MACHEnergy

Mount Pleasant Operation

Monthly Environmental Monitoring Report

February 2025

1. Introduction

The Mount Pleasant Operation (MPO) is located within 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*), the MPO Development Approval (DA 92/97) and the MPO Development Consent (SSD 10418).

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 and SSD 10418
Reporting Period Start Date	1 February 2025
Reporting Period End Date	28 February 2025
Date All Data Received	23 March 2025

Links to three key regulatory documents are provided here:

- Mount Pleasant Operation Development Application Approval DA 92/97; and
- Mount Pleasant Operation Development Consent SSD 10418.

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 conducted in accordance with *MPO Environmental Monitoring Program* (*EMP*), Project Approval (DA 92/97) and Development Consent (SSD 10418).

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.

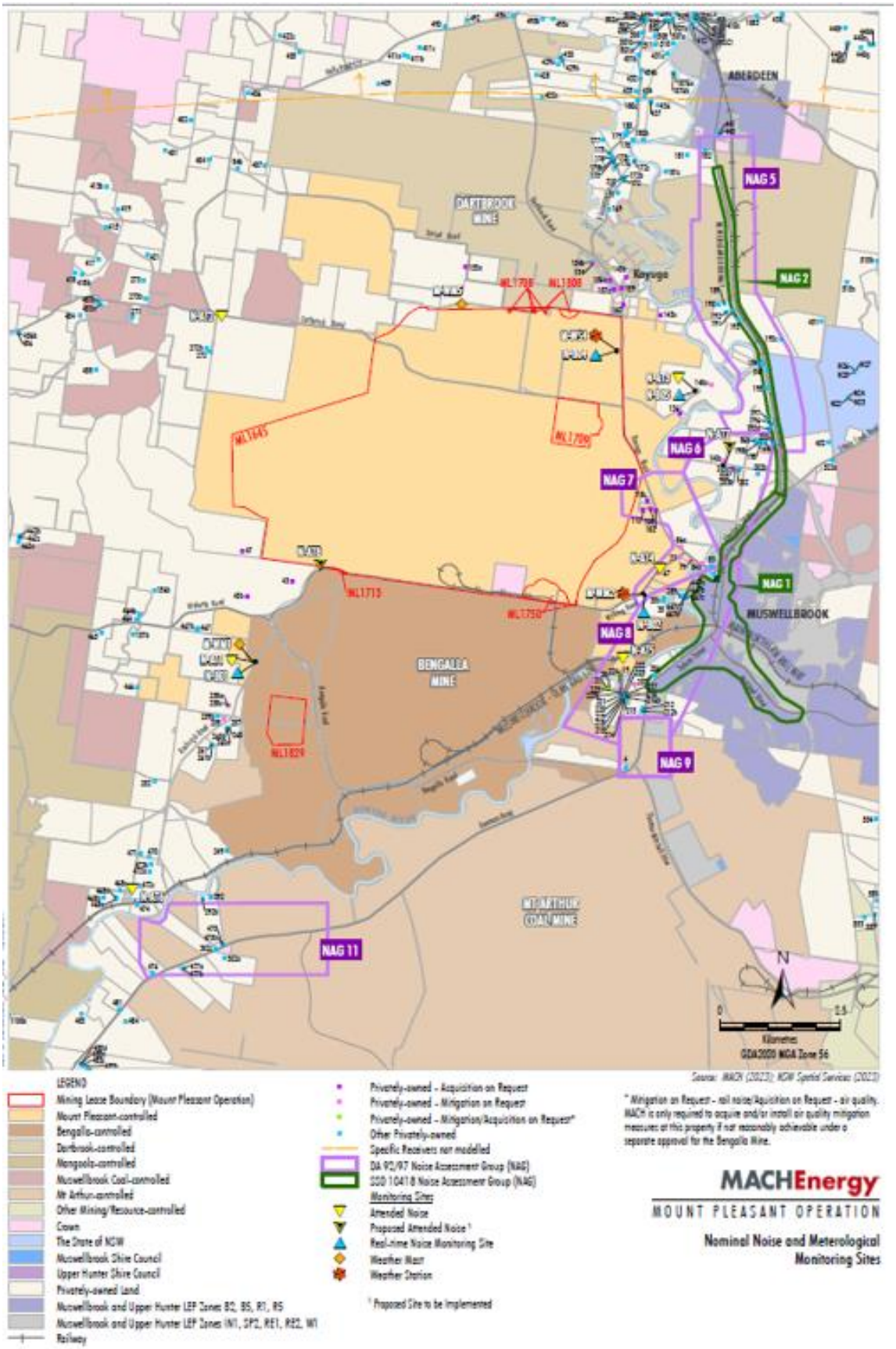


Figure 2-1 – MPO Attended Noise Monitoring Assessment Groups and Locations - Approved (SSD 10418) Water Management Plan

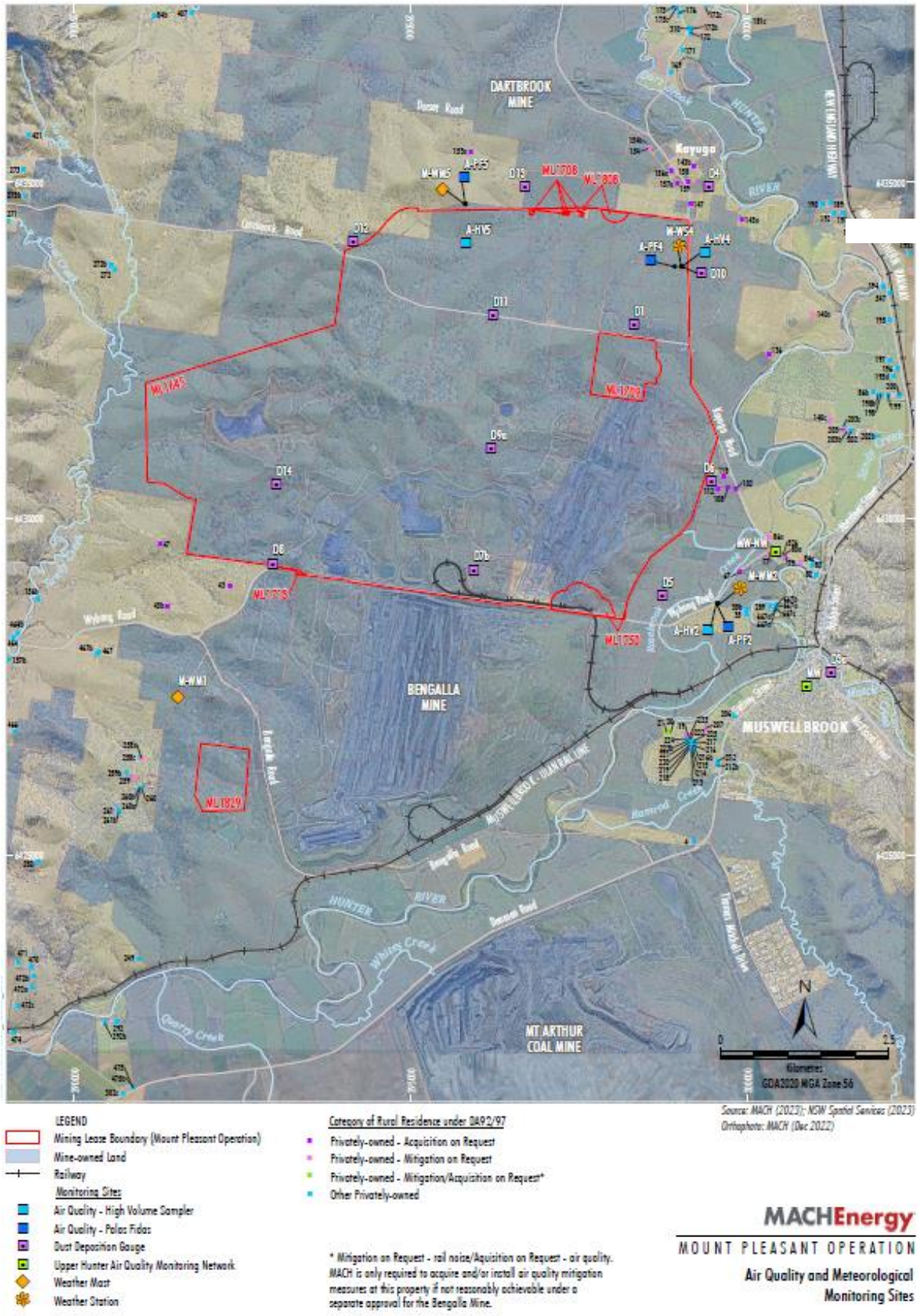


Figure 2-2 – MPO Air Quality and Meteorological Monitoring Network - Approved (SSD 10418) Water Management Plan

