RODNEY STEVENS ACOUSTICS
Acoustic Consultants

REPORT R230297R1

Revision 1

Traffic Noise Assessment
Proposed Residential Development
131 Vincent Street, Ulladulla

PREPARED FOR:
The Fleming Group and Olivander Capital

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Traffic Noise Assessment

Proposed Residential Development

131 Vincent Street, Ulladulla

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DOCUMENT CONTROL

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1 INTRODUCTION

Rodney Stevens Acoustics Pty Ltd (here forth referred to as RSA) has been engaged by The Fleming Group and Olivander Capital to conduct a noise impact assessment from road and surrounding industrial uses into the proposed residential development at 131 St Vincent Street Ulladulla. This assessment is to support the planning proposal for the proposed development.

This report addresses the road traffic noise impacts from St Vincent Street on the amenity of the proposed mixed-use residential and commercial precinct at 131 St Vincent Street Ulladulla

This assessment is to form part of the documentation to support the planning proposal for the proposed development. Specific acoustic terminology is used in this report. An explanation of common acoustic terms is provided in Appendix A.

2 PROJECT DESCRIPTION

2.1 Site Location

The proposed development site is located at 131 St Vincent Street Ulladulla. The site is bounded by St. Vincent Street to the east. Directly north is land zoned R3 Medium Residential; east is land zoned E3 Productivity Support; whilst south and east is land zoned E4 General Industrial. The site and its surroundings are shown in Figure 2-1.

Figure 2-1 Site Location

Aerial image courtesy of Google Maps © 2023

2.2 Proposed Development

The proposal is to construct a mixed-use residential and commercial precinct. The floor plans of the proposed development are presented in Appendix C.

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 Tuesday 23rd May and Tuesday 30th May 2023 at the logging location shown in Figure 2-1. Three noise loggers were set up on site. The first logger was located in the carpark of the site overlooking St Vincent Street and is representative of the traffic noise levels that the site will be exposed to.

The second logger was located at 9B Witherington Avenue, noise monitoring at this location is representative of the typical acoustic environment of the site.

An additional logger was placed on the south-western boundary of the site, this logger captured noise from the activities carried out at the concrete batching plant on Lot 7 DP723098 which is operated by Hanson Australia

Logger locations were 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 2 RION NL-42 environmental noise loggers (serial numbers 173006, 520656 and 191388) fitted with microphone windshields. Calibration of the logger 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).

The logger determines LA1, LA10, LA90 and LAeq levels of the ambient noise. LA1, LA10, LA90 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 LA1, LA10, LA90 and LAeq for each 15-minute monitoring period.

3.2 Ambient Noise Results

In order to establish the ambient noise criteria of the area, 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 at 9B Witherington Avenue	LAeq	51	43	46
	RBL (Background)	36	31	30*

Notes: All values expressed as dB(A) and rounded to nearest 1 dB(A);

LAeq 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.

LA90 Noise level present for 90% of time (background level). The average minimum background sound level (in the absence of the source under consideration).

* The L90 for the night time has been adjusted as per Factsheet A1.2 of the NPfI

3.3 Noise Intrusion (State Environmental Planning Policy (Infrastructure) 2021)

To assess noise intrusion into the proposed mixed-use residential and commercial precinct and childcare centre, the data obtained from the first logger location has been processed to establish representative traffic noise levels at the facades most exposed to St Vincent Street.

The time periods used for this assessment are as defined in the State Environmental Planning Policy (Transport and Infrastructure) 2021 and the Development near Rail Corridors and Busy Roads Interim Guideline. Results are presented below in Table 3-2.

Table 3-2 Traffic Noise Levels Corresponding to Defined SEPP 2021 Periods

Location	Period	External Noise Levels dB(A)
Approximately 18m from St Vincent Street	Day Time 7:00 am - 10:00 pm	$L_{Aeq(15hour)}$ 59
	Night Time 10:00 pm - 7:00 am	$L_{Aeq(9hour)}$ 50
	Noisiest 1 Hour	$L_{Aeq(1hour)}$ 61

3.4 Noise Intrusion Construction and Concrete Batching Plant

To assess noise intrusion into the proposed multi residential development from the operations of Hanson Australia, the data obtained from the south-western logger location has been processed to establish representative noise levels at the facades most exposed to the concrete batching plant operated by Hanson Australia

Table 3-3 Hanson Australia Noise Levels

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 at South Western Facade	LAeq	64	43	52
	RBL (Background)	40	33	30

4 NOISE GUIDELINES AND CRITERIA

4.1 Road Noise Criteria

The determination of an acceptable level of traffic noise impacting the internal residential spaces requires consideration of the activities carried out within the space and the degree to which noise will interfere with those activities.

As sleep is the activity most affected by traffic noise, bedrooms are considered to be the most sensitive internal living areas. Higher levels of noise are acceptable in living areas without interfering with activities such as reading, listening to the television etc. Noise levels in utility spaces such as kitchens, bathrooms, laundries etc. can be higher.

4.2 State Environmental Planning Policy (Transport and Infrastructure) 2021

The NSW Government's State Environmental Planning Policy (Transport and Infrastructure) 2021 (SEPP (Transport and Infrastructure) 2021) was introduced to facilitate the delivery of infrastructure across the State by improving regulatory certainty and efficiency. The NSW Department of Planning and Infrastructure's "*Development near Rail Corridors and Busy Roads - Interim Guideline"* (the DP&I Guideline) of December 2008 provides noise criteria for residential and non-residential buildings. These criteria are summarised in Table 4-1.

Table 4-1 DP&I Interim Guideline Noise Criteria

Type of occupancy	Noise Level dB(A)	Applicable time period
Sleeping areas (bedroom)	35	Night 10 pm to 7 am
Other habitable rooms (excl. garages, kitchens, bathrooms & hallways)	40	At any time

Note 1: Airborne noise is calculated as $L_{Aeq(15hour)}$ daytime and $L_{Aeq(9hour)}$ night-time

The following guidance is also provided in the DP&I Guideline:

> *"These criteria apply to all forms of residential buildings as well as aged care and nursing home facilities. For some residential buildings, the applicants may wish to apply more stringent design goals in response to market demand for a higher quality living environment.*
>
> *The night-time "sleeping areas" criterion is 5 dB(A) more stringent than the "living areas" criteria to promote passive acoustic design principles. For example, designing the building such that sleeping areas are less exposed to road or rail noise than living areas may result in less onerous requirements for glazing, wall construction and acoustic seals. If internal noise levels with windows or doors open exceed the criteria by more than 10 dB(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."*

The noise criteria presented in Section 4.2 and in Table 4-1 apply to a 'windows closed condition'. Standard window glazing of a building will typically attenuate noise ingress by 20 dB(A) with windows closed and 10 dB(A) with windows open (allowing for natural ventilation). Accordingly, the external noise threshold above which a development will require mechanical ventilation is an $L_{Aeq(9hour)}$ 55 dB(A) for bedrooms and $L_{Aeq(15hour)}$ 60 dB(A) for other areas.

Where windows must be kept closed, the adopted ventilation systems must meet the requirements of the Building Code of Australia and Australian Standard 1668 – The use of ventilation and air conditioning in buildings.

4.3 Operational Noise Project Trigger Noise Levels

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.

4.4 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.

4.5 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.

4.6 Area Classification

The NPfI characterises the "Urban" noise environment as an area with an acoustical environment that:

- is dominated by 'urban hum' or industrial source noise,
- where urban hum means the aggregate sound of many unidentifiable, mostly traffic and/or industrial related sound sources
- has through-traffic with characteristically heavy and continuous traffic flows during peak periods
- is near commercial districts or industrial districts
- has any combination of the above.

The area surrounding the proposed development falls under the "Urban" area classification.

4.7 Project Specific Trigger Noise Levels

Having defined the area type, the processed results of the unattended 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 4-2. These project trigger noise levels are nominated for the purpose of assessing potential noise impacts from the proposed development.

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 4-2.

Table 4-2 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	60	36	51	**41**	58
	Evening	50	31	43	**36**	48
	Night	45	30	36	**35**	43

Note 1: ANL = "Amenity Noise Level" for residences in Urban Areas.

Note 2: RBL = "Rating Background Level".

5 NOISE IMPACT ASSESSMENT

5.1 Traffic Noise Assessment

In order to ascertain the existing traffic noise levels from St Vincent Street, the measured noise logger data was processed in accordance to the NSW Department of Planning and Infrastructure's "*Development near Rail Corridors and Busy Roads - Interim Guideline"* assessment time periods as shown in Table 3-2.

The final façade noise levels were predicted for each time period taking into account the distance attenuation from each respective source, virtual source, façade's orientation and any barrier effects.

The required noise reduction via the building façade for each respective room for each time period will be compared to determine the appropriate design criteria levels.

It is typically accepted that an open window (fractionally open to meet ventilation requirements) results in an attenuation of external noise by 10 dB. This reduction has been used to predict the room noise level in the window open condition.

5.2 Recommended Noise Control Treatment

The calculation procedure establishes the required noise insulation performance of each surface component such that the internal noise level is achieved whilst an equal contribution of traffic noise energy is distributed across each component. Building envelope components with a greater surface area must therefore offer increased noise insulation performance.

The recommended acoustic treatment is based on the following floor finishes and room sizes:

- Bedrooms: 3 x 3.5 x 2.7 Carpet and underlay
- Living Room 4.5 x 6 x 2.7 Hard Flooring
- Kitchen/Wet Areas: Tiles

The acoustic requirements shown in this report will increase further where the bedroom floor finishes are tiled or timber.

All recommendations must be checked by others to ensure compliance with other non-acoustic requirements that Council or other authority may impose (e.g. Thermal requirements for BASIX compliance).

5.3 Glazing

The R_w rating required for each window will vary from room to room. Recommendations for windows also apply to any other item of glazing located on the external facade of the building in a habitable room unless otherwise stated.

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 requirements below

The window systems must be tested in accordance with both of the following:

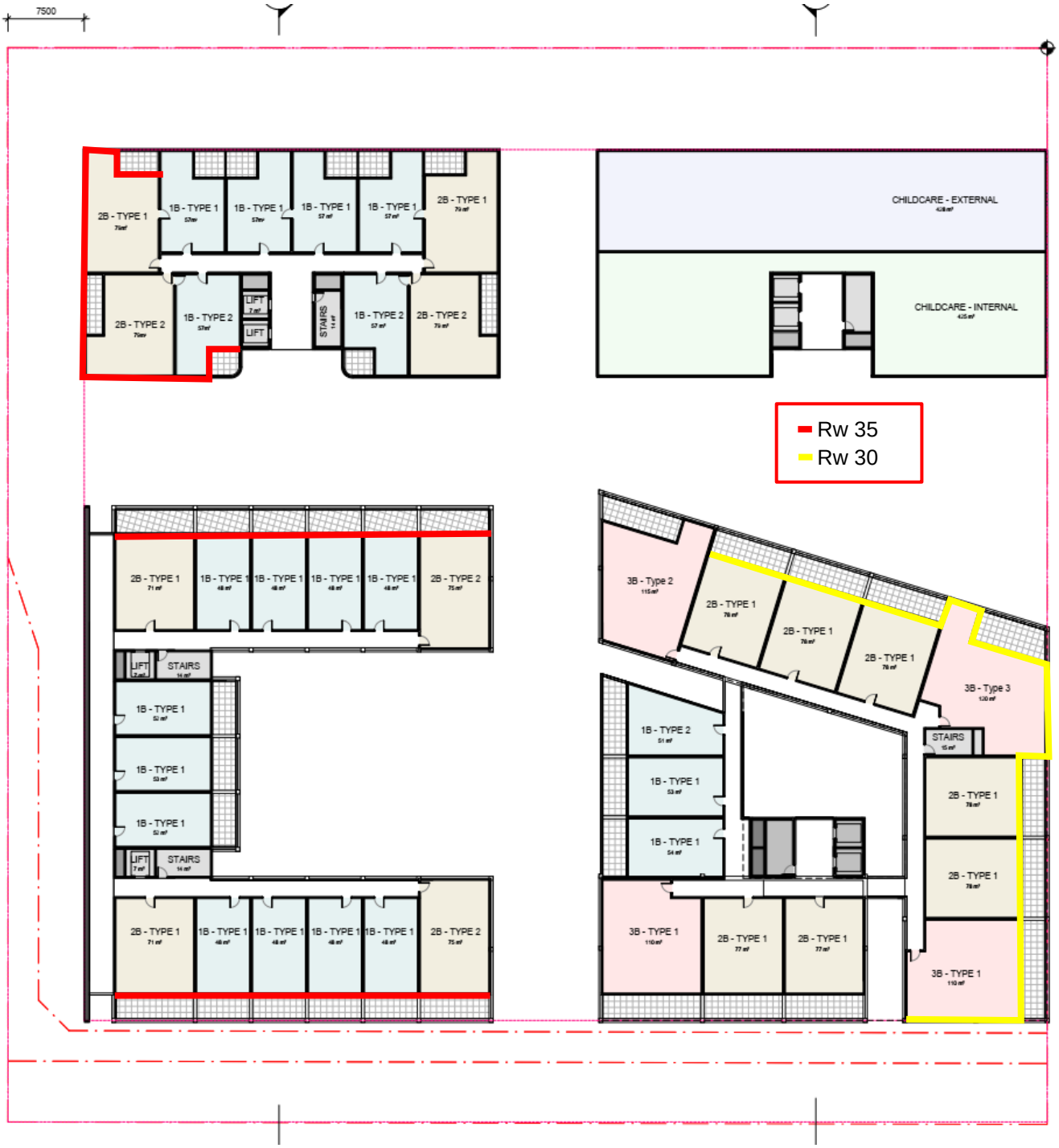
- Australian Window Association Industry Code of Practice Window and Door – Method of Acoustic Testing; and
- AS 1191 Acoustics – Method for laboratory measurement of airborne sound insulation of building elements.

It is necessary to submit such Laboratory certification for the proposed glazing systems (i.e. windows and framing systems) (e.g. NAL or CSIRO) for approval by RSA prior to ordering or commitment.

The entire frame associated with the glazing must be sealed into the structural opening using acoustic mastics and backer rods. Normal weather proofing details do not necessarily provide the full acoustic insulation potential of the window system. The manufacturers' installation instructions for the correct acoustic sealing of the frame must be followed.

It is possible that structural demands for wind loading or fire rating or the like may require more substantial glass and framing assemblies than nominated above. Where this is the case the acoustic requirements must clearly be superseded by the structural or fire rating demands.

Figure 5-1 Typical Floor Rw Requirements



The glazing sizes have been assumed to be 2.7m x 2m sliding doors in bedrooms and 5m x 2.7m sliding doors in living rooms. All reaming glazing (not highlighted) can be standard, all wind and thermal requirements must be followed

The above recommended glazing systems consist of glass pane, frame and seals. Care should be taken when selecting the system to ensure the acoustic rating (Rw) is verified through laboratory tested data. As a guide, the following table presents the Rw ratings of different glass thicknesses, please note that these are shown as a guide only, all final glazing system selections must comply with the requirements in Section 5.3.

Table 5-1 Glass Thickness Guideline

Glass Thickness	Rw Rating (Glass Pane Only)
5mm	26
6mm	28
6.38mm Laminated	32
8.38 Laminated	34
10.38 Laminated	36
12.38 Laminated	37
4mm – 50mm Airgap – 6mm Double Glazed	41

5.4 Detailing

Note that well-detailed construction and careful installation is needed to achieve the required R_w acoustic ratings. All gaps are to be minimised and fully sealed with an acoustic rated sealant, such as FireBan One by Bostik or Sikaflex Pro 2HP by Sika.

