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LOWER HUNTER LANDS DEVELOPMENT - MINMI

ACOUSTIC STUDY

TD261-02F02 (REV 5) MI REPORT

9 JANUARY 2009

Prepared for:

Coal and Allied

c/- Catylis Pty Ltd

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DOCUMENT CONTROL

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09/01/2009	Final report	-	5	MCH	-	MCH

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1 INTRODUCTION

Renzo Tonin & Associates were engaged to provide a noise assessment of the Concept Plan for the proposed development of Coal & Allied (C&A) land at Minmi, known as the Minmi Estate.

This noise assessment has been undertaken in accordance with the Director General's Requirements (DGRs) for the proposed Minmi Estate development (ref. S07/00406-1, dated 10 April 2008). The DGRs states the following for noise impacts:

> *"**Noise Impact***
>
> *(1) Demonstrate that the proposal will be designed, constructed, operated and maintained so that there are no unacceptable impacts from noise (including traffic noise)."*

In accordance with the above requirement, noise impacts onto the proposed residential development and onto existing residential properties as a result of the proposed development are assessed against the applicable noise criteria and recommendations for the mitigation of noise are provided, where required.

Noise impacts to the Minmi Estate from traffic on surrounding roads, namely the F3 Sydney-Newcastle Freeway, the Newcastle Link Road, Woodford Road, Lenaghans Drive, Minmi Road and the proposed Minmi Boulevard have been measured and/or predicted. Noise contours have been generated to present noise levels from road traffic and predicted noise levels are assessed against the NSW Environmental Criteria for Road Traffic Noise (ECRTN) and the Department of Planning's (DoP's) 'Development Near Rail Corridors and Busy Roads – Interim Guideline' (December 2008). Furthermore, noise impacts upon existing residential properties due to road traffic noise generated by the Minmi Estate have also been considered and assessed against the ECRTN for the year 2031, considered to be the year that the Minmi Estate development is completed.

Noise from other sources, including the Summer Hill Waste Management Facility, Cameron Park Business Park and the Mount Sugarloaf Kart Raceway are assessed against the NSW Industrial Noise Policy (INP) and the Environmental Noise Control Manual (ENCM), as appropriate.

Noise from air conditioners impacting upon existing residential properties due to the Minmi Estate, have also been assessed.

The work documented in this report was carried out in accordance with the Renzo Tonin & Associates Quality Assurance System, which is based on Australian Standard / NZS ISO 9001.

2 PROJECT DESCRIPTION

2.1 Background Information

This acoustic study report has been prepared to assess noise impacting upon and from the development based on the Concept Plan developed for the Minmi Estate. The land is to be rezoned for residential development as part of the Lower Hunter Regional Strategy.

Noise impact to and from the development was quantified and compared to the noise guidelines set by the NSW Department of Environment and Climate Change (DECC) and the Department of Planning (DoP).

2.2 Site Description

In accordance with the Concept Plan, the Minmi Estate is made up of 3 sites – Minmi Precinct (Minmi Extension, Minmi East and Village Centre), Link Road North Precinct and Link Road South Precinct.

The Minmi Precinct site surrounds the existing township of Minmi. The F3 Sydney-Newcastle Freeway is located to the west of the site, and the Newcastle Link Road to the south. The Blue Gum Hills Regional Park and the Summer Hill Waste Management Facility are located to the east of the site. Rural land bounds the site to the north. The site is currently largely unoccupied, with the exception of some scattered buildings and residences.

The Link Road North Precinct site is bound by the Newcastle Link Road to the south. The Minmi Precinct site, Blue Gum Hills Regional Park and the Summer Hill Waste Management Facility bound the site to the north. Unoccupied land is located to the east and west of the site. The site is currently largely unoccupied, with the exception of some roads and power lines.

The Link Road South Precinct site is bound by the Newcastle Link Road to the north, Minmi Road to the west and unoccupied land to the east and south. The site is currently largely unoccupied, with the exception of some roads and power lines.

2.3 Noise Issues

Noise sources identified from aerial photography, GIS data and site inspection include:

- Newcastle Link Road, an 'arterial road' as defined by the NSW *Environmental Criteria for Road Traffic Noise*, to the south of the Minmi and Link Road North Precinct sites, and to the north of the Link Road South Precinct site;
- F3 Sydney-Newcastle Freeway, an 'arterial road' approx 800 metres west of the Minmi Precinct site;
- Lenaghans Drive, a 'collector road' running along part of the north eastern boundary of the Minmi Precinct site;

- Minmi Road (north), a ‘collector road’, running through the existing Minmi township and the northern eastern part of the Minmi Precinct site;
- Minmi Road (south), a ‘collector road’ running along the western boundary of the Link Road South Precinct site;
- Woodford Street, a ‘collector road’ running through the southern part of the Minmi Precinct site, and to the west of the Link Road North Precinct site;
- Summer Hill Waste Management Facility, owned by Newcastle City Council, approx 200-500m east of the Minmi Precinct site, directly to the north east of the Link Road North Precinct site and approx 1 km north of the Link Road South Precinct site.
- Cameron Park Business Park, on the southern side of Newcastle Link Road and west of Cameron Park Drive and approx 500 metres from the Minmi and Northern Link Road Precinct sites. It was confirmed during a site inspection that Cameron Park Business Park is unlikely to generate noise impact onto the site, and is not further addressed in this report; and
- Mount Sugarloaf Kart Raceway, operated by the Newcastle Kart Racing Club, located approximately 1.3km – 1.5km from the Minmi and Link Road North Precinct sites, and approximately 2.8 km from the Link Road South Precinct site.

3 EXISTING ACOUSTIC ENVIRONMENT

3.1 Study Area

This study concentrates on three precinct sites surrounding and to the south east of the existing Minmi residential area. Site investigations found that the existing acoustic environment of the site is dominated by natural sounds, with some influence (depending on location) from traffic noise generated by the F3 Sydney-Newcastle Freeway and the Newcastle Link Road. Long term, unattended monitoring was completed to capture the existing acoustic environment at the three development sites.

3.2 Noise Monitoring Locations

To determine current L_{eq} traffic noise levels and background L_{90} noise levels at the proposed Minmi Estate, long-term and short-term noise monitoring was carried out at the locations summarised below. To quantify the existing ambient noise environment, long-term (unattended) noise monitoring was conducted at each location over ten (full) days, between Monday 10th December and Thursday 20th December 2007.

- **Location M1 – Part Lot 2 / DP877349 Newcastle Link Road North**
  Within bushland on the northern side of the Newcastle Link Road and approximately 100m from the road kerb. Free field measurement, representative of ambient and background noise levels within the Link Road North Precinct site, and of traffic noise levels from the Newcastle Link Road. Posted speed limit on Newcastle Link Road adjacent to noise monitoring location is 80 km/h.

- **Location M2 – Lot 3 / DP877349 Newcastle Link Road South**
  Within bushland on the southern side of the Newcastle Link Road and approximately 40m from the road kerb. Free field measurement, representative of ambient and background noise levels within the Link Road South Precinct site, and of traffic noise levels from the Newcastle Link Road. Posted speed limit on Newcastle Link Road adjacent to noise monitoring location is 80 km/h.

- **Location M3 – Part Lot 712 / DP1113237 Lenaghans Drive**
  Within bushland, on the eastern side of the F3 Freeway and approximately 70m from the road edge. Free field measurement, representative of ambient and background noise levels within the Minmi Precinct site, and of traffic noise levels from the F3 Sydney-Newcastle Freeway. Posted speed limit on F3 Freeway adjacent to noise monitoring location was 110 km/h.

- **Location M4 – Lot 351/ DP1108608 Minmi Road East**
  Within bushland and adjacent to the common boundary with Summer Hill Waste Management Facility. Free field measurement, representative of ambient and background noise levels within the Minmi Precinct site. Noise environment dominated by insect and bird noise with no contribution from road traffic noise. Therefore, only background and ambient noise levels measured at this location will be used.

Figure 1 shows the long noise monitoring locations.

Weather information was obtained from the Bureau of Meteorology for the area over the monitoring period and any data adversely affected by rain, wind or extraneous noise was discarded.

Appendix A of this report presents a description of acoustic terms. Appendix B details the noise monitoring methodology. The graphical recorded output from long term noise monitoring is included in Appendix C to this report. The graphs in Appendix C were analysed to determine an assessment background level (ABL) for each day, evening and night period in each 24 hour period of noise monitoring, and based on the median of individual ABLs an overall single Rating Background Level (RBL) for the day, evening and night period is determined over the entire monitoring period in accordance with the NSW 'Industrial Noise Policy' (INP).

In order to assess existing traffic noise from The F3 Freeway and the Newcastle Link Road, $L_{Aeq(15hr)}$ and $L_{Aeq(9hr)}$ traffic noise levels were measured as suited for arterial roads.

3.3 Existing Background & Ambient Noise Levels

Background noise varies over the course of any 24 hour period, typically from a minimum at 3am in the morning to a maximum during morning and afternoon traffic peak hours. Therefore, the NSW 'Industrial Noise Policy' (INP) requires that the level of background and ambient noise be assessed separately for the daytime, evening and night-time periods. The INP defines these periods as follows:

- **Day** is defined as 7:00am to 6:00pm, Monday to Saturday and 8:00am to 6:00pm Sundays & Public Holidays.
- **Evening** is defined as 6:00pm to 10:00pm, Monday to Sunday & Public Holidays.
- **Night** is defined as 10:00pm to 7:00am, Monday to Saturday and 10:00pm to 8:00am Sundays & Public Holidays.

Traffic noise measurements were conducted to determine whether existing traffic noise levels already exceed the traffic noise criteria. Traffic noise levels are assessed separately for daytime and night time periods, defined by the NSW 'Environmental Criteria for Road Traffic Noise' (ECRTN) as follows:

- **Day** is defined as 7:00am to 10:00pm;
- **Night** is defined as 10:00pm to 7:00am.

Existing background, ambient noise levels and road traffic noise levels are presented in Table 3.1 and Table 3.2 below.

Noise levels at all locations were measured in the free field, in accordance with the requirements for background and ambient noise measurement. Therefore, L_{eq} ambient noise levels presented in Table 3.1 below are directly applicable.

Table 3.1 – Measured Existing Background (L_{90}) & Ambient (L_{eq}) Noise Levels, dB(A)

Noise Monitoring Location	L_{90} Background Noise Levels			L_{eq} Ambient Noise Levels		
	Day	Evening	Night	Day	Evening	Night
Location M1 – Link Road North	51	41	30	59	57	51
Location M2 – Link Road South	56	50	36	67	65	62
Location M3 – Lenaghans Drive	55	45	39	66	64	61
Location M4 – Minmi Road	48	37	34	65[1]	67[1]	55[1]

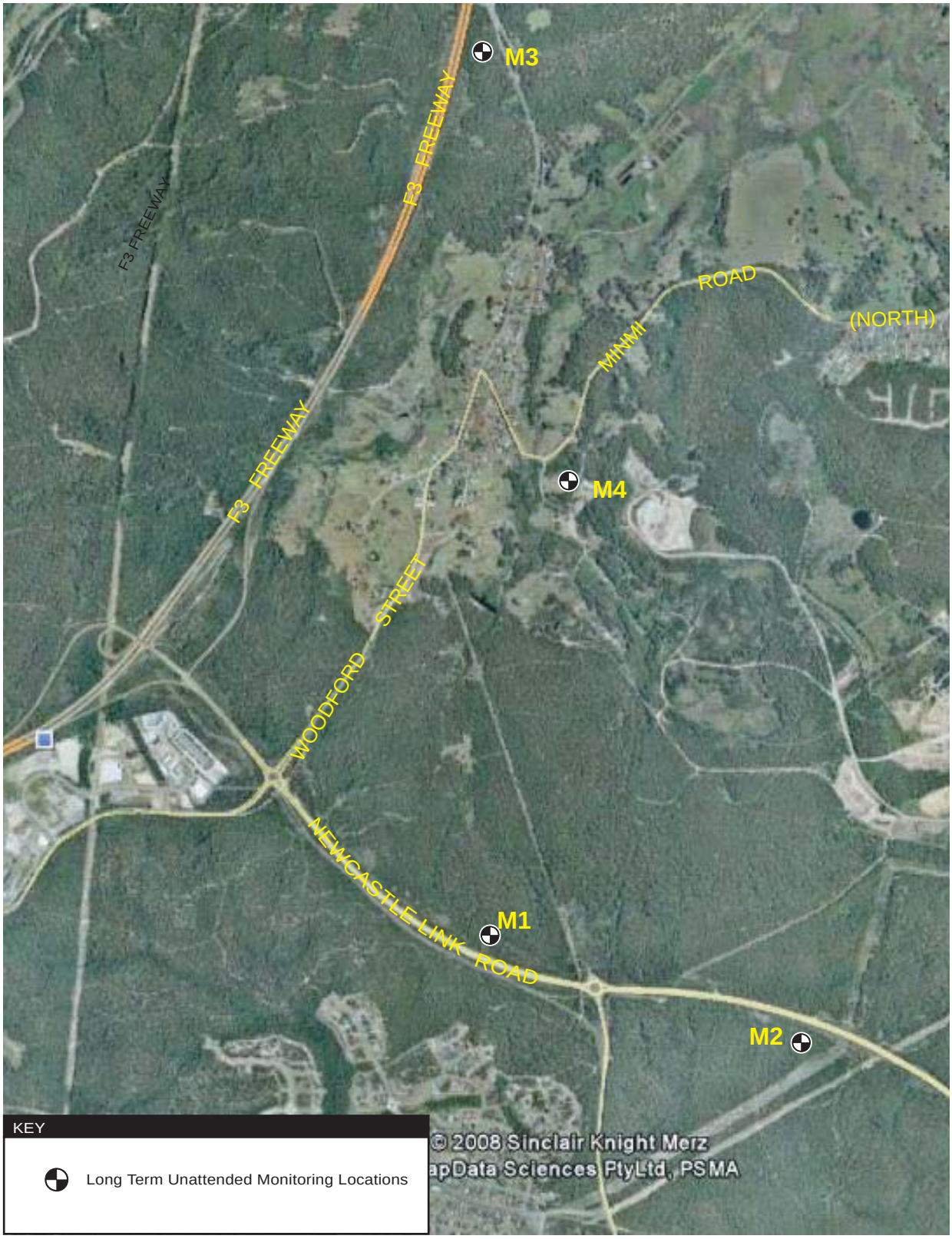
Notes: 1. L_{eq} ambient noise levels affected by insect and bird noise, notably cicadas, during day, evening and night periods.

Conversely, traffic noise levels should be measured at the facade (1m from facade) and should include facade reflections. Therefore, the L_{eq} traffic noise levels measured at all the 'free field' locations presented in Table 3.2 have been corrected to represent 'at-façade' conditions at all monitoring locations by adding 2.5dB(A) to the measured noise levels.

Table 3.2 – Measured Existing Road Traffic (L_{eq}) Noise Levels

Noise Monitoring Location	Distance from nearest kerb (m)	L_{eq} Traffic Noise Levels, dB(A)[1]	
		$L_{Aeq,15hr}$ Day[2]	$L_{Aeq,9hr}$ Night[2]
Location M1 – Link Road North	100	62	56
Location M2 – Link Road South	40	70	66
Location M3 – Lenaghans Drive	70	68	63

Notes: 1. L_{eq} noise level corrected to represent 'at-facade' conditions by adding 2.5dB(A) to the measured result
2. Day is defined as 7:00am to 10:00pm; Night is defined as 10:00pm to 7:00am



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Title : Figure 1 - Locality Map of The Minmi Estate and Monitoring Locations

Project: Coal & Allied - Lower Hunter Lands Development

Scale: NTS

Date : 06/11/08

Ref : TD261-02P01 (rev 2)

4 ROAD TRAFFIC NOISE INVESTIGATION

4.1 Road Traffic Noise Criteria

Noise impact from traffic on roads near the development sites is assessed against the *NSW Environmental Criteria for Road Traffic Noise* (the "ECRTN", Environment Protection Authority 1999), which is also referred to in the DoP's *Development Near Rail Corridors and Busy Roads – Interim Guideline* (December 2008).

The ECRTN sets out criteria to be applied to particular types of road and land uses. These noise criteria are to be applied when assessing noise impact and determining mitigation measures for developments that are potentially affected by road traffic noise, with the aim of preserving the amenity appropriate to the land use.

This project involves new residential development that may potentially be affected by noise generated by the existing and/or future road network. For new residences affected by existing roads and for existing residences affected by additional traffic due to the development, relevant criteria based on the road hierarchy are set out in the ECRTN and are reproduced in Table 4.1 below.

Table 2.1 of the ECRTN summarises the road traffic noise criteria based on the type of land use development and the road type. Table 4.1 summarises the road traffic noise criteria applicable to this study.

Table 4.1 – Applicable Road Traffic Noise Criteria

Type of Development	Criteria, dB(A)		Road Criteria Applicable to
	Day	Night	
New residential developments affected by traffic noise from 'freeway/ arterial' road	$L_{Aeq,15hr}$ 55	$L_{Aeq,9hr}$ 50	F3 Freeway Newcastle Link Road
New residential developments affected by traffic noise from 'collector' road	$L_{Aeq,1hr}$ 60	$L_{Aeq,1hr}$ 55	Lenaghans Drive Minmi Road (north & south) Woodford Street
Land use developments with potential to create additional traffic on collector road	$L_{Aeq,1hr}$ 60	$L_{Aeq,1hr}$ 55	Woodford Street Minmi Road (north)

Where feasible and reasonable, existing noise levels should be mitigated to meet the noise criteria for occupants by judicious design and construction of the development.

Typical strategies may include noise mounds or barriers (where reasonable and feasible); optimum location and orientation of buildings on the site; planning internal layouts carefully; choosing the most appropriate building materials; and using good construction techniques. These should be chosen so as to minimise noise impacts.

4.2 Road Traffic Noise Sources

The proposed development will potentially be affected by traffic along the F3 Freeway and the Newcastle Link Road, Lenaghans Drive, Minmi Road (north and south) and Woodford Street. Residences in the existing Minmi township will be affected by additional traffic on Woodford Street and Minmi Road (north).

Parsons Brinkerhoff (PB) provided 2007 hourly traffic data from traffic counts carried out on Newcastle Link Road, Lenaghans Drive, Minmi Road (north and south) and Woodford Street. Existing traffic volumes for F3 Freeway were also obtained from PB. However, as no traffic counts were performed on the F3, PB derived a growth factor from historic AADT data collected by the Roads & Traffic Authority in 2001 and 2004. This was then used to project the traffic volume to the estimated 2007 level.

Forecast traffic volumes for the year 2031 were obtained from a traffic report prepared by Hyder Consulting (ref. F0001-AA001459-AAR-13, dated 24 October 2008) assuming that the Minmi Estate development goes ahead. It is noted that the prediction of future 2031 traffic volumes along Woodford Street, Lenaghans Drive and Minmi Road (north and south) have been based on an assumed compounded traffic growth of 2.5% per year.

The traffic composition data used for noise modelling are summarised in the tables following.

Table 4.2 – Peak Hour Traffic Volume & Composition Data – Freeway/ Arterial Roads

Road	Year	Direction	Day (7am-10pm)		Night (10pm-7am)		Speed
			Volume	%HV	Volume	%HV	km/h
F3 Freeway	2007[1]	Two way	31574	25%	7090	38%	110
	2031[2]		55614	11%	9086	23%	
Newcastle Link Road west of Woodford St	2007[1]	Two way	17914	8%	2820	12%	90
	2031[2]		42785	17%	6736	26%	
Newcastle Link Road east of Minmi Rd	2007[1]	Two way	17889	6%	2455	10%	90
	2031[2]		47043	15%	6457	24%	

Note: 1. 2007 traffic count data provided by Parsons Brinckerhoff
2. 2031 forecast traffic volumes provided by Hyder Consulting

Table 4.3 – Peak Hour Traffic Volume & Composition Data – Collector Roads

Road	Year	Direction	Day (7am-10pm)		Night (10pm-7am)		Speed
			Volume	%HV	Volume	%HV	km/h
Minmi Road (south)	2007[1]	Two way	1132	2%	735	5%	82
	2031[2]	Two way	1998	2%	1296	5%	80
Minmi Road (north)	2007[1]	Two way	424	9%	235	9%	66
	2031[2]	Two way	794	9%	415	9%	60
Woodford Street	2007[1]	Two way	283	5%	142	11%	88
	2031[2]	Two way	500	5%	251	11%	80
Lenaghans Drive	2007[1]	Two way	332	10%	206	12%	78
	2031[2]	Two way	585	10%	364	12%	80
Proposed Minmi Boulevard	2031[2]	Two way	1021	5%	613	8%	60

Note: 1. 2007 traffic count data provided by Parsons Brinckerhoff
2. 2031 forecast traffic volumes provided by Hyder Consulting

4.3 Predicted Road Traffic Noise

The noise prediction model used to predict traffic noise levels for the project are contained within the calculation algorithms of the noise model developed by the United Kingdom Department of Environment entitled "Calculation of Road Traffic Noise (1988)" known as the CoRTN (1988) method. This method has been adapted to Australian conditions and extensively tested by the Australian Road Research Board.

The model predicts noise levels for free flowing traffic and a modified method has been developed which enables an accurate prediction of noise from high truck exhausts to be taken into account. The method predicts the $L_{10(1hour)}$ noise levels within the daytime 15 hour (7am to 10pm) and night-time 9 hour (10pm to 7am) periods and a correction of -3dB(A) is applied to obtain the $L_{eq(1hour)}$ noise levels for each period. The $L_{eq(1hour)}$ noise level for the time period 7am to 10pm is then equated to the daily $L_{eq(15hour)}$ noise level. Similarly, the $L_{eq(1hour)}$ noise level for the time period 10pm to 7am is then equated to the night time $L_{eq(9hour)}$ noise level.

Where traffic is assessed over a 1 hour period, the $L_{10(1hour)}$ noise level is determined based on peak 1 hour traffic volumes for the day/ night period and a correction of -3dB(A) is applied to obtain the $L_{eq(1hour)}$ noise level.

The noise prediction model takes into account the following:

Table 4.4 – Summary of Modelling Inputs

Input Parameters	Data Acquired From
Traffic volumes and mix	See Table 4.2 and Table 4.3 above
Vehicle speed	See Table 4.2 and Table 4.3 above
Gradient of roadway	Estimated from Contour Plan provided by Monteath & Powys Pty Ltd dated 27 April 2007 (Ref: 06/221; CADD File: 06221o.dwg)

Input Parameters	Data Acquired From
Source height	0.5m for car exhaust, 1.5m for car and truck engines and 3.6m for truck exhaust and detailed within CoRTN
Ground topography at receiver and road	From Contour Plan provided by Monteath & Powys Pty Ltd dated 27 April 2007 (Ref: 06/221; CADD File: 06221o.dwg)
Angles of view from receiver	160 degrees for all receivers
Reflections from existing barriers, structures and cuttings on opposite side of road	Determined during site inspections and review of concept design. No structures or cuttings identified.
Air and ground absorption	Detailed within CoRTN, ground absorption varied along route. Numeric values varied between 0 (hard surface) to 1 (100% absorptive)
Receiver Heights	1.5m above ground level
Facade correction	+2.5dB(A)
Australian conditions correction	-1.7dB(A) at 1m from facade
Acoustic properties of road surfaces	Assumed dense graded asphalt
Roadside barriers	Assumes no existing noise barriers
Existing traffic noise levels (LAeq)	Based on long term noise monitoring results

4.3.1 Model Verification

The model was verified and calibrated using the long term noise monitoring results obtained for this project. Table 4.5 summarises the results of the traffic noise model verification, providing a comparison of the modelled traffic noise levels for existing conditions compared to the measured traffic noise levels.

Table 4.5 – Noise Model Verification Results, dB(A)

Location	$L_{Aeq(15hr)}$ (Day) Noise Level			$L_{Aeq(9hr)}$ (Night) Noise Level		
	Measured	Modelled	Variation	Measured	Modelled	Variation
M1	61.5	59.1	-2.4	55.9	53.8	-2.1
M2	69.8	66.1	-3.7	66.4	60.5	-5.9
M3	68.0	67.5	-0.5	63.3	64.6	1.3

The noise model verification tests presented in Table 4.5 above shows the model to predict daytime noise levels that fall within ± 2.4dB(A) of the true noise levels monitored at locations M1 and M3. The accuracy of the CoRTN noise algorithms is generally expected to predict noise levels that are within 2.7dB(A) of the true noise levels with an 85% confidence [RTA's Interim Traffic Noise Policy (ITNP), Appendix B, Section 3]. Predicted noise levels at Location M2 fall outside this tolerance, particularly during the night period. This is likely to be as a result of extraneous noise (eg. insect noise) impacting on noise levels measured at Location M2; however, it is not considered to be a significant issue during the day period. The results indicate that the day period is the controlling factor in terms of potential noise impacts.

Therefore, the results presented above provide a reasonable level of confidence in the accuracy of the noise model used for predicting future day time traffic noise levels for this project.

4.4 Road Traffic Noise Assessment

4.4.1 Predicted Traffic Noise Levels

As there are numerous potentially noise affected sites along the proposed route, road traffic noise levels are predicted across the site using noise contour maps.

Noise modelling indicated that the day period was the controlling factor in terms of potential noise impacts. Therefore, the noise modelling results presented are for the day period only.

Figure 2 following presents the day-time noise contours representing $L_{Aeq(15hour)}$ road traffic noise generated by the F3 Freeway and the Newcastle Link Road and the $L_{Aeq(1hour)}$ peak road traffic noise generated by Woodford Street, Lenaghans Drive, Minmi Road (north and south) and the proposed Minmi Boulevard for the year 2031 (ie year that development is completed). Figure 3 presents the night-time noise contours for the year 2031.

The noise contours were produced assuming no noise control measures have been incorporated into the road development other than those measures detailed in Table 4.4. The noise contours were interpolated from a series of calculations to specific points within a regularly spaced grid, 1.5 m above ground level. It is noted that the noise contours are estimates of the predicted noise levels, and that contour values may differ slightly from equivalent spot calculations.

Traffic noise levels presented in Figure 2 and Figure 3 are for ground floor levels only.

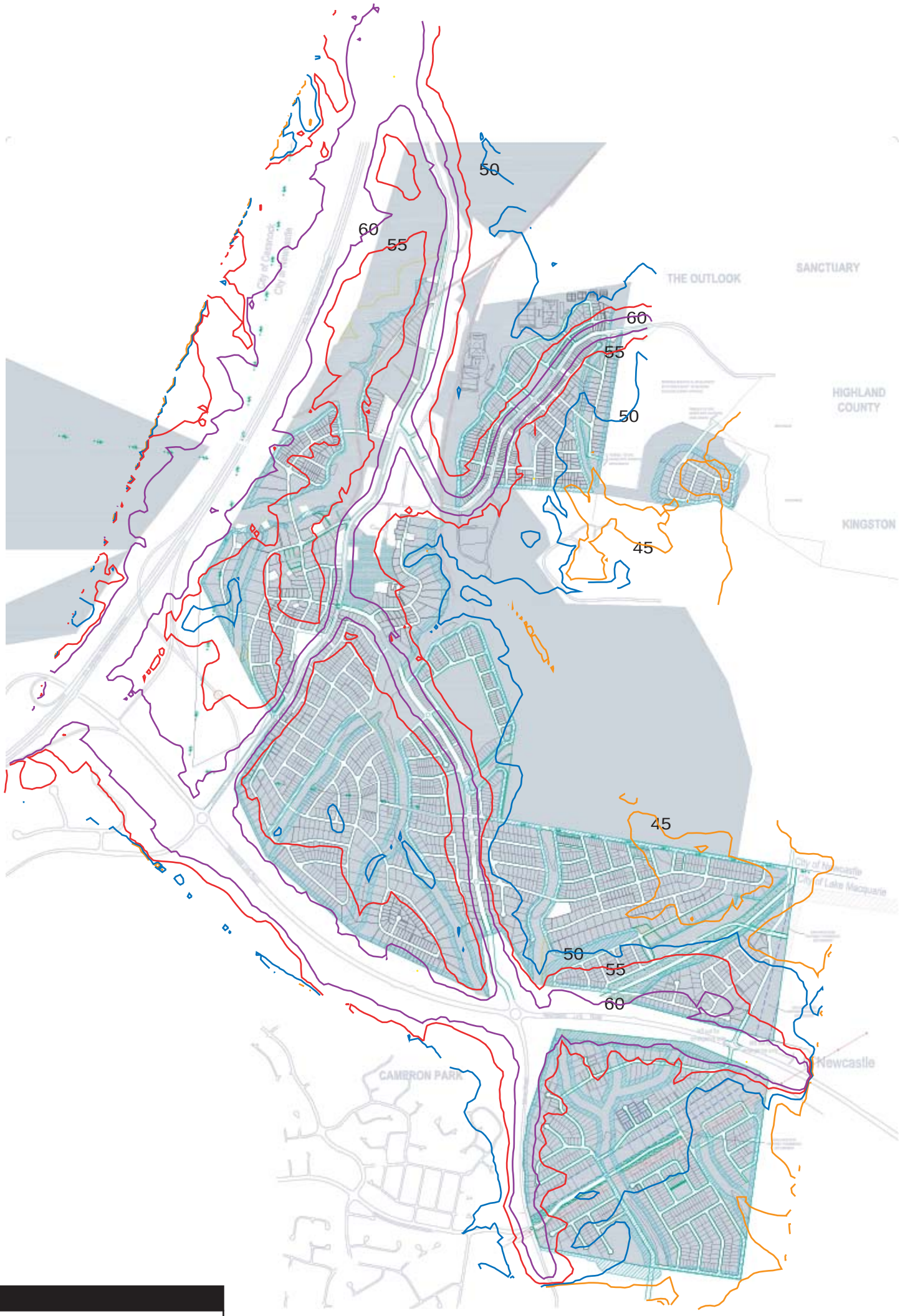
4.4.2 Assessment of Impacts

The $L_{Aeq(15hr)}$ 55dB(A) (day) contour shown along the F3 Freeway and Newcastle Link Road in Figure 2 indicates the location within where road traffic noise levels from the F3 Freeway and the Newcastle Link Road comply with the requirements of the ECRTN for the year 2031. The modelling shows that the $L_{Aeq(15hr)}$ 55dB(A) (day) contour falls a distance of approximately 50m to 400m from the F3 Freeway alignment. The areas of the site proposed for residential development and affected by the F3 Freeway is generally within the $L_{Aeq(15hr)}$ 55dB(A) (day) contour; therefore, mitigation measures should be considered for these areas. The $L_{Aeq(15hr)}$ 55dB(A) (day) contour falls a distance of approximately 60m to 380m from the Newcastle Link Road alignment and affects the proposed residential areas near the Newcastle Link Road. Residences above these contours (ie between the contour and road) will be exposed to 2031 noise levels that exceed the base criteria recommended in the ECRTN.

The $L_{Aeq(1hr)}$ 60dB(A) (day) contour shown in Figure 2 indicates the location beyond where road traffic noise levels from the identified collector roads comply with the requirements of the ECRTN for the year 2031 for both future proposed Minmi Estate residences and the existing Minmi Township residences. Assuming there is a direct line-of-sight to the road without any intervening buildings or structures that can provide acoustic shielding, the modelling shows that the L_{Aeq} 60dB(A) (day) contour falls a distance of:

- approximately up to 50m from the Lenaghans Drive alignment;
- approximately up to 40m from the Minmi Road north alignment;
- approximately up to 75m from the Minmi Road south alignment;
- approximately up to 70m from the Woodford Street alignment; and
- approximately up to 65m from the proposed Minmi Boulevard alignment.

Residences within this noise contour (ie between the noise contour and road) will be exposed to 2031 noise levels that exceed the base criteria recommended in the ECRTN.



Legend	
	45dB
	50dB
	55dB
	60dB
$L_{Aeq(15h)}$	F3 Freeway; Link Rd
$L_{Aeq(1h)}$	Lenaghan Dr; Minmi Rd; Woodford St

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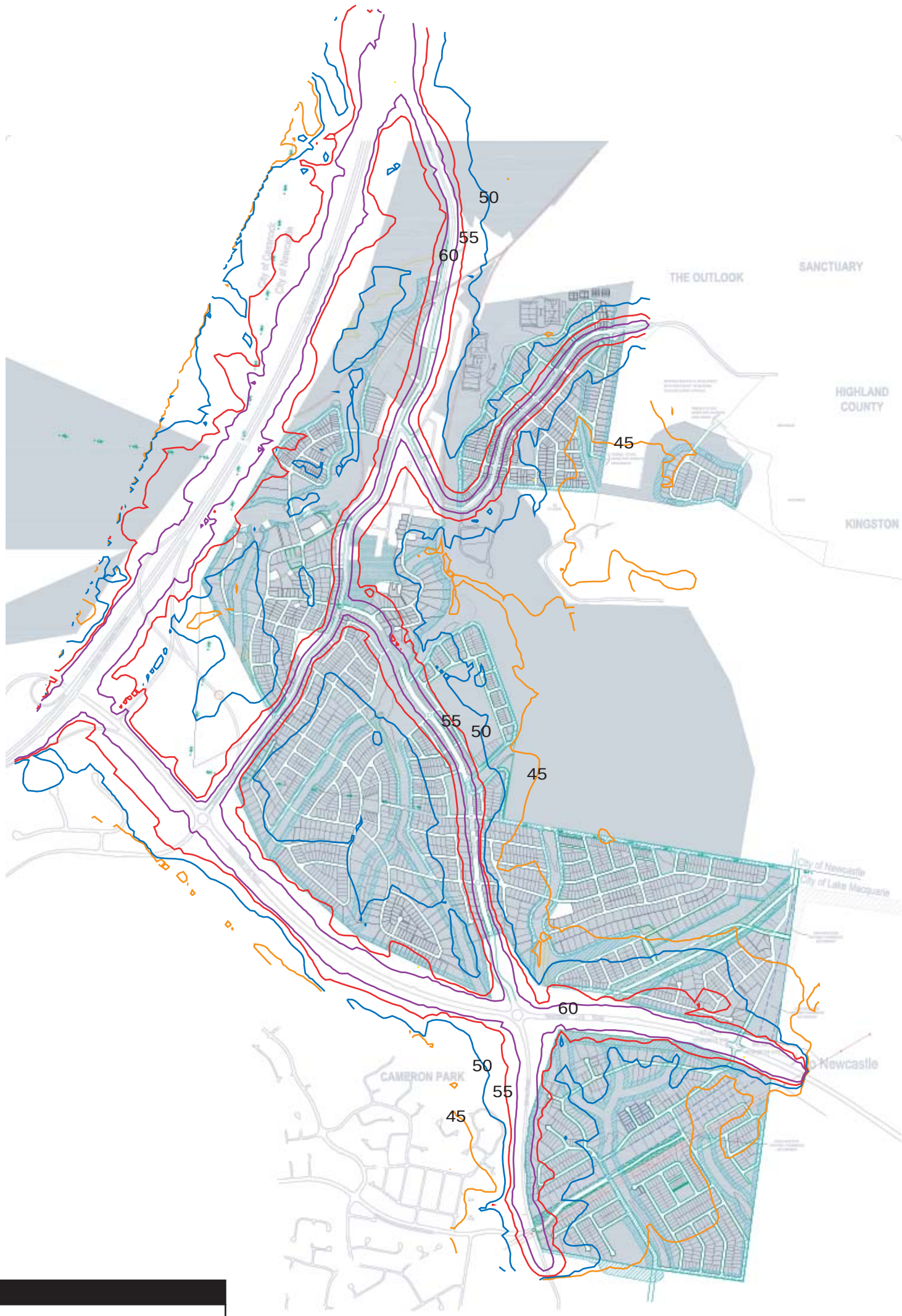
Title : Figure 2 - Minmi and North & South Link Roads - 2031 Road Traffic Noise Impacts (Day period 7am to 10pm)

Project: Coal & Allied - Lower Hunter Lands Development

Scale: NTS

Date : 28/01/09

Ref : TD261-02P02 (rev 3)



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Title : Figure 3 - Minmi and North & South Link Roads - 2031 Road Traffic Noise Impacts (Night Period - 10pm to 7am)

Project: Coal & Allied - Lower Hunter Lands Development

Scale: NTS

Date : 03/11/08

Ref : TD261-02P03 (rev 1)

4.5 Recommendations

The following recommendations provide typical noise control solutions commonly used to reduce noise impacts to the residences that may be developed along freeways, arterial roads and collector roads at Minmi. This information is presented for the purpose of development assessment only and shall not be used in more detailed design unless otherwise approved in writing by the acoustic consultant.

Furthermore, the recommendations below are in accordance with 'good design' methods outlined in the DoP's *Development Near Rail Corridors and Busy Roads – Interim Guideline*.

4.5.1 Noise Barriers

Noise barriers can usually reduce noise levels by 5dB(A) when they are high enough to break line of site and 10-15dB(A) in the acoustic 'shadow zone', with a maximum total noise reduction of 20dB(A).

Since traffic noise are generally high and affects most residential lots closest to the F3 Freeway, the Newcastle Link Road, Woodford Road/ Lenaghans Drive and Minmi Road, noise barriers or earth mounding may be a more cost effective and/or feasible solution. Further noise modelling has been undertaken to investigate the impact of incorporating noise barriers or earth mounds along the site boundaries.

Figures 4 to 8 following show road traffic noise contours modelled for noise barriers/ earth mounds at heights of 2m, 3m, 4m, 5m, and 6m located on the site boundaries of the proposed Minmi Estate development. The location of the noise walls are shown on each figure. The effectiveness of any noise barrier changes depending on where it is located. More details regarding the specific location of any noise walls or earth mounds should be determined during the detailed design stage of the development.

