

## Cricket NSW Centre of Excellence, Sydney Olympic Park

### Acoustic Assessment

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Project ID	20190901.3
Document Title	Acoustic Assessment
Attention To	Cox Architecture Pty Ltd

Revision	Date	Document Reference	Prepared By	Checked By	Approved By
0	10/09/2019	20190901.3/1009A/R0/WY	WY		GW
1	23/09/2019	20190901.3/2309A/R1/WY	WY		GW
2	8/10/2019	20190901.3/0810A/R2/WY	WY		GW
3	31/10/2019	20190901.3/3110A/R3/WY	GW		GW

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## 1 INTRODUCTION

This report supports a State Significant Development Application (SSDA) submitted to the Minister for Planning and Public Spaces, pursuant to Part 4.7 of the *Environmental Planning and Assessment Act 1979* (EP&A Act). This SSDA seeks consent for the design, construction and operation of the New South Wales Cricket Centre (NSWCC) at Wilson Park, within Sydney Olympic Park.

The NSWCC will comprise a state-of-the-art, dedicated, year-round cricket, training and administration facility that services both regional and metropolitan cricketers, as well as providing facilities for aspiring junior cricketers to support sport, social, health and educational programs.

Acoustic Logic Consultancy (ALC) has been engaged to conduct an acoustic assessment of potential environmental noise impacts associated with the proposed Cricket NSW Centre of Excellence, Sydney Olympic Park. This document addresses noise impacts associated with noise emissions from the project site from operational usage of proposed layouts.

ALC has utilised the NSW Department of Environment and Heritage, Environmental Protection Agency document – ‘*Noise Policy for Industry*’ (NPI) 2017 document in the noise assessment of the development.

This assessment has been conducted using the Cox Architecture architectural drawings for SSDA Submission, see details below.

**Table 1-1 – Architectural Sheet Information**

Drawing Owner	Drawing No.	Drawing Title	Revision	Date
Cox Architecture	A-MP-CNSW-VE3	SITE PLAN	1	20 <sup>th</sup> June 2019
	A-FP-GA-00-VE3-	LEVEL GROUND GENERAL ARRANGEMENT PLAN		25 <sup>th</sup> July 2019
	A-FP-GA-01-VE3-	LEVEL 1 GENERAL ARRANGEMENT PLAN		
	Atrium Section-VE3	TYPICAL NS GENERAL ARRANGEMENT SECTION		6 <sup>th</sup> July 2019
	Indoor Section-VE3	TYPICAL NS GENERAL ARRANGEMENT SECTION		
	N-S Section-VE3	TYPICAL NS GENERAL ARRANGEMENT SECTION		



## 2 SITE DESCRIPTION

### 2.1 BACKGROUND

Given the redevelopment and closure of Sydney Football Stadium and its associated cricket training facilities, Cricket NSW decided to relocate its facilities to Sydney Olympic Park. The Wilson Park site has therefore been selected as the appropriate location for the development.

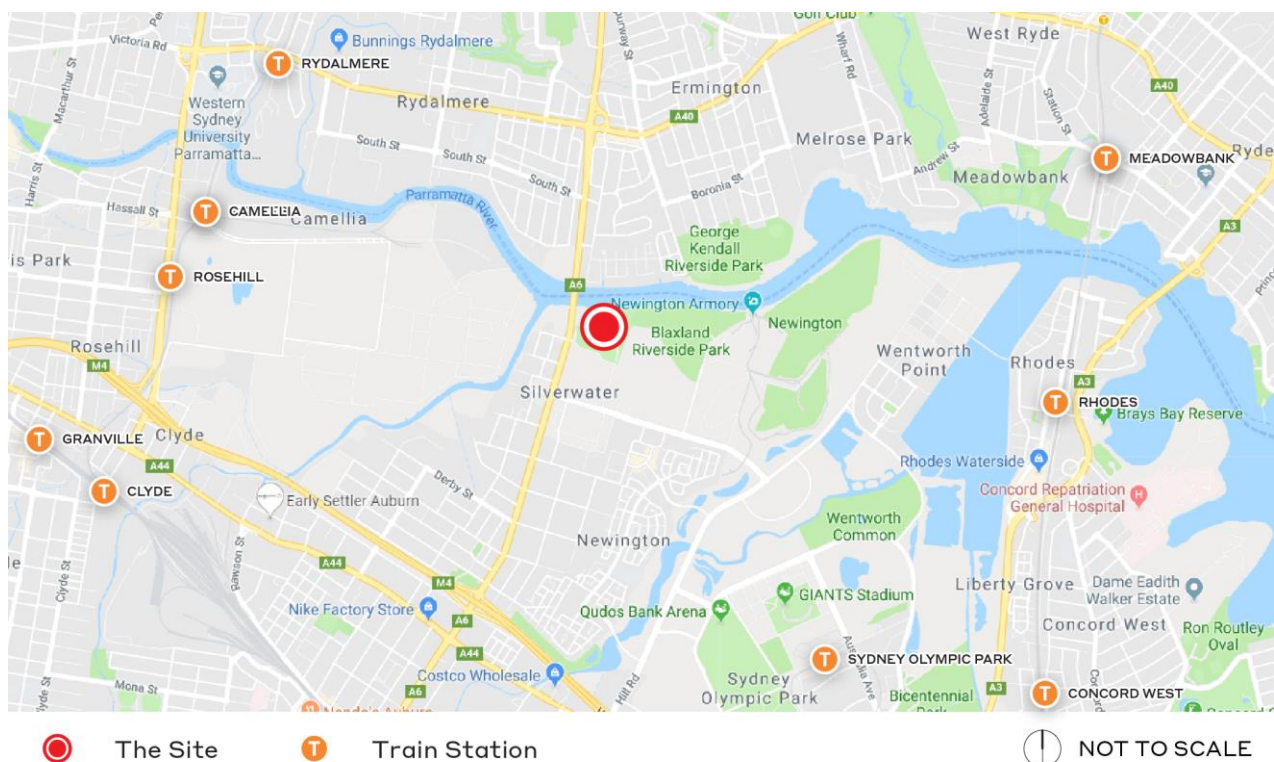
Wilson Park is a former gasworks site, today being used predominantly as playing fields with mature trees generally located around the peripheries. The site has a landfill leachate treatment plant located to its north-east, sharing the same boundary with the site.

### 2.2 SITE DESCRIPTION

The site is located at Wilson Park, in the suburb of Sydney Olympic Park, within the Cumberland Local Government Area (LGA) and is situated at the north western corner of the Sydney Olympic Park (SOP) precinct.

The site is located in proximity to a number of regionally significant facilities and amenities including the Olympic Park Railway Station, ANZ Stadium, Qudos Bank Arena and Sydney Showground, which are all approximately 2.5km south east of the site. Further to this, the site is located approximately 2km west of Wentworth Point.

The site's locational context is shown in Figure 1 below.



**Figure 1 – Locational Context**

The site is irregular in shape and comprises a single allotment of land with an area of 1211,082m<sup>2</sup> and a leased area where development will occur with a site area of 65,767m<sup>2</sup>. The leased area excludes the portion of the Wilson Park site that is used for remediation purposes, as shown in the aerial image of the site provided at Figure 2. The site is currently owned by the Sydney Olympic Park Authority (SOPA) and it is legally described as Lot C in DP 421320. The site is bounded by the Parramatta River to the north, Silverwater Correctional Complex to the east, a busway and industrial lands to the south and Silverwater Road to the west.



**Figure 2 – Site Aerial**

## 2.3 OVERVIEW OF PROPOSED DEVELOPMENT

The proposal relates to a State Significant Development Application (SSDA) to facilitate the development of a Cricket Centre for Cricket NSW at the Wilson Park site. Specifically, the works that are proposed for the SSDA include:

- A two storey cricket centre, including an internal atrium, gymnasium, community facilities, sports science and sports medicine facilities and business offices;
- An International Cricket Council compliant oval 136m long x 144m wide (16,040m<sup>2</sup>)(Oval 1) and associated seating;
- A second oval (Oval 2) that complies with the Cricket Australia community guidelines for community club cricket (with a minimum diameter of 100m (6365m<sup>2</sup>);
- Outdoor practice nets, 71 wickets with a minimum of 30m run ups;
- A double height (10.7m) indoor training facility with 15 wickets;
- A single storey shed for machinery and storage;
- Associated car parking, landscaping and public domain works; and
- Extension and augmentation of services and infrastructure as required

The proposed operating hours are as below:

Monday to Sunday:	Indoor Training	6am to 10pm
	Outdoor	8am to 10pm

## 2.4 PLANNING APPROVALS STRATEGY

The site is located within the Sydney Olympic Park precinct, which is identified as a State Significant site in Schedule 2 of *State Environmental Planning Policy (State and Regional Development) 2011*. As the proposed development has a capital investment value exceeding \$10 million, it is declared to be State Significant Development (SSD) for the purposes of the EP&A Act, with the Minister for Planning and Public Spaces the consent authority for the project.

This SSDA seeks approval for the detailed scope of development described in Section 2.3 above.

The Department of Planning, Industry and Environment provided the Secretary's Environmental Assessment Requirements (SEARs) to the applicant for the preparation of an Environmental Impact Statement for the proposed development on 23 July 2019. This report has been prepared having regard to the SEARs as relevant.

## 2.5 NEAREST POTENTIALLY AFFECTED RECEIVERS

Investigation has been carried out by this office in regards to the existing properties and noise impacts surrounding the proposed development, which is detailed below:

- Existing residential blocks to the north along River Road, Allambie Street, Yarramona Street, Bundarra Street and Koorine Street;
- Existing correctional facility to the east; and
- Existing commercial receiver to the south and west along Newington Road, Silverwater Road, Clyde Street and Blaxland Street.

The nearest noise receivers around the site include:

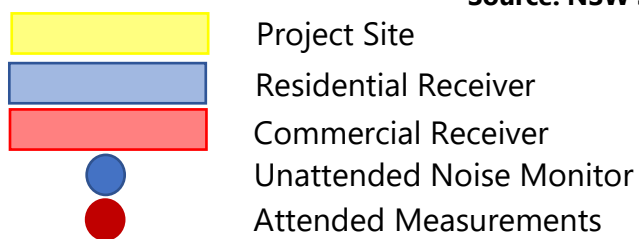
- **R1:** Residential Receiver 1 – Multi-storey residential development to the north at 64-72 River Road;
- **R2:** Residential Receiver 2 – Multi-storey residential development to the north at 74A Allambie Street;
- **R3:** Residential Receiver 3 – Multi-storey residential developments to the north at 48-56 Bundarra Street;
- **R4:** Residential Receiver 4 – Multi-storey residential development to the north at 24-32 Koorine Street;
- **R5:** Commercial Receiver 5 – Silverwater Correctional Complex to the east;
- **R6:** Commercial Receiver 6 – Multi-storey commercial developments to the south at 4 Newington Road;
- **R7:** Commercial Receiver 7 – Multi-storey commercial developments to the west at 196-210 Silverwater Road; and
- **R8:** Commercial Receiver 8 – Single-storey commercial development to the west at 214 Silverwater Road.

A site map, measurement description and surrounding receivers are presented in Figure 3 below.





**Figure 3 – Project Site**  
**Source: NSW Six Maps**



### 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 AMBIENT NOISE SURVEY**

NSW EPA's Rating Background Noise Level (RBL) assessment procedure requires determination of the assessment background noise level (ABL) for each day, 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 10<sup>th</sup> percentile noise levels during operation time period) are presented in Table 4-1.

### **4.1.1 Measurement Position**

Four unattended noise monitors were located around the boundaries of the site. Refer to Figure 3 for detailed location. Detail locations are below:

- Location 1 – Northern Boundary of project site. It was noticed that there was no access to secure places of residential buildings across Parramatta River, our investigation indicates that the RBL of this location is representative to R1 to R4.
- Location 2 – Eastern Boundary, RBL of this location represents R5.
- Location 3 – Southern Boundary. Microphone is with full view of R6.
- Location 4 – Western Boundary. Microphone is with full view of Silverwater Road.

### **4.1.2 Measurement Period**

Unattended noise monitoring was conducted from Wednesday 7<sup>th</sup> of August 2019 to Wednesday 24<sup>th</sup> of August 2019. Attended noise measurements were undertaken between the hours of 4:00pm and 5:30pm on 24<sup>th</sup> of August 2019.

### **4.1.3 Measurement Equipment**

Equipment used consisted of four Acoustic Research Laboratories Pty Ltd noise loggers. The loggers were set to A-weighted fast response and was 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 have been graphed and attached to this report. The summarised RBL have been presented in Table below.

#### 4.1.4 Rating Background Noise Levels

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

**Table 4-1 – Measured Rating Background Noise Levels**

<b>Monitor</b>	<b>Time of day</b>	<b>Rating Background Noise Level dB(A)<sub>L90(Period)</sub></b>
Monitor 1: Northern Boundary	Monday-Saturday Day (7am – 6pm) Sunday Day (8am – 6pm)	48
	Evening (6pm – 10pm)	50
	Monday-Saturday Night Shoulder (6am – 7am) Sunday Night Shoulder (6am-8am)	55
Monitor 2: Eastern Boundary	Monday-Saturday Day (7am – 6pm) Sunday Day (8am – 6pm)	43
	Evening (6pm – 10pm)	47
	Monday-Saturday Night Shoulder (6am – 7am) Sunday Night Shoulder (6am-8am)	51
Monitor 3: Southern Boundary	Monday-Saturday Day (7am – 6pm) Sunday Day (8am – 6pm)	51
	Evening (6pm – 10pm)	53
	Monday-Saturday Night Shoulder (6am – 7am) Sunday Night Shoulder (6am-8am)	55
Monitor 4: Western Boundary	Monday-Saturday Day (7am – 6pm) Sunday Day (8am – 6pm)	54
	Evening (6pm – 10pm)	56
	Monday-Saturday Night Shoulder (6am – 7am) Sunday Night Shoulder (6am-8am)	59



## 5 NOISE EMISSION CRITERIA

It is conservative to setup noise emission limits based on the requirements of the NSW Department of Environment and Heritage, Environmental Protection Agency document – Noise Policy for Industry (NPI) 2017.

### 5.1 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 urban criteria.

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

#### 5.1.1 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 presented in Table 4-1. Noise emissions from the site should comply with the noise levels presented below when measured at nearby property boundary.

#### 5.1.2 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 4-1, the Noise Policy for Industry suggests the adoption of the 'urban' categorisation.

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

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

The amenity levels appropriate for the receivers surrounding the site are presented in Table 5-1.

**Table 5-1 – EPA Amenity Noise Levels**

Type of Receiver	Time of day	Recommended Noise Level dB(A) $L_{eq}(\text{period})$	Project Amenity Noise Level dB(A) $L_{eq}(15 \text{ minute})$
Residential – Urban	Day	60	58
	Evening	55	53
	Night	45	43

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

### 5.1.3 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:*

- $L_{eq,15min}$  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 5-2 – Sleep Arousal Criteria for Residential Receivers**

Receiver	Rating Background Noise Level (Night) dB(A) $L_{90}$	Emergence Level
Residents at Northern Boundary Night Shoulder (6am – 7am)	55 dB(A) $L_{90}$	60 dB(A) $L_{eq, 15min}$ ; 70 dB(A) $L_{Fmax}$

## 5.2 SUMMARISED NOISE EMISSION CRITERIA

### 5.2.1 To Residential Receivers

**Table 5-3 – EPA NPI Noise Emission Criteria – Residents Surrounding Project Site**

Noise Receiver	Time Period	Assessment Background Noise Level dB(A) <sub>L90</sub>	Project Amenity Criteria dB(A) <sub>L<sub>eq</sub>(15min)</sub>	Intrusiveness Criteria <sub>L<sub>eq</sub>(15min)</sub>	NPI Criteria for Sleep Disturbance
R1-R4: Northern Boundary Residents	Day	48	58	<b>53</b>	N/A
	Evening	50	<b>53</b>	55	N/A
	Night Shoulder	55	<b>43</b>	60	<b>60 dB(A)<sub>L<sub>eq</sub>, 15min</sub></b> <b>70 dB(A)<sub>L<sub>Fmax</sub></sub></b>

The project noise trigger levels are indicated by the bolded values in the table above.

### 5.2.2 To Commercial Receivers

The following criteria have been recommended by NSW EPA NPI to commercial receivers.

**Table 5-4 – EPA NPI Noise Emission Criteria – Commercial Surrounding Project Site**

Time Period	Amenity Criteria dB(A) <sub>L<sub>eq</sub>,15min</sub>
When in use	63

## 6 NOISE EMISSION ASSESSMENT

This section examines the potential noise impacts from patrons and associated operational activities.

### 6.1 NOISE SOURCE DATA

Typical noise from operation of the project site is below:

- Outdoor Cricket Field and Pitch Noise;
- Patron Noise;
- Indoor Practice Pitches and Gym Facilities;
- Carpark; and
- Mechanical Plant

Noise measurements of similar activities have been carried out by this office and the measurements results have been utilised for noise modelling. Detailed noise source data is below.

#### 6.1.1 Operational Outdoor Cricket Field noise

Attended noise measurements were conducted at Joe McAleer Park on Thursday 29<sup>th</sup> August 2019 at an intra-squad practice game run by NSW Cricket. The measured typical operational activity noise levels (Sound Pressure Level) around the oval have been presented below, with 11 fielders, 2 batsmen and 2 umpires on the field. Noise measurements were taken by performing a full perimeter sweep of the oval at 2m from the oval line. Wind speeds were moderate on the day of the measurement. It is noted that there was no audience watching or cheering the practice game, therefore the resultant measurements are representative of noise originating from the players on the field only.

The L<sub>10</sub> sound pressure level spectrum used in the noise modelling to predict the impact of operational noise is presented below.

**Table 6-1 – Measured Outdoor Cricket Match Noise Level SPL dB(A) L<sub>10</sub>**

Space	31.5Hz	63Hz	125Hz	250Hz	500Hz	1kHz	2kHz	4kHz	8kHz	A-Weight
Joe MacAleer Park Cricket Game	62	58	53	47	46	49	48	41	32	53

As the measured noise level was of a practice match, conservative values for noise modelling were used to provide a worst-case scenario. In this regard, the smaller oval was modelled with a sound pressure level of 56 dB(A) (an effective doubling of sound pressure level), and the larger oval was modelled with a sound pressure level of 60 dB(A) (an effective quadrupling of sound pressure level). The worst case L<sub>max</sub> measured was when the team would shout, measuring a L<sub>max</sub> of 75 dB(A) at 2m from the oval line.

### 6.1.2 Operational Outdoor Cricket Pitch Noise

Attended noise measurements were conducted at the outdoor cricket pitches at ANZ Stadium on Monday 19<sup>th</sup> August 2019 at an intra-squad practice session run by NSW Cricket. The measured typical operational activity noise levels (Sound Pressure Level) around the pitches have been presented below, with 4 lanes of active pitches, coaching staff, and around 20 players dispersed between training in the pitches and performing other exercises on the practice field adjacent to the pitches. Noise measurements were taken by performing a full perimeter sweep of the pitches and field at 2m from the perimeter of the site. Wind speeds were moderate on the day of the measurement. It is noted that there was no audience watching or cheering the practice session, therefore the resultant measurements are representative of noise originating from the players and coaching staff only.

The measured noise level was used to model both outdoor cricket pitch areas in the proposed site layout. The L<sub>10</sub> sound power level spectrum used in the noise modelling to predict the impact of operational noise is presented below.

**Table 6-2 – Measured Outdoor Cricket Pitch Noise Level SPL dB(A) L<sub>10</sub>**

<b>Space</b>	<b>31.5Hz</b>	<b>63Hz</b>	<b>125Hz</b>	<b>250Hz</b>	<b>500Hz</b>	<b>1kHz</b>	<b>2kHz</b>	<b>4kHz</b>	<b>8kHz</b>	<b>A-Weight</b>
ANZ Stadium Cricket Pitches	73	69	63	60	61	63	57	51	45	<b>66</b>

The worst case L<sub>max</sub> measured was when the players would shout, measuring a L<sub>max</sub> of 88 dB(A) at 2m from the netting of the pitches.

### 6.1.3 Operational Indoor Cricket Pitch and Gym Noise

Attended noise measurements were conducted at the indoor cricket pitch and gym complex at NSW Cricket Headquarters on Wednesday 21<sup>st</sup> August 2019 at an intra-squad practice session run by NSW Cricket. The measured typical operational activity noise levels (Sound Pressure Level) around the pitches and gym area have been presented below, with 6 lanes of active pitches, coaching staff and around 30 players dispersed between training in the pitches and performing other excises on the other side of the gym complex. Noise measurements were taken by performing a full perimeter sweep of the pitches at 1m from the netting of the pitches. Noise measurements of the gym usage were taken by performing a full perimeter sweep of the training area at 2m from the internal boundary of the gym facility. Both measurements provide detail into the internal sound pressure level of the space from noise generated by the respective operational activities.

The measured noise levels were used to model indoor cricket pitch areas and gym areas in the proposed site layout. The  $L_{10}$  sound power level spectrum used in the noise modelling to predict the impact of noise breakout is presented below.

#### Indoor Cricket Pitch Noise

**Table 6-3 – Measured Indoor Cricket Pitch Noise Level SPL dB(A)  $L_{10}$**

Space	31.5Hz	63Hz	125Hz	250Hz	500Hz	1kHz	2kHz	4kHz	8kHz	A-Weight
NSW Cricket Indoor Pitches	69	62	66	68	69	69	64	60	53	72

The worst case  $L_{max}$  measured was when the players would strike the ball with their bat, measuring a  $L_{max}$  of 92 dB(A) at 1m from the netting of the pitches.

#### Indoor Gym Noise

**Table 6-4 – Measured Indoor Gym Noise Level SPL dB(A)  $L_{10}$**

Space	31.5Hz	63Hz	125Hz	250Hz	500Hz	1kHz	2kHz	4kHz	8kHz	A-Weight
NSW Cricket Indoor Gym	68	64	59	58	63	64	62	54	42	68

The worst case  $L_{max}$  measured was when the players would strike the ball with their bat, measuring a  $L_{max}$  of 84 dB(A) at 2m from the bounding walls of the gym area.

## 6.2 PATRON NOISE

The main noise source in the outdoor areas would be patron speech, with a sound power level of 77 dB(A) L<sub>10</sub> per patron based on ALC measurements.

Noise from patrons watching the outdoor cricket games is expected to be below the sound power level used, with periodic exceedances from cheering or celebration. The noise level predicted at each receiver is based on proposed number of people that may be accommodated in the proposed seated area with up to 1 in 2 people talking at any one time. ALC has been advised that a maximum of 1,500 patrons will be allowed for the seated area.

**Table 6-5 – L<sub>10</sub> Sound Power Level Spectrum of Single Patron, dB**

	Octave Band Centre Frequency (Hz)									
	31.5	63	125	250	500	1000	2000	4000	8000	A-wt dB(A)L <sub>10</sub>
Patron Noise (dB(A))	62	62	67	70	74	75	70	51	48	<b>77</b>

Predicted noise levels have also taken into account the effect of noise attenuation treatments recommended in Section 8. As detailed seating locations have not been made available at this stage in time, it is assumed that the area located between the main oval and proposed buildings will act as the seating area.

## 6.3 MECHANICAL PLANT AND EQUIPMENT

Detailed plant selection and location has not been undertaken at this stage. Satisfactory levels will be achievable through appropriate plant selection, location and if necessary, standard acoustic treatments such as duct lining, acoustic silencers and enclosures.

Noise emissions from all mechanical services to the closest residential receiver should comply with the requirements of Section 5.

Detailed acoustic review should be undertaken at CC stage to determine acoustic treatments to control noise emissions to satisfactory levels.

## 6.4 CAR PARK NOISE

The following noise data of car movements have been measured by this office:

### Car Manoeuvring at 10Km/Hour Sound Power Level:

**Table 6-6 – Sound Power Level of Car Manoeuvring dB(A)  $L_{eq}$**

63Hz	125Hz	250Hz	500Hz	1kHz	2kHz	4kHz	8kHz	A-Weight
94	87	83	80	80	74	70	68	84

### Door Slamming Sound Power Level

**Table 6-7 – SWL of Door Slamming dB(A)  $L_{max}$**

63Hz	125Hz	250Hz	500Hz	1kHz	2kHz	4kHz	8kHz	A-Weight
102	101	95	95	88	88	83	75	96

### Car Starting Sound Power Level

**Table 6-8 – SWL of Car Start dB(A)  $L_{max}$**

63Hz	125Hz	250Hz	500Hz	1kHz	2kHz	4kHz	8kHz	A-Weight
99	100	88	88	83	82	82	77	91



## 7 PREDICTED NOISE EMISSIONS

### 7.1 PATRON AND OPERATIONAL NOISE

The predicted noise emission levels from patron, cricket field, cricket pitches indoor facilities were corrected for distance attenuation, façade losses and barrier effects to determine the resultant noise level. The predicted noise levels have been listed as below. The recommended noise controls in Section 8 of this report has been taken account, with operational noise predictions from the model compared with noise emission requirements of Section 5.

### 7.2 CARPARK NOISE

Noise prediction has been carried out based on the noise data above and assumptions below:

- The worst scenarios during all times of day: all carpark spaces are occupied or emptied during one-hour time period.

### 7.3 SUMMARISED PREDICTED NOISE EMISSIONS

The predicted noise levels are below:

**Table 7-1 – Predicted Noise Emission from Site Operation –  $L_{eq}$**

Receiver	Predicted Noise Level $dB(A)L_{eq, 15 \text{ min}}$	Criteria $dB(A)L_{eq, 15 \text{ min}}$	Comply?
Receiver 1	Day/Evening: < 53	Day – 53 Evening – 53	Yes
	Night: < 43	Night – 43	Yes
Receiver 2	Day/Evening: < 53	Day – 53 Evening – 53	Yes
	Night: < 43	Night – 43	Yes
Receiver 3	Day/Evening: < 51	Day – 53 Evening – 53	Yes
	Night: < 43	Night – 43	Yes
Receiver 4	Day/Evening: < 47	Day – 53 Evening – 53	Yes
	Night: < 43	Night – 43	Yes
Receiver 5	Day/Evening: < 59	In Use – 63	Yes
	Night: < 51		Yes
Receiver 6	Day/Evening: < 63	In Use – 63	Yes
	Night: < 47		Yes
Receiver 7	Day/Evening: < 59	In Use – 63	Yes
	Night: < 43		Yes
Receiver 8	Day/Evening: < 55	In Use – 63	Yes
	Night: < 43		Yes

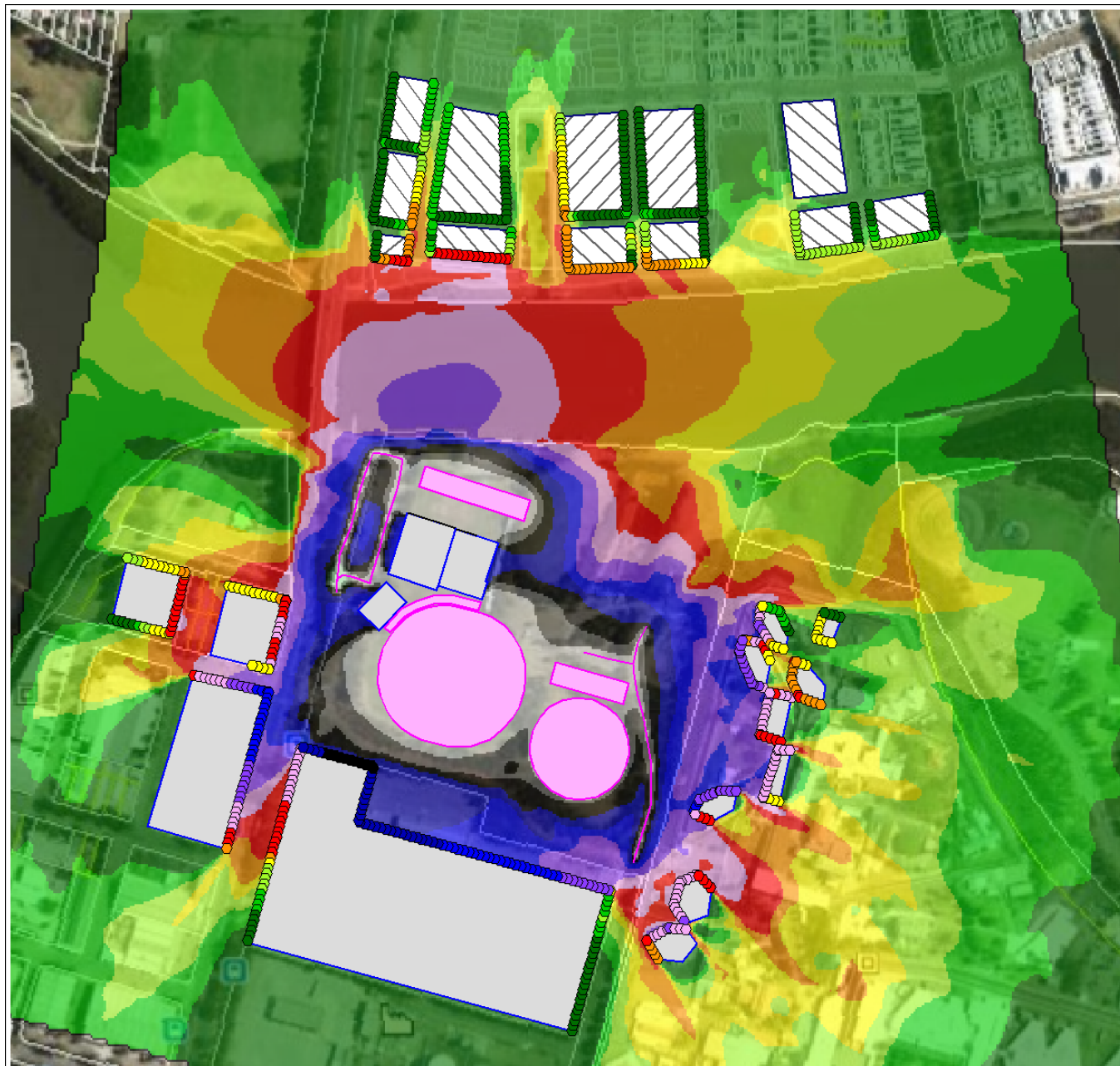
## 7.4 SLEEPING DISTURBANCE

The worst sleep arousal noise source is door slamming within project site, the predicted noise levels are below:

**Table 7-2 – Predicted Noise Emission from Car Park Door Slamming**

<b>Receiver</b>	<b>Predicted Noise Level dB(A)<math>L_{Max}</math></b>	<b>Criteria dB(A)<math>L_{max}</math></b>	<b>Comply?</b>
Receiver 1	< 43	Night – 70	Yes
Receiver 2	< 43	Night – 70	Yes
Receiver 3	< 43	Night – 70	Yes
Receiver 4	< 43	Night – 70	Yes
Receiver 5	< 53	N/A (Commercial)	Yes
Receiver 6	< 49	N/A (Commercial)	Yes
Receiver 7	< 43	N/A (Commercial)	Yes
Receiver 8	< 45	N/A (Commercial)	Yes

SoundPlan images detailing the results of the simulation are shown below with day/evening time  $L_{eq}$  predictions, night time  $L_{eq}$  predictions and night time  $L_{max}$  predictions respectively shown.



