

Monthly Environmental Monitoring Report

November 2018

November 2018	1	Draft
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 Project boundary, 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 POEO Act and the MPO Project 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	1 st November 2018
Reporting Period End Date	31 st November 2018
Date Data Received	28 th December 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 Environment Protection Licence (EPL) 20850 specifically requires the monitoring of:

- 2 x Palas Fidas PM10 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.

The MPO Environmental Monitoring Network is shown in **Figure 2-1** and Error! Reference source not found.-2.

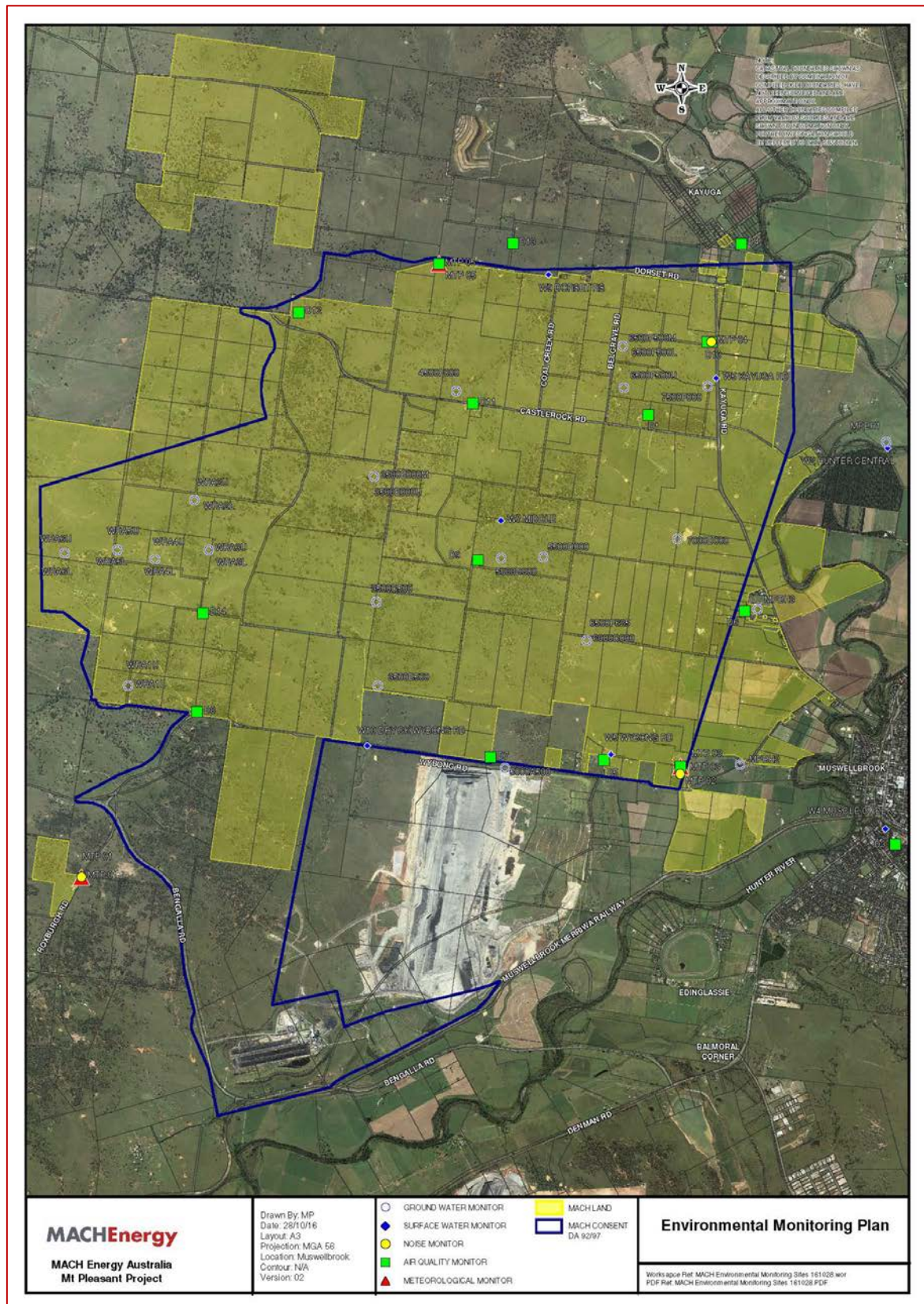
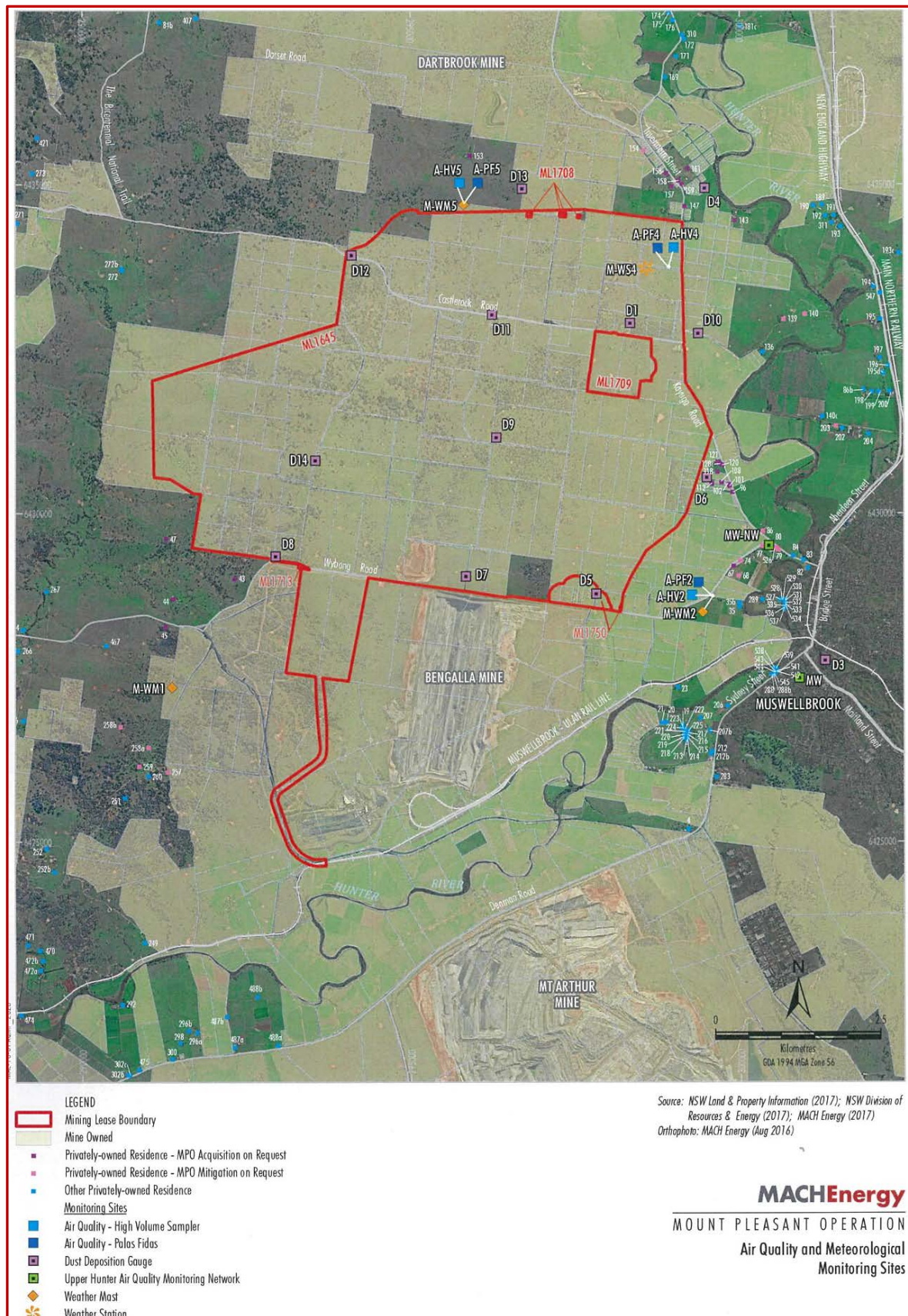


Figure 2-1 – MPO Environmental Monitoring Network



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

3. Dust Depositional Monitoring

Dust deposition was monitored according to the OEH's Approved Methods for the Sampling and Analysis of Air Pollutants in New South Wales (DEC 2007), which references AS/NZS 3580.10.1:2016 (R2014) Determination of particulate matter – Deposited matter – Gravimetric Method. The dust deposition exposure period for all gauges commenced on 18 October 2018. Sample collection was undertaken on 19 November 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 – November 2018

Location	YTD Insoluble Solids (g/m ² .month)	Insoluble Solids Annual Rolling Average (g/m ² .month)
D1	1.5	1.5
D3	2.9	2.8
D4	1.6	1.6
D5	2.4	2.4
D6	3.3	3.3
D7 ¹	8.8	8.3
D8	3.8	3.9
D9	1.8	1.9
D10	1.4	1.4
D11	1.8	1.8
D12	1.4	1.4
D13	2.2	2.4
D14	3.8	3.8
<i>Criterion</i>	-	4
Results in bold indicate exceedances' 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 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. Monthly results above $4\text{g}/\text{m}^2/\text{month}$ are not classed as an exceedance of criteria as the criteria is an annual average of $4\text{g}/\text{m}^2/\text{month}$. **Figure 3-1** compares the monthly insoluble solids results to the annual averages for each dust gauge and the assessment criterion.

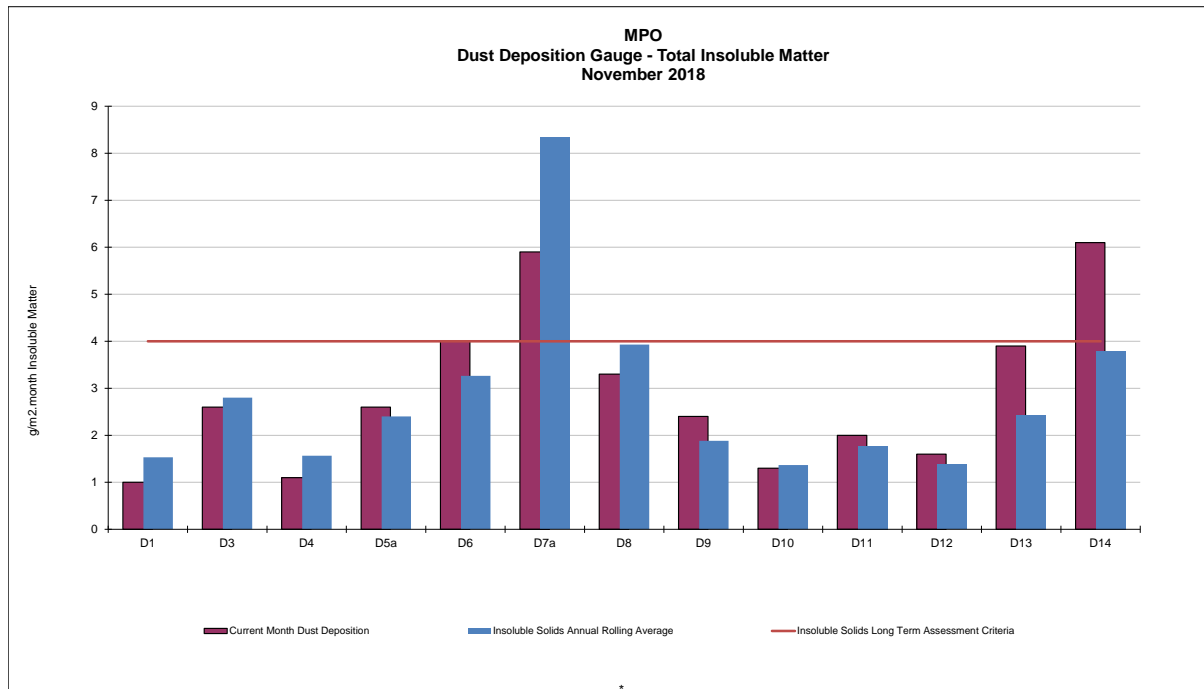


Figure 3-1: MPO Dust Deposition Results – November 2018

Field notes from the November sampling event noted that all the gauges contained insects. Evidence of vegetation was also recorded in one gauge.

4. Total Suspended Particulates

All 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 total suspended particulate (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). The EPA specifies an annual average criterion of 90 mg/m³.

