Iglu II, 80-88 Regent Street, Redfern

Traffic Noise Impact Assessment

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TABLE OF CONTENTS

1 INTRODUCTION

Acoustic Logic Consultancy (ALC) have been engaged by Iglu Pty Limited to review the proposed façade design on the 'Iglu II' development, located at 80-88 Regent Street, Redfern.

In this report we will:

- Conduct an external noise (traffic) impact assessment and recommend acoustic treatments to ensure that a reasonable level of amenity is achieved for future tenants.

Noise impacts will be addressed in accordance with the following standards and guidelines;

- Sydney DCP 2012.
- NSW Department of Planning State Environmental Planning Policy (Infrastructure SEPP) 2007.
- Australian and New Zealand Standard AS/NZS 2107:2016 *'Acoustics - Recommended design sound levels and reverberation times for building interiors'*.
- Australian Standard AS 3671:1989 '*Acoustics—Road traffic noise intrusion—Building siting and construction*'.

ALC confirms that the proposed development can comply with all of the aforementioned authorities and standards, on the proviso that the acoustic treatments nominated in this report are adopted.

This assessment is based on the following architectural drawings provided by Bates Smart Architects.

Table 1 – Architectural Drawings

Drawing Number	Revision	Date
A01.001	A	20/07/2018
A03.101 – 108		
A03.119		
A09.001 – 004		
A10.001 – 002		

2 SITE DESCRIPTION

The subject site is located at the corner of Regent Street and Marian Street in Redfern. It is bounded by Regent Street to the east, Marian Street to the south, William Lane to the west and Iglu I to the north. Regent Street is a major sub-arterial road, with high volumes of traffic. Marian Street and William Lane are local roads with low volumes of traffic.

It is proposed to demolish all existing properties on site and construct a new 19-storey student accommodation development, with ground level retail and 17 levels of accommodation facilities.

Figure 1 below illustrates the locations of the subject site, attended noise measurements and surrounding receivers.

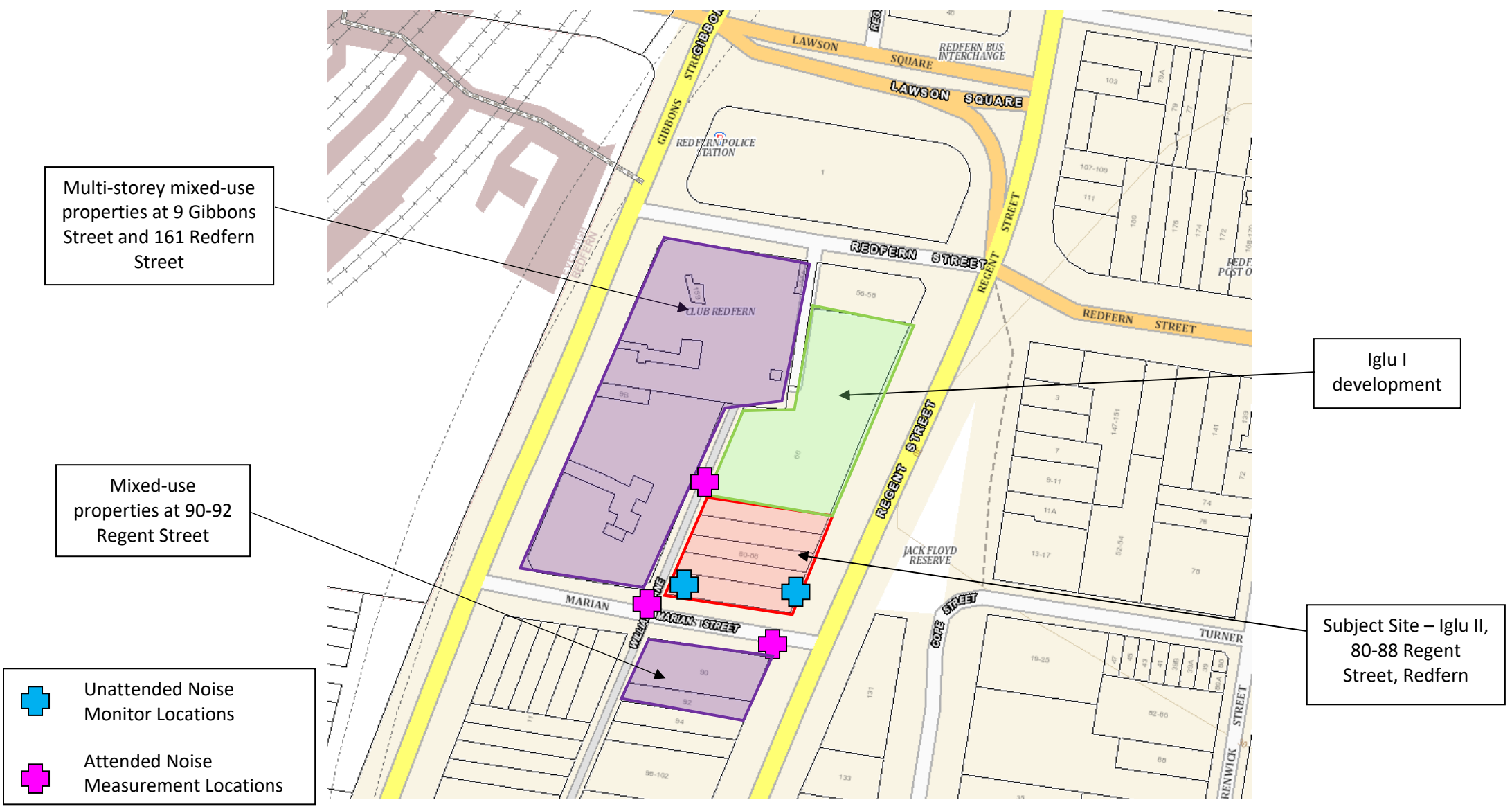


Figure 1 – Site Description (source: SixMaps)

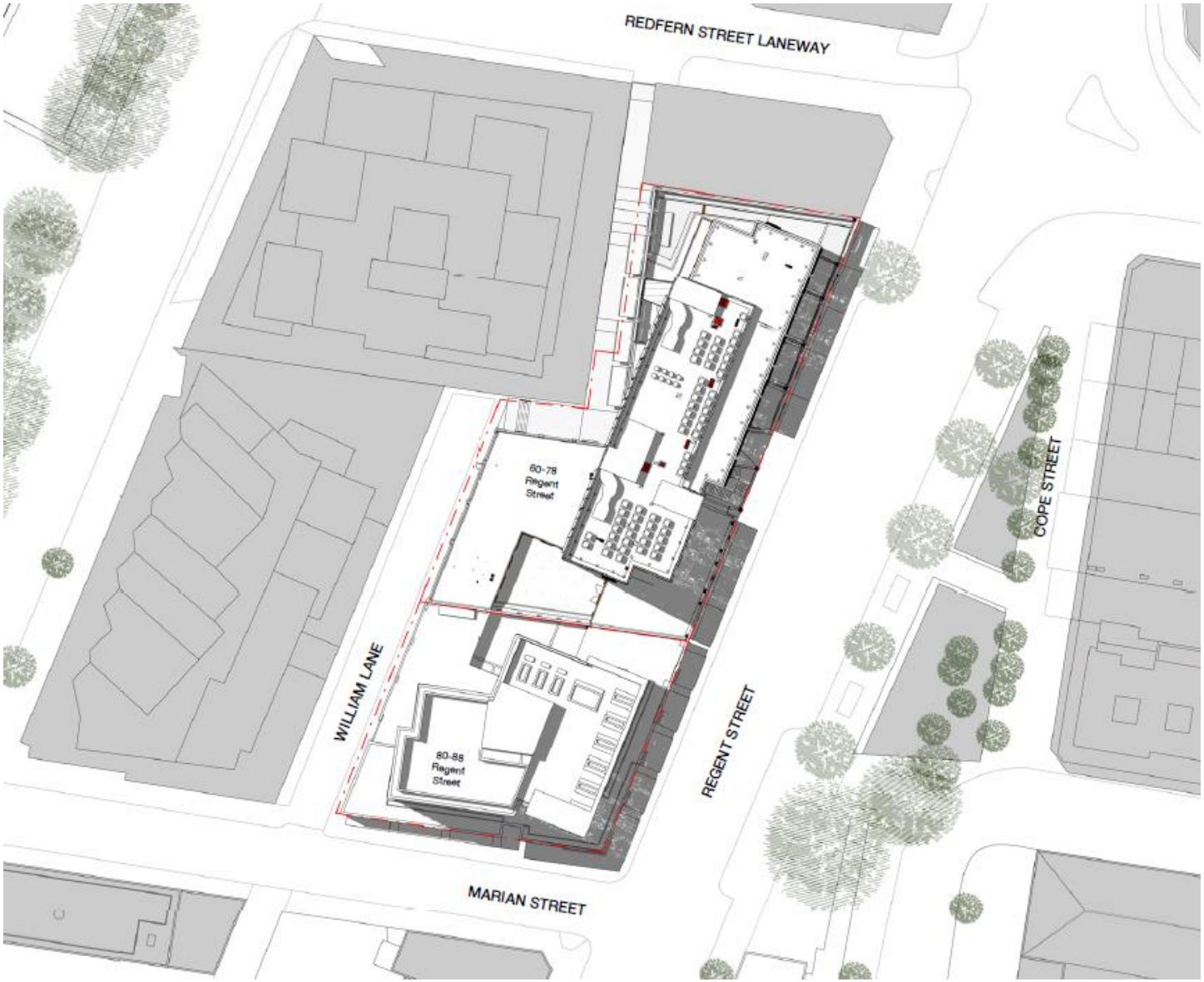


Figure 2 – Proposed Site Plan

3 NOISE DESCRIPTORS

In the case of 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 interval.

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 measurement period. L_{eq} is important in the assessment of traffic noise impact as it closely corresponds with human perception of a changing noise environment; such is the character of traffic noise.

Traffic noise constantly varies in level, due to fluctuations in traffic speed, vehicle types, road conditions and traffic densities. Accordingly, it is not possible to accurately determine prevailing traffic noise conditions by measuring a single, instantaneous noise level. To accurately determine the effects of traffic 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. These parameters are used to measure how much annoyance would be caused by a particular noise source.

Current practice favours the L_{eq} parameter as a means of measuring traffic noise, whereas the L_{10} parameter has been used in the past and is still incorporated in some codes. For the reasons outlined above, the L_{90} parameter is not used to assess traffic noise intrusion.

4 ASSESSMENT CRITERIA

Traffic noise from vehicle movements along Regent Street, will be the primary external noise source impacting the subject development. During a site visit high levels of mechanical noise was also noted towards the western boundary of the site, from louvres located along the eastern façade of the property at 9 Gibbons Street, Redfern.

