

Mount Pleasant Operation Monthly Environmental Monitoring Report

January 2023

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 January 2023
Reporting Period End Date	31 January 2023
Date All Data Received	18 March 2023

Links to two key regulatory documents are provided here:

- [MACH Energy Environment Protection Licence EPL 20850; and](#)
- [Mount Pleasant Operation Development Application Approval DA 92/97.](#)

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.

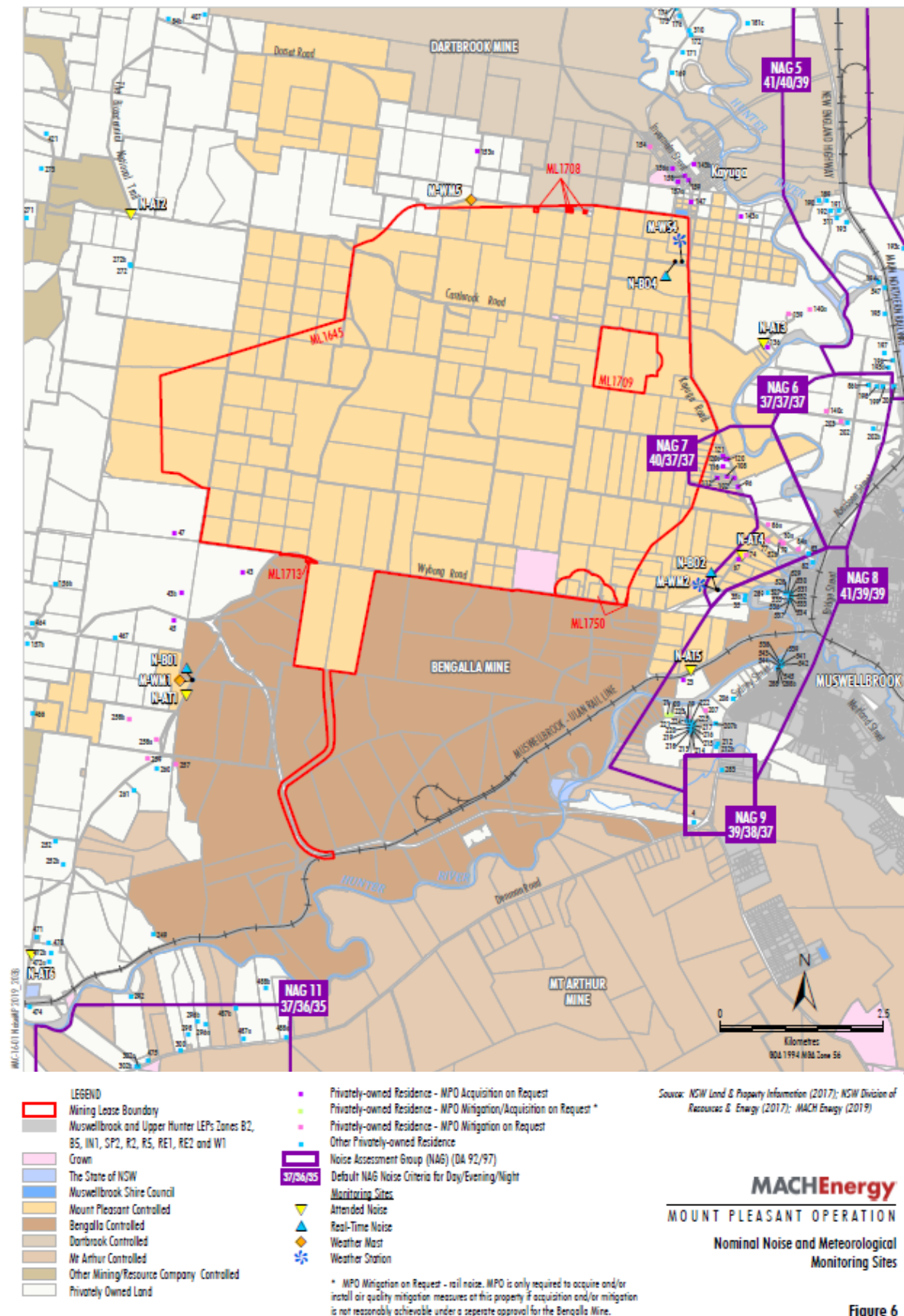