5.5 Mechanical Plant Noise Assessment

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 4-2 will 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.

6 PROPOSED CHILDCARE

It is proposed to have a childcare Centre on level 2 of building 3. The nearest residential dwellings will be the units on buildings 1, 2 and 4 and residential receivers to the north and north-west. The childcare centre and its surrounding environment are mainly influenced by traffic noise from St Vincent Street

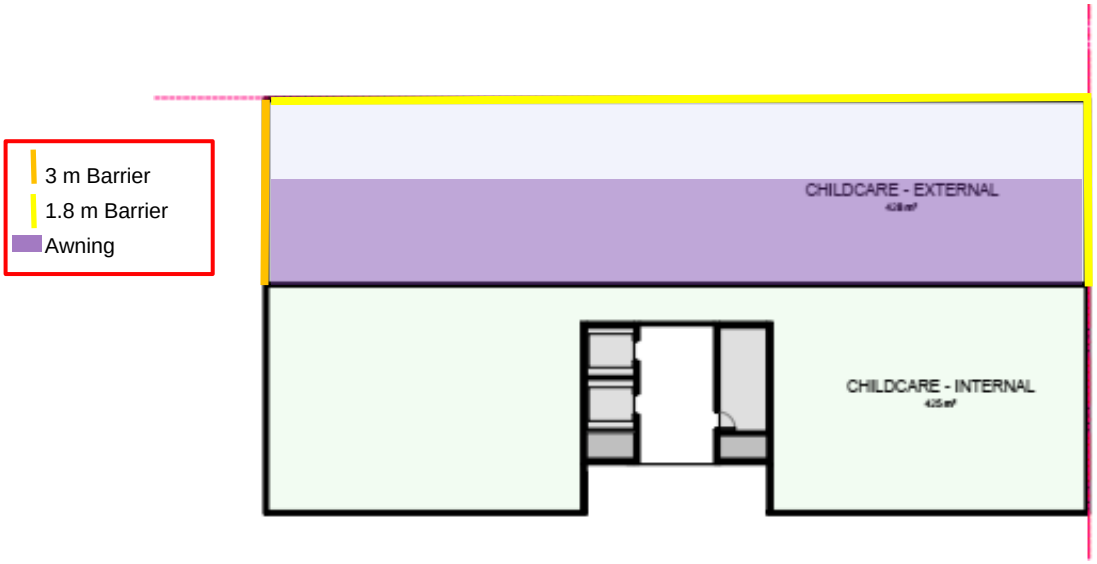
There are a number of sensitive receivers surrounding the proposed development, these receivers will be affected by noise generated by the proposed childcare centre. The following table shows the most affected receivers.

Table 6-1 Sensitive Receivers

Receiver	Sensitive Receiver's Address
R1	120 St Vincent Street and 8 Witherington Avenue
R2	9-11 Witherington Avenue
R3	Building 1
R4	Building 2
R5	Building 4
C1	130 – 146 St Vincent Street
C2	Project Lighting
C3	Rotary Club of Milton
C4	170 – 174 Camden Street

The following figure presents the proposed Childcare Centre Layout:

Figure 6-1 Proposed Childcare Centre Layout – Level 2



6.1 Hours of Operation

The following hours of operation are proposed childcare centre:

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

6.2 Enrolment Numbers

The proposed Childcare Centre plans to cater for up to 120 children between the ages of 0 and 5 years of age. The number of children and their age groups are as follows:

- 0-2 years old - 20 Children
- 2-3 years old - 60 Children
- 3-5 years old - 40 Children

7 CHILDCARE NOISE CRITERIA

7.1 Operational Noise From Childcare Centre

A guideline for the assessment of noise from childcare centres has been prepared by the Association of Australian Acoustical Consultants (AAAC). The document, *AAAC Technical Guideline Childcare Centre Noise Assessment V3.0*, provides criteria for the assessment of noise intrusion into and noise emissions from Childcare centres and also provides recommendations for treatment to minimise acoustical impacts upon neighbouring premises.

Since the time in which children are involved in outdoor play can be limited, the potential impact associated with these noise emissions reduces. The AAAC considers a total limit of 4 hours outdoor play per day (typically 2 hour in the morning and 2 hour in the afternoon) reasonable to apply a criterion of $L_{Aeq(15minute)}$ noise level emitted from the outdoor play area not exceed the background noise level by more than 10 dB at the assessment location. However, if the proposed outdoor play time is more than 2 hours per day, the $L_{Aeq(15minute)}$ noise level emitted from the outdoor play area must not exceed the background noise level by more than 5 dB at the assessment location.

We have assumed that the proposed childcare centre will operate more than 4 hours of outdoor play time per day, therefore, the noise criterion for noise emissions from outdoor activities to all surrounding residential receivers is (daytime L_{A90} 40 dB(A) + 5 dB(A) **$L_{Aeq(15minute)}$ 45 dB(A)**. This is based on an adjusted background noise level of L_{A90} 40 dB(A) as per Section 3.2.1 of the AAAC guidelines

7.2 Road Noise Intrusion to Outdoor Playground

Noise levels within outdoor play areas are not covered by the Shoalhaven City Council's DCP 2014. For the assessment of road traffic noise impact on the outdoor play areas, the Association of Australian Acoustical Consultants (AAAC). The document, *AAAC Technical Guideline Childcare Centre Noise Assessment V3.0* has been used to determine the appropriate noise level. In accordance with the AAAC, the noise criterion for outdoor play areas is as follow:

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

7.3 Noise Intrusion to Indoor Areas

Noise levels within indoor play areas are not covered by the Shoalhaven City Council's DCP 2014. For the assessment of road traffic noise impact on the indoor play areas, the Association of Australian Acoustical Consultants (AAAC). The document, *AAAC Technical Guideline Childcare Centre Noise Assessment V3.0* has

been used to determine the appropriate noise level. In accordance with the AAAC, the noise criterion for outdoor play areas is as follow:

- Indoor play areas – $L_{Aeq,(1hour)}$ 40 dB(A) (internal).
- Sleeping areas – $L_{Aeq,(1hour)}$ 35 dB(A) (internal)

7.4 Other Noise Emissions

Based on Section 3.2.2 of the AAAC guidelines, the cumulative $L_{eq,15\ minute}$ noise emission level resulting from the use and operation of the childcare centre, with the exception of noise emission from outdoor play shall not exceed the background noise level by more than 5 dB at the assessment location. This includes the noise emission resulting from:

- Indoor play
- Mechanical plant
- Drop off and pick up
- Other activities/operations (not including outdoor play).

8 NOISE IMPACT ASSESSMENT

8.1 Road Traffic Noise Intrusion into Centre

Based on the measured road traffic noise level of $L_{Aeq(1hour)}$ 61 dB(A) from St Vincent Street, the predicted traffic noise impacts at the outdoor play areas are presented in Table 8-1 below.

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

- A 3 and 1.8 meters high solid barriers are in place along the boundaries (Refer to Figure 6-1)
- The height of children between the ages of 0 and 5 years have an average height of 1 meters
- The outdoor play areas are located on level 2.
- Road traffic noise impacts have been modelled from the centre line of the road to approximately the middle of the outdoor play areas.

Table 8-1 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	45	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 7.2. Based on this assessment no additional no control measures will be required.

8.2 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 childcare centre building is calculated to be $L_{Aeq(1hour)}$ 61dB(A) on the eastern facade. Taking into account 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 8-2 Predicted Road Traffic Noise Levels Into Indoor Areas

Area	Predicted L_{Aeq} Road Traffic Noise Level – dB(A)			
	Windows Open	Windows Closed	Noise Criterion L_{Aeq} – dB(A)	Compliance (Open / Closed)
0-2 Years	35	25	40	Open
2-3 Years	35	25	40	Open
3-5 Years	35	25	40	Open
Cot	35	25	35	Open

The predicted internal noise levels are likely to exceed the 40 dB(A) criteria as required by Shoalhaven City Council with windows opened.

8.3 Mechanical Plant Noise Assessment

Mechanical ventilation may be installed at the proposed childcare centre, the operation of such mechanical plant must be assessed 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*

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 relevant noise criteria 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.

8.4 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 Association of Australian Acoustical Consultants (AAAC) technical guideline for Childcare Centre Noise Assessment V3.0 provides the following sound power levels (Lw) for various age groups of children.

Table 8-3 Effective Sound Power Levels ($L_{Aeq, 15min}$) for Groups of 10 Children Playing

Noise Descriptor	Noise Level (dB) at Octave Band Centre Frequency (Hz)								
	63	125	250	500	1 k	2 k	4 k	8 k	Overall dB(A)
0 to 2 Years	54	60	66	72	74	71	67	64	78
2 to 3 Years	61	67	73	79	81	78	74	70	85
3 to 5 Years	64	70	75	81	83	80	76	72	87

If applicable, an adjustment to the above sound power levels of -6 dB could be applied in each age group for children involved in passive play.

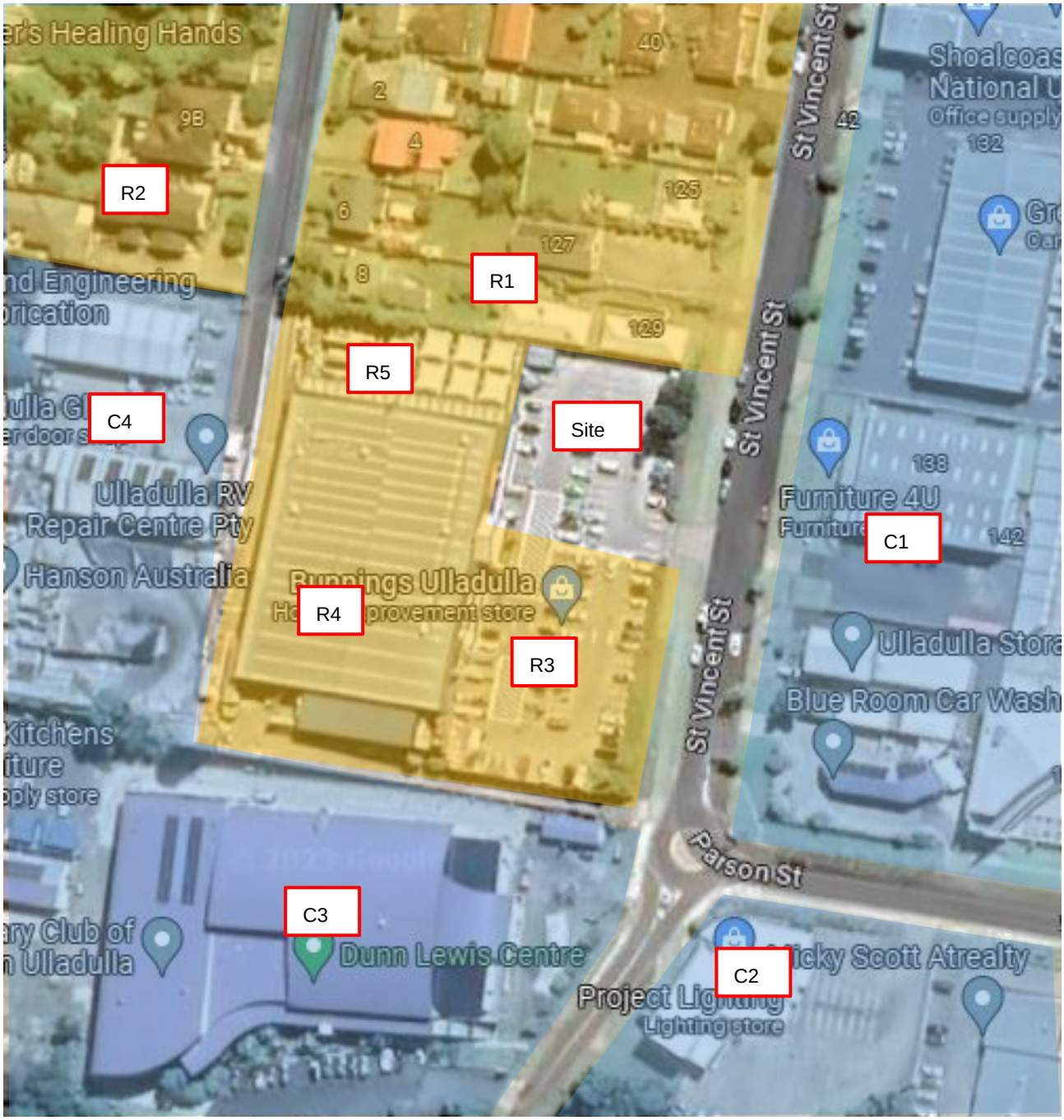
Calculations have been made based on the spectra above assuming all the children will be playing outside at the one time. The levels were scaled to reflect the overall power levels presented by the AAAC to determine the likely noise levels at nearby receivers due to 120 children playing in the Outdoor Play areas of the proposed Childcare Centre.

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

- 20 children between the ages of 0 and 2 with total sound power level of 81 dB(A), 60 children between the ages of 2 and 3 with total sound power level of 60 dB(A) and 40 children between the ages of 3 and 5 with total sound power level of 93dB(A) will be playing in the proposed outdoor play areas;
- 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 height, have been taken to be 1 meter from the ground;
- The proposed 3 and 1.8 meters high solid barriers with an awning (Refer to Figure 6-1) along the boundaries of the outdoor play areas have been taken into account 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 Childcare Centre.

Figure 8-1 Receiver Locations



The predicted noise levels experienced by the nearest residential receivers are presented in Table 8-4 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 8-4 Predicted Outdoor Play Activities Noise Emission

Receiver	Predicted Outdoor Play Activities Noise at Neighbouring Residents – dB(A)	Criteria	Compliance
R1	42	45	Yes
R2	38	45	Yes
R3	35	45	Yes
R4	33	45	Yes
R5	42	45	Yes
C1	38	65	Yes
C2	<20	65	Yes
C3	<20	65	Yes
C4	21	65	Yes

Noise from the outdoor play activities at the surrounding residences is predicted to comply with the 41 dB(A) criterion with scenario presented above.

Based on the above assessment of the outdoor play activities noise emissions, a 3 and 1.8 meters high solid barriers must be implemented along the boundaries. (Please refer to Figure 6-1 for further details)

8.5 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 open, the resulting noise levels are presented in Table 8-5 below. Noise levels have been calculated at the most affected boundary heights.

Table 8-5 Predicted Indoor Play Activities Noise Emission

Receiver	Predicted Indoor Play Activities Noise at Neighbouring Residents – dB(A)	Criteria	Compliance
R1	33	45	Yes
R2	29	45	Yes
R3	37	45	Yes
R4	35	45	Yes
R5	40	45	Yes
C1	31	65	Yes

Receiver	Predicted Indoor Play Activities Noise at Neighbouring Residents – dB(A)	Criteria	Compliance
C2	<20	65	Yes
C3	<20	65	Yes
C4	<20	65	Yes

The assessment criterion for indoor play of 41 dB(A) can be achieved with the windows open

Noise emissions from indoor activities will meet recommended design limits at the neighbouring residential receivers with the internal layout proposed.

8.6 Carpark Emission

The proposed car park is to be located in the basement, 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 where 15 cars enter or leave the carpark in a span of 15 minutes.

