

**Mount Pleasant Operation  
Monthly Environmental Monitoring Report**

**May 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**

<b>Name of Operation</b>	Mount Pleasant Operation
<b>Name of Licensee</b>	MACH Energy Australia Pty Ltd
<b>Environmental Protection Licence</b>	20850
<b>Project Approval</b>	DA 92/97
<b>Reporting Period Start Date</b>	1 May 2020
<b>Reporting Period End Date</b>	31 May 2020
<b>Date All Data Received</b>	8 July 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

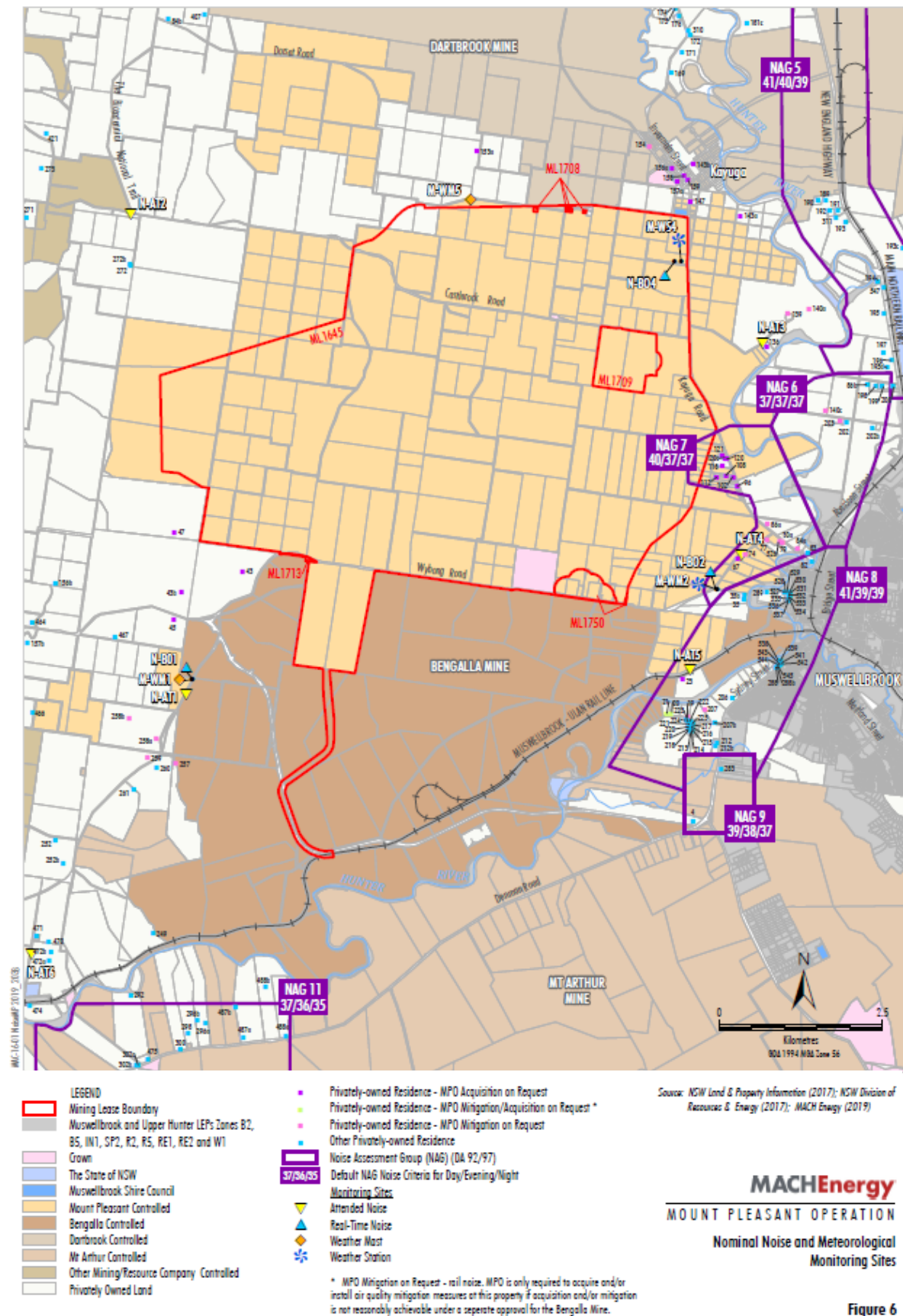
The MPO EPL 20850 specifically requires the monitoring of:

- 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 the following figures. **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.