4.1 SYDNEY DEVELOPMENT CONTROL PLAN 2012

It should be noted that the DCP does not outline any specific provisions for student accommodation. For the purpose of this assessment the subject development will be assessed as a multi-storey residential/mixed-use development and hence reference section 4.2 of the council DCP. Subsection 4.2.3.11 of the council DCP outlines the following requirements with regards to acoustic privacy;

(7) The repeatable maximum LAeq (1 hour) for residential buildings and serviced apartments must not exceed the following levels:

(a) for closed windows and doors:
(i) 35dB for bedrooms (10pm-7am); and
(ii) 45dB for main living areas (24 hours).

(b) for open windows and doors:
(i) 45dB for bedrooms (10pm-7am); and
(ii) 55dB for main living areas (24 hours).

(8) Where natural ventilation of a room cannot be achieved, the repeatable maximum LAeq (1hour) level in a dwelling when doors and windows are shut and air conditioning is operating must not exceed:

(a) 38dB for bedrooms (10pm-7am); and
(b) 48dB for main living areas (24 hours).

(9) These levels are to include the combined measured level of noise from both external sources and the ventilation system operating normally.

4.2 STATE ENVIRONMENTAL PLANNING POLICY (SEPP INFRASTRUCTURE) 2007

Clause 102 of the NSW SEPP for road traffic noise stipulates,

"This clause applies to development for any of the following purposes that is on land in or adjacent to the road corridor for a freeway, a tollway or a transit way or any other road with an annual average daily traffic volume of more than 40,000 vehicles (based on the traffic volume data published on the website of the RTA) and that the consent authority considers is likely to be adversely affected by road noise or vibration:

(a) a building for residential use,
(b) a place of public worship,
(c) a hospital,
(d) an education establishment or child care centre.

If the development is for the purposes of a building for residential use, the consent authority must not grant consent to the development unless it is satisfied that appropriate measures will be taken to ensure that the following L_{Aeq} levels are not exceeded:

(a) in any bedroom in the building – 35 dB(A) at any time between 10 pm and 7am,

(b) anywhere else in the building (other than a garage, kitchen, bathroom or hallway) – 40 dB(A) at any time."

Map 16 of the traffic volume maps for Infrastructure SEPP (from the road and maritime services website) classifies Regent Street (adjacent to site) as a carriageway carrying >40,000 AADT, and hence mandatory under clause 102 of the Infrastructure SEPP.

4.3 AUSTRALIAN STANDARD AS/NZS 3671:1989 '*ACOUSTICS—ROAD TRAFFIC NOISE INTRUSION—BUILDING SITING AND CONSTRUCTION*'

Australian Standard AS 3671-1989 notes the following in relation to traffic noise:

- Internal noise levels should be determined in accordance with AS/NZS 2107:2016 '*Acoustics – Recommended design sound levels and reverberation times for building interiors*'.
- A suitable descriptor should be adopted, relevant to the use of the proposed development. As AS2107:2016 adopts the L_{Aeq} descriptor, ALC will also use this descriptor.
- AS3671 does not specifically recommend a time interval. On this basis, ALC have adopted the worst 1-hour noise level descriptor for the two-time periods of the day, being:
    - Daytime – 7am to 10pm ($L_{eq(worst\ 1\ hr)}$), and
    - Night-time – 10pm to 7am ($L_{eq(worst\ 1\ hr)}$).

4.4 AUSTRALIAN AND NEW ZEALAND AS/NZS 2107:2016 '*Recommended Design Sound Levels and Reverberation Times for Building Interiors*'

AS2107-2016 *"Acoustics – Recommended design sound levels and reverberation times for building interiors"* recommends internal design criteria for occupiable spaces of difference types of development. The design noise levels are determined based on the occupancy type, function/activity of the space within the occupancy and proximity to environmental noise sources.

Internal design noise level criteria applicable for non-residential areas of the proposed development are detailed below;

Table 2 – AS2107:2016 Recommended Internal Design Noise Levels

Space	Time	Internal Traffic Noise Criteria dB(A)$L_{eq(1\ hour)}$
Open Plan Office/General Office Areas	When in use	40 – 45
Retail Stores	When in use	<50 dB(A)
Common Rooms	When in use	40 – 45
Games Rooms	When in use	45 – 50

5 EXISTING ENVIRONMENT NOISE LEVELS

Measurements of existing ambient noise levels on site was conducted using both long term unattended monitoring and short term attended measurements.

Long term noise monitoring was conducted using 2 unattended noise monitors installed on site;

- Monitor 1 – Installed on level 1 of the commercial property at 88 Regent Street, Redfern. The monitor was installed with the microphone positioned outside a window along the eastern façade of the property, with a clear and unrestricted view of Regent Street.

- Monitor 2 – backyard of commercial property at 88 Regent Street.

Acoustic Research Laboratories noise monitors were used for the long-term monitoring, set to record continuously on an A-weighted fast response mode. 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 logging was conducted from the 18th to 25th July 2018.

Unattended noise logging data is attached in Appendix 1 below.

Measurements of existing peak hour traffic noise levels were also conducted at various locations around the site, as illustrated in Figure 1. These measurements were conducted using a Norsonic type 140 Precision Sound Analyser between 7:30am and 9:00am, on the 25th July 2018. The analyser was set to record at 15-minute intervals in an A-weighted fast response mode. The analyser was calibrated before and after the measurements using a Norsonic Sound Calibrator type 1251. No significant drift was noted. Highest recorded 15-minute noise levels during the measurement interval have been used for this assessment.

Measured noise levels are presented below. In determination of acoustic treatments, the measured levels are adjusted for distance and orientation.

Table 3 – Measured Existing Traffic Nosie Levels

Location	Measured Traffic Noise Level	
	Daytime (7am-10pm)	**Night time (10pm-7am)**
Along Regent Street (approx. 3m from curb)	69 dB(A)$L_{eq(1hour)}$ 68 dB(A)$L_{eq(15\ hour)}$	68 dB(A)$L_{eq(1hour)}$ 66 dB(A)$L_{eq(9\ hour)}$
Along William Lane (site boundary)	66 dB(A)$L_{eq(1hour)}$ 65 dB(A)$L_{eq(15\ hour)}$	64 dB(A)$L_{eq(1hour)}$ 62 dB(A)$L_{eq(9\ hour)}$

6 METHODOLOGY OF EXTERNAL NOISE INTRUSION ASSESSMENT

External noise intrusions will primarily be as a result of noise transfer through the roof, windows and doors, as these are relatively light building elements, which offer less resistance to the transmission of sound. Noise transfer through masonry external walls will not be significant and need not be considered further.

The constructions necessary to attenuate external noise impacts to levels complying with those detailed in section 4 above, are set out below.

6.1 RECOMMENDED TREATMENTS

Internal noise levels were calculated based on the expected level and spectral characteristics of the external noise, the area of building elements exposed to the noise source, the absorption characteristics of the rooms and the noise reduction performance of the building elements.

6.1.1 Recommended Glazing

Minimum constructions to ensure compliance with the internal noise goals detailed in section 4 above, are outlined below. 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.

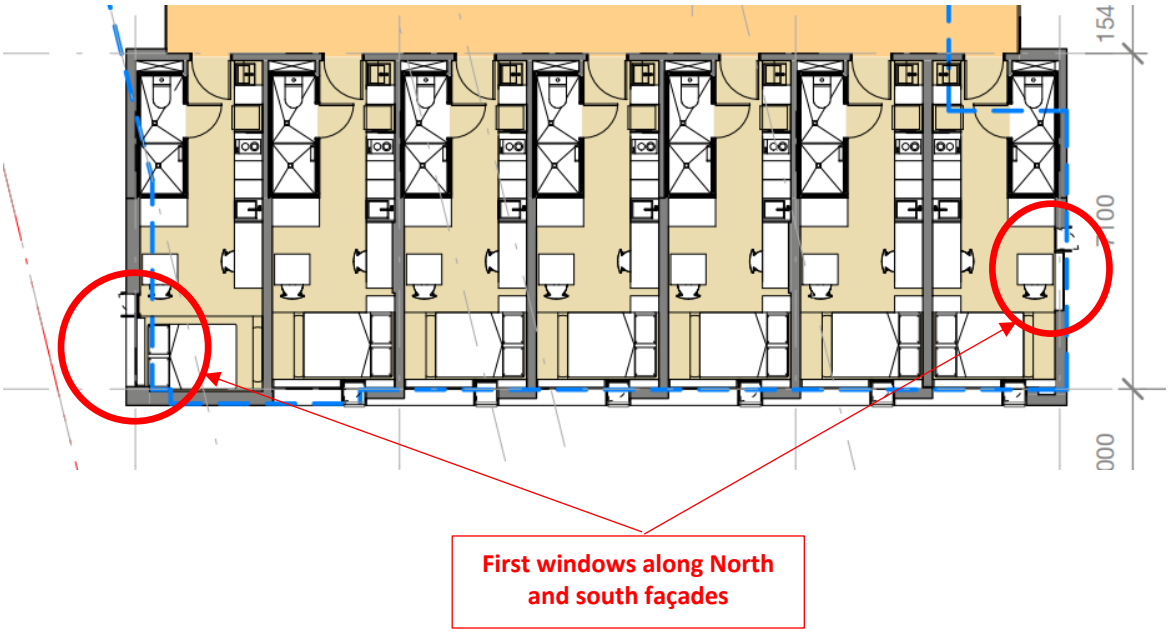
Table 4 – Recommended Minimum Glazing Construction

Levels	Space	Façade	Glazing Thickness	Acoustic Seals
Ground & Leve 00 (Mezzanine)	Retail	East (Regent Street)	10.38mm laminate	Yes
		South (Marian Street)		
	Office*	South or West (William Lane)	6.38mm laminate	Yes
Level 1	Community Space	East	10.38mm laminate	Yes
		South	6.38mm laminate	
		West or Courtyard	6mm float/toughened	
	Rooms	South or West	10.38mm laminate	

Levels	Space	Façade	Glazing Thickness	Acoustic Seals
Levels 2 to 10	Rooms	East and North	12.38mm laminate for the fixed glass element + 6mm toughened Breezway louvre for ventilation box. The box must be of a minimum 9mm FC sheet construct.	Yes
		North or South (first apartments – see figure below)	12.38mm laminate for the fixed glass element + 6mm toughened Breezway louvre for ventilation box. The box must be of a minimum 9mm FC sheet construct.	
		North, South & West	10.38mm laminate for the fixed glass element + 6mm toughened Breezway louvre for ventilation box. The box must be of a minimum 9mm FC sheet construct.	
	Living/Kitchen (Common)	North and South	6.38mm laminate for the fixed glass element + 6mm toughened Breezway louvre for ventilation box. The box must be of a minimum 9mm FC sheet construct.	
	Corridor	North or South	6mm float/toughened	
Levels 11 to 17	Rooms	East and North	10.38mm laminate for the fixed glass element + 6mm toughened Breezway louvre for ventilation box. The box must be of a minimum 9mm FC sheet construct.	Yes
		North or South (first apartments – see figure below)	10.38mm laminate for the fixed glass element + 6mm toughened Breezway louvre for ventilation box. The box must be of a minimum 9mm FC sheet construct.	
		North, South & West	6.38mm laminate for the fixed glass element + 6mm toughened Breezway louvre for ventilation box. The box must be of a minimum 9mm FC sheet construct.	

