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412 Cessnock Road, Gillieston Heights, Maitland

DA Acoustic Assessment

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Document Title	DA Acoustic Assessment
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1 INTRODUCTION

Acoustic Logic (AL) has been engaged to conduct an acoustic assessment of potential noise impacts associated with the proposed residential subdivision at 412 Cessnock Road, Gillieston Heights, Maitland.

This document addresses noise impacts associated with the following:

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

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

- Maitland City Council – '*Maitland Development Control Plan (DCP) 2011*'
- Australian Standard AS2107:2016 – '*Recommended Design Sound Levels and Reverberation Times for Building Interiors*'
- NSW Environment Protection Authority (EPA) – '*Noise Policy for Industry (NPfI) 2017*'

This assessment has been conducted using the subdivision plan provided to us prepared by The Bathla Group, dated 15/06/2022. The subdivision plan has been reproduced in Figure 2.

2 SITE DESCRIPTION

The proposed subdivision plan is comprised of 63 residential lots located at the corner of Russell Street and Cessnock Road for Lot 21 & 22 DP1092105. A site survey has been carried out by this office regarding the existing acoustic environment around the proposed development, which has detailed below:

- Existing and future residential sites around the project site, and
- Cessnock Road

The nearest noise receivers around the site include:

- **Residential receiver R1:** Residential townhouse developments to the north along Russell Street and Davies Street at 1-23 Russell Street
- **Residential receiver R2:** Existing and future residential house to the west along Broad Street, Auburn Street and Holland Cct at 4-29 Holland Cct
- **Residential receiver R3:** Existing and future residential house to the east across Cessnock Road along Cessnock Road and Camelia Street at 8-18 Russell St and 391-411 Cessnock Road, and
- **Residential receiver R4:** Existing and future residential house to the west along Broad Street, Auburn Street and Holland Cct.

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

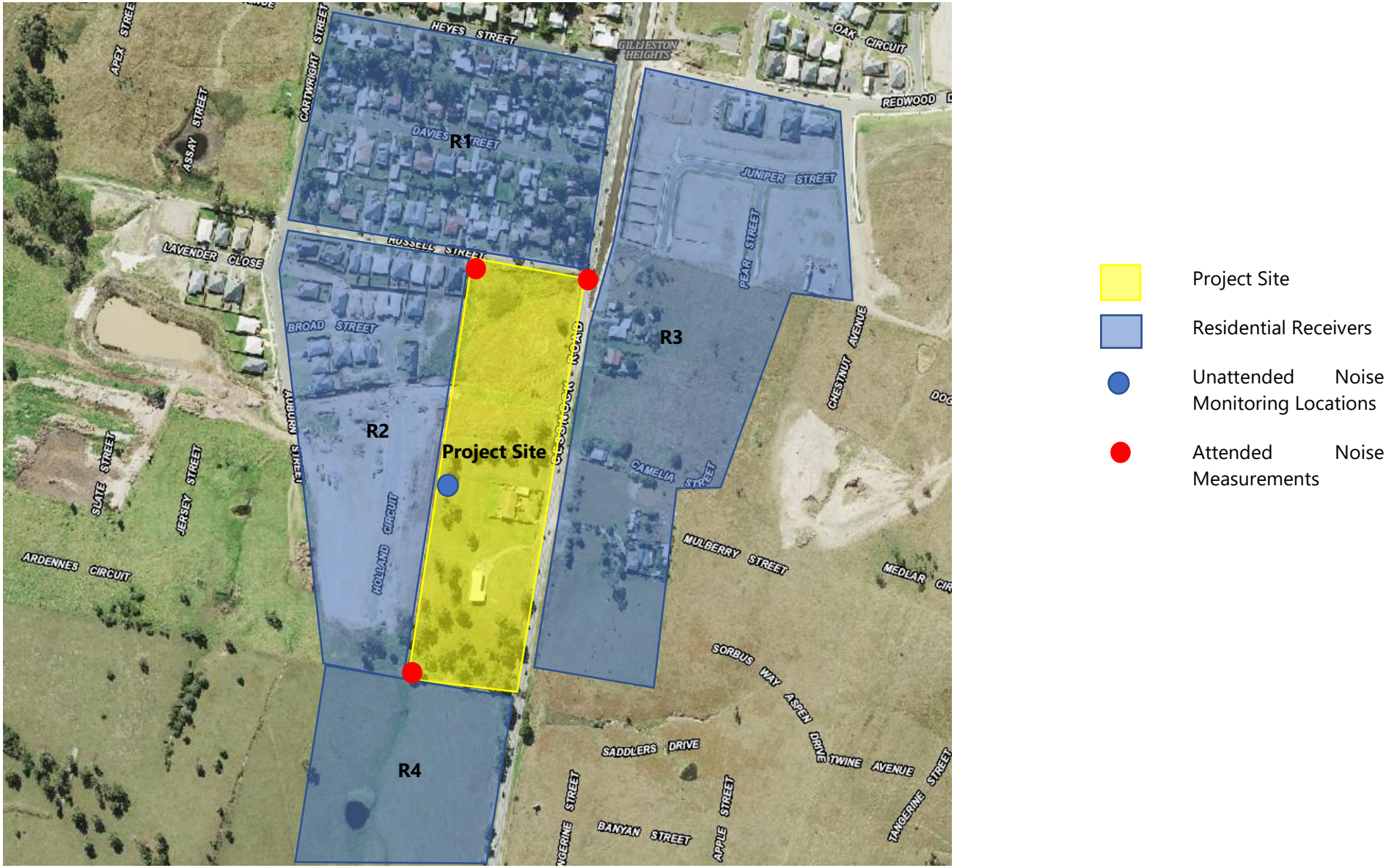


Figure 1 Site Plan and Monitoring Locations (Source from: NSW SIX MAP)

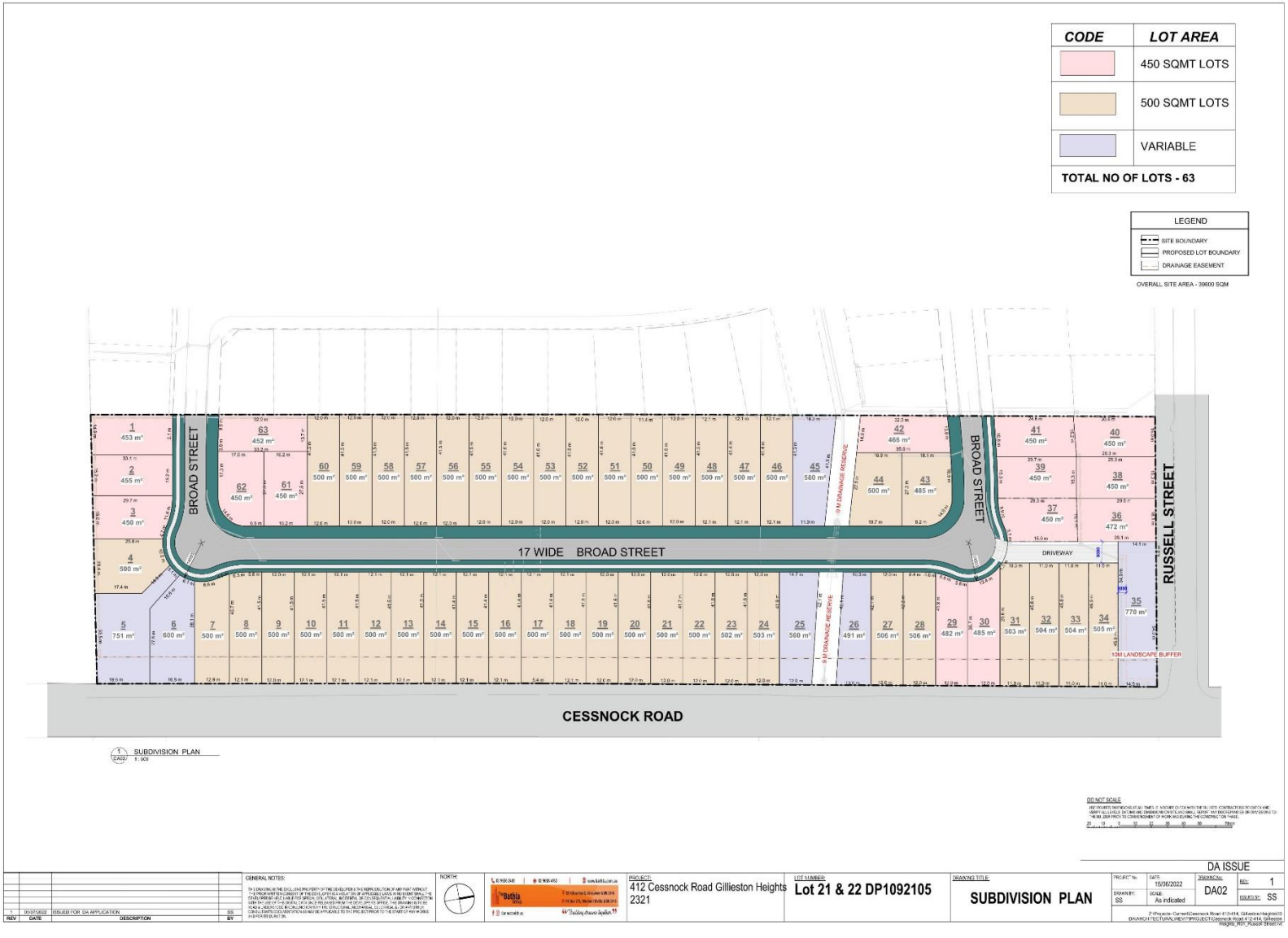


Figure 2 Subdivision Plan (Provided by The Bathla Group)

