

**Mount Pleasant Operation
Monthly Environmental Monitoring Report**

February 2021

1. Introduction

The Mount Pleasant Operation (MPO) is located in the Upper Hunter Valley of New South Wales, approximately three kilometres (km) north-west of Muswellbrook and approximately 50 km north-west of Singleton. The villages of Aberdeen and Kayuga are located 12 km north-northeast and 3 km north of the operations, respectively.

The purpose of this report is to provide a monthly update of monitoring data in accordance with the requirements of NSW Environmental Protection Licence (EPL) 20850, Section 66(6) of the *Protection of the Environment Operations Act 1997* (POEO Act) and the MPO Development Approval (DA 92/97).

Table 1-1 – Mount Pleasant Operation

Name of Operation	Mount Pleasant Operation
Name of Licensee	MACH Energy Australia Pty Ltd
Environmental Protection Licence	20850
Project Approval	DA 92/97
Reporting Period Start Date	1 February 2021
Reporting Period End Date	28 February 2021
Date All Data Received	22 March 2021

The MPO EPL 20850 and DA 92/97 can be read in full by clicking the links below:

<https://machenergyaustralia.com.au/wp-content/uploads/EPL-20850-20-January-2021.pdf>

<https://machenergyaustralia.com.au/wp-content/uploads/2018-MOD4-Consolidated-Consent.pdf>

2. Monitoring Requirements

The MPO EPL 20850 specifically requires the monitoring of:

- 2 x Palas Fidas Air Quality Monitoring sites;
- Noise monitoring;
- Blast monitoring; and
- Meteorological monitoring.

Monitoring of sites not required by the EPL are carried out in accordance with MPO Environmental Monitoring Program (EMP) and Project Approval (DA 92/97).

All monitoring is undertaken by suitably qualified and experienced person(s).

The MPO Environmental Monitoring Network is shown in the following figures:

- **Figure 2-1** shows MPO attended noise monitoring locations and Noise Assessment Groups (NAGs);
- **Figure 2-2** shows the MPO Air Quality Monitoring network;
- **Figure 2-3** shows the MPO Blast Monitoring Locations;
- **Figure 2-4** shows the MPO Groundwater Monitoring network; and
- **Figure 2-5** shows the MPO Surface Water Monitoring network.

