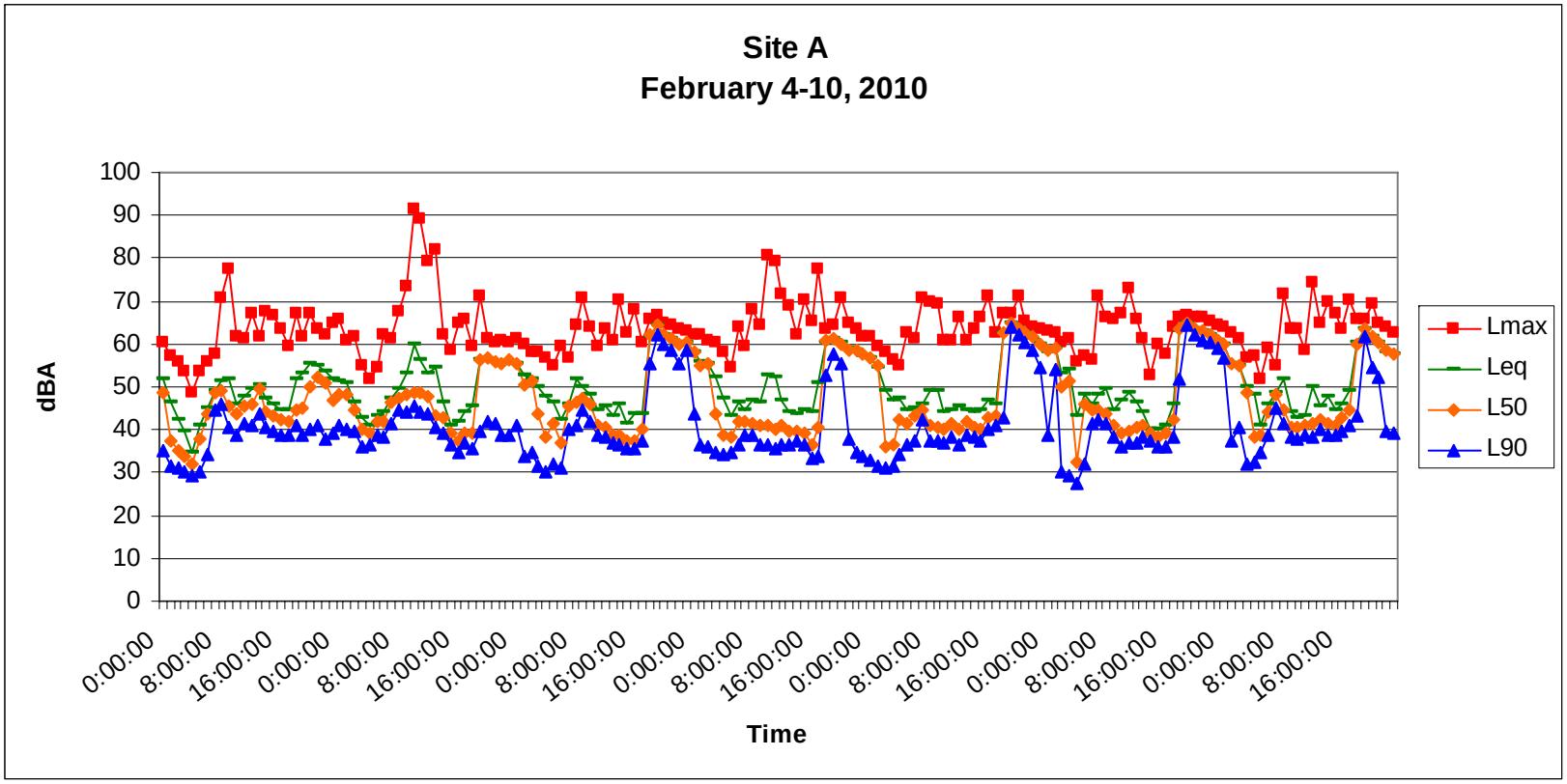
MEASURED DAILY DNL VALUES AND HOURLY NOISE LEVELS[1]
FEBRUARY 2-10, 2010
SITE E

Date	Day	DNL	7:00 am-4:59 pm (Landfill Hours)				5:00 pm-6:59 am			
			L_{max}	L_{eq}	L_{50}	L_{90}	L_{max}	L_{eq}	L_{50}	L_{90}
