Donaldson Coal Pty Limited

ABEL UNDERGROUND MINE PART 3A ENVIRONMENTAL ASSESSMENT

Appendix H

Noise Impact Assessment

HEGGIES
AUSTRALIA

REPORT 30-1409-R1

Revision 1

Noise Impact Assessment
Proposed Abel Coal Mine

PREPARED FOR

Donaldson Coal Pty Ltd
PO Box 37 Maitland NSW
Australia 2320

19 JULY 2006

Noise Impact Assessment

Proposed Abel Coal Mine

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EXECUTIVE SUMMARY

Heggies Australia Pty Ltd (Heggies) has been commissioned by Donaldson Coal Pty Limited, to conduct a noise impact assessment for the proposed Abel Coal Mine. The proposal is to develop a new underground mine that will access coal reserves south of the existing Donaldson Open Cut Mine near Beresfield NSW. This report presents the results and findings of the noise assessment including consideration of construction, rail traffic and operational noise from the proposed development.

Operational Noise Predictions

A computer model was used to predict noise emissions from the proposed Abel Coal Mine. The Environmental Noise Model (ENM) used has been produced in conjunction with the DEC. Noise levels were predicted for the general operational scenario summarised in **Section 7.2** with the inclusion of the noise mitigation and management procedures detailed in **Section 5**.

Operational noise levels from the proposed Abel Coal Mine (**Table 14**) are predicted to meet the project specific noise criteria at all receiver locations under prevailing weather conditions with the exception of Location K where an exceedance of 1 dBA is predicted during a prevailing north west wind. This minor exceedance of 1 dBA during the night-time periods is unlikely to be noticeable by most people. Furthermore, the proponent has a negotiated agreement, in relation to noise impacts, with the current owners of this property for the life of the Donaldson Open cut mine.

Since the operational scenario modelled is likely to represent an acoustically worst-case scenario, actual operational noise levels from the proposed Abel Coal mine are likely to be less than those predicted.

Sleep Disturbance Assessment

The predicted L_{Amax} noise levels from operation of Abel Coal Mine meet the sleep disturbance criteria at all locations with the exception of Location K.

External L_{Amax} noise levels up to 52 dBA may occur at Location K. The ECRTN provides further guidance with regard to sleep disturbance and calls upon a number of studies that have been conducted into the effect of maximum noise levels on sleep. The DEC policy document acknowledges that, at the current level of understanding, it is not possible to establish absolute noise level criteria that would correlate to an acceptable level of sleep disturbance. However, the ECRTN provides that maximum internal noise levels below 50 dBA to 55 dBA are unlikely to cause awakening reactions and one or two events per night, with maximum internal noise levels of 65 dBA to 70 dBA (inside dwellings) are not likely to significantly affect health and wellbeing. Maximum noise predictions have shown that external noise levels up to 52 dBA may occur at Location K during the night-time period as a result of the proposed Abel Coal Mine operation. This correlates to noise levels significantly below 50 dBA inside dwellings. Based on the preceding, maximum noise levels produced by operation of the proposed Abel Coal Mine are not likely to cause sleep disturbance at this location.

Rail Traffic Noise Assessment

The increase in rail traffic generated by trains using the Bloomfield rail loop is predicted to increase the existing daytime $L_{Aeq(15hour)}$ rail noise level by approximately 0.2 dBA and the existing night-time $L_{Aeq(9hour)}$ rail noise level by approximately 0.1 dBA. These increases are negligible and such an increase would not be discernible by receivers near the rail line.

This increase in noise level is considered to be overstated as existing Donaldson and Bloomfield rail traffic would likely be included in the existing rail traffic numbers.

EXECUTIVE SUMMARY

Construction Noise Assessment

Construction noise levels are predicted to be below the relevant noise goals at each of the residential receivers considered.

Cumulative Impact Assessment

The cumulative impact of mining in the area surrounding the Abel Coal Mine including existing Bloomfield Coal Mine, existing Donaldson Coal Mine and approved Tasman Coal Mine is predicted to comply with the relevant amenity criteria set in accordance with the INP

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1 INTRODUCTION

Heggies Australia Pty Ltd (Heggies) has been commissioned by Donaldson Coal Pty Limited, to conduct a noise impact assessment for the proposed Abel Coal Mine. The proposal is to develop a new underground mine that will access coal reserves south of the existing Donaldson Open Cut Mine near Beresfield NSW.

Broadly, the objective of the assessment was to identify the potential impacts of noise from the proposed development, including construction and operation of the mine, coal handling and processing at the existing Bloomfield plant and associated rail and road traffic movements. Advice with regard to effective mitigation strategies will be provided where necessary. The assessment of the Bloomfield Plant and associated transport movements has not been limited to the additional usage as a result of the proposed Abel Coal Mine, but includes the entire facilities including that plant attributable to the proposed Abel Coal Mine

The noise assessment has been prepared with reference to Australian Standard AS 1055:1997 *Description and Measurement of Environmental Noise* Parts 1, 2 and 3 and in accordance with the Department of Environment and Conservation's (DEC, formerly the EPA) NSW Industrial Noise Policy (INP). Where issues relating to noise are not addressed in the INP, such as sleep disturbance, rail traffic noise and construction noise goals, reference has been made to the NSW Environmental Noise Control Manual (ENCM).

2 NOISE MANAGEMENT

Selecting an appropriate noise management strategy for the proposed Abel Coal Mine involves the following steps:

- Determining the noise reduction required to achieve the project-specific noise levels.
- Identifying the specific characteristics of the industry and the site that would indicate a preference for specified measures.
- Examining the mitigation strategy chosen by similar industries on similar sites with similar requirements for noise reduction; and considering that strategy's appropriateness for the subject development.
- Considering the range of noise-control measures available.
- Considering community preferences for particular strategies. This is especially important when the community has particular sensitivities to noise.

The preference ranking (from most preferred to least preferred) for noise mitigation strategies is as follows:

- **Land-use controls** - a long-term strategy preferable to other measures when such strategic decisions are possible in planning land use, as it separates noise-producing industries from sensitive areas and avoids more expensive short-term measures.
- **Control at the source** - Best Management Practice (BMP) and Best Available Technology Economically Achievable (BATEA) used in conjunction, these strategies are the best after land-use planning, as they serve to reduce the noise output of the source so that the surrounding environment is protected against noise.
- **Control in transmission** - the next best strategy to controlling noise at the source—it serves to reduce the noise level at the receiver but not necessarily the environment surrounding the source.
- **Receiver controls** - the least-preferred option, as it protects only the internal environment of the receiver and not the external noise environment.

Proponents will take into account the cost-effectiveness of strategies in determining how much noise reduction is affordable. A proponent's choice of a particular strategy is likely to have unique features due to the economics of the industry and site specific technical considerations.

The above steps and the range of measures described in this chapter can be used as a guide in assessing the strength of the proponent's mitigation proposals. Where a proposed mitigation strategy will not achieve the desired noise reduction and leaves a remaining noise impact, the problem needs to be solved by negotiation.

3 IMPACT ASSESSMENT PROCEDURES

3.1 General Objectives

Responsibility for the control of noise emission in New South Wales is vested in Local Government and the Department of the Environment and Conservation (DEC). The INP was released in January 2000 and provides a framework and process for deriving noise criteria for consents and licences that will enable the DEC to regulate premises that are scheduled under the Protection of the Environment Operations Act, 1997.

The specific policy objectives are:

- To establish noise criteria that would protect the community from excessive intrusive noise and preserve amenity for specific land uses.
- To use the criteria as the basis for deriving project specific noise levels.
- To promote uniform methods to estimate and measure noise impacts, including a procedure for evaluating meteorological effects.
- To outline a range of mitigation measures that could be used to minimise noise impacts.
- To provide a formal process to guide the determination of feasible and reasonable noise limits for consents or licences that reconcile noise impacts with the economic, social and environmental considerations of industrial development.
- To carry out functions relating to the prevention, minimisation and control of noise from premises scheduled under the Act.

3.2 Assessing Intrusiveness

For assessing intrusiveness, the background noise level must be measured. The intrusiveness criterion essentially means that the equivalent continuous noise level (L_{Aeq}) of the source should not be more than five decibels above the measured background level (L_{A90}).

3.3 Assessing Amenity

The amenity assessment is based on noise criteria specific to land use and associated activities. The criteria relate only to industrial-type noise and do not include road, rail or community noise. The existing noise level from industry is measured. If it approaches the criterion value, then noise levels from new industries need to be designed so that the cumulative effect does not produce noise levels that would significantly exceed the criterion. For high-traffic areas there is a separate amenity criterion.

An extract from the INP that relates to the amenity criteria is given in **Table 1** and **Table 2**.

Table 1 Amenity Criteria - Recommended L_{Aeq} Noise Levels from Industrial Noise Sources

Type of Receiver	Indicative Noise Amenity Area	Time of Day	Recommended $L_{Aeq(Period)}$ Noise Level (dBA)	
			Acceptable	Recommended Maximum
Residence	Rural	Day	50	55
		Evening	45	50
		Night	40	45
	Suburban	Day	55	60
		Evening	45	50
		Night	40	45
	Urban	Day	60	65
		Evening	50	55
		Night	45	50
School classrooms - internal	All	Noisiest 1 hour period when in use	35	40
Hospital wards	All	Noisiest 1 hour period		
- internal			35	40
- external			50	55
Place of worship - internal	All	When in use	40	45
Area specifically reserved for passive recreation (eg National Park)	All	When in use	50	55
Active recreation area (eg school playground, golf course)	All	When in use	55	60
Commercial premises	All	When in use	65	70
Industrial premises	All	When in use	70	75

Note: Daytime 7.00 am to 6.00 pm; Evening 6.00 pm to 10.00 pm; Night-time 10.00 pm to 7.00 am, On Sundays and Public Holidays, Daytime 8.00 am - 6.00 pm; Evening 6.00 pm - 10.00 pm; Night-time 10.00 pm - 8.00 am.
The L_{Aeq} index corresponds to the level of noise equivalent to the energy average of noise levels occurring over a measurement period.

Table 2 Modification to Acceptable Noise Level (ANL)* to Account for Existing Levels of Industrial Noise

Total Existing L_{Aeq} noise level from Industrial Noise Sources	Maximum L_{Aeq} Noise Level for Noise from New Sources Alone, dBA
≥ Acceptable noise level plus 2 dBA	If existing noise level is *likely to decrease* in future acceptable noise level minus 10 dBA If existing noise level is *unlikely to decrease* in future existing noise level minus 10 dBA
Acceptable noise level plus 1 dBA	Acceptable noise level minus 8 dBA
Acceptable noise level	Acceptable noise level minus 8 dBA
Acceptable noise level minus 1 dBA	Acceptable noise level minus 6 dBA
Acceptable noise level minus 2 dBA	Acceptable noise level minus 4 dBA
Acceptable noise level minus 3 dBA	Acceptable noise level minus 3 dBA
Acceptable noise level minus 4 dBA	Acceptable noise level minus 2 dBA
Acceptable noise level minus 5 dBA	Acceptable noise level minus 2 dBA
Acceptable noise level minus 6 dBA	Acceptable noise level minus 1 dBA
< Acceptable noise level minus 6 dBA	Acceptable noise level

* ANL = recommended acceptable L_{Aeq} noise level for the specific receiver, area and time of day from **Table 1**

3.4 Assessing Sleep Disturbance

The DEC has acknowledged that the relationship between maximum noise levels and sleep disturbance is not currently well defined. Criteria for assessing sleep disturbance has not been identified under the INP and hence, sleep arousal has been assessed using the guidelines set out in the ENCM Chapter 19-3.

To avoid the likelihood of sleep disturbance the ENCM recommends that the $L_{A1(1minute)}$ noise level of the source under consideration should not exceed the background noise level (L_{A90}) by more than 15 dBA when measured outside the bedroom window of the receiver during the night-time hours (10.00 pm to 7.00 am).

3.5 Assessing Rail Noise

Rail traffic noise goals are outlined in Chapter 163 of the Environmental Noise Control Manual (ENCM). Reference is also made to the ARTC Environmental Pollution Licence (EPL) 3142 which applies to the Main Northern Rail line. The Main Northern Rail line provides access to the subject site. It should be noted that train movements on the Bloomfield rail loop have been assessed as on-site, industrial noise sources as part of this investigation.

3.6 Construction Noise

The ENCM, Chapter 171, sets out noise criteria applicable to construction site noise for the purpose of defining intrusive noise impacts. Based upon this document the project specific construction noise goals outlined in **Table 3** will apply to the construction period of the proposed Abel Coal Mine infrastructure at the nearest potentially affected residential locations.

Table 3 Construction Noise Goals

Construction Period	Acceptable L_{A10} Noise Level*
4 weeks and under	Background L_{A90} plus 20 dBA
4 weeks to 26 weeks	Background L_{A90} plus 10 dBA
Greater than 26 weeks	Background L_{A90} plus 5 dBA

* Applicable between the hours of 7.00 am and 6.00 pm Monday to Friday, and 8.00 am to 1.00 pm Saturdays. For all other times construction noise must be inaudible at the receiver. No construction work is to take place on Sundays or Public Holidays.

4 EXISTING ACOUSTICAL AND METEOROLOGICAL ENVIRONMENT

4.1 Ambient Background Noise Monitoring

Ambient noise surveys were conducted to characterise and quantify the acoustical environment in the area surrounding the proposed Abel Coal Mine, approved Donaldson Coal Mine and existing Bloomfield Coal Mine. Noise surveys were conducted by Heggies in October 2000 prior to the commencement of the Donaldson Mine operation. Additional ambient monitoring was conducted in 2006 at new residential premises to the north of the Bloomfield Coal Handling and Preparation Plant (CHPP) at Ashtonfield. A plan of the monitoring and assessment locations is contained in **Appendix A**.

The use of the ambient noise data prior to the commencement of Donaldson Mine is seen as a conservative measure as quarterly monitoring data, collected as part of the noise management of the Donaldson site, suggests that the ambient levels in the general area, from traffic and industrial sources (other than mining), have risen since 2000.

