MACHEnergy

Monthly Environmental Monitoring Report

December 2018

December 2018	1	Final
Date	**Rev.**	**Status**

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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 Environmental Protection Licence (EPL) 20850, Section 66(6) of the *Planning of the Environment Operations Act 1997* (POEO Act) and the MPO Project Approval Development Approval (DA) 92/97.

Table 1-1 – Mount Pleasant Operations

Name of Operation	Mount Pleasant Operation
Name of Licensee	MACH Energy Australia Pty Ltd
Environmental Protection Licence	20850
Reporting Period Start Date	1st December 2018
Reporting Period End Date	31st December 2018
Date Data Received	21st January 2018

To view MPO EPL 20850 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 or TEOM Particulate Monitor PM_{10} 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 a suitability qualified and experienced person.
The MPO Environmental Monitoring Network is shown in **Figure 2-1** and **Figure 2-2**.

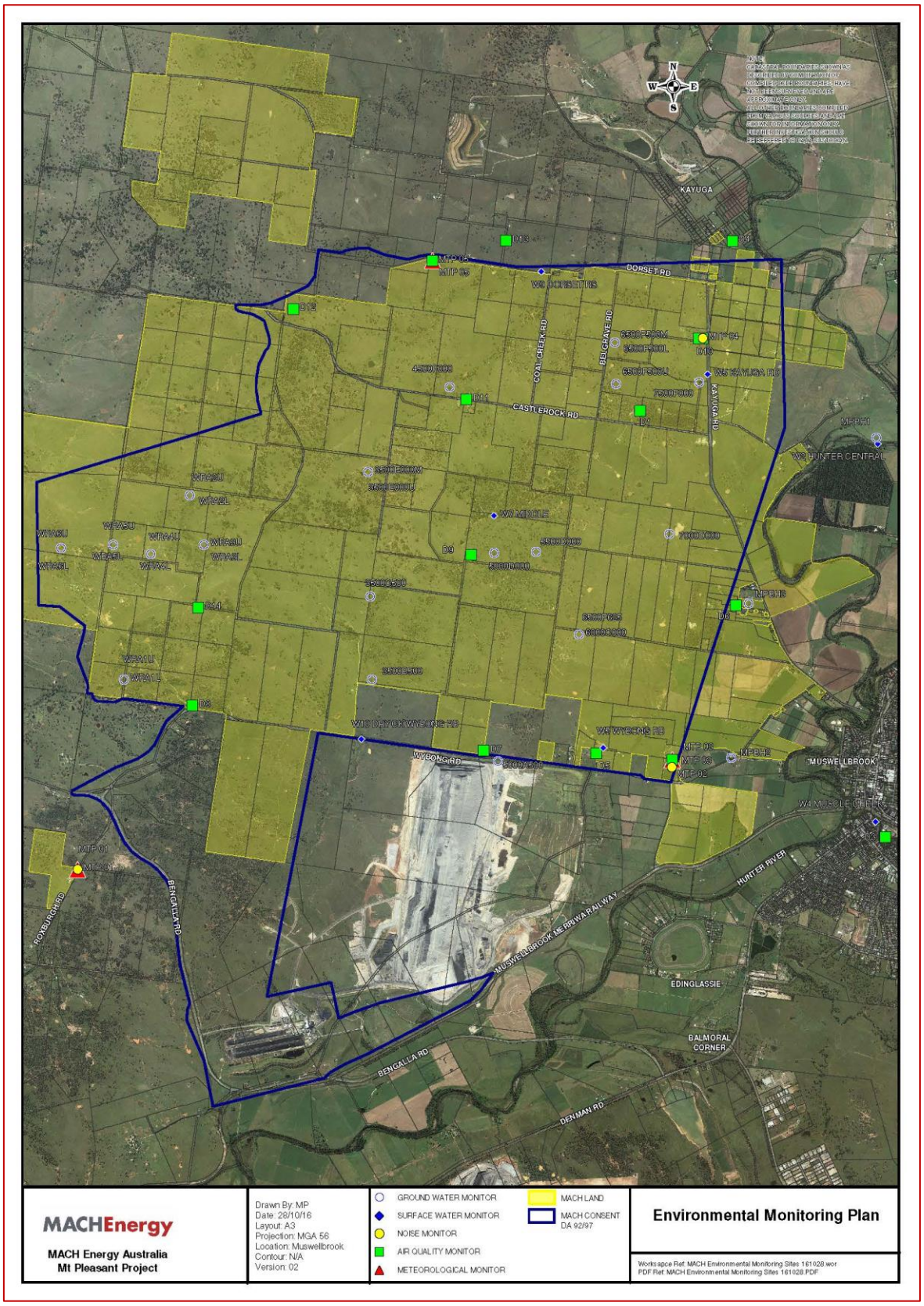

Figure 2-1 – MPO Environmental Monitoring Network

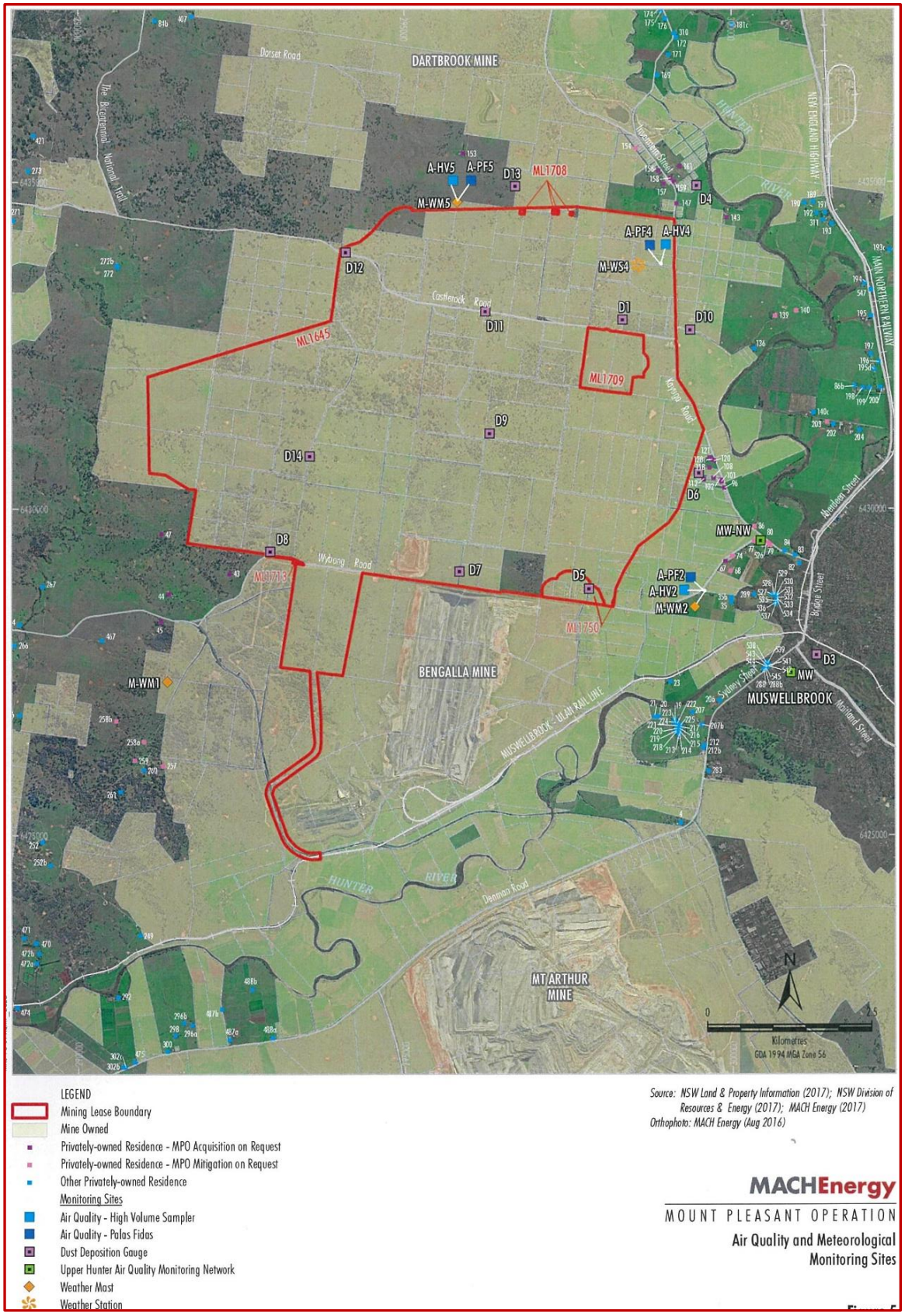

Figure 1-2 – MPO Environmental Monitoring Network/EPL Monitoring Sites

3. Dust Depositional Monitoring

Dust deposition was monitored according to the Environment Protection Agency'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). The dust deposition exposure period for all gauges commenced on 19 November 2018. Sample collection was undertaken on 17 December 2018 by AECOM with sample analysis performed by SRT NATA accredited laboratory. Results are summarised in **Table 3-1**.

Table 3-1: Dust Depositional Results – December 2018

Location	YTD Insoluble Solids (g/m2.month)	Insoluble Solids Annual Rolling Average (g/m2.month)
D1	1.6	1.6
D3	2.9	2.9
D4	1.8	1.8
D5	2.5	2.5
D6	3.2	3.2
D7[1]	8.5	**8.5**
D8	3.9	3.9
D9	1.9	1.9
D10	1.5	1.5
D11	2.0	2.0
D12	1.5	1.5
D13	2.7	2.7
D14	3.7	3.7
Criterion	-	4
Results in **bold** indicate elevated reading of adopted assessment criteria		

Note [1]: Site D7 is located within close proximity to the northern boundary of Bengalla Mine main pit and is heavily influenced by Bengalla Mine operations. This site will continue to be monitored however, will not be used to assess compliance or to represent residential receivers in the area.

Contaminated results are not included in the 12 month rolling average. Field notes from the December sampling event noted that all the gauges contained insects.

Figure 3-1 compares the monthly insoluble solids results to the annual averages for each dust gauge and the assessment criterion.

