Noise Assessment

Proposed Modifications to Approved Childcare Centre
39 Saleyards Lane
Mudgee, NSW

Prepared for: Barnson Pty Ltd
July 2024
MAC242183-01RP1V1

Muller Acoustic Consulting

Document Information

Noise Assessment

Proposed Modifications to Approved Childcare Centre

39 Saleyards Lane

Mudgee, NSW

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1 Introduction

Muller Acoustic Consulting Pty Ltd (MAC) has been commissioned by the Barnson Pty Ltd (Barnson) to prepare a Noise Assessment (NA) to quantify emissions from the proposed modifications to the approved Childcare Centre (CCC) to be to be established at 39 Saleyards Lane, Mudgee, NSW. The NA has quantified potential emissions associated with the proposed CCC as well as the noise intrusion from surrounding noise sources to the CCC spaces.

This assessment has been undertaken in accordance with the following documents:

- NSW Department of Environment and Climate Change (DECC), NSW Interim Construction Noise Guideline (ICNG), July 2009;
- NSW Environment Protection Authority (EPA), Noise Policy for Industry (NPI), 2017;
- NSW Environment Protection Authority (EPA's), Approved Methods for the measurement and analysis of environmental noise in NSW, 2022;
- Standards Australia AS 1055:2018 - Acoustics - Description and measurement of environmental noise - General Procedures; and
- Association of Australian Acoustical Consultants (AAAC), Guideline for Childcare Centre Acoustic Assessment (GCCCAA).

A glossary of terms, definitions and abbreviations used in this report is provided in **Appendix A**.

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2 Project Description

2.1 Background

The alterations and modifications of the CCC is to be established at 39 Saleyards Lane, Mudgee, NSW, which is located in a low-density residential area approximately 2km northwest from the town centre of Mudgee. The project site is bound by future residential lots and newly built residential receivers. The ambient noise environment surrounding the project site is dominated by residential traffic along Saleyards Lane and ambient environmental noise such as birds and insects. The existing CCC currently has the approval for operation.

The project proposes the modification to the approved CCC to allow for a total of 87 children to attend the centre and will also include construction to extend the existing CCC building. The modified CCC will provide the following childcare spaces and facilities:

- two baby rooms accommodating up to 24 babies;
- one toddler room accommodating up to 21 toddlers;
- two preschool rooms accommodating up to 42 preschool children;
- two outdoor play areas;
- admin offices, staff rooms, water closets with amenities; and
- associated car parking.

Site plans are provided in **Appendix B**. The CCC is proposed to operate from 7am to 6pm Monday to Friday. It is noted that hours of operation are not proposed to be changed as part of the modification to the project.

2.1.1 Receiver Review

A review of residential receivers in close proximity to the project has been completed and are summarised in **Table 1. Figure 1** provides a locality plan showing the position of these receivers in relation to the project.

Table 1 Receiver Locations

Receiver	Receiver Type	Receiver Height	MGA55 Coordinates	
			Easting	Northing
FR01	Future Residential	1.5m	740970	6391941
FR02	Future Residential	1.5m	740958	6391953
FR03	Future Residential	1.5m	740951	6391962
FR04	Future Residential	1.5m	741017	6391989
R01	Residential	1.5m	740977	6392032
R02	Residential	1.5m	740988	6392019
R03	Residential	1.5m	741001	6392005
R04	Residential	1.5m	741068	6391955
R05	Residential	1.5m	740933	6391973
R06	Residential	1.5m	740936	6391982
R07	Residential	1.5m	740944	6391989
R08	Residential	1.5m	740951	6391995
R09	Residential	1.5m	740959	6392002

The CCC receivers for both external play areas and internal occupied rooms are presented in **Table 2**.

Table 2 On-site Receiver Locations

Receptors	Type	Height Above Ground Level	MGA55 Coordinates	
			Easting	Northing
Cots Room 01	Internal Sleep Area	0.6m	740976	6391963
Cots Room 02	Internal Sleep Area	0.6m	740971	6391959
Infants Room 01	Internal Play Area	0.6m	740983	6391956
Infants Room 02	Internal Play Area	0.6m	740977	6391952
Classroom 01	Internal Play Area	0.6m	740976	6391984
Classroom 02	Internal Play Area	0.6m	740970	6391978
Classroom 03	Internal Play Area	0.6m	740962	6391971
Outdoor (Infants) Play Area 01	External Play Area	0.6m	740992	6391940
Outdoor Play Area 02	External Play Area	0.6m	740958	6391987

FIGURE 1

LOCALITY PLAN

MAC242183-01V1

Gowrie CCC

Mudgee, NSW

KEY

- Attended Location
- Unattended Location
- Receiver Locations
- Site Boundary

0 5 10 15 20 25 m

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3 Noise Policy and Guidelines

3.1 Noise Policy for Industry

The EPA released the Noise Policy for Industry (NPI) in October 2017 which provides a process for establishing noise criteria for consents and licenses enabling the EPA to regulate noise emissions from scheduled premises under the Protection of the Environment Operations Act 1997. The objectives of the NPI are to:

- provide noise criteria that is used to assess the change in both short term and long-term noise levels;
- provide a clear and consistent framework for assessing environmental noise impacts from industrial premises and industrial development proposals;
- promote the use of best-practice noise mitigation measures that are feasible and reasonable where potential impacts have been identified; and
- support a process to guide the determination of achievable noise limits for planning approvals and/or licences, considering the matters that must be considered under the relevant legislation (such as the economic and social benefits and impacts of industrial development).

The policy sets out a process for industrial noise management involving the following key steps:

1. Determine the Project Noise Trigger Levels (PNTLs) (ie criteria) for a development. These are the levels (criteria), above which noise management measures are required to be considered. They are derived by considering two factors: shorter-term intrusiveness due to changes in the noise environment; and maintaining the noise amenity of an area.
2. Predict or measure the noise levels produced by the development with regard to the presence of annoying noise characteristics and meteorological effects such as temperature inversions and wind.
3. Compare the predicted or measured noise level with the PNTL, assessing impacts and the need for noise mitigation and management measures.
4. Consider residual noise impacts - that is, where noise levels exceed the PNTLs after the application of feasible and reasonable noise mitigation measures. This may involve balancing economic, social and environmental costs and benefits from the proposed development against the noise impacts, including consultation with the affected community where impacts are expected to be significant.

5. Set statutory compliance levels that reflect the best achievable and agreed noise limits for the development.

6. Monitor and report environmental noise levels from the development.

3.1.1 Project Noise Trigger Levels (PNTL)

The policy sets out the procedure to determine the PNTLs relevant to an industrial development. The PNTL is the lower (ie, the more stringent) of the **Project Intrusiveness Noise Level** (PINL) and **Project Amenity Noise Level** (PANL) determined in accordance with Section 2.3 and Section 2.4 of the NPI.

3.1.2 Rating Background Level (RBL)

The Rating Background Level (RBL) is a determined parameter from noise monitoring and is used for assessment purposes. As per the NPI, the RBL is an overall single figure background level representing each assessment period (day, evening and night) over the noise monitoring period. The measured RBLs relevant to the project are contained in **Section 4**.

3.1.3 Project Intrusiveness Noise Level (PINL)

The PINL ($LA_{eq(15min)}$) is the RBL + 5dB and seeks to limit the degree of change a new noise source introduces to an existing environment. Hence, when assessing intrusiveness, background noise levels need to be measured.

Background noise levels need to be determined before intrusive noise can be assessed. The NPI states that background noise levels to be measured are those that are present at the time of the noise assessment and without the subject development operating. For the assessment of modifications to existing premises, the noise from the existing premises should be excluded from background noise measurements. It is note that the exception is where the premises has been operating for a significant period of time and is considered a normal part of the acoustic environment; it may be included in the background noise assessment under the following circumstances:

- the development must have been operating for a period in excess of 10 years in the assessment period/s being considered and is considered a normal part of the acoustic environment; and
- the development must be operating in accordance with noise limits and requirements imposed in a consent or licence and/or be applying best practice.

Where a project intrusiveness noise level has been derived in this way, the derived level applies for a period of 10 years to avoid continuous incremental increases in intrusiveness noise levels. This approach is consistent with the purpose of the intrusiveness noise level to limit significant change in the acoustic environment. The purpose of the Project Amenity Noise Level is to moderate against background noise creep.

3.1.4 Project Amenity Noise Level (PANL)

The PANL is relevant to a specific land use or locality. To limit continuing increases in intrusiveness levels, the ambient noise level within an area from all combined industrial sources should remain below the recommended Amenity Noise Levels specified in Table 2.2 (of the NPI). The NPI defines two categories of Amenity Noise Levels:

- **Amenity Noise Levels (ANL)** – are determined considering all current and future industrial noise within a receiver area; and
- **Project Amenity Noise Level (PANL)** – is the recommended level for a receiver area, specifically focusing the project being assessed.

Additionally, Section 2.4 of the NPI states: "to ensure that industrial noise levels (existing plus new) remain within the recommended Amenity Noise Levels for an area, a Project Amenity Noise Level applies for each new source of industrial noise as follows":

PANL for new industrial developments = recommended **ANL** minus 5dBA.

The following exceptions apply when deriving the PANL:

- areas with high traffic noise levels;
- proposed developments in major industrial clusters;
- existing industrial noise and cumulative industrial noise effects; and
- greenfield sites.

The NPI states with respect to high traffic noise areas:

The level of transport noise, road traffic noise in particular, may be high enough to make noise from an industrial source effectively inaudible, even though the LAeq noise level from that industrial noise source may exceed the Project Amenity Noise Level. In such cases the Project Amenity Noise Level may be derived from the LAeq, period(traffic) minus 15 dB(A).

Where relevant this assessment has considered influences of traffic with respect to Amenity Noise Levels (ie areas where existing traffic noise levels are 10dB greater than the recommended ANL).

The recommended Amenity Noise Levels as per Table 2.2 of the NPI are reproduced in **Table 3**.

Table 3 Amenity Noise Levels

Receiver Type	Noise Amenity Area	Time of day[1]	Recommended Amenity Noise Level dB LAeq(period)
Residential	Rural	Day	50
		Evening	45
		Night	40
	Suburban	Day	55
		Evening	45
		Night	40
	Urban	Day	60
		Evening	50
		Night	45
Hotels, motels, caretakers' quarters, holiday accommodation, permanent resident caravan parks.	See column 4	See column 4	5dB above the recommended Amenity Noise Level for a residence for the relevant noise amenity area and time of day
School Classroom	All	Noisiest 1-hour period when in use	35 (internal) 45 (external)
Hospital ward			
- internal	All	Noisiest 1-hour	35
- external	All	Noisiest 1-hour	50
Place of worship - internal	All	When in use	40
Passive Recreation	All	When in use	50
Active Recreation	All	When in use	55
Commercial premises	All	When in use	65
Industrial	All	When in use	70

Notes: The recommended Amenity Noise Levels refer only to noise from industrial noise sources. However, they refer to noise from all such sources at the receiver location, and not only noise due to a specific project under consideration. The levels represent outdoor levels except where otherwise stated.

Types of receivers are defined as rural residential; suburban residential; urban residential; industrial interface; commercial; industrial – see Table 2.3 and Section 2.7 of the NPI.

Note 1: Day - the period from 7am to 6pm Monday to Saturday or 8am to 6pm on Sundays and public holidays; Evening - the period from 6pm to 10pm; Night - the remaining periods.

3.2 The AAAC Guideline

The Guideline for Childcare Centre Acoustic Assessment (GCCCAA) been prepared by the AAAC. The document provides criteria for the assessment of noise intrusion into and noise emissions from CCCs and also provides recommendations for treatment to minimise noise upon surrounding receptors. The guideline aligns with the NPI for establishing criteria for CCCs with respect to the following noise sources:

- mechanical plant (air conditioning condensers and mechanical ventilation);
- on-site traffic, deliveries and ingress and egress of vehicles;
- on-site drop off/collection areas of children; and
- noise emissions from children at play.

