

LEE WHARF BUILDING C, HONEYSUCKLE DRIVE,
NEWCASTLE NSW
NOISE IMPACT ASSESSMENT OF OUTDOOR TERRACE

TE391-01F05 (REV 0) NOISE IMPACT ASSESSMENT

19 JUNE 2009

Prepared for:

Lee Wharf Developments Pty Ltd

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Attention: Ms Briony Mitchell



DOCUMENT CONTROL

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1 INTRODUCTION

Development Application MP05_007 for adaptive reuse of the Lee Wharf Building C located at Honeysuckle Drive, Newcastle NSW for hotel and restaurant use was approved by the Minister for Planning on 9th July 2008 pursuant to Part 3A of the Environmental Planning and Assessment Act 1979.

An application was submitted by Caverstock Group Pty Ltd (Applicant) on 30th October 2008, seeking to modify two conditions, namely Condition A6(2) which was refused and Condition G1 which was approved. Condition A6(2) restricts the use of the outdoor deck to 10pm and the extended hours sought were 11pm Mon-Thu and midnight Fri-Sat.

Renzo Tonin & Associates was engaged to prepare a noise impact assessment in support of a proposal to extend the operating hours to midnight Monday to Saturday. (the extended hours). 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 DESCRIPTION OF THE SURROUNDING LAND USE, THE DEVELOPMENT AND HOURS OF OPERATION

Lee Wharf Building C (LWC) is located to the north of Honeysuckle Drive and is within the local government area of the City of Newcastle Council. Newcastle Harbour and the steel works are situated to the north of the subject site.

A mixture of 5-7 storey residential and commercial buildings known as A1-A6 are located to the south of the subject site (see Figure 1). In particular, building A2 is a 5 storey residential building with a restaurant tenancy on the ground floor (Hog's Breath). Building A1 is also a 5 storey residential building with a take-away shop on the ground floor (Subway). Building A3 is a recently completed commercial building as yet untenanted. Building A5 is a recently completed 5-7 storey residential building with retail on the ground floor and building A6 is a recently completed 5-7 storey mixed commercial and residential building with retail on the ground floor.

It is clear that, as these buildings become inhabited, the nature of the area will change to a cosmopolitan ambience and the background noise levels in the area will probably increase in the future as residents move into the area.

LWC is approved for use as a hotel incorporating a restaurant and an outdoor deck area (see Figure 2). An operational plan of management was prepared by Altis Architecture dated 18th February 2008.

The approved trading hours of LWC are as follows:

Monday to Thursday	10:00am to 11:00pm
Friday and Saturday	10:00am to midnight
Sunday	10:00am to 10:00pm
Two special events per calendar year	10:00am to 1:00am
Outdoor Deck any time	10:00am to 10:00pm

Conditions A6(2) and A6(3) of the development consent require as follows:

(2) The outdoor deck area is to operate between the hours of 10:00 AM and 10:00 PM seven (7) days a week. No patrons are permitted in this area after 10:00 PM.

(3) A maximum of 2 special events per calendar year are permitted at which time the hotel and restaurant use may be extended until 1:00PM (sic), on a public holiday, night preceding a public holiday or on a Friday or Saturday night. During special events, use of the outdoor deck area must cease by 10:00PM. Any additional events to this are to be subject to a separate approval by Newcastle City Council.

The proposed Section 75W application of 30th October 2008 referred to in the introduction sought to delete condition A6(2). In response to that application, the NSW Department of Planning (DoP) prepared a report dated January 2009 in which it stated:¹

This part of Condition A6 was included in the approval in order to protect the acoustic amenity of the nearest residential properties from noise generated by patrons utilising the outdoor deck area as well as outdoor plant equipment. The basis for the 10pm closure comes from the DECC criteria whereby it is appreciated that excessive noise levels potentially interfere with local resident's sleep.

The nearest residential properties are situated approximately 40-50m away, directly above commercial properties reflecting the mixed use nature of the overall development. The DG's assessment report (5.5.1) states that, "noise control measures are recommended to be implemented, and a condition of the application will require a restriction to the hours of use for the outdoor deck area whereby all patrons must be cleared by 10pm."

The proponent states that a Plan of Management (required by Condition G4) for the hotel will ensure that acoustic barriers 1500mm - 1800mm above the outdoor deck area are installed as well as, on leaving the premises patrons will be gathered into the entry area or lounge. The effect of these acoustic barriers however cannot be demonstrated at this stage in terms of their ability to prevent noise from disturbing nearby residents travelling from the outdoor deck.

The modification application states that further information has been sought from the proponent's acoustic consultant (Reverb Acoustics). The findings of the consultants report (dated 11 August 2008) reveal that initial noise impacts in the outdoor area assumed that up to 100 patrons would occupy the outdoor area where in fact further calculations reveal that 500 patrons would need to occupy the outdoor area at the same time to exceed the criteria at the necessary residential receivers. The outdoor area is 380m², which the Building Code of Australia (BCA) limit would be 380 patrons. The Department is not able to predict at this stage whether the noise generated by patrons of the outdoor deck will be detrimental to the residential amenity of nearby residents.

The letter (dated 26 September 2008) from Lee Wharf Developments which accompanied the modification request states that none of the other existing restaurants in the Honeysuckle precinct have a restriction on their outdoor dining and they happen to be located closer to residential properties and in some case are directly below them. The letter also states that if the eastern and western ends of the outdoor deck have limited hours of use it would protect neighbours from any negative acoustic impacts.

The additional information from the acoustics consultant also states that Liquor Administration Board's Standard Noise Conditions apply due to the fact that the Lee Wharf hotel is a licensed premises.

¹ Section 7.1. Department of Planning Report, January 2009

On review it has not been satisfactorily justified to the Department that an extension to the trading hours would not result in a negative impact on the amenity of nearby residential properties. By extending the operational hours of the outdoor deck area as well as removing the limit on the number of patrons, a real risk is posed in terms of exceeding reasonable noise levels. Solely relying on noise criteria in the conditions of consent could lead to difficulties with regard to enforcement action.

Once the use commences operation, if it can be demonstrated that the use of the outdoor deck area by a larger number of persons does not create an unacceptable level of noise, it may be possible to trial an extension to the operational hours of the deck area.

In this regard the Department does not support the deletion of this part of the condition.

It is clear that before the Department can favourably consider an application to amend the hours of operation of the outdoor deck, it must be demonstrated in a satisfactory way that noise impacts at the nearest residential receivers will be acceptable.

This report seeks to provide that information.

3 APPLICABLE NOISE CRITERIA

3.1 OLGR and DECC Noise Policy

Noise impact in the extended hours (10:00pm to midnight) is the focus of this report. This is the worst case situation for if noise levels comply in the extended hours then they will also comply at other times.

There are two applicable criteria relating to noise from night-time venues. If the venue is licenced then the noise policy of the NSW Office of Liquor, Gaming and Racing (OLGR - formally known as Liquor Administration Board) applies. The OLGR criteria are stricter than those of the Department of Environment and Climate Change (DECC) because they apply to each octave band instead of a single overall A-weighted noise level.

The OLGR, through the Liquor Act 2007, is the regulatory authority dealing with noise disturbance issues pertaining to licensed premises. The OLGR adopts the following standard noise condition:

*The L_{A10} * noise level emitted from the licensed premises shall not exceed the background noise level in an Octave Band Centre Frequency (31.5Hz – 8kHz inclusive) by more than 5dB between 7:00am and 12:00 midnight at the boundary of any affected residence.*

Notwithstanding compliance with the above, the noise from the licensed premises shall not be audible within any habitable room in any residential premises between the hours of 12:00 midnight and 7:00am.

Interior noise levels which still exceed safe hearing levels are in no way supported or condoned by the NSW Office of Liquor, Gaming and Racing.

This is a minimum standard. In some instances the Board may specify a time earlier than midnight in respect of the above condition.

**For the purposes of this condition, the L_{A10} can be taken as the average maximum deflection of the noise emission from the licensed premises.*

That is, in the case of the subject development, the appropriate criterion in the extended hours is "background + 5" in octave bands as the extended hours to not go beyond midnight.

The DECC publishes the following noise guideline for night-time annoyance (that is, the period 10pm to 7am):

Peak noise level events, such as reversing beepers, noise from heavy items being dropped or other high noise level events, have the potential to cause sleep disturbance. The potential for high noise level events at night and effects on sleep should be addressed in noise assessments for both the construction and operational phases of a development. The INP does not specifically address sleep disturbance from high noise level events.

DEC reviewed research on sleep disturbance in the NSW Environmental Criteria for Road Traffic Noise (ECRTN) (EPA, 1999). This review concluded that the range of results is sufficiently diverse that it was not reasonable to issue new noise criteria for sleep disturbance.

