Monthly Environmental Monitoring Report

Yancoal Mount Thorley Warkworth

November 2024

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Revision History

Version No.	Version Details	Date
1.0	**Final**	**10/02/2025**

1.0 INTRODUCTION

This report has been compiled to provide a monthly summary of environmental monitoring results for Mount Thorley Warkworth (MTW). This report includes all monitoring data collected for the period 1 November to 30 November 2024.

2.0 AIR QUALITY

2.1 Meteorological Monitoring

Meteorological data is collected at MTW's 'Charlton Ridge' meteorological station (refer to **Figure 3**).

2.1.1 Rainfall

Rainfall for the reporting period is summarised in **Table 1**. The year-to-date monthly rainfall totals, 2024 monthly rainfall totals and historical average monthly rainfall trend are shown in **Figure 1**.

Table 1: Monthly Rainfall MTW

2024	Monthly Rainfall (mm)	Cumulative Rainfall (mm)
November	42.8	571.8

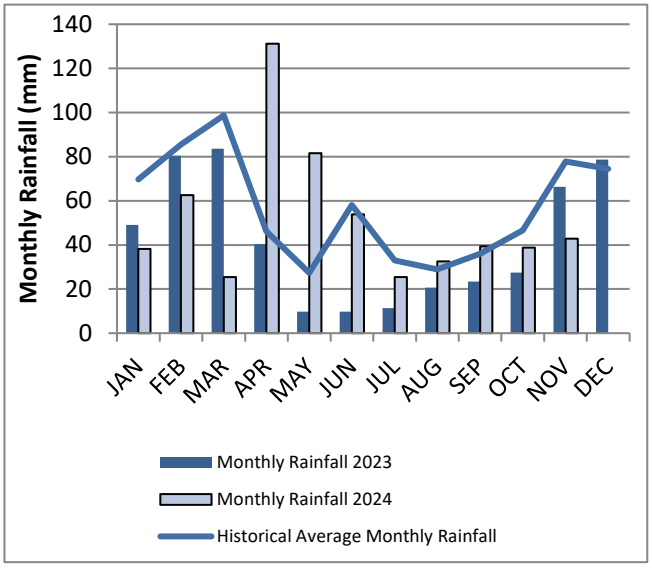


Figure 1: Rainfall Trend YTD

Note: The historical average monthly rainfall is calculated from 2007 to 2023 monthly totals.

2.1.2 Wind Speed and Direction

Winds from the Southeast and Northwest were dominant during the reporting period as shown in **Figure 2.**

