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Childcare Noise Impact Assessment

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1 INTRODUCTION

This report has been prepared to assess noise impacts associated with the proposed childcare centre to be located at 25 Hardy Avenue, Wagga Wagga.

Impacts assessed include:

- Traffic noise impacts.
- Noise emission from indoor and outdoor play areas.
- Noise emission from mechanical plant (in principle).
- Noise emission from carpark, including pickup and drop-off.

The subject site and local context are indicated in Figure 1.

The report has been prepared for the sole purpose of a development application assessment and should not be used or relied on for any other purpose.

2 REFERENCED DOCUMENTS

2.1 BACKGROUND INFORMATION USED

The assessment is based on the following drawings, reports, and other information:

- Architectural drawings provided by Innovate Architects, project number 2866, Issue B, dated September 2023.
- Traffic report prepared by McLaren Consultants *"Traffic and Parking Impact Assessment of the Proposed Child Care Centre at 25 Hardy Avenue, Wagga Wagga"*, document reference 230524.01FA, Issue C, dated 19 September 2023.

2.2 PLANNING GUIDELINES

External noise intrusion criteria and internal noise levels have been determined to satisfy the requirements below:

- Wagga Wagga Council Development Control Plan (DCP) 2010.
- NSW Department of Planning – *Development near Rail Corridors or Busy Roads – Interim Guideline*.
- Association of Australian Acoustical Consultants (AAAC) *Guideline for Child Care Centre Acoustic Assessment*, Version 3.0, 2020.

External noise emission criteria have been determined to satisfy the requirements below:

- Wagga Wagga Council Development Control Plan (DCP) 2010.
- NSW Environment Protection Authority (EPA) – *'Noise Policy for Industry (NPI) 2017'*.
- Association of Australian Acoustical Consultants (AAAC) *Guideline for Child Care Centre Acoustic Assessment*, Version 3.0, 2020.

3 SITE DESCRIPTION AND THE PROPOSAL

The project site is located at 25 Hardy Avenue, Wagga Wagga. The existing building will be altered into a childcare centre, using existing constructions and new constructions.

The proposed childcare centre consists of:

- Outdoor parking for staff and visitors on ground floor (18 spaces in total) with entry through Hardy Avenue.
- 3 internal play areas.
- 3 external play areas.

The childcare centre is to operate between 6:30am-6pm Mondays to Saturdays.

The proposed childcare centre will have a total occupancy of 72 children:

- 30 x 0-2 years old.
- 23 x 2-3 years old.
- 19 x 3-5 years old.

3.1 NEAREST SENSITIVE RECEIVERS

The following table lists the nearest sensitive receivers surrounding the site. An aerial photo of the site indicating nearby noise sensitive receivers and measurement locations is presented in Figure 1.

Table 1 – Sensitive Receivers

Receiver (Refer Figure 1)	Land Use	Comment
R1	Residential	The existing single-storey residential receiver to the west of the project site at 29 Hardy Avenue
R2	Residential	The existing single-storey residential receiver to the northwest of the project site at 28 Gormly Avenue
R3	Residential	The existing single-storey residential receiver to the north of the project site at 26 Gormly Avenue
R4	Residential	The existing single-storey residential receiver to the northeast of the project site at 24 Gormly Avenue
R5	Residential	The existing single-storey residential receiver to the east of the project site at 23 Hardy Avenue
H1 ("Calvary Riverina Hospital")	Hospital	The existing hospital receiver to the south of the project site across the road at 26-36 Hardy Avenue

3.2 ENVIRONMENTAL NOISE SOURCES

The following significant environmental noise sources have been identified:

- Traffic noise from Hardy Avenue which is located immediately to the south of the site.
- Operational noise emission from childcare centre to nearby receivers.

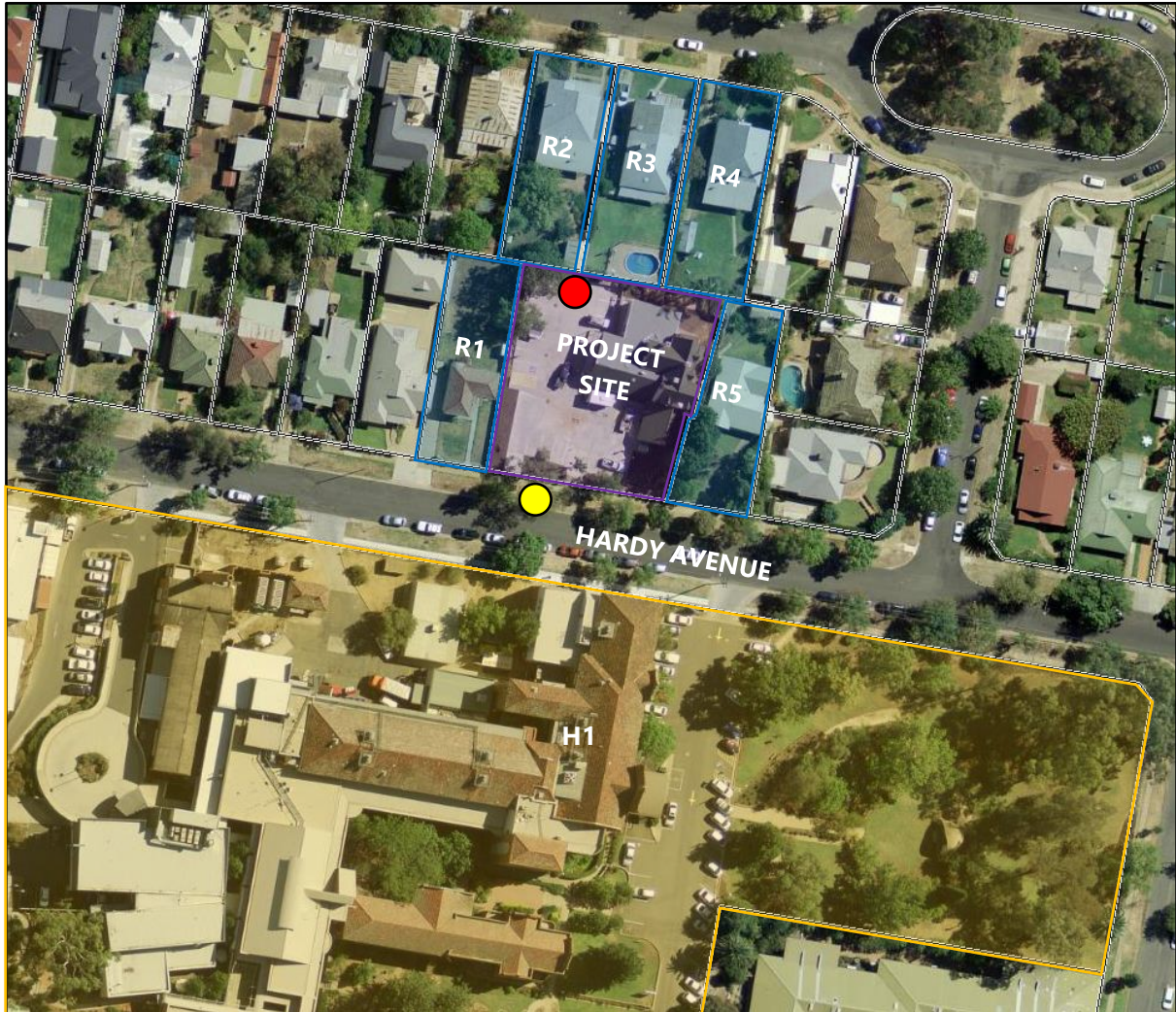


Figure 1 – Site Plan Showing Monitoring Locations and Surrounding Land Uses/Receivers

- Unattended Noise Monitoring Location	- Residential
- Attended Noise Monitoring Location	- Commercial
	- Hospital
	- Project Site

4 NOISE DESCRIPTORS

Ambient noise constantly varies in level from moment to moment, so it is not possible to accurately determine prevailing noise conditions by measuring a single, instantaneous noise level.

To quantify ambient noise, a 15-minute measurement interval is typically utilised. Noise levels are monitored continuously during this period, and then statistical and integrating techniques are used to characterise the noise being measured.

The principal measurement parameters obtained from the data are:

L_{eq} - represents the average noise energy during a measurement period. This parameter is derived by integrating the noise levels measured over the measurement period. **L_{eq}** is important in the assessment of noise impact as it closely corresponds with how humans perceive the loudness of time-varying noise sources (such as traffic noise).

L₉₀ – This is commonly used as a measure of the background noise level as it represents the noise level heard in the typical, quiet periods during the measurement interval. The **L₉₀** parameter is used to set noise emission criteria for potentially intrusive noise sources since the disturbance caused by a noise source will depend on how audible it is above the pre-existing noise environment, particularly during quiet periods, as represented by the **L₉₀** level.

L₁₀ is used in some guidelines to measure noise produced by an intrusive noise source since it represents the average of the loudest noise levels produced at the source. Typically, this is used to assess noise from licenced venues.

L_{max} is the highest noise level produced during a noise event and is typically used to assess sleep arousal impacts from short term noise events during the night. It is also used to assess internal noise levels resulting from aircraft and railway ground vibration induced noise.

L₁ is sometimes used in place of **L_{max}** to represent a typical noise level from a number of high-level, short-term noise events.

5 EXTERNAL NOISE IMPACT ASSESSMENT

Traffic noise from vehicle movements along Hardy Avenue will be the primary external noise source with the potential to impact on the amenity of future receivers located within the proposed development.

5.1 ASSESSMENT CRITERIA

5.1.1 Wagga Wagga Council Development Control Plan (DCP) 2010.

Wagga Wagga Council Development Control Plan (DCP) 2010 does not contain any applicable acoustic criteria with respect for traffic noise. Therefore, the following guidelines are adopted.

5.1.2 NSW Department of Planning – *Development near Rail Corridors or Busy Roads – Interim Guideline*

The interim guideline is used to assess the impact of noise from adjacent road and rail corridors on noise sensitive development such as educational institutions including childcare centres. Table 3.1 of the interim guideline recommends a maximum noise level within childcare centres of 40 dB(A) $L_{Aeq,1hr}$.

5.1.3 Association of Australian Acoustical Consultants (AAAC) Guideline for Child Care Centre Acoustic Assessment, Version 3.0, 2020

The AAAC *Guideline for Childcare Centre Acoustic Assessment 2020'* provides the following external noise criteria.

5.1.3.1 AAAC Criteria

A summary of the AAAC internal noise criteria applicable for the proposed development is detailed below.

Table 2 –Internal Noise Level Criteria (AAAC)

Source	Receiver	Criteria
Hardy Avenue Traffic	Sleeping Areas	35 dB(A) $L_{Aeq}(1 \text{ hour})$
	Indoor Play Areas	40 dB(A) $L_{Aeq}(1 \text{ hour})$
	Outdoor Play Areas	55 dB(A) $L_{Aeq}(1 \text{ hour})$

5.1.4 Project Criteria

A summary of the internal noise criteria applicable for the proposed development is detailed below.

Table 3 - Project Internal Noise Level Criteria

Source	Receiver	AAAC Criteria	DNRCBR – IG Criteria
Hardy Avenue Traffic	Sleeping Areas	35 dB(A) $L_{Aeq}(1 \text{ hour})$	40 dB(A) $L_{Aeq}(1 \text{ hour})$
	Indoor Play Areas	40 dB(A) $L_{Aeq}(1 \text{ hour})$	40 dB(A) $L_{Aeq}(1 \text{ hour})$
	Outdoor Play Areas	55 dB(A) $L_{Aeq}(1 \text{ hour})$	N/A

5.2 EXTERNAL NOISE MEASUREMENTS

A survey of the existing environmental noise levels on site was conducted using both unattended long term noise monitoring and attended short term measurements. All measurements were carried out generally in accordance with the Australian Standard AS1055 – “Description and measurement of environmental noise – General Procedures” and are detailed below.

5.2.1 Road Traffic Noise Measurements

5.2.1.1 Measurement Position

A noise monitor was installed on site approximately 40m from Hardy Avenue, at the rear of the property 25 Hardy Avenue, Wagga Wagga.

5.2.1.2 Time of Measurement

The long-term monitoring is conducted from 18th to 28th July 2023.

5.2.1.3 Measurement Equipment

Equipment used consisted of a Rion NL-42 noise logger. The logger was set to A-weighted fast response and was programmed to store 15-minute statistical noise levels throughout the monitoring period. The monitor was calibrated at the start and end of the monitoring period using a Rion NC-73 calibrator. No significant drift was noted. Noise logger data is provided in Appendix One.

5.2.1.4 Measurement Results

Short term attended noise measurements were also conducted on the 28th July 2023, approximately 3m away from the road, to supplement the long term monitoring. Measurement was conducted using a Norsonic 140 sound level meter, set to A-weighted fast response. The sound level meter was calibrated before and after the measurements, no significant drift was recorded.

The measurement was taken between 1:30pm – 1:45pm.

The traffic noise levels listed in Table 4, was determined based on the logging data and attended measurements. In determination of acoustic treatments, the measured level is adjusted for distance and orientation.

Table 4 - External Noise Level (Traffic Noise)

Location	Time Period	Traffic Noise Level
Along Hardy Avenue, at site boundary	Daytime (7am to 10pm)	57 dB(A) L_{Aeq} (1hour)
Along Hardy Avenue, at proposed façade (GF Floor)		54 dB(A) L_{Aeq} (1hour)
Along Hardy Avenue, at proposed façade (Level 1)		<50 dB(A) L_{Aeq} (1hour)
Along Hardy Avenue, inside external play area*		52 dB(A) L_{Aeq} (1hour)

Note:

- 1) Predicted noise levels are taking into account the recommendations in Section 9 of this report.

