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Stage 1 Kamira Avenue, Villawood

Noise Impact Assessment

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Project ID	20210202.1
Document Title	Noise Impact Assessment
Attention To	Villawood Quarter Unit Trust

Revision	Date	Document Reference	Prepared By	Checked By	Approved By
0	30/04/2021	20210202.1/3004A/R0/RG	RG		KB
1	7/05/2021	20210202.1/0705A/R1/RG	KB		KB
2	3/06/2021	20210202.1/0306A/R2/RG	KB		KB
3	17/06/2021	20210202.1/1706A/R3/RG	KB		KB
4	25/06/2021	20210202.1/2506A/R4/RG	KB		KB
5	23/07/2021	20210202.1/2307A/R5/RG	AZ		AW

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1 INTRODUCTION

Acoustic Logic has been engaged to conduct an acoustic assessment of potential noise impacts associated with Stage 1 the proposed masterplan development at Kamira Avenue, Villawood.

This report will:

- Identify relevant noise emission criteria applicable to the development.
- Identify nearby noise sensitive receivers and the operation noise sources with the potential to adversely impact them.
- Determine indicative building shell constructions necessary to comply with internal noise levels as a result of traffic and rail noise.

Acoustic Logic have utilised the following documents and regulations in the noise assessment of the development;

- Fairfield Citywide Development Control Plan (DCP) 2013
- NSW Environmental Protection Authority (EPA) document – *Noise Policy for Industry (NPI) 2017*.
- NSW Department of Planning: Development Near Busy Roads and Rail Corridors – Interim Guideline

This assessment has been conducted using the DKO Architecture drawings dated 18th June 2021 (Revision A), project number 12620.

2 SITE DESCRIPTION

The project site is located on Kamira Avenue, Villawood. The proposed development includes an 10-storey residential building with above ground carparking levels and a non-retail use tenancy, located on the ground floor.

There is no basement carpark associated with the development, instead carparking on ground and above ground on level 1 and level 2 is proposed. The entrance to the carpark is to be located on a new road to be constructed the southern boundary of the site.

The site is situated as follows:

- To the east is current commercial buildings, however as part of the masterplan the site will house future multi-storey residential buildings.
- To the north east, along Kamira Court, a multi-storey residential building is currently under construction
- Kamira Avenue and existing residential receivers bound the site to the west
- Howatt Street, once extend to the west, and Hilwa park bound the site to the south
- To the north is the Villawood road and the T2, T3 and freight rail lines passing through Villawood station.

There are an additional two multi-storey residential buildings as part of the masterplan that will sit between the site and Villawood train station. These buildings will block the direct line of site to the rail corridor, however as these buildings are yet to be approved, noise intrusion to the site will be assessed assuming no screening is provided, in the event the planning schemes of the future buildings are modified.

This nearest residential receivers to the site are as follows:

R1-R3: Existing residential dwellings on Kamira Avenue to the south and west of the site

R4: Proposed multistorey residential buildings to the north

R5: Proposed multistorey residential apartments to the east

A site map with receiver and measurement locations is depicted below in Figure 1.

Residential receiver

Figure 1 – Site Map
(Sourced SixMapsNSW)

Unattended noise monitor

Attended noise measurement

3 NOISE DESCRIPTORS

Environmental noise constantly varies. Accordingly, it is not possible to accurately determine prevailing environmental noise conditions by measuring a single, instantaneous noise level.

To accurately determine the environmental noise a 15-20 minute measurement interval is utilised. Over this period, noise levels are monitored on a continuous basis and statistical and integrating techniques are used to determine noise description parameters.

In analysing environmental noise, three-principle measurement parameters are used, namely L_{10}, L_{90} and L_{eq}. The L_{10} and L_{90} measurement parameters are statistical levels that represent the average maximum and average minimum noise levels respectively, over the measurement intervals.

The L_{10} parameter is commonly used to measure noise produced by a particular intrusive noise source since it represents the average of the loudest noise levels produced by the source.

Conversely, the L_{90} level (which is commonly referred to as the background noise level) represents the noise level heard in the quieter periods during a measurement interval. The L_{90} parameter is used to set the allowable noise level for new, potentially intrusive noise sources since the disturbance caused by the new source will depend on how audible it is above the pre-existing noise environment, particularly during quiet periods, as represented by the L_{90} level.

The L_{eq} parameter represents the average noise energy during a measurement period. This parameter is derived by integrating the noise levels measured over the 15 minute period. L_{eq} is important in the assessment of environmental noise impact as it closely corresponds with human perception of a changing noise environment; such is the character of environmental noise.

4 EXTERNAL NOISE SURVEY

An acoustic survey has been carried out by setting up three noise monitors around the project site to record the existing ambient and background noise levels.

NSW EPA's Rating Background Noise Level (RBL) assessment procedure requires determination of background noise level for each day (the ABL) then the median of the individual days as set out for the entire monitoring period.

Appendices in this report present results of unattended noise monitoring conducted at the project site. Weather affected data was excluded from the assessment. The processed RBL (lowest 10th percentile noise levels during operation time period) are presented in Table 1.

4.1 MEASUREMENT POSITION

Three unattended noise monitors were placed around the project site. The detailed locations are below:

- Location 1: Unattended noise monitor was placed near Kamira Avenue
- Location 2: The monitor was placed near Villawood Road
- Location 3: The monitor was located on the corner of Kamira Avenue and Villawood Road with sight of the rail.

Detailed monitor locations have been marked in Figure 1 above.

4.1.1 Measurement Period

Unattended noise monitoring was conducted from the 12th to the 22nd and 24th to the 28th of March 2021.

4.1.2 Measurement Equipment

Equipment used consisted of three Acoustic Research Laboratories Pty Ltd noise loggers. The loggers were set to A-weighted fast response and were programmed to store 15-minute statistical noise levels throughout the monitoring period. The monitors were 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 A.

4.1.3 Summarised Long Term Noise Measurement Results

Table 1 - Measured Background Noise Levels RBL

Monitor Locations	Time of day	Rating Background Noise Level dB(A)$L90_{(Period)}$
Logger 1	Day (7am – 6pm)	50
	Evening (6pm – 10pm)	47
	Night (10pm – 7am)	44
Logger 2	Day (7am – 6pm)	48
	Evening (6pm – 10pm)	47
	Night (10pm – 7am)	40
Logger 3	Day (7am – 6pm)	50
	Evening (6pm – 10pm)	48
	Night (10pm – 7am)	41

Table 2 - Measured Rail Noise Levels

Monitor Locations	Time of day	Measured Noise Level dB(A)$L_{eq(Period)}$
Logger 2	Day (7am – 10pm)	$59L_{eq(15hour)}$
	Night (10pm – 7am)	$52L_{eq(9hour)}$
Logger 3	Day (7am – 10pm)	$60L_{eq(15hour)}$
	Night (10pm – 7am)	$55L_{eq(9hour)}$

Table 3 - Measured Traffic Noise Levels

Monitor Locations	Time of day	Measured Noise Level dB(A)$L_{eq(worst\ 1\ hour)}$
Logger 1	Day (7am – 10pm)	$59L_{eq(1hour)}$
	Night (10pm – 7am)	$56L_{eq(1hour)}$

5 EXTERNAL NOISE INTRUSION ASSESSMENT

This section of the report details the acoustic assessment of traffic and train noise intrusion to the proposed development.

5.1 ACOUSTIC CRITERIA

The environmental noise assessment has been conducted in accordance with the following documents:

- Fairfield Citywide Development Control Plan (DCP) 2013;
- NSW Development of Planning's *"Development Near Rail Corridors & Busy Roads (Interim Guideline)"*

5.2 INTERNAL NOISE CRITERIA

5.2.1 Fairfield DCP 2013

The Fairfield Citywide development control plan (2013) does not include any specific noise controls and so we will refer to the Development Near Rail Corridors and Busy Roads (Interim Guideline) and SEPP 2007 as seen below.

5.2.2 NSW Department of Planning - State Environmental Planning Policy (SEPP) (Infrastructure)

The guidelines and criteria listed in the SEPP are summarised and listed below.

5.2.3 NSW Department of Planning's 'Development Near Rail Corridors and Busy Roads (Interim Guideline)'

Section 3.5 of the NSW Department of Planning's 'Development Near Rail Corridors and Busy Roads (Interim Guideline)' states:

"The following provides an overall summary of the assessment procedure to meet the requirements of clauses 87 and 102 of the Infrastructure SEPP. The procedure covers noise at developments for both Road and Rail.

- *If the development is for the purpose of a building for residential use, the consent authority must be satisfied that appropriate measures will be taken to ensure that the following LAeq levels are not exceeded:*
    - *in any bedroom in the building: 35dB(A) at any time 10pm-7am*
    - *anywhere else in the building (other than a garage, kitchen, bathroom or hallway): 40dB(A) at any time."*

5.2.4 Summary of Road Noise Criteria

Internal noise criteria for each space is summarised below.

Table 4 – Summary of Project Noise Objectives

Space	Criteria
Bedrooms	35dB(A) $L_{Aeq(9hour)}$
Living Spaces	40dB(A) $L_{Aeq(15hour)}$

6 RECOMMENDED CONSTRUCTIONS

6.1.1 Glazed Windows and Door Construction

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.

No detailed elevations are available at this stage, noise intrusion analysis has been carried out based on assumptions of full height glazing and room finish is tile for living rooms and carpet for bedrooms. The indicative acoustic treatments are detailed below.

Table 5 -Indicative Glazing Requirements

Façade	Space	Glazing	Recommended Construction	Acoustic Seals
All	Living	Rw32	6.38mm laminate	Yes
	Bedroom	Rw32	6.38mm laminate	Yes

6.1.2 External Roof/Ceiling Construction

The proposed external roof is to be constructed with masonry elements and thus will be acoustically acceptable and will not require further treatment. Penetrations in all ceilings (such as for light fittings etc.) must be acoustically treated and sealed gap free with a flexible sealant. In the event that any penetrations are required through the external skin, an acoustic sealant should be used to minimise all gaps.

6.1.3 External Wall Construction

The proposed external walls are to be constructed with masonry elements and thus will be acoustically acceptable. There should not be vents on the internal skin of external walls. All penetrations in the internal skin of external walls should be acoustically sealed.

6.1.4 External Entry Doors

All external entry doors opening to corridors and lobbies shall have glazing thickness equal to those recommended in Table 5 (if applicable) and are to have Raven RP10 acoustic seals to the top and sides and Raven RP38 to the underside of the door.

7 NOISE EMISSIONS GOALS

The noise emission from the operation of the project site shall comply with the requirements of NSW, Environment Protection Authority (EPA) – *Noise Policy for Industry (NPI) 2017*.

7.1 NSW EPA NOISE POLICY FOR INDUSTRY (NPI) 2017

The EPA NPI has two criteria which both are required to be satisfied, namely Intrusiveness and amenity. The NPI 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.

7.1.1 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 the lowest of those presented in Table 1. Noise emissions from the site should comply with the noise levels presented below when measured at nearby property boundary.

Table 6 - Project Intrusiveness Criterion

Location	Time of day	Rating Background Noise Level dB(A) $L_{90(period)}$ (Logger 1)	Intrusiveness Project Noise Trigger Level dB(A) $L_{eq(15min)}$
Residential Receivers	Day	48	53
	Evening	47	52
	Night	40	45

7.1.2 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 NPI 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 Table 1, the Noise Policy for Industry suggests the adoption of the 'suburban' categorisation.

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

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

The amenity levels appropriate for the receivers surrounding the project site are presented in Table 7.