4.2 Results

In November 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 – November 2018

Run Date	Assessment Criterion	TSP µg/m ³		
		HVAS A-PF2	HVAS M-WS4	HVAS A-PF5
3/11/2018	-	111	47	45
9/11/2018	-	72	53	48
15/11/2018	-	78	52	62
21/11/2018	-	105	51	47
27/11/2018	-	143	40 ¹	98
Monthly Mean	-	100	49	64
Annual Rolling Average	90	88	43	42

¹ Sample collected 4/12/2018

For the reporting period, the annual rolling average TSP data were below the annual average criterion of 90 µg/m³ at all monitoring sites.

5. Real Time PM₁₀ Monitoring

Continuous particulate matter less than 10µm (PM₁₀) monitoring was conducted by three Palas Fidas (one utilised for management only) units at MPO during November 2018.

The EPA identification numbers 1 and 2 refer to Palas Fidas Units installed on Wybong Road (APF2) and Castlerock Road (APF5) respectively. In addition, a third unit (APF4) is installed on Kayuga Road with data used for management purposes only.

On 22 and 23 November 2018, monitoring location A-PF2 and A-PF5 monitors exceeded 50 µg/m³ for the 24 hour rolling average. These exceedances were associated with wider regional air quality events (significant dust storm event in New South Wales) and were not attributed to MACH Energy's operations.

Real time PM₁₀ daily average results and annual rolling averages for November 2018 are presented in figure 5-1 below.

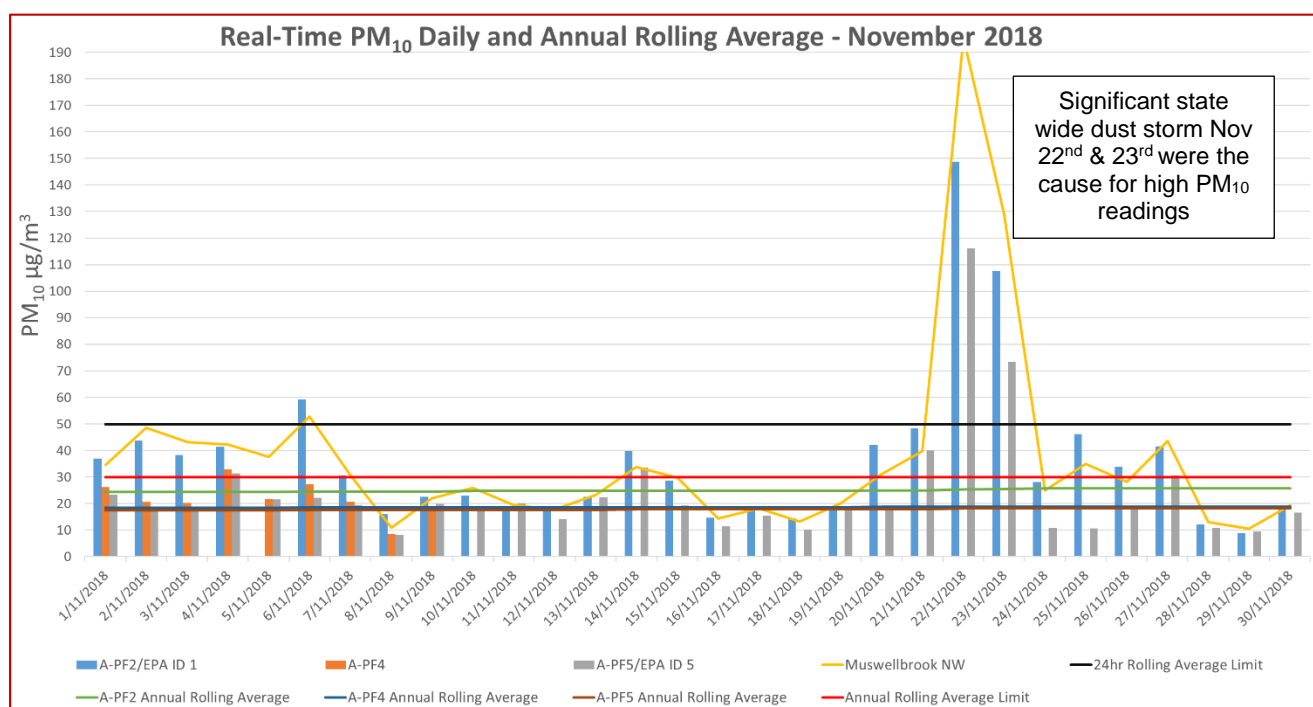


Figure 5-1 Real-time PM₁₀ daily and annual rolling average results for November 2018. Note that exceedances over November 22 and 23 were the result of a state wide significant dust event (dust storm) and were not related to mining activities at MPO.

Real time PM₁₀ daily average results for November 2018 are presented in **Table 5- 1**

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

Date	APF2/EPA ID 1	APF4	APF5/EPA ID 2	Muswellbrook NW	24 Hour Average Limit (µg/m³)
	24 hour Average Result				
1/11/2018	37	26	23	35	50
2/11/2018	44	21	18	49	50
3/11/2018	38	20	18	43	50
4/11/2018	41	33	31	42	50
5/11/2018	37	22	22	38	50
6/11/2018	59	27	22	53	50
7/11/2018	31	21	20	31	50
8/11/2018	16	9	8	11	50
9/11/2018	22	19	20	22	50
10/11/2018	23		19	26	50
11/11/2018	18		20	19	50
12/11/2018	18		14	18	50
13/11/2018	22		22	23	50
14/11/2018	40		34	34	50
15/11/2018	29		19	30	50
16/11/2018	15		11	14	50
17/11/2018	18		15	18	50
18/11/2018	14		10	13	50
19/11/2018	18		19	20	50
20/11/2018	42		18	31	50
21/11/2018	48		40	40	50
22/11/2018	149		116	195	50
23/11/2018	108		73	129	50
24/11/2018	28		11	25	50
25/11/2018	46		11	35	50
26/11/2018	34		18	28	50
27/11/2018	41		31	44	50
28/11/2018	12		11	13	50
29/11/2018	9		9	11	50
30/11/2018	18		17	19	50

Note – results in **bold** indicate exceedances that were caused by a regional dust event. A dust storm affected much of New South Wales on 22 November 2018. Dust delays/shutdowns of mining operations and dust generating activities were imposed from 9am.

6. Surface Water Monitoring

Monthly surface water monitoring was conducted by AECOM on 27 November 2018. Rain event surface water monitoring was conducted by AECOM following significant rainfall recorded on site on 29 November 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**.

Five of the 13 monitoring locations were found to be dry on 27 November 2018. During the rain event sampling on 29 November 2018 access to sites W2 and W11 was deemed unsafe due to the wet conditions following significant rainfall. All sites sampled were below or inside the trigger level values during November 2018.

Table 6-1 – MPO Surface Water Monitoring Results – November 2018

Station	pH	Electrical Conductivity (EC) (µs/cm) ¹	Total Suspended Solids (TSS) (mg/L)	Total Dissolved Solids (TDS) (mg/L)
W1	8.2	360	9	310
W2	8.1	370	5	238
W3	8.1	390	10	250
W4	7.8	1300	3	841
W5	*	*	*	*
W6A	8.2	370	7	255
W7	*	*	*	*
W9	*	*	*	*
W11	8.0	7120	5	4150
W12	8.2	5610	6	3260
W13	*	*	*	*
W14	*	*	*	*
W15	7.8	420	8	307

Results in **bold** indicate exceedances of adopted assessment criteria

*Dry or insufficient water to sample.

¹ Results have been rounded in accordance with the In-house method Q4AN(EV)-332-W13 (pH) and In-house method Q4AN(EV)-332-W12 (EC).

Table 6-2 - MPO Rain Event Surface Water Monitoring Results – 29 November 2018

Station	pH	Electrical Conductivity (EC) ($\mu\text{S}/\text{cm}$) ¹	Total Suspended Solids (TSS) (mg/L)	Total Dissolved Solids (TDS) (mg/L)
W1	7.9	360	4	187
W2	**	**	**	**
W3	7.9	370	7	279
W4	7.4	1350	6	858
W5	*	*	*	*
W6A	7.9	350	5	176
W7	*	*	*	*
W9	*	*	*	*
W11	**	**	**	**
W12	7.8	5190	5	2700
W13	*	*	*	*
W14	*	*	*	*
W15	7.7	390	13	219

Results in **bold** indicate exceedances of adopted assessment criteria (refer to Error! Reference source not found.).

*Dry or insufficient water to sample.

**Unsafe to access.

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

Quarterly groundwater monitoring was conducted on 6, 7 and 9 November 2018. Water level results for the groundwater bores are presented in **Table 7-1**. pH and EC results are presented in **Table 7-2** and **Table 7-3** respectively.

Table 7-1 - MPO Quarterly Groundwater Water Level Results

Monitoring Location/ ID	Water Level Trigger Range		Current Month Water Level (DTW)	Aug 2018 Water Level (DTW)	Triggered (Yes/No)
	80 th Percentile (DTW)	Trigger			
WRA1L	-	-	5.40	5.12	
WRA1U	-	-	*	*	
WRA2L	-	-	**	18.35	
WRA2U	-	-	**	*	
WRA3L	-	-	17.18	17.51	
WRA3U	-	-	6.48	6.48	
WRA6L	-	-	3.45	3.93	
WRA6U	-	-	4.47	4.74	
MPBH1 (Bore3)	9.71	10.70	9.95	9.96	No
MPBH2	12.20	14.20	12.43	12.46	No
MPBH3 (Bore 2)	12.00	Dry (or 13.6m)	12.40	12.32	No
3500C500 (L)	-	-	56.71	56.62	
3500C500 (S)	-	-	25.85	25.76	
4500F000	-	-	26.20	25.16	
5000D000	-	-	84.66	83.56	
5500D000	-	-	67.46	66.33	
6500F500L	-	-	52.86	52.87	
6500F500M	-	-	54.43	54.39	
6500F500U	-	-	35.08	33.74	
6500F625***	-	-	22.17	-	
Melody***	-	-	21.45	-	
7000D000L	-	-	19.10	19.08	
7000D000U	-	-	6.32	6.32	
7500F000	-	-	35.94	35.88	

* Dry/insufficient water to sample

** Bore appeared to be blocked

*** New site

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 7-2 - MPO Quarterly Groundwater pH results

Monitoring Location/ ID	pH Trigger Range		Current Month pH	Aug 2018 pH	May 2018 pH	Triggered (Yes/No)
	20 th Percentile	80 th Percentile				
WRA1L	7.30	7.74	7.1	7.0	7.1	Yes
WRA1U	-	-	*	*	*	
WRA2L	7.00	7.30	**	7.2	7.3	No
WRA2U	6.74	7.04	**	*	*	
WRA3L	6.60	6.90	6.8	6.8	6.8	No
WRA3U	7.10	7.60	7.2	7.3	7.2	No
WRA6L	7.20	7.70	6.8	7.0	7.0	Yes
WRA6U	6.80	7.00	6.6	6.9	6.9	No
MPBH1 (Bore3)	6.80	7.10	6.8	7.1	7.0	No
MPBH2	6.80	7.10	6.8	6.9	6.8	No
MPBH3 (Bore 2)	7.40	7.60	7.5	7.6	7.6	No
3500C500 (L)	7.28	7.50	7.3	7.4	7.3	No
3500C500 (S)	-	-	6.9	7.0	7.0	No
4500F000	6.50	6.90	6.9	6.9	6.8	No
5000D000	6.60	6.98	6.9	7.0	6.9	No
5500D000	6.30	6.80	7.1	7.0	7.1	Yes
6500F500L	6.52	6.80	7.2	7.1	7.3	Yes
6500F500M	6.90	7.20	7.3	7.4	7.4	Yes
6500F500U	6.82	6.98	7.1	7.0	6.9	No
6500F625***	-	-	6.7	-	-	No
Melody***	-	-	6.9	-	-	No
7000D000L	6.60	6.80	6.5	6.9	6.8	No
7000D000U	6.60	7.70	6.5	6.7	6.6	No
7500F000	6.70	7.20	7.7	7.8	7.9	Yes

* 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 7-3 - MPO Quarterly Groundwater EC results

Monitoring Location/ ID	EC Trigger Range		Current Month EC	Aug 2018 EC	May 2018 EC	Triggered (Yes/No)
	80 th Percentile	Maximum Beneficial Use Trigger				
WRA1L	4500	7800	4220	3200	3650	No
WRA1U	-	-	*	*	*	
WRA2L	6110	7800	**	5450	5500	No
WRA2U	4108	7800	**	*	*	
WRA3L	16710	22000	16220	15000	15300	No
WRA3U	9032	22000	9990	8850	8600	No
WRA6L	5950	7800	5490	5400	5900	No
WRA6U	11140	22000	10500	10200	10600	No
MPBH1 (Bore3)	590	800	460	470	470	No
MPBH2	930	930	850	840	800	No
MPBH3 (Bore 2)	4544	7800	2510	3750	3500	No
3500C500 (L)	4478	7800	4020	4050	4150	No
3500C500 (S)	-	-	4270	4050	3900	No
4500F000	3646	7800	8980	9000	8800	Yes
5000D000	710	800	760	760	720	No
5500D000	1099	2350	4340	3200	3200	Yes
6500F500L	1406	2350	3500	3400	3150	Yes
6500F500M	1918	2350	2980	2900	2950	Yes
6500F500U	5814	7800	5100	5200	5350	No
6500F625***	-	-	3810	-	-	No
Melody***	-	-	2490	-	-	No
7000D000L	1146	2350	1490	1500	1400	No
7000D000U	6688	7800	6330	6400	6350	No
7500F000	3908	7800	6320	6240	6200	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).