The influence of the operation of Bloomfield (CHPP) on background noise measurements conducted at Location L, Ashtonfield was insignificant. No correlation between Bloomfield CHPP operating times and noise levels could be established. This was confirmed during operator attended noise surveys conducted at Location L where contribution from the Bloomfield CHPP was noted as inaudible.

Monitoring was conducted to represent the areas potentially affected by noise from the proposed Abel Coal Mine. A summary of the noise levels recorded at the monitoring locations is contained within **Table 4.** The details of the recent noise monitoring results are given in **Appendix B.**

Table 4 Background Noise Levels in area surrounding Abel Coal Mine

Location	Description	Background L_{A90} Noise Level	Estimated Existing Industrial L_{Aeq} Contribution
		Rating Background Level	
A Weakleys Drive Beresfield	Daytime	45 dBA	< 54 dBA
	Evening	48 dBA	< 44 dBA
	Night	39 dBA	< 39 dBA
B Yarrum Road Beresfield	Daytime	50 dBA	< 54 dBA
	Evening	43 dBA	< 44 dBA
	Night	36 dBA	< 39 dBA
C Phoenix Road Black Hill	Daytime	38 dBA	< 49 dBA
	Evening	39 dBA	< 39 dBA
	Night	35 dBA	36 dBA
D Black Hill School	Daytime	39 dBA	< 49 dBA
	Evening	36 dBA	< 39 dBA
	Night	32 dBA	< 34dBA
E Browns Road Black Hill	Daytime	36 dBA	43 dBA
	Evening	37 dBA	< 39 dBA
	Night	31 dBA	34 dBA
F Black Hill Road Black Hill	Daytime	39 dBA	< 49 dBA
	Evening	35 dBA	< 39 dBA
	Night	31 dBA	< 34 dBA
G Buchanan Road Buchanan	Daytime	39 dBA	41 dBA
	Evening	37 dBA	< 39 dBA
	Night	34 dBA	< 34 dBA

H Mt Vincent Rd Louth Park	Daytime	38 dBA	40 dBA
	Evening	36 dBA	< 39 dBA
	Night	31 dBA	33 dBA
I Lord Howe Dr. Ashtonfield	Daytime	39 dBA	44 dBA
	Evening	41 dBA	< 39 dBA
	Night	33 dBA	< 34 dBA
J Kilarney Street Avalon Estate	Daytime	44 dBA	< 54 dBA
	Evening	42 dBA	< 44 dBA
	Night	35 dBA	< 39 dBA
K1,K2,K3 (existing residences) Catholic Diocese (Former Bartter)	Daytime	41 dBA	< 49 dBA
	Evening	40 dBA	< 39 dBA
	Night	35 dBA	< 34 dBA
L Kilshanny Avenue Ashtonfield	Daytime	41 dBA	< 49 dBA
	Evening	41 dBA	< 39 dBA
	Night	38 dBA	< 34 dBA

4.2 Effects of Meteorology on Noise Levels

Wind

Wind has the potential to increase noise at a receiver when it is light and stable and blows from the direction of the source of the noise. As the strength of the wind increases the noise produced by the wind will obscure noise from most industrial and transport sources.

Wind effects need to be considered when wind is a feature of the area under consideration. Where wind blows from the source to the receiver at speeds up to 3 m/s for more than 30% of the time in any season, then wind is considered to be a feature of the area and noise level predictions must be made under these conditions.

Weather data was obtained, for a period of 12 months, from a DEC weather station located at Francis Greenway High School near to Beresfield. This location is approximately 7 km north east of the subject site. The data from the Beresfield site was used in favour of that collected at the Donaldson mine site as the station at Donaldson is shielded by trees which means that lower than normal wind speeds are recorded at this location. The Beresfield data was analysed to determine the frequency of occurrence of winds up to speeds of 3 m/s for daytime, evening and night in each season. A summary of the most frequently occurring winds is contained within **Table 5**, **Table 6** and **Table 7**. The percentage occurrence figures provided in bold are those that exceed the 30% threshold.

Table 5 Seasonal Frequency of Occurrence of Wind Speed Intervals - Daytime

Period	Calm	Wind Direction	0.5 - 2 m/s	2 - 3 m/s	0.5 - 3 m/s
Summer	1.8%	SE±45°	5.5%	13.9%	19.4%
Autumn	1.5%	SSE±45°	9.4%	14.0%	23.4%
Winter	1.9%	NW±45°	7.0%	12.4%	19.3%
Spring	55.6%	ESE±45°	3.1%	5.7%	8.8%

Table 6 Seasonal Frequency of Occurrence of Wind Speed Intervals - Evening

Period	Calm	Wind Direction	0.5 - 2 m/s	2 - 3 m/s	0.5 - 3 m/s
Summer	1.5%	SE±45°	26.4%	26.1%	**52.5%**
Autumn	7.3%	S±45°	26.5%	9.2%	**35.7%**
Winter	9.3%	NW±45°	20.3%	6.0%	26.3%
Spring	56.6%	SE±45°	12.9%	6.9%	19.8%

Table 7 Seasonal Frequency of Occurrence of Wind Speed Intervals - Night

Period	Calm	Wind Direction	0.5 - 2 m/s	2 - 3 m/s	0.5 - 3 m/s
Summer	7.0%	SSE±45°	**31.6%**	10.5%	**42.1%**
Autumn	5.9%	WNW±45°	24.9%	12.7%	**37.6%**
Winter	6.3%	NW±45°	24.4%	19.7%	**44.1%**
Spring	58.3%	S±45°	15.2%	1.9%	17.2%

Seasonal wind records indicate that certain winds, typically from the southern sector in the evening and night and north western sector at night, are a feature of the area.

4.3 Temperature Inversion

Temperature inversions, when they occur, have the ability to increase noise levels by focusing sound waves. Temperature inversions occur predominantly at night during the winter months. For a temperature inversion to be a significant characteristic of the area it needs to occur for approximately 30% of the total night-time during winter, or about two nights per week.

Meteorological data, obtained from the DEC weather station at Beresfield was analysed by Holmes Air Sciences to determine the percentage occurrences of temperature inversions during winter nights. The analysis indicates that stabilities of F class and above occur for 27.6% of the time during winter. This means that temperature inversion is not a feature of the area as the occurrence of inversion does not exceed the 30% threshold. Hence, the occurrence of temperature inversion during the night-time period has not been considered as part of this noise assessment.

5 NOISE CONTROLS

As mining associated with the proposed Abel Coal Mine will be underground, the only potential noise sources are from surface infrastructure. This will be located within the pit created by Donaldson mining. This pit will act to mitigate noise from surface activities.

The use of existing facilities for coal processing and rail transport means that no 'new' sources of noise are being introduced to receivers and minimises noise associated with construction. The installation of an overland conveyor to Bloomfield's facilities will eventually reduce any potential noise associated with internal truck haulage.

With the implementation of controls, the Environmental Risk Assessment allocated a low risk rating from potential noise impacts.

Noise mitigation and management procedures that have been incorporated into the noise model with the aim of achieving project specific noise criteria include the following:

- Reduction of noise Bloomfield coal loader, including all drives and conveyors, by 10 dBA from current levels.
- Orientation of the ventilation fan eases towards the north-west, away from residential receivers and angle the output parallel to the ground.
- The sound power level of the front end loader to be used near the portal should not exceed 113 dBA.

6 PROJECT SPECIFIC NOISE CRITERIA

6.1 Operational Noise Design Criteria

The noise emission design criteria for the proposed Abel Coal Mine development have been established with reference to the INP outlined in **Section 3** of this report.

The amenity criteria have been set from **Table 1**, with adjustments to account for existing industrial noise contributions, from **Table 2** as necessary.

The acoustical environment typifies that of urban, suburban and commercial environments. The residences in the general area have been assessed under the relevant receiver type as shown in **Table 8.**

The intrusive and amenity noise assessment criteria based on the INP for the assessment localities are presented in **Table 8.**

Table 8 Abel Coal Mine Project Specific Noise Criteria

Location	Locality (Noise Amenity Area)	Period	Intrusiveness Criteria $L_{Aeq(15minute)}$	Amenity Criteria $L_{Aeq(Period)}$
A	Beresfield (Urban)	Day	50 dBA	60 dBA
B		Evening	48 dBA	50 dBA
		Night	41 dBA	45 dBA
C	Ebenezer Park (Suburban)	Day	43 dBA	55 dBA
		Evening	44 dBA	45 dBA
		Night	40 dBA	38 dBA
D	Black Hill (Suburban)	Day	41 dBA	55 dBA
E		Evening	40 dBA	45 dBA
F		Night	36 dBA	39 dBA
G	Buchanan & Louth Park (Suburban)	Day	43 dBA	55 dBA
H		Evening	41 dBA	45 dBA
		Night	36 dBA	40 dBA
I	Ashtonfield (Suburban)	Day	44 dBA	55 dBA
		Evening	46 dBA	45 dBA
		Night	38 dBA	40 dBA
J	Thornton (Urban)	Day	49 dBA	60 dBA
		Evening	47 dBA	50 dBA
		Night	40 dBA	45 dBA
K K1,K2,K3	Catholic Diocese [Former Bartter]	Day	41[1] dBA	55 dBA
		Evening	40[1] dBA	45 dBA
		Night	36[1] dBA	39 dBA
L	Ashtonfield (Suburban)	Day	46 dBA	55 dBA
		Evening	46 dBA	45 dBA
		Night	43 dBA	40 dBA

Note: For Monday to Saturday, Daytime 7.00 am - 6.00pm; Evening 6.00pm - 10.00pm; Night-time 10.00pm - 7.00am.
On Sundays and Public Holidays, Daytime 8.00am - 6.00pm; Evening 6.00pm - 10.0 pm; Night-time 10.0 pm - 8.00am.

Note 1 The RBL's calculated for the Black Hill area were adopted as representative of the background levels at the occupied residential receivers on the Catholic Diocese Land (K1, K2 and K3).

It should be noted that RBL's calculated for the Black Hill area were adopted as representative of the background levels at the occupied residential receivers on the Catholic Diocese Land (K1, K2 and K3). The RBL's chosen are more restrictive than those at Location K where noise levels are influenced more by traffic noise along John Renshaw Drive.

The INP states that these criteria have been selected to protect at least 90% of the population, living in the vicinity of industrial noise sources, from the adverse effects of noise for at least 90% of the time. Provided the criteria in the INP are achieved, it is unlikely that most people would consider the resultant noise levels excessive.

6.2 Sleep Disturbance Noise Goals

The relevant sleep disturbance noise goals for each residential area are provided in **Table 9**.

Table 9 Sleep Disturbance Noise Goals

Location	Locality (Noise Amenity Area)	Period	Sleep Disturbance Criteria $L_{A1(1minute)}$
A	Beresfield (Urban)	Night	51 dBA
B			
C	Ebenezer Park (Suburban)	Night	50 dBA
D	Black Hill (Suburban)	Night	46 dBA
E			
F			
G	Buchanan & Louth Park (Suburban)	Night	46 dBA
H			
I	Ashtonfield (Suburban)	Night	48 dBA
J	Thornton (Urban)	Night	50 dBA
K K1,K2,K3	Catholic Diocese [Former Bartter]	Night	46 dBA
L	Ashtonfield (Suburban)	Night	53 dBA

6.3 Rail Traffic Noise Goals

ARTC operates the Main Northern Railway. Noise emissions from the railways are regulated via ARTC's EPL 3142. The EPL Section L6 does not nominate specific environmental noise limits but notes that:

> *"It is an objective of this licence to progressively reduce noise levels of railway operations to appropriate goals through the implementation of Pollution Reduction Programs (PRPs)."*

At present the Main Northern Railway is not subject to a PRP. EPL 3142 Section U1.1 however does provide further guidance in relation to pollution studies and reduction programs for other parts of its rail network as follows:

U1.1 Objectives of PRPs

In developing the PRPs, the licensee must work towards the goals of 65 dB(A) L_{eq}, (day time - 7am-10pm), 60 dB(A) L_{eq}, (night time - 10pm-7am) and 85 dB(A) (24hr) max pass-by noise, at one metre from the facade of affected residential properties. If it is not possible for these goals to be reached by feasible and reasonable mitigation measures, the PRP must aim, through feasible and reasonable measures to:

- *reduce operational rail noise emissions and the associated noise impact on the community where traffic levels are anticipated to remain constant; or*
- *stabilise operational rail noise emissions and the associated noise impact on the community where traffic levels are anticipated to increase."*

Based on the foregoing, the guideline noise assessment criteria for the Main Northern Railway is presented in **Table 10**.

Table 10 ATRC's Guideline Noise Assessment Criteria

Railway	Licence Holder	Descriptor	Rail Traffic Goal
Main Northern Line	ATRC EPL 3142	Daytime $L_{Aeq(15hour)}$	65 dBA
		Night-time $L_{Aeq(9hour)}$	60 dBA
		Maximum L_{Amax}	85 dBA

6.4 Construction Noise Goals

The project specific construction noise goals are presented in **Table 11** for the nearest potentially affected residential locations.

Table 11 Construction Noise Goals - Residential Areas

Location	Locality (Noise Amenity Area)	Period	Construction Noise Goal (L_{A10})[1]
A	Beresfield (Urban)	4 weeks and under	65 dBA
B		4 weeks to 26 weeks	55 dBA
		Greater than 26 weeks	50 dBA
C	Ebenezer Park (Suburban)	4 weeks and under	58 dBA
		4 weeks to 26 weeks	48 dBA
		Greater than 26 weeks	43 dBA
D	Black Hill (Suburban)	4 weeks and under	56 dBA
E		4 weeks to 26 weeks	46 dBA
F		Greater than 26 weeks	41 dBA
G	Buchanan & Louth Park (Suburban)	4 weeks and under	58 dBA
H		4 weeks to 26 weeks	48 dBA
		Greater than 26 weeks	43 dBA
I	Ashtonfield (Suburban)	4 weeks and under	59 dBA
		4 weeks to 26 weeks	49 dBA
		Greater than 26 weeks	44 dBA
J	Thornton (Urban)	4 weeks and under	64 dBA
		4 weeks to 26 weeks	54 dBA
		Greater than 26 weeks	49 dBA
K	Catholic Diocese Land [Former Bartter] (Commercial)	4 weeks and under	56 dBA
		4 weeks to 26 weeks	46 dBA
		Greater than 26 weeks	41 dBA
L	Ashtonfield (Suburban)	4 weeks and under	61 dBA
		4 weeks to 26 weeks	51 dBA
		Greater than 26 weeks	46 dBA

1. Applicable between the hours of 7.00 am and 6.00 pm Monday to Friday, and 8.00 am to 1.00 pm Saturdays. For all other times construction noise must be inaudible at the receiver. No construction work is to take place on Sundays or Public Holidays.

