

23 Belmore Road, Randwick

DA Acoustic Assessment

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APPENDIX ONE – UNATTENDED NOISE MONITORING 25

1 INTRODUCTION

Acoustic Logic (AL) has been engaged to conduct an acoustic assessment of potential noise impacts associated with the proposed retail and boarding house development at 23 Belmore Road, Randwick.

This document addresses noise impacts associated with the following:

- Noise intrusion to project site from adjacent roadways, and
- Noise emissions from mechanical plant to service the project site (in principle).

AL have utilised the following documents and regulations in the noise assessment of the development:

- Randwick Council DCP 2013 and LEP 2012
- NSW Department of Planning *Infrastructure State Environmental Planning Policy (ISEPP) 2007*
- NSW Department of Planning *Developments near Rail Corridors or Busy Roads – Interim Guideline*
- Australian Standard AS3671:1989 *Acoustics—Road traffic noise intrusion—Building siting and construction*
- Australian Standard AS2107:2016 *Recommended Design Sound Levels and Reverberation Times for Building Interiors*, and
- NSW Environmental Protection Authority (EPA) *Noise Policy for Industry* (NPI) 2017.

This assessment has been conducted using the Jackson Teece architectural drawings for D.A Submission, see details below.

Table 1-1 – Architectural Sheet Information

Drawing Owner	Drawing No.	Drawing Title	Issue	Date
Jackson Teece	DA-100	FLOOR PLANS	4	23.07.2021
	DA-101	FLOOR PLANS		
	DA-102	ROOF PLAN		
	DA-300	ELEVATIONS	3	
	DA-400	SECTIONS-01	4	

2 SITE DESCRIPTION

The proposed boarding house development comprises of one level of retail with three floors of boarding house above.

Investigation has been carried out by this office in regards to the existing properties and noise impacts surrounding the proposed development, which is detailed below:

- Existing commercial and residential blocks to the north, west and south along Belmore Road, and
- Existing educational facilities to the east along Bell Lane.

The nearest noise receivers around the site include:

- **C1:** Commercial Receiver 1 – Multi storey commercial development to the north at 1-11 Belmore Road
- **C2:** Commercial Receiver 2 – Multi storey commercial development to the north at 21 Belmore Road
- **C3:** Commercial Receiver 3 – Multi storey commercial development to the south at 25 Belmore Road
- **M1:** Mixed-use Receiver 1 – Multi storey commercial and residential development to the north at 165-183 Alison Road
- **M2:** Mixed-use Receiver 2 – Multi storey commercial and residential development to the south at 27-43 Belmore Road
- **M3:** Mixed-use Receiver 3 – Multi storey commercial and residential development to the west at 12-24 Belmore Road, and
- **E1:** Educational Receiver 1 – Educational facilities to the east at 195 Alison Road.

A site map, measurement description and surrounding receivers are presented in Figure 1 below.

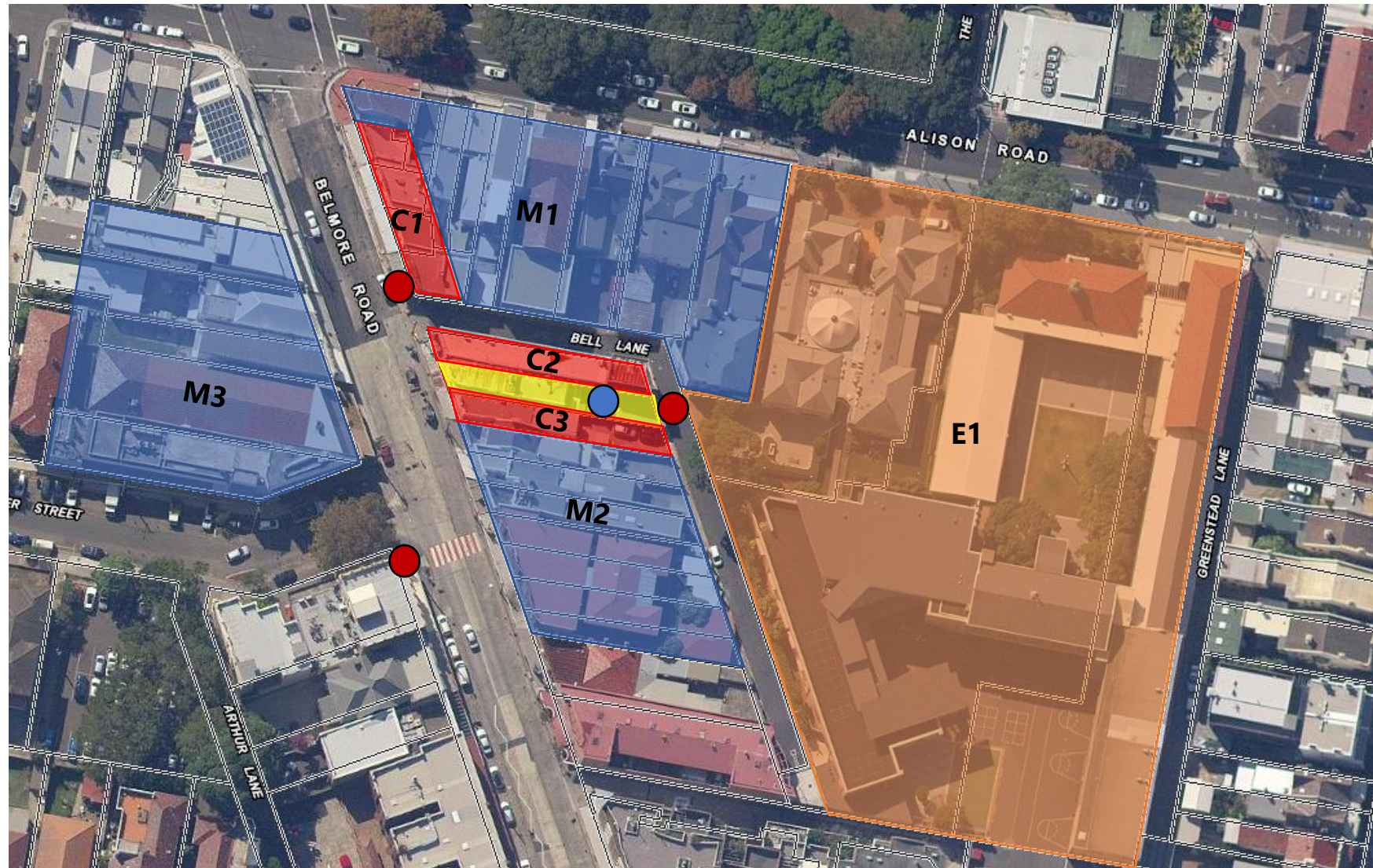
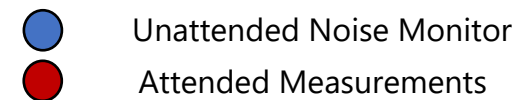


Figure 1 – Project Site
Source: NSW Six Maps



3 NOISE DESCRIPTORS

Environmental noise constantly varies. Accordingly, it is not possible to accurately determine prevailing environmental noise conditions by measuring a single, instantaneous noise level.

To accurately determine the environmental noise a 15-minute measurement interval is utilised. Over this period, noise levels are monitored on a continuous basis and statistical and integrating techniques are used to determine noise description parameters.

In analysing environmental noise, three principal measurement parameters are used, namely L_{10} , L_{90} and L_{eq} . The L_{10} and L_{90} measurement parameters are statistical levels that represent the average maximum and average minimum noise levels respectively, over the measurement intervals.

The L_{10} parameter is commonly used to measure noise produced by a particular intrusive noise source since it represents the average of the loudest noise levels produced by the source.

Conversely, the L_{90} level (which is commonly referred to as the background noise level) represents the noise level heard in the quieter periods during a measurement interval. The L_{90} parameter is used to set the allowable noise level for new, potentially intrusive noise sources since the disturbance caused by the new source will depend on how audible it is above the pre-existing noise environment, particularly during quiet periods, as represented by the L_{90} level.

The L_{eq} parameter represents the average noise energy during a measurement period. This parameter is derived by integrating the noise levels measured over the 15-minute period. L_{eq} is important in the assessment of environmental noise impact as it closely corresponds with human perception of a changing noise environment; such is the character of environmental noise.

4 AMBIENT NOISE SURVEY

NSW EPA's Rating Background Noise Level (RBL) assessment procedure requires determination of background noise level for each day (the ABL) then the median of the individual days as set out for the entire monitoring period.

Appendices in this report present results of unattended noise monitoring conducted at the project site. Weather affected data was excluded from the assessment. The processed RBL (lowest 10th percentile noise levels during operation time period) are presented in Table 4-1 below.

4.1.1 Measurement Position

One unattended noise monitor was located along the eastern façade of 23 Belmore Road, Randwick. The logger was located approximately 10m from the kerb of Bell Lane. Refer to Figure 1 for detailed location.

