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Noise Impact Assessment

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DOCUMENT CONTROL REGISTER

Project Number	20181687.1
Project Name	74 Carlton Crescent, Summer Hill
Document Title	Noise Impact Assessment
Document Reference	20181687.1/0412A/R0/JR
Issue Type	Email
Attention To	Iglu No. 210 Pty Ltd Adam Brown

Revision	Date	Document Reference	Prepared By	Checked By	Approved By
0	4/12/2018	20181687.1/0412A/R0/JR	JR		GC

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1 INTRODUCTION

This report presents an analysis of noise impacts associated with the proposed development at 74 Carlton Crescent, Summer Hill.

The following will be addressed in this report:

- Conduct an external transportation noise impact assessment (primarily rail-traffic, road 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 Summer Hill Skate 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 architectural drawing set prepared by Bates Smart architects dated 22nd October 2018 as listed below.

Table 1.1 – Drawing Set for Review

Drawing Title	Drawing Number	Plot Date
Lower Ground Plan	A03.100	22/10/2018
Ground Plan	A03.000	22/10/2018
L01 Plan	A03.001	22/10/2018
L02 Plan	A03.002	22/10/2018
NS Long Section 01	A06.000	22/10/2018
NS Long Section 02	A06.001	22/10/2018
EW Cross Section 01	A06.002	22/10/2018
North Elevation	A07.000	22/10/2018
West Elevation	A07.001	22/10/2018
South Elevation	A07.002	22/10/2018
GFA Diagrams	A09.001	22/10/2018

2 SITE DESCRIPTION

The proposed development is located at 74 Carlton Crescent, Summer Hill and involves the demolition of the majority of the existing structures at the site to make way for a student accommodation facility.

The proposed development contains approximately 184 student accommodation rooms located over 3-4 levels. The existing *Western Suburbs District Ambulance* building is of heritage significance and will remain as part of the development however, the building will be extensively re-shaped and renovated to house approximately 14 rooms and a reception area.

The remaining rooms will be located within the remaining 4 structures proposed to line the perimeter of the site.

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 Carlton Crescent, lining the northern boundary of the site;
- Rail noise from the Sydney Rail *T2 Inner West & Leppington Line* & *T3 Bankstown Line located to the north of the site across Carlton Crescent*;
- Noise associated with the use of the Summer Hill Skate Park that borders the western boundary of the proposed development.

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

- A warehouse/commercial development located to the east of the site at 72 Carlton Crescent and;
- A residential dwelling located to the west of the site at 93 Carlton Crescent, Summer Hill.

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.

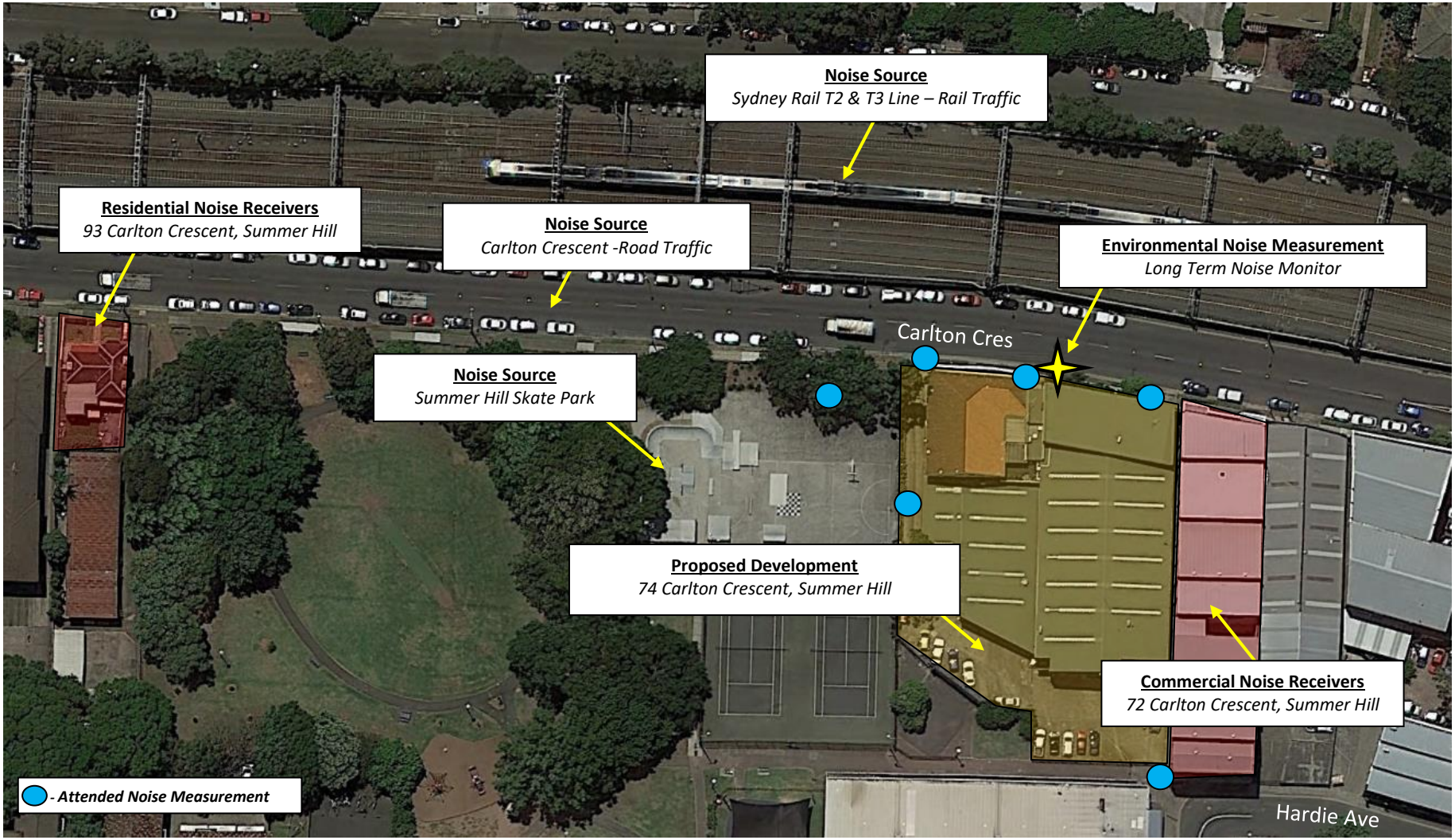


Figure 2.1 – 74 Carlton Crescent, Summer Hill (Google Earth)

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 north-south runway flight path;
- Road traffic noise from Carlton Crescent, lining the northern boundary of the site;
- Rail noise from the Sydney Rail *T2 Inner West & Leppington Line* & *T3 Bankstown Line located to the north of the site across Carlton Crescent*;
- Noise associated with the use of the Summer Hill Skate Park that borders the western boundary of the proposed development.

