MACHEnergy

Mount Pleasant Operation

Monthly Environmental Monitoring Report

November 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 November 2021
Reporting Period End Date	30 November 2021
Date All Data Received	20 January 2021

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.

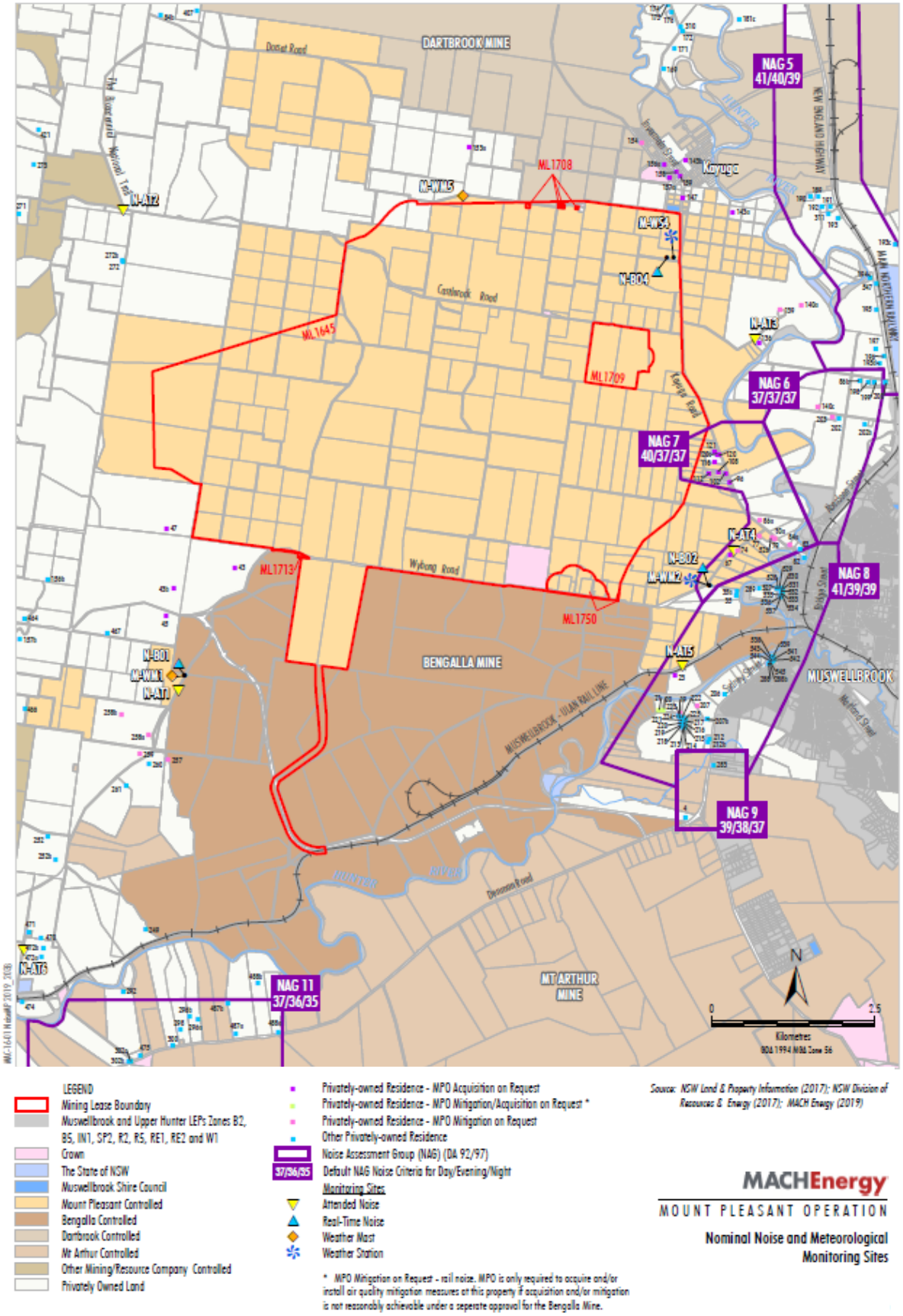
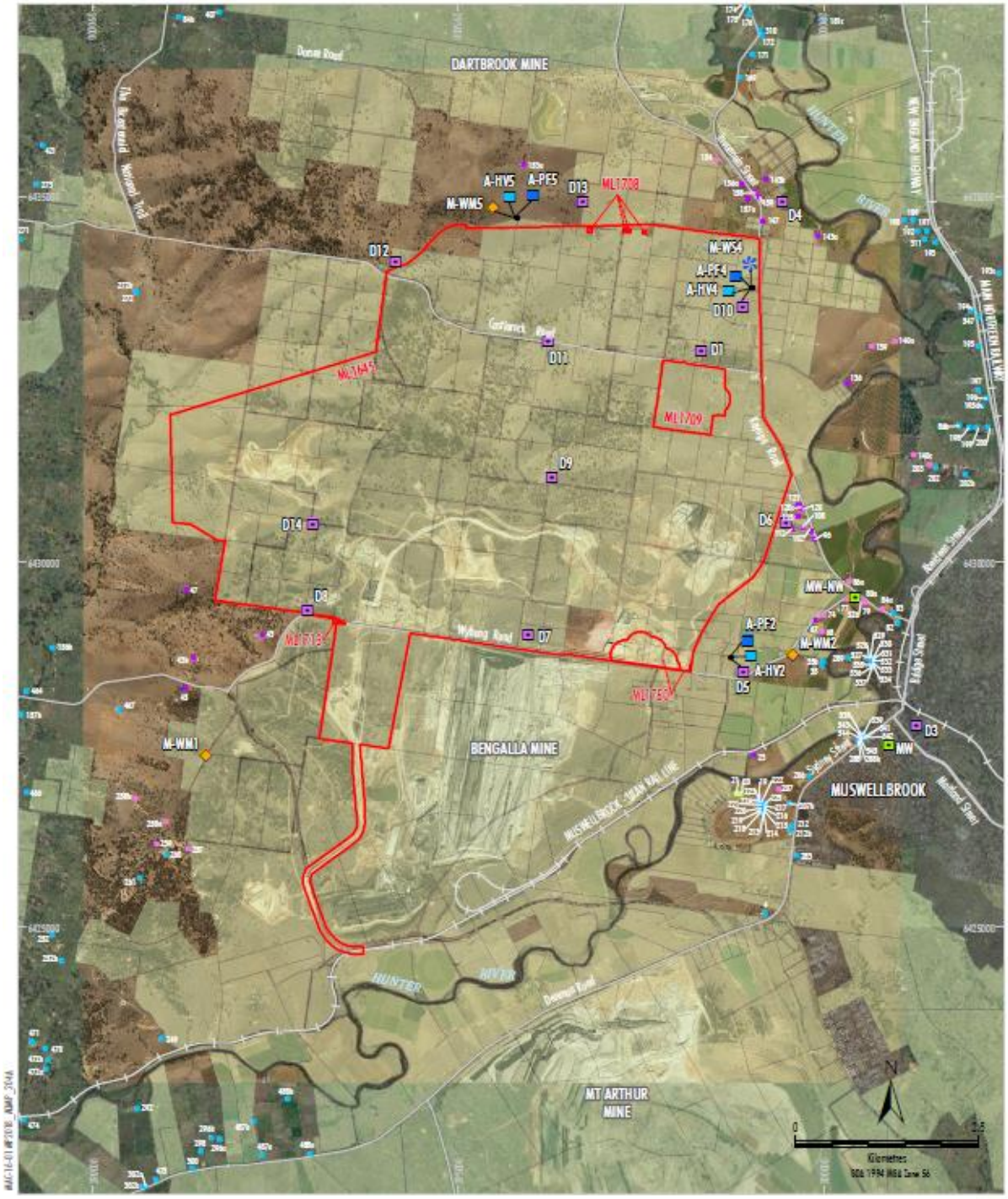


