



REPORT 221001R1

Revision 1

Noise Impact Assessment
Proposed Child Care Centre
1 Tracey Avenue, Carlingford

PREPARED FOR:

DBG

4 July 2023



Noise Impact Assessment

Proposed Child Care Centre

1 Tracey Avenue, Carlingford

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1 INTRODUCTION

Rodney Stevens Acoustics Pty Ltd (here forth referred to as RSA) has been engaged by DBG to prepare a Noise Impact Assessment Report for the proposed Child Care Centre to be located at 1 Tracey Avenue, Carlingford.

This report details the results of a noise survey and assesses the likely impact of noise (principally from traffic noise) incident upon the proposed Child Care Centre as well as noise from the proposed Child Care Centre upon nearby residential premises.

Specific acoustic terminology is used in this report. An explanation of common acoustic terms is provided in Appendix A.

2 PROPOSED DEVELOPMENT

2.1 Development Site

The proposed Child Care Centre is to be located at 1 Tracey Avenue, Carlingford. The development site is bounded by residential dwellings to the to the south, east, west and north with Murray Farm Road to the north and Tracey Avenue to the east.

The development site and its surrounding environment are mainly influenced by traffic noise from Murray Farm Road and to a lesser extent Tracey Avenue. The following table shows the most affected receivers.

Table 2-1 Sensitive Receivers

| Receiver | Sensitive Receiver's Address |
|----------|--------------------------------|
| R1 | 69 Murray Farm Road |
| R2 | 72 Murray Farm Road (Elevated) |
| R3 | 68 Murray Farm Road |
| R4 | 3 Tracey Avenue |
| R5 | 5 Tracey (Elevated) |

Figure 2-1 shows an aerial image of the site area and the surrounding environment.



Figure 2-1 Site Location

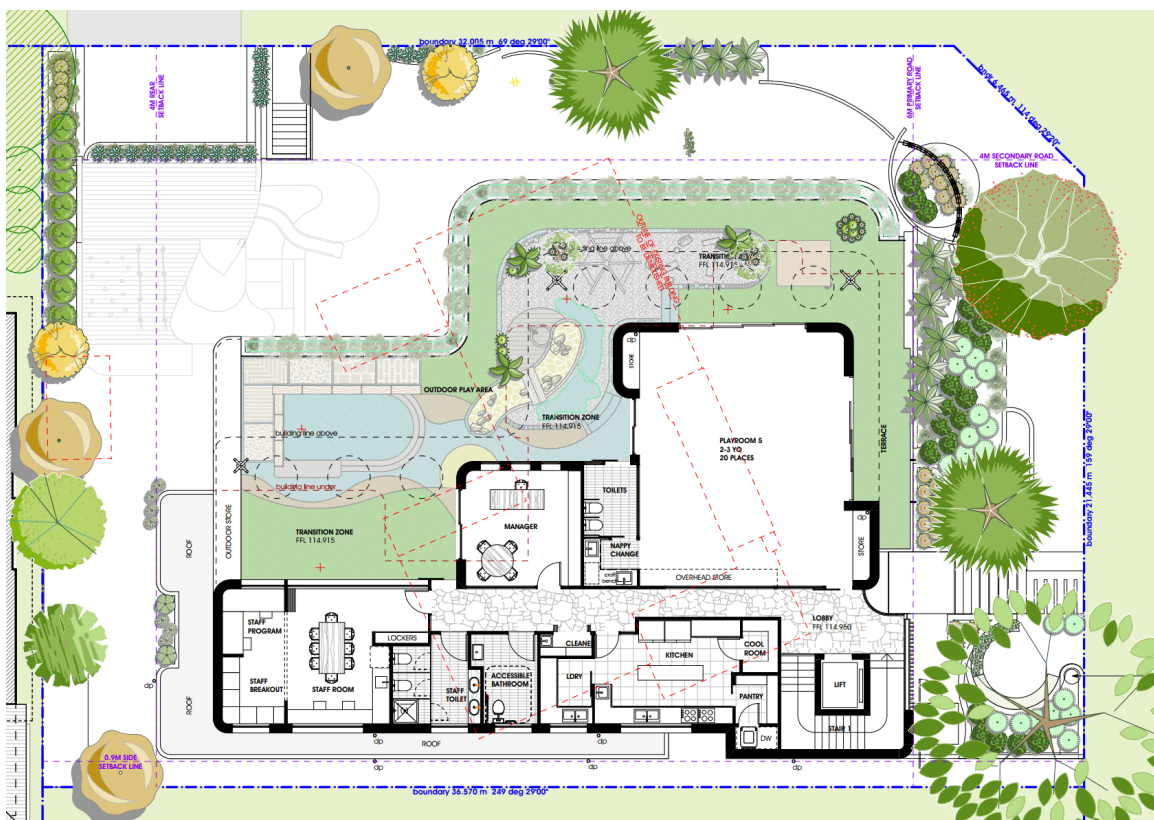


Image Courtesy of Six Map © 2023.



The following figure presents the proposed Child Care Centre Layout:

Figure 2-2 Proposed Child Care Centre Layout





2.2 The Development

The proposal is to construct a double storey childcare centre. The building will have a ground level outdoor play area, a secondary outdoor play area on the second level and feature basement level parking.

2.3 Hours of Operation

The following hours of operation are proposed:

- Monday to Friday 7:00 am until 6:00 pm

2.4 Enrolment Numbers

The proposed Child Care Centre plans to cater for up to 74 children between the ages of 0 and 6 years of age. The number of children and their age groups are as follows:

- 0-2 years old - 24 Children
- 2-3 years old - 20 Children
- 3-6 years old - 30 Children

2.5 Outdoor Play Activities

In RSA's experience with Child Care Centres, potential noise issues occur primarily when children are engaged in outdoor play activities, in terms of intrusive environmental noise to the play areas and play area noise to nearby sensitive receivers.

3 BASELINE NOISE SURVEY

3.1 Unattended Noise Monitoring

In order to characterise the existing acoustical environment of the area unattended noise monitoring was conducted between the dates of Monday 31st January and Monday 6th February 2023 at the logging location shown in Figure 2-1.

The first logger which was located on the southern boundary of the site and monitored the road traffic noise from Murray Farm Road and the surrounding area. The second logger was located on the northern boundary and measured baseline background noise environs of the surrounding residential areas adjacent to the project site.

Logger location was selected with consideration to other noise sources which may influence readings, security issues for noise monitoring equipment and gaining permission for access from residents and landowners.

Instrumentation for the survey comprised of two RION NL-42 environmental noise loggers (serial numbers: 572542 & 885460) fitted with microphone windshields. Calibration of the loggers was checked prior to and following measurements. Drift in calibration did not exceed ± 0.5 dB(A). All equipment carried appropriate and current NATA (or manufacturer) calibration certificates. Measured data has been filtered to remove data measured during adverse weather conditions upon consultation with historical weather reports provided by the Bureau of Meteorology (BOM). Data has been removed for the 31st of January.

The logger determines L_{A1} , L_{A10} , L_{A90} and L_{Aeq} levels of the ambient noise. L_{A1} , L_{A10} , L_{A90} are the levels exceeded for 1%, 10% and 90% of the sample time respectively (see Glossary for definitions in Appendix A). Detailed results at the monitoring location are presented in graphical format in Appendix B. The graphs show measured values of L_{A1} , L_{A10} , L_{A90} and L_{Aeq} for each 15-minute monitoring period.



3.2 Data Processing

3.2.1 Noise Emission (*Noise Policy for Industry*)

In order to assess noise emission from the proposed Child Care Centre, the data obtained from the noise logger has been processed in accordance with the procedures contained in the NSW Environmental Protection Authority's (EPA) *Noise Policy for Industry* (NPfI, 2017) to establish representative noise levels that can be expected in the residential vicinity of the site. The monitored baseline noise levels are detailed in Table 3-1.

Table 3-1 Measured Baseline Noise Levels Corresponding to Defined NPfI Periods

| Location | Measurement Descriptor | Measured Noise Level – dB(A) re 20 µPa | | |
|--------------------------|------------------------|--|-------------------------|----------------------------|
| | | Daytime 7 am - 6 pm | Evening 6 pm – 10 pm | Night-time 10 pm – 7 am |
| Logger Southern Boundary | L _{Aeq} | 53 | 53 | 48 |
| | RBL (Background) | 44 | 43 | 37 |

L_{Aeq} Equivalent continuous (energy average) A-weighted sound pressure level. It is defined as the steady sound level that contains the same amount of acoustic energy as the corresponding time-varying sound.

L_{A90} Noise level present for 90% of time (background level). The average minimum background sound level (in the absence of the source under consideration).

3.2.2 Noise Intrusion (*Road Noise Policy*)

To assess noise intrusion into the outdoor play areas and internal areas of the Child Care Centre, the data obtained from the logger location has been processed to establish representative ambient noise levels from Murray Farm Road.

The time periods used for this assessment are as defined in the EPA's *Road Noise Policy* (RNP, 2011). Results are presented below in Table 3-2.

Table 3-2 Ambient Noise Levels Corresponding to Defined RNP Periods

| Location | Period | External Noise Levels dB(A) |
|-----------------|--------|-------------------------------|
| Northern Facade | 1 Hour | L _{Aeq(1hour)} 58 dB |
| Eastern Facade | 1 Hour | L _{Aeq(1hour)} 56 dB |



4 NOISE GUIDELINES AND CRITERIA

4.1 Operational Noise from Child Care Centre

Responsibility for the control of noise emissions in New South Wales is vested in Local Government and the EPA. The EPA oversees the Noise Policy for Industry (NPfI) October 2017 which provides a framework and process for deriving project trigger noise level. The NPfI project noise levels for industrial noise sources have two (2) components:

- Controlling the intrusive noise impacts for residents and other sensitive receivers in the short term; and
- Maintaining noise level amenity for particular land uses for residents and sensitive receivers in other land uses.

4.1.1 Intrusiveness Noise Levels

For assessing intrusiveness, the background noise generally needs to be measured. The intrusiveness noise level essentially means that the equivalent continuous noise level (LAeq) of the source should not be more than 5 dB(A) above the measured Rated Background Level (RBL), over any 15-minute period.

4.1.2 Amenity Noise Levels

The amenity noise level is based on land use and associated activities (and their sensitivity to noise emission). The cumulative effect of noise from industrial sources needs to be considered in assessing the impact. The noise levels relate only to other industrial-type noise sources and do not include road, rail or community noise. The existing noise level from industry is measured.

If it approaches the project trigger noise level value, then noise levels from new industrial-type noise sources, (including air-conditioning mechanical plant) need to be designed so that the cumulative effect does not produce total noise levels that would significantly exceed the project trigger noise level.

4.1.3 Area Classification

The NPfI characterises the “Suburban” noise environment as an area with an acoustical environment that:

- has local traffic with characteristically intermittent traffic flows or with some limited commerce or industry.
- This area often has the following characteristic: - evening ambient noise levels defined by the natural environment and human activity

The area surrounding the proposed development falls under the “Suburban” area classification.

4.1.4 Project Specific Trigger Noise Levels

Having defined the area type, the processed results of the attended noise monitoring have been used to determine project specific project trigger noise levels. The intrusive and amenity project trigger noise levels for nearby residential premises are presented in Table 4-1. These project trigger noise levels are nominated for the purpose of assessing potential noise impacts from the proposed development.

