

# DURALIE COAL MINE

Quarterly Compliance Monitoring  
Q2 2023

Prepared for:  
Duralie Coal Ltd

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SLR 

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## BASIS OF REPORT

This report has been prepared by SLR Consulting Australia Pty Ltd (SLR) with all reasonable skill, care and diligence, and taking account of the timescale and resources allocated to it by agreement with Duralie Coal Ltd (the Client). Information reported herein is based on the interpretation of data collected, which has been accepted in good faith as being accurate and valid.

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## DOCUMENT CONTROL

Reference	Date	Prepared	Checked	Authorised
630.11772-R21-v1.0	17 July 2023	Shannon Harvey	Steven Luzuriaga	Steven Luzuriaga

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# 1 Introduction

Duralie Coal Pty Limited (DCPL), a wholly owned subsidiary of Yancoal Australia Limited (Yancoal), has commissioned SLR Consulting Australia Pty Ltd (SLR) to conduct quarterly noise monitoring for the Duralie Coal Mine (DCM) operations guided by the requirements of the *Duralie Coal Mine Noise Management Plan (NMP)*, Document No. NMP-R07-A, dated December 2021. This report presents the results and findings from operator-attended operational noise monitoring conducted Wednesday 7 June 2023.

The objectives of the noise monitoring programme for this operating period were as follows:

- Conduct one round of external operator-attended noise measurements during operational periods at four nominated locations listed in Project Approval, representative of receivers located in the north, west and south directions from the DCM. The monitoring locations are NM1, NM4, NM5, and NM6.
- The site currently operates during the daytime, evening and night-time periods. The hours of operation at the DCM involve two shifts on Monday to Friday 6:30am – 1:30am.
- Quantify all sources of noise within each of the attended noise surveys, including measured and/or estimated contribution and maximum level of individual noise sources.
- Assess the noise emissions from the DCM and determine compliance with respect to the limits contained in the NMP.

This report uses specialist acoustic terminology. An explanation of common terms is provided in **Appendix A**.

## 2 DCM Noise Limits

### 2.1 EPL Noise Limits

The site specific noise limits of sub-section L4.1 of Section L4 *Noise Limits* of the EPA’s Environment Protection Licence (EPL), EPL 11701 dated 27 July 2021, for the four nominated attended noise monitoring locations, are summarised in **Table 1**.

**Table 1 EPL Noise Limits for the Nominated Attended Noise Monitoring Locations**

Locality	LAeq(15minute)			LA1(1minute)
	Daytime	Evening	Night-time	Night-time
NM1 - Woodley	35	35	35	45
NM4 - Fisher-Webster	35	35	37	45
NM5 - Moylan	35	35	35	45
NM6 - Oleksiuk and Carmody	35	35	39	45

Additional conditions relating to the noise monitoring location and applicable meteorological conditions are outlined in sub-sections L4.2 (a) and L4.8 of EPL 11701 and are summarised below.

*L4.2 (a) with the  $L_{eq}$  (15-minute) noise limits in condition 4.1, the noise measurement equipment must be located:*

*Approximately on the property boundary, where any dwelling is situated 30 metres or less from the property boundary closest to the premises; or*

*Within 30 metres of a dwelling façade, but not closer than 3 m, where any dwelling on the property is situated more than 30 metres from the boundary closest to the premises.*

*Noise from the premises is to be measured at a distance within 30 metres of the locations identified in L4.1 to determine compliance with this condition.*

*L4.8 The noise limits set out in condition in L4.1 apply under all meteorological conditions except for the following:*

- a) wind speeds greater than 3 metres/second at 10 metres above ground level; or*
- b) Temperature Inversion conditions up to 3 degrees Celsius/100m and wind speeds greater than 2 metres/second at 10 metres above the ground level; or*
- c) Temperature inversion conditions greater than 3 degrees Celsius/100m.*

## 2.2 Project Approval Noise Limits

The Project approval conditions relating to the noise limits are as follows:

### NOISE

#### Noise Criteria

2. Except for the land referred to in Table 1, the Proponent shall ensure that the noise generated by the project does not exceed the criteria in Table 2 at any residence on privately-owned land or on more than 25 percent of any privately-owned land.

Table 2: Noise criteria dB(A)

Location	Day	Evening	Night	
	$L_{Aeq}(15\text{ minute})$	$L_{Aeq}(15\text{ minute})$	$L_{Aeq}(15\text{ minute})$	$L_{A1}(1\text{ minute})$
172 - Lyall	35	39	40	45
126 – Hamann Pixalu PL	35	35	39	45
123 – Oleksiuk & Carmody				
173 – Trigg & Holland	35	36	37	45
116 - Weismantel				
127 – Fisher-Webster	35	35	37	45
131(1) - Relton				
180 (1) - Thompson	35	36	36	45
95 - Smith & Ransley	35	35	36	45
144 - Wielgosinski				
169 - Williams	35	36	35	45
177 - Thompson				
All other privately-owned land	35	35	35	45

*Notes:*

- *To identify the locations referred to in Table 2, see the figure in Appendix 3; and*
- *Noise generated by the project is to be measured in accordance with the relevant procedures and exemptions (including certain meteorological conditions) of the NSW Industrial Noise Policy.*

However, these criteria do not apply if the Proponent has a written agreement with the relevant landowner to exceed the criteria, and the Proponent has advised the Department in writing of the terms of this agreement.

### **Noise Acquisition Criteria**

3. If the noise generated by the project exceeds the criteria in Table 3 at any residence on privately-owned land or on more than 25 percent of any privately-owned land, then upon receiving a written request for acquisition from the landowner, the Proponent shall acquire the land in accordance with the procedures in Conditions 5 - 6 of Schedule 4.

*Table 3: Noise acquisition criteria dB(A)  $L_{Aeq}(15 \text{ min})$*

<b>Location</b>	<b>Day</b>	<b>Evening</b>	<b>Night</b>
All privately-owned land	40	40	40

*Notes:*

- *Noise generated by the project is to be measured in accordance with the relevant procedures and exemptions (including certain meteorological conditions) of the NSW Industrial Noise Policy; and*
- *For this condition to apply, the exceedances of the criteria must be systemic.*

## 2.3 Low Frequency Noise

The 'Duralie Modification Noise and Blasting Assessment' (prepared by SLR Consulting Australia dated 9 July 2014) included a low frequency analysis of C and A weighted intrusive noise levels in accordance with the NSW *Industrial Noise Policy* (INP) requirements. The assessment indicated that there is no dominant low-frequency content relating to noise emissions from the DCM.

The implementation and transitional arrangements for the NSW Noise Policy for Industry (NPfi) notes the following:

*The NSW Industrial Noise Policy (2000) will continue to apply where it is referenced in existing statutory instruments (such as consents and licences), except for the NSW Industrial Noise Policy Section 4 modifying factors, which will be transitioned to the Noise Policy for Industry (2017) Fact Sheet C through a NSW Industrial Noise Policy application note. This approach has been taken because the Noise Policy for Industry (2017) modification factor approach reflects more recent understanding of the impact of tonal and low-frequency noise on the community.*

As such appropriate modifying factors such as low frequency noise have been assessed against NPfi requirements. At all locations DCM was found to not trigger any modification factors, was not audible or significantly below the relevant noise criteria and modification factors are therefore not addressed further in this report. The results of the operator attended noise measurements presented in **Section 3**.

## 3 Operational Noise Monitoring Methodology

### 3.1 General Requirements

All acoustic instrumentation employed throughout the monitoring programme has been designed to comply with the requirements of AS IEC 61672.1 – 2019 *Electroacoustics—Sound level meters*, AS IEC 60942 2017 *Electroacoustics – Sound calibrators* and carried current NATA or manufacturer calibration certificates. Instrument calibration was checked before and after each measurement survey, with the variation in calibrated levels not exceeding  $\pm 0.5$  dBA.

### 3.2 Methodology – Operator-attended Noise Monitoring Locations

Noise monitoring was conducted guided by the requirements of the NMP. Operator-attended noise measurements were conducted during the day, evening and night-time periods for 15 minutes per period at each of the four nominated noise monitoring locations. The details of the operator-attended noise monitoring locations are contained within **Table 2** and shown in **Figure 1**. During the operator attended noise measurements, the character and relative contribution of ambient noise sources along with the mine contributions were noted.