5.3 EVALUATION OF NOISE INTRUSION

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

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

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

5.3.1 Complying Constructions

5.3.1.1 Glazing Construction

The glazing constructions are indicated in Table 5 below. The complying glazing thicknesses are those needed to satisfy acoustic requirements and do not take into account other requirements such as structural, safety or other considerations. These additional considerations may require the glazing thickness to be increased beyond the acoustic requirement.

Table 5 - Glazing Complying Constructions

Space	Facade	Glazing Thickness	Acoustic Seals
Cot Room/ Indoor Playroom	Any	6.38mm laminate	Yes
Any other	Any	6mm float	Yes

In addition to complying with the minimum scheduled glazing thickness, the R_w rating of the glazing fitted into operable frames and fixed into the building opening should not be lower than the values listed in Table 6 below.

Where nominated, this will require the use of acoustic seals equal to Schlegel Q-Ion series (*acoustic bulb seal*) around the full perimeter of operable frames. The frame will need to be sealed into the building opening using Selley's Pro Series Fireblock. Note that mohair seals and/or mohair/plastic fin combination seals in windows and doors are **not** acceptable where acoustic seals are required.

It is recommended that only window systems have test results indicating compliance with the required ratings obtained in a certified laboratory be used where windows with acoustic seals have been recommended.

Table 6 - Minimum R_w of Glazing Requirements

Glazing Assembly	Acoustic Seals	Minimum R_w of Installed Window
6mm float	Yes	29
6.38mm laminate	Yes	31

5.3.1.2 External Doors

Any glass door or glazed panels set into solid doors should be constructed using glazing thickness outlined in the above section. Full perimeter acoustic seals around the doors are required.

Any timber external doors (this includes apartment entry doors along external corridor areas) shall be a minimum 40mm solid core timber with Raven RP10 to the top and sides and Raven RP38 to the underside of the door.

Entry doors within internal corridor areas shall be of a minimum 40mm solid core timber construct with gaps minimised (maximum 5mm undercut).

5.3.1.3 External Walls

The existing masonry construction is acoustically acceptable and doesn't require further acoustic upgrade. There should not be vents on the internal skin of external walls. All penetrations in the internal skin of external walls should be acoustically sealed.

Proposed lightweight wall construction should be as seen below:

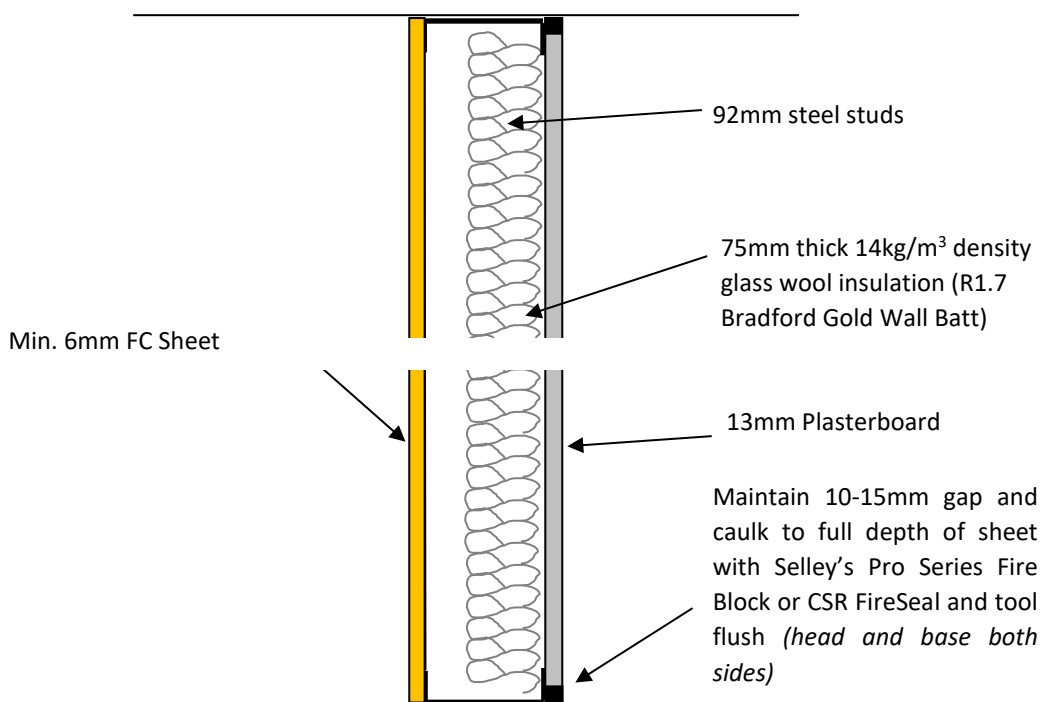


Table 7 - External Lightweight Wall Construction

Level	Space	Internal Lining	Stud System	External Lining
Any	Any	1 x 13mm plasterboard	92mm Steel stud with 75mm thick 14kg/m ³ glass wool insulation in cavity	Min. 6mm FC Sheet

There should not be vents on the internal skin of external walls. All penetrations in the internal skin of external walls should be acoustically sealed.

5.3.1.4 Roof/Ceiling Construction

The proposed and existing metal sheet roof construction should be as below.

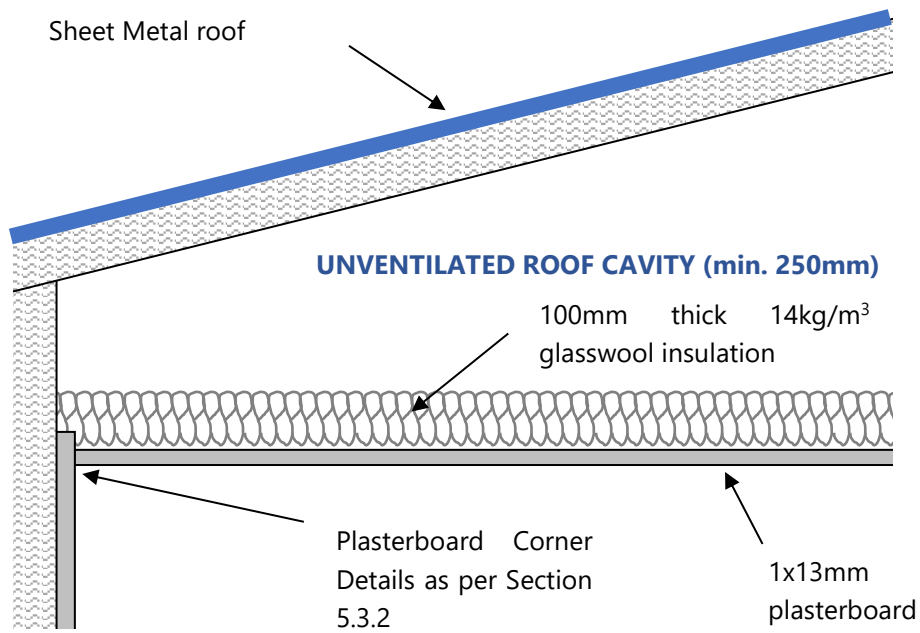


Figure 2 – Roof/Ceiling Construction

Table 8 - External Metal Sheet Roof Construction

Level	Space	Internal Lining	Truss System	External Lining
Any	Any	1 x 13mm plasterboard	Minimum of 250mm airgap with 100mm thick 14kg/m³ glass wool insulation in cavity	Sheet Metal

There should not be vents on the internal skin of external roof. All penetrations in the internal skin of external roof should be acoustically sealed.

5.3.2 Plasterboard Corner Details

The recommended plasterboard ceiling/wall corner construction options over the rooms are shown in Figure 3 below.

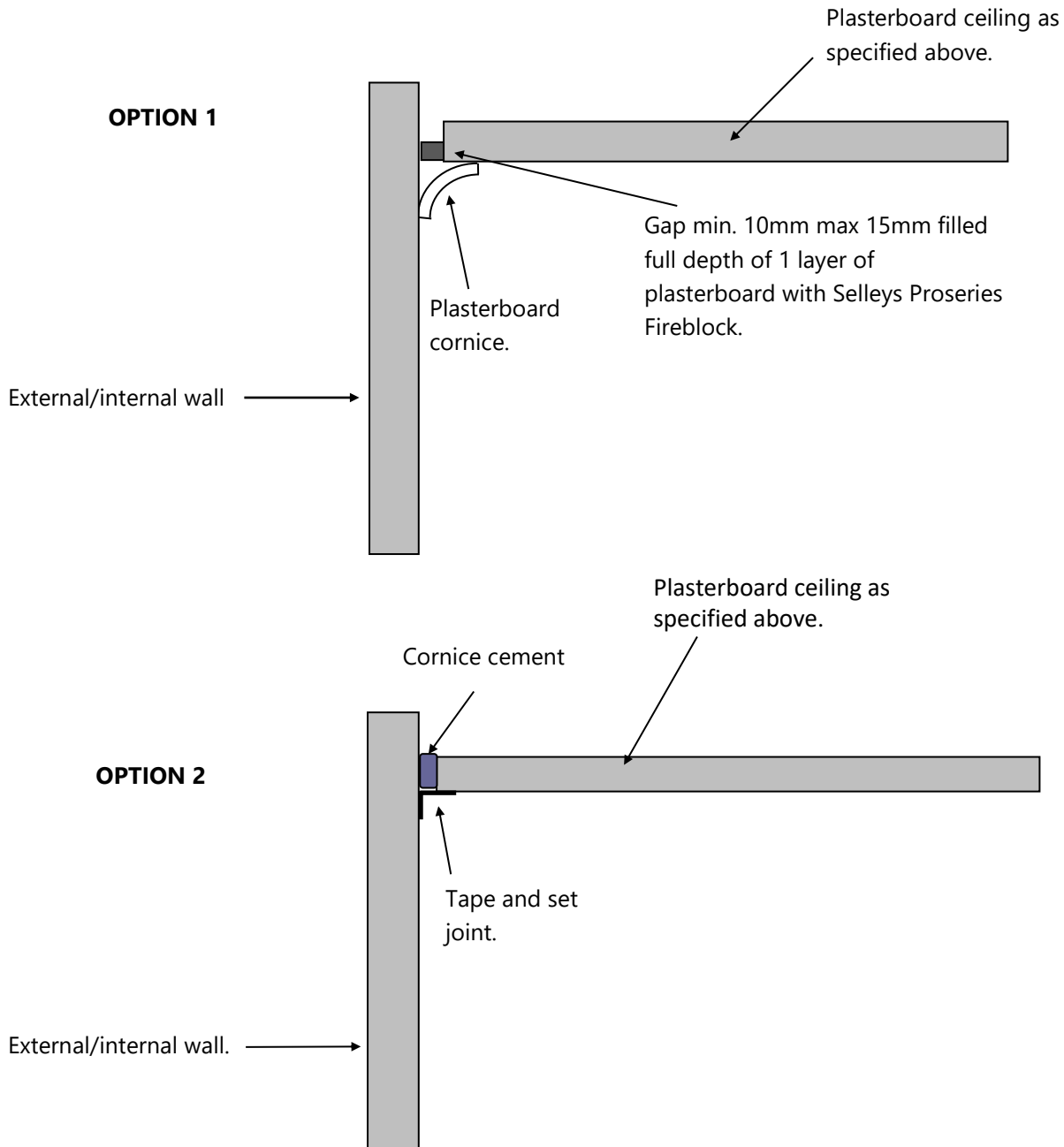


Figure 3 – Plasterboard Corner Options

6 AMBIENT NOISE SURVEY

NSW EPA's Rating Background Noise Level (RBL) assessment procedure requires determination of background noise level for each day (the ABL) then the median of the individual days as set out for the entire monitoring period.

Appendices in this report present results of unattended noise monitoring conducted at the project site. The processed RBL (lowest 10th percentile noise levels during operation time period) are presented in Table 9.

6.1 MEASUREMENT POSITION

A noise monitor was installed on site approximately 40m from Hardy Avenue, at the rear of the property 25 Hardy Avenue, Wagga Wagga.

6.2 TIME OF MEASUREMENT

The long-term monitoring is conducted from 18th to 28th July 2023.

6.3 MEASUREMENT EQUIPMENT

Equipment used consisted of a Rion NL-42 noise logger. The logger was set to A-weighted fast response and was programmed to store 15-minute statistical noise levels throughout the monitoring period. The monitor was calibrated at the start and end of the monitoring period using a Rion NC-73 calibrator. No significant drift was noted. Noise logger data is provided in Appendix One.

6.4 WEATHER AFFECTED DATA

Periods during the long-term monitoring affected by adverse weather conditions, have been highlighted in the logging data in Appendix One. Data has been corrected for meteorological conditions (excessive wind and/or rain), as required by section 3.4 of the EPA Noise Policy for Industry. Exceedances of the 5m/s average wind speed limit of the EPA were noted and corrected for in determining the background noise levels. Weather data was collected from Wagga Wagga Airport Weather Station and background noise levels were adjusted accordingly.

6.5 SUMMARISED RATING BACKGROUND NOISE LEVELS

Summarised rating background noise levels for the project site and immediate surroundings are presented below.

Table 9 - Measured Noise Levels

Time of day	Rating Background Noise Level dB(A)_{L90(Period)}
Early Morning Shoulder (6:30am – 7am)	39
Daytime (7am – 6pm)	40

7 NOISE EMISSION CRITERIA

A noise emission assessment has been carried out to ensure noise emitted from the use of the site is in accordance with the requirements listed in this section.

This assessment will review noise emissions associated with the following:

- Noise emission from indoor and outdoor play areas.
- Noise emission from mechanical plant (in principle).
- Use of carpark spaces/pickup and drop-off zone.

The noise emission assessment has been made in accordance with the following documents:

- Wagga Wagga Council Development Control Plan (DCP) 2010.
- The Environmental Protection Authority (EPA) NSW Noise Policy for Industry (NPI) 2017.
- Association of Australian Acoustical Consultants (AAAC) *Guideline for Child Care Centre Acoustic Assessment*, Version 3.0, 2020.

