

Noise Assessment

Proposed Food & Drinks Licenced Premises
416 High Street
Maitland NSW

Prepared for: Skelcon Pty Ltd
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MAC232037-01RP1



Document Information

Noise Assessment

Proposed Food & Drinks Licenced Premises

416 High Street

Maitland NSW

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1 Introduction

Muller Acoustic Consulting Pty Ltd (MAC) has been commissioned by Skelcon Pty Ltd (Skelcon) to prepare a Noise Assessment (NA) to quantify emissions from the proposed food and drinks premises, (the project) located at 416 High Street, Maitland, NSW.

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 Department of Environment and Climate Change (DECCW) – NSW Interim Construction Noise Guideline (ICNG), July 2009;
- 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;
- The Independent Liquor and Gaming Authority (ILGA) criteria related to licensed premises;
- Standards Australia AS 1055:2018 - Acoustics - Description and measurement of environmental noise - General Procedures; and
- International Organisation for Standardisation (ISO) 9613-1:1993 (ISO9613:1) - Acoustics - Attenuation of Sound During Propagation Outdoors - Part 1: Calculation of the Absorption of Sound by the Atmosphere.

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 Project Background

The project is proposed to operate as food and drinks premises. The venue is to incorporate the following:

- an internal bar and dining area (151m²);
- an external dining area with seating for approximately 36 patrons; and
- a detached structure from the historic building on the site, consisting of a commercial kitchen, cool room, freezer and bathrooms.

A site plan detailing the works for the project is included in **Appendix B**. The Development Application (DA) is to be submitted to Maitland City Council (MCC) for determination.

2.2 Receiver Review

A review of residential receivers in close proximity to the project has been completed. The land zoning of the project and immediate surrounds has been identified MU – Mixed Use, with commercial receivers neighbouring the project. The closest residential receivers are situated approximately 200m to the northeast of the project within RU1 – Primary Production land zoning. The assessed receivers are summarised in **Table 1**. **Figure 1** provides the position of these receivers in relation to the project.

Table 1 Receiver Locations					
Receiver	Description	Receiver Height ¹	Coordinates (GDA94/MGA56)		
			Easting	Northing	
C01	Commercial	1.5	364603	6377549	
C02	Commercial	1.5	364614	6377520	
C03	Commercial	1.5	364635	6377522	
R01	Residential	1.5	364811	6377611	
R02	Residential	1.5	364822	6377659	
R03	Residential	1.5	364814	6377670	
R04	Residential	1.5	364801	6377676	
R05	Residential	1.5	364776	6377694	
R06	Residential	1.5	364767	6377711	
R07	Residential	1.5	364755	6377723	
R08	Residential	1.5	364740	6377735	
R09	Residential	1.5	364724	6377754	
R10	Residential	1.5	364715	6377766	

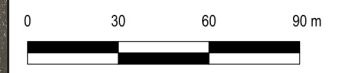
Note 1: Height above the relative ground or building below source.



FIGURE 1
 Locality Plan
 MAC232037-01
 Bond Store
 416 High Street
 Maitland NSW

KEY

- Receiver
- Unattended Noise Logging
- Site Boundary



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.

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 2**.

Table 2 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.

3.1.5 Maximum Noise Assessment Trigger Levels

The potential for sleep disturbance from maximum noise level events from a project during the night-time period needs to be considered. The NPI considers sleep disturbance to be both awakenings and disturbance to sleep stages.

Where night-time noise levels from a development/premises at a residential location exceed the following criteria, a detailed maximum noise level event assessment should be undertaken:

- LAeq(15min) 40dB or the prevailing RBL plus 5dBA, whichever is the greater; and/or
- LAmax 52dB or the prevailing RBL plus 15dBA, whichever is the greater.

A detailed assessment should cover the maximum noise level, the extent to which the maximum noise level exceeds the rating background noise level, and the number of times this happens during the night-time period.

Other factors that may be important in assessing the impacts on sleep disturbance include:

- how often the events would occur;
- the distribution of likely events across the night-time period and the existing ambient maximum events in the absence of the development;
- whether there are times of day when there is a clear change in the noise environment (such as during early morning shoulder periods); and
- current understanding of effects of maximum noise level events at night.

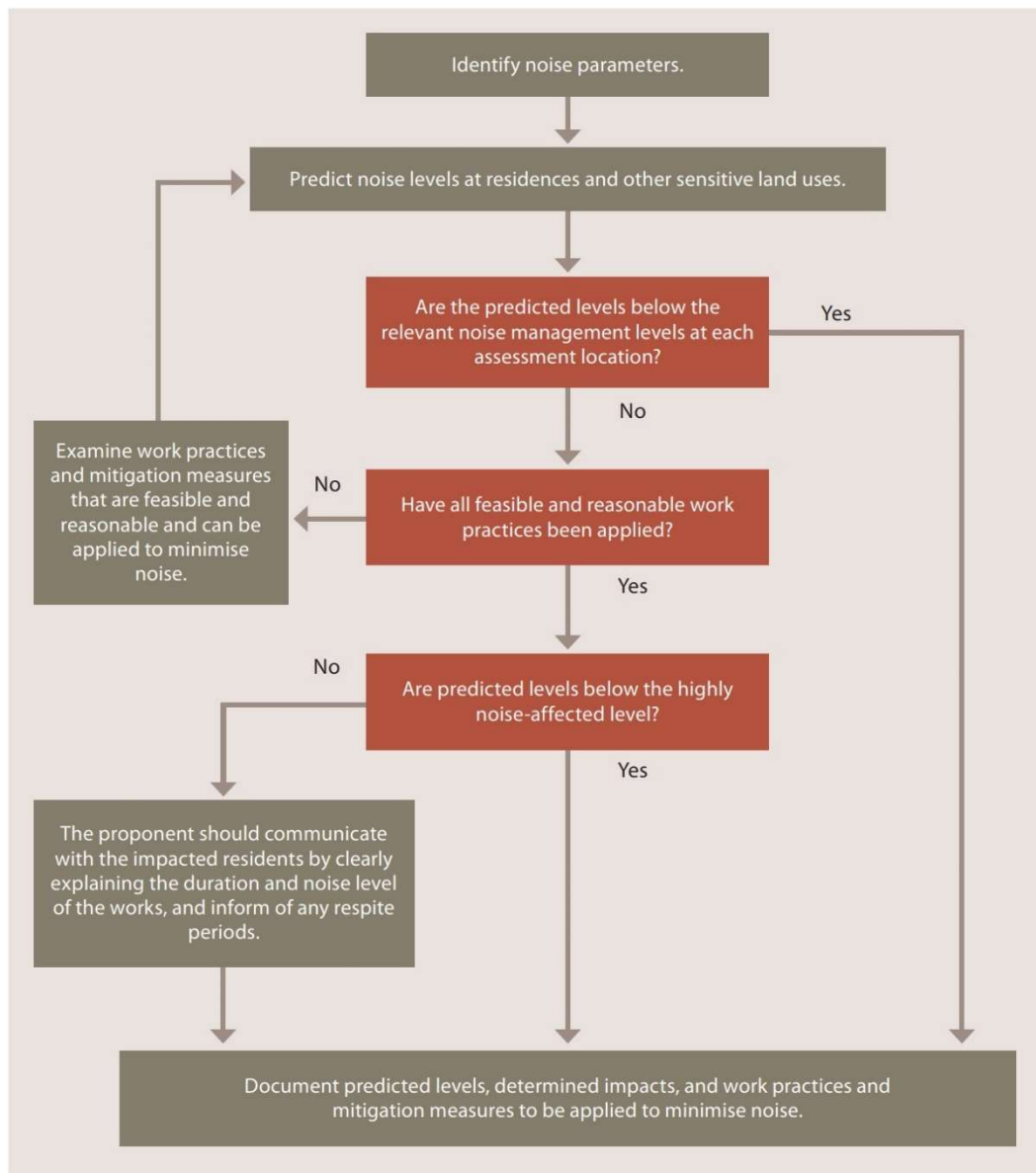
3.2 Interim Construction Noise Guideline

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.

3.2.1 Standard Hours for Construction

Table 3 presents the ICNG recommended standard hours for construction works.

Table 3 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.

3.2.2 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 4** 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 4 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 Independent Liquor and Gaming Authority (ILGA)

The NSW EPA's Noise Guide for Local Government (NGFLG) (2013) summaries criteria related to licensed premises. The Independent Liquor and Gaming Authority (ILGA) (formerly OLGR) criteria are reproduced from NGFLG below and have been adopted as the principle criteria for residential receivers in this assessment:

'The LA₁₀ noise level emitted from the licensed premises shall not exceed the background noise level in an Octave Band Centre Frequency (31.5Hz – 8kHz inclusive) by more than 5dB between 7.00am and 12.00midnight at the boundary of any affected residence.*

The LA₁₀ noise level emitted from the licensed premises shall not exceed the background noise level in an Octave Band Centre Frequency (31.5Hz – 8kHz inclusive) between 12.00midnight and 7.00am at the boundary of any affected residence. Notwithstanding compliance with the above, the noise from the licensed premises shall not be audible within any habitable room in any residential premises between the hours of 12.00midnight and 7.00am.'*

**For the purpose of this condition, the LA₁₀ can be taken as the average maximum deflection of the noise emission from the licensed premises.*

This is a minimum standard. In some instances the Director may specify a time earlier than midnight in respect of the above condition.

Interior noise levels which still exceed safe hearing levels are in no way supported or condoned by the Director.

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 Friday 1 December 2023 to Monday 11 December 2023. 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 ± 0.5 dBA.

The results of long-term unattended noise monitoring are provided in **Table 5**. The noise monitoring charts for the background monitoring assessment are provided in **Appendix C**. Data affected by adverse meteorological conditions have been excluded from the results in accordance with methodologies provided in Fact Sheet A4 of the NPI.

