Noise Assessment

Proposed Child Care Centre
1-5 Station Lane
Lochinvar, NSW

Prepared for: Mavid Group Pty Ltd
November 2024
MAC242224-01RP1

Muller Acoustic Consulting

Document Information

Noise Assessment

Proposed Child Care Centre

1 – 5 Station Lane

Lochinvar, NSW

Prepared for: Mavid Group Pty Ltd

20 Mustang Drive

Rutherford NSW 2320

Prepared by: Muller Acoustic Consulting Pty Ltd

PO Box 678, Kotara NSW 2289

ABN: 36 602 225 132

P: +61 2 4920 1833

www.mulleracoustic.com

DOCUMENT ID	DATE	PREPARED	SIGNED	REVIEWED	SIGNED
MAC242224-04RP1	14 November 2024	Robin Heaton		Oliver Muller	

CONTENTS

1 Introduction

Muller Acoustic Consulting Pty Ltd (MAC) has been commissioned by Mavid Group Pty Ltd (MG) to prepare a Noise Assessment (NA) to quantify emissions from the proposed child care centre (CCC) to be established at 1-5 Station Lane, Lochinvar, 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. The NA has quantified potential operational and sleep disturbance noise emissions from the operation and recommends reasonable and feasible noise controls where required.

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

- NSW Environment Protection Authority (EPA), Noise Policy for Industry (NPI) 2017;
- NSW Environment Protection Authority (EPA), Approved methods for the measurement and analysis of environmental noise in NSW, 2022;
- Australian Standard AS 1055:2018 - Acoustics - Description and measurement of environmental noise - General Procedures;
- NSW Department of Environment and Climate Change (DECCW) – NSW Interim Construction Noise Guideline (ICNG), July 2009; and
- Association of Australian Acoustical Consultants (AAAC), Guideline for Child Care Centre Acoustic Assessment V3 (GCCCAA), 2022.

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

This page has been intentionally left blank

2 Project Description

2.1 Background

The CCC is to be established at 1-5 Station Lane, Lochinvar, NSW, which is located in a R1 residential area. The project site is bound to the North by the New England Highway, to the east by Station Lane, and to the to the west by a nature reserve. The nearest residential receiver is located to immediate south of the project boundary. Additional residential receivers are located to the west across the nature reserve and to the north across the highway. An educational receiver and several places of worship are also located in close proximity to the project site.

The project proposes the development of a new CCC to allow which will include the following elements:

- three baby rooms accommodating up to 36 babies;
- three toddler rooms accommodating up to 45 toddlers;
- three preschool rooms accommodating up to 60 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 6am to 6pm Monday to Friday, with unlimited outdoor play each day.

2.1.1 Receiver Review

A review of residential receivers in 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	MGA56 Coordinates	
			Easting	Northing
R01	Residential	1.5m	355082	6381062
R02	Residential	1.5m	355129	6381046
R03	Residential	1.5m	355134	6380953
R04	Residential	1.5m	355020	6380929
R05	Residential	1.5m	355012	6380948
R06	Residential	1.5m	355013	6380964
R07	Residential	1.5m	355013	6380990
R08	Residential	1.5m	355001	6380996
R09	Residential	1.5m	354937	6381021
R10	Residential	1.5m	354954	6381032
POW01	Place of Worship	1.5m	355187	6381056
POW02	Place of Worship	1.5m	355241	6380955
POW03	Place of Worship	1.5m	355190	6380914
ED01	Educational	1.5m	355169	6380982

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	MGA56 Coordinates	
			Easting	Northing
Babies Room 1	Internal Play Area	1.5m	355100	6380983
Babies Room 2	Internal Play Area	1.5m	355113	6380976
Babies Room 3	Internal Play Area	1.5m	355110	6380970
Toddlers Room 1	Internal Play Area	1.5m	355103	6381013
Toddlers Room 2	Internal Play Area	1.5m	355112	6381012
Toddlers Room 3	Internal Play Area	1.5m	355118	6381011
Preschool Room 1	Internal Play Area	1.5m	355101	6380992
Preschool Room 2	Internal Play Area	1.5m	355091	6380973
Preschool Room 3	Internal Play Area	1.5m	355101	6380971
Outdoor Play Area 1	External Play Area	1.5m	355101	6381001
Outdoor Play Area 2	External Play Area	1.5m	355093	6380983
Outdoor Play Area 3	External Play Area	1.5m	355088	6380990
Outdoor Play Area 4	External Play Area	1.5m	355087	6381011
Outdoor Play Area 5	External Play Area	1.5m	355069	6380998

FIGURE 1

Locality Plan

MAC242224

Lochinvar Childcare Centre

KEY

- Unattended Location
- Attended Location
- Receiver
- Site Boundary

0 10 20 30 40 50 m

N

MAC
Muller Acoustic Consulting

This page has been intentionally left blank

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.

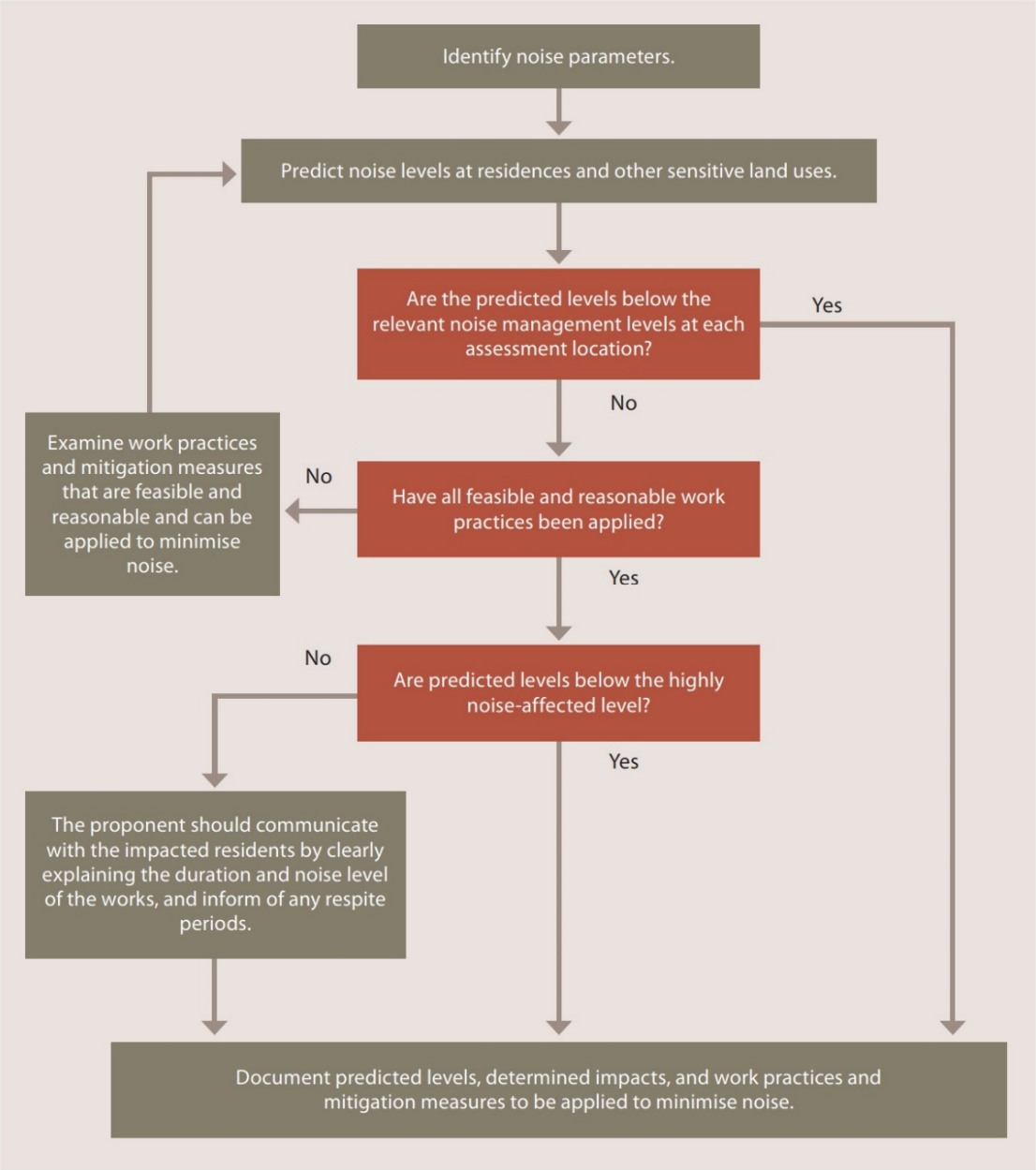
3.3 Interim Construction Noise Guideline

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.

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 Monday 28 October 2024 to Thursday 7 November 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 an urban environment, with traffic noise as the dominant noise source.

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 urban amenity category. This criterion is used in conjunction with the intrusiveness criteria to determine the limiting criteria. The results of long-term unattended noise monitoring are provided in **Table 6**. The noise monitoring charts, and a summary of the background monitoring data are provided in **Table C22** in **Appendix C.**

Table 6 Background Noise Monitoring Summary

Monitoring Location	Period[1]	Measured Background Noise Level (LA90) dB RBL	Measured dB LAeq
L1	Morning Shoulder	39	59
	Day	43	61
	Evening	37	57
	Night	29	54

Note 1: Morning Shoulder - the period from 6am to 7am; 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: Excludes periods of wind or rain affected data. Meteorological data obtained from the Bureau of Meteorology weather station Mailand Airport AWS (37.7°S 151.5°E 28m AMSL).

Note: Calibration certificates of the sound level meters used for this project are available on request.

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 Australian Standard AS 1055:2018, "Acoustics – Description and Measurement of Environmental Noise".

The acoustic instrumentation used carries current NATA calibration 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. All equipment carries appropriate and current NATA (or manufacturer) calibration certificates with records of all calibrations maintained by MAC as per the EPA's Approved Methods for the measurement and analysis of environmental noise in NSW (EPA, 2022).

The attended noise monitoring was conducted using one Svantek 971 noise analyser at the site (see **Figure 1**) on Monday 28 October 2024 to quantify ambient background noise levels.

The attended measurement was completed during calm and clear meteorological conditions and confirmed that ambient traffic and commercial noise dominated the surrounding environment. The results of the short-term noise measurement and observations are summarised in **Table 7**.

Table 7 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}		
28/10/2024 14:08	76	56	45	WD: W WS: 0.7m/s Rain: Nil	Traffic 40-76 Birds 39-53 Wind in Vegetation 43-46

5 Assessment Criteria

5.1 Operational Noise Trigger Levels (Criteria)

This section outlines the determination of PNTLs and Maximum Noise Assessment Trigger Levels in accordance with NPI methodology.

5.1.1 Intrusiveness Noise Levels

The PINL for the project are presented in **Table 8** and have been determined based on the RBL +5dBA and only apply to residential receivers.

Table 8 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	Morning Shoulder	39	39	44
		Day	43	43	48
		Evening	37	37	42
		Night	29	30[2]	35

Note 1: Morning Shoulder - the period from 6am to 7am; 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 the minimum nighttime RBL is 30dBA.

5.1.2 Determination of NPI Residential Receiver Amenity Category

Classification of residential receivers in the surrounding area have been determined by review of the measured RBLs and a tally of the features for each category described in Table 2.3 of the NPI. The overall tally of features and resulting classifications are provided in **Table 9**. The detailed assessment of receiver categories is provided in **Appendix D.** This classification is used in conjunction with the intrusiveness criteria to determine the limiting criteria.

Table 9 Determination of NPI Residential Receiver Category

Receiver/Location/Catchment	Rural	Suburban	Urban
L1	2	2	5

Observations at locations in the surrounding locality support the assessment of the receiver as an urban residential category.

5.1.3 Amenity Noise Levels and Project Amenity Noise Levels

The PANL for residential receivers and other receiver types (ie non-residential) potentially 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 $LA_{eq(period)}$	ANL dB $LA_{eq(period)}$	PANL dB $LA_{eq(15min)}$[3]
Residential	Urban	Morning Shoulder	N/A[2]	N/A[2]	N/A[2]
		Day	60	60	63
		Evening	50	50	53
		Night	45	45	48
Educational	All	When in use	35 (internal 1 hr)	35 (internal 1 hr)	38 (internal 1 hr) 48 (external 1 hr)[4]
Place of worship	All	When in use	40 (internal)	40 (internal 1 hr)	43 (internal 1 hr) 53 (external 1 hr)[4]

Note 1: Morning Shoulder - the period from 6am to 7am; 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, shoulder periods are assessed on intrusiveness levels only.

