

Noise Assessment

Proposed Modification to Operating Hours
McDonald's Operation
164 Warringah Road
Beacon Hill, NSW.

Document Information

Noise Assessment

Proposed Modification to Operating Hours

McDonald's Operation

164 Warringah Road, Beacon Hill, NSW.

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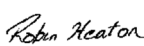
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1 Introduction

Muller Acoustic Consulting Pty Ltd (MAC) has been commissioned by KDC Pty Ltd (KDC) to prepare a Noise Assessment (NA) to quantify emissions from the proposed 24-hour operation of the existing McDonald's Operation (the 'operation'), located at 164 Warringah Road, Beacon Hill, NSW.

The NA has quantified potential operational and sleep disturbance noise emissions from the operation and recommends reasonable and feasible noise controls where required.

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

- NSW Environment Protection Authority (EPA), Noise Policy for Industry (NPI) 2017;
- Australian Standard AS 1055:2018 - Acoustics - Description and measurement of environmental noise - General Procedures; and
- International Standard ISO 9613:1993 - Acoustics - Attenuation of sound during propagation outdoors.

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

1.1 Proposal

Approval is being sought to extend the current operating hours to 24 hours, seven days.

The NA has quantified potential operational noise emissions pertaining to customer vehicles using the drive-thru and car park, the customer ordering displays (CODs) and mechanical plant to surrounding residential and commercial receivers.

It is noted that delivery/collection vehicles remain unchanged as part of the operation, therefore have not been included in this assessment.

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2 Project Description

2.1 General

The operation is located at 164 Warringah Road, Beacon Hill, NSW. This locality comprises primarily commercial and residential land uses. Preliminary noise modelling identified noise levels at nearest commercial receivers satisfied the relevant NPI noise criteria of 63dBA LAeq(15min). Hence, only residential receivers have been considered further in this assessment.

2.2 Proposed Activities

There are several key activities associated with the operation that have the potential to generate acoustic impacts on nearby receivers. **Table 1** provides a summary of operation noise sources and the assessment period in which they propose to occur.

Table 1 Noise Generating Activities		
Activity/Source	Period ¹	Operational
Customer light vehicles (customers)	Night	✓
Drive-Thru Operations	Night	✓
Mechanical Plant	Night	✓

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

2.3 Receiver Review

A review of the receivers in close proximity to the operation has been completed and are summarised in **Table 2**. **Figure 1** provides a locality plan showing the indicative position of these receivers in relation to the operation. Receiver heights were set to 1.5m and 4.0m above relative ground level for ground and first floor receivers.

Table 2 Receiver Locations

Receiver	MGA56 Coordinates		Receiver Height	Receiver Type
	Easting, m	Northing, m		
R1	338920	6263812	1.5m	Residential
R2	338895	6263830	1.5m	Residential
R3	338876	6263822	1.5m	Residential
R4	338855	6263823	1.5m	Residential
R5	338830	6263836	1.5m	Residential
R6	338794	6263775	1.5m	Residential
R7	338819	6263761	1.5m	Residential
R8	338848	6263735	1.5m	Residential
R9	338863	6263716	1.5/4.0m	Residential
R10	338878	6263692	1.5m	Residential
R11	338894	6263686	1.5m	Residential
R12	338933	6263656	1.5/4.0m	Residential
R13	338952	6263653	1.5/4.0m	Residential

FIGURE 1
LOCALITY PLAN
 REF: MAC201079

0 50m



KEY

-  A1 ATTENDED LOCATION
-  L1 LOGGER LOCATION
-  R1 RECEIVER LOCATION
-  SITE LOCATION

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3 Noise Policy and Guidelines

3.1 Noise Policy for Industry

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

The objectives of the NPI are to:

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

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

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

5. Set statutory compliance levels that reflect the best achievable and agreed noise limits for the development.
6. Monitor and report environmental noise levels from the development.

3.1.1 Project Noise Trigger Levels (PNTL)

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

3.1.2 Project Intrusiveness Noise Level (PINL)

The PINL ($L_{Aeq}(15min)$) 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 noted 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.

3.1.3 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 amenity noise level).

The recommended amenity noise levels as per Table 2.2 of the NPI are reproduced in **Table 3**.

Table 3 Amenity Criteria

Receiver Type	Noise Amenity Area	Time of day	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: 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.

3.1.4 Maximum Noise Assessment Trigger Level

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.

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4 Noise Criteria

4.1 Background Noise Environment

4.1.1 Unattended Noise Monitoring

To quantify the existing background noise environment of the area, unattended noise monitoring was conducted on site at the McDonald's operation at 164 Warringah Road, Beacon Hill, NSW (L1). The selected monitoring location is shown in **Figure 1** and is considered representative of surrounding receivers as per Fact Sheet B1.1 of the NPI.

The unattended 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 measurements were carried out using a Svantek 977 noise analyser from Wednesday 24 June 2020 to Friday 3 July 2020. Observations on-site identified the surrounding locality was typical of an urban environment, with passing traffic noise audible in the area. Calibration of all instrumentation was checked prior to and following measurements. Drift in calibration did not exceed ± 0.5 dBA. All equipment carried appropriate and current NATA (or manufacturer) calibration certificates.

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 receptors 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. A summary of measured background noise levels and derived intrusive criteria are summarised in **Table 4** and plotted in graph format along with wind speed and rainfall for the monitoring period in **Appendix B**. It is noted that night-time noise levels derived for period for 12:00am to 5:00am to ensure to measure ambient levels outside current trading hours of the operation. Calibration certificates of the sound level meters used for this project are available on request.

Table 4 Background Noise Monitoring Summary

Location	Measured background noise level, dB RBL			Measured, dB LAeq		
	Day	Evening	Night	Day	Evening	Night
	7am to 6pm	6pm to 10pm	10pm to 7am	7am to 6pm	6pm to 10pm	10pm to 7am
L1	57	53	42 ²	63	61	55 ²

Note: Excludes periods of wind or rain affected data. Meteorological data obtained from the Bureau of Meteorology weather station Terry Hills AWS 33.07°S 151.22°E 199m AMSL.

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: Night-time noise levels derived for period for 12:00am to 5:00am to ensure to measure ambient levels outside current trading hours of the operation.

4.1.2 Attended Noise Monitoring

To validate background noise levels, two 15-minute attended noise monitoring assessments were completed at the project site. Observations during the survey noted that non-project related road traffic from Warringah Road was the dominant contributor to background noise levels.

The monitored noise level contributions and observed meteorological conditions for each measurement are presented in **Table 5**.

Table 5 Operator-Attended Noise Survey Results						
Location	Time (hrs)	Descriptor (dBA re 20 µPa)			Meteorology	Description and SPL, dBA
		L _{Amax}	L _{Aeq}	L _{A90}		
A1	11:57 24/06/2020	79	63	57	WD: W	Local traffic 56-79
					WS: 1.5m/s	Birds <50
					Temp: 16°C	Aircraft <55 Local residential noise <55
A2	12:20 24/06/2020	84	67	60	WD: W	Local traffic 56-84
					WS: 1.5m/s	Birds <50
					Temp: 16°C	Local residential noise <50

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.

4.2 Operational Noise Criteria

4.2.1 Project Intrusiveness Noise Levels

The Project Intrusiveness Noise Levels (PINLs) for the project are presented in **Table 6** and have been determined based on the RBL +5dBA and applies to residential receivers only.