4.1.2 Measurement Period

Unattended noise monitoring was conducted from Wednesday 27th of March 2019 to Thursday 4th of April 2019. Attended noise measurements were undertaken between the hours of 4:00pm and 5:00pm on 27th of March 2019.

4.1.3 Measurement Equipment

Equipment used consisted of an Acoustic Research Laboratories Pty Ltd noise logger. The logger was set to A-weighted fast response and was programmed to store 15-minute statistical noise levels throughout the monitoring period. The monitor was calibrated at the start and end of the monitoring period using a Rion NC-73 calibrator. No significant drift was noted. Noise logger data is provided in Appendix One – Unattended Noise Monitoring.

4.1.4 Summarised Rating Background Noise Levels

Summarised rating background noise levels for the project site and immediate surroundings are presented below.

Table 4-1 – Measured Noise Levels

Time of day	Rating Background Noise Level dB(A)_{L90(Period)}
Day (7am – 6pm)	42
Evening (6pm – 10pm)	48
Night (10pm – 7am)	36

On review of the monitoring data, the measured L₉₀ noise levels during high wind speed days do not increase background noise levels significantly as periods with little to no wind. This demonstrates that even though wind speeds measured at Sydney Airport (the closest weather station) exceed EPA guidelines, either:

- The wind speed on site at this time was significantly lower than at Sydney Airport (which is likely given Sydney Airport is located in a very exposed area) and/or
- The wind on site was not sufficiently consistent to increase background noise levels compared to calm periods.

Therefore, only periods of adverse weather that were determined to have affected the noise data have been eliminated when determining the rating background noise level at the site, which is presented above.

5 EXTERNAL NOISE INTRUSION ASSESSMENT

Site investigation indicates that the major external noise sources around project site are from traffic movements along Belmore Road, immediately adjacent to the western boundary of the site.

5.1 NOISE INTRUSION CRITERIA

A noise intrusion assessment has been conducted based on the requirements of the following acoustic noise criteria and standards:

- NSW Department of Planning *Infrastructure State Environmental Planning Policy (ISEPP) 2007*
- NSW Department of Planning *Developments near Rail Corridors or Busy Roads – Interim Guideline*
- Australian Standard AS3671:1989 *Acoustics—Road traffic noise intrusion—Building siting and construction*, and
- Australian Standard AS2107:2016 *Recommended Design Sound Levels and Reverberation Times for Building Interiors*.

5.1.1 Randwick Council DCP 2013 and LEP 2012

C4 2.6 Visual and Acoustic Amenity and Privacy

- vii) *An acoustic report prepared by a suitably qualified acoustic consultant must be submitted for new development or conversions/intensifications with an increase in resident numbers. The report must:*
- a) *establish the existing background noise levels;*
 - b) *identify all potential noise sources from the operation of the premises, including any mechanical plant and equipment;*
 - c) *estimate the level of potential noise emission;*
 - d) *establish desirable acoustics performance criteria; and*
 - e) *recommend any mitigation measures (such as sound proofing construction and/or management practices) required to achieve relevant noise criteria.*

The Randwick Council DCP 2013 has no specific controls in relation to noise intrusion from traffic at the project site. Noise intrusion criteria will be determined from NSW Department of Planning documents and AS2107.

5.1.2 NSW Department of Planning ISEPP 2007

RMS Map No. 16 of the traffic volume maps referenced by the ISEPP on the RMS website (see below), classifies the section of Alison Road where the development is located adjacent to as a road where a noise intrusion assessment is mandatory under clause 102 of the SEPP Infrastructure 2007. See RMS average annual daily road traffic volume map number 16 and the approximate location of the site below.



Figure 2 – RMS Map No. 16 and Approximate Location of Proposed Development

The SEPP Infrastructure defines busy roads that are subject to acoustic assessment as:

"Roads specified in Clause 102 of the Infrastructure SEPP: a freeway, tollway or a transitway or any other road with an average annual traffic (AADT) volume of more than 40,000 vehicles (based on the traffic volume data provided on the website of the RTA).

Any other road – with an average annual daily traffic (AADT) volume of more than 20,000 vehicles (based on the traffic volume data published on the website of the RTA)

Any other road – with a high level of truck movements or bus traffic."

As the project site is within 100m of a SEPP road and features a high level of bus traffic, assessment will be made to the requirements of SEPP and *"Development near Rail Corridors or Busy Roads – Interim Guideline."*

5.1.3 NSW Department of Planning *Development near Rail Corridors or Busy Roads – Interim Guideline*

Section 3.5 of the NSW Department of Planning's 'Development near Rail Corridors and Busy Roads (Interim Guideline)' states:

"The following provides an overall summary of the assessment procedure to meet the requirements of clauses 87 and 102 of the Infrastructure SEPP. The procedure covers noise at developments for both Road and Rail.

- *If the development is for the purpose of a building for residential use, the consent authority must be satisfied that appropriate measures will be taken to ensure that the following LAeq levels are not exceeded:*
 - *in any bedroom in the building: 35dB(A) at any time 10pm-7am*
 - *anywhere else in the building (other than a garage, kitchen, bathroom or hallway): 40dB(A) at any time."*

Additionally, NSW Department of Planning's *Development near Busy Roads and Rail Corridors - Interim Guideline* dictates that:

If internal noise levels with windows or doors open exceed the criteria by more than 10dB(A), the design of the ventilation for these rooms should be such that occupants can leave windows closed, if they so desire, and also to meet the ventilation requirements of the Building Code of Australia.

With windows open, the allowable internal noise goal is permitted to be 10dB(A) higher than when the windows are closed (i.e. – allowable level in bedrooms becomes 45dB(A), and 50dB(A) in living rooms).

5.1.4 Australian Standard AS3671:1989 *Acoustics—Road traffic noise intrusion—Building siting and construction*

Australian Standard AS 3671:1989 notes the following in relation to traffic noise:

- Internal noise levels should be determined in accordance with AS/NZS 2107:2016 *Acoustics – Recommended design sound levels and reverberation times for building interiors*.
- A suitable descriptor should be adopted relevant to the use of the development. As AS2107:2016 adopts the L_{eq} descriptor, AL shall also use this descriptor.
- AS3671 does not specifically recommend a time interval. On this basis, AL have adopted the interval used by the EPA *Road Noise Policy* 2011 for main/arterial roads, that being:
 - Day – 7am to 10pm (15 hour); and
 - Night – 10pm to 7am (9 hour).
- AL have applied the daytime interval to the living areas of the apartment and the night time interval to the bedrooms of the development.

Internal noise levels have been selected in accordance with AS 2107:2016.

5.1.5 Australian and New Zealand AS/NZS 2107:2016 Recommended design sound levels and reverberation times for building interiors

AS2107:2016 Recommended design sound levels and reverberation times for building interiors specifies allowable internal noise levels for internal spaces within residential and commercial buildings. Table 1, in Section 5 of AS2107:2016, gives the following maximum internal noise levels for commercial buildings and residential buildings near major roads.

Table 5-1 – Recommended Design Sound Levels

Space /Activity Type	Recommended Maximum Design Sound Level
Bedrooms	35-40 dB(A) $L_{eq}(10pm-7am)$
Living Rooms	35-45 dB(A) $L_{eq}(anytime)$
Common Rooms (Communal Lounge)	40-45 dB(A) $L_{eq}(anytime)$
Small Retail Stores (General)	50 dB(A) $L_{eq}(anytime)$

5.1.6 Summarised External Noise Intrusion Criteria

The internal noise criteria adopted for each internal space is therefore summarised below based on the relevant State, Council and Australian Standard requirements.

Table 5-2 – Adopted Internal Noise Levels

Space / Activity Type	Required Internal Noise Level
Residential Living Areas	40 dB(A) L_{eq} (15hr)
Residential Sleeping Areas (night time)	35 dB(A) L_{eq} (9hr) (night time)
Common Rooms (Communal Lounge)	45 dB(A) $L_{eq}(anytime)$
Small Retail Stores (General)	50 dB(A) $L_{eq}(\text{during operation})$

5.2 EXTERNAL NOISE MEASUREMENTS

This section of the report details noise measurements conducted at the site to establish surrounding environmental noise levels impacting the development.

5.2.1 Measurement Equipment

Attended short term measurements of traffic noise were undertaken by this office to supplement the unattended noise monitoring. Measurements were conducted using a Norsonic 140 Sound Analyser. The analyser was set to fast response and calibrated before and after the measurements using a Norsonic Sound Calibrator type 1251. No significant drift was noted.

Unattended noise monitoring was conducted using one Acoustic Research Laboratories Pty Ltd noise logger. The logger was programmed to continuously store statistical noise levels as well as audio files throughout the monitoring period. The equipment was calibrated at the beginning and the end of each measurement using a Rion NC-73 calibrator; no significant drift was detected. All measurements were taken on A-weighted fast response mode.