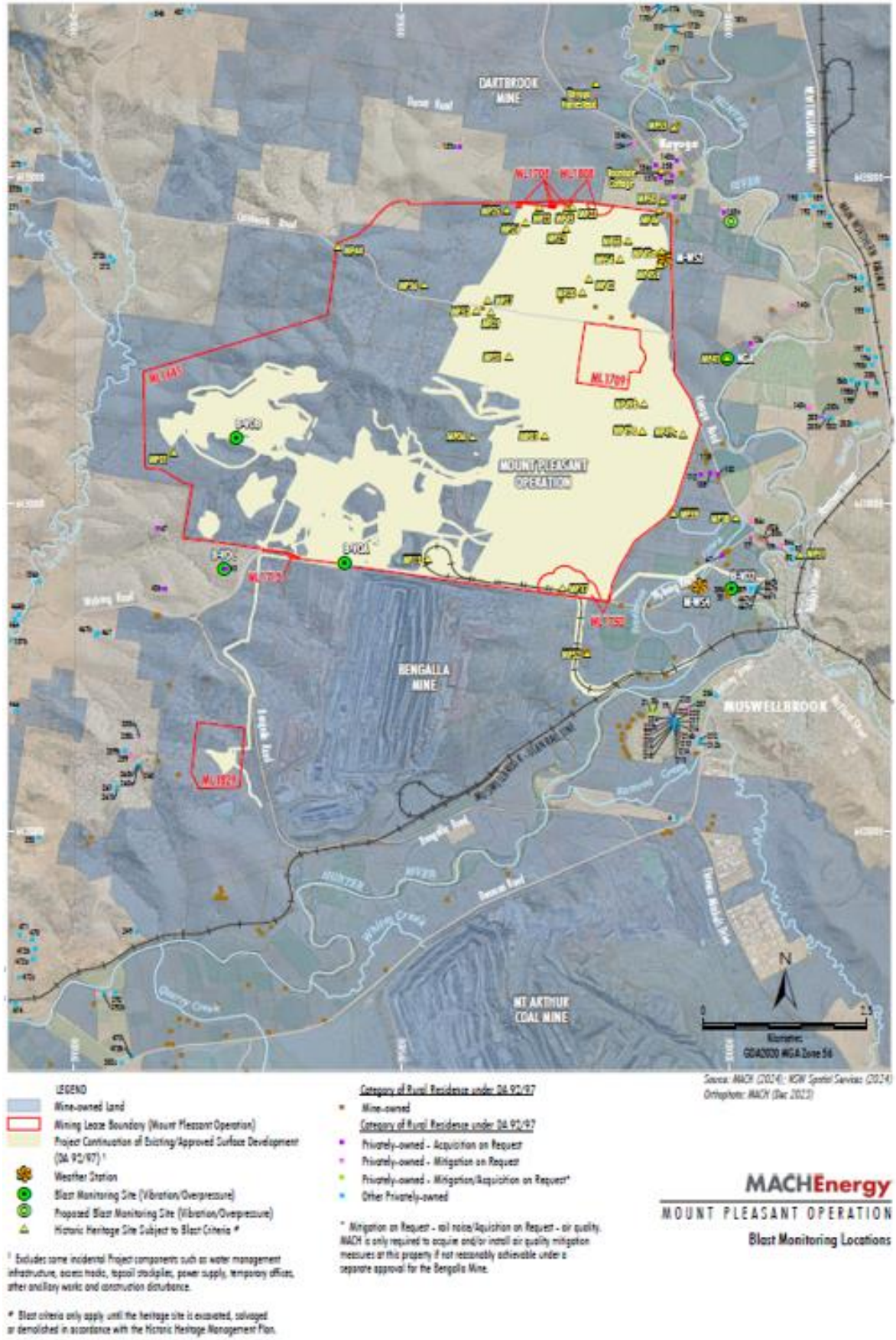


Figure 2-3 – MPO Blast Monitoring Locations

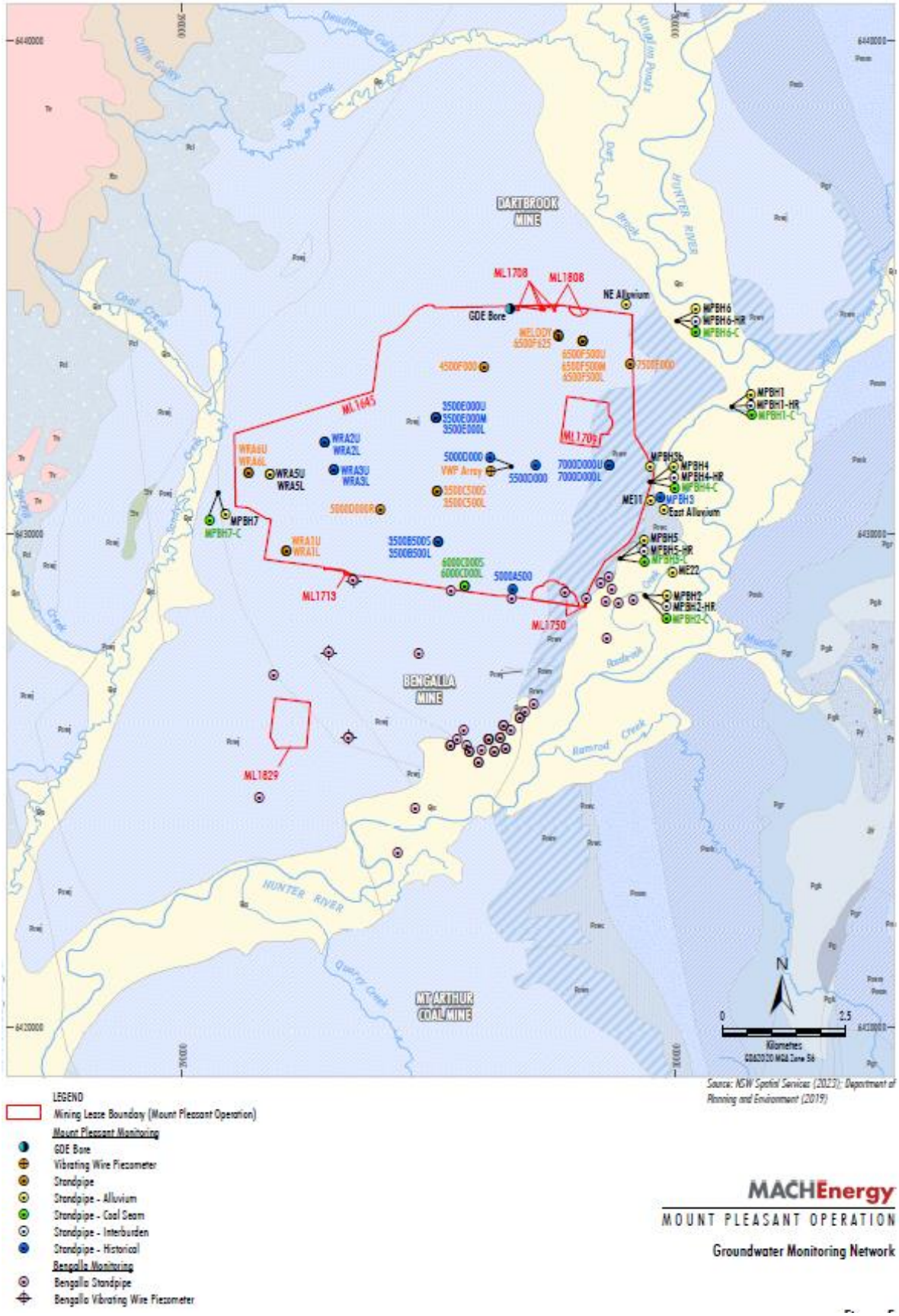


Figure 2-4 – MPO Groundwater Monitoring Network – Approved (SSD 10418) Water Management Plan

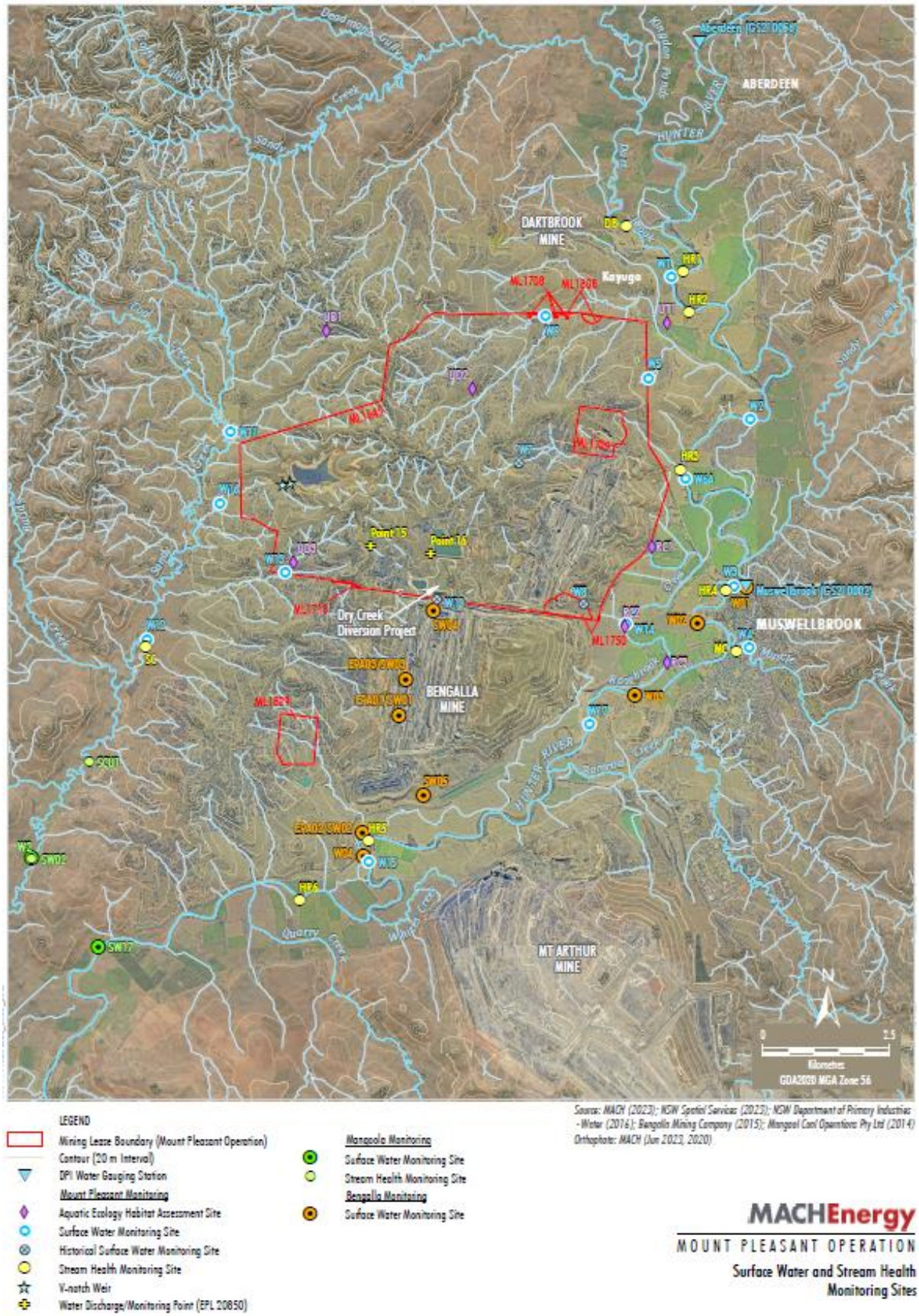


Figure 2-5 – MPO Surface Water Monitoring Network - Approved (SSD 10418) Water Management Plan

3. Meteorological Monitoring

Weather data is measured continuously[1] at the Kayuga Road (M-WS4) and the Wybong Road (M-WS2) meteorological stations. In addition to air quality parameters (particulate matter less than 10 µm and less than 2.5 µm (PM_{10} 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.

Meteorological data was captured at M-WS2 during February 2025 (the monitoring period). An additional monitor (E-BAM) is located at M-WS2 to provide additional capture for air quality. Additional meteorological data was collected at M-WS4.
Throughout February 2025, there was 46.2mm and 53mm 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. AECOM determines a gauge sample 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 an elevated level of organic matter) and field notation that bird droppings or insects were present is likely to be considered contaminated.

While the new SSD 10418 doesn't explicitly mention dust deposition gauges, there's a notable shift in regulations towards embracing high volume air sampler results and continuous air quality monitoring programs, with a specific focus on total particulate matter, PM_{10}, and $PM_{2.5}$. These modern monitoring techniques offer a more comprehensive approach to environmental surveillance, furnishing real-time data and insights into air quality conditions. By harnessing these advanced methods, MPO can ensure the implementation of robust monitoring practices, effectively supplanting the older dust deposition gauges. This