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232-240 Elizabeth Street, Surry Hills

Planning Proposal Acoustic Assessment

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1 INTRODUCTION

This report has been prepared to assess noise impacts associated with the proposed commercial development to be located at 232-240 Elizabeth Street, Surry Hills.

Impacts assessed include:

- Mechanical noise emissions
- Loading dock operation

The report has been prepared for the sole purpose of a planning proposal assessment and should not be used or relied on for any other purposes.

2 REFERENCED DOCUMENTS

2.1 BACKGROUND INFORMATION USED

This assessment is based on the architectural drawings prepared by Candalepas Associates architectural drawings, job no 5968, dated 07/11/2022.

2.2 PLANNING GUIDELINES

- City of Sydney Council DCP 2012
- NSW *EPA Noise Policy for Industry 2017*.
- NSW *Road Noise Policy 2011*.

3 SITE DESCRIPTION AND PROPOSAL

The project site is located at 232-240 Elizabeth Street, Surry Hills. The proposal seeks approval for the following:

- Nine storey building to accommodate:
    - Ground floor retail space, basement end of trip facilities and parking, lobby and plant areas.
    - Commercial offices (open plan) from Level 1 to 9 with associated amenity spaces.

Onsite acoustic investigations carried out by this office regarding the surrounding acoustic environment around the project site indicate the following:

- Elizabeth Street along the western boundary of the project site which carries a high traffic volume, primarily associated with intercity travel.
- Existing single and two storey commercial premises containing retail spaces, laundromat and backpackers.

The nearest noise sensitive receivers surrounding the project site include:

- **Receiver R1** – Existing residential building across Reservoir Street at 242-254 Elizabeth Street.
- **Receiver R2** – Existing residential building adjacent the northern boundary at 230 Elizabeth Street.
- **Receiver R3** – Existing residential building situated north-east of the project site at 62-64 Forster Street.
- **Receiver R4** – Existing commercial development adjacent the eastern boundary of the project site at 62-68 Reservoir Street.
- **Receiver R5** – Existing residential building situated south-east of the project site at 33 Reservoir Street.

An aerial photo of the site is present in Figure 1 which also shows nearby receivers and monitoring locations.

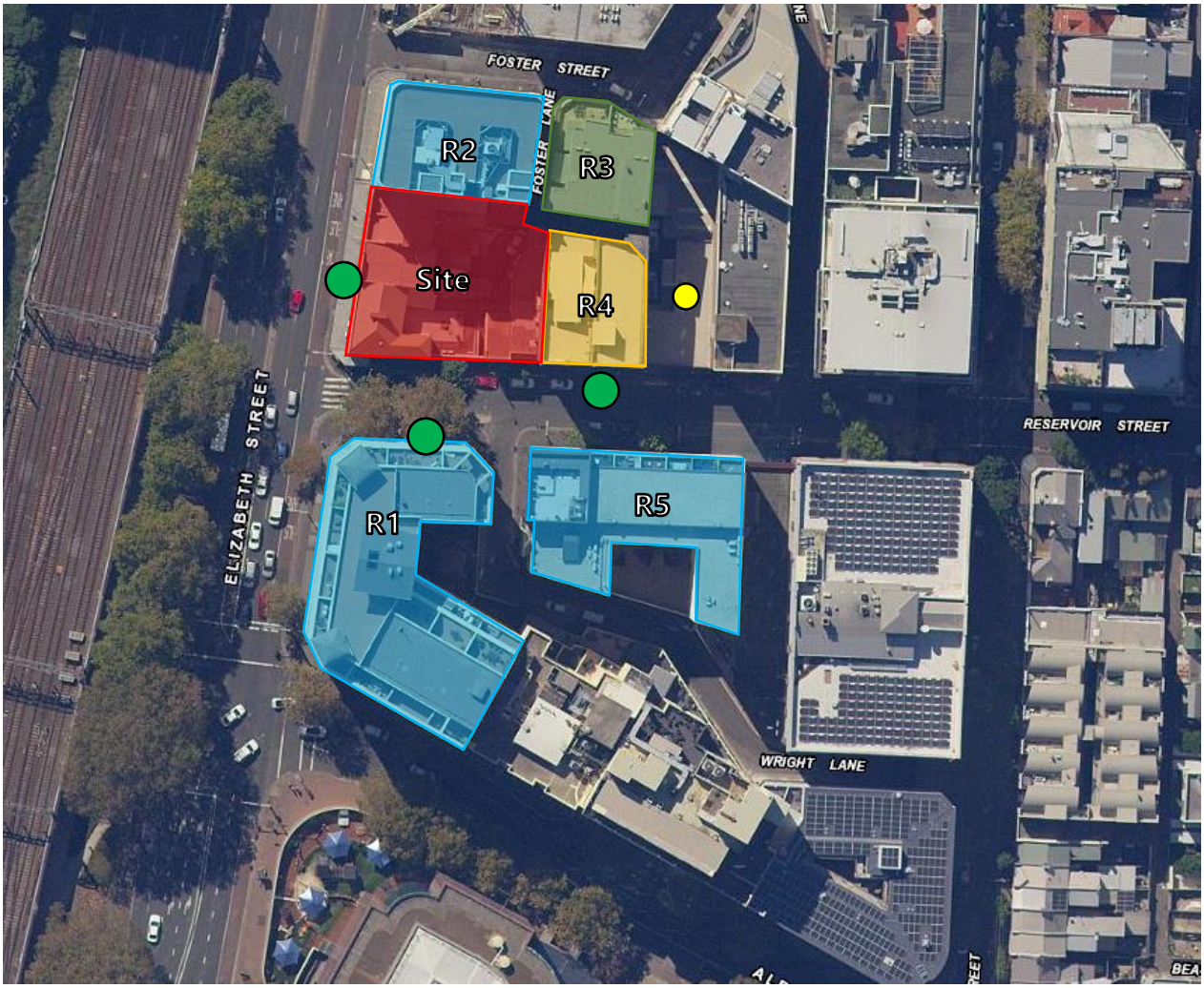


Figure 1 – Site Map and Receiver Locations
Sourced from SixMaps NSW

Unattended Noise Monitoring

Attended Noise Monitoring

Project Site

Commercial Receiver

Mixed Use Receiver

Residential Receiver

4 EXISTING ACOUSTIC ENVIRONMENT

The acoustic environment is categorised by high background noise levels consistent with an urban environment during the day, evening and night-time periods.

Unattended noise monitoring conducted at site was conducted by this office in order to establish the existing background noise environment.

