

# Noise Monitoring Assessment

Rooty Hill Distribution Centre, Rooty Hill, NSW  
Quarter 1 Ending March 2020.

# Document Information

## Noise Monitoring Assessment

### Rooty Hill Distribution Centre, Rooty Hill, NSW

### Quarter 1 Ending March 2020

Prepared for: Holcim (Australia) Pty Ltd



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# 1 Introduction

Muller Acoustic Consulting Pty Ltd (MAC) has been commissioned by Holcim (Australia) Pty Ltd (Holcim) to complete a Noise Monitoring Assessment (NMA) for the Holcim Regional Distribution Centre (RDC), at Rooty Hill, NSW.

This assessment has been undertaken at four representative monitoring locations for the Quarterly period ending March 2020 as part of the Noise Monitoring Program (NMP) to address conditions outlined in the Development Consent.

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

- NSW Environment Protection Authority (EPA), Noise Policy for Industry (NPI), 2017;
- Rooty Hill RDC Operational Noise Management Plan (NMP), 2015;
- Rooty Hill, Consolidated Consent, 2017 (Mod 2);
- Australian Standard AS 1055:2018 - Acoustics - Description and Measurement of Environmental Noise; and
- Australian Standard AS/NZS IEC 61672.1:2019 (AS 61672) – Electro Acoustics - Sound Level Meters Specifications Monitoring;

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

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## 2 Noise Criteria

The noise criteria for each receiver location are outlined in the NMP and consolidated consent for the RDC are presented in **Table 1**.

Table 1 Noise Criteria, dBA						
Location	Monitoring Location	Morning Shoulder <sup>1,2</sup>	Day <sup>1,2</sup>	Evening <sup>1,2</sup>	Night <sup>1,2</sup>	
		LAeq(15min)	LAeq(15min)	LAeq(15min)	LAeq(15min)	LA1(1min)
Any residences in Station Street	N1	39	44	44	39	53
Any residences in Coughlan Crescent	N2	40	40	39	39	53
Any residences in Mavis Street	N1/N4	35	35	35	35	53
Nurragingy Reserve	N3	When Reserve is in use – 50dB, LAeq				
Colebee Centre	N3	When the Centre is in use – 50dB, LAeq				
Blacktown Olympic Park (Active recreation areas)	N4	When active recreational areas of the Park are in use – 55dB, LAeq				

Note 1: Noise criteria adopted from NMP.

Note 2: Morning shoulder 6am-7am Monday to Saturday and 6am-8am Sundays and public holidays; Day 7am-6pm Monday to Saturday and 8am-6pm Sundays and public holidays; Evening 6pm-10pm Monday to Sunday; Night 10pm-7am Monday to Saturday and 10pm-8am Sunday.

The RDC is located at Rooty Hill, NSW approximately 1km east of the railway station and town centre. Receivers in the locality surrounding the RDC are primarily industrial, recreational and urban residential. The RDC is bounded by the railway line to the south, industry to the west and recreational areas to the east. The residential areas potentially affected by noise from the operation are to the east, beyond the Nurragingy Reserve in Doonside, NSW (Crawford Street and Knox Road); and to the west, beyond industrial zones and the M7 Motorway in Station Street, Rooty Hill, NSW. Road traffic from the M7 Motorway is a dominant noise source in the area along with urban hum and railway noise.

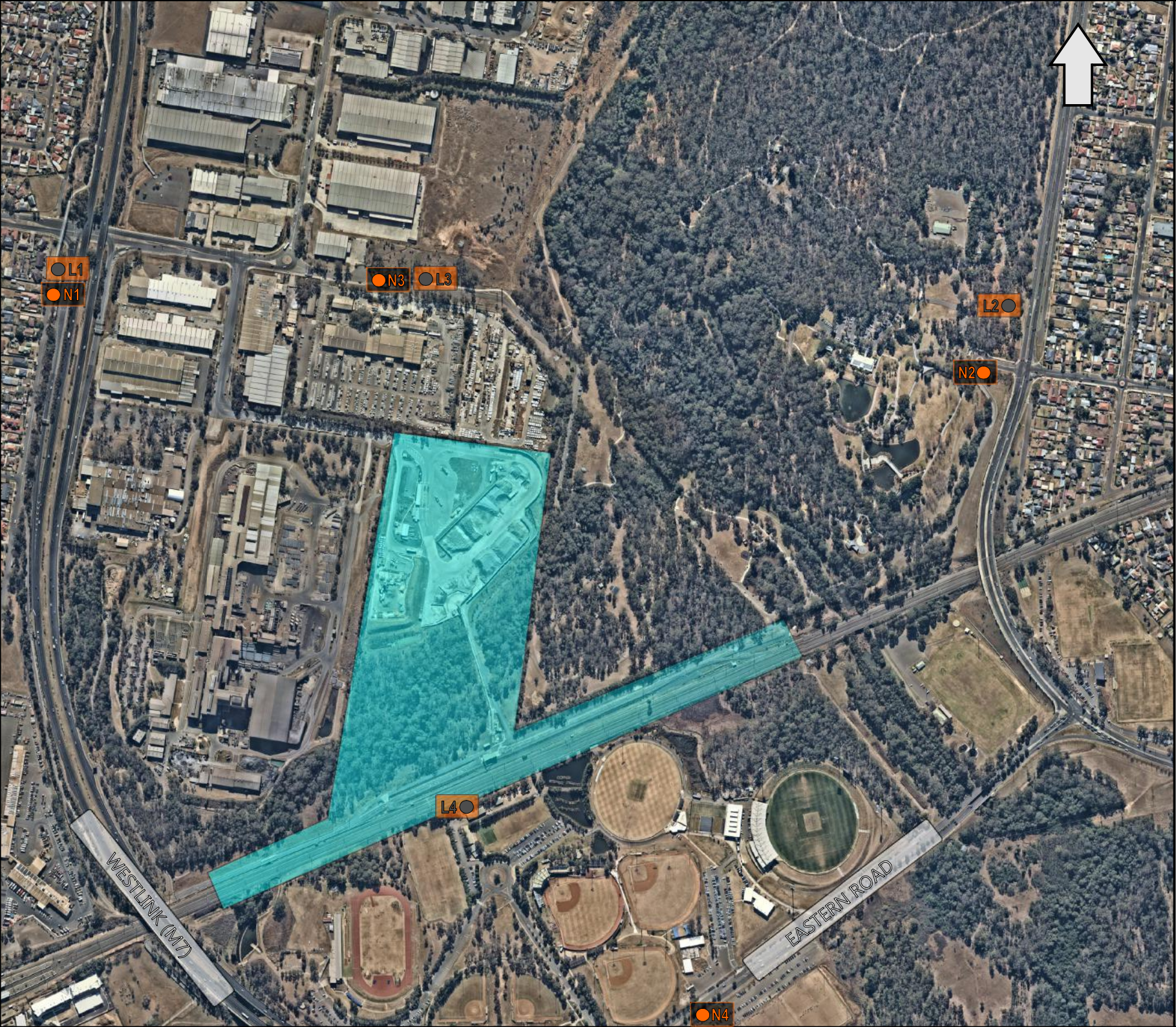
Monitoring locations were selected in accordance with the NMP and are representative of the nearest noise sensitive receivers to the RDC.

The operational compliance monitoring locations with respect to the RDC are presented in the locality plan shown in **Figure 1** and **Table 1** along with the relevant noise criteria for each location.



FIGURE 1

LOCALITY PLAN  
REF: MAC180611-01



KEY

- MONITORING LOCATION
- LOGGER LOCATION
- SITE LOCATION





### 3 Methodology

Noise monitoring consisted of attended and unattended monitoring during the daytime, evening and night time periods.

#### 3.1 Attended Noise Monitoring

Attended noise monitoring was conducted in general accordance with the procedures described in Australian Standard AS 1055:2018 and the RDC Consolidated Consent. The measurements were carried out using a Svantek Type 1, 971 noise analyser on Wednesday 8 January 2020. The acoustic instrumentation used carries current NATA calibration and complies with AS/NZS IEC 61672.1:2019. Calibration of all instrumentation was checked prior to and following measurements. Drift in calibration did not exceed  $\pm 0.5$  dBA.

Attended noise monitoring was conducted for 15-minutes in duration during the daytime, evening and night time periods over one day. Where possible, throughout each measurement the operator(s) quantified the contribution of each significant noise source.

Extraneous noise sources were excluded from the analysis to determine the  $L_{Aeq}(15min)$  RDC noise contribution for comparison against the relevant criteria. Where the RDC was inaudible, the RDC contribution is estimated to be at least 10dB below the ambient noise level.

#### 3.2 Unattended Noise Monitoring

The unattended noise monitoring was conducted at locations N1 – N4 for a minimum of seven days in general accordance with the procedures described AS 1055:2018 and the RDC Consolidated Consent. Noise measurements were carried out using Svantek Type 1, 977 noise analysers from Wednesday 8 January 2020 to Friday 17 January 2020. The acoustic instrumentation used carries current NATA calibration and complies with AS/NZS IEC 61672.1.2019. Calibration of all instrumentation was checked prior to and following measurements. Drift in calibration did not exceed  $\pm 0.5$  dBA. **Appendix B** presents the noise monitoring charts for the assessment period.

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## 4 Results

### 4.1 Attended Noise Monitoring Results

#### 4.1.1 Attended Assessment Results - Location N1

The monitored noise level contributions and observed meteorological conditions for each assessment period at location N1 for the NMA are presented in **Table 2**.

**Table 2 Operator-Attended Noise Survey Results – Location N1**

Date	Time (hrs)	Descriptor (dBA re 20 µPa)			Meteorology	Description and SPL, dBA
		L <sub>Amax</sub>	L <sub>Aeq</sub>	L <sub>A90</sub>		
08/01/2020	13:33 (Day)	80	61	52	WD: E	Traffic 48-80
					WS: 1m/s	Birds 58-67
					Rain: Nil	Local residential noise <58
						RDC Inaudible
RDC L <sub>Aeq</sub> (15min) Contribution						<42
08/01/2020	20:01 (Evening)	70	53	47	WD: E	Birds 48-60
					WS: 0.5m/s	Traffic 46-70
					Rain: Nil	Local residential noise <47
						RDC Inaudible
RDC L <sub>Aeq</sub> (15min) Contribution						<37
08/01/2020	22:19 (Night)	68	51	43	WD: E	Traffic 46-68
					WS: 1m/s	Local residential noise 46-51
					Rain: Nil	Insects <46
						Wind <46
RDC Inaudible						
RDC L <sub>Aeq</sub> (15min) Contribution						<33
RDC L <sub>A1</sub> (1min) Contribution						<45

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.

#### 4.1.2 Attended Assessment Results - Location N2

The monitored noise level contributions and observed meteorological conditions for each assessment period at location N2 for the NMA are presented in **Table 3**.

Table 3 Operator-Attended Noise Survey Results – Location N2						
Date	Time (hrs)	Descriptor (dBA re 20 µPa)			Meteorology	Description and SPL, dBA
		L <sub>Amax</sub>	L <sub>Aeq</sub>	L <sub>A90</sub>		
08/01/2020	14:07 (Day)	81	64	53	WD: E	Traffic 44-81
					WS: 2m/s	Birds 49-57
					Rain: Nil	Wind <57
						Aircraft 48-56
						RDC Inaudible
RDC L <sub>Aeq</sub> (15min) Contribution						<40
08/01/2020	20:45 (Evening)	65	56	53	WD: E	Insects 53-56
					WS: 0.5m/s	Traffic 54-65
					Rain: Nil	Train 48-54
						Birds <54
						RDC Inaudible
RDC L <sub>Aeq</sub> (15min) Contribution						<39
08/01/2020	22:43 (Night)	62	53	47	WD: SE	Traffic 46-62
					WS: 1m/s	Insects <46
					Rain: Nil	Train 46-52
						RDC Inaudible
					RDC L <sub>Aeq</sub> (15min) Contribution	
RDC L <sub>A1</sub> (1min) Contribution						<45

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.



#### 4.1.3 Attended Assessment Results - Location N3

The monitored noise level contributions and observed meteorological conditions for each assessment period at location N3 for the NMA are presented in **Table 4**.

Table 4 Operator-Attended Noise Survey Results – Location N3												
Date	Time (hrs)	Descriptor (dBA re 20 µPa)			Meteorology	Description and SPL, dBA						
		L <sub>Amax</sub>	L <sub>Aeq</sub>	L <sub>A90</sub>								
08/01/2020	14:30 (Day)	77	58	53	WD: E WS: 2m/s Rain: Nil	Traffic 49-60						
						Wind 52-58						
						Birds 48-56						
						Insects <48						
						Aircraft 48-54						
						Industrial noise 50-77						
						Holcim loader <50						
						RDC L <sub>Aeq</sub> (15min) Contribution					<50	
						08/01/2020	20:21 (Evening)	72	53	47	WD: E WS: 1m/s Rain: Nil	Industrial noise 46-49
												Birds 46-51
Traffic 48-72												
RDC Inaudible												
RDC L <sub>Aeq</sub> (15min) Contribution					<37							
08/01/2020	22:00 (Night)	60	49	47	WD: E WS: 1m/s Rain: Nil	Industrial noise 46-48						
						Aircraft 46-56						
						Wind <46						
						Traffic <46						
						Car Horn 60						
						RDC Inaudible						
RDC L <sub>Aeq</sub> (15min) Contribution					<37							

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.

#### 4.1.4 Attended Assessment Results - Location N4

The monitored noise level contributions and observed meteorological conditions for each assessment period at location N4 for the NMA are presented in **Table 5**.

Date	Time (hrs)	Descriptor (dBA re 20 µPa)			Meteorology	Description and SPL, dBA
		L <sub>Amax</sub>	L <sub>Aeq</sub>	L <sub>A90</sub>		
08/01/2020	15:17 (Day)	63	52	50	WD: E WS: 2m/s Rain: Nil	Wind 50-58
						Birds 48-63
						Traffic 46-54
						Train 48-54
						RDC Inaudible
RDC L <sub>Aeq</sub> (15min) Contribution						<40
08/01/2020	21:08 (Evening)	78	66	53	WD: E WS: 0.1m/s Rain: Nil	Local residential noise <58
						Traffic 48-78
						Insects <48
						RDC Inaudible
						RDC L <sub>Aeq</sub> (15min) Contribution
08/01/2020	23:08 (Night)	86	64	49	WD: E WS: 1m/s Rain: Nil	Traffic 48-86
						Aircraft 46-49
						Insects <49
						RDC Inaudible
						RDC L <sub>Aeq</sub> (15min) Contribution

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 Unattended Noise Monitoring Results

The summary (RBL and overall LAeq), noise levels recorded during unattended noise monitoring are presented in **Table 6**.

<b>Table 6 Unattended Noise Monitoring Summary</b>			
Monitoring Location	Period <sup>1</sup>	Measured dB LAeq(period) <sup>2</sup>	Measured Background Noise Level (LA90) dB RBL <sup>2</sup>
L1 (N1 Station Street)	Day	61	46
	Evening	69	41
	Night	51	34
L2 (N2 Knox Road)	Day	57	48
	Evening	57	46
	Night	53	36
L3 (N3 Nurragingy Reserve)	Day	54	47
	Evening	52	45
	Night	51	44
L4 (N4 Olympic Park)	Day	62	43
	Evening	62	40
	Night	60	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.

Note 2: Calculated from one week of monitoring data and determined using the long term methodology for each period as per Fact Sheet A of the NPI (2017).

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## 5 Discussion

### 5.1 Discussion of Results - Location N1

RDC noise emissions were inaudible during all three attended measurements conducted on Wednesday 8 January 2020. RDC noise contributions were estimated to satisfy the relevant noise criteria for all periods. Extraneous noise sources included birds, local residential noise, insects and wind in trees, with ambient noise levels dominated by traffic noise.

### 5.2 Discussion of Results - Location N2

RDC noise emissions were inaudible during the day, evening and night attended measurements conducted on Wednesday 8 January 2020. RDC noise contributions were estimated to satisfy the relevant noise criteria for all periods. Extraneous sources measured include traffic, birds, wind in trees, aircraft, train and insects.

### 5.3 Discussion of Results - Location N3

Attended measurements on Wednesday 8 January 2020 identified that RDC noise was audible during the daytime measurements, with evening and night measurements inaudible. RDC noise contributions were estimated to satisfy the relevant noise criteria for all periods. Extraneous sources audible during the attended surveys included traffic, wind in trees, birds, insects, aircraft and industrial noise which generally masked RDC noise. For the evening and night periods, it is noted the receiver was not in use and hence criteria are referenced for completeness.

### 5.4 Discussion of Results - Location N4

RDC noise emissions inaudible during the day, evening and night measurements on Wednesday 8 January 2020. RDC noise contributions were estimated to satisfy the relevant noise criteria for all periods. It is noted that the sports centre was not in use during the night period and criteria are referenced for completeness. Extraneous noise sources included wind in trees, birds, traffic, train, local residential noise, insects and aircraft noise all audible throughout the attended measurements at this location.

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## 6 Conclusion

Muller Acoustic Consulting Pty Ltd (MAC) has completed a Noise Monitoring Assessment (NMA) on behalf of Holcim (Australia) Pty Ltd for the Regional Distribution Centre (RDC), at Rooty Hill, NSW. The assessment was completed to assess compliance against relevant noise criteria for Quarter 1, ending March 2020.

Unattended noise monitoring was completed between Wednesday 8 January 2020 and Friday 17 January 2020 at four representative monitoring locations.

Attended noise monitoring was conducted on Wednesday 8 January 2020. The assessment has identified that noise emissions generated by RDC were inaudible at the nearest residential receivers during the attended monitoring, with all measurements satisfying the relevant noise criteria at all assessed residential receivers.

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# Appendix A – Glossary of Terms

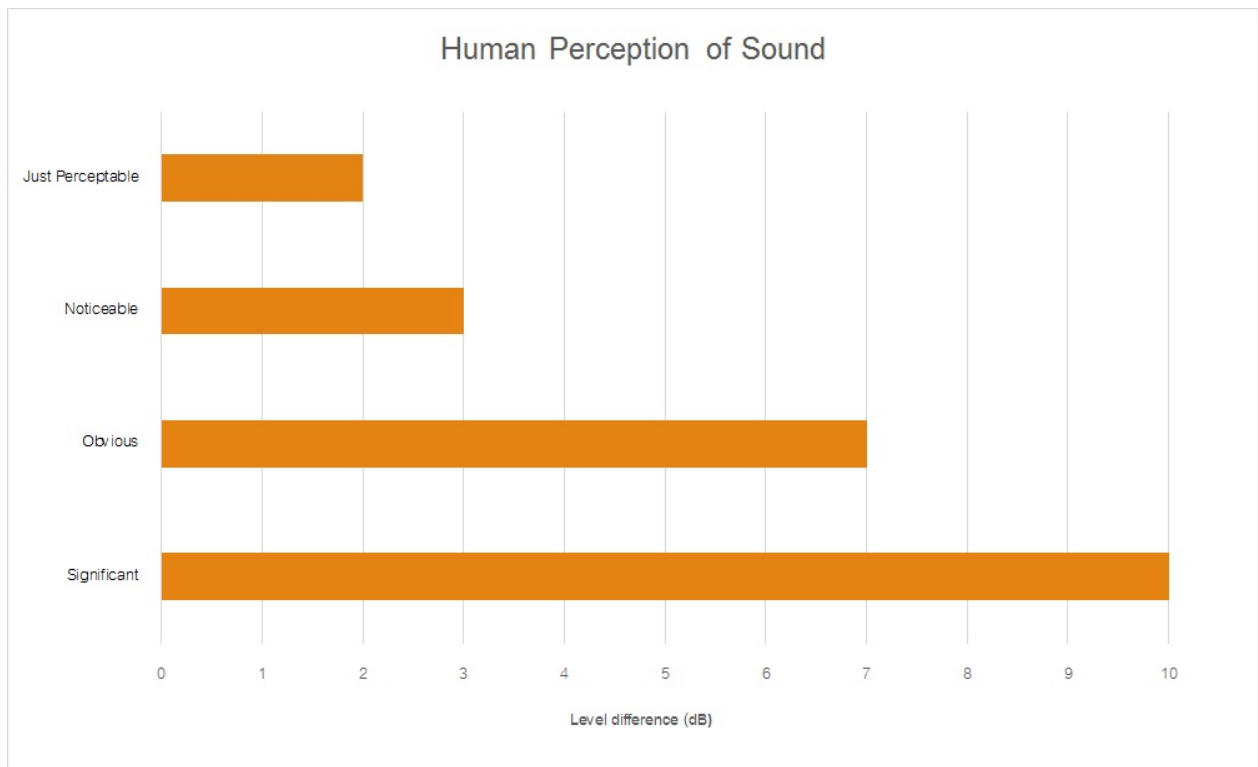
Table A1 provides a number of technical terms have been used in this report.