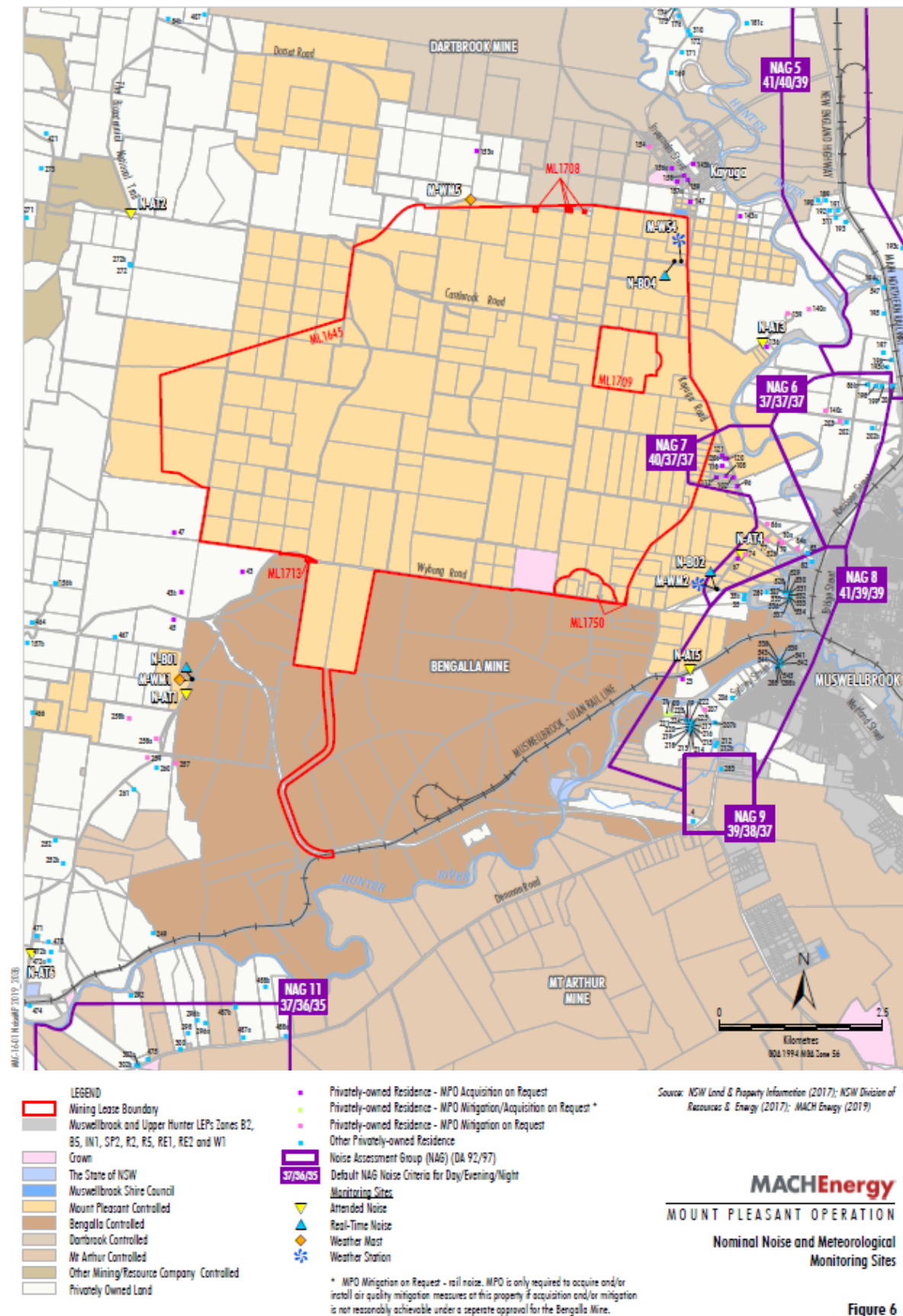


Figure 6

Figure 2-1 – MPO Attended Noise Monitoring Assessment Groups and Locations

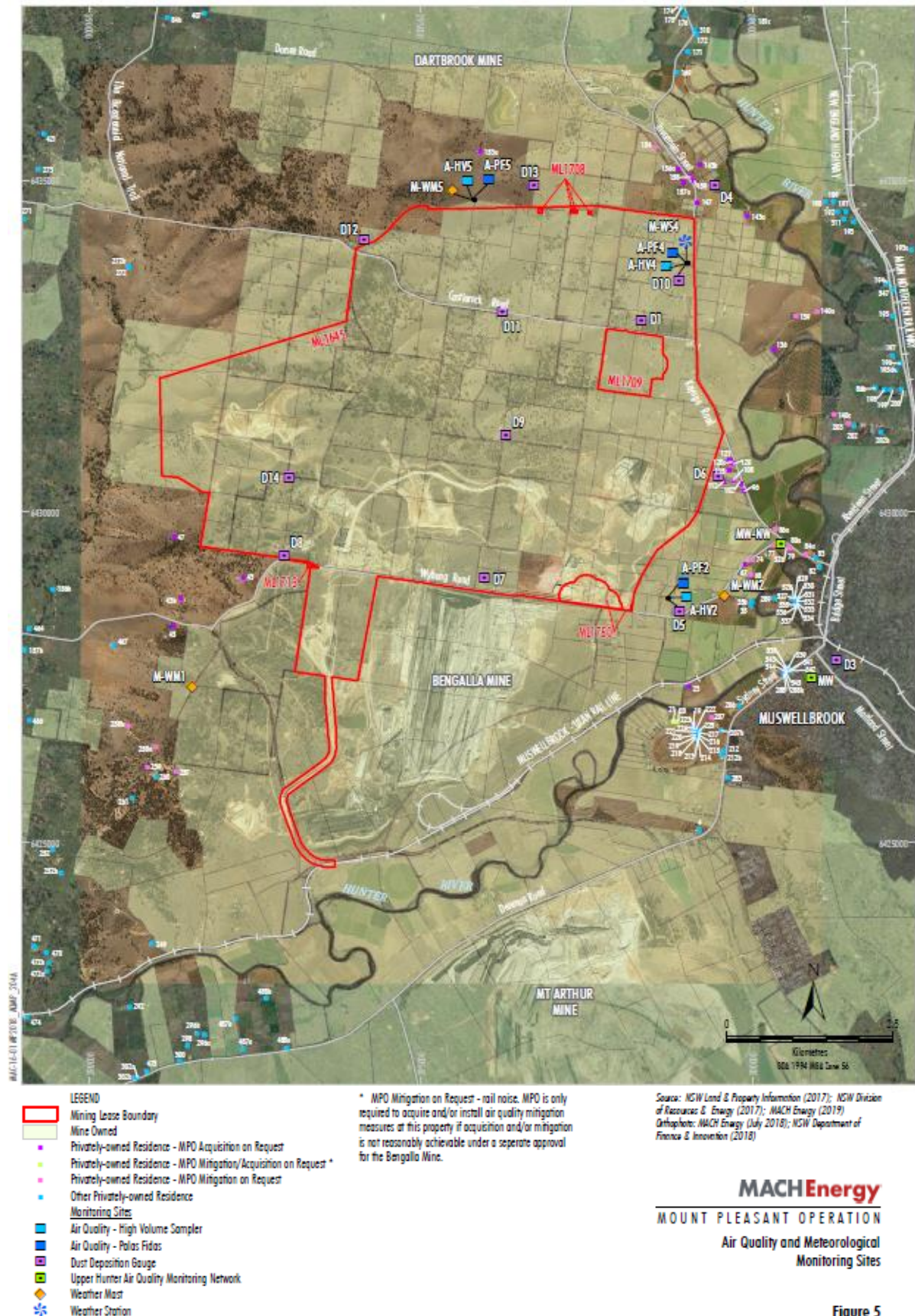


Figure 5

Figure 2-2 – MPO Air Quality and Meteorological Monitoring Network

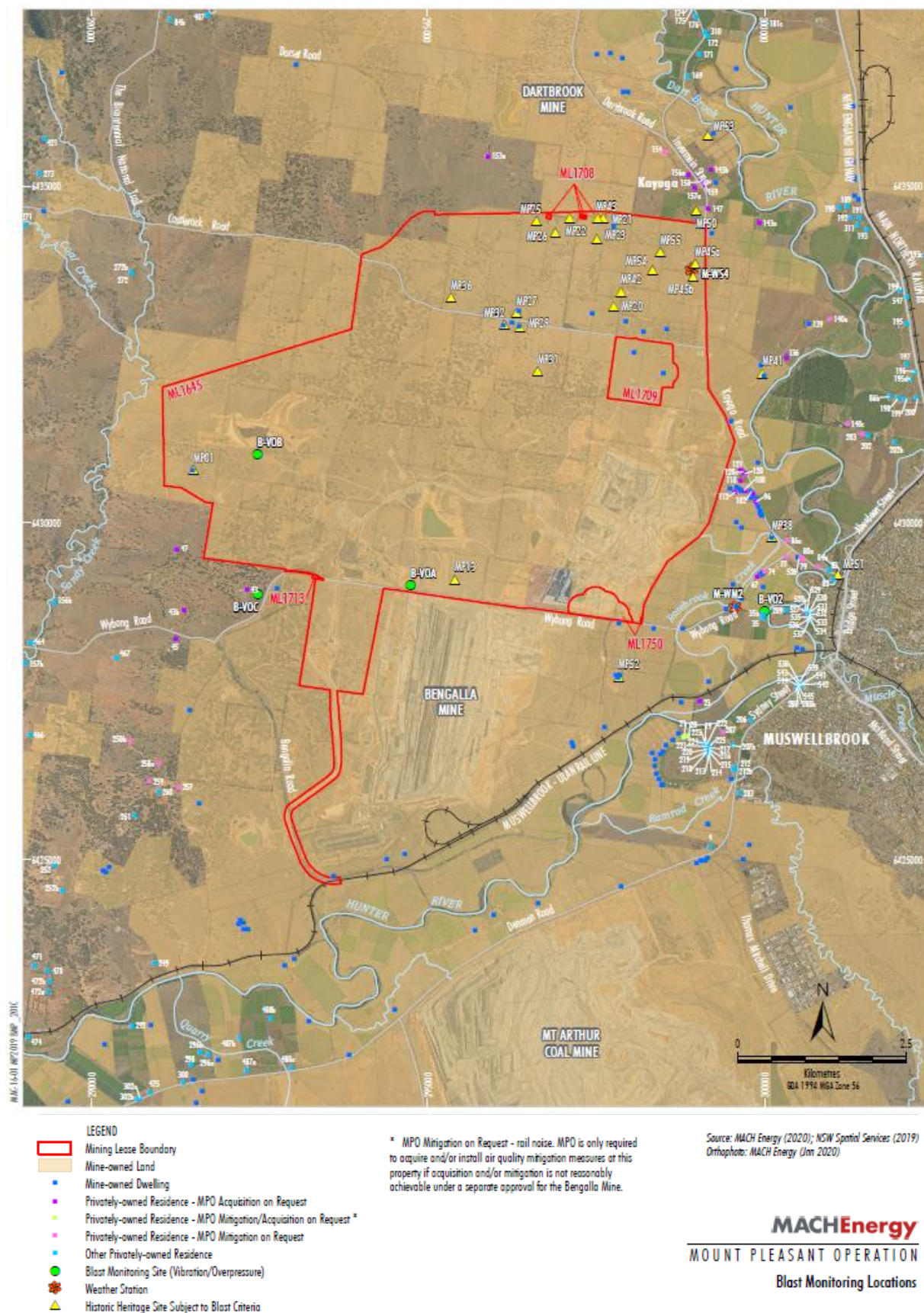
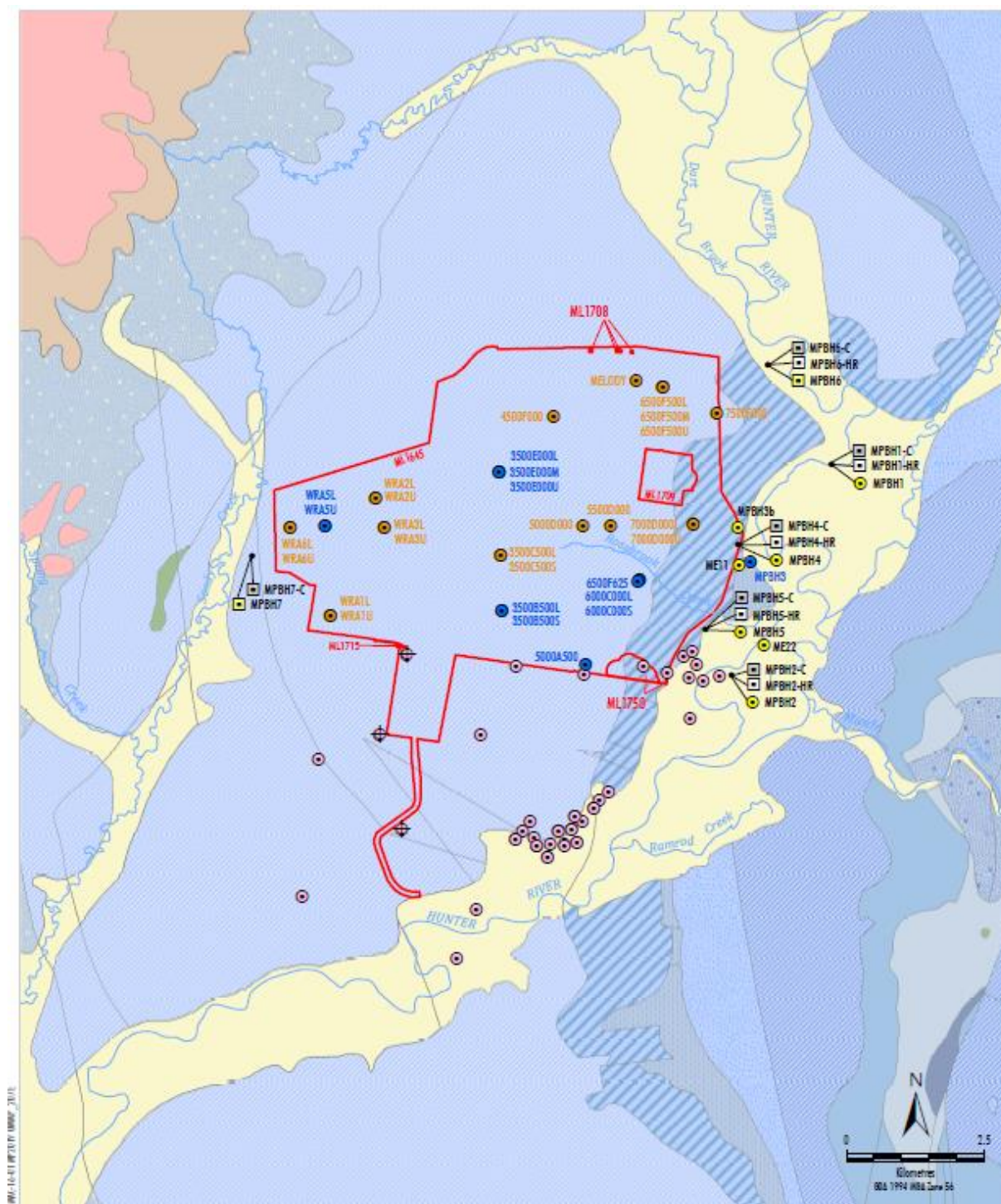