## Cricket NSW Centre of Excellence

### Operational Noise Prediction Facade and Grid Noise Map

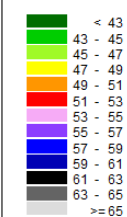
Outdoor Cricket Pits: 66dB(A) SPL  
 Outdoor Field (Small): 56dB(A) SPL  
 Outdoor Field (Large): 60dB(A) SPL

Assuming facade open:  
 Indoor Pits: 69dB(A) SPL  
 Indoor Training: 65dB(A) SPL

Prepared by: W. Yeh  
 Date: 09/09/2019

#### Noise Level

$L_{eq}$   
in dB(A)

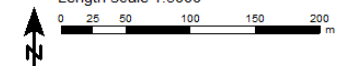


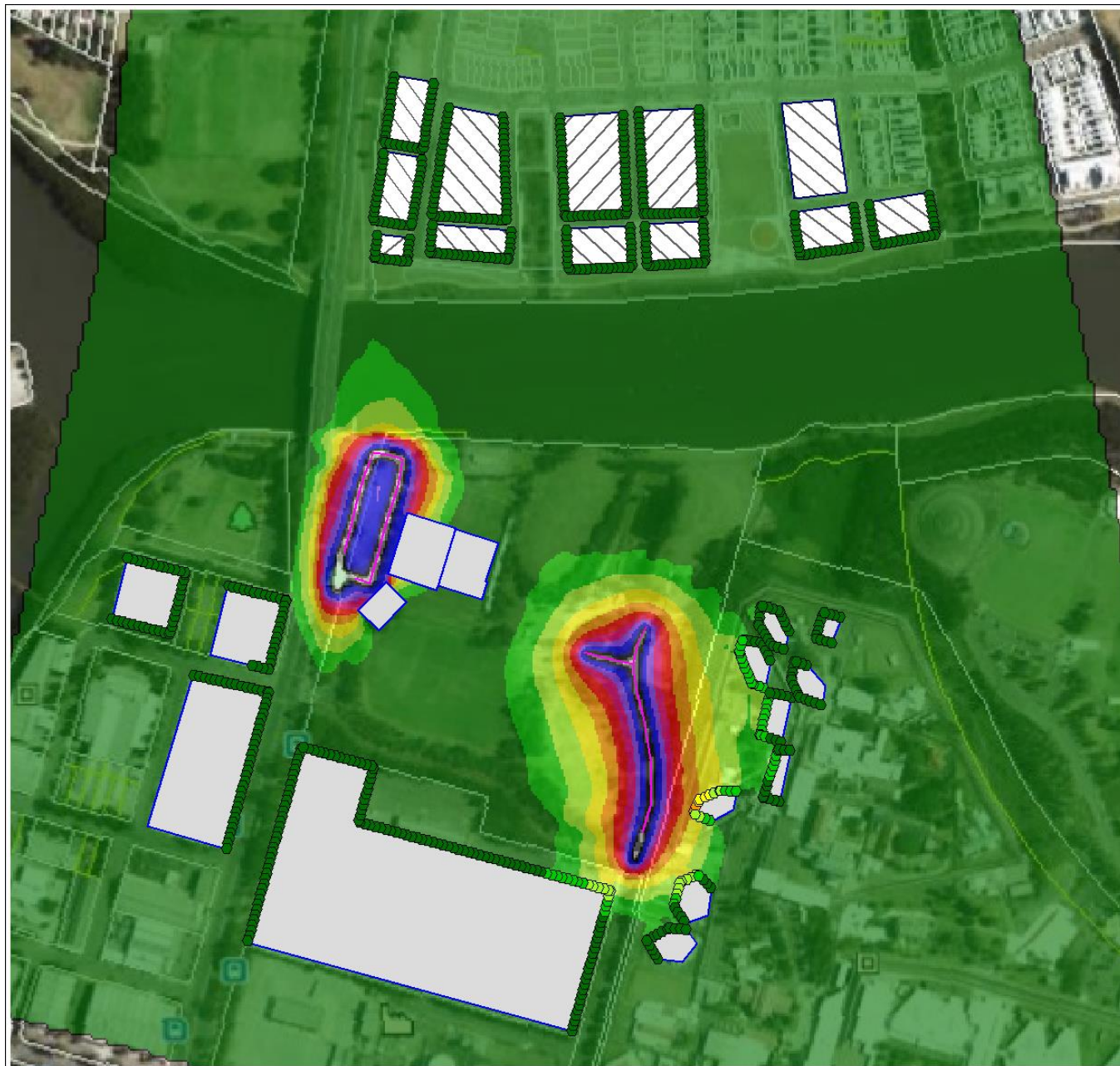
#### Signs and symbols

- Surface
  - Sensitive Receiver
  - Commercial Receiver
  - Point source
  - Area source
  - Industrial building
  - Outdoor area source
  - Noise calculation area
- Facade Noise Map**

- Facade point

Length scale 1:5000





## Cricket NSW Centre of Excellence

### Operational Noise Prediction Facade and Grid Noise Map

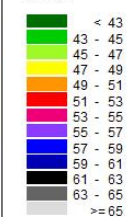
**Night Time:**  
**Mon-Sat (6am-7am), Sun (6am-8am)**

**Assuming facade closed**

Prepared by: W. Yeh  
Date: 09/09/2019

#### Noise Level

$L_{eq}$   
in dB(A)



#### Signs and symbols

- Surface
- Sensitive Receiver
- Commercial Receiver
- Point source
- Area source
- Industrial building
- Outdoor area source
- Noise calculation area

#### Facade Noise Map

- Facade point
- Facade point with conflict
- Free field point
- Free field point with conflict

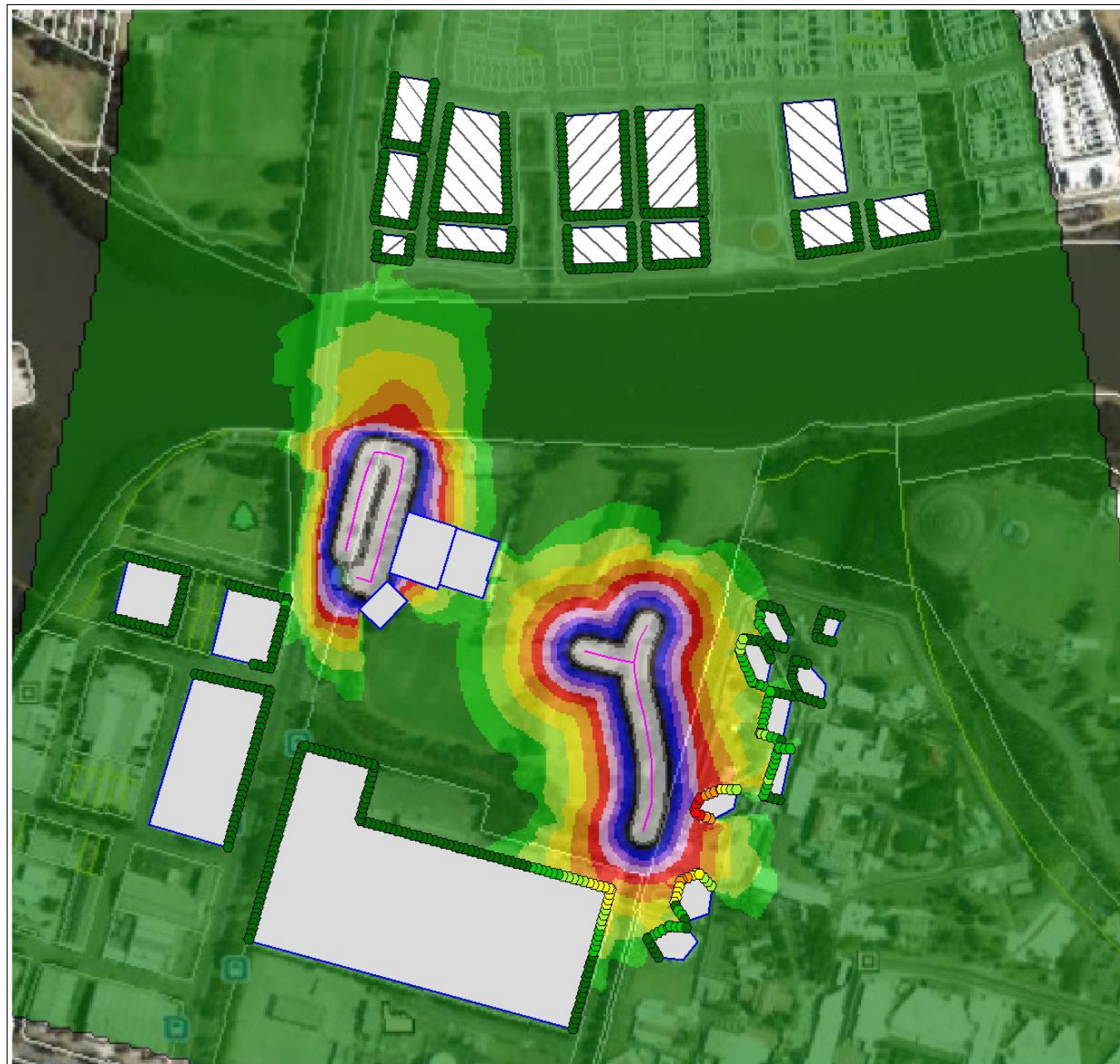
#### Building reference points

Length scale 1:5000  
0 25 50 100 m



**ACOUSTIC  
LOGIC**





## Cricket NSW Centre of Excellence

### Operational Noise Prediction Facade and Grid Noise Map

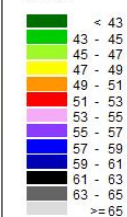
**Night Time:**  
**Mon-Sat (6am-7am), Sun (6am-8am)**

**Assuming facade closed**

Prepared by: W. Yeh  
Date: 09/09/2019

#### Noise Level

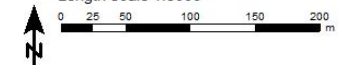
$L_{max}$   
in dB(A)



#### Signs and symbols

- Surface
- Sensitive Receiver
- Commercial Receiver
- Point source
- Area source
- Industrial building
- Outdoor area source
- Noise calculation area
- Facade Noise Map**
- Facade point

Length scale 1:5000



## 8 RECOMMENDATIONS

Noise emission from operation of project site has been analysed and the following acoustic treatments are recommended to ensure that the external noise emissions comply with the criteria in Section 5.

### **General**

- Usage of all indoor facilities is to be limited to operational hours between 6:00am and 10:00pm.
- Outdoor areas for cricket are only to be used between 8:00am and 10:00pm.
- Management controls should be utilised to manage patron departure particularly at night to ensure that patrons leave the development in a prompt and orderly manner.
- Carpark floor shall be broom or similar finish to avoid tyre squealing noise.
- No PA is allowed before 8am every day.
- Noise emissions with the plant in the final equipment locations will be assessed and the specific requirements for this treatment determined once plant selections/locations are known to meet the noise objectives determined for plant noise

### **Management of Complaints**

- Implement a Complaints Register.
- It is recommended that all staff be trained in the use of the complaint register. Noise complaints are to be registered and what course of remedial action has been taken. This register should be stored on site and be accessible at all times. The General Manager is to be notified (by the staff receiving the complaint) of any new entries in the Complaints Register.
- If a noise complaint is received the complaint should be recorded in the noise complaint register. The complaint form should list:
  - The name and address of the complainant (if provided);
  - The time and date the complaint was received;
  - The nature of the complaint and the time and date the noise was heard;
  - The name of the employee who received the complaint;
  - Actions taken to investigate the complaint, and a summary of the results of the investigation (which may include attended measurements);
  - Required remedial action, if required;
  - Validation of the remedial action; and
  - Summary of feedback to the complainant.

## 9 CONCLUSION

This report presents an acoustic assessment of potential environmental noise impacts associated with the proposed Cricket NSW Centre of Excellence, Sydney Olympic Park. Noise impacts associated with noise emissions from the project site from operational usage of proposed layouts has been addressed.

Provided that the recommendations presented in Section 8 are adopted, noise emissions from the development will comply with the acoustic requirements of the NSW Department of Environment and Heritage, Environmental Protection Agency document – '*Noise Policy for Industry*' (NPI) 2017.

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

Yours faithfully,

A handwritten signature in blue ink, appearing to read 'Weber Yeh', is positioned below the 'Yours faithfully,' text.

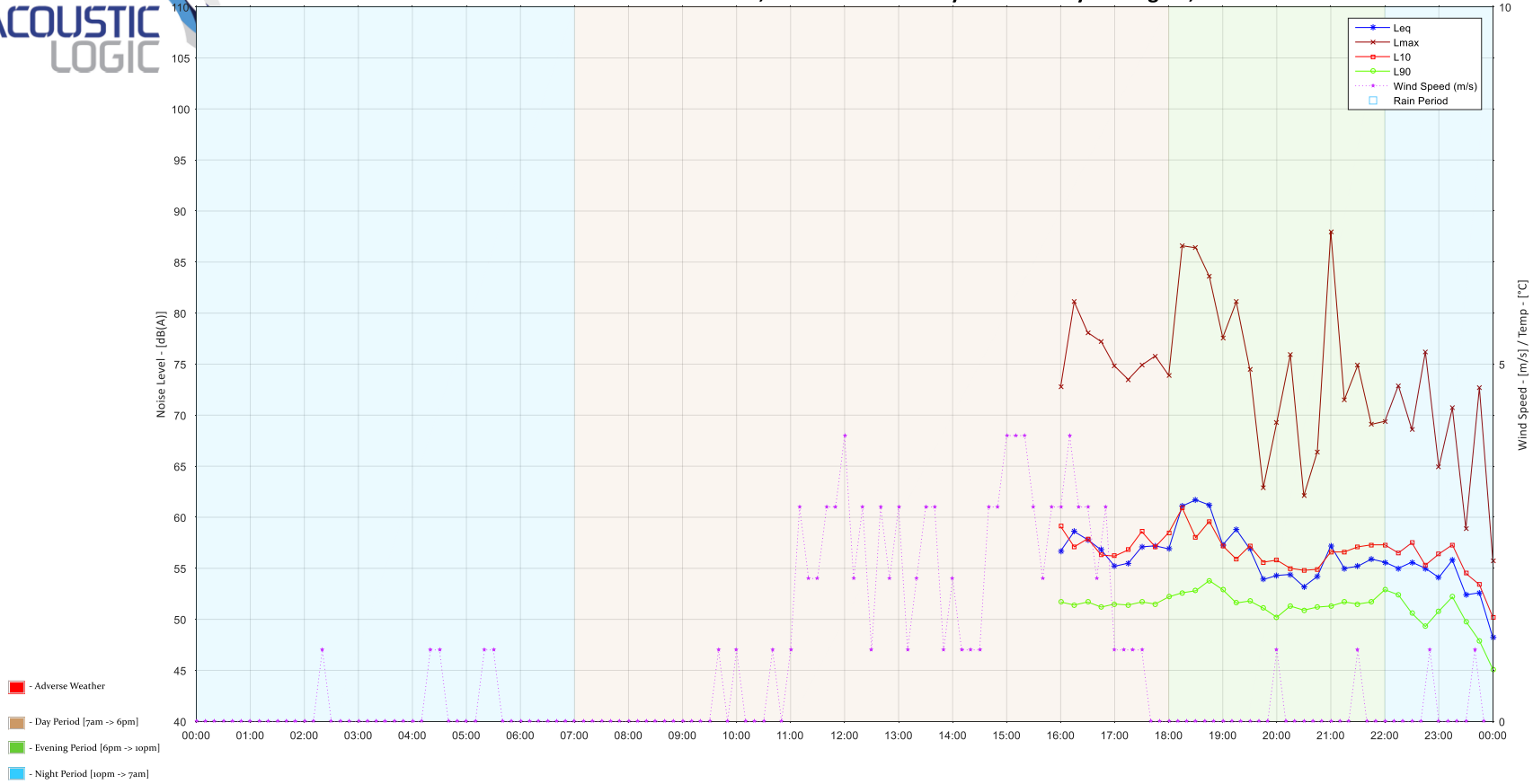
Acoustic Logic Consultancy Pty Ltd  
Weber Yeh

## **APPENDIX ONE – UNATTENDED NOISE MONITORING**

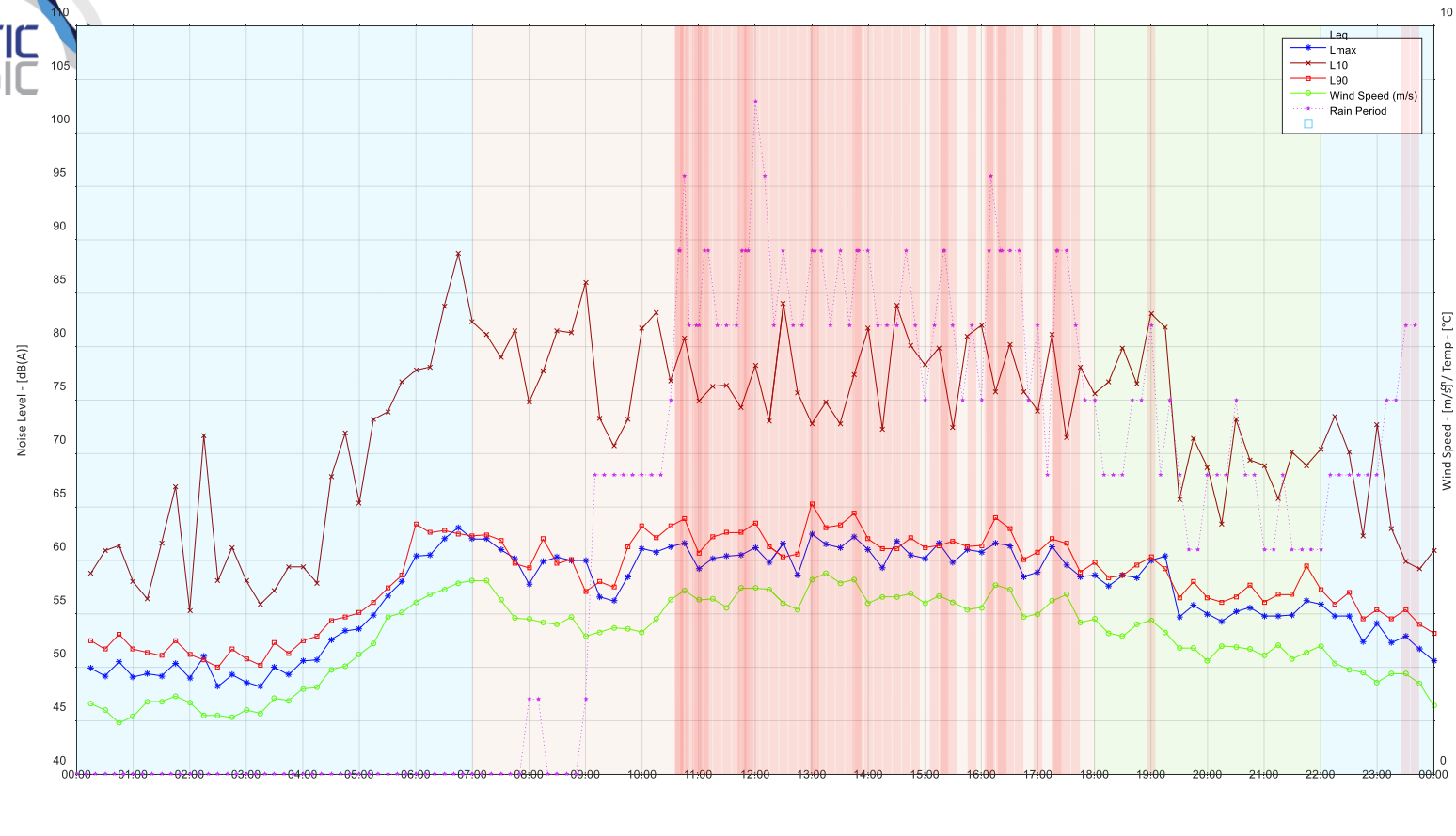
### **NORTHERN BOUNDARY**



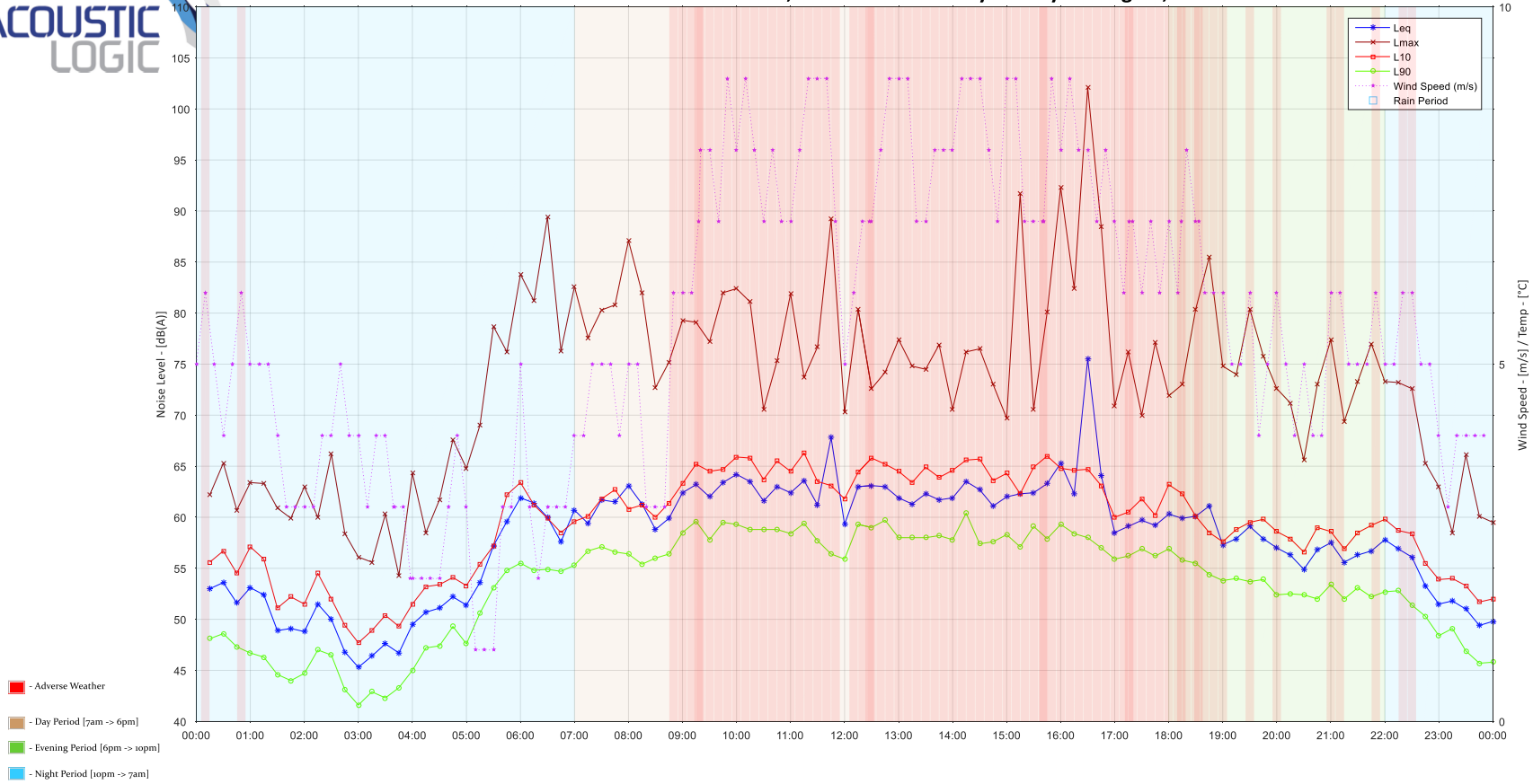
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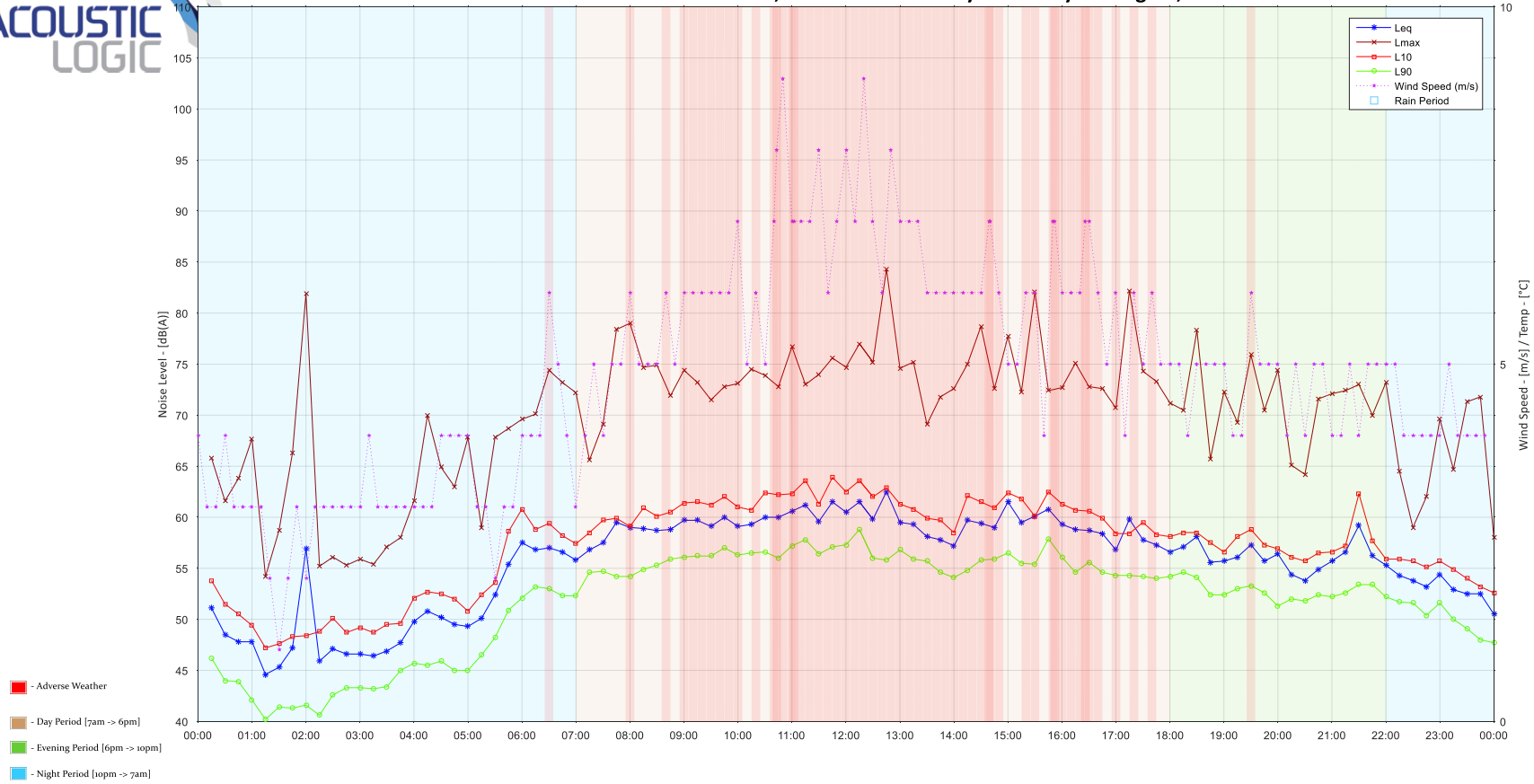
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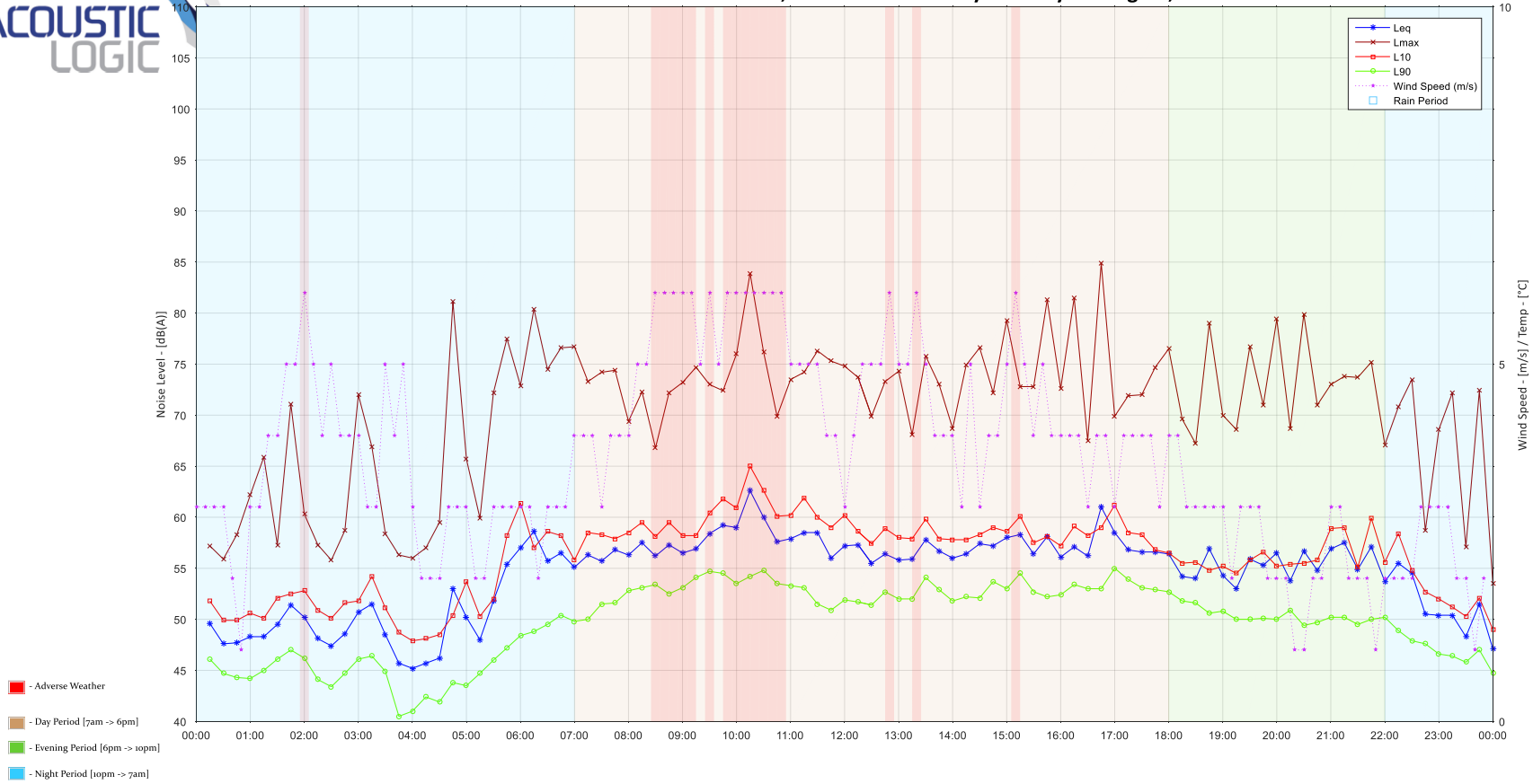
# Cricket NSW Centre of Excellence, Northern Boundary: Friday 09 August, 2019



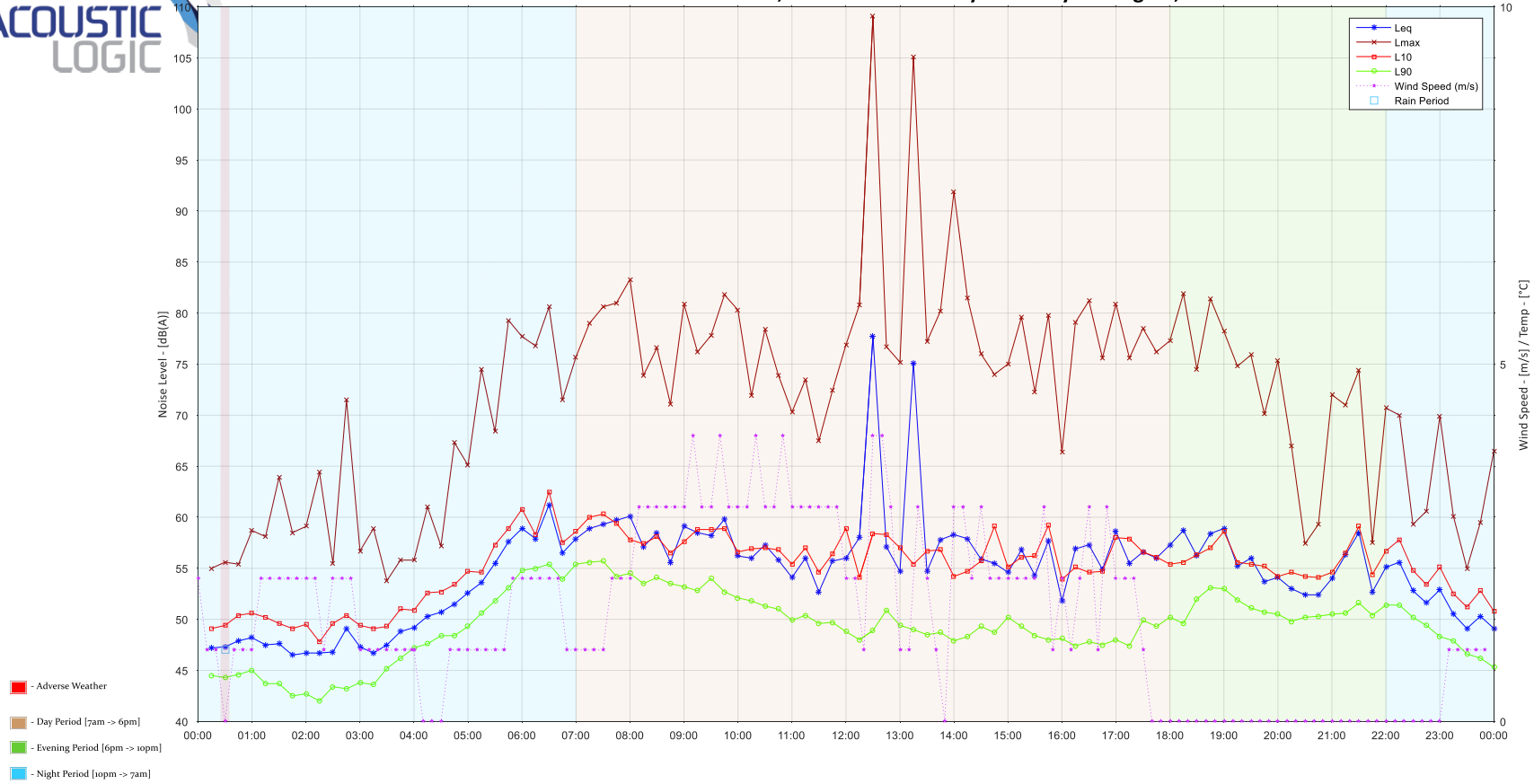
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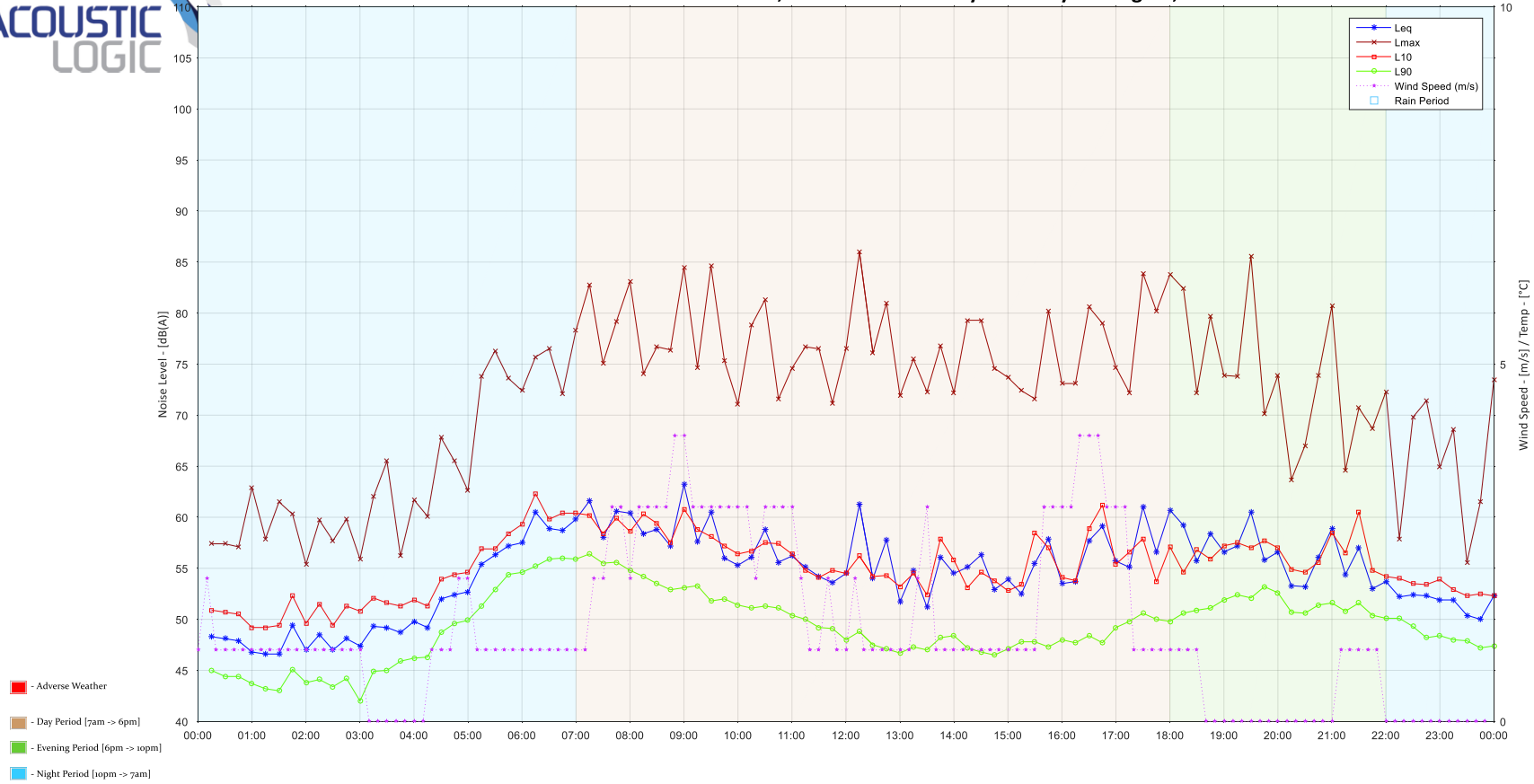
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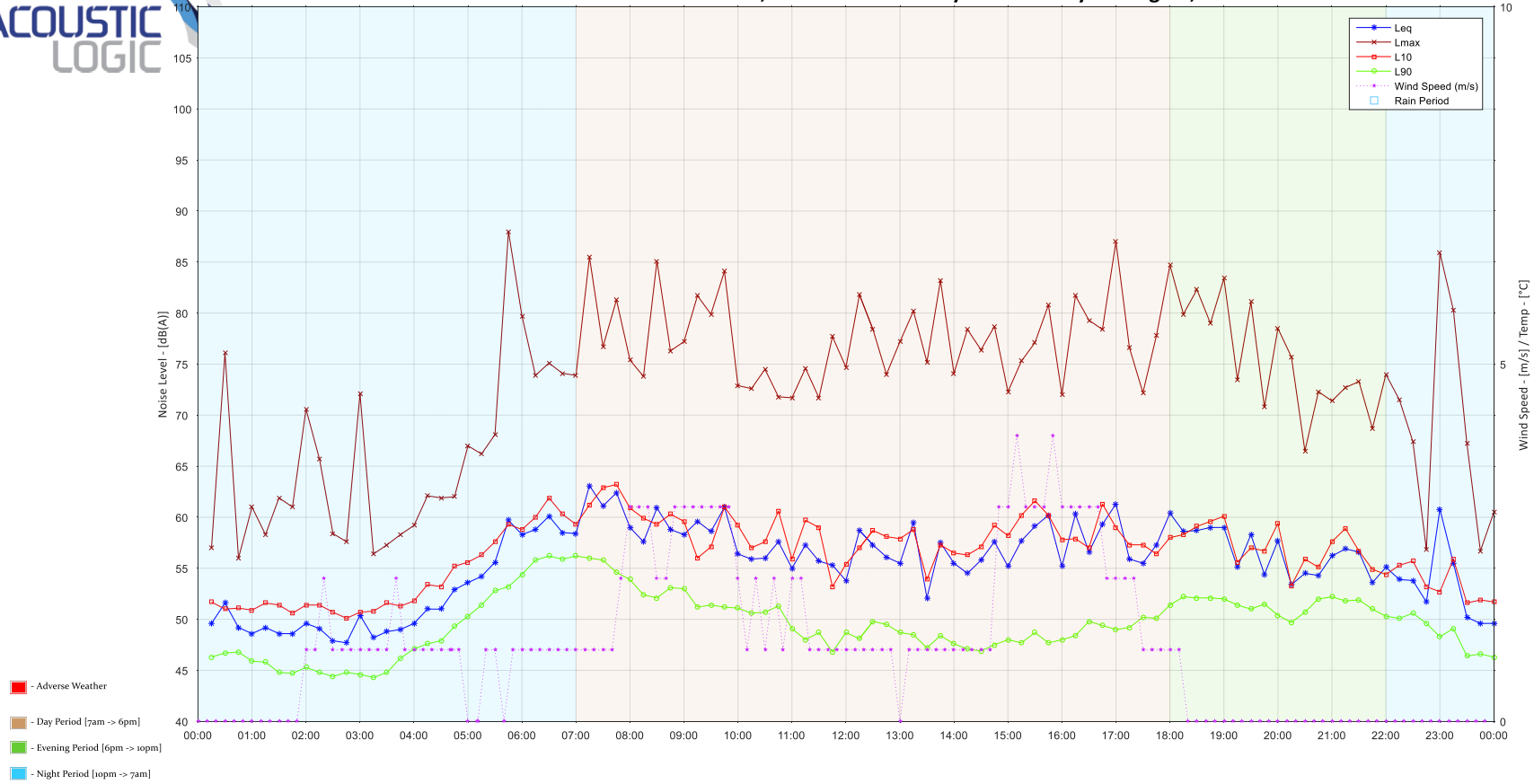
# Cricket NSW Centre of Excellence, Northern Boundary: Monday 12 August, 2019