2/2/10	Tues	60	66-73	46-61	41-59	36-47	42-71	34-63	32-61	30-60
2/3/10	Wed	59.5	62-73	47-58	44-53	40-49	46-71	33-63	32-61	29-46
2/4/10	Thu	51.6	61-77	45-58	42-51	49-48	48-71	33-48	30-47	28-45
2/5/10[2]	Fri	52.9	62-83	45-54	41-49	37-46	50-70	40-48	39-47	36-44
2/6/10	Sat	50.2	57-74	47-56	42-50	38-47	47-66	33-47	31-41	29-41
2/7/10	Sun	48.3	61-80	45-52	40-44	36-41	49-64	36-46	35-45	34-41
2/8/10	Mon	48.8	58-74	45-51	43-46	40-43	47-74	33-51	32-47	31-42
2/9/10	Tues	51.0	60-72	43-50	41-47	37-44	50-67	33-50	31-48	29-45
2/10/10	Wed	49.9	61-74	47-50	44-82	40-45	49-74	37-52	36-47	33-44

[1]Includes noise from *all* sources affecting the site, including the landfill operation, traffic and aircraft.
[2] Sustained high winds occurred on 2/5/10, affecting measured noise levels. Data collected on 2/5/10 are considered to be invalid.
Source: Brown-Buntin Associates, Inc.

APPENDIX C

HOURLY NOISE LEVEL