transition from the previous development consent DA92/97 (which is yet to be surrendered) to SSD 10418 signifies a proactive measure towards upholding environmental compliance. Therefore, Dust Depositional Monitoring will continue to be included in monthly reporting as per DA92/97 up until surrender where it will be discontinued.

[1] The EPA's Ambient air monitoring guidance note (Guidance Note) states that after allowing sufficient down time for routine maintenance and calibrations a continuous monitoring system should be able to achieve at least a 95% availability.

4.2 Results

The dust deposition exposure period for gauges commenced on 29 January 2025. Sample collection was undertaken on 27 February 2025 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 February 2025 have been provided as an indication of performance between March 2024 – February 2025 and represents 12month average results as per Schedule 3, Condition 20 of DA 92/97 and Schedule 2, Condition B28 of SSD 10418.

Table 4-1: Dust Depositional Results – February 2025

Location	YTD Insoluble Solids (g/m^2.month)	Insoluble Solids Annual Rolling Average (g/m^2.month)
D1	3.2	2.4
D3	3.6	3.6
D4	1.5	1.1
D5a	1.9	2.1
D6	1.8	1.9
D7b	8.5	9.2
D8	6.3	4.8
D9a	5.9	3.7
D10	1.2	1.1
D11	3.8	3.3
D12	2.5	1.1
D13	3.2	1.7
D14	5.7	3.5
Criterion	-	4

Notes:
*Results in **bold** indicate an elevated measurement of adopted assessment criteria.*
** Insufficient monthly results to calculate annual average*

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, D9 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 sampling event noted that all thirteen gauges contained insects, nine also contained vegetation, one contained bird droppings. Annual average dust deposition results were below the annual average criterion of 4 g/m2.month at all sites except D7b (9.2 g/m2) and D8 (4.8 g/m2).

