Nemr Makram

12 Segers Avenuse, Padstow

Childcare Centre Acoustic Assessment

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1 Introduction

The following report has been prepared by Acouras Consultancy on behalf of Nemr Makram to assess the potential for noise impact associated with the proposed childcare centre located at 12 Segers Avenuse, Padstow. childcare centre will include:

- Single level basement carpark.
- Ground level: Office, reception, cot room, change room, indoor playarea and outdoor playarea.
- First level: Staff/meeting room, kitchen, two (2) indoor playrooms and outdoor playarea on terrace.

The proposed childcare centre development is surrounded by existing residential dwellings and adjacent to Padstow Public School. The location is shown in Figure 1.

Figure 1 – Site Location, Nearest Residents and Noise Logger Position

Potentially, the nearest affected receiver are the residents located at:

- R1 –Residential dwelling at No.10 Segers Ave to the north.
- R2 – Residential dwelling at No.1 Gloucester Ave to the west.
- R3 – Residential dwelling at No.15 Segers Ave to the west/
- S1 – Padstow Public School to the south.

2 Noise Criteria

The following standards and guidelines are applicable to this project:

- Association of Australian Acoustical Consultants (AAAC) "Guideline for Child Care Centre Acoustic Assessment" (Version 3.0).
- NSW Government of Planning and Environment "Child Care Planning Guide".
- NSW EPA "Noise Policy for Industry" (NPfI).
- NSW EPA "Road Noise Policy" (RNP).
- Australian standard AS/NZS 2107-2016: Acoustics – Recommended design sound levels and reverberation times for building interiors.
- Australian standard AS 1055.1-1997: Acoustics – Description and measurement of environmental noise - General procedures.

2.1 NSW Child Care Planning Guide

The NSW Government of Planning and Environment provides a guideline for assessing any proposed childcare centre. The guideline states in Section 3.6:

> *C26: An acoustic report should identify appropriate noise levels for sleeping areas and other non play areas and examine impacts and noise attenuation measures where a child care facility is proposed in any of the following locations:*
>
> - *on industrial zoned land*
> - *where the ANEF contour is between 20 and 25, consistent with AS 2021 – 2000*
> - *along a railway or mass transit corridor, as defined by State Environmental Planning Policy (Infrastructure) 2007*
> - *on a major or busy road*
> - *other land that is impacted by substantial external noise.*

The proposed location of the childcare centre is not affected by aircraft noise and is not located on "major or busy road" that carries more than 40 000 AADT in as defined by the SEPP(I) and the RMS.

2.2 Childcare Centre Internal Noise Level

For the childcare centre, the Association of Australian Acoustical Consultants (AAAC) 'Guideline for Child Care Centre Acoustic Assessment' recommends the following criteria for noise intrusion from traffic, rail and industry.

> *The LAeq,1hr noise level from road traffic, rail or industry at any location within the outdoor play or activity area during the hours when the Centre is operating should not exceed 55 dB(A).*
>
> *The LAeq,1hr noise level from road traffic, rail or industry at any location within the indoor activity or sleeping areas of the Centre during the hours when the centre is operating shall be capable (ie with doors and / or windows closed) of achieving 40 dB(A) within indoor activity areas and 35 dB(A) in sleeping areas.*

Table 1 presents the recommended internal design noise levels for the various spaces in a childcare centre based on the Australian Standard AS/NZS 2107–2016.

Table 1— Recommended Internal Design Noise Levels (AS/NZS 2107)

Type of occupancy/activity	Design sound level ($L_{Aeq,t}$) range
Administrative offices	35 to 40
Staff common rooms	40 to 45
Toilets	< 55

2.3 Noise Survey and Project Specific Limits

An unattended noise survey was carried out at the site to measure the background and ambient noise levels. Noise monitoring was placed on the ground level as shown in Figure 1.

Measurements were conducted using the following equipment:

- SVAN 977C Type 1 Real time Analyser/Noise Logger. Serial No. 98078.
- SVAN SV30A Type 1 Sound Level Calibrator. Serial No. 31830.

Noise monitoring was conducted in general accordance with Australian standard AS 1055.1-1997: Acoustics-Description and measurement of environmental noise-General procedures. The noise analyser was calibrated immediately before and after measurements were taken with no discernible differences between these two recorded levels. The sound analyser is Type 1 and complies with Australian standard AS1259.2: 1990. During the monitoring period any adverse weather condition have been excluded. The noise logger results are presented in Appendix C.

2.3.1 Measured Traffic Noise Levels

Table 2 presents a summary of the measured ambient noise level and traffic noise impacting the development.

Table 2 – Measured Ambient and Traffic Noise and Levels, dBA

Location	Period	Average L_{eq}	Highest L_{eq} 1hr
Segers Rd	Day (07:00-22:00)	53	61
	Night (22:00-07:00)	44	53

2.3.2 Children Activity Noise Limits (AAAC)

To provide an objective assessment of the proposed childcare centre the Association of Australian Acoustical Consultants (AAAC) 'Guideline for Child Care Centre Acoustic Assessment'.as a best practice method to determine the intrusive noise levels.