7.1.1 Wagga Wagga Council Development Control Plan (DCP) 2010

Wagga Wagga Council Development Control Plan (DCP) 2010 does not contain any applicable acoustic criteria with respect for noise emissions from childcare centres. Therefore, the following guidelines are adopted.

7.2 AAAC GUIDELINE FOR CHILD CARE CENTRE ACOUSTIC ASSESSMENT, VERSION 3.0, 2020

Section 3.2 of the guideline states the following regarding noise criteria to residential receptors:

3.2.1 Outdoor Play Area

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 10 dB 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 10 dB (ie background + 10 dB 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 10 dB 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.*

3.2.2 Other Noise Emission

The cumulative $L_{eq,15\text{ minute}}$ noise emission level resulting from the use and operation of the child care centre, with the exception of noise emission from outdoor play discussed above, shall not exceed the background noise level by more than 5 dB at the assessment location as defined above. This includes the noise emission resulting from:

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

3.2.3 Sleep Disturbance

The noise impact of staff arrivals, setup, cleaning or other on-site activities prior to 7am or during night-time hours should be assessed at nearby residential premises. The L_{Amax} noise level emitted from vehicles arriving and parking, depending on the requirements of the state or territory where the centre is located shall not exceed the background noise level by more than 15 dB outside the nearest habitable room window.

7.3 NSW ENVIRONMENT PROTECTION AUTHORITY (EPA) – ‘NOISE POLICY FOR INDUSTRY (NPI) 2017’

Noise sources generally covered by this code are mechanical services and plant noise. The EPA NPI has two criteria which both are required to be satisfied, namely Intrusiveness and amenity. The NPI sets out acceptable noise levels for various localities noise emissions such. The policy indicates four categories to assess the appropriate noise level at a site. They are rural, suburban, urban, and urban/industrial interface. Under the policy the nearest residential receivers would be assessed against the suburban criteria.

Mechanical services and plant noise levels are to be assessed at the property boundary or nearby dwelling, or at the balcony or façade of an apartment.

7.3.1 Intrusiveness Criterion

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

Background noise levels adopted are presented in Table 10. Noise emissions from the site should comply with the noise levels presented below when measured at nearby property boundary.

Table 10 - Allowable Intrusive Noise Levels

Location	Intrusiveness Noise Goals dB(A) $L_{eq}(15\text{ minutes})$	
	Early Morning Shoulder (6:30am – 7am)	Daytime (7am – 6pm)
Nearby Residential Receiver	44	45

7.3.2 Project Amenity Criterion

The guideline is intended to limit the absolute noise level from all noise sources to a level that is consistent with the general environment.

The EPA's NPI sets out acceptable noise levels for various localities. The recommended noise amenity area is based upon the measured background noise levels at the sensitive receiver. Based on the measured background noise levels detailed in Table 9, the Noise Policy for Industry suggests the adoption of the 'suburban' categorisation.

The NPI requires project amenity noise levels to be calculated in the following manner:

$$L_{Aeq,15min} = \text{Recommended Amenity Noise Level} - 5 \text{ dB(A)} + 3 \text{ dB(A)}$$

The amenity levels appropriate for the receivers surrounding the site are presented in Table 11.

Table 11 - EPA Amenity Noise Levels

Type of Receiver	Time of day	Recommended Amenity Noise Level dB(A) _{Leq(period)}	Project Amenity Noise Level dB(A) _{Leq(15 minute)}
Residential – Suburban	Daytime (7am – 6pm)	55	53
Hospital Ward – Internal	When in Use	35	33
Hospital Ward – External	When in Use	50	48

Note:

- 1) Early morning shoulder (6:30am – 7am) in this case falls into the Daytime (7am – 6pm) category for Amenity Noise Level consideration purposes due to the difference in measured background noise levels being only 1dB.

The NSW EPA Noise Policy for Industry (2017) defines:

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

7.3.3 Sleep Arousal Criteria (External)

Potential sleep arousal impacts should be considered for noise generated before 7am or after 10pm. Short duration, intermittent noise events are typically assessed for potential sleep disturbance.

Potential impacts are assessed using the recommended procedure in the NSW EPA Noise Policy for Industry.

- An assessment should be conducted to determine if noise levels at a residential location during the night-time period (10pm-7am) exceed:
 - $L_{Aeq, 15min}$ 40dB(A) or the prevailing RBL (rating background noise level) plus 5 dB, whichever is greater, and/or
 - L_{AFmax} 52 dB(A) or the prevailing RBL plus 15 dB, whichever is greater.

The policy does not explicitly state where noise impacts should be assessed within the residential location. For the purposes of this assessment, noise impacts will be assessed at the location immediately outside a resident's bedroom window. If the noise events are compliant with this criterion, then sleep arousal impacts are unlikely and no further analysis is needed. This is consistent with the Noise Guide for Local Government. The criteria are set out in Table 12.

Table 12 – Sleep Arousal Trigger Criteria

Location	Background Noise Level	Sleep Arousal Criteria
External Residential Receivers	39dB(A) L_{90} (6:30am-7am)	44dB(A) $L_{Aeq}(15min)$ 54dB(A) $L_{Max, F}$

7.4 SUMMARY OF NOISE EMISSION CRITERIA

The following tables presents the noise emission objectives for the proposed childcare centre.

7.4.1 AAAC Child Care Noise Emission Criteria

**Table 13 - AAAC Child Care Noise Emission Criteria
(Early Morning Shoulder 6:30am – 7am)**

Source	Residential Receiver (External) Criteria	Hospital Ward (External) Criteria	Hospital Ward (Internal) Criteria
Childcare Outdoor Play – up to 4h per day	49 dB(A) $L_{Aeq}(15min)$	65 dB(A) $L_{Aeq}(15min)$	45 dB(A) $L_{Aeq}(15min)$
Childcare Outdoor Play – more than 4h per day	44 dB(A) $L_{Aeq}(15min)$	65 dB(A) $L_{Aeq}(15min)$	45 dB(A) $L_{Aeq}(15min)$
Indoor play/Mechanical plant/drop off & pick up and other activities (cumulative)	44 dB(A) $L_{Aeq}(15min)$	65 dB(A) $L_{Aeq}(15min)$	45 dB(A) $L_{Aeq}(15min)$

**Table 14 - AAAC Child Care Noise Emission Criteria
(Daytime 7am – 6pm)**

Source	Residential Receiver (External) Criteria	Hospital Ward (External) Criteria	Hospital Ward (Internal) Criteria
Childcare Outdoor Play – up to 4h per day	50 dB(A) $L_{Aeq}(15min)$	65 dB(A) $L_{Aeq}(15min)$	45 dB(A) $L_{Aeq}(15min)$
Childcare Outdoor Play – more than 4h per day	45 dB(A) $L_{Aeq}(15min)$	65 dB(A) $L_{Aeq}(15min)$	45 dB(A) $L_{Aeq}(15min)$
Indoor play/Mechanical plant/drop off & pick up and other activities (cumulative)	45 dB(A) $L_{Aeq}(15min)$	65 dB(A) $L_{Aeq}(15min)$	45 dB(A) $L_{Aeq}(15min)$

7.4.2 EPA NPI 2017 Criteria

**Table 15 - EPA NPI 2017 Noise Emission Criteria
(Early Morning Shoulder 6:30am – 7am & Daytime 7am – 6pm)**

Receiver	Time Period	Measured Background Noise Level dB(A) _{L₉₀}	Project Amenity Criteria dB(A) _{L_{eq}}	Intrusiveness Criteria _{L_{eq}(15min)}	EPA NPI Project Trigger Criteria
Residential	Early Morning Shoulder 6:30am – 7am	39	53	44	44 dB(A) _{L_{eq}(15min)} 54dB(A) _{L_{Max, F}}
	Daytime (7am – 6pm)	40	53	45	45 dB(A) _{L_{eq}(15min)}
Hospital Ward – Internal	When in Use	N/A	38	N/A	38 dB(A) _{L_{eq}(15min)}
Hospital Ward – External	When in Use	N/A	48	N/A	48 dB(A) _{L_{eq}(15min)}

7.4.3 Project Criteria

The most stringent criteria as presented in the sections above have been taken and are presented in the table below.

**Table 16 - Project Child Care Noise Emission Criteria
(Early Morning Shoulder 6:30am – 7am)**

Source	Residential Receiver (External) Criteria	Hospital Ward (Internal) Criteria	Hospital Ward (External) Criteria
Childcare Outdoor Play – up to 4h per day	49 dB(A) _{L_{Aeq}(15min)} – AAAC	45 dB(A) _{L_{Aeq}(15min)} – AAAC	65 dB(A) _{L_{Aeq}(15min)} – AAAC
Childcare Outdoor Play – more than 4h per day	44 dB(A) _{L_{Aeq}(15min)} – AAAC	45 dB(A) _{L_{Aeq}(15min)} – AAAC	65 dB(A) _{L_{Aeq}(15min)} – AAAC
Indoor play/Mechanical plant/drop off & pick up and other activities (cumulative)	44 dB(A) _{L_{Aeq}(15min)} – AAAC 54dB(A) _{L_{Max, F}} - AAAC	45 dB(A) _{L_{Aeq}(15min)} – AAAC	65 dB(A) _{L_{Aeq}(15min)} – AAAC
Mechanical Plant	44 dB(A) _{L_{Aeq}(15min)} – EPA 54dB(A) _{L_{Max, F}} - EPA	38 dB(A) _{L_{Aeq}(15min)} – EPA	48 dB(A) _{L_{Aeq}(15min)} – EPA

**Table 17 - Project Child Care Noise Emission Criteria
(Daytime 7am – 6pm)**

Source	Residential Receiver (External) Criteria	Hospital Ward (Internal) Criteria	Hospital Ward (External) Criteria
Childcare Outdoor Play – up to 4h per day	50 dB(A) $L_{Aeq(15min)}$ – AAAC	45 dB(A) $L_{Aeq(15min)}$ – AAAC	65 dB(A) $L_{Aeq(15min)}$ – AAAC
Childcare Outdoor Play – more than 4h per day	45 dB(A) $L_{Aeq(15min)}$ – AAAC	45 dB(A) $L_{Aeq(15min)}$ – AAAC	65 dB(A) $L_{Aeq(15min)}$ – AAAC
Indoor play/Mechanical plant/drop off & pick up and other activities (cumulative)	45 dB(A) $L_{Aeq(15min)}$ – AAAC	45 dB(A) $L_{Aeq(15min)}$ – AAAC	65 dB(A) $L_{Aeq(15min)}$ – AAAC
Mechanical Plant	45 dB(A) $L_{Aeq(15min)}$ – EPA	38 dB(A) $L_{Aeq(15min)}$ – EPA	48 dB(A) $L_{Aeq(15min)}$ – EPA

8 NOISE EMISSION ASSESSMENT

8.1 ASSUMPTIONS ADOPTED IN ASSESSMENT

8.1.1 Operating Hours and Capacity

The childcare centre is to operate between 6:30am-6pm Mondays to Saturdays.

The proposed childcare centre will have a total occupancy of 72 children:

- 30 x 0-2 years old.
- 23 x 2-3 years old.
- 19 x 3-5 years old.

8.1.2 Outdoor Play Sound Power Levels

Noise emissions from outdoor play activities were predicted using the mid-point level of Sound Power Level data recommended by AAAC Guideline for Child Care Centre Acoustic Assessment (2020) V3 which has been detailed in table below.

Table 18 - AAAC Sound Power Levels

Number and Age of Children	Sound Power Levels (dB) at Octave Band Centre Frequencies (Hz)								
	dB(A)	63	125	250	500	1k	2k	4k	8k
10 Children – 0 to 2 years	78	54	60	66	72	74	71	67	64
10 Children – 2 to 3 years	85	61	67	73	79	81	78	74	70
10 Children – 3 to 5 years	87	64	70	75	81	83	80	76	72

Note:

- 1) 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.
- 2) For simplicity, based upon a review of World Health Organization (WHO) data, a single recommended source height of 1metre is suggested as the source heights.

8.1.3 Indoor Play/Teaching

- The sound pressure level generated inside the internal play areas is 75dB(A)_{L_{eq}} based on measurements taken by this office at similar sites.
- All children using the indoor activity areas at any given time and distributed as described in the architectural drawings.
 - **Playroom 1:** 30 Children (0–2-year-old)
 - **Playroom 2:** 19 Children (2–3-year-old)
 - **Playroom 3:** 23 Children (3–5-year-old)

8.1.4 Outdoor Play

The outdoor play noise has been predicted based on the following information and assumptions:

- No more than 72 children inside the Child Care Centre at any one time.
- Maximum 4h of outdoor play per day
 - All 30 children aged 0-2, all 23 children aged 2-3, and all 19 children aged 3-5 using the outdoor play area at any given time concurrently, as below:



- Outdoor play areas are to be limited to the prescribed 72 children inside the centre, and no outdoor play before 7am or after 6pm.
- An acoustic barrier system as a detailed complying construction in Section 9 of this report.

8.1.5 Pickup/Drop-off & Carpark Usage

- Pickup and drop-off will be conducted in the open space carpark in front of the main building, inside the development, with cars entering the site through Hardy Avenue.
- According to traffic report reference: 230524.01FA, it is predicted that there will be 58 vehicle trips from 7:00am-9:00am, at a worst-case scenario. For noise emission prediction purposes, this will include the early morning shoulder period from 6:30am-7:00am.
- Each vehicle movement (approaching or leaving) lasts on average 30 seconds. This assumption has been taken based on the length of a typical car movement (40m total) and the assumption that the cars approaching or leaving will be driving at 10km/h.
- Each car has a sound power level of 84dB(A) (Typical in our experience for cars driving at 10km/h), and car door slams have a sound power level of 95dB(A).

8.2 PREDICTED NOISE LEVELS

The predicted noise levels at nearby residents are presented below. The predicted levels take into account any expected noise reduction provided by distance losses and the recommendations set out in Section 9.