From the research, DEC recognised that current sleep disturbance criterion of an LA1, (1 minute) not exceeding the LA90, (15 minute) by more than 15 dB(A) is not ideal. Nevertheless, as there is insufficient evidence to determine what should replace it, DEC will continue to use it as a guide to identify the likelihood of sleep disturbance. This means that where the criterion is met, sleep disturbance is not likely, but where it is not met, a more detailed analysis is required.

The detailed analysis should cover the maximum noise level or LA1, (1 minute), that is, the extent to which the maximum noise level exceeds the background level and the number of times this happens during the night-time period. Some guidance on possible impact is contained in the review of research results in the appendices to the ECRTN. Other factors that may be important in assessing the extent of impacts on sleep include:

- how often high noise events will occur*
- time of day (normally between 10pm and 7am)*
- whether there are times of day when there is a clear change in the noise environment (such as during early morning shoulder periods).*

The LA1, (1 minute) descriptor is meant to represent a maximum noise level measured under 'fast' time response. DEC will accept analysis based on either LA1, (1 minute) or LA, (Max).

The policy states that a sleep disturbance criterion of $L_{A1(1min)} \leq L_{A90(15min)} + 15dB(A)$, should be used as a first step 'guide' as it is 'not ideal' and 'where it is not met, a more detailed analysis is required'. It is noted that the DECC policy includes in the background $L_{A90(15minute)}$, noise from the subject premises.

3.2 Measured Ambient Noise Levels and Applicable Criterion

Ambient noise levels were measured on site using an unattended noise logger from Tuesday 12th May to Tuesday 19th May 2009. An RTA Technology Class 1 RTA-04 logger was located on the outside balcony of apartment number 402 of building A4 which is representative of the high-rise apartments in the area facing the subject development.

The logger was calibrated before and after the survey using a Class 1 Bruel & Kjaer 4231 sound level calibrator and no significant drift in calibration was detected. The logger, being less than 2 years of age, has current manufacturer's calibration certification and the sound level calibrator carries current NATA certification.

The results are shown in Annexure B.

At the time of measurements, building construction was occurring in building A4 and adjacent buildings, however, this activity ceased on each day at approximately 4pm and therefore background noise measurements in the extended hours after 10:00pm are representative of noise levels without extraneous activity.

The following results were obtained in the extended hours:

Table 1 – Measured LA90 Noise Level and Adopted Criteria in the Extended Hours

Descriptor	Overall dB(A)	A-weighted Octave Band Centre Frequency - Hz								
		31.5	63	125	250	500	1k	2k	4k	8k
LA90	48	13	29	37	41	43	43	36	25	11
OLGR Criterion (LA90+5)	53	18	34	42	46	48	48	41	30	16
DECC Criterion LA1(1min)	63									

4 NOISE MODELLING AND RESULTS

Noise emitted from patrons at entertainment venues varies according to the type of venue and the ambient noise level of any music played at the venue. For example, at venues offering live or DJ music, patron noise is significantly greater than venues which have no music or only low-level music (such as from a jukebox). In order to accurately predict noise levels from patrons in the extended hours from LWC at the nearest residential receivers, appropriate patron source noise levels should be used.

We have utilised patron source noise levels from similar hotels in Sydney, particularly the Winston Hills Hotel which has a modern outdoor beer garden with no live music.

In the LWC hotel, there is no proposal to have live bands or DJ music and only low level music will be played indoors (at an L10 level not exceeding 80dB(A)). Loudspeakers will be prohibited on the outside deck. The maximum patron capacity has been considered as a worst case scenario however it should be noted that the space taken by furniture and the necessity for patrons and staff to move about will reduce this number to less than the 380 assumed. The following table shows the sound power levels used for this category of venue.

Table 2 – Patron Source Noise L10 Sound Power Level per patron (dB re 10⁻¹² watts)

Venue Type	Overall LA10	L10 Octave Band Centre Frequency – Hz								
		31.5	63	125	250	500	1k	2k	4k	8k
With low level music indoors	79	68	67	67	72	78	75	70	62	51

NOTE: The background music and live or DJ music referred to in this table will only be played indoors. Loudspeakers will be prohibited on the outside deck

The sound power level was then scaled for the maximum capacity of 380 patrons distributed over the outdoor deck in a 3D computer model as shown in Figure 3. The model used is CadnaA which incorporates the internationally accepted ISO9613 noise prediction algorithm.

The model incorporates on each end of the outdoor deck a glazed acoustic screen 4.27m high above deck level (4.95m high above ground level) as depicted in Figure 3. However, there are a number of other viable alternative solutions which would also achieve the intended result.

The predicted noise contours are shown in Figure 4 and the worst case noise levels for each building are shown in the following table.

Table 3 – Predicted Worst Case L10 Sound Pressure Levels at Residential Receivers in the Extended Hours (to Midnight) with Low Level Music Indoors

Receiver Location	Overall	A-weighted Octave Band Centre Frequency – Hz								
	LA10	31.5	63	125	250	500	1k	2k	4k	8k
Level 4 Building A2	47	4	15	23	34	44	42	37	26	7
Level 6 Buildings A4-A5	44	1	11	20	31	41	40	35	23	3
OLGR Criterion	53	18	34	42	46	48	48	41	30	16

Noise Levels predicted for 380 patrons on outside deck

It is clear from this table that for the use intended (i.e. low level music only played indoors) the predicted patron sound levels are well below the OLGR criterion and in fact do not even exceed the background noise level at the residential receivers by more than 1dB to midnight.

Finally, in respect of the DECC sleep disturbance criterion, the predicted maximum noise level (LAmax or LA1,1min) from patrons (which would occur when a group of patrons burst into laughter or shouting) is 56dB(A) which complies with the DECC criterion of 63dB(A).

5 DISCUSSION AND RECOMMENDATIONS

It is evident from the foregoing analysis that noise levels from use of the outside deck in the extended hours will comply with the nominated OLGR and DECC criteria and will therefore be acceptable and will not cause unacceptable noise impacts at any residential receiver.

Furthermore, we have demonstrated that the results are conservative because with the acoustic barrier recommended, noise levels will comply with an ample margin below the applicable criteria.

The following table therefore summarises the response to the objections raised by the DoP in written form (as particularised in Section 2 above) and in oral communication with the Applicant's consultants.

Table 4 - Response to DoP Objections

No	Objection	Response
1	The original application received a lot of objection from residents about potential noise disturbance	Proven engineering design methods are used to resolve any noise conflicts
2	In the City of Sydney all outdoor areas appurtenant to drinking establishments are closed beyond 10pm	We have been involved with many outdoor areas which operate beyond 10pm near residential areas e.g. Dolphin Hotel Surry Hills, Argyle Hotel The Rocks, The Courthouse Taylor Square, Crest Hotel Kings Cross, Beresford Hotel Surry Hills, Sugarmill Kings cross and the Burbon & Beefstake Kings Cross.
3	The Acoustic report is reporting an inaccurate science and predicting and estimating an impact. It is not made on an actual measurement of noise generation.	This acoustic report uses actual noise measurements of patrons at major Sydney hotels for its predictions and the method of prediction is state-of-the-art.
4	There is potential for the building to be used as a place of public entertainment (and an application was made for such a use) with potential for hundreds of people on the outside deck.	The predictions assume 380 people on the outside deck which at 1 person per sqm is a very conservative density.
5	It would be irresponsible of the DoP to extend the hours when it is unknown what impact a drinking establishment will have on nearby residents	<p>The revised acoustic report draws on actual measurement of noise generation at major Sydney hotels and the method of prediction is state-of-the-art. Therefore, the accuracy of predictions is very high and the risk is small.</p> <p>To be certain, the Applicant will accept a condition of 80dB(A) L10 music indoors and no loudspeakers on the outside deck to ensure the predicted levels are met.</p>
6	DoP have applied the precautionary principle and are comfortable with a restriction after 10pm	The engineering results show this is unnecessary.
7	Once the hotel is up and running and the noise levels can be measured and it can be demonstrated that there will be no impact then a further application can be made to extend the hours	The conservatism in the calculations makes this unnecessary.
8	The restaurant uses below the residential buildings have a very different noise generation to the proposed use and is not aware of any complaint by residents to the noise from these uses.	This is correct and for this reason realistic noise levels were input to the acoustic model from Sydney hotels with outside beer gardens.

No	Objection	Response
9	Relying on the noise restrictions enforced under the liquor license is irresponsible as a potential impact is better dealt with prior to the use commencing and the conflict arising	The conservative assumptions made in the modelling can be relied upon to ensure the risk of adverse impact is minimal.

