Attachment A15

Noise Impact Assessment

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Noise Impact Assessment

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1 INTRODUCTION

This report has been prepared to assess noise impacts associated with the proposed development located at 150 Day Street, Sydney

Impacts assessed include:

- Noise intrusion from traffic on nearby public roads.
- Noise emissions criteria for mechanical plant.

The subject site and local context are indicated in Figure 4-1.

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

2 REFERENCED DOCUMENTS

2.1.1 Background Information Used

This assessment has been conducting using the Hassell architectural drawings for planning proposal submission (Project No. 16185, Revision B, dated 21st March 2025).

2.1.2 Guidelines

The following planning instruments and guidelines have been used in the assessment:

- City of Sydney (**CoS**) Council *Development Control Plan* (**DCP**) 2012.
- Australian and New Zealand AS/NZS 2107:2016 Recommended design sound levels and reverberation times for building interiors.
- NSW Department of Planning (**DoP**) Development near Rail Corridors or Busy Roads – Interim Guideline (**DNRCBR**) 2008.
- NSW EPA *Noise Policy for Industry* (**NPfI**) October 2017.

3 ABBREVIATIONS AND DEFINITIONS

The following abbreviations and definitions are used in this noise impact assessment.

dB	Decibels – unit for the measurement of sound
dB(A)	A-weighted decibels. Unit of measurement for broadband sound with the A-frequency weighting applied to approximate human loudness perception to sounds of different pitch.
L_{eq}	Energy, time averaged sound level
L_{max}	Maximum sound pressure level, fast response
L_{90}	Sound level exceeded for 90% of the measurement period
R_w	Frequency weighted sound reduction index.
NRC	Average absorption co-efficient for the octave bands with centre frequencies of 250Hz to 2 kHz inclusive.
Day*	The period from 7am to 6pm (Monday to Saturday) and 8am to 6pm (Sundays and public holidays).
Evening*	Refers to the period from 6pm to 10pm.
Night*	The period from 10 pm to 7 am (Monday to Saturday), and 10pm to 8am (Sundays and public holidays).
Project Trigger Level	Target noise levels for a particular noise-generating facility.
Assessment Background Level (ABL)	Background noise level representative of a single period.
Rating Background Level (RBL)	The overall, single-figure background level representing each assessment period (day/evening/night) over the whole monitoring period. (Calculated in accordance with NPfI unless noted otherwise)

* Unless nominated otherwise.

4 SITE DESCRIPTION AND THE PROPOSAL

The planning proposal for the existing Park Royal Hotel at 150 Day Street, Sydney (**the site**), involves an ambitious upgrade and expansion of the existing hotel. This project aims to enhance the existing hotel offering while introducing a new, distinct hotel experience above the current structure, enabling the coexistence of the existing Park Royal and a new Pan Pacific Hotel on the same site. Strategically positioned at the edge of the City of Sydney, the development reinforces the city's entry into Darling Harbour by maintaining and emphasising the city wall characteristic of this prominent location.

The project is defined by 3 key principles – maximising adaptive reuse (setting a benchmark for future developments in Sydney), energising the Sydney visitor economy, and significantly enhancing the greening of both the public realm and the skyline, in alignment with the City of Sydney's sustainability goals. Achieving this vision involves expanding the existing core to support the new hotel above, employing a 'strip to structure' approach from ground to Level 02 to facilitate amenity upgrades, lightly refurbishing existing hotel rooms, and comprehensively upgrading all building services. This initiative aims to establish a contemporary hotel destination while setting a new standard for sustainable urban redevelopment.

To achieve the intended outcomes, this planning proposal seeks to amend the *Sydney Local Environmental Plan 2012* (the **LEP**) by inserting a new site-specific clause for the subject site under Part 6 Division 5 Site specific provisions to:

- Allow a maximum building height of 85 metres,
- Permit a maximum floor space ratio of 13.5:1 for hotel and associated land uses,
- Restrict use to employment/hotel use and not residential accommodation or serviced apartments.

The Planning Proposal is supported by a site-specific Development Control Plan (**DCP**) and reference design scheme, prepared by Hassell. Key elements of the site specific DCP and reference design include:

- Renovation of existing 2 level basement and existing 11 storey hotel, with the addition of a new 11 storey hotel above (including a transfer floor between the two structures), and a rooftop plant floor resulting:
    - Two hotel brand offerings – Park Royal Hotel (3.5 star) and Pan Pacific Hotel (5 star)
    - 490-540 hotel keys with gross floor area of ~30,000m^2
    - Upgrade existing infrastructure and services (including new lift core),
    - New and upgraded hotel facilities (including lobby, dining areas, meeting rooms, ball room, gymnasium, bar and restaurants, and pool).
    - Removal existing Porte Cochere and exit ramp resulting in single vehicle entry/exit ramp from Day Street to be used by valet only.
- Ground floor public domain, public art and landscaping design, and
- Significant greening and landscaping of western façade.

4.1 SENSITIVE RECEIVERS

Onsite acoustic investigation has been carried out by this office regarding the surrounding acoustic environment, these have been detailed below:

- Residential properties located to the east and south of the site.
- Visitor accommodation properties located to the west and north east of the site.
- Commercial development surrounding the site with an industrial development to the west.
- Harbour Street, Bathurst Street, Druitt Street onramp to Anzac Bridge and the Western Distributor as major traffic noise sources.

The following table lists the nearest/potentially most impacted sensitive receivers surrounding the site. An aerial photo of the site indicating nearby noise sensitive receivers and measurement locations is presented in Figure 4-1.

Table 4-1 – Sensitive Receivers

Receiver (Refer Figure 1)	Receiver Type	Comment
R1	Residential	Residential receiver to the east at 267 Sussex Street
R2	Residential	Residential receiver to the east at 273-279 Sussex Street
R3	Residential	Residential receivers to the south of the site at 289-295 Sussex Street and 158-166 Day Street
R4	Visitor Accommodation	Visitor Accommodation receiver to the west (W Hotel) at 31 Wheat Road
R5	Visitor Accommodation	Visitor Accommodation receivers to the north east at 234-258 Sussex Street
R6	Residential	Residential receivers above Crowne Plaza (visitor accommodation) to the east at 58 Bathurst Street
C1	Commercial	Commercial receivers to the east along Sussex Street
C2	Commercial	
C3	Commercial	
C4	Commercial	Commercial receivers to the south west along Harbour Street
C5	Commercial	Commercial receivers to the north across Druitt Street
C6	Commercial	Commercial receivers to the north east across Druitt Street
C7	Commercial	Commercial receivers to the far east across Sussex Street
C8	Commercial	Commercial receivers to the far south east along Sussex Street
I1	Industrial	AusGrid power station at 1 Blackwattle Place

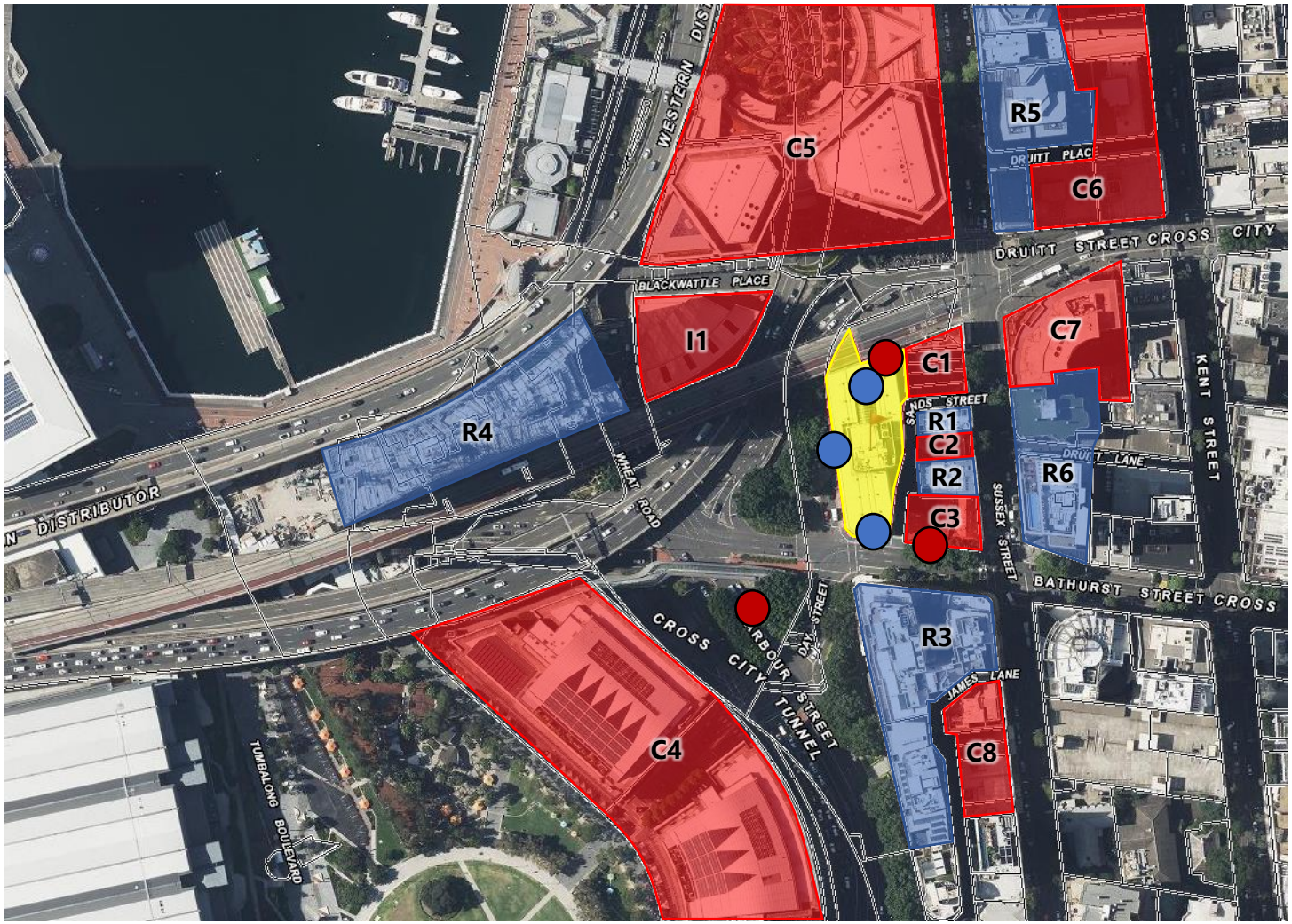

Figure 4-1 – Site Plan Showing Local Context (Source: SixMaps)

Project Site

Residential & Hotel Receivers

Commercial & Industrial Receivers

Unattended Noise Monitoring

Attended Noise Measurements

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5 EXTERNAL NOISE INTRUSION ASSESSMENT

Site investigation indicates that the major external noise sources around the site are from traffic movements along Harbour Street, Bathurst Street, Druitt Street onramp to Anzac Bridge and the Western Distributor.

Acoustic treatments for noise intrusion will be subject to further design development at later stages pending final constructions. Complying constructions below are for authority approval purposes only and not to be used as specific façade consent requirements. Finalised façade requirements will be reviewed at construction certification (**CC**) Stage.

5.1 NOISE INTRUSION CRITERIA

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

- City of Sydney (**CoS**) Council *Development Control Plan* (**DCP**) 2012.
- Australian and New Zealand AS/NZS 2107:2016 *Recommended design sound levels and reverberation times for building interiors.*

5.1.1 CoS DCP 2012

Section 4.4.8 of the DCP relates to objectives and provisions for visitor accommodation, however no specific noise controls are provided in this section.

AL also notes that the SEPPT&I 2021 also does not provide specific requirements for hotel development. Therefore, internal noise requirements will be assessed with reference to AS/NZS 2107:2016.

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

Australian Standard AS 2107:2016: *Recommended design sound levels and reverberation times for building interiors* specifies allowable internal noise levels for internal spaces within various building types. AS 2107:2016, gives the following maximum internal noise levels for relevant areas of the proposed building.

Table 5-1 – Recommended Design Sound Level

Space /Activity Type	Recommended Maximum Design Sound Level dB(A) L_{eq}
Hotel Sleeping Areas (Major Roads)	35-40 dB(A)$L_{eq(10pm-7am)}$
Hotel Foyers and Recreation Areas	45-50 dB(A) $L_{eq(anytime)}$
Hotel Washrooms and Toilets	45-55 dB(A) $L_{eq(anytime)}$
Hotel Bars and Lounges	< 50 dB(A) $L_{eq(anytime)}$
Kitchen, Laundry and Maintenance Areas	< 55 dB(A) $L_{eq(anytime)}$
Restaurants	40-50 dB(A) $L_{eq(anytime)}$

5.2 ADOPTED PROJECT SPECIFIC 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	Adopted Internal Sound Level dB(A) L_{eq}
Hotel Sleeping Areas (Major Roads)	35 dB(A) $L_{eq(10pm-7am)}$
Hotel Foyers and Recreation Areas	50 dB(A) $L_{eq(anytime)}$
Hotel Washrooms and Toilets	50 dB(A) $L_{eq(anytime)}$
Hotel Bars and Lounges	50 dB(A) $L_{eq(anytime)}$
Kitchen, Laundry and Maintenance Areas	55 dB(A) $L_{eq(anytime)}$
Restaurants	50 dB(A) $L_{eq(anytime)}$

5.3 COMPLYING CONSTRUCTIONS

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

Noise levels around the site have been predicted using the SoundPLAN computer model. The model is able to predict façade noise levels, taking into account the factors indicated above.

The model:

- Has been calibrated for each noise source using the relevant measured noise levels, with any long-term change in noise level applied.
- Includes a digitised geo-map of the proposed building and any nearby structures that may affect noise levels at the site.
- ISO 9613-2:1996 "Acoustics – Attenuation of Sound During Propagation Outdoors – Part 2: General Method of Calculation" noise propagation standard was adopted.

The modelling assumptions include:

- Noise source heights:
    - Heavy vehicles engines at 1m height above roadway.
    - Passenger cars and light commercial vehicles at 0.5m above the roadway.
- Heavy vehicle composition of 10% based on conservative estimate.
- Data obtained from Geoscape for the surrounding land, roadways and existing built form.

SoundPLAN modelling outputs are provided in the appendices. SoundPLAN "façade noise maps" do not include a façade reflection allowance, and therefore do not require correction.

The modelling indicates that mitigation of noise impacts is needed to achieve compliance with the nominated assessment criteria. Complying mitigation is provided in the sections below.

Note: Façade constructions are to be reviewed at CC stage based on construction drawings pending final façade design. The below constructions are provided for authority approval purposes only.

5.3.1 Glazed Façade (Windows and Doors)

The following constructions will 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 external glazing design to mitigate potential noise impacts are detailed in Table 5-3.

Table 5-3 – Complying Glazing Construction

Room	Glazing Thickness	Acoustic Seals
Western facing hotel rooms including associated corner rooms	6mm Toughened/ 100mm airgap/ 10.38mm Laminated	Yes
Northern facing hotel rooms including northeastern corner rooms	12.5mm Vlam Hush **or** 8mm Toughened/ 12mm airgap/ 13.52mm Laminated IGU	Yes
Southern facing hotel rooms including southeastern corner rooms	10.38mm Laminated **or** 10mm Toughened/ 12mm airgap/ 6.38mm Laminated IGU	Yes
Eastern facing hotel rooms	6.38mm Laminated **or** 6mm Toughened/ 12mm airgap/ 6.38mm Laminated IGU	Yes
All Other Glazed Elements (Toilets, Restaurants, Foyers, etc.)	6.38mm Laminated **or** 6mm Toughened/ 12mm airgap/ 6.38mm Laminated IGU	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.

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 5-4 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 5-4 – Minimum R_w of Glazing Assembly (with Acoustic Seals)

Glazing Assembly	Minimum R_w of Installed Window
6mm Toughened/ 100mm airgap/ 10.38mm Laminated	45
8mm Toughened/ 12mm airgap/ 13.52mm Laminated IGU	42
12.5mm Vlam Hush	40
10mm Toughened/ 12mm airgap/ 6.38mm Laminated IGU	40
10.38mm Laminated	35
6mm Toughened/ 12mm airgap/ 6.38mm Laminated IGU	35
6.38mm Laminated	31

Note: Façade constructions to be reviewed at CC stage based on construction drawings, pending final façade design.

5.3.2 External Wall Construction

External wall construction will be constructed from concrete and masonry elements, therefore; acoustic upgrading is not required. Any lightweight façade construction shall provide a minimum acoustic performance of R_w 50.

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.

5.3.3 Entry Doors

All doors shall have glazing thicknesses equal to those recommended in Section 5.3.1 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 <u>are not acceptable</u> where acoustic seals are required.

5.3.4 External Roof/Ceiling Construction

External roof construction will be constructed from concrete elements, therefore; acoustic upgrading is not required. In the event that any penetrations are required through the external skin, an acoustic sealant should be used to minimise all gaps.

5.3.5 Ventilation and Air Conditioning

AS2107 relies on the external façade being closed to provide the required noise reduction through the façade. Whilst they do not provide guidance on acceptable tolerances for a 'windows open' level, and noting that this is not strictly required, with respect to natural ventilation of a dwelling, NSW Planning guidelines allow internal noise levels to be up to 10 dB(A) higher than the specified criterion with windows and doors to a dwelling open.

Based on the above, all hotel rooms are recommended to be provided with alternative ventilation such as air condition systems to maintain adequate ventilation with windows closed.

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 external noise emission criteria to nearby properties.

6 SITE OPERATIONAL NOISE EMISSIONS ASSESSMENT

6.1 ENVIRONMENTAL NOISE AND VIBRATION SOURCES

The following significant noise and vibration sources have been identified as requiring assessment:

- Internal activities and process equipment and plant. This includes:
    - Gym on Level 11
    - Lounge/ bar on Level 18
    - Leased restaurant on Level 21
- External activities and external process equipment and plant. This includes:
    - An outdoor pool on Level 11
    - Associated outdoor terrace of the lounge/bar on Level 18
    - Associated outdoor terrace of the leased restaurant on Level 21
- Air conditioning and ventilation plant.

6.2 NOISE ASSESSMENT CRITERIA FOR ON-SITE NOISE SOURCES

Criteria to assess noise emissions from the operation of the proposed development have been developed using the NSW EPA *Noise Policy for Industry* (**NPI**) 2017. This policy was primarily developed to assess noise impacts from industrial development, however, 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 4-1.
- For each catchment, representative noise assessment trigger levels have been determined based on NPI 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 NPI 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 6-1 – Project Specific Trigger Levels

Location/ Receiver Type	Time	RBL dB(A) L_{90}	Trigger Noise Level (dB(A) $L_{eq,15min}$)		
			Intrusiveness	Amenity	Max Event
Residential **R1**, **R2** & **R3**	Day	64*	69	**58**	N/A
	Evening	62*	67	**48**	N/A
	Night	57*	62	**43**	**62 L_{eq}** **72 L_{max}**
Commercial **C1-C8**	When in Use	N/A	N/A	**63**	N/A
Industrial **I1**	When in Use	N/A	N/A	**68**	N/A

*Lowest measured RBL's from unattended noise monitoring on site.

The project noise trigger levels are bolded above.

6.3 NOISE FROM GENERAL SITE OPERATIONS

Typically, surrounding local receivers are most affected by external noise emissions and not internal noise breakout, given that noise from usage of internal spaces such as the gym, lounge/ bar and leased restaurant can be adequately controlled through the enclosed façade. This is considered low acoustic risk of noise impact and manageable through acoustic selection of façade treatments, however detailed noise emissions assessments shall be carried out by the operator for specific use cases for any leased tenancies. The areas that are most likely to cause noise impact to neighbouring receivers are the outdoor spaces such as the pool on Level 11 and terraces on Levels 18 and 21.

The location the outdoor terraces on Levels 18 and 21 are much higher than those of local residential receivers. It is noted that licensed premises are governed by Liquor & Gaming NSW (**L&GNSW**) and the new Vibrancy Reforms, not the NPI. A preliminary assessment can still be conducted of these spaces to ascertain if there is a concern with noise impact on local residents.

Preliminary assessment of the outdoor terraces with up to 50 patrons at each terrace with 1 in 2 patrons speaking at a raised voice in the external space (66 dB(A) @ 1m L_{eq} per the AAAC *Licensed Premises Noise Assessment Technical Guideline* V2 2020 (Cushing et al)) yields a façade noise level at **R1** of under 40dB(A) at the most affected façade externally. This predicted noise level is lower than the measured background noise levels for the area and within historic noise emissions objectives adopted by L&GNSW. A detailed review can be conducted when operational conditions of each space are finalised.

Preliminary assessment of the outdoor pool area with up to 50 patrons at the outdoor pool area with 1 in 2 patrons speaking at a raised voice in the external space (66 dB(A) @ 1m L_{eq} per the AAAC *Licensed Premises Noise Assessment Technical Guideline* V2 2020 (Cushing et al)) yields a façade noise level at **R2** of under 50dB(A) at the most affected façade externally. This predicted noise level is over 10dB(A) lower than the measured background noise levels for the area. A detailed review can be conducted when operational conditions of each space are finalised.

AL is therefore of the opinion that the proposed configurations are considered low acoustic risk and are acoustically acceptable. Specific requirements of any operator (such as extended hours operation or external amplified music) are to be reviewed via a detailed noise emissions assessment.

6.4 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 and commercial receivers should comply with the requirements of the NSW EPA *Noise Policy for Industry* 2017 as summarised in Section 6.2.

Detailed acoustic review should be undertaken at CC stage to determine acoustic treatments to control noise emissions to satisfactory levels. Indicative treatments to be reviewed and/ or iterated at CC stage are shown below.

Preliminary Mechanical Treatment Advice:

- Condenser plant equipment: No indicative location of condenser plant is currently shown. Night time operational speeds shall be restricted with a night mode card (Daikin RXYMQ or similar).

- Major fans (typically with a sound power over 80dB(A) such as kitchen exhaust, major toilet exhaust and major carpark exhaust/supply/ relief air fans) may require acoustic treatment if located externally near sensitive receivers. It is recommended that axial (as opposed to roof mounted fans) are to be used as this will enable acoustic treatment to be incorporated within ductwork running to atmosphere and with attenuators if necessary. Indicatively a 1d unpodded attenuator with 2m of 50mm internally lined ductwork.

- Eastern facing plant rooms on Level 11 will require additional treatment to ensure noise emissions to **R1** and **R2** are adequately treated. Similarly, southern facing plantrooms on Level 11 may require additional treatment to minimise noise to **R3**. This can be achieved with silencers and lined ducting for fans or acoustic louvres for plant items that cannot incorporate individual treatment.

- Rooftop plant items may require barriers or acoustic louvres pending final mechanical plant selections.

- Cumulative assessment of both plant noise with other noise sources is recommended when conducting acoustic design of plant items.

Compliance with EPA acoustic criteria (as set out in Section 6.2) will be achievable provided that detailed acoustic review of plant items is undertaken once plant is selected, and acoustic treatments similar to those outlined above are adopted.

7 CONCLUSION

This report summarises the potential noise impact assessment undertaken for the proposed development.

Provided that the complying design recommendations presented in Section 5.3 are adopted, the development will comply with the acoustic requirements of the following documents:

- City of Sydney (**CoS**) Council *Development Control Plan* (**DCP**) 2012.
- Australian and New Zealand AS/NZS 2107:2016 Recommended design sound levels and reverberation times for building interiors.
- NSW Department of Planning (**DoP**) Development near Rail Corridors or Busy Roads – Interim Guideline (**DNRCBR**) 2008.
- NSW EPA *Noise Policy for Industry* (**NPfI**) October 2017.

External noise emissions criteria have been established in this report. In principle advice has been provided for mechanical plant that is to be iterated in later development stages.

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

Yours faithfully,

Acoustic Logic Pty Ltd
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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)
- Svan calibrator SV 338

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 A-1. Photographs of the monitoring locations are provided below.

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 the current roof level of the building in moderately sheltered locations such as from other buildings. A wind multiplying factor of 0.67 has been applied to the BOM data to estimate the wind speed at the microphone location.

Wind speed data was obtained from Fort Denison AWS. Rain fall data was obtained from Observatory Hill AWS.

Multiple time periods were identified as likely to contain significant periods of non-representative data and have been excluded from the assessment.