7 OPERATIONAL NOISE MODELLING

7.1 Operational Noise Modelling Parameters

A computer model was used to predict noise emissions from operation of the proposed Abel Coal Mine. The Environmental Noise Model (ENM) used has been produced in conjunction with the DEC. A three-dimensional digital terrain map giving all relevant topographic information was used in the modelling process. The model used this map, together with noise source data, ground cover, shielding by barriers and/or adjacent buildings and atmospheric information to predict noise levels at the nearest potentially affected receivers.

Topographic contours and drawings of the proposed site were supplied by Donaldson Coal for the purpose of modelling noise from the proposed development.

Prediction of noise under calm and prevailing atmospheric conditions (prevailing winds) was conducted. Atmospheric parameters under which noise predictions were made are given in **Table 12**.

Table 12 Meteorological Parameters for Noise Predictions

	Temperature	**Humidity**	**Wind Speed**	**Wind Direction** (degrees from north)	**Temperature Gradient**
Calm (All periods)	20°C	65%	N/A	N/A	N/A
South Easterly Wind (Evening and night)	10°C	65%	3 m/s	135°	N/A
North West Wind (Night)	10°C	65%	3 m/s	315°	N/A

Other assumptions made in modelling the proposed operation include the following:

- All acoustically significant plant and equipment operates simultaneously.
- Mobile noise sources, such haul trucks, were modelled at typical locations and assumed to operate in repetitive cycles.
- All noise control measures described in **Section 5** are implemented.
- Modifications proposed for the Bloomfield CHPP have been completed. The modifications to the CHPP include:
    - Increasing the run-of-mine coal stockpile and reclaim facilities
    - Minor modifications to the CHPP to improve efficiencies, with a second tailings thickener to be added;
    - Modification of coarse washery reject bin and outloading facilities as production increases;
    - Expansion of clean coal gantries and stockpiles, with new gantries to be added, increasing the clean coal stockpile size;
    - Modifications to the current water management system to cater for the above mentioned additions;
    - Relocation of existing service roads to cater for larger stockpile pad areas; and
    - Minor upgrading of train loading facilities at Bloomfield

7.2 Operational Scenario - Noise Model Summary

The operational scenario modelled during each period is summarised in **Table 13**. A tick (✓) indicates that the equipment is in operation during the relevant period. Where there is a number in brackets following a tick, this represents the number of pieces of the equipment that has been considered in the noise model during the relevant period. Sound power levels of relevant equipment are contained within **Appendix C**. It should be noted that the operational scenario modelled is likely to represent an acoustically worst-case scenario.

Table 13 Operational Scenario Considered in Noise Model

Plant and Equipment	Day	Evening	Night
Ventilation fan	✓	✓	✓
Frontend loader loading coal trucks ROM stockpile near portal (to be replaced by dozer Yr3 when using overland conveyor)	✓	✓	✓
Radial stacker ROM stockpile near portal	✓	✓	✓
Coal truck hauling to CHPP (to be replaced by overland conveyor system Yr 3)	✓	✓	✓
Eimco near portal	✓	✓	✓
Bloomfield CHPP	✓	✓	✓
Dozer on ROM stockpile (Bloomfield)	✓	✓	✓
Coal truck unloading	✓	✓	✓
Frontend loader loading coal into crusher			
Rail noise Locomotives Wagons (bunching etc)	✓ (3) ✓	✓ (3) ✓	✓ (3) ✓
Coal loader loading rail wagons	✓	✓	✓

7.3 Operational Noise Modelling Results and Discussion

Noise emission levels were predicted from the proposed operation for the typical operational scenario described in **Table 13** including the noise control and management procedures described in **Section 5**. Noise from all sources that contribute to the total noise from the site have been examined to identify characteristics that may cause greater annoyance (for example tonality, impulsiveness etc). The appropriate modifying factors, as outlined in the INP, have been applied where these characteristics are considered to be present. A summary of the predicted operational noise levels from the proposed Abel Coal Mine are contained within **Table 14**.

Table 14 Predicted Abel Coal Mine Noise Levels

Location	Period	Predicted Noise Level $L_{Aeq(15minute)}$ (dBA)			Project Specific Noise Criteria (L_{Aeq})
		Calm	NW Wind	SE Wind	
A Weakleys Drive Beresfield	Day	< 30 dBA	n/a	n/a	50 dBA
	Evening	< 30 dBA	n/a	< 30 dBA	48 dBA
	Night	< 30 dBA	< 30 dBA	< 30 dBA	41 dBA
B Yarrum Road Beresfield	Day	< 30 dBA	n/a	n/a	50 dBA
	Evening	< 30 dBA	n/a	< 30 dBA	48 dBA
	Night	< 30 dBA	< 30 dBA	< 30 dBA	41 dBA
C Phoenix Road Black Hill	Day	< 30 dBA	n/a	n/a	43 dBA
	Evening	< 30 dBA	n/a	< 30 dBA	44 dBA
	Night	< 30 dBA	< 30 dBA	< 30 dBA	38 dBA
D Black Hill School	Day	< 30 dBA	n/a	n/a	41 dBA
	Evening	< 30 dBA	n/a	< 30 dBA	40 dBA
	Night	< 30 dBA	30 dBA	< 30 dBA	36 dBA
E Browns Road Black Hill	Day	< 30 dBA	n/a	n/a	41 dBA
	Evening	< 30 dBA	n/a	< 30 dBA	40 dBA
	Night	< 30 dBA	30 dBA	< 30 dBA	36 dBA
F Black Hill Road Black Hill	Day	< 30 dBA	n/a	n/a	41 dBA
	Evening	< 30 dBA	n/a	< 30 dBA	40 dBA
	Night	< 30 dBA	33 dBA	< 30 dBA	36 dBA
G Buchanan Road Buchanan	Day	< 30 dBA	n/a	n/a	43 dBA
	Evening	< 30 dBA	n/a	< 30 dBA	41 dBA
	Night	< 30 dBA	< 30 dBA	< 30 dBA	36 dBA
H Mt Vincent Rd Louth Park	Day	< 30 dBA	n/a	n/a	43 dBA
	Evening	< 30 dBA	n/a	< 30 dBA	41 dBA
	Night	< 30 dBA	< 30 dBA	< 30 dBA	36 dBA
I Lord Howe Dr. Ashtonfield	Day	< 30 dBA	n/a	n/a	44 dBA
	Evening	< 30 dBA	n/a	36 dBA	46 dBA
	Night	< 30 dBA	31 dBA	36 dBA	38 dBA
J Kilarney Street Avalon Estate	Day	< 30 dBA	n/a	n/a	49 dBA
	Evening	< 30 dBA	n/a	< 30 dBA	47 dBA
	Night	< 30 dBA	33 dBA	< 30 dBA	40 dBA
K Catholic Diocese (Former Bartter) K1,K2,K3	Day	< 30 dBA	n/a	n/a	41 dBA
	Evening	< 30 dBA	n/a	< 30 dBA	40 dBA
	Night	< 30 dBA	**37 dBA**	< 30 dBA	36 dBA
L Kilshanny Avenue Ashtonfield	Day	33 dBA	n/a	n/a	46 dBA
	Evening	33 dBA	n/a	40 dBA	46 dBA
	Night	33 dBA	35 dBA	40 dBA	40 dBA

n/a the meteorological condition is not relevant during this period

Operational noise levels from the proposed Abel Coal Mine (**Table 14**) are predicted to meet the project specific noise criteria at all receiver locations under prevailing weather conditions with the exception of Location K where an exceedance of 1 dBA is predicted during a prevailing north west wind. This minor exceedance of 1 dBA during the night-time periods is unlikely to be noticeable by most people.

Since the operational scenario modelled is likely to represent an acoustically worst-case scenario, actual operational noise levels from the proposed Abel Coal mine are likely to be less than those predicted.

With specific reference to rail operations, the scenario considered in Heggies' noise model considers locomotives, wagon noise (bunching etc) and rail loading as three distinct noise sources. When the locomotives are at their highest output the rail loading source will not exist (since the train would be in motion). Further, while a train is loading, the locomotives would be at or near idle and therefore operating at a potentially lower sound power level than that utilised in the noise model. In addition to this, during loading there would be little wagon noise since the train would be moving very slowly. Since all three sources have been modelled to occur simultaneously, it is Heggies' opinion that the modelled rail operations represent an acoustically worst case scenario.

As noted Heggies has modelled, as part of the operational noise scenario, what is considered to be the worst case impact of trains on the Bloomfield rail loop which occurs when trains are being loaded with coal. However, the private rail loop does extend offsite and some impacts may occur due to train movements prior to entering the Main Northern Rail line. The movement of trains along the rail loop once leaving the Bloomfield site while defined as an 'onsite' operational noise level are likely to be viewed by receivers as a transport source as would any other train movement. Notwithstanding this, measurements of noise from a passing train were undertaken at the boundary of residences off Barrington Grove, at Avalon Estate, the closest residential area to the rail line. These measurements indicated that a train passby would meet the $L_{Aeq(15minute)}$ criteria for day, evening and night at this location.

7.4 Sleep Disturbance Analysis

In assessing sleep disturbance, typical L_{Amax} noise levels of acoustically significantly plant and equipment to be used at the subject site were used as input to the ENM acoustic model and predictions were made at the nearest residential areas under adverse weather conditions at night. Noise events considered include loading into an empty coal truck near the portal, truck reversing alarms, a dozer near the ROM stockpile, rail movements and the coal loader at Bloomfield. The use of the L_{Amax} noise level provides a worst-case prediction since the $L_{A1(1minute)}$ noise level of a noise event is likely to be less than the L_{Amax}.

A summary of the predicted maximum noise levels at the most affected locations are contained within **Table 15**.

Table 15 Predicted Maximum Noise Levels at Night Adverse Weather

Location	Period	Predicted Noise Level L_{Amax} (dBA)		Sleep Disturbance Criteria (L_{Aeq})
		NW Wind	**SE Wind**	
E Browns Road Black Hill	Night	41dBA	39 dBA	46 dBA
F Black Hill Road Black Hill	Night	42 dBA	44 dBA	46 dBA
I Lord Howe Dr. Ashtonfield	Night	37 dBA	43 dBA	48 dBA
J Kilarney Street Avalon Estate	Night	40 dBA	38 dBA	50 dBA
K Catholic Diocese (Former Bartter) K1,K2,K3	Night	**52 dBA**	37 dBA	46 dBA
L Kilshanny Avenue Ashtonfield	Night	38 dBA	46 dBA	53 dBA

The predicted L_{Amax} noise levels from operation of Abel Coal Mine meet the sleep disturbance criteria at all locations with the exception of Location K.

External L_{Amax} noise levels up to 52 dBA may occur at Location K. The ECRTN provides further guidance with regard to sleep disturbance and calls upon a number of studies that have been conducted into the effect of maximum noise levels on sleep. The DEC policy document acknowledges that, at the current level of understanding, it is not possible to establish absolute noise level criteria that would correlate to an acceptable level of sleep disturbance. However, the ECRTN provides that maximum internal noise levels below 50 dBA to 55 dBA are unlikely to cause awakening reactions and one or two events per night, with maximum internal noise levels of 65 dBA to 70 dBA (inside dwellings) are not likely to significantly affect health and wellbeing. Maximum noise predictions have shown that external noise levels up to 52 dBA may occur at Location K during the night-time period as a result of the proposed Abel Coal Mine operation. This correlates to noise levels significantly below 50 dBA inside dwellings. Based on the preceding, maximum noise levels produced by operation of the proposed Abel Coal Mine are not likely to cause sleep disturbance at this location.

7.5 Rail Noise

All rail deliveries to and from the site will utilise the Main Northern Railway Line. The projected rail despatches on the Bloomfield Rail loop per annum are contained in **Table 16**.

Table 16 Project Rail Despatches Bloomfield Loop per Annum

Operation	2006	2007	2008	2009	2010	2011	2012	2013
Donaldson	320	320	270	270	144	0	0	0
Tasman	21	112	137	137	137	137	137	137
Bloomfield	100	100	100	100	100	100	100	100
Abel	0	0	160	224	352	464	560	704

This means on average there will be 3 to 6 train movements (despatches x 2) per day using the Bloomfield rail loop.

The estimated existing daily rail traffic movements for the section of the Main Northern line in the vicinity of the Bloomfield rail loop were provided by ARTC and are summarised in **Table 17**.

Table 17 Existing Daily Rail Traffic Movements

Description	Daily Movements
Passenger (local)	94
Passenger (XPT, Discovery)	12
Intermodal	12
General Freight	18
Coal	96
Total	232

Rail traffic noise levels have been predicted, at an offset distance of 30 m, 60 m, and 90 m from the rail line, based on the existing rail traffic movements along the Main Northern Railway and the rail traffic from the Bloomfield loop which includes proposed Abel Coal Mine movements, proposed Tasman movements and existing rail movements from Bloomfield, and Donaldson. Rail traffic noise predictions are provided in **Table 18**.

Table 18 Rail Traffic Noise Predictions

Receiver	Daytime Rail Traffic Noise Prediction			
	Existing Rail Traffic		**Total Rail Traffic Including Bloomfield Loop Rail Traffic**	
	$L_{Aeq(15hour)}$	L_{Amax}	$L_{Aeq(15hour)}$	L_{Amax}
30 m	70.8 dBA	88 dBA	71 dBA	88 dBA
60 m	68.1 dBA	84.5 dBA	68.3 dBA	84.5 dBA
90 m	66.7 dBA	82.4 dBA	66.9 dBA	82.4 dBA
	Night-time Rail Traffic Noise Prediction			
	Existing Rail Traffic		**Total Rail Traffic Including Bloomfield Loop Rail Traffic**	
	$L_{Aeq(9hour)}$	L_{Amax}	$L_{Aeq(15hour)}$	L_{Amax}
30 m	68.9 dBA	88 dBA	69 dBA	88 dBA
60 m	66.1 dBA	84.5 dBA	66.2 dBA	84.5 dBA
90 m	64.6 dBA	82.4 dBA	64.7 dBA	82.4 dBA

The increase in rail traffic generated by trains using the Bloomfield rail loop is predicted to increase the existing daytime $L_{Aeq(15hour)}$ rail noise level by approximately 0.2 dBA and the existing night-time $L_{Aeq(9hour)}$ rail noise level by approximately 0.1 dBA. These increases are negligible and such an increase would not be discernible by receivers near the rail line.