The AAAC guideline recommends that outdoor play be assessed as follows:

- Base Criteria – With the development of child care centres in residential areas, the background noise level within these areas can at certain times, be low. Thus, a base criterion of a contributed $L_{eq,15min}$ 45 dB(A) for the assessment of outdoor play is recommended in locations where the background noise level is less than 40 dB(A).
- Background Greater Than 40 dB(A) – The contributed $L_{eq,15min}$ noise level emitted from an outdoor play and internal activity areas shall not exceed the background noise level by more than 5 or 10dB at the assessment location, depending on the usage of the outdoor play area. AAAC members regard that a total time limit of approximately 2 hours outdoor play per morning and afternoon period should allow an emergence above the background of 10dB (ie background+10dB if outdoor play is limited to 2 hours in the morning and 2 hours in the afternoon).
- Up to 4 hours (total) per day - If outdoor play is limited to no more than 2 hours in the morning and 2 hours in the afternoon, the contributed $L_{eq,15\ minute}$ noise level emitted from the outdoor play shall not exceed the background noise level by more than 10dB at the assessment location.
- More than 4 hours (total) per day - If outdoor play is not limited to no more than 2 hours in the morning and 2 hours in the afternoon, the contributed $L_{eq,15\ minute}$ noise level emitted from the outdoor play area shall not exceed the background noise level by more than 5 dB at the assessment location.

The assessment location is defined as the most affected point on or within any residential receiver property boundary. Examples of this location may be:

- 1.5 m above ground level;
- On a balcony at 1.5 m above floor level;
- Outside a window on the ground or higher floors.

For outdoor playareas, the AAAC recommends the following:

- The $L_{Aeq,1hr}$ noise level from road traffic, rail or industry at any location within the outdoor play or activity area during the hours when the Centre is operating should not exceed 55 dB(A).

For the purpose of the assessment, the background noise level RBL has been determined based on the average noise level recorded during the expected play time periods. Table 4 presents a summary of the measured background noise level and the allowable intrusive noise limit for this project from children activity noise.

Table 3—Children Activity Noise Limits, dBA (AAAC)

Receiver	Time Period	Existing Noise Levels			AAAC Noise Limits, $L_{eq\ (15min)}$[1]	AAAC Noise Limits, $L_{eq\ (15min)}$[2]
		L_{eq} (period)	L_{90} (period)	RBL	(More than 4 hours)	(Up to 4 hours per day)
Residential	Day (07:00-18:00)	53	39	34	39	**44**
	Evening (18:00-22:00)	53	40	38	43	**48**
	Night (22:00-07:00)	44	34	30	N/A	N/A
Schools	When is use				65 dB(A) externally 45 dB(A) internally	

[1] More than 4 hours per day - not exceed the background noise level by more than 5 dB.
[2] Up to 4 hours per day - not exceed the background noise level by more than 10 dB.

2.3.3 EPA Noise Policy for Industry

Table 4 presents a summary of the measured background noise level and the allowable intrusive noise limit for this project. The amenity criteria are based on a rural receiver.

Table 4—Noise Survey Summary and Project Limits, dBA

Time Period	Existing Noise Levels		NSW EPA NPfI			
	L_{eq} (period)	RBL	Recommended ANL	Project ANL[3] $L_{eq(15min)}$	Intrusiveness Criteria, $L_{eq(15min)}$	Project Noise Trigger Level $L_{eq(15min)}$
Day	53	34	60	58	39	**39**
Evening	53	38	50	48	43	**43**
Night	44	30	45	43	35	**35**

During detailed design stage, the design and selection of the mechanical equipment required to service the proposed development will be required to achieve the EPA noise limits as presented in the table above.

2.4 Traffic Noise Generation

The development of the childcare centre has the potential to generate increased traffic noise along Heath Road will be assessed in accordance with the NSW EPA Road Noise Policy (RNP). Table 5 sets out the assessment criteria for residences to be applied to particular types of project, road category and land use.

Table 5— Road Traffic Noise Assessment Criteria

Road Category	Type of project/land use	Assessment Criteria - dBA	
		Day (7am-10pm)	Night (10pm-7am)
Local roads	Existing residences affected by additional traffic on existing local roads generated by land use developments	$L_{Aeq, (1\ hour)}$ 55 (external)	$L_{Aeq, (1\ hour)}$ 50 (external)

For existing residences and other sensitive land uses affected by additional traffic on existing roads generated by land use developments, any increase in the total traffic noise level should be limited to 2 dB above that of the corresponding 'no build option'.

[3] 2. Project ANL is recommended ANL minus 5 dB(A) and plus 3 dB(A), to convert from a period level to a 15-minute level.

3 Assessment and Recommendations

3.1 Façade Glazing Requirements

Acoustic glazing for the various spaces are given in Table 6 is required to reduce noise intrusion into the internal spaces and should result in noise levels within such units in accordance with the AAAC and the Australian Standards AS/NZS 2107:2016.

Table 6 – Schedule of Window and Glazing (R_w)

Level	Façade	Space	Glazing Thickness	Minimum R_w (Glazing+Frame)
All	All	All	6.38mm laminated	30

All Windows/doors should be well sealed (air tight) when closed with good acoustic seals around the top and bottom sliders. Mohair seals are not considered to be acoustic seals.

3.2 Building Façade Construction

To provide sufficient acoustic attenuation, the general external construction of the proposed building would need to be constructed as detailed in Table 7.

Table 7 – External Façade Construction (R_w)

Building Element	Proposed Construction	Minimum R_w
External Wall	External brick veneer. or External cladding (FC sheet or similar) with internal plasterboard lining. Insulation as per thermal requirements.	45
Roof and ceiling	Metal roof with 13mm plasterboard ceiling. Insulation as per thermal requirements.	45

3.3 Noise from Children Activities

The proposed childcare centre intends to operate Monday to Friday between 7.00am to 6.00pm to accommodate a total of forty-five (45) children. The facility will be closed on Public Holidays. To control activity noise, there will be restricted outdoor activity before 8:00am or after 5.30pm. The proposed centre would have the maximum allowable in each of the internal paly rooms:

- Playroom 1: 11 children, aged 0-2.
- Playroom 2: 13 children aged 2-3.
- Playroom 3: 21 children aged 3-6.