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.
Adverse Weather	Weather effects that enhance noise (that is, wind and temperature inversions) that occur at a site for a significant period of time (that is, wind occurring more than 30% of the time in any assessment period in any season and/or temperature inversions occurring more than 30% of the nights in winter).
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.
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 <sub>ax</sub>	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 (LW)	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 W <sub>0</sub> 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



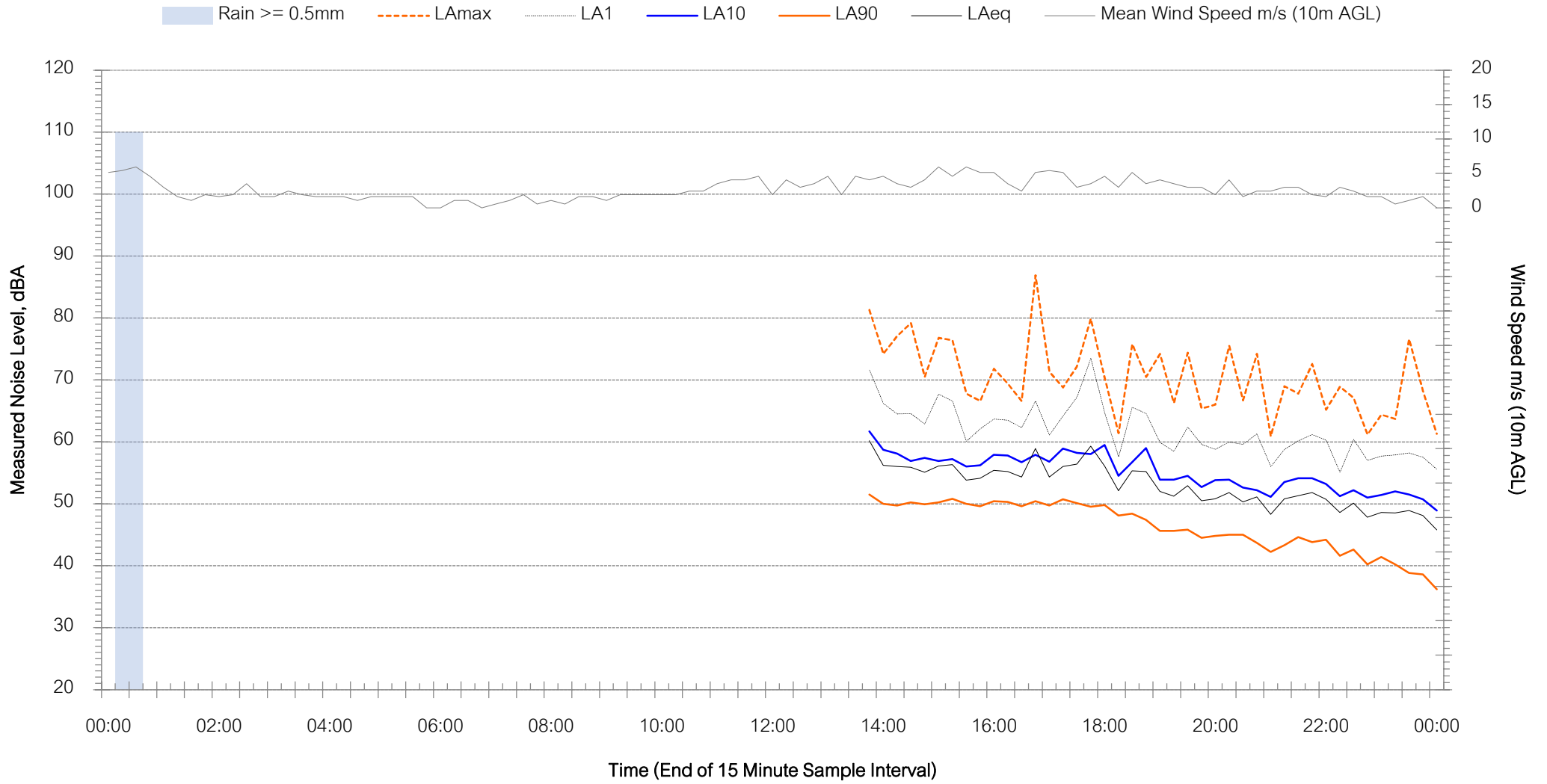
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# Appendix B – Unattended Noise Monitoring Charts