This increase in noise level is considered to be overstated as existing Donaldson and Bloomfield rail traffic would likely be included in the existing rail traffic numbers.

7.6 Construction Noise Assessment

Construction activities for the proposed Abel Coal Mine are concentrated around the portal and surface facilities and the mine ventilation fan. It should be noted that the portal will be located in the open cut mine workings of the Donaldson Coal Mine and therefore the excavation required to reach the entry level of the portal has not been considered as part of this construction assessment.

Construction noise modelling was carried out using the same model as for the operational scenario. Noise predictions were conducted for calm atmospheric conditions as construction is only permitted between 7.00 am and 6.00 pm Monday to Friday, and 8.00 am to 1.00 pm Saturdays.

A summary of the construction modelling scenario is contained within **Table 19**. A tick (✓) indicates that the equipment is in operation during the relevant period. Where there is a number in brackets following a tick, this represents the number of pieces of the equipment that has been considered in the noise model.

The details of the sound power levels used in the construction modelling are contained within **Appendix D**.

Table 19 Construction Scenario Considered in Noise Model

Plant and Equipment	Day
Construction Portal and Surface Facilities	
Generator	✓ (3)
Compressor	✓ (2)
Excavator	✓(3)
Backhoe	✓(3)
Truck 6 wheeler	✓(4)
Dozer	✓(2)
Crane	✓(2)
Grader	✓
Compactor sheeps foot	✓
Compactor flat	✓
Water cart	✓
Construction Ventilation Fan	
Compressor	✓ (2)
Crane	✓
Dozer	✓

7.6.1 Construction Noise Modelling Results and Discussion

The predicted construction noise levels for the proposed Abel Coal Mine for the most affected receivers are summarised in **Table 20**. It has been assumed that construction would take in excess of 26 weeks so the relevant criteria from **Table 11** have been applied.

Table 20 Predicted Maximum Noise Levels at Night Adverse Weather

Location	Period	Predicted Noise Level L_{A10} (dBA) Calm	Construction Noise Criteria (L_{A10})
D Black Hill School	Day	<30 dBA	41 dBA
E Browns Road Black Hill	Day	30 dBA	41 dBA
F Black Hill Road Black Hill	Day	37 dBA	41 dBA
K Catholic Diocese (Former Bartter) K1,K2,K3	Day	36 dBA	41 dBA

It is predicted that construction activities associated with the proposed Abel Coal Mine will comply with construction noise criteria at surrounding receivers.

7.7 Cumulative Noise Assessment

Existing and proposed mining in the vicinity of the proposed Abel Coal Mine includes the existing Bloomfield Coal Mine, existing Donaldson Coal Mine and approved Tasman Coal Mine. Due to its remote location the noise impact of the proposed Tasman Coal Mine will be negligible and therefore has not been considered as part of this assessment.

Bloomfield Coal Mine

The INP prescribes detailed calculation routines for establishing "project specific" $L_{Aeq(15minute)}$ intrusive criteria and $L_{Aeq(Period)}$ amenity criteria at potentially affected receivers for a development (in isolation).

Potential cumulative noise impacts from existing and successive developments are embraced by the INP procedures by ensuring that the appropriate noise emission criteria (and consent limits) are established with a view to maintaining acceptable noise *amenity* levels for residences. Therefore, the cumulative impact of the proposed Abel Coal Mine with existing industrial noise sources including Bloomfield Coal Mine has been assessed in the determination of the amenity levels.

Donaldson Coal Mine

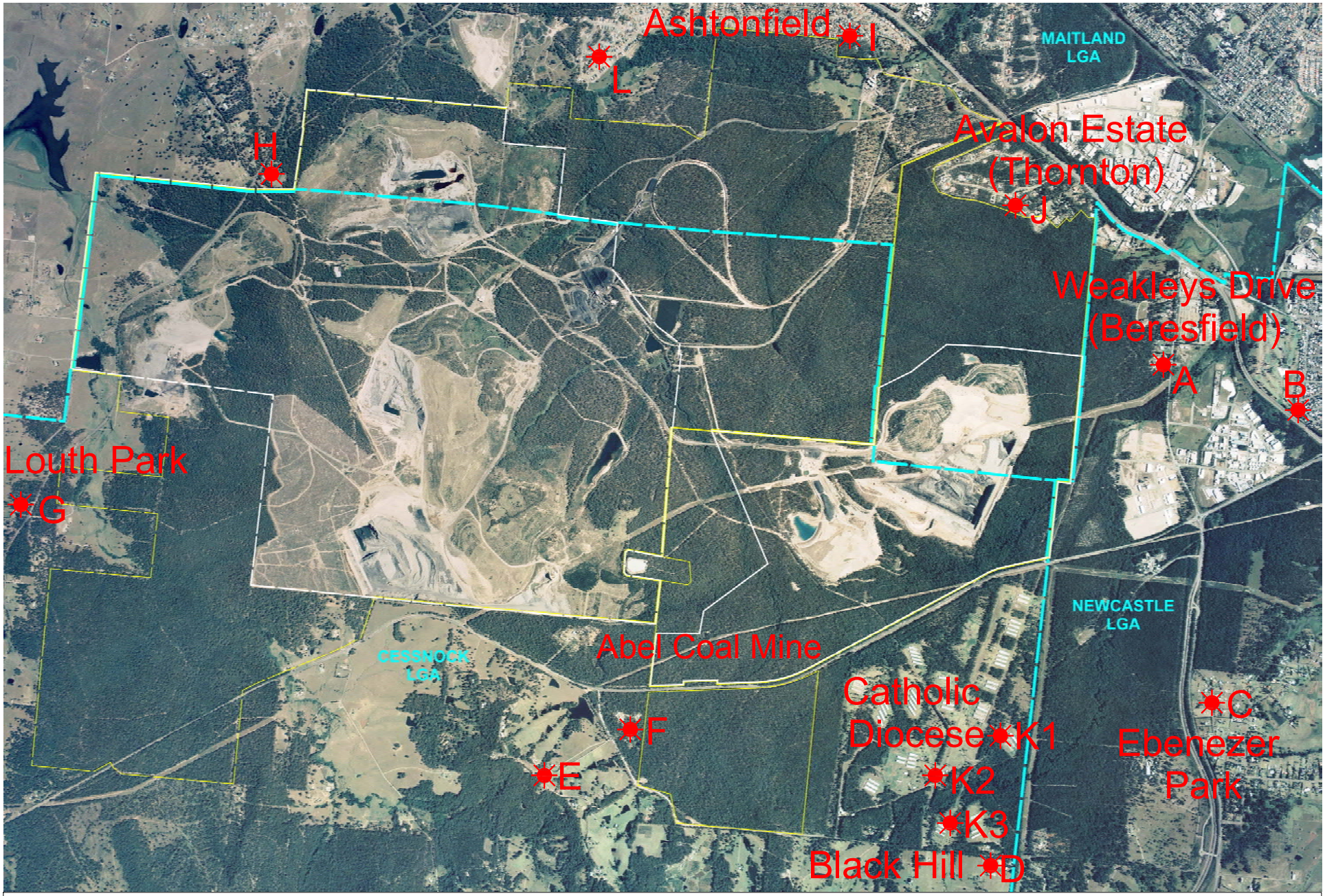
The potential for the simultaneous operation of the proposed Abel Coal Mine and Donaldson Coal Mine to exceed the acceptable and maximum noise amenity criteria can be assessed on a worst case scenario basis by adding the predicted noise levels from the proposed Abel Coal Mine together with the predicted noise levels from Donaldson Coal Mine. The cumulative intrusive level is then adjusted (by -3 dBA) to the equivalent amenity level for comparison with the relevant amenity criteria for each location. The cumulative mine noise amenity levels during calm and adverse weather conditions for the areas of greatest potential cumulative impact are presented in **Table 21**.

Table 21 Predicted Cumulative Impact Abel Coal Mine

Location	Period	Intrusive Predicted Noise Level LAeq(15minute) (dBA)				Cumulative Amenity Level LAeq(period)		Amenity Criteria (LAeq)
		Project Abel		Donaldson Coal				
		Calm	Adverse	Calm	Adverse	Calm	Adverse	
D Black Hill School	Day	< 30 dBA	n/a	34 dBA	42 dBA	32 dBA	39 dBA	55 dBA
	Evening	< 30 dBA	< 30 dBA	34 dBA	40 dBA	32 dBA	37 dBA	45 dBA
	Night	< 30 dBA	30 dBA	32 dBA	36 dBA	31 dBA	33 dBA	39 dBA
E Browns Road Black Hill	Day	< 30 dBA	n/a	< 30 dBA	43 dBA	30 dBA	40 dBA	55 dBA
	Evening	< 30 dBA	< 30 dBA	< 30 dBA	< 40 dBA	30 dBA	37 dBA	45 dBA
	Night	< 30 dBA	30 dBA	< 30 dBA	< 36 dBA	30 dBA	34 dBA	39 dBA
F Black Hill Road Black Hill	Day	< 30 dBA	n/a	< 30 dBA	43 dBA	30 dBA	40 dBA	55 dBA
	Evening	< 30 dBA	< 30 dBA	< 30 dBA	< 40 dBA	30 dBA	37 dBA	45 dBA
	Night	< 30 dBA	33 dBA	< 30 dBA	< 36 dBA	30 dBA	35 dBA	39 dBA
I Lord Howe Dr. Ashtonfield	Day	< 30 dBA	n/a	< 30 dBA	< 46 dBA	30 dBA	43 dBA	55 dBA
	Evening	< 30 dBA	36 dBA	< 30 dBA	< 44 dBA	30 dBA	42 dBA	45 dBA
	Night	< 30 dBA	36 dBA	< 30 dBA	< 38 dBA	30 dBA	38 dBA	40 dBA
K Catholic Diocese Land K1,K2,K3	Day	< 30 dBA	n/a	41 dBA	44 dBA	38 dBA	41 dBA	55 dBA
	Evening	< 30 dBA	< 30 dBA	41 dBA	43 dBA	38 dBA	40 dBA	45 dBA
	Night	< 30 dBA	37 dBA	36 dBA	38 dBA	34 dBA	38 dBA	39 dBA
L Kilshanny Avenue Ashtonfield	Day	33 dBA	n/a	< 30 dBA	< 46 dBA	31 dBA	43 dBA	55 dBA
	Evening	33 dBA	40 dBA	< 30 dBA	< 44 dBA	31 dBA	42 dBA	45 dBA
	Night	33 dBA	40 dBA	< 30 dBA	< 38 dBA	31 dBA	39 dBA	40 dBA

n/a: the meteorological condition is not relevant during this period

The results contained in **Table 21** show that the cumulative impact of mining in the area surrounding the Abel Coal Mine will comply with the relevant amenity criteria set in accordance with the INP.

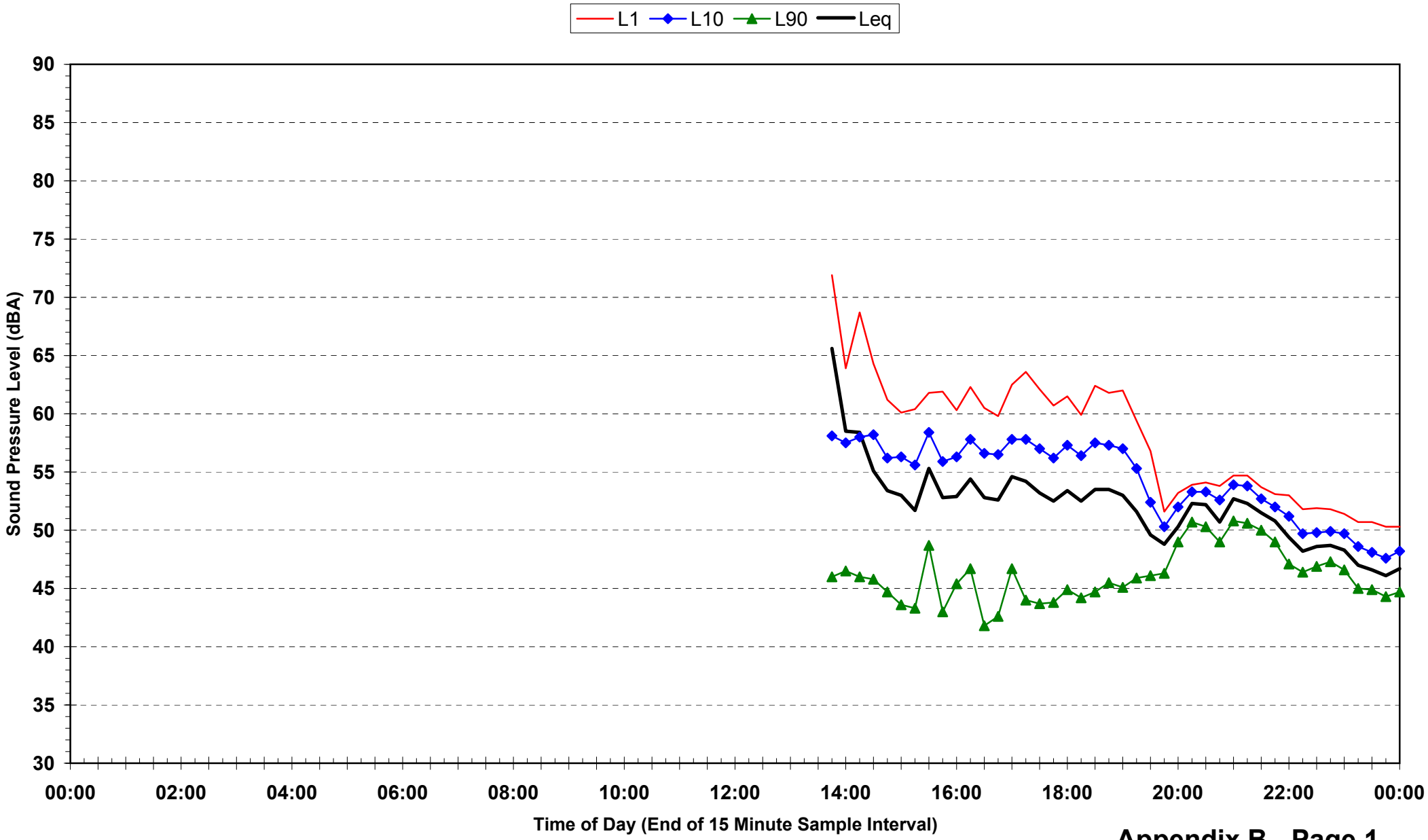


Appendix A
Report 30-1409
Location Map

E - Noise Monitoring/Assessment Location

N

Statistical Ambient Noise Levels
20 Kilshanney Ave - Backyard - Friday 17 March 2006