We recommend the following conditions for consideration by the Department of Planning:

G5 Noise from Use of the Premises

The LA10 noise level emitted from the premises shall not exceed the LA90 background noise level (measured in the absence of noise from the premises) in any Octave Band Centre Frequency (31.5Hz – 8kHz inclusive) by more than 5dB between 7:00am and 12:00 midnight at the boundary of any affected residence. For the purposes of this condition, the LA10 can be taken as the average maximum deflection of the noise emission from the premises.

G6 Noise Compliance Certification

Within 6 months of commencement of operation, the Licensee shall engage an accredited acoustic engineer (who shall be a member of the Association of Australian Acoustical Consultants) to measure noise emitted from the premises in accordance with Condition G5 and to prepare an acoustic report setting out the results obtained. Noise levels shall be measured between the hours of 10pm and midnight on a day when patronage on the outdoor deck is at or close to its maximum as evidenced by historical records kept by the Licensee. The measurement procedures specified in the Industrial Noise Policy issued by the Department of Environment and Climate Change shall apply. The Licensee shall provide a copy of the acoustic report to the Consent Authority upon request.

In the event that noise levels exceed the prescribed limits of Condition G5, the Licensee shall as soon as practical implement any reasonable recommendations made by the acoustic engineer to reduce noise levels to the prescribed limits. Within 1 month of implementation of those recommendations, the acoustic engineer shall undertake a supplementary noise measurement as specified in the previous paragraph to demonstrate compliance with Condition G5 and a final acoustic report shall be provided to the Consent Authority upon request.

6 CONCLUSION

Renzo Tonin & Associates has completed an assessment of noise impact from use of the outside deck of the LWC in the extended hours from 10pm to midnight. Patron noise levels were calculated to the nearest residential receivers at all building levels using state-of-the art computer modelling using actual measured noise source data from major hotel venues in Sydney with outside beer gardens and based on a maximum capacity of 380 patrons.

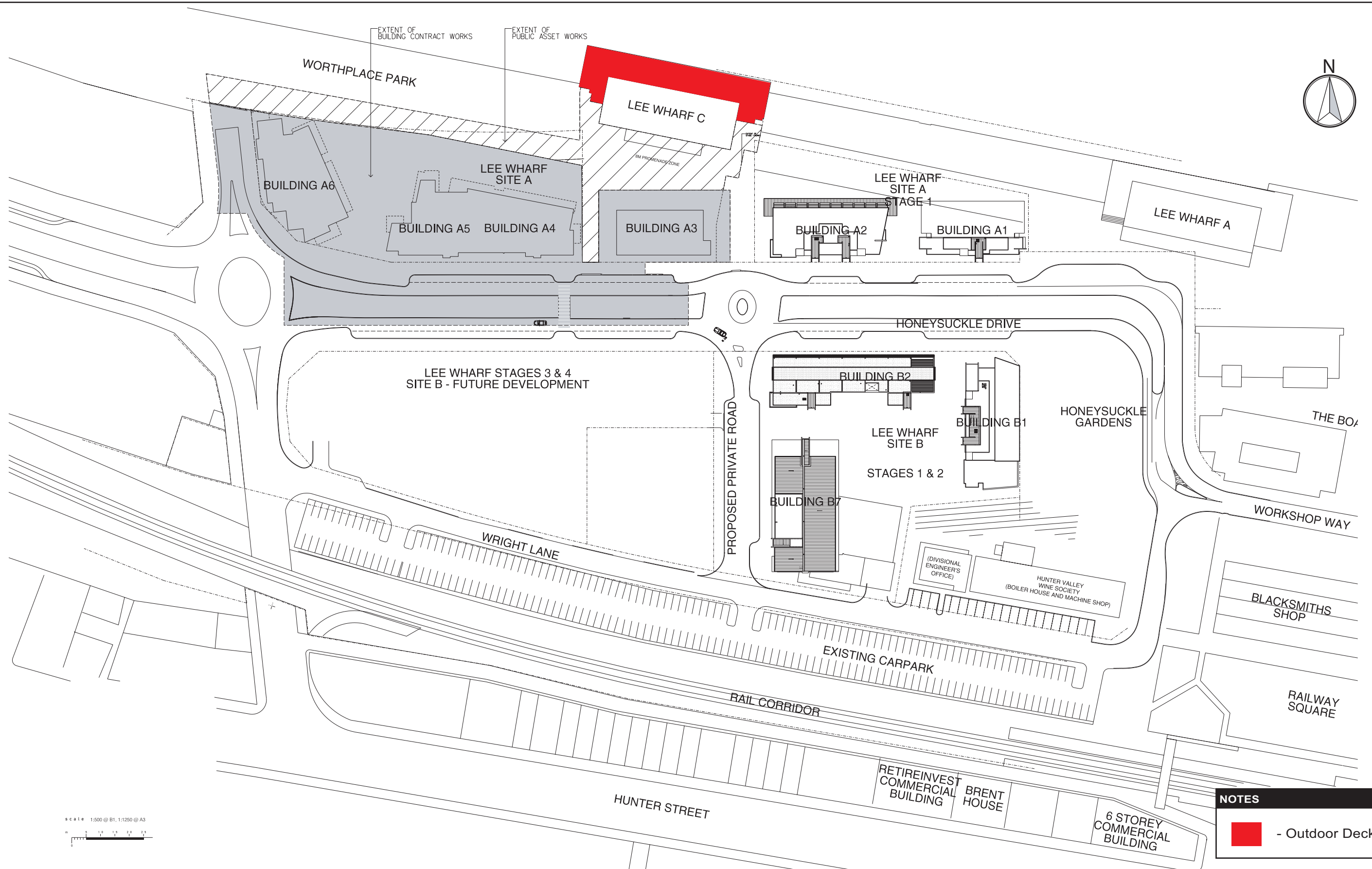
A 4.27m high noise barrier is recommended at each end of the outside deck to ensure that noise levels are controlled.

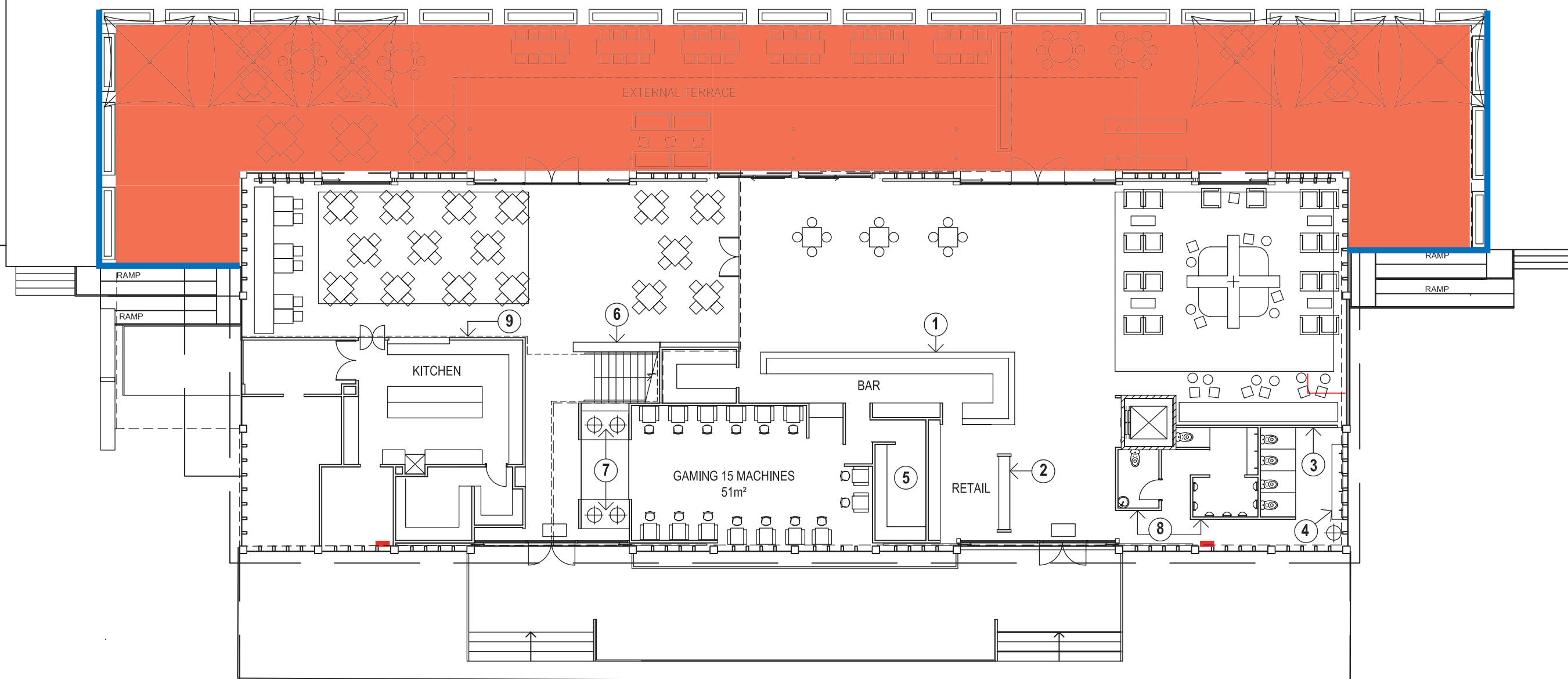
The noise source levels used in the modelling are therefore realistic and conservative because noise levels are far below the acceptability criteria and patron numbers will ultimately be less than the assumed number of 380 as space taken by furniture and the necessity for patrons and staff to move about.