In this case, the ambient noise environment is not controlled by industrial noise sources and therefore the project amenity noise levels are assigned as per Table 2.2 of the NPfI (Recommended Amenity Noise Levels) and standardised as per Section 2.2 of the NPfI. For each assessment period, the lower (i.e. the more stringent) of the amenity or intrusive project trigger noise levels are adopted. These are shown in bold text in Table 4-1.



Table 4-1 Operational Project Trigger Noise Levels

| Receiver | Time of Day | ANL ¹ L _{Aeq} (15min) | Measured | | Project Trigger Noise Levels | |
|-------------|-------------|--|--|---------------------------------------|---------------------------------------|-------------------------------------|
| | | | RBL ² L _{A90} (15min) | Existing L _{Aeq} (Period) | Intrusive L _{Aeq} (15min) | Amenity L _{Aeq} (15min) |
| Residential | Day | 55 | 44 | 53 | 49 | 58 |
| | Evening | 45 | 43 | 53 | 48 | 48 |
| | Night | 40 | 37 | 48 | 42 | 43 |

Note 1: ANL = “Amenity Noise Level” for residences in Suburban Areas.

Note 2: RBL = “Rating Background Level”.

4.1.5 Noise Emissions from Children Play Activities

The noise criteria required at the most sensitive receivers is based on the measured background noise level plus 5 dB(A), therefore, the noise criteria for the proposed child care centre is (daytime L_{A90} 41 dB(A) + 5 dB(A) L_{Aeq}(15minute) **46 dB(A)**). This is based on a measured background noise level of L_{A90}(15minute) 41 dB(A).

4.1.6 Road Noise Intrusion to Outdoor Playground

Noise levels within outdoor play areas are covered by the Liverpool City Council's DCP 2012, the noise criterion for outdoor play areas is as follow:

- Outdoor play areas – L_{Aeq}(1hour) 55 dB(A) (external).

4.1.7 Noise Intrusion to Indoor Areas

Hills Shire Council's DCP 2012 requires the internal area noise levels to not exceed the L_{Aeq}, 40 dB(A) (internal) for all rooms and a the L_{Aeq}, 35 dB(A) (internal) for sleeping areas

5 NOISE IMPACT ASSESSMENT

5.1 Road Traffic Noise Intrusion into Centre

5.1.1 Outdoor Play Area

Based on the measured road traffic noise level of L_{Aeq}(1hour) 58 dB(A) from Murray Farm Road, the predicted traffic noise impacts at the outdoor play areas are presented in Table 5-1 below.

The following assumptions have been made in the noise modelling of the road traffic noise impacts on the outdoor play areas:

- Acoustic barrier along the west and northern boundaries will be in place (Refer to Appendix D)
- The height of children between the ages of 0 and 6 years have an average height of 1 metre;
- The outdoor play areas are located to the north and east of the site and are moderately shielded by the child care building to the north and east directions.
- Road traffic noise impacts have been modelled from the centre line of the road to approximately the middle of the outdoor play areas.



Table 5-1 Predicted Road Traffic Noise Levels Into Outdoor Play Areas

| Area | Predicted L_{Aeq} Road Traffic Noise Level – dB(A) | Noise Criterion L_{Aeq} – dB(A) | Compliance (Yes / No) |
|---------------------------------|--|-----------------------------------|-----------------------|
| Outdoor Play Area - Ground | 53 | 55 | Yes |
| Outdoor Play Area - First Floor | 50 | 55 | Yes |

Existing road traffic noise levels in the Outdoor Play areas are predicted to comply with the $L_{Aeq,(1hour)}$ 55 dB(A) (external) criterion stipulated in Section 4.1.6. Based on this assessment no additional no control measures will be required.

5.1.2 Indoor Areas

The typical outdoor to indoor noise reductions provided by most standard glazed facades (i.e. without special acoustical treatment) is generally accepted as being 10 dB(A) through an open window and in the order of 20 dB(A) with windows closed.

The facade road traffic noise at the proposed child care centre building is calculated to be $L_{Aeq,(1hour)}$ 58 dB(A) on the Northern facade. Considering the distance, shielding and glazing performance, the resultant indoor noise levels for opened and closed windows at the northern facade, corresponding to the typical noise reductions are as follow:

Table 5-2 Predicted Road Traffic Noise Levels Into Indoor Areas

| Area | Predicted L_{Aeq} Road Traffic Noise Level – dB(A) | | Noise Criterion L_{Aeq} – dB(A) | Compliance (Open / Closed) |
|---------------|--|----------------|-----------------------------------|----------------------------|
| | Windows Open | Windows Closed | | |
| 3-6yr (West) | 40 | 30 | 40 | Open |
| 0-2yr (South) | 34 | 24 | 40 | Open |
| 2-3yr (North) | 48 | 38 | 40 | Closed |

The predicted internal noise levels are likely to meet the 40 dB(A) criteria as required by Parramatta City Council for road traffic into indoor areas with the above configurations.

5.2 Mechanical Plant Noise Assessment

Mechanical ventilation may be installed at the proposed childcare centre, the operation of such mechanical plant must be in accordance with the relevant regulations such as the Building Code of Australia (BCA Vol.1, Part 4.5 *Ventilation of rooms*) and AS1668.2-2002 *The use of ventilation and air conditioning in buildings* will be required.

A specific mechanical plant selection has not been supplied at this stage. It is anticipated that the building will be serviced by typical mechanical ventilation/air conditioning equipment.

It is likely that the criteria set out in Table 4-1 may be met through the use of conventional noise control methods (e.g. selection of equipment on the basis of quiet operation and, where necessary, providing enclosures, localised barriers, silencers and lined ductwork).



An appropriately qualified acoustic consultant should review the mechanical plant associated with the development at the detailed design stage when final plant selections have been made.

5.3 Operational Noise Emissions to Nearby Residences

5.3.1 Outdoor Play Activities Noise Impact

Potential noise management issues occur primarily when children are engaged in outdoor play activities. Noise generated by the children in the outdoor play area will occur at limited times throughout the day, with numbers of children playing and periods of play managed by the Centre staff.

The noise level of 75 dB(A) has been used as a noise source as per Appendix 10 of Hills Shire Council's DCP 2012.

The following assumptions have been made in the noise modelling of the Outdoor Play areas noise impacts on the neighbouring residences:

- The height of the residential receivers has been assumed to be 1.5 metres for residential buildings on their respective level;
- Source height in the outdoor play area, i.e. children average height, has been taken to be 1 metre for children between the ages of 0 and 6;
- The proposed acoustic Barrier (Refer to Appendix D) along the boundaries of the outdoor play areas have been considered in the noise model;
- Resulting noise levels have been calculated to the most affected point on the boundary of the affected receivers.

The following figure shows the receiver locations in relation to the proposed Child Care Centre.

Figure 5-1 Receiver Locations





The predicted noise levels experienced by nearest residential receivers are presented in Table 5-3 below. Noise levels have been calculated at the most affected boundary heights. The noise levels presented below are representative of the worst-case scenarios for receivers.

Table 5-3 Predicted Outdoor Play Activities Noise Emission

| Receiver | Predicted Outdoor Play Activities Noise at Neighbouring Residents – dB(A) | Criteria | Compliance |
|-----------------|--|-----------------|-------------------|
| R1 | 34 | 49 | Yes |
| R2 | 47 | 49 | Yes |
| R3 | 30 | 49 | Yes |
| R4 | 45 | 49 | Yes |
| R5 | 35 | 49 | Yes |

Noise from the outdoor play activities at the surrounding residences is predicted to comply with the 49 dB(A) criterion with the scenario presented above.

Based on the above assessment of the outdoor play activities noise emissions, acoustic treatment must be implemented along the boundaries. (Please refer to Section 6.3 and Appendix D)

5.3.2 Noise Emissions from Indoor Activities

Calculations have been carried out to ascertain the noise breakout from indoor activities to the neighbouring premises. The predicted noise levels indicate that the noise criteria will not be exceeded if the windows are in the configuration shown in Table 5-2 the resulting noise levels are presented in Table 5-4 below. Noise levels have been calculated at the most affected boundary heights.

Table 5-4 Predicted Indoor Play Activities Noise Emission

| Receiver | Predicted Indoor Play Activities Noise at Neighbouring Residents – dB(A) | Criteria | Compliance |
|-----------------|---|-----------------|-------------------|
| R1 | 23 | 49 | Yes |
| R2 | 36 | 49 | Yes |
| R3 | 20 | 49 | Yes |
| R4 | 35 | 49 | Yes |
| R5 | 25 | 49 | Yes |

The glazing for the windows on all façades of the indoor play areas must have a minimum rating of R_w 32, This rating can be achieved with 6.38mm laminated glass in aluminium frames with acoustic seals. We note that the R_w rating is required for the complete glazing and frame assembly. The minimum glazing thicknesses will not necessarily meet the required R_w rating without an appropriate frame system. It will be therefore necessary to provide a window glass and frame system having a laboratory tested acoustic performance meeting the specified requirements.



Noise emissions from indoor activities will meet criteria at the neighbouring residential receivers with windows on the northern, southern, eastern and western facades open.

5.3.3 Carpark Emission

The proposed car park is to be located on the east of the site, it has a capacity of 19 car spaces, calculations of noise from the carpark have been based on typical noise generating events within a carpark such as, door slams, engine starts and cars driving away. We have assumed a scenario were 15 cars enter or leave the carpark in a span of 15 minutes. A 1.6m barrier must be implemented as per Appendix D.

The calculated noise levels from the activities carried out within the carpark are presented in the table below:

Table 5-5 Calculated Carpark Noise Levels

| Receiver | Predicted Carpark Activities Noise at Neighbouring Residents – dB(A) | Criteria | Compliance |
|----------|--|----------|------------|
| R1 | 36 | 49 | Yes |
| R2 | 34 | 49 | Yes |
| R3 | 49 | 49 | Yes |
| R4 | 47 | 49 | Yes |

6 RECOMMENDATIONS

The following recommendations must be implemented in order to achieve compliance with the criteria requirements from Parramatta City Council.

6.1 Outdoor Play Areas

In order to achieve compliance with council's noise requirements for outdoor play, the following must be implemented:

- Children should be spread out evenly across the outdoor play area.
- Playground equipment that allows a child to be more than 1 above the ground level should not be used
- No music is to be played in the outdoor areas
- Children must be supervised at all times.
- Acoustic barrier detailed in Section 6.3 and Appendix D must be implemented.

6.2 Indoor Play Areas

In order to achieve compliance with council's noise requirements for outdoor play, the following must be implemented:

- The glazing for all indoor play areas must have a minimum Rw 32, all remaining glazing can be standard. This rating can be achieved with 6.38mm laminated glass in aluminium frames with acoustic seals.
- Glazing on the western and southern facades should remain closed during active indoor play.



6.3 Acoustic Enclosure Details

A 2.1 meters high solid barrier with a 1m awning angled at 45 degrees (total height approx. 2.6m) and 1.8m meter solid barrier must be implemented along the western boundary must be implemented (Appendix D).

The acoustic barrier is required to provide the adequate noise attenuation, the construction material of the barriers must have a surface density of 10-15 kg/m² and be free from holes and gaps. Some suitable materials include:

- 25 mm thick plywood timber panelling
- 9 mm thick fibre cement sheet
- 75mm thick Hebel PowerPanel
- Slim Wall
- 12 mm thick Perspex, polycarbonate or Danpalon
- 6 mm toughened laminated safety glass
- Any other approved material which meets the above surface density specification

A typical material used in childcare centres is Perspex, which is a polycarbonate material. The use of the 12 mm thick Perspex or 6 mm glass for this purpose which has a surface mass of 11 kg/m² will meet the mass requirements detailed above and be suitable for use as it is transparent and will not unduly restrict light or vision.