Figure 2-1 – MPO Attended Noise Monitoring Assessment Groups and Locations



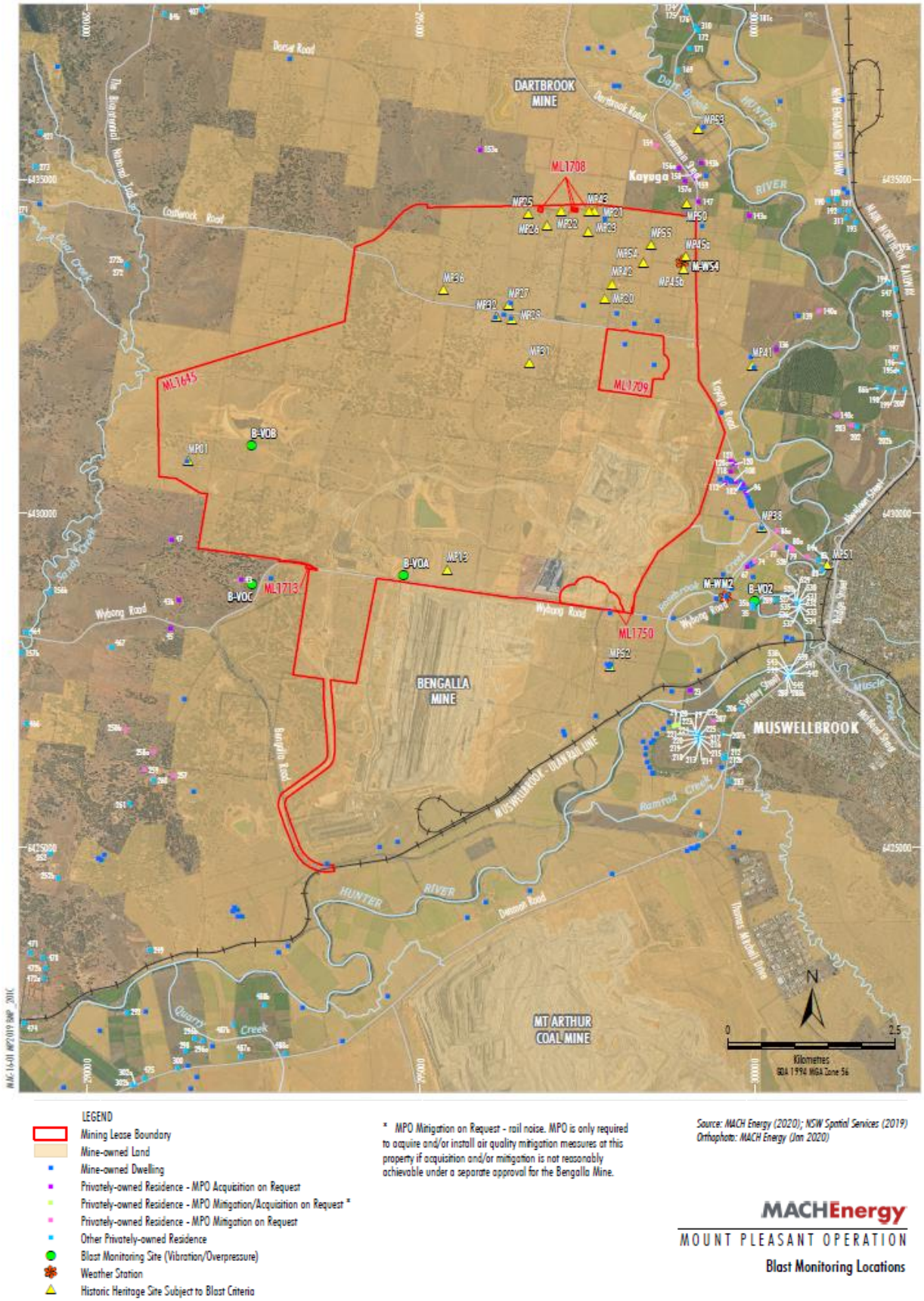
LEGEND
Mining Lease Boundary
Mine Owned
Privately-owned Residence - MPO Acquisition on Request
Privately-owned Residence - MPO Mitigation/Acquisition on Request *
Privately-owned Residence - MPO Mitigation on Request
Other Privately-owned Residence
Monitoring Sites
Air Quality - High Volume Sampler
Air Quality - Palas Fidas
Dust Deposition Gauge
Upper Hunter Air Quality Monitoring Network
Weather Mast
Weather Station

* MPO Mitigation on Request - rail noise. MPO is only required to acquire and/or install air quality mitigation measures at this property if acquisition and/or mitigation is not reasonably achievable under a seperate approval for the Bengalla Mine.

Source: NSW Land & Property Information (2017); NSW Division of Resources & Energy (2017); MACH Energy (2019) Orthophoto: MACH Energy (July 2018); NSW Department of Finance & Innovation (2018)

MACHEnergy
MOUNT PLEASANT OPERATION
Air Quality and Meteorological Monitoring Sites