# Cricket NSW Centre of Excellence, Northern Boundary: Tuesday 13 August, 2019

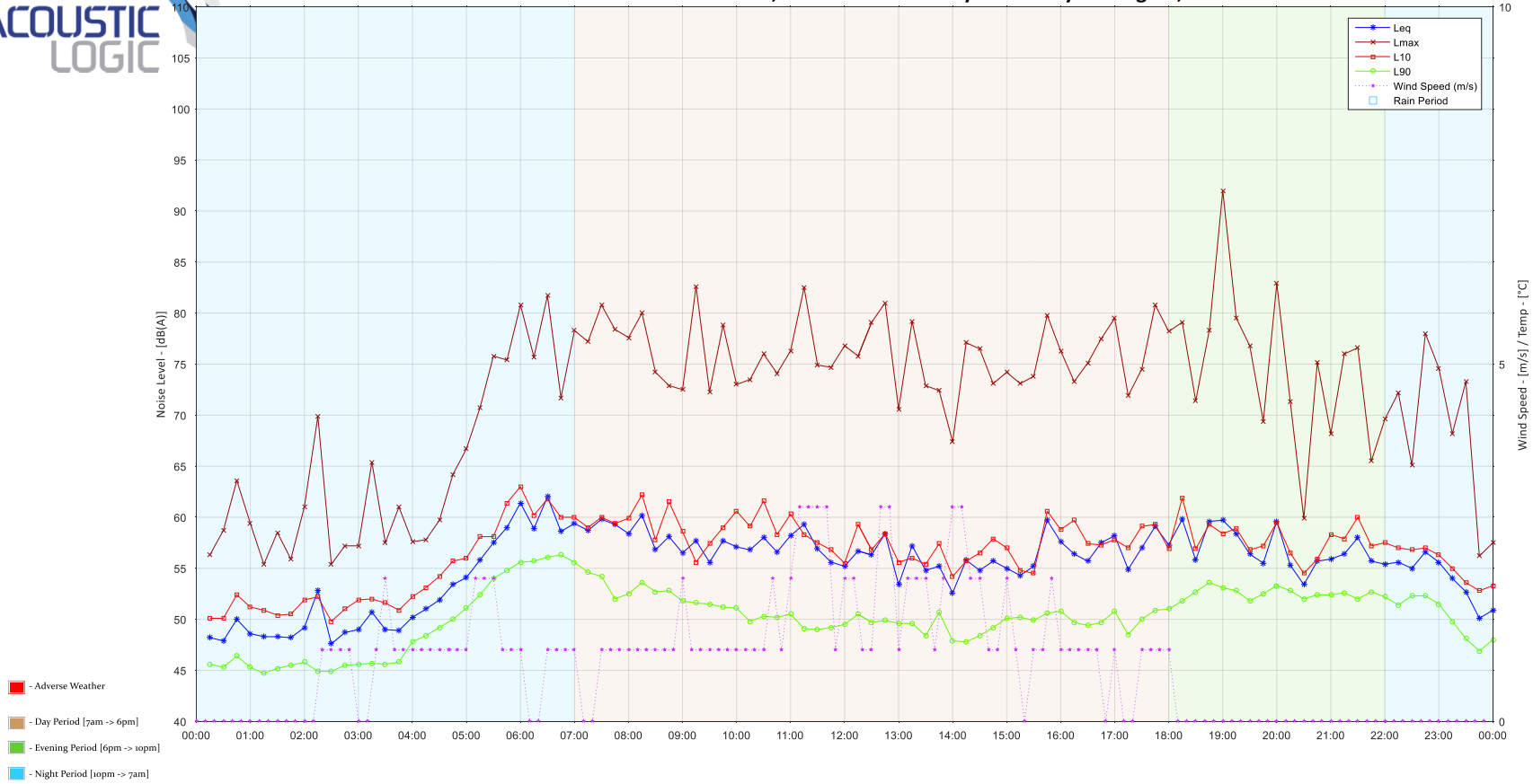


# Cricket NSW Centre of Excellence, Northern Boundary: Wednesday 14 August, 2019

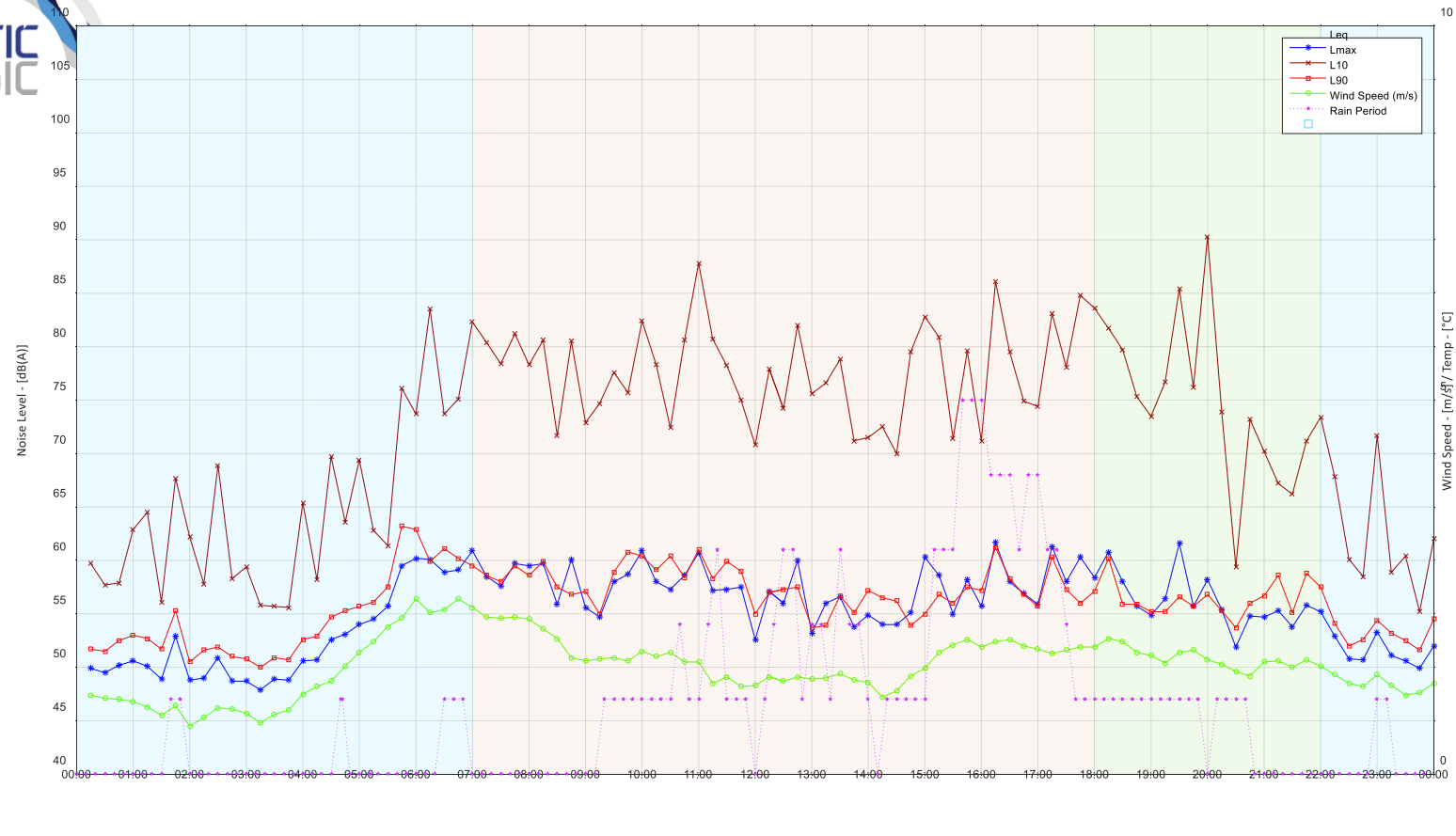




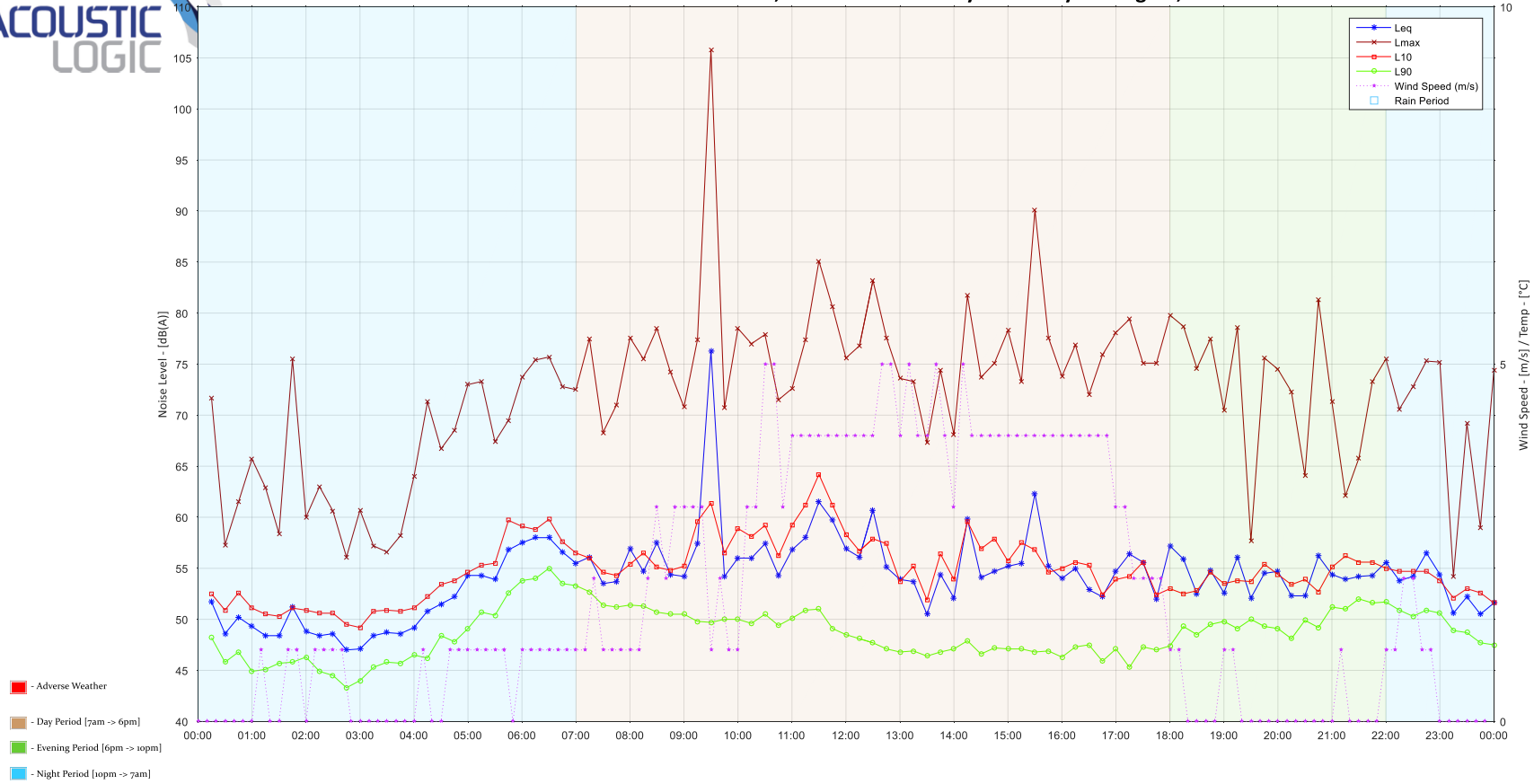
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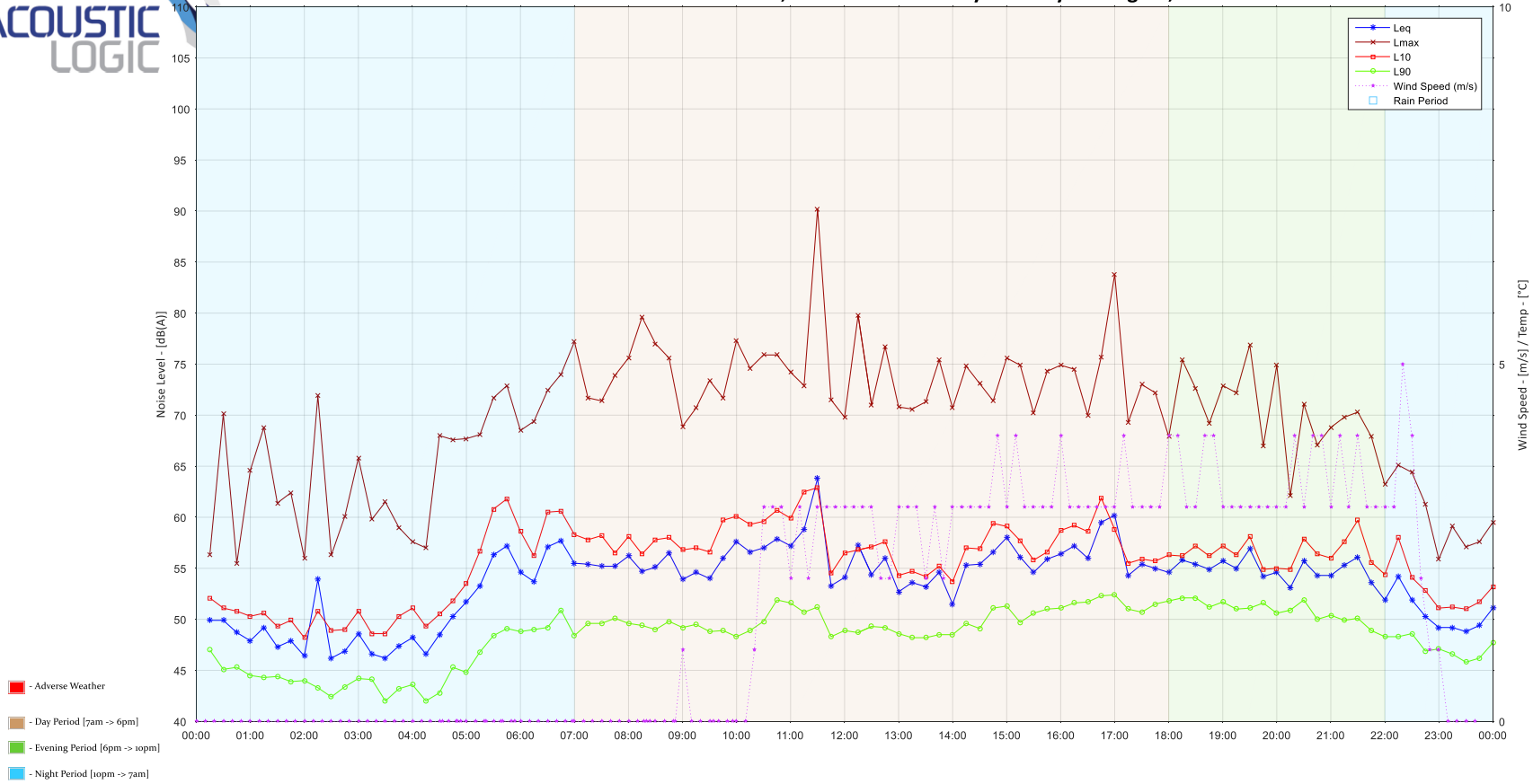
# Cricket NSW Centre of Excellence, Northern Boundary: Friday 16 August, 2019



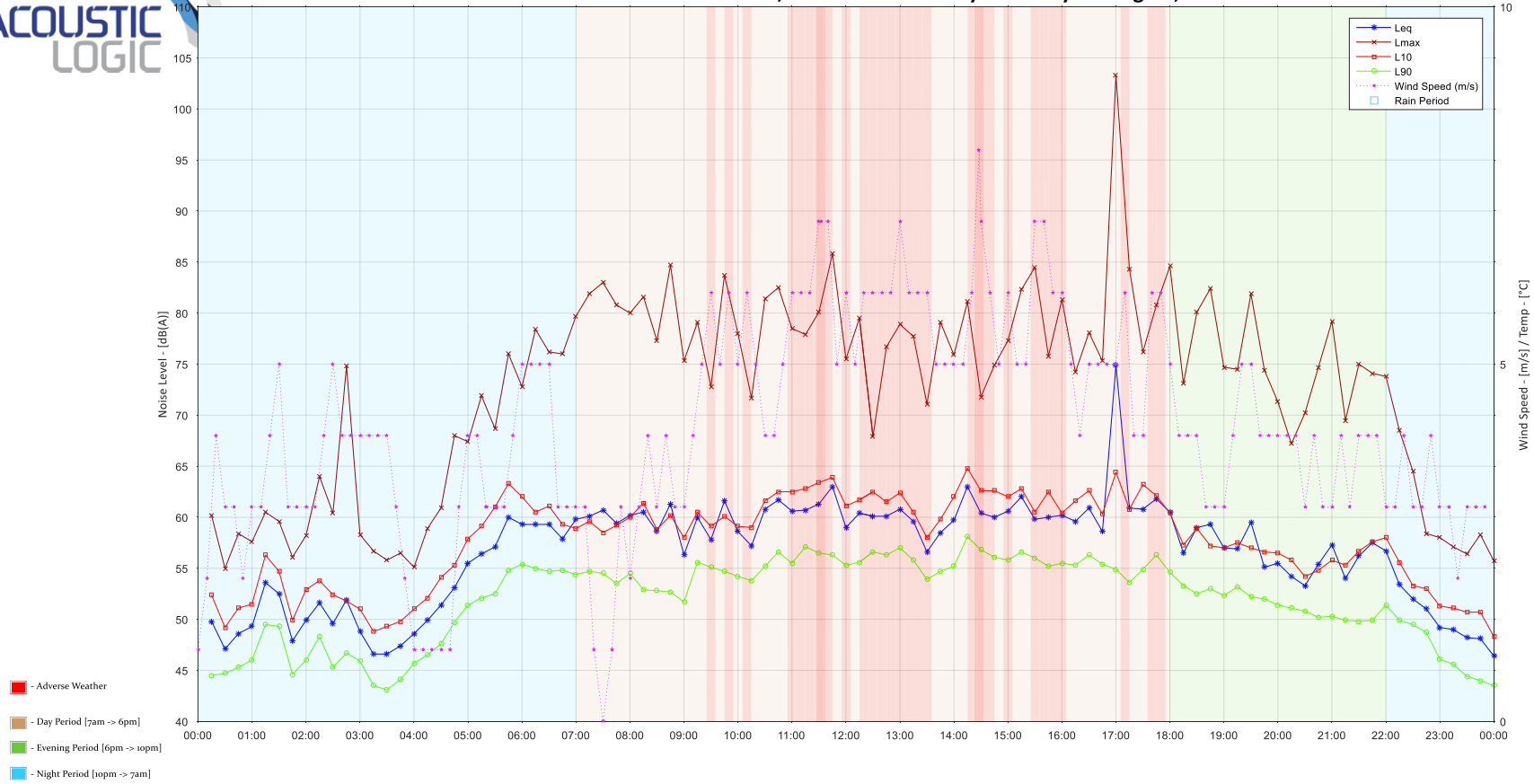
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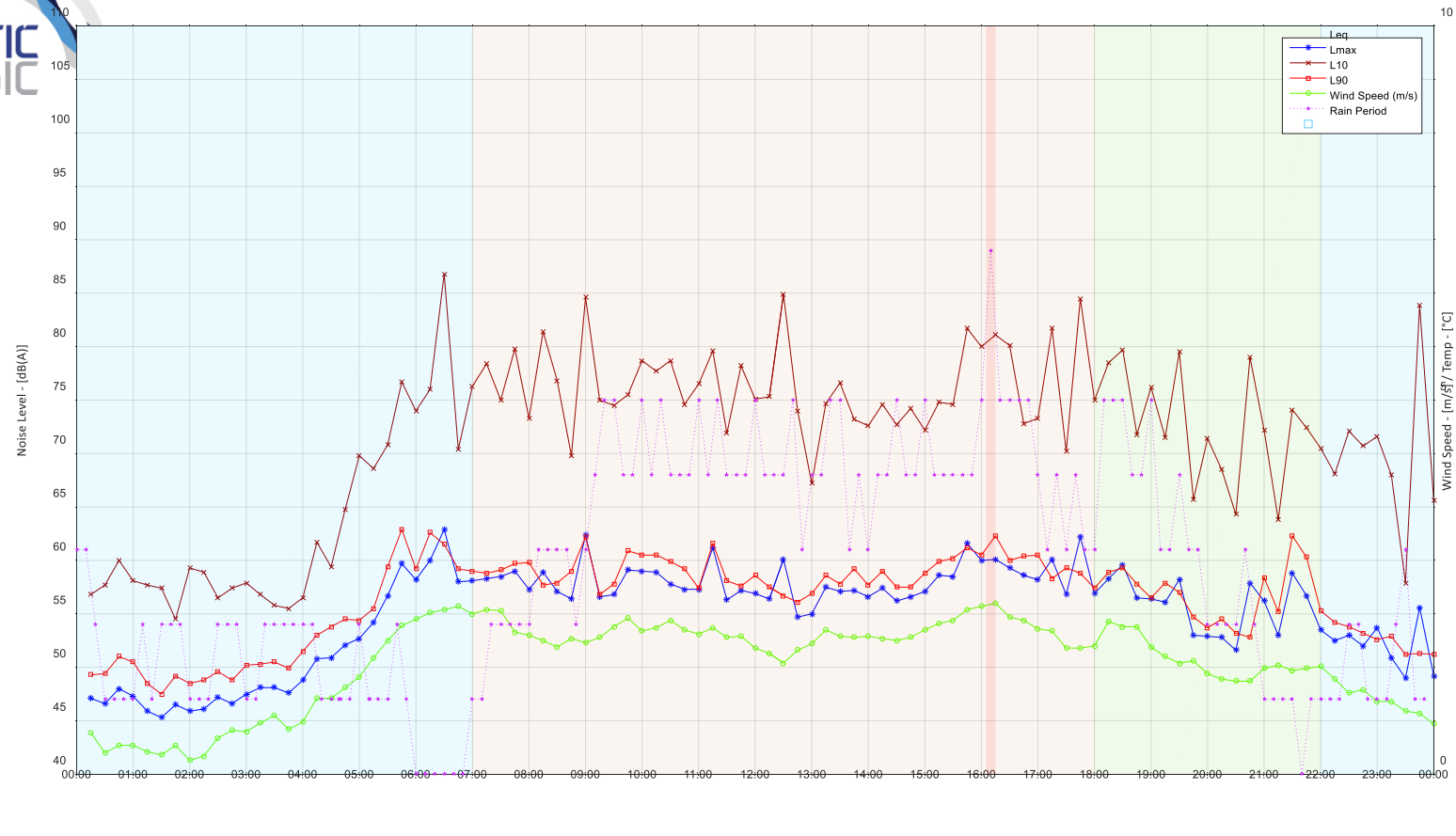
# Cricket NSW Centre of Excellence, Northern Boundary: Sunday 18 August, 2019



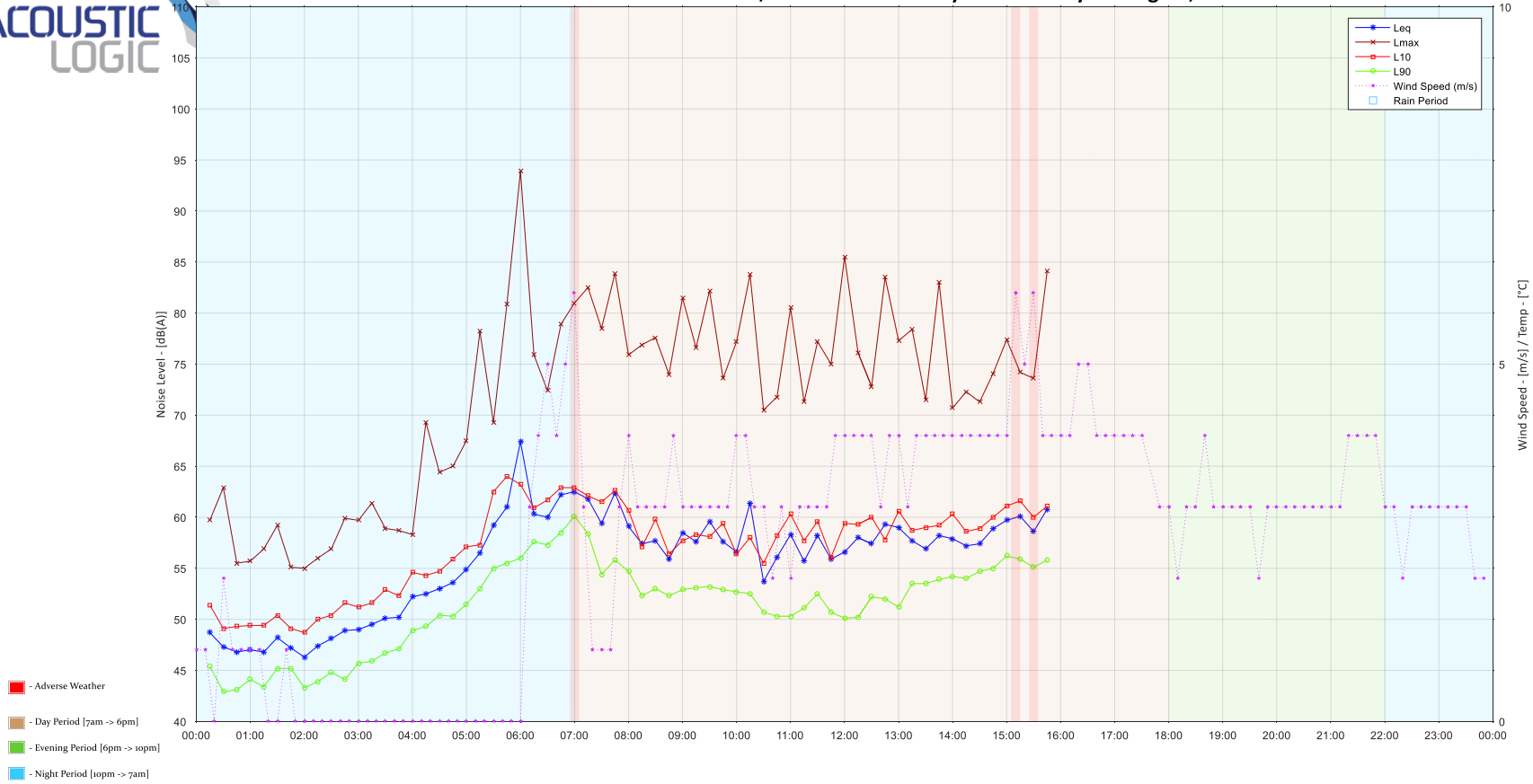
# Cricket NSW Centre of Excellence, Northern Boundary: Monday 19 August, 2019