5.2.2 Measurement Location

One unattended noise monitor was located along the eastern façade of 23 Belmore Road, Randwick. The logger was located approximately 10m from the kerb of Bell Lane. Refer to Figure 1 for detailed location.

Attended measurements were taken at the following locations:

- 9 Belmore Road – Attended noise measurement conducted at 9 Belmore Road north of project site as project site is located right at a bus stop. Sound level meter had an unobstructed view of traffic and was approximately 2m from the kerb. Refer to Figure 1 for detailed location.
- 28 Silver Street - Attended noise measurement conducted at 28 Silver Street west of project site. Sound level meter had an unobstructed view of traffic movements along and was approximately 2m from the kerb. Refer to Figure 1 for detailed location.

5.2.3 Measurement Period

Unattended noise monitoring was conducted from Wednesday 27th of March 2019 to Thursday 4th of April 2019. Attended noise measurements were undertaken between the hours of 4:00pm and 5:00pm on 27th of March 2019.

5.2.4 Attended Noise Measurements

Attended noise measurements have been summarised below for each location.

Table 5-3 – Attended Noise Measurements

Location	Measure Noise Level dB(A) L_{Aeq} (15 minute)
9 Belmore Road, Randwick Measurement was conducted 2m from kerb	72 dB(A)L _{eq} (15min)
28 Silver Street, Randwick Measurement was conducted 3m from kerb	70 dB(A)L _{eq} (15min)

5.2.5 Summarised External Noise Levels

The following noise levels for the site have been established based on short term attended measurements and long-term noise monitoring.

Table 5-4 – Measured Traffic Noise Levels

Location	Time of Day	Noise Level – L_{eq}
23 Belmore Road	Daytime 7am – 10pm	71 dB(A) L_{eq} (15hr)
	Night Time 10pm – 7am	66 dB(A) L_{eq} (9hr)

5.3 COMPLYING CONSTRUCTIONS

Assessment of façade requirements to achieve required indoor noise levels has been undertaken. Dimensions of rooms, setbacks from roadways, window openings and floor areas have been used.

5.3.1 Glazed Windows and Doors

The following constructions are recommended to comply with the project noise objectives. Aluminium framed/sliding glass doors and windows will be satisfactory provided they meet the following criteria. All external windows and doors listed are required to be fitted with Q-Ion type acoustic seals. **(Mohair Seals are unacceptable).**

Thicker glazing may be required for structural, safety or other purposes. Where it is required to use thicker glazing than scheduled, this will also be acoustically acceptable. The recommended constructions are detailed in Table 5-5.

Table 5-5 – Recommended Glazing Construction

Room	Glazing Thickness	Acoustic Seals
Level 1 Western Double Room (facing Belmore Road)	10.38mm Laminated/ 100mm airgap/ 6mm Float	Yes
Level 1 Eastern Double Room (facing Bell Lane)	6.38mm Laminated	
Retail	6mm Float	
Level 1 Single Rooms		
Level 2 Communal Living (Sliding door & Skylights)		
Level 2 & 3 (All rooms)		

It is recommended that only window systems having test results indicating compliance with the required ratings obtained in a certified laboratory be used where windows with acoustic seals have been recommended.

In addition to complying with the minimum scheduled glazing thickness, the R_w rating of the glazing fitted into open-able frames and fixed into the building opening should not be lower than the values listed in Table 5-6 for all areas. Where nominated, this will require the use of acoustic seals around the full perimeter of open-able frames and the frame will need to be sealed into the building opening using a flexible sealant.

Table 5-6 - Minimum R_w of Glazing Assembly (with Acoustic Seals)

Glazing Assembly	Minimum R_w of Installed Window
6mm Float	29
6.38mm Laminated	31
10.38mm Laminated/100mm air gap/6mm float	44

Note: Façade constructions to be reviewed at CC stage based on construction drawings. The glazing types listed above are indicative and for authority approvals purposes only

5.3.2 External Roof/Ceiling Construction

External roof construction will be constructed from light weight elements, therefore; acoustic upgrading is required. The following roof construction is recommended.

The recommended roof/ceiling construction is shown in Figure 3 and Table 5-7 below. In the event that any penetrations are required thru the external skin, an acoustic sealant should be used to minimise all gaps.

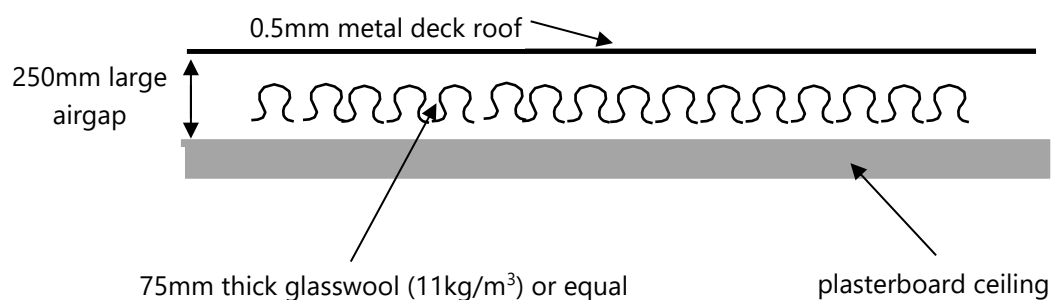


Figure 3 – Roof/ Ceiling Construction

Table 5-7 – External Light Weight Roof Construction

Room	Internal Lining	Truss System	External Lining
Communal Living	1 x 10mm plasterboard	Minimum of 250mm truss with 75mm thick 11kg/m³ glasswool insulation in cavity	0.5mm metal deck roof
Level 2 Double Room (Next to communal living)	1 x 16mm plasterboard		
Level 3 Units			
Ground Floor Retail	2 x 13mm plasterboard	Concrete slab above	

Note: Façade constructions to be reviewed at CC stage based on construction drawings. The roof/ ceiling construction types listed above are indicative and for authority approvals purposes only

5.3.3 External Wall Construction

External wall construction will be constructed from a combination of masonry and light weight elements. For external wall systems which are constructed with masonry no further acoustic upgrading is required.

For walls that are constructed with lightweight materials, see Table 5-8 below.

Table 5-8 – Light Weight External Wall Construction

Space	Internal Lining	Stud System	External Lining
Western facing façades (Belmore Road)	1 x 16mm plasterboard	Min 90mm Stud with 75mm thick 11kg/m ³ glasswool insulation	1 x 9mm fibre cement sheet
All other lightweight walls	1 x 10mm plasterboard		

There should not be vents on the internal skin of external walls. In the event that any penetrations are required through the external skin, an acoustic sealant should be used to minimise all gaps.

5.3.4 Entry Doors

All doors shall have glazing thicknesses equal to those recommended in Section 5.3.1 above and are to have Raven RP10 to the top and sides and Raven RP38 to the underside of a swing door.

Note that mohair seals in windows and doors are not acceptable where acoustic seals are required.

5.3.5 Mechanical Ventilation

With respect to natural ventilation of a dwelling, the NSW Department of Planning document '*Development near Busy Roads and Rail Corridors - Interim Guideline*' dictates that:

- "If internal noise levels with windows or doors open exceed the criteria by more than 10dB(A), the design of the ventilation for these rooms should be such that occupants can leave windows closed, if they so desire, and also to meet the ventilation requirements of the Building Code of Australia."*

With windows open, the allowable internal noise goal is permitted to be 10dB(A) higher than when the windows are closed (i.e. – allowable level in bedrooms becomes 45dB(A) $L_{eq(9hr)}$, and 50dB(A) $L_{eq(15hr)}$ in living rooms).

- The bedrooms and living rooms along western façade (as indicated on architectural drawings) facing Belmore Road will not be able to achieve required internal noise levels with windows or doors open.
- The remaining rooms and façades (as indicated on architectural drawings, including external façades separating the two blocks) will be able to achieve required internal noise levels with windows or doors open.

Any supplementary ventilation system proposed to be installed should be acoustically designed to ensure that the acoustic performance of the acoustic treatments outlined above is not reduced and does not exceed Council criteria for noise emission to nearby properties.

5.3.6 Plasterboard Corner Details

The recommended plasterboard ceiling/wall corner construction options over the rooms are shown in Figure 4 below.