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



LEGEND

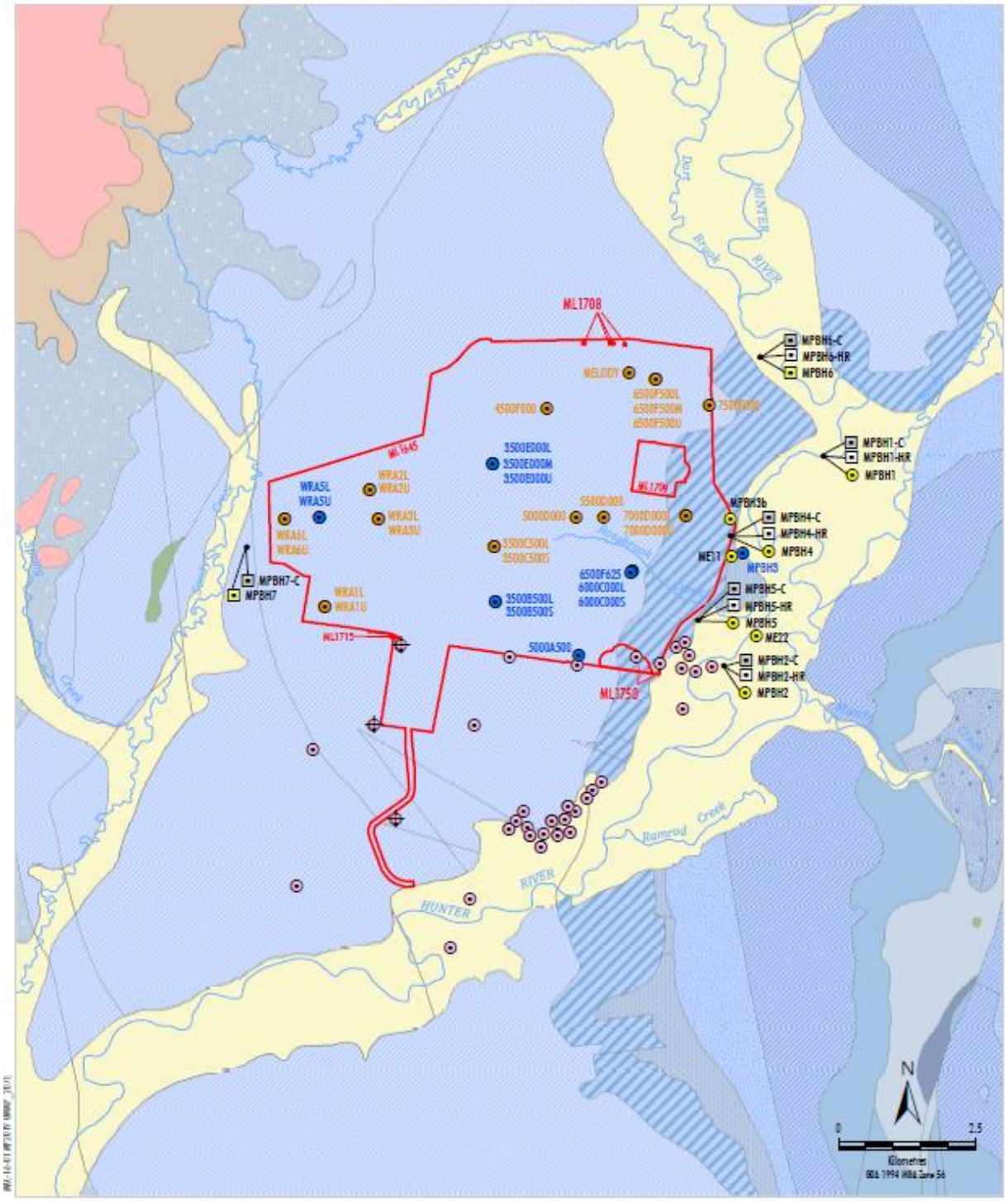
- Mining Lease Boundary
- Mine-owned Land
- Mine-owned Dwelling
- Privately-owned Residence - MPO Acquisition on Request
- Privately-owned Residence - MPO Mitigation/Acquisition on Request *
- Privately-owned Residence - MPO Mitigation on Request
- Other Privately-owned Residence
- Blast Monitoring Site (Vibration/Overpressure)
- Weather Station
- Historic Heritage Site Subject to Blast Criteria

* MPO Mitigation on Request - rail noise. MPO is only required to acquire and/or install air quality mitigation measures at this property if acquisition and/or mitigation is not reasonably achievable under a separate approval for the Bengalla Mine.

Source: MACH Energy (2020); NSW Spatial Services (2019)
Orthophoto: MACH Energy (Jan 2020)

MACHEnergy
MOUNT PLEASANT OPERATION
Blast Monitoring Locations

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 2-4 – MPO Groundwater Monitoring Network

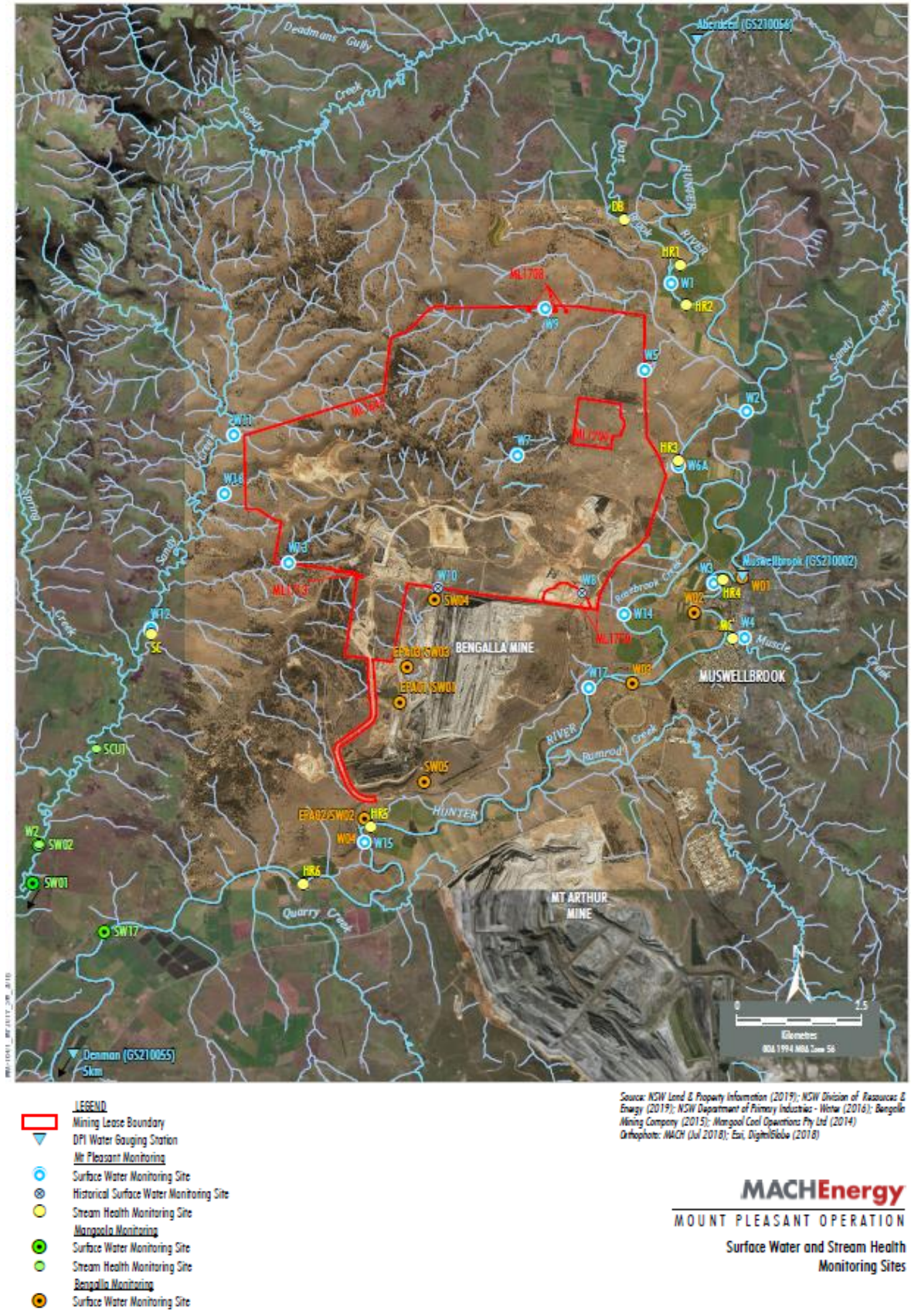


Figure 2-5 – MPO Surface Water Monitoring Network

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 November 2021 (the monitoring period), with the exception of solar radiation (91.7%). The majority of meteorological data was captured at M-WS4 (95.6%) during the monitoring period.