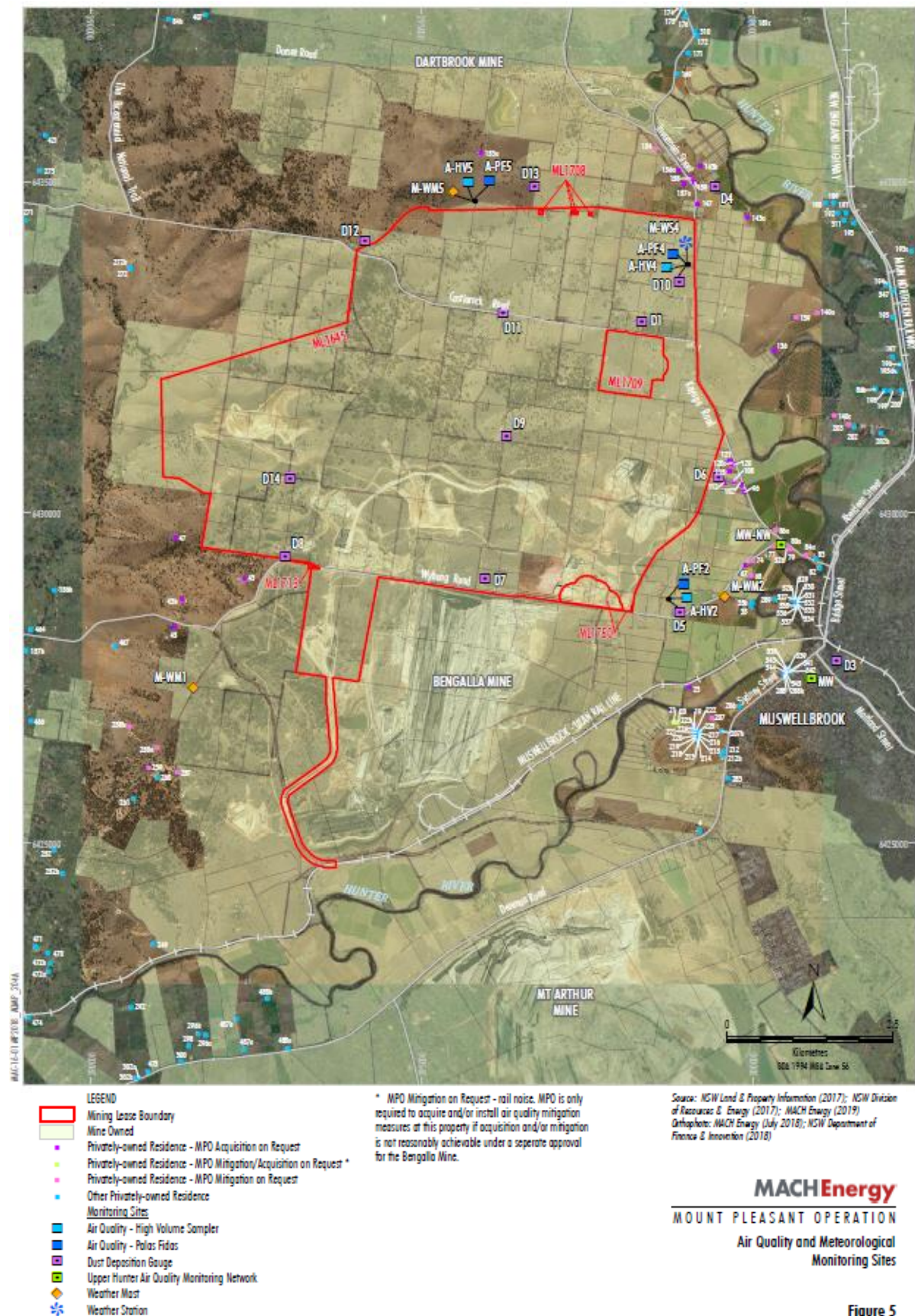


Figure 5

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



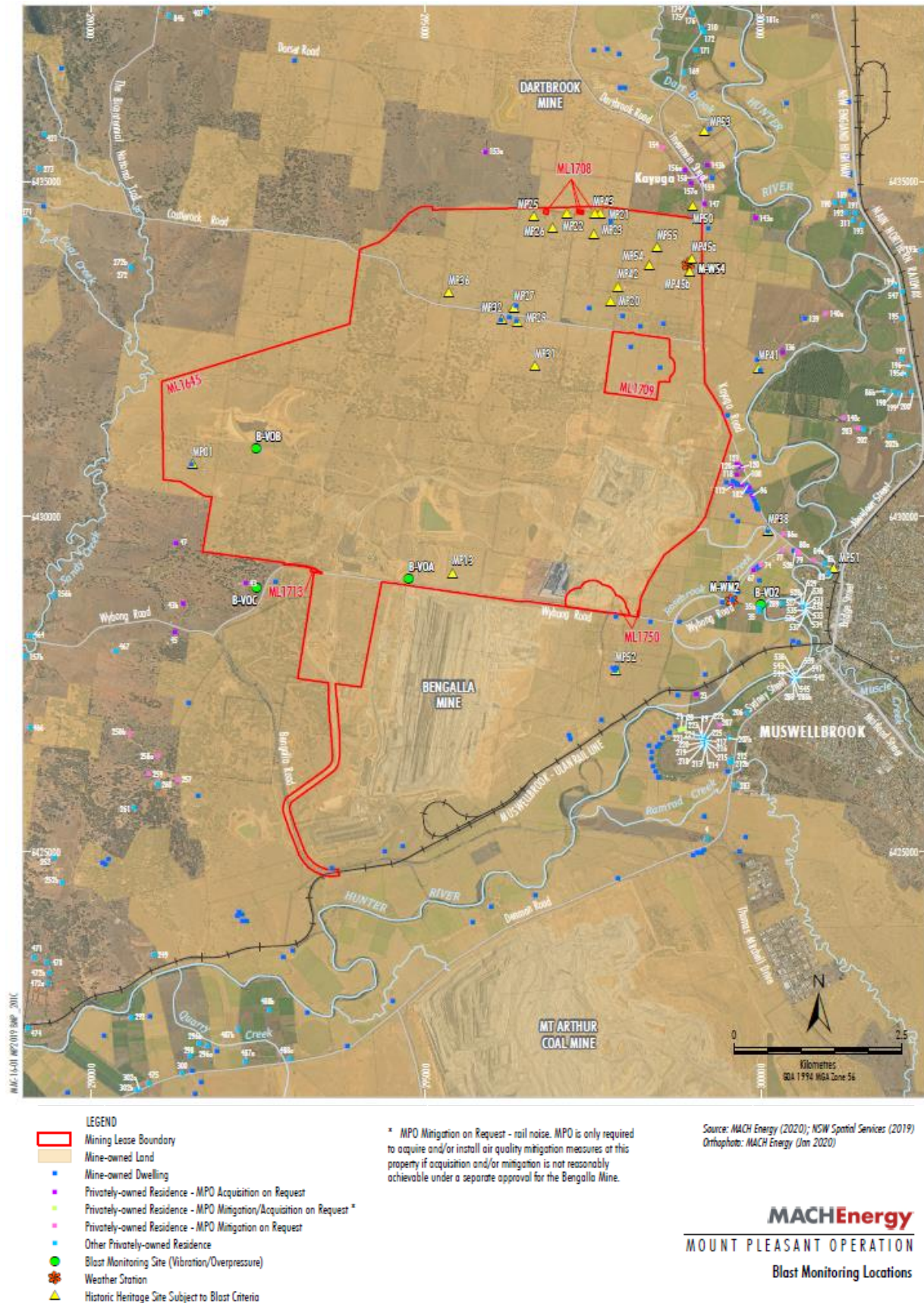
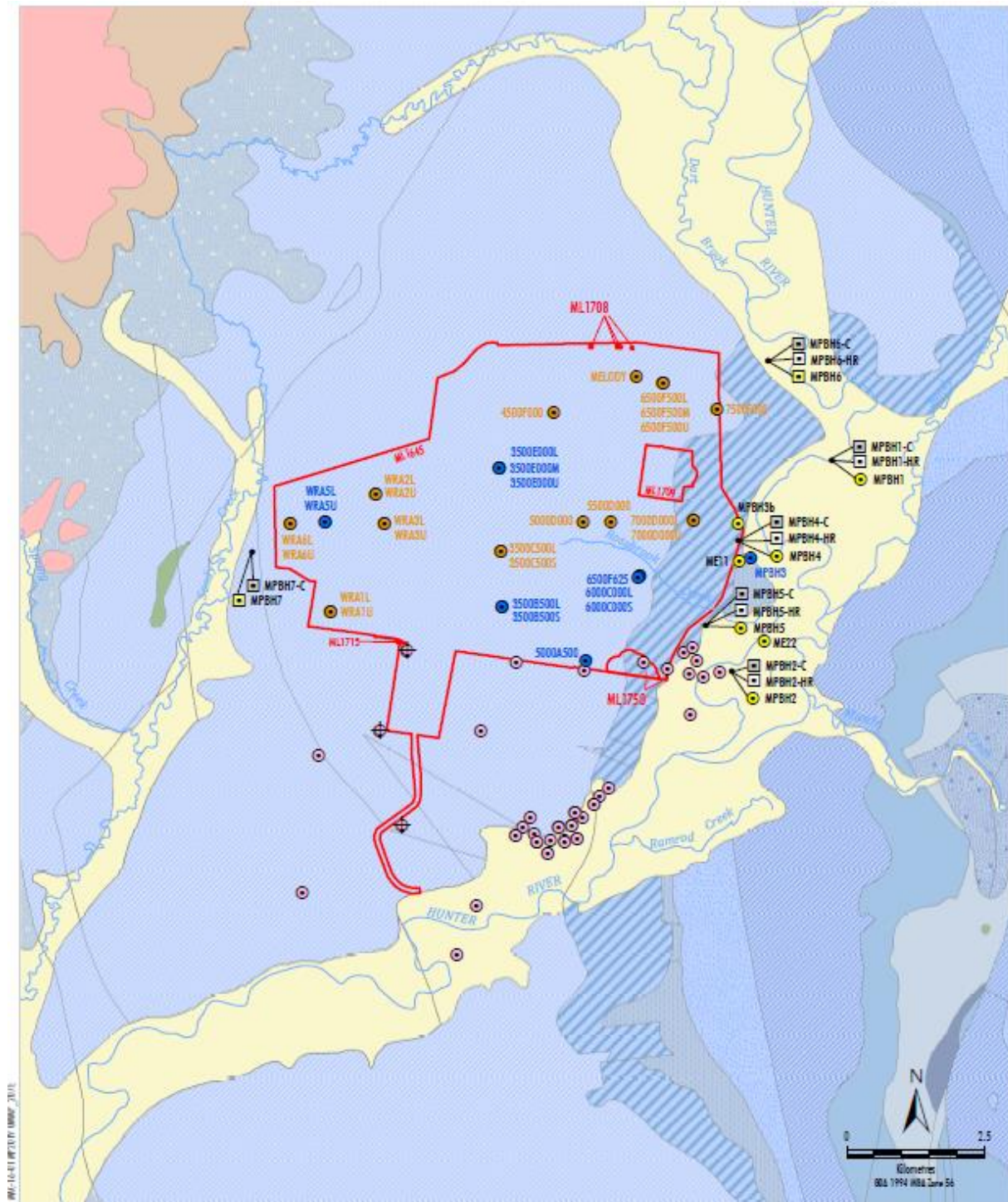