Note 3: 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.

Note 4: External level based on 10dB loss through partially open window.

5.1.4 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 $LA_{eq(15min)}$	PANL dB $LA_{eq(15min)}$	PNTL dB $LA_{eq(15min)}$
Residential	Urban	Morning Shoulder	44	N/A[2]	44
		Day	48	63	48
		Evening	42	53	42
		Night	35	48	35
Educational	All	Noisiest 1 hour period	N/A	38 (internal 1 hr) 48 (external 1 hr)[3]	48 (external 1 hr)
Place of Worship	All	When in Use	N/A	43 (internal 1 hr) 53 (external 1 hr)[3]	53. (external 1 hr)

Note 1: Morning Shoulder - the period from 5am to 7am; 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, shoulder periods are assessed on intrusiveness levels only.

Note 3: External level based on 10dB with windows open for adequate ventilation (NPI).

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 proposes unlimited hours for outdoor play and adopted the RBL+5dB assessment approach. Other noise emissions, from mechanical plant, drop off, pick up and any other activities are not to exceed the background noise level by more than 5dB.

In regard to sleep disturbance, activities prior to 7am, such as the LA_{max} noise level from staff vehicles arriving, parking etc should not exceed the background noise level by more than 15dB. **Table 12** summarises the noise emission criteria from the CCC.

Table 12 CCC Noise Emission Criteria

Location	Period	Activity	Criteria
L1	Day (7:00am-6:00pm)	Outdoor Play (Unlimited Play)	48dB $LA_{eq(15min)}$
	Morning Shoulder (6:00am-7:00am)	All Other Activities	44dB $LA_{eq(15min)}$
	Day (7:00am-6:00pm)		48dB $LA_{eq(15min)}$
	Morning Shoulder (6:00am-7:00am)	Staff Arrival	54dB LA_{max}

5.4 Construction Noise Management Levels

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

Table 13 Construction Noise Management Levels

Receiver Type	Assessment Period[1]	Adopted RBL dB L_{A90}	NML dB $L_{Aeq(15min)}$
Residential	Standard Hours	43	53 (RBL+10dBA)
Educational	When in use	N/A	45 (internal) 55 (external)[2]
Place of Worship	When in use	N/A	45 (internal) 55 (external)[2]

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

Note 2: External level based on 10dB with windows open for adequate ventilation (ICNG).

6 Modelling Methodology

A computer model was developed to quantify project noise emissions to neighbouring receivers using DGMR (iNoise, Version 2024.1) 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 modelled noise source 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			
Air Conditioning (AC) plant (x10)	76	86	1.4m
Rooftop extraction fan (x8)	73	82	0.5m
Car idle, start up and drive off (x20)[2]	81	86	0.5m
Car enters and exiting car park (20 cars per 15min)	81	86	0.5m
Waste Collection (x1)	86	86	1.0m
CCC Outdoor Play Sources			
Child aged 0-2 years vocal effort (x36)	68	84	0.5m
Child aged 2-3 years vocal effort (x45)	75	92	0.5m
Child aged 3-6 years vocal effort (x60)	77	95	0.5m
Maximum Noise Level Assessment (LA_{max}), Morning Shoulder (5am – 7am)			
Door Slam	87		0.5m
Waste Collection Impact	104		2.0m
Construction Fleet			
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 the playground retaining wall as per the site plans;
- construction of an impervious barriers surrounding the southern boundary of project car park area (see **Figure 3**). The barriers should be constructed to an RL of 1.8m above the relative ground level of the car park. The barriers should 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);
- construction of an impervious barrier surrounding the northern side of the playground (see **Figure 3**). The barrier should be constructed to an RL of 1.8m above the relative ground level of the outdoor play area. The barrier should consist of materials consistent with those outlined above; and
- the mechanical plant for the CCC is yet to be finalised. Therefore, the modelling assumes one AC unit per classroom and one for the admin spaces, totalling ten AC units. The AC units are assumed to be located on rooftop of the building located over each educational/admin space (see **Figure 3**).

FIGURE 3

Barrier Plan

MAC242224

Lochinvar Childcare Centre

KEY

- 1.8m Noise Barrier
- CCC Receivers
- Mechancial Plant

0 4 8 12 16 m

N

MAC Muller Acoustic Consulting

7 Noise Assessment Results

7.1 Operational Noise Assessment

Noise predictions from all operational sources (mech plant and onsite parent/educator vehicles) have been quantified at surrounding residential receivers to the project site and are presented in **Table 15**.

Table 15 Noise Predictions – All Receivers

Location	Predicted Noise Level dB $LA_{eq(15min)}$		PNTL dB $LA_{eq(15min)}$		Compliant
	Morning Shoulder	Day	Morning Shoulder	Day	
R01	36	36	44	48	✓
R02	37	38	44	48	✓
R03	41	43	44	48	✓
R04	<35	<35	44	48	✓
R05	<35	<35	44	48	✓
R06	<35	<35	44	48	✓
R07	<35	<35	44	48	✓
R08	<35	<35	44	48	✓
R09	<35	<35	44	48	✓
R10	<35	<35	44	48	✓

Location	Period	Predicted Noise Level dB $LA_{eq(15min)}$	PNTL dB $LA_{eq(15min)}$	Compliant
ED01	When in use	45	48	✓
POW01	When in use	39	53	✓
POW02	When in use	<35	53	✓
POW03	When in use	36	53	✓

Note 1: Morning Shoulder - the period from 6am to 7am; 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.

Satisfying the NPI PNTLs also ensures the GCCCAA emission criteria from mechanical plant and onsite vehicles.

Waste collections are expected to be undertaken once per day during the day, evening and morning shoulder periods. Waste collection usually takes several minutes, but to present a conservative assessment, it has been assumed that it would take up to 15 minutes to complete. Fact Sheet C of the NPI allows for exceedance of the PNTL or adjustment of the PNTL for short term single events that may occur in any 24-hour period. Table C3 of the NPI allows an adjustment to the PNTL of +7dB for the daytime and evening periods and +2dB during the morning shoulder period, when the event is expected to occur. Results of the noise modelling predictions are presented in **Table 15**. for operations with waste collection during the morning shoulder, daytime and evening periods.

Table 16 Noise Predictions – All Receivers

Location	Predicted Noise Level dB $LA_{eq(15min)}$		PNTL dB $LA_{eq(15min)}$		Compliant
	Morning Shoulder	Day	Morning Shoulder	Day	
R01	39	36	46	55	✓
R02	40	37	46	55	✓
R03	44	41	46	55	✓
R04	<35	<35	46	55	✓
R05	<35	<35	46	55	✓
R06	<35	<35	46	55	✓
R07	<35	<35	46	55	✓
R08	<35	<35	46	55	✓
R09	<35	<35	46	55	✓
R10	<35	<35	46	55	✓

Location	Period	Predicted Noise Level dB $LA_{eq(15min)}$	PNTL dB $LA_{eq(15min)}$	Compliant
ED01	When in use	47	55	✓
POW01	When in use	41	60	✓
POW02	When in use	<35	60	✓
POW03	When in use	38	60	✓

Note 1: Morning Shoulder - the period from 6am to 7am; 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.

Satisfying the NPI PNTLs also ensures the GCCCAA emission criteria from mechanical, onsite vehicles and waste collections.

7.2 Child Care Centre Noise Assessment Results

7.2.1 Noise Intrusion Results – Outdoor Play Area

Table 17 presents the predicted noise intrusion from the existing ambient levels impacting on the CCC external play spaces. The predicted results show compliance with the criteria in the GCCCAA.

Table 17 External Play Area Noise Results

Receiver	Predicted Noise Level dB $LA_{eq(1hr)}$	Criteria	Compliant
	Traffic Noise Levels	dB $LA_{eq(1hr)}$	
Outdoor Play Area 1	52	55	✓
Outdoor Play Area 2	47	55	✓
Outdoor Play Area 3	48	55	✓
Outdoor Play Area 4	51	55	✓
Outdoor Play Area 5	51	55	✓
Outdoor Play Area 6	49	55	✓

7.2.2 Noise Intrusion Results – Internal Play Spaces

Table 18 presents the predicted internal CCC noise levels from the existing ambient noise levels. The predicted results show compliance with the criteria in the GCCCAA assuming a 20dB loss for the installed windows.

Table 18 Internal Cumulative Noise Results

Receiver	Predicted noise level dB $LA_{eq(1hr)}$		Internal Criteria	Compliant
	Traffic Noise Levels	Internal	dB $LA_{eq(1hr)}$	
Babies Room 1	51	<35	40	✓
Babies Room 2	49	<35	40	✓
Babies Room 3	48	<35	40	✓
Toddlers Room 1	51	<35	40	✓
Toddlers Room 2	50	<35	40	✓
Toddlers Room 3	49	<35	40	✓
Preschool 1	57	37	40	✓
Preschool 2	57	37	40	✓
Preschool 3	57	37	40	✓

7.2.3 Noise Emission Results – Outdoor play

Table 19 presents the noise emission results for children at play ($L_{Aeq(15min)}$) in the outdoor play areas of the CCC The predicted results show compliance with the criteria in the GCCCAA. For modelling purposes, children were spread evenly over the playground areas.

Table 19 Noise Emissions Results – CCC Outdoor Play[1]

Receiver	Predicted Noise Level dB $L_{Aeq(15min)}$		Emission Criteria dB $L_{Aeq(15min)}$		Compliant
	Decked Semi Covered Playground Area	Garden Playground Area	All Playground Areas	Day	
R01	40	41	41	48	✓
R02	<35	40	38	48	✓
R03	41	36	39	48	✓
R04	39	43	42	48	✓
R05	40	44	42	48	✓
R06	41	45	43	48	✓
R07	41	45	43	48	✓
R08	40	42	41	48	✓
R09	35	37	36	48	✓
R10	36	39	37	48	✓

Note 1: Morning Shoulder - the period from 6am to 7am; 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.

7.2.4 Noise Emission Results – Transient Events

Table 20 presents the noise emission results for transient events such door slam events in the car park or playground area or waste collection impacts during the morning shoulder period (L_{Amax}).

Table 20 Noise Emissions Results –Transient Events[1]

Receiver	Predicted Noise Level[2] dB LAmax				Trigger Level dB LAmax
	Door Slam Northernmost Car Space	Door Slam Southernmost Car Space	Door Slam Playground	Waste Collection Impact	
R1	36	<35	36	54	54
R2	38	<35	<35	53	54
R3	35	45	<35	54	54
R4	<35	<35	35	36	54
R5	<35	<35	35	38	54
R6	<35	<35	36	39	54
R7	<35	<35	<35	<35	54
R8	<35	<35	<35	<35	54
R9	<35	<35	<35	<35	54
R10	<35	<35	<35	<35	54

Note 1: Morning Shoulder - the period from 6am to 7am; 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: Maximum predicted noise level on any façade.

The predicted results show compliance with the criteria in the GCCCAA for door slams and waste collection. Satisfying the GCCCAA criteria also satisfies the maximum noise trigger levels established in accordance with NPI methodologies.

7.3 Construction Noise Assessment

Table 21 presents the results of modelled construction noise emissions. Predictions identify that emissions from construction have the potential to be above the noise management levels at several assessed receivers. Accordingly, recommendations to reduce the impact of construction noise emissions on surrounding receivers are provided in Section 8.

Table 21 Construction Noise Levels – All Receivers

Receiver	Period[1]	Predicted Noise Level dB $L_{Aeq(15min)}$	Management Level dB $L_{Aeq(15min)}$
R01	Day	58	53
R02	Day	55	53
R03	Day	67	53
R04	Day	54	53
R05	Day	53	53
R06	Day	54	53
R07	Day	52	53
R08	Day	52	53
R09	Day	46	53
R10	Day	51	53
ED01	Day	62	55
POW01	Day	57	55
POW02	Day	35	55
POW03	Day	56	55

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

8 Construction Recommendations

The results of the Noise Assessment identify that levels during standard construction hours are above the ICNG noise management levels at surrounding receivers to the project. Accordingly, it is recommended that noise management and mitigation measures be adopted during noise intensive construction activities to limit impacts on surrounding receivers.