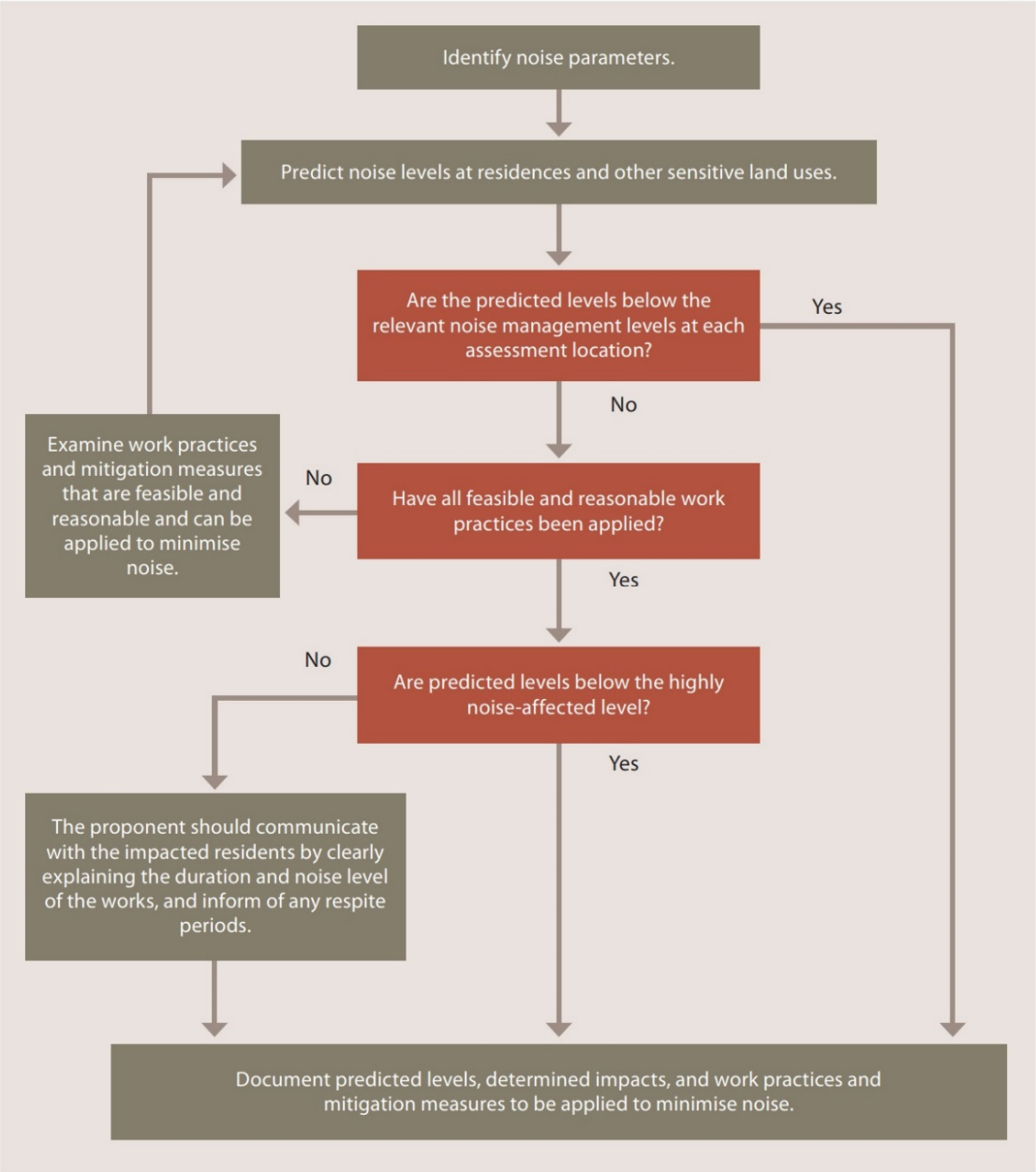
3.3 Interim Construction Noise Guideline

The ICNG sets out procedures to identify and address the impacts of construction noise on residences and other sensitive land uses. This section provides a summary of noise objectives that are applicable to the assessment. The ICNG provides two methodologies for the assessment of construction noise emissions:

- quantitative, which is suited to major construction projects with typical durations of more than three weeks; and
- qualitative, which is suited to short term infrastructure maintenance (< three weeks).

The qualitative assessment methodology is a more simplified approach that relies on noise management strategies. This NA has adopted a quantitative assessment approach which is summarised in **Figure 2.** The quantitative approach includes identification of potentially affected receivers, derivation of the construction noise management levels, quantification of potential noise impact at receivers via predictive modelling and, provides management and mitigation recommendations.

Figure 2 Quantitative Assessment Processes for Assessing and Managing Construction Noise



Source: Department of Environment and Climate Change, 2009.

3.3.1 Standard Hours for Construction

Table 4 presents the ICNG recommended standard hours for construction works.

Table 4 Recommended Standard Hours for Construction

Daytime	Construction Hours
Monday to Friday	7am to 6pm
Saturdays	8am to 1pm
Sundays or Public Holidays	No construction

These recommended hours do not apply in the event of direction from police, or other relevant authorities, for safety reasons or where required in an emergency to avoid the loss of lives, property and/or to prevent environmental harm. Construction activities are anticipated to be undertaken during standard construction hours.

3.3.2 Construction Noise Management Levels

Section 4 of the ICNG details the quantitative assessment method involving predicting noise levels and comparing them with the Noise Management Level (NML) and are important indicators of the potential level of construction noise impact. **Table 5** reproduces the ICNG Noise Management Level (NML) for residential receivers. The NML is determined by adding 10dB (standard hours) or 5dB for Out of Hours (OOH) to the Rating Background Level (RBL) for each specific assessment period.

Table 5 Noise Management Levels		
Time of Day	Management Level LAeq(15min)[1]	How to Apply
Recommended standard hours: Monday to Friday 7am to 6pm Saturday 8am to 1pm No work on Sundays or public holidays.	Noise affected RBL + 10dB	The noise affected level represents the point above which there may be some community reaction to noise. Where the predicted or measured LAeq(15min) is greater than the noise affected level, the proponent should apply all feasible and reasonable work practices to meet the noise affected level. The proponent should also inform all potentially impacted residents of the nature of work to be carried out, the expected noise levels and duration, as well as contact details.
	Highly Noise Affected 75dBA (HNA)	The highly noise affected level represents the point above which there may be strong community reaction to noise. Where noise is above this level, the relevant authority (consent, determining or regulatory) may require respite periods by restricting the hours that the very noisy activities can occur, taking into account times identified by the community when they are less sensitive to noise such as before and after school for work near schools, or mid-morning or mid-afternoon for work near residences; and if the community is prepared to accept a longer period of construction in exchange for restrictions on construction times.
Outside recommended standard hours.	Noise affected RBL + 5dB	A strong justification would typically be required for work outside the recommended standard hours. The proponent should apply all feasible and reasonable work practices to meet the noise affected level. Where all feasible and reasonable practices have been applied and noise is more than 5dBA above the noise affected level, the proponent should negotiate with the community. For guidance on negotiating agreements see Section 7.2.2 of the ICNG.

Note 1: The Rating Background Level (RBL) is an overall single figure background level representing each assessment period over the whole monitoring period. The RBL is used to determine the construction noise management levels for noise assessment purposes and is the median of the ABL's.

3.3.3 Minimising Construction Noise

The ICNG outlines noise management and mitigation measures to minimise the noise impacts from construction activities on nearby sensitive receivers. Adopting the standard mitigation measures may result in an attenuation of up to 10dBA where space requirements place limitations on the attenuation options. Examples of standard mitigation measures are reproduced in **Table 6**, which may be adopted for the operation.

Table 6 Standard Mitigation Measures		
	Action Required	Details
Management Measures	Implement community consultation or notification measures	Notification detailing work activities, dates, and hours, impacts and mitigation measures, indication of work schedule over the night-time period, any operational noise benefits from the works (where applicable) and contact telephone number. Notification should be a minimum of 7 calendar days prior to the start of works. For projects other than maintenance works more advanced consultation or notification may be required. Please contact Roads and Maritime Communication and Stakeholder Engagement for guidance: - website (If required); - contact telephone number for community; - email distribution list (if required); and/or - community drop-in session (if required by approval conditions).
	Site Inductions	All employees, contractors and subcontractors are to receive an environmental induction. The induction must at least include: - all relevant project specific and standard noise and vibration mitigation measures; - relevant licence and approval conditions; - permissible hours of work; - any limitations on noise generating activities; - location of nearest sensitive receivers; - construction employee parking areas; - designated loading/unloading areas and procedures; - site opening/closing times (including deliveries); and - environmental incident procedures.
Site Controls	Minimise disturbance arising from delivery of goods to construction sites	Loading and unloading of materials/deliveries is to occur as far as possible from sensitive receivers. Select site access points and roads as far as possible away from sensitive receivers. Dedicated loading/unloading areas to be shielded if close to sensitive receivers. Delivery vehicles to be fitted with straps rather than chains for unloading, wherever possible. Avoid or minimise these out of hours movements where possible.
Path Controls	Shield stationary noise sources	Stationary noise sources should be enclosed or shielded whilst ensuring that the occupational health and safety of workers is maintained. Appendix D of AS2436:2010 lists materials suitable for shielding.
	Shield sensitive receivers from noise activities	Use structures to shield residential receivers from noise such as site shed placement; earth bunds; fencing; erection of operational stage noise barriers (where practicable) and consideration of site topography when situating plant.

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4 Existing Environment

4.1 Unattended Noise Monitoring

To quantify the existing background noise environment of the area, unattended noise monitoring was conducted at one location representative of the ambient environment surrounding the project site. The selected monitoring location is shown in **Figure 1** and is considered representative of surrounding residential receivers as per Fact Sheet B1.1 of the NPI.

The unattended noise survey was conducted in general accordance with the procedures described in Standards Australia AS 1055:2018, "Acoustics – Description and Measurement of Environmental Noise".

The measurements were carried out using one Svantek 977 noise analyser from Thursday 27 June 2024 to Friday 5 July 2024. All acoustic instrumentation used carries appropriate and current NATA (or manufacturer) calibration certificates with records of all calibrations maintained by MAC as per Approved Methods for the measurement and analysis of environmental noise in NSW (EPA, 2022) and complies with AS/NZS IEC 61672.1-2019-Electroacoustics - Sound level meters - Specifications. Calibration of all instrumentation was checked prior to and following measurements. Drift in calibration did not exceed ±0.5dBA.

Observations on-site identified the surrounding locality was typical of a rural environment, with road traffic noise and wildlife noise audible.

Data affected by adverse meteorological conditions have been excluded from the results in accordance with methodologies provided in Fact Sheet A4 of the NPI. Residential receivers situated in the surrounding area have been classified under the EPA's rural amenity category. This criteria is used in conjunction with the intrusiveness criteria to determine the limiting criteria. The summary results of long-term unattended noise monitoring are provided in **Table 7**. The measured daily ABLs for the background monitoring are provided in **Table C1** in **Appendix C** along with the daily noise monitoring charts.

Table 7 Background Noise Monitoring Summary

Location	Measured background noise level, RBL, dBA			Measured L_{Aeq}, dBA		
	Day 7am to 6pm	Evening 6pm to 10pm	Night 10pm to 6am	Day 7am to 6pm	Evening 6pm to 10pm	Night 10pm to 6am
L1	38	33	29	50	43	41

Note: Excludes periods of wind or rain affected data. Meteorological data obtained from the Bureau of Meteorology weather station Mudgee Airport AWS 32.6°S 149.6°E 471m AMSL.

4.2 Attended Noise Monitoring

To supplement the unattended noise assessment and to quantify the changes in ambient noise in the community surrounding the operation, one 15 minute attended measurement was completed.

The attended noise survey was conducted in general accordance with the procedures described in Standards Australia AS 1055:2018, "Acoustics – Description and Measurement of Environmental Noise".

All acoustic instrumentation used carries appropriate and current NATA (or manufacturer) calibration certificates with records of all calibrations maintained by MAC as per Approved Methods for the measurement and analysis of environmental noise in NSW (EPA, 2022) and complies with AS/NZS IEC 61672.1-2019-Electroacoustics - Sound level meters - Specifications. Calibration of all instrumentation was checked prior to and following measurements. Drift in calibration did not exceed ±0.5dBA.

The attended noise monitoring was conducted using one Svantek 971 noise analyser at the site (see **Figure 1**) on Friday 5 July 2024 to quantify ambient background noise levels.

The attended measurement was completed during calm and clear meteorological conditions and confirmed that traffic and ambient environmental noise dominated the surrounding environment. The results of the short-term noise measurement and observations are summarised in **Table 8**.

Table 8 Operator-Attended Noise Survey Results

Date/ Time (hrs)	Noise Descriptor (dBA re 20 µPa)			Meteorology	Description and SPL, dBA
	L_{Amax}	L_{Aeq}	L_{A90}		
05/07/2024 11:49	72	52	43	WD: SE WS: 4.0m/s Rain: Nil	Traffic 42-59 Insects <37 Birds 40-52 Aircraft 40-72 Wind in trees <38 Construction 42-44

Note 1: Day - the period from 7am to 6pm Monday to Saturday or 8am to 6pm on Sundays and public holidays; Evening - the period from 6pm to 10pm; Night - the remaining periods.

5 Assessment Criteria

5.1 Operational Noise Criteria

5.1.1 Intrusiveness Noise Levels

The PINL are presented in **Table 9** and have been determined based on the RBL +5dBA and only apply to residential receivers.

Table 9 Project Intrusiveness Noise Levels

Location	Receiver Type	Period[1]	Measured RBL dB L_{A90}	Adopted RBL dB L_{A90}	PINL dB $L_{Aeq(15min)}$
L1	Residential	Day	38	38	43
		Evening	33	33	38[2]
		Night	29	30[2]	35[2]

Note 1: Day - the period from 7am to 6pm Monday to Saturday or 8am to 6pm on Sundays and public holidays; Evening - the period from 6pm to 10pm; Night - the remaining periods.

Note 2: As per NPI guidance, minimum assumed RBLs and project intrusive noise levels have been adopted for evening and night periods.

5.1.2 Amenity Noise Levels and Project Amenity Noise Levels

The PANL for residential receivers affected by the project are presented in **Table 10.**

Table 10 Amenity Noise Levels and Project Amenity Noise Levels

Receiver Type	Noise Amenity Area	Assessment Period[1]	NPI Recommended ANL dB $L_{Aeq(period)}$	ANL dB $L_{Aeq(period)}$[2]	PANL dB $L_{Aeq(15min)}$
Residential	Rural	Day	50	53	53
		Evening	45	48	48
		Night	40	43	43

Note 1: Day - the period from 7am to 6pm Monday to Saturday or 8am to 6pm on Sundays and public holidays; Evening - the period from 6pm to 10pm; Night - the remaining periods.