Figure 2-3 – MPO Blast Monitoring Locations

Figure 2





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

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

Note: Refer Figure 3 for geology legend

**MACHEnergy**  
MOUNT PLEASANT OPERATION  
Augmentations to the  
Groundwater Monitoring Network

Figure 9

Figure 2-4 – MPO Groundwater Monitoring Network





Figure 3

Figure 2-5 – MPO Surface Water Monitoring Network

### 3. Meteorological Monitoring

Weather data is measured continuously at the Kayuga Road (M-WS4) and the Wybong Road (M-WS2) meteorological stations. In addition to air quality parameters, the weather stations measure wind speed and direction, 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 (>99.2%) during the May 2020 monitoring period, with the exception of solar radiation data loss (86.4%) and temperature (2m) (87.3%). The majority of meteorological data was captured at M-WS4 (>98.1%) with the exception of temperature (2m and 10m) (37.3%).

Throughout May 2020, there was 24.6mm and 21.6mm of rainfall recorded at M-WS2 and M-WS4 respectively.

### 4. Dust Depositional Monitoring

#### 4.1 Methodology

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

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

#### 4.2 Results

The dust deposition exposure period for all gauges commenced on 20 April 2020. Sample collection was undertaken on 21 May 2020 by AECOM with sample analysis performed by SRT, a NATA accredited laboratory. Results are summarised in **Table 4-1**. Annual rolling averages for May 2020 have been provided as an indication of annual performance between May 2019 – May 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 – May 2020**

Location	YTD Insoluble Solids (g/m <sup>2</sup> .month)	Insoluble Solids Annual Rolling Average (g/m <sup>2</sup> .month)
D1	3.0	2.7
D3a	3.0	*
D4	2.7	2.6
D5	3.5	3.8
D6	3.6	<b>6.6<sup>^</sup></b>
D7a <sup>1</sup>	6.8	<b>7.6</b>
D8	5.6	<b>5.3</b>
D9	4.5	4.0
D10	2.2	1.9
D11	3.9	3.1
D12	3.2	1.8
D13	5.1	<b>4.2</b>
D14	3.8	<b>4.1</b>
Criterion	-	4.0
<p><i>Note: Results in <b>bold</b> indicate an elevated measurement of adopted assessment criteria</i>  <i>**Indicates result unavailable due to contaminated depositional dust gauges for YTD</i></p>		

**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 during construction activities

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

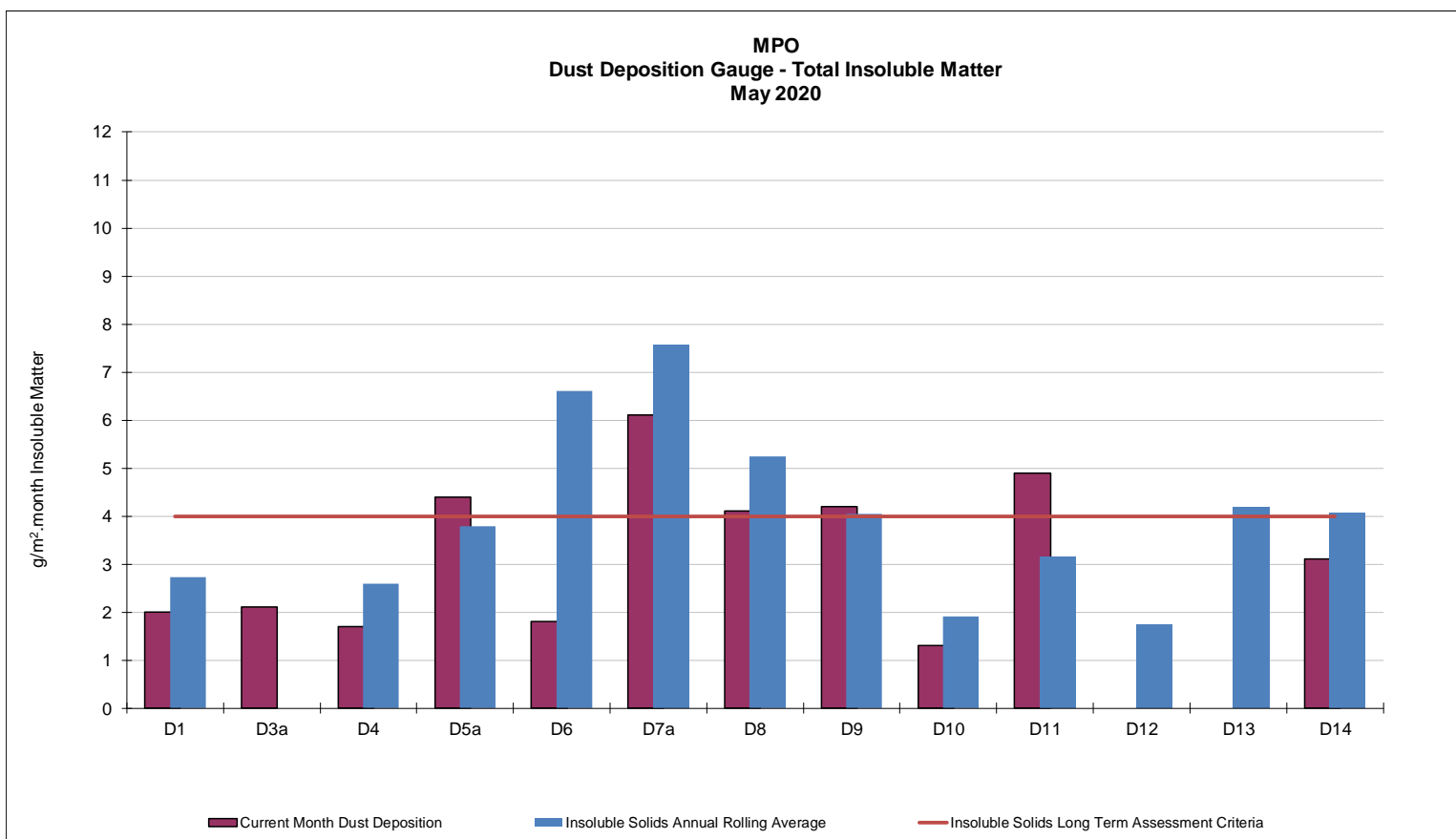
Contaminated results are not included in the 12 month rolling average. An elevated reading above the annual average criterion for dust deposition (insoluble solids) was recorded at site D6 (6.6 g/m<sup>2</sup>.month); D7a (7.6 g/m<sup>2</sup>.month); D8 (5.3 g/m<sup>2</sup>.month); D13 (4.2 g/m<sup>2</sup>.month); and D14 (4.1 g/m<sup>2</sup>.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 May 2020 sampling event noted that all the gauges contained insects and three gauges contained bird droppings. The results of D12 and D14 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 – May 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 project contribution criterion of 90 µg/m<sup>3</sup>.

