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12 The Strand, Dee Why NSW 2099

DA Acoustic Assessment

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1 INTRODUCTION

This report has been prepared to assess noise impacts associated with the proposed mixed-use residential development to be located at 12 The Strand, Dee Why.

This document addresses the noise impacts associated with the external noise intrusion and noise emissions which include:

- Traffic noise impacts from adjacent roadways,
- Operational Noise Emissions, and
- Noise emissions from mechanical plant and equipment servicing the development (in principle).

The subject site and local context are indicted in Figure 1.

2 REFERENCED DOCUMENTS

2.1 BACKGROUND INFORMATION USED

This assessment has been conducted using the "12 The Strand, Dee Why" architectural drawings provided by Studio Johnston, Job No. 2401, dated 14/3/2025.

2.2 PLANNING GUIDELINES

Acoustic Logic have used the following documents and regulations in the assessment of the above noise impacts:

- Warringah Council Document 'Warringah Development Control Plan **(DCP)** 2011,
- Australian and New Zealand **(AS/NZS 3671:1989)** – 'Acoustics – Road traffic noise intrusion – Building siting and construction',
- Australian and New Zealand **(AS/NZS 2107:2016)** – 'Recommended design sound levels and reverberation times for building interiors',
- Requirements of NSW Office of Liquor and Gaming **(L&GNSW)**, and
- NSW Environmental Protection Authority (EPA) – 'Noise Policy for Industry' **(NPfI)** 2017.

3 SITE DESCRIPTION AND THE PROPOSAL

The project site is located at 12 The Strand, Dee Why and proposes a mixed-use residential development consisting of the following:

- 2 Basement levels for car park spaces,
- A commercial space on the ground floor level to accommodate F&B tenancies, and
- 3 levels of residential accommodation.

3.1 NEAREST SENSITIVE RECEIVERS

Table 1 – Sensitive Receivers

Receiver (Refer Figure 1)	Land Use	Comment
R1	Residential	A multi-storey residential building located at 105 Howard Avenue, Dee Why maintained north west of the project site.
R2	Mixed Use Residential	A multi-storey mixed use residential building maintained directly north of the project site.
R3	Mixed Use Residential	A multi-storey mixed use residential building located from 8 – 11 The Strand, Dee Why maintained directly south of the project site.
R4	Residential	A multi-storey residential building located at 110-112 Oaks Avenue, Dee Why maintained south west of the project site.

An aerial view of the project site and measurement locations are presented in Figure 1 below.

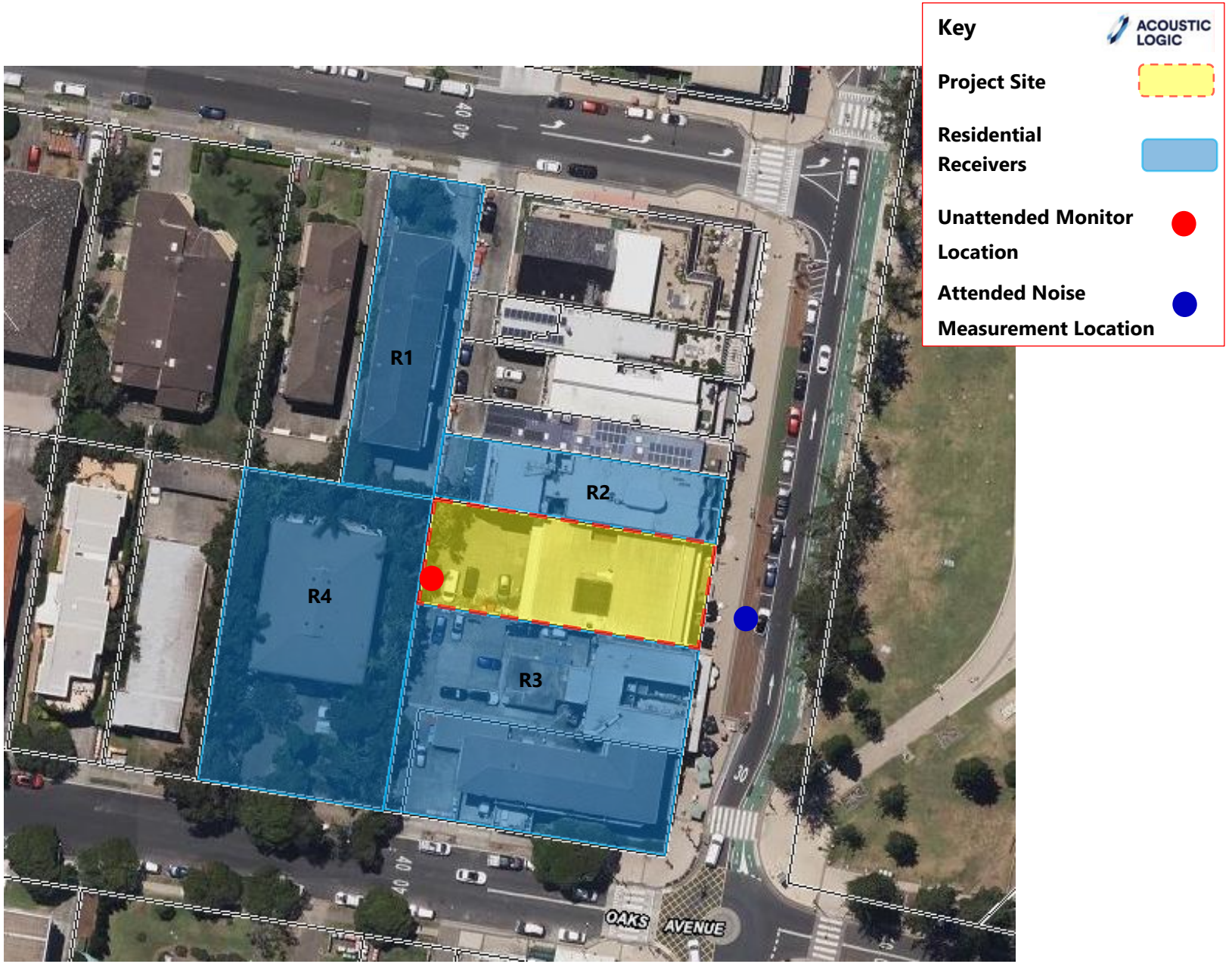


Figure 1: Project Site Map with Local Context

4 EXTERNAL NOISE INTRUSION ASSESSMENT

The potential noise impacts on the proposed mixed-use development due to nearby transportation noise sources has been assessed. The noise source identified as potentially impacting the proposed development includes the adjacent roadway "The Strand".

4.1 GUIDELINES AND ASSESSMENT CRITERIA

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

- Warringah Council Document 'Warringah Development Control Plan **(DCP)** 2011,
- Australian and New Zealand **(AS/NZS 3671:1989)** – 'Acoustics – Road traffic noise intrusion – Building siting and construction', and
- Australian and New Zealand **(AS/NZS 2107:2016)** – 'Recommended design sound levels and reverberation times for building interiors'.

4.1.1 AS/NZS 3671:1989

Australian Standard AS/NZS 3671:1989 *'Acoustics—Road traffic noise intrusion—Building siting and construction'* 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, Acoustic Logic shall also use this descriptor.
- AS3671 does not specifically recommend a time interval. On this basis, Acoustic Logic have adopted the interval used by the EPA Road Noise Policy for main/arterial roads, that being:
    - Day – 7am to 10pm (15 hour); and
    - Night – 10pm to 7am (9 hour).
- Acoustic Logic have applied the daytime interval to the living/dining areas and the night time interval to the bedrooms of residential spaces.

Internal noise levels have been selected in accordance with AS 2107:2016, as presented in the below section.

4.1.2 AS/NZS 2107:2016

AS2107-2016 recommends design criteria for internal spaces within various types of spaces/occupancies to ensure a healthy, comfortable and productive environment for the occupant.

Table 2 – Recommended Design Sound Level

Occupancy/Activity Type **Houses and Apartments near Minor Roads**	**Recommended Design Sound Level**
Sleeping Areas (Night Time)	30-35 dB(A)L_{eq}
Living Areas	30-40 dB(A)L_{eq}

5 COMPLYING CONTROLS

5.1.1 Glazed Windows

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-lon 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 listed in the table below.

Table 3 – Complying Glazing Thicknesses

Level	Space	Glazing Construction	Acoustic Seals
All Levels	All Bedroom Spaces	6.38mm Laminated	**Yes**
	Living/Dining/Kitchen	6mm Float	**Yes**

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. All windows shall have glazing thicknesses equal to those recommended above and are to have Raven RP10 to the top, bottom and sides.

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 the table below for all rooms. 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 4 – Minimum R_w of Glazing (with Acoustic Seals)

Glazing Assembly	Minimum R_w of Installed Window
6mm Float	29
6.38mm Laminate	31

5.1.2 External Roof/Ceiling Construction

The proposed concrete roof will be considered acoustically acceptable without the need for further upgrading.

5.1.3 External Wall Construction

Any proposed concrete/masonry/brick external wall constructions will be acoustically acceptable without the need for further upgrading.

If any penetrations are required through any of the external lining of any of the systems above for other building services, all gaps should be filled with acoustic sealant to ensure compliance with internal noise level requirements.

6 NOISE EMISSIONS ASSESSMENT

The following noise sources are likely to impact surrounding residential receives and therefore require an acoustic assessment and determination of suitable mitigation measures. These uses include:

- F&B retail from Patron Speech and Music.
- Noise emissions from mechanical plant and equipment.

6.1 PROJECT NOISE EMISSIONS CRITERIA

The noise criteria for this site are established from the following documents:

- Warringah Council Document 'Warringah Development Control Plan **(DCP)** 2011,
- Requirements of NSW Office of Liquor and Gaming **(L&GNSW)**, and
- NSW Environmental Protection Authority (EPA) – 'Noise Policy for Industry' **(NPfI)** 2017.