CHARTS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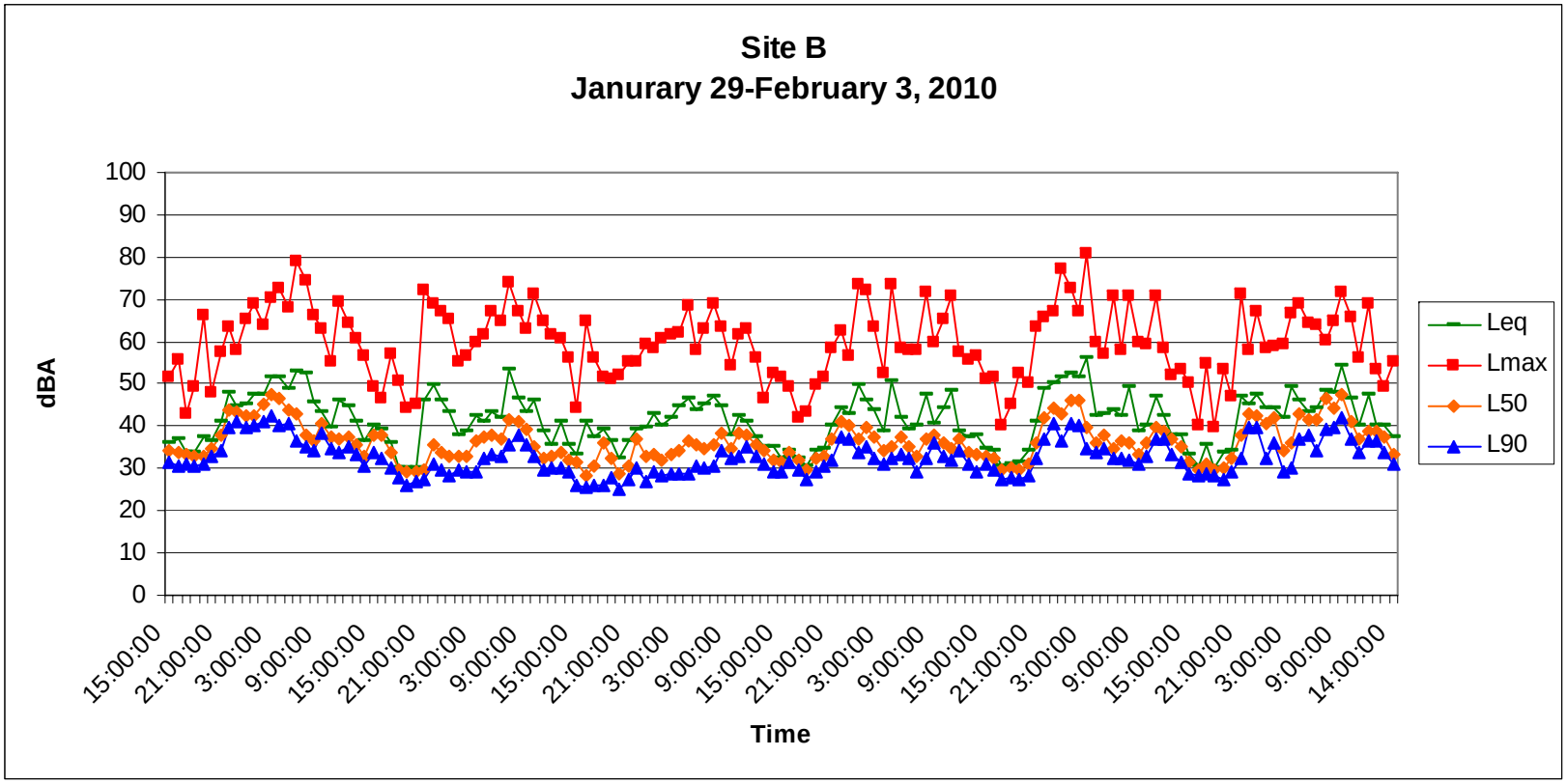
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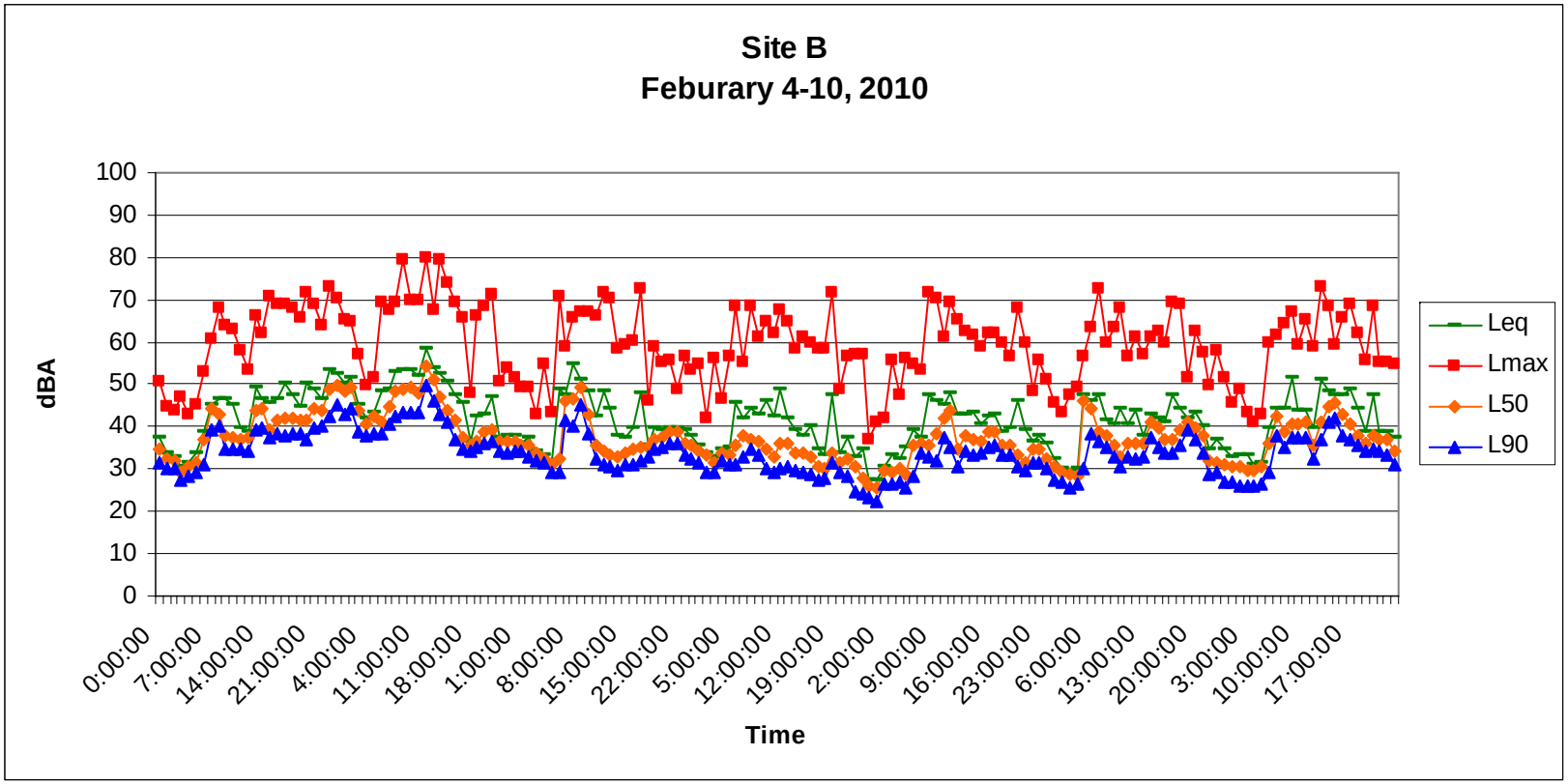
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