### 5.2 Results

In May 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 May 2020 have been provided as an indication of annual performance between May 2019 – May 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 – May 2020**

Run Date	Assessment Criterion	TSP µg/m <sup>3</sup>		
		HVAS A-PF2	HVAS M-WS4	HVAS A-PF5
2/05/2020	-	25	9	9
8/05/2020	-	44	16	13
14/05/2020	-	46	38	43
20/05/2020	-	45	21	15
26/05/2020	-	31	29	18
Monthly Mean	-	38	23	20
<b>Annual Rolling Average</b>	<b>90</b>	88	58	65

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<sup>3</sup>, with the exception of A-PF2 (92 µg/m<sup>3</sup>).

## 6. Real Time Air Quality Monitoring

Continuous particulate matter less than 10  $\mu\text{m}$  ( $\text{PM}_{10}$ ) and particulate matter less than 2.5  $\mu\text{m}$  ( $\text{PM}_{2.5}$ ) monitoring was conducted by three Palas Fidas (one utilised for management only) units at MPO during May 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  $\text{PM}_{10}$  and  $\text{PM}_{2.5}$  annual rolling averages for May 2020 have been provided in Section 6.2 and 6.4 respectively, as an indication of annual performance between May 2019 – May 2020 and does not represent annual average results for 2020 as per Schedule 3, Condition 20 of DA 92/97.

### 6.1 $\text{PM}_{10}$ Results – 24 hour rolling average

There were no elevated  $\text{PM}_{10}$  measurements reported at MPO throughout May 2020. The Muswellbrook NW monitor was operational during all days of May 2020. Real time  $\text{PM}_{10}$  24 hour rolling average results for May 2020 are presented in **Table 6-1**.

**Table 6-1: MPO Palas Fidas  $\text{PM}_{10}$  Data – May 2020**

Date	A-PF2/EPA ID 1	A-PF4	A-PF5/EPA ID 2	Muswellbrook NW	Muswellbrook NW 24 Hour Average Limit ( $\mu\text{g}/\text{m}^3$ )	A-PF2, A-PF4, A-PF5 24 Hour Average Limit ( $\mu\text{g}/\text{m}^3$ )
	24 hour Average Result					
1/05/2020	9	7	7	9	44	50
2/05/2020	8	6	6	9	44	50
3/05/2020	9	6	5	10	44	50
4/05/2020	12	11	10	15	44	50
5/05/2020	13	14	10	16	44	50
6/05/2020	15	11	8	14	44	50
7/05/2020	14	9	7	13	44	50
8/05/2020	15	10	8	16	44	50
9/05/2020	13	9	8	15	44	50
10/05/2020	11	7	7	13	44	50
11/05/2020	15	11	9	16	44	50
12/05/2020	19	17	12	22	44	50
13/05/2020	25	19	8	29	44	50
14/05/2020	15	11	10	17	44	50
15/05/2020	15	14	10	19	44	50
16/05/2020	11	10	8	11	44	50
17/05/2020	14	11	10	14	44	50
18/05/2020	13	11	9	17	44	50
19/05/2020	17	17	11	15	44	50
20/05/2020	21	12	9	18	44	50
21/05/2020	11	8	7	8	44	50
22/05/2020	15	7	6	14	44	50
23/05/2020	9	7	6	8	44	50
24/05/2020	9	7	6	8	44	50