# Background Noise Levels

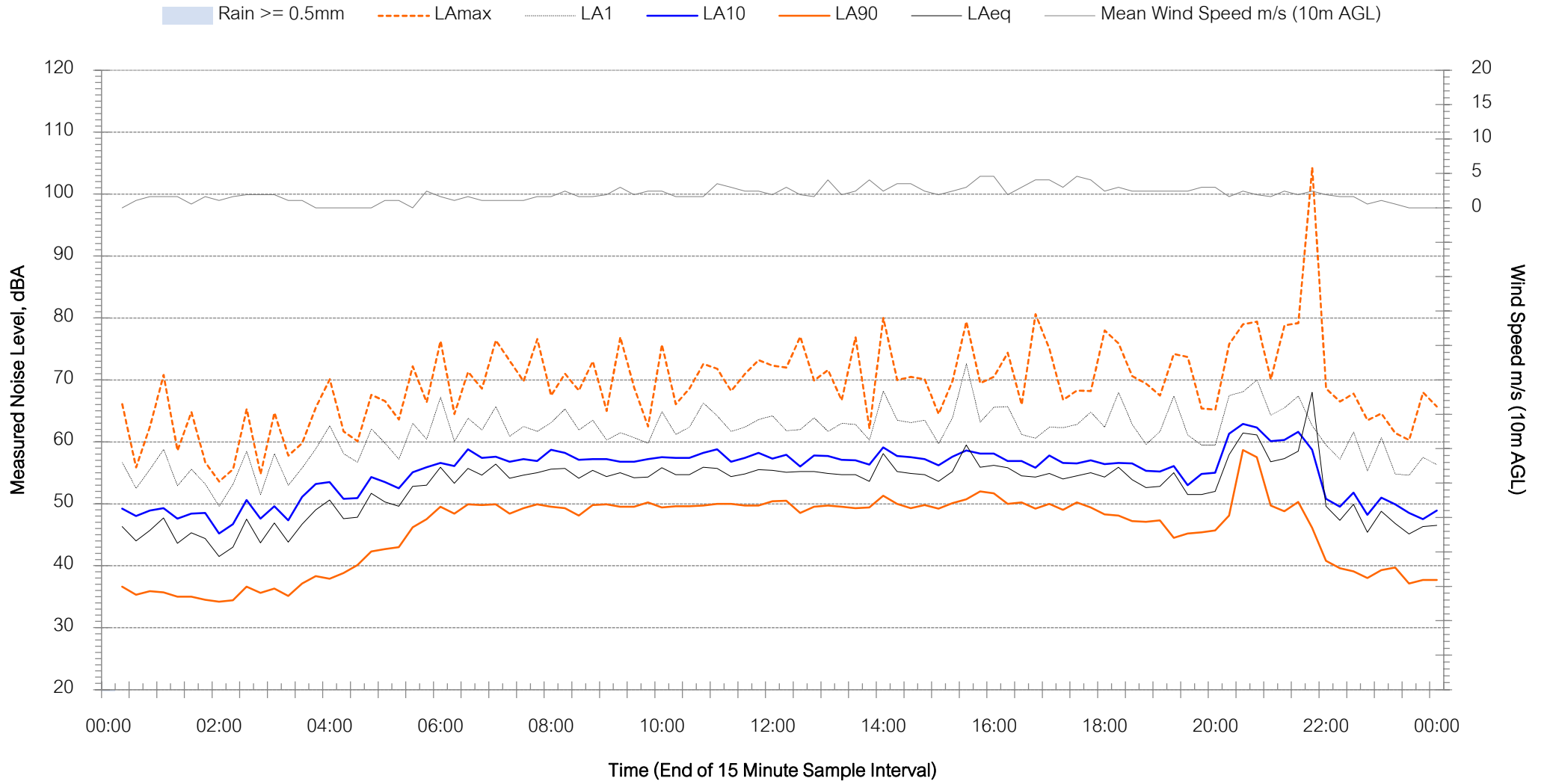
## N1 - Wednesday 8 January 2020





# Background Noise Levels

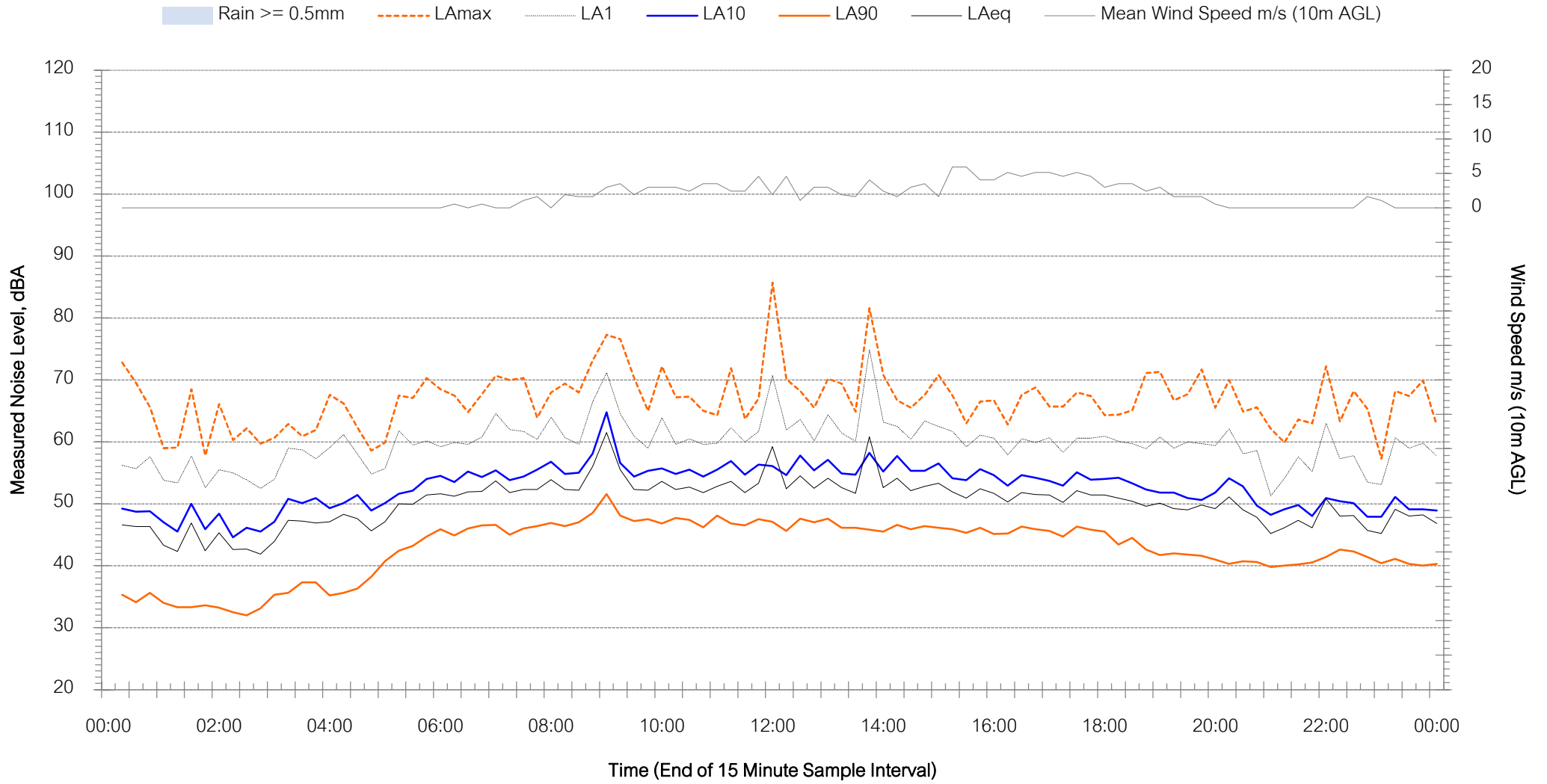
## N1 - Thursday 9 January 2020





# Background Noise Levels

## N1 - Friday 10 January 2020

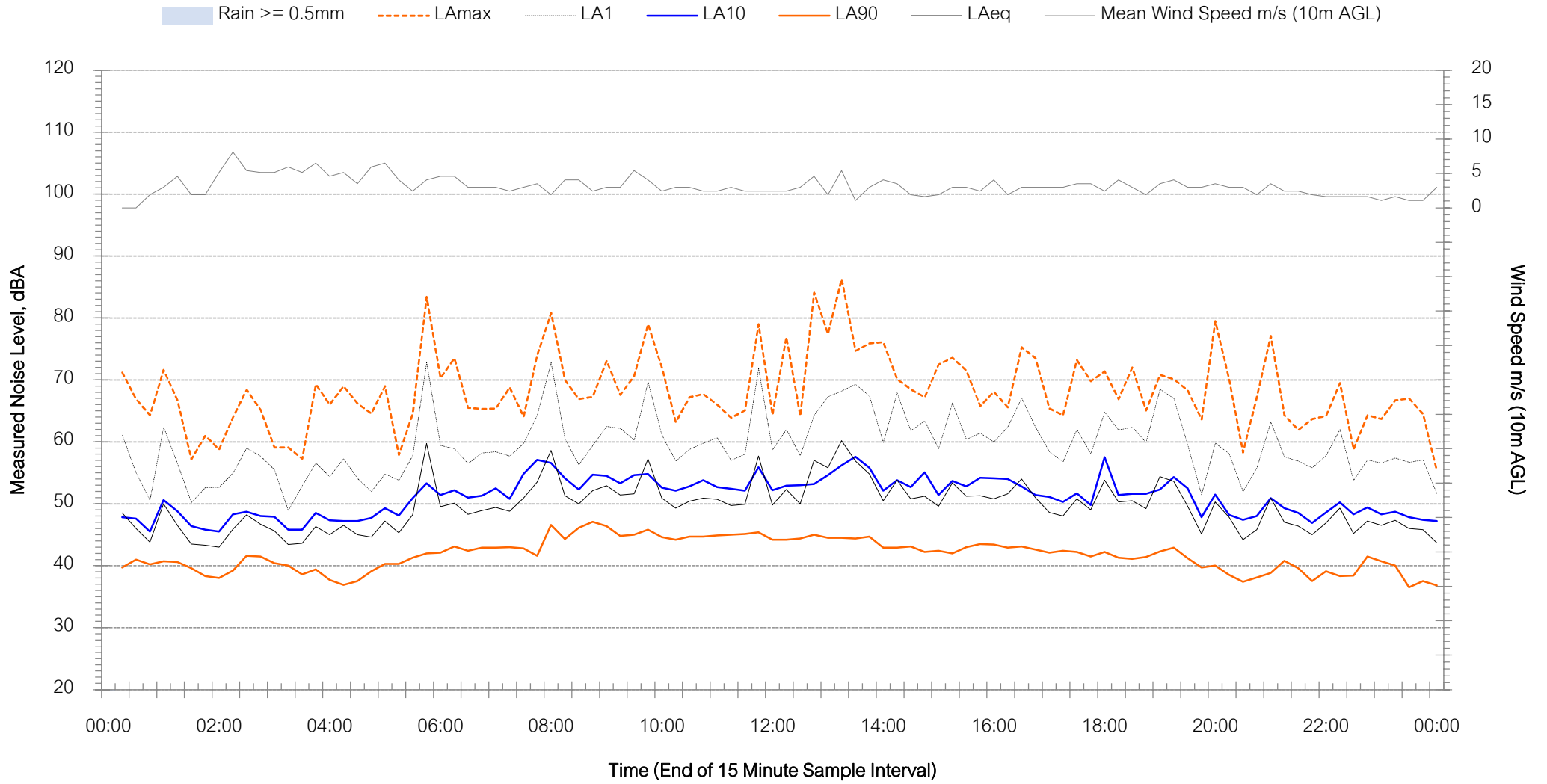






# Background Noise Levels

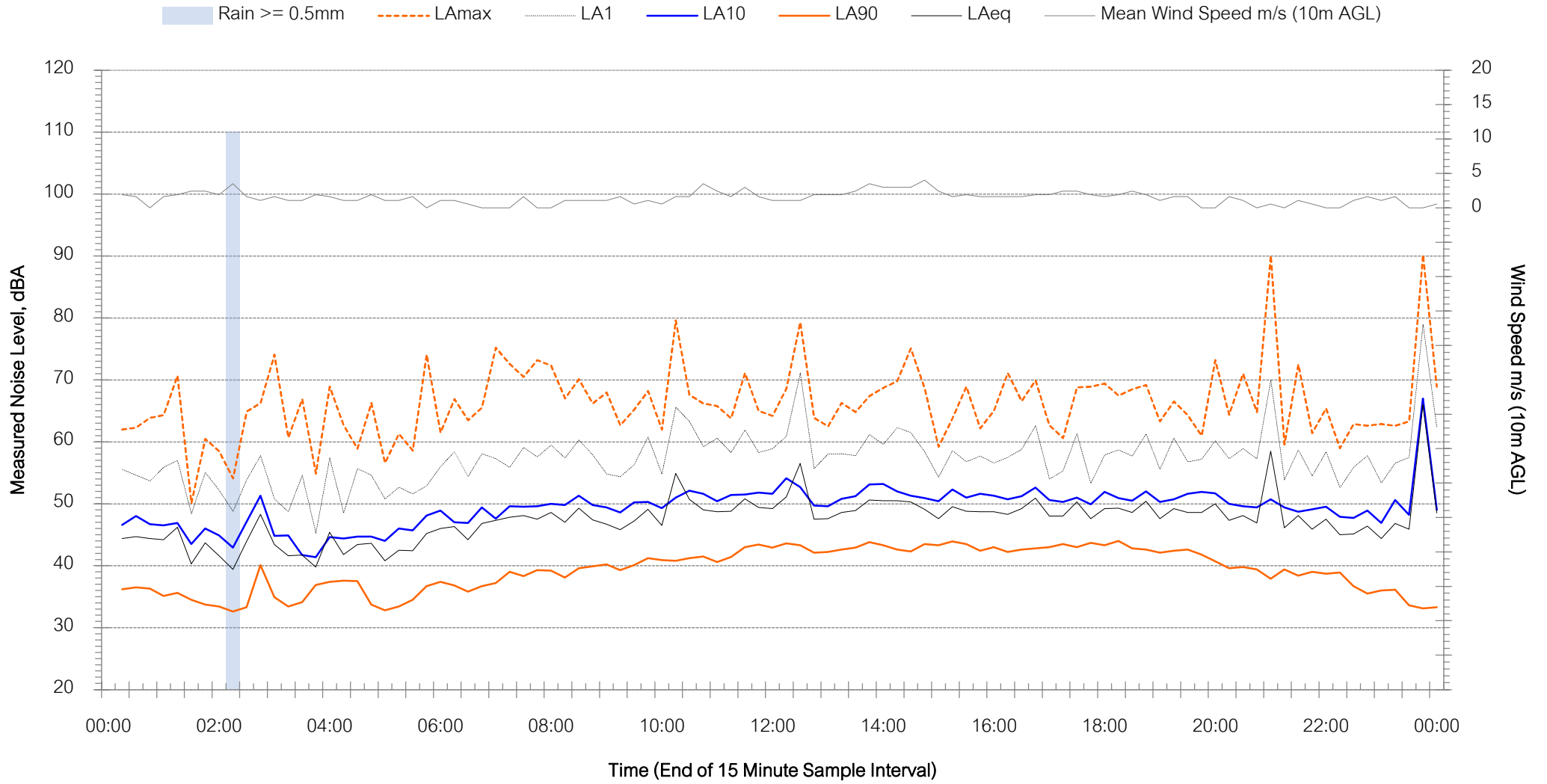
## N1 - Saturday 11 January 2020





# Background Noise Levels

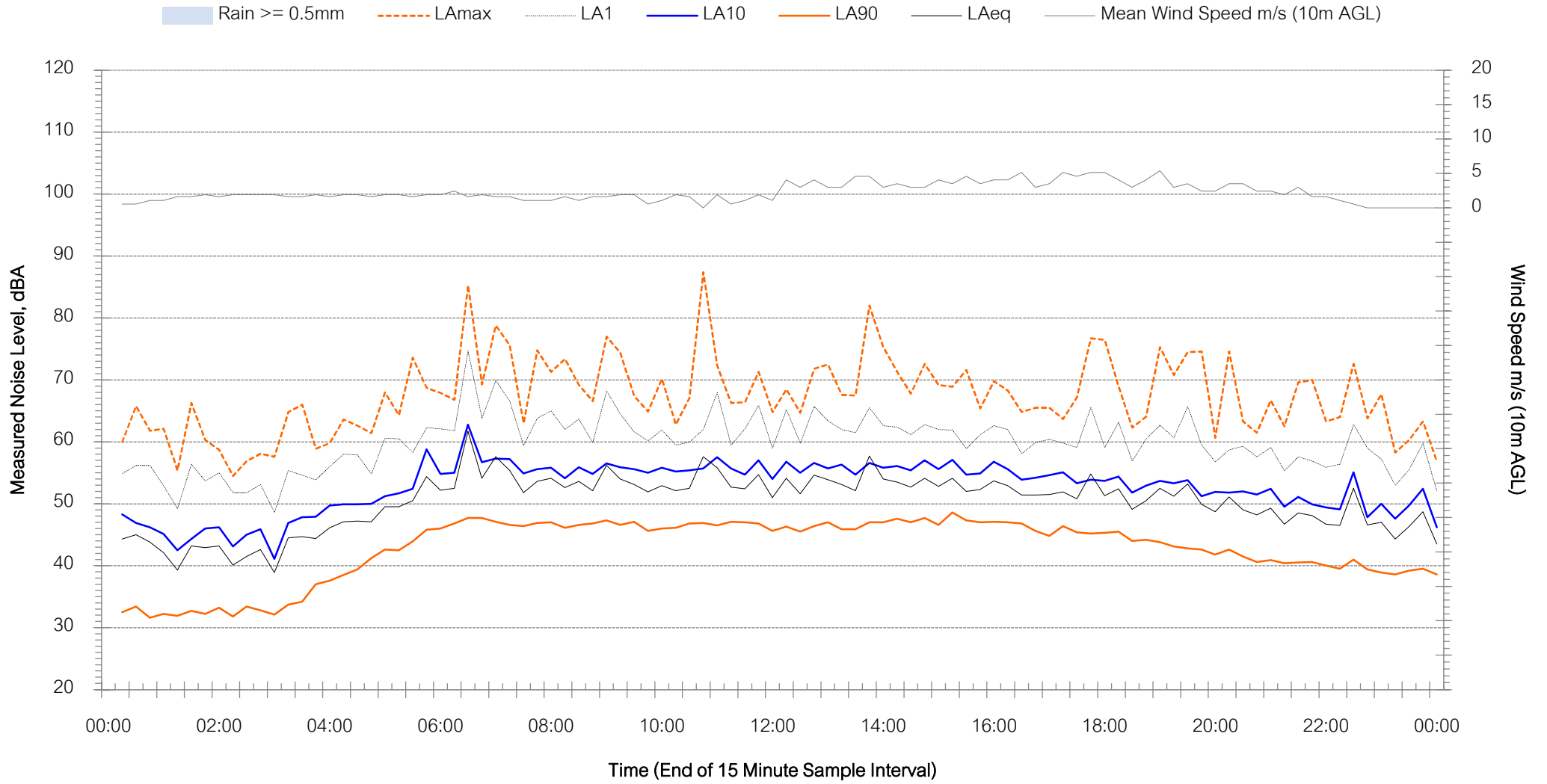
N1 - Sunday 12 January 2020





# Background Noise Levels

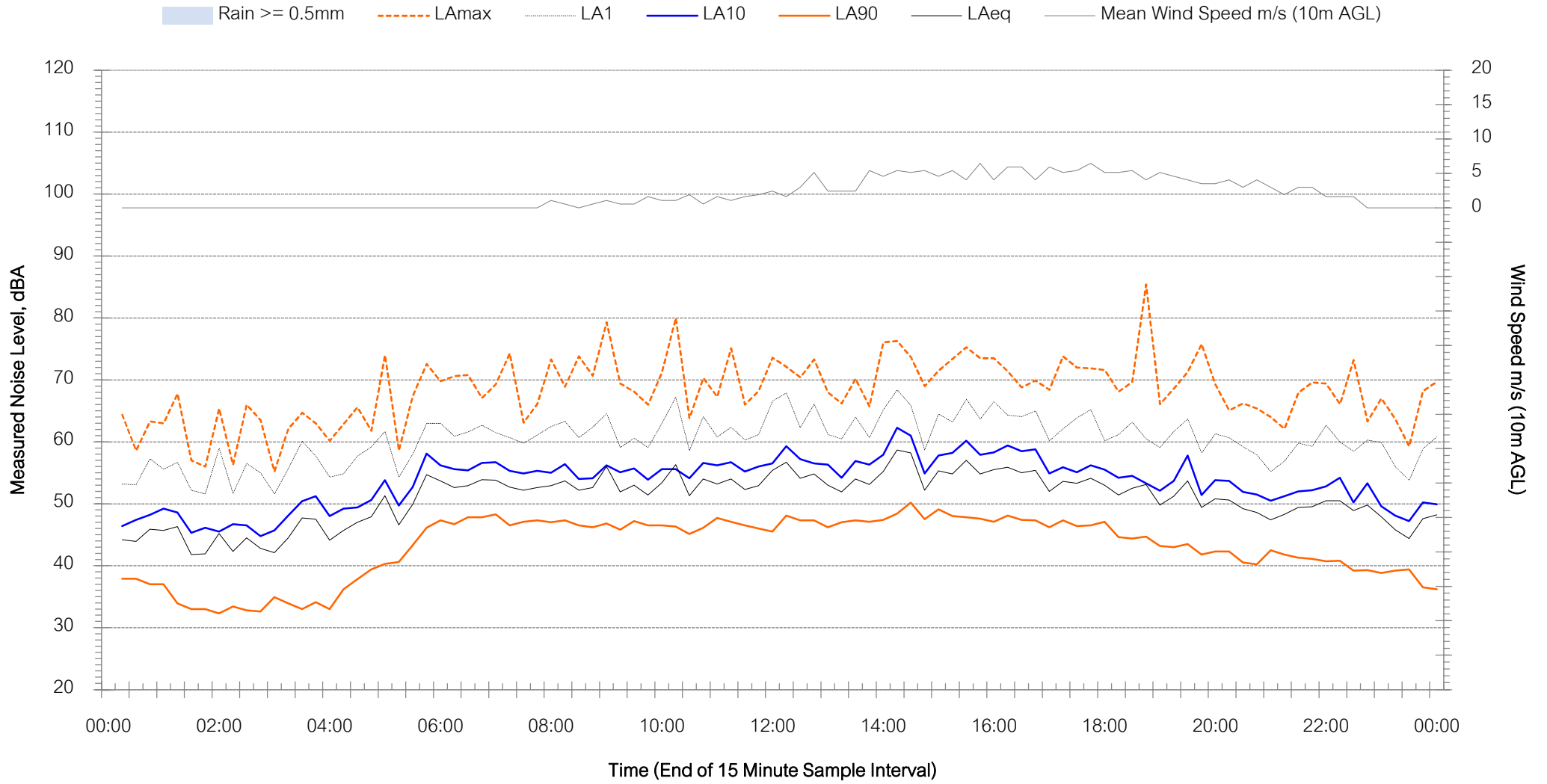
## N1 - Monday 13 January 2020





# Background Noise Levels

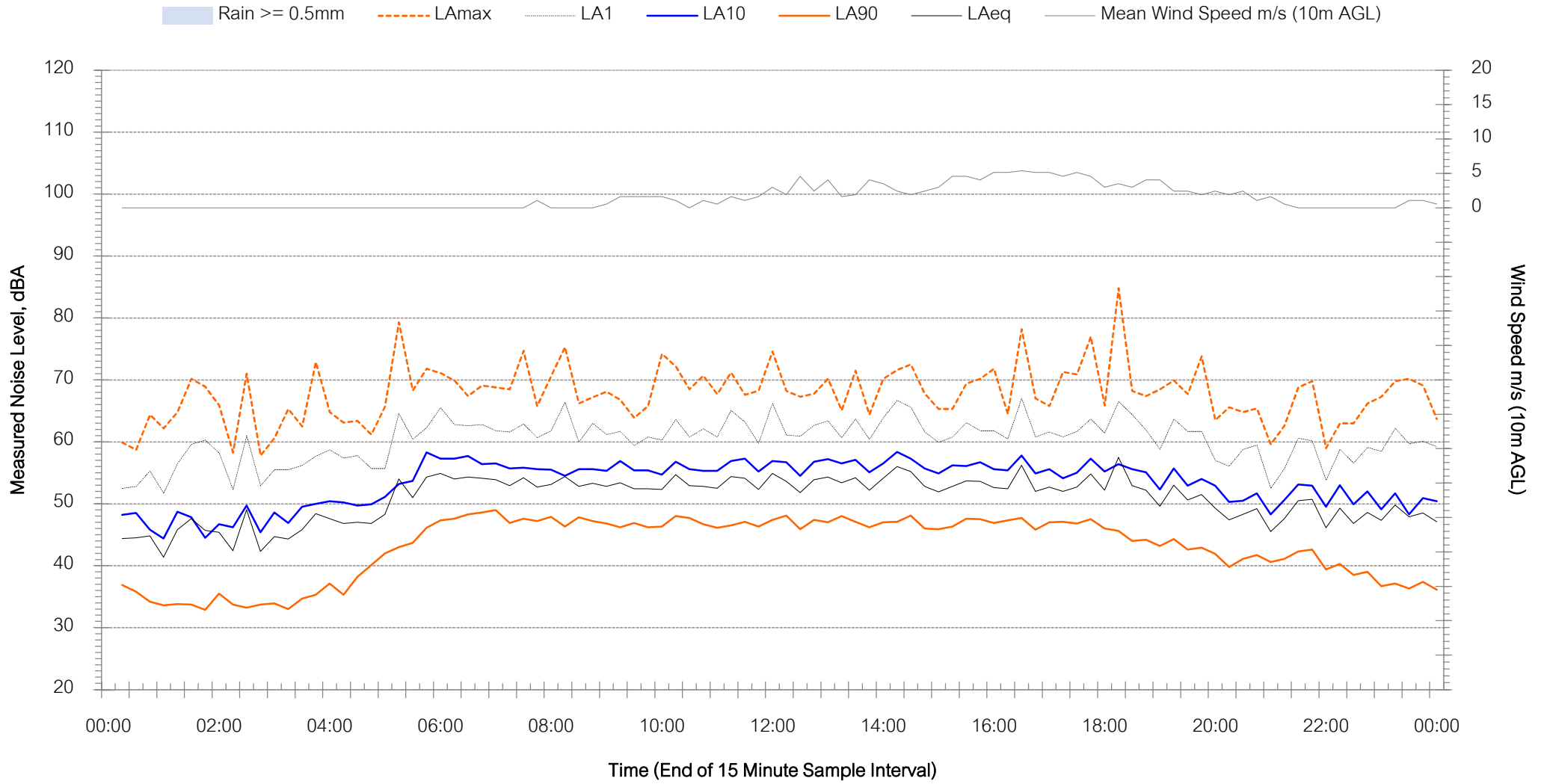