The assessment of children activity noise in the external playscape have been predicted based on the following parameters:

- Source noise is averaged of the entire area of the outdoor playarea based on 45 children aged 0-5.
- Source height is taken a 1m from the playarea ground level.
- On grounding level and first level outdoor playarea, solid acoustic barrier around the perimeter as shown in Figure 2 and Figure 3.
- The acoustic barrier is to be constructed of a solid material, such as:
  - Lapped and capped timber fence (30-50mm thick),
  - Laminated glass (10.38mm thick laminated) or 10mm thick perspex/polycarbonate with a minimum acoustic performance of Rw30.
- Calculations have been conducted based on ISO9613 using CadnaA (version 4.5.149).
- Internal noise level (with windows/doors closed) is predicted to be less than 35dBA at the receivers and therefore has not been included in the calculation tables below.
- For this assessment, the assumed sound power for children noise is presented in Table 8 below depending on the age range. The sound power levels given in the table below have been extrapolated for the proposed number of children in each playscape or activity room as outlined above.
- For the outdoor playarea on ground and first level, to consider the worst case scenario there is to be a maximum of 45 children.

Table 8— Effective Sound Power Levels ($L_{Aeq,15min}$) for Groups of 10 Children Playing[4]

Number and Age of Children	Sound Power Level, dB								
	dBA	63	125	250	500	1k	2k	4k	8k
10 Children aged 0-2 years	78	54	60	66	72	74	71	67	64
10 Children aged 2-3 years	85	61	67	73	79	81	78	74	70
10 Children aged 3-5 years	87	64	70	75	81	83	80	76	72

The predicted cumulative noise level from the outdoor playareas on ground and first level for the childcare centre located is presented in Table 9 below and shown in Figure 2 and Figure 3.

Table 9 – Predicted Noise Level at Receivers

Receiver	No. Children (max)	SWL dBA	Cumulative Noise Level at Receiver, $L_{eq15min}$ dBA	AAAC Noise Limit $L_{eq15min}$ dBA (Up to 4 hours per day)	Complies (Y/N)
R1	Ground: 32 First: 13	Ground: 90 First: 86	47	47	Y
R2	Ground: 32 First: 13	Ground: 90 First: 86	48	48	Y
R3	Ground: 32 First: 13	Ground: 90 First: 86	34	48	Y
S1	Ground: 32 First: 13	Ground: 90 First: 86	57	65	Y

[4] Source: AAAC, Version 3.0.