Table 6 Intrusiveness Noise Levels			
Receiver	Period ¹	Measured RBL	PINL
		dB LA ₉₀	dB LA _{eq} (15min)
R1-R13	Night	42	47

Note: As per Section 2.1 of the NPI, Intrusiveness Noise Levels only apply to residences.

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.

4.2.2 Project Amenity Noise Levels

The Project Amenity Noise Levels (PANLs) for residential receivers potentially affected by the project are presented in **Table 7**.

Table 7 Amenity Noise Levels and Project Amenity Noise Levels					
Receiver Type	Noise Amenity Area	Assessment Period ¹	Recommended ANL dB LAeq(period) ²	PANL dB LAeq(period) ³	PANL LAeq(15min) ^{4,5}
R1-R13	Urban	Night	45	40	43

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

Note 2: Recommended amenity noise levels as per Table 2.2 of the NPI.

Note 3: Project Amenity Noise Level equals the amenity noise level – 5dB as there is other industry proposed for the area.

Note 4: 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 5: LAeq,period(traffic) as per section 2.4.1 of the NPI (ie existing LAeq traffic – 15dB).

4.2.3 Project Noise Trigger Levels

The Project Noise Trigger Levels (PNTLs) are the lower of either the PINL or the PANL. **Table 8** presents the derivation of the PNTLs in accordance with the methodologies outlined in the NPI.

Table 8 Project Noise Trigger Levels				
Receiver	Period ¹	PINL dB LAeq(15min)	PANL dB LAeq(15min)	PNTL dB LAeq(15min)
R1-R13	Night	47	43	43

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

4.2.4 Maximum Noise Assessment Trigger Levels

The maximum noise trigger levels shown in **Table 9** 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 9 Maximum Noise Assessment Trigger Levels			
Residential Receivers R1-R13			
LAeq(15min)		LAmax	
40dB LAeq(15min) or RBL + 5dB		52dB LAmax or RBL + 15dB	
Trigger	40	Trigger	52
RBL 42+5dB	47	RBL 42+15dB	57
Highest	47	Highest	57

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

Note: As per Section 2.5 of the NPI, the highest of the two criteria are adopted as the trigger level.

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5 Noise Assessment Methodology

A computer model was developed to quantify project noise emissions to neighbouring receivers for typical operations. DGMR (iNoise, Version 2020.0) noise modelling software was used to quantify noise emissions from typical night time operations. iNoise is a new 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.

The model calculation method used to predict noise levels was in accordance with ISO 9613-1 'Acoustics - Attenuation of sound during propagation outdoors. Part 1: Calculation of the absorption of sound by the atmosphere' and ISO 9613-2 'Acoustics - Attenuation of sound during propagation outdoors. Part 2: General method of calculation'. The ISO 9613 standard from 1996 is 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.

5.1 Sound Power Levels

Table 10 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. The sound power levels have been adjusted to account for duration over a 15-minute period.

Table 10 Acoustically Significant Sources - Sound Power Levels (re 10⁻¹² Watts)			
Item and number modelled per 15 minutes	Individual Sound Power Level, dB LAeq(15min)	Total source Sound Power Level, dB LAeq(15min)	Source Height ¹
Operation			
Fan CDG404 (x2)	77	80	0.5m
AC Plant PKY620T-6Q1 (x2)	81	84	0.5m
AC Plant PCA260U (x2)	76	79	0.5m
Customer Ordering Displays (x2)	75	78	1.0m
Car idle, and drive off (x18)	73	86	0.5m
Sleep disturbance assessment (LA_{max}), Night-time periods (10pm to 7am)			
Customer Yelling		92	1.0m
Car Door Slam		85	0.5m

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

5.2 Noise Attenuation Assumptions and Controls

The noise model incorporated the following controls:

- mechanical AC plant is located on the rooftop plant deck of the operation and there is no line of site to surrounding receivers shielded by the roof parapet which extends a minimum of 500mm above the top of the highest plant item;
- mechanical extraction fans are located in a rooftop deck area and there is not line of site to surrounding receivers by an acoustic screen which extends a minimum of 500mm above the top of the highest fan plant;
- retention of existing drive thru canopies and coral barriers; and
- the COD's are assumed to be set at the lowest volume setting.

6 Noise Assessment Results

This assessment has quantified operational noise levels at the nearest receivers combining the simultaneous occurrence of all the following sources:

- customer car noise (driving around site / parking);
- COD's, customers and passbys; and
- mechanical plant.

It is noted that the potential for maximum noise level events to occur simultaneously is unlikely for this operation as the majority of vehicles in any 15-minute period would be parked and not operational.

6.1 Operational Noise Results

Noise predictions from all sources have been quantified at surrounding residential receivers to the operation and are presented in **Table 11**. The coincidence of all plant occurring onsite simultaneously for an entire 15-minute period is unlikely.

However, it is probable that several plant may operate simultaneously on occasion for a limited duration. To account for this, modelling has adopted the LAeq(15min) contribution of sources which were derived from in-field measurements of operation sources or activities. Noise levels from combined activities are predicted to satisfy the relevant NPI criteria at all assessed receivers.

Table 11 Combined Noise Predictions

Receiver	Period ¹	Predicted Noise Level dB LAeq(15min)	PNTL dB LAeq(15min)	Compliant
R1	Night	37	43	✓
R2	Night	<35	43	✓
R3	Night	37	43	✓
R4	Night	35	43	✓
R5	Night	<35	43	✓
R6	Night	<35	43	✓
R7	Night	<35	43	✓
R8	Night	<35	43	✓
R9	Night	40	43	✓
R10	Night	<35	43	✓
R11	Night	<35	43	✓
R12	Night	<35	43	✓
R13	Night	<35	43	✓

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

6.2 Maximum Noise Levels Assessment Results

In assessing maximum noise events, typical L_{Amax} noise levels from transient events were assessed to the nearest residential receivers. For the maximum noise assessment, a sound power level of 92dBA for customer yelling noise and 85dBA for a car door slam are adopted for this assessment with the night-time operational scenario adopted for the awakenings assessment. The noise yelling noise was assessed at the entrance to the store as well as the COD point and drive-thru service window. Car door slam noise was assessed in the southern section of the car park area

Predicted noise levels from L_{Aeq}(15min) and L_{Amax} events for assessed receivers are presented in **Table 12**. Results identify that the maximum noise events trigger levels will be satisfied for all assessed receivers.

Table 12 Maximum Noise Levels Assessment (Night)¹

Rec	Predicted Noise Level					Screening Criteria		Compliant
	dB LAeq(15min)	dB LAmax				dB LAeq(15min)	dB LAmax	
		Door Slam in South Carpark	Yell at Entrance	Yell at COD Point	Yell at Service Window			
R1	47	<35	41	45	<35	47	57	✓
R2	44	<35	39	43	<35	47	57	✓
R3	47	<35	45	41	<35	47	57	✓
R4	46	<35	41	44	<35	47	57	✓
R5	40	<35	<35	40	<35	47	57	✓
R6	32	<35	<35	<35	<35	47	57	✓
R7	35	<35	<35	<35	<35	47	57	✓
R8	41	<35	37	35	<35	47	57	✓
R9	46	<35	35	<35	<35	47	57	✓
R10	38	<35	37	<35	<35	47	57	✓
R11	39	<35	<35	<35	<35	47	57	✓
R12	37	<35	41	45	<35	47	57	✓
R13	39	<35	45	41	<35	47	57	✓

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 Discussion and Conclusion

Muller Acoustic Consulting Pty Ltd (MAC) has completed a Noise Assessment to quantify emissions from the proposed 24hour operation of the existing McDonald's Operation (the 'operation') located at 164 Warringah Road, Beacon Hill, NSW.