The Department of Planning should therefore be satisfied that the forecast noise levels will be met.

We have recommended draft conditions of consent for consideration by the Department of Planning.

We conclude that, with these measures in place, use of the outside deck in the extended hours will be completely acceptable.





NOTES	
	- Outdoor Deck
	- Acoustic Barrier



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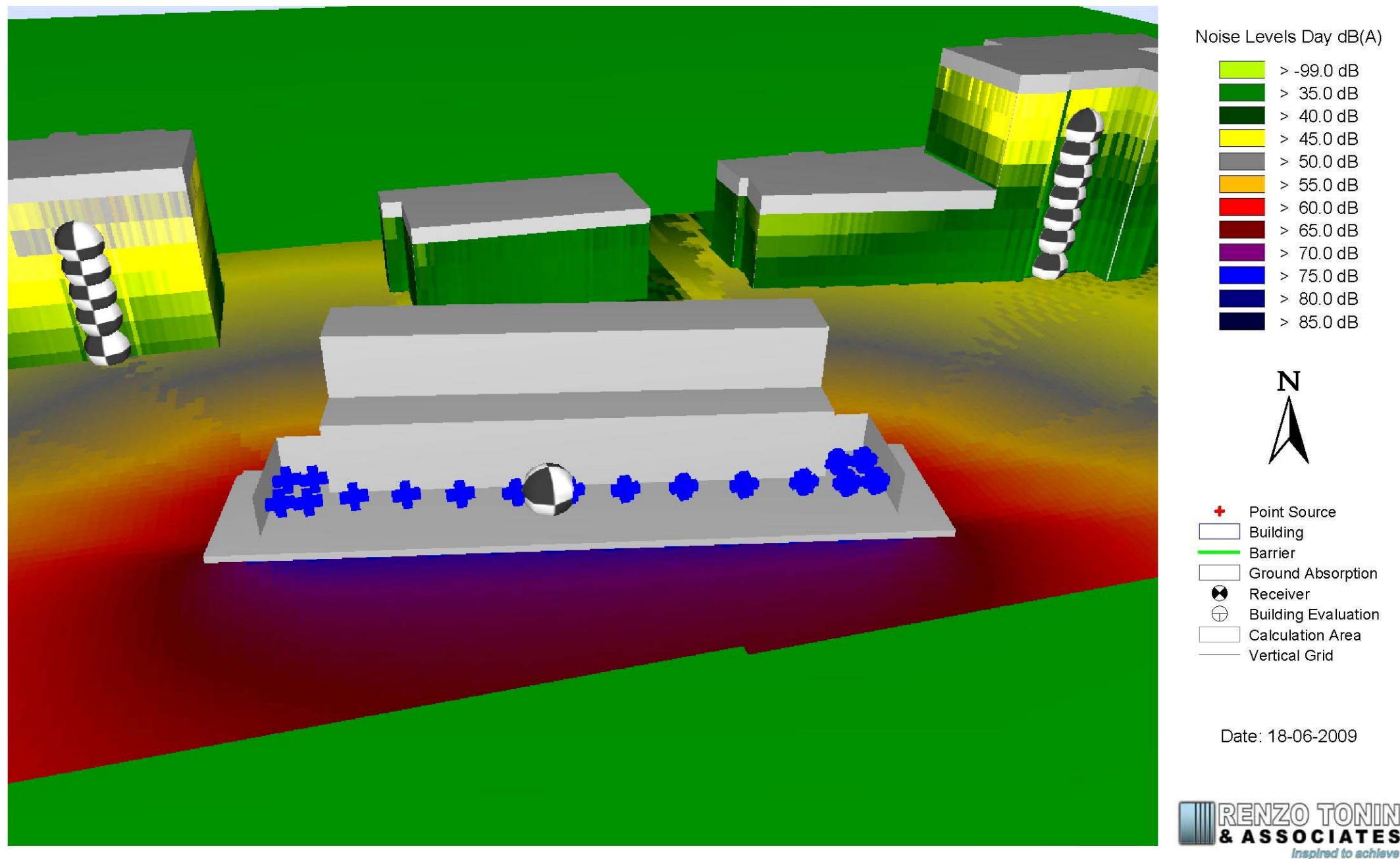
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Figure 2 - Lee Wharf Building C - Ground Floor Plan

Project :
Lee Wharf C

Date: 15/05/09
Scale: NTS
Ref: TE391-01P02 (rev 0)