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

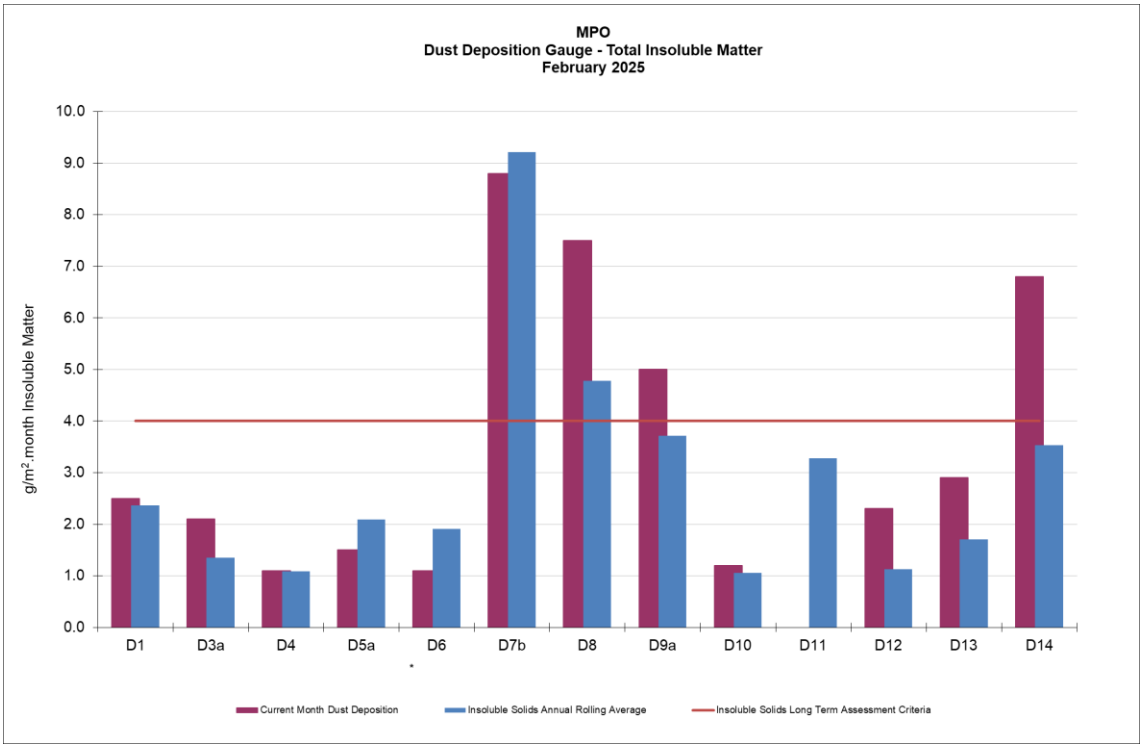


Figure 4-1: MPO Dust Deposition Monthly Results and Annual Rolling Average – February 2025

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), Project Approval DA 92/97 and Development Consent SSD 10418. The DA 92/97 and SSD 10418 both specify an annual average project contribution plus background criterion of 90 µg/m^3.

5.2 Results

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**. Twelve month rolling averages to February 2025 is provided as an indication of performance between March 2024 – February 2025 as per Schedule 3, Condition 20 of DA 92/97 and Schedule 2, Condition B28 of SSD 10418.

Table 5-2 Total Suspended Particulate Monitoring Data – February 2025

Run Date	Assessment Criterion	TSP µg/m^3		
		HVAS A-PF2	HVAS A-PF5	HVAS M-WS4
5/02/2025	-	29.2	59.9	51.8
11/02/2025	-	16.4	30.7	26.8
17/02/2025	-	44.9	95.6	54.3
23/02/2025	-	82.5	91.8	54.7
*Monthly Mean	-	43.2	69.5	46.9
Annual Rolling Average	90	46	45	36

Notes:
** Results have been rounded to one decimal place for reporting purposes where applicable.*
^ Indicates makeup run results for run date 11/11/2024.

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/m^3.

6. Real Time Air Quality Monitoring

Continuous particulate matter less than 10 µm (PM_{10}) and particulate matter less than 2.5 µm ($PM_{2.5}$) monitoring was conducted by three Palas Fidas units (one utilised for management only) at MPO during February 2025.

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 $PM_{2.5}$ 12-month rolling averages to February 2025 have been provided in Section 6.2 and 6.4 respectively, as an indication of performance during the last 12 month as per Schedule 3, Condition 20 of DA 92/97 and Schedule 2, Condition B28 of SSD 10418.

6.1 PM_{10} Results – 24 Hour Rolling Average

In accordance with the DA 92/97 and SSD 10418 limit of 50 µg/m^3 for the 24-hour daily average, there were no elevated readings in February 2025. Real time PM_{10} 24 hour daily average results for February 2025 are presented in **Table 6-1.**

Table 6-1: MPO Palas Fidas PM_{10} Data – February 2025

Date	A-PF2/EPA ID 1	A-PF4	A-PF5/EPA ID 2	Muswellbrook NW	A-PF2, A-PF4, A-PF5 24 Hour Average Limit (µg/m^3)
	24-hour Average Result				
1/02/2025	12.93	10.67	13.04	13.04	50
2/02/2025	13.85	11.68	15.17	15.17	50
3/02/2025	12.85	10.65	17.49	17.49	50
4/02/2025	16.83	14.14	21.03	21.03	50
5/02/2025	20.43	16.02	17.13	17.13	50
6/02/2025			27.74	27.74	50
7/02/2025	15.86		18.49	18.49	50
8/02/2025	16.17		22.66	22.66	50
9/02/2025	18.41		19.46	19.46	50
10/02/2025	23.35		23.21	23.21	50
11/02/2025	15.44		15.64	15.64	50
12/02/2025	12.57		14.05	14.05	50
13/02/2025	13.00	11.74	14.98	14.98	50
14/02/2025	15.84	13.44	23.52	23.52	50
15/02/2025	16.04	13.12	14.40	14.40	50
16/02/2025	22.45	16.33	11.31	11.31	50
17/02/2025	16.67	21.51	23.59	23.59	50
18/02/2025	17.25	14.58	22.50	22.50	50
19/02/2025	21.99	18.39	26.03	26.03	50
20/02/2025	21.28	16.23	26.66	26.66	50
21/02/2025	20.93	14.09	19.82	19.82	50
22/02/2025	19.06	13.37	16.73	16.73	50
23/02/2025	19.99	14.79	18.87	18.87	50
24/02/2025	25.42	14.31	13.46	13.46	50
25/02/2025	31.00	20.59	21.20	21.20	50
26/02/2025	22.20	15.46	18.59	18.59	50
27/02/2025	22.17	18.49	26.63	26.63	50
28/02/2025	22.77	19.74	26.95	26.95	50

