

Terrey Hills Seniors Living Development Development Application Acoustic Report

SYDNEY
A: 9 Sarah St
MASCOT 2020
T: (02) 8339 8000

SYDNEY MELBOURNE BRISBANE CANBERRA
LONDON DUBAI SINGAPORE GREECE

ABN: 11 068 954 343

The information in this document is the property of Acoustic Logic Consultancy Pty Ltd ABN 11 068 954 343 and shall be returned on demand. It is issued on the condition that, except with our written permission, it must not be reproduced, copied or communicated to any other party nor be used for any purpose other than that stated in particular enquiry, order or contract with which it is issued.

DOCUMENT CONTROL REGISTER

Project Number	20181314.1
Project Name	Terrey Hills Seniors Living Development
Document Title	Development Application Acoustic Report
Document Reference	20181314.1/1210A/R0/RL
Issue Type	Email
Attention To	Tolucy Pty Limited

Revision	Date	Document Reference	Prepared By	Checked By	Approved By
0	12/10/2018	20181314.1/1210A/R0/RL	RL		TT

TABLE OF CONTENTS

1	INTRODUCTION	4
2	SITE DESCRIPTION	4
3	ENVIRONMENTAL NOISE DESCRIPTORS	6
4	EXTERNAL NOISE INTRUSION ASSESSMENT	7
4.1	NOISE INTRUSION CRITERIA	7
4.2	CRITERIA	7
4.3	EXTERNAL NOISE MEASUREMENTS	7
4.3.1	Measurement Equipment	7
4.3.2	Measurement Location	7
4.3.3	Measurement Period	7
4.3.4	Results	7
4.4	RECOMMENDED CONSTRUCTIONS	8
4.4.1	Glazed Windows and Doors	8
4.4.2	External Roof/Ceiling	9
4.4.3	External Walls	9
5	NOISE EMISSION ASSESSMENT	11
5.1	BACKGROUND NOISE LEVELS	11
5.1.1	Measurement Equipment	11
5.1.2	Measurement Location	11
5.1.3	Measurement Period	11
5.1.4	Measured Background Noise Levels	11
5.2	NOISE EMISSION CRITERIA	12
5.2.1	Warringah Development Control Plan 2011	12
5.2.2	NSW EPA - Noise Policy for Industry (NPfI)	12
5.2.2.1	NPfI - Intrusiveness Noise Goals	12
5.2.2.2	INP – Project Amenity Goals	13
5.3	NOISE EMISSION ASSESSMENT/RECOMMENDATIONS	13
5.3.1	Supply / Exhaust fans	13
5.3.2	Minor Plant	13
5.3.3	Condenser, Heating and Reverse Cycling Air Conditioners	13
6	CONCLUSION	14
	APPENDIX 1 – UNATTENDED NOISE MONITORING DATA	15

1 INTRODUCTION

Acoustic Logic Consultancy (ALC) has been engaged to conduct an assessment of potential noise impacts associated with the Terrey Hills Seniors Living Development to be constructed 58 Laitoki Road, Terrey Hills.

This document addresses noise impacts associated with the following:

- External noise impacts on the site (traffic noise impacts from surrounding roadways;
- Noise emissions from the site (primarily mechanical plant);

This assessment has been conducted using the Calder Flower Architects preliminary architectural drawings, dated 9th October 2018.

2 SITE DESCRIPTION

The site is located at the corner of Cooyong Road and Laitoki Road. The proposed development consists of a new 94-bed residential care age facility and 60 Independent Living Units (ILUs).

Access to the site will be provided via driveways on Cooyong Road. Parking facilities will be provided in underground car parks.

The site is surrounded by residential properties with Cooyong Road to the south and Laitoki Road to the west. Both roads carry low traffic volumes.

An aerial photo showing noise measurement positions and surrounding noise receivers is presented below.



Figure 1: Site Map and Measurement Locations (Source: *SixMaps*)

3 ENVIRONMENTAL 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 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 INTRUSION ASSESSMENT

4.1 NOISE INTRUSION CRITERIA

4.2 CRITERIA

We note that there are no specific noise goals for Residential Aged Care Developments in the Warringah Council DCP 2011 (Northern Beaches Council).

The site does not lie on any major road or near any significant external noise source. As such, documents such as NSW Department of Planning's 'Development Near Rail Corridors and Busy Roads (Interim Guideline)' and SEPP Infrastructure are not applicable.

Given this, the building shell will be designed such that external noise impacts (distant traffic, school noise) will be attenuated to noise levels compliant with AS2107, as detailed below.

Table 1 - Summary of Internal Noise Level Criteria

Space	External Noise Intrusion Criteria
Bedroom	35dB(A) _{Leq} (1 hour - night)
Living Areas	40dB(A) _{Leq} (1 hour - day)

4.3 EXTERNAL NOISE MEASUREMENTS

Traffic noise levels at the site were measured using a combination of attended and long-term noise monitoring.

4.3.1 Measurement Equipment

Unattended noise monitoring was conducted using one Acoustic Research Laboratories Pty Ltd noise logger. The logger was programmed to store 15-minute statistical noise levels throughout the monitoring period. The equipment was calibrated at the beginning and the end of each measurement using a Rion NC-73 calibrator; no significant drift was detected. All measurements were taken on A-weighted fast response mode.

4.3.2 Measurement Location

The long-term logger was installed adjacent to Laitoki Road, as shown in the aerial photograph in section 2.

4.3.3 Measurement Period

Unattended noise monitoring was conducted from Wednesday, 19th September 2018 to 26th September 2018.

4.3.4 Results

Attended and unattended noise measurements have been summarised below.