The proposed Carlton Crescent site sits outside the ANEF 25 aircraft noise contour as shown on the Sydney Airport 2039 ANEF contours map, indicating the site is acceptable for 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.

Carlton Street, lining the north boundary 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 Carlton Street to the proposed residential dwellings has been assessed.

We note the Sydney Trains *T2 Inner West & Leppington Line* and the *T3 Bankstown Line* run across the length of the northern boundary of the site across Carlton Street approximately 18m from the proposed façade of the development. 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 the Summer Hill Skate Park, lining the north-western boundary of the site will be conducted to ensure noise impacts on the amenity of the residential receivers is not affected while the park 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 boundary of the site. Additionally, attended measurements were also conducted at the location of the nearest noise sources (Road traffic and 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 Tuesday 27th November between 3pm and 5pm and on Tuesday 4th December between 9am and 11am. Long-term noise monitoring was conducted on site from Tuesday 27th November 2018 – Tuesday 4th December 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 an Acoustic Research Laboratories (ARL) NGARA noise monitor set to A-weighted fast response. The monitor was calibrated at the start and end of the monitoring period using a Rion NC-75 calibrator. No significant drift was noted.

4.1.4 Measurement Results

The 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)	70dB(A)$L_{eq(15hr)}$ / 71dB(A)$L_{eq(1hr)}$
	Night (10pm – 7am)	67dB(A)$L_{eq(9Hr)}$ / 70dB(A)$L_{eq(1hr)}$
Attended Measurement Carlton Road @ 2m	Day (Peak-Hour)	70dB(A)$L_{eq(15min)}$
Attended Measurement @Proposed Facade	During Rail Movement	84dB(A)L_{max}

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

4.2 ASSESSMENT CRITERIA

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

- Inner West 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 DCP 2013

Section C3.12 – Acoustic Privacy, contained in the Inner West 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 skate park, in addition to the non-habitable areas of the development including the reception areas and corridors and common areas.

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
Reception Areas	40 to 45

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 74 Carlton Crescent, Summer Hill is outside the ANEF 20 contour as shown in the Sydney Airport Draft 2039 ANEF chart, however, the site is located in the region of the flight path outside ANEF contour. As such, an evaluation of aircraft noise intrusion is recommended to 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 2039.

Based on the distance from the property at Carlton Crescent, Summer Hill to the main Sydney Airport runway and the Sydney Airport flight paths (ANEF-2039); AS2021 predicts that the loudest typical aircraft movement will be from an Boeing 777 aircraft taking off from the Main Runway. The noise level at the site, as indicated by the standard, is 78dB(A)L_{max}. This noise level will be used to predict the resultant internal noise levels at the development.

4.4 RECOMMENDED CONSTRUCTIONS

Internal noise levels will primarily be as a result of noise transfer through the roof, walls, windows and doors as these are relatively light building elements that offer less resistance to the transmission of sound.

The predicted noise levels through the roof, walls, windows and doors are discussed below. The predicted noise levels have been based on the expected level and spectral characteristics of the external noise, the area of building elements exposed to aircraft, rail and traffic noise, the absorption characteristics of the rooms and the noise reduction performance of the building elements.

Traffic and aircraft noise intrusion into the proposed development was assessed using the measured traffic noise levels and predicted aircraft noise level presented above.

Calculations were undertaken taking into account the orientation of windows, barrier effects *(where applicable)*, the total area of glazing, facade transmission loss and room sound absorption characteristics. In this way the likely interior noise levels can be predicted.

4.4.1 Glazed Windows

A preliminary review of noise intrusion from all external noise sources has revealed that compliance with acoustic guidelines is achievable with 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 – Heritage Building

Facade	Room	Glazing requirements
Heritage Building All Facades	Heritage Bedrooms	**Option 1 (Recommended)** Replace existing glazing & frame with new 12.38mm laminated glazing in aluminium frame **Option 2 – Heritage Req.** Retain existing glazing and wooden frame and install additional 12.38mm laminated glazing in existing window reveal
	Heritage Common Areas / Reception Area	**Option 1 (Recommended)** Replace existing glazing & frame with new 10.38mm laminated glazing in aluminium frame **Option 2 – Heritage Req.** Retain existing glazing and wooden frame and install additional 10.38mm laminated glazing in existing window reveal

Table 4.5 – Typical Glazing Construction Recommendations – New Buildings

Facade	Room	Glazing requirements
New Buildings North Façade (Facing Rail Lines)	Bedrooms	12.38mm Laminated
	Meeting / Study	12.38mm Laminated
	Communal Lounge	10.38mm Laminated
New Buildings West Façade (Facing Park)	Bedrooms	12.38mm Laminated
	Other	6.38mm Laminated
New Buildings Remaining Façades	Bedrooms	10.38mm Laminated
	Other	6.38mm Laminated

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

In addition to complying with the minimum scheduled glazing thickness, the STC rating of the glazing fitted into operable frames and fixed into the building opening should not be lower than the values listed in Table 4.4 for all rooms. Where nominated, this will require the use of acoustic seals around the full perimeter of operable frames and the frame will need to be sealed into the building opening using a flexible sealant. Note that all these windows are assumed as aluminium awning windows and **mohair seals in windows and doors are not acceptable where acoustic seals are required**.

Table 4.6 - Minimum STC of Glazing & Frame

Glazing Assembly	Acoustic Seals	Min STC of Installed Window
6.38mm Laminated Glass & Frame	Yes	31
10.38mm Laminated Glass & Frame	Yes	35
12.38mm Laminated Glass & Frame	Yes	37

4.4.2 External Walls

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

We note the heritage building is constructed of solid double-brick construction.