The results of the Noise Assessment demonstrate that emissions from the operation would satisfy the relevant PNTLs at all assessed receivers for the proposed extension of operational hours based on the recommended noise controls outlined in **Section 5.2** of this report.

Furthermore, sleep disturbance is not anticipated, as emissions from impact noise are predicted to remain below the EPA Guideline for maximum noise level trigger levels.

Based on the Noise Assessment results, there are no noise related issues which would prevent Council approving the proposed operation.

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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**.

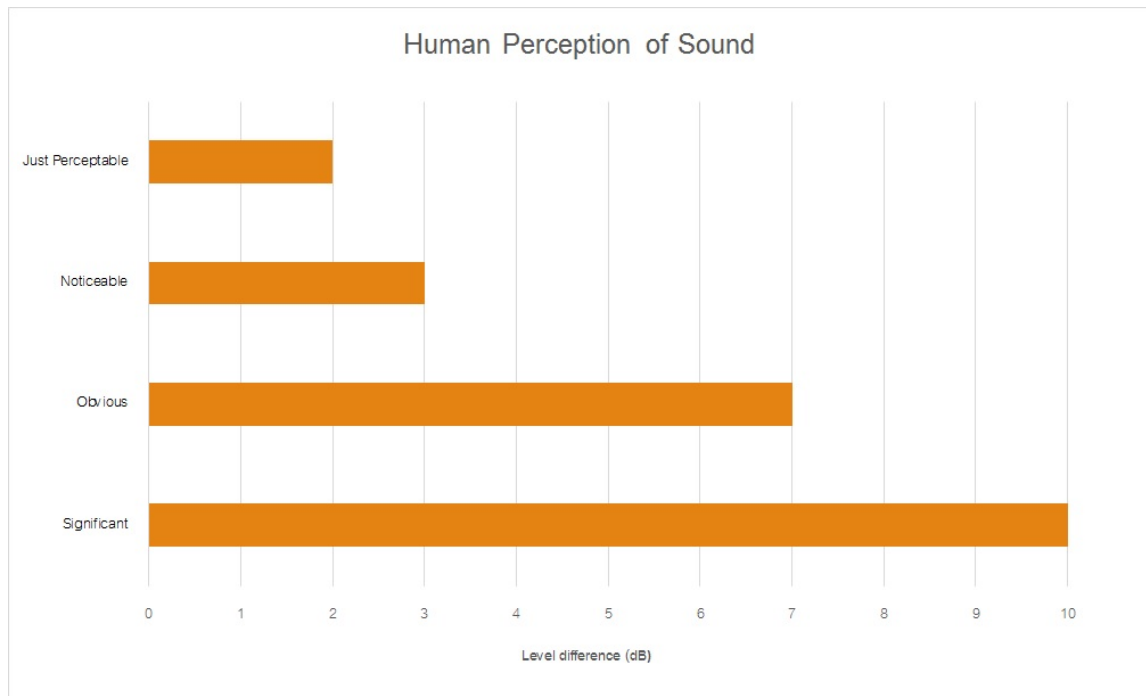
Table A1 Glossary of Terms	
Term	Description
1/3 Octave	Single octave bands divided into three parts
Octave	A division of the frequency range into bands, the upper frequency limit of each band being twice the lower frequency limit.
ABL	Assessment Background Level (ABL) is defined in the NPI as a single figure background level for each assessment period (day, evening and night). It is the tenth percentile of the measured LA90 statistical noise levels.
Ambient Noise	The noise associated with a given environment. Typically a composite of sounds from many sources located both near and far where no particular sound is dominant.
Extraneous Noise	Noise resulting from activities that are not typical of the area. Atypical activities include sources such as construction and holiday period traffic.
A Weighting	A standard weighting of the audible frequencies designed to reflect the response of the human ear to noise.
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 Linear or decibels Z-weighted.
Hertz (Hz)	The measure of frequency of sound wave oscillations per second - 1 oscillation per second equals 1 hertz.
LA10	A noise level which is exceeded 10 % of the time. It is approximately equivalent to the average of maximum noise levels.
LA90	Commonly referred to as the background noise, this is the level exceeded 90 % of the time.
LAeq	The summation of noise over a selected period of time. It is the energy average noise from a source, and is the equivalent continuous sound pressure level over a given period.
LAm _{ax}	The maximum root mean squared (rms) sound pressure level received at the microphone during a measuring interval.
RBL	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 intrusiveness criteria for noise assessment purposes and is the median of the ABL's.
Sound power level (L _W)	This is a measure of the total power radiated by a source. The sound power of a source is a fundamental location of the source and is independent of the surrounding environment. Or a measure of the energy emitted from a source as sound and is given by : $= 10 \cdot \log_{10} (W/W_0)$ Where: W is the sound power in watts and W₀ is the sound reference power at 10-12 watts.

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 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