Figure 6

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

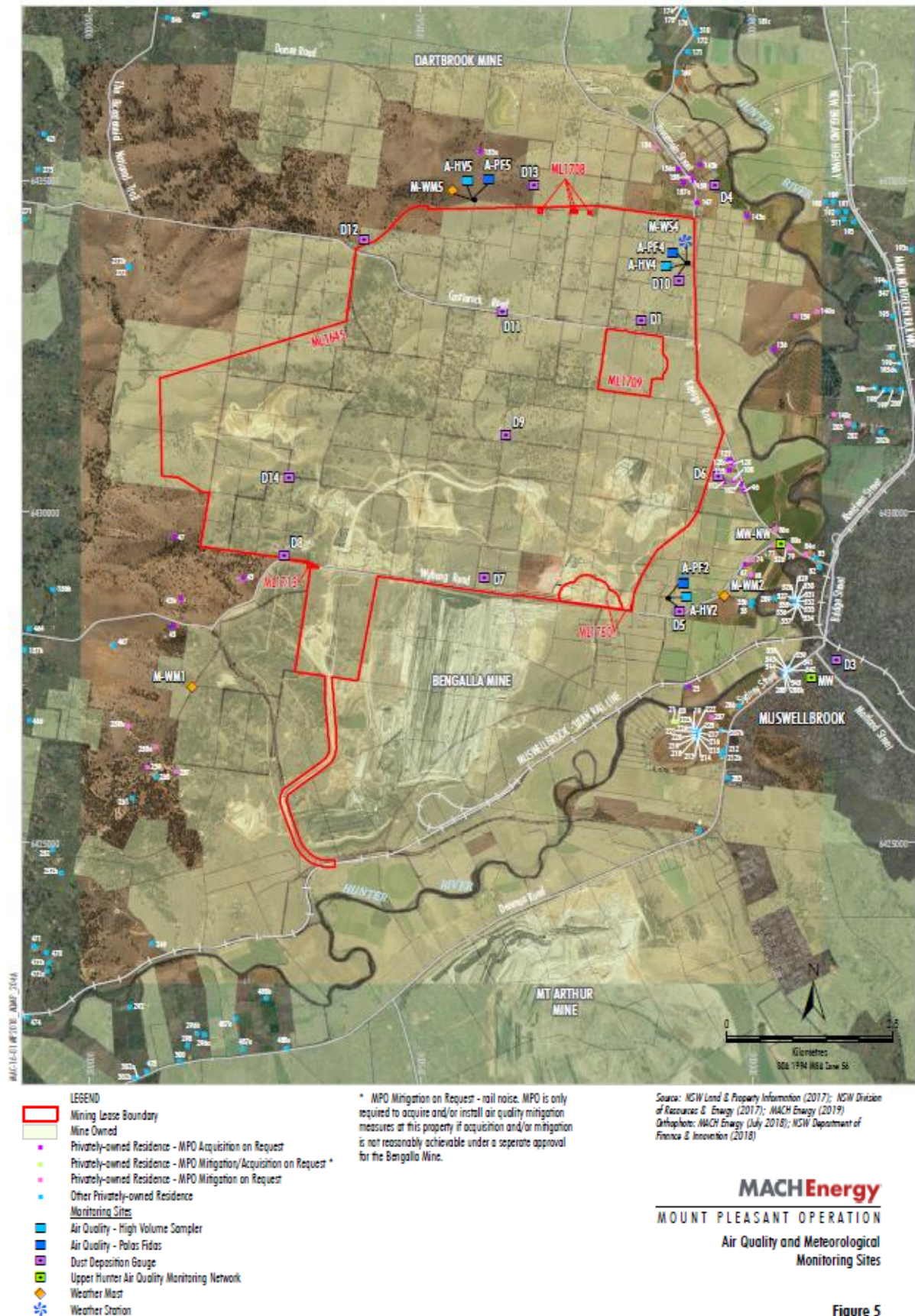


Figure 5

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

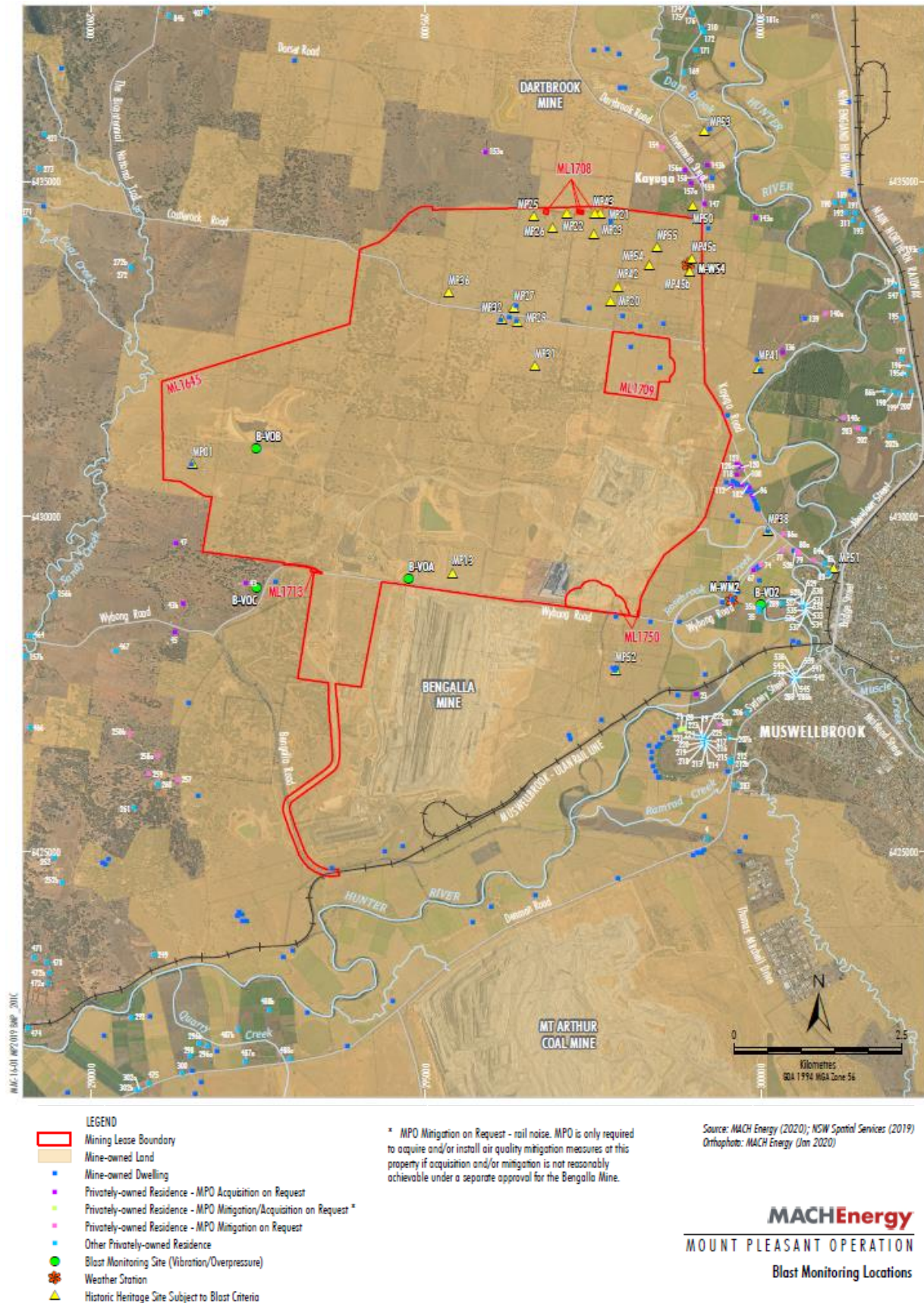
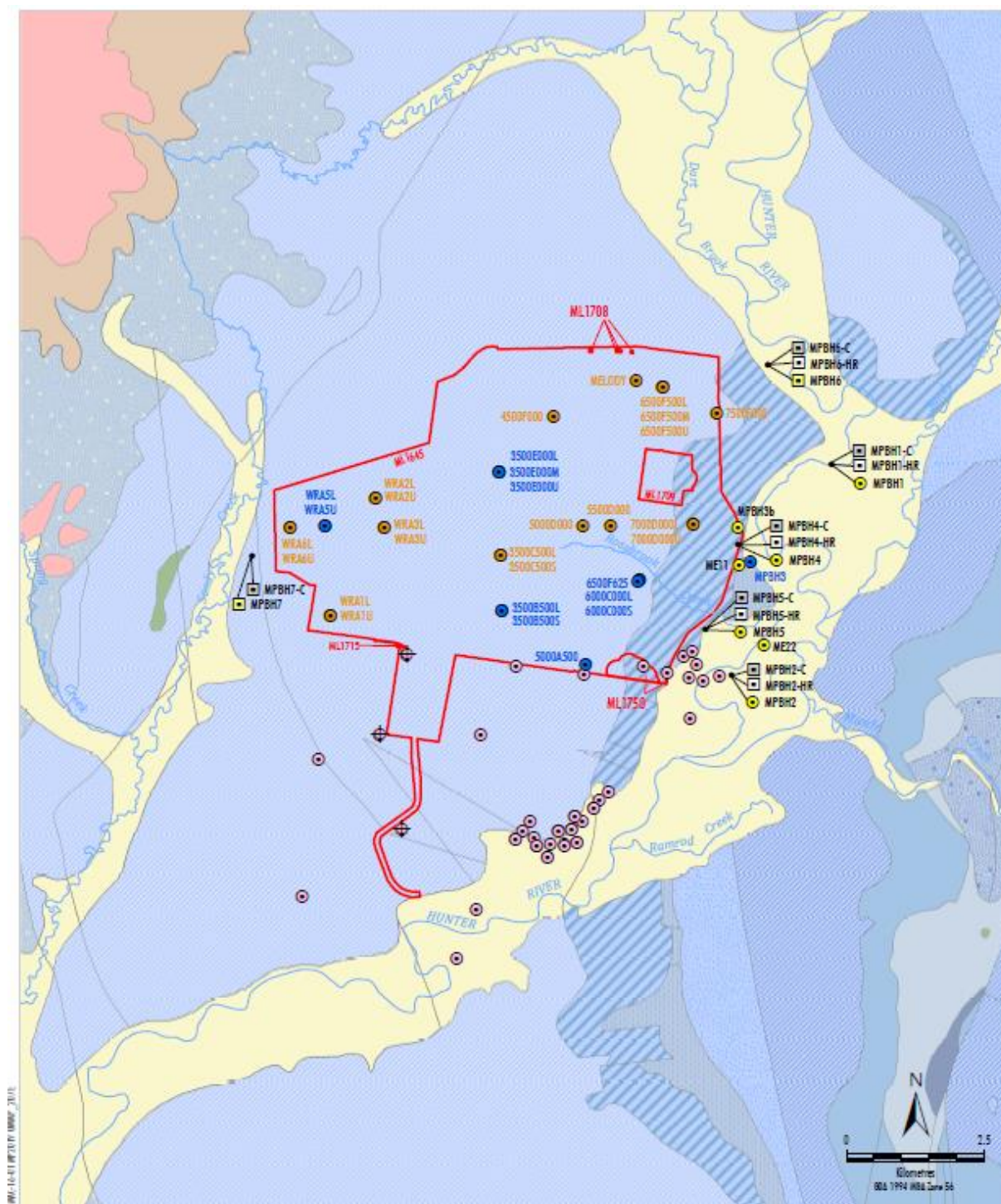