Table 7 - EPA Amenity Noise Levels

Type of Receiver	Time of day	Recommended Noise Level dB(A)$L_{eq(period)}$	Amenity Project Noise Trigger Level dB(A)$L_{eq(15min)}$
Residential – Suburban	Day	55	53
	Evening	45	43
	Night	40	38
Commercial	When in use	-	63

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

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

7.1.3 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:

- *$L_{Aeq,15min}$ 40 dB(A) or the prevailing RBL plus 5 dB, whichever is the greater, and/or*
- *L_{AFmax} 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 8 - Sleep Arousal Criteria for Residential Receivers

Receiver	Rating Background Noise Level (Night) dB(A)L_{90}	Emergence Level
Residential Receivers Night (10pm – 7am)	40dB(A) L_{90}	45dB(A)$L_{eq,\ 15min}$; 55dB(A)L_{Fmax}

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

For the research on sleep disturbance to date it can be concluded that:

- *Maximum internal noise levels below 50-55dB(A) are unlikely to awaken people from sleep.*
- *One to two noise events per night with maximum internal noise levels of 65-70dB(A) are not likely to affect health and wellbeing significantly.*

8 NOISE EMISSIONS ASSESSMENT

8.1 MECHANICAL PLANT

Detailed review of all external mechanical plant should be undertaken at construction certificate stage (once plant selections and locations are finalised). Acoustic treatments should be determined in order to control plant noise emissions to the levels set out in section 7 of this report.

For roof top plant items compliance with noise emission requirements will be achievable with appropriate acoustic treatment.

Other equipment external items (fans) would be expected to be capable of compliance through use of internal duct lining and/or in-duct attenuators.

8.2 PODIUM CAR PARK

The following development controls should be incorporated to ensure that the noise emissions from the car park comply with the nominated criteria.

- The car park pavement shall be smooth and level to ensure minimal vertical displacement and potential for noise generated by wheel to concrete impacts. The surface finish shall be of a type that minimises squealing of car tyres.
- Concrete to have a broom finish or similar, to prevent tyre squeal.
- Traffic calming devices should be applied to control vehicle speeds including10km/hour.
- No speed humps are to be installed within the car park.
- Grates and any cover plates are to be fixed flush and tight. Any cover plates are to be smooth and level with the slab (i.e. no humps).

8.3 GARBAGE COLLECTION

Recommendations are as follows:

- All bin handling is to be conducted within the garbage collection area (i.e. within the covered area)
- Baler, if one is installed, to be vibration isolated from the building structure.

9 CONCLUSION

This report presents an acoustic assessment of potential noise impacts associated with the mixed-use development proposed for Stage 1 of the Villawood Masterplan, located at Kamira Ave, Villawood.

Noise intrusion criteria has been set up in this report to satisfy the requirements from the following documents

- Fairfield Citywide Development Control Plan (DCP) 2012, and
- NSW Department of Planning: *"Development Near Busy Roads and Rail Corridors – Interim Guideline"*

Indicative constructions have been presented in section 5.

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

- Fairfield Citywide Development Control Plan (DCP) 2012
- NSW Environmental Protection Authority (EPA) document – *Noise Policy for Industry (NPI) 2017*.

Noise impacts from the proposed use of the development has been assessed with reference to the requirements of the NSW EPA Noise Policy for Industry (2017). The assessment of specific plant items should be undertaken as part of the construction certificate process.

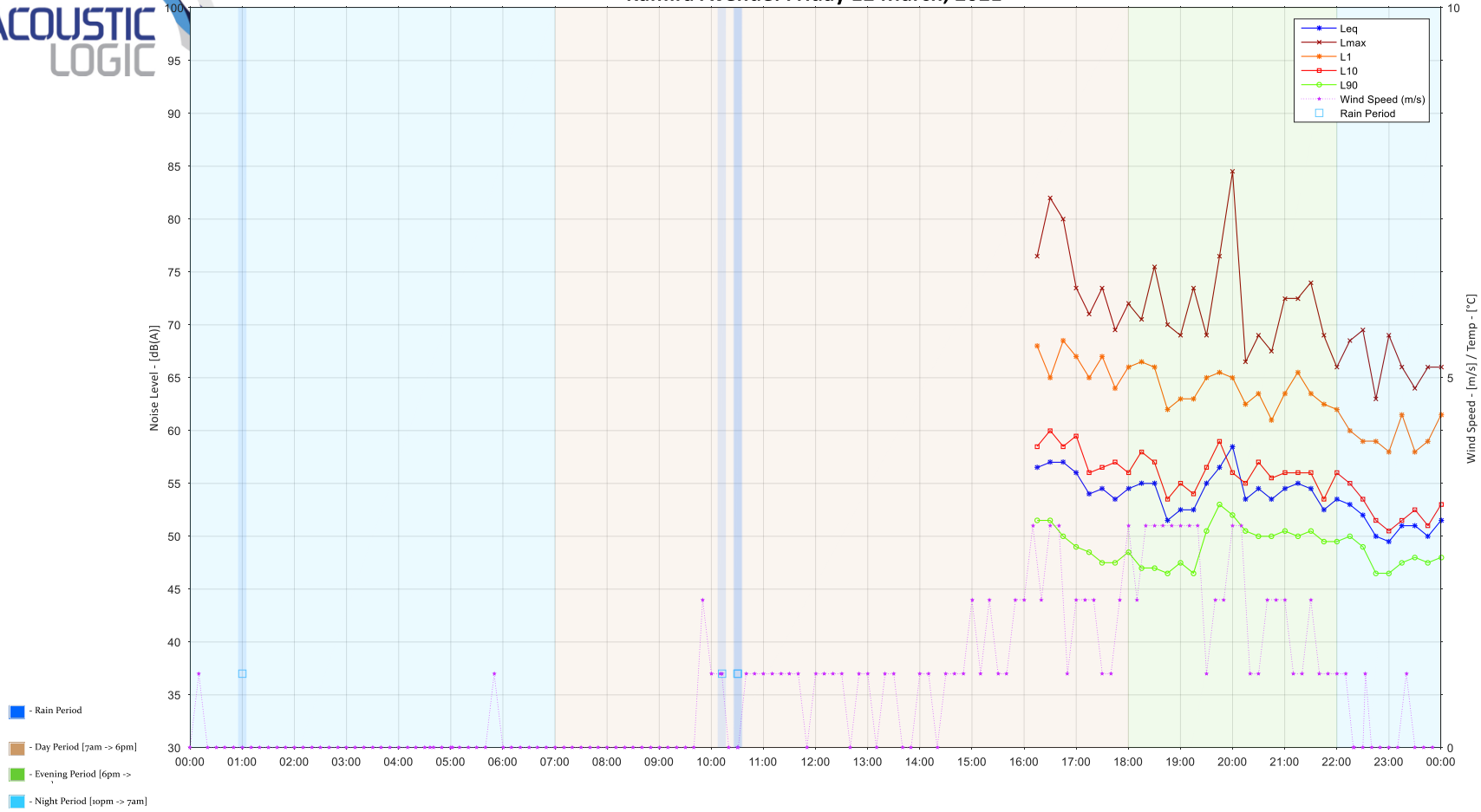
We trust this information is satisfactory. Please contact us should you have any further queries.

