



Mount Thorley Warkworth
Community Consultative Committee

Business Papers – May 2017

Materials ahead of meeting of the committee on 22 May 2017

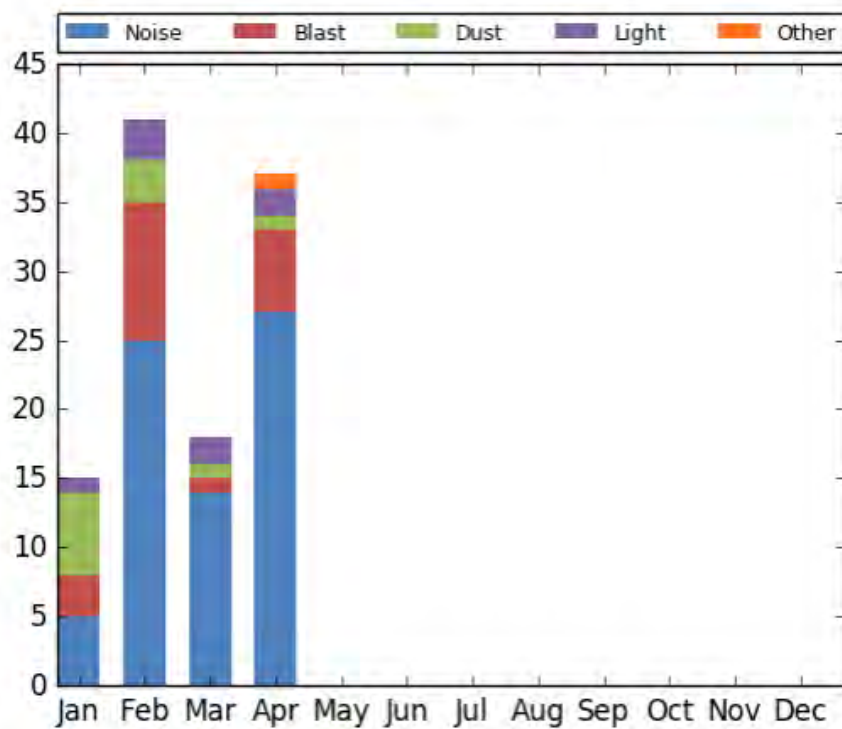
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1.0 Complaints

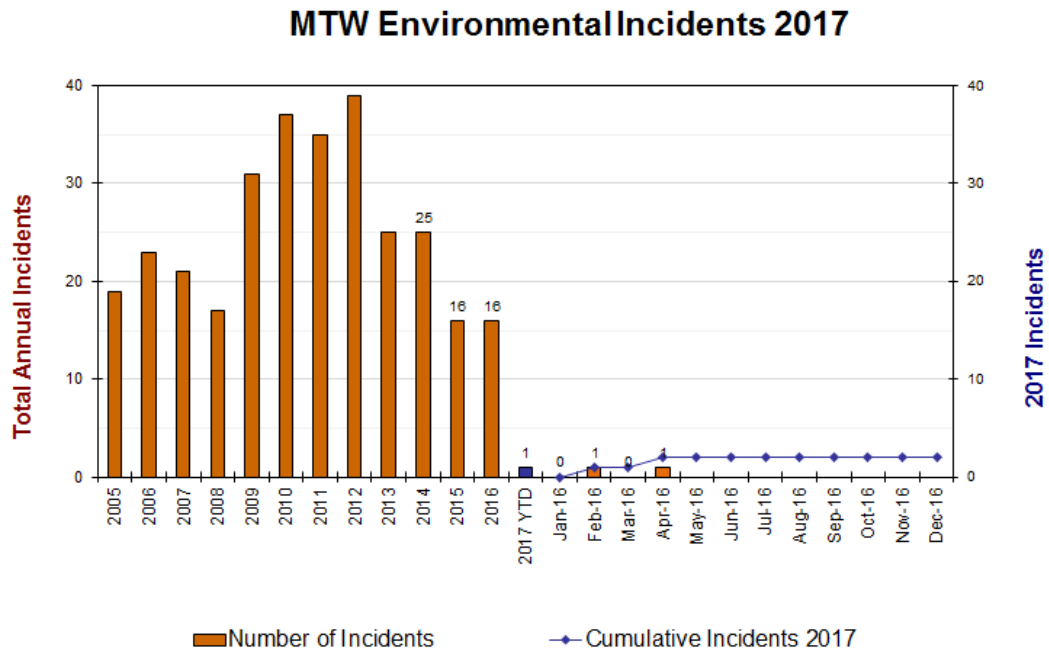
Complaints overview for period YTD 2017

	Noise	Dust	Blast	Lighting	Other	Total
January	5	6	3	1	0	15
February	25	3	10	3	0	41
March	14	1	1	2	0	18
April	27	1	6	2	1	37
May	-	-	-	-	-	-
June	-	-	-	-	-	-
July	-	-	-	-	-	-
August	-	-	-	-	-	-
September	-	-	-	-	-	-
October	-	-	-	-	-	-
November	-	-	-	-	-	-
December	-	-	-	-	-	-
Total	71	11	20	8	1	111



2.0 Incidents

Overview of environmental incidents for period YTD 2017



Incident summary for the period 1 January to 30 April 2017

Date	Details	Key Actions	Aspect
21-February-2017	<p>Water pipeline damaged by dozer ripper-blade</p> <p>The ripper-blade of a dozer working on the third Putty Road crossing contacted a buried water pipeline causing water to discharge from the pipe. All water was contained onsite.</p>	<p>Incident investigated.</p> <p>Clearer signage has been erected in the area identifying the buried pipeline.</p>	Water
27-April-2017	<p>Level 4B Fume from Blast</p> <p>Fume generated from a blast in Warkworth's West Pit generated fume rated at 4B. Blast emissions were observed to have crossed over the closed section of Putty Road, continuing into the Mount Thorley premises where the plume was observed to dissipate at elevation. Gas readings observed from the Putty Road at Charlton Ridge following the migration of the blast plume into Mount Thorley Operations did not trigger Low Alarm Levels.</p> <p>Design and firing of the blast was in accordance with the MTW Blast Management Plan and associated procedures. A 4-way road closure was implemented to exclude the public from areas that could have been subject to fume and as a precautionary measure the neighbouring Bulga Coal mine was notified of potential for blast emissions.</p> <p>The design applied for the blast was based on historical results for this area. Explosive product selection was based on ground conditions; where blast holes were dewatered and/or wet loaded, Fortan13 and Fortis125 products respectively were used, consistent with manufacturer recommendations.</p>	<p>The Department of Planning and Environment as well as the NSW EPA were notified of the event.</p> <p>Incident investigated with the most likely cause of the blast fume was due to excessive shot confinement.</p> <p>Future blasts in the same area have been reduced in size and top initiated to reduce the chance of excessive confinement</p>	Air

3.0 Environmental monitoring

Monthly summaries of environmental monitoring for the period
1 January 2017 to 31 March 2017

January 2017

Attached as **Appendix A**

February 2017

Attached as **Appendix B**

March 2017

Attached as **Appendix C**

4.0 Rehabilitation plan

At the end of the April, rehabilitation progressed with 59.1 ha of the targeted areas bulk shaped, 33.4 ha topsoiled, and 31.6 ha composted were completed.

Disturbance was predominantly in Warkworth's West Pit area, for mine advance, and to construct a water management contour along the western extent of the disturbance to manage water off pre-strip activities. A total of 16.8 ha have been disturbed at the end of March.



Plan of: **Topsoiled 2017**

Location: **MTW**

Date: **Apr17**

Plan By: **RPC**

Version: **1.0**

**COAL
&
ALLIED**



Legend

Total Topsoiled (YTD + carryover) = 33.4 ha

Planned 2017 Topsoil (111.1 ha)

Topsoiled YTD (18.9 ha)

2016 Carryover (14.5 ha)

Coal & Allied - Environmental Services

Plan of: **Composted 2017**
Location: **MTW**

Date: **Apr17**
Plan By: **RPC**
Version: **1.0**

**COAL
&
ALLIED**



Legend
Total Composted (YTD + carryover) = 31.6 ha
Planned 2017 Composted (115.9 ha)
Composted YTD (25.5 ha)
2016 Carryover (6.1 ha)

Coal & Allied - Environmental Services

Plan of: **Seeded 2017**

Location: **MTW**

Date: **Apr17**

Plan By: **RPC**

Version: **1.0**

**COAL
&
ALLIED**



Coal & Allied - Environmental Services

Plan of: **Disturbance 2017**
Location: **MTW**

Date: **Apr17**
Plan By: **RPC**
Version: **1.0**

**COAL
&
ALLIED**



Coal & Allied - Environmental Services

Plan of: Disturbance 2017

Date: Mar17

Location: MTW

Plan By: RPC

Version: 1.0

**COAL
&
ALLIED**



Legend

Total Planned Disturbance 2017 = 88 ha

Planned 2017 New Disturbance (50 ha)

Planned 2017 Rehab Disturbance (38 ha)

Disturbance YTD (16.8 ha)

Coal & Allied - Environmental Services

5.0 Acquisition Update

A presentation with a property acquisition update for Mount Thorley Warkworth is included in **Appendix D** of this Business Paper. Nine acquisitions have been made to the property portfolio since the last CCC meeting.

6.0 Website Uploads

The following is a list of all documents uploaded to the MTW library of the Rio Tinto website between the period of 1 January 2017 to 31 March 2017. Uploads have been characterised as Additions, being a new document, or a Change, meaning a new version of an existing document. Please refer to the library page of the website for document contents: <http://www.riotinto.com/copperandcoal/documents-10401.aspx>

Table 1: Uploaded Documents

Document Title	Upload type
Mount Thorley Warkworth Environmental Protection Licence 1376 1976 Monthly Meaningful Summary October 2016	Addition
Mount Thorley Warkworth Environmental Protection Licence 1376 1976 Monthly Obtained Data Summary October 2016	Addition
Mount Thorley Warkworth Environmental Monitoring Report October 2016	Addition
Mount Thorley Warkworth Environmental Protection Licence 1376 1976 Monthly Meaningful Summary November 2016	Addition
Mount Thorley Warkworth Environmental Protection Licence 1376 1976 Monthly Obtained Data Summary November 2016	Addition
Mount Thorley Warkworth Environmental Monitoring Report November 2016	Addition
Mount Thorley Warkworth Complaints Register 2016	Change
Mount Thorley Warkworth Environmental Protection Licence 1376 1976 Monthly Meaningful Summary December 2016	Addition
Mount Thorley Warkworth Environmental Protection Licence 1376 1976 Monthly Obtained Data Summary December 2016	Addition
Mount Thorley Warkworth Environmental Monitoring Report December 2016	Addition
Mount Thorley Warkworth Pollution Incident Response Management Plan	Addition
Mount Thorley Warkworth Environmental Protection Licence 1376 1976 Monthly Meaningful Summary January 2017	Addition
Mount Thorley Warkworth Environmental Protection Licence 1376 1976 Monthly Obtained Data Summary January 2017	Addition
Mount Thorley Warkworth Environmental Monitoring Report January 2017	Addition
Mount Thorley Warkworth Environmental Protection Licence 1376 1976 Monthly Meaningful Summary February 2017	Addition
Mount Thorley Warkworth Environmental Protection Licence 1376 1976 Monthly Obtained Data Summary February 2017	Addition

Mount Thorley Operations Community Consultative Committee Minutes November 2016	Addition
Mount Thorley Warkworth Annual Environmental Review 2016	Addition
Mount Thorley Warkworth Annual Environmental Review 2016 - Appendices	Addition
Mount Thorley Warkworth Environmental Monitoring Report February 2017	Addition
Warkworth Sands Woodland Integrated Management Plan February 2017	Addition
Mount Thorley Warkworth Environmental Protection Licence 1376 1976 Monthly Meaningful Summary March 2017	Addition
Mount Thorley Warkworth Environmental Protection Licence 1376 1976 Monthly Obtained Data Summary March 2017	Addition
Mount Thorley Warkworth Environmental Protection Licence 1376 1976 Monthly Meaningful Summary October 2016	Addition
Mount Thorley Warkworth Environmental Protection Licence 1376 1976 Monthly Obtained Data Summary October 2016	Addition
Mount Thorley Warkworth Environmental Monitoring Report October 2016	Addition
Mount Thorley Warkworth Environmental Protection Licence 1376 1976 Monthly Meaningful Summary November 2016	Addition
Mount Thorley Warkworth Environmental Protection Licence 1376 1976 Monthly Obtained Data Summary November 2016	Addition
Mount Thorley Warkworth Environmental Monitoring Report November 2016	Addition

7.0 Community investment & support

Mount Thorley Warkworth (MTW) site donations

The site donations committee provides an opportunity for employees to assess and make recommendations on requests for sponsorship and donations received by MTW.

Funding is provided in the form of sponsorship or a donation to assist local, community-based organisations. The funding criteria for site donations has been updated to reflect MTW's focus on funding projects and initiatives from the Bulga, Milbrodale, Broke and Singleton area.

Application forms can be requested by emailing CNACommunityRelation@riotinto.com. Alternatively, potential projects and opportunities for support from Coal & Allied can be discussed with Travis Bates – Community Relations Specialist, Singleton.

Year to date, MTW has provided \$29,902 to 12 local projects and initiatives, including:

- Rotary Club of Singleton on Hunter – 2017 Singleton Art Prize
- Australian Families of the Military – Mental Health Retreat
- Wildlife Aid Inc
- Singleton Business Chamber - International Women's Day event
- Cancer Council NSW – Singleton Relay for Life
- Singleton Junior Rugby League Club
- Singleton Junior Rugby Club
- Northern Agriculture Association Inc – Singleton Show
- Glendon Brook Hall Inc
- Singleton Pony Club
- Singleton Theatrical Society
- Little Bit of Italy Festival

Coal & Allied Community Development Fund (CDF)

The year 2017 marks 19 years of operation of the CDF, which has invested over \$14.5 million to support over 120 community projects in the Hunter Valley since its establishment in 1999, across the areas of health, education, environment and economic development.

In 2014, Coal & Allied announced that a further \$3 million would be made available to the CDF over a three year period (2015 – 2017) for projects in the Singleton, Muswellbrook and Upper Hunter LGAs. Strategic priority areas were refined for the 2015-2017 funding cycle to enable a more targeted approach to addressing identified community need and to leverage other resources Coal and Allied may be able to offer to strengthen community partnerships.

Priority areas for the 2015-2017 funding cycle include:

- Economic Development: encouraging the diversity and competitiveness of the Upper Hunter economy
- Community Health: Supporting projects which target health, safety and social wellbeing of the community
- Education: Promoting the value of education and building skills within our community
- Environment and Land Management: Supporting projects that can make a difference on a greater scale. i.e. beyond C&A mining operations

In 2017, the CDF has committed to funding 14 unique projects, to a value of almost \$700,000. These projects are aimed at delivering long term benefits for communities in the CDF catchment, which include the Singleton, Muswellbrook and Upper Hunter LGAs.

Table 2: Coal & Allied Community Development Fund projects supported in 2016

Programme	Partner
Enterprise Facilitation	Sirolli Institute
UHWTAWF – Positive Education Program	Upper Hunter Where There's A Will Foundation
Science and Engineering Challenge, and SMART Program (2015-2017)	University of Newcastle
Upper Hunter Education Fund Scholarships (2015-2017)	Upper Hunter Education Fund
Business Development Officer	Singleton Business Chamber
RFS Datasign	Bulga RFS
University of Newcastle Scholarships	University of Newcastle
Youth Leadership Program	Outward Bound Australia
Singleton Economic Development and Funding Coordinator	Singleton Council
STEM Lego Robotics Program	Australian Christian College Singleton

HSC Study Camps	Upper Hunter Education Fund
Ready 4 School Program	Jerrys Plains Public School
Total Steers Challenge	Tocal College
Early Learning Program	Milbrodale Public School



Appendix A

Environmental Monitoring
January 2017



Mount Thorley Warkworth

Monthly Environmental Report

January 2017

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Revision History

Version No.	Person Responsible	Document Status	Date
1.0	Environmental Graduate	Draft	01/03/2017
1.1	Acting Environmental Specialist	Final	01/03/2017

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 1st January to 31st January 2017.

2.0 AIR QUALITY

2.1 Meteorological Monitoring

Meteorological data is collected at MTW's 'Charlton Ridge' meteorological station (refer to Figure 3: Air Quality Monitoring Locations).

2.1.1 Rainfall

Rainfall for the period is summarised in Table 1, the year-to-date trend and historical trend are shown in Figure 1.

Table 1: Monthly Rainfall MTW

2017	Monthly Rainfall (mm)	Cumulative Rainfall (mm)
January	41.0	41.0

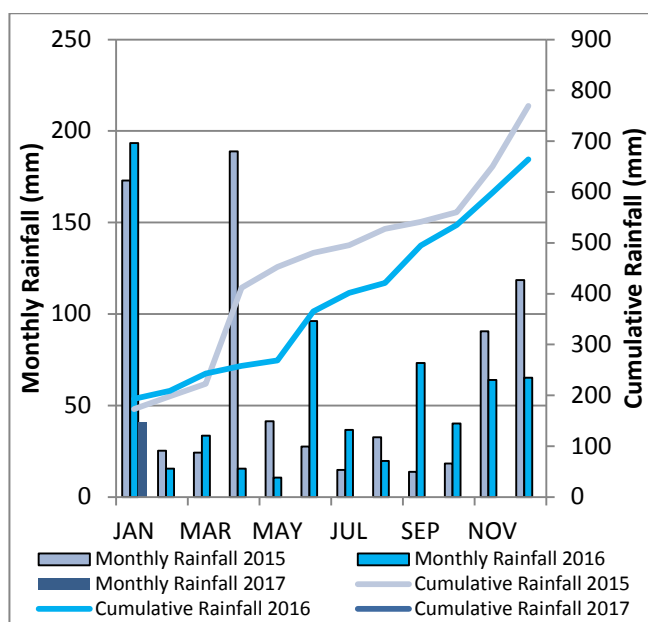


Figure 1: Rainfall Trend YTD

2.1.2 Wind Speed and Direction

Winds from the South-East were dominant throughout the reporting period as shown in Figure 2.

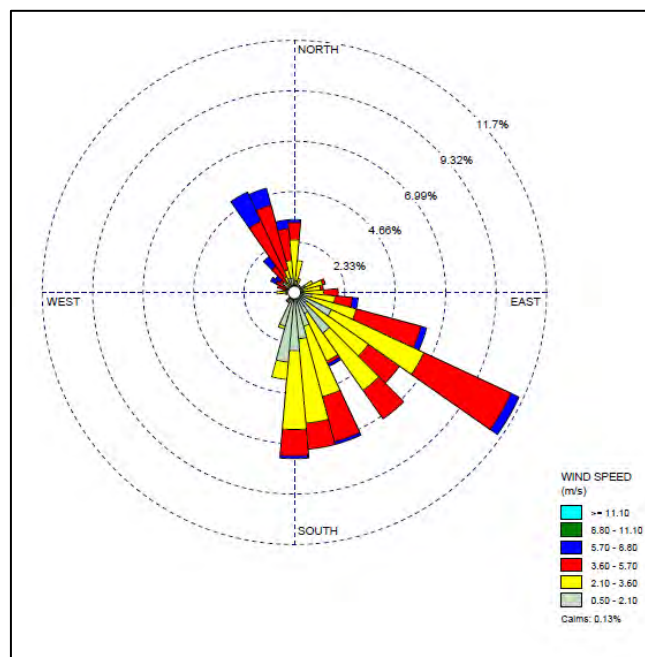


Figure 2: Charlton Ridge Wind Rose – January 2017

**Mount Thorley Warkworth
Air Quality Monitoring Programme**

Date: 170301
Plan By: DF
Version: 1.3



RTCA - NSW Environmental Services

Figure 3: Air Quality Monitoring Locations

2.2 Depositional Dust

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

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.

During the reporting period the DW14, DW20a, DW21a, D124 and Warkworth monitors recorded monthly results above the long term impact assessment criteria of 4.0 g/m² per month. Field notes associated with DW20a, D124 and Warkworth confirm the presence of insects and bird droppings. As such the results are considered contaminated and will be excluded from calculation of the annual average. There is no evidence to suggest that the Dw21a result is contaminated. Accordingly, this result will be included in the annual average calculation.

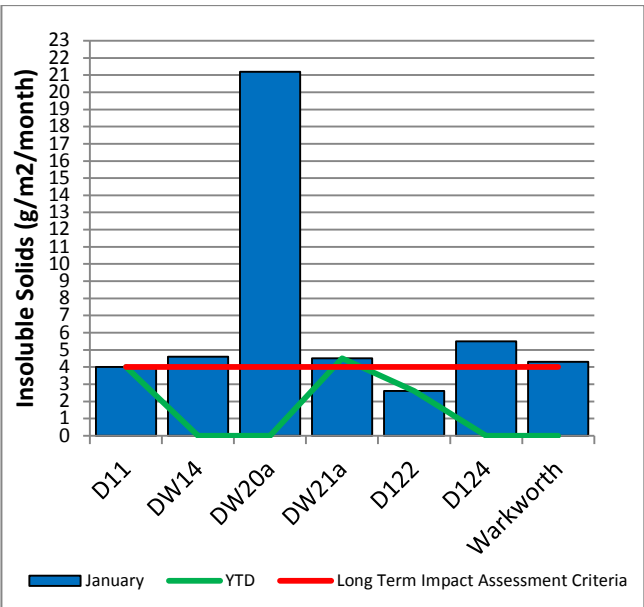


Figure 4: Depositional Dust – January 2017

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 (PM₁₀). 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 PM₁₀ Results

Figure 5 shows the individual PM₁₀ results at each monitoring station against the short term impact assessment criteria of 50µg/m³.

On 18/01/2017 and on 24/01/2017, one HVAS PM₁₀ unit recorded a result greater than the short term (24hr) PM₁₀ impact assessment criteria; Long Point (135 µg/m³) and Long Point (89 µg/m³) respectively.

Investigation indicates that the Long Point HVAS failed to collect valid samples on the 18th and 24th January due to local livestock impacting the monitor. The proximity of the monitor to livestock is being increased, through the relocation of a nearby chook yard and also a demountable horse yard away from the monitor.

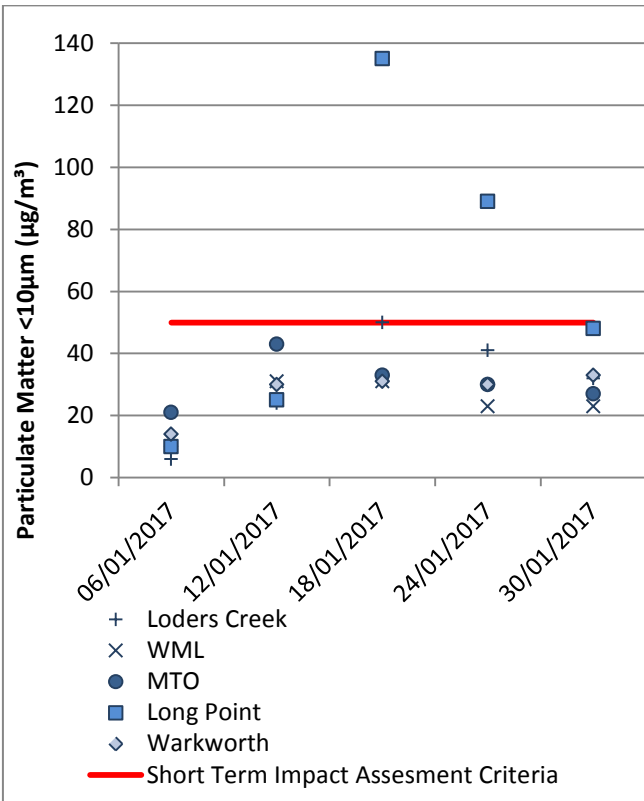


Figure 5: Individual PM₁₀ Results – January 2017

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

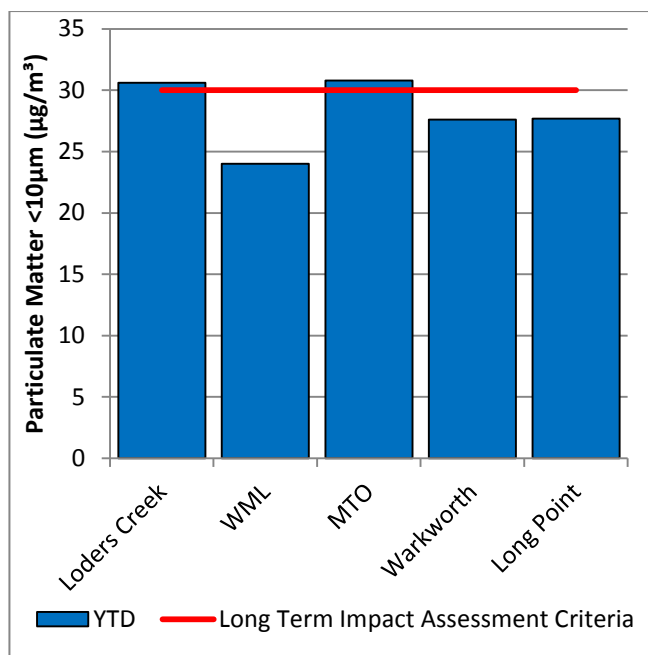


Figure 6: Annual Average PM₁₀ – January 2017

2.3.2 TSP Results

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

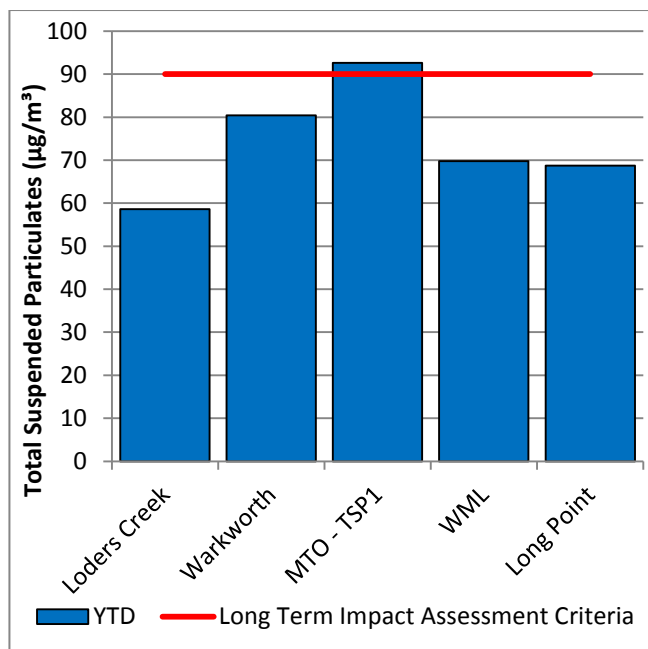


Figure 7: Annual Average Total Suspended Particulates – January 2017

2.3.3 Real Time PM₁₀ Results

Mount Thorley Warkworth maintains a network of real time PM₁₀ monitors. The real time air quality monitoring stations continuously log information and transmit data to a central database, generating alarms 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 PM₁₀ result and the annual PM₁₀ average.

Data was not available on the 20th January (Warkworth) or on 21st January (Bulga) due to technical issues.

2.3.4 Real Time Alarms for Air Quality

During January, the real time monitoring system generated 76 automated air quality related alerts, including 14 alerts for adverse meteorological conditions and 62 alerts for elevated PM₁₀ levels.

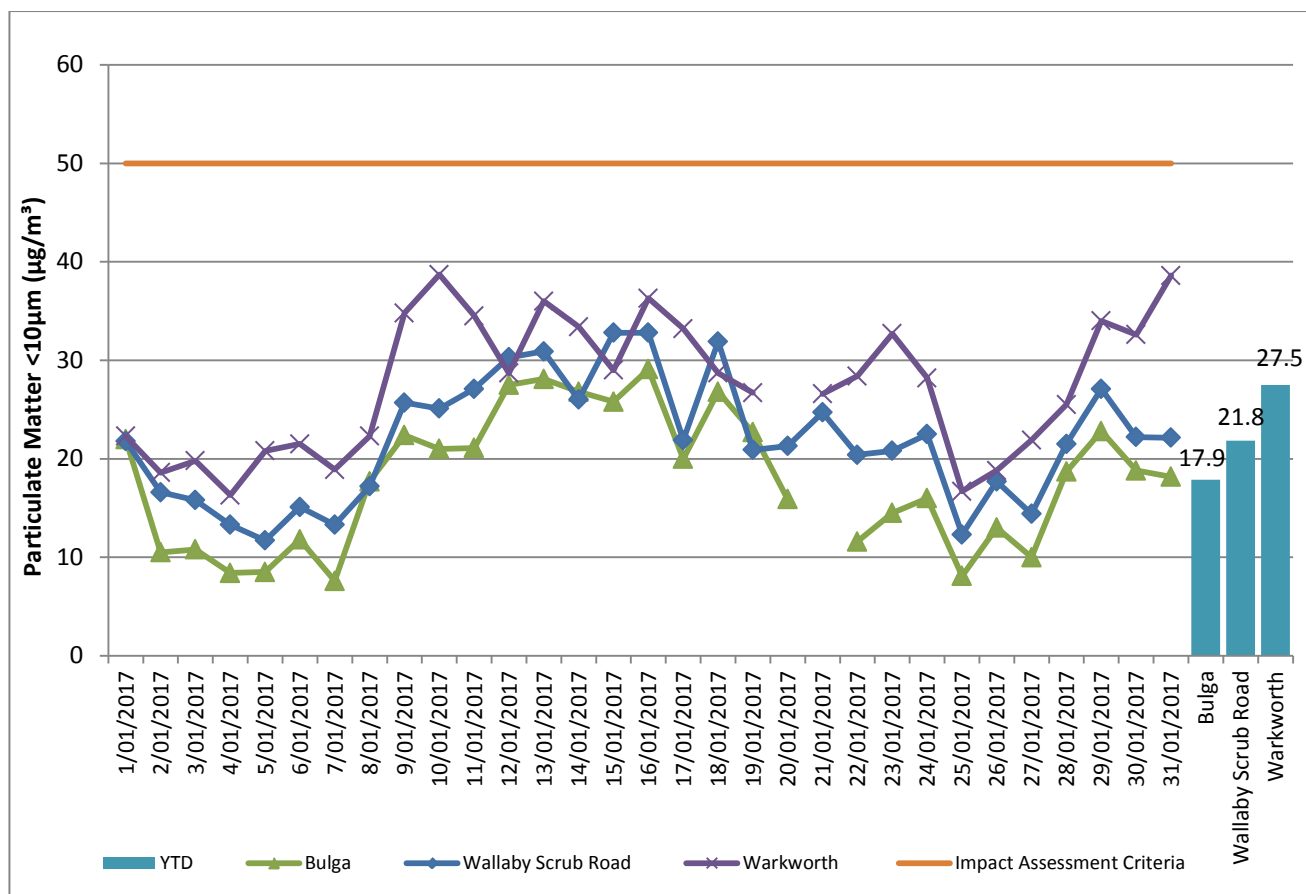


Figure 8: Real Time PM₁₀ daily 24hr average and annual average – January 2017

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 monitor the potential impact of mining on the river. Other Hunter River tributaries are also monitored.

Results of monitoring are reported quarterly, next available in the March 2017 report.

3.2 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 March 2017 report.

3.3 HRSTS Discharge

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

During the reporting period no water was discharged under the HRSTS.