**Table 2 DCM Operational Noise Monitoring Locations**

Monitoring Location	Receiver Type	Resident / Owner	Monitoring Location - MGA Zone 56	
			Easting (m)	Northing (m)
NM1	Residence	Woodley <sup>1</sup>	400644	6421907
NM4	Residence	Fisher-Webster	396790	6428961
NM5	Residence	Moylan	396770	6428945
NM6	Residence	Oleksiuk and Carmody	399661	6431862

Note 1: Woodley property has changed ownership but will retain the title of 'Woodley' until a License revision.

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**LEGEND**

- Attended Noise Monitoring Location

Base Aerial Photography Source: Google Earth



Scale: 1:100000 (GDA94) MGA ZONE 56



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### ATTENDED NOISE MONITORING LOCATIONS

FIGURE 1

The objective of the DCM operational operator-attended noise monitoring was to measure the maximum ( $L_{Amax}$ ) and the  $L_{Aeq(15minute)}$  noise level contributions at the nearest potentially affected receptors to determine the noise contribution of mining activities associated with Duralie Coal Mine operations over a 15 minute measurement period. In addition, the operator quantifies and characterises the overall levels of ambient noise in the area (i.e.  $L_{Amax}$ ,  $LA1$ ,  $LA10$ ,  $LA90$ , and  $L_{Aeq}$ ) over the 15 minute measurement interval. Operator-attended noise measurements were conducted using a one-third octave integrating Brüel & Kjær Type 2250L sound level meter (serial number 3003389).

## 4 Results

### 4.1 Operator-attended Monitoring – DCM Operational Activity

Operator-attended noise measurements were conducted during the day, evening and night period on Wednesday 7 June 2023. Results of the operator-attended noise surveys at NM1, NM4, NM5, NM6 are provided in **Table 3** to **Table 6**.

A summary of the results for the operator-attended noise monitoring are displayed graphically in **Appendix B**. Charts of the noise surveys show  $L_{Amax}$ ,  $L_{Aeq}$ , and  $L_{Aeq(\leq 1.25kHz)}$  in 1-second intervals throughout the monitoring survey.

Ambient noise levels presented include all noise sources such as transport (roads, rail and aircraft), fauna (insects, frogs, birds, and bats), farm animals, the natural environment (wind in trees), domestic noises, other industrial operations as well as Duralie Coal Mine noise emissions.

Weather data during the monitoring period has been obtained from the weather station located on the Duralie Coal Mine site. Where this data was not available meteorological conditions have been estimated based on observed conditions during the monitoring period.

The tables provide the following information:

- Date and start time, operator and equipment details.
- Monitoring location.
- Wind velocity (m/s) and temperature (°C) at the measurement location.
- Typical maximum ( $L_{Amax}$ ) and contributed  $L_{Aeq(15minute)}$  noise levels.

Note that operator-attended rail noise monitoring was not conducted during Q2 2023 as the Duralie Shuttle rail was not in operation.

#### 4.1.1 Operator-attended Noise Survey Results – ‘NM1’

Results of the operator-attended noise surveys at ‘NM1’ are provided in **Table 3**. Monitoring location ‘NM1’ represents residential receptors located to the south of the site. Due to access restrictions noise monitoring was conducted at the entrance to the property.

**Table 3 Operator Attended Noise Survey Results – ‘NM1’**

Period	Date/Start Time/ Weather	Primary Noise Descriptor dBA (15 minute)						Description of Noise Emissions and Typical Maximum Noise Levels (dBA)
		L <sub>Amax</sub>	L <sub>A1</sub>	L <sub>A10</sub>	L <sub>A90</sub>	L <sub>Aeq</sub>	L <sub>Aeq</sub> (≤1.25kHz)	
Day	07/06/2023 14:22 20°C 2.5 m/s SE	70	50	35	25	43	42	<i>Site related noise events:</i> <b>DCM: Inaudible</b> <i>Other noise events:</i> Local traffic 33-70 Birdsong 28-37 Aeroplane 32-49
Evening	07/06/2023 21:23 13°C 2.7 m/s NW	59	39	36	30	34	23	<i>Site related noise events:</i> Dozer and engine noise 22-26 <b>DCM: Barely Audible</b> <b>L<sub>Aeq</sub>(15minute) Contribution &lt;25 dBA</b> <i>Other noise events:</i> Frogs/birds 36-41 Aeroplane 20-22 Road traffic 22-26 Equipment click 59
Night	07/06/2023 23:47 11°C 1.6 m/s WNW	40	38	36	28	33	21	<i>Site related noise events:</i> Engine noise 21-24 <b>DCM: Barely Audible</b> <b>L<sub>Aeq</sub>(15minute) Contribution 21 dBA</b> <b>L<sub>Amax</sub> contribution 24 dBA</b> <i>Other noise events:</i> Frogs/birds 21-40

DCM operations were Inaudible during the day and barely audible during the evening and night-time operator attended noise surveys at this location. DCM operations generated an L<sub>Aeq</sub>(15minute) noise contribution of less than 25 dBA during the evening and 21 dBA during the during the night-time. During the night-time period engine noise generated L<sub>Amax</sub> noise levels of up to 24 dBA. The ambient noise environment at the monitoring location generally consisted of road traffic and aircraft noise as well as natural sources such as frogs and birdsong.

#### 4.1.2 Operator-attended Noise Survey Results – ‘NM4’

Results of the operator-attended noise surveys at ‘NM4’ are provided in **Table 4**. Monitoring location ‘NM4’ represents residential receptors located north of the site.

**Table 4 Operator-attended Noise Survey Results – ‘NM4’**

Period	Date/Start Time/ Weather	Primary Noise Descriptor dBA (15 minute)						Description of Noise Emissions and Typical Maximum Noise Levels (dBA)
		L <sub>Amax</sub>	L <sub>A1</sub>	L <sub>A10</sub>	L <sub>A90</sub>	L <sub>Aeq</sub>	L <sub>Aeq</sub> (≤1.25kHz)	
Day	07/06/2023 12:46 20°C 2.6 m/s WNW	55	41	36	28	34	32	<i>Site related noise events:</i> <b>DCM: Inaudible</b> <i>Other noise events:</i> Road traffic 31-38 Dogs barking 35-39 Pigs 31-50 Birdsong 30-47 Vehicle exhaust click 55
Evening	06/07/2023 20:17 14°C 2.2 m/s NW	53	39	34	25	31	26	<i>Site related noise events:</i> Engine noise <25 <b>DCM: Barely Audible</b> <b>L<sub>Aeq</sub>(15minute) Contribution &lt;25 dBA</b> <i>Other noise events:</i> Frogs/birds 28-38 Livestock 34-37 Road traffic 25-41 Operator 53
Night	07/06/2023 22:43 12°C 2.5 m/s WNW	47	37	34	27	32	26	<i>Site related noise events:</i> <b>DCM: Inaudible</b> <i>Other noise events:</i> Insects 26-35 Distant road traffic 30-36 Wind in trees 23-29 Aeroplane 30-35 Dog barking 28-45 Vehicle exhaust click 47

DCM operations were inaudible during the day, barely audible during the evening and inaudible during the night-time operator attended noise surveys at this location. DCM operations generated an L<sub>Aeq</sub>(15minute) noise contribution of less than 25 dBA during the evening. The ambient noise environment at the monitoring location generally consisted of road traffic, livestock and dogs barking as well as natural sources such as frogs and birdsong.

### 4.1.3 Operator-attended Noise Survey Results – ‘NM5’

Results of the operator-attended noise surveys at ‘NM5’ are provided in **Table 4**. Monitoring location ‘NM5’ represents residential receptors located to the west of the site.