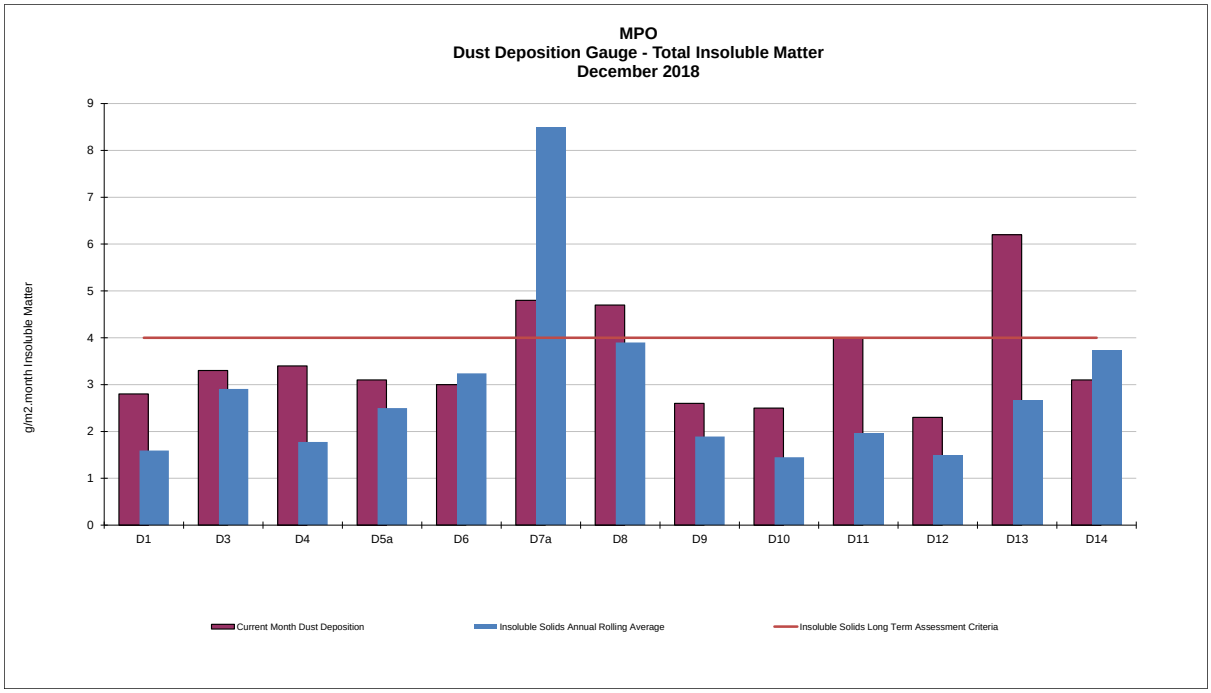

Figure 3-1: MPO Dust Deposition Results – December 2018

Note : Site D7 is located within close proximity to the northern boundary of Bengalla Mine main pit and is heavily influenced by Bengalla Mine operations. This site will continue to be monitored however, will not be used to assess compliance or to represent residential receivers in the area.

4. 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 4-1** below. These units were commissioned in March 2017.

Table 4-1 Total suspended Particulate Monitoring Sites

ID	Description
A-PF2	Reilly's
M-WS4	Kayuga Road Met Station
A-PF5	Athlone

4.1 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 EPA specifies an annual average criterion of 90 mg/m^3.

4.2 Results

In December 2018, sample collection was undertaken by AECOM with sample analysis performed by SRT NATA accredited laboratory. TSP results for the monitoring period are provided in **Table 4-2**.

Table 4-2 Total Suspended Particulate Monitoring Data – December 2018

Run Date	Assessment Criterion	TSP µg/m^3		
		HVAS A-PF2	HVAS M-WS4	HVAS A-PF5
3/12/2018	-	155	71	45
9/12/2018	-	96	73	69
15/12/2018	-	84	57	55
21/12/2018	-	72	63	62
27/12/2018	-	84	62	*
Monthly Mean	-	98	65	58
Annual Rolling Average	**90**	**91**	46	44

Results in **bold** indicate an elevated reading
*Indicates no sample due to power failure at machine

For the reporting period, the annual rolling average TSP data revealed an elevated result at HVAS A-PF2 of 91ug/m^3. The HVAS A-PF2 is located within MPO mine owned land and therefore is not considered a non-compliant reading against the assessment criterion.

5. Real Time PM_{10} Monitoring

Continuous particulate matter less than 10µm (PM_{10}) monitoring was conducted by three Palas Fidas (one utilised for management only) units at MPO during December 2018.

The EPA identification numbers 1 and 2 refer to Palas Fidas units installed on Wybong Road (A-PF2) and Castlerock Road (A-PF5) respectively. In addition, a third unit (A-PF4) is installed on Kayuga Road with data used for management purposes only. The third unit at A-PF4 is currently under maintenance, and has been temporarily replaced by a TEOM unit for the December 2018 monitoring period.

On 2 December 2018, monitoring location A-PF2 and the Muswellbrook NW monitors resulted in an elevated reading in line with the EPL condition limit of 50 µg/m^3 for the 24 hour rolling average. These PM_{10} levels on 2 December were associated with wider regional air quality events. Operations across MPO site executed a total of 33.1 shut down hours on 2 December 2018 and a total of 1 hour on 3 December 2018 in response to these air quality conditions.

Real time PM_{10} daily average results and annual rolling averages for December 2018 are presented in **figure 5-1** below.