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 January 2017, 36 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
120	0%
Ground Vibration (mm/s)	Comments
5	5% of the total number of blasts in a 12 month period
10	0%

During the reporting period no blasts exceeded the 115 dB(L) 5% threshold for airblast overpressure or 5mm/s 5% threshold for ground vibration

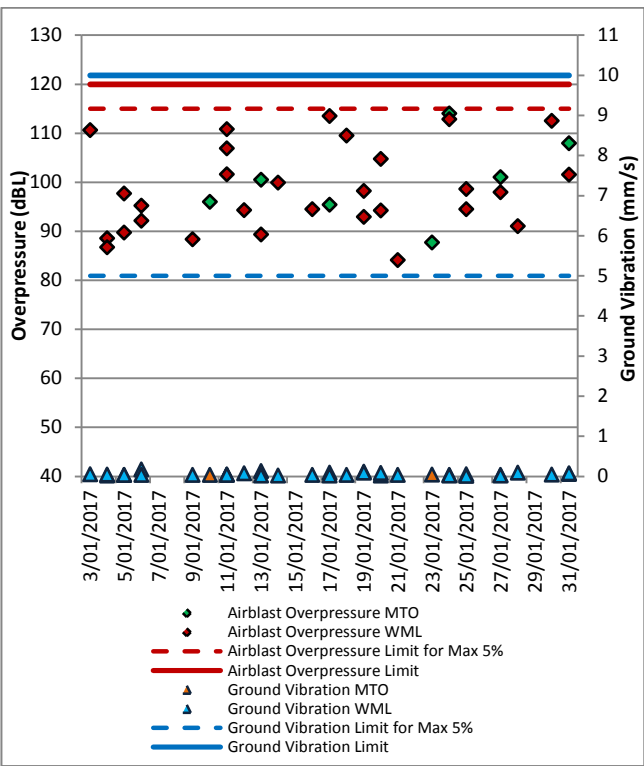


Figure 9: Abbey Green Blast Monitoring Results – January 2017

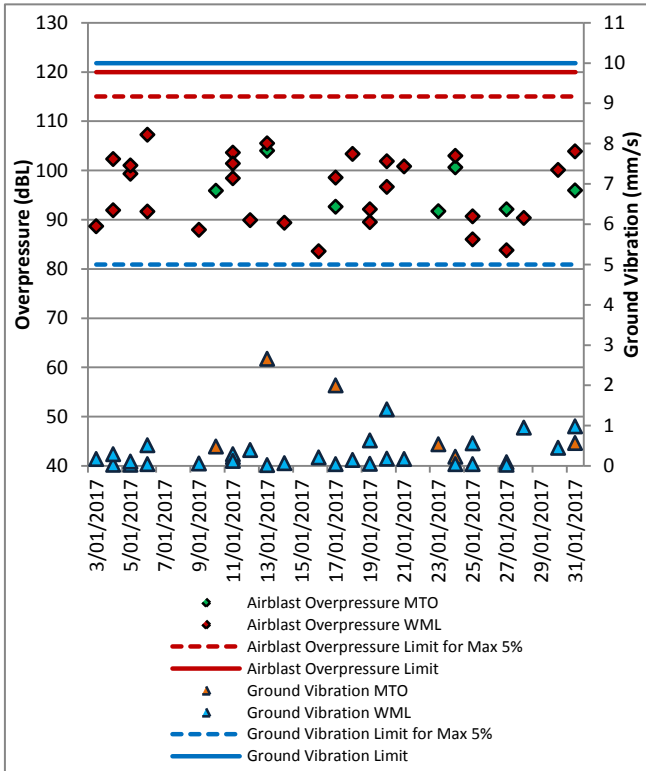


Figure 10: Bulga Village Blast Monitoring Results – January 2017

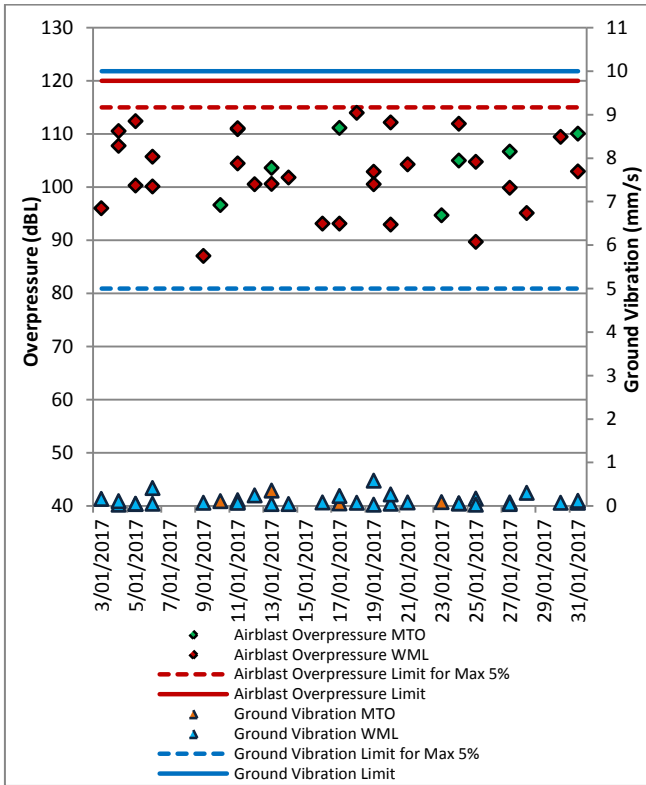


Figure 11: MTIE Blast Monitoring Results – January 2017

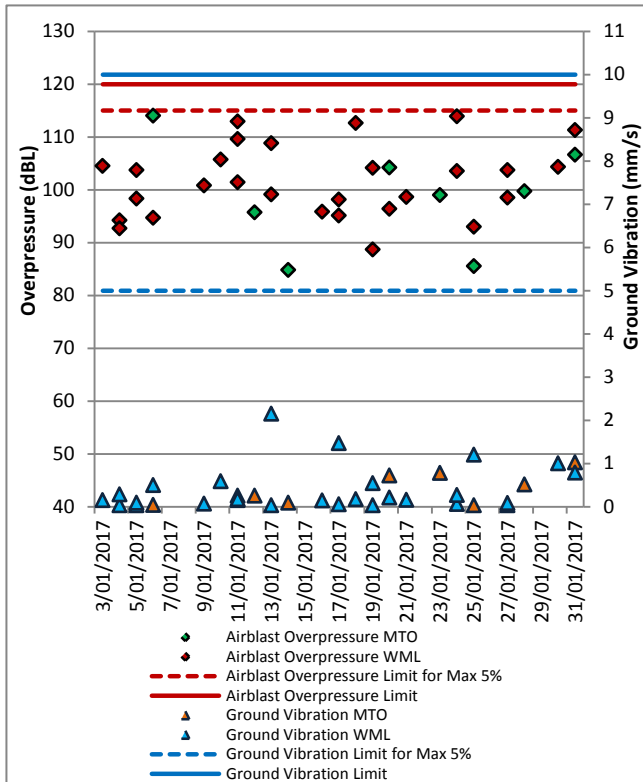


Figure 12: Wollemi Peak Road Blast Monitoring Results – January 2017

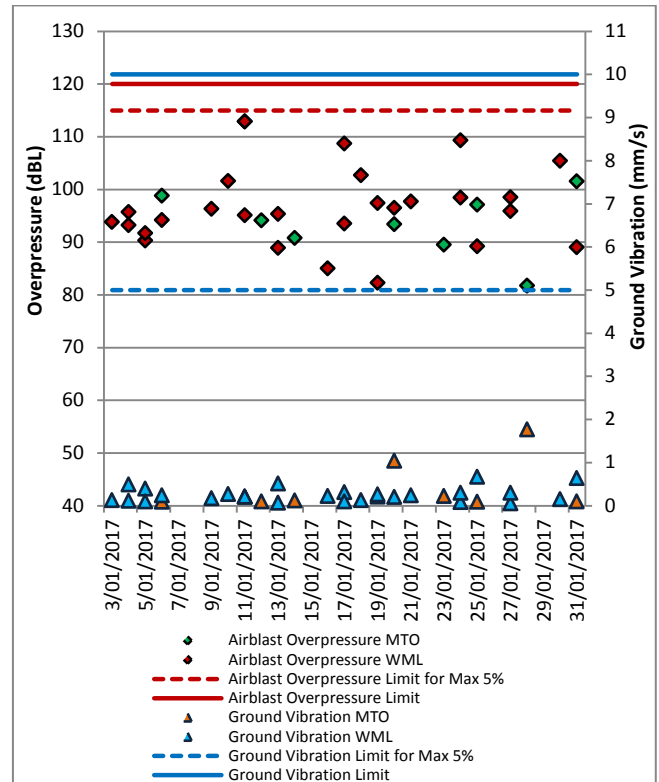


Figure 14: Warkworth Blast Monitoring Results – January 2017

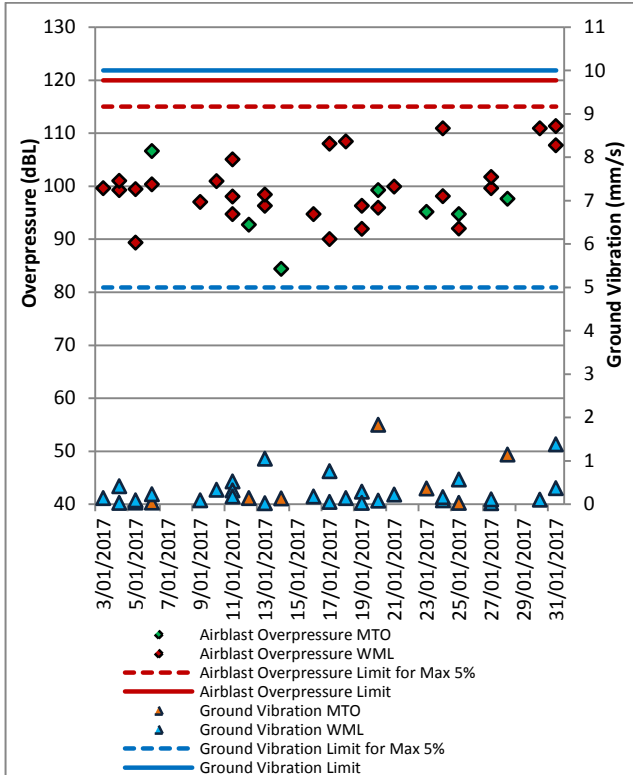


Figure 13: Wambo Road Blast Monitoring Results – January 2017

Mount Thorley Warkworth Blast Monitoring Locations

Date: 160621
Plan By: DF
Version: 4.0



RTCA - NSW Environmental Services

Figure 15: 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 nine 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 9th January 2017. 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 – January 2017

Location	Date and Time	Wind Speed (m/s) ⁵	Stability Class	Criterion (dB(A))	Criterion Applies? ^{1,6}	WML L _{Aeq} dB ^{2,4}	Exceedance ³	Total L _{Ceq} – L _{Aeq}	Revised WML L _{Aeq} ^{5,6}
Bulga RFS	9/01/2017 23:16	4.8	D	37	No	IA	NA	13	IA
Bulga Village	9/01/2017 22:00	3.1	D	38	No	IA	NA	8	IA
Gouldsville	9/01/2017 21:25	3.3	D	38	No	IA	NA	6	IA
Inlet Rd	9/01/2017 21:14	3.5	D	37	No	33	NA	16	38
Inlet Rd West	9/01/2017 21:35	3.3	D	35	No	25	NA	6	25
Long Point	9/01/2017 21:00	3.5	D	35	No	IA	NA	16	IA
South Bulga	9/01/2017 23:45	3.8	D	35	No	IA	NA	7	IA

Table 4: L_{A1}, 1 minute Warkworth -

Impact Assessment Criteria – January 2017

Location	Date and Time	Wind Speed (m/s) ⁵	Stability Class	Criterion dB	Criterion Applies? ^{1,6}	WML L _{A1} , 1min dB ^{2,4}	Exceedance ³
Bulga RFS	9/01/2017 23:16	4.8	D	47	No	IA	NA
Bulga Village	9/01/2017 22:00	3.1	D	48	No	IA	NA
Gouldsville	9/01/2017 21:25	3.3	D	45	No	IA	NA
Inlet Rd	9/01/2017 21:14	3.5	D	47	No	41	NA
Inlet Rd West	9/01/2017 21:35	3.3	D	45	No	32	NA
Long Point	9/01/2017 21:00	3.5	D	45	No	IA	NA
South Bulga	9/01/2017 23:45	3.8	D	46	No	IA	NA

Notes

1. Noise emission limits apply during all meteorological conditions except the following: during periods of rain or hail; average wind speed at microphone height exceeds 5 m/s; 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;

2. Estimated or measured L_{A1}, 1minute attributed to Warkworth mine (WML);

3. NA in exceedance column means atmospheric conditions outside conditions specified in project approval and so criterion is not applicable. NA (not applicable) in criterion column means criterion not specified for this location;

4. Bolded results in red are possible exceedances of relevant criteria; and

5. Criterion may or may not apply due to rounding of meteorological data values.

5.1.3 MTO Noise Assessment

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

Table 5: $L_{Aeq, 15\text{minute}}$ Mount Thorley - Impact Assessment Criteria – January 2017

Location	Date and Time	Wind Speed (m/s) ⁵	Stability Class	Criterion dB	Criterion Applies? ^{1,6}	MTO L_{Aeq} dB ^{2,4}	Exceedance ³	Total $L_{Ceq} - L_{Aeq}$ ⁷	Revised MTO L_{Aeq} ^{5,6}
Bulga RFS	9/01/2017 23:16	4.8	D	37	No	IA	NA	13	IA
Bulga Village	9/01/2017 22:00	3.1	D	38	No	NM	NA	8	NM
Gouldsville	9/01/2017 21:25	3.3	D	35	No	IA	NA	6	IA
Inlet Rd	9/01/2017 21:14	3.5	D	37	No	NM	NA	16	NM
Inlet Rd West	9/01/2017 21:35	3.3	D	35	No	IA	NA	6	IA
Long Point	9/01/2017 21:00	3.5	D	35	No	IA	NA	16	IA
South Bulga	9/01/2017 23:45	3.8	D	36	No	IA	NA	7	IA

Table 6: $L_{A1, 1\text{Minute}}$ Mount Thorley - Impact Assessment Criteria – January 2017

Location	Date and Time	Wind Speed (m/s) ⁵	Stability Class	Criterion dB	Criterion Applies? ^{1,6}	MTO $L_{A1, 1\text{min}}$ dB ^{2,4}	Exceedance ³
Bulga RFS	9/01/2017 23:16	4.8	D	47	No	IA	NA
Bulga Village	9/01/2017 22:00	3.1	D	48	No	22	NA
Gouldsville	9/01/2017 21:25	3.3	D	45	No	IA	NA
Inlet Rd	9/01/2017 21:14	3.5	D	47	No	NM	NA
Inlet Rd West	9/01/2017 21:35	3.3	D	45	No	IA	NA
Long Point	9/01/2017 21:00	3.5	D	45	No	IA	NA
South Bulga	9/01/2017 23:45	3.8	D	46	No	IA	NA

Notes

- Noise emission limits apply during all meteorological conditions except the following: during periods of rain or hail; average wind speed at microphone height exceeds 5 m/s; 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;
- Estimated or measured $L_{A1, 1\text{minute}}$ attributed to Mt Thorley Operations (MTO);
- NA in exceedance column means atmospheric conditions outside conditions specified in project approval and so criterion is not applicable. NA (not applicable) in criterion column means criterion not specified for this location;
- Bolded results in red are possible exceedances of relevant criteria; and
- Criterion may or may not apply due to rounding of meteorological data values.

5.1.4 INP Low Frequency

In accordance with the requirements of the NSW Industrial Noise Policy (INP), the low frequency modification factor has been applied where appropriate. It should be noted that the Industrial Noise Policy does not give guidance on the application of the penalty where more than one target noise source is audible. The L_{Ceq} levels reported above are “Total”, or “Total mine noise” at best, and cannot be attributed accurately to a single mine. Accordingly, where the INP criteria for the application of the Low Frequency modification factor is triggered, the penalty has been applied to the dominant mine noise source (either of WML or MTO).

Resulting L_{Aeq} noise levels exceeded the WML impact assessment criteria by 1 dB at Inlet Road, and remained in compliance at all other locations.

This result has been reported in writing to the NSW Department of Planning and Environment.

**Mount Thorley Warkworth
Noise Monitoring Programme**

Date: 160226

Plan By: DF

Version: 2.0

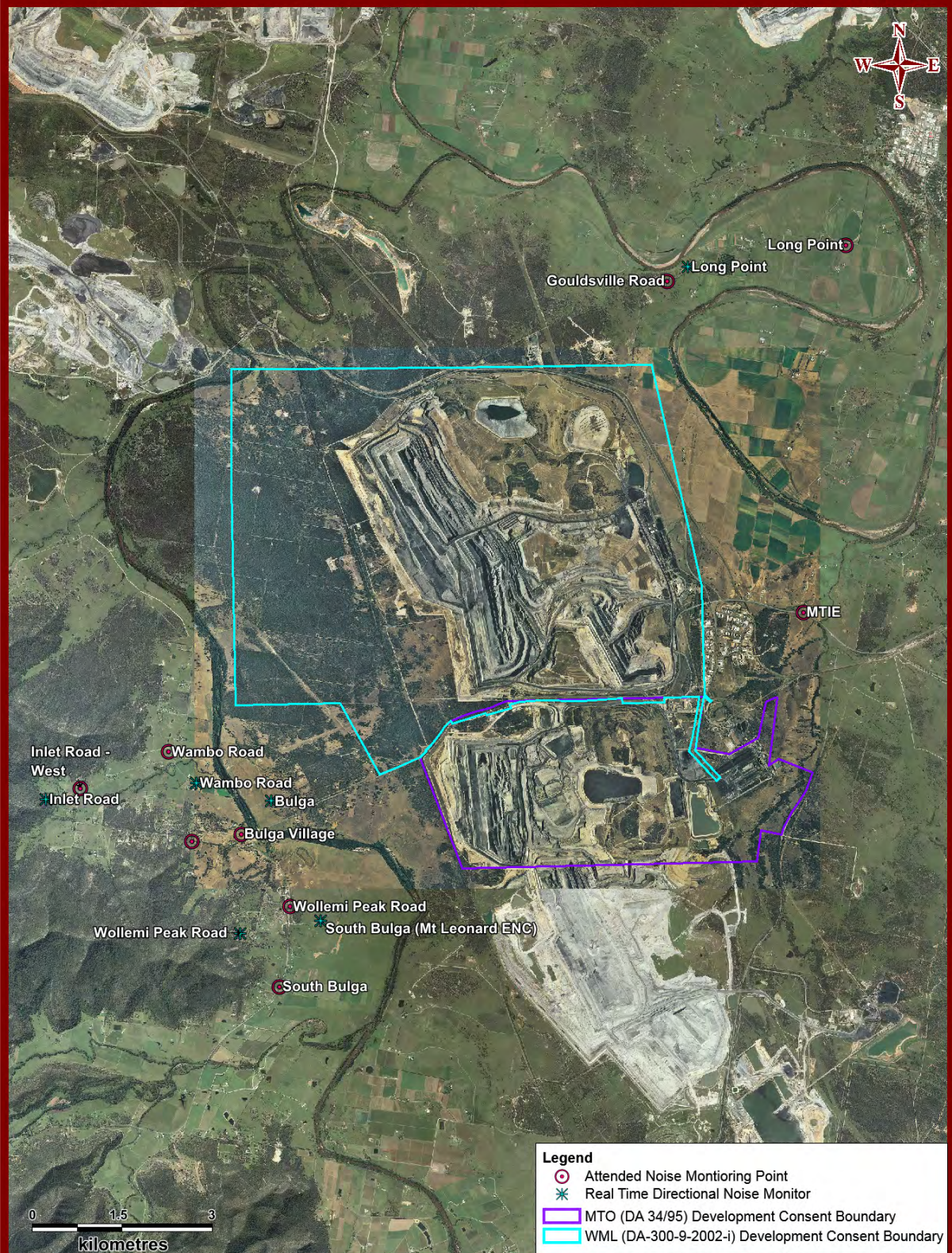


Figure 16: Noise Monitoring Location Plan

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 particular residence, modifications will be made so as 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:

- Replacement of non-attenuated equipment with sound attenuated equipment;
- 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 January are provided in Table 7.

Table 7: Supplementary Attended Noise Monitoring Data – January 2017

No. of assessments	No. of assessments > trigger	No. of nights where assessments > trigger	% greater than trigger
526	0	0	0

Note: Measurements are taken under all meteorological conditions, including conditions under which the consent noise criteria do not apply.

6.0 OPERATIONAL DOWNTIME

During January, a total of 726.1 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.

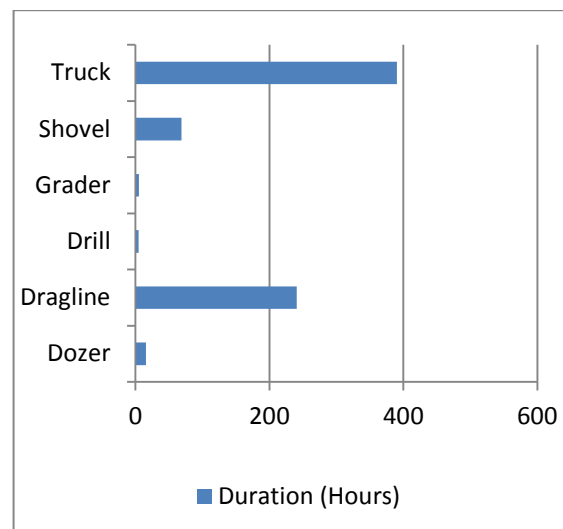


Figure 17: Operational Downtime by Equipment Type – January 2017

7.0 REHABILITATION

During January, 32.5 Ha of land was released, 8.8 Ha of land was bulk shaped, 2.6 Ha of land was topsoiled and 3.0 Ha of land was composted.

8.0 ENVIRONMENTAL INCIDENTS

There were no reportable environmental incidents during the reporting period.

9.0 COMPLAINTS

During the reporting period 15 complaints were received, details of these complaints are shown in Figure 19 below.

	Noise	Dust	Blast	Lighting	Other	Total
January	5	6	3	1	0	15
February	-	-	-	-	-	-
March	-	-	-	-	-	-
April	-	-	-	-	-	-
May	-	-	-	-	-	-
June	-	-	-	-	-	-
July	-	-	-	-	-	-
August	-	-	-	-	-	-
September	-	-	-	-	-	-
October	-	-	-	-	-	-
November	-	-	-	-	-	-
December	-	-	-	-	-	-
Total	5	6	3	1	0	15

Figure 18: Complaints Summary - YTD January 2017

Appendix A: Meteorological Data

Table 8: Meteorological Data – Charlton Ridge Meteorological Station – January 2017

Date	Air Temperature Maximum (°C)	Air Temperature Minimum (°C)	Relative Humidity Maximum (%)	Relative Humidity Minimum (%)	Wind Direction Average (°)	Wind Speed Average (m/sec)	Rainfall(mm)
1/01/2017	28.3	19.5	94.4	59.6	132.4	2.1	9.0
2/01/2017	28.4	18.6	97.0	50.4	161.3	3.0	17.8
3/01/2017	28.2	17.0	85.8	41.7	146.2	3.2	0.0
4/01/2017	26.4	16.6	82.0	42.4	125.5	3.0	0.0
5/01/2017	30.0	16.8	90.7	42.9	139.1	3.1	0.0
6/01/2017	30.3	16.9	87.7	39.5	137.3	3.5	0.0
7/01/2017	31.3	16.1	79.8	33.4	124.7	2.9	0.0
8/01/2017	35.6	14.2	90.0	21.6	140.2	2.1	0.0
9/01/2017	39.3	17.9	73.3	15.2	142.9	2.4	0.0
10/01/2017	39.1	21.6	73.7	13.2	198.9	2.8	0.0
11/01/2017	39.1	23.0	71.3	15.3	241	3.3	0.0
12/01/2017	32.4	21.6	81.0	42.5	120.5	3.5	0.0
13/01/2017	43.4	20.3	78.3	14.1	219.3	3.8	0.0
14/01/2017	39.5	24.0	75.2	24.5	221.6	3.2	0.0
15/01/2017	26.9	18.9	93.8	45.7	114.9	3.1	0.2
16/01/2017	36.1	17.2	86.3	23.4	147.2	2.3	0.0
17/01/2017	41.3	17.6	88.7	20.3	247.6	3.4	0.0
18/01/2017	43.4	20.0	84.6	15.5	235.5	5.1	0.0
19/01/2017	26.2	16.3	93.2	55.1	141	3.3	0.4
20/01/2017	30.4	16.8	93.1	53.4	225	2.8	9.6
21/01/2017	28.4	18.6	91.8	38.3	133.4	2.7	0.0
22/01/2017	32.1	15.1	82.9	29.3	136.6	2.8	0.0
23/01/2017	38.2	15.4	89.0	21.1	149.8	2.2	0.0
24/01/2017	40.5	20.2	89.8	23.2	241	4.2	1.0
25/01/2017	23.2	17.2	94.7	65.4	153.9	3.1	1.2
26/01/2017	26.5	17.1	96.6	64.8	154.6	2.0	0.6
27/01/2017	30.7	18.1	95.5	46.3	153.7	3.2	0.8
28/01/2017	38.0	15.7	93.9	20.4	152	2.1	0.0
29/01/2017	39.1	20.0	81.5	25.6	158	1.9	0.0
30/01/2017	40.8	19.9	90.0	19.0	252.5	3.5	0.4
31/01/2017	44.1	22.6	78.9	10.8	256.2	4.4	0.0



Appendix B

Environmental Monitoring
February 2017



Mount Thorley Warkworth

Monthly Environmental Report

February 2017

Coal & Allied Operations Pty Ltd

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Revision History

Version No.	Person Responsible	Document Status	Date
1.0	Environmental Graduate	Draft	24/03/2017
1.1	Acting Environmental Specialist	Final	30/03/2017

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 1st February to 28th February 2017.

2.0 AIR QUALITY

2.1 Meteorological Monitoring

Meteorological data is collected at MTW's 'Charlton Ridge' meteorological station (refer to Figure 3: Air Quality Monitoring Locations).

2.1.1 Rainfall

Rainfall for the period is summarised in Table 1, the year-to-date trend and historical trend are shown in Figure 1.

Table 1: Monthly Rainfall MTW

2017	Monthly Rainfall (mm)	Cumulative Rainfall (mm)
February	7.0	48.0

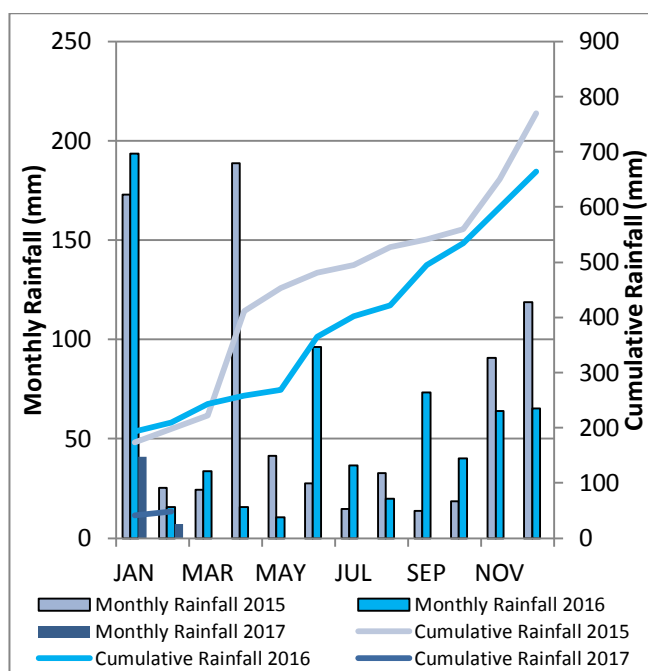


Figure 1: Rainfall Trend YTD

2.1.2 Wind Speed and Direction

Winds from the South were dominant throughout the reporting period as shown in Figure 2.

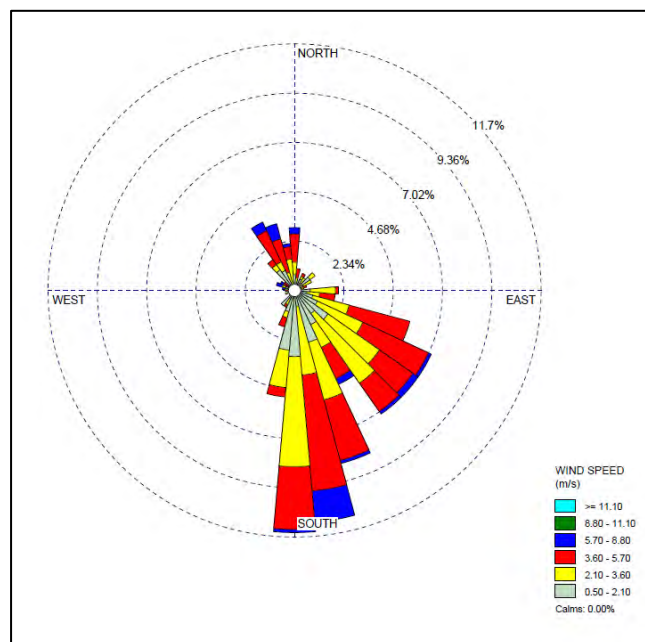


Figure 2: Charlton Ridge Wind Rose – February 2017

Mount Thorley Warkworth Air Quality Monitoring Programme

Date: 170301

Plan By: DF

Version: 1.3



RTCA - NSW Environmental Services

Figure 3: Air Quality Monitoring Locations

2.2 Depositional Dust

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

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.

During the reporting period the DW20a, DW21a, D122 and D124 monitors recorded monthly results above the long term impact assessment criteria of 4.0 g/m² per month. Field notes associated with DW20a and D124 confirm the presence of insects and vegetation. As such the results are considered contaminated and will be excluded from calculation of the annual average. There is no evidence to suggest that the Dw21a and D122 results are contaminated. Accordingly, these results will be included in the annual average calculation.

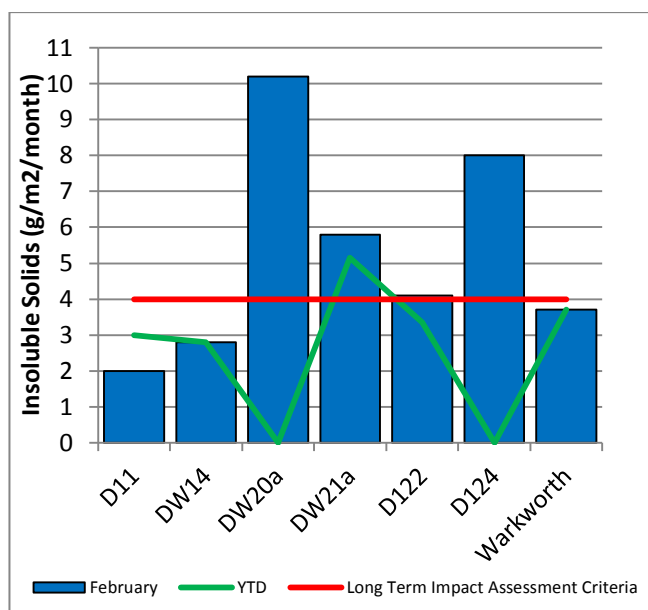


Figure 4: Depositional Dust – February 2017

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 (PM₁₀). 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 PM₁₀ Results

Figure 5 shows the individual PM₁₀ results at each monitoring station against the short term impact assessment criteria of 50µg/m³.

On 5/02/2017 and on one HVAS PM₁₀ unit recorded a result greater than the short term (24hr) PM₁₀ impact assessment criteria at Long Point (57µg/m³).

Investigation indicates that that the likely MTW contribution to the results at Long Point on the 5th February is less than 75%. Accordingly, no further action is required (as per approved Air Quality Monitoring Programme).

On 23/02/2017 one HVAS PM₁₀ unit recorded a result greater than the short term (24hr) PM₁₀ impact assessment criteria; MTO (53µg/m³).

Investigation indicates that that the likely MTW contribution to the result at MTO on the 23rd February is less than 75%. Accordingly, no further action is required (as per approved Air Quality Monitoring Programme).

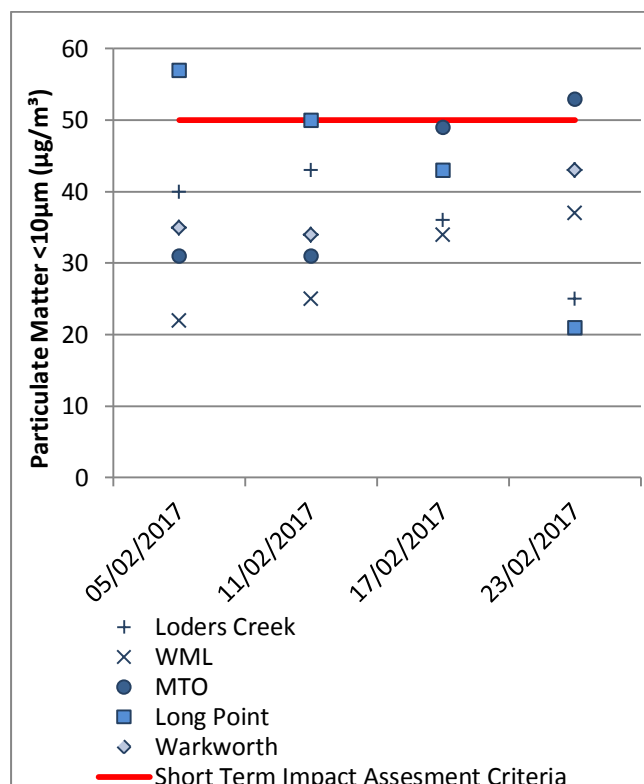


Figure 5: Individual PM₁₀ Results – February 2017

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

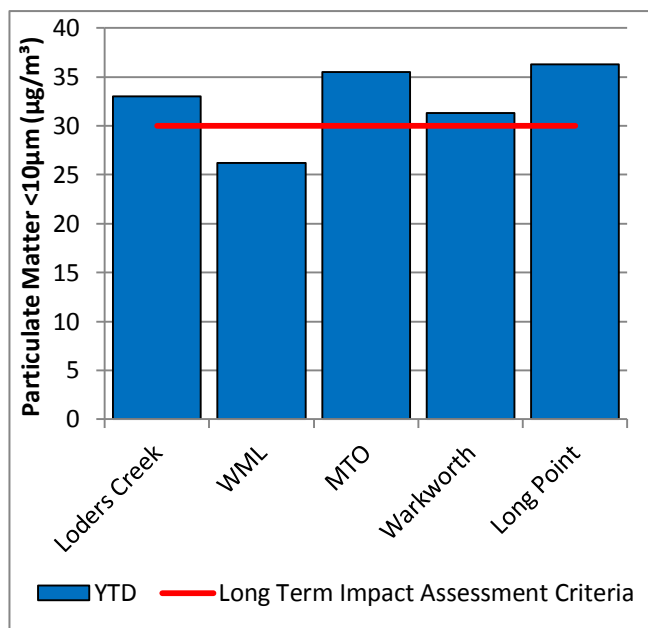


Figure 6: Annual Average PM₁₀ – February 2017

2.3.2 TSP Results

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

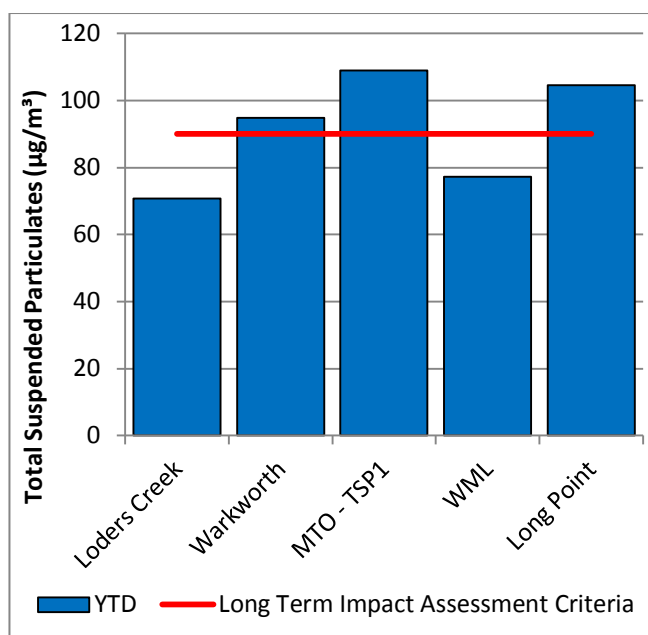


Figure 7: Annual Average Total Suspended Particulates – February 2017

2.3.3 Real Time PM₁₀ Results

Mount Thorley Warkworth maintains a network of real time PM₁₀ monitors. The real time air quality monitoring stations continuously log information and transmit data to a central database, generating alarms 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 PM₁₀ result and the annual PM₁₀ average.

2.3.4 Real Time Alarms for Air Quality

During February, the real time monitoring system generated 104 automated air quality related alerts, including 9 alerts for adverse meteorological conditions and 95 alerts for elevated PM₁₀ levels.

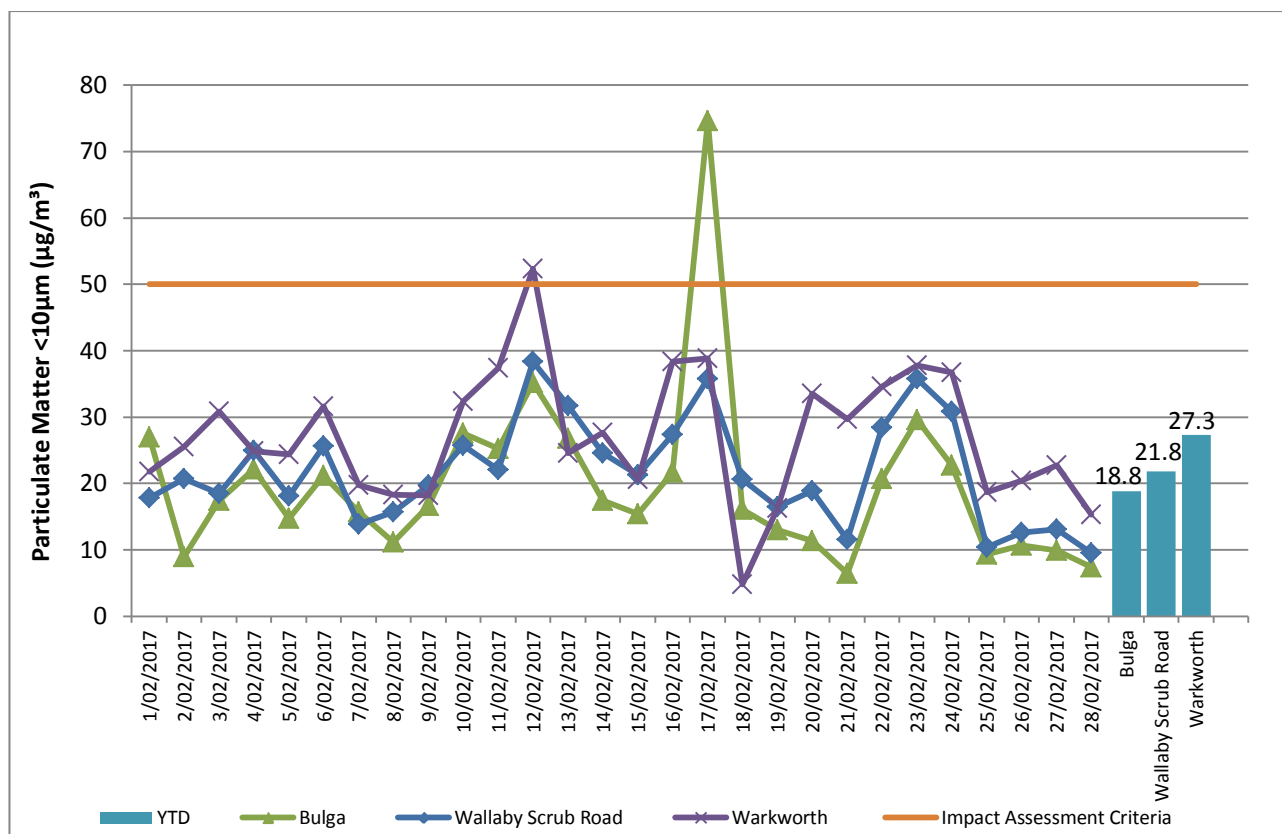


Figure 8: Real Time PM₁₀ daily 24hr average and annual average – February 2017

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 monitor the potential impact of mining on the river. Other Hunter River tributaries are also monitored.