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

Table 8-6 Calculated Carpark Noise Levels

Receiver	Predicted Carpark Activities Noise at Neighbouring Residents – dB(A)	Criteria	Compliance
R1	41	45	Yes
R2	25	45	Yes
R3	29	45	Yes
R4	36	45	Yes
R5	42	45	Yes*
C1	34	65	Yes
C2	<20	65	Yes
C3	<20	65	Yes
C4	<20	65	Yes

9 RECOMMENDATIONS

The following recommendations must be implemented in order to achieve compliance with the criteria requirements from the AAAC guidelines and Shoalhaven City Council

9.1 Outdoor Play Areas

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

- All children can engage in outdoor play at a time
- No music is to be played in the outdoor areas
- Playground equipment that allows a child to be more than 0.5 above the ground level should not be used
- Children must be supervised at all times

9.2 Indoor Play Areas

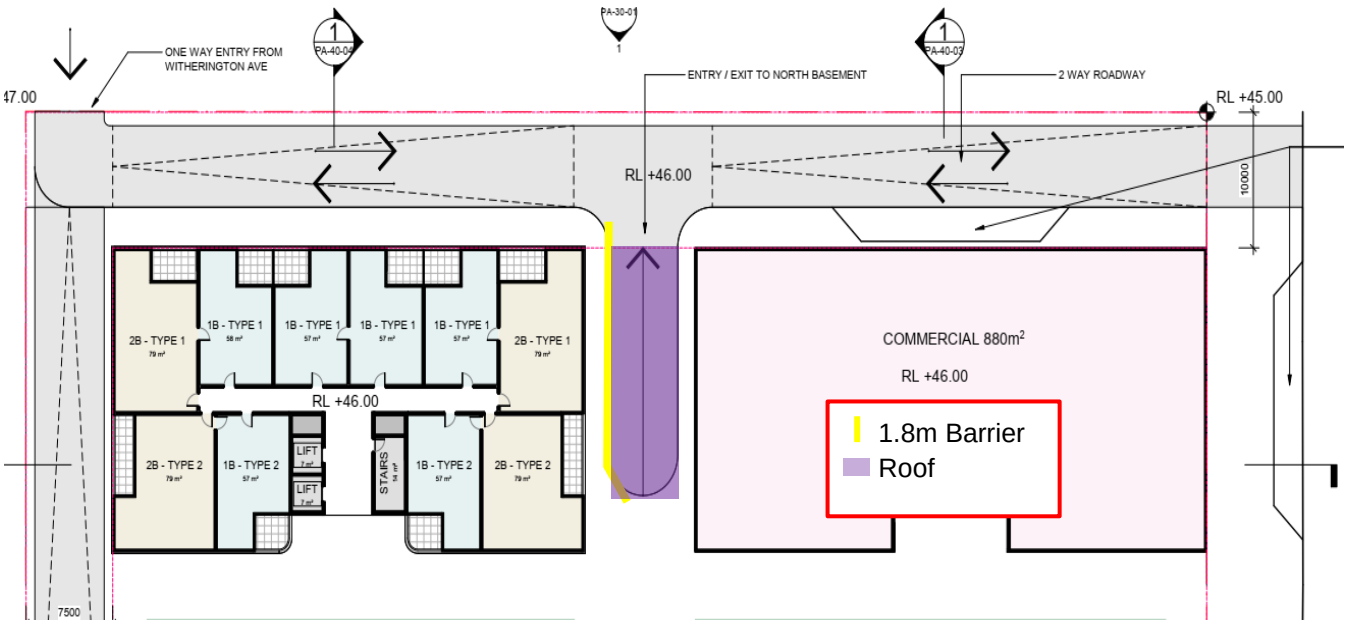
In order to achieve compliance with council's noise requirements for outdoor play, the following must be implemented:

- The windows can be opened while in use,

9.3 Carpark

- A 1.8 meter solid barrier on the eastern boundary and a roof must be implemented in order to comply with the noise criteria, please refer to the figure below:

Figure 9-1 Carpark Ramp Treatment



9.4 Acoustic Barrier Details

A 3 and 1.8 meters high solid barriers with the addition of a roof or awning along the boundaries must be implemented (Refer to Figure 6-1)

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/m^2 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
- 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/m^2 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

10 CONCLUSION

RSA has conducted a traffic noise impact assessment of the proposed mixed-use development at 131 St Vincent Street, Ulladulla. The assessment has comprised the establishment of noise criteria and assessed noise impacts with regard to relevant statutory requirements.

10.1 Traffic and Industrial

A noise survey has been conducted and the processed data has been used to determine traffic noise from St Vincent Street and noise impacts from the concrete batching plant on Lot 7 DP723098 which is operated by Hanson Australia.

Based on the noise impact study conducted, the proposed development is assessed to comply with the SEPP (Transport and Infrastructure) 2021 noise criteria with recommendations from this report. It is therefore considered that rezoning of the Site to permit mixed-use residential and commercial precinct, including residential and childcare centre uses would be suitable.

Traffic and industrial noise intrusion into the indoor areas has been assessed to comply with the noise criteria as set out in Section 8.2. Based on this assessment, the windows can be open.

10.2 Child Care Centre

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 8-2

Noise emissions from the outdoor area play activities to the nearest residential receivers have been calculated to comply with the noise criterion, where all children are playing outside at any given time. A 3 and 1.8 meters

high solid barriers along the boundaries must be implemented to minimise the noise impact from the outdoor areas (Refer to Figure 6-1).

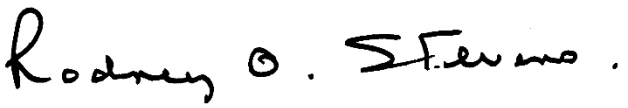
Noise emissions from the carpark to the nearest sensitive receivers have been calculated to comply with the noise criterion, a 1.8 meter solid barrier on the eastern boundary and a roof/awning must be implemented. (Refer to Figure 9-1**Error! Reference source not found.**).

Based on our assessment the proposed Childcare Centre at 131 St Vincent Street, Ulladulla complies with the noise criteria provided that the recommended noise control measures are implemented.

10.3 Mechanical Plant

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.

Approved:-



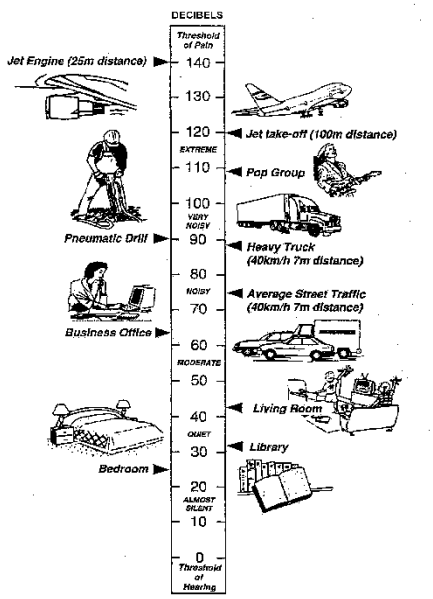
Rodney Stevens

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 '*A-weighting*' frequency filter is applied to the measured sound level *dB(A)* 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 dB(linear).
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: 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, taking into account the following factors: 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 10th 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)	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. The picture below indicates typical noise levels from common noise sources.



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)*.

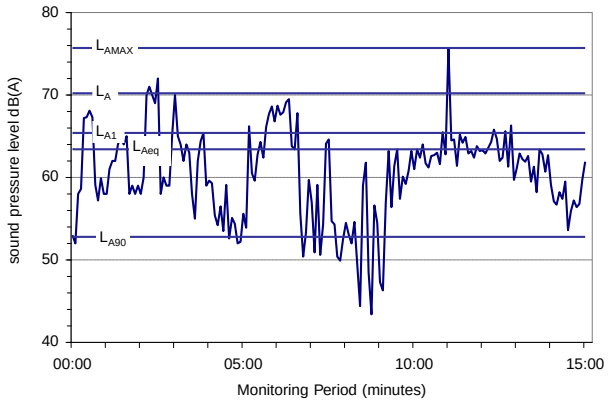
Sound Pressure Level (SPL)

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:

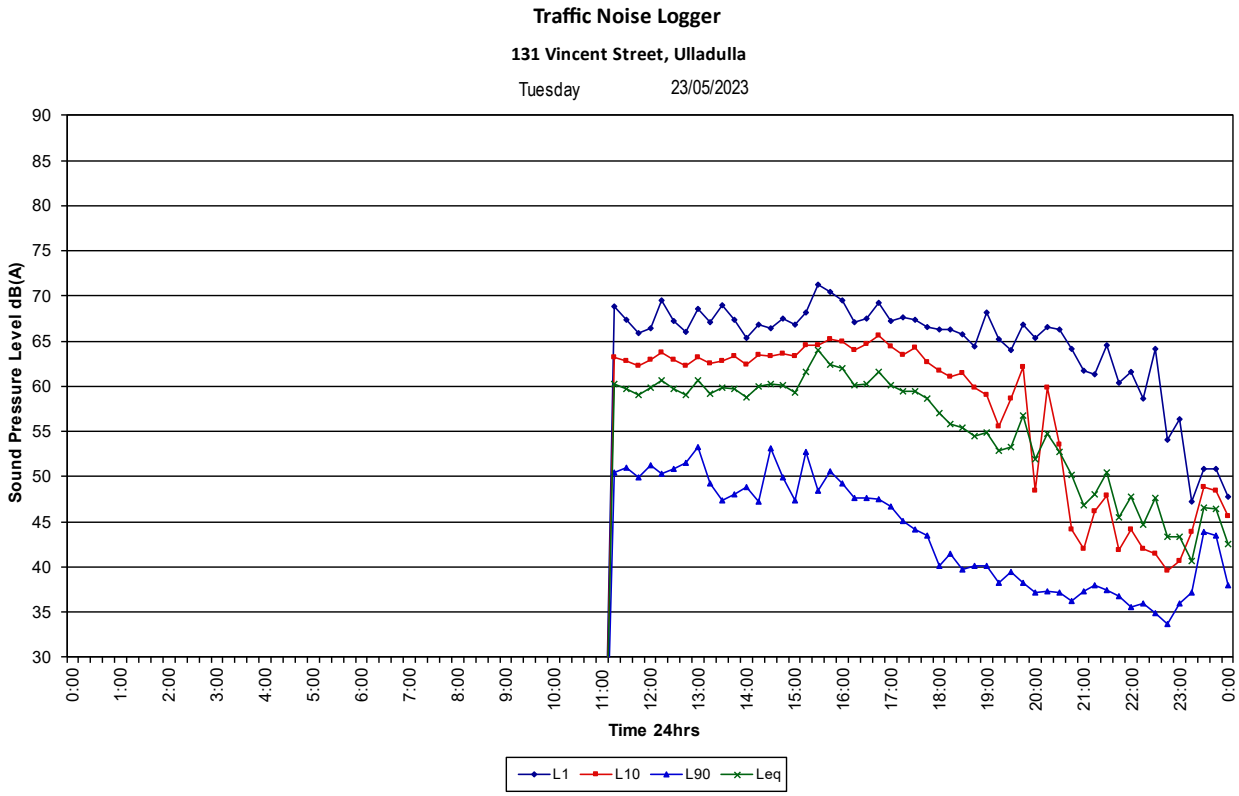


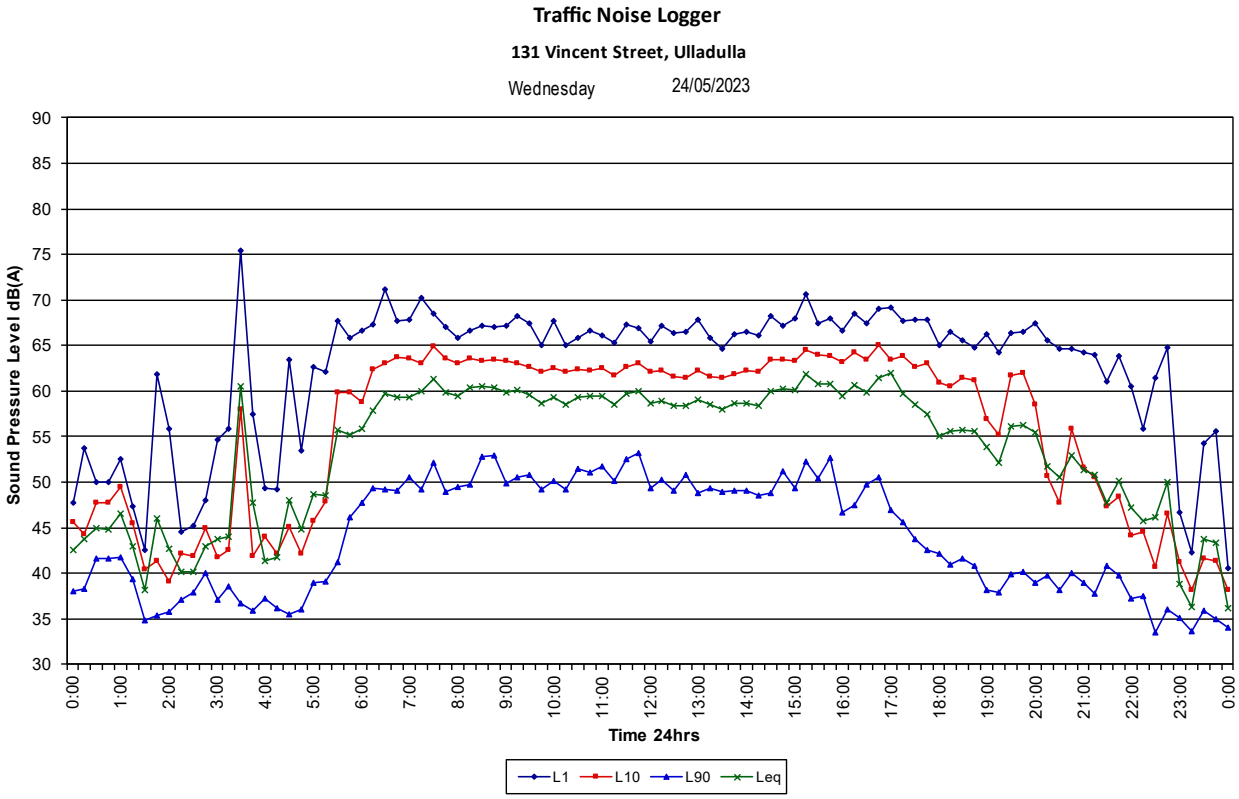
Key descriptors:

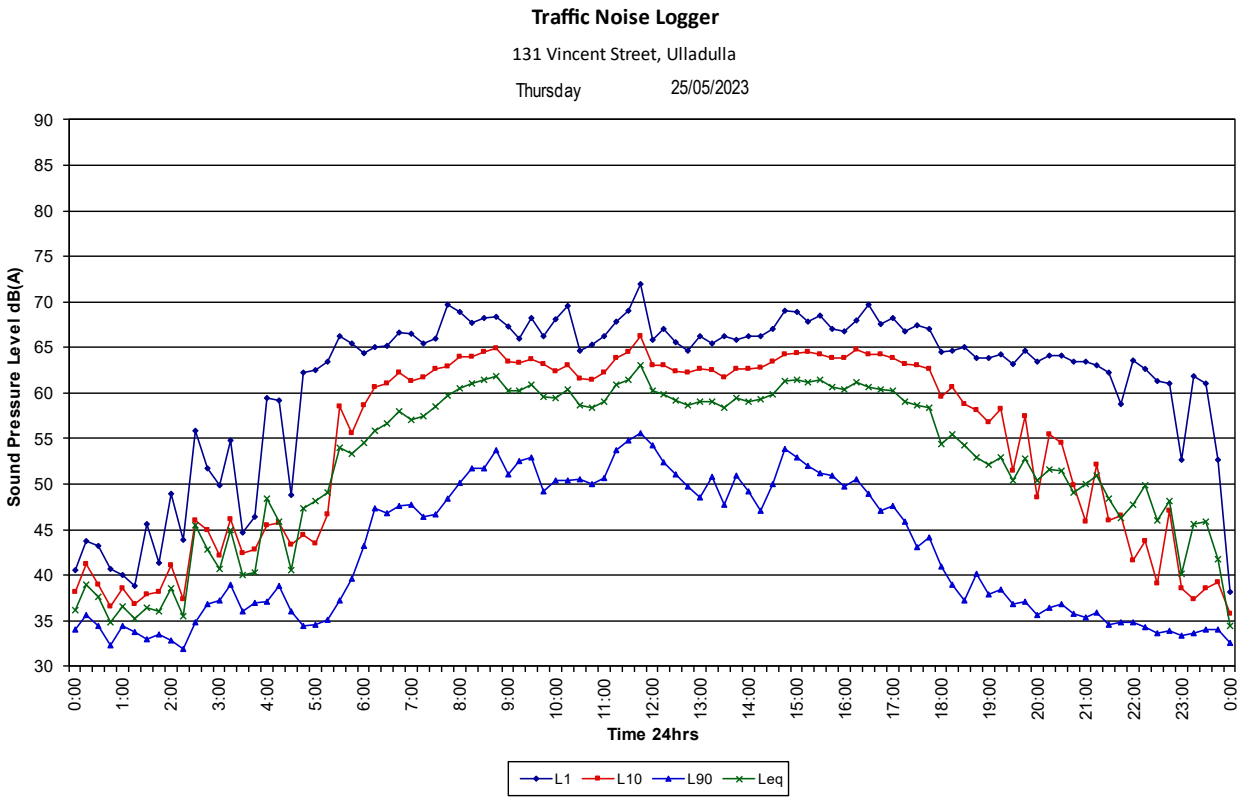
	L_{Amax} Maximum recorded noise level.
	L_{A1} The noise level exceeded for 1% of the 15 minute interval.
	L_{A10} Noise level present for 10% of the 15 minute interval. Commonly referred to the average maximum noise level.
	L_{Aeq} Equivalent continuous (energy average) A-weighted sound pressure level. 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

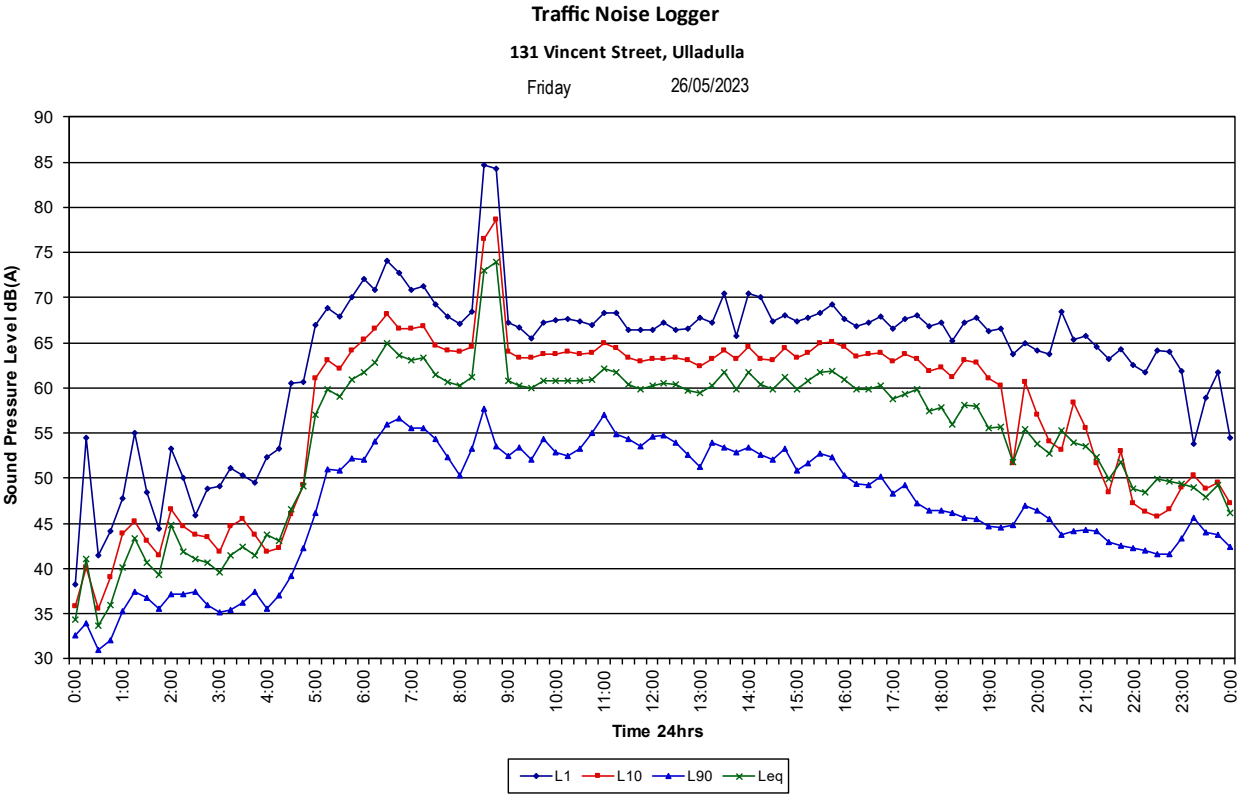
Appendix B – Logger Graphs

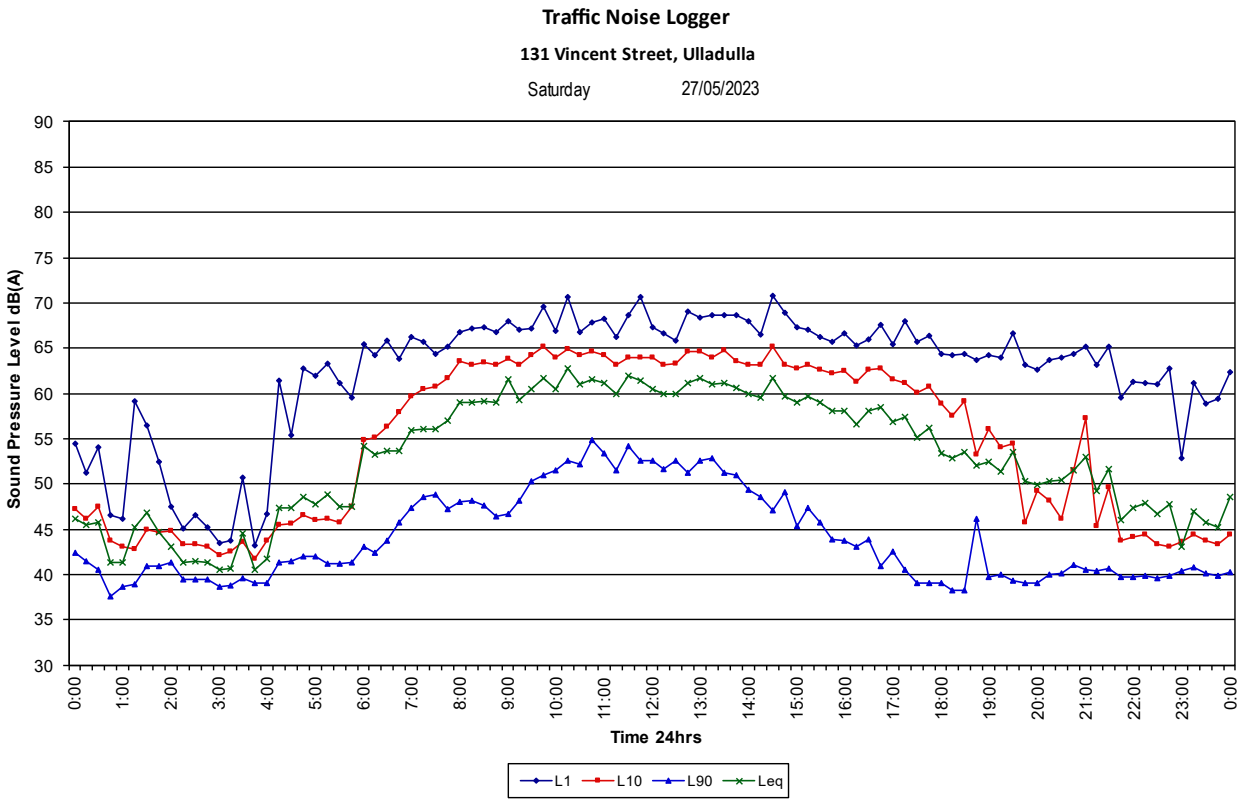
Traffic Logger






Traffic Noise Logger
131 Vincent Street, Ulladulla
Thursday 25/05/2023
Sound Pressure Level dB(A)
Time 24hrs
L1 L10 L90 Leq


Traffic Noise Logger
131 Vincent Street, Ulladulla
Friday 26/05/2023
Sound Pressure Level dB(A)
Time 24hrs
L1 L10 L90 Leq


Traffic Noise Logger
131 Vincent Street, Ulladulla
Saturday 27/05/2023
Sound Pressure Level dB(A)
90
85
80
75
70
65
60
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50
45
40
35
30
0:00
1:00
2:00
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Time 24hrs
L1
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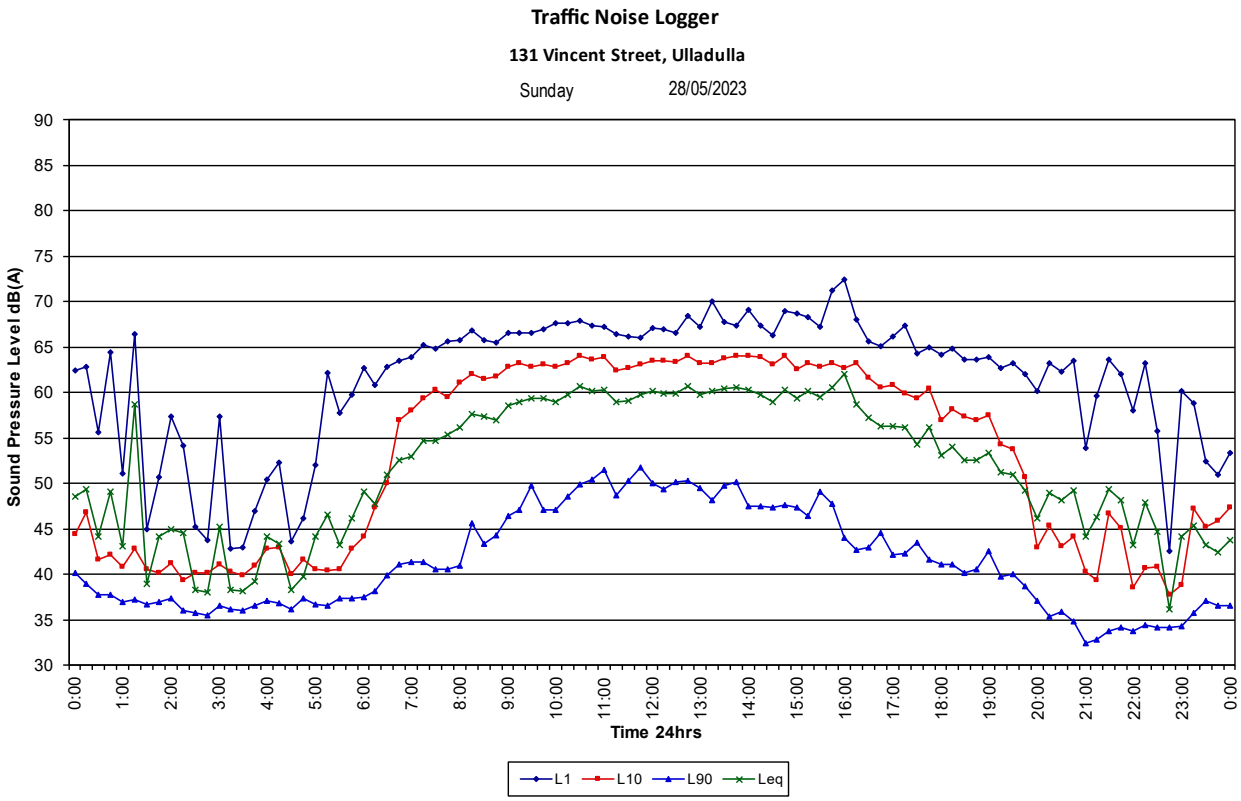
Leq


