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Noise Impact Assessment

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EXECUTIVE SUMMARY

This report presents an assessment of noise impacts associated with the proposed residential development at 67-75 Lords Road, Leichhardt. A review of noise intrusion from external noise sources and its effect on residential amenity has been conducted, including noise from:

- Aircraft noise (Sydney Airport's main north-south runway flight path);
- Noise emissions from activities carried out on the adjacent APIA Leichhardt Tigers Football Club playing field (Lambert Park);
- Road traffic (Marion Street) and;
- Rail noise (L1 Sydney light rail-line).

Noise impacts have been assessed using the relevant Australian Standards, and relevant NSW and Council guidelines including:

- AS 2021 – 2015 "*Aircraft Noise Intrusion – Building Siting and Construction*" – Aircraft noise
- AS 2107 - 2016 Acoustics – *"Recommended design sound level and reverberation times for building interiors"* – Park noise emissions
- NSW Infrastructure SEPP – Road and rail noise
- Inner West Council (Leichhardt Council) Development Control Plan (DCP) 2013
- NSW Department of Planning – "*Development near Rail Corridors and Busy Roads –Interim Guideline"* – Road and rail noise

Extensive long and short-term noise monitoring was conducted at the site to quantify existing noise exposure from rail, road and park noise emissions at the site, including match and other activities carried out at Lambert Park. Data obtained from the monitoring was used to calibrate a computer (SoundPlan) model of the site and the main noise sources. Noise levels outside all the future dwellings were modelled so that potential noise impacts at all the proposed dwellings could be determined.

The proposed development includes measures to mitigate noise impacts including:

- The residential building proposed along the northern site boundary will have a solid façade facing Lambert Park. For this building, the orientation of the openings away from the Park addresses noise impacts from the Park, and the building also largely screens the remainder of the site from this noise source.

- Other dwellings will have wintergardens that will act as a noise buffer to habitable spaces.

- Acoustically rated glazing is proposed in addition to the above measures.

The assessment indicates that with these measures in place the requirements of all relevant noise-related planning instruments will be satisfied, and the future dwellings will provide an acceptable level of acoustic amenity. In particular, noise from the operation of Lambert Park will not adversely impact any of the proposed dwellings.

TABLE OF CONTENTS

1 INTRODUCTION

This report presents an analysis of noise impacts associated with the proposed development at 67-75 Lords Road, Leichhardt.

The following will be addressed in this report:

- Conduct an external transportation noise impact assessment (primarily rail-traffic and aircraft noise) and recommend acoustic treatments to ensure that a reasonable level of amenity is achieved for future tenants.
- Assess potential noise impacts from the adjacent sporting field, Lambert Park.
- Identify potential noise sources generated by the site and determine noise emission goals for the development to meet local council acoustic requirements to ensure that nearby developments are not adversely impacted.

This report has been based on the master plan drawing set prepared by Stewart Hollenstein & Matthew Pullinger Architects dated July 2018 as listed below.

Table 1.1 – Drawing Set for Review

Drawing Title	Plot Date
05 Indicative Ground Level Master Plan	July 2018
05 Illustrative Master Plan	July 2018
05 Cross Sections	July 2018
05 3D Building Envelope	July 2018

2 SITE DESCRIPTION

The proposed development is located at 67-75 Lords Road, Leichhardt and involves the demolition of the existing structures at the site to make way for a mixed use residential and commercial development.

The development includes the construction of five buildings at the site, each 3-9 levels high with 1-2 levels of basement car parking below. The proposed development contains approximately 235 dwellings distributed between the five buildings totalling 22,482m^2 of habitable residential floor area with approximately 3,000m^2 of non-residential floor area.

The most significant noise sources near the site is associated with the following:

- Aircraft noise from Sydney Airport's main north-south runway flight path;
- Road traffic noise from Marion Street, approximately 90m to the north of the site;
- Rail noise from the L1 Sydney light rail-line lining the western boundary of the site, and;
- Noise associated with the use of the APIA Leichhardt Tigers Football Club playing field (Lambert Park) that borders the north boundary of the proposed development.

The nearest affected noise sensitive receivers near the site include the following:

- 12 residential dwellings on the eastern side of Davies Lane, at 2-28 Davies Street;
- Several residential dwellings located across Lords Road to the south of the site at 17-27 Kegworth Street.

Long term noise monitoring has been conducted at the site at the locations indicated below to determine the environmental noise levels present at the site. In addition to the long-term monitoring data, ALC has conducted short-term attended measurements to determine the spectral characteristics of the external noise impacting the site.

Refer to figure 2.1 for a satellite image of the proposed site and the relative location of all noise sources and receivers.

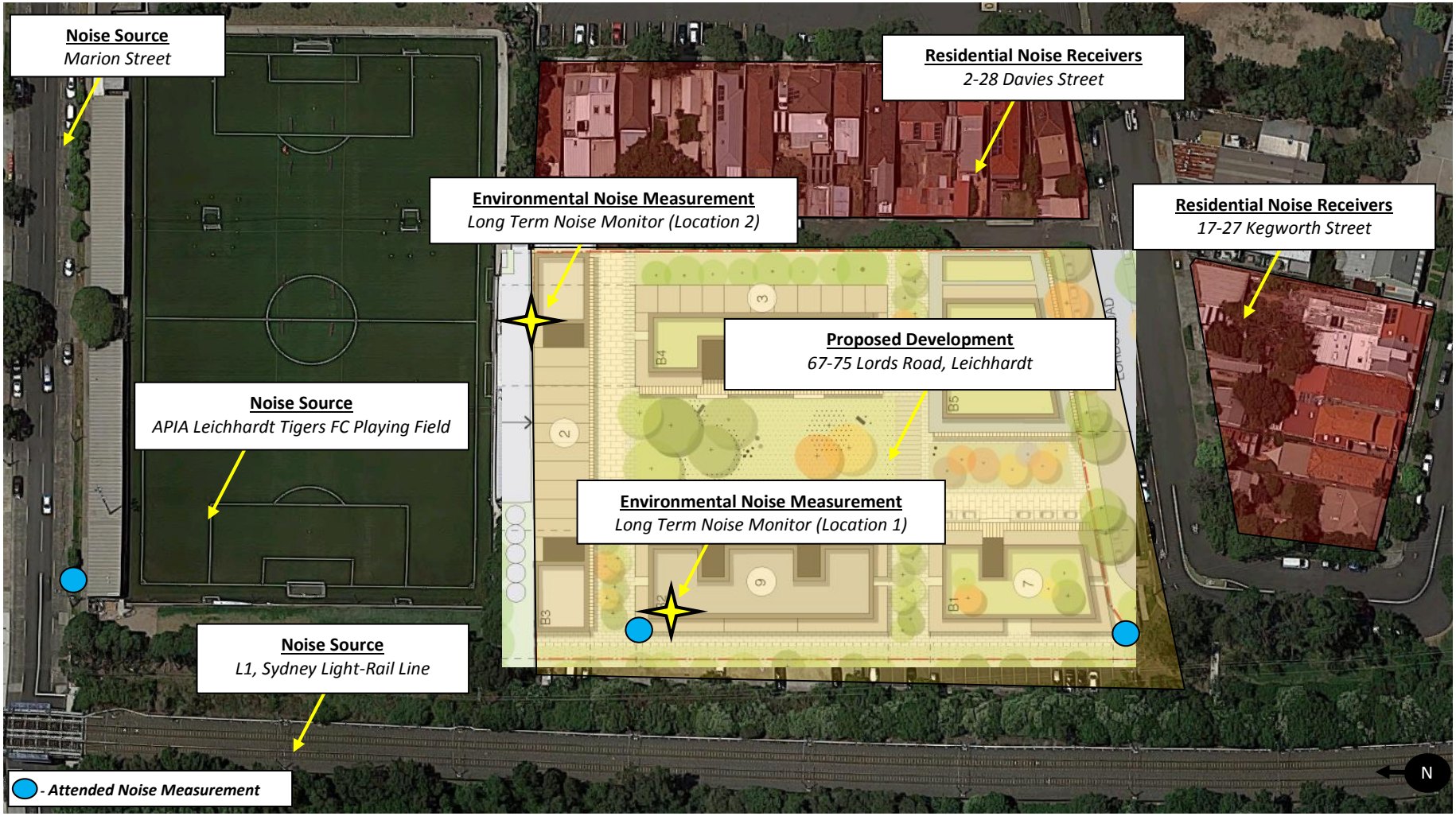


Figure 2.1 – 67-75 Lords Road, Leichhardt – Site Description

3 NOISE DESCRIPTORS

Traffic (and other environmental noise) 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.

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 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 at 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.

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 NOISE INTRUSION ASSESSMENT

The most significant noise sources near the site is associated with the following:

- Aircraft noise from Sydney Airport's Main Runway flight path;
- Road traffic noise from Marion Street, approximately 90m to the north of the site;
- Rail noise from the L1 Sydney light rail-line lining the western boundary of the site, and;
- Noise associated with the use of the APIA Leichhardt Tigers Football Club (Lambert Park) playing field lining the north boundary of the proposed site.

The proposed Lords Road site sits outside the ANEF 25 aircraft noise contour as shown on the Sydney Airport 2033 ANEF contours map, indicating the site is conditionally acceptable for commercial and residential development. However, as the Sydney Airport Main-Runway curved flight path passes over the development the building envelope needs to provide suitable attenuation to control aircraft noise levels within the buildings.

Marion Street, approximately 90m to the north of the proposed site, is listed as a "*Regional Road*" on map No. 15 of the traffic volume maps for the Infrastructure SEPP; indicating that a road-noise impact assessment is not mandatory for nearby development. Notwithstanding, traffic noise impacts from Marion Street to the proposed residential dwellings has been assessed.

We note the L1 Sydney Light Rail Line runs the western boundary of the site approximately 10m from the boundary. Therefore, an assessment of noise intrusion is mandatory under the State Environmental Planning Policy (Infrastructure SEPP) which nominates internal noise levels based on noise levels averaged over 15 and 9 hours for the day and night periods respectively.

In addition to the above, an assessment of noise from Lambert Park will be conducted to ensure noise impacts on the amenity of the residential receivers is not affected while the field is in use.

The following sections present the noise intrusion criteria applicable at the site, the details of all noise monitoring conducted at the site and the recommended acoustic treatments to reduce internal noise levels to comply with the relevant noise intrusion criteria.

4.1 MEASURED NOISE LEVELS

Environmental noise monitoring was conducted at the site of the proposed development to determine the noise levels extant at the proposed façade.

Measurements were performed generally in accordance with the Australian Standard AS1055 – "*Description and measurement of environmental noise – General Procedures*".

4.1.1 Measurement Locations

The on-site measurements were conducted at the locations shown in figure 2.1.

Noise monitoring was conducted along the northern and eastern boundary of the proposed site. Additionally, attended measurements were also conducted at the location of the nearest noise sources (Road traffic and light-rail noise) to determine the spectral characteristics of the environmental noise impacting the site.

4.1.2 Measurement Period

The attended noise measurements were taken on Wednesday 18th July 2018 between 4:00pm and 5:00pm. Long term noise monitoring was conducted on site from Wednesday 18th July 2018 – Thursday 26th July 2018 and Friday 3rd August 2018 – Saturday 11th August 2018.

4.1.3 Measurement Equipment

Attended noise measurements were conducted using a Norsonic 140 sound level analyser, set to A-weighted fast response. The sound level analyser was calibrated before and after the measurements, no significant drift was noted.

Monitoring was conducted using 2 Acoustic Research Laboratories (ARL) NGARA noise monitors set to A-weighted fast response. The monitors were calibrated at the start and end of the monitoring period using a Rion NC-75 calibrator. No significant drift was noted.

Noise logger data is provided in Appendix B.

4.1.4 Measurement Results

The traffic noise levels listed in the table below were determined based on the short-term attended measurements and the long-term noise monitoring conducted on site. In determination of acoustic treatments at each façade, the measured level is adjusted for distance and orientation and any barrier effects applicable in the design.

Table 4.1 – Measured External Noise Levels

Measurement Location	Measurement Time	Measured Noise level
Monitoring Location 1	Day (7am – 10pm)	61dB(A)$L_{eq(15hr)}$ / 64dB(A)$L_{eq(1hr)}$
	Night (10pm – 7am)	55dB(A)$L_{eq(9Hr)}$ / 60dB(A)$L_{eq(1hr)}$
Monitoring Location 2	Day (7am – 10pm)	63dB(A)$L_{eq(15hr)}$ / 66dB(A)$L_{eq(1hr)}$
	Night (10pm – 7am)	55dB(A)$L_{eq(9Hr)}$ / 60dB(A)$L_{eq(1hr)}$
Attended Measurement Marion Road @ 2m	Day (Peak-Hour)	70dB(A)$L_{eq(15min)}$
Attended Measurement L1 Light Rail @ 20m	During Rail Movement	68dB(A)L_{max}

A complete record of the noise levels recorded on site can be found in Appendix A.

The SoundPlan™ noise models developed for the site have been calibrated for the noise measurements recorded surrounding the proposed development as detailed in the table above. The noise contour plots are presented in Appendix A and present two noise impact scenarios as below:

1) Road and rail noise impacts from Marion Road to the north of the site and the L1 light-rail line along the western boundary of the site.

2) Noise impacts from noise associated with the use of the Lambert Park playing field.

4.2 ASSESSMENT CRITERIA

The following documents were used to determine the project criteria for noise intrusion into the development:

- Inner West Council (Leichhardt Council) Development Control Plan (DCP) 2013
- NSW Department of Planning – "*Development near Rail Corridors and Busy Roads –Interim Guideline".*
- AS2107 – 2016 Acoustics – *"Recommended design sound level and reverberation times for building interiors"*
- AS 2021 – 2015 "*Aircraft Noise Intrusion – Building Siting and Construction*"

The standards and the application of the criteria is presented in the following sections.

4.2.1 Inner West Council (Leichhardt Council) DCP 2013

Section C3.12 – Acoustic Privacy, contained in the Inner West Council (Leichhardt Council) DCP 2013 has the following controls regarding external noise impacts on residential development.

C3.12 ACOUSTIC PRIVACY

C2 Buildings that are exposed to high levels of external noise are designed and constructed in accordance with *AS3671 – Acoustics – Road Traffic Noise Intrusion*, *AS2107:2016 – Recommended Design Sound Levels and Reverberation Times for Building Interiors*, and *AS2021-2015 – Acoustics – Aircraft Noise Intrusion – Building siting and construction*.

4.2.2 State Environmental Planning Policy (SEPP Infrastructure) 2007

As the development is located adjacent to a rail-line the provisions of the State Environmental Planning Policy (Infrastructure SEPP) 2007, additionally applies at this site.

Clause 102 & Clause 87 of the SEPP states:

> *"This clause applies to development for any of the following purposes that is on land in or adjacent to, a rail corridor (Clause 87) OR a 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) (Clause 102) and that the consent authority considers is likely to be adversely affected by road noise or vibration:*
>
> *(a) a building for residential use,*
>
> *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."*

4.2.1 Australian Standard AS 2107:2016

Australian Standard 2107:2016 – "*Recommended Design Sound Levels and Reverberation Times for Building Interiors*", will be used to establish the internal noise levels for the residential areas of the development for noise impacts from the playing field, in addition to the non-habitable areas of the development and the ground floor commercial tenancies.

Table 4.2 – Recommended Design Sound Levels for Residential & Commercial Spaces

Space /Activity Type	Recommended Maximum Design Sound Level dB(A)L_{eq}
Sleeping Areas	35 to 40
Living Areas	40 to 45
Apartment Common Areas (e.g. foyer, lift lobby etc.)	50
Small Retail Stores	Less than 50

4.2.2 AS2021:2015 – Aircraft Noise Intrusion – Building Siting and Construction

AS2021 states that a full evaluation of internal noise levels should be carried out for locations with an aircraft noise exposure close to or exceeding ANEF 20. This full evaluation requires an examination of likely levels of internal noise from aircraft flyovers.

