

72-84 Foveaux St, Surry Hills

DA Noise Impact Assessment

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1 INTRODUCTION

This report presents an analysis of the acoustic impacts associated with the proposed alterations to the existing commercial development at 72-84 Foveaux St, Surry Hills.

In this report we will:

- Conduct an external noise impact assessment (primarily traffic) and recommend acoustic treatments to ensure that a reasonable level of amenity is achieved for future tenants of the commercial site.
- Identify potential noise sources generated by the site, and determine noise emission goals for the development to meet Council acoustic requirements, ensuring that nearby developments are not adversely impacted by the subject development.

The noise assessment is based on the DA architectural drawing set provided to this office by Candalepas Associates and presented in the table below.

Table 1 – Referenced Drawings

Consultant	Drawing Number	Issue	Date
Candalepas Associates (Project no 5638)	DA1101	A	14/3/2019
	DA1102	A	14/3/2019
	DA1103	A	14/3/2019
	DA1104	A	14/3/2019
	DA1105	A	14/3/2019
	DA1201	A	14/3/2019
	DA1202	A	14/3/2019
	DA1301	A	14/3/2019
	DA1302	A	14/3/2019
	DA1303	A	14/3/2019
	DA1304	A	14/3/2019
	DA1601	A	14/3/2019

2 SITE DESCRIPTION

The site is located on Foveaux Street, with building frontages also along Waterloo Street and Corben Street. The site is generally bounded by existing residential development, with adjoining residences being immediately adjacent to the site boundaries. Refer to Figure 1 for detail.

The subject proposal includes the demolition works involving the stripping out of existing interiors, removal of the existing façade and associated structural works and then construction and fitout of a multi storey commercial building, with basement bicycle parking.

Sensitive receiver locations as presented in Figure 1 and detailed below.

- **R1:** Residential dwellings adjoining the site to the east located at 41-43 Corben Street & 86 Foveaux Street. Residents are bounded on two sides by the proposed development;
- **R2:** Residential dwellings adjoining the site to the north located at 31-33 Corben Street & 6 Waterloo Street. Residents are bounded on one side by the proposed development;
- **R3:** Residential dwellings to the south across Foveaux Street, located at 95 – 99 Foveaux Street;
- **R4:** Residential dwellings to the east across Corben Street, located at 30-36 Corben Street;
- **C1:** Commercial development to the east across Corben Street;
- **C2:** Commercial development to the south across Foveaux Street;
- **C3:** Commercial development to the west across Waterloo Street.

An aerial photo of the site, monitoring locations and surrounding receivers is shown in Figure 1



Development Site

Residential Receivers

Commercial Receivers

Figure 1 - Site Map and Receiver Locations
Source: NSWSixMaps



Unattended Noise Monitor



Attended Noise Measurements

3 NOISE DESCRIPTORS

Traffic noise constantly varies in level, due to fluctuations in traffic speed, vehicle types, road conditions and traffic densities. Accordingly, it is not possible to accurately determine prevailing traffic noise conditions by measuring a single, instantaneous noise level. To accurately determine the effects of traffic noise a 15-20 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. These parameters are used to measure how much annoyance would be caused by a particular noise source.

In the case of environmental noise three principle 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 interval.

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 measurement period. L_{eq} is important in the assessment of traffic noise impact as it closely corresponds with human perception of a changing noise environment; such is the character of traffic noise.

Current practice favours the L_{eq} parameter as a means of measuring traffic noise, whereas the L_{10} parameter has been used in the past and is still incorporated in some codes. For the reasons outlined above, the L_{90} parameter is not used to assess traffic noise intrusion.

4 EXTERNAL NOISE INTRUSIONS

The predominant noise source affecting the site is traffic noise from vehicle movements on surrounding roadways

4.1 ENVIRONMENTAL NOISE INTRUSIONS ASSESSMENT CRITERIA

Environmental noise impact into the proposed development has been assessed in conjunction with the City of Sydney council DCP and AS 2107:2016 as detailed in this section of the report.

4.2 CITY OF SYDNEY DCP

As the City of Sydney DCP has no relevant internal traffic noise requirements for commercial sites the Australian Standard 2107:2016 internal noise criteria will be used for this project.

4.3 AUSTRALIAN STANDARD 2107:2016

Australian Standard AS2107:2016 “Recommended design sound levels and reverberation times for building interiors” stipulates the following internal noise criteria for commercial development:

Table 2 – AS2107:2016

Type of occupancy/activity	Recommended Maximum Design Sound Level
Commercial Areas	45 dB(A) _{Leq(1hr)}

4.3.1 Environmental Noise Measurements

Unattended long-term monitoring was conducted by this office, to measure the existing ambient environment at site. The unattended noise monitor was installed along the western edge of the property facing York Street.

Monitoring was conducted using an Acoustic Research Laboratories noise monitor set to A-weighted fast response. The monitor was calibrated at the start and end of the monitoring period using a Rion NC-73 calibrator. No significant drift was noted. The noise logging was conducted between Monday 14th of January & Tuesday 22nd of January 2019.

Detailed results of the noise monitoring, showing measured L₁₀, L₉₀, and L_{eq} noise levels during the monitoring period are provided in Appendix 1.

Attended short term measurements of environmental noise was also undertaken by this office, to supplement the unattended noise monitoring data. These measurements were undertaken on the 22nd January 2019 between 7:00am and 9:00am, a period of peak traffic activity, at the locations detailed in Figure 1 above. Attended noise measurements were obtained using a Norsonic 140 Sound Level Analyser, set on A- weighted fast response. The sound level meter was calibrated before and after the measurements using a Norsonic 1251 Sound Level Calibrator. No significant drift was recorded.

The traffic noise levels listed in the table below, were determined based on the unattended logging data and attended noise measurements. In determination of acoustic treatments, the measured levels are adjusted for distance and orientation.

Table 3 – Measured Existing Traffic Noise Levels

Location	Measured Traffic Noise Level dB(A) $L_{eq}(1hr)$
	Daytime (7am-10pm)
Foveaux Street – 3 metres from curb	68
Waterloo Street – 1 metre from curb	65

4.3.2 Methodology of Traffic Noise Intrusion Assessment

External noise intrusions will primarily be as a result of noise transfer through the roof, windows and doors, as these are relatively light building elements, which offer less resistance to the transmission of sound. Noise transfer through masonry external walls will not be significant and need not be considered further.