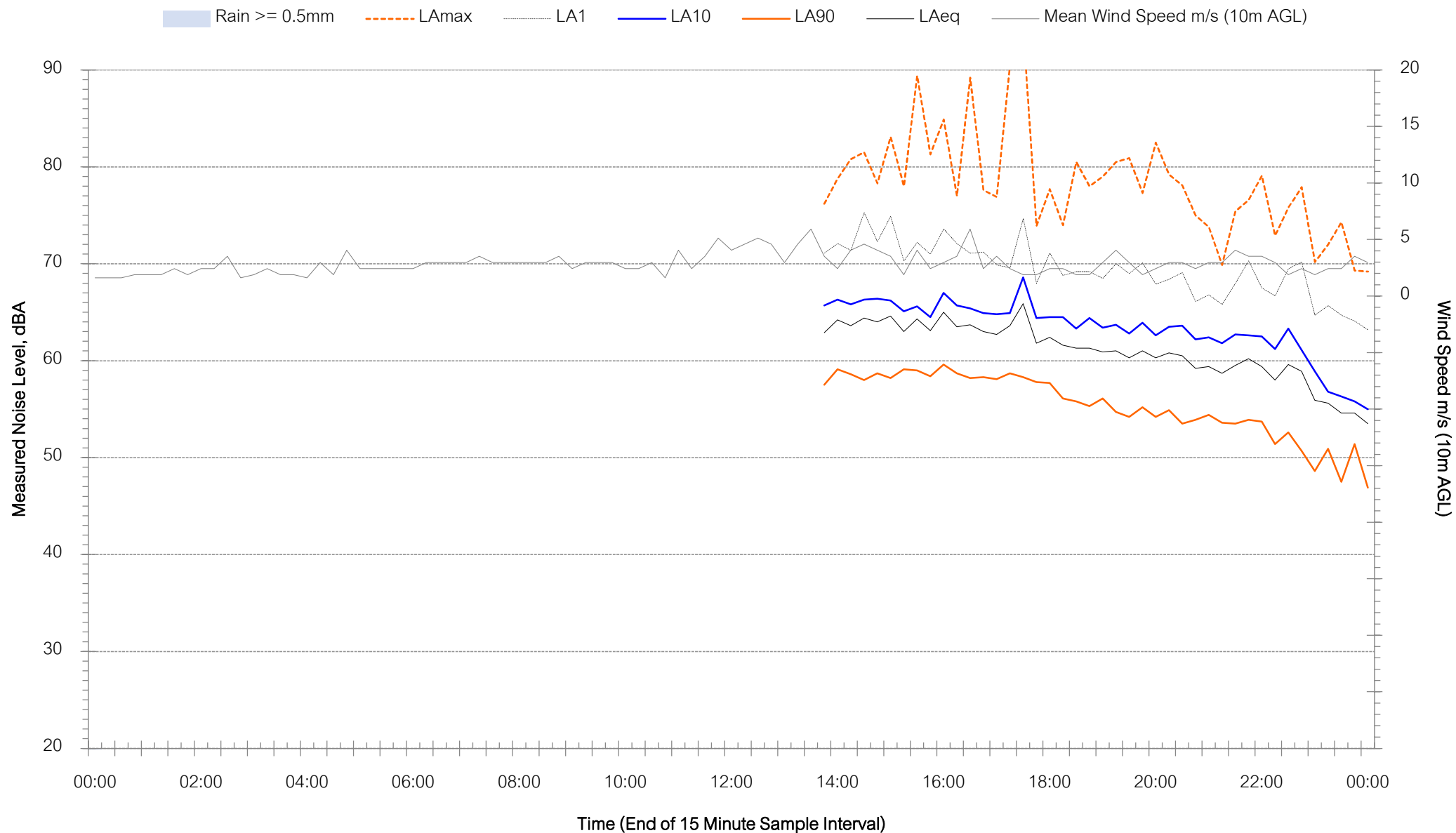


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Appendix B – Noise Monitoring Charts

