

**Mount Pleasant Operation
Monthly Environmental Monitoring Report**

March 2020

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 March 2020
Reporting Period End Date	31 March 2020
Date All Data Received	7 May 2020

To view MPO EPL 20850 or DA 92/97 in full please refer to the link below:

<https://machenergyaustralia.com.au/mount-pleasant/documentation/>

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 **Figure 2-1; Figure 2-2; Figure 2-3; Figure 2-4; and Figure 2-5.**

Figure 2-1 shows MPO attended noise monitoring assessment groups and monitoring locations. **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. **Figure 2-5** shows the MPO surface water monitoring network.

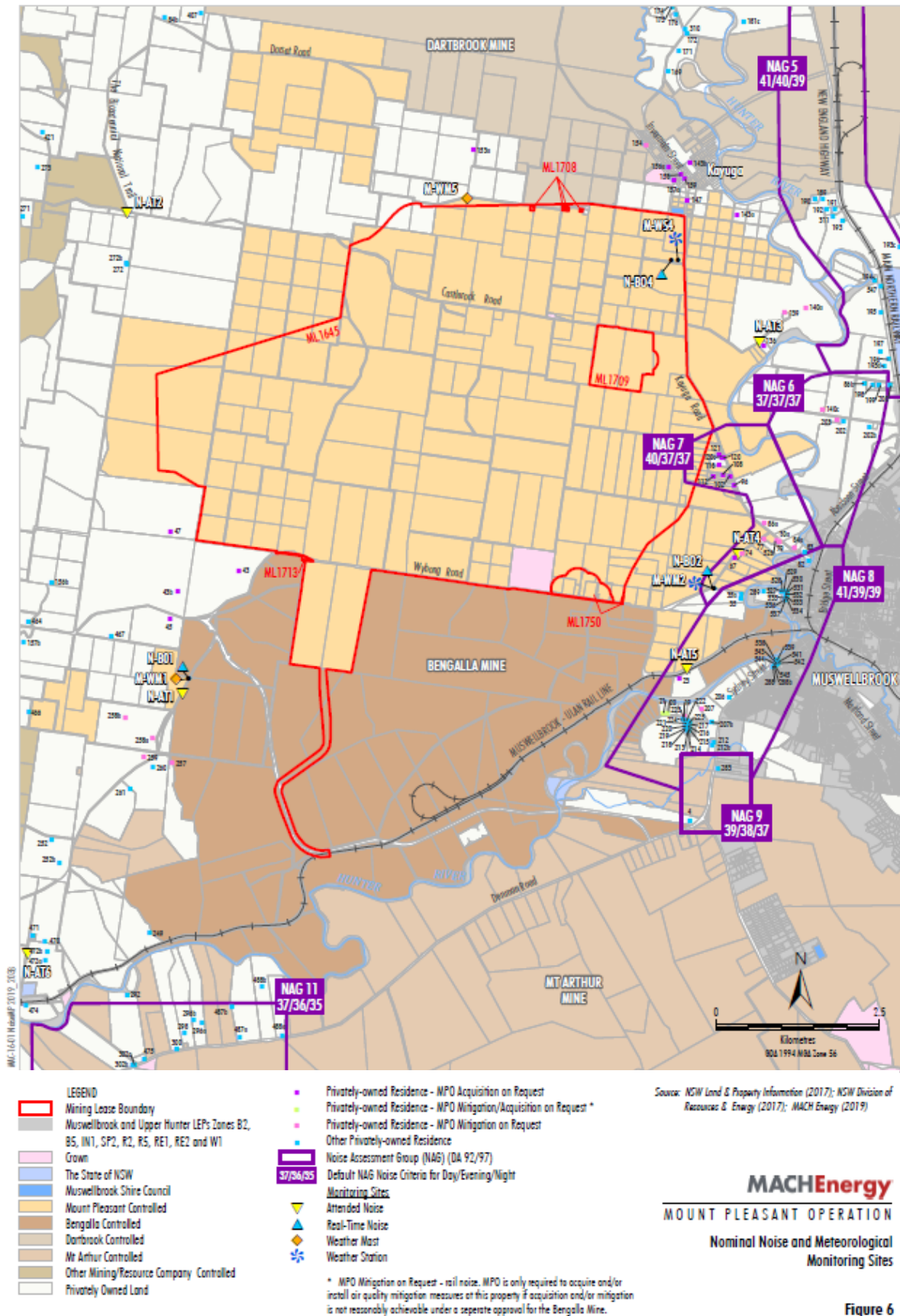


Figure 6

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

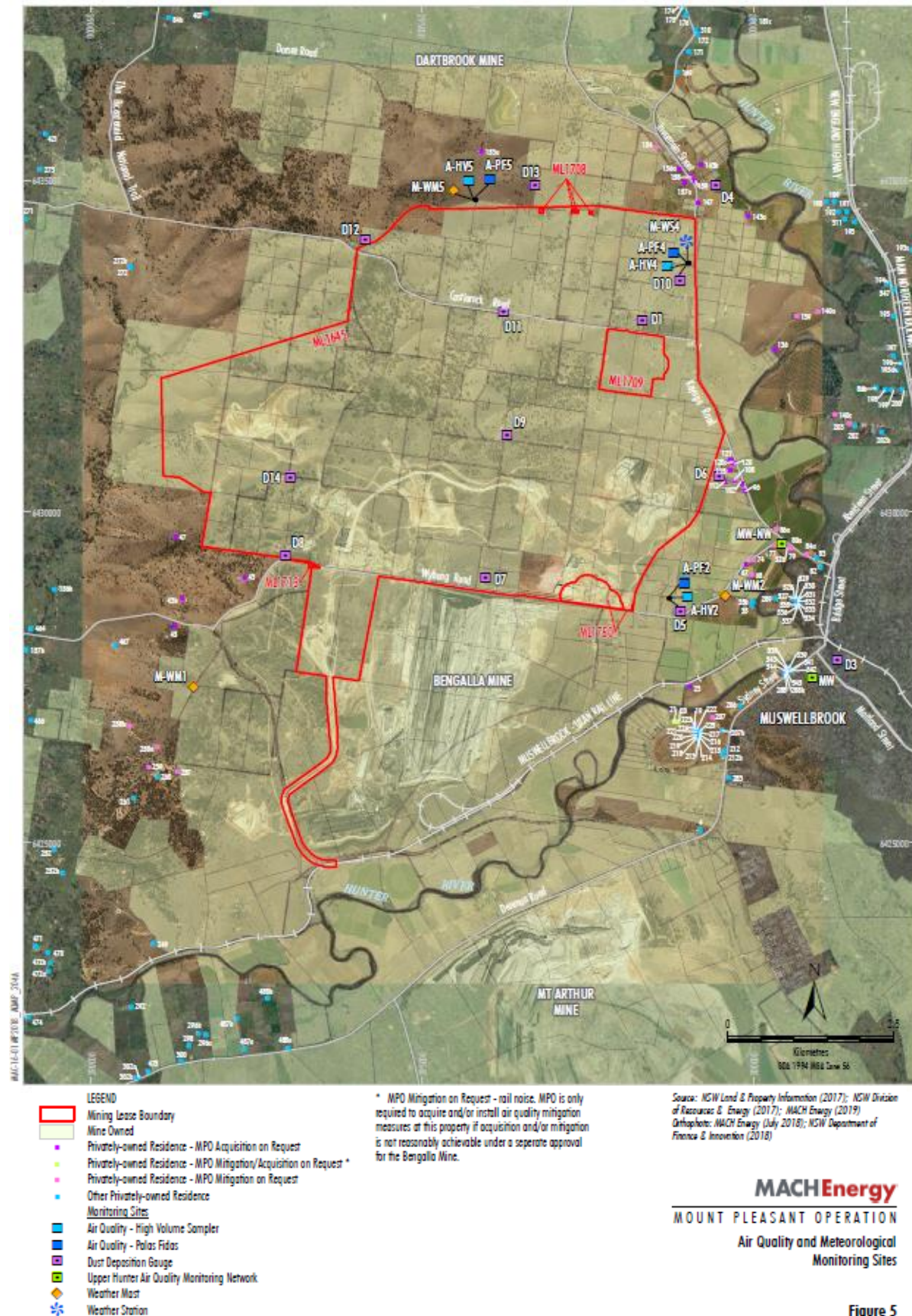


Figure 5

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

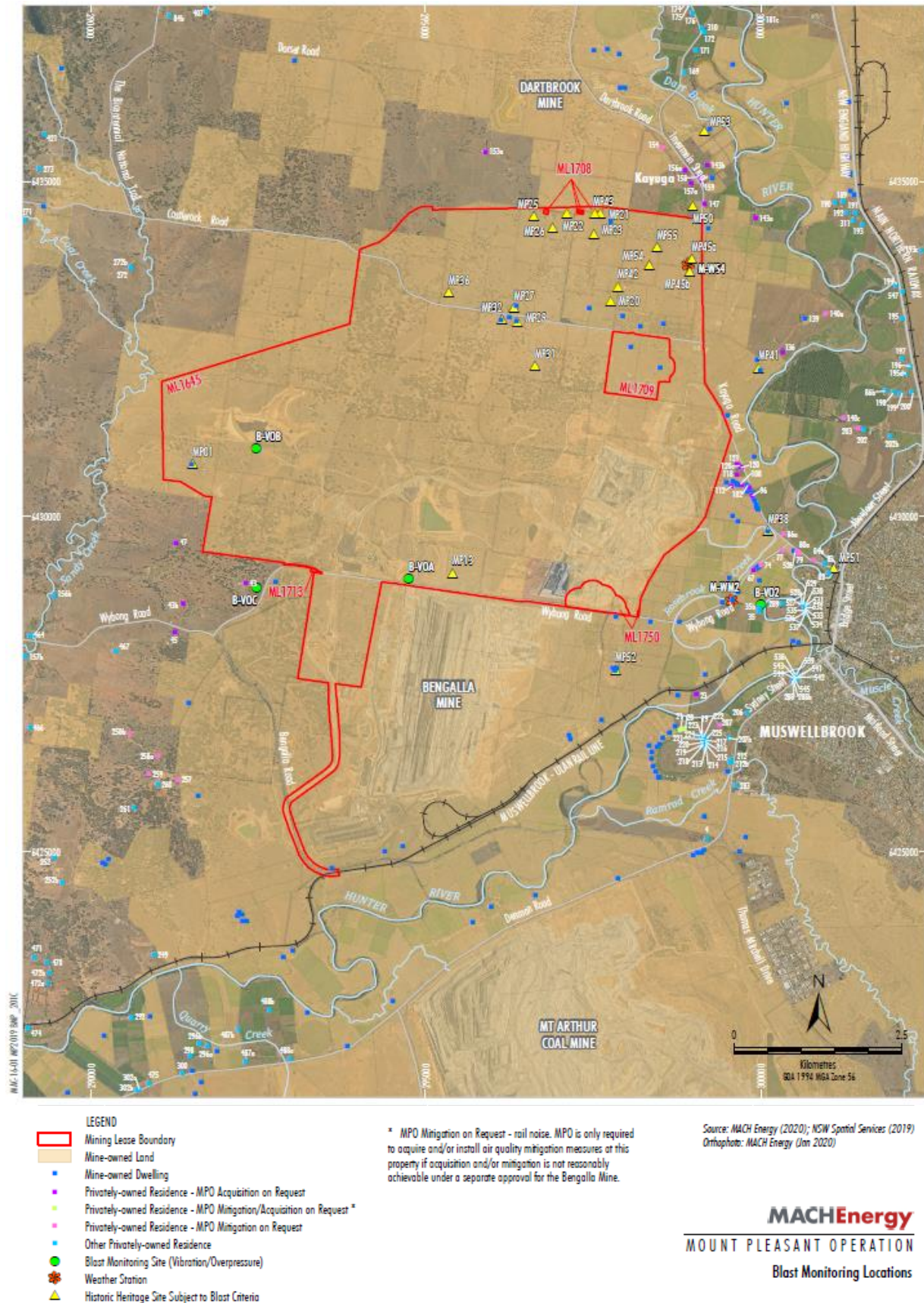


Figure 2-3 – MPO Blast Monitoring Locations

Figure 2

MACHEnergy
MOUNT PLEASANT OPERATION
Augmentations to the
Groundwater Monitoring Network