The constructions necessary to attenuate traffic noise impacts to levels complying with those detailed in section 4.3 above, are set out in section 4.4. The predicted noise levels have been based on the expected level and spectral characteristics of the external noise, the area of building elements exposed to aircraft noise, the absorption characteristics of the rooms and the noise reduction performance of the building elements.

4.4 RECOMMENDED TREATMENTS

The treatments set out in this section will ensure compliance with the noise objectives for both external noise sources (predominantly traffic noise) likely to impact the potential development. Calculations take into account the size and orientation of windows, facade transmission losses and room sound absorption characteristics.

4.4.1 Recommended Glazing

The recommended glazing assemblies are presented below. In all cases, the selected glazing type reduces internal noise levels to within the nominated criterion for the various space types.

The proposed glazing thickness will satisfy all acoustic requirements. 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.

Table 4 – Recommended Glazing Constructions

Level	Façade Location	Room Type	Recommended Construction
All Levels	All Façade orientations	Commercial areas	6.38mm Laminated

In addition to meeting the minimum glazing thickness requirements given, the design of the window mullions, perimeter seals and the installation of the windows/doors in the building openings shall not reduce the STC rating of the glazing assembly below the values nominated in the table above. All external windows and doors listed are required to be fitted with Q-lon type acoustic seals. Note that mohair of fin type seals will not be acceptable for the windows requiring acoustic seals. The window/door suppliers should provide evidence that the systems proposed have been tested in a registered laboratory with the recommended glass thicknesses and comply with the minimum listed STC requirements. Also, the glazing installer should certify that the window/doors have been constructed and installed in a manner equivalent to the tested samples.

Table 5 - Minimum STC or R_w of Glazing (with Acoustic Seals)

Glazing Assembly	Minimum STC or R_w of Installed Window (with acoustic seals)
6.38mm Laminated	30

4.4.2 Roof / Ceiling

The proposed roof ceiling constructions will be acoustically acceptable without additional acoustic treatments.

4.4.3 External Walls

The proposed external wall constructions will be acoustically acceptable without additional acoustic treatments.

5 NOISE EMISSION ASSESSMENT

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

Potential noise sources which should be assessed are:

- Noise generated by future mechanical plant and equipment servicing the proposed development.

5.1 BACKGROUND NOISE MONITORING

Background noise levels at the site have been measured based on the unattended noise logging undertaken by this office as outlined in section 4.3.1.

The measured background noise levels have been corrected for meteorological conditions (excessive wind and/or rain), as required by section 3.4 of the EPA Industrial Noise Policy. Weatherzone data for observations recorded at Observatory Hill, periods of precipitation or extraneous wind conditions have been removed from the data and have not been used in the assessment of existing background noise levels as detailed in Appendix 1.

Measured rating background noise levels are presented below. Refer to Appendix 1 for unmanned noise monitoring data.

Table 6 - Measured Background Noise Levels

Location	Rating Background Noise Level dB(A) $L_{90}(\text{period})$		
	Daytime (7am – 6pm)	Evening (6pm – 10pm)	Night (10pm – 7am)
72-84 Foveaux St, Surry Hills	55	54	48

5.1.1 Measured Background Noise Spectrum

A background noise measurement was also conducted on site to determine the existing background noise spectrum. A 15 minute measurement was conducted on the 7th February, 2018 from 11:00pm – 12:00pm at street level, this measured noise level will be used as the basis of this assessment as it is more conservative than the RBL's recorded during the long term unattended monitoring.

Table 7 – Background Noise Spectrum

	31.5Hz	63Hz	125Hz	250Hz	500Hz	1kHz	2kHz	4kHz	8kHz	dB(A)
Waterloo St	59	58	57	54	50	47	42	36	23	52

The attended background noise measurement (to ascertain the spectrum) was a one-off broadband measurement.

The measurement period was not affected by inclement weather (i.e. wind speed > 5 m/s or any rain). Attached weather data for this period.

5.1.2 Meteorological conditions during monitor period

Section 3.4 of the NSW Environment Protection Authority (EPA) Industrial Noise Policy document outlines the following with regards to meteorological impacts on noise monitoring;

“Noise monitoring should not be conducted (or the data should be excluded) when average wind speeds (over 15-minute periods or shorter) at microphone height are greater than 5 m/s, or when rainfall occurs.”

However, the same section of this policy also outlines that;

“Exceptions to this rule are allowed, provided the proponent is able to show that the wind-induced noise on the microphone, and sound levels due to rain, are at least 10 dB below the noise levels (that is, background and/or ambient) under investigation.”

Weather conditions during the monitoring period have been assessed and the periods of inclement weather are highlighted in Appendix 1. Weatherzone data for observations recorded at Observatory Hill, indicate some periods of inclement weather which have been excluded from the monitoring data in calculation of the rating background noise levels (RBL's) for the daytime, evening and night-time periods, as indicted in Appendix 1.

Additionally, it should be noted that the subject site is located in a built-up area with multi-storey buildings, and includes an environment without significant flora and as such will not result in background noise levels being affected by wind, including noise generated by wind blowing through leaves. Based on the built up nature of the exiting environment periods with a wind speed of less than 20m/s have been included within the assessment of background noise.

5.2 ACOUSTIC CRITERIA

Noise emission controls typically applied by the City of Sydney Council and the EPA which are set out below.