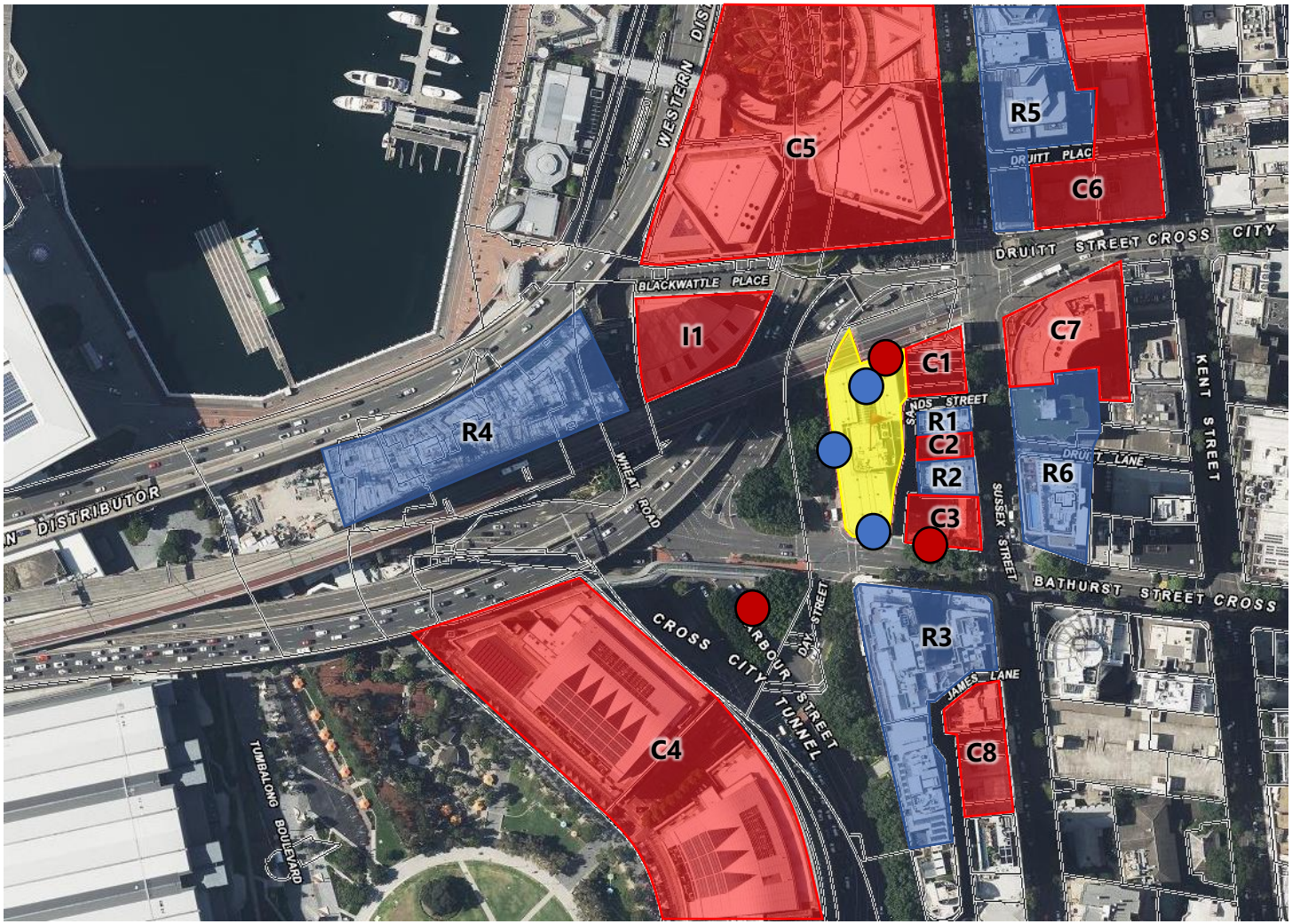

Figure A-1 – Site Plan Showing Local Context (Source: SixMaps)

Project Site

Residential & Hotel Receivers

Commercial & Industrial Receivers

Unattended Noise Monitoring

Attended Noise Measurements

Figure A-2 – Northern Noise Monitor Location

Figure A-3 – Southern Noise Monitor Location

Figure A-4 – Western Noise Monitor Location

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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 A-1 – Assessment Background Noise Levels – Northern Noise Monitor

Location	Date		ABL		
			Day	Evening	Night
Northern side of roof of 150 Day Street	Friday	4/10/2024	-	64	58*
	Saturday	5/10/2024	64	63	58
	Sunday	6/10/2024	63	63	57
	Monday	7/10/2024	63	60	56*
	Tuesday	8/10/2024	65	61	55
	Wednesday	9/10/2024	65	62	56
	Thursday	10/10/2024	65	63	57
	Friday	11/10/2024	66	64	59
	Saturday	12/10/2024	65	65	60
	Sunday	13/10/2024	64	62	57
	Monday	14/10/2024	66	62	59
	Tuesday	15/10/2024	-	-	-
	Calculated RBL		**65**	**63**	**57**
	Adopted RBL		**65**	**63**	**57**

*Weather affected data removed from calculation.

Table A-2 – Assessment Background Noise Levels – Southern Noise Monitor

Location	Date		ABL		
			Day	Evening	Night
Northern side of roof of 150 Day Street	Friday	4/10/2024	-	63	58*
	Saturday	5/10/2024	63	63	58
	Sunday	6/10/2024	62	62	58
	Monday	7/10/2024	62	61	55*
	Tuesday	8/10/2024	64	61	56
	Wednesday	9/10/2024	65	61	56
	Thursday	10/10/2024	64	62	57
	Friday	11/10/2024	65	63	58
	Saturday	12/10/2024	64	63	59
	Sunday	13/10/2024	63	61	56
	Monday	14/10/2024	64	61	57
	Tuesday	15/10/2024	-	-	-
	Calculated RBL		**64**	**62**	**57**
	Adopted RBL		**64**	**62**	**57**

*Weather affected data removed from calculation.

Table A-3 – Assessment Background Noise Levels – Western Noise Monitor

Location	Date		ABL		
			Day	Evening	Night
Northern side of roof of 150 Day Street	Friday	4/10/2024	-	65	58*
	Saturday	5/10/2024	65	65	59
	Sunday	6/10/2024	64	64	58
	Monday	7/10/2024	64	62	54*
	Tuesday	8/10/2024	68	63	55
	Wednesday	9/10/2024	68	63	55
	Thursday	10/10/2024	67	64	56
	Friday	11/10/2024	68	66	60
	Saturday	12/10/2024	67	66	60
	Sunday	13/10/2024	65	64	56
	Monday	14/10/2024	67	63	58
	Tuesday	15/10/2024	-	-	-
	Calculated RBL		**67**	**64**	**58**
	Adopted RBL		**67**	**64**	**58**

*Weather affected data removed from calculation.

A.5 AMBIENT NOISE LEVELS

The data for the day, evening and night periods have been processed to determine the ambient noise levels at the monitoring locations for each period.

The $L_{eq,15hr}$ (day period, 7am to 10pm) and $L_{eq,9hr}$ (night period, 10pm to 7am) ambient noise level descriptors adopted in the NSW *Road Noise Policy* 2011 guideline have been calculated from the data and are summarised in the following table.

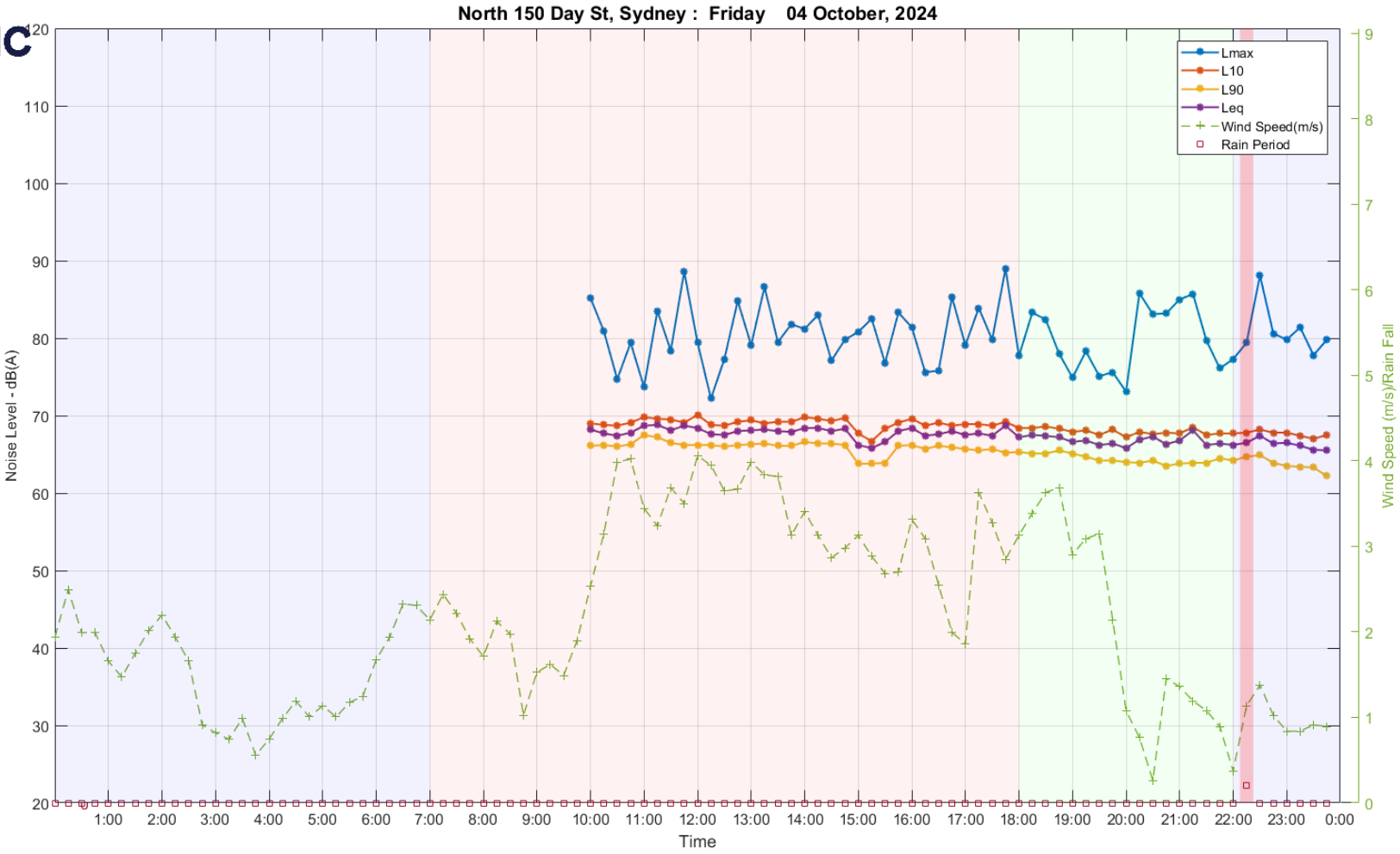
Table A-4 – RNP Ambient Noise

Location	Ambient Noise Level (dB(A) $L_{eq,period}$)*	
	Day (7am to 10pm)	Night (10pm to 7am)
Northern Noise Monitor on roof of 150 Day Street	68	64
Southern Noise Monitor on roof of 150 Day Street	74	63
Western Noise Monitor on roof of 150 Day Street	75	66
Druitt Street Balcony on Level 2 of 150 Day Street approximately 4m from the onramp kerb	70 $L_{eq(15min)}$	-
Bathurst Street approximately 3m from the kerb	71 $L_{eq(15min)}$	-
Harbour Street approximately 3m from the kerb	75 $L_{eq(15min)}$	-

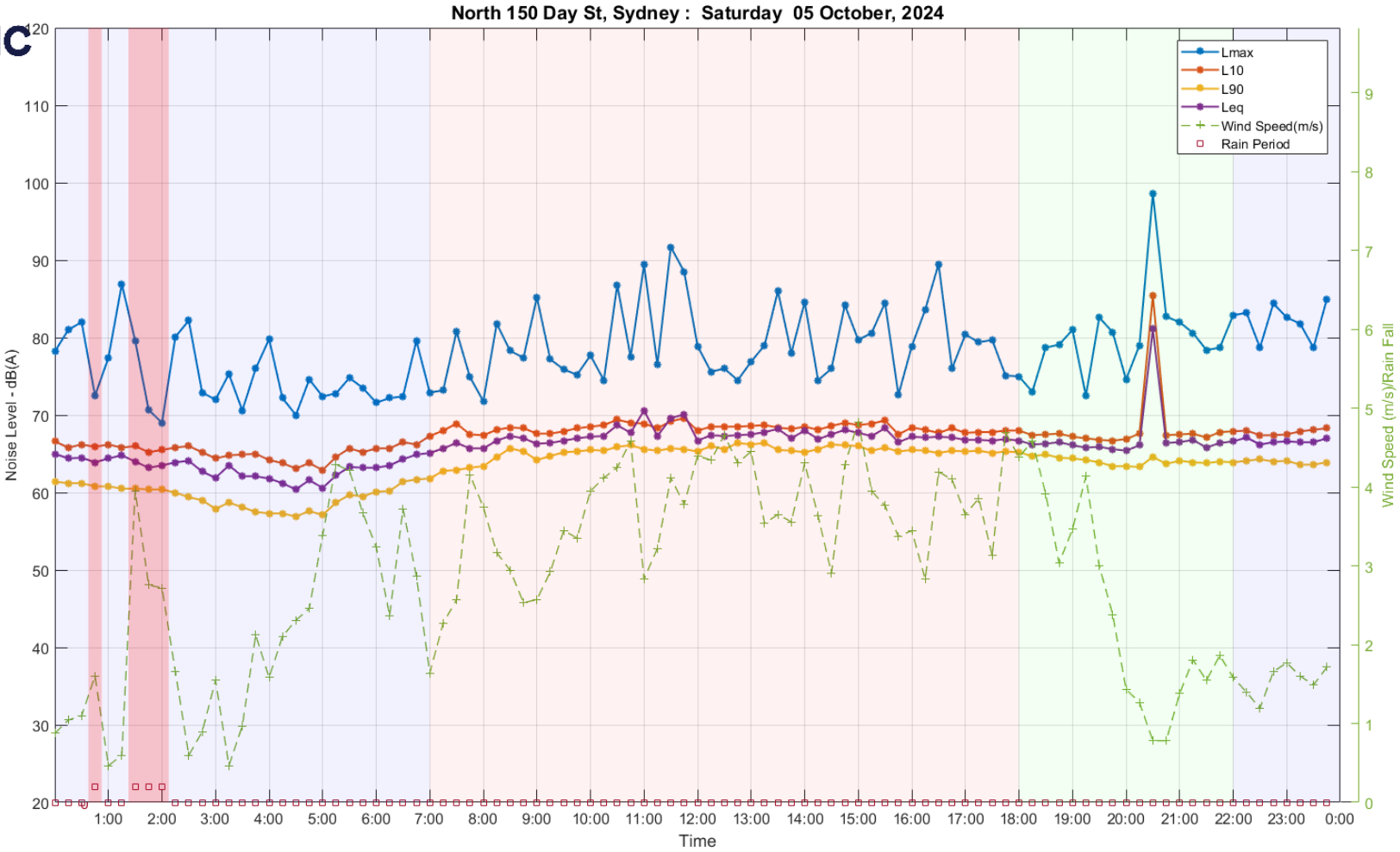
It is noted that all unattended noise monitors were affected by local mechanical plant, therefore façade noise levels were calibrated to the attended measurements conducted at ground level around the site. Day night noise level differences from the unattended noise monitoring were used to predict night time façade noise levels.

A.6 UNATTENDED MONITORING DATA GRAPHS

A.6.1 NORTHERN FAÇADE



1024


North 150 Day St, Sydney : Saturday 05 October, 2024
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
9
8
7
6
5
4
3
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1
0
1:00
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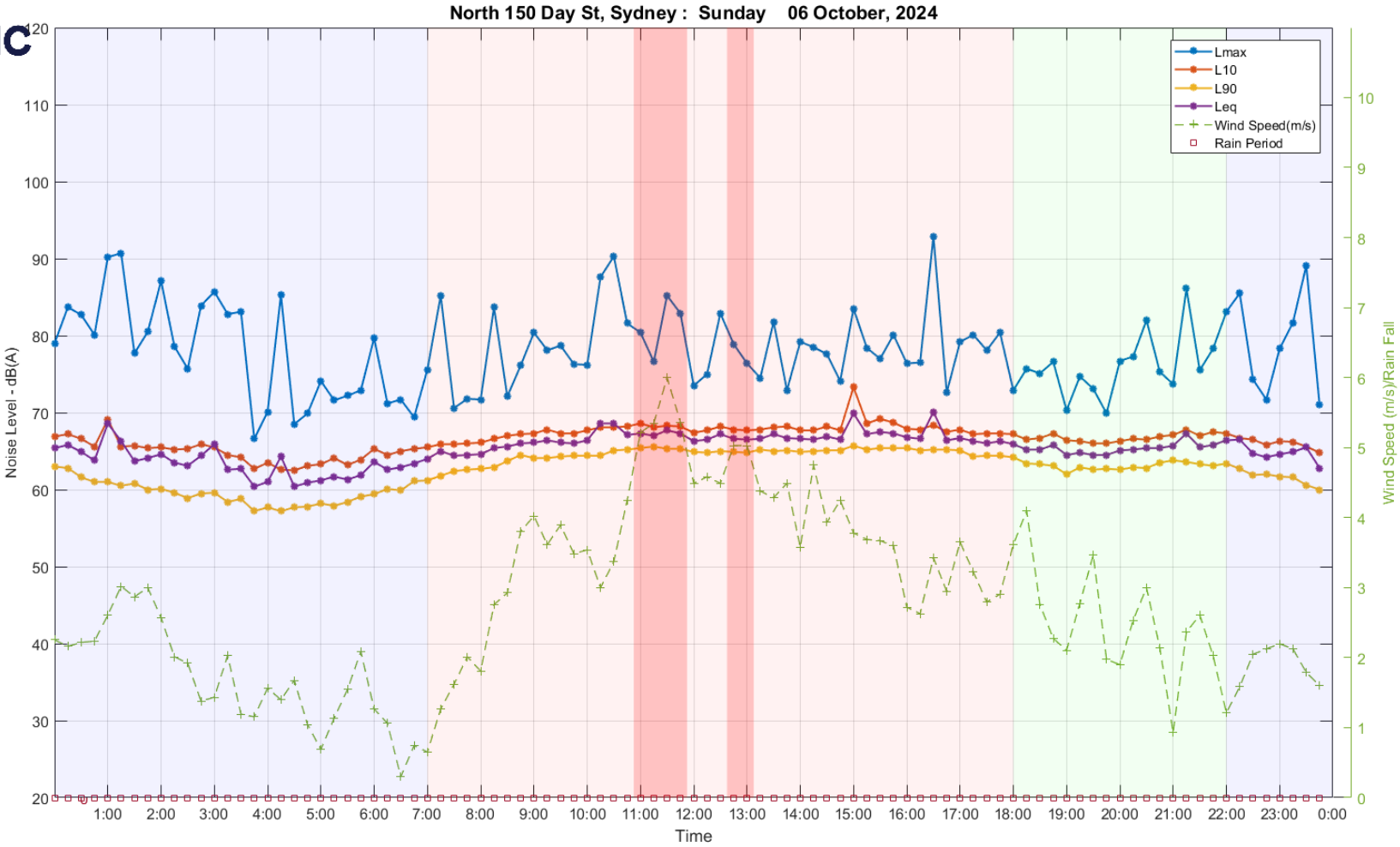
1025


North 150 Day St, Sydney : Sunday 06 October, 2024
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
10
9
8
7
6
5
4
3
2
1
0
1:00
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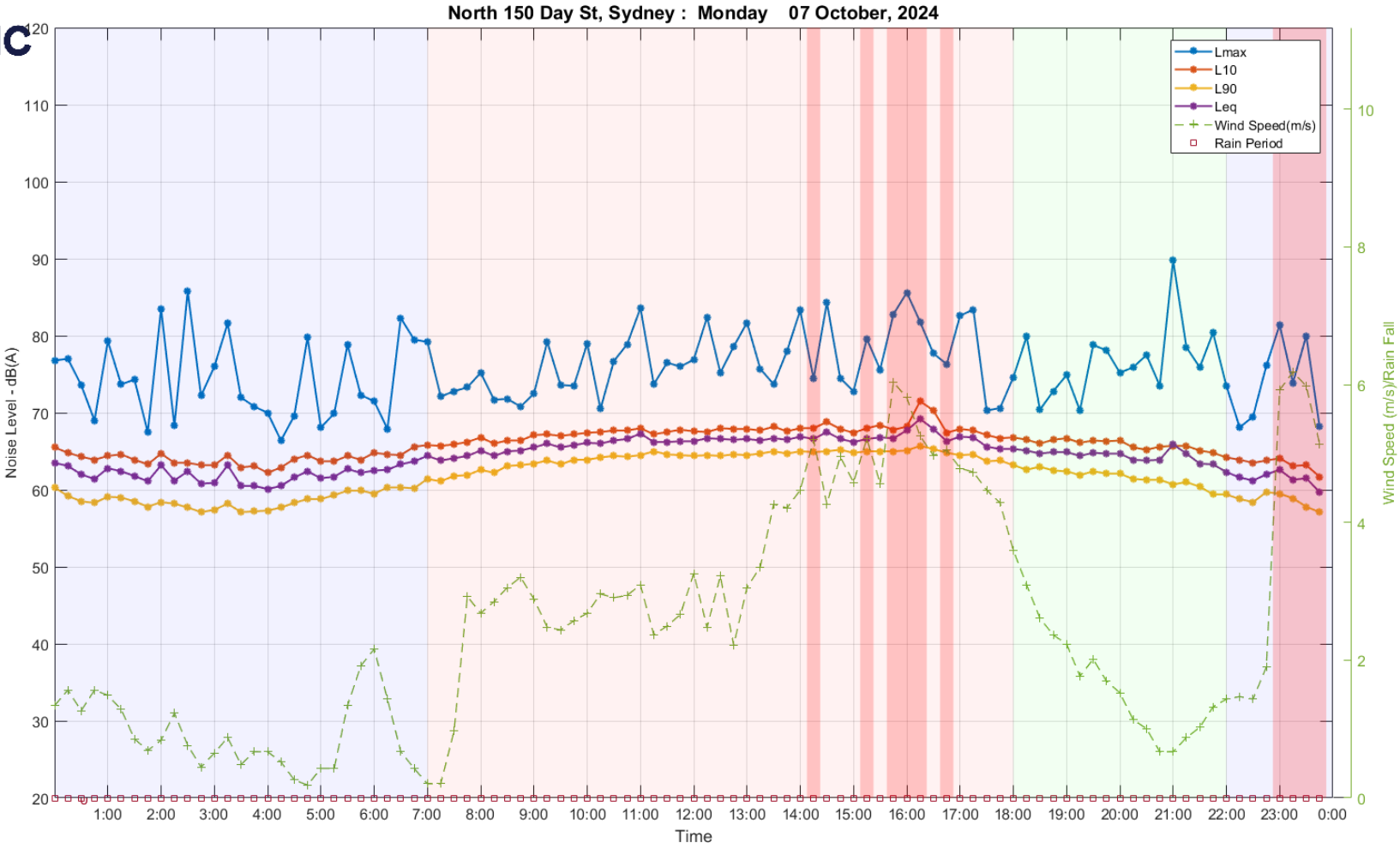
1027