Note 2: Includes a +3dB adjustment to the amenity period level to convert to a 15-minute assessment period as per Section 2.2 of the NPI.

5.1.3 Project Noise Trigger Levels

The PNTL are the lower of either the PINL or the PANL. **Table 11** presents the derivation of the PNTLs in accordance with the methodologies outlined in the NPI.

Table 11 Project Noise Trigger Levels

Receiver Type	Noise Amenity Area	Assessment Period[1]	PINL dB $L_{Aeq(15min)}$	PANL dB $L_{Aeq(15min)}$	PNTL dB $L_{Aeq(15min)}$
Residential	Rural	Day	43	53	43
		Evening	38	48	38
		Night	35	43	35

Note 1: Day - the period from 7am to 6pm Monday to Saturday or 8am to 6pm on Sundays and public holidays; Evening - the period from 6pm to 10pm; Night - the remaining periods.

5.2 Noise Intrusion Criteria to Childcare Centres

The GCCCAA provides recommendations for external noise impact upon children in Childcare Centres. The relevant criteria for noise intrusion to the CCC is reproduced below:

- the $LA_{eq(1\text{-}hour)}$ intrusive noise level from road, rail or industry at any location within an outdoor play area should not exceed 55dBA; and
- the $LA_{eq(1\text{-}hour)}$ intrusive noise level from road, rail or industry within the indoor play or sleeping areas should not exceed 40dBA.

5.3 Noise Emission Criteria from Childcare Centres

The GCCCAA recommends a base criterion of 45dB $LA_{eq(15min)}$ for the assessment of outdoor play where the background noise level is less than 40dBA, however, where the background noise level is greater than 40dBA, the GCCCAA states:

> *The contributed Leq,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).*

The project adopted the base criterion of 45dB $LA_{eq(15min)}$ for the assessment of outdoor play due to the RBL remaining below 40dBA for the daytime period and is presented in **Table 12**.

Table 12 CCC Noise Emission Criteria

Location	Period	Activity	Criteria
Location A	Day (7:00am-6:00pm)	Outdoor Play	45dB $LA_{eq(15min)}$
	Day (7:00am-6:00pm)	All Other Activities	45dB $LA_{eq(15min)}$

5.4 Construction Noise Criteria

The relevant Noise Management Levels (NMLs) for standard construction hours are presented in **Table 13**.

Table 13 Construction Noise Management Levels

Catchment (No) Receiver ID	Assessment Period[1]	Adopted RBL dB LA_{90}	NML dB $LA_{eq(15min)}$
Residential Premises	When in use	38	48

Note 1: Refer to Table 4 for Standard Recommended Hours for Construction.

6 Modelling Methodology

A computer model was developed to quantify project noise emissions to neighbouring receivers using DGMR (iNoise, Version 2024) noise modelling software. iNoise is an intuitive and quality assured software for industrial noise calculations in the environment. 3D noise modelling is considered industry best practice for assessing noise emissions from projects.

The model incorporated a three-dimensional digital terrain map giving all relevant topographic information used in the modelling process. Additionally, the model uses relevant noise source data, ground type, attenuation from barrier or buildings and atmospheric information to predict noise levels at the nearest potentially affected receivers. Where relevant, modifying factors in accordance with Fact Sheet C of the NPI have been applied to calculations.

The model calculation method used to predict noise levels was in accordance with ISO 9613:1 and ISO 9613:2 including corrections for meteorological conditions using CONCAWE[1]. The ISO 9613 standards are the most used noise prediction method worldwide. Many countries refer to ISO 9613 in their noise legislation. However, the ISO 9613 standard does not contain guidelines for quality assured software implementation, which leads to differences between applications in calculated results. In 2015 this changed with the release of ISO/TR 17534-3. This quality standard gives clear recommendations for interpreting the ISO 9613 method. iNoise fully supports these recommendations. The models and results for the 19 test cases are included in the software.

[1] Report no. 4/18, "the propagation of noise from petroleum and petrochemical complexes to neighbouring communities", Prepared by C.J. Manning, M.Sc., M.I.O.A. Acoustic Technology Limited (Ref.AT 931), CONCAWE, Den Haag May 1981

6.1 Sound Power Levels

Table 14 presents the sound power level for each noise source modelled in this assessment. It is noted that operational sound power levels were sourced from manufacturer's specifications or from in-field measurements at similar project sites. Sound powers for children at play activities were sourced from the Guideline for Childcare Centre Acoustic Assessment.

Table 14 Acoustically Significant Sources - Sound Power Levels dBA (re 10^{-12} Watts)

Item and number modelled per 15 minutes	Sound Power Level dB LA_{eq}	Total Sound Power Level dB $LA_{eq(15min)}$	Source Height[1]
CCC Operational Sources			
15Kw AC plant (x7)	71	79	1.5m
Toilet Extraction Fan (x3)	70	74	0.5m
Kitchen Extraction Fan (x1)	73	73	0.5m
Car enters, park, start up, idle and drive off – External (x11)[2]	73	83	0.5m
CCC Outdoor Play Sources			
Child aged 0-2 years vocal effort (x24)	68	82	0.6m
Child aged 2-3 years vocal effort (x21)	75	88	0.6m
Child aged 3-6 years vocal effort (x42)	77	93	0.6m
Construction			
Combined Construction Fleet	108		1.5m

Note 1: Height above the relative ground or building below source.

Note 2: Includes a duration adjustment assuming vehicles operate for three (3) minutes continuously within a period of 15-minutes.

6.2 Noise Attenuation Assumptions, Controls and Recommendations

The noise model adopted the following assumptions, controls and recommendations:

- the project is constructed as per the site design and plans, which includes the barrier attenuation provided by the project buildings orientation;
- construction of an impervious barrier surrounding the project boundary (see **Figure 3**). The barrier should be constructed to an RL of 1.8m above the relative ground level of the site and consist of materials with a surface density of at least 10kg/m^2, and not contain any gaps (ie lapped and capped timber or equivalent); and
- the mechanical plant for the CCC is yet to be finalised. Therefore, the modelling assumes seven 15Kw AC units to account for the classrooms and admin spaces The AC units are assumed to be located on rooftop of the building over each served area.

FIGURE 3

MITIGATION MEASURES

MAC242183-01V1

Gowrie CCC

Mudgee, NSW

KEY

- 1.8m Barrier
- Project Boundary
- Outdoor Play Areas
- Proposed Building
- Receiver Locations

0 5 10 15 20 25 m

N

MAC
Muller Acoustic Consulting

7 Noise Assessment Results

7.1 Operational Noise Assessment

Noise predictions from all operational sources have been quantified at surrounding residential receivers to the project site and are presented in **Table 15**.

Table 15 Noise Predictions – All Receivers

Receiver	Predicted Noise Level dB $LA_{eq(15min)}$	PNTL dB $LA_{eq(15min)}$	Compliant
	Day	Day	
FR01	37	43	✓
FR02	40	43	✓
FR03	38	43	✓
FR04	39	43	✓
R01	32	43	✓
R02	33	43	✓
R03	37	43	✓
R04	35	43	✓
R05	34	43	✓
R06	35	43	✓
R07	34	43	✓
R08	33	43	✓
R09	32	43	✓

Note 1: Day - the period from 7am to 6pm Monday to Saturday or 8am to 6pm on Sundays and public holidays; Evening - the period from 6pm to 10pm; Night - the remaining periods.

The results of the predictive noise modelling demonstrate the noise emissions from the project site satisfy the GCCCAA criteria from operational sources.

7.2 Childcare Centre Noise Assessment Results

7.2.1 Noise Intrusion Results - Outdoor Play Area

Table 16 presents the noise intrusion from the measured ambient noise levels comprising of traffic noise levels impacting on the CCC external play spaces. The results demonstrate compliance with the criteria outlined in the GCCCAA.

Table 16 External Play Area Noise Results

Receiver	Measured Ambient Noise Level dB $LA_{eq(1hr)}$	Criteria	Compliant
	Traffic	dB $LA_{eq(1hr)}$	
Outdoor (Infants) Play Area 01	50	55	✓
Outdoor Play Area 02	50	55	✓

7.2.2 Noise Intrusion Results – Internal Play Spaces

Table 17 presents the predicted internal CCC noise levels (assuming that rooms have an external façade) from the existing ambient noise levels. The predicted internal results show compliance with the criteria in the GCCCAA assuming a 20dB loss for the installed windows when closed.

Table 17 Internal Cumulative Noise Results

Receiver	Predicted noise level dB $LA_{eq(1hr)}$		Internal Criteria	Compliant
	Ambient Noise Level	Internal	dB $LA_{eq(1hr)}$	
Cots Room 01	50	<35[1]	40	✓
Cots Room 02	50	<35[1]	40	✓
Infants Room 01	50	<35[1]	40	✓
Infants Room 02	50	<35[1]	40	✓
Classroom 01	50	<35[1]	40	✓
Classroom 02	50	<35[1]	40	✓
Classroom 03	50	<35[1]	40	✓

Note 1: Includes 20dB attenuation for a closed window.

7.2.3 Noise Emission Results – Outdoor play

Table 18 presents the noise emission results for children at play ($LA_{eq(15min)}$) in the outdoor play area of the CCC. The predicted results show compliance with the criteria in the GCCCAA.

Table 18 Noise Emissions Results – CCC Outdoor Play

Receiver	Predicted Noise Level dB LAeq(15min)	Emission Criteria dB LAeq(15min)	Compliant
FR01	31	45	✓
FR02	34	45	✓
FR03	41	45	✓
FR04	31	45	✓
R01	34	45	✓
R02	35	45	✓
R03	34	45	✓
R04	25	45	✓
R05	40	45	✓
R06	42	45	✓
R07	44	45	✓
R08	44	45	✓
R09	44	45	✓

Note 1: Day - the period from 7am to 6pm Monday to Saturday or 8am to 6pm on Sundays and public holidays; Evening - the period from 6pm to 10pm; Night - the remaining periods.

7.3 Construction Noise Assessment

Table 19 presents the results of modelled construction noise emissions taking into account the additional 10dB attenuation provided by standard mitigation measures. Predictions identify that emissions from construction would remain below the Construction NMLs at all the assessed existing receivers with the inclusion of standard mitigation measures.

Table 19 Construction Noise Levels – All Receivers

Receiver	Period[1]	Predicted Noise Level dB $L_{Aeq(15min)}$	Management Level dB $L_{Aeq(15min)}$	Compliant
R01	Day	28	48	✓
R02	Day	30	48	✓
R03	Day	34	48	✓
R04	Day	45	48	✓
R05	Day	33	48	✓
R06	Day	32	48	✓
R07	Day	32	48	✓
R08	Day	31	48	✓
R09	Day	30	48	✓

Note: Future residential lots are not currently approved hence will not be present during construction.

Note 1: See Table 4 for Recommended Standard Hours for Construction.

8 Discussion and Conclusion

Muller Acoustic Consulting Pty Ltd (MAC) has completed a Noise Assessment (NA) to quantify emissions from the Proposed Modification to the approved Childcare Centre to be established at 39 Saleyards Road, Mudgee, NSW. The Noise Assessment has quantified potential emissions associated with the proposed modifications to the CCC as well as the noise intrusion from surrounding noise sources to the CCC.

The results of the Noise Assessment demonstrate that noise emissions from the operation would satisfy the relevant trigger levels at all assessed receivers once noise controls for the project are implemented (see Section 6.2):

- the project is constructed as per the site design and plans, which includes the barrier attenuation provided by the project buildings orientation;
- construction of an impervious barrier surrounding the project boundary (see Figure 3). The barrier should be constructed to an RL of 1.8m above the relative ground level of the site and consist of materials with a surface density of at least 10kg/m^2, and not contain any gaps (ie lapped and capped timber or equivalent); and
- the mechanical plant for the CCC is yet to be finalised. Therefore, the modelling assumes seven 15Kw AC units to account for the classrooms and admin spaces The AC units are assumed to be located on rooftop of the building over each served area.

Modelled noise emissions from construction activities identify that predicted noise emissions will remain below the applicable construction management levels at all receivers taking into account the standard mitigation measures (see Table 6).

In summary, the Noise Assessment supports the Development Application for the project incorporating the recommendations and controls outlined in this report.

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Appendix A – Glossary of Terms

A number of technical terms have been used in this report and are explained in **Table A1**.