5.2.1 City of Sydney Council Criteria

The current standard City of Sydney council noise criteria include the following;

“(1) NOISE - GENERAL

- (a) The emission of noise associated with the use of the premises including the cumulative operation of any mechanical plant and equipment, and air conditioning shall comply with the following:*
 - (i) The $L_{Aeq, 15 \text{ minute}}$ noise level emitted from the use must not exceed the project specific noise level for that receiver as determined in accordance with the NSW EPA Industrial Noise Policy. Noise must be measured in accordance with the Industrial Noise Policy and relevant requirements of Australian Standard AS 1055-1997 Acoustics – Description and measurement of environmental noise.*
 - (ii) Project specific noise levels shall be determined by establishing the existing environmental noise levels, in complete accordance with the assessment $L_{A90, 15 \text{ minute}}$ / rating $L_{A90, 15 \text{ minute}}$ process to be in accordance with the requirements for noise monitoring listed in the NSW EPA Industrial Noise Policy and relevant requirements of Australian Standard AS1055-1997 Standard AS 1055-1997 Acoustics – Description and measurement of environmental noise.*
 - (iii) Modifying factors in Table 4.1 of the NSW EPA Industrial Noise Policy are applicable.*
- (b) An $L_{Aeq, 15 \text{ minute}}$ noise level emitted from the use must not exceed the $L_{A90, 15 \text{ minute}}$ noise level by more than 3dB in any Octave Band Centre Frequency (31.5 Hz to 8 kHz inclusive) when assessed inside any habitable room of any affected residence or noise sensitive commercial premises provided that;*
 - (i) Where the $L_{A90, 15 \text{ minute}}$ noise level is below the threshold of hearing, T_f at any Octave Band Centre Frequency as defined in Table 1 of International Standard ISO 226 : 2003- Normal Equal-Loudness-Level Contours then the value of T_f corresponding to that Octave Band Centre Frequency shall be used instead.*
 - (ii) The $L_{Aeq, 15 \text{ minute}}$ noise level and the $L_{A90, 15 \text{ minute}}$ noise level shall both be measured with all external doors and windows of the affected residence closed;*
 - (iii) The relevant background noise level ($L_{A90, 15 \text{ minute}}$) is taken to mean the day, evening or night rating background noise level determined in complete accordance with the methodology outlined in the NSW EPA Industrial Noise Policy and Australian Standard AS1055.1997 Acoustics – Description and measurement of environmental noise.*

- (iv) *Background noise shall be established in the absence of all noise emitted from the use but with the ventilation equipment normally servicing the affected residence operating. Background noise measurements are to be representative of the environmental noise levels at the affected location.*
- (v) *Modifying factors in Table 4.1 of the NSW EPA Industrial Noise Policy are applicable. Internal Noise measurements are not to be corrected for duration.”*

5.2.2 NSW Environmental Protection Agency (EPA) document – ‘Noise Policy for Industry (NPfI)’

The NPfI 2017 provides guidelines for assessing noise impacts from developments. The recommended assessment objectives vary depending on the potentially affected receivers, the time of day, and the type of noise source. The NPfI has two requirements which both have to be complied with, namely an amenity criterion and an intrusiveness criterion.

5.2.3 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 5 dB(A).

5.2.4 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 Industrial Noise Policy sets out acceptable noise levels for various land uses. Table 2.1 on page 16 of the policy has four categories to distinguish different residential areas. They are rural, suburban, urban and urban/industrial interface.

For the purposes of a conservative assessment, ALC will assess noise emissions in accordance with the ‘Urban’ category.

Table 8 – NPfI Project Amenity Criteria

Type of Receiver	Time of day	Recommended Project Acceptable Noise Level dB(A) $L_{eq}(15mins)$
Residential (Suburban)	Day	53
	Evening	48
	Night	43
Commercial	When in Use	65

5.2.5 Summarised Plant Noise Emission Criteria

Summary for noise emission criteria for all plant associated with the development has been summarised below.

Table 9 – Summary of Noise Emission Criteria (Plant Noise)

Receiver	Time of day	Background Noise Level dB(A) _{L₉₀}	Amenity Criteria dB(A) L _{eq}	Intrusiveness Criteria (Background + 5dB(A))
Residential Receivers	Day	55	53	60
	Evening	54	48	59
	Night	48	43	53
Commercial	When in Use	N/A	65	N/A

Table 10 – Octave Band Criteria

Location	Time Period	31.5Hz	63Hz	125Hz	250Hz	500Hz	1kHz	2kHz	4kHz	8kHz	A-wt
Boundary of any surrounding residential/commercial receiver	Daytime (7am – 6pm)	65	64	63	60	56	53	48	42	29	58
	Evening (6pm – 10pm)	64	63	62	59	55	52	47	41	28	57
	Night (10pm – 12am)	58	57	56	53	49	46	41	35	22	51

5.3 RECOMMENDATIONS

5.3.1 Mechanical Plant

Mechanical plant items are not typically selected at selected at DA stage.

Detailed review of all external mechanical plant should be undertaken at construction certificate stage (once plant selections and locations are finalised). Based on the measured noise levels at the site acoustic screens may be recommended for the plant on the roof.

All plant can be satisfactorily attenuated to levels complying with noise emission criteria through appropriate location and (if necessary) standard acoustic treatments such as noise screens to roof top plant, enclosures, in-duct treatments (silencers/lined ducting) or similar.

6 CONCLUSION

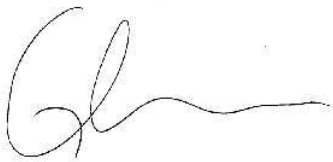
This report presents an analysis of the acoustic impacts associated with the proposed alterations to the existing commercial development at 72-84 Foveaux St, Surry Hills.

Noise impacts from environmental noise sources on future occupants of the development have been assessed in accordance with the Sydney DCP requirements and AS2107:2016. The acoustic mitigation measures to ensure compliance with these guidelines, have been set out in section 4.4.

Noise emissions objectives for the site have also been determined, based on on-site noise logging and noise emission guidelines typically adopted by Council and the EPA Noise policy for Industry. This is outlined in section 5 above.

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

Yours faithfully,

A handwritten signature in black ink, appearing to read 'Glen Campbell', with a long horizontal flourish extending to the right.