All barriers must be free of gaps and penetrations and it is particularly important to ensure that the gap at the bottom of the barrier is minimised as far as practicable. The base of the barriers should be well sealed at the junction where the barrier meets the floor, but still be designed to allow proper water drainage.

7 CONCLUSION

RSA has conducted a noise impact assessment of the proposed Child Care Centre at 1 Tracey Avenue, Carlingford. The assessment has comprised the establishment of noise criteria and assesses noise impacts with regard to relevant statutory requirements.

Traffic noise intrusion into the indoor areas has been assessed to comply to noise criteria as set out in Section 3.2.2 based on this assessment.

Noise emissions from the indoor play activities to the nearest residential receivers have been calculated to comply with the noise criterion, with the configurations shown in Table 5-2.

Noise emissions from the outdoor area play activities to the nearest residential receivers have been calculated to comply with the noise criterion. A 2.1m with 1m angled awning, solid barrier (2.6m) and a 1.8m barriers must be implemented along the outdoor play areas boundary to minimise the noise impact from the outdoor areas. (See Appendix D).

Criteria for noise emissions from mechanical plant have been established, a further acoustic survey by a qualified acoustic consultant will be required once mechanical plant schedules have been selected.

Based on our assessment the proposed Child Care Centre at 1 Tracey Avenue, Carlingford is deemed to not cause "Offensive Noise" to neighbouring residences provided that the noise control measures recommended is implemented. It is therefore recommended that planning approval be granted for the proposed development on the basis of acoustics.



Approved: -

Rodney O. Stevens.

Rodney Stevens
Manager/Principal

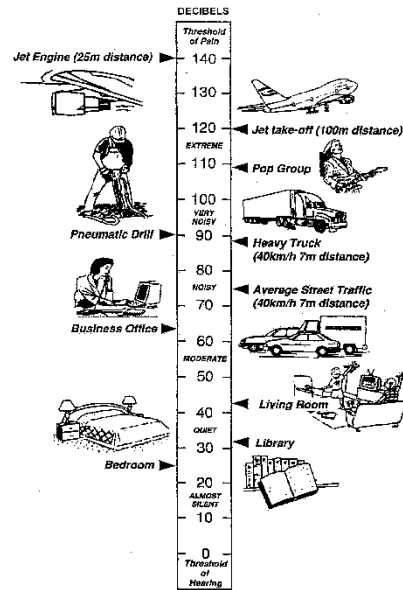


Appendix A – Acoustic Terminology

| | |
|---|--|
| A-weighted sound pressure | The human ear is not equally sensitive to sound at different frequencies. People are more sensitive to sound in the range of 1 to 4 kHz (1000 – 4000 vibrations per second) and less sensitive to lower and higher frequency sound. During noise measurement an electronic ' <i>A-weighting</i> ' frequency filter is applied to the measured sound level <i>dB(A)</i> to account for these sensitivities. Other frequency weightings (B, C and D) are less commonly used. Sound measured without a filter is denoted as linear weighted <i>dB(linear)</i> . |
| Ambient noise | The total noise in a given situation, inclusive of all noise source contributions in the near and far field. |
| Community annoyance | Includes noise annoyance due to: <ul style="list-style-type: none">■ character of the noise (e.g. sound pressure level, tonality, impulsiveness, low-frequency content)■ character of the environment (e.g. very quiet suburban, suburban, urban, near industry)■ miscellaneous circumstances (e.g. noise avoidance possibilities, cognitive noise, unpleasant associations)■ human activity being interrupted (e.g. sleep, communicating, reading, working, listening to radio/TV, recreation). |
| Compliance | The process of checking that source noise levels meet with the noise limits in a statutory context. |
| Cumulative noise level | The total level of noise from all sources. |
| Extraneous noise | Noise resulting from activities that are not typical to the area. Atypical activities may include construction, and traffic generated by holiday periods and by special events such as concerts or sporting events. Normal daily traffic is not considered to be extraneous. |
| Feasible and reasonable measures | Feasibility relates to engineering considerations and what is practical to build; reasonableness relates to the application of judgement in arriving at a decision, considering the following factors: <ul style="list-style-type: none">■ Noise mitigation benefits (amount of noise reduction provided, number of people protected).■ Cost of mitigation (cost of mitigation versus benefit provided).■ Community views (aesthetic impacts and community wishes).■ Noise levels for affected land uses (existing and future levels, and changes in noise levels). |
| Impulsiveness | Impulsive noise is noise with a high peak of short duration or a sequence of these peaks. Impulsive noise is also considered annoying. |



| | |
|--------------------------------------|--|
| Low frequency | Noise containing major components in the low-frequency range (20 to 250 Hz) of the frequency spectrum. |
| Noise criteria | The general set of non-mandatory noise levels for protecting against intrusive noise (for example, background noise plus 5 dB) and loss of amenity (e.g. noise levels for various land use). |
| Noise level (goal) | A noise level that should be adopted for planning purposes as the highest acceptable noise level for the specific area, land use and time of day. |
| Noise limits | Enforceable noise levels that appear in conditions on consents and licences. The noise limits are based on achievable noise levels, which the proponent has predicted can be met during the environmental assessment. Exceedance of the noise limits can result in the requirement for either the development of noise management plans or legal action. |
| Performance-based goals | Goals specified in terms of the outcomes/performance to be achieved, but not in terms of the means of achieving them. |
| Rating Background Level (RBL) | The rating background level is the overall single figure background level representing each day, evening and night time period. The rating background level is the 10 th percentile min L _{A90} noise level measured over all day, evening and night time monitoring periods. |
| Receptor | The noise-sensitive land use at which noise from a development can be heard. |
| Sleep disturbance | Awakenings and disturbance of sleep stages. |
| Sound and decibels (dB) | <p>Sound (or noise) is caused by minute changes in atmospheric pressure that are detected by the human ear. The ratio between the quietest noise audible and that which should cause permanent hearing damage is a million times the change in sound pressure. To simplify this range the sound pressures are logarithmically converted to decibels from a reference level of 2 x 10⁻⁵ Pa.</p> <p>The picture below indicates typical noise levels from common noise sources.</p> |



dB is the abbreviation for decibel – a unit of sound measurement. It is equivalent to 10 times the logarithm (to base 10) of the ratio of a given sound pressure to a reference pressure.

Sound power Level (SWL)

The sound power level of a noise source is the sound energy emitted by the source. Notated as SWL, sound power levels are typically presented in *dB(A)*.

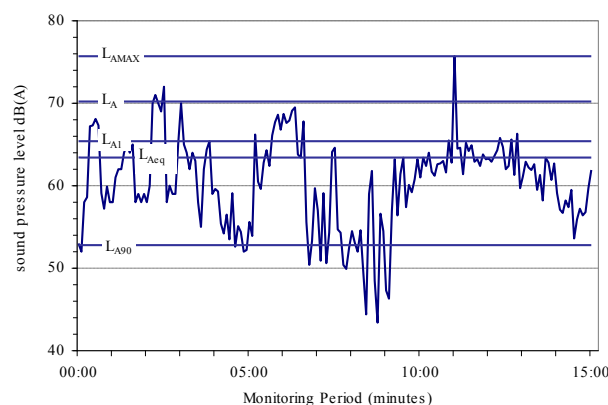
Sound Pressure Level (SPL)

The level of noise, usually expressed as SPL in *dB(A)*, as measured by a standard sound level meter with a pressure microphone. The sound pressure level in *dB(A)* gives a close indication of the subjective loudness of the noise.

Statistic noise levels

Noise levels varying over time (e.g. community noise, traffic noise, construction noise) are described in terms of the statistical exceedance level.

A hypothetical example of A weighted noise levels over a 15 minute measurement period is indicated in the following figure:



Key descriptors:

L_{Amax} Maximum recorded noise level.

L_{A1} The noise level exceeded for 1% of the 15 minute interval.



L_{A10} Noise level present for 10% of the 15-minute interval. Commonly referred to the average maximum noise level.

L_{Aeq} Equivalent continuous (energy average) A-weighted sound pressure level. It is defined as the steady sound level that contains the same amount of acoustic energy as the corresponding time-varying sound.

L_{A90} Noise level exceeded for 90% of time (background level). The average minimum background sound level (in the absence of the source under consideration).

Threshold The lowest sound pressure level that produces a detectable response (in an instrument/person).

Tonality Tonal noise contains one or more prominent tones (and characterised by a distinct frequency components) and is considered more annoying. A 2 to 5 dB(A) penalty is typically applied to noise sources with tonal characteristics