The documents above are presented in detail below.

6.1.1 Liquor & Gaming NSW Noise Requirements – F&B Retail (Patron & Music)

For F&B retail noise emissions, the acoustic requirements imposed by Liquor and Gaming NSW can be utilised particularly for patron and music noise:

These guidelines relate to noise generated by patrons and by music. The requirements are set out below:

- That the L10 noise level emitted from the premises shall not exceed 5dB above the background L_{90} sound level in any Octave Band Centre Frequency (31.5kHz to 8kHz inclusive) between the hours of 7.00am to 12.00 midnight when assessed at the boundary of the nearest affected residential premises.
- L10 noise level emitted from the premises shall not exceed the background L90 sound level in any Octave Band Centre Frequency (31.5kHz to 8kHz inclusive) after midnight when assessed at the boundary of the nearest affected residential premises.
- After midnight, noise emissions from the place providing entertainment are to be inaudible within any habitable rooms in nearby residential properties.

6.1.2 Noise Policy for Industry (NPfI) 2017 – Mechanical Plant

Criteria to assess noise emissions from the operation of the proposed development have been developed using the NPfI. This policy was primarily developed to assess noise impacts from industrial development, but can also be adapted to assess other types of development such as commercial buildings and air conditioning plant.

For each receiver type:

- Receivers have been grouped into "catchments". These are receivers that have been assessed as having similar characteristics (receiver type and ambient noise level). These are shown in Figure 1.
- For each catchment, representative noise assessment trigger levels have been determined based on NPfI guidelines. The trigger levels have been adopted in this assessment as criteria. These will be used to indicate whether additional mitigation is needed to manage noise emissions.

- For each catchment, noise emissions have been assessed to the most impacted receiver. This means that impacts at all other receivers within that catchment will be less. Compliance at the most impacted receiver will therefore also result in compliance at all other receivers within the catchment.

For residential receivers, three criteria are assessed:

- Intrusive assessment– that is, how audible is the emitted noise compared to ambient, background noise). Criteria are determined relative to the measured rating background noise level.

- Amenity assessment – that is, how loud is the absolute level of industrial noise, including cumulative noise from other industrial sources. The NPfI nominates appropriate amenity noise levels depending on the receiver type and prevailing noise environment/zoning.

- Maximum Noise assessment – will high level, short term noise events cause adversely impact sleep at night? Trigger levels are determined relative to the measured night rating background, and assessed outside rooms where sleep is likely to occur.

For residential receivers, noise emissions are assessed against the trigger levels to determine the likely extent of impacts. The lower of the relevant intrusiveness and amenity trigger levels are adopted. Noise emissions lower than the trigger levels indicate there is no adverse impact. A maximum noise level assessment is separately undertaken if night time emissions occur.

For other receiver types, only an "amenity" assessment is required.

Appendix A summarises the results of ambient noise monitoring. Appendix B provides the derivation of NPfI trigger levels for each of the receivers. These are summarised in the following table.

Table 5 – Project Specific Trigger Levels

Location/Receiver Type	Time	RBL dB(A) L_{90}	Trigger Noise Level (dB(A) $L_{eq,15min}$)
Residential	Day	53	58
	Evening	53	48
	Night	52	43

6.2 NOISE FROM MECHANICAL PLANT (IN PRINCIPLE)

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.

6.2.1 F&B Retail

A detailed noise emission assessment for F&B retail will be subject to a separate development application once detailed design information is determined.

At this stage, to ensure noise emissions are acceptable to the nearest residential receivers, the following recommendations shall be implemented.

- No amplified music shall be played externally above 65 dB(A) (conversation level) during the day-time and evening time periods.
- No amplified music shall be played externally after 10pm.
- All external doors and windows closed after 10pm (aside from ingress and egress).
- A noise limiter shall be installed within indoor dining areas (particularly those with amplified music). The noise limiter shall:
    - Be set at a level specified by a suitably qualified acoustic engineer.
    - Ensure that emission of amplified music does not exceed the requirements within Section 6.1.1.
    - Speakers used for amplified systems shall be vibration isolated from the building structure.
    - Be maintained and operated at all times.
- Management systems (including appropriate signage) shall be put in place to encourage patrons to limit noise when leaving the premises.
- Glass bottles shall not be emptied/transferred anywhere externally after 10pm and/or before 7am.
- Staff shall undertake appropriate training to minimise noise when emptying heavy garbage items/bottles into bins.
- Any mechanical plant to service the F&B retail shall be reviewed by a suitably qualified acoustic consultant to ensure compliance with Section 6.1.2.

7 CONCLUSION

This report presents an acoustic assessment of noise impacts associated with the proposed mixed use residential development to be located at 12 The Strand, Dee Why.

Internal noise criteria for external noise impacts have been formulated with reference to the following documents:

- Warringah Council Document 'Warringah Development Control Plan **(DCP)** 2011,
- Australian and New Zealand **(AS/NZS 3671:1989)** – 'Acoustics – Road traffic noise intrusion – Building siting and construction', and
- Australian and New Zealand **(AS/NZS 2107:2016)** – 'Recommended design sound levels and reverberation times for building interiors'.

External noise emissions criteria have been setup in this report to satisfy the requirements from the following documents:

- Warringah Council Document 'Warringah Development Control Plan **(DCP)** 2011,
- Requirements of NSW Office of Liquor and Gaming **(L&GNSW)**, and
- NSW Environmental Protection Authority (EPA) – 'Noise Policy for Industry' **(NPfI)** 2017.

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

Yours faithfully,

Acoustic Logic Pty Ltd
Andrew Pham

APPENDIX A AMBIENT NOISE MONITORING

This appendix summarises the ambient noise data measured near the subject site, and the calculated noise level descriptors adopted to characterise the existing noise environment.

Monitoring has been undertaken to provide the following ambient data:

- Background noise levels at the surrounding residential properties.
- Traffic noise levels.
- Noise generated by adjacent land uses.

A.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 on a continuous basis over this period, and statistical and integrating techniques are used to characterise the noise being measured.

The principal measurement parameters 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 steady state and quasi-steady state 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 quieter 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 noise and ground vibration induced noise from railways.

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.

A.2 UNATTENDED LONG TERM NOISE MONITORING

A.2.1 Equipment Used

Unattended noise monitoring was conducted using the following equipment:

- Rion NL-42 (Type 2)
- Norsonics Sound Level Calibrator Type 1251

Monitoring was continuous, with statistical noise levels recorded at 15-minute intervals throughout the monitoring period. Measurements were taken on "A" frequency weighting and fast time response, unless noted otherwise.

All monitoring equipment used retains current calibration - either manufacturers' calibration or NATA certified calibration. The monitors were field calibrated at the beginning and the end of the measurement with no significant drift in calibration noted.

A.2.2 Location Monitored

The location monitored is indicated in Figure 1.

A.2.3 Weather Affected and Extraneous/ Outlying Data

Periods affected by adverse weather conditions (as defined by Fact Sheet B) are indicated on the following data graphs and have been excluded from the assessment. Weather data was obtained from records provided by the Bureau of Meteorology for the following station:

As the Bureau of Meteorology wind data is typically obtained at an exposed location at 10m above ground level, and the monitoring locations were at approximately 1.5m above ground in more sheltered locations a wind multiplying factor of 0.5 has been applied to the BOM data to estimate the wind speed at the microphone location.

Wind speed and rain fall data was obtained from the Terry Hills AWS.

A.3 CALCULATION OF REPRESENTATIVE AMBIENT NOISE LEVELS

The ambient, assessment and rating background levels have been determined from the unattended, long-term noise monitoring data based on the methodology in the Noise Policy for Industry Fact Sheet B.

A.4 RATING BACKGROUND NOISE LEVELS

The following table summarises the assessment background noise levels (ABL) for each location. Note that where no ABL is indicated, this is because that period was significantly affected by adverse weather or other extraneous noise.

In accordance with the NPfI:

- If the calculated evening rating background noise level is higher than the day level, the day rating background noise level has been adopted for the evening period.
- If the calculated night rating background noise level is higher than the evening level, the evening rating background noise level has been adopted for the evening period.
- If the calculated day rating background noise level was less than 35 dB(A), a "default" background of 35 dB(A) has been adopted.
- If the calculated evening or night rating background noise level was less than 30 dB(A), a "default" background of 30 dB(A) has been adopted.
- Where monitoring was conducted within 3m of a significant sound reflecting surface, 2.5 dB(A) has been subtracted from the calculated rating background to account for an increase in noise from reflections.

Table 6 – Assessment Background Noise Levels

Location	Date		ABL		
			Day	Evening	Night
12 The Strand, Dee Why	Wednesday	5/03/2025	-	53	53
	Thursday	6/03/2025	54	53	53
	Friday	7/03/2025	55	53	-
	Saturday	8/03/2025	54	53	52
	Sunday	9/03/2025	53	52	52
	Monday	10/03/2025	53	53	-
	Tuesday	11/03/2025	-	-	-
	Wednesday	12/03/2025	53	52	52
	Thursday	13/03/2025	53	52	52
	Friday	14/03/2025	54	52	51
	Saturday	15/03/2025	53	52	51
	Sunday	16/03/2025	52	53	52
	Monday	17/03/2025	-	-	-
	Calculated RBL		**53**	**53**	**52**
	Adopted RBL		**53**	**53**	**52**

*Weather affected data removed from calculation.

A.5 ATTENDED MONITORING

A.5.1 EQUIPMENT USED

Attended noise monitoring was conducted using:

- Norsonics SA 131 (Type 1) sound analyser

The sound level meter equipment used retain current calibration - either manufacturers' calibration or NATA certified calibration, and were field calibrated at the beginning and the end of the measurement with no significant drift in calibration noted.