Figure 2-3 – MPO Blast Monitoring Locations



- 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

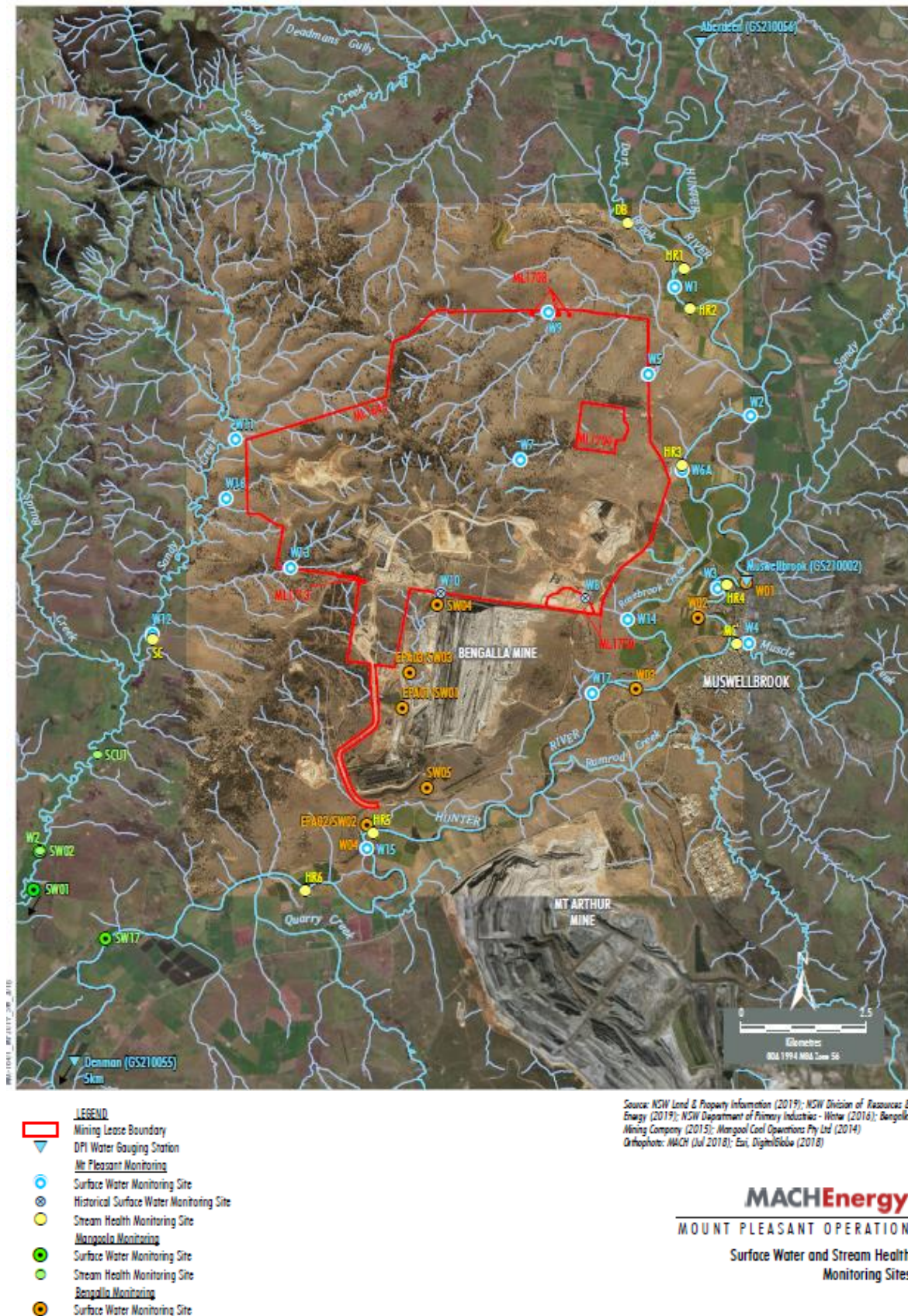


Figure 3

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 (PM₁₀ and PM_{2.5}), the weather stations measure wind speed and direction, temperature (at 2 metres (m) and 10m), temperature inversion (using the sigma theta method), solar radiation, relative humidity, rainfall and atmospheric pressure.

The majority of meteorological data was captured at M-WS2 (100%) during January 2023 (the monitoring period), with the exception of solar radiation parameters (93.7%). The majority of data for this meteorological parameter was captured at M-WS4 (95.1%) during the monitoring period.

Throughout January 2023, there was 60mm and 57.2mm 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 gauges commenced on 15 December 2022. Sample collection was undertaken on 16 January 2023 by AECOM with sample analysis performed by ALS, a National Accreditation and Testing Authority (NATA) accredited laboratory. Results are summarised in **Table 4-1**. Annual rolling averages for January 2023 have been provided as an indication of performance between January 2022 – January 2023 and does not represent annual average results for 2023 as per Schedule 3, Condition 20 of DA 92/97.

Table 4-1: Dust Depositional Results – January 2023

Location	YTD Insoluble Solids (g/m ² .month)	Insoluble Solids Annual Rolling Average (g/m ² .month)
D1	2.0	2.3
D3*	-	-
D4	1.8	1.0
D5a	1.6	2.0
D6	1.4	1.6
D7b	9.3	6.8
D8	3.0	3.1
D9a	3.7	2.4
D10	1.5	1.0
D11	2.3	1.8
D12	0.9	0.6
D13	1.7	1.1
D14	4.7	3.0
Criterion	-	4

Notes:

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

* not in service.

Contaminated results, as described in Section 4.1, are not included in the 12-month rolling average. 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 January sampling event noted that all the gauges contained insects. All January 2023 insoluble solid results were included in the annual rolling average calculations. **Figure 4-1** compares the monthly insoluble solids results to the annual averages for each dust gauge and the assessment criterion.