# Cricket NSW Centre of Excellence, Northern Boundary: Tuesday 20 August, 2019



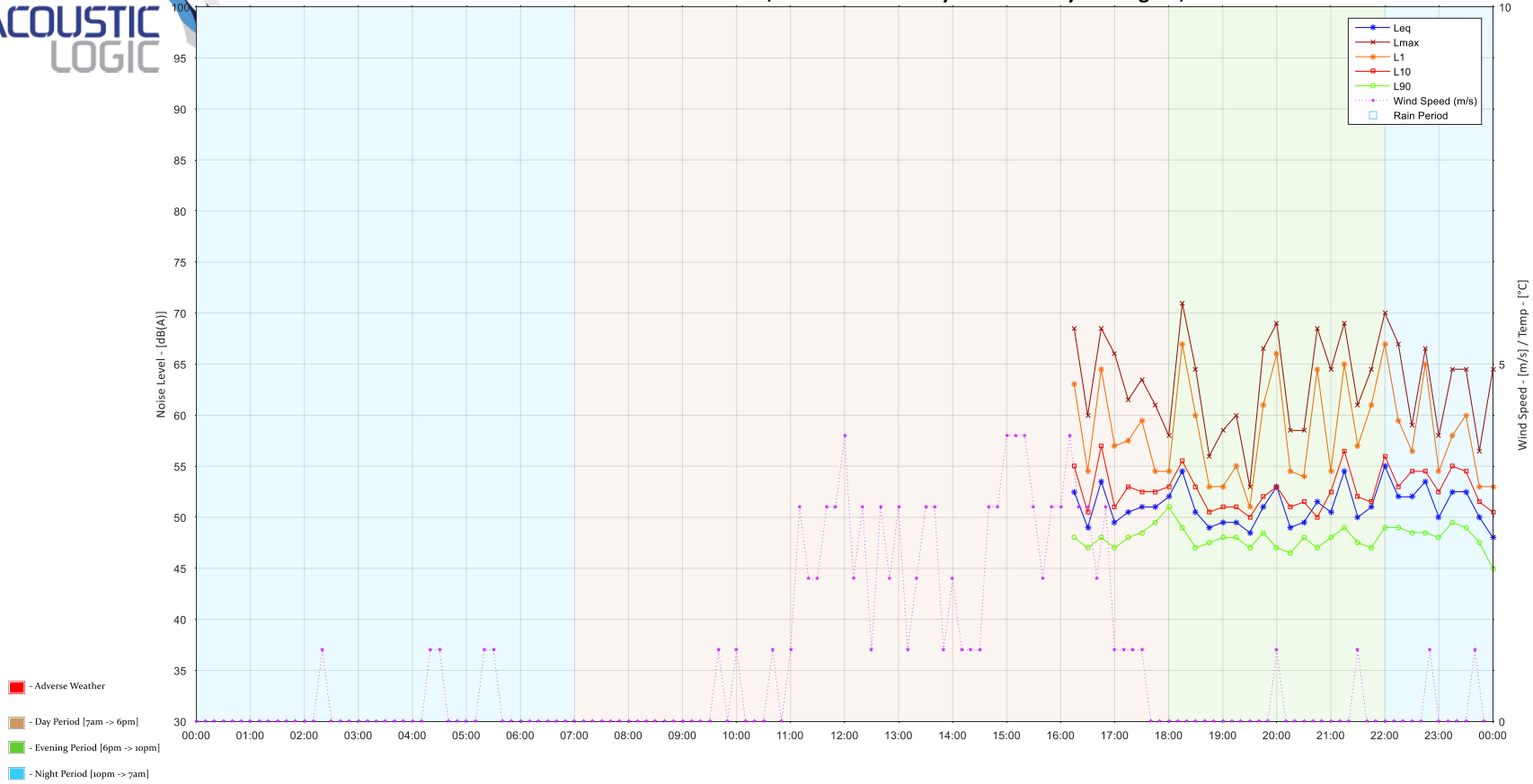
# Cricket NSW Centre of Excellence, Northern Boundary: Wednesday 21 August, 2019



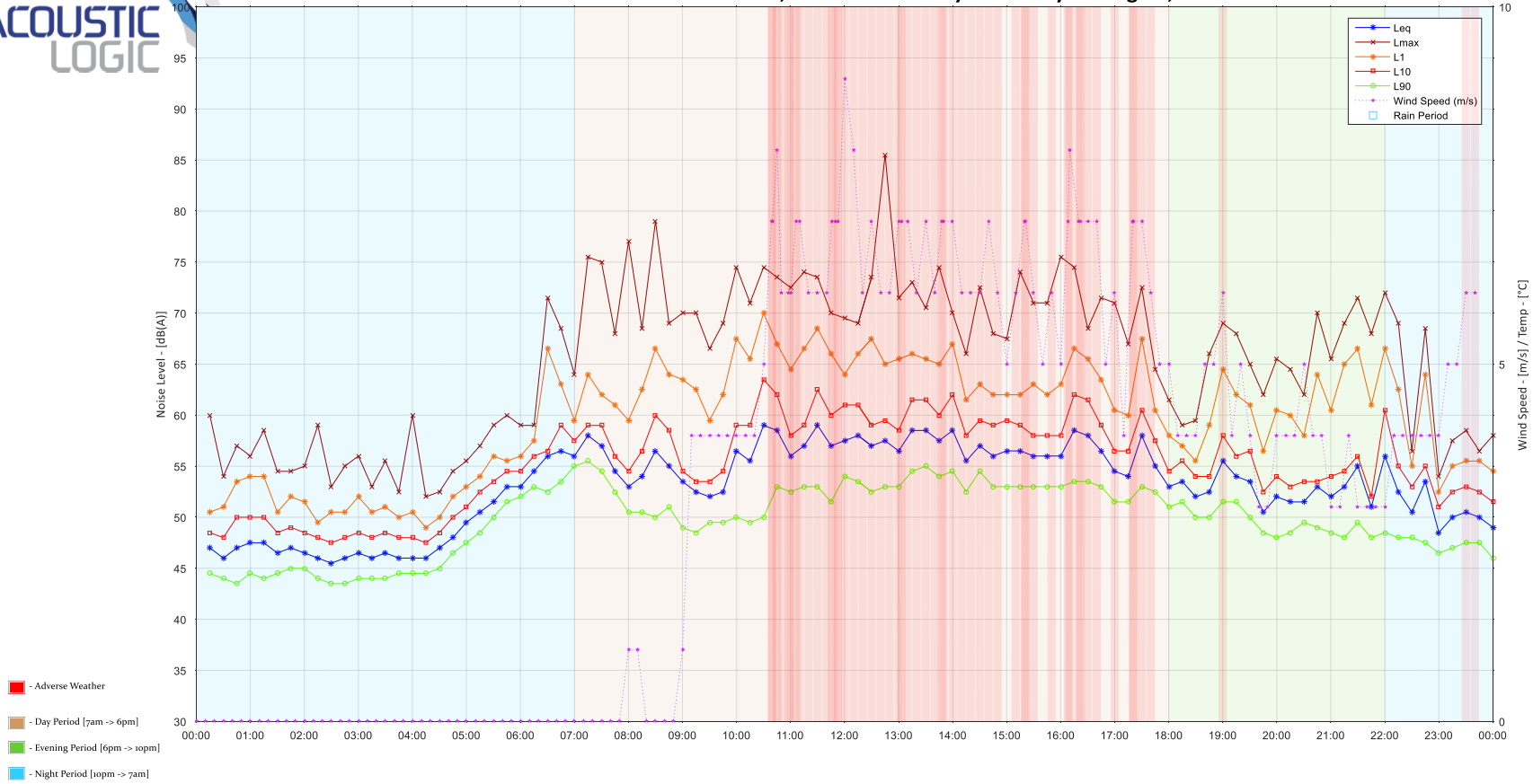
## **EASTERN BOUNDARY**



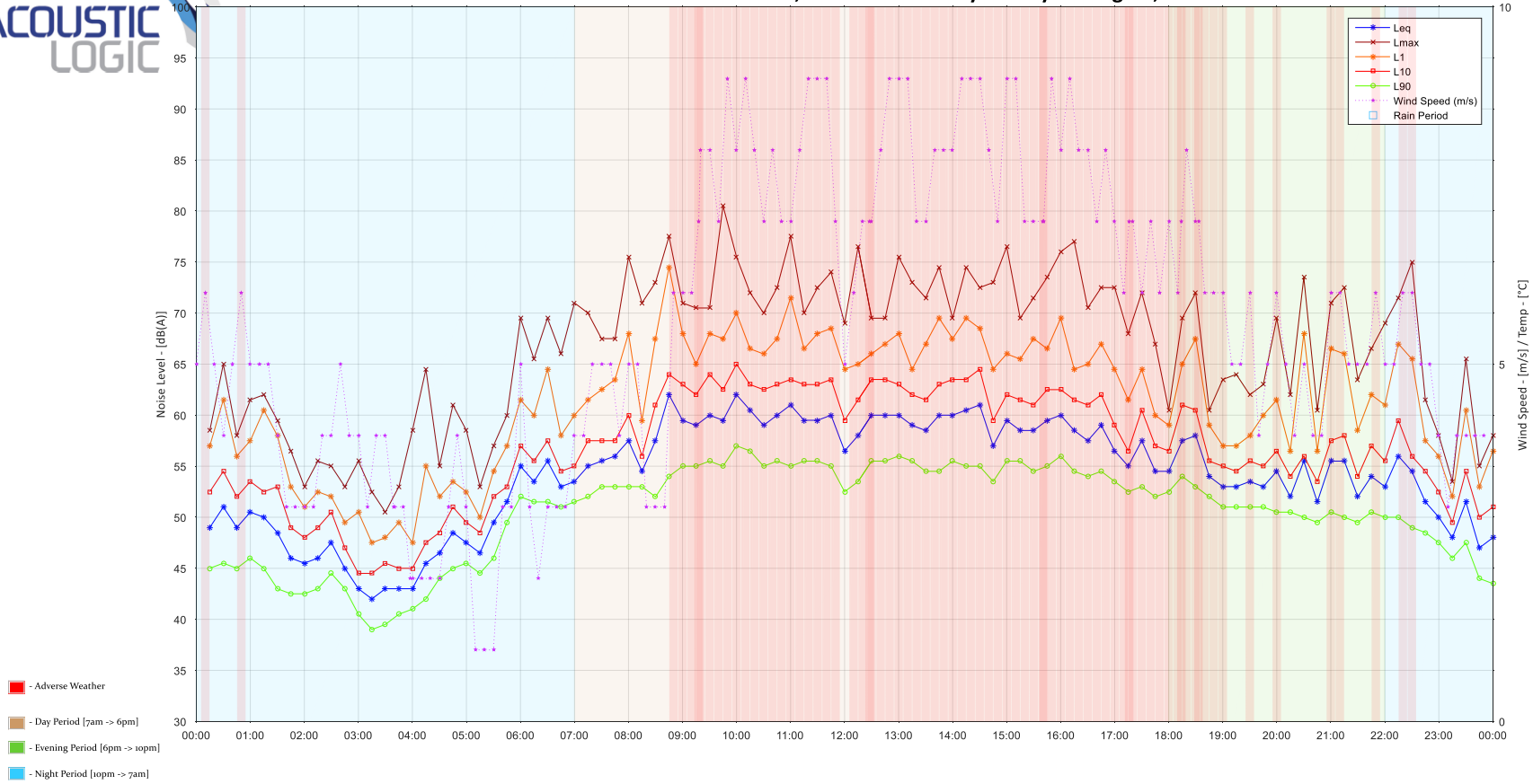
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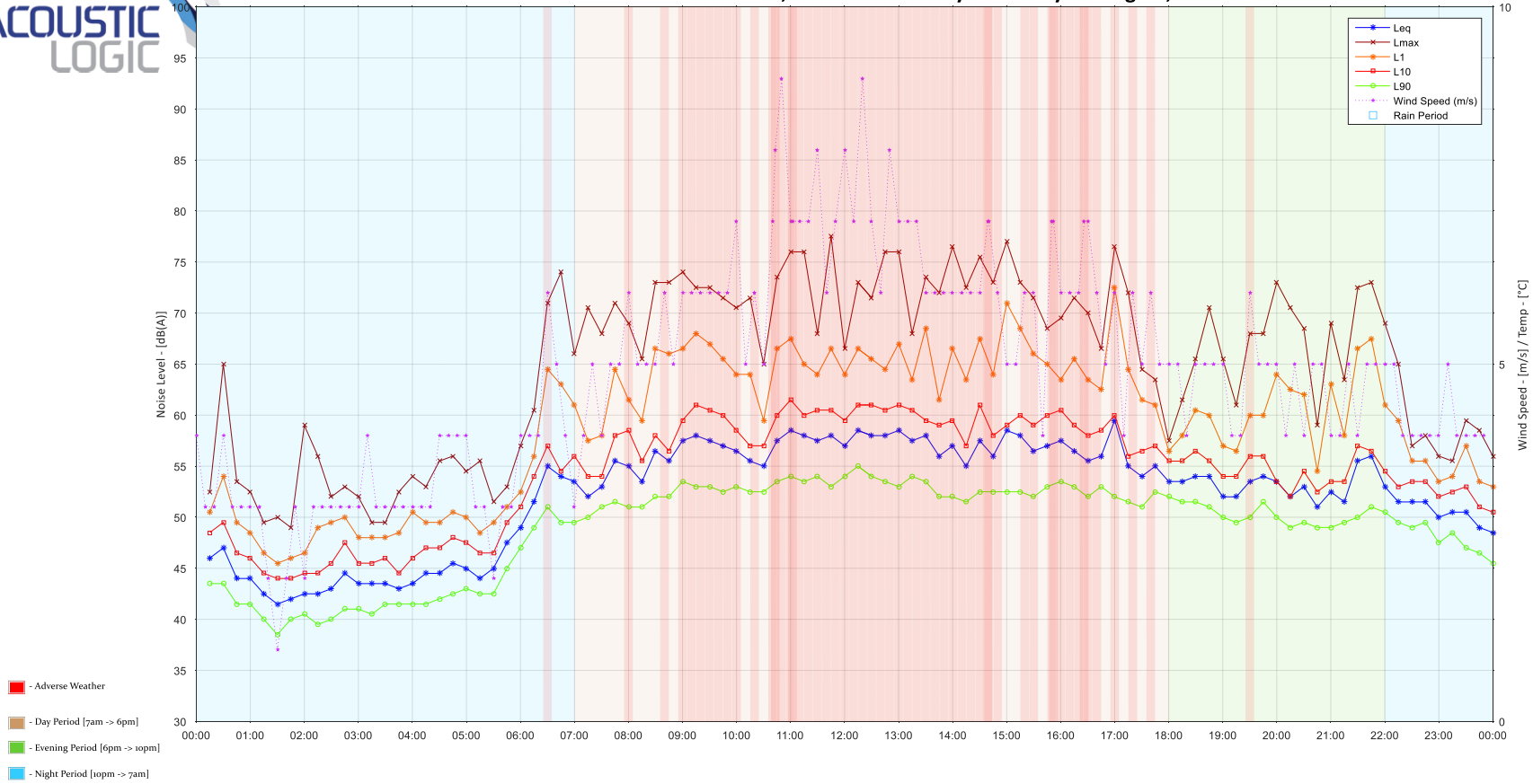
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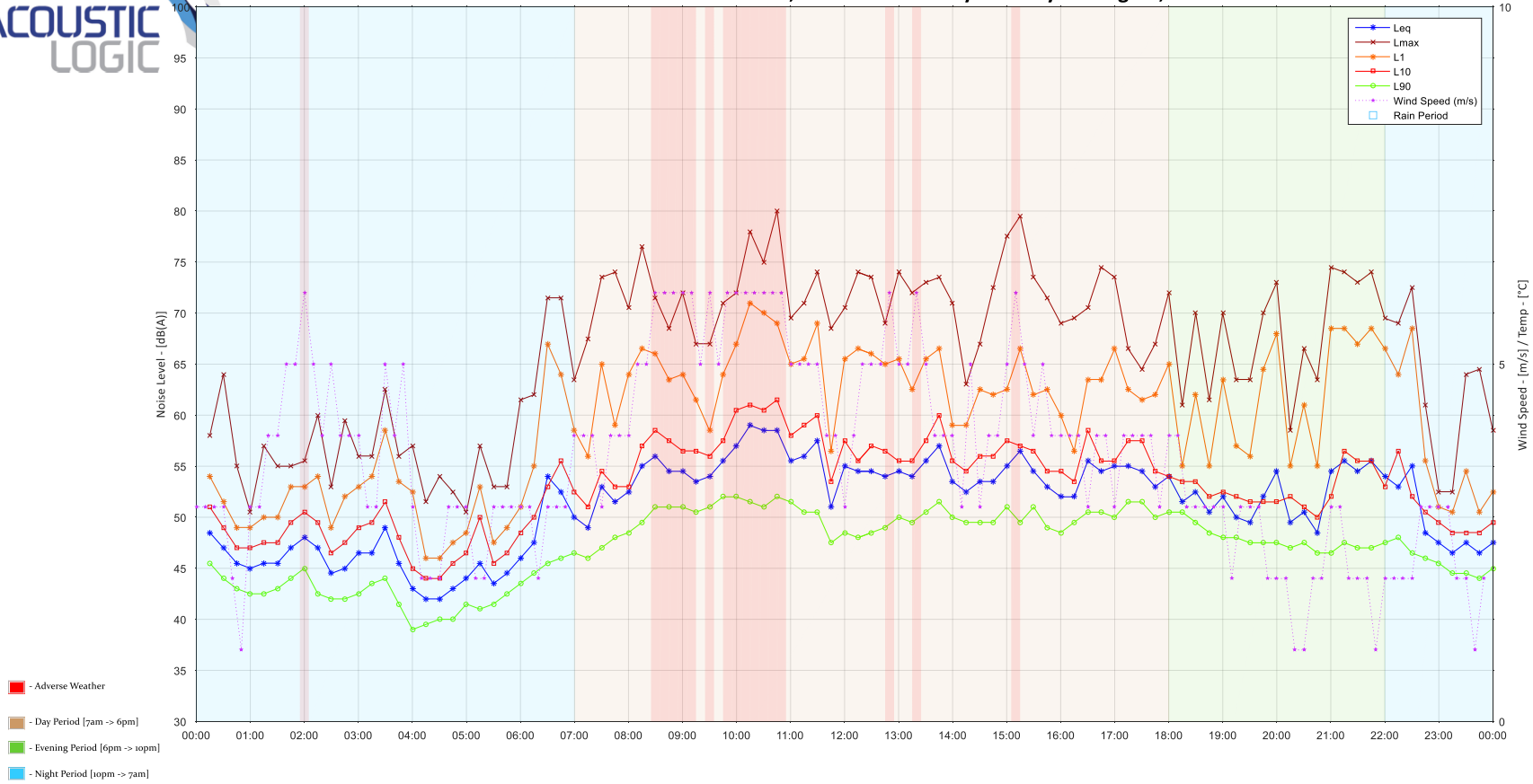
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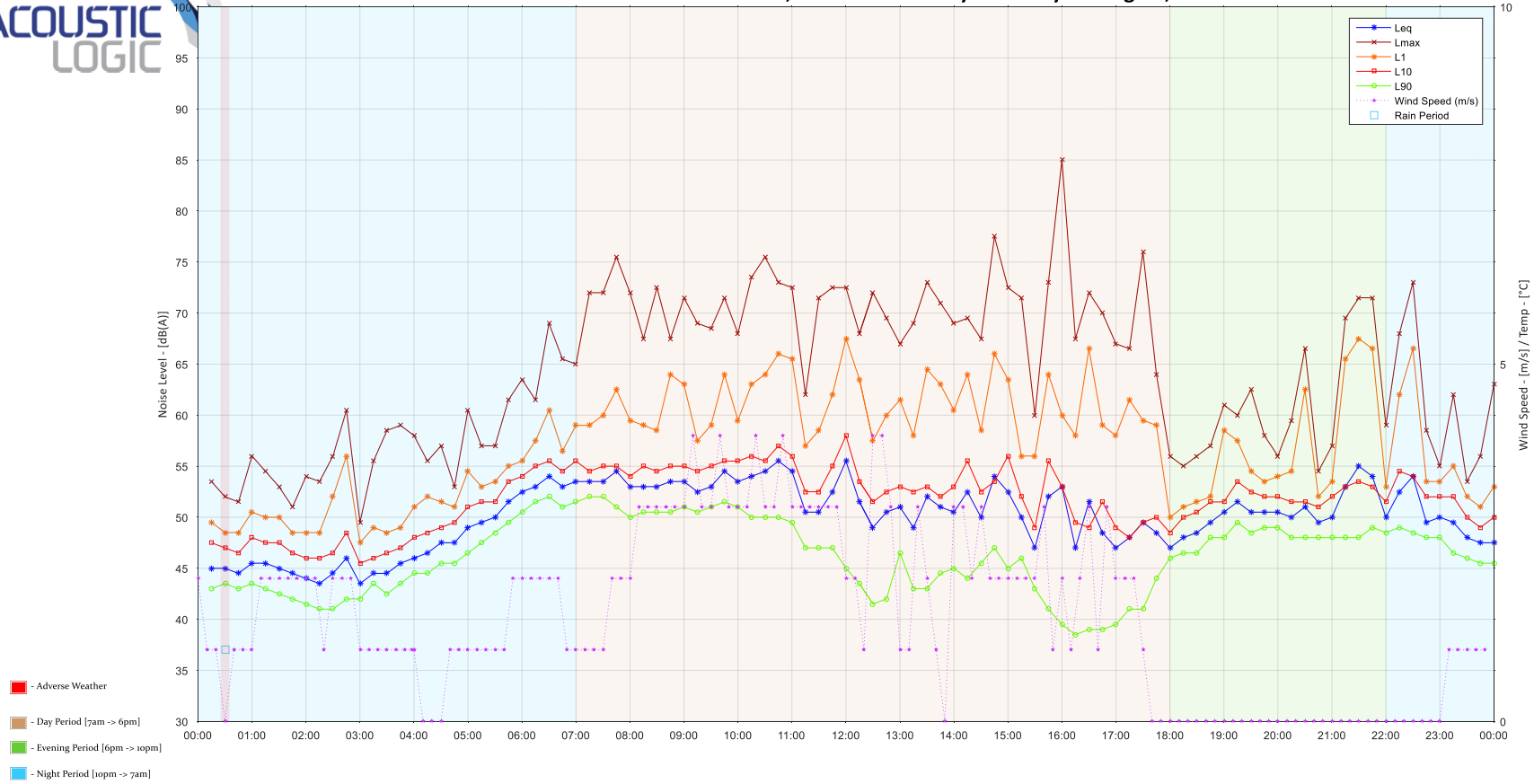
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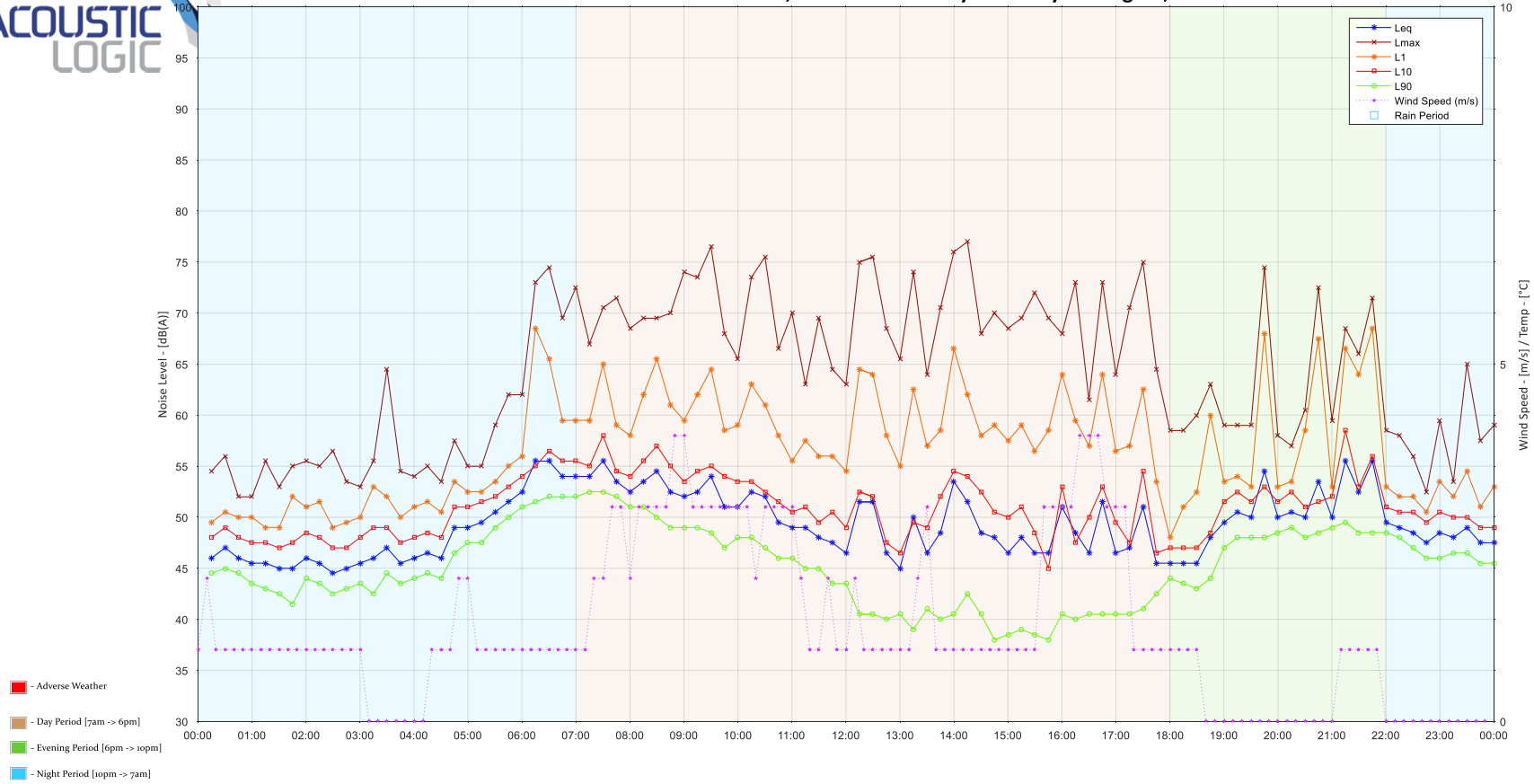
# Cricket NSW Centre of Excellence, Eastern Boundary: Sunday 11 August, 2019