Table A1 Glossary of Acoustical Terms

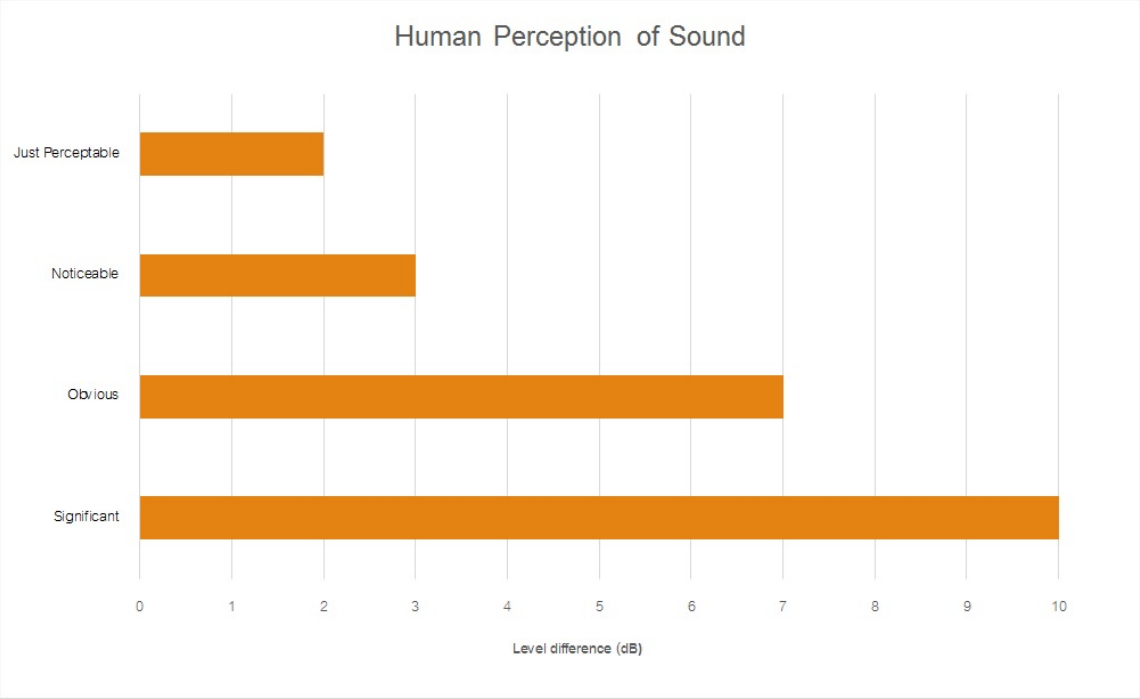
Term	Description
1/3 Octave	Single octave bands divided into three parts
Octave	A division of the frequency range into bands, the upper frequency limit of each band being twice the lower frequency limit.
ABL	Assessment Background Level (ABL) is defined in the NPI as a single figure background level for each assessment period (day, evening and night). It is the tenth percentile of the measured L90 statistical noise levels.
Ambient Noise	The total noise associated with a given environment. Typically, a composite of sounds from all sources located both near and far where no particular sound is dominant.
A Weighting	A standard weighting of the audible frequencies designed to reflect the response of the human ear to sound.
Background Noise	The underlying level of noise present in the ambient noise, excluding the noise source under investigation, when extraneous noise is removed. This is usually represented by the LA90 descriptor
dBA	Noise is measured in units called decibels (dB). There are several scales for describing noise, the most common being the 'A-weighted' scale. This attempts to closely approximate the frequency response of the human ear.
dB(Z), dB(L)	Decibels Z-weighted or decibels Linear (unweighted).
Extraneous Noise	Sound resulting from activities that are not typical of the area.
Hertz (Hz)	The measure of frequency of sound wave oscillations per second - 1 oscillation per second equals 1 hertz.
LA10	A sound level which is exceeded 10% of the time.
LA90	Commonly referred to as the background noise, this is the level exceeded 90% of the time.
LAeq	Represents the average noise energy or equivalent sound pressure level over a given period.
LAmax	The maximum sound pressure level received at the microphone during a measuring interval.
Masking	The phenomenon of one sound interfering with the perception of another sound. For example, the interference of traffic noise with use of a public telephone on a busy street.
RBL	The Rating Background Level (RBL) as defined in the NPI, is an overall single figure representing the background level for each assessment period over the whole monitoring period. The RBL, as defined is the median of ABL values over the whole monitoring period.
Sound power level (Lw or SWL)	This is a measure of the total power radiated by a source in the form of sound and is given by 10.log10 (W/Wo). Where W is the sound power in watts to the reference level of 10^{-12} watts.
Sound pressure level (Lp or SPL)	the level of sound pressure; as measured at a distance by a standard sound level meter. This differs from Lw in that it is the sound level at a receiver position as opposed to the sound 'intensity' of the source.

Table A2 provides a list of common noise sources and their typical sound level.

Table A2 Common Noise Sources and Their Typical Sound Pressure Levels (SPL), dBA

Source	Typical Sound Pressure Level
Threshold of pain	140
Jet engine	130
Hydraulic hammer	120
Chainsaw	110
Industrial workshop	100
Lawnmower (operator position)	90
Heavy traffic (footpath)	80
Elevated speech	70
Typical conversation	60
Ambient suburban environment	40
Ambient rural environment	30
Bedroom (night with windows closed)	20
Threshold of hearing	0

Figure A1 – Human Perception of Sound



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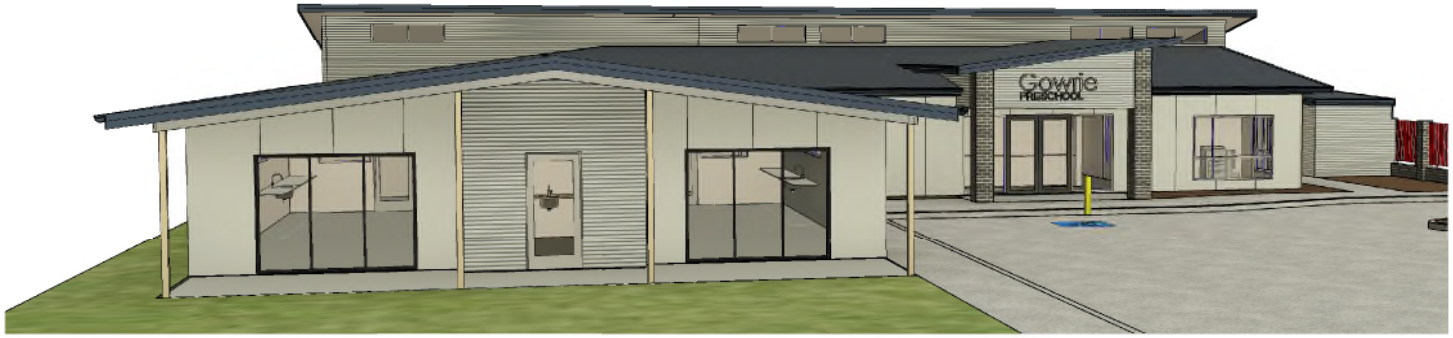
Appendix B – Site Plans



LOCALITY PLAN.

saleyards lane, mudgee — lot 30 & 29, dp1267151 & lot 2 , dp510997

DRAWING SCHEDULE.

A 00	COVER SHEET	REV B	DATED 20.02.2023
A 01	EXISTING SITE PLAN	REV B	DATED 20.02.2023
A 02	PROPOSED SITE PLAN	REV D	DATED 20.02.2023
A 03	EXISTING FLOOR PLAN & DEMOLITION	REV A	DATED 27.06.2023
A 04	PROPOSED FLOOR PLAN	REV C	DATED 20.02.2023
A 05	ELEVATIONS	REV C	DATED 20.02.2023

EXTENSION TO GOWRIE CHILDCARE CENTRE

39 SALEYARDS LANE, MUDGEE

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Project.
EXTENSION TO GOWRIE CHILDCARE CENTRE
Site Address.
39 SALEYARDS LANE, MUDGEE
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Drawing Title.
COVER SHEET

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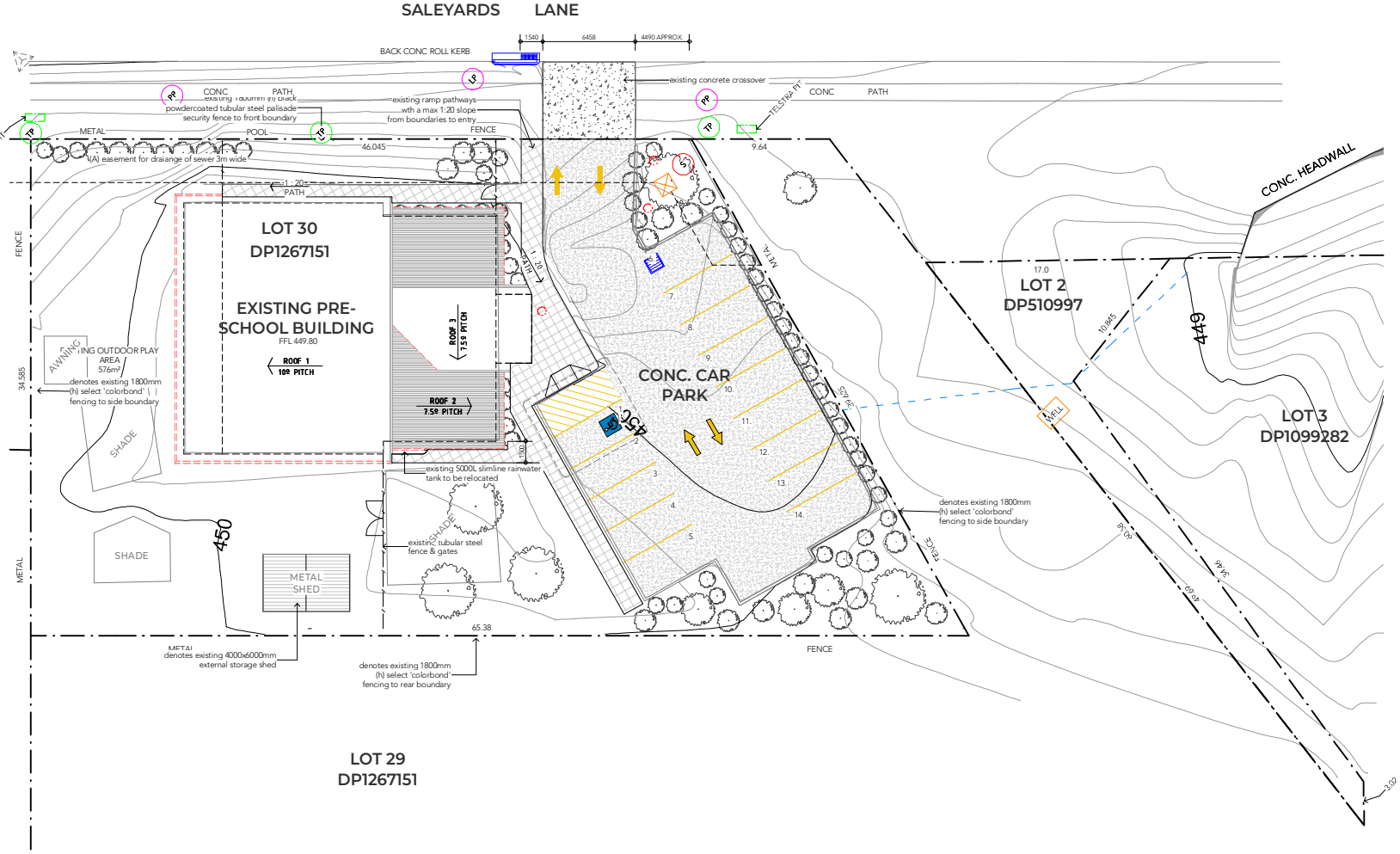
41821-
A00



N

01 EXISTING SITE LAYOUT

Scale 1 : 160 @ A1

0 1600 3200 6400 16000

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A	27.06.2023	PRELIMINARY
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EXISTING SITE PLAN

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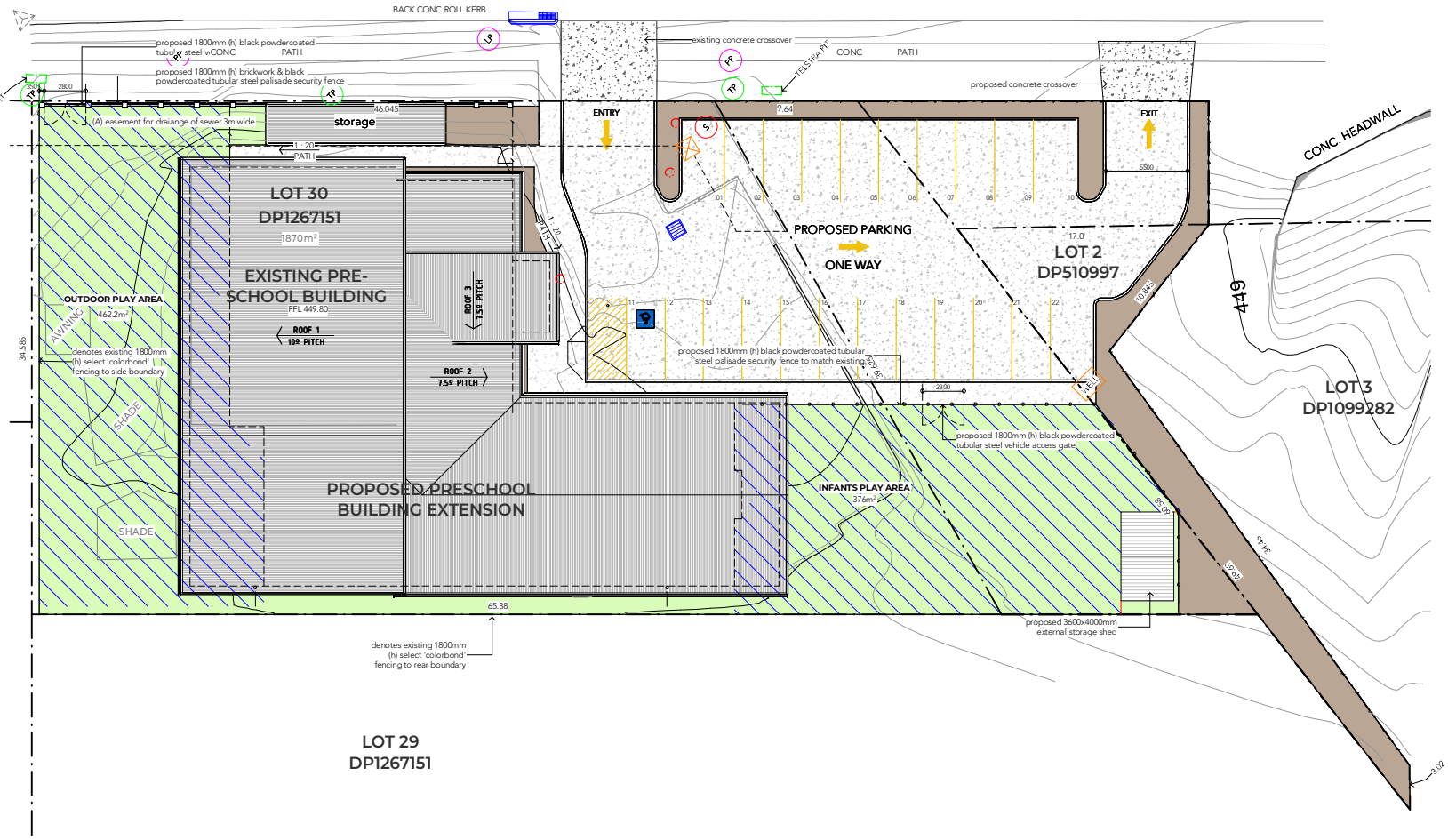
41821-A01