Levels	Space	Façade	Glazing Thickness	Acoustic Seals
Levels 11 to 17	Living/Kitchen (Common)	North and South	6.38mm laminate for the fixed glass element + 6mm toughened Breezway louvre for ventilation box. The box must be of a minimum 9mm FC sheet construct.	Yes
	Corridor	North or South	6mm float/toughened	

***Assumed as general/open plan office space. If this space is proposed to be part of future fit-out, any sensitive areas such as meeting rooms, private office etc. located along the façade will need to be reviewed, as these spaces will require an upgraded façade construction.**



In addition to meeting the minimum glazing thickness requirements given, the design of the window mullions, perimeter seals and the installation of the windows/doors in the building openings shall not reduce the STC rating of the glazing assembly below the values nominated in the table above. All external windows and doors listed are required to be fitted with Q-lon type acoustic seals. **Note that mohair of fin type seals will not be acceptable for the windows requiring acoustic seals.**

The window/door suppliers should provide evidence that the systems proposed have been tested in a registered laboratory with the recommended glass thicknesses and comply with the minimum listed STC requirements. Also, the glazing installer should certify that the window/doors have been constructed and installed in a manner equivalent to the tested samples.

Table 5 – Minimum STC/R_w of Glazing Assembly (with Acoustic Seals)

Glazing Assembly	Minimum STC/R_w of Glazing Assembly* (with acoustic seals)
6mm toughened Breezway louvres	24
6mm float/toughened	29
6.38mm laminate	31
10.38mm laminate	35
12.38mm laminate	37

***Glazing assembly is a combination of glass, frame and seals.**

6.1.2 External Doors

Any glass door or glazed panels set into solid doors should be constructed using glazing thickness outlined in the above section. Full perimeter acoustic seals around the doors are required.

Any timber external doors (this includes apartment entry doors along external corridor areas) shall be a minimum 40mm solid core timber with Raven RP10 to the top and sides and Raven RP38 to the underside of the door.

Entry doors to rooms within internal corridor areas shall be of a minimum 35mm solid core timber construct with gaps minimised (maximum undercut of 5mm).

6.1.3 External Walls

Proposed masonry external wall construction is acoustically acceptable and does not require any additional treatments. 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 Roof / Ceiling

Proposed concrete slab roof is acoustically acceptable and does not require any additional treatments. All opening or penetrations in ceilings must be acoustically sealed.

6.2 VENTILATION AND AIR CONDITIONING

The following areas of the development can comply with this internal noise goal, with windows/doors open (5% for natural ventilation as detailed in section **Error! Reference source not found.**);

- Living/Kitchen (Common) from levels 11 – 17. Operable façade elements on only 1 side can be open (glazing proposed along north and south façades).

All other areas of the development can only comply with the internal noise level criteria, with windows/doors closed. Any alternate source/mechanical ventilation system that is installed should be acoustically designed such that the acoustic performance of the recommended constructions is not reduced by any duct or pipe penetrating the wall/ceiling/roof. Noise emitted to the property boundaries by any ventilation system shall also comply with the noise emission goals detailed in the following section.

7 CONCLUSION

This report presents the results of a preliminary review of the proposed façade design on the 'Iglu II' development, located at 80-88 Regent Street, Redfern.

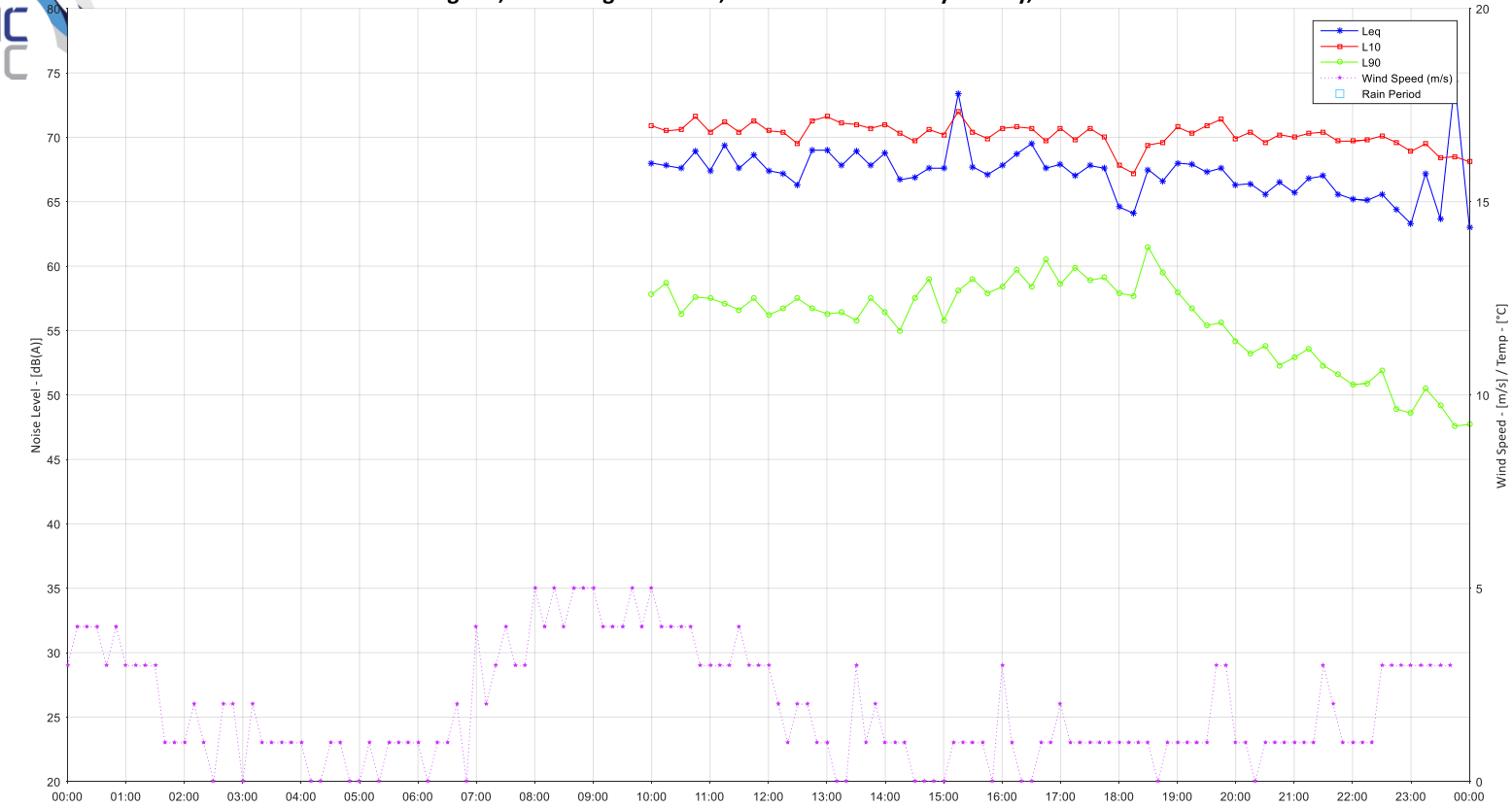
Noise impacts from existing environmental noise sources on future occupants of the development, have been assessed in accordance with the requirements of the Sydney DCP 2012, NSW DoP Infrastructure SEPP 2007 and Australian Standard 2107-2016. The acoustic treatments necessary to achieve compliance with the requirements contained within these guidelines have been set out in section 6.1.