Results of monitoring are reported quarterly, next available in the March 2017 report.

3.2 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 March 2017 report.

3.3 HRSTS Discharge

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

During the reporting period no water was discharged under the HRSTS.

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 February 2017, 24 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
120	0%
Ground Vibration (mm/s)	Comments
5	5% of the total number of blasts in a 12 month period
10	0%

During the reporting period no blasts exceeded the 115 dB(L) 5% threshold for airblast overpressure or 5mm/s 5% threshold for ground vibration

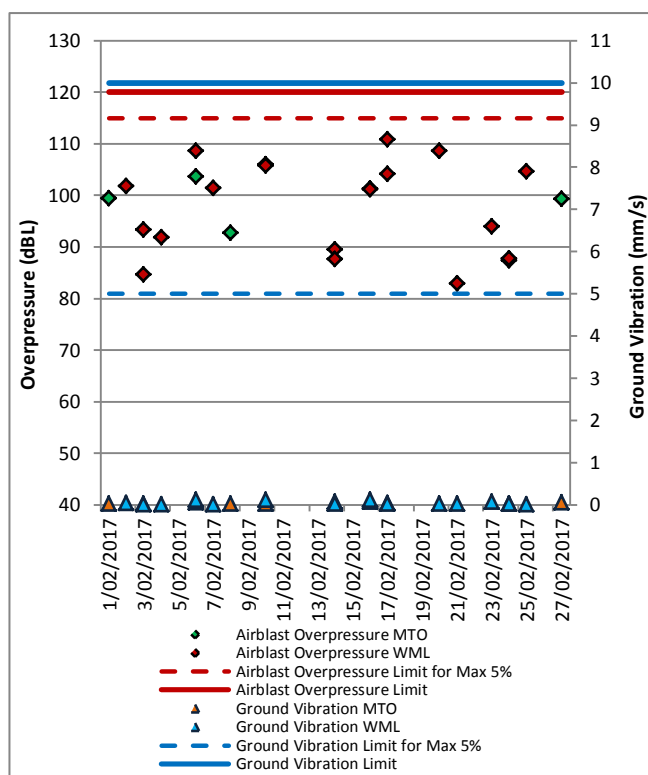


Figure 9: Abbey Green Blast Monitoring Results – February 2017

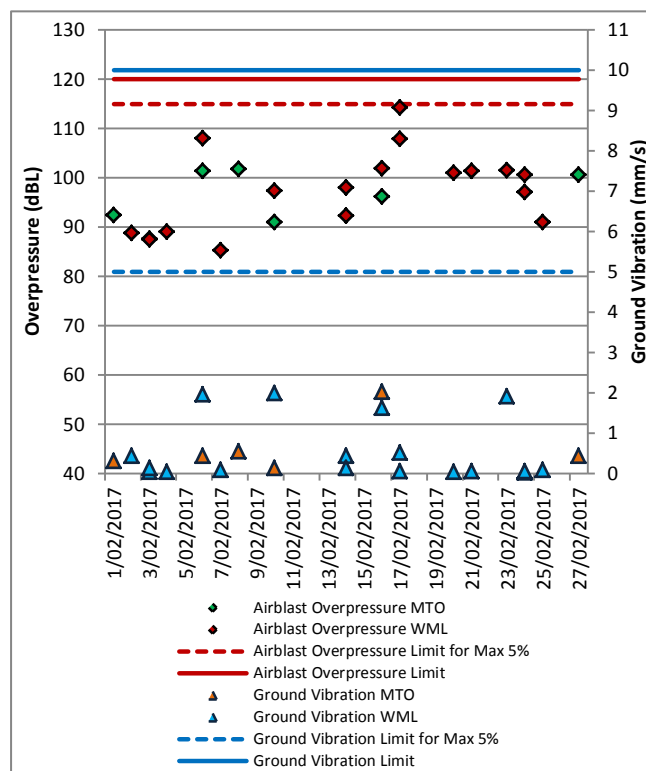


Figure 10: Bulga Village Blast Monitoring Results – February 2017

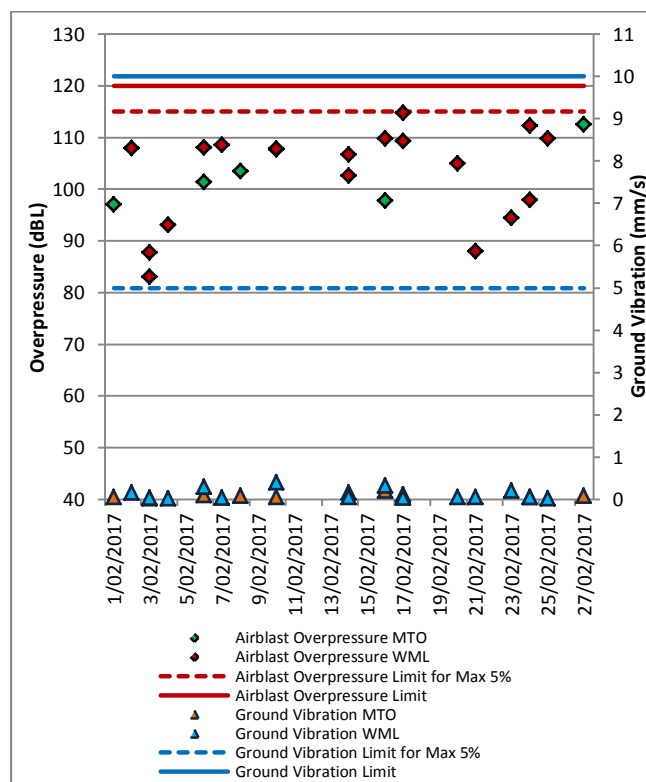


Figure 11: MTIE Blast Monitoring Results – February 2017

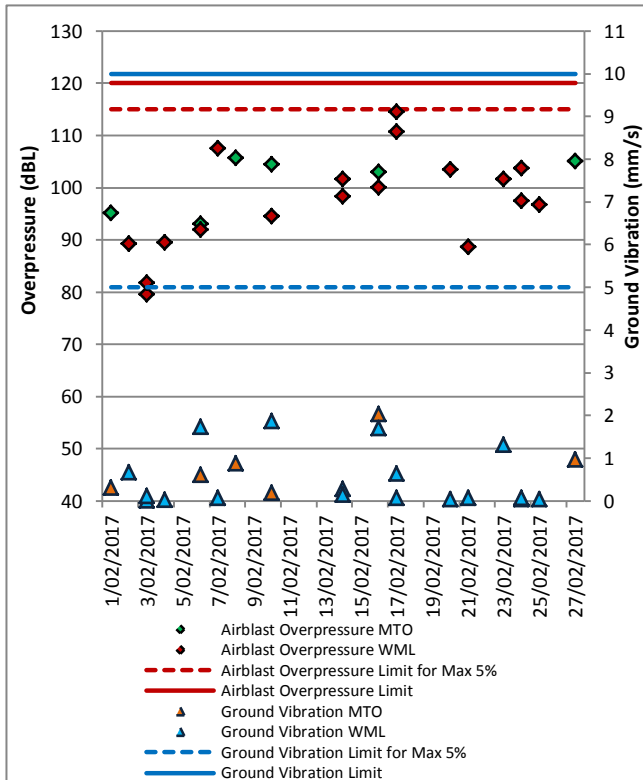


Figure 12: Wollemi Peak Road Blast Monitoring Results – February 2017

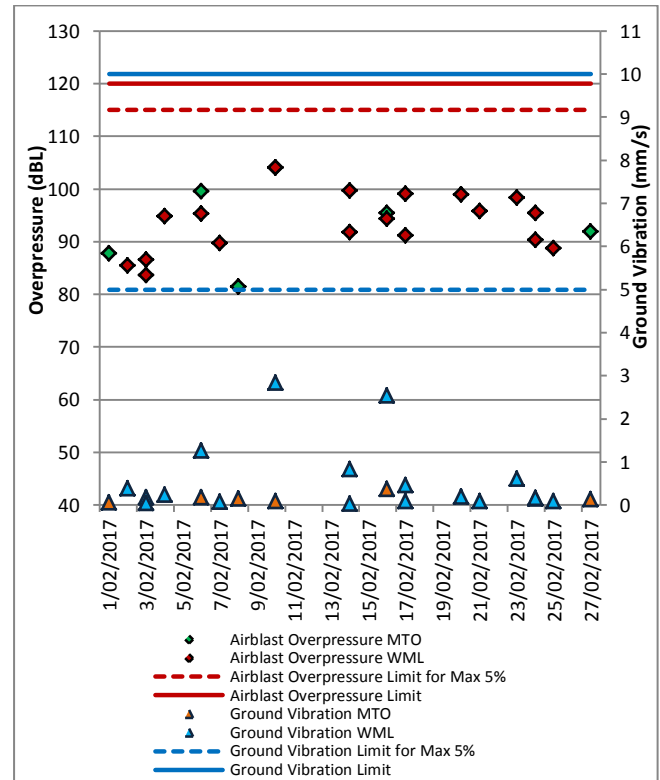


Figure 14: Warkworth Blast Monitoring Results – February 2017

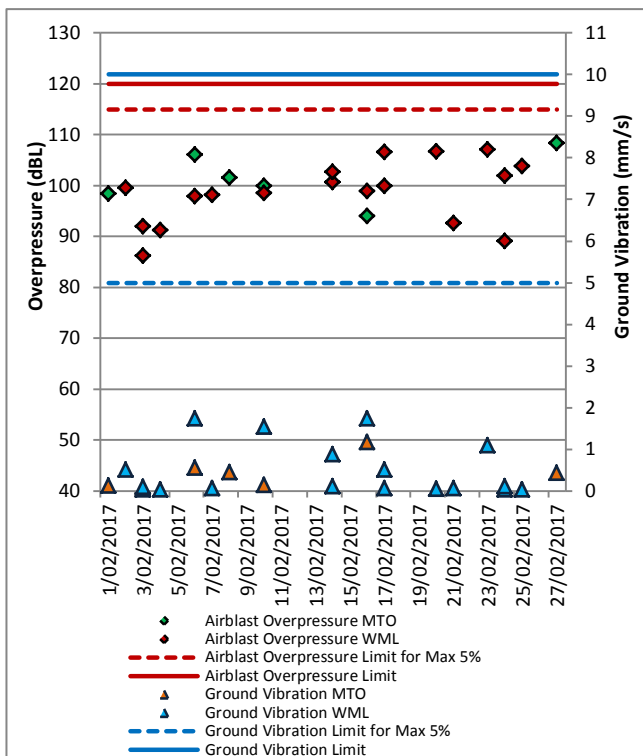


Figure 13: Wambo Road Blast Monitoring Results – February 2017

Mount Thorley Warkworth Blast Monitoring Locations

Date: 160621
Plan By: DF
Version: 4.0



RTCA - NSW Environmental Services

Figure 15: 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 nine 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 9th and 10th February 2017. 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 – February 2017

Location	Date and Time	Wind Speed (m/s) ⁵	Stability Class	Criterion (dB(A))	Criterion Applies? ^{1,6}	WML L _{Aeq} dB ^{2,4}	Exceedance ³	Total L _{Ceq} – L _{Aeq}	Revised WML L _{Aeq} ^{5,6}
Bulga RFS	10/02/2017 0:05	1	D	37	Yes	29	Nil	21	29
Bulga Village	9/02/2017 22:54	1.2	E	38	Yes	32	Nil	18	37
Gouldsville	9/02/2017 21:32	1.7	F	38	Yes	<30	Nil	20	<35
Inlet Rd	9/02/2017 22:21	1.7	E	37	Yes	33	Nil	22	38
Inlet Rd West	9/02/2017 21:23	1.7	F	35	Yes	28	Nil	19	33
Long Point	9/02/2017 21:03	2.3	F	35	No	IA	NA	18	IA
South Bulga	10/02/2017 0:37	0.7	F	35	Yes	IA	Nil	19	IA
Wambo Road	9/02/2017 23:30	1	D	38	Yes	35	Nil	18	40

Table 4: L_{A1}, 1 minute Warkworth - Impact Assessment Criteria – February 2017

Location	Date and Time	Wind Speed (m/s) ⁵	Stability Class	Criterion dB	Criterion Applies? ^{1,6}	WML L _{A1} , 1min dB ^{2,4}	Exceedance ³
Bulga RFS	10/02/2017 0:05	1	D	47	Yes	40	Nil
Bulga Village	9/02/2017 22:54	1.2	E	48	Yes	34	Nil
Gouldsville	9/02/2017 21:32	1.7	F	48	Yes	<30	Nil
Inlet Rd	9/02/2017 22:21	1.7	E	47	Yes	36	Nil
Inlet Rd West	9/02/2017 21:23	1.7	F	45	Yes	30	Nil
Long Point	9/02/2017 21:03	2.3	F	45	No	IA	NA
South Bulga	10/02/2017 0:37	0.7	F	45	Yes	IA	Nil
Wambo Road	9/02/2017 23:30	1	D	48	Yes	38	Nil

Notes

- Noise emission limits apply during all meteorological conditions except the following: during periods of rain or hail; average wind speed at microphone height exceeds 5 m/s; 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;
- Estimated or measured L_{A1}, 1minute attributed to Warkworth mine (WML);
- NA in exceedance column means atmospheric conditions outside conditions specified in project approval and so criterion is not applicable. NA (not applicable) in criterion column means criterion not specified for this location;
- Bolded results in red are possible exceedances of relevant criteria; and
- Criterion may or may not apply due to rounding of meteorological data values.

5.1.3 MTO Noise Assessment

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

Table 5: $L_{Aeq, 15\text{minute}}$ Mount Thorley - Impact Assessment Criteria – February 2017

Location	Date and Time	Wind Speed (m/s) ⁵	Stability Class	Criterion dB	Criterion Applies? ^{1,6}	MTO L_{Aeq} dB ^{2,4}	Exceedance ³	Total $L_{Ceq} - L_{Aeq}$ ⁷	Revised MTO L_{Aeq} ^{5,6}
Bulga RFS	10/02/2017 0:05	1	D	37	Yes	32	Nil	21	37
Bulga Village	9/02/2017 22:54	1.2	E	38	Yes	IA	Nil	18	IA
Gouldsville	9/02/2017 21:32	1.7	F	35	Yes	IA	Nil	20	IA
Inlet Rd	9/02/2017 22:21	1.7	E	37	Yes	28	Nil	22	28
Inlet Rd West	9/02/2017 21:23	1.7	F	35	Yes	NM	Nil	19	NM
Long Point	9/02/2017 21:03	2.3	F	35	No	IA	NA	18	IA
South Bulga	10/02/2017 0:37	0.7	F	36	Yes	31	Nil	19	36
Wambo Road	9/02/2017 23:30	1	D	38	Yes	IA	Nil	18	IA

Table 6: $L_{A1, 1\text{Minute}}$ Mount Thorley - Impact Assessment Criteria – February 2017

Location	Date and Time	Wind Speed (m/s) ⁵	Stability Class	Criterion dB	Criterion Applies? ^{1,6}	MTO $L_{A1, 1\text{min}}$ dB ^{2,4}	Exceedance ³
Bulga RFS	10/02/2017 0:05	1	D	47	Yes	33	Nil
Bulga Village	9/02/2017 22:54	1.2	E	48	Yes	IA	Nil
Gouldsville	9/02/2017 21:32	1.7	F	45	Yes	IA	Nil
Inlet Rd	9/02/2017 22:21	1.7	E	47	Yes	30	Nil
Inlet Rd West	9/02/2017 21:23	1.7	F	45	Yes	NM	Nil
Long Point	9/02/2017 21:03	2.3	F	45	No	IA	NA
South Bulga	10/02/2017 0:37	0.7	F	46	Yes	32	Nil
Wambo Road	9/02/2017 23:30	1	D	48	Yes	IA	Nil

Notes

1. Noise emission limits apply during all meteorological conditions except the following: during periods of rain or hail; average wind speed at microphone height exceeds 5 m/s; 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;
2. Estimated or measured $L_{A1, 1\text{minute}}$ attributed to Mt Thorley Operations (MTO);
3. NA in exceedance column means atmospheric conditions outside conditions specified in project approval and so criterion is not applicable. NA (not applicable) in criterion column means criterion not specified for this location;
4. Bolded results in red are possible exceedances of relevant criteria; and
5. Criterion may or may not apply due to rounding of meteorological data values.

5.1.4 INP Low Frequency

In accordance with the requirements of the NSW Industrial Noise Policy (INP), the low frequency modification factor has been applied where appropriate. It should be noted that the Industrial Noise Policy does not give guidance on the application of the penalty where more than one target noise source is audible. The L_{Ceq} levels reported above are “Total”, or “Total mine noise” at best, and cannot be attributed accurately to a single mine. Accordingly, where the INP criteria for the application of the Low Frequency modification factor is triggered, the penalty has been applied to the dominant mine noise source (either of WML or MTO).

Resulting L_{Aeq} noise levels exceeded the WML impact assessment criteria by 1 dB at Inlet Road and by 2dB at Wambo Road, and remained in compliance at all other locations.

The results have been reported in writing to the NSW Department of Planning and Environment.



Figure 16: 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 particular residence, modifications will be made so as 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:

- Replacement of non-attenuated equipment with sound attenuated equipment;
- 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 February are provided in Table 7.

Table 7: Supplementary Attended Noise Monitoring Data – February 2017

No. of assessments	No. of assessments > trigger	No. of nights where assessments > trigger	% greater than trigger
518	0	0	0

Note: Measurements are taken under all meteorological conditions, including conditions under which the consent noise criteria do not apply.

6.0 OPERATIONAL DOWNTIME

During February, a total of 1416.4 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.

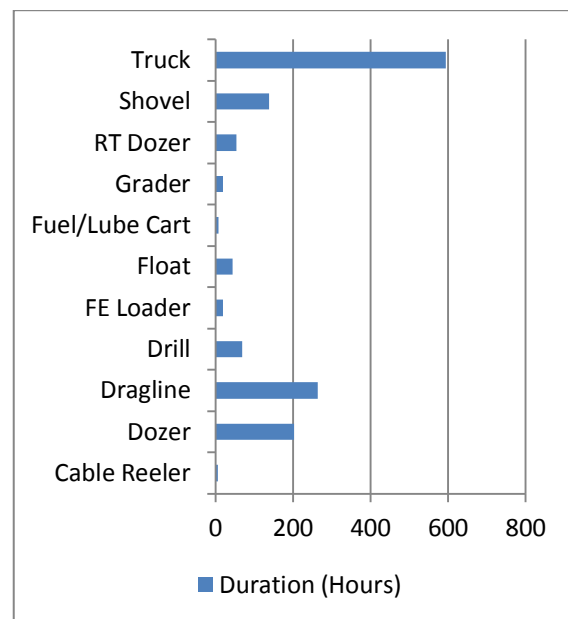


Figure 17: Operational Downtime by Equipment Type – February 2017

7.0 REHABILITATION

During February, 4.4 Ha of land was released, 5.9 Ha of land was bulk shaped and 9.0 Ha of land was topsoiled.

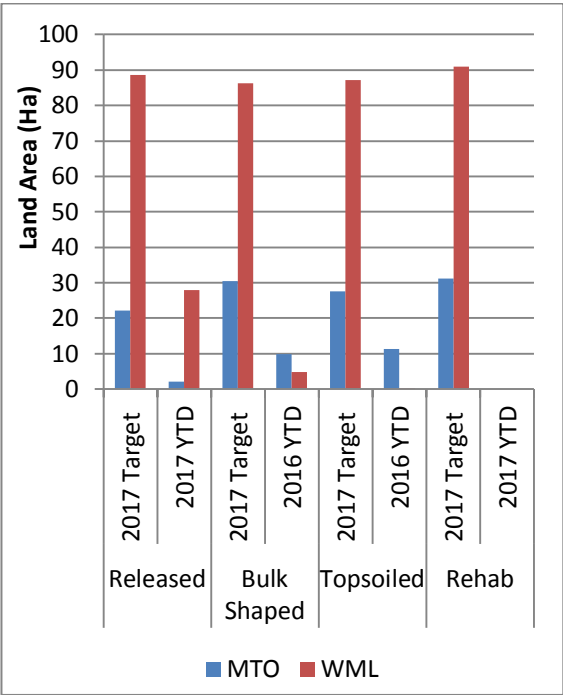


Figure 18: Rehabilitation YTD - February 2017

8.0 ENVIRONMENTAL INCIDENTS

There were no reportable environmental incidents during the reporting period.

9.0 COMPLAINTS

During the reporting period 41 complaints were received, details of these complaints are shown in Figure 19 below.

	Noise	Dust	Blast	Lighting	Other	Total
January	5	6	3	1	0	15
February	25	3	10	3	0	41
March	-	-	-	-	-	-
April	-	-	-	-	-	-
May	-	-	-	-	-	-
June	-	-	-	-	-	-
July	-	-	-	-	-	-
August	-	-	-	-	-	-
September	-	-	-	-	-	-
October	-	-	-	-	-	-
November	-	-	-	-	-	-
December	-	-	-	-	-	-
Total	30	9	13	4	0	56

Figure 19: Complaints Summary - YTD February 2017

Appendix A: Meteorological Data

Table 8: Meteorological Data – Charlton Ridge Meteorological Station – February 2017

Date	Air Temperature Maximum (°C)	Air Temperature Minimum (°C)	Relative Humidity Maximum (%)	Relative Humidity Minimum (%)	Wind Direction Average (°)	Wind Speed Average (m/sec)	Rainfall(mm)
1/02/2017	34.8	20.5	92.1	42.9	155.6	3.0	0.6
2/02/2017	33.2	19.6	91.4	33.9	154.8	2.8	0.2
3/02/2017	30.5	19.6	87.2	51.4	153.9	2.9	0.0
4/02/2017	40.8	20.9	91.5	27.4	179.8	2.6	0.0
5/02/2017	40.4	23.2	62.9	21.3	245.8	3.0	0.0
6/02/2017	43.4	22.5	73.7	8.3	229.7	3.7	0.0
7/02/2017	32.7	19.2	85.0	43.2	160.2	4.1	0.0
8/02/2017	30.3	18.4	93.1	47.9	137.6	4.0	0.2
9/02/2017	37.8	19.2	93.9	22.5	131.0	1.8	0.0
10/02/2017	45.0	19.5	76.5	10.3	172.1	2.2	0.0
11/02/2017	47.0	23.9	73.1	7.1	203.3	3.1	0.0
12/02/2017	46.0	20.7	86.2	4.8	177.5	4.3	0.0
13/02/2017	33.5	18.3	89.4	24.7	125.3	2.8	0.0
14/02/2017	30.3	16.7	85.0	34.8	125.5	3.7	0.0
15/02/2017	31.4	16.9	83.8	33.3	137.9	2.6	0.0
16/02/2017	38.6	15.7	83.7	14.2	192.2	2.5	0.0
17/02/2017	39.5	20.2	81.2	19.8	187.8	2.9	0.8
18/02/2017	38.8	17.7	89.2	21.7	225.2	3.5	2.0
19/02/2017	25.9	17.9	92.9	41.0	155.5	2.3	1.0
20/02/2017	30.6	12.9	59.5	12.9	216.7	3.2	0.0
21/02/2017	32.1	12.6	68.9	16.8	156.3	2.8	0.0
22/02/2017	34.8	15.3	78.0	23.0	145.6	2.7	0.0
23/02/2017	37.3	15.3	82.0	16.8	149.7	2.1	0.0
24/02/2017	34.3	17.9	75.4	24.4	123.8	3.0	0.0
25/02/2017	25.6	17.2	84.7	56.0	167	3.9	0.0
26/02/2017	28.7	17.1	87.3	36.0	165.7	4.2	0.0
27/02/2017	29.8	14.8	91.5	31.9	163.1	4.5	1.2
28/02/2017	27.4	17.0	90.9	51.5	159.1	3.3	1.0



Appendix C

Environmental Monitoring
March 2017



Mount Thorley Warkworth

Monthly Environmental Report

March 2017

Coal & Allied Operations Pty Ltd

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Revision History

Version No.	Person Responsible	Document Status	Date
1.0	Environmental Graduate	Draft	27/04/2017
1.1	Acting Environmental Specialist	Final	28/04/2017

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 March to 31 March 2017.

2.0 AIR QUALITY

2.1 Meteorological Monitoring

Meteorological data is collected at MTW's 'Charlton Ridge' meteorological station (refer to Figure 3: Air Quality Monitoring Locations).

2.1.1 Rainfall

Rainfall for the period is summarised in Table 1, the year-to-date trend and historical trend are shown in Figure 1.

Table 1: Monthly Rainfall MTW

2017	Monthly Rainfall (mm)	Cumulative Rainfall (mm)
March	140	188

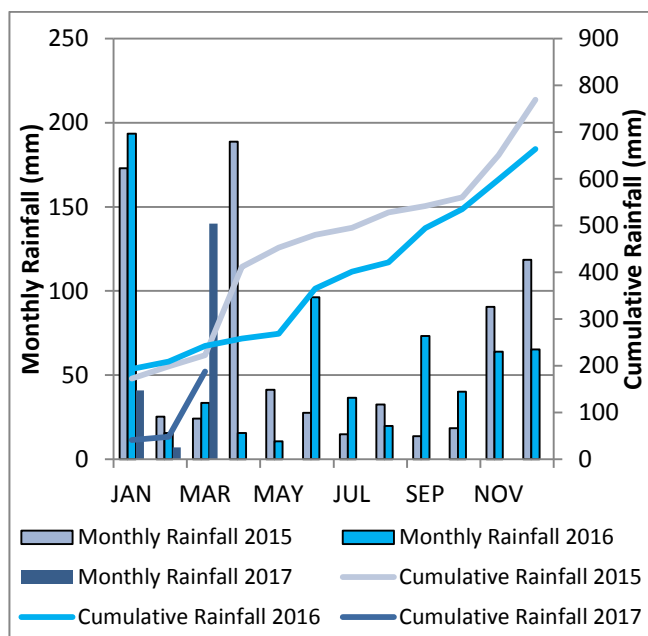


Figure 1: Rainfall Trends YTD

2.1.2 Wind Speed and Direction

Winds from the South were dominant throughout the reporting period as shown in Figure 2.

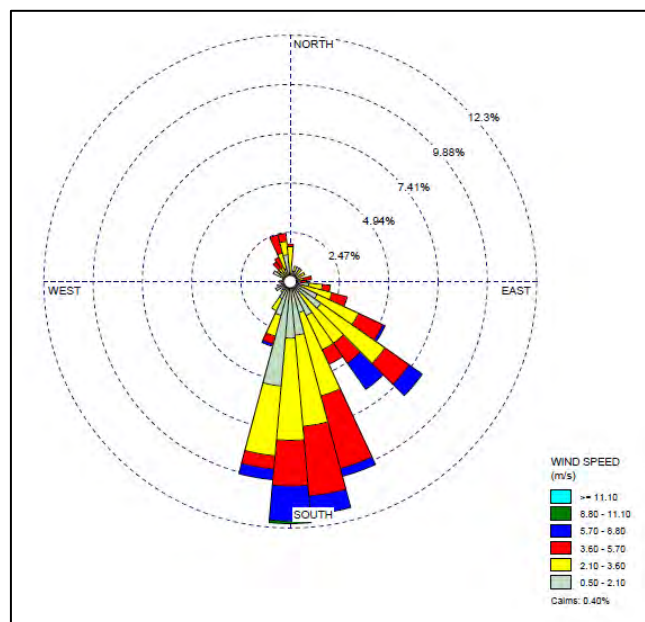


Figure 2: Charlton Ridge Wind Rose – March 2017

Mount Thorley Warkworth Air Quality Monitoring Programme

Date: 160622
Plan By: DF
Version: 1.3



Figure 3: Air Quality Monitoring Locations

2.2 Depositional Dust

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

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.

During the reporting period the DW14, DW20a and Warkworth monitors recorded monthly results above the long term impact assessment criteria of 4.0 g/m² per month. There is no evidence to suggest that the DW14, DW20a and Warkworth results are contaminated. Accordingly, the results will be included in the annual average calculation.

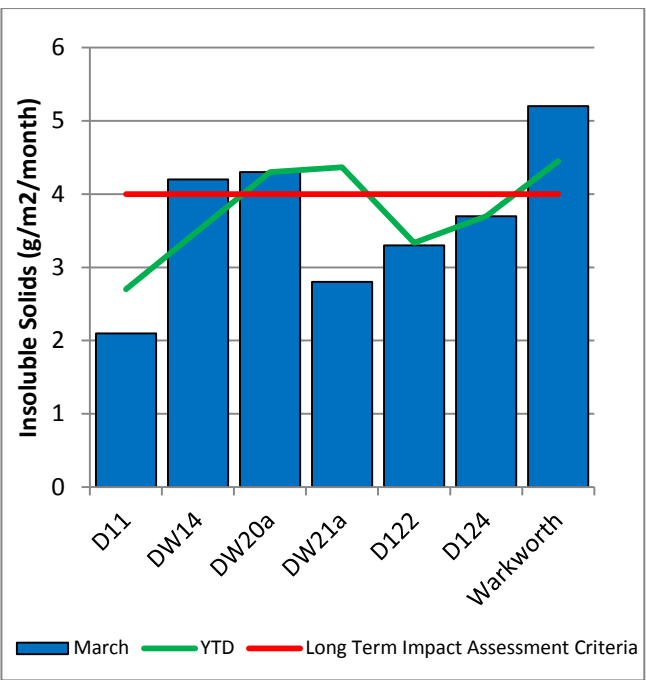


Figure 4: Depositional Dust – March 2017

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 (PM₁₀). 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 PM₁₀ Results

Figure 5 shows the individual PM₁₀ results at each monitoring station against the short term impact assessment criteria of 50µg/m³.

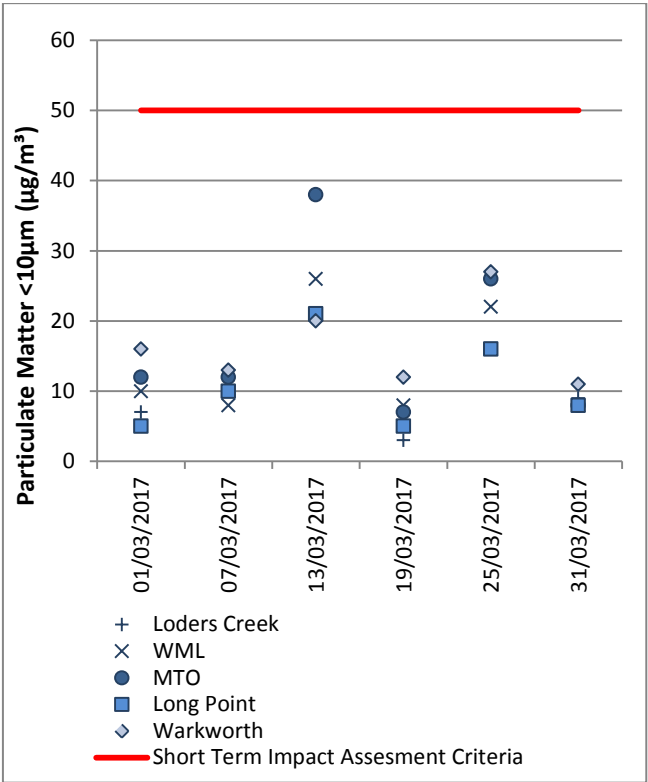


Figure 5: Individual PM₁₀ Results – March 2017

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

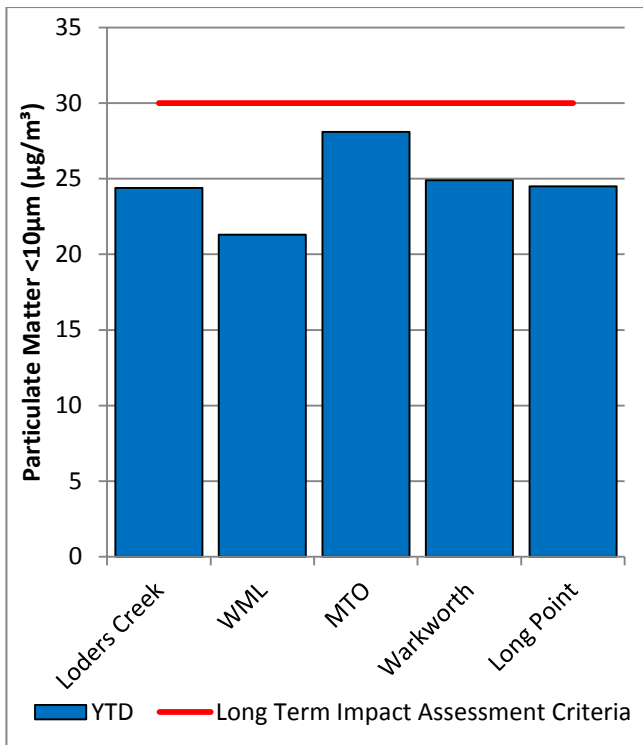


Figure 6: Annual Average PM₁₀ – March 2017

2.3.2 TSP Results

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

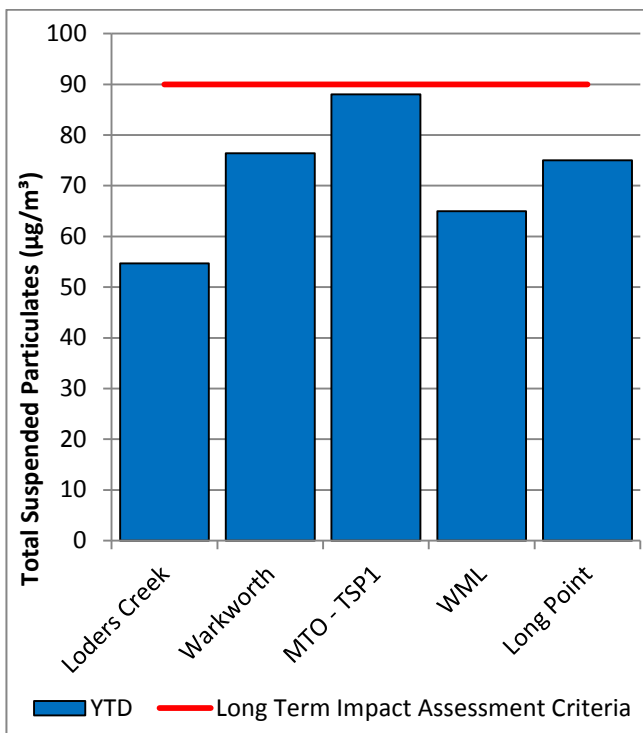


Figure 7: Annual Average Total Suspended Particulates – March 2017

2.3.3 Real Time PM₁₀ Results

Mount Thorley Warkworth maintains a network of real time PM₁₀ monitors. The real time air quality monitoring stations continuously log information and transmit data to a central database, generating alarms 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 PM₁₀ result and the annual PM₁₀ average.