North 150 Day St, Sydney : Monday 07 October, 2024
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
10
8
6
4
2
0
1:00
2:00
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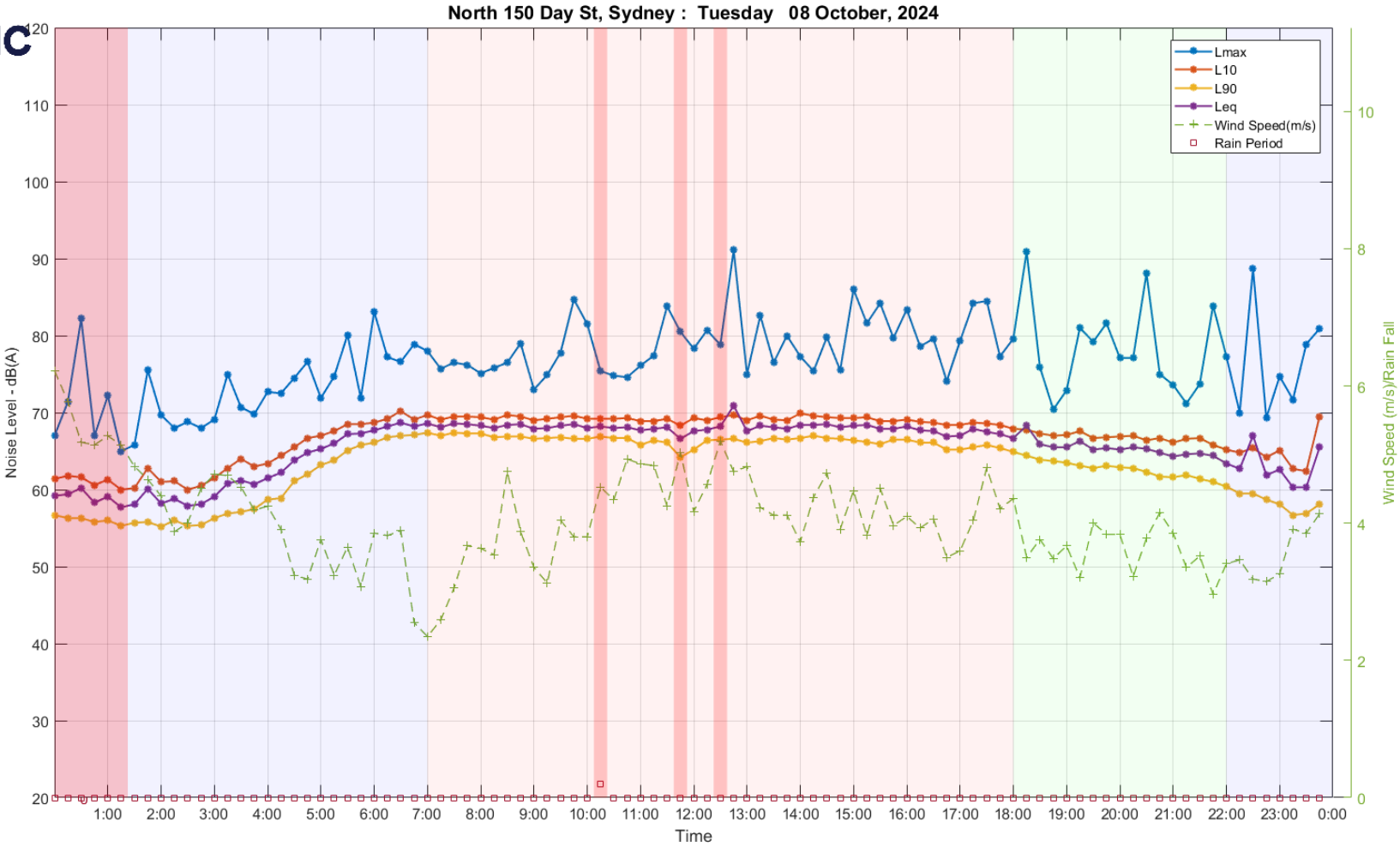
23:00
0:00


North 150 Day St, Sydney : Tuesday 08 October, 2024
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
10
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1:00
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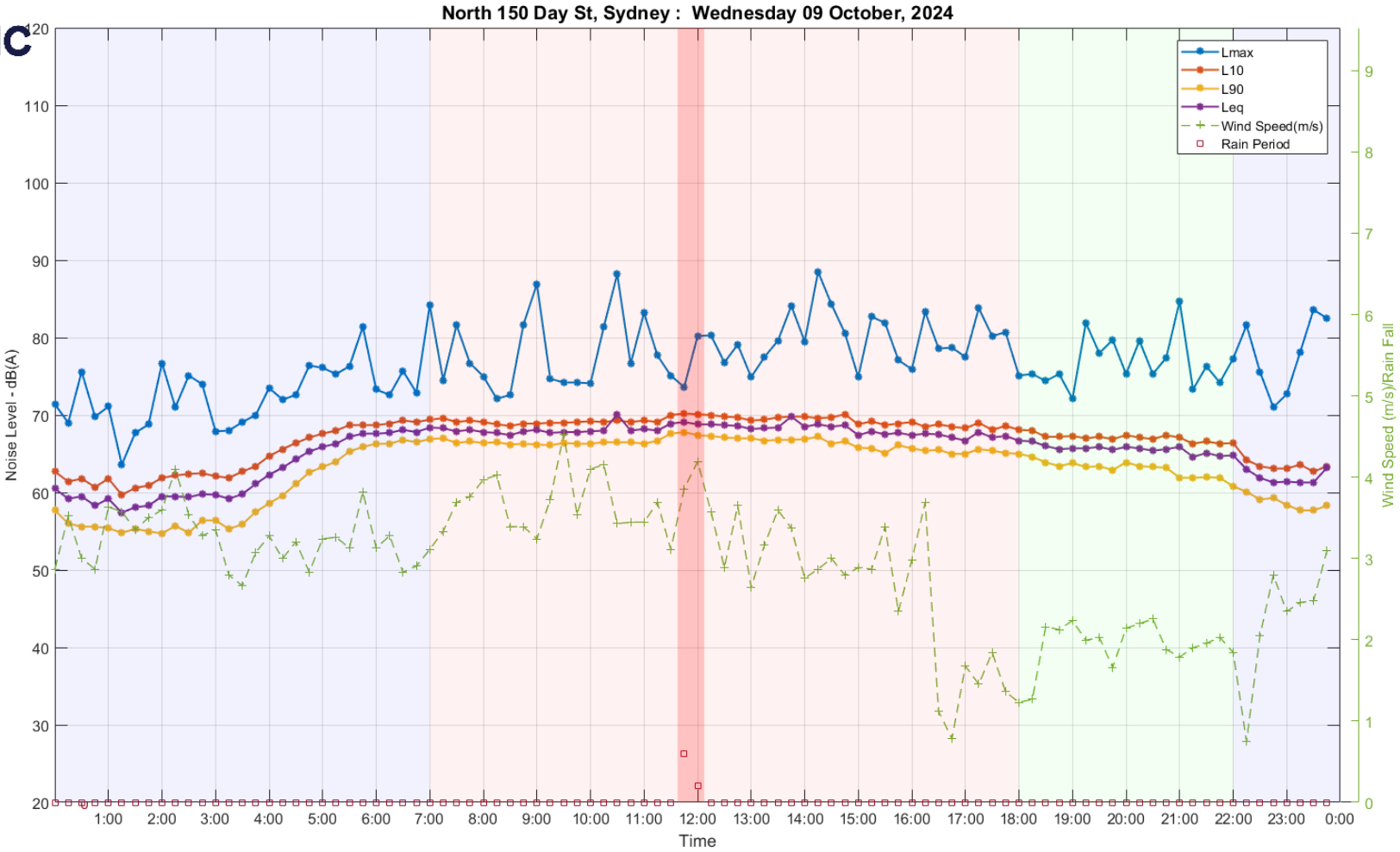
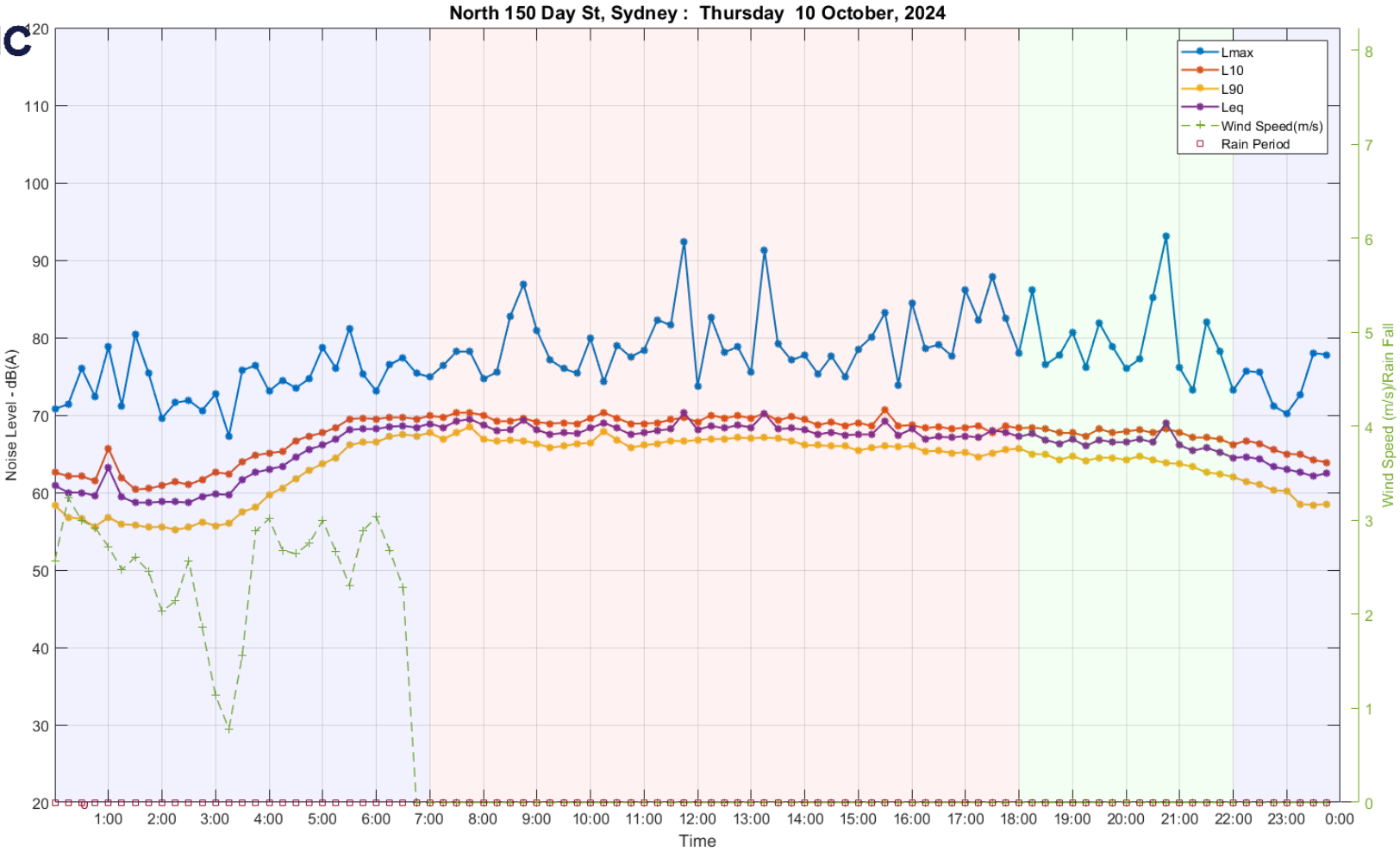
23:00
0:00

1028

ACOUSTIC LOGIC

1029




North 150 Day St, Sydney : Thursday 10 October, 2024
Lmax
L10
L90
Leq
Wind Speed(m/s)
Rain Period
Noise Level - dB(A)
Wind Speed (m/s)/Rain Fall
Time
120
110
100
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80
70
60
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1:00
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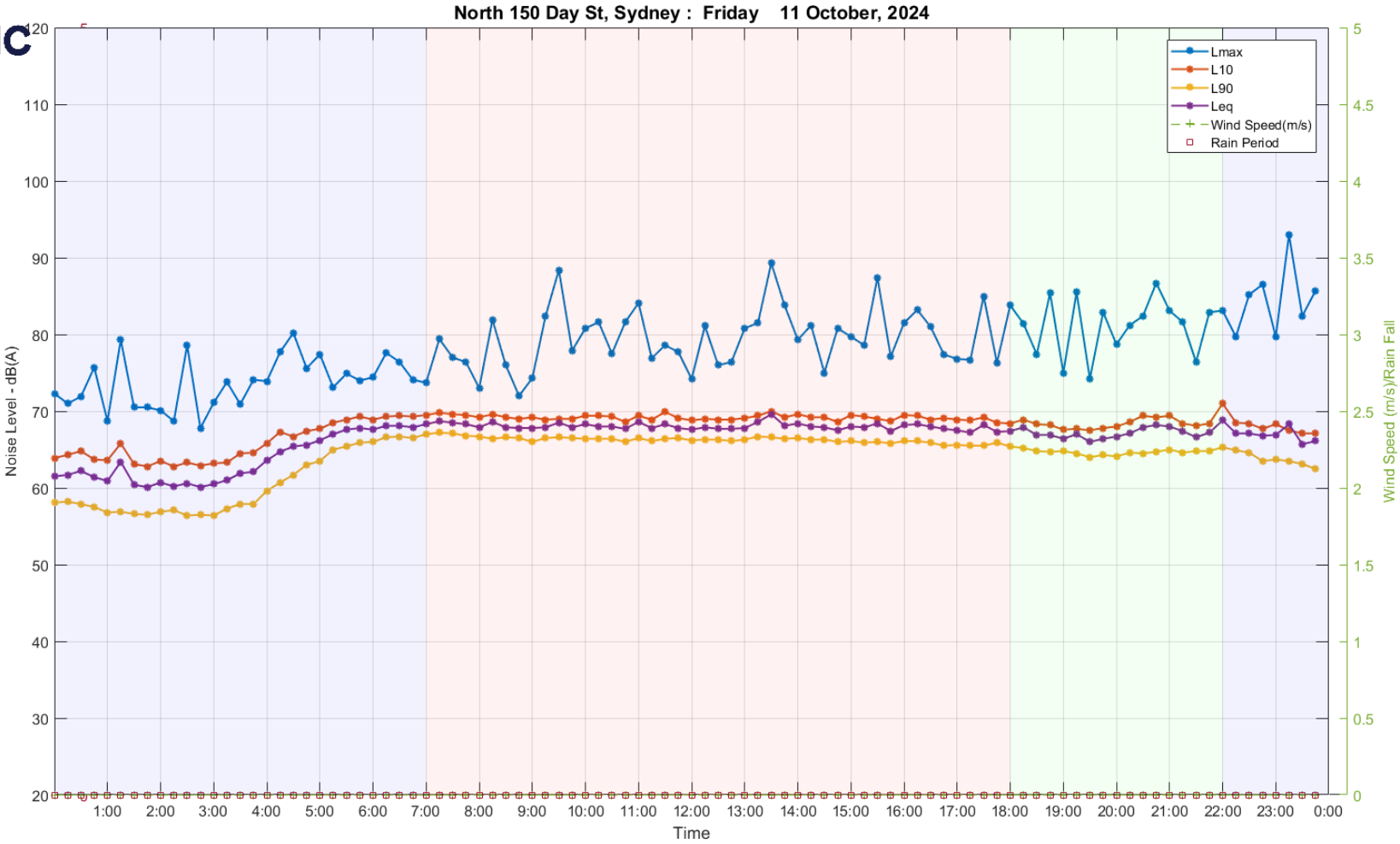
1030


North 150 Day St, Sydney : Friday 11 October, 2024
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
5
4.5
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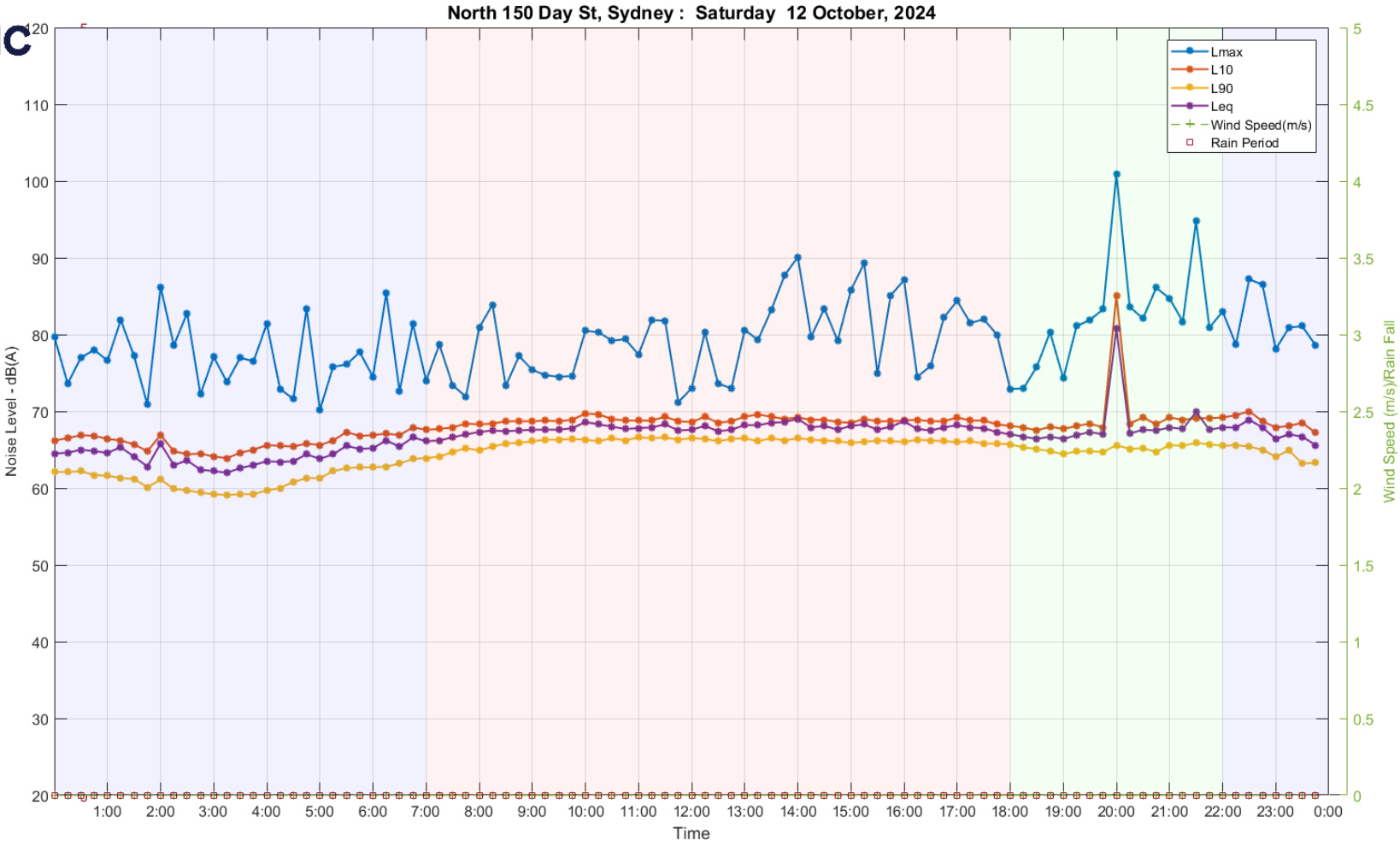
1031