Several groundwater monitoring sites were outside of the EC and/or pH triggers, and as such an investigation has been commenced for these sites. All other sites complied with trigger levels.

8. Noise Monitoring

In accordance with the MPO Noise Management Plan, attended noise compliance monitoring is undertaken monthly by a suitably qualified and experienced person. All monitoring measurements are undertaken during day periods. For further details see the November Environmental Noise Monitoring Report by Global Acoustics attached with this report.

9. Blast Monitoring

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

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

Date Fired	Time Fired	Vibration BVOA	Overpressure BVOA	Vibration BVOC	Overpressure BVOC	Vibration BVO2	Overpressure BV02	Wind Direction	Wind Speed
05/11/18	10:28	0.970 mm/s	94.8 DBL	0.470 mm/s	91 DBL	0.650 mm/s	107.9 DBL	328 deg	1.9 m/s
08/11/18	14:57	0.540 mm/s	90.5 DBL	0.230 mm/s	87.5 DBL	1.240 mm/s	102.8 DBL	133 deg	2.4 m/s
14/11/18	12:09	0.500 mm/s	89.9 DBL	0.150 mm/s	86.3 DBL	0.240 mm/s	96.7 DBL	133 deg	0.7 m/s
14/11/18	12:09	1.020 mm/s	98.7 DBL	0.470 mm/s	88.9 DBL	1.090 mm/s	102.7 DBL	133 deg	0.7 m/s
16/11/18	12:01	0.540 mm/s	103.2 DBL	0.160 mm/s	102.6 DBL	1.120 mm/s	103.3 DBL	142 deg	6.6 m/s
21/11/18	4:06	1.940 mm/s	104.6 DBL	0.880 mm/s	102.5 DBL	1.330 mm/s	107.7 DBL	303 deg	4.3 m/s
29/11/18	12:38	0.450 mm/s	89.1 DBL	0.160 mm/s	82.5 DBL	1.260 mm/s	100.7 DBL	217 deg	2.3 m/s

Blast results complied with all criteria at each monitoring site.

10. Meteorological Monitoring

Weather data is measured continuously at the Kayuga Road (M-WS4). In addition to these parameters the weather station also measures wind, temperature (10m), solar radiation, humidity, atmospheric pressure, and sigma theta. All data was captured during November 2018.

Mount Pleasant Operation

*Environmental Noise Monitoring
November 2018*

*Prepared for
MACH Energy Australia Pty Ltd*



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Mount Pleasant Operation

Environmental Noise Monitoring November 2018

Reference: 18383_R01

Report date: 21 December 2018

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Prepared: Jason Cameron
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QA Review: Robert Kirwan
Consultant

Global Acoustics Pty Ltd ~ Environmental noise modelling and impact assessment ~ Sound power testing ~ Noise control advice ~ Noise and vibration monitoring ~ OHS noise monitoring and advice ~ Expert evidence in Land and Environment and Compensation Courts ~ Architectural acoustics ~ Blasting assessments and monitoring ~ Noise management plans (NMP) ~ Sound level meter and noise logger sales and hire

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1 INTRODUCTION

1.1 Background

Global Acoustics was engaged by MACH Energy Australia to conduct monthly environmental noise monitoring around their Mount Pleasant Operation (MTP) near Muswellbrook, NSW.

Noise monitoring as described in this report was undertaken during the day period of 27 November 2018, at six monitoring locations in accordance with the MTP Environmental Protection Licence (EPL).

the purpose of the survey was to quantify and describe the acoustic environment around the site and compare results with specified limits.

1.2 Attended Monitoring Locations

There were six monitoring locations during this survey as detailed in Table 1.1 and shown on Figure 1. It should be noted that Figure 1 shows actual monitoring positions, not the location of residences.

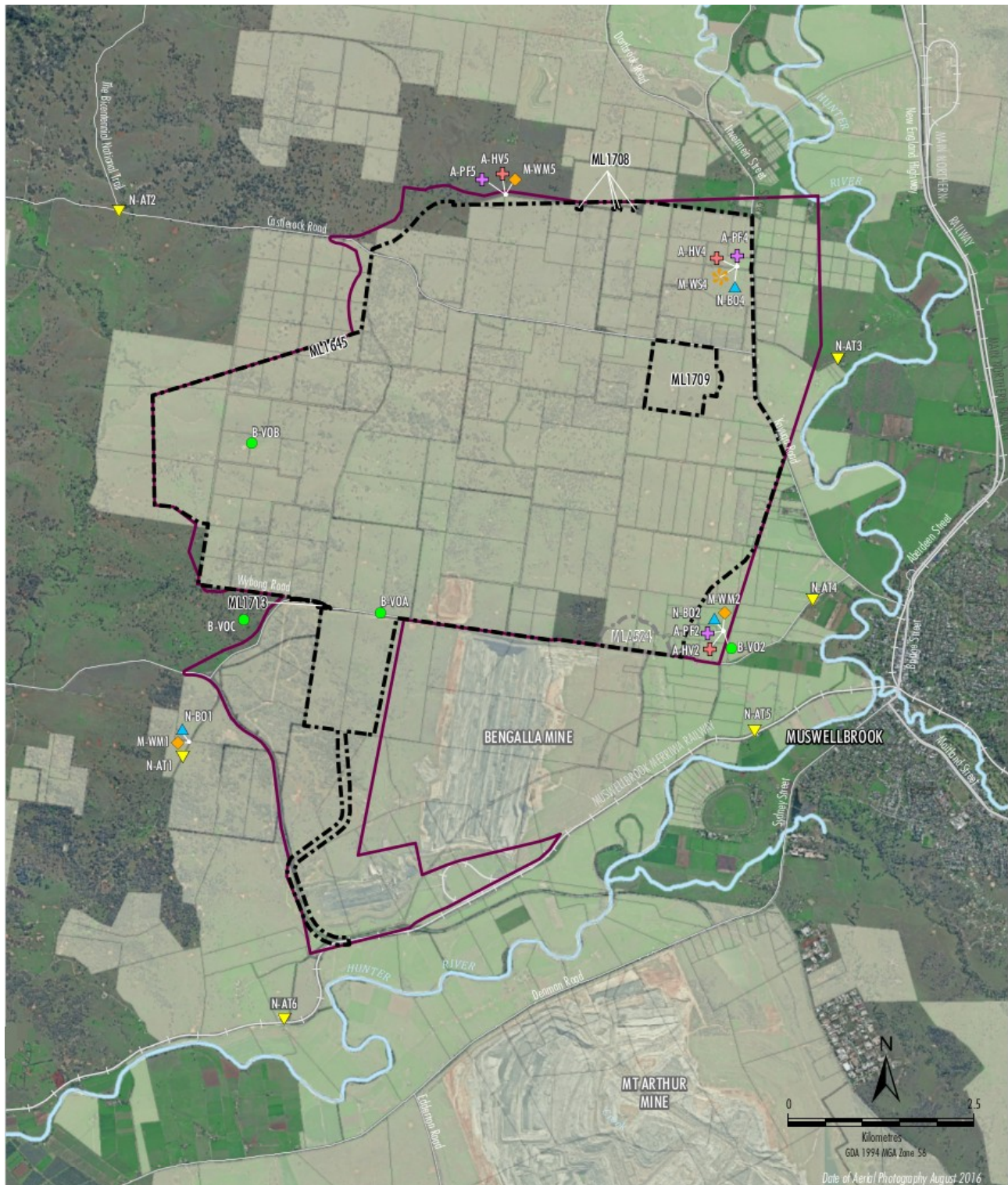
Monitoring locations are selected to represent the most noise affected residence in each of the Noise Affected Groups (NAG). Suitable monitoring locations, where noise levels are likely to be higher than those measured at the residence, are chosen to take a conservative approach as the direct measurement of noise 1 metre from the dwelling facades or within 30 metres of the residence is often impractical due to access requirements, the presence of dogs, air conditioners and other noise sources at the residences.

Table 1.1: ATTENDED NOISE MONITORING LOCATIONS

Descriptor	Assessment Location	NAG Represented	Monitoring Location
N-AT1	258	1	Roxburgh Road
N-AT2	272	2	Castlerock Road, Castle Rock
N-AT3	139	3/5	Wiltons Lane, Kayuga
N-AT4	74	6/7	Wybong Road, Muswellbrook
N-AT5	23	8/9	Logues Lane, Muswellbrook
N-AT6	-	10/11	Old Bengalla Road, Bengalla ¹

Notes:

1. While monitoring for N-AT6 was originally carried out at 599 Roxburgh Road, Mangoola, this monitoring location has been altered as of February 2017 in order to better represent receptors to the southwest of site.



Source: MACH Energy 2016 – N-AT6 has been modified in this image to represent the current monitoring location at Old Bengalla Road, Bengalla.

Figure 1: MTP Noise Monitoring Locations

1.3 Terminology & Abbreviations

Some definitions of terms and abbreviations, which may be used in this report, are provided in Table 1.2.

Table 1.2: TERMINOLOGY & ABBREVIATIONS

Descriptor	Definition
L_A	The A-weighted root mean squared (RMS) noise level at any instant
L_{Amax}	The maximum A-weighted noise level over a time period or for an event
L_{A1}	The noise level which is exceeded for 1 per cent of the time
L_{A10}	The noise level which is exceeded for 10 percent of the time, which is approximately the average of the maximum noise levels
L_{A50}	The noise level which is exceeded for 50 per cent of the time
L_{A90}	The level exceeded for 90 percent of the time, which is approximately the average of the minimum noise levels. The L_{A90} level is often referred to as the “background” noise level and is commonly used to determine noise criteria for assessment purposes
L_{Amin}	The minimum A-weighted noise level over a time period or for an event
L_{Aeq}	The average noise energy during a measurement period
dB(A)	Noise level measurement units are decibels (dB). The “A” weighting scale is used to describe human response to noise
SPL	Sound pressure level (SPL), fluctuations in pressure measured as 10 times a logarithmic scale, the reference pressure being 20 micropascals
Hertz (Hz)	Cycles per second, the frequency of fluctuations in pressure, sound is usually a combination of many frequencies together
VTG	Vertical temperature gradient in degrees Celsius per 100 metres altitude. Estimated from wind speed and sigma theta data
SC	Stability class (or category) is determined from VTG and wind speed.
IA	Inaudible. When site noise is noted as IA then there was no site noise at the monitoring location
NM	Not Measurable. If site noise is noted as NM or <30 dB, this means some noise was audible but could not be quantified
Day	This is the period 7:00am to 6:00pm
Evening	This is the period 6:00pm to 10:00pm
Night	This is the period 10:00pm to 7:00am

2 PROJECT APPROVAL & CRITERIA

2.1 Mount Pleasant Project Approval

The most current project approval associated with activities at MTP is the development application 'DA 92/97 MOD3' (August 2018). Sections 1 to 9 of Schedule 3 of the development application detail specific environmental conditions relating to noise associated with site operations. Relevant sections of the project approval are reproduced in Appendix A.

2.2 Noise Management Plan

Noise monitoring requirements are detailed in the MTP 'Noise Management Plan' (NMP). The most recent version of the NMP was approved in February 2018. Relevant sections are reproduced in Appendix A.

2.3 Environmental Protection Licence

Environmental monitoring requirements are detailed in the Environmental Protection Licence (EPL) No. 20850. The most recent version of the EPL is dated October 2018 with relevant sections reproduced in Appendix A.