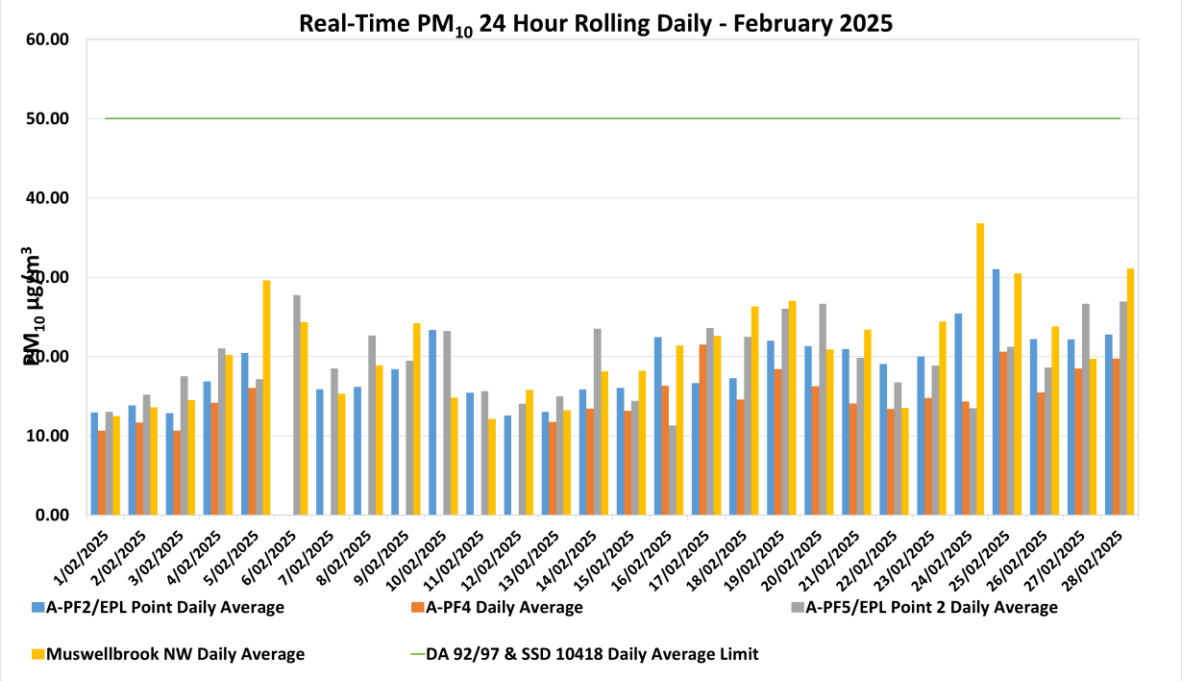
Notes:
*Results in **bold** indicate elevated readings during adverse weather conditions.*
Results with "- "indicate dates where data was affected by maintenance or servicing (scheduled and unscheduled)

Figure 6-1 below shows the results of real-time PM_{10} 24 hour daily average results at MPO air quality monitoring sites February 2025.

Figure 6-1: Real-time PM_{10} 24 Daily Average Results for February 2025.

6.2 PM_{10} Results – Annual Rolling Average

There was no exceedance of the PM_{10} annual rolling average reported at MPO during February 2025. Real time PM_{10} annual rolling averages during the reporting period are presented in **Figure 6-2** below.



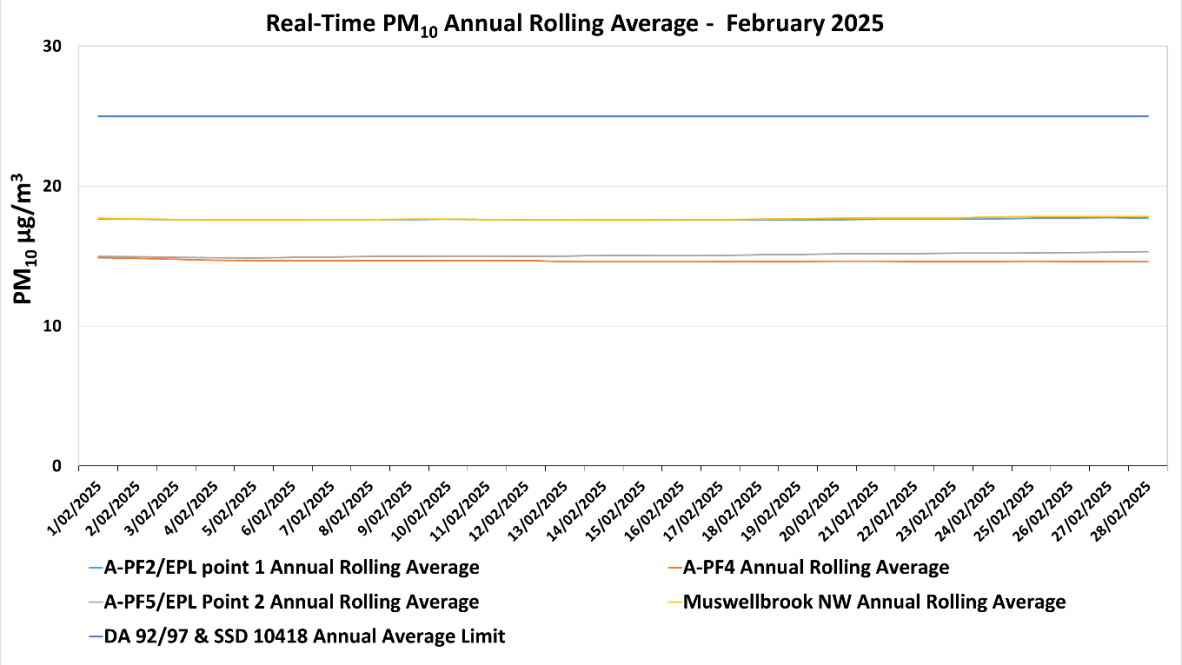


Figure 6-2: Real-time PM_{10} Annual Rolling Average Results for February 2025.

6.3 $PM_{2.5}$ Results – 24 Hour Daily Average

There was no exceedance of the $PM_{2.5}$ annual rolling average reported at MPO during February 2025. Real time $PM_{2.5}$ 24 hour rolling average results for Februaryy 2025 are presented in **Table 6-2.**

Table 6-2: MPO Palas Fidas $PM_{2.5}$ Data – February 2025

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			
1/02/2025	4.81	4.72	4.89	25
2/02/2025	4.94	4.78	5.00	25
3/02/2025	4.41	4.11	4.79	25
4/02/2025	4.95	4.60	5.27	25
5/02/2025	5.38	4.54	6.10	25
6/02/2025			11.50	25
7/02/2025	6.67		7.12	25
8/02/2025	5.41		5.90	25
9/02/2025	6.83		6.74	25
10/02/2025	10.54		9.89	25
11/02/2025	6.06		5.82	25
12/02/2025	5.47		5.49	25
13/02/2025	5.55	5.45	5.72	25
14/02/2025	5.32	4.93	6.02	25
15/02/2025	5.29	4.70	4.74	25
16/02/2025	5.41	4.29	3.67	25
17/02/2025	4.39	4.94	5.27	25
18/02/2025	5.13	4.77	6.15	25
19/02/2025	5.64	5.10	7.00	25
20/02/2025	5.40	4.89	6.97	25
21/02/2025	5.91	5.24	6.42	25
22/02/2025	6.06	5.58	6.63	25
23/02/2025	5.27	4.87	5.96	25
24/02/2025	5.90	4.71	5.37	25
25/02/2025	8.70	7.66	8.42	25
26/02/2025	6.95	6.18	7.28	25
27/02/2025	6.77	6.15	8.05	25
28/02/2025	6.29	5.71	7.55	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 2025 are presented in **Figure 6-3** below.