Recommendations for consideration during construction activities for this project may include:

- implement boundary fences/retaining walls as early as possible to maximise their attenuation benefits to surrounding receivers;
- toolbox and induction of personnel prior to shift to discuss noise control measures that may be implemented to reduce noise emissions to the community;
- where possible use mobile screens or construction hording to act as barriers between construction works and receivers;
- all plant should be shut down when not in use. Plant to be parked/started at farthest point from relevant assessment locations;
- operating plant in a conservative manner (no over-revving);
- selection of the quietest suitable machinery available for each activity;
- avoidance of noisy plant/machinery working simultaneously where practicable;
- minimisation of metallic impact noise;
- all plant are to utilise a broadband reverse alarm in lieu of the traditional hi frequency type reverse alarm; and
- undertake letter box drops to notify receivers of potential works.

This page has been intentionally left blank

9 Discussion and Conclusion

Muller Acoustic Consulting Pty Ltd (MAC) has completed a Noise Assessment (NA) to quantify emissions from the proposed child care centre (CCC) to be established at 1-5 Station Lane, Lochinvar, 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.

The results of the NA 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 the playground retaining wall as per the site plans;
- construction of an impervious barriers surrounding the southern boundary of project car park area (see Figure 3). The barriers should be constructed to an RL of 1.8m above the relative ground level of the car park. The barriers should 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);
- construction of an impervious barrier surrounding the northern side of the playground (see Figure 3). The barrier should be constructed to an RL of 1.8m above the relative ground level of the outdoor play area. The barrier should consist of materials consistent with those outlined above; and
- the mechanical plant for the CCC is yet to be finalised. Therefore, the modelling assumes one AC unit per classroom and one for the admin spaces, totalling ten AC units. The AC units are assumed to be located on rooftop of the building located over each educational/admin space (see Figure 3).

Furthermore, sleep disturbance is not anticipated, as emissions from maximum noise events (ie impact noise from staff car door slams and waste collection impacts during the morning shoulder) are predicted to satisfy the criteria in the Guideline for Child Care Centre Acoustic Assessment. Accordingly, as the applicable criteria in the Guideline for Child Care Centre Acoustic Assessment are satisfied the project is deemed to also comply with the NPIs maximum noise trigger levels for car door slams.

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

This page has been intentionally left blank

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

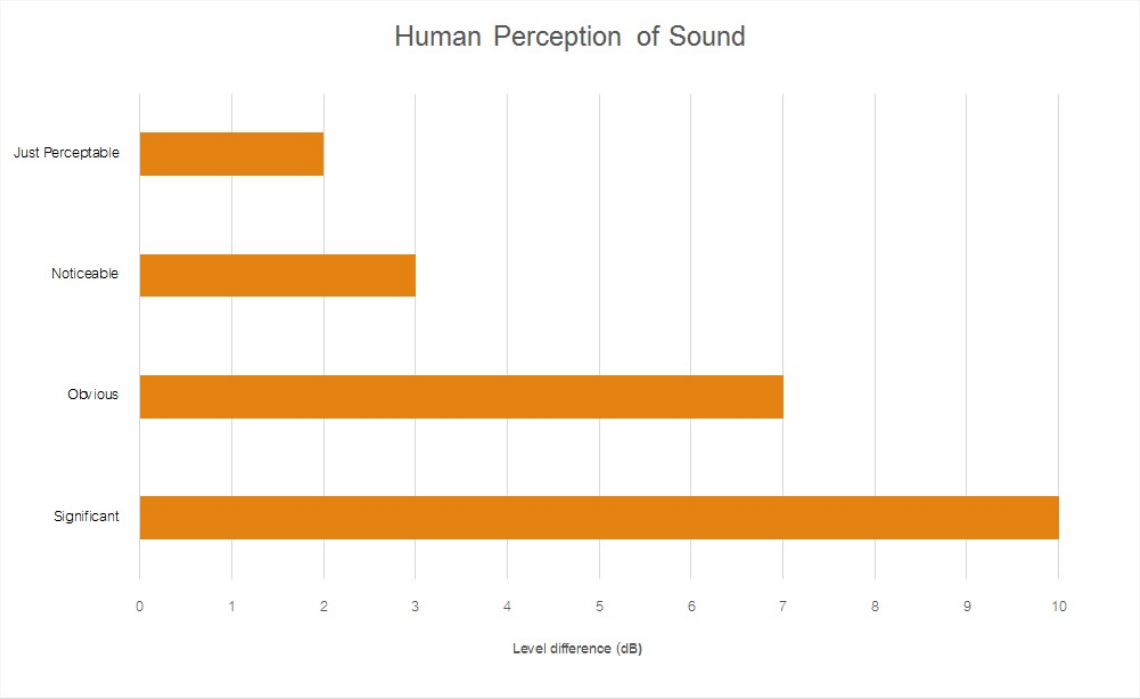
Term	Description
1/3 Octave	Single octave bands divided into three parts
Octave	A division of the frequency range into bands, the upper frequency limit of each band being twice the lower frequency limit.
ABL	Assessment Background Level (ABL) is defined in the NPI as a single figure background level for 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
Lawn-mower (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



This page has been intentionally left blank

Appendix B – Site Plans

Option C - Area Values

Site Area
1619m² + 1657m² + 1752m²
= 5028m²

Proposed GFA
950.4m²

Proposed Outdoor Play Area
713m²

	Playroom Areas 3.25m² / child min. requirement	**Staff Requirements** Refer age based requiremnts	**Internal Storage** 0.2m³ / child min. requirement
36 Babies (0-2y)	3 Playrooms of 12 = 12 x 3.25 = 39m²	1 Staff to every 4 Babies = 8 Staff	36 x 0.2m³ = 7.2m³
45 Toddlers (2-3y)	3 Playrooms of 15 = 15 x 3.25 = 48.75m²	1 Staff to every 5 Toddlers = 8 Staff	45 x 0.2m³ = 9m³
60 Pre-school (3-5y)	3 Playrooms of 20 = 20 x 3.25 = 65m²	1 Staff to every 10 Pre-schoolers = 8 Staff	60 x 0.2m³ = 12m³
141 Children		24 Educators + 2 Admin 26 Total Staff	

	Outdoor Play Area 7m² / child min. requirement	**Parking Requirements**	**External Storage** 0.3m³ / child min. requirement
141 Children	141 x 7m³ = 987m³	1 Parking space per 4 Childcare Places = 36	141 x 0.3m³ = 42.3m³
26 Staff		1 Parking space per Staff Member = 26	
	Provided 512m² (52%) Semi Covered Play Space + 201m² (20%) Structured Play Space Total = 713m² (72%) Outdoor Play Area	**Provided** 34 Parking Spaces + 2 On street parking	

F2.3 - CLASS 9B - ELC
Number of Children = 141

WC Requirements	
1-30 Children	= 2 WC
+	
> 30 Children	= 1 per 15 = 111 / 15 = 7.4 WC
Total	= 9.4 WC = 10 WC

Hand Basin Requirements	
1-30 Children	= 2 HB
+	
> 30 Children	= 1 per 15 = 111 / 15 = 7.4 HB
Total	= 9.4 HB = 10 HB

Provided
10 WC
10 Hand Basins

F2.3 - CLASS 9B - ELC
Number of Staff = 26

WC Requirements	
Male 1-20	= 1 WC
Female 1-15	= 1 WC

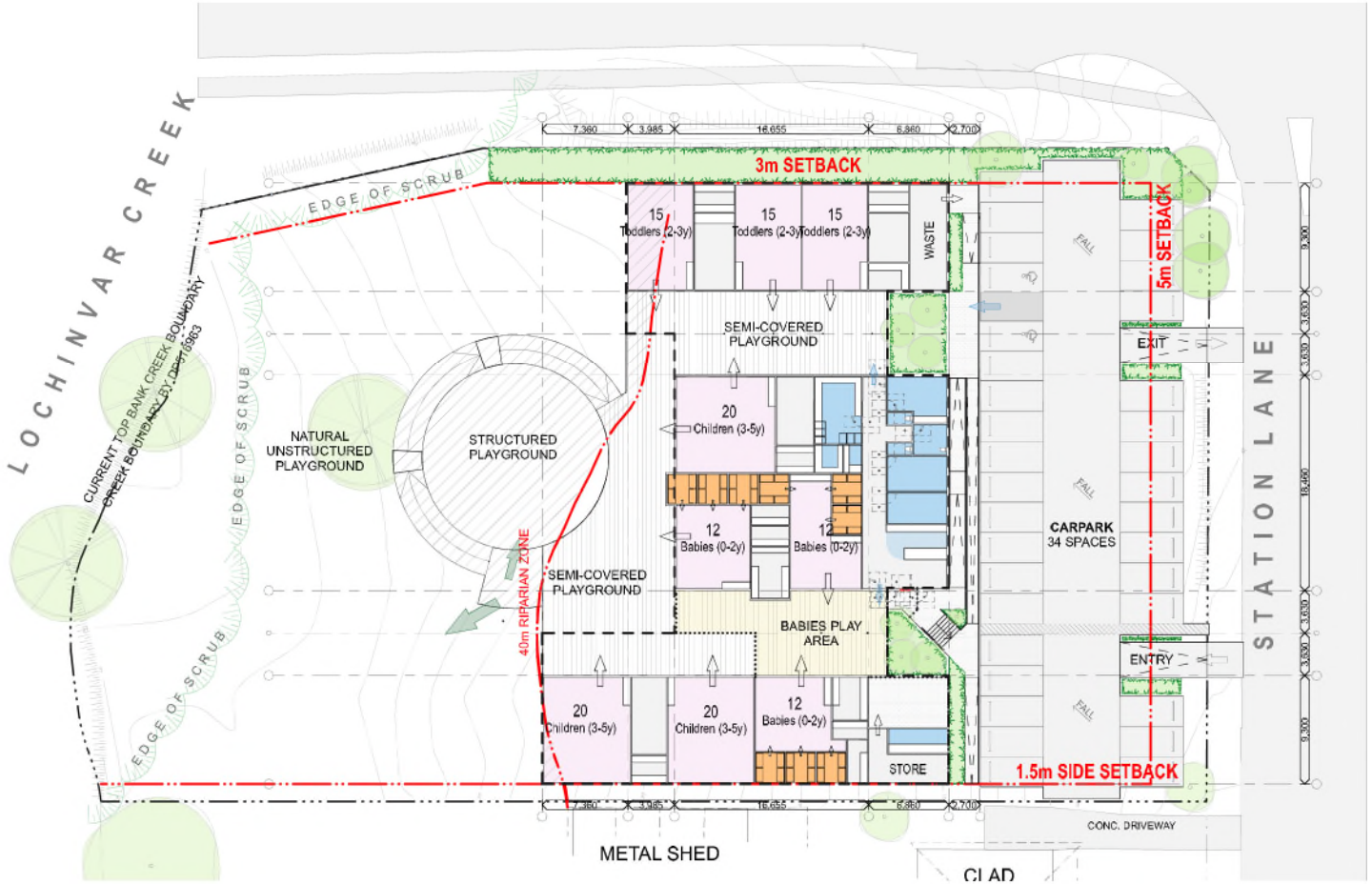
Urinal Requirements	
Male 1-10	= 1

Hand Basin Requirements	
1-30 CHILDREN	= 2 HB
+	
> 30 CHILDREN	= 1 PER 15 = 111 / 15 = 7.4 HB
Total	= 9.4 HB = 10 HB