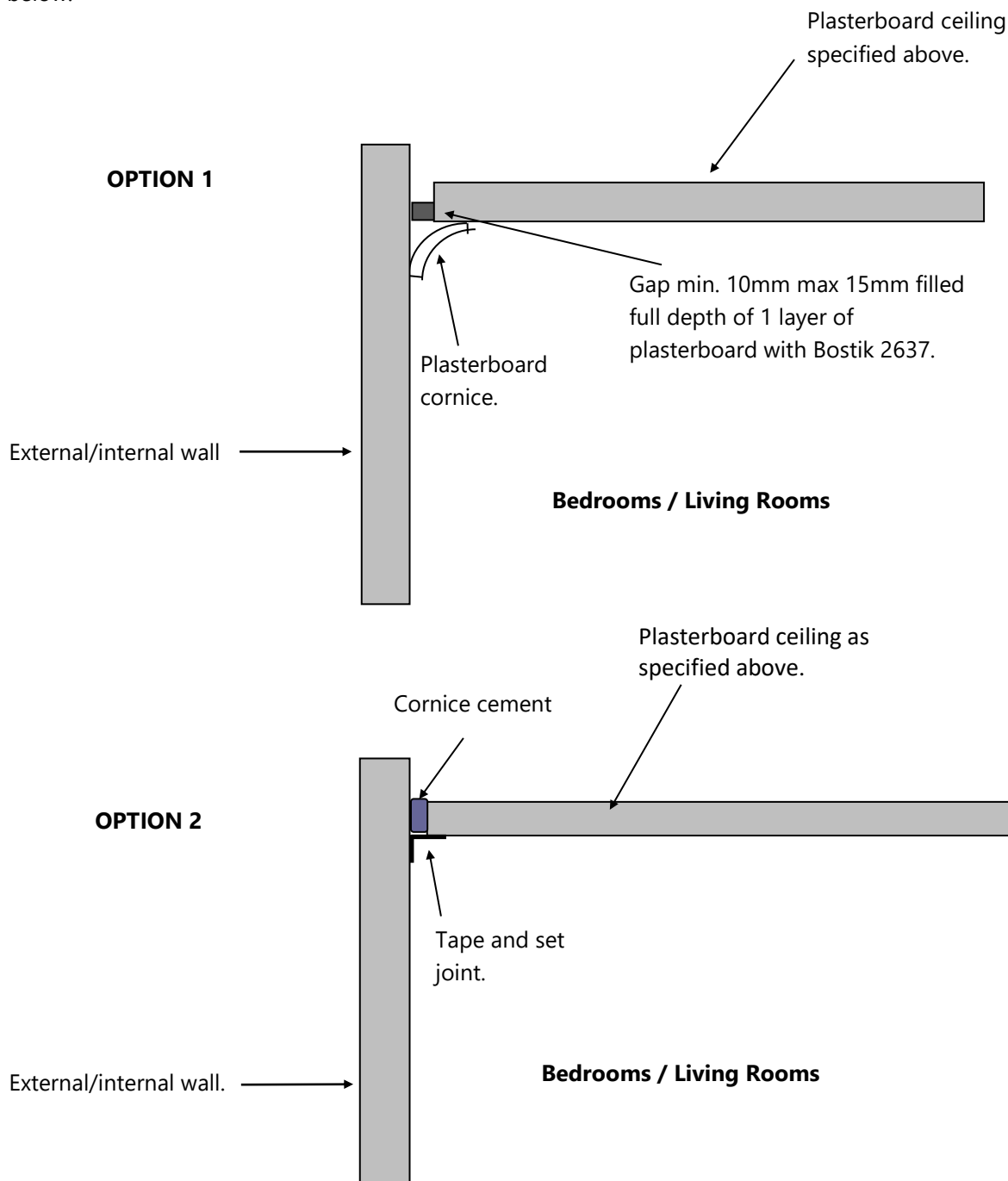


Figure 4 – Plasterboard Corner Options

6 NOISE EMISSION CRITERIA

The noise emission from the project site shall comply with the requirements of the following documents:

- Randwick Council DCP 2013 and LEP 2012, and
- NSW EPA *Noise Policy for Industry* (NPI) 2017.

6.1 RANDWICK COUNCIL DCP 2013 AND LEP 2012

It is noted that there are no specific criteria for noise emissions in the Randwick DCP 2013 relating to the site. In this regard, the NSW EPA Noise Policy for Industry (2017) will be adopted.

6.2 NSW EPA NOISE POLICY FOR INDUSTRY (NPI) 2017

The EPA NPI has two criteria which both are required to be satisfied, namely Intrusiveness and amenity. The NPI sets out acceptable noise levels for various localities. The policy indicates four categories to assess the appropriate noise level at a site. They are rural, suburban, urban and urban/industrial interface. Under the policy the nearest residential receivers would be assessed against the urban criteria.

Noise levels are to be assessed at the property boundary or nearby dwelling, or at the balcony or façade of an apartment.

6.2.1 Intrusiveness Criterion

The guideline is intended to limit the audibility of noise emissions at residential receivers and requires that noise emissions measured using the L_{eq} descriptor not exceed the background noise level by more than 5dB(A). Where applicable, the intrusive noise level should be penalised (increased) to account for any annoying characteristics such as tonality.

Background noise levels adopted are presented in Table 4-1. Noise emissions from the site should comply with the noise levels presented below when measured at nearby property boundary.

6.2.2 Project Amenity Criterion

The guideline is intended to limit the absolute noise level from all noise sources to a level that is consistent with the general environment.

The EPA's NPI sets out acceptable noise levels for various localities. The recommended noise amenity area is based upon the measured background noise levels at the sensitive receiver. Based on the measured background noise levels detailed in Table 4-1, the Noise Policy for Industry suggests the adoption of the 'urban' categorisation.

The NPI requires project amenity noise levels to be calculated in the following manner:

$$L_{Aeq,15min} = \text{Recommended Amenity Noise Level} - 5 \text{ dB(A)} + 3 \text{ dB(A)}$$

The amenity levels appropriate for the receivers surrounding the site are presented in Table 6-1.

Table 6-1 – EPA Amenity Noise Levels

Type of Receiver	Time of day	Recommended Noise Level dB(A) $L_{eq}(\text{period})$	Project Amenity Noise Level dB(A) $L_{eq}(15 \text{ minute})$
Residential – Urban	Day	60	58
	Evening	50	48
	Night	45	43

The NSW EPA *Noise Policy for Industry* 2017 defines:

- Day as the period from 7am to 6pm Monday to Saturday and 8am to 6pm Sundays and Public Holidays.
- Evening as the period from 6pm to 10pm.
- Night as the period from 10pm to 7am Monday to Saturday and 10pm to 8am Sundays and Public Holidays

6.2.3 Sleep Arousal Criteria

The Noise Policy for Industry recommends the following noise limits to mitigate sleeping disturbance:

Where the subject development / premises night -time noise levels at a residential location exceed:

- $L_{eq,15min}$ 40 dB(A) or the prevailing RBL plus 5 dB, whichever is the greater, and/or
- L_{Fmax} 52 dB(A) or the prevailing RBL plus 15 dB, whichever is the greater,

a detailed maximum noise level even assessment should be undertaken.

Table 6-2 – Sleep Arousal Criteria for Residential Receivers

Receiver	Rating Background Noise Level (Night) dB(A) L_{90}	Emergence Level
Residences Surrounding Site Night (10pm – 7am)	36 dB(A) L_{90}	41 dB(A) $L_{eq, 15min}$; 52 dB(A) L_{Fmax}

6.3 SUMMARISED NOISE EMISSION CRITERIA

Table 6-3 – EPA NPI Noise Emission Criteria (Residents Surrounding Project Site)

Time Period	Assessment Background Noise Level dB(A) L_{90}	Project Amenity Criteria dB(A) L_{eq}	Intrusiveness Criteria $L_{eq}(15min)$	NPI Criteria for Sleep Disturbance
Day	42	58	47	N/A
Evening	48	48	53	N/A
Night	36	43	41	41 dB(A)$L_{eq, 15min}$; 52 dB(A)L_{Fmax}

The project noise trigger levels are indicated by the bolded values in the table above.

7 NOISE EMISSION ASSESSMENT

7.1 NOISE FROM MECHANICAL PLANT WITHIN PROPOSED SITE GENERALLY

Detailed plant selection and location has not been undertaken at this stage. Satisfactory levels will be achievable through appropriate plant selection, location and if necessary, standard acoustic treatments such as duct lining, acoustic silencers and enclosures.

Noise emissions from all mechanical services to the closest residential receiver should comply with the requirements of Section 6.

Detailed acoustic review should be undertaken at CC stage to determine acoustic treatments to control noise emissions to satisfactory levels.

It is noted that no condenser units are proposed for the development, with mechanical noise therefore most likely to be from mechanical ventilation that is required on the western external façade (Belmore Road) due to requirements from the NSW Department of Planning document '*Development near Busy Roads and Rail Corridors - Interim Guideline*' and detailed in Section 5.3.5. As stated, satisfactory levels will be achievable through appropriate plant selection, location and if necessary, standard acoustic treatments such as duct lining, acoustic silencers and enclosures.

7.2 COMMUNAL LIVING

Noise generated by usage of the communal area is assessed in this section.