Throughout November 2021, there was 228.2mm and 229.8mm 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 October 2021. Sample collection was undertaken on 15 November 2021 by AECOM with sample analysis performed by ALS NATA accredited laboratory. Results are summarised in **Table 4-1**. Annual rolling averages for November 2021 have been provided as an indication of performance between November 2020 – November 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 – November 2021

Location	YTD Insoluble Solids (g/m^2.month)	Insoluble Solids Annual Rolling Average (g/m^2.month)
D1	2.5	2.5
D3a	1.7	2.1
D4	1.6	1.7
D5	2.9	3.1
D6	2.8	2.8
D7b[1]	7.9	7.4
D8	3.6	3.7
D9a	1.6	1.7
D10	1.0	1.2
D11	1.7	1.8
D12	0.7	0.8
D13	1.5	1.6
D14	2.9	2.9
Criterion	-	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*
[1]Site 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. 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 November 2021 sampling event noted that all gauges contained insects and one gauge contained vegetation. There was insufficient evidence of contamination in all

depositional dust gauges to justify any being deemed contaminated. All November 2021 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.

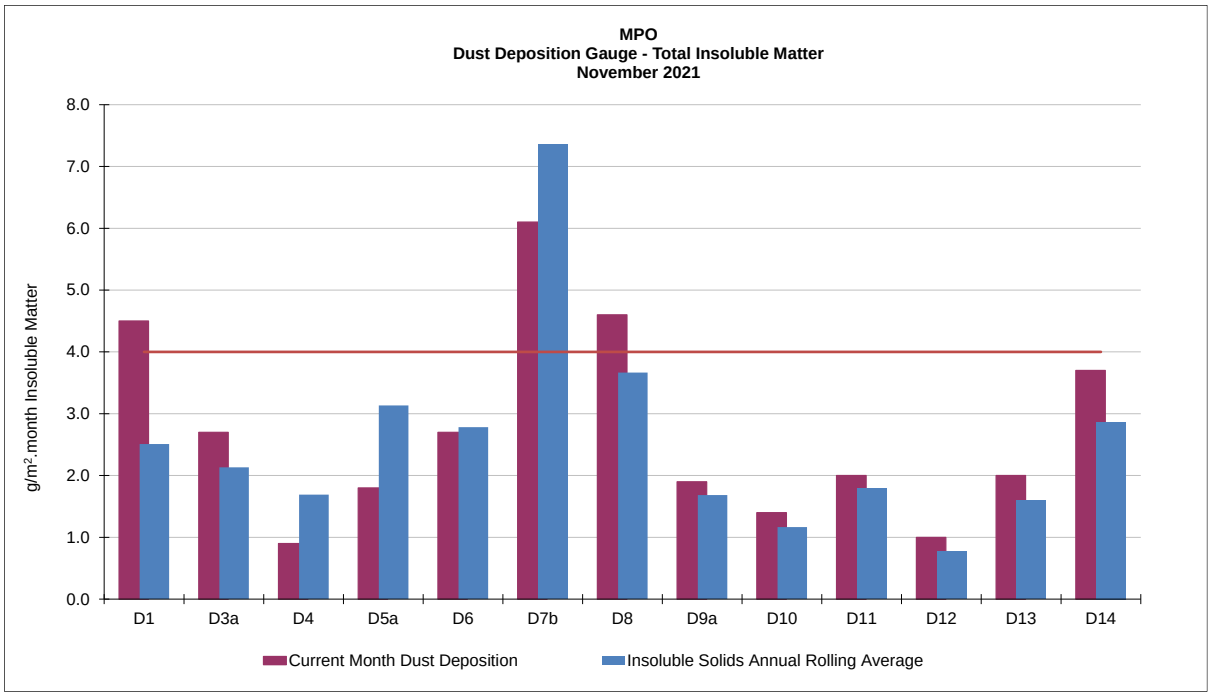


Figure 4-1: MPO Dust Deposition Monthly Results and Annual Rolling Average – November 2021

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/m^3.

5.2 Results

In November 2021 sample collection was undertaken by AECOM with sample analysis performed by ALS NATA accredited laboratory. TSP results for the monitoring period are provided in **Table 5-2**. Annual rolling averages for November 2021 have been provided as an indication of performance between November 2020 – November 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 – November 2021

Run Date	Assessment Criterion	TSP µg/m^3		
		HVAS A-PF2	HVAS M-WS4	HVAS A-PF5
5/11/2021	-	31.3	35.2	37.8
11/11/2021	-	26.6	19.0	20.0
17/11/2021	-	43.2	50.0	32.4
23/11/2021	-	23.2	28.4	18.3
29/11/2021		34.1	40.5	33.0
Monthly Mean	-	31.7	34.6	28.3
Annual Rolling Average	90	51	30	28

*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/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 November 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 $PM_{2.5}$ 12-month rolling averages for November 2021 have been provided in Section 6.2 and 6.4 respectively, as an indication of performance between November 2020 – November 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 November 2021. The Muswellbrook NW monitor was operational during all days of November 2021. Real time PM_{10} 24 hour rolling average results for November 2021 are presented in **Table 6-1.**

Table 6-1: MPO Palas Fidas PM_{10} Data – November 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					
1/11/2021	24	24	46	25.8	44	50
2/11/2021	19	14	36	16.7	44	50
3/11/2021	20	16	34	19	44	50
4/11/2021	22	21	31	22.3	44	50
5/11/2021	13	12	21	9.4	44	50
6/11/2021	14	10	13	11.1	44	50
7/11/2021	15	10	17	14.8	44	50
8/11/2021	14	12	17	12	44	50
9/11/2021	16	15	30	17.5	44	50
10/11/2021	15	11	15	13.9	44	50
11/11/2021	13	9	10	8.6	44	50
12/11/2021	26	23	28	29.6	44	50
13/11/2021	11	7	7	17.4	44	50
14/11/2021	12	7	-	13.7	44	50
15/11/2021	19	9	-	24.3	44	50
16/11/2021	11	8	-	13.8	44	50
17/11/2021	15	11	-	16.6	44	50
18/11/2021	19	11	-	16.7	44	50
19/11/2021	22	12	-	18.6	44	50
20/11/2021	16	14	-	15.9	44	50
21/11/2021	8	8	-	5.1	44	50

22/11/2021	9	7	-	8.8	44	50
23/11/2021	10	8	-	10.6	44	50
24/11/2021	13	11	-	12.5	44	50
25/11/2021	14	12	-	10.9	44	50
26/11/2021	7	6	-	2.3	44	50
27/11/2021	9	7	-	6.6	44	50
28/11/2021	15	12	-	13.5	44	50
29/11/2021	19	15	-	18.7	44	50
30/11/2021	16	13	-	12.7	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 PM_{10} 24 hour rolling average results at MPO air quality monitoring sites November 2021.