02 PROPOSED SITE LAYOUT

Scale 1 : 160 @ A1

0 1600 3200 6400 16000

PROPOSED SITE LEGEND

- new asphaltic concrete carpark area — for more information refer to civil engineer's design
- new concrete footpaths — for more information refer to civil engineer's design
- proposed grassed area — for more information refer to landscape architect's design
- proposed landscaping area — for more information refer to landscape architect's design
- carpark markings - arrows to be applied using paint in accordance with Mid-Western Regional Council Development Control Plan & AS2890.6-2009
- proposed 1800mm (h) tubular steel palisade security gence to match existing
- new concrete kerb & gutter — for more information refer to civil engineer's design

UNENCUMBERED OUTDOOR CALCULATIONS.

The following calculations have been determined in accordance with *chapter 4, part 4.3, clause 108* of the *education & care services national regulations*.

outdoor play area	– 462.2m²
infants play area	– 376.6m²
total unencumbered outdoor area	**– 808.8m²**
allowable space per child in care	– 7.00m²
853/7.00m²	**– 115children (88 proposed)**

The above calculations & adjoining plan have been prepared by Kirk Gleeson, *a building practioner* referred to in *chapter 1, clause 4* of the *education & care services national regulations* & accredited under building designers accreditation & training p/l, accreditation no. 6289

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B	13.07.2023	CLIENT REQUESTED AMENDMENTS
C	31.10.2023	PARKING AMENDMENT
D	20.02.2023	SURVEY IMPORT & FLOOR PLAN AMENDMENT

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PROPOSED SITE PLAN

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Project No. 41821
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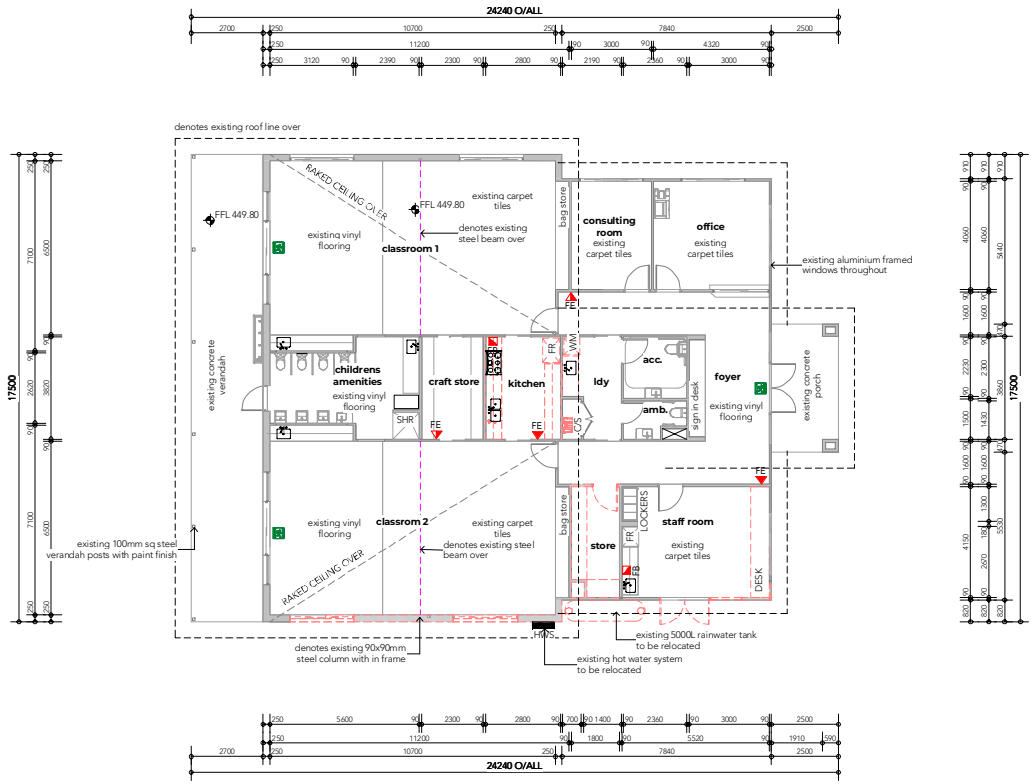
Revision. D

Drawing No.
41821-A02



denotes existing elements to be demolished, make good to existing surfaces

denotes existing walls to be demolished, make good to existing surfaces

denotes existing doors to be demolished, make good to existing surfaces

denotes existing windows to be demolished, make good to existing surfaces

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Drawing Title.
EXISTING FLOOR PLAN & DEMOLITION
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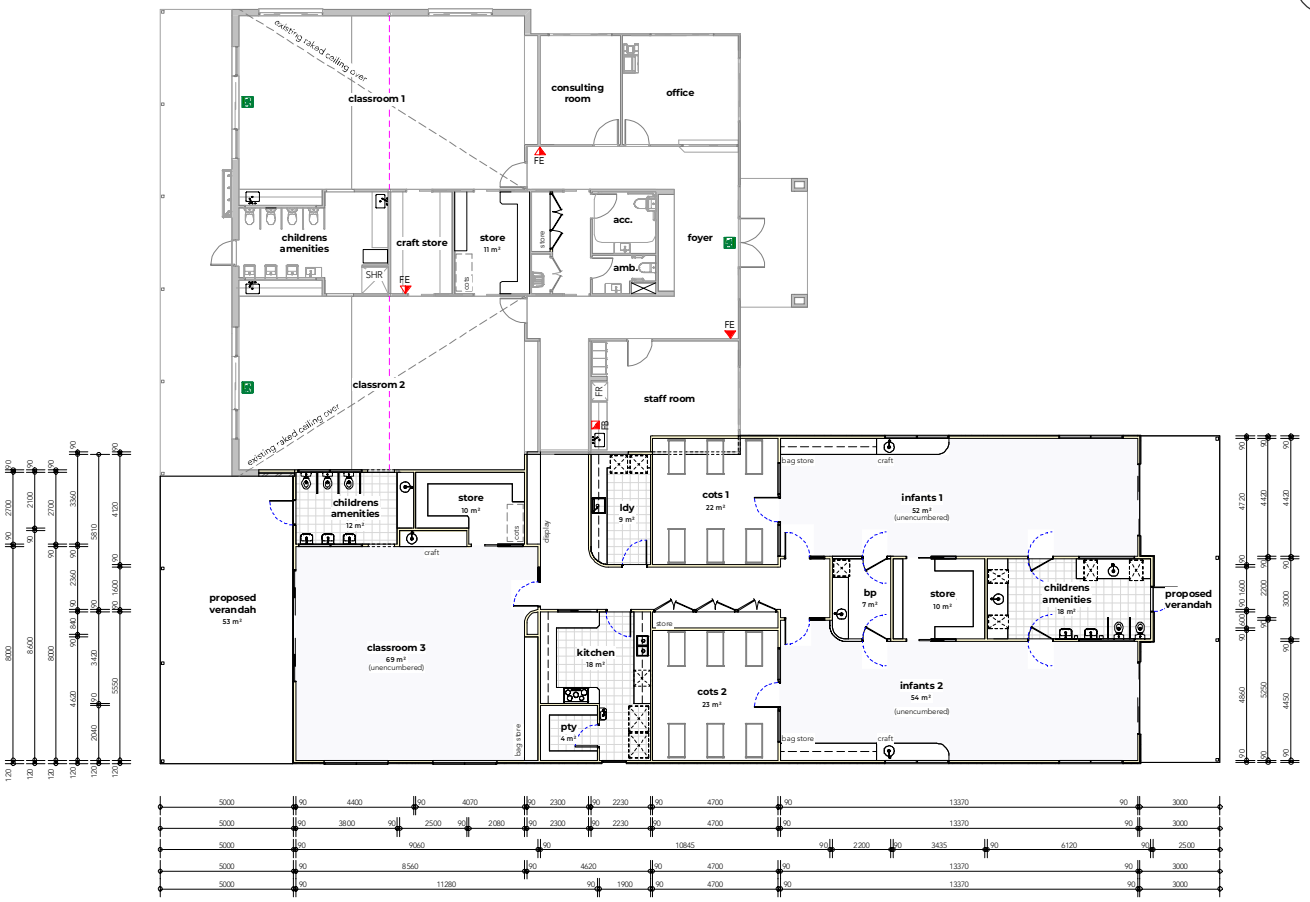
Sheet. 03 of 04
Project No. 41821
Drawn. CM
Checked. KG
Revision. A

Drawing No.
41821-A03



04 FLOOR PLAN - GENERAL ARRANGEMENT

Scale 1 : 100 @ A1

0 1000 2000 4000 10000

EXISTING FLOOR AREA

existing ancillary	160.60 m²
existing classroom	154.02 m²
existing verandah & porch	61.65 m²
TOTAL	**376.28 m²**

PROPOSED FLOOR AREA

proposed ancillary	171.48 m²
proposed classroom	201.97 m²
proposed verandah	89.85 m²
TOTAL	**463.29 m²**
OVERALL TOTAL	**790.50m²**

UNENCUMBERED INDOOR SPACE CALCULATIONS.

The following calculations have been determined in accordance with *chapter 4, part 4.3, clause 107* of the *education & care services national regulations*.

infants 1

total unencumbered floor area	– 51.6m²
allowable space per child in care	– 3.25m²
47.2/3.25m²	**– 15 children (12 proposed)**

infants 2

total unencumbered floor area	– 53.9m²
allowable space per child in care	– 3.25m²
49.5/3.25m²	**– 16 children (12 proposed)**

classroom 1

total unencumbered floor area	– 68.4m²
allowable space per child in care	– 3.25m²
68.4/3.25m²	**– 21 children**

classroom 2

total unencumbered floor area	– 68.4m²
allowable space per child in care	– 3.25m²
68.4/3.25m²	**– 21 children**

classroom 3

total unencumbered floor area	– 68.5m²
allowable space per child in care	– 3.25m²
68.5/3.25m²	**– 21 children**

The above calculations & adjoining plan have been prepared by Kirk Gleeson, a *building practioner* referred to in *chapter 1, clause 4* of the *education & care services national regulations* & accredited under building designers accreditation & training p/l, accreditation no. *6289*

LEGEND

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PROPOSED FLOOR PLAN

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Sheet. 04 of 04
Project No. 41821
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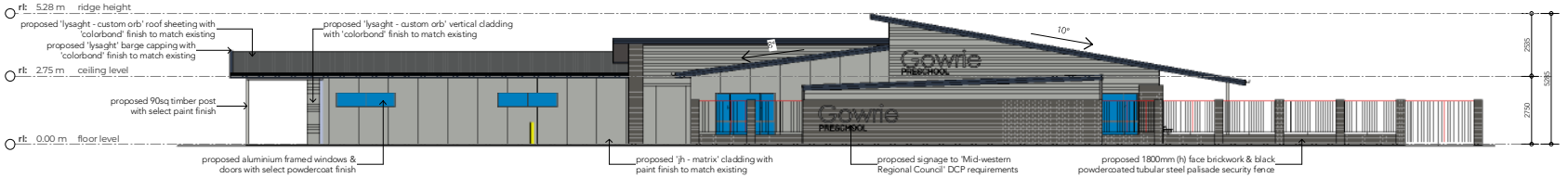
41821-A04