We note that the site at 67-75 Lords Road, Leichhardt is outside the ANEF 20 contour as shown in the Sydney Airport Draft 2033 ANEF chart, however the site lies between the ANEF 20-25 contour on the 2029 ANEF chart. Based on this, the site should be considered "*conditionally acceptable"* for residential use. As such, an evaluation of aircraft noise intrusion should be conducted at the site.

AS2021 stipulates the internal noise levels listed in the table below for residential and commercial buildings. These levels will be used to assess aircraft noise intrusion into the residential and commercial areas of the development.

Table 4.3 – Aircraft Noise Levels Inside Residential & Commercial Buildings

Space /Activity Type	Recommended Design Sound Level dB(A)L_{max}
Sleeping areas, dedicated lounges	50dB(A)L_{max}
Other habitable spaces	55dB(A)L_{max}
Bathrooms, toilets, laundries	60dB(A)L_{max}
Open Offices	65dB(A)L_{max}
Private Offices	55dB(A)L_{max}

4.3 AIRCRAFT NOISE ASSESSMENT

Aircraft noise levels at the site were determined using AS2021-2015. The Standard gives aircraft noise levels for aircraft landing and taking off for locations near airports. The location of the runways was obtained from the Sydney Airport ANEF 2033.

Based on the distance from the property at Lords Road, Leichhardt to the main Sydney Airport runway and the Sydney Airport flight paths (ANEF-2033); AS2021 predicts that the loudest typical aircraft movement will be from an Airbus A330 aircraft taking off from the Main Runway. The noise level at the Lords Road site, as indicated by the standard, is 72dB(A)L_{max}. This noise level will be used to predict the resultant internal noise levels at the development.

4.3.1 Recommended Constructions to Control Aircraft Noise

Internal noise levels will primarily be a result of noise transfer through the windows and doors as these are relatively light building elements that offer less resistance to the transmission of sound. Noise transfer through any masonry elements will not be significant and need not be considered further. **Any lightweight constructions will need to be reviewed and assessed at a later stage prior to construction.**

4.3.2 Glazed Windows

A preliminary review of noise intrusion from all external noise sources has revealed that compliance with acoustic guidelines is achievable with mostly single glazed windows with acoustic seals. Exact glazing thicknesses and acoustic treatments are to be determined after window sizing and room layouts are finalised in the detailed design phase of the project. All recommendations are based on noise levels measured on site. Noise levels have been adjusted based on distances from any major noise source, any barrier effects from objects in the direct path of the sound source and the orientation of the building façade with respect to the sound source.

Table 4.4 – Typical Glazing Construction Recommendations – Residential Areas

<table>
<tr><th>Facade</th><th>Room</th><th>Glazing requirements</th></tr>
<tr><td rowspan="3">Any</td><td>Bedrooms</td><td rowspan="2"><u>Option 1:</u>
Single layer of medium to heavy-weight laminated glazing with acoustic seals
<u>Option 2:</u>
Wintergarden balconies with single layer of medium-weight laminated glazing to “internal” windows and single layer light-weight glazing to external façade.</td></tr>
<tr><td>Living Rooms</td></tr>
<tr><td>Common Areas / Corridors</td><td>Light to medium weight single glazed windows with acoustic seals</td></tr>
</table>

Table 4.5 – Typical Glazing Construction Recommendations – Commercial Areas

Façade	Room	Glazing requirements
Any	Open Offices	Light to medium weight single glazed windows with acoustic seals
	Showrooms	
	Private Offices	Medium to heavy weight single glazed windows with acoustic seals

The glazing thicknesses recommended are those needed to satisfy acoustic requirements and do not consider other requirements such as structural, safety or other considerations.

4.3.3 External Walls

Noise intrusion through the external masonry walls will be negligible and will not contribute to internal noise levels.

If any light weight wall systems are incorporated into the final design, any such wall should be first approved by the acoustic consultant prior to construction.

4.3.4 Roof / Ceiling Construction

Areas where there is proposed to be concrete slab roofing is acoustically acceptable and the roof/ceiling below will not need to be acoustically upgraded for reasons related to external noise intrusion.

In the event an alternative, light-weight, system is proposed in the final design, acoustic treatments to these areas would be subject to investigation in the detailed design phase of the project.

4.4 LIGHT RAIL NOISE ASSESSMENT

Façade noise levels due to light rail operations have been predicted from the long-term monitoring results. The most affected façade would experience noise levels of 61dB(A)$L_{eq,15hr}$ and 55dB(A)$L_{eq,9hr}$.

The constructions needed to control aircraft noise will also achieve noise levels within the dwellings required by the Infrastructure SEPP.

4.5 ROAD TRAFFIC NOISE ASSESSMENT

Façade noise levels due to road traffic have been predicted from the long-term monitoring results. The most affected façade would experience noise levels of 61dB(A)$L_{eq,15hr}$ and 53dB(A)$L_{eq,9hr}$.

The constructions needed to control aircraft noise will also achieve noise levels within the dwellings recommended by the Infrastructure SEPP and in compliance with the recommendations of AS2107/AS 3671.

4.6 LAMBERT PARK NOISE ASSESSMENT

The long-term noise monitoring data indicates that the loudest typical $L_{eq(15\ min)}$ noise level recorded during use of the field is 65 dB(A)$L_{eq(15\ min)}$ at the location of the monitor. This level has been used to calibrate a SoundPlan™ computer noise model of noise contours from the use of the park at the façades of the proposed development. The model is able to predict noise levels around the site with the future buildings in place, including a prediction of the noise levels at the top of the proposed light-well within the northern-most building at the site.

The noise levels have been calibrated to the loudest typical $L_{eq,15minute}$ noise levels measured when the park was in operation, as confirmed by reviewing the recorded audio files, and therefore represents a typical worst case. For the purposes of the modelling it was assumed that this noise level was due to crowd cheers from the grandstand located on the northern side of the field. This assumption provides the most conservative (I.e. worst case) assessment of impact.

Noise contours obtained from the modelling are presented in Appendix A and are summarised below.

- The north, west and east facing walls of the proposed non-residential block on the northern boundary are proposed to be solid walls. Noise incident on these facades can be readily controlled by solid building elements.

- The highest noise level outside facades which are proposed to contain windows occurs near the top of the higher buildings closest to the field where a maximum facade level of 63 dB(A) is predicted. However, the vast majority of facades will be exposed to noise levels less than 60 dB(A).

- Based on the modelled noise levels, the constructions needed to control aircraft noise (with windows closed) will also achieve noise levels within the buildings complying with the levels recommended in AS2107. Therefore, additional façade noise treatment is not needed to control noise impacts from Lambert Park.

4.7 VENTILATION

With respect to natural ventilation of the occupied living spaces of the development, the Australian Standard AS 2021 – 2015 "*Aircraft Noise Intrusion – Building Siting and Construction*" states that:

> *"Buildings on sites determined to be 'conditionally acceptable' under clause 2.2 should be designed such that the Aircraft Noise Reductions (ANR) values determined under clause 3.2.2 are achieved for all internal spaces. In general, this will require that external windows and doors be kept closed, since if these are opened for ventilation purposes the aircraft noise reduction of the building envelope will be significantly reduced. If it is necessary to close windows and doors to comply with this standard, building ventilation should be in accordance with the National Construction Code on the assumption that windows and doors are not openable. Mechanical ventilation or air-conditioning systems complying with AS1668.2 should be installed."*

With windows (or doors) open, the allowable internal noise goals specified in AS 2021 – 2015 "*Aircraft Noise Intrusion – Building Siting and Construction*" will not be achieved and therefore ventilation systems complying with the standard are required for all habitable rooms in dwellings.

Furthermore, the NSW Department of Planning document "*Development near Busy Roads and Rail Corridors - Interim Guideline"* states the following with respect to natural ventilation of buildings adjacent to rail corridors and busy roads:

> *"If internal noise levels with windows or doors open exceed the criteria by more than 10dB(A), the design of the ventilation for these rooms should be such that occupants can leave windows closed, if they so desire, and also to meet the ventilation requirements of the Building Code of Australia."*

With windows open, the allowable internal noise goal is therefore permitted to be 10dB(A) higher than when the windows are closed (i.e. the allowable noise intrusion level in bedrooms becomes 45dB(A), and 50dB(A) in living rooms).

Light rail noise levels within the dwellings and natural ventilation has been considered with reference to the NSW Department of Planning guideline. An assessment of noise intrusion from Lambert Park has also been conducted in a similar manner.

Façade noise levels due to light rail operations have been predicted from the long-term monitoring results. The most affected façade would experience noise levels of 61dB(A)$L_{eq,15hr}$ and 55dB(A)$L_{eq,9hr}$. Therefore, without any other measures the corresponding internal "windows open" (to 5% of the floor area) noise levels will be approximately 51 dB(A) and 45 dB(A). Therefore, noise levels in the most affected location would only exceed the windows open goal by only 1 dB(A) in living areas and would comply in sleeping areas.

Similarly, based on the external noise levels generated by use of Lambert Park, with windows open (open area of window equal to 5% of floor space of habitable room), the internal noise levels from the loudest typical noise levels is approximately 53dB(A) within living areas, which exceeds the 50dB(A) noise goal by 3dB(A), which is a small exceedance. As the park does not operate in the night-time period (10pm-7am), a consideration of noise levels in sleeping areas is not required.

It is proposed to incorporate wintergardens to the dwellings. The wintergardens would act as a noise buffer so that, even with natural ventilation, the recommended internal noise levels can be achieved at all times (notwithstanding that additional ventilation may be needed to meet AS 2021 (aircraft noise).

5 NOISE EMISSION ASSESSMENT

Noise emissions from the site should be assessed to ensure that the amenity of nearby land users is not adversely affected.

Mechanical noise emissions have been identified as the primary noise emission sources associated with the development.

The nearest potentially affected noise receivers near the site have been identified and are listed below (refer also to figure 2.1 for locations):

- 12 residential dwellings on the eastern side of Davies Lane, at 2-28 Davies Street;
- Several residential dwellings located across Lords Road to the south of the site at 17-27 Kegworth Street.

5.1 BACKGROUND NOISE MONITORING

Unattended background noise monitoring was conducted from Wednesday 18th July 2018 – Thursday 26th July 2018 and Friday 3rd August 2018 – Saturday 11th August 2018 using two ARL NGARA noise monitors set to A-weighted fast response. The monitor was calibrated at the start and end of the monitoring period using a Rion NC-73 calibrator. No significant drift was noted. All noise monitoring data recorded at the site is provided in Appendix B. Measured background noise levels are presented below.

Table 5.1 – Measured Background Noise Levels

Location	Background noise level dB(A)L_{90}		
	Day (7am-6pm)	Evening (6pm-10pm)	Night (10pm-7am)
67-75 Lords Road, Leichhardt	42	45	40

5.2 NOISE EMISSION OBJECTIVES

Noise emissions from the site must comply with the provisions of the NSW Environmental Protection Authority (EPA) Noise Policy for Industry and the Protection of the Environment Operations Act in addition to the local council DCP.

All noise emission criteria applicable at the site is presented in the following sections.

5.2.1 Inner West Council (Leichhardt Council) DCP 2013

Section C3.12 – Acoustic Privacy, contained in the Inner West Council (Leichhardt Council) DCP 2013 has the following controls regarding noise emissions from new development.

C3.12 ACOUSTIC PRIVACY

C6 Electrical, mechanical or hydraulic plant achieves a maximum noise level of 5dB(A) above background sound levels at the boundary of the site.

5.2.2 NSW EPA Noise Policy for Industry

The EPA Noise Policy for Industry (2017), has two criteria which need to be satisfied namely Intrusiveness and Amenity.

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

5.2.2.1 Intrusiveness Criterion

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

5.2.2.2 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 Noise Policy for Industry sets out acceptable noise levels for various localities. Table 2.2 on page 11 of the policy indicates 3 categories to distinguish different residential areas. They are rural, suburban and urban and urban/industrial interface.

Table 5.2 provides the recommended maximum noise levels for the suburban residential receivers for the day, evening and night periods. For the purposes of this condition:

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

Table 5.2 - EPA Recommended Acceptable Noise Levels

Type of Receiver	***Time of day***	***Recommended Noise Level dB(A)L_{eq}***	
		Recommended	***Maximum***
Residential	Day	55	60
	Evening	45	50
	Night	40	45

5.3 MECHANICAL PLANT

Detailed plant selection has not been undertaken at this stage, as plant specifications have not been determined. Detailed acoustic review should be undertaken at CC stage to determine acoustic treatments to control noise emissions to satisfactory levels.

Satisfactory levels will be achievable through appropriate plant selection and location and, if necessary, standard acoustic treatments such as duct lining, acoustic silencers and enclosures.

Noise emissions from all services plant to the closest residential receiver should comply with the noise emission criteria in Section 5.2.

6 CONCLUSION

This report presents our noise impact assessment for the proposed mixed-use residential and commercial development located at 67-75 Lords Road, Leichhardt.

- Existing noise levels generated by road traffic, rail traffic, air traffic and from activities on Lambert Park have been measured using a combination of long term and attended monitoring.

- Road traffic, rail and aircraft noise impacts on future occupants of the development have been assessed in accordance with the Inner West Council (Leichhardt Council) DCP 2013 and the requirements of the NSW Department of Planning "*Development near Rail Corridors and Busy Roads – Interim Guideline"*. Aircraft noise intrusion has been assessed against the provisions contained in AS 2021–2015 "*Aircraft Noise Intrusion – Building Siting and Construction*". It is concluded that the development is able to comply with all requirements with the adoption of typical envelope treatments.

- Noise impacts from other significant noise sources surrounding the site, including Lambert Park, have been assessed with reference to the internal noise levels stated in AS2107–2016 Acoustics – *"Recommended design sound level and reverberation times for building interiors".* It is concluded that the internal noise criteria can be readily achieved using typical envelope treatments, and that acceptable internal noise levels can be achieved under windows open condition where wintergardens are incorporated into the dwellings.

- Noise emission objectives for the proposed development have been determined based on on-site noise logging and noise emission guidelines presented in the Inner West Council (Leichhardt Council) DCP 2013, including the noise emission criteria of the NSW EPA Noise Policy for Industry and the Protection of the Environment Operations Act. All noise emission criteria are presented in section 5.2.