3 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 15minute measurement interval is typically utilised. Noise levels are monitored continuously during this period, and then statistical and integrating techniques are used to characterise the noise being measured.

The principal measurement parameters obtained from the data are:

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

L_{90} – This is commonly used as a measure of the background noise level as it represents the noise level heard in the typical, quiet periods during the measurement interval. The L_{90} parameter is used to set noise emission criteria for potentially intrusive noise sources since the disturbance caused by a noise source will depend on how audible it is above the pre-existing noise environment, particularly during quiet periods, as represented by the L_{90} level.

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

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

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

4 ENVIRONMENTAL NOISE SURVEY

4.1 MEASUREMENT LOCATION

One unattended noise monitor was located to the existing backyard of the project site to the west facing residential receiver **R2**. Refer to Figure 1 for detailed location. Noise level data obtained at this location is considered representative of background noise levels for all surrounding residents.

Attended measurements were conducted around the site at several locations including the northwest and southwest corner of the site and 2 m from the kerb of Cessnock Road. See Figure 1 for detailed locations.

4.2 MEASUREMENT PERIOD

Unattended noise monitoring at this location was conducted between Friday 24th of June 2022 to Monday 4th of July 2022. Attended noise measurements were undertaken on Friday 24th of June 2022.

4.3 MEASUREMENT EQUIPMENT

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

Attended noise measurements were conducted using a Norsonic 140 Sound Analyser. The analyser was set to fast response and calibrated before and after the measurements using a Norsonic Sound Calibrator type 1251. No significant drift was noted.

4.4 SUMMARISED RATING BACKGROUND NOISE LEVELS

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

Table 4-1 – Summarised Rating Background Noise Levels

Location	Time of day	Rating Background Noise Level dB(A)$_{L90(Period)}$
Residential Receivers	Day (7am – 6pm)	43
	Evening (6pm – 10pm)	39
	Night (10pm – 7am)	31

On review of the monitoring data, the measured L_{90} noise levels during high wind speed days do not increase background noise levels significantly as periods with little to no wind. This demonstrates that even though wind speeds measured at Maitland airport (the closest weather station) exceed EPA guidelines, either:

- The wind speed on site at this time was significantly lower than at Maitland airport (which is likely given Maitland airport is located in a very exposed area) and/or
- The wind on site was not sufficiently consistent to increase background noise levels compared to calm periods.
- BOM wind speeds are obtained at 10m above ground and wind speeds close to ground level are lower.

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

4.5 MEASURED TRAFFIC NOISE LEVELS

Measured traffic noise levels for the project site are presented below.

Table 4-2 – Measured Traffic Noise Levels

Location	Time of day	Noise Level dB(A)$_{Leq}$
Future faced facing Cessnock Road	Day (7am – 10pm)	62
	Night (10pm – 7am)	57

5 EXTERNAL NOISE INTRUSION ASSESSMENT

Site investigation indicates that the primary external noise sources around project site are from traffic movements along surrounding roads.

5.1 NOISE INTRUSION CRITERIA

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

- Maitland City Council – '*Maitland Development Control Plan (DCP) 2011*', and
- Australian Standard AS2107:2016 – '*Recommended Design Sound Levels and Reverberation Times for Building Interiors.*'

5.1.1 Maitland Development Control Plan (DCP) 2011

Section C.10 Subdivision of Part C Design Guideline of the Maitland DCP does not provide specific criteria in relation to noise intrusion. Australian Standard AS2107 will hence be adopted.

5.1.2 Australian and New Zealand AS2107:2016 *'Recommended design sound levels and reverberation times for building interiors'*

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

Table 5-1 – Recommended Design Sound Levels

Space /Activity Type	Recommended Maximum Design Sound Level
Bedrooms	35-40 dB(A)$L_{eq(10pm-7am)}$
Living Rooms	35-45 dB(A)$L_{eq(anytime)}$

5.1.3 Summarised External Noise Intrusion Criteria

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

Table 5-2 – Adopted Internal Noise Levels

Space / Activity Type	Maximum Internal Noise Levels
Living Areas	40 dB(A) $L_{eq\ (15hr)}$
Sleeping Areas (night-time)	35 dB(A) $L_{eq\ (9hr)}$

5.2 COMPLYING CONSTRUCTIONS

Assessment of façade requirements to achieve required indoor noise levels has been undertaken. Dimensions of rooms, setbacks from roadways, window openings and floor areas have been used. As no architectural drawings have been issued for specific layouts, the following assumptions have been made:

- All residents are two-storey dwellings
- Living rooms will be on ground level with a typical size of 6m x 8m x 2.7m with 6m x 2.7m of glazing
- Bedrooms are on the first floor with a typical size of 3m x 4m x 2.7m with 3m x 2.7m of glazing
- Bedrooms will have lightweight ceiling/ roof construction
- All spaces have complying constructions for both lightweight and concrete/masonry walls, and
- Note: super lots likely to develop residential flat buildings shall be separately assessed.

5.2.1 Glazed Windows and Doors

The following constructions are recommended to comply with the project noise objectives. Aluminium framed/sliding glass doors and windows will be satisfactory provided they meet the following criteria. All external windows and doors listed are required to be fitted with Q-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 detailed in Table 5-3.

Table 5-3 - Complying Glazing Construction

Lots	Room	Glazing Thickness	Acoustic Seals
Lots 5-35 Eastern façade with direct line of slight to the Cessnock Road (Lightweight walls only)	Bedroom	10 mm Float	Yes
	Living Room	6 mm Float	Yes
Lots 5-35 Eastern façade with direct line of slight to the Cessnock Road (Masonry walls)	Bedroom	6.38 mm Laminated	Yes
	Living Room	6 mm Float	Yes
All other Lots	Bedroom	6 mm Float	Yes
	Living Room	4 mm Float	Yes

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. 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.

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
4mm Float	27
6mm Float	29
6.38mm Laminated	31
10 mm Float	33

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

5.2.2 External Roof/Ceiling Construction

External roof construction from light weight elements will require acoustic upgrading. A complying roof construction for lightweight roof/ceiling constructions is detailed below in Figure 5-1 and Table 5-5 below.

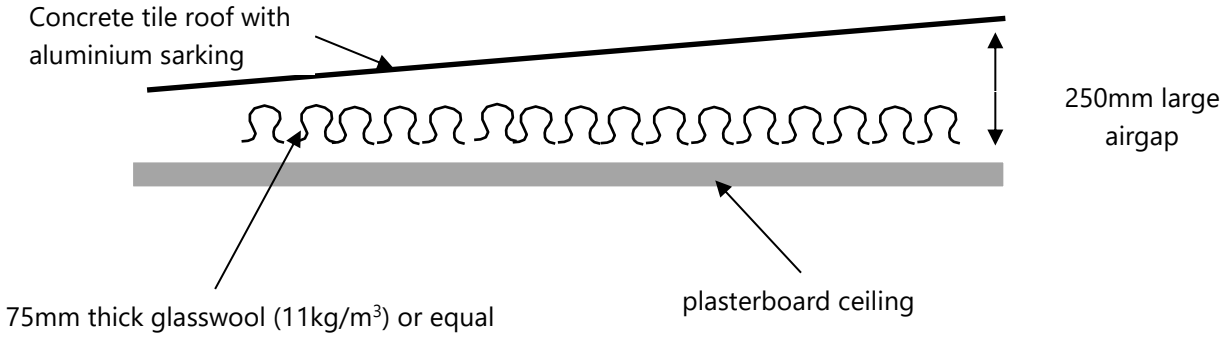


Figure 5-1 – Roof/ Ceiling Construction

Table 5-5 – External Light Weight Roof Construction

Lots	Internal Lining	Truss System	External Lining
All lots	1 x 13 mm plasterboard	Pitched roof, minimum of 250mm truss with 75mm thick 11kg/m^3 glasswool insulation in cavity	Concrete tile roof with aluminium sarking

In the event that any penetrations are required thru the external skin, an acoustic sealant should be used to minimise all gaps.