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

Yours faithfully,

Yogendra Kalkunte

APPENDIX 1 – NOISE LOGGING DATA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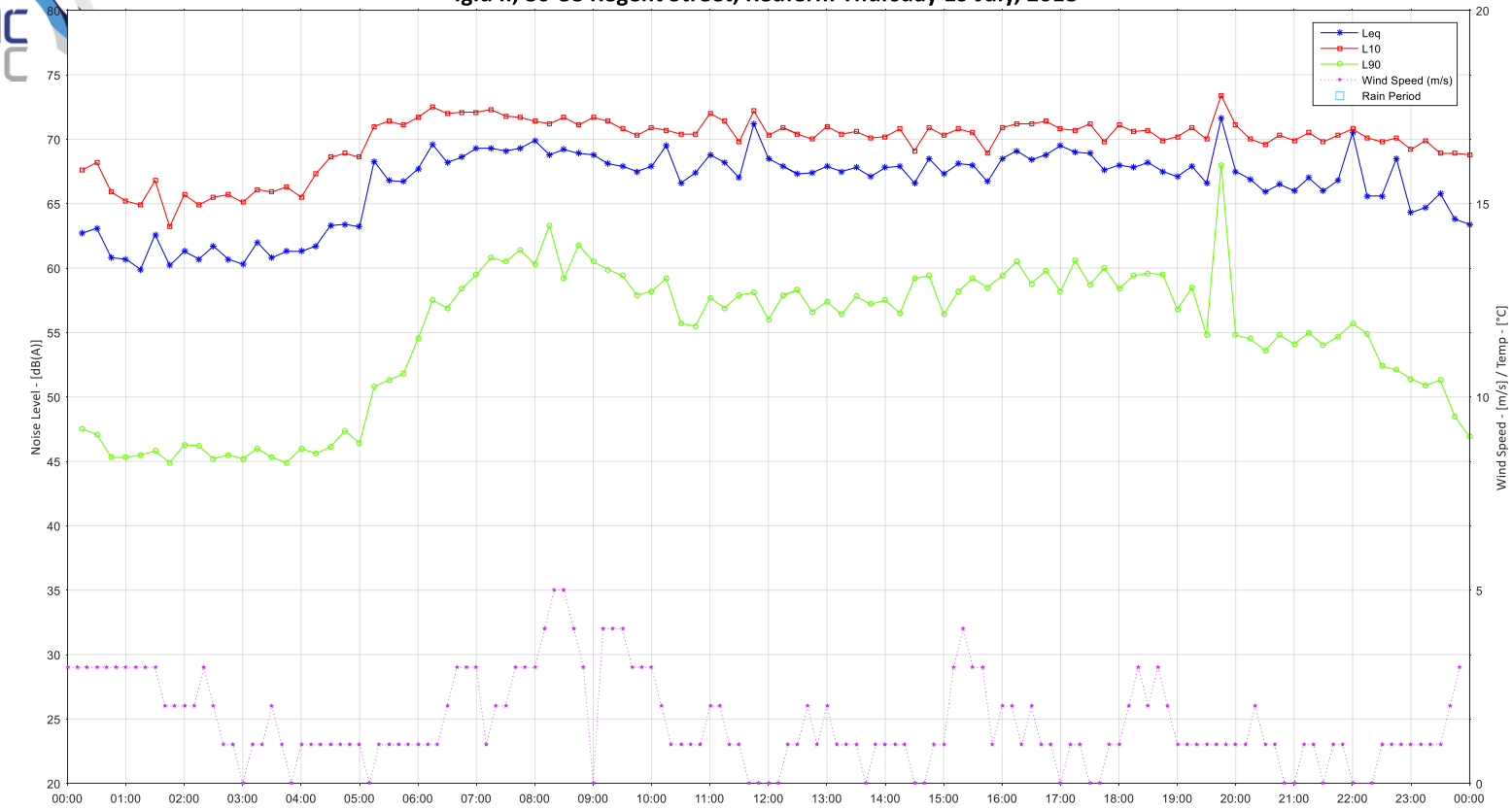
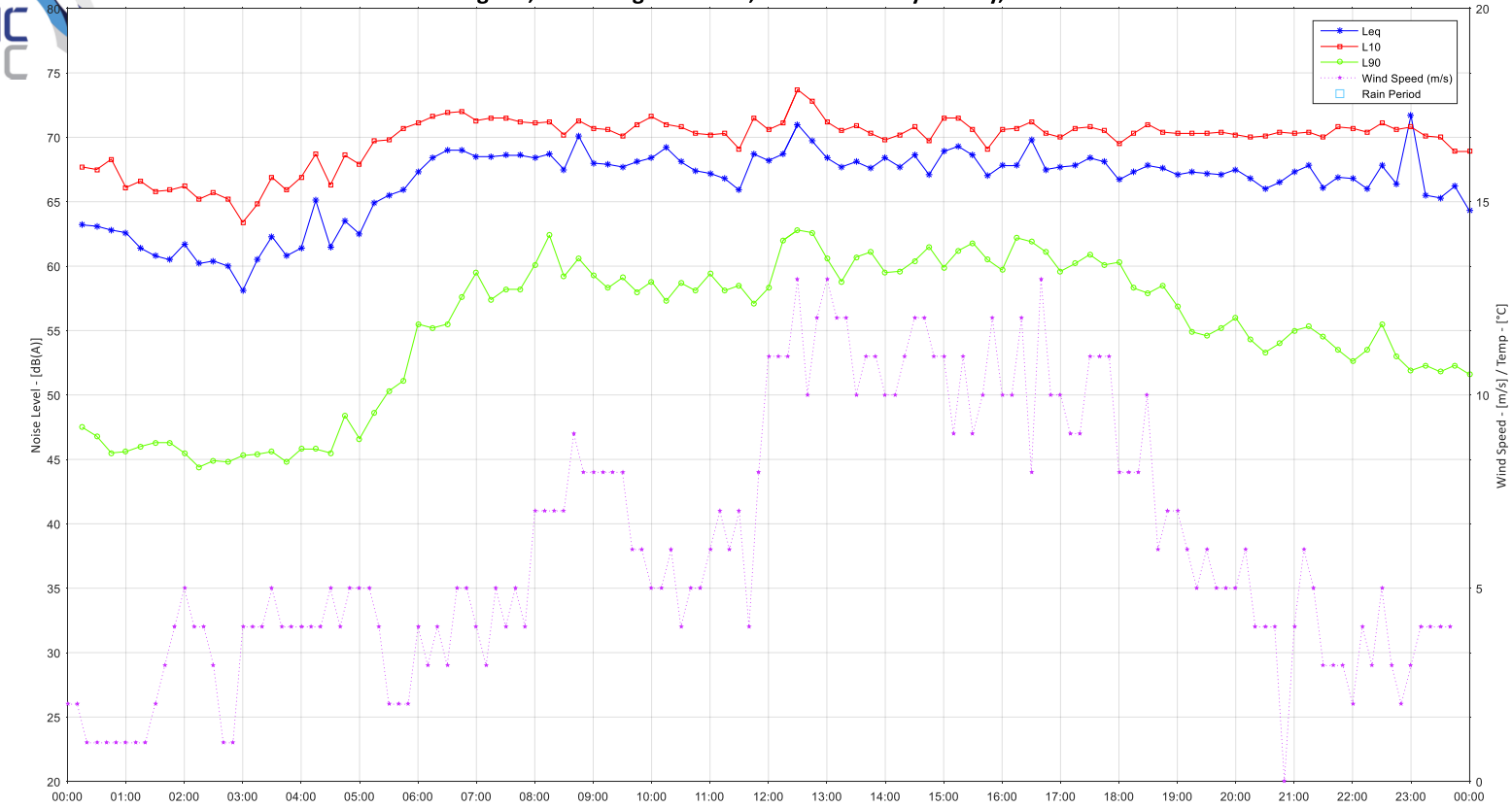
ACOUSTIC LOGIC

Iglu II, 80-88 Regent Street, Redfern: Thursday 19 July, 2018




Iglu II, 80-88 Regent Street, Redfern: Friday 20 July, 2018
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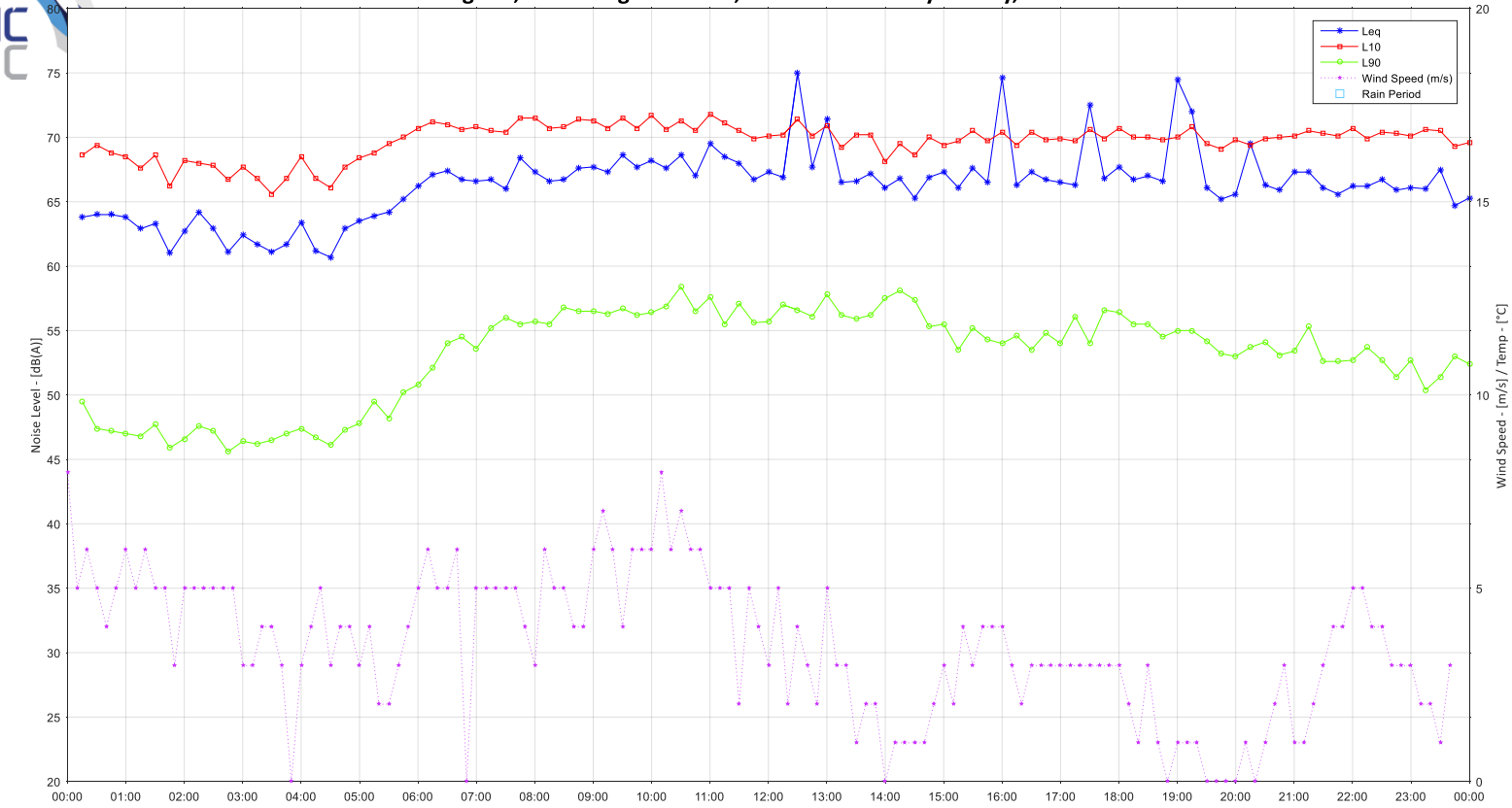
Iglu II, 80-88 Regent Street, Redfern: Saturday 21 July, 2018