2.3.4 Real Time Alarms for Air Quality

During March, the real time monitoring system generated 37 automated air quality related alerts, including 5 alerts for adverse meteorological conditions and 32 alerts for elevated dust levels.

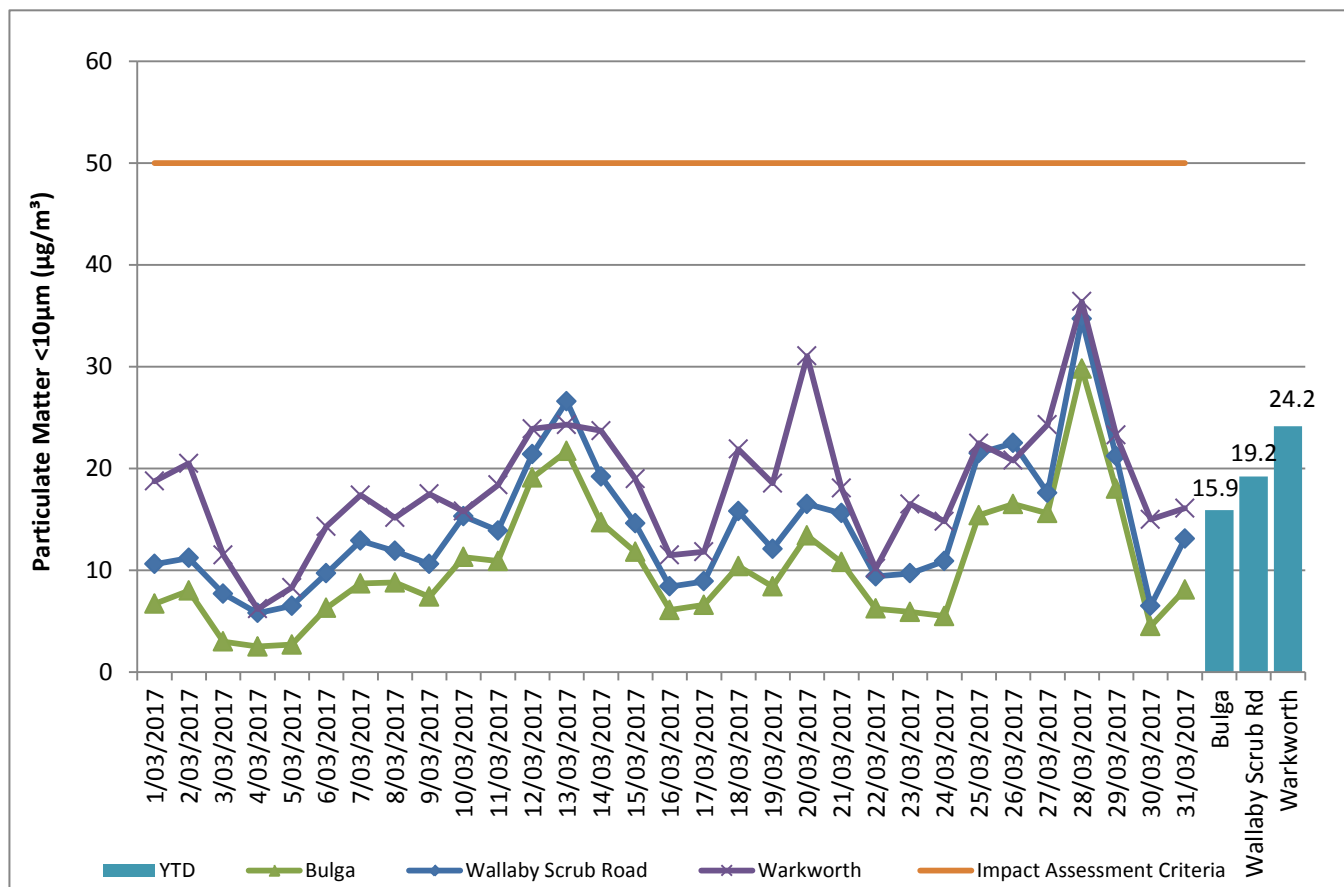


Figure 8: Real Time PM₁₀ 24hr average and Year-to-date average – March 2017

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. The surface water monitoring locations are outlined in Figure 15.

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 monitor the potential impact of mining on the river. Other Hunter River tributaries are also monitored.

3.1.1 Surface Water Monitoring Results

Figure 9 to Figure 11 show the long term surface water trend (2014 – current) within MTW mine dams. Figure 12 to Figure 14 show the long term surface water trend (2014 - current) in surrounding watercourses.

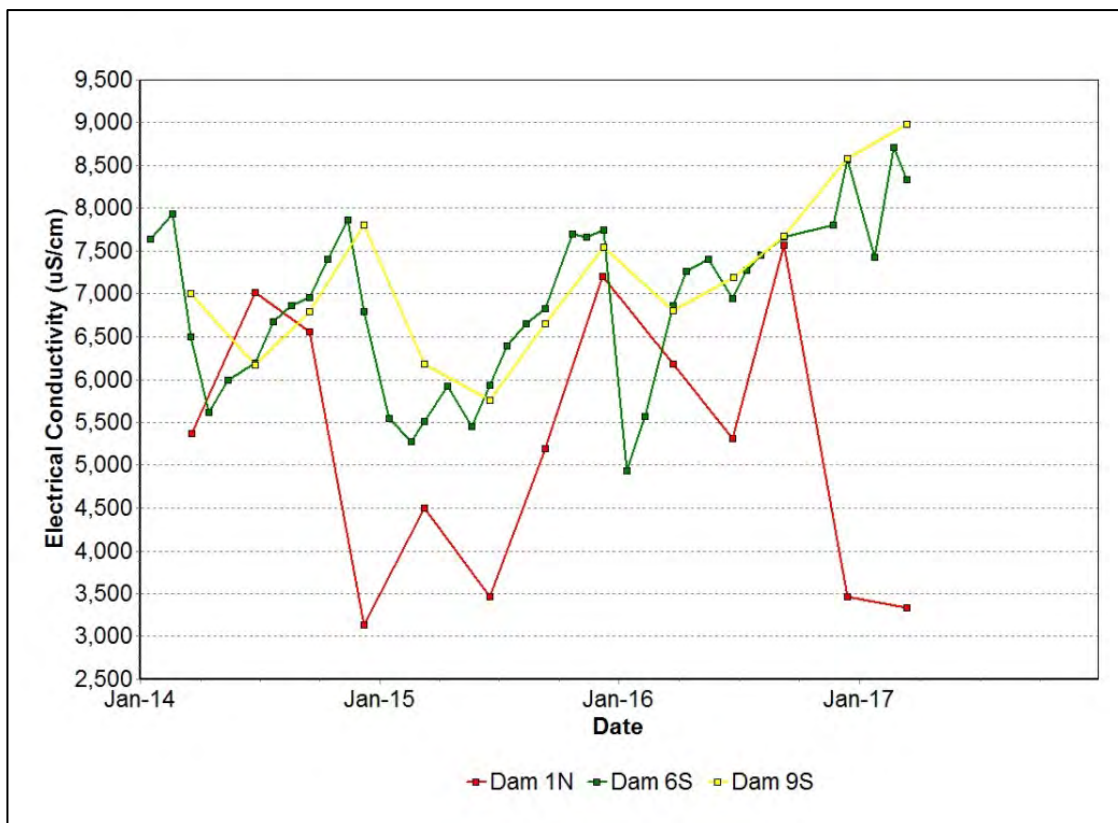


Figure 9: Site Dams Electrical Conductivity Trend 2014 – Current

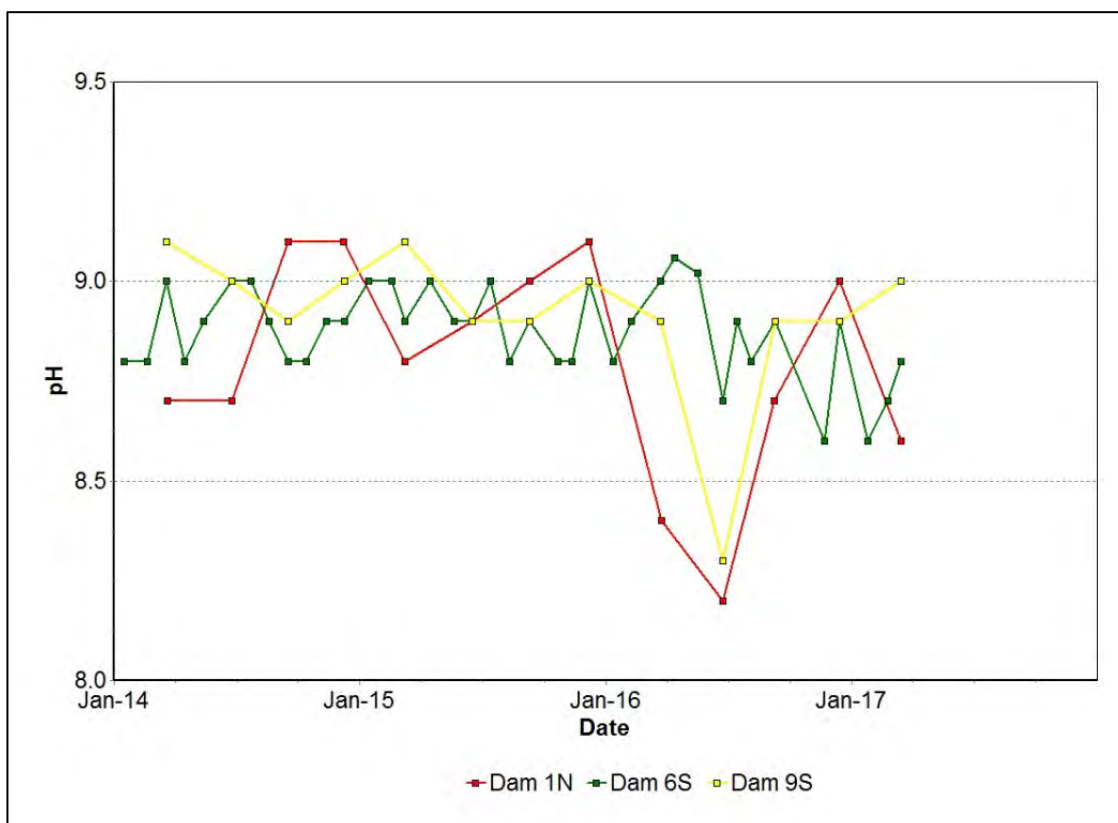


Figure 10: Site Dams pH Trend 2014 - Current

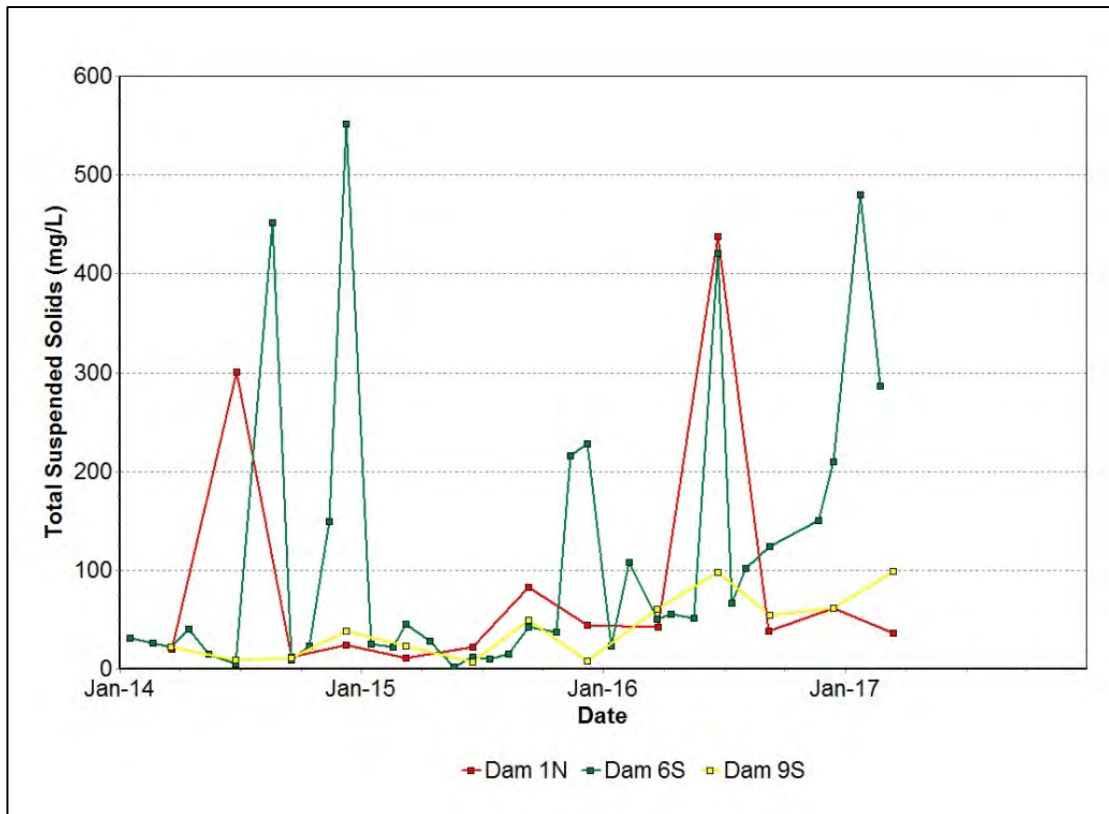


Figure 11: Site Dams Total Suspended Solids Trend 2014 – Current

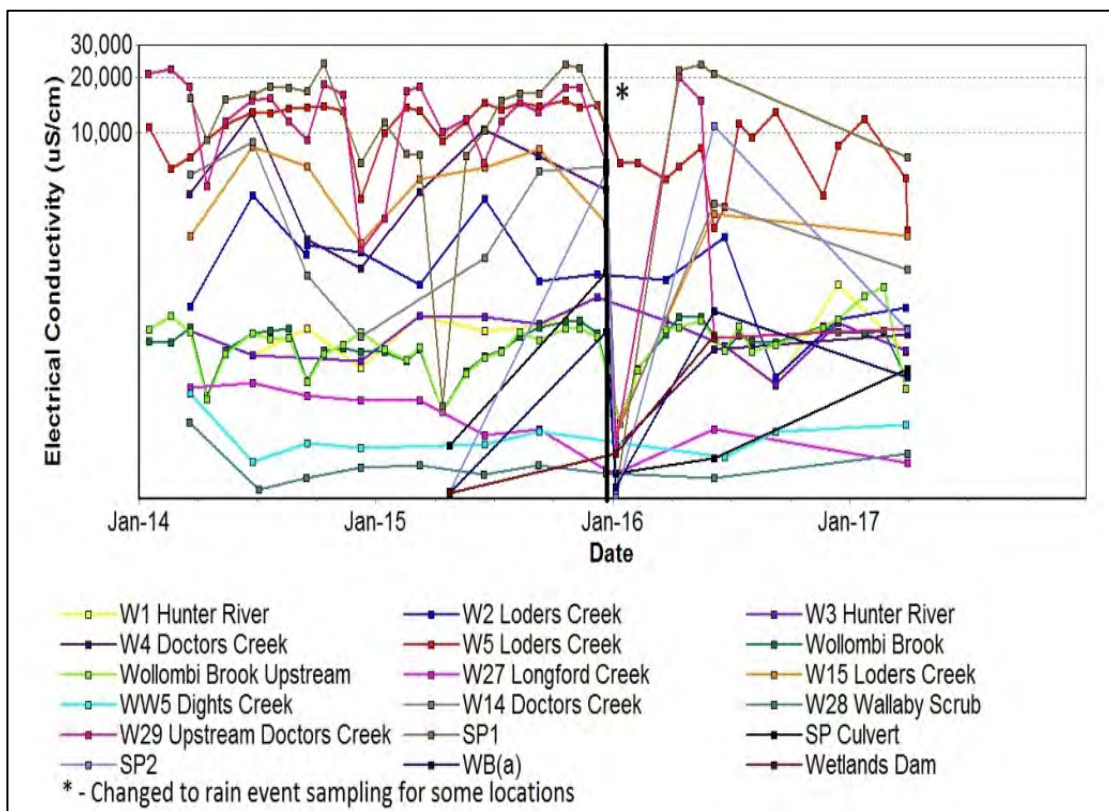


Figure 12: Watercourse Electrical Conductivity Trend 2014 - Current

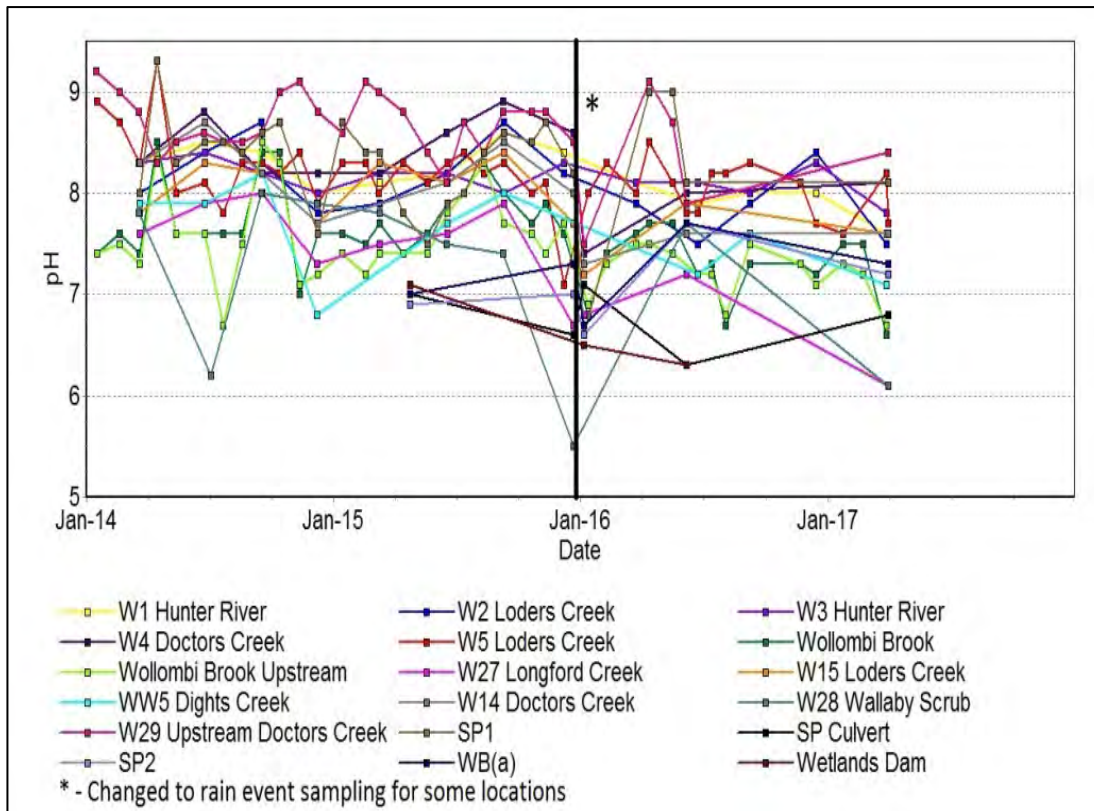


Figure 13: Watercourse pH Trend 2014 – Current

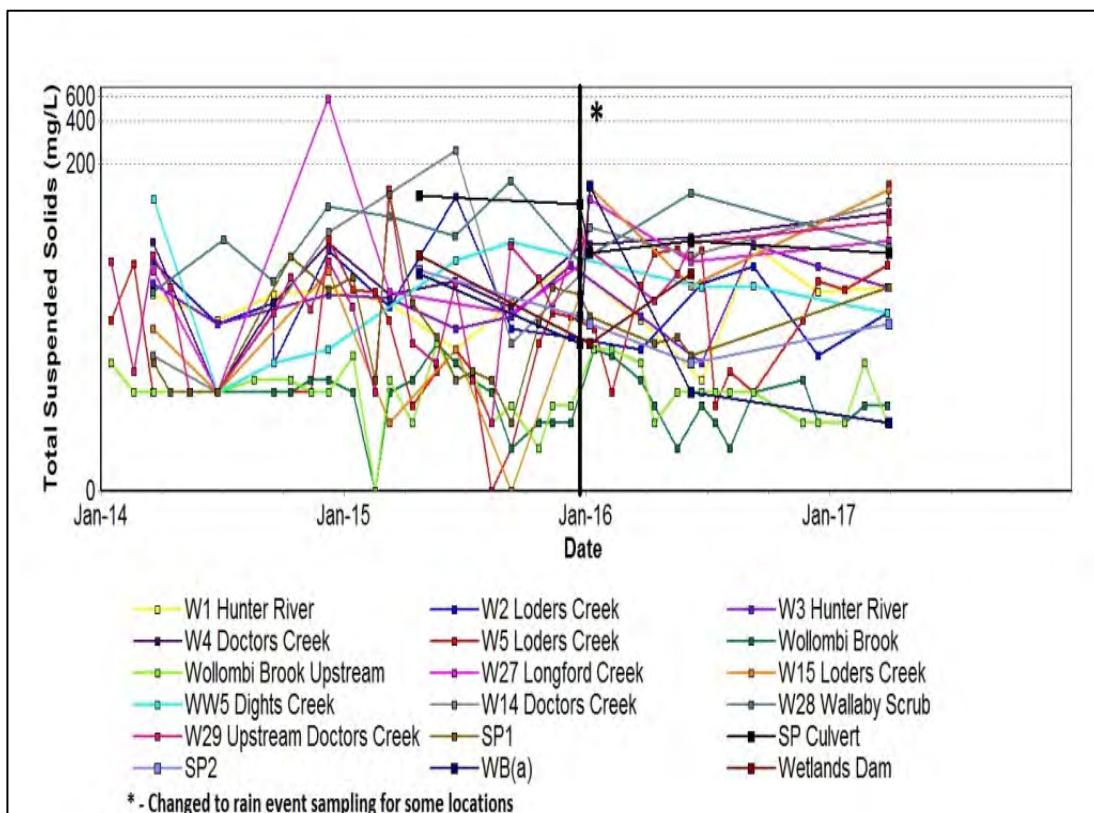


Figure 14: Watercourse Total Suspended Solids Trend 2014 – Current

3.1.2 Surface Water Trigger Tracking

Internal trigger limits have been developed to assess monitoring data on an on-going basis, and to highlight potentially adverse surface water impacts. The process for evaluating monitoring results against the internal triggers and subsequent responses are outlined in the MTW Water Management Plan.

During Q1 2017 14 internal trigger limits were breached, summarised in Table 2.

Table 2: Surface Water Trigger Tracking - March 2017

Site	Date	Trigger Limit Breached	Action Taken in Response
W5	28/03/2017	EC –95 th Percentile	Watching Brief*
W1	28/03/2017	EC –95 th Percentile	Watching Brief*
W1	28/03/2017	pH –5 th Percentile	Watching Brief*
W2	28/03/2017	pH –5 th Percentile	Watching Brief*
W4	31/03/2017	pH –5 th Percentile	Watching Brief*
W5	28/03/2017	pH –5 th Percentile	Watching Brief*
W15	31/03/2017	pH –5 th Percentile	Watching Brief*
W27	31/03/2017	pH –5 th Percentile	Watching Brief*
W4	31/03/2017	TSS – 50mg/L (ANZECC criteria)	Field investigation did not identify any mining-related sources of sediment. Elevated TSS associated with high-intensity rainfall event. No further action.
W14	31/03/2017	TSS – 50mg/L (ANZECC criteria)	Field investigation did not identify any mining-related sources of sediment. Elevated TSS associated with high-intensity rainfall event. No further action.
W15	31/03/2017	TSS – 50mg/L (ANZECC criteria)	Investigation did not identify any mining-related sources of sediment. Elevated TSS associated with high-intensity rainfall event. No further action.
W27	31/03/2017	TSS – 50mg/L (ANZECC criteria)	Investigation did not identify any mining-related sources of sediment. Elevated TSS associated with high-intensity rainfall event; data consistent with historical range. No

further action.

W28	31/03/2017	TSS – 50mg/L (ANZECC criteria)	Investigation did not identify any mining-related sources of sediment. Elevated TSS associated with high-intensity rainfall event; data consistent with historical range. No further action.
W29	31/03/2017	TSS – 50mg/L (ANZECC criteria)	Field investigation did not identify any mining-related sources of sediment. Elevated TSS associated with high-intensity rainfall event. No further action.

* = Watching brief established pending outcomes of subsequent monitoring events. No specific actions required.

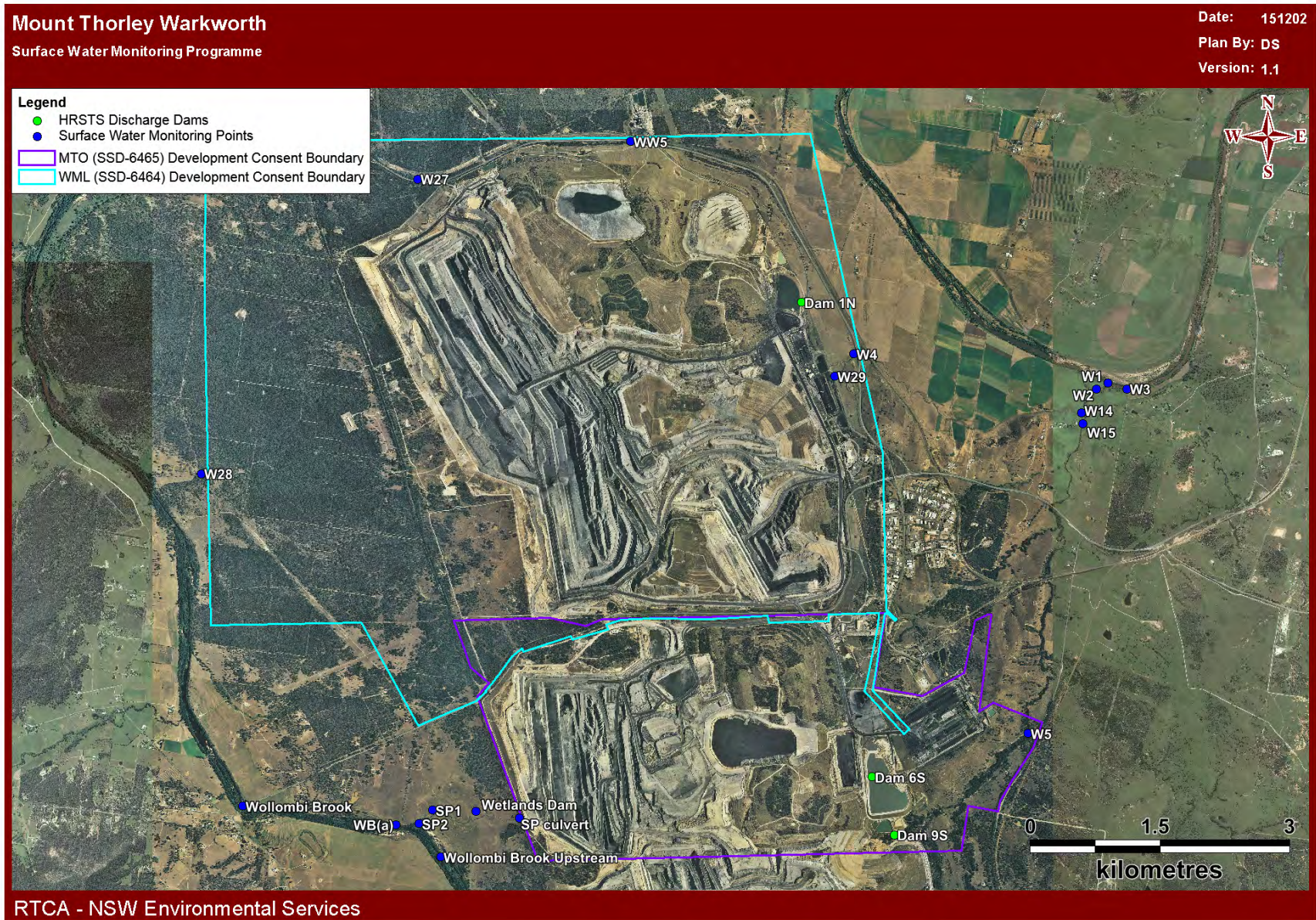


Figure 15: Surface Water Monitoring Location Plan

3.2 Groundwater Monitoring

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

Figures 16 to 58 show the long term water quality trends (2014 – current) for groundwater bores monitored at MTW.