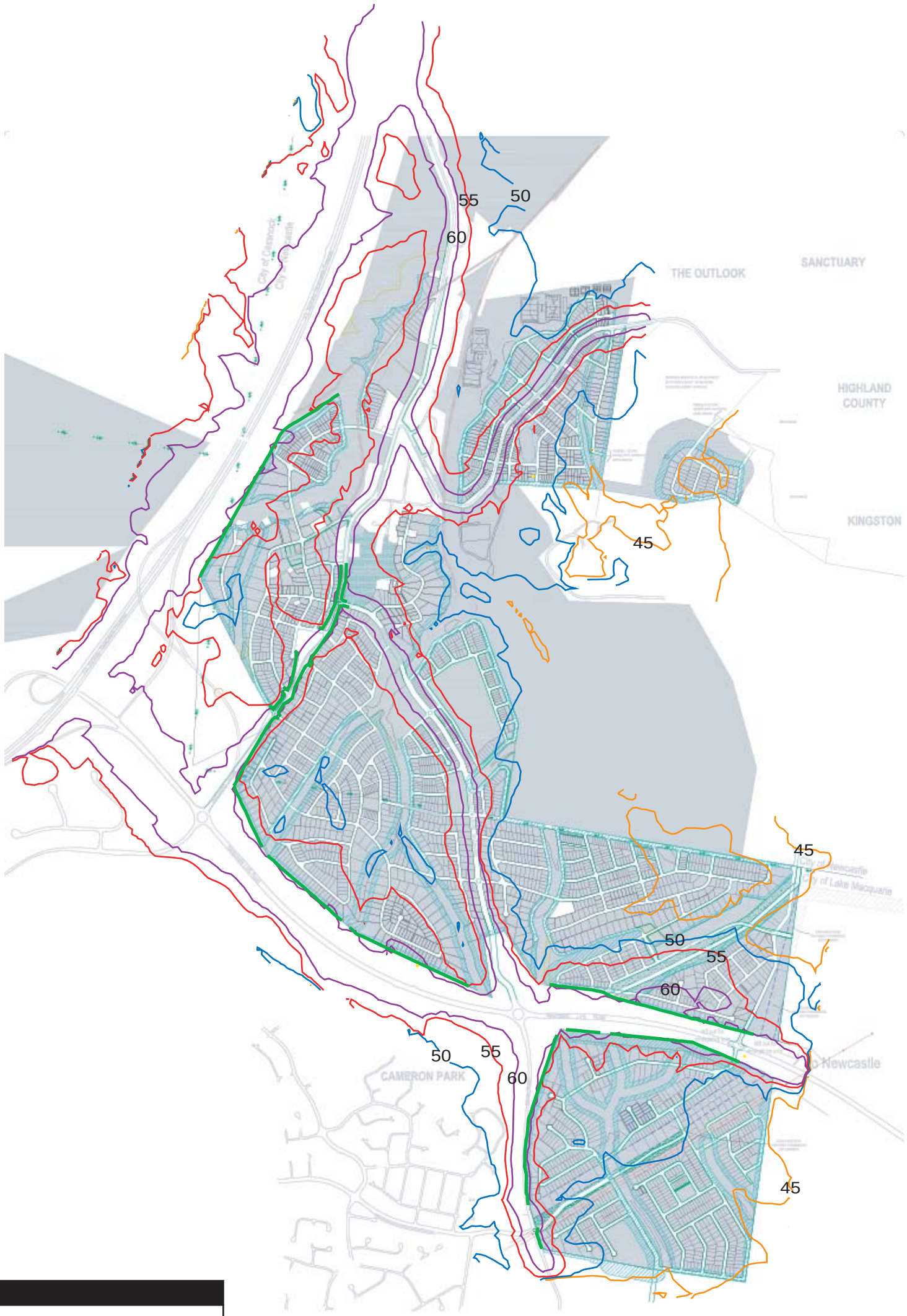
It is noted that there are no noise walls proposed for properties in the existing Minmi Township as the existing properties front onto the roads where traffic noise originate from and as such it would not be feasible to implement noise walls or earth mounds for these properties.

Review of the noise contours for various noise wall heights shown in Figures 4 to 8 indicate that the use of 3m to 5m high noise walls or earth mounds would generally reduce the number of residences exceeding ECRTN.

Given that noise walls higher then 6m are generally not considered aesthetically acceptable, and not all properties will be protected by noise walls or earth mounds of up to 6m, building setbacks and/or building treatment should be considered during the detailed design stage of the development.

Furthermore, noise walls or earth mounds may not be in keeping with the existing visual landscape and/or may not be a feasible or reasonable option (eg. existing Minmi Township);

therefore, building setback and/or building treatment on site may be preferred options to achieve acceptable internal noise levels as discussed below.



Legend	
	45dB
	50dB
	55dB
	60dB
$L_{Aeq(15h)}$	F3 Freeway; Link Rd
$L_{Aeq(1h)}$	Lenaghan Dr; Minmi Rd; Woodford St
	2m High Noise Wall

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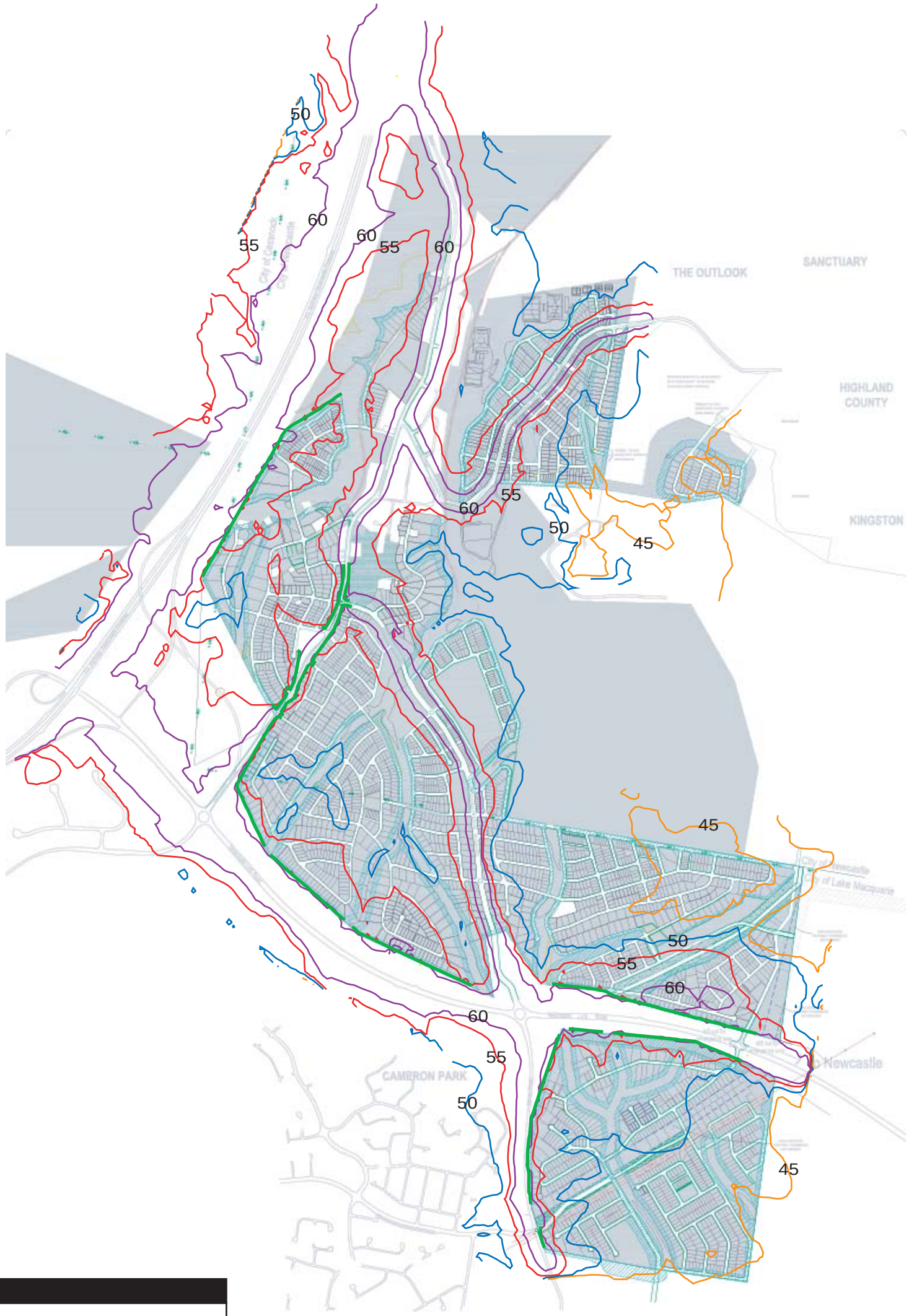
Title : Figure 4 - Minmi and North & South Link Roads - 2m Noise Wall
2031 Road Traffic Noise Impacts
(Day Period - 7am to 10pm)

Project: Coal & Allied - Lower Hunter Lands Development

Scale: NTS

Date : 28/01/09

Ref : TD261-02P04 (rev 2)



Legend	
	45dB
	50dB
	55dB
	60dB
$L_{Aeq(15h)}$	F3 Freeway; Link Rd
$L_{Aeq(1h)}$	Lenaghan Dr; Minmi Rd; Woodford St
	3m High Noise Wall

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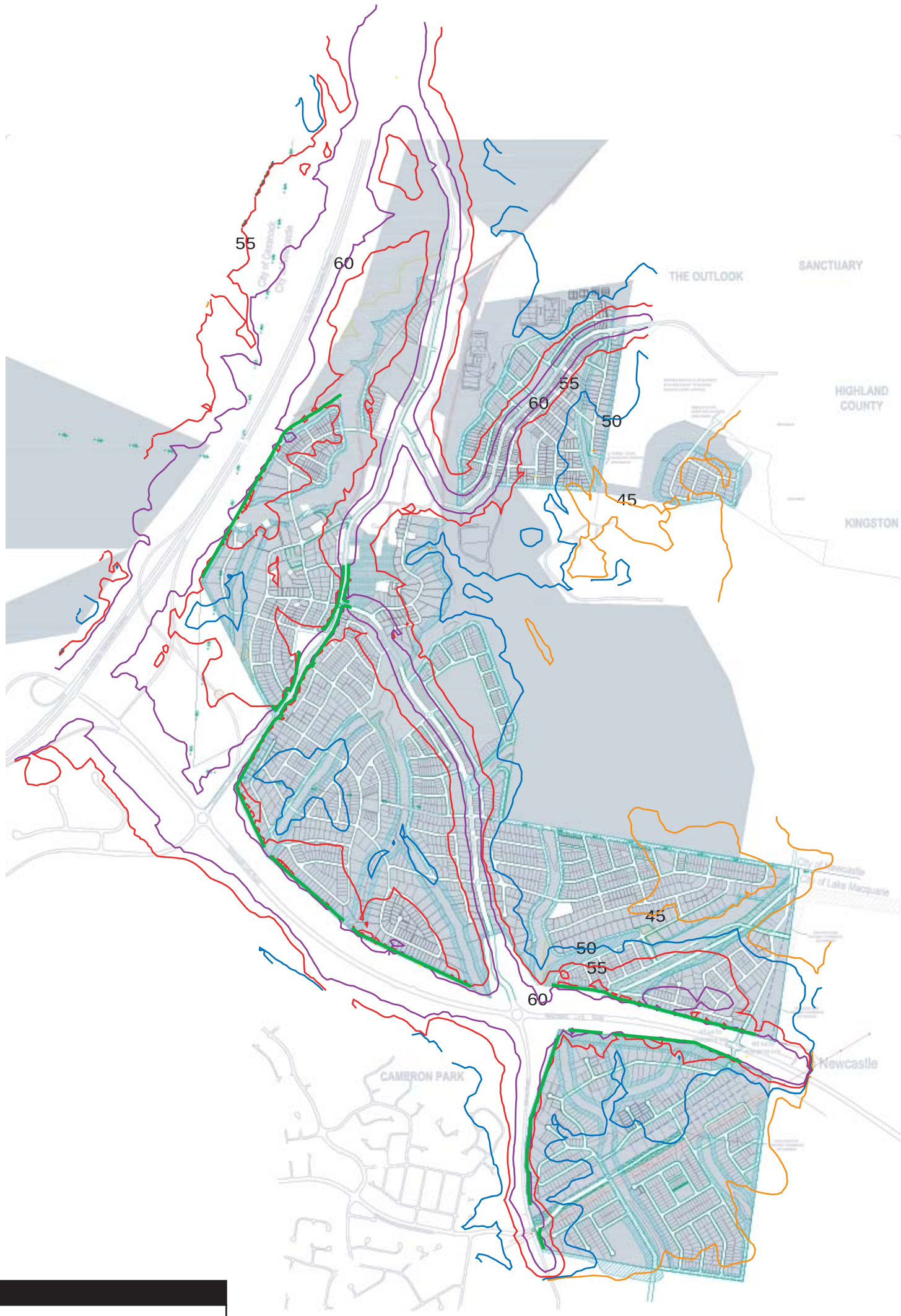
Title : Figure 5 - Minmi and North & South Link Roads - 3m Noise Wall
2031 Road Traffic Noise Impacts
(Day Period - 7am to 10pm)

Project: Coal & Allied - Lower Hunter Lands Development

Scale: NTS

Date : 28/01/09

Ref : TD261-02P05 (rev 2)



Legend	
	45dB
	50dB
	55dB
	60dB
$L_{Aeq(15h)}$	F3 Freeway; Link Rd
$L_{Aeq(1h)}$	Lenaghan Dr; Minmi Rd; Woodford St
	4m High Noise Wall

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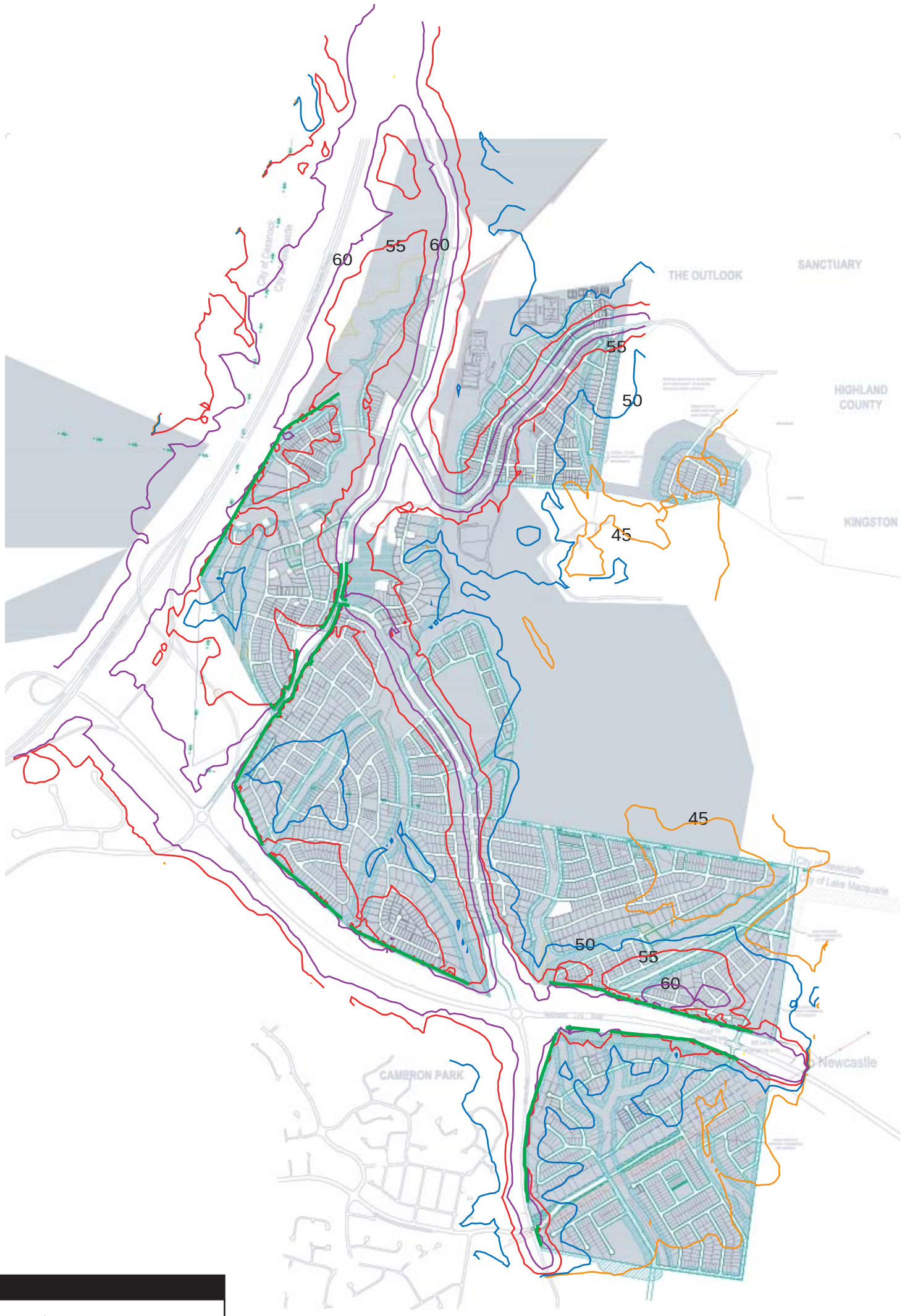
Title : Figure 6 - Minmi and North & South Link Roads - 4m Noise Wall
2031 Road Traffic Noise Impacts
(Day Period - 7am to 10pm)

Project: Coal & Allied - Lower Hunter Lands Development

Scale: NTS

Date : 28/01/09

Ref : TD261-02P06 (rev 2)



Legend	
	45dB
	50dB
	55dB
	60dB
$L_{Aeq(15h)}$	F3 Freeway; Link Rd
$L_{Aeq(1h)}$	Lenaghan Dr; Minmi Rd; Woodford St
	5m High Noise Wall

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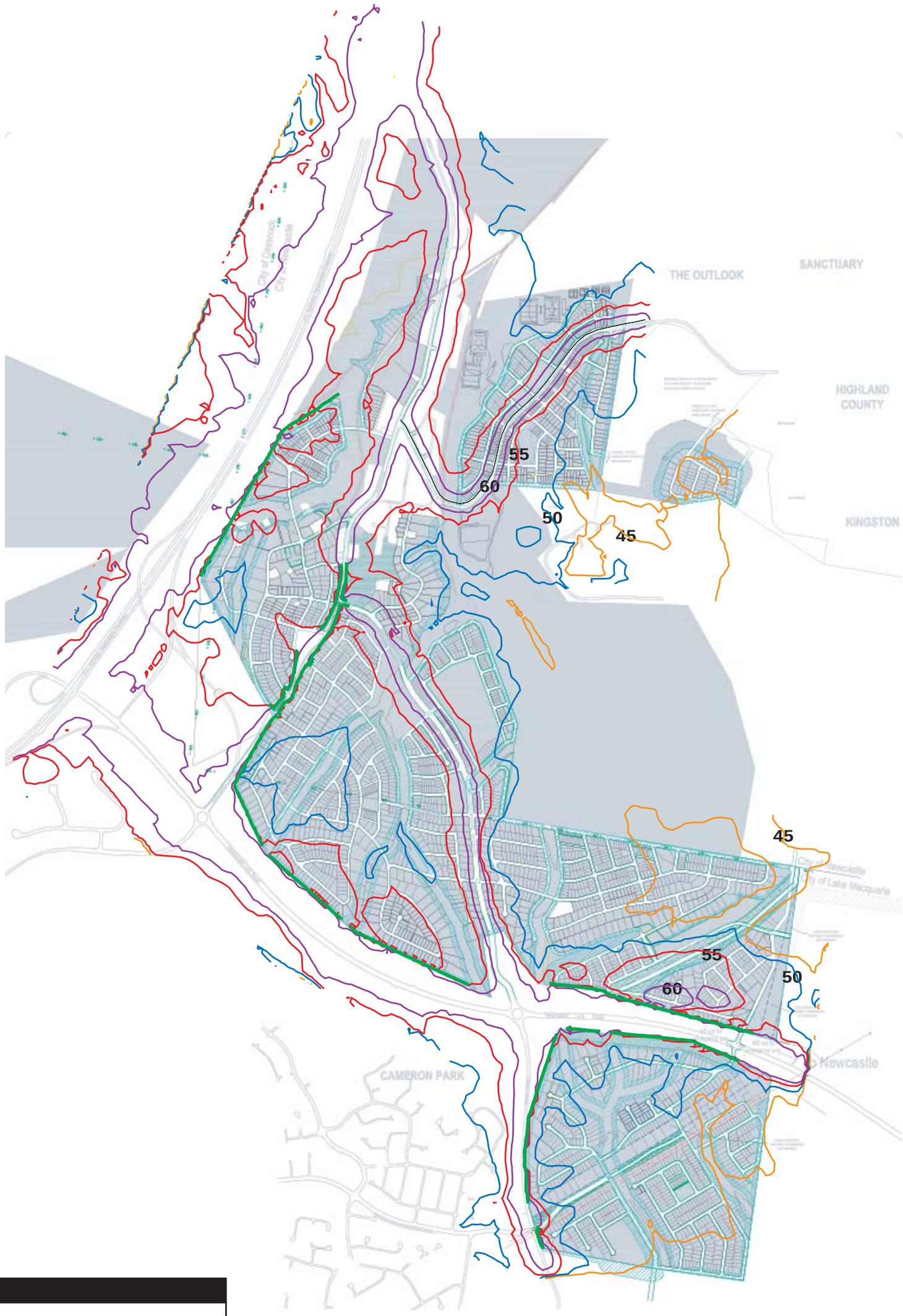
Title : Figure 7 - Minmi and North & South Link Roads - 5m Noise Wall
2031 Road Traffic Noise Impacts
(Day Period - 7am to 10pm)

Project: Coal & Allied - Lower Hunter Lands Development

Scale: NTS

Date : 28/01/09

Ref : TD261-02P07 (rev 2)



Legend	
	45dB
	50dB
	55dB
	60dB
$L_{Aeq(15h)}$	F3 Freeway; Link Rd
$L_{Aeq(1h)}$	Lenaghan Dr; Minmi Rd; Woodford St
	6m High Noise Wall

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Title : Figure 8 - Minmi and North & South Link Roads - 6m Noise Wall
2031 Road Traffic Noise Impacts
(Day Period - 7am to 10pm)

Project: Coal & Allied - Lower Hunter Lands Development

Scale: NTS

Date : 29/01/09

Ref : TD261-02P08 (rev 2)

4.5.2 Building Treatment

Future dwellings of the Minmi Estate development to be constructed in areas above the $L_{Aeq(15hr)}$ 55 dB(A) (day) contour for the arterial roads or the $L_{Aeq(1hr)}$ 60 dB(A) (day) contour for collector roads shown in Figure 2 should consider building treatment at the design stage to ensure internal noise levels meet the ECRTN guidelines.

According to the ECRTN, building treatment should only be considered for dwellings where the set external criteria ('base' criteria) is exceeded and other noise mitigation measures (eg. noise walls or earth mounds) are either exhausted or are not cost effective.

Table 3.1 of the DoP's 'Development Near Rail Corridors and Busy Roads – Interim Guideline' provides criteria for internal areas of residential and non-residential buildings affected by busy roads. Any building treatment should be designed to achieve the following internal noise criteria.

Table 4.6 – Recommended Internal Noise Criteria based on DoP's Interim Guideline

Building Type	Affected Area	Noise Level, dB(A)	Applicable Time Period
Residential	Sleeping areas	35	Night (10pm to 7am)
	Other habitable rooms	40	Any time
Educational Institutions including childcare centres	Noise sensitive areas	40	When in use
Places of worship	Noise sensitive areas	40	When in use
Hospitals	Wards	35	Any Time
	Other noises sensitive areas	45	Any Time

Notes: 1. Noise criteria based on Table 3.1 of DoP's "Development Near Rail Corridors and Busy Roads – Interim Guidelines"

Where the noise reduction required is less than 5dB(A) to achieve the ECRTN 'base' criteria, the internal noise criteria may be achieved by simply closing the windows. A light framed building with single glazed windows will provide a minimum noise reduction of up to 20dB(A) from outside to inside (RTA Environmental Noise Management Manual 2001 p20) when windows are closed and wall vents are sealed. If the internal noise criteria can only be achieved with windows closed, then mechanical ventilation or air conditioning must be provided to ensure fresh airflow inside the dwelling so to meet the requirements of the Building Code of Australia.

Therefore, if other noise mitigation such as noise barriers are not used and assuming there is direct line-of-sight to the road without any intervening buildings or structures that can provide acoustic shielding, we recommend mechanical ventilation be installed in any dwellings within:

- 50 to 400 metres of the F3 Freeway;
- 60 to 380 metres of the Newcastle Link Road;
- 50 metres of Lenaghans Drive;
- 40 metres of Minmi Road (north);

- 75 metres of Minmi Road (south);
- 70 metres of Woodford Street; and
- 65 metres of the proposed Minmi Boulevard

It is important to ensure that mechanical ventilation does not provide another noise leakage path into the dwelling and does not create a noise nuisance to neighbouring residential premises. If noise walls/ earth mounds were to be incorporated into the landscape design, only those residential lots still potentially affected by road traffic noise would require additional treatment.

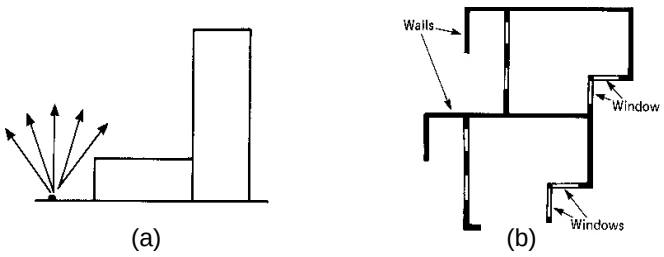
Further to the above recommendations and subject to community preferences, building treatment to existing dwellings within the existing Minmi Township affected by future road traffic noise impacts should also be considered since noise barriers for the affected dwellings are not a feasible option. Building treatment should be implemented to reduce noise within internal areas, in accordance with the criteria in Table 4.6 above.

4.5.3 Building Design

Dwellings to be constructed in areas above the $L_{Aeq(15hr)}$ 55 dB(A) (day) or the $L_{Aeq(1hr)}$ 60 dB(A) (day) contour shown in Figure 2 should consider building layout design at the design stage to ensure internal noise levels meet the ECRTN guidelines.

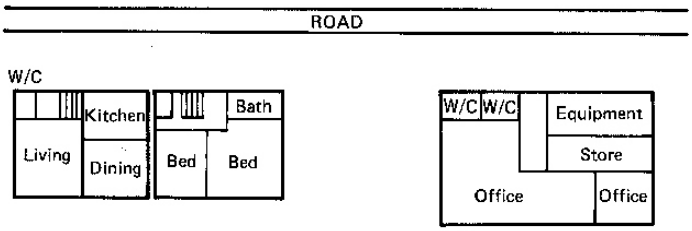
Courtyards and open space areas can be located away from the road, using the building as a buffer to obtain a quiet outdoor environment. Within the building itself, locate less sensitive rooms closest to the road, so that these essentially form a barrier between the road and noise sensitive rooms such as bedrooms and offices. Where possible, locate the building further away from the road, thereby reducing road traffic noise at the facade.

Figure 9 following provides examples of 'self protecting' building design.



(a) Podium provides shielding for most of the tower block

(b) Building shape provides shielding for the windows and the solid wing wall provides a quiet courtyard



(c) Arrangement of rooms to minimise traffic noise problems

Figure 9 – Examples of 'Self-Protecting' Buildings

(Nelson P 1987 p11/16)

5 INDUSTRIAL NOISE INVESTIGATION

5.1 General

The types of noise source considered to be 'industrial' include industrial premises, extractive industries, commercial premises, warehousing facilities and their associated machinery and equipment. For the Minmi Estate, the nearby industrial type noise sources are the Summer Hill Waste Management Facility (SHWMF) and the Cameron Park Business Park. As mentioned in Section 2.3, a site inspection confirmed that Cameron Park Business Park is unlikely to generate noise impact onto the site, and is therefore not further addressed in this report

The SHWMF is located to the east of the Minmi precinct site and to the north of the Link Road North Precinct site and is considered an industrial type noise. The SHWMF bounds part of the northern section of the Minmi Precinct site and is separated from the southern section of the Minmi Precinct site by the Blue Gum Regional Park. The facility is located to the north of the Link Road North Precinct, sharing a small section of the northern boundary (approx 300 metres) and stretching to the north, away from the site.

The SHWMF is currently 11 years into its 20 year life cycle. Figure 10 following shows the layout of the SHWMF. The main waste disposal area is located centrally on the site, and is comprised of 4 active cells. Future cells have been identified and are shown on Figure 10. Waste is also disposed at the open-cut disposal site to the north west of the facility, adjacent to the Minmi Precinct site boundary. It is expected that waste disposal will only occur in this area for the next 2-3 years. Noise emission from the open-cut disposal site is therefore unlikely to impact on the Minmi site.

The site operates Monday to Friday, 7:30am to 5:00pm, and 9:00am to 3:00pm on weekends.

In addition to the existing operations at the SHWMF, it has been proposed by others that a Regional Waste Facility (RWF) will be built on land towards the north eastern corner of the Link Road North Precinct. Details of the proposed RWF (eg. on site activities, location and type of machinery to be used and operating hours) are currently unavailable and therefore noise from the facility cannot be assessed accordingly. Nevertheless, it is expected that the proponent of the RWF will be required to undertake a noise impact assessment to determine the noise from the proposed RWF impacting on nearby existing and future noise sensitive receivers. Therefore, it is expected that noise impacts upon proposed residential properties of the Link Road North Precinct near the RWF site will be investigated as part of the noise impact assessment.

5.2 Noise Criteria

Industrial noise sources are assessed in accordance with the *NSW Industrial Noise Policy* (the "INP", Environment Protection Authority 2000). The assessment procedure in terms of the INP, has two components:

- Controlling intrusive noise impacts in the short term for residences
- Maintaining noise level amenity for particular land uses for residences and other land uses.

The intrusiveness criterion is summarised as follows:

$L_{Aeq} \leq L_{A90}$ background noise level plus 5dB(A)

To determine the background noise levels, long term, unattended noise monitoring was carried out on the Minmi Precinct site at Location M4 (see Section 3.2) which was considered to be representative of the acoustic environment at the proposed residential area near the waste management facility. Based on the noise monitoring carried out, the rating background noise level during the day time (ie when the SHWMF is operational) is $L_{A90(15min)}$ 48dB(A). Therefore, the intrusive criteria for noise impacts from the SHWMF is **$L_{Aeq(15min)}$ 53dB(A)**.

To ensure an acceptable noise level in terms of residential amenity industrial noise sources should not normally exceed the acceptable noise levels specified in Table 2.1 of the policy. The L_{Aeq} noise level recommended in the INP to achieve acceptable residential amenity in suburban areas is **$L_{Aeq(Day)}$ 55dB(A)** during the day time (ie when the SHWMF is operational).

As the intrusive criterion is the stricter of the two criteria, noise impact from the SHWMF will be assessed to this criterion. That is, noise emission from the SHWMF should be limited to **$L_{Aeq(15min)}$ 53dB(A)** at the nearest residential boundary within the Minmi Estate.

5.3 Existing Noise Sources

Noise emission from the SHWMF is mostly generated by the bulldozers, excavators and trucks associated with the waste management process.

To obtain data for noise prediction calculations, noise levels were measured during typical daytime operation of the SHWMF on Thursday 20th December 2007. Two typical scenarios were measured, as follows:

Scenario 1 – Solid Waste Disposal Site

- Six trucks and four bulldozers operating approx 250 metres from noise monitoring location. Reverse alarms and engine noise dominate;
- 2-3 trucks dumping waste approx 250 metres from noise monitoring location. Truck noise less audible than above source; and
- Intermittent trucks using internal roadway approx 50 metres from noise monitoring location.

The measured noise level from Scenario 1 was **$L_{Aeq,15min}$ 61dB(A)**.

Scenario 2 – Open Cut Disposal Site

- 3 trucks and 2 bulldozers operating approx 85 metres from noise monitoring location. Reverse alarms, trucks dumping waste and engine noise dominate; and
- 1 small excavator operating approx 100 metres from noise monitoring location.

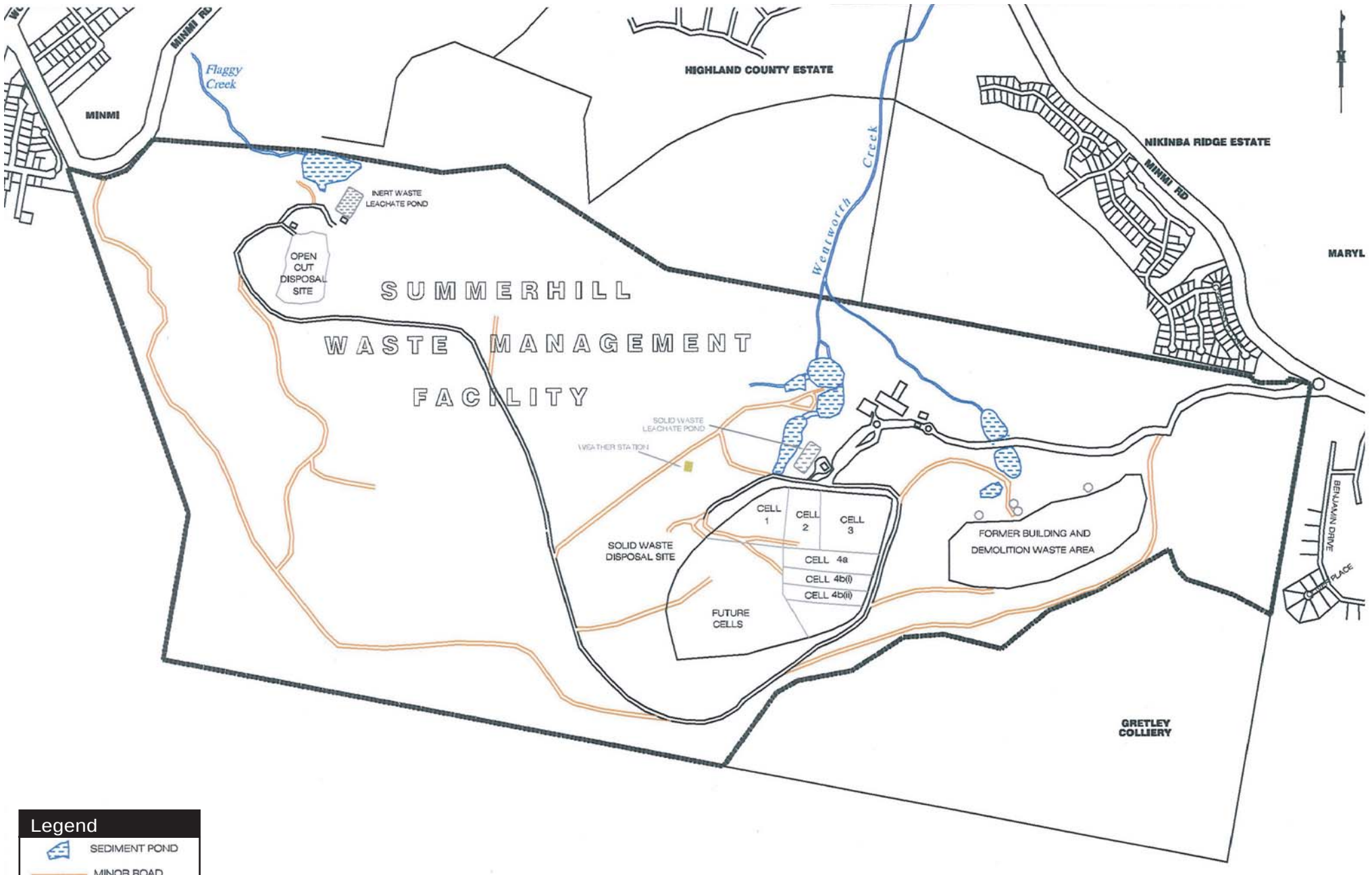
The measured noise level from the Scenario 2 was **$L_{Aeq,15min}$ 61 dB(A)**.

The Minmi Estate site boundary is a minimum distance of approximately 600 metres from the existing Solid Waste Disposal site (including future cells) and 250 metres from the existing Open Cut Disposal site.

Based on distance corrections alone (ie. not taking into account intervening topography) noise emissions from the SHWMF operations were determined to be $L_{Aeq,15min}$ 53 dB(A) from Scenario 1 and $L_{Aeq,15min}$ 52 dB(A) from Scenario 2. This complies with both the intrusive and amenity criteria determined in Section 5.2 above. Provided the hours of operation of the SHWMF do not change (ie there is no introduction of night time operations) and the activities carried out at the facility do not alter significantly from those described above, additional noise mitigation is not required.

5.4 Recommendations

During the detailed design phase it should be confirmed that there has been no change in the activities carried out at the SHWMF and that the hours of operation are unaltered from those outlined in this report.



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Title : Figure 10 - Summer Hill Waste Management Facility - Site Plan Showing Operational Areas and Major Site Features (Source: Newcastle City Coucil)

Project: Coal & Allied - Lower Hunter Lands Development

Scale: 0 100 200 300 400 500

Date : 13/03/08

Ref : TD261-02P10 (rev 0)

6 GO-KART RACEWAY NOISE

6.1 General

The Mount Sugarloaf Kart Raceway is located on the corner of George Booth Drive and Cameron Park Drive, West Wallsend. The raceway is located approximately 1.5km south of the Minmi Precinct site; 1.4km south of the Link Road North Precinct site and 3km west of the Link Road South Precinct site.