# Cricket NSW Centre of Excellence, Eastern Boundary: Monday 12 August, 2019

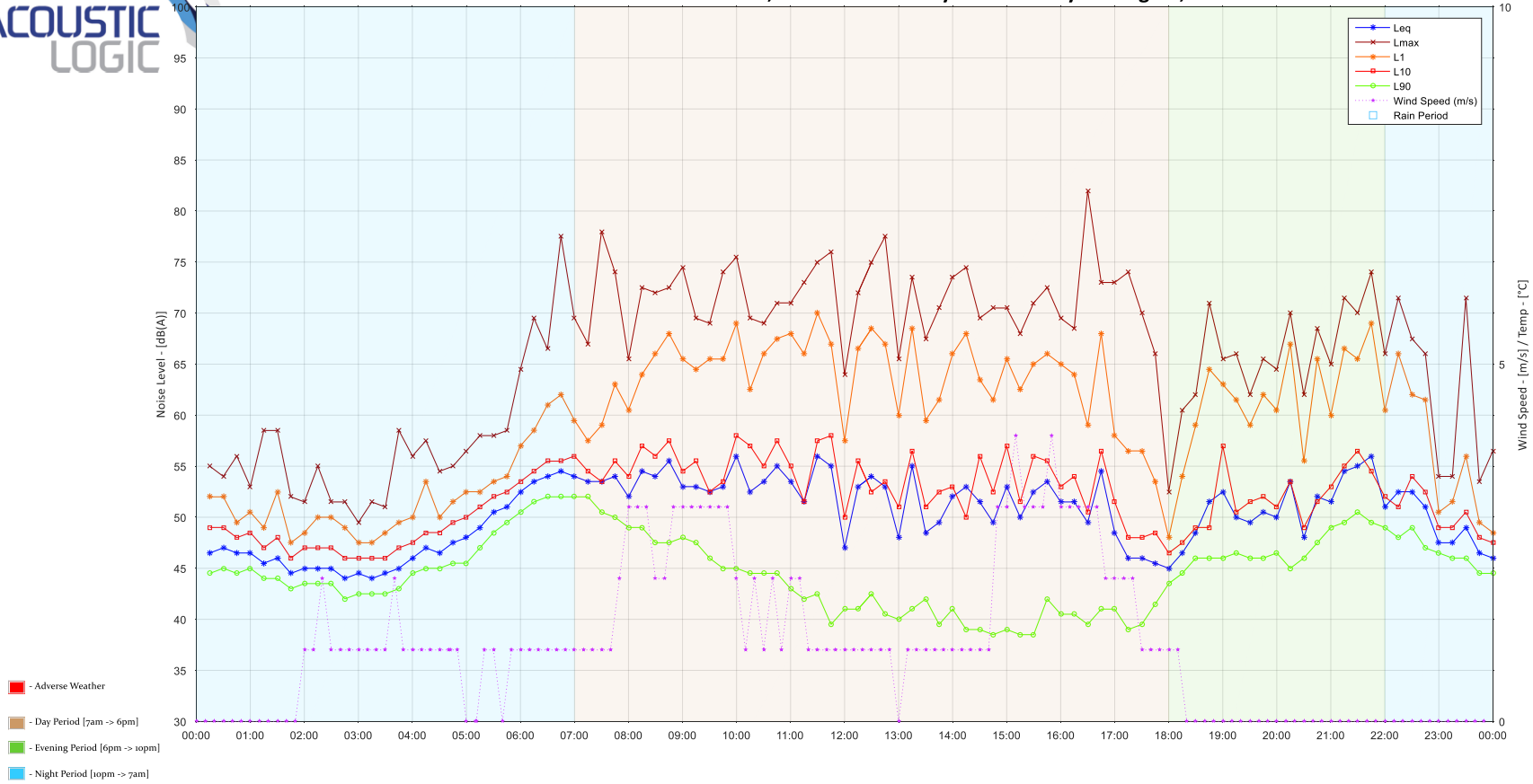


# Cricket NSW Centre of Excellence, Eastern Boundary: Tuesday 13 August, 2019

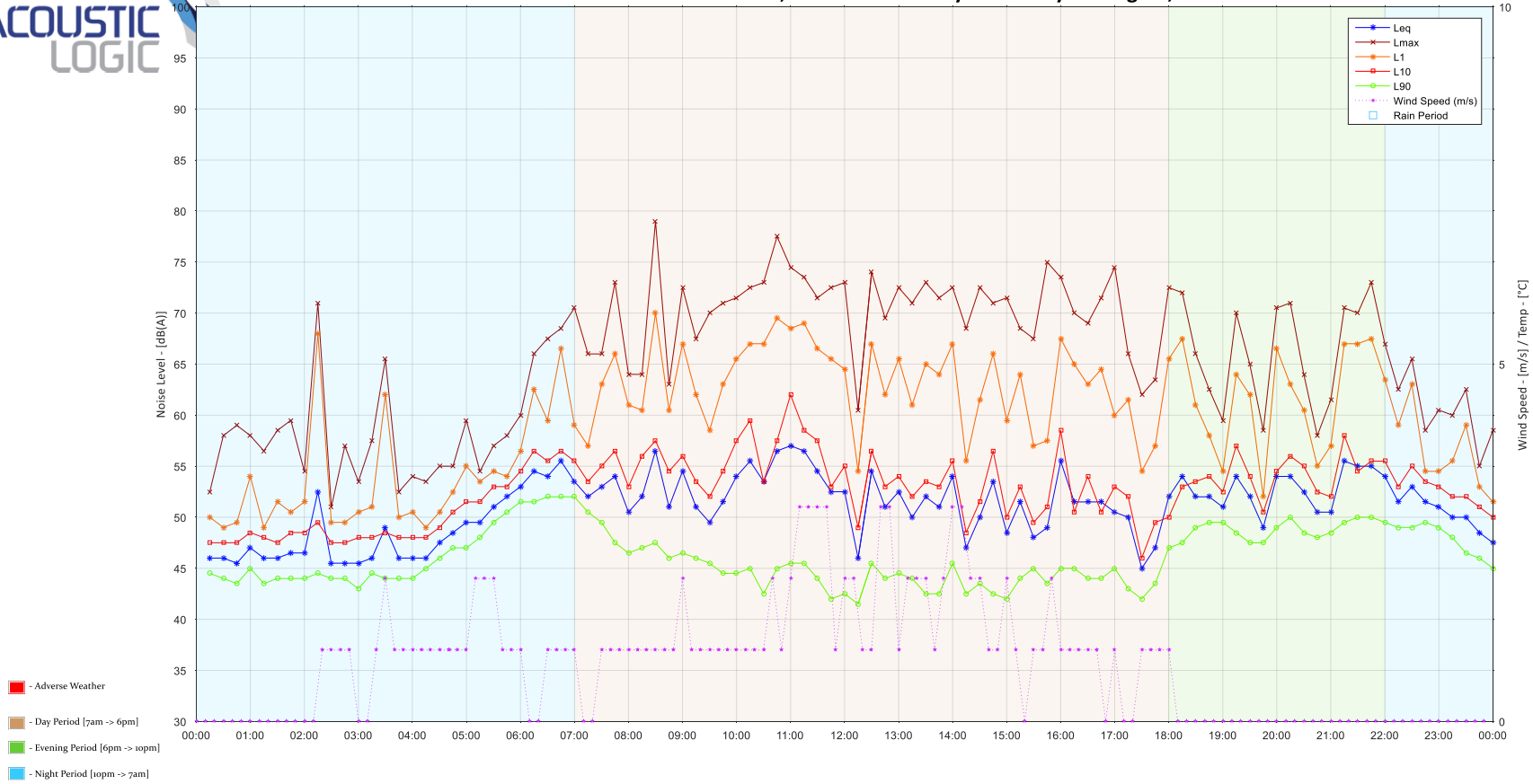




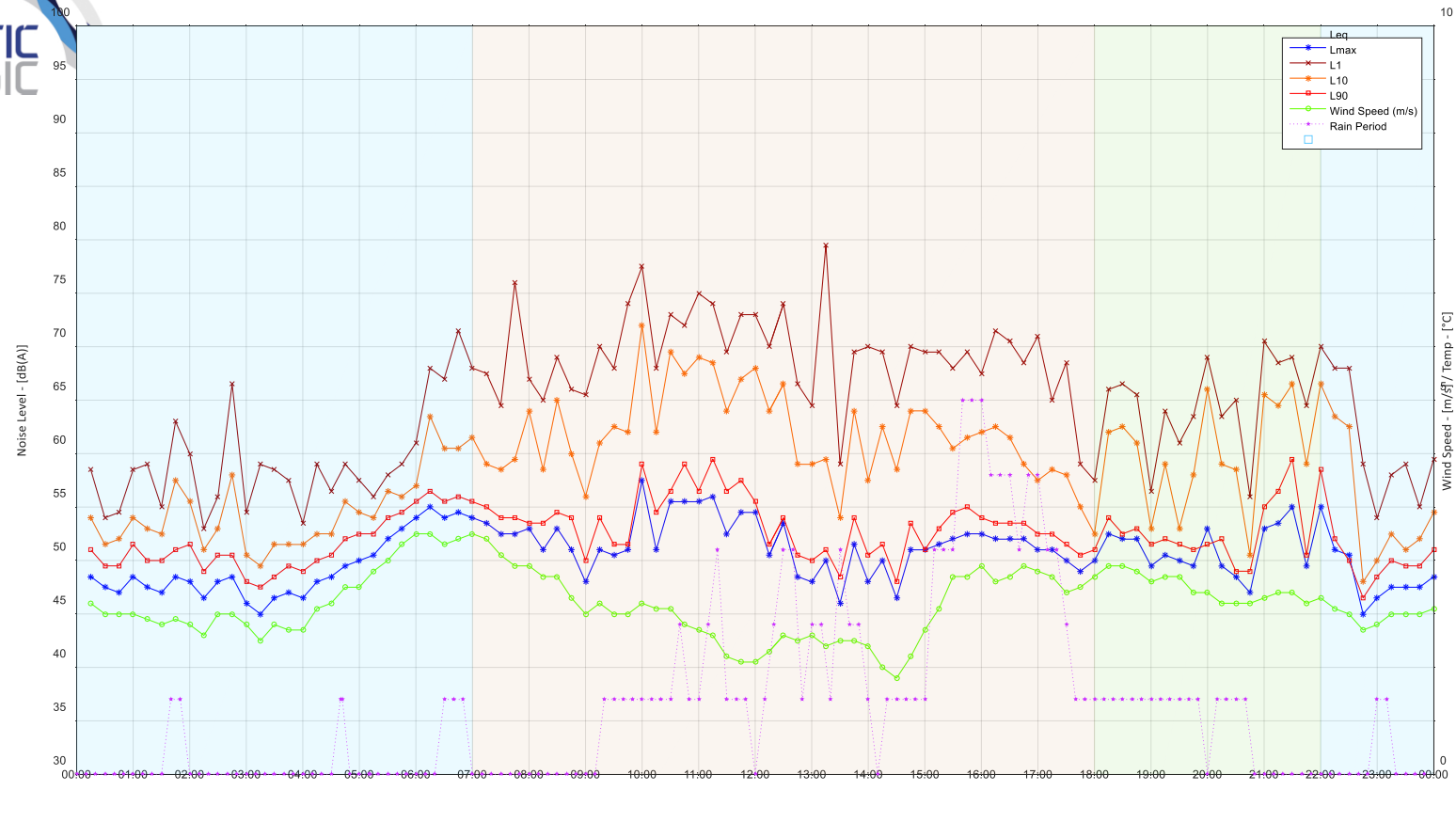
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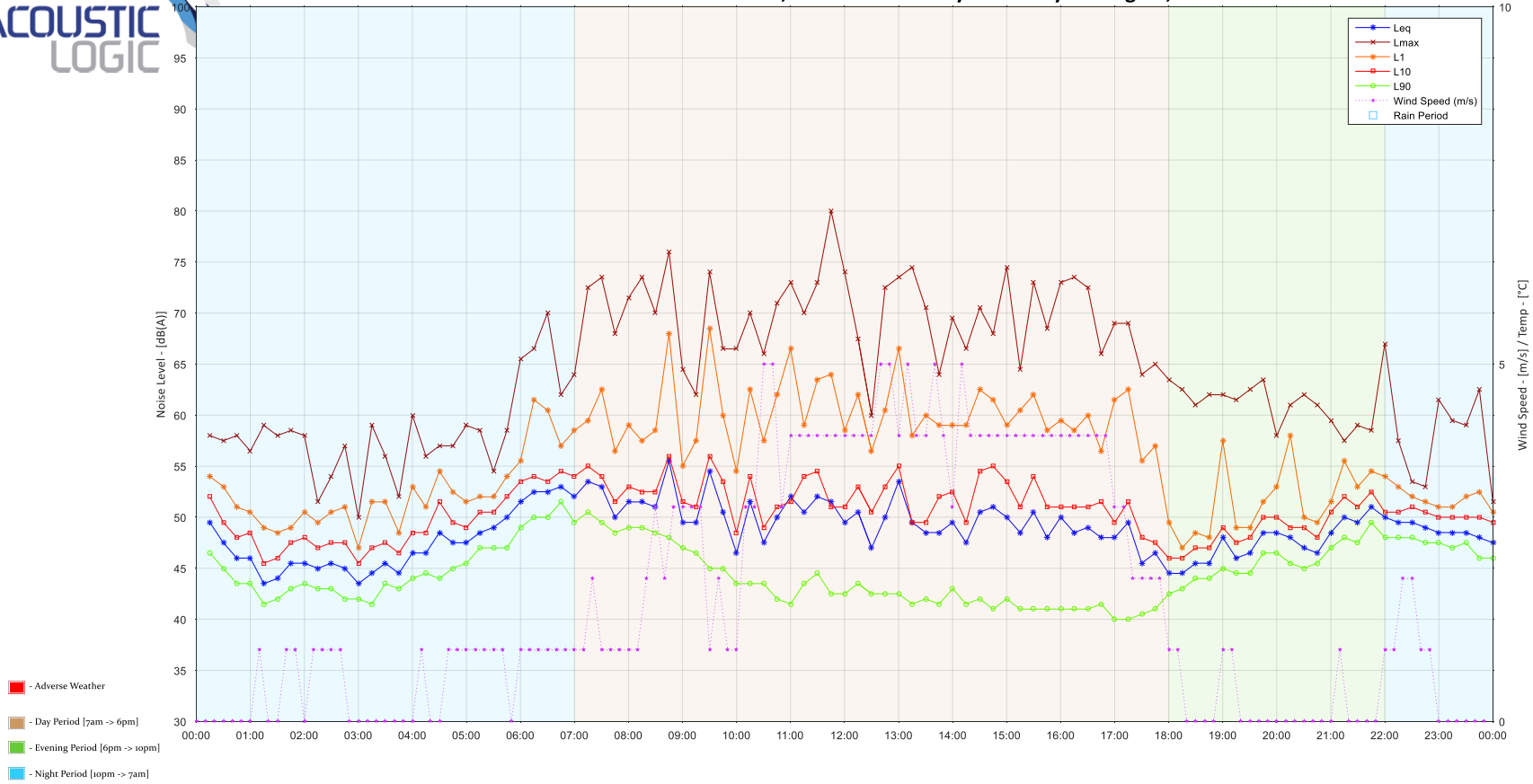
# Cricket NSW Centre of Excellence, Eastern Boundary: Thursday 15 August, 2019



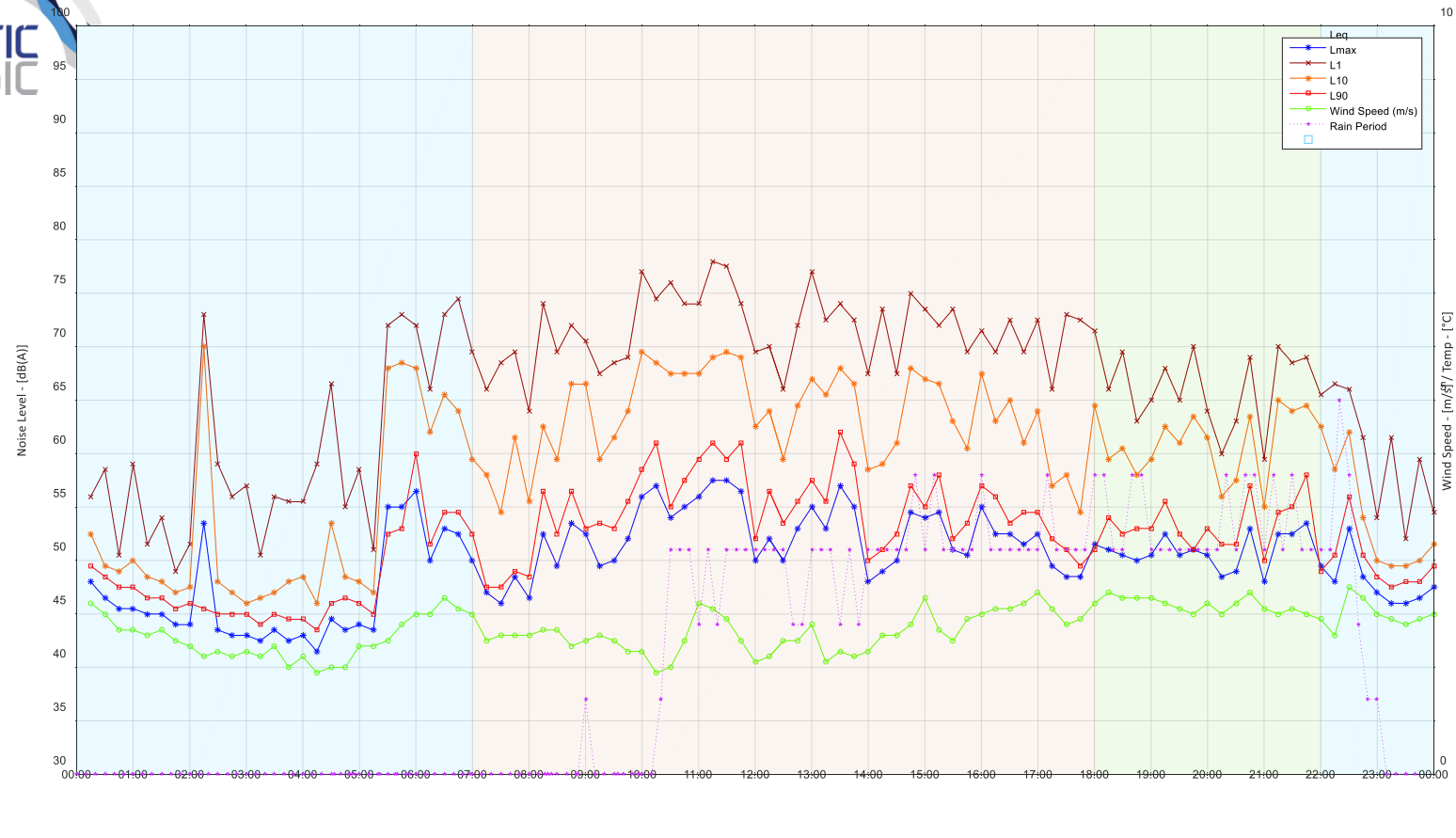
# Cricket NSW Centre of Excellence, Eastern Boundary: Friday 16 August, 2019



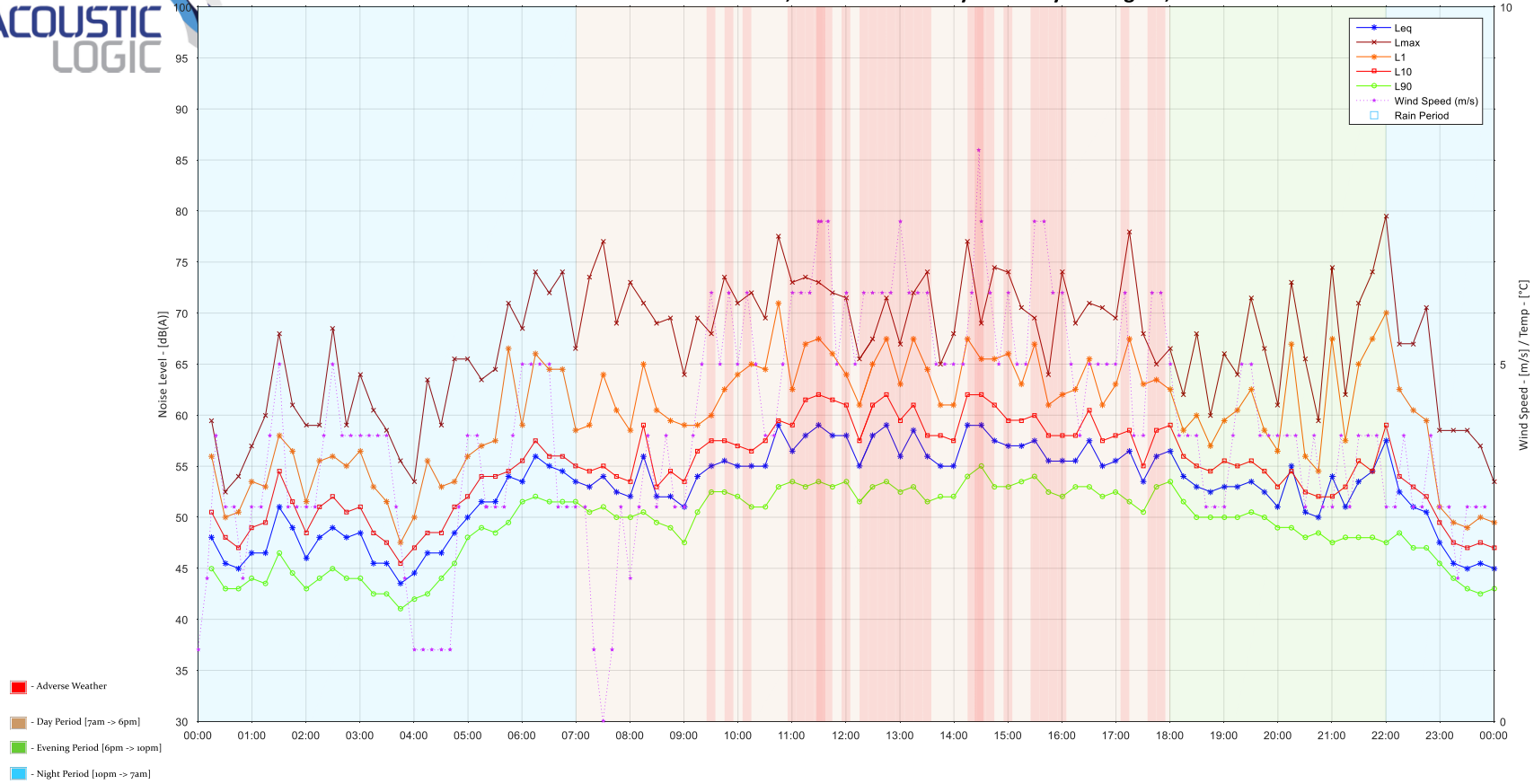
# Cricket NSW Centre of Excellence, Eastern Boundary: Saturday 17 August, 2019



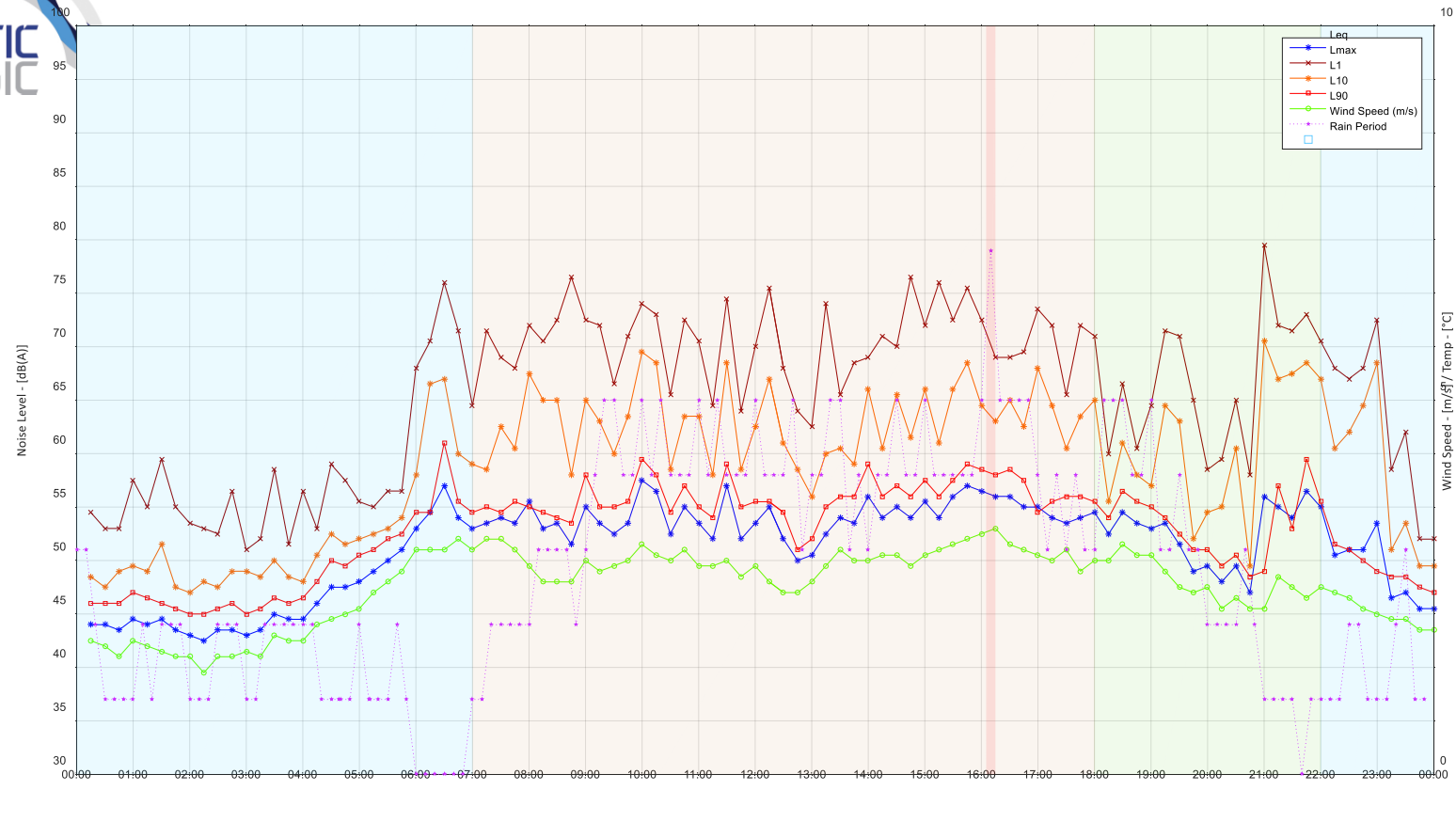
# Cricket NSW Centre of Excellence, Eastern Boundary: Sunday 18 August, 2019



# Cricket NSW Centre of Excellence, Eastern Boundary: Monday 19 August, 2019

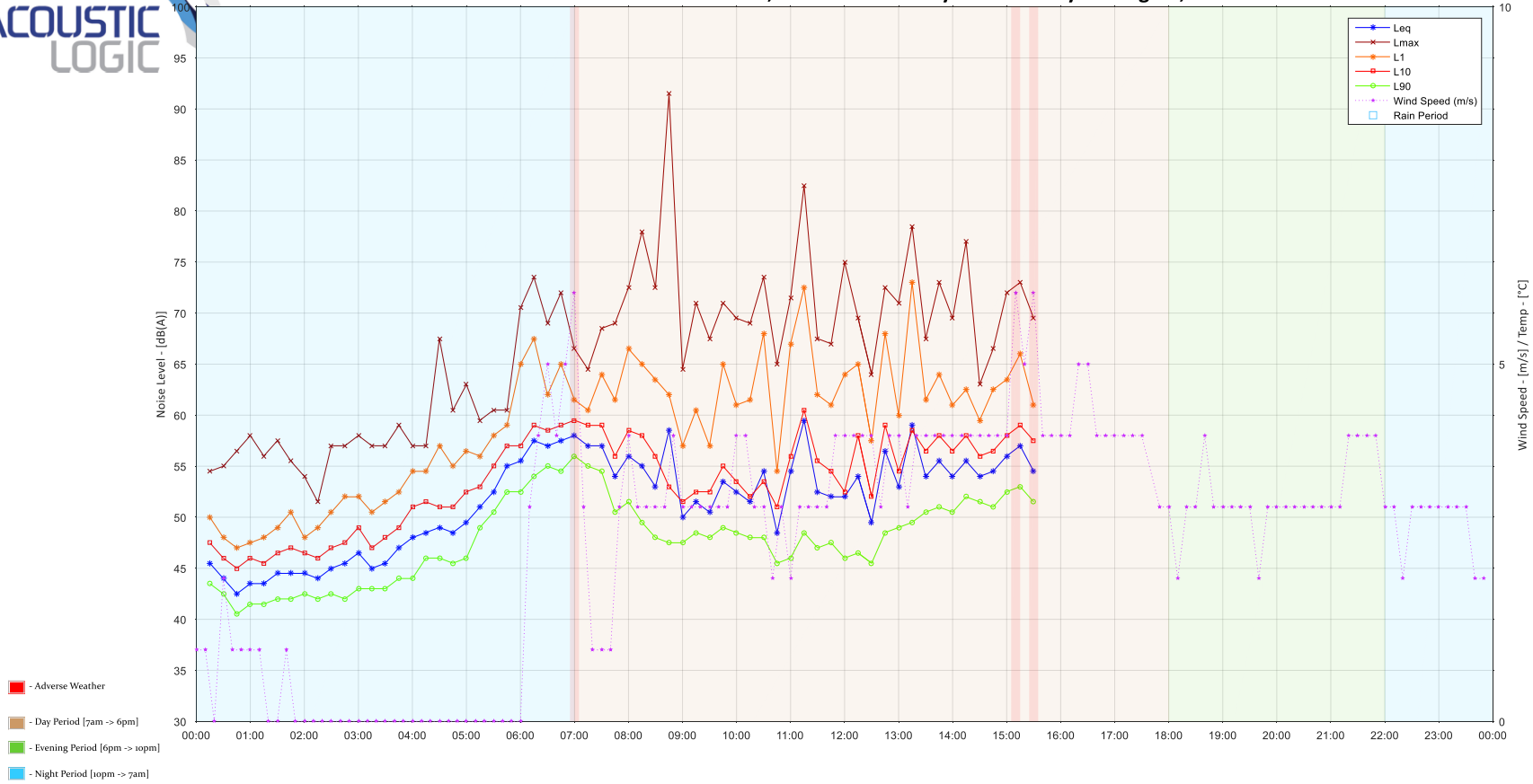


# Cricket NSW Centre of Excellence, Eastern Boundary: Tuesday 20 August, 2019

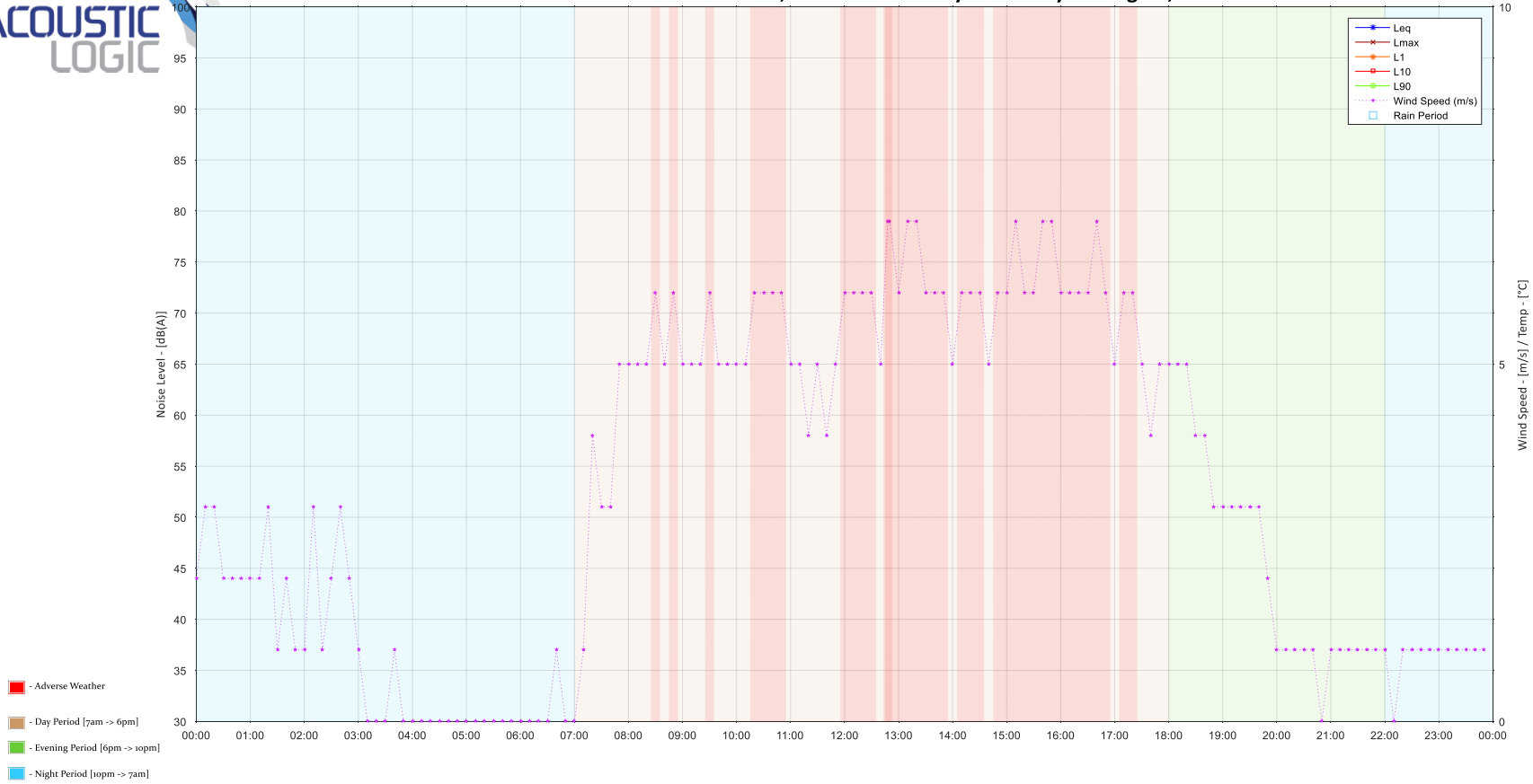




# Cricket NSW Centre of Excellence, Eastern Boundary: Wednesday 21 August, 2019

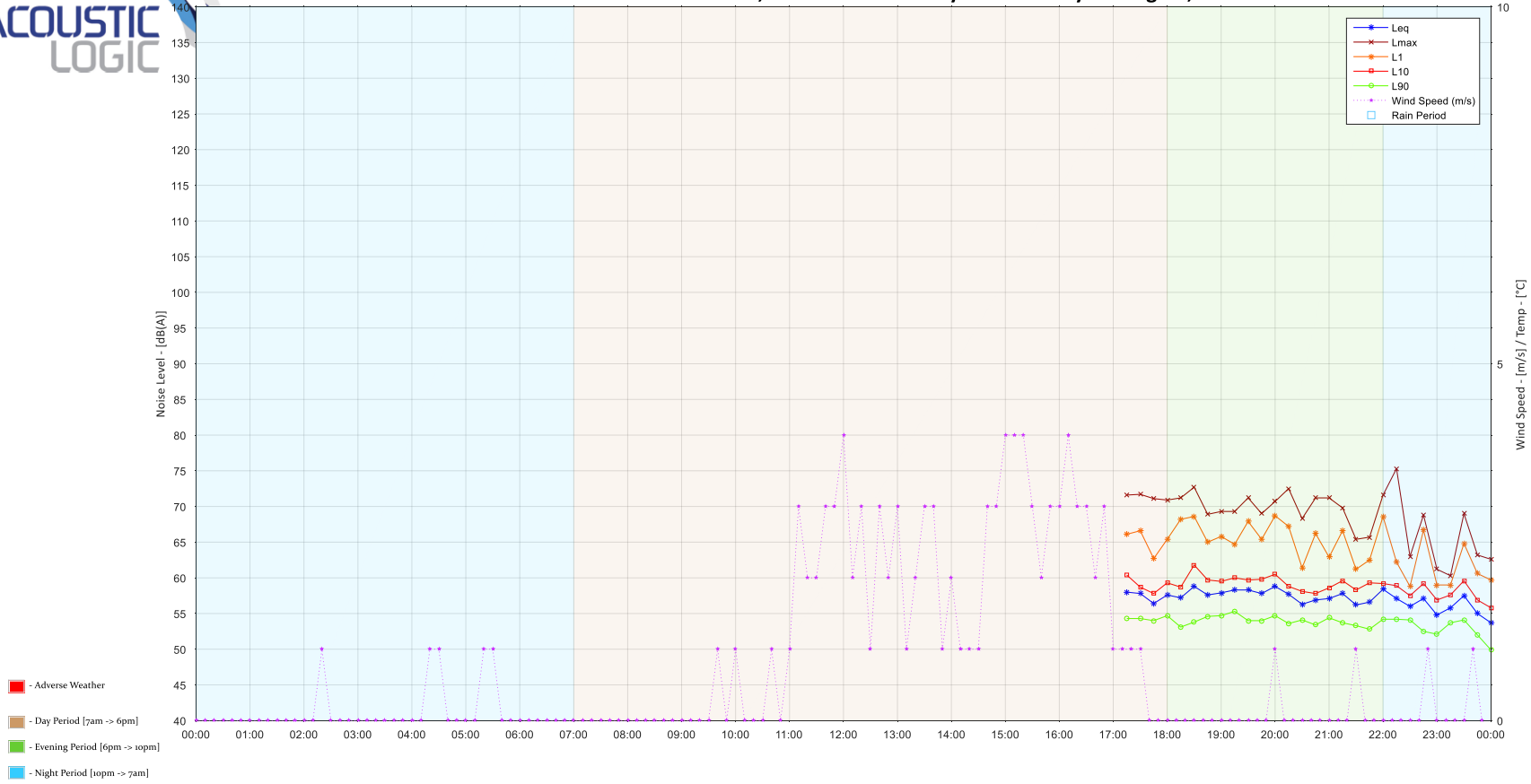


Cricket NSW Centre of Excellence, Eastern Boundary: Thursday 22 August, 2019

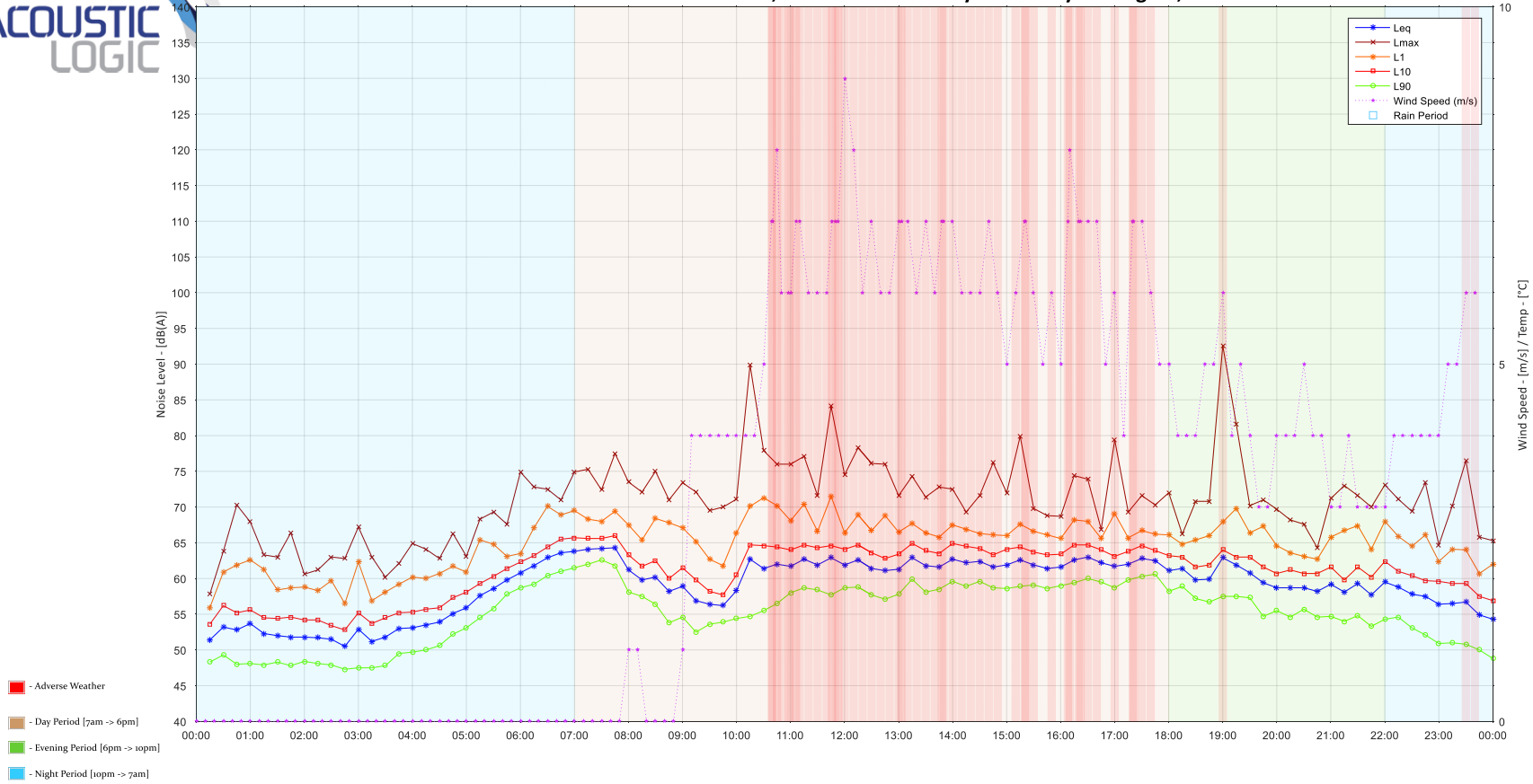


## **SOUTHERN BOUNDARY**

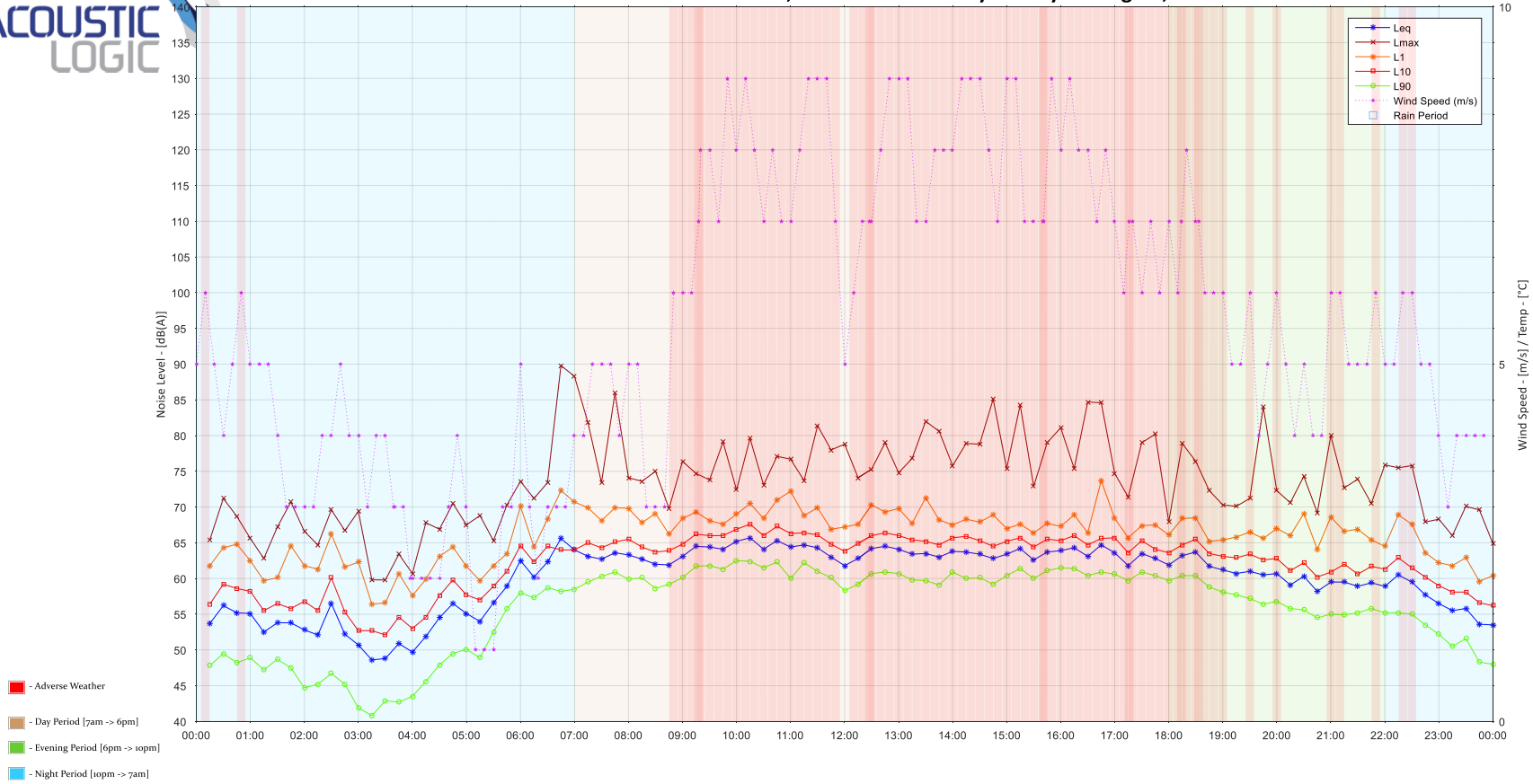
# Cricket NSW Centre of Excellence, Southern Boundary: Wednesday 07 August, 2019