Provided
1 Male Ambulant WC
1 Female Ambulant WC
1 Unisex Accessinle WC*

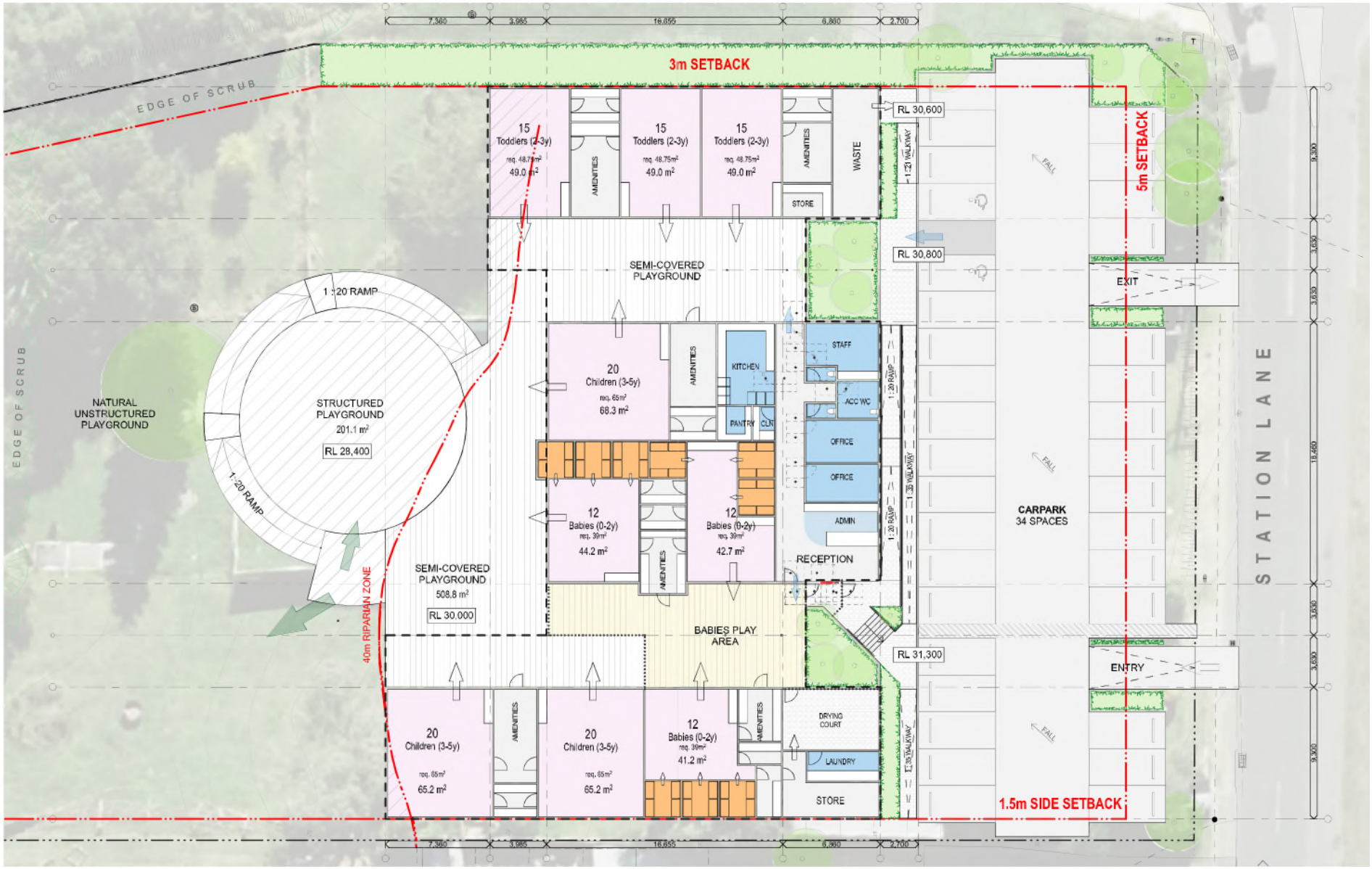
**Unisex Accessible WC satisfies the provision of 1 WC for Male & Female*