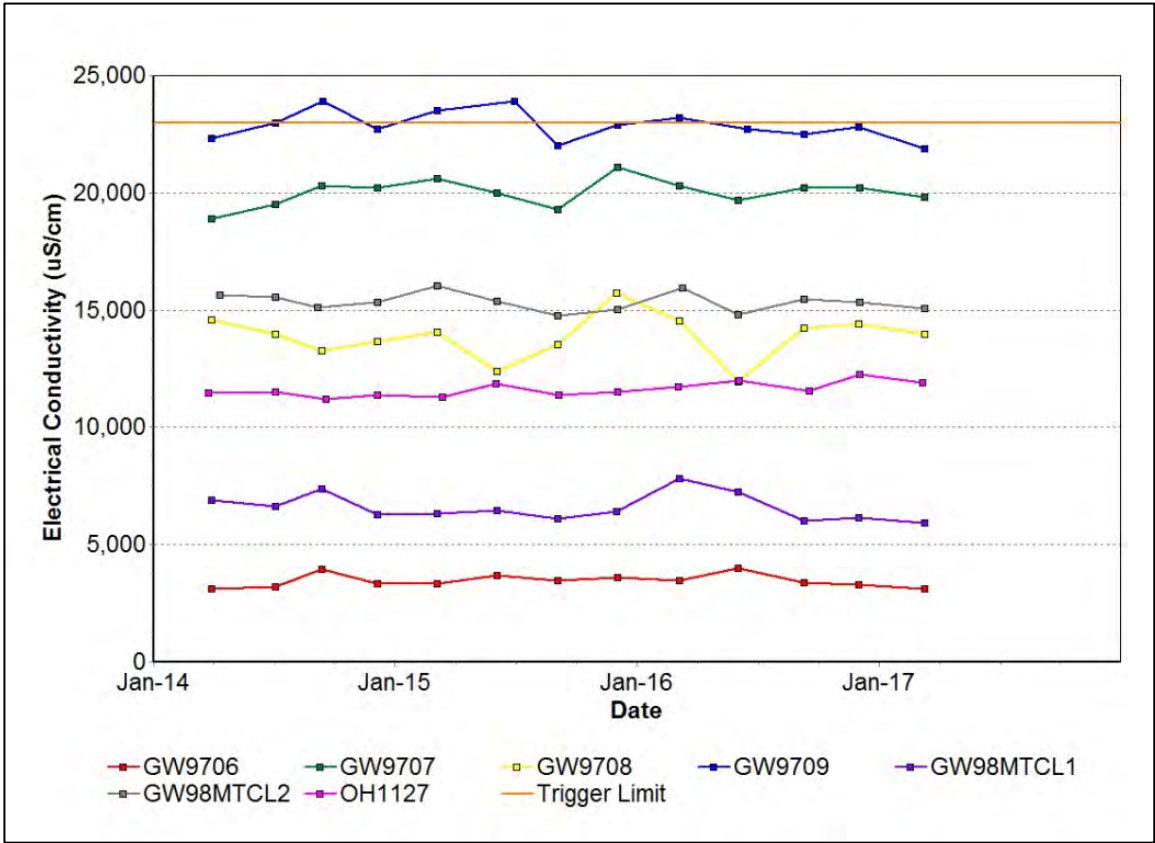


Figure 16: Bayswater Seam Electrical Conductivity Trend – March 2017

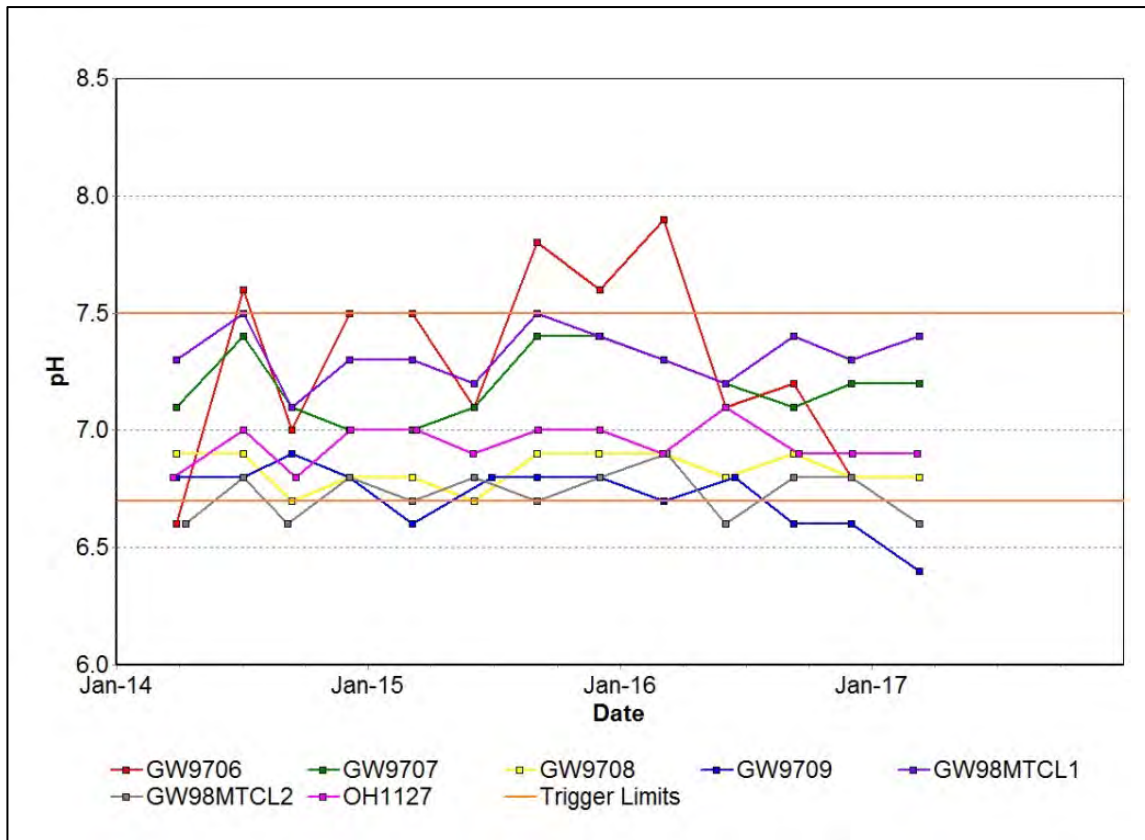


Figure 17: Bayswater Seam pH Trend March 2017

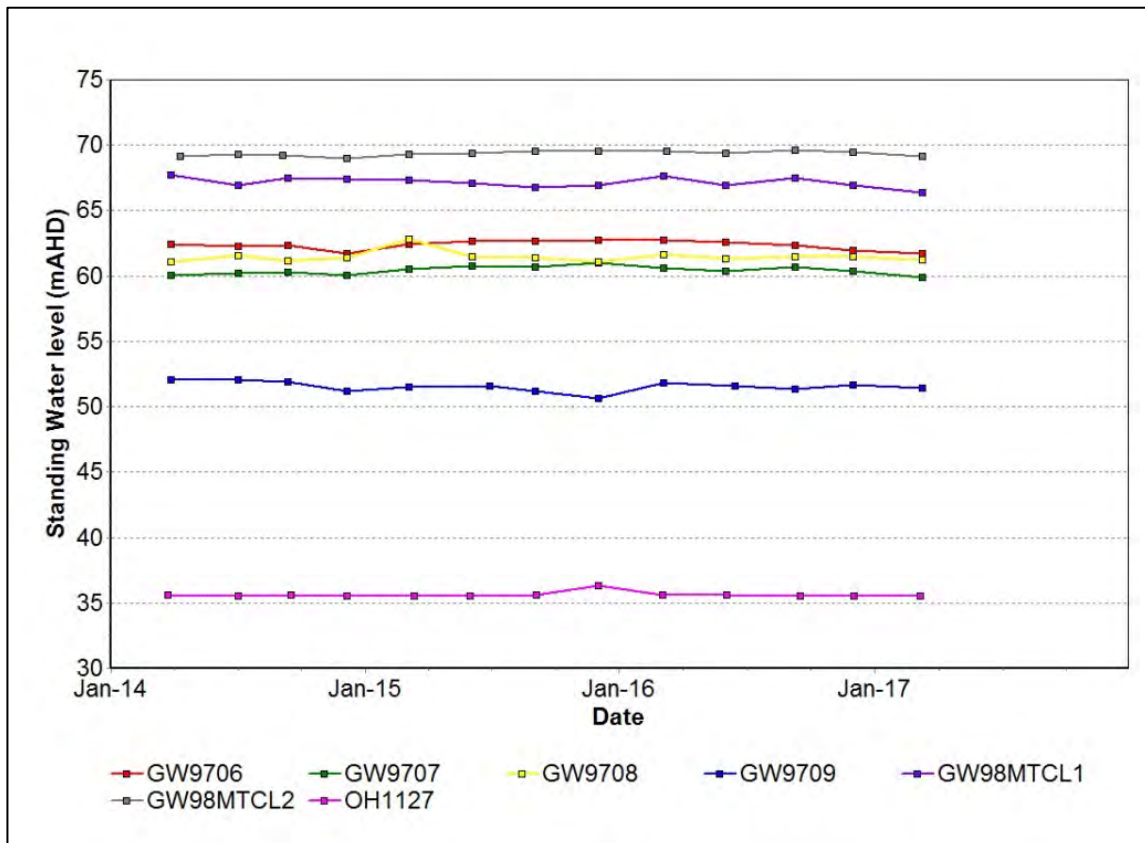


Figure 18: Bayswater Seam Standing Water Level – March 2017

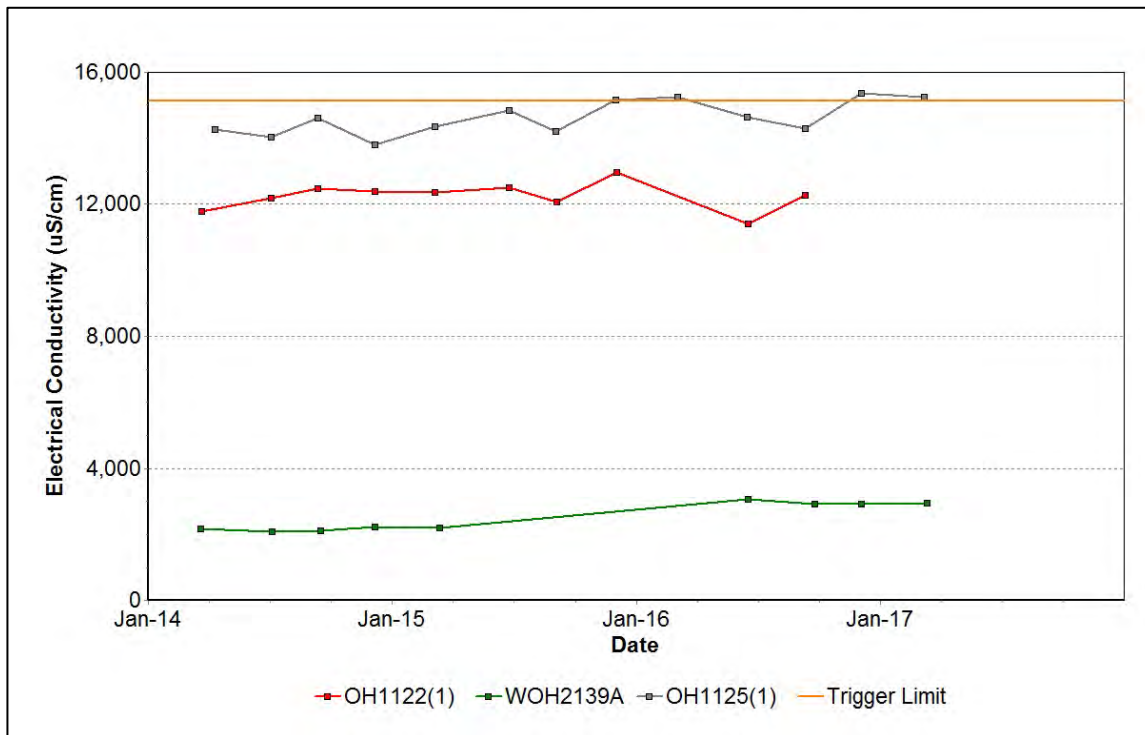


Figure 19: Blakefield Seam Electrical Conductivity Trend - March 2017

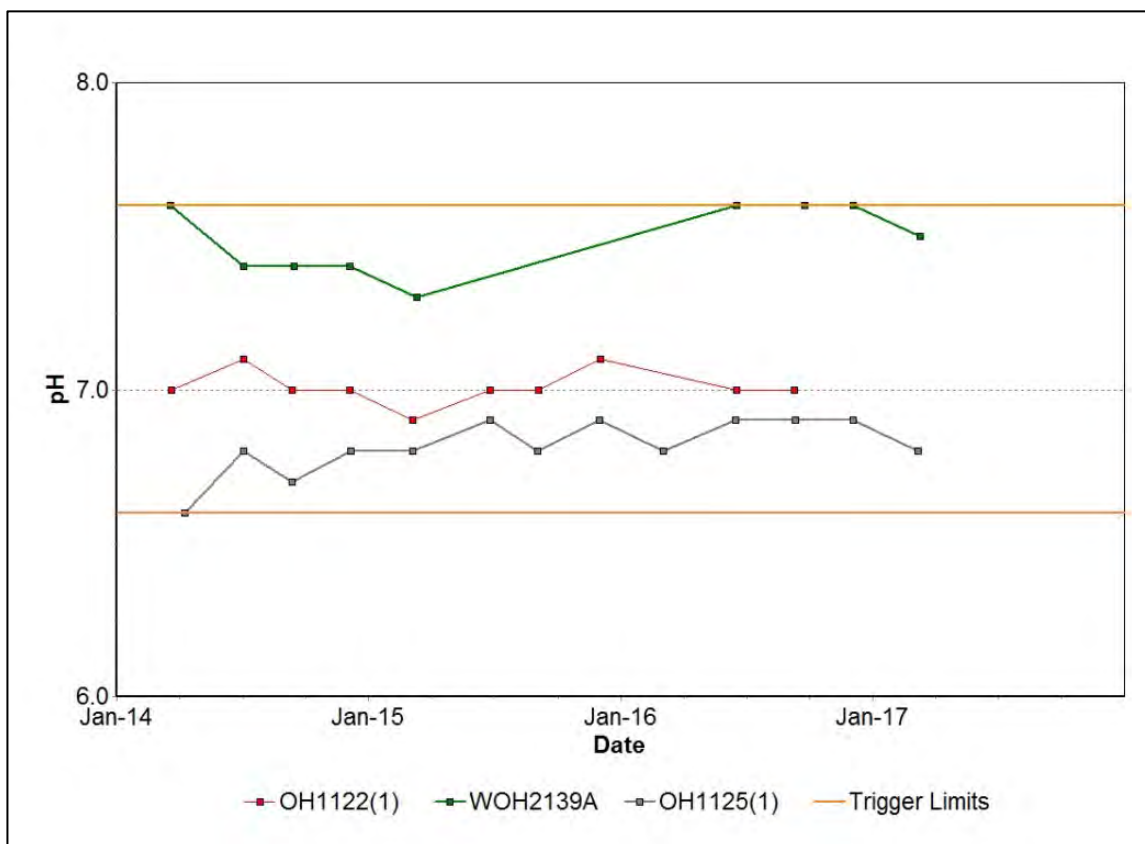


Figure 20: Blakefield Seam pH Trend - March 2017

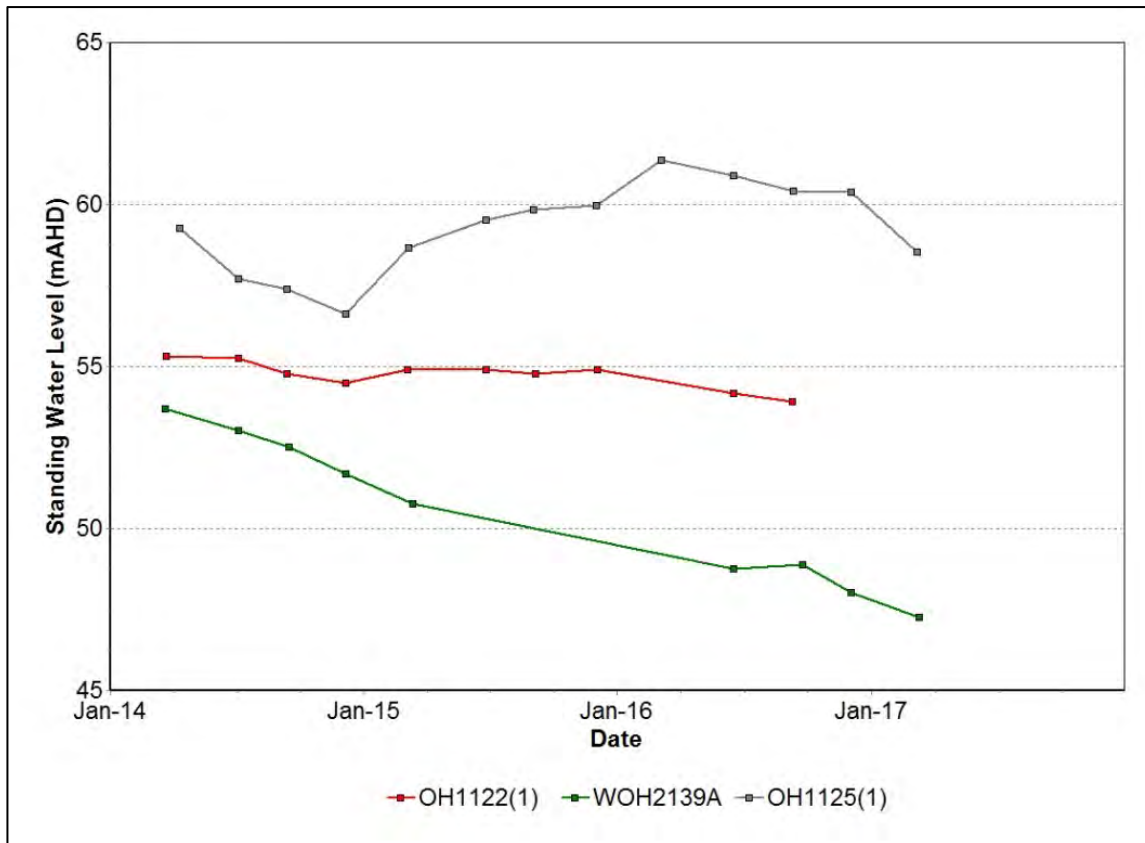


Figure 21: Blakefield Seam Standing Water Level Trend - March 2017

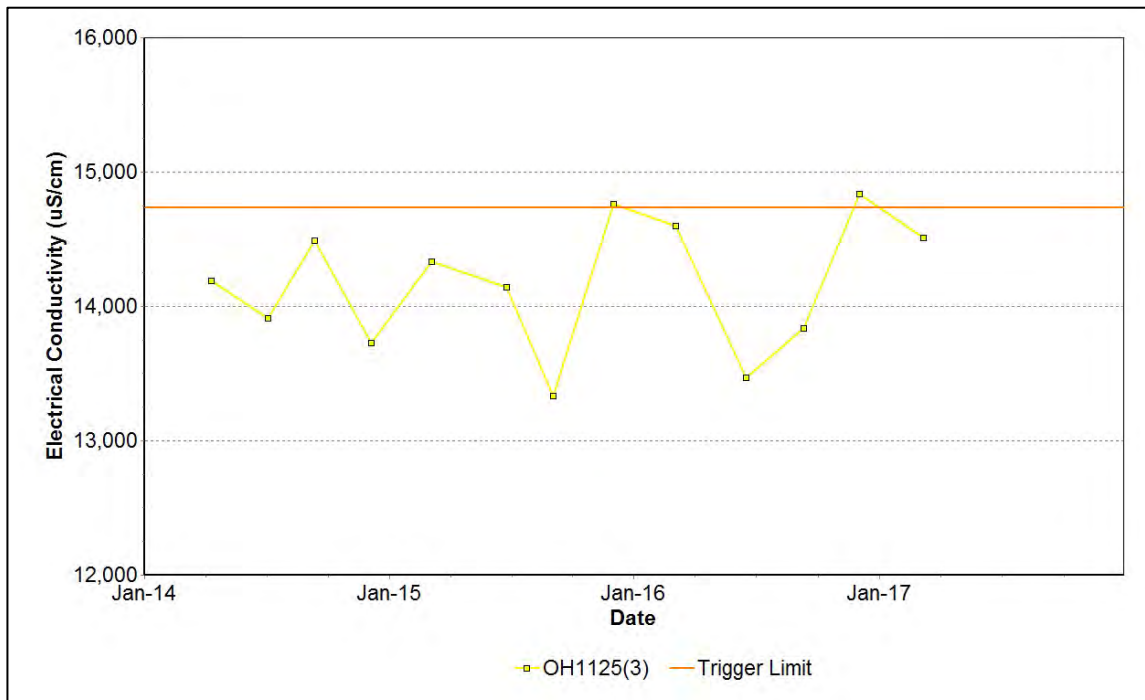


Figure 22: Bowfield Seam Electrical Conductivity Trend - March 2017

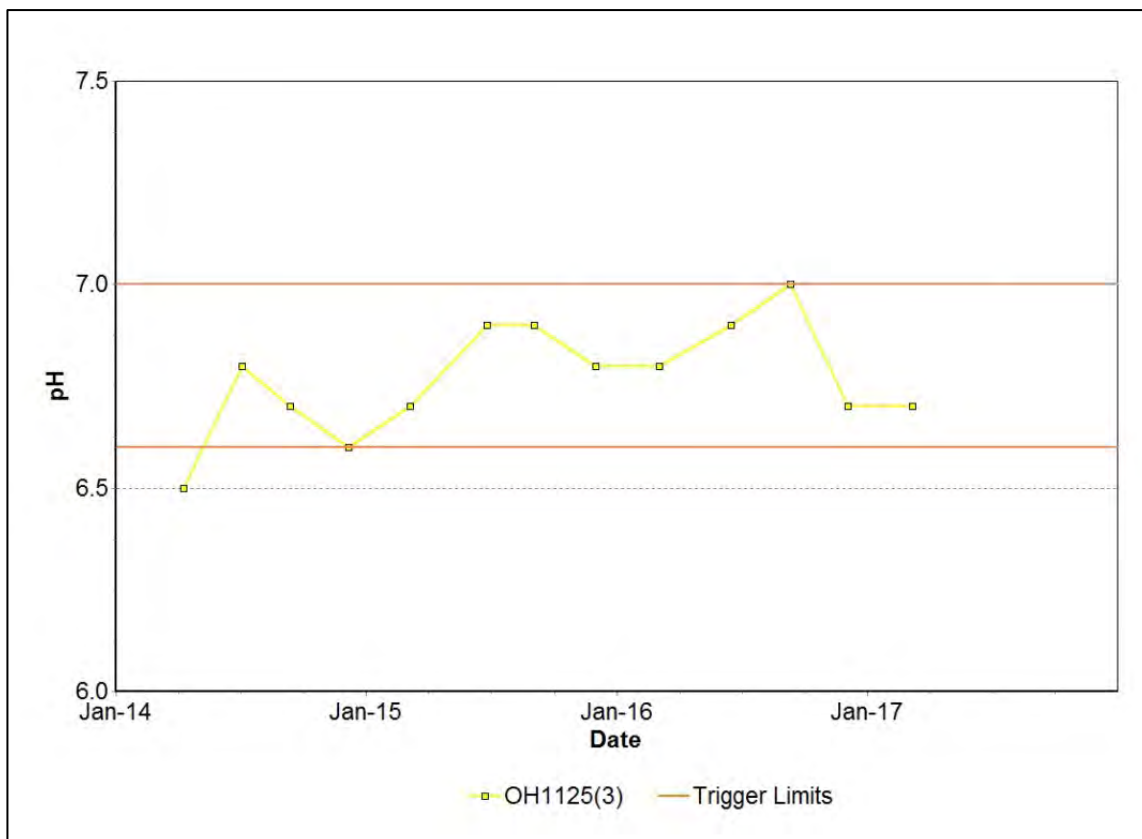


Figure 23: Bowfield Seam pH Trend – March 2017

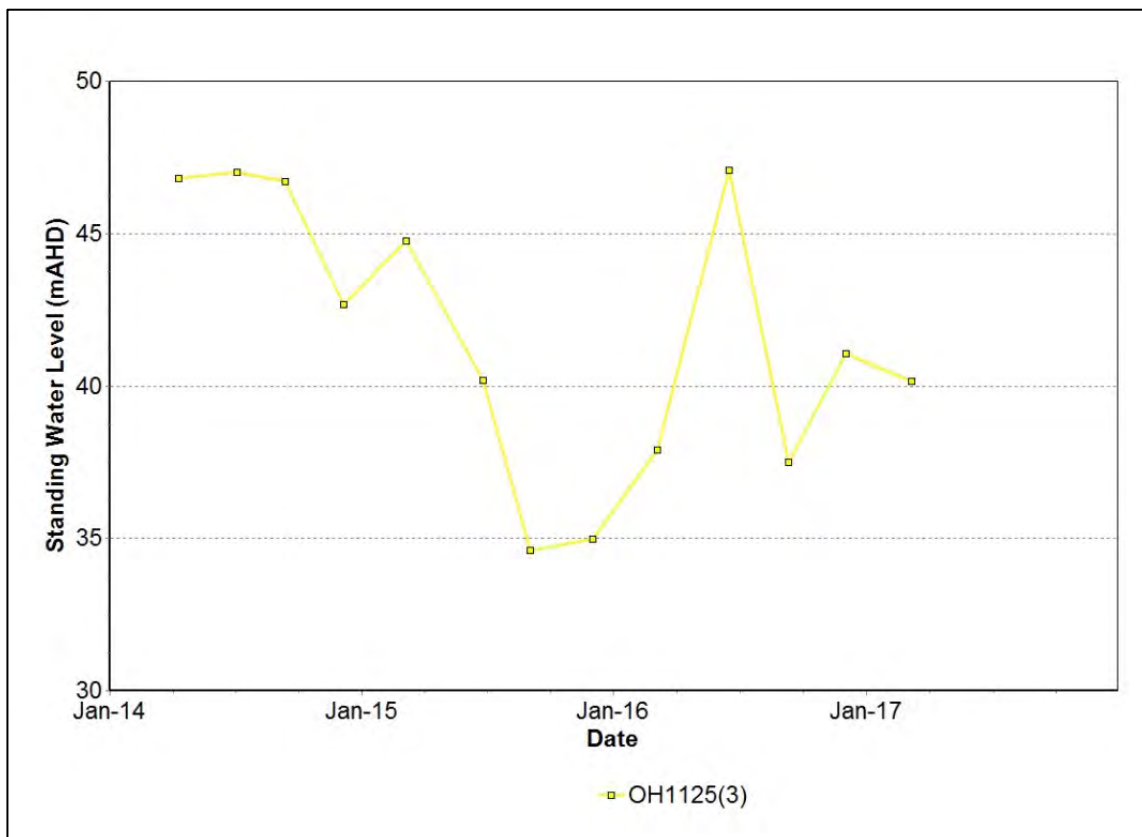


Figure 24: Bowfield Seam Standing Water Level Trend - March 2017

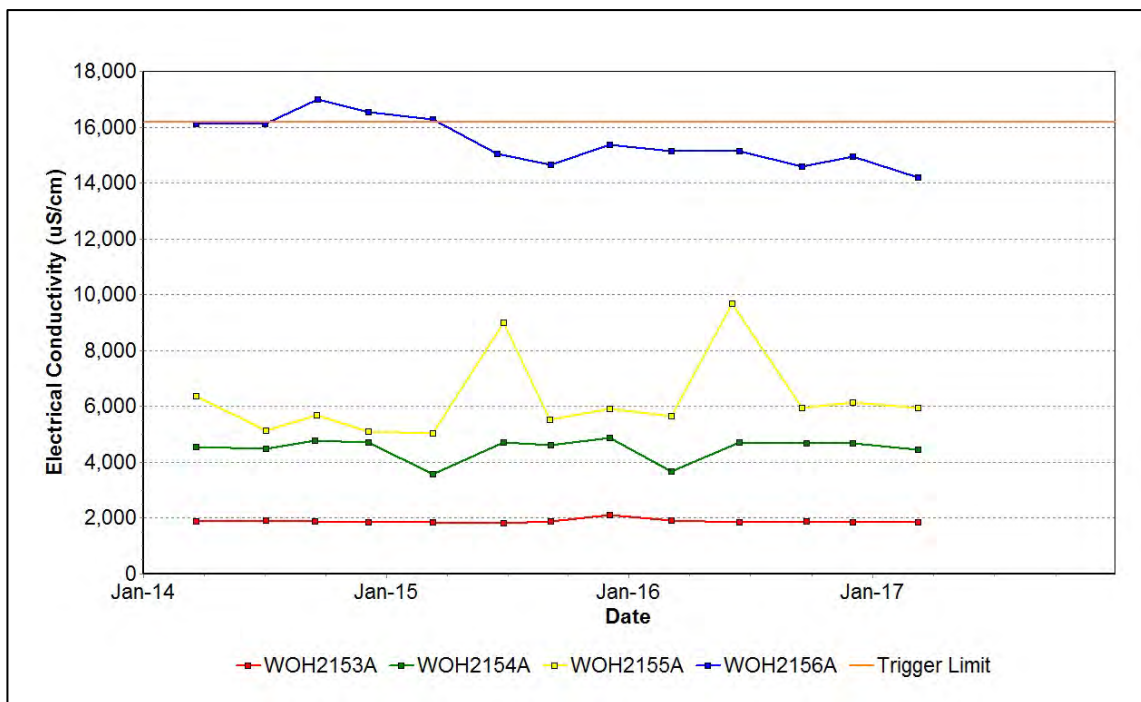


Figure 25: Redbank Seam Electrical Conductivity Trend - March 2017

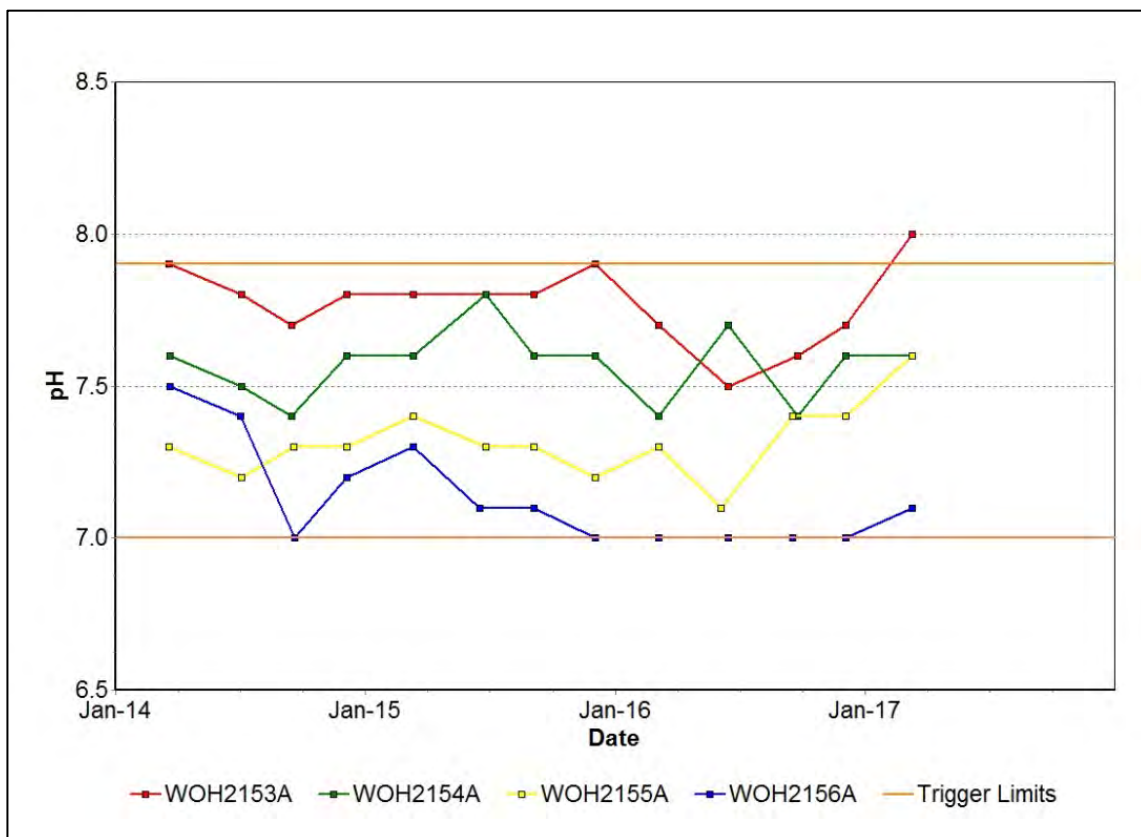


Figure 26: Redbank Seam pH Trend – March 2017

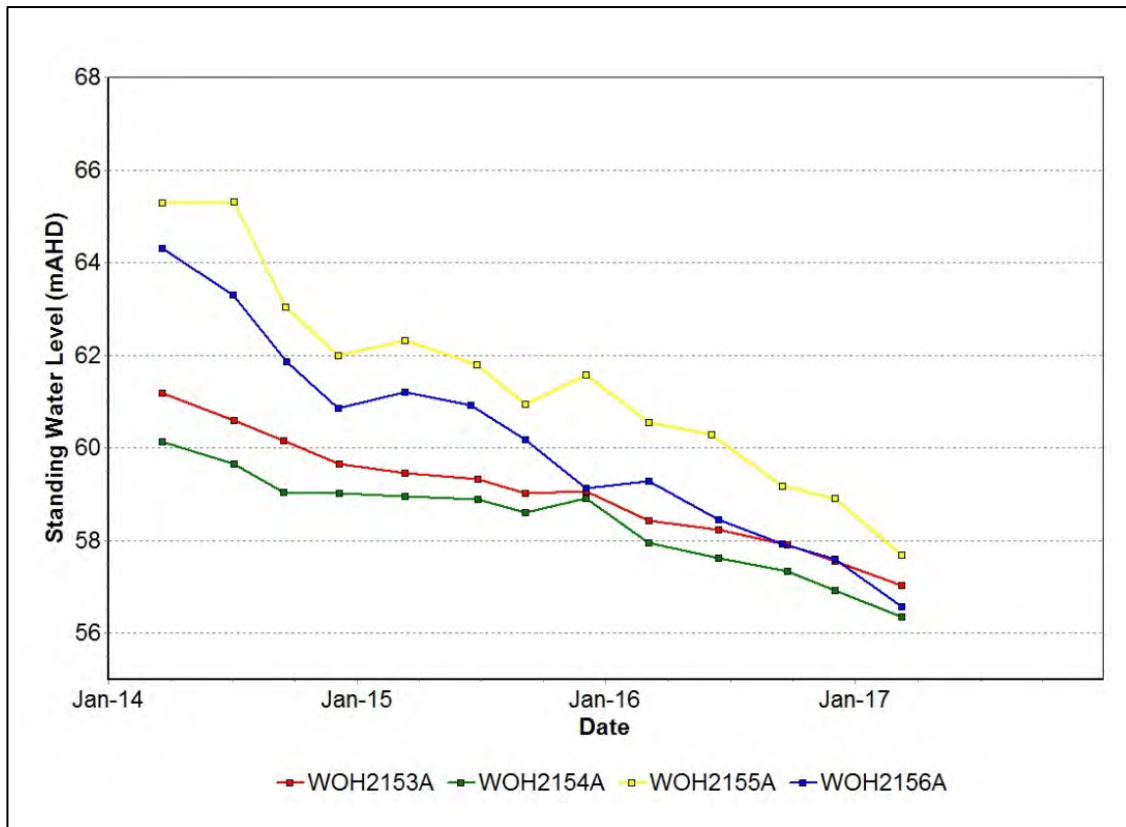


Figure 27: Redbank Seam Standing Water Level - March 2017

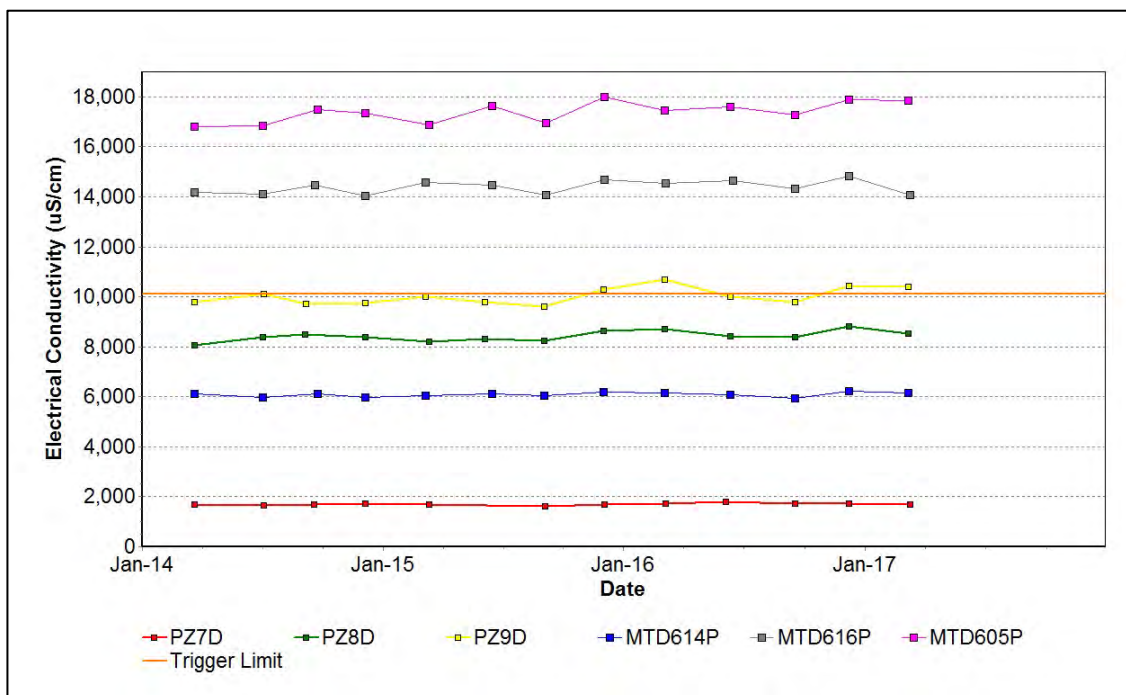


Figure 28: Shallow Overburden Seam Electrical Conductivity Trend - March 2017

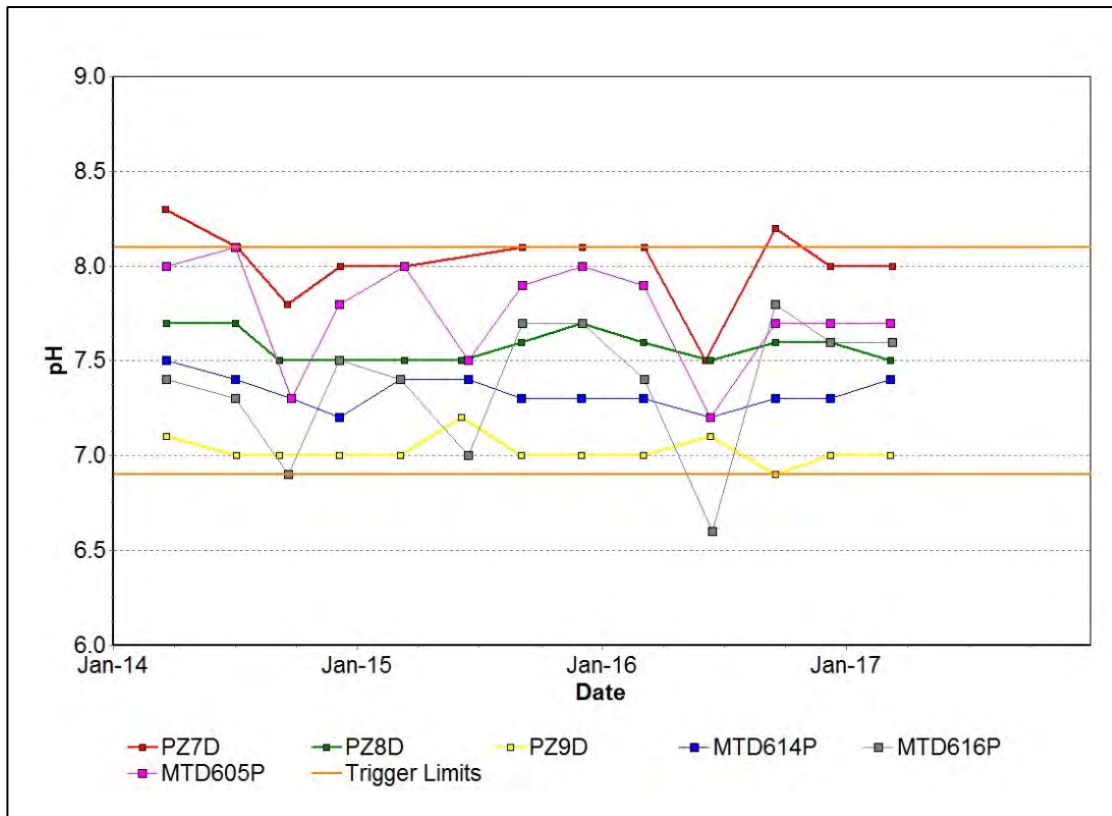


Figure 29: Shallow Overburden Seam pH Trend – March 2017

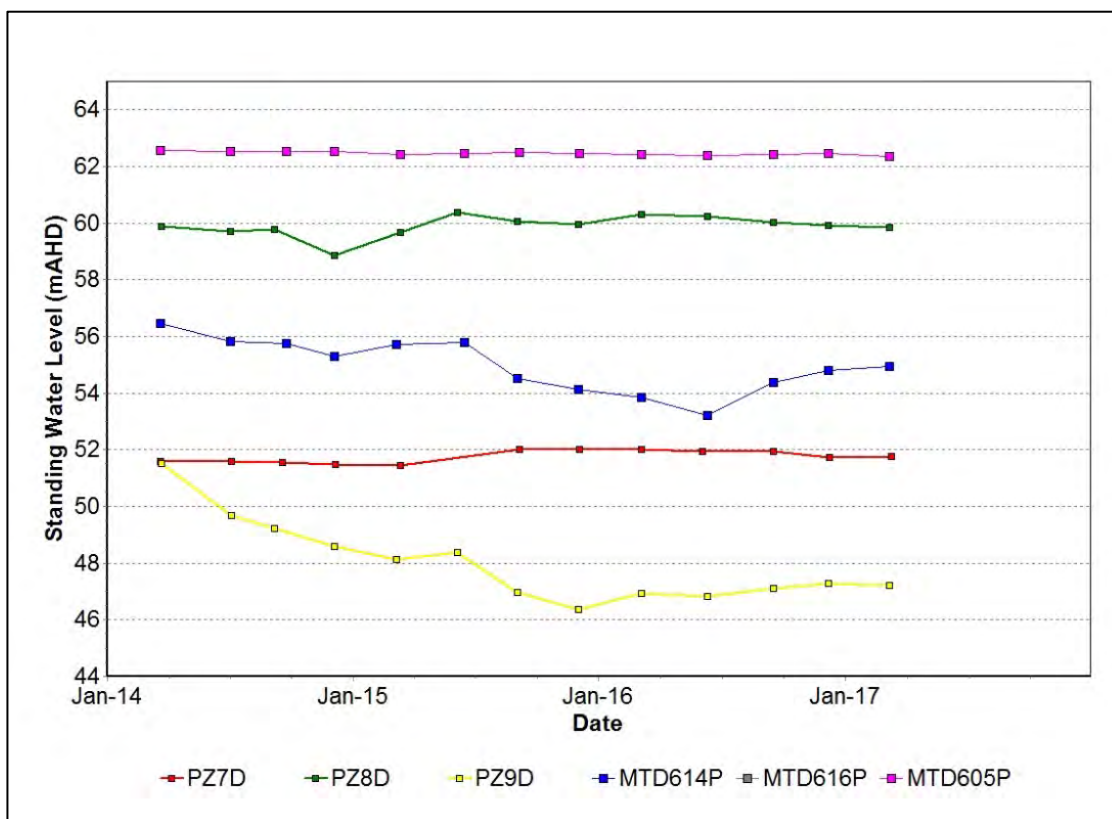


Figure 30: Shallow Overburden Seam Standing Water Level Trend - March 2017

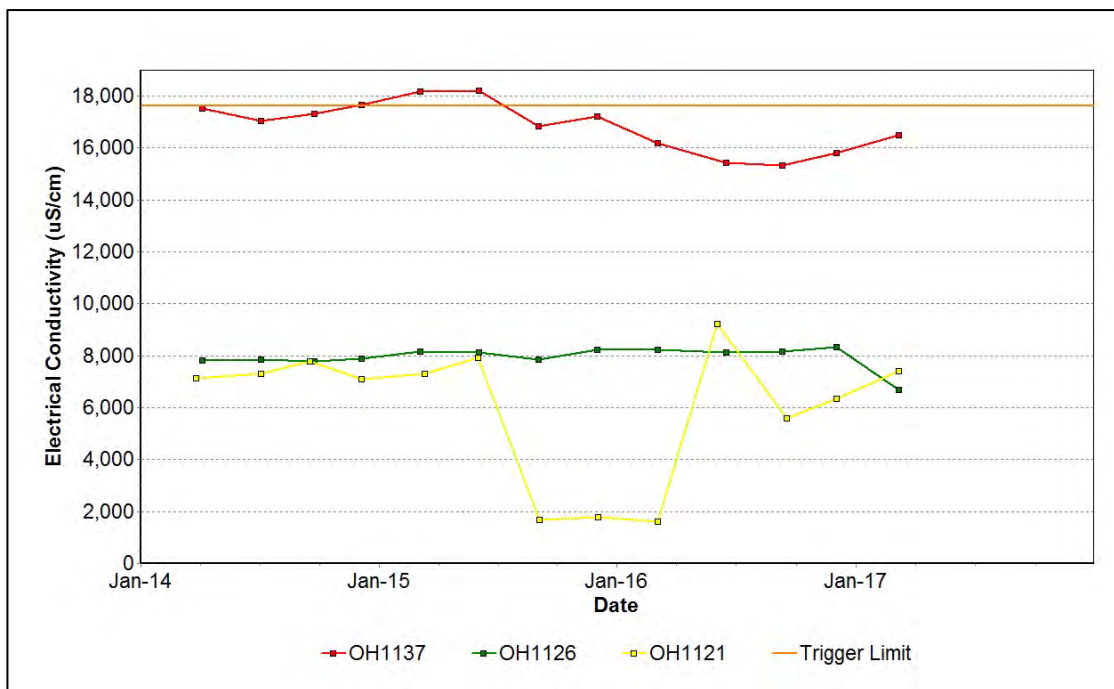


Figure 31: Vaux Seam Electrical Conductivity Trend – March 2017

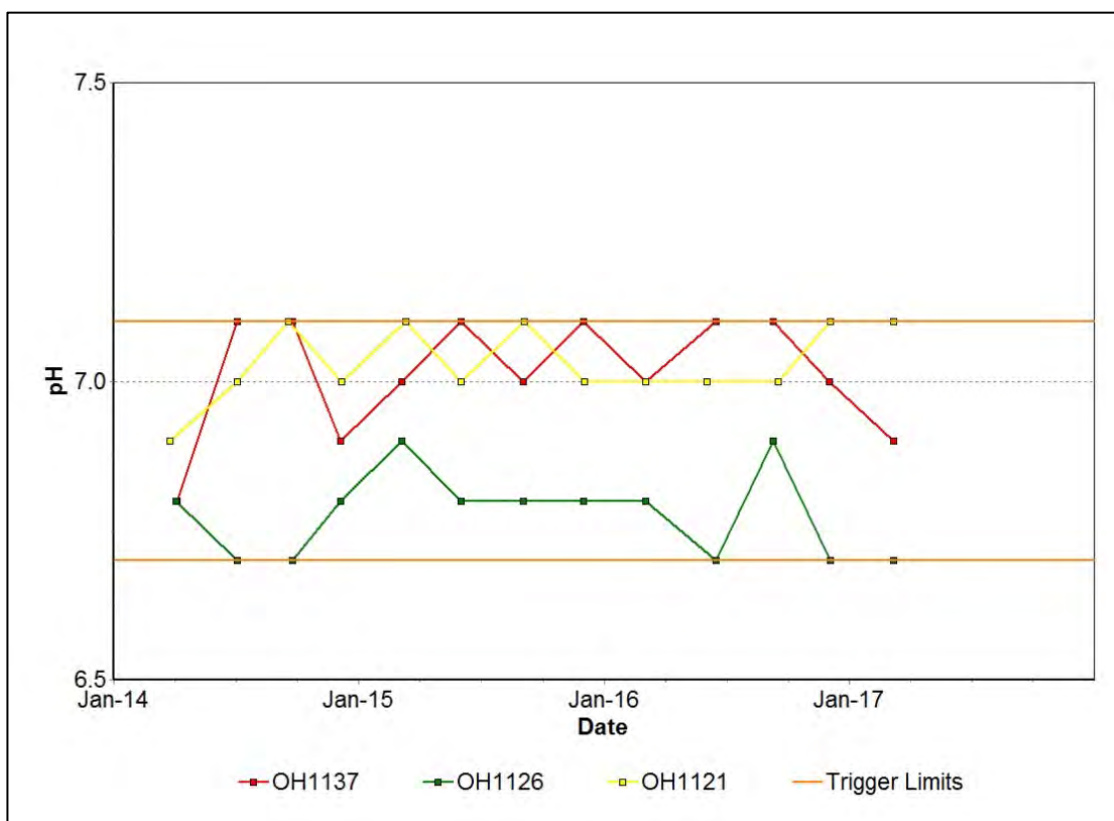


Figure 32: Vaux Seam pH Trend - March 2017

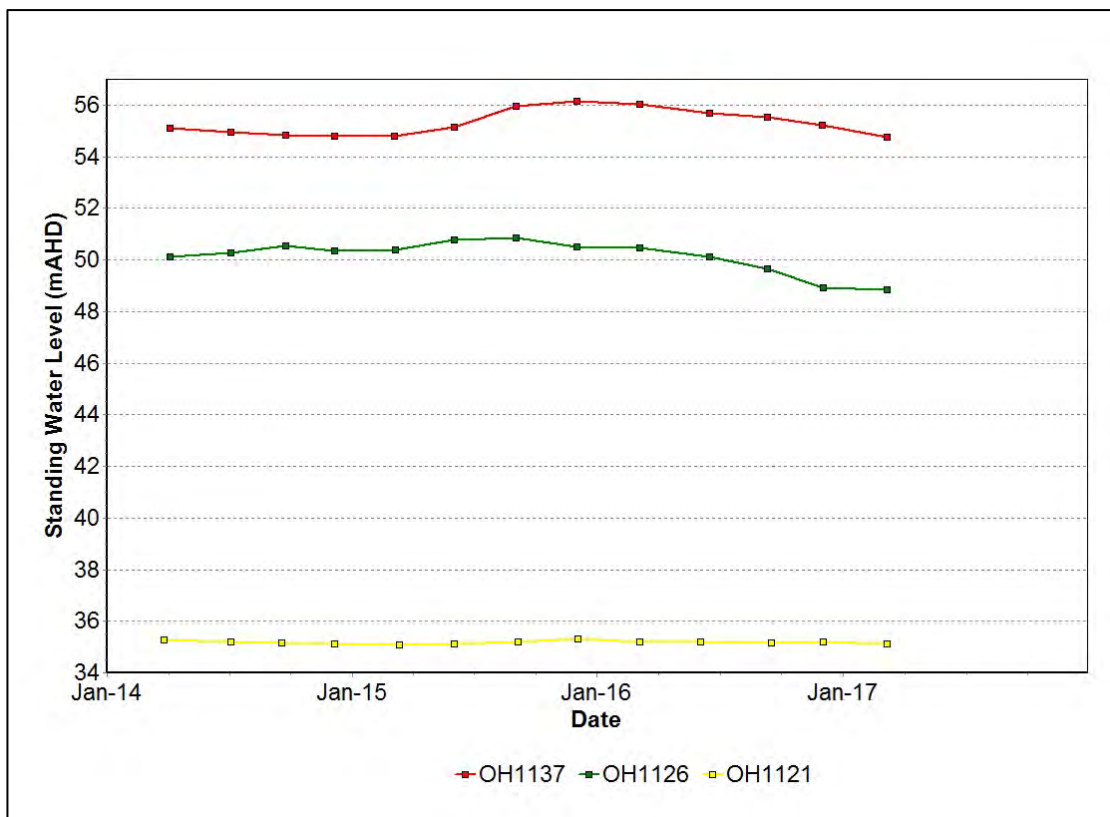


Figure 33: Vaux Seam Standing Water Level Trend - March 2017

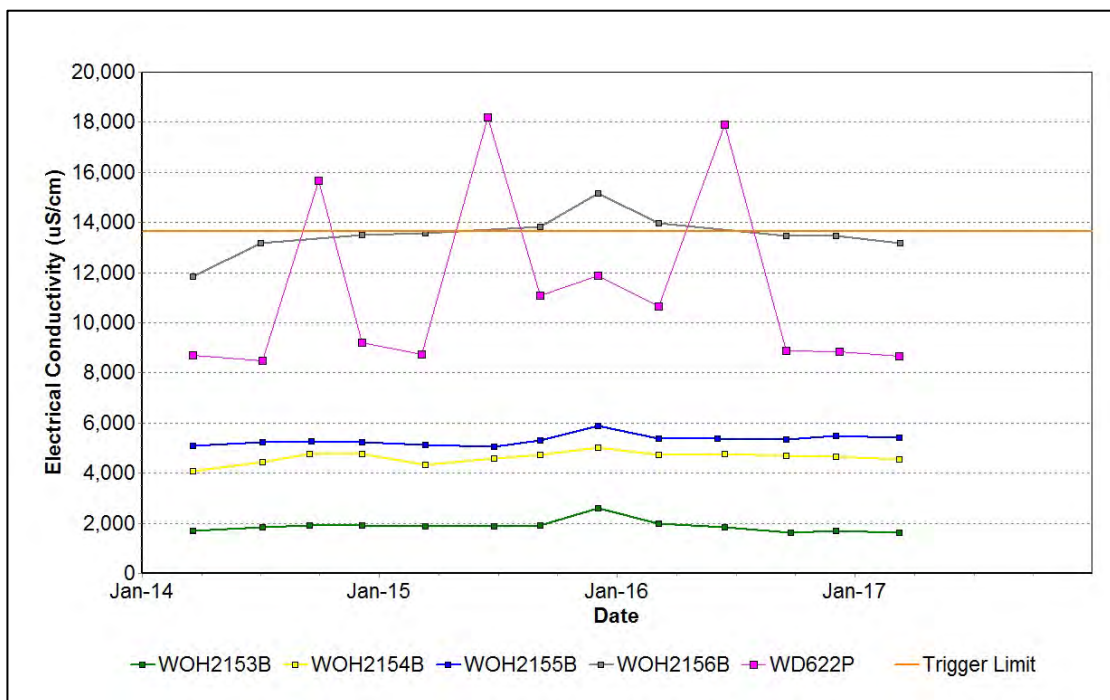


Figure 34: Wambo Seam Electrical Conductivity Trend - March 2017

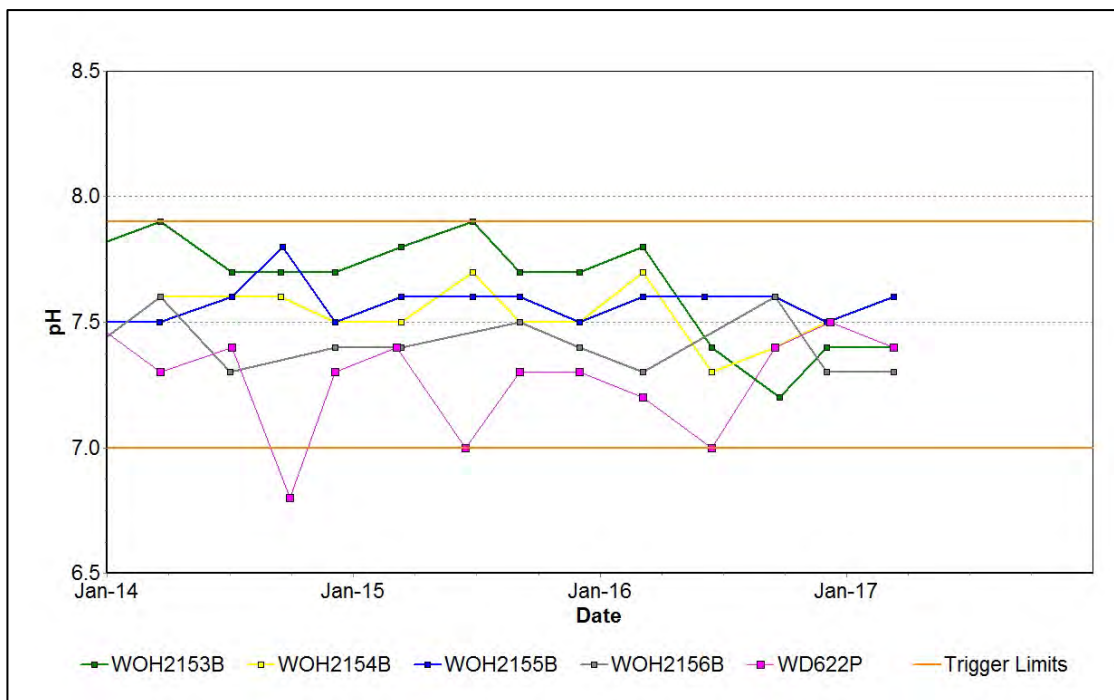


Figure 35: Wambo Seam pH Trend – March 2017

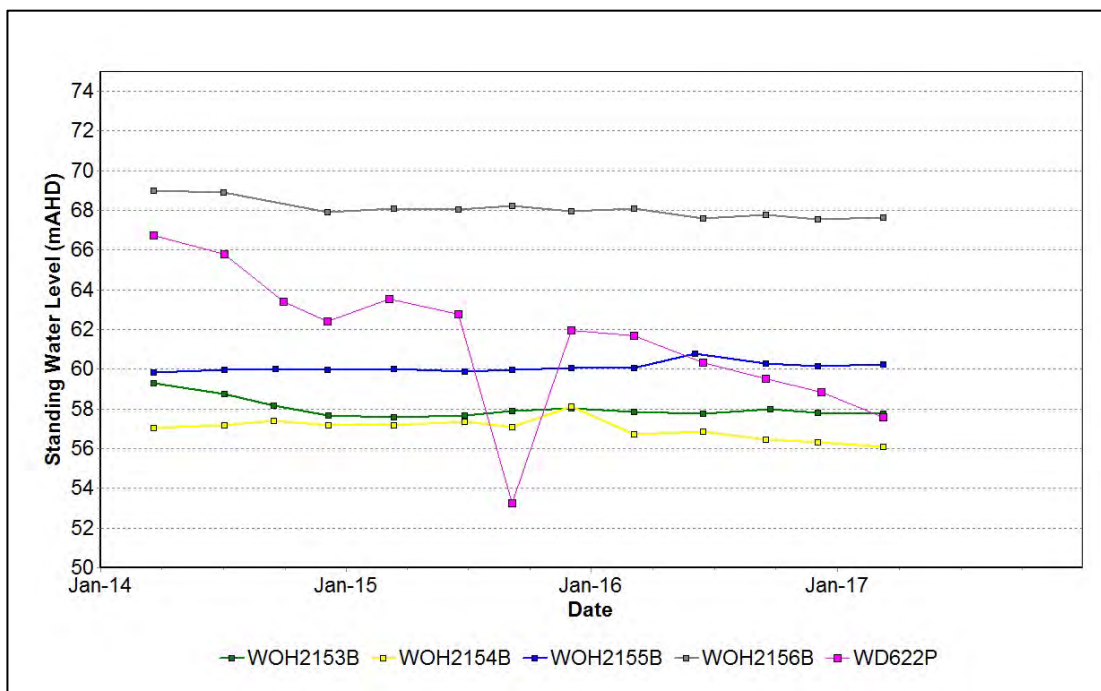


Figure 36: Wambo Seam Standing Water Level Trend - March 2017

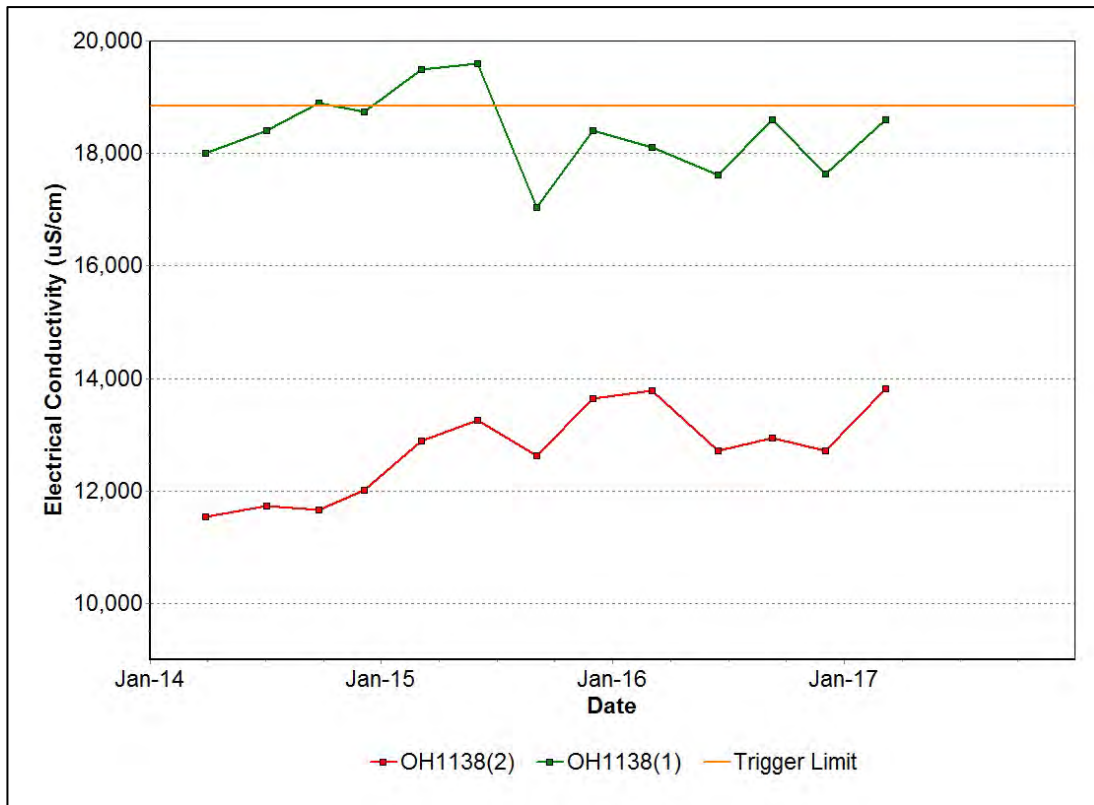


Figure 37: Warkworth Seam Electrical Conductivity Trend – March 2017

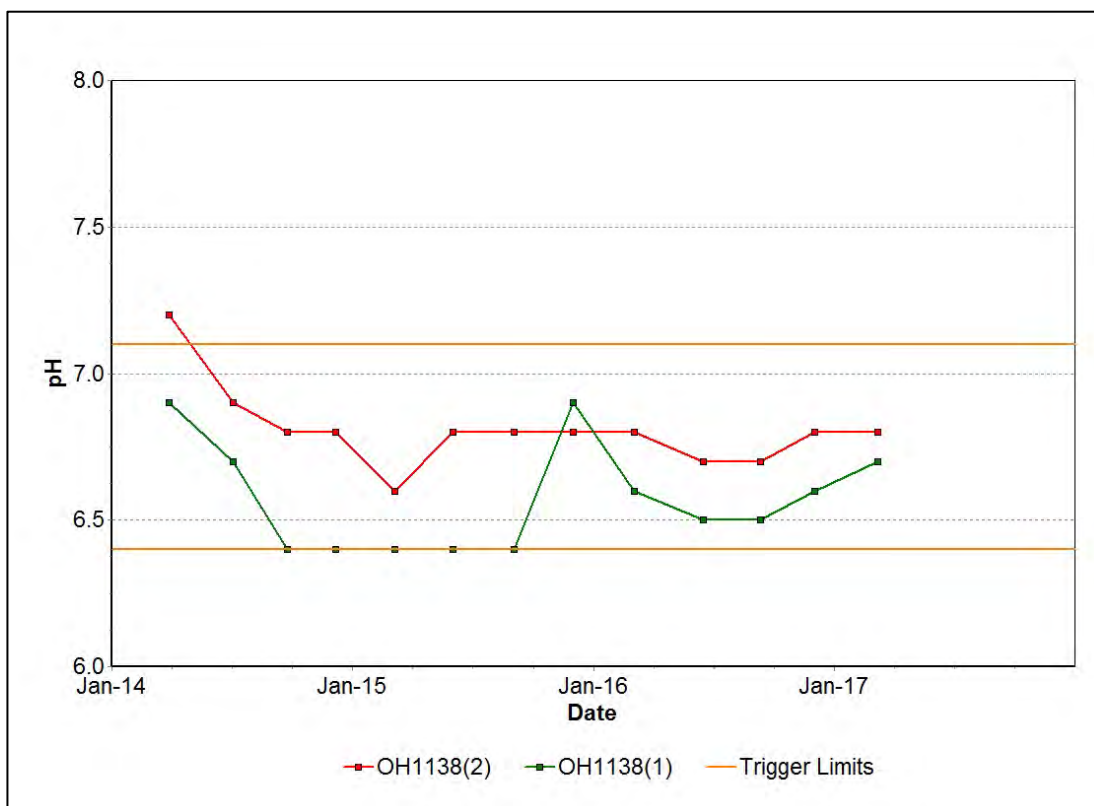


Figure 38: Warkworth Seam pH Trend - March 2017

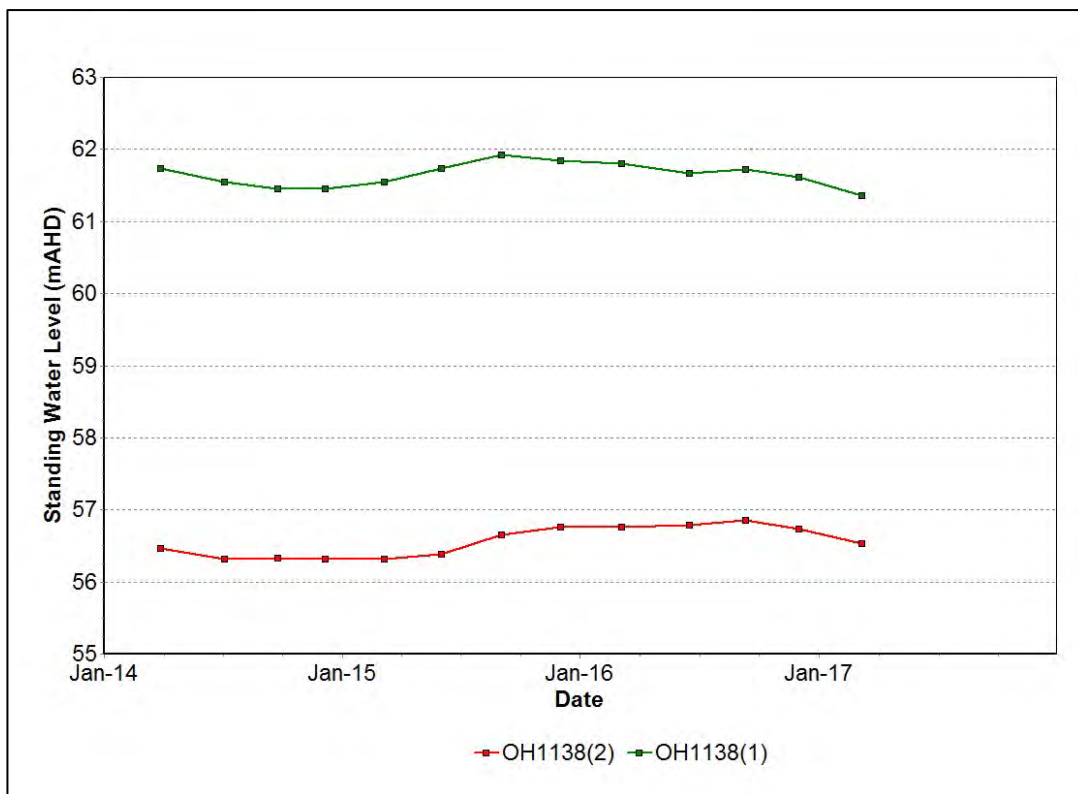


Figure 39: Warkworth Seam Standing Water Level Trend - March 2017

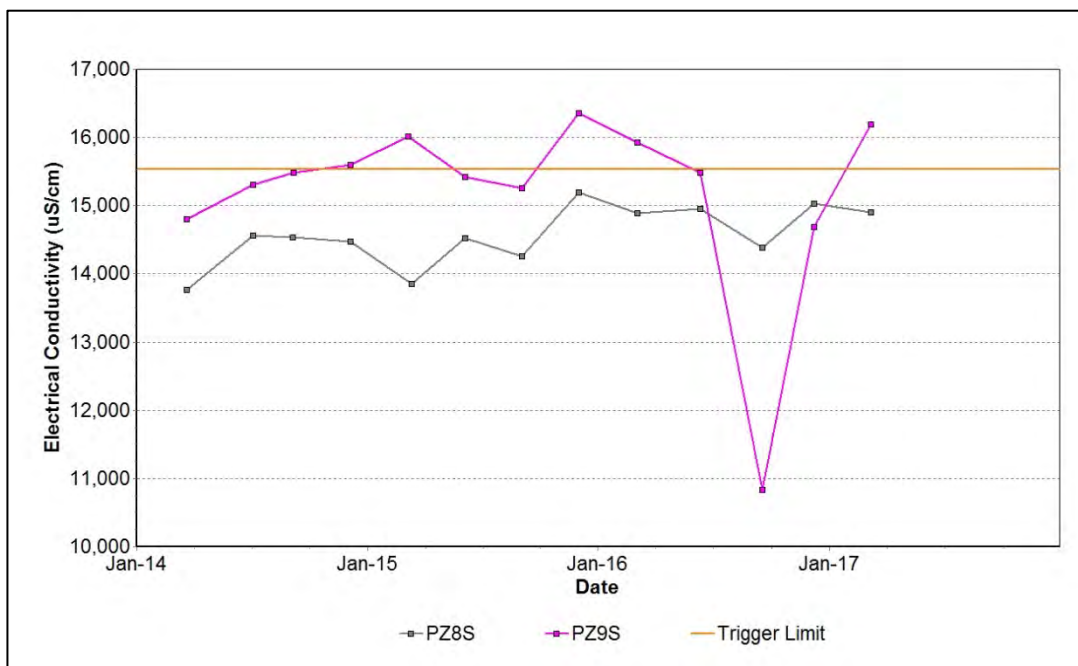


Figure 40: Wollombi Alluvium Electrical Conductivity Trend – March 2017

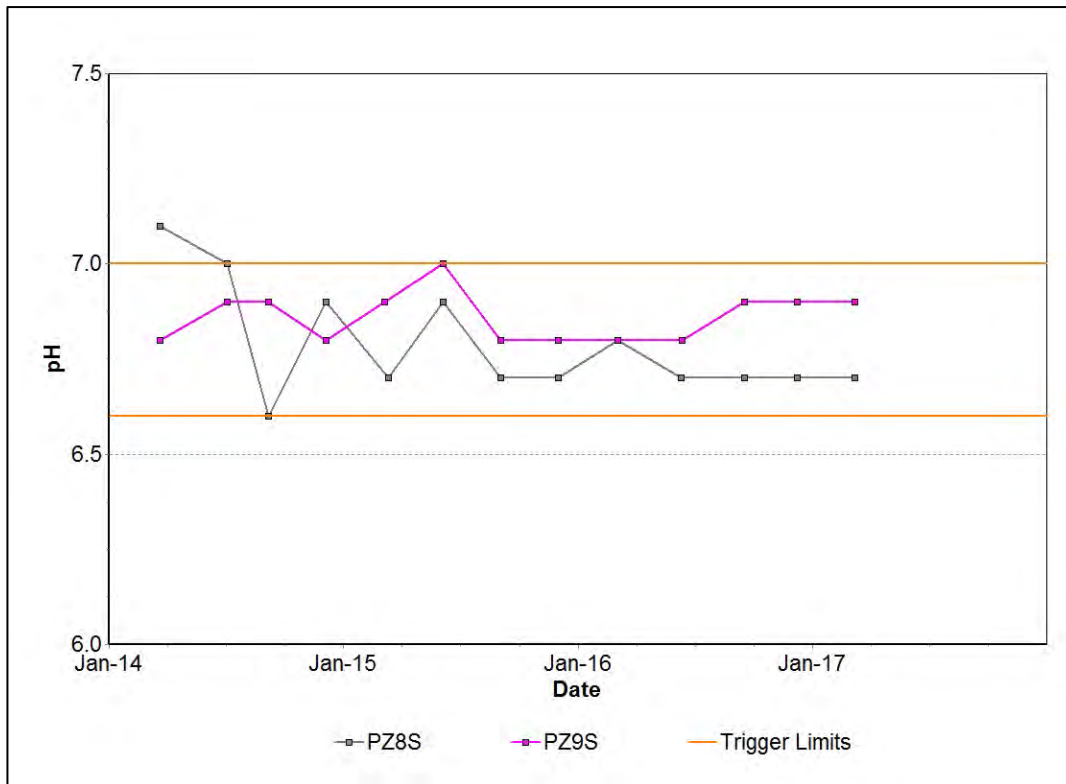


Figure 41: Wollombi Alluvium pH Trend – March 2017

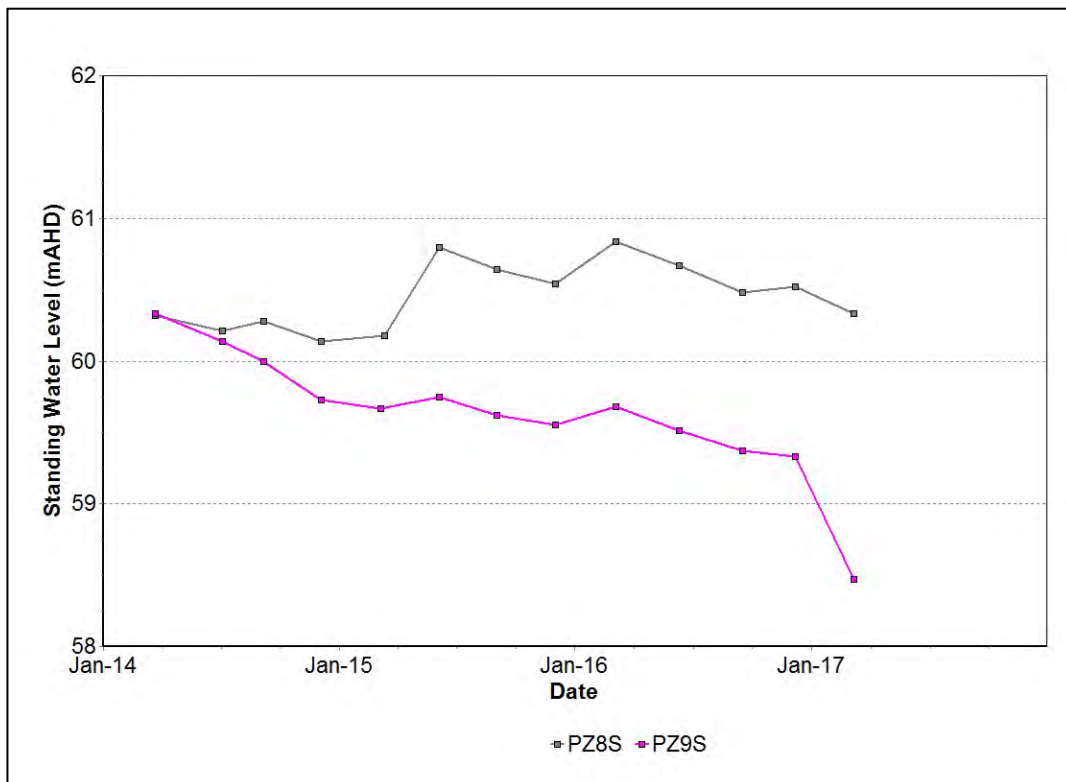


Figure 42: Wollombi Alluvium Standing Water Level Trend - March 2017

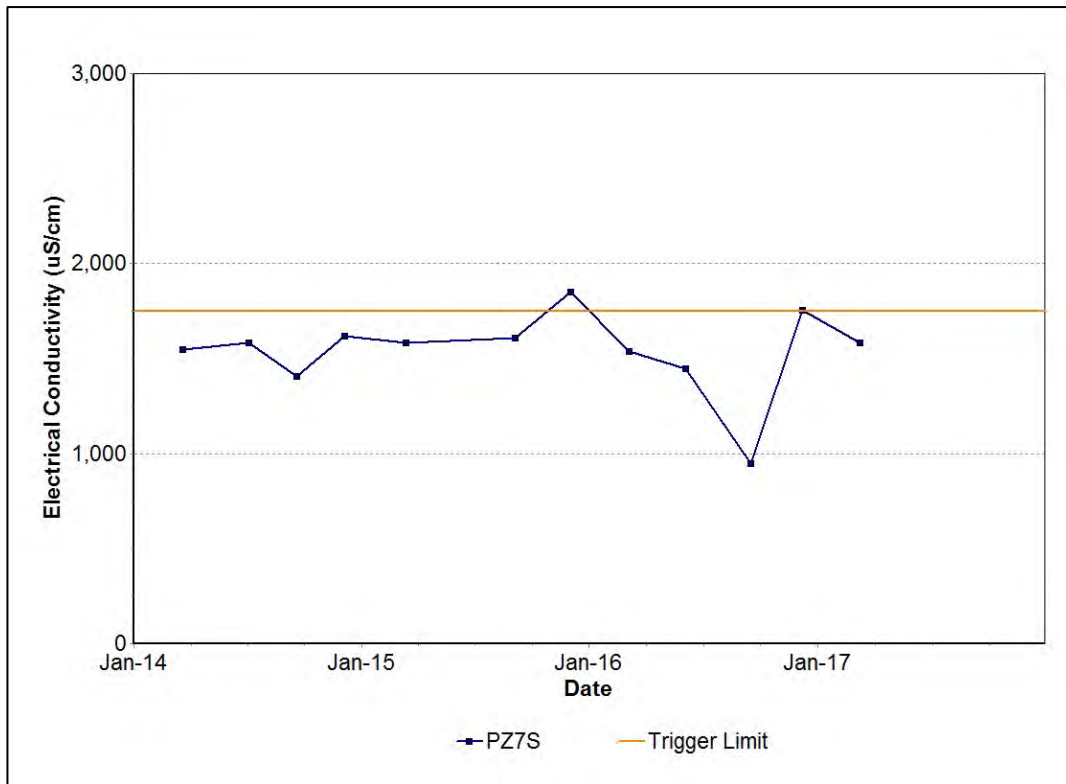


Figure 43: Aeolian Warkworth Sands Electrical Conductivity Trend – March 2017

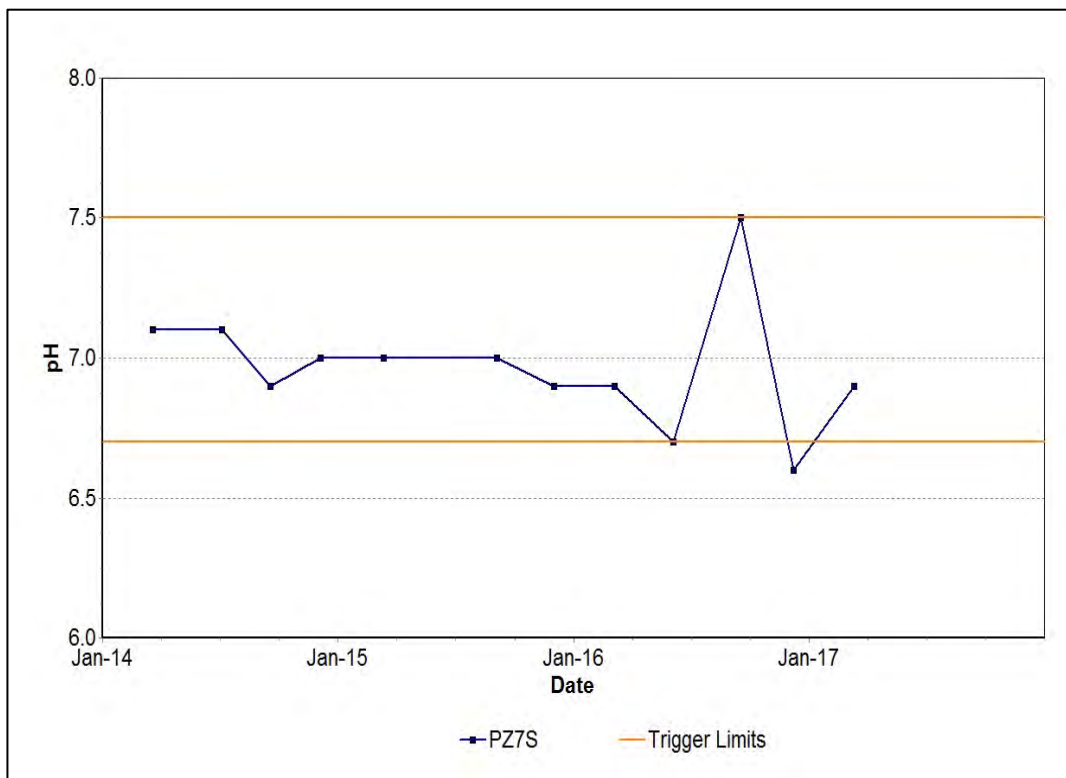


Figure 44: Aeolian Warkworth Sands pH Trend - March 2017

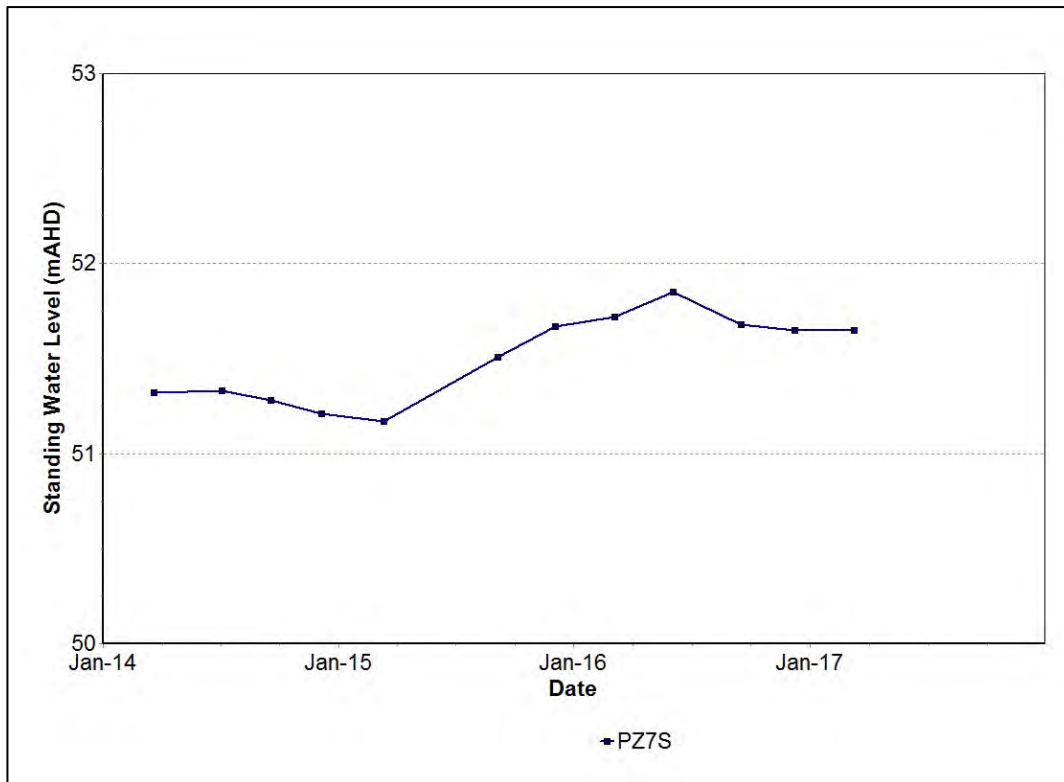


Figure 45: Aeolian Warkworth Sands Standing Water Level Trend - March 2017

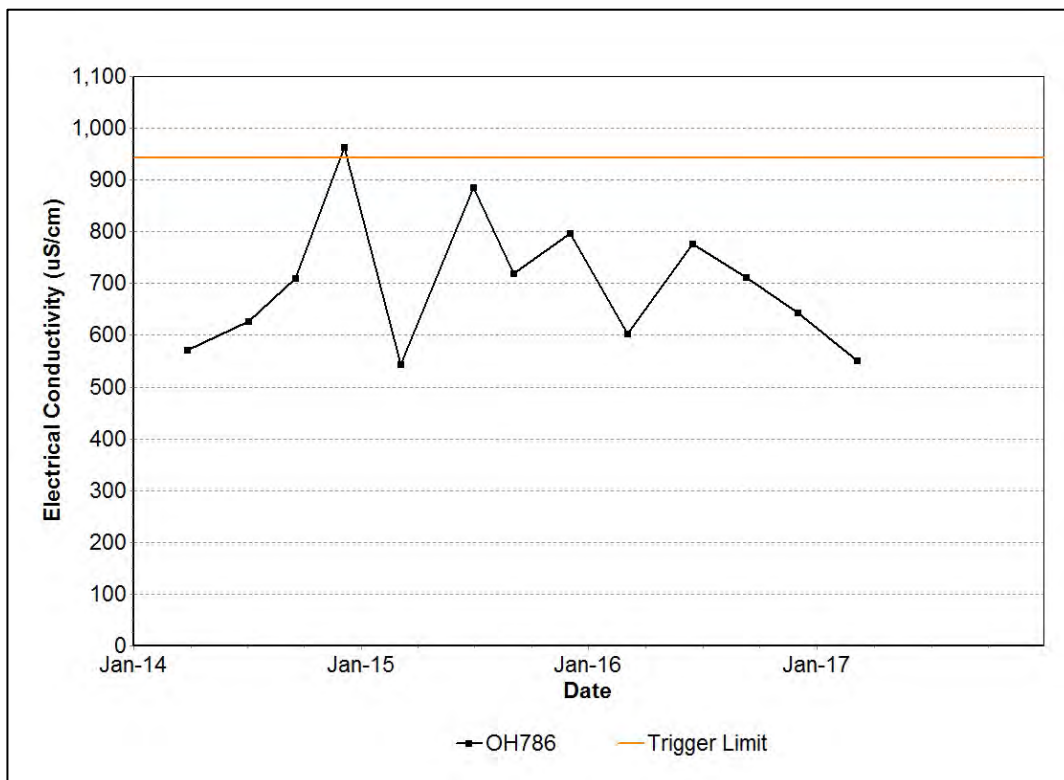


Figure 46: Hunter River Alluvium 1 Seam Electrical Conductivity - March 2017

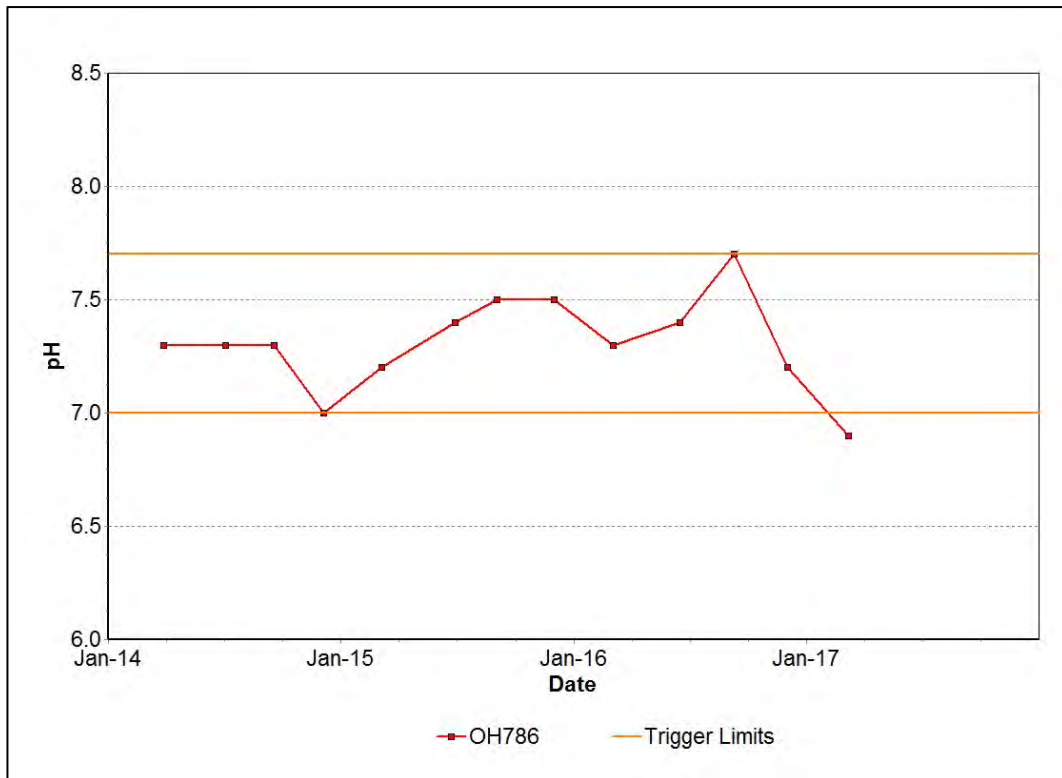


Figure 47: Hunter River Alluvium 1 Seam pH Trend - March 2017

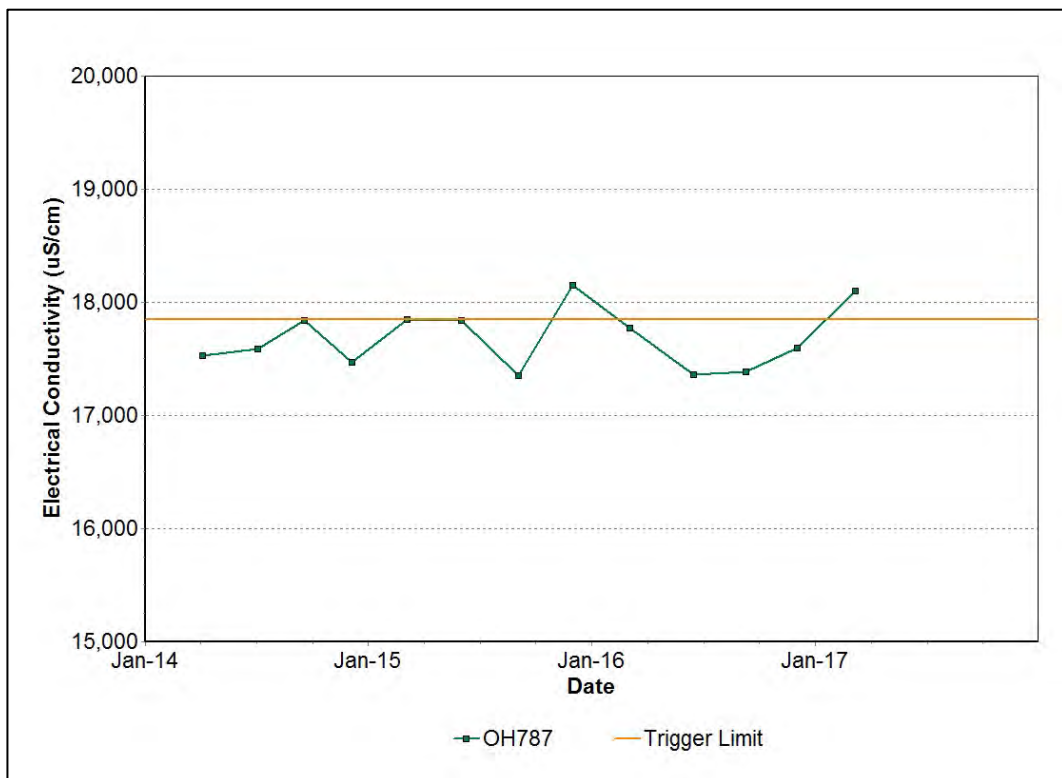


Figure 48: Hunter River Alluvium 2 Seam Electrical Conductivity - March 2017

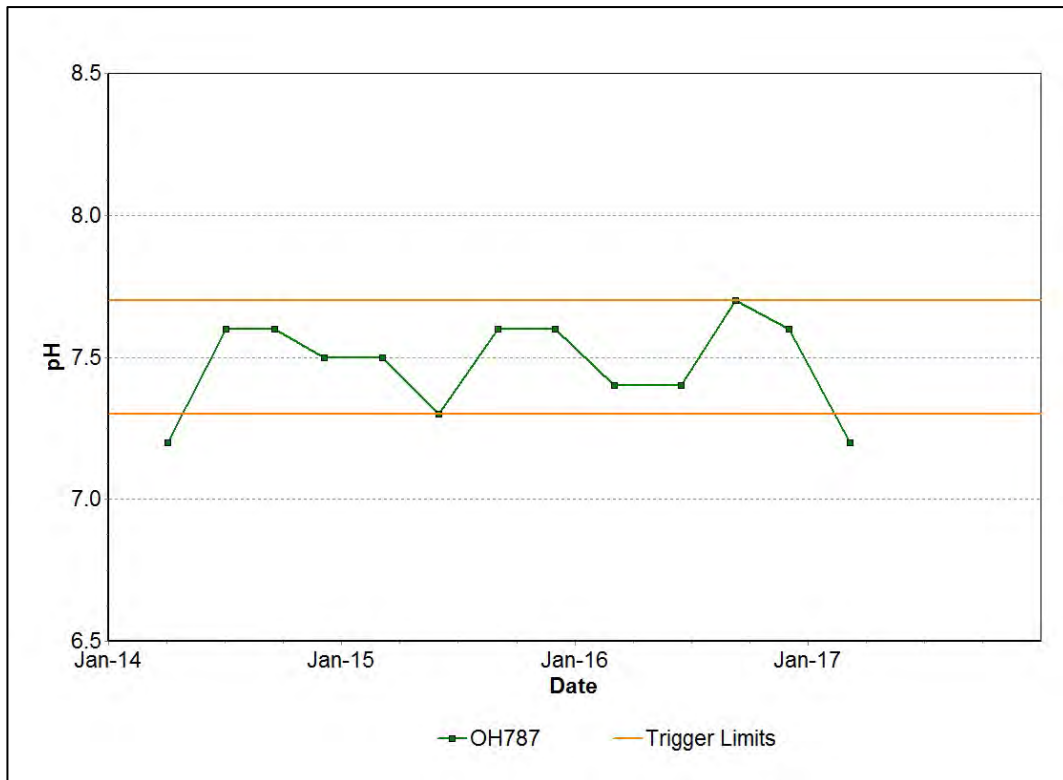


Figure 49: Hunter River Alluvium 2 Seam pH Trend - March 2017

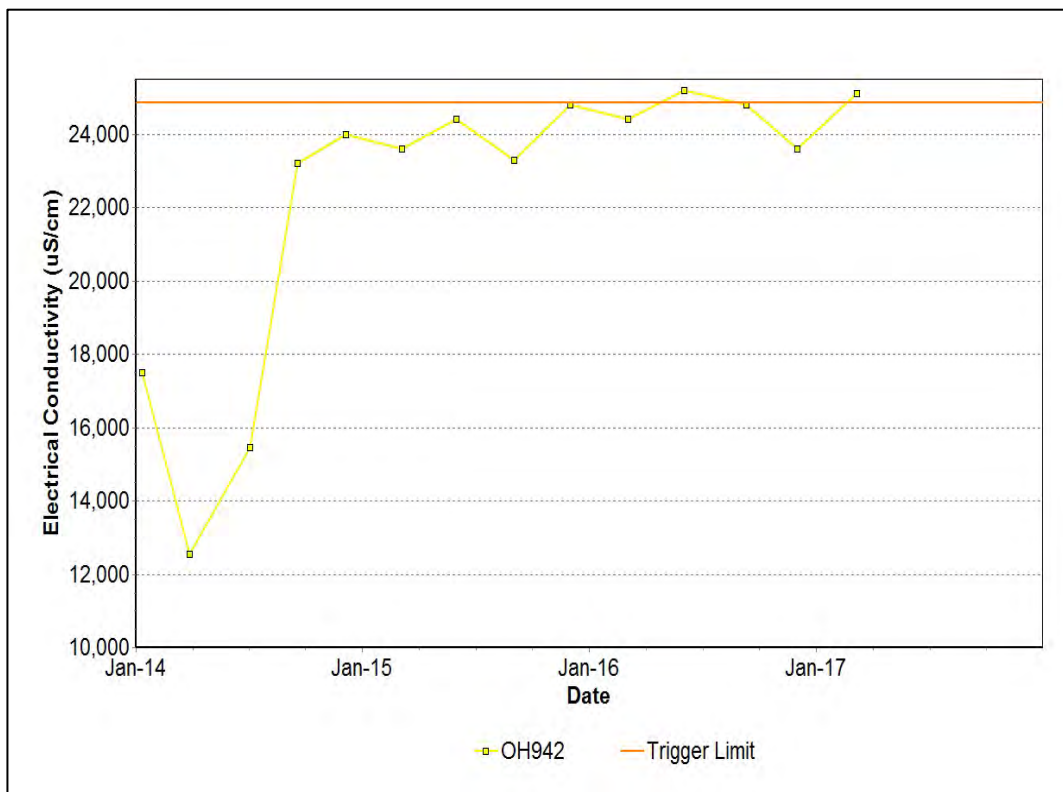


Figure 50: Hunter River Alluvium 3 Seam Electrical Conductivity - March 2017

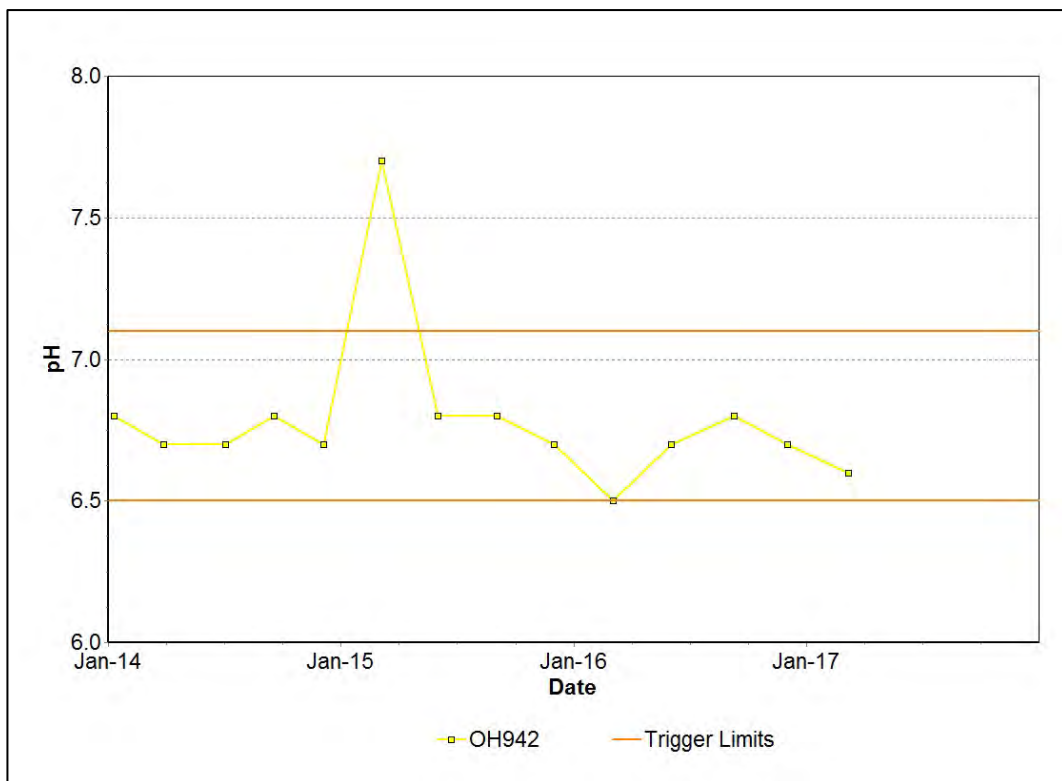


Figure 51: Hunter River Alluvium 3 Seam pH Trend - March 2017

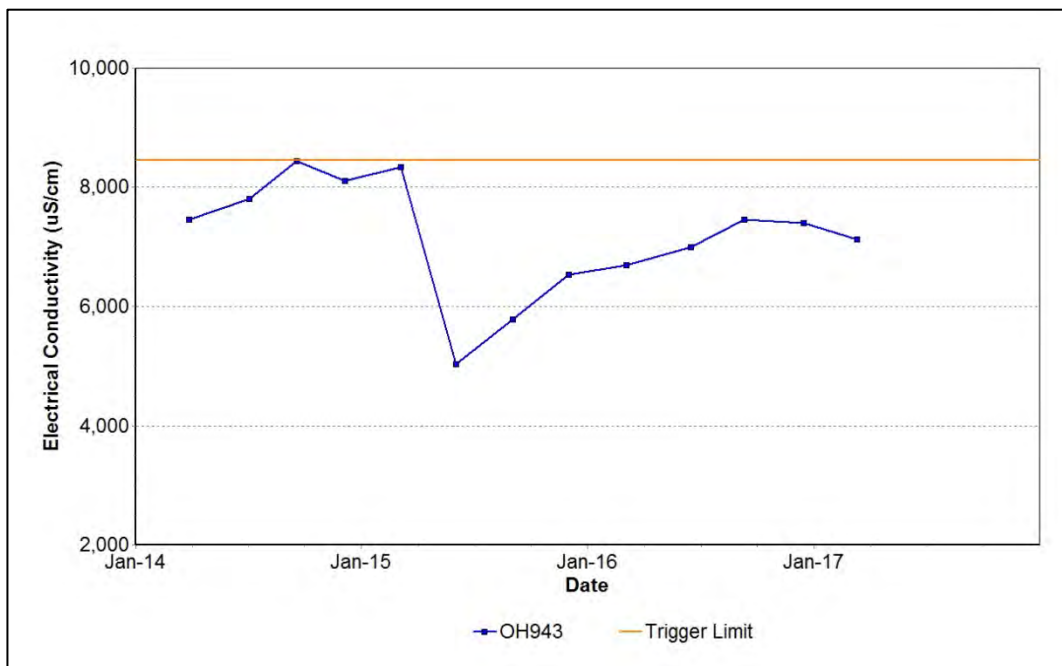


Figure 52: Hunter River Alluvium 4 Seam Electrical Conductivity - March 2017

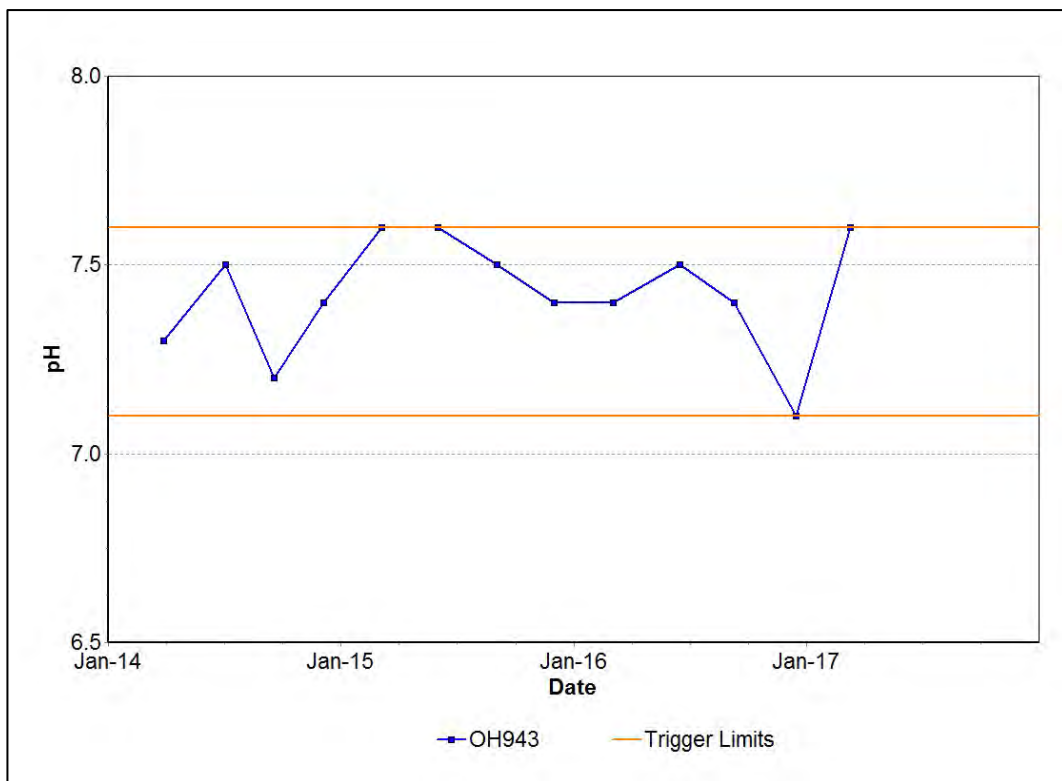


Figure 53: Hunter River Alluvium 4 Seam pH Trend - March 2017

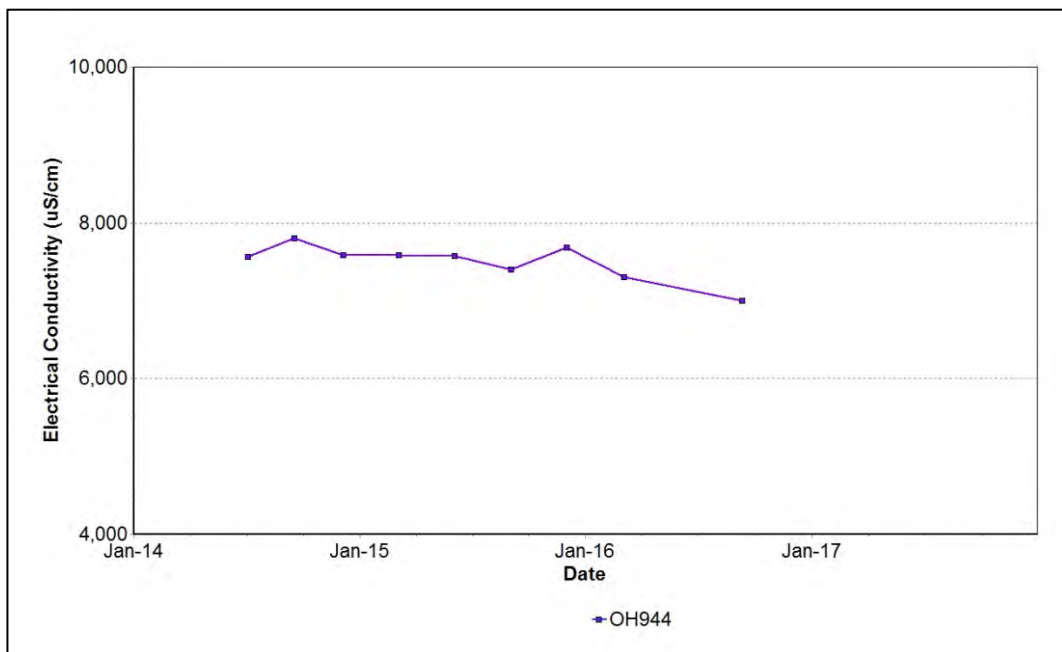


Figure 54: Hunter River Alluvium 5 Seam Electrical Conductivity - March 2017

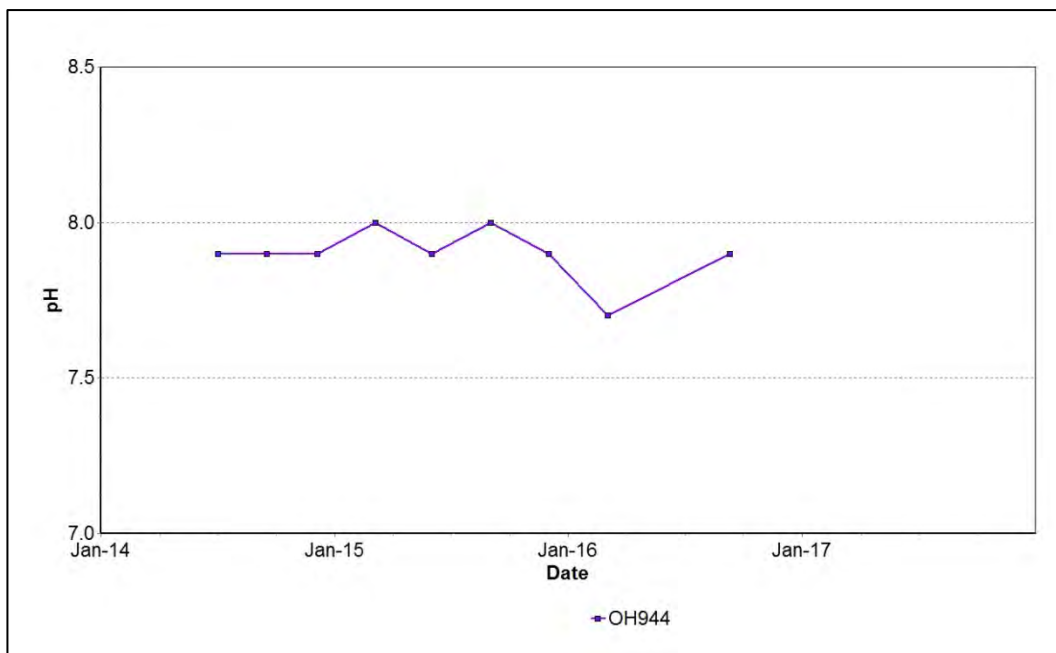


Figure 55: Hunter River Alluvium 5 Seam pH Trend - March 2017

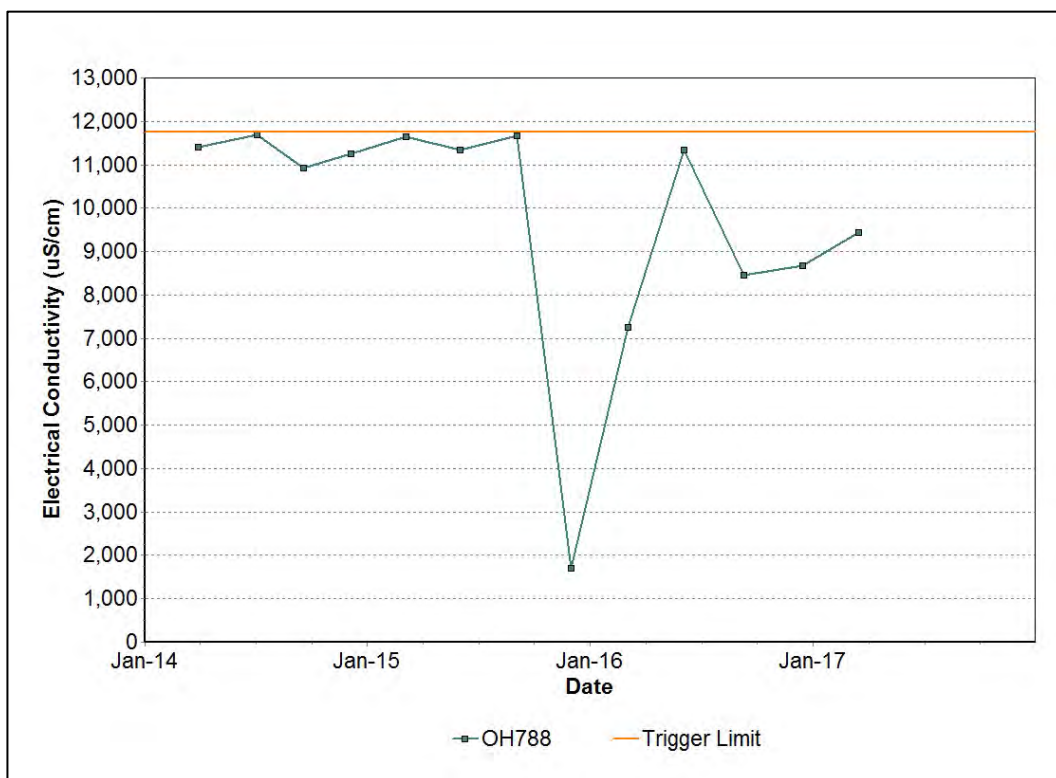


Figure 56: Hunter River Alluvium 6 Seam Electrical Conductivity - March 2017

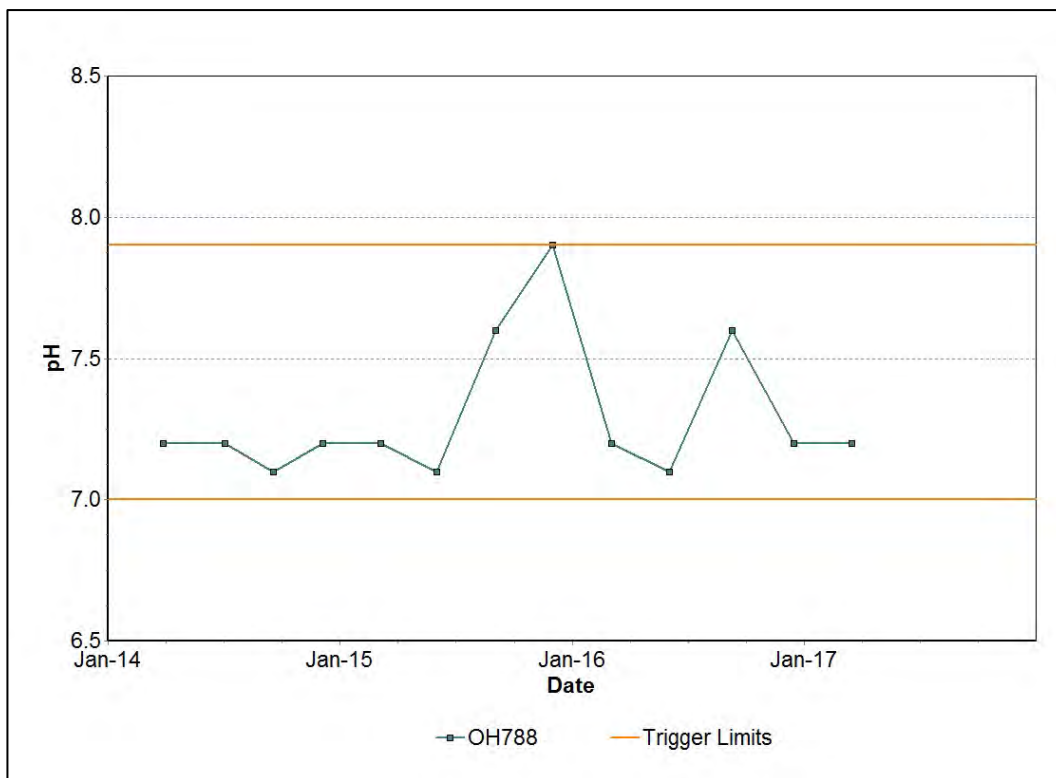


Figure 57: Hunter River Alluvium 6 Seam pH Trend - March 2017

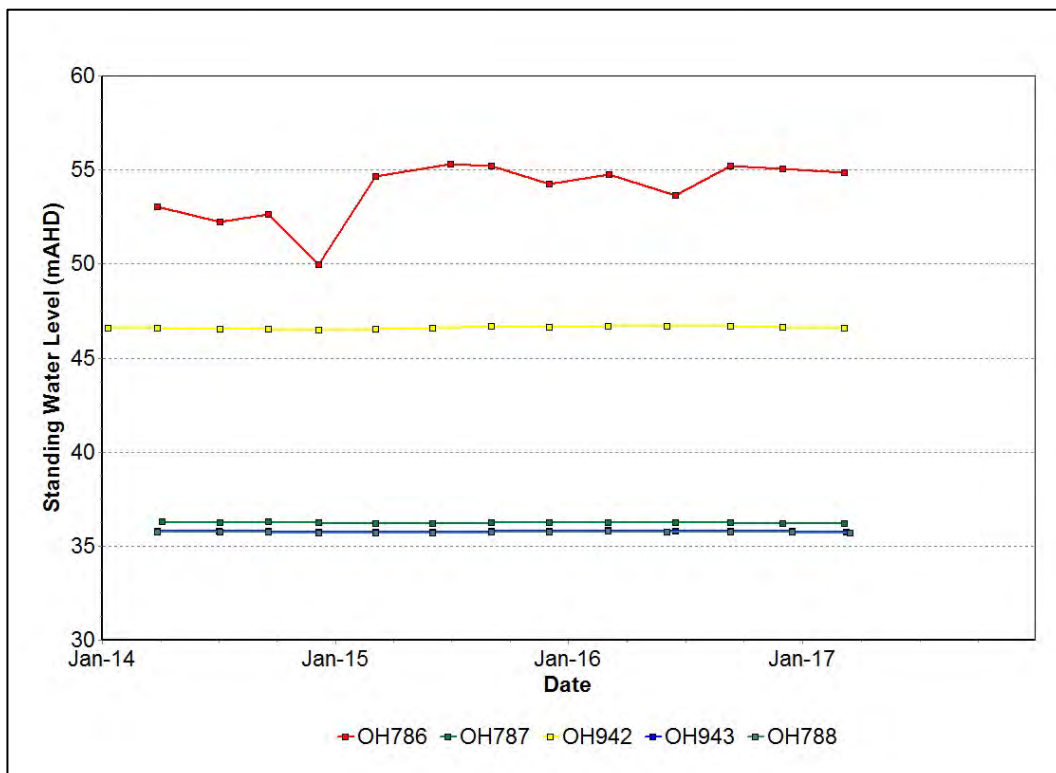


Figure 58: Hunter River Alluvium Standing Water Level Trend - March 2017

3.2.1 Groundwater Trigger Tracking