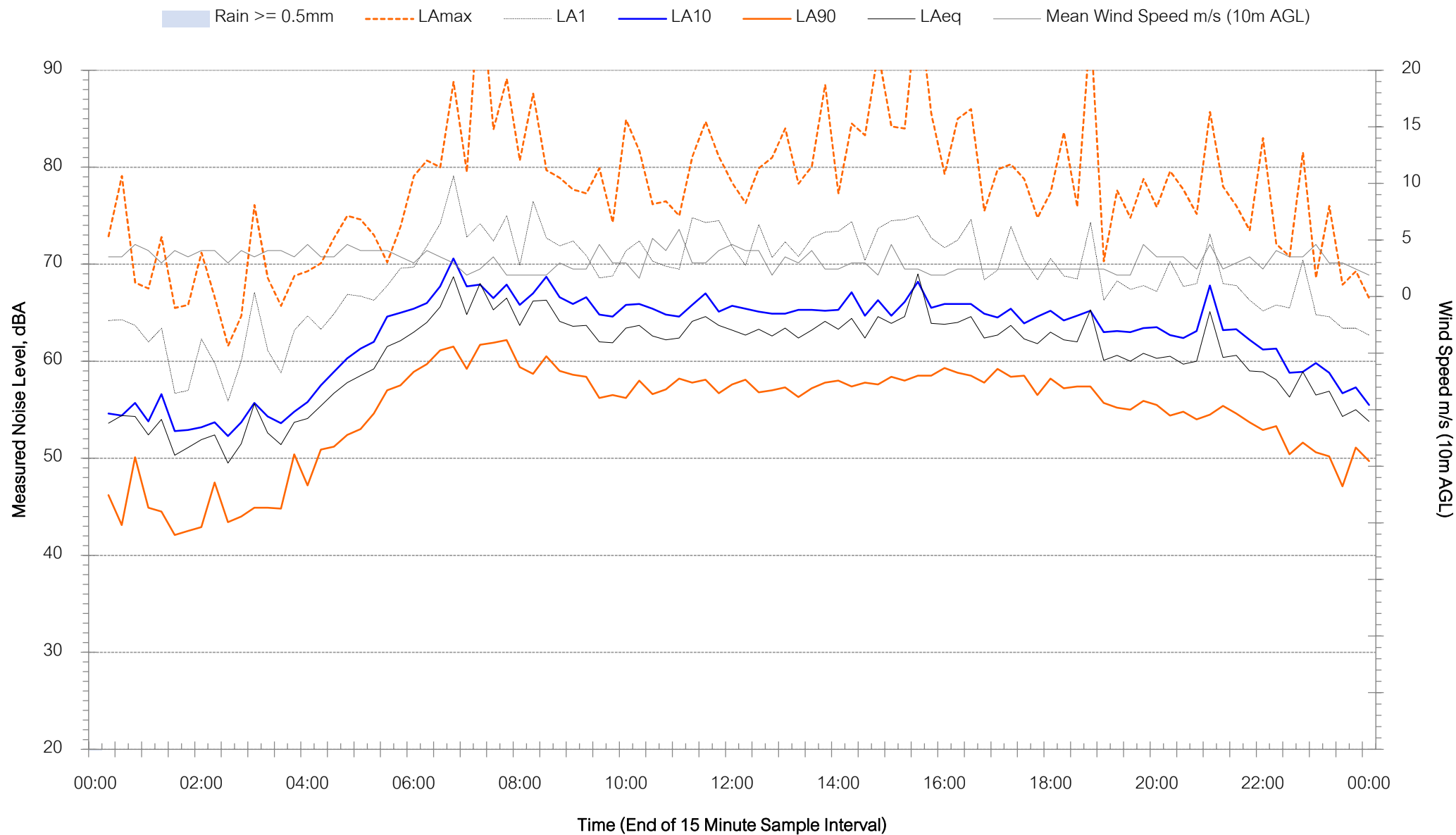
Background Noise Levels

McDonalds Beacon Hill, NSW - Wednesday 24 June 2020



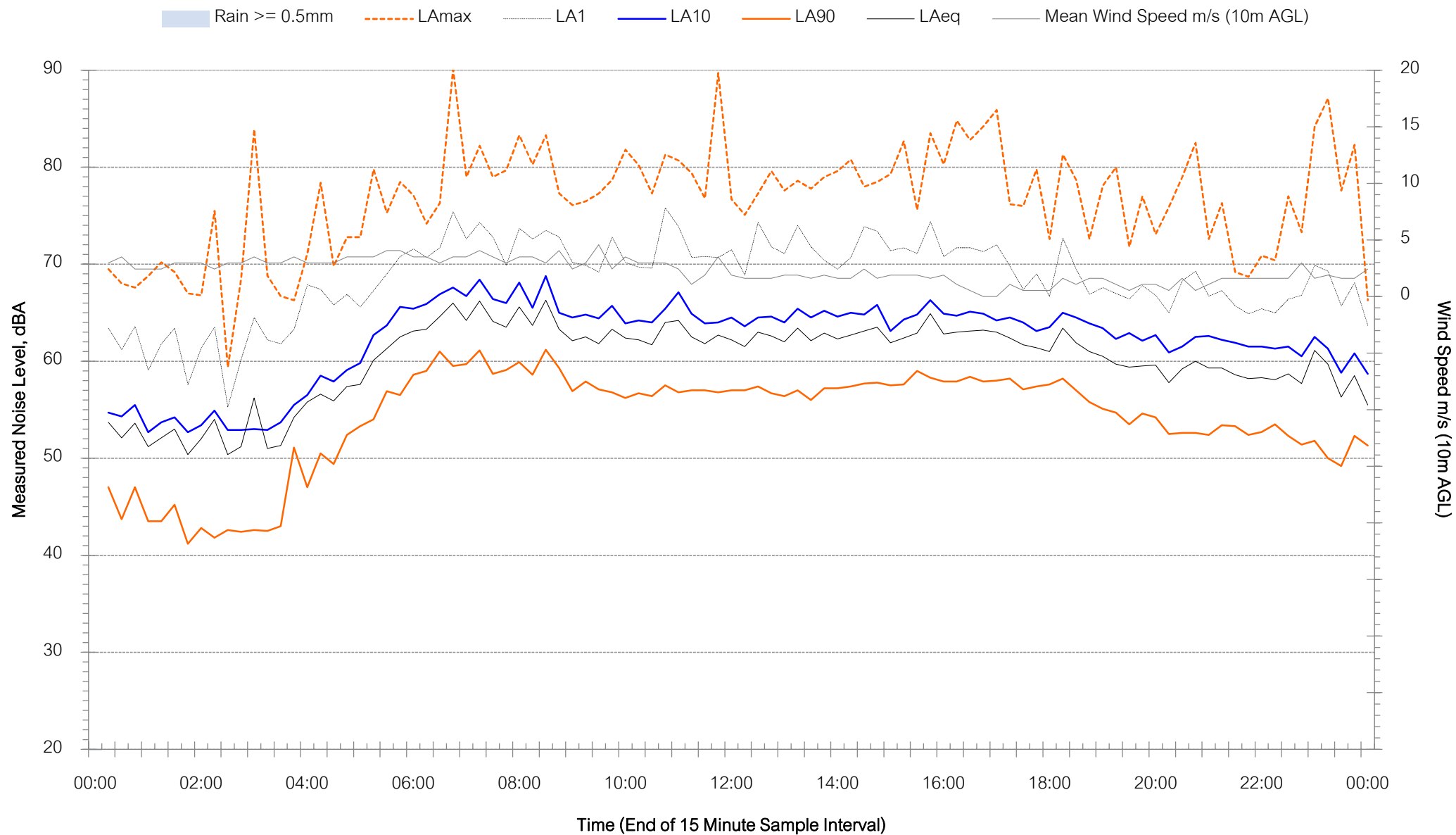
Background Noise Levels

McDonalds Beacon Hill, NSW - Thursday 25 June 2020



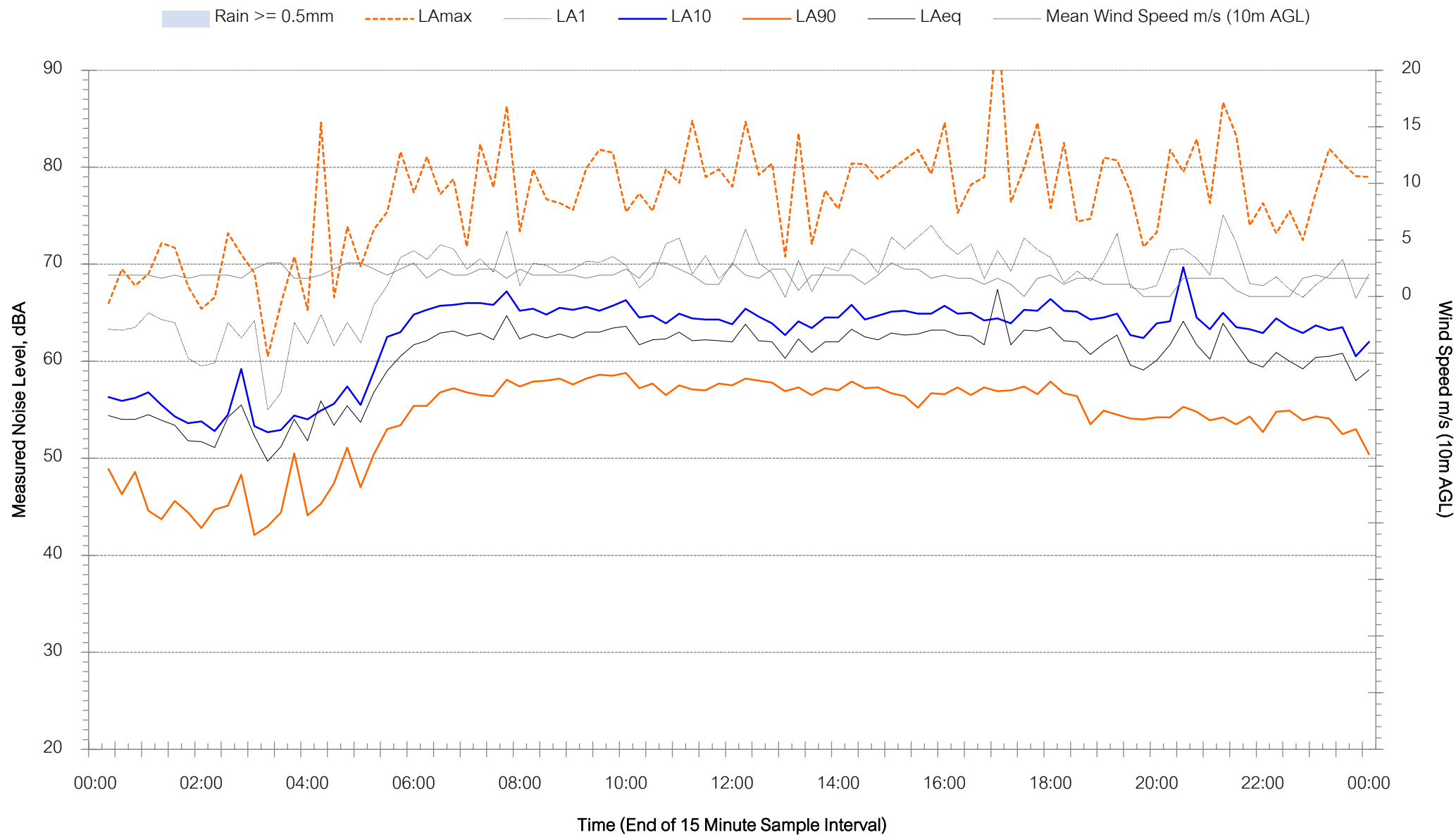
Background Noise Levels