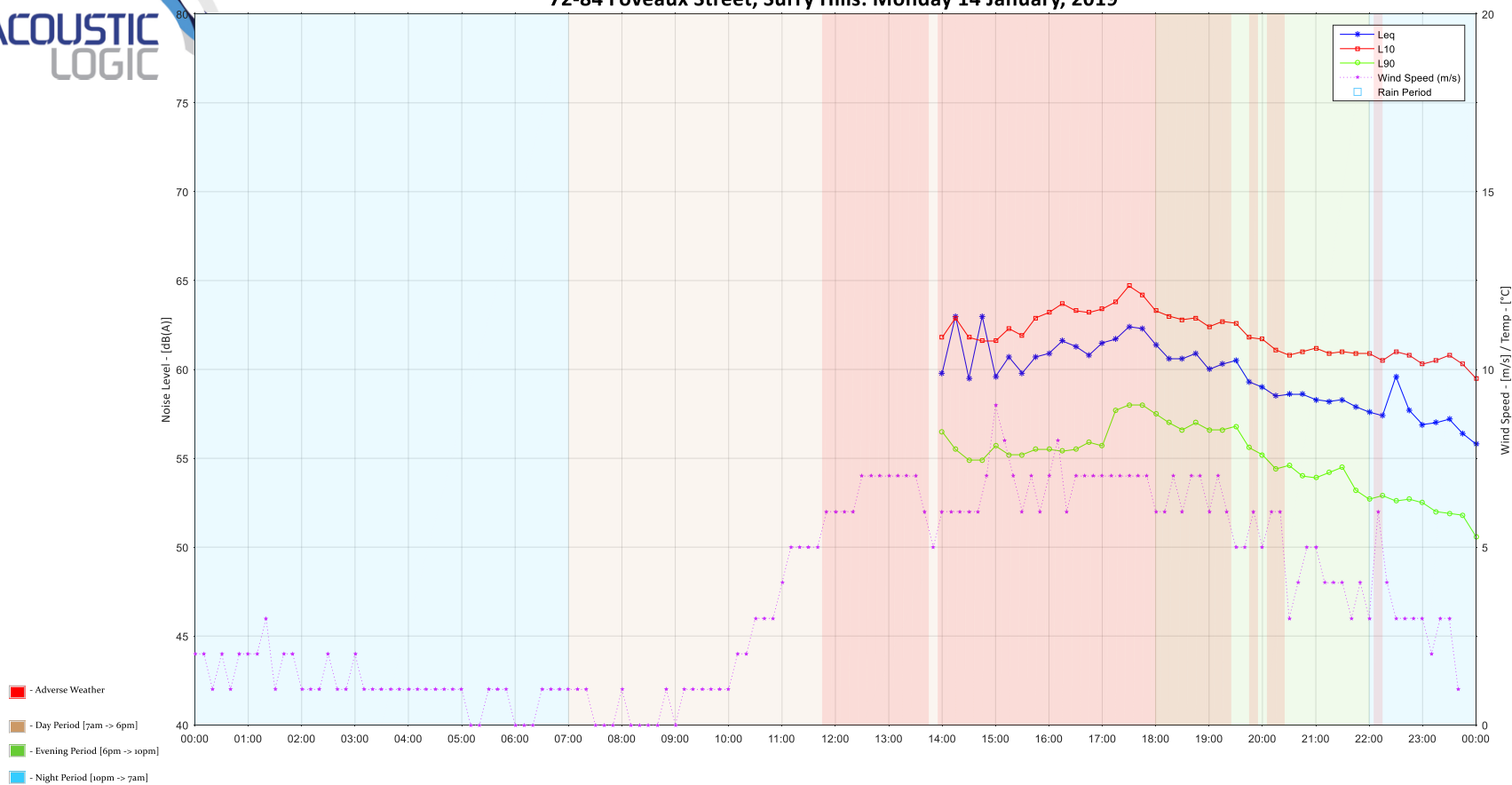
Glen Campbell

APPENDIX 1

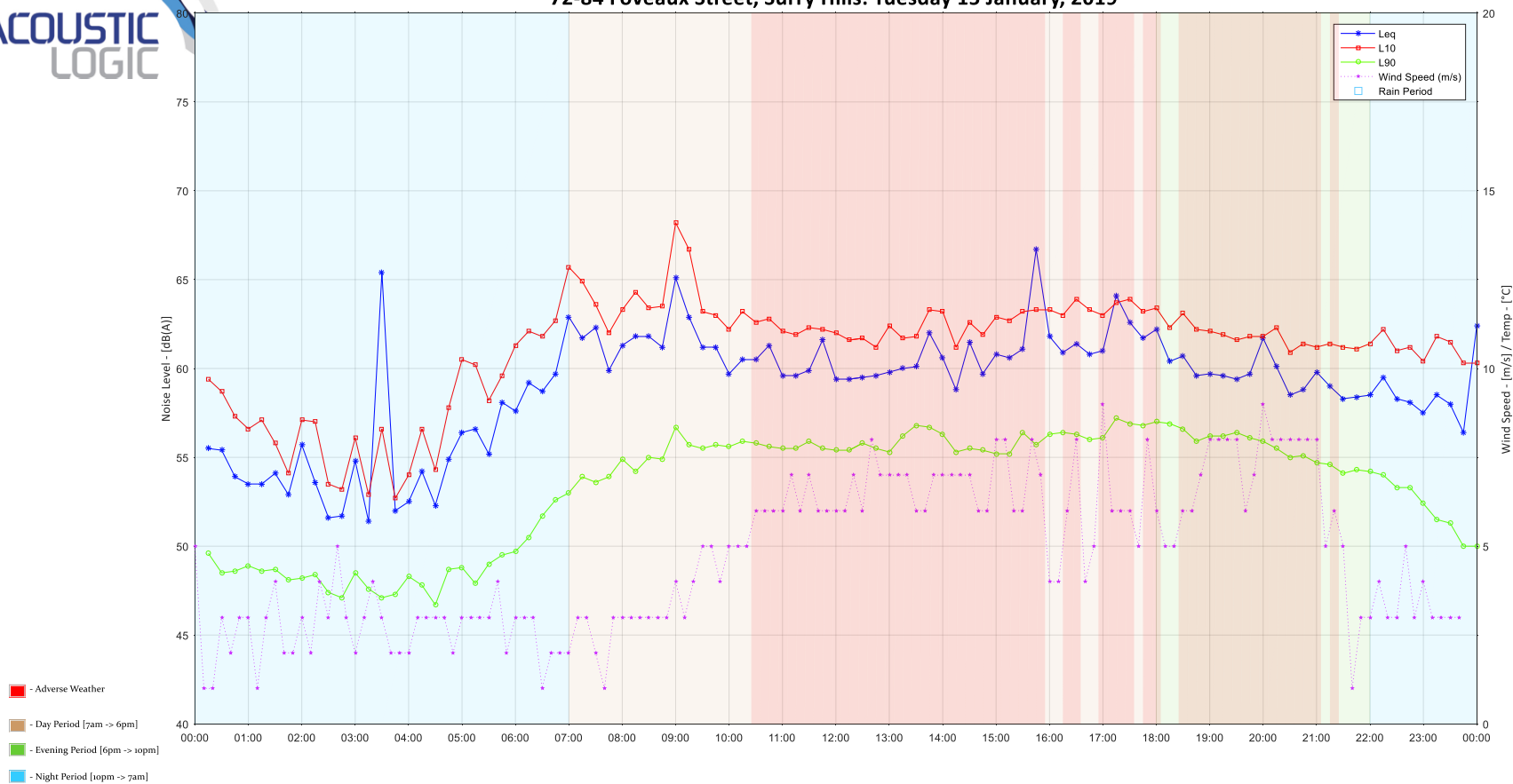