Table 2 – Unattended Noise Monitor – Traffic Noise Measurements

Location	Time of day	Long Term Traffic Noise Level
Site – At Logger	Day	51dB(A) _{Leq(15hr - Day)} 54dB(A) _{Leq(1hr)}
	Night	45dB(A) _{Leq(9hr - Night)} 51dB(A) _{Leq(1hr)}

4.4 RECOMMENDED CONSTRUCTIONS

Recommended acoustic treatments to the building façade are detailed below.

4.4.1 Glazed Windows and Doors

The following constructions are recommended to comply with the project noise objectives.

Minimum glazing thicknesses and acoustic performance requirements for window/glass door systems are presented 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.

Aluminium frames for any glass doors and windows must achieve the same R_w as the glass which is installed for that window/door.

All external windows and doors listed are required to be fitted with Q-Ion type acoustic seals.

The recommended constructions are listed in the table below.

Table 3 – Recommended Glazing Construction

Space	Recommended Construction	Acoustic Seals
Living Areas	4mm glass	Yes
Bedrooms	4mm glass	Yes
Dining / Lounges / Community rooms	4mm glass	Yes

It is recommended that only window systems having test results indicating compliance with the required ratings obtained in a certified laboratory be used where windows with acoustic seals have been recommended.

Standard glazing construction (4mm glass) will be satisfactory for internal spaces (including café, staff rooms, common spaces) not listed in the above table.

In addition to complying with the minimum scheduled glazing thickness, the R_w rating of the glazing fitted into open-able frames and fixed into the building opening should not be lower than the values listed in Table 4 for all rooms. Where nominated, this will require the use of acoustic seals around

the full perimeter of open-able frames and the frame will need to be sealed into the building opening using a flexible sealant.

Table 4 – Minimum R_w of Glazing (with Acoustic Seals)

Glazing Assembly	Minimum R_w of Installed Window
4mm Float	27

4.4.2 External Roof/Ceiling

Masonry roof constructions are acoustically acceptable and do not require any further treatment.

Recommendations for lightweight roof/ceiling construction are shown in Figure 2 below. Penetrations in all ceilings (such as for light fittings etc.) must be acoustically treated and sealed gap free with a flexible sealant.

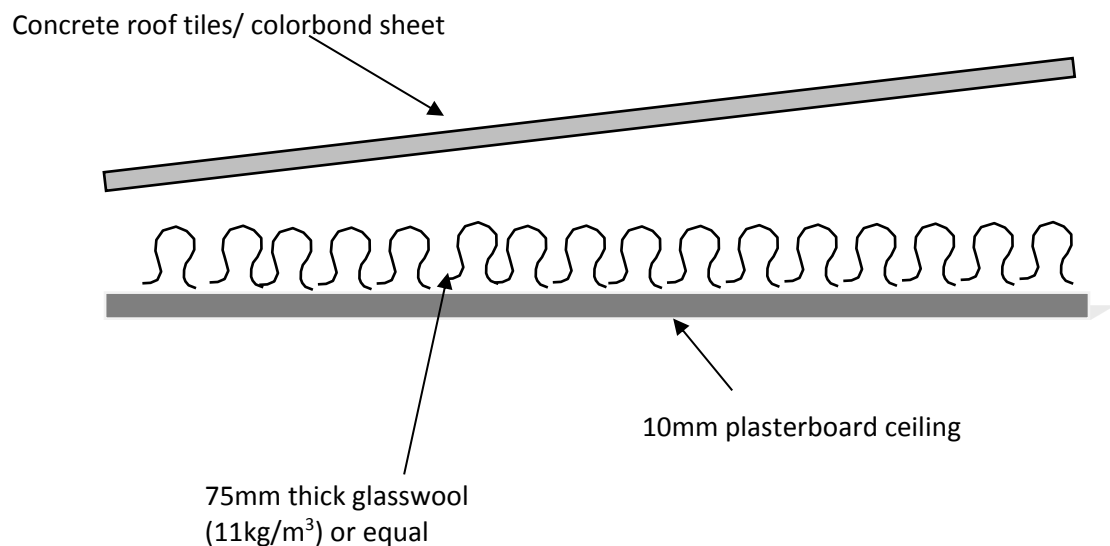


Figure 2: Roof / Ceiling Construction

4.4.3 External Walls

Concrete or masonry external wall construction will not require any upgrade for acoustic purposes.

In the event that light weigh building elements are incorporated, minimum 75mm thick 11kg/m³ glass wool insulation should be incorporated in any external wall cavity.

Lightweight external walls should be constructed as per the following:

Table 5 – External Light Weight Wall and Roof /Ceiling Construction

External Lining	Stud / Truss System	Internal Lining
Timber wall cladding	64mm Timber Stud with 75mm thick 11kg/m ³ glasswool insulation in truss cavity	1 x 10mm plasterboard sheeting
Colorbond wall cladding	64mm Timber Stud with 75mm thick 11kg/m ³ glasswool insulation in truss cavity	1 x 10mm plasterboard sheeting
FC sheet cladding	64mm Timber Stud with 75mm thick 11kg/m ³ glasswool insulation in truss cavity	1 x 10mm plasterboard sheeting

5 NOISE EMISSION ASSESSMENT

Noise emissions from the site have been assessed for noise emitted from base building mechanical plant and operation of the site.

The noise emission from the project site are to comply with the following:

- Warringah Development Control Plan 2011;
- EPA Noise Policy for Industry; and

5.1 BACKGROUND NOISE LEVELS

Acoustic monitoring was conducted at the site to establish the background noise levels which will be used as basis for setting noise emission requirements.