A.5.2 LOCATIONS MONITORED

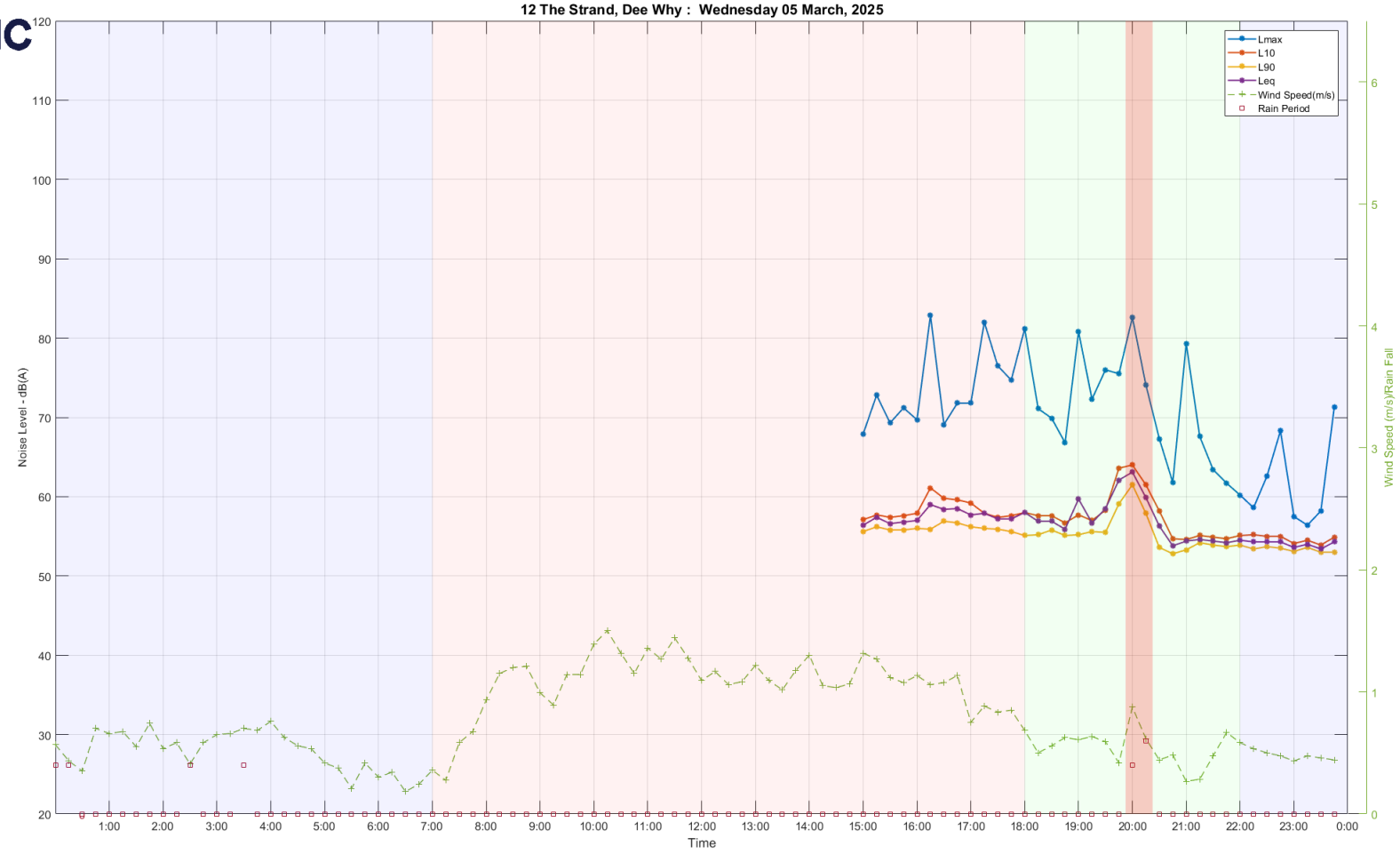
The monitoring location is indicated in Figure 1.

A.5.3 RESULTS

Table 4 – Attended Traffic Noise Measurements-

Location	**Measured Noise Level** **dB(A)L_{eq}**
The Strand (Refer Figure 1) (180° view of the road)	61