Noise levels will be predicted only during the hours of operation of the childcare centre, from 6:30am-6pm Monday to Saturday.

8.2.1 Outdoor Play Area

8.2.1.1 Daytime 7am-6pm

**Table 19 - Scenario 1 - Predicted Noise Levels at Nearby Receivers¹
(Up to 4h of outdoor play – BG+10)**

Receiver	Assessment Location	Predicted Noise Level dB(A) _{Leq(15min)}	Allowable Noise Level dB(A) _{Leq(15min)}	Complies?
R1	Nearest Habitable Window	51	50	Yes ²
R2	Nearest Habitable Window	46	50	Yes
R3	Nearest Habitable Window	43	50	Yes
R4	Nearest Habitable Window	36	50	Yes
R5	Nearest Habitable Window	48	50	Yes
H1	Nearest Façade	44	65	Yes

Note:

- 1) Predicted noise levels are taking into account the recommendations in Section 9 of this report.
- 2) According to the NSW EPA Noise Policy for Industry 2017, a 1-2dB exceedance is considered to have a negligible significance of residual noise level.

8.2.2 Indoor Play area

8.2.2.1 Early Morning Shoulder 6:30am – 7am

Table 20 - Predicted Indoor Play Noise Levels at Nearby Receivers

Receiver	Assessment Location	Predicted Noise Level dB(A) $L_{eq}(15min)$	Allowable Noise Level dB(A) $L_{eq}(15min)$	Complies?
R1	Nearest Habitable Window	<30	44	Yes
R2	Nearest Habitable Window	<30	44	Yes
R3	Nearest Habitable Window	<30	44	Yes
R4	Nearest Habitable Window	<30	44	Yes
R5	Nearest Habitable Window	<30	44	Yes
H1	Nearest Façade	<30	65	Yes

Note:

- 1) Predicted noise levels are taking into account the recommendations in Section 9 of this report.

8.2.2.2 Daytime 7am – 6pm

Table 21 - Predicted Indoor Play Noise Levels at Nearby Receivers

Receiver	Assessment Location	Predicted Noise Level dB(A) $L_{eq}(15min)$	Allowable Noise Level dB(A) $L_{eq}(15min)$	Complies?
R1	Nearest Habitable Window	<30	44	Yes
R2	Nearest Habitable Window	<30	44	Yes
R3	Nearest Habitable Window	<30	44	Yes
R4	Nearest Habitable Window	<30	44	Yes
R5	Nearest Habitable Window	<30	44	Yes
H1	Nearest Façade	<30	65	Yes

Note:

- 1) Predicted noise levels are taking into account the recommendations in Section 9 of this report.

8.2.3 Use of the Carpark & Pickup/Drop-off

The predicted noise levels from use of the pickup/drop-off area associated with the childcare centre are presented in the table below for the worst-affected receivers. Noise generated by the pickup/drop-off area usage has been assessed in a worst-case scenario, with 58 vehicle movements during AM peak period.

8.2.3.1 Early Morning Shoulder 6:30am – 7am

Table 22 - Predicted Noise Levels at Nearby Receivers¹

Receiver	Assessment Location	Predicted Noise Level	Allowable Noise Level	Complies?
R1	Nearest Habitable Window	<40 dB(A) _{Leq(15min)} 56 dB(A) _{L_{max}}	45 dB(A) _{Leq(15min)} 54 dB(A) _{L_{max}}	Yes/Yes ²
R5	Nearest Habitable Window	<40 dB(A) _{Leq(15min)} 54 dB(A) _{L_{max}}	45 dB(A) _{Leq(15min)} 54 dB(A) _{L_{max}}	Yes/Yes
H1	Nearest Façade	41 dB(A) _{Leq(15min)}	65 dB(A) _{Leq(15min)}	Yes

Note:

- 1) Predicted noise levels are taking into account the recommendations in Section 9 of this report.
- 2) According to the NSW EPA Noise Policy for Industry 2017, a 1-2dB exceedance is considered to have a negligible significance of residual noise level.

8.2.3.2 Daytime 7am – 6pm

Table 23 - Predicted Noise Levels at Nearby Receivers¹

Receiver	Assessment Location	Predicted Noise Level dB(A) _{Leq(15min)}	Allowable Noise Level dB(A) _{Leq(15min)}	Complies?
R1	Nearest Habitable Window	<40	45	Yes
R5	Nearest Habitable Window	<40	45	Yes
H1	Nearest Façade	41	65	Yes

Note:

- 1) Predicted noise levels are taking into account the recommendations in Section 9 of this report.

8.2.4 Mechanical Noise Emission

Detailed plant selection and location has not been undertaken at this stage. Satisfactory levels will be achievable through appropriate plant selection, location and if necessary, standard acoustic treatments such as duct lining, acoustic silencers, and enclosures.

Noise emissions from all mechanical services to the closest residential receiver should comply with the requirements of Section 7.

Detailed acoustic review should be undertaken at CC stage to determine acoustic treatments to control noise emissions to satisfactory levels.

9 COMPLYING CONTROLS – BUILDING AND MANAGEMENT

The following building and management controls are required in order to control noise emission from the operation of the childcare centre.

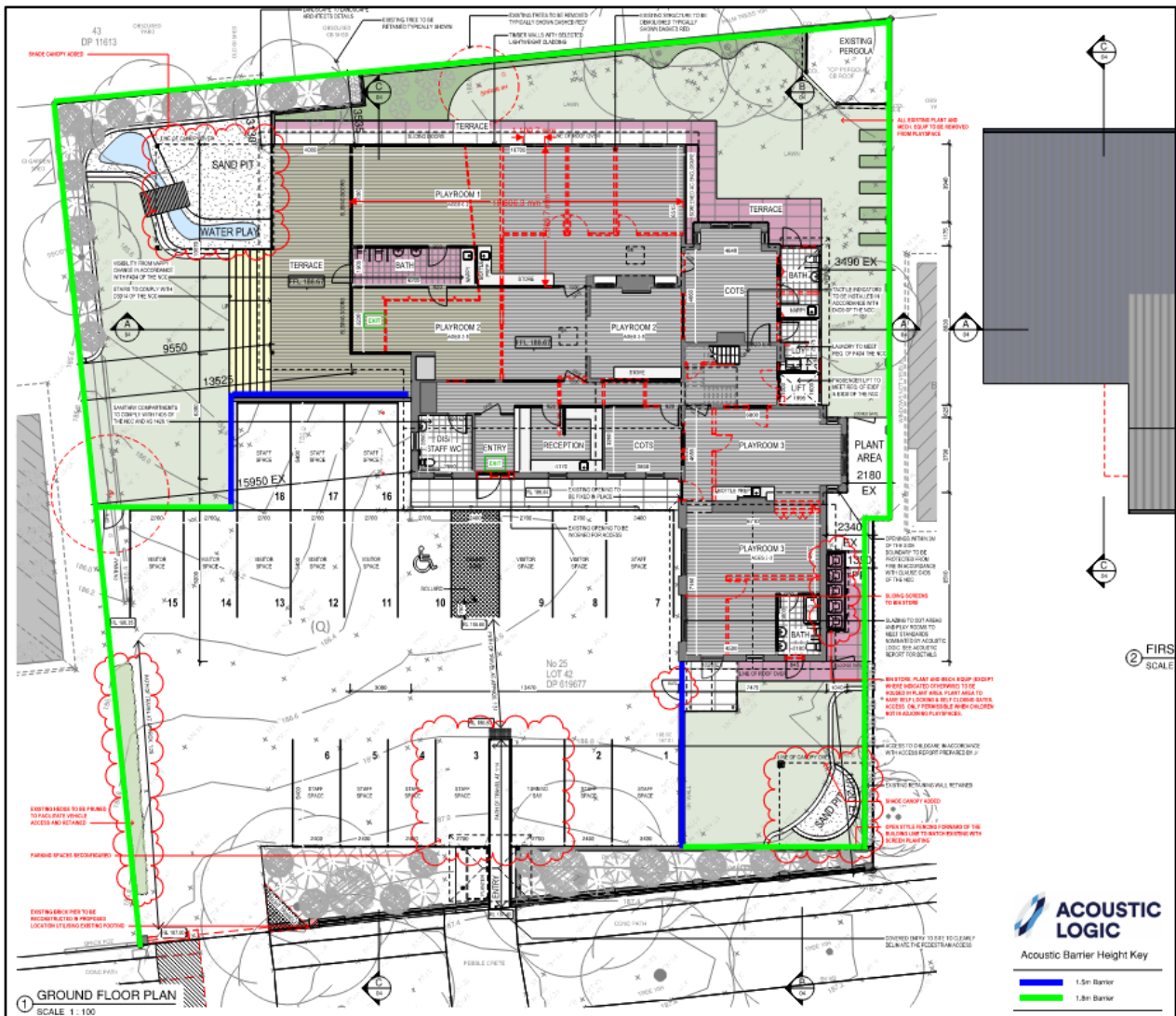
9.1 BUILDING CONSTRUCTION

- The underside of the ceiling over outdoor play areas is to be treated with an absorptive material (eg 50mm thick Echosoft with perforated metal pan lining), covering minimum 50% of roof area.
- See Section 5.3.1 for detailed Glazing, Roof, and Wall constructions.

9.1.1 Boundary Fencing/Noise Screens

The following boundary fence or noise screen heights will need to be constructed to ensure compliance with operation noise objectives. Refer also to Appendix Two for fence markups.

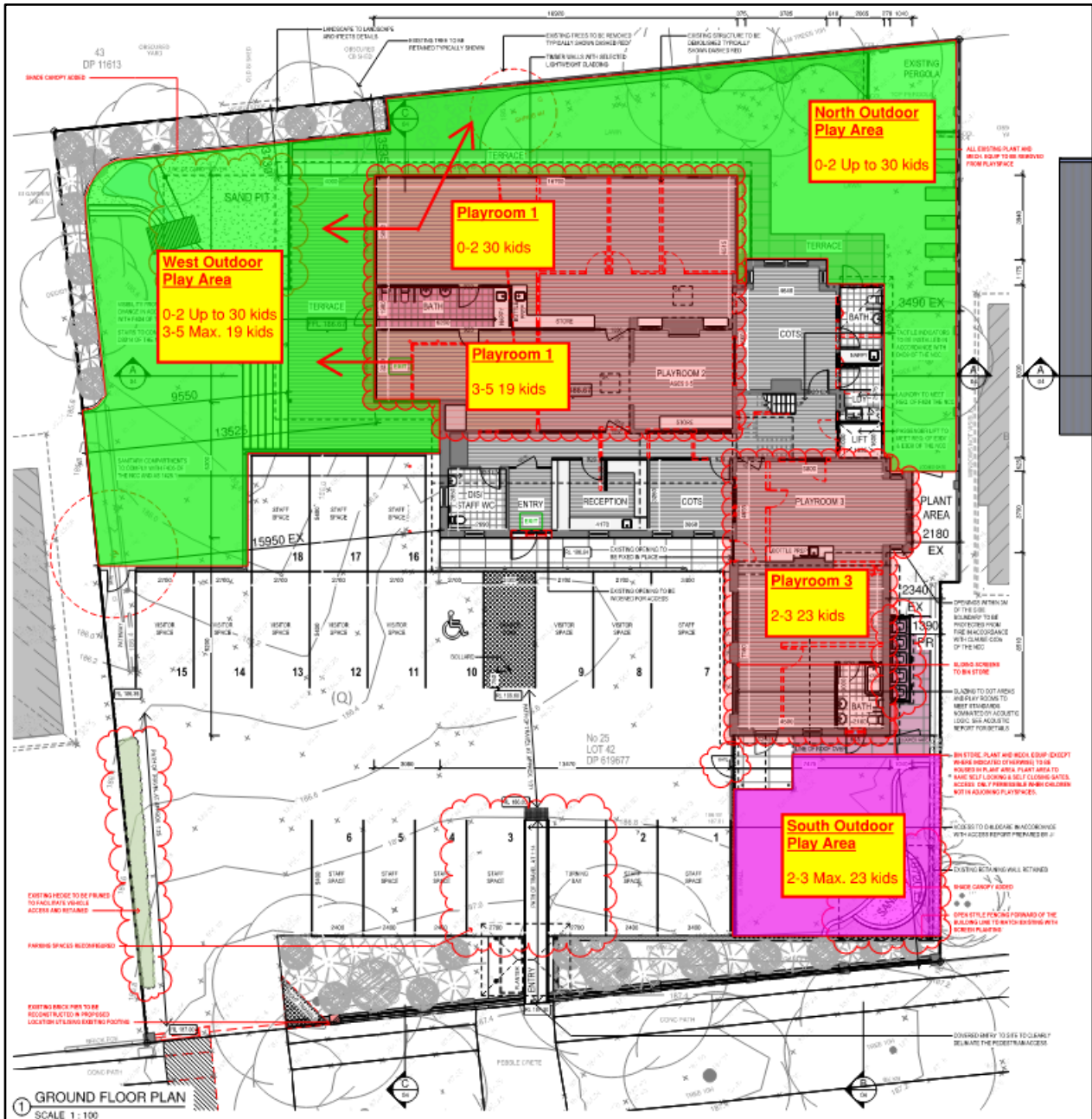
The fences along the perimeter of the outdoor areas, of height specified below, may be constructed of lapped and capped timber, flexi-glass, 4mm Perspex, Colorbond, 9mm fibrous cement sheet or equivalent, installed with no gaps between the panels, and maximum of a 20mm gap at the bottom to allow water flow if required.



9.2 MANAGEMENT CONTROLS

The outdoor play noise has been predicted based on the following information and assumptions:

- No more than 72 children inside the Child Care Centre at any one time.
- Maximum 4h of outdoor play per day
 - All 30 children aged 0-2, all 23 children aged 2-3, and all 19 children aged 3-5 using the outdoor play area at any given time concurrently, as below:



- Outdoor play areas are to be limited to the prescribed 72 children inside the centre, and no outdoor play before 7am or after 6pm.
- An acoustic barrier system as a detailed complying construction in Section 9 of this report.