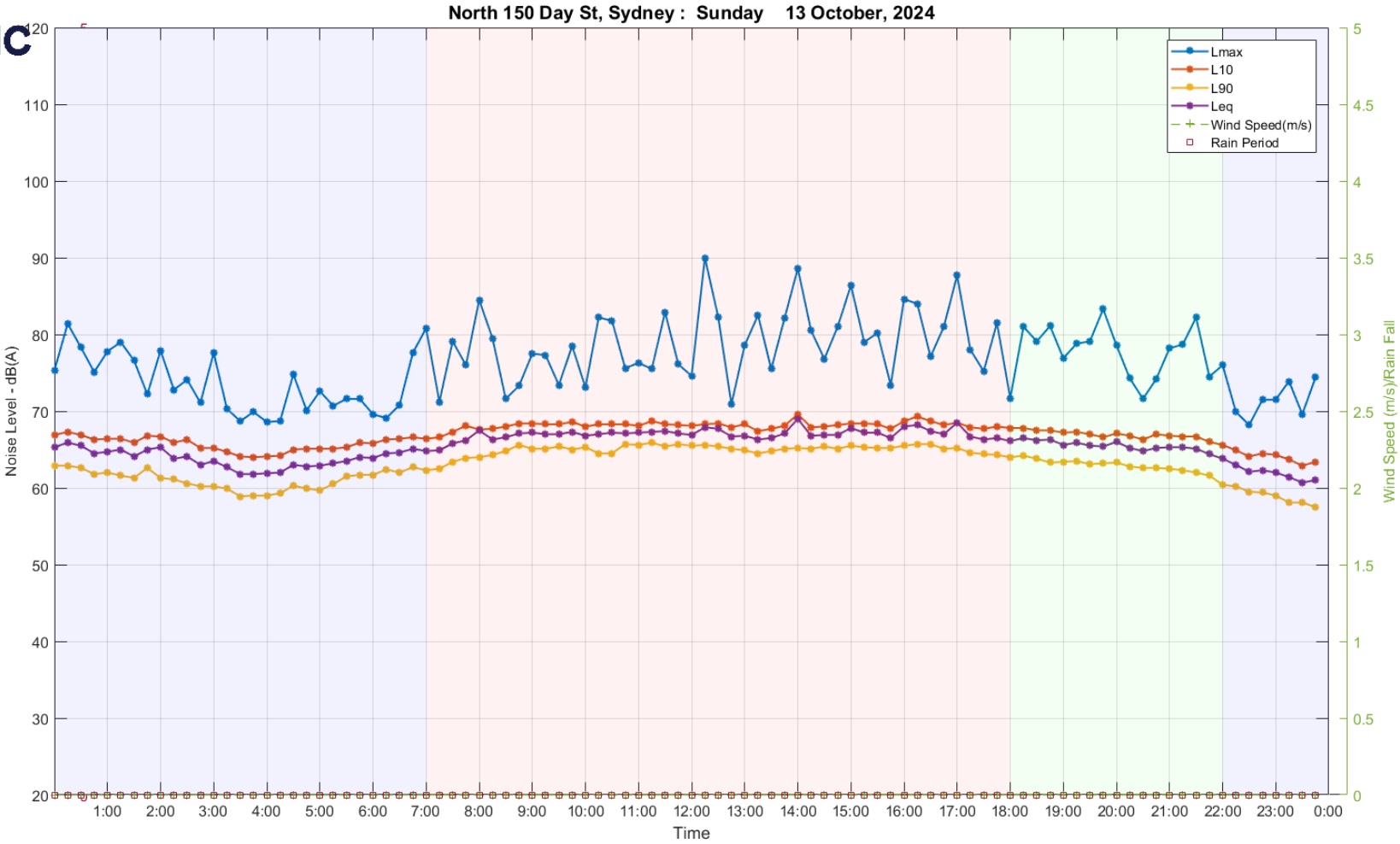
ACOUSTIC LOGIC

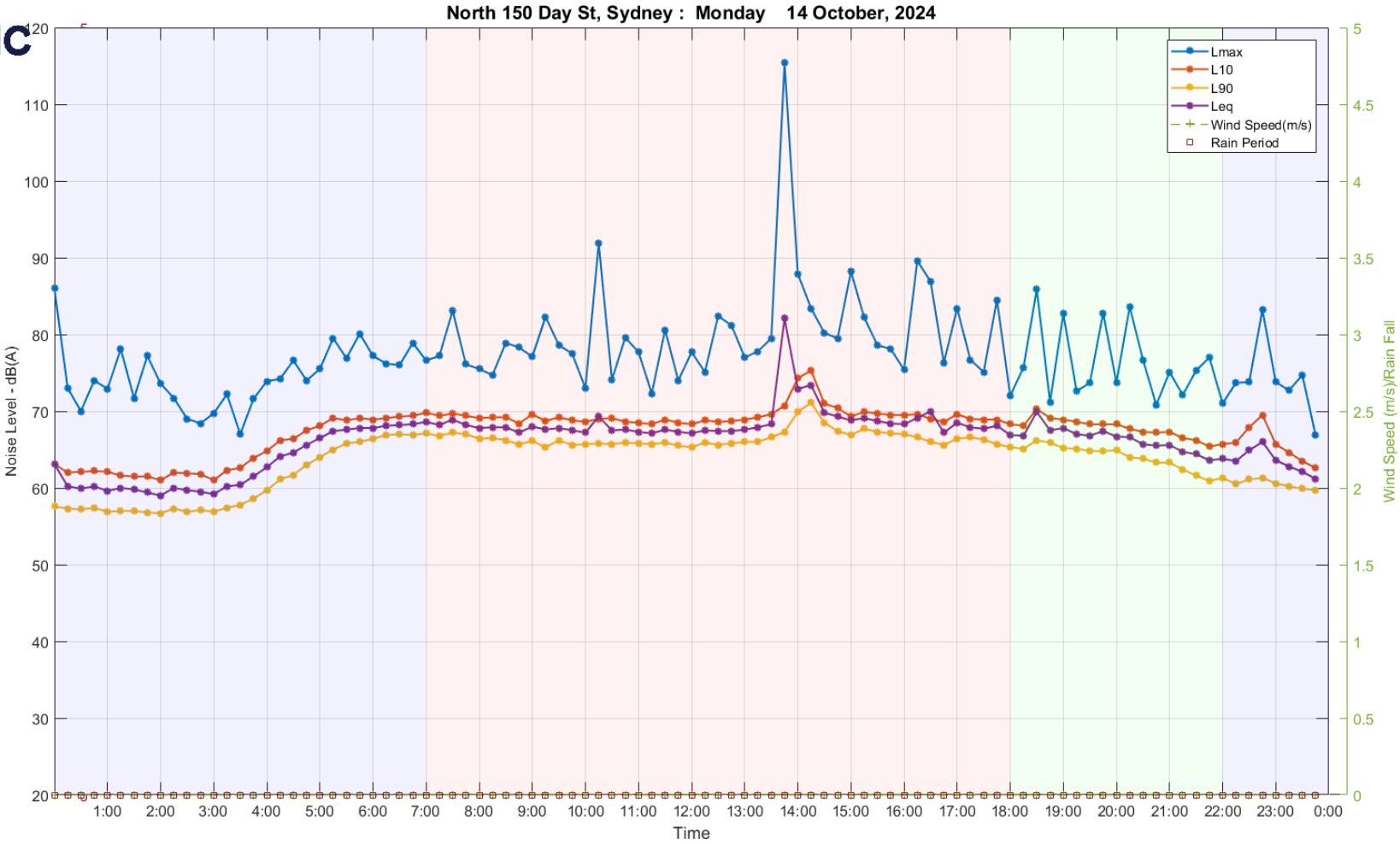
1032



ACOUSTIC LOGIC

1033




North 150 Day St, Sydney : Monday 14 October, 2024
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
5
4.5
4
3.5
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2.5
2
1.5
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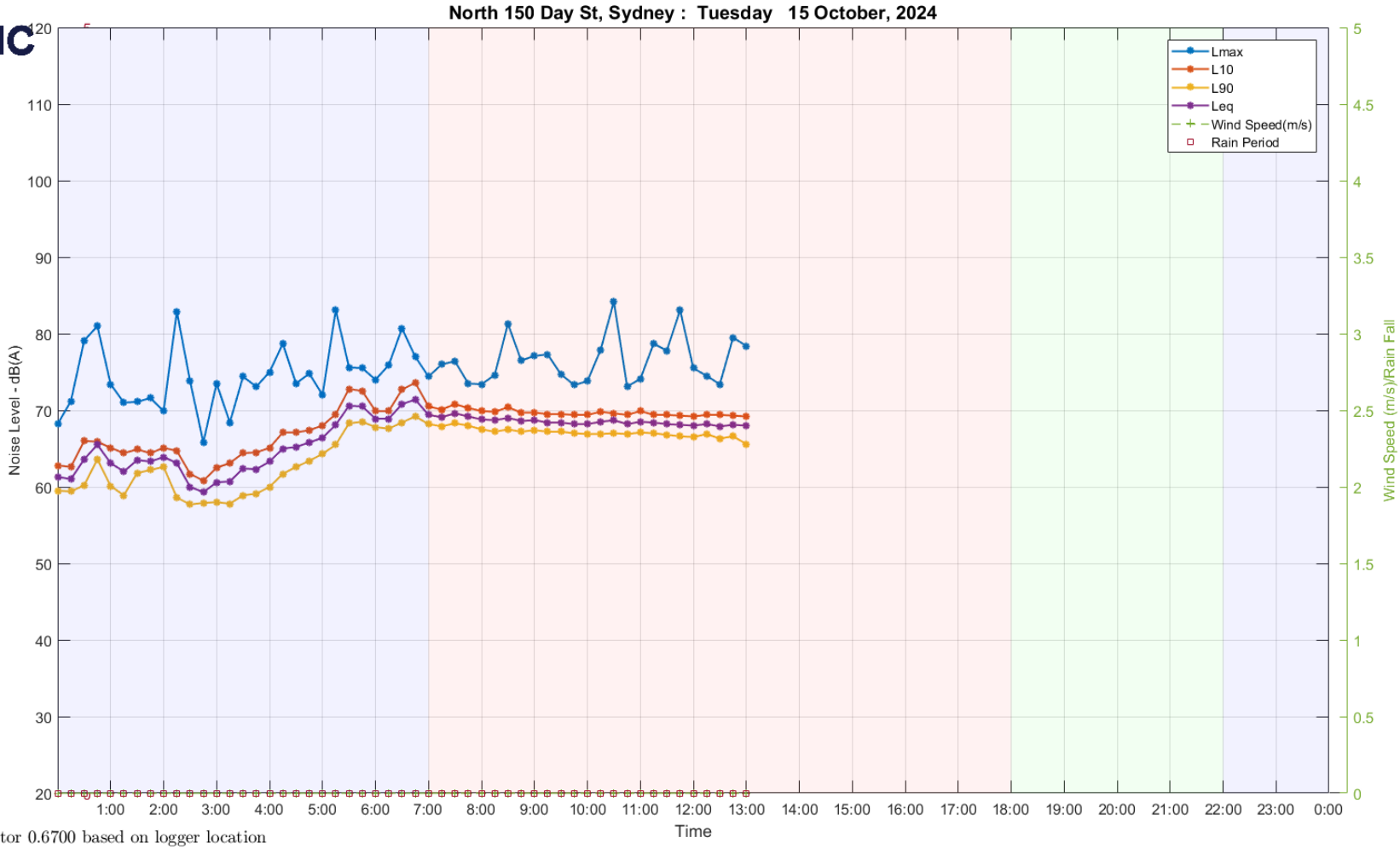
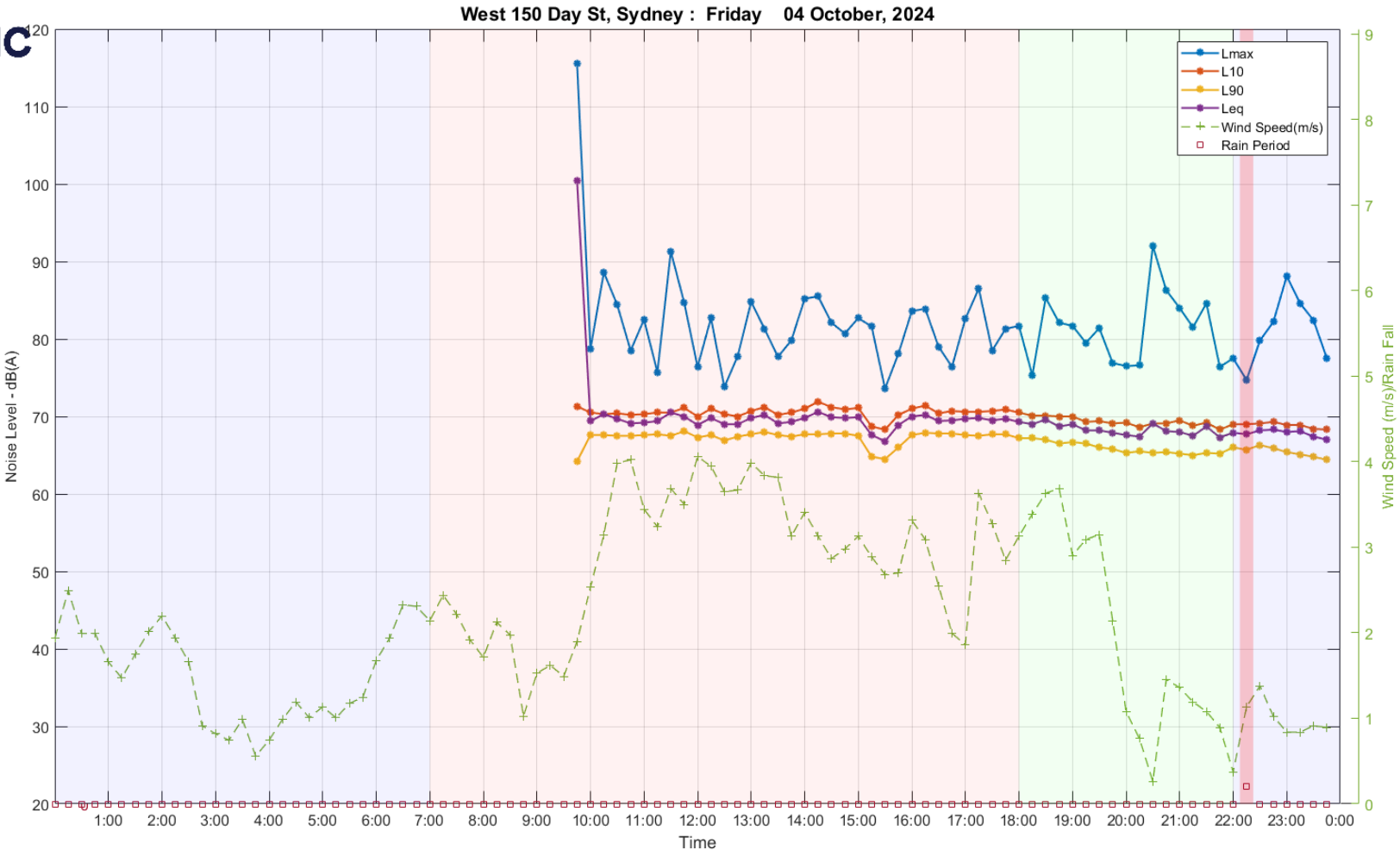
1035



Wind Speed is corrected using factor 0.6700 based on logger location

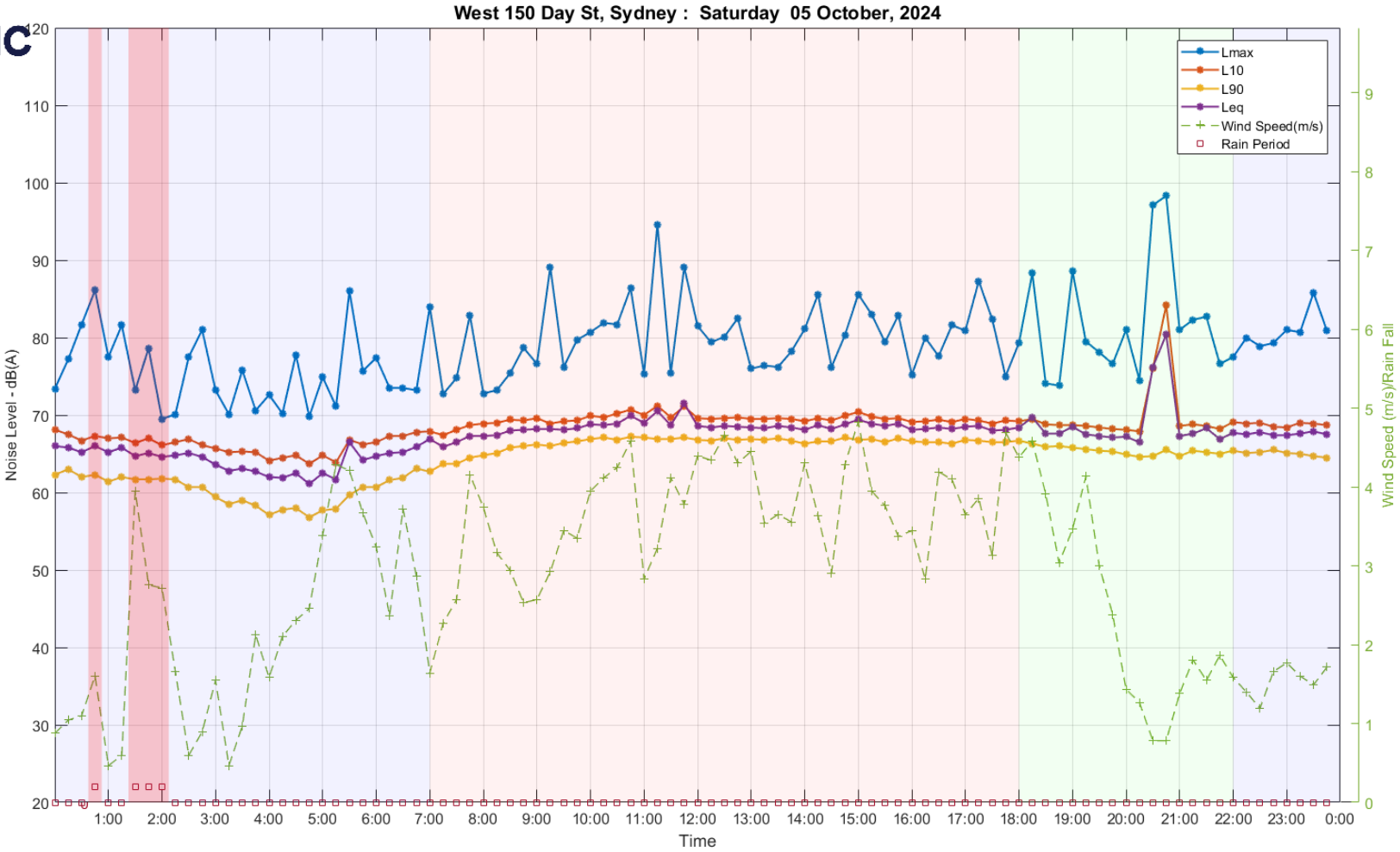
A.6.2 WESTERN FAÇADE

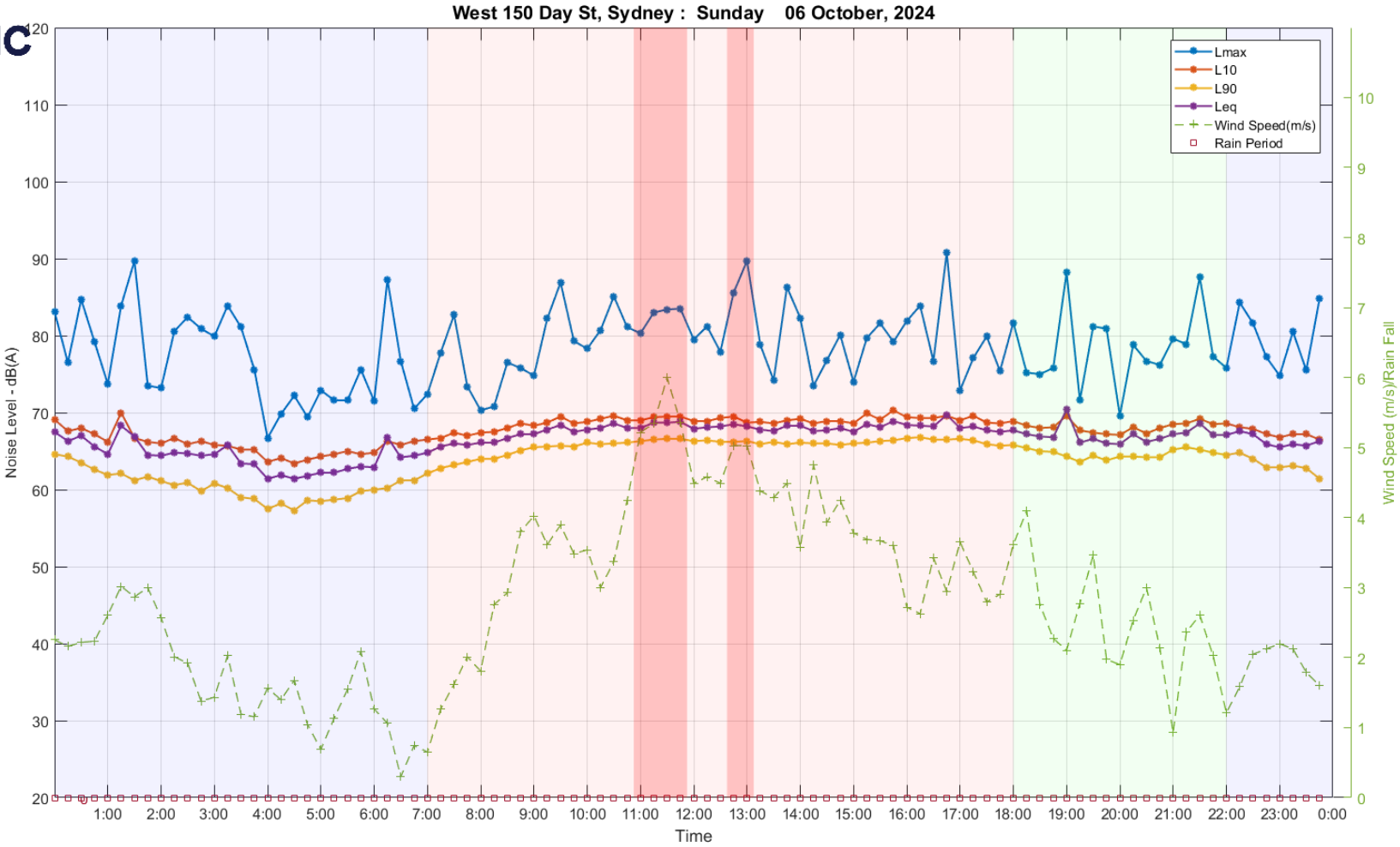


1036

ACOUSTIC LOGIC

1037




West 150 Day St, Sydney : Sunday 06 October, 2024
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
10
9
8
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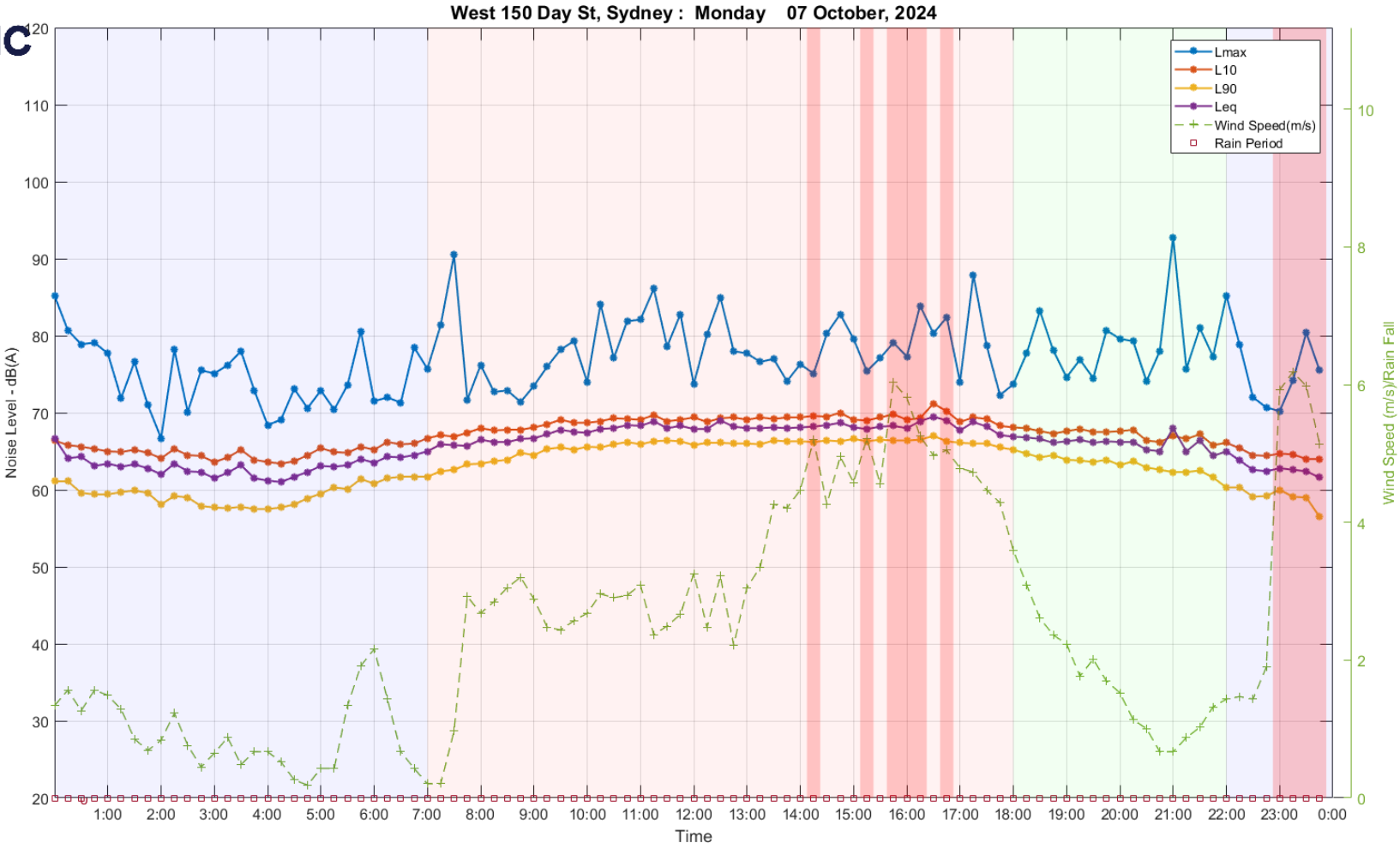
1038