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.

4.4.3 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 on the new buildings at the site, acoustic treatments to these areas would be subject to investigation in the detailed design phase of the project.

For heritage building with concrete roof tiles and large cavity pitched roof, the following ceiling constructions are recommended:

Table 4.7 – Recommended Ceiling Construction (Concrete Tile Pitched Roof)

Area	Roof/Ceiling Construction
Bedrooms (Top Level 01)	**External Roofing:** Concrete Tile Roof, aluminum sarking **Cavity:** Large air cavity (Pitched Roof) with minimum 150mm thick 11kg/m^3 density Glasswool Insulation **Internal Layer:** 2 layers of 13mm plasterboard
Corridors (Top Level 01)	**External Roofing:** Concrete Tile Roof, aluminum sarking **Cavity:** Large air cavity (Pitched Roof) with minimum 150mm thick 11kg/m^3 density Glasswool Insulation **Internal Layer:** 1 layers of 13mm plasterboard

4.5 RAIL NOISE ASSESSMENT

Façade noise levels due to rail operations have been predicted from the long-term monitoring results. The most affected façade would experience noise levels of 70dB(A)$L_{eq,15hr}$ and 67dB(A)$L_{eq,9hr}$.

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

4.6 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 70dB(A)$L_{eq,15hr}$ and 67dB(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.

4.7 SKATE PARK NOISE ASSESSMENT

Attended noise monitoring data indicates that the loudest typical $L_{eq\ (15\ min)}$ noise level recorded during use of the skate park is 65 dB(A)$L_{eq\ (15\ min)}$ / 70dB(A)L_{Max} at the location of the facade.

The noise levels were measured when the skate-park occupied by 20+ park users and therefore represents a typical worst-case scenario. For the purposes of the noise intrusion assessment, the typical loudest event (skate board crashing/landing) was used. This assumption provides the most conservative (I.e. worst case) assessment of impact.

Based on the calculated noise levels at the western façade, 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 the skate park.

4.8 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.

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).

Rail and road noise levels within the habitable spaces has been considered with reference to the NSW Department of Planning guideline. An assessment of noise intrusion from the skate park to the west of the site has also been conducted in a similar manner.

Façade noise levels due to rail operations have been predicted from the long-term monitoring results. The most affected façade would experience noise levels of 70dB(A)$L_{eq,15hr}$ and 67dB(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 60 dB(A) and 57 dB(A). Therefore, noise levels in the most affected locations would exceed the windows open goal.

Similarly, based on the external noise levels generated by use of the adjacent Skate 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 55dB(A) within living areas, which exceeds the 50dB(A) noise goal. As the park does not operate in the night-time period (10pm-7am), a consideration of noise levels in sleeping areas is not required.

The development is therefore required to be mechanically ventilated to ensure the amenity of the occupants is maintained.

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):

- A warehouse/commercial development located to the east of the site at 72 Carlton Crescent and;
- A residential dwelling located to the west of the site at 93 Carlton Crescent, Summer Hill.

5.1 BACKGROUND NOISE MONITORING

Unattended background noise monitoring was conducted from Tuesday 27th November 2018 – Tuesday 4th December 2018 using an ARL NGARA noise monitor 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 A. 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)
74 Carlton Crescent, Summer Hill	50	49	37

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 DCP 2013

Section C3.12 – Acoustic Privacy, contained in the Inner West 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.

In addition to the council DCP, the requirements of the Environmental Protection Authority (EPA) also apply at the site. The requirements of the EPA are presented below.

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.

The project amenity noise level is calculated by taking the recommended amenity noise level (as presented in table 2.2 of the policy), subtracting 5dB(A) and then adding 3dB(A) to convert from $L_{Aeq,\ period}$ to a $L_{Aeq,\ 15\text{-}minute}$ descriptor. The project amenity noise level criteria are presented in the table below.

Table 5.2 - EPA Recommended Acceptable Noise Levels

Location	Period/Time	Project Amenity Noise Level Criteria dB(A) $L_{eq(15min)}$
Nearby Residences – Urban Receiver	Day (7am-6pm)	53
	Evening(6pm-10pm)	48
	Night(10pm-7am)	43
Commercial	When in use	63

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 DA acoustic assessment for the proposed development at 72 Carlton Crescent, Summer Hill.

Aircraft, rail and road traffic noise impacts on future occupants of the development have been assessed in accordance with the local council requirements, the NSW Department of Planning – "*Development near Rail Corridors and Busy Roads –Interim Guideline",* Australian Standard 2107 – "*Recommended Design Sound Levels and Reverberation Times for Building Interiors*" and AS 2021 – 2015 "*Aircraft Noise Intrusion – Building Siting and Construction*".

Provided that the treatments set out in section 4.3 of this report are employed, traffic noise impacts to internal areas of the development will comply with relevant acoustic criteria.

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 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.

Recommendations for control of noise emissions have been presented in section 5.3 where it is recommended that specific acoustic treatment to plant servicing the building is determined in the detailed design phase of the project when detailed plant items are known.