4.1 NOISE DESCRIPTORS

Ambient noise constantly varies in level from moment to moment, so it is not possible to accurately determine prevailing noise conditions by measuring a single, instantaneous noise level.

To quantify ambient noise, a 15 minute measurement interval is typically utilised. Noise levels are monitored continuously during this period, and then statistical and integrating techniques are used to characterise the noise being measured.

The principal measurement parameters obtained from the data are:

L_{eq} - represents the average noise energy during a measurement period. This parameter is derived by integrating the noise levels measured over the measurement period. L_{eq} is important in the assessment of noise impact as it closely corresponds with how humans perceive the loudness of time-varying noise sources (such as traffic noise).

L_{90} – This is commonly used as a measure of the background noise level as it represents the noise level heard in the typical, quiet periods during the measurement interval. The L_{90} parameter is used to set noise emission criteria for potentially intrusive noise sources since the disturbance caused by a noise 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.

L_{10} is used in some guidelines to measure noise produced by an intrusive noise source since it represents the average of the loudest noise levels produced at the source. Typically, this is used to assess noise from licenced venues.

L_{max} is the highest noise level produced during a noise event, and is typically used to assess sleep arousal impacts from short term noise events during the night. It is also used to assess internal noise levels resulting from aircraft and railway ground vibration induced noise.

L_1 is sometimes used in place of L_{max} to represent a typical noise level from a number of high level, short term noise events.

4.2 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.

Appendix 1 presents the results of unattended noise monitoring previously conducted at the project site. Weather affected data was excluded from the assessment in line with Fact Sheet B of NPfI.

4.2.1 Measurement Equipment

Unattended noise monitoring for background noise levels was conducted using one Acoustic Research Laboratories Pty Ltd noise logger. The logger was programmed to store 15-minute statistical noise levels throughout the monitoring period. The equipment was calibrated at the beginning of the measurement period using a Rion NC-73 calibrator; no significant drift was detected at the end of the measurement period. All measurements were taken on A-weighted fast response mode.

4.2.2 Measurement Location

An unattended noise monitor was installed at the rear of the site to measure background noise levels, however was affected by mechanical plant noise (which is proposed to be removed as part of the development). Other locations on the site to install monitoring equipment were unsuitable to determine the prevailing background noise levels of surrounding receivers, as it would also be affected by the installed mechanical plant, or impacted by road traffic noise from Elizabeth Street.

Long term monitoring results previously undertaken within the surrounding areas was used to determine background noise levels. The location of the monitor along Reservoir Street was substantially screened from traffic noise along Elizabeth Street, and unaffected by mechanical plant noise. As such, this represents a suitably conservative representative background noise level.

4.2.3 Measured Background Noise Levels

The measured Rating Background Noise Level (RBL) is presented in the table below.

Table 3-1 – Unattended Noise Monitoring RBL Results

Logger Location	Time of Day	Measured Rating Background Noise Level dB(A)$L_{90(period)}$
52-58 Reservoir Street, Surry Hills	Day (7:00am-6:00pm)	53
	Evening (6:00pm-10:00pm)	51
	Night (10:00pm-7:00am)	48

5 TRAFFIC NOISE SURVEY

5.1 ATTENDED NOISE MEASUREMENTS

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

5.1.1 Measurement Position

Attended noise measurements were undertaken to investigate the existing noise environment surrounding the development (see Figure 1).

5.1.2 Measurement Period

The attended noise measurements were conducted on Thursday the 3rd of November 2022 between 12:00pm and 2:00pm.

5.1.3 Measurement Equipment

The 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.

5.1.4 Measured External Noise Levels

The measured external noise levels are presented in Table 5.1 below.

Table 5-1 – Measured Noise Levels at Attended Measurement Locations

Measurement Location	Time of day	Measured Noise Level dB(A)$L_{eq(15min)}$
232-240 Elizabeth Street, Surry Hills 180˚ View of Road 3m from kerb	Wednesday 3rd November 2022 12.00pm – 1.00pm	72
Reservoir Street, Surry Hills Measurement was conducted 3m from kerb	Wednesday 3rd November 2022 1.00pm – 2.00pm	64

6 NOISE EMISSION CRITERIA

Noise emissions from the site should be assessed to ensure that the amenity of nearby land users is not adversely affected.

The primary potential noise sources from use of the site will be operational noise from the patrons and any mechanical equipment that services the site.

Noise emissions will be assessed to the following criteria:

- Sydney Development Control Plan (DCP) 2012 & Standard Conditions of Consent.
- The NSW EPA Noise Policy for Industry (NPfI).

6.1 CITY OF SYDNEY COUNCIL STANDARD CONDITIONS OF CONSENT

There are no specific acoustic controls relating to commercial development in the City of Sydney DCP 2012. Standard conditions of consent relating to noise emission from commercial premises are as follows;

NOISE – COMMERCIAL PLANT / INDUSTRIAL DEVELOPMENT

(a) Noise from commercial plant and industrial development must not exceed a project amenity/intrusiveness noise level or maximum noise level in accordance with relevant requirements of the NSW EPA Noise Policy for Industry 2017 (NPfI) unless agreed to by the City's Area Planning Manager. Further:

(i) Background noise monitoring must be carried out in accordance with the long-term methodology in Fact Sheet B of the NPfI unless otherwise agreed by the City's Area Planning Manager.

(ii) Commercial plant is limited to heating, ventilation, air conditioning, refrigeration and energy generation equipment.

(b) An $L_{Aeq,15\ minute}$ (noise level) emitted from the development must not exceed the $L_{A90,\ 15\ minute}$ (background noise level) by more than 3dB when assessed inside any habitable room of any affected residence or noise sensitive commercial premises at any time. Further:

(i) The noise level and the background noise level shall both be measured with all external doors and windows of the affected residence closed.

(ii) Background noise measurements must not include noise from the development but may include noise from necessary ventilation at the affected premise.

(c) Corrections in Fact Sheet C of the NPfI are applicable to relevant noise from the development measured in accordance with this condition, however duration corrections are excluded from commercial noise.

6.2 NSW EPA NOISE POLICY FOR INDUSTRY (NPFI) 2017

The EPA NPFI has two criteria which are both required to be satisfied, namely Intrusiveness and amenity. The NPFI 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 Section 4. 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 NPFI 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 Section 4, the Noise Policy for Industry suggests the adoption of the 'urban' categorisation.