Figure 2-4 – MPO Groundwater Monitoring Network

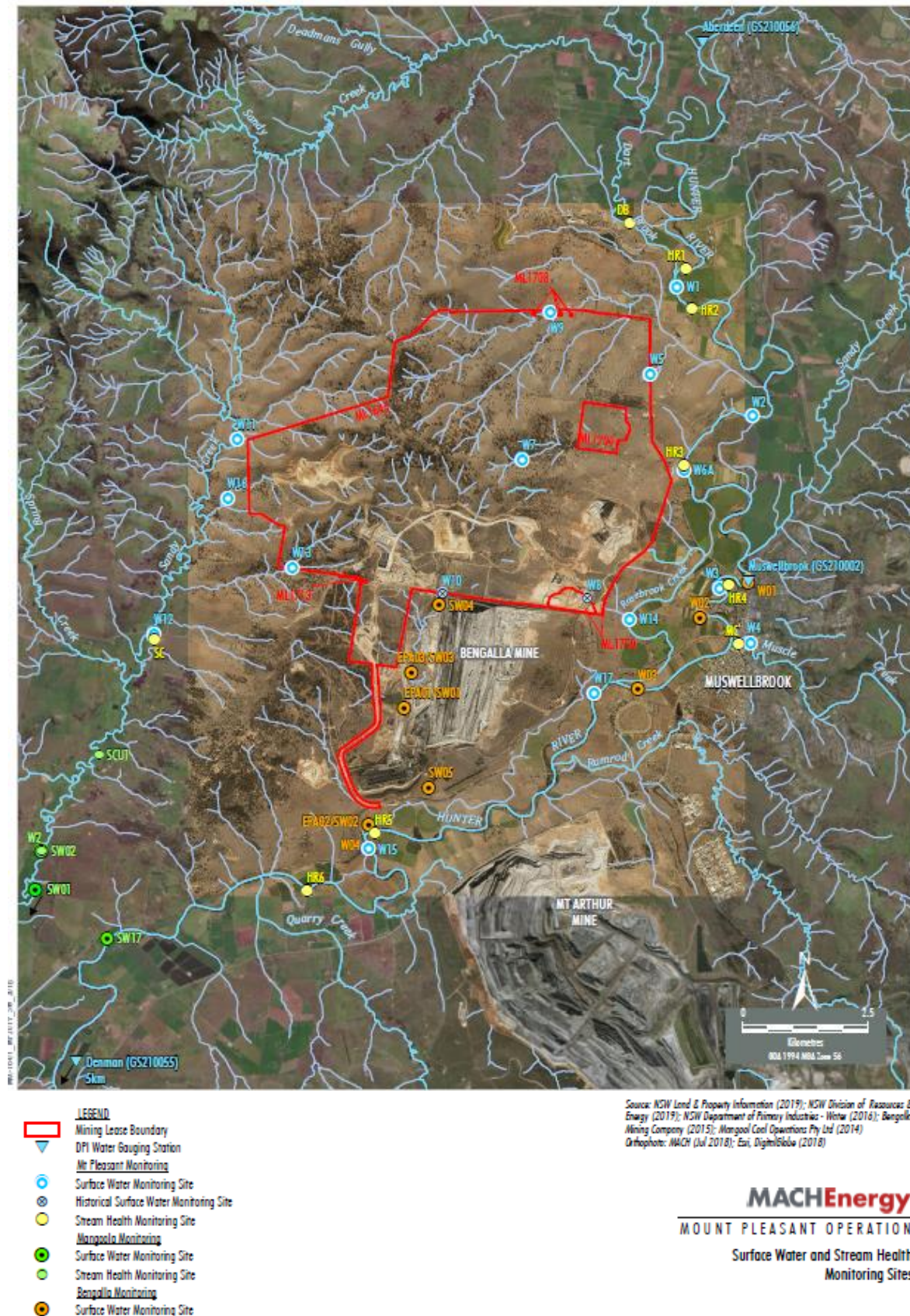


Figure 3

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 station. In addition to air quality parameters, the weather stations also measure wind speed and direction, temperature (at 2 m and 10 m), solar radiation, relative humidity, rainfall, atmospheric pressure, and sigma theta.

The majority of meteorological data was captured at M-WS2 (>99.8%) during the March 2020 monitoring period, with the exception of solar radiation data loss (91.6%). The majority of meteorological data was captured at M-WS4 (>98.6%) with the exception of temperature (10m) (92.0%) during the March 2020 monitoring period.

During March 2020, there was 55.0mm and 55.5mm 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 and 20 February 2020. Sample collection was undertaken on 19 March 2020 by AECOM with sample analysis performed by SRT, a NATA accredited laboratory. Results are summarised in **Table 4-1**. Annual rolling averages for March 2020 have been provided as an indication of annual performance between March 2019 – March 2020 and does not represent annual average results for 2020 as per Schedule 3, Condition 20 of DA 92/97.

Table 4-1: Dust Depositional Results – March 2020

Location	YTD Insoluble Solids (g/m ² .month)	Insoluble Solids Annual Rolling Average (g/m ² .month)
D1	3.7	2.7
D3a	4.0	*
D4	3.1	2.7
D5	3.6	3.7
D6	5.1^	6.8^
D7a ¹	7.3	7.9
D8	6.6	5.6
D9	4.8	4.4
D10	2.8	2.0
D11	3.9	3.1
D12	3.2	1.6
D13	6.1	4.0
D14	4.5	4.1
Criterion	-	4.0
Note: Results in bold indicate an elevated measurement of adopted assessment criteria **Indicates result unavailable due to contaminated depositional dust gauges for YTD		

Note 1: Site D7a is located within close proximity to the northern boundary of a neighbouring mining company's main pit and thus is heavily influenced by this. 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 due to site construction activities

^ Elevated results due to earthworks in the vicinity of D6 commencing 13 January 2020 not subject to DA 92/97 or EPL 20850.

Contaminated results 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 D6 (6.8 g/m².month); D7a (7.9 g/m².month); D8 (5.6 g/m².month); D9 (4.4 g/m².month) and D14 (4.1 g/m².month).

Site D7a is located within close proximity to the northern boundary of a neighbouring mining operation and thus can be influenced by this site. D7a 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 March sampling event noted that all the gauges contained insects; two contained vegetation; and four gauges contained bird droppings. The results of D7a, D12 and D13 were determined to be contaminated and the result was not included in the annual rolling average.