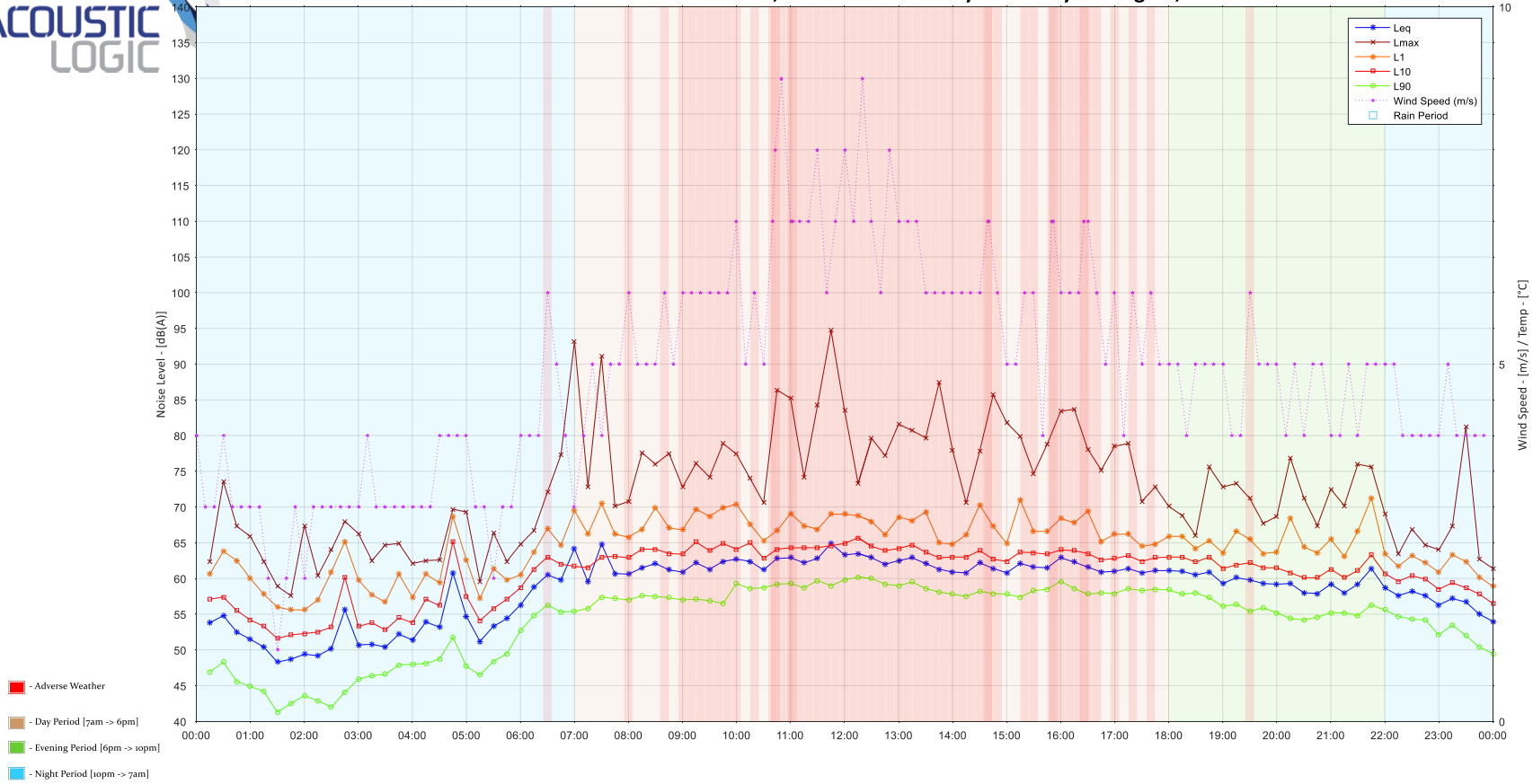
Cricket NSW Centre of Excellence, Southern Boundary: Thursday 08 August, 2019



Cricket NSW Centre of Excellence, Southern Boundary: Friday 09 August, 2019

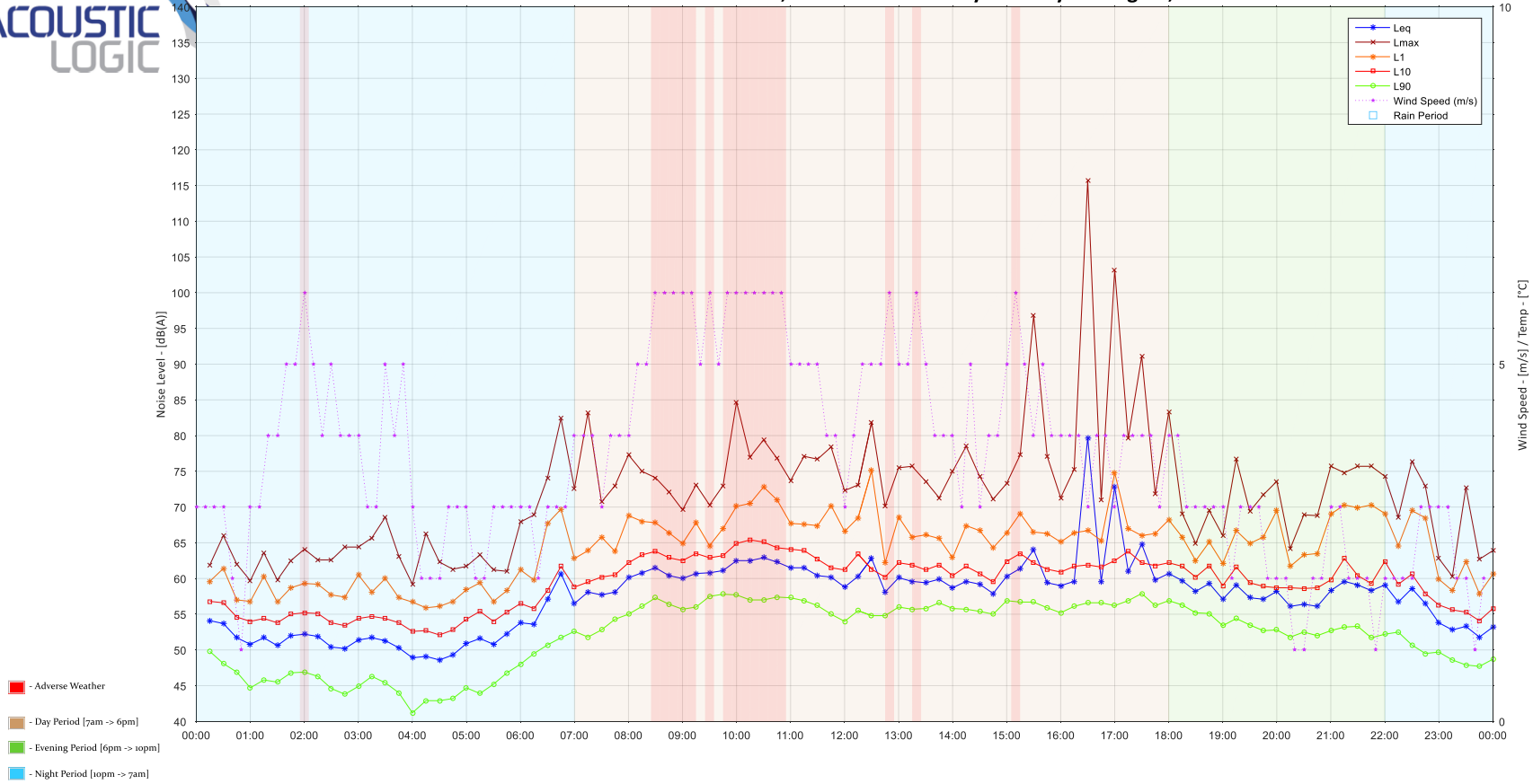


Cricket NSW Centre of Excellence, Southern Boundary: Saturday 10 August, 2019

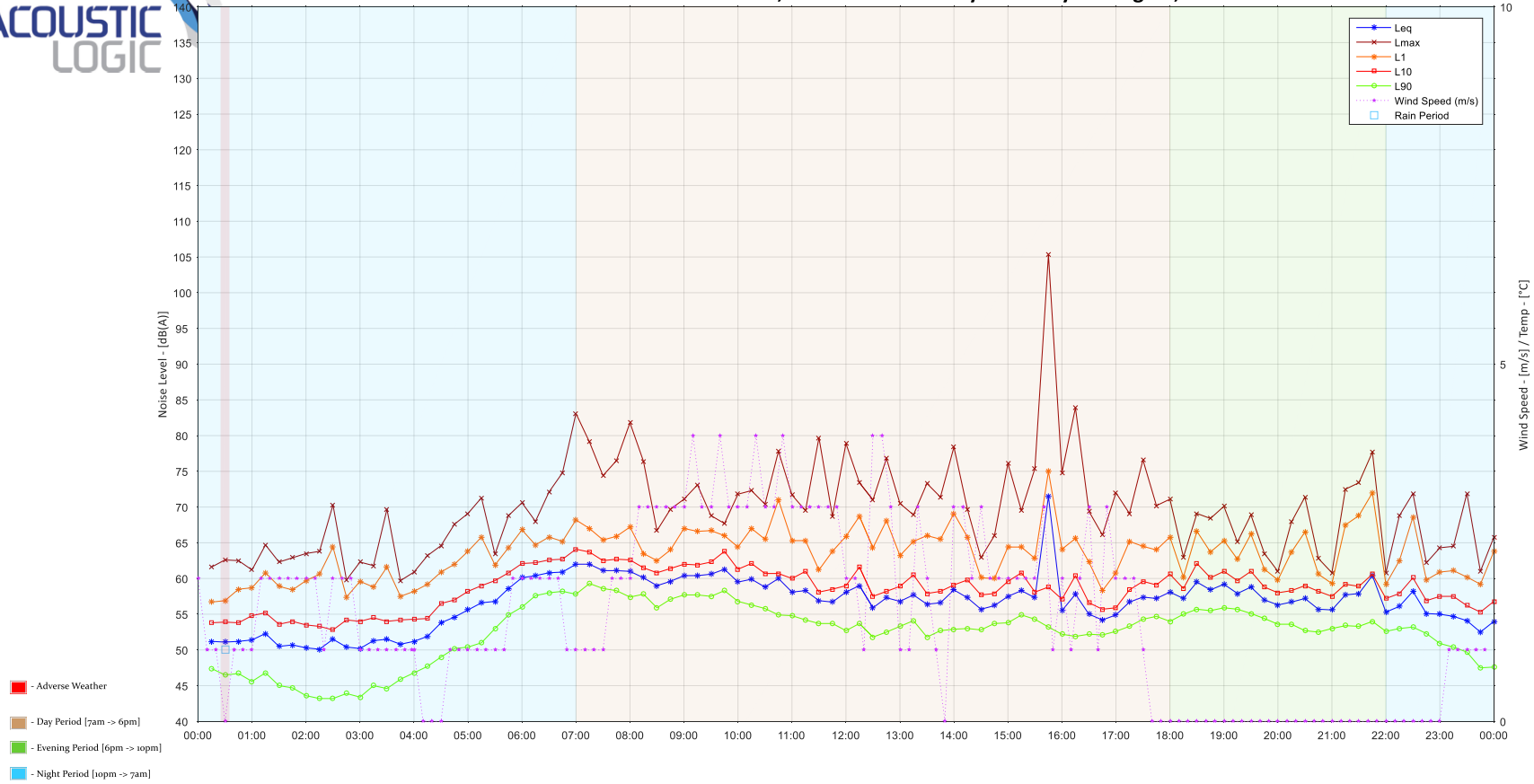




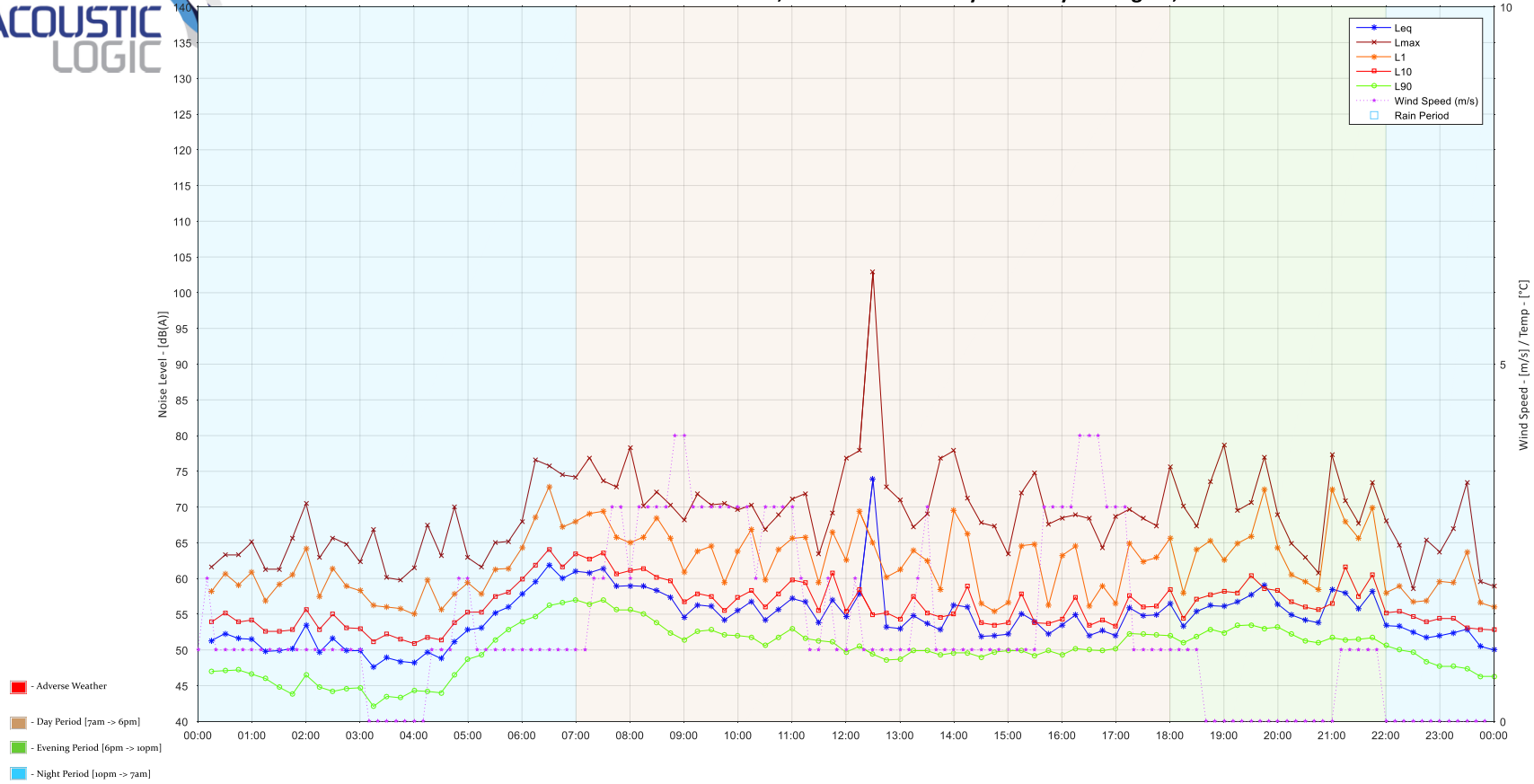
Cricket NSW Centre of Excellence, Southern Boundary: Sunday 11 August, 2019



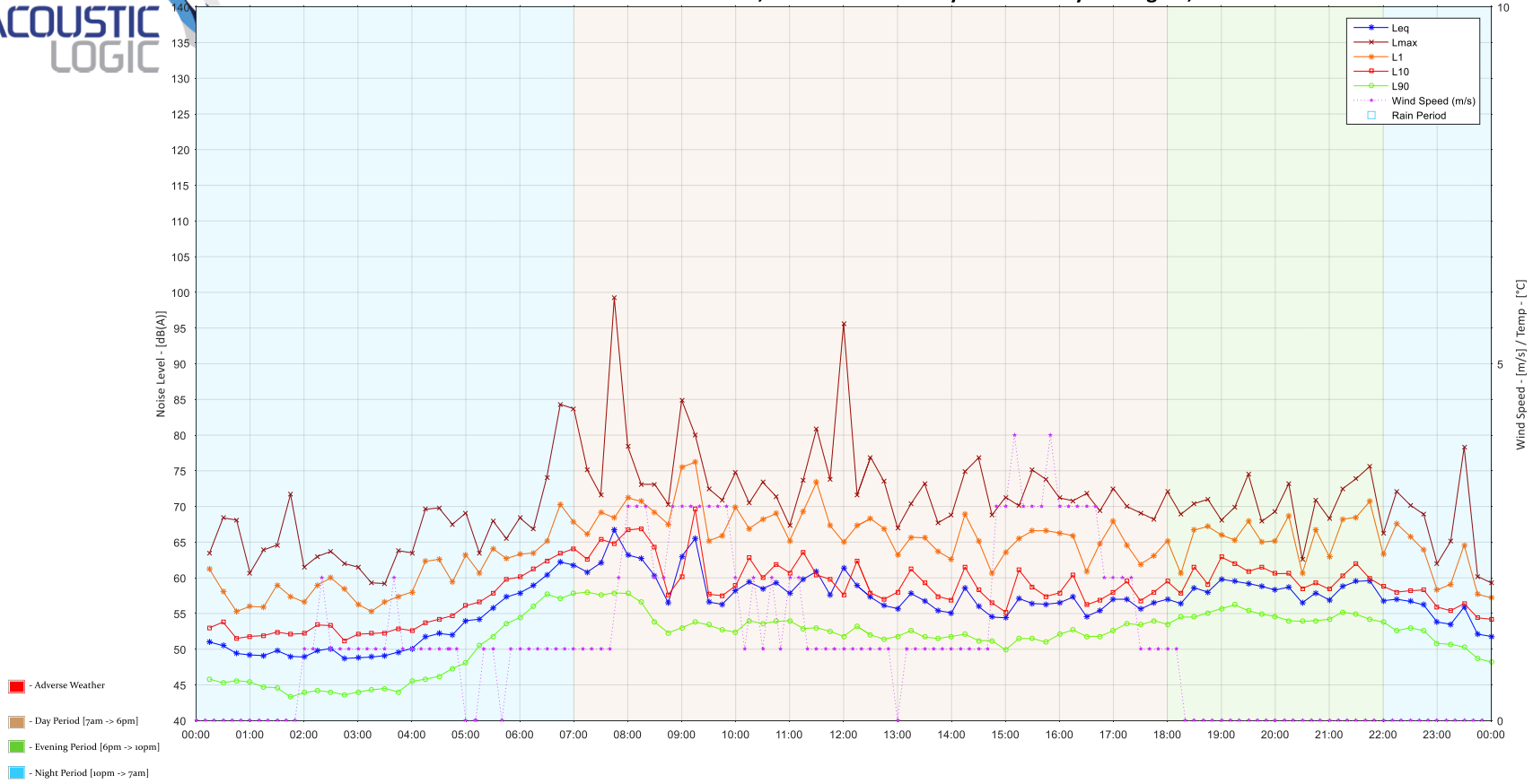
Cricket NSW Centre of Excellence, Southern Boundary: Monday 12 August, 2019



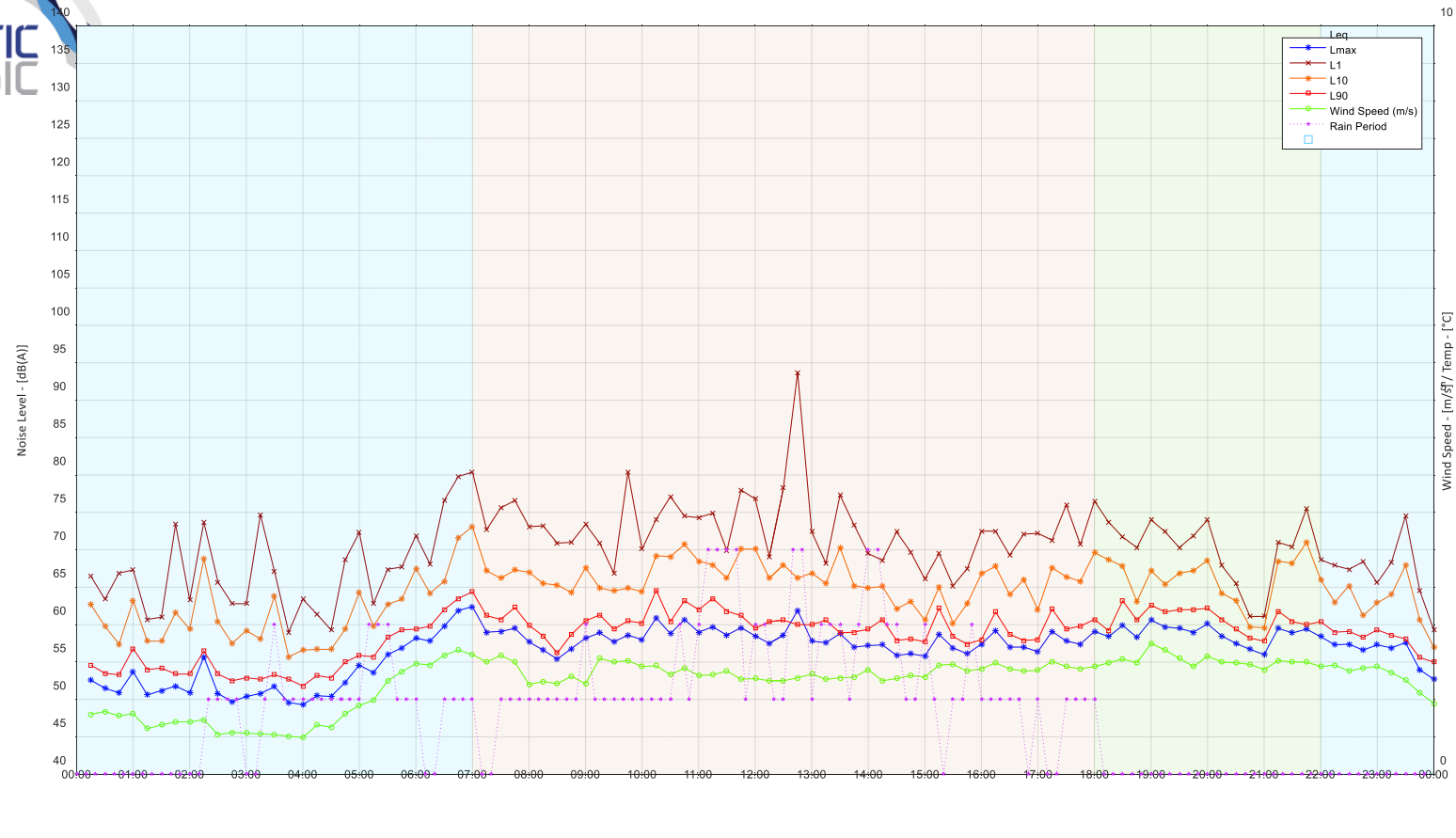
Cricket NSW Centre of Excellence, Southern Boundary: Tuesday 13 August, 2019



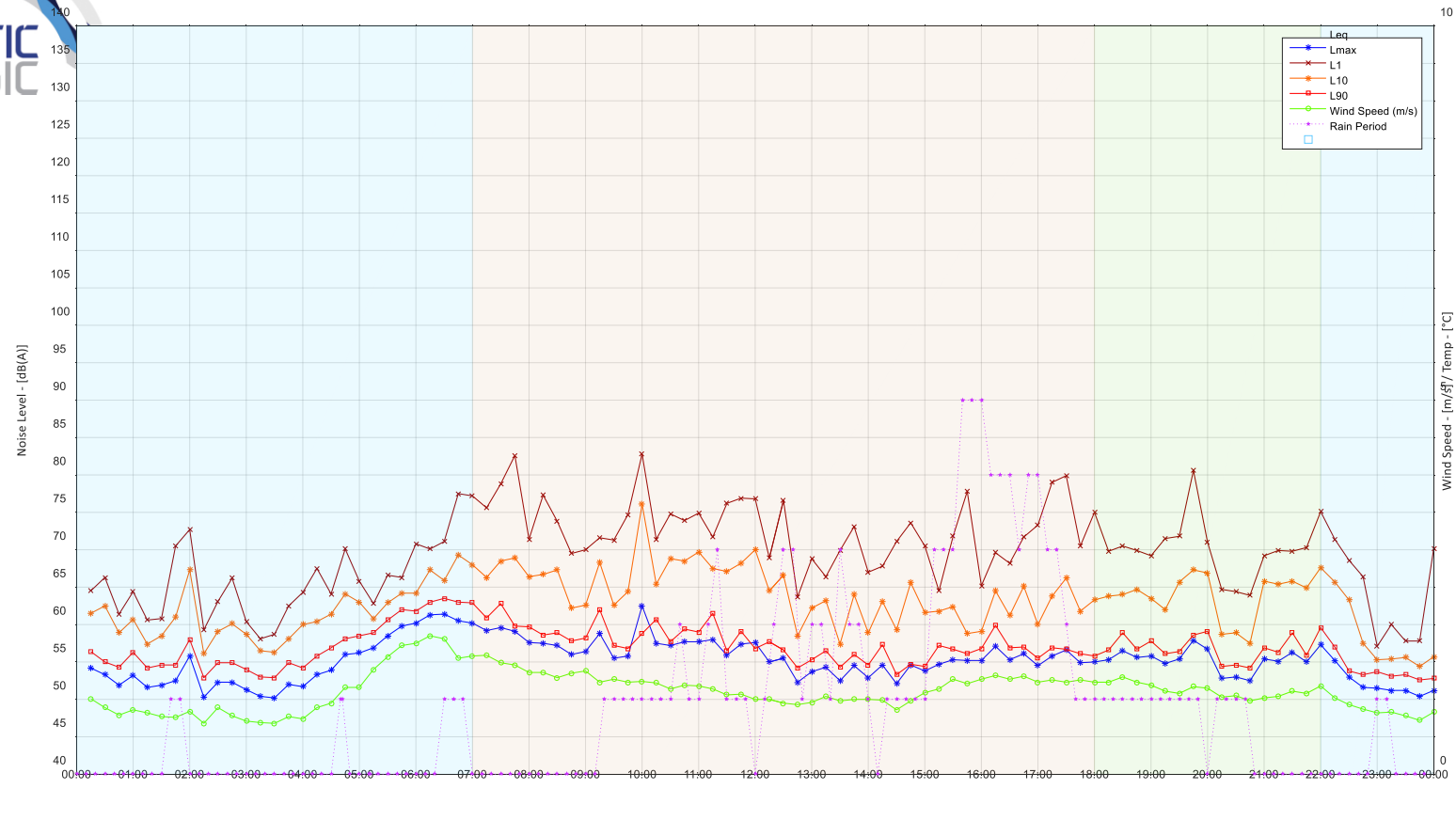
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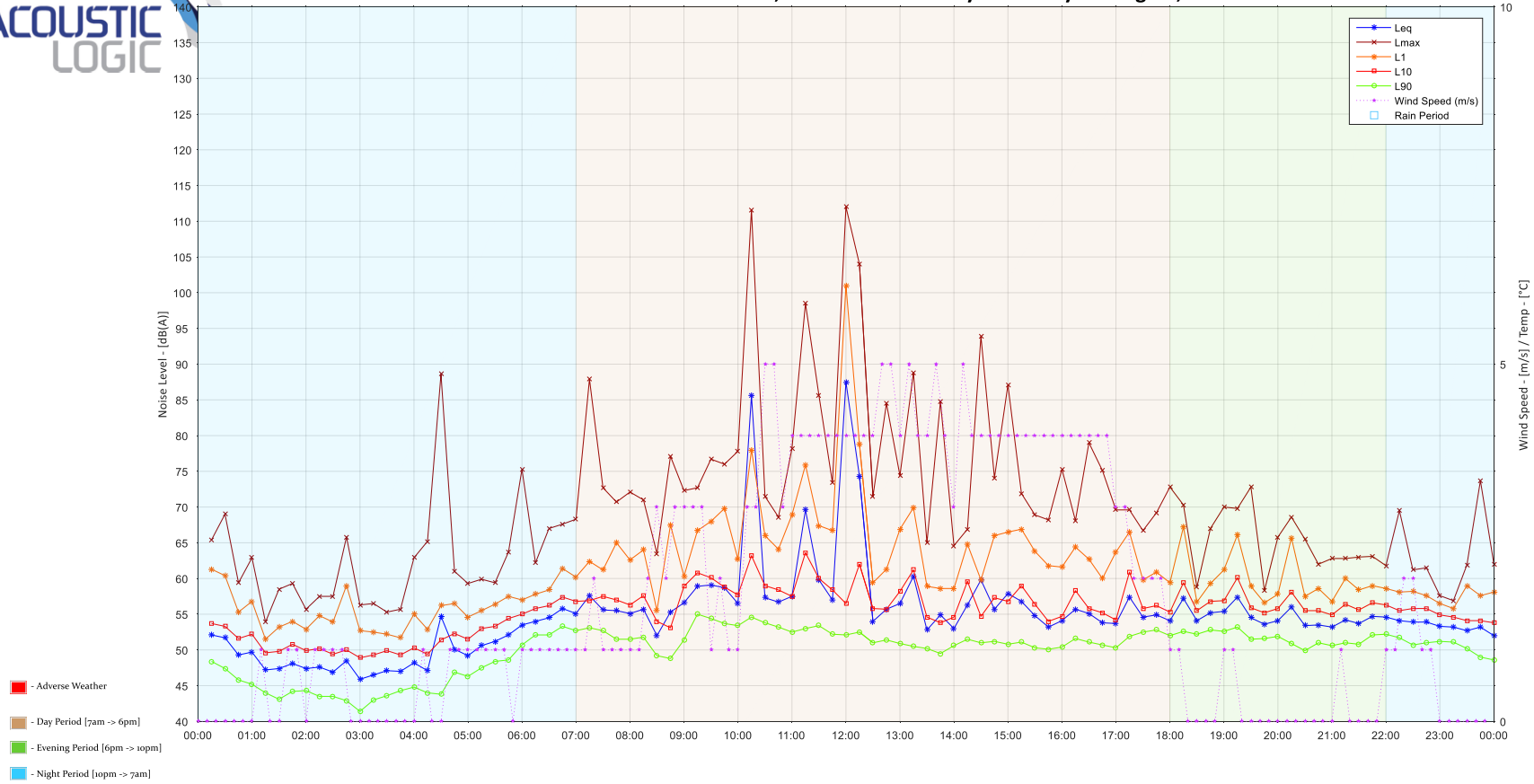
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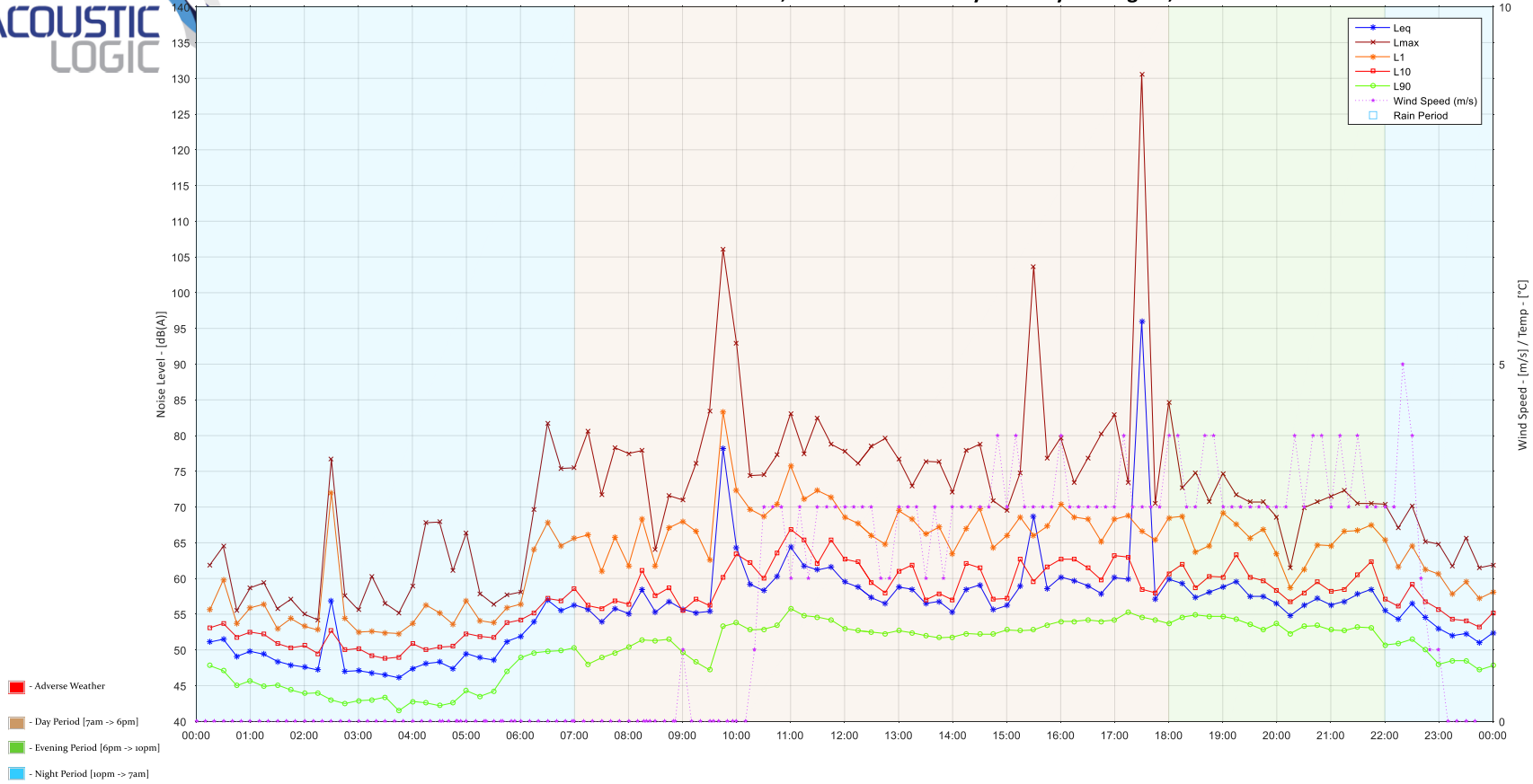
# Cricket NSW Centre of Excellence, Southern Boundary: Friday 16 August, 2019