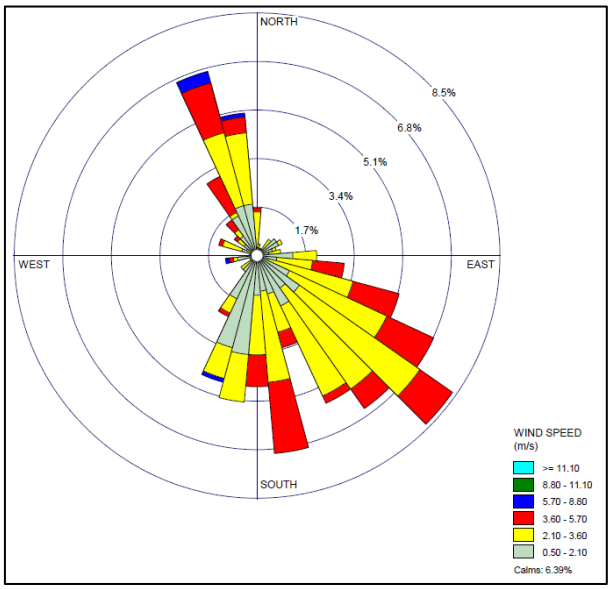


Figure 2: Charlton Ridge Wind Rose – November 2024

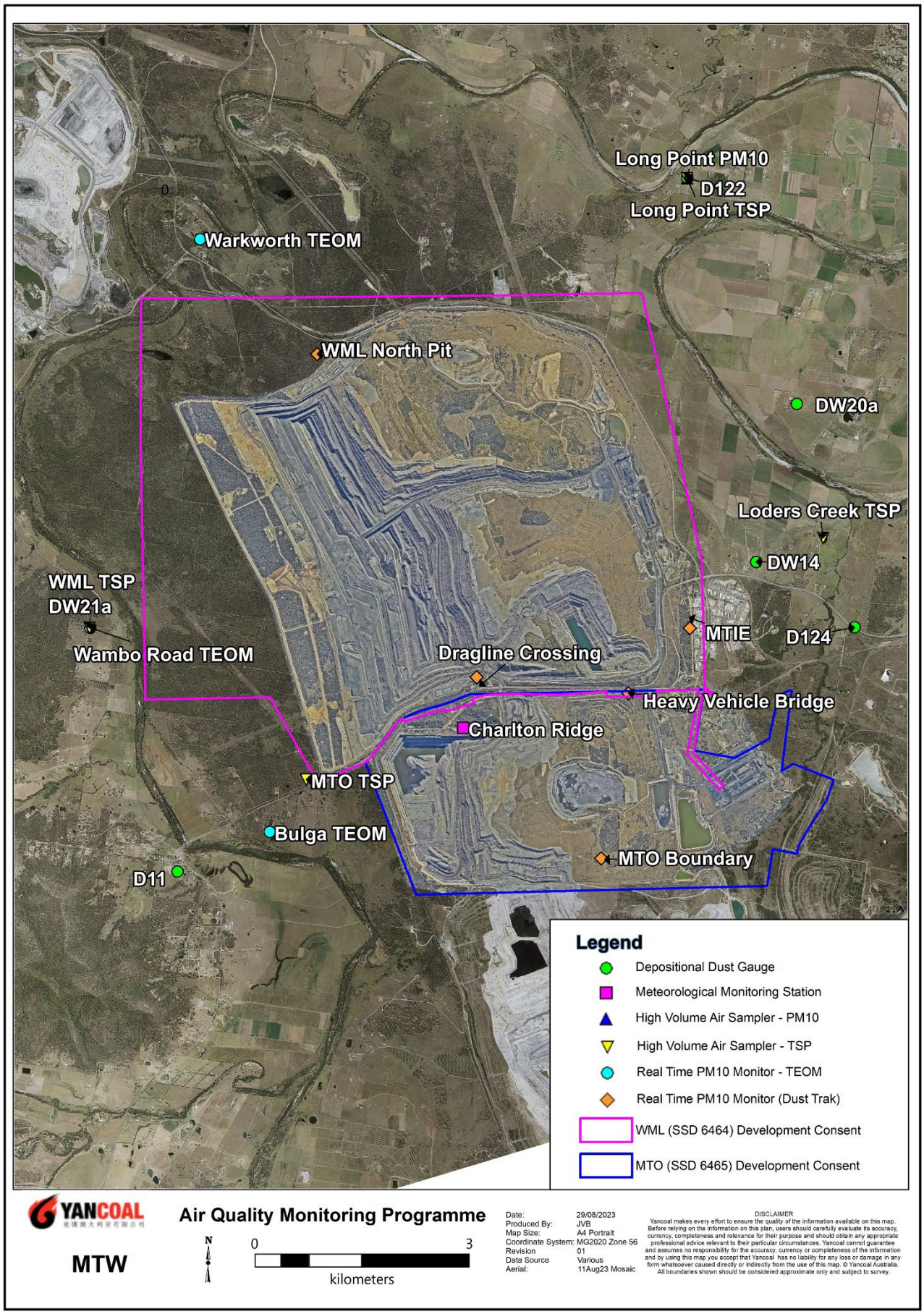


Figure 3: Air Quality Monitoring Locations

2.2 Depositional Dust

To monitor air quality, MTW operates and maintains a network of seven depositional dust gauges, situated on private and mine owned land surrounding MTW.

During the reporting period, the Warkworth monitoring location recorded a monthly result above the long-term impact assessment criteria of 4.0 g/m2 per month. There is no evidence to suggest that the result at Warkworth (8.6 g/m2) is contaminated, as such the result will be included in the annual average calculation.

Figure 4 displays insoluble solids results from depositional dust gauges during the reporting period compared against the year-to-date average and the annual impact assessment criteria.

An annual assessment of MTW's compliance with the Long-Term Impact Assessment Criteria will be provided in the 2024 Annual Review Report.

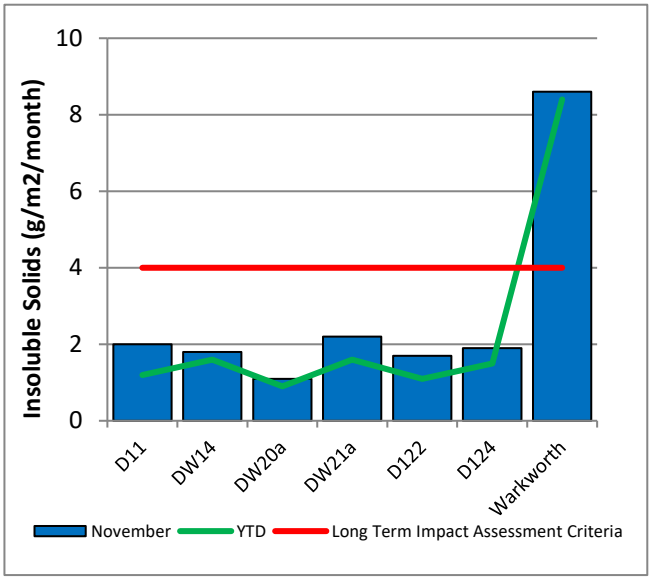


Figure 4: Depositional Dust – November 2024

2.3 Suspended Particulates

Suspended particulates are measured by a network of High Volume Air Samplers (HVAS) measuring Total Suspended Particulates (TSP) and Particulate Matter <10µm (PM_{10}). The location of these monitors can be found in **Figure 3**. Each HVAS was run for 24 hours on a six-day cycle in accordance with EPA requirements.

2.3.1 HVAS PM_{10} Results

Figure 5 shows the individual PM_{10} results at each monitoring station against the short-term impact assessment criteria of 50µg/m³.

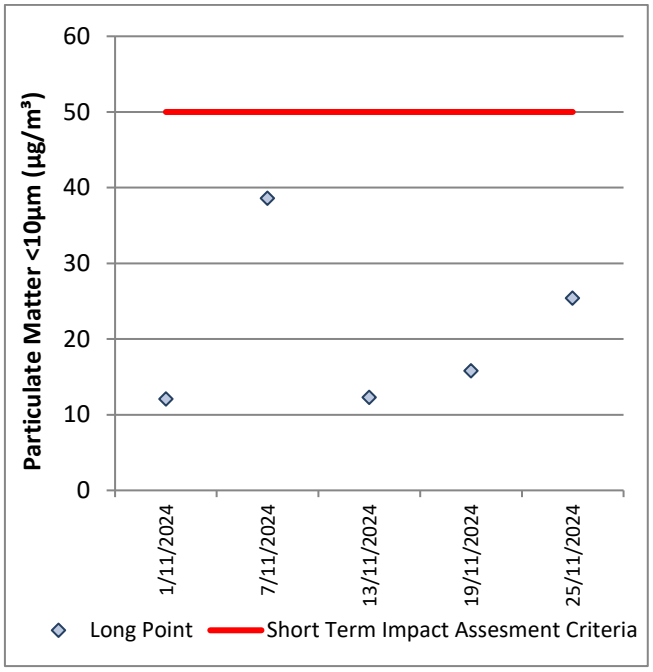


Figure 5: Individual PM10 Results – November 2024

Figure 6 shows the annual average PM10 result against the long-term impact assessment criteria.

An assessment of MTW's compliance with the Long-Term Impact Assessment Criteria will be provided in the 2024 Annual Review Report.

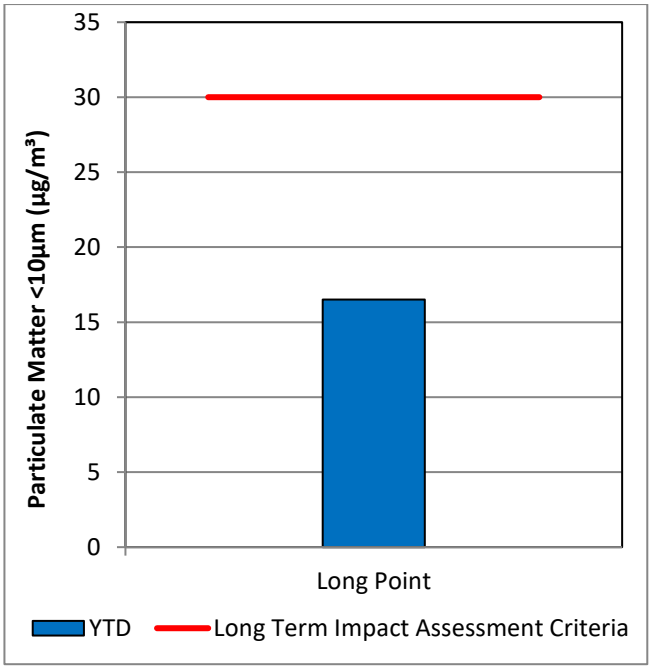


Figure 7: Annual Average PM_{10} – November 2024

2.3.2 TSP Results

Figure 7 shows the annual average TSP results compared against the long-term impact assessment criteria of 90µg/m³.