A.6 UNATTENDED MONITORING DATA GRAPHS


12 The Strand, Dee Why : Wednesday 05 March, 2025
Noise Level - dB(A)
Wind Speed (m/s)/Rain Fall
Time
Lmax
L10
L90
Leq
Wind Speed(m/s)
Rain Period
120
110
100
90
80
70
60
50
40
30
20
6
5
4
3
2
1
0
1:00
2:00
3:00
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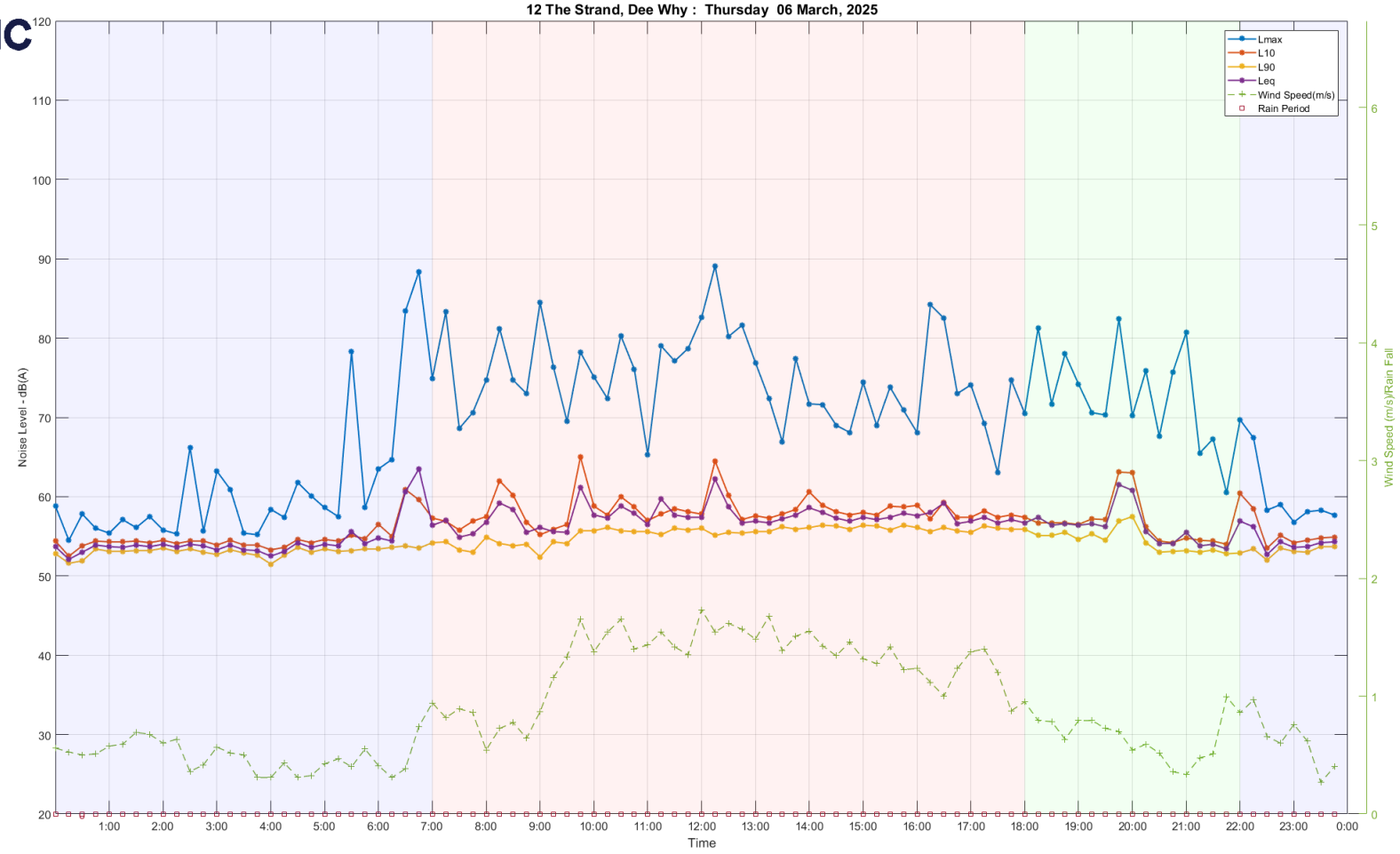
12 The Strand, Dee Why : Thursday 06 March, 2025
Lmax
L10
L90
Leq
Wind Speed(m/s)
Rain Period
Noise Level - dB(A)
Wind Speed (m/s)/Rain Fall
Time
120
110
100
90
80
70
60
50
40
30
20
6
5
4
3
2
1
0
1:00
2:00
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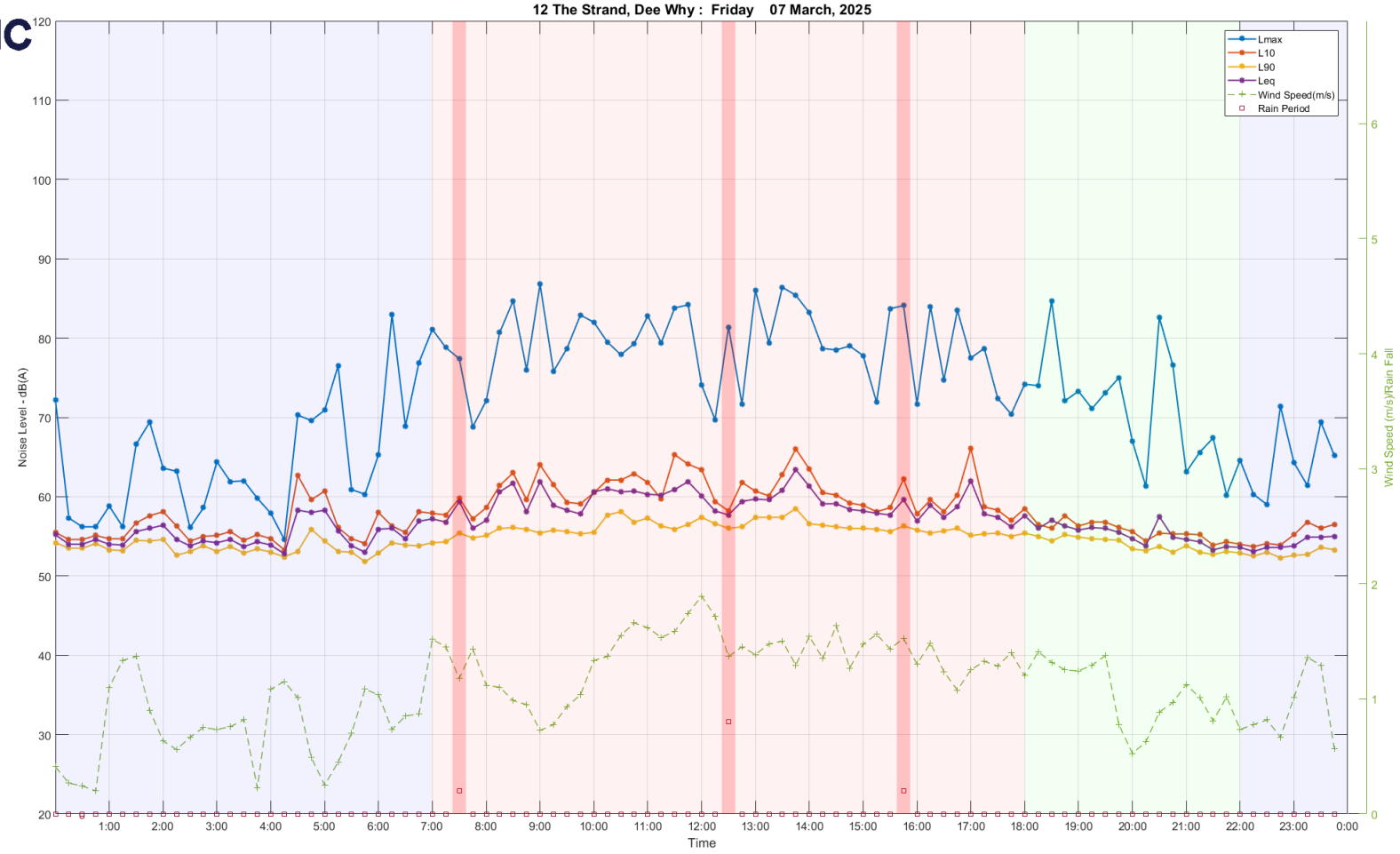
12 The Strand, Dee Why : Friday 07 March, 2025
Lmax
L10
L90
Leq
Wind Speed(m/s)
Rain Period
Noise Level - dB(A)
Wind Speed (m/s)/Rain Fall
Time
120
110
100
90
80
70
60
50
40
30
20
6
5
4
3
2
1
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1:00