Internal trigger limits have been developed to assess monitoring data on an on-going basis, and to highlight potentially adverse groundwater impacts. The process for evaluating monitoring results against the internal triggers and subsequent responses are outlined in the MTW Water Management Plan. Locations of groundwater bores are shown in Figure 59.

During Q1 2017 15 trigger limits were breached and investigated, summarised in Table 3.

Table 3: Groundwater Triggers - 2017

Site	Date	Trigger Limit Breached	Action Taken in Response
OH 787	07/03/2017	EC – 95th Percentile	Watching Brief*
OH942	07/03/2017	EC – 95th Percentile	Watching Brief*
PZ9S	07/03/2017	EC – 95th Percentile	Watching Brief*
OH1125(1)	07/03/2017	EC – 95th Percentile	Watching Brief*
MTD616P	10/03/2017	EC – 95th Percentile	Data is stable and consistent with historical trend; significant natural variability in water quality is typical of low-conductivity shallow overburden material. No further action.
MTD605P	07/03/2017	EC – 95th Percentile	Data is stable and consistent with historical trend; significant natural variability in water quality is typical of low-conductivity shallow overburden material. No further action.
PZ9D	07/03/2017	EC – 95th Percentile	Watching Brief*
WOH2156B	10/03/2017	EC – 95th Percentile	Data is stable and consistent with historical trend; no further action.
OH786	07/03/2017	PH –5th Percentile	Watching Brief*
OH787	07/03/2017	PH –5th Percentile	Watching Brief*
PZ8S	07/03/2017	PH –5th Percentile	Watching Brief*
GW9709	10/03/2017	PH –5th Percentile	Data broadly in line with historical range; EC or water level do not show a rising or falling trend. Watching brief to be maintained.
GW98MTCL2	10/03/2017	PH –5th Percentile	Watching Brief*
WOH2153A	10/03/2017	PH –95th Percentile	Watching Brief*

* = Watching brief established pending outcomes of subsequent monitoring events. No specific actions required.



Figure 59: Groundwater Monitoring Location Plan

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 66.

4.1 Blast Monitoring Results

During March 2017, 29 blasts were initiated at MTW. Figure 60 to Figure 65 show the blast monitoring results for the reporting period against the impact assessment criteria. The criteria are summarised in Table 4.

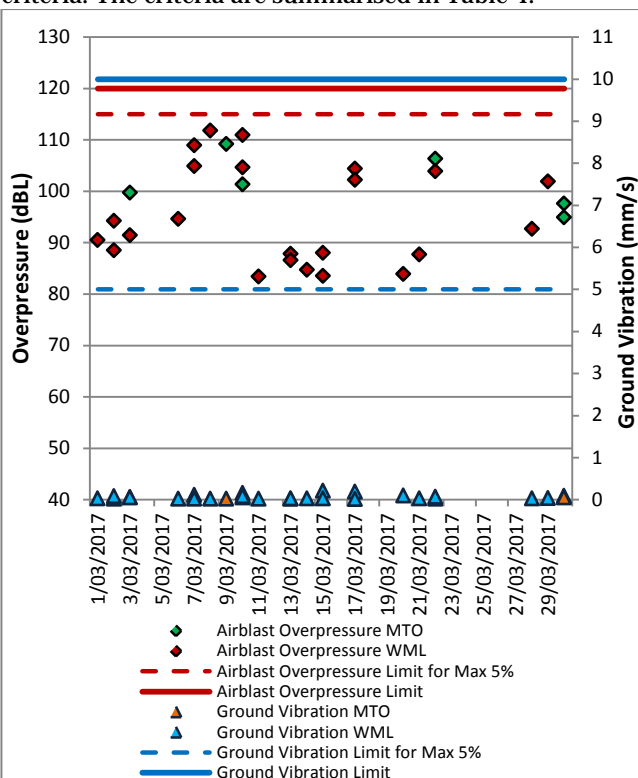


Figure 60: Abbey Green Blast Monitoring Results – March 2017

Table 4: Blasting Limits

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

During the reporting period no blasts exceeded the 115 dB(L) 5% threshold for airblast overpressure or 5mm/s 5% threshold for ground vibration

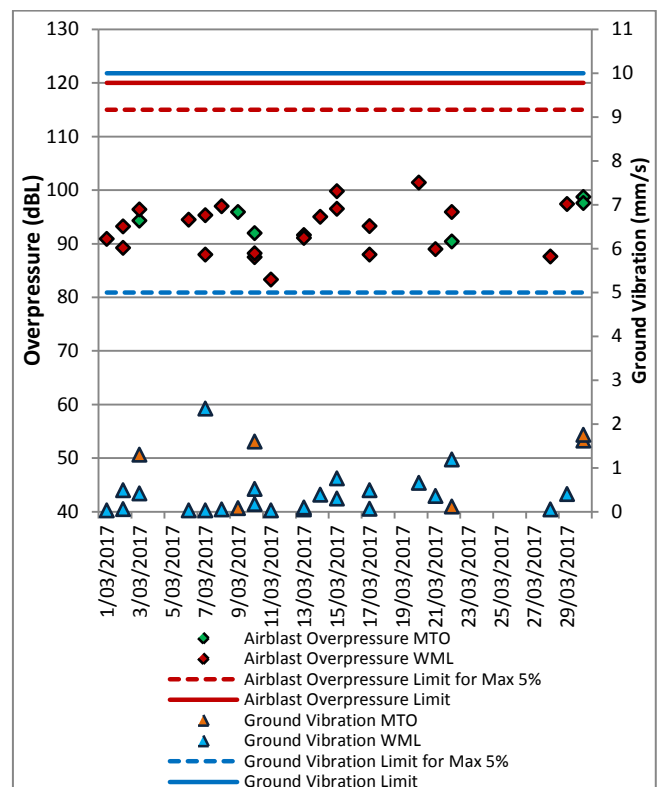


Figure 61: Bulga Village Blast Monitoring Results – March 2017

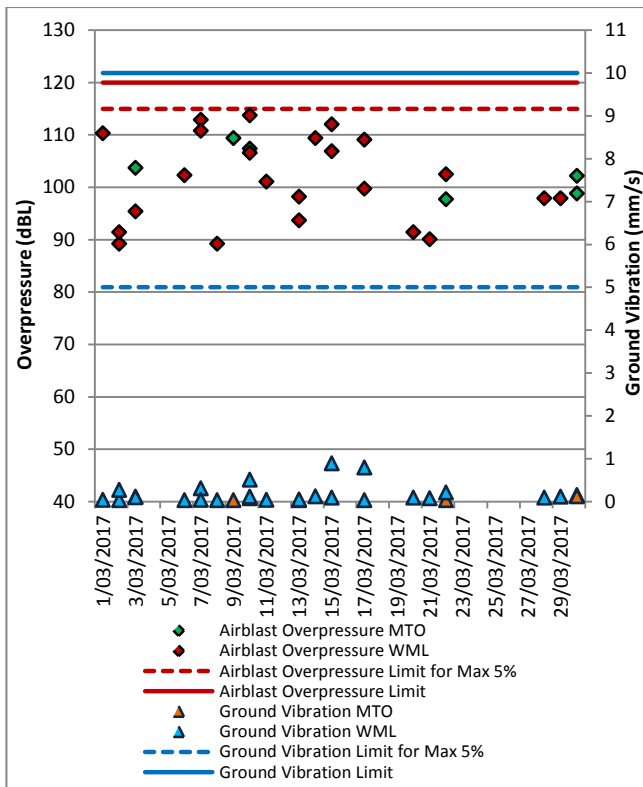


Figure 62: MTIE Blast Monitoring Results – March 2017

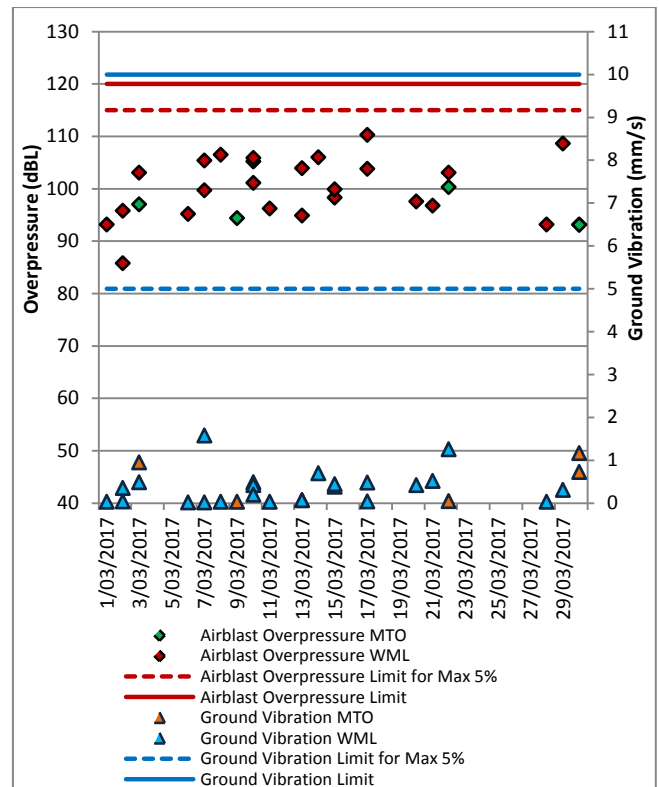


Figure 64: Wambo Road Blast Monitoring Results – March 2017

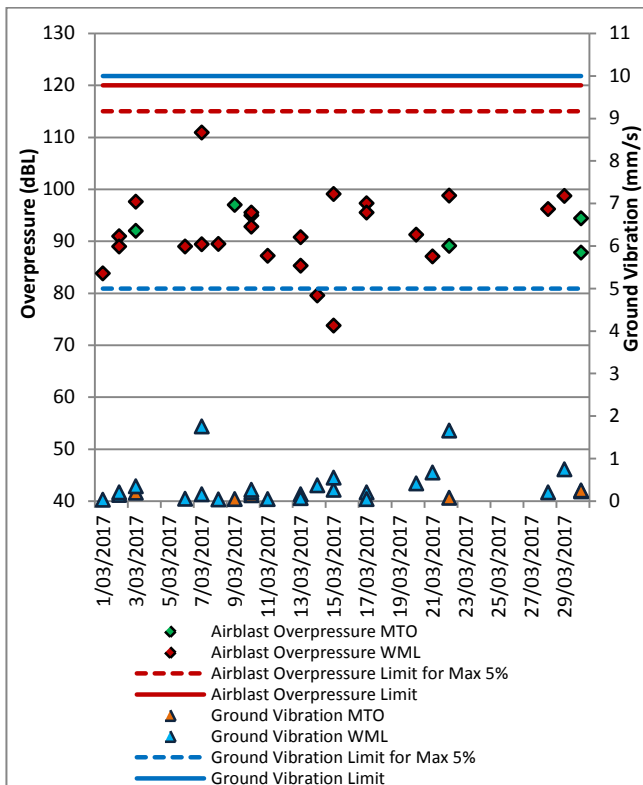


Figure 63: Warkworth Blast Monitoring Results – March 2017

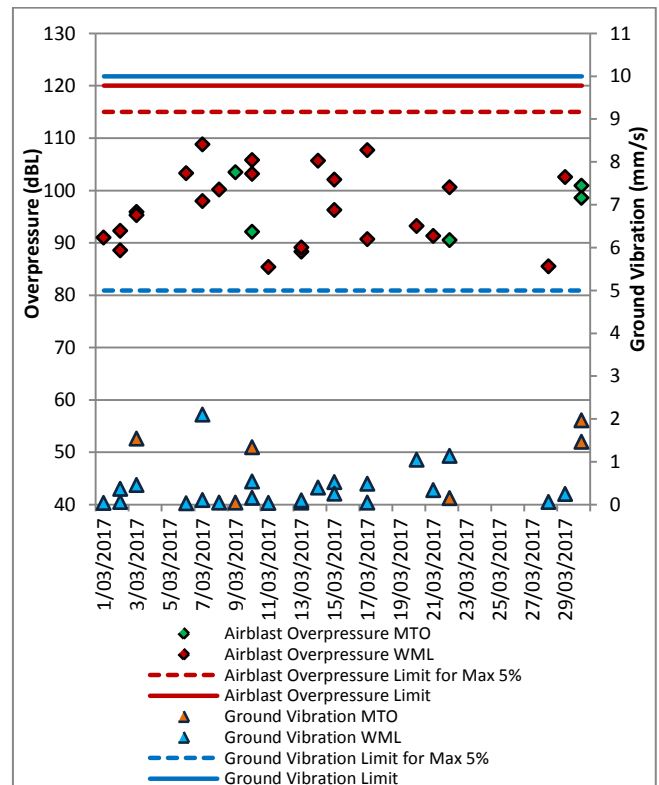


Figure 65: Wollemi Peak Road Blast Monitoring Results – March 2017

Mount Thorley Warkworth Blast Monitoring Locations

Date: 160621
Plan By: DF
Version: 4.0



RTCA - NSW Environmental Services

Figure 66: Blast and Vibration 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. Unattended monitoring (real time noise monitoring) also occurs at seven sites surrounding MTW. The attended noise monitoring locations are displayed in Figure 67.

5.1 Attended Noise Monitoring Results

Attended monitoring was conducted at receiver locations surrounding MTW on the night of 7 March 2017. All measurements complied with the relevant criteria. Results are detailed in Table 5 to Table 8.

5.1.1 WML Noise Assessment

Compliance assessments undertaken against the WML noise criteria are presented in Tables 5 and 6.

Table 5: LAeq, 15 minute Warkworth Impact Assessment Criteria – March 2017

Location	Date and Time	Wind Speed (m/s) ⁵	Stability Class	Criterion (dB(A))	Criterion Applies? ^{1,6}	WML LAeq dB ^{2,4}	Exceedance ³	Total LAeq – LAeq	Revised WML LAeq ^{5,6}
Bulga RFS	7/03/2017 23:20	3.1	D	37	No	IA	NA	16	IA
Bulga Village	7/03/2017 21:46	3.4	D	38	No	IA	NA	17	IA
Gouldsville	7/03/2017 21:21	3.8	D	38	No	30	NA	20	35
Inlet Rd	7/03/2017 21:25	4.1	D	37	No	IA	NA	20	IA
Inlet Rd West	7/03/2017 21:00	3	D	35	Yes	IA	Nil	20	IA
Long Point	7/03/2017 21:00	3	D	35	Yes	30	Nil	17	35
South Bulga	7/03/2017 23:46	4	D	35	No	IA	NA	22	IA
Wambo Road	7/03/2017 22:34	1.6	F	38	Yes	IA	Nil	7	IA

Table 6: LA1, 1 minute Warkworth – Impact Assessment Criteria – March 2017

Location	Date and Time	Wind Speed (m/s) ⁵	Stability Class	Criterion (dB(A))	Criterion Applies? ^{1,6}	WML LAeq dB ^{2,4}	Exceedance ³
Bulga RFS	7/03/2017 23:20	3.1	D	47	No	IA	NA
Bulga Village	7/03/2017 21:46	3.4	D	48	No	IA	NA
Gouldsville	7/03/2017 21:21	3.8	D	48	No	33	NA
Inlet Rd	7/03/2017 21:25	4.1	D	47	No	IA	NA