Unattended Noise Monitoring Data



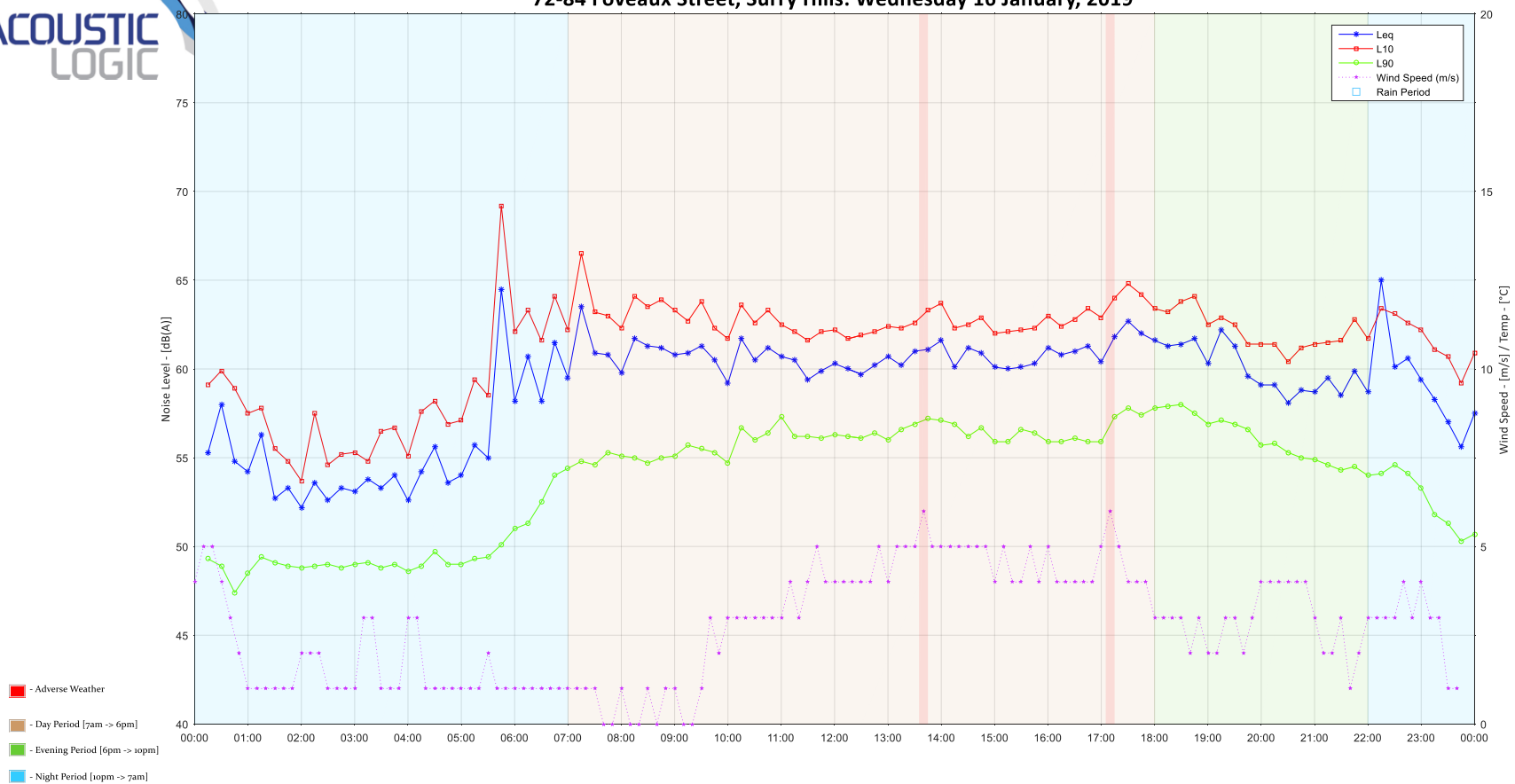
72-84 Foveaux Street, Surry Hills: Monday 14 January, 2019