An assessment of MTW's compliance with the Long-Term Impact Assessment Criteria will be provided in the 2024 Annual Review Report.

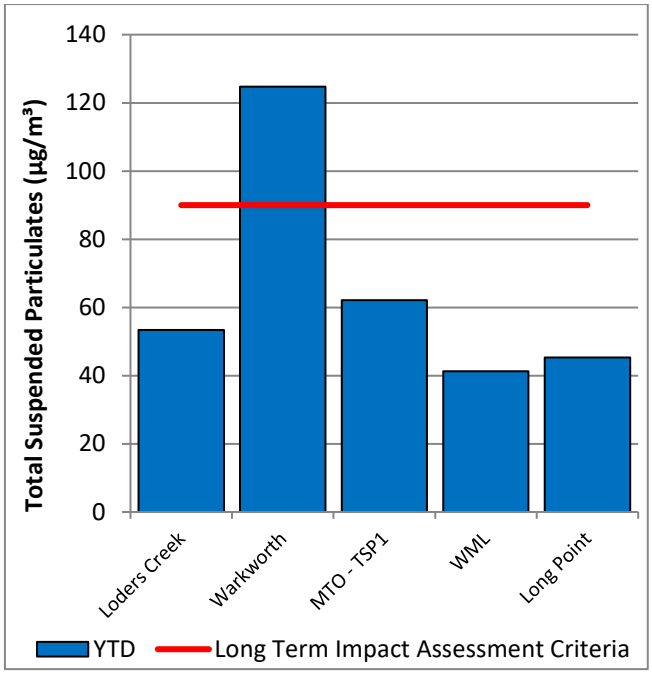


Figure 8: Annual Average Total Suspended Particulates – November 2024

2.3.3 Real Time PM_{10} Results

MTW maintains a network of real time PM_{10} monitors. The real time air quality monitoring stations continuously log information and transmit data to a central database, generating internal alerts when particulate matter levels exceed internal trigger limits.

Results for real time dust sampling are shown in **Figure 8**, including the daily 24-hour average PM_{10} result and the annual PM_{10} average.

On 4 November 2024, the Warkworth TEOM (63 µg/m³) exceeded the short term (24hr) criteria. The measurement was assessed for MTW's potential contribution based on meteorological conditions on the day resulting in a maximum estimated contribution of 8 µg/m³, less than a 14% contribution to the result. Accordingly, no further action is required (as per the approved Air Quality Monitoring Programme).

2.3.4 Real Time Alarms for Air Quality

During November, the real time monitoring system generated 123 automated air quality related alerts, including 12 alerts for adverse meteorological conditions and 111 alerts for elevated PM_{10} levels.

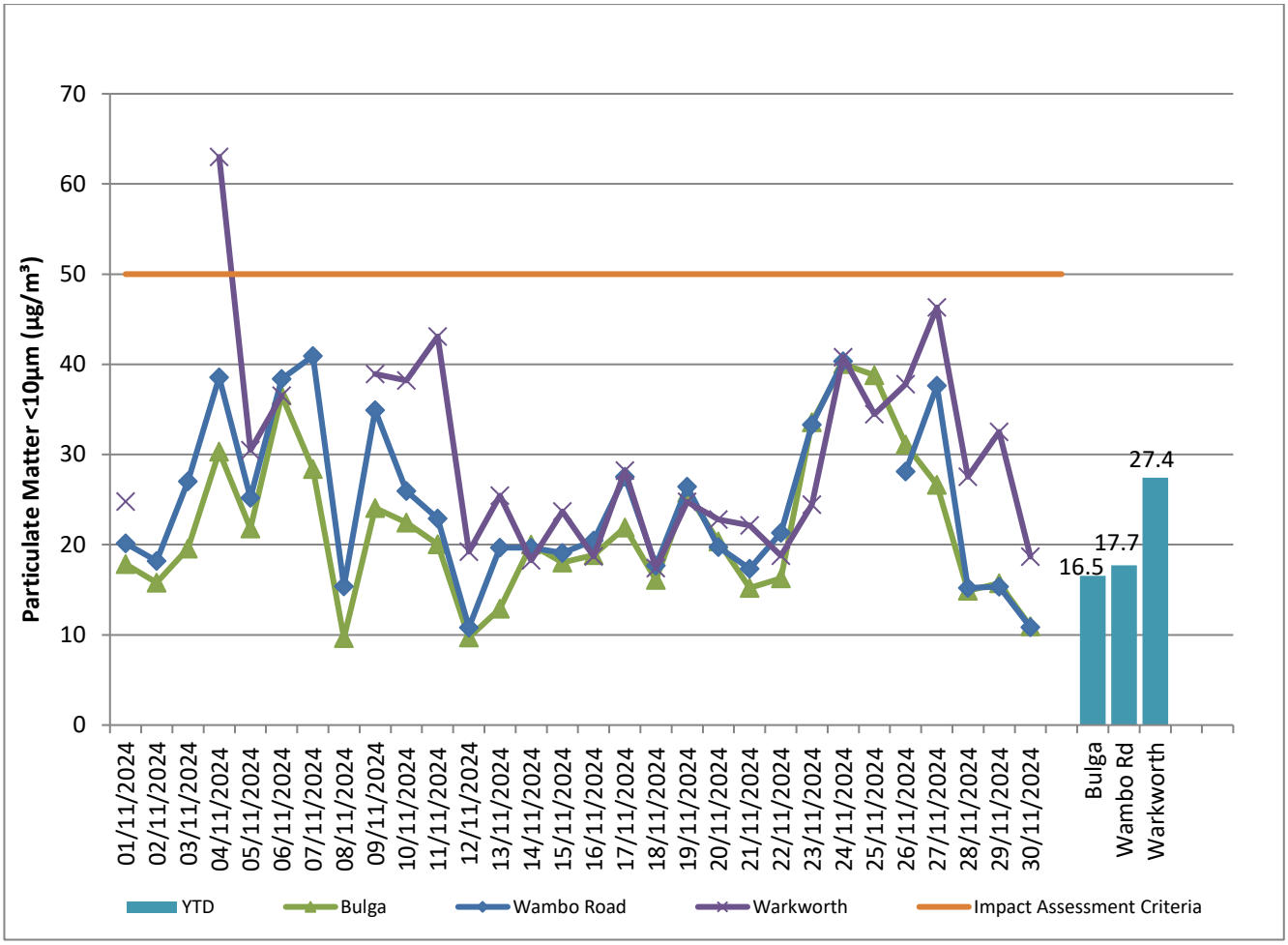


Figure 9: Real Time PM_{10} daily 24hr average (line graphs) and YTD annual average (column graphs) – November 2024

3.0 WATER QUALITY

MTW maintains a network of surface water and groundwater monitoring sites.