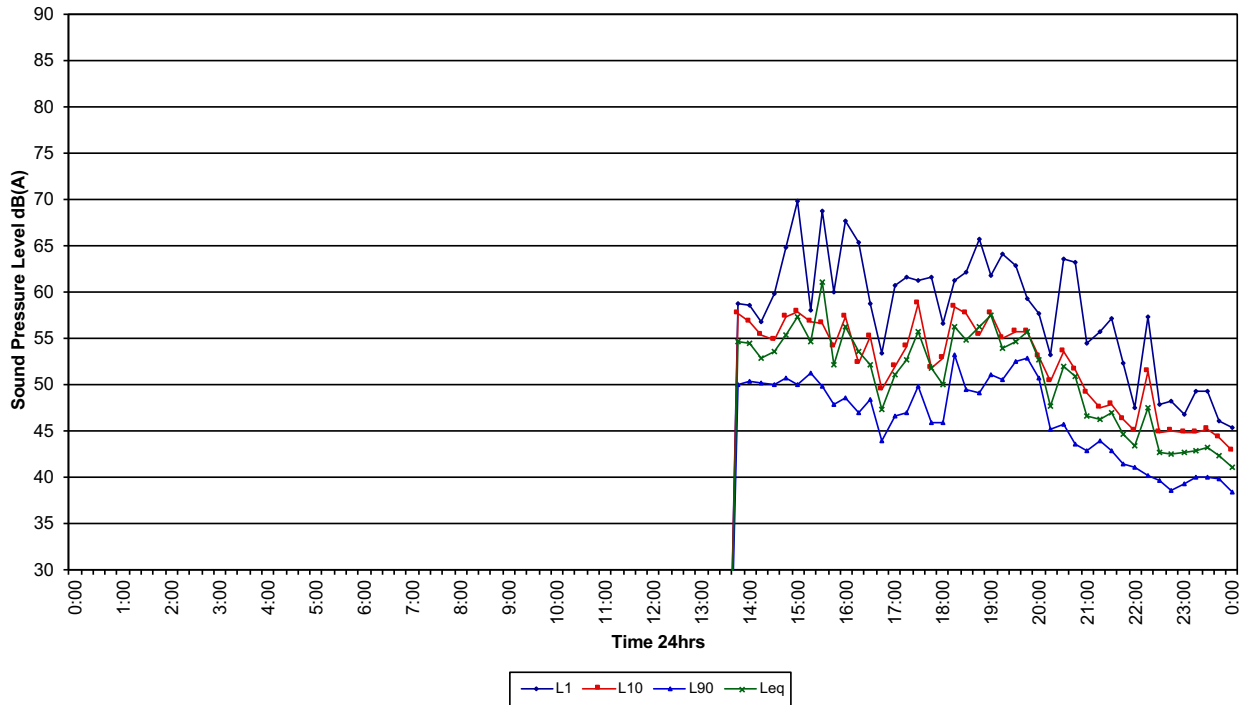


Appendix B – Logger Graphs

Ambient Noise Logger

1 Tracey Avenue, Carlingford

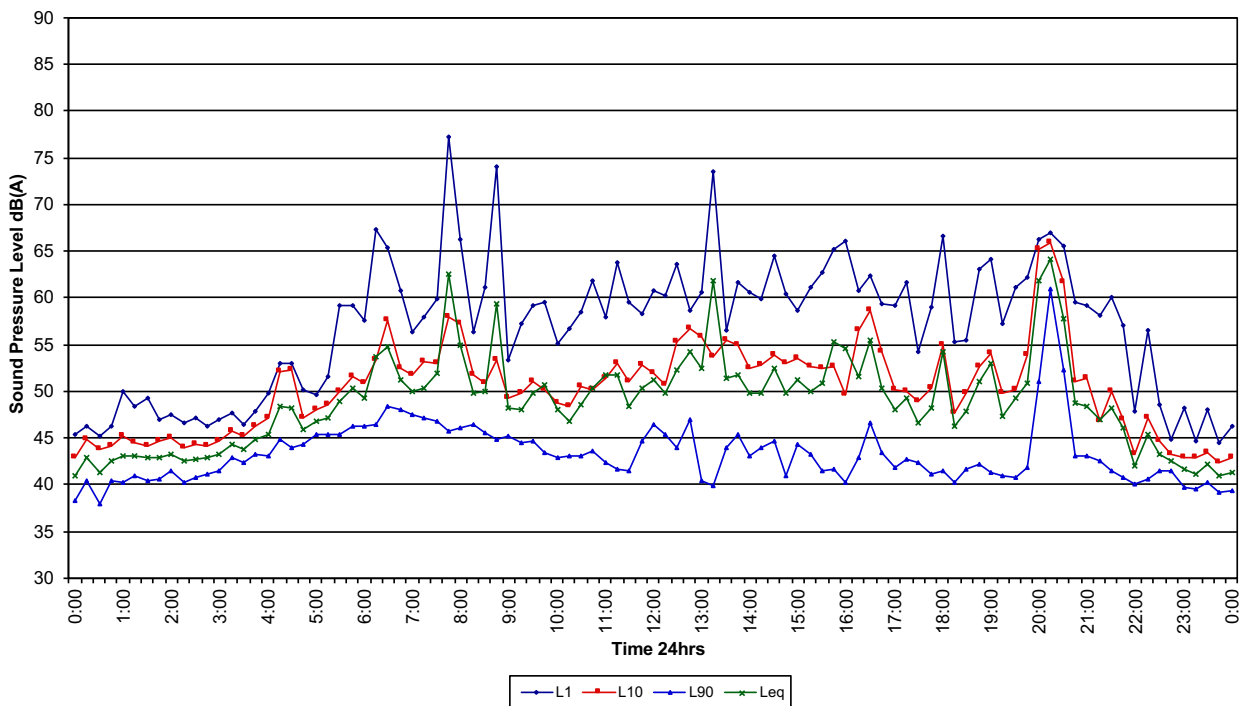
Monday 30/1/2023



Ambient Noise Logger

1 Tracey Avenue, Carlingford

Tuesday 31/1/2023

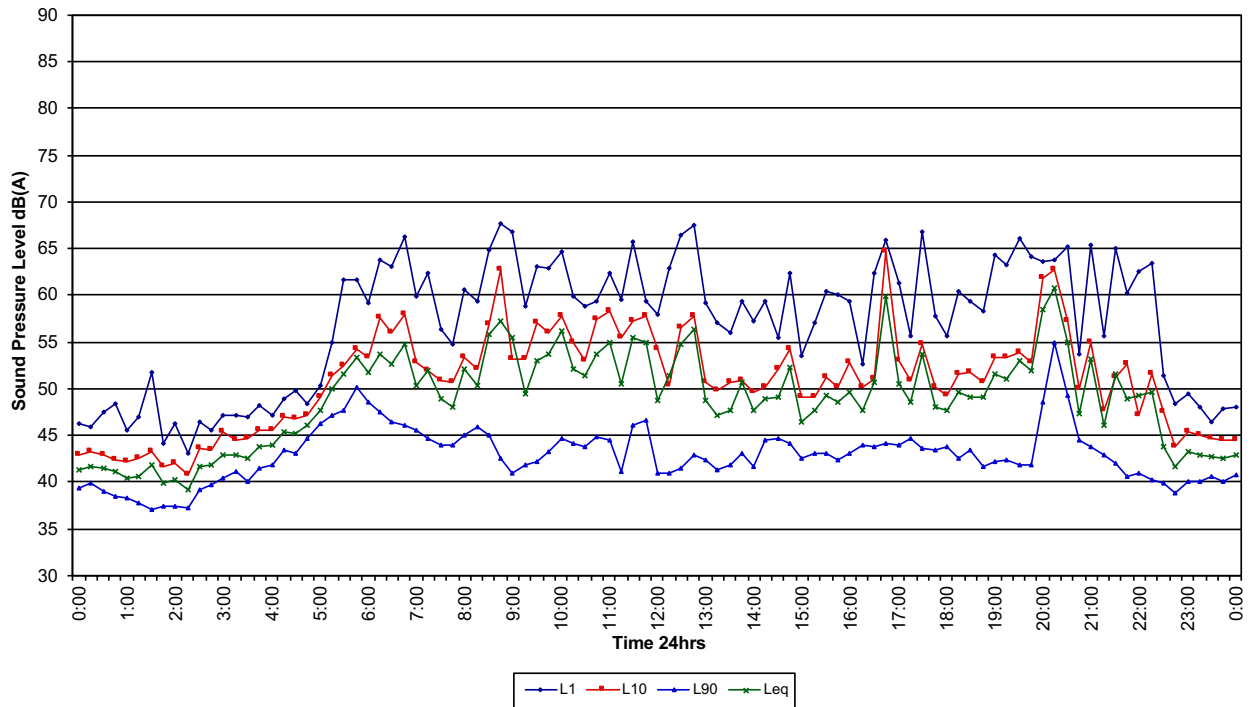




Ambient Noise Logger

1 Tracey Avenue, Carlingford

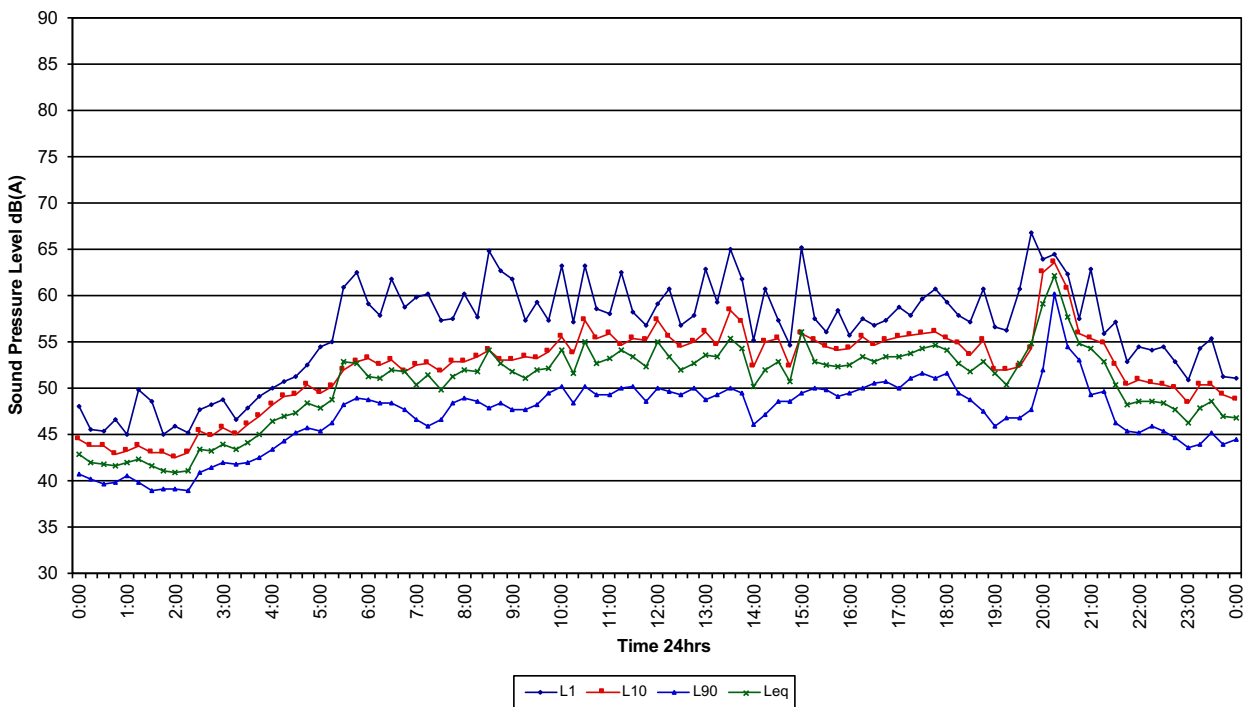
Wednesday 1/2/2023



Ambient Noise Logger

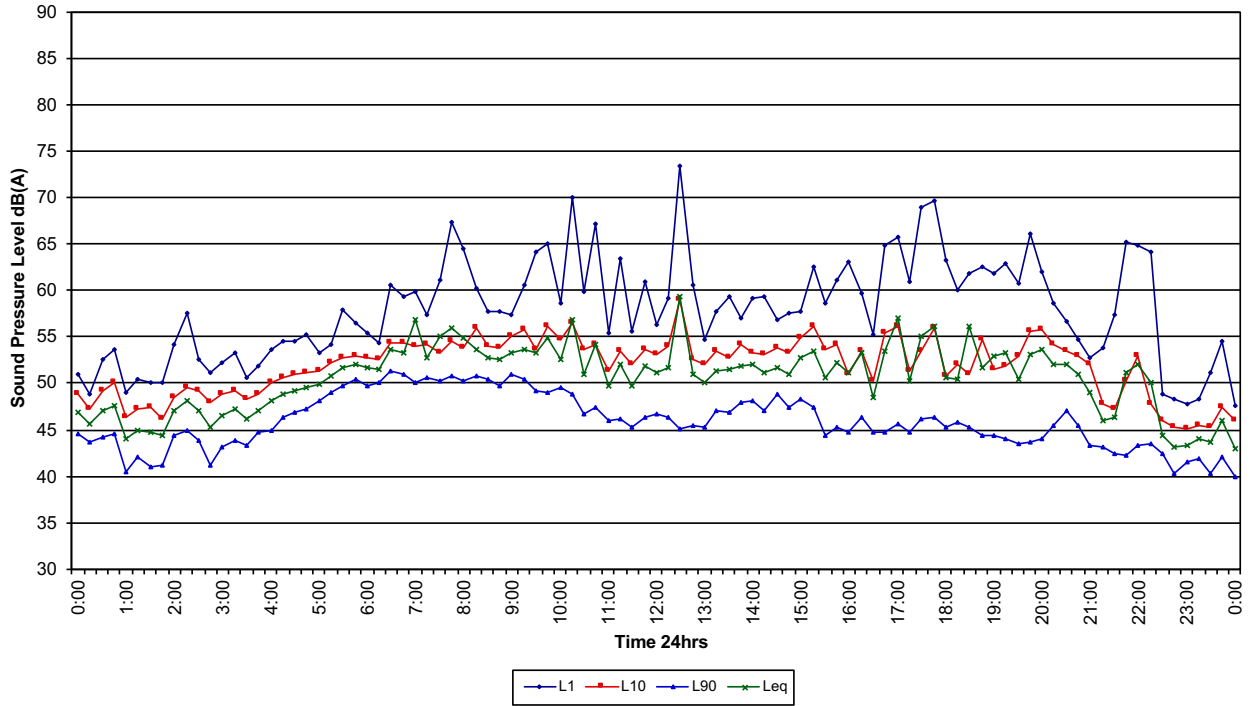
1 Tracey Avenue, Carlingford

Thursday 2/2/2023

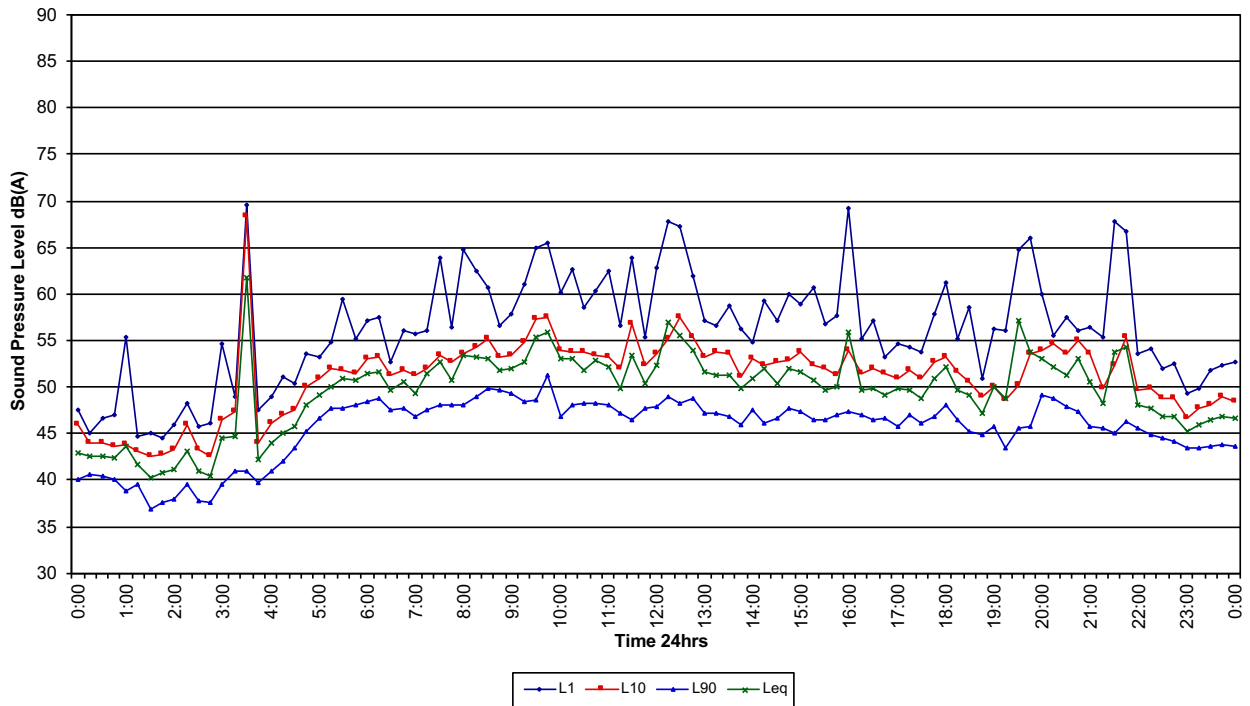




Ambient Noise Logger
1 Tracey Avenue, Carlingford
Friday 3/2/2023

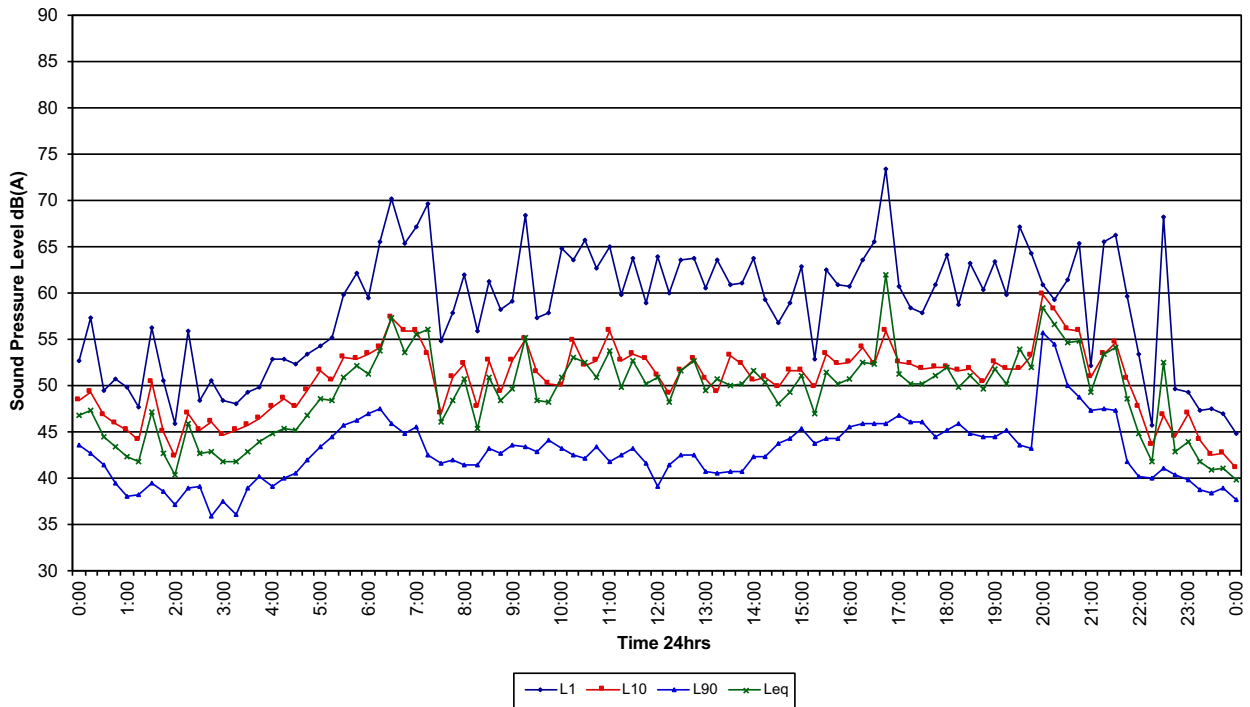


Ambient Noise Logger
1 Tracey Avenue, Carlingford
Saturday 4/2/2023

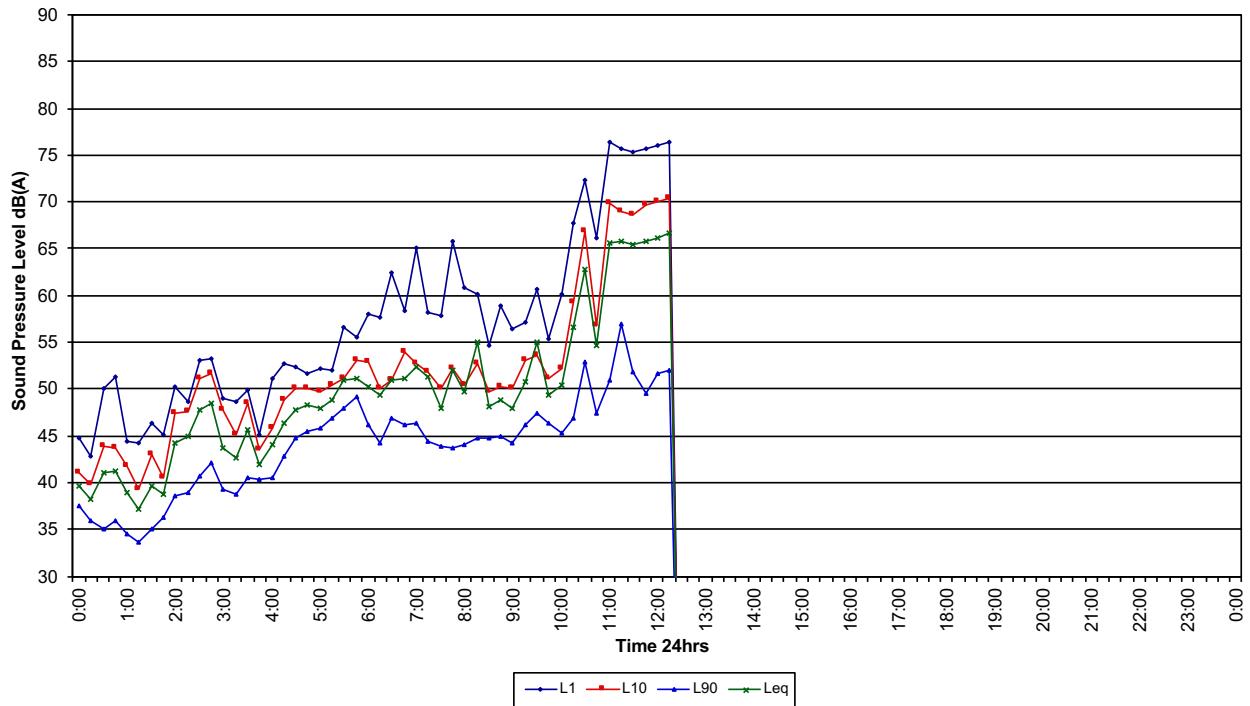




Ambient Noise Logger
1 Tracey Avenue, Carlingford
Sunday 5/2/2023



Ambient Noise Logger