5.2.3 External Wall Construction

External wall construction will be constructed from the combination of masonry and light weight elements. For masonry walls, no further acoustic upgrading is required. For light weight elements, the complying constructions are shown below:

Table 5-6 – External Light Weight Wall Construction

Lots	Space	Internal Lining	Studwork System	External Lining
All Lots	Bedrooms & Living room	1 x 13 mm plasterboard	A min 90 mm stud with 75mm thick 11kg/m^3 glasswool insulation	1 x 9 mm fibre cement sheet (or equivalent in density)

In the event that any penetrations are required through the external skin, an acoustic sealant should be used

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.

6 NOISE EMISSION REQUIREMENTS

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

- Maitland City Council – '*Maitland Development Control Plan (DCP) 2011*', and
- NSW Department of Environmental Protection Agency – Noise Policy for Industry (NPFI) 2017.

6.1 MAITLAND DEVELOPMENT CONTROL PLAN (DCP) 2011

Given there are no other specific controls for noise emissions in the Maitland DCP relating to site, the requirements of NSW EPA's Noise Policy for Industry (2017) will be adopted.

6.2 NSW EPA NOISE POLICY FOR INDUSTRY (NPFI) 2017

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

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

6.2.1 Intrusiveness Criterion

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

Background noise levels adopted are presented in Section 4.4. Noise emissions from the site should comply with the noise levels presented below when measured at nearby property boundary.

6.2.2 Project Amenity Criterion

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

The EPA's NPFI sets out acceptable noise levels for various localities. The recommended noise amenity area is based upon the measured background noise levels at the sensitive receiver. Based on the measured background noise levels detailed in Section 4.4, the Noise Policy for Industry suggests the adoption of the 'urban' categorisation.

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

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

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

Table 6-1 – EPA Amenity Noise Levels

Type of Receiver	Time of day	Recommended Noise Level dB(A)$L_{eq(period)}$	Project Amenity Noise Level dB(A)$L_{eq(15\ minute)}$
All Surrounding Residential - Rural	Day	50	48
	Evening	45	43
	Night	40	38

The NSW EPA Noise Policy for Industry (2017) defines;

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

6.2.3 Sleep Arousal Criteria

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

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

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

a detailed maximum noise level even assessment should be undertaken.

Table 6-2 – Sleep Arousal Criteria for Residential Receivers

Receiver	Rating Background Noise Level (Night) dB(A)L_{90}	Emergence Level
Residential receivers Night (10pm – 7am)	31 dB(A) L_{90}	40 dB(A)$L_{eq,\ 15min}$; 52 dB(A)L_{Fmax}

6.3 SUMMARISED NOISE EMISSION CRITERIA

Applicable noise limits are bolded in the table below.

Table 6-3 – Project Trigger Levels – Residential Receivers

Time Period	Assessment Background Noise Level dB(A)L_{90}	Project Amenity Criteria dB(A) L_{eq}	Intrusiveness Criteria $L_{eq(15min)}$	NPFI Criteria for Sleep Disturbance
Day	43	48	**48**	N/A
Evening	39	**43**	44	N/A
Night	31	38	**36**	**40 dB(A)$L_{eq,\ 15min}$; 52 dB(A)L_{Fmax}**

*Project trigger levels have been highlighted in bold in the table.

7 NOISE EMISSION ASSESSMENT

7.1 MECHANICAL PLANT

The detailed design and selection of plant has not been undertaken, but would generally consist of carpark ventilation plant, apartment air conditioning condensing units, bathroom ventilation fans (which would typically be small fans located internally) and miscellaneous ventilation fans.

The plant would be selected to meet the noise levels required by the noise limits indicated above, and where required would be treated by enclosing the equipment, treating ducting, acoustic louvres, as required to meet limit noise emissions.

Designers should have regard for the fact that allowances should be made in respect of plant locations to minimise impacts on sensitive receivers and to provide sufficient space to incorporate treatment to plant areas to meet the above guidelines.

Information is provided however, for the location and indicative quantity of residential condensing units. As such, a preliminary assessment of noise impacts has been undertaken.

8 CONCLUSION

This report presents an acoustic assessment of noise impacts associated with the development to be located at 412 Cessnock Road, Gillieston Heights, Maitland.

Provided that complying, constructions detailed in section 5 are adopted, internal noise levels for the residential development will comply with the acoustic requirements of the following documents:

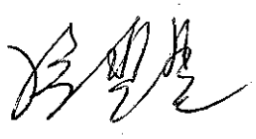
- Maitland City Council – '*Maitland Development Control Plan (DCP) 2011*', and
- Australian Standard AS2107:2016 – '*Recommended Design Sound Levels and Reverberation Times for Building Interiors.*'

Noise emissions criteria has been set up in Section 6 using the following documents:

- Maitland City Council – '*Maitland Development Control Plan (DCP) 2011*', and
- NSW Department of Environmental Protection Agency – '*Noise Policy for Industry*' (NPFI) 2017.

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

Yours faithfully,



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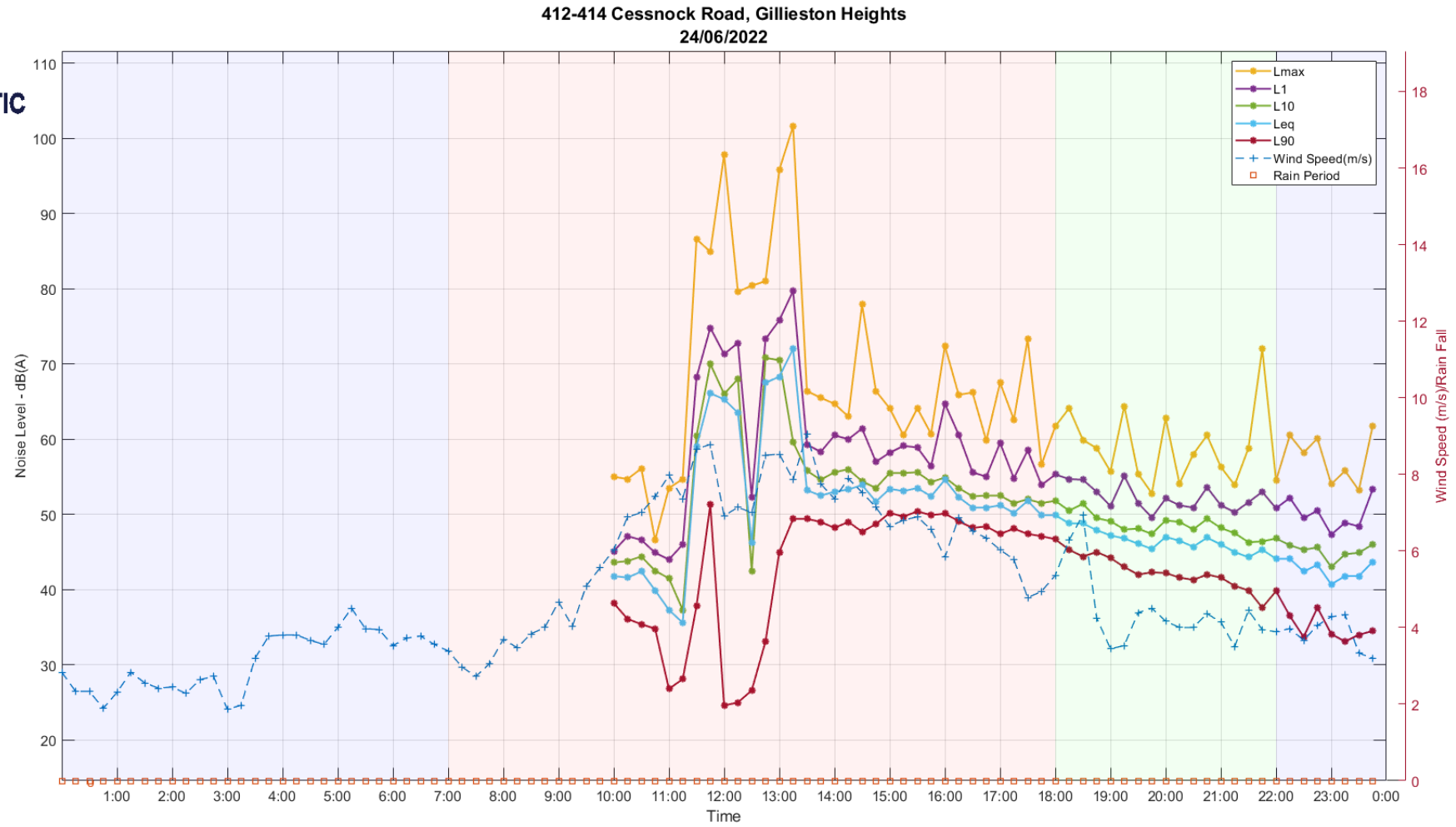
PeiPei Feng