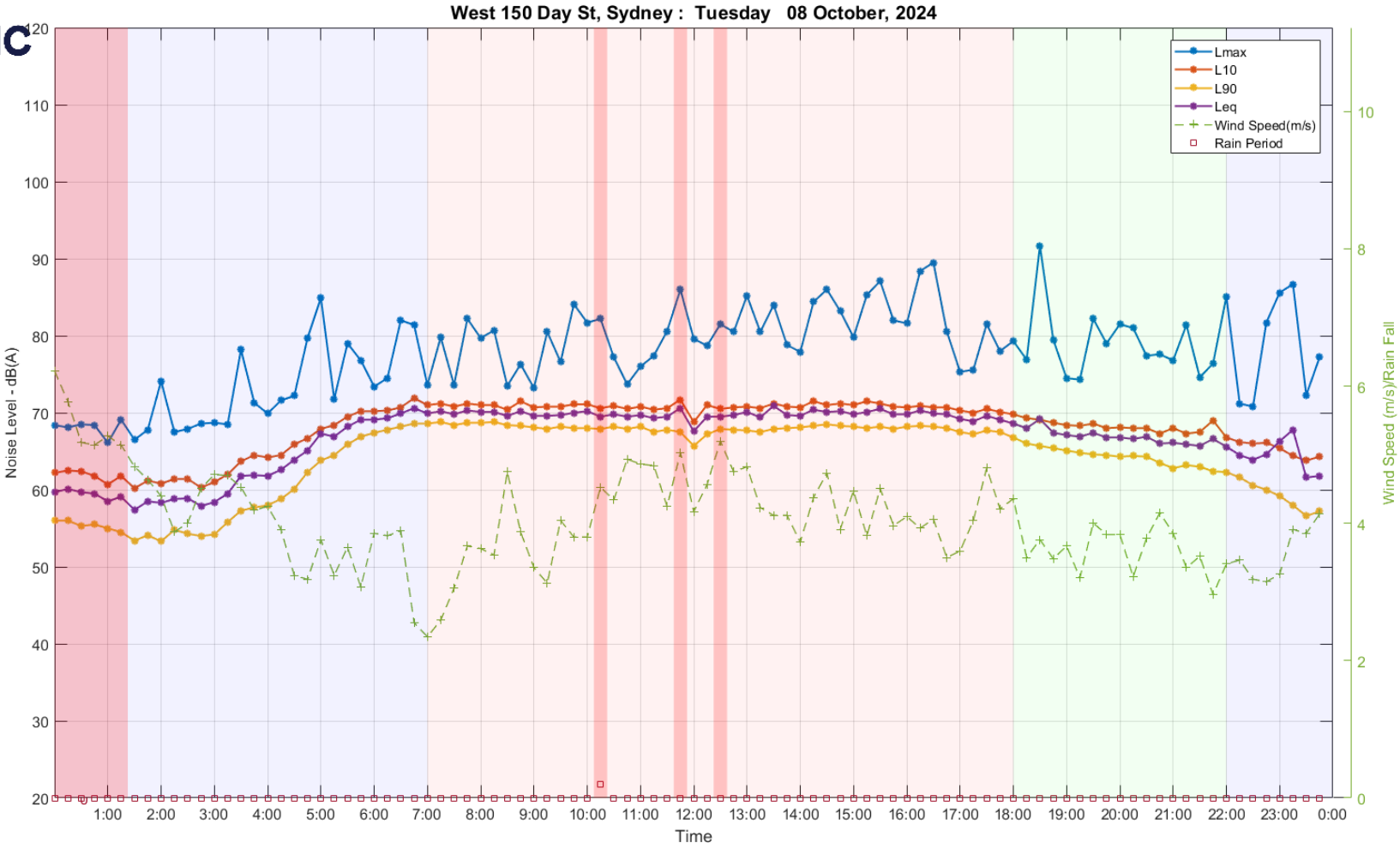
ACOUSTIC LOGIC

1039



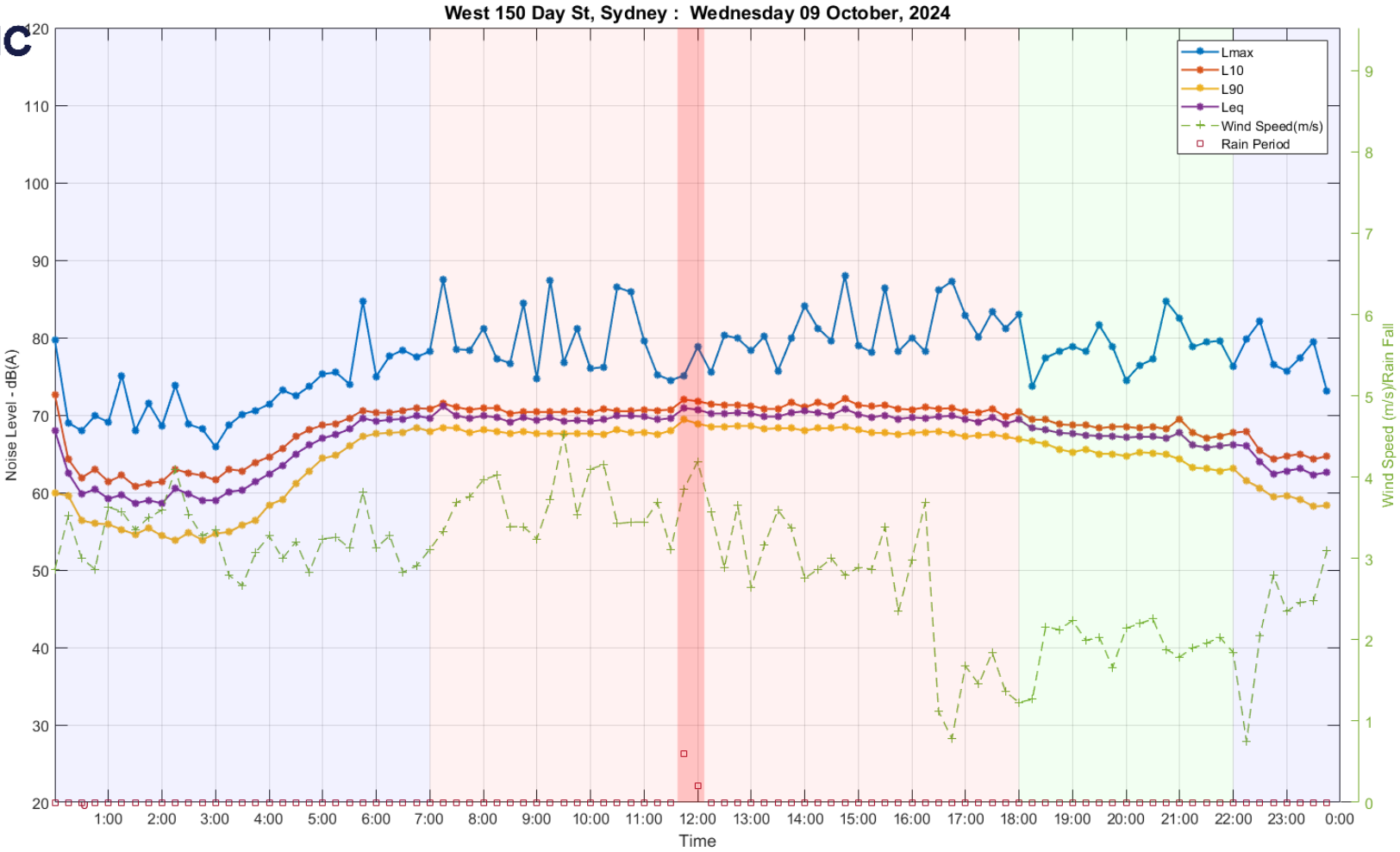
ACOUSTIC LOGIC

1040



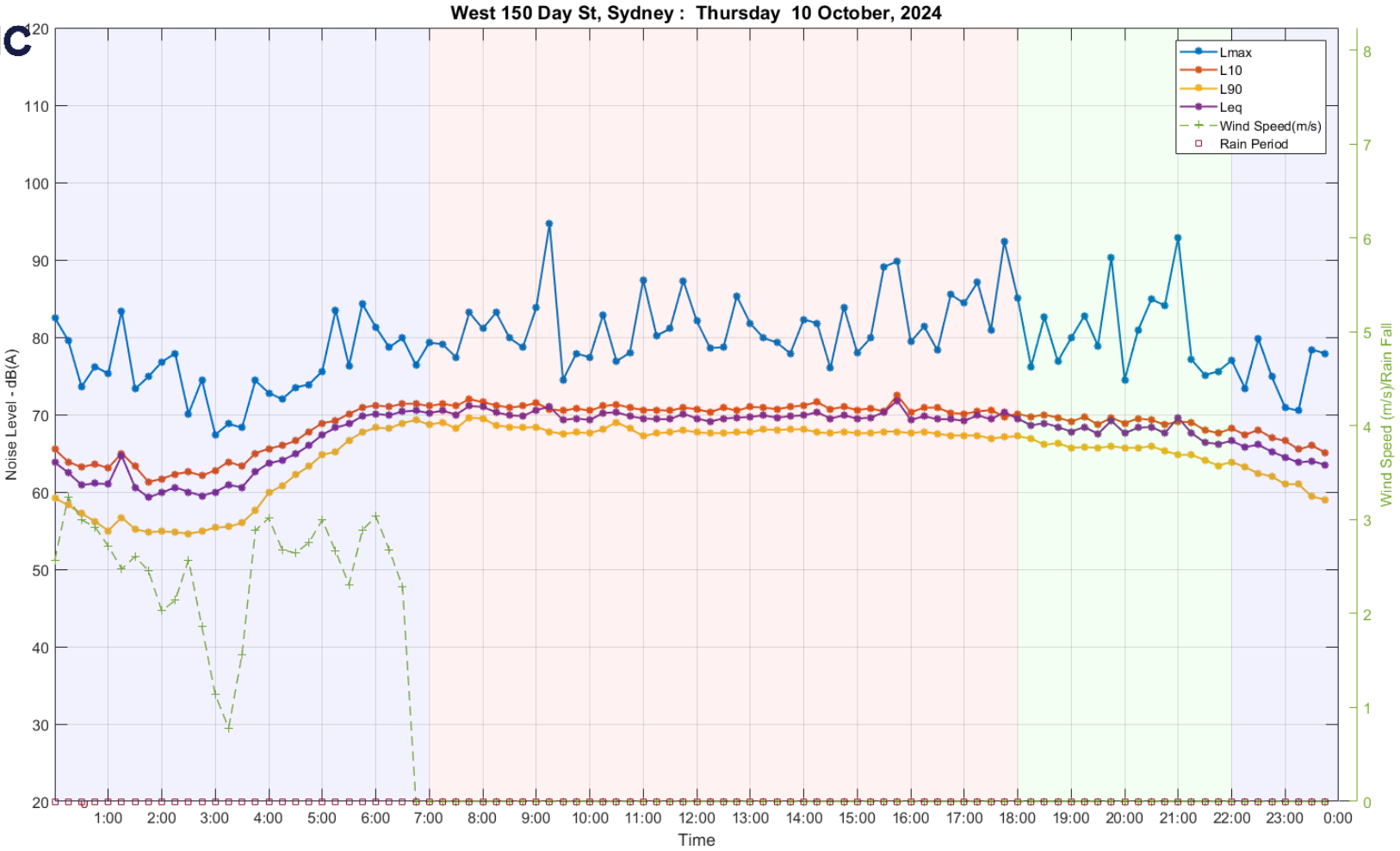
ACOUSTIC LOGIC

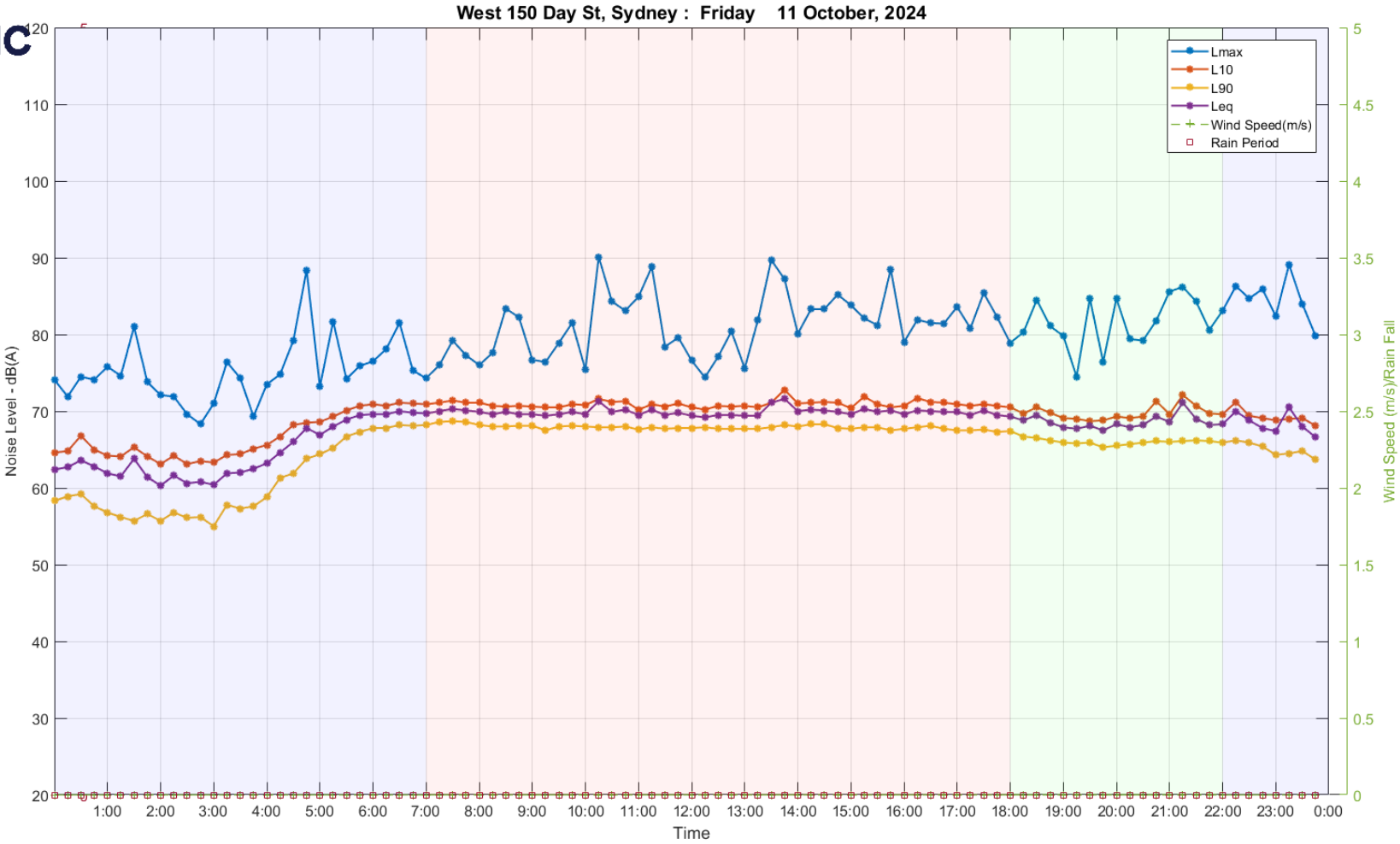
1041



ACOUSTIC LOGIC

1042




West 150 Day St, Sydney : Friday 11 October, 2024
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
5
4.5
4
3.5
3
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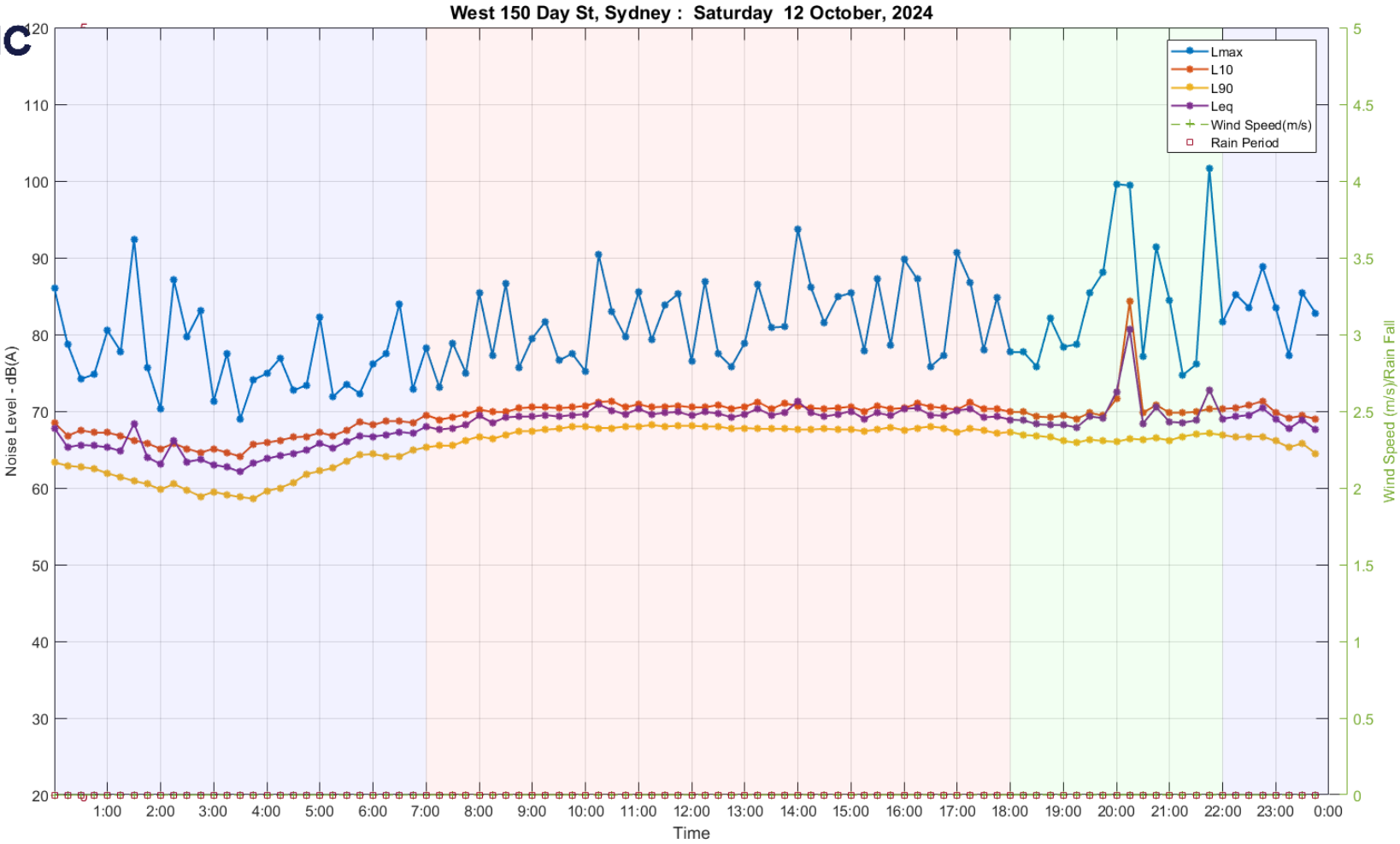
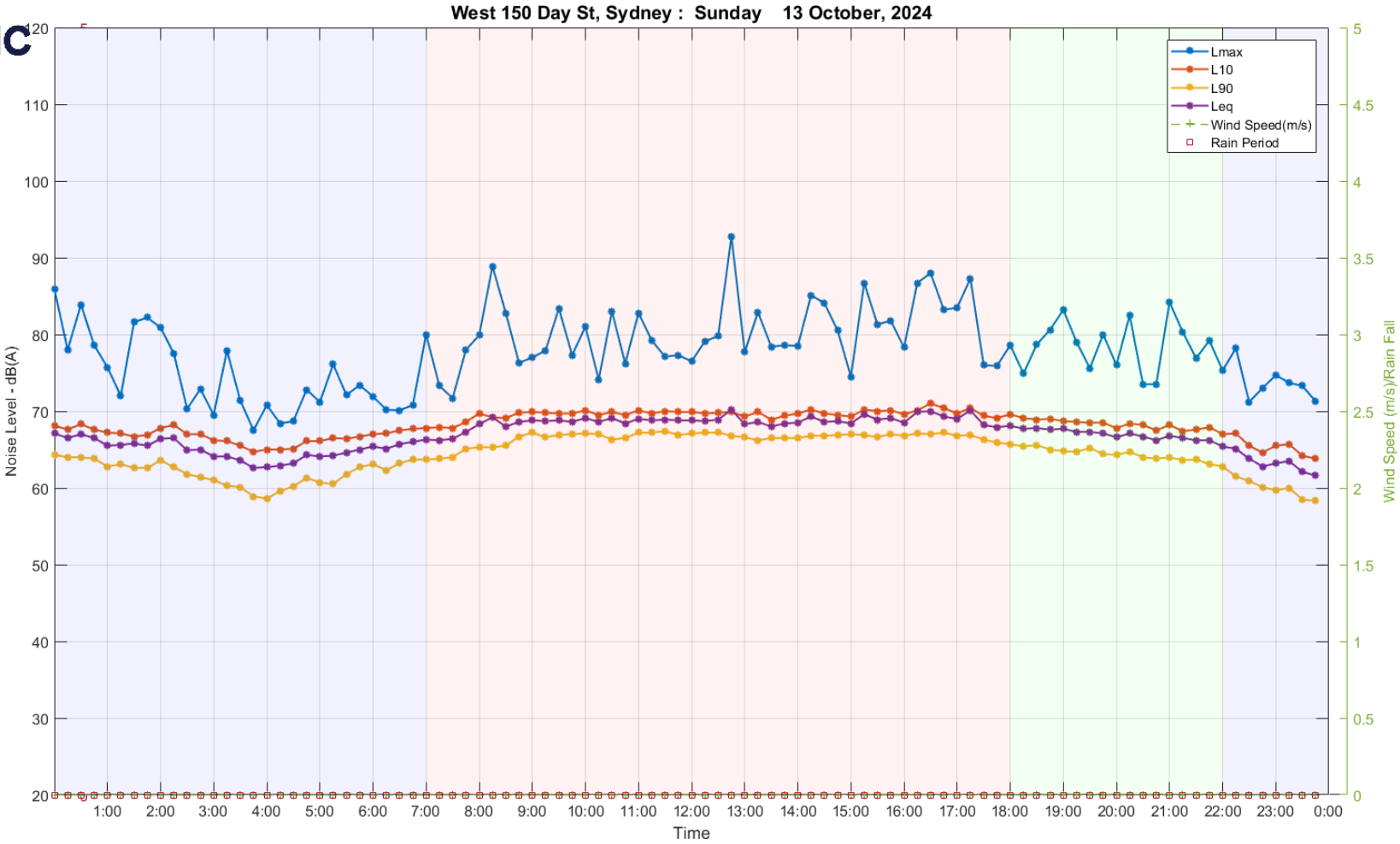
1043

ACOUSTIC LOGIC

1044




West 150 Day St, Sydney : Sunday 13 October, 2024
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
5
4.5
4
3.5
3
2.5
2
1.5
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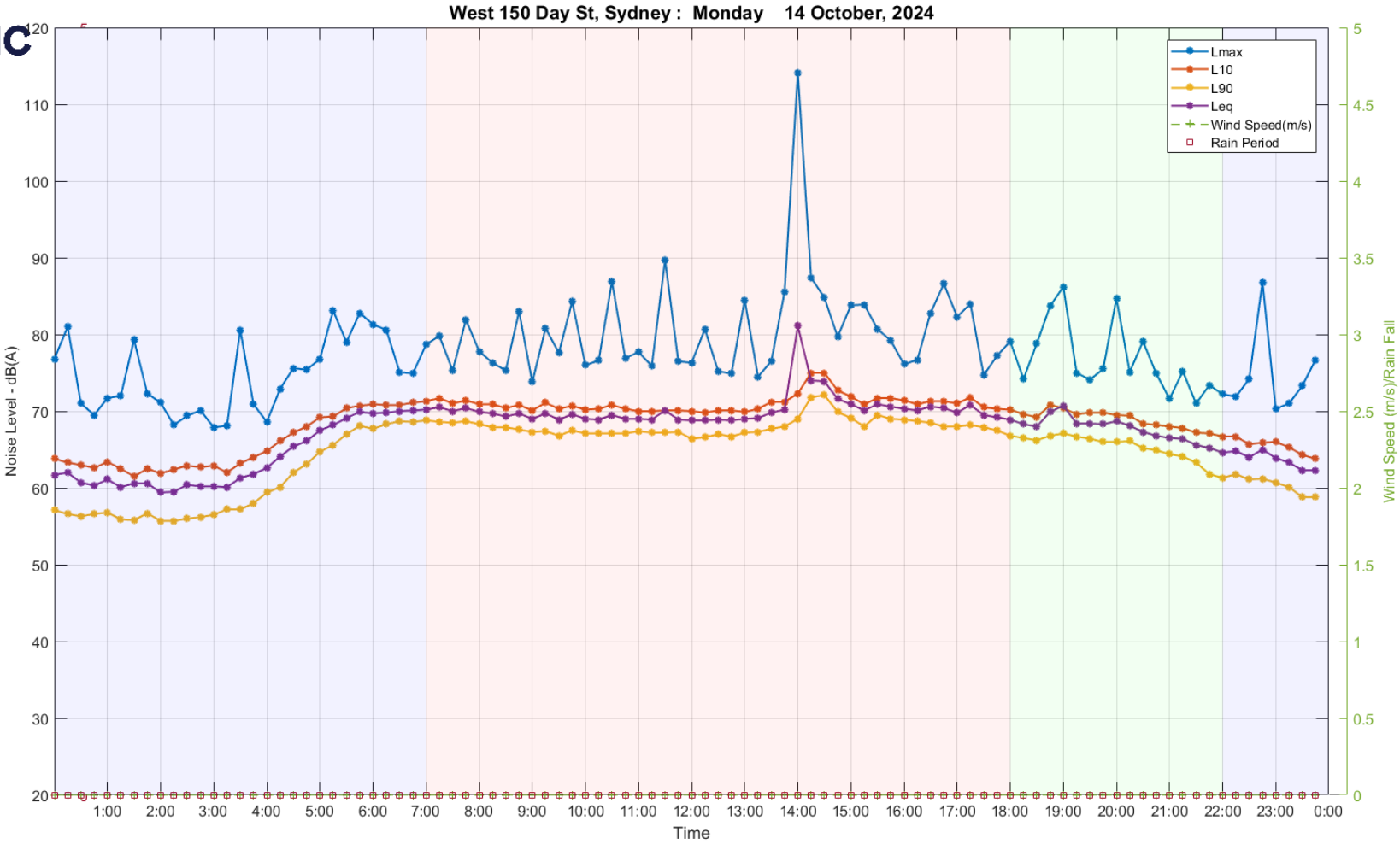
1045