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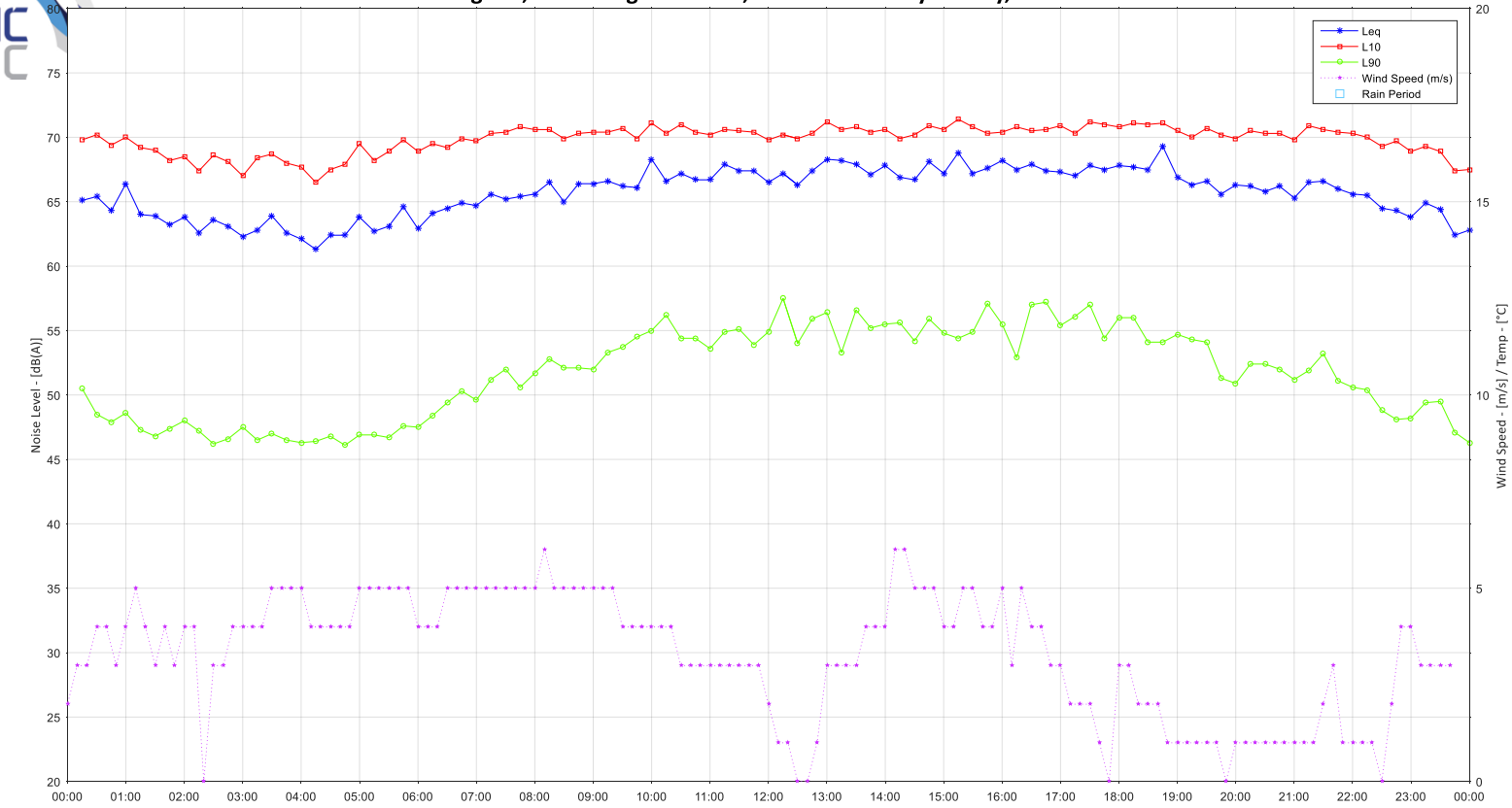

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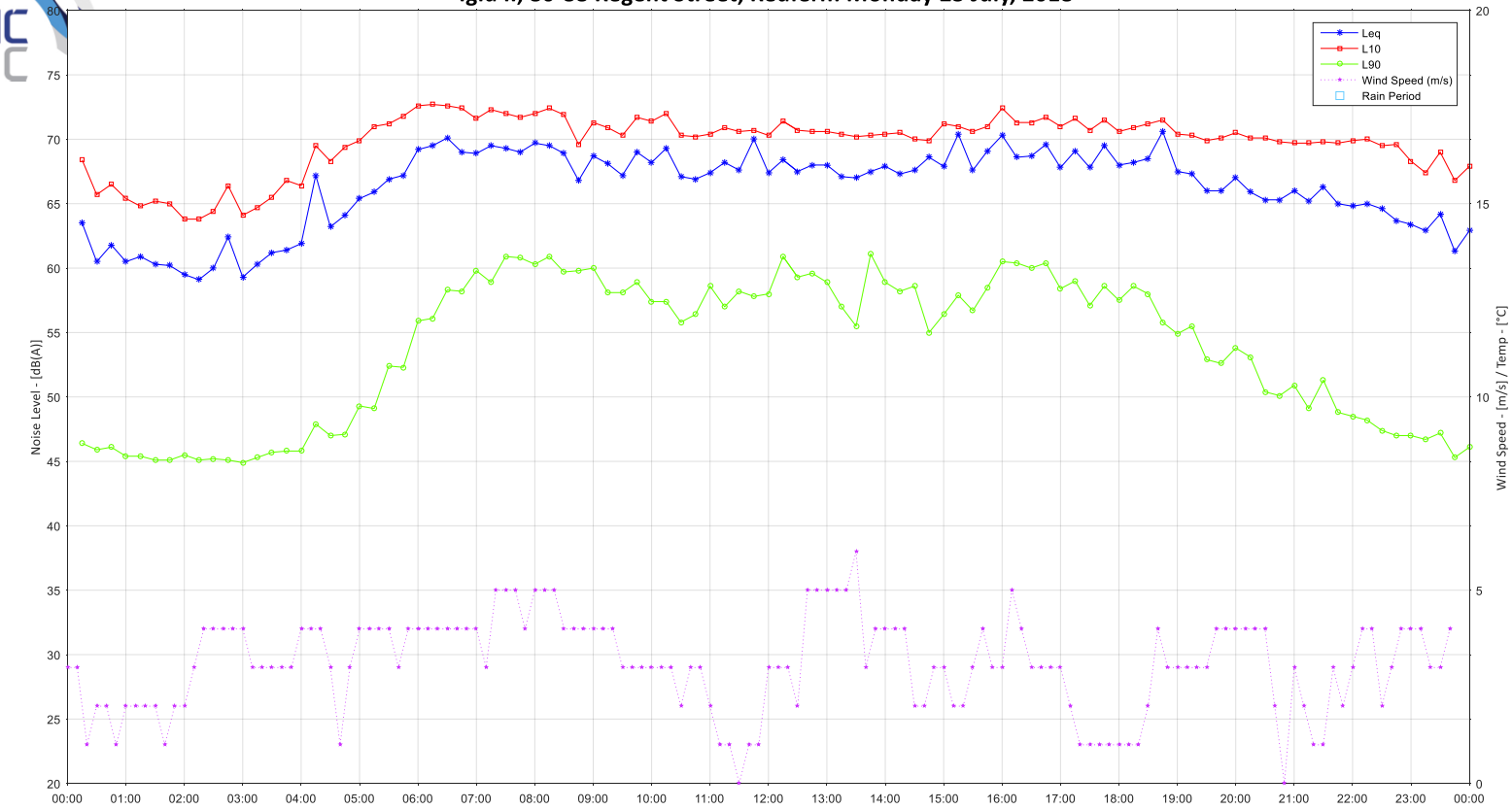

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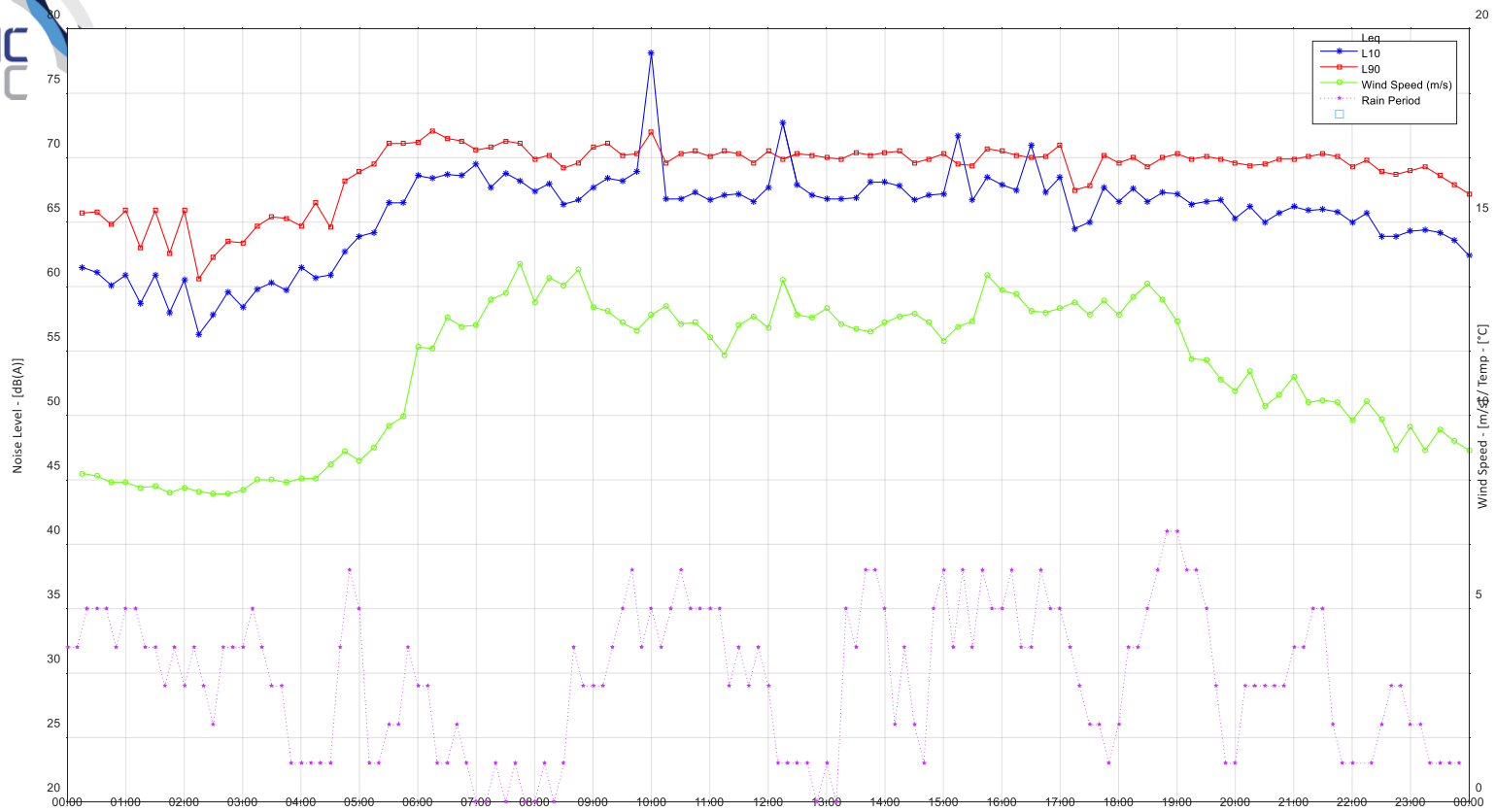