1 Tracey Avenue, Carlingford
Monday 6/2/2023

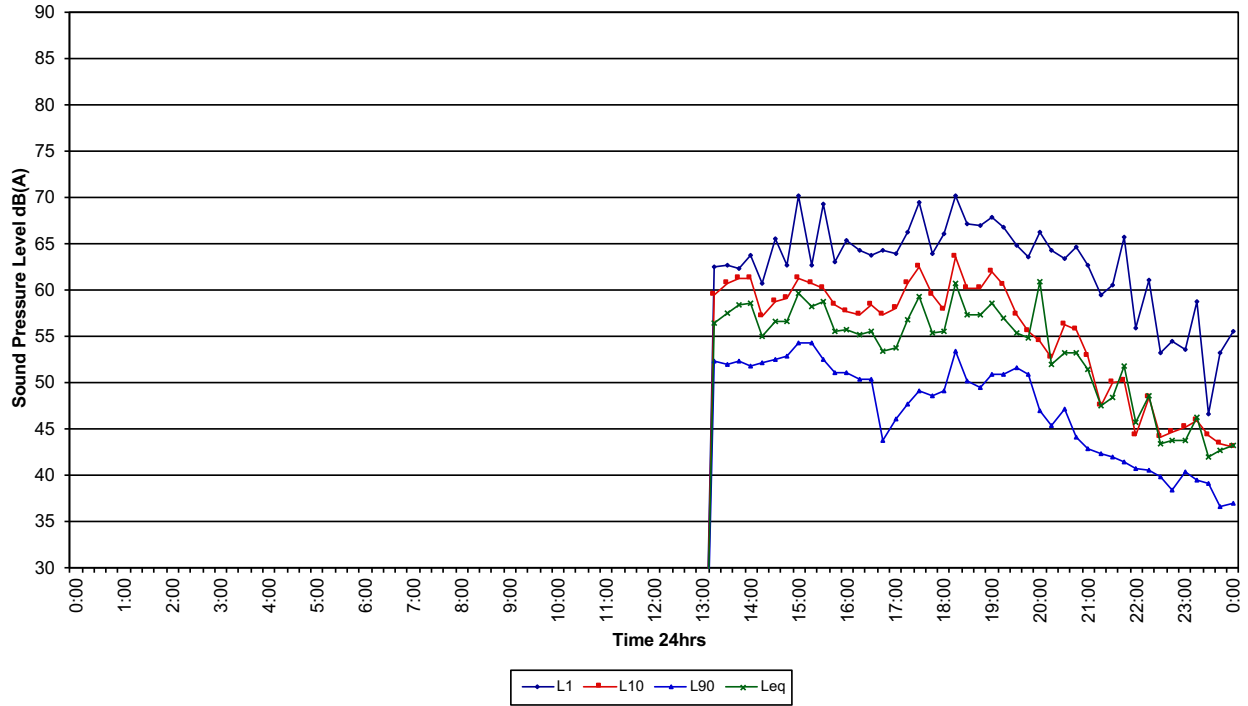




1 Tracey Avenue, Carlingford

Traffic

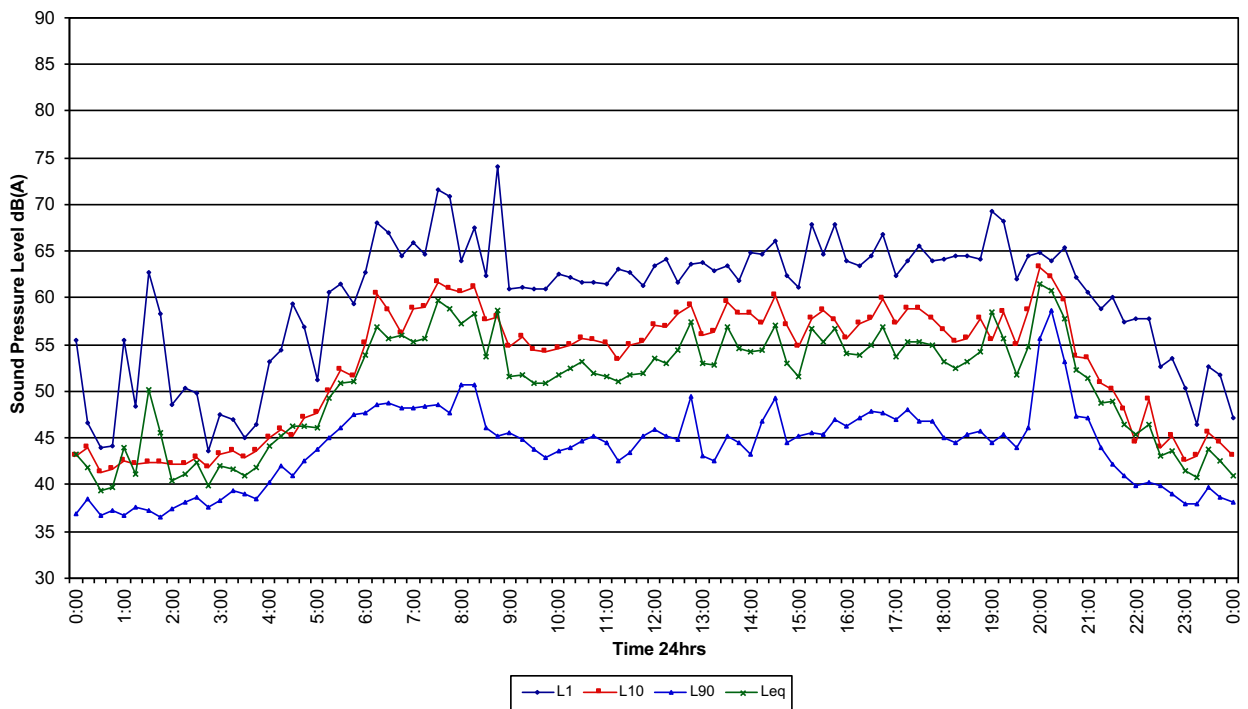
Monday 30/1/2023



1 Tracey Avenue, Carlingford

Traffic

Tuesday 31/1/2023

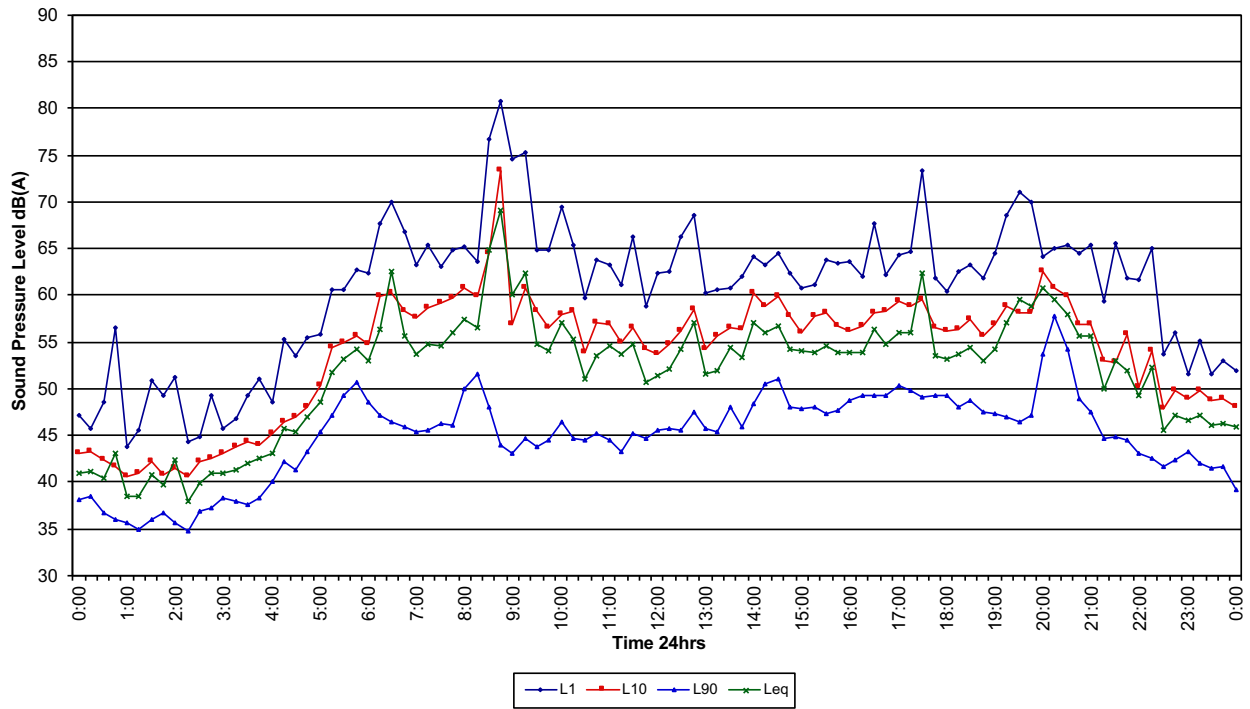




1 Tracey Avenue, Carlingford

Traffic

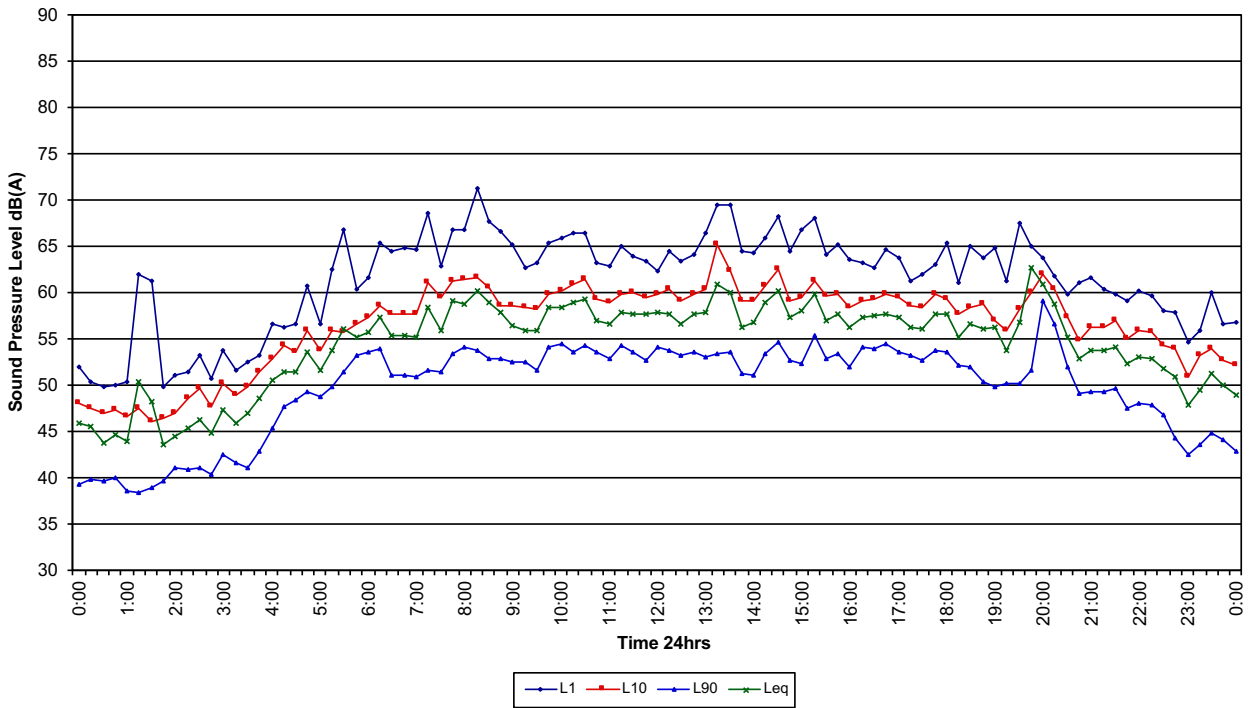
Wednesday 1/2/2023



1 Tracey Avenue, Carlingford

Traffic

Thursday 2/2/2023

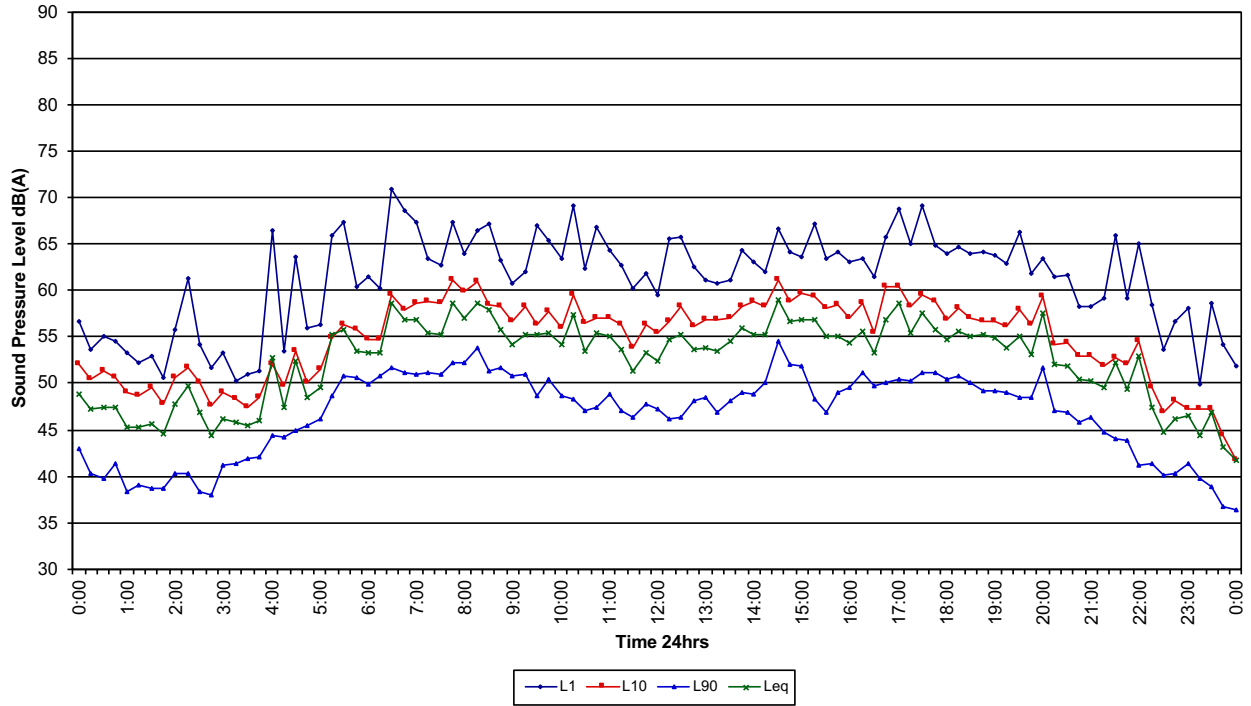




1 Tracey Avenue, Carlingford

Traffic

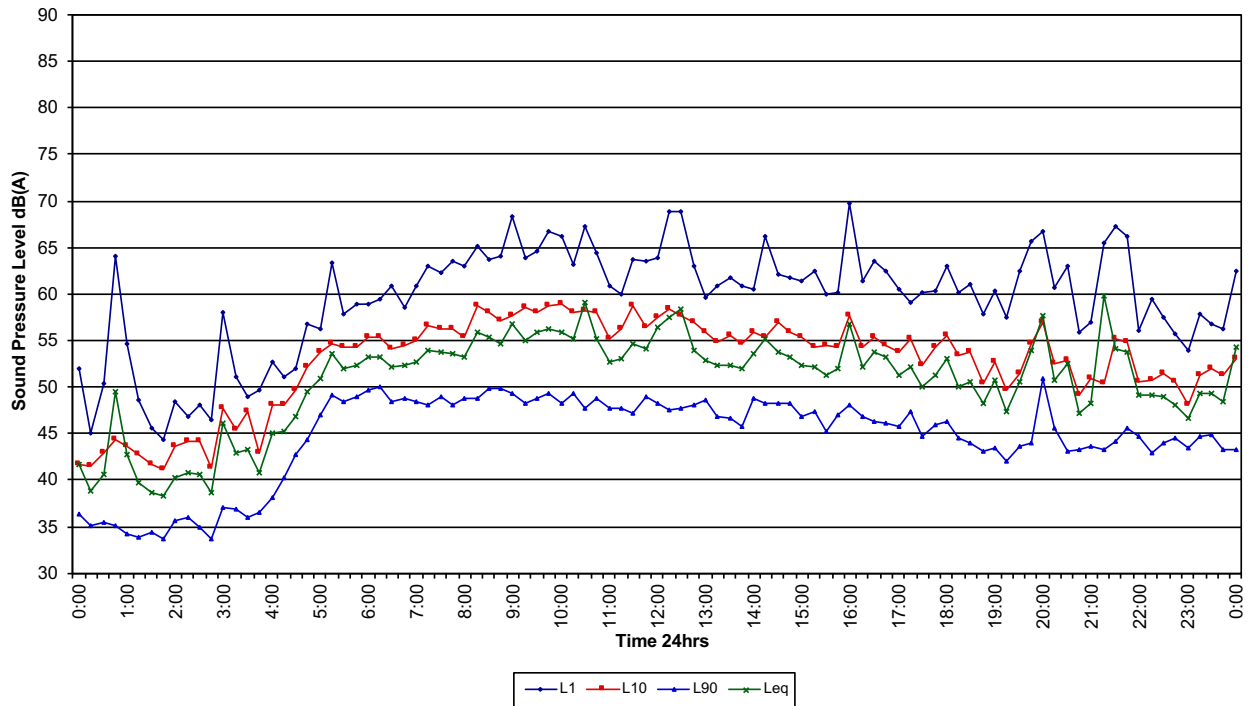
Friday 3/2/2023



1 Tracey Avenue, Carlingford

Traffic

Saturday 4/2/2023

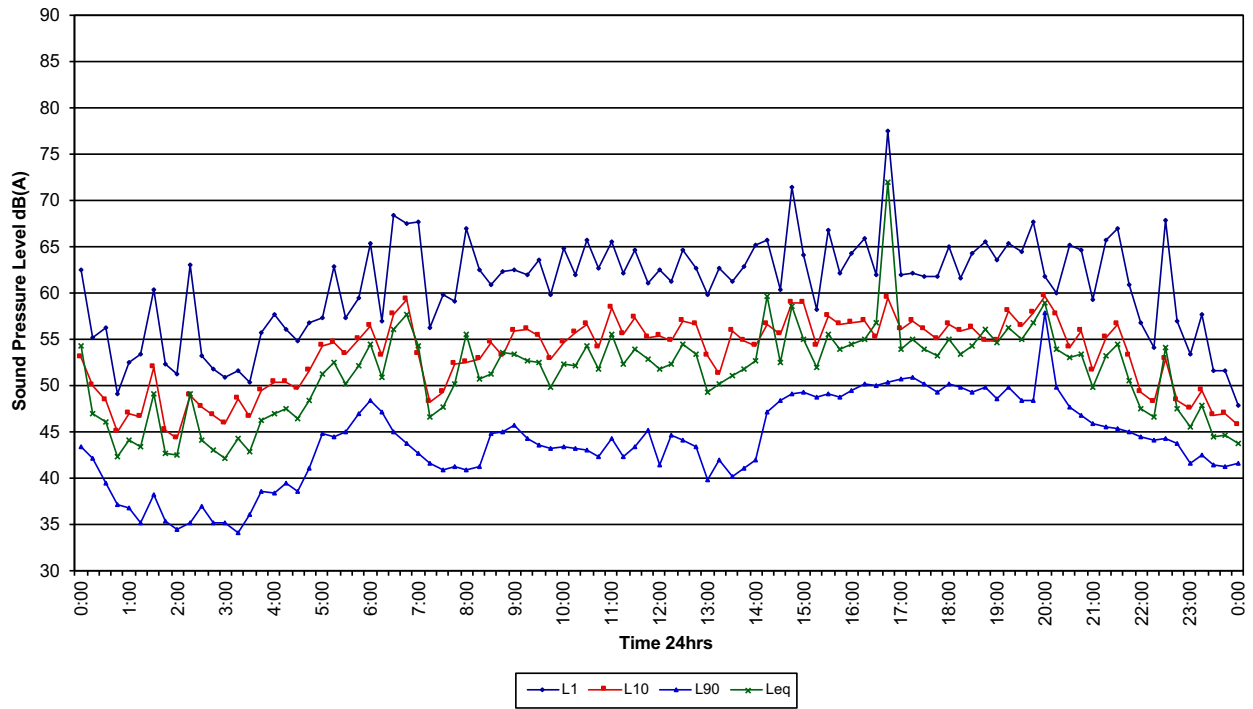




1 Tracey Avenue, Carlingford

Traffic

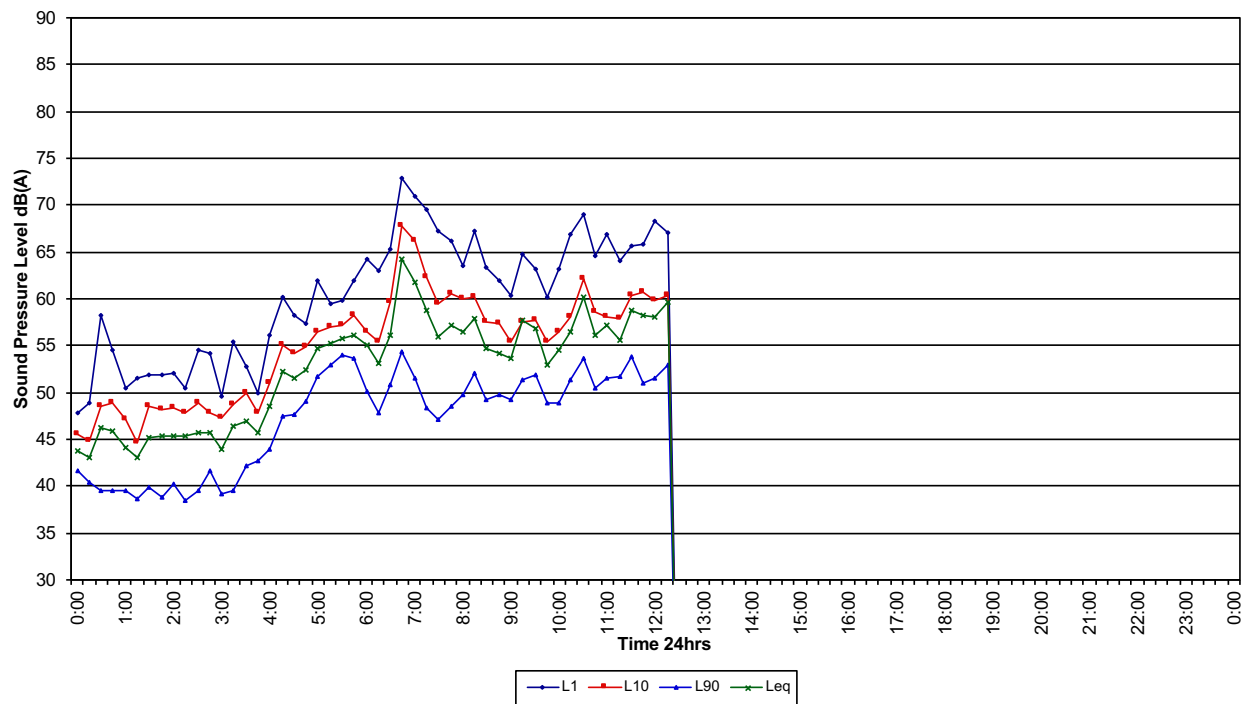
Sunday 5/2/2023



1 Tracey Avenue, Carlingford

Traffic

Monday 6/2/2023





Appendix C – Calibration Certificates