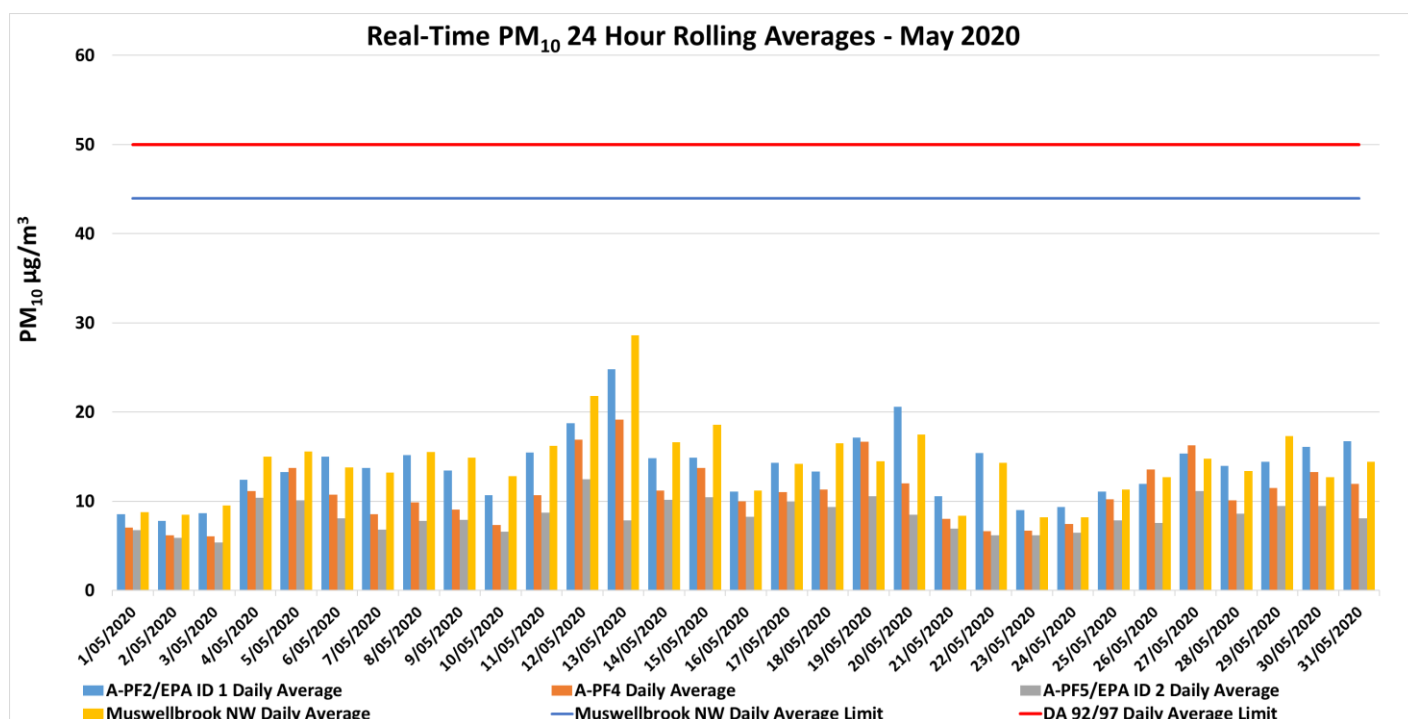


25/05/2020	11	10	8	11	44	50
26/05/2020	12	14	8	13	44	50
27/05/2020	15	16	11	15	44	50
28/05/2020	14	10	9	13	44	50
29/05/2020	14	11	9	17	44	50
30/05/2020	16	13	9	13	44	50
31/05/2020	17	12	8	14	44	50

**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 PM<sub>10</sub> 24 hour rolling average results at MPO air quality monitoring sites May 2020.

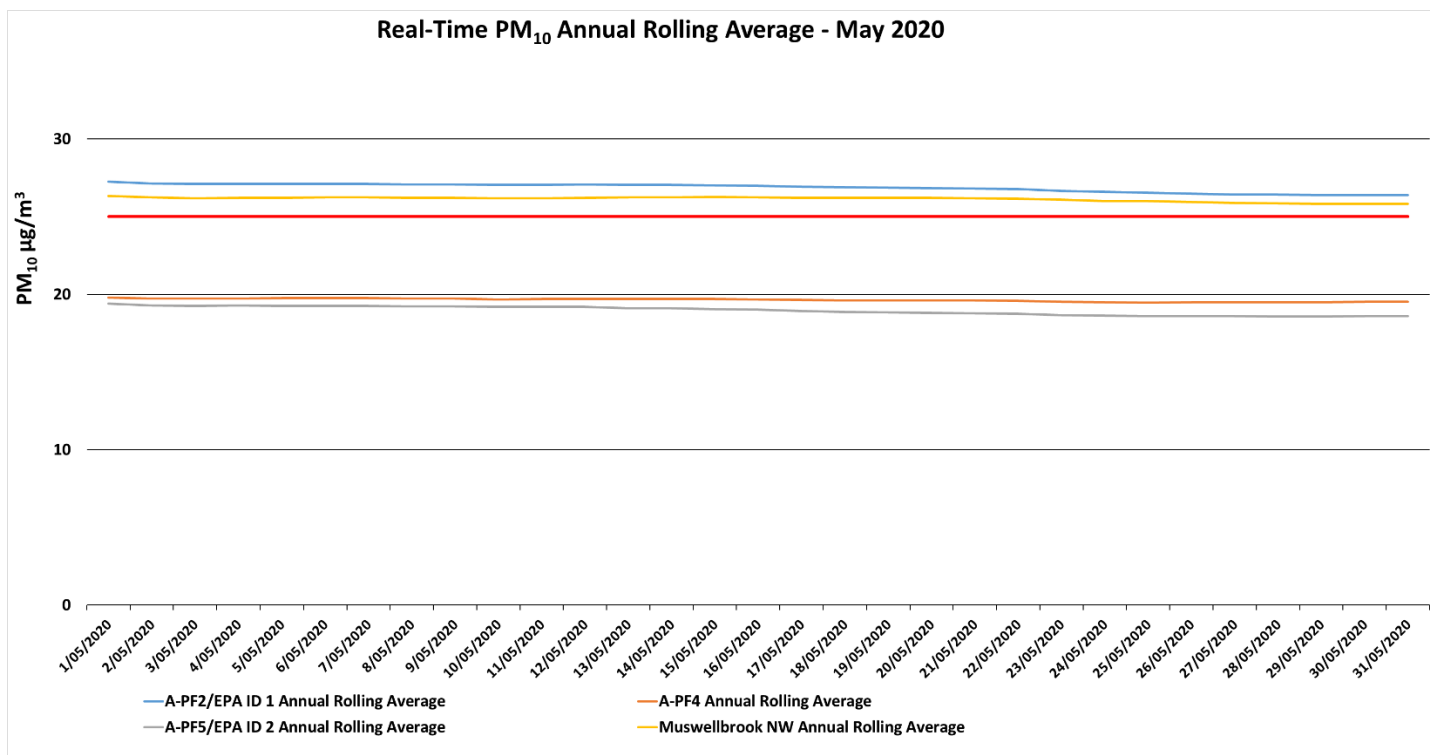


**Figure 6-1: Real-time PM<sub>10</sub> 24 hour rolling average results for May 2020.**

## 6.2 PM<sub>10</sub> Results – Annual rolling average

Elevated readings have been measured for the annual rolling average of PM<sub>10</sub> data collected since the amendment of the limit from 30 µg/m<sup>3</sup> to 25 µg/m<sup>3</sup> 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 PM<sub>10</sub> levels.

Real time PM<sub>10</sub> annual rolling averages for May 2020 are presented in **Figure 6-2** below.



**Figure 6-2: Real-time PM<sub>10</sub> Annual Rolling average results for May 2020.**

### 6.3 PM<sub>2.5</sub> Results – 24 hour rolling average

There were no elevated PM<sub>2.5</sub> measurements reported throughout May 2020. Real time PM<sub>2.5</sub> 24 hour rolling average results for May 2020 are presented in **Table 6-2**.

