

Mount Thorley Warkworth Community Consultative Committee (CCC)

BUSINESS PAPERS – May 2018

Contents page

1	Complaints.....	3
2	Incidents	4
3	Environmental Monitoring.....	6
4	Rehabilitation Plan	7
5	Acquisition Update	13
6	Website Uploads	14
7	Yancoal Corporate Investment.....	15

Appendices

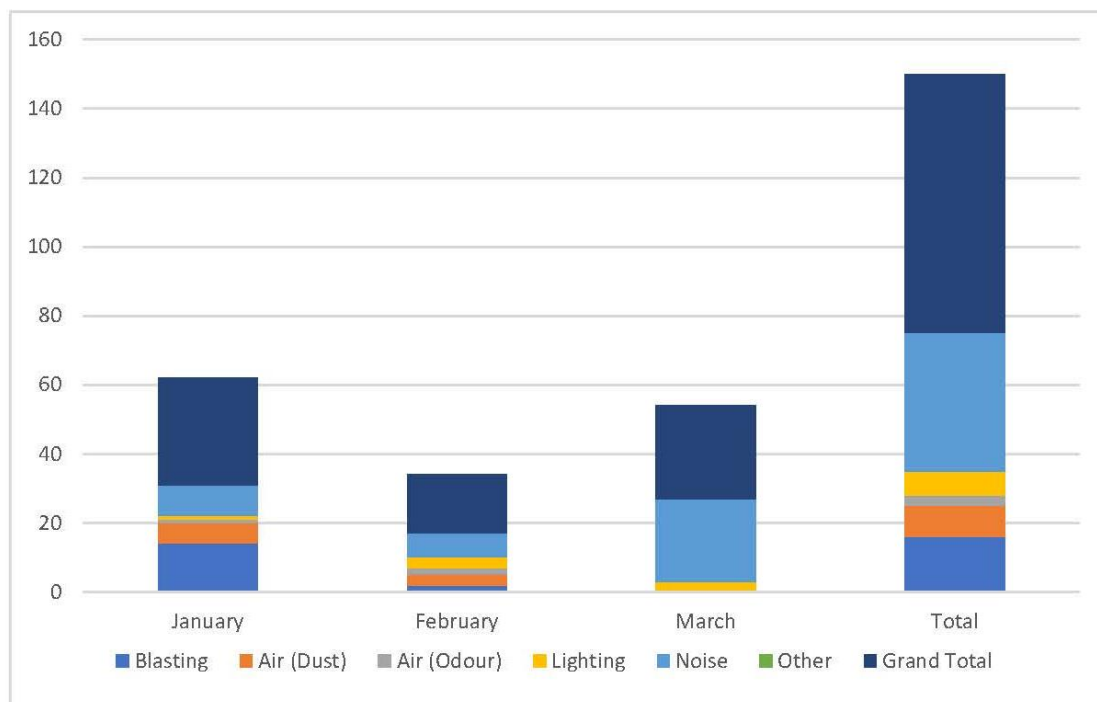
- Appendix A – Environmental Monitoring Report January 2018
- Appendix B – Environmental Monitoring Report February 2018
- Appendix C – Environmental Monitoring Report March 2018
- Appendix D – Land Acquisition Update

1 COMPLAINTS

Complaints overview for Quarter 1 and YTD 2018 (01.01.2018 - 30.03.2018)