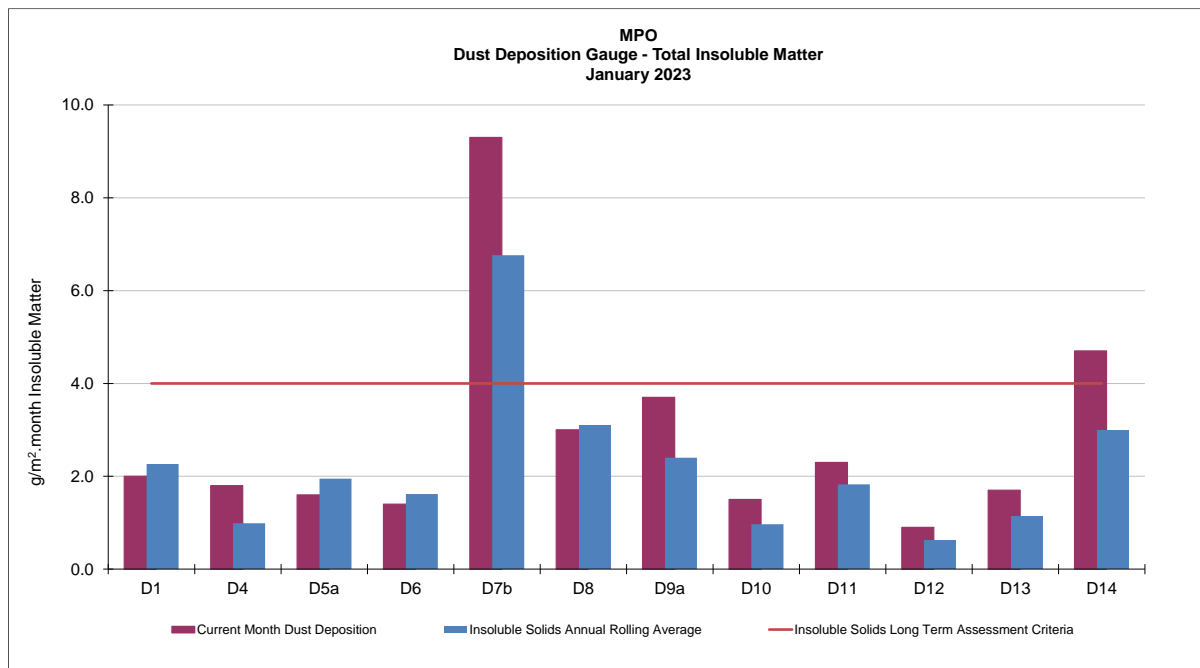


Figure 4-1: MPO Dust Deposition Monthly Results and Annual Rolling Average – January 2023

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 January 2023, sample collection was undertaken by AECOM with sample analysis performed by ALS, a NATA accredited laboratory. TSP results for the monitoring period are

provided in **Table 5-2**. Annual rolling averages for January 2023 have been provided as an indication of performance between January 2022 – January 2023 and do not represent annual average results for 2023 as per Schedule 3, Condition 20 of DA 92/97.

Table 5-2 Total Suspended Particulate Monitoring Data – January 2023

Run Date	Assessment Criterion	TSP $\mu\text{g}/\text{m}^3$		
		HVAS A-PF2	HVAS M-WS4	HVAS A-PF5
5/01/2023	-	37.3	44.7	26.3
11/01/2023	-	49.9	95.2	40.0
17/01/2023	-	32.4	58.1	21.4
23/01/2023	-	48.8	91.8	47.4
29/01/2023	-	55.5	62.8	53.2
Monthly Mean	-	44.8	70.5	37.7
Annual Rolling Average	90	39	31	26

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 $90 \mu\text{g}/\text{m}^3$.

6. Real Time Air Quality Monitoring

Continuous particulate matter less than $10 \mu\text{m}$ (PM_{10}) and particulate matter less than $2.5 \mu\text{m}$ ($\text{PM}_{2.5}$) monitoring was conducted by three Palas Fidas units (one utilised for management only) at MPO during January 2023.

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 January 2023 have been provided in Section 6.2 and 6.4 respectively, as an indication of performance during 2023 as per Schedule 3, Condition 20 of DA 92/97.

6.1 PM_{10} Results – 24 Hour Rolling Average

In accordance with the DA 92/97 limit of $50 \mu\text{g}/\text{m}^3$ for the 24 hour rolling average, there were no elevated readings in January 2023. Real time PM_{10} 24 hour rolling average results for January 2023 are presented in **Table 6-1**.

Table 6-1: MPO Palas Fidas PM₁₀ Data – January 2023

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					
1/01/2023	14	10	16	14	44	50
2/01/2023	18	14	25	19.7	44	50
3/01/2023	21	15	28	27.2	44	50
4/01/2023	20	16	28	23.4	44	50
5/01/2023	11	9	13	10	44	50
6/01/2023	9	8	13	10.7	44	50
7/01/2023	10	9	14	10.6	44	50
8/01/2023	13	11	20	16.8	44	50
9/01/2023	19	14	29	23.6	44	50
10/01/2023	11	11	23	15.1	44	50
11/01/2023	14	11	21	16.2	44	50
12/01/2023	18	15	30	22.2	44	50
13/01/2023	17	13	21	18.5	44	50
14/01/2023	13	11	21	21.4	44	50
15/01/2023	16	13	22	21	44	50
16/01/2023	13	9	16	14.5	44	50
17/01/2023	13	9	17	10.9	44	50
18/01/2023	26	17	32	27	44	50
19/01/2023	13	9	13	11	44	50
20/01/2023	14	10	17	13.4	44	50
21/01/2023	13	10	18	14.3	44	50
22/01/2023	11	8	16	10.9	44	50
23/01/2023	16	13	21	17.7	44	50
24/01/2023	20	15	25	21.8	44	50
25/01/2023	24	16	30	26.1	44	50
26/01/2023	25	16	24	23.7	44	50
27/01/2023	24	17	24	24.9	44	50
28/01/2023	21	14	18	21.1	44	50
29/01/2023	21	14	23	20	44	50
30/01/2023	27	15	20	15.7	44	50
31/01/2023	14	11	17	11.5	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 January 2023.