**Table 6-2: MPO Palas Fidas PM<sub>2.5</sub> Data – May 2020**

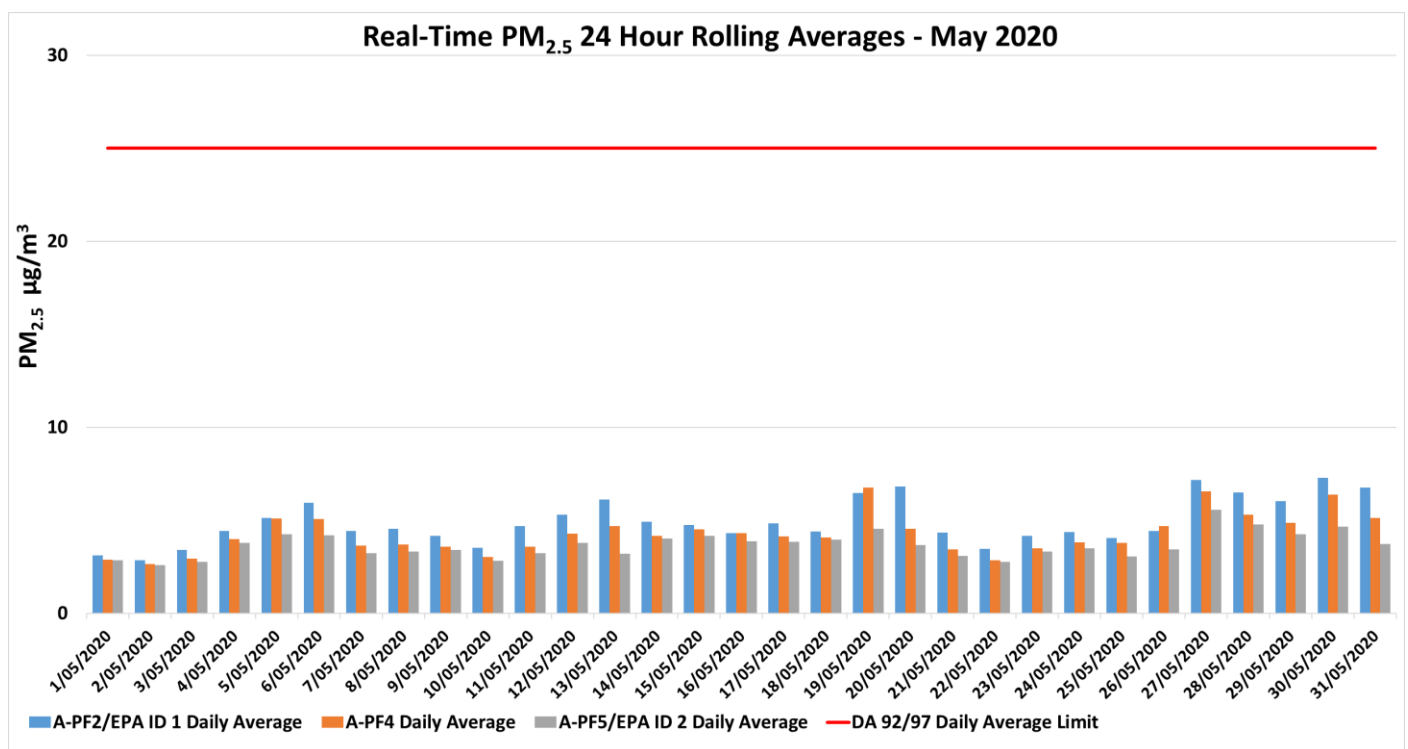
Date	A-PF2/EPA ID 1	A-PF4	A-PF5/EPA ID 2	A-PF2, A-PF4, A-PF5 24 Hour Average Limit (µg/m³)
	24 hour Average Result			
1/05/2020	3	3	3	25
2/05/2020	3	3	3	25
3/05/2020	3	3	3	25
4/05/2020	4	4	4	25
5/05/2020	5	5	4	25
6/05/2020	6	5	4	25
7/05/2020	4	4	3	25
8/05/2020	5	4	3	25
9/05/2020	4	4	3	25
10/05/2020	4	3	3	25
11/05/2020	5	4	3	25
12/05/2020	5	4	4	25
13/05/2020	6	5	3	25
14/05/2020	5	4	4	25
15/05/2020	5	5	4	25
16/05/2020	4	4	4	25



17/05/2020	5	4	4	25
18/05/2020	4	4	4	25
19/05/2020	6	7	5	25
20/05/2020	7	5	4	25
21/05/2020	4	3	3	25
22/05/2020	3	3	3	25
23/05/2020	4	3	3	25
24/05/2020	4	4	3	25
25/05/2020	4	4	3	25
26/05/2020	4	5	3	25
27/05/2020	7	7	6	25
28/05/2020	6	5	5	25
29/05/2020	6	5	4	25
30/05/2020	7	6	5	25
31/05/2020	7	5	4	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<sub>2.5</sub> 24 hour average results for May 2020 are presented in **Figure 6-3** below.



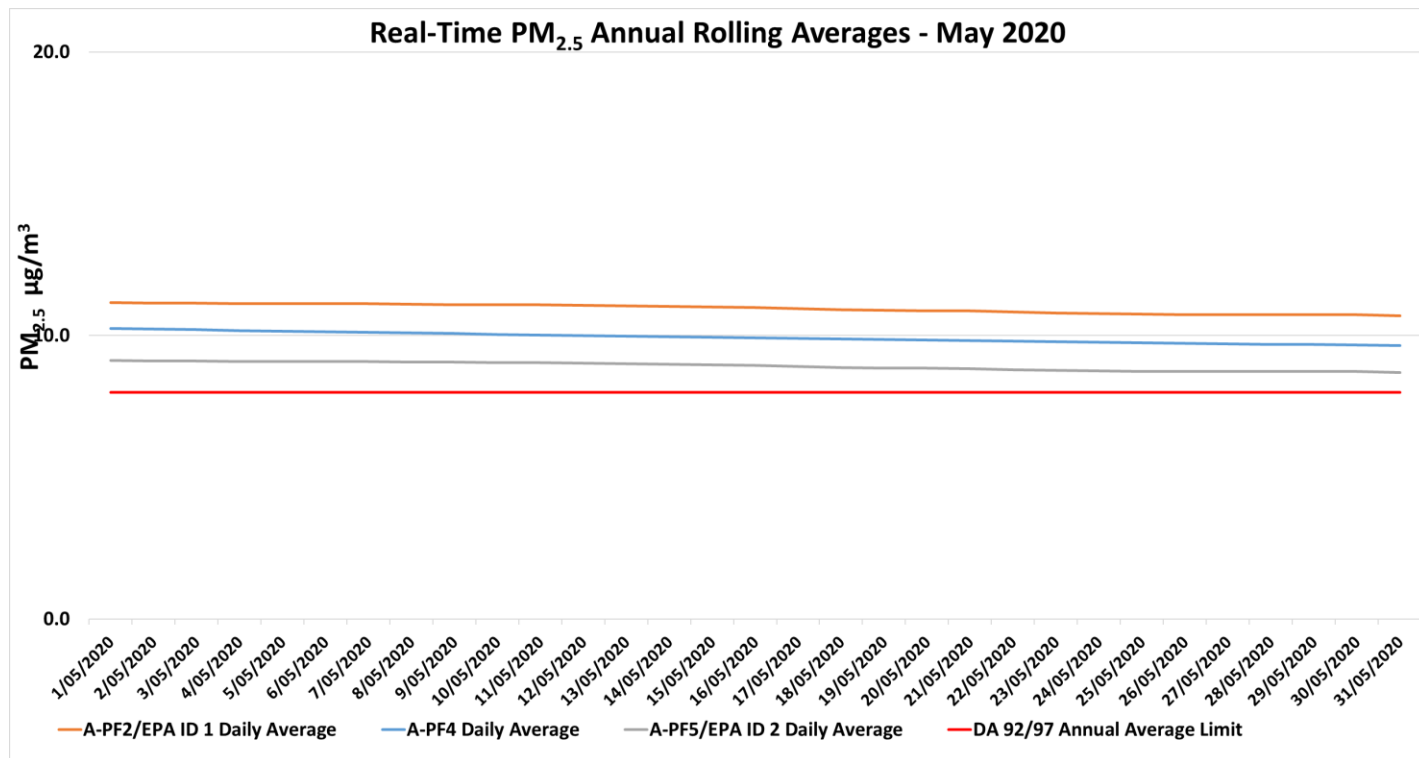
**Figure 6-3: Real-time PM<sub>2.5</sub> 24 hour rolling average results for May 2020.**

## 6.4 PM<sub>2.5</sub> Results - Annual rolling average

The requirement of the annual rolling average of PM<sub>2.5</sub> data was inceptioned during MOD 3 of DA 92/97, dated 24 August 2018. Elevated readings have been measured for the annual rolling average of PM<sub>2.5</sub> data collected during May 2020. Wider regional air quality events,

including dust storms and bushfires in late 2019, have contributed to elevated rolling PM<sub>2.5</sub> average levels.