- Additional general management controls as follows:
 - Signs reminding staff and visitors to minimise noise at all times shall be installed at ingress/egress points from the child-care centre (including car park).
 - All staff are to be given appropriate training in relation to the acoustic impacts and requirements in terms of operation of the facility.
 - Management is to ensure children are supervised at all times to minimise noise generated by the children whenever practical and possible.
 - Install a contact phone number at the front of the centre so that any complaints regarding centre operation can be made.
 - No music systems are to be used outside at any time.
 - Mechanical Plant only to operate between 6:30am and 6:00pm Monday-Saturday.

10 CONCLUSION

This report has been prepared to assess noise impacts associated with the proposed childcare centre to be located at 25 Hardy Avenue, Wagga Wagga.

Provided that the recommendations presented in Section 5 and Section 9 are adopted, internal noise levels and noise emission targets for the proposed childcare development will comply with the acoustic requirements of the following documents:

- Wagga Wagga Council Development Control Plan (DCP) 2010.
- NSW Department of Planning – *Development near Rail Corridors or Busy Roads – Interim Guideline*.
- NSW Environment Protection Authority (EPA) – *Noise Policy for Industry (NPI) 2017*.
- Association of Australian Acoustical Consultants (AAAC) Guideline for Child Care Centre Acoustic Assessment, Version 3.0, 2020.

Based on the information provided above, we believe in our professional opinion that the proposal is capable of maintaining the acoustic amenity of the occupants and surrounding receivers, provided that the recommendations in Section 5 and Section 9 of this report are adopted.

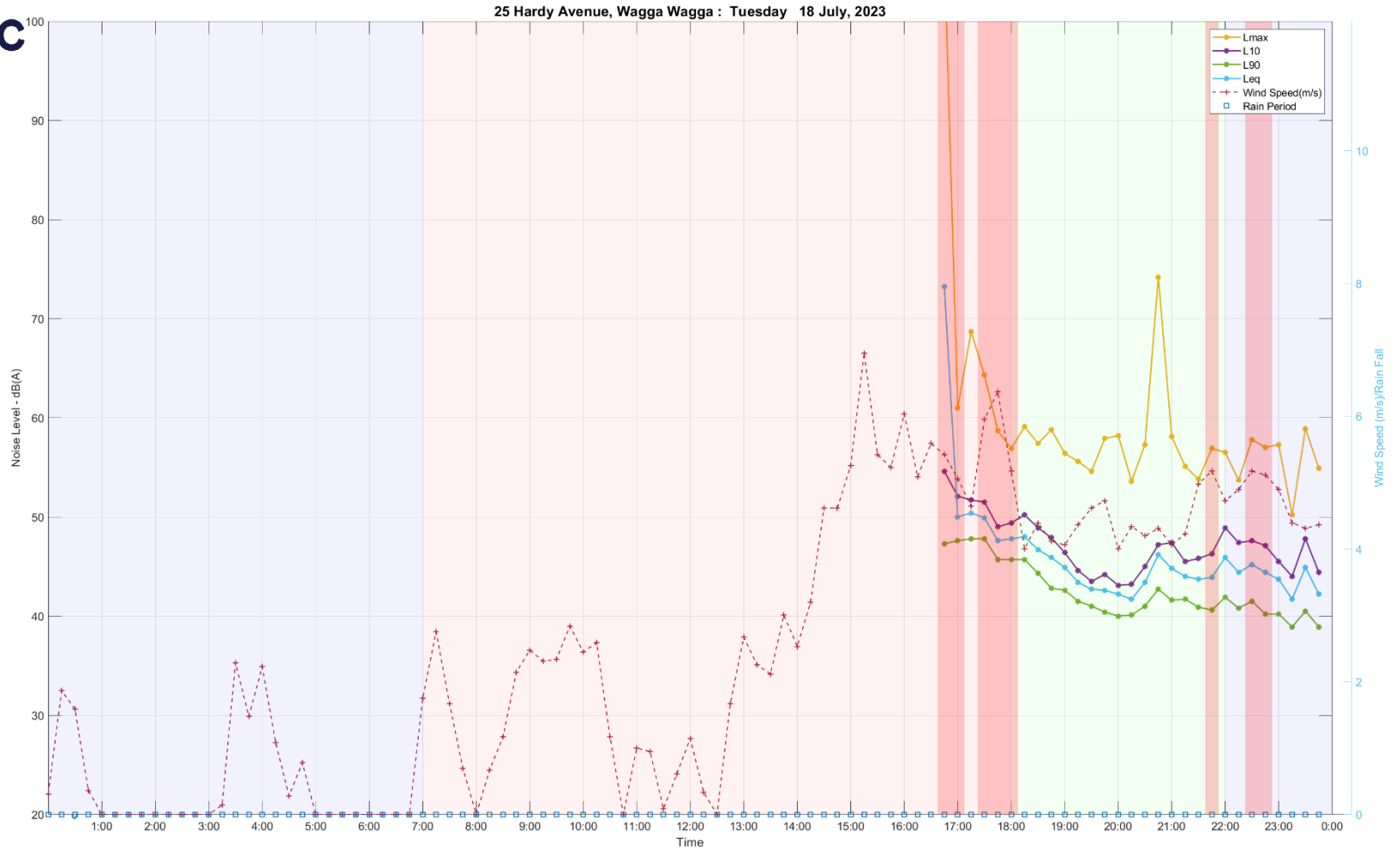
We trust this information is satisfactory. Please contact us should you have any further queries.

Yours faithfully,



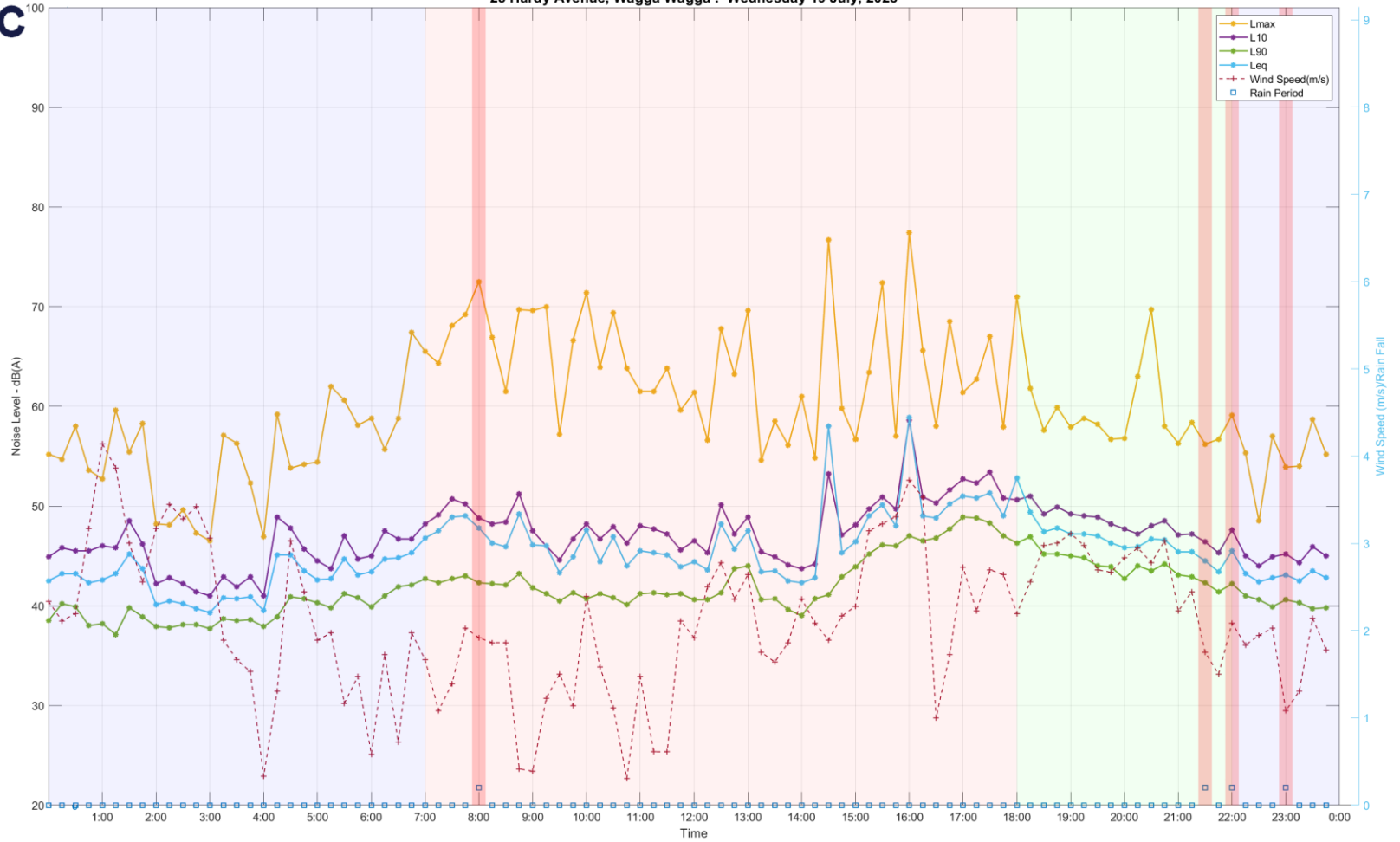
Acoustic Logic Pty Ltd
Bruno Lobato Da Jornada