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

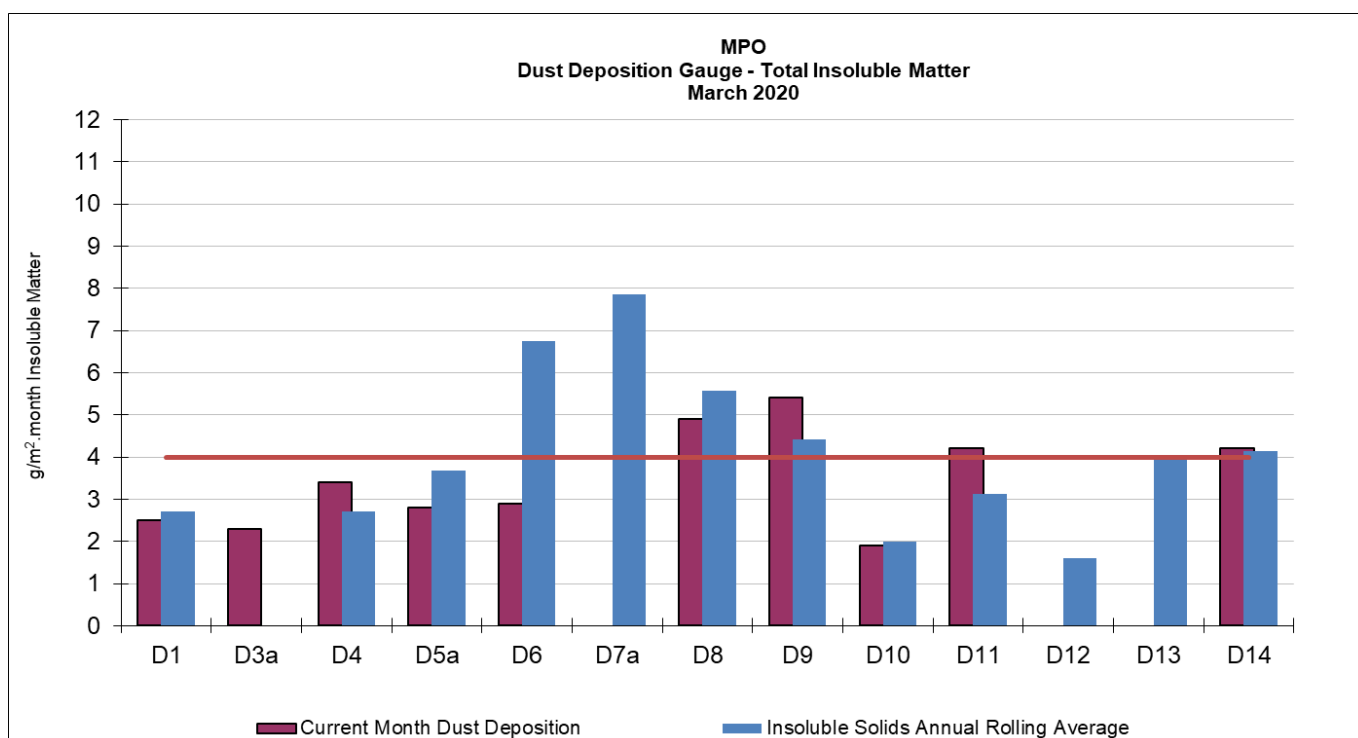


Figure 4-1: MPO Dust Deposition Monthly Results and Annual Rolling Average – March 2020

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 criterion of 90 µg/m³.

5.2 Results

In March 2020 sample collection was undertaken by AECOM with sample analysis performed by SRT, a NATA accredited laboratory. TSP results for the monitoring period are provided in **Table 5-2**. Annual rolling averages for March 2020 have been provided as an indication of annual performance between March 2019 – March 2020 and do not represent annual average results for 2020 as per Schedule 3, Condition 20 of DA 92/97.

Table 5-2 Total Suspended Particulate Monitoring Data – March 2020

Run Date	Assessment Criterion	TSP µg/m ³		
		HVAS A-PF2	HVAS M-WS4	HVAS A-PF5
3/03/2020	-	60	48	53
9/03/2020	-	44	27	38
15/03/2020	-	46	43	47
21/03/2020	-	74	62	75
27/03/2020	-	31	24	27
Monthly Mean	-	51	41	48
Annual Rolling Average	90	95	60	67

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, with the exception of A-PF2 (95 µg/m³).

6. Real Time Air Quality Monitoring

Continuous particulate matter less than 10 µm (PM₁₀) and particulate matter less than 2.5 µm (PM_{2.5}) monitoring was conducted by three Palas Fidas (one utilised for management only) units at MPO during March 2020.

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 PM₁₀ and PM_{2.5} annual rolling averages for March 2020 have been provided in Section 6.2 and 6.4 respectively, as an indication of annual performance between March 2019 – March 2020 and does not represent annual average results for 2020 as per Schedule 3, Condition 20 of DA 92/97.

6.1 PM₁₀ Results – 24 hour rolling average

There were no elevated PM₁₀ measurements reported at MPO throughout March 2020. The Muswellbrook NW monitor was operational during all days of March 2020. During this period, approximately 14 total mining machinery hours were lost due to dust delays / shutdowns executed at MPO. Real time PM₁₀ 24 hour rolling average results for March 2020 are presented in **Table 6-1**.

Table 6-1: MPO Palas Fidas PM₁₀ Data – March 2020

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					
1/03/2020	22	17	12	22	44	50
2/03/2020	26	17	14	32	44	50
3/03/2020	19	16	13	24	44	50
4/03/2020	15	13	11	16	44	50
5/03/2020	12	11	8	13	44	50
6/03/2020	12	8	7	9	44	50
7/03/2020	14	13	10	16	44	50
8/03/2020	13	11	-	13	44	50
9/03/2020	11	10	8	13	44	50
10/03/2020	13	11	8	13	44	50
11/03/2020	14	10	9	14	44	50
12/03/2020	12	11	8	12	44	50
13/03/2020	16	15	12	17	44	50
14/03/2020	14	12	10	28	44	50
15/03/2020	14	12	10	17	44	50
16/03/2020	9	9	8	11	44	50
17/03/2020	12	9	9	12	44	50
18/03/2020	18	15	11	21	44	50
19/03/2020	20	11	9	22	44	50
20/03/2020	20	12	11	22	44	50
21/03/2020	24	21	16	33	44	50
22/03/2020	26	20	16	31	44	50
23/03/2020	18	14	11	20	44	50
24/03/2020	19	16	12	21	44	50
25/03/2020	23	16	10	22	44	50
26/03/2020	13	11	9	11	44	50
27/03/2020	15	13	11	16	44	50
28/03/2020	14	12	9	23	44	50
29/03/2020	15	11	9	17	44	50
30/03/2020	10	9	6	10	44	50
31/03/2020	11	10	7	11	44	50

Note: 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 March 2020.