# Cricket NSW Centre of Excellence, Southern Boundary: Saturday 17 August, 2019

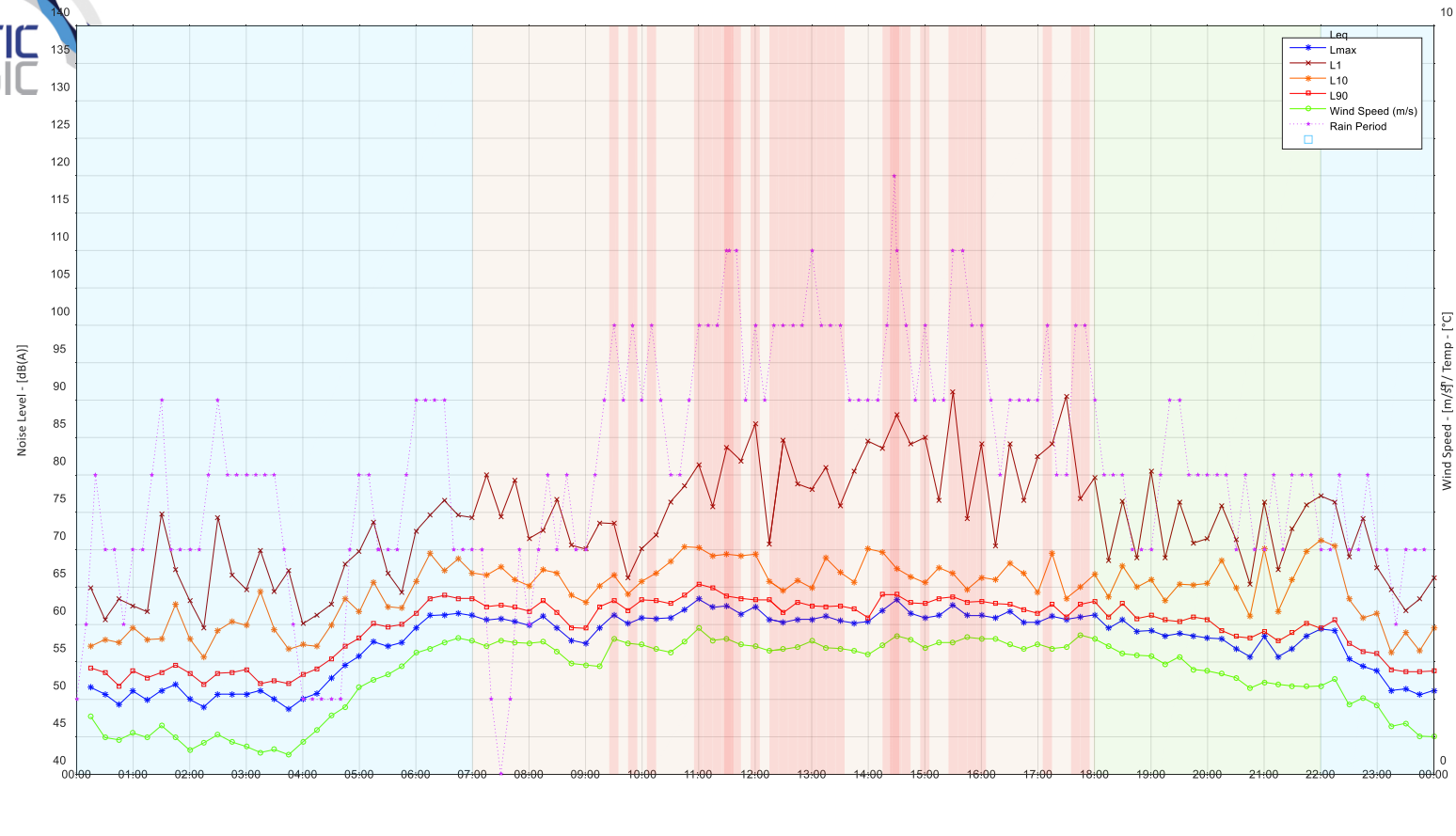


Cricket NSW Centre of Excellence, Southern Boundary: Sunday 18 August, 2019

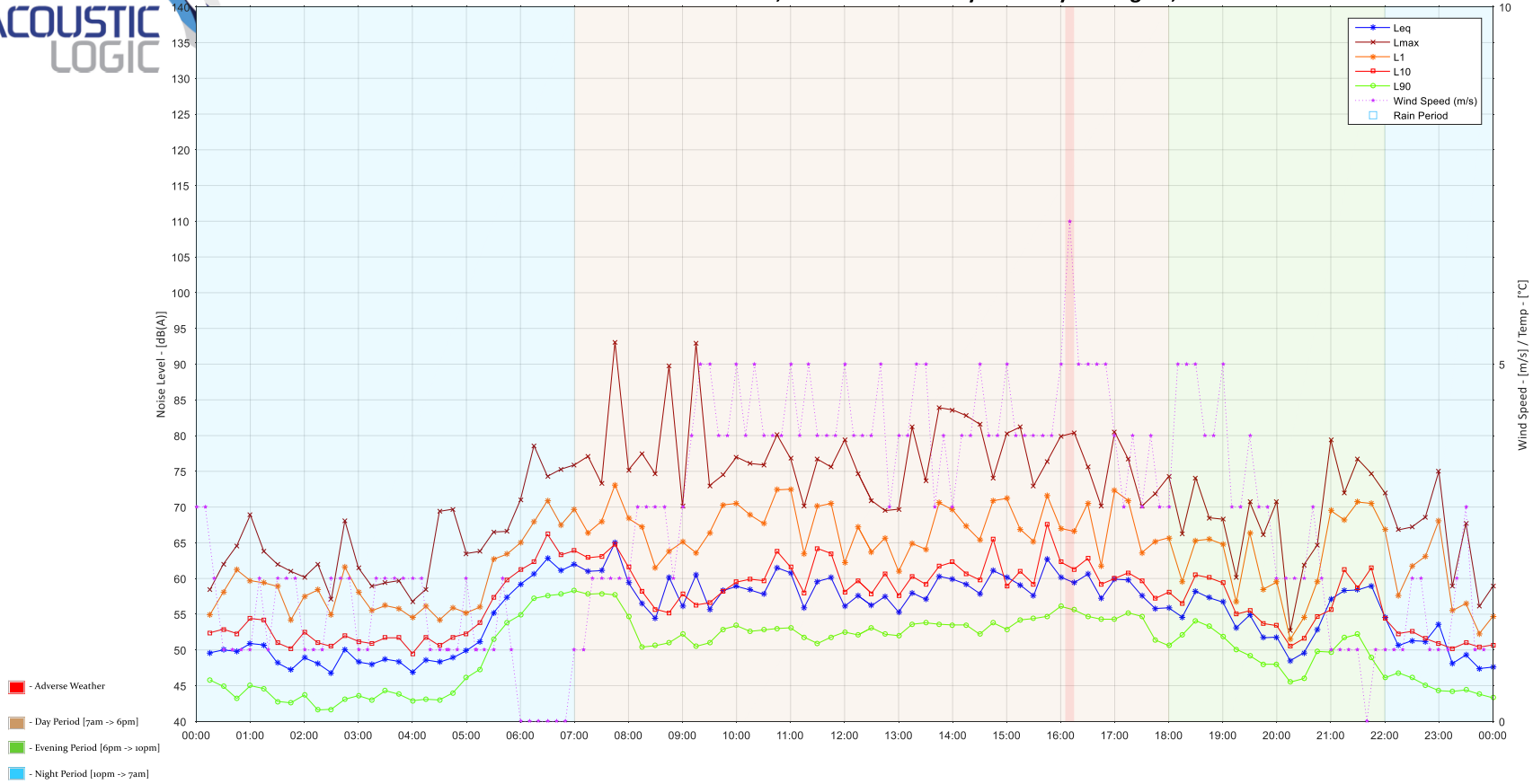




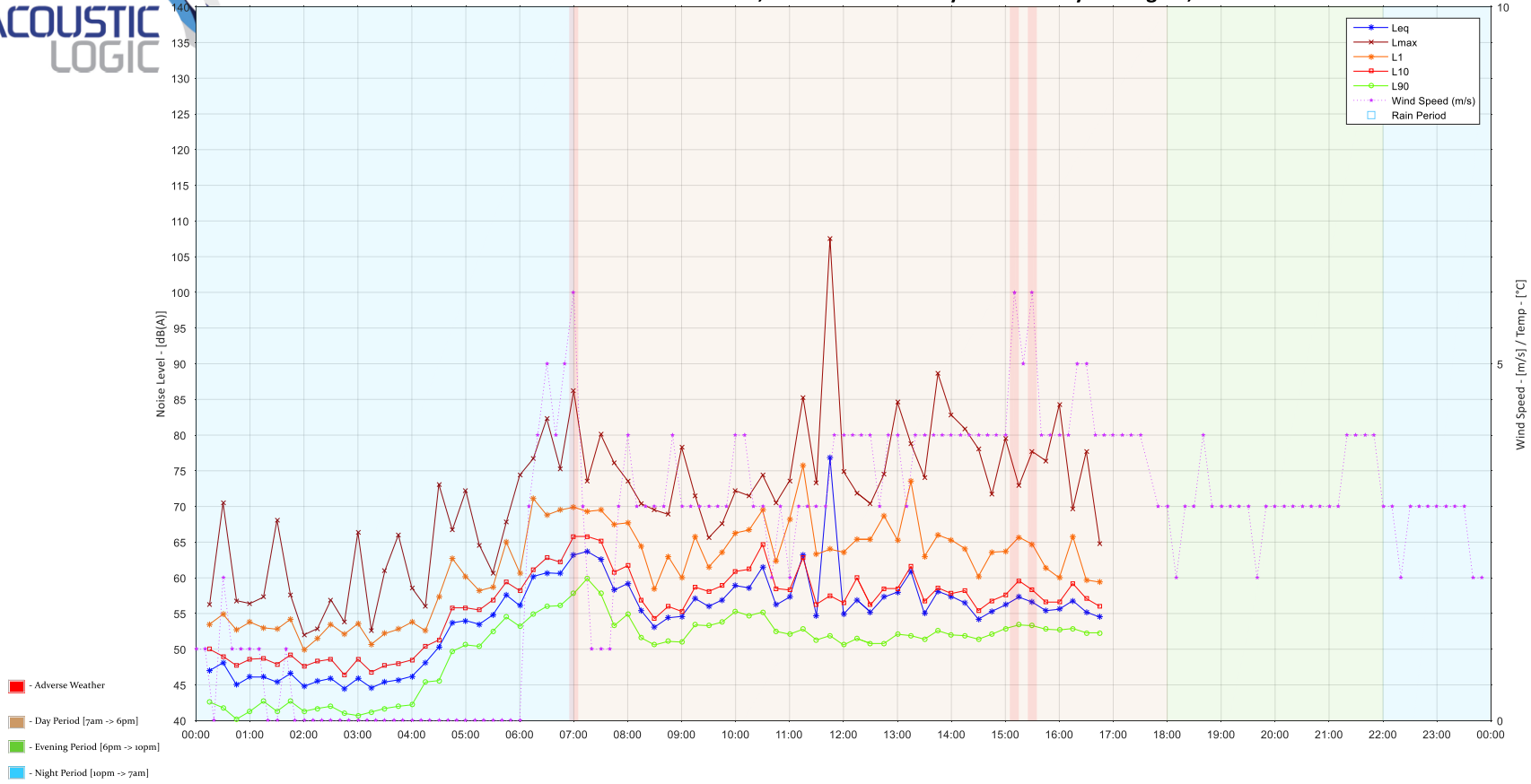
# Cricket NSW Centre of Excellence, Southern Boundary: Monday 19 August, 2019



Cricket NSW Centre of Excellence, Southern Boundary: Tuesday 20 August, 2019

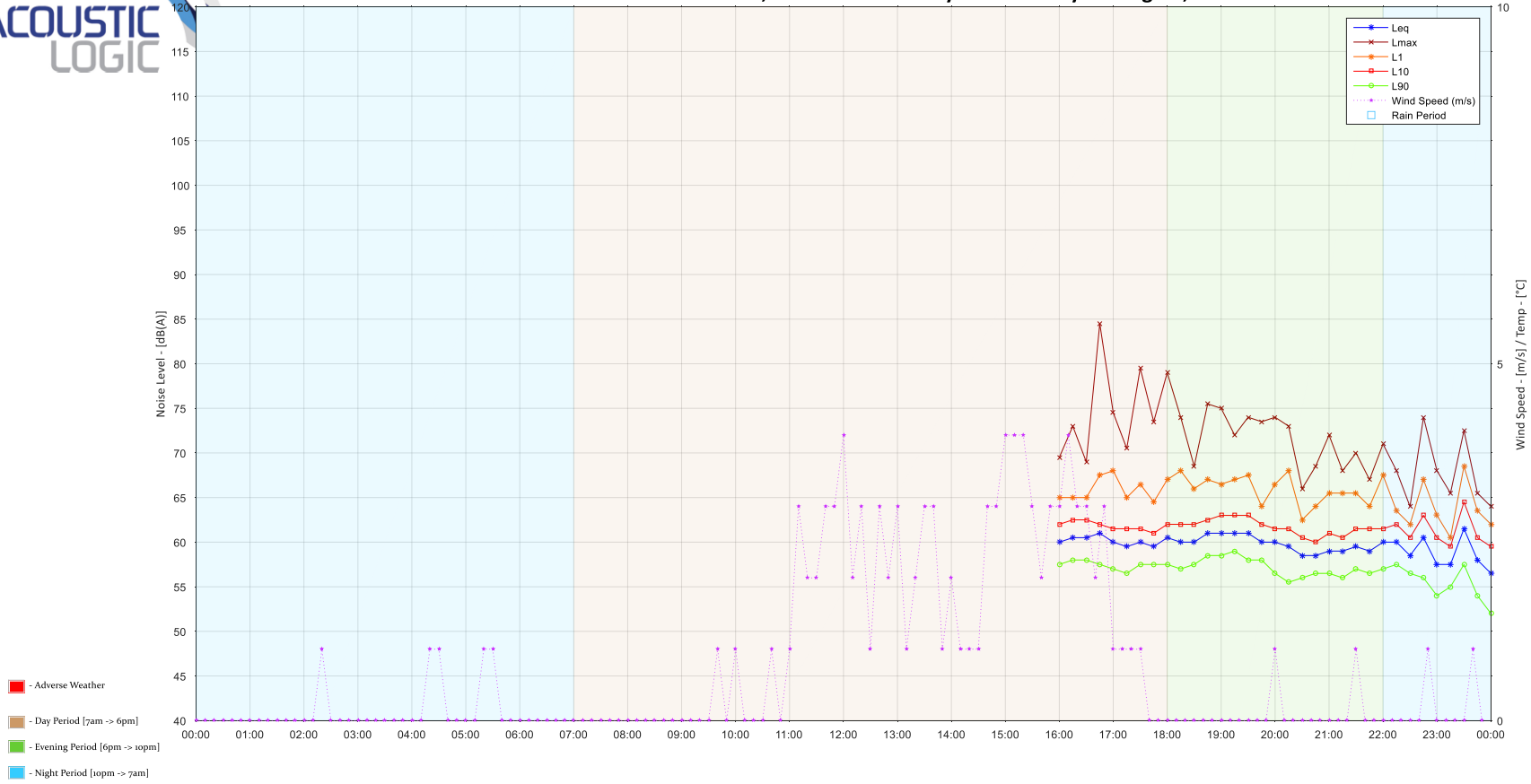


# Cricket NSW Centre of Excellence, Southern Boundary: Wednesday 21 August, 2019

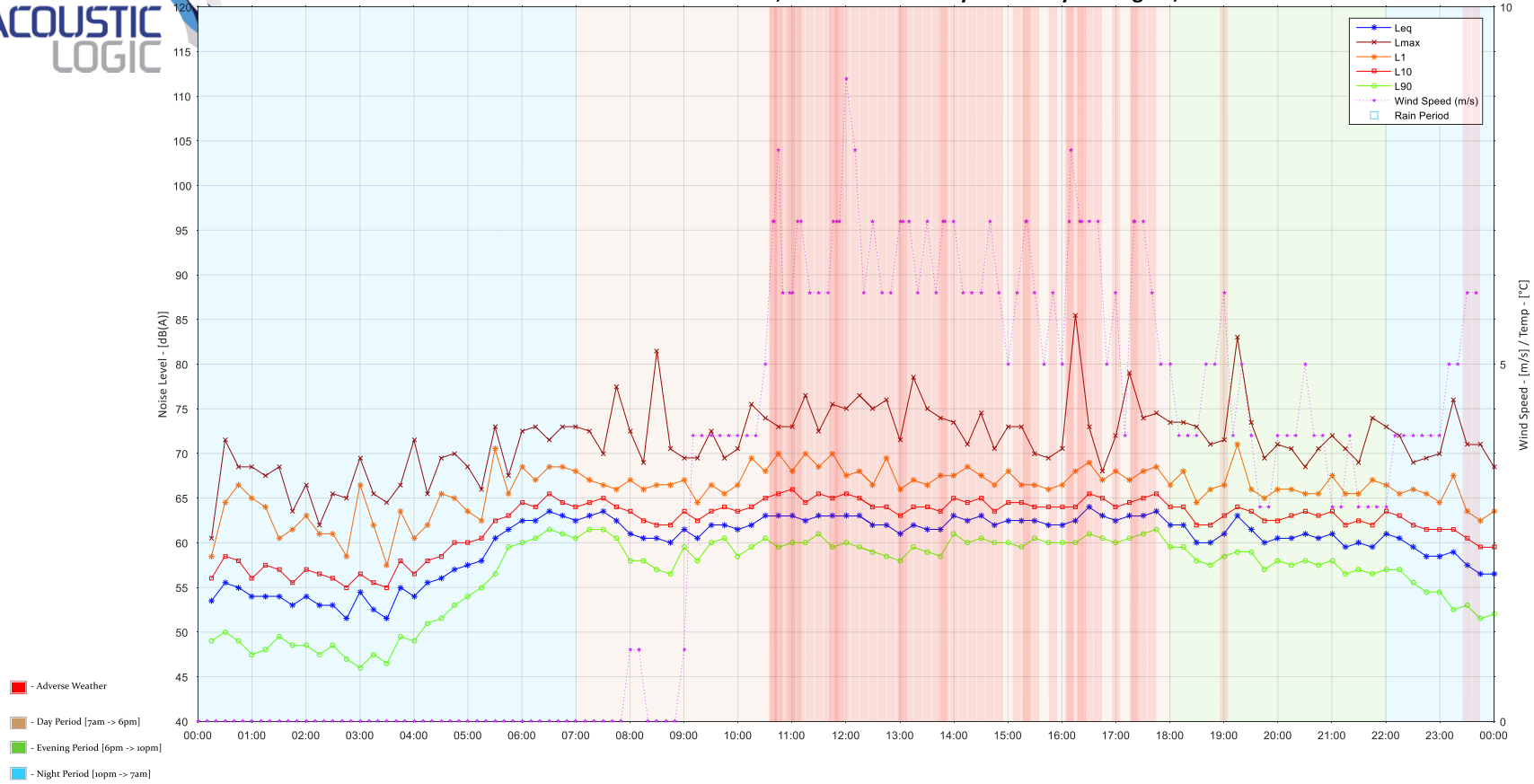


## **WESTERN BOUNDARY**

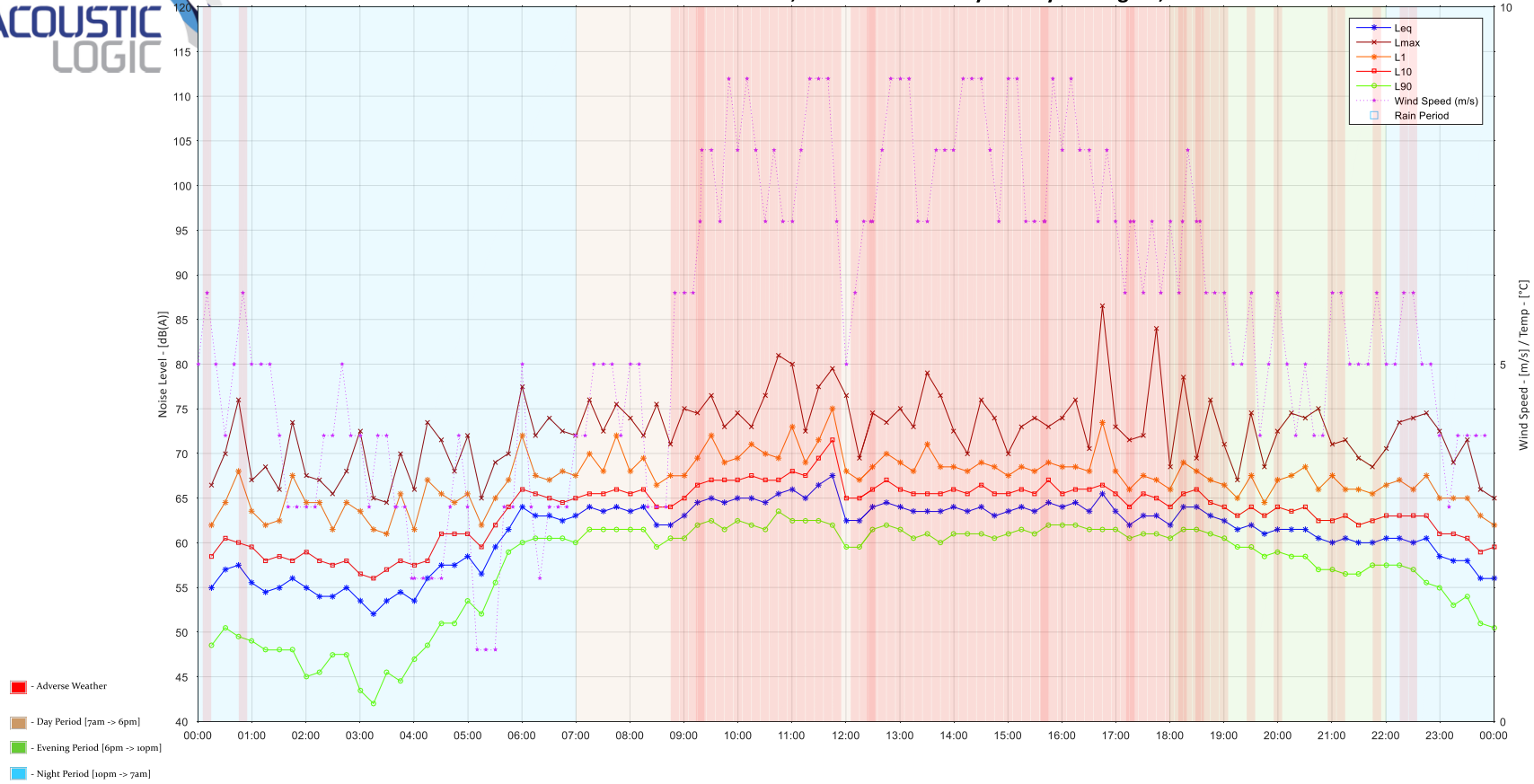
# Cricket NSW Centre of Excellence, Western Boundary: Wednesday 07 August, 2019



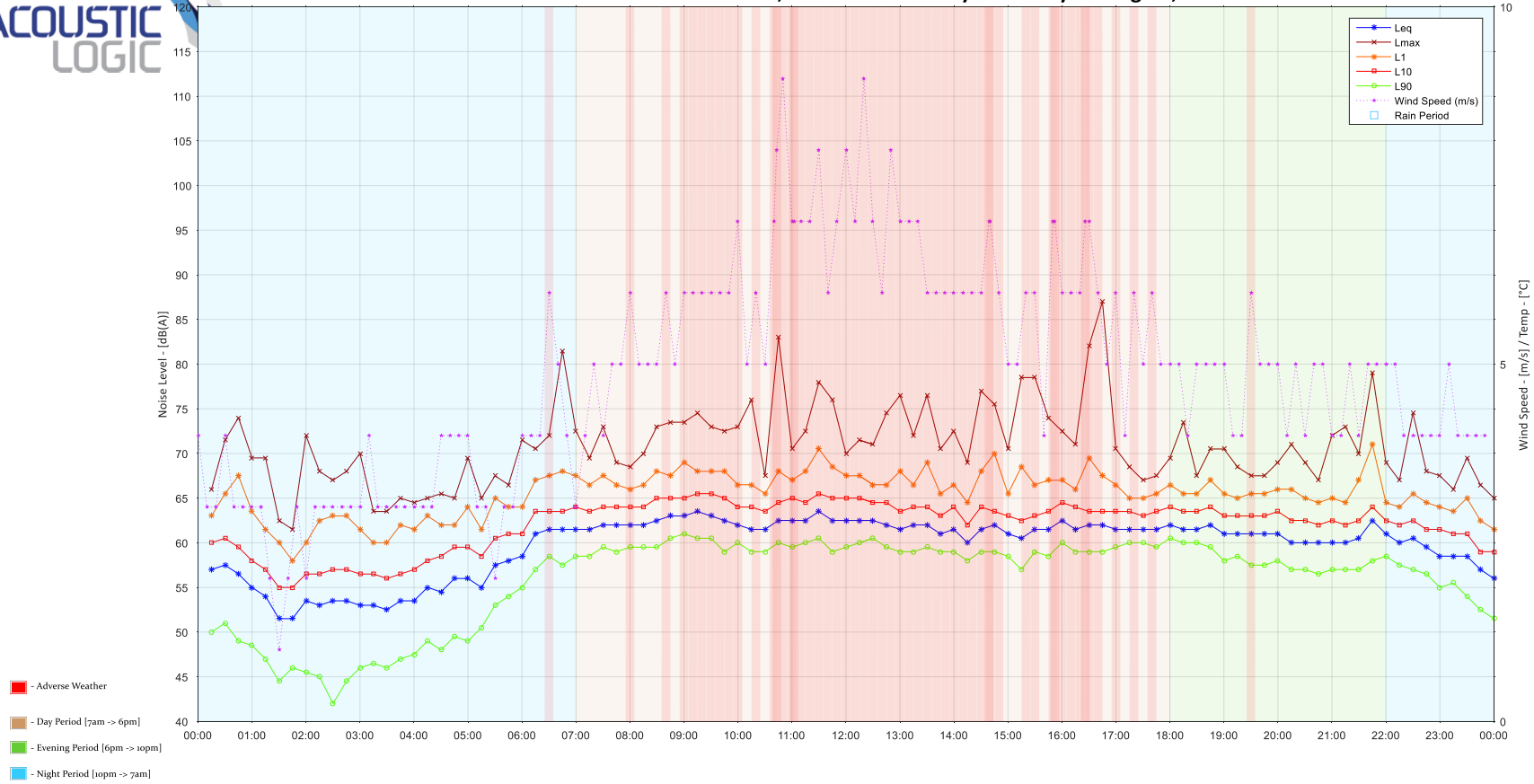
# Cricket NSW Centre of Excellence, Western Boundary: Thursday 08 August, 2019