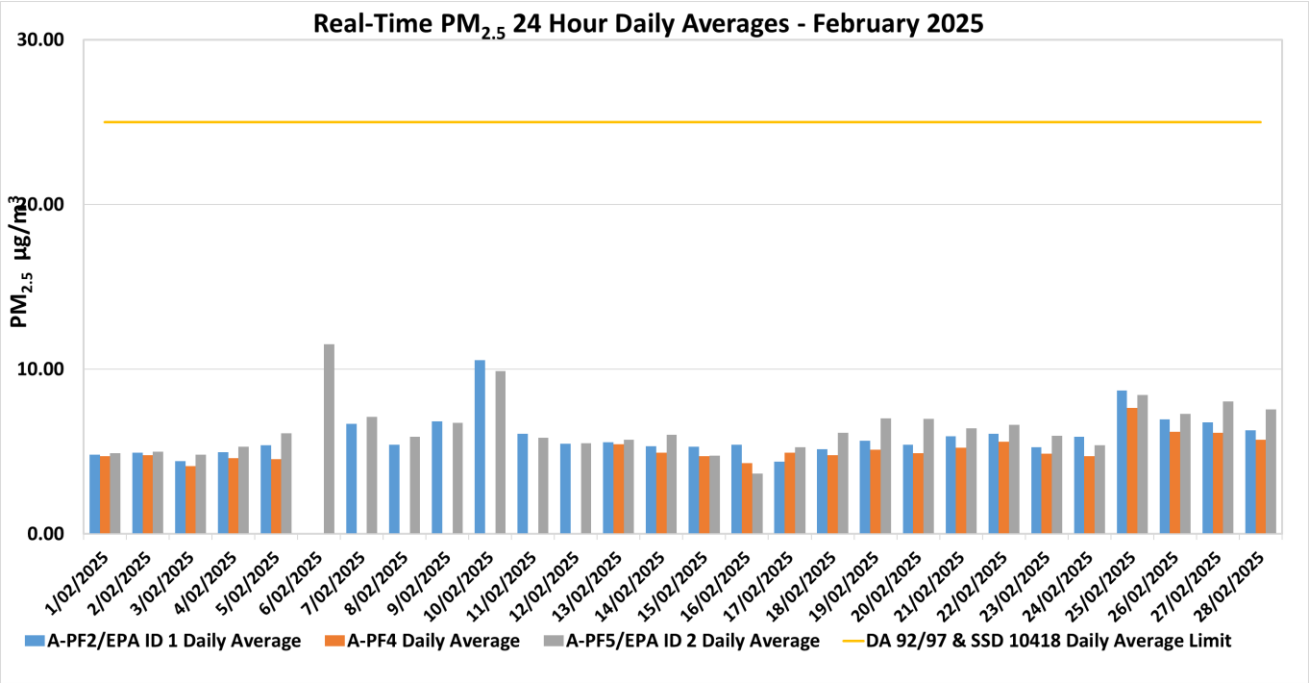


Figure 6-3: Real-time $PM_{2.5}$ 24 hour Daily Average Results for February 2024.

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 February 2025. Real time $PM_{2.5}$ annual rolling averages during the reporting period are presented in **Figure 6-4** below.

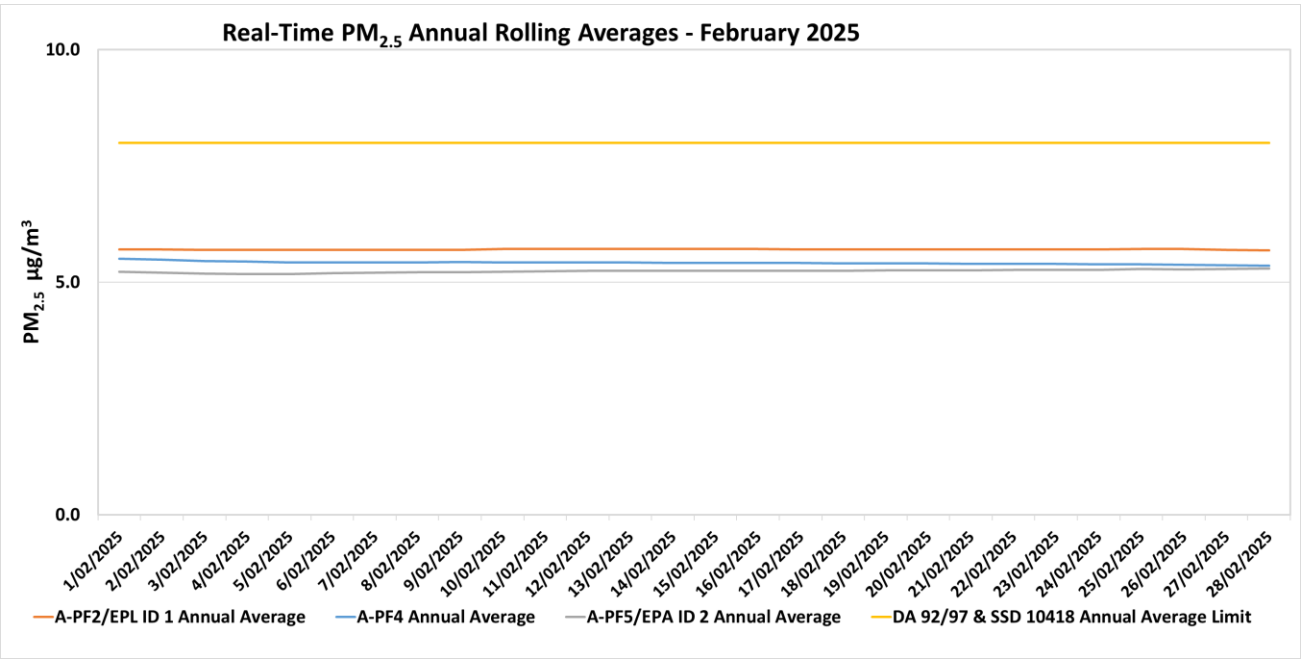


Figure 6-4: Real-time $PM_{2.5}$ Annual Rolling Average Results for February 2025.

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, 2024) 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 monitoring was conducted by AECOM on 12 February 2025. 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 – 12 February 2025

Station	pH	Electrical Conductivity (EC) (µs/cm)[1]	Total Dissolved Solids (TDS) (mg/L)	Total Suspended Solids (TSS) (mg/L)
W1	8.0	**558**	300	13
W2	7.9	**811**	450	9.5
W3	8.1	648	350	16
W4	7.7	1870	1100	9
W5	*	*	*	*
W6A	8.2	**793**	460	17
W9	*	*	*	*
W11	**8.4**	3610	2000	< 5
W12	8.1	5070	2800	12
W13	8.2	2910	1700	16
W14	*	*	*	*
W15	**8.3**	**881**	450	**49**
W16	8.3	4910	2800	18
W17	7.4	**773**	420	30

*Note: Results in **bold** indicate exceedances of adopted assessment criteria.*
**Dry or insufficient water to sample.*
*** No access due to track conditions.*
[1] Results have been rounded in accordance with the In-house method Q4AN(EV)-332-WI2 (EC).

During 12 February 2025 monitoring event, three (3) sites were dry. Sites W1, W2, W6A, W15 and W17 were above their respective EC trigger levels. Sites W11 and W15 were above their respective pH trigger levels. Sites W15 was above the TSS trigger level.

Site W6A was above the respective EC trigger level for five consecutive monitoring events during the last monthly environmental report (January 2024) and continues to be above trigger levels for February 2025.

In accordance with the MPO Water Management Plan (WMP) Table 26 (MACH Energy, 2024) if a water quality indicator at a potential impact monitoring location or at a downstream receiving water monitoring location is above (or outside the range) of the site-specific trigger value for three consecutive sampling events an investigation is required.

Site W6A continued to exceed the respective EC trigger level (520 µS/cm) for February 2025); however, according to Table 26 of the WMP no further investigation is required as the upstream site W2 (Hunter River reference site) was also found to be exceeding trigger levels.