Mount Thorley Warkworth Monthly Complaints
Summary

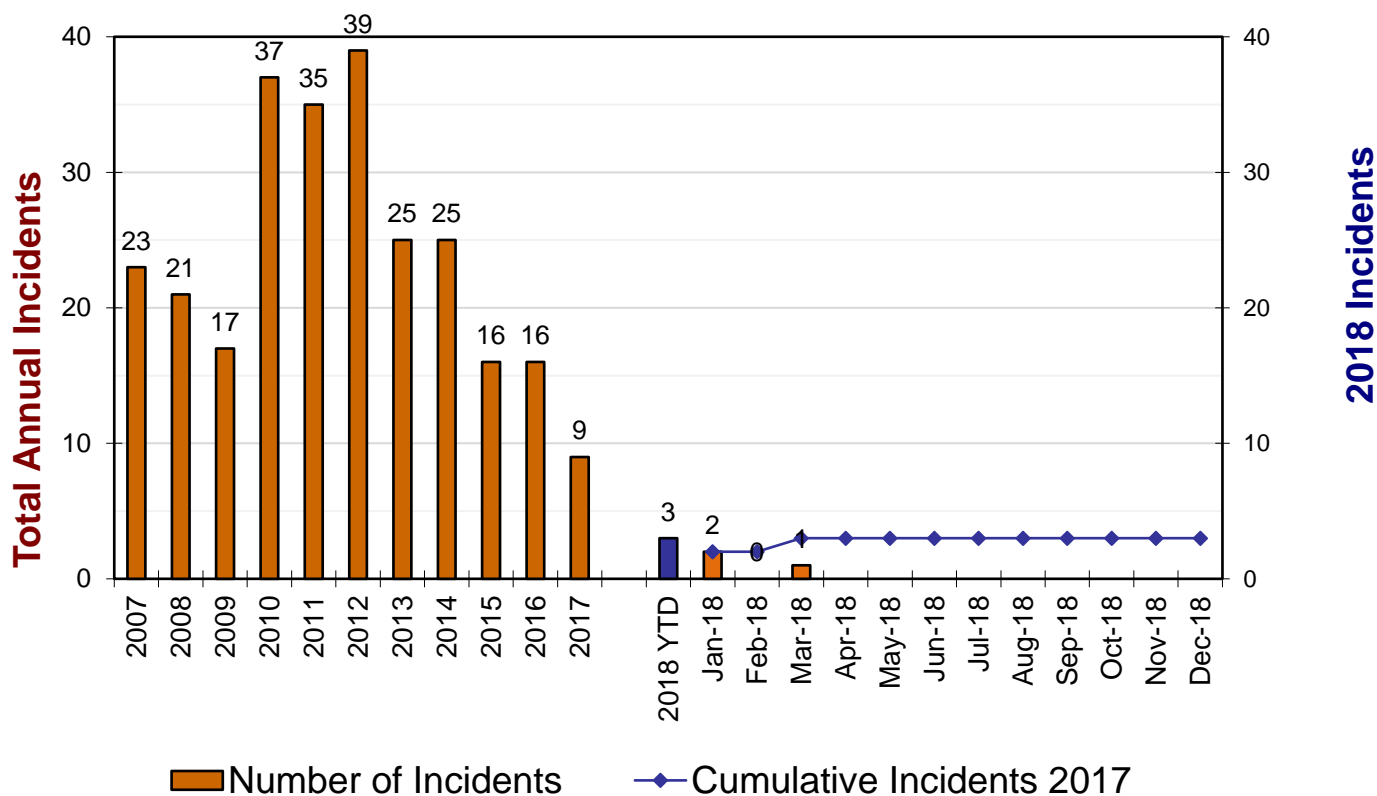
	January	February	March	Total
Blasting	14	2	0	16
Air (Dust)	6	3	0	9
Air (Odour)	1	2	0	3
Lighting	1	3	3	7
Noise	9	7	24	40
Other	0	0	0	0
Grand Total	31	17	27	75



2 INCIDENTS

Overview of environmental incidents for period first quarter 2018 – 01 January 2018 to 30 March 2018.

MTW Environmental Incidents 2018



Incident Summary for the period of 1 February 2018 to 30 March 2018.

Date	Details	Key Actions	Aspect
20-March-2018	Whilst being loaded, a rock has fallen from the side of the tray landing on the ground directly next to the fuel tank of a haul truck and bounced into the side of the fuel tank creating a hole in the tank where approximately 500-1000L of Diesel was spilt.	Spill was contained. Incident investigated.	Hydrocarbon

3 ENVIRONMENTAL MONITORING

Monthly summaries of environmental monitoring for the period 1 January 2018 to 30 March 2018.