APPENDIX ONE – UNATTENDED NOISE MONITORING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L1
L10
Leq
L90
Wind Speed(m/s)
Rain Period
Noise Level - dB(A)
Wind Speed (m/s)/Rain Fall
Time
110
100
90
80
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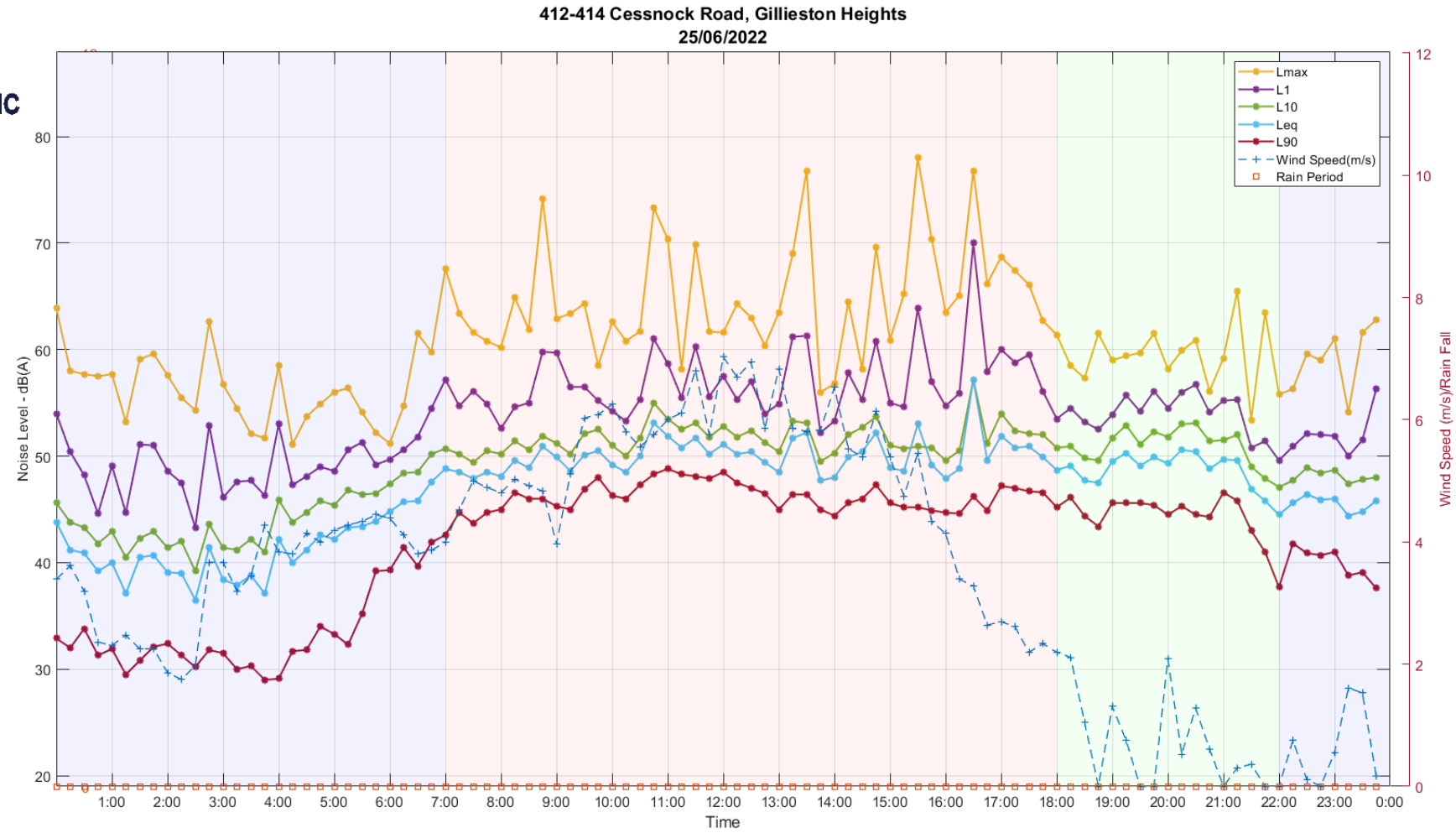
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25/06/2022
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L1
L10
Leq
L90
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Rain Period
Noise Level - dB(A)
Wind Speed (m/s)/Rain Fall
Time
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2:00
3:00
4:00
5:00
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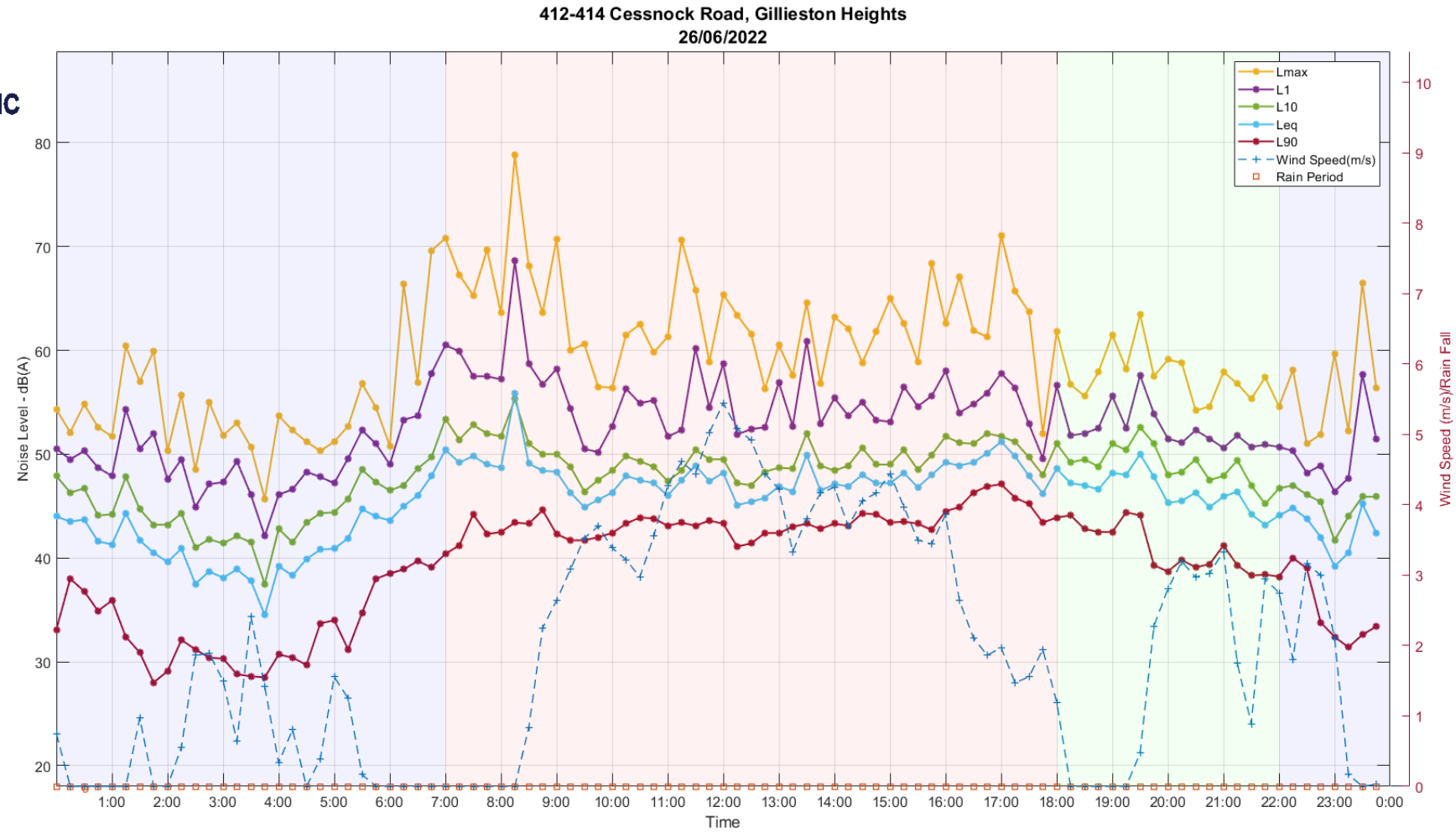