Appendix B - Page 1
Statistical Noise Levels
RHA Report 30-1409

Statistical Ambient Noise Levels
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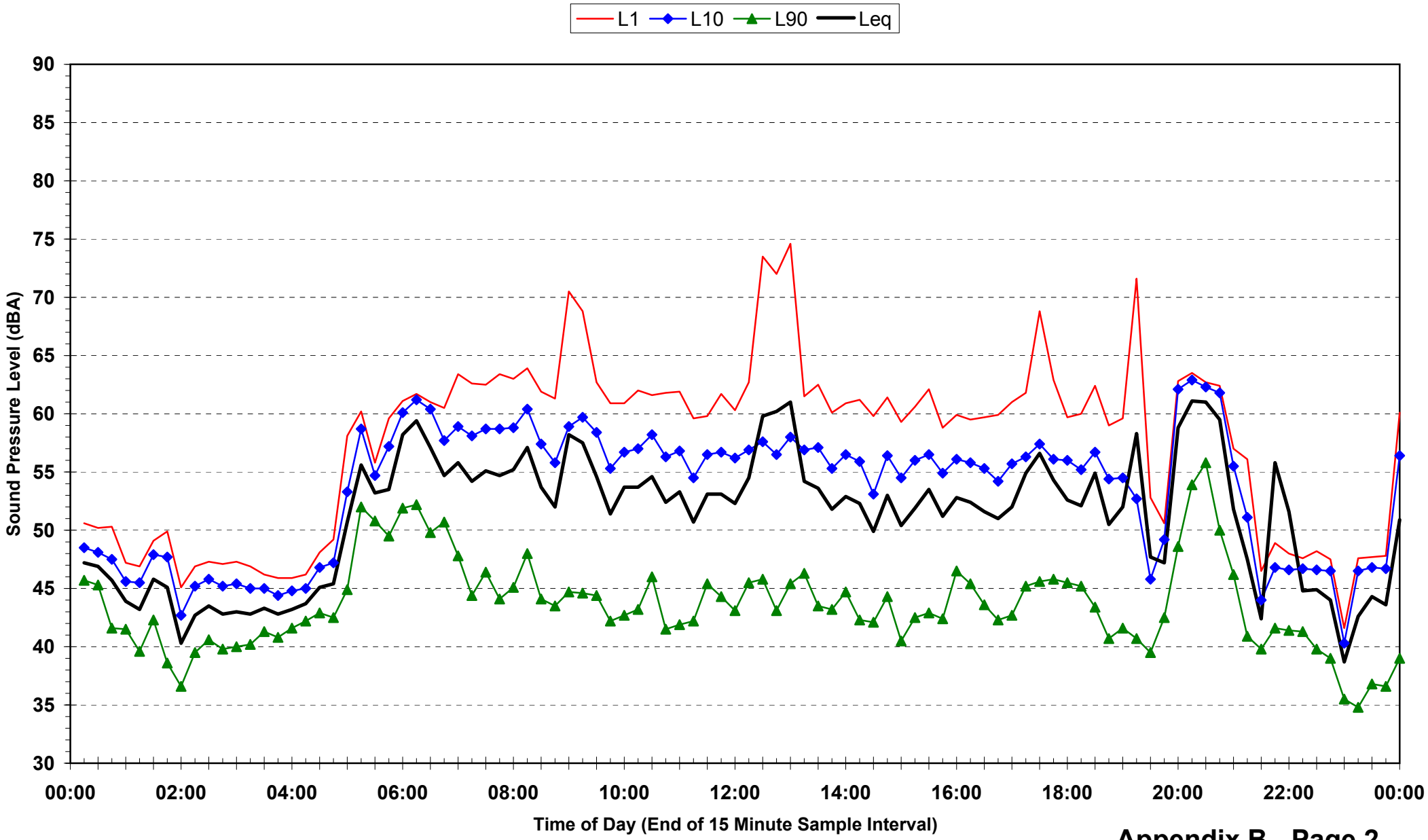

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Statistical Noise Levels
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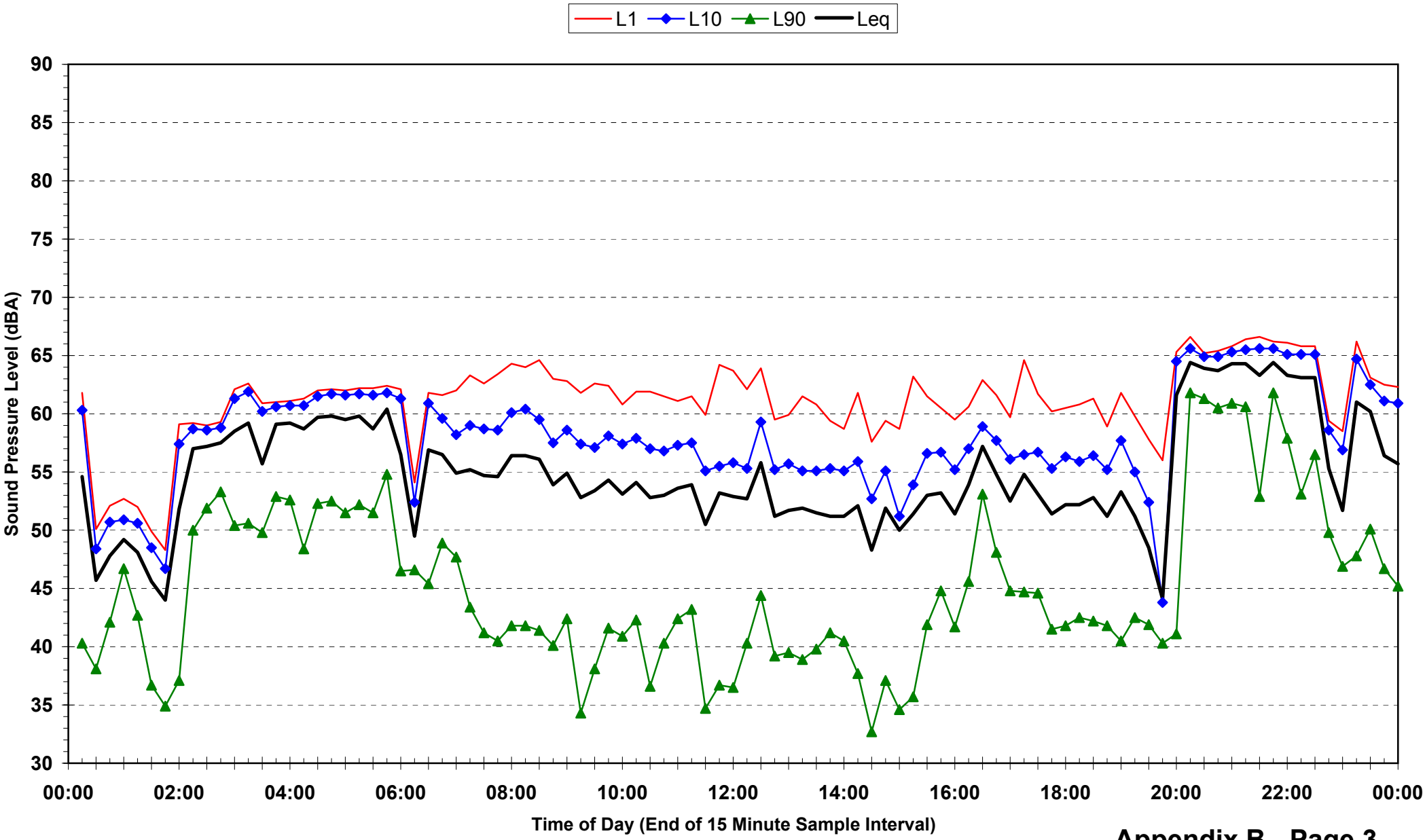
Statistical Ambient Noise Levels
20 Kilshanney Ave - Backyard - Sunday 19 March 2006



Statistical Ambient Noise Levels
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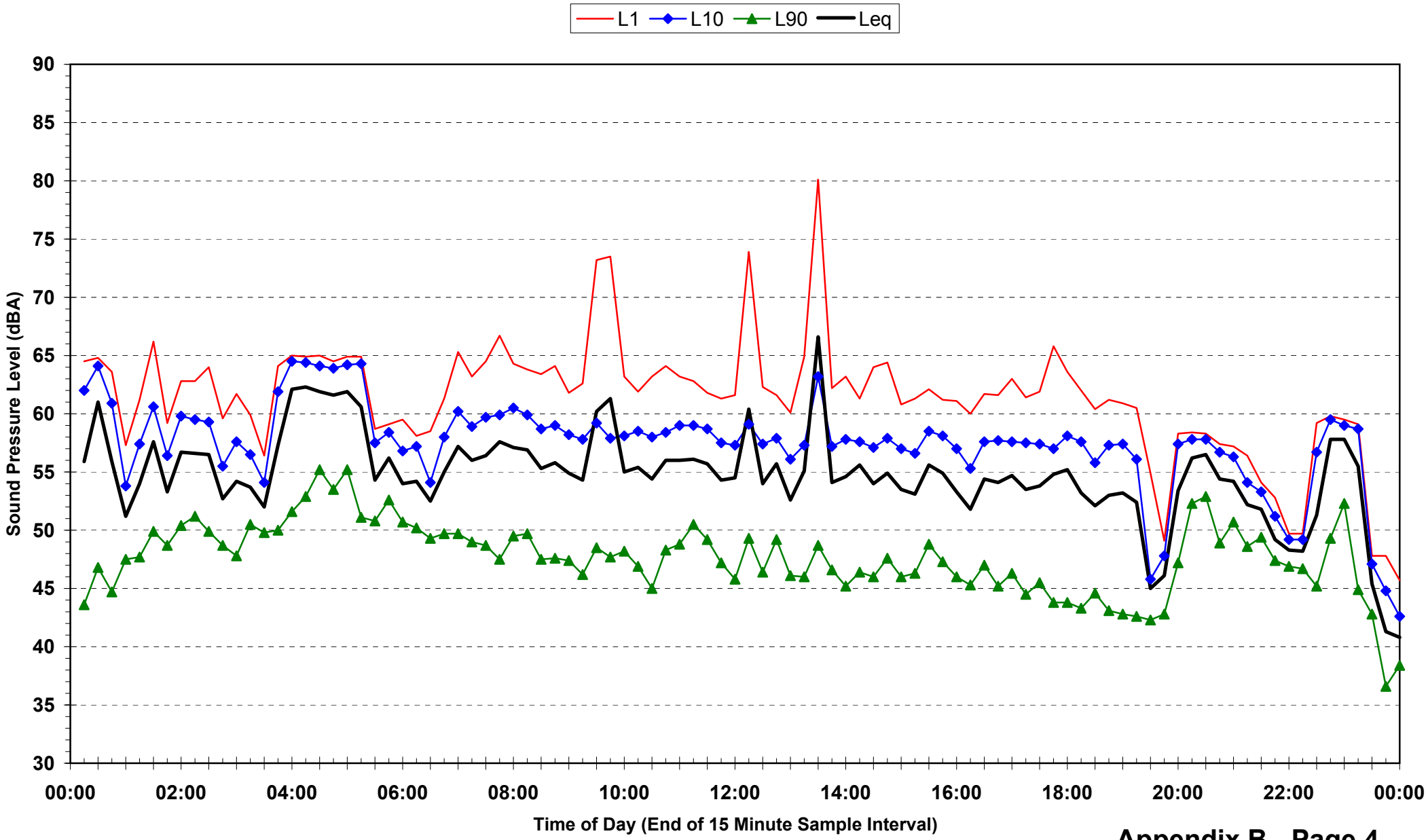