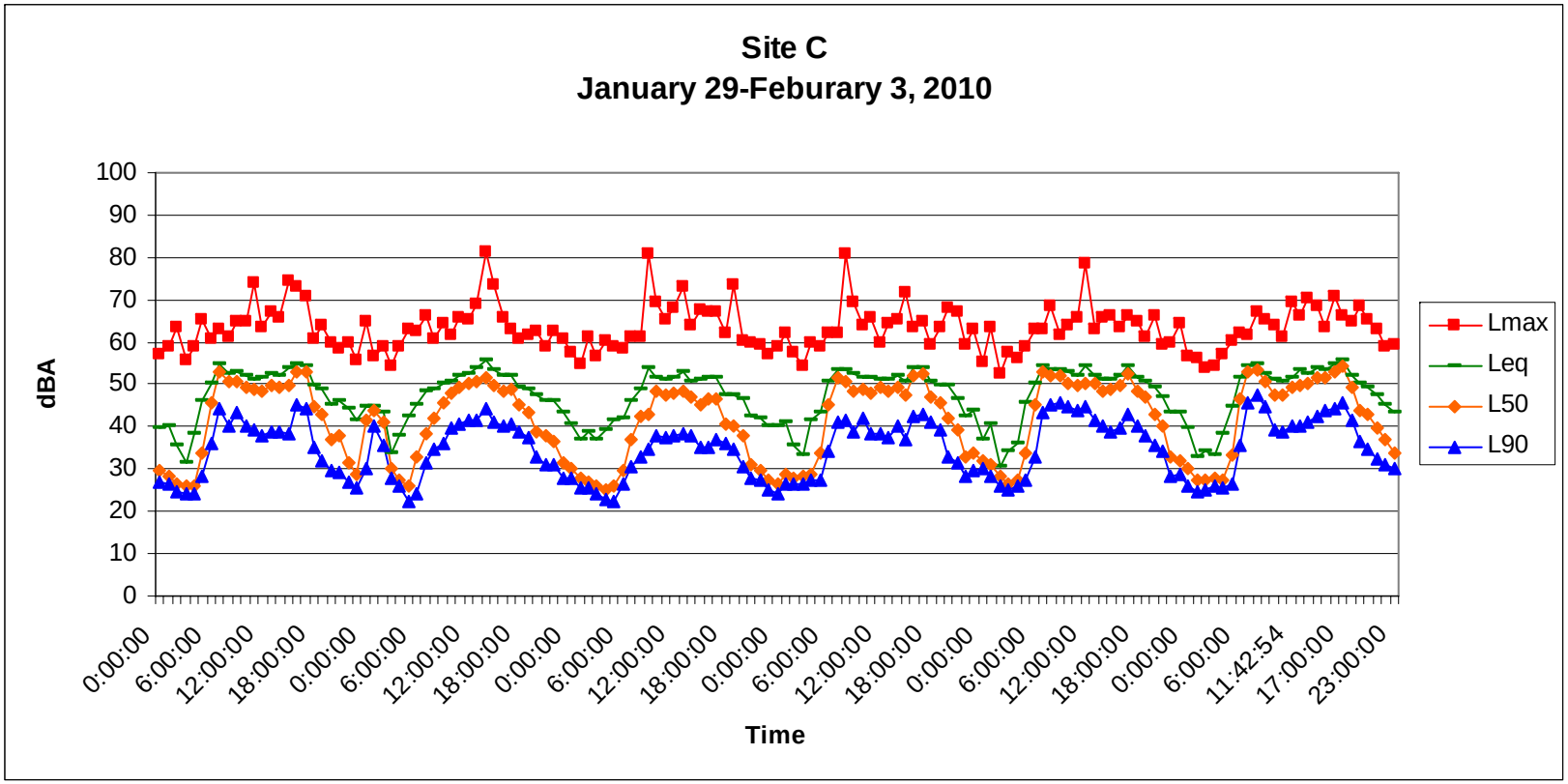
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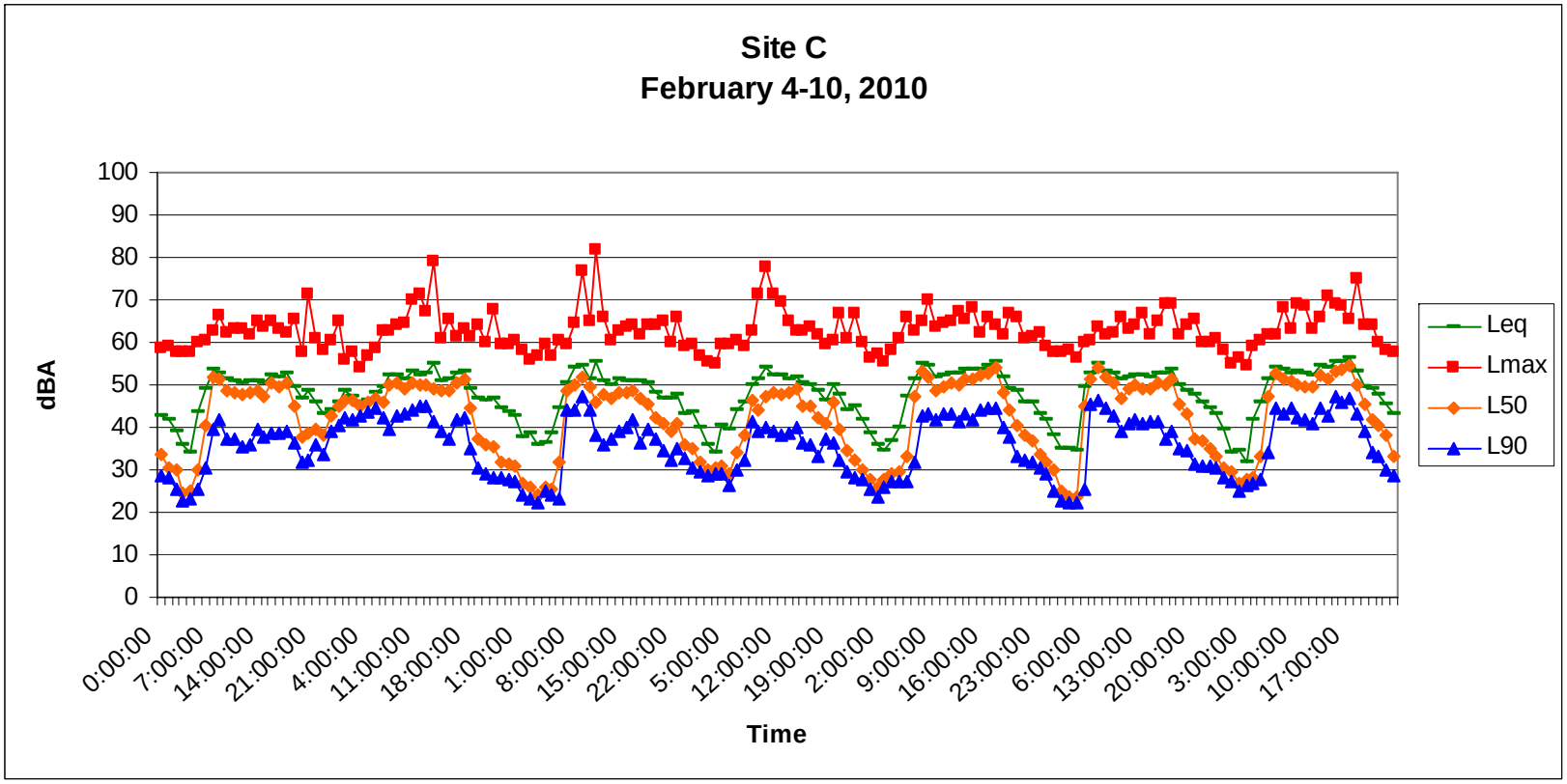
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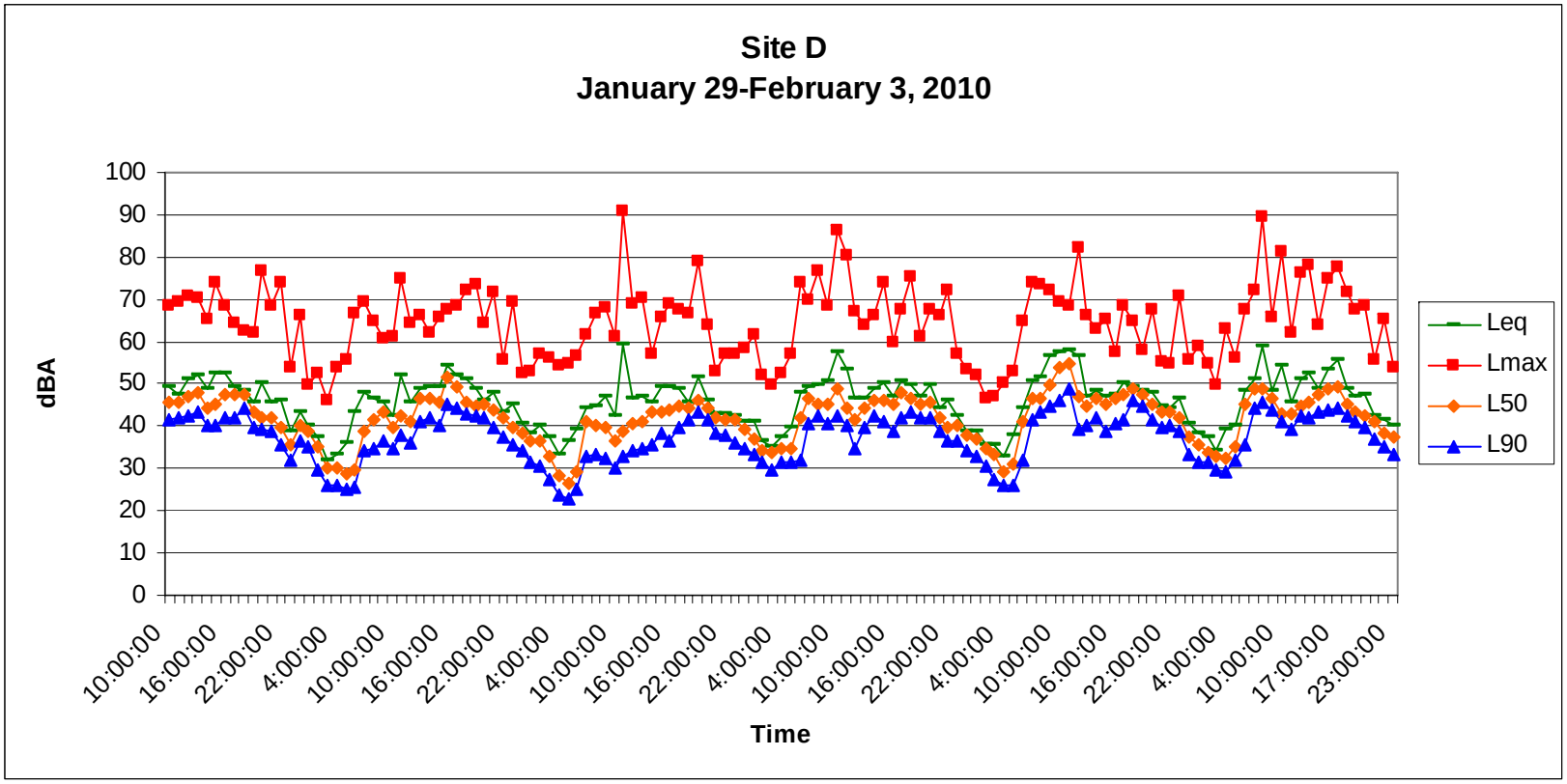