5.1.1 Measurement Equipment

Unattended noise monitoring was conducted using one Acoustic Research Laboratories Pty Ltd noise loggers. The logger was programmed to store 15-minute statistical noise levels throughout the monitoring period. The equipment was calibrated at the beginning and the end of each measurement using a Rion NC-73 calibrator; no significant drift was detected. All measurements were taken on A-weighted fast response mode.

5.1.2 Measurement Location

The logger was installed at the subject site, as shown in the aerial photograph in figure 1.

Background noise levels measured at this location are representative of background noise levels at the adjacent residential developments.

5.1.3 Measurement Period

Unattended noise monitoring was conducted from Wednesday, 19th September to Wednesday, 26th September 2018.

5.1.4 Measured Background Noise Levels

Background noise levels are established from the unattended noise monitoring conducted on site.

NSW EPA's rating background noise level assessment procedure requires determination of background noise level for each day. The Rating Background Noise level is the median of the daily background noise levels measured for the entire monitoring period.

Appendix 1 provides the results of the unattended noise monitoring. Weather affected data was excluded from the assessment.

Summarised rating background noise levels are presented below.

Table 6 – Summarised Rating Background Noise Level

Location	Time of day	Background Noise Level dB(A) _{L₉₀}
Terrey Hills Seniors Living Development Site	Day (7am-6pm)	36
	Evening (6pm-10pm)	33
	Night (10pm-7am)	25

5.2 NOISE EMISSION CRITERIA

5.2.1 Warringah Development Control Plan 2011

Warringah Development Control Plan does not contain any explicit noise criteria for noise emissions. Therefore, the typically adopted NSW EPA Noise Policy for Industry will be adopted.

5.2.2 NSW EPA - Noise Policy for Industry (NPfI)

Noise sources covered by this code include mechanical services noise (the identified potential noise emission source from the site). Both the Intrusiveness and the Project Amenity criteria (as set out below) must be complied with.

5.2.2.1 NPfI - Intrusiveness Noise Goals

Intrusiveness criteria permit noise generation to be no more than 5dB(A) above existing background noise levels. On page 53 of the document, the Noise Policy for Industry indicates that where the background noise level is found to be less than 30 dB(A) for night time periods, the rating background noise level should be set to 30 dB(A).

Background noise levels and intrusiveness criteria are as follows:

Table 7 - EPA Intrusiveness Criteria

Location	Time of Day	Background noise Levels - dB(A) _{L₉₀}	Adjusted Rating Background Noise Levels dB(A) _{L₉₀}	Intrusiveness Noise Objective dB(A) _{L_{eq}(15min)} (Background + 5dB)
Residences Surrounding the Site	Day Time (7am - 6pm)	36	36	41
	Evening (6pm - 10pm)	33	33	38
	Night (10pm - 7am)	25	30	35

5.2.2.2 INP – Project Amenity Goals

Project amenity criteria are determined based on the land use in the area (residential/commercial/industrial). The residential land use is then further categorised into rural, suburban and urban areas. For the purpose of this assessment the existing residential dwellings will be considered rural.

Table 8 -EPA Project Amenity Criteria

Noise Receiver	Amenity Noise Level – dB(A) $L_{Aeq(15min)}$		
	Daytime	Evening	Night
Existing Residences (rural)	48	43	38

5.3 NOISE EMISSION ASSESSMENT/RECOMMENDATIONS

The primary noise source associated with the site will be mechanical plant. Detailed acoustic design should be conducted as construction certificate stage once plant selections are finalised.

Indicative acoustic treatments to primary plant items are as follows:

5.3.1 Supply / Exhaust fans

Supply and exhaust fans may be located within the underground plant rooms or in rooftop plant areas. These units typically emit moderate/high noise levels and require acoustic treatment such as silencers and internal lined ductwork. Silencer requirements would be determined once fan selections have been completed.

5.3.2 Minor Plant

Other minor plant items, such as bathroom or kitchen exhaust fans, may also be required. These items typically emit relatively low noise levels and may require minimal acoustic treatment of a standard nature, such as internally lining of ductwork.

5.3.3 Condenser, Heating and Reverse Cycling Air Conditioners

The location of heating/cooling units is the most important factor to ensure noise is not going to be intrusive. The location and selection of the proposed units associated with the development will be conducted such that noise impact to both the future residential tenancies and existing receivers will comply with the relevant EPA criteria of the noise standard less 5dB(A) and compliance with this standard inside any other unit in the same development.

Noise emissions from all mechanical services to the nearest residential receivers should comply with the requirements of section 5.2.

6 CONCLUSION

This report presents an acoustic assessment of noise impacts associated with the proposed development at Terrey Hills Seniors Living Development.

Provided that the treatments set out in section 4.4 of this report are implemented, internal noise levels (as a result of traffic noise impacts) will comply with the requirements below:

- Warringah DCP 2011; and
- Australian and New Zealand AS/NZS 2107:2016.

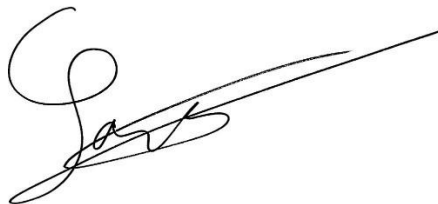
External noise emissions criteria have been set out in this report to satisfy the requirements from the following documents;

- Warringah DCP 2011 and
- NSW EPA Noise Policy for Industry (NPfI).

Provided that the recommendations set out in section 5.3 of the report are adopted, noise emission goals for the development will be achieved.

Please contact us should you have any further queries.