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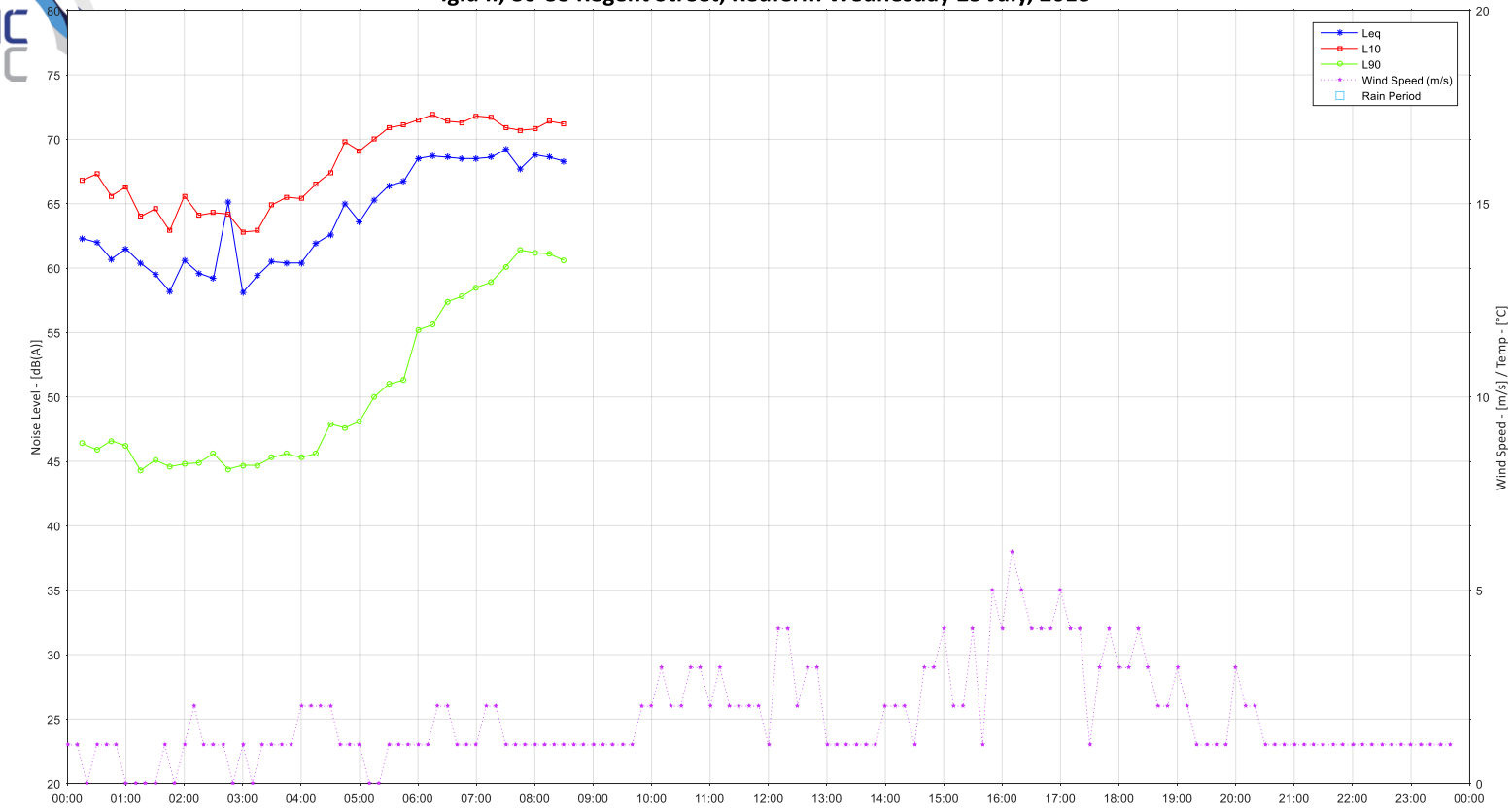