7.2.1 Patron Noise

The main noise source in the outdoor areas would be patron speech, with a sound power level of 77 dB(A) L_{10} per patron based on AL measurements.

Noise from patrons using the terrace has been predicted at the nearest residences. The noise level predicted at each receiver is based on proposed number of people that may access the outdoor areas with up to 1 in 2 people talking at any one time.

Table 7-1 – L_{10} Sound Power Level Spectrum of Single Patron, dB

	Octave Band Centre Frequency (Hz)									A-wt dB(A) L_{10}
	31.5	63	125	250	500	1000	2000	4000	8000	
Patron Noise (dB(A))	62	62	67	70	74	75	70	51	48	77

7.2.2 Music Noise

The uniform sound pressure level for amplified music to be used on the terrace has been assessed as 80 dB(A) L₁₀. The noise level & spectrum is typical of loud background music as would typically be expected to be played within this type of venue, as follows:

Table 7-2 – Noise Spectrum for Amplified Music Sound Pressure Level

31.5Hz	63Hz	125Hz	250Hz	500Hz	1kHz	2kHz	4kHz	8kHz	A-weighted level dB(A)L ₁₀
76	76	82	78	77	76	71	62	64	80

The noise emission levels were corrected for distance attenuation, façade reflection and the number of patrons to determine the resultant noise level. The L₁₀ sound power level spectrum used in the calculations to predict the impact of music on the terrace is presented below. Predicted noise levels have also taken into account the effect of noise attenuation treatments recommended in Section 5.3.

7.3 OPERATIONAL USAGE AND MECHANICAL PLANT FROM THE RESTAURANT

Possible mechanical plant emissions may stem from usage of the commercial tenancy. Any mechanical plant required for the commercial tenancy is to be assessed as a separate DA Assessment. In general, satisfactory levels will be achievable through appropriate plant selection, location and if necessary, standard acoustic treatments such as duct lining, acoustic silencers and enclosures.

Preliminary calculations show that noise transmission through the heritage floor to the boarding room above will achieve recommended design levels of AS2107 for habitable areas. It is noted that the site currently operates as a restaurant with a bedroom above. The floor construction between the two floors is proposed to stay the same.

It is recommended that the ceiling of the commercial unit to be no less than 2x13mm plasterboard. Further analysis is to be done during CC Stage.

7.4 COMPLYING CONTROLS

Noise emission from operation of project site has been analysed and the following acoustic treatments are recommended to ensure that the external noise emissions comply with the criteria in Section 6. Noise emission from plant service project site shall be carried out at CC stage to ensure that the overall noise emission satisfy the requirements in Section 6.

- The communal area shall not be used after 10pm (including any usage of music).
- The communal area windows shall be closed after 6pm.
- Music is to be limited to 80 dB(A) L₁₀ sound pressure level.
- No more than 20 people should be allowed in the communal area at any time (internal and external combined).
- The ceiling of the commercial unit to be no less than 2x13mm plasterboard (TBC at CC Stage).

8 CONCLUSION

This report presents an acoustic assessment of noise impacts associated with the development to be located at 23 Belmore Road, Randwick.

Provided that the complying constructions presented in Section 5.3 are adopted, internal noise levels for the boarding house development will comply with the acoustic requirements of the following documents:

- Randwick Council DCP 2013 and LEP 2012
- NSW Department of Planning *Infrastructure State Environmental Planning Policy (ISEPP) 2007*
- NSW Department of Planning *Developments near Rail Corridors or Busy Roads – Interim Guideline*
- Australian Standard AS3671:1989 *Acoustics—Road traffic noise intrusion—Building siting and construction*, and
- Australian Standard AS2107:2016 *Recommended Design Sound Levels and Reverberation Times for Building Interiors*.

Provided that the complying controls presented in Section 7.4 are adopted, external noise levels for the boarding house development will comply with the acoustic requirements of the following documents:

- Randwick Council DCP 2013 and LEP 2012, and
- NSW Environmental Protection Authority (EPA) *Noise Policy for Industry (NPI) 2017*.

We trust this information is satisfactory. Please contact us should you have any further queries.