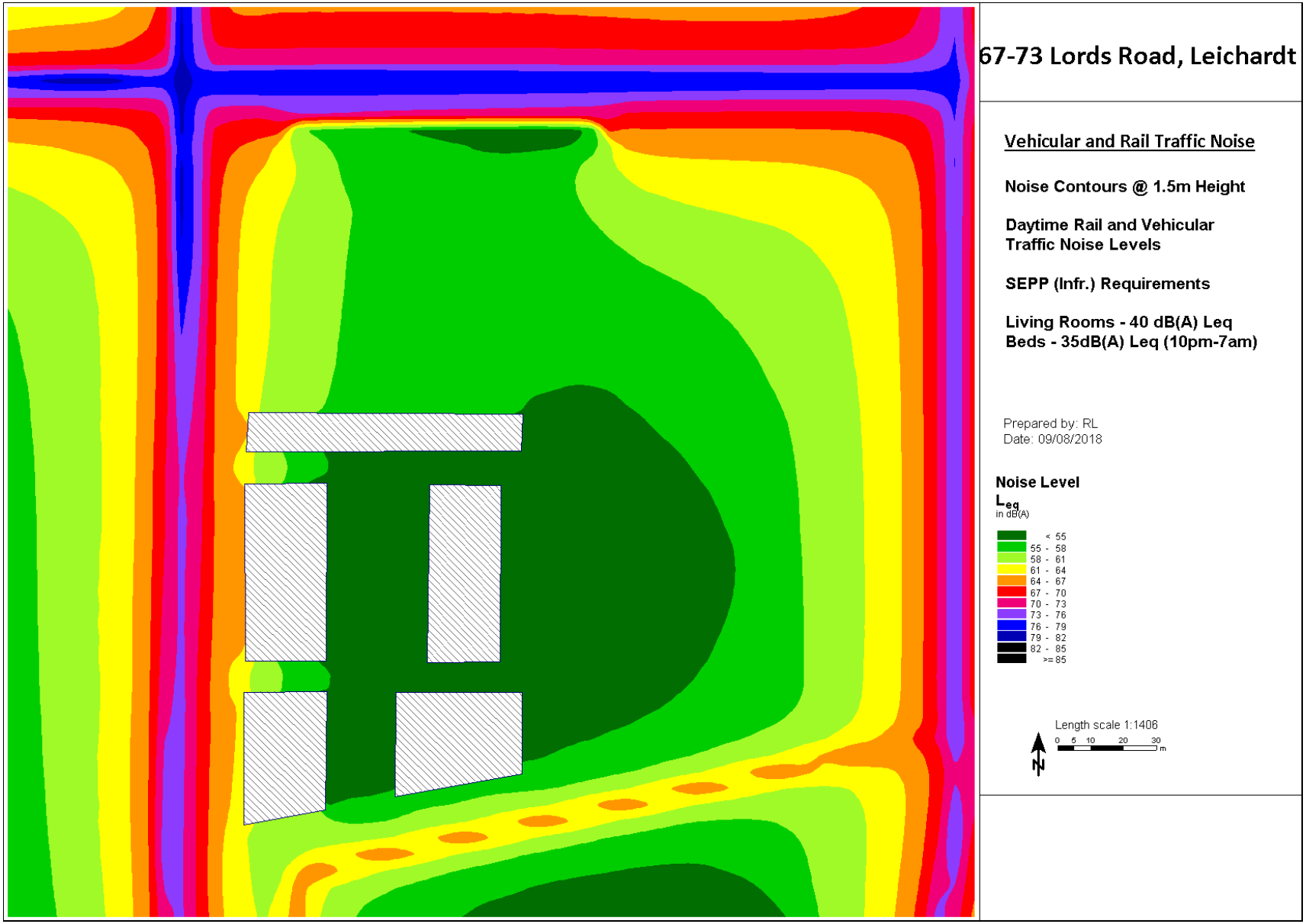
- A detailed examination of building constructions and treatment to noise emission sources should be undertaken during the detailed design stage and appropriate measures incorporated into the design to comply with all recommended criteria.

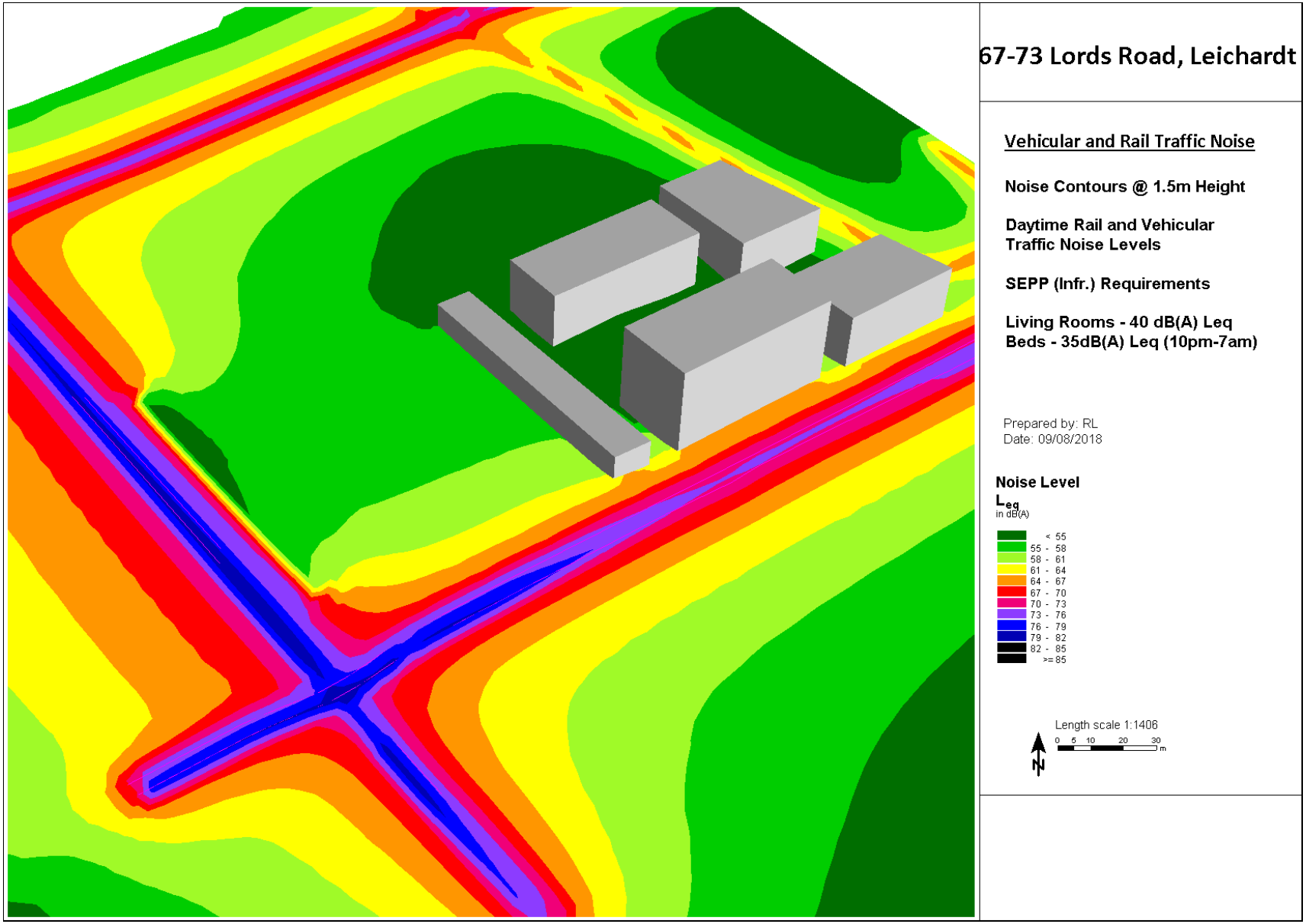
Yours faithfully,

Acoustic Logic Consultancy Pty Ltd
Jeff Robinson

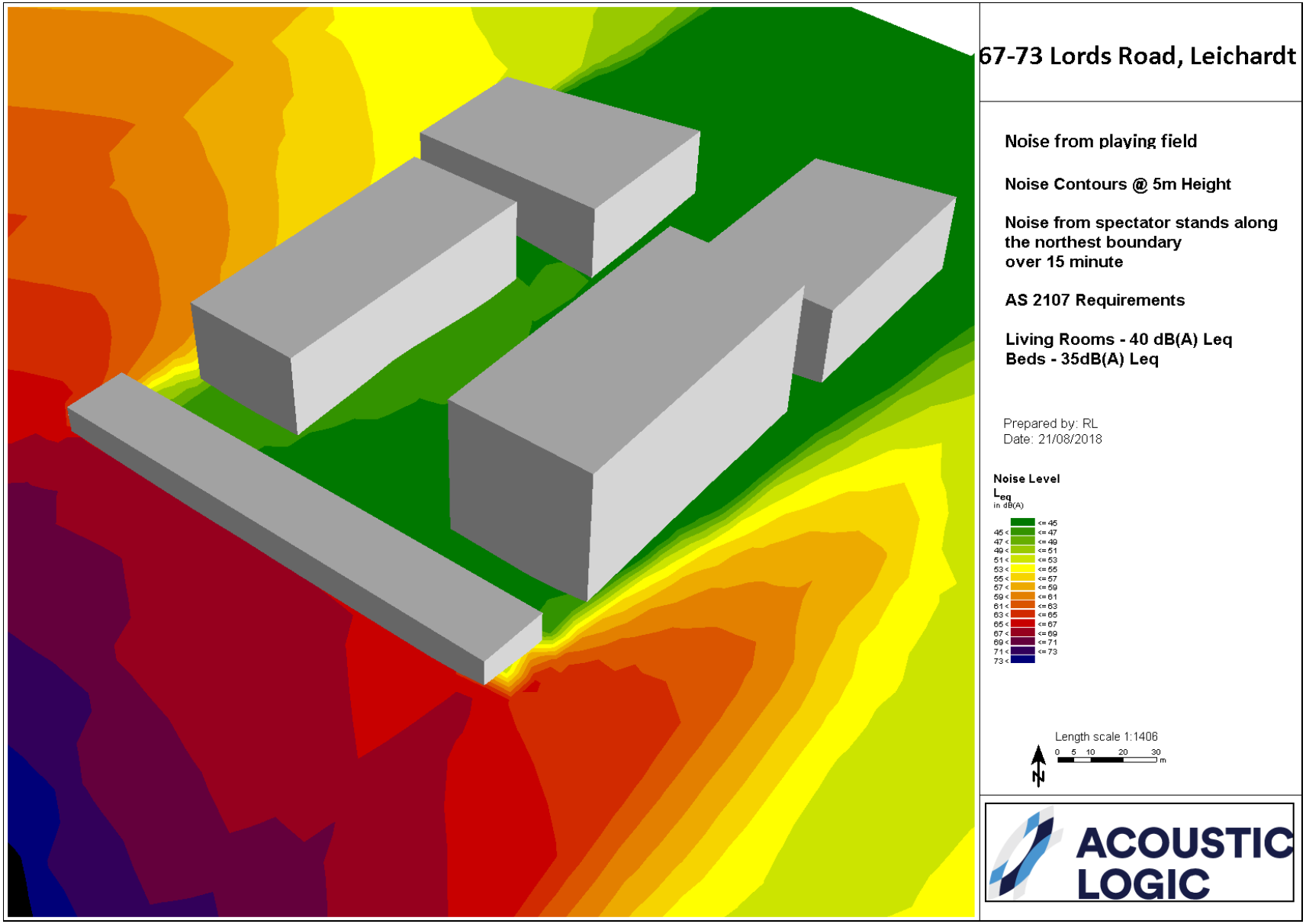
APPENDIX A – SOUND PLAN NOISE CONTOURS

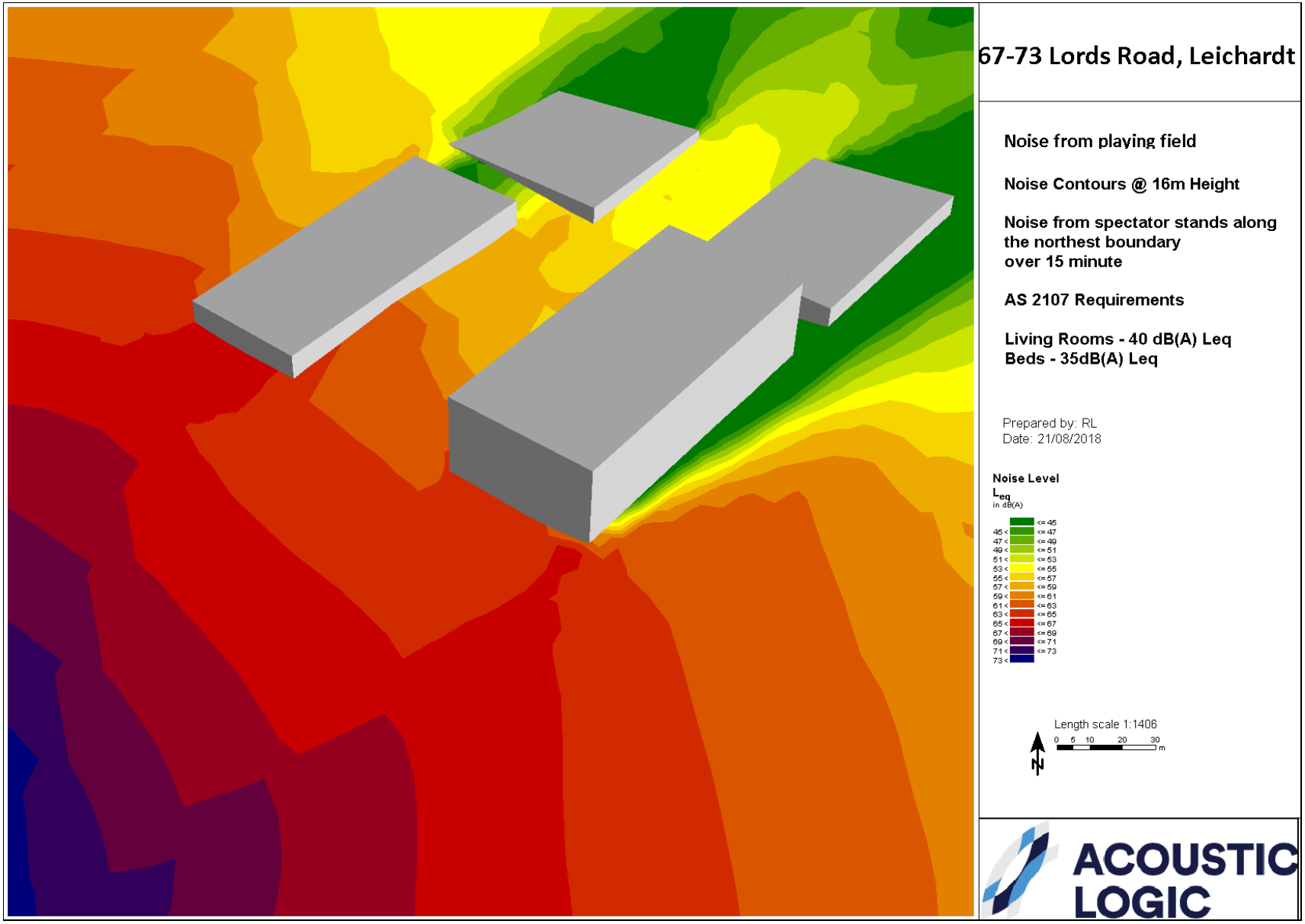
A.1: NOISE FROM ROAD TRAFFIC AND LIGHT-RAIL