Traffic Noise Logger
131 Vincent Street, Ulladulla
Sunday 28/05/2023
Sound Pressure Level dB(A)
90
85
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50
45
40
35
30
0:00
1:00
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Time 24hrs
L1
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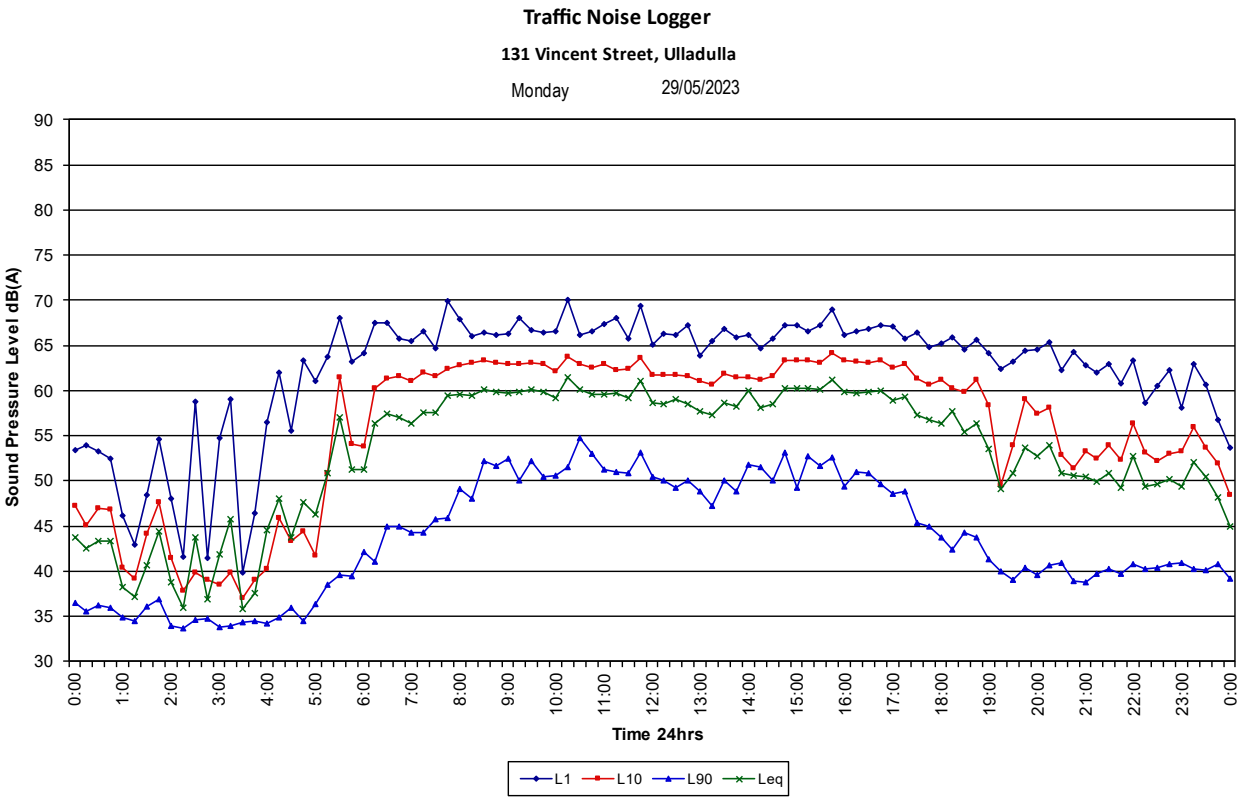
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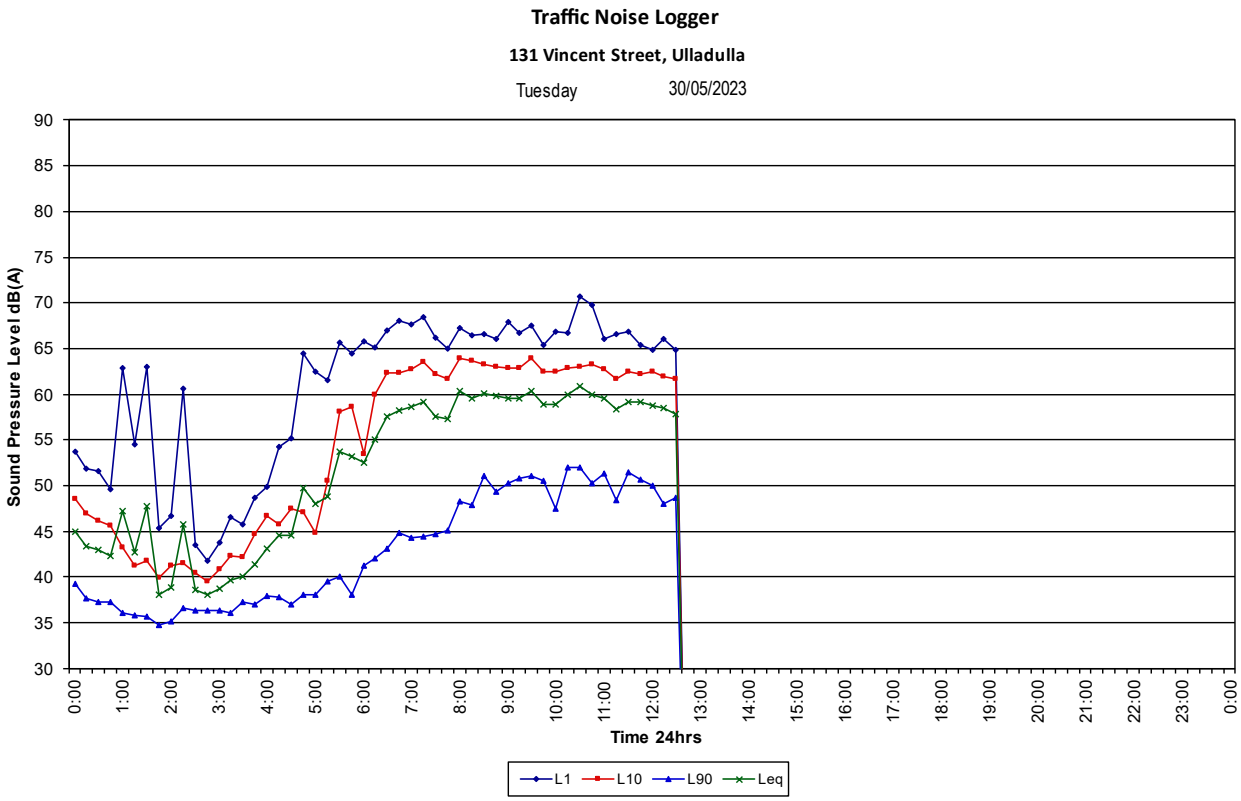
Monday 29/05/2023
Sound Pressure Level dB(A)
Time 24hrs
L1 L10 L90 Leq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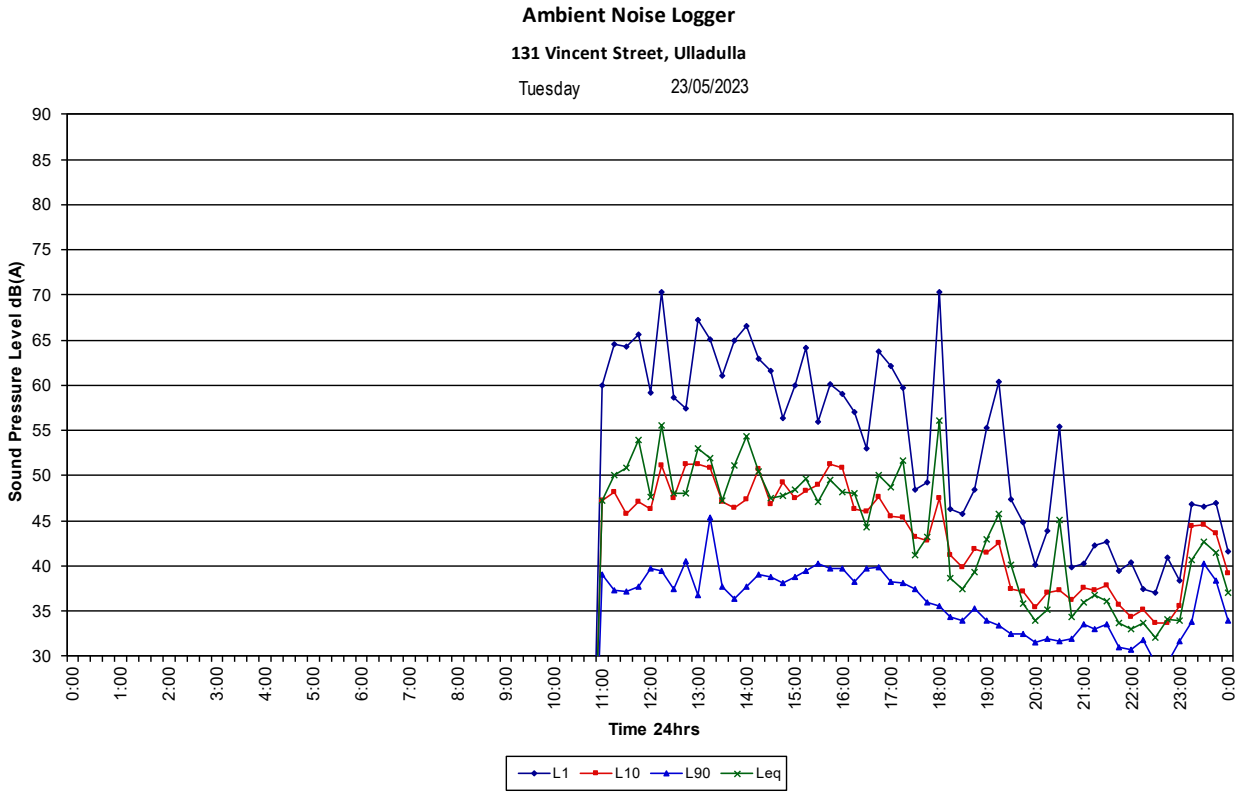
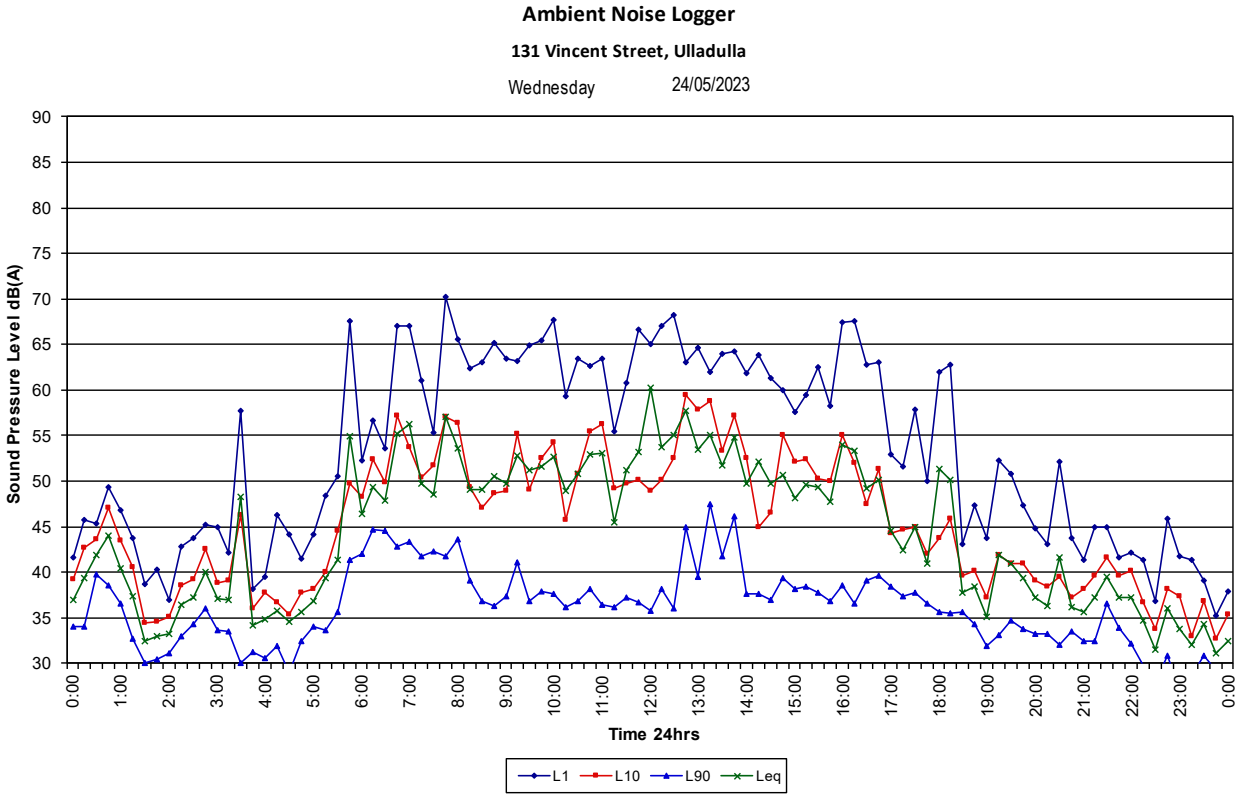
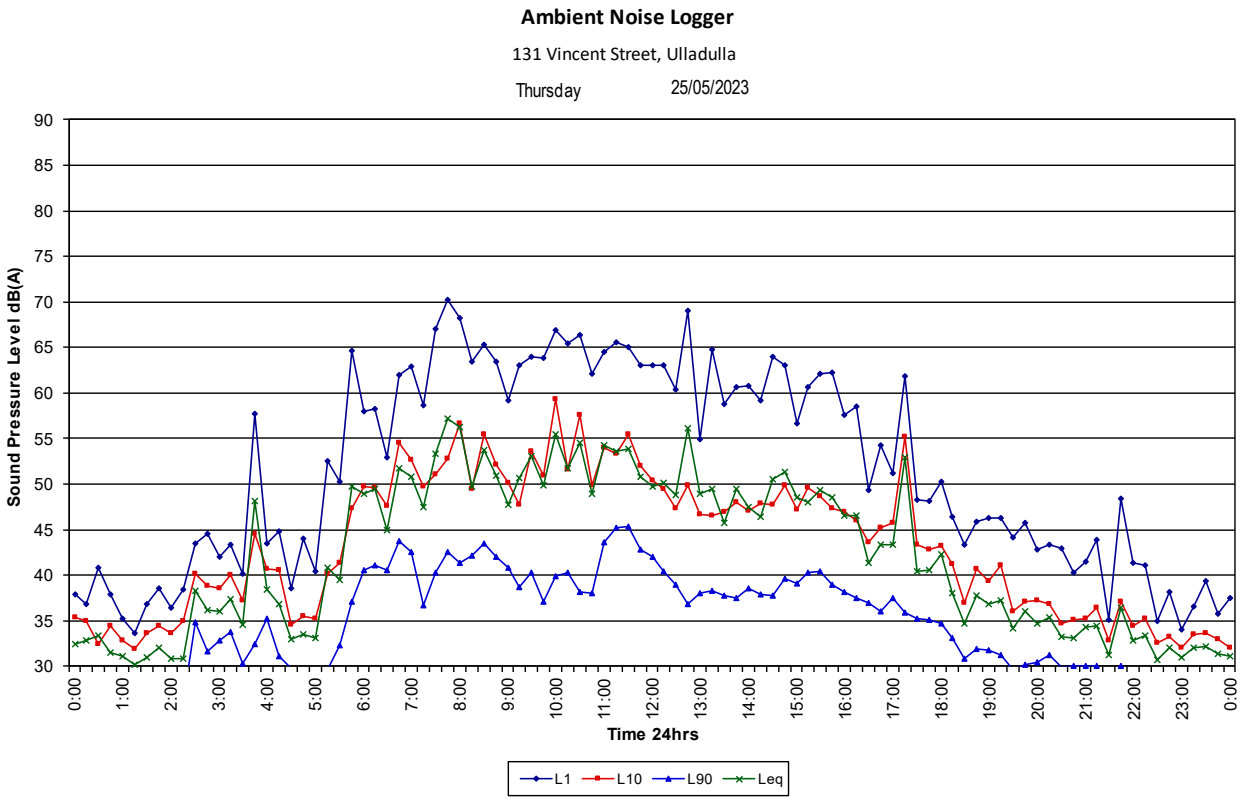
Tuesday 30/05/2023
Sound Pressure Level dB(A)
Time 24hrs
L1 L10 L90 Leq