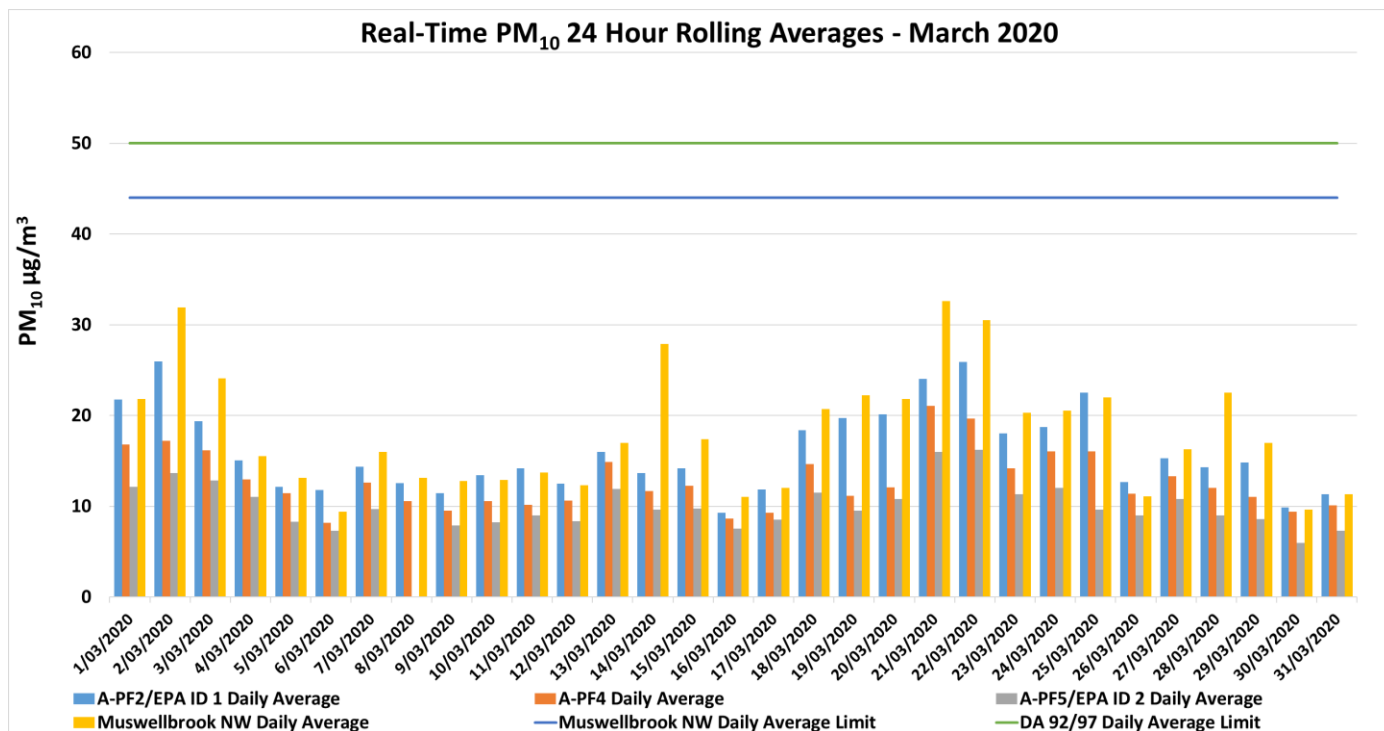


Figure 6-1: Real-time PM₁₀ 24 hour rolling average results for March 2020.

6.2 PM₁₀ Results – Annual rolling average

Elevated readings have been measured for the annual rolling average of PM₁₀ data collected since the amendment of the limit from 30 µg/m³ to 25 µg/m³ during approval of Modification 3 (MOD 3) of DA 92/97, dated 24 August 2018. Wider regional air quality events, including dust storms and bushfires, have contributed to elevated PM₁₀ levels.

Real time PM₁₀ annual rolling averages for March 2020 are presented in **Figure 6-2** below.

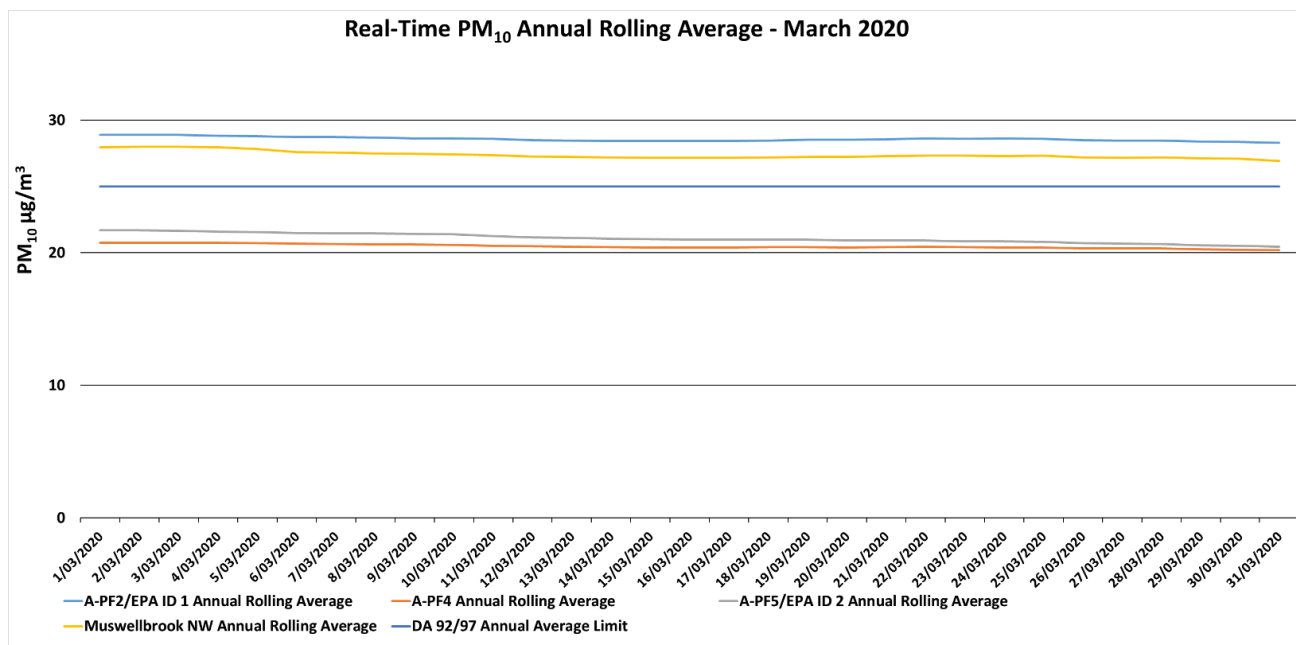


Figure 6-2: Real-time PM₁₀ Annual Rolling average results for March 2020.

6.3 PM_{2.5} Results – 24 hour rolling average

There were no elevated PM_{2.5} measurements reported throughout March 2020. Real time PM_{2.5} 24 hour rolling average results for March 2020 are presented in **Table 6-2**.