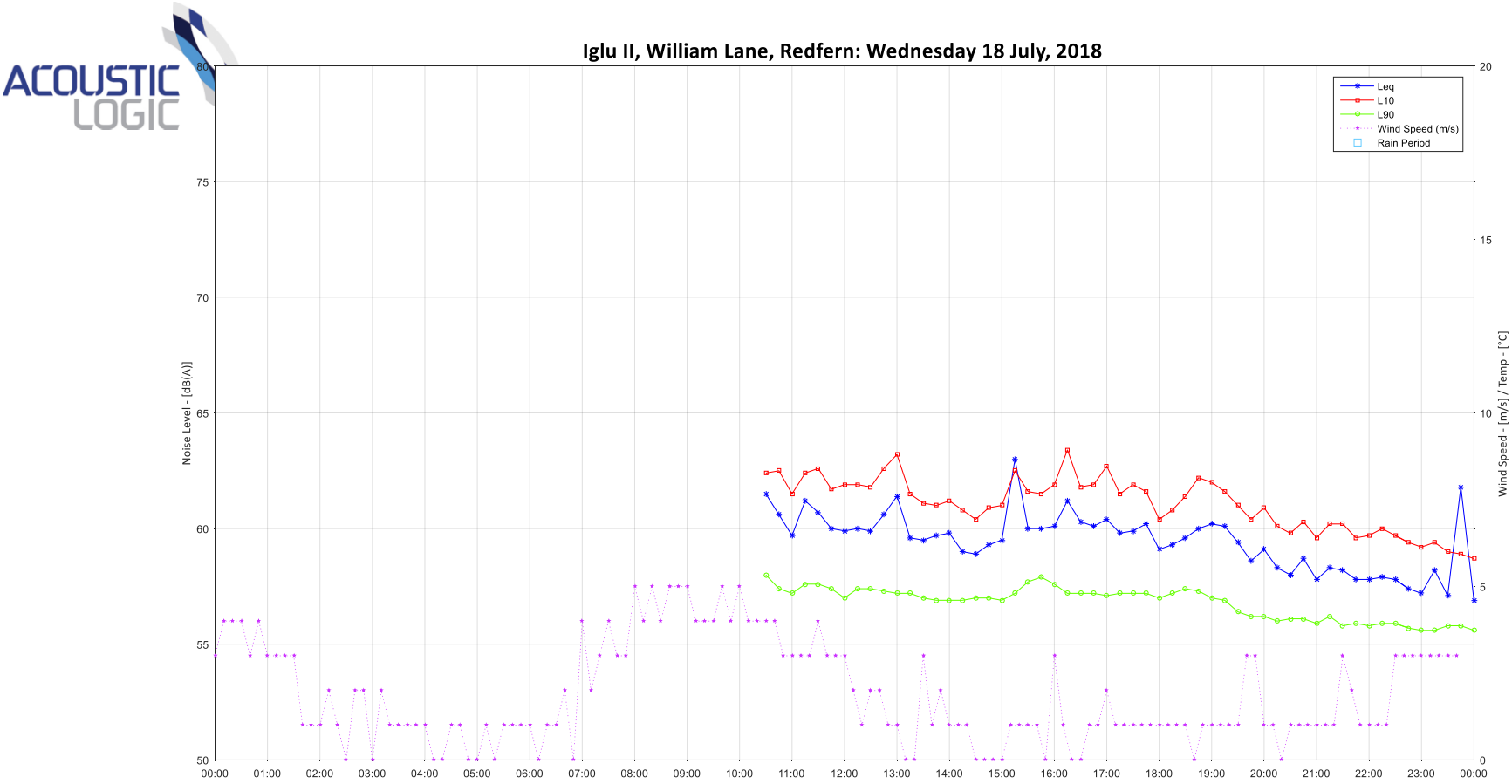
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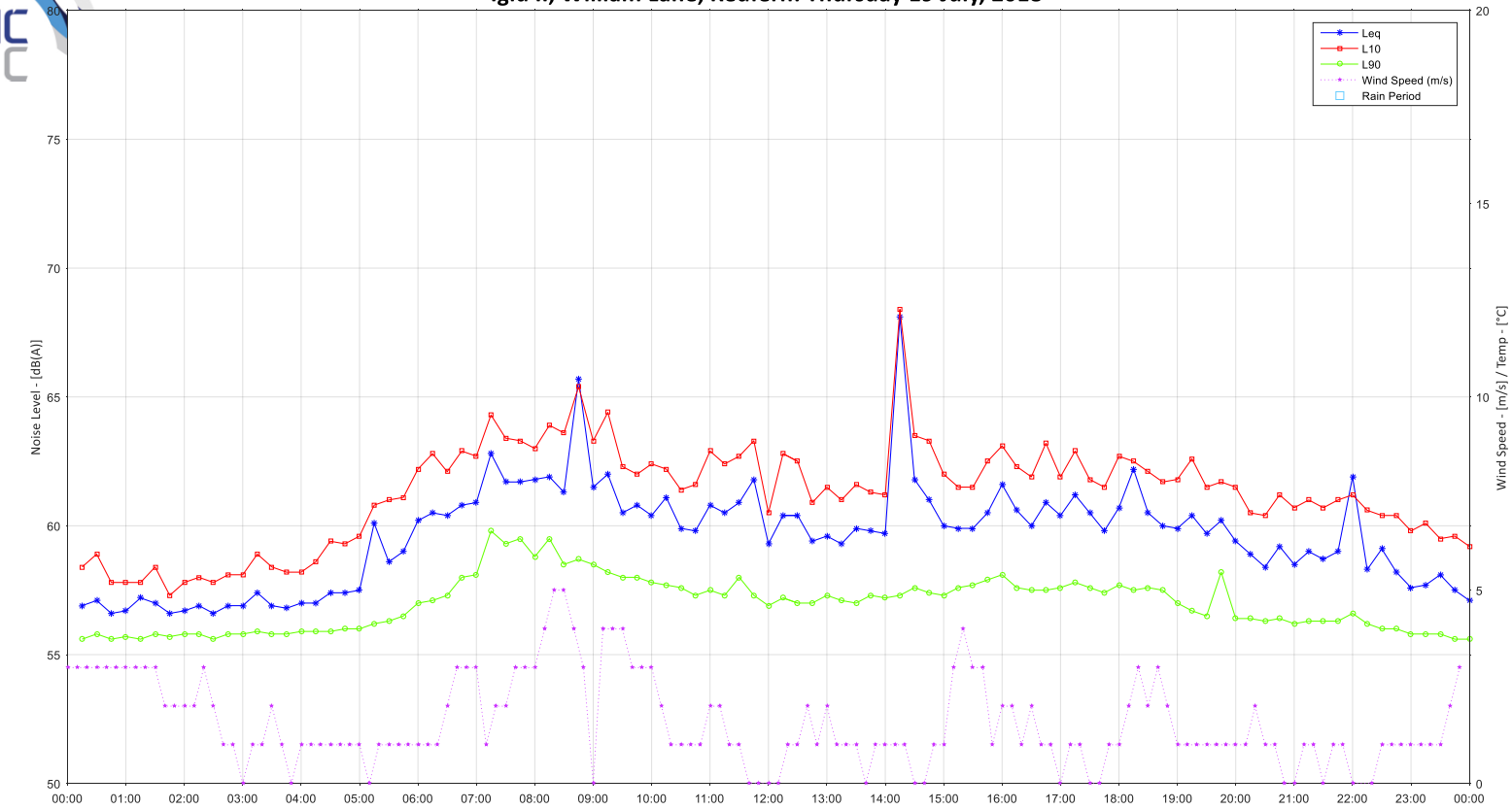
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Noise Level - [dB(A)]
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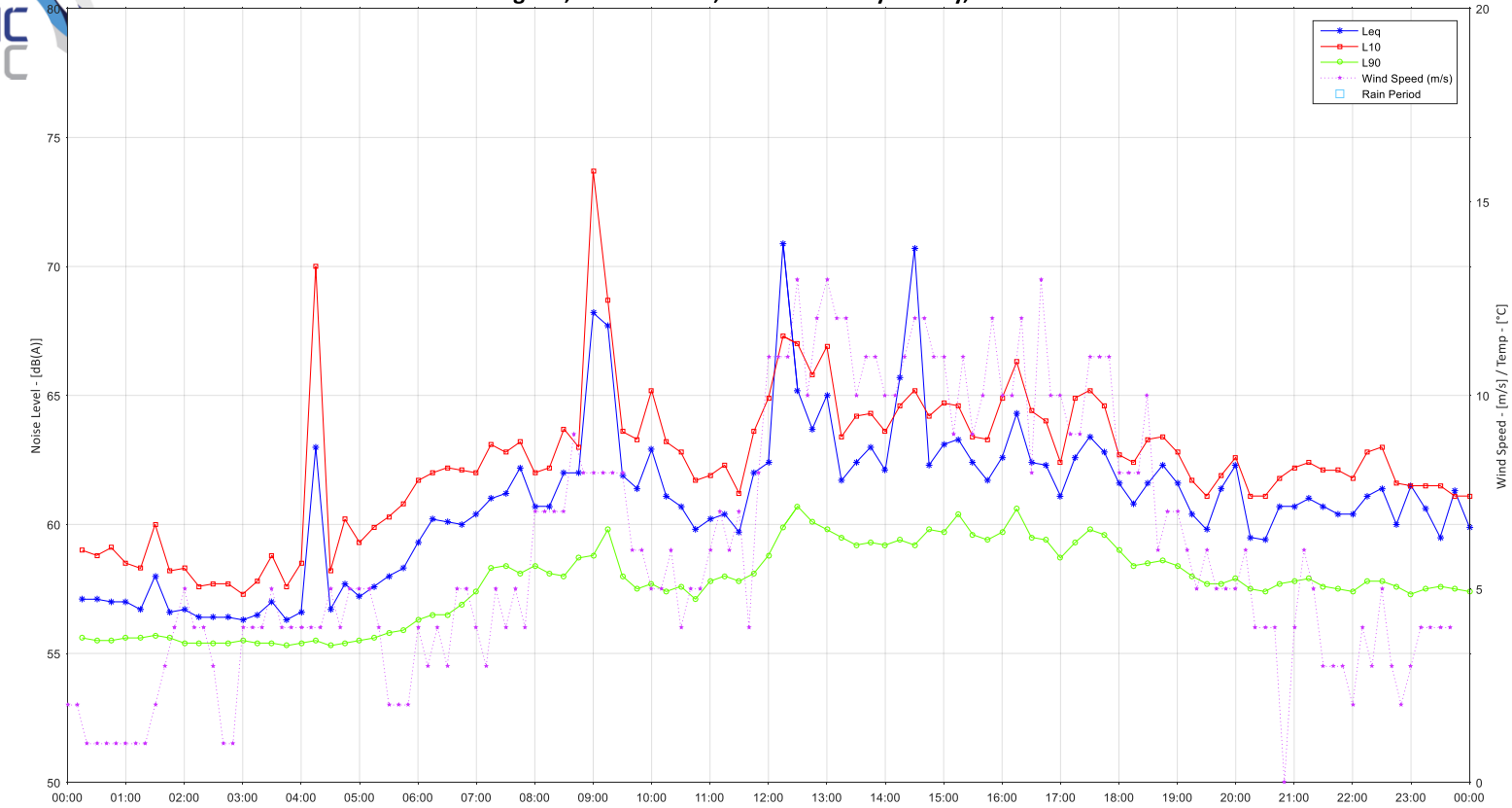
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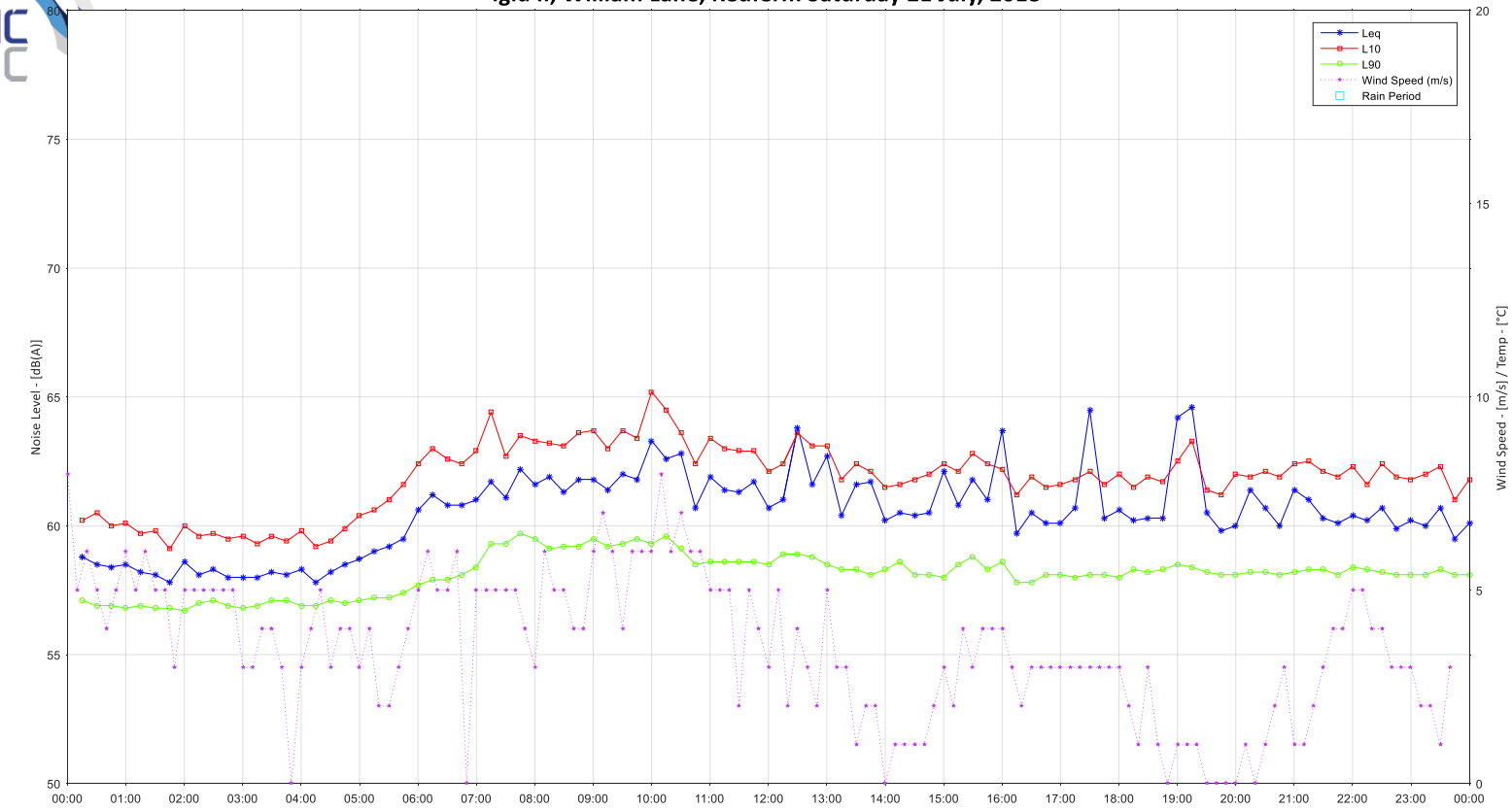
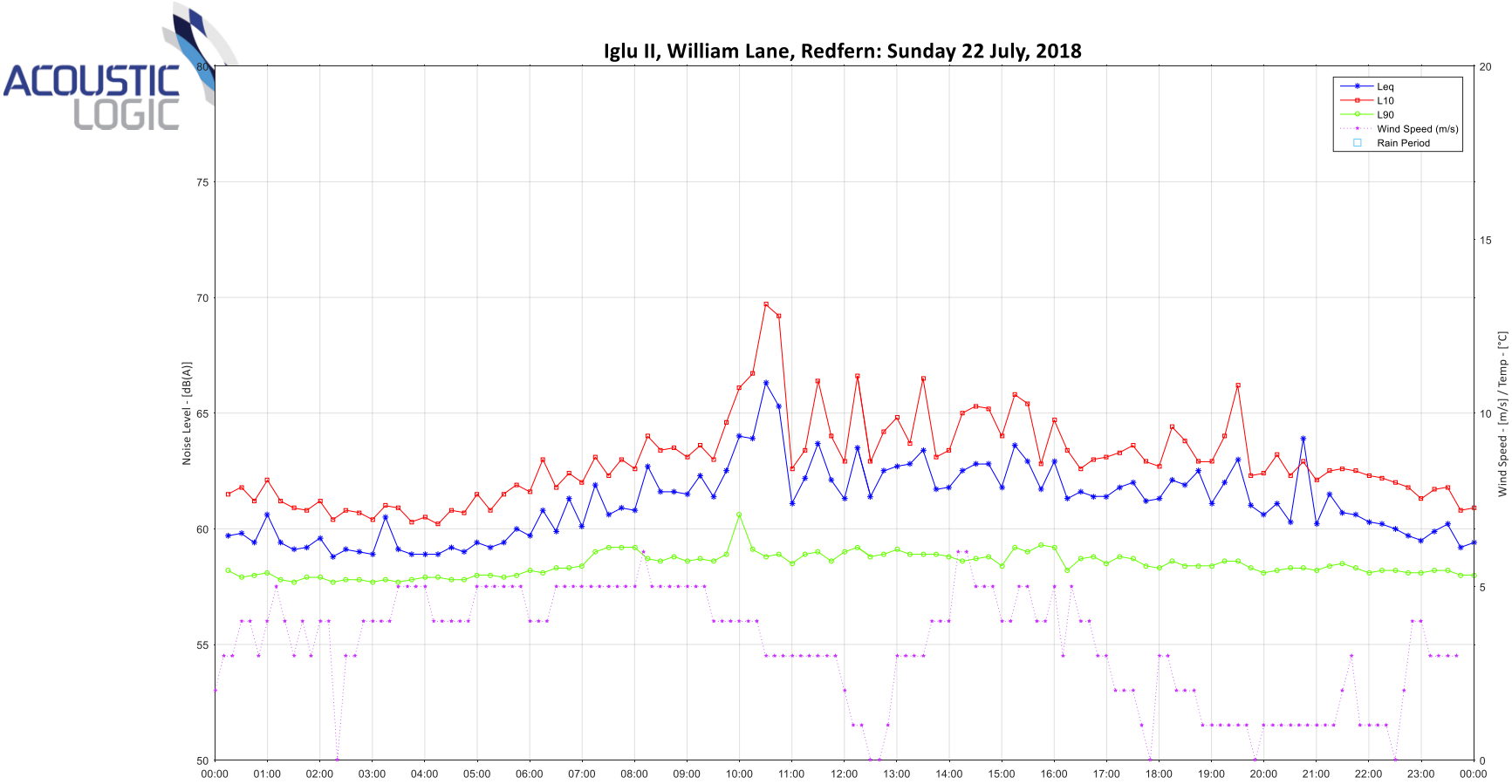
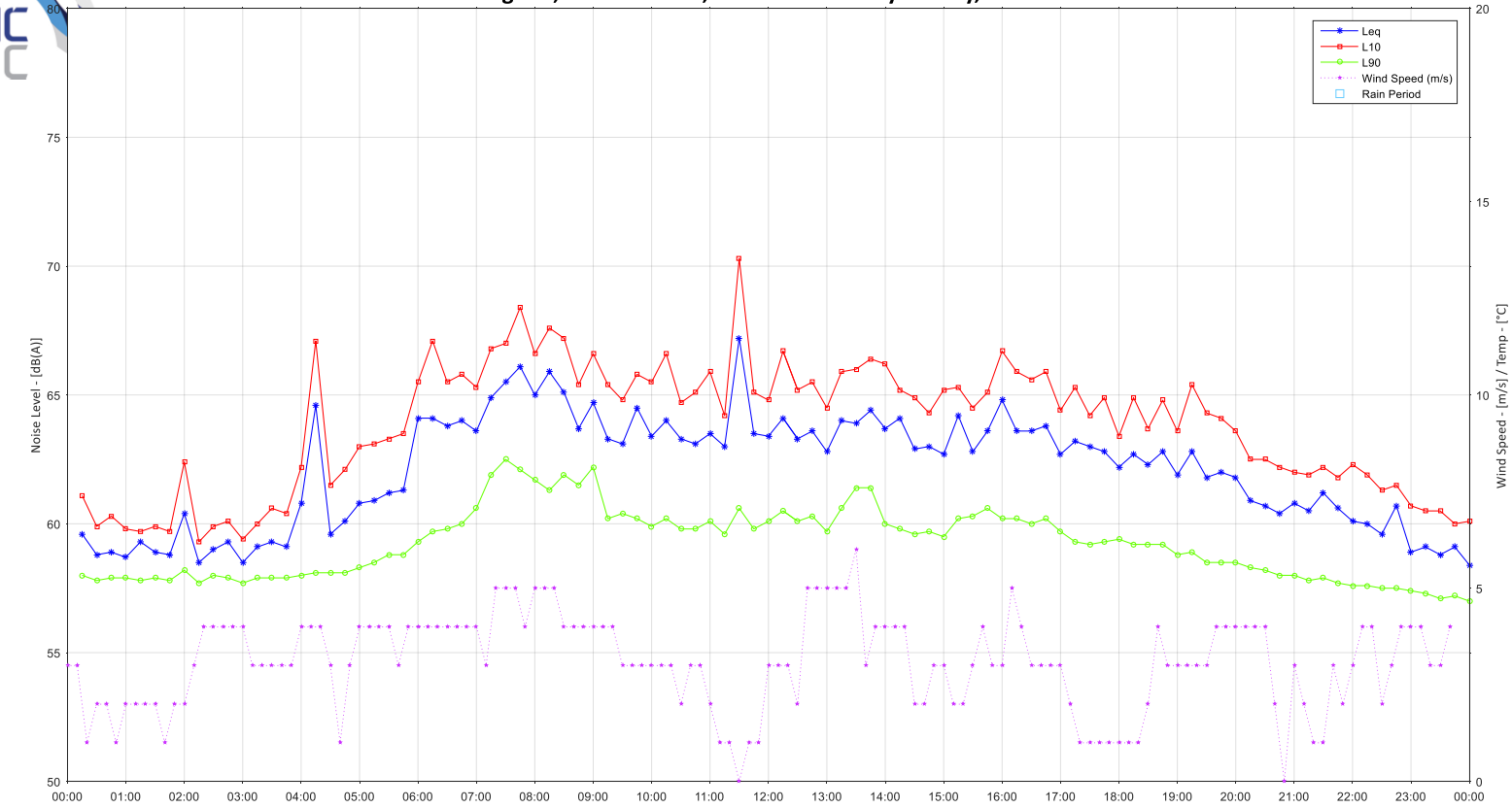
ACOUSTIC LOGIC