## N1 - Tuesday 14 January 2020





# Background Noise Levels

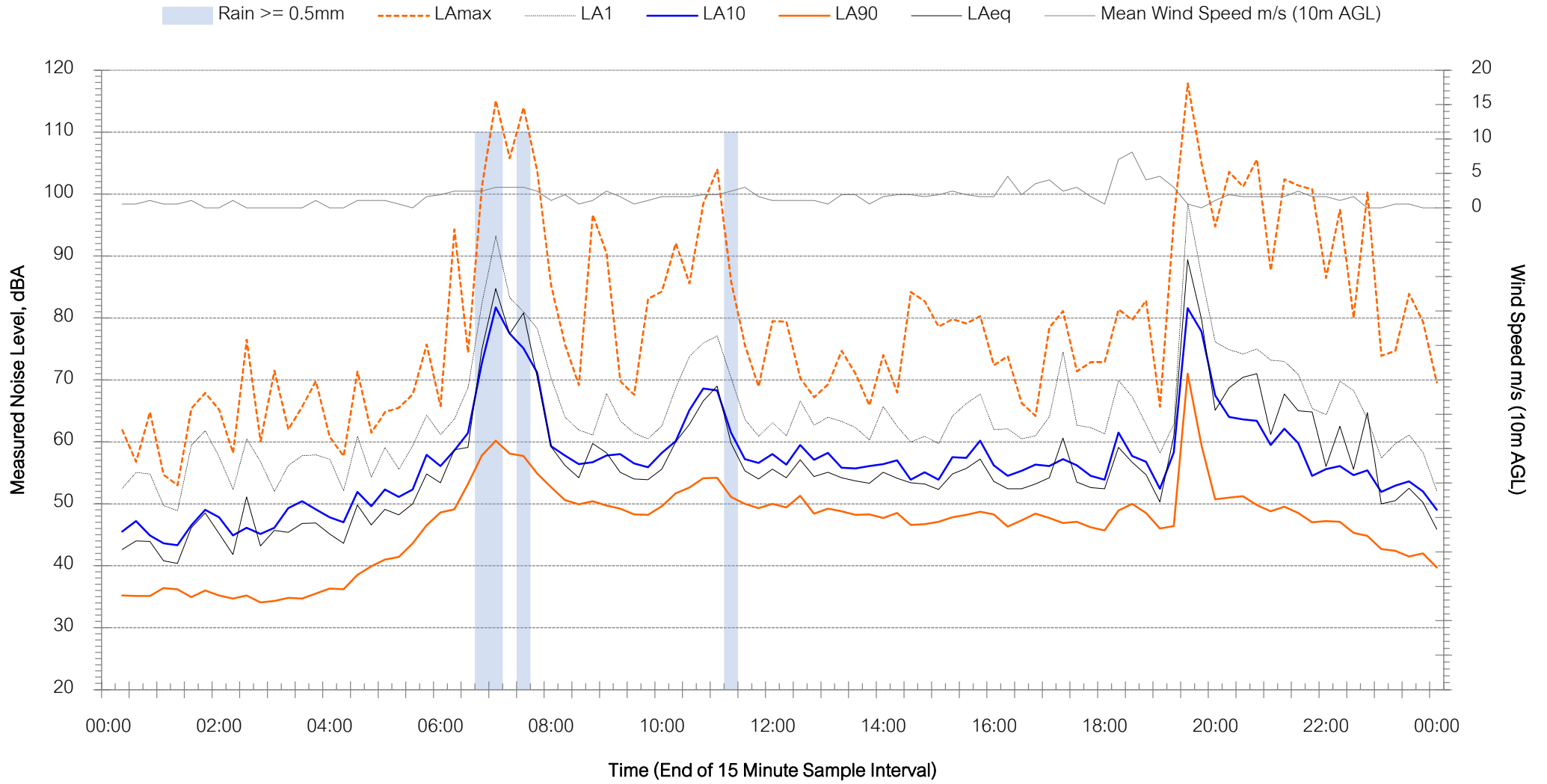
## N1 - Wednesday 15 January 2020





# Background Noise Levels

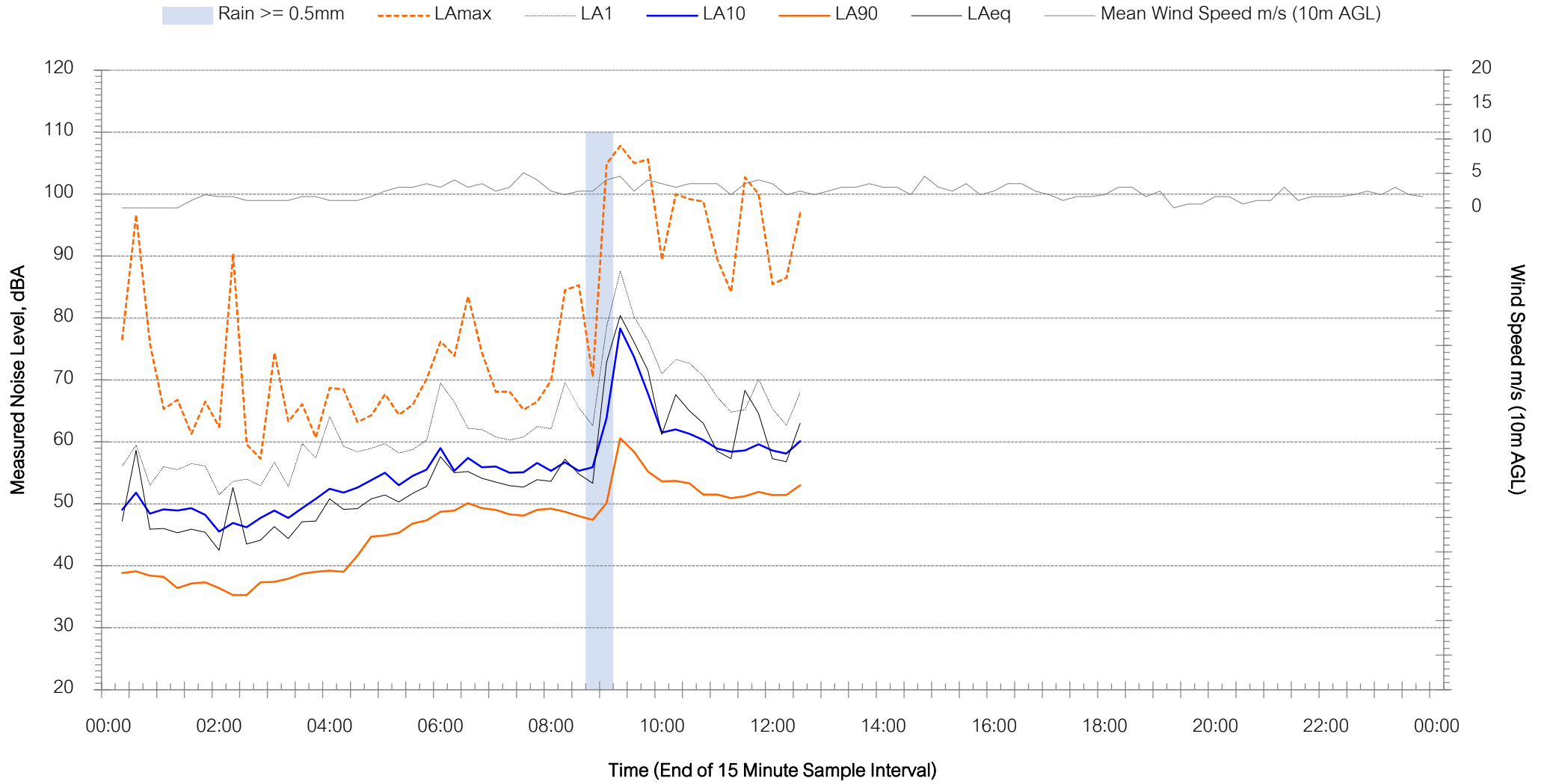
## N1 - Thursday 16 January 2020





# Background Noise Levels

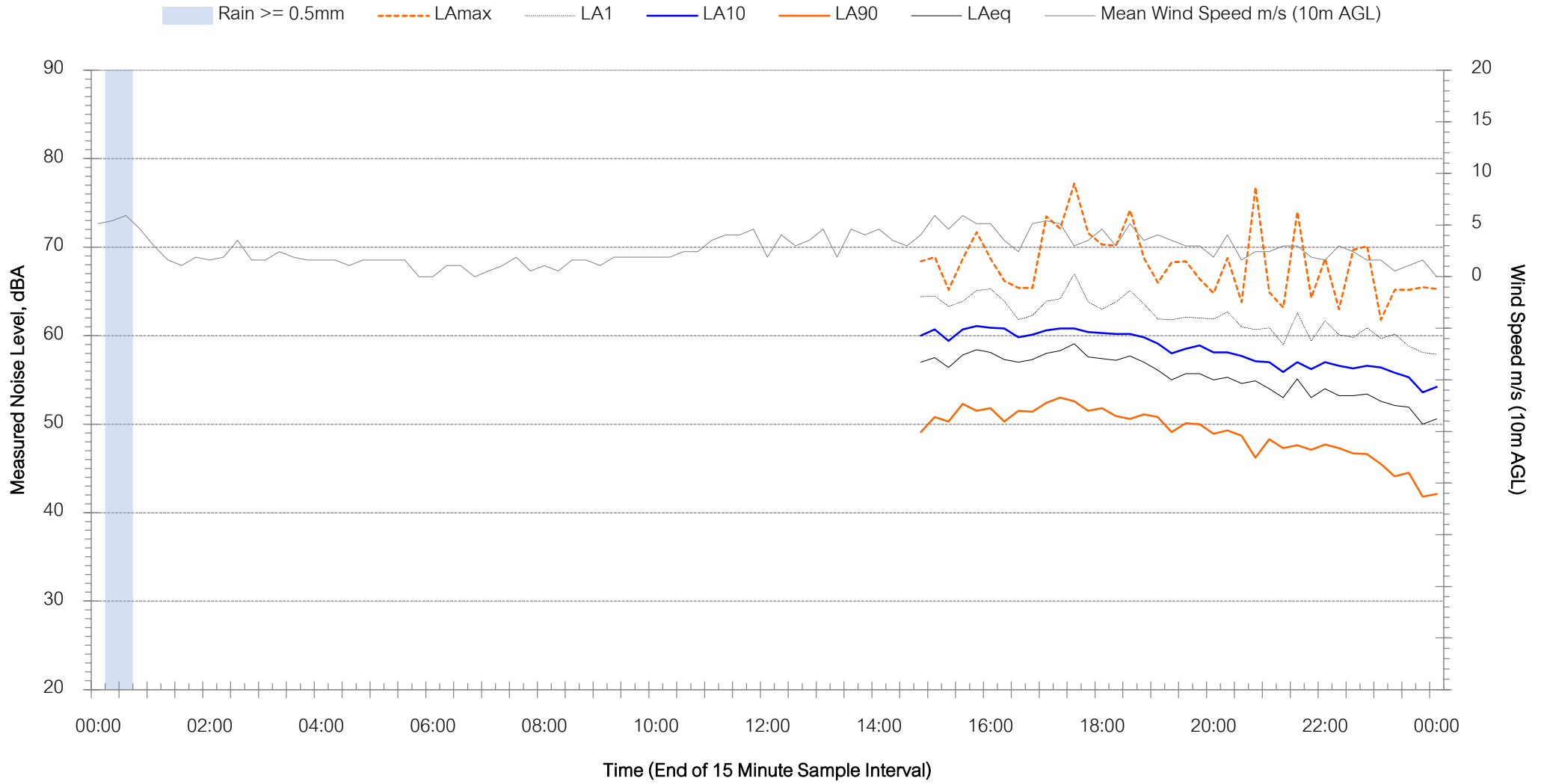
## N1 - Friday 17 January 2020





# Background Noise Levels

## N2 - Wednesday 8 January 2020

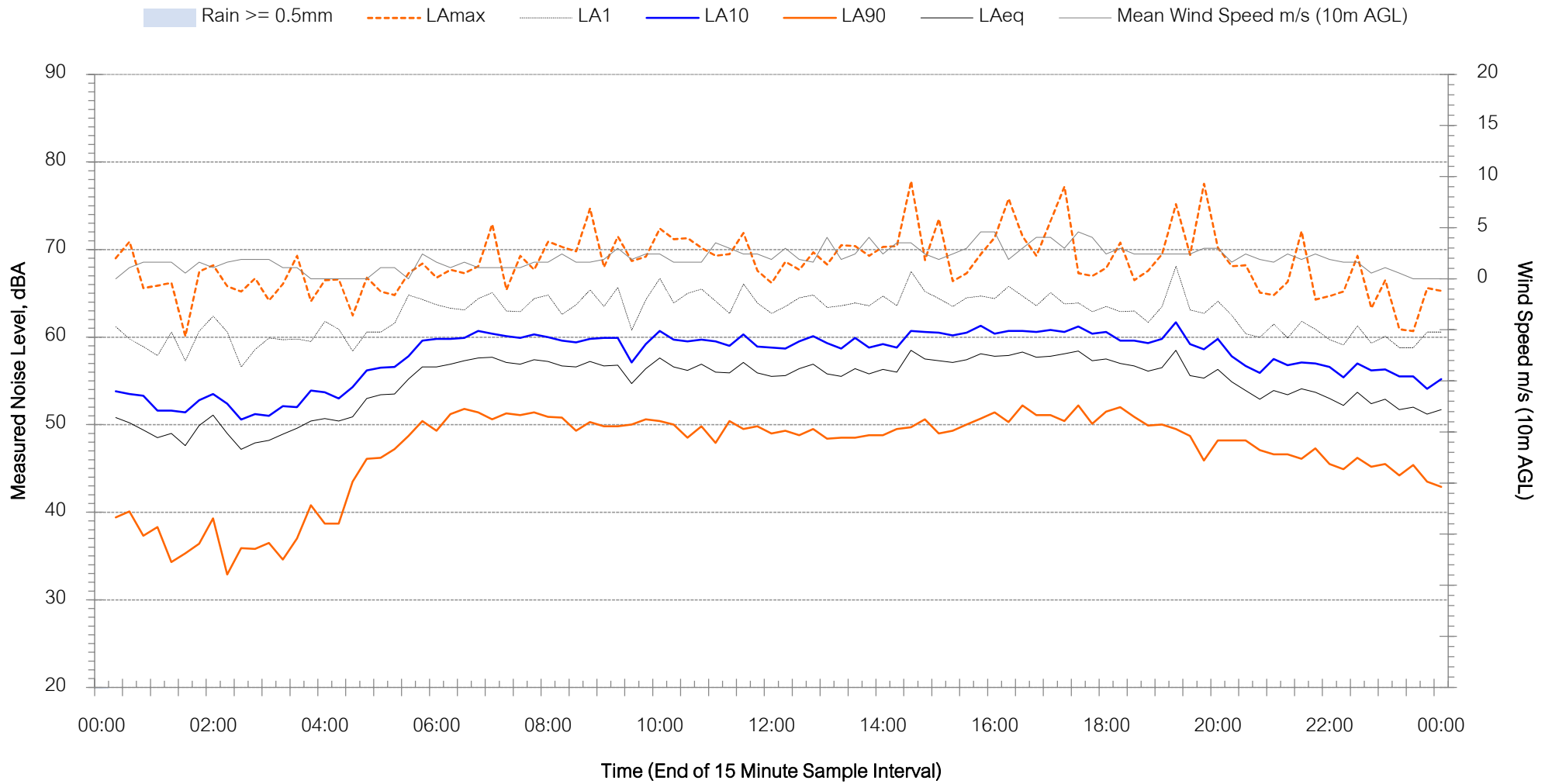






# Background Noise Levels

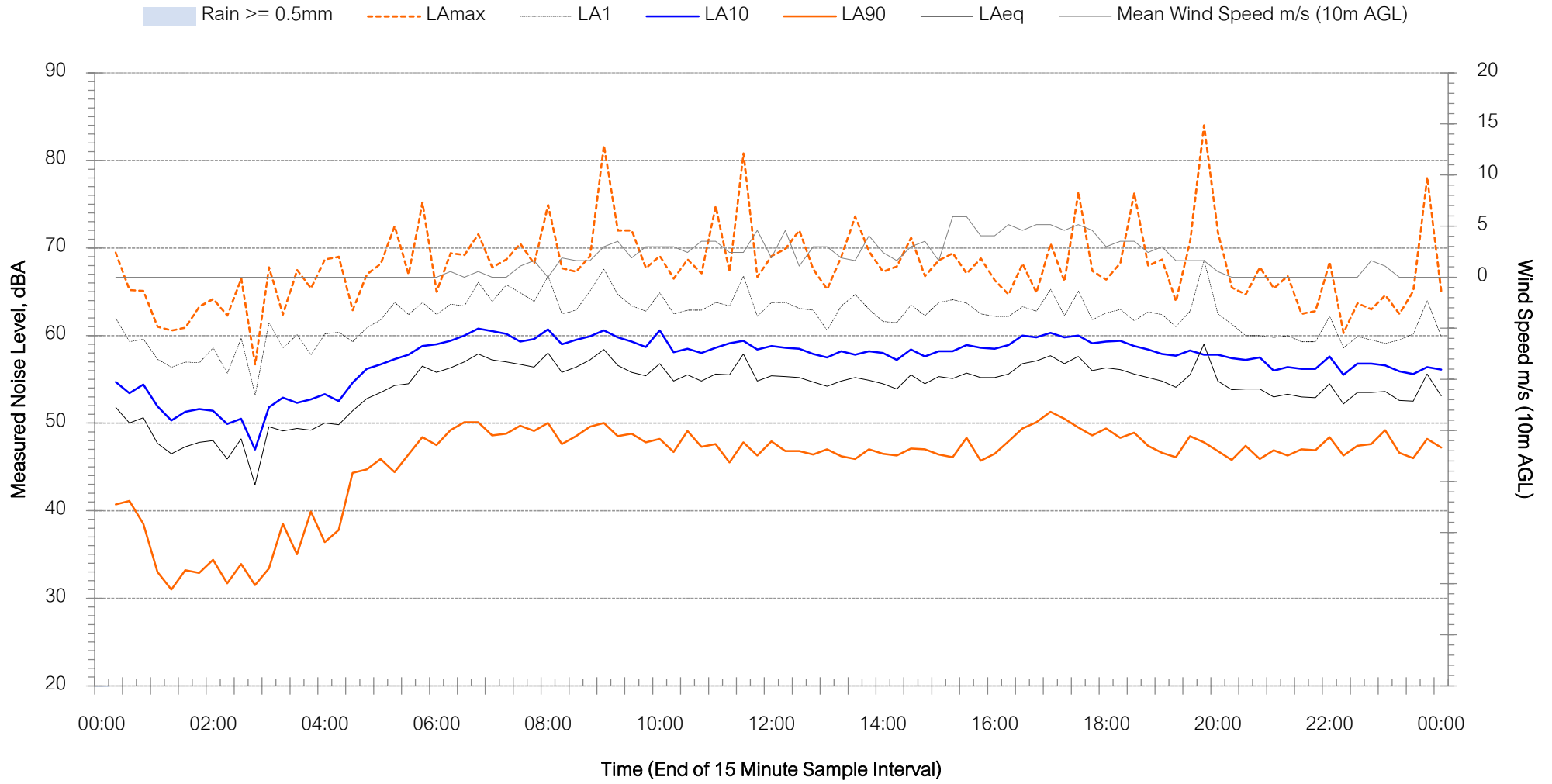
## N2 - Thursday 9 January 2020





# Background Noise Levels

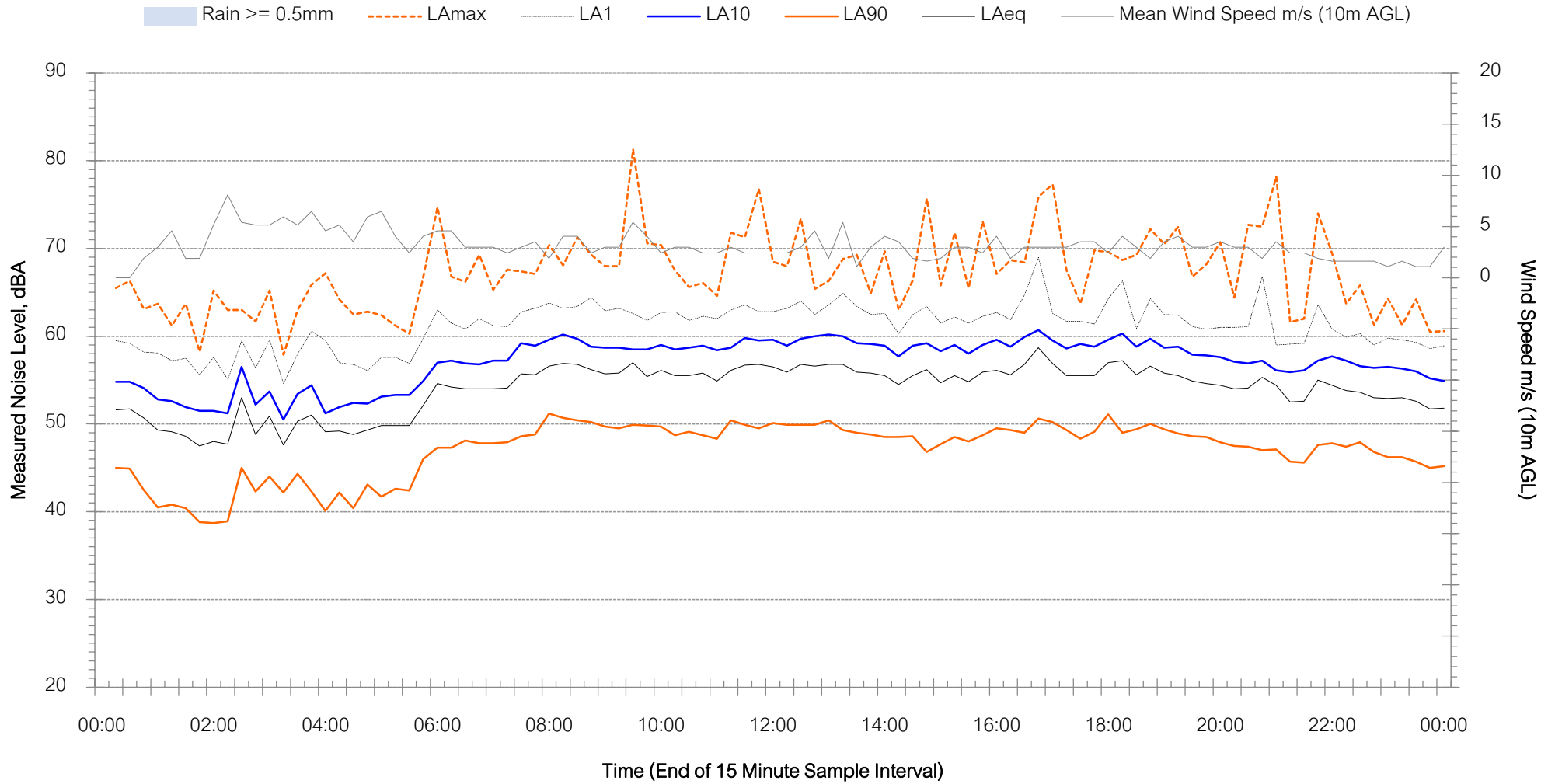
## N2 - Friday 10 January 2020





# Background Noise Levels

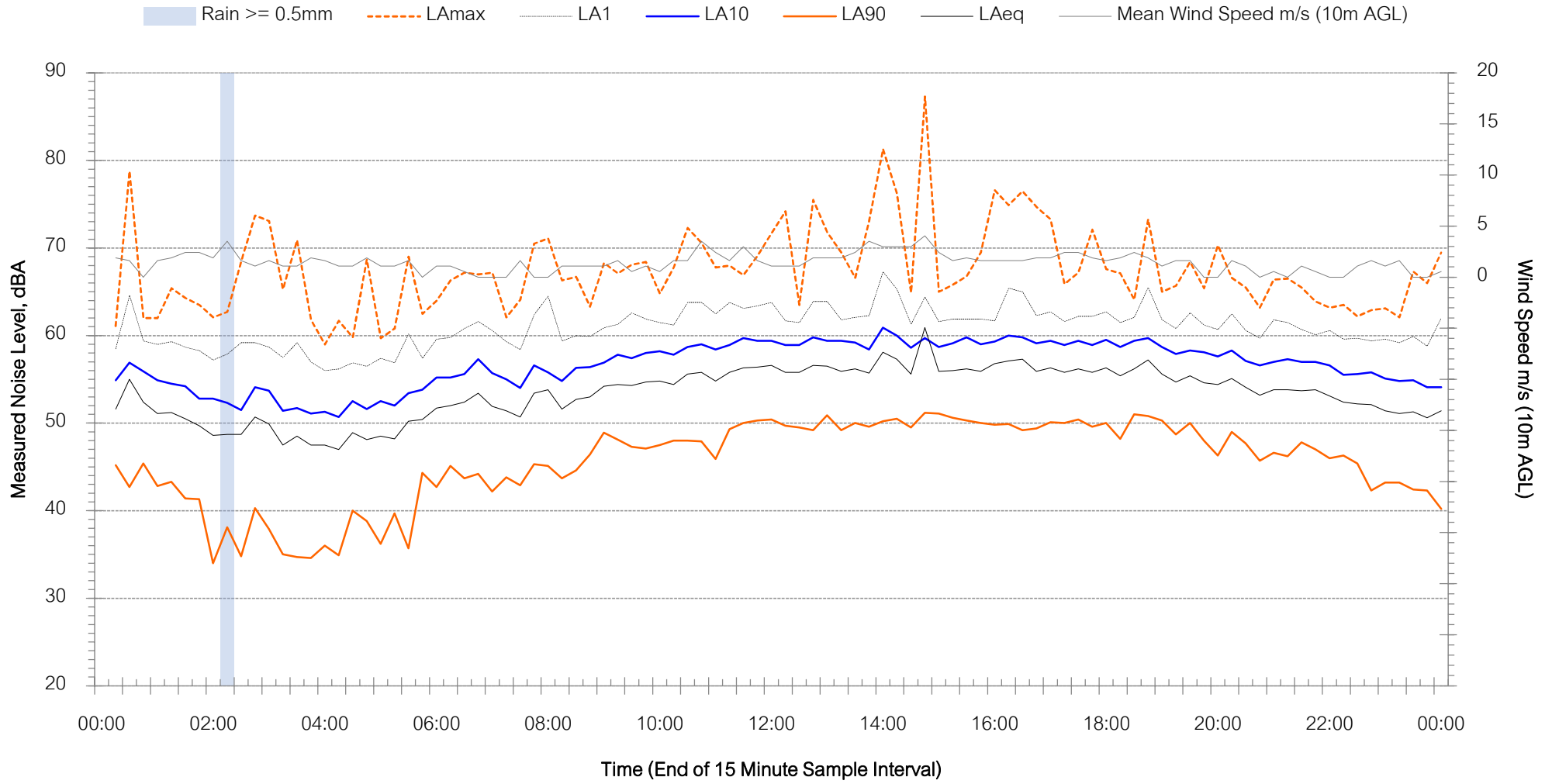