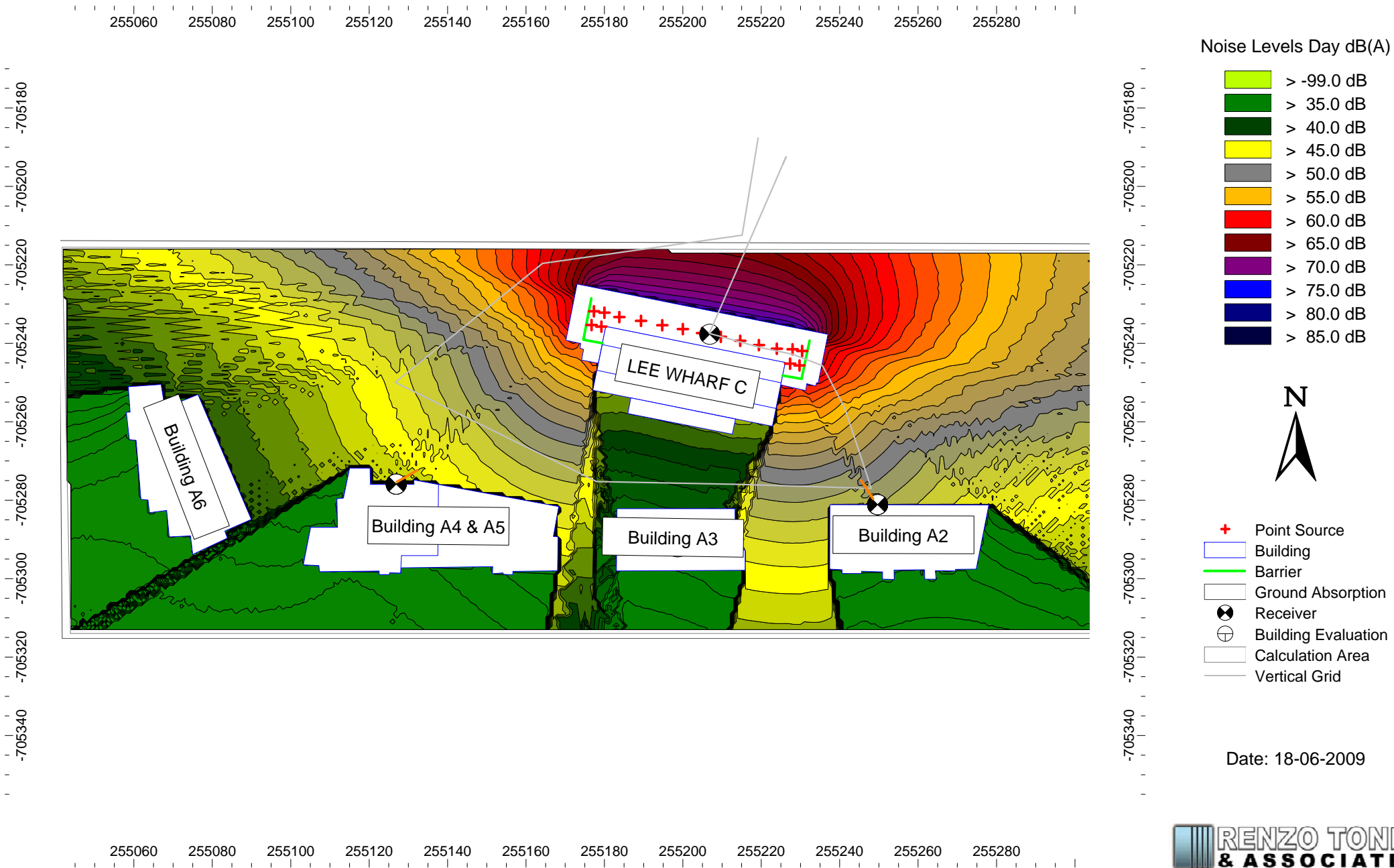
TE391-01 Lee Wharf C

Figure 3: 3D view 4.27m Noise Wall - Patron Noise with No Music



TE391-01 Lee Wharf C

Figure 4: 4.27m Noise Wall - Patron Noise with No Music



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 L90 noise level (see below).
Decibel [dB]	<p>The units that sound is measured in. The following are examples of the decibel readings of every day sounds:</p> <p>0dB The faintest sound we can hear</p> <p>30dB A quiet library or in a quiet location in the country</p> <p>45dB Typical office space. Ambience in the city at night</p> <p>60dB Martin Place at lunch time</p> <p>70dB The sound of a car passing on the street</p> <p>80dB Loud music played at home</p> <p>90dB The sound of a truck passing on the street</p> <p>100dB The sound of a rock band</p> <p>115dB Limit of sound permitted in industry</p> <p>120dB Deafening</p>
dB(A):	<p>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.</p>
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.
Lmax	The maximum sound pressure level measured over a given period.
Lmin	The minimum sound pressure level measured over a given period.
L1	The sound pressure level that is exceeded for 1% of the time for which the given sound is measured.
L10	The sound pressure level that is exceeded for 10% of the time for which the given sound is measured.

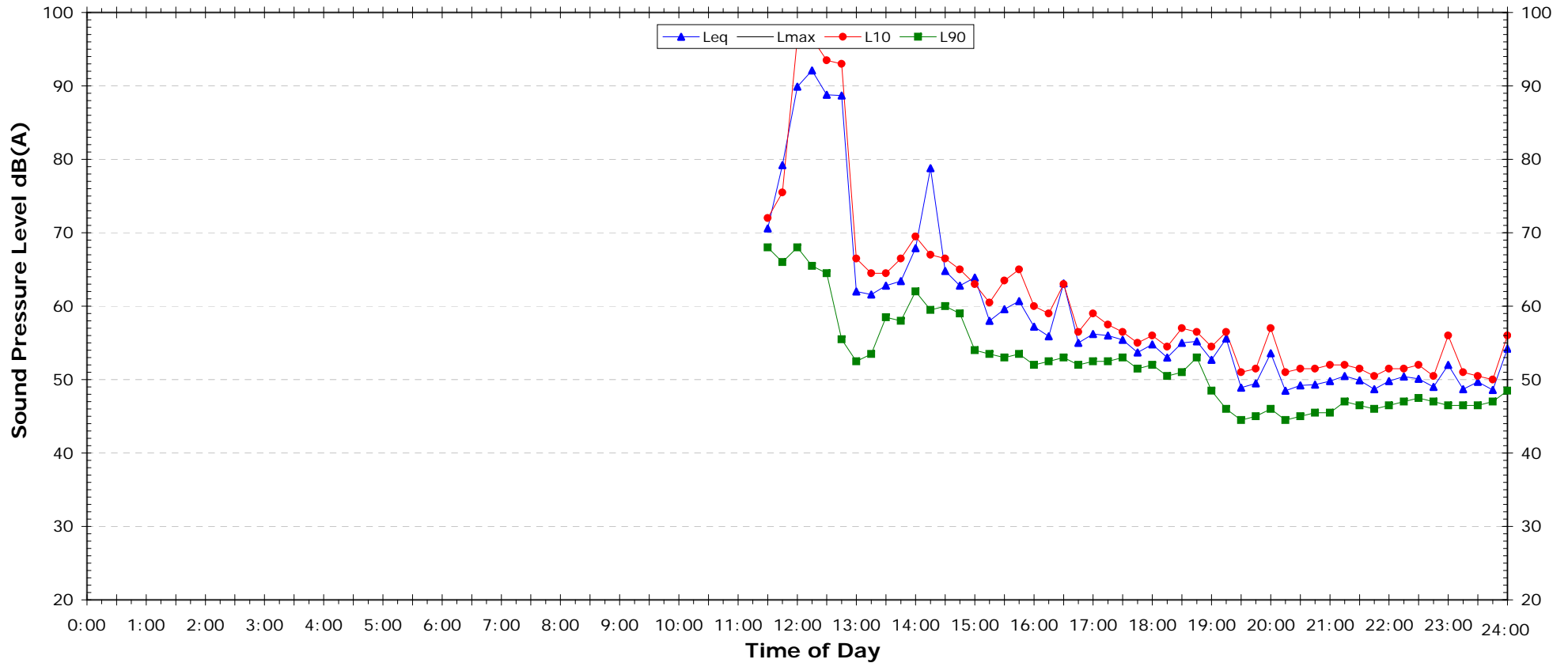
L90	The level of noise exceeded for 90% of the time. The bottom 10% of the sample is the L90 noise level expressed in units of dB(A).
Leq	The "equivalent noise level" is the summation of noise events and integrated over a selected period of time.
Reflection	Sound wave changed in direction of propagation 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 - UNATTENDED LOGGER MEASUREMENT RESULTS

EXISTING AMBIENT NOISE LEVELS

Apt 402 Building A4 Honeysuckle Drive, Newcastle

Tuesday, 12 May 2009



NSW Industrial Noise Policy (Free Field)			
Descriptor	Day	Evening	Night ²
	7am-6pm	6pm-10pm	10pm-7am
L ₉₀	-	44.5	46.5
Leq (see note 3)	-	51.9	53.1

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)

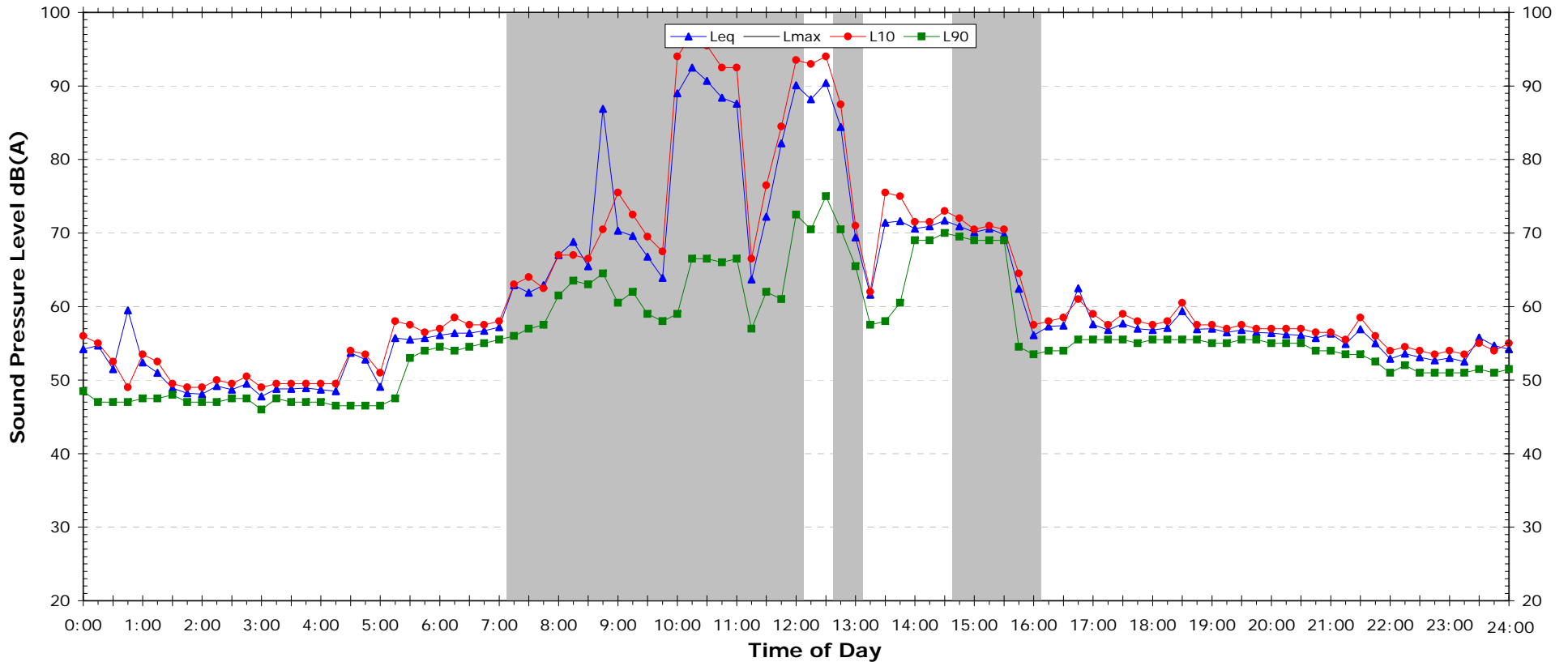
NSW ECRTN Policy (1m from facade)			(see note3)
Descriptor	Day	Night ²	
	7am-10pm	10pm-7am	
L _{eq} 15 hr and L _{eq} 9 hr	82.5	55.6	
L _{eq} 1hr upper 10 percentile	91.2	59.2	
L _{eq} 1hr lower 10 percentile	51.8	51.3	