3.1 Surface Water

Monitoring is conducted at mine site dams and surrounding natural watercourses.

Surface water courses are sampled on a monthly or quarterly sampling regime. Water quality is evaluated through the parameters of pH, Electrical Conductivity (EC) and Total Suspended Solids (TSS). The Hunter River and the Wollombi Brook are sampled both upstream and downstream of mining operations, to record background water quality and to monitor the potential impact of mining on the river system. Other Hunter River tributaries are also monitored.

Results of monitoring are reported quarterly, next available in the December 2024 report.

3.2 HRSTS Discharge

MTW participates in the Hunter River Salinity Trading Scheme (HRSTS), allowing discharge from licensed discharge points located at Dam 1N and Dam 9S. Discharges can only take place subject to HRSTS regulations.

MTW did not undertake any HRSTS discharges in the reporting period.

3.3 Groundwater Monitoring

Groundwater monitoring is undertaken on a quarterly basis in accordance with the MTW Groundwater Monitoring Programme.

Groundwater results are reported quarterly, next available in the December 2024 report.

4.0 BLAST MONITORING

MTW have a network of six blast monitoring units. These are located at nearby privately owned residences and function as regulatory compliance monitors.

The location of these monitors can be found in **Figure 15**.

4.1 Blast Monitoring Results

During November 2024, 26 blasts were initiated at MTW. **Figure 9** to **Figure 14** show the blast monitoring results for the reporting period against the impact assessment criteria. The criteria are summarised in **Table 2**.

Table 2: Blasting Limits

Airblast Overpressure (dB(L))	Comments
115	5% of the total number of blasts in a 12 month period at WML or MTO
120	0%
Ground Vibration (mm/s)	**Comments**
5	5% of the total number of blasts in a 12 month period at WML or MTO
10	0%

During the reporting period no blast exceeded the 115dB(L) threshold for airblast overpressure. Two blasts exceeded the 5 mm/s criteria (permissible for 5% of blasts in 12 month period) for ground vibration, one at the Bulga village and Wollemi Peak Road monitoring locations and one at the Warkworth monitoring location.