Yours faithfully,

Acoustic Logic Pty Ltd
Ruben Ghannoum

APPENDIX A – UNATTENDED NOISE MONITORING DATA

LOGGER LOCATION 1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Lmax
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L10
L90
Wind Speed (m/s)
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- Evening Period [6pm ->
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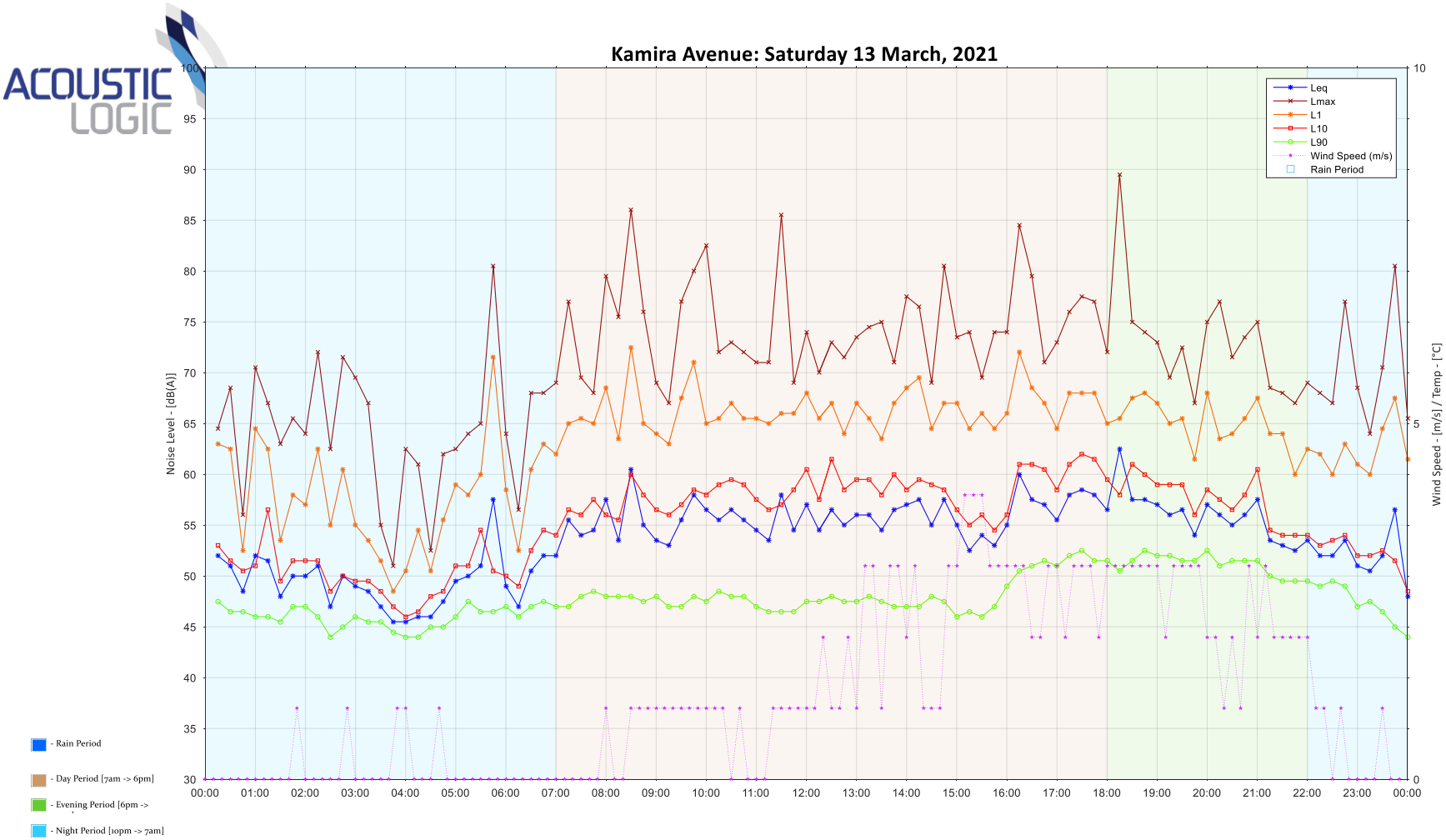
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Lmax
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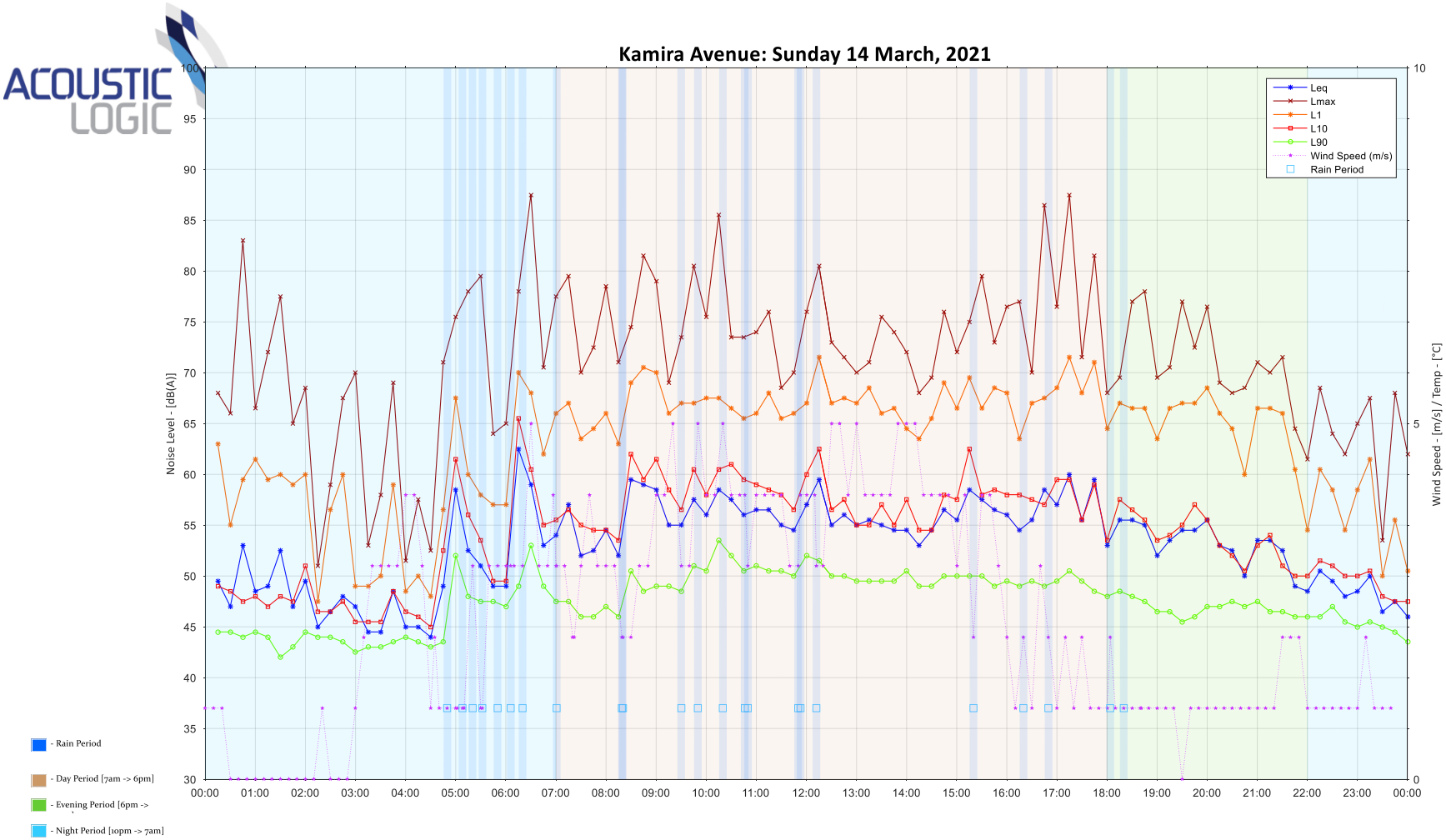
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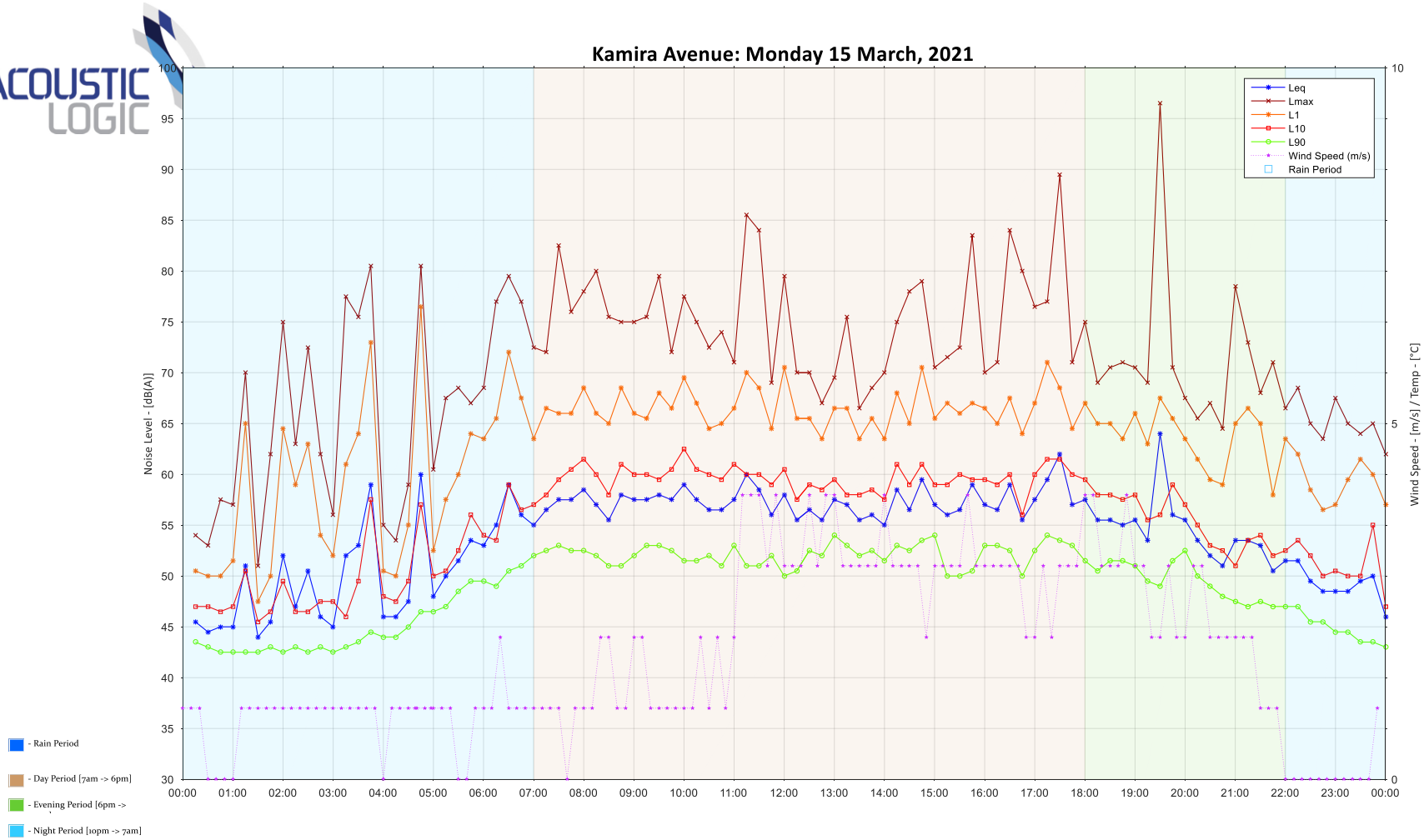
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- Evening Period [6pm ->
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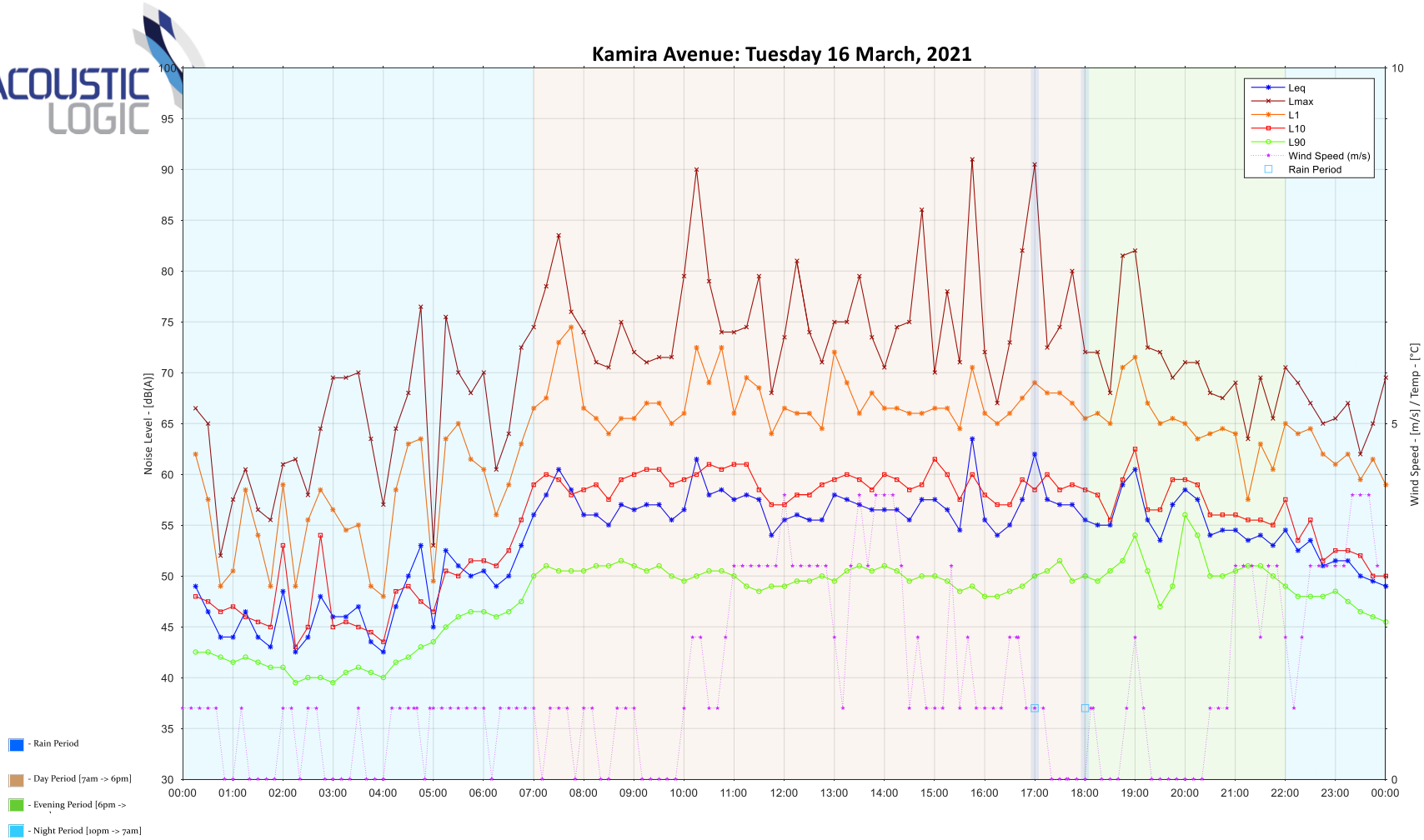
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L90
Wind Speed (m/s)
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- Evening Period [6pm ->
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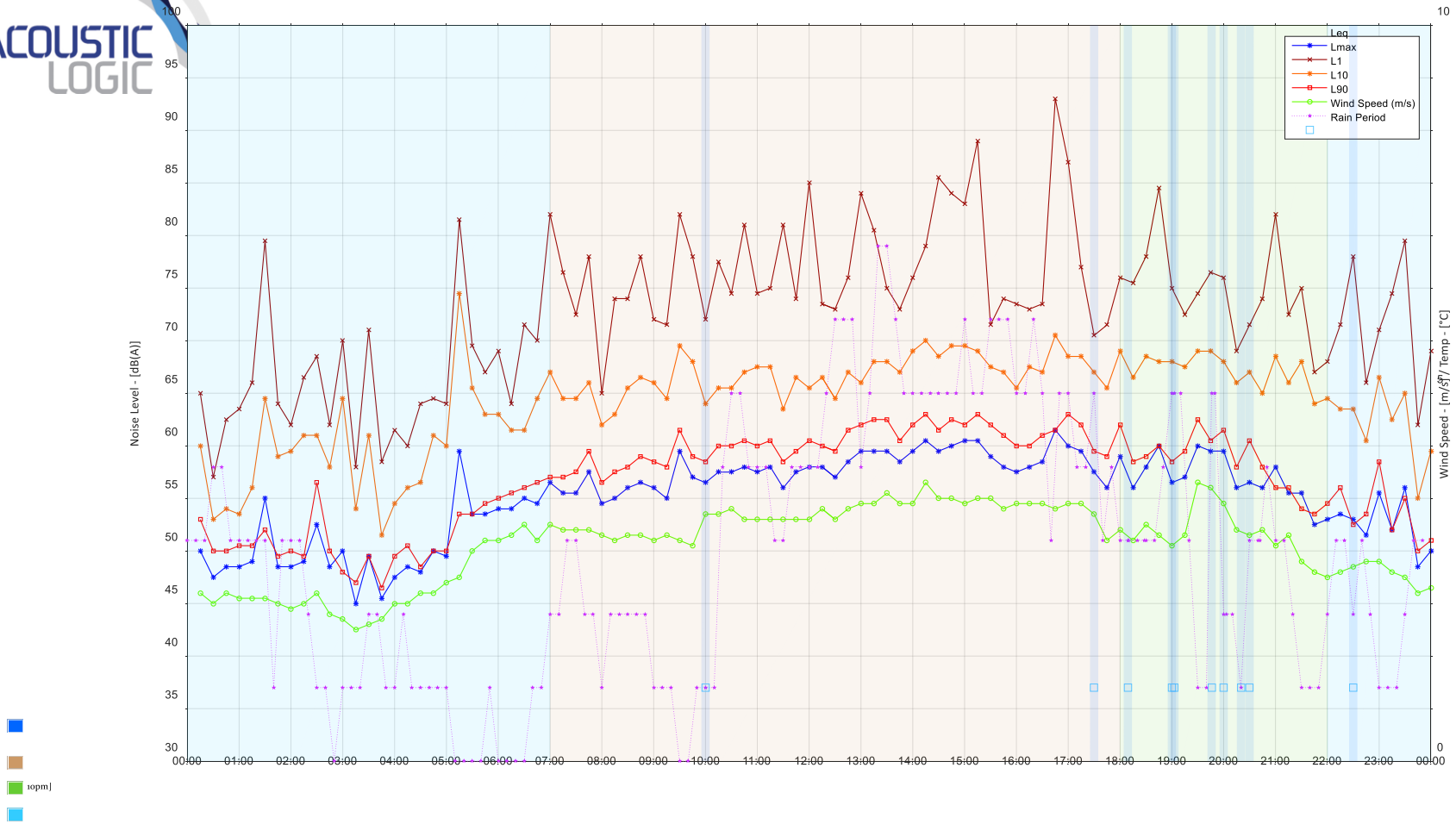