Ambient Logger



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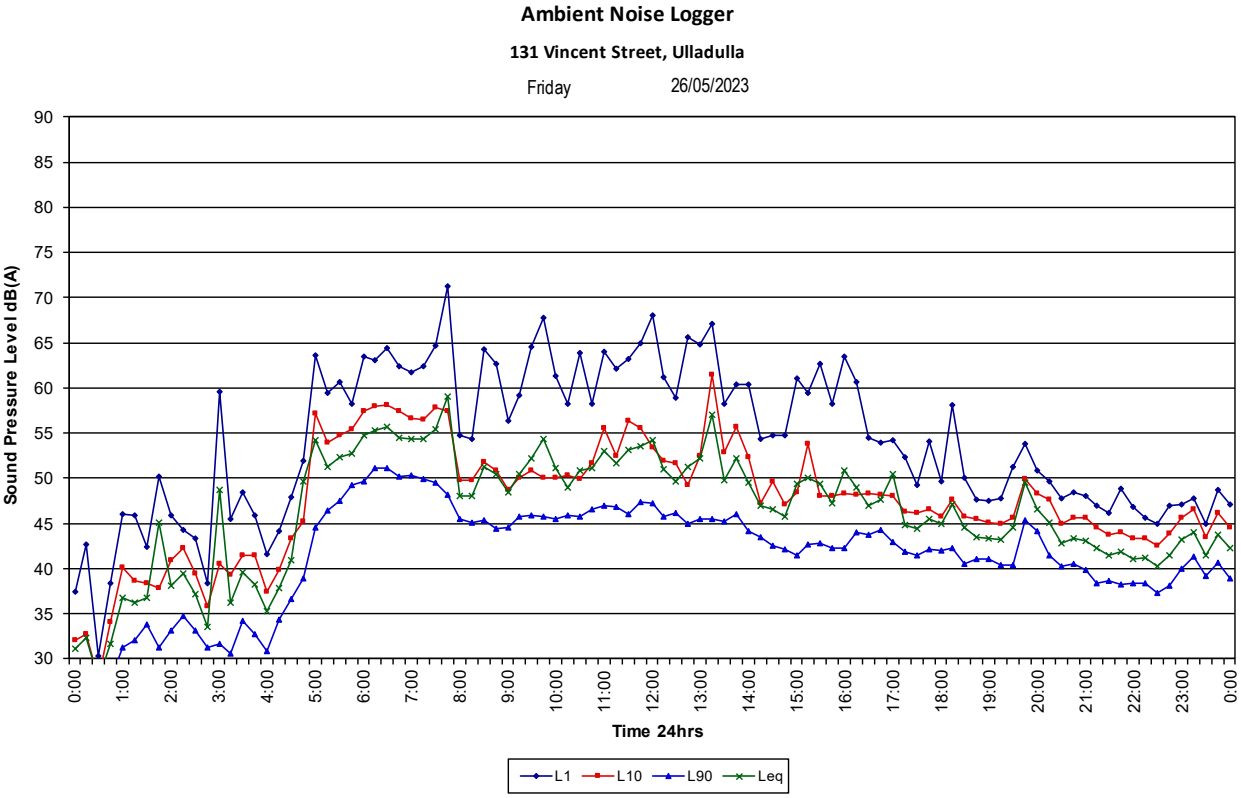
Thursday 25/05/2023
Sound Pressure Level dB(A)
Time 24hrs
L1 L10 L90 Leq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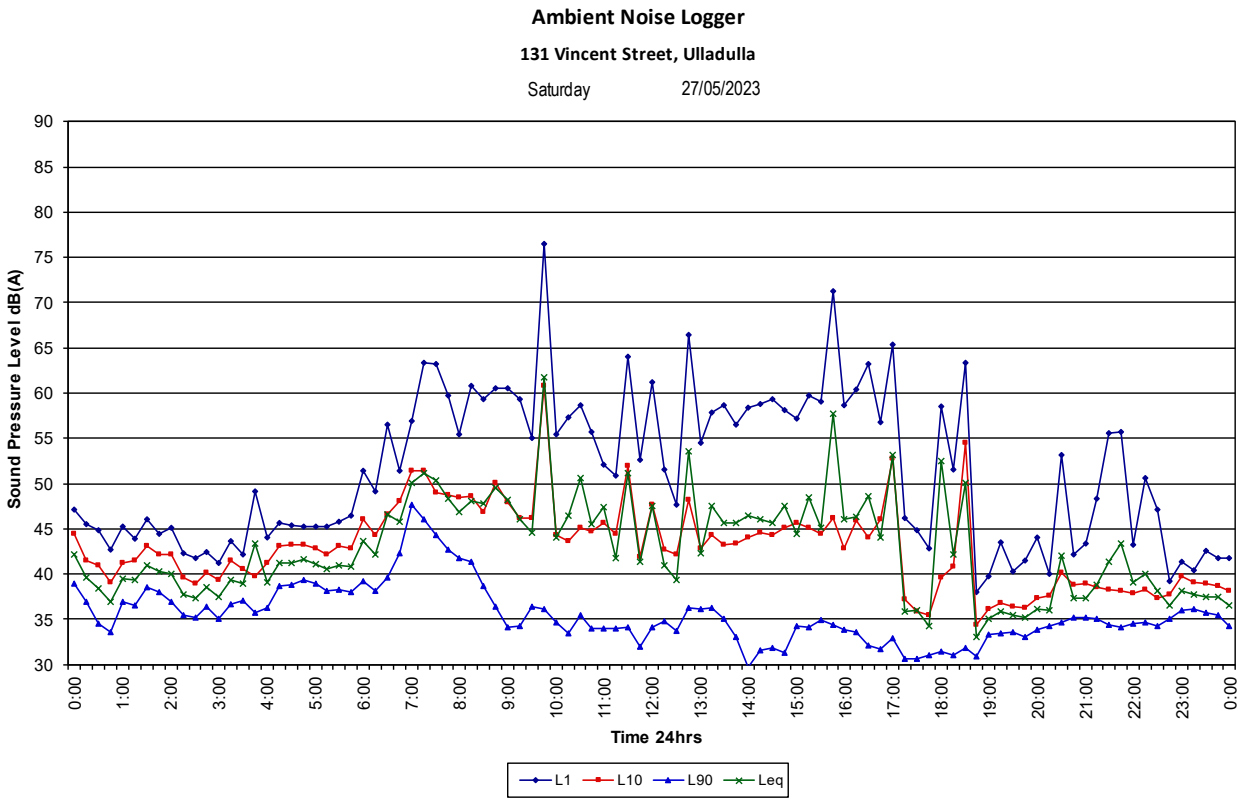
Friday 26/05/2023
Sound Pressure Level dB(A)
Time 24hrs
L1 L10 L90 Leq


Ambient Noise Logger
131 Vincent Street, Ulladulla
Saturday 27/05/2023
Sound Pressure Level dB(A)
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Time 24hrs
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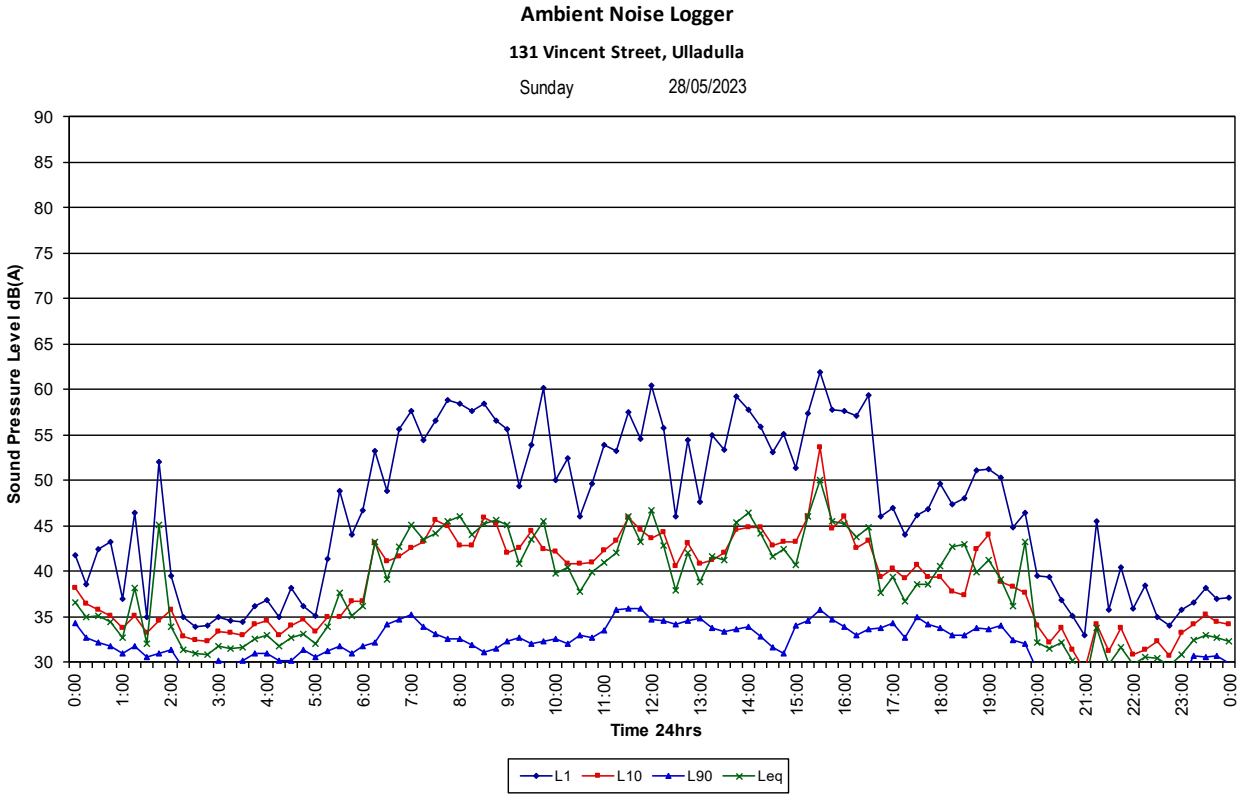
Ambient Noise Logger
131 Vincent Street, Ulladulla
Sunday 28/05/2023
Sound Pressure Level dB(A)
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55
50
45
40
35
30
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1:00
2:00
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Time 24hrs
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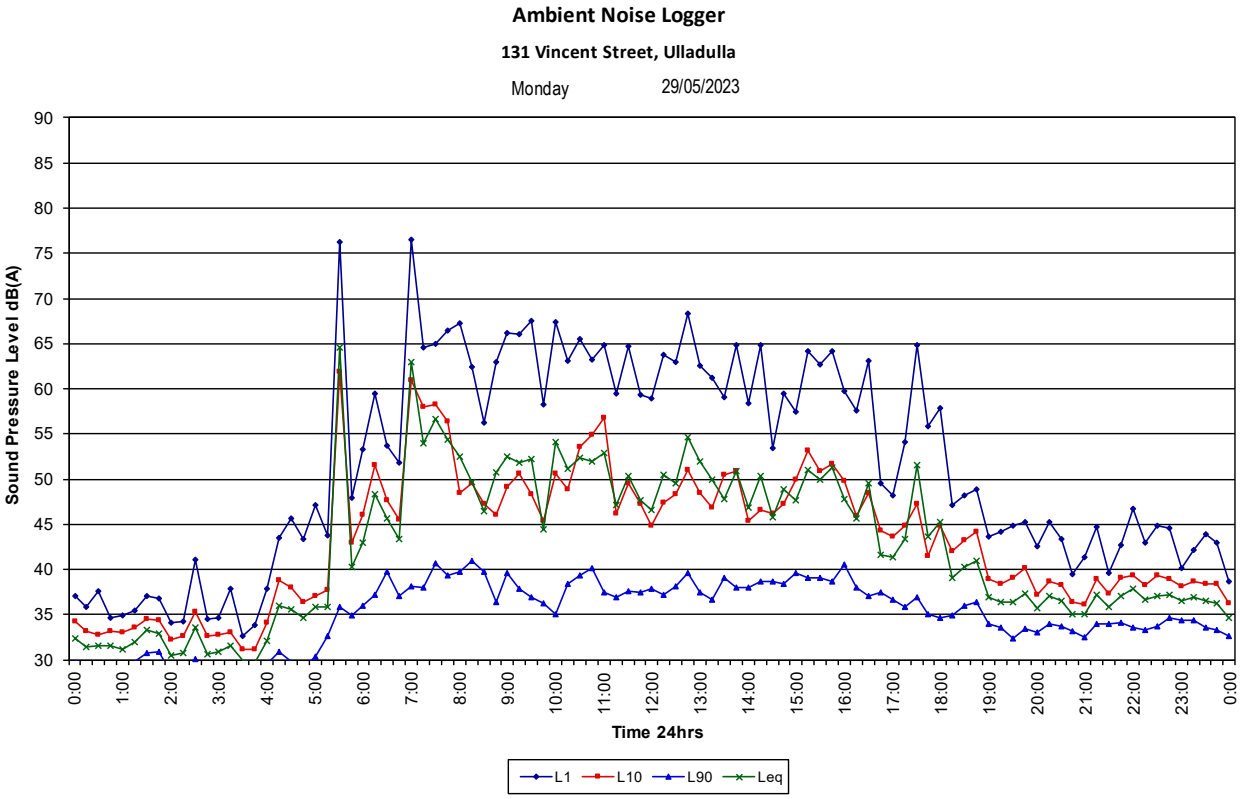
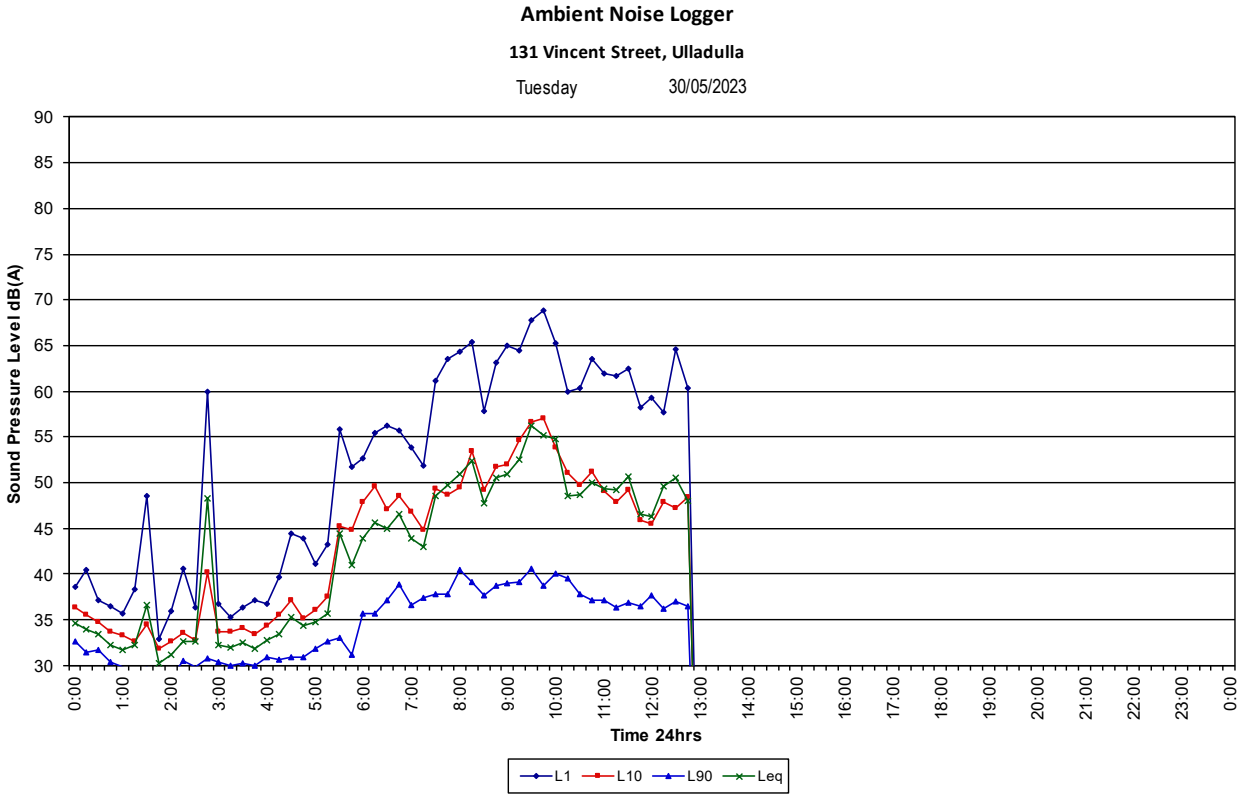
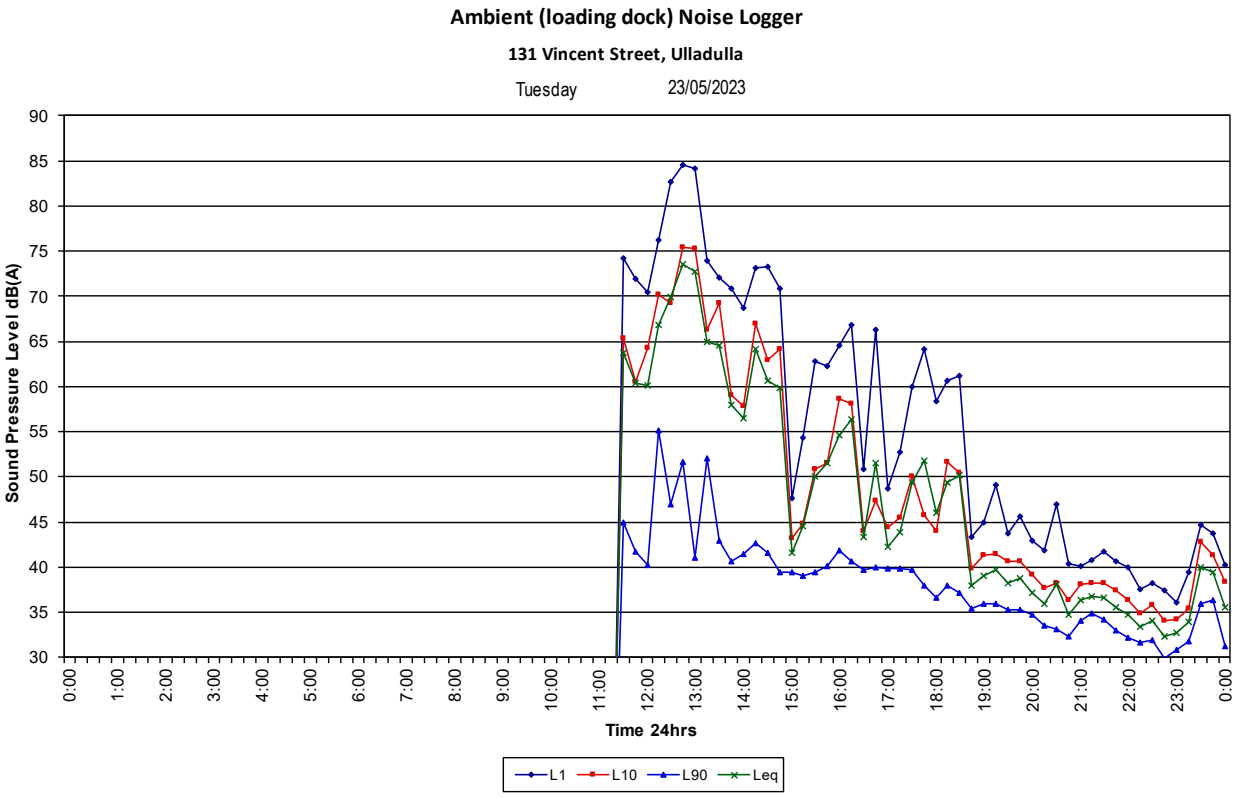
Leq