West 150 Day St, Sydney : Monday 14 October, 2024
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
5
4.5
4
3.5
3
2.5
2
1.5
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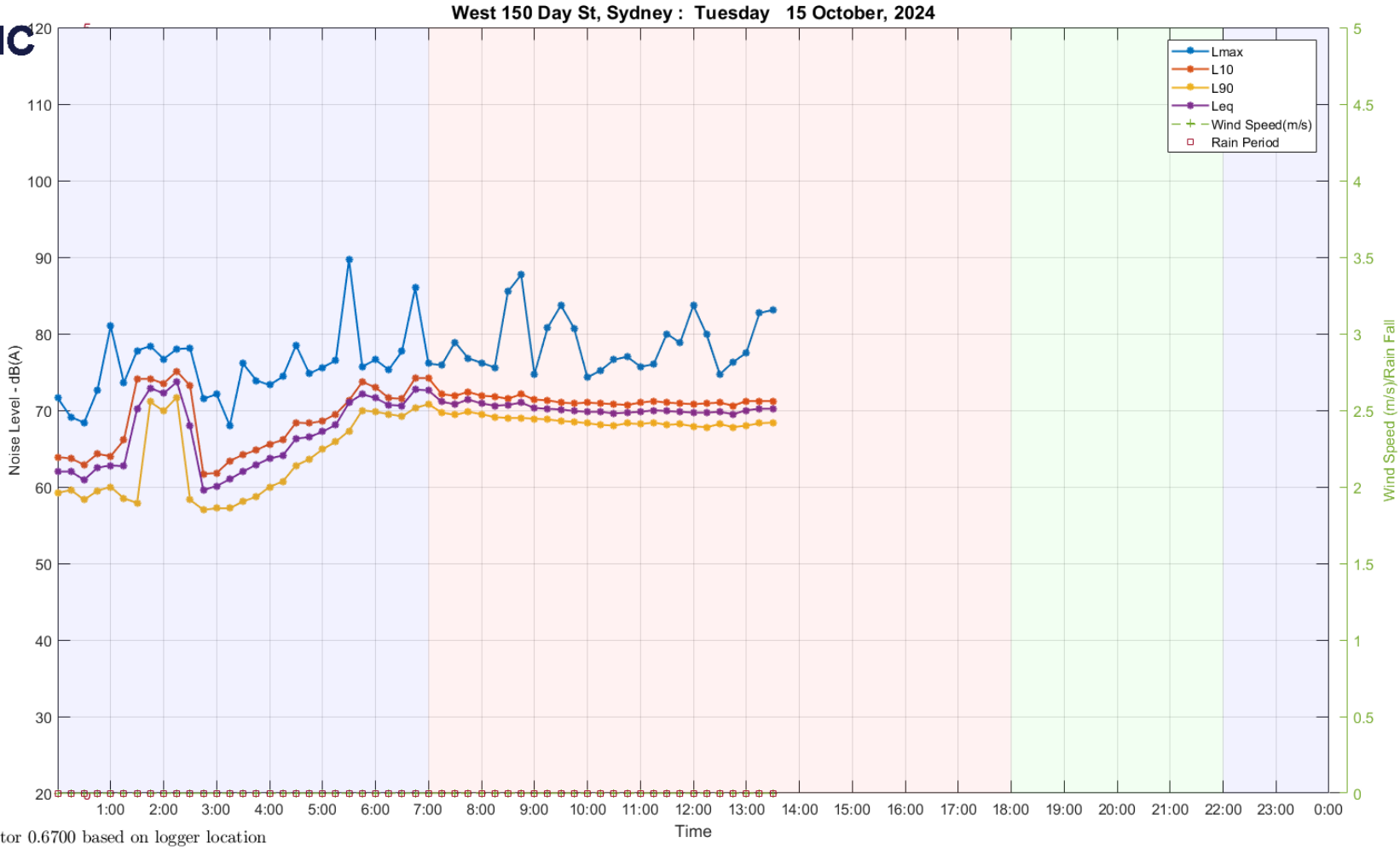
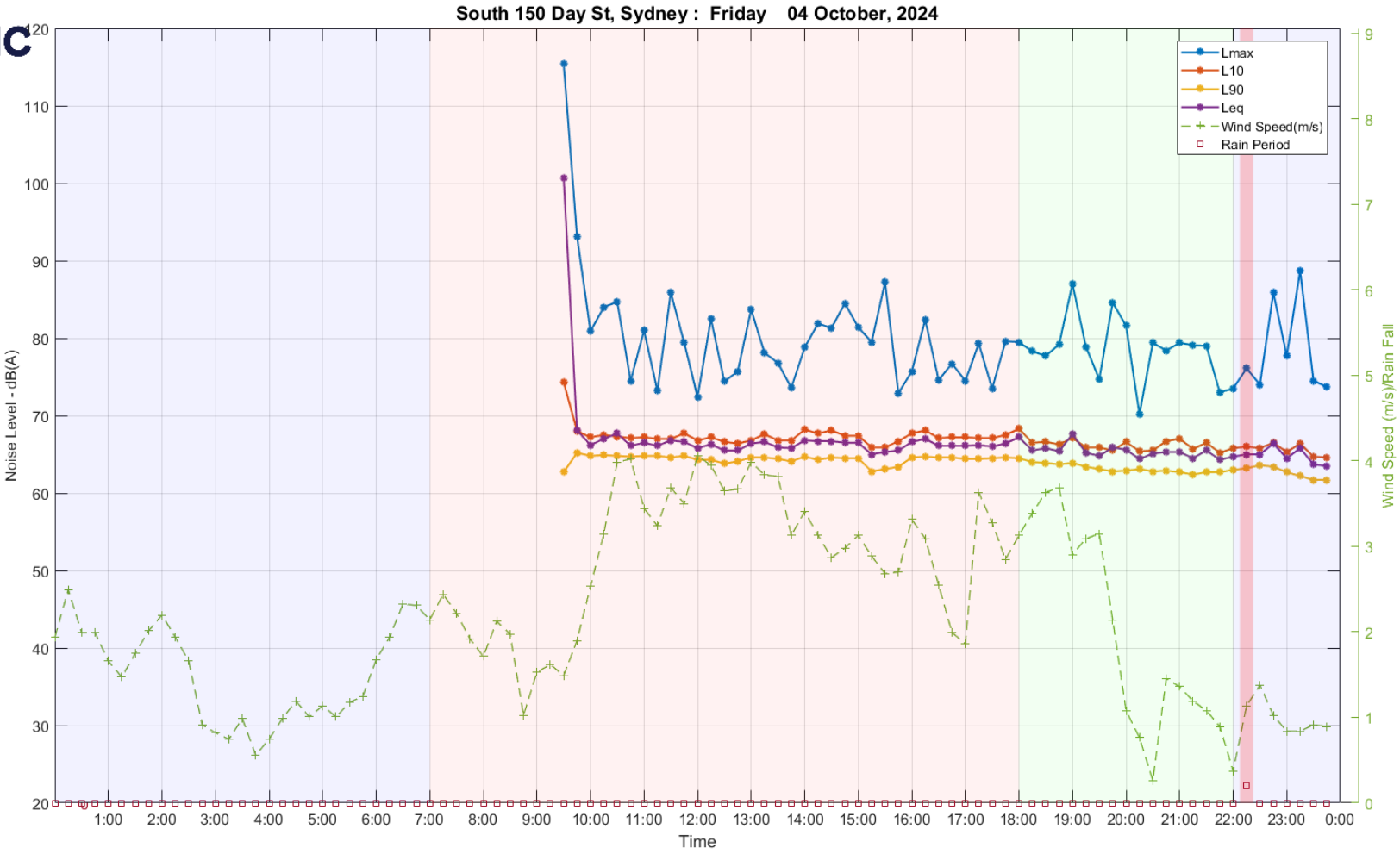
1046



Wind Speed is corrected using factor 0.6700 based on logger location

1047

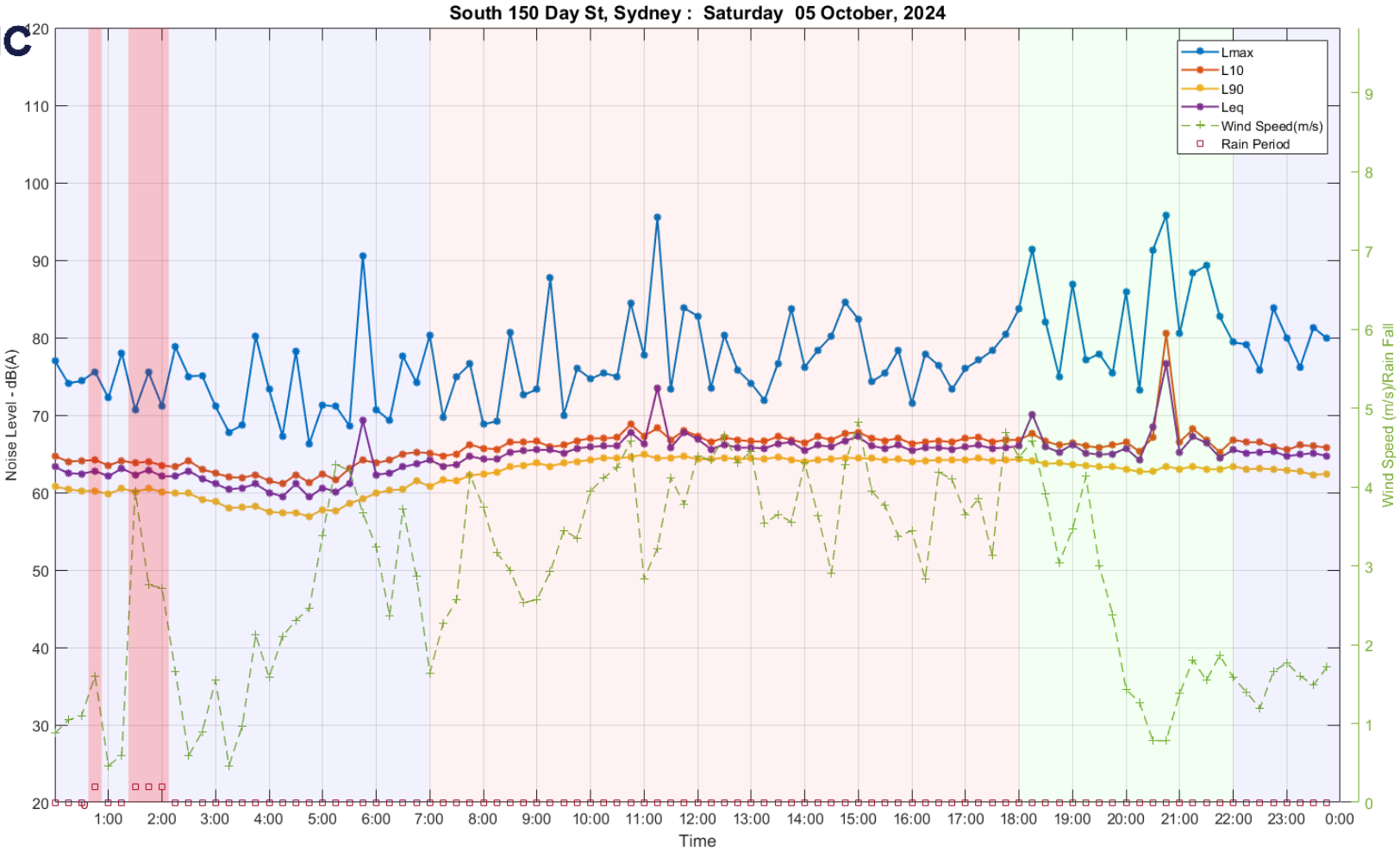
A.6.3 SOUTHERN FAÇADE

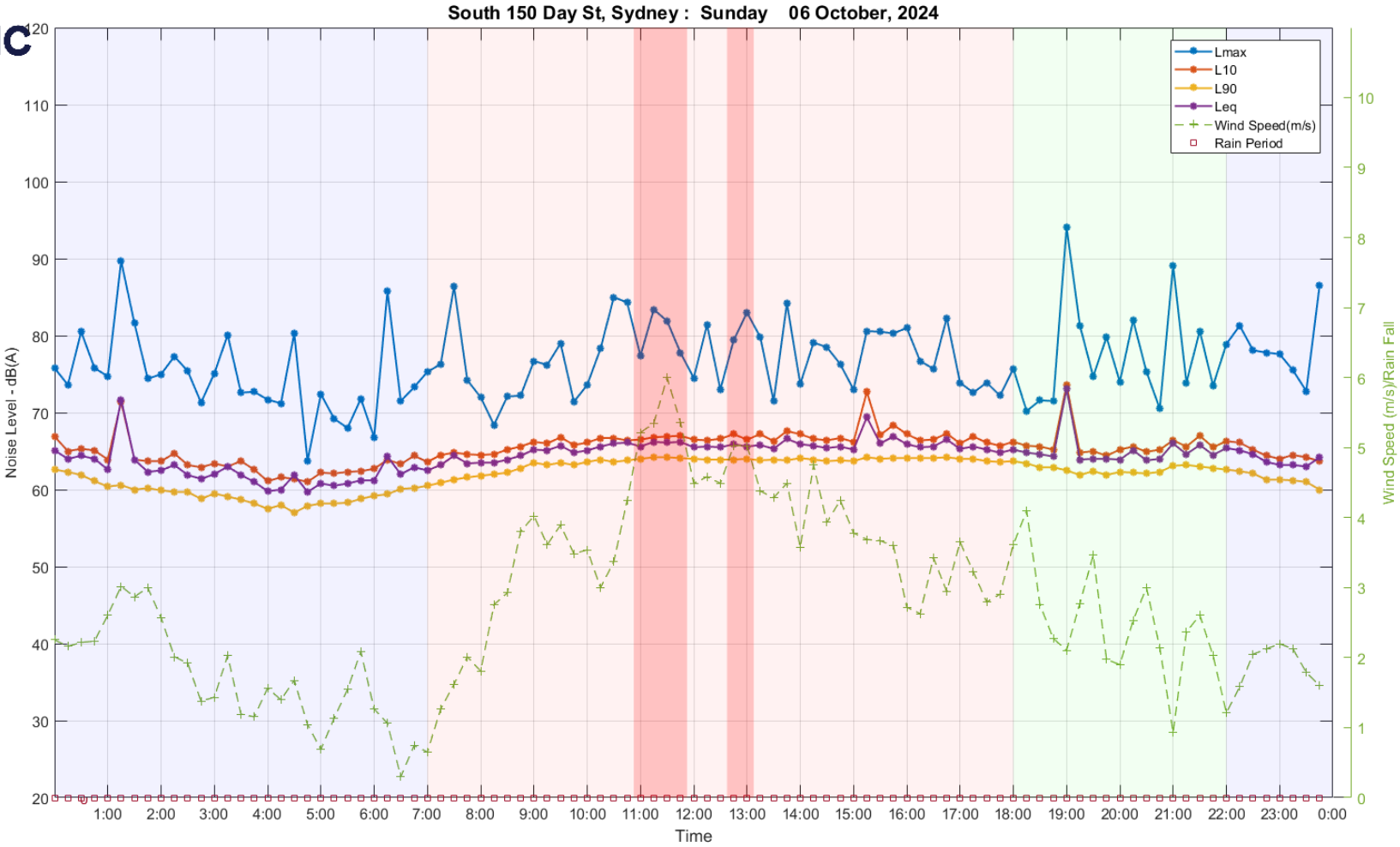


1048

ACOUSTIC LOGIC

1049




South 150 Day St, Sydney : Sunday 06 October, 2024
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
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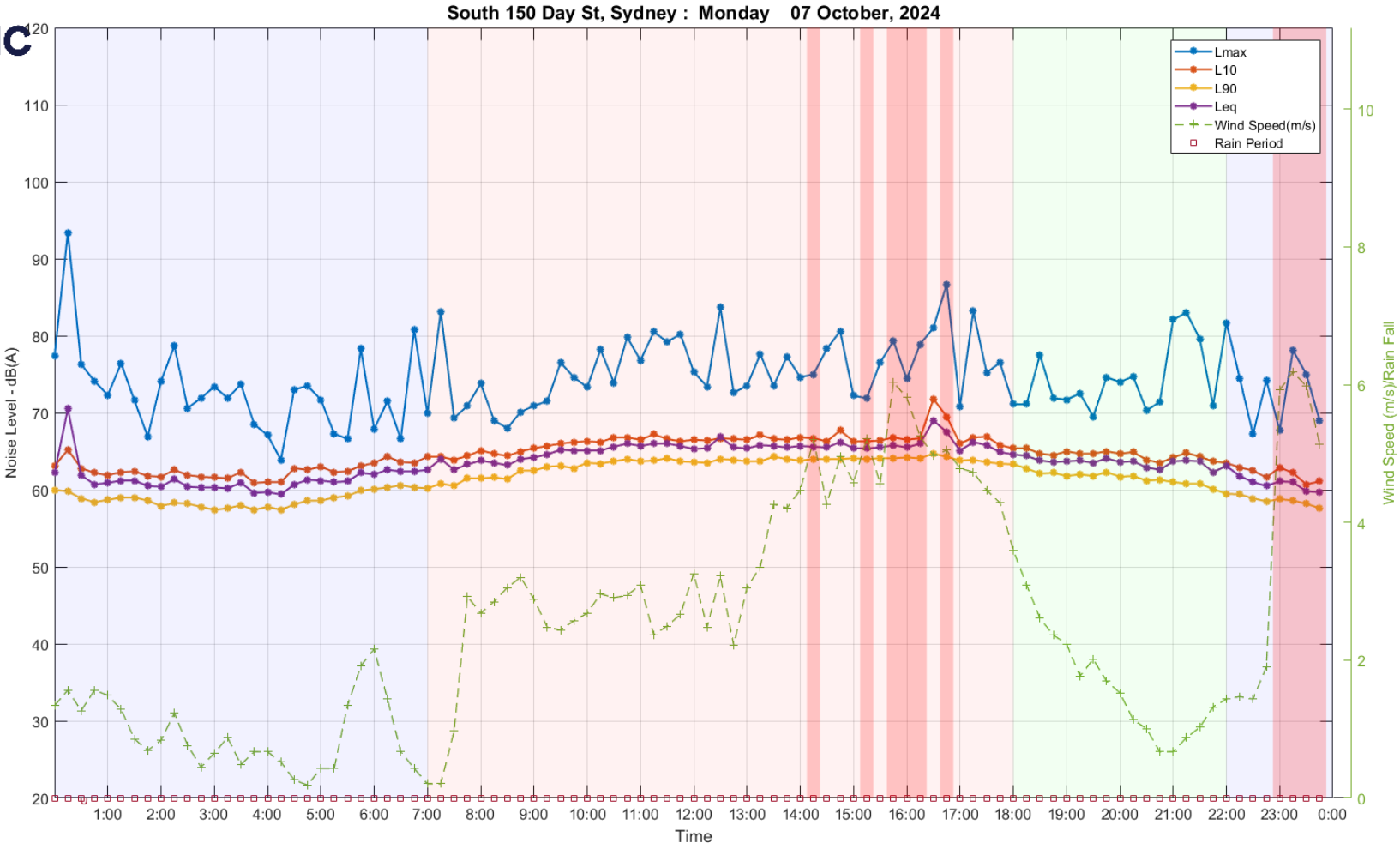
1050

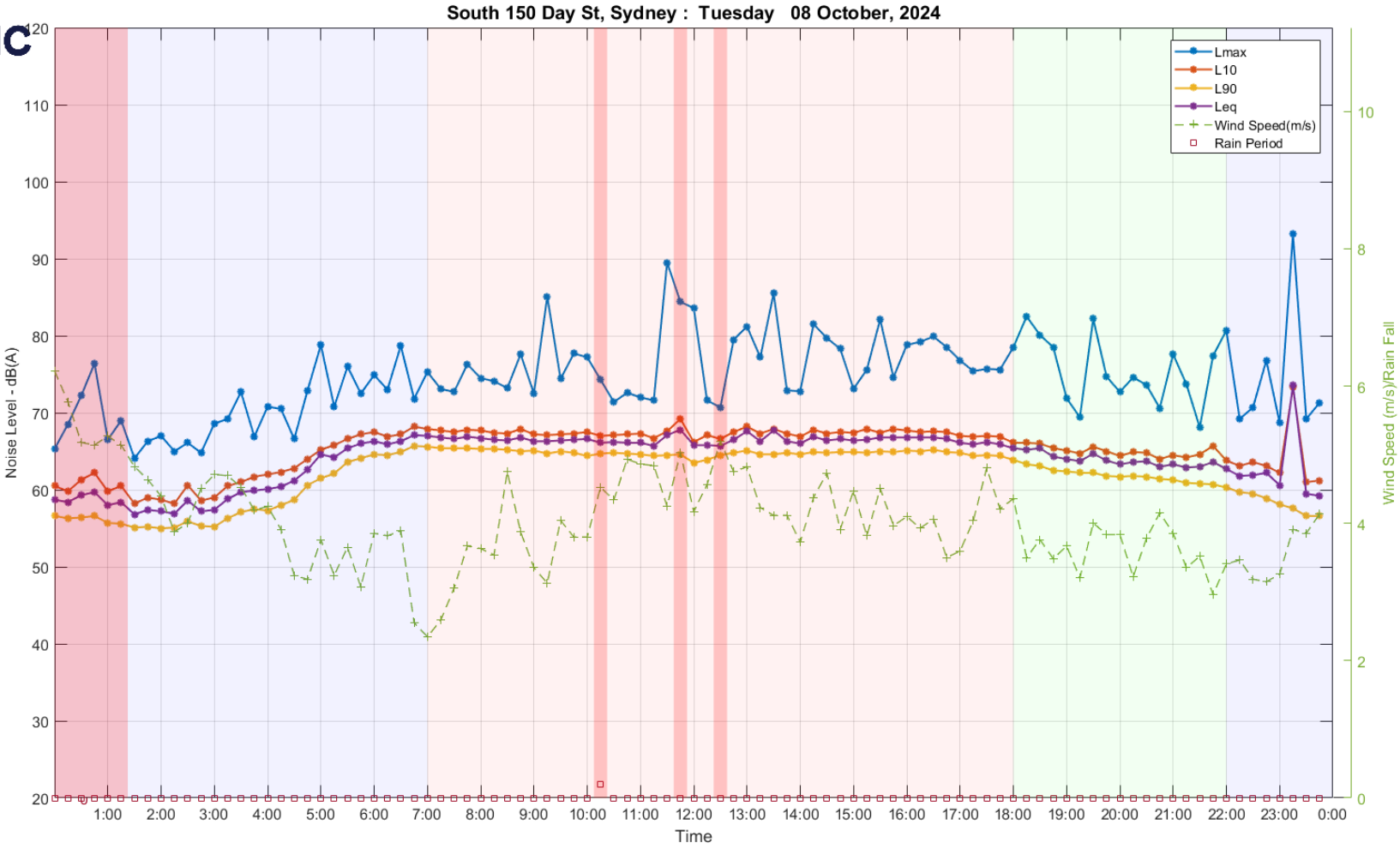
ACOUSTIC LOGIC

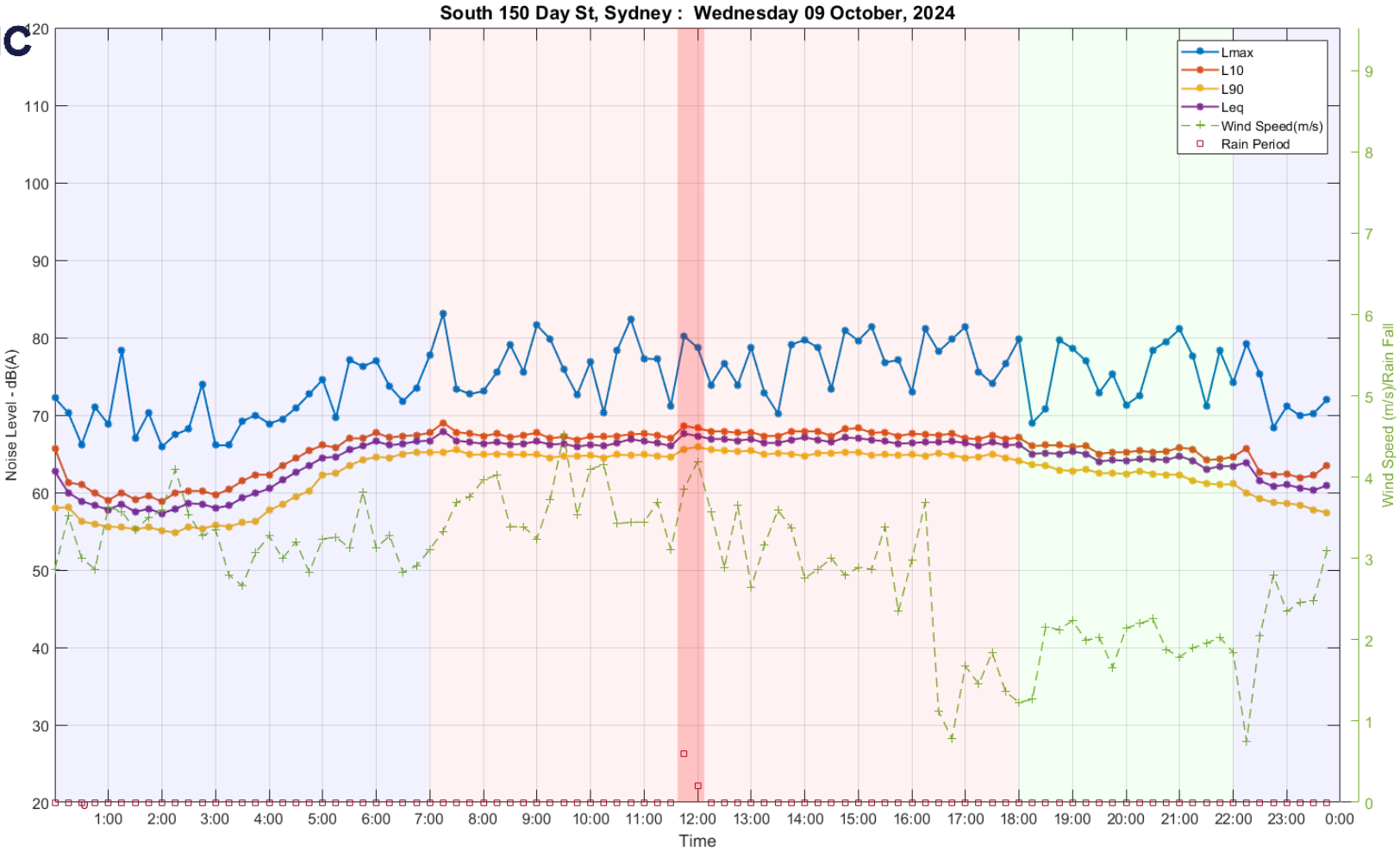
1051



ACOUSTIC LOGIC

1052

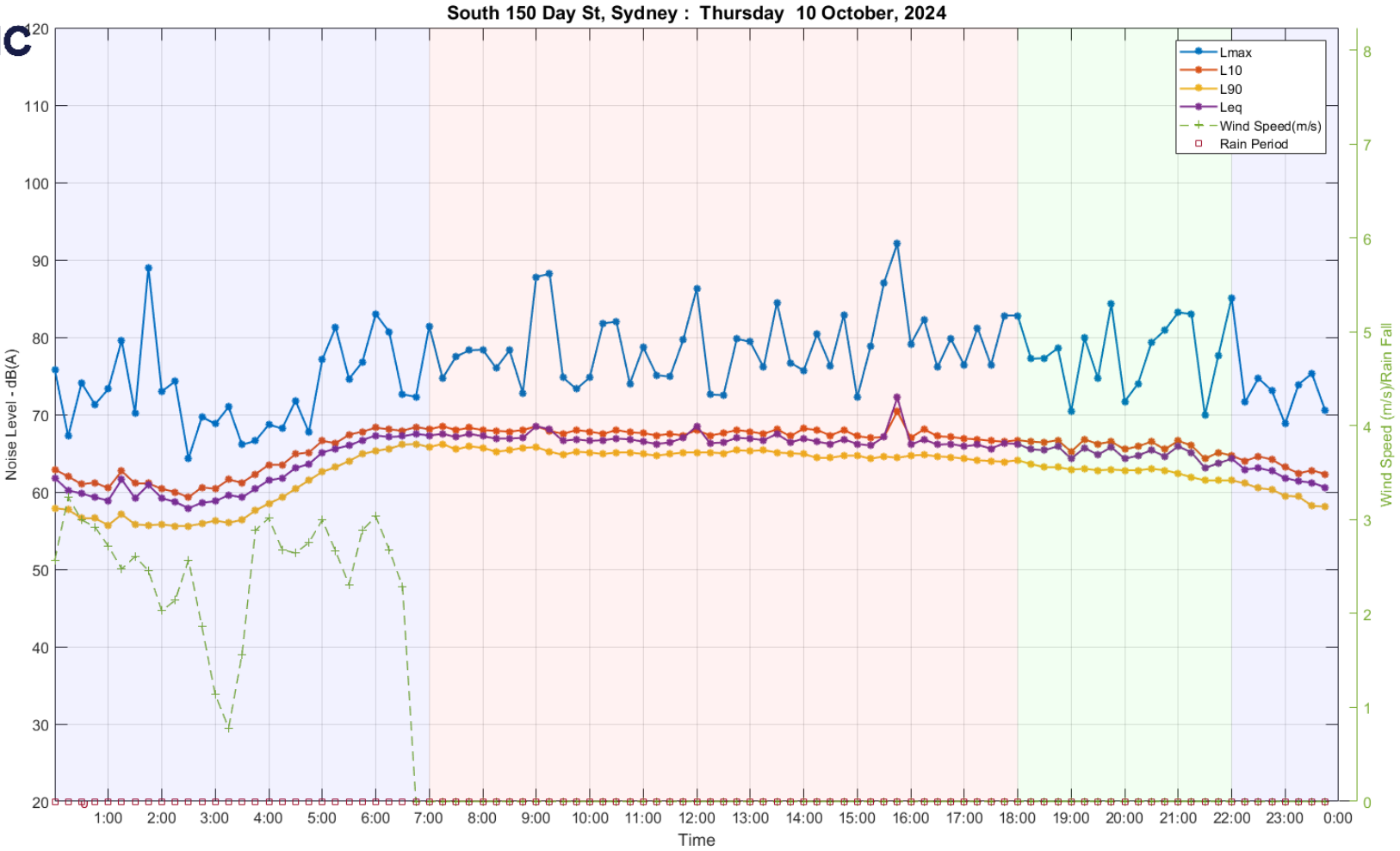



South 150 Day St, Sydney : Wednesday 09 October, 2024
Lmax
L10
L90
Leq
Wind Speed(m/s)
Rain Period
Noise Level - dB(A)
Wind Speed (m/s)/Rain Fall
Time
120
110
100
90
80
70
60
50
40
30
20
9
8
7
6
5
4
3
2
1
0
1:00
2:00
3:00
4:00
5:00
6:00
7:00
8:00
9:00
10:00
11:00
12:00
13:00
14:00
15:00
16:00
17:00
18:00
19:00
20:00
21:00
22:00
23:00
0:00