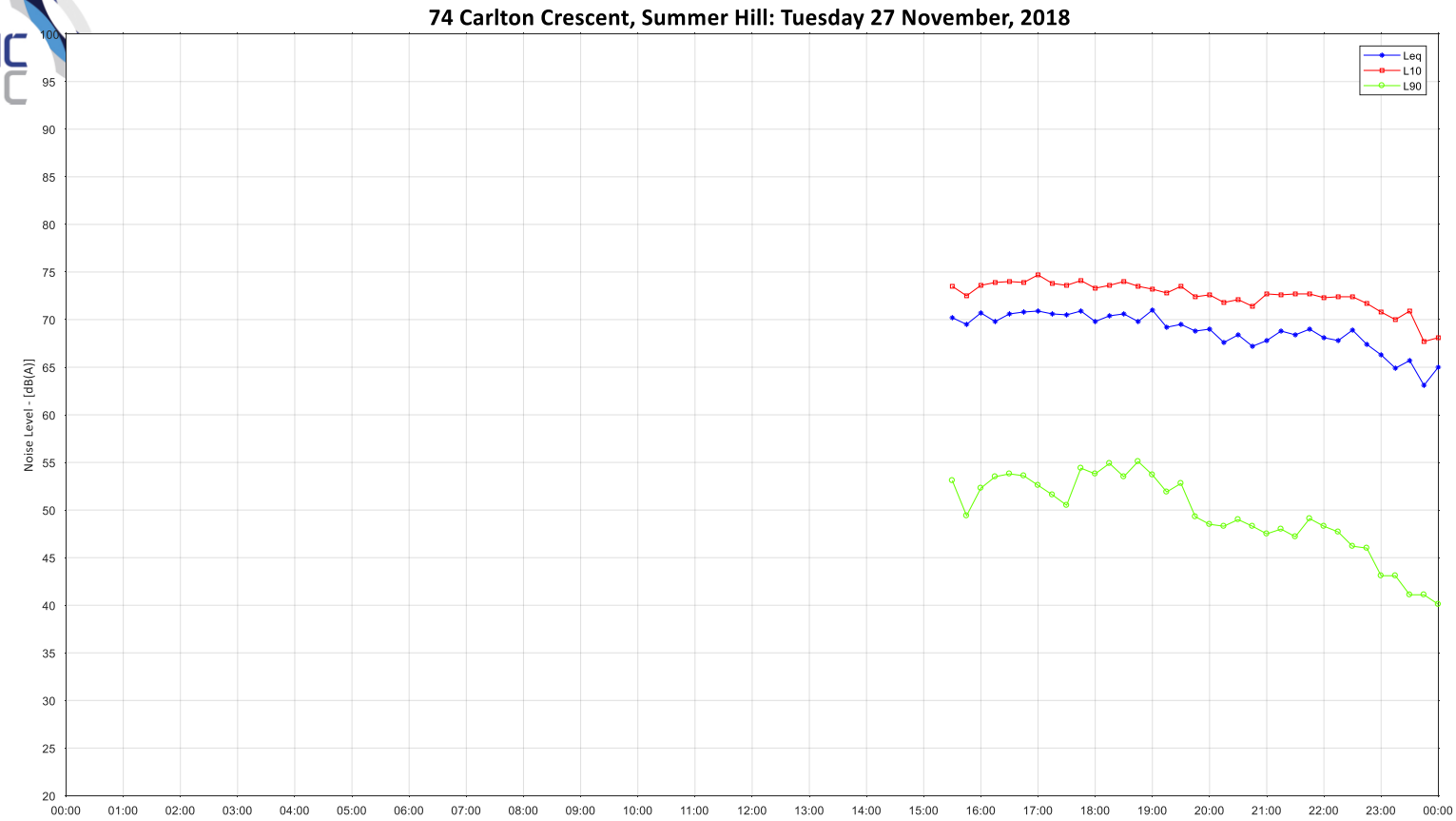
Provided that the recommendations in this report are adopted, compliance with all relevant authoritative acoustic control criteria will be achieved.