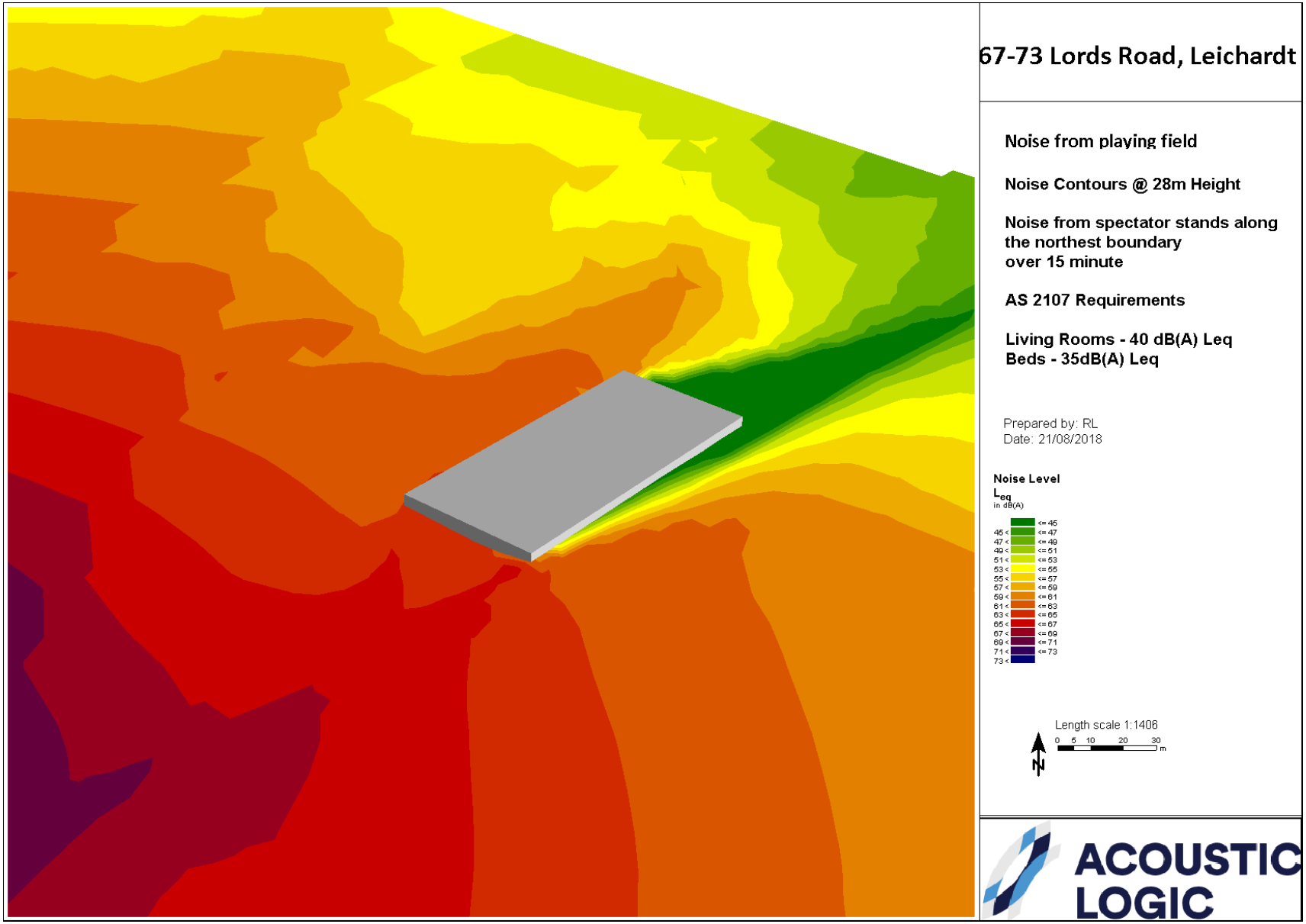

67-73 Lords Road, Leichardt
Vehicular and Rail Traffic Noise
Noise Contours @ 1.5m Height
Daytime Rail and Vehicular Traffic Noise Levels
SEPP (Infr.) Requirements
Living Rooms - 40 dB(A) Leq
Beds - 35dB(A) Leq (10pm-7am)
Prepared by: RL
Date: 09/08/2018
Noise Level
Leq
in dB(A)
< 55
55 - 58
58 - 61
61 - 64
64 - 67
67 - 70
70 - 73
73 - 76
76 - 79
79 - 82
82 - 85
>= 85
Length scale 1:1406
0 5 10 20 30 m
N


67-73 Lords Road, Leichardt
Vehicular and Rail Traffic Noise
Noise Contours @ 1.5m Height
Daytime Rail and Vehicular Traffic Noise Levels
SEPP (Infr.) Requirements
Living Rooms - 40 dB(A) Leq
Beds - 35dB(A) Leq (10pm-7am)
Prepared by: RL
Date: 09/08/2018
Noise Level
Leq
in dB(A)
< 55
55 - 58
58 - 61
61 - 64
64 - 67
67 - 70
70 - 73
73 - 76
76 - 79
79 - 82
82 - 85
>= 85
Length scale 1:1406
0 5 10 20 30 m
N

A.2: NOISE FROM LAMBERT PARK

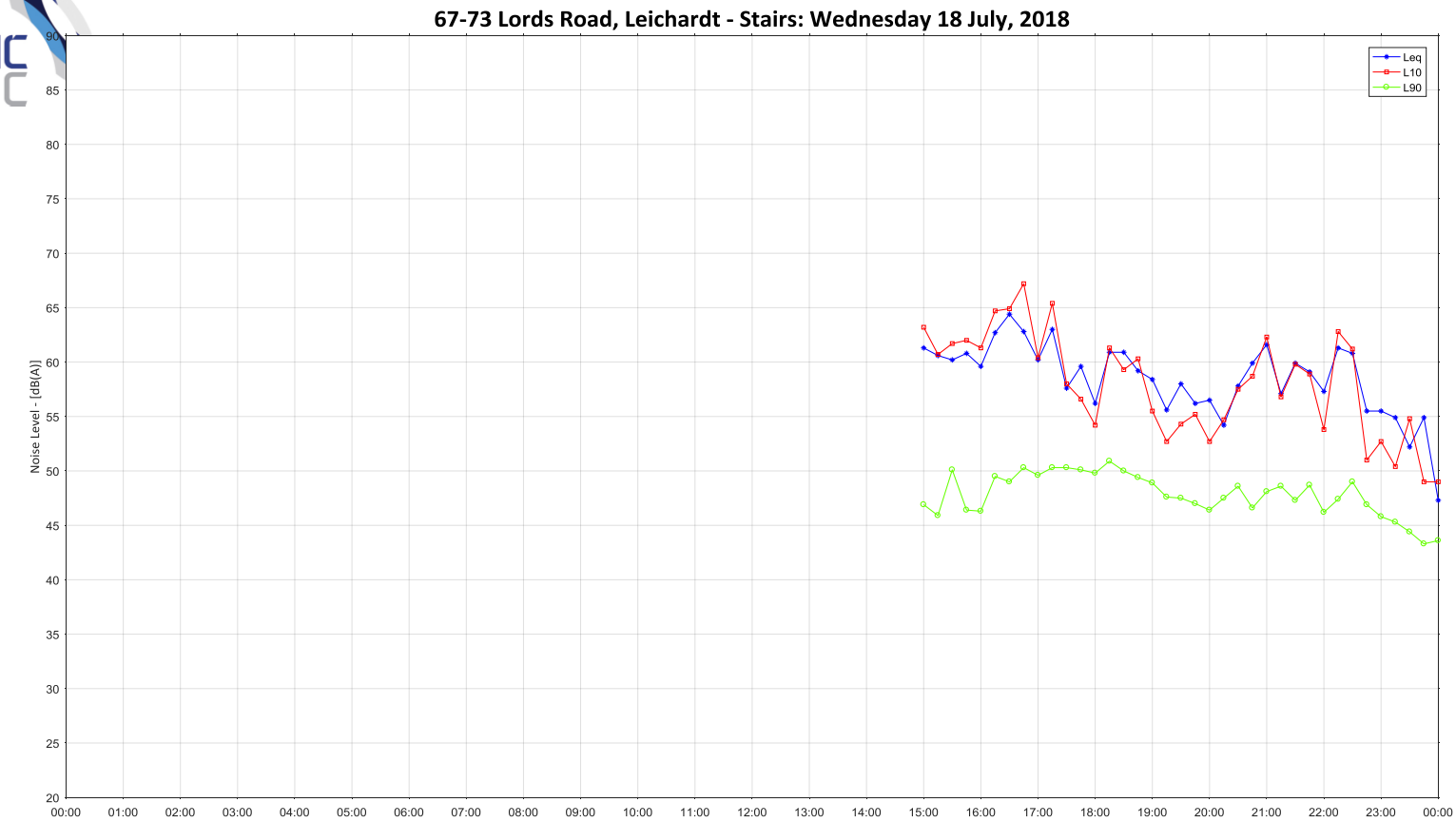

67-73 Lords Road, Leichardt
Noise from playing field
Noise Contours @ 5m Height
Noise from spectator stands along the northest boundary over 15 minute
AS 2107 Requirements
Living Rooms - 40 dB(A) Leq
Beds - 35dB(A) Leq
Prepared by: RL
Date: 21/08/2018
Noise Level
Leq
in dB(A)
<= 45
45 < <= 47
47 < <= 49
49 < <= 51
51 < <= 53
53 < <= 55
55 < <= 57
57 < <= 59
59 < <= 61
61 < <= 63
63 < <= 65
65 < <= 67
67 < <= 69
69 < <= 71
71 < <= 73
73 <
Length scale 1:1406
0 5 10 20 30 m
N
ACOUSTIC LOGIC

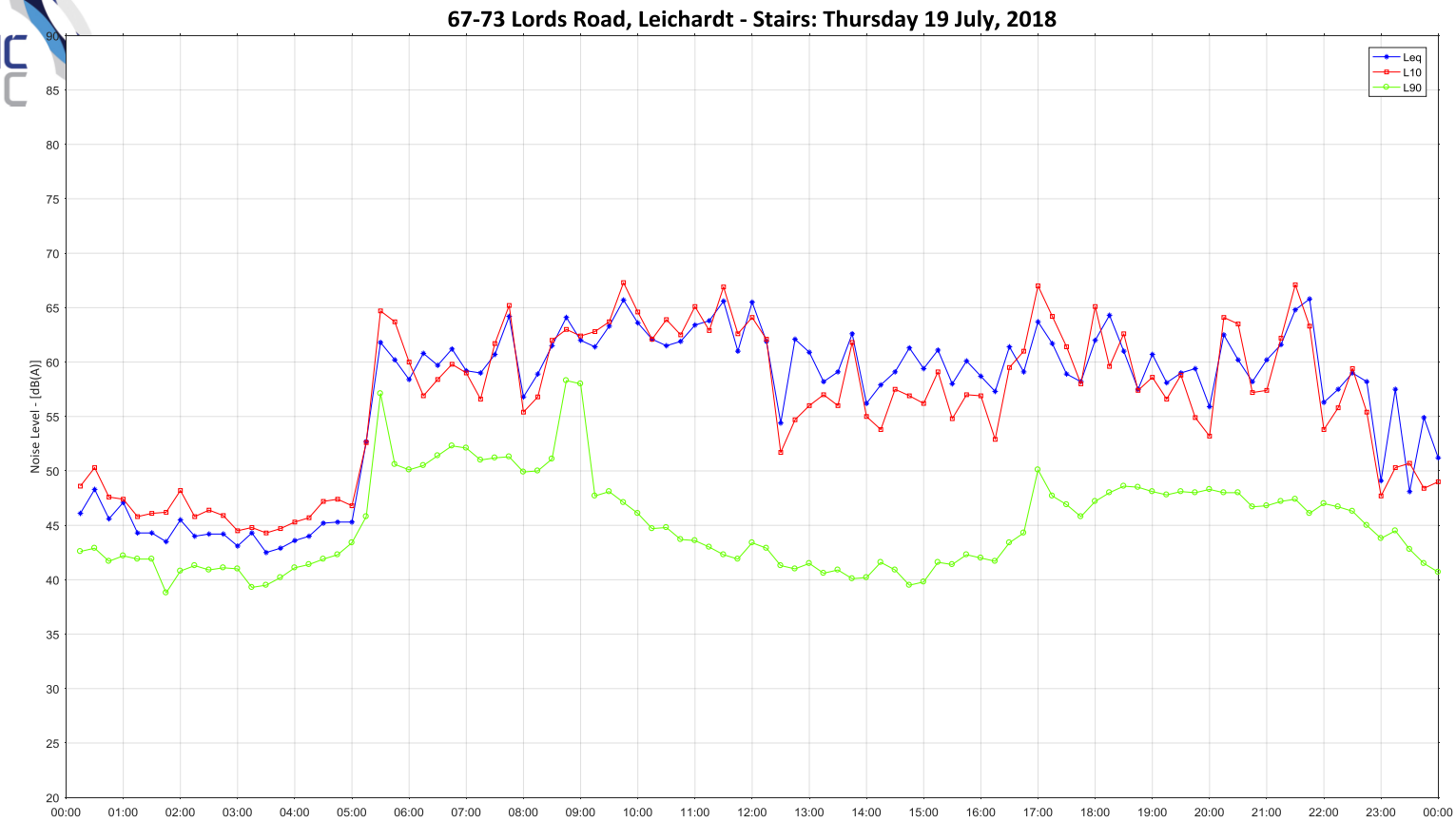

67-73 Lords Road, Leichardt
Noise from playing field
Noise Contours @ 16m Height
Noise from spectator stands along the northest boundary over 15 minute
AS 2107 Requirements
Living Rooms - 40 dB(A) Leq
Beds - 35dB(A) Leq
Prepared by: RL
Date: 21/08/2018
Noise Level
Leq
in dB(A)
<= 45
45 < <= 47
47 < <= 49
49 < <= 51
51 < <= 53
53 < <= 55
55 < <= 57
57 < <= 59
59 < <= 61
61 < <= 63
63 < <= 65
65 < <= 67
67 < <= 69
69 < <= 71
71 < <= 73
73 <
Length scale 1:1406
0 5 10 20 30 m
N
ACOUSTIC LOGIC

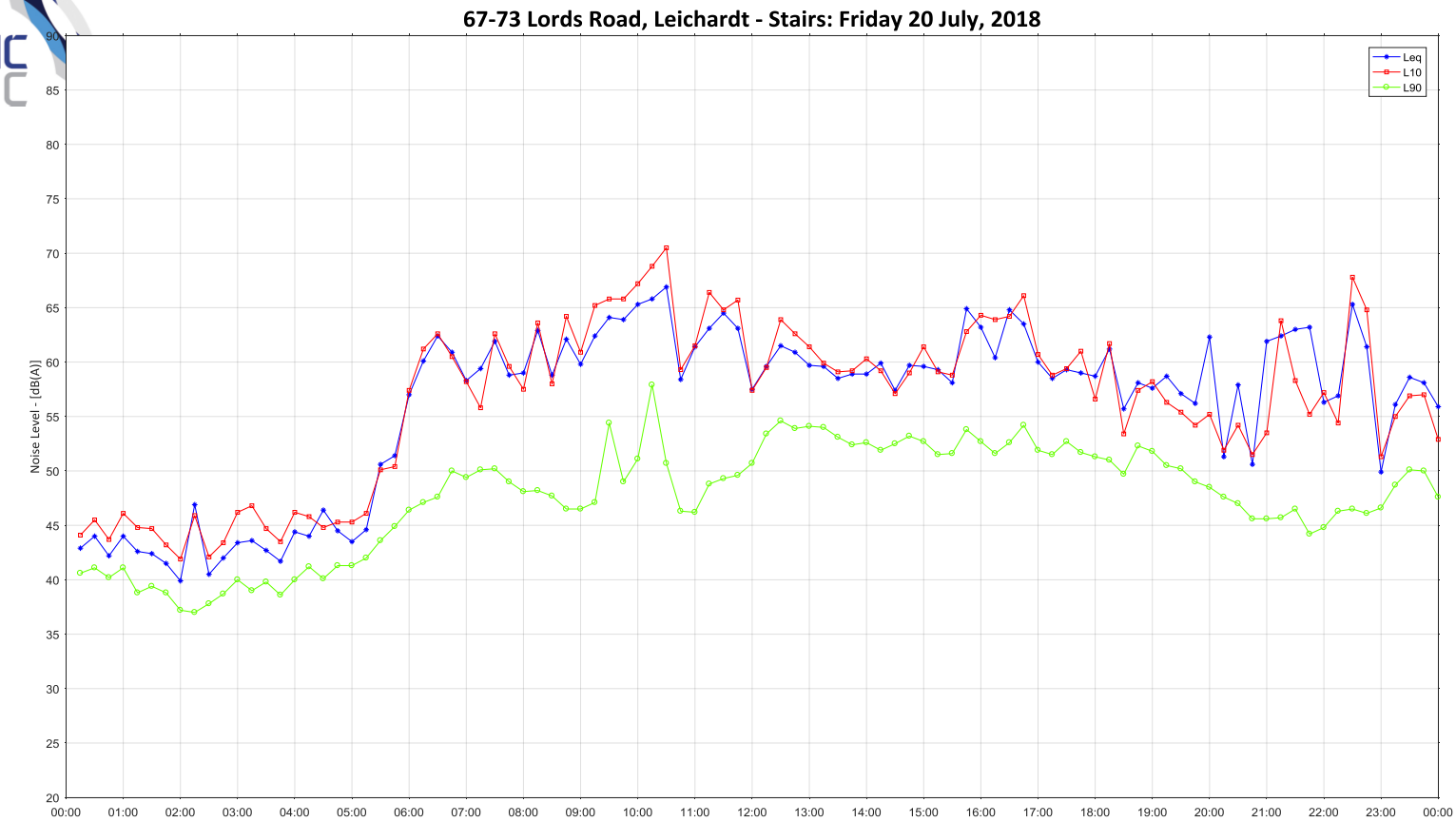

67-73 Lords Road, Leichardt
Noise from playing field
Noise Contours @ 28m Height
Noise from spectator stands along the northest boundary over 15 minute
AS 2107 Requirements
Living Rooms - 40 dB(A) Leq
Beds - 35dB(A) Leq
Prepared by: RL
Date: 21/08/2018
Noise Level
Leq in dB(A)
<= 45
45 < <= 47
47 < <= 49
49 < <= 51
51 < <= 53
53 < <= 55
55 < <= 57
57 < <= 59
59 < <= 61
61 < <= 63
63 < <= 65
65 < <= 67
67 < <= 69
69 < <= 71
71 < <= 73
73 <
Length scale 1:1406
0 5 10 20 30 m
N
ACOUSTIC LOGIC