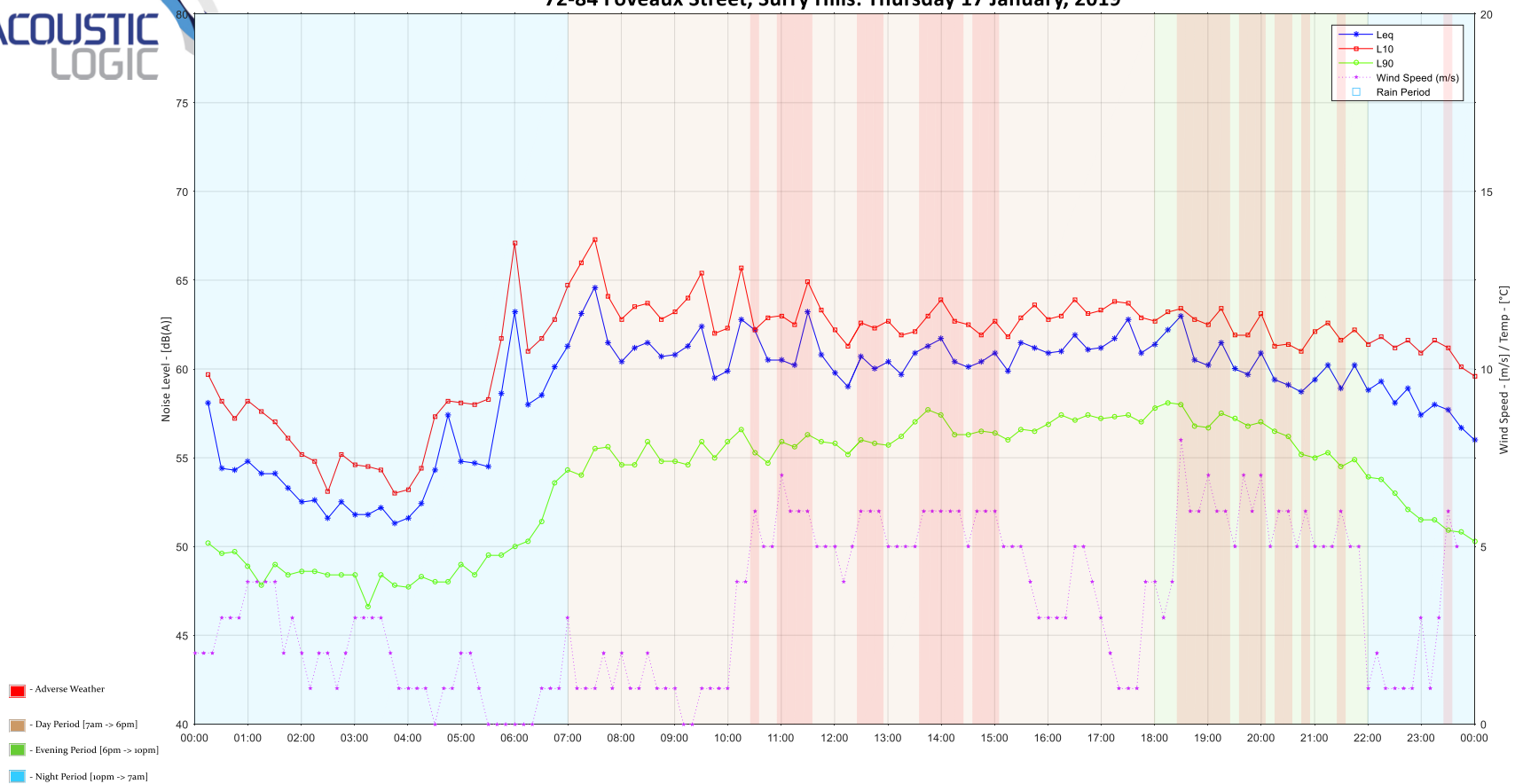
72-84 Foveaux Street, Surry Hills: Tuesday 15 January, 2019



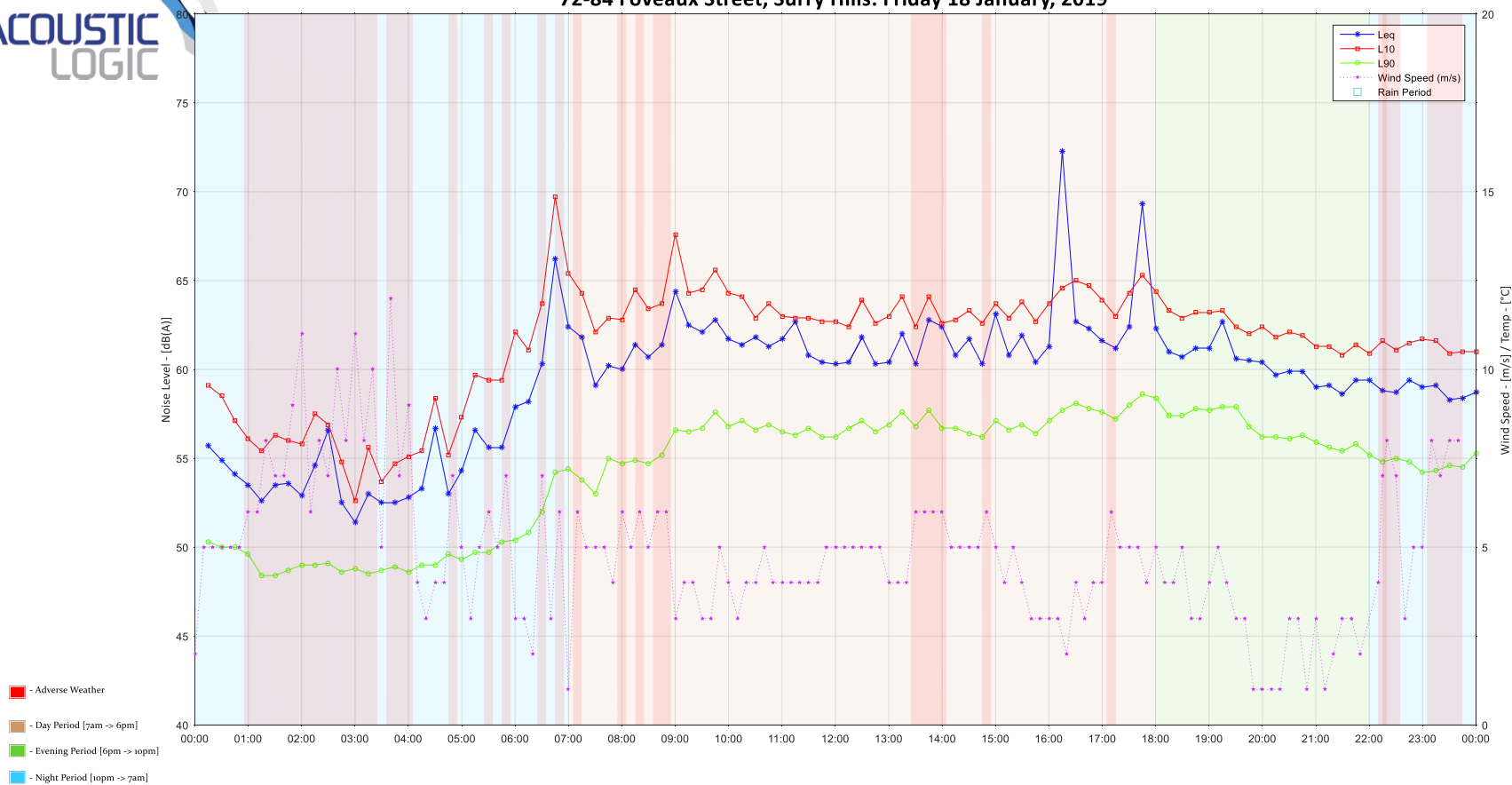
72-84 Foveaux Street, Surry Hills: Wednesday 16 January, 2019