The NPFI requires project amenity noise levels to be calculated in the following manner;

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

The amenity levels appropriate for the receivers surrounding the project site are presented in Table 2

Table 2 – EPA NPFI Amenity Noise Levels

Type of Receiver	Time of day	Recommended Noise Level dB(A)$L_{eq(period)}$	Project Amenity Noise Levels dB(A)$L_{eq(15min)}$
Residential – Urban	Day	60	58
	Evening	50	48
	Night	45	43
Commercial premises	When in use	65	63

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.*

The following sleep emergence noise objectives then apply.

Table 3 - Sleep Arousal Criteria for Residential Receivers

Receiver	Rating Background Noise Level (Night) dB(A)L_{90}	Emergence Level
Residential Dwellings Surrounding Site	48	53 dB(A) $L_{eq,\ 15min}$; 63 dB(A) L_{Fmax}

If there are noise events that could exceed the emergence levels detailed in the table above, then an assessment of sleep arousal impact is required to be carried out, taking into account the level and frequency of noise events during the night, existing noise sources, etc. This more detailed sleep arousal test is conducted using the guidelines in the EPA Road Noise Policy. Most relevantly, the Road Noise Policy states:

> *For the research on sleep disturbance to date it can be concluded that:*
>
> - *Maximum internal noise levels below 50-55dB(A) are unlikely to awaken people from sleep.*
> - *One to two noise events per night with maximum internal noise levels of 65-70dB(A) are not likely to affect health and wellbeing significantly.*

Table 4 – EPA NPfI Project Noise Target Level (Plant and Equipment Noise)

Receiver	Time Period	Assessment Background Noise Level dB(A)$L_{90(period)}$	Project Amenity Criteria dB(A) $L_{eq(15min)}$	Intrusiveness Criteria dB(A) $L_{eq(15min)}$	NPFI Criteria for Sleep Disturbance
Residential Locations	Day	53	**58**	58	-
	Evening	51	**48**	56	-
	Night	48	**43**	53	53 dB(A) $L_{eq,15min}$; 63 dB(A) L_{Fmax}
Commercial Premises	When in Use	-	**63**	-	-

The project noise trigger levels for the development are presented as bold within the above table.

7 NOISE EMISSION ASSESSMENT

A discussion of the potential noise impacts associated with the development have been presented for the following:

- Loading dock operation;
- Mechanical plant noise emissions in principle.

Each of these noise sources will be discussed in detail.

7.1 LOADING DOCK OPERATION

A loading dock to service the retail/commercial tenancies within the development is located within the ground level, access to the loading dock is from Reservoir Street. Surrounding development is commercial/residential with high traffic intrusion, and as such average noise emissions from the loading dock would be expected to readily comply with the requirements of the NSW EPA Noise Policy for Industry.

If it is proposed to operate the loading dock during the night time period (10pm – 7am) such as for large deliveries or waste collection, then consideration must be given to the potential for sleep disturbance from peak noise events.

The following assumptions have been made with regards to an assessment of sleep disturbance potential due to loading dock operations:

- Only small delivery vans are proposed for the loading dock.
- The loudest typical noise event associated with a van is the door slam, which has been measured by this office to be 90dB(A)

Given the distance between the site and nearby residential receivers, as well as any barrier effects which will be provided by the surrounding buildings and site, predicted noise levels to the first floor residents of R1 along Reservoir Street due to a van within the loading dock is predicted to be 57 dB(A) L_{Fmax} at the façade, fully compliant with the 63dB(A) L_{max} requirement formulated in Section 6.

7.2 MECHANICAL PLANT

Detailed acoustic design of mechanical plant cannot be undertaken at this preliminary stage as plant selections and locations are not finalised. Cumulative assessment of plant noise with other noise sources is recommended when conducting the acoustic design of plant items.

The current design includes a centralised plantroom on Level 9, internally within the development. Given the location of the plant room, compliance with NSW *Noise Policy for Industry* (2017) criteria as set out in Section 5.2 will be achievable, provided that detailed acoustic review of plant items is undertaken once plant is selected and standard acoustic treatments (such as in-duct attenuation, barriers, appropriate location of plant items etc) are adopted.

8 CONCLUSION

Noise emissions associated with the proposed commercial development to be located at 232-240 Elizabeth Street, Surry Hills has been assessed with reference to the City of Sydney Council DCP 2012 and the NSW EPA Noise Policy for Industry.

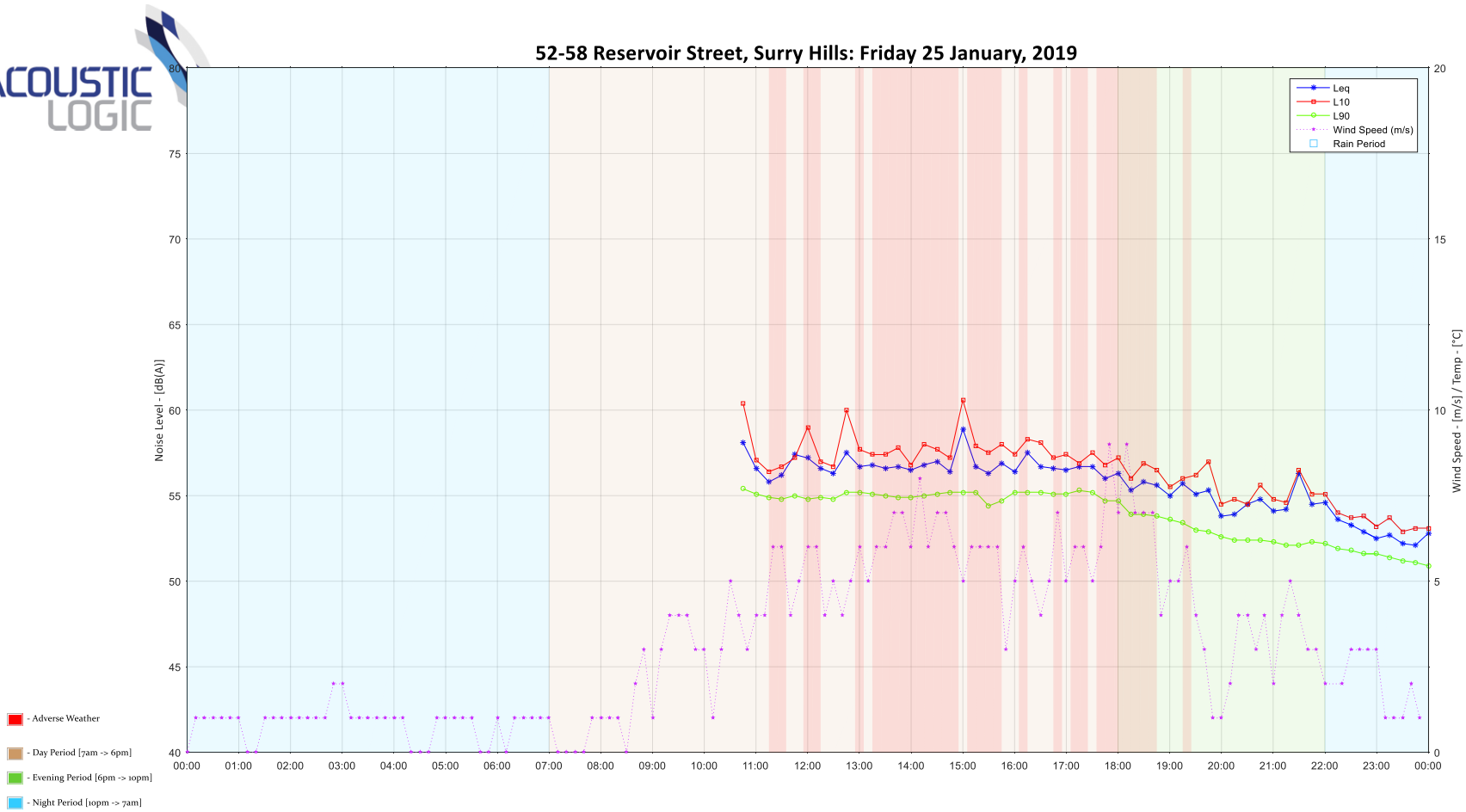
Noise emission limits for the site have been established for the proposed uses of the development. It is recommended that individual tenancies and any proposed mechanical plant be acoustically reviewed to ensure that the noise emission criteria established are achieved, with particular regard to the cumulative operation of the site.