The Newcastle Kart Racing Club operates out of Mount Sugarloaf. Karts are permitted to use the track between 8:30am and 5:00pm, Wednesday to Sunday. Practice occurs on the track Wednesday through to Saturday, with racing on Sundays. There is a race meeting about once per month, usually Club Championships. Since the completion of the current race circuit in 1998 the Club has also hosted larger championship meetings, including:

- 2001 AKA National Titles
- 2001 8th Australian Masters Games
- 2003 NSW Senior State Titles
- 2003 Rotax Nationals
- 2004 Premier State Cup Round 2
- 2005 Premier State Cup Final
- 2006 Formula Rotax and Re.Sa National Titles

6.2 Motorsports Noise Criteria

Chapter 152 of the DECC's ENCM provides general noise control guidelines for general motor sport venues. Noise control guidelines are given specifically for: off-road recreational areas, general motor sport including motocross and mini bikes, village grand prix, speedway, drag racing, trials and enduro racing.

The relevant DECC noise criteria for the Mount Sugarloaf Go-Kart Raceway, as presented in the ENCM, are as follows:

'General Motor Sport Including Motocross and Mini Bikes

Operating times:	*10 am to 5 pm for 50 events per year.*
Noise Level Restriction:	*5dB(A) above background at residential boundary (L_{BG} + 10dB(A) for existing venues).'*

As the Go-Kart Raceway is an existing motor sport venue, the appropriate environmental noise restriction is **10dB(A) above the background at residential boundaries.** To limit the potential impact of noise from the raceway to the proposed new residences at the proposed

Minmi Estates, it is recommended that noise from the raceway be limited to **5dB(A) above the background at residential boundaries.**

To determine the background noise levels, long term, unattended noise monitoring was carried out at the Minmi Precinct site at Location M4, which was considered to be representative of the acoustic environment at the proposed residential area, in areas unaffected by road traffic noise. Based on the background noise monitoring carried out, the rating background noise level during the day time (ie when the raceway would be operational) is 48dB(A). Therefore, the design criteria for noise from the Go-Kart Raceway is **53dB(A)**, up to a maximum acceptable level of **58dB(A)**.

6.3 Raceway Noise Sources

Measurement of noise emission from the Mount Sugarloaf Kart Raceway has not been completed as part of this assessment. From discussion with the Newcastle Kart Racing Club and review of the operational requirements under the Australian Karting Association Inc (AKA), it is understood that from 1st January 2003, the maximum permitted noise emission level from a kart must not exceed 100dB(A) when measured at a point 4 metres away with AKA vertical methods (2008 AKA Manual, Chapter 24 p148). This is based on a kart operating under maximum acceleration and at a minimum of 75% of their engine revving range.

At race meetings on a Sunday the track may have up to 24 karts racing at one time at a major event, but more typically there would be 12-15 karts at a typical race meet. On practice there are usually 1-2 karts on the track, with up to 5 karts during busier periods.

Sound Exposure Level (SEL) measurements from our database and library files were used for the purpose of this assessment, taking into consideration the noise limit imposed on the raceway by the AKA. The sound power levels generated by go-kart activities on site as used in the predictive noise modelling for this project are presented in Table 6.1 below.

Table 6.1 – Sound Power Levels From Go-Karting Events (dB re. 1pW)

Noise Source	Overall dB(A)	Octave Band Centre Frequency (Hz) – dB(lin)							
		63	125	250	500	1000	2000	4000	8000
Race Mtg – 24 Go Karts	134	103	110	125	136	120	122	122	116
Race Mtg – 15 Go Karts	132	101	108	123	134	118	120	120	114
Practice – 5 Go Karts	127	96	103	118	129	113	115	115	109
Practice – 2 Go Karts	123	92	99	114	125	109	111	111	105

6.4 Predicted Raceway Noise levels

Calculation of noise from the site was based on the typical and worst-case scenario operations during the assessment period (day only). Noise emissions from go-kart events were calculated to the nearest boundary of each of the Minmi Estate sites. Noise emissions were determined by modelling the noise source, receiver locations, and topographical features of the intervening

area using the ENM (Environmental Noise Model) computer program. The program is endorsed by the EPA and its environmental noise predictions have been verified on many past occasions in the field.

Table 6.2 summarises the predicted noise levels at the nearest boundary of the three Minmi Estate precincts.

Table 6.2 – Predicted Noise Levels from Mt Sugarloaf Kart Raceway, dB(A)

Noise Source	Minmi Precinct	Link Road North Precinct	Link Road South Precinct
Noise Criteria	*53*	*53*	*53*
Race Meeting – 24 Go Karts	45	46	30
Race Meeting – 15 Go Karts	43	44	<30
Practice – 5 Go Karts	38	39	<30
Practice – 2 Go Karts	34	35	<30

Predicted noise levels indicate that noise emission from the Mount Sugarloaf Go Kart facility are well within the noise level restrictions recommended by the DECC in the ENCM, as outlined in Section 6.2 above. Therefore, no noise mitigation treatment to reduce noise levels from the facility is required.

7 AIR CONDITIONING NOISE INVESTIGATION

7.1 General

New residences that form part of the proposed development may install domestic air conditioner units. These units have the potential to generate noise impact to neighbouring residential receivers.

7.2 Noise Criteria

The *Protection of the Environment Operations (Noise Control) Regulation 2000* limits the amount of noise generated in residential areas. Provisions relating to the use of domestic air conditioners aim to minimise the impact from this specific noise source.

Noise generated by domestic air conditioners is limited by Part 52 'Air conditioners' of the *Protection of the Environment Operations (Noise Control) Regulation 2000*. The Regulation states that:

> *'A person must not cause or permit an air conditioner to be used on residential premises in such a manner that it emits noise that can be heard within a habitable room in any other residential premises (regardless of whether any door or window to that room is open):*
>
> *(a) before 8 am or after 10 pm on any Saturday, Sunday or public holiday, or*
>
> *(b) before 7 am or after 10 pm on any other day.'*

There are no specific Council guidelines in relation to noise from air conditioners. Guidance for assessing the intrusiveness of an air conditioner unit is therefore taken from the NSW INP.

The intrusiveness criterion, which is recommended as the applicable criterion between 8am and 10pm on any Saturday, Sunday or public holiday and between 7am and 10pm on any other day, is summarised as follows:

$L_{Aeq} \leq L_{A90}$ background noise level plus 5dB(A)

7.3 Recommendations

Air conditioner units installed at individual residences have the potential to impact on neighbouring residential properties. However, as details for mechanical plant are not available at this stage of the development, the following in-principle noise management measures are provided:

- Acoustic assessment of air conditioning equipment will need to be undertaken as part of the approval process for the air conditioning units to ensure that they shall not exceed the noise limits specified in Section 7.2;

- Mechanical plant noise emission can be controlled by appropriate design and implementation of common engineering methods that may include any or a combination of the following:
  - Procurement of quiet plant;
  - Strategic positioning of plant away from sensitive areas of neighbouring premises (ie not adjacent to neighbouring bedroom windows), maximising the intervening shielding between the plant and the neighbouring premises. For example, incorporation of plant into the front facade of the dwelling (using suitable visual screening) to gain maximum distances between plant and neighbouring residences;
  - Commercially available silencers or acoustic attenuators for air discharge and air intakes of plant;
  - Acoustically lined and lagged ductwork;
  - Acoustic screens and barriers between plant and sensitive neighbouring premises; and/or
  - Partially-enclosed or fully enclosed acoustic enclosures around plant.
- Mechanical plant should have their noise specifications and proposed locations checked prior to their installation on site.

8 CONCLUSION

Renzo Tonin & Associates have completed an investigation of environmental acoustic impacts onto the proposed Minmi Estate. Noise impact to the sites from existing surrounding noise sources and to the existing Minmi Township from future noise sources as a result of the development has been quantified and compared to the noise guidelines set by the NSW DECC.

The noise mitigation recommendations included in this report are in-principle only. The assistance of an acoustic consultant must be sought at the detailed design phase of the project to provide more accurate design advice when there is more detailed information about building type, lot arrangement and traffic flow information available.

The final selected noise mitigation measures will depend on the location and design of dwellings on the site. However, based on the Concept Plan provided by Conics dated 24 October 2008 (ref: 06083-CON3Q), the findings of this study are:

Traffic Noise

- Traffic noise from the F3 Freeway and the Newcastle Link Road is predicted to impact the site. The use of earth mounding or noise walls would reduce the number of residential properties impacted upon by road traffic noise from the F3 Freeway, Newcastle Link Road, Woodford Street, Lenaghans Drive and Minmi Road (south). Use of 3m to 5m high noise walls or earth mounds would generally reduce the number of residences exceeding ECRTN. The use of noise walls higher than those specified above is not considered to be cost effective. Furthermore, given that the noise walls or earth mounds will not protect all residences from road traffic noise, building treatment should be used to reduce internal noise levels at residences that are still exposed to noise levels in excess of the $L_{Aeq(15h)}$ 55 dB(A) day criteria

- Traffic noise from Woodford Street, Lenaghans Drive and Minmi Road South is predicted to impact the site. The use of 3m high earth mounding or noise walls on the Minmi Estate boundaries adjacent to Woodford Street, Lenaghans Drive and Minmi Road South would reduce traffic noise levels. Furthermore, given that the noise walls or earth mounds will not protect all residences from road traffic noise, building treatment should be used to reduce internal noise levels at residences that are still exposed to noise levels in excess of the $L_{Aeq(1h)}$ 60dB(A) day criteria

- Traffic noise impacts upon existing residences within the existing Minmi Township were predicted. Noise walls or earth mounds were not considered to be feasible and as such, building treatment to residences exceeding the relevant criteria should be used to reduce noise to acceptable levels, subject to community consultation.

Industrial Noise

- Industrial noise from the Summer Hill Waste Management Facility is not predicted to impact on the site based on its current configuration and hours of operation.

- Detailed information regarding the proposed Regional Waste Facility is currently unknown and as such an assessment of noise from the proposed facility impacting upon future residential properties of the Link Road North Precinct could not be undertaken. It is expected that the proponent of the facility will be required to undertake a noise impact assessment as part of the environmental assessment for the facility which should consider noise impacts on future residential properties of the Minmi Estate.

Go-Kart Noise

- Noise emission from the Mount Sugarloaf Kart Raceway is not predicted to impact on the site.

Air Conditioner Noise

- Air conditioner units installed at individual residences have the potential to impact on neighbouring residential properties. Acoustic assessment of air conditioning equipment will need to be undertaken as part of the approval process for the air conditioning units to ensure noise impacts from proposed units are accounted for.

APPENDIX A - GLOSSARY OF ACOUSTIC TERMS

The following is a brief description of the technical terms used to describe noise to assist in understanding the technical issues presented.

Adverse Weather — Weather effects that enhance noise (that is, wind and temperature inversions) that occur at a site for a significant period of time (that is, wind occurring more than 30% of the time in any assessment period in any season and/or temperature inversions occurring more than 30% of the nights in winter).

Ambient Noise — The all-encompassing noise associated within a given environment at a given time, usually composed of sound from all sources near and far.

Assessment Period — The period in a day over which assessments are made.

Assessment Point — A point at which noise measurements are taken or estimated. A point at which noise measurements are taken or estimated.

Background Noise — Background noise is the term used to describe the underlying level of noise present in the ambient noise, measured in the absence of the noise under investigation, when extraneous noise is removed. It is described as the average of the minimum noise levels measured on a sound level meter and is measured statistically as the A-weighted noise level exceeded for ninety percent of a sample period. This is represented as the $\mathbf{L_{90}}$ noise level (see below).

Decibel [dB] — The units that sound is measured in. The following are examples of the decibel readings of every day sounds:

0dB The faintest sound we can hear

30dB A quiet library or in a quiet location in the country

45dB Typical office space. Ambience in the city at night

60dB Martin Place at lunch time

70dB The sound of a car passing on the street

80dB Loud music played at home

90dB The sound of a truck passing on the street

100dB The sound of a rock band

115dB Limit of sound permitted in industry

120dB Deafening

dB(A): A-weighted decibels The ear is not as effective in hearing low frequency sounds as it is hearing high frequency sounds. That is, low frequency sounds of the same dB level are not heard as loud as high frequency sounds. The sound level meter replicates the human response of the ear by using an electronic filter which is called the "A" filter. A sound level measured with this filter switched on is denoted as dB(A). Practically all noise is measured using the A filter.

Frequency Frequency is synonymous to pitch. Sounds have a pitch which is peculiar to the nature of the sound generator. For example, the sound of a tiny bell has a high pitch and the sound of a bass drum has a low pitch. Frequency or pitch can be measured on a scale in units of Hertz or Hz.

Impulsive noise Having a high peak of short duration or a sequence of such peaks. A sequence of impulses in rapid succession is termed repetitive impulsive noise.

Intermittent noise The level suddenly drops to that of the background noise several times during the period of observation. The time during which the noise remains at levels different from that of the ambient is one second or more.

L_{max} The maximum sound pressure level measured over a given period.

L_{min} The minimum sound pressure level measured over a given period.

L_1 The sound pressure level that is exceeded for 1% of the time for which the given sound is measured.

L_{10} The sound pressure level that is exceeded for 10% of the time for which the given sound is measured.

L_{90} The level of noise exceeded for 90% of the time. The bottom 10% of the sample is the L_{90} noise level expressed in units of dB(A).

L_{eq}	The "equivalent noise level" is the summation of noise events and integrated over a selected period of time.
Reflection	Sound wave changed in direction of propagation due to a solid object obscuring its path.
SEL	Sound Exposure Level (SEL) is the constant sound level which, if maintained for a period of 1 second would have the same acoustic energy as the measured noise event. SEL noise measurements are useful as they can be converted to obtain Leq sound levels over any period of time and can be used for predicting noise at various locations.
Sound	A fluctuation of air pressure which is propagated as a wave through air.
Sound Absorption	The ability of a material to absorb sound energy through its conversion into thermal energy.
Sound Level Meter	An instrument consisting of a microphone, amplifier and indicating device, having a declared performance and designed to measure sound pressure levels.
Sound Pressure Level	The level of noise, usually expressed in decibels, as measured by a standard sound level meter with a microphone.
Sound Power Level	Ten times the logarithm to the base 10 of the ratio of the sound power of the source to the reference sound power.
Tonal noise	Containing a prominent frequency and characterised by a definite pitch.

APPENDIX B - NOISE MONITORING METHODOLOGY

B.1 Noise Monitoring Equipment

All long term noise monitoring was conducted using RTA Technology noise loggers. The noise monitoring equipment used here complies with Australian Standard 1259.2-1990 “Acoustics - Sound Level Meters” and is designated as a Type 2 instrument suitable for field use.

A noise monitor consists of a sound level meter and a computer housed in a weather resistant enclosure. Ambient noise levels were recorded at a rate of 10 samples per second. Every 15 minutes, the data is processed statistically and stored in memory. The equipment was calibrated prior and subsequent to the measurement period using a Bruel & Kjaer Type 4230 calibrator. No significant drift in calibration was observed.

The equipment used for the short term, attended noise measurements was a Brüel & Kjær Type 2250 precision sound level analyser. Statistical noise levels were acquired in both overall and octave band frequencies. This instrument complies with Australian Standard 1259.2-1990 “Acoustics - Sound Level Meters – Part 2: Integrating - averaging” and is designated as Type 1 instrument having accuracy suitable for field and laboratory use.

The sound level analyser was calibrated prior and subsequent to the measurements using a Bruel & Kjaer Type 4231 calibrator. No significant drift in calibration was observed.

B.2 Meteorology during Monitoring

Measurements affected by extraneous noise, wind (greater than 5m/s) or rain were excluded from the recorded data in accordance with the INP. The Bureau of Meteorology provided meteorological data, which is considered representative of the site, for the duration of the noise monitoring period.

B.3 Noise vs Time Graphs

Noise almost always varies with time. Noise environments can be described using various descriptors to show how a noise ranges about a level. In this report, noise values measured or referred to include the L_{10}, L_{90}, and L_{eq} levels. The statistical descriptors L_{10} and L_{90} measure the noise level exceeded for 10% and 90% of the sample measurement time. The L_{eq} level is the equivalent continuous noise level or the level averaged on an equal energy basis. Measurement sample periods are usually ten to fifteen minutes. The Noise -vs- Time graphs representing measured noise levels at the two noise monitoring locations in Appendix C illustrate these concepts.

Noise levels are commonly measured in units of A-weighted decibels or dB(A). The "A-weighting" refers to standardised amplitude versus frequency curve used to "weight" sound measurements to represent the response of the human ear. The human ear is less sensitive to

low pitch sound than it is to high pitch sound. Overall A-weighted measurements quantify sound with a single number to represent how people subjectively hear different frequencies at different levels.

Background noise is the term used to describe the noise measured in the absence of the noise under investigation. It is described as the average of the minimum noise levels measured on a sound level meter and is measured statistically as the A-weighted noise level exceeded for ninety percent of a sample time period. This is represented as the $\mathbf{L_{90}}$ noise level.

APPENDIX C - LONG TERM NOISE MONITORING RESULTS

Renzo Tonin & Associates

noise logger results

Location M1 - Link Road North

BACKGROUND & AMBIENT NOISE MONITORING RESULTS
NSW DEC's 'INDUSTRIAL NOISE POLICY', 2000

Day	L_{A90} Background Noise Levels[5]			L_{Aeq} Ambient Noise Levels		
	Day	Evening	Night	Day	Evening	Night
Monday-10-December-2007	-	40	-	-	58	-
Tuesday-11-December-2007	-	-	-	-	-	-
Wednesday-12-December-2007	-	-	-	-	-	-
Thursday-13-December-2007	-	-	30	-	-	52
Friday-14-December-2007	52	42	30	60	57	50
Saturday-15-December-2007	50	41	30	59	58	48
Sunday-16-December-2007	50	-	-	59	-	-
Monday-17-December-2007	-	-	-	-	-	-
Tuesday-18-December-2007	52	40	-	59	56	-
Wednesday-19-December-2007	-	41	31	-	57	51
Representative Level	**51**	**41**	**30**	**59**	**57**	**51**

Notes:

1. Day is taken to be 7:00am to 6:00pm
2. Evening is taken to be 6:00pm to 10:00pm.
3. Night is taken to be the remaining periods.
4. Partial day's monitoring
5. Assessment Background Level (ABL)
6. Rating Background Level (RBL) for L90 and logarithmic average for Leq

TRAFFIC NOISE MONITORING RESULTS
NSW DEC 'ENVIRONMENTAL CRITERIA FOR ROAD TRAFFIC NOISE', 1999

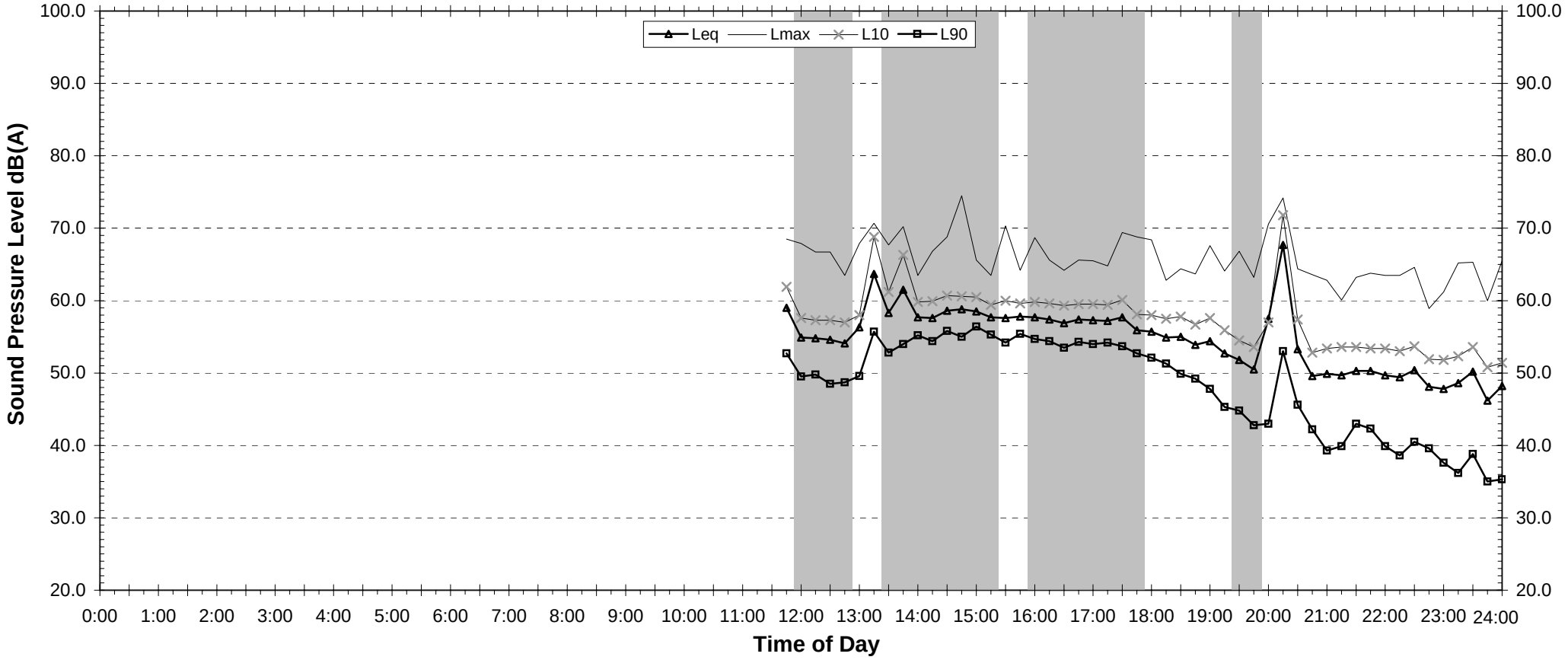
Day	L_{Aeq} Noise Levels		$L_{Aeq\ 1hr}$ Noise Levels			
	Day	Night	Day - Up	Day - Low	Night - Up	Night - Low
Monday-10-December-2007	61	50	66	53	52	48
Tuesday-11-December-2007	61	56	64	53	66	48
Wednesday-12-December-2007	59	54	60	58	60	49
Thursday-13-December-2007	63	55	66	57	60	49
Friday-14-December-2007	62	53	66	55	56	47
Saturday-15-December-2007	61	50	66	55	53	45
Sunday-16-December-2007	61	62	66	55	62	62
Monday-17-December-2007	63	57	66	61	61	51
Tuesday-18-December-2007	61	54	64	56	59	48
Wednesday-19-December-2007	62	54	66	54	59	48
Thursday-20-December-2007	62	-	63	61	-	-
Representative Weekday	**62**	**55**	**65**	**57**	**61**	**49**
Representative Weekend	**61**	**59**	**66**	**55**	**59**	**59**
Representative Week	**62**	**56**	**65**	**57**	**60**	**53**

20 YEARS
1982-2002 ACOUSTIC ENGINEERING EXCELLENCE

EXISTING AMBIENT NOISE LEVELS

Location M1 - Link Road North

Monday, 10 December 2007



NSW Industrial Noise Policy (Free Field)			
Descriptor	Day	Evening	Night[2]
	7am-6pm	6pm-10pm	10pm-7am
L_{90}	-	39.9	-
Leq (see note 3)	-	57.9	-

NOTES:

1. Shaded periods denote measurements adversely affected by rain, wind or extraneous noise - data in these periods are excluded from calculations.

2. "Night" relates to period from 10pm on this graph to 7am on the following graph.

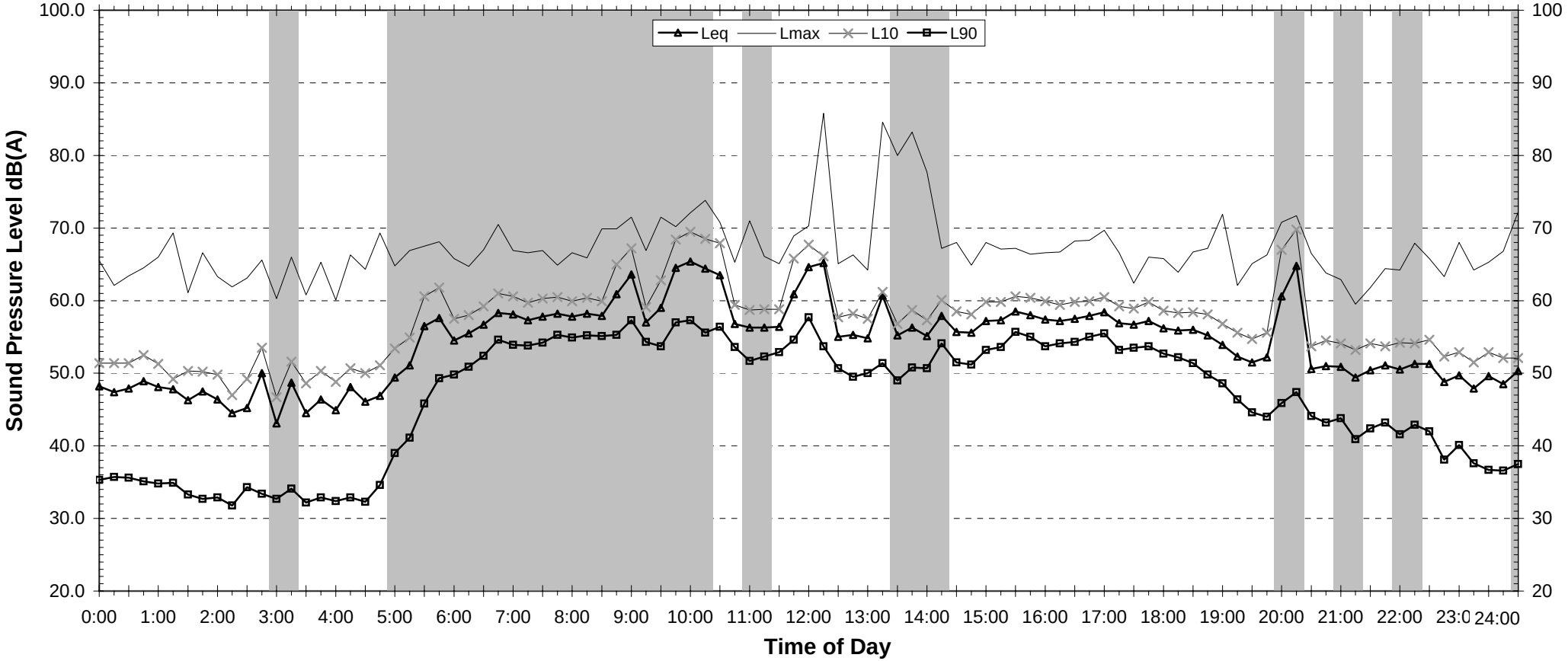
3. Graphed data measured in free-field; tabulated results facade corrected

4. Night time Lmax values are shown only where Lmax > 65dB(A) and where Lmax-Leq ≥ 15dB(A)

NSW ECRTN Policy (1m from facade) (see note3)		
Descriptor	Day	Night[2]
	7am-10pm	10pm-7am
$L_{eq\ 15\ hr}$ and $L_{eq\ 9\ hr}$	60.9	50.2
$L_{eq\ 1hr}$ upper 10 percentile	66.2	51.6
$L_{eq\ 1hr}$ lower 10 percentile	52.5	47.8

Night Time Maximum Noise Levels (see note 4)			
Lmax (Range)	65.3	to	69.3
Lmax - Leq (Range)	15.5	to	22.2

EXISTING AMBIENT NOISE LEVELS
Location M1 - Link Road North
Tuesday, 11 December 2007



NSW Industrial Noise Policy (Free Field)			
Descriptor	Day	Evening	Night[2]
	7am-6pm	6pm-10pm	10pm-7am
L_{90}	-	-	-
Leq (see note 3)	-	-	-

NOTES:

1. Shaded periods denote measurements adversely affected by rain, wind or extraneous noise - data in these periods are excluded from calculations.

2. "Night" relates to period from 10pm on this graph to 7am on the following graph.

3. Graphed data measured in free-field; tabulated results facade corrected

4. Night time Lmax values are shown only where Lmax > 65dB(A) and where Lmax-Leq ≥ 15dB(A)

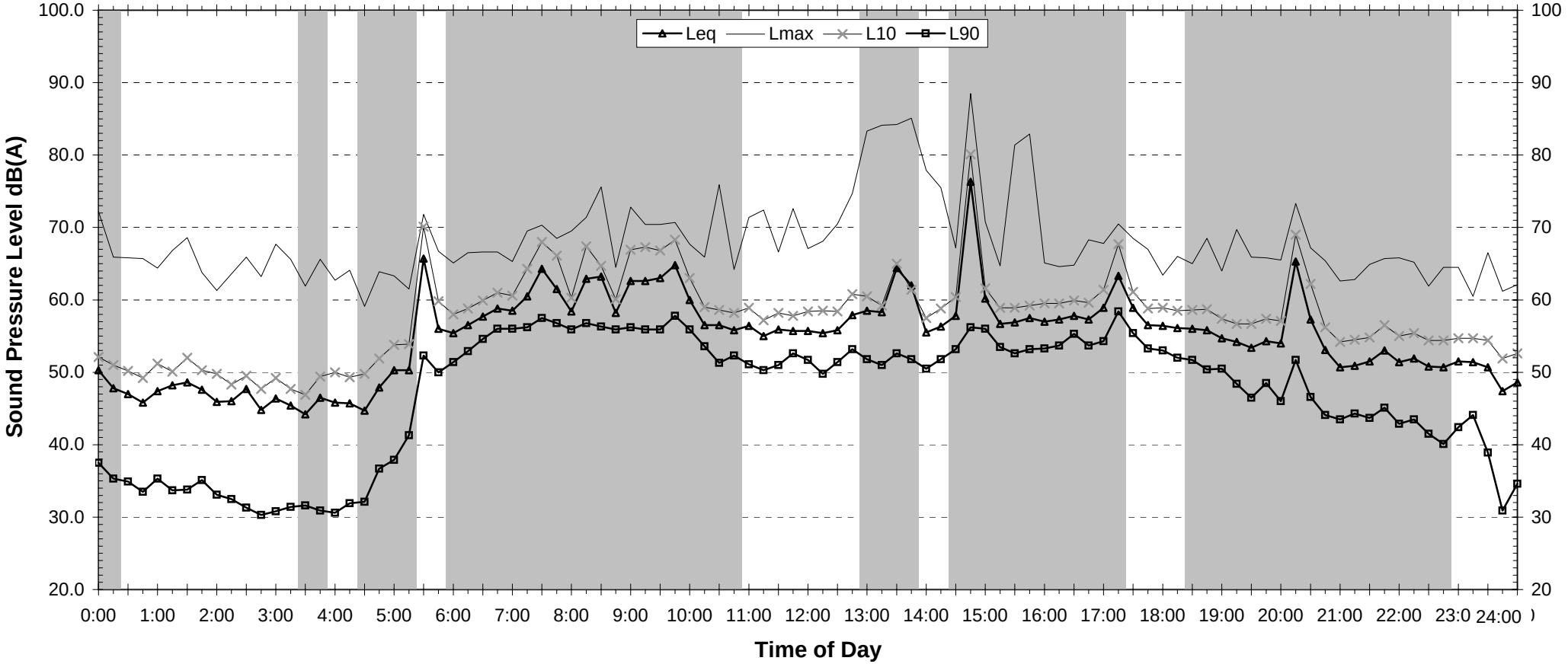
NSW ECRTN Policy (1m from facade) (see note3)		
Descriptor	Day	Night[2]
	7am-10pm	10pm-7am
$L_{eq\ 15\ hr}$ and $L_{eq\ 9\ hr}$	60.6	56.3
$L_{eq\ 1hr}$ upper 10 percentile	64.2	65.6
$L_{eq\ 1hr}$ lower 10 percentile	53.3	48.1

Night Time Maximum Noise Levels (see note 4)			
Lmax (Range)	65.6	to	68.6
Lmax - Leq (Range)	17.9	to	21.4

EXISTING AMBIENT NOISE LEVELS

Location M1 - Link Road North

Wednesday, 12 December 2007



NSW Industrial Noise Policy (Free Field)			
Descriptor	Day	Evening	Night[2]
	7am-6pm	6pm-10pm	10pm-7am
L_{90}	-	-	-
Leq (see note 3)	-	-	-

NOTES:

1. Shaded periods denote measurements adversely affected by rain, wind or extraneous noise - data in these periods are excluded from calculations.

2. "Night" relates to period from 10pm on this graph to 7am on the following graph.

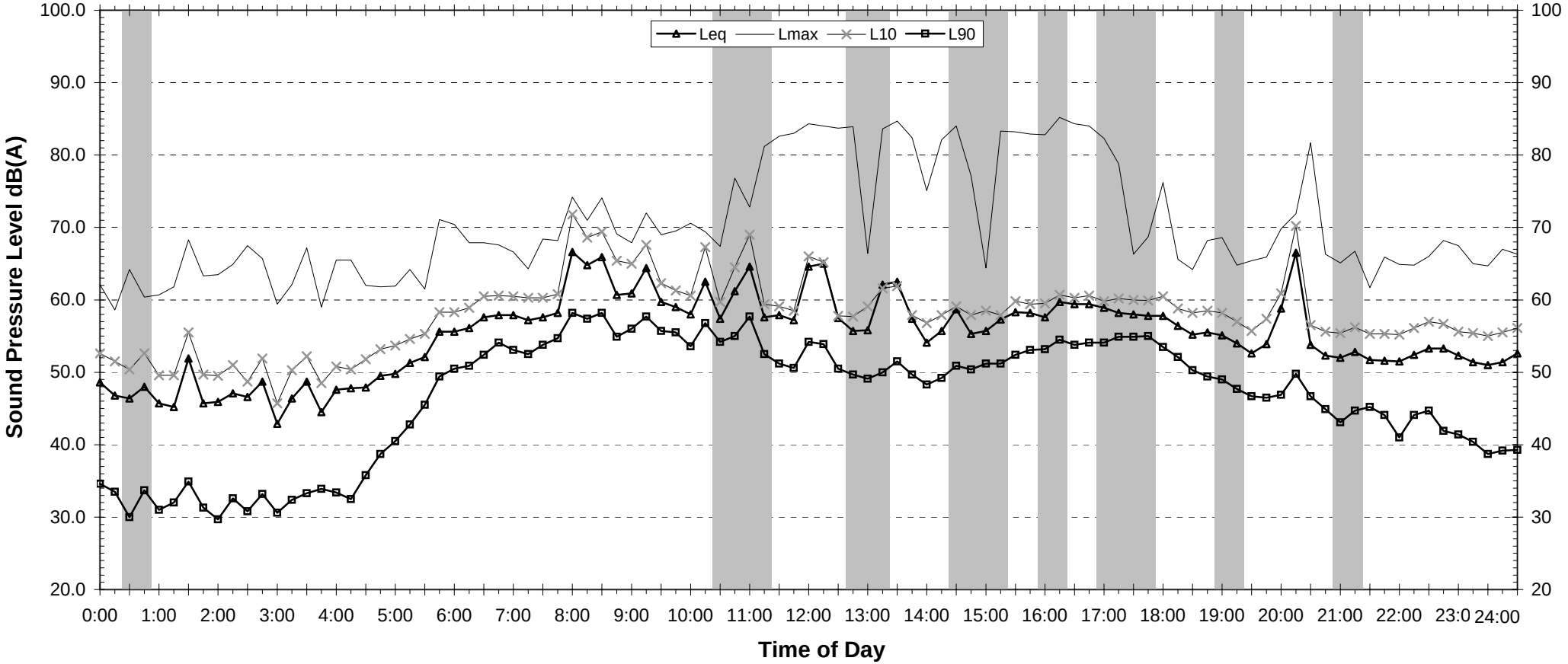
3. Graphed data measured in free-field; tabulated results facade corrected

4. Night time Lmax values are shown only where Lmax > 65dB(A) and where Lmax-Leq ≥ 15dB(A)

NSW ECRTN Policy (1m from facade) (see note3)		
Descriptor	Day	Night[2]
	7am-10pm	10pm-7am
$L_{eq\ 15\ hr}$ and $L_{eq\ 9\ hr}$	58.9	54.4
$L_{eq\ 1hr}$ upper 10 percentile	59.9	59.9
$L_{eq\ 1hr}$ lower 10 percentile	58.0	48.8

Night Time Maximum Noise Levels (see note 4)			
Lmax (Range)	65.5	to	71.1
Lmax - Leq (Range)	16.7	to	20.7

EXISTING AMBIENT NOISE LEVELS
Location M1 - Link Road North
Thursday, 13 December 2007



NSW Industrial Noise Policy (Free Field)			
Descriptor	Day	Evening	Night[2]
	7am-6pm	6pm-10pm	10pm-7am
L_{90}	-	-	30.3
Leq (see note 3)	-	-	52.4

NOTES:

1. Shaded periods denote measurements adversely affected by rain, wind or extraneous noise - data in these periods are excluded from calculations.

2. "Night" relates to period from 10pm on this graph to 7am on the following graph.