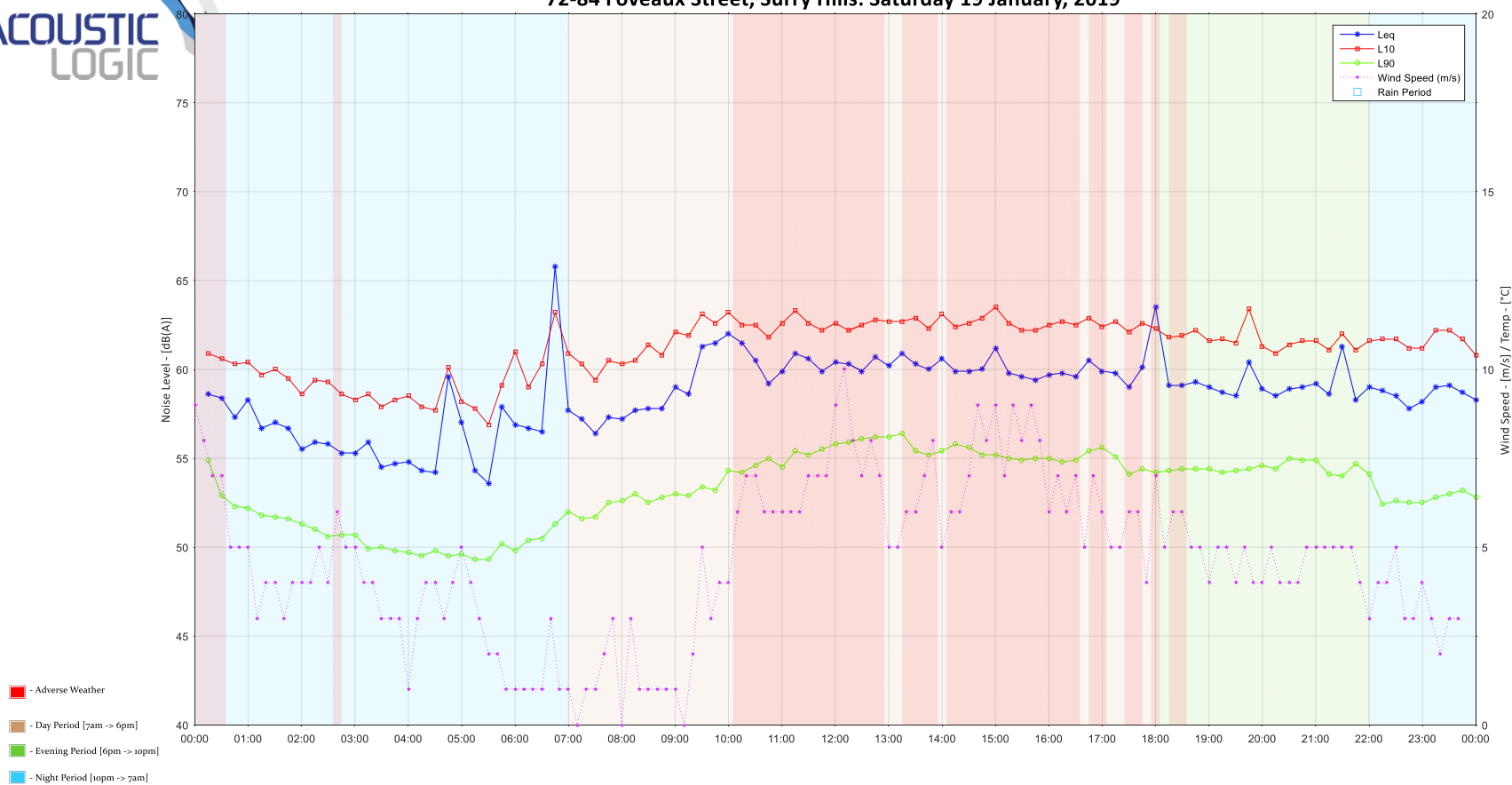
72-84 Foveaux Street, Surry Hills: Thursday 17 January, 2019