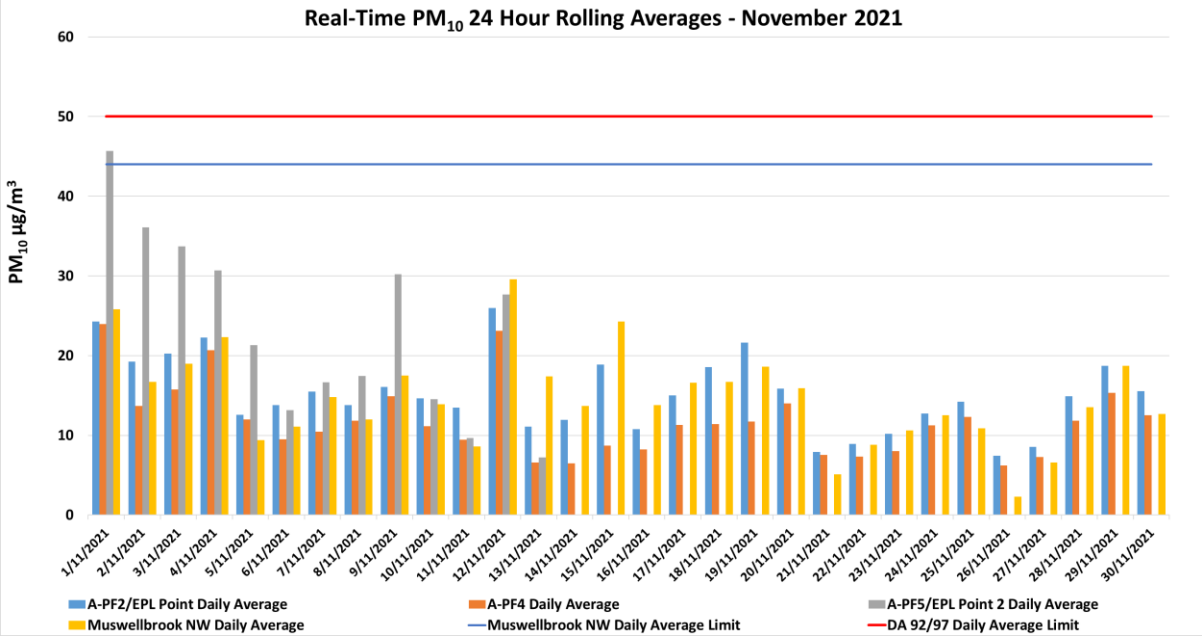


Figure 6-1: Real-time PM_{10} 24 hour rolling average results for November 2021.

6.2 PM_{10} Results – Annual rolling average

There were no elevated PM_{10} measurements reported at MPO for the November 2021 annual rolling average. Real time PM_{10} annual rolling averages for November 2021 are presented in **Figure 6-2** below.

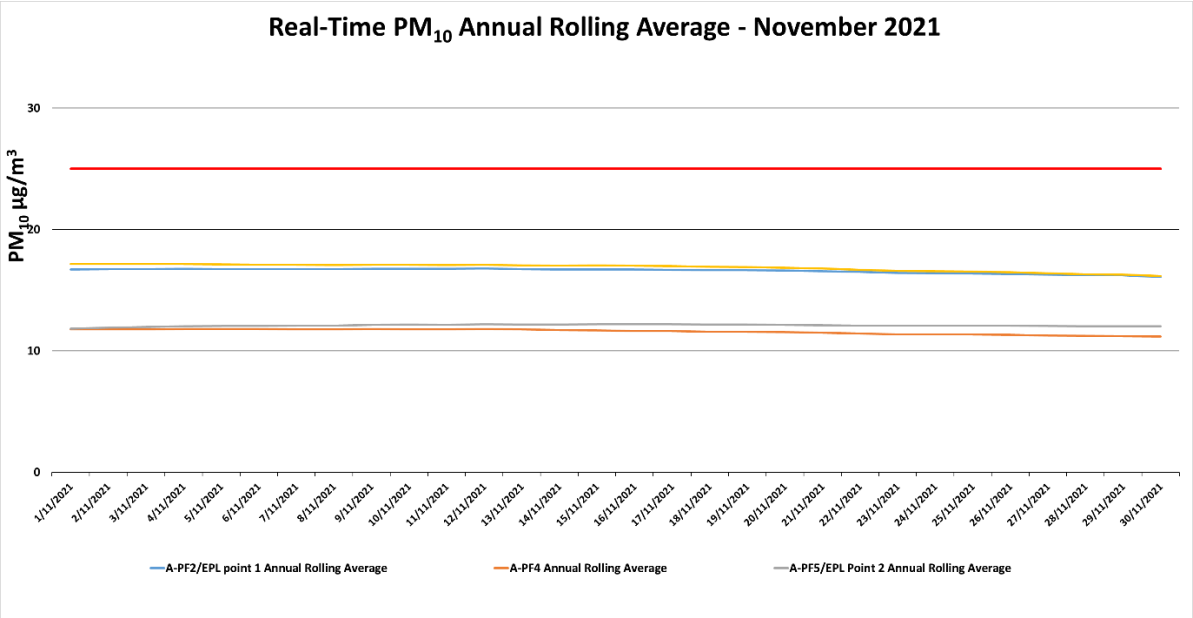


Figure 6-2: Real-time PM_{10} Annual Rolling average results for November 2021.

6.3 $PM_{2.5}$ Results – 24 hour rolling average

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

Table 6-2: MPO Palas Fidas $PM_{2.5}$ Data – November 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			
1/11/2021	5	6	9	25
2/11/2021	4	4	7	25
3/11/2021	4	4	7	25
4/11/2021	6	6	8	25
5/11/2021	5	6	8	25
6/11/2021	5	5	6	25
7/11/2021	5	5	7	25
8/11/2021	6	6	7	25
9/11/2021	6	6	10	25
10/11/2021	5	5	5	25
11/11/2021	6	4	4	25
12/11/2021	5	6	6	25
13/11/2021	3	3	3	25
14/11/2021	4	3	0	25
15/11/2021	4	3	0	25
16/11/2021	3	3	0	25
17/11/2021	5	4	0	25
18/11/2021	5	4	0	25
19/11/2021	6	5	0	25

20/11/2021	6	6	0	25
21/11/2021	4	4	0	25
22/11/2021	4	4	0	25
23/11/2021	4	4	0	25
24/11/2021	5	5	0	25
25/11/2021	6	6	0	25
26/11/2021	3	3	0	25
27/11/2021	4	3	0	25
28/11/2021	6	5	0	25
29/11/2021	7	7	0	25
30/11/2021	6	6	0	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 November 2021 are presented in **Figure 6-3** below.