8. Groundwater Monitoring

Quarterly groundwater monitoring was conducted between 18, 20 and 26 of February 2025. 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		February 2025 Water Level (DTW)	Nov 2024 Water Level (DTW)	August 2024 Water Level (DTW)	Triggered (Yes/No)
	80th Percentile (DTW)	Trigger				
WRA1L	-	>± 0.5m	2.44	1.98	3.37	
WRA1U	-	>± 0.5m	*	*	*	
WRA3L-R**	-	>± 0.5m	*	-	-	
WRA3U-R**	-	>± 0.5m	*	-	-	
WRA5L-R**	-	>± 0.5m	*	-	-	
WRA5U-R**	-	>± 0.5m	*	-	-	
WRA6L	-	>± 0.5m	0.37	0.36	0.12	
WRA6U	-	>± 0.5m	0.91	0.88	0.75	
MPBH1	9.71	10.70	9.72	9.74	9.37	No
MPBH2	12.20	13.59	11.82	11.74	11.64	No
MPBH3b	13.04	Dry (or 14.0m)	11.89	11.83	11.81	No
MPBH4	-	>± 0.5m	12.19	12.09	12.19	
MPBH5	-	>± 0.5m	*	*	*	
MPBH1-C	-	>± 0.5m	9.623	9.623	9.203	
MPBH1-HR	-	>± 0.5m	32.22	34.69	38.34	

Monitoring Location/ ID	Water Level Trigger Range		February 2025 Water Level (DTW)	Nov 2024 Water Level (DTW)	August 2024 Water Level (DTW)	Triggered (Yes/No)
	80th Percentile (DTW)	Trigger				
MPBH2-C	-	>± 0.5m	11.833	11.743	11.643	
MPBH2-HR	-	>± 0.5m	11.856	11.756	11.686	
MPBH4-C	-	>± 0.5m	10.913	10.843	10.793	
MPBH4-HR	-	>± 0.5m	49.875	49.895	50.036	
MPBH5-C	-	>± 0.5m	11.479	11.359	11.669	
MPBH5-HR	-	>± 0.5m	11.52	11.42	11.34	
MPBH6	-	>± 0.5m	9.44	9.41	9.25	
MPBH6-C	-	>± 0.5m	10.848	10.838	11.048	
MPBH6-HR	-	>± 0.5m	10.355	10.295	10.195	
MPBH7	10.1	>± 0.5m	5.29	4.95	4.42	No
MPBH7-C	-	>± 0.5m	17.435	17.66	15.045	
3500C500L	-	>± 0.5m	25.98	25.79	25.65	
3500C500S	-	>± 0.5m	**25.08**	24.73	24.53	
4500F000	-	>± 0.5m	22.34	^	21.58	
5000D000-R	-	>± 0.5m	138.43	138.21	138.23	
5500D000	-	>± 0.5m	Removed	40.94	40.49	
6000C000L-R**	-	>± 0.5m	*	*	-	
6000C000U-R**	-	>± 0.5m	*	*	-	
6500F500L	-	>± 0.5m	50.48	50.46	49.69	
6500F500M	-	>± 0.5m	**52.49**	**51.35**	50.67	
6500F500U	-	>± 0.5m	31.8	31.92	32.22	
6500F625	-	>± 0.5m	16.1	16.04	15.93	
Melody	-	>± 0.5m	13.1	13.05	12.81	
7500F000	-	>± 0.5m	**36.68**	35.98	35.79	
GDE Bore Shallow**	-	>± 0.5m	*	*	-	
GDE Bore Deep**	-	>± 0.5m	10.86	10.67	-	
NE Alluvium**	-	>± 0.5m	^	^	-	
East Alluvium**	-	>± 0.5m	*	*	-	

Results in **bold** indicate that the bore has exceeded the adopted assessment criterion for changes in standing water level from the previous measurement.
* Dry/insufficient water to sample.
**New site.
^Unsafe access.

Table 8-2 - MPO Quarterly Groundwater pH Results

Monitoring Location/ ID	pH Trigger Range		Feb 2025 pH	Nov 2024 pH	Aug 2024 pH	Triggered (Yes/No)
	Lower	Upper				
WRA1L	6.0	8.5	7.1	7.1	7.2	No
WRA1U			*	*	*	-
WRA3L-R**			7.5	7.6	-	-
WRA3U-R**			*	*	-	-
WRA5L-R**			6.9	7.1	-	-
WRA5U-R**			7.5	7.5	-	-
WRA6L			7	7	7	No
WRA6U			6.9	6.9	6.7	No
MPBH1			7	7	7.1	No
MPBH2			6.9	6.8	7	No
MPBH3b			7.4	7.8	7.8	No
MPBH4			6.9	7	6.9	No
MPBH5			*	*	*	-
MPBH1-C			**8.7**	**8.7**	7.9	**Yes**
MPBH1-HR			8	8	8.1	No
MPBH2-C			**10.2**	7.7	8.2	**Yes**
MPBH2-HR			8.4	7.5	7.9	No
MPBH4-C			8	8	8	No
MPBH4-HR			7.2	7.2	7.3	No
MPBH5-C			**9.1**	**9.8**	**9.3**	**Yes**
MPBH5-HR			7.4	7.5	7.6	No
MPBH6			7.1	7	7.1	No
MPBH6-C			7	7	7.1	No
MPBH6-HR			7.3	7.3	7.3	No
MPBH7			7.3	7	7	No
MPBH7-C			7.1	7	7.1	No
3500C500L			7.5	7.5	7.6	No
3500C500S			7.1	7.1	6.9	No
4500F000			6.8	^	6.8	No
5000D000-R			7.5	7.4	7.5	No
5500D000			Removed	6.9	7	No
6000C000L-R**			*	*	-	-
6000C000U-R**			*	*	-	-
6500F500L			7.2	7.2	7.2	No
6500F500M			7.3	7.3	7.3	No

Monitoring Location/ ID	pH Trigger Range		Feb 2025 pH	Nov 2024 pH	Aug 2024 pH	Triggered (Yes/No)
	Lower	Upper				
6500F500U			6.8	6.8	6.8	No
6500F625			6.7	6.9	7	No
Melody			6.8	6.9	6.9	No
7500F000			7.7	7.7	7.8	No
GDE Bore Shallow**			*	*	-	-
GDE Bore Deep**			7.4	7.5	-	-
NE Alluvium**			^	^	-	-
East Alluvium**			*	*	-	-

** Dry/insufficient water to sample.*
***New site.*
^Unsafe access.
*An investigation is triggered when pH values are recorded outside the baseline range (20^{th} – 80^{th} percentile). Results shown in **bold** are outside of this range.*

Table 8-3 - MPO Quarterly Groundwater EC Results

Monitoring Location/ ID	Maximum Beneficial Use Trigger	Feb 2025 EC[1]	Nov 2024 EC[1]	Aug 2024 EC[1]	Triggered (Yes/No)
WRA1L	7800	3080	3050	3200	No
WRA1U	*	***	***	***	-
WRA3L-R**	*	*	*	-	-
WRA3U-R**	*	4800	5320	-	-
WRA5L-R**	*	4800	5320	-	-
WRA5U-R**	*	*	*	-	-
WRA6L	7800	5880	5700	6000	No
WRA6U	22000	9010	8650	8950	No
MPBH1	800	675	640	620	No
MPBH2	930	**1247**	**1300**	**1200**	**Yes**
MPBH3b	7800	5920	5600	5550	No
MPBH4	*	5620	5650	5550	-
MPBH5	*	***	***	***	-
MPBH1-C	*	1450	1500	820	-
MPBH1-HR	*	1580	1550	1500	-
MPBH2-C	*	1436	1078	1072	-
MPBH2-HR	*	1631	1229	1361	-
MPBH4-C	*	4950	4970	4860	-
MPBH4-HR	*	5880	5500	5690	-
MPBH5-C	*	1042	919	761	-
MPBH5-HR	*	842	856	843	-
MPBH6	*	1230	1250	1194	-
MPBH6-C	*	2710	2730	2780	-
MPBH6-HR	*	1490	4760	3580	-
MPBH7	*	11480	9770	10580	-
MPBH7-C	*	10760	10280	10800	-
3500C500L	7800	3770	3890	3810	No
3500C500S	7800	6010	**8270**	**12160**	No
4500F000	22000	8440	^	8150	No
5000D000-R	*	4490	4500	4410	-
5500D000	7800	Removed	4350	4400	No
6000C000L-R**	*	4530	4780	-	-
6000C000U-R**	*	*	*	-	-
6500F500L	7800	2530	2550	2450	No
6500F500M	7800	2780	2610	2450	No
6500F500U	7800	5120	4920	4860	No