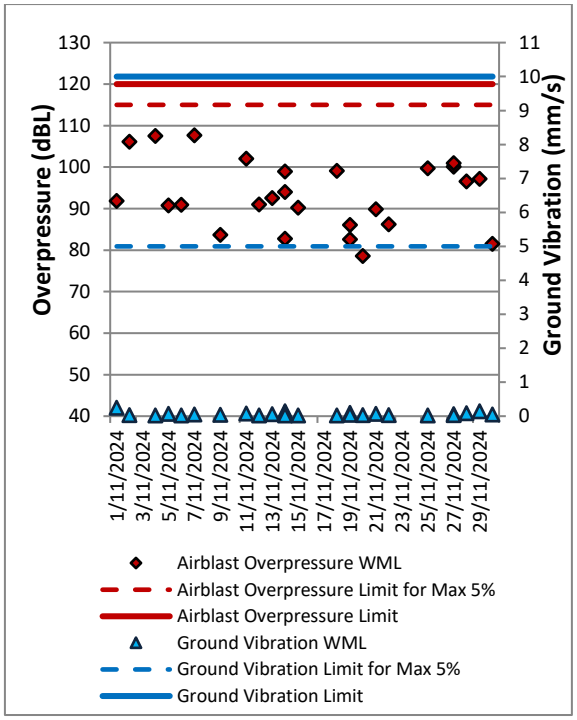


Figure 10: Abbey Green Blast Monitoring Results – November 2024

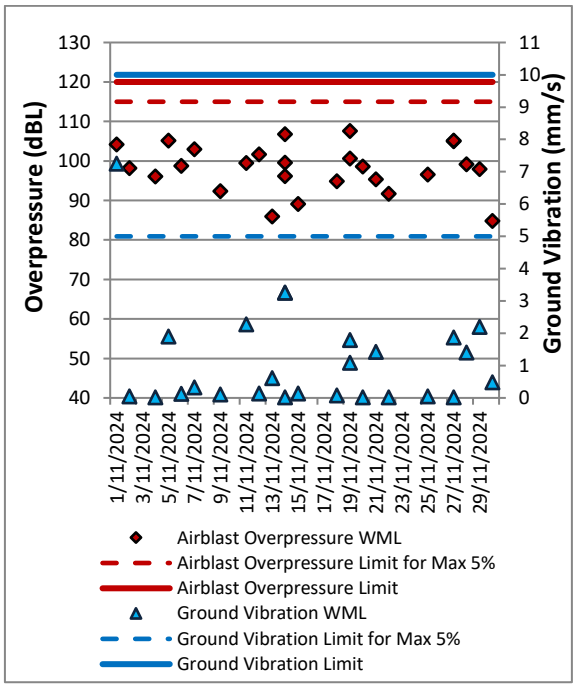


Figure 11: Bulga Village Blast Monitoring Results – November 2024

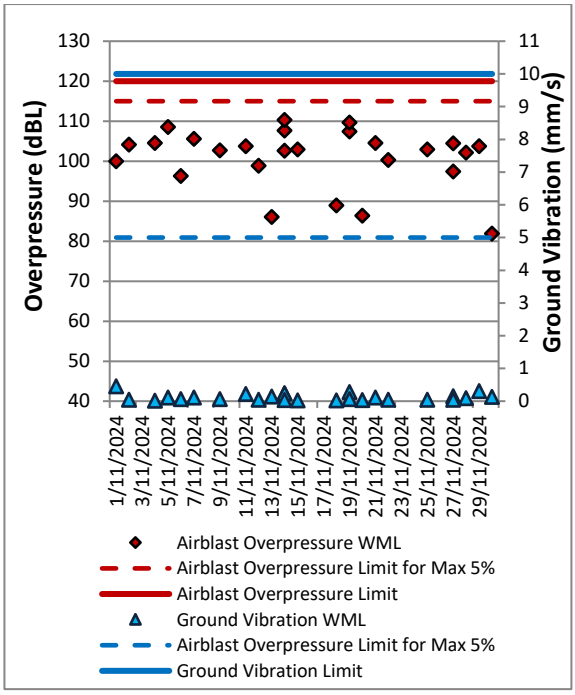


Figure 12: MTIE Blast Monitoring Results –November2024

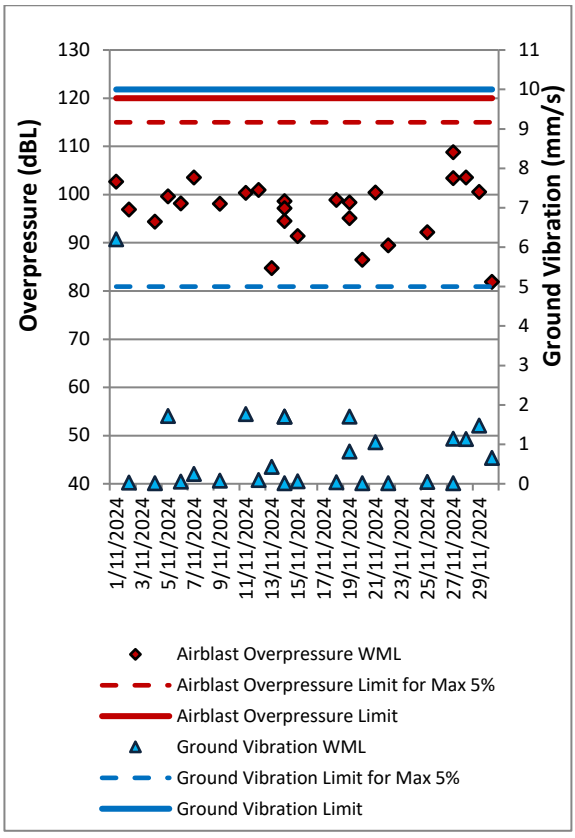


Figure 13: Wollemi Peak Road Blast Monitoring Results – November 2024

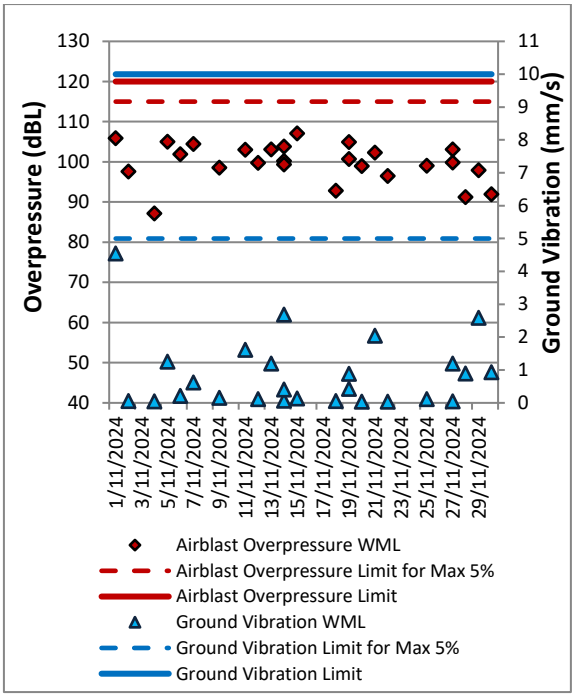


Figure 14: Wambo Road Blast Monitoring Results – November 2024

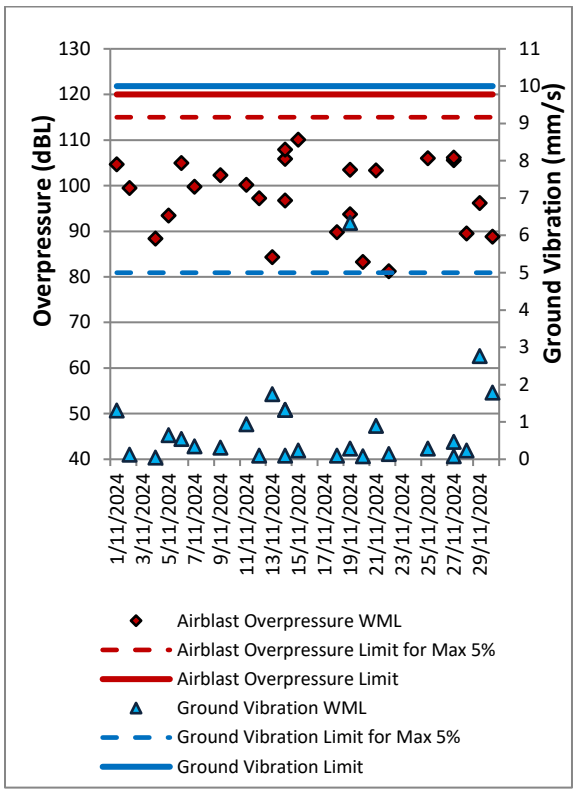


Figure 15: Warkworth Blast Monitoring Results – November 2024

Figure 16: MTW Blast Monitoring Location Plan

5.0 NOISE

Routine attended noise monitoring is carried out in accordance with the MTW Noise Management Plan. A review against EIS predictions will be reported in the Annual Review. The purpose of the noise surveys is to quantify and describe the acoustic environment around the site and compare results with specified limits. Real time noise monitoring also occurs at five sites surrounding MTW. Noise monitoring locations are displayed in **Figure 16**.

5.1 Attended Noise Monitoring Results

Attended monitoring was conducted at receiver locations surrounding MTW on the night of 14 November 2024. All measurements complied with the relevant criteria. Results are detailed in **Table 3** to **Table 6.**

5.1.1 WML Noise Assessment

Compliance assessments undertaken against the WML noise criteria are presented in **Tables 3** and **4**.