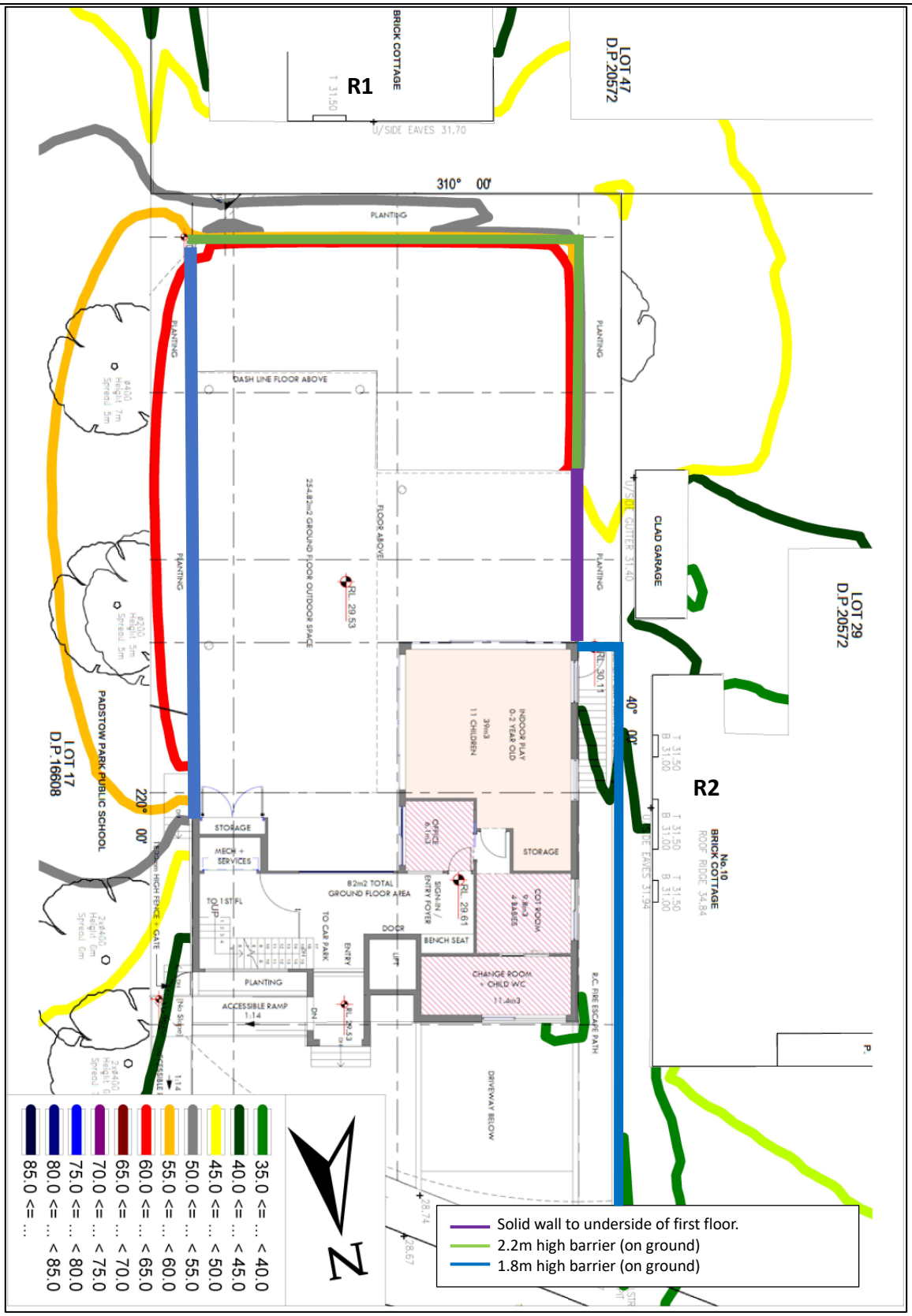


Figure 2 –Children Activity on Ground Level – Noise Model (Ground Level)

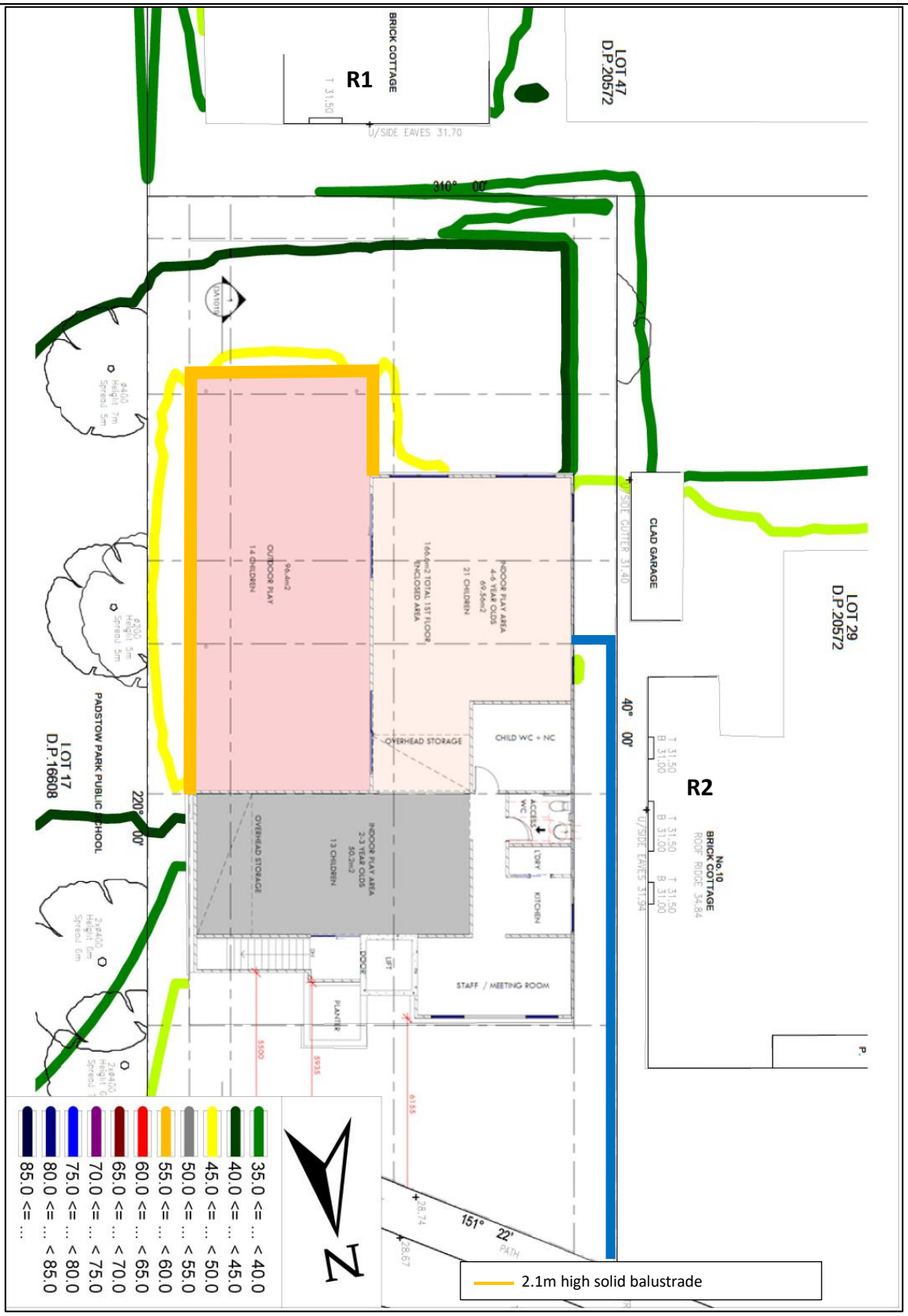


Figure 3 –Children Activity on Ground Level – Noise Model (Ground Level)

3.4 Assessment of Traffic Noise Generation

This section details a review of the expected future traffic noise generated from the childcare centre. Based on the report 'Car Parking Impact Assessment' prepared by EB Traffic Solutions Pty Ltd , dated 5 November 2024, the proposed childcare centre development will result in a net increase in the traffic generation of approximately:

- AM Peak (7am to 9am) = 35 trips, 17 vehicles in and 18 vehicles out.
- PM Peak (4pm to 6pm) = 31 trips, 15 vehicles in and 16 vehicles out.

The traffic report states that the traffic generated *"is not expected to adversely impact upon the safety or operation of the surrounding road network".*

The predicted noise levels are given in Table 11 are based on the expected number of vehicles during the AM and PM peak periods. Calculations have been conducted based on ISO9613 using CadnaA (version 4.5.149). The calculations include the attenuation effect from the acoustic barrier on the boundary.