Table 5 Background Noise Monitoring Summary

Date	Measured Background Noise Level					
	(LA90) dB RBL ^{1,2,3}			Measured dB LAeq(period) ^{2,3}		
	Day	Evening	Night	Day	Evening	Night
L1 – RBL / Leq Overall	44	40	36	52	53	47

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

Note 2: Excludes periods of wind or rain affected data. Meteorological data obtained from the Bureau of Meteorology weather station Maitland Airport AWS, NSW (32.7023°S 151.4881°E 28m AMSL).

Note 3: 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.

Classification of residential receivers in the surrounding area have been determined by review of the measured RBLs and features for each category described in Table 2.3 of the NPI. The overall tally of features and resulting classifications are provided in **Table 6**. The detailed assessment of receiver categories is provided in **Appendix C**.

This classification is used in conjunction with the intrusiveness criteria to determine the limiting criteria.

Table 6 Determination of NPI Residential Receiver Category			
Receiver	Land-use Zoning	Existing background noise levels	Residential Receiver Category Determination
R01 – R02	RE2 – Private Recreation	Daytime RBL < 45dB(A)	Suburban
		Evening RBL < 40dB(A)	
		Night RBL < 40dB(A)	

Observations at locations in the surrounding locality support the assessment of the receiver categories as suburban residential where continuous traffic and construction noise were audible.

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 ± 0.5 dBA.

The attended noise monitoring was conducted using one Svantek 971 noise analyser at the site (see **Figure 1**) on Monday 11 December 2023 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 μ Pa)			Meteorology	Description and SPL, dBA
	L _{Amax}	L _{Aeq}	L _{A90}		
Location L1					
11/12/2023				WD: SE	Traffic 40-65
10:55	65	50	44	WS: 0.5m/s	Construction Noise 35-48
				28°C	Birds 35-63

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5 Assessment Criteria

5.1 Project Noise Trigger Levels (Operational Criteria)

5.1.1 Intrusiveness Noise Levels

The PINL 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	Adopted RBL	PINL
			dB LA90	dB LA90	dB LAeq(15min)
R01 – R10	Suburban	Day	44	44	49
		Evening	40	40	45
	Residential	Night	36	36	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.

5.1.2 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 9**.

Table 9 Amenity Noise Levels and Project Amenity Noise Levels

Receiver Type	Noise Amenity Area	Assessment Period ¹	NPI Recommended	ANL	PANL
			ANL dB LAeq(period)	dB LAeq(period) ²	dB LAeq(15min) ³
Residential	Suburban	Day	55	50	53
		Evening	45	40	43
		Night	40	35	38
Commercial	All	When in use	65	60	63

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: Project Amenity Noise Level equals the Amenity Noise Level -5dB as there is other industry in the area.

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.

5.1.3 Project Noise Trigger Levels

The PNTL are the lower of either the PINL or the PANL. **Table 10** presents the derivation of the PNTLs in accordance with the methodologies outlined in the NPI.

Table 10 Project Noise Trigger Levels					
Receiver Type	Noise Amenity	Assessment	PINL	PANL	PNTL
	Area	Period ¹	dB LAeq(15min)	dB LAeq(15min)	dB LAeq(15min)
Residential	Suburban	Day	49	53	49
		Evening	45	43	43
		Night	41	38	38
Commercial	All	When in Use	N/A	63	63

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.

5.1.4 Maximum Noise Trigger Levels

The maximum noise trigger levels shown in **Table 11** are based on night-time RBLs and trigger levels as per Section 2.5 of the NPI. The trigger levels will be applied to transient noise events that have the potential to cause sleep disturbance.

Table 11 Maximum Noise Trigger Levels (Night)			
Residential Receivers			
LAeq(15min)		LAmax	
40dB LAeq(15min) or RBL + 5dB		52dB LAmax or RBL + 15dB	
Trigger	40	Trigger	52
RBL +5dB	41	RBL +15dB	51
Highest	40	Highest	52

Note: Monday to Saturday; Night 10pm to 7am. On Sundays and Public Holidays Night 10pm to 8am.

Note: NPI identifies that maximum of the two values is to be adopted which is shown in bold font.

5.2 Construction Noise

The relevant Noise Management Levels for standard construction hours are presented in **Table 12**.

Table 12 Construction Noise Management Levels			
Receiver ID	Assessment Period ¹	Adopted RBL dB LA90	NML dB LAeq(15min)
Residential	Standard Hours	44	54 (RBL+10dBA)
Commercial Premises	When in use	N/A	70 (external)

Note 1: Refer to **Table 3** for Standard Recommended Hours for Construction.

5.3 Independent Liquor and Gaming Authority (ILGA) Criteria

The ILGA criteria has been derived by analysing the single octave LA90 statistical levels from the unattended noise monitoring data. The period analysed was from Friday 1 December 2023 to Monday 11 December 2023, and adopted criteria derived from the operation period, 7am to 12am. **Table 13** reproduces the adopted ILGA noise criteria which is to be applied to residential receivers only.

Table 13 ILGA Criteria – Residential Receivers									
LA10 Noise Criteria, Octave Band Centre Frequency (Hz), dBA									
	31.5	63	125	250	500	1 k	2 k	4 k	8 k
7:00am – 12:00am									
Octave Background (LA90)	7	20	27	27	32	33	30	26	15
LA10 criteria (LA90 +5dB)	12	25	32	32	37	38	35	31	20

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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 CONCAWE¹. 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 Assessment Scenarios

There are several key activities associated with the project that have the potential to generate acoustic impacts on nearby receivers. These key activities have been incorporated into noise modelling as follows:

- a modelled operational scenario in accordance with NPI guidance, assuming the operation of mechanical plant with the project operating over a 15-minute period;
- a modelled licenced premises scenario assuming normal vocal efforts from patrons and amplified music. This scenario was assessed against ILGA criteria from 7am until 12am. This scenario assumes amplified music and 36 patrons outside as a conservative worst-case scenario; and
- a modelled scenario addressing the construction noise criteria was conducted. This scenario assumed a combined construction fleet working in the vicinity of the frontage of the venue. The modelled scenario was assessed against the standard construction hours.

6.2 Sound Power Levels

Table 14 presents the Sound Power Level for each noise source modelled in this assessment. It is noted that Sound Power Levels were sourced from manufacturer's specifications or from in-field measurements at similar project sites.

Table 14 Acoustically Significant Sources - Sound Power Levels dBA (re 10-12 Watts)										
Item and number modelled per 15 minutes	Individual Sound Power Level			Modelled Sound Power Level dB LAeq(15min)						Source Height ¹
Operation										
Condenser Unit (x2)	75			78						1.0
A/C unit (x1)	76			76						1.0
ILGA Guideline Assessment (dB LA10)										
Item	Octave Band Sound Power Level									Total dBA ²
	31.5	63	125	250	500	1000	2000	4000	8000	
36 Patrons Normal Vocal Effort ³	-	-	67	76	77	66	57	52	44	80
Amplified Music	54	70	73	83	91	87	81	72	63	93
Construction Noise Assessment (dB LAeq(15min))										
Combined Construction Fleet								108		
Maximum Noise Level Assessment (dB LAmax)										
Patron Shouting ³								92		

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

Note 2: Total dBA is Sound Power Level per item.

Note 3: Source: Association of Australasian Acoustical Consultants Licensed Premises Noise Assessment Technical Guideline Version 2.0.

Table 15 provides a summary of project noise sources for each scenario and the assessment period in which they propose to occur.

Table 15 Noise Generating Activities		
Activity/Source	Period ¹	Operational
Operational NPI Assessment		
Mechanical Plant	Day	✓
	Evening	✓
	Night	✓
Maximum Noise Level Assessment		
Patron Shouting	Night	✓
Licensed Premises Assessment		
Amplified Music and Vocal Efforts from Patrons	Day	✓
	Evening	✓
	Night	✓
Construction Noise Assessment		
Construction Fleet	Day (Standard Construction Hours)	✓

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.

6.3 Mitigation Included in Design and Noise Control Recommendations

The following parameters were incorporated as assumptions in the noise model and are recommended for the project:

- the assessment against the ILGA criteria considers noise contributions from amplified music externally within the outdoor dining area (see area plan in **Appendix B**);
- the assessment against the ILGA criteria considers noise contributions from the vocal effort of 36 patrons simultaneously;
- all noise sources assessed against the ILGA criteria (patrons and amplified music) were modelled to occur simultaneously; and
- all noise sources associated with assessment in accordance with the NPI (mechanical plant) were modelled to occur simultaneously.

7 Noise Assessment Results

This assessment has quantified operational noise levels at the nearest receivers.

7.1 Operational Noise Assessment

Noise predictions from all sources have been quantified at surrounding residential receivers to the project site and are presented in **Table 16**.

Table 16 Noise Predictions – All Receivers				
Location	Period ¹	Predicted Noise Level	PNTL	Compliant
		dB LAeq(15min)	dB LAeq(15min)	
C01	When in Use	<30	63	✓
C02		57	63	✓
C03		57	63	✓
R01	Day/Evening/Night	<30	49/43/38	✓
R02		<30	49/43/38	✓
R03		<30	49/43/38	✓
R04		<30	49/43/38	✓
R05		<30	49/43/38	✓
R06		<30	49/43/38	✓
R07		<30	49/43/38	✓
R08		<30	49/43/38	✓
R09		<30	49/43/38	✓
R10		<30	49/43/38	✓

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.

7.1.1 Maximum Noise Level Assessment

In assessing maximum noise events, typical L_{Amax} noise levels from transient events were assessed at the nearest residential receivers. For the sleep disturbance assessment, a sound power level of 92dBA for a patron shouting within the outdoor area was adopted for maximum noise level (L_{Amax}) events during the night period.

Predicted noise levels from L_{Aeq}(15min) and L_{Amax} events for assessed receivers are presented in **Table 17**. Results identify that the maximum noise trigger levels will be satisfied for all assessed receivers.