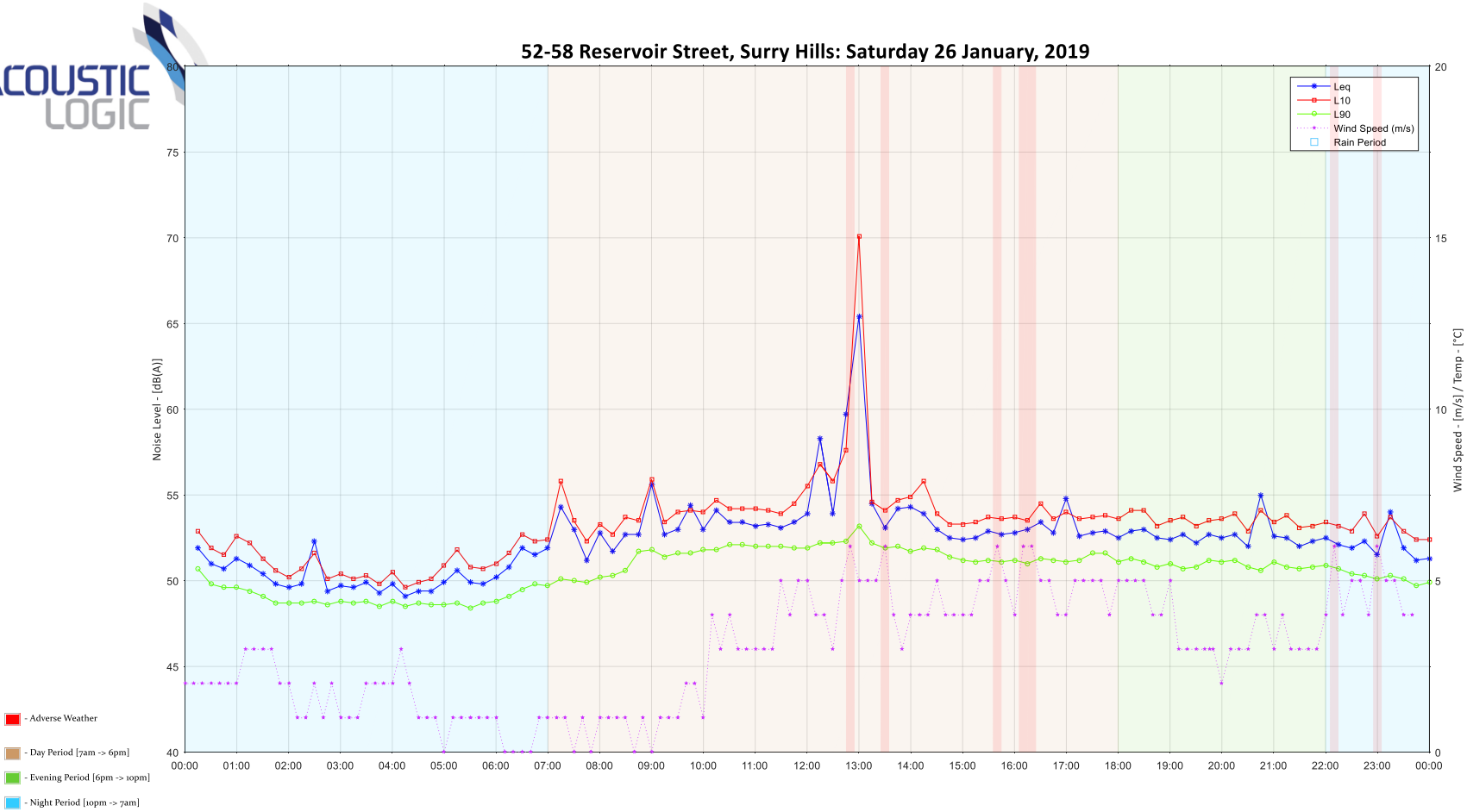
We trust this information is satisfactory. Please contact us should you have any further queries.