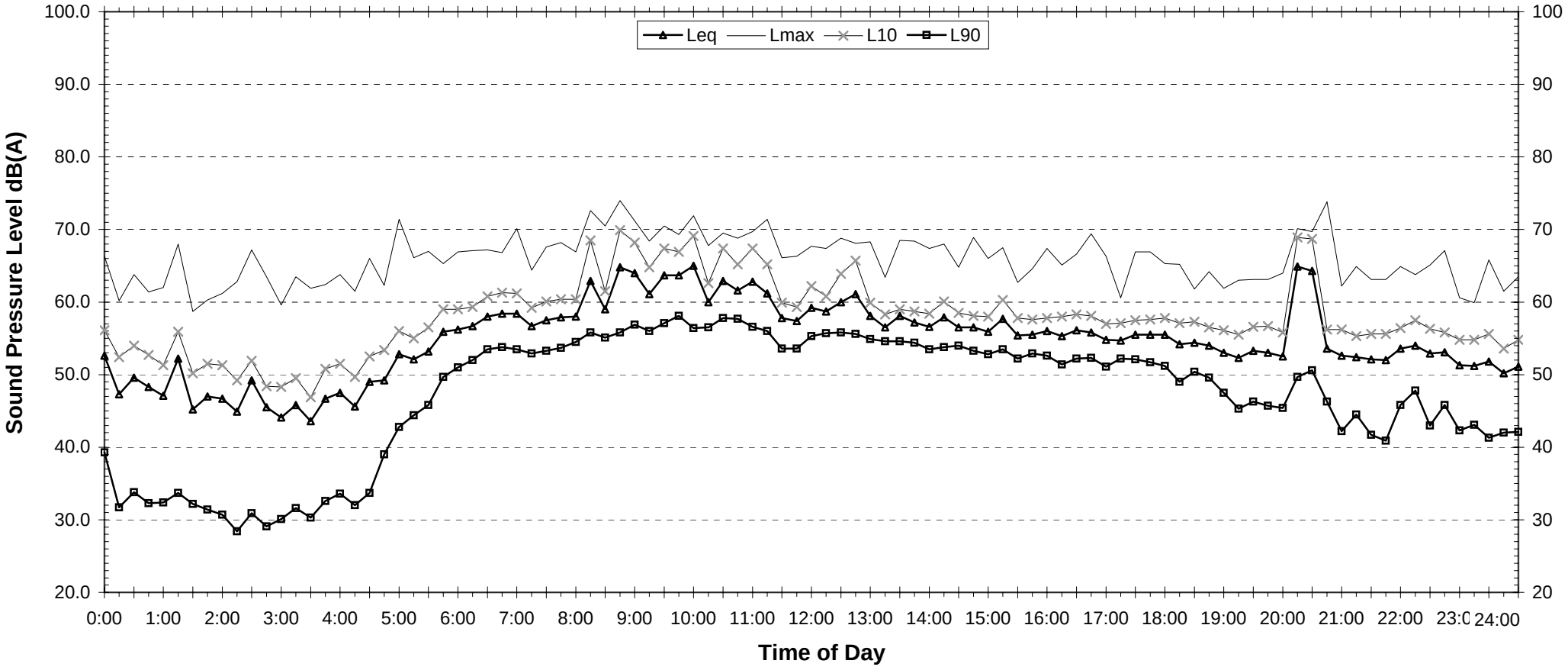
3. Graphed data measured in free-field; tabulated results facade corrected

4. Night time Lmax values are shown only where Lmax > 65dB(A) and where Lmax-Leq ≥ 15dB(A)

NSW ECRTN Policy (1m from facade) (see note3)		
Descriptor	Day	Night[2]
	7am-10pm	10pm-7am
$L_{eq\ 15\ hr}$ and $L_{eq\ 9\ hr}$	63.1	54.9
$L_{eq\ 1hr}$ upper 10 percentile	65.7	60.4
$L_{eq\ 1hr}$ lower 10 percentile	56.6	48.6

Night Time Maximum Noise Levels (see note 4)			
Lmax (Range)	67.0	to	71.4
Lmax - Leq (Range)	15.3	to	21.5

EXISTING AMBIENT NOISE LEVELS
Location M1 - Link Road North
Friday, 14 December 2007



NSW Industrial Noise Policy (Free Field)			
Descriptor	Day	Evening	Night[2]
	7am-6pm	6pm-10pm	10pm-7am
L_{90}	52.1	41.7	30.3
Leq (see note 3)	59.7	57.3	50.4

NOTES:

1. Shaded periods denote measurements adversely affected by rain, wind or extraneous noise - data in these periods are excluded from calculations.

2. "Night" relates to period from 10pm on this graph to 7am on the following graph.

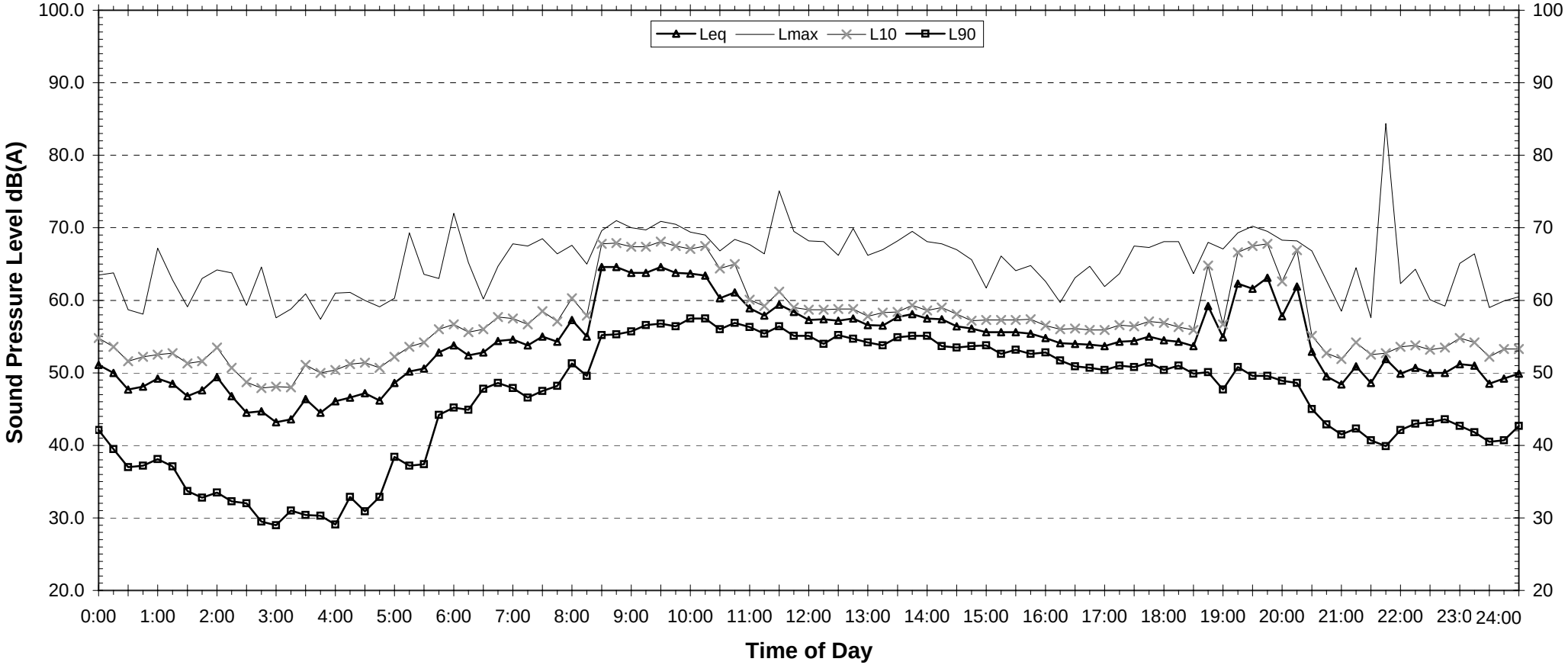
3. Graphed data measured in free-field; tabulated results facade corrected

4. Night time Lmax values are shown only where Lmax > 65dB(A) and where Lmax-Leq ≥ 15dB(A)

NSW ECRTN Policy (1m from facade) (see note3)		
Descriptor	Day	Night[2]
	7am-10pm	10pm-7am
$L_{eq\ 15\ hr}$ and $L_{eq\ 9\ hr}$	61.7	52.9
$L_{eq\ 1hr}$ upper 10 percentile	65.9	56.2
$L_{eq\ 1hr}$ lower 10 percentile	55.2	47.5

Night Time Maximum Noise Levels (see note 4)			
Lmax (Range)	67.2	to	72.0
Lmax - Leq (Range)	15.7	to	19.9

EXISTING AMBIENT NOISE LEVELS
Location M1 - Link Road North
Saturday, 15 December 2007



NSW Industrial Noise Policy (Free Field)			
Descriptor	Day	Evening	Night[2]
	7am-6pm	6pm-10pm	10pm-7am
L_{90}	50.4	40.7	30.4
Leq (see note 3)	59.3	57.9	47.7

NOTES:

1. Shaded periods denote measurements adversely affected by rain, wind or extraneous noise - data in these periods are excluded from calculations.

2. "Night" relates to period from 10pm on this graph to 7am on the following graph.

3. Graphed data measured in free-field; tabulated results facade corrected

4. Night time Lmax values are shown only where Lmax > 65dB(A) and where Lmax-Leq ≥ 15dB(A)

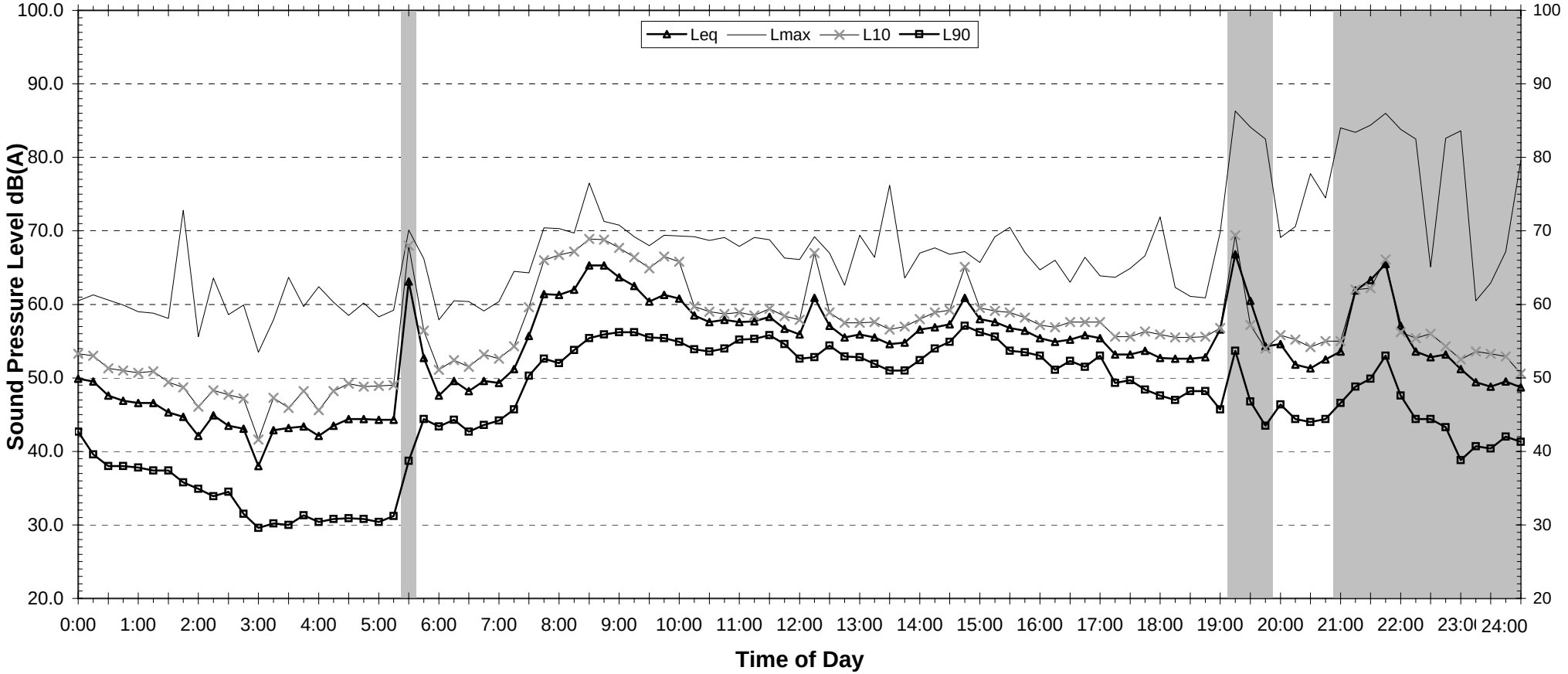
NSW ECRTN Policy (1m from facade) (see note3)		
Descriptor	Day	Night[2]
	7am-10pm	10pm-7am
$L_{eq\ 15\ hr}$ and $L_{eq\ 9\ hr}$	61.5	50.2
$L_{eq\ 1hr}$ upper 10 percentile	66.1	53.0
$L_{eq\ 1hr}$ lower 10 percentile	55.0	45.4

Night Time Maximum Noise Levels (see note 4)			
Lmax (Range)	66.2	to	72.8
Lmax - Leq (Range)	16.1	to	27.8

EXISTING AMBIENT NOISE LEVELS

Location M1 - Link Road North

Sunday, 16 December 2007



NSW Industrial Noise Policy (Free Field)			
Descriptor	Day	Evening	Night[2]
	7am-6pm	6pm-10pm	10pm-7am
L_{90}	49.7	-	-
Leq (see note 3)	59.0	-	-

NOTES:

1. Shaded periods denote measurements adversely affected by rain, wind or extraneous noise - data in these periods are excluded from calculations.

2. "Night" relates to period from 10pm on this graph to 7am on the following graph.

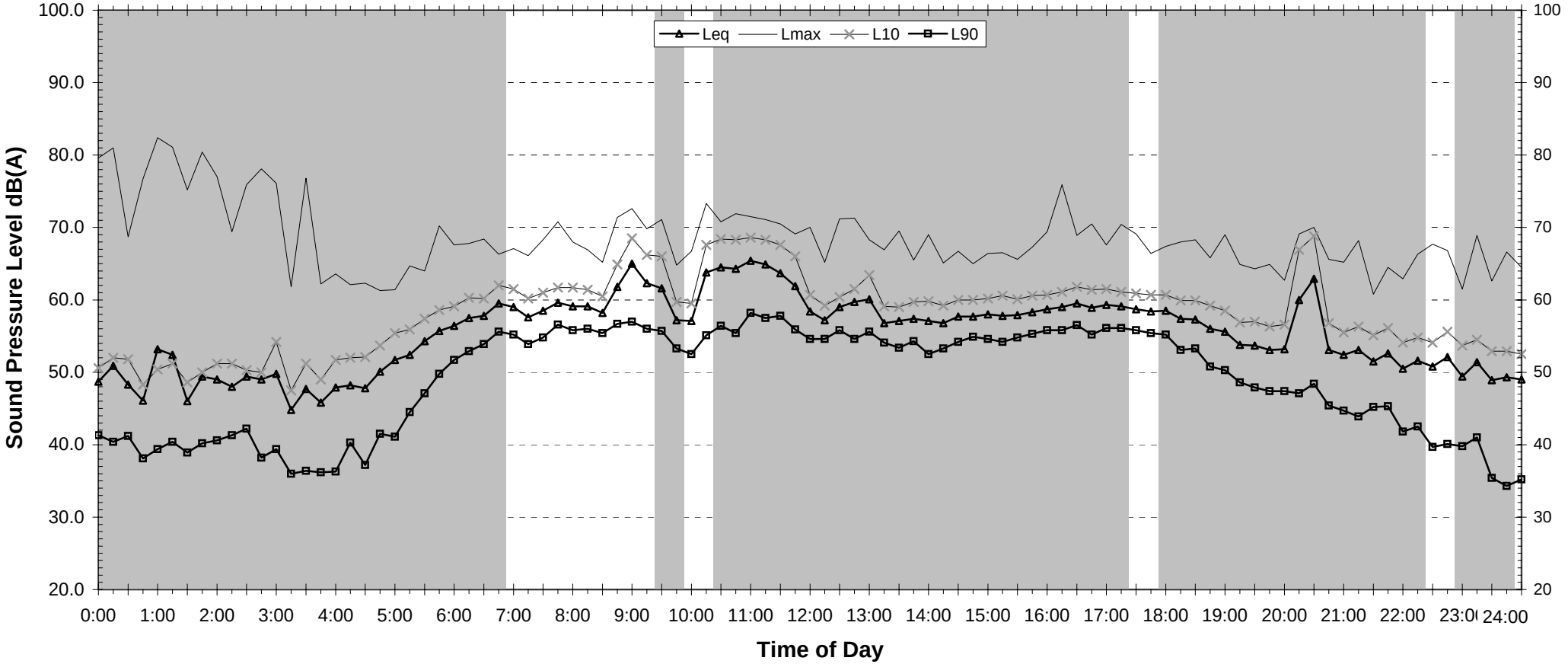
3. Graphed data measured in free-field; tabulated results facade corrected

4. Night time Lmax values are shown only where Lmax > 65dB(A) and where Lmax-Leq ≥ 15dB(A)

NSW ECRTN Policy (1m from facade) (see note3)		
Descriptor	Day	Night[2]
	7am-10pm	10pm-7am
$L_{eq\ 15\ hr}$ and $L_{eq\ 9\ hr}$	61.0	61.5
$L_{eq\ 1hr}$ upper 10 percentile	65.8	61.5
$L_{eq\ 1hr}$ lower 10 percentile	55.0	61.5

Night Time Maximum Noise Levels (see note 4)			
Lmax (Range)	-	to	-
Lmax - Leq (Range)	-	to	-

EXISTING AMBIENT NOISE LEVELS
Location M1 - Link Road North
Monday, 17 December 2007



NSW Industrial Noise Policy (Free Field)			
Descriptor	Day	Evening	Night[2]
	7am-6pm	6pm-10pm	10pm-7am
L_{90}	-	-	-
Leq (see note 3)	-	-	-

NOTES:

1. Shaded periods denote measurements adversely affected by rain, wind or extraneous noise - data in these periods are excluded from calculations.

2. "Night" relates to period from 10pm on this graph to 7am on the following graph.

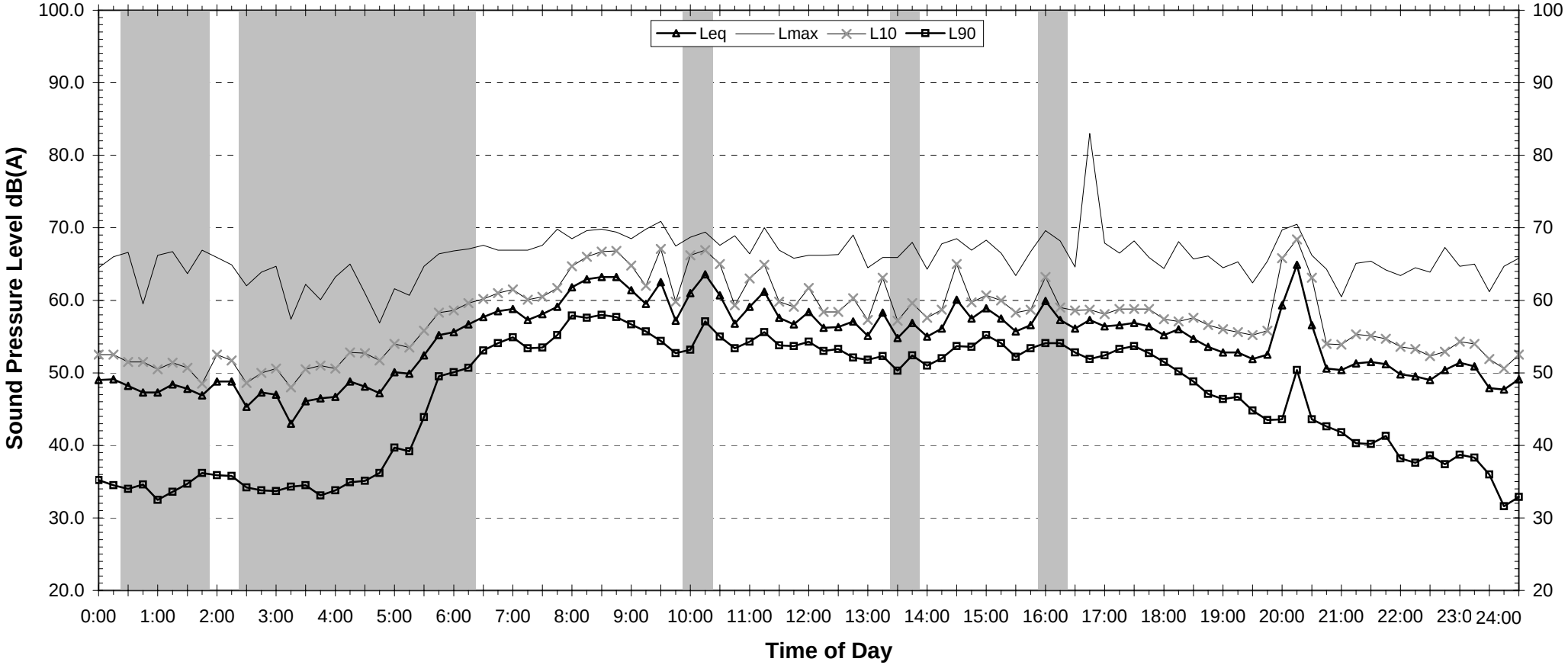
3. Graphed data measured in free-field; tabulated results facade corrected

4. Night time Lmax values are shown only where Lmax > 65dB(A) and where Lmax-Leq ≥ 15dB(A)

NSW ECRTN Policy (1m from facade) (see note3)		
Descriptor	Day	Night[2]
	7am-10pm	10pm-7am
$L_{eq\ 15\ hr}$ and $L_{eq\ 9\ hr}$	63.2	57.2
$L_{eq\ 1hr}$ upper 10 percentile	66.3	60.9
$L_{eq\ 1hr}$ lower 10 percentile	61.1	51.3

Night Time Maximum Noise Levels (see note 4)			
Lmax (Range)	65.9	to	67.7
Lmax - Leq (Range)	15.5	to	17.1

EXISTING AMBIENT NOISE LEVELS
Location M1 - Link Road North
Tuesday, 18 December 2007



NSW Industrial Noise Policy (Free Field)			
Descriptor	Day	Evening	Night[2]
	7am-6pm	6pm-10pm	10pm-7am
L_{90}	51.9	40.2	-
Leq (see note 3)	58.9	56.3	-

NOTES:

1. Shaded periods denote measurements adversely affected by rain, wind or extraneous noise - data in these periods are excluded from calculations.

2. "Night" relates to period from 10pm on this graph to 7am on the following graph.

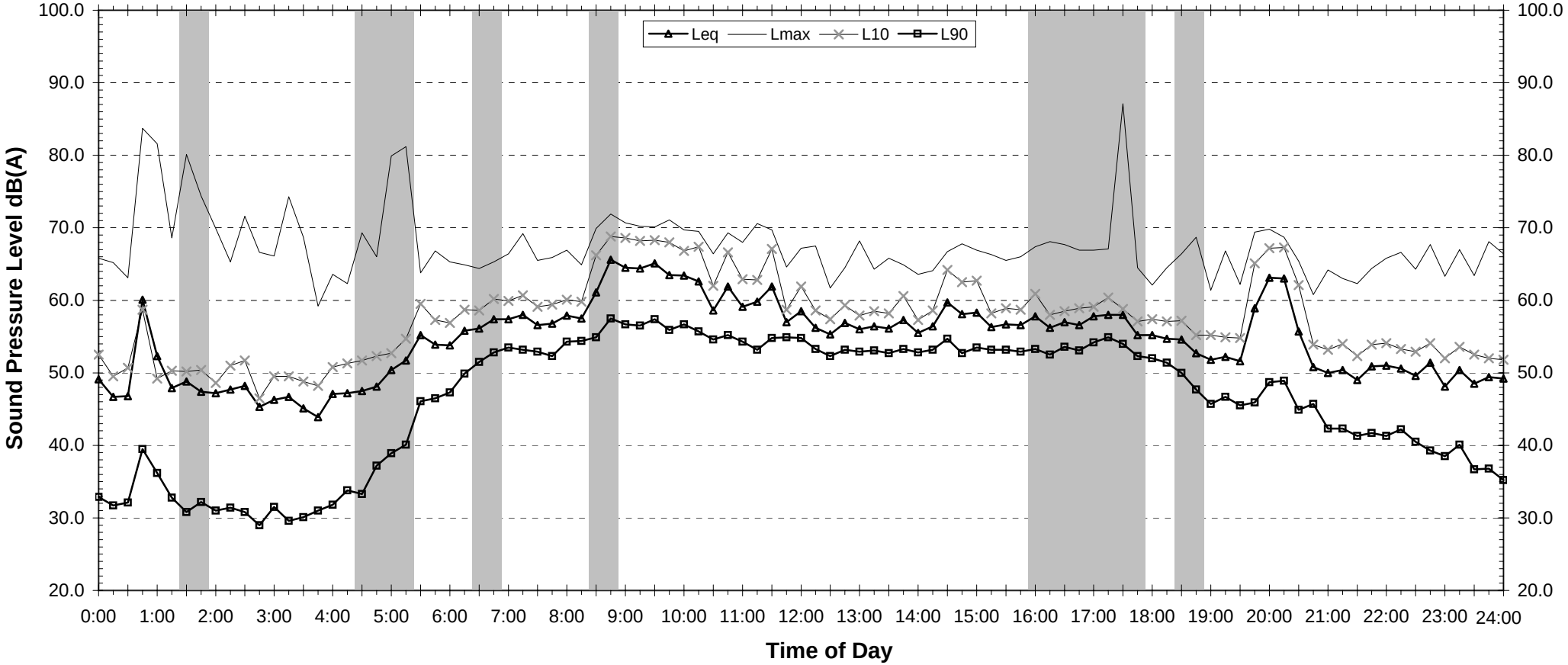
3. Graphed data measured in free-field; tabulated results facade corrected

4. Night time Lmax values are shown only where Lmax > 65dB(A) and where Lmax-Leq ≥ 15dB(A)

NSW ECRTN Policy (1m from facade) (see note3)		
Descriptor	Day	Night[2]
	7am-10pm	10pm-7am
$L_{eq\ 15\ hr}$ and $L_{eq\ 9\ hr}$	60.8	54.4
$L_{eq\ 1hr}$ upper 10 percentile	64.2	59.2
$L_{eq\ 1hr}$ lower 10 percentile	55.6	48.4

Night Time Maximum Noise Levels (see note 4)			
Lmax (Range)	65.8	to	83.7
Lmax - Leq (Range)	15.1	to	28.6

EXISTING AMBIENT NOISE LEVELS
Location M1 - Link Road North
Wednesday, 19 December 2007



NSW Industrial Noise Policy (Free Field)			
Descriptor	Day	Evening	Night[2]
	7am-6pm	6pm-10pm	10pm-7am
L_{90}	-	41.3	30.9
Leq (see note 3)	-	56.7	51.3

NOTES:

1. Shaded periods denote measurements adversely affected by rain, wind or extraneous noise - data in these periods are excluded from calculations.

2. "Night" relates to period from 10pm on this graph to 7am on the following graph.

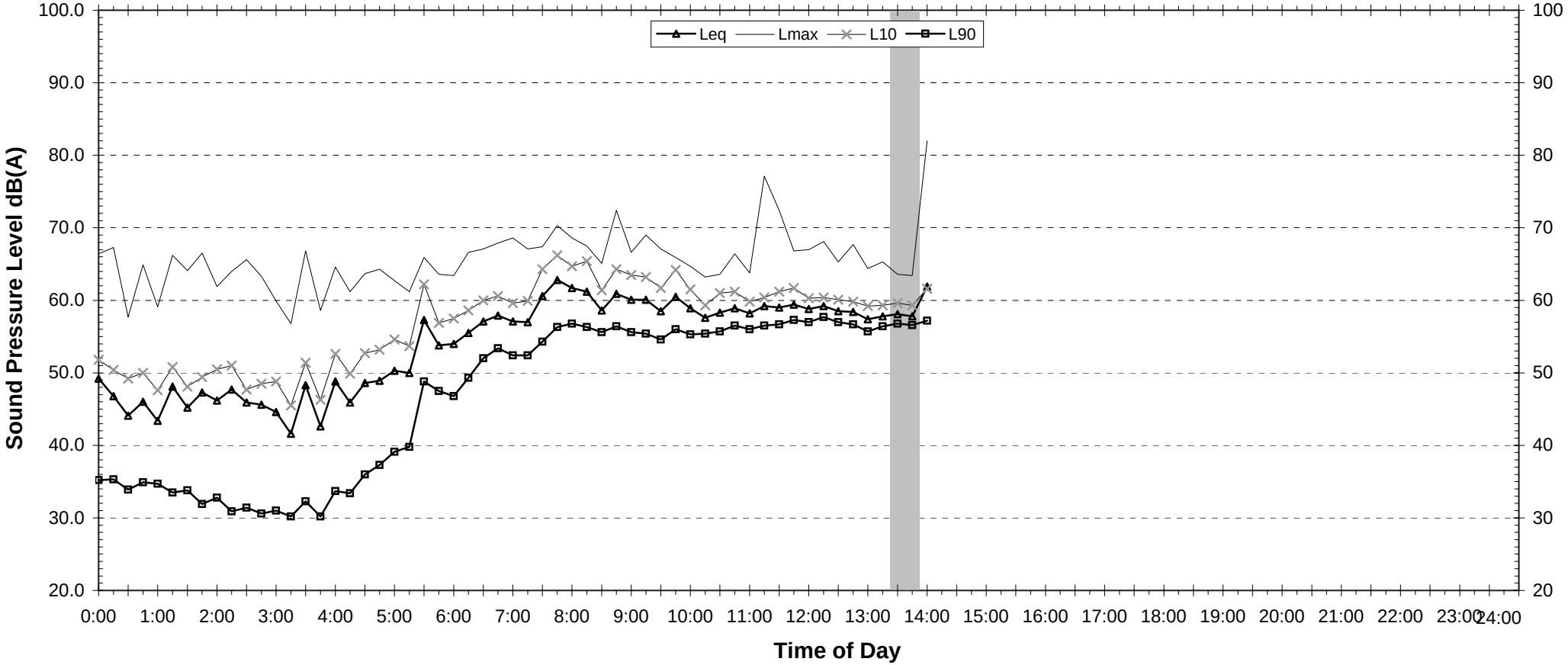
3. Graphed data measured in free-field; tabulated results facade corrected

4. Night time Lmax values are shown only where Lmax > 65dB(A) and where Lmax-Leq ≥ 15dB(A)

NSW ECRTN Policy (1m from facade) (see note3)		
Descriptor	Day	Night[2]
	7am-10pm	10pm-7am
$L_{eq\ 15\ hr}$ and $L_{eq\ 9\ hr}$	61.6	53.8
$L_{eq\ 1hr}$ upper 10 percentile	66.0	59.5
$L_{eq\ 1hr}$ lower 10 percentile	54.4	47.8

Night Time Maximum Noise Levels (see note 4)			
Lmax (Range)	65.6	to	68.1
Lmax - Leq (Range)	15.6	to	22.0

EXISTING AMBIENT NOISE LEVELS
Location M1 - Link Road North
Thursday, 20 December 2007



NSW Industrial Noise Policy (Free Field)			
Descriptor	Day	Evening	Night[2]
	7am-6pm	6pm-10pm	10pm-7am
L_{90}	-	-	-
Leq (see note 3)	-	-	-

NOTES:

1. Shaded periods denote measurements adversely affected by rain, wind or extraneous noise - data in these periods are excluded from calculations.

2. "Night" relates to period from 10pm on this graph to 7am on the following graph.

3. Graphed data measured in free-field; tabulated results facade corrected

4. Night time Lmax values are shown only where Lmax > 65dB(A) and where Lmax-Leq ≥ 15dB(A)

NSW ECRTN Policy (1m from facade) (see note3)		
Descriptor	Day	Night[2]
	7am-10pm	10pm-7am
$L_{eq\ 15\ hr}$ and $L_{eq\ 9\ hr}$	62.1	-
$L_{eq\ 1hr}$ upper 10 percentile	63.5	-
$L_{eq\ 1hr}$ lower 10 percentile	60.8	-

Night Time Maximum Noise Levels (see note 4)			
Lmax (Range)	-	to	-
Lmax - Leq (Range)	-	to	-

Renzo Tonin & Associates

noise logger results

Location M2 - Link Rd South

BACKGROUND & AMBIENT NOISE MONITORING RESULTS
NSW DEC's 'INDUSTRIAL NOISE POLICY', 2000

Day	L_{A90} Background Noise Levels[5]			L_{Aeq} Ambient Noise Levels		
	Day	Evening	Night	Day	Evening	Night
Monday-10-December-2007	-	46	-	-	65	-
Tuesday-11-December-2007	-	-	-	-	-	-
Wednesday-12-December-2007	-	-	-	-	-	-
Thursday-13-December-2007	-	-	35	-	-	64
Friday-14-December-2007	60	52	34	68	66	62
Saturday-15-December-2007	55	51	40	67	65	60
Sunday-16-December-2007	56	-	-	66	-	-
Monday-17-December-2007	-	-	-	-	-	-
Tuesday-18-December-2007	56	50	-	67	65	-
Wednesday-19-December-2007	-	50	37	-	65	63
Representative Level	**56**	**50**	**36**	**67**	**65**	**62**

Notes:

1. Day is taken to be 7:00am to 6:00pm
2. Evening is taken to be 6:00pm to 10:00pm.
3. Night is taken to be the remaining periods.
4. Partial day's monitoring
5. Assessment Background Level (ABL)
6. Rating Background Level (RBL) for L90 and logarithmic average for Leq

TRAFFIC NOISE MONITORING RESULTS
NSW DEC 'ENVIRONMENTAL CRITERIA FOR ROAD TRAFFIC NOISE', 1999

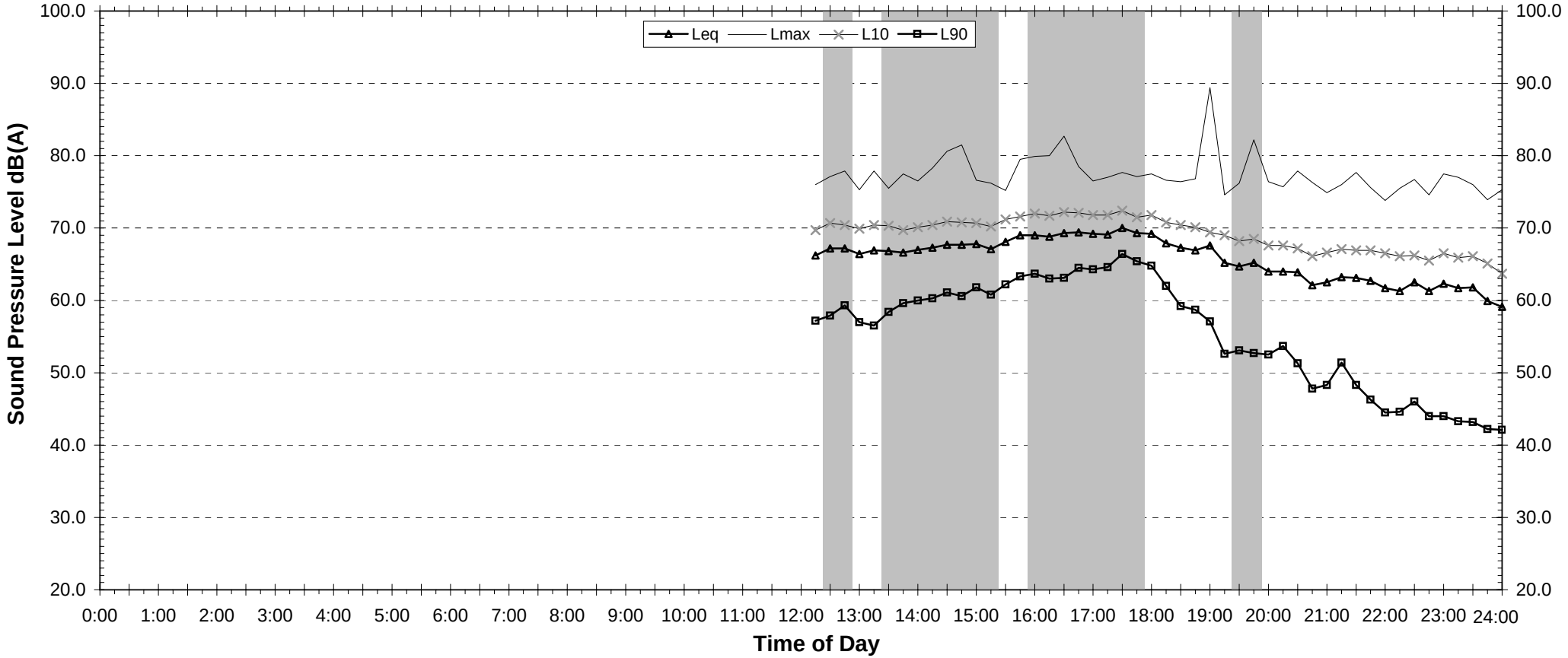
Day	L_{Aeq} Noise Levels		$L_{Aeq\ 1hr}$ Noise Levels			
	Day	Night	Day - Up	Day - Low	Night - Up	Night - Low
Monday-10-December-2007	69	62	72	65	64	60
Tuesday-11-December-2007	70	64	72	67	68	59
Wednesday-12-December-2007	70	66	71	70	71	61
Thursday-13-December-2007	70	66	72	66	72	60
Friday-14-December-2007	70	65	71	67	68	60
Saturday-15-December-2007	69	62	70	65	66	58
Sunday-16-December-2007	68	72	69	65	72	72
Monday-17-December-2007	71	68	72	69	71	62
Tuesday-18-December-2007	69	65	71	66	70	60
Wednesday-19-December-2007	70	66	72	67	71	61
Thursday-20-December-2007	70	-	72	69	-	-
Representative Weekday	**70**	**65**	**72**	**68**	**70**	**60**
Representative Weekend	**69**	**69**	**70**	**65**	**70**	**69**
Representative Week	**70**	**66**	**71**	**67**	**70**	**64**

20 YEARS
1982-2002 ACOUSTIC ENGINEERING EXCELLENCE

EXISTING AMBIENT NOISE LEVELS

Location M2 - Link Rd South

Monday, 10 December 2007



NSW Industrial Noise Policy (Free Field)			
Descriptor	Day	Evening	Night[2]
	7am-6pm	6pm-10pm	10pm-7am
L_{90}	-	46.3	-
Leq (see note 3)	-	65.0	-

NOTES:

1. Shaded periods denote measurements adversely affected by rain, wind or extraneous noise - data in these periods are excluded from calculations.

2. "Night" relates to period from 10pm on this graph to 7am on the following graph.