Table 10 – Typical Noise Level of Vehicles, L_{max} dBA

Type	Sound Pressure Level Range
General passenger vehicle	67-88 @ 0.5m, L_{max} dBA[5]

The predicted noise levels from vehicle movements in the carpark during the AM and PM peak period are given in Table 11. The predicted noise levels from vehicle movement is graphically presented in Figure 4 (AM peak) on the following page.

Table 11 – Predicted Traffic Noise Levels during Morning Peak Period

Receiver	Time	Predicted Carpark Noise Level, $L_{eq\ (1hr)}$ dBA	Project Specific Limit L_{eq}
R2	AM Peak (7am to 9am)	33-38	39
	PM Peak (4pm to 6pm)	32-37	39

[5] Based on ADR83/00 external noise test.

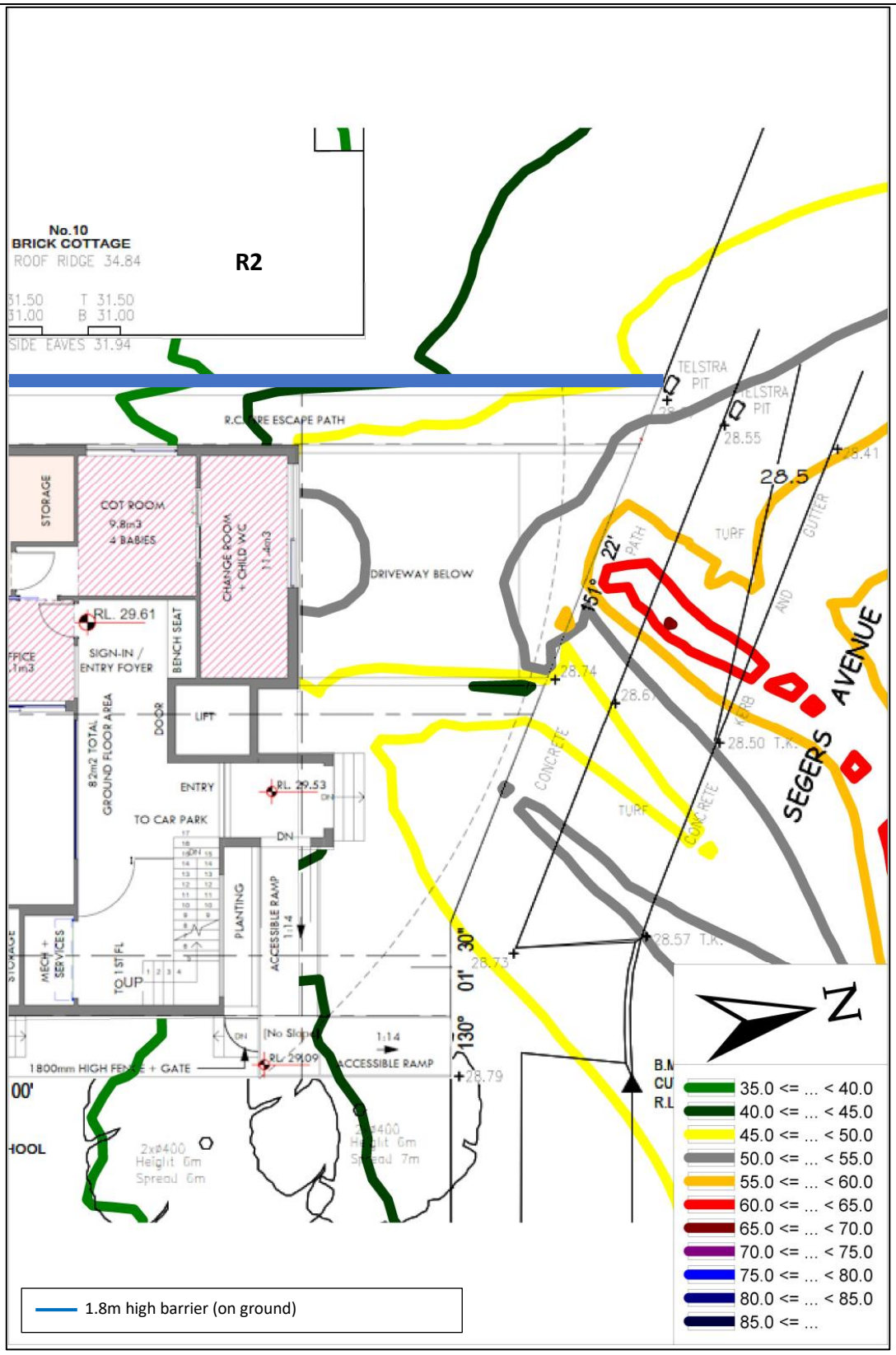


Figure 4 – Carpark and Traffic Noise Model for AM Peak (Ground Level)

4 Conclusion

An acoustic assessment of the proposed childcare centre at 12 Segers Avenuse, Padstow has been carried out in accordance with AAAC guidelines for childcare centres, EPA noise guidelines and Australian Standards.

An environmental noise survey of the site has been conducted to determine the noise criteria for children activity and mechanical plant/equipment noise emission. The determined noise limits are presented in Table 4 in Section 2.3 .

Section 3.3 details our assessment of the potential noise impact from children in the indoor activity rooms and outdoor playscapes. Our predictions indicate that children activity noise emissions from the outdoor playarea will comply with project noise criteria for children activity.

For vehicles movements entering and exiting the carpark, we would recommend the installation of an acoustic barriers (refer to Figure 4) on the boundary to minimise the potential impact and comply with EPA guidelines.