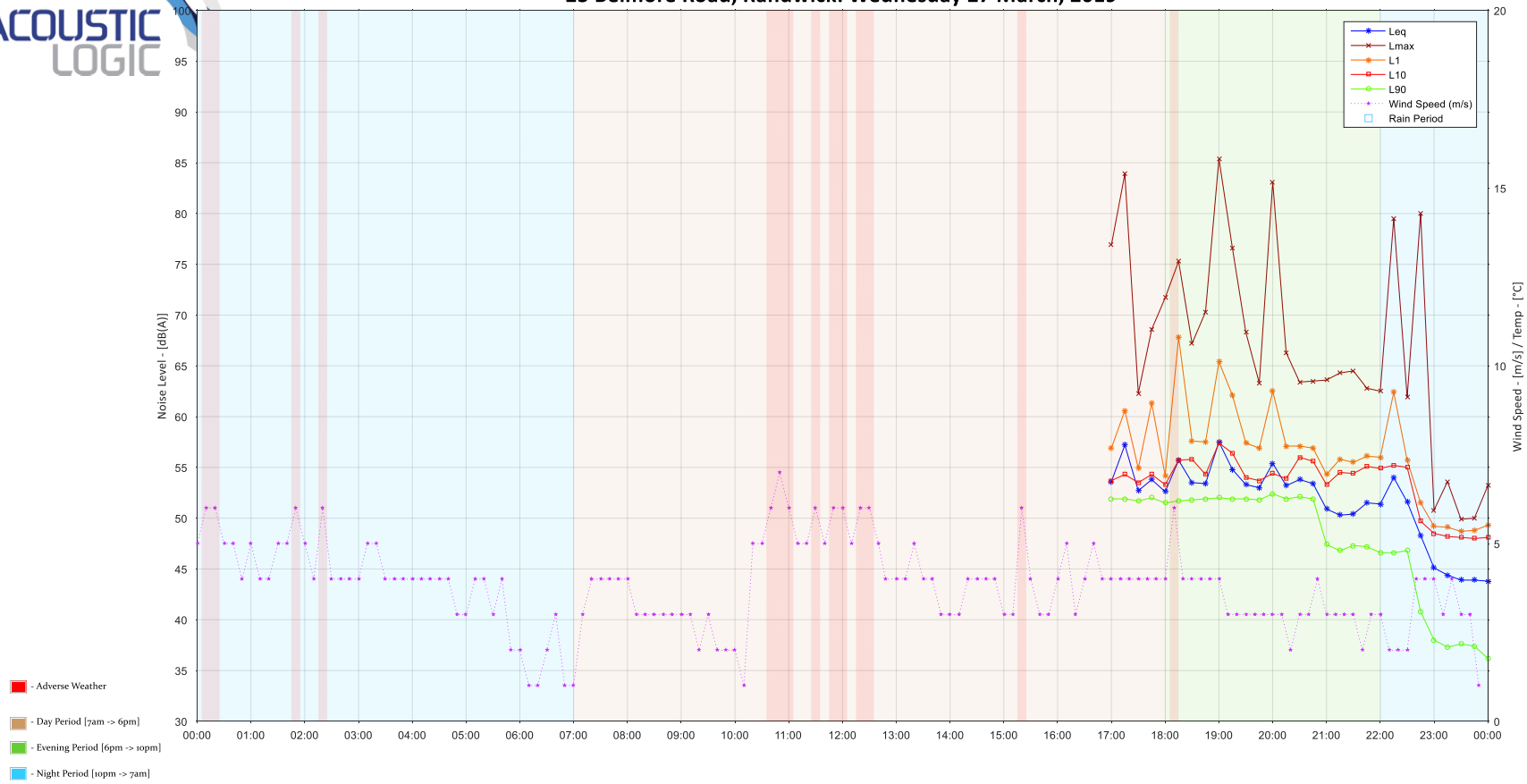
Yours faithfully,



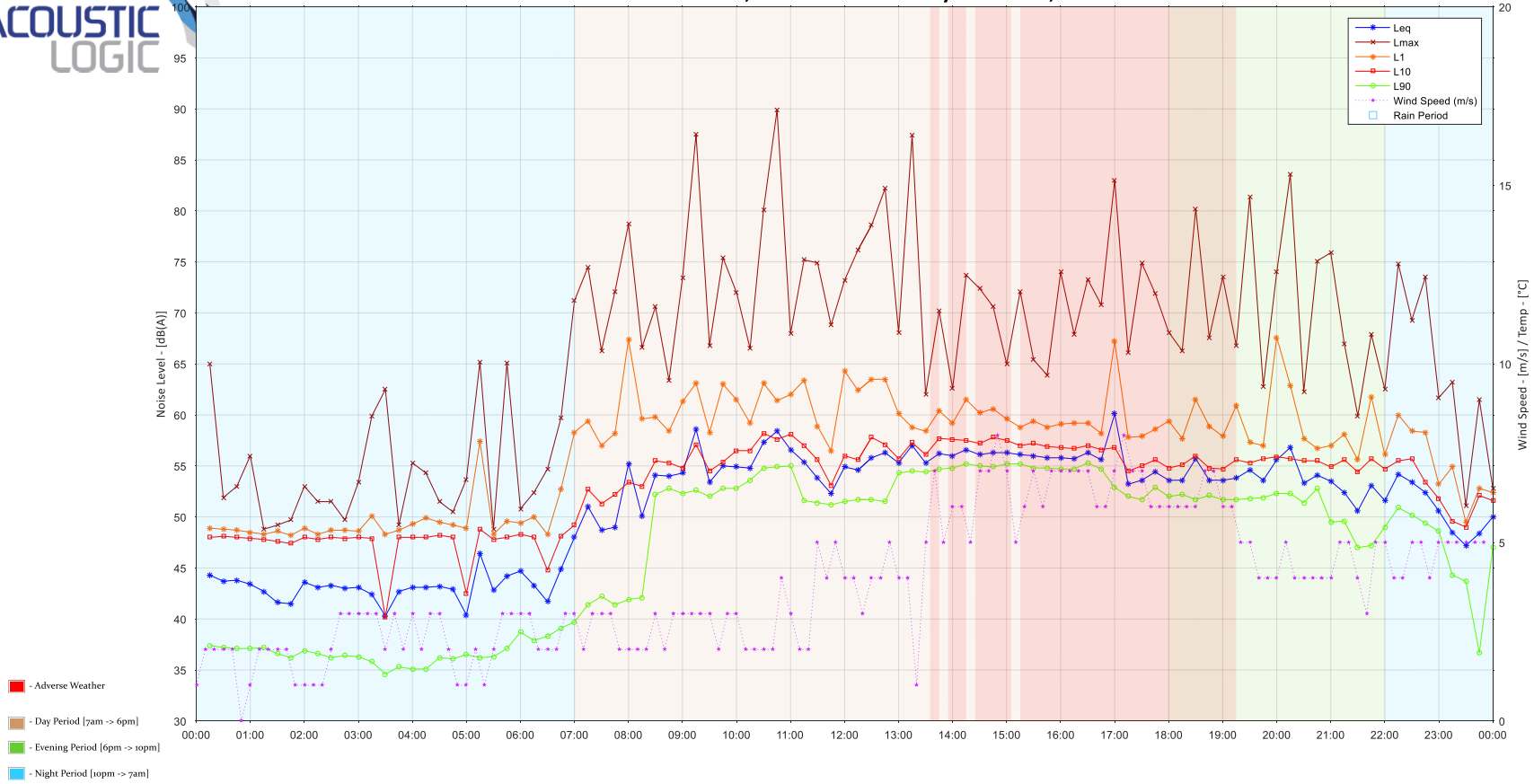
Acoustic Logic Pty Ltd
Weber Yeh

APPENDIX ONE – UNATTENDED NOISE MONITORING

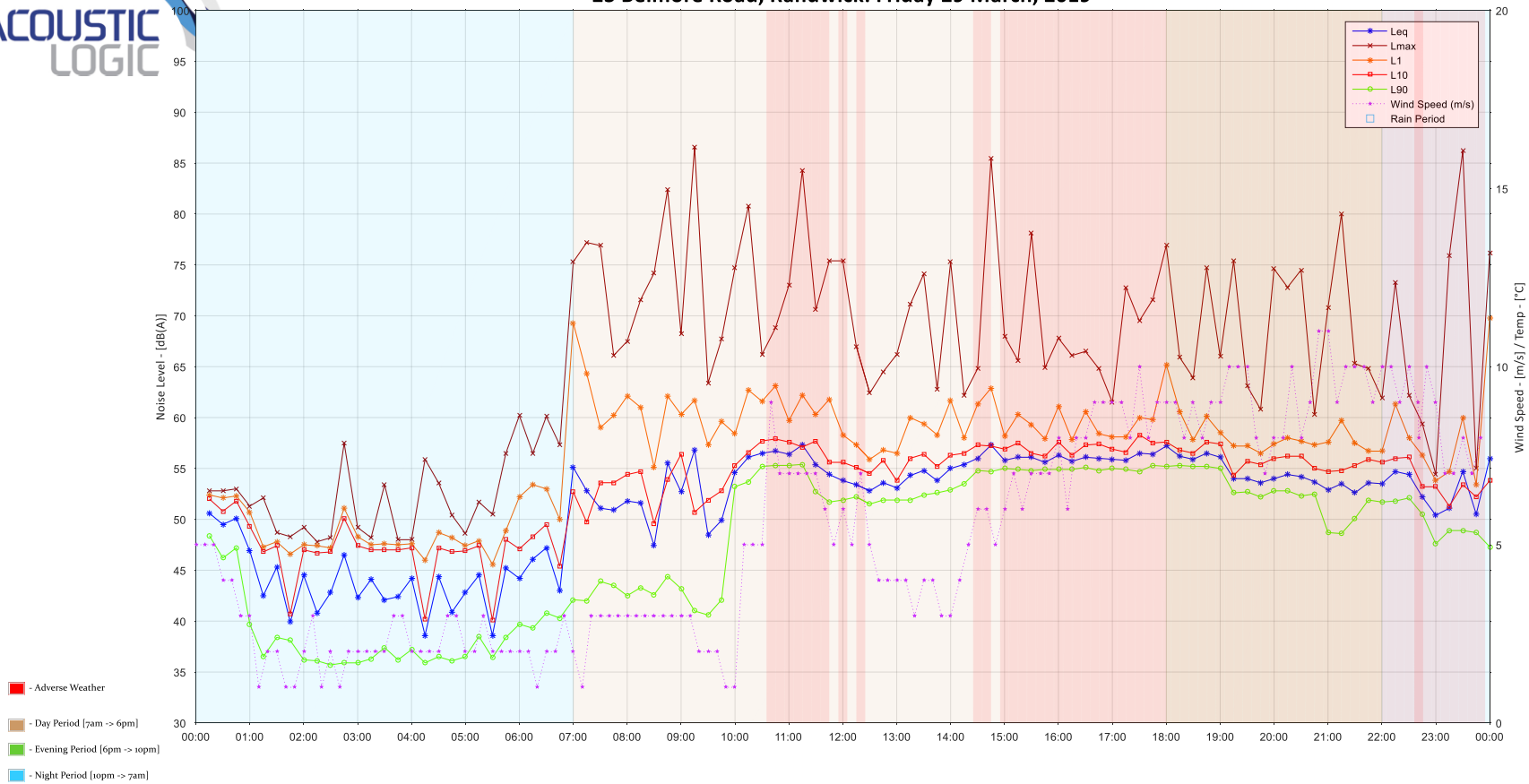
23 Belmore Road, Randwick: Wednesday 27 March, 2019



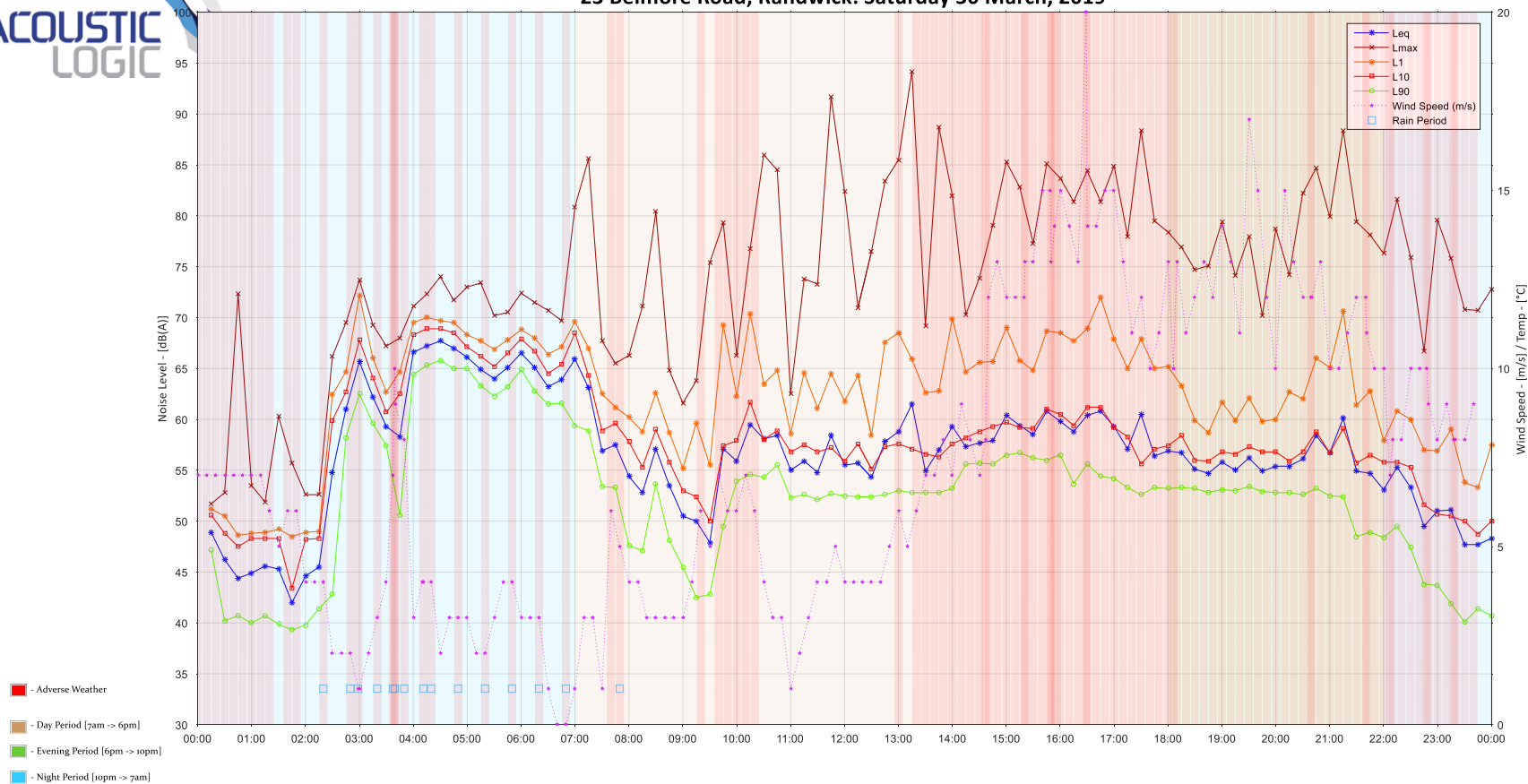
23 Belmore Road, Randwick: Thursday 28 March, 2019