Table 17 Maximum Noise Level Assessment					
Receiver	Predicted Noise Level		Maximum Trigger Levels		Compliant
	dB L _{Aeq} (15min)	dB L _{Amax}	dB L _{Aeq} (15min)	dB L _{Amax}	
R01	<30	42	40	52	✓
R02	<30	36	40	52	✓
R03	<30	35	40	52	✓
R04	<30	35	40	52	✓
R05	<30	35	40	52	✓
R06	<30	35	40	52	✓
R07	<30	35	40	52	✓
R08	<30	35	40	52	✓
R09	<30	39	40	52	✓
R10	<30	39	40	52	✓

7.2 Independent Liquor and Gaming Authority (ILGA) Noise Assessment

Noise assessment calculations have been completed to address patron noise and amplified music emissions. This scenario assumes approximately 36 patrons with a normal vocal effort, and amplified music externally in the outdoor dining area. This scenario was assessed against the criteria from 7am until 12am. Results of the calculations are presented in **Table 18** for the nearest potentially most affected residential receivers.

Table 18 ILGA Noise Assessment Results – Patrons and Live Amplified Music									
LA10 Noise Criteria, Octave Band Centre Frequency (Hz), dBA									
	31.5	63	125	250	500	1 k	2 k	4 k	8 k
R01									
Received level	-3	13	11	13	18	24	18	6	-16
Criteria	12	25	32	32	37	38	35	31	20
Exceedance	Nil	Nil	Nil	Nil	Nil	Nil	Nil	Nil	Nil
R02									
Received level	-4	12	10	12	17	23	17	4	-20
Criteria	12	25	32	32	37	38	35	31	20
Exceedance	Nil	Nil	Nil	Nil	Nil	Nil	Nil	Nil	Nil
R03									
Received level	-4	12	10	12	17	23	17	4	-20
Criteria	12	25	32	32	37	38	35	31	20
Exceedance	Nil	Nil	Nil	Nil	Nil	Nil	Nil	Nil	Nil
R04									
Received level	-4	12	10	12	17	23	17	5	-19
Criteria	12	25	32	32	37	38	35	31	20
Exceedance	Nil	Nil	Nil	Nil	Nil	Nil	Nil	Nil	Nil
R05									
Received level	-3	13	10	12	17	23	18	5	-18
Criteria	12	25	32	32	37	38	35	31	20
Exceedance	Nil	Nil	Nil	Nil	Nil	Nil	Nil	Nil	Nil
R06									
Received level	-3	12	10	12	17	23	17	5	-19
Criteria	12	25	32	32	37	38	35	31	20
Exceedance	Nil	Nil	Nil	Nil	Nil	Nil	Nil	Nil	Nil
R07									
Received level	-3	12	10	12	17	23	17	5	-19
Criteria	12	25	32	32	37	38	35	31	20
Exceedance	Nil	Nil	Nil	Nil	Nil	Nil	Nil	Nil	Nil

Table 18 ILGA Noise Assessment Results – Patrons and Live Amplified Music

LA10 Noise Criteria, Octave Band Centre Frequency (Hz), dBA									
	31.5	63	125	250	500	1 k	2 k	4 k	8 k
R08									
Received level	-4	12	10	12	17	23	17	4	-19
Criteria	12	25	32	32	37	38	35	31	20
Exceedance	Nil	Nil	Nil	Nil	Nil	Nil	Nil	Nil	Nil
R09									
Received level	3	19	16	14	19	26	24	11	-13
Criteria	12	25	32	32	37	38	35	31	20
Exceedance	Nil	Nil	Nil	Nil	Nil	Nil	Nil	Nil	Nil
R10									
Received level	3	19	16	14	19	26	24	11	-14
Criteria	12	25	32	32	37	38	35	31	20
Exceedance	Nil	Nil	Nil	Nil	Nil	Nil	Nil	Nil	Nil

Calculations of noise emissions from the project to the nearest affected residential receivers are identified to satisfy the ILGA noise criteria provided the noise modelling assumptions and recommendations outlined in **Section 6.3** are implemented.

7.3 Construction Noise Assessment

Table 19 presents the results of modelled construction noise emissions for the proposed additions and alterations to the project. Predictions identify that emissions from construction above the NMLs at assessed commercial receivers and one residential receiver. Accordingly, recommendations to reduce the impact of construction noise emissions on surrounding receivers are provided in **Section 8**.

Table 19 Construction Noise Assessment				
Receiver	Period ¹	Predicted Noise Level	NML	Compliant
		dB LAeq(15min)	dB LAeq(15min)	
C01	When in use	73	70	X
C02	When in use	78	70	X
C03	When in use	78	70	X
R01	Day	55	54	X
R02	Day	49	54	✓
R03	Day	49	54	✓
R04	Day	50	54	✓
R05	Day	49	54	✓
R06	Day	49	54	✓
R07	Day	49	54	✓
R08	Day	49	54	✓
R09	Day	54	54	✓
R10	Day	53	54	✓

Note 1: Refer to **Table 3** for Standard Recommended Hours for Construction.

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8 Construction Recommendations

The results of the Noise Assessment indicate emissions from construction above the NMLs at assessed commercial receivers and one residential receiver. 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.

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9 Discussion and Conclusion

Muller Acoustic Consulting Pty Ltd (MAC) has completed a Noise Assessment to quantify emissions from a proposed food and drinks premises to be located at 416 High Street, Maitland, NSW.

Noise predictions from operational sources (mechanical plant) have been predicted to satisfy the relevant NPI criteria at all assessed receivers for all periods.

The modelled ILGA scenario assumed the operation of the project with noise from patrons and amplified music between 7am and 12am.

The results of the Noise Assessment demonstrate that emissions from patrons and amplified music would satisfy the relevant criteria at all assessed residential receivers with noise controls and assumptions for the project implemented as per **Section 6.3** below:

- the assessment against the ILGA criteria considers noise contributions from amplified music externally within the outdoor dining area (see area plan in **Appendix B**);
- the assessment against the ILGA criteria considers noise contributions from the vocal effort of 36 patrons simultaneously;
- all noise sources assessed against the ILGA criteria (patrons and amplified music) were modelled to occur simultaneously; and
- all noise sources associated with assessment in accordance with the NPI (mechanical plant) were modelled to occur simultaneously.

Furthermore, sleep disturbance is not anticipated, as emissions from maximum noise events (patrons shouting) are predicted to satisfy the NPIs maximum noise trigger levels.

Modelled noise emissions from construction activities identify that predicted noise emissions are below the applicable construction management levels at all assessed receivers. Notwithstanding, noise management measures are provided in this report to reduce potential impacts on surrounding receivers.

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

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Appendix A – Glossary of Terms

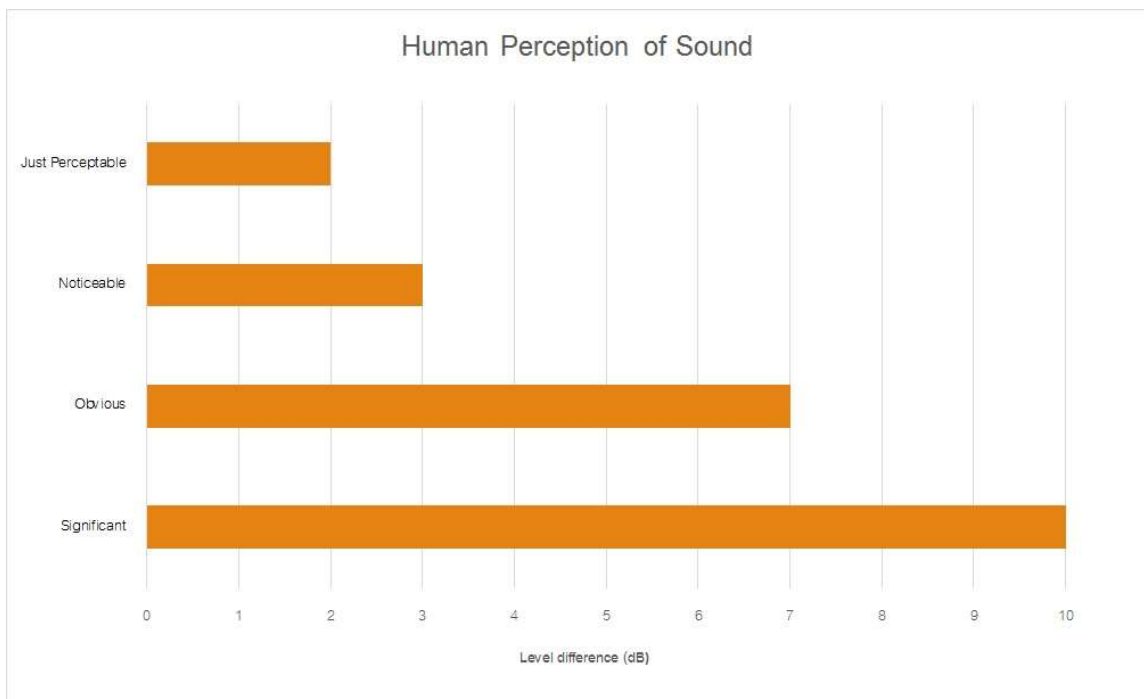
A number of technical terms have been used in this report and are explained in **Table A1**.