Monitoring Location/ ID	Maximum Beneficial Use Trigger	Feb 2025 EC[1]	Nov 2024 EC[1]	Aug 2024 EC[1]	Triggered (Yes/No)
6500F625	7800	4480	4310	3850	No
Melody	*	6140	5810	5400	-
7500F000	7800	6450	6350	6270	No
GDE Bore Shallow**	*		*	-	-
GDE Bore Deep**	*	11240	10710	-	-
NE Alluvium**	*	^	^	-	-
East Alluvium**	*	*	*	-	-

** Indicates no trigger limit identified*
*** New site*
**** Dry/insufficient water to sample*
^Unsafe access.
[1]Results have been rounded in accordance with the In-house method Q4AN(EV)-332-WI2 (EC).
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.**

During the February 2025 monitoring event, sites WRA1U, MPBH5, GDE Bore Shallow and East Alluvium were dry. WRA3U-R contained insufficient water to sample and three (3) sites had changes in standing water level of greater than ± 0.5m from the previous measurement. All monitoring locations were within the pH trigger limits except sites MPBH1-C, MPBH2-C and MPBH5-C. MPBH5-C has been outside the limits for three consecutive monitoring events. All monitoring locations were below their respective EC trigger limits except MPBH2. MPBH2 have been outside these limits for three consecutive monitoring events.

An investigation is triggered if elevated measurements occur for three consecutive sampling events in accordance MPO Water Management Plan (MACH Energy, 2022). An investigation was triggered (AGE, 2023) examining the cause of elevated EC values in the alluvial zone, specifically MPBH2. The data strongly suggests that the cause of the increase in EC is persistent above-average stage in the adjacent Hunter River, caused by above-average rainfall since 2020, which is causing a rise in groundwater levels in similar alluvial bores. Trigger values have since been reviewed and will be incorporated in future Water management plans. The next quarterly ground water monitoring event is scheduled for May 2025.

9. Noise Monitoring

Attended noise monitoring was undertaken during the night of 26th February 2025 at eight (8) monitoring locations as per the *MPO Noise Management Plan* (MACH Energy, 2021) in accordance with DA 92/97, SSD 10418 and EPL 20850.

9.1 Results

The results for nighttime attended noise monitoring for noise generated by MPO in February 2025 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 – 26 February 2025

Location	Start Date and Time	MPO Only $L_{A1,1min}$ dB[2,4]	Criterion dB	Wind Speed m/s Direction °	Criterion Applies[1]	Stability Class	Exceedance dB[3]
N-AT1	11:24pm	IA	45	1.0 / 208	Yes	E	No
N-AT2	10:45pm	IA	45	2.7 / 169	Yes	D	No
N-AT3	10:05pm	IA	45	3.0 / 167	Yes	D	No
N-AT4	10:31pm	IA	45	1.4 / 182	Yes	D	No
N-AT5	10:55pm	32	45	1.3 / 206	No	F	No
N-AT6	11:52pm	IA	45	1.0 / 198	No	F	No
N-AT7	10:08pm	IA	45	2.9 / 168	Yes	D	No
N-AT8	11:24pm	44	NA[2]	1.0 / 208	NA[6]	F	NA[6]

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 $L_{A1,1minute}$ 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.*
4. *IA = inaudible; and*
5. *Bold results indicate exceedance of criteria.*
6. *This is not a compliance monitoring location.*

Table 9-2 – $L_{Aeq,15min}$ Generated by MPO: Attended Night Monitoring – 26 Feb 2025

Location	Start Date and Time	MPO Only $L_{A1,1min}$ dB[2,4]	Criterion dB	Wind Speed m/s Direction °	Criterion Applies[1]	Stability Class	Exceedance dB[3]
N-AT1	11:24pm	IA	45	1.0 / 208	Yes	D	No
N-AT2	10:45pm	IA	45	2.7 / 169	Yes	D	No
N-AT3	10:05pm	IA	45	3.0 / 167	Yes	D	No
N-AT4	10:31pm	IA	45	1.4 / 182	Yes	D	No
N-AT5	10:55pm	28	45	1.3 / 206	Yes	D	No
N-AT6	11:52pm	IA	45	1.0 / 198	Yes	E	No
N-AT7	10:08pm	IA	45	2.9 / 168	Yes	D	No
N-AT8	11:24pm	40	NA[2]	1.0 / 208	NA[6]	D	NA[6]

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. *IA = inaudible; and*
4. *Bold results indicate exceedance of criteria.*
5. *This is not a compliance monitoring location.*

Table 9-3 – $L_{Aeq,\ period}$ Cumulative Noise: Attended Night Monitoring – 26 Feb 2025

Location	Start Date and Time	Measured Mining Only $L_{Aeq,\ period}$ dB[1,2,3]	Cumulative Noise Criterion LAeq dB	Exceedance dB
N-AT1	11:24pm	IA	40	No
N-AT2	10:45pm	IA	40	No
N-AT3	10:05pm	IA	40	No
N-AT4	10:31pm	IA	40	No
N-AT5	10:55pm	28	40	No
N-AT6	11:52pm	IA	40	No
N-AT7	10:08pm	IA	40	No
N-AT8	11:24pm	40	NA[4]	NA[4]

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'.*
3. *NA in exceedance column means criterion was not applicable due to atmospheric conditions.*
4. *This is not a compliance monitoring location.*

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).

10. Blast Monitoring

There were six (7) blast events during February 2025 (a total of 13 blasts YTD). Results for February are presented in **Table 10-1**. All blast results during this monitoring period were below the criteria stated in Schedule 3, Condition 10 of DA 92/97, Schedule 2; Condition B12 of SSD 10418; and L5 of EPL 20850.

Table 10-1 – MPO Blast Monitoring Results – February 2025

Day & Date Fired	Time Fired	BVOC Vibration (mm/s)	BVOC Overpressure (dBL)	BVO2 Vibration (mm/s)	BVO2 Overpressure (dBL)	Blast Fume Compliant
5/02/2025	12:01	0.430 mm/s	86 DBL	0.520 mm/s	97.9 DBL	Y
10/02/2025	11:24	0.390 mm/s	92.7 DBL	0.440 mm/s	98.5 DBL	Y
13/02/2025	15:51	0.150 mm/s	96.4 DBL	0.310 mm/s	96.2 DBL	Y

17/02/2025	11:02	0.160 mm/s	95.8 DBL	0.100 mm/s	92.1 DBL	Y
21/02/2025	10:58	0.310 mm/s	97.6 DBL	0.250 mm/s	94.6 DBL	Y
26/02/2025	16:14	0.760 mm/s	99.7 DBL	0.630 mm/s	103 DBL	Y
28/02/2025	13:05	0.150 mm/s	102 DBL	0.300 mm/s	98.9 DBL	Y

END OF REPORT