Unit 36/14 Loyalty Rd
North Rocks NSW AUSTRALIA 2151
Ph: +61 2 9484 0800 A.B.N. 65 160 399 119
www.acousticresearch.com.au

Sound Level Meter IEC 61672-3:2013 Calibration Certificate

Calibration Number C22466

| | | |
|---|--|--------------|
| Client Details | Acoustic Research Labs Pty Ltd 36/14 Loyalty Road North Rocks NSW 2151 | |
| Equipment Tested/ Model Number : | Rion NL-42EX | |
| Instrument Serial Number : | 00885460 | |
| Microphone Serial Number : | 176935 | |
| Pre-amplifier Serial Number : | 86282 | |
| Pre-Test Atmospheric Conditions | Post-Test Atmospheric Conditions | |
| Ambient Temperature : 23.5°C | Ambient Temperature : 23.8°C | |
| Relative Humidity : 44.9% | Relative Humidity : 44.1% | |
| Barometric Pressure : 100.14kPa | Barometric Pressure : 100.17kPa | |
| Calibration Technician : Lucky Jaiswal | Secondary Check: | Shaheen Boaz |
| Calibration Date : 13 Jul 2022 | Report Issue Date : | 15 Jul 2022 |
| Approved Signatory : | | Juan Aguero |

| Clause and Characteristic Tested | Result | Clause and Characteristic Tested | Result |
|--|--------|---|--------|
| 12: Acoustical Sig. tests of a frequency weighting | Pass | 17: Level linearity incl. the level range control | N/A |
| 13: Electrical Sig. tests of frequency weightings | Pass | 18: Toneburst response | Pass |
| 14: Frequency and time weightings at 1 kHz | Pass | 19: C Weighted Peak Sound Level | Pass |
| 15: Long Term Stability | Pass | 20: Overload Indication | Pass |
| 16: Level linearity on the reference level range | Pass | 21: High Level Stability | Pass |

The sound level meter submitted for testing has successfully completed the class 2 periodic tests of IEC 61672-3:2013, for the environmental conditions under which the tests were performed.