Option C



Option C - Site Plan

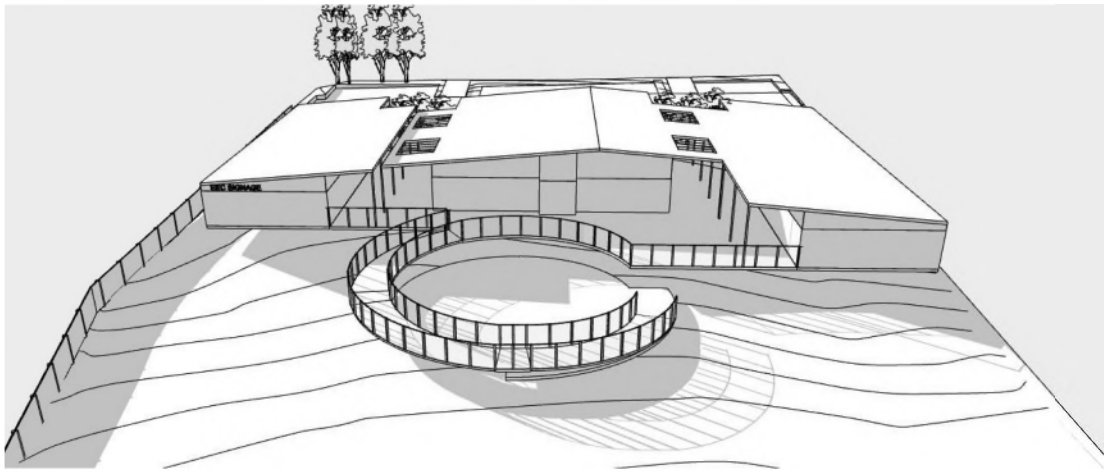
SK-111-003 |

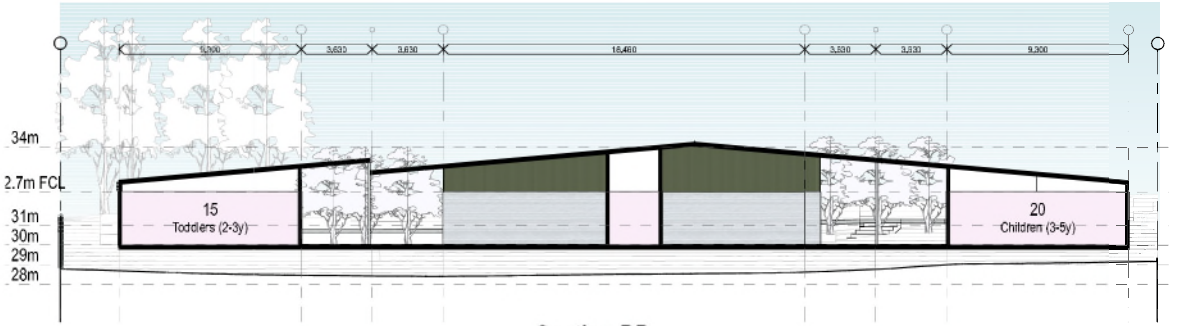


Option C - Ground Level

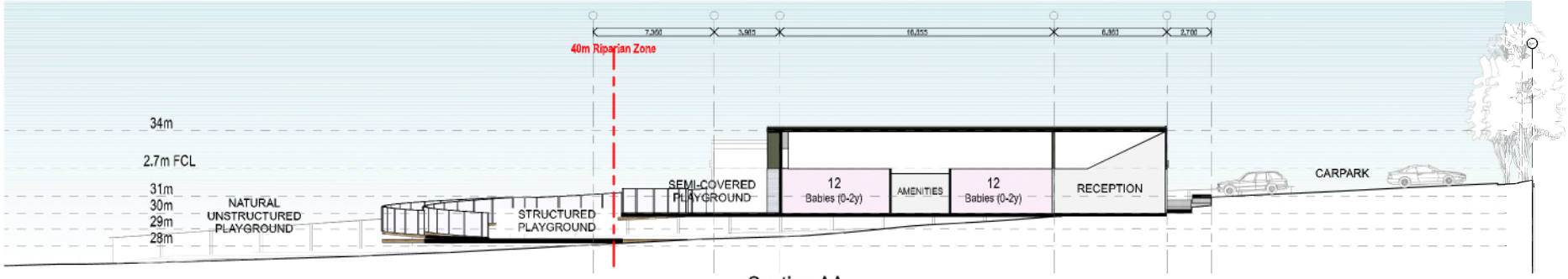
CKDS

SK-111-004





Section BB



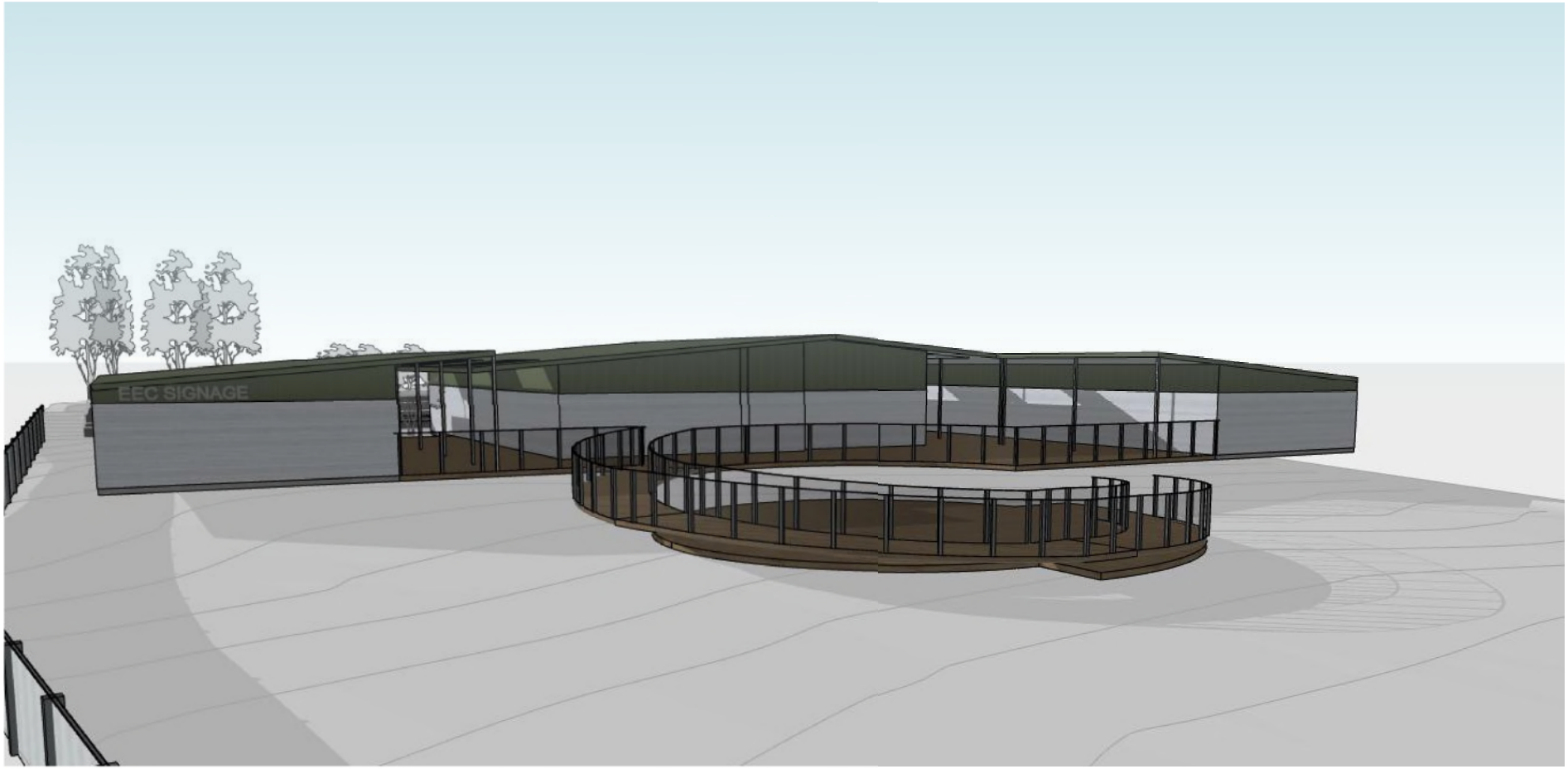
Section AA

Option C - Sections

View from Above West

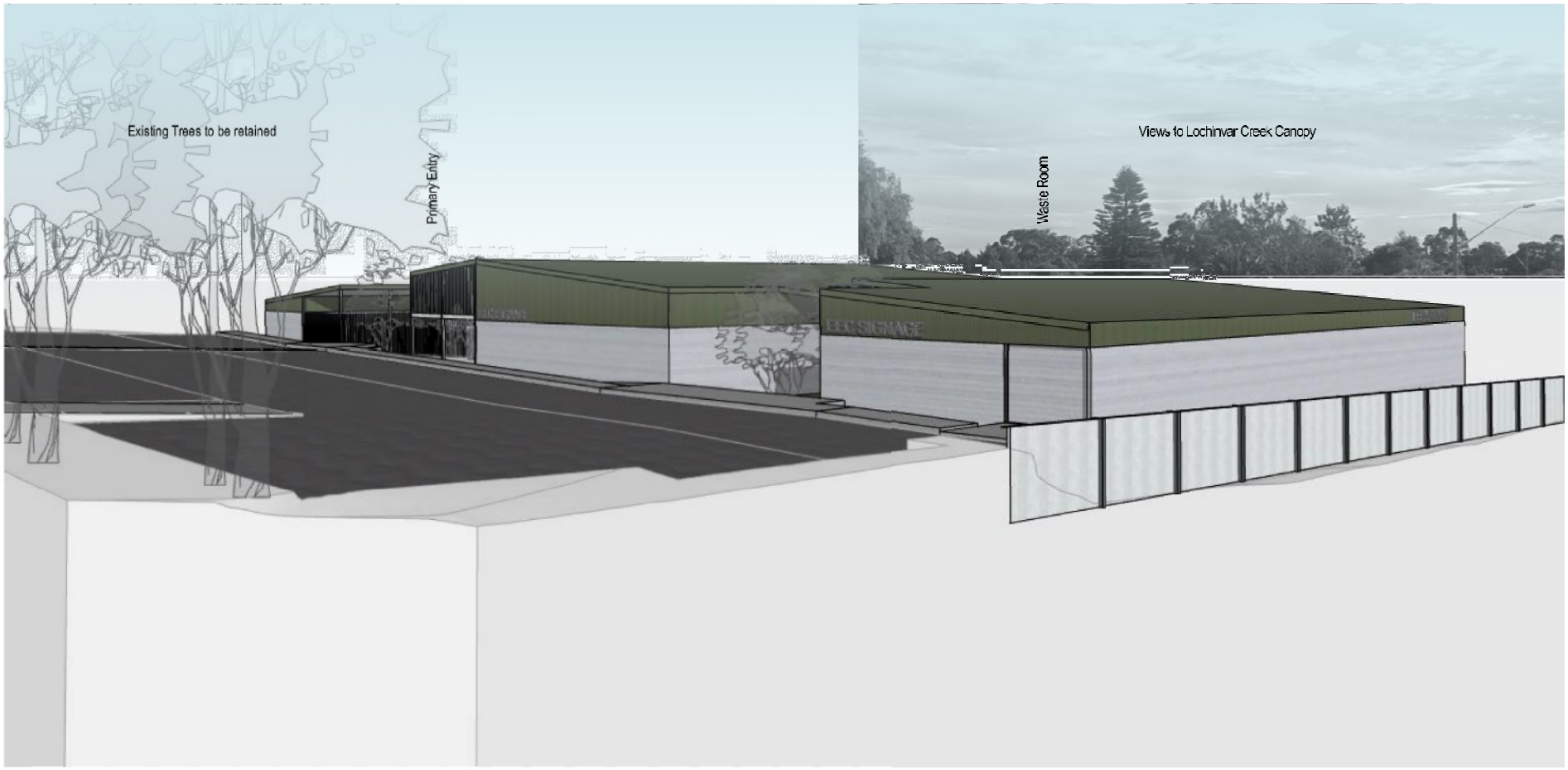
Option C - Perspective

View from Landscape



Option C - Perspective

View from HNE Highway



Option C - Perspective

View from Car Park

Option C - Perspective

This page has been intentionally left blank

Appendix C – Noise Monitoring Charts and Assessment Background Levels Summary

Table C22 Background Noise Monitoring Summary – Location L1

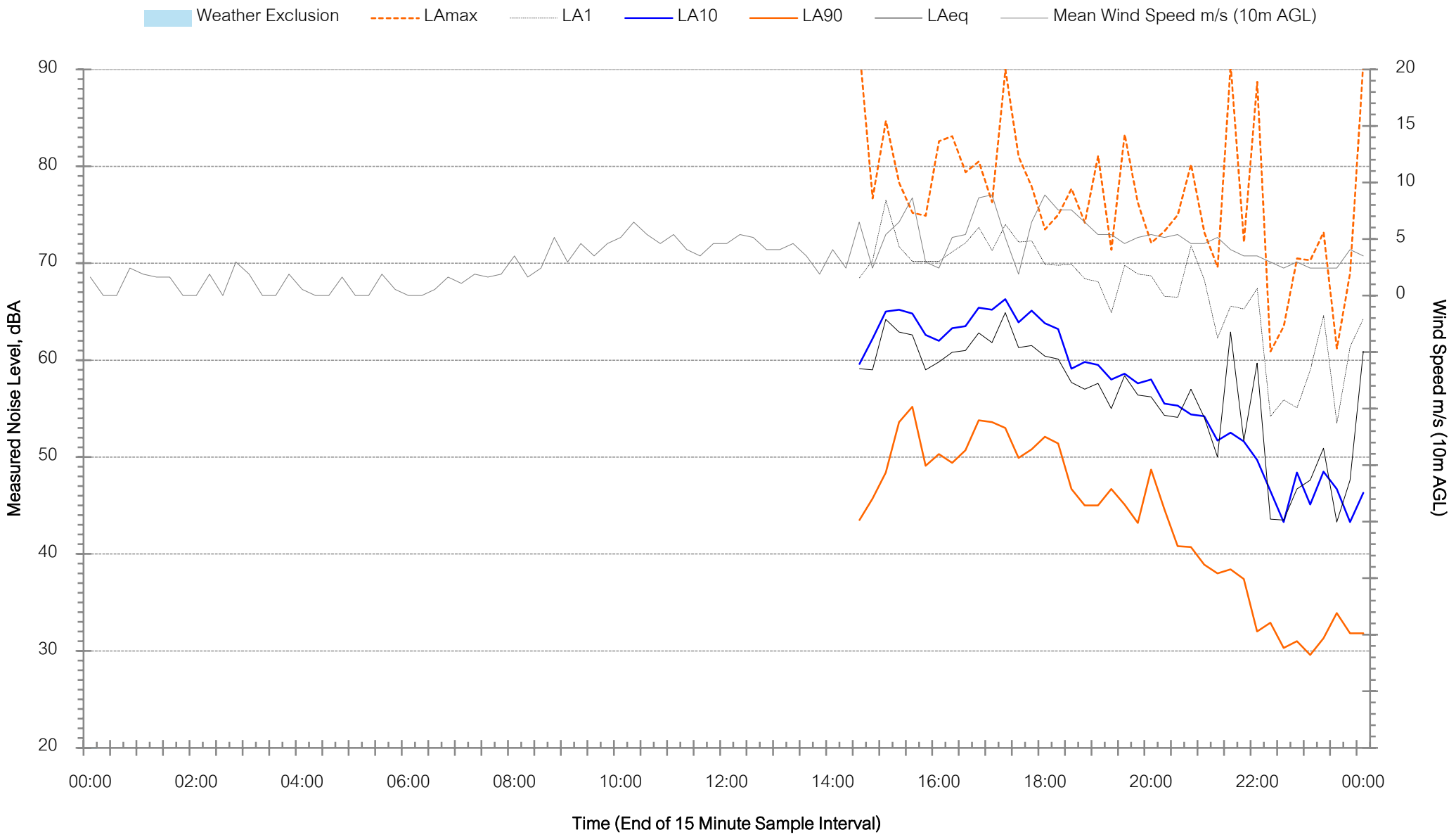
Date	Measured Background Noise Level (LA_{90}) dB ABL[1]			Measured dB $LA_{eq(period)}$		
	Day	Evening	Night	Day	Evening	Night
Monday 28 October 2024	--	38	27	--	57	55
Tuesday 28 October 2024	43	38	27	60	57	54
Wednesday 28 October 2024	43	37	30	66	57	55
Thursday 28 October 2024	44	38	30	61	57	55
Friday 01 November 2024	46	37	28	62	56	50
Saturday 02 November 2024	42	37	28	59	58	51
Sunday 03 November 2024	41	35	31	57	56	55
Monday 04 November 2024	45	37	33	63	55	54
Tuesday 05 November 2024	45	35	27	59	57	54
Wednesday 06 November 2024	43	37	33	61	57	54
Thursday 07 November 2024	--	--	--	--	--	--
Location1 – RBL / Leq Overall	43	37	29	61	57	54

Note 1: Assessment Background Level (ABL) – the single-figure background level representing each assessment period day, evening, and night as per NPI Fact Sheet A.