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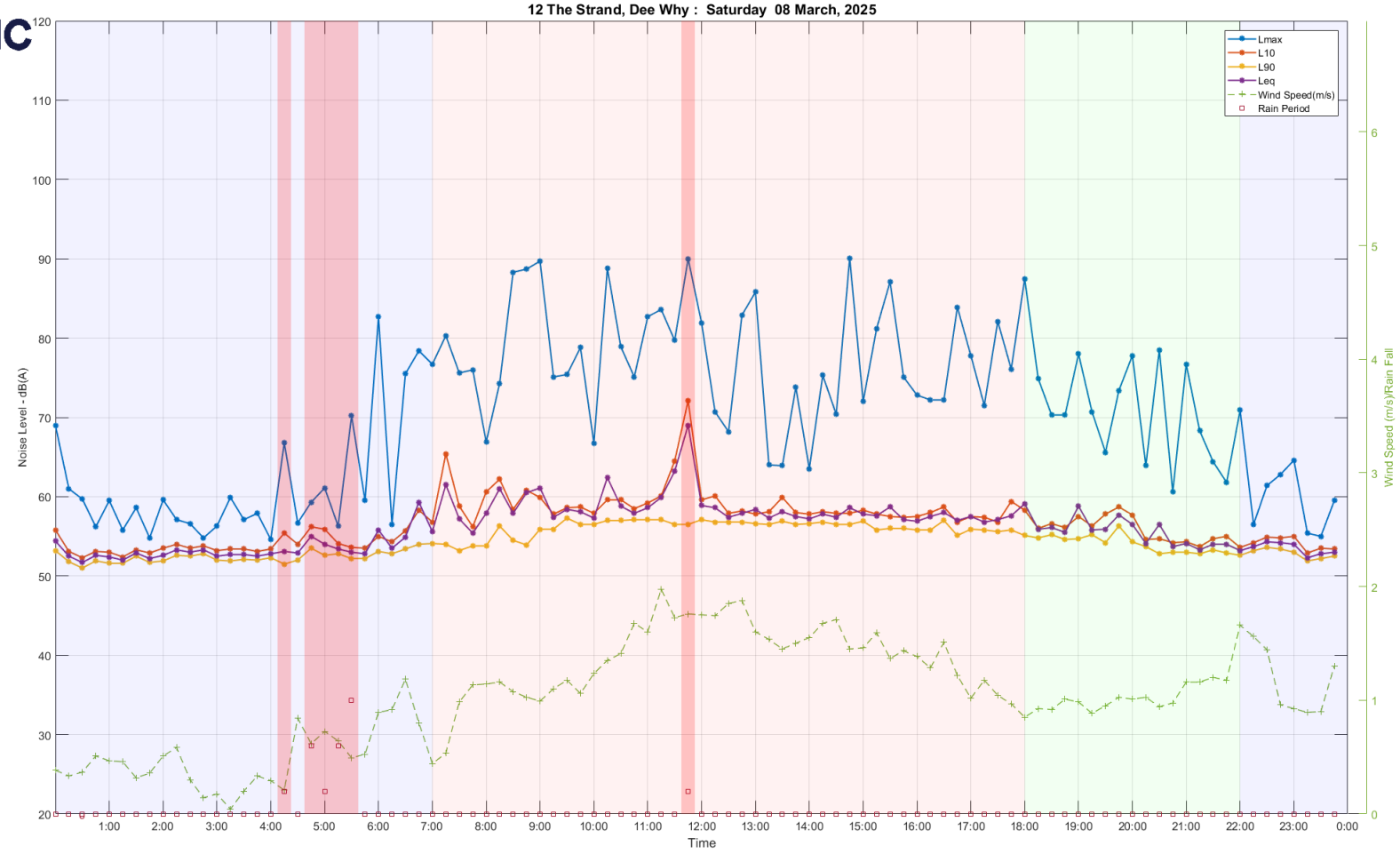
12 The Strand, Dee Why : Saturday 08 March, 2025
Lmax
L10
L90
Leq
Wind Speed(m/s)
Rain Period
Noise Level - dB(A)
Wind Speed (m/s)/Rain Fall
Time
120
110
100
90
80
70
60
50
40
30
20
6
5
4
3
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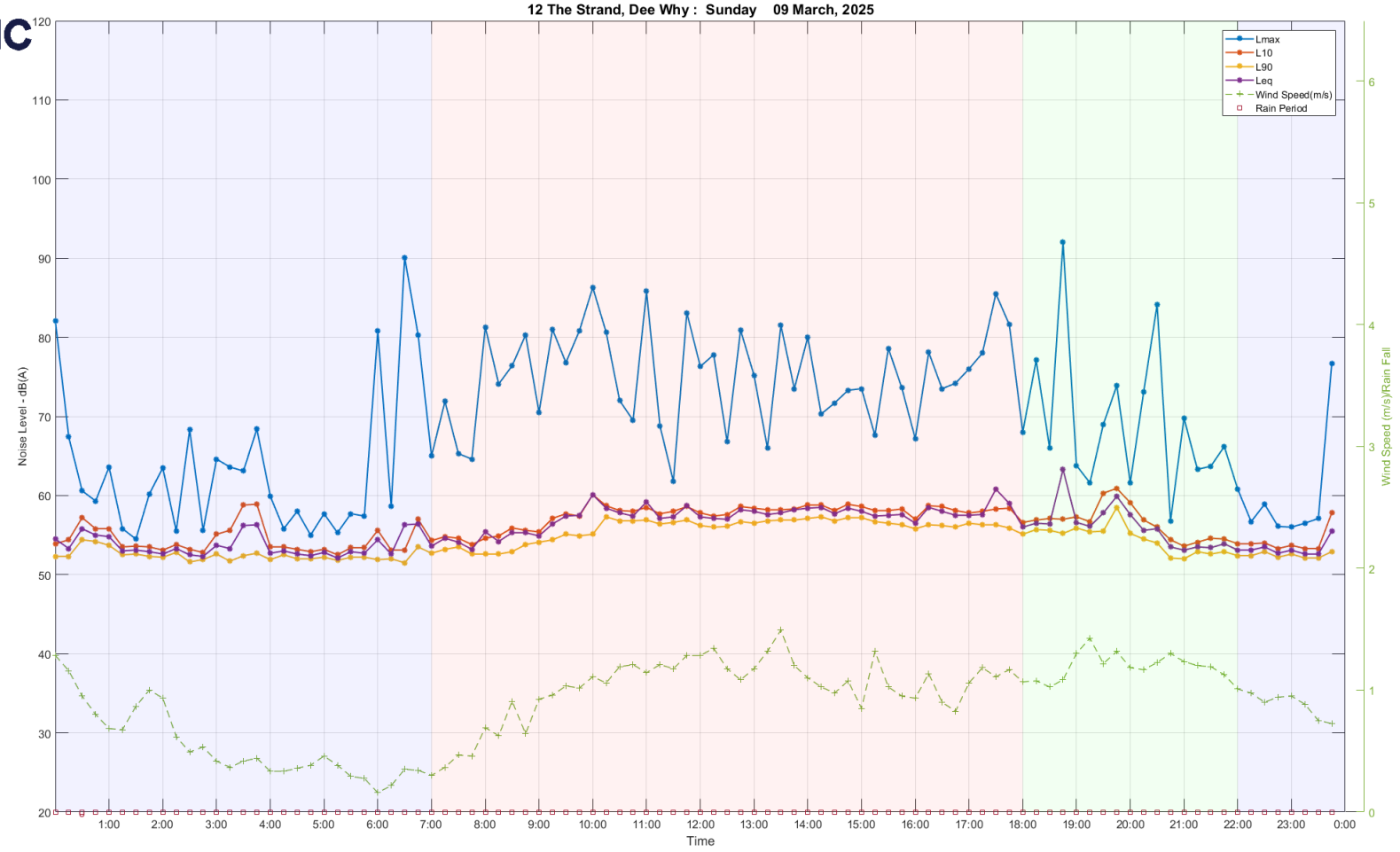
12 The Strand, Dee Why : Sunday 09 March, 2025
Lmax
L10
L90
Leq
Wind Speed(m/s)
Rain Period
Noise Level - dB(A)
Wind Speed (m/s)/Rain Fall
Time
120
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100
90
80
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20
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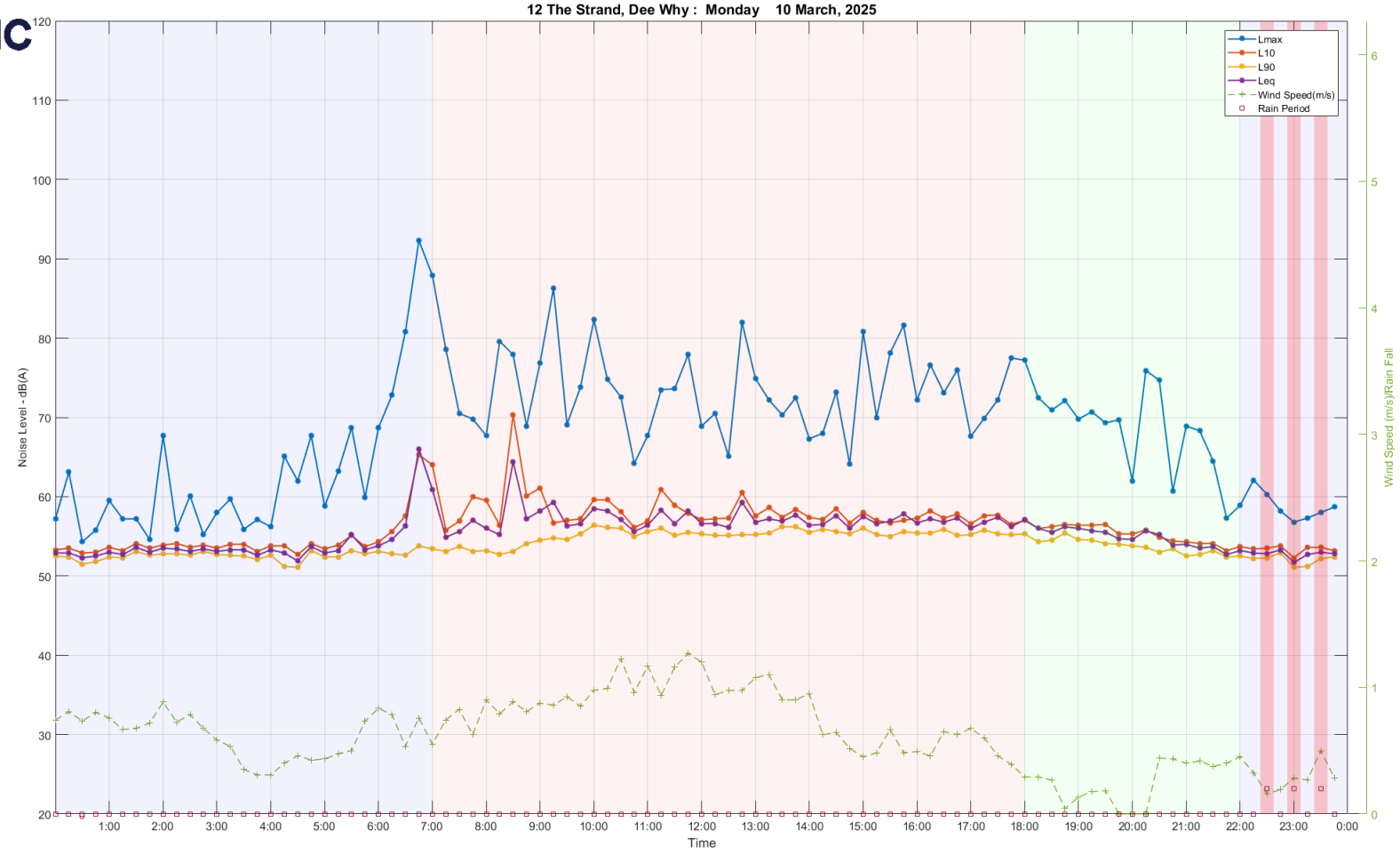
12 The Strand, Dee Why : Monday 10 March, 2025
Lmax
L10
L90
Leq
Wind Speed(m/s)
Rain Period
Noise Level - dB(A)
Wind Speed (m/s)/Rain Fall
Time
120
110
100
90
80
70
60
50
40
30
20
6
5
4
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2