Providing the recommendations in this report are implemented, activity noise from the proposed childcare centre will comply with AAAC guidelines for childcare centres, EPA noise guidelines and Australian Standards.

Appendix A – Acoustic Terminology

Decibel, dB: A dimensionless unit which denotes the ratio between two quantities that are proportional to power, energy or intensity. One of these quantities is a designated reference by which all other quantities of identical units are divided. The sound pressure level in decibels is equal to 10 times the logarithm (to the base 10) of the ratio between the pressure squared divided by the reference pressure squared. The reference pressure used in acoustics is 20 micro Pascals.

A-WEIGHTING: A measure of sound pressure level designed to reflect the response of the human ear, which does not respond equally to all frequencies. To describe sound in a manner representative of the human ear's response it is necessary to reduce the effects of the low and high frequencies with respect to medium frequencies. The resultant sound level is said to be A-weighted, and the units are in decibels (dBA). The A-weighted sound level is also called the noise level.

Sound Pressure Level, L p (dB), of a sound: 20 times the logarithm to the base 10 of the ratio of the r.m.s. sound pressure to the reference sound pressure of 20 micro Pascals. Sound pressure level is measured using a microphone and a sound level meter, and varies with distance from the source and the environment.

Ambient Noise/Sound: All noise level present in a given environment, usually being a composite of sounds from many sources far and near. Traffic, HVAC, masking sound or even low-level background music can contribute to ambient level of noise or sound.

Percentile Level - L 90 , L 10 , etc: A statistical measurement giving the sound pressure level which is exceeded for the given percentile of an observation period, e.g. L 90 is the level which is exceeded for 90% of a measurement period. L 90 is commonly referred to as the "background" sound level.

Background Noise (L 90): The sum total of all unwanted residual noise generated from all direct and reflected sound sources in a space that can represent an interface to, or interfere with good listening and speech intelligibility.

Rating Background Level – RBL: Method for determining the existing background noise level which involves calculating the tenth percentile from the L A90 measurements. This value gives the Assessment Background Noise Level (ABL). Rating Background Level is the median of the overall ABL.

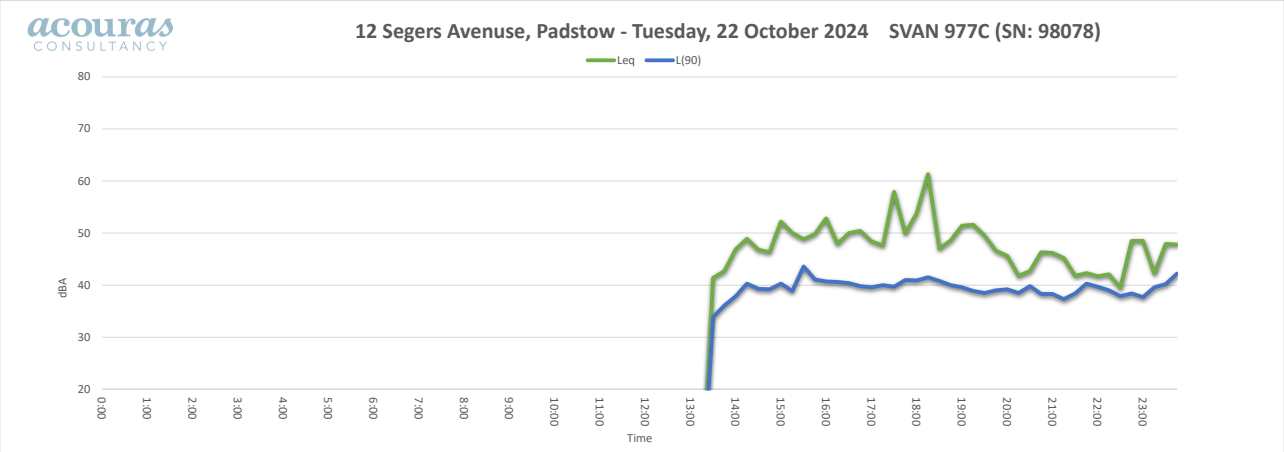
L AEQ,T : Equivalent continuous A-weighted sound pressure level. The value of the A-weighted sound pressure level of a continuous steady sound that, within a measurement time interval T, has the same A-weighted sound energy as the actual time-varying sound.