## N2 - Saturday 11 January 2020





# Background Noise Levels

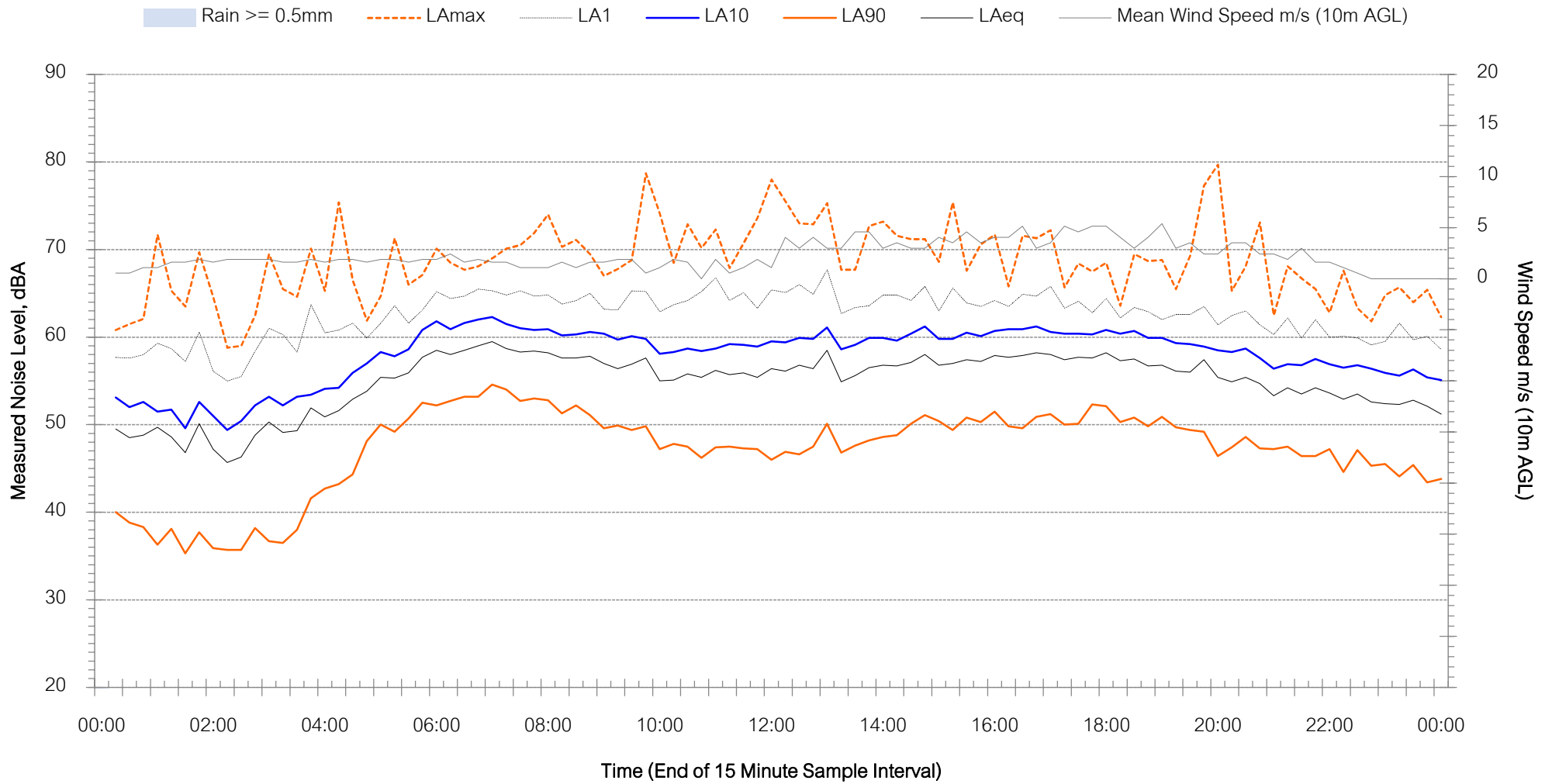
## N2 - Sunday 12 January 2020





# Background Noise Levels

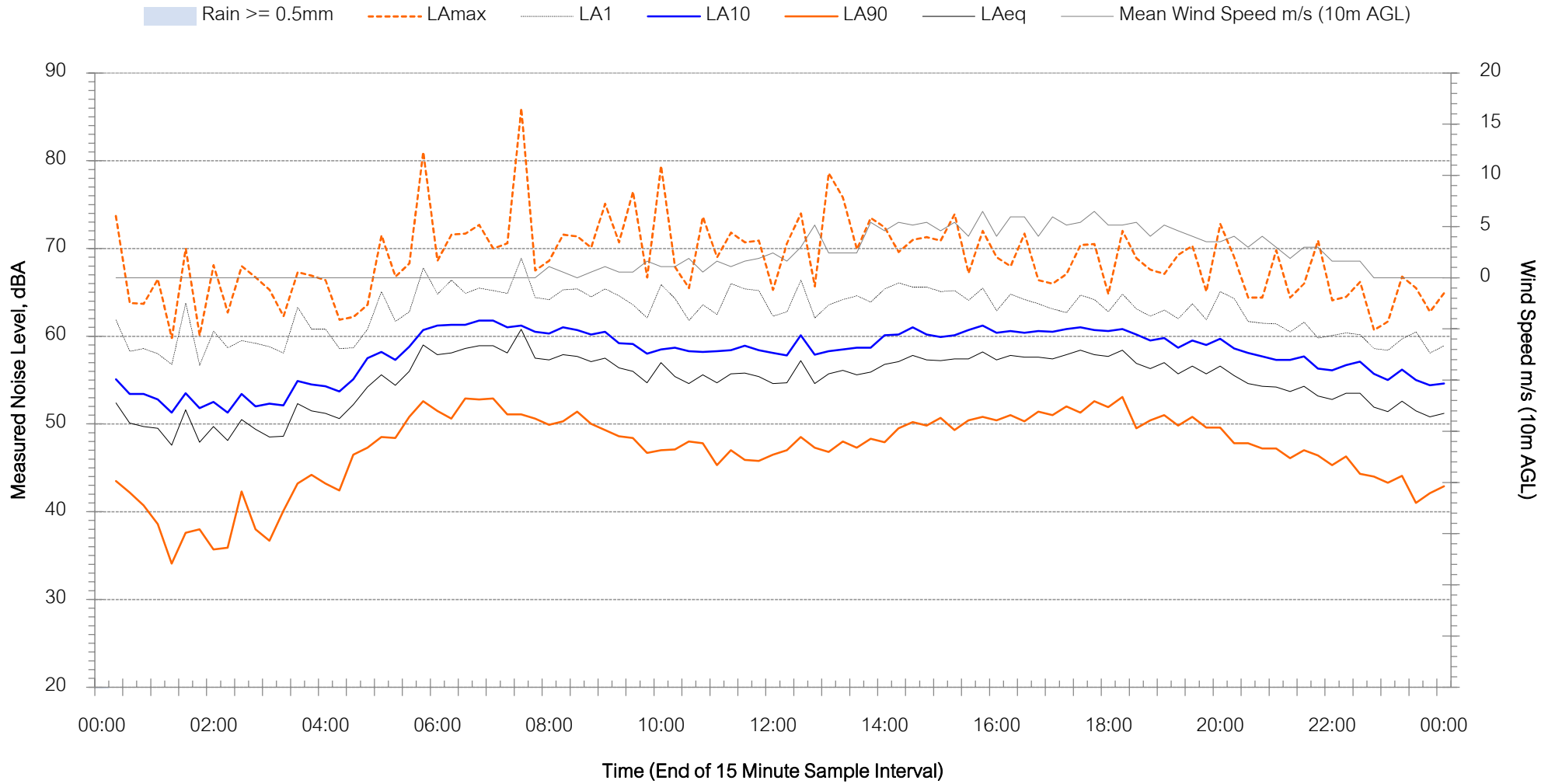
## N2 - Monday 13 January 2020





# Background Noise Levels

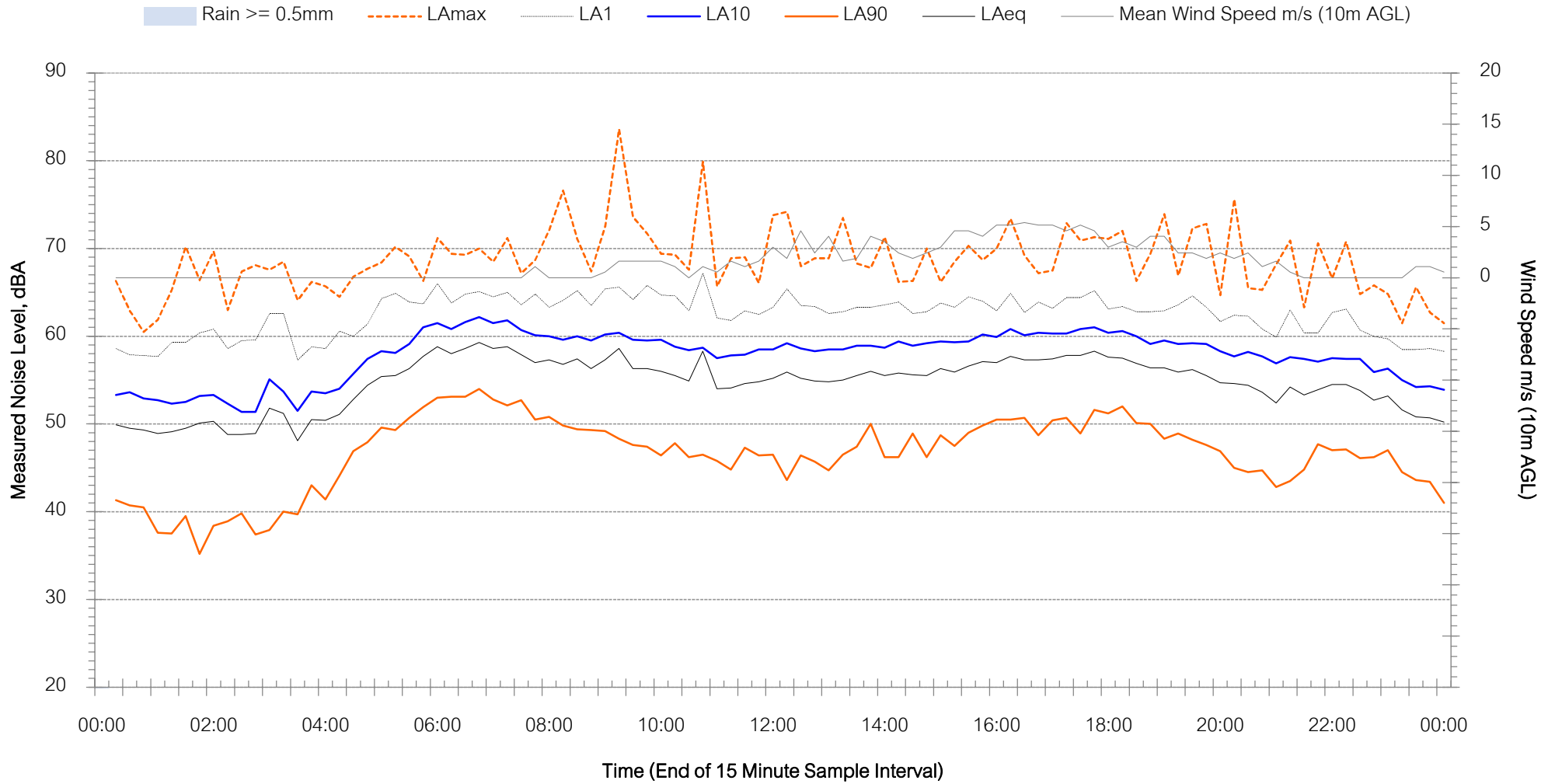
## N2 - Tuesday 14 January 2020





# Background Noise Levels

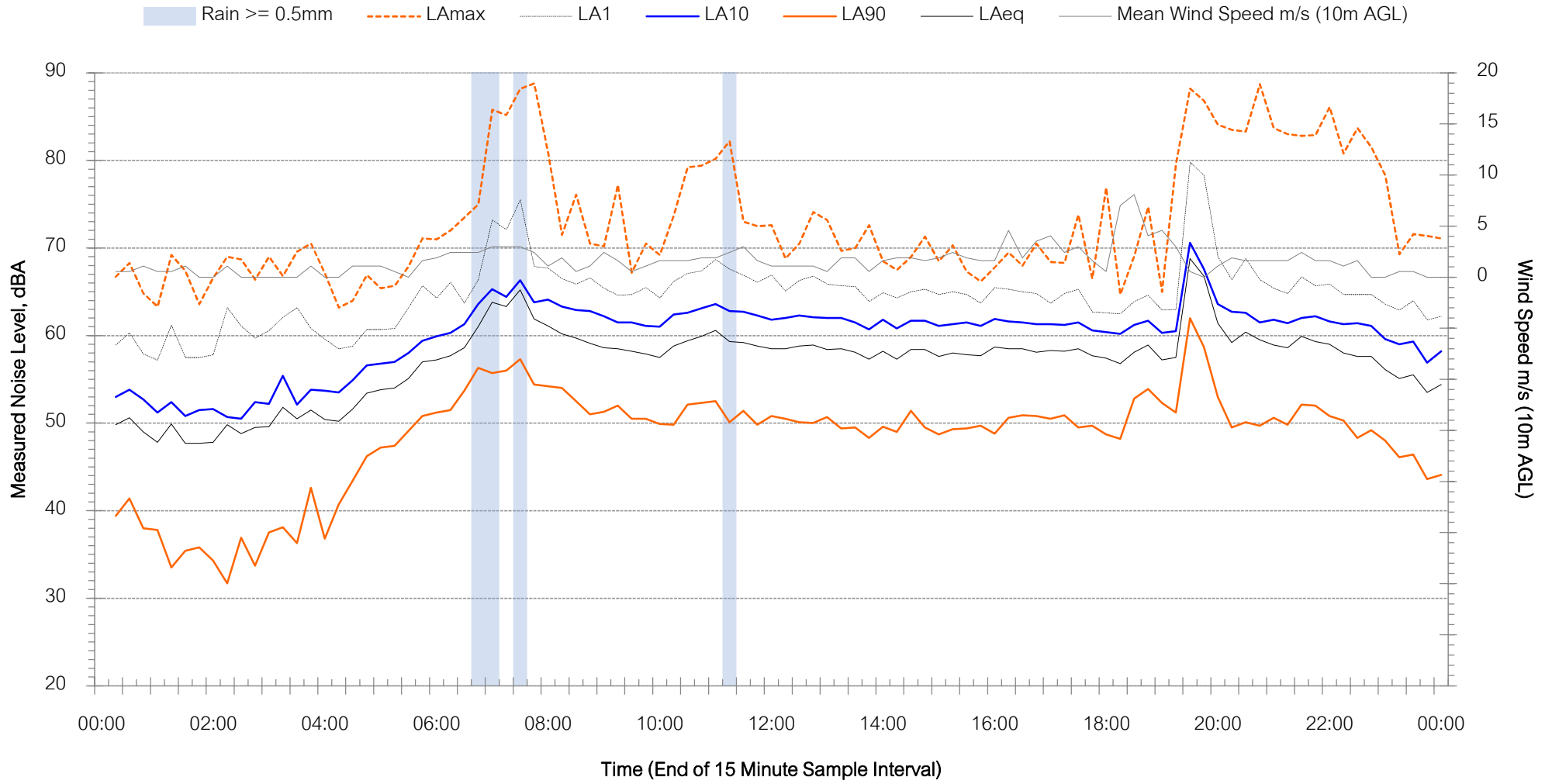
## N2 - Wednesday 15 January 2020





# Background Noise Levels

## N2 - Thursday 16 January 2020

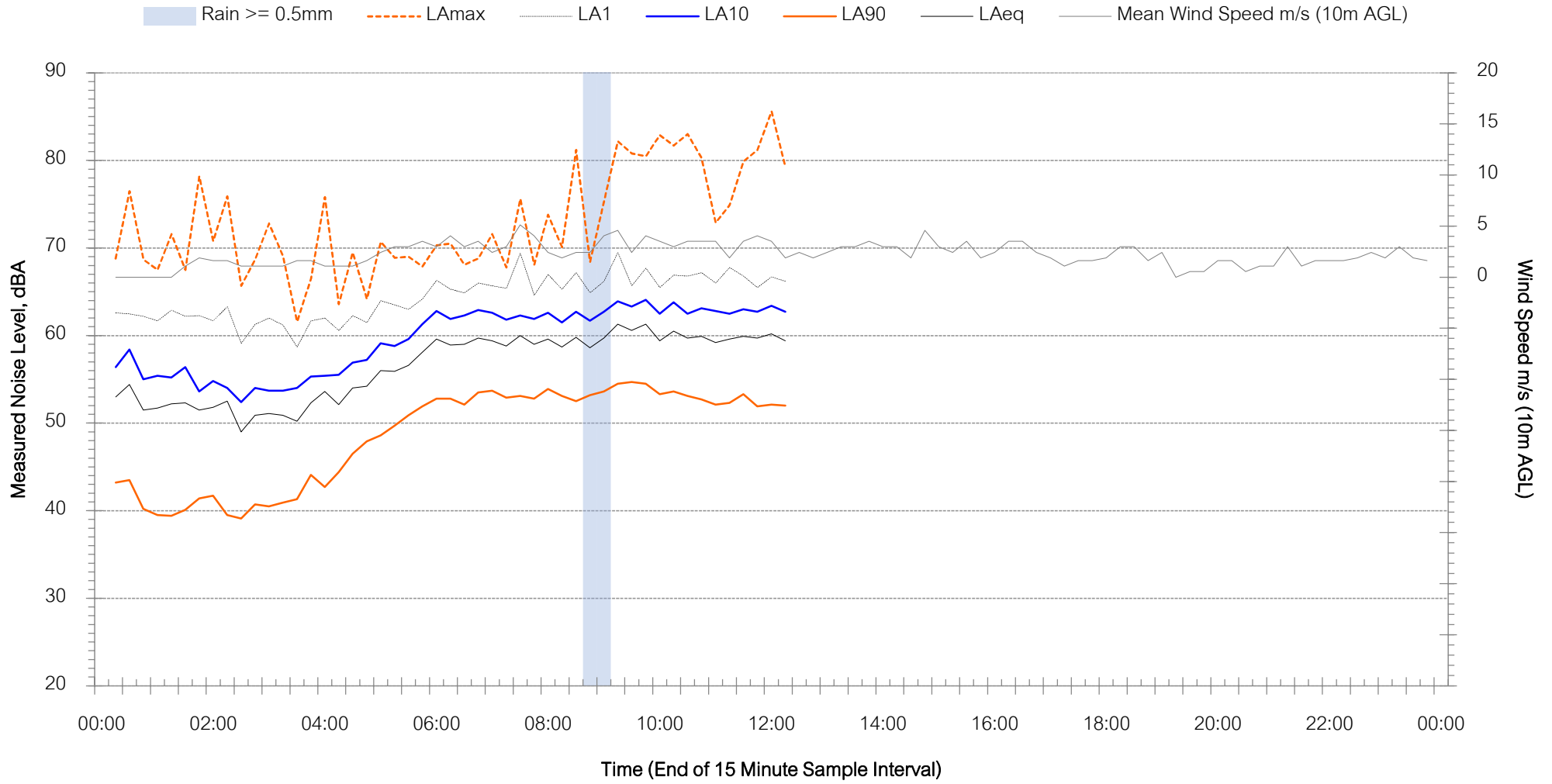






# Background Noise Levels

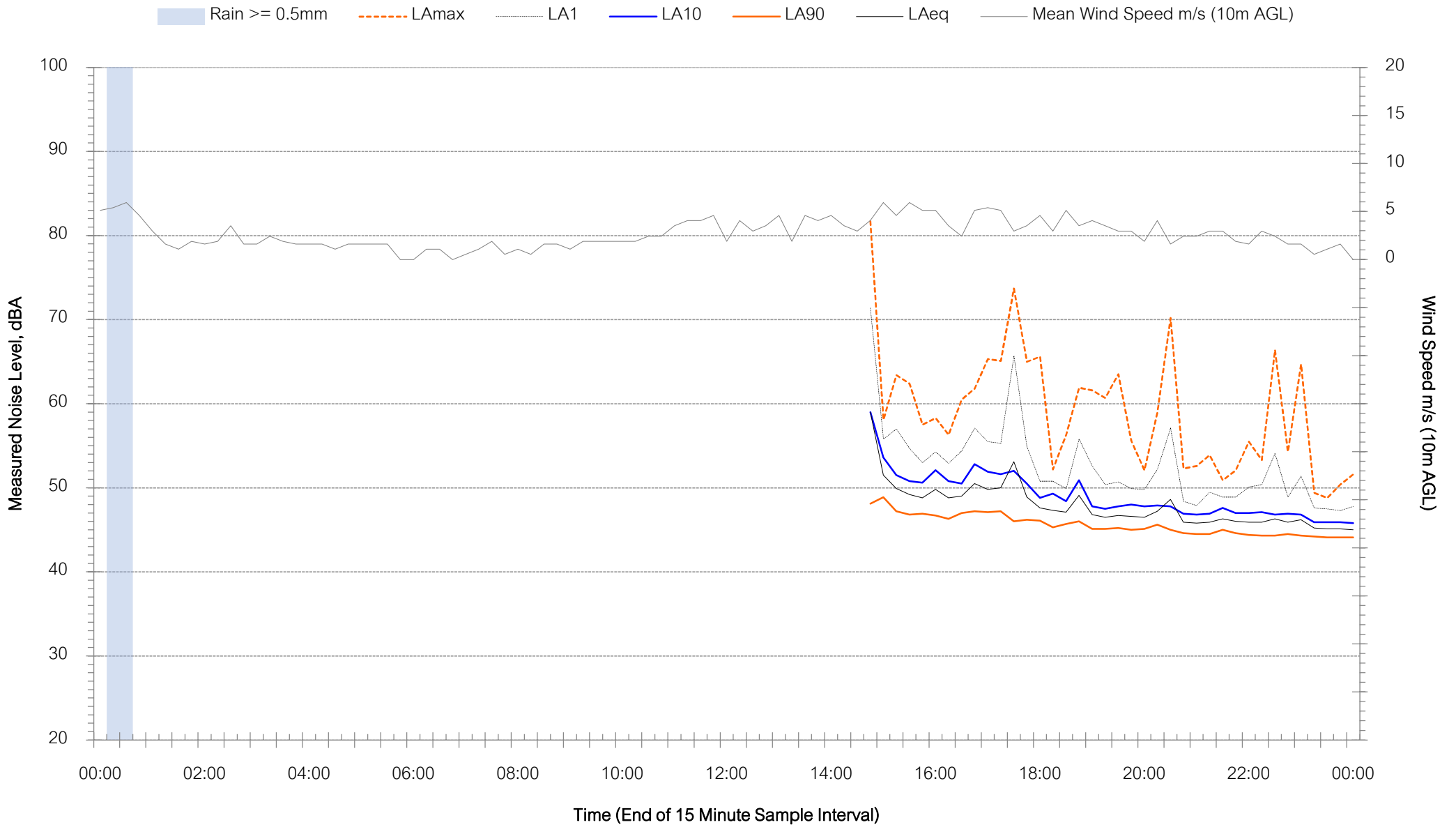