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0
1:00
2:00
3:00
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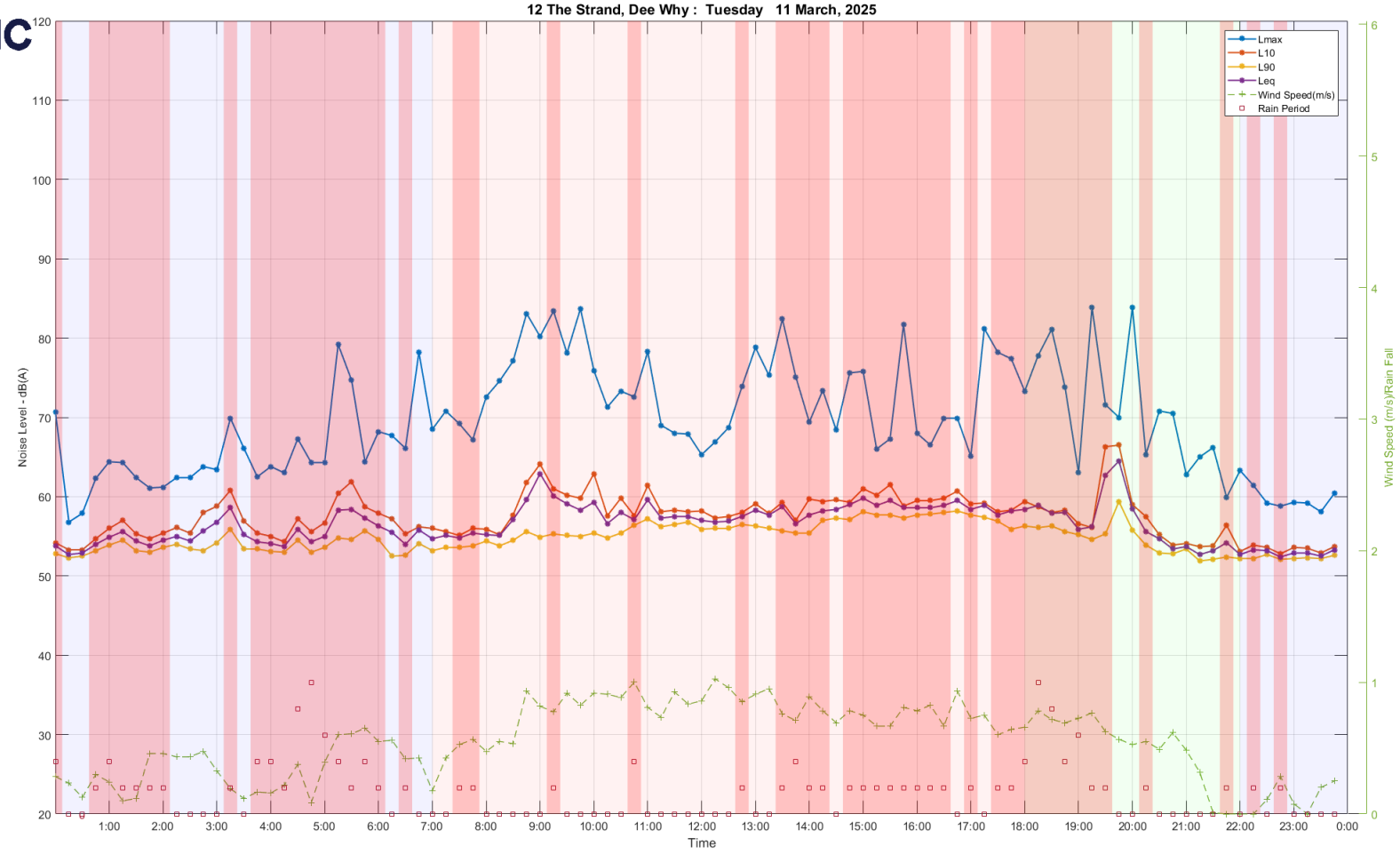
12 The Strand, Dee Why : Tuesday 11 March, 2025
Noise Level - dB(A)
Wind Speed (m/s)/Rain Fall
Time
Lmax
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L90
Leq
Wind Speed(m/s)
Rain Period
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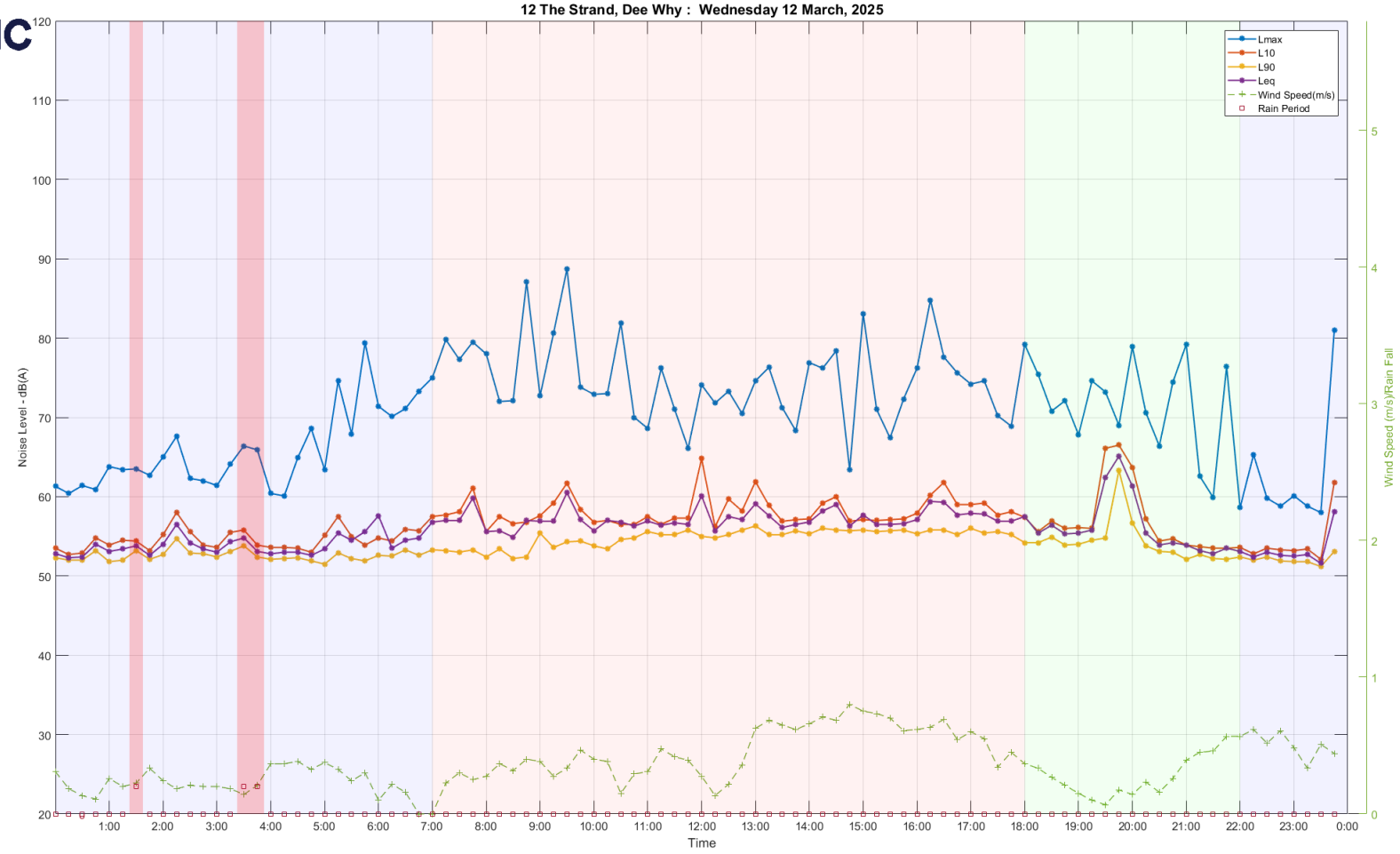
12 The Strand, Dee Why : Wednesday 12 March, 2025
Lmax
L10
L90
Leq
Wind Speed(m/s)
Rain Period
Noise Level - dB(A)
Wind Speed (m/s)/Rain Fall
Time
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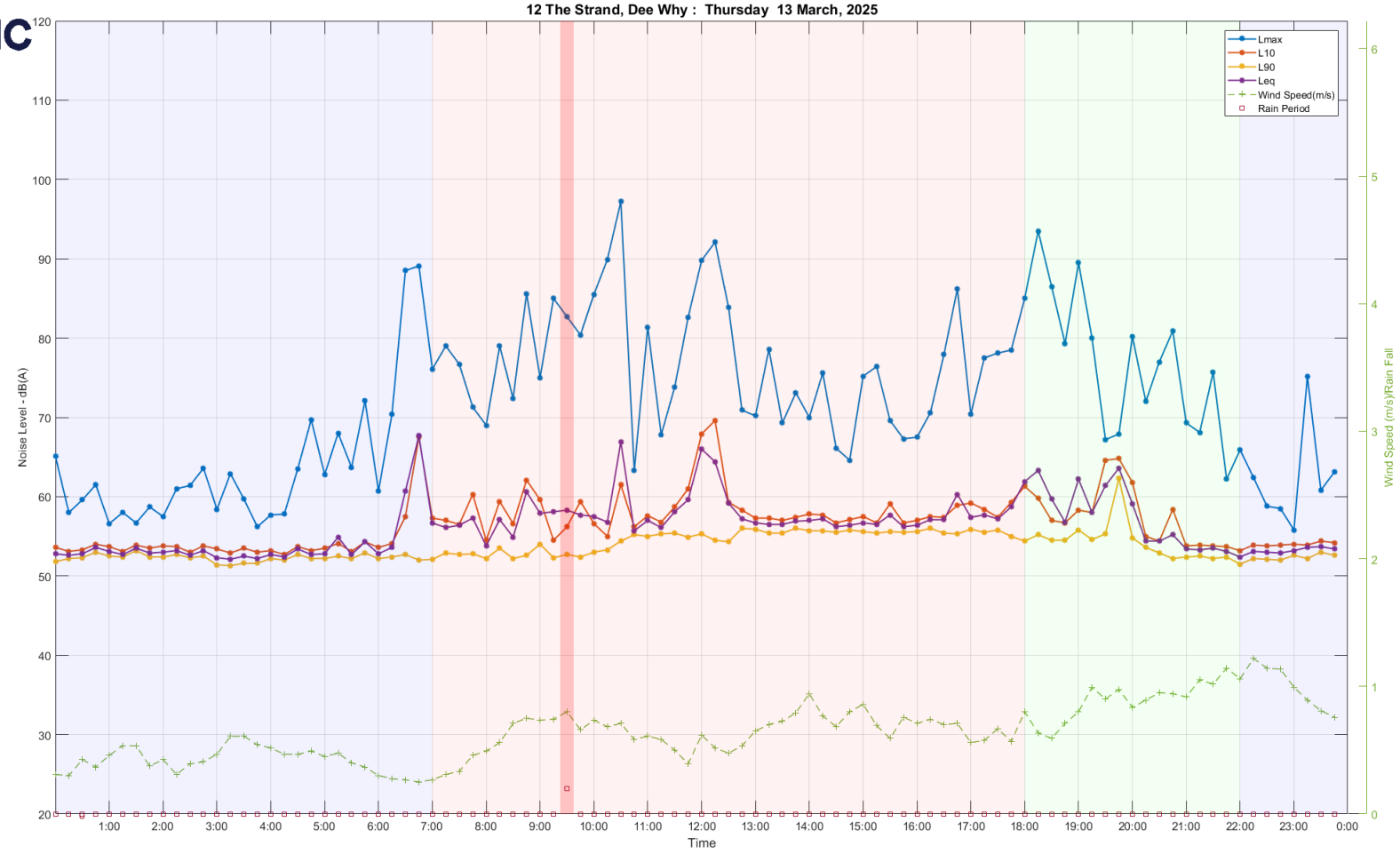
12 The Strand, Dee Why : Thursday 13 March, 2025
Lmax
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L90
Leq
Wind Speed(m/s)
Rain Period
Noise Level - dB(A)
Wind Speed (m/s)/Rain Fall
Time