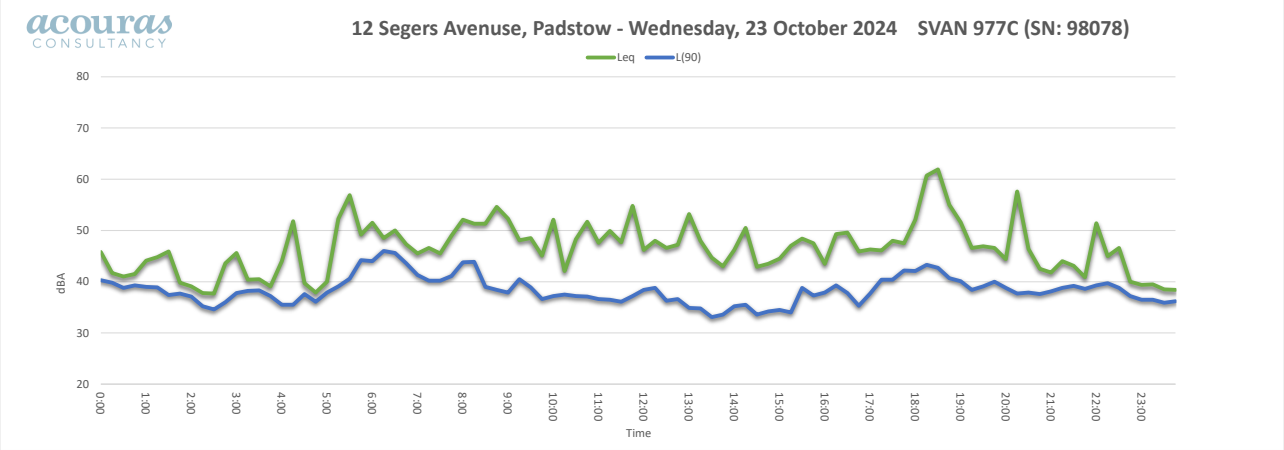
Appendix B – Architectural Drawings

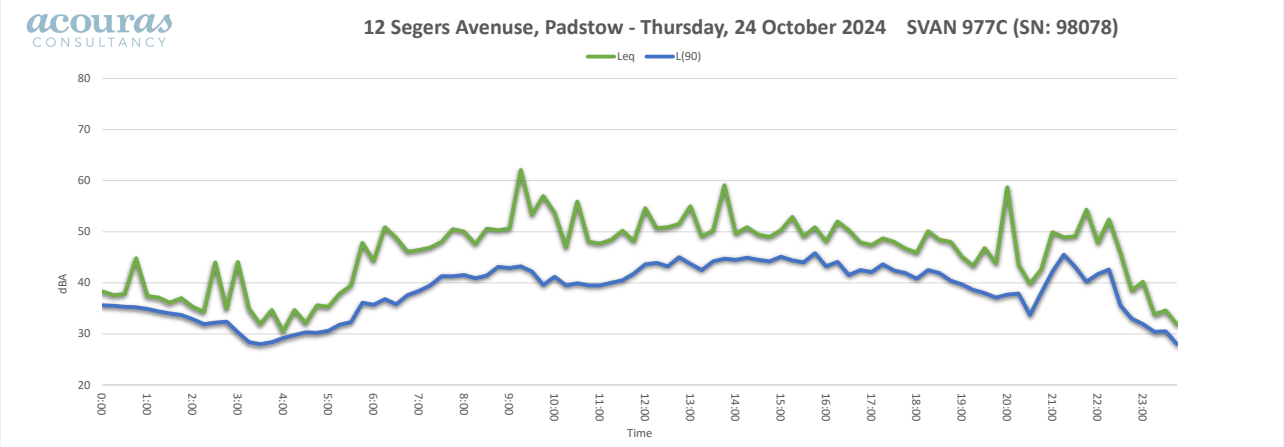
This assessment was based on the following architectural drawings provided by Space.

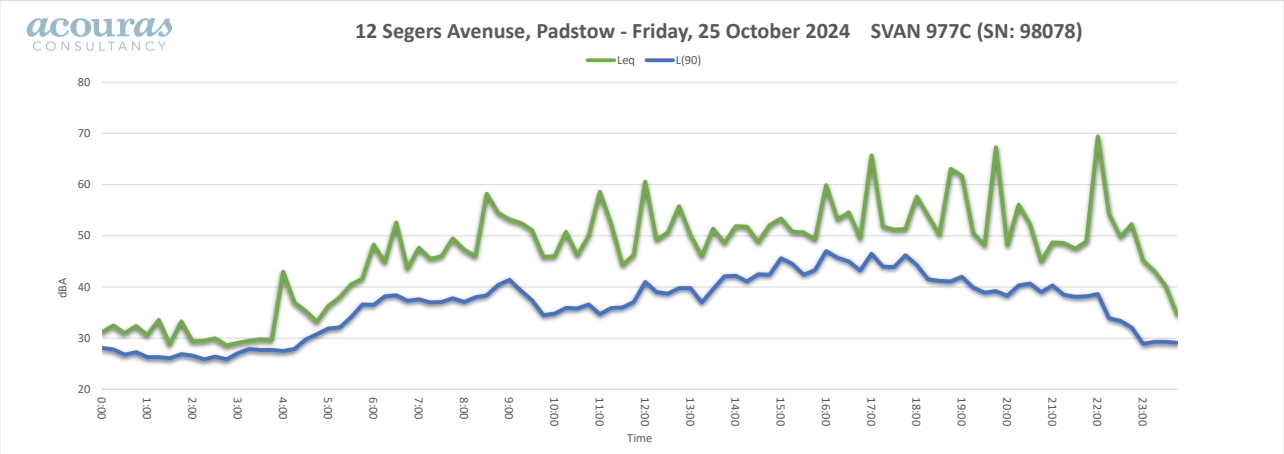
Drawing	Issue	Date	Description
DA1010		May 24	Cover Sheet
DA1011		May 24	General Notes
DA1012		May 24	Survey
DA1014		May 24	Site Plan
DA1015		May 24	Basement Floor Plan
DA1016		May 24	Ground Floor Plan
DA1017		May 24	First Floor Plan
DA1018		May 24	Elevations
DA1019		May 24	Sections