Figure 2-3 – MPO Blast Monitoring Locations

Figure 2



- LEGEND**
- Mining Lease Boundary
 - Mount Pleasant Monitoring
 - Standpipe
 - Standpipe - Alluvium
 - Standpipe - Historical
 - Planned Mount Pleasant Monitoring
 - Standpipe - Coal Seam
 - Standpipe - Interburden
 - Standpipe - Alluvium
 - Bengalla Monitoring
 - Standpipe
 - + Vibrating Wire Piezometer

Source: NSW Land & Property Information (2019); NSW Division of Resources & Energy (2019); MACH Energy (2019)

Note: Refer Figure 3 for geology legend

MACHEnergy
MOUNT PLEASANT OPERATION
Augmentations to the
Groundwater Monitoring Network

Figure 9

Figure 2-4 – MPO Groundwater Monitoring Network



Figure 3

Figure 2-5 – MPO Surface Water Monitoring Network

3. Meteorological Monitoring

Weather data is measured continuously at the Kayuga Road (M-WS4) and the Wybong Road (M-WS2) meteorological stations. In addition to air quality parameters, the weather stations measure wind speed and direction (using the sigma theta method), temperature (at 2 m and 10 m), solar radiation, relative humidity, rainfall, atmospheric pressure.

The majority of meteorological data was captured at M-WS2 (>99.9%) during February 2021 (the monitoring period), with the exception of solar radiation (88.8%). All meteorological data was captured at M-WS4 during the monitoring period, with the exception of PM₁₀ and PM_{2.5} (92.8%).

Throughout February 2021, there was 119.4 and 96.6mm of rainfall recorded at M-WS2 and M-WS4, respectively.

4. Dust Depositional Monitoring

4.1 Methodology

Dust deposition was monitored according to the OEH's Approved Methods for the Sampling and Analysis of Air Pollutants in New South Wales (DECC 2007), which references Australian Standard (AS)/New Zealand Standard (NZS) 3580.10.1:2016 Methods for Sampling and Analysis of Ambient Air: Determination of particulate matter – Deposited matter – Gravimetric Method. The dust deposition monitoring network comprises of 13 dust deposition gauges (DDG). Details of the monitoring locations are shown in **Figure 2-2**.

DDG samples can be contaminated by a variety of means, notably by the presence of insects and bird droppings. Results for contaminated gauges were not included in the calculation of the annual averages as this would result in skewed or misleading results for the purpose of dust deposition assessment. The Australian Standard does not provide criteria for the determination of contamination of a DDG. A gauge sample is determined by AECOM to be contaminated only after reference to field observation sheets, historical monitoring location data, laboratory notes and results, prevailing atmospheric conditions and feedback from field technicians. For example, a gauge sample with a statistically abnormally high insoluble solids result, a low ash residue result (indicating a high level of organic matter) and field notation that bird droppings or insects were present is likely to be considered contaminated.

4.2 Results

The dust deposition exposure period for all gauges commenced on 18 January 2021. Sample collection was undertaken on 18 February 2021 by AECOM with sample analysis performed by SRT, a NATA accredited laboratory. Results are summarised in **Table 4-1**. Annual rolling averages for February 2021 have been provided as an indication of performance between February 2020 – February 2021 and does not represent annual average results for 2021 as per Schedule 3, Condition 20 of DA 92/97.

Table 4-1: Dust Depositional Results – February 2021

Location	YTD Insoluble Solids (g/m ² .month)	Insoluble Solids Annual Rolling Average (g/m ² .month)
D1	1.7	2.2
D3a	***	2.2
D4	2.5	2.8
D5	1.4	2.7
D6	2.1	2.8
D7b ¹	5.7	****
D8	4.9	4.2
D9a	2.2	****
D10	1.1	1.3
D11	3.0	3.1
D12	1.2	1.7
D13	2.1	2.4
D14	4.1	3.1
<i>Criterion</i>	-	4

Notes:

Results in **bold** indicate an elevated measurement of adopted assessment criteria

**Indicates result unavailable due to contaminated depositional dust gauges for YTD

*** annual rolling average not available as new site location

¹Site D7b is located within close proximity to the northern boundary of a neighbouring mining company's main pit and thus is influenced by activities there. This site will continue to be monitored, however will not be used to assess compliance or to represent residential receivers in the area.

* No data due to dust gauge removed during construction activities

Contaminated results, as described in section 4.1, are not included in the 12 month rolling average. An elevated reading above the annual average criterion for dust deposition (insoluble solids) was recorded at site D8 (4.2 g/m².month).

Site D7b is located within close proximity to the northern boundary of a neighbouring mining operation and thus can be influenced by this site. D7b will continue to be monitored, however will not be used to assess compliance or to represent residential receivers in the area. Furthermore, there are no privately-owned receivers in the vicinity of D8 and D14. Whilst these sites do not represent residence(s) on privately-owned land, they will continue to be monitored

in accordance with the MPO Air Quality and Greenhouse Gas Management Plan (MACH Energy, 2019).

Field notes from the February 2021 sampling event noted that all the gauges contained insects and one contained vegetation.

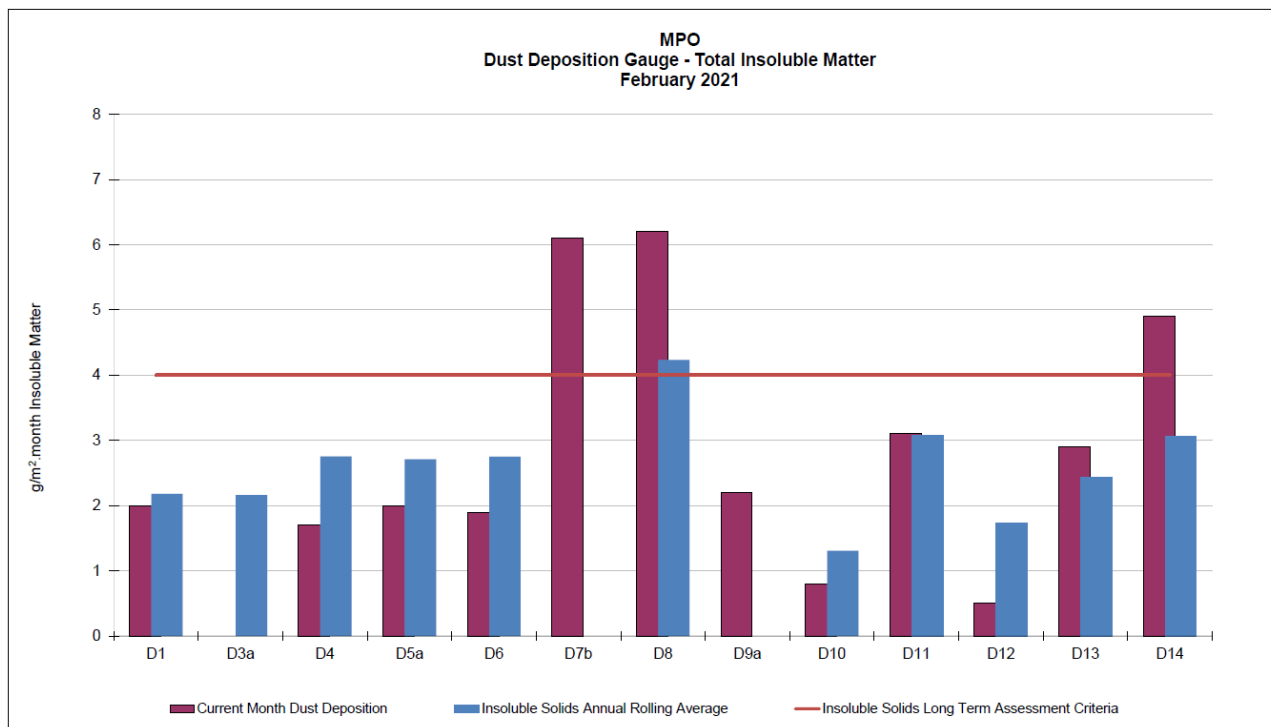


Figure 4-1 compares the monthly insoluble solids results to the annual averages for each dust gauge and the assessment criterion.