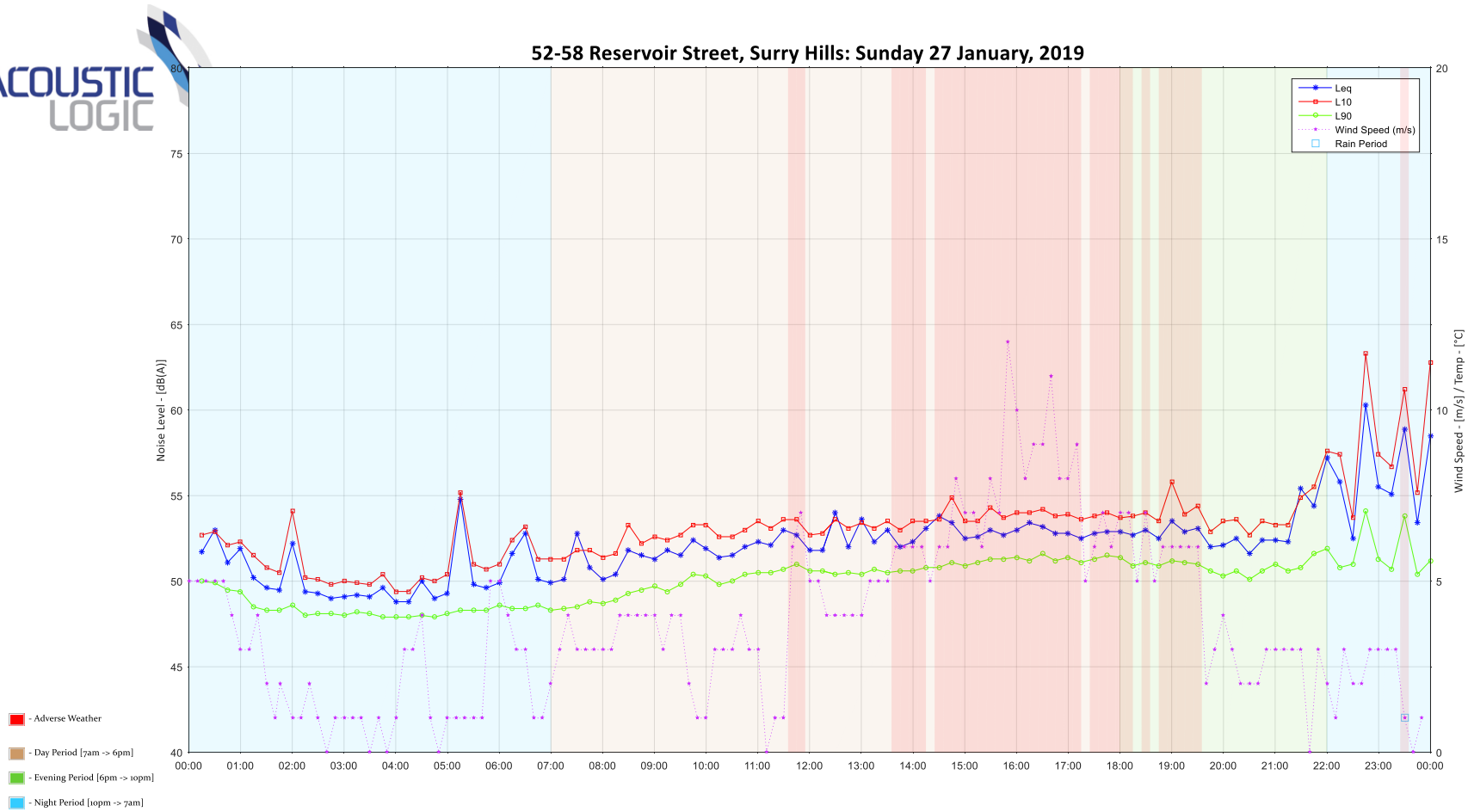
Yours faithfully,

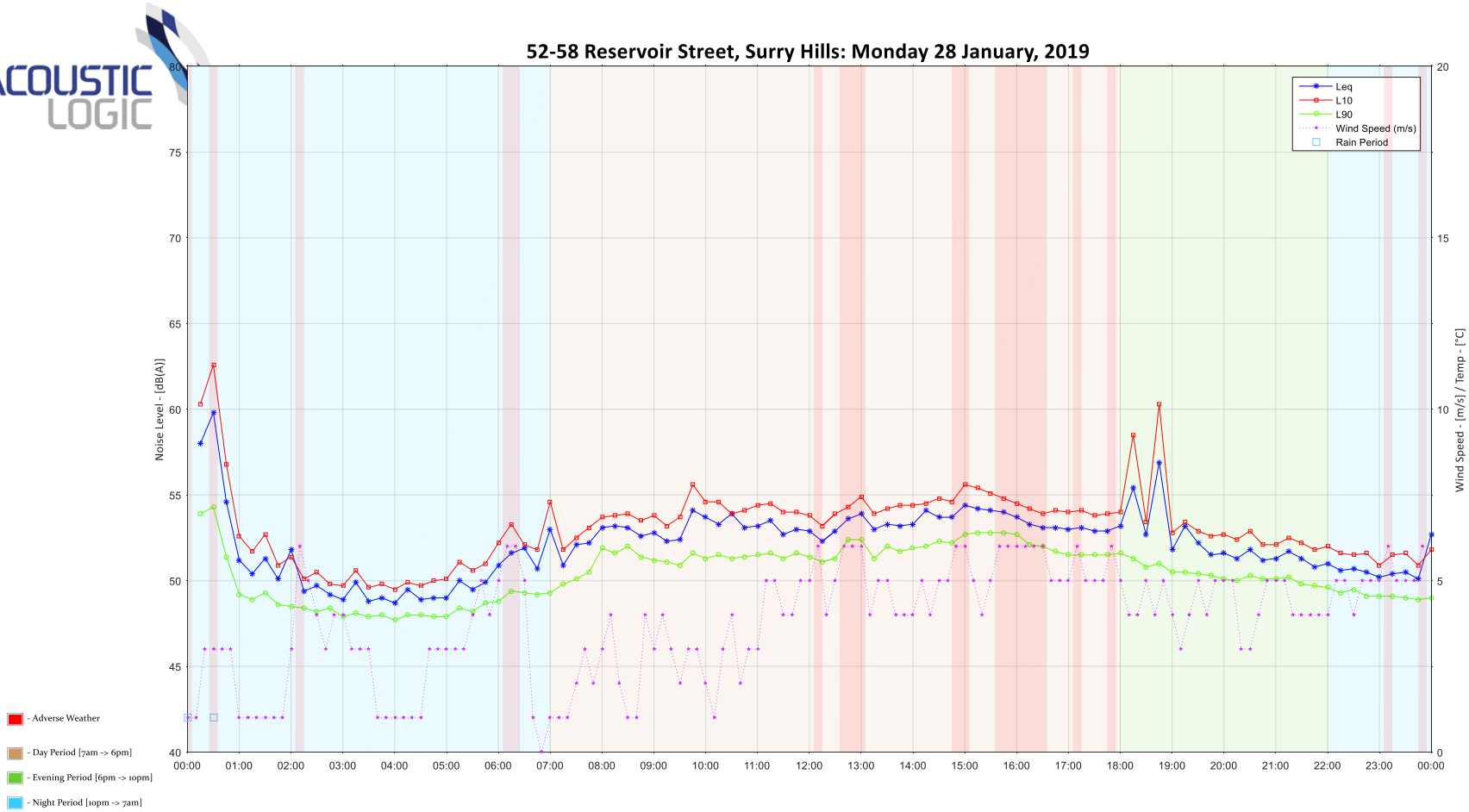
Acoustic Logic Pty Ltd
Justine Wade

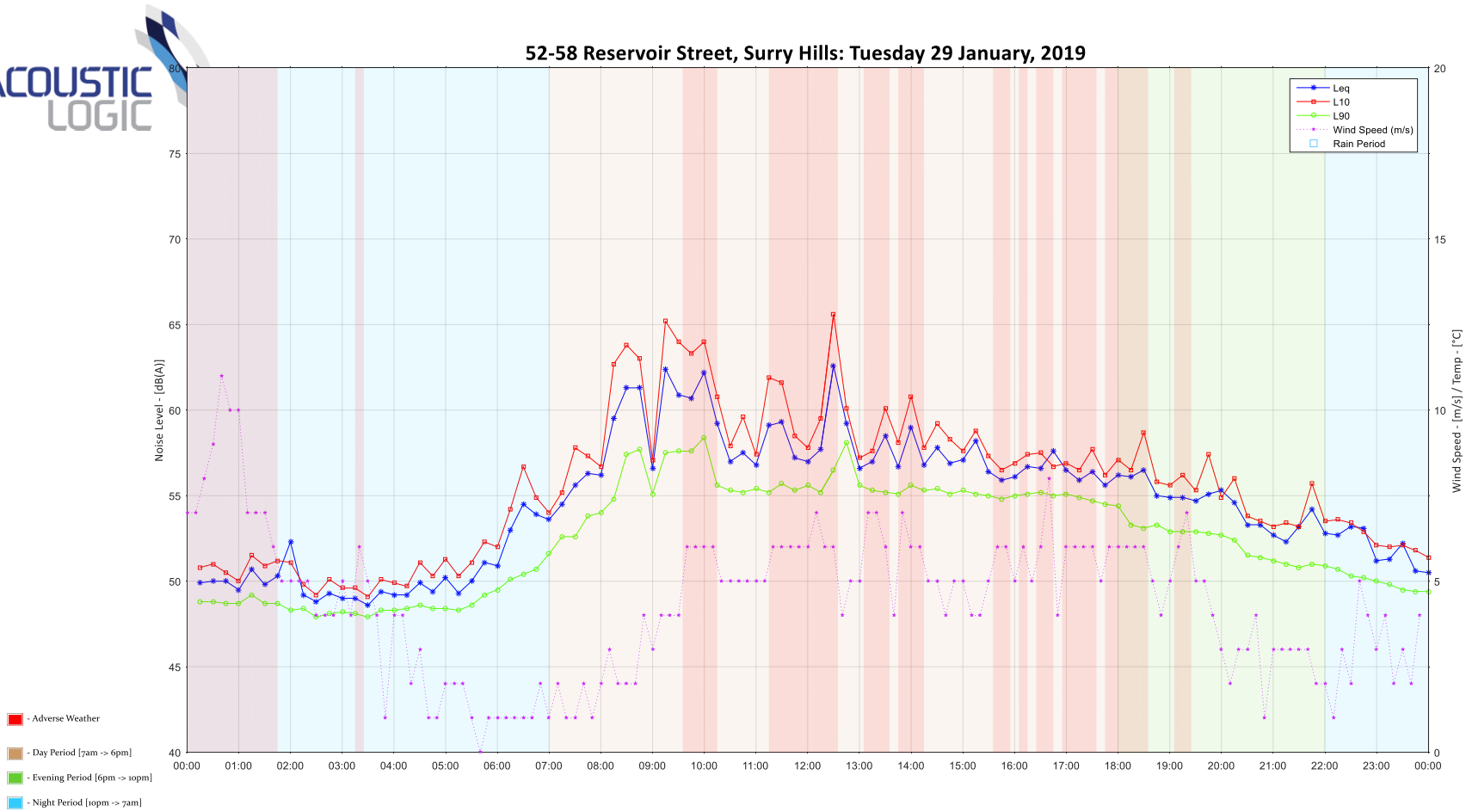
APPENDIX ONE – UNATTENDED NOISE MONITORING DATA

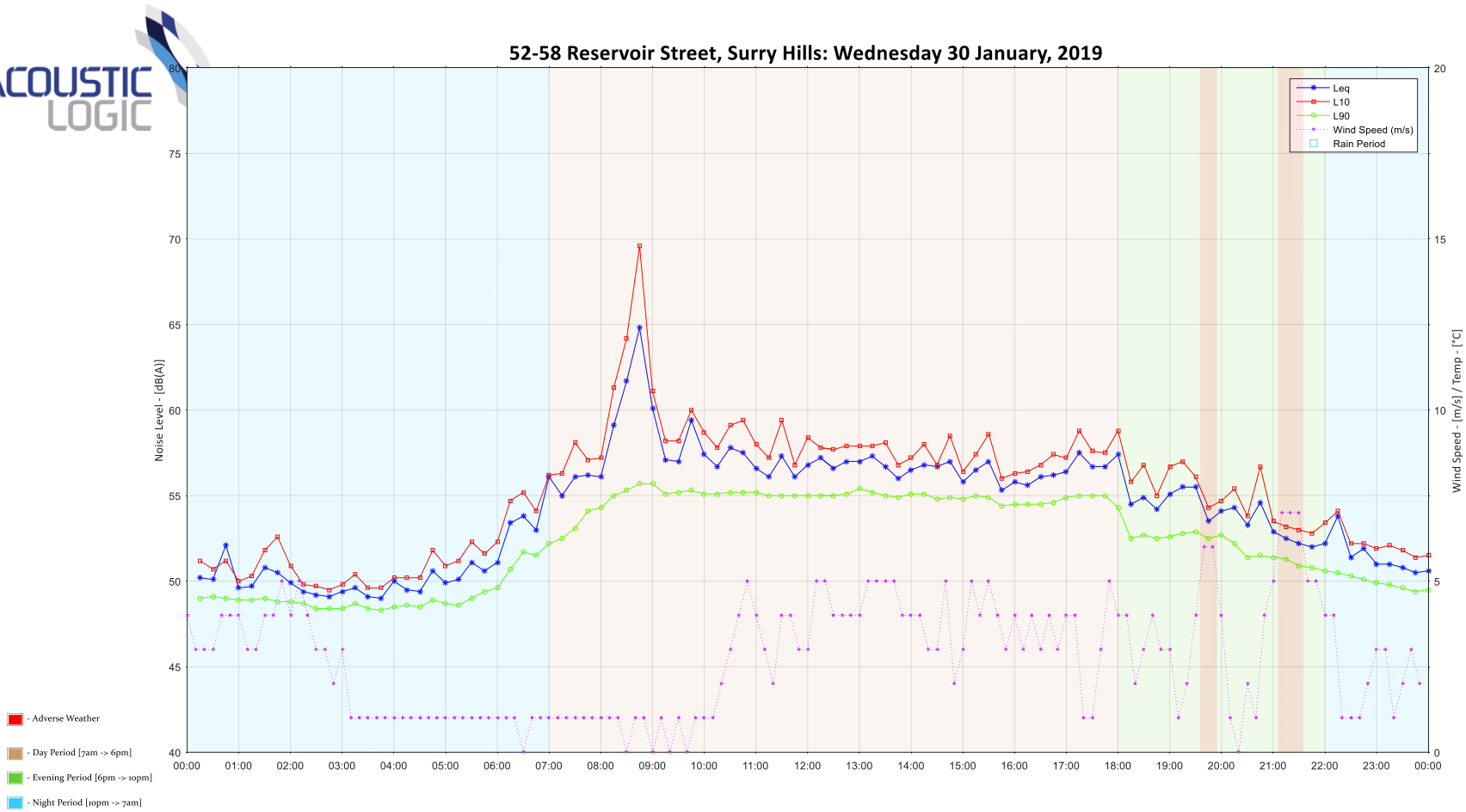