APPENDIX B – NOISE MONITORING DATA

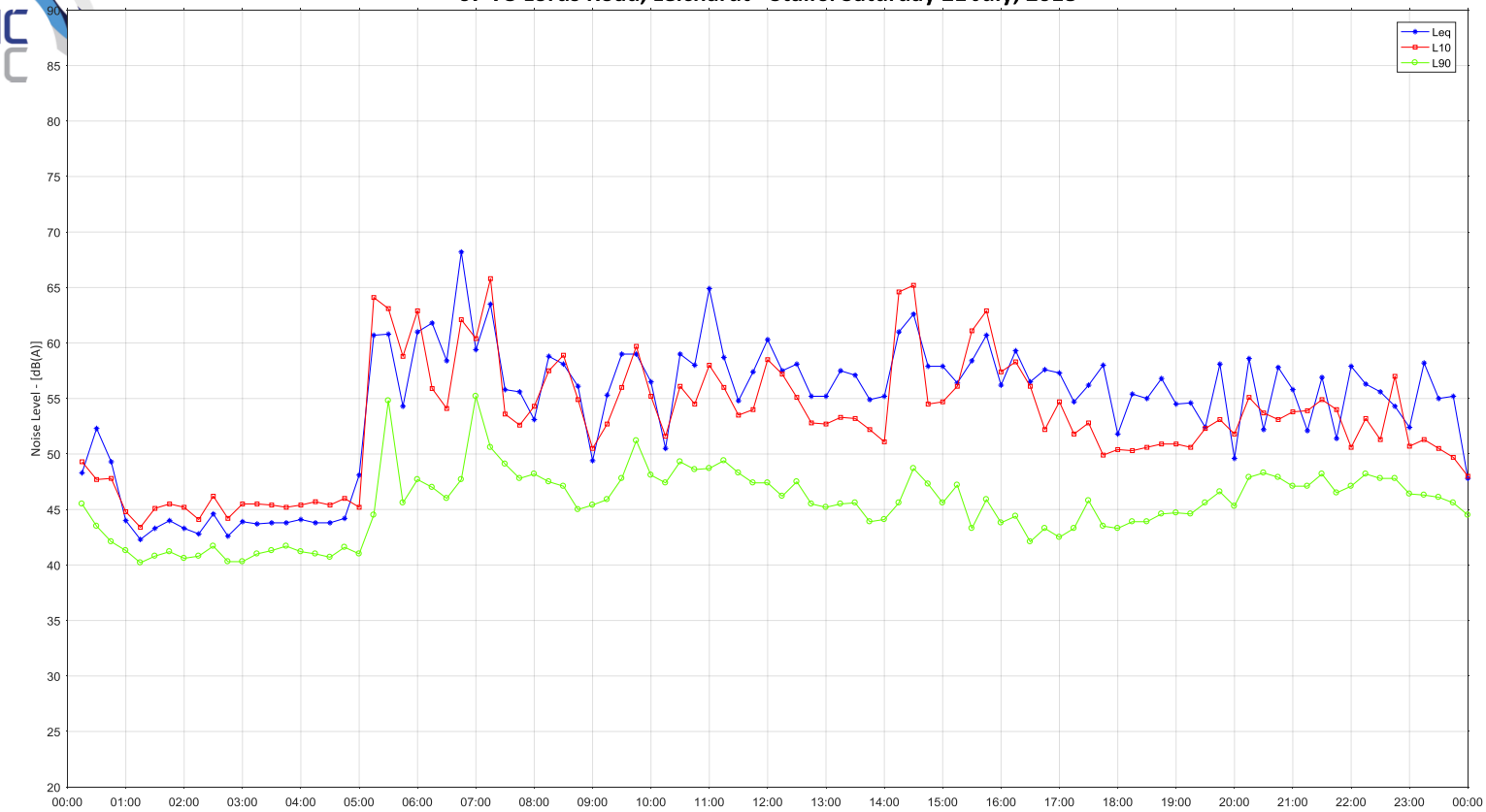
B.1: LOCATION 1 – WESTERN SITE BOUNDARY


67-73 Lords Road, Leichardt - Stairs: Wednesday 18 July, 2018
Leq
L10
L90
Noise Level - [dB(A)]
90
85
80
75
70
65
60
55
50
45
40
35
30
25
20
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

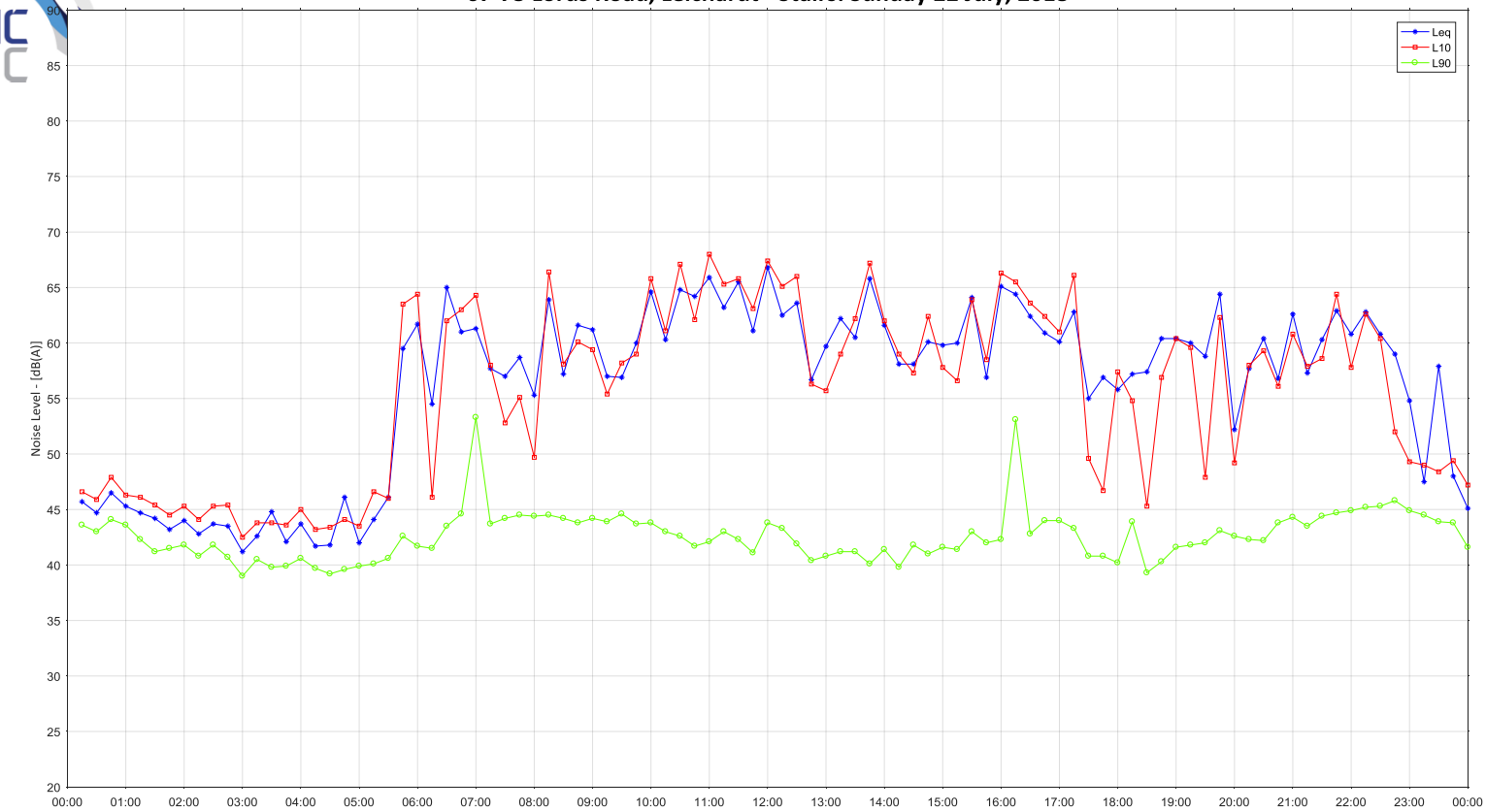

67-73 Lords Road, Leichardt - Stairs: Thursday 19 July, 2018
Leq
L10
L90
Noise Level - [dB(A)]
90
85
80
75
70
65
60
55
50
45
40
35
30
25
20
00:00
01:00
02:00
03:00
04:00
05:00
06:00
07:00
08:00
09:00
10:00
11:00
12:00
13:00
14:00
15:00
16:00
17:00
18:00
19:00
20:00
21:00
22:00
23:00
00:00


67-73 Lords Road, Leichardt - Stairs: Friday 20 July, 2018
Leq
L10
L90
Noise Level - [dB(A)]
90
85
80
75
70
65
60
55
50
45
40
35
30
25
20
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

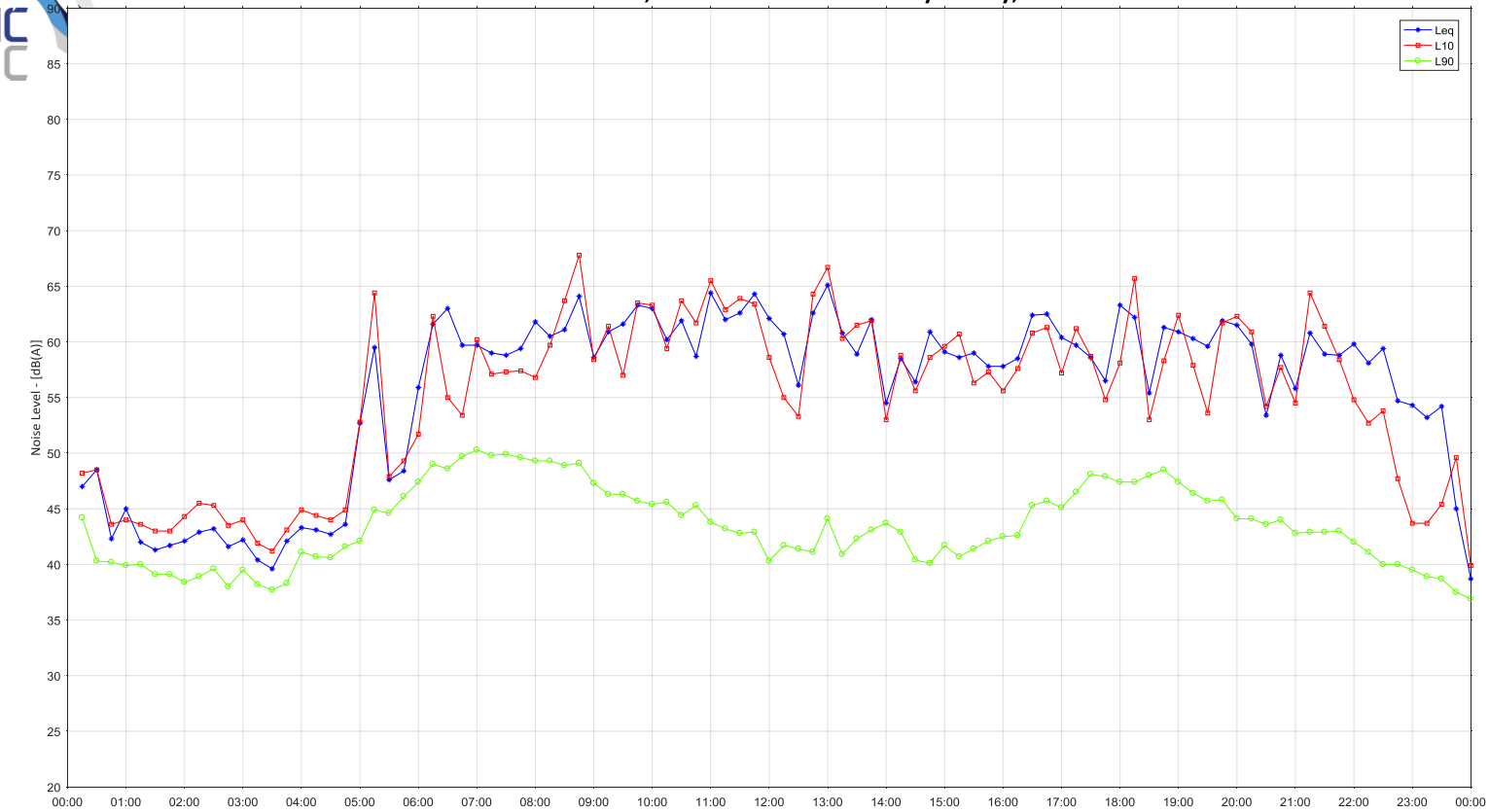
67-73 Lords Road, Leichardt - Stairs: Saturday 21 July, 2018