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26/06/2022
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L10
Leq
L90
Wind Speed(m/s)
Rain Period
Noise Level - dB(A)
Wind Speed (m/s)/Rain Fall
Time
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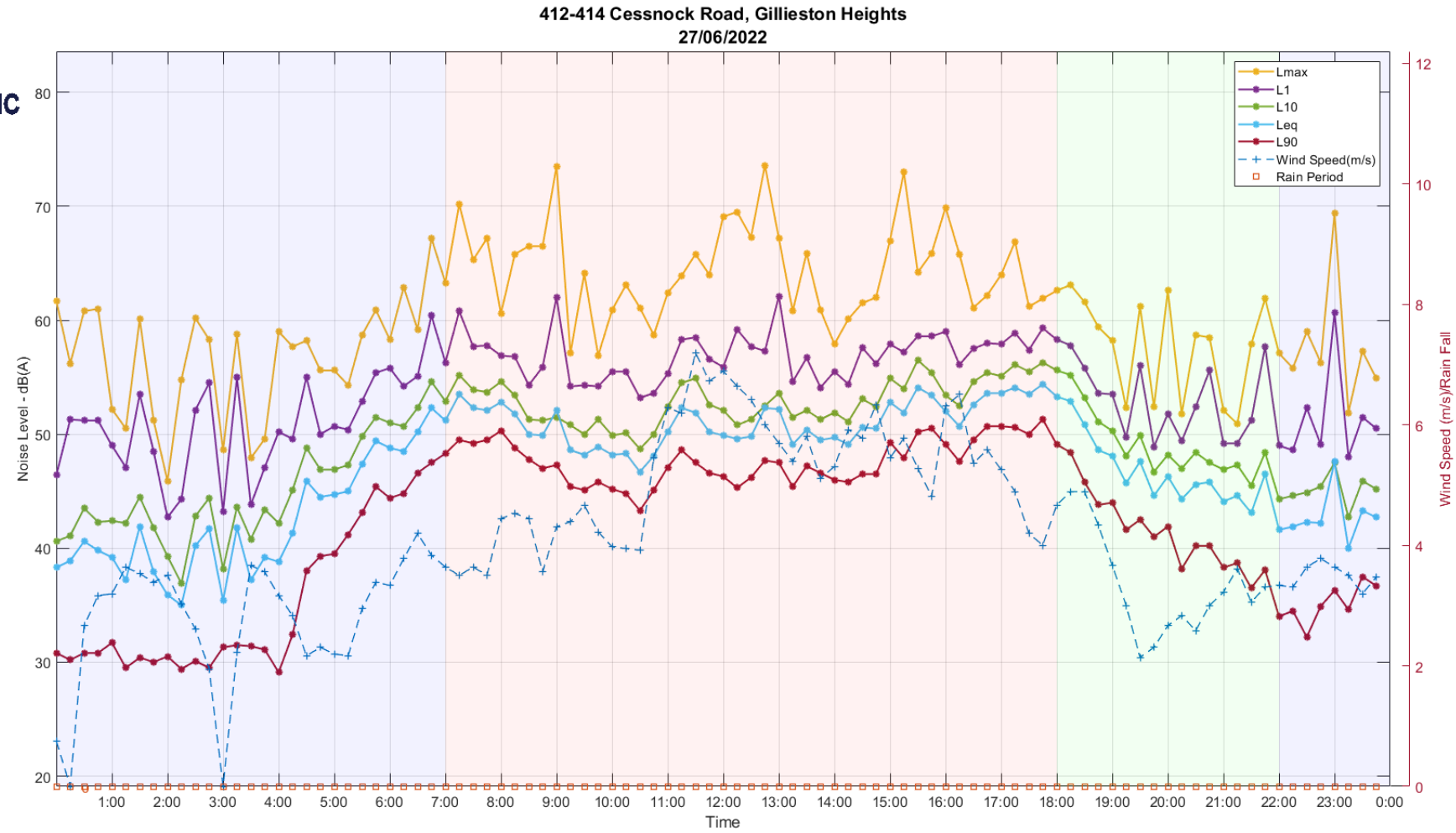
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Wind Speed (m/s)/Rain Fall
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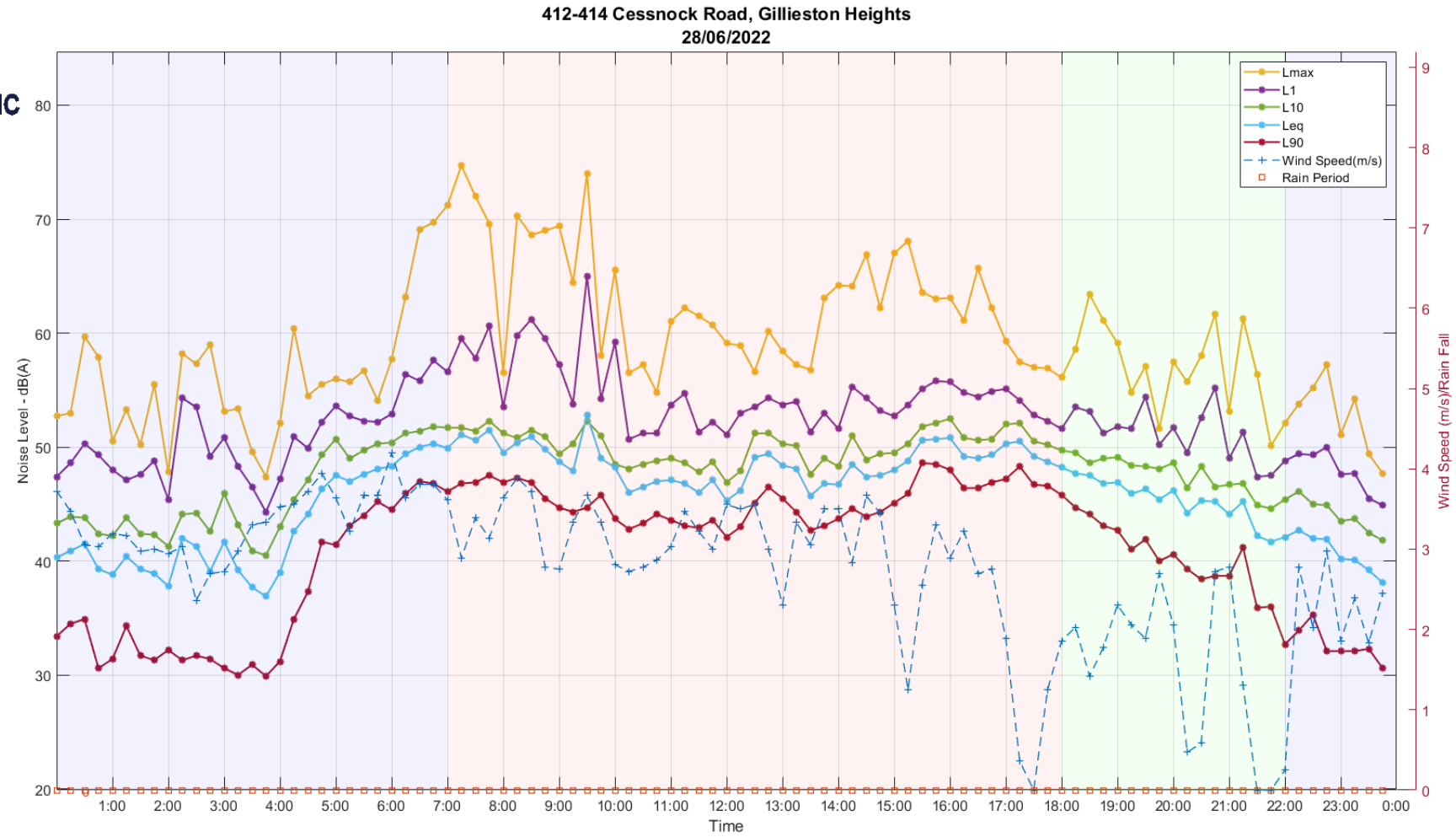
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Rain Period
Noise Level - dB(A)
Wind Speed (m/s)/Rain Fall
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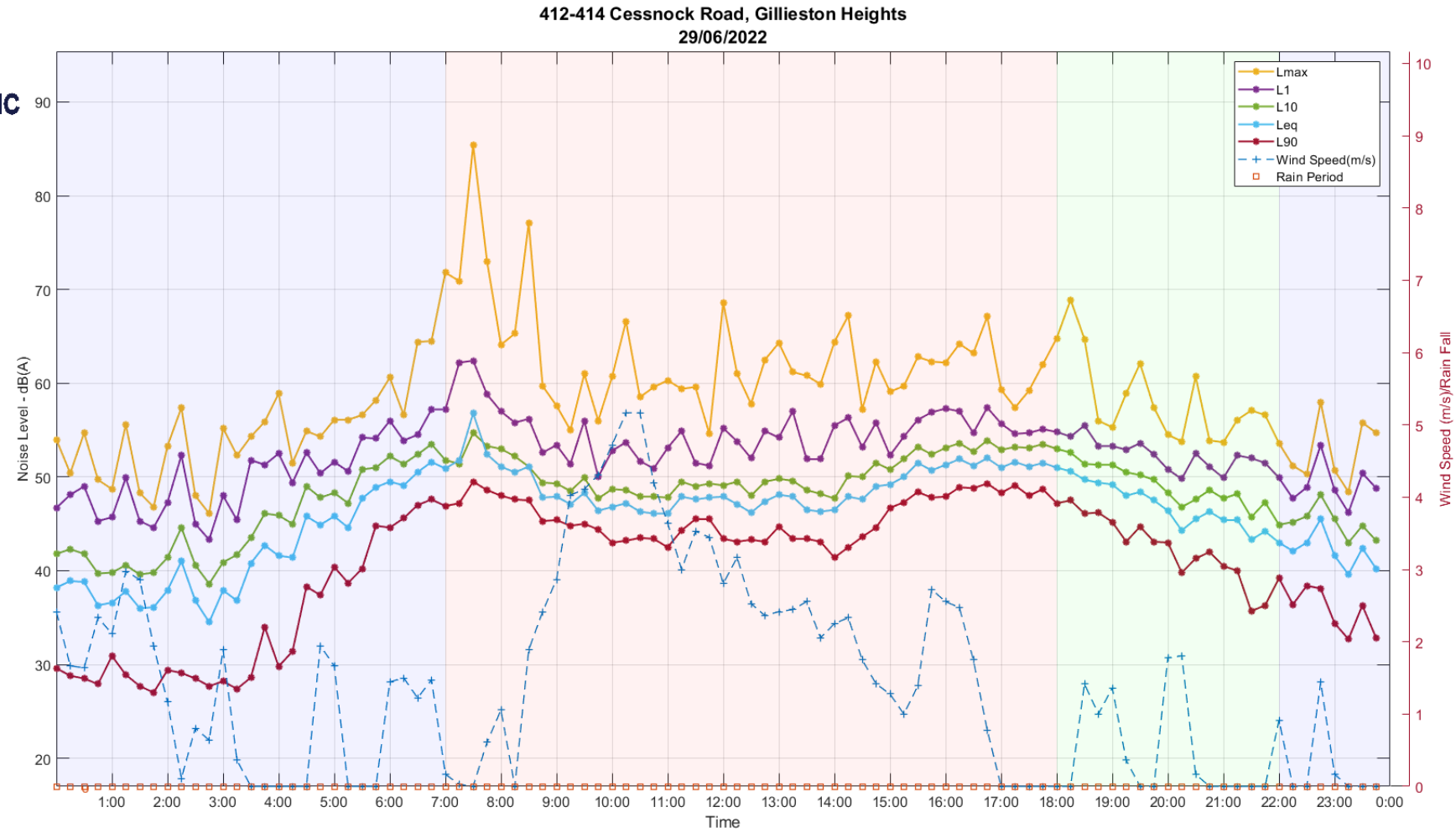
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Wind Speed (m/s)/Rain Fall