## N2 - Friday 17 January 2020





# Background Noise Levels

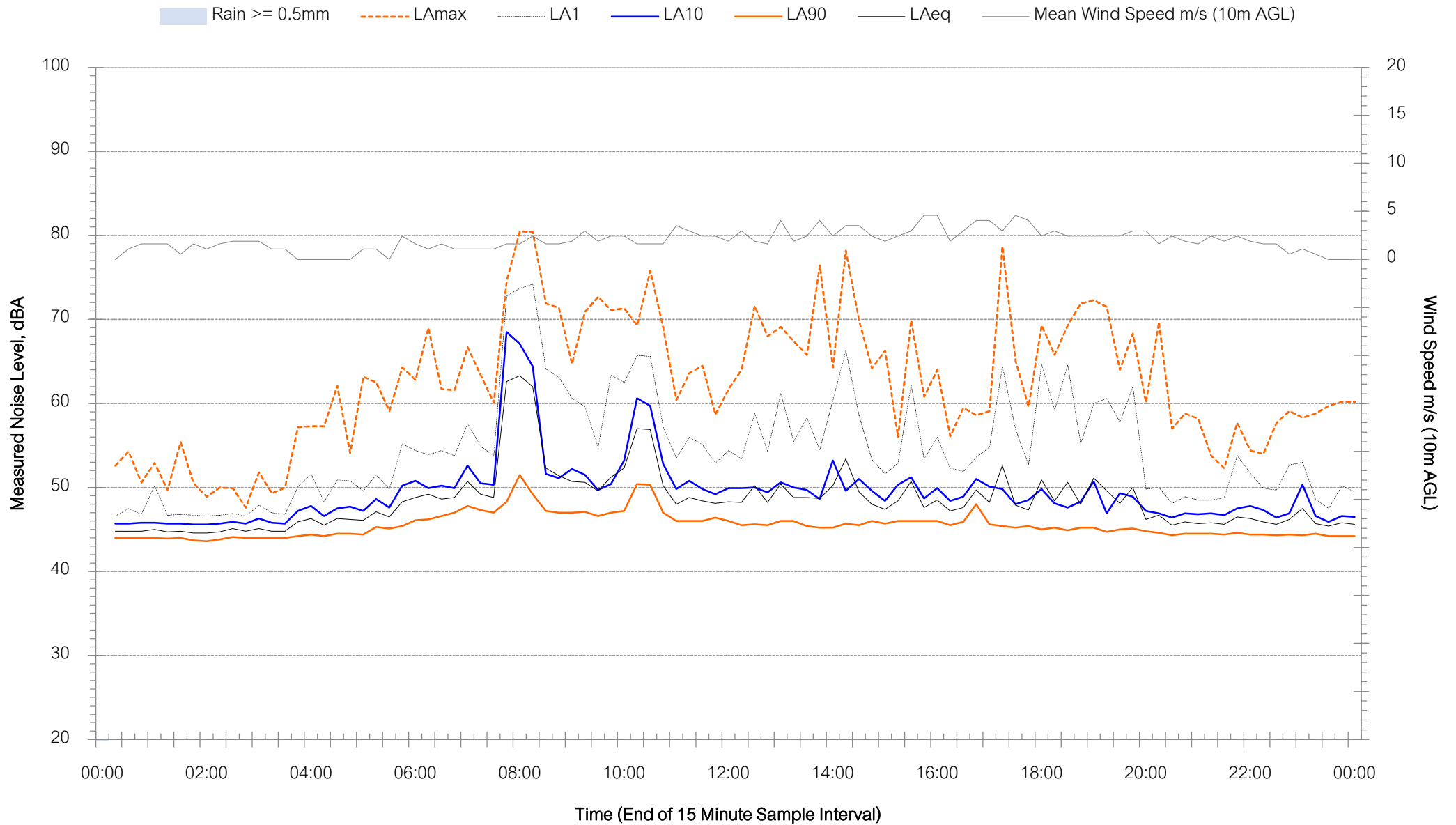
## N3 - Wednesday 8 January 2020





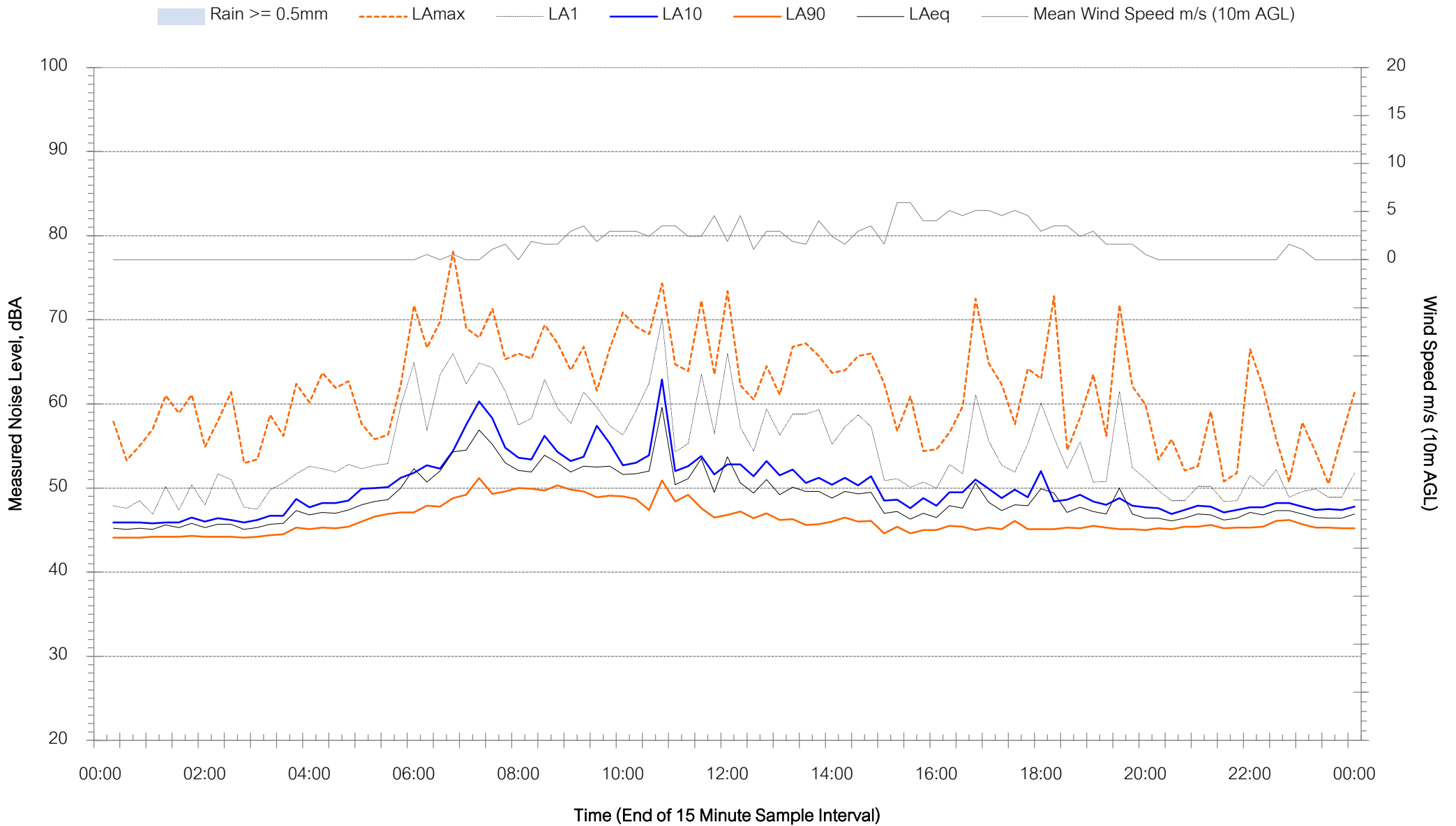
# Background Noise Levels

## N3 - Thursday 9 January 2020



# Background Noise Levels

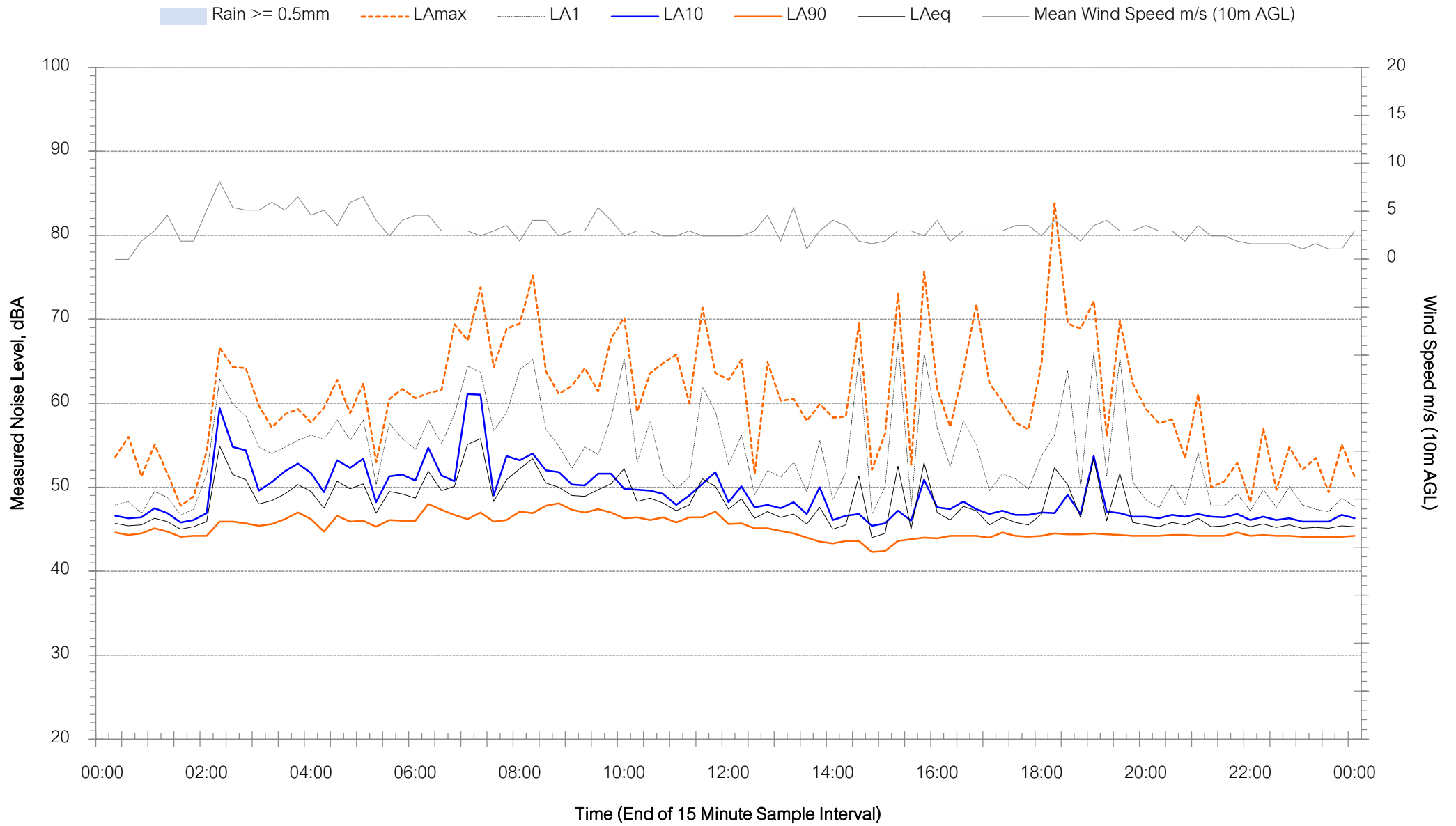
## N3 - Friday 10 January 2020





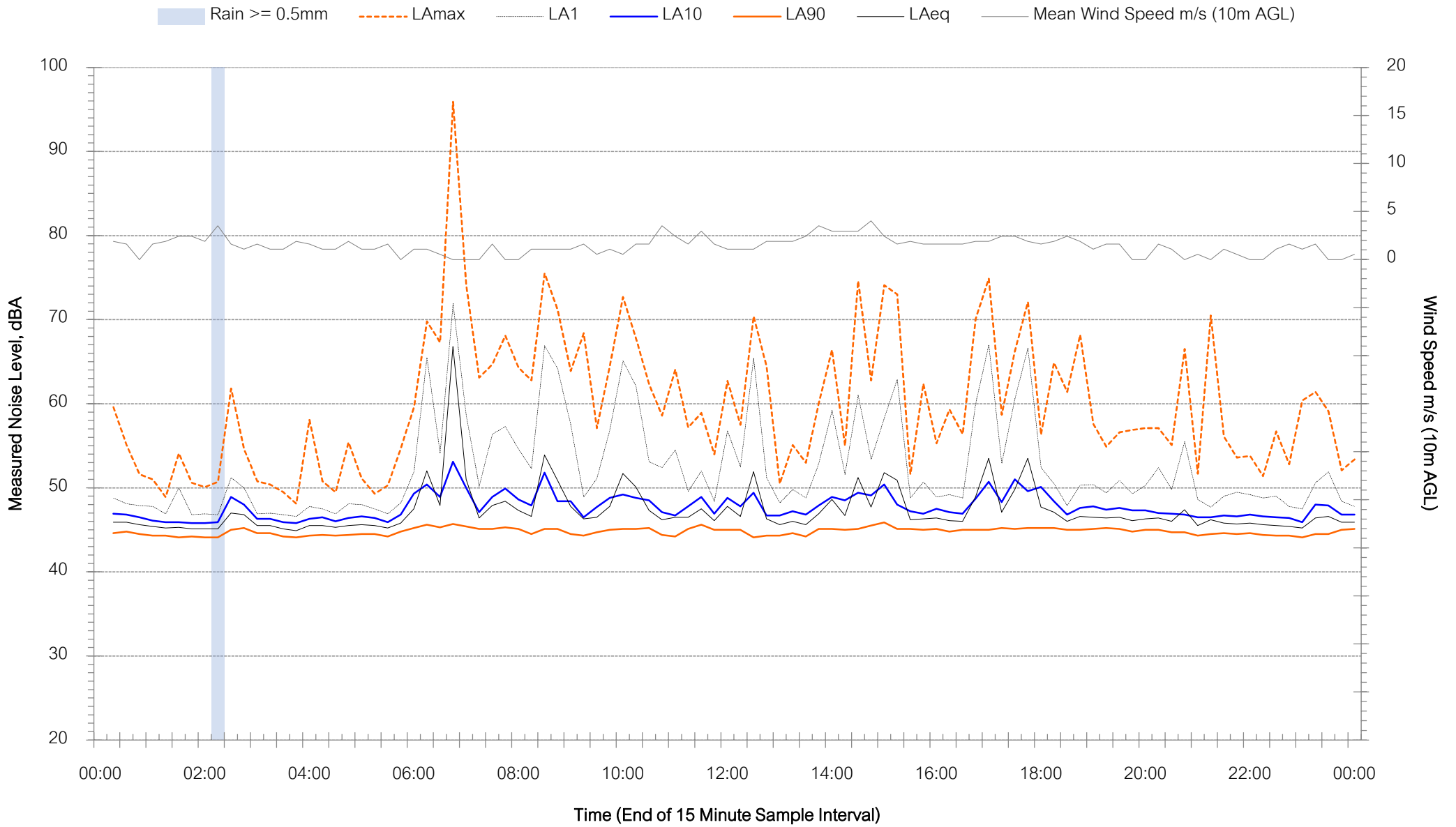
# Background Noise Levels

## N3 - Saturday 11 January 2020



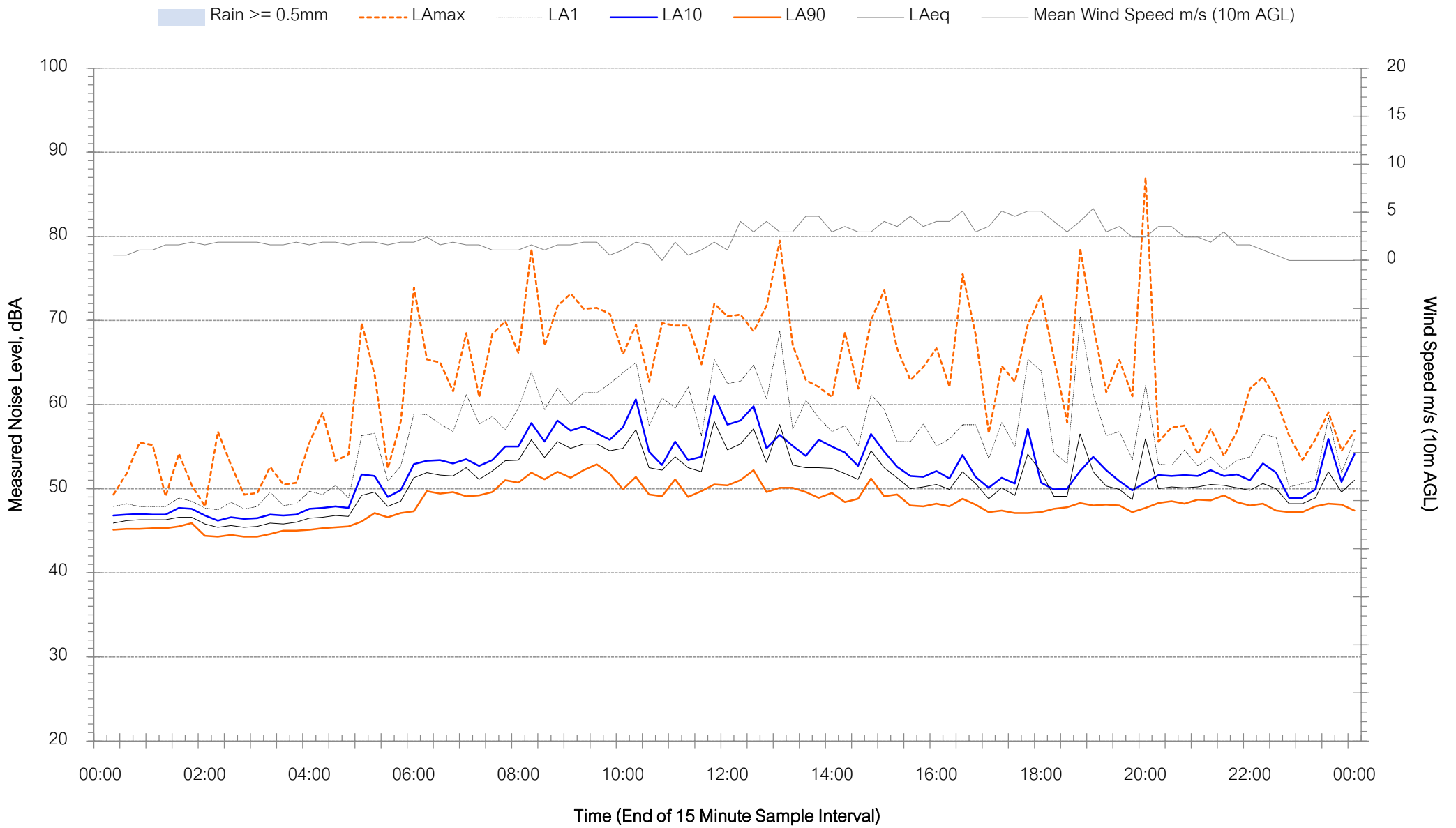
# Background Noise Levels

N3 - Sunday 12 January 2020



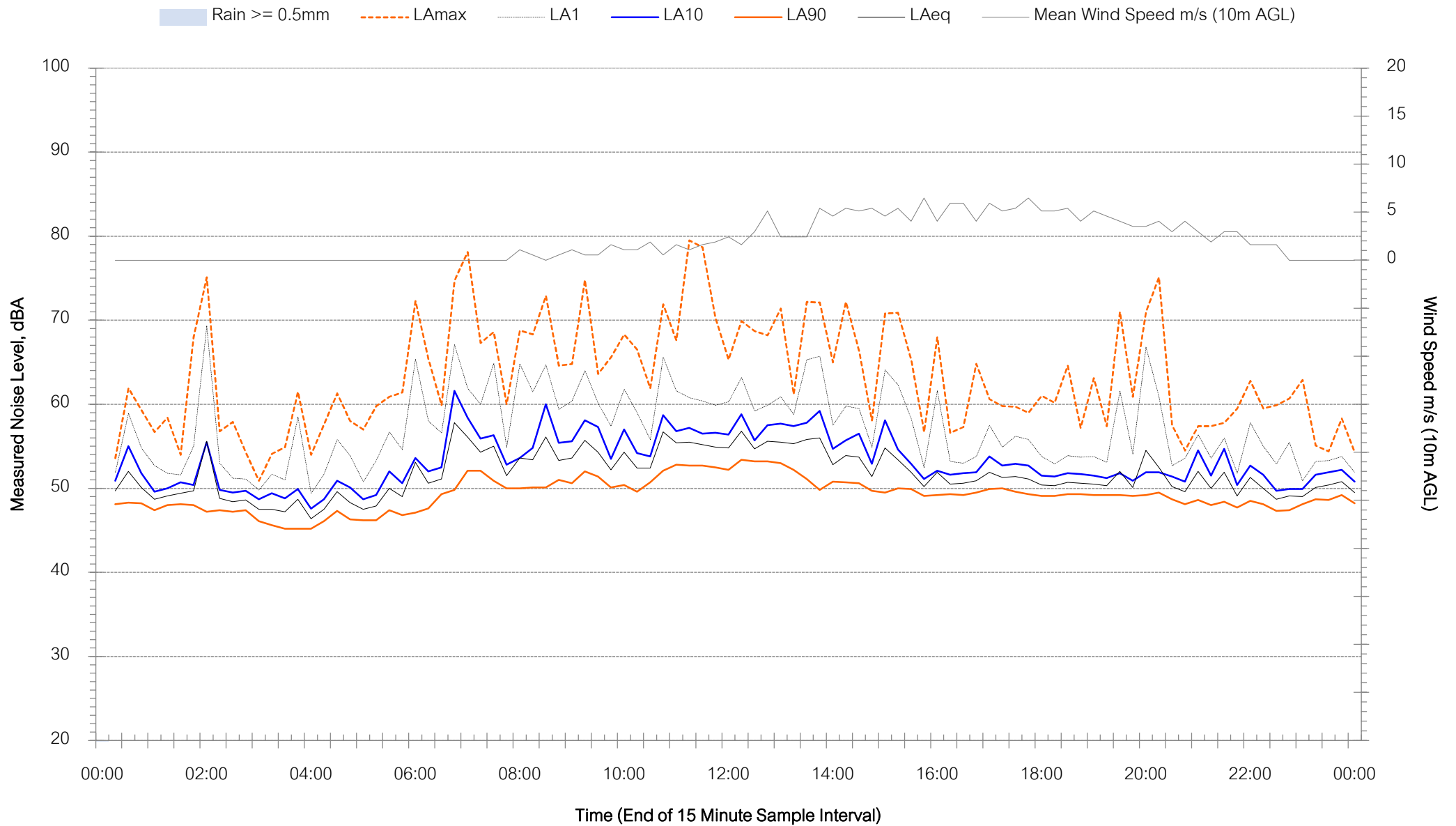
# Background Noise Levels

N3 - Monday 13 January 2020



# Background Noise Levels

N3 - Tuesday 14 January 2020