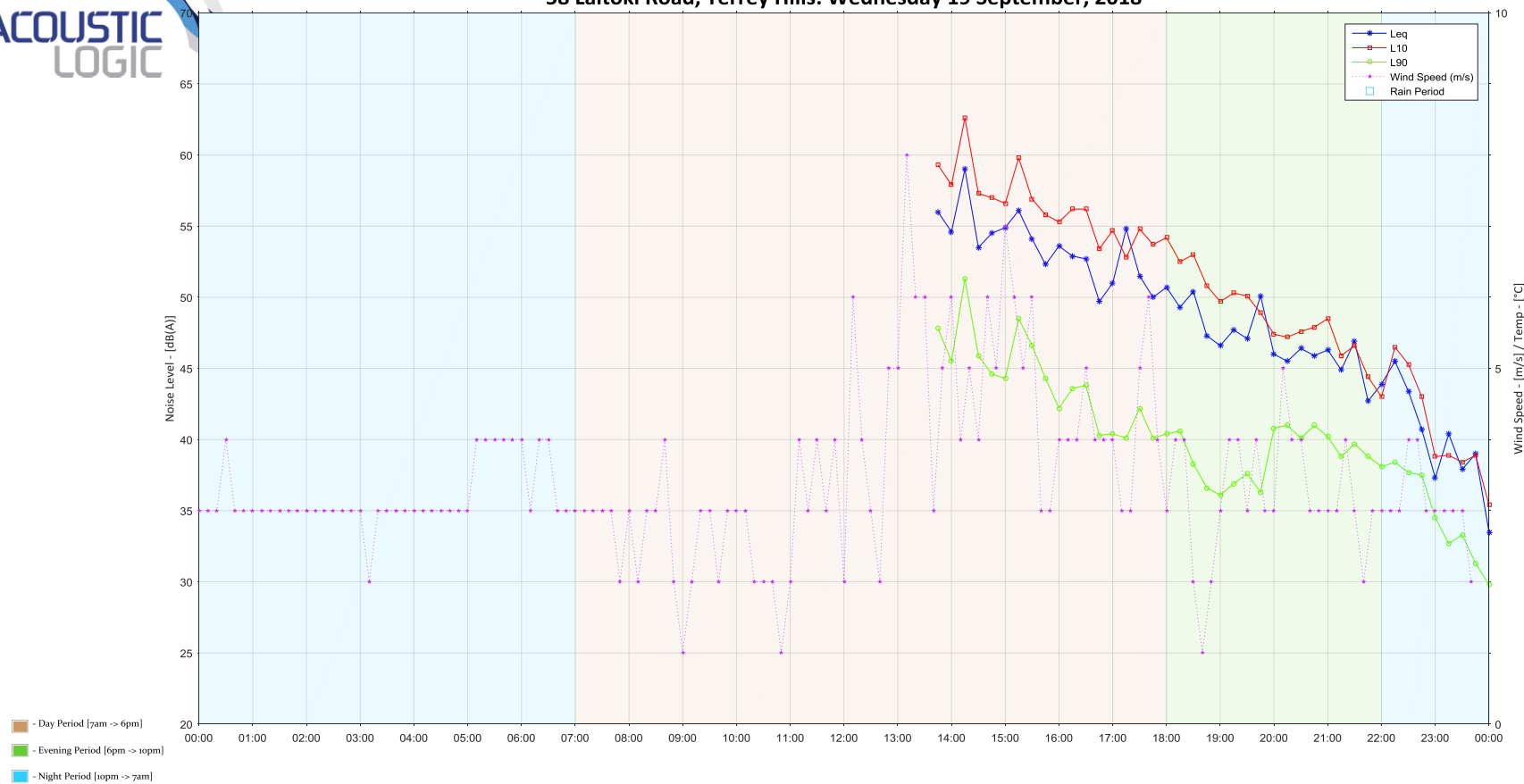
Yours faithfully,

A handwritten signature in black ink, appearing to read 'Remi Larmandieu', with a long horizontal flourish extending to the right.