Table 3: $L_{Aeq,\ 15\ minute}$ Warkworth Impact Assessment Criteria – November 2024

Location	Date and Time	Wind Speed (m/s)	Stability Class	Criterion dB(A)	Criterion Applies?[1]	WML L_{Aeq} dB[2,3]	Exceedance[3,4]
Bulga RFS	14/11/2024 23:32	2.5	F	37	No	IA	NA
Bulga Village	14/11/2024 22:08	3.1	D	38	No	<25	NA
Gouldsville	14/11/2024 21:34	3.2	E	38	No	<25	NA
Inlet Road	14/11/2024 21:23	3.2	E	37	No	NM	NA
Inlet Road West	14/11/2024 21:00	3.3	D	35	No	IA	NA
Long Point	14/11/2024 21:10	3.5	E	35	No	IA	NA
South Bulga	14/11/2024 23:10	2.0	F	35	Yes	IA	Nil
Wambo Road	14/11/2024 21:50	2.9	E	38	Yes	<20	Nil

Notes:
1. Noise criteria apply during all meteorological conditions except the following: wind speeds greater than 3 m/s measured at 10 metres above ground level; 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. Criterion may or may not apply due to rounding of meteorological data values;
2. Site-only LAeq,15minute attributed to WML, including modifying factors if applicable;
3. Bold results in red indicate exceedance of relevant criterion; and
4. NA in exceedance column means atmospheric conditions outside conditions specified in consent, therefore criterion was not applicable.
5. Follow up measurement within one week of measured exceedance.

Table 4: $L_{A1,\ 1\ minute}$ Warkworth - Impact Assessment Criteria – November 2024

Location	Date and Time	Wind Speed (m/s)	Stability Class	Criterion dB(A)	Criterion Applies?[1]	WML $L_{A1,\ 1min}$ dB[2,3]	Exceedance[3,4]
Bulga RFS	14/11/2024 23:32	2.5	F	47	No	IA	NA
Bulga Village	14/11/2024 22:08	3.1	D	48	No	<25	NA
Gouldsville	14/11/2024 21:34	3.2	E	48	No	<25	NA
Inlet Road	14/11/2024 21:23	3.2	E	47	No	NM	NA
Inlet Road West	14/11/2024 21:00	3.3	D	45	No	IA	NA
Long Point	14/11/2024 21:10	3.5	E	45	No	IA	NA
South Bulga	14/11/2024 23:10	2.0	F	45	Yes	IA	Nil
Wambo Road	14/11/2024 21:50	2.9	E	48	Yes	26	Nil

Notes:
1. Noise criteria apply during all meteorological conditions except the following: wind speeds greater than 3 m/s measured at 10 metres above ground level; 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. Criterion may or may not apply due to rounding of meteorological data values;
2. Site-only LA1,1minute attributed to WML;
3. Bold results in red indicate exceedance of relevant criterion; and
4. NA in exceedance column means atmospheric conditions outside conditions specified in consent, therefore criterion was not applicable.
5. Follow up measurement within one week of measured exceedance.

5.1.2 MTO Noise Assessment

Compliance assessments undertaken against the MTO noise criteria are presented in **Table 5** and **6**.

Table 5: $L_{Aeq,\ 15minute}$ Mount Thorley - Impact Assessment Criteria – November 2024

Location	Date and Time	Wind Speed (m/s)	Stability Class	Criterion dB	Criterion Applies?[1]	MTO L_{Aeq} dB[2,3]	Exceedance[3,4]
Bulga RFS	14/11/2024 23:32	2.5	F	37	No	<20	NA
Bulga Village	14/11/2024 22:08	3.1	D	38	No	<20	NA
Gouldsville	14/11/2024 21:34	3.2	E	35	No	IA	NA
Inlet Road	14/11/2024 21:23	3.2	E	37	No	IA	NA
Inlet Road West	14/11/2024 21:00	3.3	D	35	No	IA	NA
Long Point	14/11/2024 21:10	3.5	E	35	No	IA	NA
South Bulga	14/11/2024 23:10	2.0	F	36	Yes	<20	Nil
Wambo Road	14/11/2024 21:50	2.9	E	38	Yes	IA	Nil

Notes:
1. Noise criteria apply during all meteorological conditions except the following: wind speeds greater than 3 m/s measured at 10 metres above ground level; 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. Criterion may or may not apply due to rounding of meteorological data values;
2. Site-only LAeq,15minute attributed to MTO, including modifying factors if applicable;
3. Bold results in red indicate exceedance of relevant criterion; and
4. NA in exceedance column means atmospheric conditions outside conditions specified in consent, therefore criterion was not applicable.
5. Follow up measurement within one week of measured exceedance.

Table 6: $L_{A1,\ 1Minute}$ Mount Thorley - Impact Assessment Criteria – November 2024

Location	Date and Time	Wind Speed (m/s)	Stability Class	Criterion dB	Criterion Applies?[1]	MTO $L_{A1,\ 1min}$ dB[2,3]	Exceedance[3,4]
Bulga RFS	14/11/2024 23:32	2.5	F	47	No	27	NA
Bulga Village	14/11/2024 22:08	3.1	D	48	No	<25	NA
Gouldsville	14/11/2024 21:34	3.2	E	45	No	IA	NA
Inlet Road	14/11/2024 21:23	3.2	E	47	No	IA	NA
Inlet Road West	14/11/2024 21:00	3.3	D	45	No	IA	NA
Long Point	14/11/2024 21:10	3.5	E	45	No	IA	NA
South Bulga	14/11/2024 23:10	2.0	F	46	Yes	<25	Nil
Wambo Road	14/11/2024 21:50	2.9	E	48	Yes	IA	Nil

Notes:
1. Noise criteria apply during all meteorological conditions except the following: wind speeds greater than 3 m/s measured at 10 metres above ground level; 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. Criterion may or may not apply due to rounding of meteorological data values;
2. Site-only LA1,1minute attributed to MTO;
3. Bold results in red indicate exceedance of relevant criterion; and
4. NA in exceedance column means atmospheric conditions outside conditions specified in consent, therefore criterion was not applicable.
5. Follow up measurement within one week of measured exceedance.

5.1.3 NPfI Low Frequency Assessment

In accordance with the requirements of the EPA's Noise Policy for Industry (NPfI), the applicability of the low frequency modification factor corrections has been assessed. The WML assessment for low frequency noise is shown in **Table 7** and the MTO assessment for low frequency noise is shown in **Table 8**.