McDonalds Beacon Hill, NSW - Friday 26 June 2020



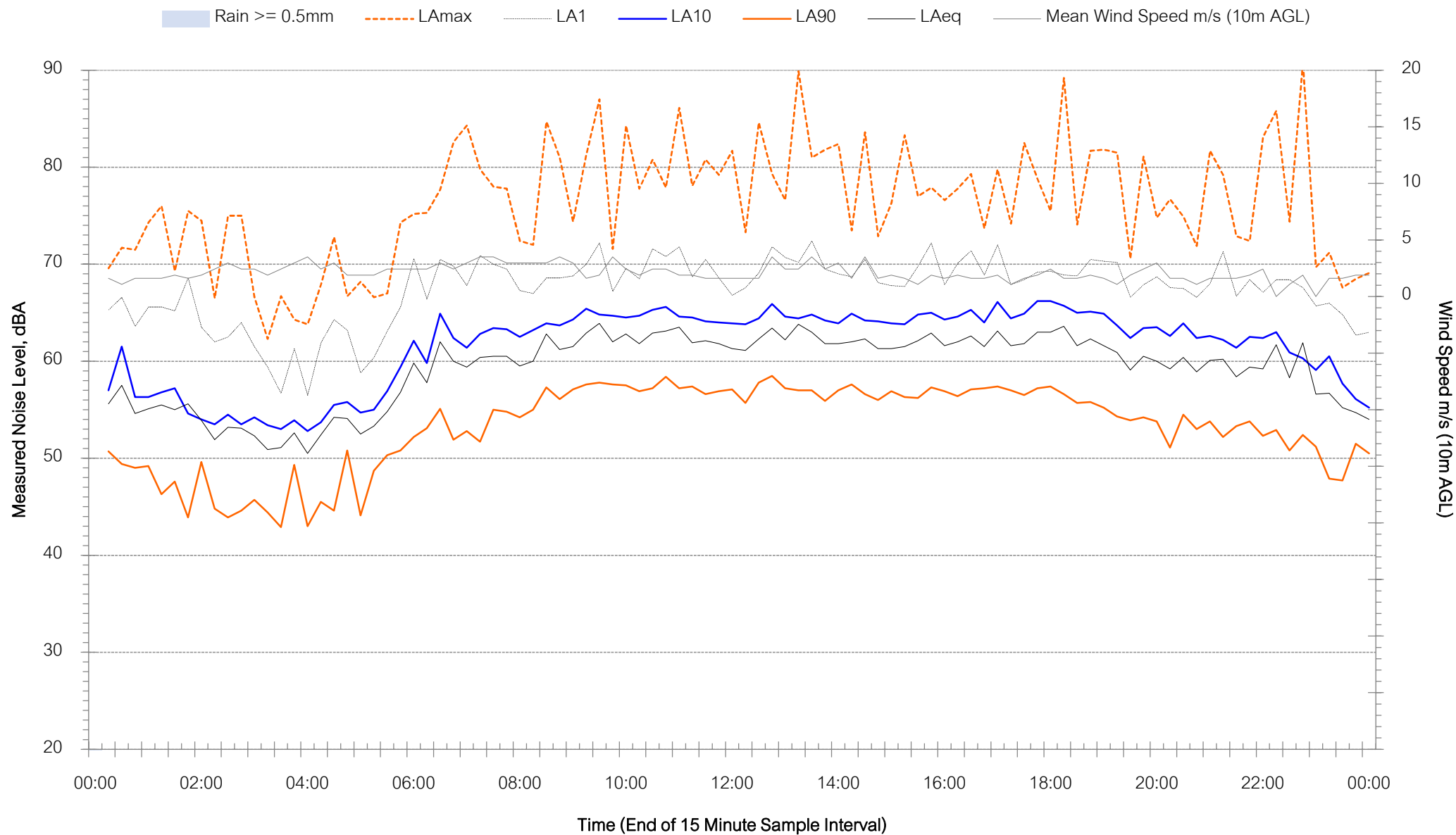
Background Noise Levels

McDonalds Beacon Hill, NSW - Saturday 27 June 2020



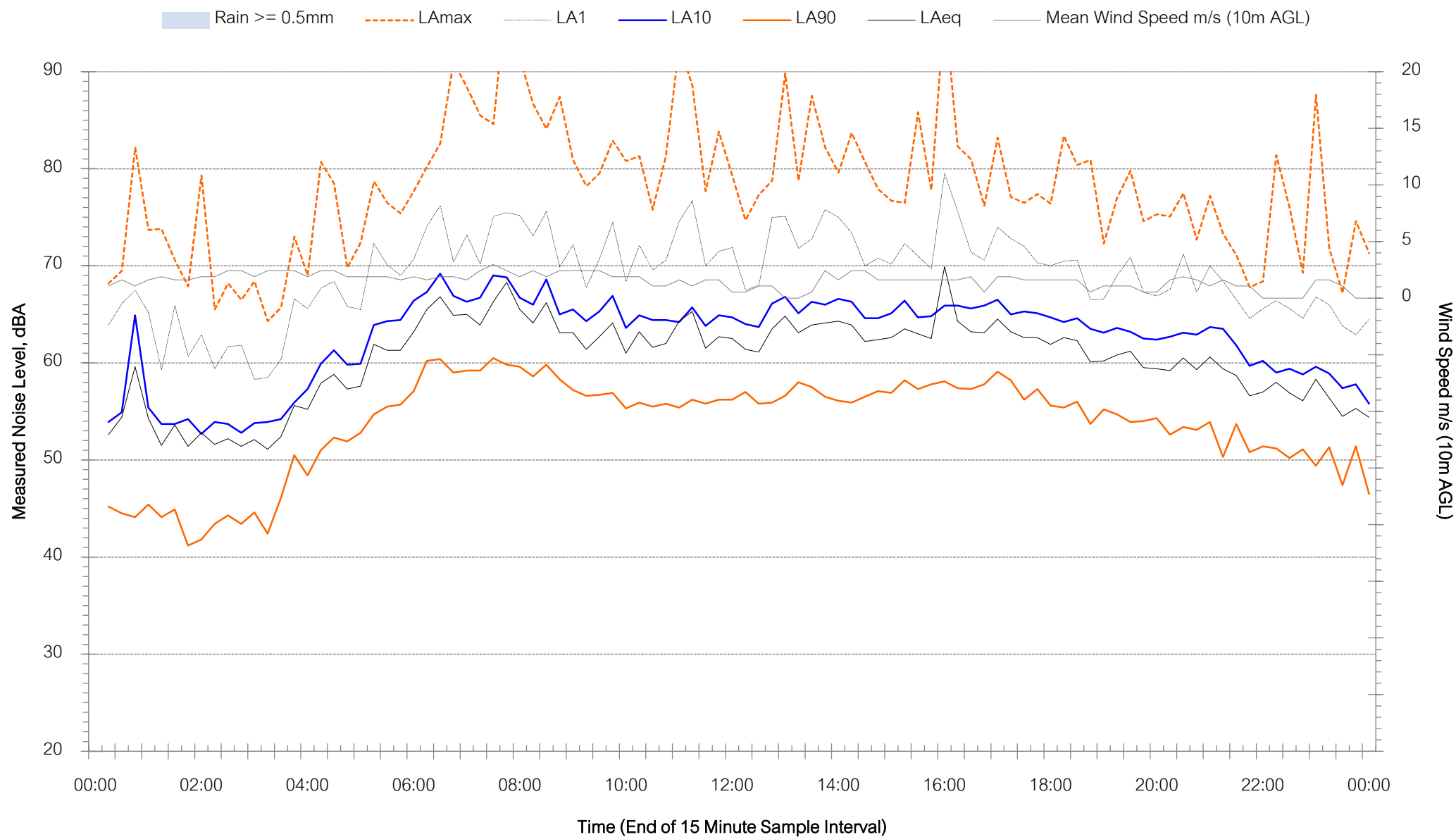
Background Noise Levels

McDonalds Beacon Hill, NSW - Sunday 28 June 2020