Figure 4-1: MPO Dust Deposition Monthly Results and Annual Rolling Average – February 2021

5. Total Suspended Particulates

All High Volume Air Samplers (HVAS) are run for 24 hours every six days in accordance with AM-15 of Approved Methods for the Sampling and Analysis of Air Pollutants in New South Wales (DECC, 2007), referencing AS/NZS 3580.9.3:2015 Methods for sampling and analysis of ambient air – Determination of suspended particulate matter – Total suspended particulate matter (TSP) - High volume sampler gravimetric method, for the monitoring of TSP.

Three TSP HVAS units are included in the MPO air quality monitoring network and are displayed in **Table 5-1** below. These units were commissioned in March 2017.

Table 5-1 Total Suspended Particulate Monitoring Sites

ID	Description
A-PF2	Reilly's
M-WS4	Kayuga Road Met Station
A-PF5	Athlone

5.1 Assessment Criteria

TSP is assessed against the guidelines defined in the EPA Approved Methods for the Modelling and Assessment of Air Pollutants in New South Wales (EPA 2016) and Project Approval DA 92/97. The DA 92/97 specifies an annual average project contribution plus background criterion of 90 µg/m³.

5.2 Results

In February 2021 sample collection was undertaken by AECOM with sample analysis performed by Steel River Testing (SRT), a NATA accredited laboratory. TSP results for the monitoring period are provided in **Table 5-2**. Annual rolling averages for February 2021 have been provided as an indication of performance between February 2020 – February 2021 and do not represent annual average results for 2021 as per Schedule 3, Condition 20 of DA 92/97.

Table 5-2 Total Suspended Particulate Monitoring Data – February 2021

Run Date	Assessment Criterion	TSP µg/m ³		
		HVAS A-PF2	HVAS M-WS4	HVAS A-PF5
2/02/2021	-	36.4	32.5	41.0
8/02/2021	-	39.6	27.8	54.4
14/02/2021	-	43.0	29.2	47.6
20/02/2021	-	26.0	19.1	38.1
26/02/2021	-	62.8	27.0	35.6
Monthly Mean	-	42	27	43
Annual Rolling Average	90	52	33	34

Note: Results in **bold** indicate an elevated reading

5.3 Discussion

For the reporting period, the annual rolling average TSP data at all sites was below the annual average criterion of 90 µg/m³.

6. Real Time Air Quality Monitoring

Continuous particulate matter less than 10 μm (PM_{10}) and particulate matter less than 2.5 μm ($\text{PM}_{2.5}$) monitoring was conducted by three Palas Fidas units (one utilised for management only) at MPO during February 2021.

The EPA identification numbers 1 and 2 refer to Palas Fidas units installed on Wybong Road (A-PF2) and Dorset Road (A-PF5), respectively. In addition, a third unit (A-PF4) is installed on Kayuga Road with data used for management purposes only.

Real time PM_{10} and $\text{PM}_{2.5}$ 12-month rolling averages for February 2021 have been provided in Section 6.2 and 6.4 respectively, as an indication of performance between February 2020 – February 2021 and do not represent annual average results for 2021 as per Schedule 3, Condition 20 of DA 92/97.

6.1 PM_{10} Results – 24 hour rolling average

There were no elevated PM_{10} measurements reported throughout February 2021. The Muswellbrook NW monitor was operational during all days of February 2021. Real time PM_{10} 24 hour rolling average results for February 2021 are presented in **Table 6-1**.

Table 6-1: MPO Palas Fidas PM_{10} Data – February 2021

Date	A-PF2/EPA ID 1	A-PF4	A-PF5/EPA ID 2	Muswellbrook NW	Muswellbrook NW 24 Hour Average Limit (µg/m³)	A-PF2, A-PF4, A-PF5 24 Hour Average Limit (µg/m³)
	24 hour Average Result					
1/02/2021	18	17	17	19	44	50
2/02/2021	11	-	10	10	44	50
3/02/2021	18	-	17	22	44	50
4/02/2021	16	-	19	19	44	50
5/02/2021	18	18	18	21	44	50
6/02/2021	15	16	13	16	44	50
7/02/2021	13	11	10	15	44	50
8/02/2021	15	14	13	19	44	50
9/02/2021	13	13	12	16	44	50
10/02/2021	12	12	13	14	44	50
11/02/2021	15	17	18	15	44	50
12/02/2021	24	20	20	31	44	50
13/02/2021	12	11	9	12	44	50
14/02/2021	17	15	15	20	44	50
15/02/2021	14	13	13	19	44	50
16/02/2021	10	9	10	10	44	50
17/02/2021	13	11	12	16	44	50
18/02/2021	16	14	14	20	44	50
19/02/2021	11	10	10	13	44	50
20/02/2021	10	10	10	11	44	50
21/02/2021	11	10	12	13	44	50
22/02/2021	19	15	12	20	44	50
23/02/2021	17	13	11	22	44	50

24/02/2021	14	12	9	15	44	50
25/02/2021	16	15	10	17	44	50
26/02/2021	16	11	8	20	44	50
27/02/2021	17	16	11	21	44	50
28/02/2021	23	21	14	27	44	50

Notes:

Results in bold indicate elevated readings during adverse weather conditions.

Results with "-" indicate dates where data was affected by maintenance or servicing (scheduled and unscheduled)

Figure 6-1 below shows the results of real-time PM₁₀ 24 hour rolling average results at MPO air quality monitoring sites February 2021.

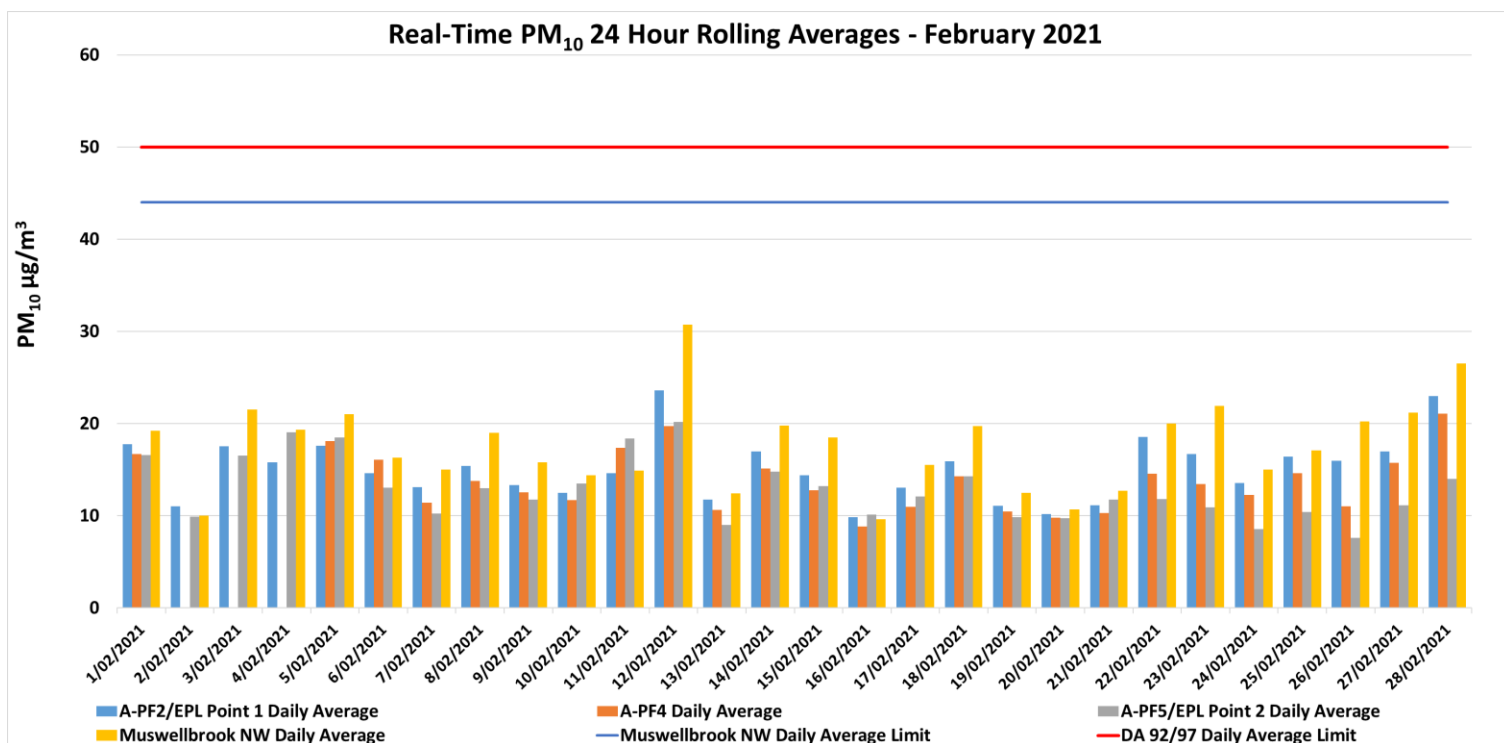


Figure 6-1: Real-time PM₁₀ 24 hour rolling average results for February 2021.