1053

ACOUSTIC LOGIC

1054



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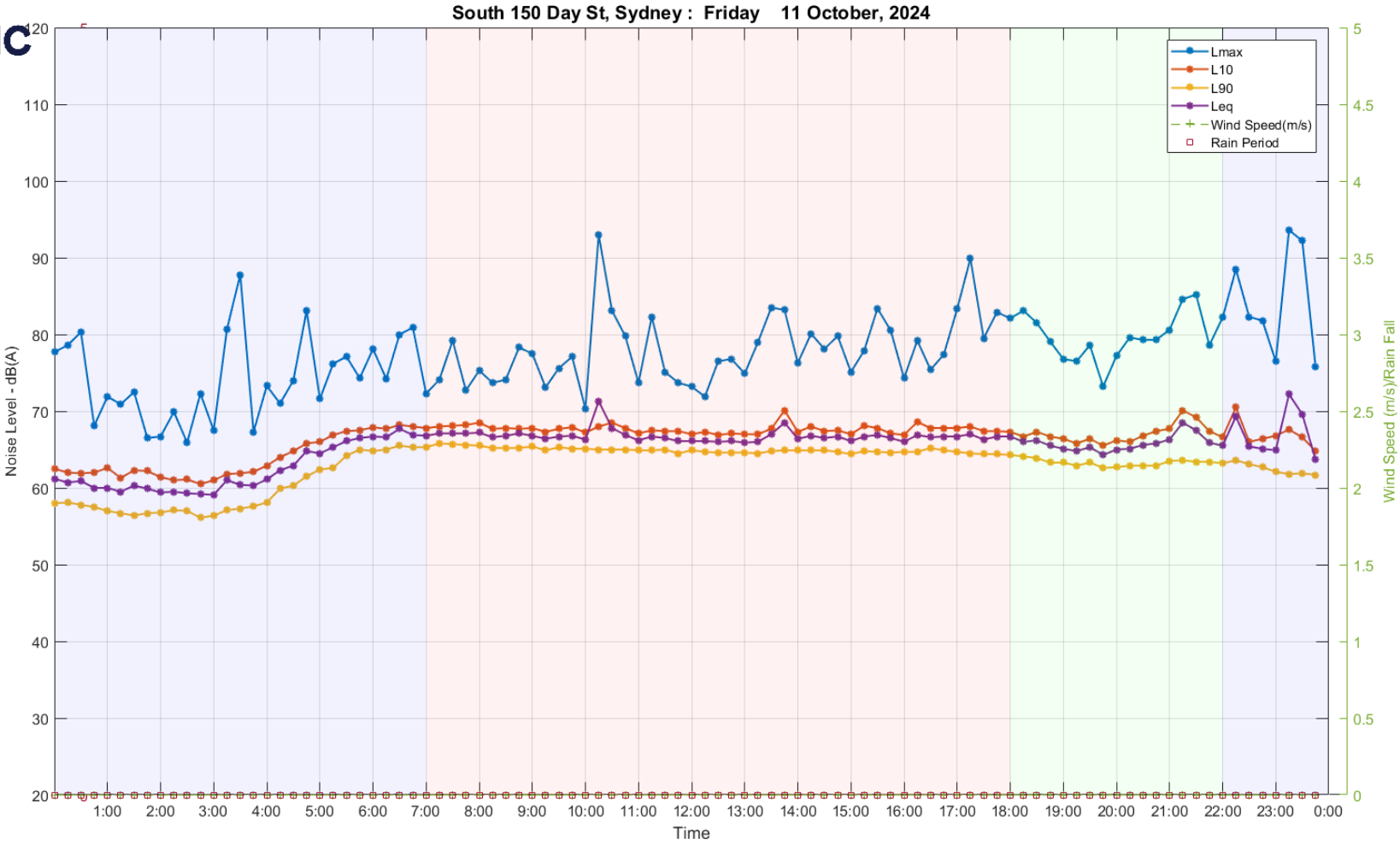
1055



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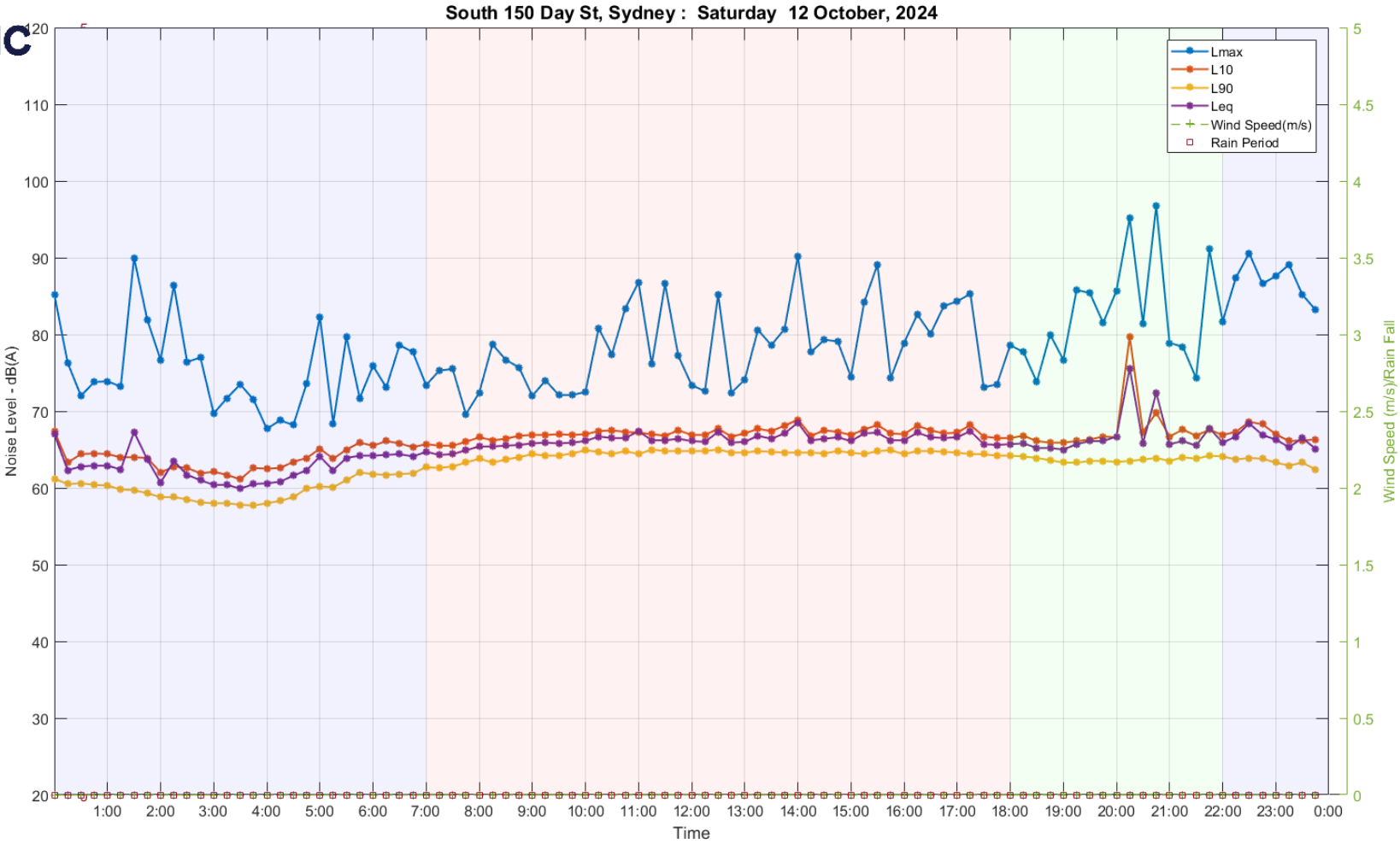
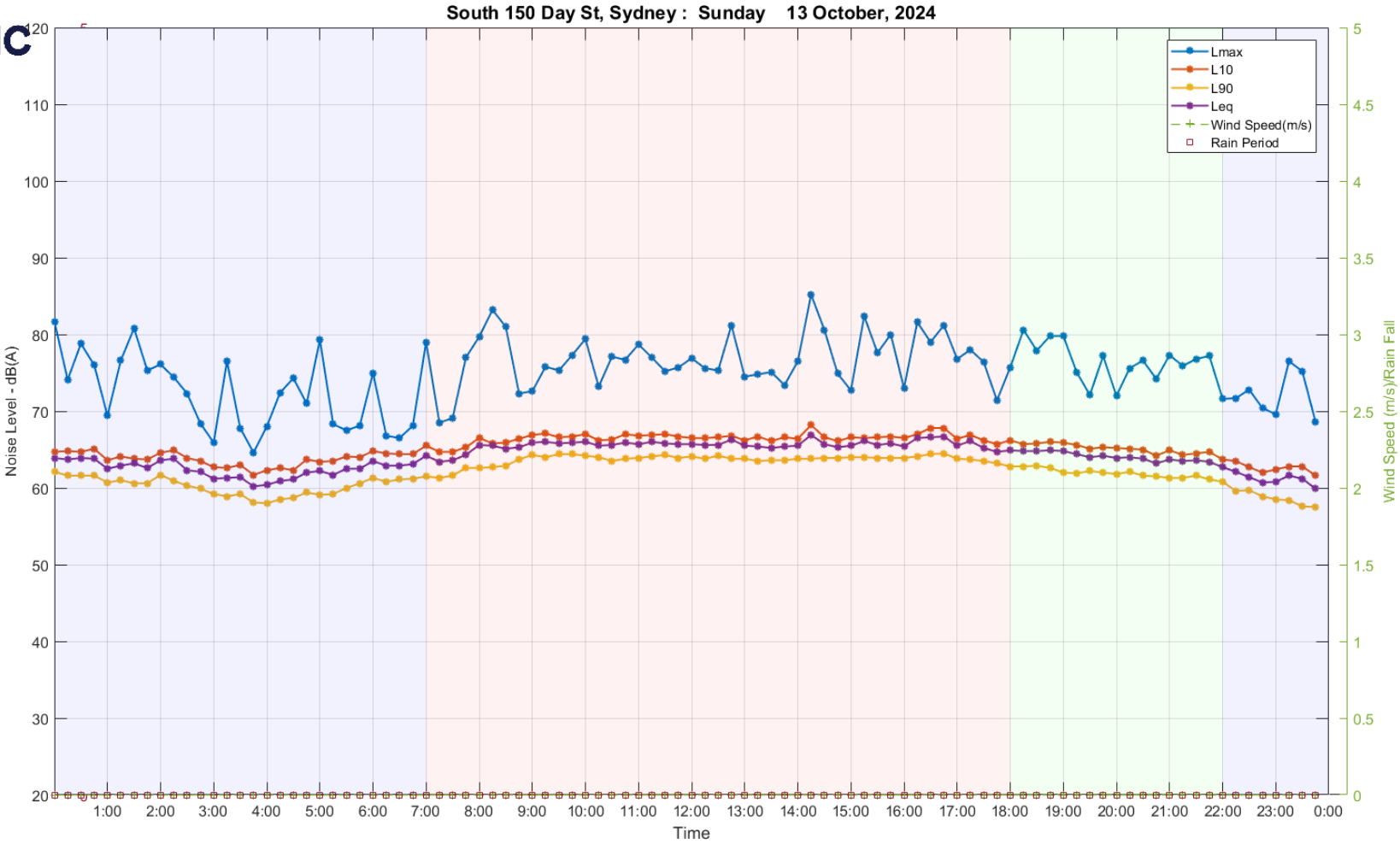

South 150 Day St, Sydney : Saturday 12 October, 2024
Lmax
L10
L90
Leq
Wind Speed(m/s)
Rain Period
Noise Level - dB(A)
Wind Speed (m/s)/Rain Fall
Time
120
110
100
90
80
70
60
50
40
30
20
5
4.5
4
3.5
3
2.5
2
1.5
1
0.5
0
1:00
2:00
3:00
4:00
5:00
6:00
7:00
8:00
9:00
10:00
11:00
12:00
13:00
14:00
15:00
16:00
17:00
18:00
19:00
20:00
21:00
22:00
23:00
0:00

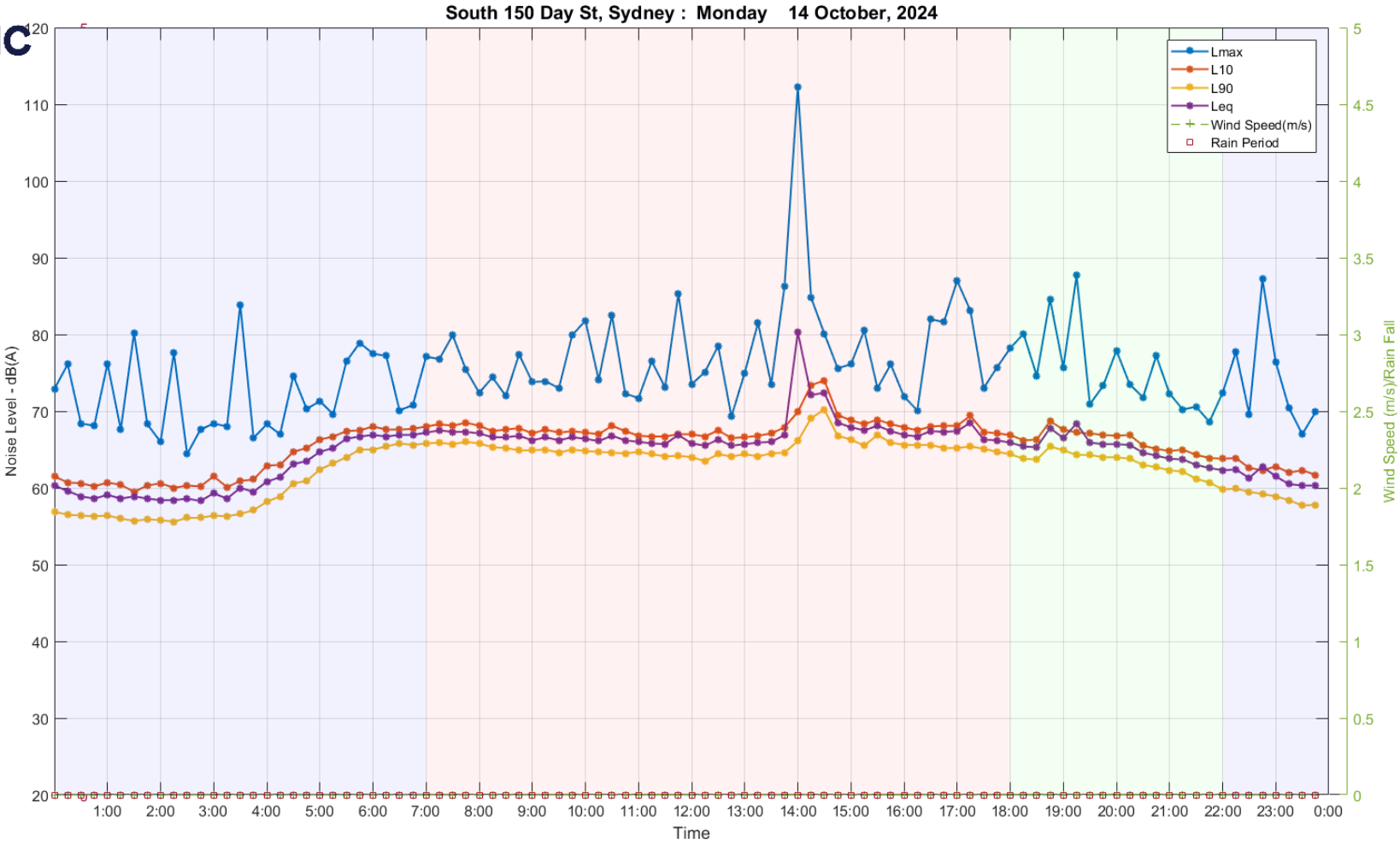
ACOUSTIC LOGIC

1057



ACOUSTIC LOGIC

1058



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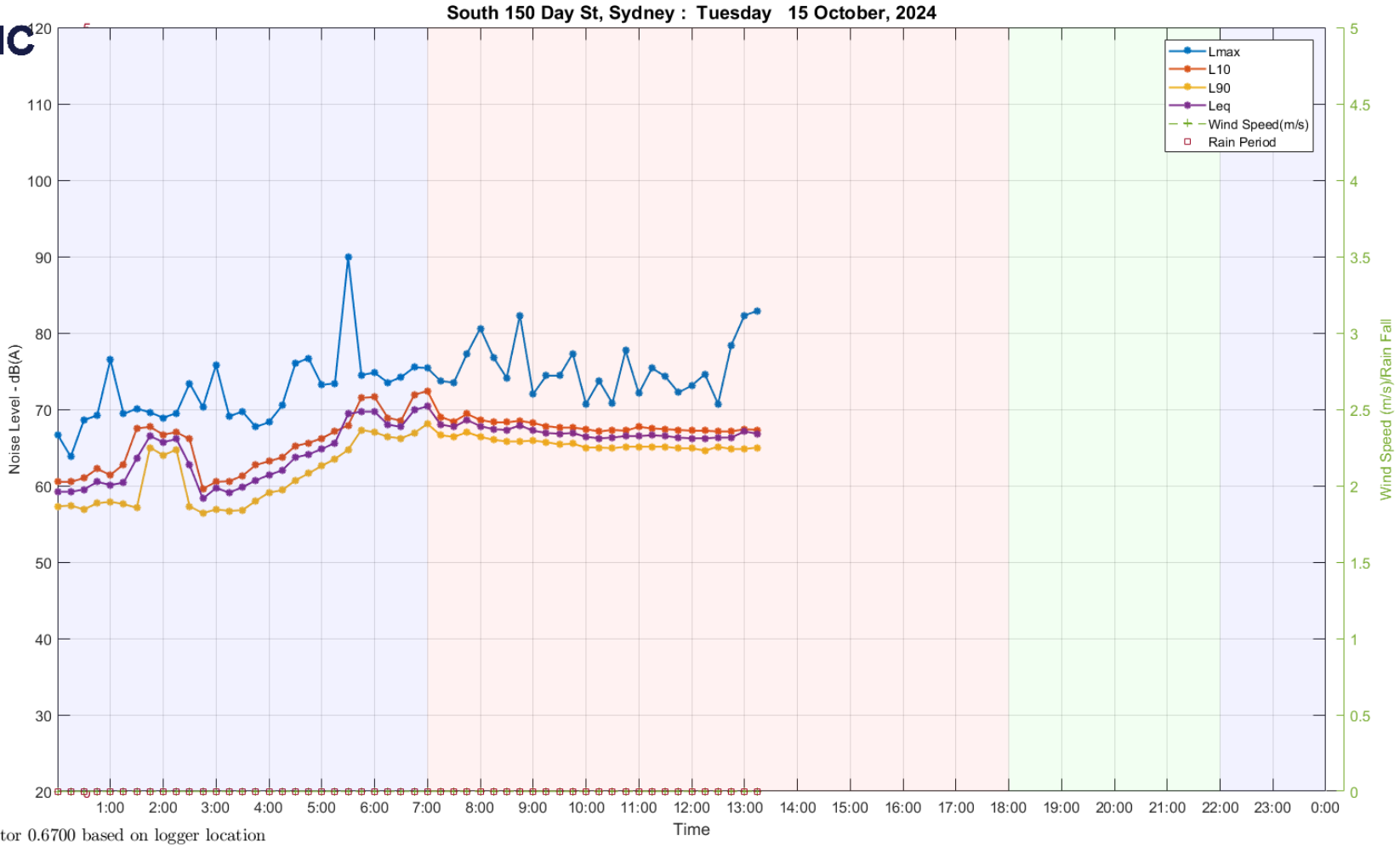


Wind Speed is corrected using factor 0.6700 based on logger location

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.