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

EXISTING AMBIENT NOISE LEVELS

Apt 402 Building A4 Honeysuckle Drive, Newcastle

Wednesday, 13 May 2009



NSW Industrial Noise Policy (Free Field)			
Descriptor	Day	Evening	Night ²
	7am-6pm	6pm-10pm	10pm-7am
L ₉₀	-	52.5	-
Leq (see note 3)	-	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 L_{max} values are shown only where L_{max} > 65dB(A) and where L_{max}-Leq ≥ 15dB(A)

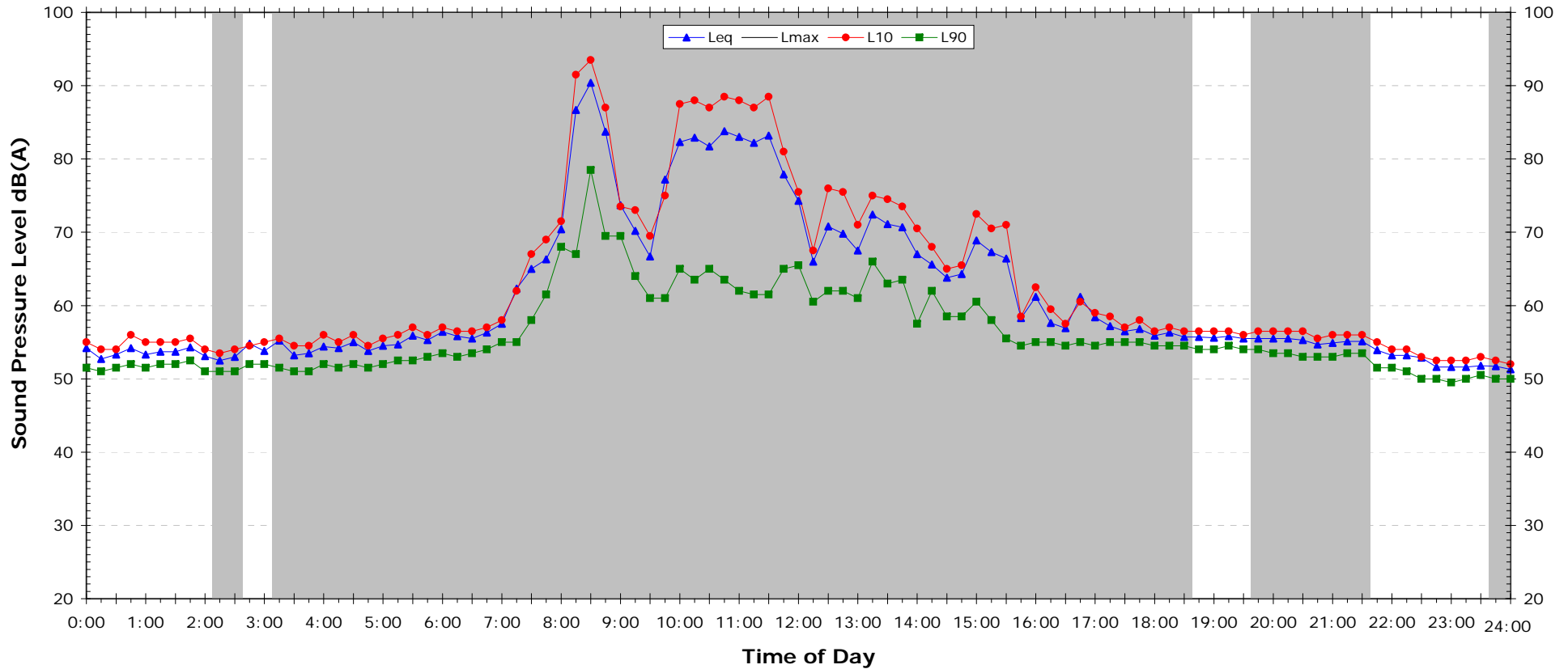
NSW ECRTN Policy (1m from facade) (see note3)		
Descriptor	Day	Night ²
	7am-10pm	10pm-7am
L _{eq} 15 hr and L _{eq} 9 hr	80.1	56.3
L _{eq} 1hr upper 10 percentile	91.9	57.0
L _{eq} 1hr lower 10 percentile	57.7	55.6

Night Time Maximum Noise Levels (see note 4)			
L _{max} (Range)	-	to	-
L _{max} - Leq (Range)	-	to	-

EXISTING AMBIENT NOISE LEVELS

Apt 402 Building A4 Honeysuckle Drive, Newcastle

Thursday, 14 May 2009



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 L_{max} values are shown only where L_{max} > 65dB(A) and where L_{max} - Leq ≥ 15dB(A)

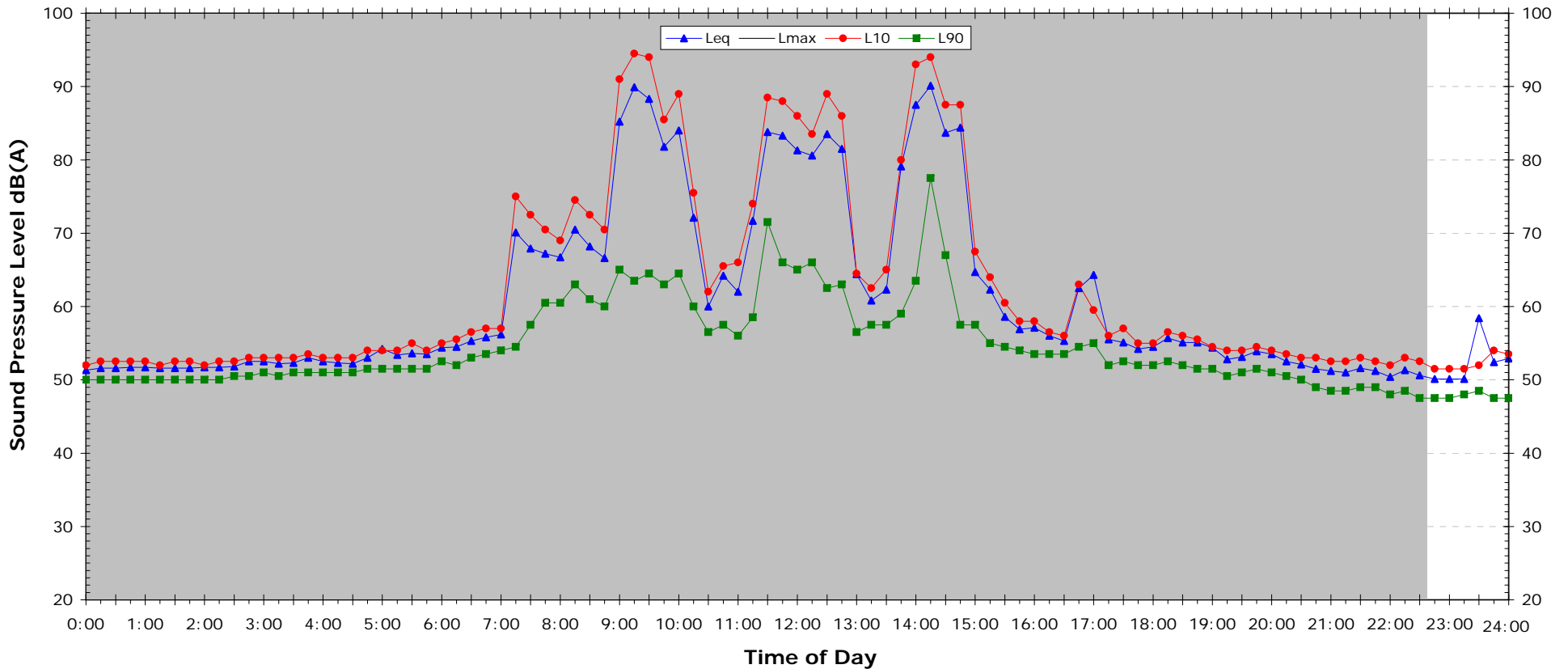
NSW ECRTN Policy (1m from facade) (see note3)		
Descriptor	Day	Night ²
	7am-10pm	10pm-7am
L _{eq} 15 hr and L _{eq} 9 hr	57.6	54.7
L _{eq} 1hr upper 10 percentile	58.2	54.9
L _{eq} 1hr lower 10 percentile	56.1	54.2