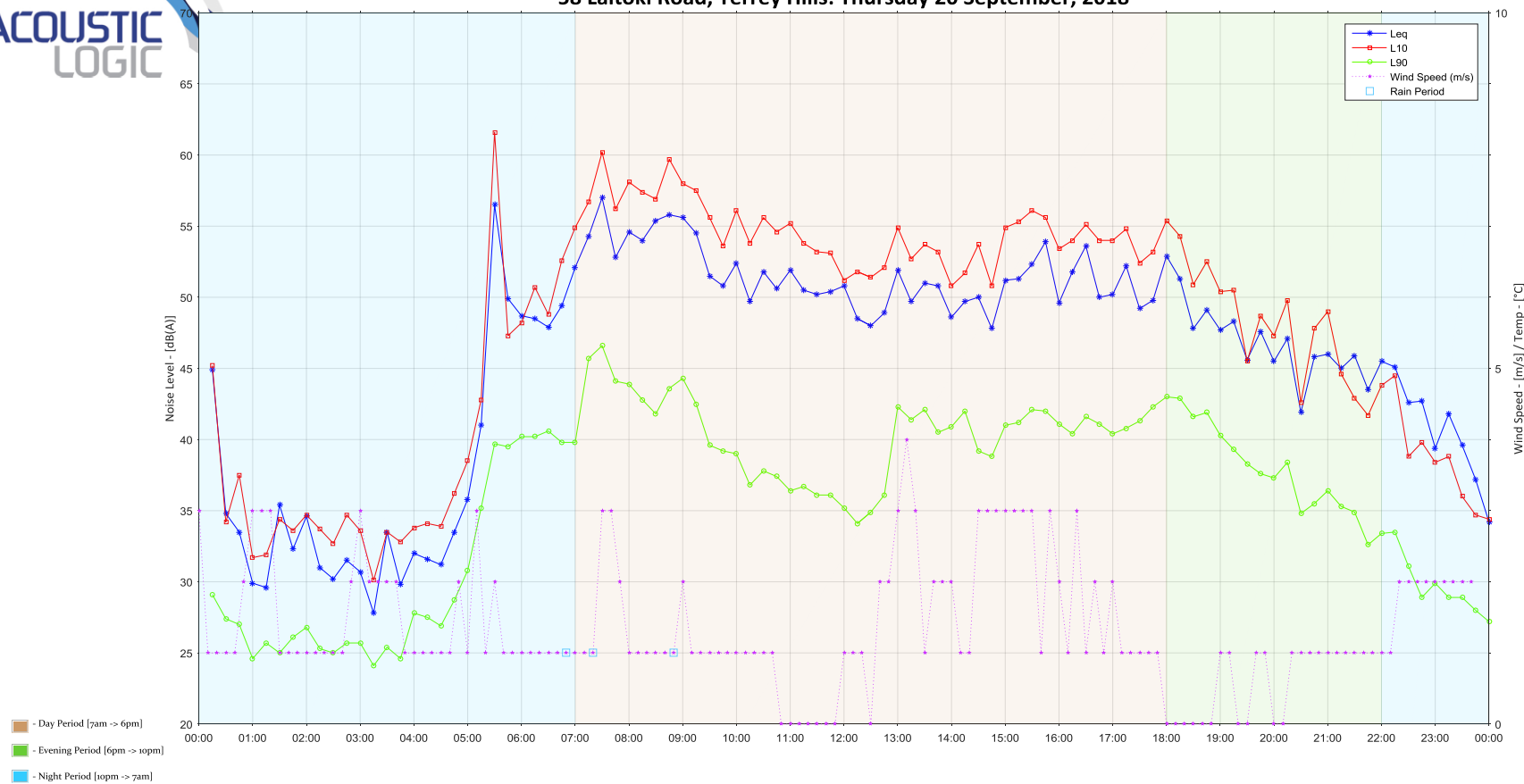
Remi Larmandieu

APPENDIX 1 – UNATTENDED NOISE MONITORING DATA

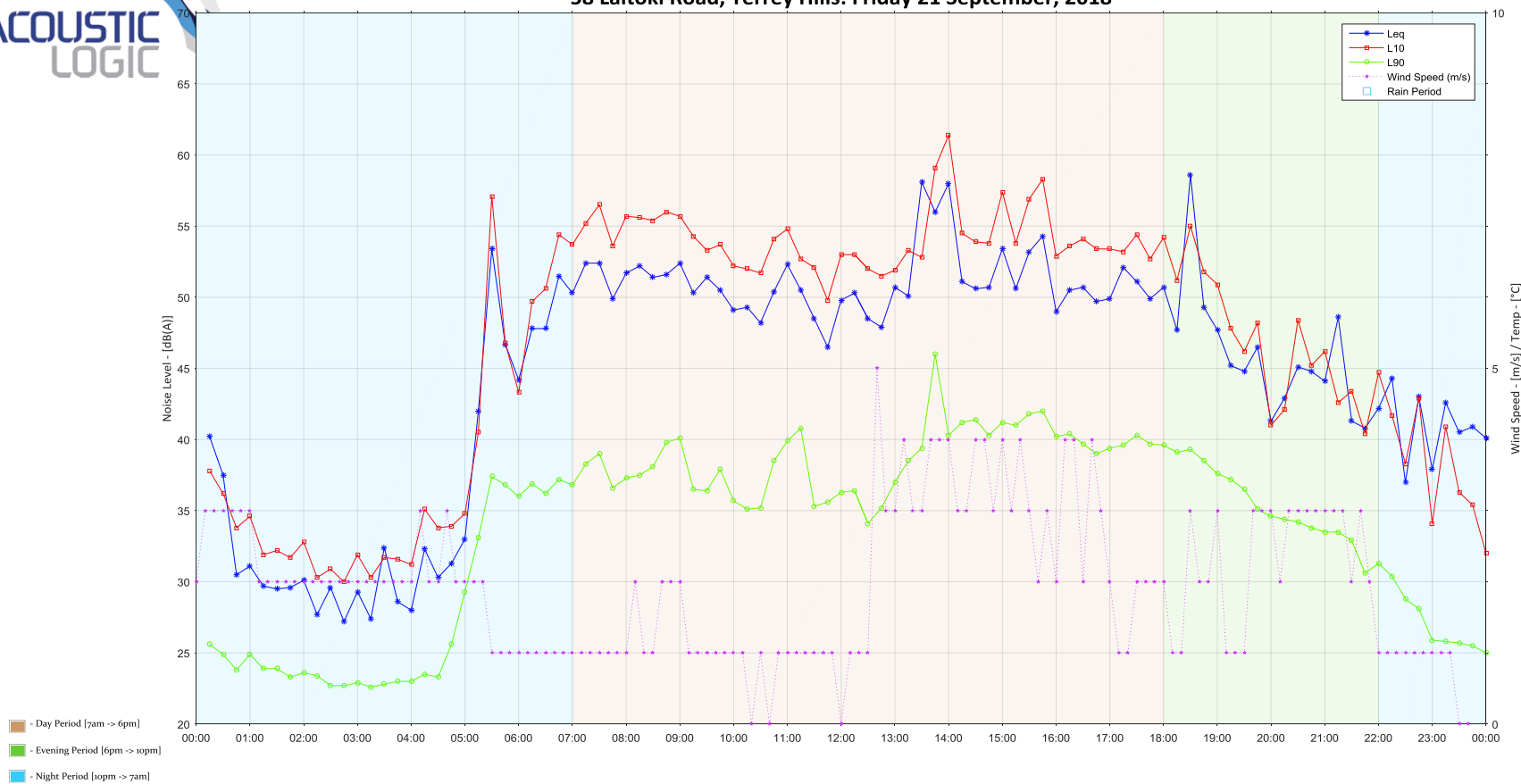
58 Laitoki Road, Terrey Hills: Wednesday 19 September, 2018