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

Yours faithfully,

Acoustic Logic Consultancy Pty Ltd
Jeff Robinson

APPENDIX A – NOISE MONITORING DATA


74 Carlton Crescent, Summer Hill: Tuesday 27 November, 2018
Leq
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Noise Level - [dB(A)]
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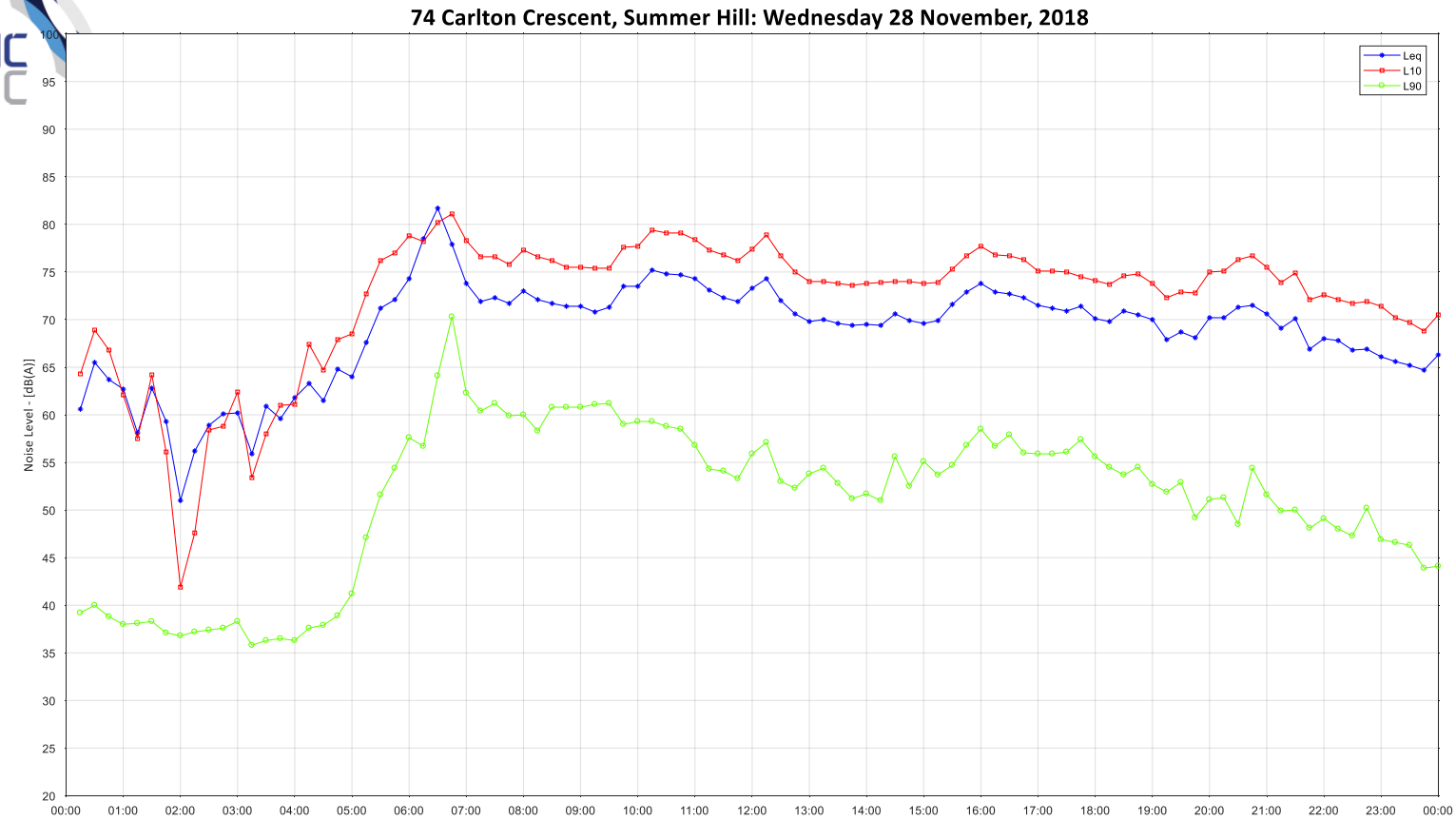