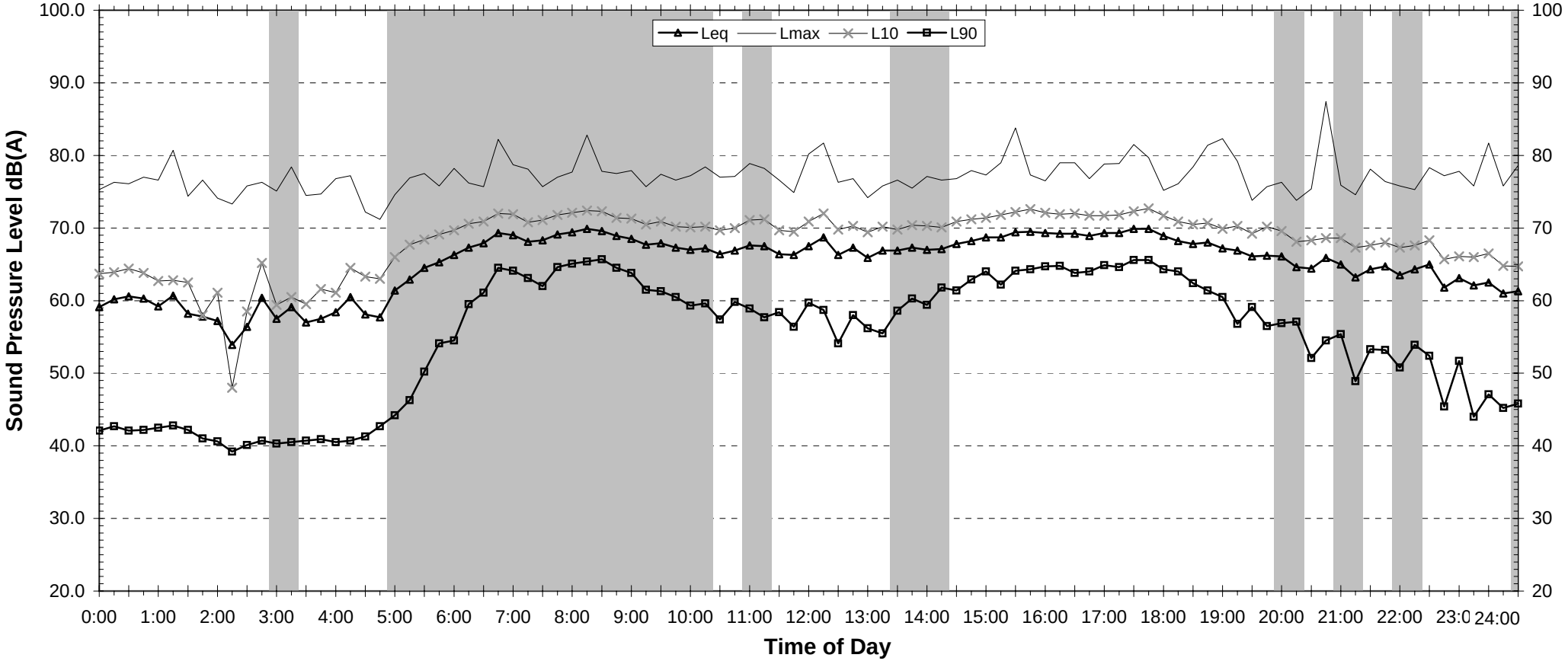
3. Graphed data measured in free-field; tabulated results facade corrected

4. Night time Lmax values are shown only where Lmax > 65dB(A) and where Lmax-Leq ≥ 15dB(A)

NSW ECRTN Policy (1m from facade) (see note3)		
Descriptor	Day	Night[2]
	7am-10pm	10pm-7am
$L_{eq\ 15\ hr}$ and $L_{eq\ 9\ hr}$	68.5	62.3
$L_{eq\ 1hr}$ upper 10 percentile	71.7	64.4
$L_{eq\ 1hr}$ lower 10 percentile	65.2	60.2

Night Time Maximum Noise Levels (see note 4)			
Lmax (Range)	76.3	to	80.7
Lmax - Leq (Range)	15.6	to	22.0

EXISTING AMBIENT NOISE LEVELS
Location M2 - Link Rd South
Tuesday, 11 December 2007



NSW Industrial Noise Policy (Free Field)			
Descriptor	Day	Evening	Night[2]
	7am-6pm	6pm-10pm	10pm-7am
L_{90}	-	-	-
Leq (see note 3)	-	-	-

NOTES:

1. Shaded periods denote measurements adversely affected by rain, wind or extraneous noise - data in these periods are excluded from calculations.

2. "Night" relates to period from 10pm on this graph to 7am on the following graph.

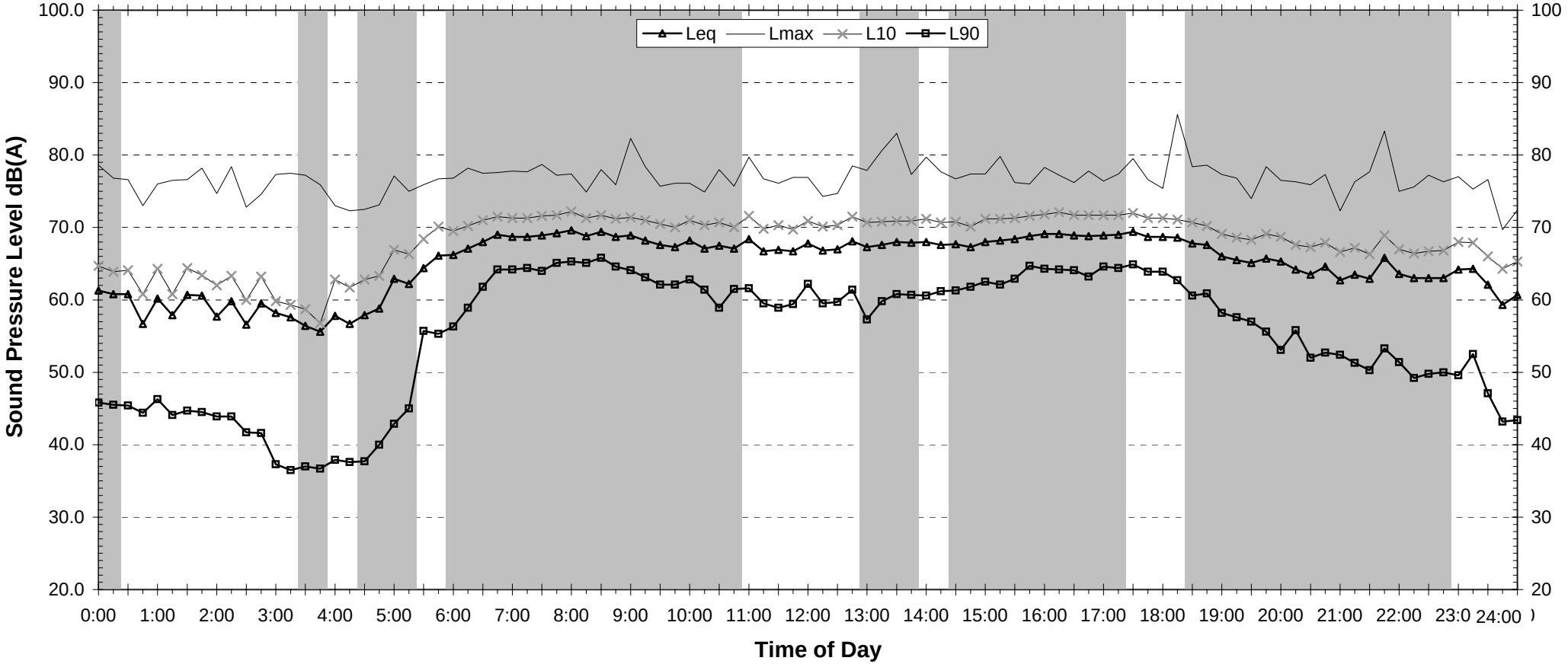
3. Graphed data measured in free-field; tabulated results facade corrected

4. Night time Lmax values are shown only where Lmax > 65dB(A) and where Lmax-Leq ≥ 15dB(A)

NSW ECRTN Policy (1m from facade) (see note3)		
Descriptor	Day	Night[2]
	7am-10pm	10pm-7am
$L_{eq\ 15\ hr}$ and $L_{eq\ 9\ hr}$	70.4	63.7
$L_{eq\ 1hr}$ upper 10 percentile	72.0	67.8
$L_{eq\ 1hr}$ lower 10 percentile	67.2	59.2

Night Time Maximum Noise Levels (see note 4)			
Lmax (Range)	72.3	to	81.7
Lmax - Leq (Range)	15.6	to	19.8

EXISTING AMBIENT NOISE LEVELS
Location M2 - Link Rd South
Wednesday, 12 December 2007



NSW Industrial Noise Policy (Free Field)			
Descriptor	Day	Evening	Night[2]
	7am-6pm	6pm-10pm	10pm-7am
L_{90}	-	-	-
Leq (see note 3)	-	-	-

NOTES:

1. Shaded periods denote measurements adversely affected by rain, wind or extraneous noise - data in these periods are excluded from calculations.

2. "Night" relates to period from 10pm on this graph to 7am on the following graph.

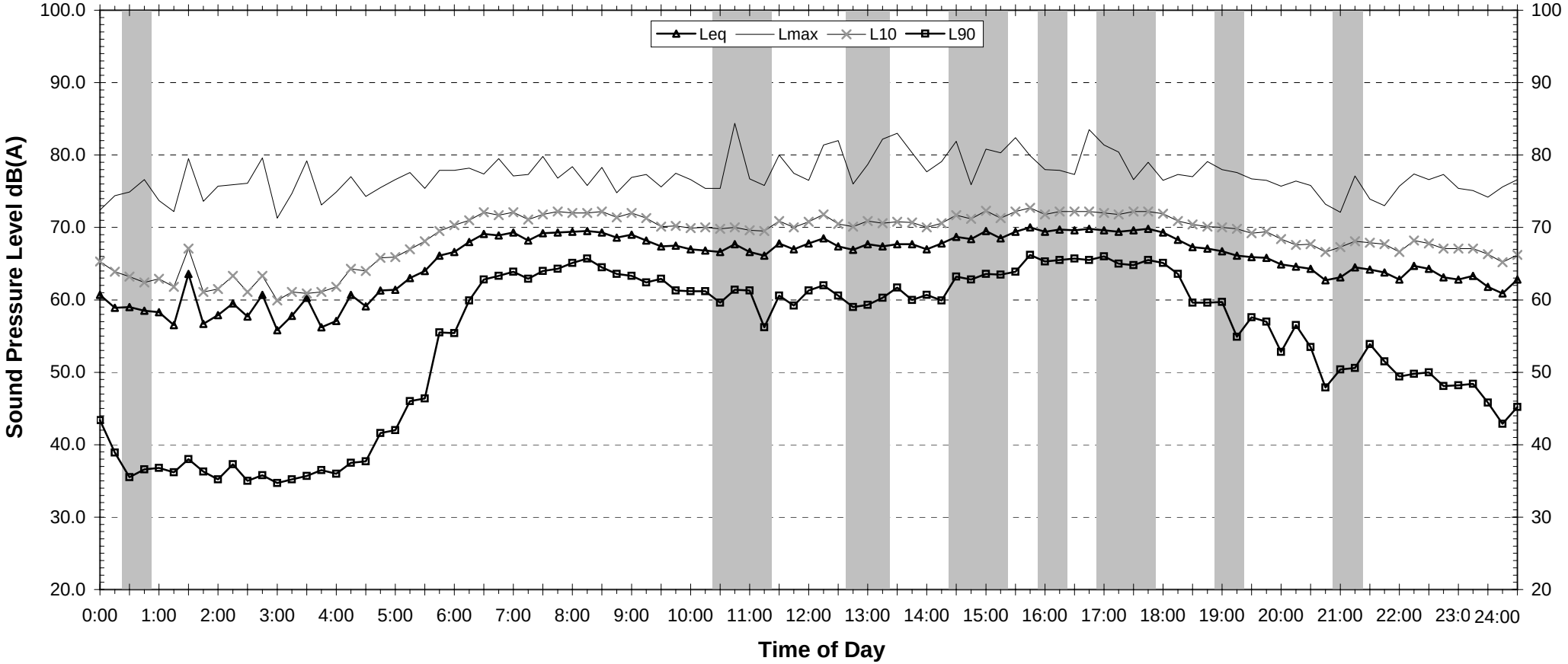
3. Graphed data measured in free-field; tabulated results facade corrected

4. Night time Lmax values are shown only where Lmax > 65dB(A) and where Lmax-Leq ≥ 15dB(A)

NSW ECRTN Policy (1m from facade) (see note3)		
Descriptor	Day	Night[2]
	7am-10pm	10pm-7am
$L_{eq\ 15\ hr}$ and $L_{eq\ 9\ hr}$	70.4	65.9
$L_{eq\ 1hr}$ upper 10 percentile	71.4	71.4
$L_{eq\ 1hr}$ lower 10 percentile	69.5	60.6

Night Time Maximum Noise Levels (see note 4)			
Lmax (Range)	74.4	to	79.6
Lmax - Leq (Range)	15.8	to	21.1

EXISTING AMBIENT NOISE LEVELS
Location M2 - Link Rd South
Thursday, 13 December 2007



NSW Industrial Noise Policy (Free Field)			
Descriptor	Day	Evening	Night[2]
	7am-6pm	6pm-10pm	10pm-7am
L_{90}	-	-	34.9
Leq (see note 3)	-	-	63.5

NOTES:

1. Shaded periods denote measurements adversely affected by rain, wind or extraneous noise - data in these periods are excluded from calculations.

2. "Night" relates to period from 10pm on this graph to 7am on the following graph.

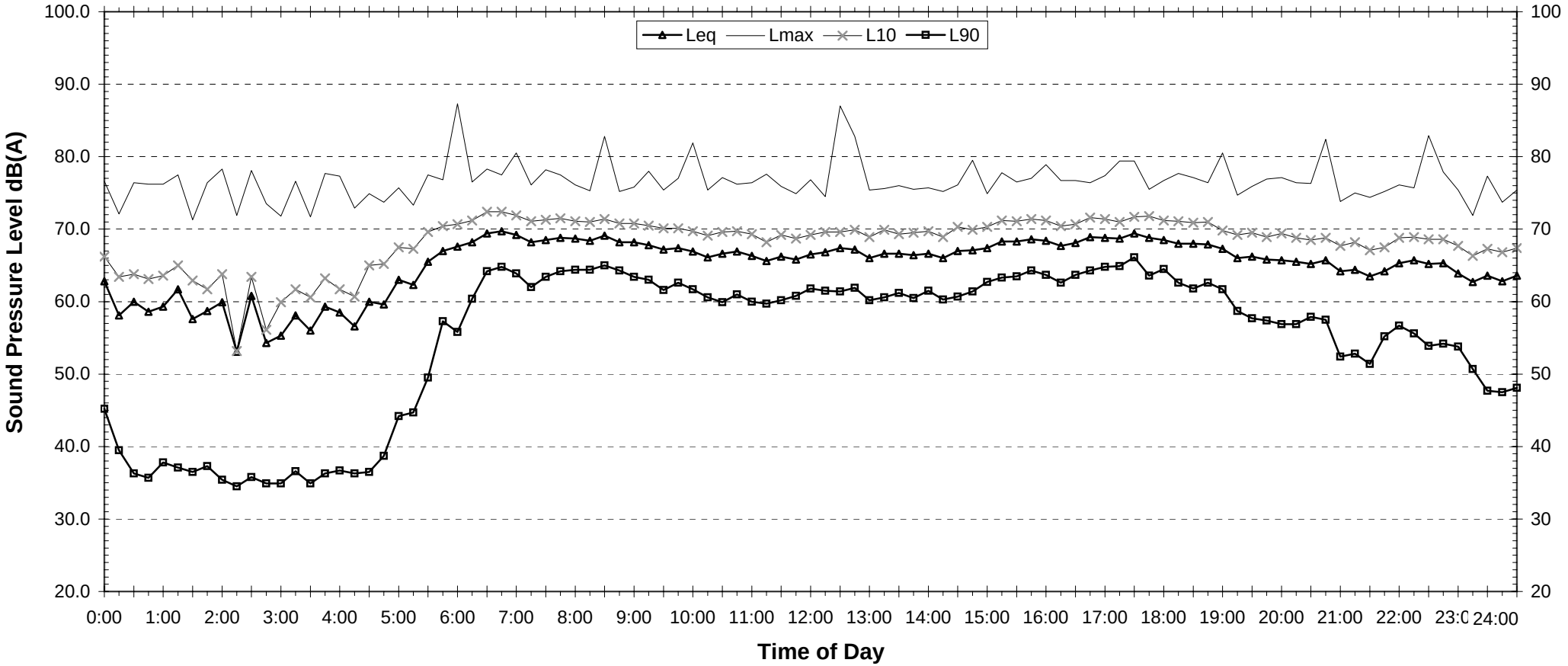
3. Graphed data measured in free-field; tabulated results facade corrected

4. Night time Lmax values are shown only where Lmax > 65dB(A) and where Lmax-Leq ≥ 15dB(A)

NSW ECRTN Policy (1m from facade) (see note3)		
Descriptor	Day	Night[2]
	7am-10pm	10pm-7am
$L_{eq\ 15\ hr}$ and $L_{eq\ 9\ hr}$	70.3	66.0
$L_{eq\ 1hr}$ upper 10 percentile	72.2	71.7
$L_{eq\ 1hr}$ lower 10 percentile	66.3	59.5

Night Time Maximum Noise Levels (see note 4)			
Lmax (Range)	75.7	to	87.3
Lmax - Leq (Range)	15.3	to	21.3

EXISTING AMBIENT NOISE LEVELS
Location M2 - Link Rd South
Friday, 14 December 2007



NSW Industrial Noise Policy (Free Field)			
Descriptor	Day	Evening	Night[2]
	7am-6pm	6pm-10pm	10pm-7am
L_{90}	60.2	52.4	34.2
Leq (see note 3)	67.6	66.0	62.1

NOTES:

1. Shaded periods denote measurements adversely affected by rain, wind or extraneous noise - data in these periods are excluded from calculations.

2. "Night" relates to period from 10pm on this graph to 7am on the following graph.

3. Graphed data measured in free-field; tabulated results facade corrected

4. Night time Lmax values are shown only where Lmax > 65dB(A) and where Lmax-Leq ≥ 15dB(A)

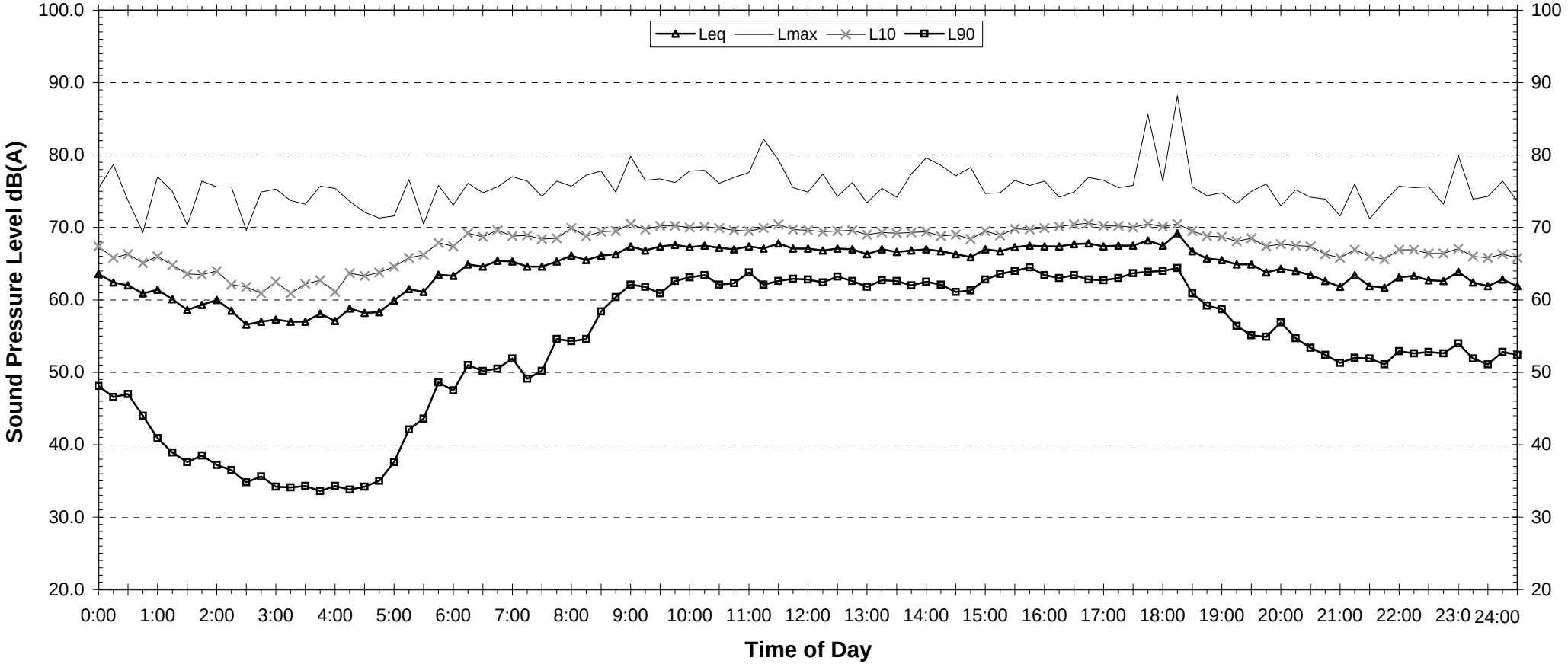
NSW ECRTN Policy (1m from facade) (see note3)		
Descriptor	Day	Night[2]
	7am-10pm	10pm-7am
$L_{eq\ 15\ hr}$ and $L_{eq\ 9\ hr}$	69.8	64.6
$L_{eq\ 1hr}$ upper 10 percentile	71.2	67.6
$L_{eq\ 1hr}$ lower 10 percentile	67.3	59.8

Night Time Maximum Noise Levels (see note 4)			
Lmax (Range)	75.6	to	82.9
Lmax - Leq (Range)	16.9	to	18.4

EXISTING AMBIENT NOISE LEVELS

Location M2 - Link Rd South

Saturday, 15 December 2007



NSW Industrial Noise Policy (Free Field)			
Descriptor	Day	Evening	Night[2]
	7am-6pm	6pm-10pm	10pm-7am
L_{90}	54.6	51.3	40.2
Leq (see note 3)	67.0	64.7	59.7

NOTES:

1. Shaded periods denote measurements adversely affected by rain, wind or extraneous noise - data in these periods are excluded from calculations.

2. "Night" relates to period from 10pm on this graph to 7am on the following graph.

3. Graphed data measured in free-field; tabulated results facade corrected

4. Night time Lmax values are shown only where Lmax > 65dB(A) and where Lmax-Leq ≥ 15dB(A)

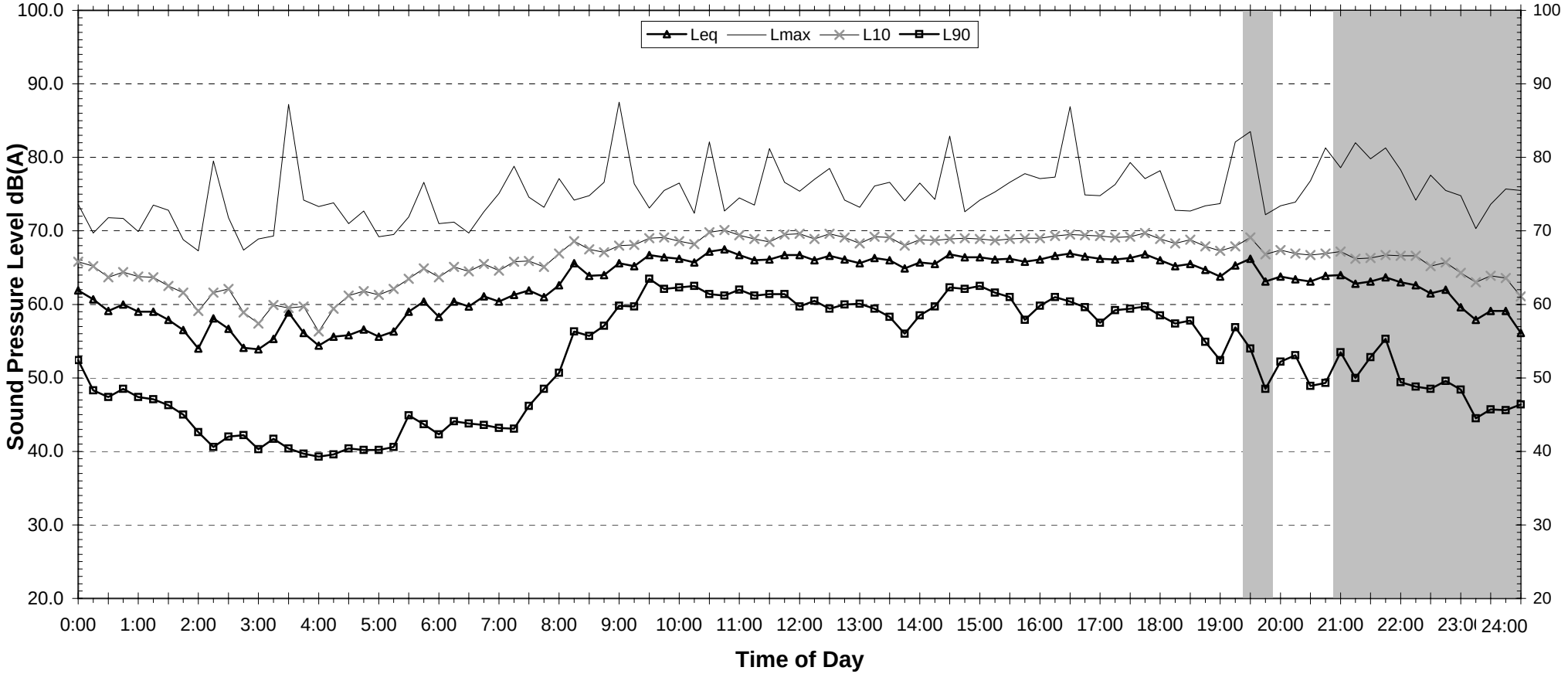
NSW ECRTN Policy (1m from facade) (see note3)		
Descriptor	Day	Night[2]
	7am-10pm	10pm-7am
$L_{eq\ 15\ hr}$ and $L_{eq\ 9\ hr}$	69.0	62.2
$L_{eq\ 1hr}$ upper 10 percentile	70.1	65.7
$L_{eq\ 1hr}$ lower 10 percentile	65.3	58.4

Night Time Maximum Noise Levels (see note 4)			
Lmax (Range)	73.5	to	87.2
Lmax - Leq (Range)	16.3	to	30.7

EXISTING AMBIENT NOISE LEVELS

Location M2 - Link Rd South

Sunday, 16 December 2007



NSW Industrial Noise Policy (Free Field)			
Descriptor	Day	Evening	Night[2]
	7am-6pm	6pm-10pm	10pm-7am
L_{90}	55.7	-	-
Leq (see note 3)	65.9	-	-

NOTES:

1. Shaded periods denote measurements adversely affected by rain, wind or extraneous noise - data in these periods are excluded from calculations.

2. "Night" relates to period from 10pm on this graph to 7am on the following graph.

3. Graphed data measured in free-field; tabulated results facade corrected

4. Night time Lmax values are shown only where Lmax > 65dB(A) and where Lmax-Leq ≥ 15dB(A)

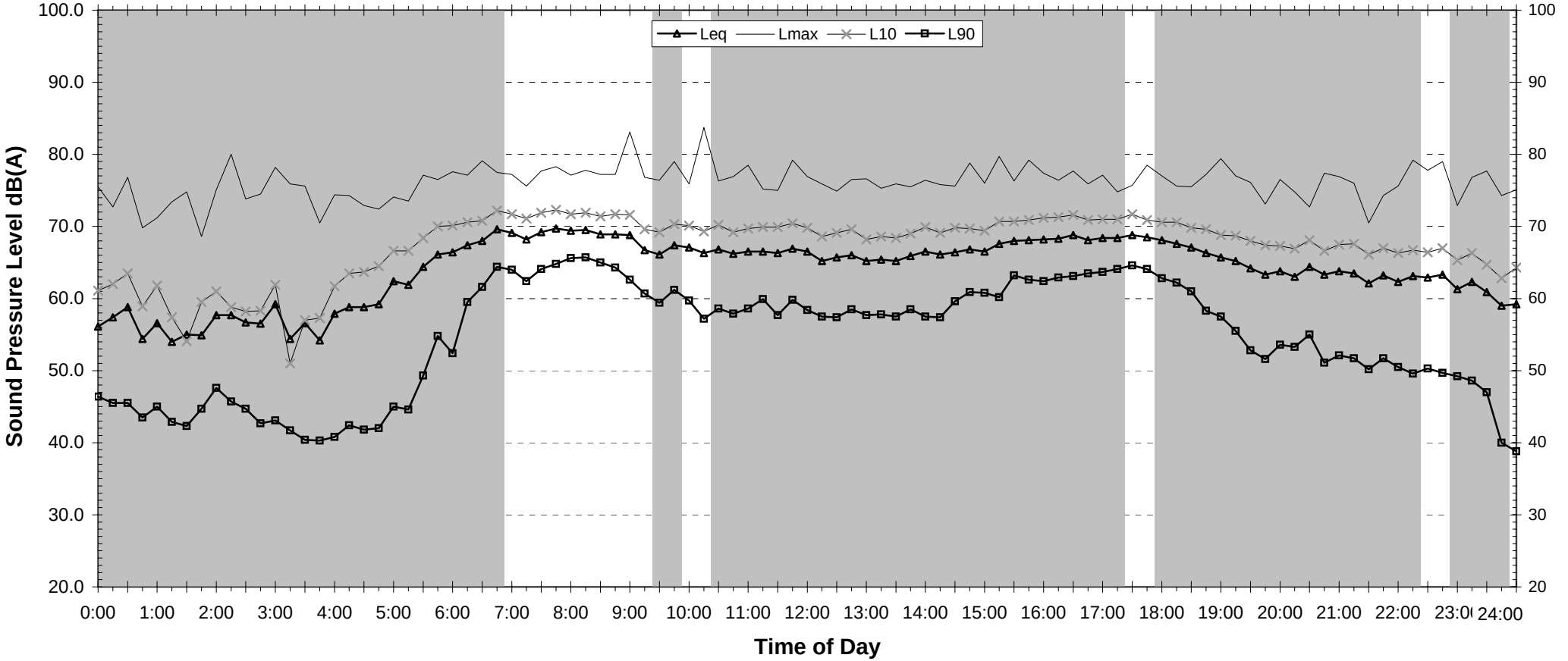
NSW ECRTN Policy (1m from facade) (see note3)		
Descriptor	Day	Night[2]
	7am-10pm	10pm-7am
$L_{eq\ 15\ hr}$ and $L_{eq\ 9\ hr}$	68.2	71.6
$L_{eq\ 1hr}$ upper 10 percentile	69.2	71.6
$L_{eq\ 1hr}$ lower 10 percentile	65.0	71.6

Night Time Maximum Noise Levels (see note 4)			
Lmax (Range)	-	to	-
Lmax - Leq (Range)	-	to	-

EXISTING AMBIENT NOISE LEVELS

Location M2 - Link Rd South

Monday, 17 December 2007



NSW Industrial Noise Policy (Free Field)			
Descriptor	Day	Evening	Night[2]
	7am-6pm	6pm-10pm	10pm-7am
L_{90}	-	-	-
Leq (see note 3)	-	-	-

NOTES:

1. Shaded periods denote measurements adversely affected by rain, wind or extraneous noise - data in these periods are excluded from calculations.

2. "Night" relates to period from 10pm on this graph to 7am on the following graph.

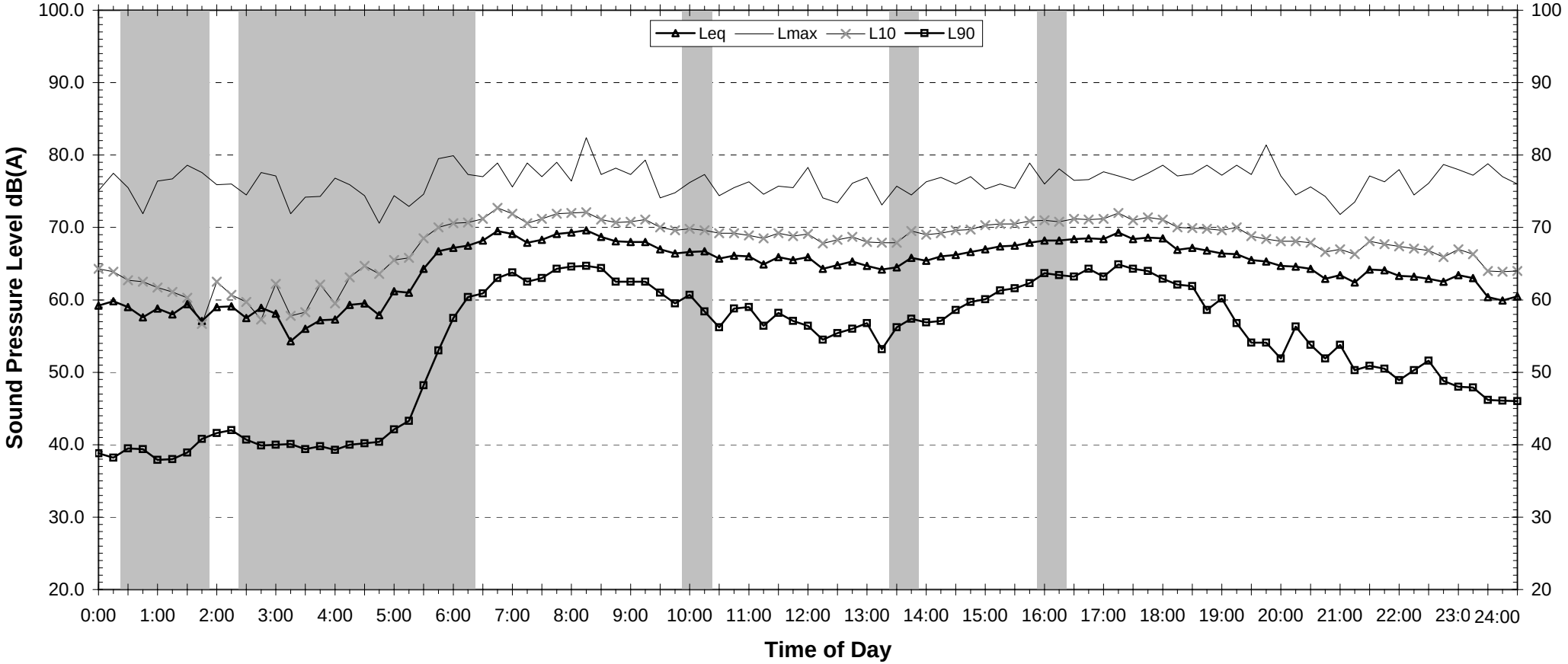
3. Graphed data measured in free-field; tabulated results facade corrected

4. Night time Lmax values are shown only where Lmax > 65dB(A) and where Lmax-Leq ≥ 15dB(A)

NSW ECRTN Policy (1m from facade)		(see note3)
Descriptor	Day	Night[2]
	7am-10pm	10pm-7am
$L_{eq\ 15\ hr}$ and $L_{eq\ 9\ hr}$	71.1	67.9
$L_{eq\ 1hr}$ upper 10 percentile	71.7	71.5
$L_{eq\ 1hr}$ lower 10 percentile	68.8	61.5

Night Time Maximum Noise Levels			(see note 4)
Lmax (Range)	75.1	to	79.0
Lmax - Leq (Range)	15.9	to	17.7

EXISTING AMBIENT NOISE LEVELS
Location M2 - Link Rd South
Tuesday, 18 December 2007



NSW Industrial Noise Policy (Free Field)			
Descriptor	Day	Evening	Night[2]
	7am-6pm	6pm-10pm	10pm-7am
L_{90}	56.0	50.3	-
Leq (see note 3)	67.3	65.1	-

NOTES:

1. Shaded periods denote measurements adversely affected by rain, wind or extraneous noise - data in these periods are excluded from calculations.

2. "Night" relates to period from 10pm on this graph to 7am on the following graph.