**Table 5 Operator-attended Noise Survey Results - ‘NM5’**

Period	Date/Start Time/ Weather	Primary Noise Descriptor dBA (15 minute)						Description of Noise Emissions and Typical Maximum Noise Levels (dBA)
		L <sub>Amax</sub>	L <sub>A1</sub>	L <sub>A10</sub>	L <sub>A90</sub>	L <sub>Aeq</sub>	L <sub>Aeq</sub> (≤1.25kHz)	
Day	07/06/2023 14:48 20°C 2.6 m/s ESE	58	53	48	29	43	37	<i>Site related noise events:</i> <b>DCM: Inaudible</b> <i>Other noise events:</i> Road traffic 30-42 Birdsong 34-58 Aeroplane 35-49
Evening	07/06/2023 20:46 13°C 2.1 m/s NW	47	39	31	27	30	28	<i>Site related noise events:</i> Engine noise 23-27 <b>DCM: Barely Audible</b> <b>L<sub>Aeq</sub>(15minute) Contribution &lt;25 dBA</b> <i>Other noise events:</i> Insects 26-30 Livestock 27-32 Road traffic 28-47 Aeroplane 28-31 Creek 26-28
Night	07/06/2023 23:10 11°C 2.1 m/s NW	59	52	31	26	38	36	<i>Site related noise events:</i> <b>DCM: Inaudible</b> <i>Other noise events:</i> Livestock 30-59 Frogs/creek 28-31 Road traffic 30-37

DCM operations were inaudible during the day, barely audible during the evening and inaudible during the night-time operator attended noise surveys at this location. DCM operations generated an L<sub>Aeq</sub>(15minute) noise contribution of less than 25 dBA during the evening. The ambient noise environment at the monitoring location generally consisted of road traffic and aircraft noise and natural sources such as livestock, frogs and birdsong.

#### 4.1.4 Operator-attended Noise Survey Results – ‘NM6’

Results of the operator-attended noise surveys at ‘NM6’ are provided in **Table 4**. Monitoring location ‘NM6’ represents residential receptors located north of the site.

**Table 6 Operator-attended Noise Survey Results - ‘NM6’**

Period	Date/Start Time/ Weather	Primary Noise Descriptor dBA (15 minute)						Description of Noise Emissions and Typical Maximum Noise Levels (dBA)
		L <sub>Amax</sub>	L <sub>A1</sub>	L <sub>A10</sub>	L <sub>A90</sub>	L <sub>Aeq</sub>	L <sub>Aeq</sub> (≤1.25kHz)	
Day	07/06/2023 12:05 20°C 2.7 m/s W	54	43	38	31	36	33	<i>Site related noise events:</i> <b>DCM: Inaudible</b> <i>Other noise events:</i> Wind gusts 33-38 Road traffic 30-45 Residential noise 38-50 Birdsong 32-36 Insects 39-54
Evening	07/06/2023 19:29 15°C 2 m/s NW	58	53	43	26	40	39	<i>Site related noise events:</i> <b>DCM: Inaudible</b> <i>Other noise events:</i> Road traffic 29-58 Farming operations/other industry 33-38 Insects/frogs 29-33 Train passby 32-55 Aeroplane 36-52 Livestock 42
Night	07/06/2023 22:00 12°C 2.2 m/s NW	47	33	31	27	30	28	<i>Site related noise events:</i> <b>DCM: Inaudible</b> <i>Other noise events:</i> Dogs barking 27-34 Insects 27-29 Road traffic 29-33 Farming operations/other industry 26-37 Residential noise 27-47

DCM operations were inaudible during all periods of the operator attended noise surveys at this location. The ambient noise environment at the monitoring location generally consisted of road traffic noise, farming operations as well as natural sources such as wind, insects, frogs and birdsong.

## 5 Performance Assessment

### 5.1 Operational Noise

Results of the operator-attended noise measurements compared with the relevant noise criteria contained in the Project Approval and EPL 11701 are given in **Table 7**.

**Table 7 Performance Assessment – Operations**

Location	Estimated DCM LAeq(15minute) Noise Level dBA			Noise Criteria LAeq(15minute) dBA			Compliance		
	Day	Eve	Night	Day	Eve	Night	Day	Eve	Night
NM1	I/A <sup>1</sup>	<25	21	35	35	35	Yes	Yes	Yes
NM4	I/A <sup>1</sup>	<25	I/A <sup>1</sup>	35	35	37	Yes	Yes	Yes
NM5	I/A <sup>1</sup>	<25	I/A <sup>1</sup>	35	35	35	Yes	Yes	Yes
NM6	I/A <sup>1</sup>	I/A <sup>1</sup>	I/A <sup>1</sup>	35	35	39	Yes	Yes	Yes

1. I/A = Inaudible

### 5.2 Sleep Disturbance

Results of the night period sleep disturbance measurements compared with the relevant noise criteria contained in the Project Approval and EPL 11701 are given in **Table 8**.

**Table 8 Performance Assessment – Sleep Disturbance**

Location	DCM LA1(1minute) Contribution	Noise Criteria LA1(1minute)	Compliance
NM1	24	45	Yes
NM4	I/A <sup>1</sup>	45	Yes
NM5	I/A <sup>1</sup>	45	Yes
NM6	I/A <sup>1</sup>	45	Yes

1. I/A = Inaudible

Results presented in **Table 7** and **Table 8** indicate that compliance with the relevant criteria was achieved at all operator-attended monitoring locations.

## 6 Conclusion

SLR has conducted quarterly noise monitoring for the DCM guided by the requirements of the NMP.

Operator-attended operational noise monitoring was conducted at four locations during the day, evening and night period on Wednesday 7 June 2023. The assessment of daytime, evening and night-time operational noise emissions found DCM to be compliant with the relevant criteria contained within the DCM PA and EPL.

# APPENDIX A

## Acoustic Terminology

The following is a brief description of the acoustic terminology.

Acoustic Terminology	Description
'A' Weighted	Frequency filter applied to measured noise levels to represent how humans hear sounds.
dBA	'A' Weighted overall sound pressure level.
L90 , L10, L1	A statistical measurement giving the sound pressure level which is exceeded for the given percentile of an observation period, i.e., L90 is the level which is exceeded for 90 percent of an observation period. L90 is commonly referred to as the background sound level.
L <sub>Amax</sub>	Highest value of the A-weighted sound pressure level with a specified time weighting that occurs during a given event.