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
dB(A)	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.
LAm _{ax}	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 (L _w or SWL)	This is a measure of the total power radiated by a source in the form of sound and is given by $10 \cdot \log_{10} (W/W_0)$. Where W is the sound power in watts to the reference level of 10^{-12} watts.
Sound pressure level (L _p or SPL)	the level of sound pressure; as measured at a distance by a standard sound level meter. This differs from L _w 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



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Appendix B – Site Plans



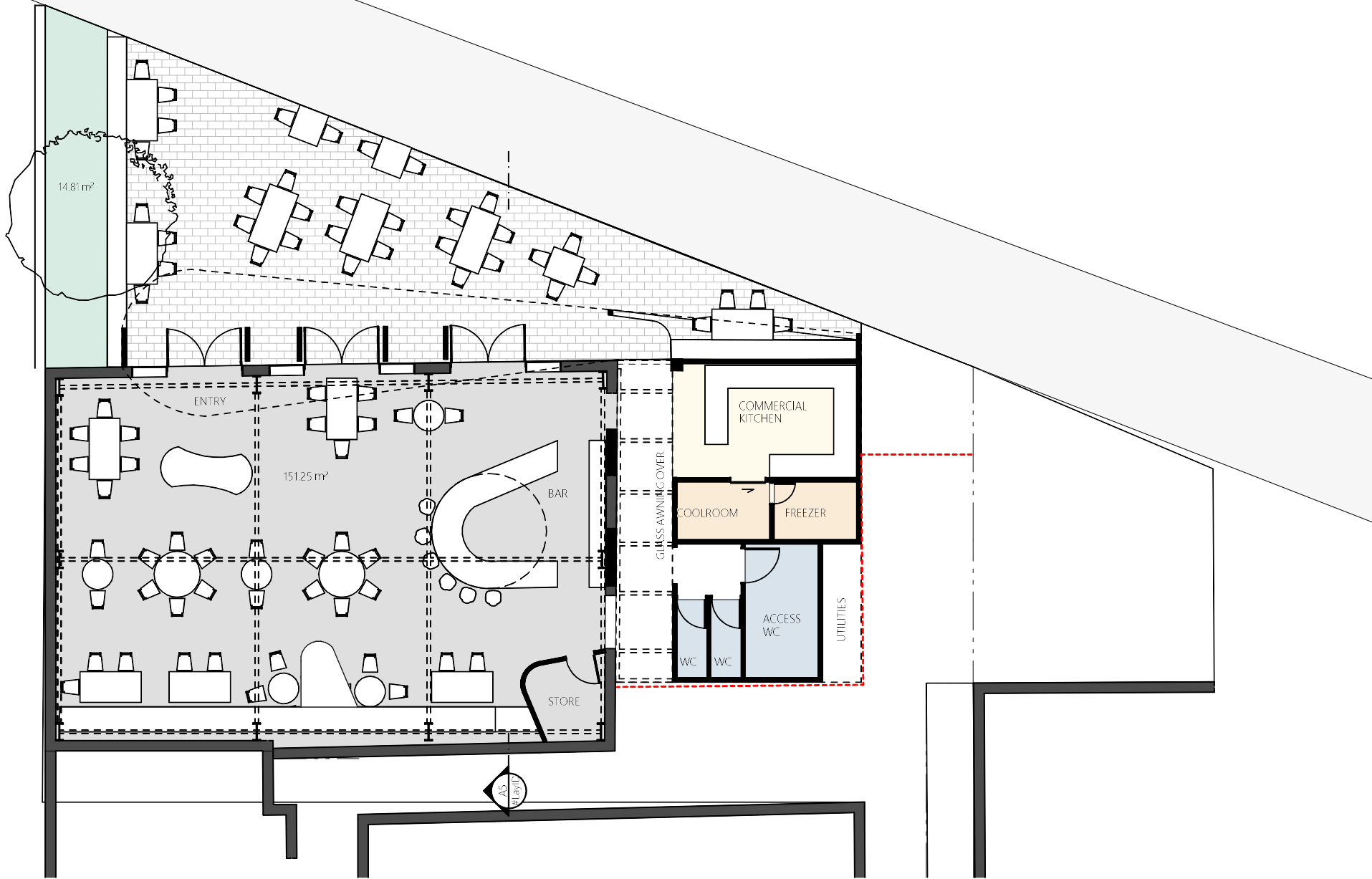
SITE AERIAL

PROJECT NO
###

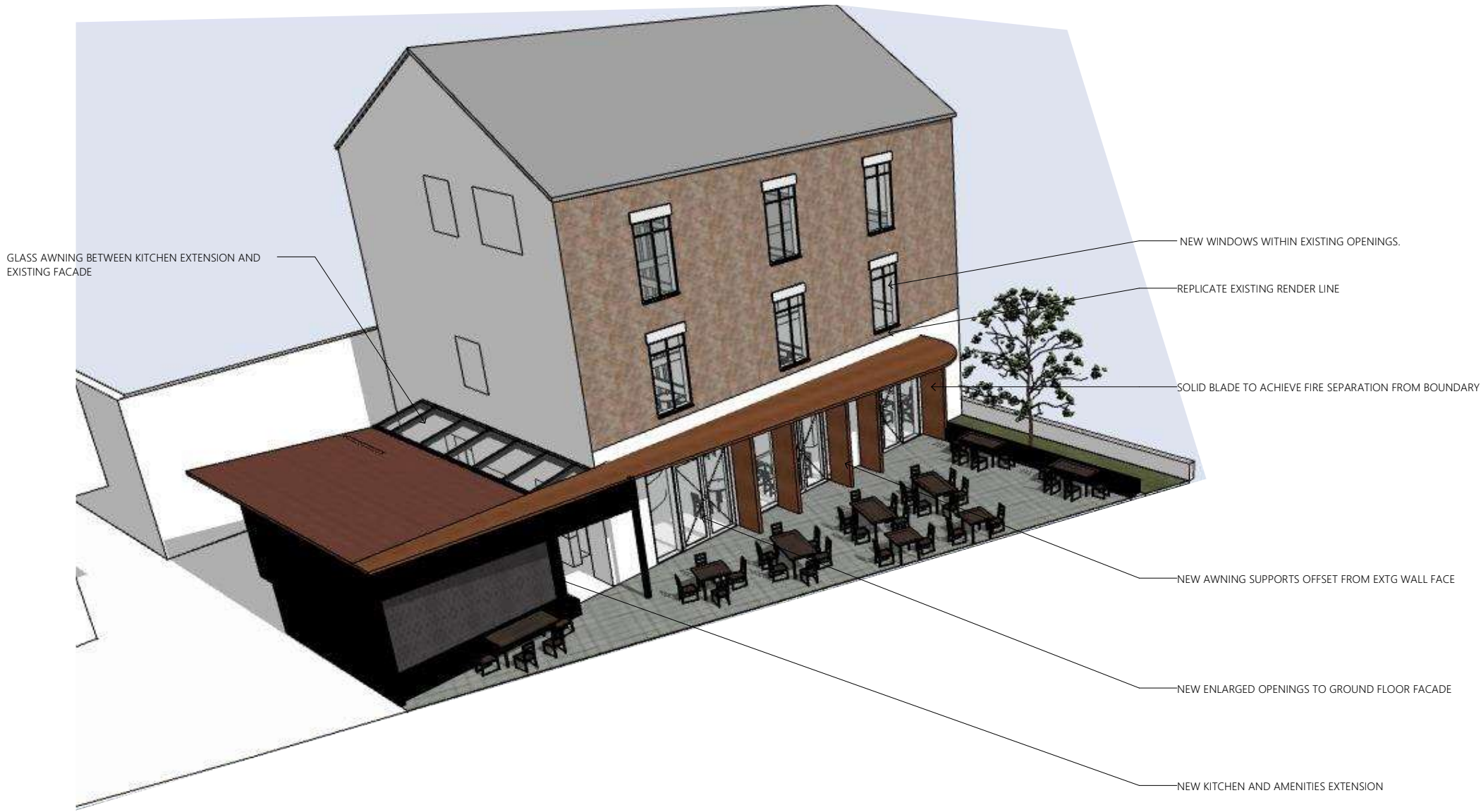
PROJECT
416 HIGH STREET ADAPTIVE REUSE

ISSUE NO
01

SCALE
@A3



FLOOR PLAN



GLASS AWNING BETWEEN KITCHEN EXTENSION AND EXISTING FACADE

NEW WINDOWS WITHIN EXISTING OPENINGS.