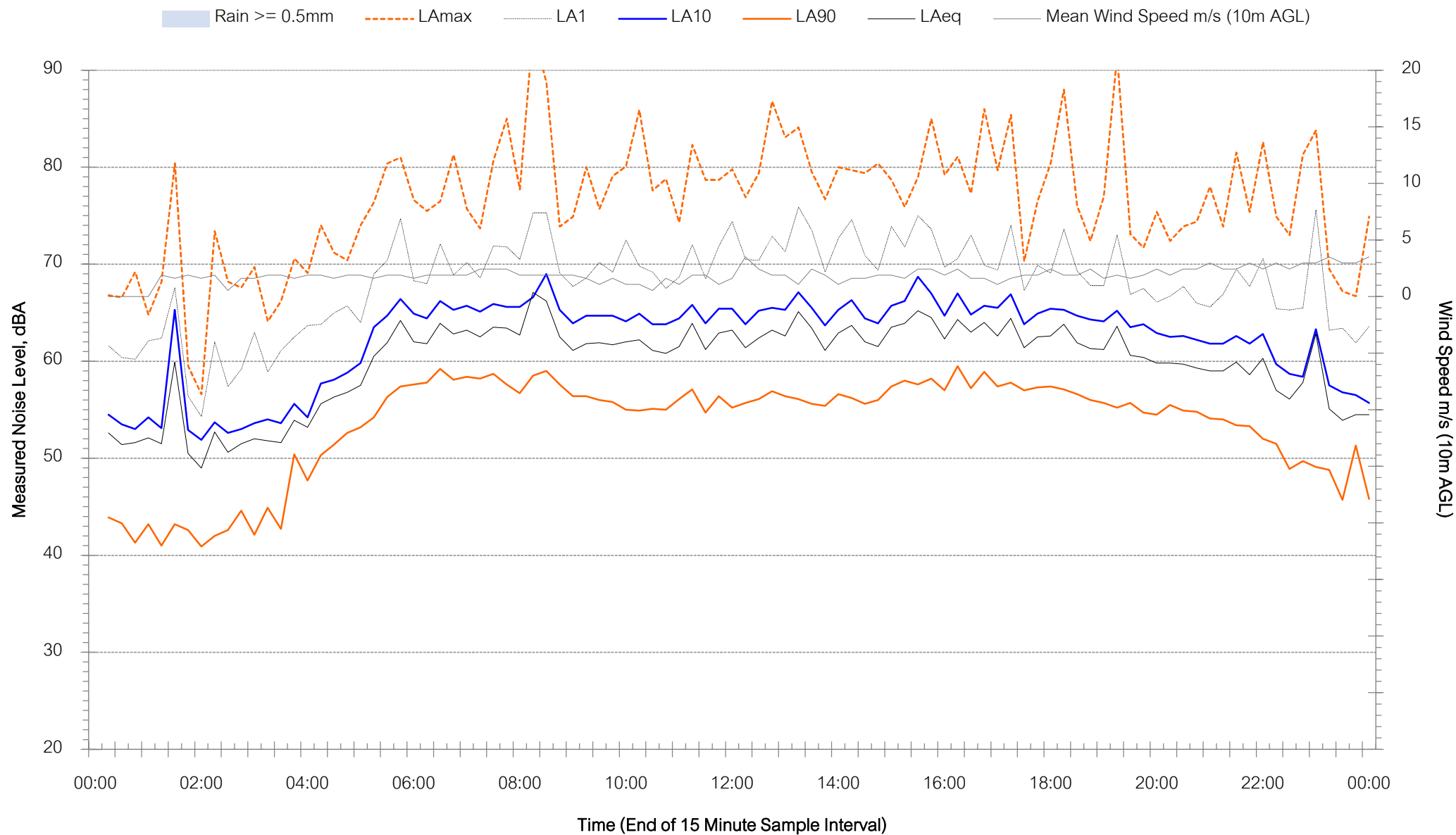
Background Noise Levels

McDonalds Beacon Hill, NSW - Monday 29 June 2020



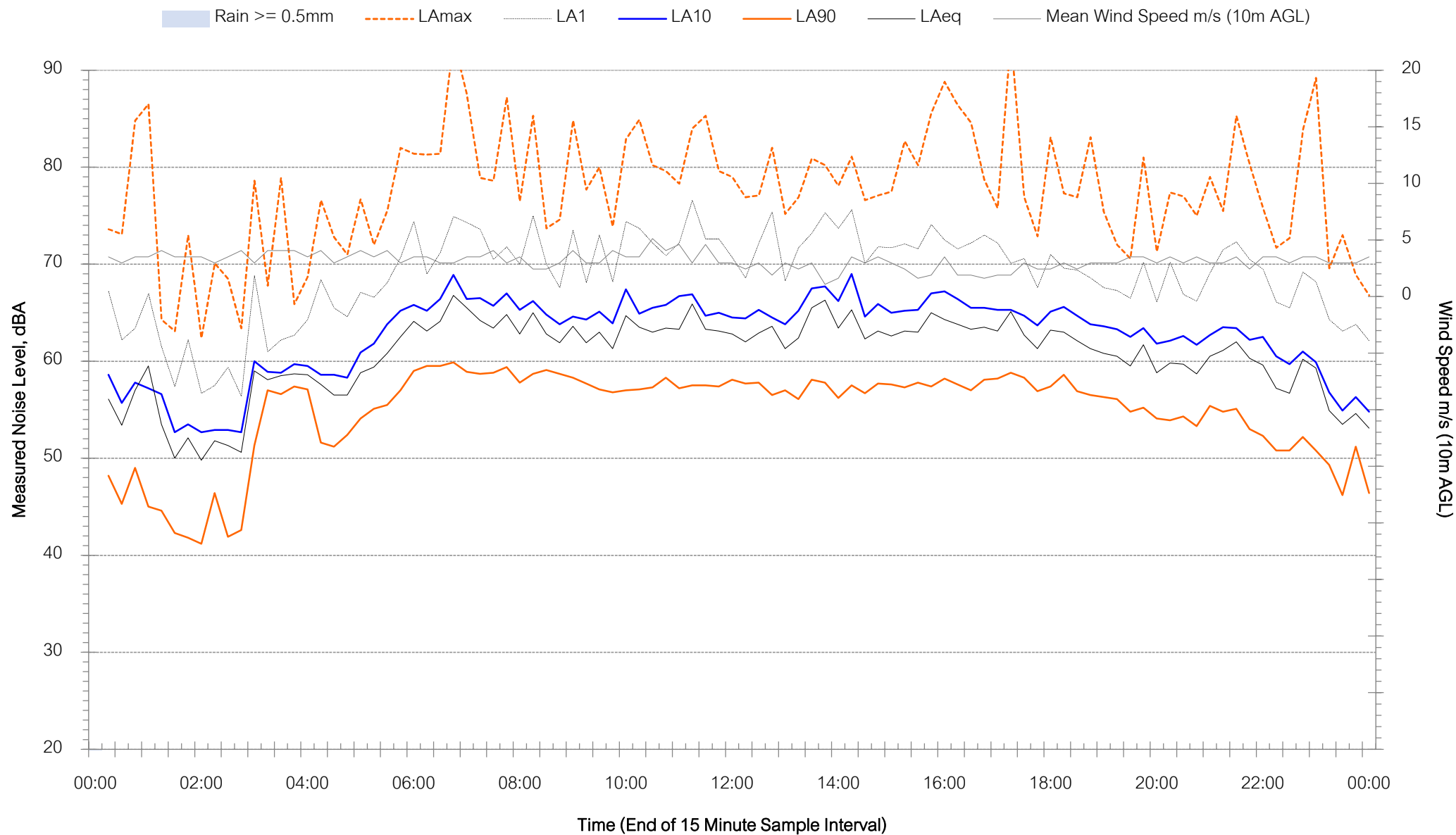
Background Noise Levels

McDonalds Beacon Hill, NSW - Tuesday 30 June 2020



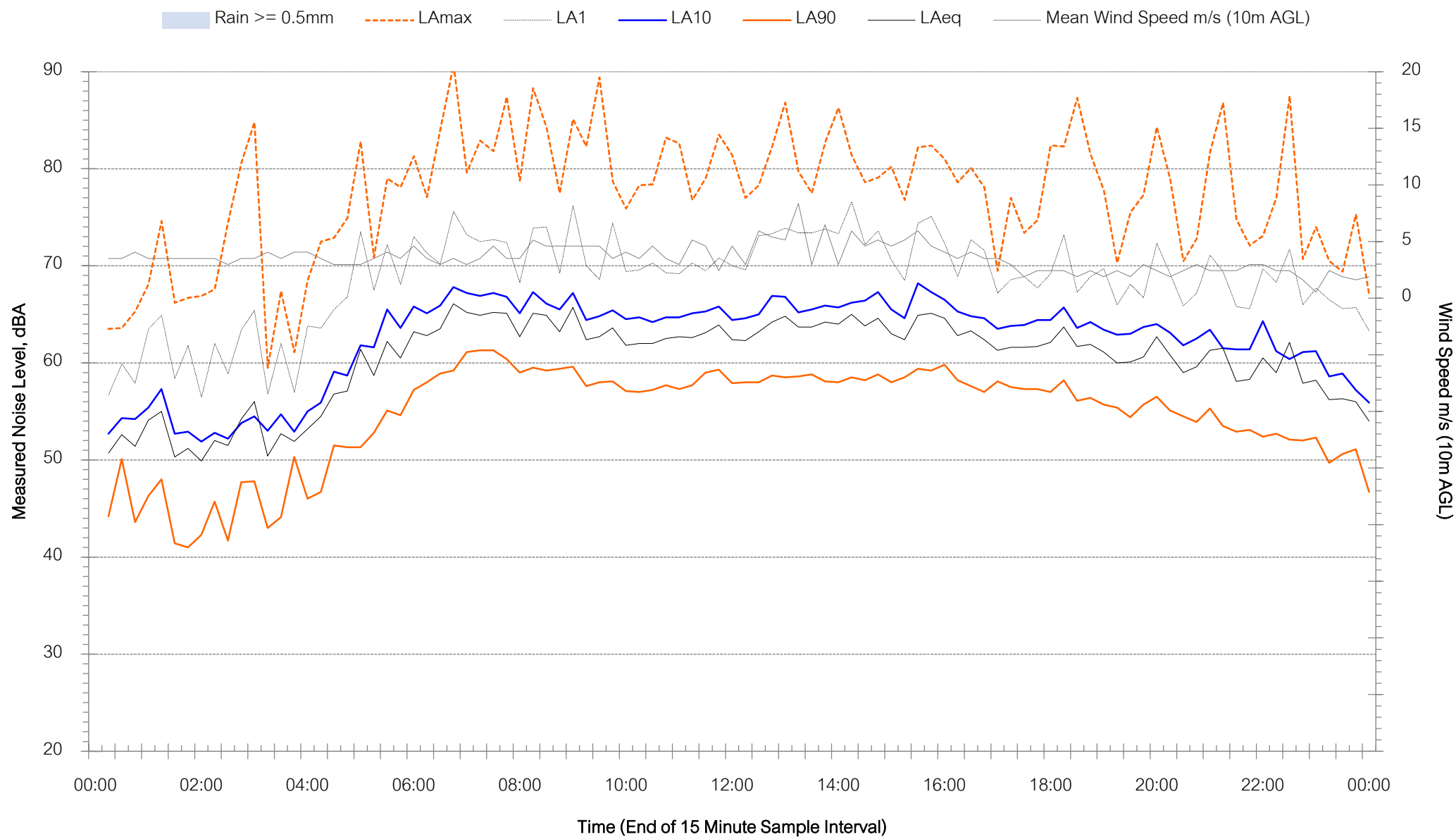
Background Noise Levels