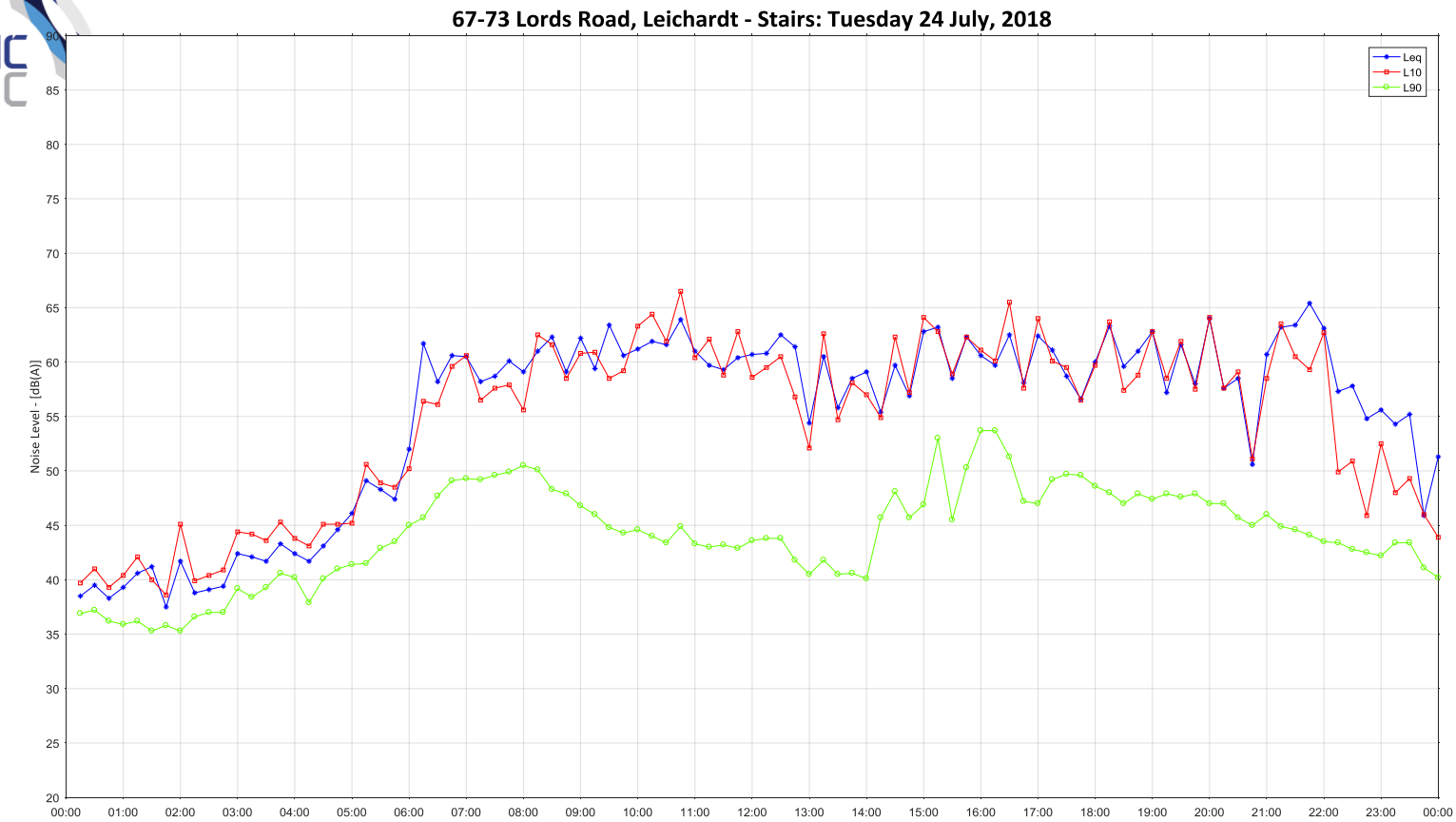


67-73 Lords Road, Leichardt - Stairs: Sunday 22 July, 2018



67-73 Lords Road, Leichardt - Stairs: Monday 23 July, 2018




67-73 Lords Road, Leichardt - Stairs: Tuesday 24 July, 2018
Leq
L10
L90
Noise Level - [dB(A)]
90
85
80
75
70
65
60
55
50
45
40
35
30
25
20
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
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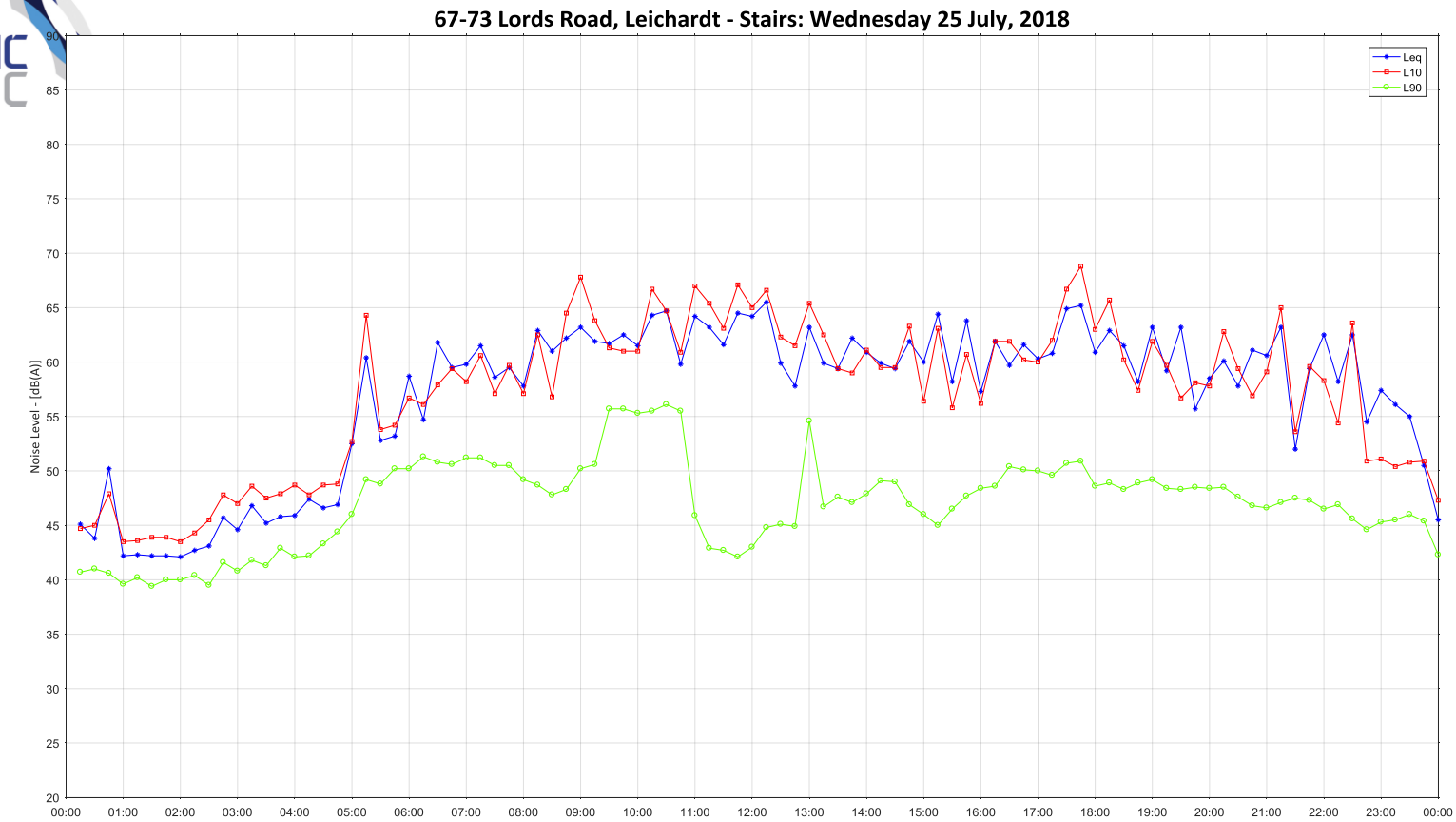
19:00
20:00
21:00
22:00
23:00
00:00


67-73 Lords Road, Leichardt - Stairs: Wednesday 25 July, 2018
Leq
L10
L90
Noise Level - [dB(A)]
90
85
80
75
70
65
60
55
50
45
40
35
30
25
20
00:00
01:00
02:00
03:00
04:00
05:00
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11:00
12:00
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19:00
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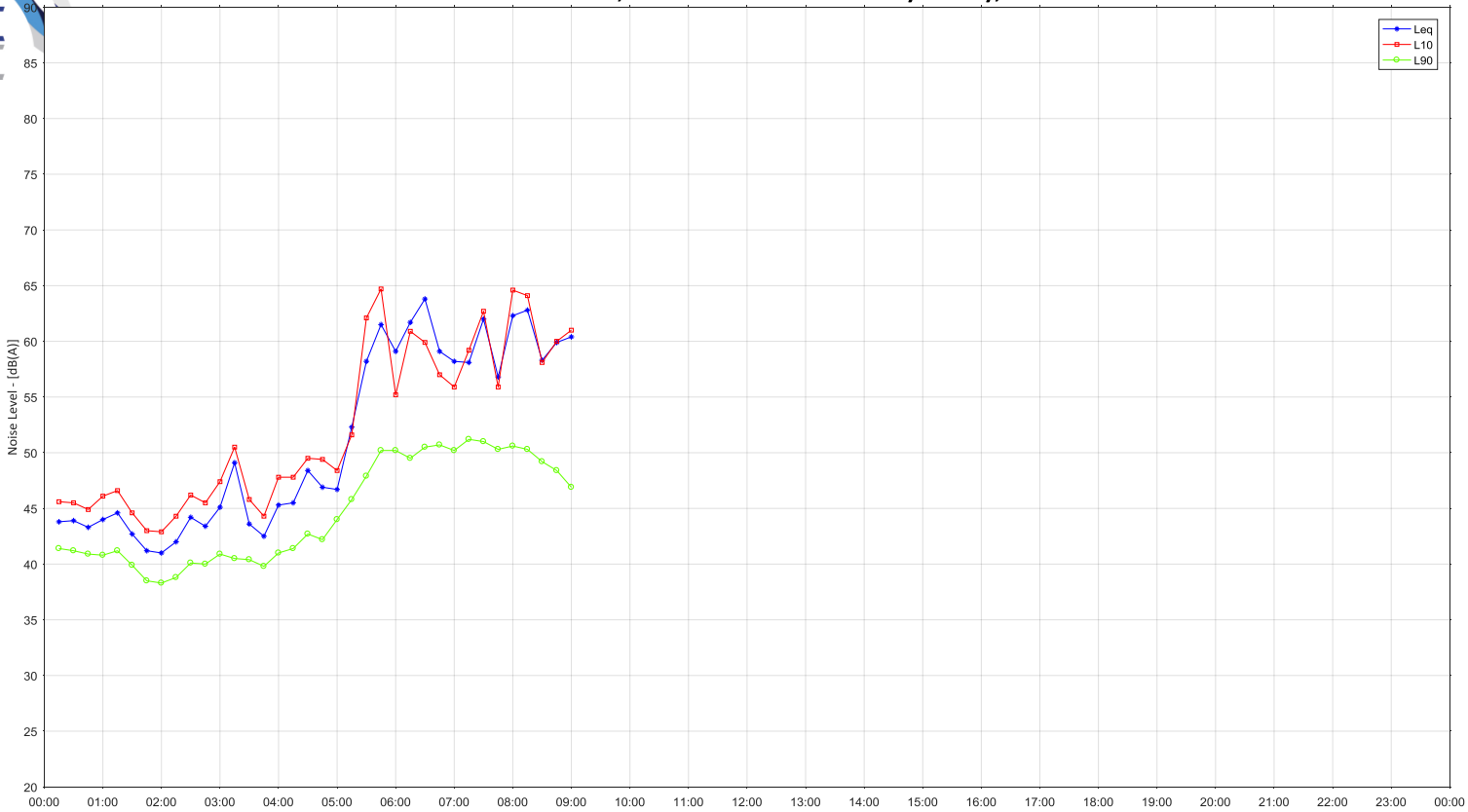
21:00
22:00
23:00
00:00