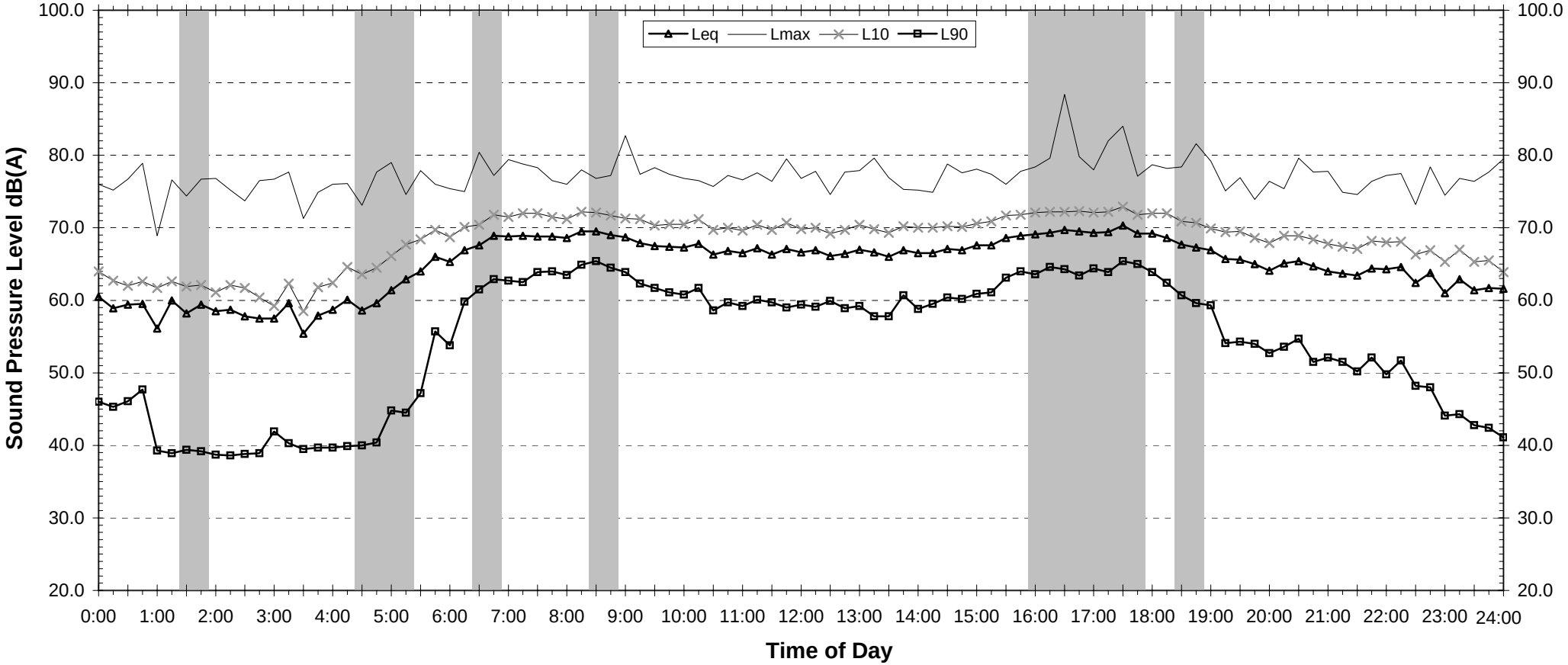
3. Graphed data measured in free-field; tabulated results facade corrected

4. Night time Lmax values are shown only where Lmax > 65dB(A) and where Lmax-Leq ≥ 15dB(A)

NSW ECRTN Policy (1m from facade) (see note3)		
Descriptor	Day	Night[2]
	7am-10pm	10pm-7am
$L_{eq\ 15\ hr}$ and $L_{eq\ 9\ hr}$	69.3	64.7
$L_{eq\ 1hr}$ upper 10 percentile	71.2	70.5
$L_{eq\ 1hr}$ lower 10 percentile	66.2	60.4

Night Time Maximum Noise Levels (see note 4)			
Lmax (Range)	76.1	to	78.9
Lmax - Leq (Range)	15.7	to	20.2

EXISTING AMBIENT NOISE LEVELS
Location M2 - Link Rd South
Wednesday, 19 December 2007



NSW Industrial Noise Policy (Free Field)			
Descriptor	Day	Evening	Night[2]
	7am-6pm	6pm-10pm	10pm-7am
L_{90}	-	50.2	37.1
Leq (see note 3)	-	65.3	63.1

NOTES:

1. Shaded periods denote measurements adversely affected by rain, wind or extraneous noise - data in these periods are excluded from calculations.

2. "Night" relates to period from 10pm on this graph to 7am on the following graph.

3. Graphed data measured in free-field; tabulated results facade corrected

4. Night time Lmax values are shown only where Lmax > 65dB(A) and where Lmax-Leq ≥ 15dB(A)

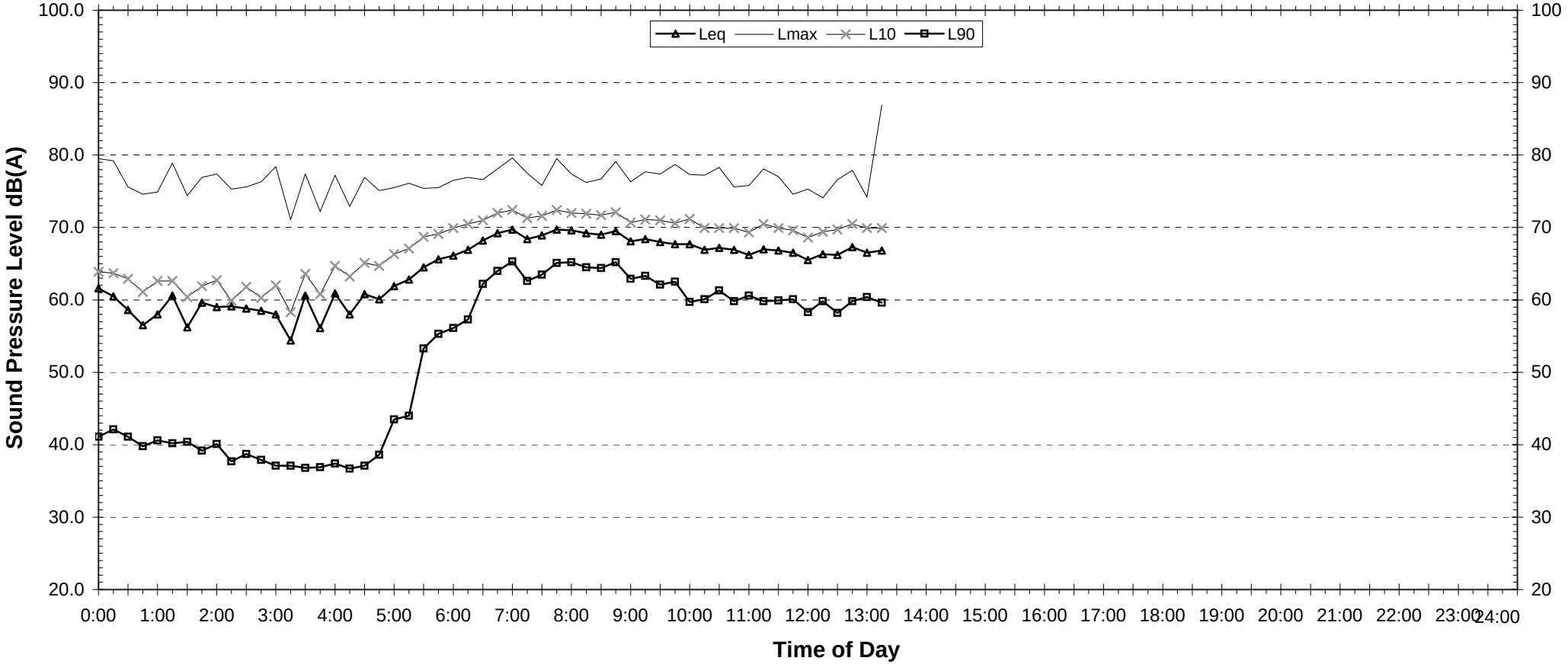
NSW ECRTN Policy (1m from facade) (see note3)		
Descriptor	Day	Night[2]
	7am-10pm	10pm-7am
$L_{eq\ 15\ hr}$ and $L_{eq\ 9\ hr}$	69.5	65.6
$L_{eq\ 1hr}$ upper 10 percentile	71.7	71.1
$L_{eq\ 1hr}$ lower 10 percentile	66.8	61.1

Night Time Maximum Noise Levels (see note 4)			
Lmax (Range)	76.9	to	79.5
Lmax - Leq (Range)	15.2	to	20.6

EXISTING AMBIENT NOISE LEVELS

Location M2 - Link Rd South

Thursday, 20 December 2007



NSW Industrial Noise Policy (Free Field)			
Descriptor	Day	Evening	Night[2]
	7am-6pm	6pm-10pm	10pm-7am
L_{90}	-	-	-
Leq (see note 3)	-	-	-

NOTES:

1. Shaded periods denote measurements adversely affected by rain, wind or extraneous noise - data in these periods are excluded from calculations.

2. "Night" relates to period from 10pm on this graph to 7am on the following graph.

3. Graphed data measured in free-field; tabulated results facade corrected

4. Night time Lmax values are shown only where Lmax > 65dB(A) and where Lmax-Leq ≥ 15dB(A)

NSW ECRTN Policy (1m from facade) (see note3)		
Descriptor	Day	Night[2]
	7am-10pm	10pm-7am
$L_{eq\ 15\ hr}$ and $L_{eq\ 9\ hr}$	70.3	-
$L_{eq\ 1hr}$ upper 10 percentile	71.7	-
$L_{eq\ 1hr}$ lower 10 percentile	69.0	-

Night Time Maximum Noise Levels (see note 4)			
Lmax (Range)	-	to	-
Lmax - Leq (Range)	-	to	-

Renzo Tonin & Associates

noise logger results

Location M3 - Lenaghans Drive

BACKGROUND & AMBIENT NOISE MONITORING RESULTS
NSW DEC's 'INDUSTRIAL NOISE POLICY', 2000

Day	L_{A90} Background Noise Levels[5]			L_{Aeq} Ambient Noise Levels		
	Day	Evening	Night	Day	Evening	Night
Monday-10-December-2007	-	45	-	-	63	-
Tuesday-11-December-2007	-	-	-	-	-	-
Wednesday-12-December-2007	-	-	-	-	-	-
Thursday-13-December-2007	-	-	40	-	-	61
Friday-14-December-2007	55	50	38	67	63	59
Saturday-15-December-2007	53	44	32	65	64	56
Sunday-16-December-2007	56	-	-	65	-	-
Monday-17-December-2007	-	-	-	-	-	-
Tuesday-18-December-2007	55	45	-	66	63	-
Wednesday-19-December-2007	-	49	40	-	64	63
Representative Level	**55**	**45**	**39**	**66**	**64**	**61**

Notes:

1. Day is taken to be 7:00am to 6:00pm
2. Evening is taken to be 6:00pm to 10:00pm.
3. Night is taken to be the remaining periods.
4. Partial day's monitoring
5. Assessment Background Level (ABL)
6. Rating Background Level (RBL) for L90 and logarithmic average for Leq

TRAFFIC NOISE MONITORING RESULTS
NSW DEC 'ENVIRONMENTAL CRITERIA FOR ROAD TRAFFIC NOISE', 1999

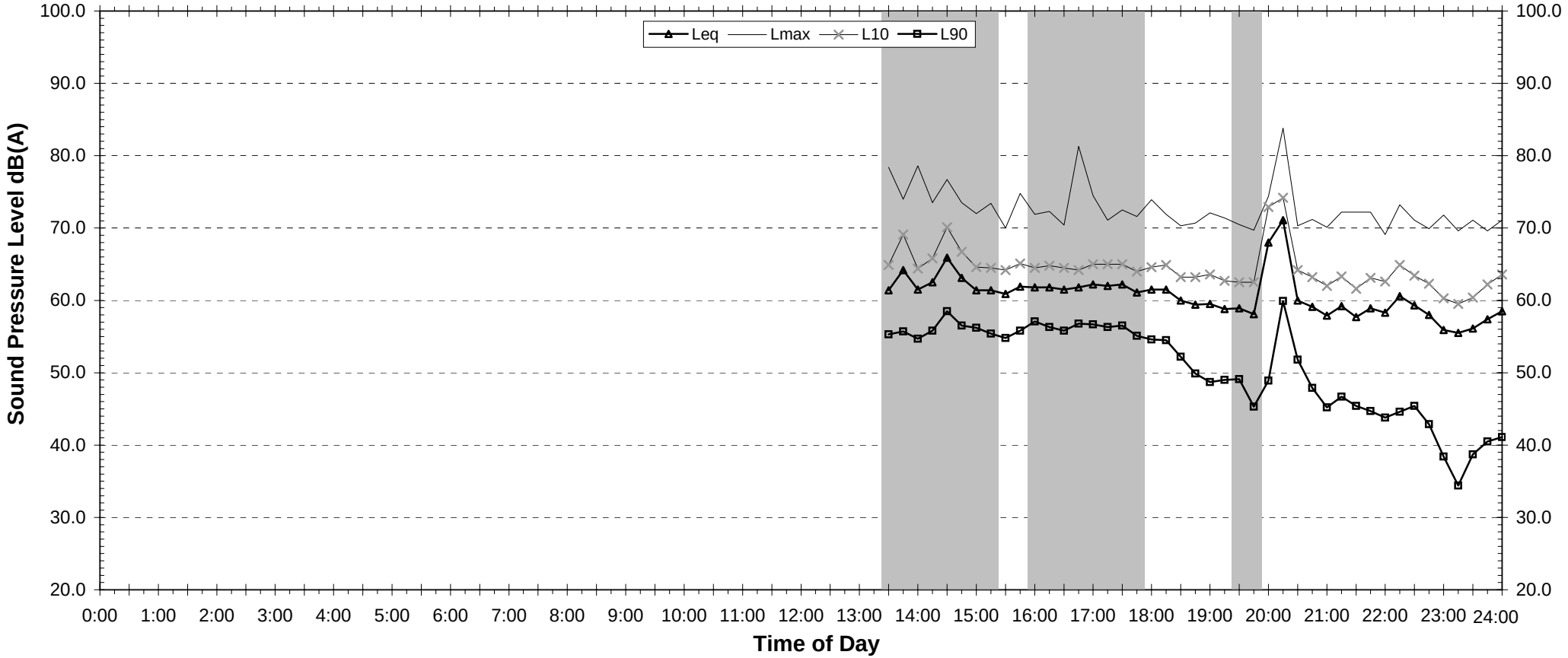
Day	L_{Aeq} Noise Levels		$L_{Aeq\ 1hr}$ Noise Levels			
	Day	Night	Day - Up	Day - Low	Night - Up	Night - Low
Monday-10-December-2007	65	61	68	61	62	60
Tuesday-11-December-2007	65	63	69	62	71	60
Wednesday-12-December-2007	67	63	69	64	66	60
Thursday-13-December-2007	69	64	72	63	67	61
Friday-14-December-2007	68	61	73	62	64	59
Saturday-15-December-2007	67	59	72	61	64	55
Sunday-16-December-2007	68	66	71	63	66	66
Monday-17-December-2007	69	64	72	65	66	60
Tuesday-18-December-2007	68	63	72	63	67	61
Wednesday-19-December-2007	69	65	74	63	70	61
Thursday-20-December-2007	70	-	73	66	-	-
Representative Weekday	**68**	**63**	**72**	**64**	**68**	**60**
Representative Weekend	**68**	**64**	**72**	**62**	**65**	**63**
Representative Week	**68**	**63**	**72**	**63**	**67**	**61**

20 YEARS 1982-2002 ACOUSTIC ENGINEERING EXCELLENCE

EXISTING AMBIENT NOISE LEVELS

Location M3 - Lenaghans Drive

Monday, 10 December 2007



NSW Industrial Noise Policy (Free Field)			
Descriptor	Day	Evening	Night[2]
	7am-6pm	6pm-10pm	10pm-7am
L_{90}	-	44.7	-
Leq (see note 3)	-	63.2	-

NOTES:

1. Shaded periods denote measurements adversely affected by rain, wind or extraneous noise - data in these periods are excluded from calculations.

2. "Night" relates to period from 10pm on this graph to 7am on the following graph.

3. Graphed data measured in free-field; tabulated results facade corrected

4. Night time Lmax values are shown only where Lmax > 65dB(A) and where Lmax-Leq ≥ 15dB(A)

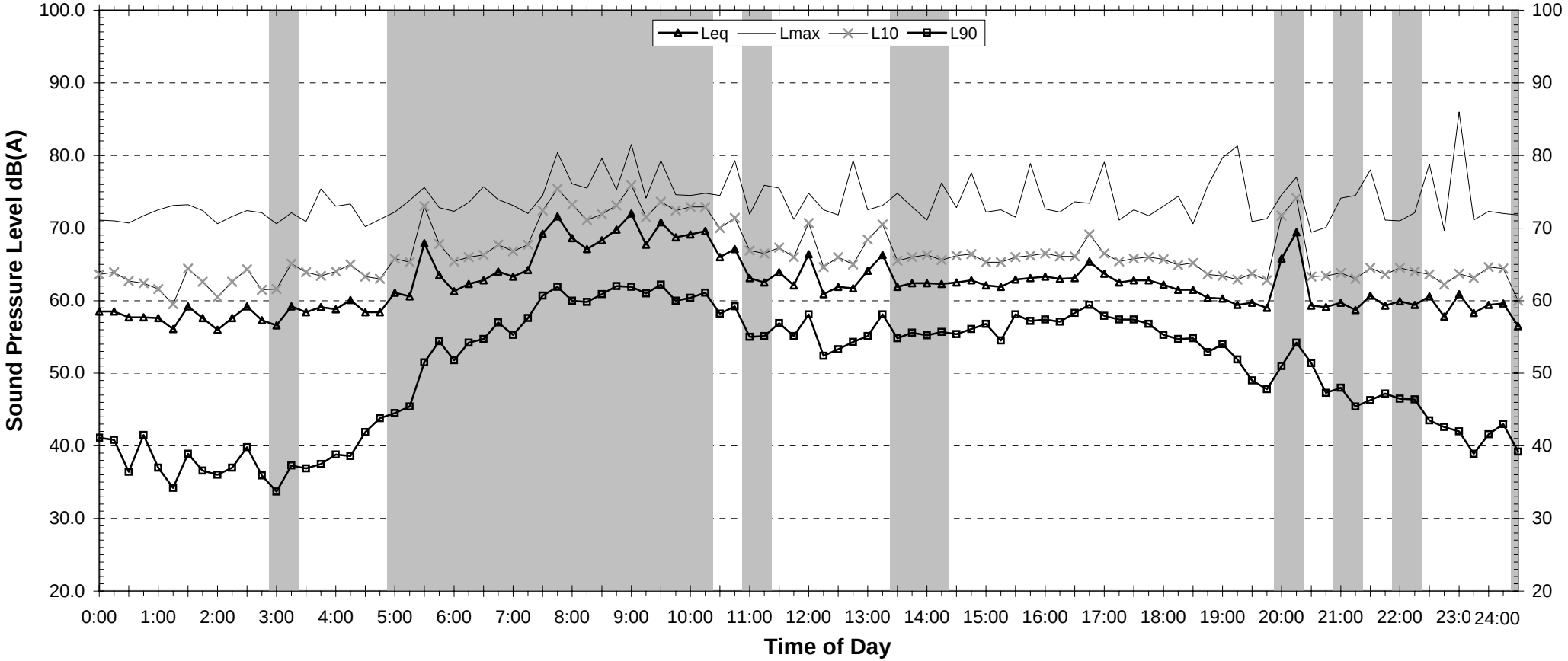
NSW ECRTN Policy (1m from facade) (see note3)		
Descriptor	Day	Night[2]
	7am-10pm	10pm-7am
$L_{eq\ 15\ hr}$ and $L_{eq\ 9\ hr}$	65.5	60.6
$L_{eq\ 1hr}$ upper 10 percentile	68.3	61.5
$L_{eq\ 1hr}$ lower 10 percentile	61.1	59.5

Night Time Maximum Noise Levels (see note 4)			
Lmax (Range)	73.2	to	75.4
Lmax - Leq (Range)	15.8	to	16.6

EXISTING AMBIENT NOISE LEVELS

Location M3 - Lenaghans Drive

Tuesday, 11 December 2007



NSW Industrial Noise Policy (Free Field)			
Descriptor	Day	Evening	Night[2]
	7am-6pm	6pm-10pm	10pm-7am
L_{90}	-	-	-
Leq (see note 3)	-	-	-

NOTES:

1. Shaded periods denote measurements adversely affected by rain, wind or extraneous noise - data in these periods are excluded from calculations.

2. "Night" relates to period from 10pm on this graph to 7am on the following graph.

3. Graphed data measured in free-field; tabulated results facade corrected

4. Night time Lmax values are shown only where Lmax > 65dB(A) and where Lmax-Leq ≥ 15dB(A)

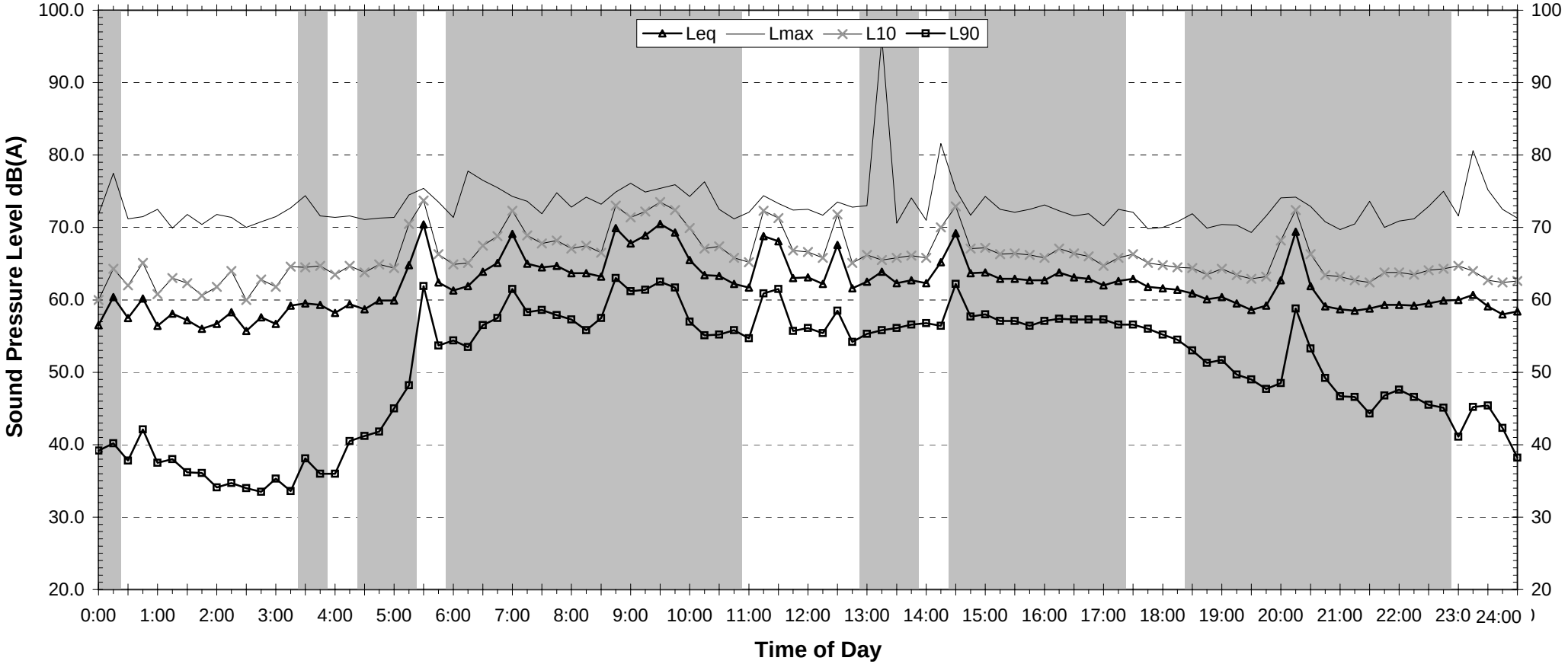
NSW ECRTN Policy (1m from facade) (see note3)		
Descriptor	Day	Night[2]
	7am-10pm	10pm-7am
$L_{eq\ 15\ hr}$ and $L_{eq\ 9\ hr}$	65.4	63.3
$L_{eq\ 1hr}$ upper 10 percentile	69.0	70.5
$L_{eq\ 1hr}$ lower 10 percentile	61.7	59.6

Night Time Maximum Noise Levels (see note 4)			
Lmax (Range)	86.0	to	86.0
Lmax - Leq (Range)	26.0	to	26.0

EXISTING AMBIENT NOISE LEVELS

Location M3 - Lenaghans Drive

Wednesday, 12 December 2007



NSW Industrial Noise Policy (Free Field)			
Descriptor	Day	Evening	Night[2]
	7am-6pm	6pm-10pm	10pm-7am
L_{90}	-	-	-
Leq (see note 3)	-	-	-

NOTES:

1. Shaded periods denote measurements adversely affected by rain, wind or extraneous noise - data in these periods are excluded from calculations.

2. "Night" relates to period from 10pm on this graph to 7am on the following graph.

3. Graphed data measured in free-field; tabulated results facade corrected

4. Night time Lmax values are shown only where Lmax > 65dB(A) and where Lmax-Leq ≥ 15dB(A)

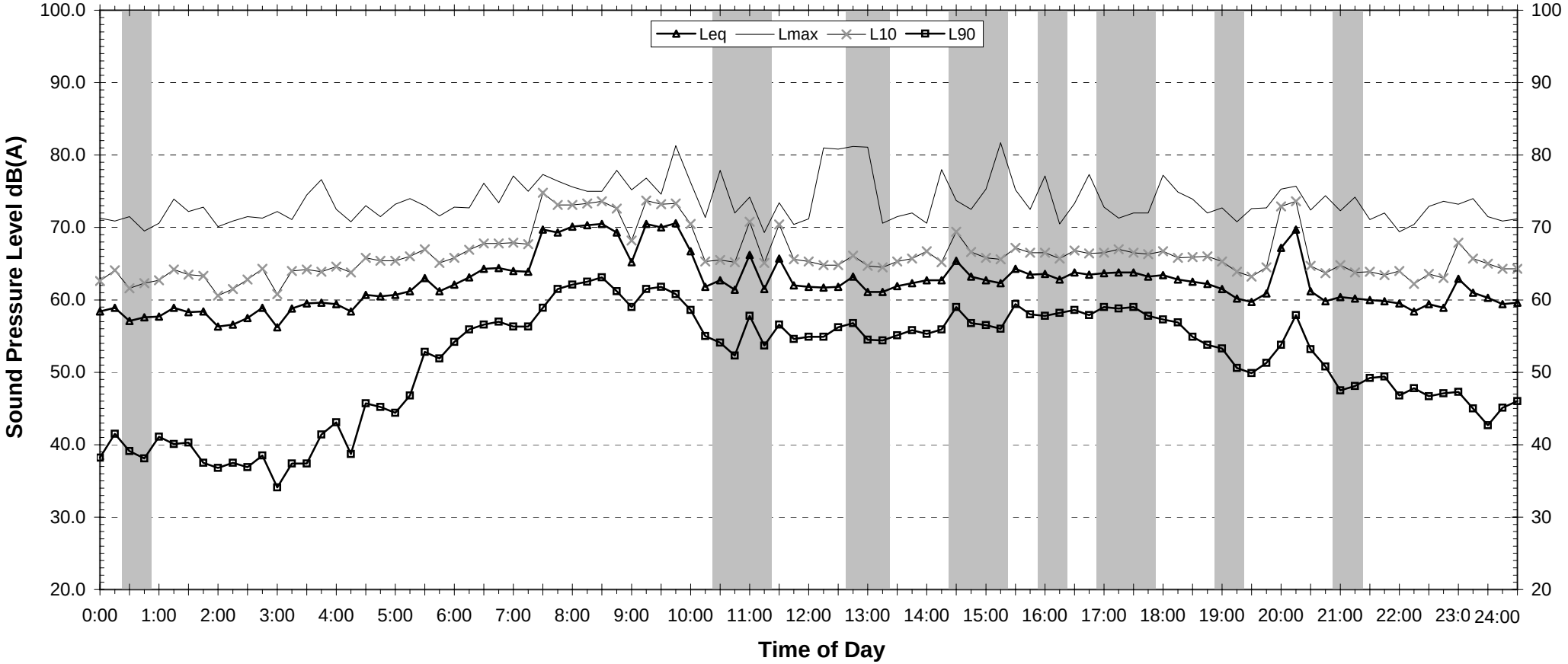
NSW ECRTN Policy (1m from facade) (see note3)		
Descriptor	Day	Night[2]
	7am-10pm	10pm-7am
$L_{eq\ 15\ hr}$ and $L_{eq\ 9\ hr}$	67.0	62.9
$L_{eq\ 1hr}$ upper 10 percentile	69.1	66.5
$L_{eq\ 1hr}$ lower 10 percentile	63.9	59.9

Night Time Maximum Noise Levels (see note 4)			
Lmax (Range)	73.9	to	80.6
Lmax - Leq (Range)	15.8	to	21.4

EXISTING AMBIENT NOISE LEVELS

Location M3 - Lenaghans Drive

Thursday, 13 December 2007



NSW Industrial Noise Policy (Free Field)			
Descriptor	Day	Evening	Night[2]
	7am-6pm	6pm-10pm	10pm-7am
L_{90}	-	-	40.1
Leq (see note 3)	-	-	61.3

NOTES:

1. Shaded periods denote measurements adversely affected by rain, wind or extraneous noise - data in these periods are excluded from calculations.

2. "Night" relates to period from 10pm on this graph to 7am on the following graph.

3. Graphed data measured in free-field; tabulated results facade corrected

4. Night time Lmax values are shown only where Lmax > 65dB(A) and where Lmax-Leq ≥ 15dB(A)

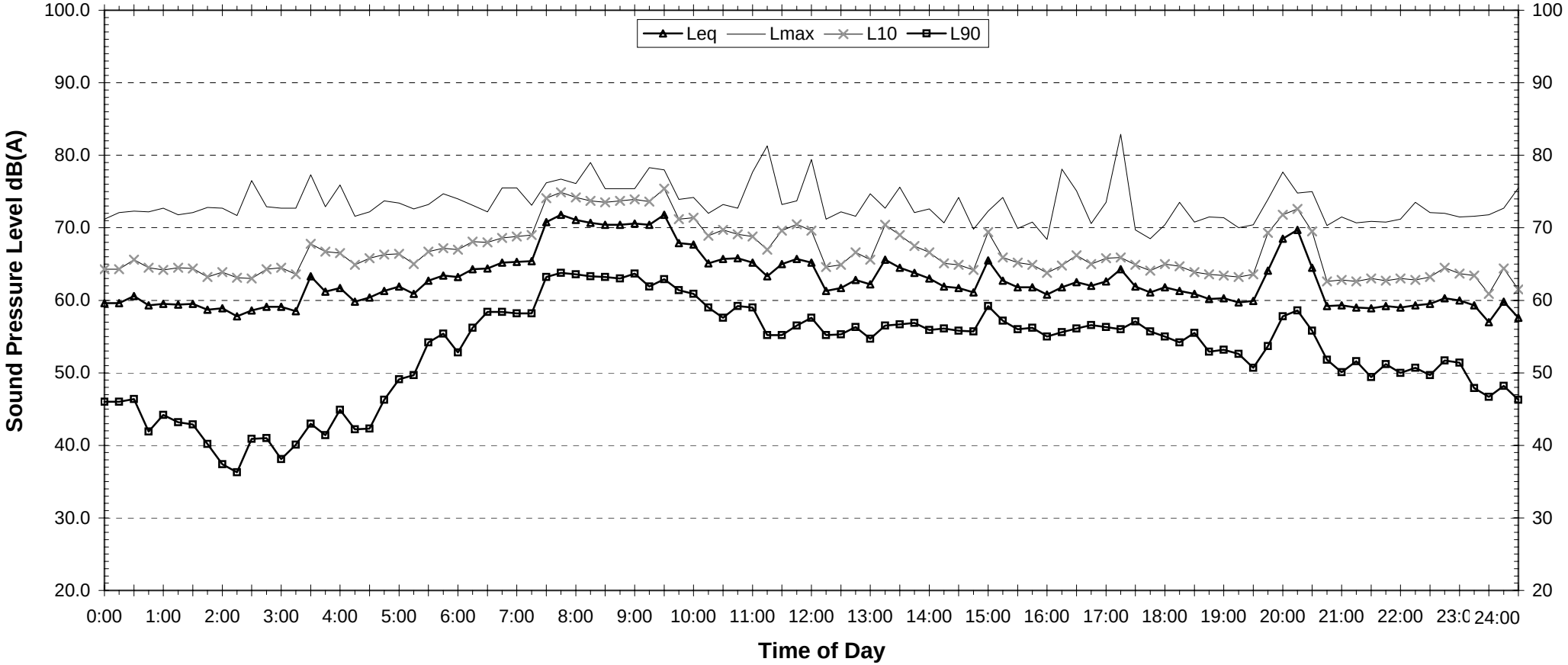
NSW ECRTN Policy (1m from facade) (see note3)		
Descriptor	Day	Night[2]
	7am-10pm	10pm-7am
$L_{eq\ 15\ hr}$ and $L_{eq\ 9\ hr}$	68.6	63.8
$L_{eq\ 1hr}$ upper 10 percentile	72.0	67.3
$L_{eq\ 1hr}$ lower 10 percentile	63.4	61.2

Night Time Maximum Noise Levels (see note 4)			
Lmax (Range)	76.5	to	77.3
Lmax - Leq (Range)	15.8	to	17.8

EXISTING AMBIENT NOISE LEVELS

Location M3 - Lenaghans Drive

Friday, 14 December 2007



NSW Industrial Noise Policy (Free Field)			
Descriptor	Day	Evening	Night[2]
	7am-6pm	6pm-10pm	10pm-7am
L_{90}	55.2	50.0	37.5
Leq (see note 3)	66.5	63.2	59.0

NOTES:

1. Shaded periods denote measurements adversely affected by rain, wind or extraneous noise - data in these periods are excluded from calculations.

2. "Night" relates to period from 10pm on this graph to 7am on the following graph.

3. Graphed data measured in free-field; tabulated results facade corrected

4. Night time Lmax values are shown only where Lmax > 65dB(A) and where Lmax-Leq ≥ 15dB(A)

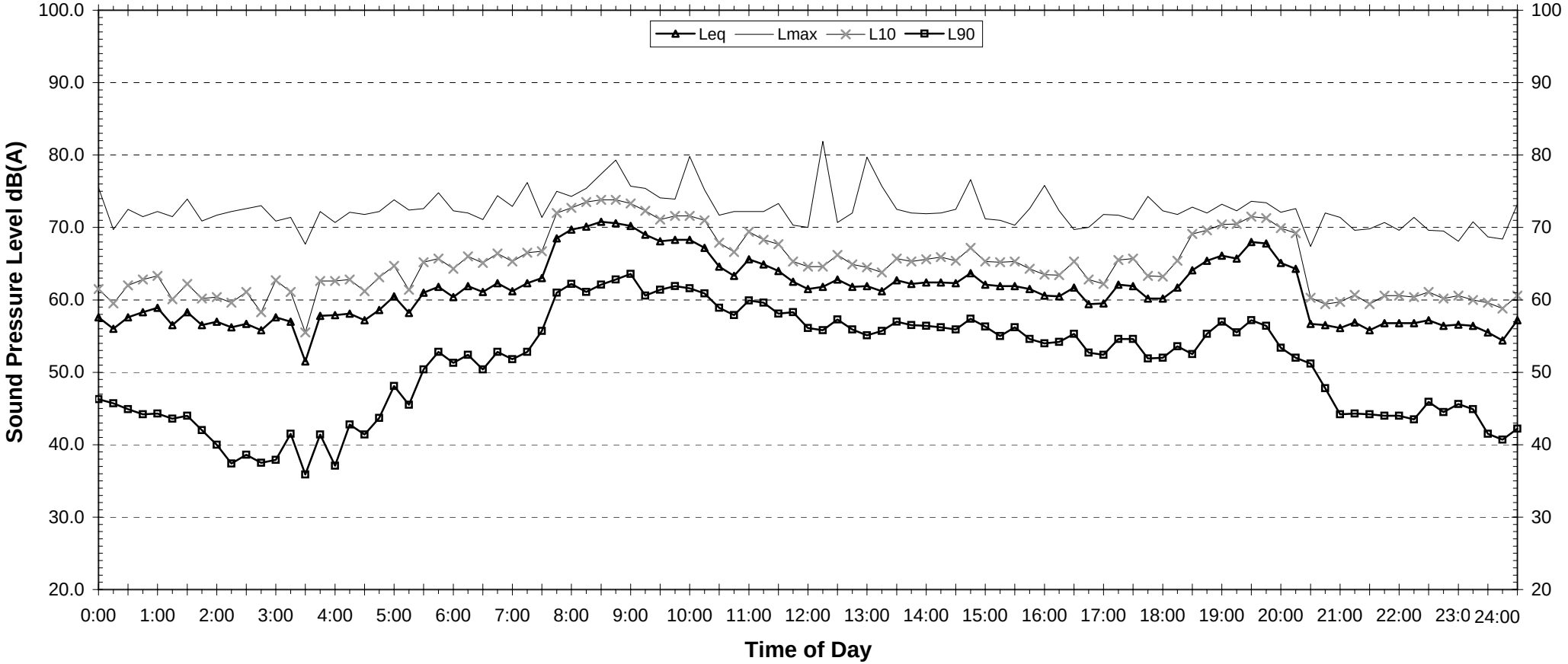
NSW ECRTN Policy (1m from facade) (see note3)		
Descriptor	Day	Night[2]
	7am-10pm	10pm-7am
$L_{eq\ 15\ hr}$ and $L_{eq\ 9\ hr}$	68.4	61.5
$L_{eq\ 1hr}$ upper 10 percentile	72.9	64.2
$L_{eq\ 1hr}$ lower 10 percentile	62.4	59.1

Night Time Maximum Noise Levels (see note 4)			
Lmax (Range)	72.2	to	75.5
Lmax - Leq (Range)	15.0	to	16.9

EXISTING AMBIENT NOISE LEVELS

Location M3 - Lenaghans Drive

Saturday, 15 December 2007



NSW Industrial Noise Policy (Free Field)			
Descriptor	Day	Evening	Night[2]
	7am-6pm	6pm-10pm	10pm-7am
L_{90}	52.8	44.0	32.2
Leq (see note 3)	65.3	63.6	56.5

NOTES:

1. Shaded periods denote measurements adversely affected by rain, wind or extraneous noise - data in these periods are excluded from calculations.

2. "Night" relates to period from 10pm on this graph to 7am on the following graph.