January 2018

Attached as **Appendix A**

February 2018

Attached as **Appendix B**

March 2018

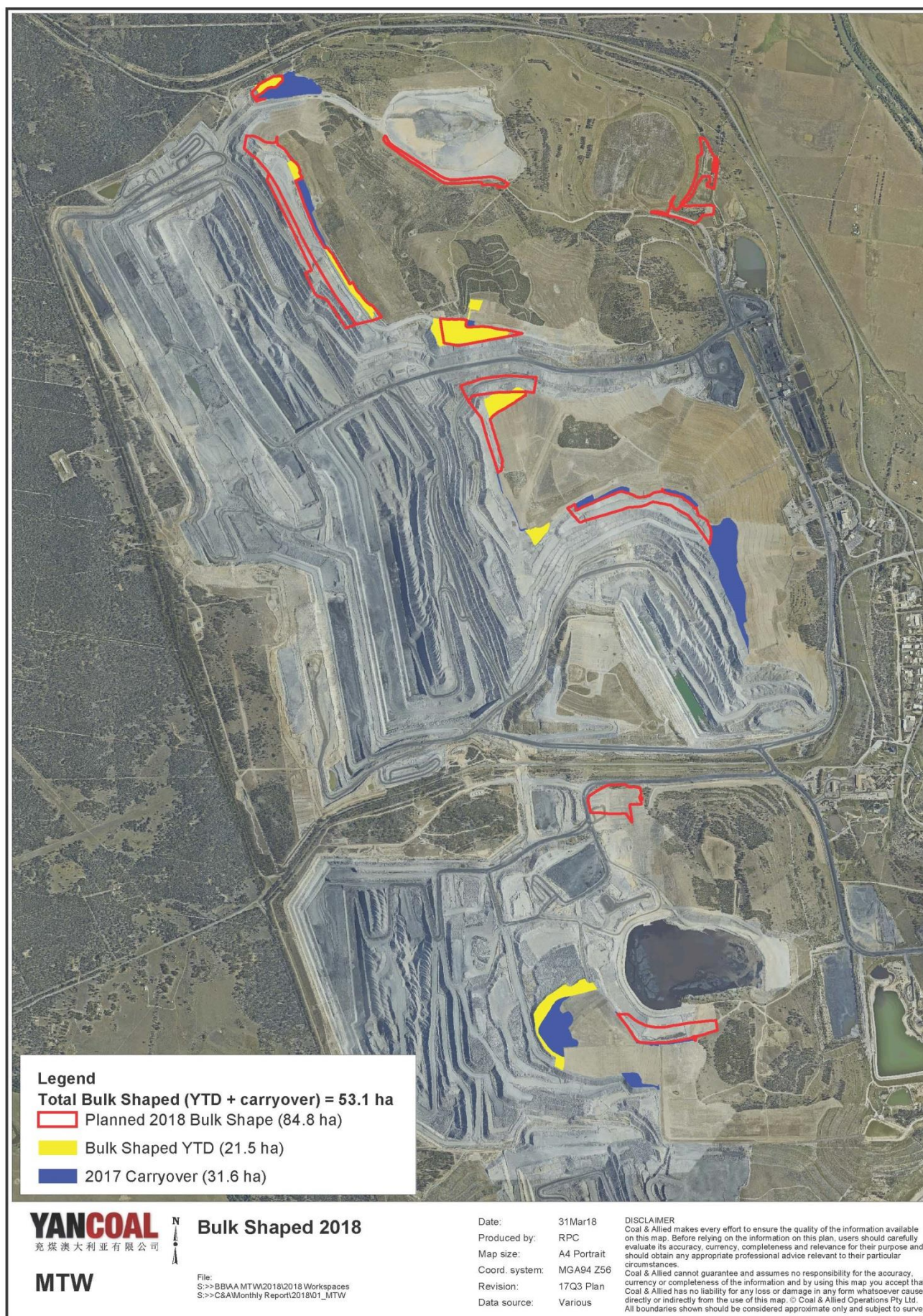
Attached as **Appendix C**