2.4 EPL Noise Criteria

Site-only noise levels from MTP are compared with EPL limits which are detailed in Table 2.1.

Table 2.1: EPL NOISE CRITERIA, dB(A)

Descriptor	Assessment Location	NAG Represented	Day L _{Aeq,15min}	Evening L _{Aeq,15min}	Night L _{Aeq,15min}	Night Criterion L _{A1,1min}
N-AT1	258	1	40	40	40	45
N-AT2	272	2	36	36	36	45
N-AT3	139	3/5	35	35	35	45
N-AT4	74	6/7	43	42	42	45
N-AT5	23	8/9	40	40	40	45
N-AT6	-	10/11	35	35	35	45

Notes:

1. While monitoring for N-AT6 was originally carried out at 599 Roxburgh Road, Mangoola, this monitoring location has been altered as of February 2017 in order to better represent receptors to the southwest of site; and
2. Monitoring at N-AT7 commenced November 2018 in order to better represent receptors to the northeast of site.

The EPL outlines the required meteorological conditions in Section 3, Limit Conditions, as follows:

L2.3 The noise limits set out in this licence apply under all meteorological conditions except for the following:

- a) Wind speeds greater than 3 metres/second at 10 metres above ground level; or
- b) Stability category F temperature inversion conditions and wind speeds greater than 2 metres/second at 10 metres above ground level; or
- c) Stability category G temperature inversion conditions.

For the purposes of assessing quarterly compliance, the meteorological conditions noted above have been used in accordance with the EPL.

2.5 Project Approval Cumulative Noise Criteria

Cumulative noise criteria are sourced from the project approval and outlined in Table 2.2. By definition, cumulative noise refers to noise from MTP in conjunction with noise from one or more other mines. If MTP is inaudible or the only noise source, the measured cumulative noise is defined as 'Nil'.

Table 2.2: MTP PROJECT APPROVAL CUMULATIVE NOISE CRITERIA, dB^{1,2,3}

Location	Day LAeq,15min	Evening LAeq,15min	Night LAeq,15min
NAG 8 and 9	55	45	40
All other privately-owned land	50	45	40

2.6 Modifying Factors

The EPA 'Noise Policy for Industry' (NPfI, 2017) was approved for use in NSW in October 2017, and supersedes the EPA's Industrial Noise Policy (INP, 2000). Assessment and reporting of modifying factors is to be carried out in accordance with Fact Sheet C of the NPfI.

NPfI modifying factors, as they are applicable to mining noise, are described in more detail below.

2.6.1 Tonal and Intermittent Noise

As defined in the NPfI:

Tonal noise contains a prominent frequency and is characterised by a definite pitch.

Intermittent noise is noise where the level suddenly drops/increases several times during the assessment period, with a noticeable change in source noise level of at least 5 dB(A); for example, equipment cycling on and off. The intermittency correction is not intended to be applied to changes in noise level due to meteorology.

2.6.2 Low-Frequency Noise

As defined in the NPfI:

Low frequency noise is noise with an unbalanced spectrum and containing major components within the low-frequency range (10 – 160 Hz) of the frequency spectrum.

The NPfI contains the current method of assessing low-frequency noise, which is a 2 step process as detailed below:

Measure/assess source contribution C-weighted and A-weighted $L_{eq,T}$ levels over the same time period. The low frequency noise modifying factor correction is to be applied where the C-A level is 15 dB or more and:

- where any of the 1/3 octave noise levels in Table C2 are exceeded by **up to and including** 5 dB and cannot be mitigated, a 2 dBA positive adjustment to measured A weighted levels applies for the evening/night period; and*
- where any of the 1/3 octave noise levels in Table C2 are exceeded by **more than** 5 dB and cannot be mitigated, a 5 dBA positive adjustment to measured A weighted levels applies for the evening/night period and a 2 dBA positive adjustment applies for the daytime period.*

Table C2 and associated notes from the NPfI is reproduced below:

Table C2: One-third octave low-frequency noise thresholds.

Hz/dB(Z)	One-third octave $L_{Zeq,15min}$ threshold level												
Frequency (Hz)	10	12.5	16	20	25	31.5	40	50	63	80	100	125	160
dB(Z)	92	89	86	77	69	61	54	50	50	48	48	46	44

Notes:

- dB(Z) = decibel (Z frequency weighted).
- For the assessment of low-frequency noise, care should be taken to select a wind screen that can protect the microphone from wind-induced noise characteristics at least 10 dB below the threshold values in Table C2 for

wind speeds up to 5 metres per second. It is likely that high performance larger diameter wind screens (nominally 175 mm) will be required to achieve this performance (Hessler, 2008). In any case, the performance of the wind screen and wind speeds at which data will be excluded needs to be stated.

- Low-frequency noise corrections only apply under the standard and/or noise-enhancing meteorological conditions.
- Where a receiver location has had architectural acoustic treatment applied (including alternative means of mechanical ventilation satisfying the Building Code of Australia) by a proponent, as part of consent requirements or as a private negotiated agreement, alternative external low-frequency noise assessment criteria may be proposed to account for the higher transmission loss of the building façade.
- Measurements should be made between 1.2 and 1.5 metres above ground level unless otherwise approved through a planning instrument (consent/approval) or environment protection licence, and at locations nominated in the development consent or licence.

3 METHODOLOGY

3.1 Attended Noise Monitoring

Noise monitoring was conducted in accordance with the Australian Standard AS1055 'Acoustics, Description and Measurement of Environmental Noise' and relevant NSW EPA requirements. Atmospheric condition measurement was also undertaken.

Noise monitoring was conducted by Jason Cameron.

During this survey, monthly attended monitoring was undertaken during the day period, once at each location. Evening and night monitoring will commence once site operations during these periods begins. The duration of each measurement was 15 minutes.

Attended monitoring is preferred to the use of noise loggers when determining compliance with prescribed limits; it allows an accurate determination of the contribution, if any, to measured noise levels by the source of interest (in this case MTP).

If the exact contribution of the source of interest cannot be established, due to masking by other noise sources in a similar frequency range, but site noise levels are observed to be well below (more than 5 dB lower than) any relevant criterion, a maximum estimate of the potential contribution of the site might be made based on other measured site-only noise levels, for example, L_{A10} , L_{A50} or L_{A90} . This is generally expressed as a 'less than' quantity, such as <20 dB or <30 dB.

The terms 'Inaudible' (IA) or 'Not Measurable' (NM) may also be used in this report. When site noise is noted as IA, no site noise was audible at the monitoring location. When site noise is noted as NM, this means some noise was audible but could not be quantified. If site noise was NM due to masking but estimated to be significant in relation to a relevant criterion, we would employ methods (e.g. measure closer and back calculate) to determine a value for reporting.

All sites noted as NM in this report are due to one or more of the following reasons:

- site noise levels were extremely low and unlikely, in many cases, to be even noticed;
- site noise levels were masked by another relatively loud noise source that is characteristic of the environment (e.g. breeze in foliage or continuous road traffic noise) that cannot be eliminated by moving closer; and/or
- it was not feasible or reasonable to employ methods such as move closer and back calculate. Cases may include, but are not limited to, rough terrain preventing closer measurement, addition/removal of significant source to receiver shielding caused by moving closer, and meteorological conditions where back calculation may not be accurate

Meteorological data used to determine if criteria apply has been sourced from the MTP weather station.

3.2 Modifying Factors

Years of monitoring have indicated that noise levels from mining operations, particularly those measured at significant distances from the source are relatively continuous and broad spectrum. Given this, noise levels from MTP at the monitoring locations are unlikely to be intermittent or tonal.

Assessment of low-frequency modifying factors is necessary when application of the maximum correction could potentially result in an exceedance of the relevant site-only L_{Aeq} criterion. Low-frequency analysis is therefore undertaken for measurements in this report where:

- meteorological conditions resulted in criteria being applicable;
- contributions from MTP were audible and directly measurable, such that the site-only L_{Aeq} was not “NM” or less than a maximum cut off value (e.g. “<20 dB” or “<30dB”);
- contributions from MTP were within 5 dB of the relevant L_{Aeq} criterion, as 5 dB is the maximum penalty that can be applied by low-frequency modifying factors; and
- MTP was the dominant low-frequency noise source.

All measurements meeting these conditions were evaluated for possible low-frequency penalty applicability in accordance with the NPfL.

3.3 Attended Noise Monitoring Equipment

Table 3.1 lists the equipment used to measure environmental noise levels. Calibration certificates are provided in Appendix B.

Table 3.1: ATTENDED NOISE MONITORING EQUIPMENT

Model	Serial Number	Calibration Due Date
Rion NA-28 sound level meter	30131882	14/03/2019
Pulsar model 105 acoustic calibrator	78226	14/03/2019

4 RESULTS

4.1 Total Measured Noise levels

Overall noise levels measured at each location during attended monitoring are provided in Table 4.1.

Table 4.1: TOTAL MEASURED NOISE LEVELS – NOVEMBER 2018¹

Location	Start Date and Time	L _{Amax} dB	L _{A1} dB	L _{A10} dB	L _{A50} dB	L _{Aeq} dB	L _{A90} dB	L _{Amin} dB	L _{Ceq} dB
N-AT1	27/11/2018 13:06	82	62	36	32	55	29	27	68
N-AT2	27/11/2018 12:25	80	53	38	28	49	24	20	55
N-AT3	27/11/2018 11:55	65	51	35	31	38	29	27	52
N-AT4	27/11/2018 11:29	80	71	49	35	56	30	27	61
N-AT5	27/11/2018 11:02	60	48	39	34	38	32	30	54
N-AT6	27/11/2018 13:31	66	49	39	34	40	31	29	57

Notes:

1. Levels in this table are not necessarily the result of activity at MTP;

4.2 Modifying Factors

Measured MTP only noise levels were assessed for the applicability of modifying factors in accordance with the EPA's NPfL.

There were no intermittent or tonal noise sources, as defined in the NPfL, audible from site during the survey.

None of the measurements in this survey satisfied the conditions outlined in Section 3.2. No further assessment of low-frequency noise was required.

4.3 Attended Noise Monitoring

Table 4.2 compares measured $L_{Aeq,15\text{minute}}$ levels for MTP with site-only noise criteria detailed in the EPL.

Table 4.2: $L_{Aeq,15\text{minute}}$ GENERATED BY MTP AGAINST NOISE CRITERIA – NOVEMBER 2018

Location	Start Date and Time	Wind Speed m/s	Stability Class	Criterion dB	Criterion Applies ¹	MTP Only L_{Aeq} dB ^{2,4}	Exceedance dB ^{3,4}
N-AT1	27/11/2018 13:06	3.3	B	40	No	IA	NA
N-AT2	27/11/2018 12:25	3.0	A	36	Yes	IA	Nil
N-AT3	27/11/2018 11:55	2.3	A	35	Yes	IA	Nil
N-AT4	27/11/2018 11:29	1.4	A	43	Yes	35	Nil
N-AT5	27/11/2018 11:02	2.2	B	40	Yes	<25	Nil
N-AT6	27/11/2018 13:31	1.1	A	35	Yes	IA	Nil

Notes:

- Noise emission limits apply 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 $L_{Aeq,15\text{minute}}$ attributed to MTP;
- NA in exceedance column means atmospheric conditions outside those specified in project approval and so criterion is not applicable; and
- Bold results in red indicate exceedance of criteria.

Table 4.3 compares cumulative noise levels for all mines against cumulative noise level criteria.

Table 4.3: CUMULATIVE MINING NOISE AGAINST CUMULATIVE NOISE CRITERIA – NOVEMBER 2018

Location	Start Date and Time	Wind Speed m/s	Stability Class	Criterion dB	Criterion Applies ¹	Mining L_{Aeq} dB ^{2,4,5}	Exceedance dB ^{3,4}
N-AT1	27/11/2018 13:06	3.3	B	40	No	Nil	NA
N-AT2	27/11/2018 12:25	3.0	A	36	Yes	Nil	Nil
N-AT3	27/11/2018 11:55	2.3	A	35	Yes	Nil	Nil
N-AT4	27/11/2018 11:29	1.4	A	43	Yes	Nil	Nil
N-AT5	27/11/2018 11:02	2.2	B	40	Yes	Nil	Nil
N-AT6	27/11/2018 13:31	1.1	A	35	Yes	Nil	Nil

Notes:

- Noise emission limits apply 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 $L_{Aeq,15\text{minute}}$ attributed to cumulative mine noise;
- NA in exceedance column means atmospheric conditions outside those specified in project approval and so criterion is not applicable;
- Bold results in red indicate exceedance of criteria; and
- By definition, cumulative noise refers to noise from MTP in conjunction with noise from one or more other mines. If MTP is inaudible or the only noise source, the measured cumulative noise is defined as 'Nil'.