REPLICATE EXISTING RENDER LINE

SOLID BLADE TO ACHIEVE FIRE SEPARATION FROM BOUNDARY

NEW AWNING SUPPORTS OFFSET FROM EXTG WALL FACE

NEW ENLARGED OPENINGS TO GROUND FLOOR FACADE

NEW KITCHEN AND AMENITIES EXTENSION



PRELIM 3D

PROJECT NO. ###

PROJECT 416 HIGH STREET ADAPTIVE REUSE

ISSUE NO. 01

SCALE @A3

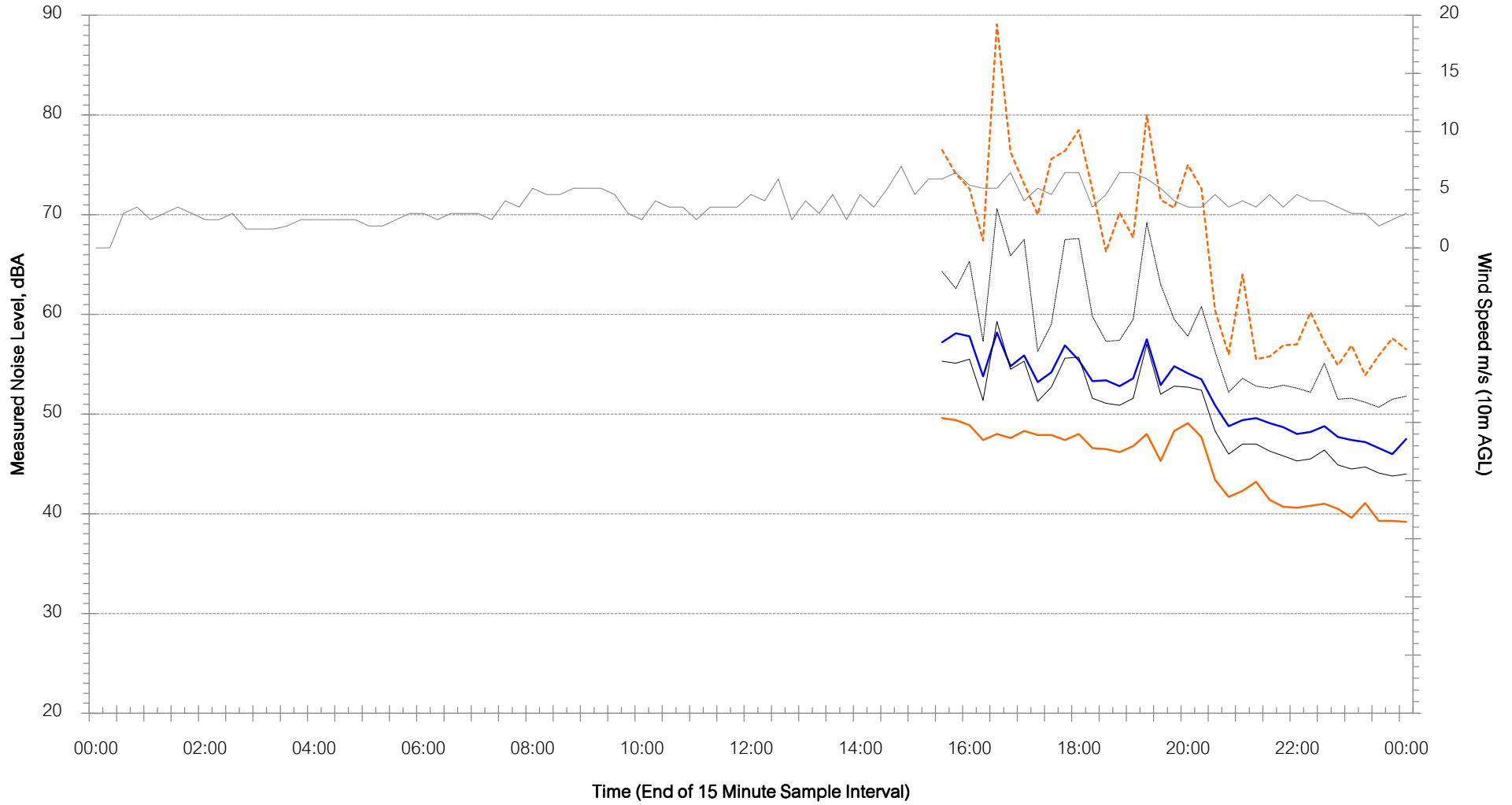
Appendix C – Noise Monitoring Chart



Background Noise Levels

The Esplanade, Lorn, NSW, 2320 - Friday 1 December 2023

Weather Exclusion LAmx LA1 LA10 LA90 LAeq Mean Wind Speed m/s (10m AGL)

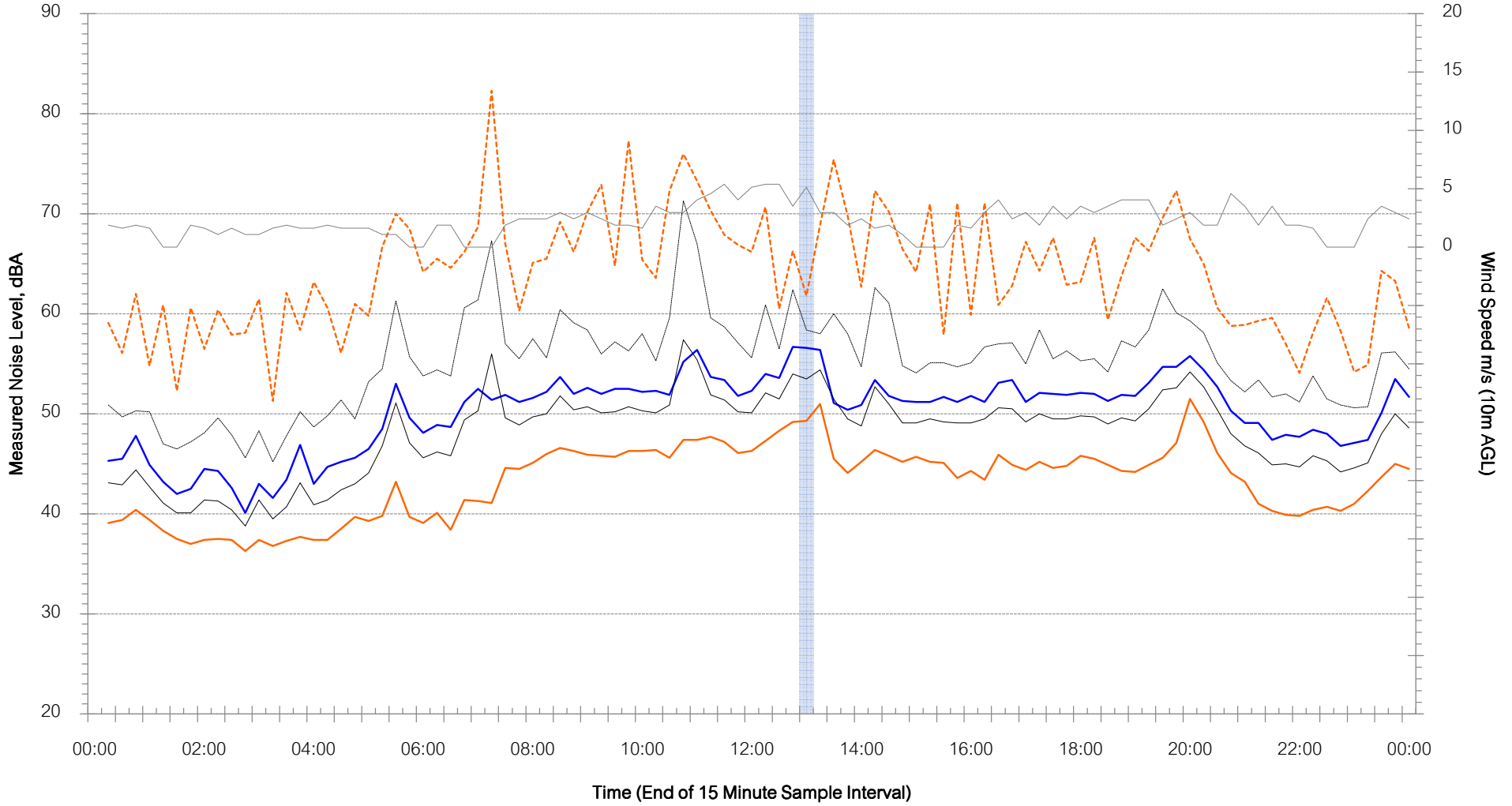




Background Noise Levels

The Esplanade, Lorn, NSW, 2320 - Saturday 2 December 2023

Weather Exclusion LAmax LA1 LA10 LA90 LAeq Mean Wind Speed m/s (10m AGL)

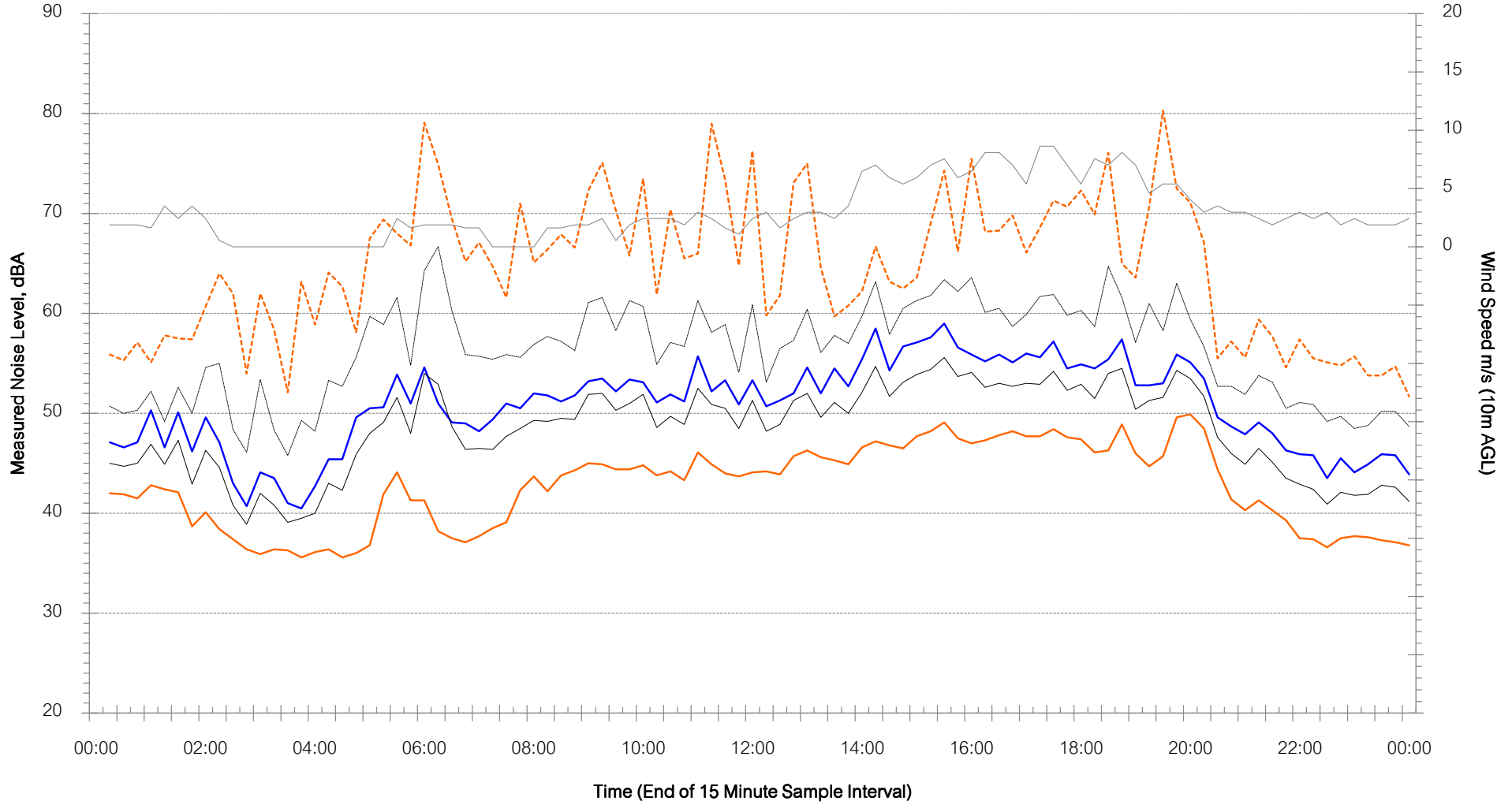




Background Noise Levels

The Esplanade, Lorn, NSW, 2320 - Sunday 3 December 2023

Weather Exclusion LAmax LA1 LA10 LA90 LAeq Mean Wind Speed m/s (10m AGL)