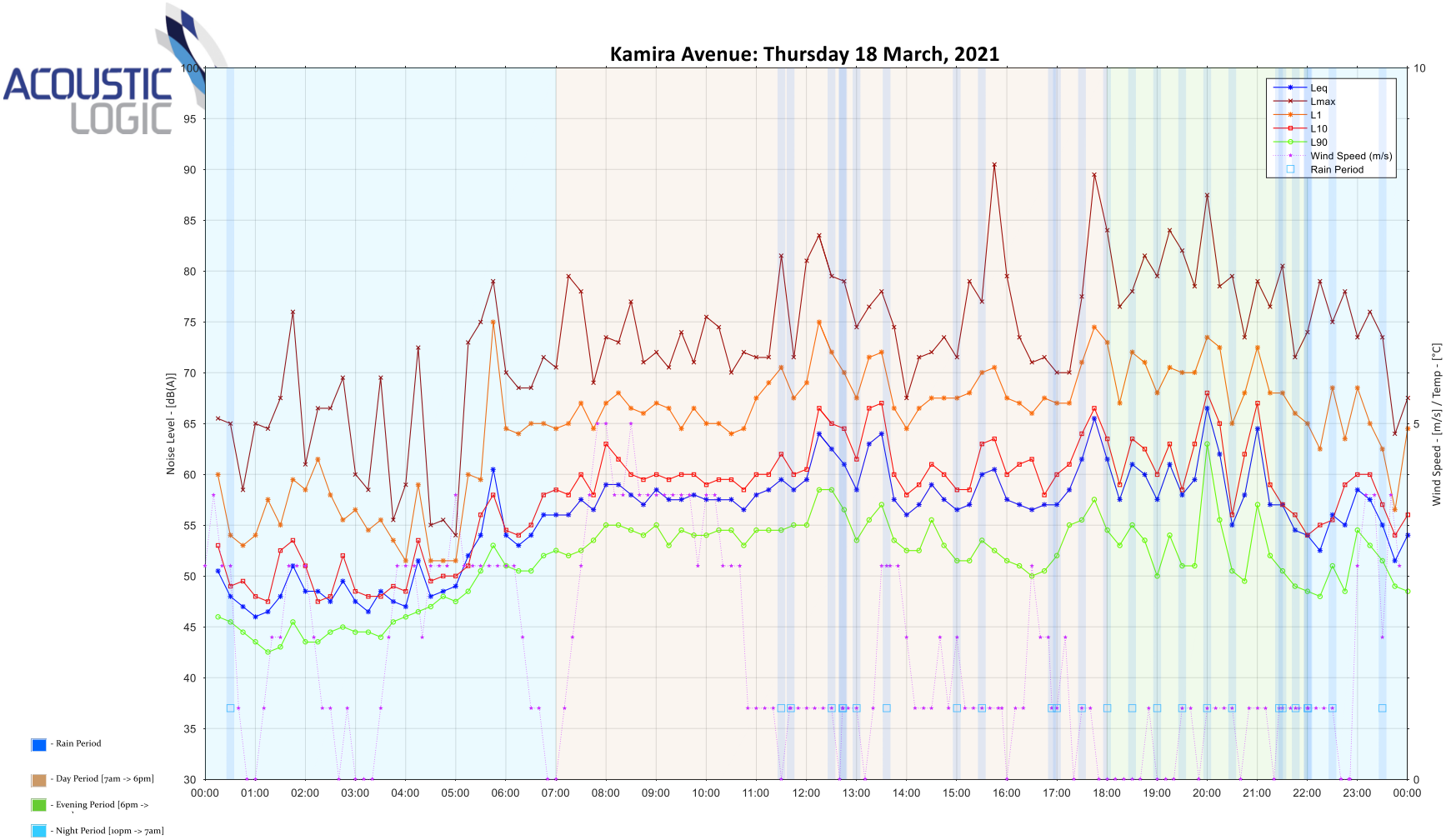
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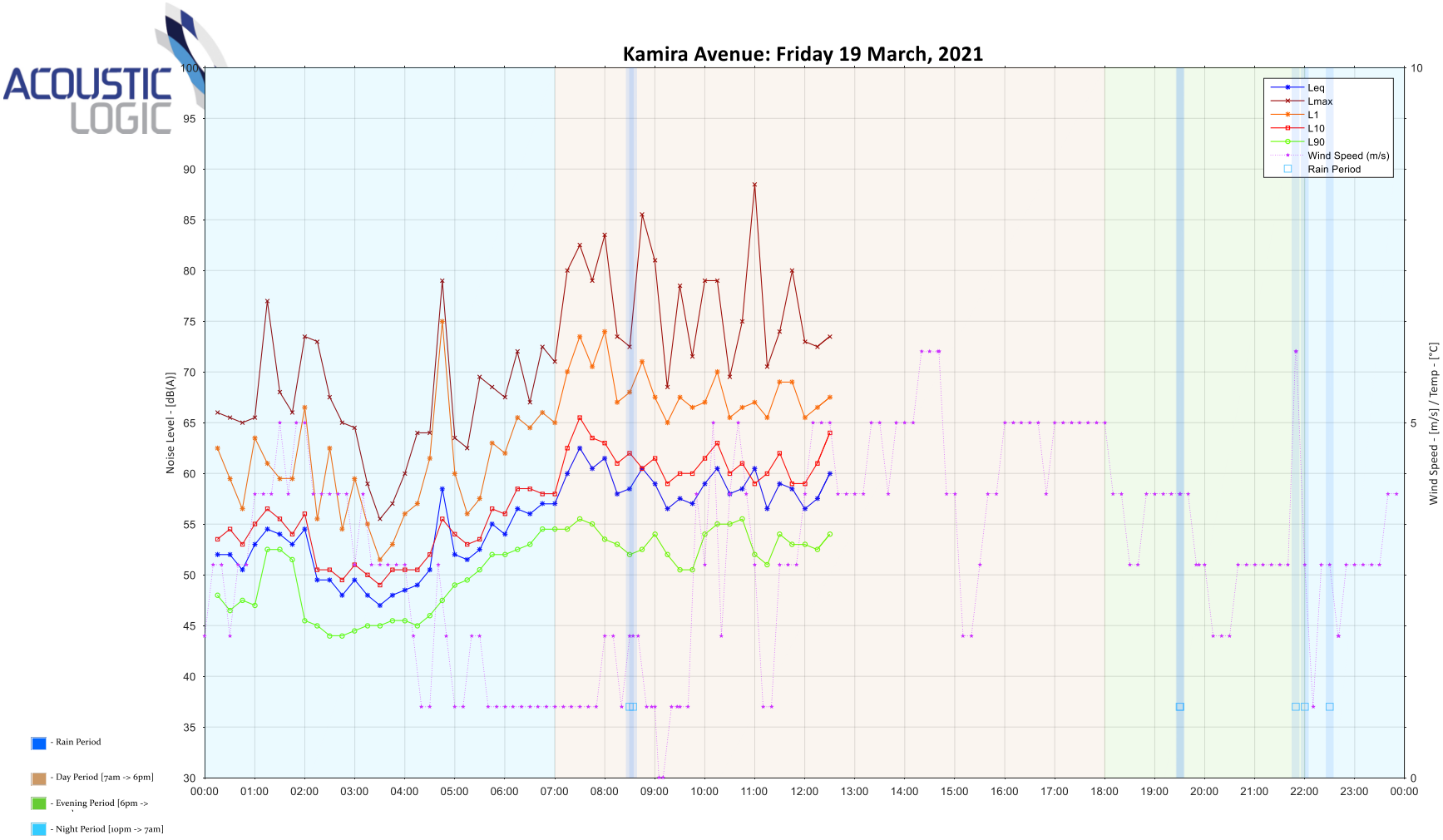
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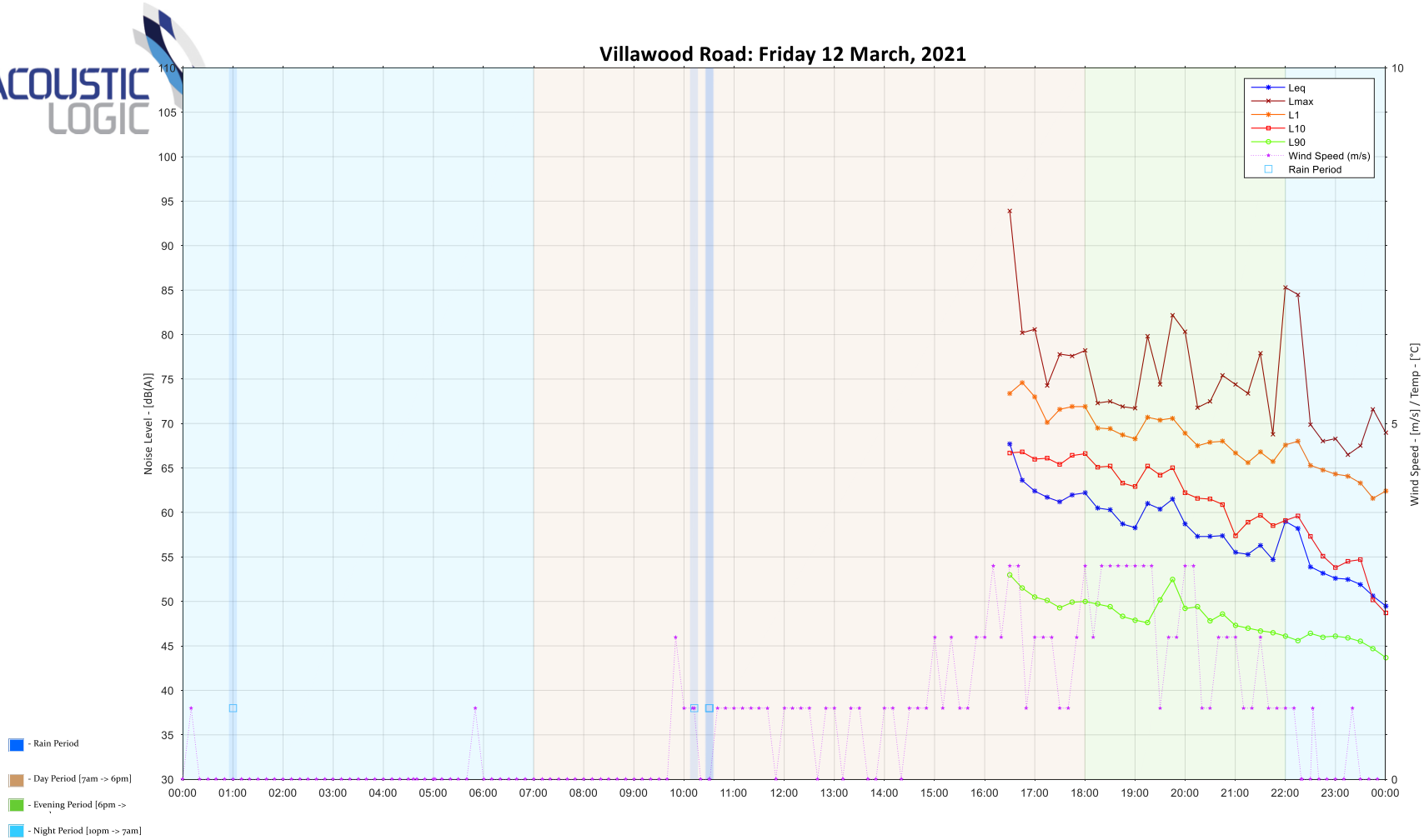
LOGGER LOCATION 2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Rain Period
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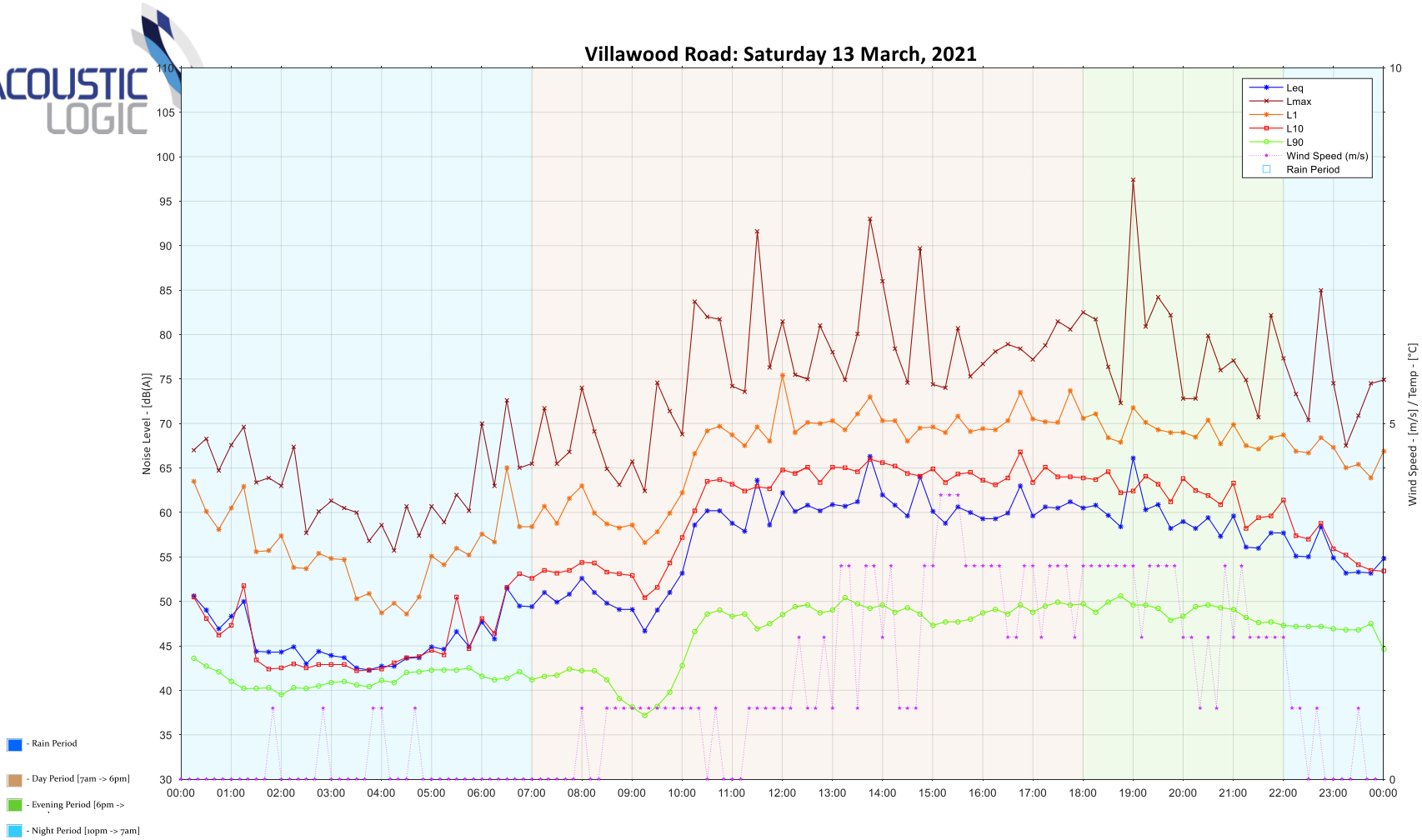