Night Time Maximum Noise Levels (see note 4)			
L _{max} (Range)	-	to	-
L _{max} - Leq (Range)	-	to	-

EXISTING AMBIENT NOISE LEVELS

Apt 402 Building A4 Honeysuckle Drive, Newcastle

Friday, 15 May 2009



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)

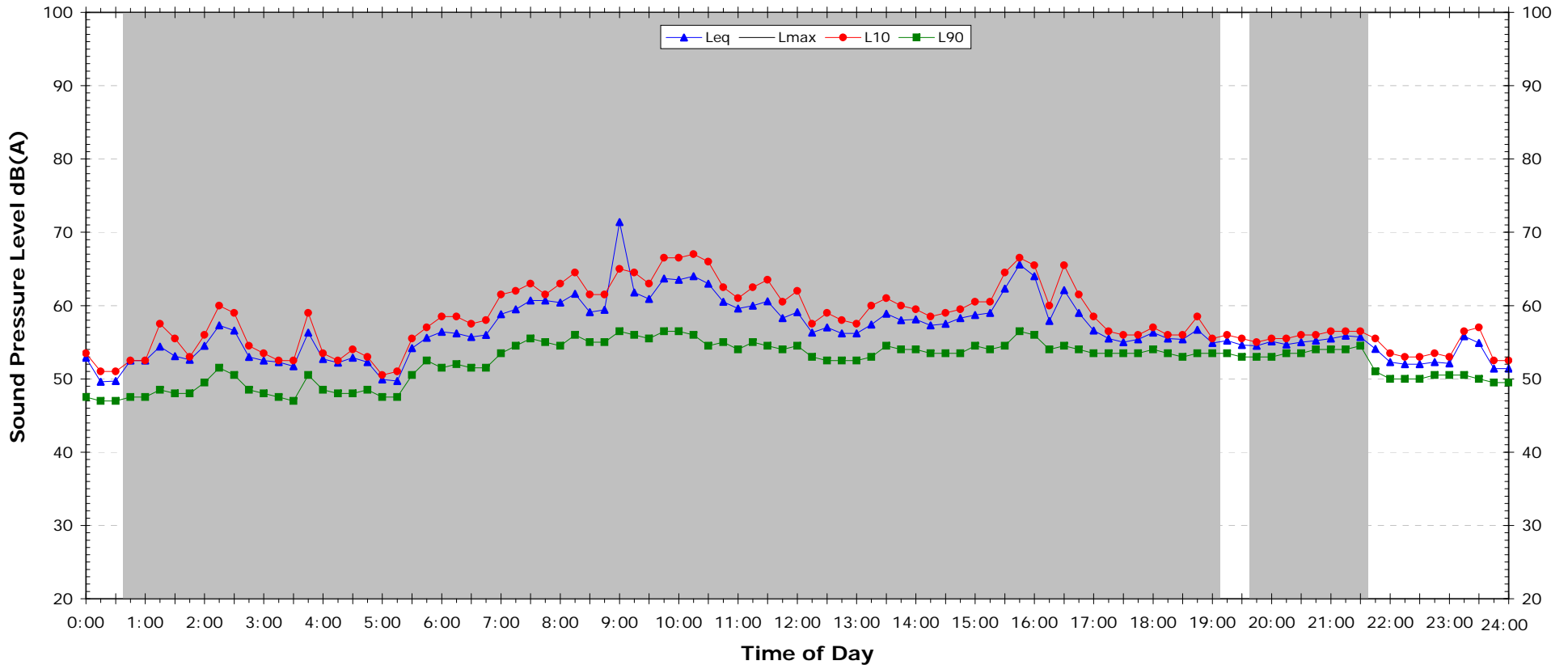
NSW ECRTN Policy (1m from facade) (see note3)		
Descriptor	Day	Night ²
	7am-10pm	10pm-7am
L _{eq} 15 hr and L _{eq} 9 hr	-	55.4
L _{eq} 1hr upper 10 percentile	-	57.1
L _{eq} 1hr lower 10 percentile	-	52.2

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

EXISTING AMBIENT NOISE LEVELS

Apt 402 Building A4 Honeysuckle Drive, Newcastle

Saturday, 16 May 2009



NSW Industrial Noise Policy (Free Field)			
Descriptor	Day	Evening	Night ²
	7am-6pm	6pm-10pm	10pm-7am
L ₉₀	-	-	48.0
Leq (see note 3)	-	-	51.9

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 L_{max} values are shown only where L_{max} > 65dB(A) and where L_{max}-Leq ≥ 15dB(A)

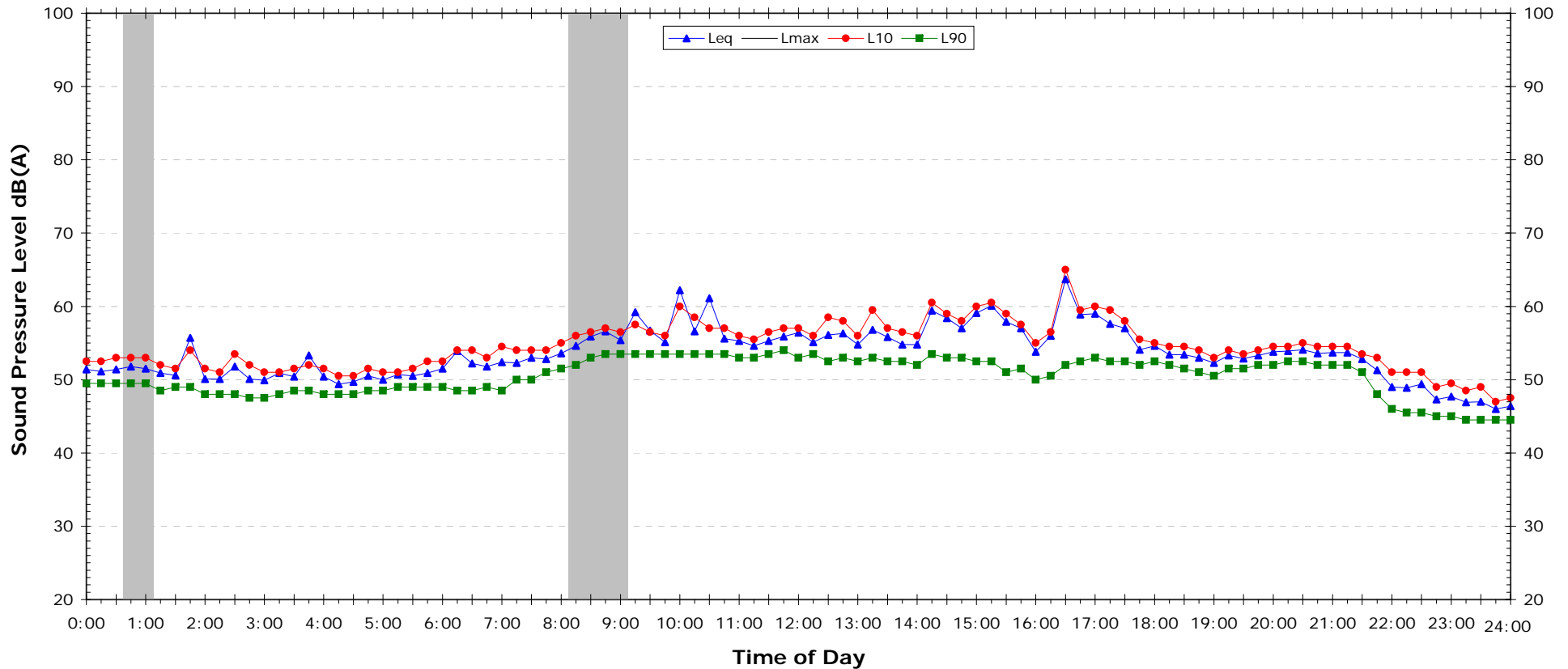
NSW ECRTN Policy (1m from facade) (see note3)		
Descriptor	Day	Night ²
	7am-10pm	10pm-7am
L _{eq} 15 hr and L _{eq} 9 hr	56.7	54.4
L _{eq} 1hr upper 10 percentile	57.4	56.3
L _{eq} 1hr lower 10 percentile	55.8	52.4

Night Time Maximum Noise Levels (see note 4)			
L _{max} (Range)	-	to	-
L _{max} - Leq (Range)	-	to	-

EXISTING AMBIENT NOISE LEVELS

Apt 402 Building A4 Honeysuckle Drive, Newcastle

Sunday, 17 May 2009



NSW Industrial Noise Policy (Free Field)			
Descriptor	Day	Evening	Night ²
	7am-6pm	6pm-10pm	10pm-7am
L ₉₀	50.8	48.0	-
Leq (see note 3)	57.4	53.1	-