# APPENDIX B

## Operator-attended Noise Survey Charts

Figure B1 – NM1 – Day Period – Operator Attended Noise Survey Results

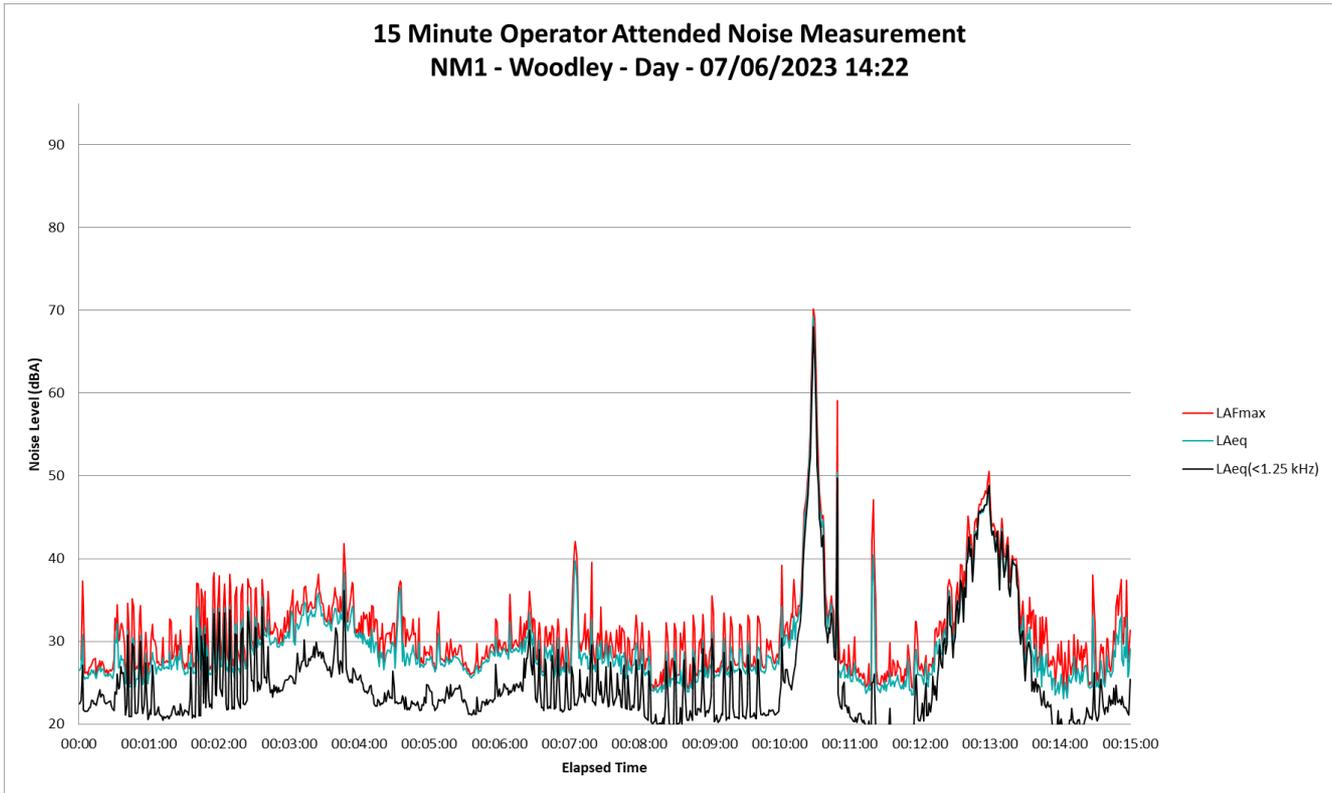


Figure B2 – NM1– Evening Period – Operator Attended Noise Survey Results