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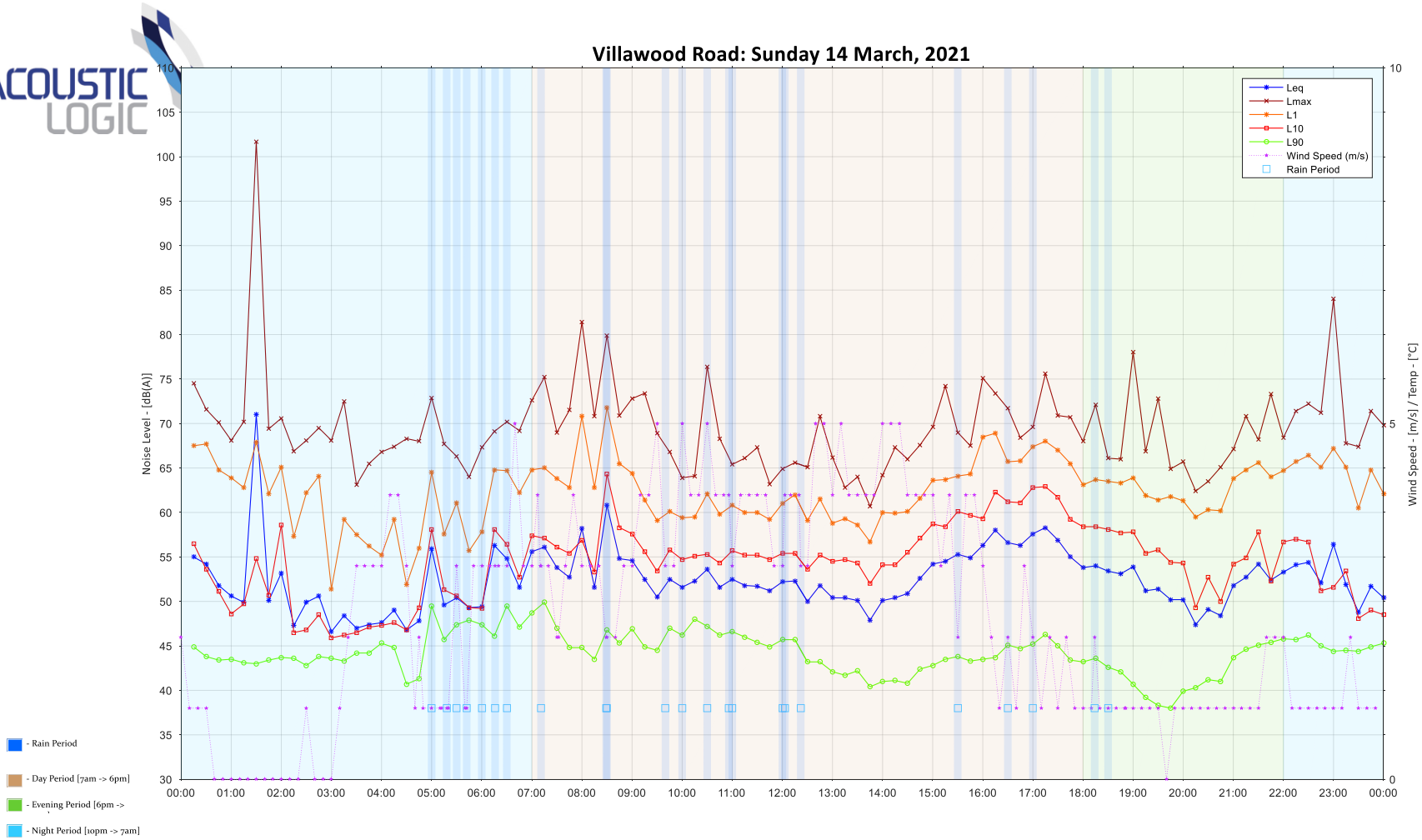
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L1
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L90
Wind Speed (m/s)
Rain Period
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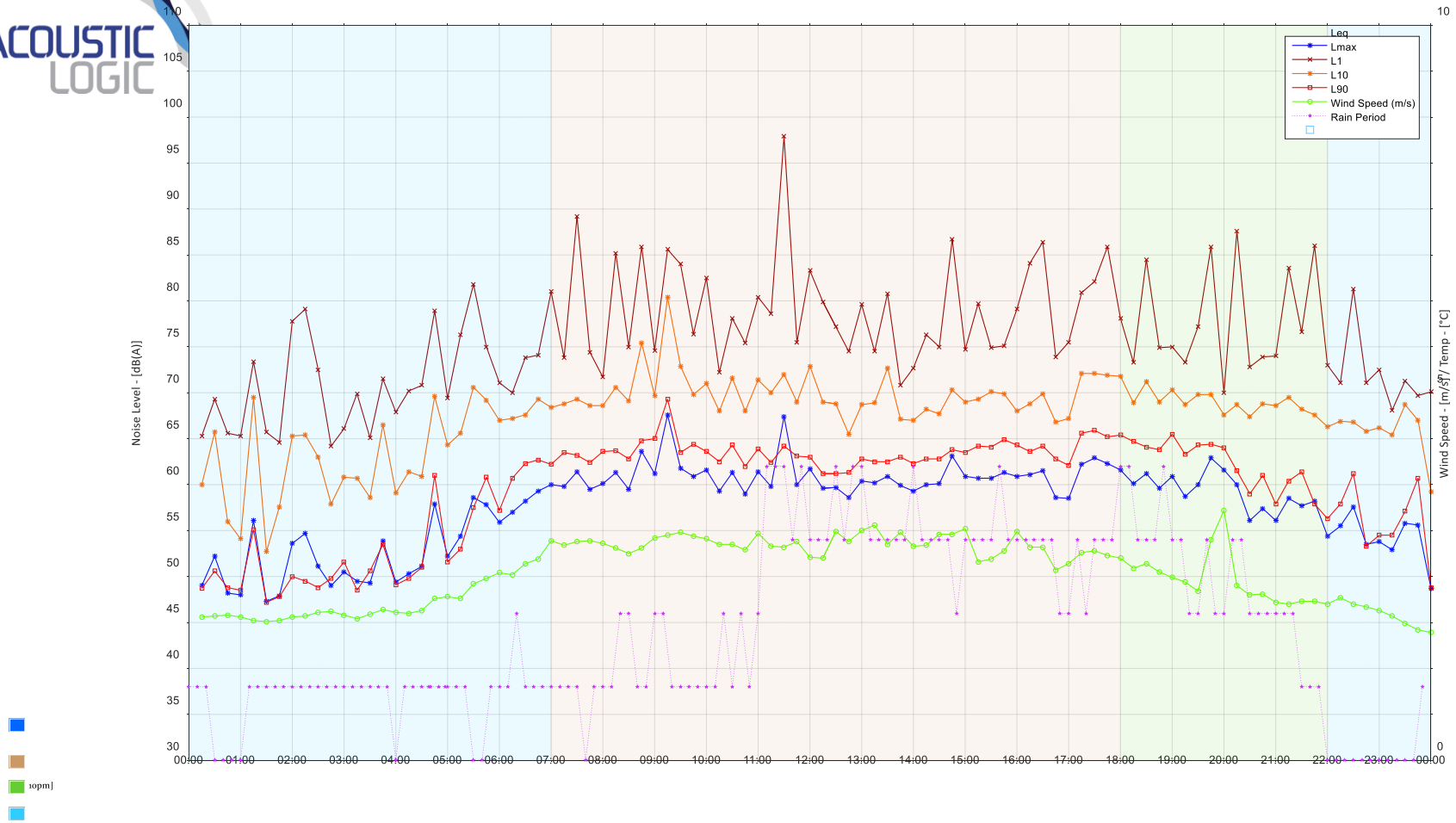