3. Graphed data measured in free-field; tabulated results facade corrected

4. Night time Lmax values are shown only where Lmax > 65dB(A) and where Lmax-Leq ≥ 15dB(A)

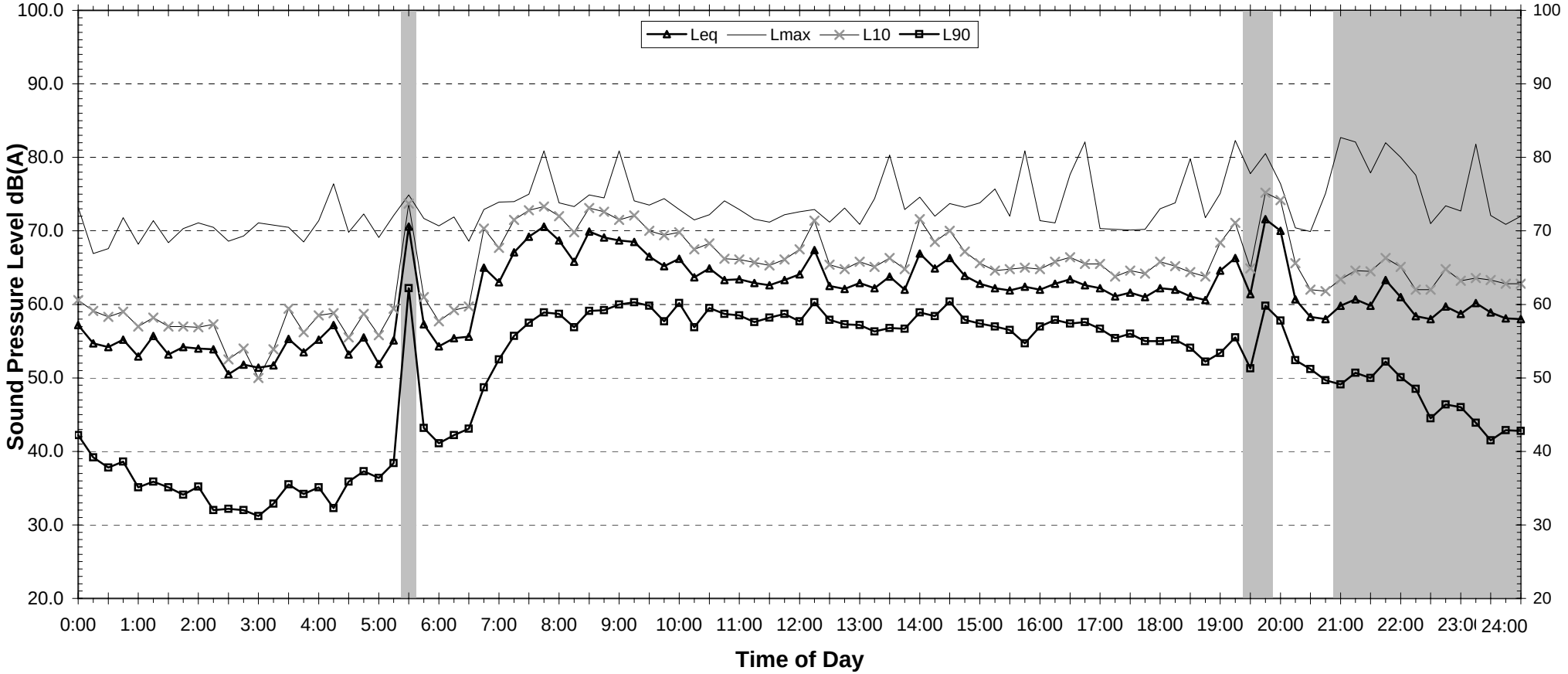
NSW ECRTN Policy (1m from facade) (see note3)		
Descriptor	Day	Night[2]
	7am-10pm	10pm-7am
$L_{eq\ 15\ hr}$ and $L_{eq\ 9\ hr}$	67.4	59.0
$L_{eq\ 1hr}$ upper 10 percentile	72.1	64.2
$L_{eq\ 1hr}$ lower 10 percentile	61.1	54.6

Night Time Maximum Noise Levels (see note 4)			
Lmax (Range)	71.1	to	76.4
Lmax - Leq (Range)	16.3	to	21.5

EXISTING AMBIENT NOISE LEVELS

Location M3 - Lenaghans Drive

Sunday, 16 December 2007



NSW Industrial Noise Policy (Free Field)			
Descriptor	Day	Evening	Night[2]
	7am-6pm	6pm-10pm	10pm-7am
L_{90}	55.7	-	-
Leq (see note 3)	65.4	-	-

NOTES:

1. Shaded periods denote measurements adversely affected by rain, wind or extraneous noise - data in these periods are excluded from calculations.

2. "Night" relates to period from 10pm on this graph to 7am on the following graph.

3. Graphed data measured in free-field; tabulated results facade corrected

4. Night time Lmax values are shown only where Lmax > 65dB(A) and where Lmax-Leq ≥ 15dB(A)

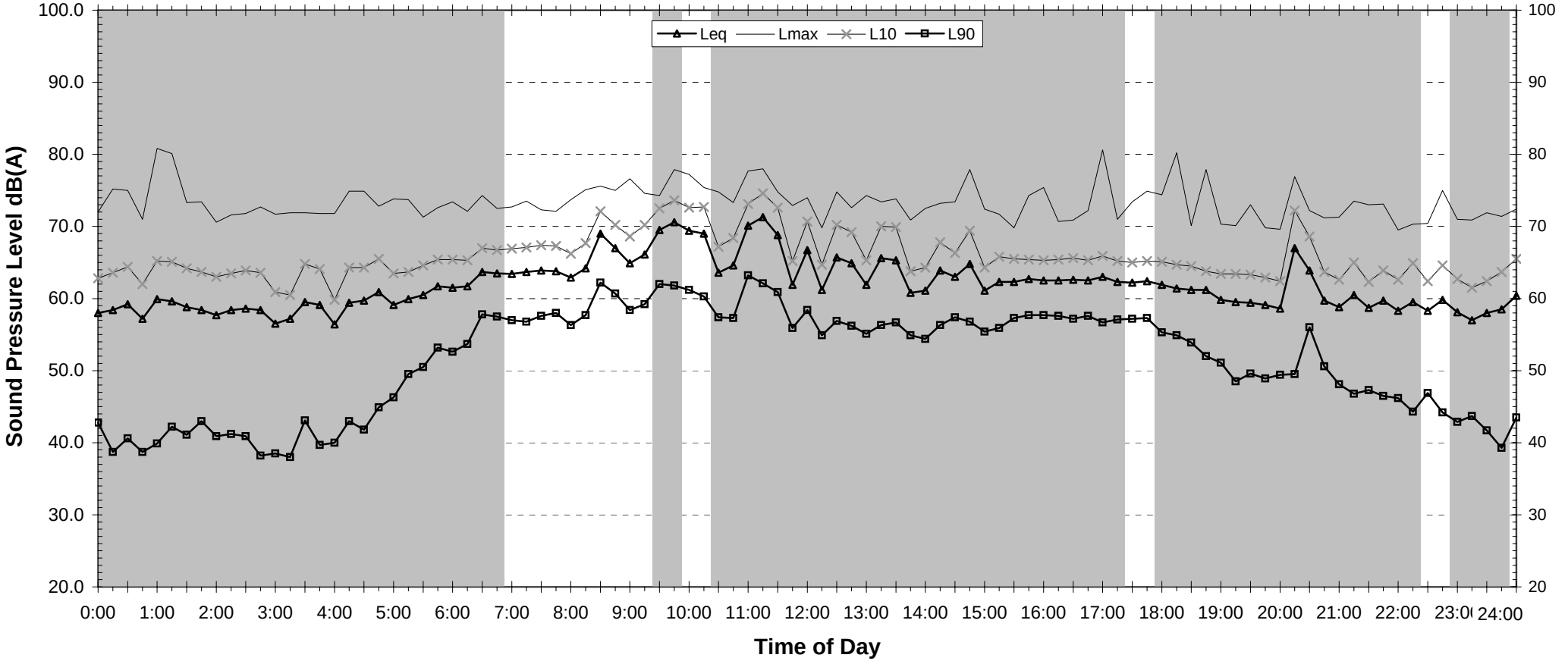
NSW ECRTN Policy (1m from facade) (see note3)		
Descriptor	Day	Night[2]
	7am-10pm	10pm-7am
$L_{eq\ 15\ hr}$ and $L_{eq\ 9\ hr}$	67.7	65.9
$L_{eq\ 1hr}$ upper 10 percentile	71.4	65.9
$L_{eq\ 1hr}$ lower 10 percentile	62.8	65.9

Night Time Maximum Noise Levels (see note 4)			
Lmax (Range)	-	to	-
Lmax - Leq (Range)	-	to	-

EXISTING AMBIENT NOISE LEVELS

Location M3 - Lenaghans Drive

Monday, 17 December 2007



NSW Industrial Noise Policy (Free Field)			
Descriptor	Day	Evening	Night[2]
	7am-6pm	6pm-10pm	10pm-7am
L_{90}	-	-	-
Leq (see note 3)	-	-	-

NOTES:

1. Shaded periods denote measurements adversely affected by rain, wind or extraneous noise - data in these periods are excluded from calculations.

2. "Night" relates to period from 10pm on this graph to 7am on the following graph.

3. Graphed data measured in free-field; tabulated results facade corrected

4. Night time Lmax values are shown only where Lmax > 65dB(A) and where Lmax-Leq ≥ 15dB(A)

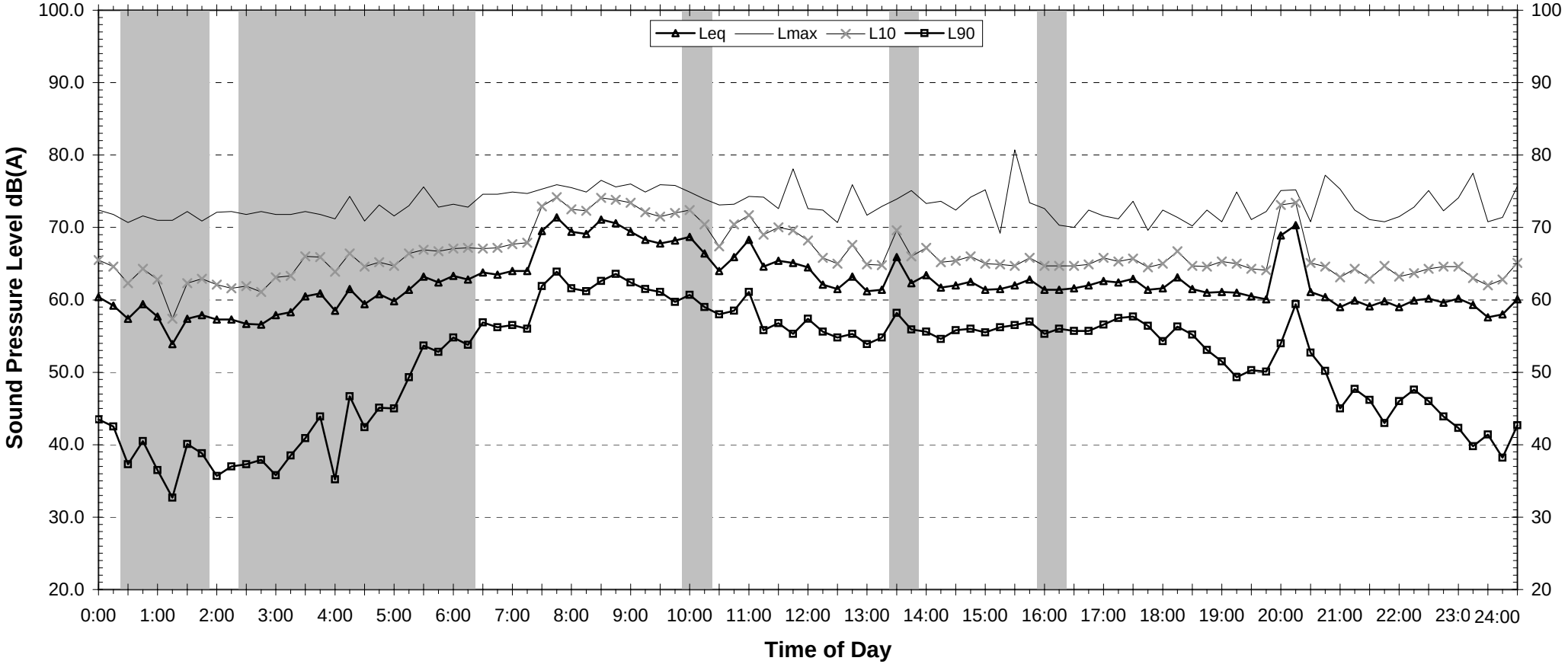
NSW ECRTN Policy (1m from facade) (see note3)		
Descriptor	Day	Night[2]
	7am-10pm	10pm-7am
$L_{eq\ 15\ hr}$ and $L_{eq\ 9\ hr}$	68.5	63.7
$L_{eq\ 1hr}$ upper 10 percentile	71.5	66.3
$L_{eq\ 1hr}$ lower 10 percentile	64.8	59.8

Night Time Maximum Noise Levels (see note 4)			
Lmax (Range)	75.0	to	75.0
Lmax - Leq (Range)	15.9	to	15.9

EXISTING AMBIENT NOISE LEVELS

Location M3 - Lenaghans Drive

Tuesday, 18 December 2007



NSW Industrial Noise Policy (Free Field)			
Descriptor	Day	Evening	Night[2]
	7am-6pm	6pm-10pm	10pm-7am
L_{90}	54.8	45.0	-
Leq (see note 3)	66.0	63.3	-

NOTES:

1. Shaded periods denote measurements adversely affected by rain, wind or extraneous noise - data in these periods are excluded from calculations.

2. "Night" relates to period from 10pm on this graph to 7am on the following graph.

3. Graphed data measured in free-field; tabulated results facade corrected

4. Night time Lmax values are shown only where Lmax > 65dB(A) and where Lmax-Leq ≥ 15dB(A)

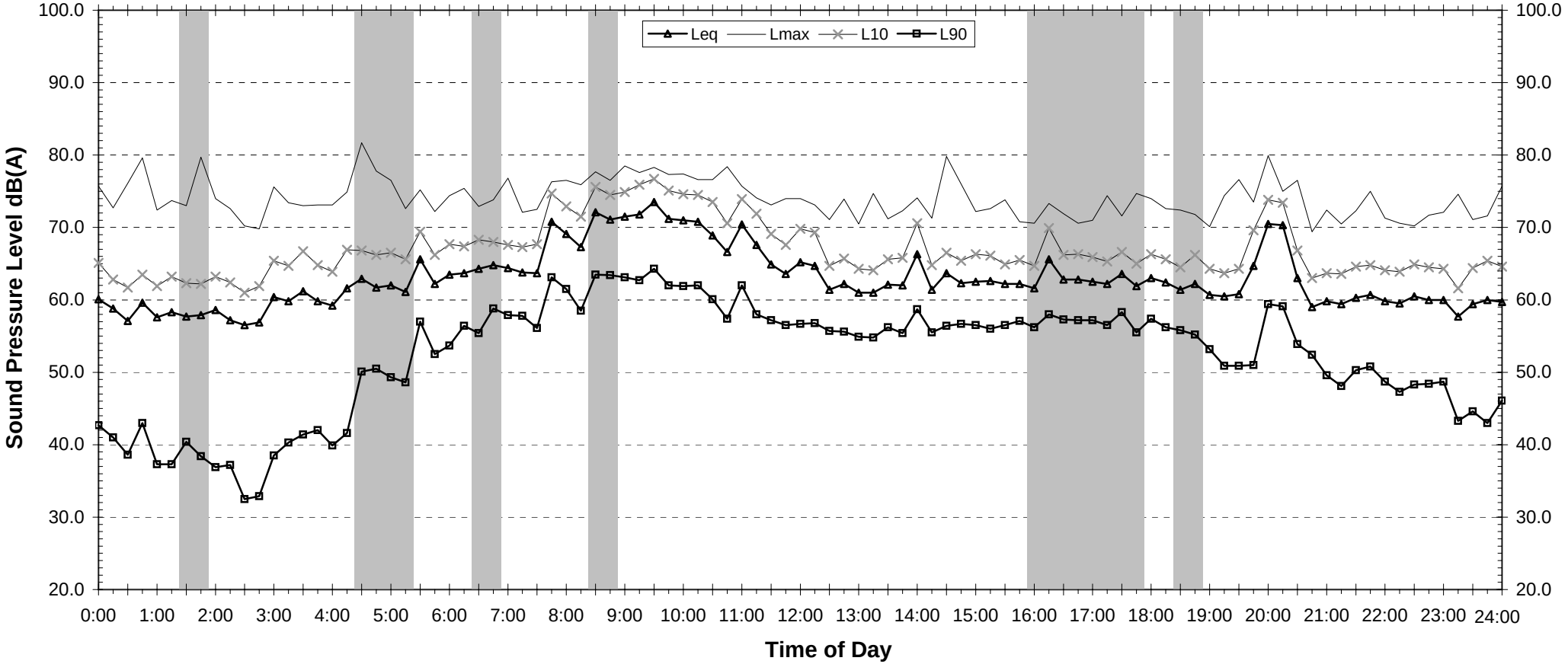
NSW ECRTN Policy (1m from facade) (see note3)		
Descriptor	Day	Night[2]
	7am-10pm	10pm-7am
$L_{eq\ 15\ hr}$ and $L_{eq\ 9\ hr}$	67.9	63.1
$L_{eq\ 1hr}$ upper 10 percentile	72.2	66.6
$L_{eq\ 1hr}$ lower 10 percentile	63.3	60.6

Night Time Maximum Noise Levels (see note 4)			
Lmax (Range)	74.0	to	79.6
Lmax - Leq (Range)	15.1	to	21.2

EXISTING AMBIENT NOISE LEVELS

Location M3 - Lenaghans Drive

Wednesday, 19 December 2007



NSW Industrial Noise Policy (Free Field)			
Descriptor	Day	Evening	Night[2]
	7am-6pm	6pm-10pm	10pm-7am
L_{90}	-	48.7	39.5
Leq (see note 3)	-	64.3	62.8

NOTES:

1. Shaded periods denote measurements adversely affected by rain, wind or extraneous noise - data in these periods are excluded from calculations.

2. "Night" relates to period from 10pm on this graph to 7am on the following graph.

3. Graphed data measured in free-field; tabulated results facade corrected

4. Night time Lmax values are shown only where Lmax > 65dB(A) and where Lmax-Leq ≥ 15dB(A)

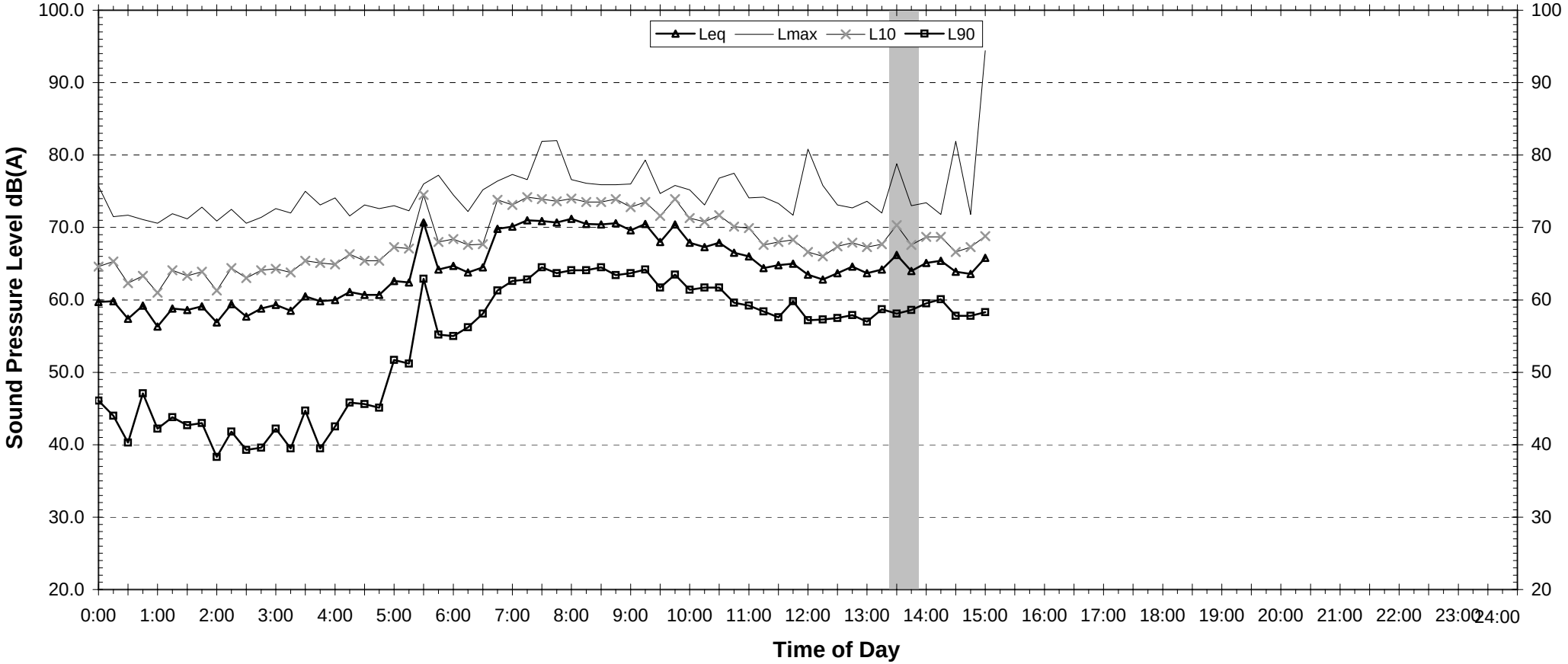
NSW ECRTN Policy (1m from facade) (see note3)		
Descriptor	Day	Night[2]
	7am-10pm	10pm-7am
$L_{eq\ 15\ hr}$ and $L_{eq\ 9\ hr}$	69.2	65.3
$L_{eq\ 1hr}$ upper 10 percentile	73.8	70.5
$L_{eq\ 1hr}$ lower 10 percentile	63.3	60.9

Night Time Maximum Noise Levels (see note 4)			
Lmax (Range)	75.0	to	75.7
Lmax - Leq (Range)	15.2	to	16.4

EXISTING AMBIENT NOISE LEVELS

Location M3 - Lenaghans Drive

Thursday, 20 December 2007



NSW Industrial Noise Policy (Free Field)			
Descriptor	Day	Evening	Night[2]
	7am-6pm	6pm-10pm	10pm-7am
L_{90}	-	-	-
Leq (see note 3)	-	-	-

NOTES:

1. Shaded periods denote measurements adversely affected by rain, wind or extraneous noise - data in these periods are excluded from calculations.

2. "Night" relates to period from 10pm on this graph to 7am on the following graph.

3. Graphed data measured in free-field; tabulated results facade corrected

4. Night time Lmax values are shown only where Lmax > 65dB(A) and where Lmax-Leq ≥ 15dB(A)

NSW ECRTN Policy (1m from facade) (see note3)		
Descriptor	Day	Night[2]
	7am-10pm	10pm-7am
$L_{eq\ 15\ hr}$ and $L_{eq\ 9\ hr}$	70.4	-
$L_{eq\ 1hr}$ upper 10 percentile	73.5	-
$L_{eq\ 1hr}$ lower 10 percentile	66.2	-

Night Time Maximum Noise Levels (see note 4)			
Lmax (Range)	-	to	-
Lmax - Leq (Range)	-	to	-

Renzo Tonin & Associates

noise logger results

Location M4 - Minmi Road

BACKGROUND & AMBIENT NOISE MONITORING RESULTS
NSW DEC's 'INDUSTRIAL NOISE POLICY', 2000

	L_{A90} Background Noise Levels[5]			L_{Aeq} Ambient Noise Levels		
Day	Day	Evening	Night	Day	Evening	Night
Monday-10-December-2007	-	39	-	-	66	-
Tuesday-11-December-2007	-	-	-	-	-	-
Wednesday-12-December-2007	-	-	-	-	-	-
Thursday-13-December-2007	-	-	34	-	-	44
Friday-14-December-2007	49	37	33	64	64	43
Saturday-15-December-2007	52	40	34	67	70	60
Sunday-16-December-2007	47	-	-	66	-	-
Monday-17-December-2007	-	-	-	-	-	-
Tuesday-18-December-2007	39	35	-	63	63	-
Wednesday-19-December-2007	-	37	35	-	65	49
Representative Level	**48**	**37**	**34**	**65**	**67**	**55**

Notes:

1. Day is taken to be 7:00am to 6:00pm
2. Evening is taken to be 6:00pm to 10:00pm.
3. Night is taken to be the remaining periods.
4. Partial day's monitoring
5. Assessment Background Level (ABL)
6. Rating Background Level (RBL) for L90 and logarithmic average for Leq

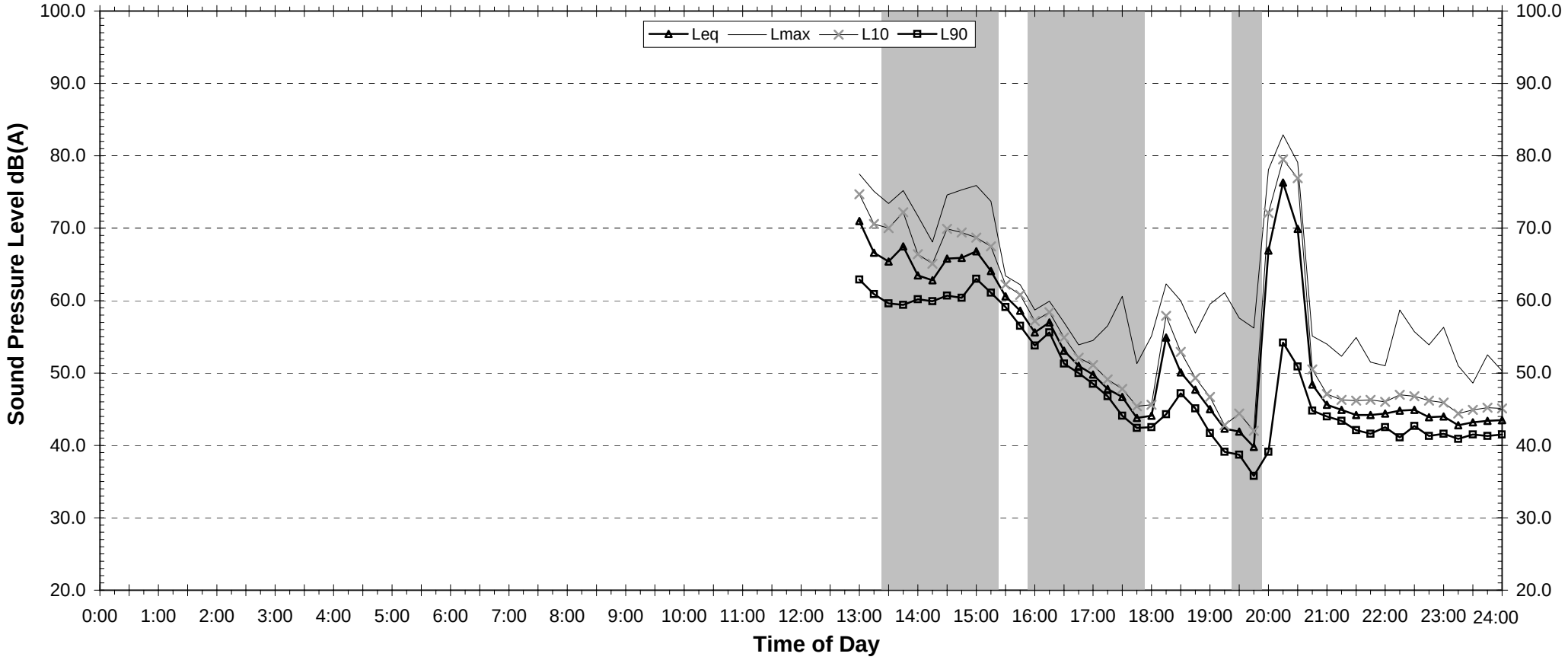
TRAFFIC NOISE MONITORING RESULTS
NSW DEC 'ENVIRONMENTAL CRITERIA FOR ROAD TRAFFIC NOISE', 1999

	L_{Aeq} Noise Levels		$L_{Aeq\ 1hr}$ Noise Levels			
Day	Day	Night	Day - Up	Day - Low	Night - Up	Night - Low
Monday-10-December-2007	69	45	74	47	47	42
Tuesday-11-December-2007	66	63	73	46	74	36
Wednesday-12-December-2007	66	48	71	45	52	44
Thursday-13-December-2007	69	46	75	47	52	42
Friday-14-December-2007	67	45	72	50	49	40
Saturday-15-December-2007	71	63	75	55	72	40
Sunday-16-December-2007	68	50	73	54	50	50
Monday-17-December-2007	62	48	69	50	51	44
Tuesday-18-December-2007	66	55	70	46	61	44
Wednesday-19-December-2007	68	51	71	45	60	40
Thursday-20-December-2007	67	-	71	64	-	-
Representative Weekday	**67**	**55**	**72**	**55**	**65**	**42**
Representative Weekend	**70**	**60**	**74**	**54**	**69**	**48**
Representative Week	**68**	**57**	**73**	**55**	**66**	**44**

EXISTING AMBIENT NOISE LEVELS

Location M4 - Minmi Road

Monday, 10 December 2007



NSW Industrial Noise Policy (Free Field)			
Descriptor	Day	Evening	Night[2]
	7am-6pm	6pm-10pm	10pm-7am
L_{90}	-	39.1	-
Leq (see note 3)	-	66.2	-

NOTES:

1. Shaded periods denote measurements adversely affected by rain, wind or extraneous noise - data in these periods are excluded from calculations.

2. "Night" relates to period from 10pm on this graph to 7am on the following graph.

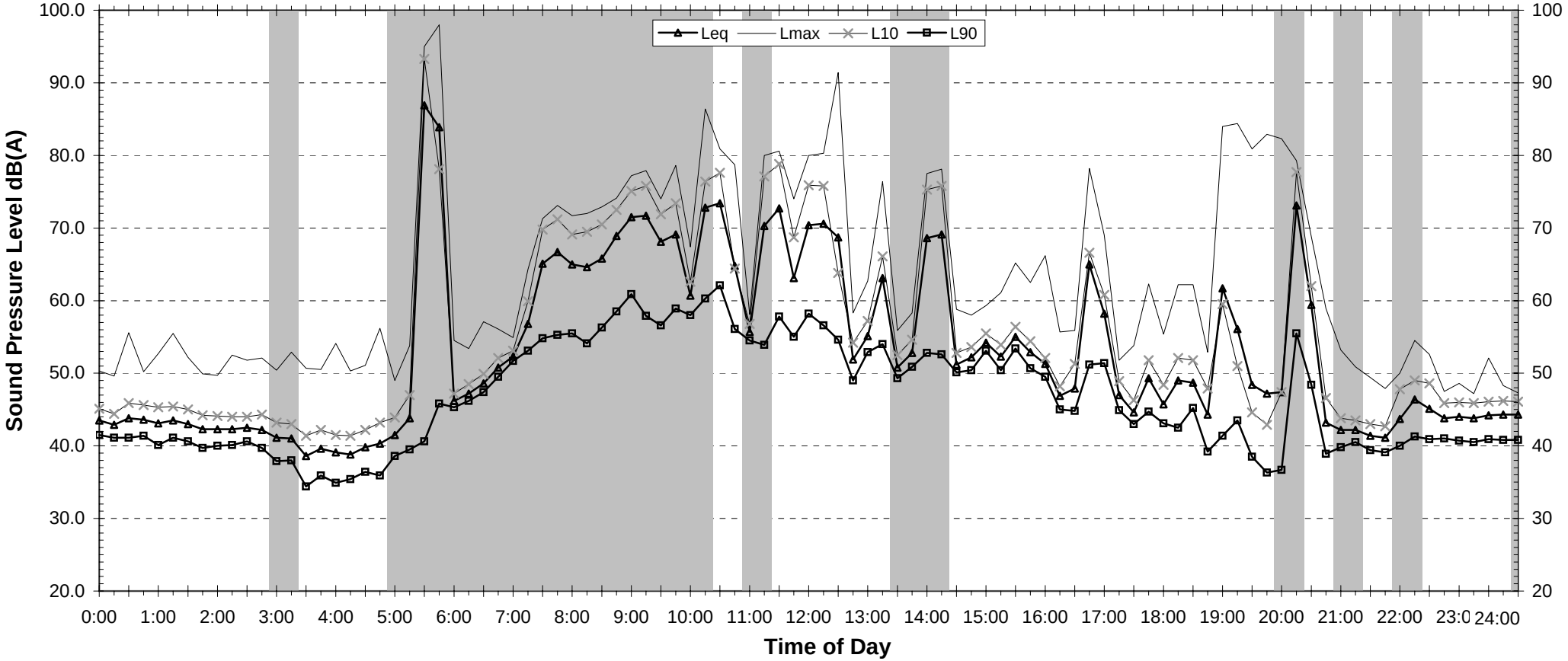
3. Graphed data measured in free-field; tabulated results facade corrected

4. Night time Lmax values are shown only where Lmax > 65dB(A) and where Lmax-Leq ≥ 15dB(A)

NSW ECRTN Policy (1m from facade) (see note3)		
Descriptor	Day	Night[2]
	7am-10pm	10pm-7am
$L_{eq\ 15\ hr}$ and $L_{eq\ 9\ hr}$	68.6	45.2
$L_{eq\ 1hr}$ upper 10 percentile	73.7	46.9
$L_{eq\ 1hr}$ lower 10 percentile	46.6	41.6

Night Time Maximum Noise Levels (see note 4)			
Lmax (Range)	-	to	-
Lmax - Leq (Range)	16.5	to	16.5

EXISTING AMBIENT NOISE LEVELS
Location M4 - Minmi Road
Tuesday, 11 December 2007



NSW Industrial Noise Policy (Free Field)			
Descriptor	Day	Evening	Night[2]
	7am-6pm	6pm-10pm	10pm-7am
L_{90}	-	-	-
Leq (see note 3)	-	-	-

NOTES:

1. Shaded periods denote measurements adversely affected by rain, wind or extraneous noise - data in these periods are excluded from calculations.

2. "Night" relates to period from 10pm on this graph to 7am on the following graph.

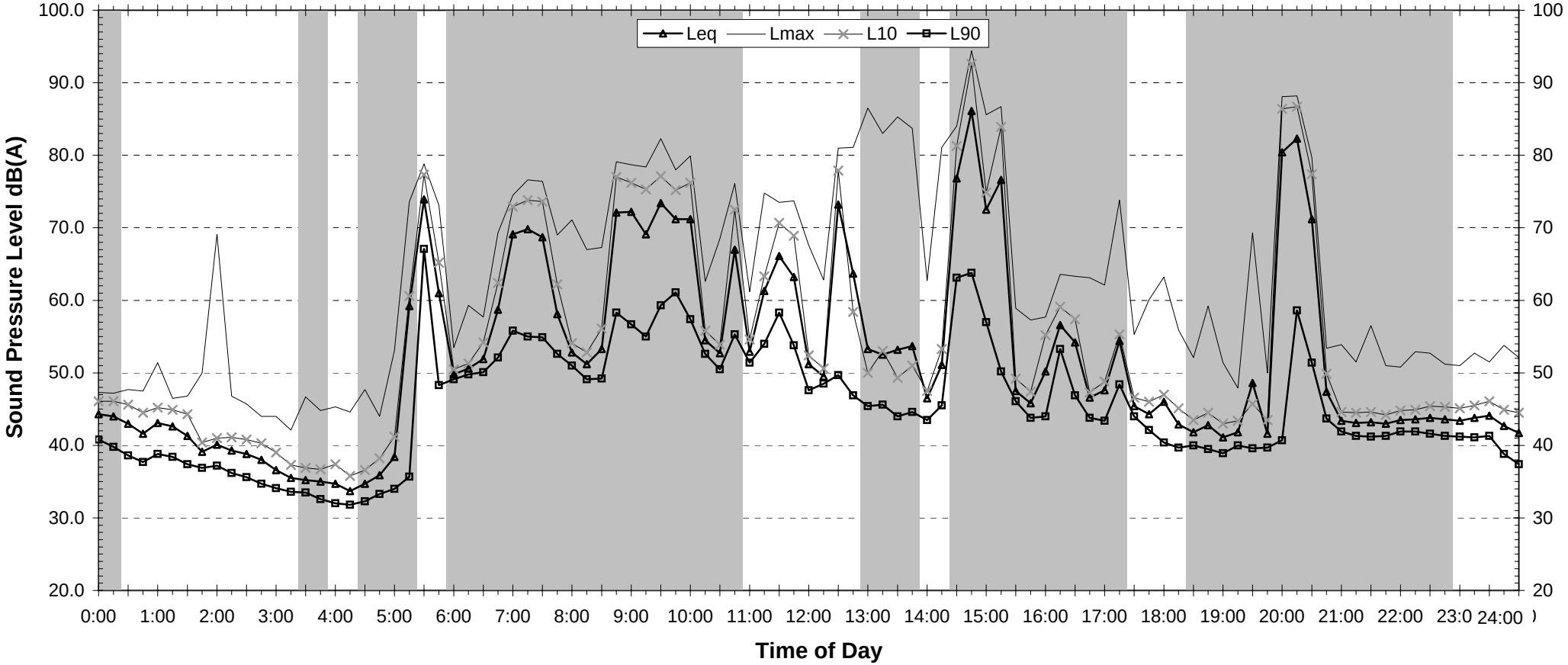
3. Graphed data measured in free-field; tabulated results facade corrected

4. Night time Lmax values are shown only where Lmax > 65dB(A) and where Lmax-Leq ≥ 15dB(A)

NSW ECRTN Policy (1m from facade) (see note3)		
Descriptor	Day	Night[2]
	7am-10pm	10pm-7am
$L_{eq\ 15\ hr}$ and $L_{eq\ 9\ hr}$	66.3	63.2
$L_{eq\ 1hr}$ upper 10 percentile	73.3	73.6
$L_{eq\ 1hr}$ lower 10 percentile	45.7	36.2

Night Time Maximum Noise Levels (see note 4)			
Lmax (Range)	69.1	to	69.1
Lmax - Leq (Range)	28.1	to	28.1

EXISTING AMBIENT NOISE LEVELS
Location M4 - Minmi Road
Wednesday, 12 December 2007



NSW Industrial Noise Policy (Free Field)			
Descriptor	Day	Evening	Night[2]
	7am-6pm	6pm-10pm	10pm-7am
L_{90}	-	-	-
Leq (see note 3)	-	-	-

NOTES:

1. Shaded periods denote measurements adversely affected by rain, wind or extraneous noise - data in these periods are excluded from calculations.