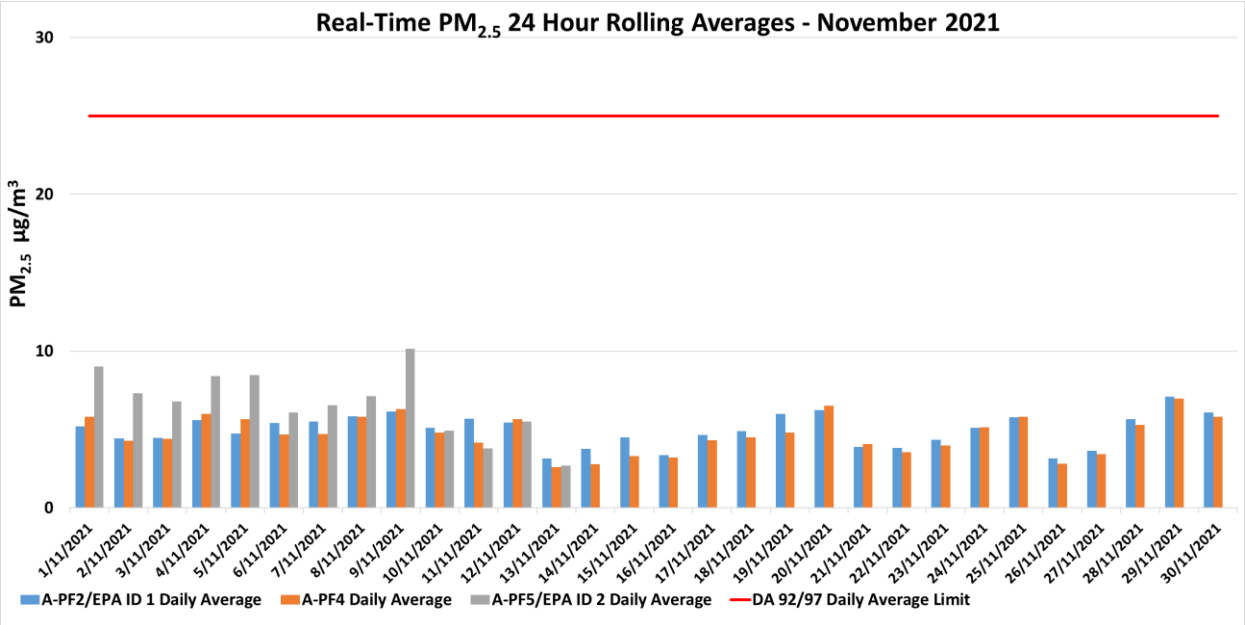


Figure 6-3: Real-time $PM_{2.5}$ 24 hour rolling average results for November 2021.

6.4 $PM_{2.5}$ Results - Annual rolling average

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

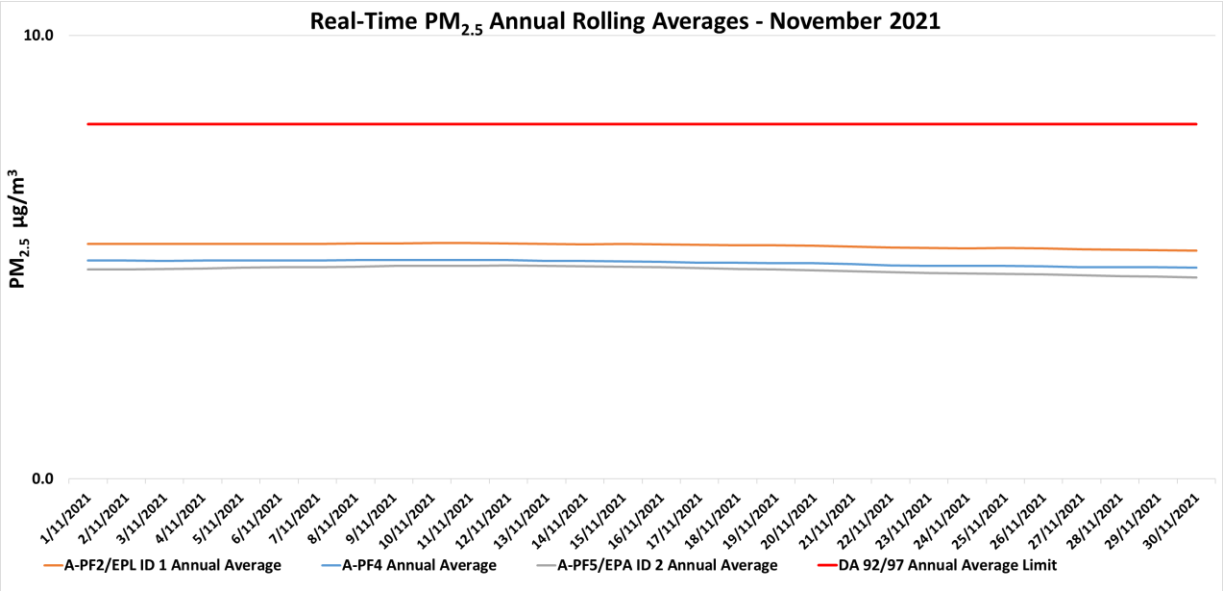


Figure 6-4: Real-time $PM_{2.5}$ Annual Rolling average results for November 2021.

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 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, 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 surface water monitoring was conducted by AECOM on 9 November 2021. 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.** Additional rain event surface water monitoring was conducted by AECOM on 22nd of November 2021 with results shown in **Table 7-2.**

Table 7-1 – MPO Monthly Surface Water Monitoring Results – 9 November 2021

Station	pH	Electrical Conductivity (EC) (µs/cm)[1]	Total Suspended Solids (TSS) (mg/L)	Total Dissolved Solids (TDS) (mg/L)
W1	8.3	630	356	11
W2	8.2	**700**	375	7
W3	8.2	770	414	12

Station	pH	Electrical Conductivity (EC) (µs/cm)[1]	Total Suspended Solids (TSS) (mg/L)	Total Dissolved Solids (TDS) (mg/L)
W4	7.8	1750	961	<5
W5	*	*	*	*
W6A	8.3	**700**	380	9
W7	*	*	*	*
W9	*	*	*	*
W11	^	^	^	^
W12	8.0	4950	2720	<5
W13	*	*	*	*
W14	*	*	*	*
W15	8.1	810	450	16
W16	*	*	*	*
W17	8.1	**780**	438	13

Notes:
*Results in **bold** indicate elevated reading of adopted assessment criteria.*
**Dry or insufficient water to sample.*
*** Calculated result due to interference from fine colloidal material*
^ 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).