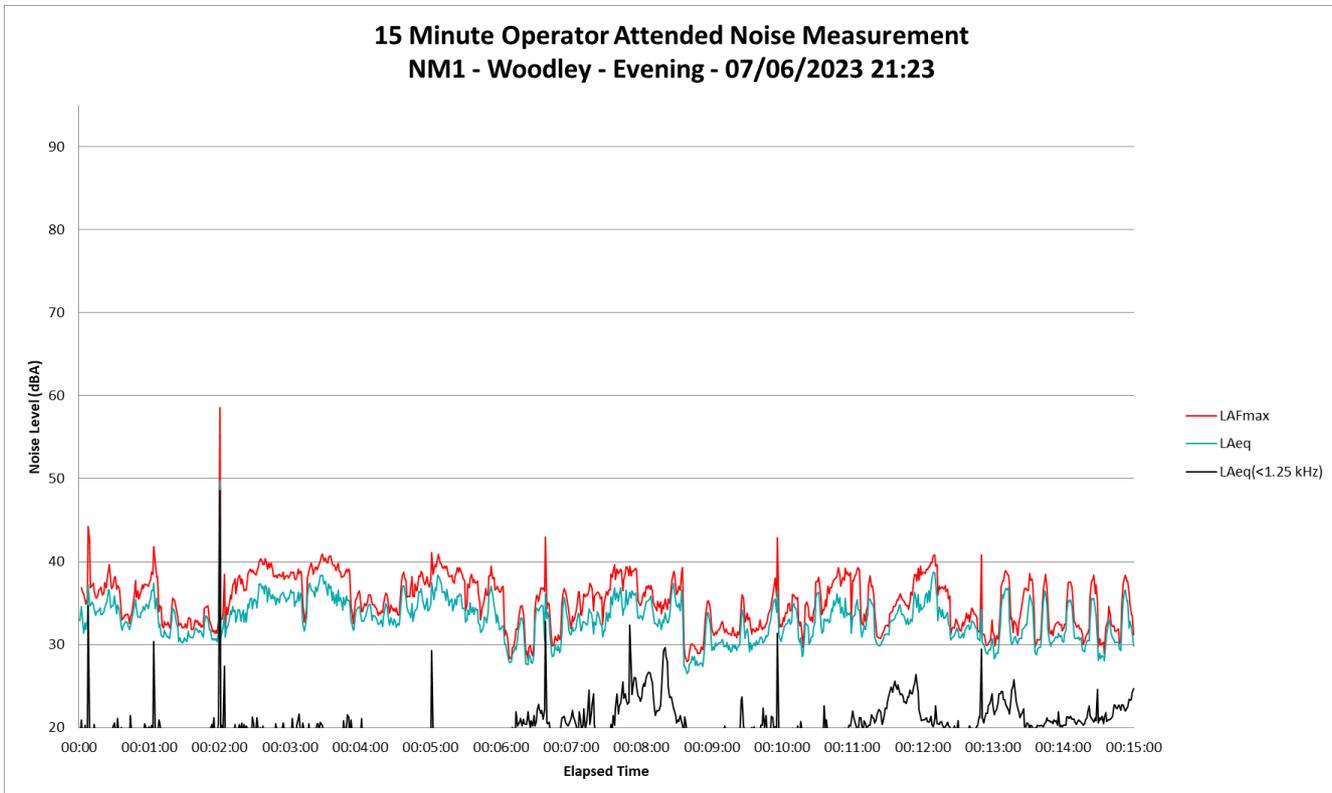


Figure B3 – NM1– Night Period – Operator Attended Noise Survey Results

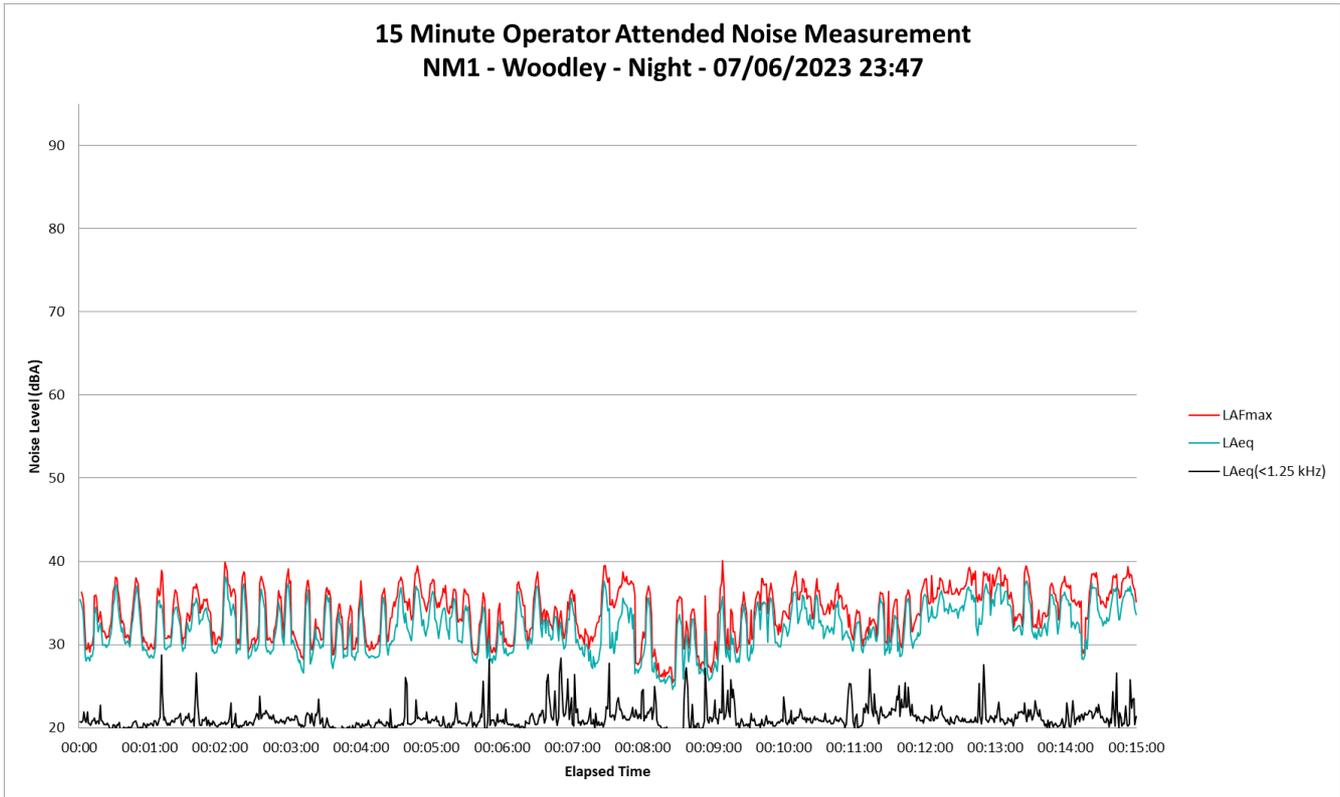


Figure B4 – NM4 – Day Period – Operator Attended Noise Survey Results