05 ELEVATION. NORTH FACADE

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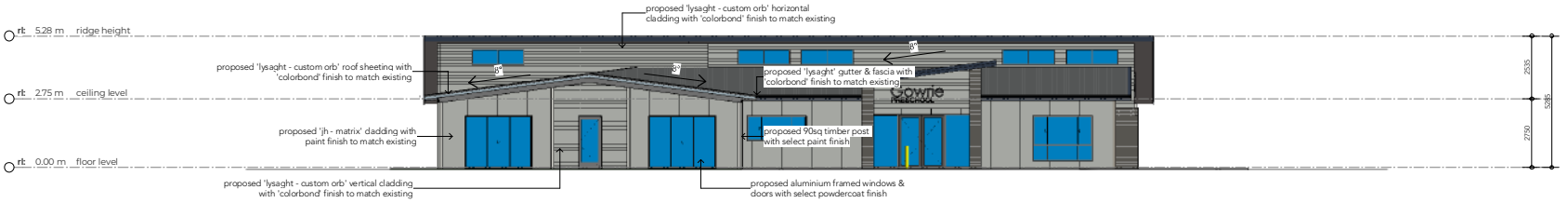

06 ELEVATION. EAST FACADE

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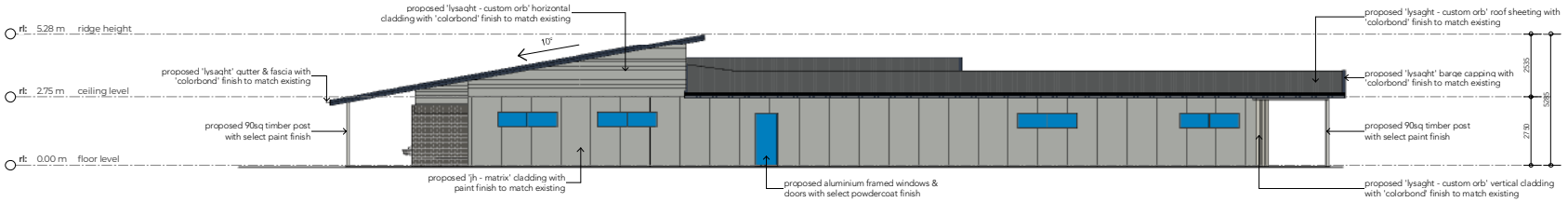

07 ELEVATION. SOUTH FACADE

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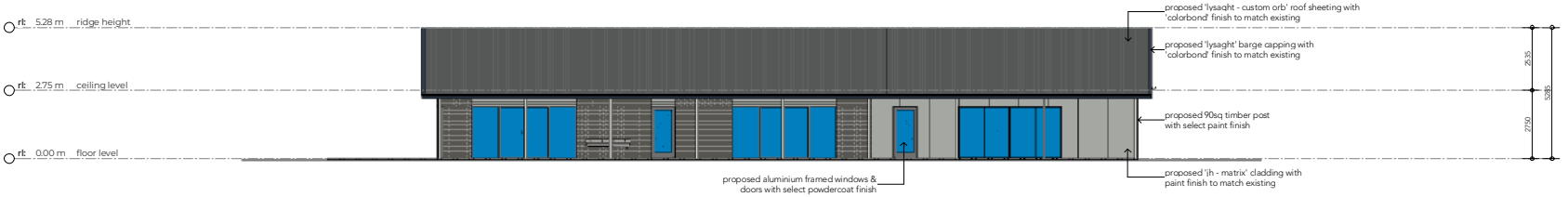

08 ELEVATION. WEST FACADE

Scale 1 : 100 @ A1

LEGEND

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EXTENSION TO GOWRIE CHILDCARE CENTRE
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ELEVATIONS

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Project No.	41821	Revision.	C

Drawing No.
41821-A05

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Appendix C – Unattended Noise Monitoring Charts

Table C1 Background Noise Monitoring Summary – Location L1[1]

Date	Measured Background Noise Level (LA90) dB ABL[2]			Measured Ambient Noise Level dB LAeq(period)		
	Day	Evening	Night	Day	Evening	Night
Thursday 27 June 2024	N/A[3]	33	25	N/A[3]	44	42
Friday 28 June 2024	33	35	26	50	44	39
Saturday 29 June 2024	35	28	N/A[3]	48	43	N/A[3]
Sunday 30 June 2024	31	28	25	43	40	41
Monday 01 July 2024	38	32	30	53	41	42
Tuesday 02 July 2024	43	37	33	53	45	42
Wednesday 03 July 2024	43	34	31	49	43	40
Thursday 04 July 2024	42	33	29	51	42	40
Location L1 – RBL / Leq Overall	**38**	**33**	**29**	**50**	**43**	**41**

Note 1: Day - the period from 7am to 6pm Monday to Saturday or 8am to 6pm on Sundays and public holidays; Evening - the period from 6pm to 10pm; Night - the remaining periods.

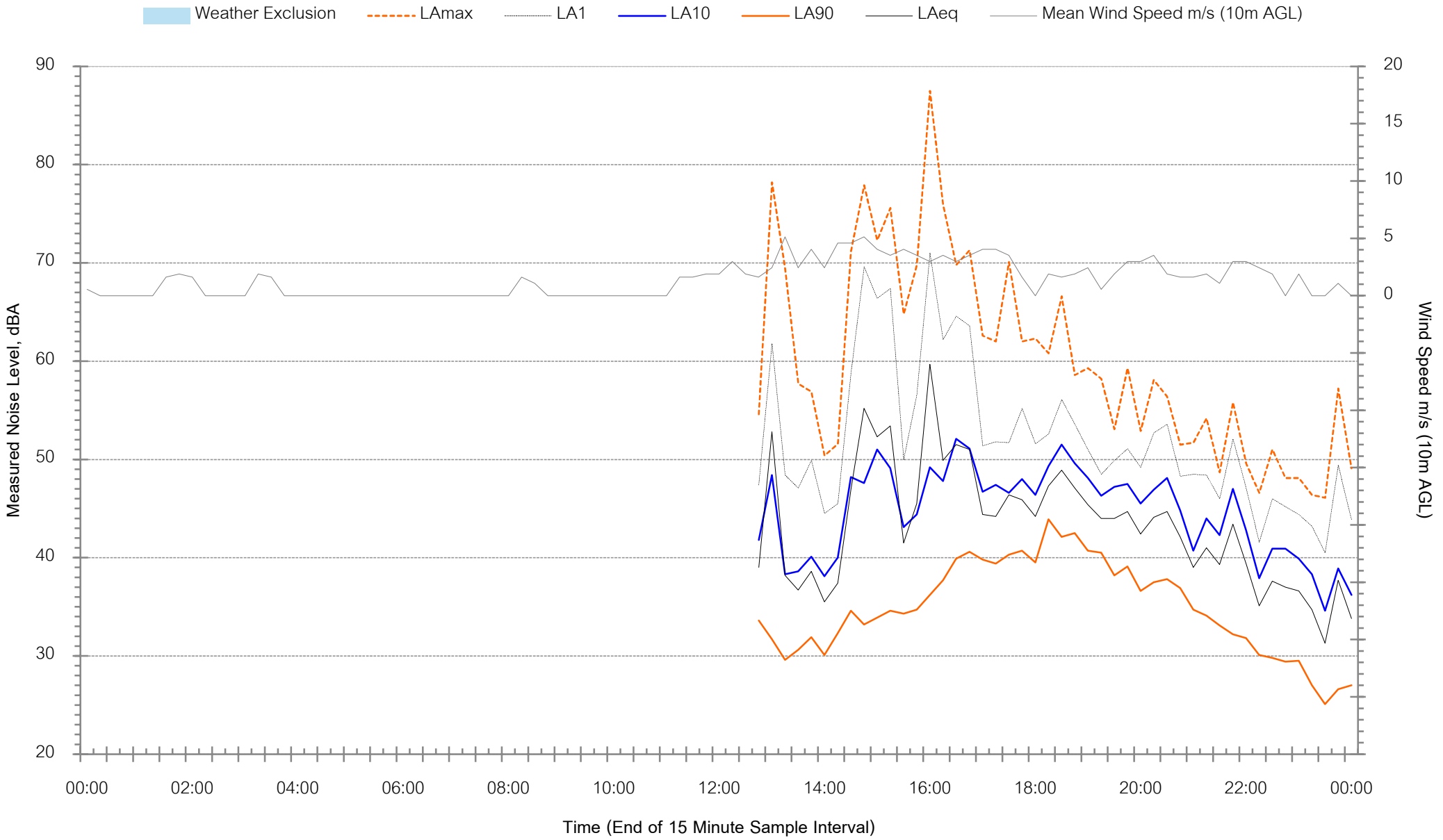
Note 2: Assessment background level (ABL) – the single-figure background level representing each assessment period day, evening, and night as per NPI Fact Sheet A.

Note 3: Extraneous noise excluded.

Note: Excludes periods of wind or rain affected data. Meteorological data obtained from the Bureau of Meteorology weather station Mudgee Airport AWS 32.6°S 149.6°E 471m AMSL.