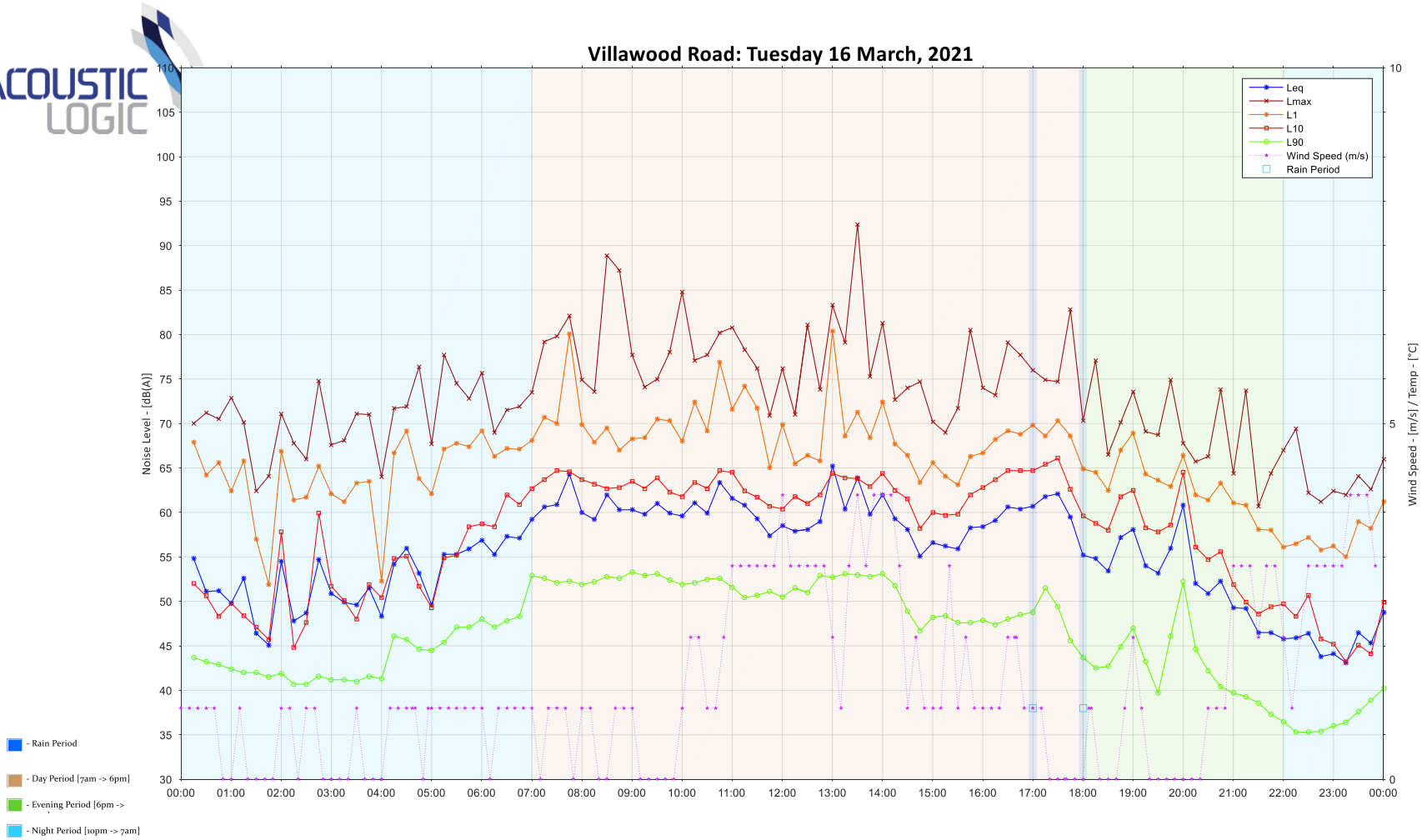
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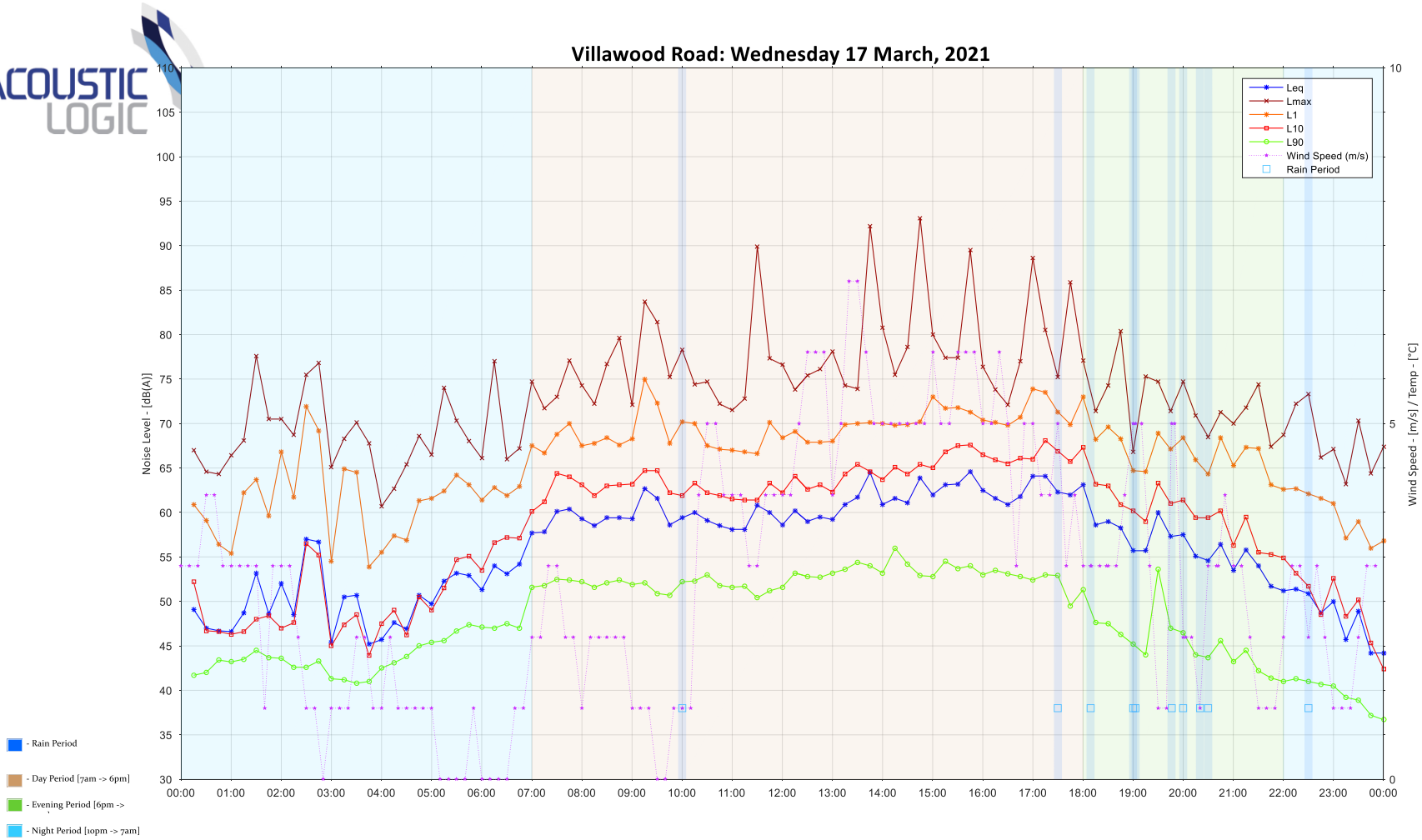
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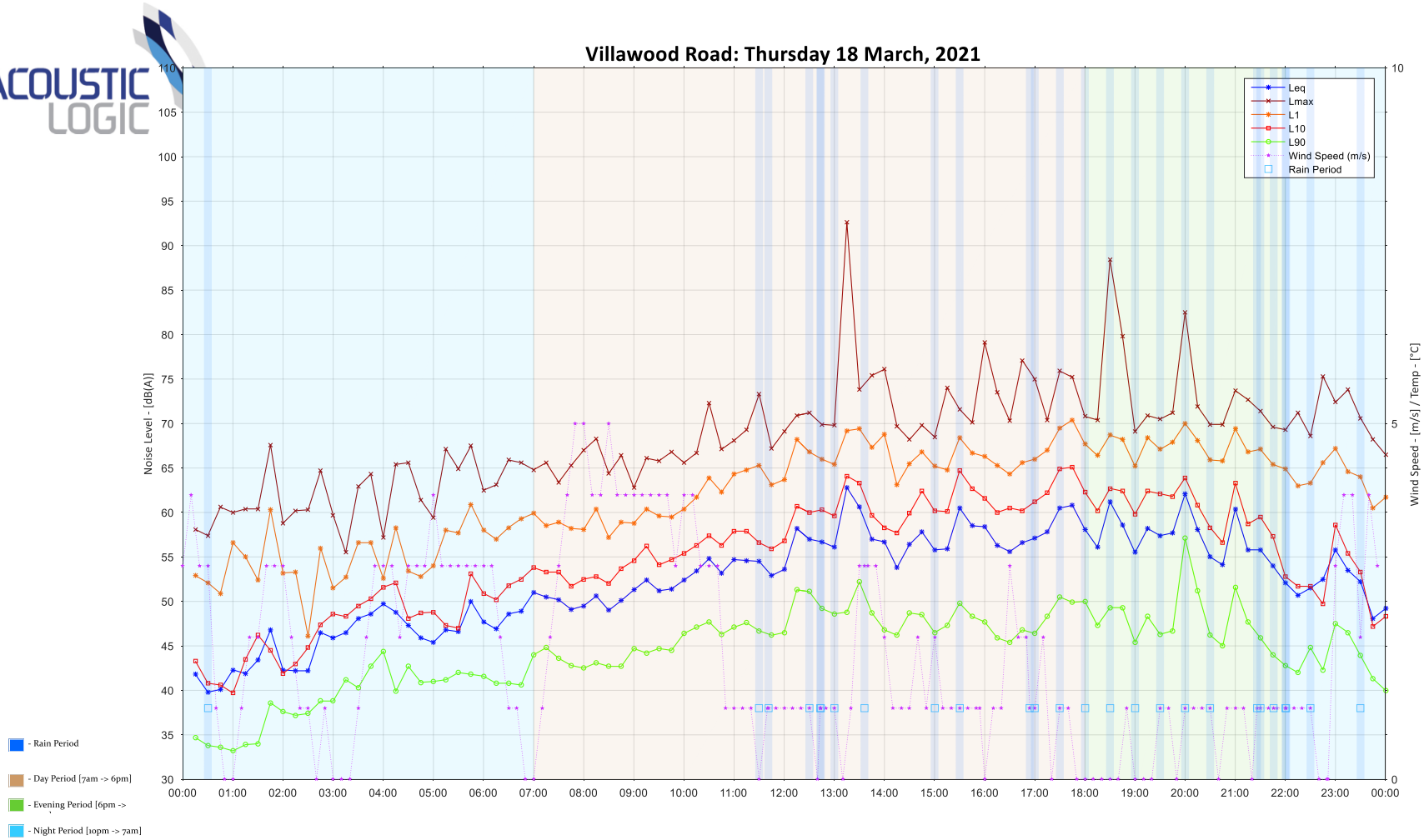
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Wind Speed (m/s)