Table 7-2 – MPO Rain Event Surface Water Monitoring Results – 22 November 2021

Station	pH	Electrical Conductivity (EC) (µs/cm)[1]	Total Suspended Solids (TSS) (mg/L)	Total Dissolved Solids (TDS) (mg/L)
W1	^	^	^	^
W2	^	^	^	^
W3	7.8	260	148**	225
W4	7.4	150	86**	52
W5	7.1	120	66**	16
W6A	^	^	^	^
W7	^	^	^	^
W9	7.4	100	57**	20
W11	^	^	^	^
W12	7.9	250	142**	755
W13	7.7	120	68**	53
W14	*	*	*	*
W15	7.6	260	148**	111
W16	8.0	540	310**	77
W17	7.7	270	153**	**232**
TSB1	8.0	280	187**	161

Station	pH	Electrical Conductivity (EC) (µs/cm)[1]	Total Suspended Solids (TSS) (mg/L)	Total Dissolved Solids (TDS) (mg/L)
TSB2	^	^	^	^
TSB3	8.4	350	276	597

Notes:
*Results in **bold** indicate exceedances of adopted assessment criteria.*
** Dry or insufficient water to sample*
^ Unsafe access
*** Calculated result due to interference from fine colloidal material*
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).

During the November 9 2021 monthly monitoring, six of the eighteen monitoring location were found to be dry or contain insufficient water to sample. All sites were within or below their respective pH and TSS trigger levels. Site W2, W6A and W17 exceeded their respective EC trigger levels. During 22 November 2021 monitoring event one of eighteen monitoring locations was found to be dry, or contain insufficient water to sample and six sites were unsafe to access. All sites were within or below their respective pH and EC trigger levels. Site W17 was above its TSS trigger level. An investigation will be triggered if elevated measurements occur for three consecutive sampling events in accordance MPO Water Management Plan (MACH Energy, 2019). All other sites were below or inside the assessment trigger ranges

8. Groundwater Monitoring

Quarterly groundwater monitoring (annual analytical suite) was undertaken on 16, 18, 19 and 20 November 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)	Aug 2021 Water Level (DTW)	May 2021 Water Level (DTW)	Triggered (Yes/No)
	80th Percentile (DTW)	Trigger				
WRA1L	-	± 0.5m	3.04	2.73	**2.66**	
WRA1U	-	± 0.5m	*	*	*	
WRA3L	-	± 0.5m	^	**10.05**	**10.82**	
WRA3U	-	± 0.5m	^	4.25	4.04	
WRA5L	-	± 0.5m	^	0.00	0.00	
WRA5U	-	± 0.5m	^	1.06	1.00	
WRA6L	-	± 0.5m	^	1.19	1.31	
WRA6U	-	± 0.5m	^	2.16	2.08	
MPBH1	9.71	10.70	9.46	9.86	9.94	No
MPBH2	12.20	14.20	12.53	12.50	12.56	No
MPBH3b	12.00	Dry (or 14.0m)	12.01	11.93	11.96	No
MPBH4	-	± 0.5m	11.84	11.91	11.95	
MPBH5	-	± 0.5m	8.83	8.83	8.82	
MPBH1-C	-	± 0.5m	9.64	10.01	10.10	
MPBH1-HR	-	± 0.5m	**16.10**	**20.69**	**23.35**	
MPBH2-C	-	± 0.5m	12.83	12.80	12.85	
MPBH2-HR	-	± 0.5m	**36.90**	**43.96**	**31.26**	
MPBH4-C	-	± 0.5m	11.49	11.49	11.53	
MPBH4-HR	-	± 0.5m	50.78	50.91	50.93	
MPBH5-C	-	± 0.5m	12.47	12.45	12.59	
MPBH5-HR	-	± 0.5m	12.37	12.37	12.45	
MPBH6	-	± 0.5m	10.17	10.18	10.23	
MPBH6-C	-	± 0.5m	11.87	11.94	12.16	
MPBH6-HR	-	± 0.5m	10.97	11.11	11.13	
MPBH7	-	± 0.5m	7.34	7.21	7.23	
MPBH7-C	-	± 0.5m	18.76	18.83	18.86	

Monitoring Location/ ID	Water Level Trigger Range		Current Month Water Level (DTW)	Aug 2021 Water Level (DTW)	May 2021 Water Level (DTW)	Triggered (Yes/No)
	80th Percentile (DTW)	Trigger				
3500C500 (L)	-	± 0.5m	**60.07**	60.74	60.65	
3500C500 (S)	-	± 0.5m	25.45	25.54	25.59	
4500F000	-	± 0.5m	^	**30.45**	**29.45**	
5000D000	-	± 0.5m	**118.13**	**117.36**	**114.74**	
5500D000	-	± 0.5m	**40.46**	^	**41.80**	
6500F500L	-	± 0.5m	^	53.41	53.31	
6500F500M	-	± 0.5m	^	54.86	54.80	
6500F500U	-	± 0.5m	^	*	*	
6500F625	-	± 0.5m	^	22.79	22.68	
Melody	-	± 0.5m	^	13.41	13.46	
7500F000	-	± 0.5m	36.69	36.64	36.64	

** 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	Aug 2021 Month pH	May 2021 pH	Triggered (Yes/No)
	20th Percentile	80th Percentile				
WRA1l	6.0	8.5	7.1	7.2	7.1	No
WRA1U	6.0	8.5	*	*	*	No
WRA3L	6.0	8.5	6.7	6.7	6.9	No
WRA3U	6.0	8.5	7.2	7.4	7.6	No
WRA5L	6.0	8.5	7.2	7.1	7.2	No
WRA5U	6.0	8.5	7.2	7.2	7.2	No
WRA6L	6.0	8.5	7.0	6.9	6.9	No
WRA6U	6.0	8.5	6.8	7.0	7.0	No
MPBH1	6.0	8.5	6.9	7.0	6.9	No
MPBH2	6.0	8.5	6.9	6.8	6.9	No
MPBH3b	6.0	8.5	7.9	7.6	7.7	No
MPBH4	6.0	8.5	6.9	7.0	6.9	No
MPBH5	6.0	8.5	*	*	*	-
MPBH1-C***	6.0	8.5	8.2	8.4	7.5	No
MPBH1-HR***	6.0	8.5	8.0	7.9	7.9	No
MPBH2-C***	6.0	8.5	10.4	7.6	7.3	Yes
MPBH2-HR***	6.0	8.5	8.2	8.4	7.6	Yes