APPENDIX ONE – UNATTENDED NOISE MONITORING DATA



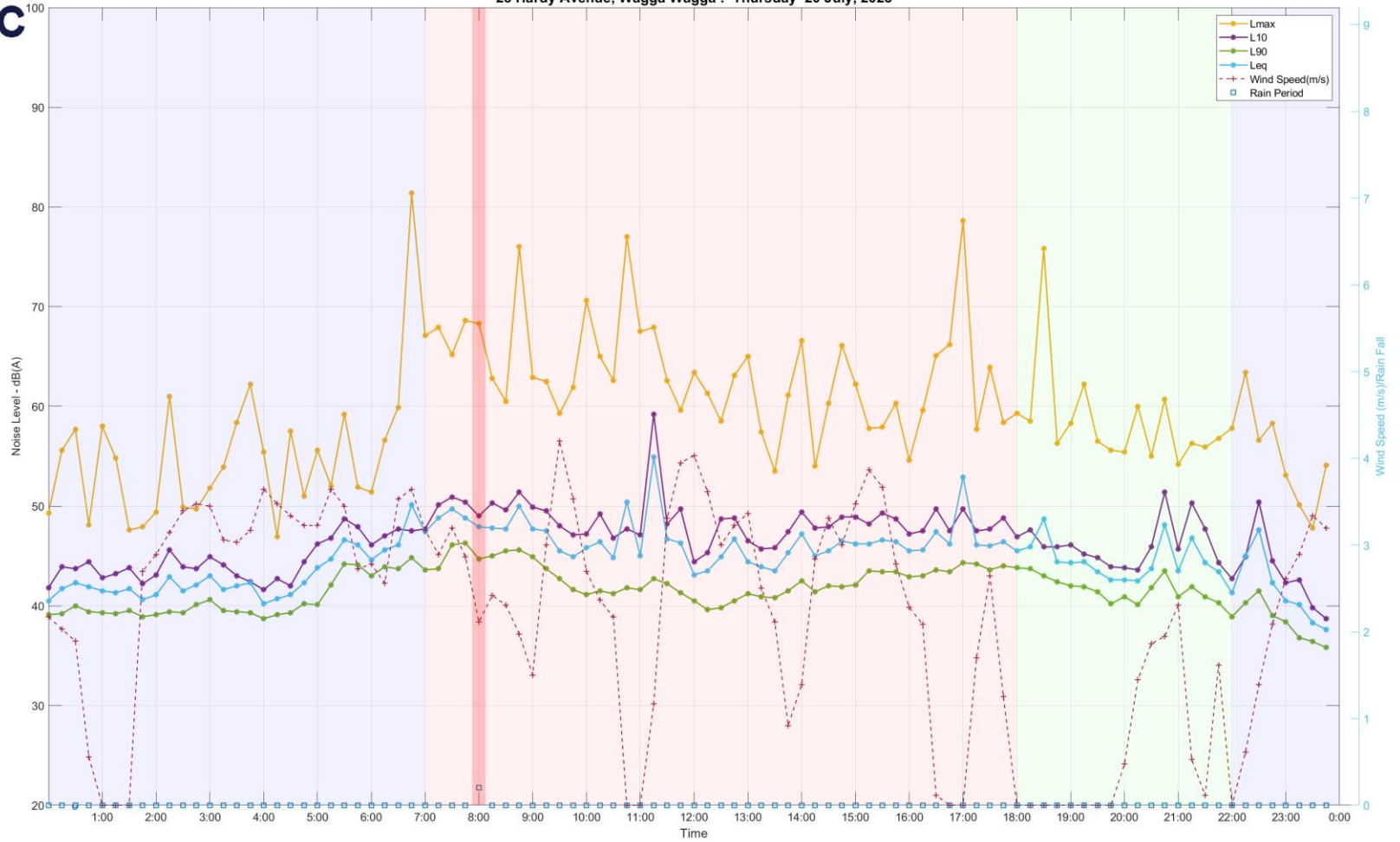


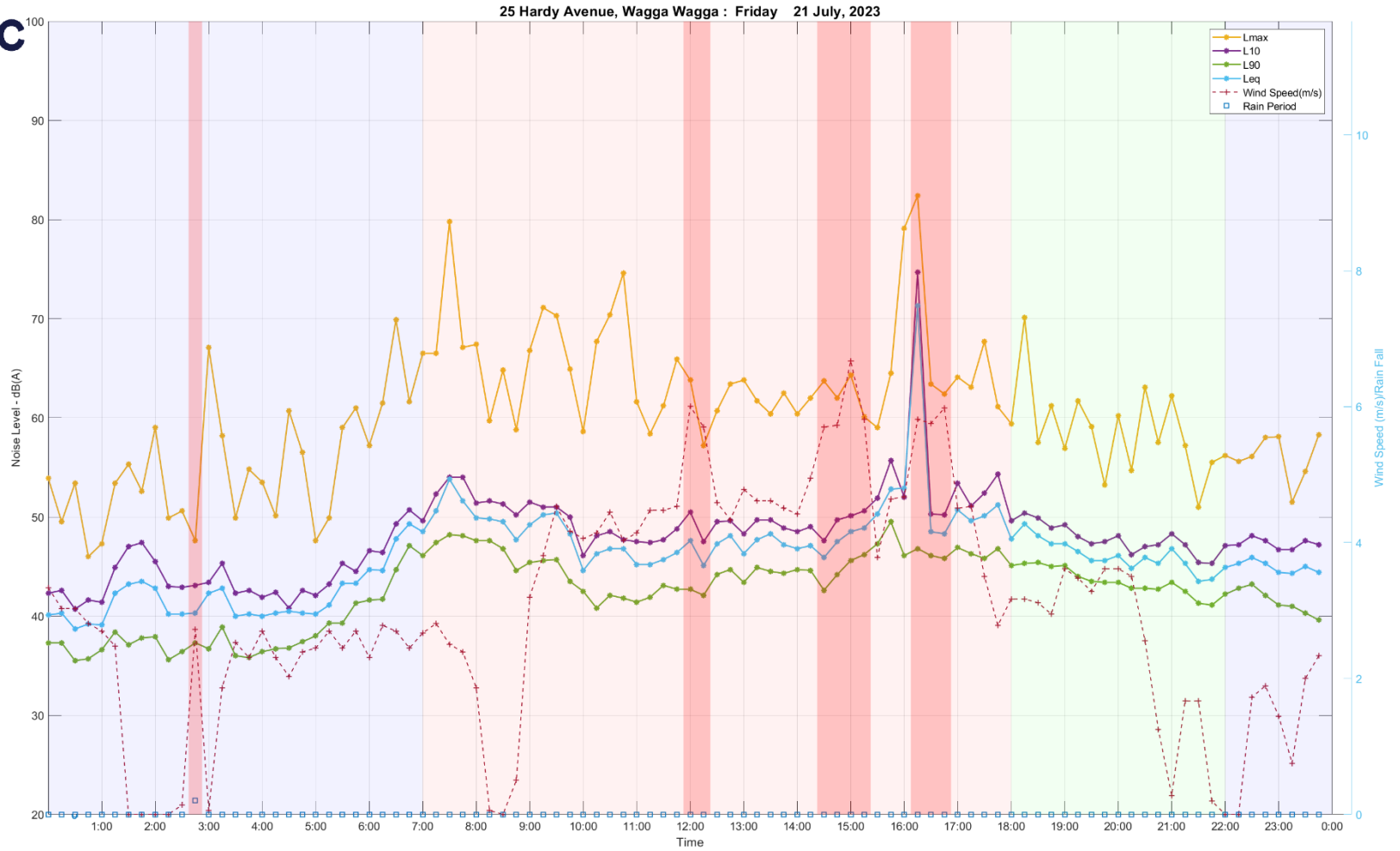
25 Hardy Avenue, Wagga Wagga : Wednesday 19 July, 2023





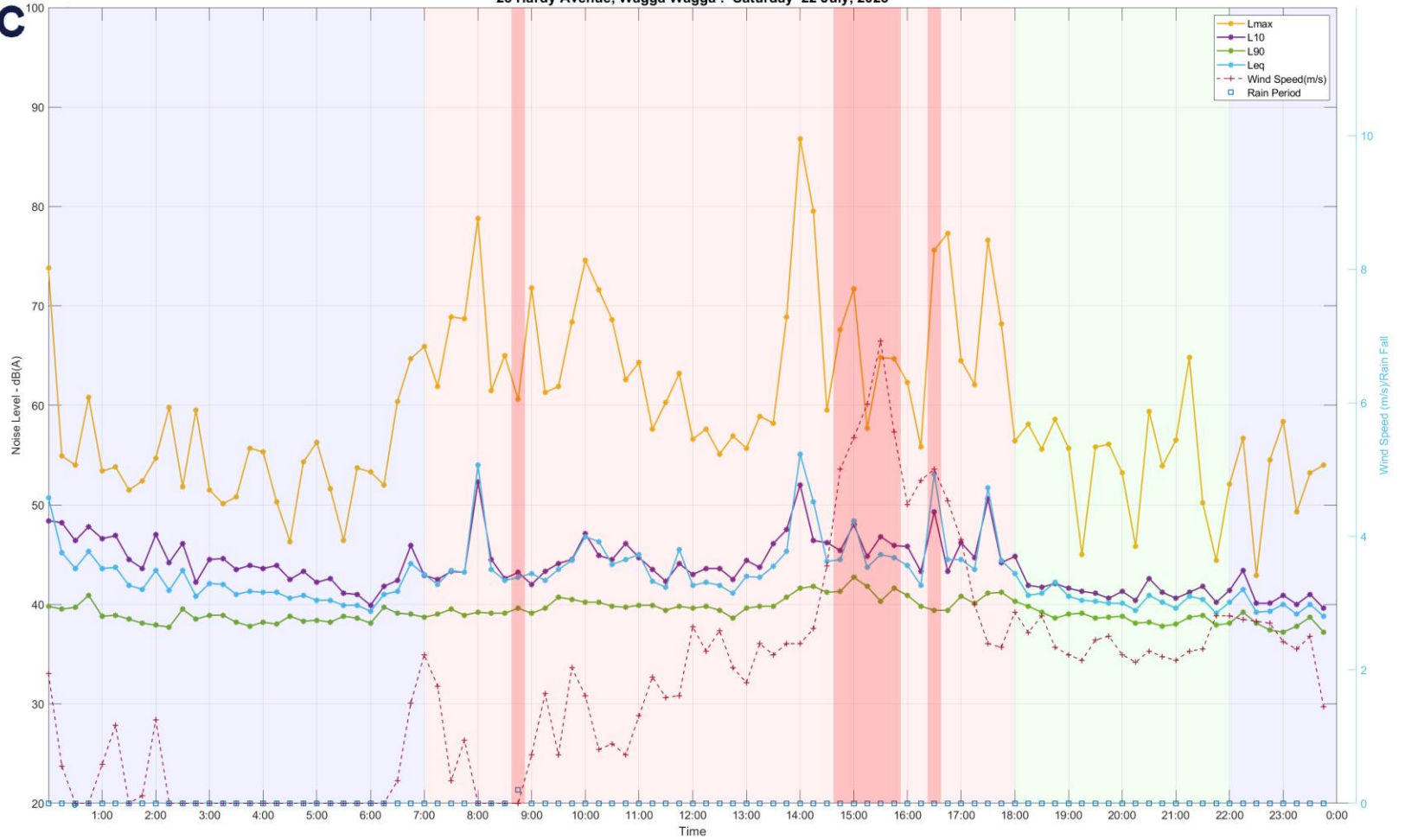
25 Hardy Avenue, Wagga Wagga : Thursday 20 July, 2023





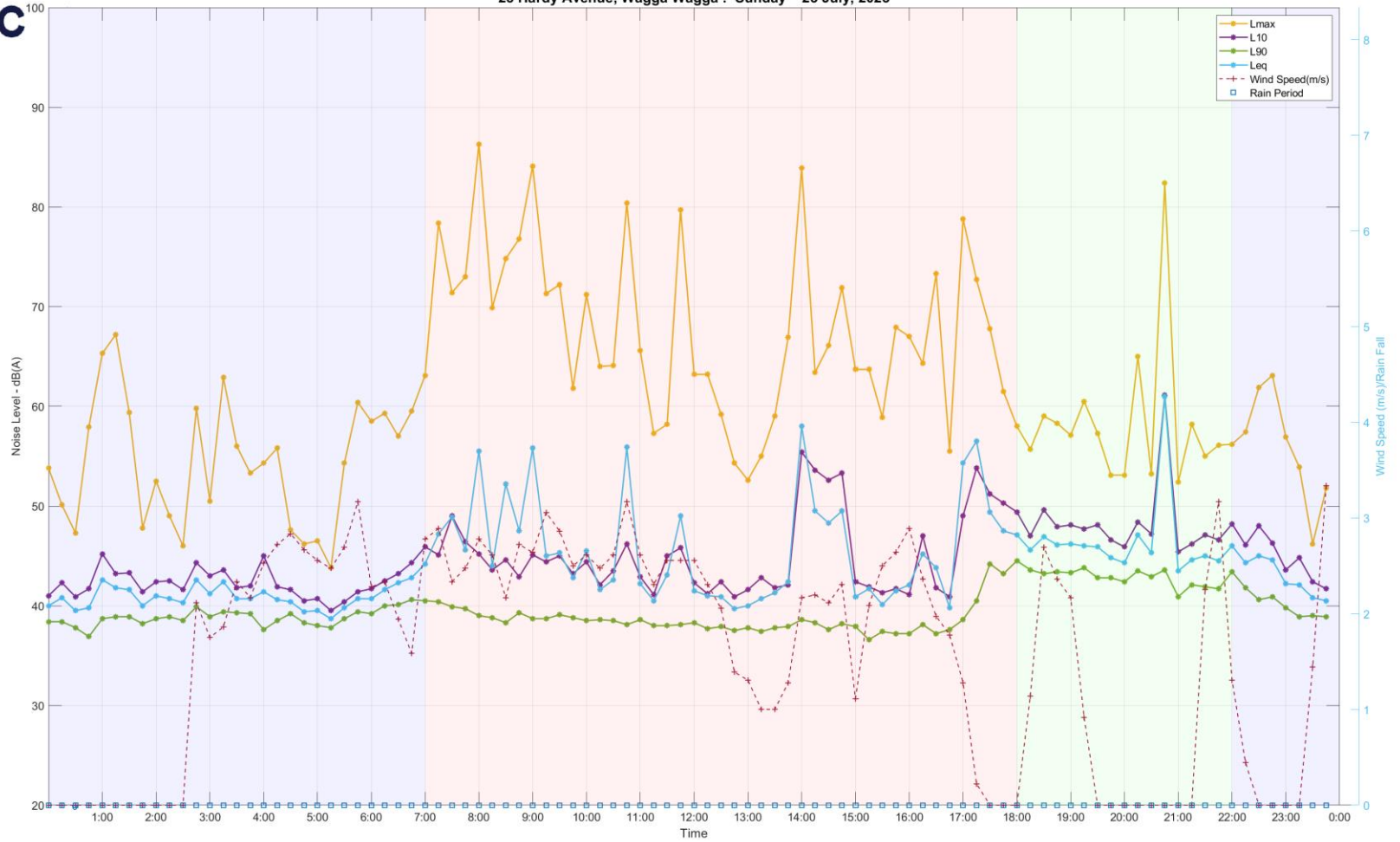


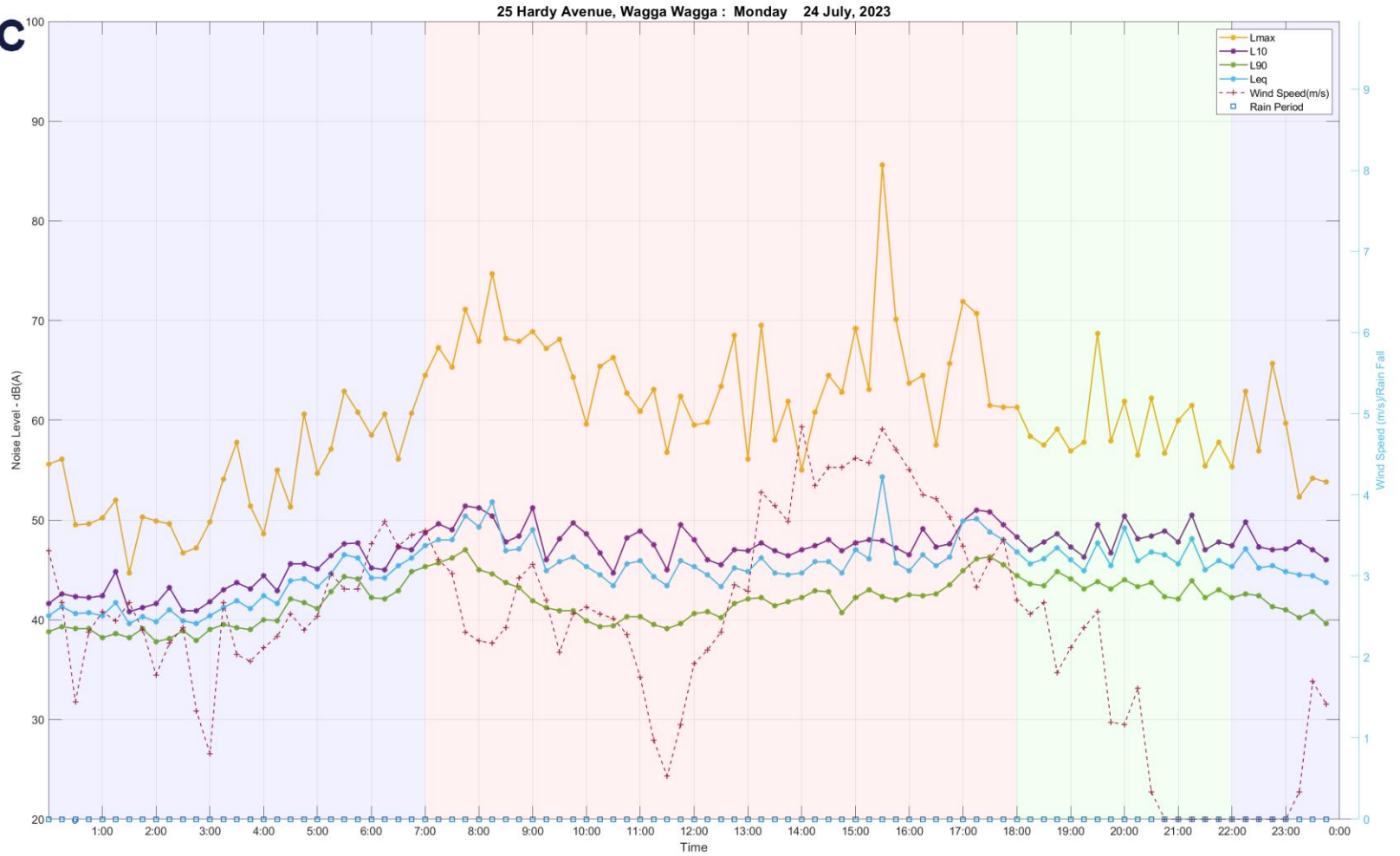
25 Hardy Avenue, Wagga Wagga : Saturday 22 July, 2023