However, no general statement or conclusion can be made about conformance of the sound level meter to the full requirements of IEC 61672-1:2013 because evidence was not publicly available, from an independent testing organisation responsible for pattern approvals, to demonstrate that the model of sound level meter fully conformed to the requirements in IEC 61672-1:2013 and because the periodic tests of IEC 61672-3:2013 cover only a limited subset of the specifications in IEC 61672-1:2013.

| Uncertainties of Measurement - | | | |
|--------------------------------|---------|--------------------------|-----------|
| Acoustic Tests | | Environmental Conditions | |
| 125Hz | ±0.13dB | Temperature | ±0.1°C |
| 1kHz | ±0.13dB | Relative Humidity | ±1.9% |
| 8kHz | ±0.14dB | Barometric Pressure | ±0.014kPa |
| Electrical Tests | ±0.13dB | | |

All uncertainties are derived at the 95% confidence level with a coverage factor of 2.



This calibration certificate is to be read in conjunction with the calibration test report.

Acoustic Research Labs Pty Ltd is NATA Accredited Laboratory Number 14172. Accredited for compliance with ISO/IEC 17025 - Calibration.

The results of the tests, calibrations and/or measurements included in this document are traceable to SI units.

NATA is a signatory to the ILAC Mutual Recognition Arrangement for the mutual recognition of the equivalence of testing, medical testing, calibration and inspection reports.

PAGE 1 OF 1




**Acoustic
Research
Labs Pty Ltd**

Unit 36/14 Loyalty Rd
North Rocks NSW AUSTRALIA 2151
Ph: +61 2 9484 0800 A.B.N. 65 160 399 119
www.acousticresearch.com.au

**Sound Level Meter
IEC 61672-3:2013
Calibration Certificate**

Calibration Number C22558

| | |
|---|--|
| Client Details | Acoustic Research Labs Pty Ltd 36/14 Loyalty Road North Rocks NSW 2151 |
| Equipment Tested/ Model Number : | Rion NL-42EX |
| Instrument Serial Number : | 00572542 |
| Microphone Serial Number : | 199465 |
| Pre-amplifier Serial Number : | 01985 |
| Firmware Version : | 2.0 |
| Pre-Test Atmospheric Conditions | Post-Test Atmospheric Conditions |
| Ambient Temperature : 24.9°C | Ambient Temperature : 25.9°C |
| Relative Humidity : 46.3% | Relative Humidity : 44.4% |
| Barometric Pressure : 101.3kPa | Barometric Pressure : 101.27kPa |
| Calibration Technician : Lucky Jaiswal | Secondary Check: Rhys Gravelle |
| Calibration Date : 29 Aug 2022 | Report Issue Date : 29 Aug 2022 |
| Approved Signatory :  | Ken Williams |

| Clause and Characteristic Tested | Result | Clause and Characteristic Tested | Result |
|--|--------|---|--------|
| 12: Acoustical Sig. tests of a frequency weighting | Pass | 17: Level linearity incl. the level range control | N/A |
| 13: Electrical Sig. tests of frequency weightings | Pass | 18: Toneburst response | Pass |
| 14: Frequency and time weightings at 1 kHz | Pass | 19: C Weighted Peak Sound Level | Pass |
| 15: Long Term Stability | Pass | 20: Overload Indication | Pass |
| 16: Level linearity on the reference level range | Pass | 21: High Level Stability | Pass |

The sound level meter submitted for testing has successfully completed the class 2 periodic tests of IEC 61672-3:2013, for the environmental conditions under which the tests were performed.

However, no general statement or conclusion can be made about conformance of the sound level meter to the full requirements of IEC 61672-1:2013 because evidence was not publicly available, from an independent testing organisation responsible for pattern approvals, to demonstrate that the model of sound level meter fully conformed to the requirements in IEC 61672-1:2013 and because the periodic tests of IEC 61672-3:2013 cover only a limited subset of the specifications in IEC 61672-1:2013.

| Uncertainties of Measurement - | | | |
|--------------------------------|---------|--------------------------|-----------|
| Acoustic Tests | | Environmental Conditions | |
| 125Hz | ±0.13dB | Temperature | ±0.1°C |
| 1kHz | ±0.13dB | Relative Humidity | ±1.9% |
| 8kHz | ±0.14dB | Barometric Pressure | ±0.014kPa |
| Electrical Tests | ±0.13dB | | |

All uncertainties are derived at the 95% confidence level with a coverage factor of 2.



This calibration certificate is to be read in conjunction with the calibration test report.

Acoustic Research Labs Pty Ltd is NATA Accredited Laboratory Number 14172. Accredited for compliance with ISO/IEC 17025 - Calibration.

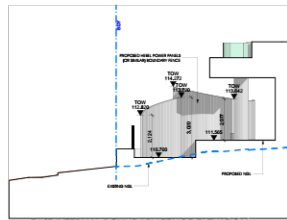
The results of the tests, calibrations and/or measurements included in this document are traceable to SI units.

NATA is a signatory to the ILAC Mutual Recognition Arrangement for the mutual recognition of the equivalence of testing, medical testing, calibration and inspection reports.

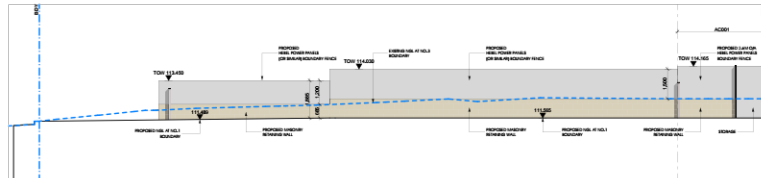
PAGE 1 OF 1



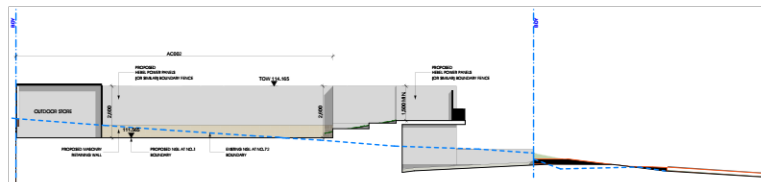
Appendix D – Barrier Layout



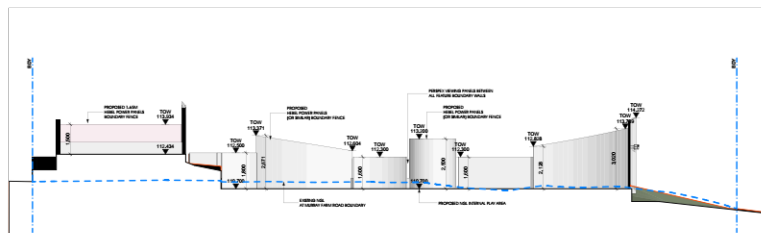
01 EAST INTERNAL BOUNDARY FENCE ELEVATION



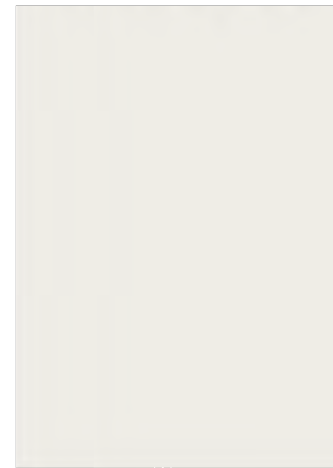
02 SOUTH INTERNAL BOUNDARY FENCE ELEVATION



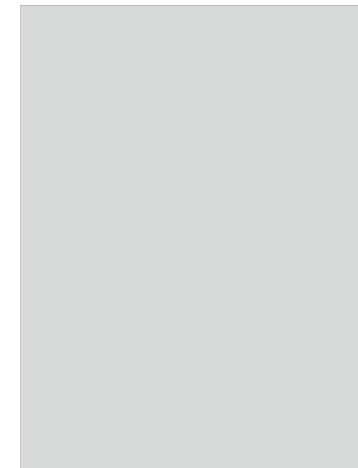
03 WEST INTERNAL BOUNDARY FENCE ELEVATION



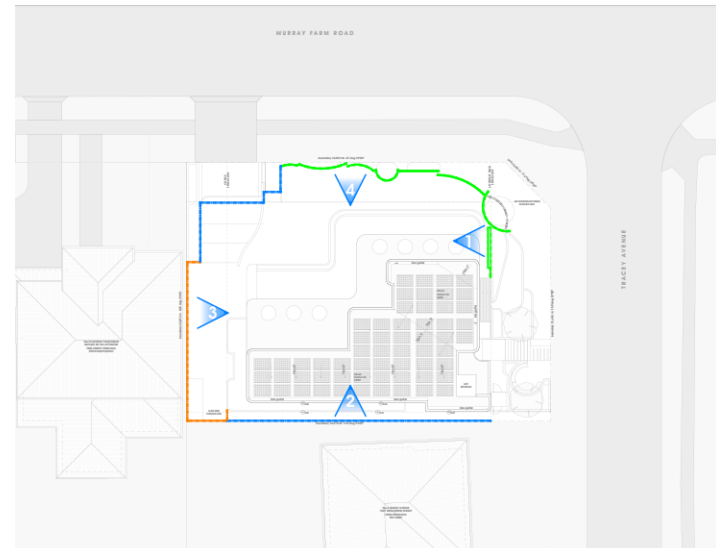
04 NORTH INTERNAL BOUNDARY FENCE ELEVATION



DULUX CASPER WHITE QUARTER



DULUX TERRACE WHITE



05 SITE & ROOF PLAN

LEGEND:
 2.6M BOUNDARY FENCE TO ACOUSTIC ENGINEERS DETAIL
 1.6M BOUNDARY FENCE TO ACOUSTIC ENGINEERS DETAIL
 1.5M BOUNDARY FENCE TO ACOUSTIC ENGINEERS DETAIL

| | | | | | | | |
|--|--|---|------------------------------------|----------------------------|------------------------|---------------------------------|----------------------------|
| | CLIENT: PROPOSED CHICHESTER CENTRE | SITE: BOUNDARY FENCE DETAILS | APPROVED BY: [Signature] | DATE: 14/08/2023 | SCALE: 1:100 | PROJECT NO.: 221001R1 | DATE: 14/08/2023 |
| | PROJECT ADDRESS: 1 TRACEY AVENUE, CARLINGFORD K18 8J9 (N OF DUBLIN) | CLIENT: HURRAY FARM EARLY LEARNING CENTRE | DESIGNED BY: [Signature] | DATE: 14/08/2023 | SCALE: 1:100 | PROJECT NO.: 221001R1 | DATE: 14/08/2023 |