4.4 Atmospheric Conditions

Atmospheric condition data measured by the operator at each location using a Kestrel hand-held weather meter is shown in Table 4.4. Atmospheric condition data is recorded during each measurement to show conditions near the microphone during the monitoring period.

Table 4.4: MEASURED ATMOSPHERIC CONDITIONS – NOVEMBER 2018

Location	Start Date and Time	Temperature °C	Wind Speed m/s	Wind Direction °MN	Cloud Cover 1/8s
N-AT1	27/11/2018 13:06	30	2.8	120	4
N-AT2	27/11/2018 12:25	28	1.2	150	3
N-AT3	27/11/2018 11:55	27	0.9	190	4
N-AT4	27/11/2018 11:29	33	0.3	30	3
N-AT5	27/11/2018 11:02	30	0.8	30	1
N-AT6	27/11/2018 13:31	30	2.8	120	4

Notes:

1. Temperature, wind speed and direction measured at 1.8 metres; and
2. “-” indicates calm conditions at monitoring location.

MTP weather station data is used to determine compliance with specified noise criteria.

5 DISCUSSION

5.1 Noted Noise Sources

Table 4.1 to Table 4.3 present data gathered during attended monitoring. These noise levels are the result of many sounds reaching the sound level meter microphone during monitoring. Received levels from various noise sources were noted during attended monitoring and particular attention was paid to the extent of MTP's contribution, if any, to measured levels. At each receptor location, MTP's $L_{Aeq,15\text{minute}}$ was, where possible, measured directly, or, determined by frequency analysis. Time variations of noise sources in each measurement, their temporal characteristics, are taken into account via statistical descriptors.

From these observations summaries have been derived for each location. The following sections provide these summaries. Statistical 1/3 octave band analysis of environmental noise was undertaken, and Figure 3 to Figure 8 display the frequency ranges for various noise sources at each location for L_{A1} , L_{A10} , L_{Aeq} , L_{A50} , and L_{A90} . These figures also provide, graphically, statistical information for these noise levels.

An example is provided as Figure 2 where it can be seen that frogs and insects are generating noise at frequencies above 1000 Hz, mining noise is at frequencies less than 1000 Hz (this is typical). Adding levels at frequencies that relate to mining only allows separate statistical results to be calculated. This analysis cannot always be performed if there are significant levels of other noise at the same frequencies as mining, this can be dogs, cows, or most commonly, road traffic.

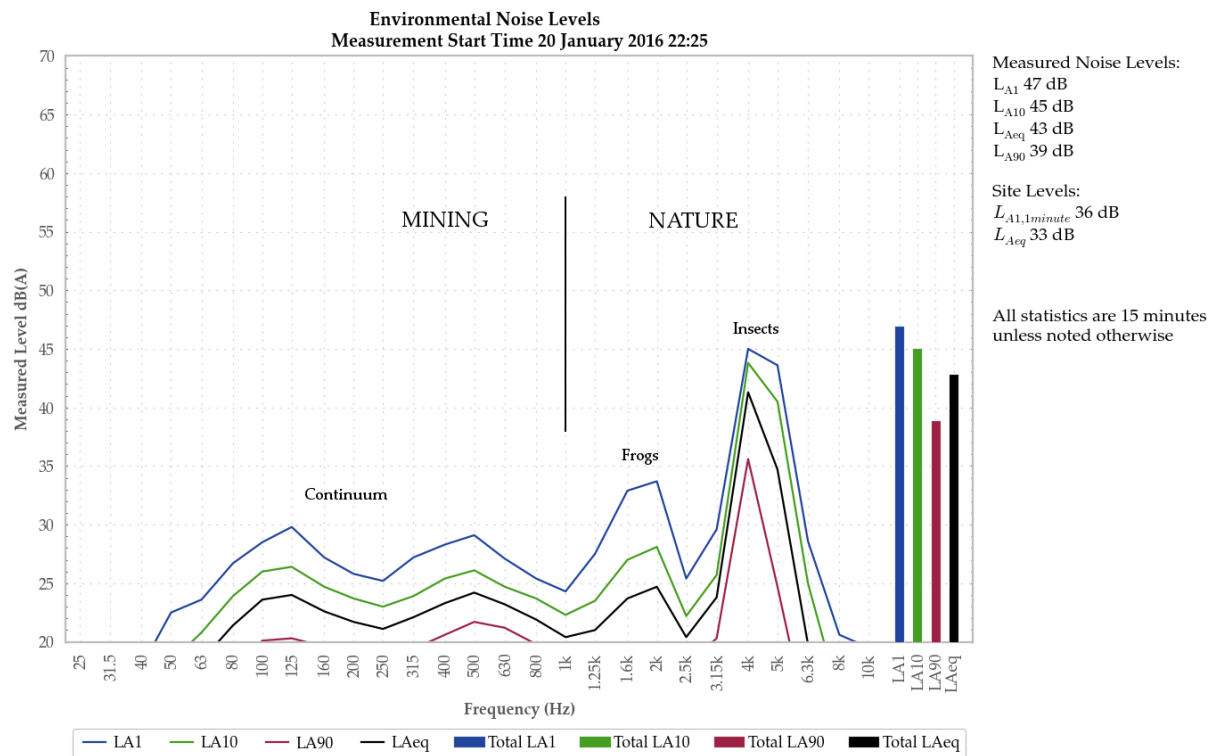


Figure 2: Sample Graph (See Section 5.1 for explanatory note)

5.1.1 N-AT1, Day

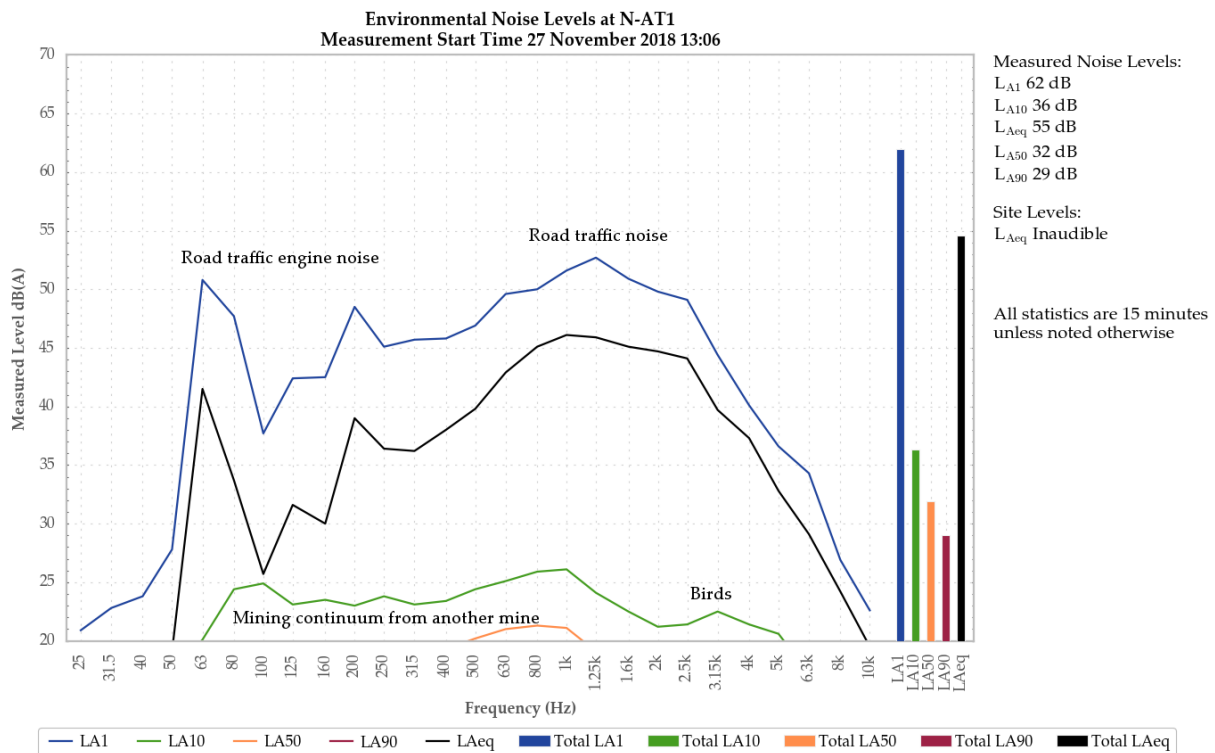


Figure 3: Environmental Noise Levels, N-AT1 – Roxburgh Road

MTP was inaudible during the measurement.

Road traffic was responsible for the measured LA1 and LAeq. Birds and continuum from another mining operation generated the measured LA10, LA50, and LA90.

Insects and aircraft were also noted.

5.1.2 N-AT2, Day

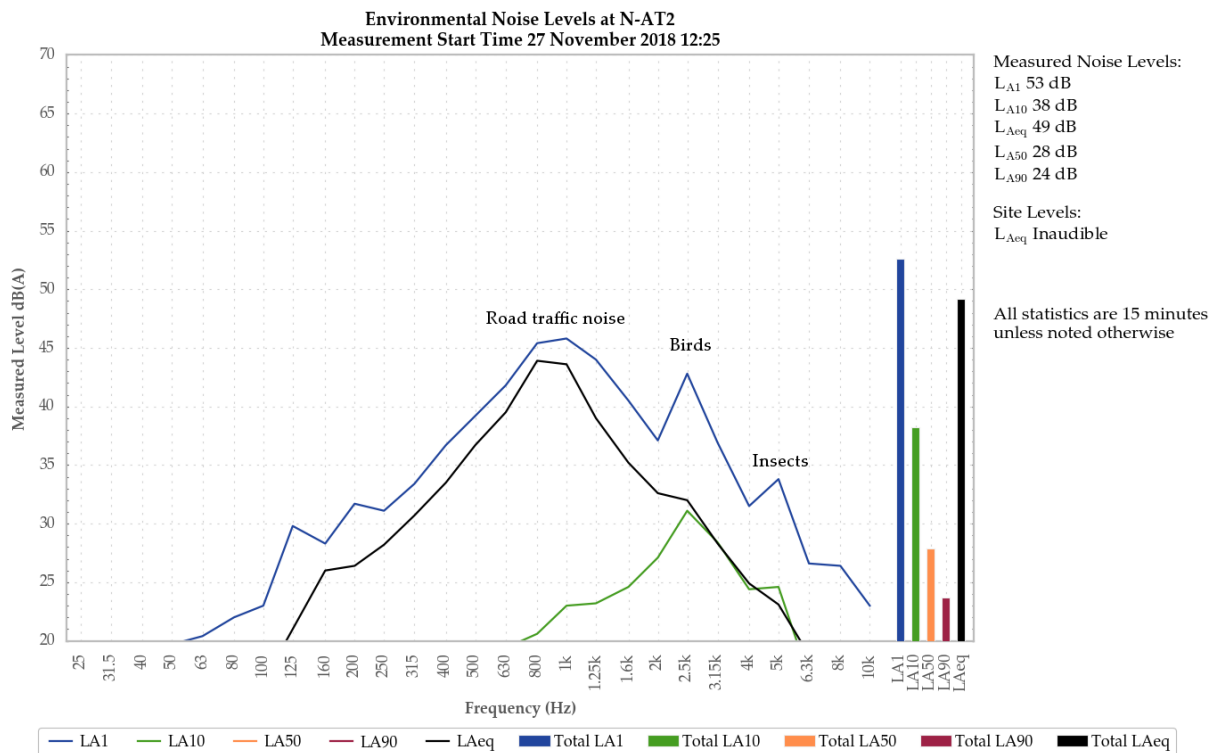


Figure 4: Environmental Noise Levels, N-AT2 – Castlerock Road

MTP was inaudible during the measurement.

Road traffic was primarily responsible for the measured L_{A1} and L_{Aeq} . Birds and insects generated the measured L_{A10} , L_{A50} and L_{A90} and contributed to the measured L_{A1} and L_{Aeq} .

Aircraft noise was also noted.