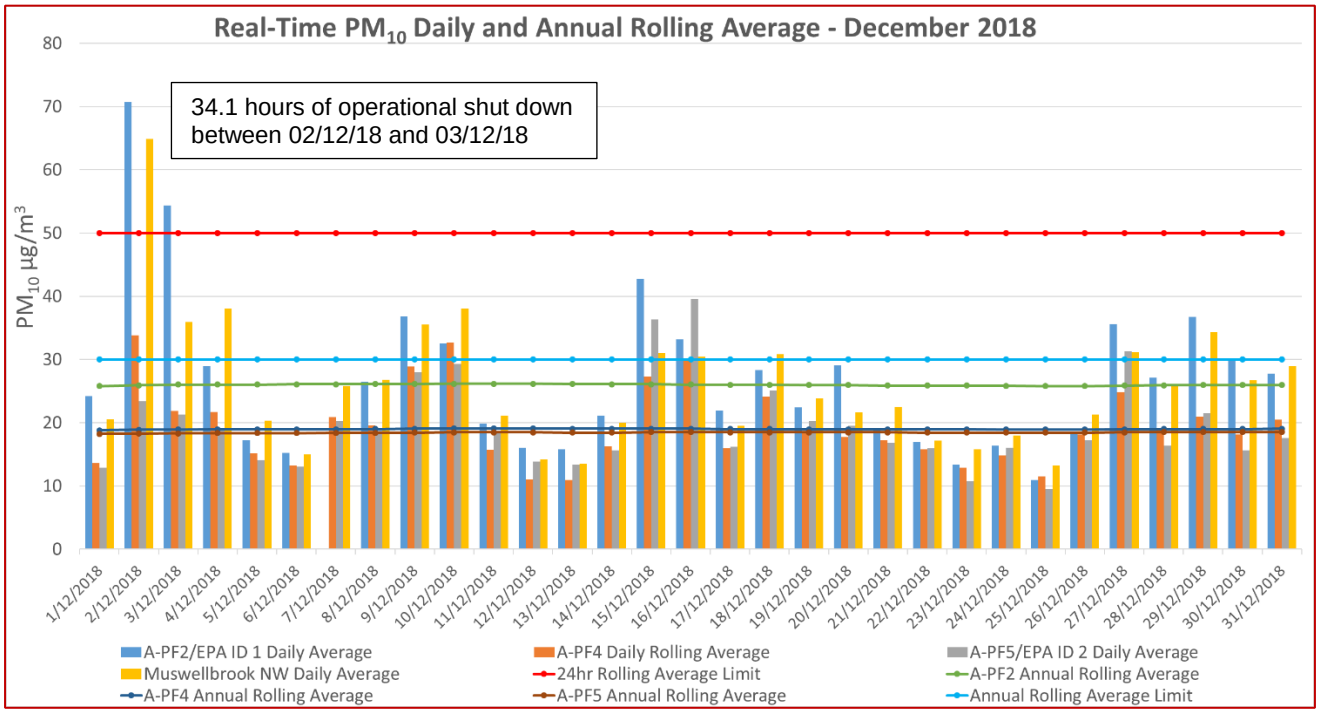

Figure 5-1 Real-time PM_{10} daily and annual rolling average results for December 2018.

Real time PM_{10} daily average results for December 2018 are presented in **Table 5- 1**

Table 5-1: MPO Palas Fidas Data – December 2018

Date	APF2/EPA ID 1	APF4	APF5/EPA ID 2	Muswellbrook NW	24 Hour Average Limit ($\mu g/m^3$)
	24 hour Average Result				
1/12/2018	24	14	13	21	50
2/12/2018	**71**	34	23	**65**	50
3/12/2018	**54**	22	21	36	50
4/12/2018	29	22	19	38	50
5/12/2018	17	15	14	20	50
6/12/2018	15	13	13	15	50
7/12/2018	-	21	20	26	50
8/12/2018	27	20	19	27	50
9/12/2018	37	29	28	36	50
10/12/2018	33	33	29	38	50
11/12/2018	20	16	18	21	50
12/12/2018	16	11	14	14	50
13/12/2018	16	11	13	14	50
14/12/2018	21	16	16	20	50
15/12/2018	43	27	36	31	50
16/12/2018	33	30	40	30	50
17/12/2018	22	16	16	20	50
18/12/2018	28	24	25	31	50
19/12/2018	22	19	20	24	50
20/12/2018	29	18	20	22	50
21/12/2018	19	17	17	23	50
22/12/2018	17	16	16	17	50
23/12/2018	13	13	11	16	50
24/12/2018	16	15	16	18	50
25/12/2018	11	11	10	13	50
26/12/2018	19	18	17	21	50
27/12/2018	36	25	31	31	50
28/12/2018	27	19	16	26	50
29/12/2018	37	21	22	34	50
30/12/2018	30	18	16	27	50

Note – results in **bold** indicate elevated readings. Dust delays/shutdowns of mining operations and a halt to dust generating activities were imposed for a total of 34.1 hours between 02/12/18 and 03/12/18.