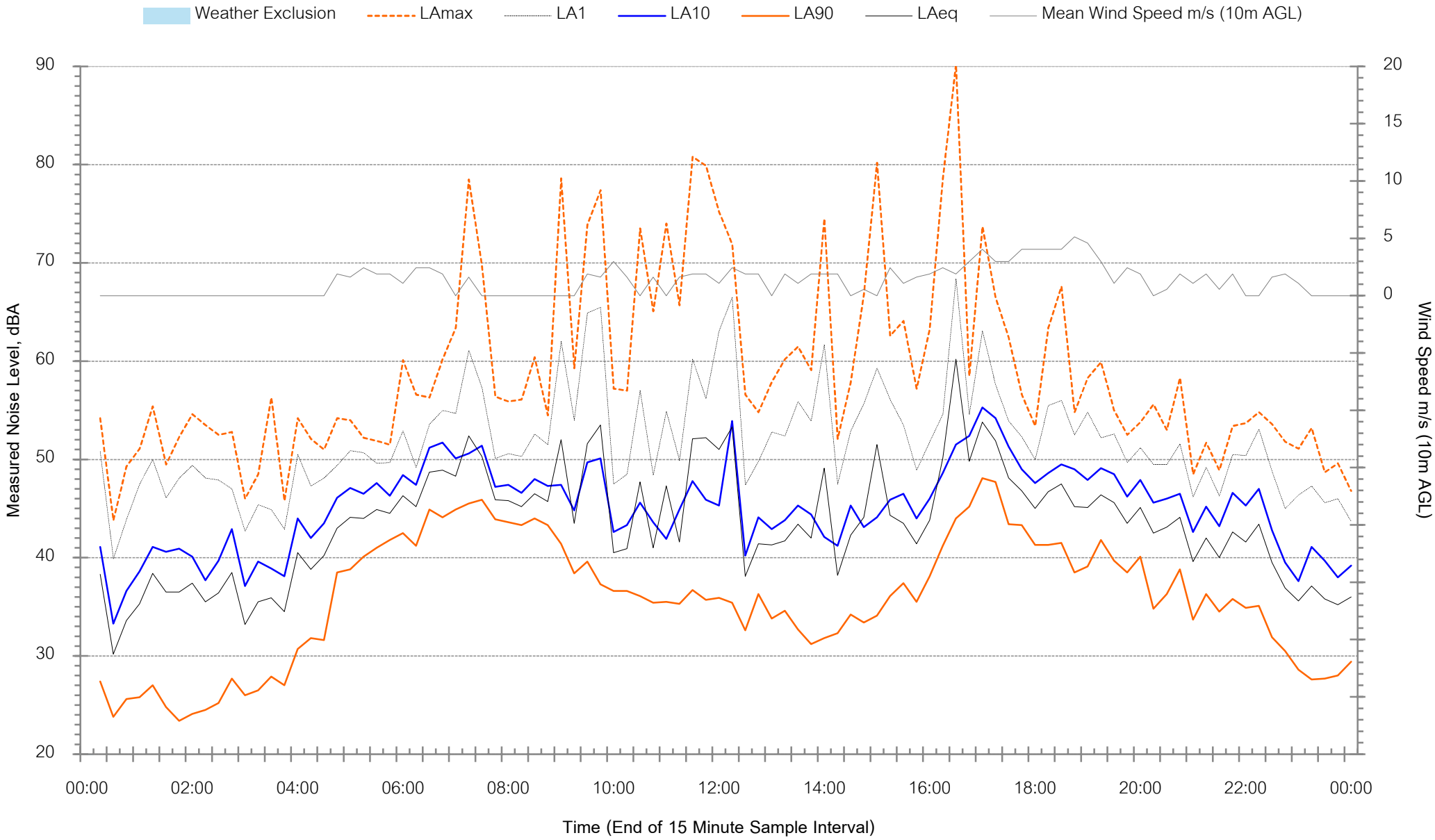
Background Noise Levels

Gowrie CCC, Mudgee NSW - Thursday 27 June 2024



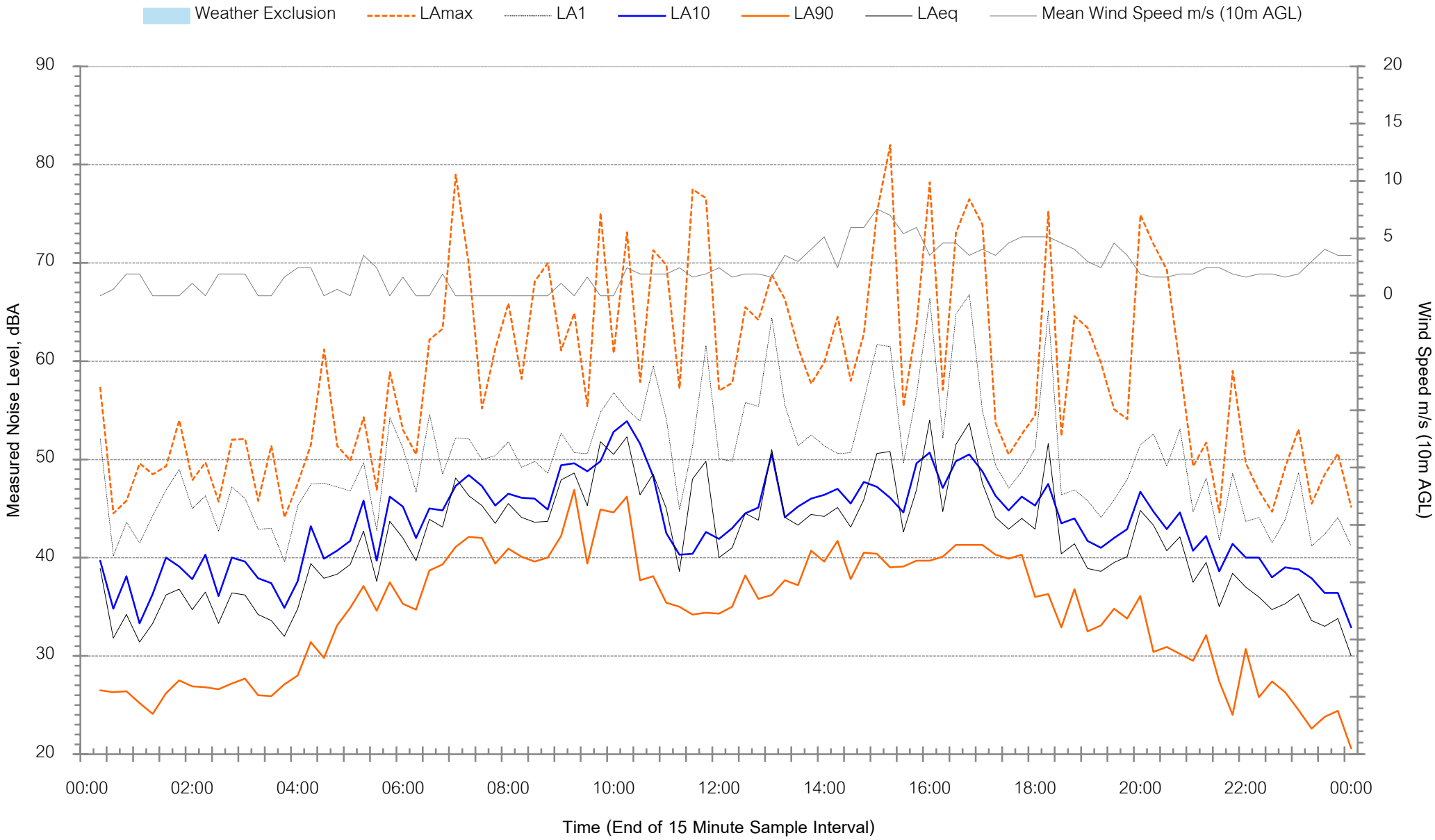
Background Noise Levels

Gowrie CCC, Mudgee NSW - Friday 28 June 2024



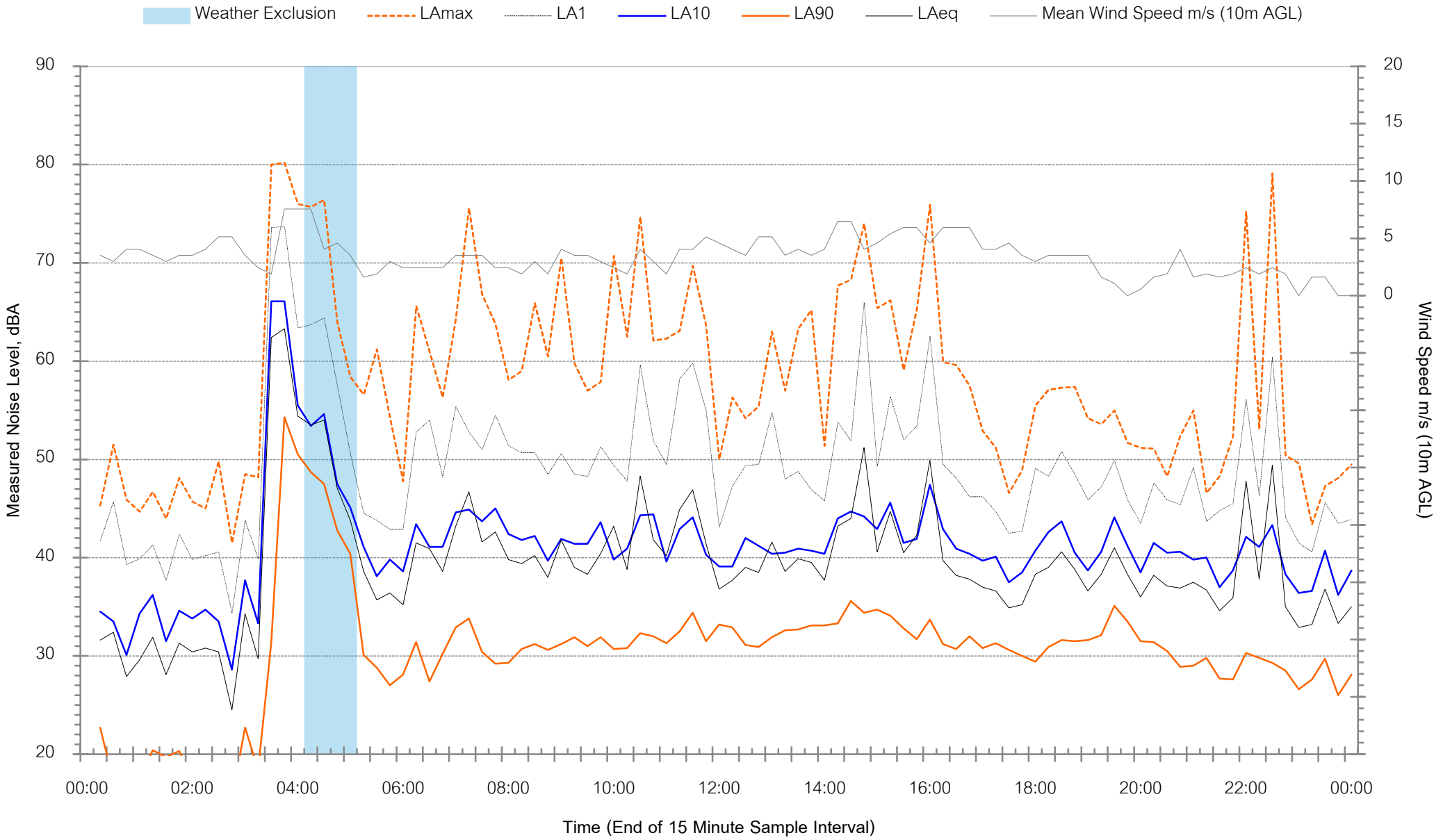
Background Noise Levels

Gowrie CCC, Mudgee NSW - Saturday 29 June 2024



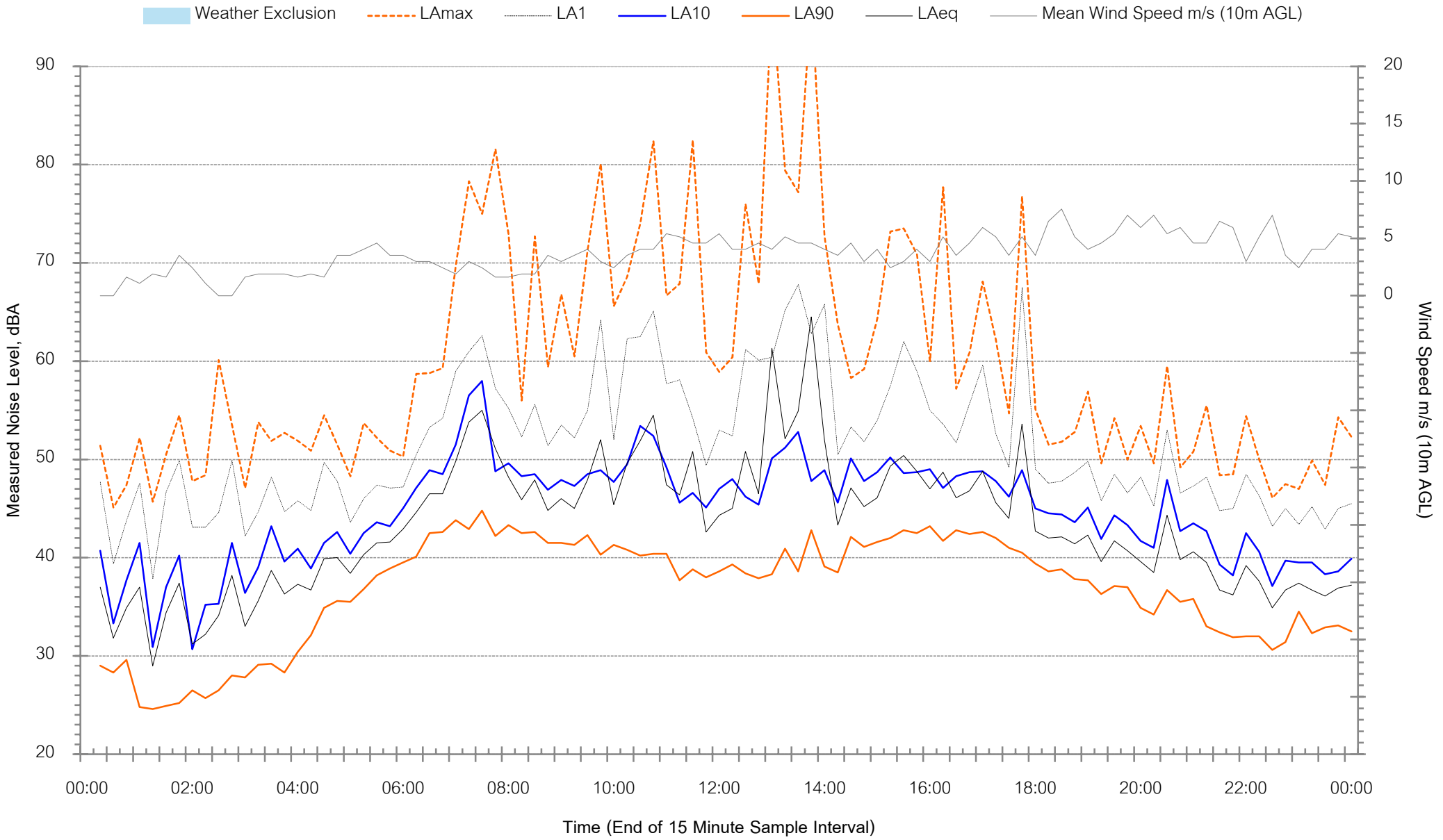
Background Noise Levels

Gowrie CCC, Mudgee NSW - Sunday 30 June 2024



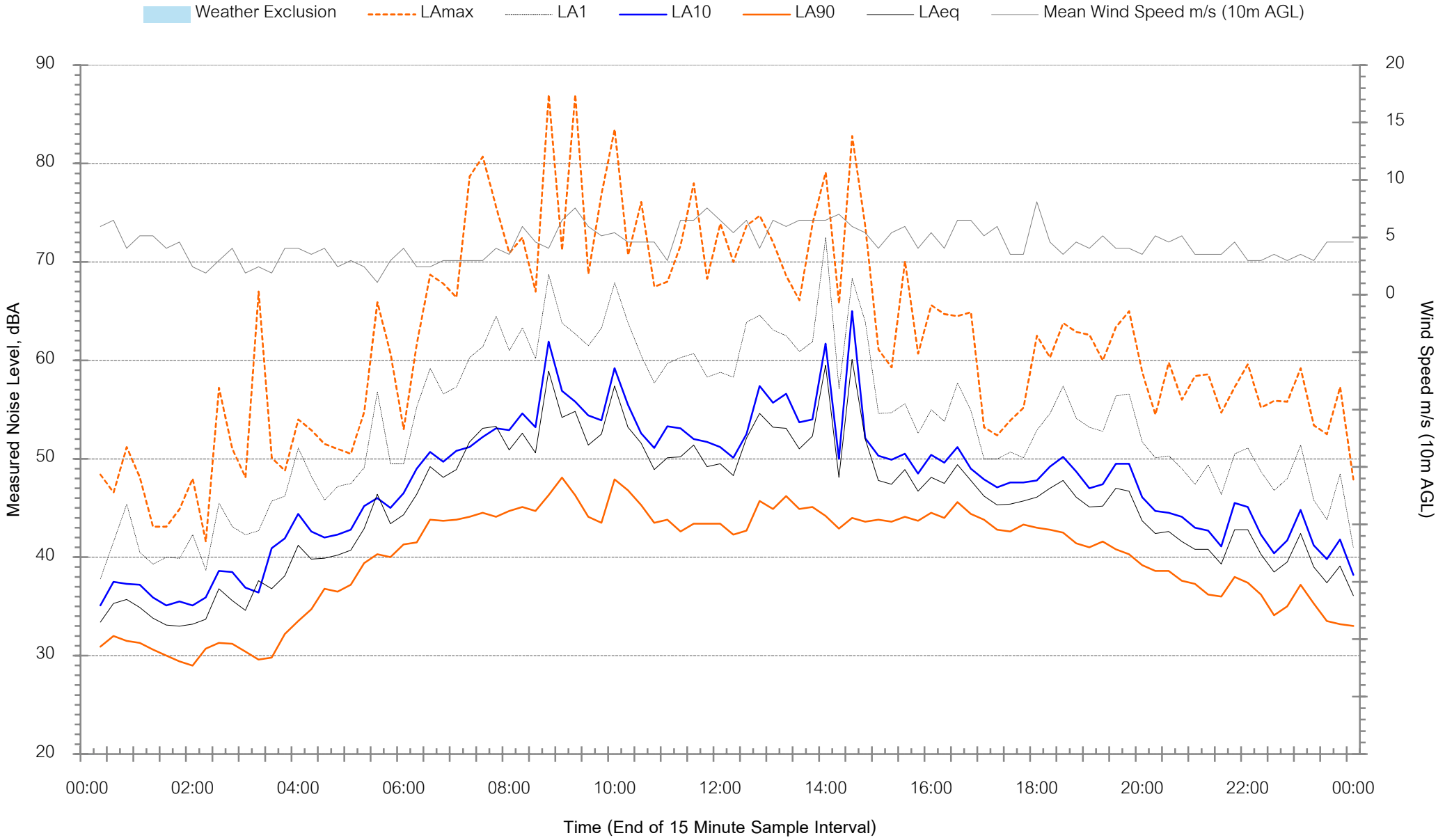
Background Noise Levels