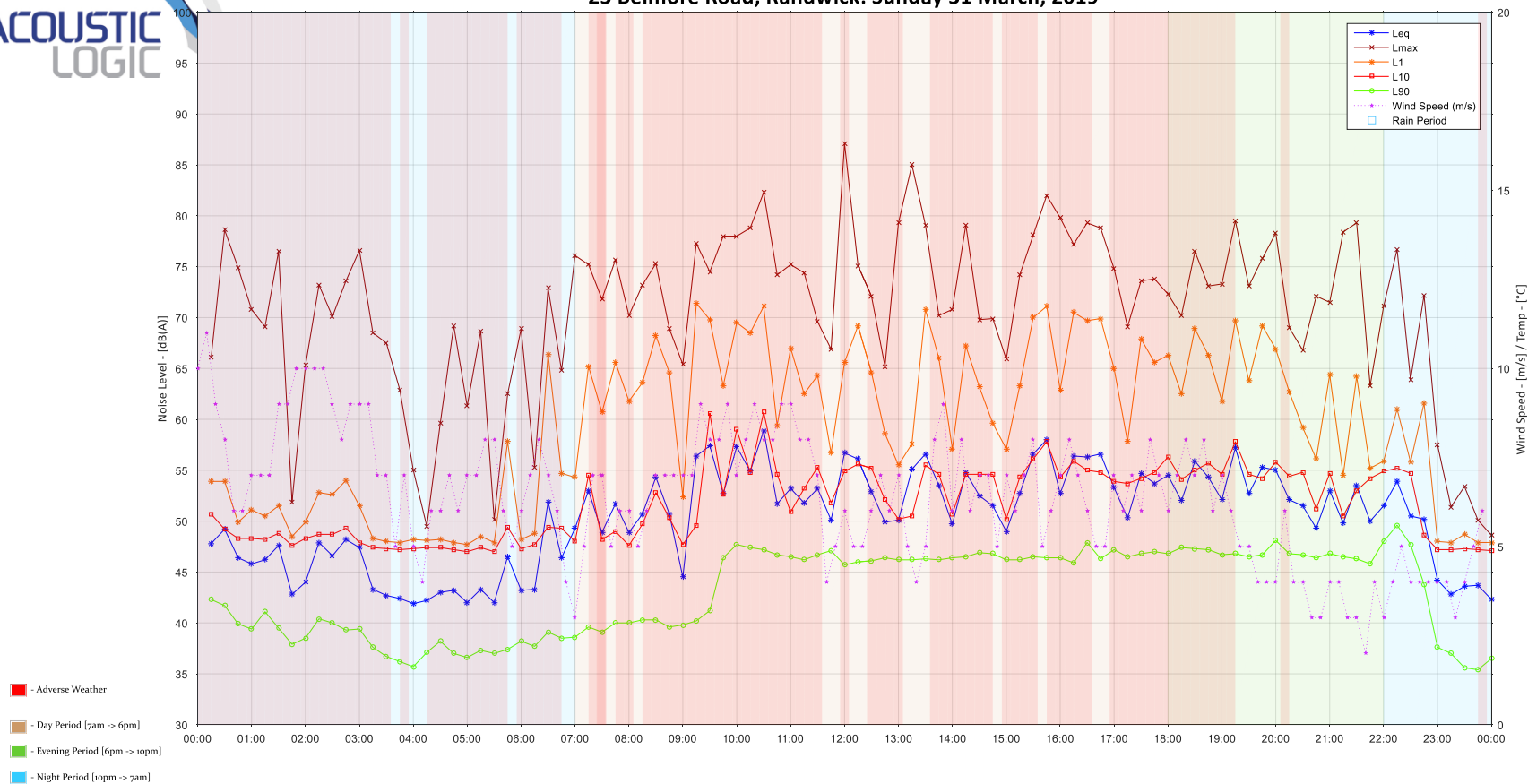
23 Belmore Road, Randwick: Friday 29 March, 2019



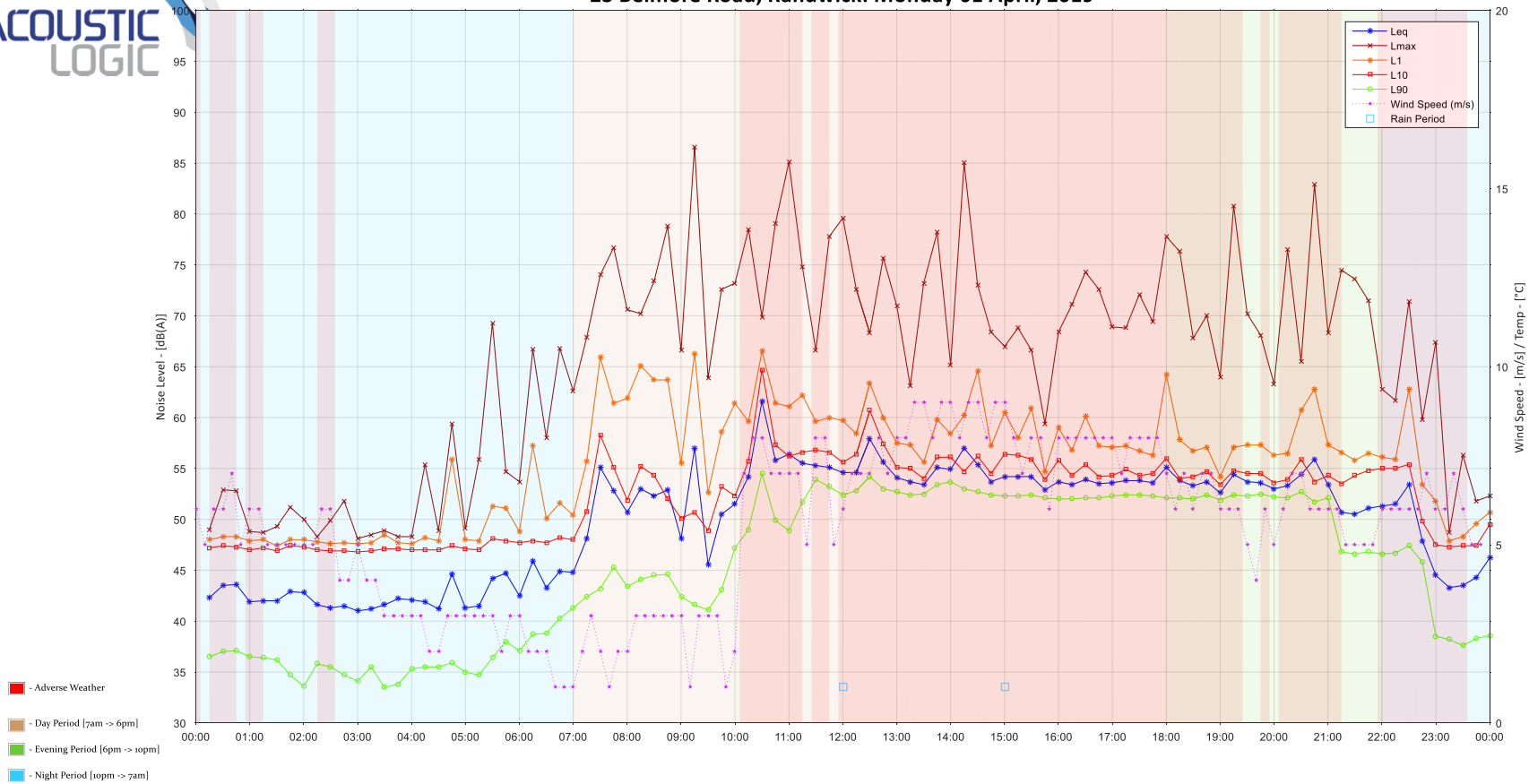
23 Belmore Road, Randwick: Saturday 30 March, 2019