6. Surface Water Monitoring

Surface water quality is monitored at 13 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. Monthly and rain event surface water monitoring was conducted by AECOM on 14 December 2018 following significant rainfall recorded on site on 13 December 2018. Laboratory analysis was performed by SRT and SGS NATA accredited laboratories. Monthly monitoring results for pH, EC, TSS and TDS are presented in **Table 6-1**. Rain event monitoring results for pH, EC, TSS and TDS are presented **Table 6-2**.

Four of the 13 monitoring locations were found to be dry on 14 December 2018 and one was unsafe to access due to the rain event (W11). All sites sampled were below or inside the trigger level values during December 2018.

Table 6-1 – MPO Monthly Surface Water Monitoring Results – 14 December 2018

Station	pH	Electrical Conductivity (EC) (µs/cm)[1]	Total Suspended Solids (TSS) (mg/L)	Total Dissolved Solids (TDS) (mg/L)
W1	8.0	390	6	194
W2	8.0	370	3	184
W3	7.9	370	7	259
W4	7.6	1250	2	734
W5	*	*	*	*
W6	8.0	350	4	214
W7	*	*	*	*
W9	*	*	*	*
W11	**	**	**	**
W12	8.4	4250	9	2900
W13	7.8	170	6830	720
W14	*	*	*	*
W15	7.9	380	23	306

Results in **bold** indicate elevated reading of adopted assessment criteria (refer to Error! Reference source not found.).
*Dry or insufficient water to sample.
** 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).

7. Groundwater Monitoring

Groundwater monitoring did not occur during December 2018. The next sampling quarterly monitoring event is scheduled for February 2019.

8. Noise Monitoring

Attended noise monitoring was undertaken during the day period of 7 December 2018 at the six monitoring locations in accordance with the EPL and MPO Noise Management Plan.

Table 8-1 – $L_{Aeq,15min}$ Generated by MPO – December 2018

Location	Start Date and Time	Wind Speed m/s	Stability Class	Criterion dB	MTP Only L_{Aeq} dB	Exceedance dB
N-AT1	07/12/18 12:26	2.2	A	40	Inaudible	Nil
N-AT2	07/12/18 11:46	1.8	A	36	Inaudible	Nil
N-AT3	07/12/18 11:14	2.8	A	35	Not Measurable (i.e. <30 dB)	Nil
N-AT4	07/12/18 10:48	3.0	A	43	Inaudible	Nil
N-AT5	07/12/18 10:25	3.0	B	40	Inaudible	Nil
N-AT6	07/12/18 13:06	2.4	A	35	Inaudible	Nil

Noise from MPO was inaudible at all locations except one, where it was not measurable. Noise from road traffic, birds, insects, dogs, farm equipment and breeze in foliage was noted throughout the monitoring period. Noise levels from MTP complied with noise limits at all monitoring locations during the December 2018 monitoring period.

9. Blast Monitoring

Results for December 2018 are presented in **Table 9-1**.

Table 9-1 – MPO Blast Monitoring Results – December 2018

Date Fired	Time Fired	Vibration BVOA	Overpressure BVOA	Vibration BVOC	Overpressure BVOC	Vibration BVO2	Overpressure BV02
11/12/18	10:05	0.350 mm/s	95.6 DBL	0.120 mm/s	87.8 DBL	0.270 mm/s	99.1 DBL
20/12/18	12:07	0.690 mm/s	98.8 DBL	0.220 mm/s	89 DBL	0.880 mm/s	107 DBL
21/12/18	10:20	0.430 mm/s	105.1 DBL	0.310 mm/s	92.3 DBL	0.320 mm/s	96 DBL
27/12/18	13:07	0.18 mm/s	85.5 DBL	0.06 mm/s	92.5 DBL	0.50 mm/s	94.7 DBL
28/12/18	12:30	0.140 mm/s	95.8 DBL	0.040 mm/s	89.7 DBL	0.190 mm/s	93.4 DBL

Blast results complied with all criteria at each monitoring site.

10. Meteorological Monitoring

Weather data is measured continuously at the Kayuga Road meteorological station (M-WS4). In addition to air quality parameters, the weather station also measures wind speed and direction, temperature (at 2 m and 10 m), solar radiation, relative humidity, rainfall, atmospheric pressure, and sigma theta. All data was captured during December 2018.