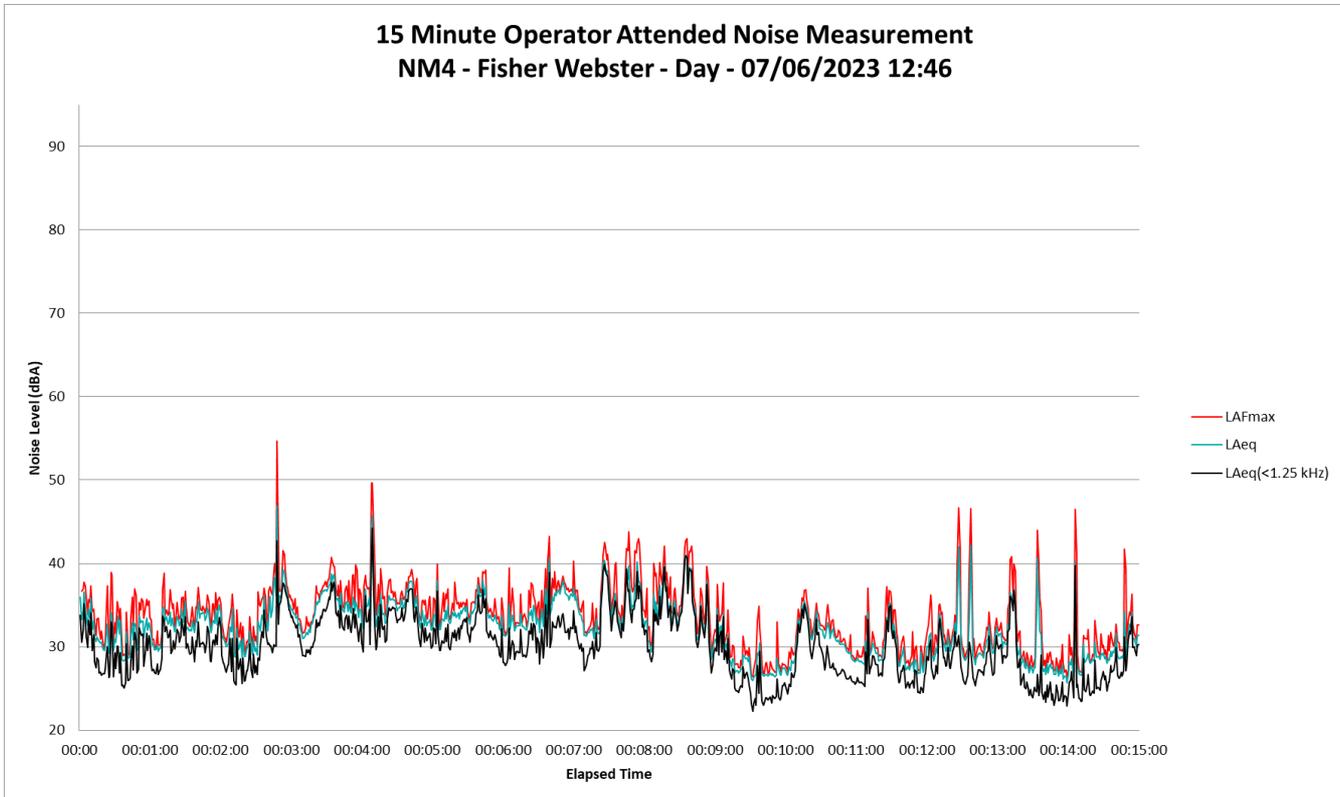


Figure B5 – NM4 – Evening Period – Operator Attended Noise Survey Results

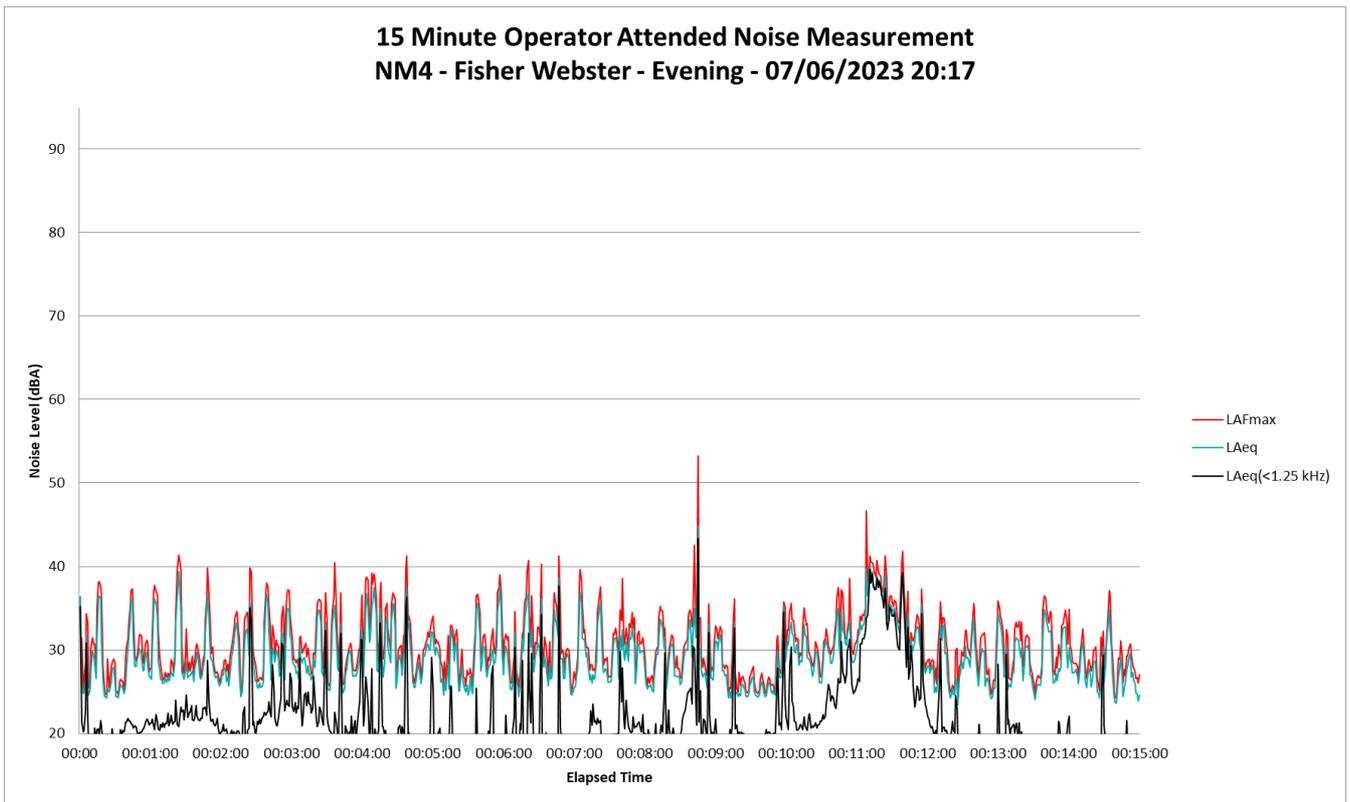


Figure B6 – NM4 – Night Period – Operator Attended Noise Survey Results