Statistical Ambient Noise Levels
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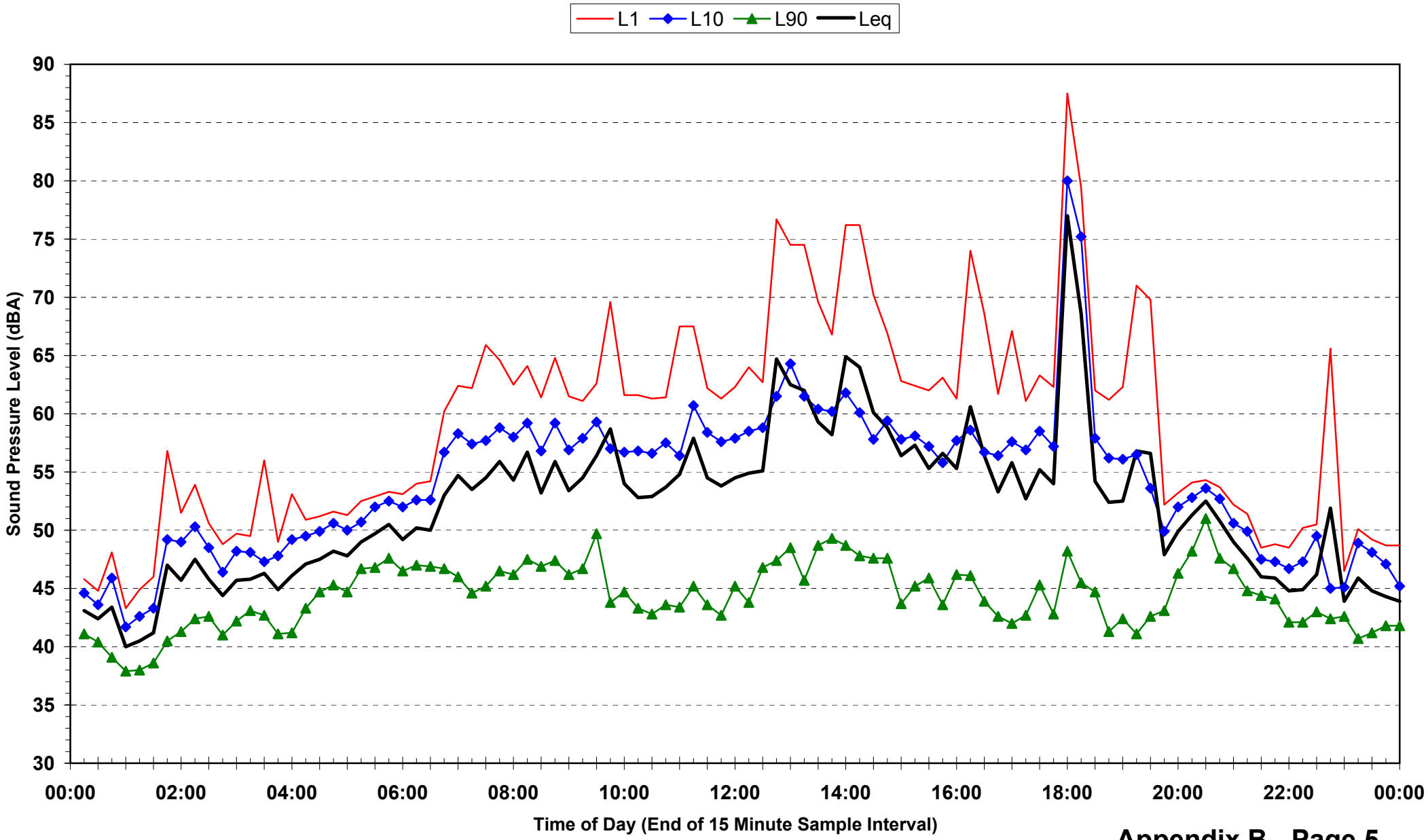

Statistical Ambient Noise Levels
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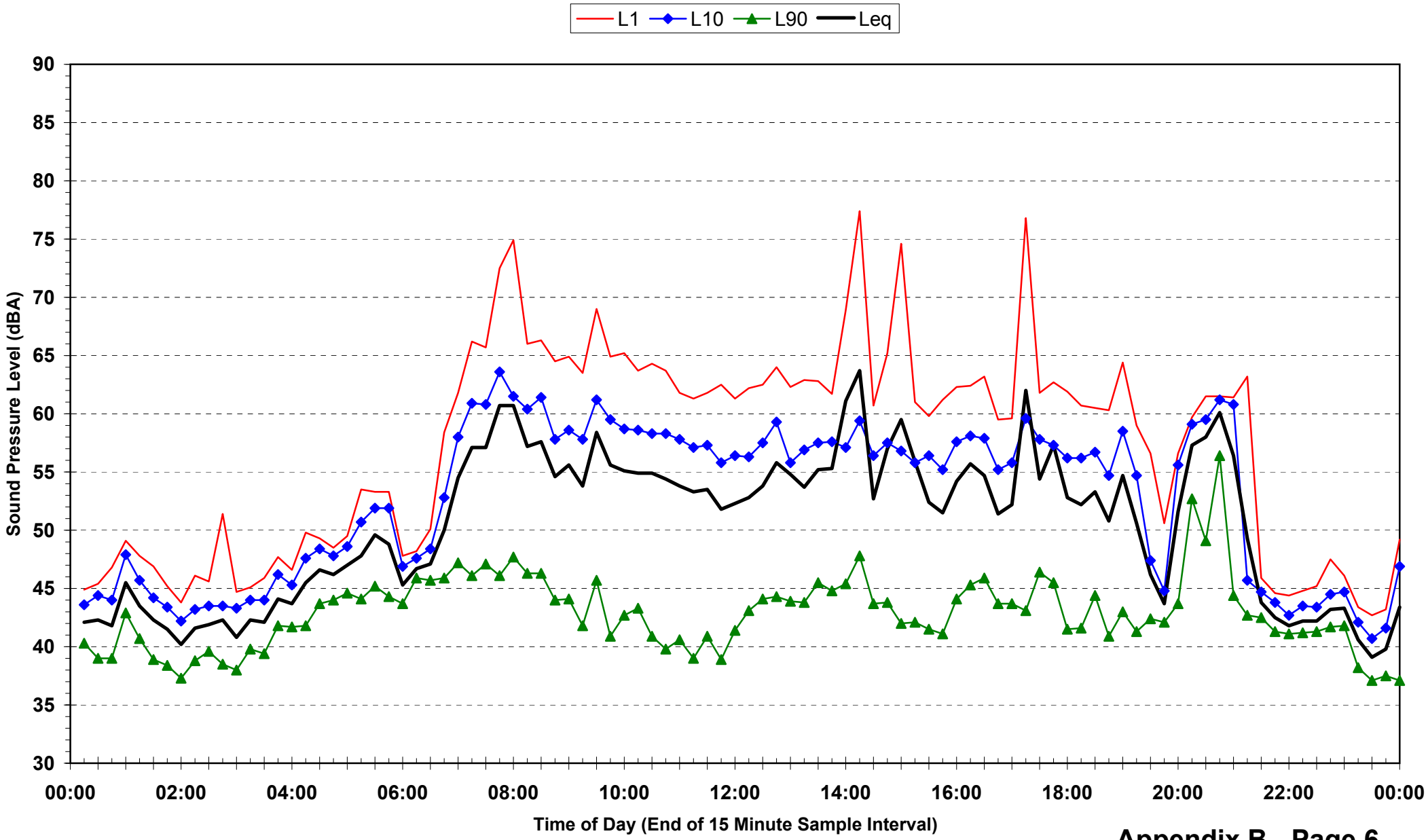
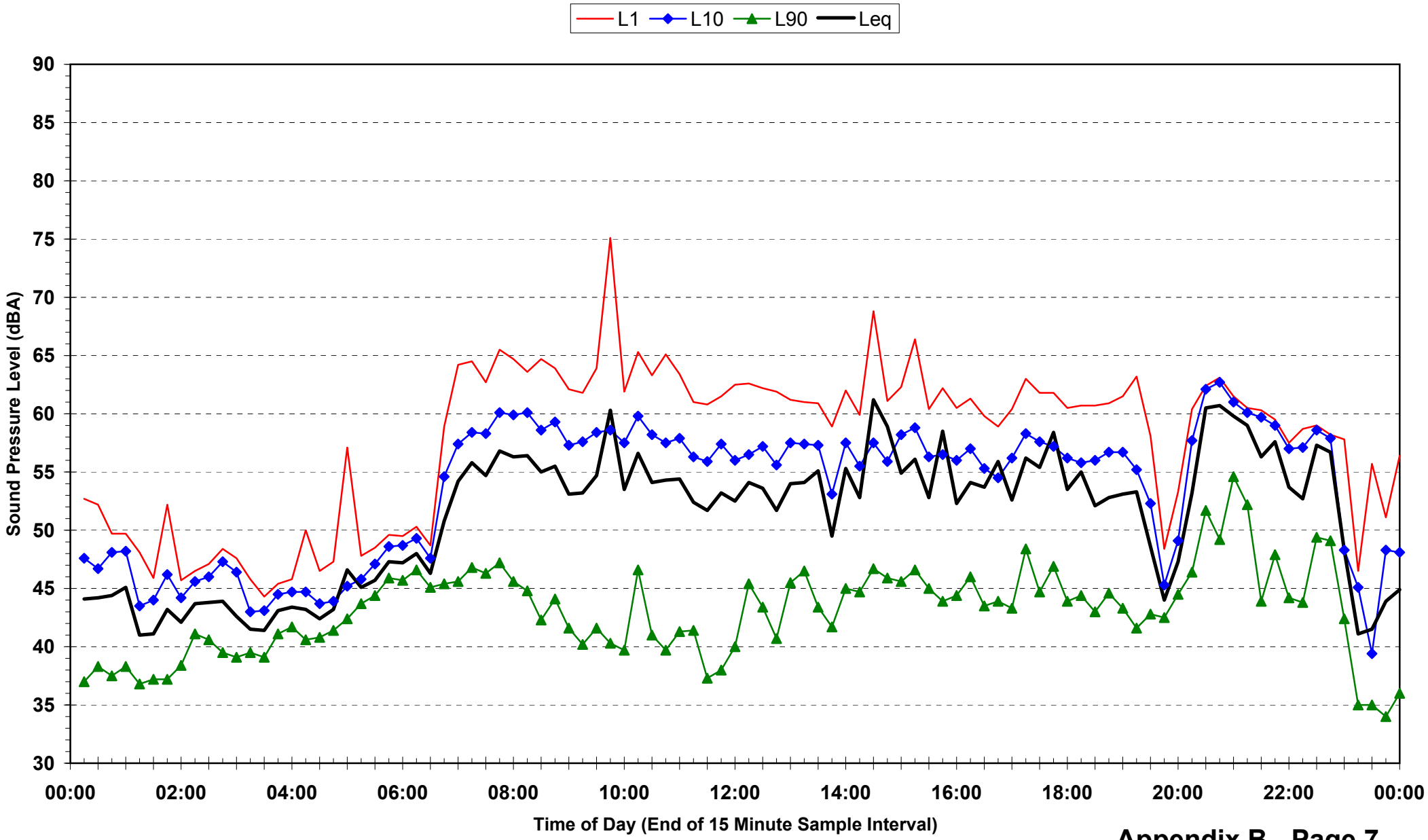


Statistical Ambient Noise Levels
20 Kilshanney Ave - Backyard - Thursday 23 March 2006



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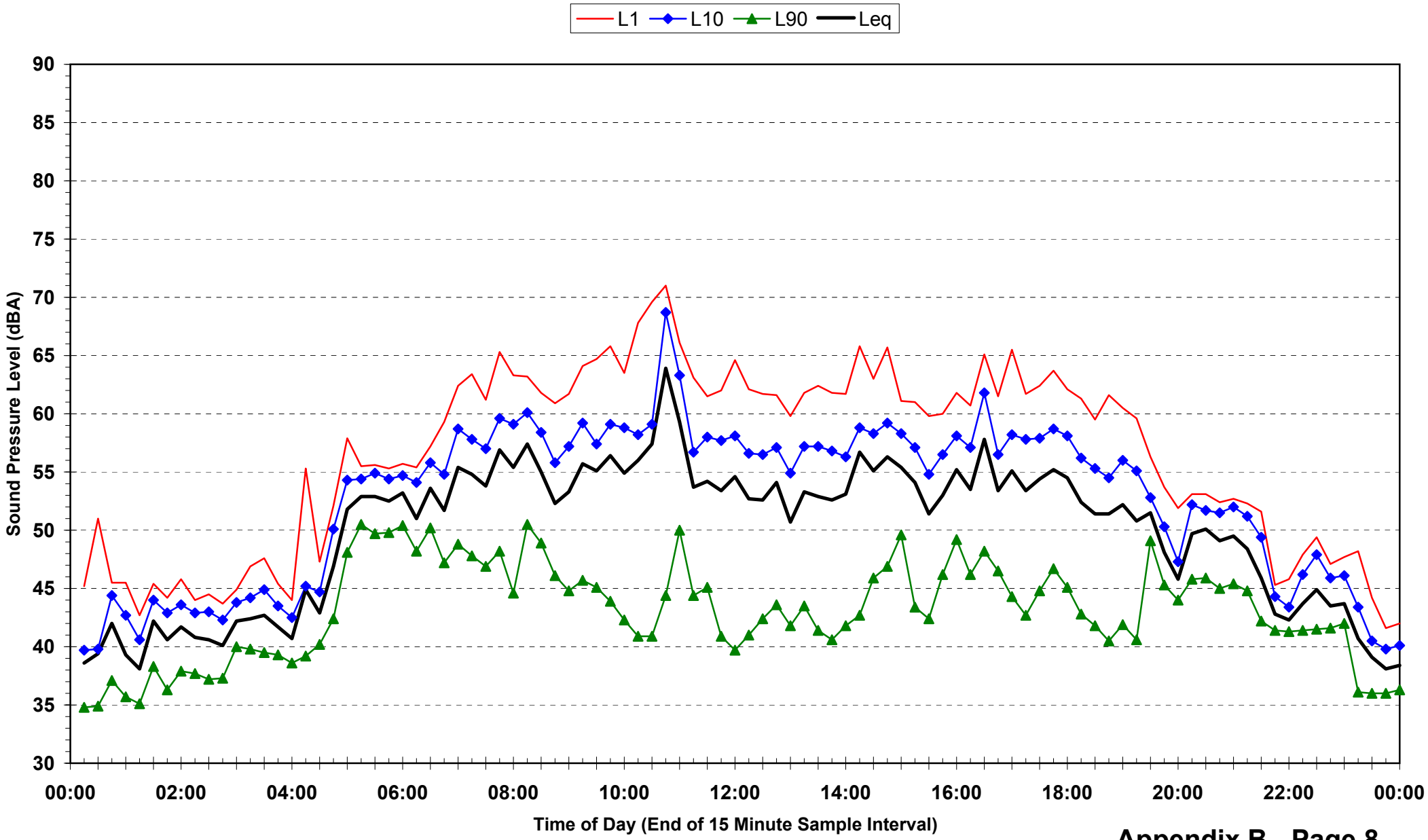