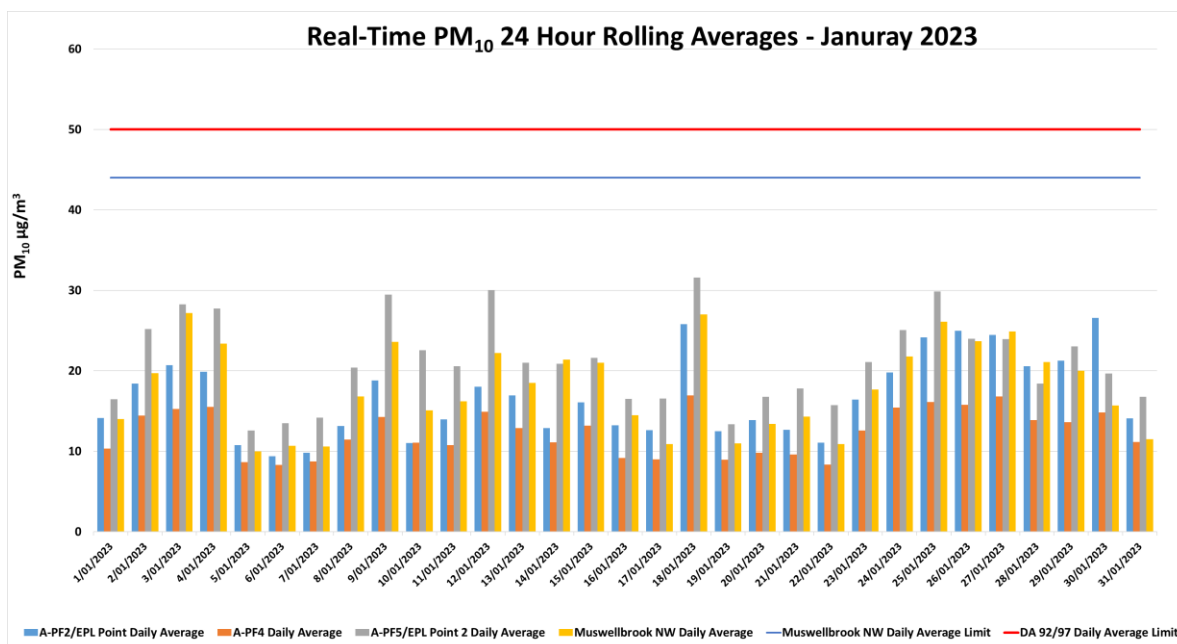


Figure 6-1: Real-time PM₁₀ 24 Rolling Average Results for January 2023.

6.2 PM₁₀ Results – Annual Rolling Average

There were no exceedance of the PM₁₀ annual rolling average reported at MPO during January 2023. Real time PM₁₀ annual rolling averages during the reporting period are presented in **Figure 6-2** below.

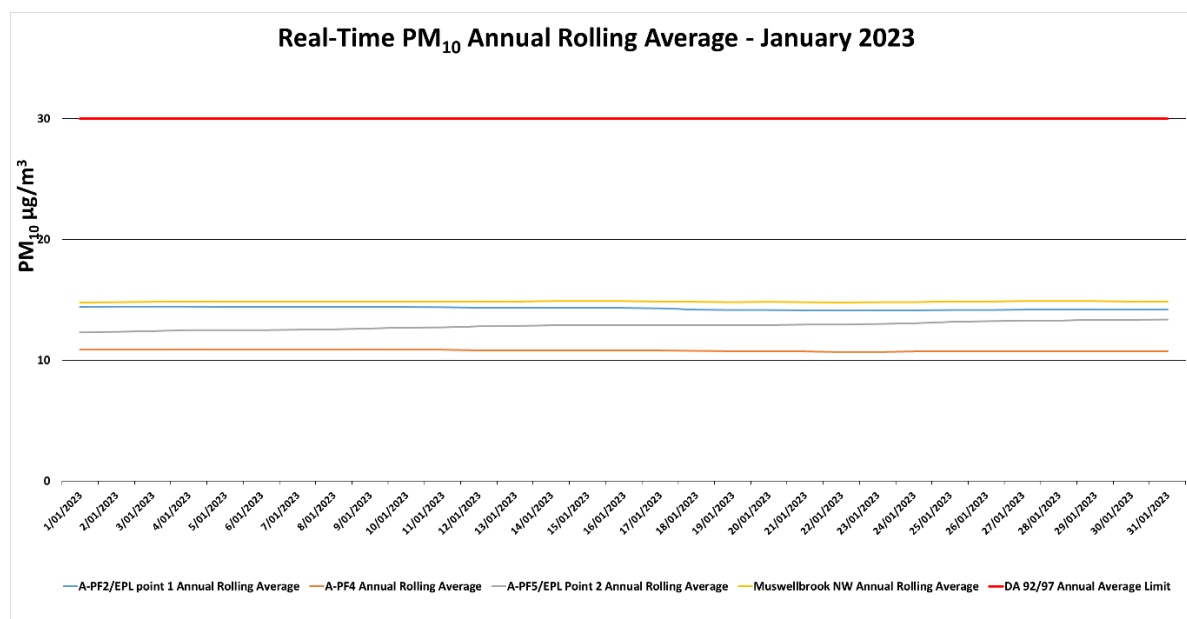


Figure 6-2: Real-time PM₁₀ Annual Rolling Average Results for January 2023.

6.3 PM_{2.5} Results – 24 Hour Rolling Average

There was no exceedance of the PM_{2.5} annual rolling average reported at MPO during January 2023. Real time PM_{2.5} 24 hour rolling average results for January 2023 are presented in **Table 6-2**.

Table 6-2: MPO Palas Fidas PM_{2.5} Data – January 2023

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			
1/01/2023	6	5	6	25
2/01/2023	8	6	8	25
3/01/2023	7	6	7	25
4/01/2023	8	6	8	25
5/01/2023	5	4	4	25
6/01/2023	4	3	4	25
7/01/2023	4	4	5	25
8/01/2023	5	4	6	25
9/01/2023	6	5	6	25
10/01/2023	4	4	5	25
11/01/2023	5	4	5	25
12/01/2023	6	6	7	25
13/01/2023	7	5	7	25
14/01/2023	5	5	6	25
15/01/2023	5	5	6	25
16/01/2023	5	4	5	25
17/01/2023	5	4	5	25
18/01/2023	6	5	6	25
19/01/2023	6	4	5	25
20/01/2023	6	4	6	25
21/01/2023	5	4	5	25
22/01/2023	5	4	5	25
23/01/2023	7	5	7	25
24/01/2023	8	6	7	25
25/01/2023	10	7	10	25
26/01/2023	10	7	8	25
27/01/2023	11	8	9	25
28/01/2023	9	6	7	25
29/01/2023	8	5	7	25
30/01/2023	15	7	8	25
31/01/2023	6	5	5	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 January 2023 are presented in **Figure 6-3** below.