6.2 PM₁₀ Results – Annual rolling average

There were no elevated PM₁₀ measurements reported at MPO for the February 2021 annual rolling average. Real time PM₁₀ annual rolling averages for February 2021 are presented in **Figure 6-2** below.

Real-Time PM₁₀ Annual Rolling Average - February 2021

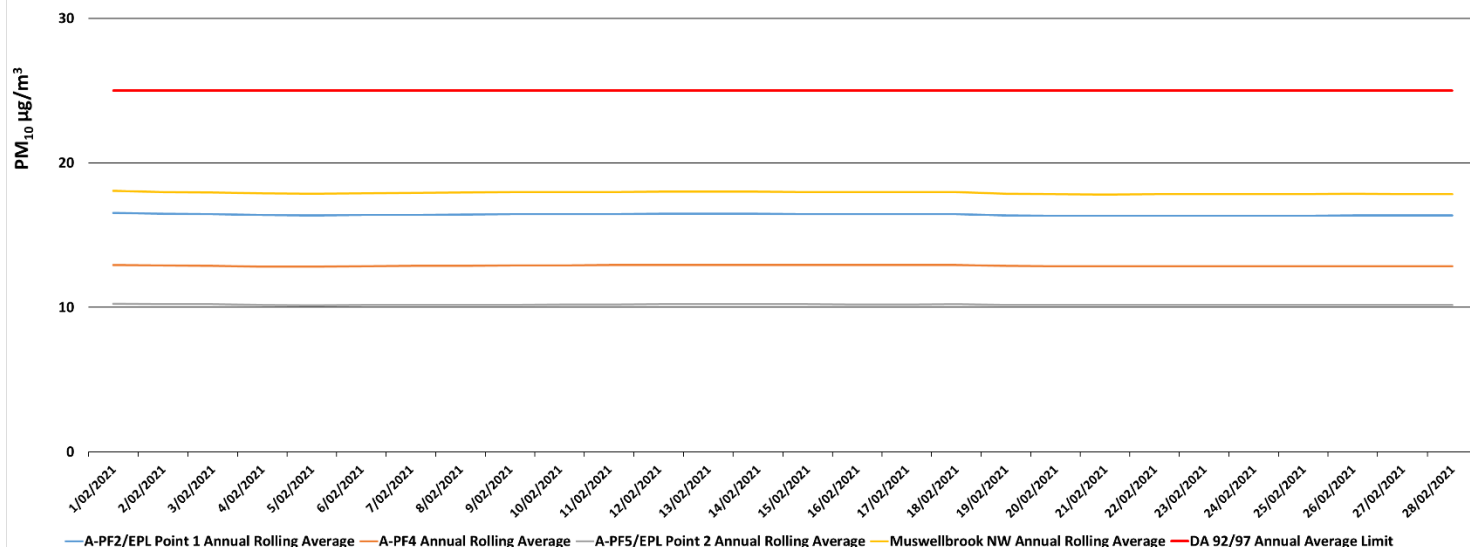


Figure 6-2: Real-time PM₁₀ Annual Rolling average results for February 2021.

6.3 PM_{2.5} Results – 24 hour rolling average

There were no elevated PM_{2.5} measurements reported throughout February 2021. Real time PM_{2.5} 24 hour rolling average results for February 2021 are presented in **Table 6-2**.

Table 6-2: MPO Palas Fidas PM_{2.5} Data – February 2021

Date	A-PF2/EPA ID 1	A-PF4	A-PF5/EPA ID 2	A-PF2, A-PF4, A-PF5 24 Hour Average Limit (µg/m³)
	24 hour Average Result			
1/02/2021	6	9	6	25
2/02/2021	4	-	4	25
3/02/2021	6	-	6	25
4/02/2021	5	-	5	25
5/02/2021	5	6	5	25
6/02/2021	5	5	4	25
7/02/2021	4	4	4	25
8/02/2021	6	6	5	25
9/02/2021	5	5	5	25
10/02/2021	5	5	5	25
11/02/2021	5	6	5	25
12/02/2021	6	6	5	25
13/02/2021	5	5	4	25
14/02/2021	6	6	6	25
15/02/2021	5	5	4	25
16/02/2021	4	4	4	25
17/02/2021	5	5	5	25

18/02/2021	6	6	5	25
19/02/2021	4	5	4	25
20/02/2021	4	4	4	25
21/02/2021	4	4	4	25
22/02/2021	5	6	4	25
23/02/2021	6	6	4	25
24/02/2021	5	5	4	25
25/02/2021	6	6	4	25
26/02/2021	5	4	3	25
27/02/2021	7	7	5	25
28/02/2021	9	10	6	25

Notes:

Results in **bold** indicate elevated readings during adverse weather conditions.

Results with "-" indicate dates where data was affected by maintenance or servicing (scheduled and unscheduled)

Real time PM_{2.5} 24 hour average results for February 2021 are presented in **Figure 6-3** below.