5.1.3 N-AT3, Day

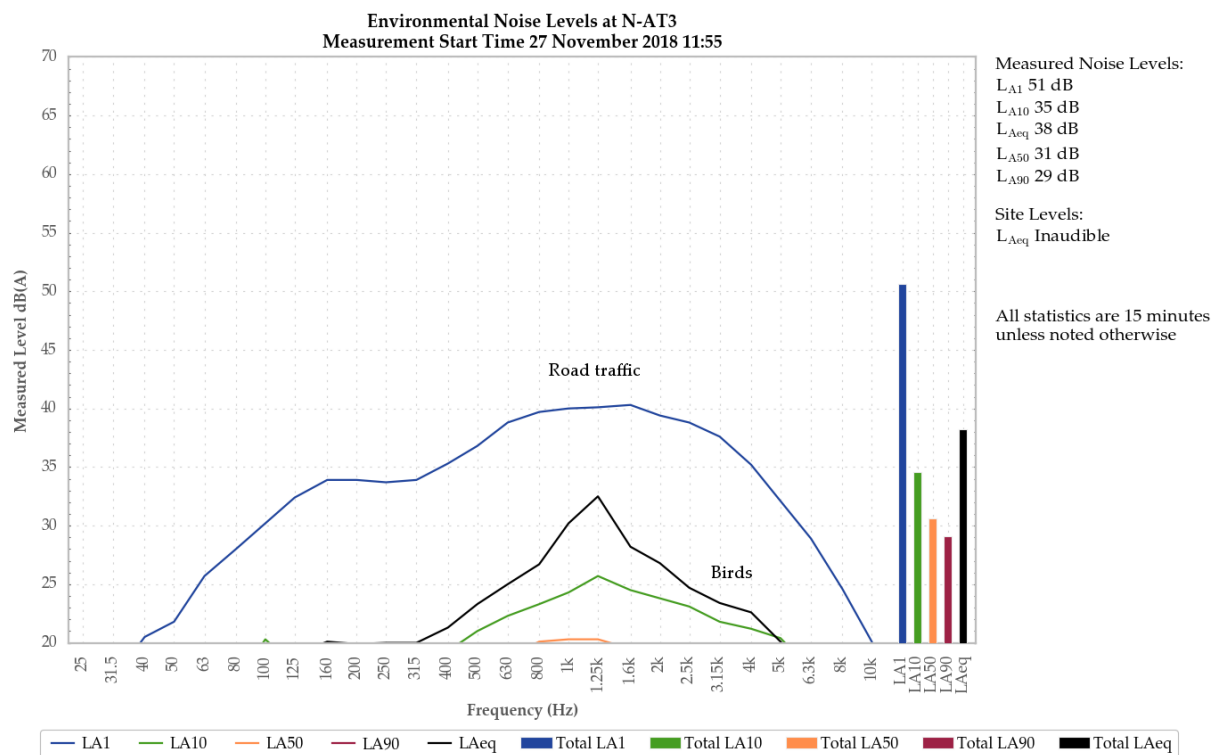


Figure 5: Environmental Noise Levels, N-AT3 – Wiltons Lane

MTP was inaudible during the measurement.

Road traffic generated the measured L_{A1} and contributed to all measured levels. Birds were primarily responsible for the measured L_{Aeq} and L_{A10} and contributed to the measured L_{A50} and L_{A90}.

5.1.4 N-AT4, Day

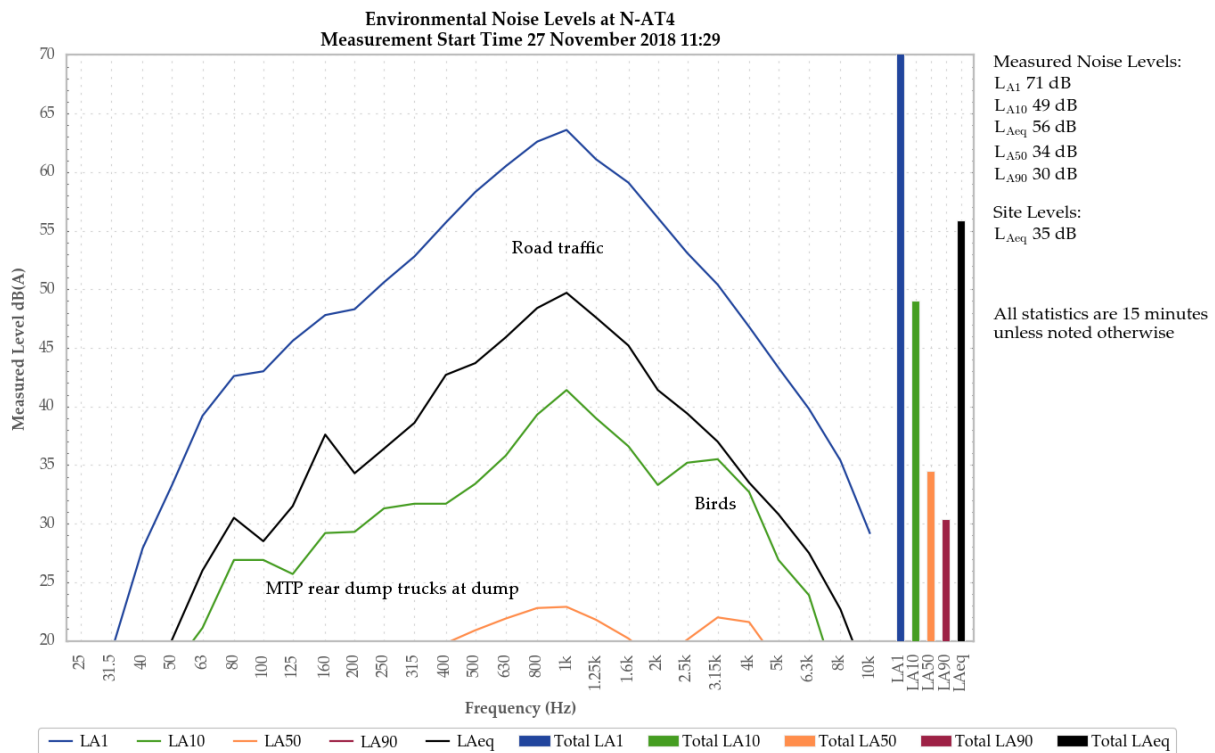


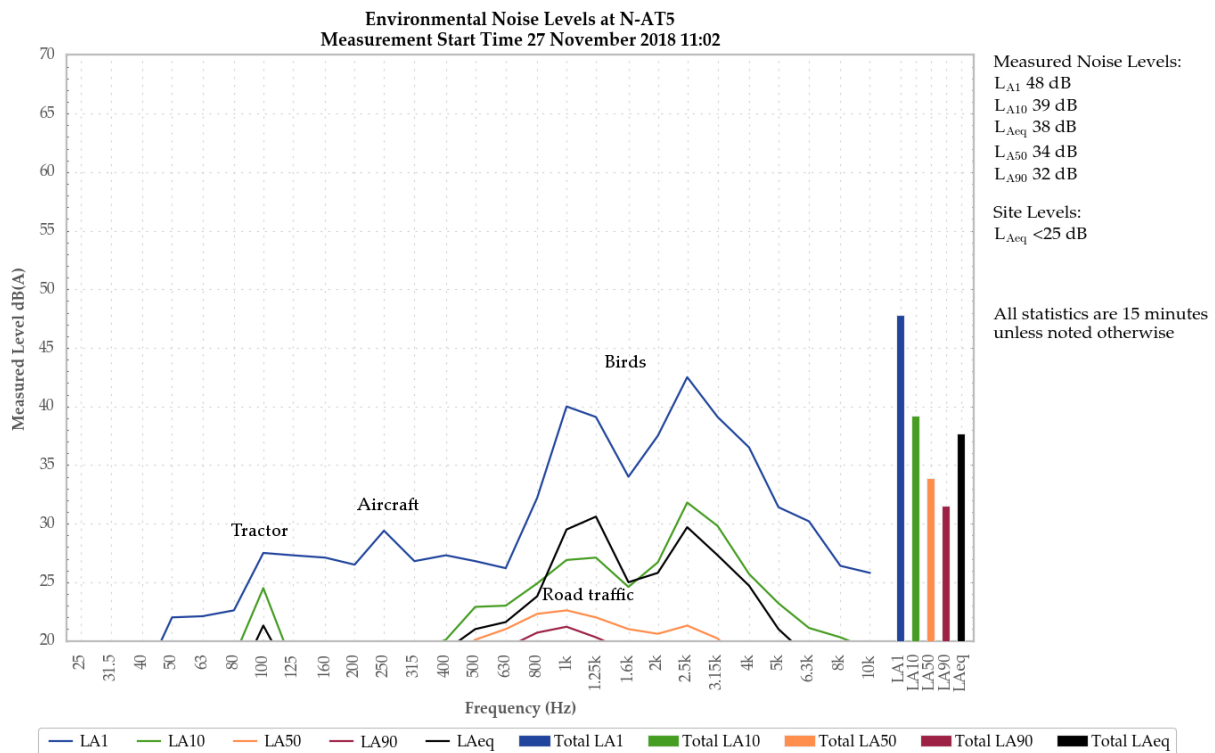
Figure 6: Environmental Noise Levels, N-AT4 – Wybong Road

Engine surges, reverse alarms and load dumping from rear dump trucks at MTP were audible throughout the measurement and generated a site only L_{Aeq} of 35 dB.

Road traffic generated the measured L_{A1} , and contributed to the measured L_{Aeq} and L_{A10} . Mining noise sources from MTP and birds contributed to the measured L_{Aeq} and L_{A10} and generated the measured L_{A50} and L_{A90} .

A horse and local impacts were also noted.

5.1.5 N-AT5, Day



Low level mining continuum, reverse alarms and track noise from MTP were audible throughout the measurement. These noise sources combined to generate a site-only L_{Aeq} of less than 25 dB.

Birds were responsible for the measured L_{A1} , L_{A10} , and L_{Aeq} and contributed to the measured L_{A50} . A tractor contributed to all measured levels. An aircraft was a minor contributor to the measured L_{A1} . Road traffic contributed to the measured L_{A50} and generated the measured L_{A90} .

Insects were also noted.

5.1.6 N-AT6, Day

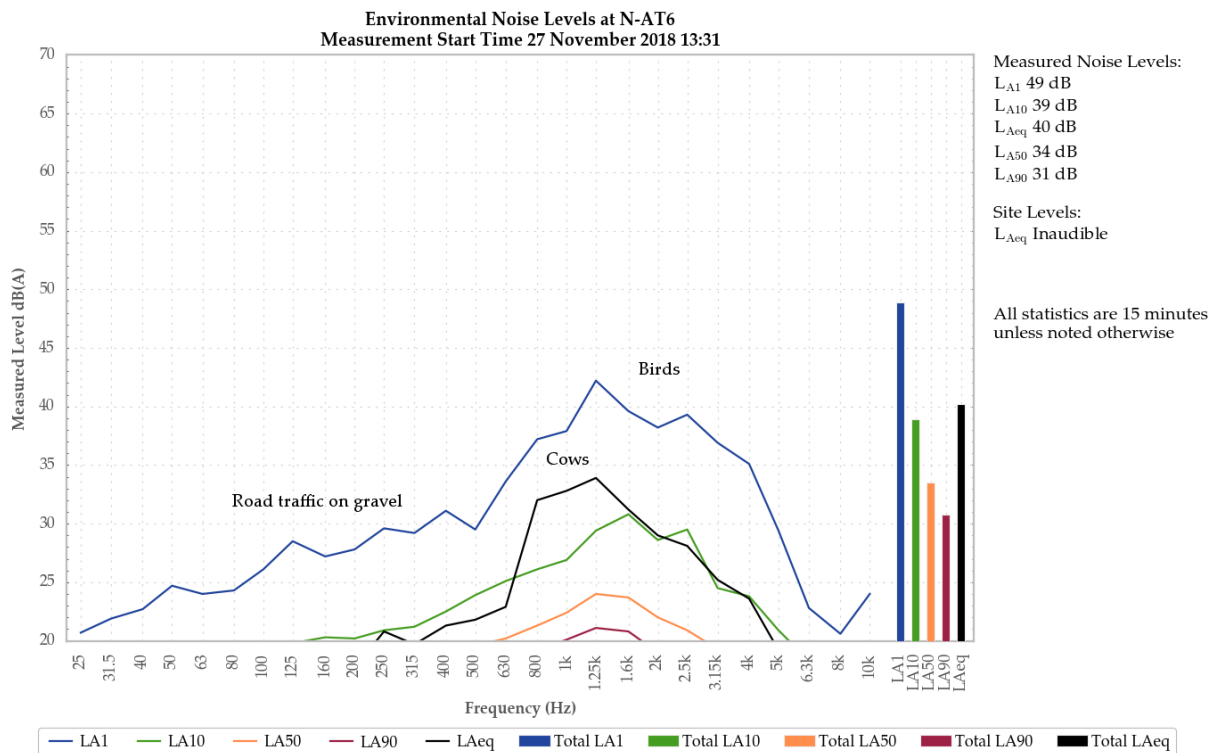


Figure 8: Environmental Noise Levels, N-AT6 – Old Bengalla Road

MTP was inaudible during the measurement.