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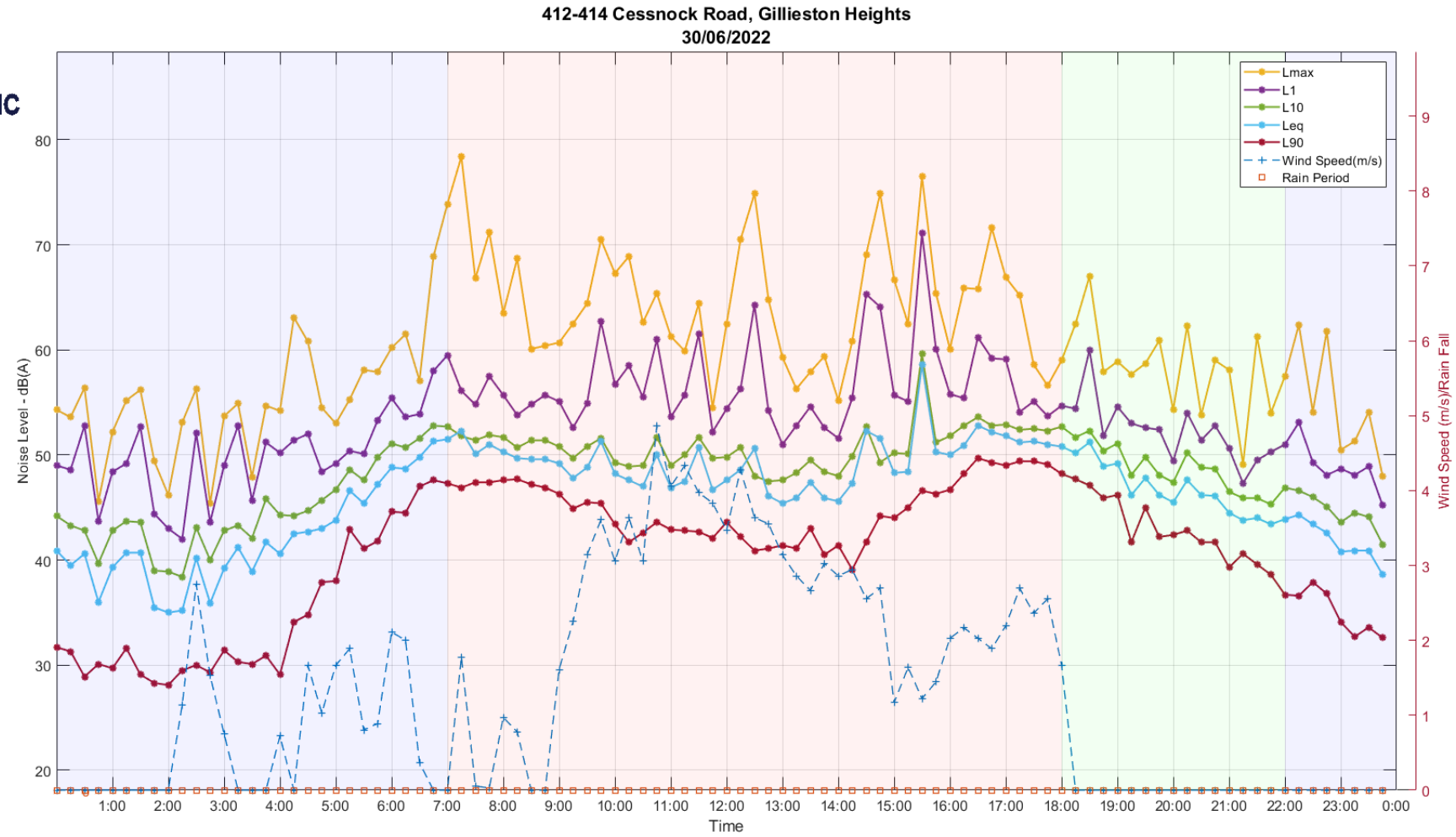
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Rain Period
Noise Level - dB(A)
Wind Speed (m/s)/Rain Fall
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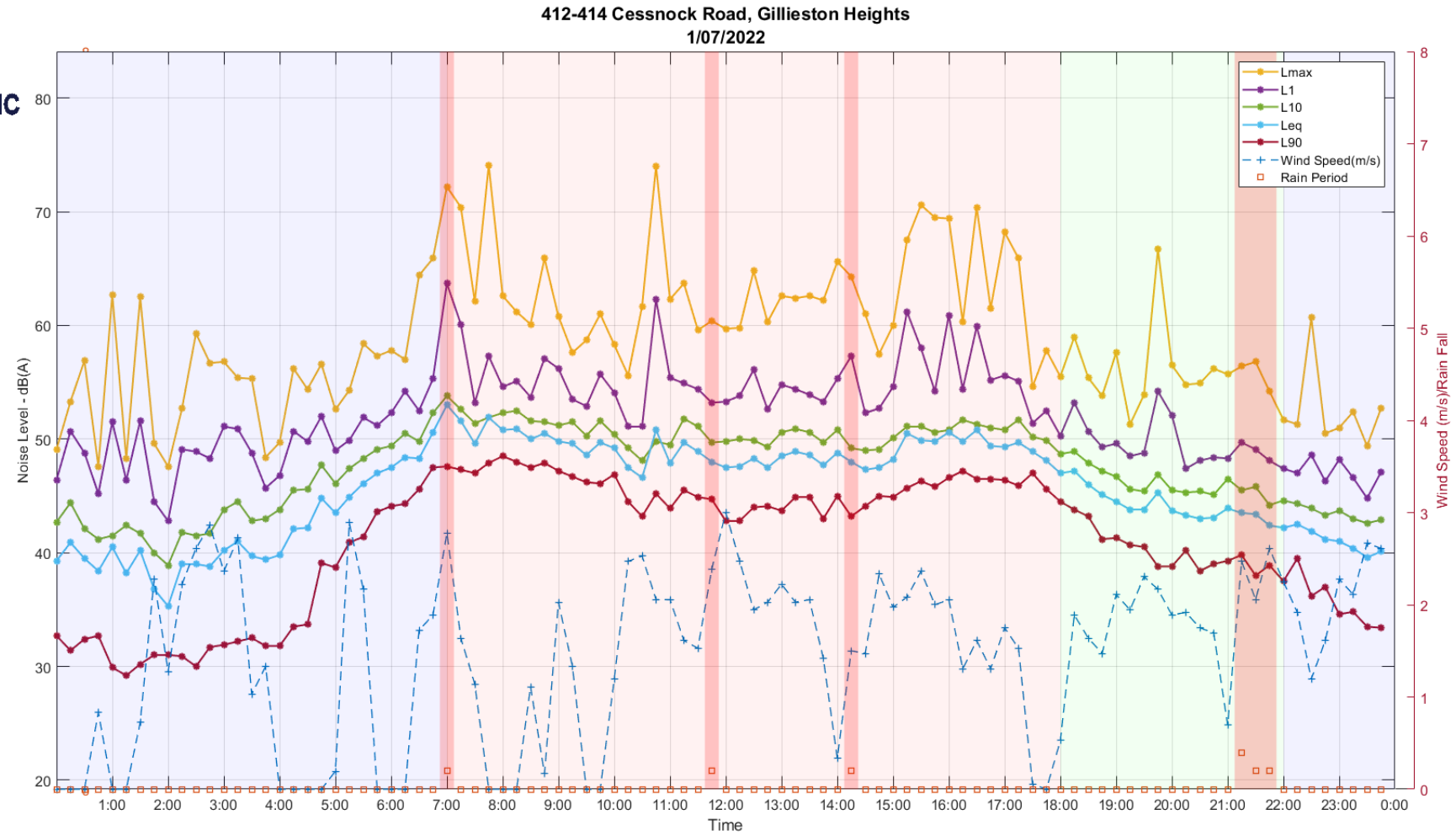
412-414 Cessnock Road, Gillieston Heights
1/07/2022
Lmax
L1
L10
Leq
L90
Wind Speed(m/s)
Rain Period
Noise Level - dB(A)
Wind Speed (m/s)/Rain Fall
Time
20
30
40
50
60
70
80
0
1
2
3
4
5
6
7
8
1:00
2:00
3:00
4:00
5:00
6:00
7:00
8:00
9:00
10:00
11:00
12:00
13:00
14:00
15:00
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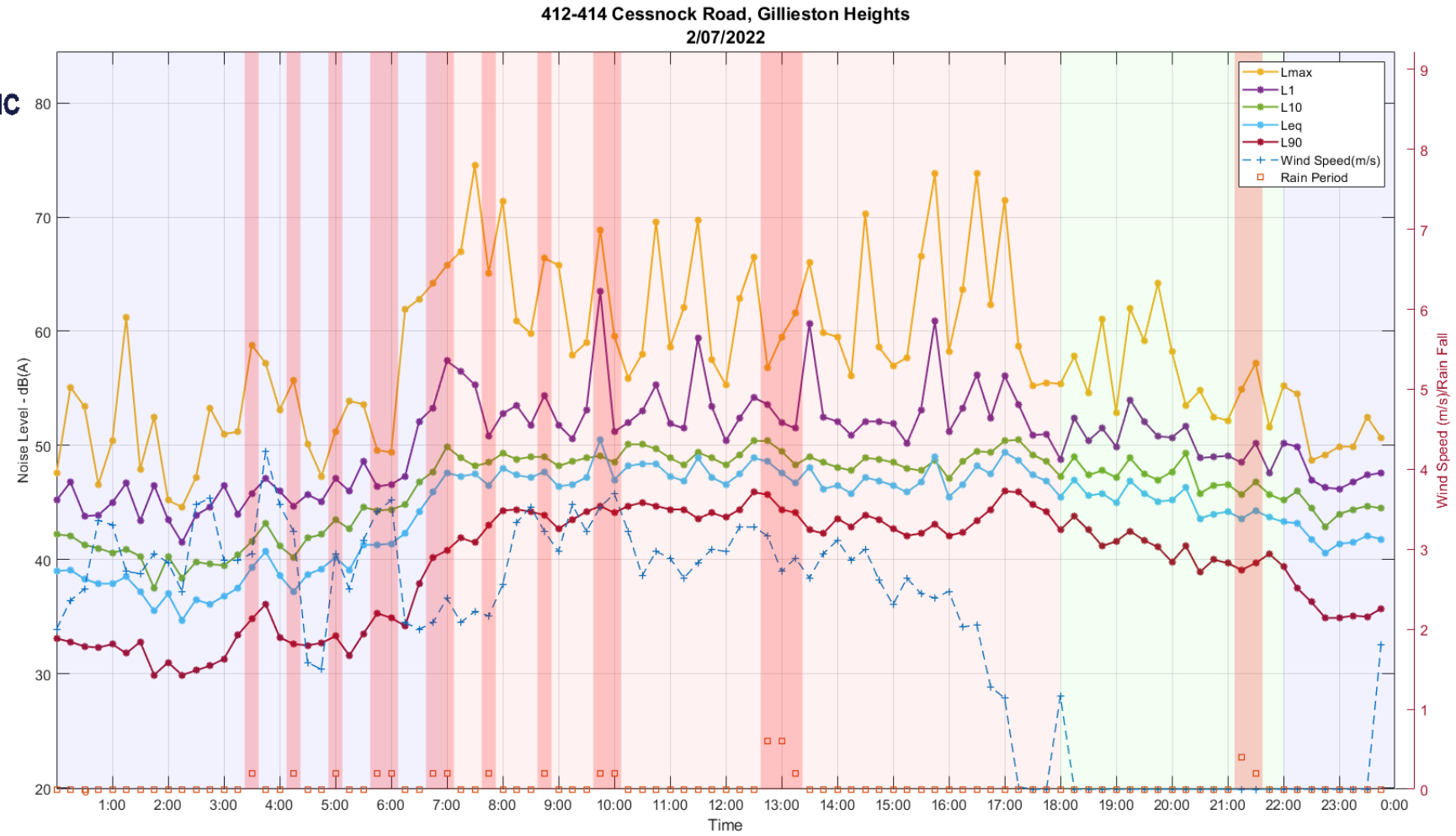
17:00
18:00
19:00
20:00
21:00
22:00
23:00
0:00