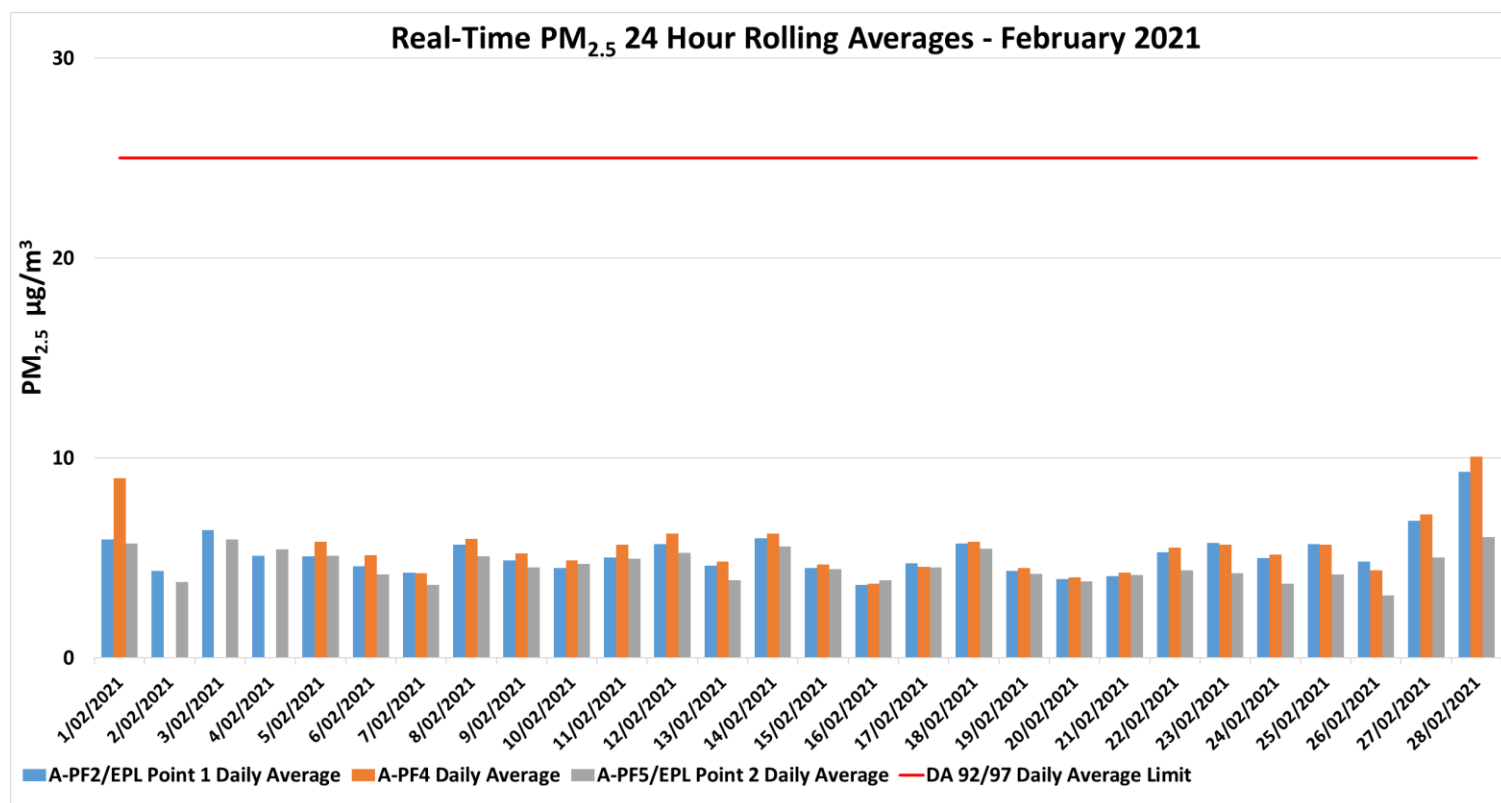


Figure 6-3: Real-time PM_{2.5} 24 hour rolling average results for February 2021.

6.4 PM_{2.5} Results - Annual rolling average

There were no elevated PM_{2.5} measurements reported at MPO for the February 2021 annual rolling average. Real time PM₁₀ annual rolling averages for February 2021 are presented in **Figure 6-4** below.

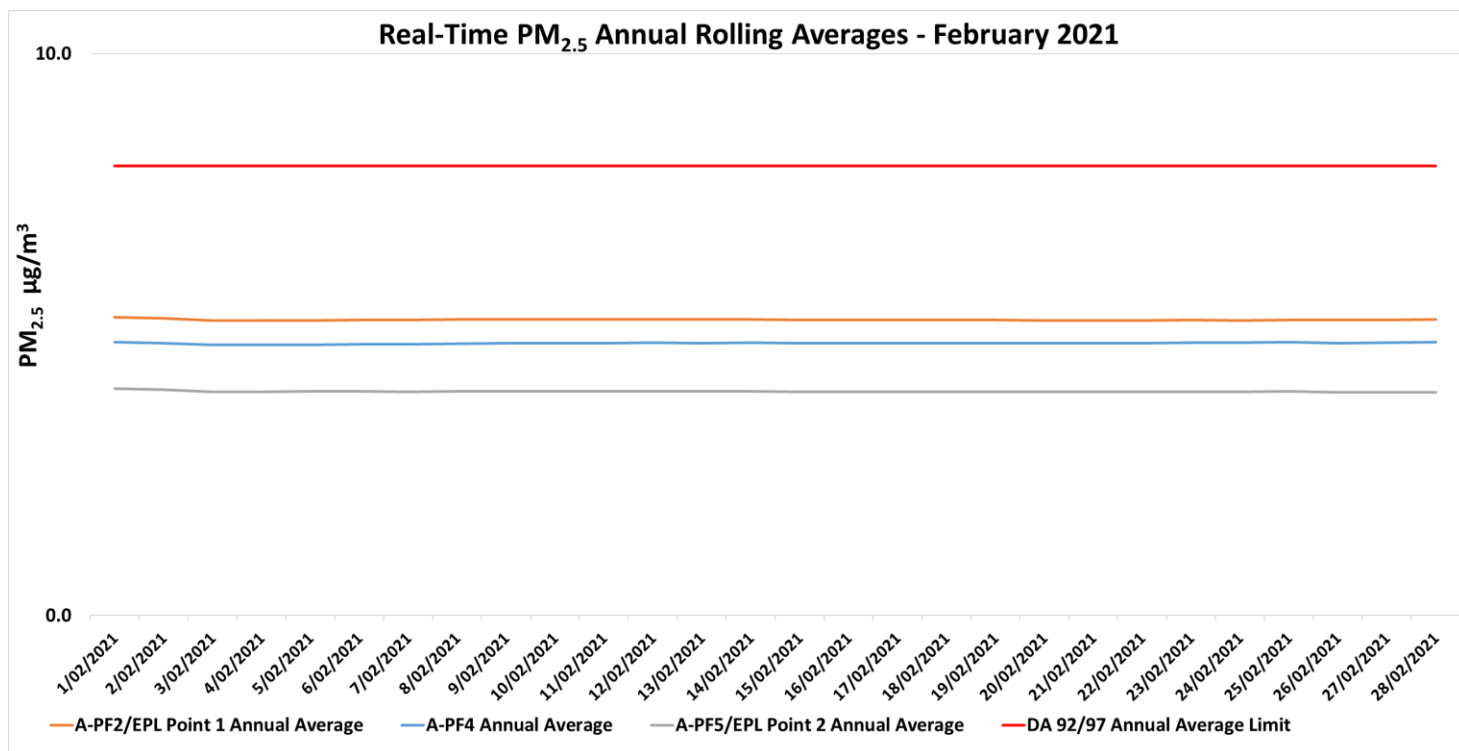


Figure 6-4: Real-time PM_{2.5} Annual Rolling average results for February 2021.

7. Surface Water Monitoring

7.1 Methodology

Surface water quality is monitored at 15 sites on a monthly basis, with additional monitoring conducted if triggered by a rain event. A comprehensive suite of analysis is performed at these sites on a quarterly basis.

7.2 Assessment Criteria

Surface waters were assessed as per the MPO Water Management Plan (MACH Energy, 2019) in accordance with site specific trigger values that have been developed using the ANZECC (2000) guidelines for sites that contain a minimum of two years of monthly data. Sites with insufficient data are assessed on default trigger values adopted from ANZECC (2000) guidelines.

7.3 Results

Monthly and rain event surface water monitoring was conducted by AECOM on 3 and 4 February 2021. Additional rain event sampling was undertaken on 15 February 2021. Laboratory analysis was performed by ALS which is a NATA accredited laboratory. Monthly monitoring results for pH, EC, TSS and TDS are presented in **Table 7-1**.

Table 7-1 – MPO Monthly Surface Water Monitoring Results – 3 and 4 February 2021

Station	pH	Electrical Conductivity (EC) (µs/cm) ¹	Total Suspended Solids (TSS) (mg/L)	Total Dissolved Solids (TDS) (mg/L)
W1	^	^	^	^
W2	^	^	^	^
W3	7.9	550	24	350
W4	7.5	1250	18	700
W5	*	*	*	*
W6A	8.1	490	8	309
W7	^	^	^	^
W9	*	*	*	*
W11	^	^	^	^
W12	7.8	5400	27	3190**
W13	*	*	*	*
W14	*	*	*	*
W15	8.0	590	31	284
W16	*	*	*	*
W17	^	^	^	^

Notes:

Results in **bold** indicate elevated reading of adopted assessment criteria.

*Dry or insufficient water to sample.

** TDS result calculated due to high TSS containing colloidal clay particles which have interfered with the Laboratory TDS result.

^ Indicates no safe access due to wet weather conditions

¹ Results have been rounded in accordance with the In-house method Q4AN(EV)-332-WI3 (pH) and In-house method Q4AN(EV)-332-WI2 (EC).

** Calculated result due to interference from colloidal material interfering with laboratory result.

Table 7-2 – MPO Monthly Surface Water Monitoring Results – 15 February 2021

Station	pH	Electrical Conductivity (EC) (µs/cm) ¹	Total Suspended Solids (TSS) (mg/L)	Total Dissolved Solids (TDS) (mg/L)
W1	^	^	^	^
W2	8.1	560	22	336
W3	7.9	620	16	341
W4	7.5	1000	<5	595
W5	*	*	*	*
W6A	8.1	560	15	348
W7	*	*	*	*
W9	*	*	*	*
W11	^	^	^	^
W12	7.7	5400	11	2900

Station	pH	Electrical Conductivity (EC) (µs/cm) ¹	Total Suspended Solids (TSS) (mg/L)	Total Dissolved Solids (TDS) (mg/L)
W13	*	*	*	*
W14	*	*	*	*
W15	7.8	640	25	364
W16	*	*	*	*
W17	8.0	670	19	382

Notes:

Results in **bold** indicate elevated reading of adopted assessment criteria.

*Dry or insufficient water to sample.

** TDS result calculated due to high TSS containing colloidal clay particles which have interfered with the Laboratory TDS result.