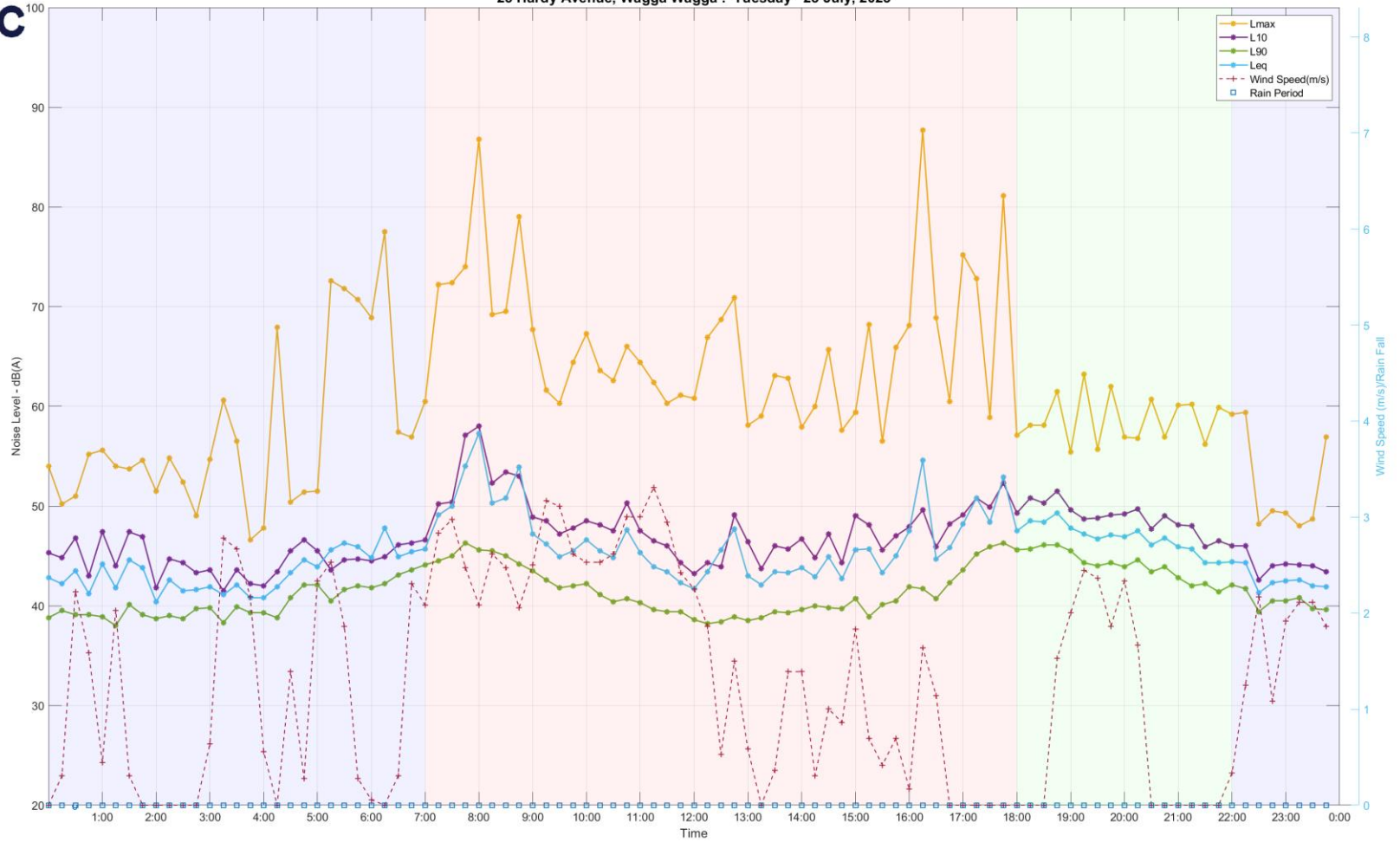
25 Hardy Avenue, Wagga Wagga : Sunday 23 July, 2023