52-58 Reservoir Street, Surry Hills: Friday 25 January, 2019
Noise Level - [dB(A)]
Wind Speed - [m/s] / Temp - [°C]
Leq
L10
L90
Wind Speed (m/s)
Rain Period
- Adverse Weather
- Day Period [7am -> 6pm]
- Evening Period [6pm -> 10pm]
- Night Period [10pm -> 7am]

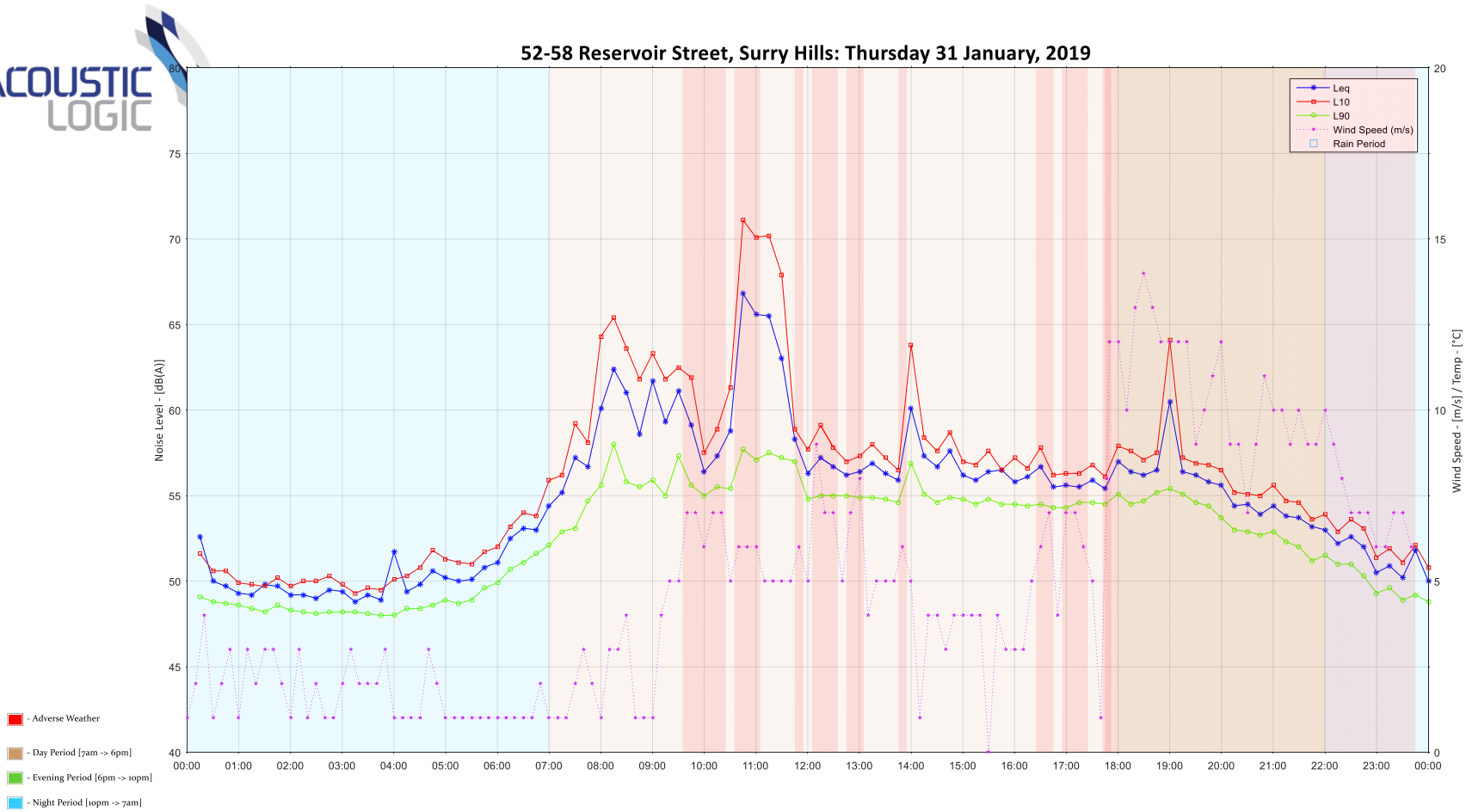

52-58 Reservoir Street, Surry Hills: Saturday 26 January, 2019
Noise Level - [dB(A)]
Wind Speed - [m/s] / Temp - [°C]
Leq
L10
L90
Wind Speed (m/s)
Rain Period
- Adverse Weather
- Day Period [7am -> 6pm]
- Evening Period [6pm -> 10pm]
- Night Period [10pm -> 7am]