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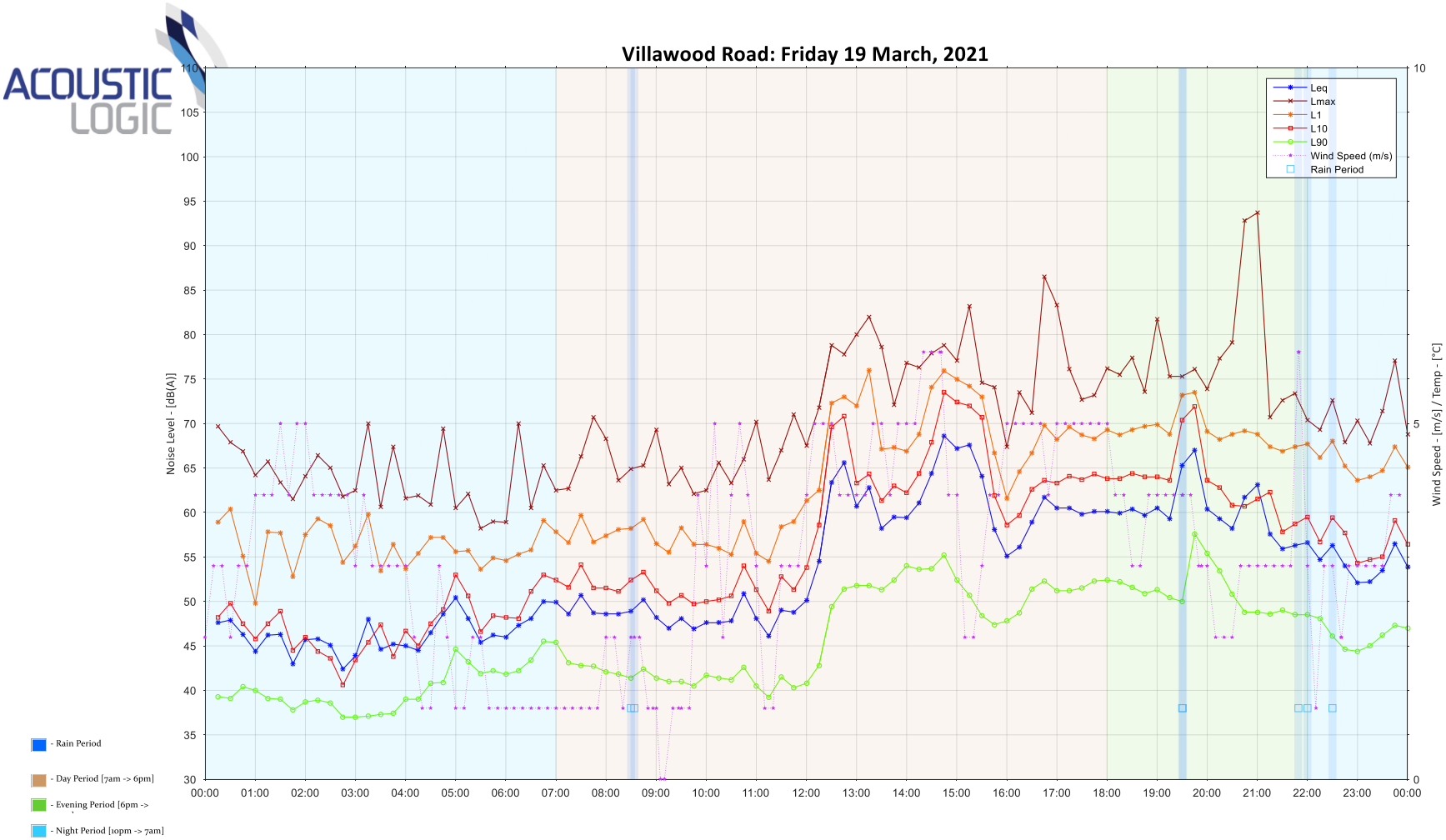
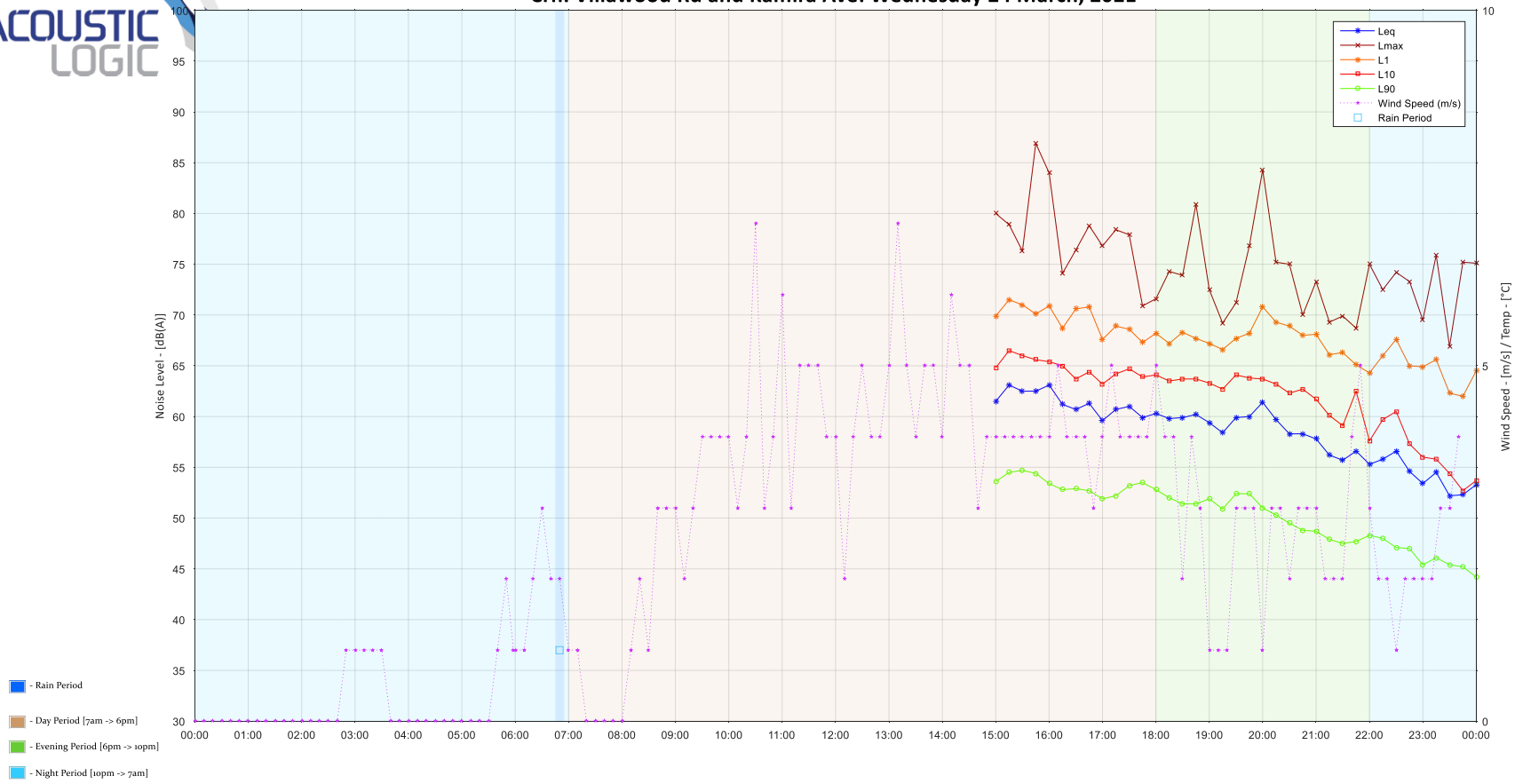
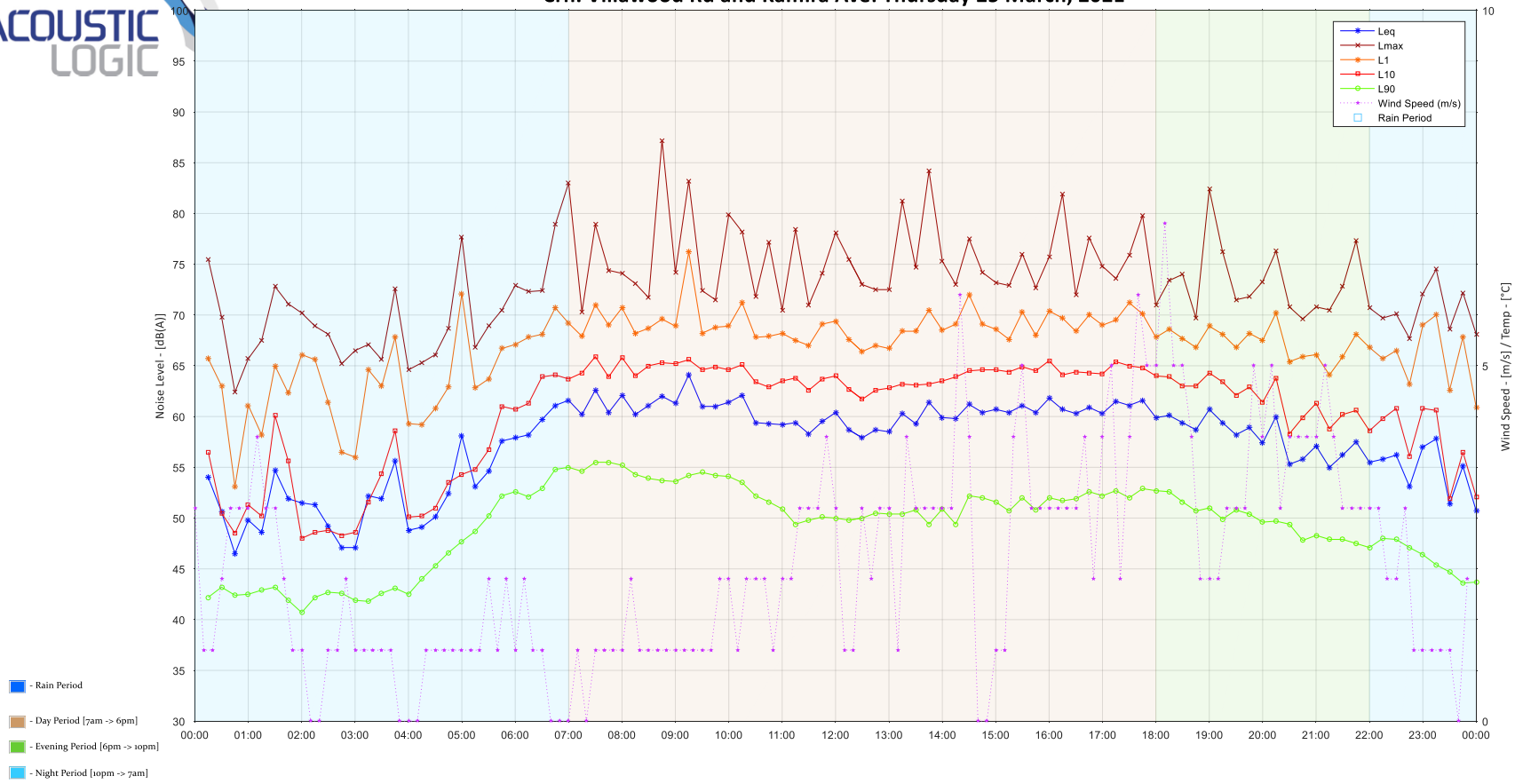
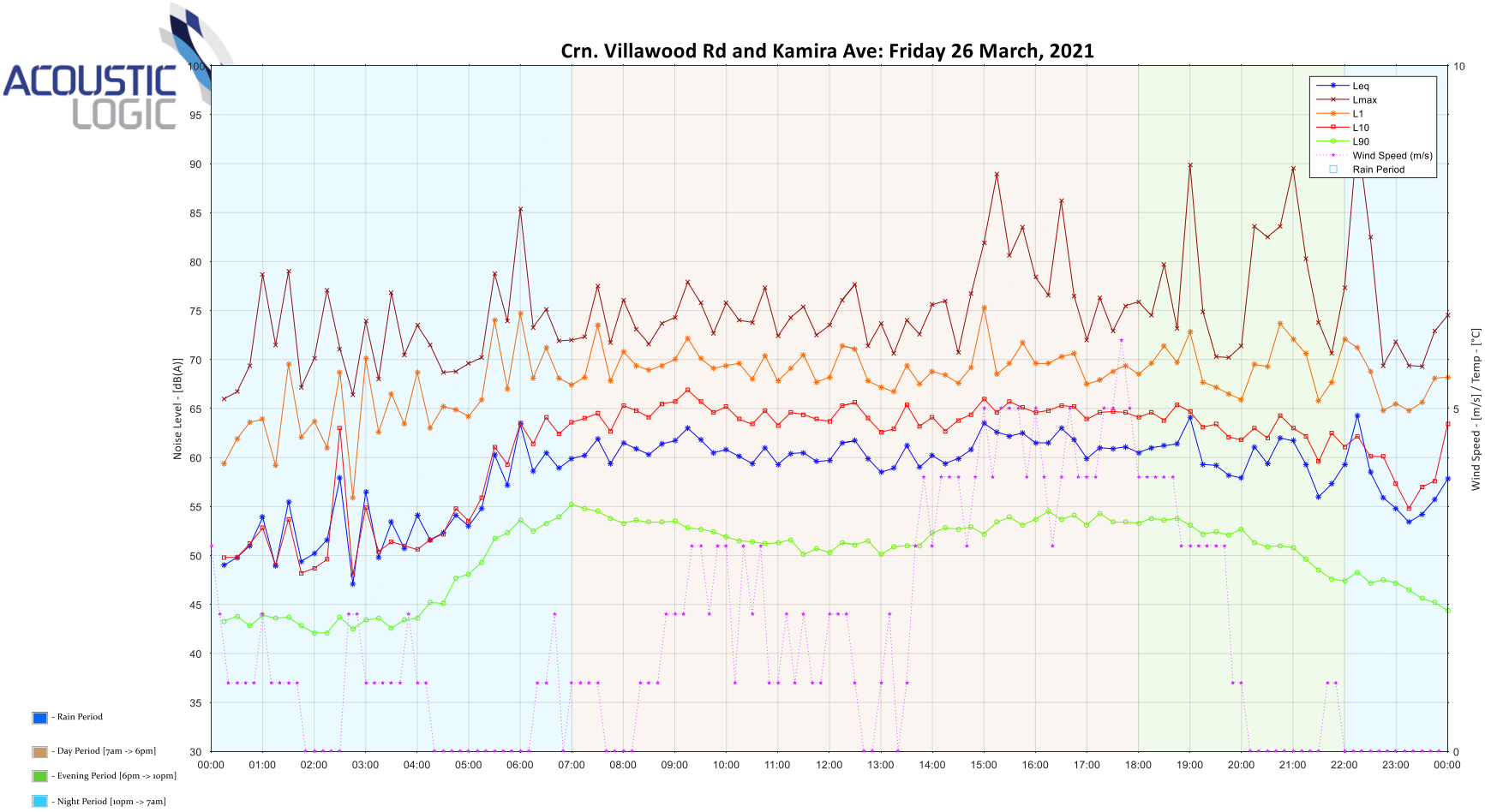
- Rain Period
- Day Period [7am -> 6pm]
- Evening Period [6pm ->
- Night Period [10pm -> 7am]