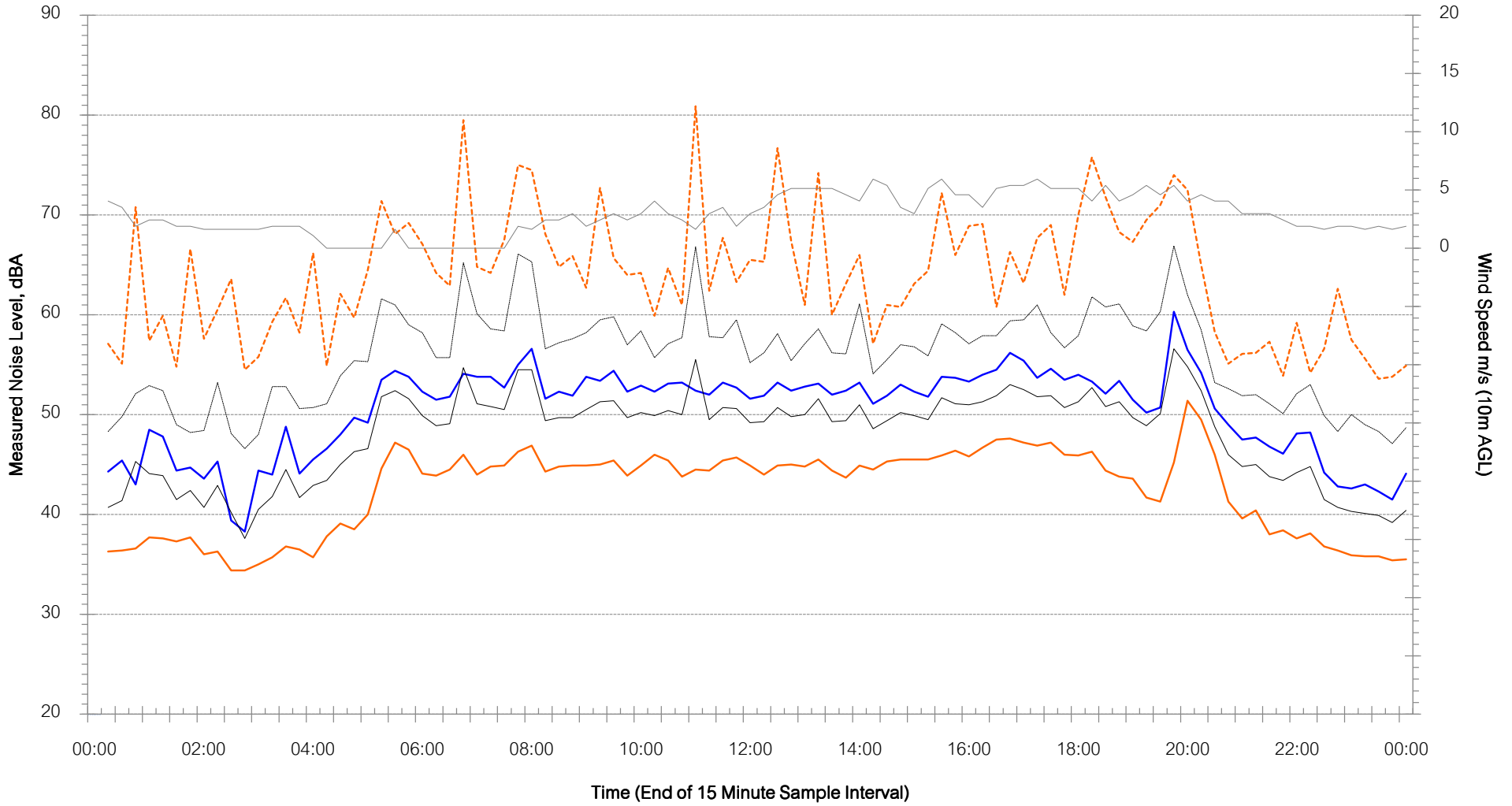




Background Noise Levels

The Esplanade, Lorn, NSW, 2320 - Monday 4 December 2023

Weather Exclusion LAmax LA1 LA10 LA90 LAeq Mean Wind Speed m/s (10m AGL)

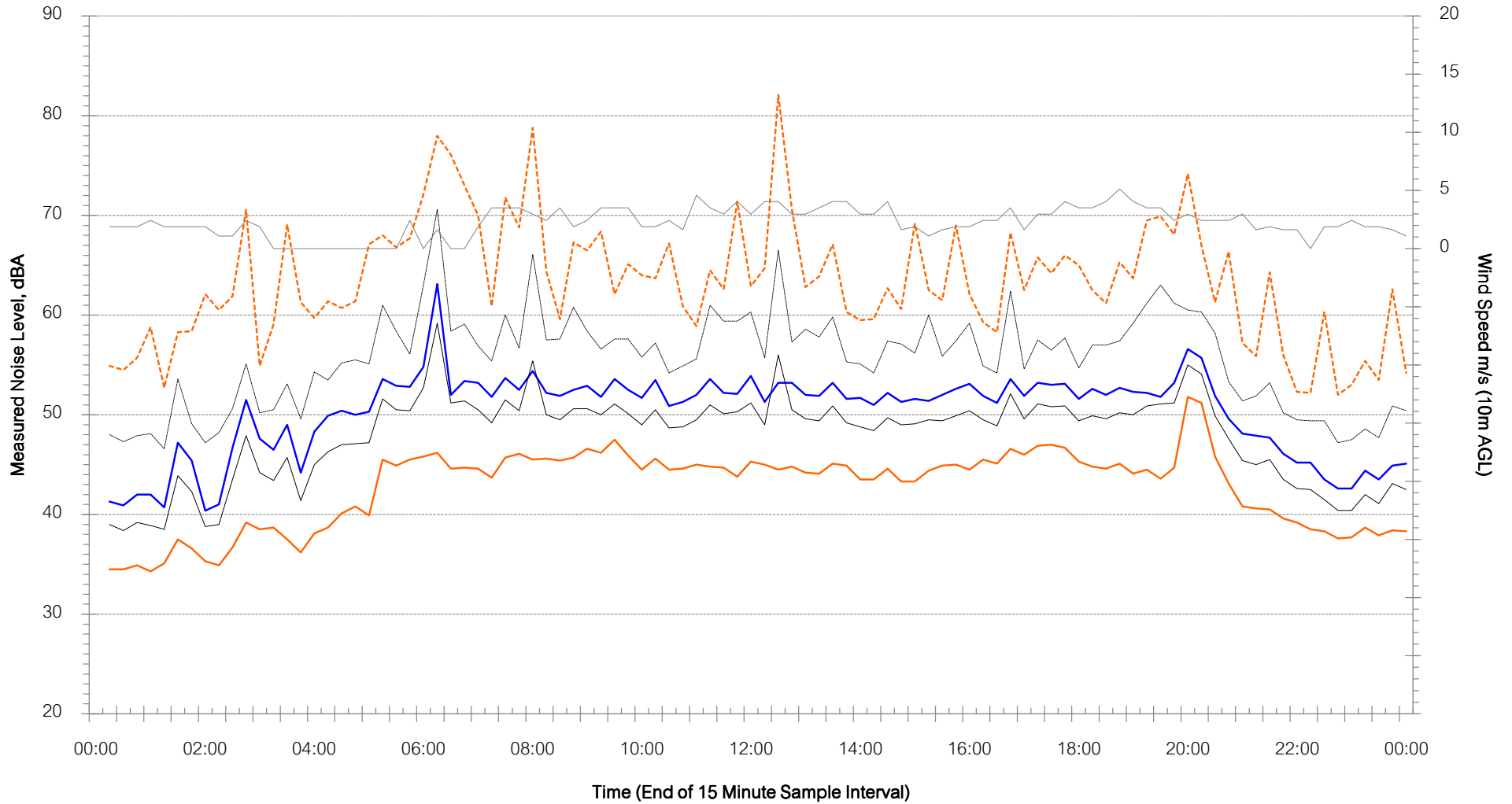




Background Noise Levels

The Esplanade, Lorn, NSW, 2320 - Tuesday 5 December 2023

Weather Exclusion LAmx LA1 LA10 LA90 LAeq Mean Wind Speed m/s (10m AGL)