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)

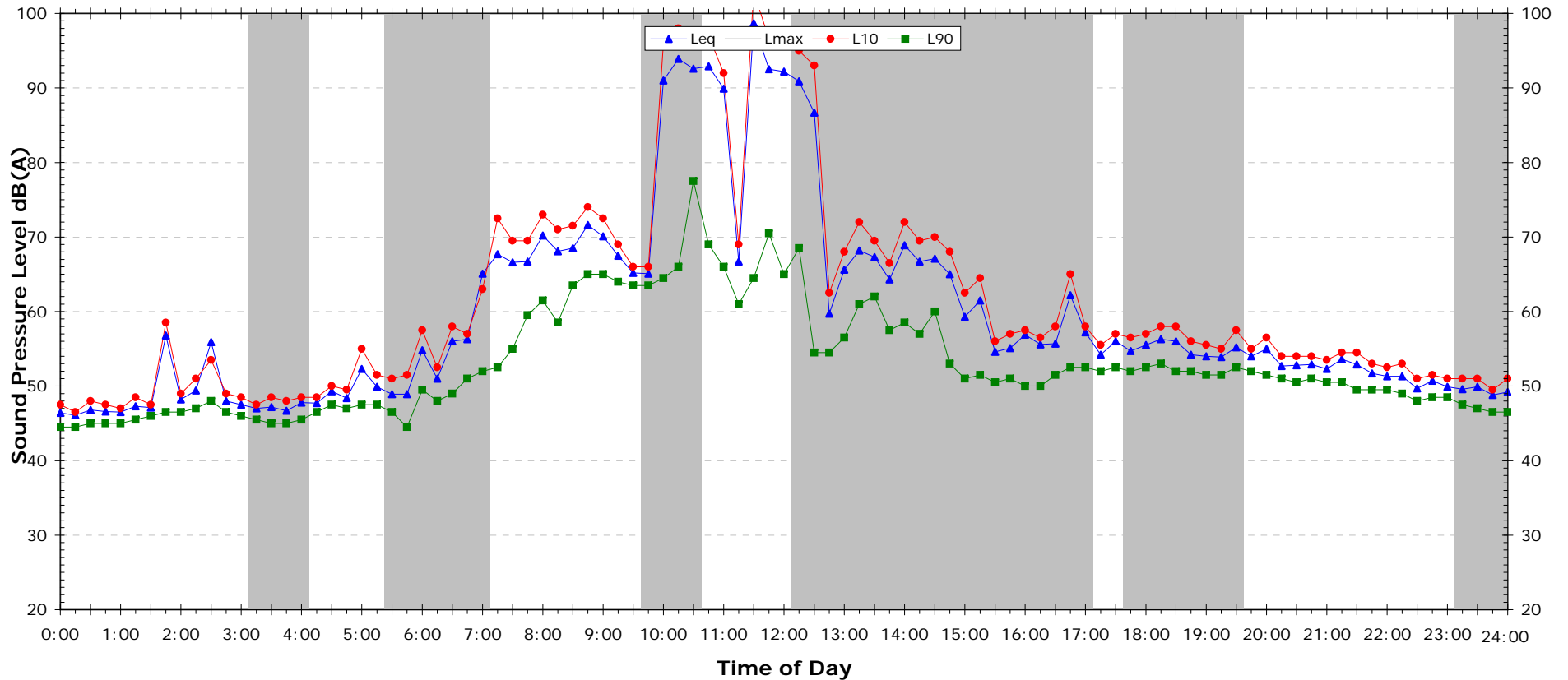
NSW ECRTN Policy (1m from facade) (see note3)		
Descriptor	Day	Night ²
	7am-10pm	10pm-7am
L _{eq} 15 hr and L _{eq} 9 hr	59.1	52.3
L _{eq} 1hr upper 10 percentile	62.4	54.6
L _{eq} 1hr lower 10 percentile	54.9	49.0

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

EXISTING AMBIENT NOISE LEVELS

Apt 402 Building A4 Honeysuckle Drive, Newcastle

Monday, 18 May 2009



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 L_{max} values are shown only where L_{max} > 65dB(A) and where L_{max} - Leq ≥ 15dB(A)

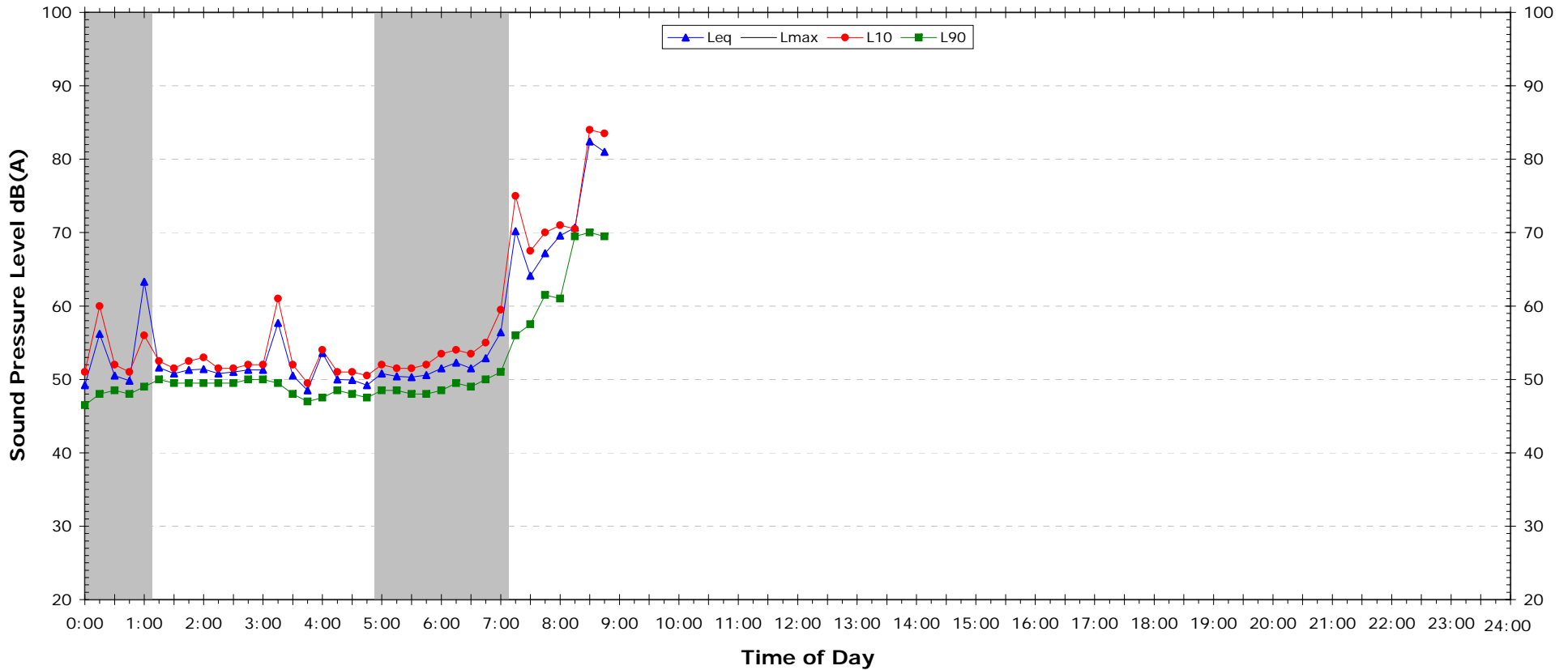
NSW ECRTN Policy (1m from facade) (see note3)		
Descriptor	Day	Night ²
	7am-10pm	10pm-7am
L _{eq} 15 hr and L _{eq} 9 hr	89.4	54.2
L _{eq} 1hr upper 10 percentile	96.8	56.5
L _{eq} 1hr lower 10 percentile	55.0	52.2

Night Time Maximum Noise Levels (see note 4)			
L _{max} (Range)	-	to	-
L _{max} - Leq (Range)	-	to	-

EXISTING AMBIENT NOISE LEVELS

Apt 402 Building A4 Honeysuckle Drive, Newcastle

Tuesday, 19 May 2009



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 L_{max} values are shown only where L_{max} > 65dB(A) and where L_{max} - L_{eq} ≥ 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	79.3	-
L _{eq} 1hr upper 10 percentile	82.7	-
L _{eq} 1hr lower 10 percentile	70.9	-

Night Time Maximum Noise Levels (see note 4)			
L _{max} (Range)	-	to	-
L _{max} - L _{eq} (Range)	-	to	-