412-414 Cessnock Road, Gillieston Heights
2/07/2022
Lmax
L1
L10
Leq
L90
Wind Speed(m/s)
Rain Period
Noise Level - dB(A)
Wind Speed (m/s)/Rain Fall
Time
20
30
40
50
60
70
80
0
1
2
3
4
5
6
7
8
9
1:00
2:00
3:00
4:00
5:00
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7:00
8:00
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20:00
21:00
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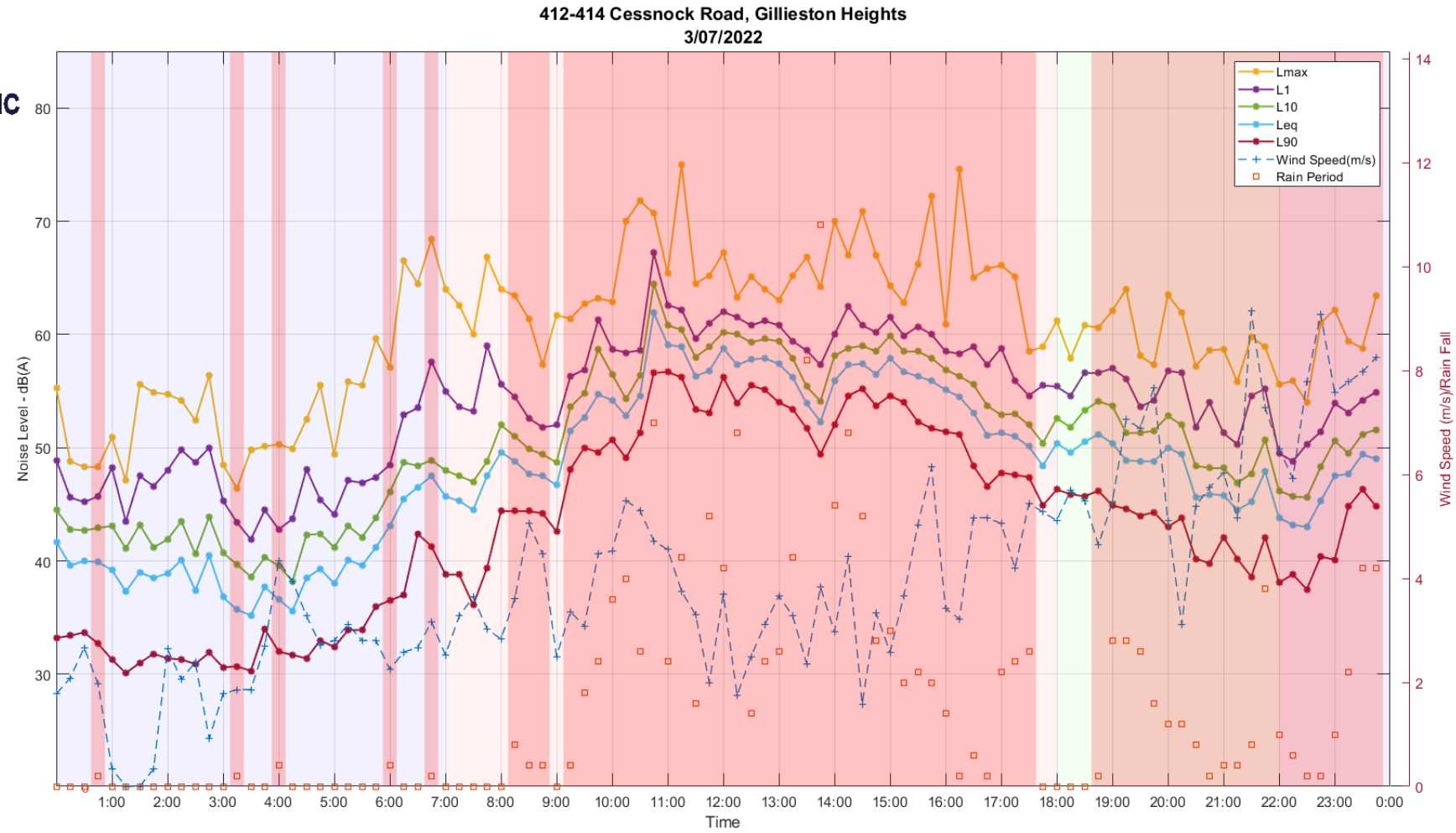
23:00
0:00