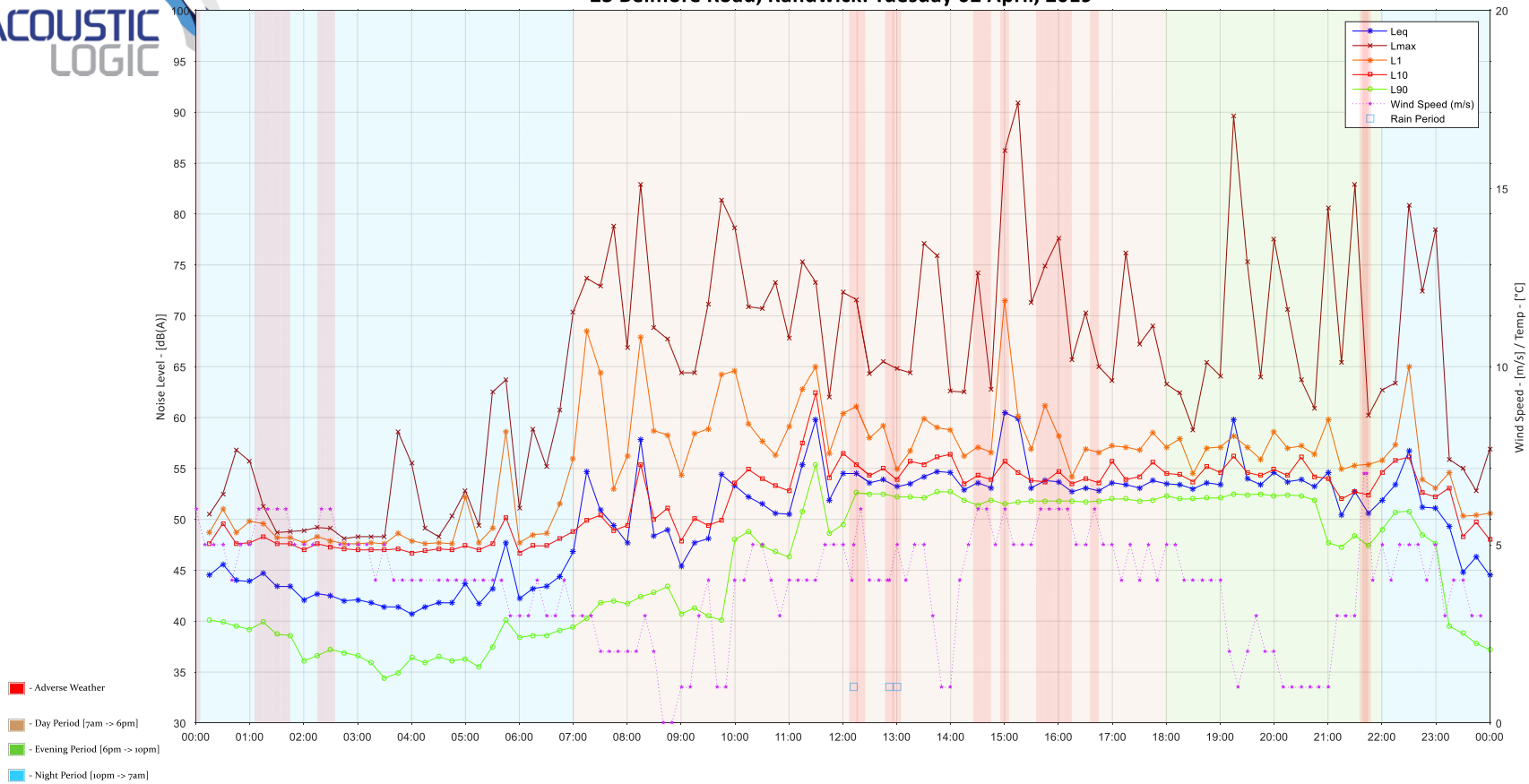
23 Belmore Road, Randwick: Sunday 31 March, 2019



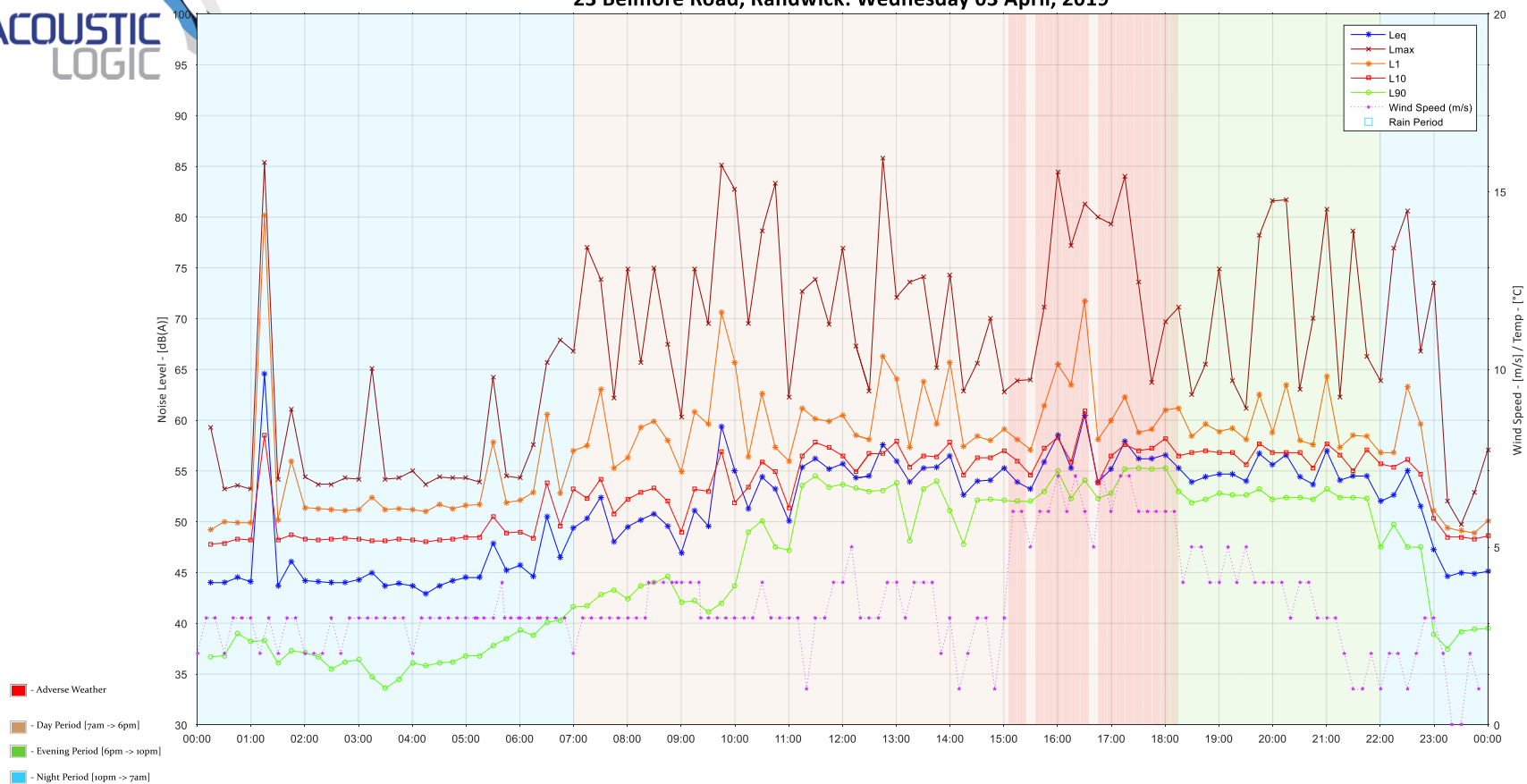
23 Belmore Road, Randwick: Monday 01 April, 2019



23 Belmore Road, Randwick: Tuesday 02 April, 2019



23 Belmore Road, Randwick: Wednesday 03 April, 2019



23 Belmore Road, Randwick: Thursday 04 April, 2019