74 Carlton Crescent, Summer Hill: Wednesday 28 November, 2018
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Noise Level - [dB(A)]
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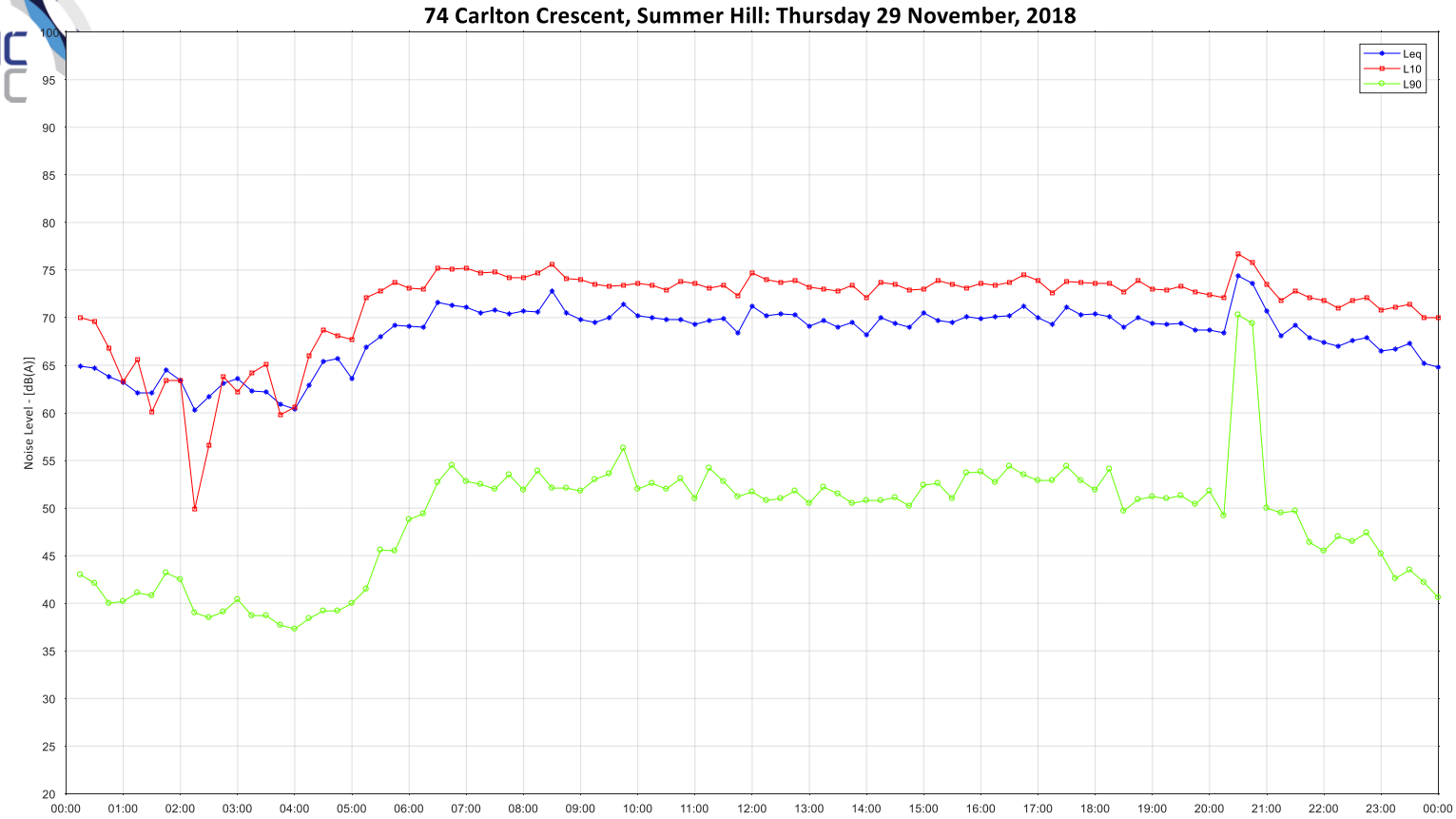
74 Carlton Crescent, Summer Hill: Thursday 29 November, 2018
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Noise Level - [dB(A)]