Real time PM<sub>2.5</sub> annual rolling averages for May 2020 are presented in **Figure 6-4** below.



**Figure 6-4: Real-time PM<sub>2.5</sub> Annual Rolling average results for May 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 1 May 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 – 1 May 2020**

Station	pH	Electrical Conductivity (EC) (µs/cm) <sup>1</sup>	Total Suspended Solids (TSS) (mg/L)	Total Dissolved Solids (TDS) (mg/L)
W1	8.1	430	27	234
W2	7.9	420	15	234
W3	8.0	440	38	247
W4	7.4	1550	5	924
W5	*	*	*	*
W6A	8.0	430	19	216
W7	^	^	^	^
W9	*	*	*	*
W11	^	^	^	^
W12	7.7	3400	7	1800
W13	*	*	*	*
W14	*	*	*	*
W15	7.9	540	38	276
W16	7.8	330	100	416**
W17	7.7	580	<b>111</b>	304

**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

<sup>1</sup> 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).

Four of the fifteen monitoring locations were found to be dry or were not safely accessible on 1 May 2020. All sites sampled were below or inside the trigger level values with the exception of 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

The quarterly groundwater monitoring was conducted on 12 – 14, 18 – 20 and 28 May 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)	Feb/Mar 2020 Water Level (DTW)	November 2019 Water Level (DTW)	Triggered (Yes/No)
	80 <sup>th</sup> Percentile (DTW)	Trigger				
WRA1L	-	± 0.5m	6.11	6.37	6.10	
WRA1U	-	± 0.5m	*	*	*	
WRA3L	-	± 0.5m	<b>15.14</b>	15.84	16.02	
WRA3U	-	± 0.5m	4.41	4.88	4.80	
WRA5L	-	± 0.5m	0.00	<b>0.00</b>	<b>0.99</b>	
WRA5U	-	± 0.5m	0.65	<b>0.65</b>	<b>1.78</b>	
WRA6L	-	± 0.5m	<b>1.75</b>	2.82	2.98	
WRA6U	-	± 0.5m	3.84	4.21	4.27	
MPBH1	9.71	10.70	10.06	10.03	9.69	No
MPBH2	12.20	14.20	12.54	12.51	12.51	No
MPBH3b	12.00	Dry (Or 14.0m)	12.21	12.38	12.46	No
MPBH4	-	± 0.5m	12.31	12.37	12.40	
MPBH5	-	± 0.5m	*	*	*	
MPBH1-C**	-	± 0.5m	10.17	10.21	-	
MPBH1-HR**	-	± 0.5m	10.12	10.21	-	
MPBH2-C**	-	± 0.5m	12.87	12.91	-	
MPBH2-HR**	-	± 0.5m	12.84	12.86	-	
MPBH4-C**	-	± 0.5m	<b>11.90**</b>	57.66	-	
MPBH4-HR**	-	± 0.5m	51.05	50.76	-	
MPBH5-C**	-	± 0.5m	<b>12.28**</b>	12.79	-	
MPBH5-HR**	-	± 0.5m	12.39	12.34	-	
MPBH6**	-	± 0.5m	10.44	10.39	-	
MPBH6-C**	-	± 0.5m	12.69	12.67	-	
MPBH6-HR**	-	± 0.5m	11.22	11.68	-	
MPBH7**	-	± 0.5m	9.50	9.71	-	
MPBH7-C**	-	± 0.5m	19.02	19.01	-	
3500C500 (L)	-	± 0.5m	58.04	58.06	57.74	
3500C500 (S)	-	± 0.5m	26.08	26.10	26.09	
4500F000	-	± 0.5m	31.29	<b>31.36</b>	<b>29.09</b>	
5000D000	-	± 0.5m	<b>101.71</b>	<b>100.52</b>	<b>97.89</b>	
5500D000	-	± 0.5m	84.09	-	-	

Monitoring Location/ ID	Water Level Trigger Range		Current Month Water Level (DTW)	Feb/Mar 2020 Water Level (DTW)	November 2019 Water Level (DTW)	Triggered (Yes/No)
	80 <sup>th</sup> Percentile (DTW)	Trigger				
6500F500L	-	± 0.5m	53.07	53.01	52.96	
6500F500M	-	± 0.5m	54.85	54.64	54.58	
6500F500U	-	± 0.5m	*	*	*	
6500F625	-	± 0.5m	<b>15.11</b>	22.67	22.23	
Melody	-	± 0.5m	<b>11.49</b>	21.87	13.55	
7500F000	-	± 0.5m	36.44	36.39	36.33	

\* 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 exceeded the adopted assessment criterion for changes 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	Mar 2020 pH	Nov 2019 pH	Triggered (Yes/No)
	20 <sup>th</sup> Percentile	80 <sup>th</sup> Percentile				
WRA1I	6.0	8.5	7.0	7.0	7.3	No
WRA1U	6.0	8.5	*	*	*	No
WRA3L	6.0	8.5	6.8	6.8	6.7	No
WRA3U	6.0	8.5	7.6	7.2	7.6	No
WRA5L	6.0	8.5	7.2	7.2	7.9	No
WRA5U	6.0	8.5	7.3	7.3	7.4	No
WRA6L	6.0	8.5	7.0	6.9	7.6	No
WRA6U	6.0	8.5	6.8	6.8	6.9	No
MPBH1	6.0	8.5	7.0	7.0	7.1	No
MPBH2	6.0	8.5	6.9	6.8	7.0	No
MPBH3b	6.0	8.5	7.6	7.3	7.7	No
MPBH4	6.0	8.5	6.9	7.0	7.0	No
MPBH5	6.0	8.5	*	*	*	-
MPBH1-C**	6.0	8.5	<b>8.8**</b>	7.5	-	-
MPBH1-HR**	6.0	8.5	<b>8.8**</b>	8.0	-	-
MPBH2-C**	6.0	8.5	<b>12.3**</b>	<b>12.3**</b>	-	-
MPBH2-HR**	6.0	8.5	<b>9.1**</b>	<b>11.2**</b>	-	-
MPBH4-C**	6.0	8.5	8.2	8.4	-	-
MPBH4-HR**	6.0	8.5	*	8.3	-	-
MPBH5-C**	6.0	8.5	<b>12.0**</b>	<b>12.2**</b>	-	-