Birds and cows were primarily responsible for all measured levels. Road traffic contributed to the measured L_{A1} .

Breeze in foliage and highway road traffic were also noted.

6 SUMMARY OF COMPLIANCE

Noise monitoring as described in this report was undertaken during the day period of 27 November 2018 at six monitoring locations.

The survey purpose is to quantify and describe the existing acoustic environment around the mine project and compare results with relevant limits.

Noise levels from MTP complied with noise limits at all monitoring locations during the November 2018 monitoring period.

Global Acoustics Pty Ltd

APPENDIX

A *PROJECT APPROVAL, NOISE MANAGEMENT PLAN & EPL*

A.1 MOUNT PLEASANT PROJECT APPROVAL (DA 92/97)

SCHEDULE 3 ENVIRONMENTAL PERFORMANCE CONDITIONS

ACQUISITION UPON REQUEST

1. If the Applicant receives a written request for acquisition from the owner of any land listed in Table 1, then the Applicant must acquire the land in accordance with the procedures in conditions 6-7 of Schedule 4.

Table 1: Land subject to acquisition upon request

Basis	Receiver
Noise	45, 47, 67, 96, 102, 108, 112, 118, 120, 120c, 121, 136, 143a, 143b, 147, 153a, 156a, 157a, 158, 159
Noise & Air	43, 43b
Air	20 ² , 21 ²

Notes:

1 To identify the locations referred to in Table 1, see the figures in Appendix 5.

2 The Applicant is only required to acquire and/or install mitigation measures at this property if acquisition and/or mitigation is not reasonably achievable under a separate approval for the Bengalla mine.

ADDITIONAL MITIGATION UPON REQUEST

2. Upon receiving a written request from the owner of any residence on any land listed in Table 1 (unless the owner of that land has requested acquisition) or Table 2, the Applicant must implement additional:
 - (a) noise mitigation measures (such as double-glazing, insulation and/or air conditioning); and/or
 - (b) air quality mitigation measures (such as air filters, a first flush roof water drainage system and/or air conditioning),
 at the residence(s) in consultation with the owner.

These measures must be reasonable and feasible, and directed towards reducing the noise and/or air quality impacts of the development on the residence(s). The Applicant must also be responsible for the reasonable costs of ongoing maintenance of these additional mitigation measures until the cessation of mining operations.

If within 3 months of receiving this request from the owner, the Applicant and the owner cannot agree on the measures to be implemented, or there is a dispute about the implementation of these measures, then either party may refer the matter to the Secretary for resolution.

Table 2: Land where additional mitigation measures are available on request

Basis	Receiver
Noise	68, 74, 77, 79, 80a, 84a, 86a, 139, 140a, 140c, 154, 203, 257, 258, 259, 526

Note:

1 To identify the locations referred to in Table 2, see the figures in Appendix 5.

NOISE

Noise Criteria

3. Except for the noise-affected land referred to in Table 1, the Applicant must ensure that the noise generated by the development does not exceed the criteria in Table 3 at any residence on privately-owned land.

Table 3: Noise criteria dB(A)

Receiver or other location	Day	Evening	Night	
	L _{Aeq} (15min)	L _{Aeq} (15min)	L _{Aeq} (15min)	L _{A1} (1min)
68, 74	43	42	42	45
86a	42	42	42	45
35, 35b, 77	42	41	41	45
79, 80a, 140c, 526	41	41	41	45
289	41	40	40	45
23, 84a, 139, 154, 203, 257, 258a	40	40	40	45
83	40	39	39	45
86b, 140a, 202, 259	39	39	39	45
198, 202b	38	38	38	45

260, 261	37	37	37	45
169, 272	36	36	36	45
NAG 5 - All privately-owned land	41	40	39	45
NAG 6 - All privately-owned land	37	37	37	45
NAG 7 - All privately-owned land	40	37	37	45
NAG 8 - All privately-owned land	41	39	39	45
NAG 9 - All privately-owned land	39	38	37	45
NAG 11 - All privately-owned land	37	36	35	45
All other privately-owned land	35	35	35	45

Notes:

- To identify the locations referred to in Table 3, see the figures in Appendix 5.
- Noise generated by the development is to be measured in accordance with the relevant procedures and exemptions (including certain meteorological conditions) of the NSW Industrial Noise Policy, with the exception of the application of modifying factors under Fact Sheet C of the Noise Policy for Industry.

However, these criteria do not apply if the Applicant has a written agreement with the relevant landowner to exceed the criteria, and the Applicant has advised the Department in writing of the terms of this agreement.

4. Deleted

Cumulative Noise Criteria

- Except for the noise-affected land referred to in Table 1, the Applicant **must** implement all reasonable and feasible measures to ensure that the noise generated by the development combined with the noise generated by other mines in the area does not exceed the criteria in Table 5 at any residence on privately-owned land.

Table 5: Cumulative noise criteria dB(A) L_{Aeq} (period)

Location	Day	Evening	Night
NAG 8, 9	55	45	40
All other privately-owned land	50	45	40

Notes:

- To identify the locations referred to in Table 5, see the figures in Appendix 5; and
- Cumulative noise is to be measured in accordance with the relevant procedures and exemptions (including certain meteorological conditions) of the NSW Industrial Noise Policy.

Rail Noise

- The Applicant **must** ensure that its rail spur is only accessed by locomotives that are approved to operate on the NSW rail network in accordance with the noise limits in RailCorp's EPL (No. 12208) and ARTC's EPL (No. 3142).

Noise Operating Conditions

- The Applicant **must**:
 - implement best practice noise management, including all reasonable and feasible noise mitigation measures to minimise the **construction**, operational, low frequency, and rail noise generated by the development;
 - minimise the noise impacts of the development during temperature inversions;
 - regularly assess the real-time noise monitoring and meteorological forecasting data and relocate, modify, and/or stop operations on site to ensure compliance with the relevant conditions of this consent; and
 - co-ordinate the noise management on site with the noise management at nearby mines (including the Bengalla mine) to minimise the cumulative noise impacts of the mines, to the satisfaction of the **Secretary**.

Note: Monitoring under this consent is not required at all residences and the use of representative monitoring locations can be used to demonstrate compliance with criteria, if agreed to by the Secretary.

Noise Management Plan

- The Applicant **must** prepare a Noise Management Plan for the development to the satisfaction of the **Secretary**. This plan must:

- (a) be submitted to the Secretary for approval prior to carrying out any development on site;
- (b) describe the noise mitigation measures that would be implemented to ensure compliance with the relevant conditions of this consent, including a real-time noise management system that employs both reactive and proactive mitigation measures;
- (c) include a noise monitoring program that:
 - uses a combination of real-time and supplementary attended monitoring to evaluate the performance of the development;
 - accounts for the occurrence of any noise enhancement between the site, and any sensitive receivers located beyond the site boundary; and
 - includes a protocol for determining exceedances of the relevant conditions of this consent.
- (d) include a protocol that has been prepared in consultation with the owners of the nearby mines (including the Bengalla mine) to minimise the cumulative noise impacts of the mines.

The Applicant must implement the approved management plan as approved from time to time by the Secretary.

A.2 MOUNT PLEASANT NOISE MANAGEMENT PLAN

9 NOISE MONITORING PROGRAM

9.1 GENERAL REQUIREMENTS

As per the requirements of Development Consent DA 92/97, the MPO noise monitoring program will comprise both attended (Section 9.2) and real-time (Section 9.3) noise monitoring.

The results of attended monitoring will be used to assess compliance with relevant noise impact assessment criteria. Real-time monitoring will be used as a management tool to assist MACH Energy to take pre-emptive actions to avoid potential non-compliances.

Meteorological monitoring will also be conducted (Section 9.4).

9.2 ATTENDED NOISE MONITORING

9.2.1 Purpose

Attended noise monitoring will be undertaken to determine compliance with the noise criteria in Development Consent DA 92/97.

9.2.2 Monitoring Locations

Attended noise monitoring will initially be undertaken at the nominal locations described in Table 15 and shown on Figure 6.

Table 15
Indicative Operator-attended Noise Monitoring Locations

Location				Frequency ¹	Justification
Site ID	Description	Easting	Northing		
N-AT1	South-west of the MPO	291465	6427182	Quarterly	Representative of dwellings to the south-west (i.e. NAG 1)
N-AT2	North-west of the MPO	290608	6434490	Quarterly	Representative of dwellings to the north-west (i.e. NAG 2)
N-AT3	East of the MPO	300270	6432503	Quarterly	Representative of dwellings to the north-east and east (i.e. NAGs 3, 4 and 5)
N-AT4	South-east of the MPO	299947	6429264	Quarterly	Representative of dwellings to the east (i.e. NAGs 6 and 7)
N-AT5	South-east of the MPO	299161	6427503	Quarterly	Representative of dwellings to the south-east (i.e. NAGs 8 and 9)
N-AT6	South-west of the MPO	289092	6423155	Quarterly	Representative of dwellings to the south-west (i.e. NAGs 10 and 11)

¹ Operator-attended noise monitoring will be undertaken quarterly at each monitoring location in accordance with Condition M4.1 of EPL 20850, however, more frequent monitoring may be conducted at a subset of sites (e.g. those in close proximity to operations) as required.

Monitoring locations have been selected as being representative of residential and other sensitive receivers in the vicinity of mining at the MPO. Locations were also selected based on prevailing weather conditions and with consideration given to the privacy of residents. These nominal locations will be periodically updated based on noise monitoring results and review of applicable EPL 20850 requirements that may be updated by the EPA from time to time.

9.2.3 Methodology

The operator-attended noise monitoring will be conducted on a quarterly basis in accordance with Condition M4.1 of EPL 20850. More frequent monitoring may be conducted at a subset of sites (e.g. those in close proximity to operations). Monitoring would be conducted in accordance with AS 1055:1997 *Acoustics – Description and Measurement of Environmental Noise and the INP*.

In accordance with Condition 3, Schedule 5 of Development Consent DA 92/97, the results of the attended monitoring will be compared with the noise criteria (Section 6).

Monitoring reports will be made publicly available on the MACH Energy website in accordance with Condition 11, Schedule 5 of Development Consent DA 92/97. A summary of all monitoring results for each year will be reported in the MPO Annual Review at the end of that year, in accordance with Condition 3, Schedule 5 of Development Consent DA 92/97.

Timing

In accordance with EPL 20850, attended noise monitoring will be undertaken in each quarter for a minimum of:

- 90 minutes during the day (i.e. 7.00 am to 6.00 pm);
- 30 minutes during the evening (i.e. 6.00 pm to 10.00 pm); and
- 60 minutes during the night (i.e. 10.00 pm to 7.00 am);

for three consecutive operating days.

Measurement

Measurement will be undertaken by a suitably experienced and capable person.

Acoustic instrumentation used in attended monitoring will comply with AS 1259.2:1990 Sound Level Meters and carry current National Association of Testing Authorities or manufacturer calibration certificates. Instrument calibration will be conducted before and after each survey, with the variation in calibrated levels not to exceed ± 0.5 dB(A).

Wind direction, wind speed, air temperature and relative humidity will all be recorded as part of the attended noise monitoring. Notes will be taken if there are changes in wind speed/direction at the various monitoring locations or if other relevant changes occur. While this information is gathered, the site data (wind speed/direction) will be included in compliance reports as this is taken at the required 10 m above ground level.

In accordance with EPL requirements, $L_{Aeq(15 \text{ minute})}$ noise monitoring for compliance purposes at a specific residence will be undertaken approximately on the property boundary (where any dwelling is situated 30 m or less from the property boundary closest the premises), or within 30 m of the dwelling (where the dwelling is more than 30 m from the boundary, if previously agreed with the landowner). However, if monitoring is being undertaken at a representative location for a general NAG, this requirement will not apply.

Comprehensive field notes will be taken to indicate mine sources (haul truck, dozer tracks, etc.) and other sources (birds, insects, dogs, passing cars, etc.) and when they occurred during the measurement to the nearest second. The recorded time-trace (at one second intervals) and wavefile will be analysed to quantify the noise contribution from each source. Notes about maximum mine noise levels (source and times) will also be taken. Where practicable, the data would be recorded using a sound level meter or noise logger with the capability to record time-traces and wavefiles.