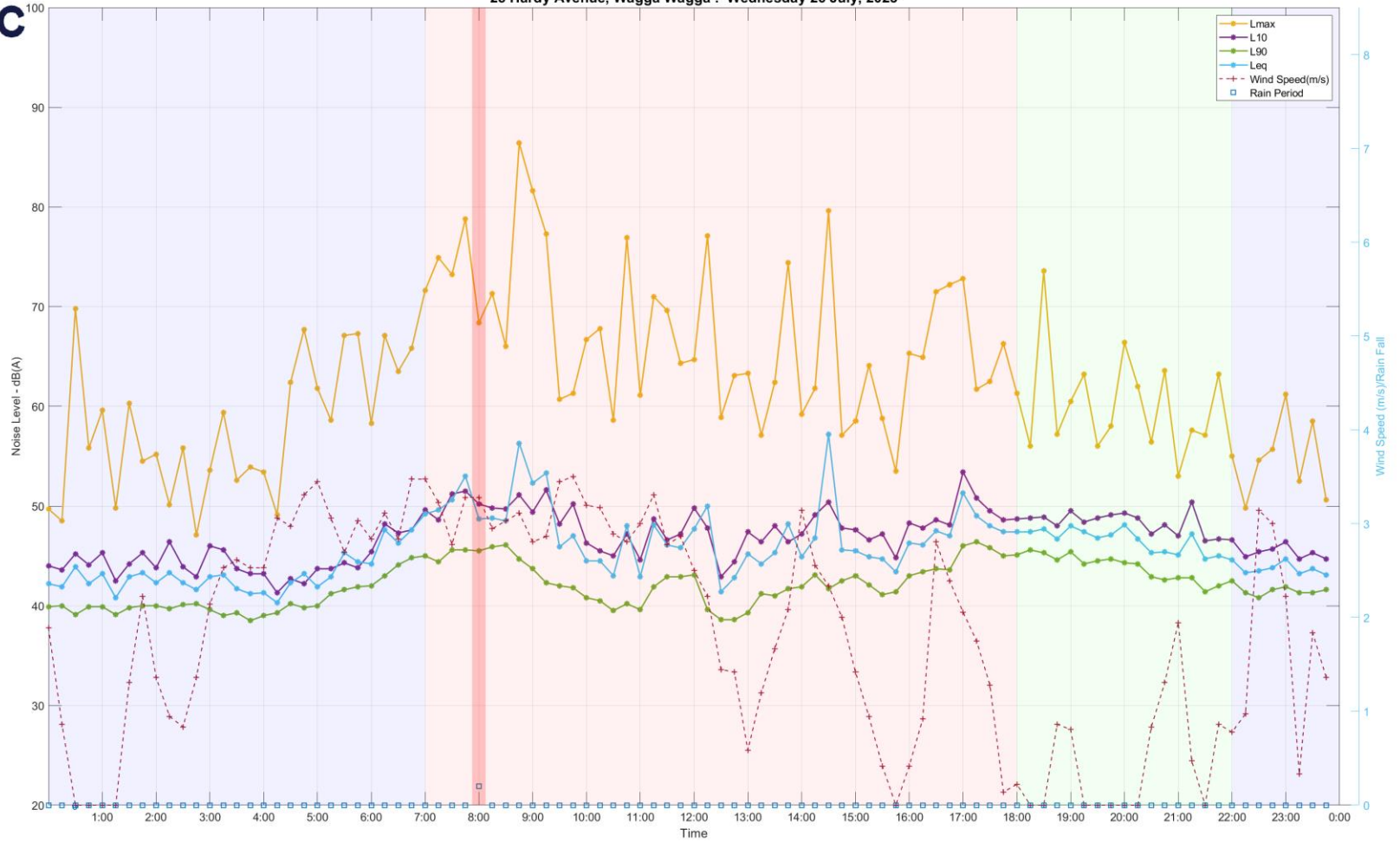


25 Hardy Avenue, Wagga Wagga : Tuesday 25 July, 2023



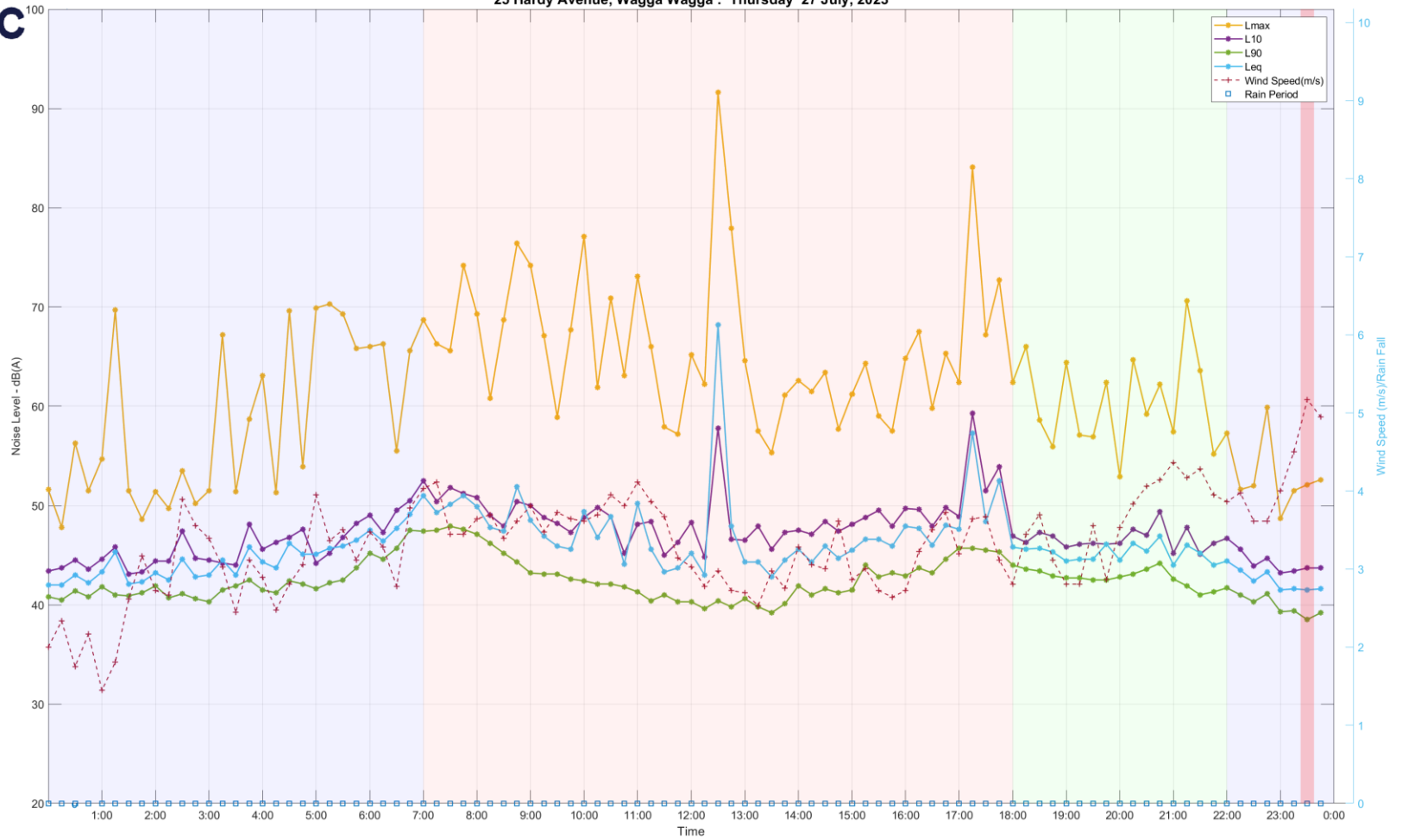


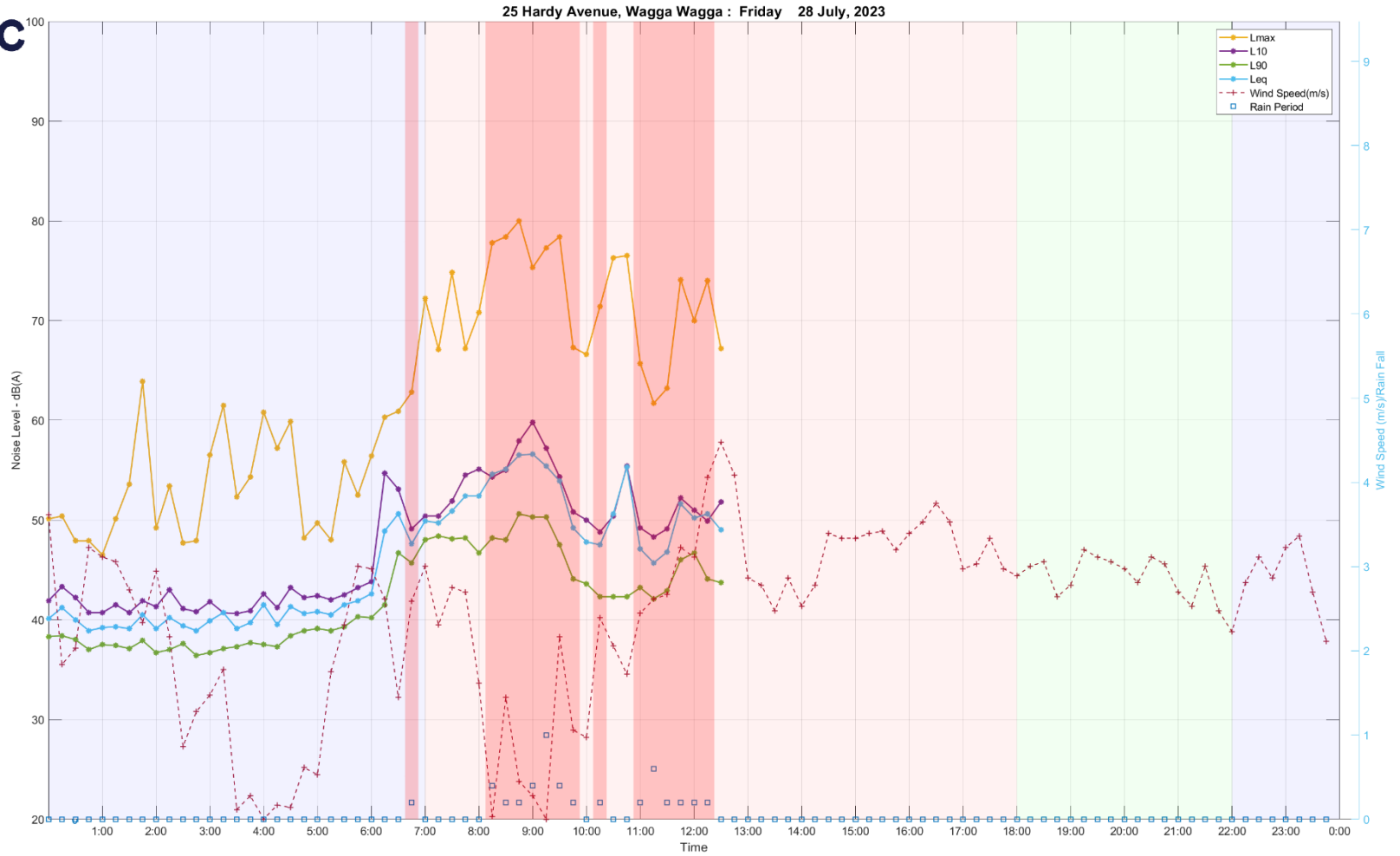
25 Hardy Avenue, Wagga Wagga : Wednesday 26 July, 2023





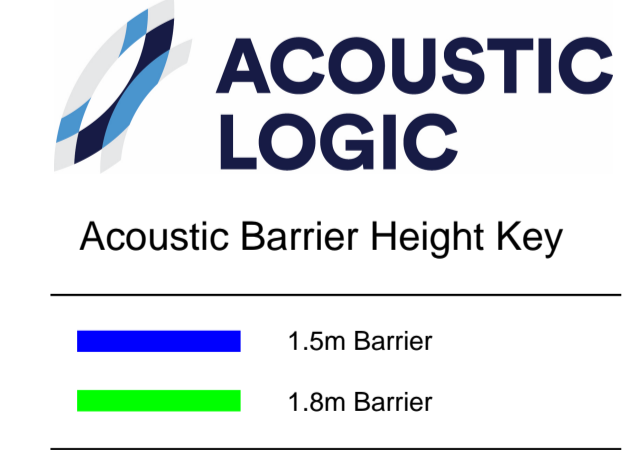
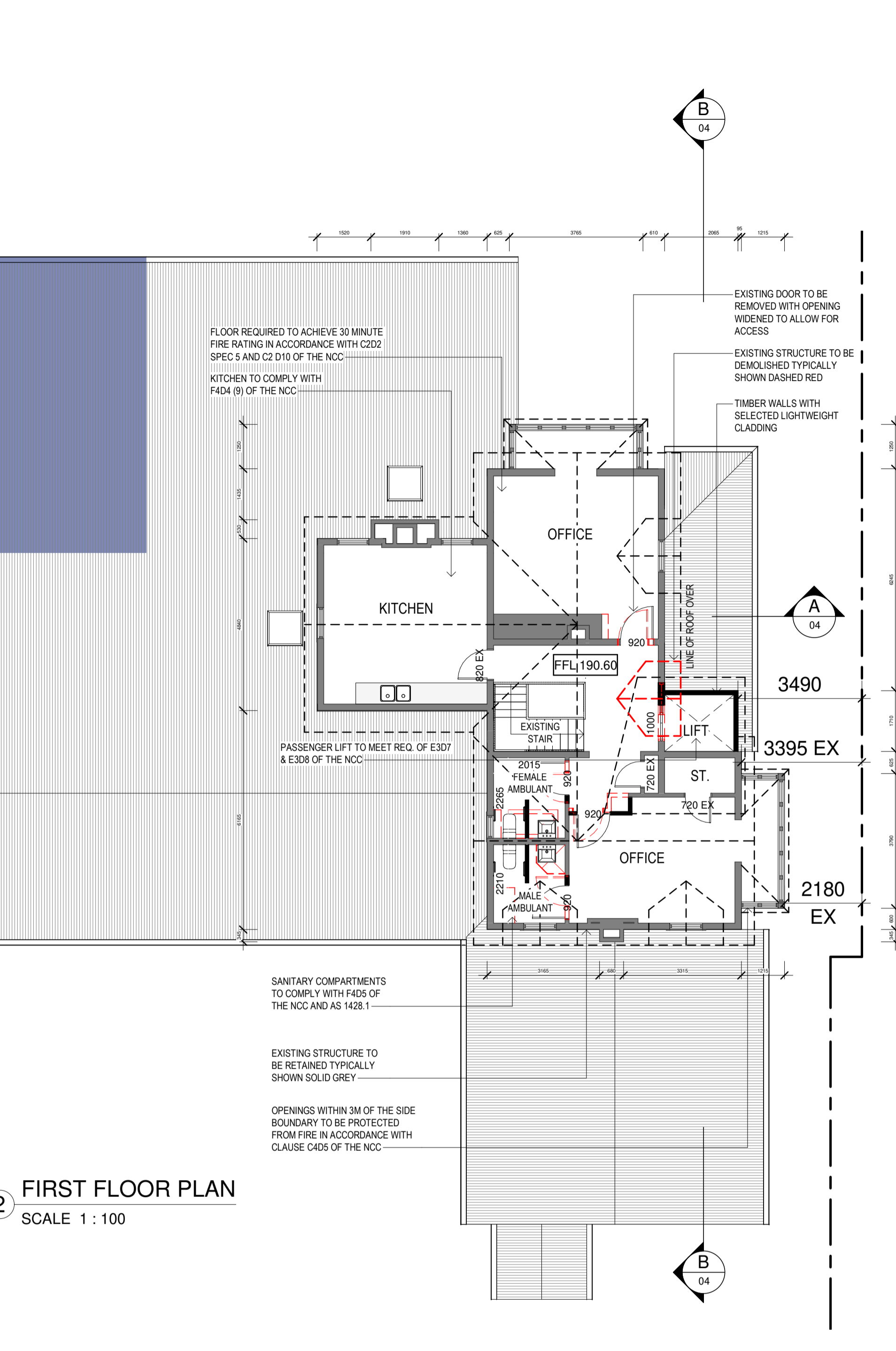
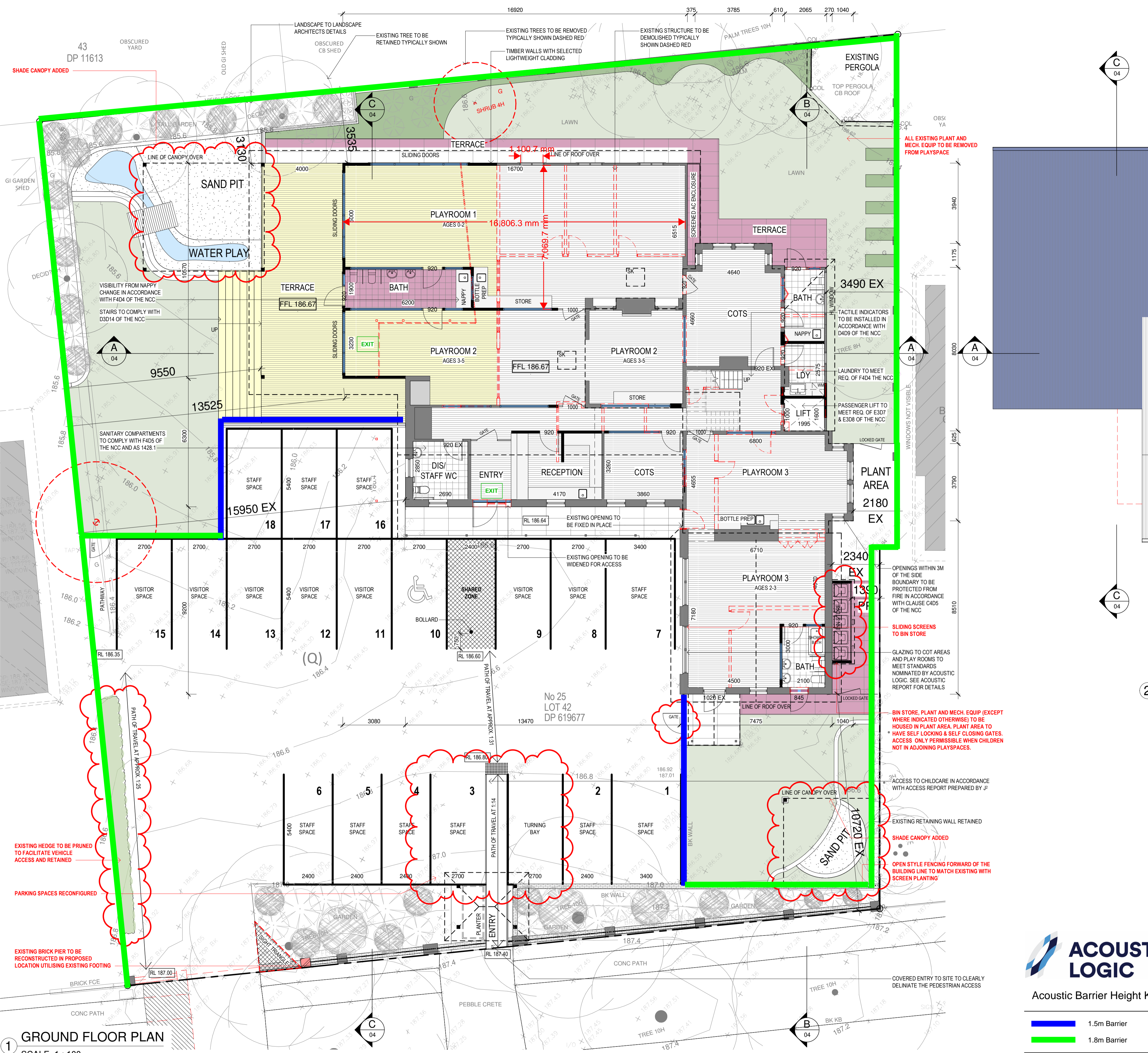
25 Hardy Avenue, Wagga Wagga : Thursday 27 July, 2023





Wind Speed is corrected using factor 1.0000 based on logger location

APPENDIX TWO – FENCE & PLAY AREA MARKUP



NOTE:
All existing & overall dimensions are nominal & subject to verification on site, where any discrepancy occurs between new work & existing dimensions - existing dimensions/work should take preference where necessary - otherwise notify Innovate Architects Pty Ltd.
Selected termite protection to be used on site in accordance with local council's requirements, B.C.A and all relevant Australian Standards.
Smoke detectors to comply with requirements of S2004 of the NCC and AS 1670.1. Fire and smoke alarms shall be connected to the main power supply.

GENERAL NOTES:
All work to be carried out in accordance with the Building Code of Australia, all Local and State Government Ordinances, relevant Australian Standards, Local Electricity and Water Authorities Regulations and all other relevant Authorities concerned.
All structural work and site drainage to be subject to Engineer's details or certification where required by Council. This shall include: i.e. slabs and footings, i.e. and steel beams and columns, wind bracing to AS 1170 and AS4055, anchor rods or bolts, tie downs, fixings etc., driveway slabs and drainage to Council's satisfaction.
All timbers to be in accordance with SAA Timber Structure Code AS1720 and SAA Timber Framing Code AS 1684. All work to be carried out in a professional and workmanship like manner according to the plans and specification.

NOTE:
Do not scale off the drawings unless otherwise stated and use figured dimensions in preference. All dimensions are to be checked and verified on site before the commencement of any work, all dimensions and levels are subject to final survey and set-out. No responsibility will be accepted by this firm for any variations in design, builder's method of construction or materials used, deviation from specification without permission or accepted work practices resulting in inferior construction. Locate and protect all services prior to construction.

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ISSUE	AMENDMENT	DATE	INT.
B	ISSUE FOR ADDITIONAL INFORMATION	NOV 2023	MJ
A	DEVELOPMENT APPLICATION	SEP 2023	MJ

BEN DRANSFIELD AND RENEE CLARE HUMPHRY ATF DRANSFIELD FAMILY TRUST & FAKU PTY LTD ATF HUMPHRY FAMILY TRUST

25 HARDY AVENUE, WAGGA WAGGA

ALTERATIONS AND ADDITIONS TO AN EXISTING STRUCTURE AND CREATION OF A CHILDCARE CENTRE

FLOOR PLANS

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REGISTERED ARCHITECTS
Notified Architect
Cameron Jones
7143

Architects

2866

02

DEVELOPMENT APPLICATION