Monitoring Location/ ID	pH Trigger Range		Current Month pH	Mar 2020 pH	Nov 2019 pH	Triggered (Yes/No)
	20 <sup>th</sup> Percentile	80 <sup>th</sup> Percentile				
MPBH5-HR**	6.0	8.5	7.5	7.4	-	-
MPBH6**	6.0	8.5	7.0	7.0	-	-
MPBH6-C**	6.0	8.5	7.9	7.8	-	-
MPBH6-HR**	6.0	8.5	7.4	7.2	-	-
MPBH7**	6.0	8.5	7.3	7.2	-	-
MPBH7-C**	6.0	8.5	7.6	7.6	-	-
3500C500 (L)	6.0	8.5	7.3	7.4	7.4	No
3500C500 (S)	6.0	8.5	7.2	7.2	7.2	No
4500F000	6.0	8.5	6.8	6.7	6.8	No
5000D000	6.0	8.5	7.0	6.9	6.9	No
5500D000	6.0	8.5	7.2	-	-	-
6500F500L	6.0	8.5	7.4	7.4	7.4	No
6500F500M	6.0	8.5	7.3	7.3	7.3	No
6500F500U	6.0	8.5	*	*	*	*
6500F625	6.0	8.5	7.0	6.9	7.0	No
Melody	6.0	8.5	7.0	7.1	7.3	No
7500F000	6.0	8.5	7.7	7.7	7.8	No

\* Dry/insufficient water to sample

\*\* Bore appeared to be blocked

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

- indicated no trigger limit identified

An investigation is triggered when pH values are recorded outside the baseline range (20<sup>th</sup> – 80<sup>th</sup> 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	March 2020 EC	Nov 2019 EC	Triggered (Yes/No)
	Maximum Beneficial Use Trigger				
WRA1I	7800	4200	4300	3650	No
WRA1U	^	*	*	*	
WRA3L	22000	16100	16000	16600	No
WRA3U	22000	3050	5450	3600	No
WRA5L	7800	3550	2850	2900	No
WRA5U	7800	3450	2750	2900	No
WRA6L	7800	6550	6650	6500	No
WRA6U	22000	10700	10900	11200	No
MPBH1	800	450	500	480	No



Monitoring Location/ ID	EC Trigger Range	Current Month EC	March 2020 EC	Nov 2019 EC	Triggered (Yes/No)
	Maximum Beneficial Use Trigger				
MPBH2	930	750	760	850	No
MPBH3b	7800	4150	4050	3950	No
MPBH4	^	6000	5500	6150	No
MPBH5	^	*	*	*	
MPBH1-C**	^	1250	830	-	-
MPBH1-HR**	^	1150	580	-	-
MPBH2-C**	^	3800	4200	-	-
MPBH2-HR**	^	1300	830	-	-
MPBH4-C**	^	3500	3450	-	-
MPBH4-HR**	^	*	3400	-	-
MPBH5-C**	^	1800	3100	-	-
MPBH5-HR**	^	800	830	-	-
MPBH6**	^	1250	1250	-	-
MPBH6-C**	^	6800	6650	-	-
MPBH6-HR**	^	4900	6400	-	-
MPBH7**	^	13700	11600	-	-
MPBH7-C**	^	10400	11000	-	-
3500C500 (L)	7800	3950	4000	4000	No
3500C500 (S)	7800	4800	4950	5000	No
4500F000	22000	9000	9450	9400	No
5000D000	800	<b>910</b>	<b>840</b>	<b>830</b>	Yes
5500D000	7800	4150	-	-	-
6500F500L	7800	3850	4000	3900	No
6500F500M	7800	3050	3050	3050	No
6500F500U	7800	*	*	*	-
6500F625	7800	3400	3630	3600	-
Melody	^	970	1650	1300	-
7500F000	7800	6350	6500	6450	No

\* Dry/insufficient water to sample

\*\* Bore appeared to be blocked

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

^ indicated no trigger limit identified

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

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

EC trigger limits in May 2020 were reached at groundwater bore 5000D000 which has been above the limit for three consecutive monitoring events. An investigation has been initiated

regarding this in accordance with the MPO Groundwater Management Plan (MACH Energy, 2019). The next quarterly monitoring event is scheduled for August 2020.

## 9. Noise Monitoring

Attended noise monitoring was undertaken during the night period of 19 May 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 May 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 – 19 May 2020**

Location	Start Date and Time	Wind Speed m/s	Stability Class	Criterion dB	Criterion Applies <sup>1</sup>	MPO Only $L_{Aeq}$ dB <sup>2,4</sup>	Exceedance dB <sup>3,4</sup>
N-AT1	19/05/20 22:27	1.6	D	45	Yes	IA	Nil
N-AT2	19/05/20 22:00	1.1	E	45	Yes	33	Nil
N-AT3	19/05/20 23:01	1.0	E	45	Yes	38	Nil
N-AT4	19/05/20 00:00	1.4	G	45	No	IA	NA
N-AT5	19/05/20 23:36	1.1	D	45	Yes	IA	Nil
N-AT6	19/05/20 23:21	1.2	D	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 – 19 May 2020**

Location	Start Date and Time	Wind Speed m/s	Stability Class	Criterion dB	Criterion Applies <sup>1</sup>	MPO Only $L_{Aeq}$ dB <sup>2,4</sup>	Exceedance dB <sup>3,4</sup>
N-AT1	19/05/20 22:27	1.6	D	43	Yes	IA	Nil
N-AT2	19/05/20 22:00	0.8	F	36	Yes	<20	Nil
N-AT3	19/05/20 23:01	0.8	E	41	Yes	<35	Nil

N-AT4	19/05/20 00:00	1.0	E	42	No	IA	NA
N-AT5	19/05/20 23:36	2.1	D	40	Yes	IA	Nil
N-AT6	19/05/20 23:21	1.9	G	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 – 19 May 2020**

Location	Start Date and Time	Cumulative Noise Criterion $L_{Aeq}$ dB	Measured Mining Only $L_{Aeq,period}$ dB <sup>1,2</sup>	Exceedance dB
N-AT1	19/05/20 22:27	40	Nil	Nil
N-AT2	19/05/20 22:00	40	Nil	Nil
N-AT3	19/05/20 23:01	40	Nil	Nil
N-AT4	19/05/20 00:00	40	Nil	NA
N-AT5	19/05/20 23:36	40	Nil	Nil
N-AT6	19/05/20 23:21	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 May 2020 monitoring period.

## 10. Blast Monitoring

There were 7 blast events during May (a total of 31 blasts YTD). Results for May 2020 are presented in **Table 10-1**. All blast results during the May 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 – May 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	Blast Fume Compliant
Monday 04/05/20	13:07	0.230	94.4	0.200	84.3	0.430	97.8	Y
Thursday 07/05/20	14:15	0.210	97.1	0.180	103.9	0.959	103.9	Y
Wednesday 13/05/20	13:04	0.080	89.4	0.070	81.9	0.120	94.7	Y
Friday 15/05/20	13:01	0.460	104.0	0.420	92.7	0.850	101.1	Y
Tuesday 19/05/20	13:01	0.580	88.5	0.360	82.2	0.770	96.2	Y
Thursday 21/05/20	12:51	0.090	95.7	0.080	84.3	0.110	97.0	Y
Wednesday 27/05/20	12:04	0.380	90.8	0.360	83.2	0.550	101.0	Y