Appendix C – Noise Logger Results





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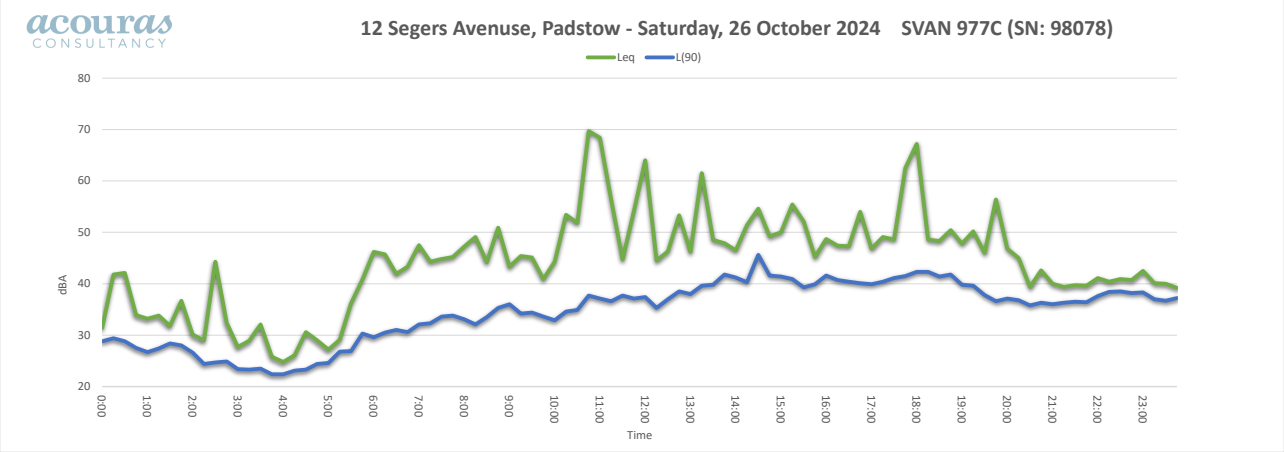
Leq
L(90)
dBA
Time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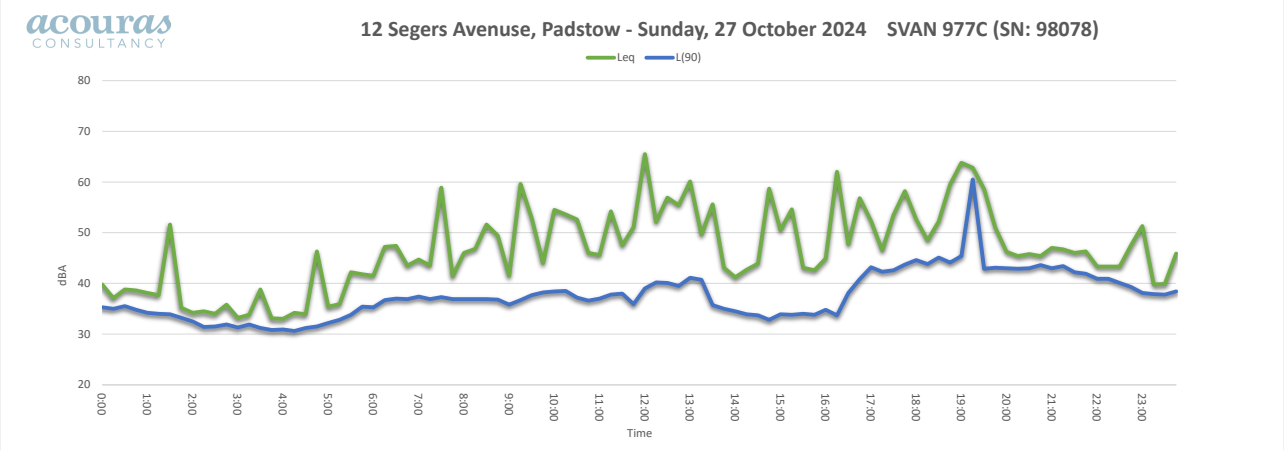
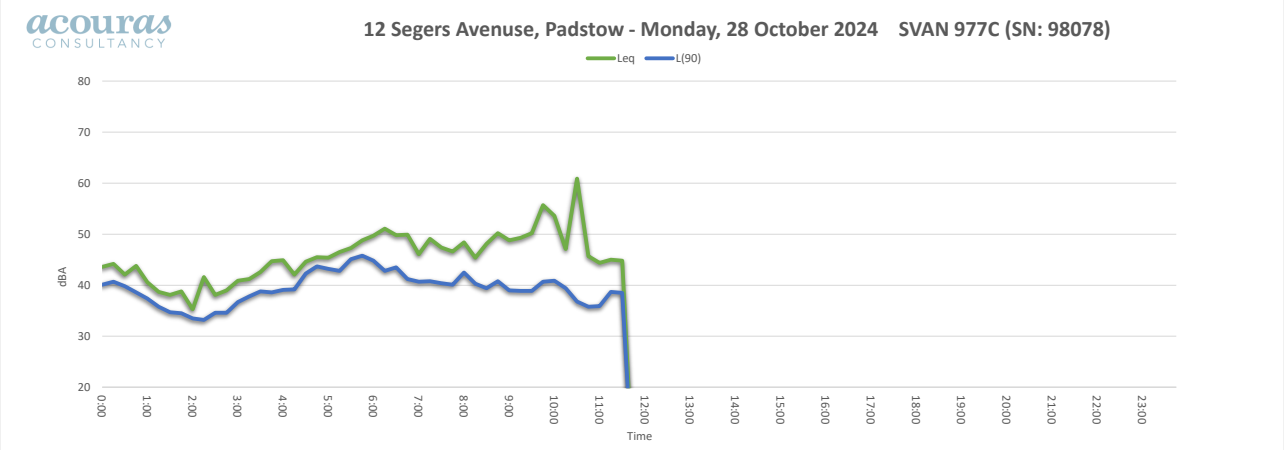
Leq
L(90)
dBA
Time


12 Segers Avenue, Padstow - Sunday, 27 October 2024 SVAN 977C (SN: 98078)
Leq
L(90)
dBA
Time


12 Segers Avenuse, Padstow - Monday, 28 October 2024 SVAN 977C (SN: 98078)
Leq
L(90)
dBA
80
70
60
50
40
30
20
0:00
1:00
2:00
3:00
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