2. "Night" relates to period from 10pm on this graph to 7am on the following graph.

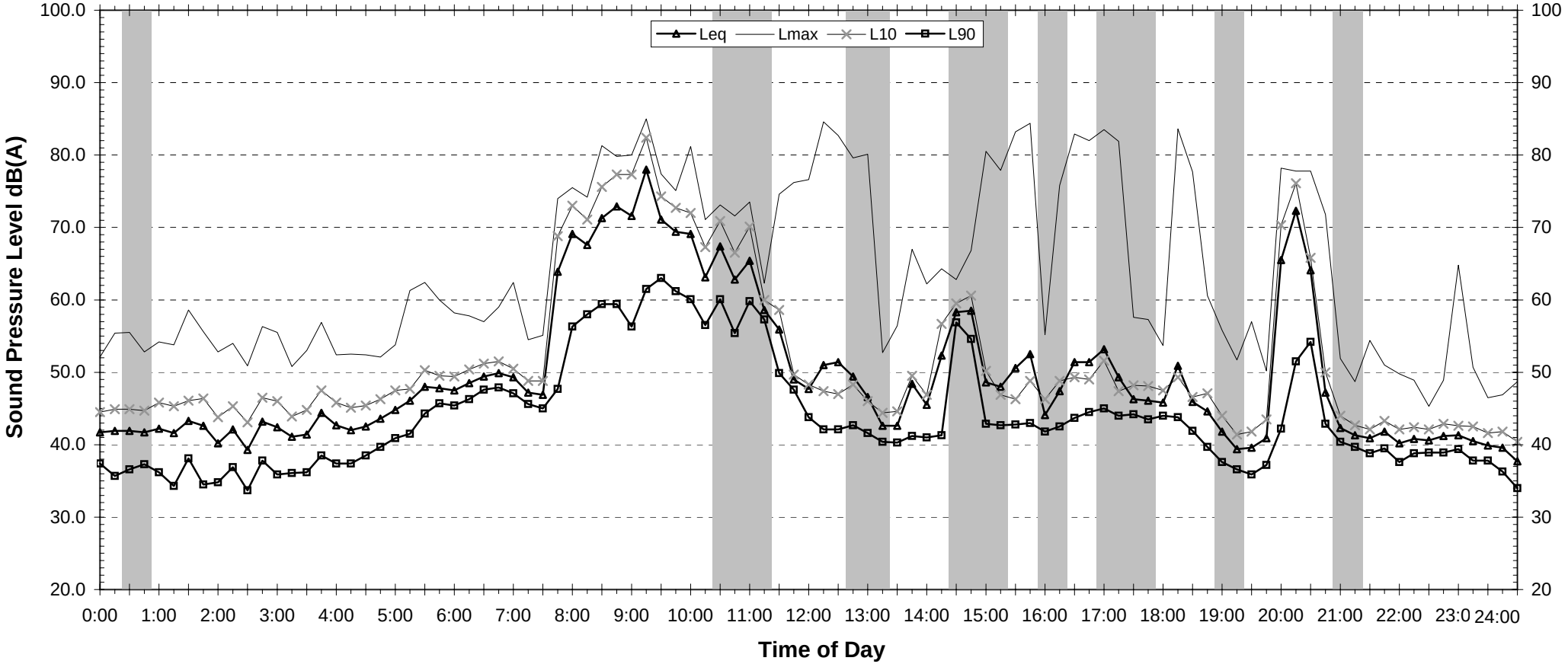
3. Graphed data measured in free-field; tabulated results facade corrected

4. Night time Lmax values are shown only where Lmax > 65dB(A) and where Lmax-Leq ≥ 15dB(A)

NSW ECRTN Policy (1m from facade) (see note3)		
Descriptor	Day	Night[2]
	7am-10pm	10pm-7am
$L_{eq\ 15\ hr}$ and $L_{eq\ 9\ hr}$	66.0	47.5
$L_{eq\ 1hr}$ upper 10 percentile	71.4	51.8
$L_{eq\ 1hr}$ lower 10 percentile	45.4	44.5

Night Time Maximum Noise Levels (see note 4)			
Lmax (Range)	-	to	-
Lmax - Leq (Range)	16.5	to	16.5

EXISTING AMBIENT NOISE LEVELS
Location M4 - Minmi Road
Thursday, 13 December 2007



NSW Industrial Noise Policy (Free Field)			
Descriptor	Day	Evening	Night[2]
	7am-6pm	6pm-10pm	10pm-7am
L_{90}	-	-	33.8
Leq (see note 3)	-	-	44.0

NOTES:

1. Shaded periods denote measurements adversely affected by rain, wind or extraneous noise - data in these periods are excluded from calculations.

2. "Night" relates to period from 10pm on this graph to 7am on the following graph.

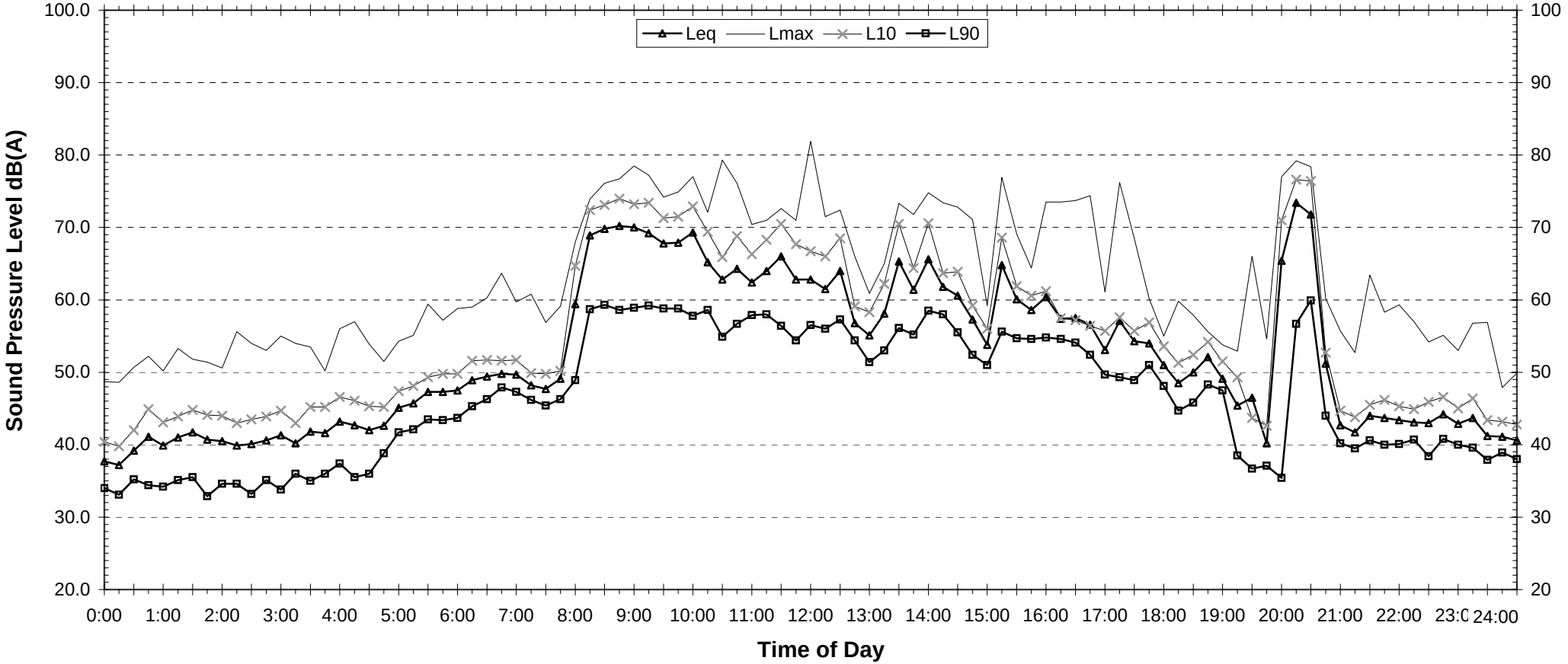
3. Graphed data measured in free-field; tabulated results facade corrected

4. Night time Lmax values are shown only where Lmax > 65dB(A) and where Lmax-Leq ≥ 15dB(A)

NSW ECRTN Policy (1m from facade) (see note3)		
Descriptor	Day	Night[2]
	7am-10pm	10pm-7am
$L_{eq\ 15\ hr}$ and $L_{eq\ 9\ hr}$	69.2	46.5
$L_{eq\ 1hr}$ upper 10 percentile	75.1	52.0
$L_{eq\ 1hr}$ lower 10 percentile	46.5	42.0

Night Time Maximum Noise Levels (see note 4)			
Lmax (Range)	-	to	-
Lmax - Leq (Range)	15.1	to	23.8

EXISTING AMBIENT NOISE LEVELS
Location M4 - Minmi Road
Friday, 14 December 2007



NSW Industrial Noise Policy (Free Field)			
Descriptor	Day	Evening	Night[2]
	7am-6pm	6pm-10pm	10pm-7am
L_{90}	48.9	36.7	32.7
Leq (see note 3)	64.1	64.1	42.8

NOTES:

1. Shaded periods denote measurements adversely affected by rain, wind or extraneous noise - data in these periods are excluded from calculations.

2. "Night" relates to period from 10pm on this graph to 7am on the following graph.

3. Graphed data measured in free-field; tabulated results facade corrected

4. Night time Lmax values are shown only where Lmax > 65dB(A) and where Lmax-Leq ≥ 15dB(A)

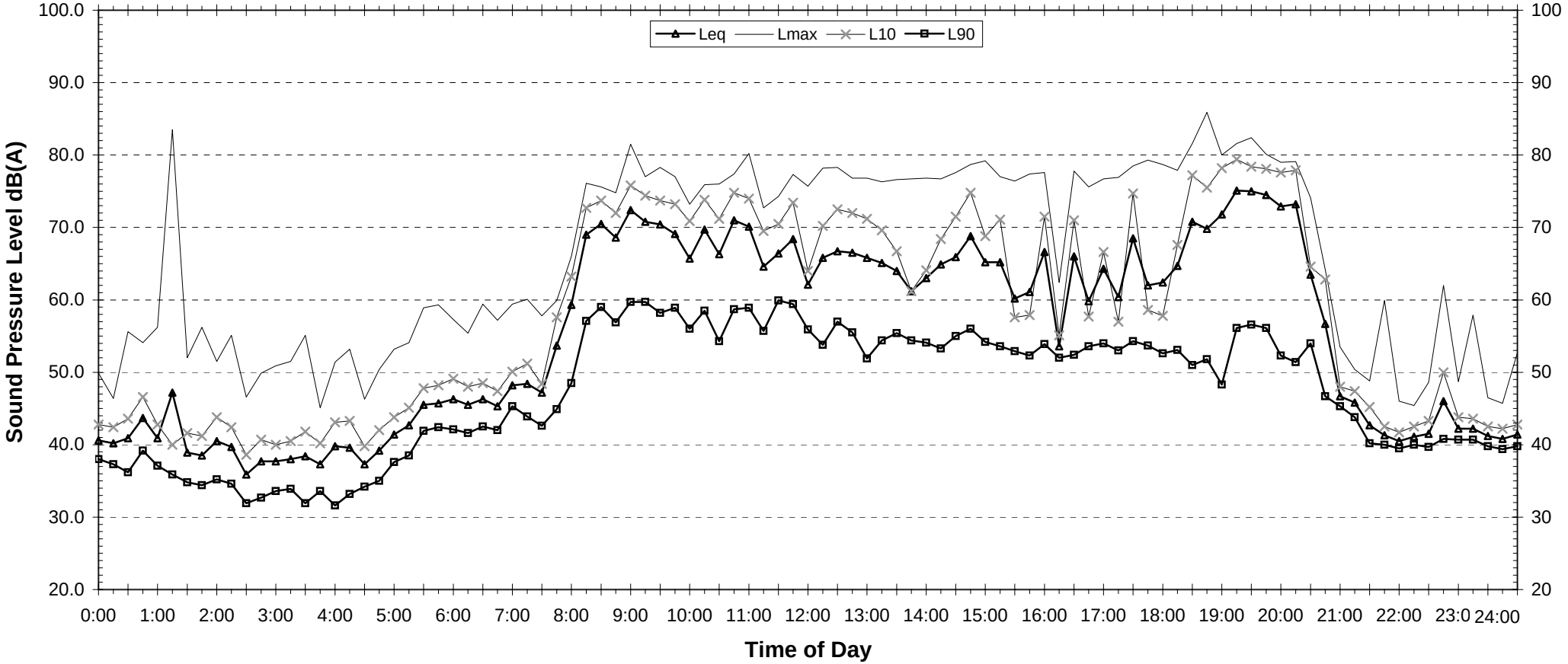
NSW ECRTN Policy (1m from facade) (see note3)		
Descriptor	Day	Night[2]
	7am-10pm	10pm-7am
$L_{eq\ 15\ hr}$ and $L_{eq\ 9\ hr}$	66.6	45.3
$L_{eq\ 1hr}$ upper 10 percentile	72.2	49.0
$L_{eq\ 1hr}$ lower 10 percentile	50.5	40.5

Night Time Maximum Noise Levels (see note 4)			
Lmax (Range)	83.5	to	83.5
Lmax - Leq (Range)	15.1	to	40.6

EXISTING AMBIENT NOISE LEVELS

Location M4 - Minmi Road

Saturday, 15 December 2007



NSW Industrial Noise Policy (Free Field)			
Descriptor	Day	Evening	Night[2]
	7am-6pm	6pm-10pm	10pm-7am
L_{90}	51.9	40.0	33.9
Leq (see note 3)	66.7	70.4	60.4

NOTES:

1. Shaded periods denote measurements adversely affected by rain, wind or extraneous noise - data in these periods are excluded from calculations.

2. "Night" relates to period from 10pm on this graph to 7am on the following graph.

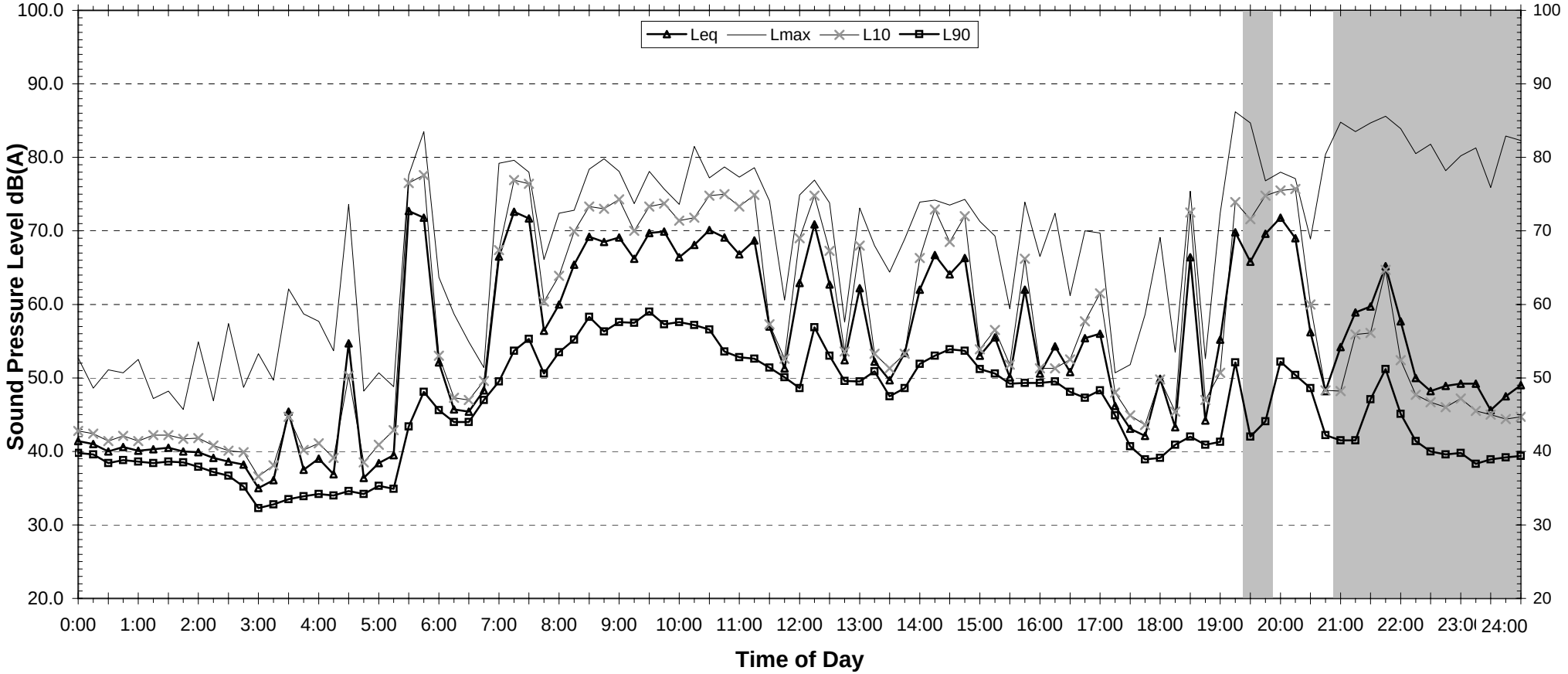
3. Graphed data measured in free-field; tabulated results facade corrected

4. Night time Lmax values are shown only where Lmax > 65dB(A) and where Lmax-Leq ≥ 15dB(A)

NSW ECRTN Policy (1m from facade) (see note3)		
Descriptor	Day	Night[2]
	7am-10pm	10pm-7am
$L_{eq\ 15\ hr}$ and $L_{eq\ 9\ hr}$	70.5	62.9
$L_{eq\ 1hr}$ upper 10 percentile	75.4	71.8
$L_{eq\ 1hr}$ lower 10 percentile	54.6	40.5

Night Time Maximum Noise Levels (see note 4)			
Lmax (Range)	73.6	to	79.2
Lmax - Leq (Range)	16.5	to	24.7

EXISTING AMBIENT NOISE LEVELS
Location M4 - Minmi Road
Sunday, 16 December 2007



NSW Industrial Noise Policy (Free Field)			
Descriptor	Day	Evening	Night[2]
	7am-6pm	6pm-10pm	10pm-7am
L_{90}	47.3	-	-
Leq (see note 3)	65.7	-	-

NOTES:

1. Shaded periods denote measurements adversely affected by rain, wind or extraneous noise - data in these periods are excluded from calculations.

2. "Night" relates to period from 10pm on this graph to 7am on the following graph.

3. Graphed data measured in free-field; tabulated results facade corrected

4. Night time Lmax values are shown only where Lmax > 65dB(A) and where Lmax-Leq ≥ 15dB(A)

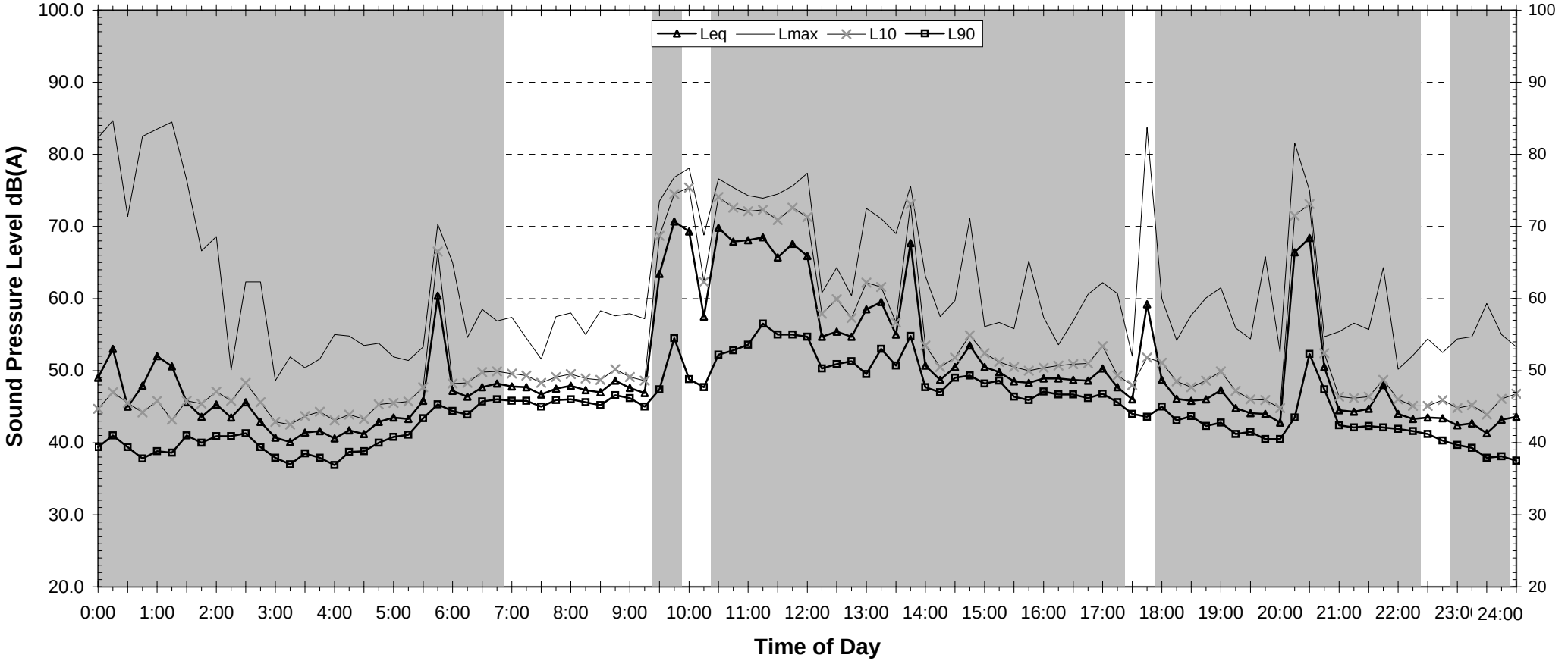
NSW ECRTN Policy (1m from facade) (see note3)		
Descriptor	Day	Night[2]
	7am-10pm	10pm-7am
$L_{eq\ 15\ hr}$ and $L_{eq\ 9\ hr}$	68.3	50.3
$L_{eq\ 1hr}$ upper 10 percentile	72.9	50.3
$L_{eq\ 1hr}$ lower 10 percentile	54.0	50.3

Night Time Maximum Noise Levels (see note 4)			
Lmax (Range)	-	to	-
Lmax - Leq (Range)	-	to	-

EXISTING AMBIENT NOISE LEVELS

Location M4 - Minmi Road

Monday, 17 December 2007



NSW Industrial Noise Policy (Free Field)			
Descriptor	Day	Evening	Night[2]
	7am-6pm	6pm-10pm	10pm-7am
L_{90}	-	-	-
Leq (see note 3)	-	-	-

NOTES:

1. Shaded periods denote measurements adversely affected by rain, wind or extraneous noise - data in these periods are excluded from calculations.

2. "Night" relates to period from 10pm on this graph to 7am on the following graph.

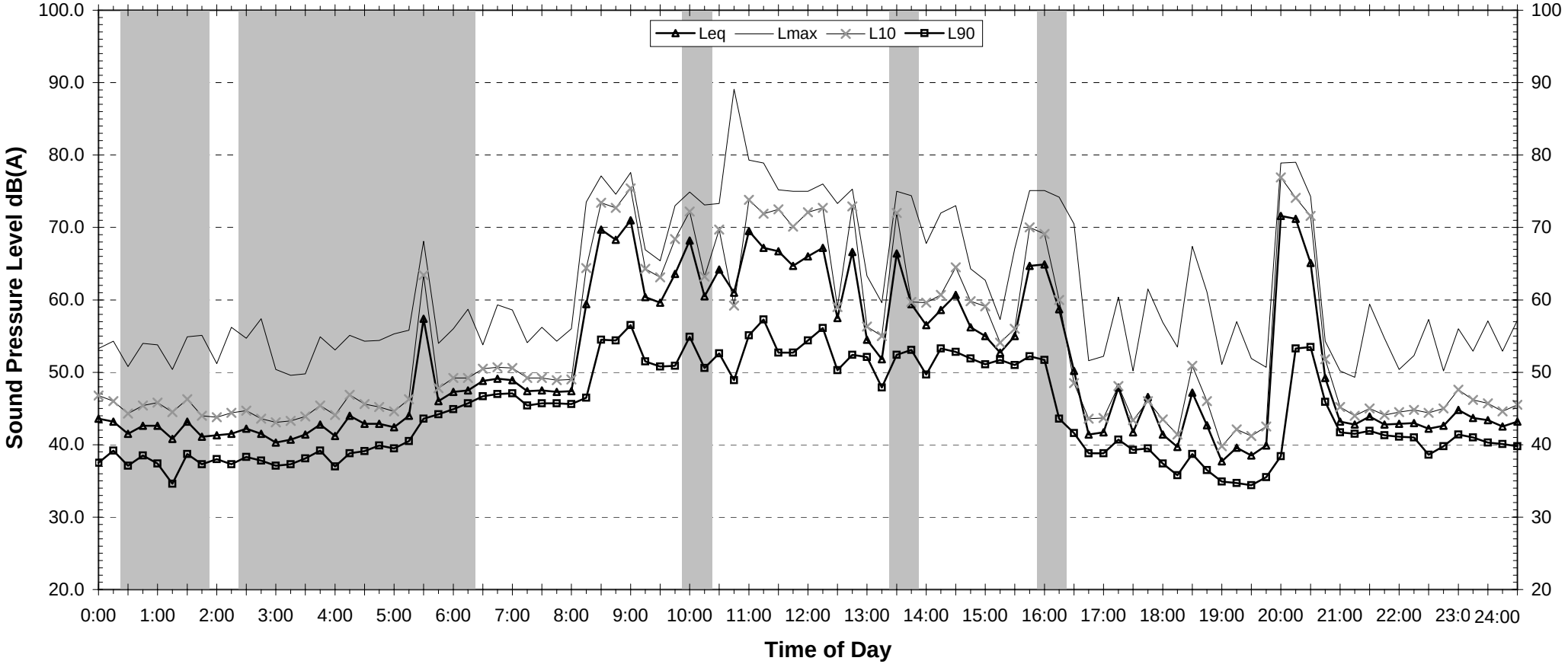
3. Graphed data measured in free-field; tabulated results facade corrected

4. Night time Lmax values are shown only where Lmax > 65dB(A) and where Lmax-Leq ≥ 15dB(A)

NSW ECRTN Policy (1m from facade) (see note3)		
Descriptor	Day	Night[2]
	7am-10pm	10pm-7am
$L_{eq\ 15\ hr}$ and $L_{eq\ 9\ hr}$	61.6	48.4
$L_{eq\ 1hr}$ upper 10 percentile	68.8	51.4
$L_{eq\ 1hr}$ lower 10 percentile	50.0	43.8

Night Time Maximum Noise Levels (see note 4)			
Lmax (Range)	-	to	-
Lmax - Leq (Range)	-	to	-

EXISTING AMBIENT NOISE LEVELS
Location M4 - Minmi Road
Tuesday, 18 December 2007



NSW Industrial Noise Policy (Free Field)			
Descriptor	Day	Evening	Night[2]
	7am-6pm	6pm-10pm	10pm-7am
L_{90}	39.3	34.7	-
Leq (see note 3)	63.3	62.9	-

NOTES:

1. Shaded periods denote measurements adversely affected by rain, wind or extraneous noise - data in these periods are excluded from calculations.

2. "Night" relates to period from 10pm on this graph to 7am on the following graph.

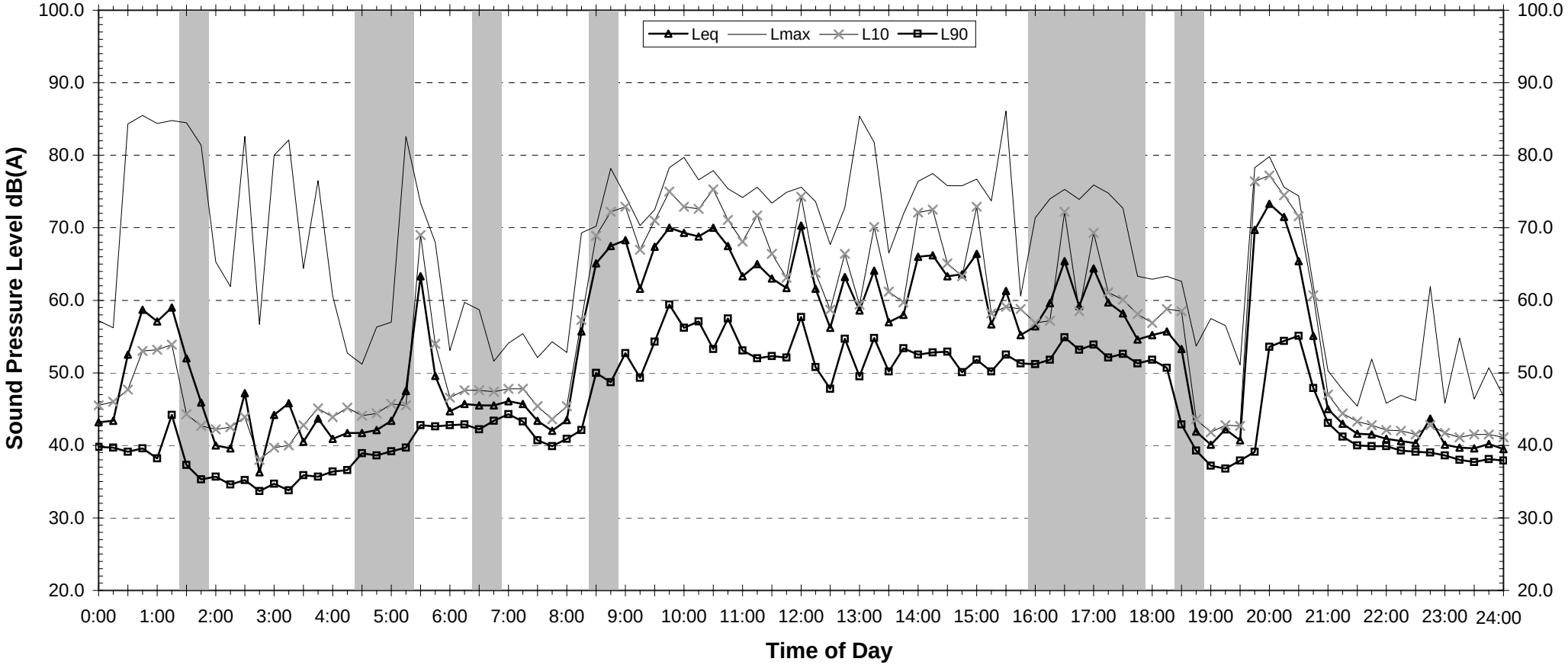
3. Graphed data measured in free-field; tabulated results facade corrected

4. Night time Lmax values are shown only where Lmax > 65dB(A) and where Lmax-Leq ≥ 15dB(A)

NSW ECRTN Policy (1m from facade) (see note3)		
Descriptor	Day	Night[2]
	7am-10pm	10pm-7am
$L_{eq\ 15\ hr}$ and $L_{eq\ 9\ hr}$	65.7	55.0
$L_{eq\ 1hr}$ upper 10 percentile	70.2	61.3
$L_{eq\ 1hr}$ lower 10 percentile	45.7	44.2

Night Time Maximum Noise Levels (see note 4)			
Lmax (Range)	82.1	to	85.5
Lmax - Leq (Range)	28.8	to	39.0

EXISTING AMBIENT NOISE LEVELS
Location M4 - Minmi Road
Wednesday, 19 December 2007



NSW Industrial Noise Policy (Free Field)			
Descriptor	Day	Evening	Night[2]
	7am-6pm	6pm-10pm	10pm-7am
L_{90}	-	37.2	34.5
Leq (see note 3)	-	65.5	48.8

NOTES:

1. Shaded periods denote measurements adversely affected by rain, wind or extraneous noise - data in these periods are excluded from calculations.

2. "Night" relates to period from 10pm on this graph to 7am on the following graph.

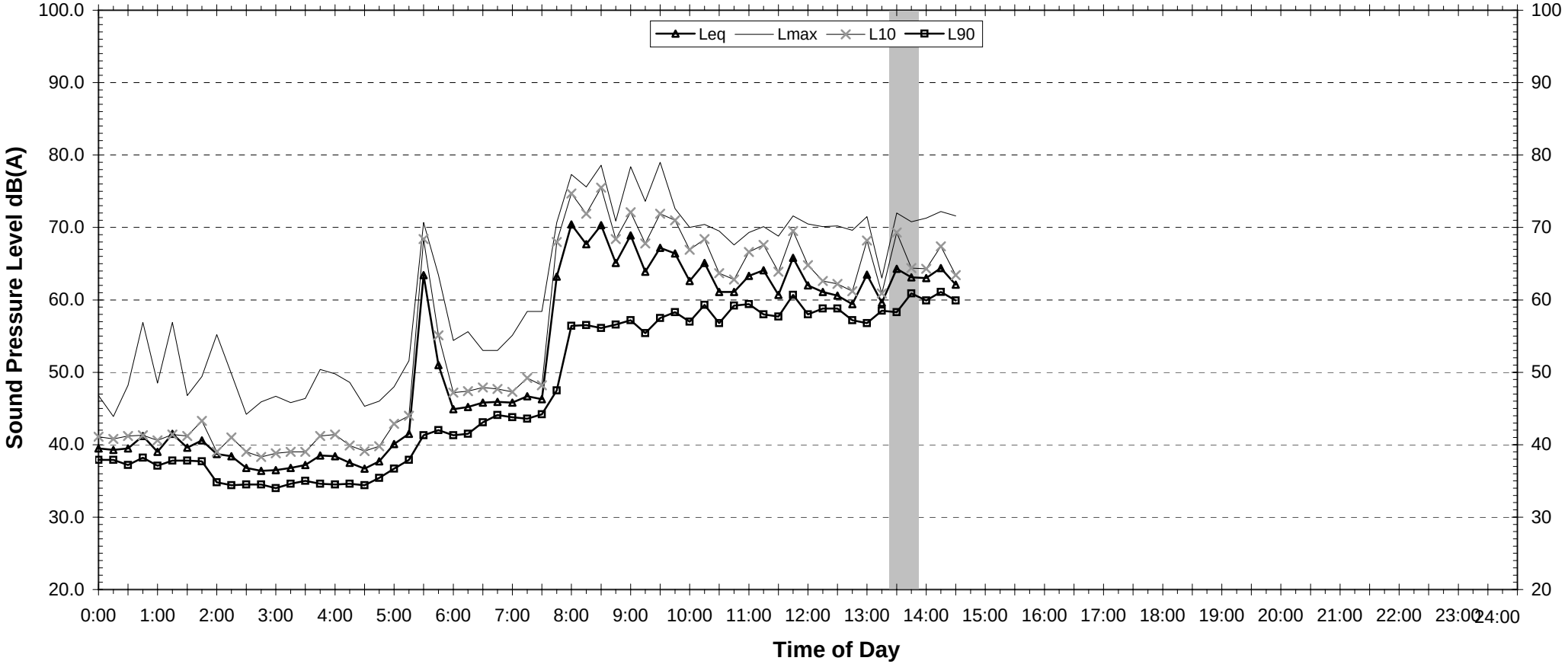
3. Graphed data measured in free-field; tabulated results facade corrected

4. Night time Lmax values are shown only where Lmax > 65dB(A) and where Lmax-Leq ≥ 15dB(A)

NSW ECRTN Policy (1m from facade) (see note3)		
Descriptor	Day	Night[2]
	7am-10pm	10pm-7am
$L_{eq\ 15\ hr}$ and $L_{eq\ 9\ hr}$	67.5	51.3
$L_{eq\ 1hr}$ upper 10 percentile	71.0	60.2
$L_{eq\ 1hr}$ lower 10 percentile	45.3	39.6

Night Time Maximum Noise Levels (see note 4)			
Lmax (Range)	-	to	-
Lmax - Leq (Range)	15.0	to	20.4

EXISTING AMBIENT NOISE LEVELS
Location M4 - Minmi Road
Thursday, 20 December 2007



NSW Industrial Noise Policy (Free Field)			
Descriptor	Day	Evening	Night[2]
	7am-6pm	6pm-10pm	10pm-7am
L_{90}	-	-	-
Leq (see note 3)	-	-	-

NOTES:

1. Shaded periods denote measurements adversely affected by rain, wind or extraneous noise - data in these periods are excluded from calculations.

2. "Night" relates to period from 10pm on this graph to 7am on the following graph.

3. Graphed data measured in free-field; tabulated results facade corrected

4. Night time Lmax values are shown only where Lmax > 65dB(A) and where Lmax-Leq ≥ 15dB(A)

NSW ECRTN Policy (1m from facade) (see note3)		
Descriptor	Day	Night[2]
	7am-10pm	10pm-7am
$L_{eq\ 15\ hr}$ and $L_{eq\ 9\ hr}$	67.3	-
$L_{eq\ 1hr}$ upper 10 percentile	70.9	-
$L_{eq\ 1hr}$ lower 10 percentile	63.9	-

Night Time Maximum Noise Levels (see note 4)			
Lmax (Range)	-	to	-
Lmax - Leq (Range)	-	to	-