Inlet Rd West	7/03/2017 21:00	3	D	45	Yes	IA	Nil
Long Point	7/03/2017 21:00	3	D	45	Yes	33	Nil
South Bulga	7/03/2017 23:46	4	D	45	No	IA	NA
Wambo Road	7/03/2017 22:34	1.6	F	48	Yes	IA	Nil

Notes

1. Noise emission limits apply during all meteorological conditions except the following: during periods of rain or hail; average wind speed at microphone height exceeds 5 m/s; 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;
2. Estimated or measured LA1,1minute attributed to Warkworth mine (WML);
3. NA in exceedance column means atmospheric conditions outside conditions specified in project approval and so criterion is not applicable. NA (not applicable) in criterion column means criterion not specified for this location;
4. Bolded results in red are possible exceedances of relevant criteria; and
5. Criterion may or may not apply due to rounding of meteorological data values.

5.1.2 MTO Noise Assessment

Compliance assessments undertaken against the MTO noise criteria are presented in Tables 7 and 8.

Table 7: LAeq, 15minute Mount Thorley - Impact Assessment Criteria – March 2017

Location	Date and Time	Wind Speed (m/s) ⁵	Stability Class	Criterion dB	Criterion Applies? ^{1,6}	MTO LAeq dB ^{2,4}	Exceedance ³	Total LCeq – LAeq ⁷	Revised MTO LAeq ^{5,6}
Bulga RFS	7/03/2017 23:20	3.1	D	37	No	IA	NA	16	IA
Bulga Village	7/03/2017 21:46	3.4	D	38	No	IA	NA	17	IA
Gouldsville	7/03/2017 21:21	3.8	D	35	No	NM	NA	20	NM
Inlet Rd	7/03/2017 21:25	4.1	D	37	No	IA	NA	20	IA
Inlet Rd West	7/03/2017 21:00	3	D	35	Yes	IA	Nil	20	IA
Long Point	7/03/2017 21:00	3	D	35	Yes	NM	Nil	17	NM
South Bulga	7/03/2017 23:46	4	D	36	No	IA	NA	22	IA
Wambo Road	7/03/2017 22:34	1.6	F	38	Yes	IA	Nil	7	IA

Table 8: LA1, 1Minute Mount Thorley - Impact Assessment Criteria – March 2017

Location	Date and Time	Wind Speed (m/s) ⁵	Stability Class	Criterion dB	Criterion Applies? ^{1,6}	MTO LA1, 1min dB ^{2,4}	Exceedance ³
Bulga RFS	7/03/2017 23:20	3.1	D	47	No	IA	NA
Bulga Village	7/03/2017 21:46	3.4	D	48	No	IA	NA
Gouldsville	7/03/2017 21:21	3.8	D	45	No	NM	NA
Inlet Rd	7/03/2017 21:25	4.1	D	47	No	IA	NA
Inlet Rd West	7/03/2017 21:00	3	D	45	Yes	IA	Nil
Long Point	7/03/2017 21:00	3	D	45	Yes	NM	Nil
South Bulga	7/03/2017 23:46	4	D	46	No	IA	NA
Wambo Road	7/03/2017 22:34	1.6	F	48	Yes	IA	Nil

Notes

1. Noise emission limits apply during all meteorological conditions except the following: during periods of rain or hail; average wind speed at microphone height exceeds 5 m/s; 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;
2. Estimated or measured LA1,1minute attributed to Mt Thorley Operations (MTO);

3. NA in exceedance column means atmospheric conditions outside conditions specified in project approval and so criterion is not applicable. NA (not applicable) in criterion column means criterion not specified for this location;
4. Bolded results in red are possible exceedances of relevant criteria; and
5. Criterion may or may not apply due to rounding of meteorological data values

5.1.3 INP Low Frequency Assessment

In accordance with the requirements of the Industrial Noise Policy, the low frequency modification factor has been applied where appropriate. It should be noted that the Industrial Noise Policy does not give guidance on the application of the penalty where more than one target source is audible. The LCeq levels reported above are “Total”, or “Total mine noise” at best, and cannot be attributed accurately to a single mine. Accordingly, where the INP criteria for the application of the Low Frequency penalty is triggered, the penalty has been applied to the dominant mine noise source (either of WML or MTO). There were no exceedances of noise criteria following application of the INP Low Frequency modification factor during March 2017.

**Mount Thorley Warkworth
Noise Monitoring Programme**

Date: 160226
Plan By: DF
Version: 2.0



RTCA - NSW Environmental Services

Figure 67: 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 particular residence, modifications will be made so as 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:

- Replacement of non-attenuated equipment with sound attenuated equipment;
- 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 March are provided in Table 9.

Table 9: Supplementary Attended Noise Monitoring Data – March 2017

No. of assessments	No. of assessments > trigger	No. of nights where assessments > trigger	% greater than trigger
462	4	2	0.87

Note: Measurements are taken under all meteorological conditions, including conditions under which the consent noise criteria do not apply.

6.0 OPERATIONAL DOWNTIME

During March a total of 45.4 hours of equipment downtime was logged in response to environmental events such as dust, noise and elevated wind impacts. Operational downtime by equipment type is shown in Figure 68.