McDonalds Beacon Hill, NSW - Wednesday 1 July 2020



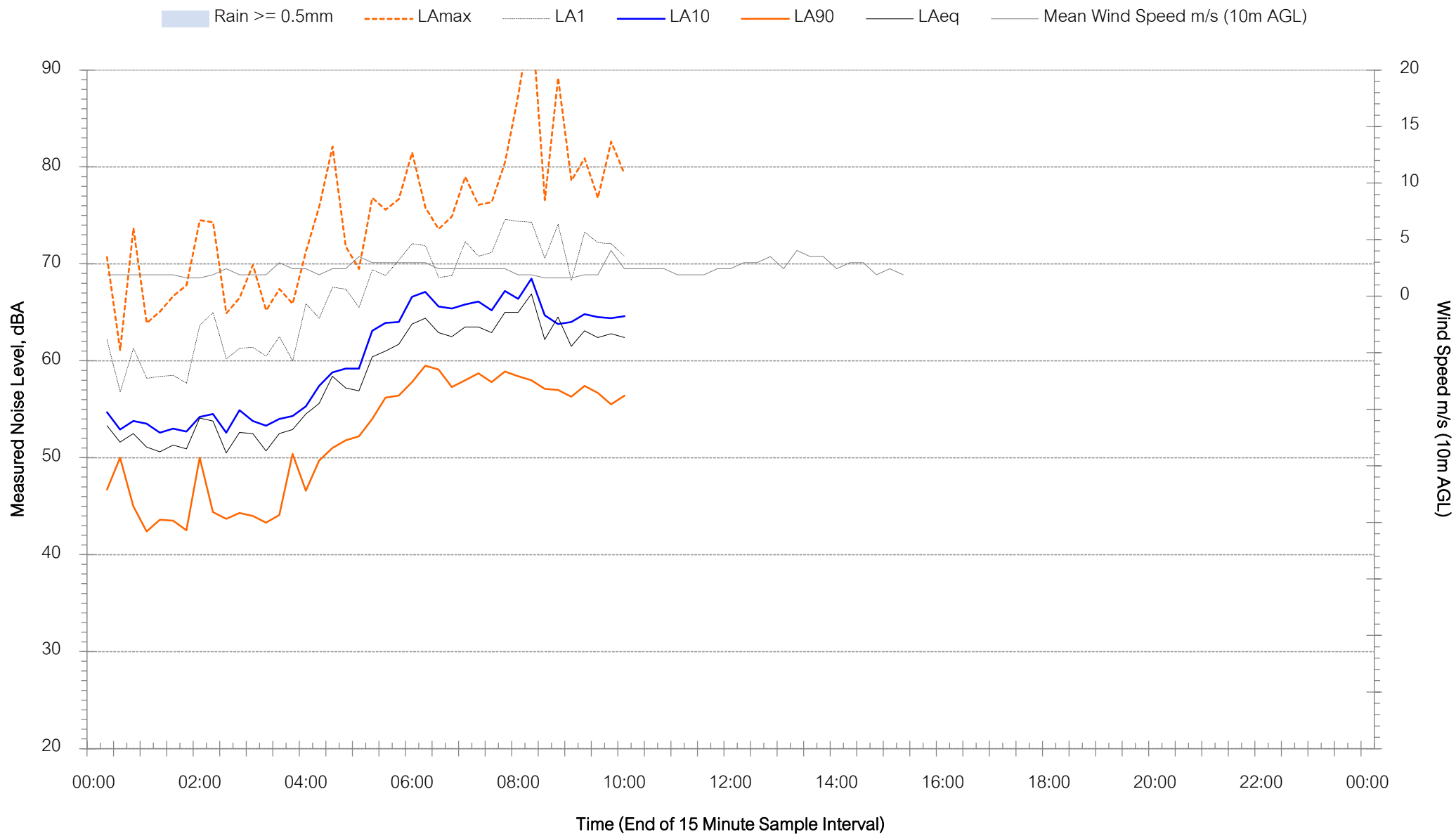
Background Noise Levels

McDonalds Beacon Hill, NSW - Thursday 2 July 2020



Background Noise Levels

McDonalds Beacon Hill, NSW - Friday 3 July 2020



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