Gowrie CCC, Mudgee NSW - Monday 1 July 2024



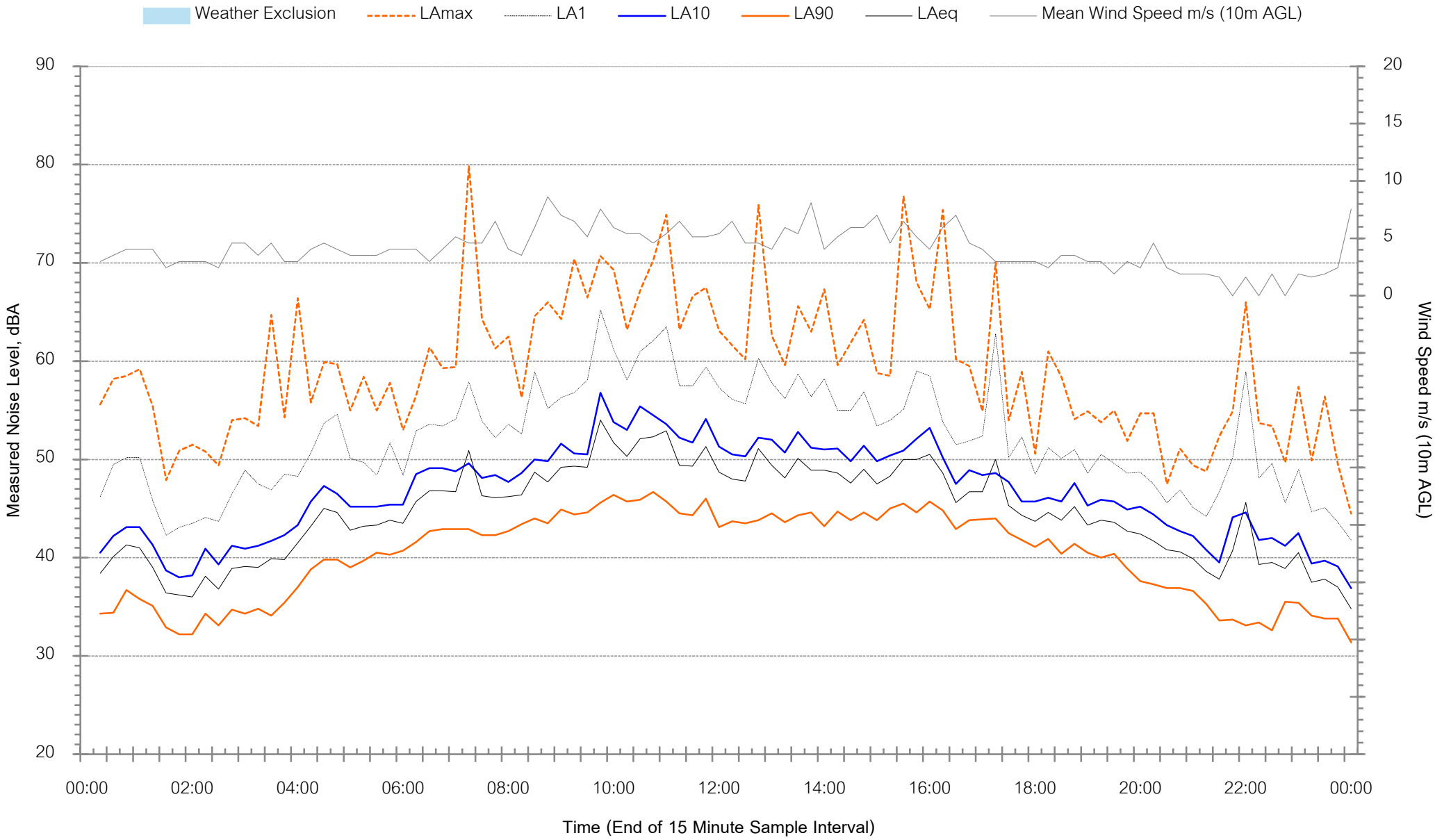
Background Noise Levels

Gowrie CCC, Mudgee NSW - Tuesday 2 July 2024



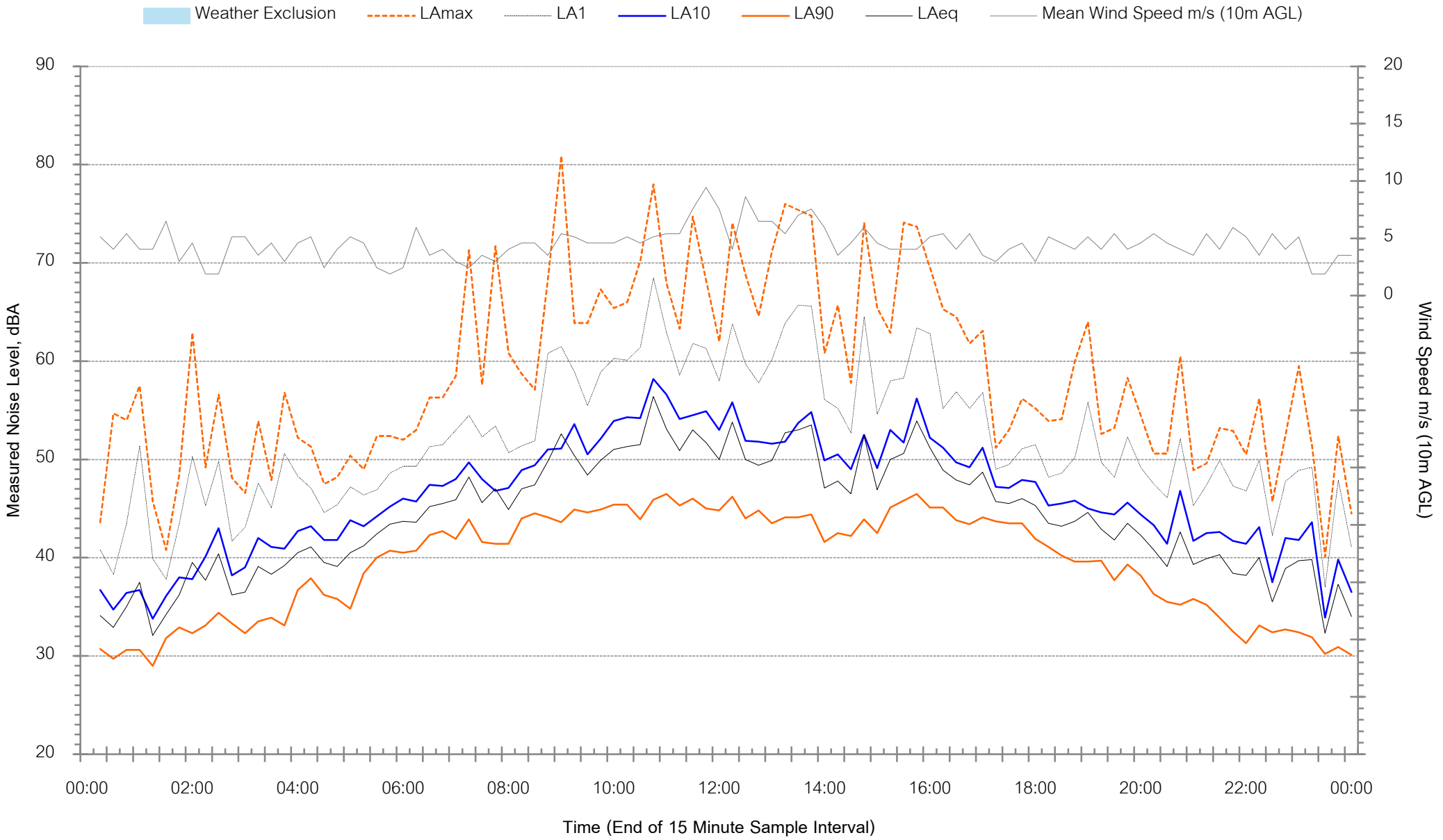
Background Noise Levels

Gowrie CCC, Mudgee NSW - Wednesday 3 July 2024



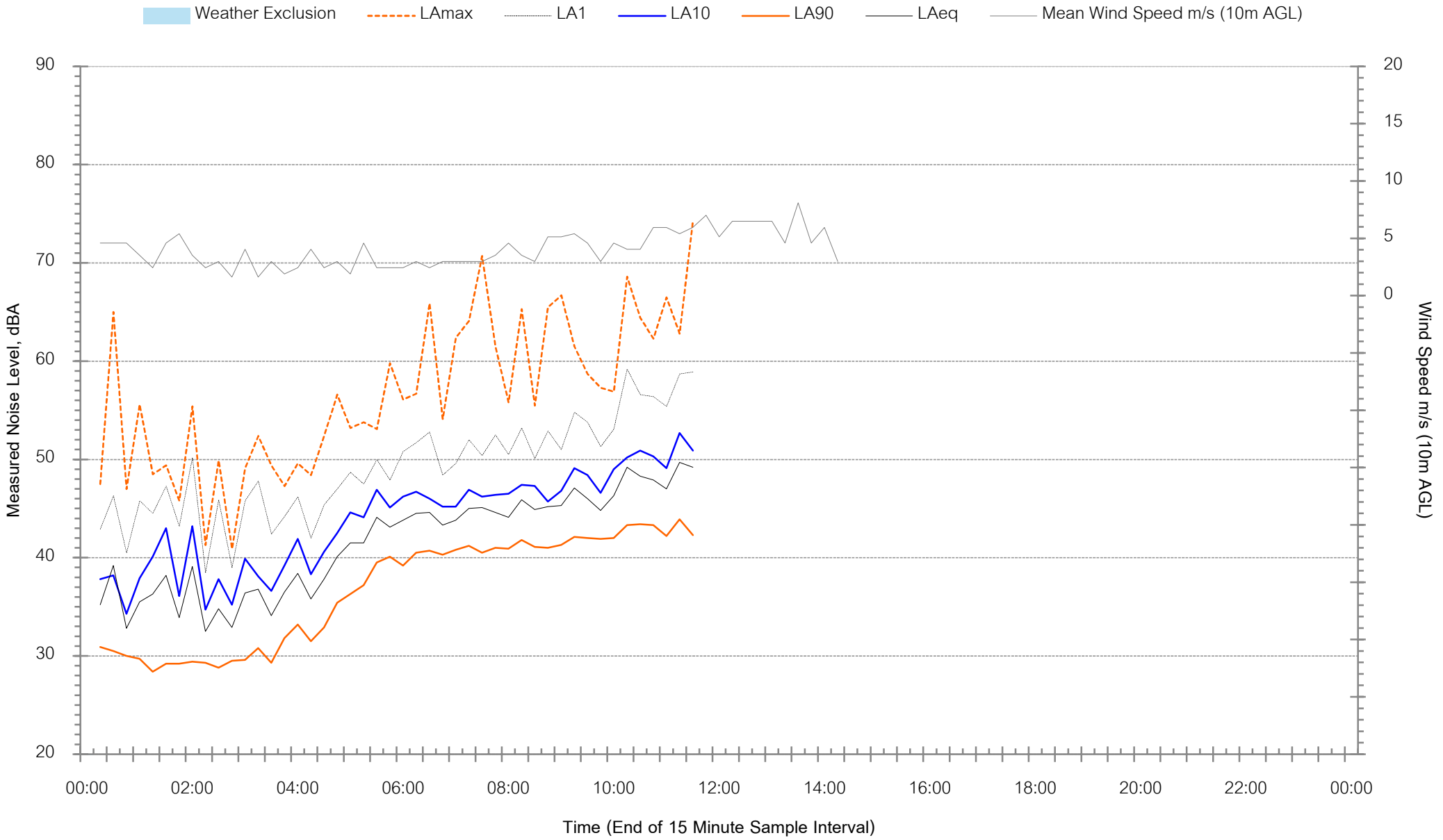
Background Noise Levels

Gowrie CCC, Mudgee NSW - Thursday 4 July 2024



Background Noise Levels

Gowrie CCC, Mudgee NSW - Friday 5 July 2024



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