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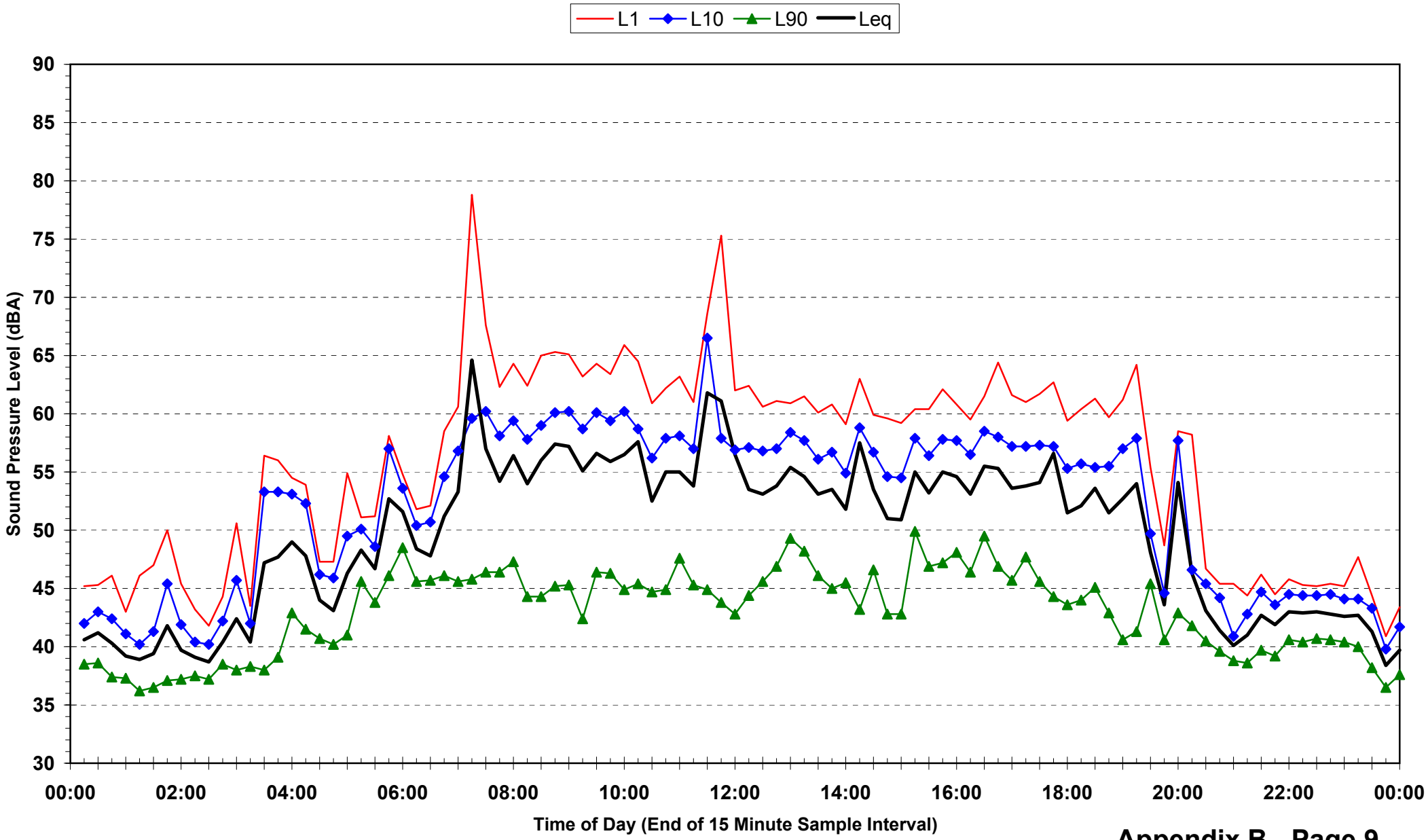

Statistical Ambient Noise Levels
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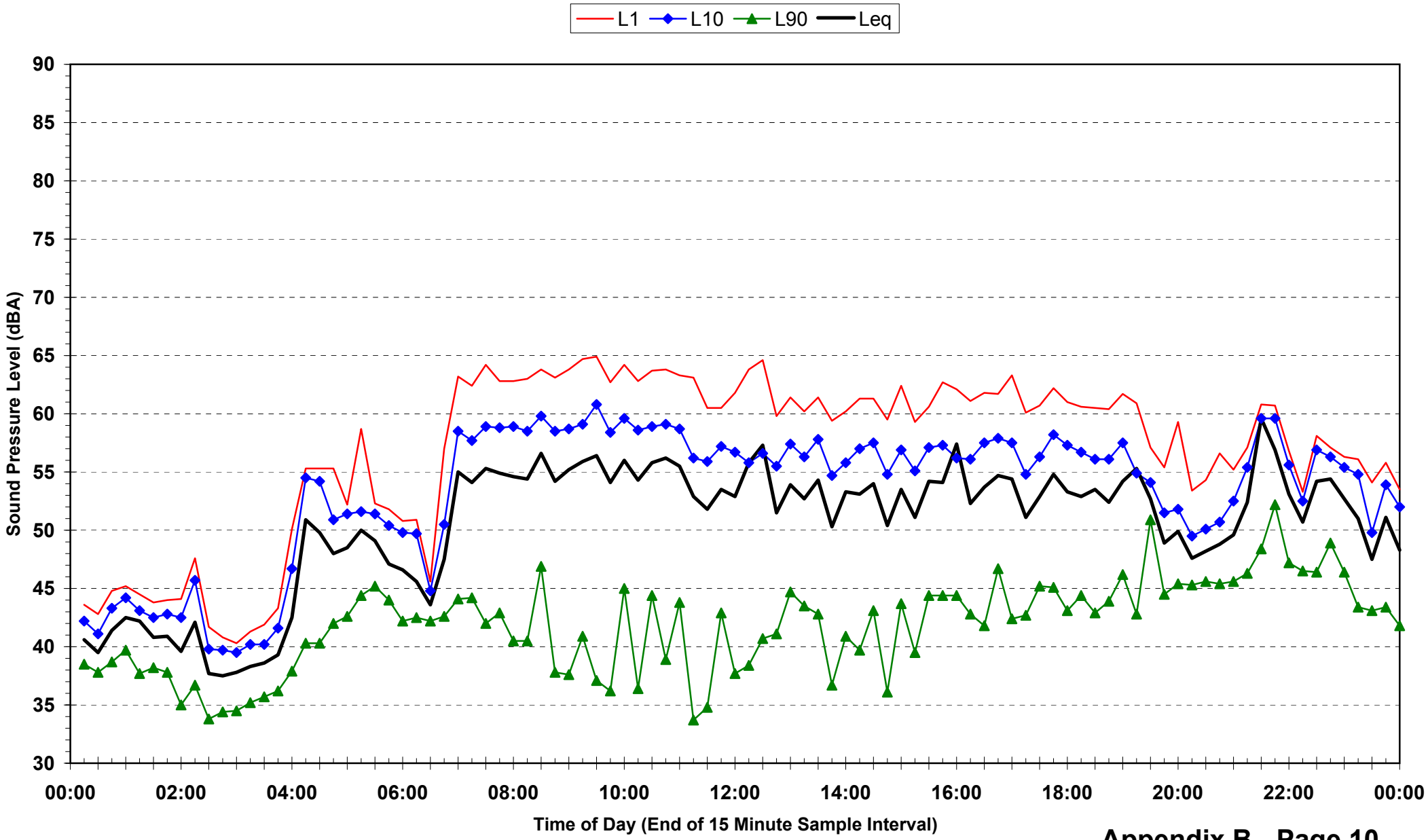

Statistical Ambient Noise Levels
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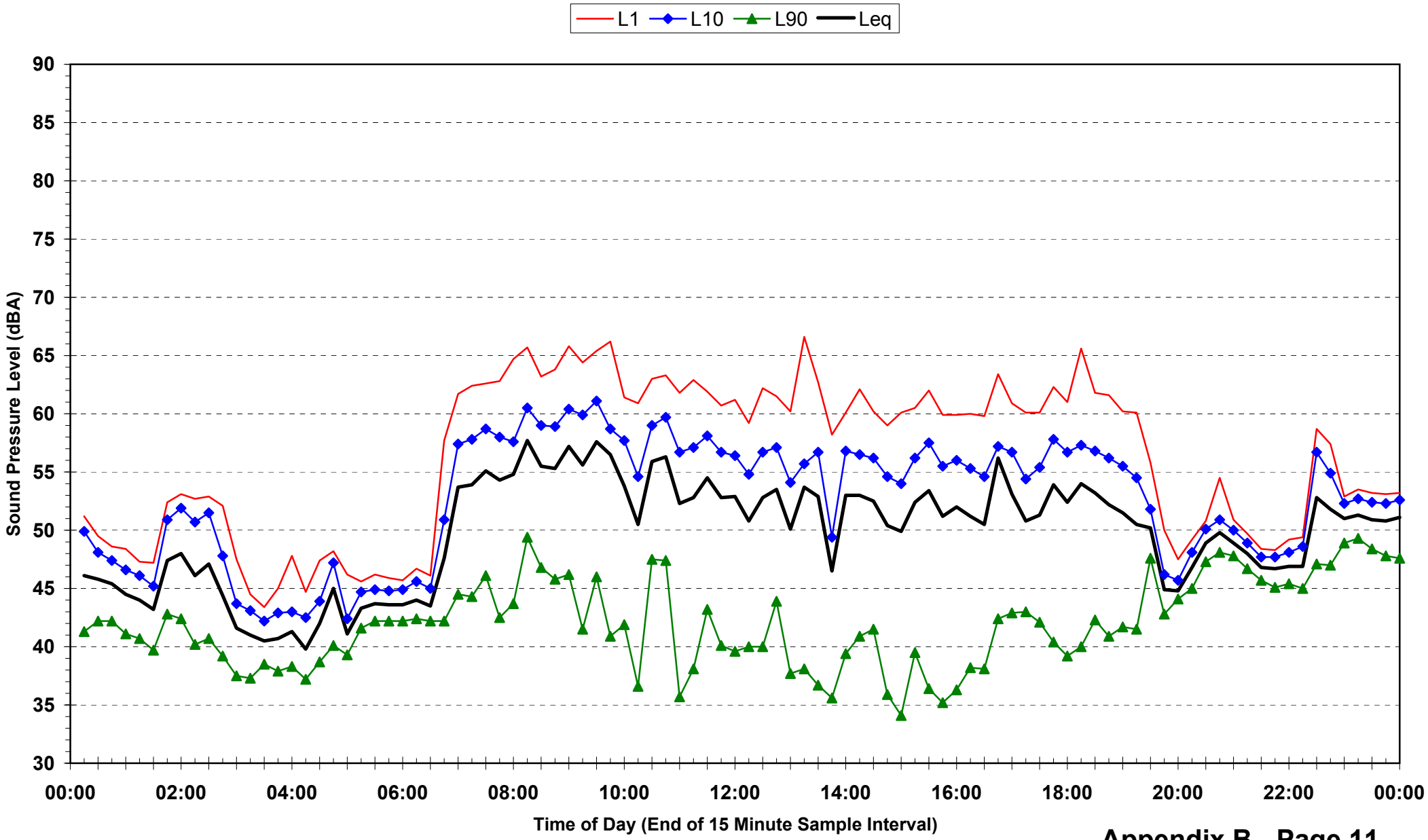

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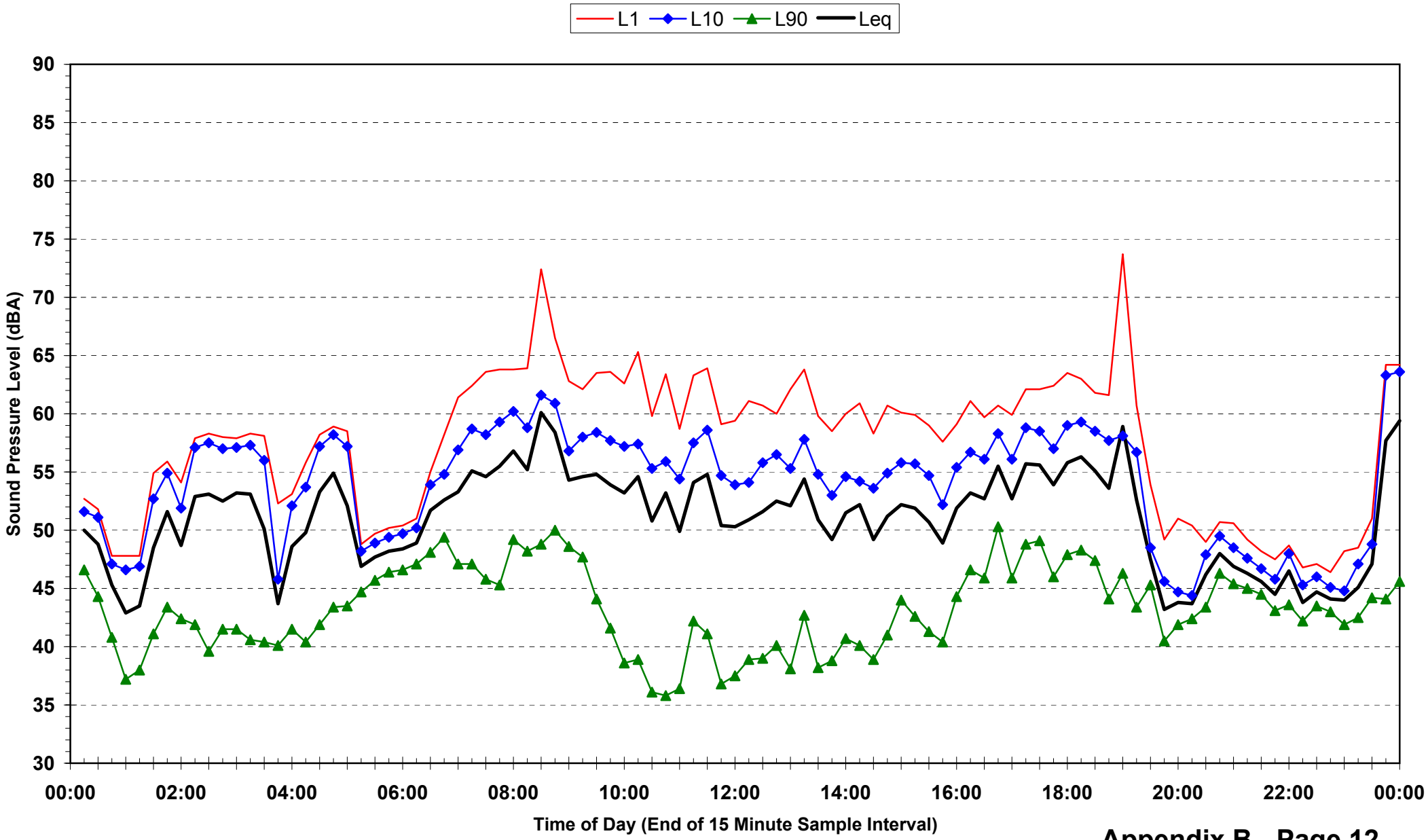