Monitoring Location/ ID	pH Trigger Range		Current Month pH	Aug 2021 Month pH	May 2021 pH	Triggered (Yes/No)
	20th Percentile	80th Percentile				
MPBH4-C***	6.0	8.5	7.6	7.6	7.6	No
MPBH4-HR***	6.0	8.5	7.3	7.4	7.4	-
MPBH5-C***	6.0	8.5	11.1	10.8	11.5	Yes
MPBH5-HR***	6.0	8.5	7.5	7.4	7.4	No
MPBH6***	6.0	8.5	7.1	7.2	7.0	No
MPBH6-C***	6.0	8.5	7.9	7.9	7.8	No
MPBH6-HR***	6.0	8.5	7.3	7.4	7.2	No
MPBH7***	6.0	8.5	7.1	7.3	7.3	No
MPBH7-C***	6.0	8.5	7.6	7.1	7.8	No
3500C500 (L)	6.0	8.5	7.5	7.5	7.6	No
3500C500 (S)	6.0	8.5	6.9	7.1	7.4	No
4500F000	6.0	8.5	6.8	6.8	6.9	No
5000D000	6.0	8.5	7.6	7.6	7.4	No
5500D000	6.0	8.5	^	6.9	7.1	-
6500F500L	6.0	8.5	7.4	7.3	7.4	No
6500F500M	6.0	8.5	7.2	7.3	7.4	No
6500F500U	6.0	8.5	*	*	*	*
6500F625	6.0	8.5	7.0	7.0	7.0	No
Melody	6.0	8.5	7.2	7.2	6.9	No
7500F000	6.0	8.5	7.8	7.7	7.8	No

** Dry/insufficient water to sample*
^ Unsafe Access
**** 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 8-3 - MPO Quarterly Groundwater EC results

Monitoring Location/ ID	EC Trigger Range	Current Month EC	Aug 2021 EC	May 2021 EC	Triggered (Yes/No)
	Maximum Beneficial Use Trigger				
WRA1l	7800	2800	3650	3050	No
WRA1U	*	**	**	**	-
WRA3L	22000	^	16200	16300	No
WRA3U	22000	^	5600	1950	No
WRA5L	7800	^	4750	4450	No
WRA5U	7800	^	4700	4550	No
WRA6L	7800	^	5850	5900	No
WRA6U	22000	^	10700	10400	No
MPBH1	800	490	480	480	No

Monitoring Location/ ID	EC Trigger Range Maximum Beneficial Use Trigger	Current Month EC	Aug 2021 EC	May 2021 EC	Triggered (Yes/No)
MPBH2	930	770	740	740	No
MPBH3b	7800	5050	4800	4900	No
MPBH4	*	6050	6250	6350	-
MPBH5	*	**	**	**	-
MPBH1-C	*	650	1250	1300	-
MPBH1-HR	*	1600	2000	1900	-
MPBH2-C	*	1250	1400	860	-
MPBH2-HR	*	1800	1650	1350	-
MPBH4-C	*	3800	3550	3550	-
MPBH4-HR	*	5800	5850	5850	-
MPBH5-C	*	600	640	780	-
MPBH5-HR	*	1050	1000	780	-
MPBH6	*	1000	1100	1150	-
MPBH6-C	*	7350	7350	7400	-
MPBH6-HR	*	6100	6200	5700	-
MPBH7	*	11900	13800	12300	-
MPBH7-C	*	11700	11200	12100	-
3500C500 (L)	7800	3800	3750	3800	No
3500C500 (S)	7800	1100	2500	1900	No
4500F000	22000	^	8550	8600	No
5000D000	800	**4400**	**4000**	**4250**	Yes
5500D000	7800	4500	^	4450	No
6500F500L	7800	^	3900	3900	No
6500F500M	7800	^	3000	3000	No
6500F500U	7800	^	**	**	-
6500F625	7800	^	3850	3700	No
Melody	*	^	1000	1300	No
7500F000	7800	6250	6350	6300	No

** indicates no trigger limit identified*
*** Dry/insufficient water to sample*
^ Unsafe access
**** 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) including suitably qualified hydrogeologist assessment; and amendment to Surface & Groundwater Trigger Response Plan currently in review with DPIE.

The were no elevated measurements during the November 2021 sampling event not previously reported. The next quarterly monitoring event is scheduled for February 2022.

9. Noise Monitoring

Attended noise monitoring was undertaken during the night period of 9/10 November 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 November 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 – 9/10 September 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	09/11/2021 23:06	1.8	D	45	Yes	39	Nil
N-AT2	09/11/2021 22:01	1.6	E	45	Yes	<20	Nil
N-AT3	09/11/2021 22:37	3.2	D	45	No	IA	NA
N-AT4	09/11/2021 23:54	1.3	E	45	Yes	IA	Nil
N-AT5	09/11/2021 23:30	1.5	E	45	Yes	IA	Nil
N-AT6	09/11/2021 22:00	1.6	E	45	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 $L_{A1,1minute}$ 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.*
6. *Remeasure*

Table 9-2 – $L_{Aeq,15min}$ Generated by MPO: Attended Night Monitoring – 9/10 November 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	09/11/2021 23:06	1.8	D	43	Yes	35	Nil
N-AT2	09/11/2021 22:01	1.6	E	36	Yes	<20	Nil
N-AT3	09/11/2021 22:37	3.2	D	41	No	IA	NA
N-AT4	09/11/2021 23:54	1.3	E	42	Yes	IA	Nil
N-AT5	09/11/2021 23:30	1.5	E	40	Yes	IA	Nil
N-AT6	09/11/2021 22:00	1.6	E	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.*
5. *Remeasure*

Table 9-3 – $L_{Aeq,period}$ Cumulative Noise: Attended Night Monitoring – 9/10 November 2021

Location	Start Date and Time	Cumulative Noise Criterion LAeq dB	Measured Mining Only $L_{Aeq,period}$ dB[1,2]	Exceedance dB
N-AT1	09/11/2021 23:06	40	37	Nil
N-AT2	09/11/2021 22:01	40	Nil	Nil
N-AT3	09/11/2021 22:37	40	Nil	Nil
N-AT4	09/11/2021 23:54	40	Nil	Nil
N-AT5	09/11/2021 23:30	40	Nil	Nil
N-AT6	09/11/2021 22:00	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 9 blast events during November (a total of 73 blasts YTD). Results for November 2021 are presented in **Table 10-1**. All blast results during the November 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 – November 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
Wednesday 3/11/2021	12:58	0.030	94.9	0.010	96	0.000	81.3	Y
Thursday 4/11/2021	12:59	0.070	93.9	0.010	80.8	0.010	72.7	Y
Friday 5/11/2021	12:00	0.030	83.8	0.010	73.4	0.000	65.5	Y
Wednesday 10/11/2021	14:29	0.440	101.6	0.270	104	0.550	100.9	Y
Thursday 11/11/2021	13:07	0.300	91.4	0.160	83	0.350	94.7	Y
Wednesday 17/11/2021	12:44	0.220	97.1	0.190	99.7	0.230	91	Y
Thursday 18/11/2021	13:12	0.010	86.1	0.010	79.8	0.000	82.2	Y
Friday 19/11/2021	1:45	0.270	96.3	0.120	90	0.220	93.7	Y
Thursday 25/11/2021	12:17	0.240	97.6	0.110	88.9	0.230	94.3	Y

END OF REPORT