Iglu II, William Lane, Redfern: Saturday 21 July, 2018




Iglu II, William Lane, Redfern: Sunday 22 July, 2018
Leq
L10
L90
Wind Speed (m/s)
Rain Period
Noise Level - [dB(A)]
Wind Speed - [m/s] / Temp - [°C]
80
75
70
65
60
55
50
20
15
10
5
0
00:00
01:00
02:00
03:00
04:00
05:00
06:00
07:00
08:00
09:00
10:00
11:00
12:00
13:00
14:00
15:00
16:00
17:00
18:00
19:00
20:00
21:00
22:00
23:00
00:00


Iglu II, William Lane, Redfern: Monday 23 July, 2018
Noise Level - [dB(A)]
Wind Speed - [m/s] / Temp - [°C]
Leq
L10
L90
Wind Speed (m/s)
Rain Period
80
75
70
65
60
55
50
20
15
10
5
0
00:00
01:00
02:00
03:00
04:00
05:00
06:00
07:00
08:00
09:00
10:00
11:00
12:00
13:00
14:00
15:00
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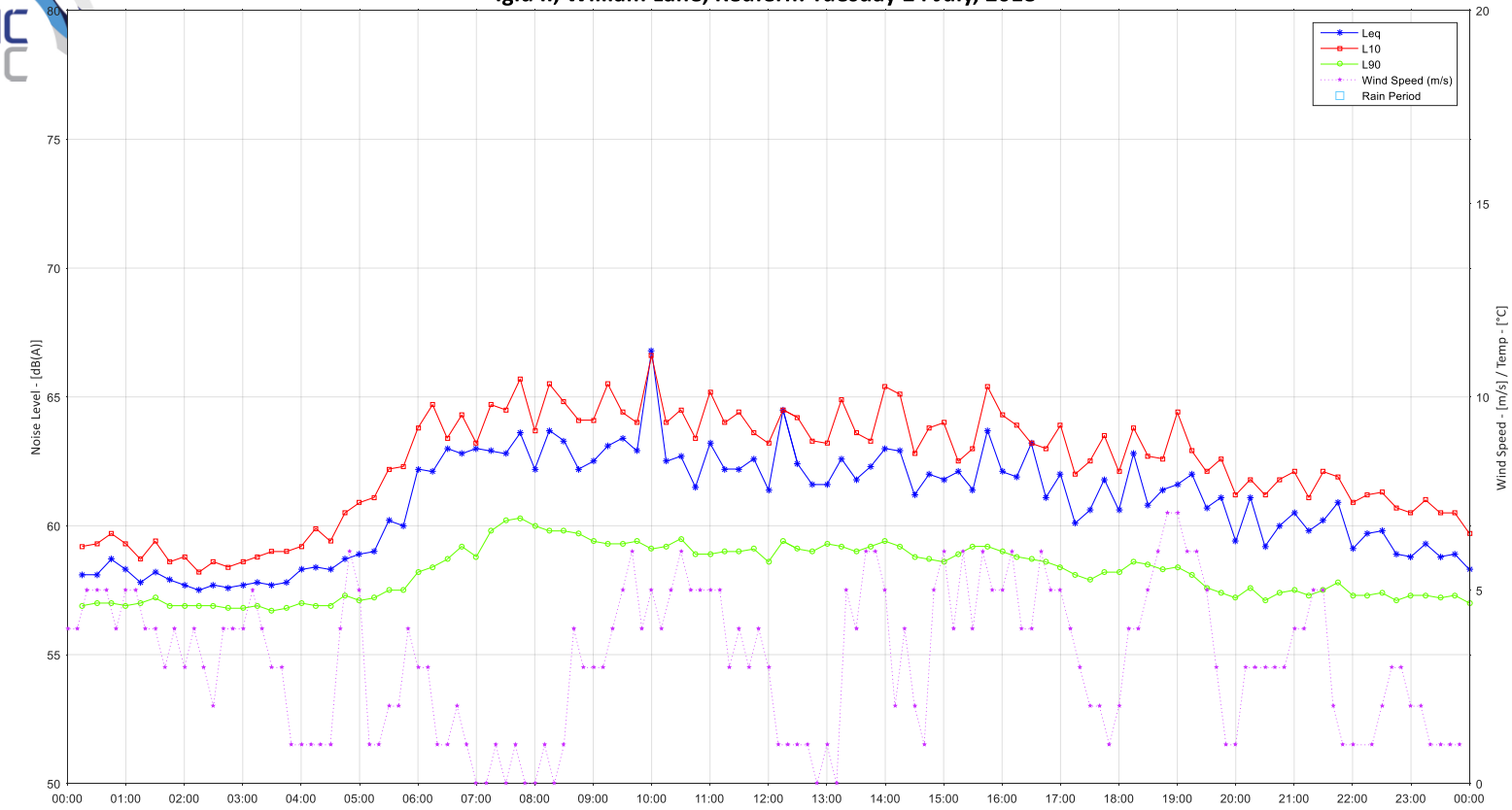
22:00
23:00
00:00


Iglu II, William Lane, Redfern: Tuesday 24 July, 2018
Leq
L10
L90
Wind Speed (m/s)
Rain Period
Noise Level - [dB(A)]
Wind Speed - [m/s] / Temp - [°C]
80
75
70
65
60
55
50
20
15
10
5
0
00:00
01:00
02:00
03:00
04:00
05:00
06:00
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20:00
21:00
22:00
23:00
00:00

ACOUSTIC LOGIC

Iglu II, William Lane, Redfern: Wednesday 25 July, 2018