Note: 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

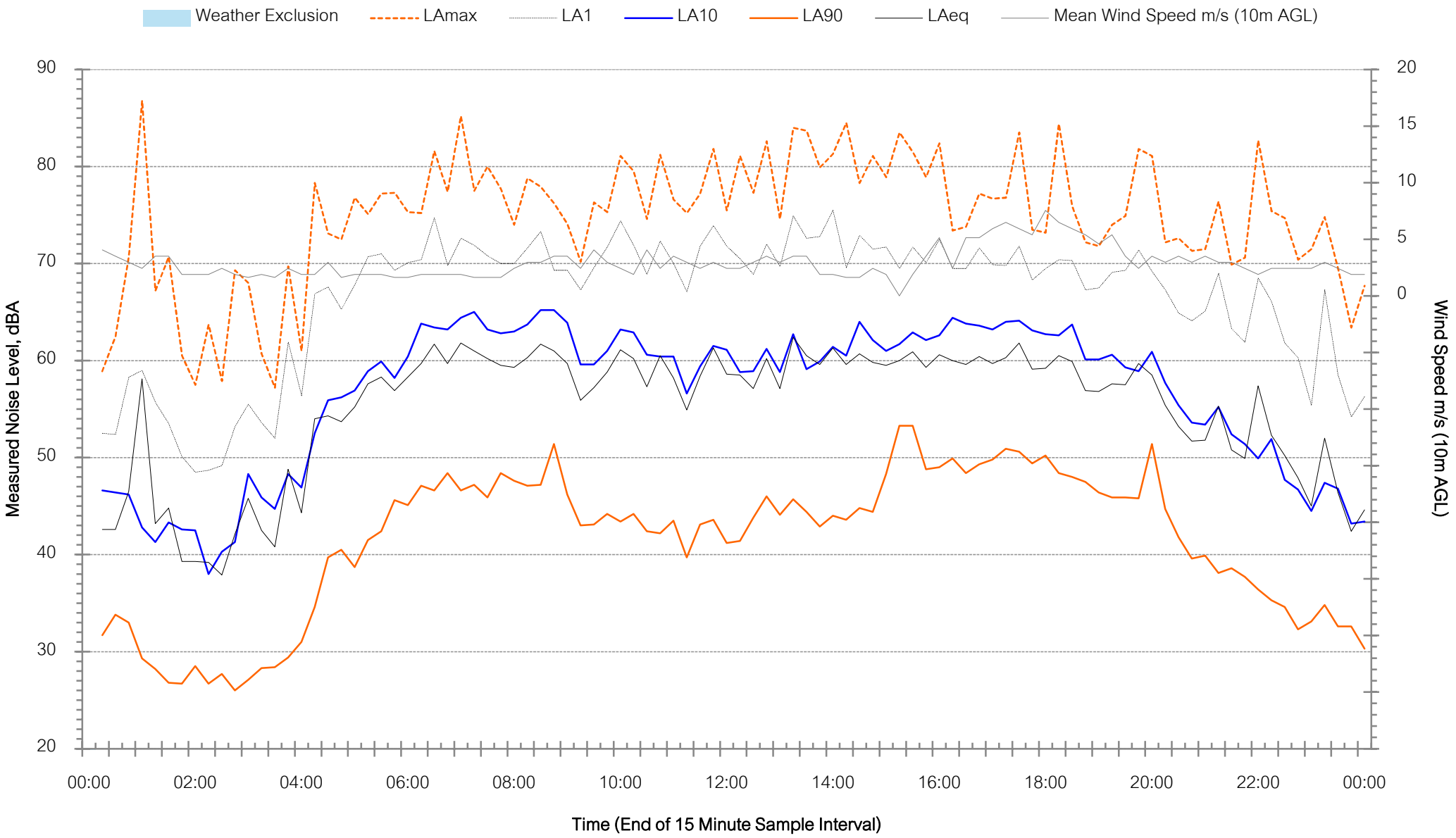
Background Noise Levels

Station Lane, Lochinvar - Monday 28 October 2024



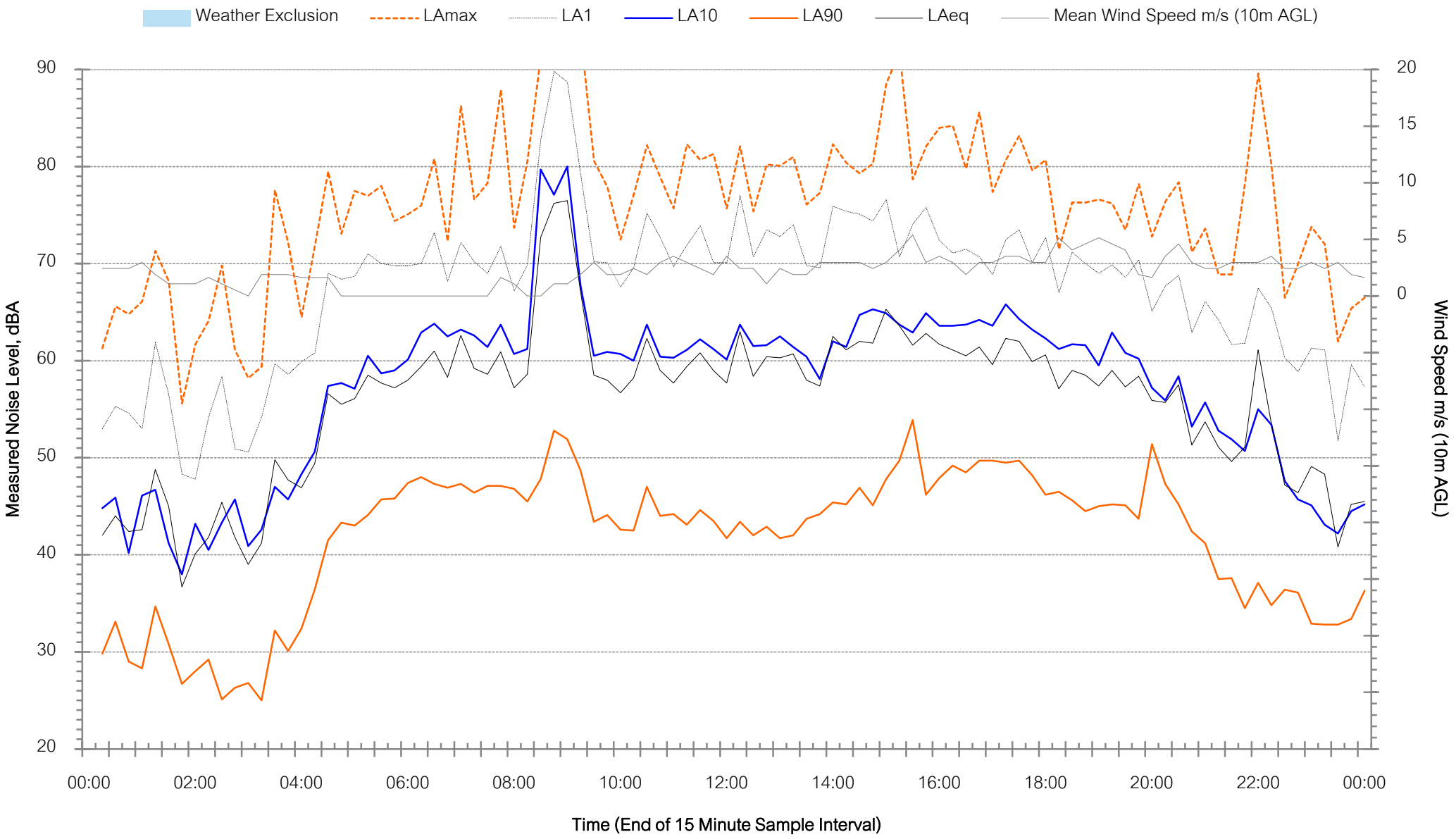
Background Noise Levels

Station Lane, Lochinvar - Tuesday 29 October 2024



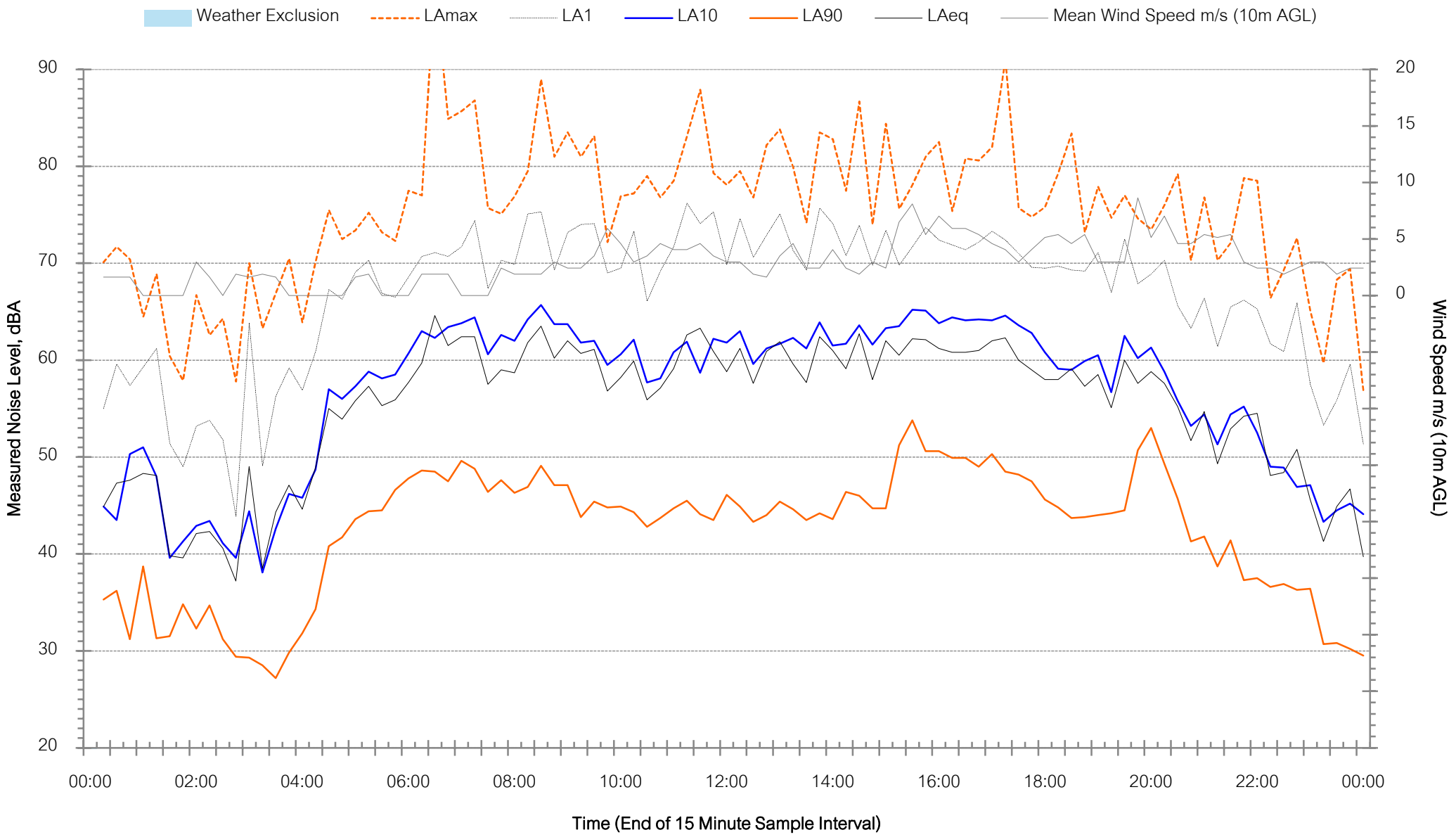
Background Noise Levels

Station Lane, Lochinvar - Wednesday 30 October 2024



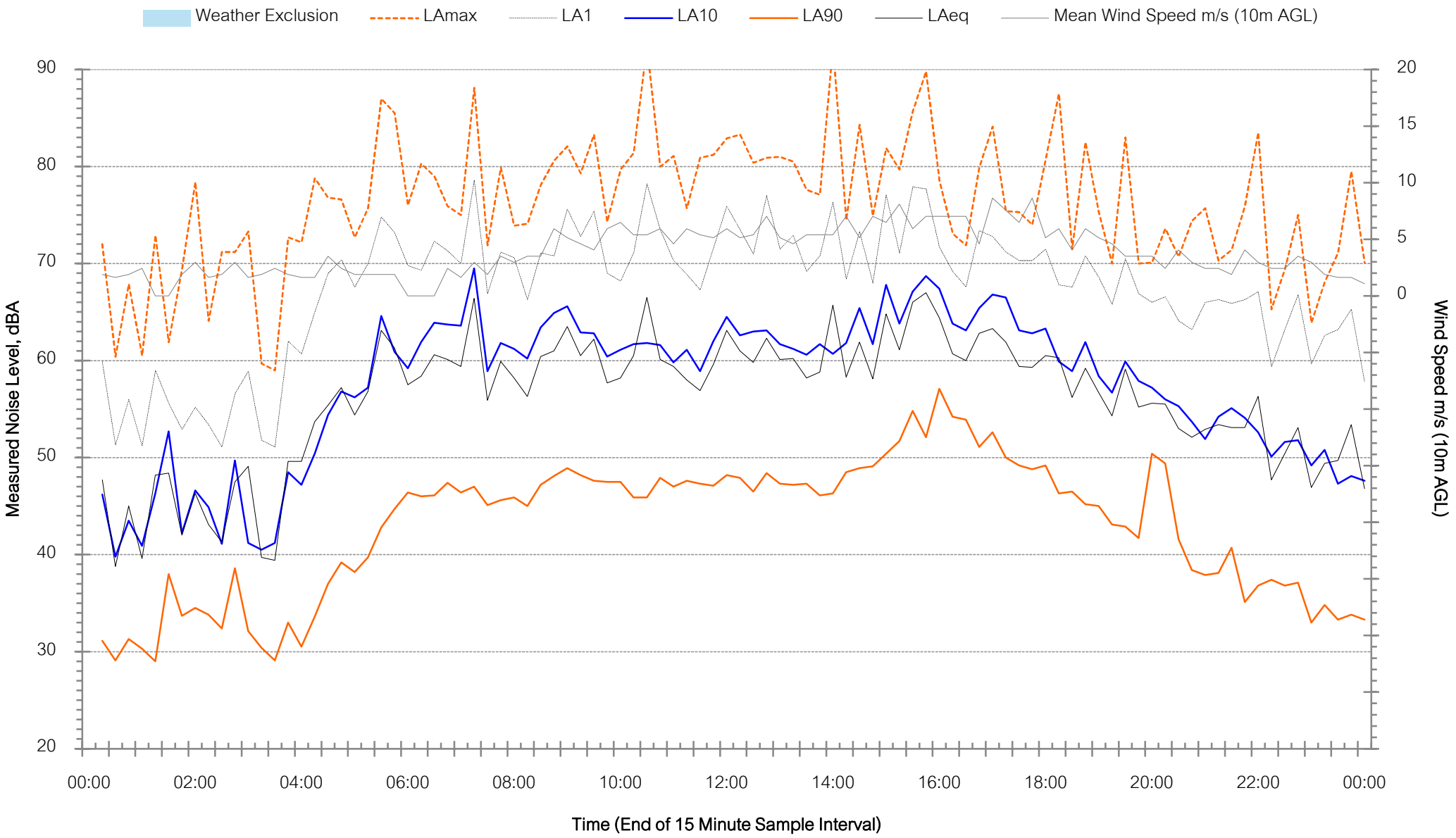
Background Noise Levels

Station Lane, Lochinvar - Thursday 31 October 2024



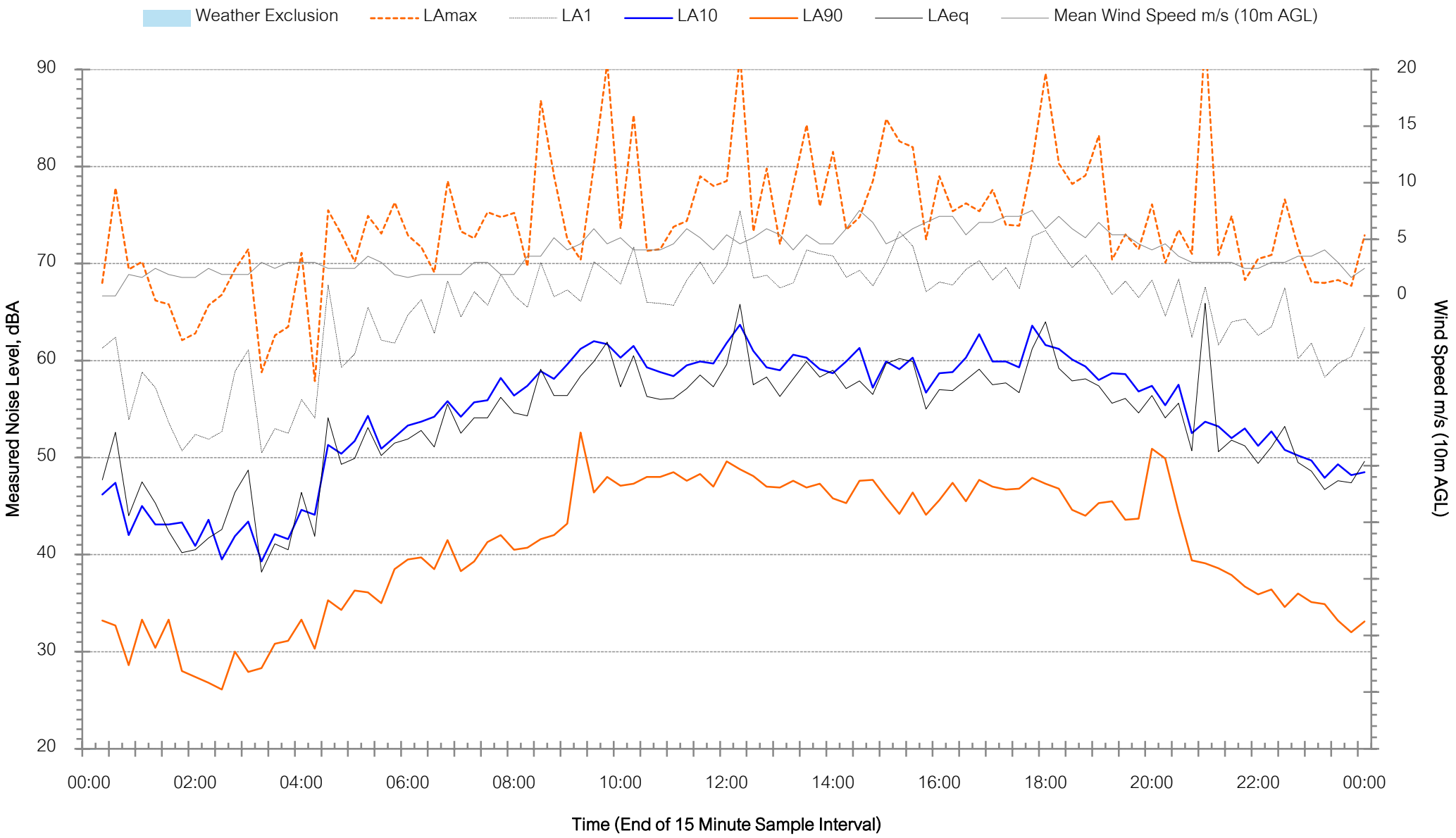
Background Noise Levels

Station Lane, Lochinvar - Friday 1 November 2024



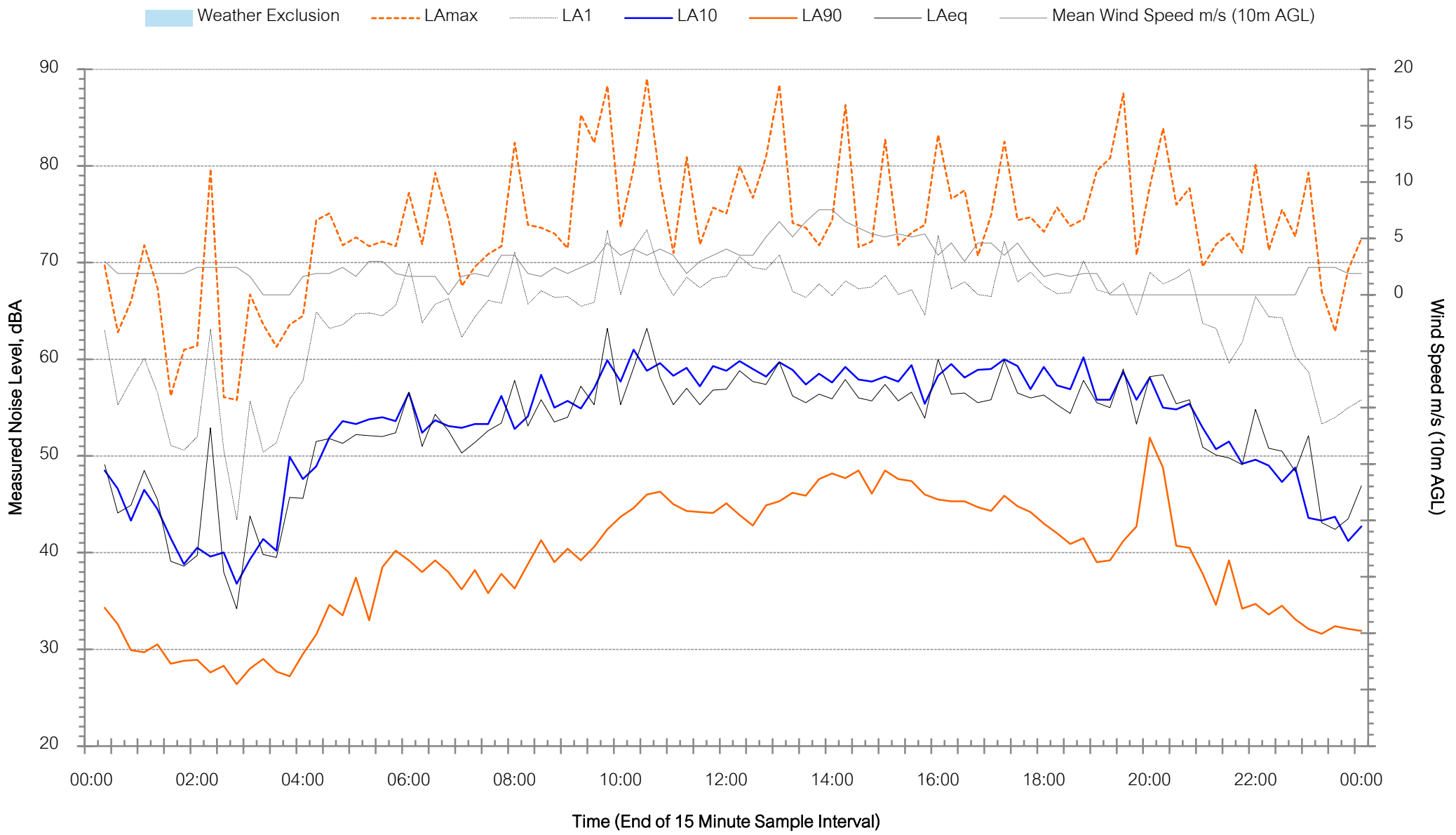
Background Noise Levels

Station Lane, Lochinvar - Saturday 2 November 2024



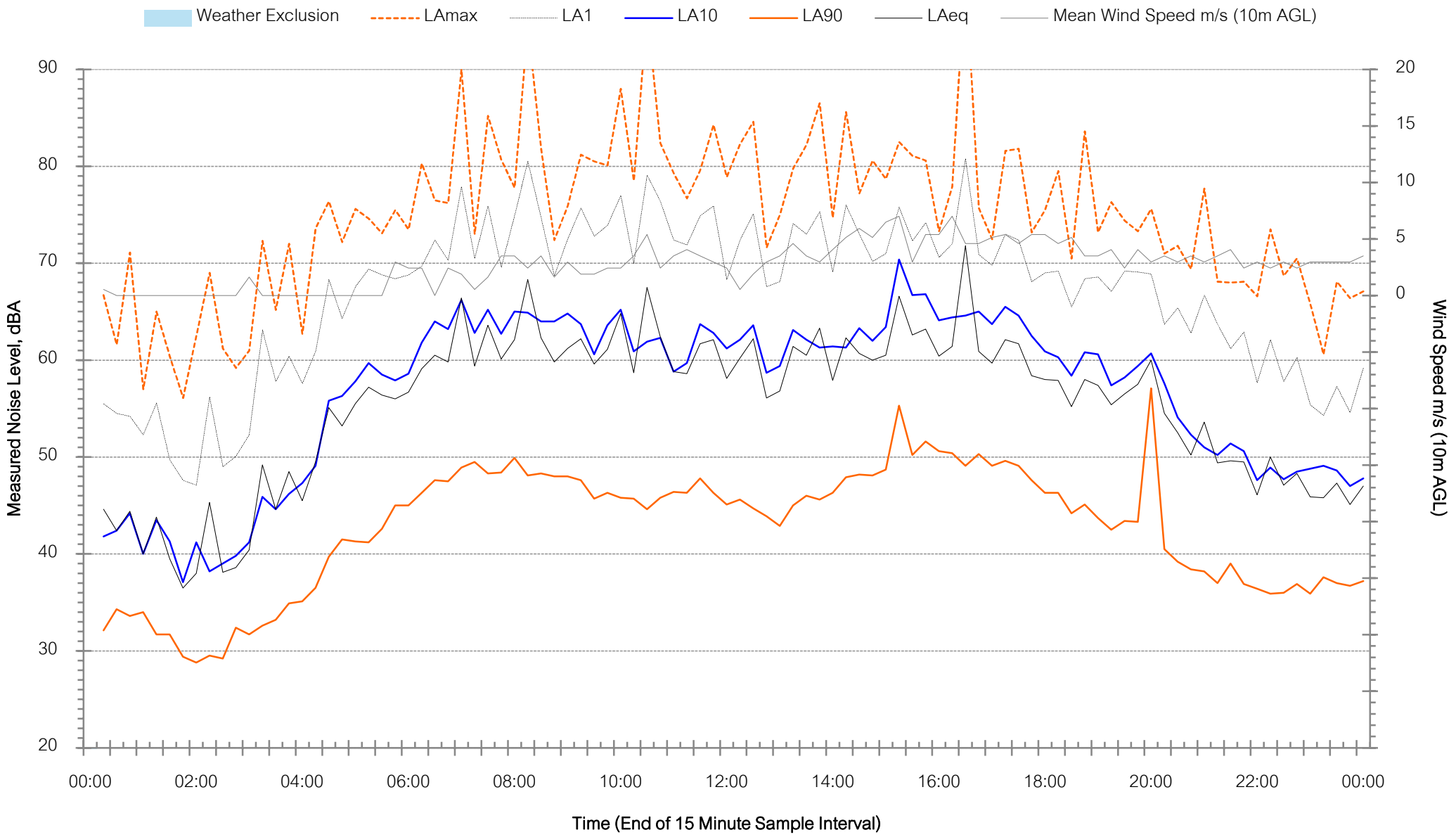
Background Noise Levels

Station Lane, Lochinvar - Sunday 3 November 2024



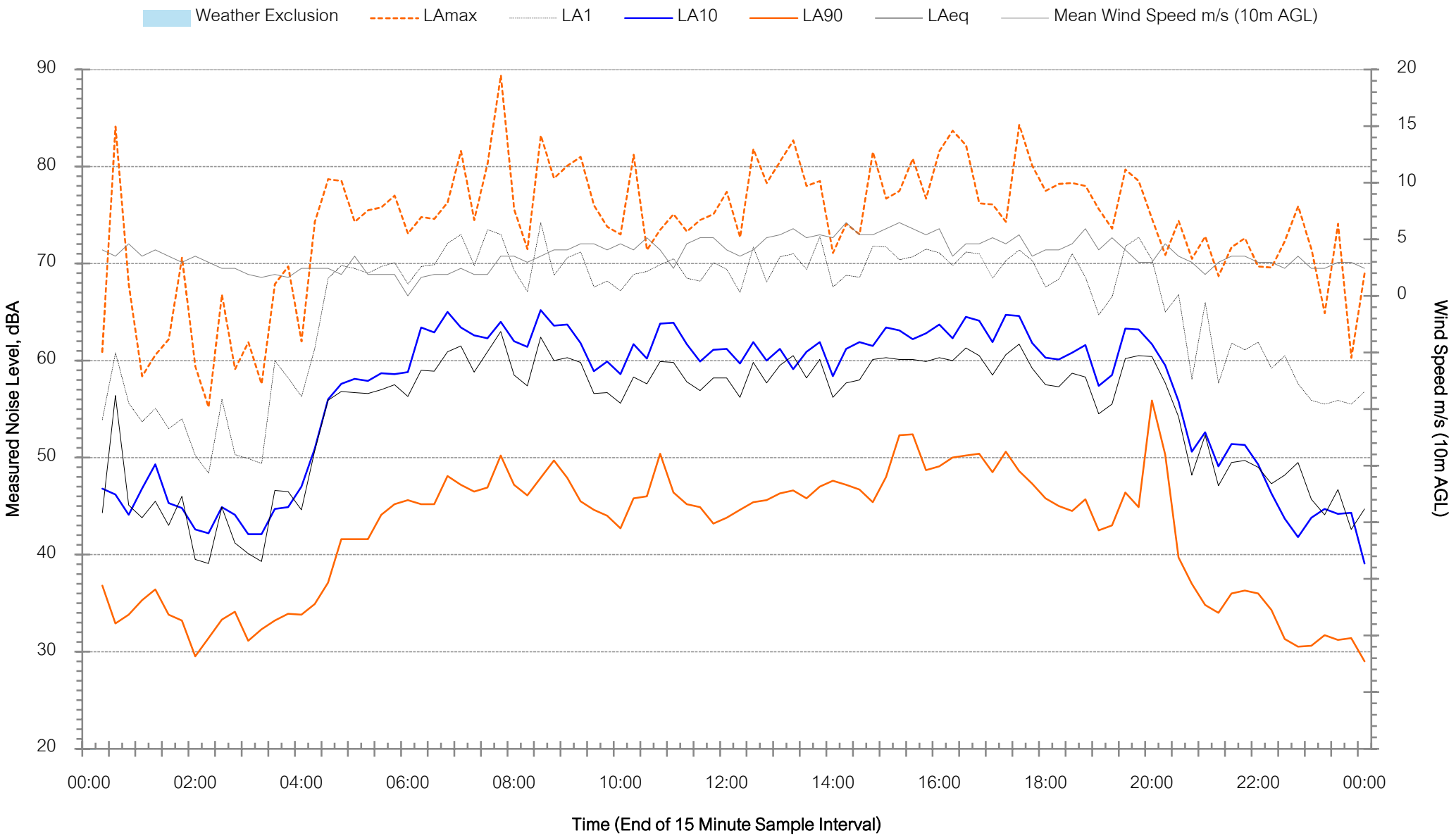
Background Noise Levels

Station Lane, Lochinvar - Monday 4 November 2024



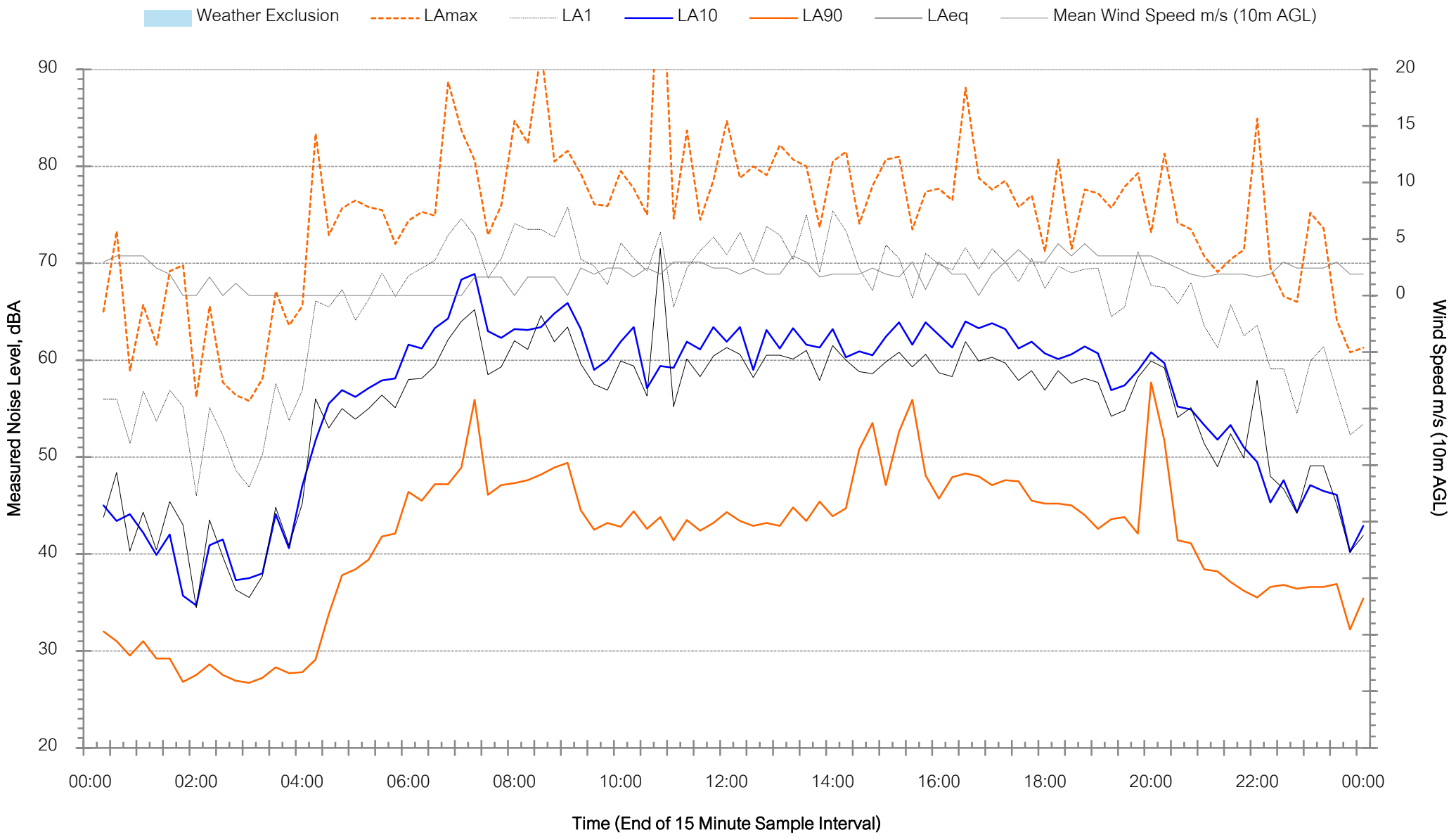
Background Noise Levels

Station Lane, Lochinvar - Tuesday 5 November 2024