Table 6-2: MPO Palas Fidas PM_{2.5} Data – March 2020

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			
1/03/2020	7	7	6	25
2/03/2020	6	6	5	25
3/03/2020	8	7	7	25
4/03/2020	6	5	5	25
5/03/2020	5	5	4	25
6/03/2020	4	4	3	25
7/03/2020	5	5	5	25
8/03/2020	5	4	-	25
9/03/2020	4	4	3	25
10/03/2020	4	4	3	25
11/03/2020	4	3	3	25
12/03/2020	4	4	3	25
13/03/2020	4	4	4	25
14/03/2020	4	4	4	25
15/03/2020	4	4	4	25
16/03/2020	3	3	3	25
17/03/2020	4	4	4	25
18/03/2020	5	4	4	25

19/03/2020	4	4	3	25
20/03/2020	4	4	3	25
21/03/2020	7	7	6	25
22/03/2020	9	8	7	25
23/03/2020	6	5	5	25
24/03/2020	5	5	5	25
25/03/2020	6	5	4	25
26/03/2020	5	5	5	25
27/03/2020	6	5	5	25
28/03/2020	6	5	4	25
29/03/2020	5	4	4	25
30/03/2020	4	3	3	25
31/03/2020	4	4	3	25

Note: 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 March 2020 are presented in **Figure 6-3** below.

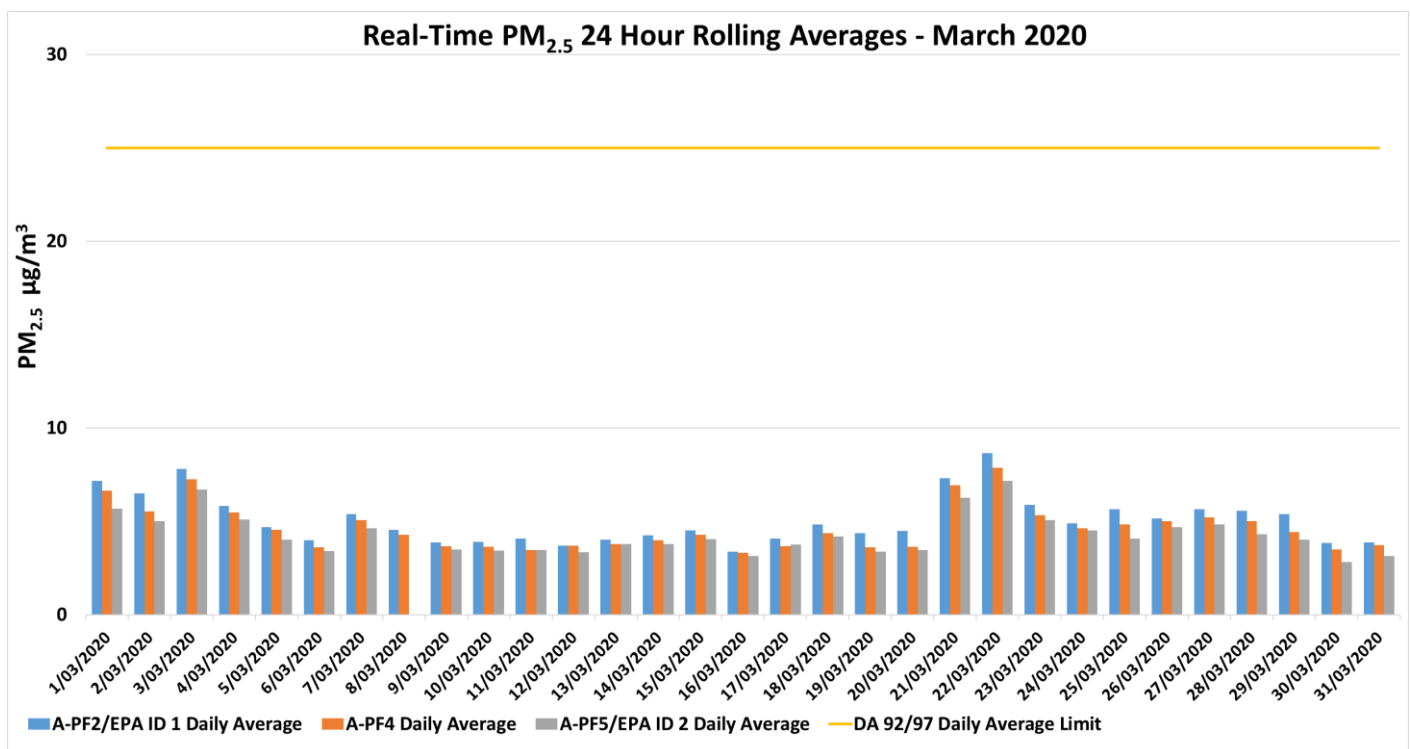


Figure 6-3: Real-time PM_{2.5} 24 hour rolling average results for March 2020.

6.4 PM_{2.5} Results - Annual rolling average

The requirement of annual rolling average of PM_{2.5} data was incepted during MOD 3 of DA 92/97, dated 24 August 2018. Elevated readings have been measured for the annual rolling average of PM_{2.5} data collected during March 2020. Wider regional air quality events, including dust storms and bushfires in late 2019, have contributed to elevated PM_{2.5} levels.

Real time PM_{2.5} annual rolling averages for March 2020 are presented in **Figure 6-4** below