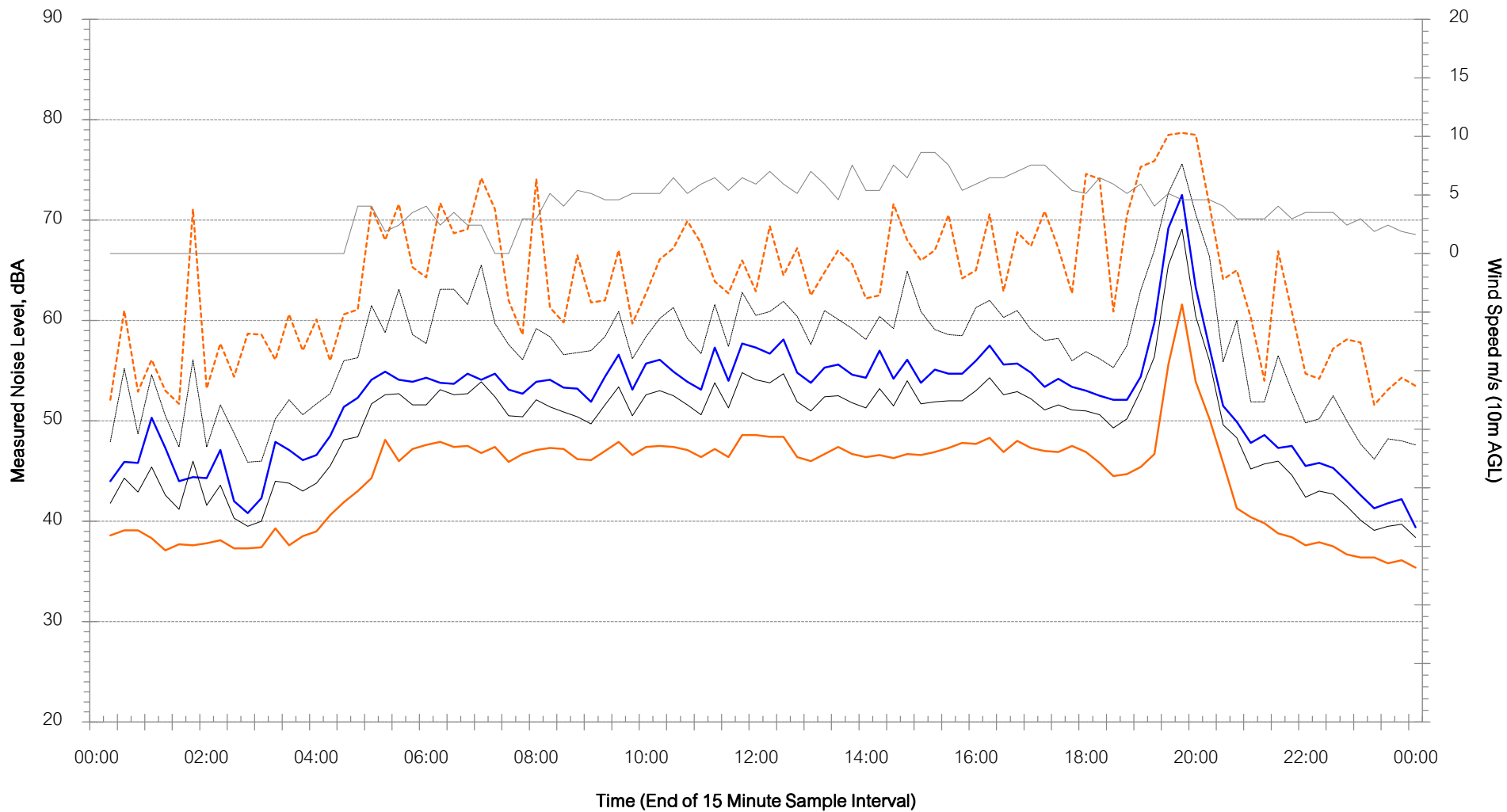




Background Noise Levels

The Esplanade, Lorn, NSW, 2320 - Wednesday 6 December 2023

Weather Exclusion LAmax LA1 LA10 LA90 LAeq Mean Wind Speed m/s (10m AGL)





Background Noise Levels

The Esplanade, Lorn, NSW, 2320 - Thursday 7 December 2023

Weather Exclusion LAmax LA1 LA10 LA90 LAeq Mean Wind Speed m/s (10m AGL)

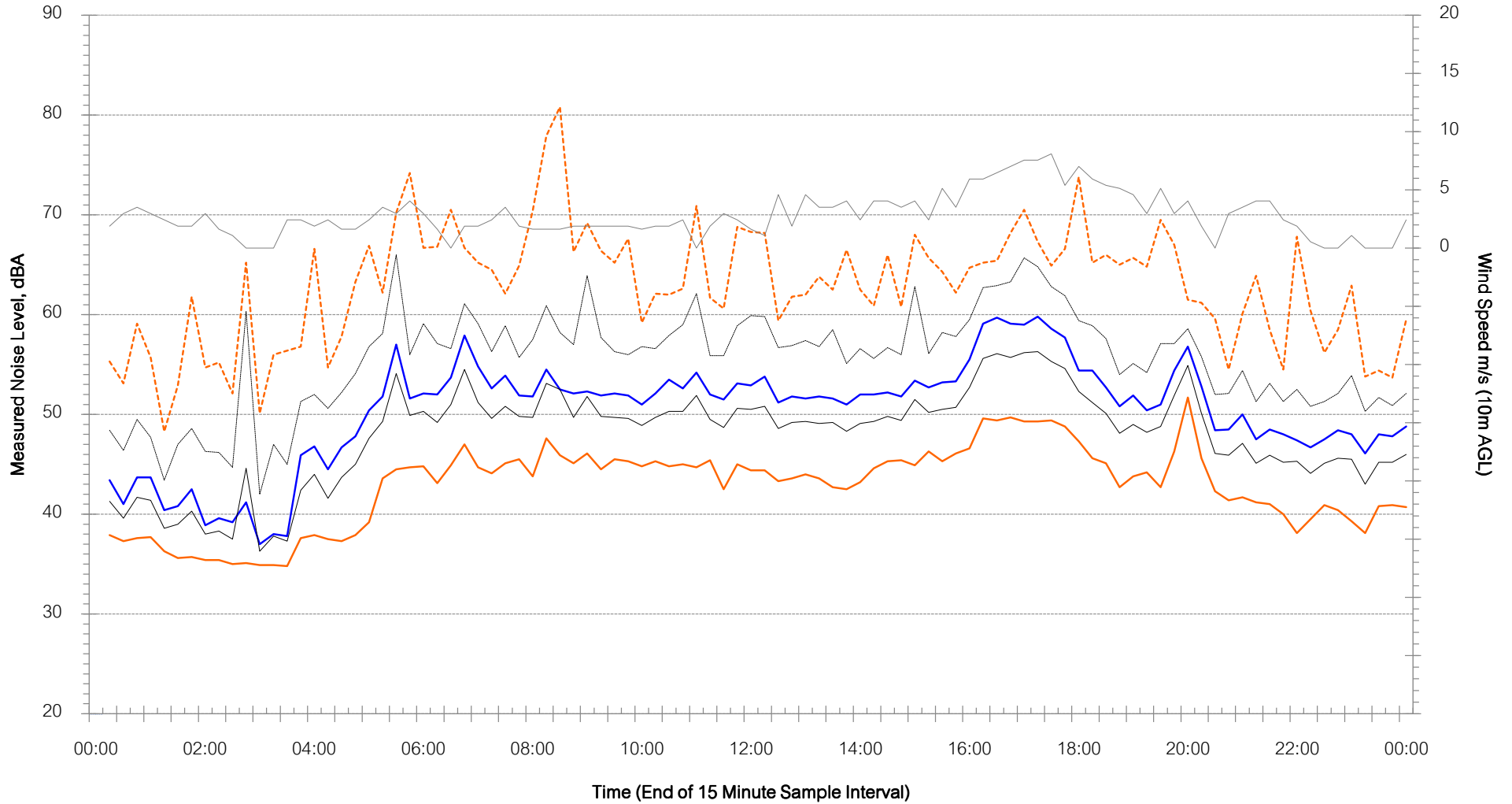




Background Noise Levels

The Esplanade, Lorn, NSW, 2320 - Friday 8 December 2023

Weather Exclusion LAmax LA1 LA10 LA90 LAeq Mean Wind Speed m/s (10m AGL)