# Cricket NSW Centre of Excellence, Western Boundary: Friday 09 August, 2019

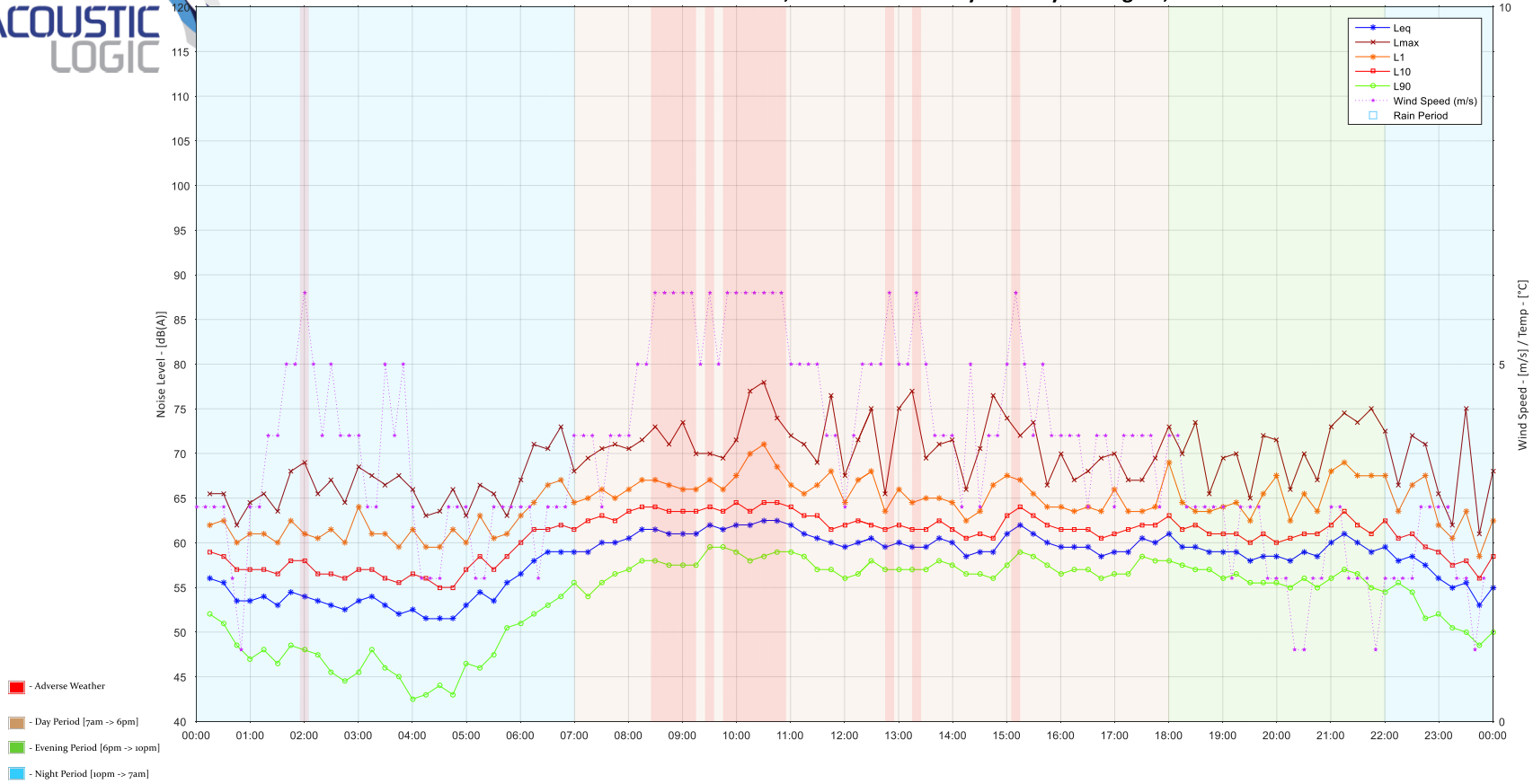


# Cricket NSW Centre of Excellence, Western Boundary: Saturday 10 August, 2019

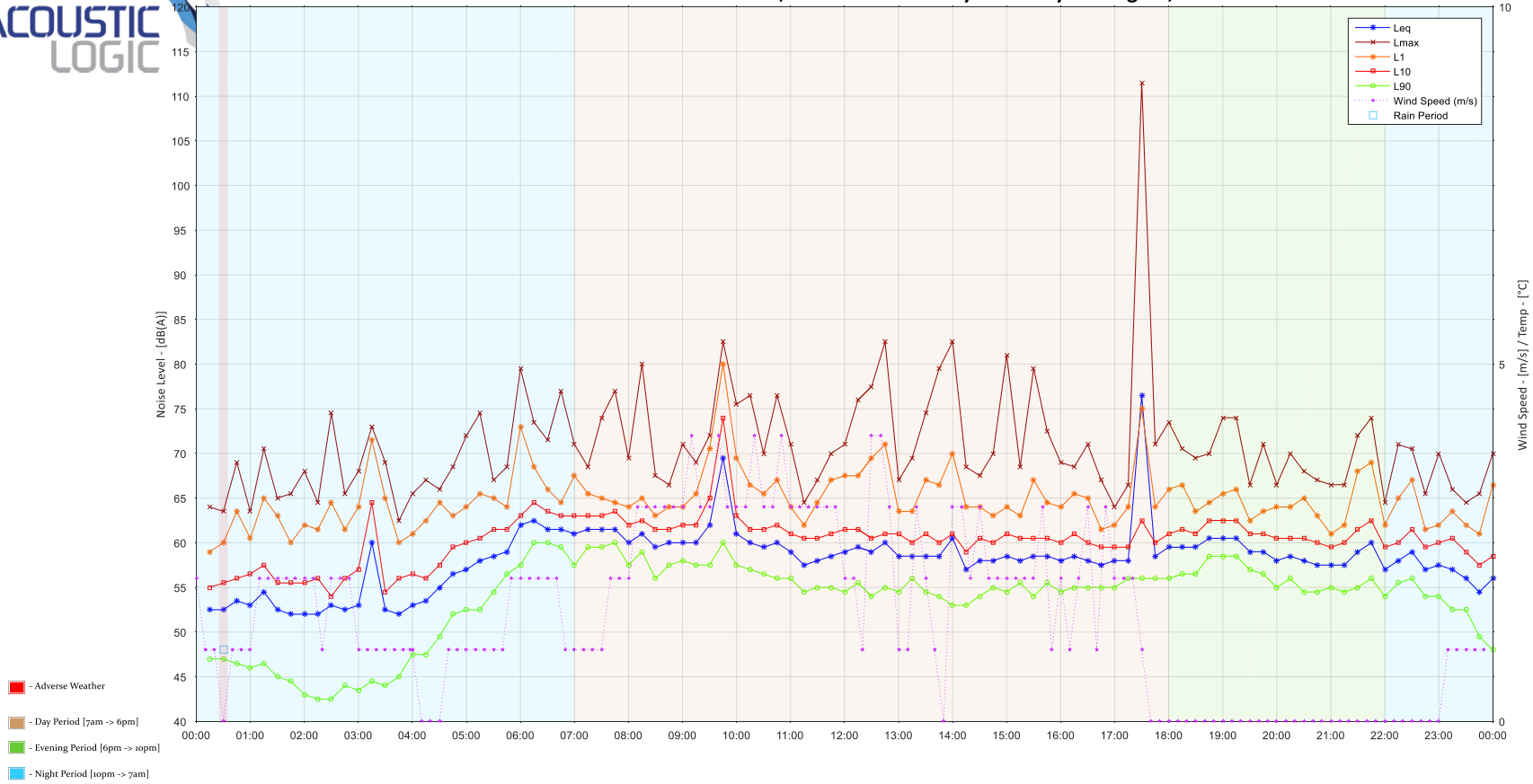




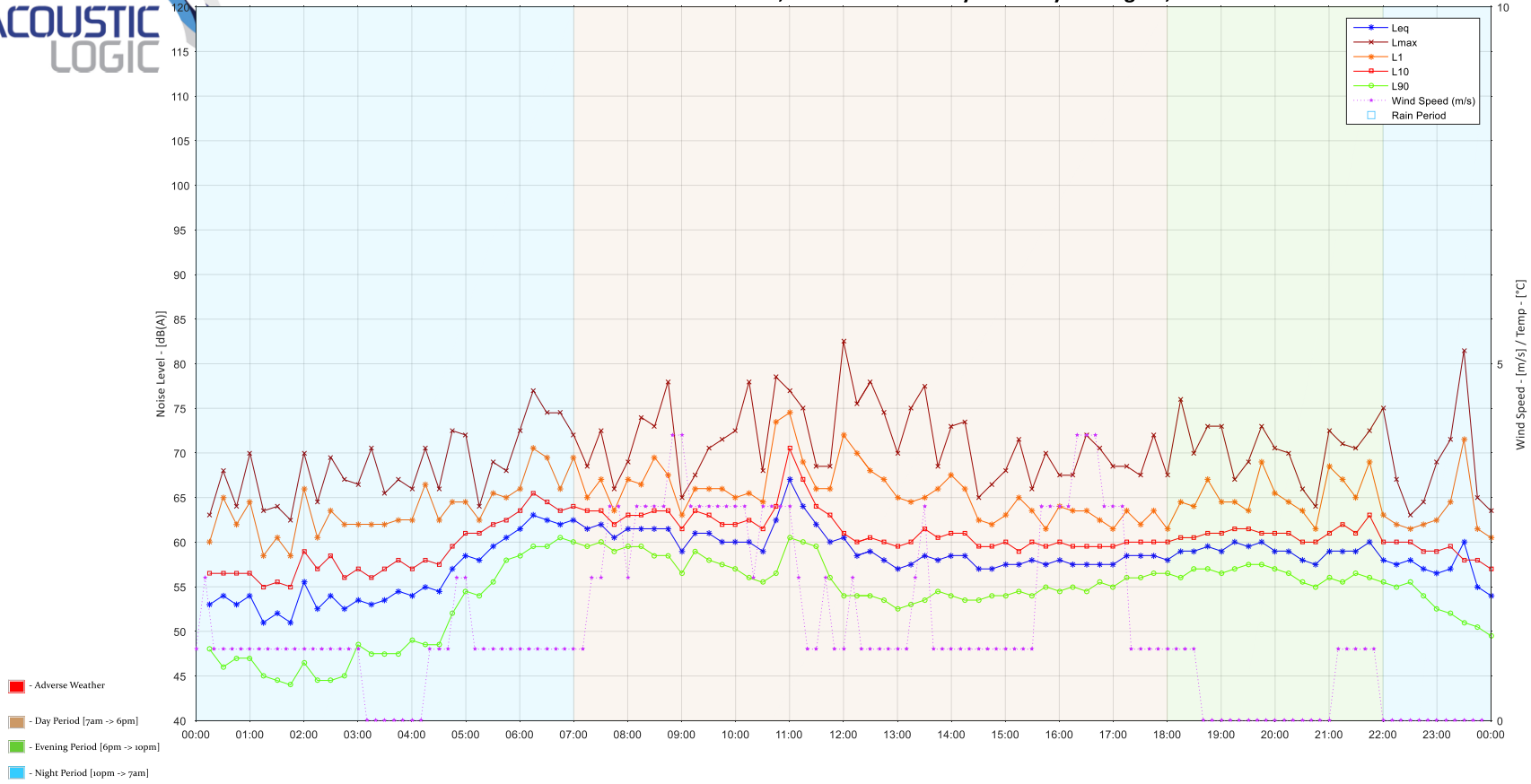
Cricket NSW Centre of Excellence, Western Boundary: Sunday 11 August, 2019



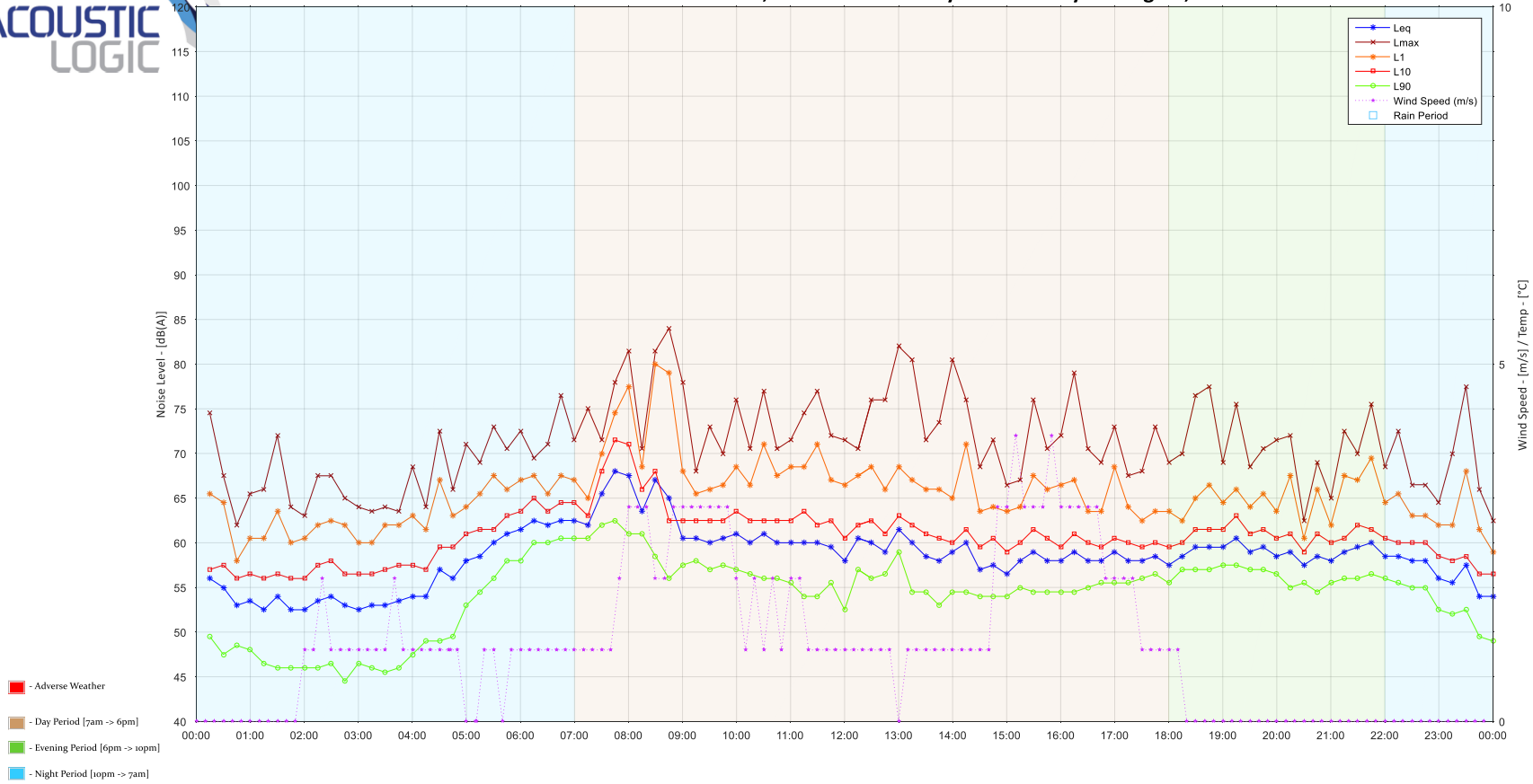
Cricket NSW Centre of Excellence, Western Boundary: Monday 12 August, 2019



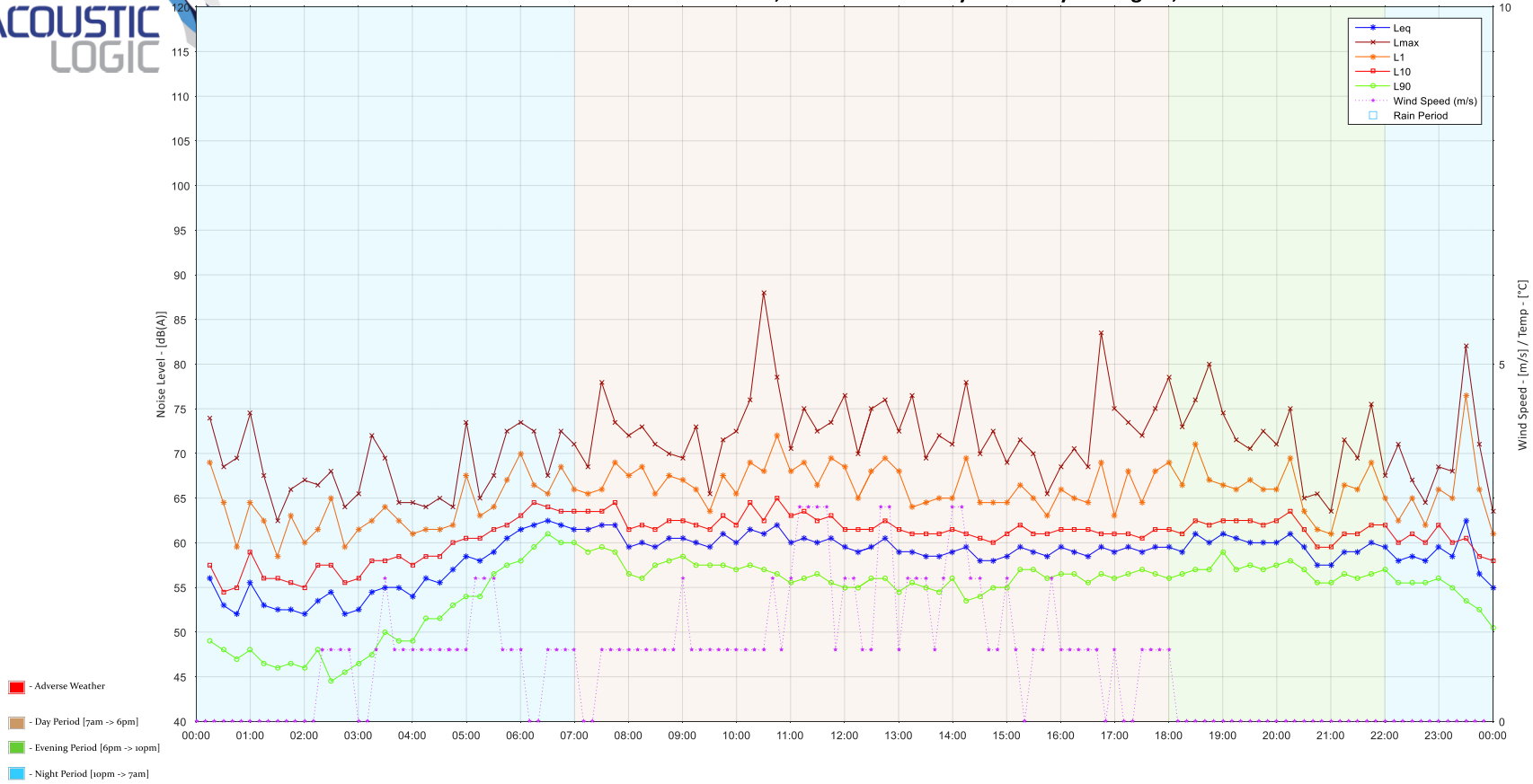
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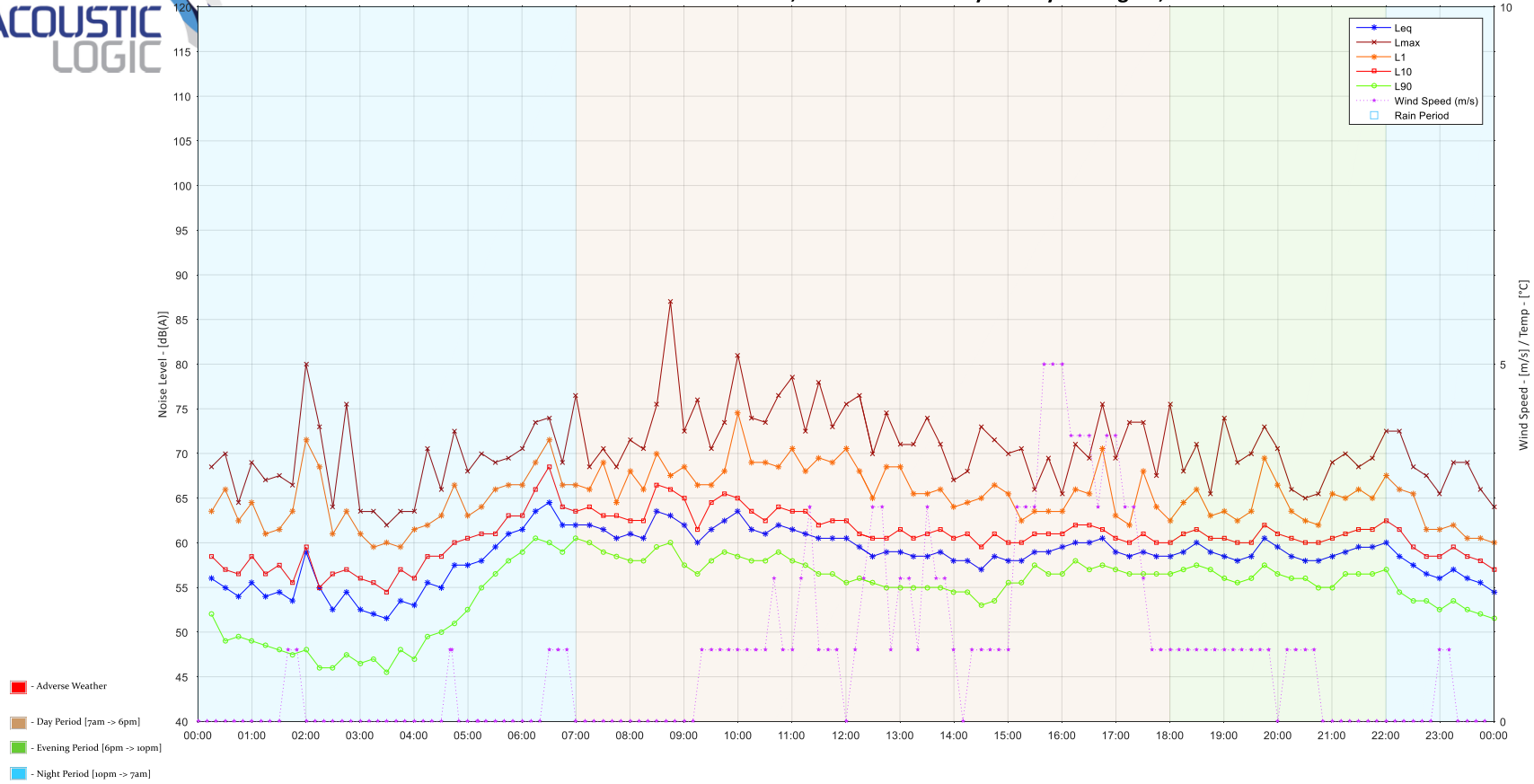
# Cricket NSW Centre of Excellence, Western Boundary: Wednesday 14 August, 2019



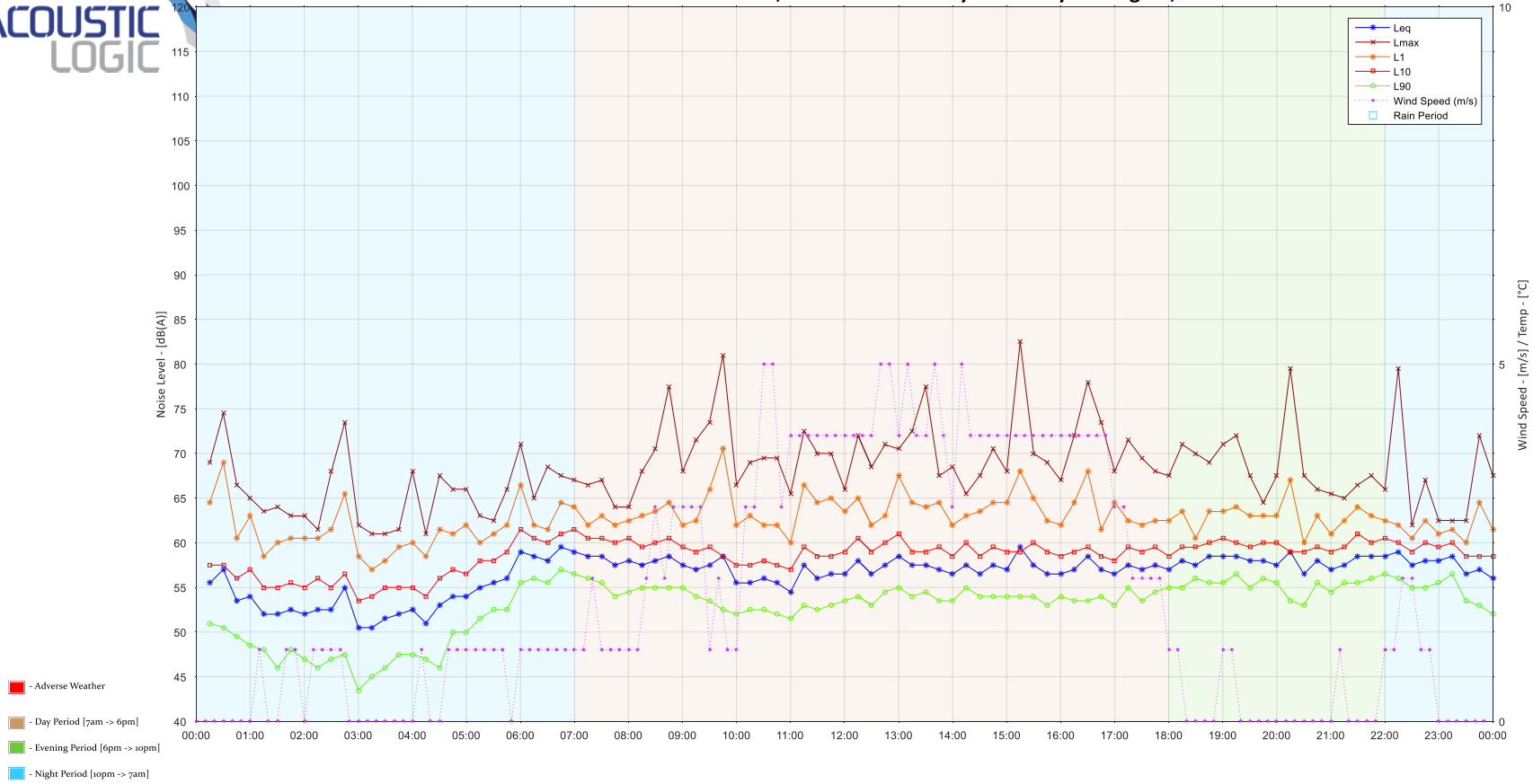
Cricket NSW Centre of Excellence, Western Boundary: Thursday 15 August, 2019



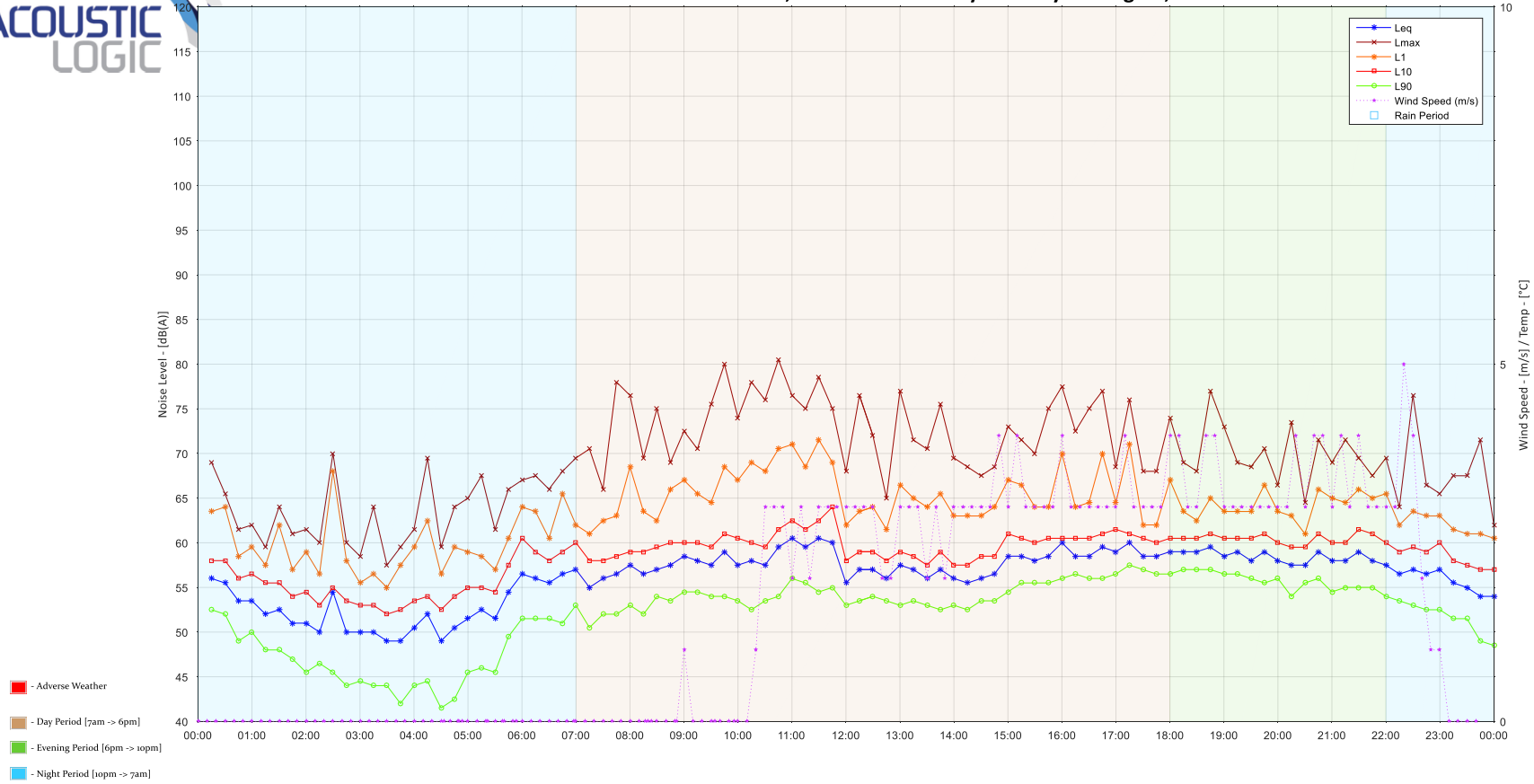
# Cricket NSW Centre of Excellence, Western Boundary: Friday 16 August, 2019



# Cricket NSW Centre of Excellence, Western Boundary: Saturday 17 August, 2019

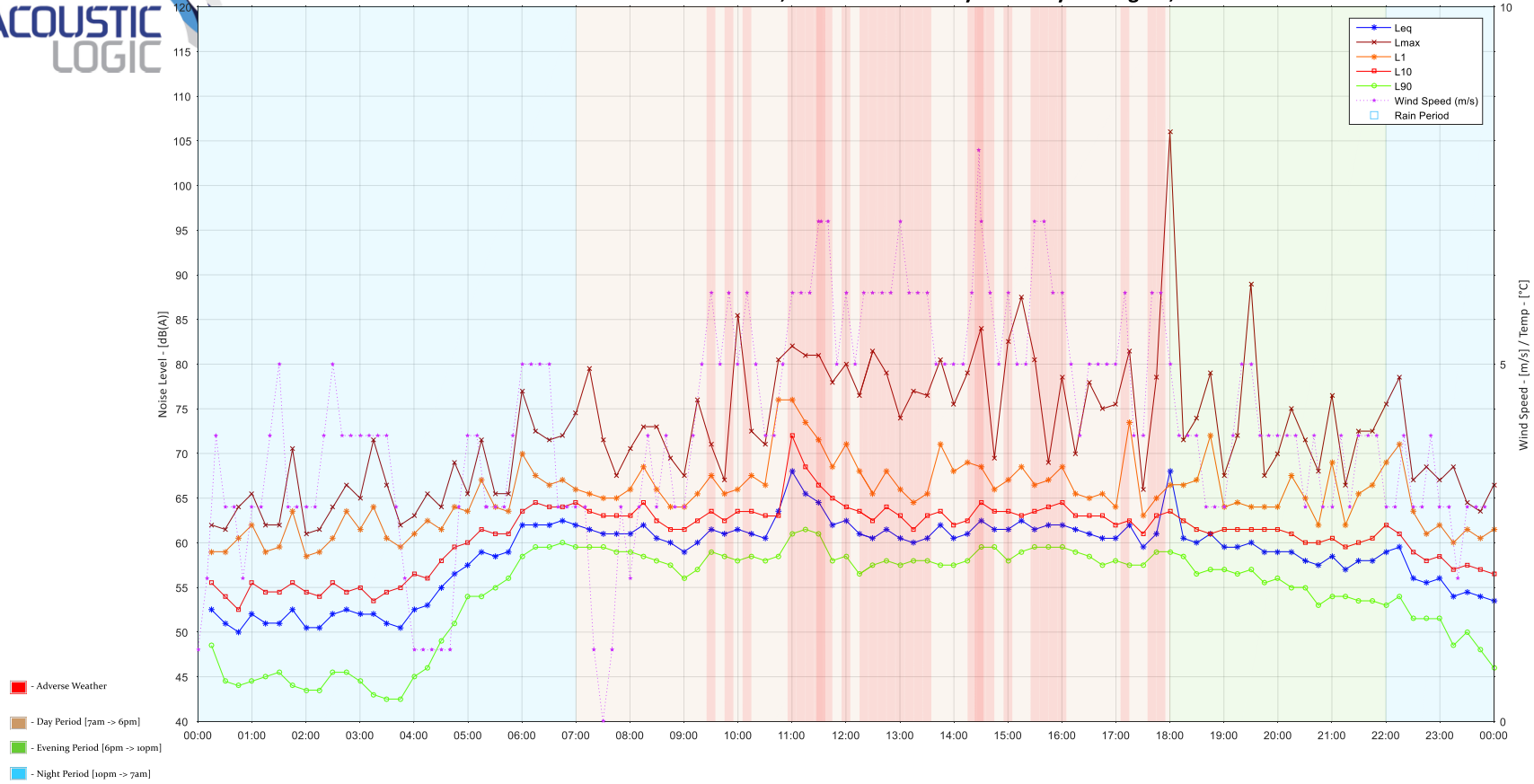


# Cricket NSW Centre of Excellence, Western Boundary: Sunday 18 August, 2019

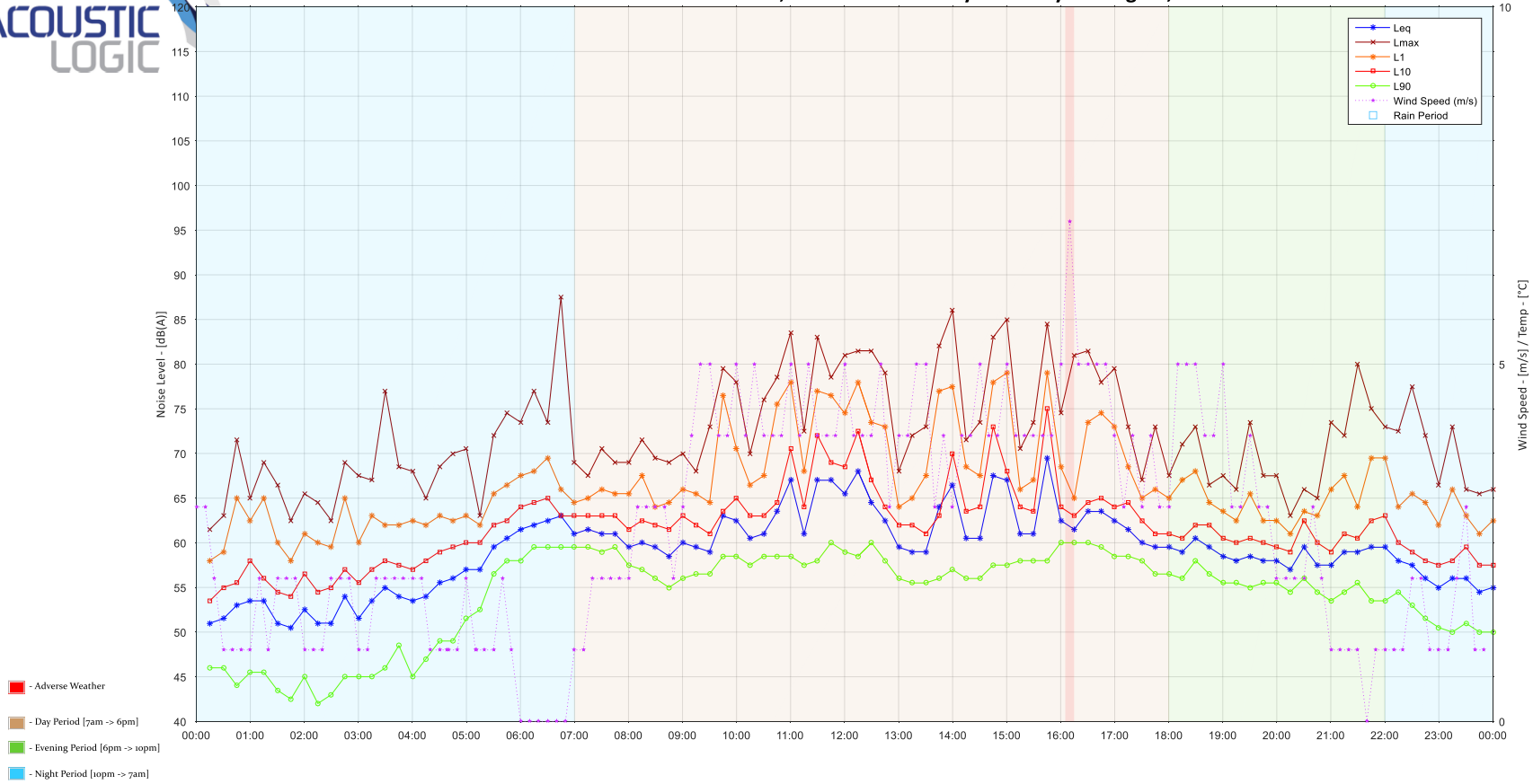




# Cricket NSW Centre of Excellence, Western Boundary: Monday 19 August, 2019



# Cricket NSW Centre of Excellence, Western Boundary: Tuesday 20 August, 2019



Cricket NSW Centre of Excellence, Western Boundary: Wednesday 21 August, 2019