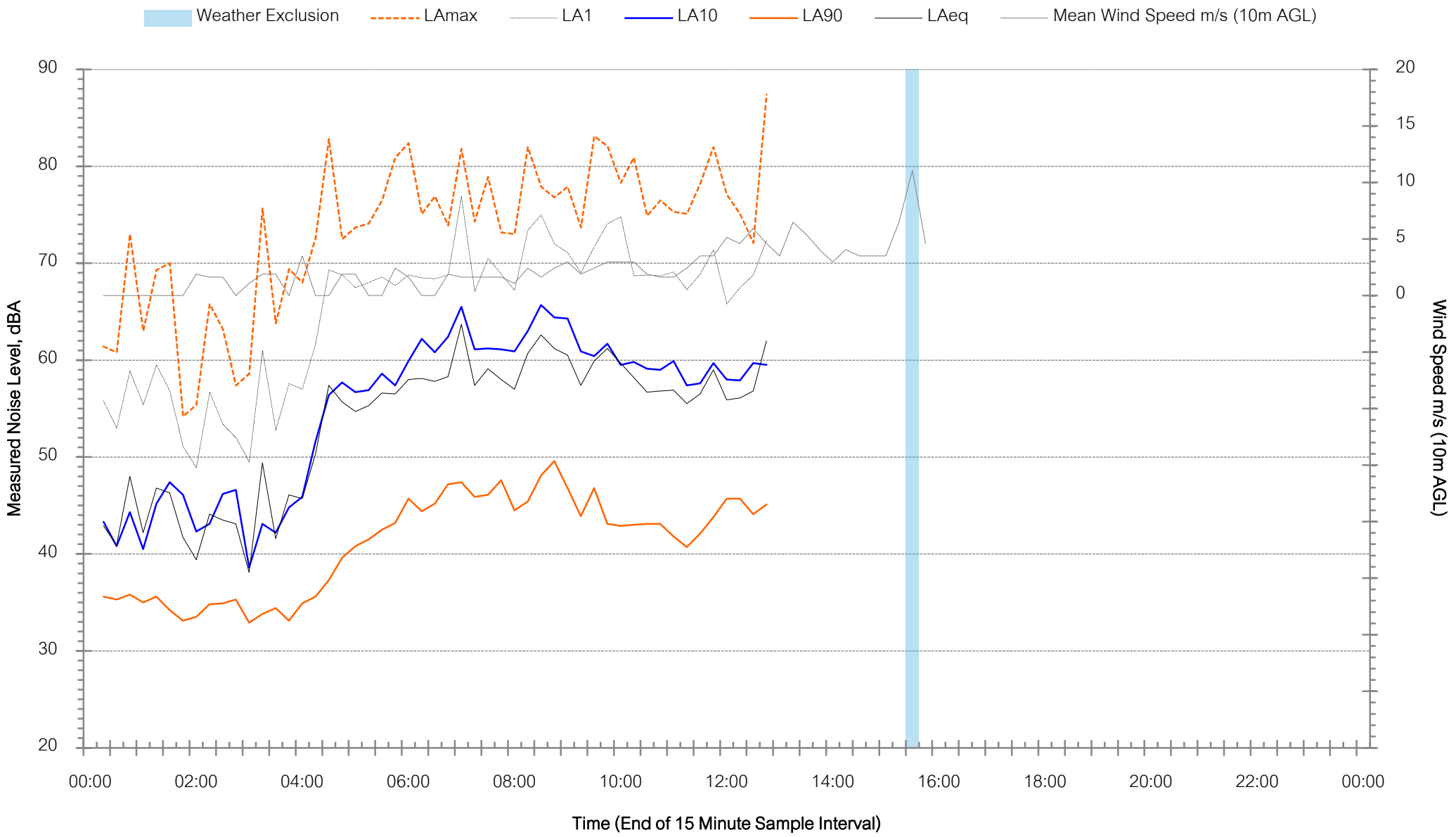
Background Noise Levels

Station Lane, Lochinvar - Wednesday 6 November 2024



Background Noise Levels

Station Lane, Lochinvar - Thursday 7 November 2024



This page has been intentionally left blank

Appendix D – Determination of NPI

Receiver Category

Table D21 - Determination of NPI Residential Receiver Category

Location/ Catchment	Period	Measured RBL dB LA90(period)	Land Use Zone: RU1, RU2, RU4, R5, E4 (Rural)	Land Use Zone: RU5, RU6, R2, R3, R4, E2, E3 (Suburban)	Land Use Zone: R1, R4, B1, B2, B4 (Urban)	Land Use Zone: Others (Commercial, Industrial)	Typical Existing Background Noise Levels Table 2.3 NPI: RURAL Daytime <40 Eve <35 Night <30	Typical Existing Background Noise Levels Table 2.3 NPI: SUBURBAN Daytime <45 Eve <40 Night <35	Typical Existing Background Noise Levels Table 2.3 NPI: URBAN Daytime >45 Eve >40 Night >35	Rural Residential - an area with an acoustical environment that: is dominated by natural sounds.	having little or no road traffic noise	generally characterised by low background noise levels.	Settlement patterns would be typically sparse	Suburban Residential - an area that has: local traffic with characteristically intermittent traffic flows	or with some limited commerce or industry.	evening ambient noise levels defined by the natural environment and human activity.	Urban Residential- an area with an acoustical environment that: is dominated by 'urban hum' or industrial source noise	has through-traffic with characteristically heavy and continuous traffic flows during peak	is near commercial districts or industrial districts	has any combination of the above
Location 1	Day	43			✓			✓										✓		
	Evening	37			✓			✓										✓		
	Night	30			✓		✓			✓										

where urban hum means the aggregate sound of many unidentifiable, mostly traffic and/or industrial related sound sources

Assessment

Location	Rural	Suburban	Urban	Rural - RBL	Suburban - RBL	Urban - RBL	Rural - RBL	Suburban - RBL	Urban - RBL	Rural - Description				Suburban - Description			Urban - Description			
Location 1	2	2	**5**	0	0	3	1	2	0	1	0	0	0	0	0	0	0	2	0	0

Muller Acoustic Consulting Pty Ltd
PO Box 678, Kotara NSW 2289
ABN: 36 602 225 132
Ph: +61 2 4920 1833
www.mulleracoustic.com

MAC
Muller Acoustic Consulting