412-414 Cessnock Road, Gillieston Heights
3/07/2022
Lmax
L1
L10
Leq
L90
Wind Speed(m/s)
Rain Period
Noise Level - dB(A)
Wind Speed (m/s)/Rain Fall
Time
80
70
60
50
40
30
14
12
10
8
6
4
2
0
1:00
2:00
3:00
4:00
5:00
6:00
7:00
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23:00
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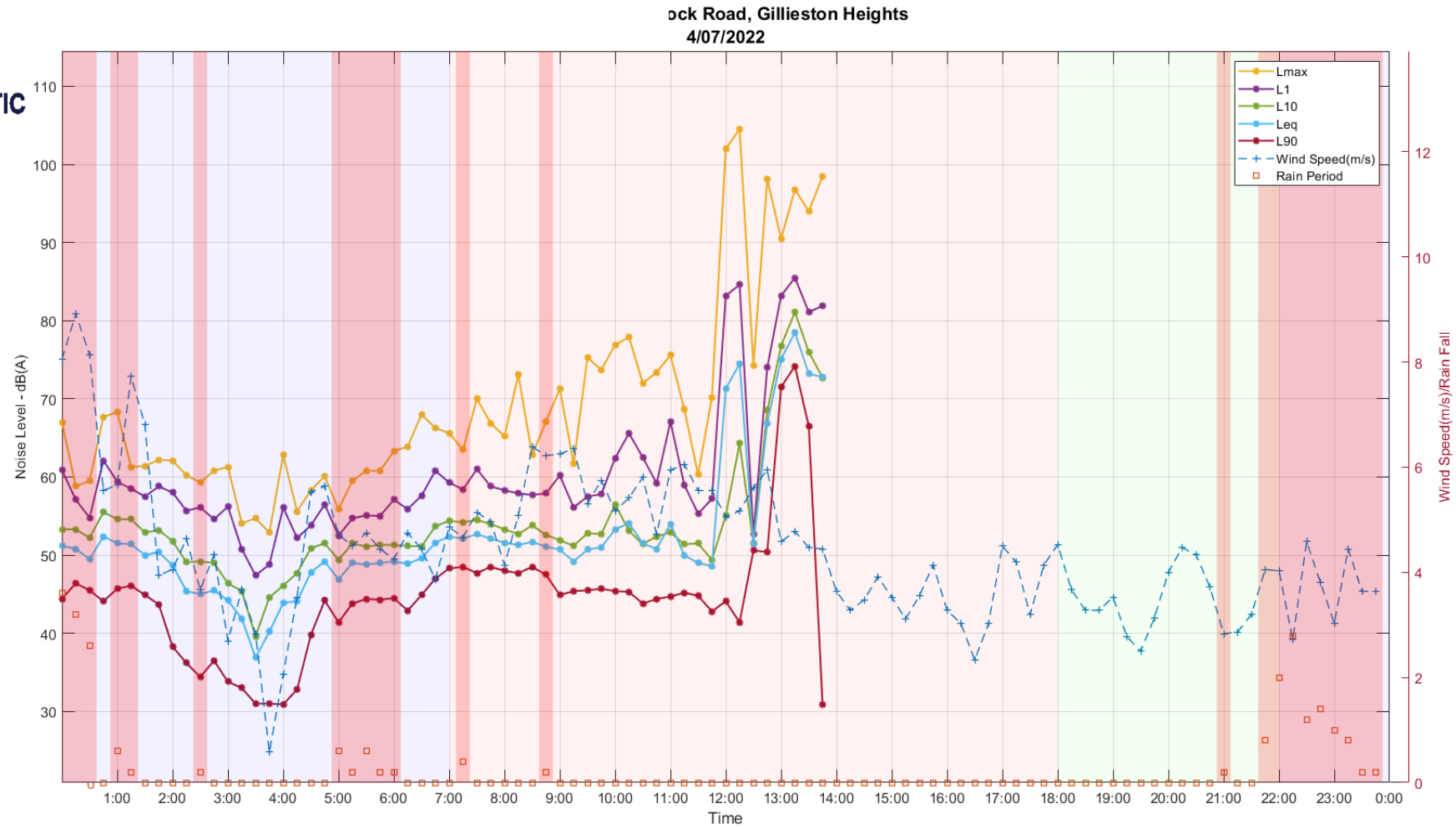
ock Road, Gillieston Heights
4/07/2022
Lmax
L1
L10
Leq
L90
Wind Speed(m/s)
Rain Period
Noise Level - dB(A)
Wind Speed(m/s)/Rain Fall
Time
110
100
90
80
70
60
50
40
30
12
10
8
6
4
2
0
1:00
2:00
3:00
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