67-73 Lords Road, Leichardt - Stairs: Thursday 26 July, 2018
Leq
L10
L90
Noise Level - [dB(A)]
90
85
80
75
70
65
60
55
50
45
40
35
30
25
20
00:00
01:00
02:00
03:00
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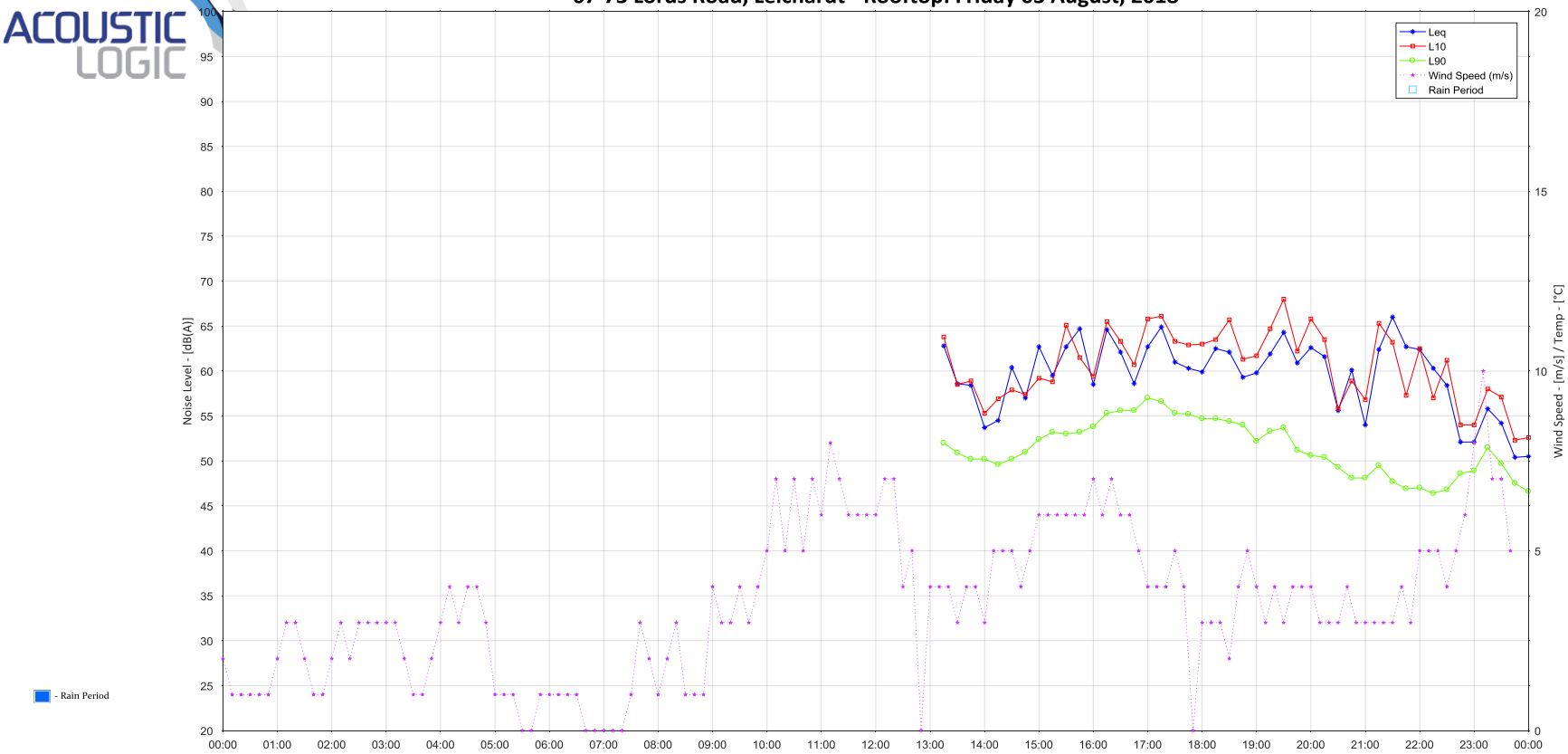
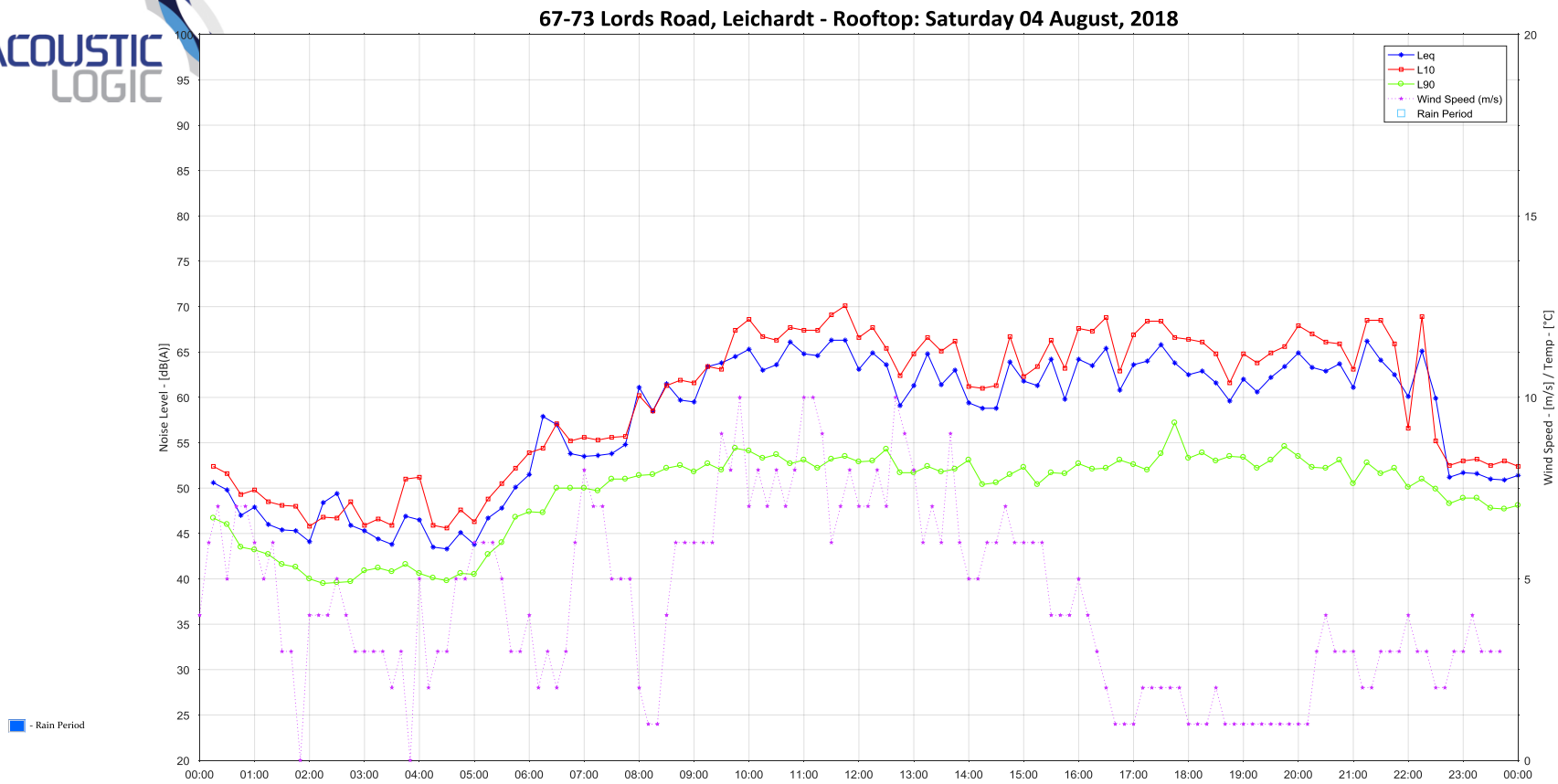
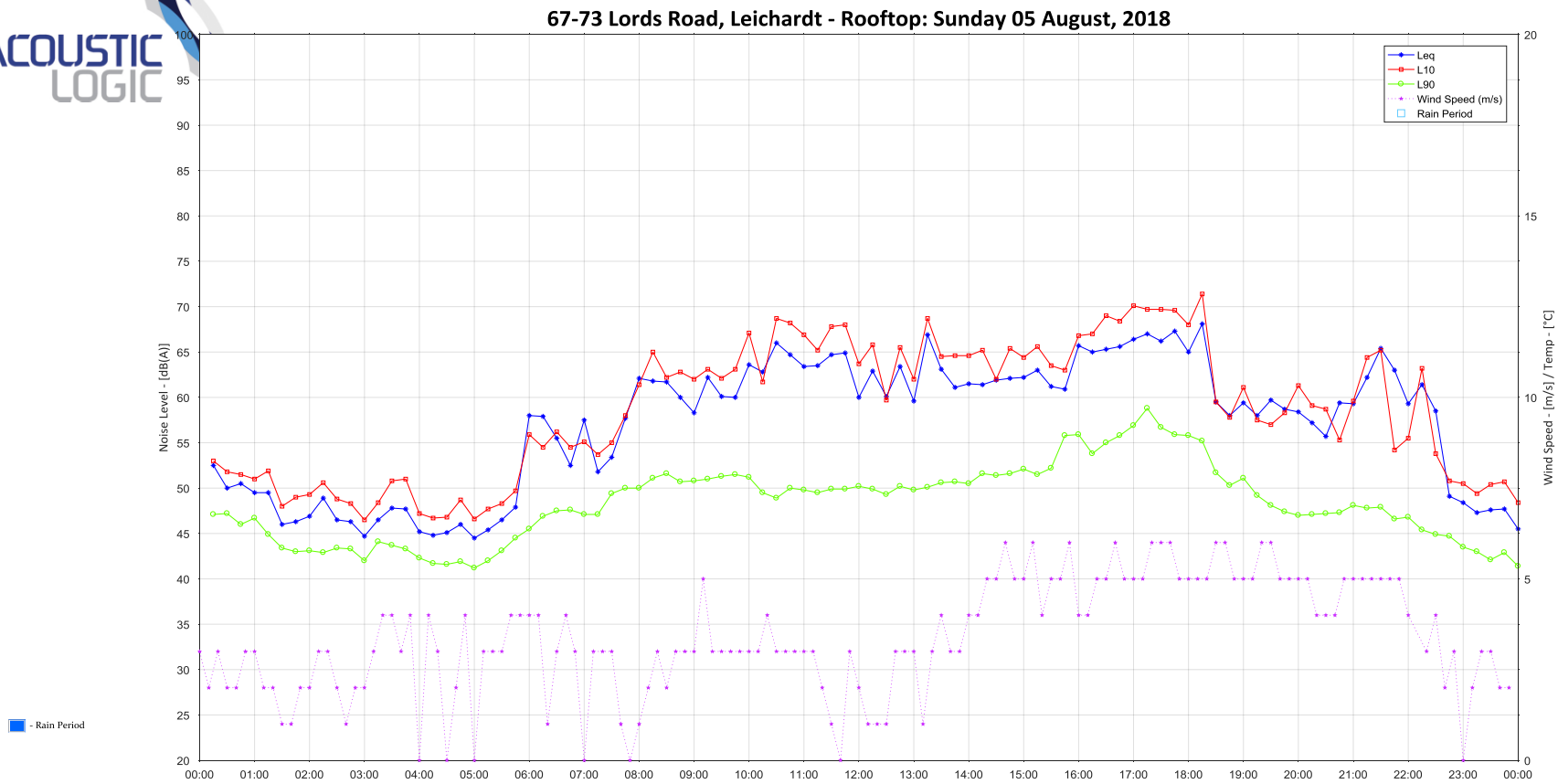
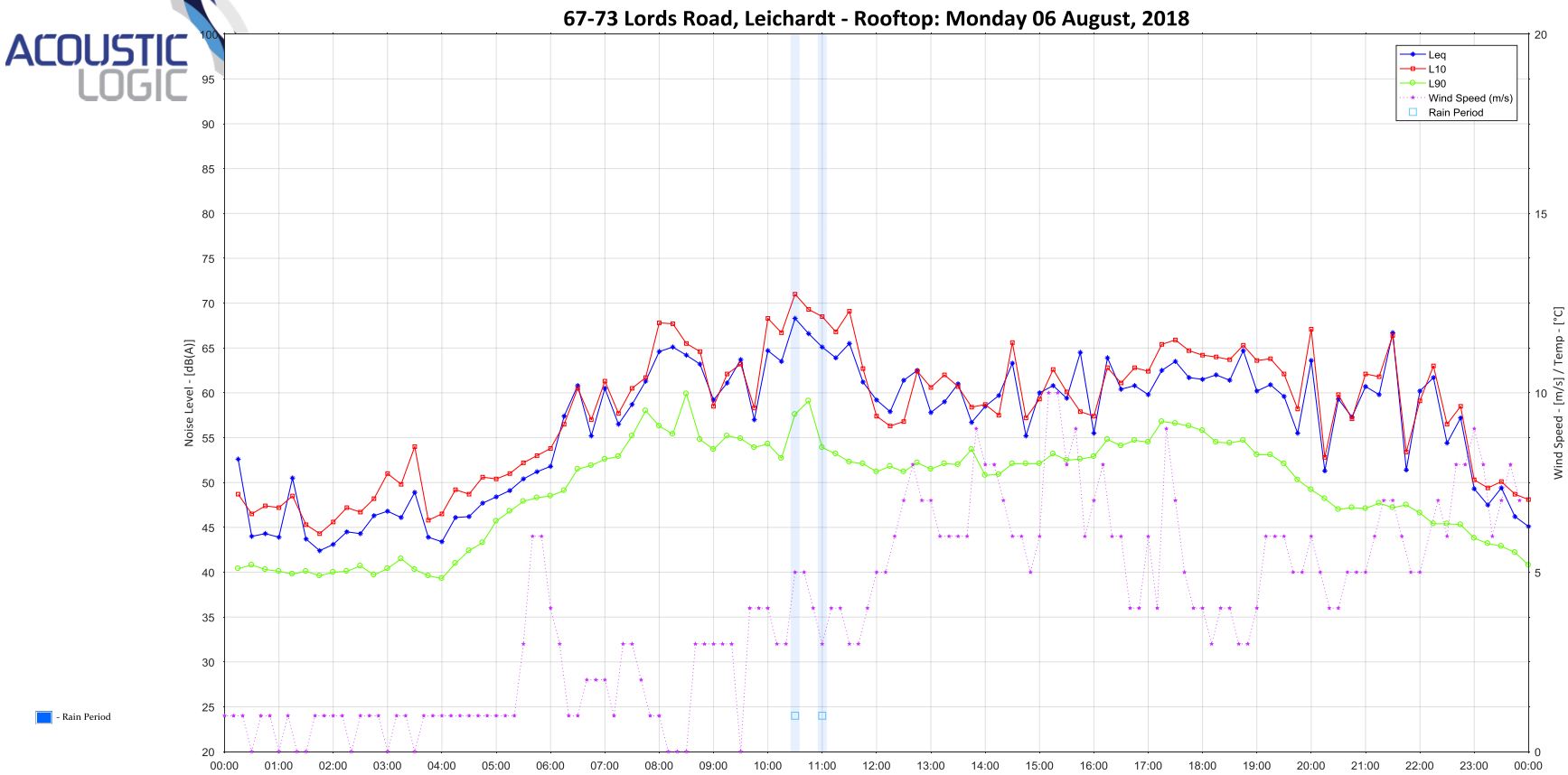
21:00
22:00
23:00
00:00

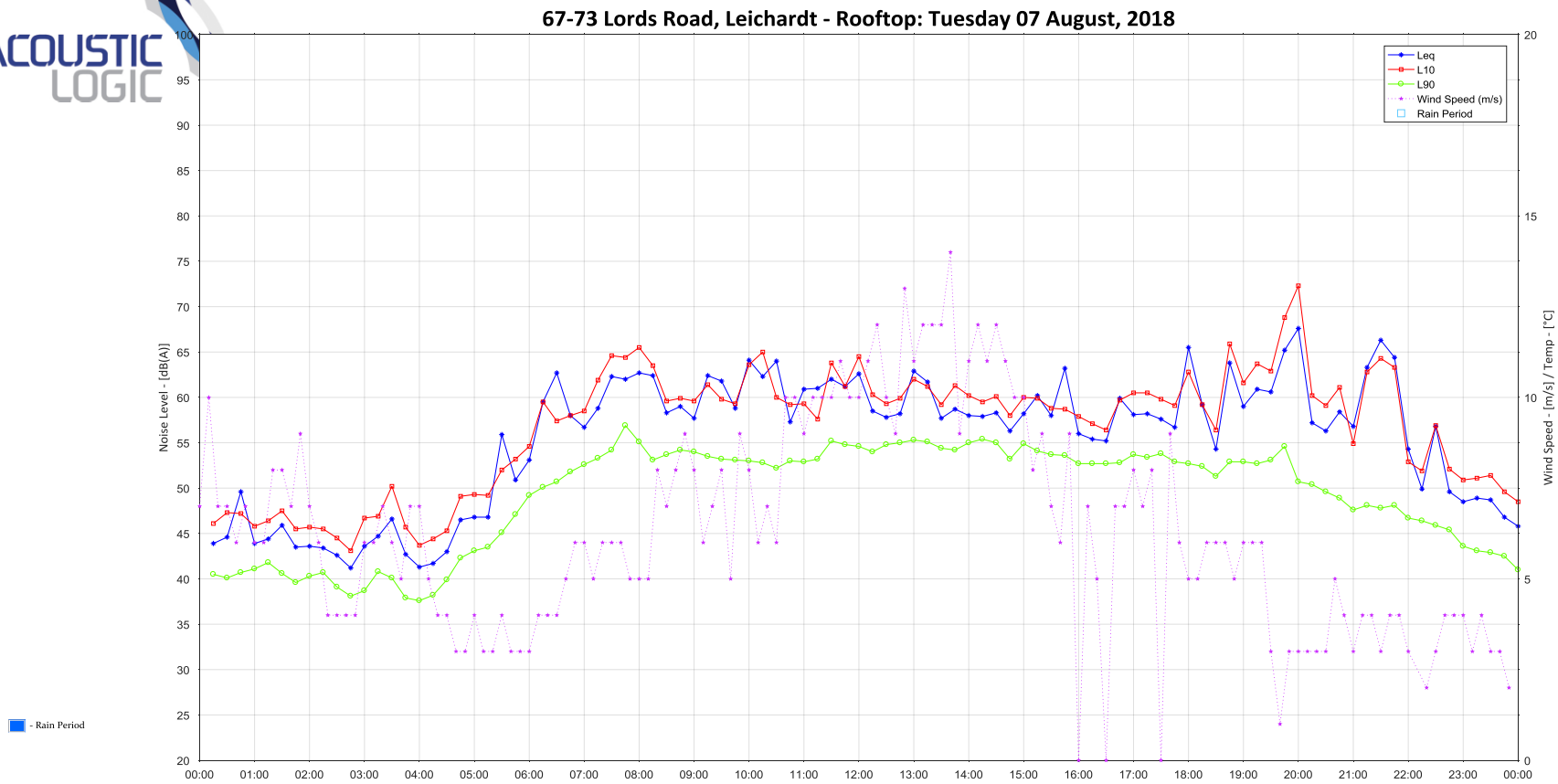
A.2: LOCATION 2 – NORTHERN SITE BOUNDARY