^ Indicates no safe access due to wet weather conditions

¹ Results have been rounded in accordance with the In-house method Q4AN(EV)-332-WI3 (pH) and In-house method Q4AN(EV)-332-WI2 (EC).

** Calculated result due to interference from colloidal material interfering with laboratory result.

Ten of the fifteen monitoring locations were found to be dry or were not safely accessible on 3 and 4 February 2021. Eight of the fifteen monitoring locations were found to be dry or were not safely accessible on 15 February 2021. All sites sampled were below or inside the trigger level values. An investigation will be triggered if elevated measurements occur for three consecutive sampling events in accordance MPO Water Management Plan (MACH Energy, 2019).

8. Groundwater Monitoring

The quarterly groundwater monitoring was conducted on 9 – 12, 18, 19 and 25 February 2021. Water level results for the groundwater bores are presented in **Table 8-1**. The quarterly pH and EC results are presented in **Table 8-2** and **Table 8-3**, respectively.

Table 8-1 - MPO Quarterly Groundwater Water Level Results

Monitoring Location/ ID	Water Level Trigger Range		Current Month Water Level (DTW)	Nov 2020 Water Level (DTW)	Aug 2020 Water Level (DTW)	Triggered (Yes/No)
	80 th Percentile (DTW)	Trigger				
WRA1L	-	± 0.5m	3.30	3.72	4.94	
WRA1U	-	± 0.5m	*	*	*	
WRA3L	-	± 0.5m	12.38	13.27	14.02	
WRA3U	-	± 0.5m	4.46	4.36	3.76	
WRA5L	-	± 0.5m	0.00	0.00	0.00	
WRA5U	-	± 0.5m	1.14	1.15	0.84	
WRA6L	-	± 0.5m	1.43	1.49	1.33	
WRA6U	-	± 0.5m	2.56	2.95	3.37	
MPBH1	9.71	10.70	9.95	9.86	9.90	No
MPBH2	12.20	14.20	12.68	12.67	12.57	No
MPBH3b	12.00	Dry (Or 14.0m)	12.12	12.09	12.17	No

Monitoring Location/ ID	Water Level Trigger Range		Current Month Water Level (DTW)	Nov 2020 Water Level (DTW)	Aug 2020 Water Level (DTW)	Triggered (Yes/No)
	80 th Percentile (DTW)	Trigger				
MPBH4	-	± 0.5m	12.08	12.13	12.19	
MPBH5	-	± 0.5m	*	*	*	
MPBH1-C***	-	± 0.5m	10.10	10.19	10.26	
MPBH1-HR***	-	± 0.5m	26.11	10.15	10.15	
MPBH2-C***	-	± 0.5m	12.94	13.01	12.92	
MPBH2-HR**	-	± 0.5m	27.10	12.90	12.81	
MPBH4-C***	-	± 0.5m	11.66	11.69	11.77	
MPBH4-HR***	-	± 0.5m	50.99	51.10	51.06	
MPBH5-C***	-	± 0.5m	12.43	12.39	12.35	
MPBH5-HR***	-	± 0.5m	12.53	12.50	12.46	
MPBH6***	-	± 0.5m	10.32	10.33	10.30	
MPBH6-C***	-	± 0.5m	12.41	12.62	12.62	
MPBH6-HR***	-	± 0.5m	11.16	11.16	11.06	
MPBH7***	-	± 0.5m	7.33	9.42	9.51	
MPBH7-C***	-	± 0.5m	18.86	18.88	18.74	
3500C500 (L)	-	± 0.5m	60.34	60.62	53.36	
3500C500 (S)	-	± 0.5m	25.67	25.75	25.86	
4500F000	-	± 0.5m	28.88	27.56	28.97	
5000D000	-	± 0.5m	110.04	107.54	106.56	
5500D000	-	± 0.5m	88.98	99.65	86.56	
6500F500L	-	± 0.5m	53.20	53.17	53.08	
6500F500M	-	± 0.5m	54.71	54.71	54.67	
6500F500U	-	± 0.5m	*	*	*	
6500F625	-	± 0.5m	22.29	17.78	14.39	
Melody	-	± 0.5m	13.55	12.66	11.64	
7500F000	-	± 0.5m	36.57			

* Dry/insufficient water to sample

** Bore appeared to be blocked

*** New site – results may not be representative of groundwater conditions at time of sampling due to ongoing well development
- Trigger Levels are not applicable due to non-alluvial bore

Note: An investigation is triggered when the water levels in any **alluvial bores** exceed the 80th percentile and/ or trigger level. Results shown in **bold** indicate that the bore has had a change in standing water level of ± 0.5m from the previous measurement.

Table 8-2 - MPO Quarterly Groundwater pH results

Monitoring Location/ ID	pH Trigger Range		Current Month pH	Nov 2020 pH	Aug 2020 pH	Triggered (Yes/No)
	20 th Percentile	80 th Percentile				
WRA11	6.0	8.5	7.1	7.0	7.0	No

Monitoring Location/ ID	pH Trigger Range		Current Month pH	Nov 2020 pH	Aug 2020 pH	Triggered (Yes/No)
	20 th Percentile	80 th Percentile				
WRA1U	6.0	8.5	*	*	*	No
WRA3L	6.0	8.5	6.9	6.8	6.9	No
WRA3U	6.0	8.5	7.6	7.3	7.5	No
WRA5L	6.0	8.5	7.2	7.1	7.2	No
WRA5U	6.0	8.5	7.2	7.1	7.2	No
WRA6L	6.0	8.5	6.9	6.9	7.0	No
WRA6U	6.0	8.5	7.0	6.8	7.0	No
MPBH1	6.0	8.5	6.9	6.9	7.0	No
MPBH2	6.0	8.5	6.9	6.8	6.8	No
MPBH3b	6.0	8.5	7.7	7.9	8.2	No
MPBH4	6.0	8.5	6.9	6.9	6.8	No
MPBH5	6.0	8.5	*	*	*	-
MPBH1-C***	6.0	8.5	7.5	7.7	7.6	No
MPBH1-HR***	6.0	8.5	7.9	8.4	7.3	No
MPBH2-C***	6.0	8.5	7.3	10.8	10.2	Yes
MPBH2-HR***	6.0	8.5	7.6	8.9	9.2	Yes
MPBH4-C***	6.0	8.5	7.6	8.3	7.5	No
MPBH4-HR***	6.0	8.5	7.4	7.3	7.4	-
MPBH5-C***	6.0	8.5	11.5	11.0	11.5	Yes
MPBH5-HR***	6.0	8.5	7.4	7.4	7.4	No
MPBH6***	6.0	8.5	7.0	7.0	7.0	No
MPBH6-C***	6.0	8.5	7.8	8.0	7.9	No
MPBH6-HR***	6.0	8.5	7.2	7.1	7.2	No
MPBH7***	6.0	8.5	7.3	7.3	7.3	No
MPBH7-C***	6.0	8.5	7.8	7.3	7.6	No
3500C500 (L)	6.0	8.5	7.6	7.6	7.5	No
3500C500 (S)	6.0	8.5	7.4	7.2	7.2	No
4500F000	6.0	8.5	6.9	6.9	6.8	No
5000D000	6.0	8.5	7.4	7.2	7.1	No
5500D000	6.0	8.5	7.1	7.2	7.1	-
6500F500L	6.0	8.5	7.4	7.6	7.4	No
6500F500M	6.0	8.5	7.4	7.5	7.2	No
6500F500U	6.0	8.5	*	*	*	*
6500F625	6.0	8.5	7.0	6.9	6.9	No
Melody	6.0	8.5	6.9	7.0	7.0	No
7500F000	6.0	8.5	7.8	7.9	7.9	No

* Dry/insufficient water to sample

** Bore appeared to be blocked

*** New site - results may not be representative of groundwater conditions at time of sampling due to ongoing well development - indicated no trigger limit identified

An investigation is triggered when pH values are recorded outside the baseline range (20th – 80th percentile) for three consecutive readings. Results outside this range are shown in **bold**.

Results have been rounded in accordance with the In-house method Q4AN(EV)-332-WI3 (pH) and In-house method Q4AN(EV)-332-WI2 (EC).