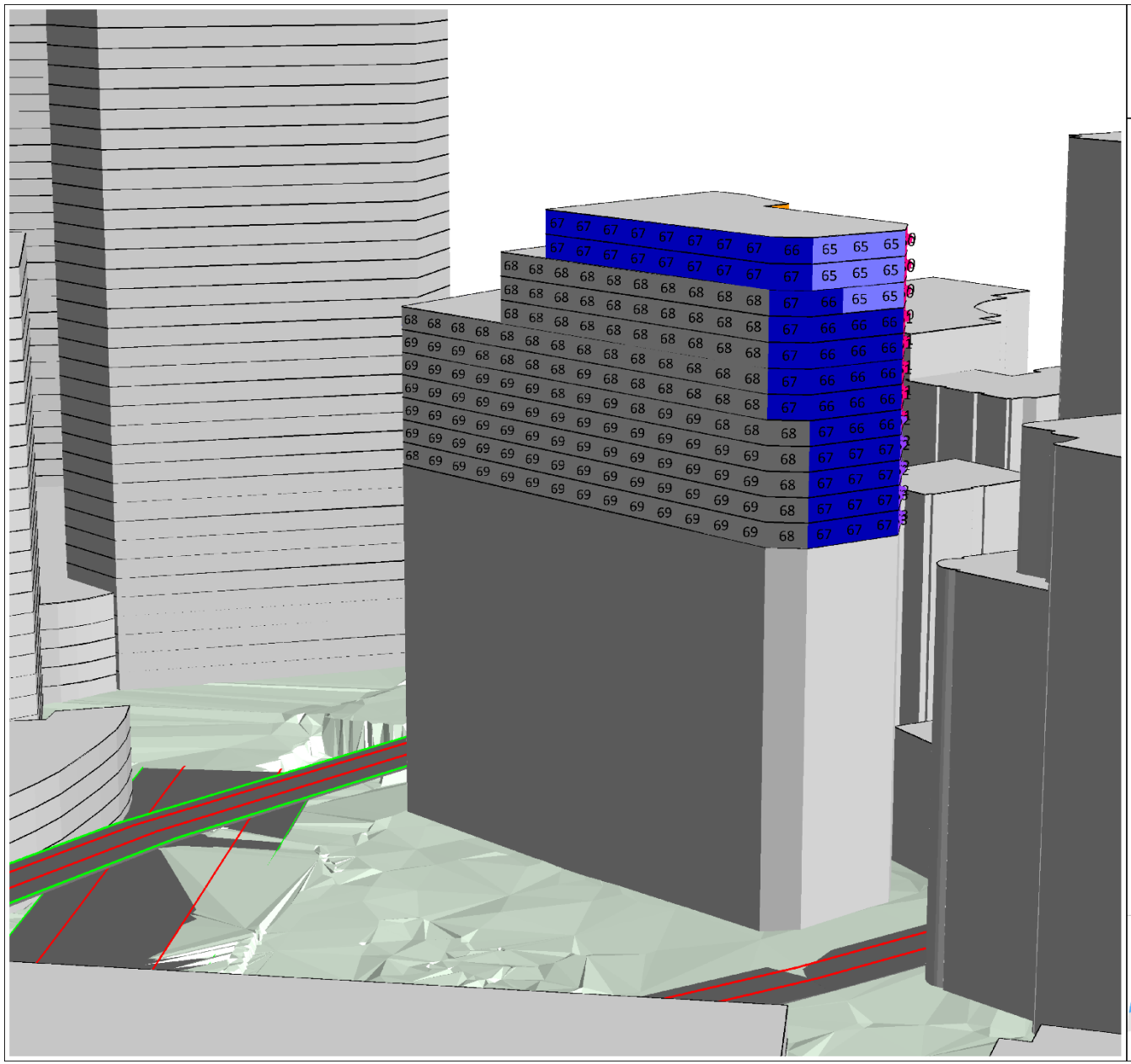
Table B-1 – Project Specific Trigger Levels

Location/ Receiver Type	Time	RBL dB(A) L_{90}	Trigger Noise Level (dB(A) $L_{eq,15min}$)		
			Intrusiveness	Amenity	Max Event
Residential **R1**, **R2** & **R3**	Day	64*	69	**58**	N/A
	Evening	62*	67	**48**	N/A
	Night	57*	62	**43**	**62 L_{eq}** **72 L_{max}**
Commercial **C1-C8**	When in Use	N/A	N/A	**63**	N/A
Industrial **I1**	When in Use	N/A	N/A	**68**	N/A

*Lowest measured RBL's from unattended noise monitoring on site.

The project noise trigger levels are bolded above.

APPENDIX C SOUNDPLAN NOISE MODELLING



150 Day Street, Sydney

Traffic Noise Prediction

Daytime

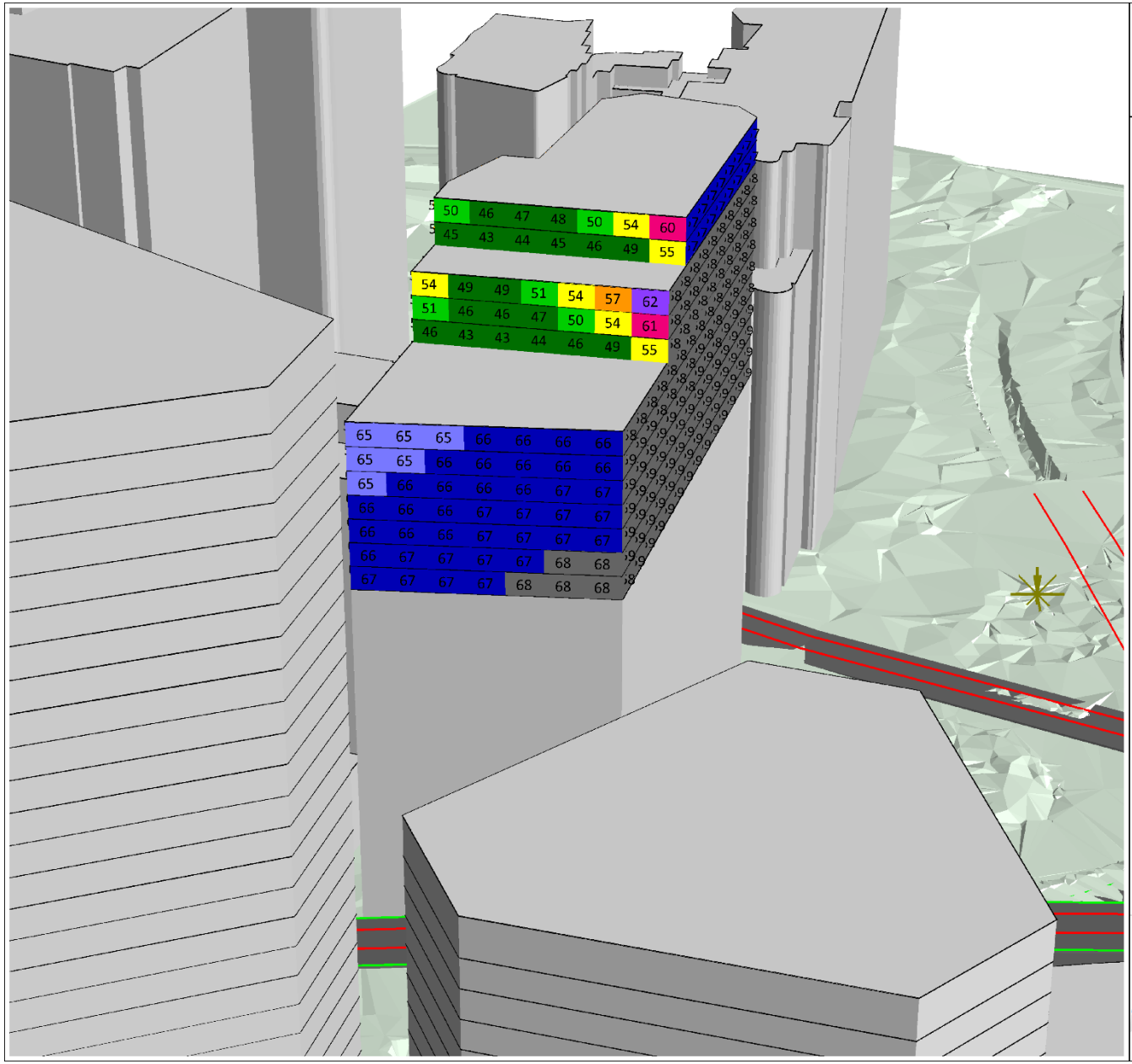
Prepared by: P. Feng
Date: 18/12/2024

Noise Level
L_{eq}
in dB(A)

	< 50
	50 - 52
	52 - 54
	54 - 56
	56 - 58
	58 - 60
	60 - 62
	62 - 64
	64 - 66
	66 - 68
	68 - 70
	>= 70

ACOUSTIC LOGIC

1065



150 Day Street, Sydney

Traffic Noise Prediction

Daytime

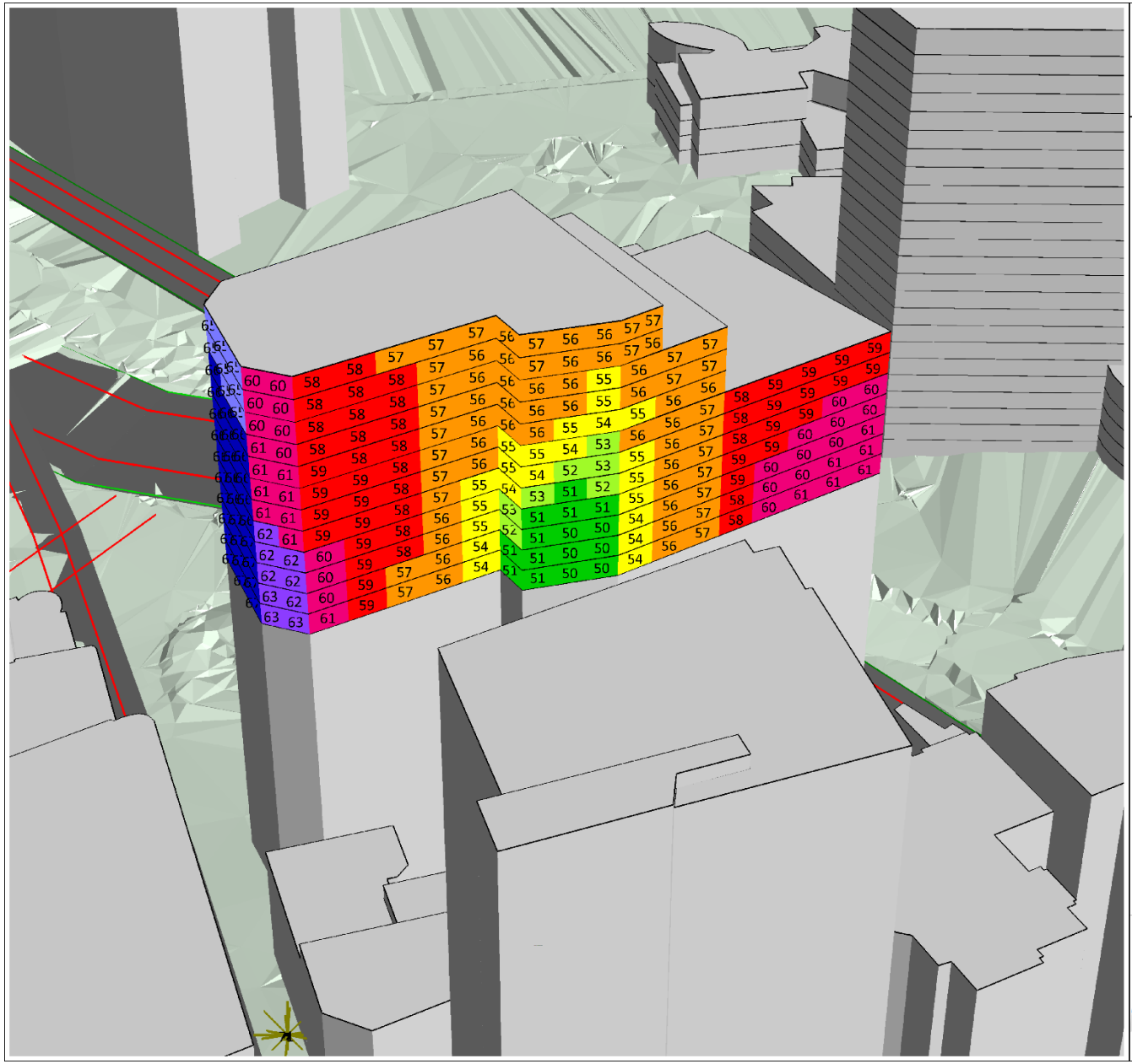
Prepared by: P. Feng
Date: 18/12/2024

Noise Level
L_{eq}
in dB(A)

	< 50
	50 - 52
	52 - 54
	54 - 56
	56 - 58
	58 - 60
	60 - 62
	62 - 64
	64 - 66
	66 - 68
	68 - 70
	>= 70

ACOUSTIC LOGIC

1066



150 Day Street, Sydney

Traffic Noise Prediction

Daytime

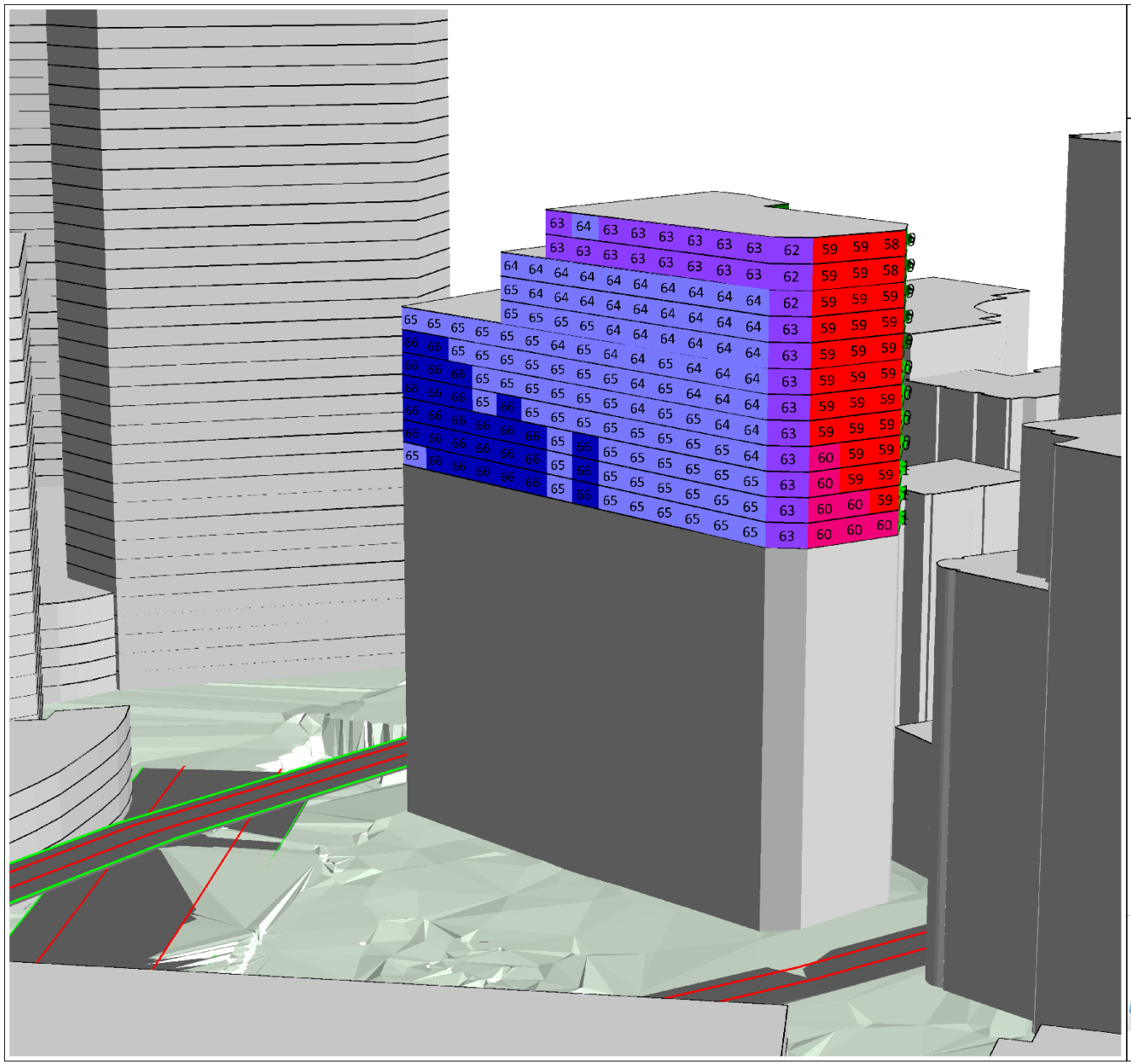
Prepared by: P. Feng
Date: 18/12/2024

Noise Level
L_{eq}
in dB(A)

	< 50
	50 - 52
	52 - 54
	54 - 56
	56 - 58
	58 - 60
	60 - 62
	62 - 64
	64 - 66
	66 - 68
	68 - 70
	>= 70

ACOUSTIC LOGIC

1067


63 64 63 63 63 63 63 63 62 59 59 58
63 63 63 63 63 63 63 63 62 59 59 58
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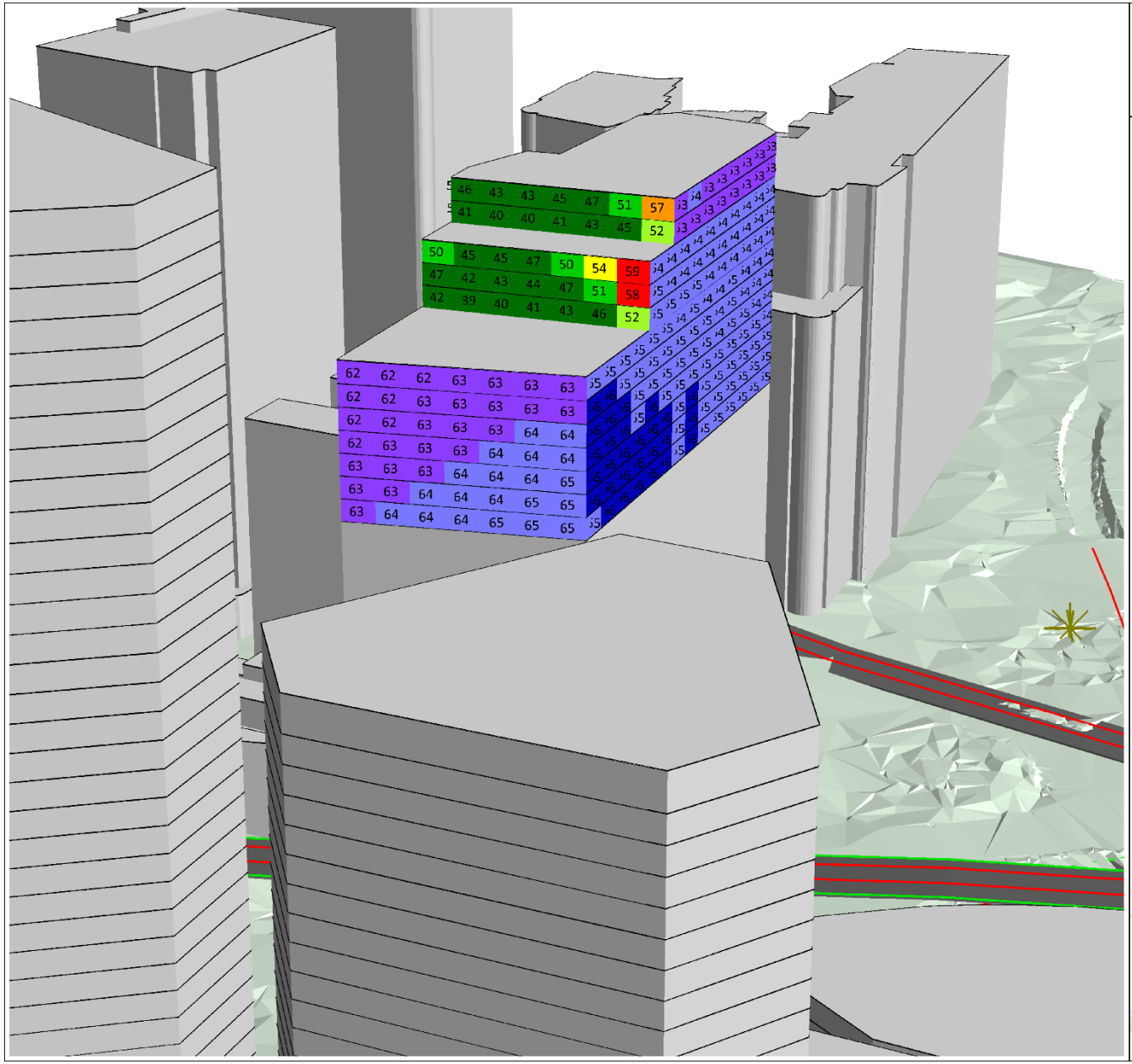
65 66 65 65 65 65 65 65 65 65 63 60 60 59
65 65 65 65 65 65 63 60 60 60
150 Day Street, Sydney
Traffic Noise Prediction
Nighttime
Prepared by: P. Feng
Date: 18/12/2024
Noise Level
Leq
in dB(A)
< 50
50 - 52
52 - 54
54 - 56
56 - 58
58 - 60
60 - 62
62 - 64
64 - 66
66 - 68
68 - 70
>= 70
ACOUSTIC LOGIC

1068



150 Day Street, Sydney

Traffic Noise Prediction

Nighttime

Prepared by: P. Feng
Date: 18/12/2024

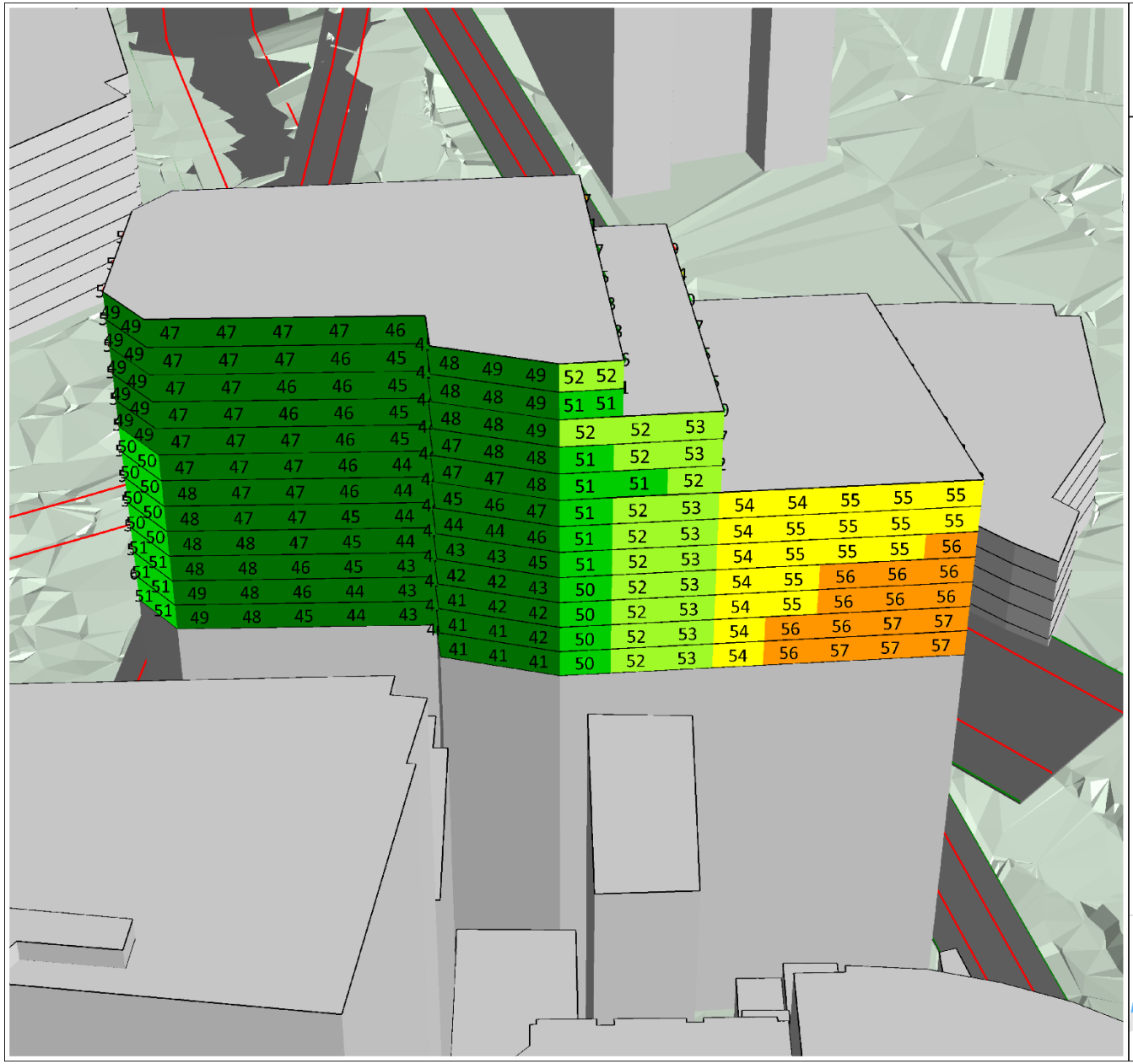
Noise Level
L_{eq}
in dB(A)

	< 50
	50 - 52
	52 - 54
	54 - 56
	56 - 58
	58 - 60
	60 - 62
	62 - 64
	64 - 66
	66 - 68
	68 - 70
	>= 70

ACOUSTIC LOGIC

1069

1070



150 Day Street, Sydney

Traffic Noise Prediction

Nighttime

Prepared by: P. Feng
Date: 18/12/2024

Noise Level
L_{eq}
in dB(A)

	< 50
	50 - 52
	52 - 54
	54 - 56
	56 - 58
	58 - 60
	60 - 62
	62 - 64
	64 - 66
	66 - 68
	68 - 70
	>= 70

ACOUSTIC LOGIC