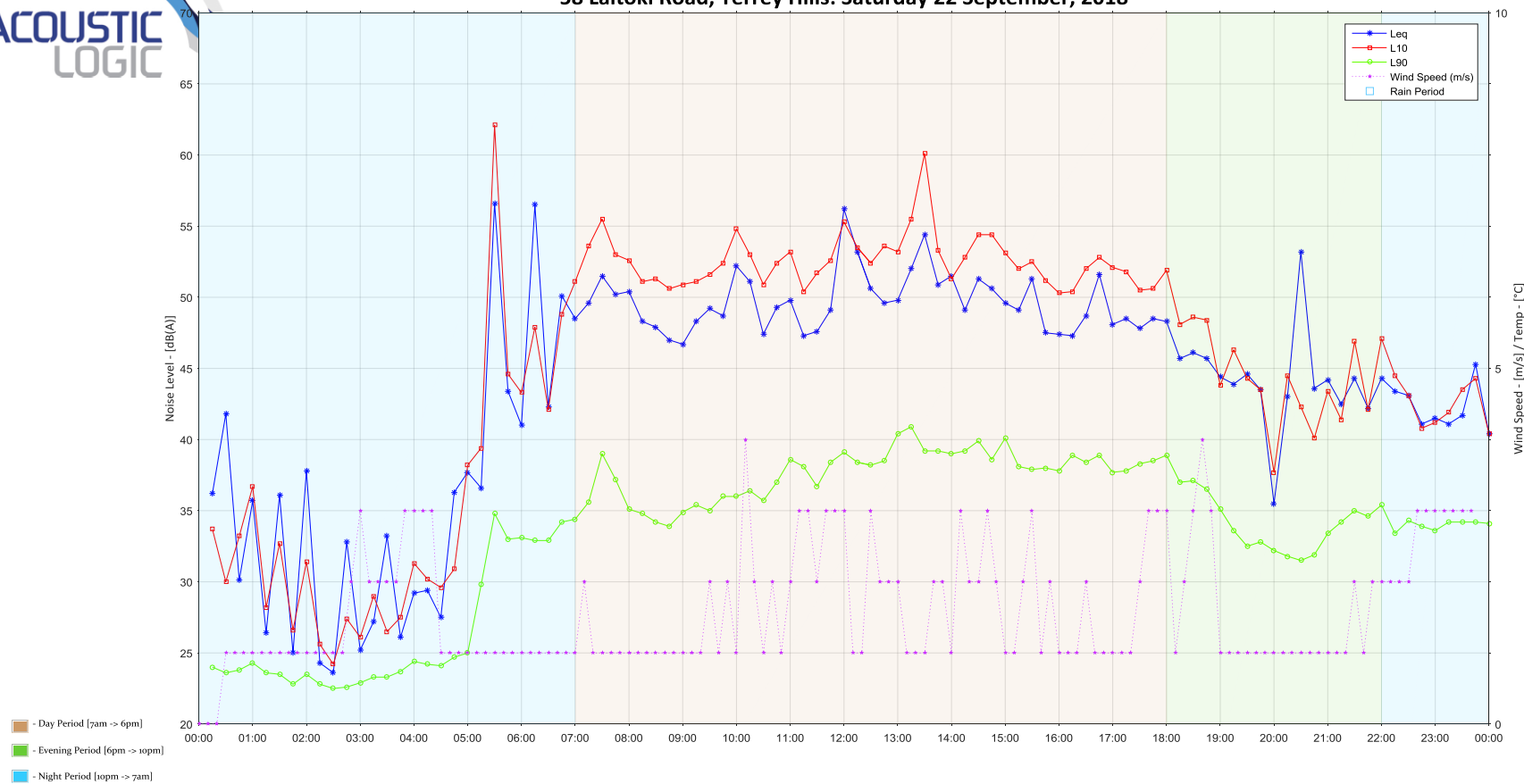
58 Laitoki Road, Terrey Hills: Thursday 20 September, 2018