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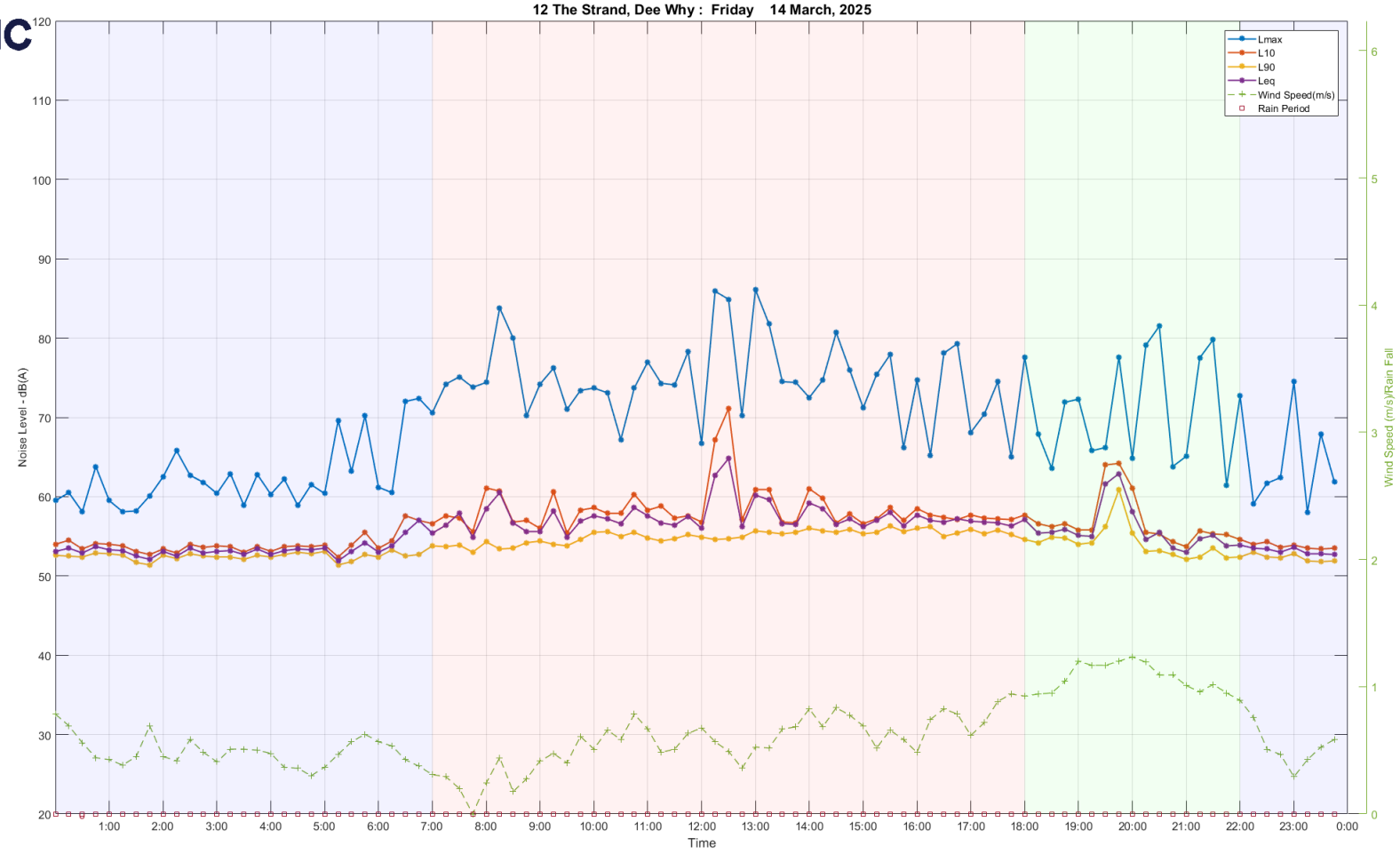
12 The Strand, Dee Why : Friday 14 March, 2025
Lmax
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Leq
Wind Speed(m/s)
Rain Period
Noise Level - dB(A)
Wind Speed (m/s)/Rain Fall
Time
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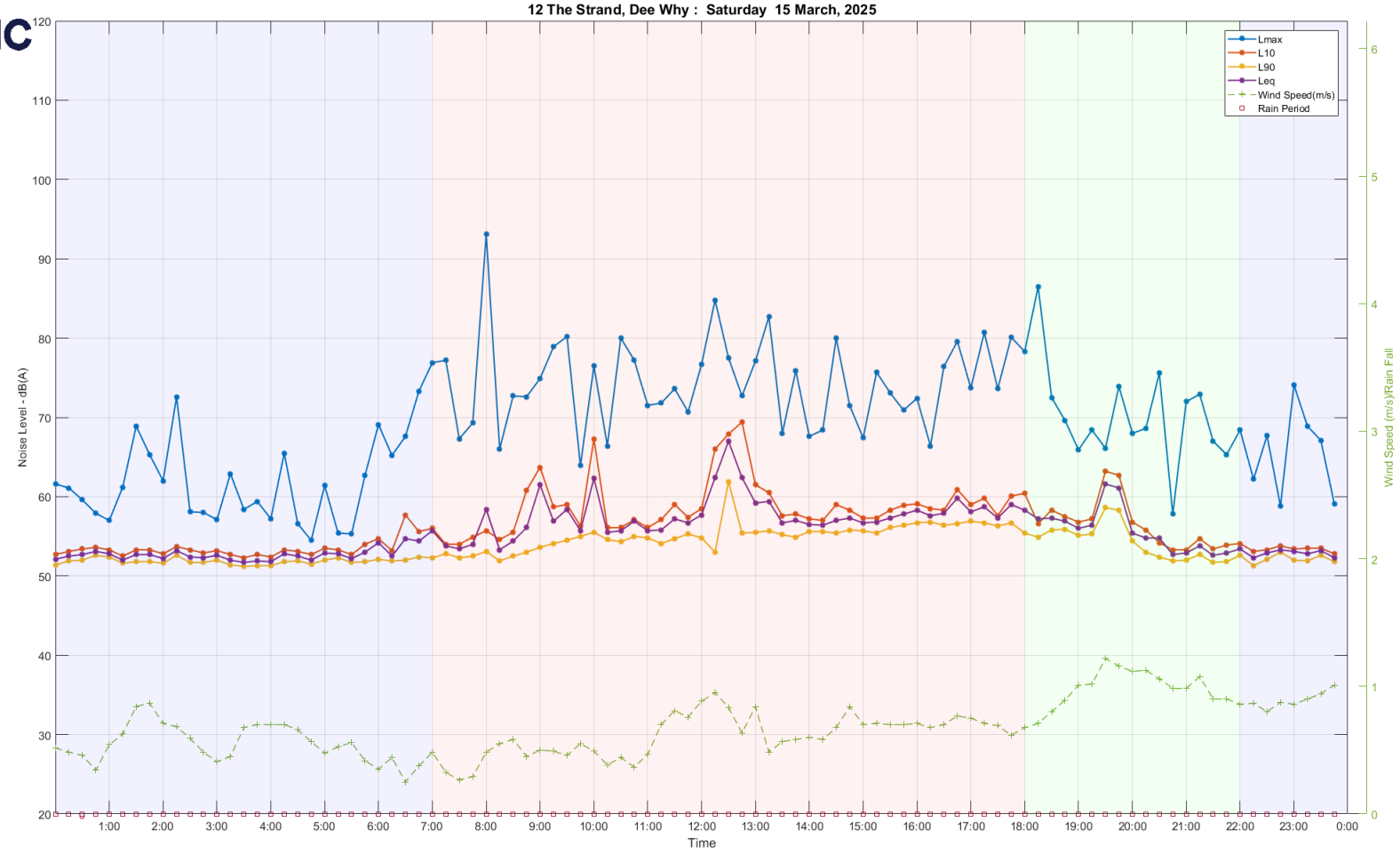
12 The Strand, Dee Why : Saturday 15 March, 2025
Lmax
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Leq
Wind Speed(m/s)
Rain Period
Noise Level - dB(A)
Wind Speed (m/s)/Rain Fall
Time
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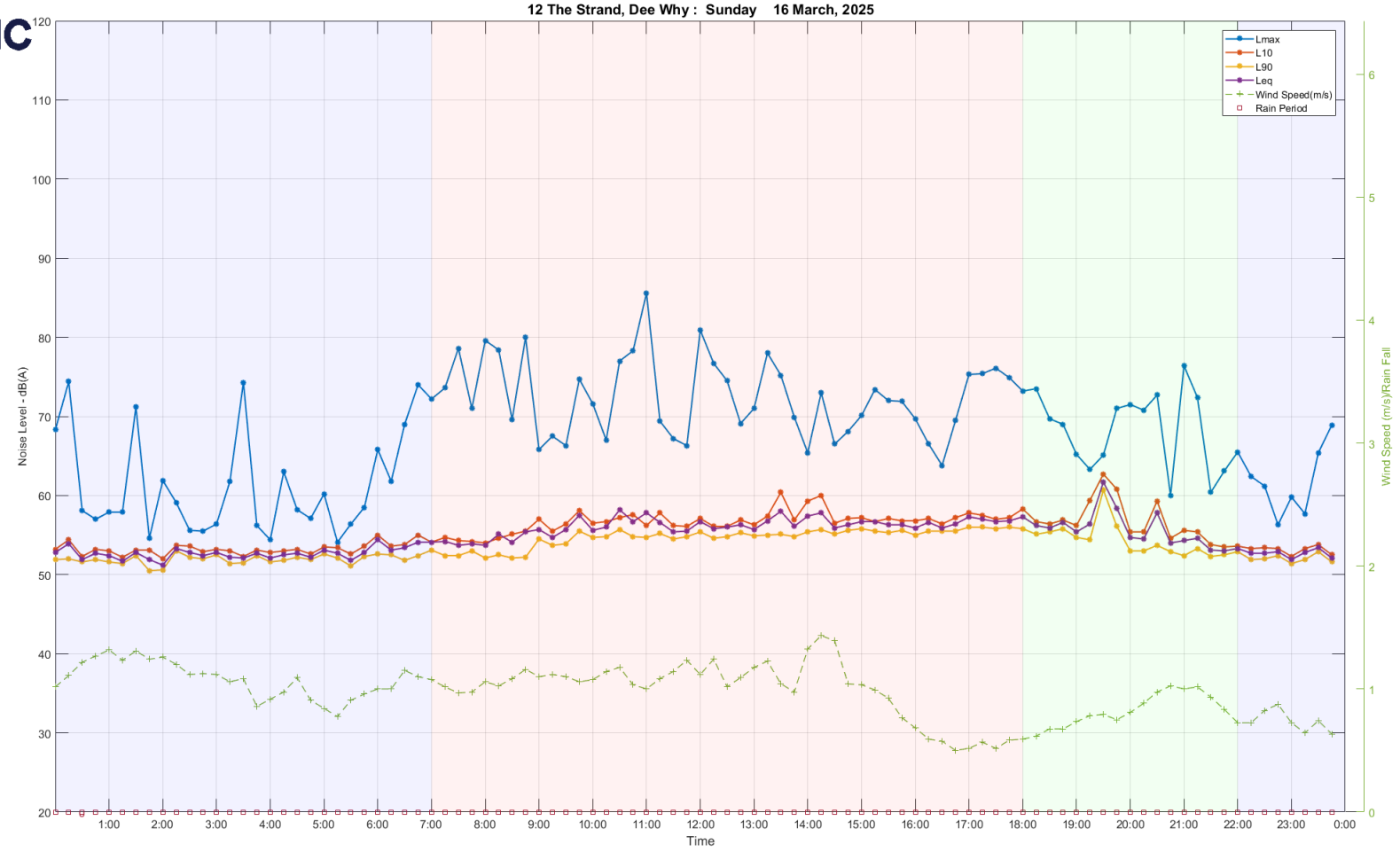
12 The Strand, Dee Why : Sunday 16 March, 2025
Lmax
L10
L90
Leq
Wind Speed(m/s)
Rain Period
Noise Level - dB(A)
Wind Speed (m/s)/Rain Fall
Time
120
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100
90
80
70
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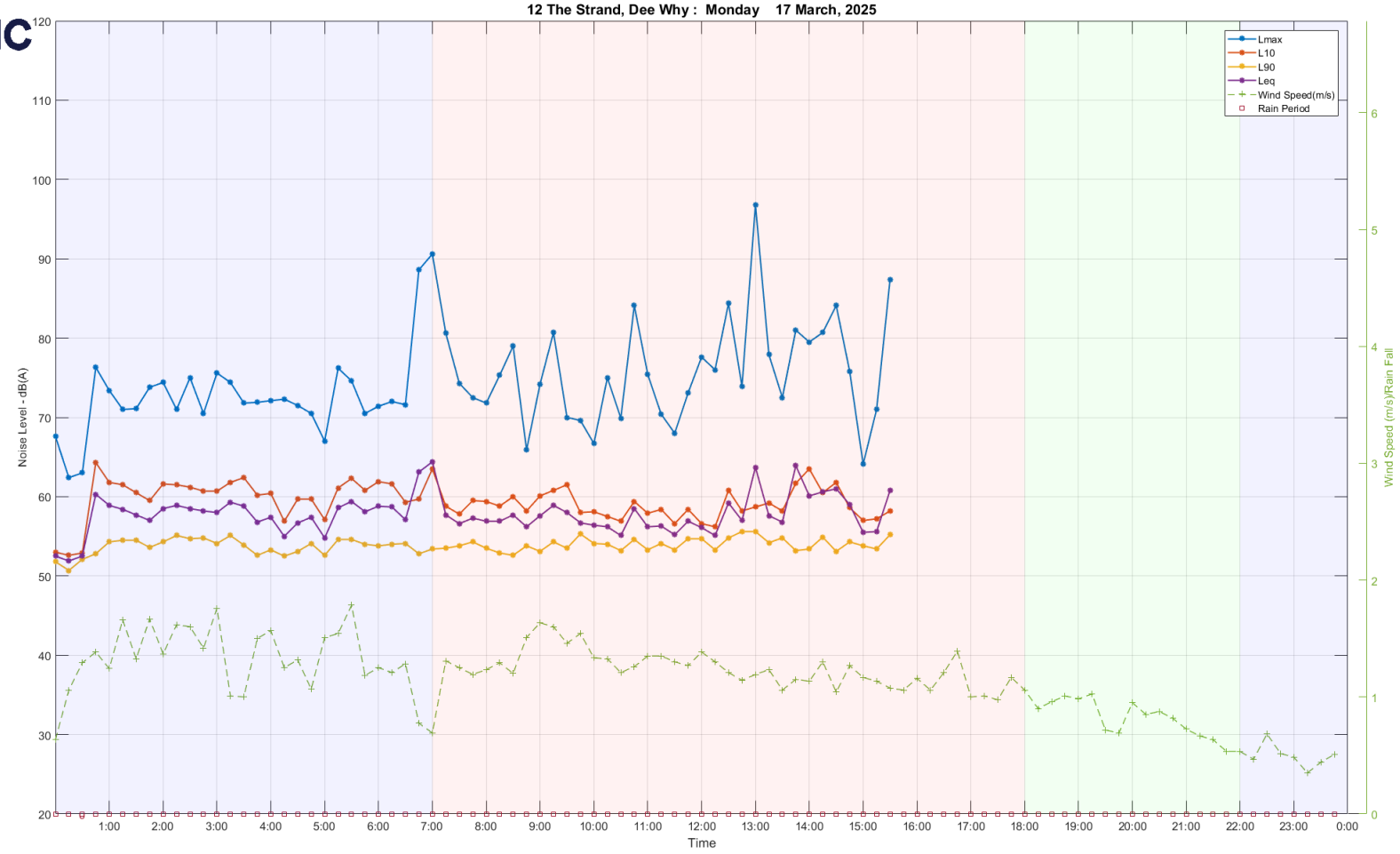