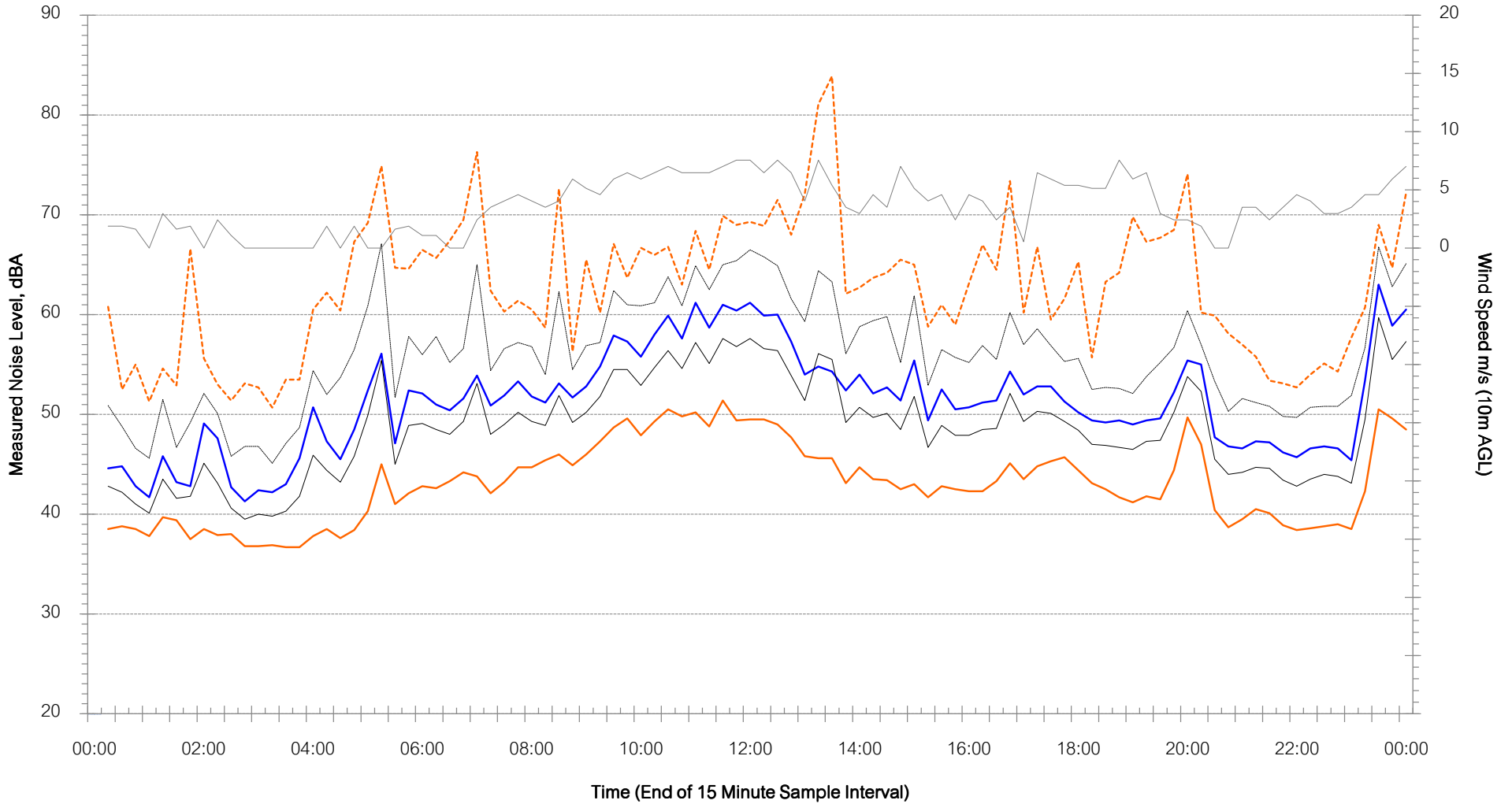




Background Noise Levels

The Esplanade, Lorn, NSW, 2320 - Saturday 9 December 2023

Weather Exclusion LAmix LA1 LA10 LA90 LAeq Mean Wind Speed m/s (10m AGL)

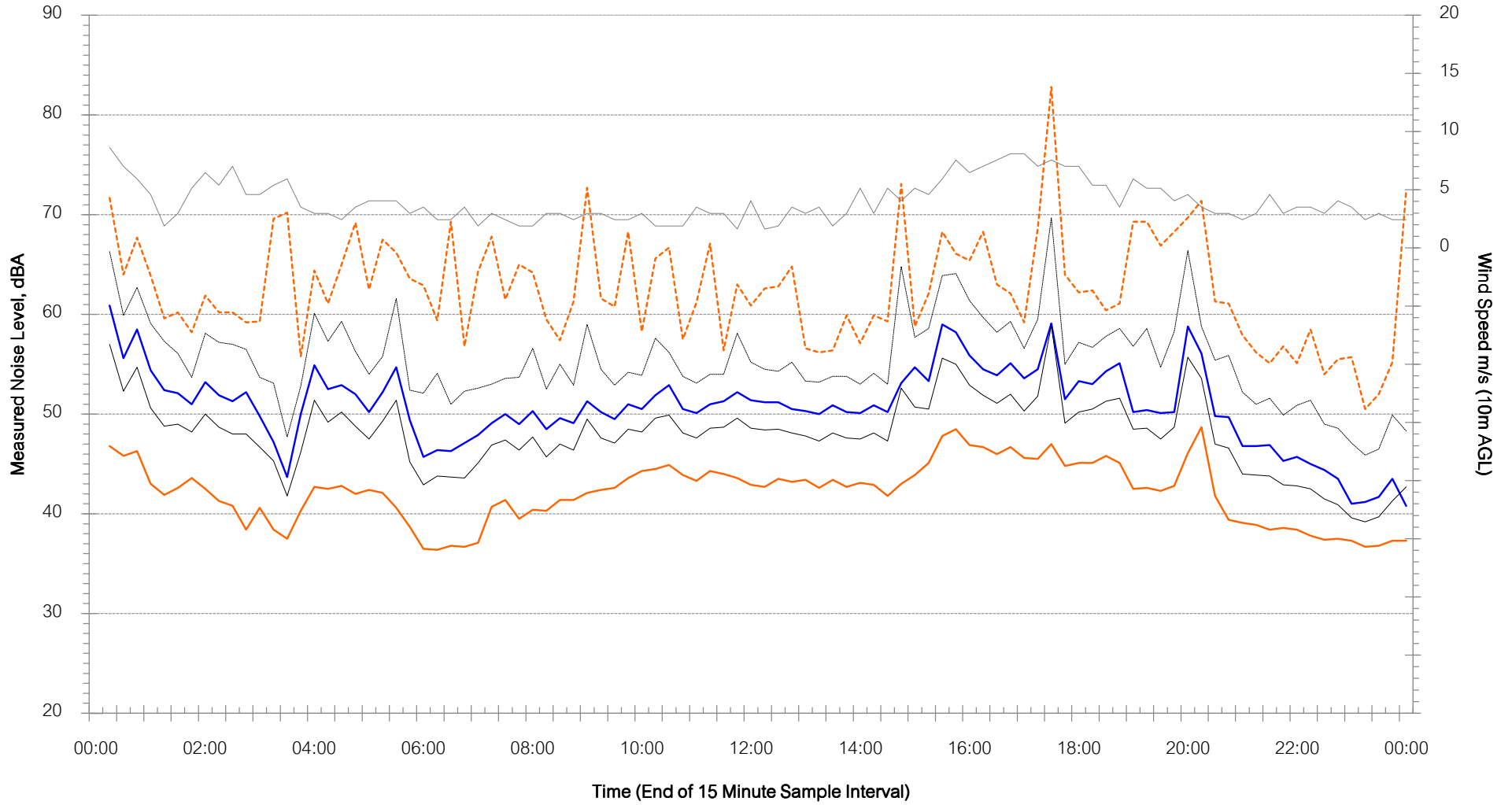




Background Noise Levels

The Esplanade, Lorn, NSW, 2320 - Sunday 10 December 2023

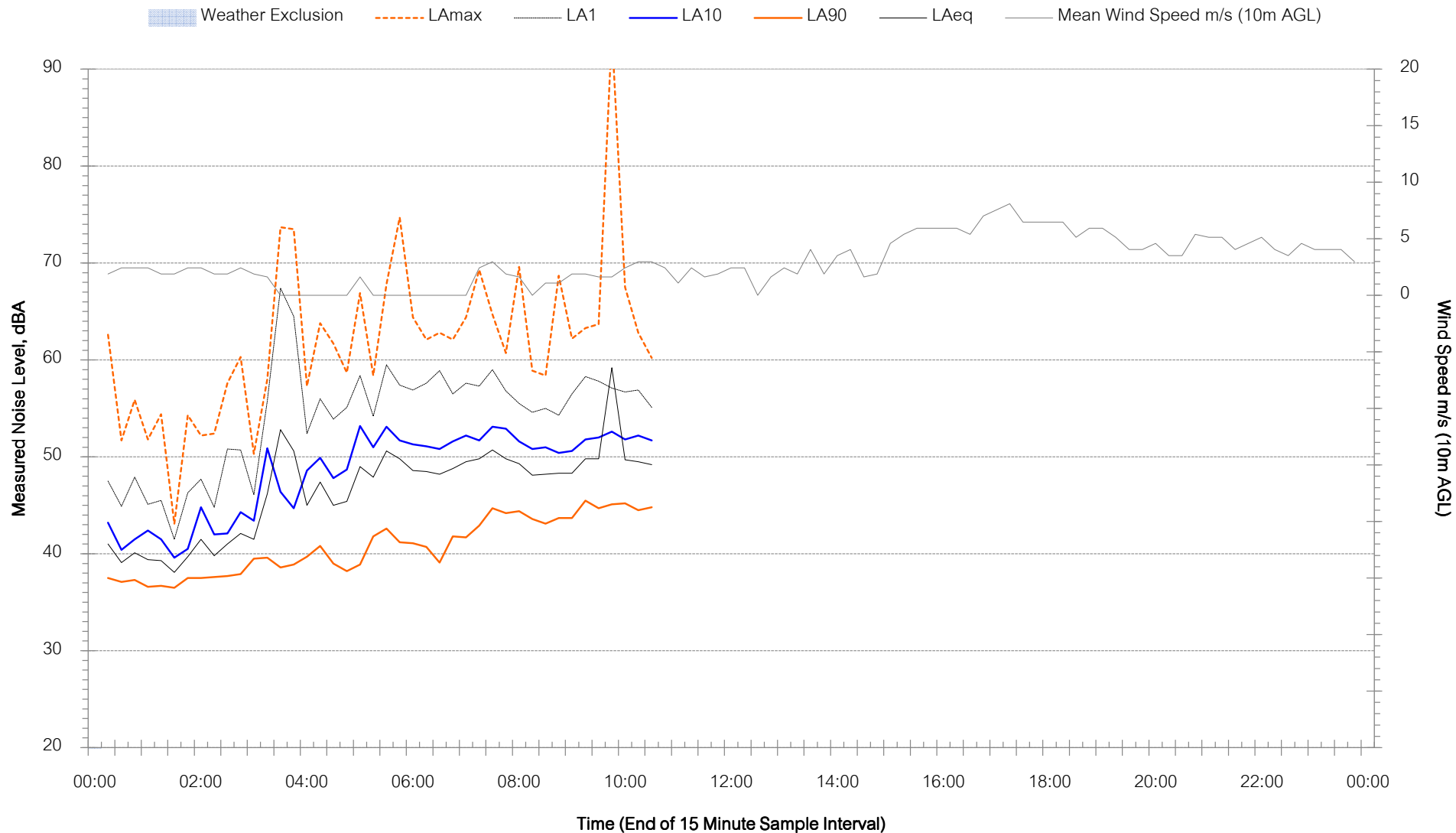
Weather Exclusion LAmax LA1 LA10 LA90 LAeq Mean Wind Speed m/s (10m AGL)





Background Noise Levels

The Esplanade, Lorn, NSW, 2320 - Monday 11 December 2023



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