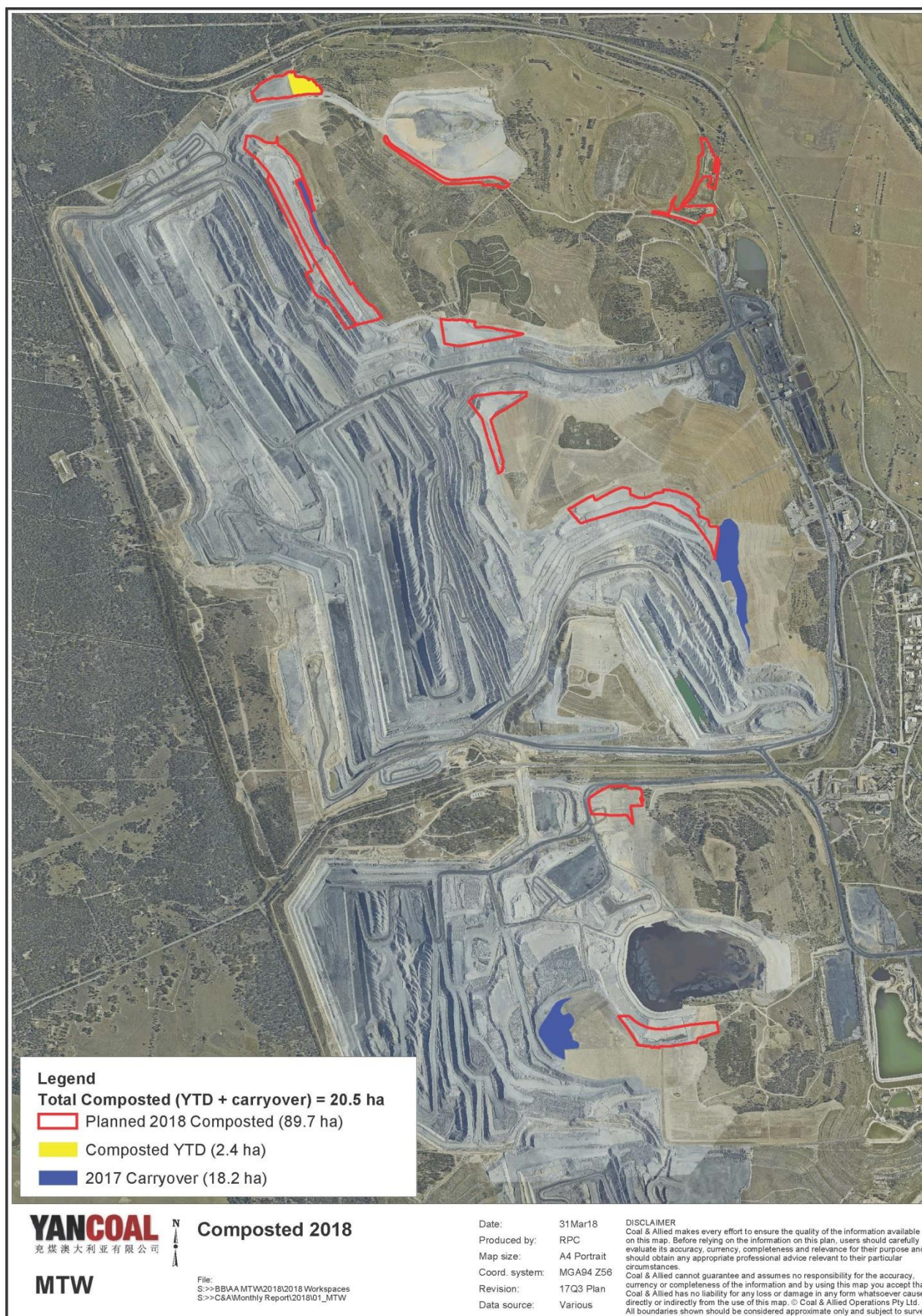
4 REHABILITATION PLAN

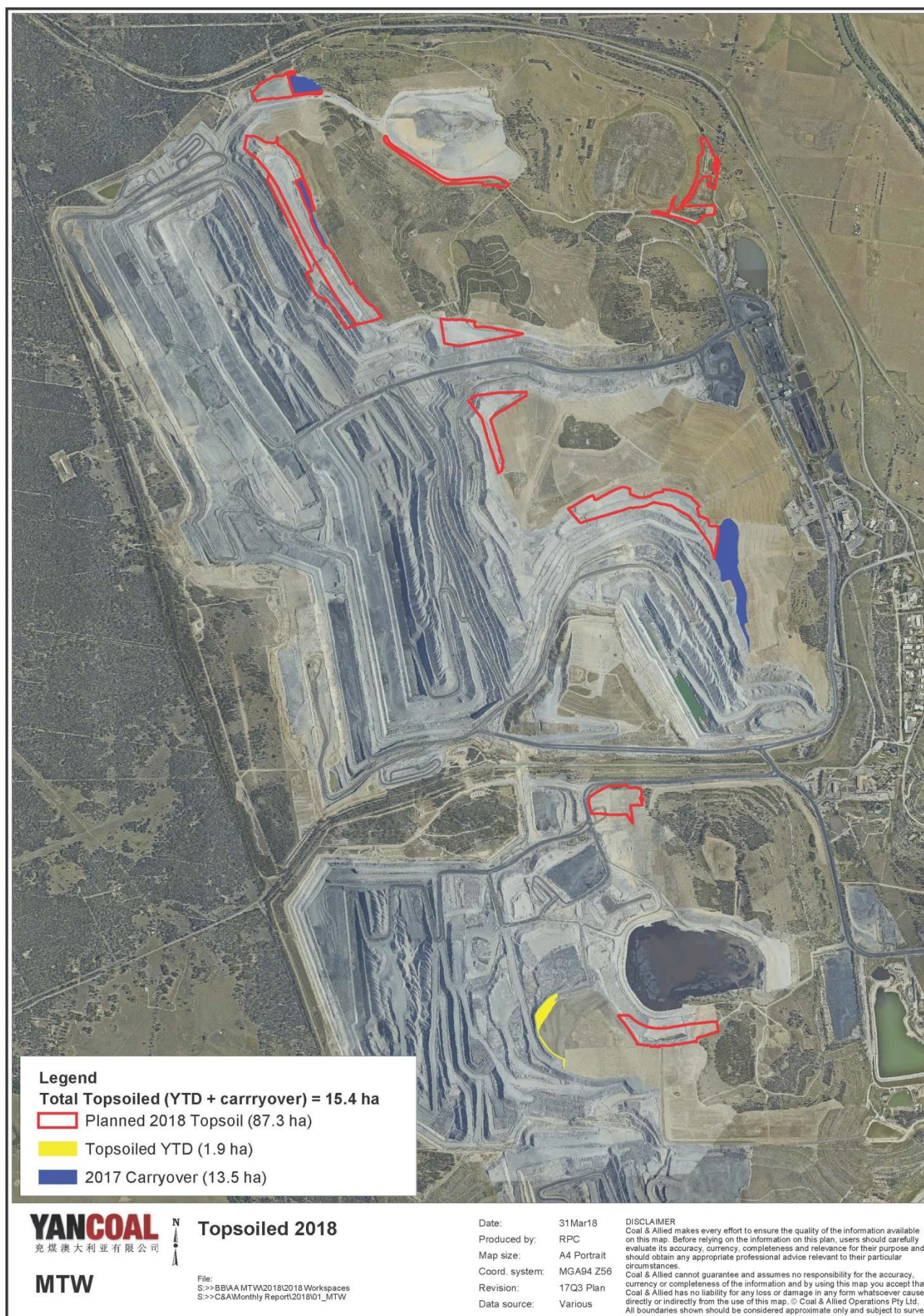
Good progress has been made to date against the 2018 MTW rehab target of 100ha, with bulk shaping completed on 53.1ha. Rehabilitation activities have progressed further on many of these areas such that 11.2ha are ready for seeding and 9.3ha have been seeded.