Wind Speed is corrected using factor 0.3000 based on logger location

APPENDIX B EPA NOISE POLICY FOR INDUSTRY TRIGGER LEVELS

Project specific assessment trigger levels have been determined for each noise source applying at the identified potentially most impacted receivers.

B.1 NPFI TRIGGER LEVELS

The NPfI requires noise impacts at residential receivers to be assessed in 3 ways:

- Whether the emitted noise is unreasonably loud relative to ambient background noise. (which the EPA calls the "intrusiveness" trigger level).
- Whether the noise emitted is unreasonably loud in an absolute sense, and consistent with surrounding land use and environment. ("amenity" trigger level)
- For night noise emissions, whether discrete noise events are likely to adversely impact sleep ("maximum noise level" trigger levels).

For other receiver types only the amenity trigger level is relevant.

B.1.1 Intrusiveness

The $L_{eq,15min}$ descriptor is used for the intrusiveness trigger level, and is set at a level that is 5dB(A) above the rating background noise level.

B.1.2 Amenity

Table 2.2 of the NPfI (repeated below) sets out acceptable noise levels for various receiver types.

There are 3 categories of residential receivers - rural, suburban, urban. The nearest residential receivers to the subject site are categorised as "urban" receivers. Categories for non-residential uses are also indicated in the table.

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

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

NPfI Table 2.2: Amenity Noise Levels			
Receiver	***Noise Amenity Area***	***Time of Day***	***Recommended Amenity Noise Level L_{Aeq}***
Residential	*Rural*	*Day*	*50*
		Evening	*45*
		Night	*40*
	Suburban	*Day*	*55*
		Evening	*45*
		Night	*40*
	Urban	*Day*	*60*
		Evening	*50*
		Night	*45*
Hotels motels caretakers' quarters holiday accommodation permanent resident caravan parks	*See column 4*	*See column 4*	*5 dB(A) above the recommended amenity noise level for a residence for the relevant noise amenity area and time of day*
School classroom – internal	*All*	*Noisiest 1-hour period when in use*	*35 (see notes for table)*
Hospital ward internal external	*All* *All*	*Noisiest 1-hour* *Noisiest 1-hour*	*35* *50*
Place of worship – internal	*All*	*When in use*	*40*
Area specifically reserved for passive recreation (e.g. national park)	*All*	*When in use*	*50*
Active recreation area (e.g. school playground golf course)	*All*	*When in use*	*55*
Commercial premises	*All*	*When in use*	*65*
Industrial premises	*All*	*When in use*	*70*
Industrial interface (applicable only to residential noise amenity areas)	*All*	*All*	*Add 5 dB(A) to recommended noise amenity area*

Notes: The recommended amenity noise levels refer only to noise from industrial sources. However, they refer to noise from all such sources at the receiver location, and not only noise due to a specific project under consideration. The levels represent outdoor levels except where otherwise stated.

Types of receivers are defined as follows:

- rural residential – see Table 2.3
- suburban residential – see Table 2.3
- urban residential – see Table 2.3
- industrial interface – an area that is in close proximity to existing industrial premises and that extends out to a point where the existing industrial noise from the source has fallen by 5 dB or an area defined in a planning instrument. Beyond this region the amenity noise level for the applicable category applies. This category may be used only for existing situations (further explanation on how this category applies is outlined in Section 2.7)
- commercial – commercial activities being undertaken in a planning zone that allows commercial land uses
- industrial – an area defined as an industrial zone on a local environment plan; for isolated residences within an industrial zone the industrial amenity level would usually apply.

Time of day is defined as follows:

- day – the period from 7 am to 6 pm Monday to Saturday or 8 am to 6 pm on Sundays and public holidays
- evening – the period from 6 pm to 10 pm
- night – the remaining periods.

(These periods may be varied where appropriate, for example, see A3 in Fact Sheet A.)

In the case where existing schools are affected by noise from existing industrial noise sources, the acceptable L_{Aeq} noise level may be increased to 40 dB $L_{Aeq(1hr)}$.

B.1.3 Noise Characteristic Modifying Factors

Where applicable, the emitted intrusive noise level should be modified (increased or decreased) to account for characteristics such as tonality, low frequency, duration, etc according to NPfI Fact Sheet C.

B.1.4 Maximum Noise Level Assessment

The purpose of this assessment is to identify whether discrete, night time noise events have the potential to produce adverse sleep impacts.

Section 2.5 of NPfI recommends the following procedure to assess the potential for adverse sleep 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 (L_{90}) plus 5 dB, whichever is the greater, and/or
- L_{max} 52 dB(A) or the prevailing RBL (L_{90}) plus 15 dB, whichever is the greater,

a detailed maximum noise level event assessment should be undertaken.

The detailed assessment should cover the maximum noise level, the extent to which the maximum noise level exceeds the rating background noise 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 NSW Road Noise Policy.

Other factors that may be important in assessing the extent of impacts on sleep include:

- *how often high noise events will occur*
- *the distribution of likely events across the night-time period and the existing ambient maximum events in the absence of the subject development*
- *whether there are times of day when there is a clear change in the noise environment (such as during early-morning shoulder periods)*
- *current scientific literature available at the time of the assessment regarding the impact of maximum noise level events at night.*

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.*

Maximum noise level event assessments should be based on the L_{AFmax} descriptor on an event basis under 'fast' time response. The detailed assessment should consider all feasible and reasonable noise mitigation measures with a goal of achieving the above trigger levels.

B.2 PROJECT SPECIFIC TRIGGER LEVELS

The following table summarises the trigger levels applying at each of the identified "most impacted" receivers. These have been determined based on the NPfI methodology described above and the measured rating background noise levels.

The trigger levels in bold indicate the most stringent trigger level at each location.

Table 7 – Project Specific Trigger Levels

Location/ Receiver Type	Time	RBL dB(A) L_{90}	Trigger Noise Level (dB(A) $L_{eq,15min}$)	
			Intrusiveness	Amenity
Residential	Day	53	58	**58**
	Evening	53	58	**48**
	Night	52	57	**43**

The project noise trigger levels are bolded above.