Table 7: Warkworth Low Frequency Noise Assessment – November 2024

Location	Date and Time	Measured WML LAeq dB	Criterion Applies?	Intermittency Modifying Factor?	Tonality Modifying Factor?	Frequency of Tonality [1]	Low-frequency Modifying Factor?	Maximum Exceedance of Reference Spectrum [1,2]	Penalty dB [2]
Bulga RFS	14/11/2024 23:32	IA	No	No	No	NA	NA	NA	Nil
Bulga Village	14/11/2024 22:08	<25	No	No	No	NA	NA	NA	Nil
Gouldsville	14/11/2024 21:34	<25	No	No	No	NA	NA	NA	Nil
Inlet Road	14/11/2024 21:23	NM	No	No	No	NA	NA	NA	Nil
Inlet Road West	14/11/2024 21:00	IA	No	No	No	NA	NA	NA	Nil
Long Point	14/11/2024 21:10	IA	No	No	No	NA	NA	NA	Nil
South Bulga	14/11/2024 23:10	IA	Yes	No	No	NA	No	NA	Nil
Wambo Road	14/11/2024 21:50	<20	Yes	No	No	NA	No	NA	Nil

Notes:
1. NA denotes 'not applicable'; and
2. Bold results indicate that application of NPfI modifying factor/s is required.
3. Follow up measurement within one week of measured exceedance.

Table 8: Mount Thorley Operations Low Frequency Noise Assessment – November 2024

Location	Date and Time	Measured MTO LAeq dB	Criterion Applies?	Intermittency Modifying Factor?	Tonality Modifying Factor?	Frequency of Tonality[1]	Low-frequency Modifying Factor?	Maximum Exceedance of Reference Spectrum [1,2]	Penalty dB[2]
Bulga RFS	14/11/2024 23:32	<20	No	No	No	NA	NA	NA	Nil
Bulga Village	14/11/2024 22:08	<20	No	No	No	NA	NA	NA	Nil
Gouldsville	14/11/2024 21:34	IA	No	No	No	NA	NA	NA	Nil
Inlet Road	14/11/2024 21:23	IA	No	No	No	NA	NA	NA	Nil
Inlet Road West	14/11/2024 21:00	IA	No	No	No	NA	NA	NA	Nil
Long Point	14/11/2024 21:10	IA	No	No	No	NA	NA	NA	Nil
South Bulga	14/11/2024 23:10	<20	Yes	No	No	NA	No	NA	Nil
Wambo Road	14/11/2024 21:50	IA	Yes	No	No	NA	No	NA	Nil

Notes:
1. NA denotes 'not applicable'; and
2. Bold results indicate that application of NPfI modifying factor/s is required.
3. Follow up measurement within one week of measured exceedance.

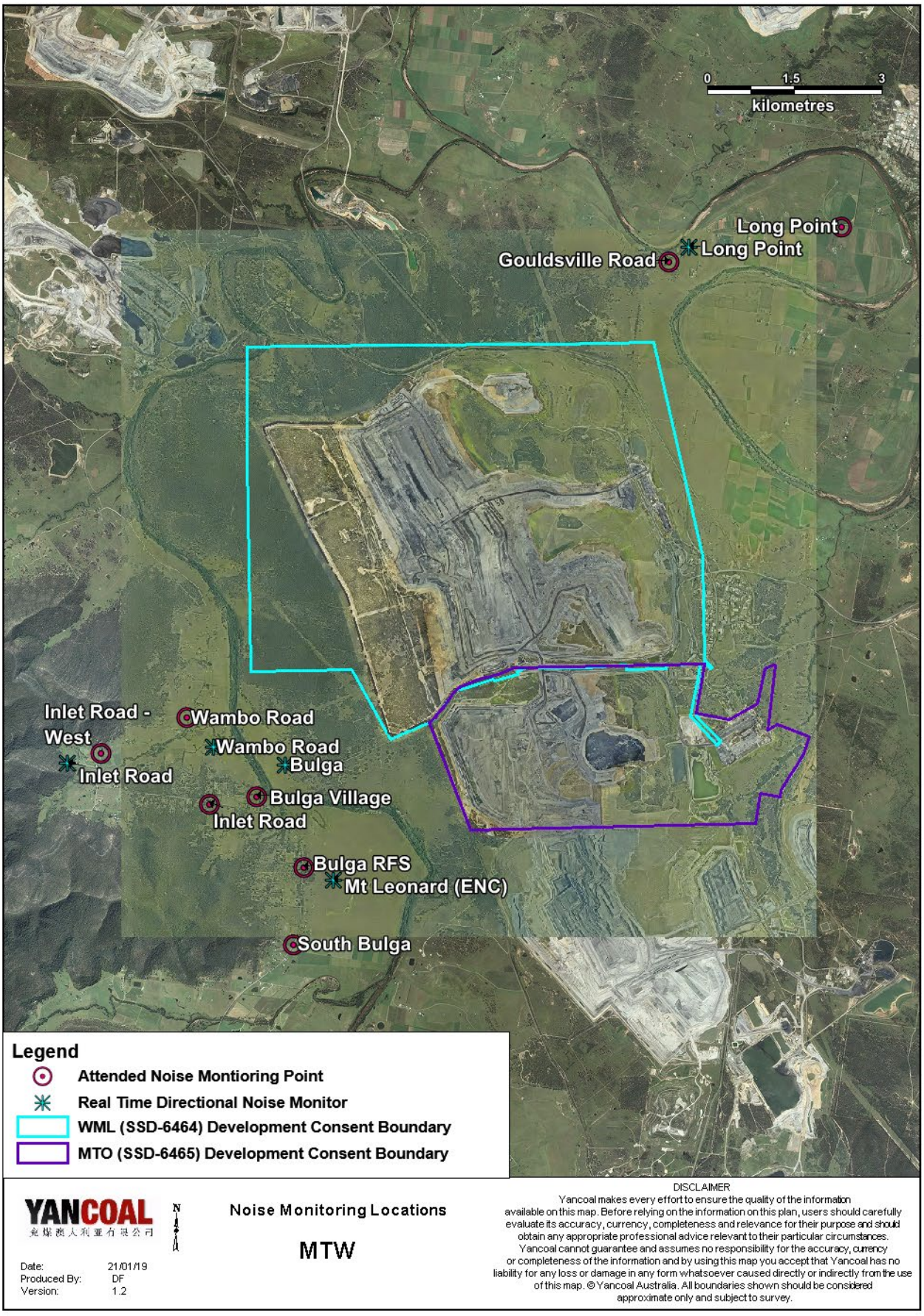


Figure 17: Noise Monitoring Location Plan

5.2 Noise Management Measures

A program of targeted supplementary attended noise monitoring is in place at MTW, supported by the real-time directional monitoring network and ensuring the highest level of noise management is maintained. The supplementary program is undertaken by MTW personnel and involves:

- Routine inspections from both inside and outside the mine boundary;
- Routine and as-required handheld noise assessments (undertaken in response to noise alarm and/or community complaint), comparing measured levels against consent noise limits; and
- Validation monitoring following operational modifications to assess the adequacy of the modifications.