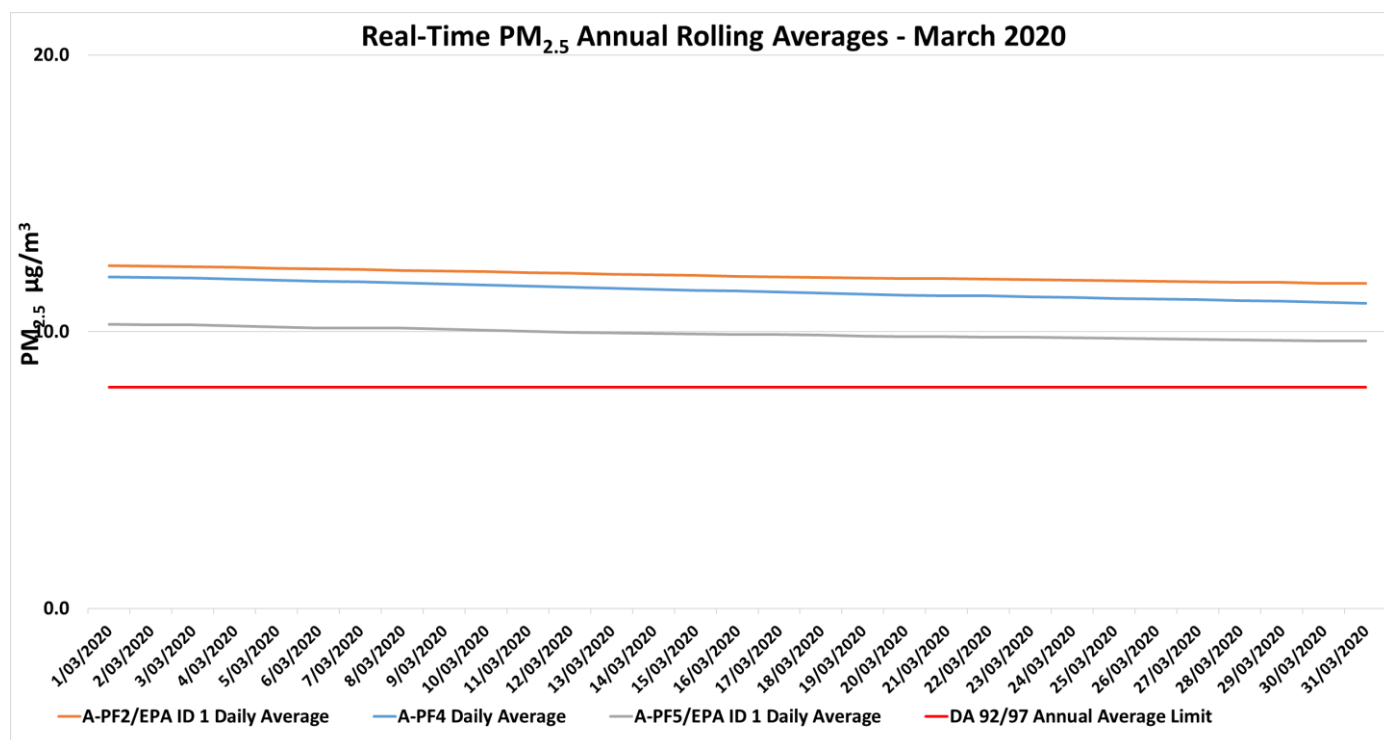


Figure 6-4: Real-time PM_{2.5} Annual Rolling average results for March 2020.

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 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 6 March 2020. Laboratory analysis was performed by SRT and SGS, both NATA accredited laboratories. Monthly monitoring results for pH, EC, TSS and TDS are presented in **Table 7-1**.

Table 7-1 – MPO Monthly Surface Water Monitoring Results – 6 March 2020

Station	pH	Electrical Conductivity (EC) (µs/cm) ¹	Total Suspended Solids (TSS) (mg/L)	Total Dissolved Solids (TDS) (mg/L)
W1	8.0	460	59	285
W2	^	^	^	^
W3	7.6	640	48	389
W4	7.2	690	8	427
W5	*	*	*	*
W6A	8.0	530	39	313
W7	*	*	*	*
W9	*	*	*	*
W11	^	^	^	^
W12	7.7	2400	6	1320
W13	7.3	140	64	242**
W14	*	*	*	*
W15	7.6	780	53	483
W16	7.6	280	64	215
W17	7.6	620	89	382

Note: 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).

Six of the fifteen monitoring locations were found to be dry or were not safely accessible on 6 March 2020. All sites sampled were below or inside the trigger level values with the exception of W6A and W17. An investigation into the elevated measurement will be triggered if this occurs for three consecutive sampling events in accordance MPO Water Management Plan (MACH Energy, 2019).

8. Groundwater Monitoring

Due to above average rainfall in February 2020 and associated access issues, the remainder of the quarterly groundwater monitoring not completed on 6 February 2020 was completed on 2 – 5, 9, 10 – 12 and 23 March 2020.

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)	November 2019 Water Level (DTW)	August 2019 Water Level (DTW)	Triggered (Yes/No)
	80 th Percentile (DTW)	Trigger				
WRA3L	-	± 0.5m	15.84	16.02	15.93	
WRA3U	-	± 0.5m	4.88	4.80	4.48	
WRA5L	-	± 0.5m	0.00	0.99	0.00	
WRA5U	-	± 0.5m	0.65	1.78	0.43	
WRA6U	-	± 0.5m	4.21	4.27	4.10	
MPBH1	9.71	10.70	10.03	9.69	10.00	No
MPBH2	12.20	14.20	12.51	12.51	12.47	No
MPBH4	-	± 0.5m	12.37	12.40	12.38	
MPBH5	-	± 0.5m	*	*	*	
MPBH1-C***	-	± 0.5m	10.21	-	-	
MPBH1-HR***	-	± 0.5m	10.21	-	-	
MPBH2-C***	-	± 0.5m	12.91	-	-	
MPBH2-HR***	-	± 0.5m	12.86	-	-	
MPBH4-C***	-	± 0.5m	57.66	-	-	
MPBH4-HR***	-	± 0.5m	50.76	-	-	
MPBH5-C***	-	± 0.5m	12.79	-	-	
MPBH5-HR***	-	± 0.5m	12.34	-	-	
MPBH6***	-	± 0.5m	10.39	-	-	
MPBH6-C***	-	± 0.5m	12.67	-	-	
MPBH6-HR***	-	± 0.5m	11.68	-	-	
MPBH7***	-	± 0.5m	9.71	-	-	
MPBH7-C***	-	± 0.5m	19.01	-	-	
3500C500 (L)	-	± 0.5m	58.06	57.74	57.44	
3500C500 (S)	-	± 0.5m	26.10	26.09	26.05	
4500F000	-	± 0.5m	31.36	29.09	28.31	
5000D000	-	± 0.5m	100.52	97.89	90.85	
6500F500L	-	± 0.5m	53.01	52.96	52.86	
6500F500M	-	± 0.5m	54.64	54.58	54.48	
6500F500U	-	± 0.5m	*	*	*	
7500F000	-	± 0.5m	36.39			

* Dry/insufficient water to sample

** Bore appeared to be blocked

*** New site

- 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 exceeded the adopted assessment criterion for changes in standing water level of $\pm 0.5\text{m}$ from the previous measurement.