Logger at South-western Boundary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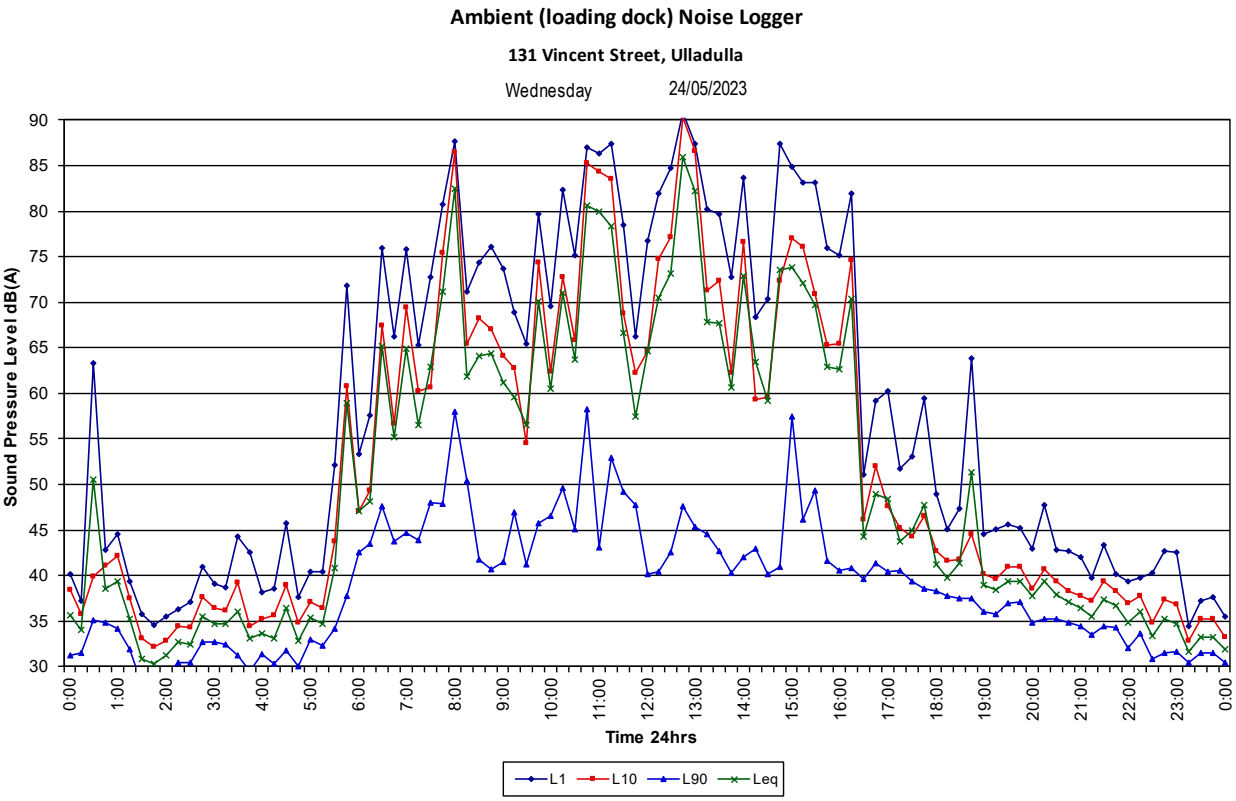
Tuesday 23/05/2023
Sound Pressure Level dB(A)
Time 24hrs
L1 L10 L90 Leq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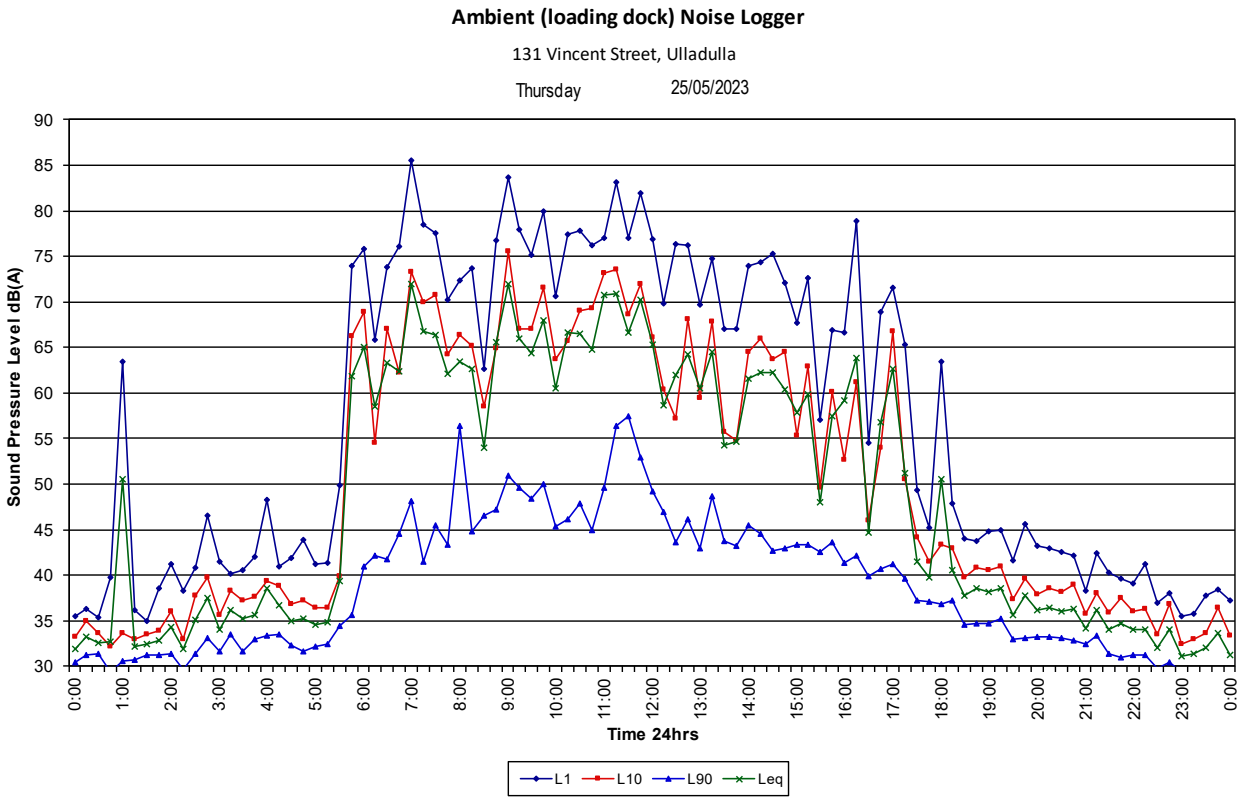
Wednesday 24/05/2023
Sound Pressure Level dB(A)
Time 24hrs
L1 L10 L90 Leq