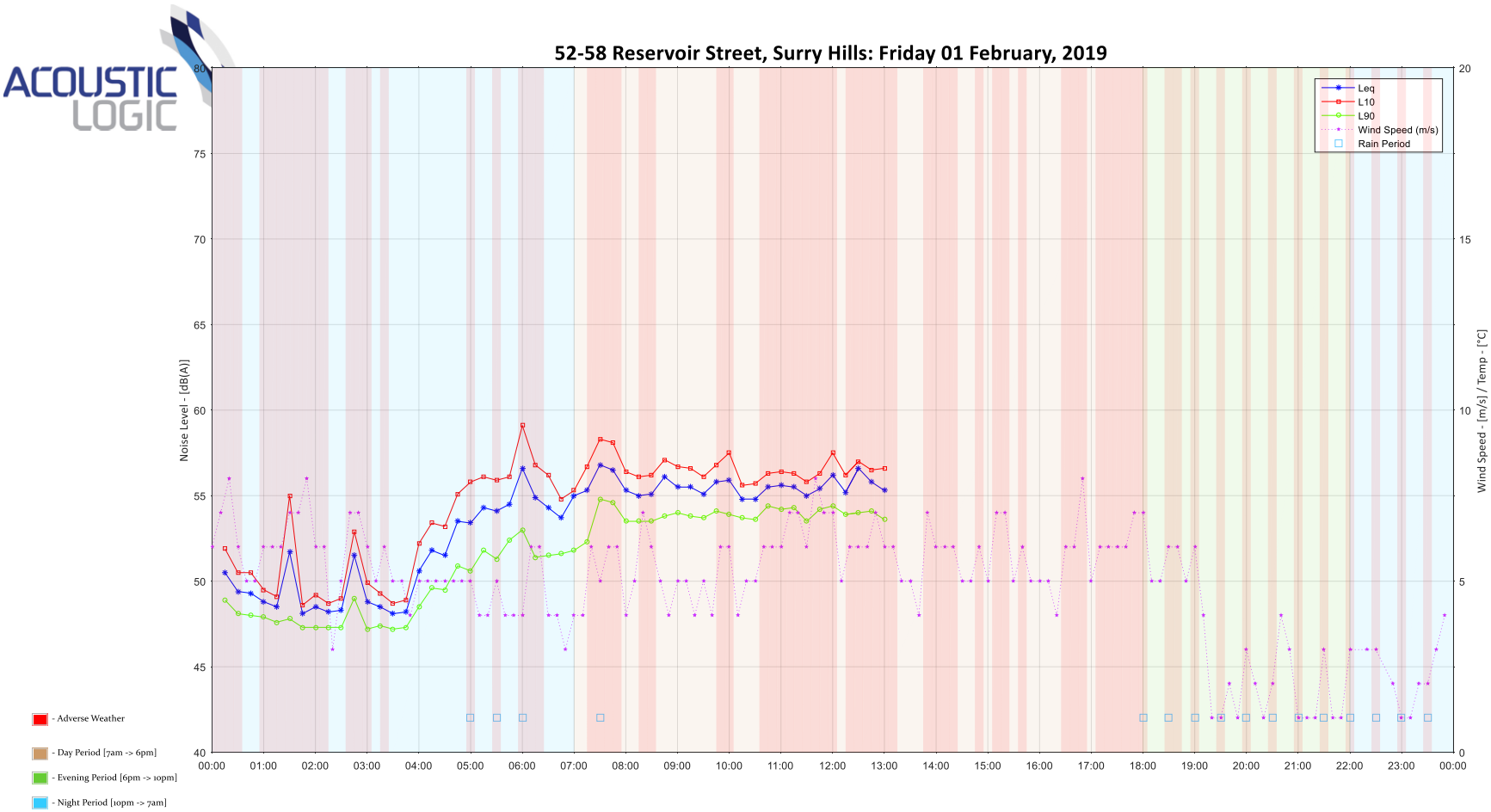

52-58 Reservoir Street, Surry Hills: Sunday 27 January, 2019
Leq
L10
L90
Wind Speed (m/s)
Rain Period
Noise Level - [dB(A)]
Wind Speed - [m/s] / Temp - [°C]
80
75
70
65
60
55
50
45
40
20
15
10
5
0
00:00
01:00
02:00
03:00
04:00
05:00
06:00
07:00
08:00
09:00
10:00
11:00
12:00
13:00
14:00
15:00
16:00
17:00
18:00
19:00
20:00
21:00
22:00
23:00
00:00
- Adverse Weather
- Day Period [7am -> 6pm]
- Evening Period [6pm -> 10pm]
- Night Period [10pm -> 7am]


52-58 Reservoir Street, Surry Hills: Monday 28 January, 2019
Noise Level - [dB(A)]
Wind Speed - [m/s] / Temp - [°C]
Leq
L10
L90
Wind Speed (m/s)
Rain Period
- Adverse Weather
- Day Period [7am -> 6pm]
- Evening Period [6pm -> 10pm]
- Night Period [10pm -> 7am]


52-58 Reservoir Street, Surry Hills: Tuesday 29 January, 2019
Noise Level - [dB(A)]
Wind Speed - [m/s] / Temp - [°C]
Leq
L10
L90
Wind Speed (m/s)
Rain Period
- Adverse Weather
- Day Period [7am -> 6pm]
- Evening Period [6pm -> 10pm]
- Night Period [10pm -> 7am]


52-58 Reservoir Street, Surry Hills: Wednesday 30 January, 2019
Noise Level - [dB(A)]
Wind Speed - [m/s] / Temp - [°C]
Leq
L10
L90
Wind Speed (m/s)
Rain Period
- Adverse Weather
- Day Period [7am -> 6pm]
- Evening Period [6pm -> 10pm]
- Night Period [10pm -> 7am]


52-58 Reservoir Street, Surry Hills: Thursday 31 January, 2019
Noise Level - [dB(A)]
Wind Speed - [m/s] / Temp - [°C]
Leq
L10
L90
Wind Speed (m/s)
Rain Period
- Adverse Weather
- Day Period [7am -> 6pm]
- Evening Period [6pm -> 10pm]
- Night Period [10pm -> 7am]


52-58 Reservoir Street, Surry Hills: Friday 01 February, 2019
Leq
L10
L90
Wind Speed (m/s)
Rain Period
Noise Level - [dB(A)]
Wind Speed - [m/s] / Temp - [°C]
80
75
70
65
60
55
50
45
40
20
15
10
5
0
00:00
01:00
02:00
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23:00
00:00
- Adverse Weather
- Day Period [7am -> 6pm]
- Evening Period [6pm -> 10pm]
- Night Period [10pm -> 7am]