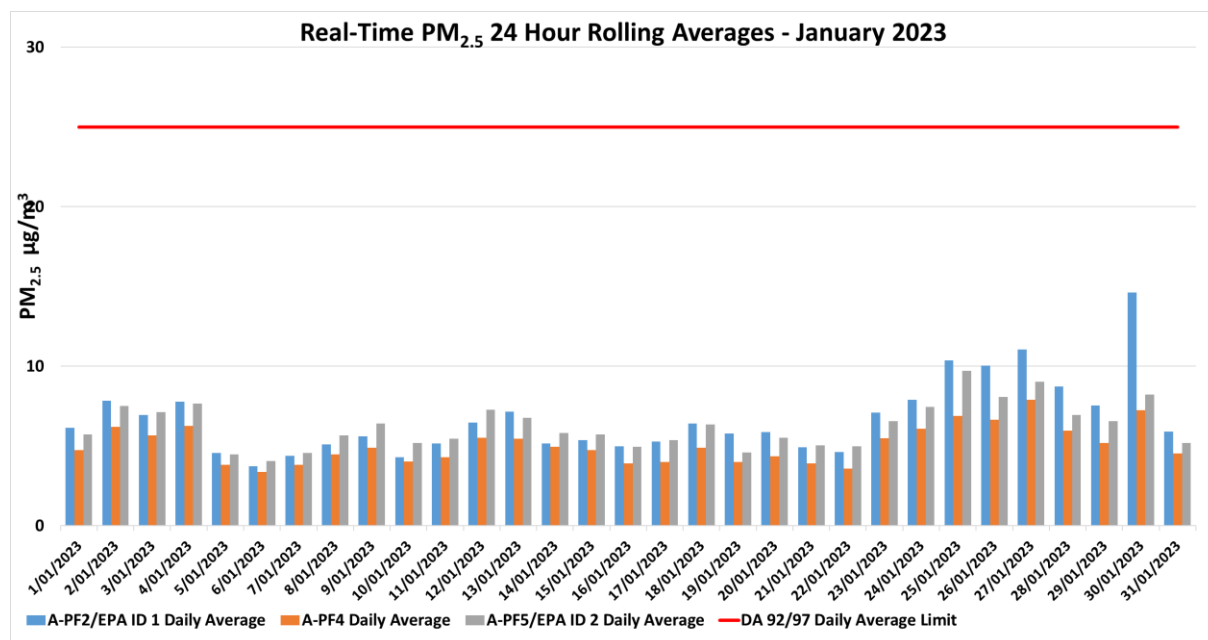


Figure 6-3: Real-time PM_{2.5} 24 hour Rolling Average Results for January 2023.

6.4 PM_{2.5} Results - Annual Rolling Average

There was no exceedance of the PM_{2.5} annual rolling average reported at MPO during January 2023. Real time PM_{2.5} annual rolling averages during the reporting period are presented in **Figure 6-4** below.

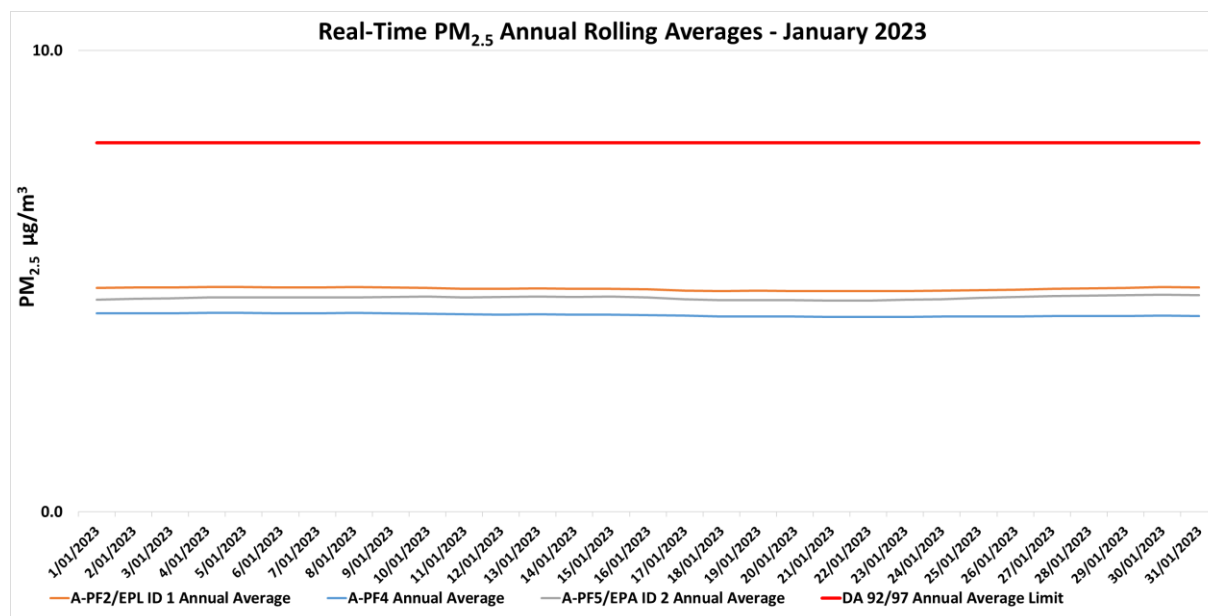


Figure 6-4: Real-time PM_{2.5} Annual Rolling Average Results for January 2023.