Ambient (loading dock) Noise Logger
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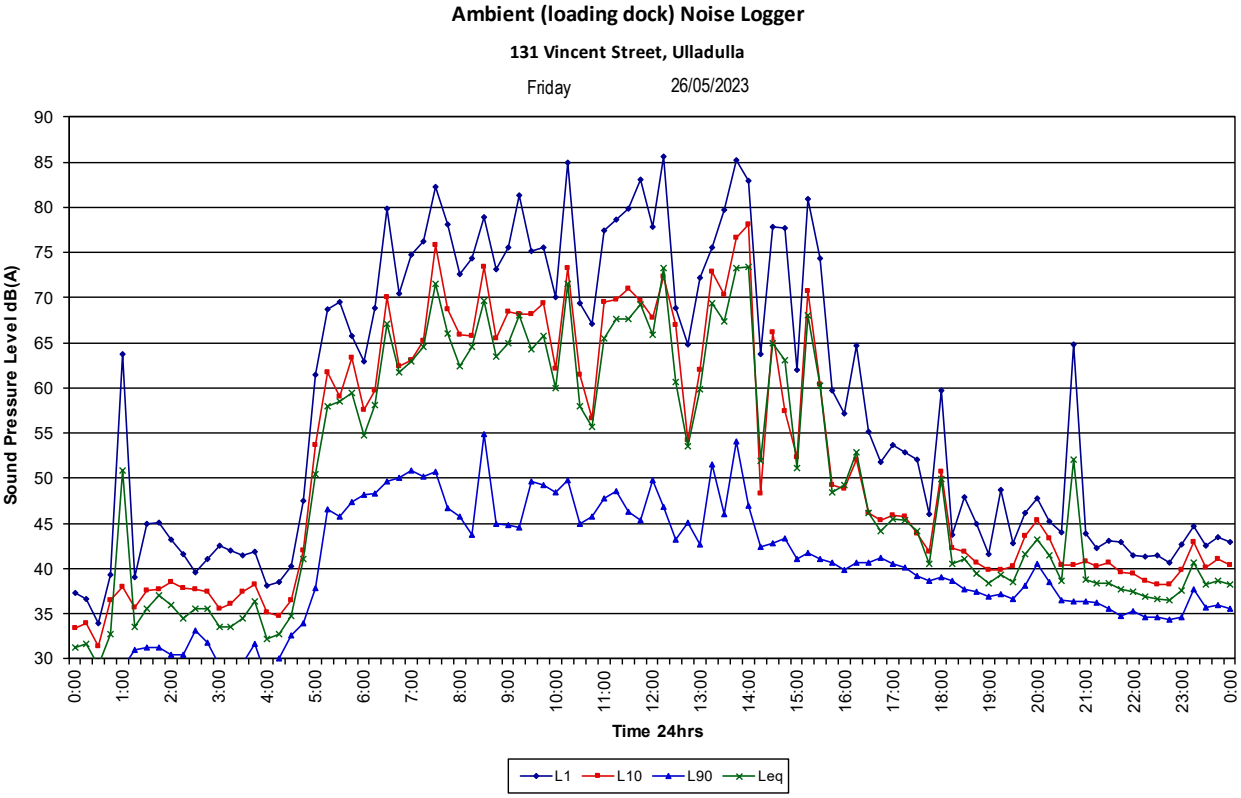
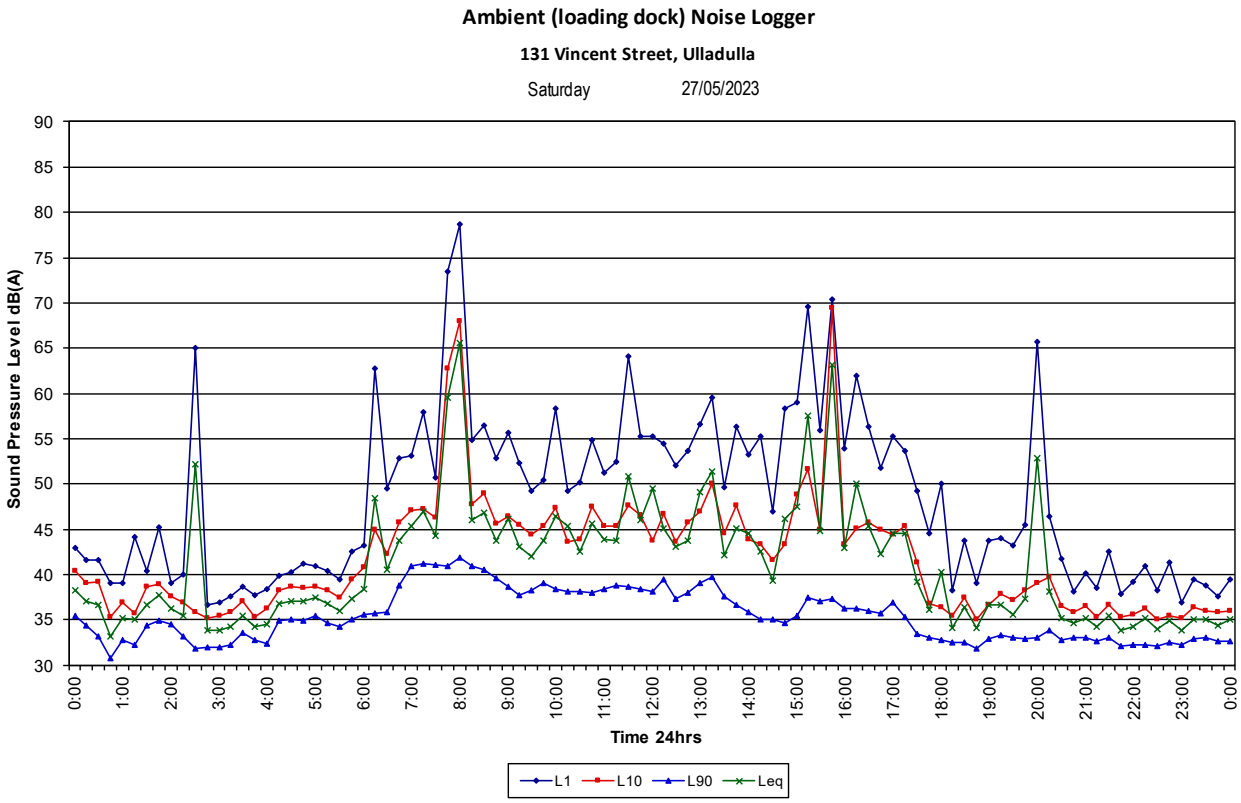
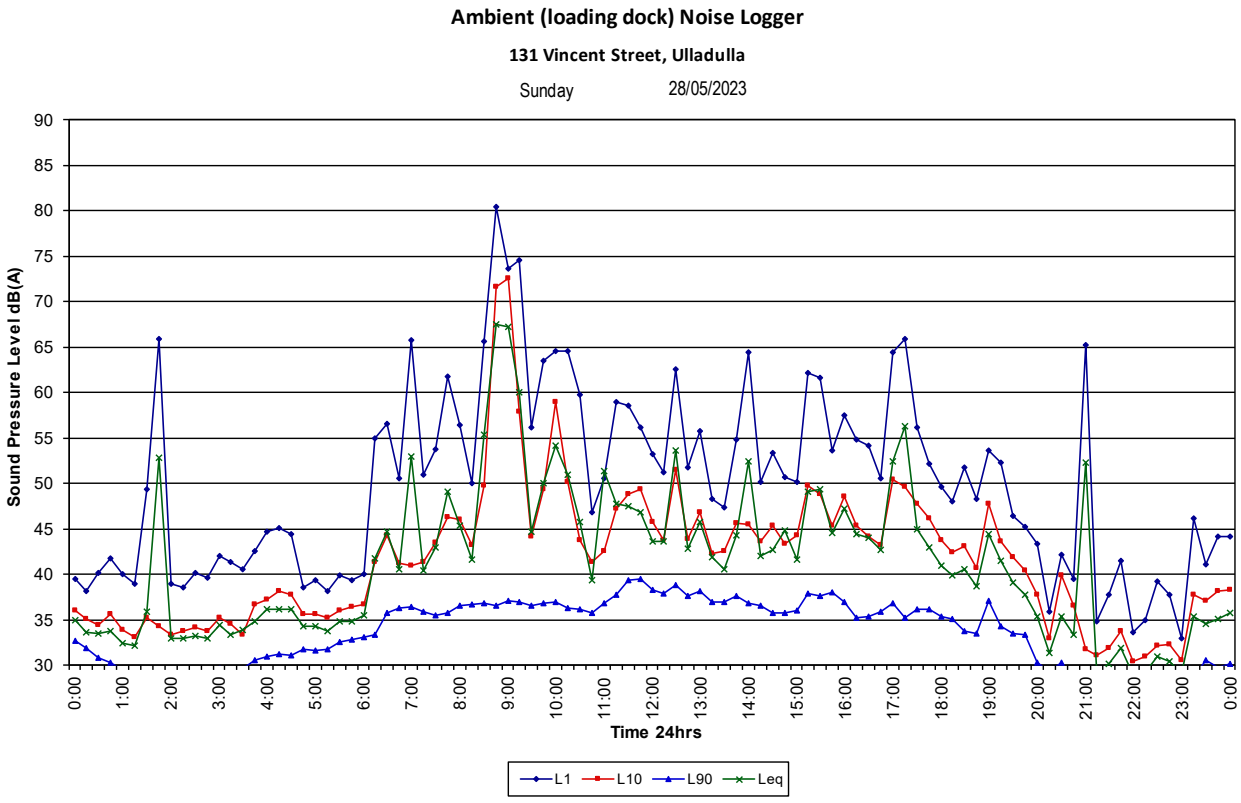
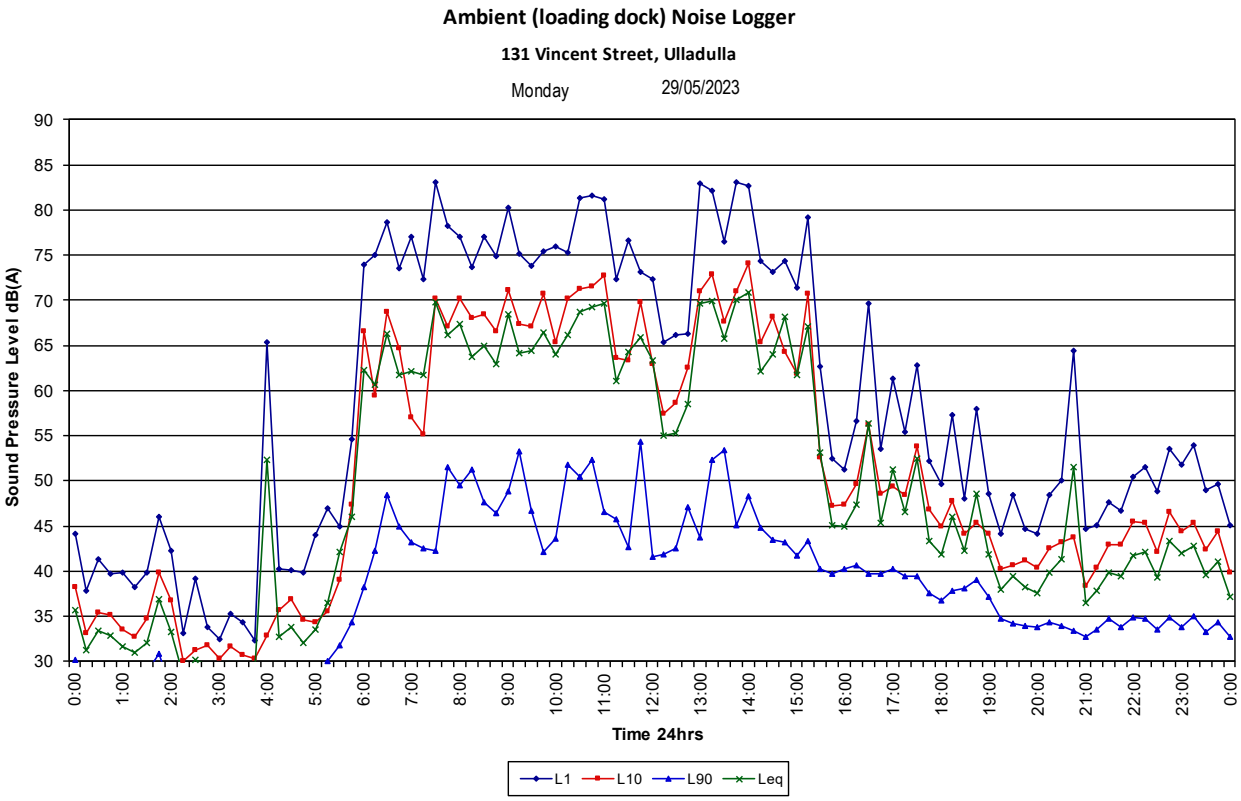
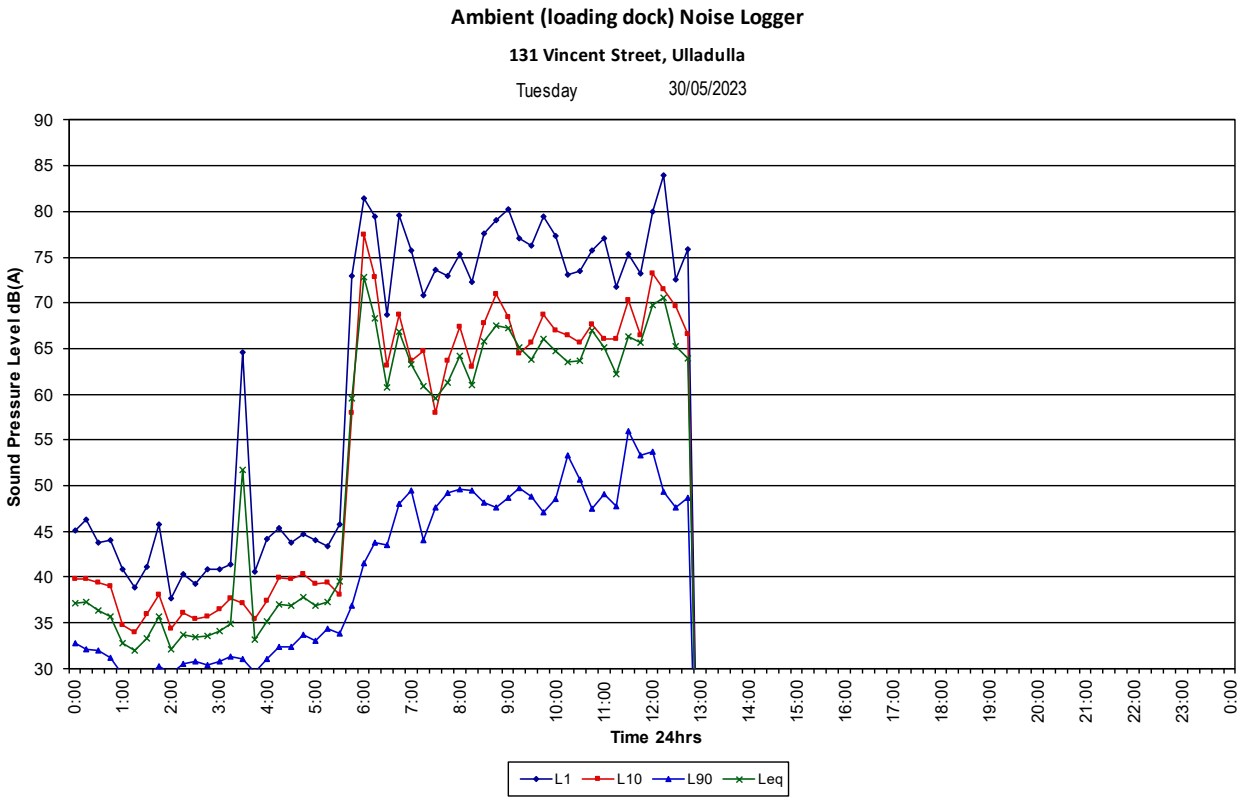
Thursday 25/05/2023
Sound Pressure Level dB(A)
Time 24hrs
L1 L10 L90 Leq


Ambient (loading dock) Noise Logger
131 Vincent Street, Ulladulla
Friday 26/05/2023
Sound Pressure Level dB(A)
Time 24hrs
L1 L10 L90 Leq


Ambient (loading dock) Noise Logger
131 Vincent Street, Ulladulla
Saturday 27/05/2023
Sound Pressure Level dB(A)
Time 24hrs
L1 L10 L90 Leq


Ambient (loading dock) Noise Logger
131 Vincent Street, Ulladulla
Sunday 28/05/2023
Sound Pressure Level dB(A)
Time 24hrs
L1 L10 L90 Leq





Appendix C – Calibration Certificate

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 C22036

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 :	00521656
Microphone Serial Number :	140633
Pre-amplifier Serial Number :	11697

Pre-Test Atmospheric Conditions		**Post-Test Atmospheric Conditions**	
Ambient Temperature :	24°C	**Ambient Temperature :**	23.8°C
Relative Humidity :	39.9%	**Relative Humidity :**	40.8%
Barometric Pressure :	99.68kPa	**Barometric Pressure :**	99.65kPa

Calibration Technician : Lucky Jaiswal **Secondary Check:** Max Moore
Calibration Date : 31 Jan 2022 **Report Issue Date :** 2 Feb 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	*±0.10dB*		

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.

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Acoustic Research Labs Pty Ltd
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www.acousticresearch.com.au

Sound Level Meter
IEC 61672-3:2013
Calibration Certificate

Calibration Number C22037

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 :	00184110
Microphone Serial Number :	173006
Pre-amplifier Serial Number :	74636

Pre-Test Atmospheric Conditions		Post-Test Atmospheric Conditions	
Ambient Temperature :	24.8°C	**Ambient Temperature :**	24.8°C
Relative Humidity :	38.3%	**Relative Humidity :**	37.8%
Barometric Pressure :	98.8kPa	**Barometric Pressure :**	98.82kPa

Calibration Technician : Lucky Jaiswal **Secondary Check:** Max Moore
Calibration Date : 1 Feb 2022 **Report Issue Date :** 2 Feb 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	*±0.10dB*		

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.

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Sound Level Meter
IEC 61672-3:2013
Calibration Certificate

Calibration Number C22221_Reissued

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 :	00710677
Microphone Serial Number :	191388
Pre-amplifier Serial Number :	46604
Firmware Version :	-

Pre-Test Atmospheric Conditions		**Post-Test Atmospheric Conditions**	
Ambient Temperature :	24.4°C	**Ambient Temperature :**	24.5°C
Relative Humidity :	52.2%	**Relative Humidity :**	51.8%
Barometric Pressure :	100.19kPa	**Barometric Pressure :**	100.17kPa

Calibration Technician :	Lucky Jaiswal	**Secondary Check:**	Shaheen Boaz
Calibration Date :	4 Apr 2022	**Report Issue Date :**	24 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	*±0.10dB*		

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

Reissued to update company name and address.

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.

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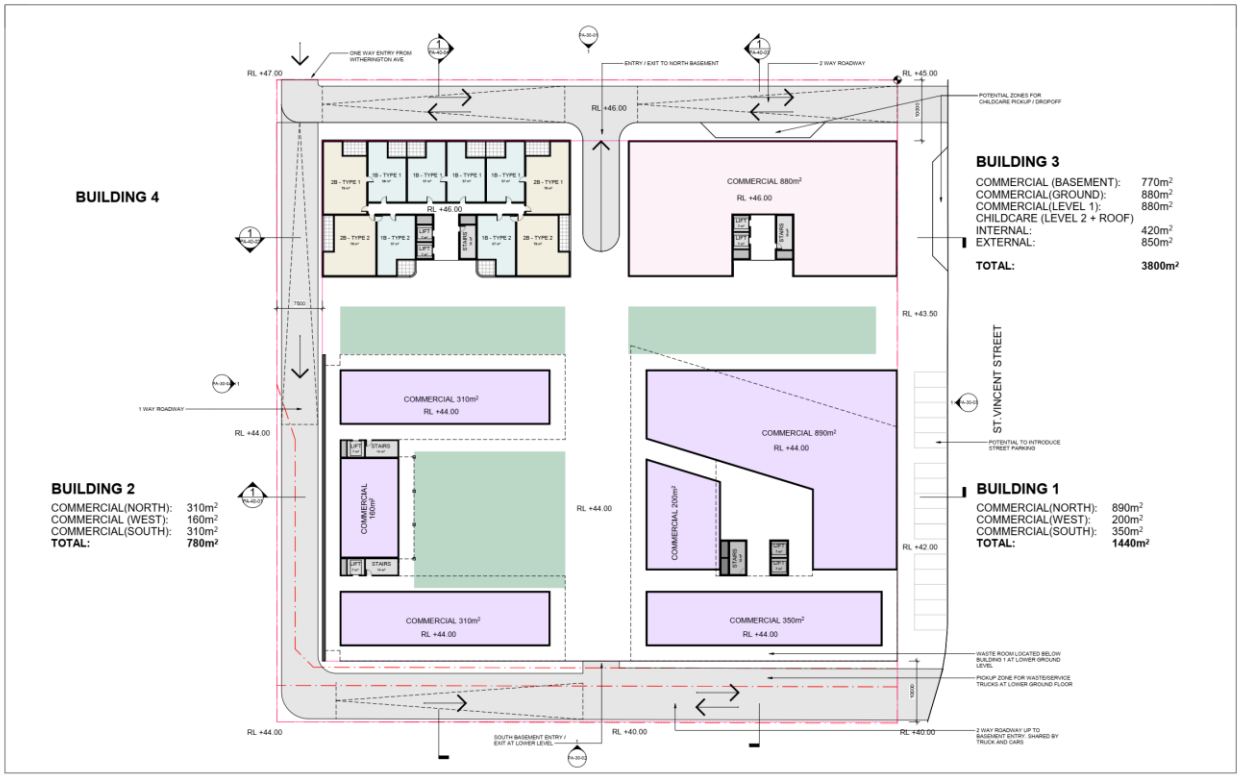
Appendix D – Architectural Plans



COX

Fleming Group - Ulladulla
131 St Vincent Street, Ulladulla
GROUND FLOOR PLAN
PA-21-03

COX

Fleming Group - Ulladulla
131 St Vincent Street, Ulladulla
TYPICAL FLOOR PLAN
PA-21-04