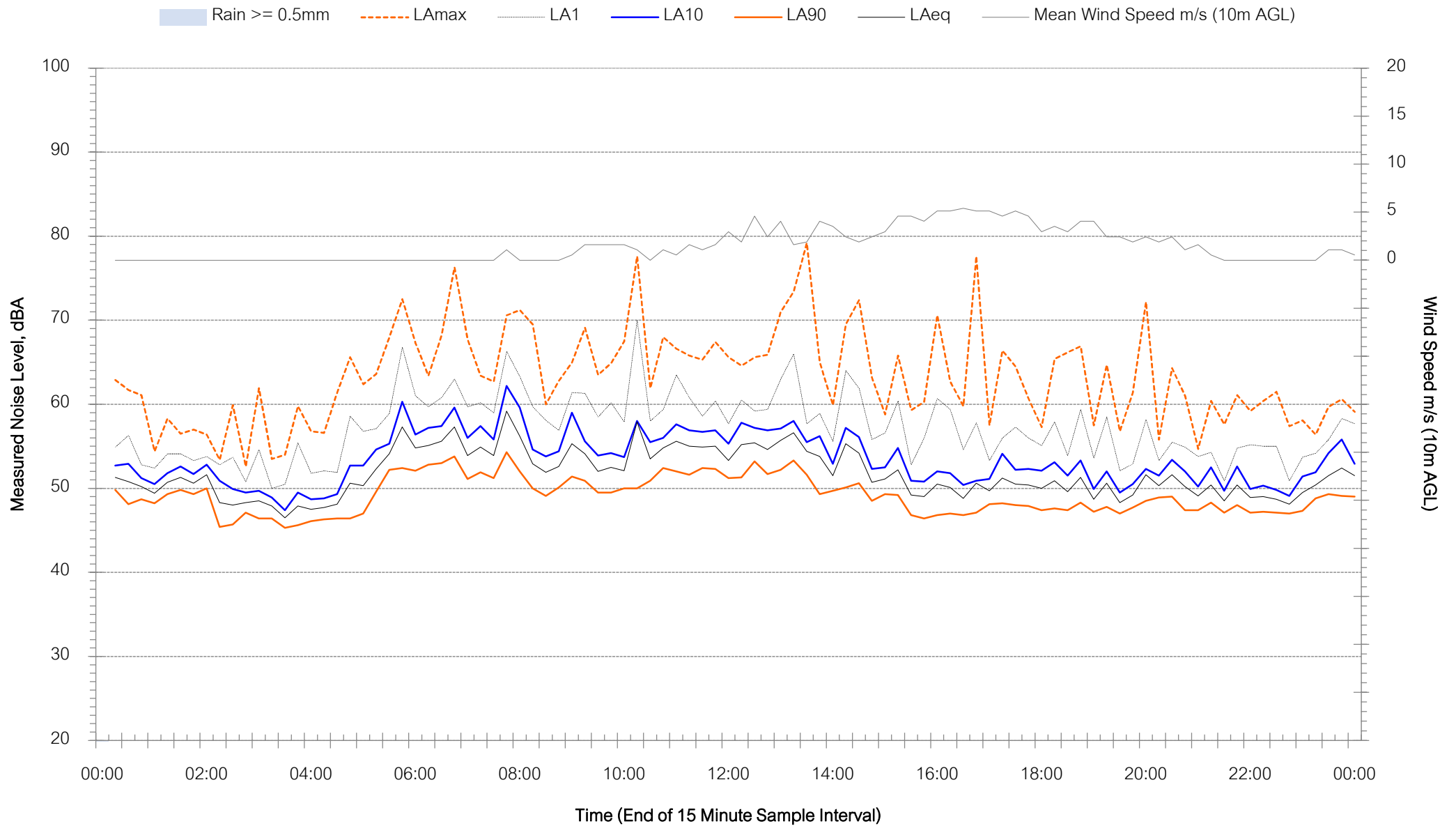






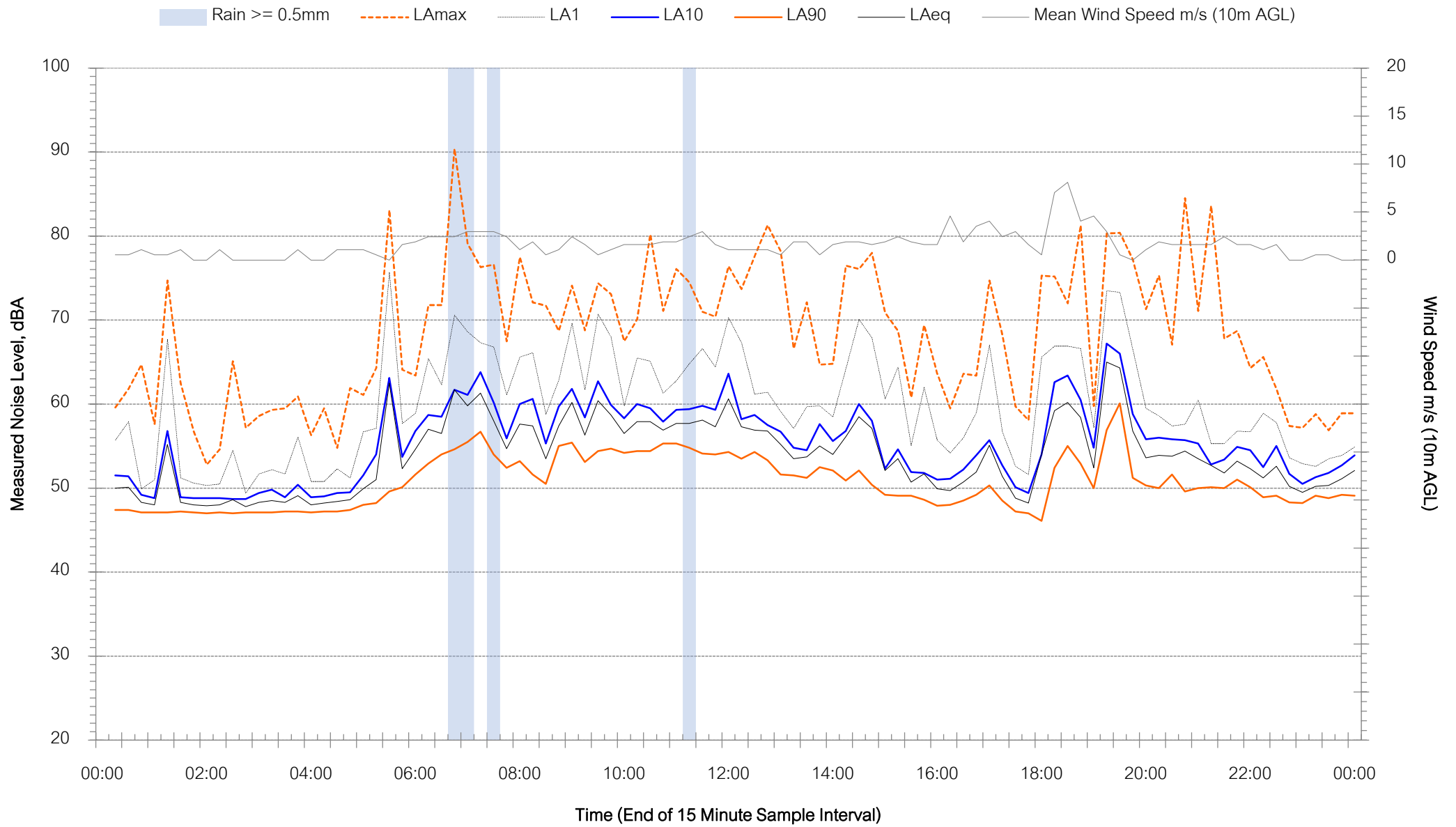
# Background Noise Levels

## N3 - Wednesday 15 January 2020



# Background Noise Levels

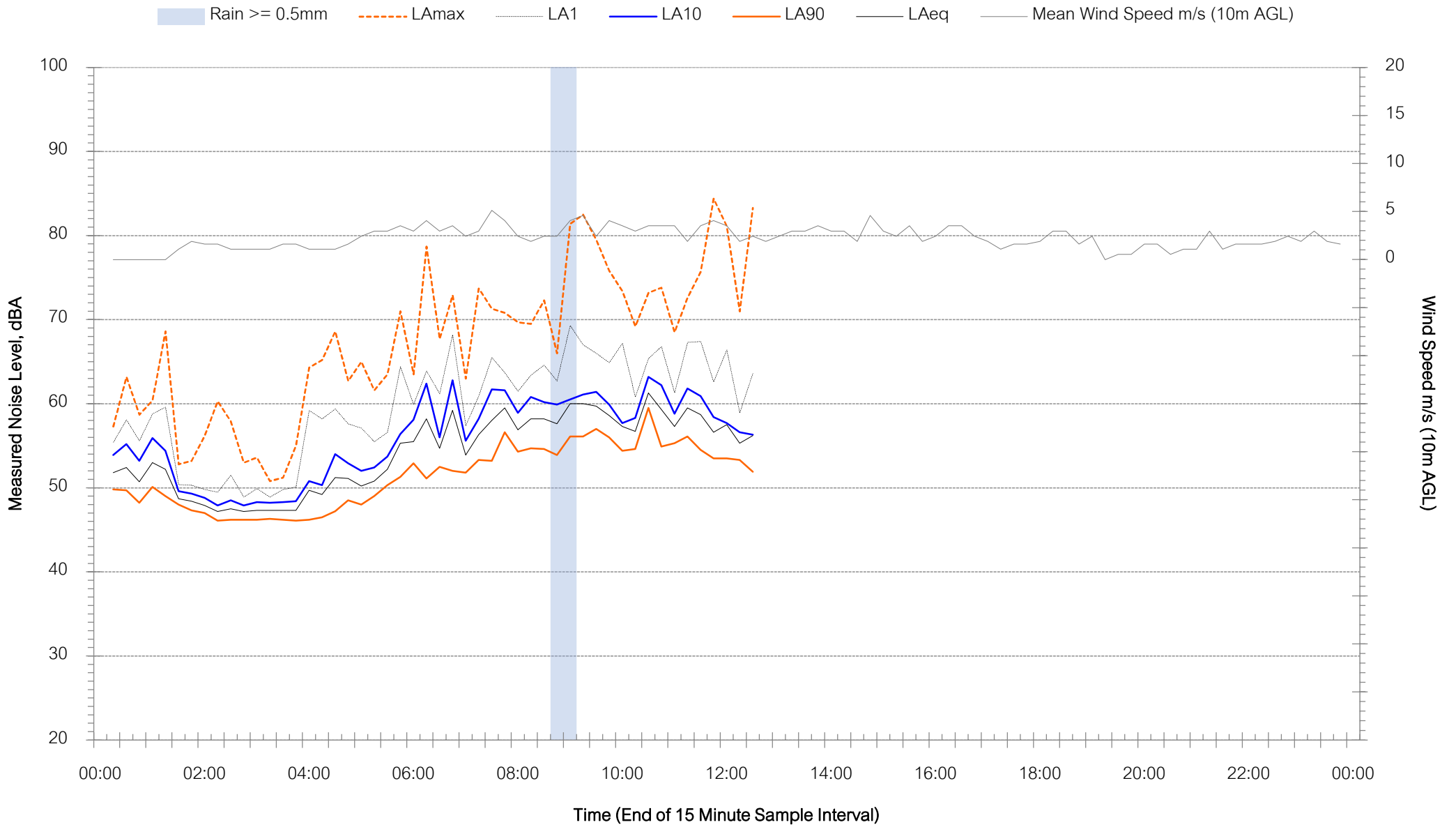
N3 - Thursday 16 January 2020





# Background Noise Levels

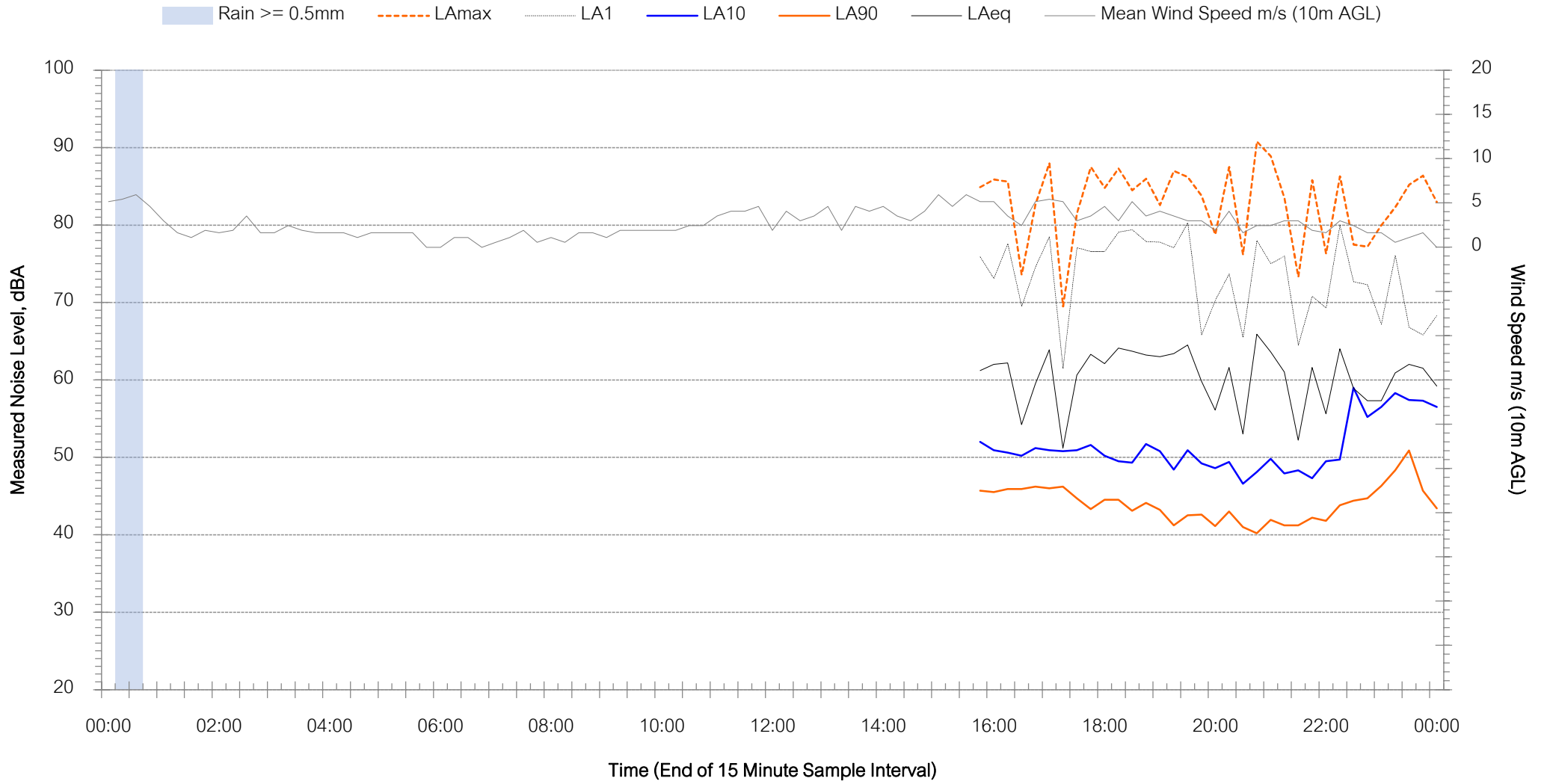
## N3 - Friday 17 January 2020





# Background Noise Levels

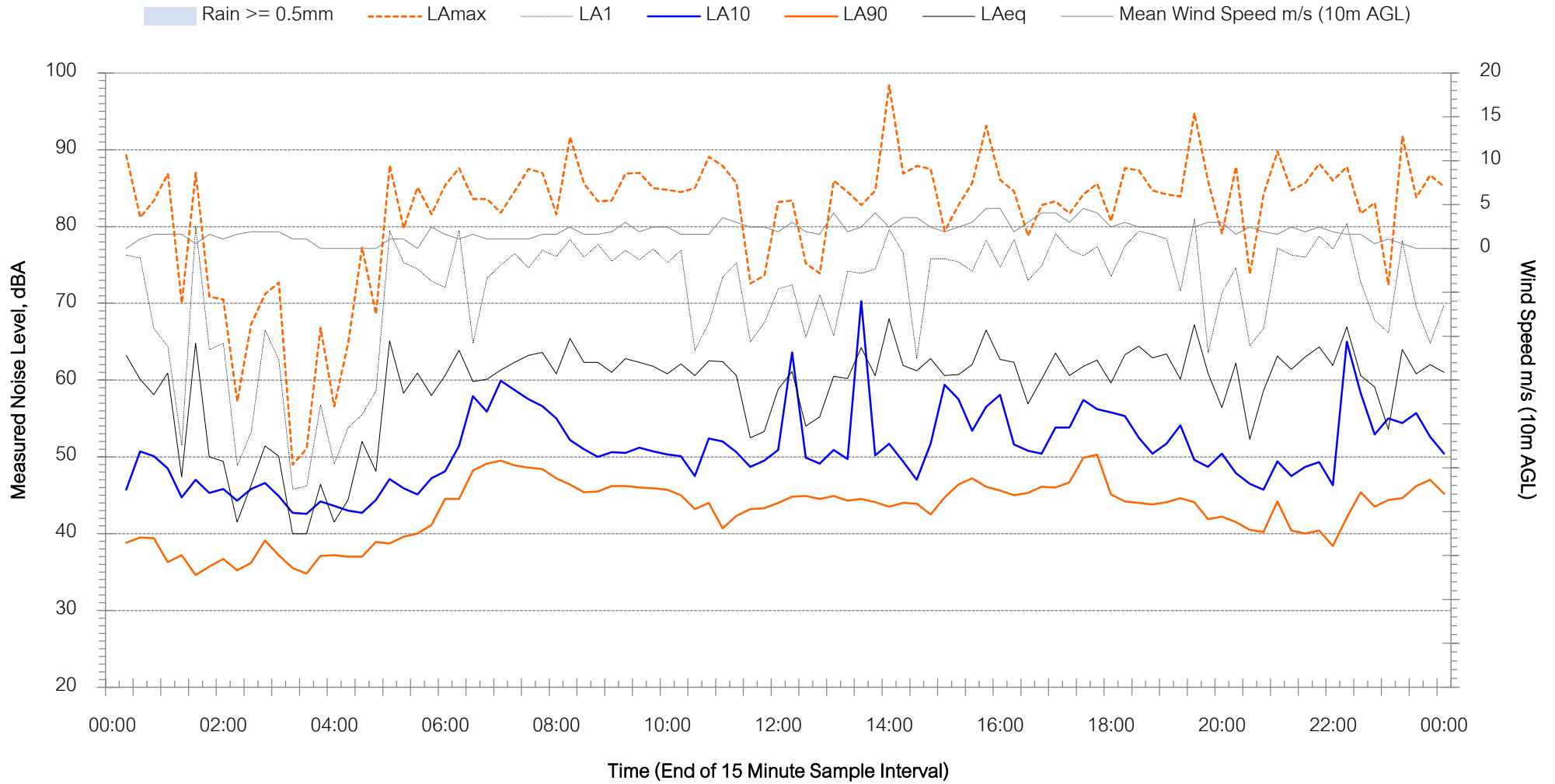
## N4 - Wednesday 8 January 2020





# Background Noise Levels

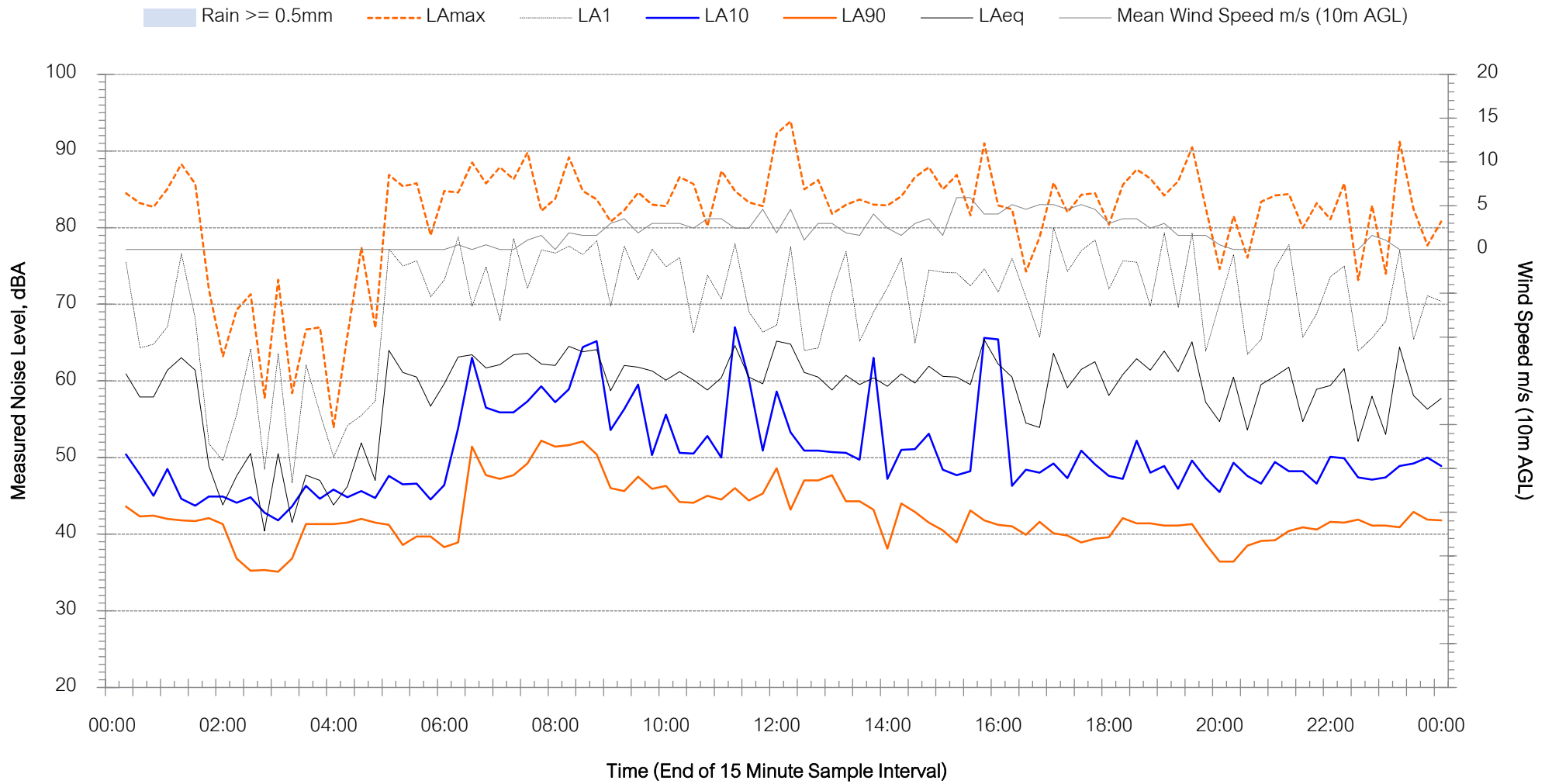
## N4 - Thursday 9 January 2020





# Background Noise Levels

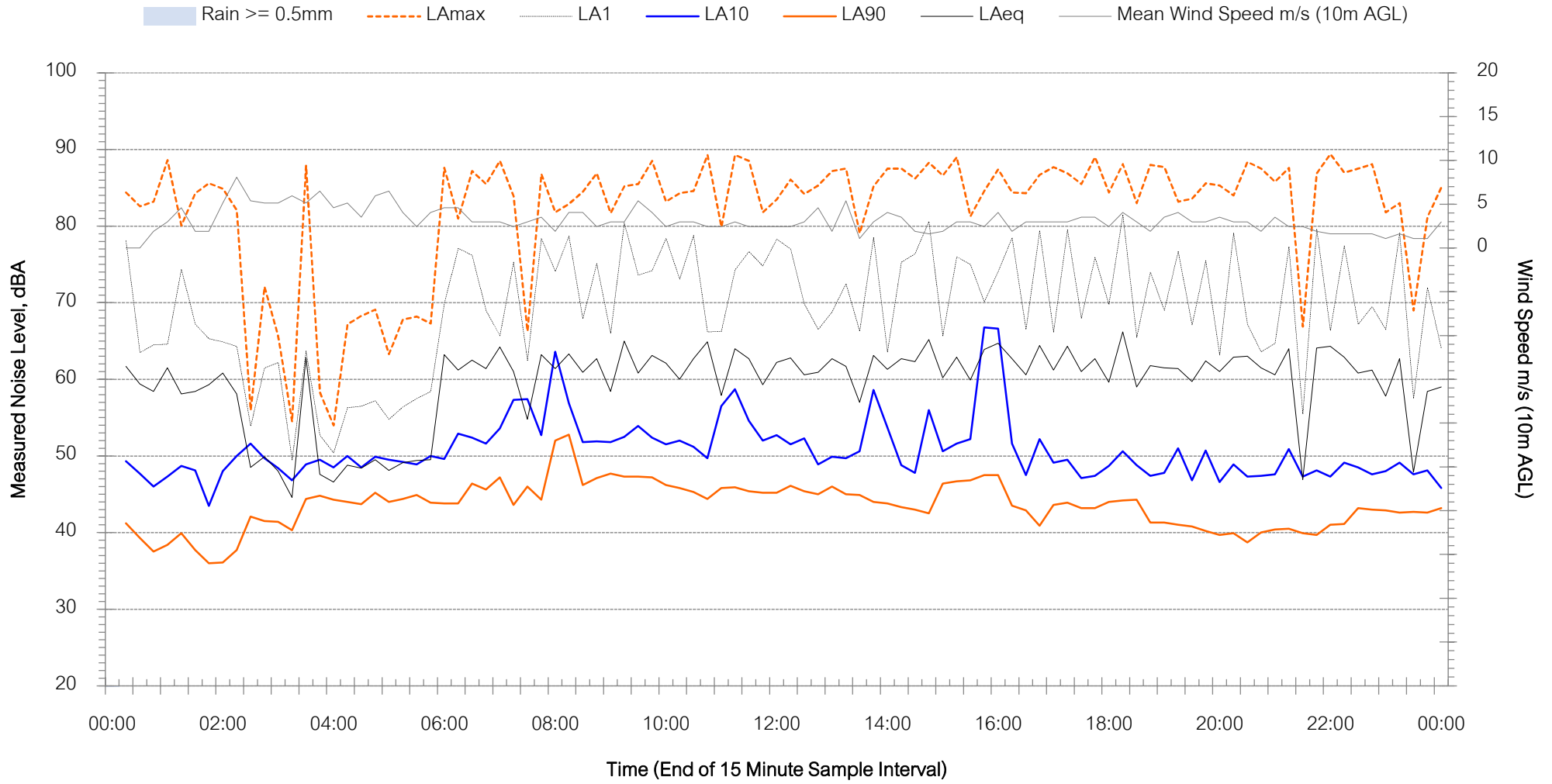
## N4 - Friday 10 January 2020





# Background Noise Levels

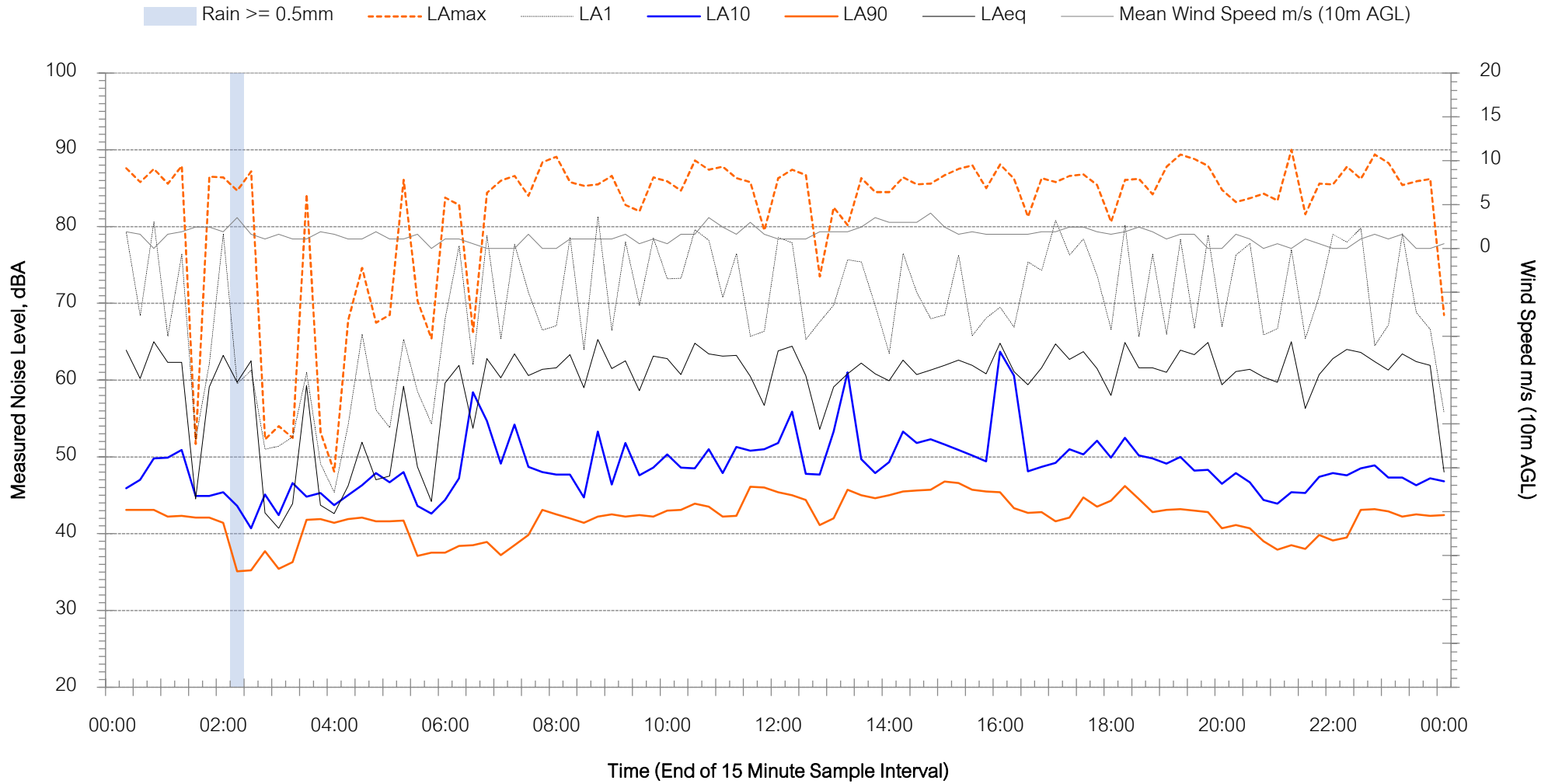