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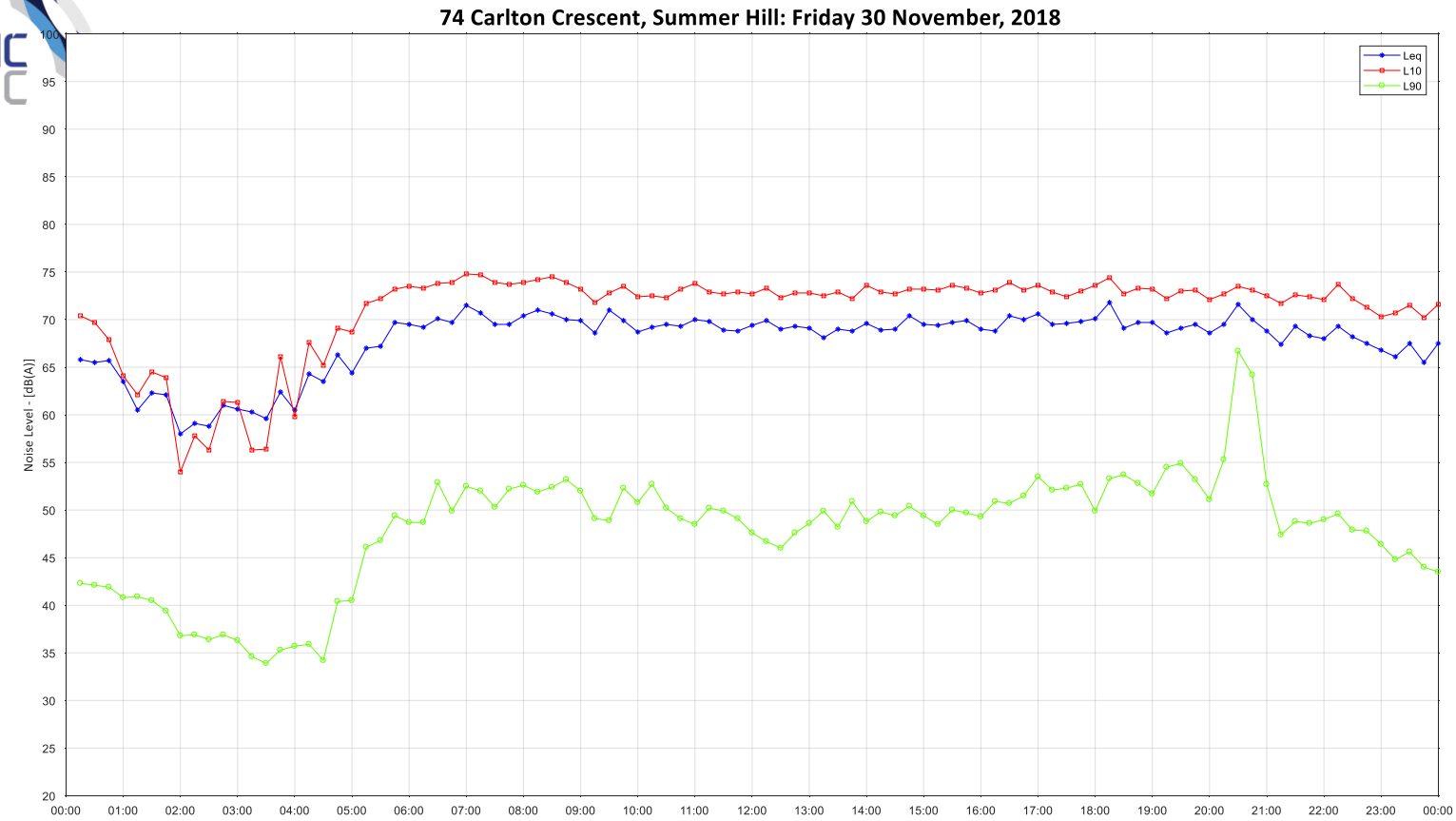
74 Carlton Crescent, Summer Hill: Friday 30 November, 2018
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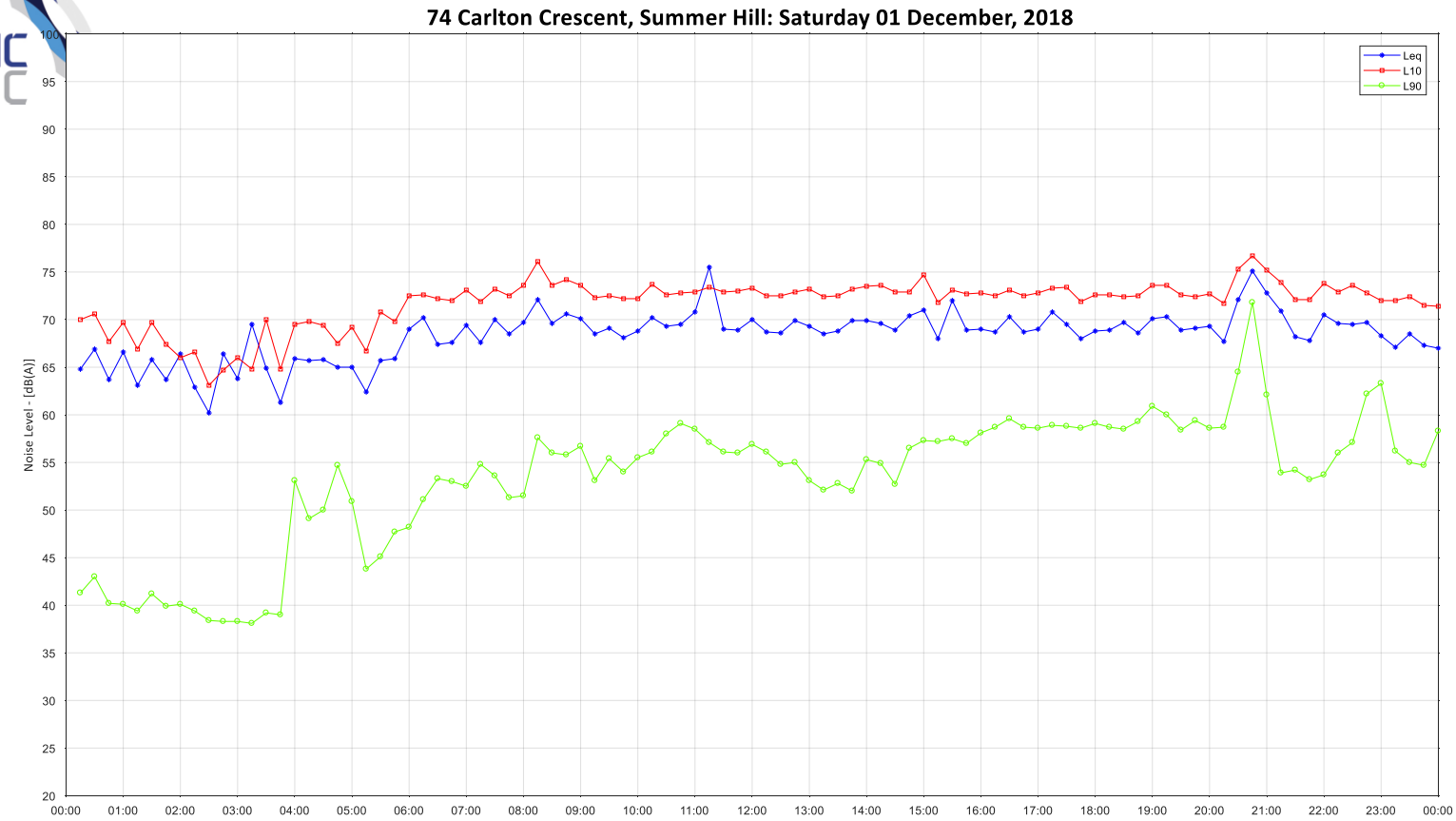
74 Carlton Crescent, Summer Hill: Saturday 01 December, 2018
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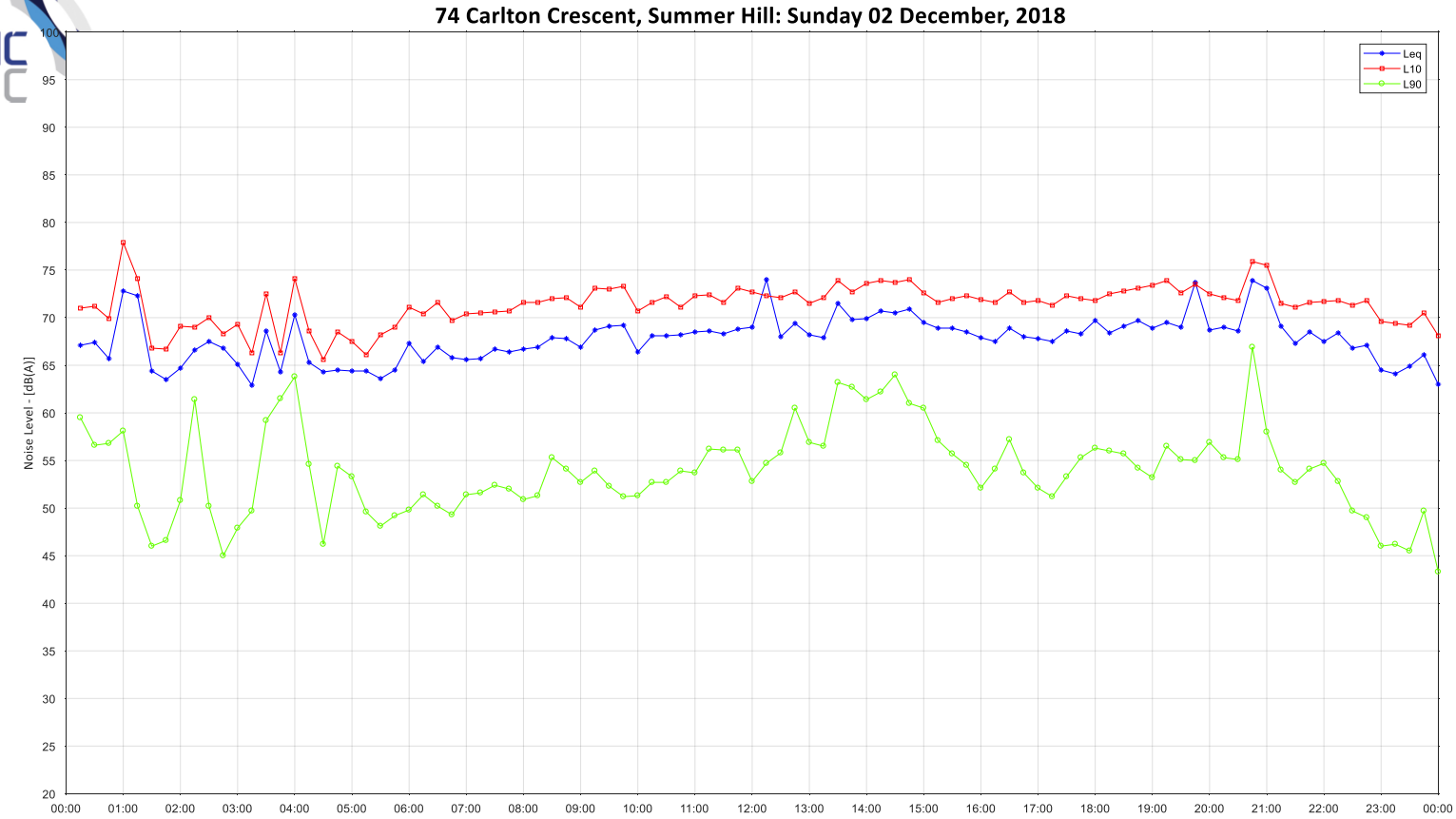
74 Carlton Crescent, Summer Hill: Sunday 02 December, 2018