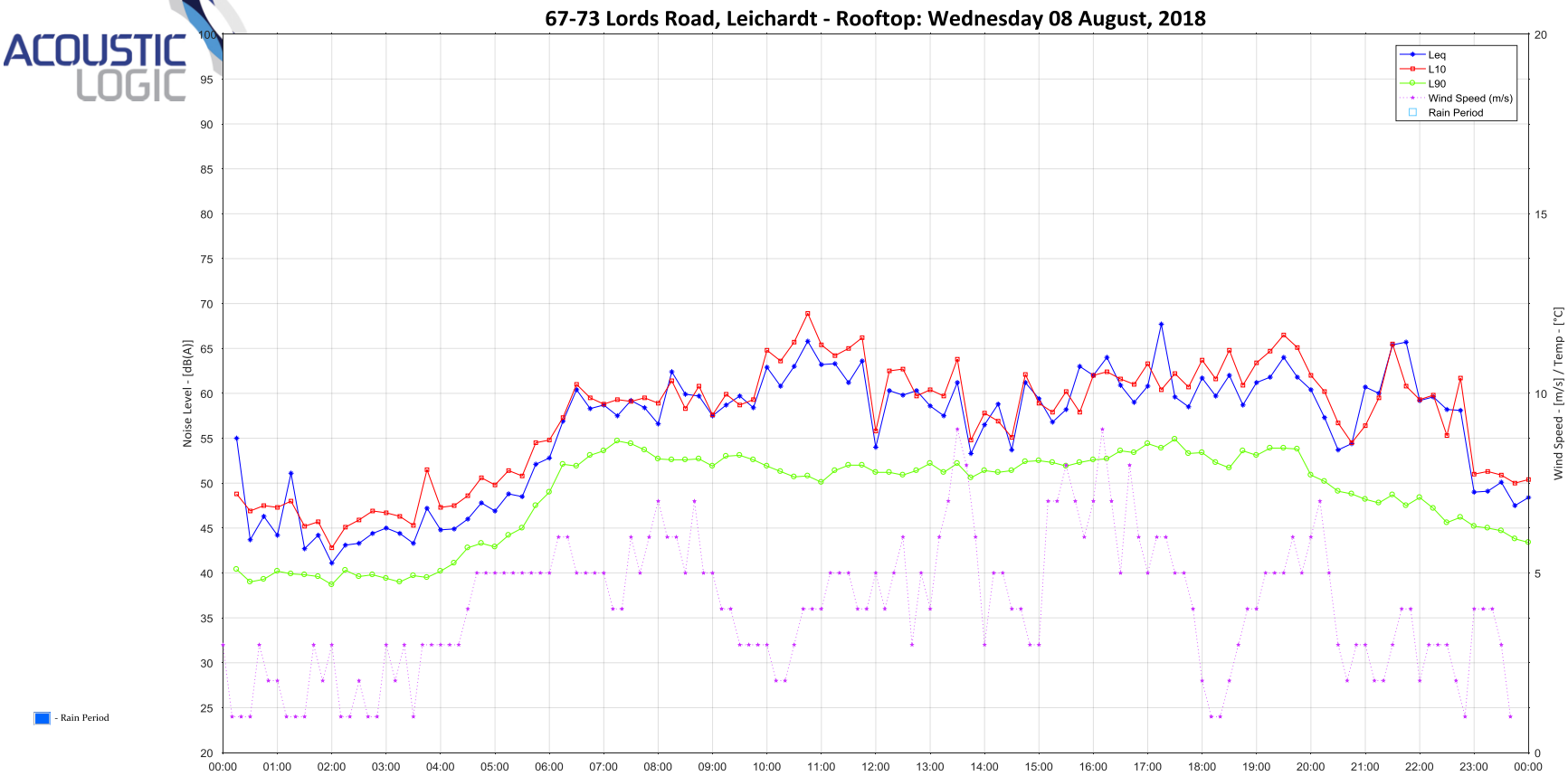

67-73 Lords Road, Leichardt - Rooftop: Friday 03 August, 2018
Leq
L10
L90
Wind Speed (m/s)
Rain Period
Noise Level - [dB(A)]
Wind Speed - [m/s] / Temp - [°C]
- Rain Period

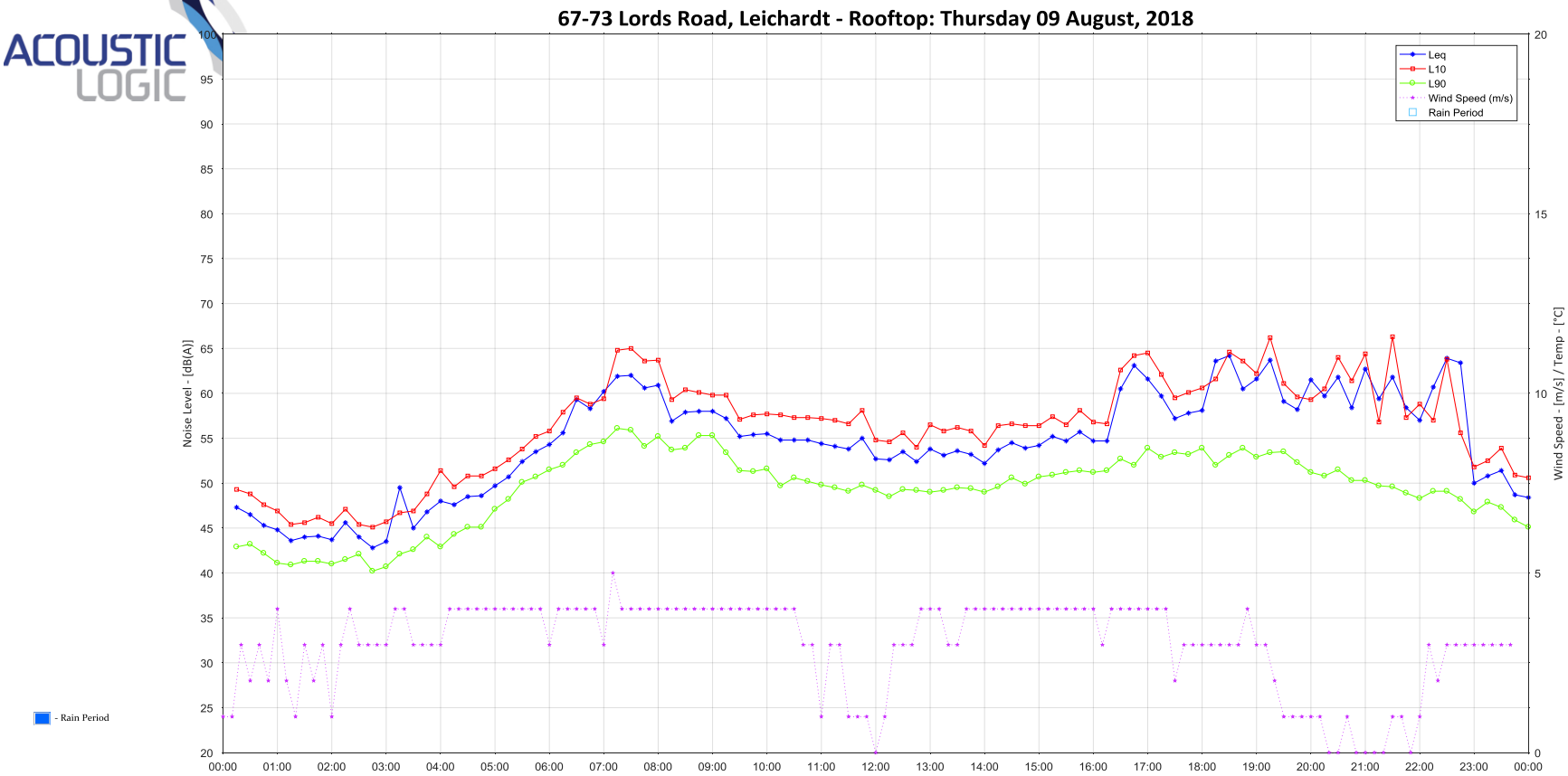

67-73 Lords Road, Leichardt - Rooftop: Saturday 04 August, 2018
Leq
L10
L90
Wind Speed (m/s)
Rain Period
Noise Level - [dB(A)]
Wind Speed - [m/s] / Temp - [°C]
- Rain Period

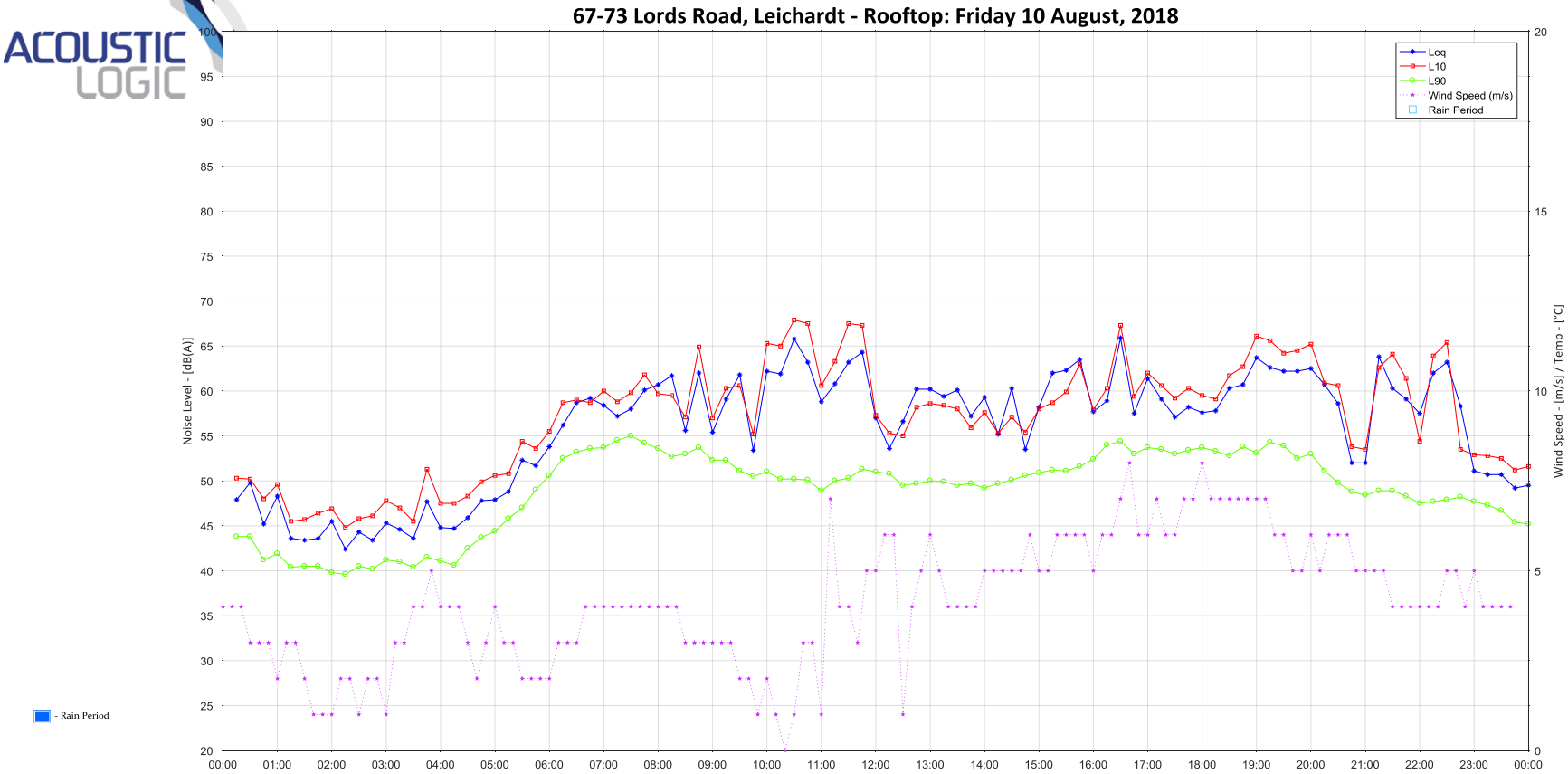

67-73 Lords Road, Leichardt - Rooftop: Sunday 05 August, 2018
Leq
L10
L90
Wind Speed (m/s)
Rain Period
Noise Level - [dB(A)]
Wind Speed - [m/s] / Temp - [°C]
- Rain Period

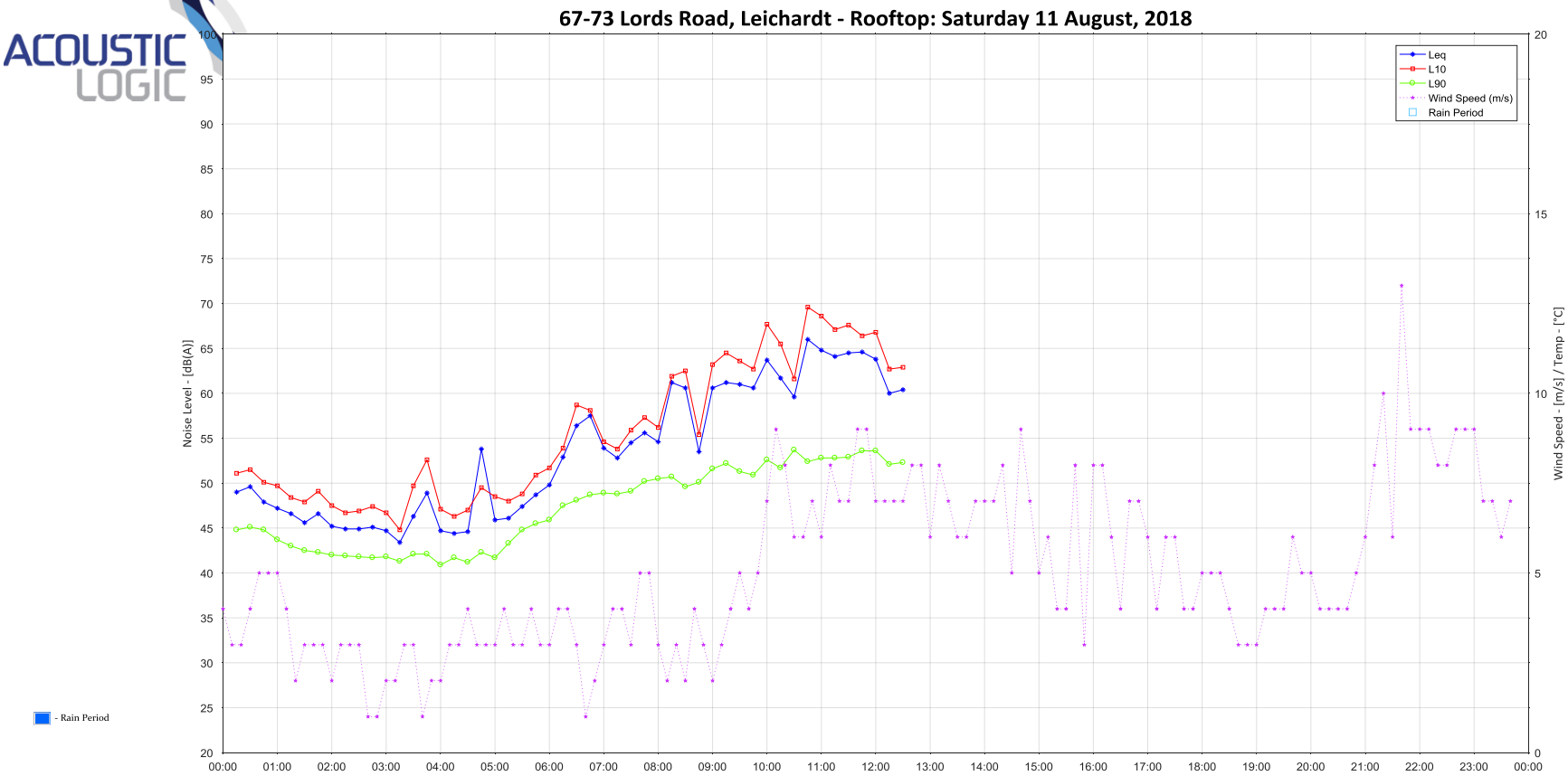

67-73 Lords Road, Leichardt - Rooftop: Monday 06 August, 2018
Leq
L10
L90
Wind Speed (m/s)
Rain Period
Noise Level - [dB(A)]
Wind Speed - [m/s] / Temp - [°C]
- Rain Period


67-73 Lords Road, Leichardt - Rooftop: Tuesday 07 August, 2018
Leq
L10
L90
Wind Speed (m/s)
Rain Period
Noise Level - [dB(A)]
Wind Speed - [m/s] / Temp - [°C]
- Rain Period


67-73 Lords Road, Leichardt - Rooftop: Wednesday 08 August, 2018
Leq
L10
L90
Wind Speed (m/s)
Rain Period
Noise Level - [dB(A)]
Wind Speed - [m/s] / Temp - [°C]
- Rain Period


67-73 Lords Road, Leichardt - Rooftop: Thursday 09 August, 2018
Leq
L10
L90
Wind Speed (m/s)
Rain Period
Noise Level - [dB(A)]
Wind Speed - [m/s] / Temp - [°C]
- Rain Period


67-73 Lords Road, Leichardt - Rooftop: Friday 10 August, 2018
Leq
L10
L90
Wind Speed (m/s)
Rain Period
Noise Level - [dB(A)]
Wind Speed - [m/s] / Temp - [°C]
- Rain Period


67-73 Lords Road, Leichardt - Rooftop: Saturday 11 August, 2018
Leq
L10
L90
Wind Speed (m/s)
Rain Period
Noise Level - [dB(A)]
Wind Speed - [m/s] / Temp - [°C]
- Rain Period