## N4 - Saturday 11 January 2020





# Background Noise Levels

## N4 - Sunday 12 January 2020

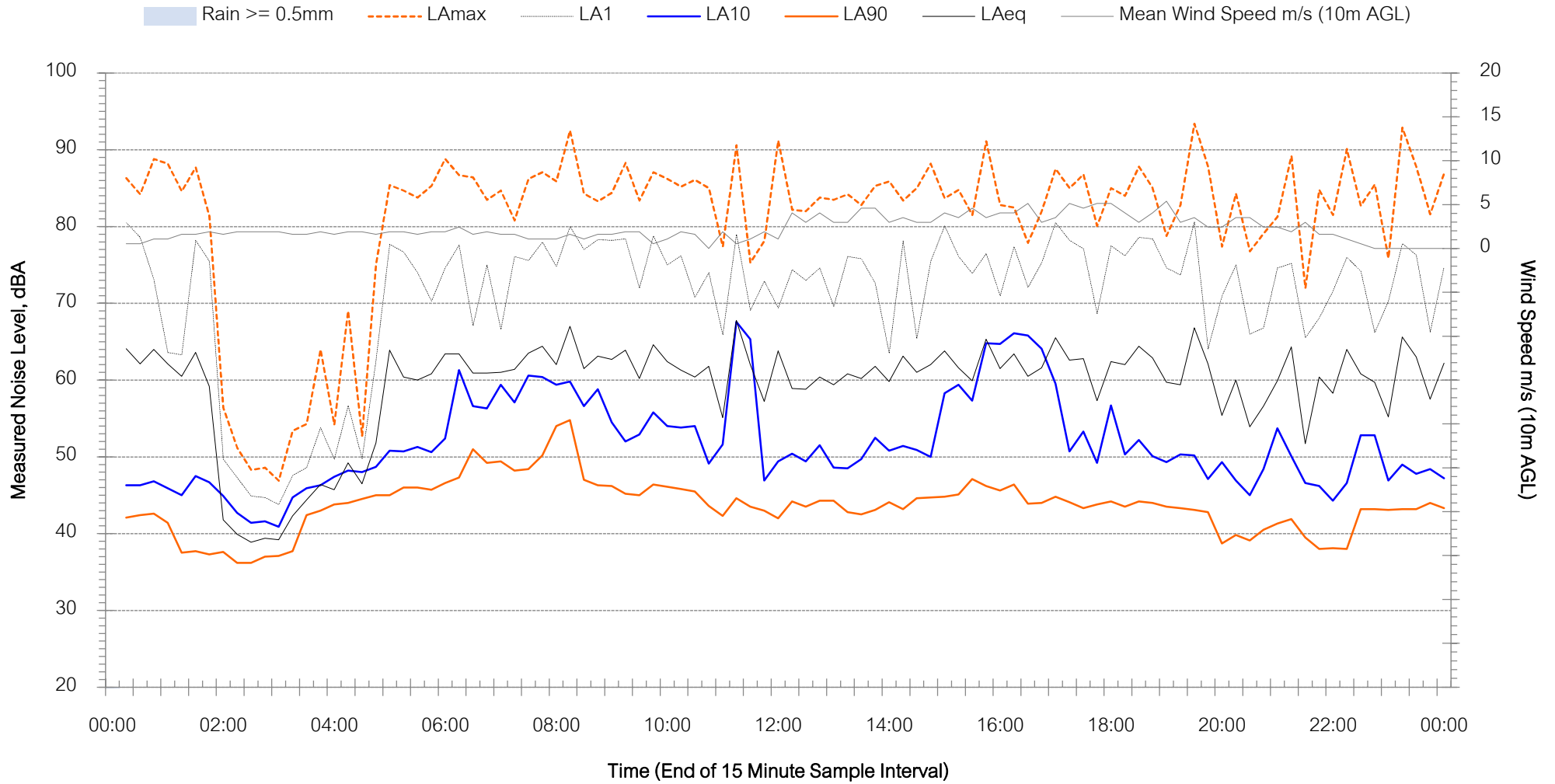






# Background Noise Levels

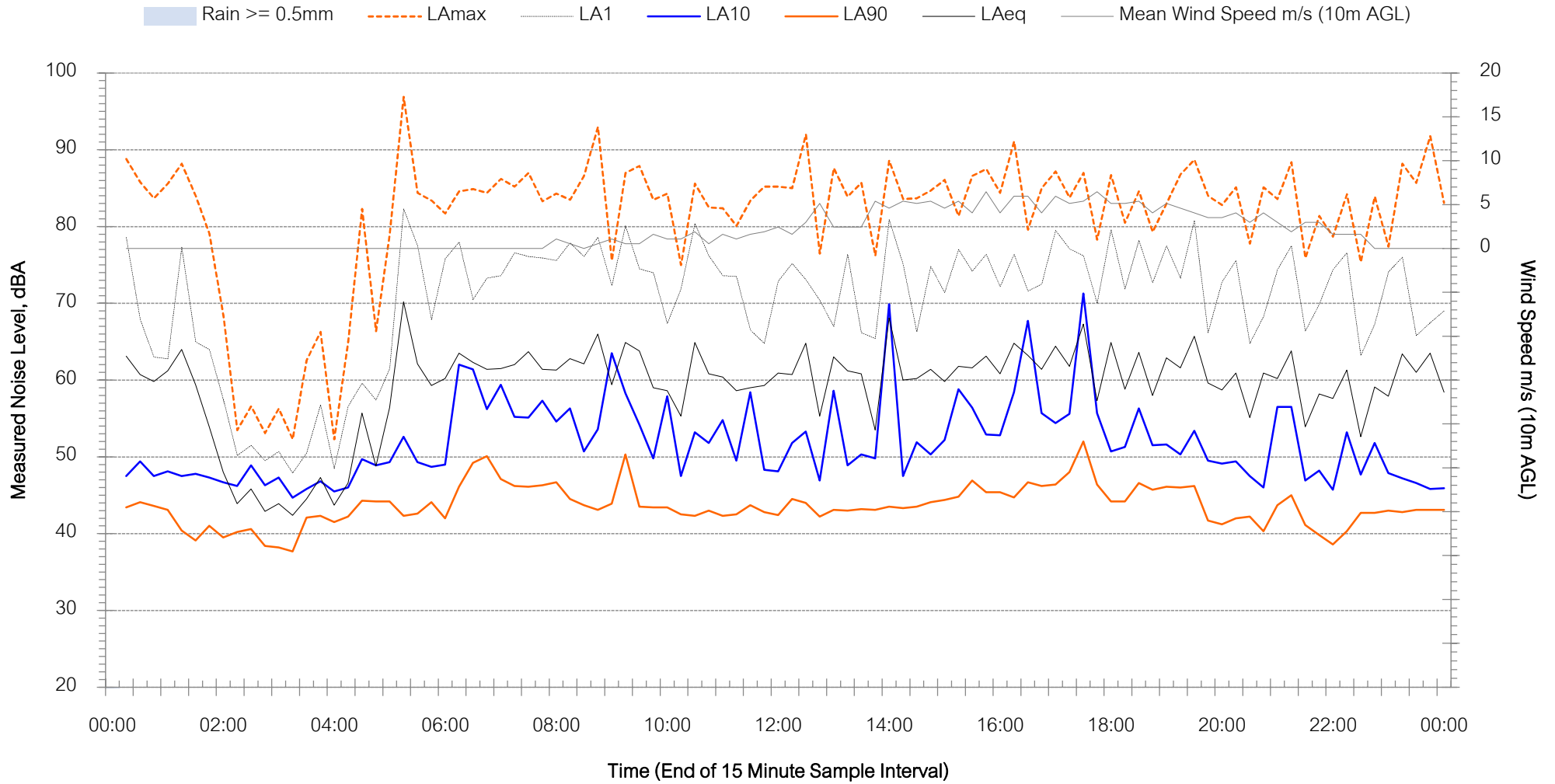
## N4 - Monday 13 January 2020





# Background Noise Levels

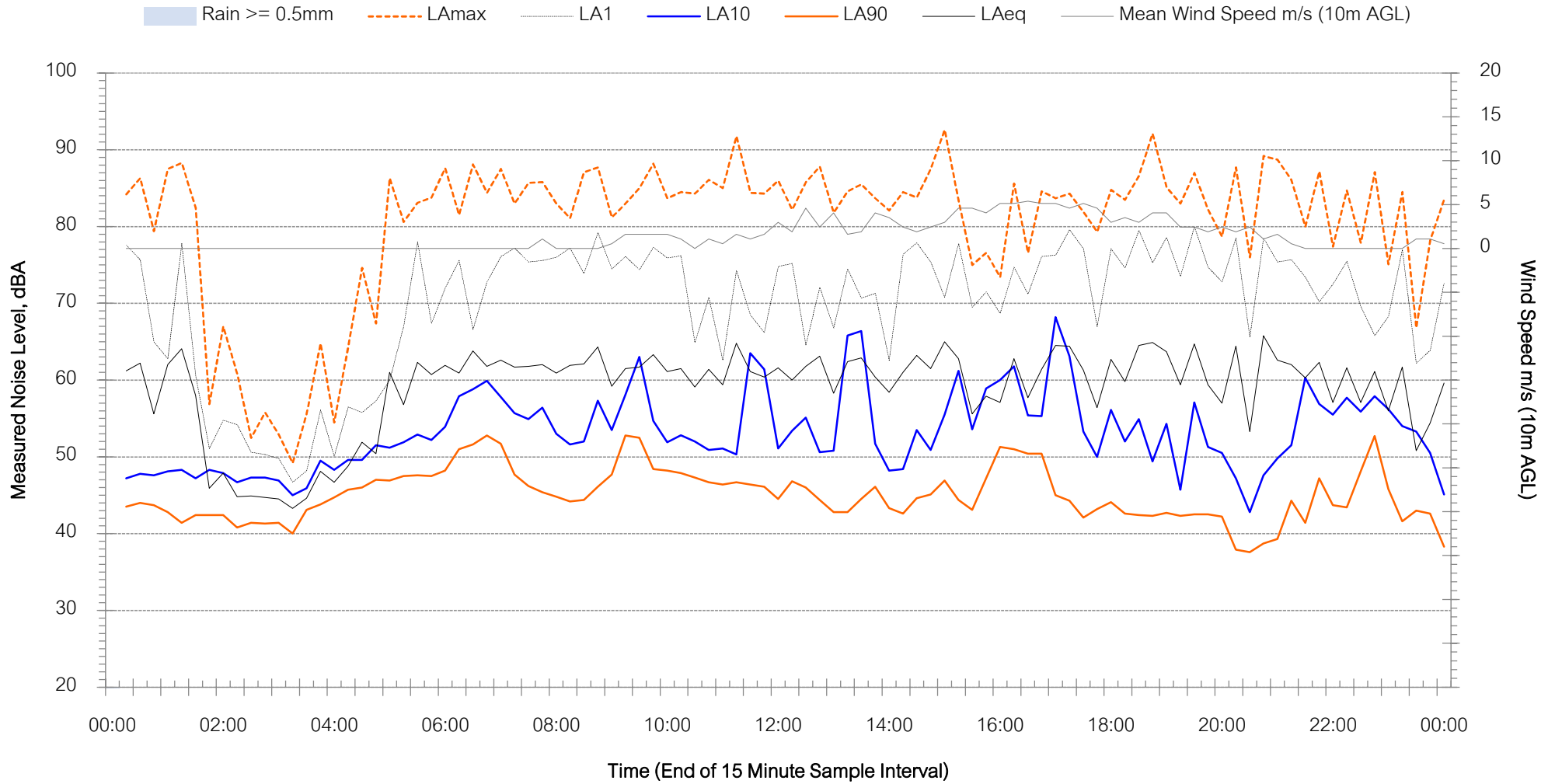
## N4 - Tuesday 14 January 2020





# Background Noise Levels

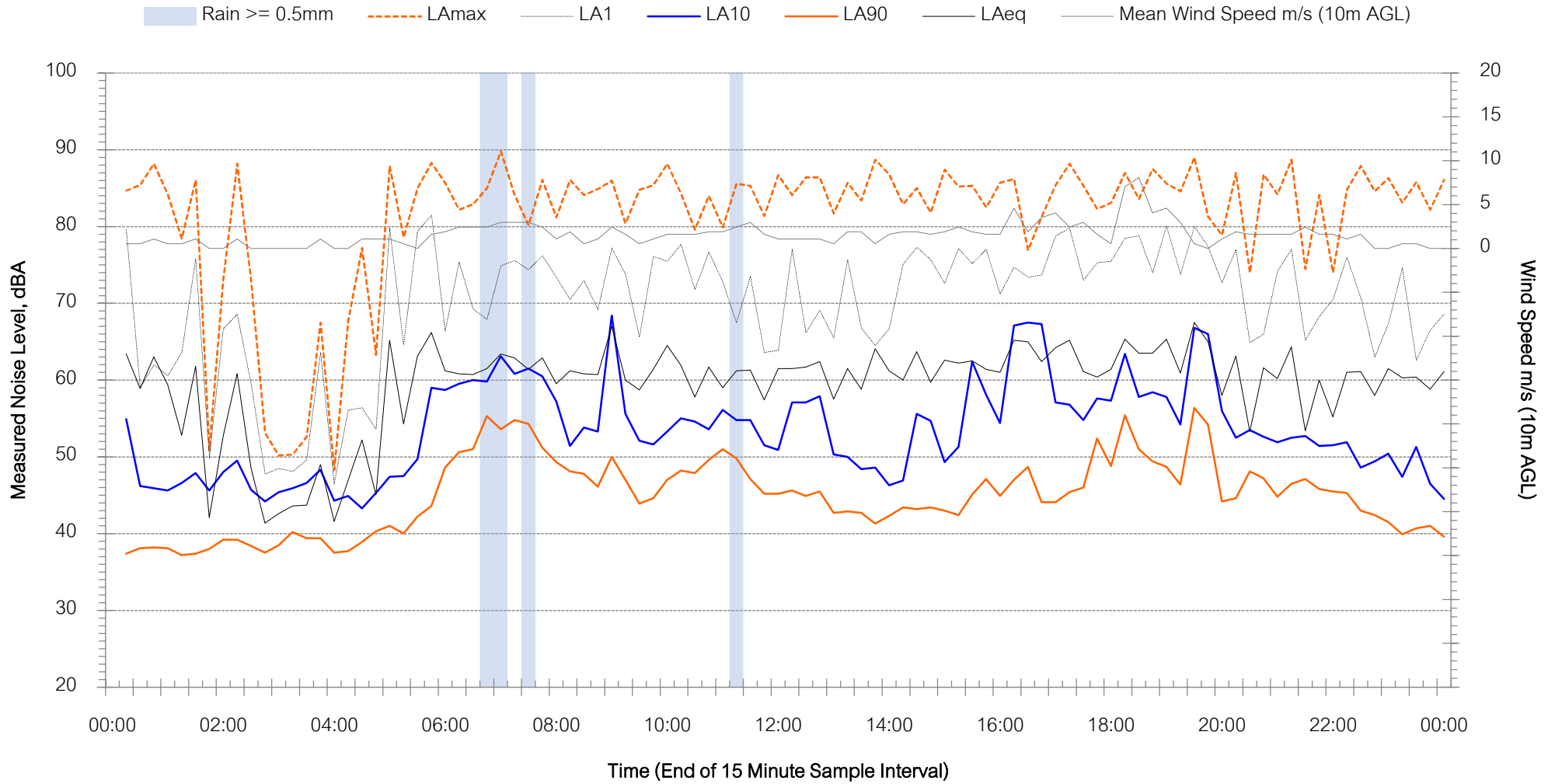
## N4 - Wednesday 15 January 2020





# Background Noise Levels

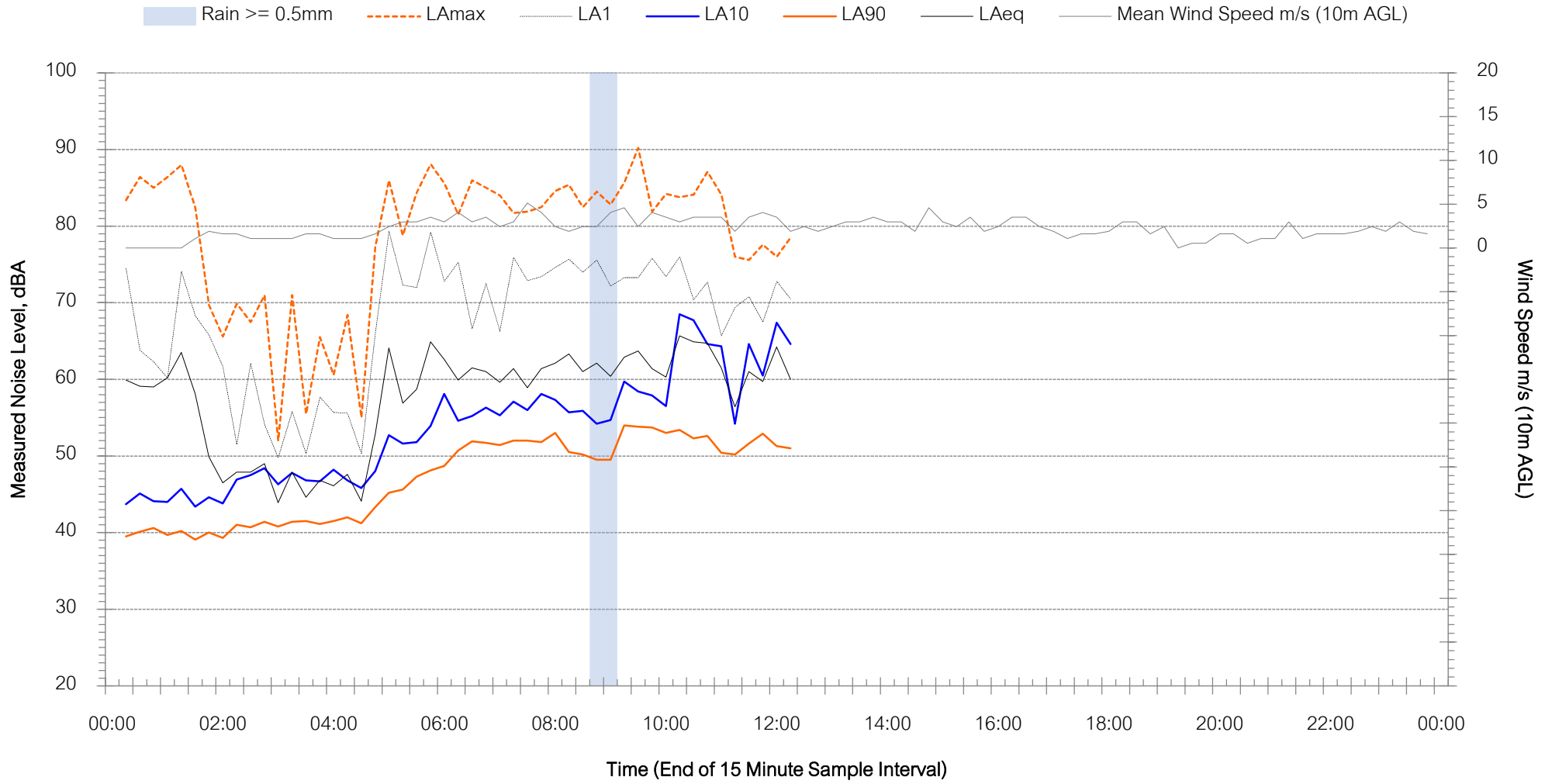
## N4 - Thursday 16 January 2020





# Background Noise Levels

## N4 - Friday 17 January 2020



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