58 Laitoki Road, Terrey Hills: Friday 21 September, 2018

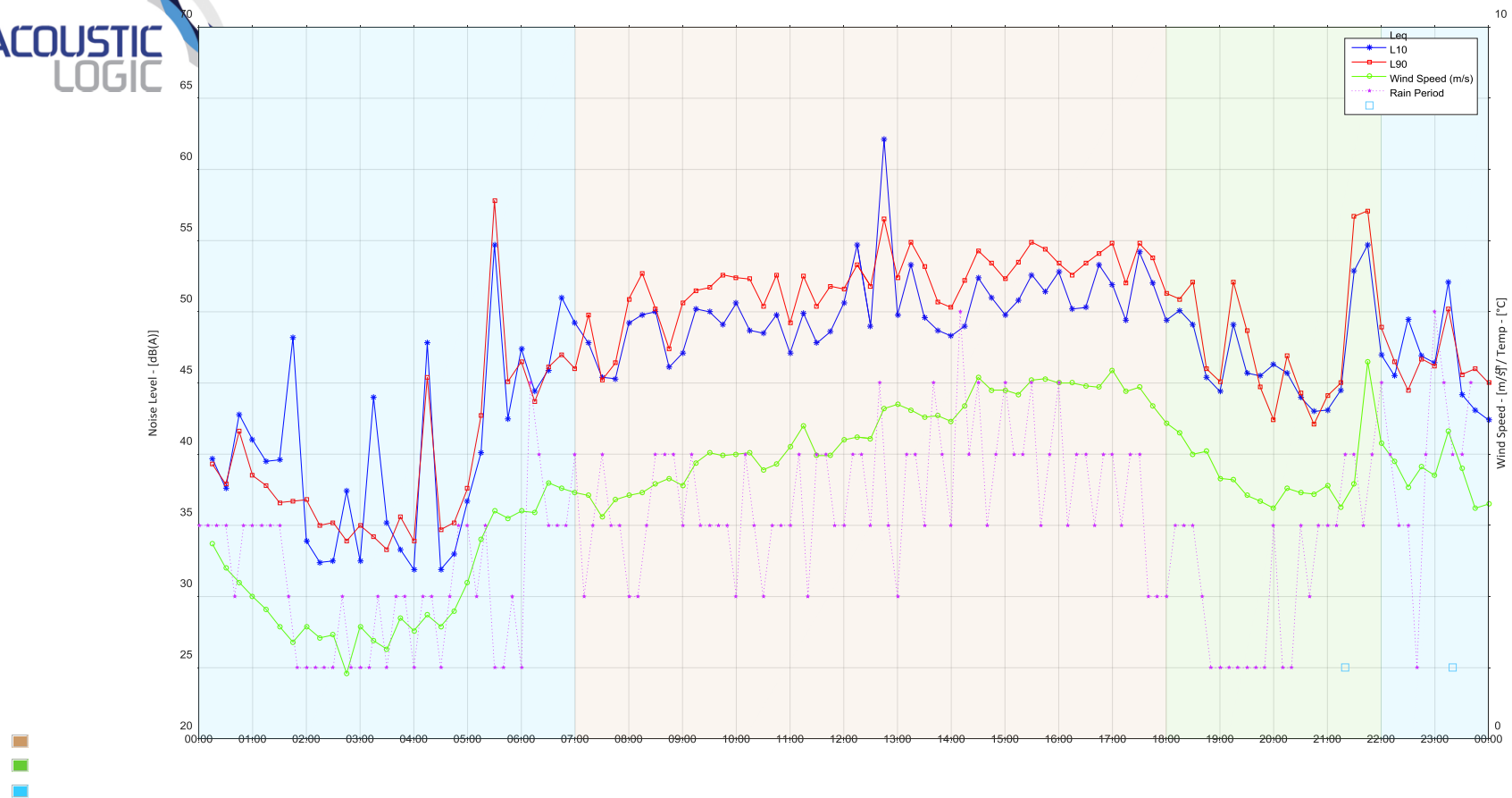


58 Laitoki Road, Terrey Hills: Saturday 22 September, 2018

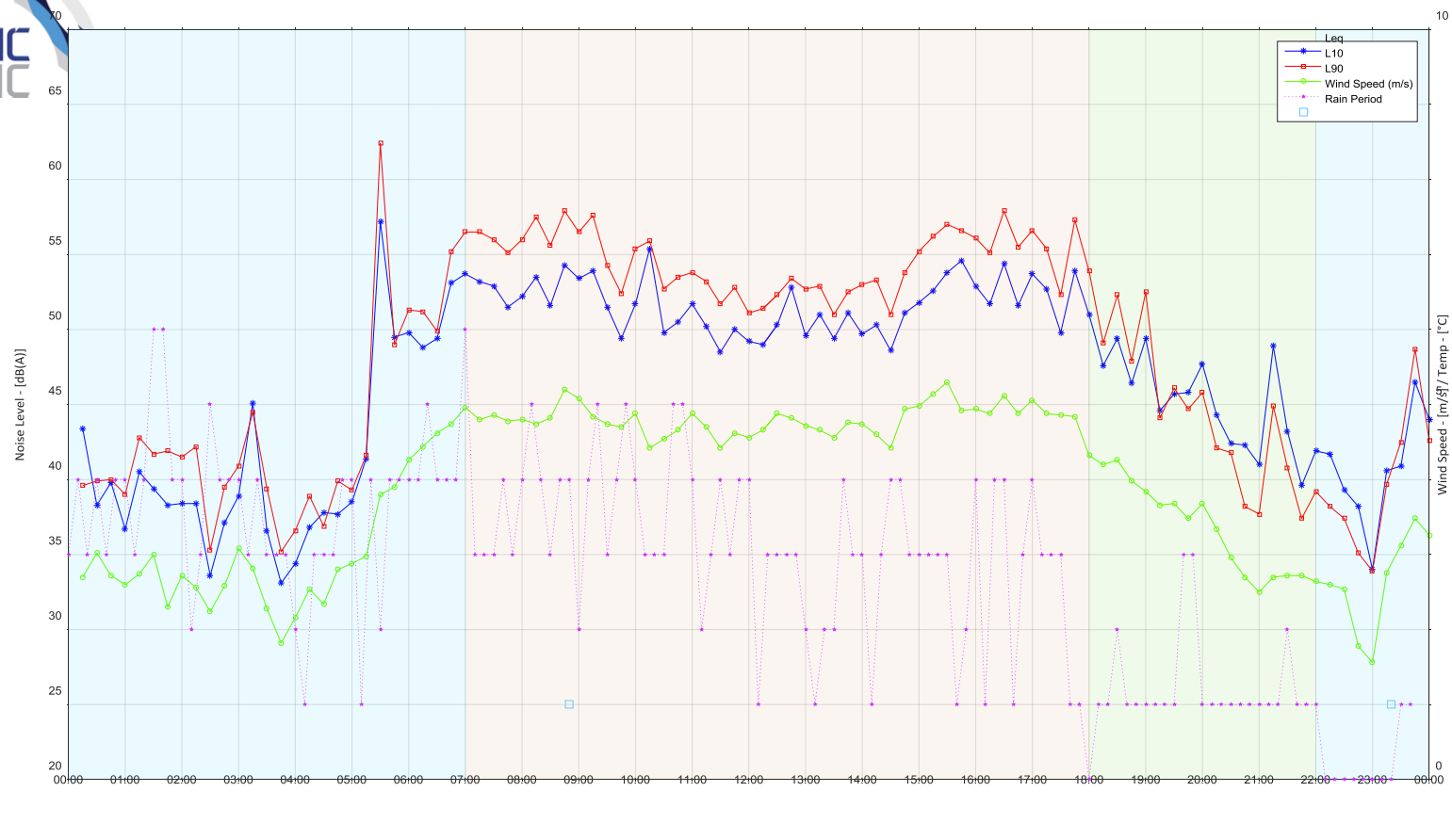




58 Laitoki Road, Terrey Hills: Sunday 23 September, 2018