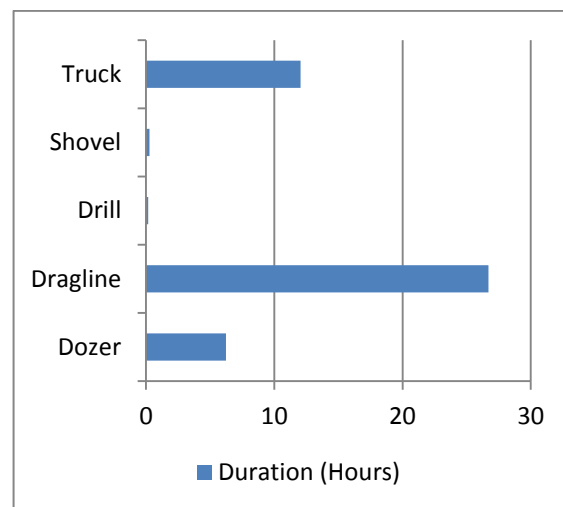


Figure 68: Operational Downtime by Equipment Type – March 2017

7.0 REHABILITATION

During March, 8.0 Ha of land was released, 10.3Ha was bulk shaped, 17.3Ha was composted and 0.1Ha was rehabilitated. Year-to-date progress can be viewed in Figure 69.

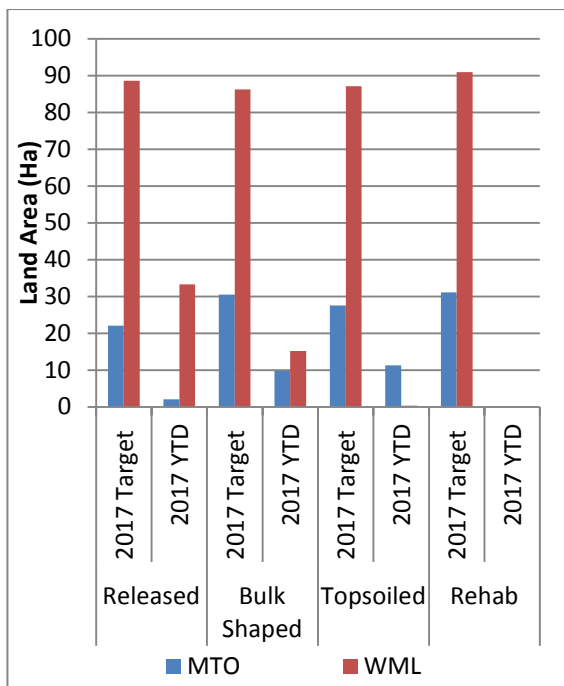


Figure 69: Rehabilitation YTD - March 2017

8.0 ENVIRONMENTAL INCIDENTS

During the reporting period MTW there were no reportable environmental incidents.

9.0 COMPLAINTS

During the reporting period 18 complaints were received, details of these complaints are displayed in Figure 70 below.

	Noise	Dust	Blast	Lighting	Other	Total
January	5	6	3	1	0	15
February	25	3	10	3	0	41
March	14	1	1	2	0	18
April	-	-	-	-	-	-
May	-	-	-	-	-	-
June	-	-	-	-	-	-
July	-	-	-	-	-	-
August	-	-	-	-	-	-
September	-	-	-	-	-	-
October	-	-	-	-	-	-
November	-	-	-	-	-	-
December	-	-	-	-	-	-
Total	44	10	14	6	0	74

Figure 70: Complaints Summary - YTD March 2017

Appendix A: Meteorological Data

Table 10: Meteorological Data – Charlton Ridge Meteorological Station – March 2017

Date	Air Temperature Maximum (°C)	Air Temperature Minimum (°C)	Relative Humidity Maximum (%)	Relative Humidity Minimum (%)	Solar Radiation Maximum (W/Sq. M)	Wind Direction Average (°)	Wind Speed Average (m/sec)	Rainfall(mm)
1/03/2017	28.8	17.5	94.5	46.4	1237	144.5	2.9	3.6
2/03/2017	31.0	17.2	91.6	38.1	1236	151.6	2.6	0.0
3/03/2017	29.4	15.6	91.9	46.6	1289	169.4	3.0	3.0
4/03/2017	25.5	16.3	95.4	63.3	580	196.6	2.5	13.2
5/03/2017	25.3	15.5	96.4	60.1	1151	258.9	1.6	15.6
6/03/2017	27.6	14.5	90.6	39.5	1322	184.2	3.3	0.0
7/03/2017	26.1	13.9	81.4	41.4	1251	172.8	4.0	0.0
8/03/2017	23.8	12.4	88.1	47.0	1253	166.8	3.6	0.4
9/03/2017	26.3	13.5	93.9	37.2	1409	167.6	3.2	0.6
10/03/2017	27.9	13.4	81.0	32.6	1308	166.6	3.0	0.0
11/03/2017	28.8	11.8	89.6	24.4	1035	165.2	2.0	0.0
12/03/2017	34.3	11.3	91.3	13.7	904	162.0	2.1	0.0
13/03/2017	32.7	17.0	76.6	24.4	1148	133.6	2.5	0.0
14/03/2017	31.1	17.6	89.4	41.1	1164	125.1	4.1	0.0
15/03/2017	25.7	19.2	95.5	60.7	322	116.0	3.5	4.6
16/03/2017	32.5	19.1	97.1	37.3	306	177.0	2.3	2.8
17/03/2017	23.5	17.6	88.6	66.9	152	177.3	5.7	0.0
18/03/2017	27.2	15.0	95.9	58.6	273	148.4	5.8	15.2
19/03/2017	30.5	19.4	96.5	55.1	291	129.7	3.4	1.2
20/03/2017	29.8	19.5	92.5	54.4	106	143.4	1.6	0.0
21/03/2017	33.0	18.4	95.2	41.8	695	175.1	1.9	12.4
22/03/2017	31.2	17.3	96.4	53.2	201	259.0	3.1	13.2
23/03/2017	24.2	15.7	96.5	67.0	325	170.7	2.6	0.0
24/03/2017	24.3	14.9	97.1	62.5	284	144.2	2.4	6.2
25/03/2017	26.9	14.6	92.7	51.7	93	154.0	1.6	0.0
26/03/2017	30.2	17.2	91.3	44.2	110	159.0	1.9	0.0
27/03/2017	29.8	15.0	95.1	36.9	230	164.3	1.6	0.0
28/03/2017	31.5	17.8	93.5	50.6	87	143.3	2.2	0.0
29/03/2017	34.6	18.4	97.0	42.4	183	192.6	2.1	0.2
30/03/2017	27.2	13.6	97.0	50.4	277	232.1	3.9	47.8
31/03/2017	23.2	12.8	79.2	43.2	32	172.2	3.6	0.0



Appendix D

Acquisition Update - Mount Thorley Warkworth
Property Portfolio

Mount Thorley Warkworth property portfolio update

March 2017

Approach

Property purchases are based on the following:

- Regulatory criteria (those properties identified as being within a zone of acquisition due to predicted impacts under current operating consent. The majority of properties owned by Coal & Allied fall into this category);

How are properties managed?

- Properties within the mining lease may or may not be tenanted depending on their distance from the operation.
- Some of the properties were purchased as part of consent conditions requiring offer of acquisition to owners. Many have been owned for some time over the 30 year life of the operation (e.g. along Putty Road).
- Properties that are tenanted are offered for lease on the open market at market rates, and are managed through local real estate agents.
- Properties must be managed in accordance with Coal & Allied standards of property management.

Current property portfolio

1909 Putty Road, Bulga
1870 Putty Road, Bulga
1758 Putty Road, Bulga
1804 Putty Road, Bulga
1855 Putty Road, Bulga
1893 Putty Road, Bulga
1906 Putty Road, Bulga
1951 Putty Road, Bulga
2119 Putty Road, Bulga
2042 Putty Road, Bulga
1946 Putty Road, Bulga
1946 Putty Road, Bulga
608 Hambledon Hill Road, Singleton
271 Wallaby Scrub Road, Bulga
277 Wallaby Scrub Road, Bulga
896 Putty Road, Mt Thorley
288 Jerrys Plains Road, Jerrys Plains
11 Inlet Road , Bulga
36 Inlet Road, Bulga
1 Wambo Road, Bulga
89 Wambo Road , Bulga

910 Putty Road, Mt Thorley
129 Wambo Road, Bulga
181 Wambo Road, Bulga
313 Wambo Road, Bulga
317 Wambo Road, Bulga
248 Wambo Road, Bulga
367 Wambo Road, Bulga
Lot 84 Jerrys Plains Road, Warkworth
28 Inlet Road, Bulga
42 Inlet Road, Bulga
5A Wollemi Peak Road, Bulga
2041 Putty Road, Bulga
16 Inlet Road, Bulga
30 Inlet Road, Bulga
2068 Putty Road, Bulga
34 Wambo Road, Bulga