The intrusive noise level contribution from MPO activities will be quantified over a 15 minute measurement period. In addition, measurements will be made in both A-weighting and C-weighting. Only parameters relevant to noise criteria will be reported.

Modifying factors from Section 4 of the INP will be used where applicable. Tonality and low frequency will be assessed by analysis of the measured L_{Aeq} spectrum³. Analysis should be conducted on a spectrum representative of potential MPO noise. The use of smaller sampling periods may be necessary to assess the applicability of modifying factors.

Details of corrective actions taken to address any noise criteria exceedances, and confirmation of their successful implementation, will be recorded by MACH Energy.

Recording

The following information will be recorded for each monitoring survey:

- operator's name;
- time and date;
- locations of attended or unattended noise instruments;
- recording intervals;
- meteorological conditions for each measurement location (as collected by a hand held meter) and also a combination of graphs and tables presenting the weather conditions for the entire survey period;
- statistical noise level descriptors together with notes identifying the principal noise sources;
- notes of recorded mine-related noise sources, including approximate start and finishing times;
- project operating conditions including train loading times together with mobile and ancillary equipment operation and predominant location; and
- instrument calibration details.

9.2.4 Applicable Meteorological Conditions

As described in Section 8.5, the noise limits set out in Development Consent DA 92/97 and in EPL 20850 do not apply under the following meteorological conditions:

- rain; or
- wind speeds greater than 3 metres/second (m/s) at 10 m above ground level; or
- stability category F temperature inversion conditions and wind speeds greater than 2 m/s at 10 m above ground level; or
- stability category G temperature inversion conditions.

Notwithstanding the above, weather conditions will be monitored (Section 9.4) and, where adverse conditions are experienced or predicted, operational changes will be implemented to avoid or reduce noise impacts.

A.3 MOUNT PLEASANT ENVIRONMENTAL PROTECTION LICENCE (20850)

L2 Noise limits

L2.1 Noise generated at the premises must not exceed the noise limits presented in the table below.

Note:

The noise limits in the table below do not apply if the licensee has a written agreement with the relevant landowner to exceed the noise limit and the licensee has advised the EPA in writing of the terms of the agreement.

The noise limits in the table below do not apply to residences owned by the licensee or those residences that are subject to acquisition as Listed in Table 1 of the Development Consent DA 92/97 (MOD1) dated 19 September 2011.

Location	Day - LAeq(15 minute)	Evening - LAeq(15 minute)	Night - LAeq(15 minute)	Night - LA1(1 minute)
NAG 1 - assessment locations 260 and 261	37	37	37	45
NAG 1 - assessment location 258	40	40	40	45
NAG 1 - assessment location 259	39	39	39	45
NAG 1 - All other privately-owned land	35	35	35	45
NAG 2 - assessment location 272	36	36	36	45
NAG 2 - All other privately-owned land	35	35	35	45
NAG 3 - assessment locations 139, 154 and 240	40	40	40	45
NAG 3 - assessment location 241	39	39	39	45

NAG 3 - All other privately-owned land	35	35	35	45
NAG 4 - assessment location 169	36	36	36	45
NAG 4 - All other privately-owned land	35	35	35	45
NAG 5 - All privately-owned land	41	40	39	45
NAG 6 - assessment location 205	41	41	41	45
NAG 6 - assessment locations 203 and 242	40	40	40	45
NAG 6 - assessment location 202	39	39	39	45
NAG 6 - assessment location 204	38	38	38	45
NAG 6 - All other privately-owned land	37	37	37	45
NAG 7 - assessment locations 68, 74 and 279	43	42	42	45
NAG 7 - assessment locations 86 and 290	42	42	42	45
NAG 7 - assessment location 77	42	41	41	45
NAG 7 - assessment locations 79, 80 and 231	41	41	41	45
NAG 7 - assessment location 78	41	40	40	45
NAG 7 - All other privately-owned land	40	37	37	45
NAG 8 - assessment location 35	42	41	41	45
NAG 8 - assessment location 289	41	40	40	45

NAG 8 - assessment locations 23 and 84	40	40	40	45
NAG 8 - All other privately-owned land	41	39	39	45
NAG 9 - All other privately-owned land	39	38	37	45
NAG 10 - All other privately-owned land	35	35	35	45
NAG 11 - All other privately-owned land	37	36	35	45
All other privately-owned land	35	35	35	45

L2.2 For the purpose of this licence the following definitions apply.

NAG is to be read as 'Noise Assessment Group'.

The locations of the Noise Assessment Groups are defined in Appendix 6 of the Determination of Development Application for the Mount Pleasant Coal Mine DA92/97, as modified on 19 September 2011.

Day is defined as the period from 7am to 6pm Monday to Saturday and 8am to 6pm Sundays and Public Holidays.

Evening is defined as the period from 6pm to 10pm.

Night is defined as the period from 10pm to 7am Monday to Saturday and 10pm to 8am Sundays and Public Holidays.

L2.3 The noise limits set out in this licence apply under all meteorological conditions except for the following:

- a) Wind speeds greater than 3 metres/second at 10 metres above ground level; or
- b) Stability category F temperature inversion conditions and wind speeds greater than 2 metres/second at 10 metres above ground level; or
- c) Stability category G temperature inversion conditions.

For the purposes of this condition:

- i) Data recorded by the meteorological station within the licensed premises must be used to determine meteorological conditions; and
- ii) Temperature inversion conditions (stability category) are to be determined by the sigma-theta method referred to in Part E4 of Appendix E to the NSW Industrial Noise Policy.

L2.4 **Determining Compliance**

To determine compliance:

- a) with the LAeq(15 minute) noise limits in this licence, the noise measurement equipment must be located:
 - i) approximately on the property boundary, where any dwelling is situated 30 metres or less from the property boundary closest to the premises; or
 - ii) within 30 metres of a dwelling façade, but not closer than 3m, where any dwelling on the property is situated more than 30 metres from the property boundary closest to the premises; or, where applicable
 - iii) within approximately 50 metres of the boundary of a National Park or a Nature Reserve.
- b) with the LA1(1 minute) noise limits in this licence, the noise measurement equipment must be located within 1 metre of a dwelling façade.
- c) with the noise limits in this licence, the noise measurement equipment must be located:
 - i) at the most affected point at a location where there is no dwelling at the location; or
 - ii) at the most affected point within an area at a location prescribed by part (a) or part (b) of this condition.

- L2.5 Where it can be demonstrated that direct measurement of noise from the premises is impractical, the EPA may accept alternative means of determining compliance. See Chapter 11 of the NSW Industrial Noise Policy
- L2.6 A non-compliance with the noise limits specified in this licence will still occur where noise generated from the premises in excess of the appropriate limit is measured:
 - i) at a location other than an area prescribed in part (a) and part (b) of condition L2.4; or
 - ii) at a point other than the most affected point at a location.
- L2.7 For the purposes of determining the noise generated at the premises the modification factors in Section 4 of the NSW Industrial Noise Policy must be applied, as appropriate, to the noise levels measured by the noise monitoring equipment.

M9 Noise monitoring

- M9.1 To assess compliance with the noise limits specified in condition L2.1, the licensee must undertake attended noise monitoring in accordance with condition L2.4 and the following requirements:
 - a) be undertaken during a period that is representative of typical operating conditions and not undertaken during a shutdown period;
 - b) be undertaken at each one of the locations or at a location representative of the most-affected locations listed in condition L2.1;
 - c) be undertaken monthly in a reporting period; and
 - d) be undertaken for a minimum duration of 15 minutes within an assessment period.

Note: Night time noise monitoring is not required to be undertaken until night operations commence at the premises.

APPENDIX

B CALIBRATION CERTIFICATES



**Acoustic
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Level 7 Building 2 423 Pennant Hills Rd
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Ph: +61 2 9484 0800 A.B.N. 65 160 399 119
www.acousticresearch.com.au

Sound Level Meter

IEC 61672-3:2013

Calibration Certificate

Calibration Number C17126

Client Details Global Acoustics Pty Ltd
12/16 Huntingdale Drive
Thornton NSW 2322

Equipment Tested/ Model Number : Rion NA-28
Instrument Serial Number : 30131882
Microphone Serial Number : 04739
Pre-amplifier Serial Number : 11942

Pre-Test Atmospheric Conditions
Ambient Temperature : 22.4°C
Relative Humidity : 55.6%
Barometric Pressure : 99.91kPa

Post-Test Atmospheric Conditions
Ambient Temperature : 22.6°C
Relative Humidity : 58.1%
Barometric Pressure : 99.85kPa

Calibration Technician : Vicky Jaiswal
Calibration Date : 14/03/2017

Secondary Check: Riley Cooper
Report Issue Date : 15/03/2017

Approved Signatory :

Ken Williams

Clause and Characteristic Tested	Result	Clause and Characteristic Tested	Result
12: Acoustical Sig. tests of a frequency weighting	Pass	17: Level linearity incl. the level range control	Pass
13: Electrical Sig. tests of frequency weightings	Pass	18: Toneburst response	Pass
14: Frequency and time weightings at 1 kHz	Pass	19: C Weighted Peak Sound Level	Pass
15: Long Term Stability	Pass	20: Overload Indication	Pass
16: Level linearity on the reference level range	Pass	21: High Level Stability	Pass

The sound level meter submitted for testing has successfully completed the class 1 periodic tests of IEC 61672-3:2006, for the environmental conditions under which the tests were performed.

As public evidence was available, from an independent testing organisation responsible for approving the results of pattern evaluation test performed in accordance with IEC 61672-2:2003, to demonstrate that the model of sound level meter fully conformed to the requirements in IEC 61672-1:2002, the sound level meter submitted for testing conforms to the class 1 requirements of IEC 61672-1:2002.

Least Uncertainties of Measurement -			
Acoustic Tests		Environmental Conditions	
31.5 Hz to 8kHz	±0.16dB	Temperature	±0.05°C
12.5kHz	±0.2dB	Relative Humidity	±0.46%
16kHz	±0.29dB	Barometric Pressure	±0.017kPa
Electrical Tests			
31.5 Hz to 20 kHz	±0.12dB		

All uncertainties are derived at the 95% confidence level with a coverage factor of 2.



This calibration certificate is to be read in conjunction with the calibration test report.

Acoustic Research Labs Pty Ltd is NATA Accredited Laboratory Number 14172.
Accredited for compliance with ISO/IEC 17025.

The results of the tests, calibrations and/or measurements included in this document are traceable to Australian/national standards.

NATA is a signatory to the ILAC Mutual Recognition Arrangement for the mutual recognition of the equivalence of testing, medical testing, calibration and inspection reports.

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Sound Calibrator
IEC 60942-2004

Calibration Certificate

Calibration Number C17127

Client Details Global Acoustics Pty Ltd
12/16 Huntingdale Drive
Thornton NSW 2322

Equipment Tested/ Model Number : Pulsar 105
Instrument Serial Number : 78226

Atmospheric Conditions

Ambient Temperature : 22.3°C
Relative Humidity : 55.6%
Barometric Pressure : 99.9kPa

Calibration Technician : Vicky Jaiswal
Calibration Date : 14/03/2017

Secondary Check: Riley Cooper
Report Issue Date : 15/03/2017

Approved Signatory :

Ken Williams

Clause and Characteristic Tested	Result	Clause and Characteristic Tested	Result
5.2.2: Generated Sound Pressure Level	Pass	5.3.2: Frequency Generated	Pass
5.2.3: Short Term Fluctuation	Pass	5.5: Total Distortion	Pass

	Nominal Level	Nominal Frequency	Measured Level	Measured Frequency
Measured Output	94.0	1000.0	94.1	1000.32

The sound calibrator has been shown to conform to the class 1 requirements for periodic testing, described in Annex B of IEC 60942:2004 for the sound pressure level(s) and frequency(ies) stated, for the environmental conditions under which the tests were performed.

Least Uncertainties of Measurement - Environmental Conditions			
Specific Tests		Temperature	±0.05°C
Generated SPL	±0.11dB	Relative Humidity	±0.46%
Short Term Fluct.	±0.02dB	Barometric Pressure	±0.017kPa
Frequency	±0.01%		
Distortion	±0.5%		

All uncertainties are derived at the 95% confidence level with a coverage factor of 2.



This calibration certificate is to be read in conjunction with the calibration test report.

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