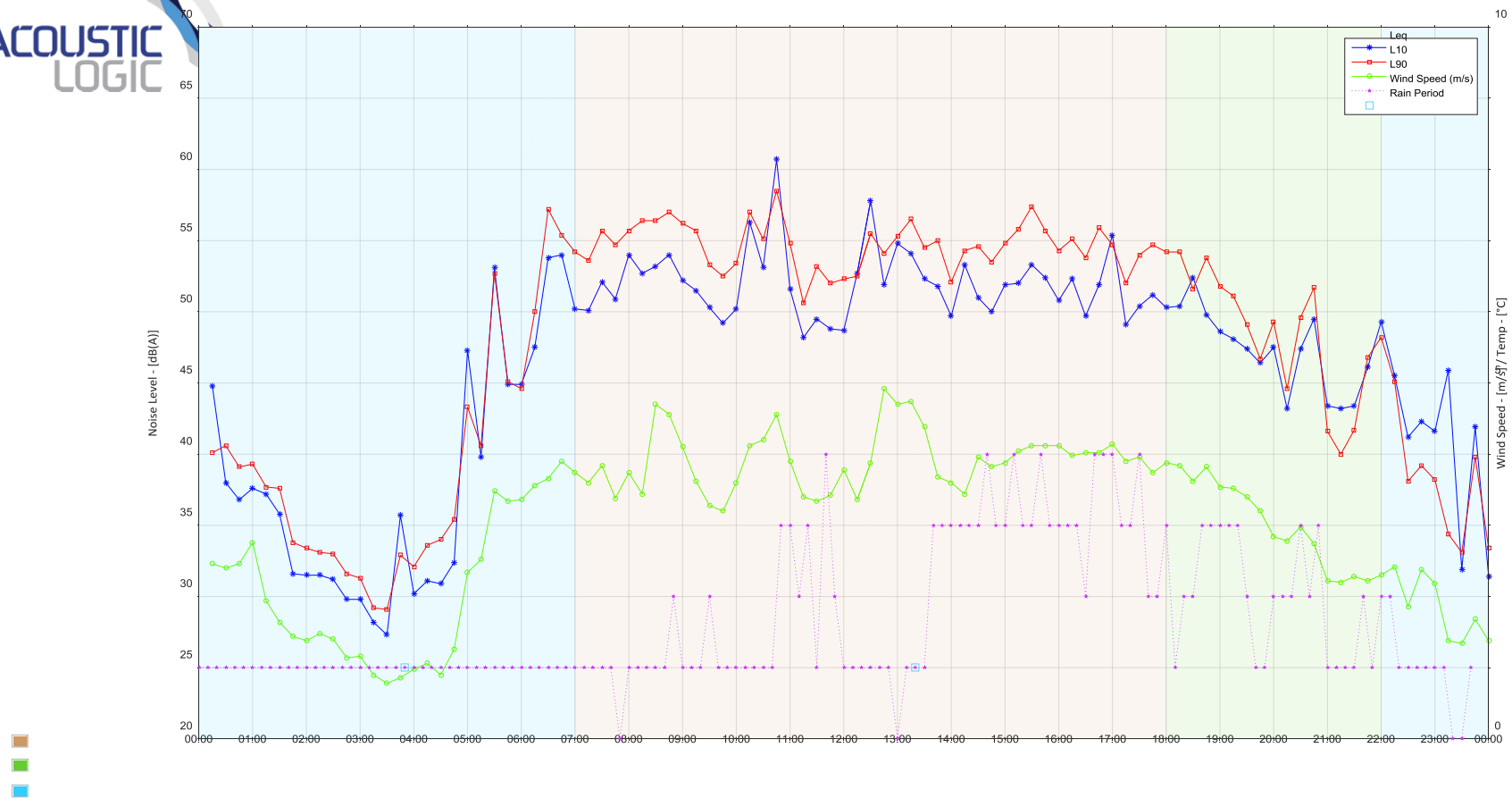


58 Laitoki Road, Terrey Hills: Monday 24 September, 2018





58 Laitoki Road, Terrey Hills: Tuesday 25 September, 2018



58 Laitoki Road, Terrey Hills: Wednesday 26 September, 2018