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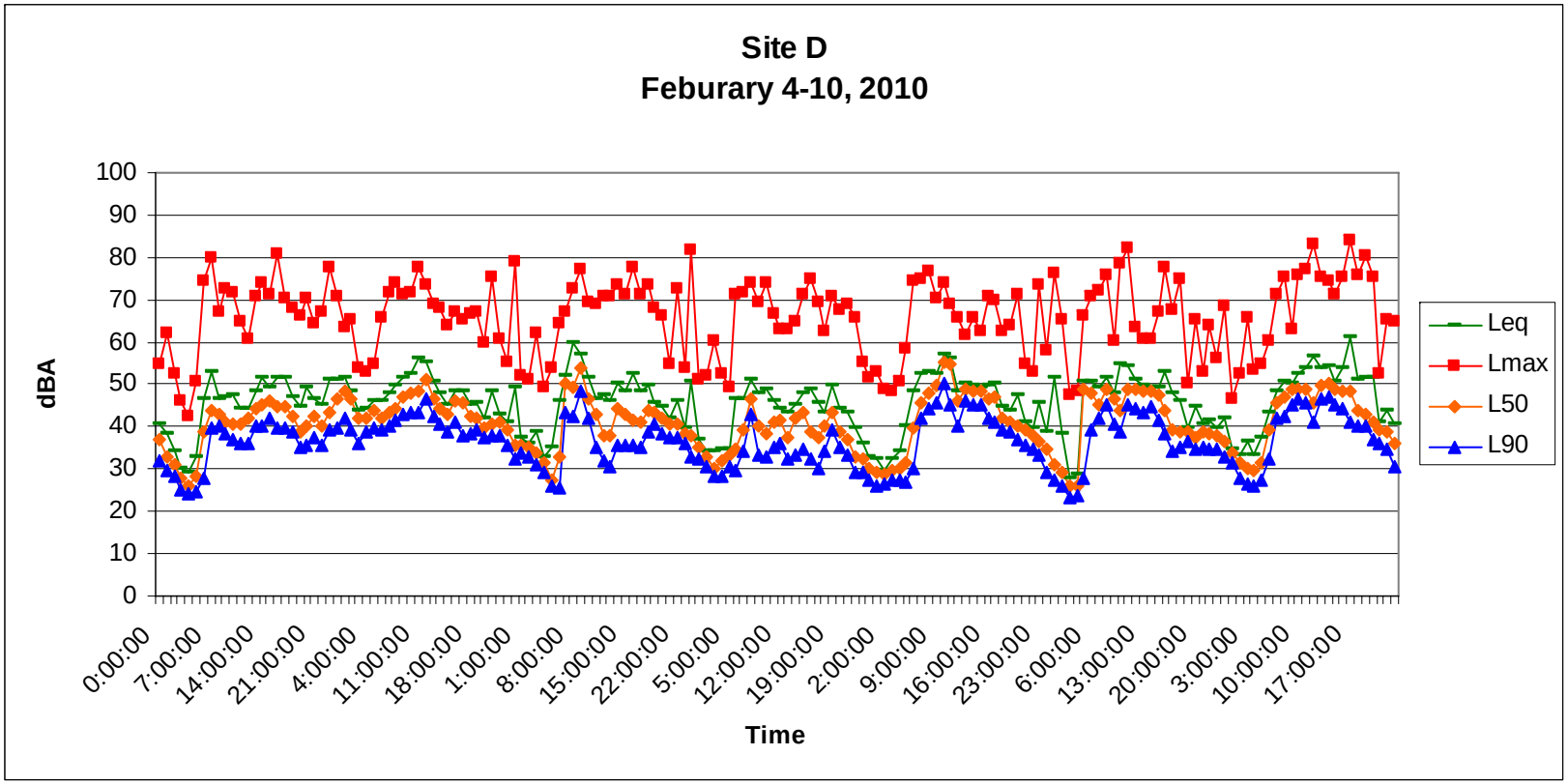
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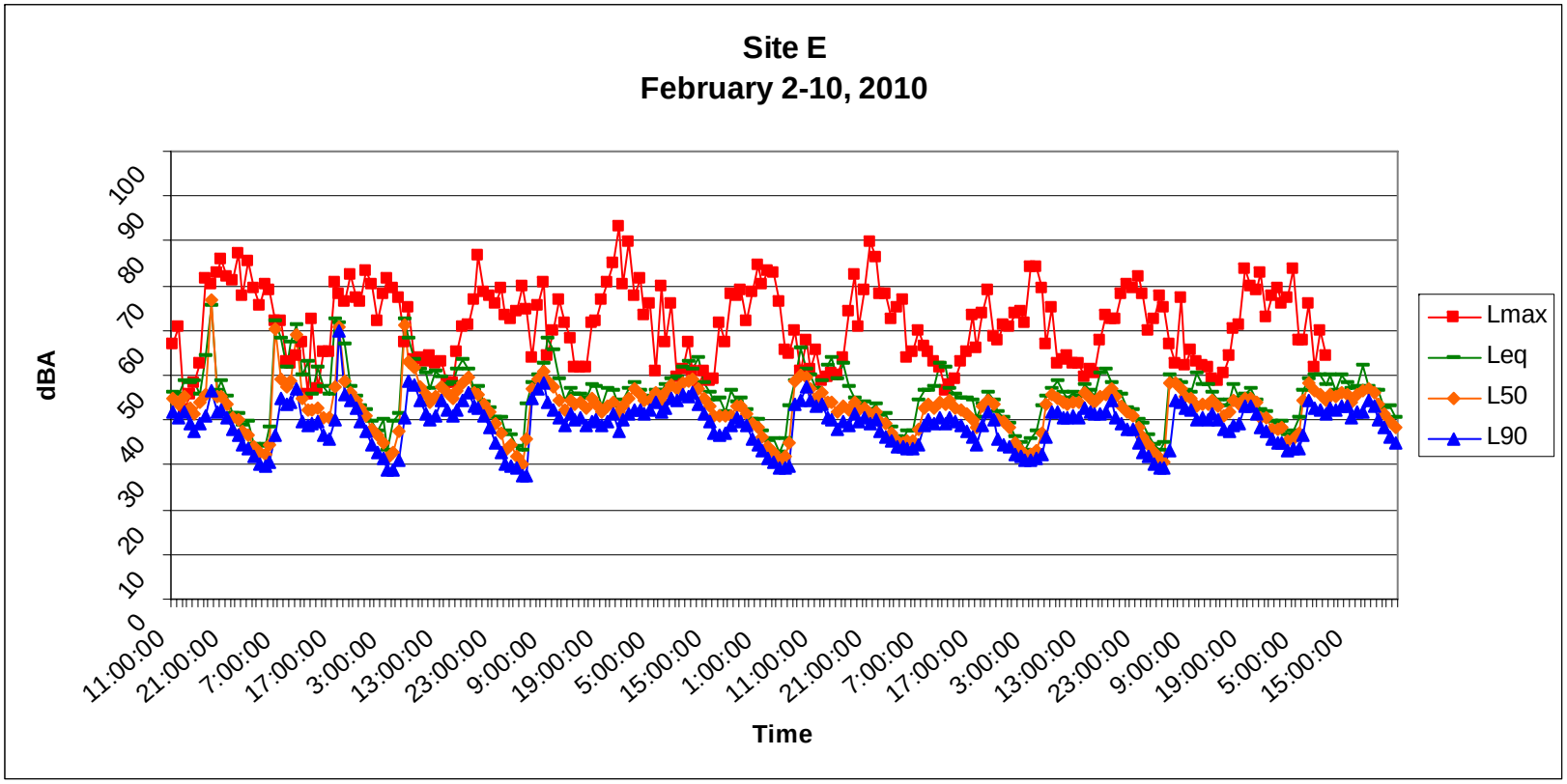
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