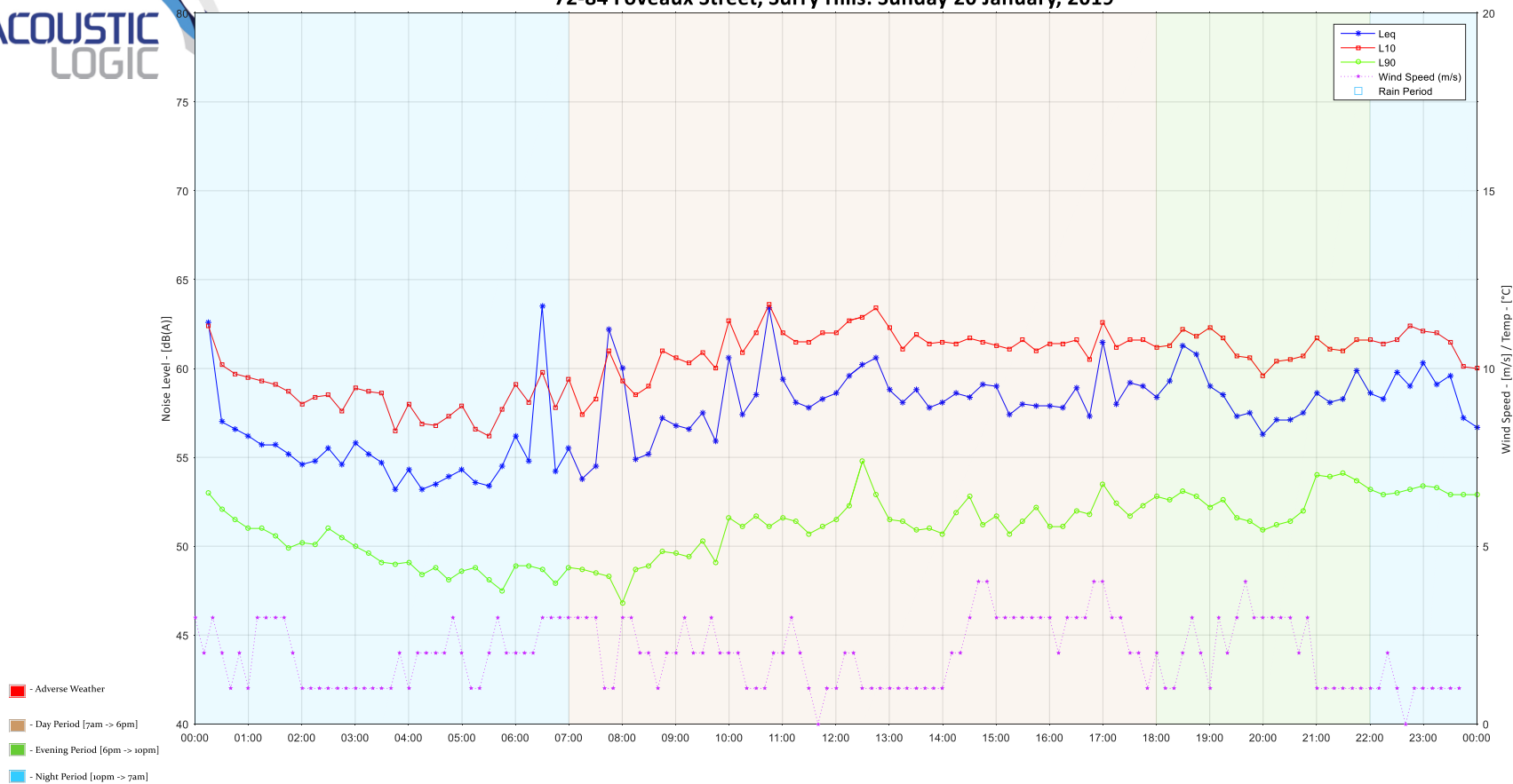
72-84 Foveaux Street, Surry Hills: Friday 18 January, 2019



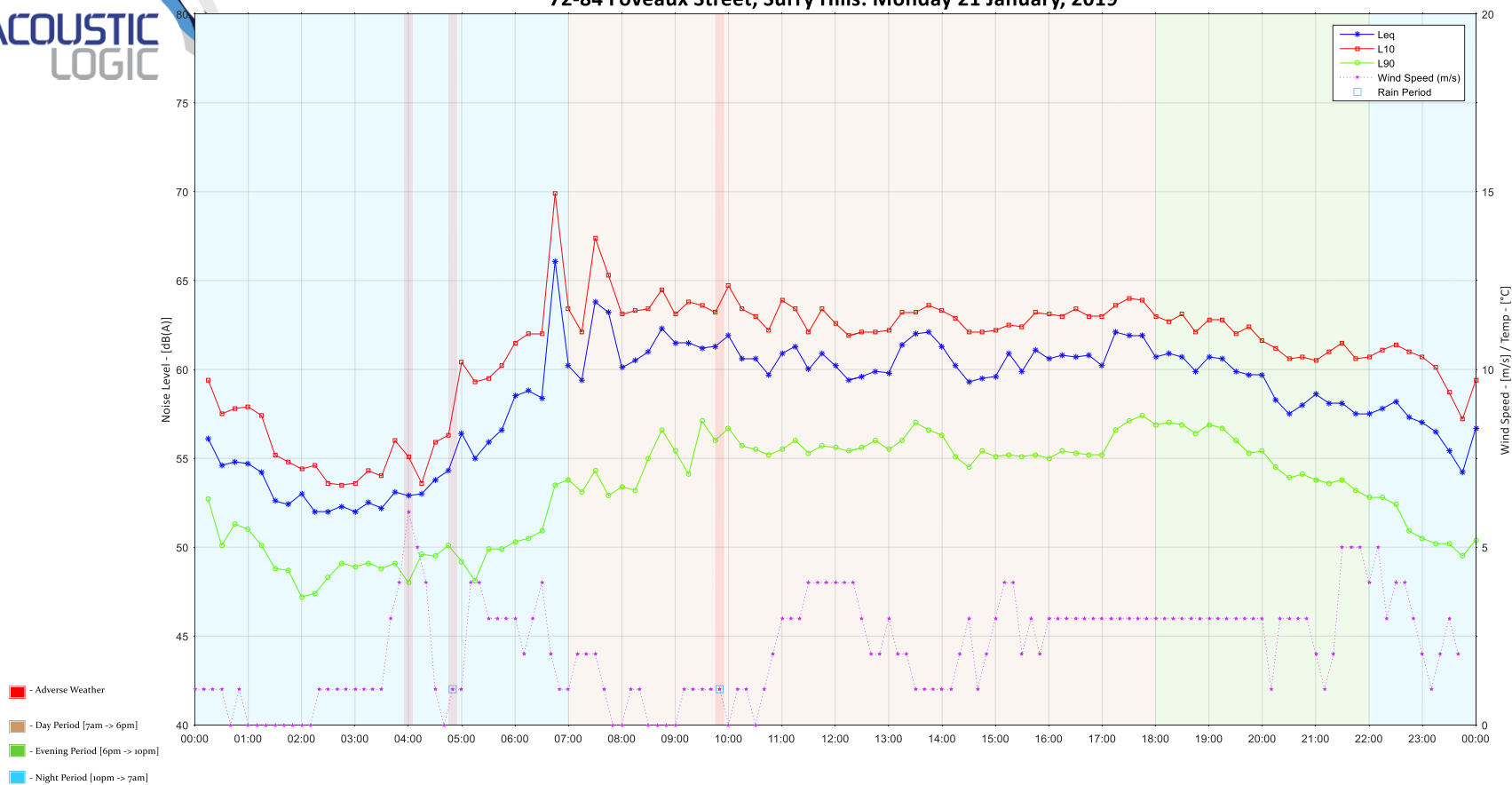
72-84 Foveaux Street, Surry Hills: Saturday 19 January, 2019



72-84 Foveaux Street, Surry Hills: Sunday 20 January, 2019



72-84 Foveaux Street, Surry Hills: Monday 21 January, 2019



72-84 Foveaux Street, Surry Hills: Tuesday 22 January, 2019