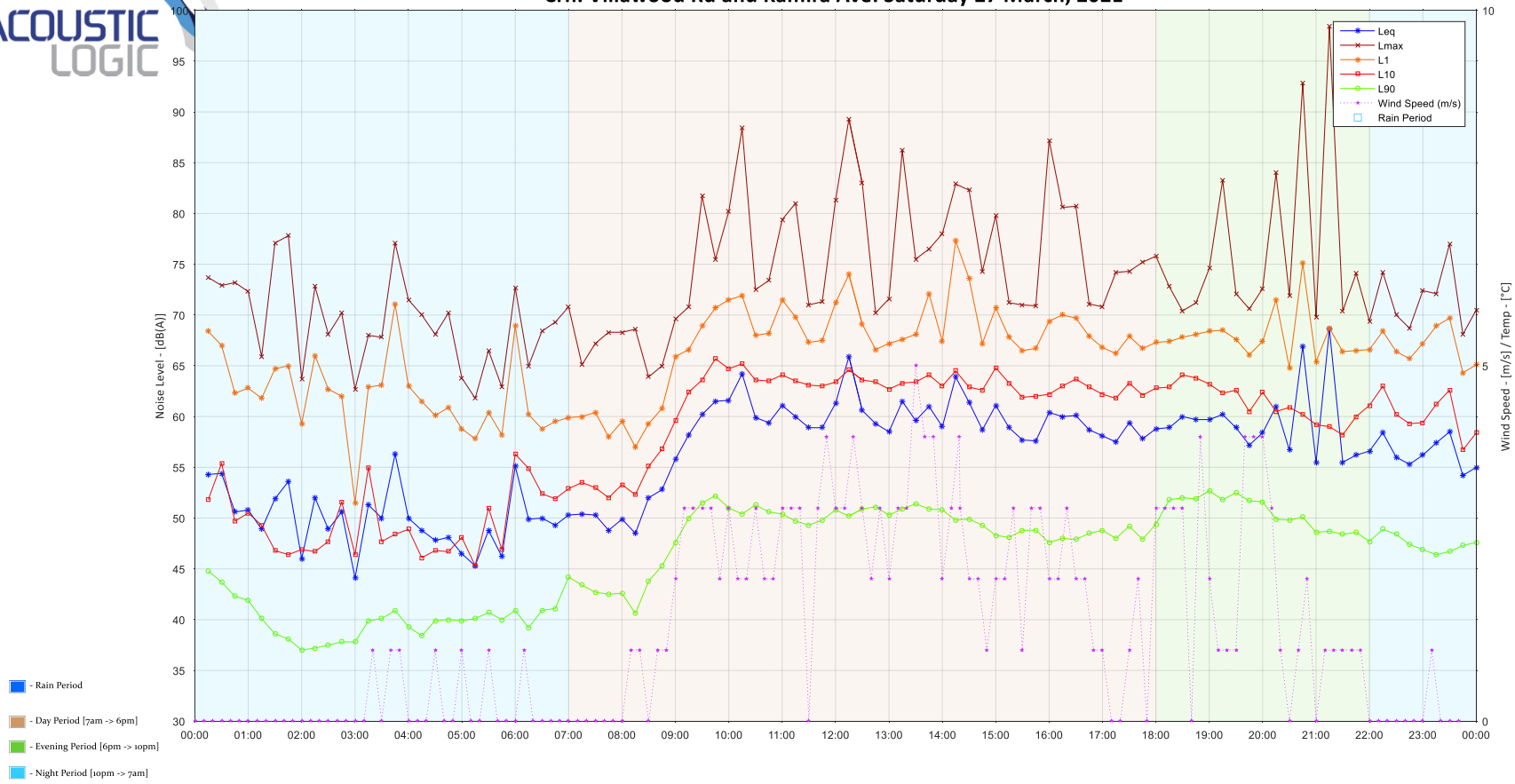

Villawood Road: Friday 19 March, 2021
Noise Level - [dB(A)]
Wind Speed - [m/s] / Temp - [°C]
Leq
Lmax
L1
L10
L90
Wind Speed (m/s)
Rain Period
- Rain Period
- Day Period [7am -> 6pm]
- Evening Period [6pm ->
- Night Period [10pm -> 7am]

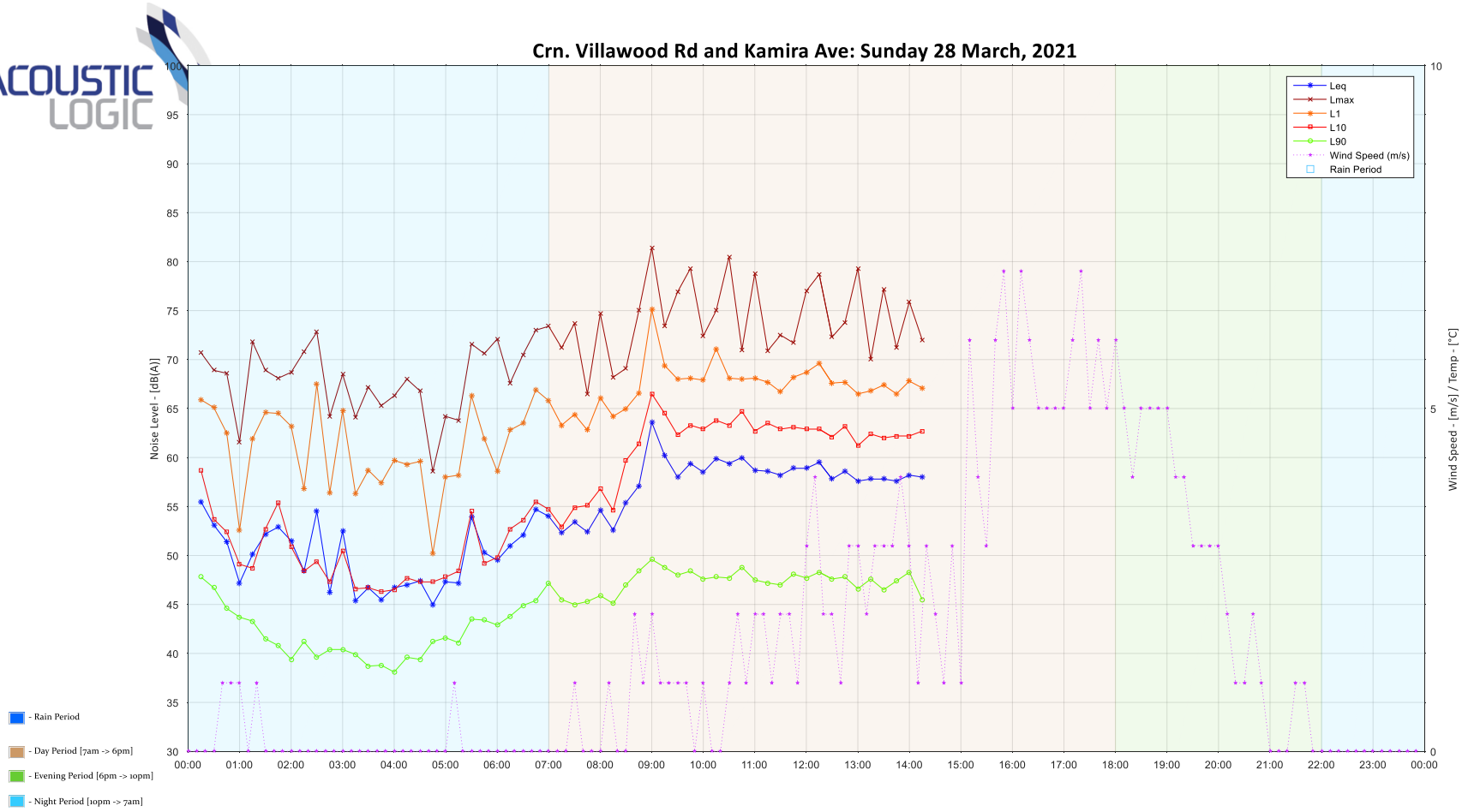
LOGGER LOCATION 3


Crn. Villawood Rd and Kamira Ave: Wednesday 24 March, 2021
Noise Level - [dB(A)]
Wind Speed - [m/s] / Temp - [°C]
Leq
Lmax
L1
L10
L90
Wind Speed (m/s)
Rain Period
- Rain Period
- Day Period [7am -> 6pm]
- Evening Period [6pm -> 10pm]
- Night Period [10pm -> 7am]


Crn. Villawood Rd and Kamira Ave: Thursday 25 March, 2021
Noise Level - [dB(A)]
Wind Speed - [m/s] / Temp - [°C]
Leq
Lmax
L1
L10
L90
Wind Speed (m/s)
Rain Period
- Rain Period
- Day Period [7am -> 6pm]
- Evening Period [6pm -> 10pm]
- Night Period [10pm -> 7am]


Crn. Villawood Rd and Kamira Ave: Friday 26 March, 2021
Noise Level - [dB(A)]
Wind Speed - [m/s] / Temp - [°C]
Leq
Lmax
L1
L10
L90
Wind Speed (m/s)
Rain Period
- Rain Period
- Day Period [7am -> 6pm]
- Evening Period [6pm -> 10pm]
- Night Period [10pm -> 7am]


Crn. Villawood Rd and Kamira Ave: Saturday 27 March, 2021
Noise Level - [dB(A)]
Wind Speed - [m/s] / Temp - [°C]
Leq
Lmax
L1
L10
L90
Wind Speed (m/s)
Rain Period
- Rain Period
- Day Period [7am -> 6pm]
- Evening Period [6pm -> 10pm]
- Night Period [10pm -> 7am]


Crn. Villawood Rd and Kamira Ave: Sunday 28 March, 2021
Noise Level - [dB(A)]
Wind Speed - [m/s] / Temp - [°C]
Leq
Lmax
L1
L10
L90
Wind Speed (m/s)
Rain Period
- Rain Period
- Day Period [7am -> 6pm]
- Evening Period [6pm -> 10pm]
- Night Period [10pm -> 7am]