Table 8-2 - MPO Quarterly Groundwater pH results

Monitoring Location/ ID	pH Trigger Range		Current Month pH	Nov 2019 pH	Aug 2019 pH	Triggered (Yes/No)
	Lower	Upper				
WRA3L	6.5	8.5	6.8	6.7	6.8	No
WRA3U			7.2	7.6	7.2	No
WRA5L			7.2	7.9	7.3	No
WRA5U			7.3	7.4	7.4	No
WRA6U			6.8	6.9	6.9	No
MPBH1			7.0	7.1	7.1	No
MPBH2			6.8	7.0	6.9	No
MPBH4			7.0	7.0	7.0	No
MPBH5			*	*	*	-
MPBH1-C***			7.5	-	-	-
MPBH1-HR***			8.0	-	-	-
MPBH2-C***			12.3***	-	-	-
MPBH2-HR***			11.2***	-	-	-
MPBH4-C***			8.4	-	-	-
MPBH4-HR***			8.3	-	-	-
MPBH5-C***			12.2***	-	-	-
MPBH5-HR***			7.4	-	-	-
MPBH6***			7.0	-	-	-
MPBH6-C***			7.8	-	-	-
MPBH6-HR***			7.2	-	-	-
MPBH7***			7.2	-	-	-
MPBH7-C***			7.6	-	-	-
3500C500 (L)			7.4	7.4	7.5	No
3500C500 (S)			7.2	7.2	7.0	No
4500F000			6.7	6.8	6.8	No
5000D000			6.9	6.9	6.9	No
6500F500L			7.4	7.4	7.5	No
6500F500M			7.3	7.3	7.3	No
6500F500U			*	*	*	-
7500F000			7.7	7.8	7.8	No

* Dry/insufficient water to sample

** Bore appeared to be blocked

*** New site

- 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 2019 EC	Aug 2019 EC	Triggered (Yes/No)
	Maximum Beneficial Use Trigger				
WRA3L	22000	16000	16600	16100	No
WRA3U	22000	5450	3600	6800	No
WRA5L	7800	2850	2900	2750	No
WRA5U	7800	2750	2900	2750	No
WRA6U	22000	10900	11200	10800	No
MPBH1	800	500	480	450	No
MPBH2	930	760	850	800	No
MPBH4	^	5500	6150	5550	-
MPBH5	^	*	*	*	-
MPBH1-C***	^	830	-	-	-
MPBH1-HR***	^	580	-	-	-
MPBH2-C***	^	4200****	-	-	-
MPBH2-HR***	^	830	-	-	-
MPBH4-C***	^	3450	-	-	-
MPBH4-HR***	^	3400	-	-	-
MPBH5-C***	^	3100	-	-	-
MPBH5-HR***	^	830	-	-	-
MPBH6***	^	1250	-	-	-
MPBH6-C***	^	6650	-	-	-
MPBH6-HR***	^	6400	-	-	-
MPBH7***	^	11600****	-	-	-
MPBH7-C***	^	11000****	-	-	-
3500C500 (L)	7800	4000	4000	3950	No
3500C500 (S)	7800	4950	5000	4700	No
4500F000	22000	9450	9400	9300	No
5000D000	800	840	830	820	Yes
6500F500L	7800	4000	3900	3750	No
6500F500M	7800	3050	3050	3000	No
6500F500U	7800	*	*	*	-
7500F000	7800	6500	6450	6350	No

* Dry/insufficient water to sample

** Bore appeared to be blocked

*** New site

^ 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).

Results of newly installed groundwater monitoring locations are suspected to have residual impacts from bore installation and as such these results are not considered to be representative of groundwater chemistry at the monitoring location at the time of sampling.

Following the completion of the remainder this quarterly groundwater monitoring in March 2020, the next quarterly monitoring event is scheduled for May 2020.

9. Noise Monitoring

Attended noise monitoring was undertaken during the night period of 18 March 2020 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 March 2020 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 – 18 March 2020

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	18/03/20 23:27	1.8	E	45	Yes	IA	Nil
N-AT2	18/03/20 22:03	0.7	F	45	Yes	IA	Nil
N-AT3	18/03/20 22:58	0.9	F	45	Yes	NM	Nil
N-AT4	18/03/20 23:23	1.8	E	45	Yes	40	Nil
N-AT5	18/03/20 23:48	1.3	F	45	Yes	43	Nil
N-AT6	18/03/20 22:46	0.9	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;
- NA in exceedance column means meteorological conditions outside those specified in Condition L2.3 of EPL 20850 and thus criterion is not applicable; and
- Bold results indicate exceedance of criteria.

Table 9-2 – $L_{Aeq,15min}$ Generated by MPO: Attended Night Monitoring – 18 March 2020

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	18/03/20 23:27	1.8	E	43	Yes	IA	Nil
N-AT2	18/03/20 22:03	0.7	F	36	Yes	IA	Nil
N-AT3	18/03/20 22:58	0.9	F	41	Yes	NM	Nil
N-AT4	18/03/20 23:23	1.8	E	42	Yes	30	Nil
N-AT5	18/03/20 23:48	1.3	F	40	Yes	37	Nil
N-AT6	18/03/20 22:46	0.9	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 – 18 March 2020

Location	Start Date and Time	Cumulative Noise Criterion L_{Aeq} dB	Measured Mining Only $L_{Aeq,period}$ dB ^{1,2}	Exceedance dB
N-AT1	18/03/20 23:27	40	Nil	Nil
N-AT2	18/03/20 22:03	40	Nil	Nil
N-AT3	18/03/20 22:58	40	Nil	Nil
N-AT4	18/03/20 23:23	40	33	Nil
N-AT5	18/03/20 23:48	40	37	Nil
N-AT6	18/03/20 22:46	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 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 Noise Management Plan (MACH Energy, 2019). Noise levels from MPO complied with noise limits at all monitoring locations during the March 2020 monitoring period.

10. Blast Monitoring

There were 7 blast events during March (a total of 18 blasts YTD). Results for March 2020 are presented in **Table 10-1**. All blast results during the March 2020 monitoring period were below the criteria in Schedule 3, Condition 10 of DA 92/97 and EPL 20850 and thus the MPO remains compliant in 2020 YTD.

Table 10-1 – MPO Blast Monitoring Results – March 2020

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
Wednesday 04/03/20	13:36	0.640	102.3	0.440	96.6	1.890	101.3
Thursday 12/03/20	13:07	0.500	111.6	0.350	108.9	1.070	101.6
Friday 13/03/20	17:00	1.170	104	0.600	96.1	1.430	103.2
Wednesday 18/03/20	14:56	0.750	101.5	0.400	93	1.020	106
Thursday 19/03/20	15:09	0.280	90.6	0.470	83	0.490	100.5
Tuesday 24/03/20	13:02	0.630	97.1	0.350	93.6	1.880	103.5
Monday 30/03/20	13:08	0.920	98.3	0.620	92.4	1.310	105.1