7. Surface Water Monitoring

7.1 Methodology

Surface water quality is monitored at 14 sites on a monthly basis, with additional monitoring conducted if triggered by a rain event. A more 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, 2022) 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

Surface water event monitoring was conducted by AECOM on 5 January 2023. Laboratory analysis was performed by ALS NATA accredited laboratory. Monthly monitoring results for pH, EC, TSS and Total Dissolved Solids (TDS) are presented in **Table 7-1**.

Table 7-1 – MPO Monthly Surface Water Monitoring Results – 5 January 2023

Station	pH	Electrical Conductivity (EC) (µs/cm) ¹	Total Dissolved Solids (TDS) (mg/L)	Total Suspended Solids (TSS) (mg/L)
W1	8.0	610	361	11
W2	8.1	700	415	12
W3	8.0	750	450	18
W4	7.7	2200	1350	32
W5	*	*	*	*
W6A	8.0	700	416	32
W9	*	*	*	*
W11	7.9	2850	1580	<5
W12	7.9	4000	2250	8
W13	8.3	4600	2590	13
W14	*	*	*	*
W15	7.9	840	497	25
W16	8.2	7700	4630	15
W17	8.0	830	486	28

Notes:

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

*Dry or insufficient water to sample.

During the January monthly monitoring, three (3) sites were dry or contained insufficient water to sample. All sites were within their respective pH levels and TSS with the exception of W6A, which exceeded their individual TSS trigger values. Three (3) sites – W2, W6A and

W17 - exceeded their EC trigger values. All other sites were within or below their EC respective trigger levels during the monitoring event.

An investigation is triggered if elevated measurements occur for three consecutive sampling events in accordance MPO Water Management Plan (MACH Energy, 2022).

8. Groundwater Monitoring

Quarterly groundwater monitoring was not undertaken in January. The next quarterly monitoring event is scheduled for February 2023.

9. Noise Monitoring

Attended noise monitoring was undertaken during the night period of 25/26 January 2023 at six (6) monitoring locations as per the *MPO Noise Management Plan* (MACH Energy, 2021) 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 January 2023 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 – 25/26 January 2023

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
N-AT1	26/01/2023 0:20	1.7	D	45	Yes	IA	NA
N-AT2	25/01/2023 22:00	3.2	D	45	No	32	NA
N-AT3	25/01/2023 22:30	1.4	F	45	Yes	IA	NA
N-AT4	25/01/2023 22:56	2.6	D	45	Yes	IA	NA
N-AT5	25/01/2023 23:19	1.5	E	45	Yes	IA	NA
N-AT6	25/01/2023 23:55	1.4	E	45	Yes	IA	NA

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;
- NA in exceedance column means meteorological conditions outside those specified in Condition L2.3 of EPL 20850 and thus criterion is not applicable;
- IA = inaudible; and
- Bold results indicate exceedance of criteria.

Table 9-2 – $L_{Aeq,15min}$ Generated by MPO: Attended Night Monitoring – 25/26 January 2023

Location	Start Date and Time	Wind Speed m/s	Stability Class	Criterion dB	Criterion Applies ¹	MPO Only L_{Aeq} dB ^{2,3}	Exceedance dB
N-AT1	26/01/2023 0:20	1.7	D	43	Yes	<25	NA
N-AT2	25/01/2023 22:00	3.2	D	36	No	<25	NA
N-AT3	25/01/2023 22:30	1.4	F	41	Yes	IA	Nil
N-AT4	25/01/2023 22:56	2.6	D	42	Yes	IA	Nil
N-AT5	25/01/2023 23:19	1.5	E	40	Yes	IA	NA
N-AT6	25/01/2023 23:55	1.4	E	35	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 $L_{Aeq,15minute}$ attributed to MPO;
- IA = inaudible; and
- Bold results indicate exceedance of criteria.

Table 9-3 – $L_{Aeq,period}$ Cumulative Noise: Attended Night Monitoring – 25/26 January 2023

Location	Start Date and Time	Cumulative Noise Criterion L_{Aeq} dB	Measured Mining Only $L_{Aeq,period}$ dB ^{1,2}	Exceedance dB
N-AT1	26/01/2023 0:20	40	32	Nil
N-AT2	25/01/2023 22:00	40	Nil	NA
N-AT3	25/01/2023 22:30	40	Nil	Nil
N-AT4	25/01/2023 22:56	40	Nil	Nil
N-AT5	25/01/2023 23:19	40	Nil	Nil
N-AT6	25/01/2023 23:55	40	Nil	Nil

Notes:

- 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
- 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, 2021). Noise levels from MPO complied with noise limits at all monitoring locations during the monitoring period.

10. Blast Monitoring

There were 7 blast events during January (a total of 7 blasts YTD). Results for January 2023 are presented in **Table 10-1**. All blast results during the January 2023 monitoring period were below the criteria in Schedule 3, Condition 10 of DA 92/97 and EPL 20850.

Table 10-1 – MPO Blast Monitoring Results – January 2023

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
Tuesday 3/01/2023	13:12	0.160	95.2	0.180	97.9	0.190	94.7	Y
Friday 6/01/2023	16:45	0.730	112	0.530	103	0.550	96.9	Y
Wednesday 11/01/2023	13:42	0.910	99.8	0.560	106	0.310	98.5	Y
Thursday 12/01/2023	16:55	0.750	108	0.390	108	0.600	11.1	Y
Friday 13/01/2023	13:42	0.020	98.1	0.010	96.2	0.000	90.3	Y
Thursday 19/01/2023	13:34	0.640	96.8	0.610	98	0.610	112	Y
Wednesday 25/01/2023	15:06	1.120	101	0.540	99.6	0.550	111	Y

END OF REPORT