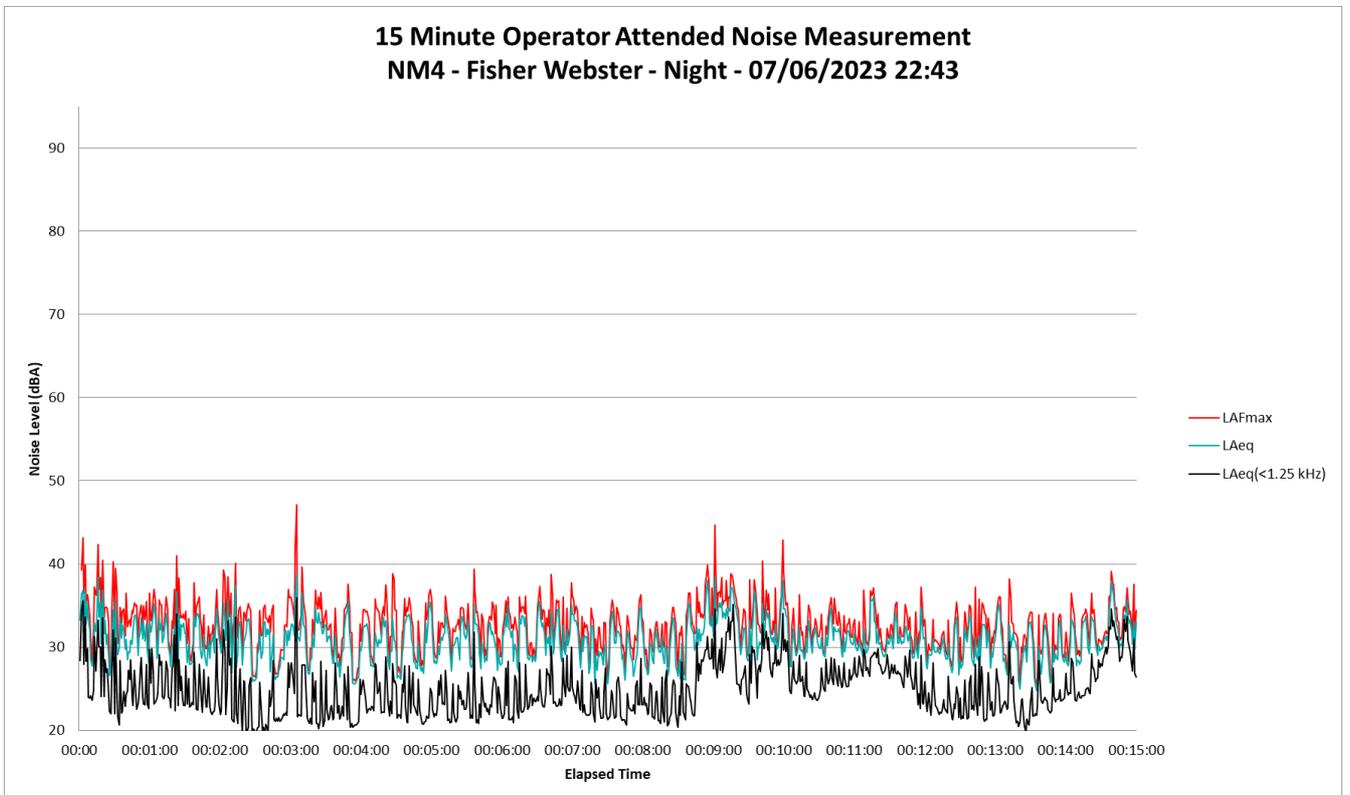


Figure B7 – NM5 – Day Period – Operator Attended Noise Survey Results

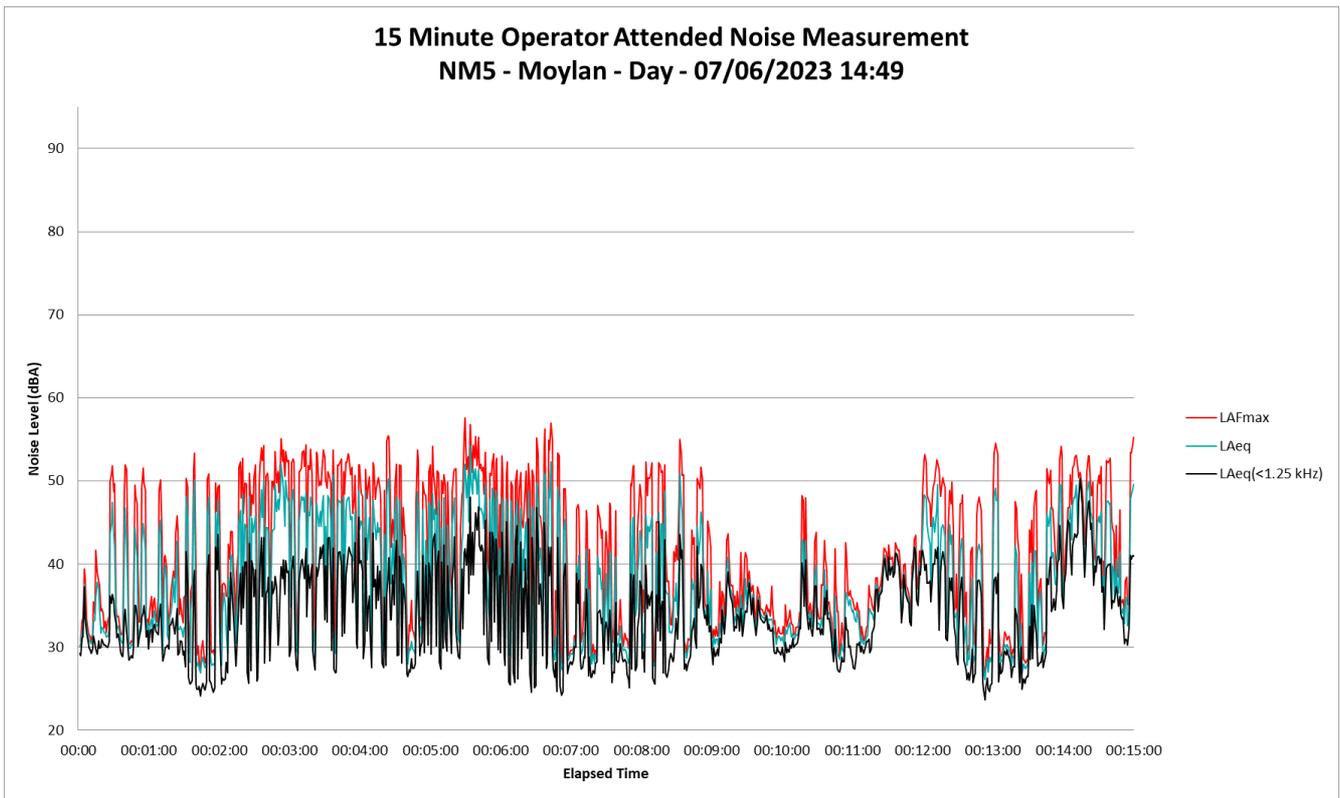
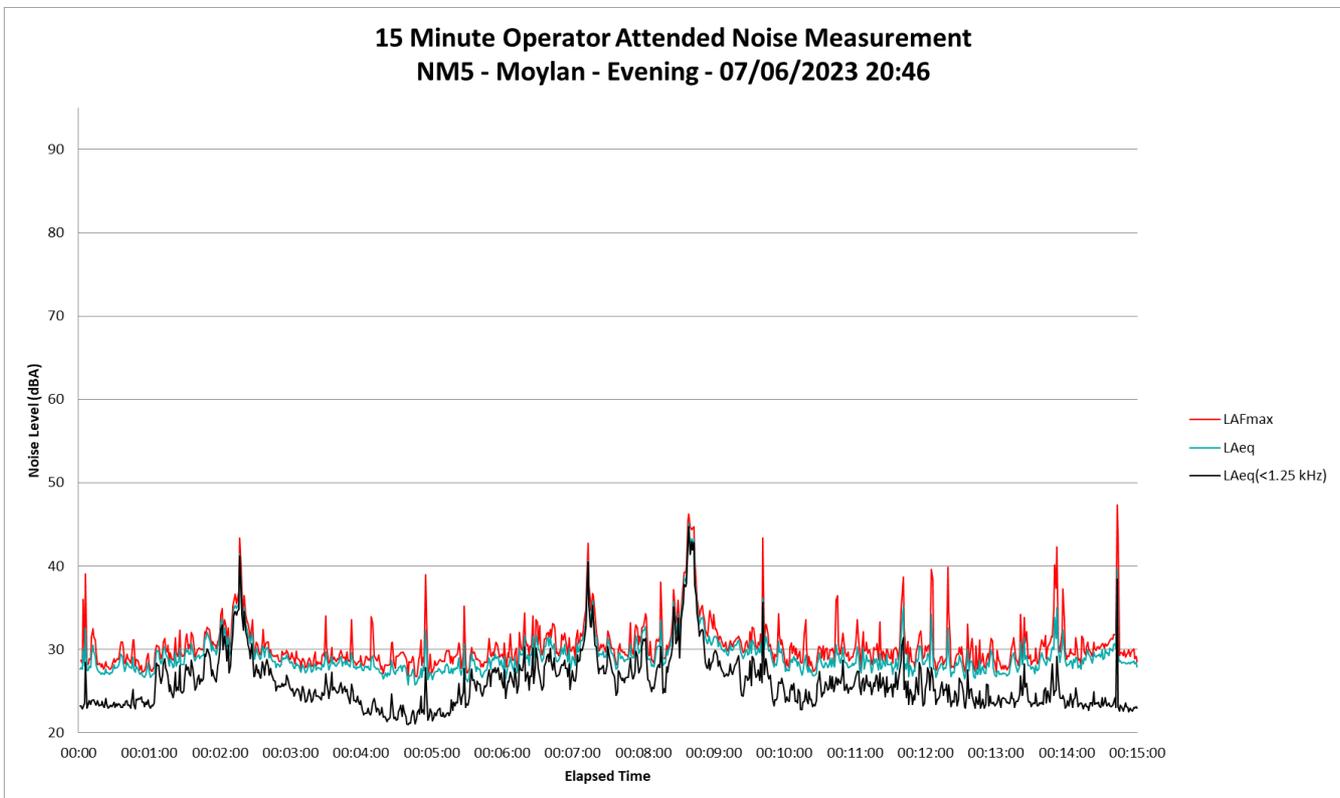
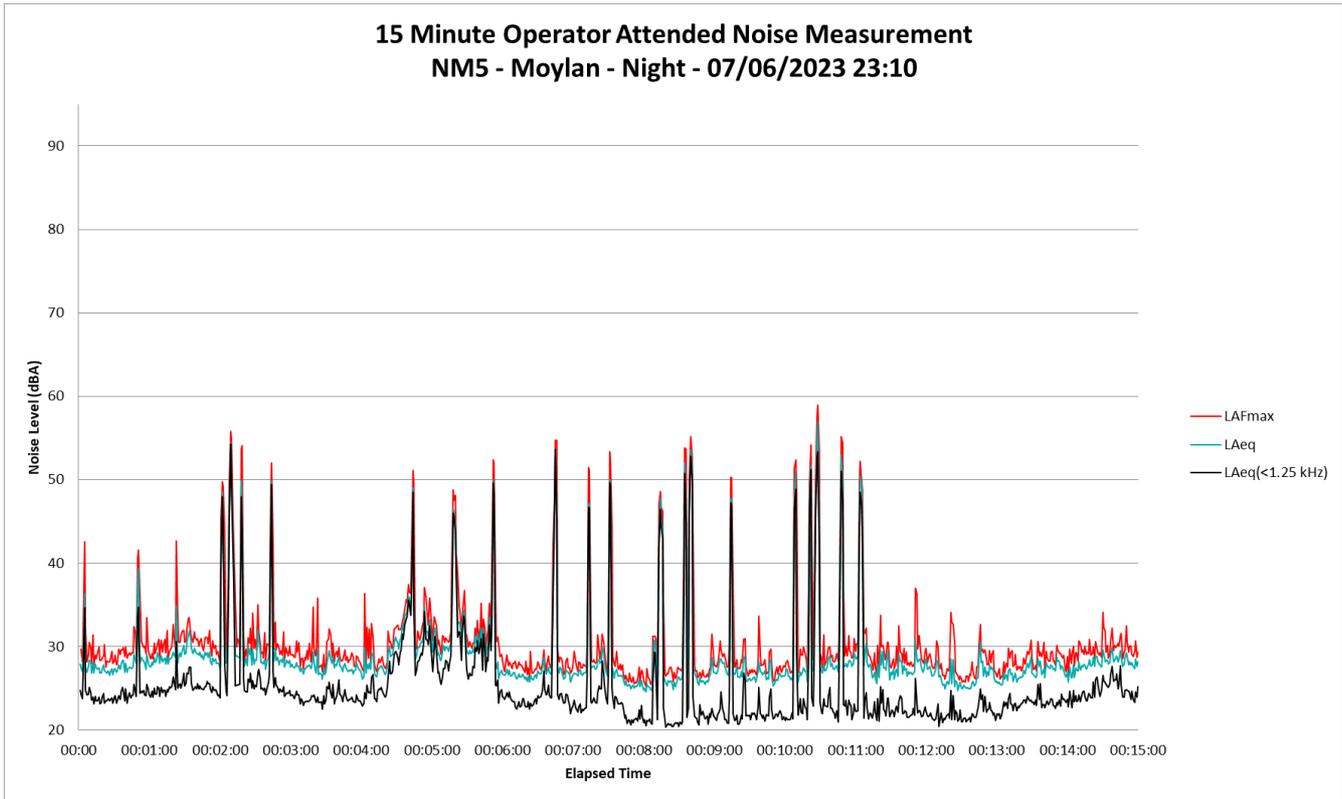