Statistical Ambient Noise Levels
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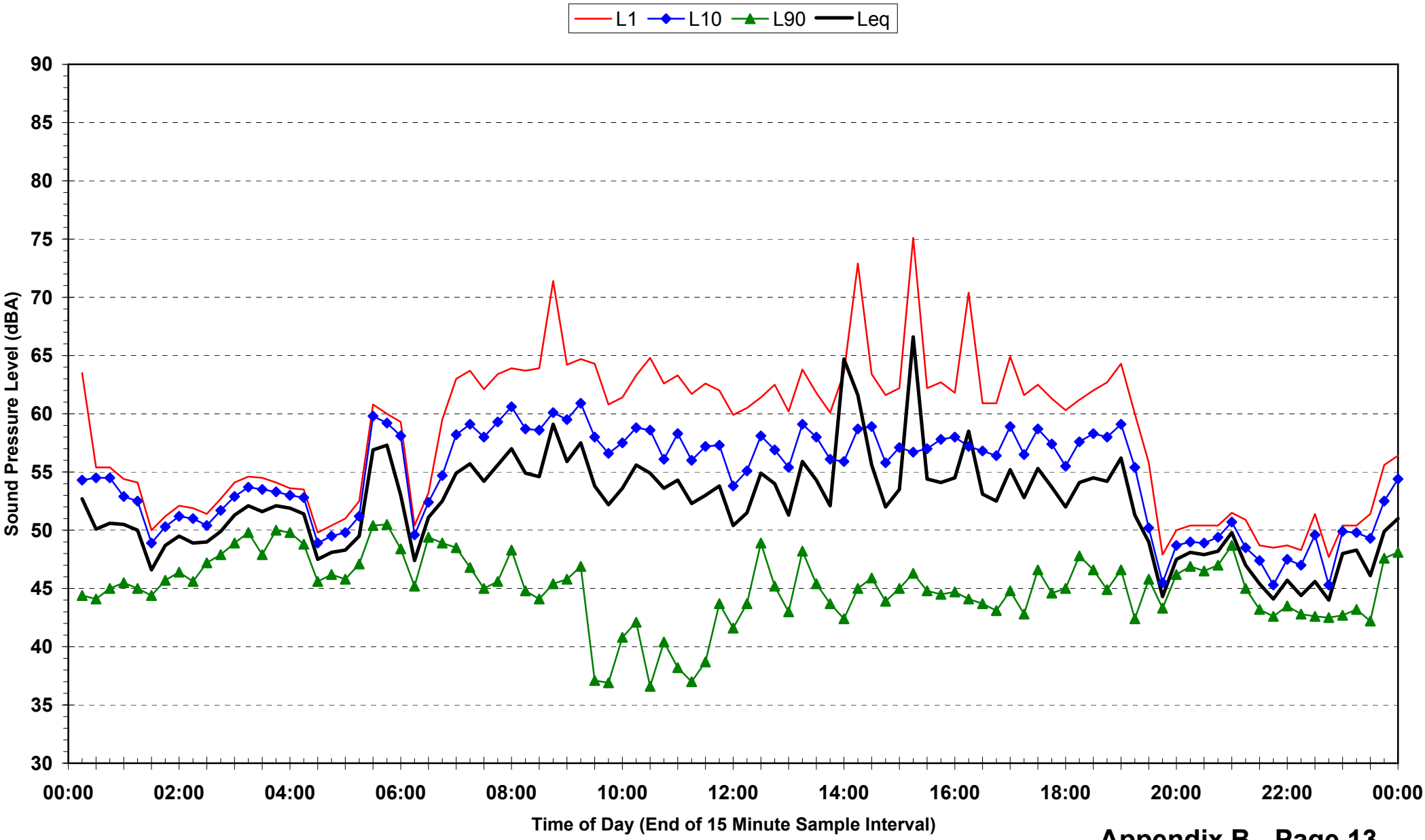

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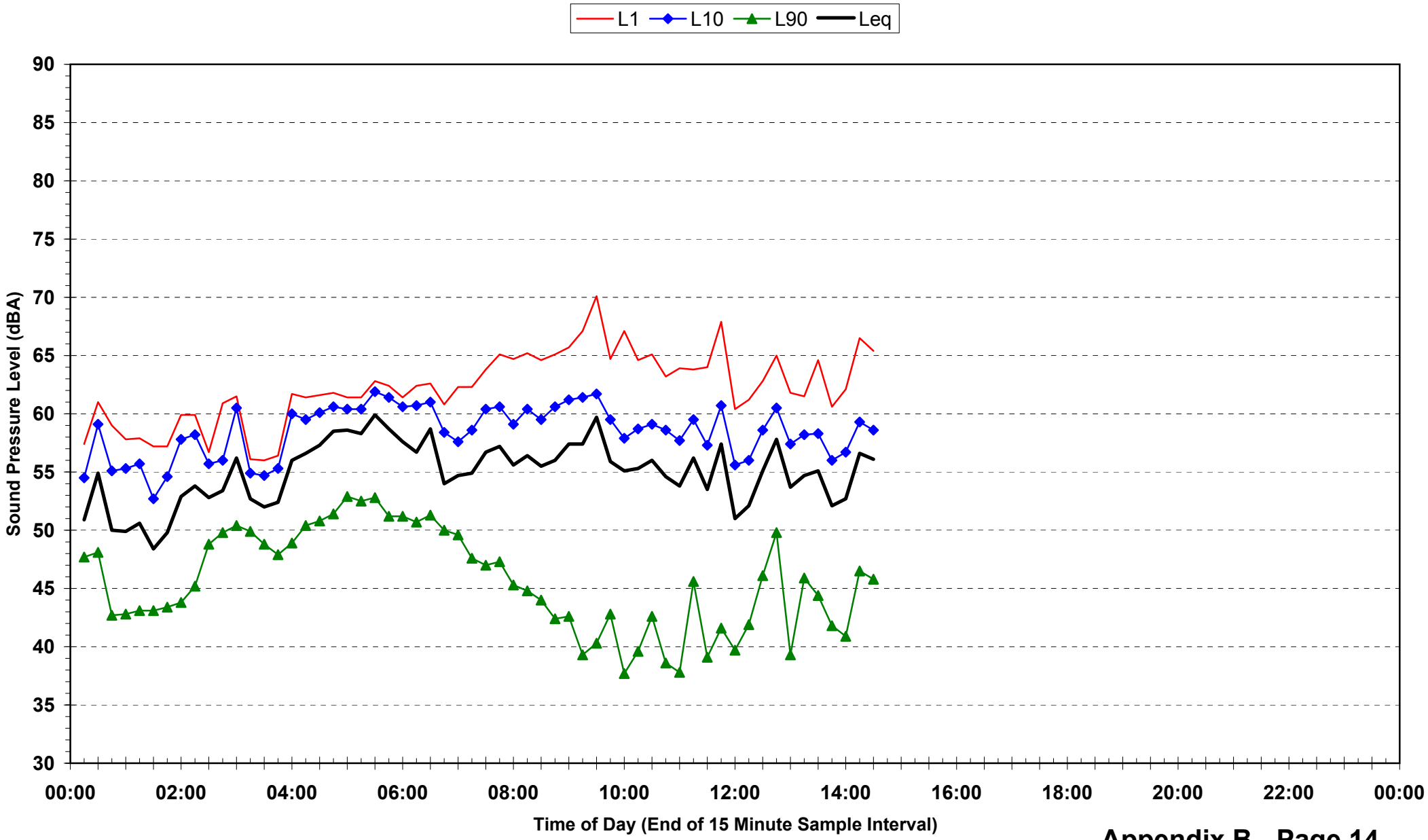

ENM Source File Generator V2.0 (May 2005)

Project Number	30-1409
Description	Project Abel
Project Manager	OM

Source	Equipment Description	Octave Band Centre Frequency (Hz) - dBL re 1pW										dB Lin	dBA	ISG (m)		Enclosure #	ENM (m)		Ground	Elevation
No.	Need 1 line gap between last source and receivers to create source file No gap required to create map file for sources and receivers	31.5	63	125	250	500	1k	2k	4k	8k	16K	Overall	Overall	East	North		East	North	RL(m)	RL(m)
1	992C Loader Driveby	108	107	118	108	109	108	107	102	93		120 dB	113 dB				4603.0	9775.0	42.0	42.0
2	992C Loader Driveby	108	107	118	108	109	108	107	102	93		120 dB	113 dB				4594.0	9687.0	42.0	42.0
3	992C Loader Driveby	108	107	118	108	109	108	107	102	93		120 dB	113 dB				4555.0	9693.0	49.0	49.0
4	992C Loading into crusher + crusher	107	113	113	111	108	108	106	100	93		119 dB	113 dB				4548.0	9716.0	51.0	51.0
5	Washery	126	123	119	115	110	109	107	103	96		129 dB	115 dB				4612.0	9876.0	42.0	42.0
6	Coal Train Loader	100	102	101	101	104	99	96	96	90		110 dB	105 dB				5076.0	10601.0	39.0	39.0
7	3xLoco's @ 1km/hr	101	101	98	91	95	91	88	89	84		106 dB	97 dB				5337.0	10887.0	39.0	39.0
8	3xLoco's @ 1km/hr	101	101	98	91	95	91	88	89	84		106 dB	97 dB				5153.0	10756.0	39.0	39.0
9	3xLoco's @ 1km/hr	101	101	98	91	95	91	88	89	84		106 dB	97 dB				5184.0	10805.0	39.0	39.0
10	3xLoco's @ 1km/hr	101	101	98	91	95	91	88	89	84		106 dB	97 dB				5248.0	10857.0	39.0	39.0
11	Ventilation Fan	100	115	113	109	107	103	99	96	95		118 dB	109 dB				6294.0	6589.0	45.0	45.0
12	Eimco	95	104	109	109	108	107	103	98	90		115 dB	111 dB				6078.0	7049.8	16.0	16.0
13	Dozer pushing coal	119	112	111	107	107	106	105	100	94		121 dB	111 dB				4593.0	9963.0	39.0	39.0
14	Road Truck at stockpiles	100	115	111	99	92	93	96	91	86		117 dB	102 dB				4450.0	9868.0	43.0	43.0
15	Loader near portal	109	109	120	110	111	110	109	104	95		122 dB	115 dB				6264.0	7036.0	28.0	28.0
16	Haul Truck 1	100	115	111	99	92	93	96	91	86		116.7 dB	101.7 dBA				5729.0	8349.0	45.0	45.0
17	Haul Truck 2	100	115	111	99	92	93	96	91	86		116.7 dB	101.7 dBA				6439.0	7560.0	50.0	50.0

ENM Source File Generator

Job Number	30-1409
Job Description	Project Abel Construction
Project Manager	OM

Source	Equipment Description	Octave Band Centre Frequency (Hz) - dBL re 1pW										dBA	ISG (m)		ENM (m)		Ground	Elevation
No.		31.5	63	125	250	500	1k	2k	4k	8k	16K	Overall	East	North	East	North	RL(m)	RL(m)
1	Generator No.1	109	112	113	110	101	102	99	93	84	76	118 dB			6176	6519	45	46.5
2	Compressor 100 cfm No.1	106	102	98	93	90	86	86	79	73	73	108 dB			6176	6519	45	46.5
3	Excavator No.1	103	104	107	103	104	99	94	86	76	76	112 dB			6176	6519	45	46.5
4	Backhoe No.1	85	94	93	92	97	94	88	101	95	84	105 dB			6176	6519	45	46.5
5	Truck 6 wheeler No.1	106	115	102	109	104	102	99	100	92	92	117 dB			6176	6519	45	46.5
6	Dozer D8	108	112	111	108	110	103	101	99	93	93	117 dB			6176	6519	45	46.5
7	Crane No.1	99	106	96	96	99	97	93	89	87	87	109 dB			6176	6519	45	46.5
8	Grader 12G	103	109	111	112	108	106	101	96	83	82	117 dB			6176	6519	45	46.5
9	Compactor sheeps foot	99	104	109	112	107	105	102	96	90	90	116 dB			6176	6519	45	46.5
10	Compactor flat	99	104	109	112	107	105	102	96	90	90	116 dB			6176	6519	45	46.5
11	Crane No.2	99	106	96	96	99	97	93	89	87	87	109 dB			6176	6519	45	46.5
12	Water cart	110	115	113	106	109	108	104	99	95	95	119 dB			6176	6519	45	46.5
13	Compressor 100 cfm No.2	106	102	98	93	90	86	86	79	73	73	108 dB			6176	6519	45	46.5
14	Generator No.2	109	112	113	110	101	102	99	93	84	76	118 dB			6176	6519	45	46.5
15	Generator No.3	109	112	113	110	101	102	99	93	84	76	118 dB			6176	6519	45	46.5
16	Excavator No.2	103	104	107	103	104	99	94	86	76	76	112 dB			6176	6519	45	46.5
17	Excavator No.3	103	104	107	103	104	99	94	86	76	76	112 dB			6176	6519	45	46.5
18	Backhoe No.2	85	94	93	92	97	94	88	101	95	84	105 dB			6176	6519	45	46.5
19	Backhoe No.3	85	94	93	92	97	94	88	101	95	84	105 dB			6176	6519	45	46.5
20	Dozer D6	108	112	111	108	110	103	101	99	93	93	117 dB			6176	6519	45	46.5
21	Truck 6 wheeler No.2	106	115	102	109	104	102	99	100	92	92	117 dB			6176	6519	45	46.5
22	Truck 6 wheeler No.3	106	115	102	109	104	102	99	100	92	92	117 dB			6176	6519	45	46.5
23	Truck 6 wheeler No.4	106	115	102	109	104	102	99	100	92	92	117 dB			6176	6519	45	46.5
												0 dB						