Table 8-3 - MPO Quarterly Groundwater EC results

Monitoring Location/ ID	EC Trigger Range	Current Month EC	Nov 2020 EC	Aug 2020 EC	Triggered (Yes/No)
	Maximum Beneficial Use Trigger				
WRA1I	7800	3650	3750	4150	No
WRA1U	^	*	*	*	-
WRA3L	22000	16500	15800	15900	No
WRA3U	22000	3350	3050	2350	No
WRA5L	7800	4700	4350	4050	No
WRA5U	7800	4650	4300	4000	No
WRA6L	7800	6750	6650	6800	No
WRA6U	22000	10700	10400	10300	No
MPBH1	800	470	470	460	No
MPBH2	930	770	800	750	No
MPBH3b	7800	4700	4000	4100	No
MPBH4	^	6400	6150	6200	-
MPBH5	^	*	*	*	-
MPBH1-C***	^	530	740	680	-
MPBH1-HR***	^	1750	1400	530	-
MPBH2-C***	^	880	1350	1350	-
MPBH2-HR***	^	840	980	1100	-
MPBH4-C***	^	3650	3750	3450	-
MPBH4-HR***	^	6200	6100	6100	-
MPBH5-C***	^	960	1000	1150	-
MPBH5-HR***	^	880	820	800	-
MPBH6***	^	1200	1200	1300	-
MPBH6-C***	^	7450	6250	7250	-
MPBH6-HR***	^	3800	1900	1350	-
MPBH7***	^	13000	13500	14400	-
MPBH7-C***	^	10500	11000	9900	-
3500C500 (L)	7800	3950	4050	3950	No
3500C500 (S)	7800	5150	4800	4800	No
4500F000	22000	8900	8800	8800	No
5000D000 ¹	800	2000	1250	970	Yes
5500D000	7800	4650	4600	4550	No

Monitoring Location/ ID	EC Trigger Range	Current Month EC	Nov 2020 EC	Aug 2020 EC	Triggered (Yes/No)
	Maximum Beneficial Use Trigger				
6500F500L	7800	3800	3850	3050	No
6500F500M	7800	3000	3050	3800	No
6500F500U	7800	*	*	*	-
6500F625	7800	3750	3550	3350	No
Melody	^	1250	1000	800	No
7500F000	7800	6300	6350	6400	No

* Dry/insufficient water to sample

** Bore appeared to be blocked

*** New site - results may not be representative of groundwater conditions at time of sampling due to ongoing well development

^ indicated no trigger limit identified

An investigation is triggered when EC values recorded exceed the beneficial use quality range (as described in the GWMP) for three successive monitoring rounds. Results outside this range are shown in **bold**.

Results have been rounded in accordance with the In-house method Q4AN(EV)-332-WI3 (pH) and In-house method Q4AN(EV)-332-WI2 (EC).

¹ - Investigation commenced into elevated measurements as per Groundwater Management Plan (MACH Energy, 2019).

The were no elevated measurements during the February 2021 sampling event. The next quarterly monitoring event is scheduled for May 2021.

9. Noise Monitoring

Attended noise monitoring was undertaken during the night period of 4 February 2021 at 6 monitoring locations as per the MPO Noise Management Plan (MACH Energy, 2019) in accordance with DA 92/97 and EPL 20850.

9.1 Results

The results for night time attended noise monitoring for noise generated by MPO in February 2021 against noise criteria is shown in **Table 9-1**; **Table 9-2**; and **Table 9-3**.

Table 9-1 – L_{A1,1min} Generated by MPO: Attended Night Monitoring – 4 February 2021

Location	Start Date and Time	Wind Speed m/s	Stability Class	Criterion dB	Criterion Applies ¹	MPO Only L _{A1,1min} dB ^{2,4}	Exceedance dB ^{3,4}
N-AT1	04/02/2021 23:15	0.9	D	45	Yes	<25	Nil
N-AT2	04/02/2021 22:00	0.9	E	45	Yes	<25	Nil
N-AT3	04/02/2021 23:37	1.1	E	45	Yes	43	Nil
N-AT4	05/02/2021 00:45	1.0	G	45	No	IA	NA
N-AT5	05/02/2021 00:16	0.6	F	45	Yes	IA	Nil
N-AT6	04/02/2021 22:38	0.8	F	45	Yes	IA	Nil

Notes:

- As per Condition L2.3 of EPL 20850, noise emission limits do not apply during wind speeds greater than 3m/s at 10m above ground level, or stability category F temperature inversion conditions and wind speeds greater than 2m/s at 10m above ground level, or stability category G temperature inversion conditions;
- Estimated or measured L_{A1,1minute} attributed to MPO;

3. NA in exceedance column means meteorological conditions outside those specified in Condition L2.3 of EPL 20850 and thus criterion is not applicable; and
4. Bold results indicate exceedance of criteria.
5. IA indicates inaudible noise attributed to MPO.

Table 9-2 – $L_{Aeq,15min}$ Generated by MPO: Attended Night Monitoring – 4 February 2021

Location	Start Date and Time	Wind Speed m/s	Stability Class	Criterion dB	Criterion Applies ¹	MPO Only L_{Aeq} dB ^{2,4}	Exceedance dB ^{3,4}
N-AT1	04/02/2021 23:15	0.9	D	43	Yes	<25	Nil
N-AT2	04/02/2021 22:00	0.9	E	36	Yes	<25	Nil
N-AT3	04/02/2021 23:37	1.1	E	41	Yes	38	Nil
N-AT4	05/02/2021 00:45	1.0	G	42	No	IA	Nil
N-AT5	05/02/2021 00:16	0.6	F	40	Yes	IA	Nil
N-AT6	04/02/2021 22:38	0.8	F	35	Yes	IA	Nil

Notes:

1. As per Condition L2.3 of EPL 20850, noise emission limits do not apply during wind speeds greater than 3m/s at 10m above ground level, or stability category F temperature inversion conditions and wind speeds greater than 2m/s at 10m above ground level, or stability category G temperature inversion conditions;
2. Estimated or measured $L_{Aeq,15minute}$ attributed to MPO;
3. NA in exceedance column means meteorological conditions outside those specified in Condition L2.3 of EPL 20850 and thus criterion is not applicable; and
4. Bold results indicate exceedance of criteria.

Table 9-3 – $L_{Aeq,period}$ Cumulative Noise: Attended Night Monitoring – 4 February 2021

Location	Start Date and Time	Cumulative Noise Criterion L_{Aeq} dB	Measured Mining Only $L_{Aeq,period}$ dB ^{1,2}	Exceedance dB
N-AT1	04/02/2021 23:15	40	32	Nil
N-AT2	04/02/2021 22:00	40	Nil	Nil
N-AT3	04/02/2021 23:37	40	Nil	Nil
N-AT4	05/02/2021 00:45	40	Nil	NA
N-AT5	05/02/2021 00:16	40	Nil	Nil
N-AT6	04/02/2021 22:38	40	Nil	Nil

Notes:

1. These are the results for MPO and all other mining sources. 15-minute measurements have been assumed to apply across the entire night period as a conservative measure and to represent "worst case" results; and
2. By definition, cumulative noise refers to two or more noise sources. If only one other source of mining is audible, or if MPO is inaudible, the measured cumulative noise defined here is 'Nil'.

The purpose of the noise monitoring is to quantify and describe the existing acoustic environment around the mining operation and compare results with relevant limits as per the MPO Noise Management Plan (MACH Energy, 2019). Noise levels from MPO complied with noise limits at all monitoring locations during the monitoring period.

10. Blast Monitoring

There were 5 blast events during February (a total of 12 blasts YTD). Results for February 2021 are presented in **Table 10-1**. All blast results during the February 2021 monitoring period were below the criteria in Schedule 3, Condition 10 of DA 92/97 and EPL 20850 and therefore compliant.

Table 10-1 – MPO Blast Monitoring Results – February 2021

Day & Date Fired	Time Fired	Vibration (mm/s) BVOA	Overpressure (dBL) BVOA	Vibration (mm/s) BVOC	Overpressure (dBL) BVOC	Vibration (mm/s) BVO2	Overpressure (dBL) BVO2	Blast Fume Compliant
Monday 1/02/2021	13:00	0.300	93.6	0.130	88.6	0.440	95.1	Y
Wednesday 3/02/2021	13:00	0.400	95.6	0.270	88.5	0.450	95.7	Y
Saturday 6/02/2021	10:43	0.260	101.2	0.130	89.1	0.300	99.0	Y
Thursday 11/02/2021	1:28	0.290	96.9	0.100	97.3	0.210	97.0	Y
Friday 19/02/2021	12:12	0.570	106.8	0.200	102.6	0.430	102.8	Y
Wednesday 24/02/2021	15:06	0.420	100.1	0.310	102.2	0.390	100.6	Y
Friday 26/02/2021	12:17	0.170	95.9	0.150	87.9	0.370	97.7	Y