Figure B8 – NM5 – Evening Period – Operator Attended Noise Survey Results



**Figure B9 – NM5 – Night Period – Operator Attended Noise Survey Results**



**Figure B10 – NM6 – Day Period – Operator Attended Noise Survey Results**

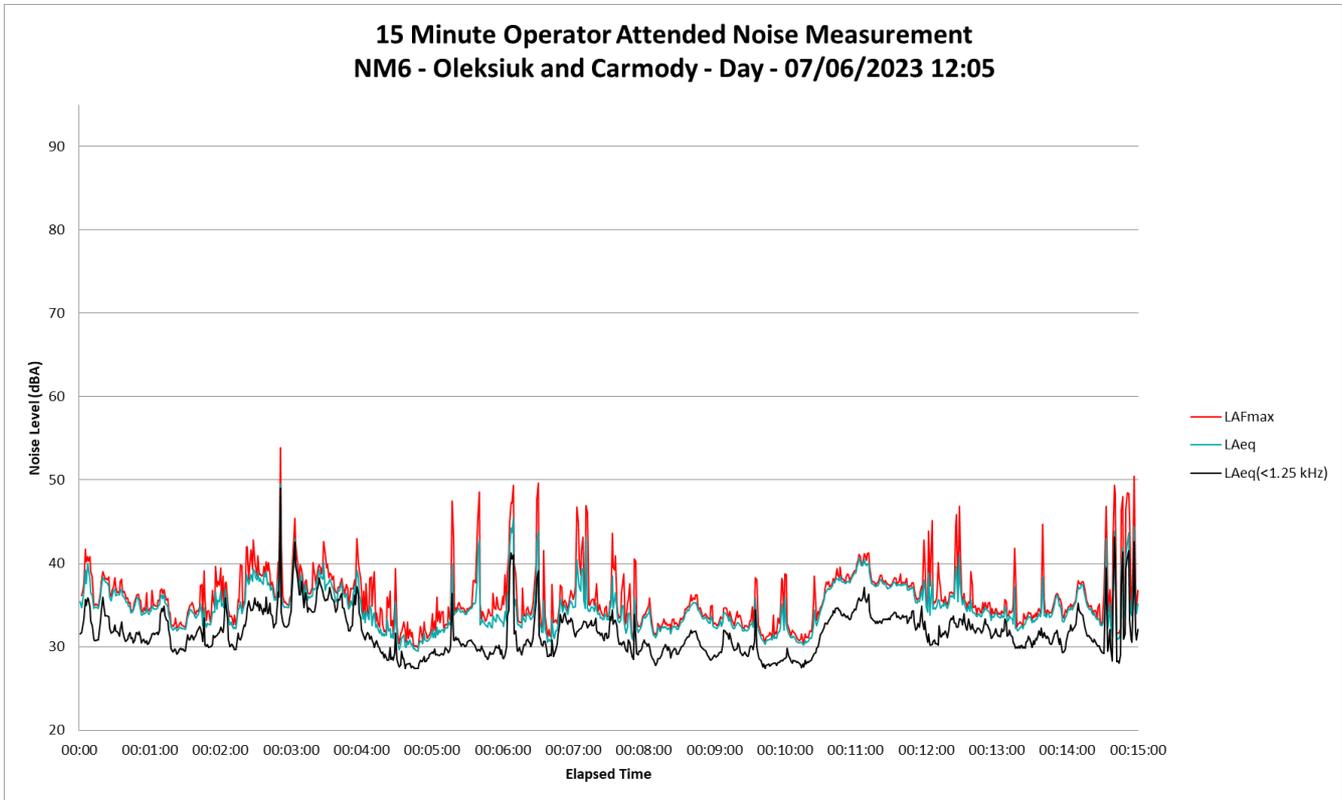


Figure B11 – NM6 – Evening Period – Operator Attended Noise Survey Results

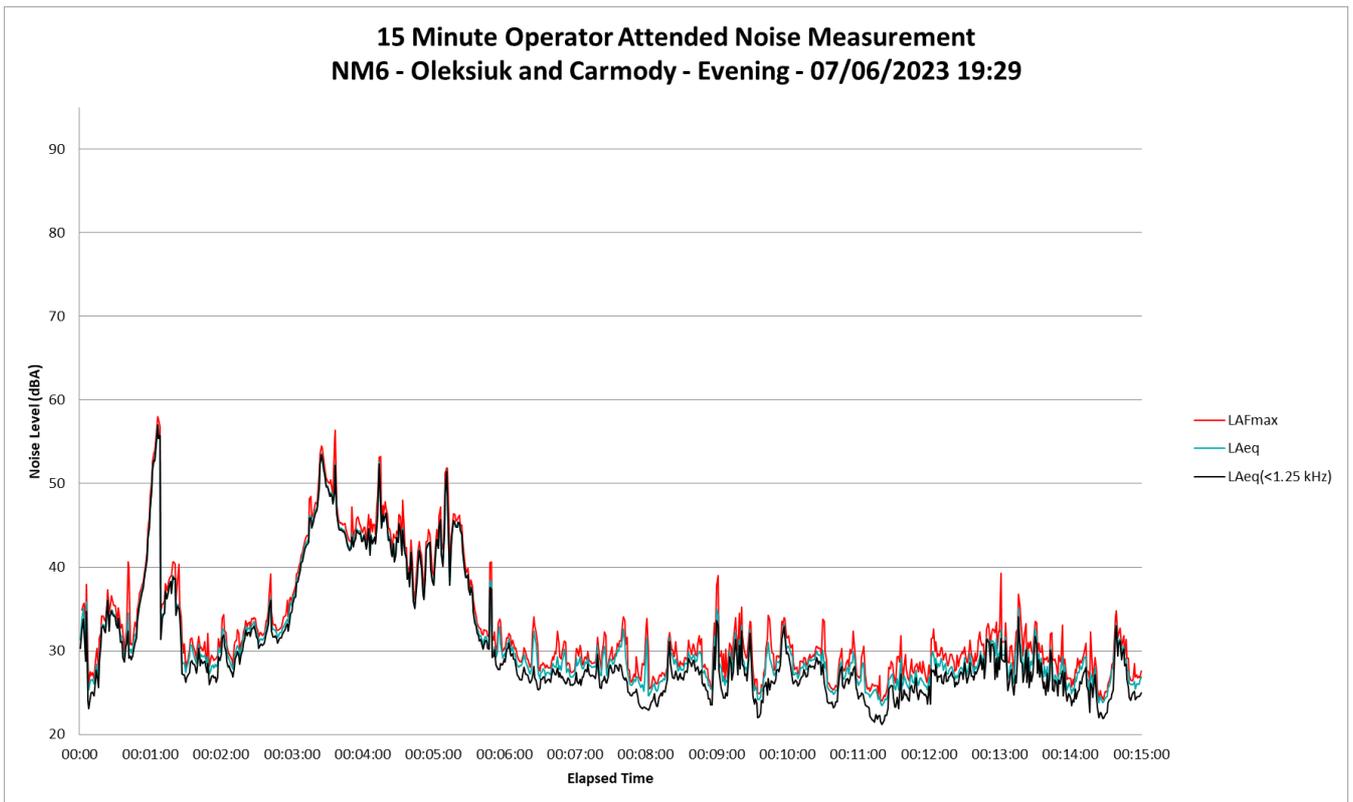
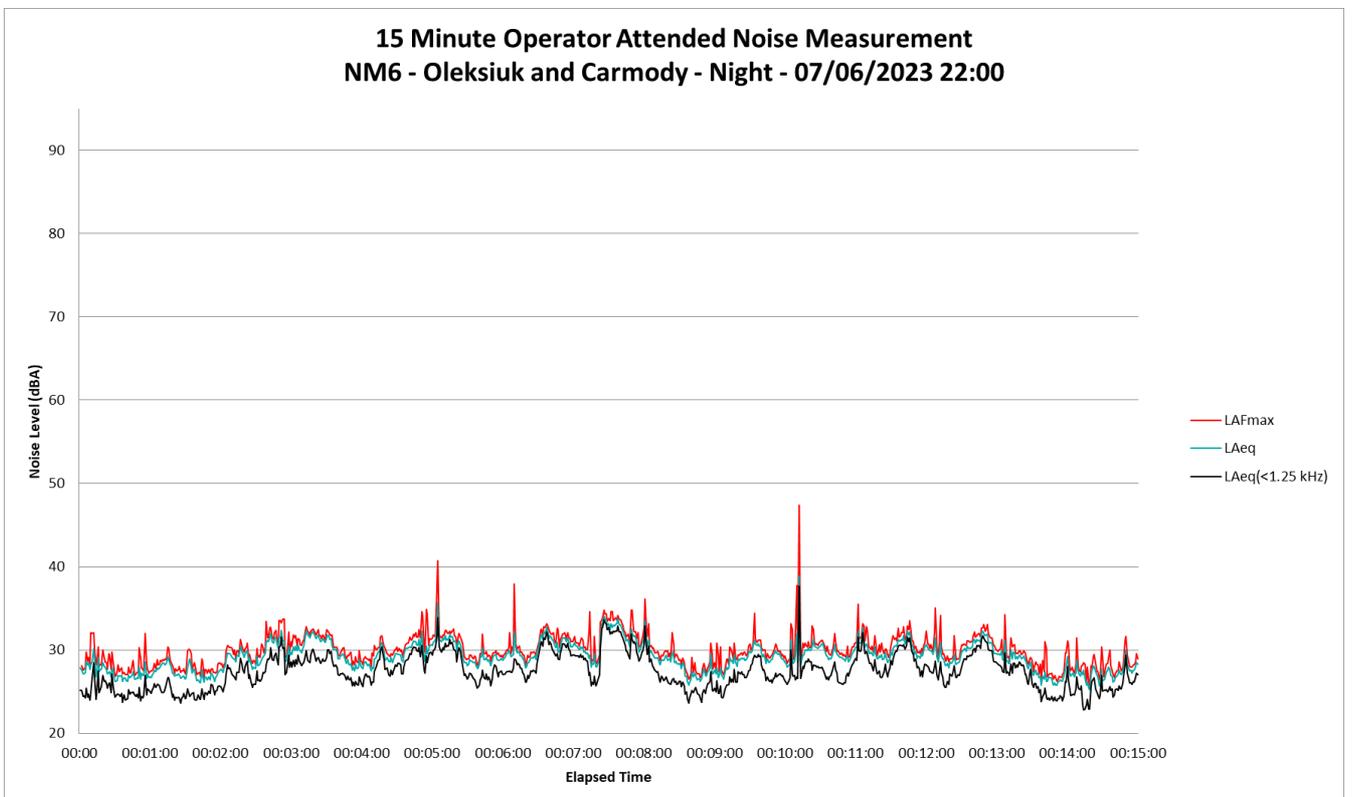


Figure B12 – NM6 – Night Period – Operator Attended Noise Survey Results



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