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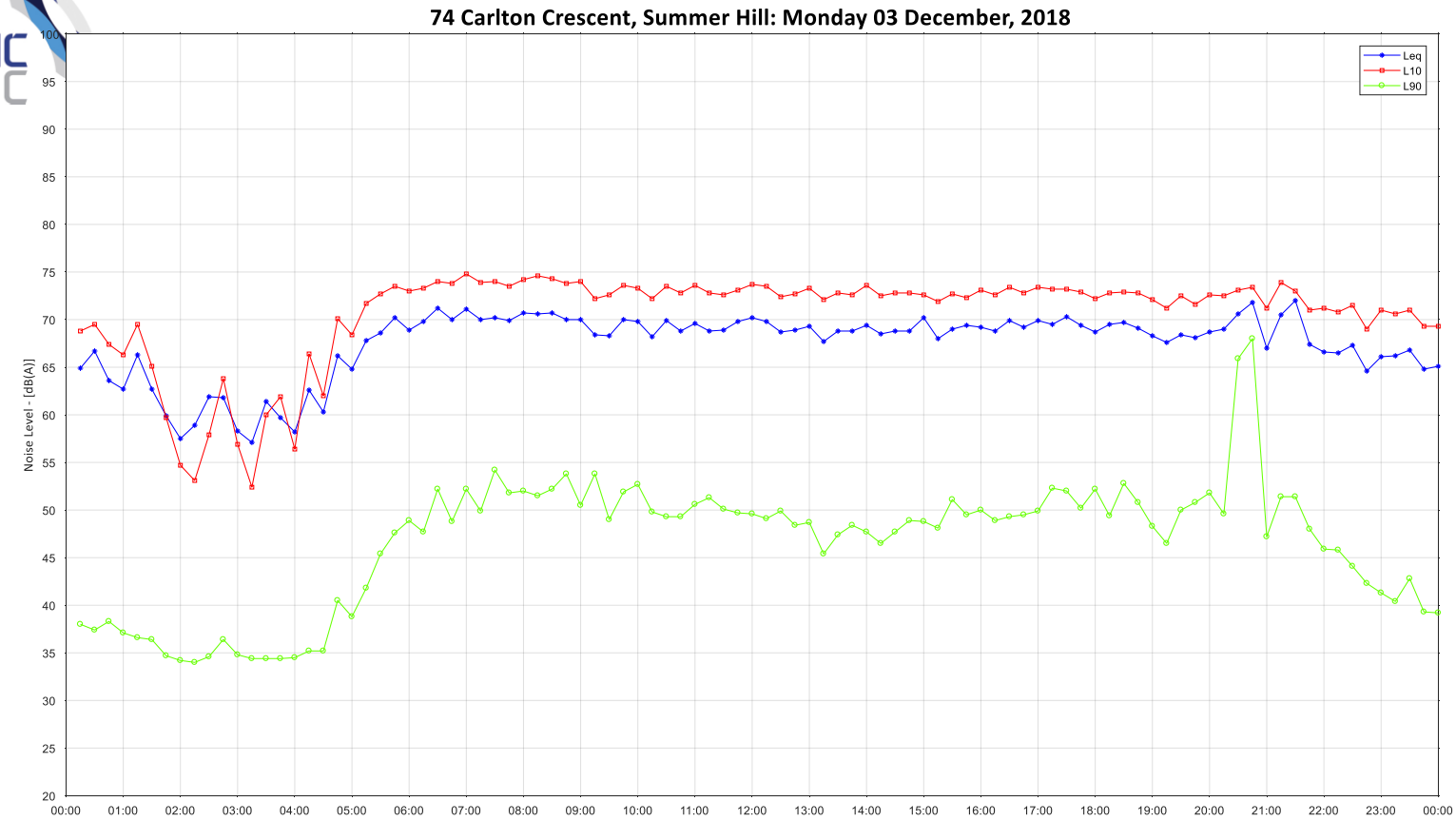
74 Carlton Crescent, Summer Hill: Monday 03 December, 2018
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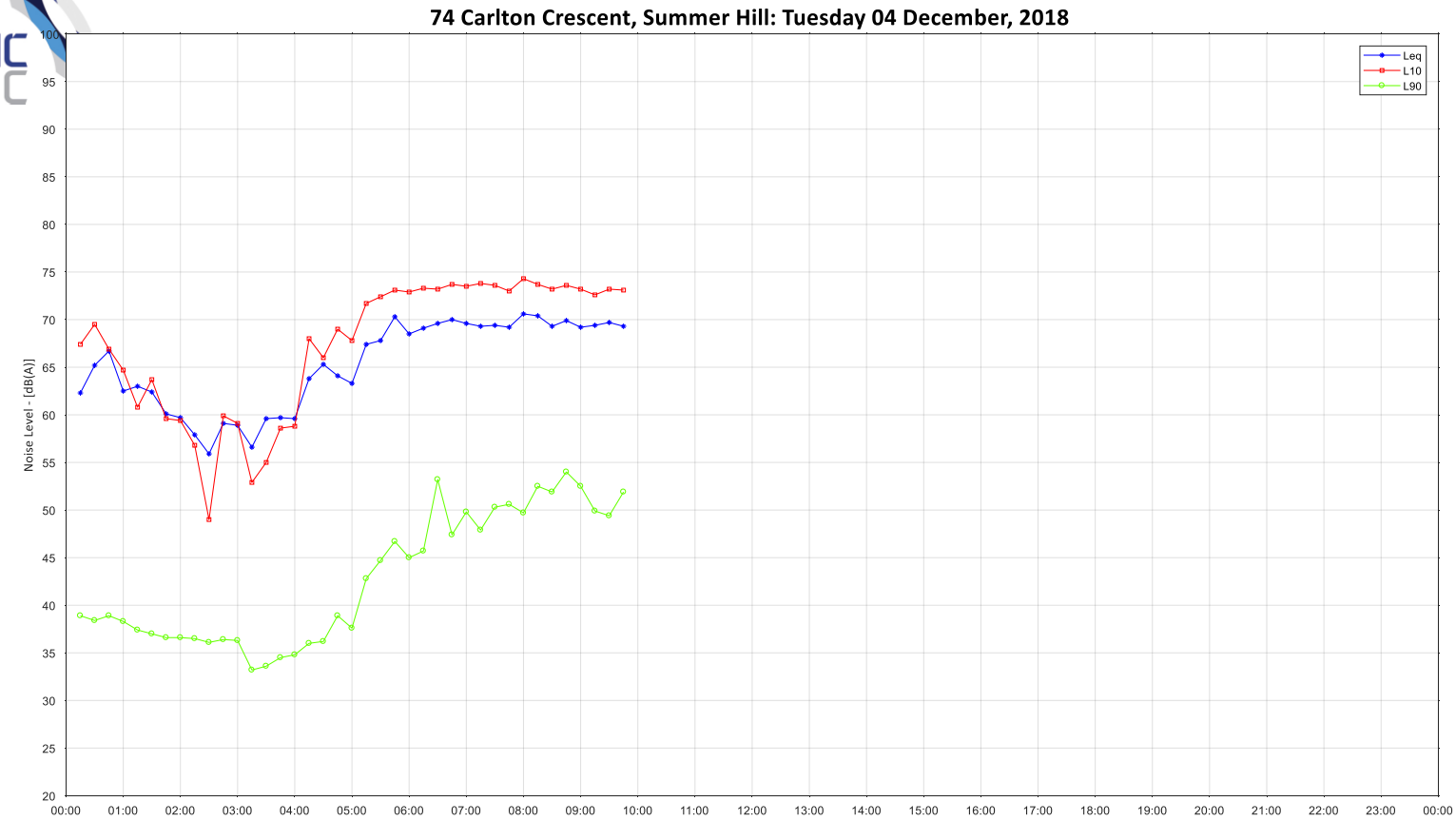
74 Carlton Crescent, Summer Hill: Tuesday 04 December, 2018
Noise Level - [dB(A)]
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