Where a noise assessment identifies noise emissions which are exceeding the relevant noise limit(s) for any residence, modifications will be made to ensure that the noise event is resolved within 75 minutes of identification. The actions taken are commensurate with the nature and severity of the noise event, but can include:

- Changing the haul route to a less noise sensitive haul;
- Changing dump locations (in-pit or less exposed dump option);
- Reducing equipment numbers;
- Shut down of task; or
- Site shut down.

A summary of these assessments undertaken during November are provided in **Table 9**.

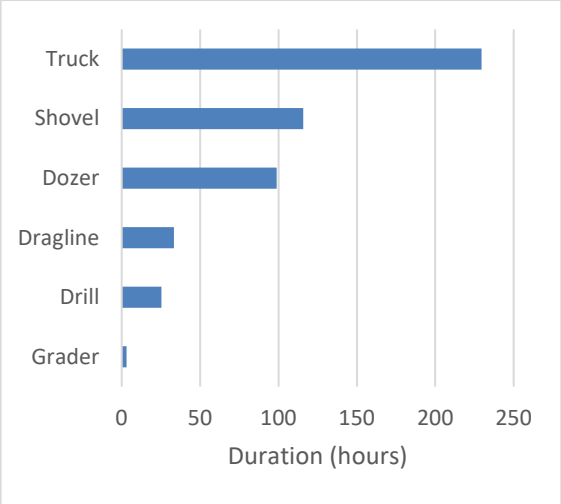
Table 9: Supplementary Attended Noise Monitoring Data – November 2024

No. of assessments	No. of assessments > trigger	No. of nights where assessments > trigger	% greater than trigger
676	14	8	2.1

6.0 OPERATIONAL DOWNTIME

During November, a total of 505.8 hours of equipment downtime was logged in response to environmental events such as dust, noise, and adverse meteorological conditions. Operational downtime by equipment type is shown in **Figure 17**.

Figure 18: Operational Downtime by Equipment Type – November 2024



7.0 REHABILITATION

During November 2024, 2.8 Ha of land was released, 15.1 Ha was bulk shaped, 12.8 Ha was topsoiled and 24.4 Ha was rehabilitated.

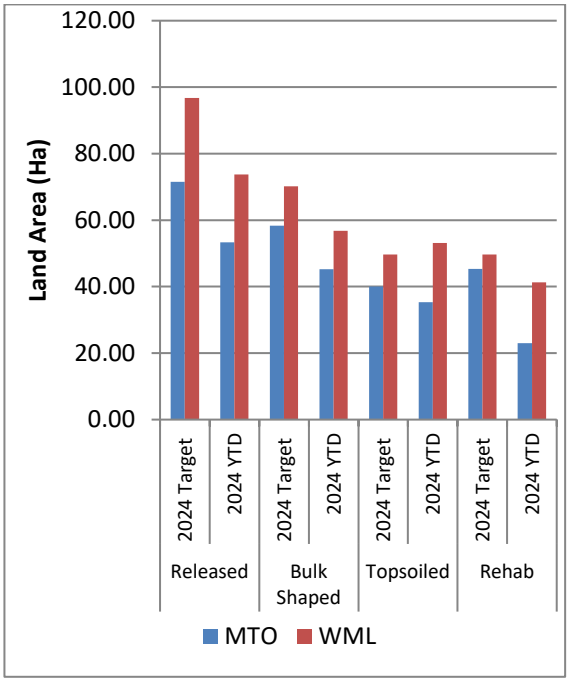


Figure 19: Rehabilitation YTD – November 2024

8.0 ENVIRONMENTAL INCIDENTS

There were no environmental incidents recorded during the reporting period.

9.0 COMPLAINTS

27 complaints were received during the reporting period. Details of these complaints are shown in **Table 10**.

Table 10: Complaints Summary YTD

	Noise	Dust	Blast	Lighting	Other	Total
January	1	3	5	2	0	11
February	3	4	1	0	0	8
March	3	1	2	0	0	6
April	7	2	1	5	0	15
May	8	1	5	0	2	16
June	2	1	3	0	0	6
July	1	2	2	1	0	6
August	5	1	3	0	1	10
September	0	6	0	3	1	10
October	2	8	5	3	0	18
November	8	10	6	3	0	27
December						
Total	40	39	33	17	4	133

Appendix A: Meteorological Data

Table 11: Meteorological Data – Charlton Ridge Meteorological Station – November 2024

Date	Air Temperature		Relative Humidity		Wind Direction	Wind Speed	Rainfall
	Maximum (°C)	Minimum (°C)	Maximum (%)	Minimum (%)	Average (°)	Average (m/sec)	total (mm)
1/11/2024	26	15	97	40	138	3.2	0.0
2/11/2024	27	15	90	41	143	3.2	0.0
3/11/2024	34	12	100	25	250	2.5	0.0
4/11/2024	33	17	92	25	213	2.8	0.0
5/11/2024	26	16	94	54	140	3.1	0.0
6/11/2024	35	16	95	24	144	1.2	0.0
7/11/2024	40	16	100	21	202	2.5	4.4
8/11/2024	31	14	97	18	234	1.9	0.8
9/11/2024	30	14	87	26	148	2.8	0.0
10/11/2024	32	15	93	28	169	3.2	0.0
11/11/2024	22	15	100	60	177	2.6	8.2
12/11/2024	23	15	100	66	162	1.7	0.6
13/11/2024	27	13	100	48	188	1.5	2.2
14/11/2024	28	12	100	45	166	2.3	0.2
15/11/2024	21	15	95	70	140	2.8	0.0
16/11/2024	28	16	98	52	131	3.1	0.0
17/11/2024	34	15	100	28	216	3.1	6.2
18/11/2024	26	15	100	49	206	2.5	5.2
19/11/2024	26	14	95	41	127	2.9	0.0
20/11/2024	27	13	95	36	128	2.5	0.0
21/11/2024	27	12	95	33	132	3.0	0.0
22/11/2024	30	12	95	31	147	1.9	0.0
23/11/2024	33	18	78	19	139	1.8	0.0
24/11/2024	35	14	87	14	159	1.6	0.0
25/11/2024	36	15	92	21	152	1.7	0.0
26/11/2024	38	17	93	19	187	2.2	0.0
27/11/2024	37	20	100	18	275	3.7	6.6
28/11/2024	25	20	99	70	241	1.6	2.4
29/11/2024	25	19	100	74	163	2.0	3.4
30/11/2024	24	19	100	79	142	0.9	2.6