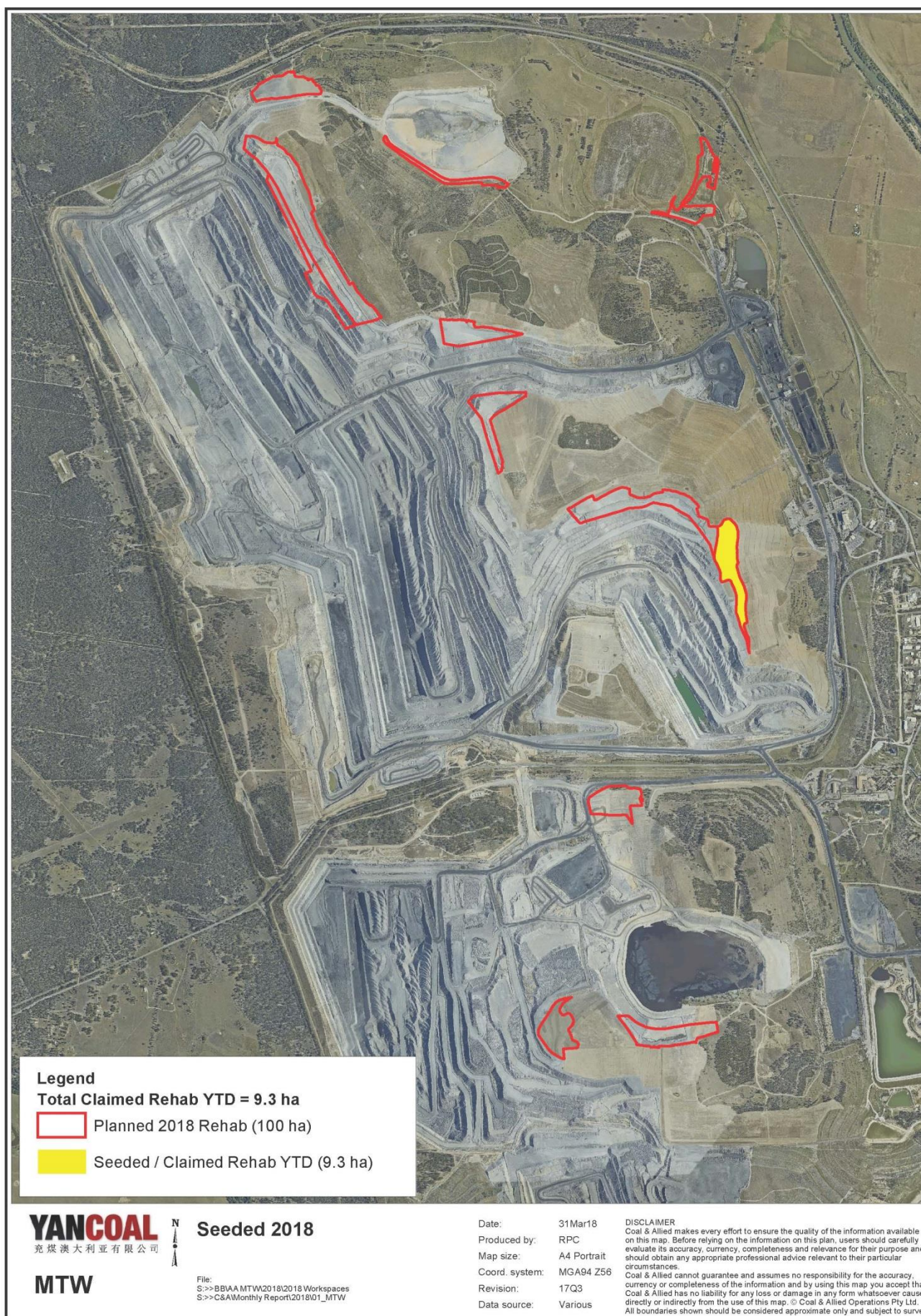
The year to date disturbance is 31.6ha. The disturbance during this period was evenly distributed between WML and MTO leases as a result of Pit advancement in West Pit, infrastructure (including implementation of water management) and stripping of rehab areas at Mt Thorley in preparation for dumping progression.

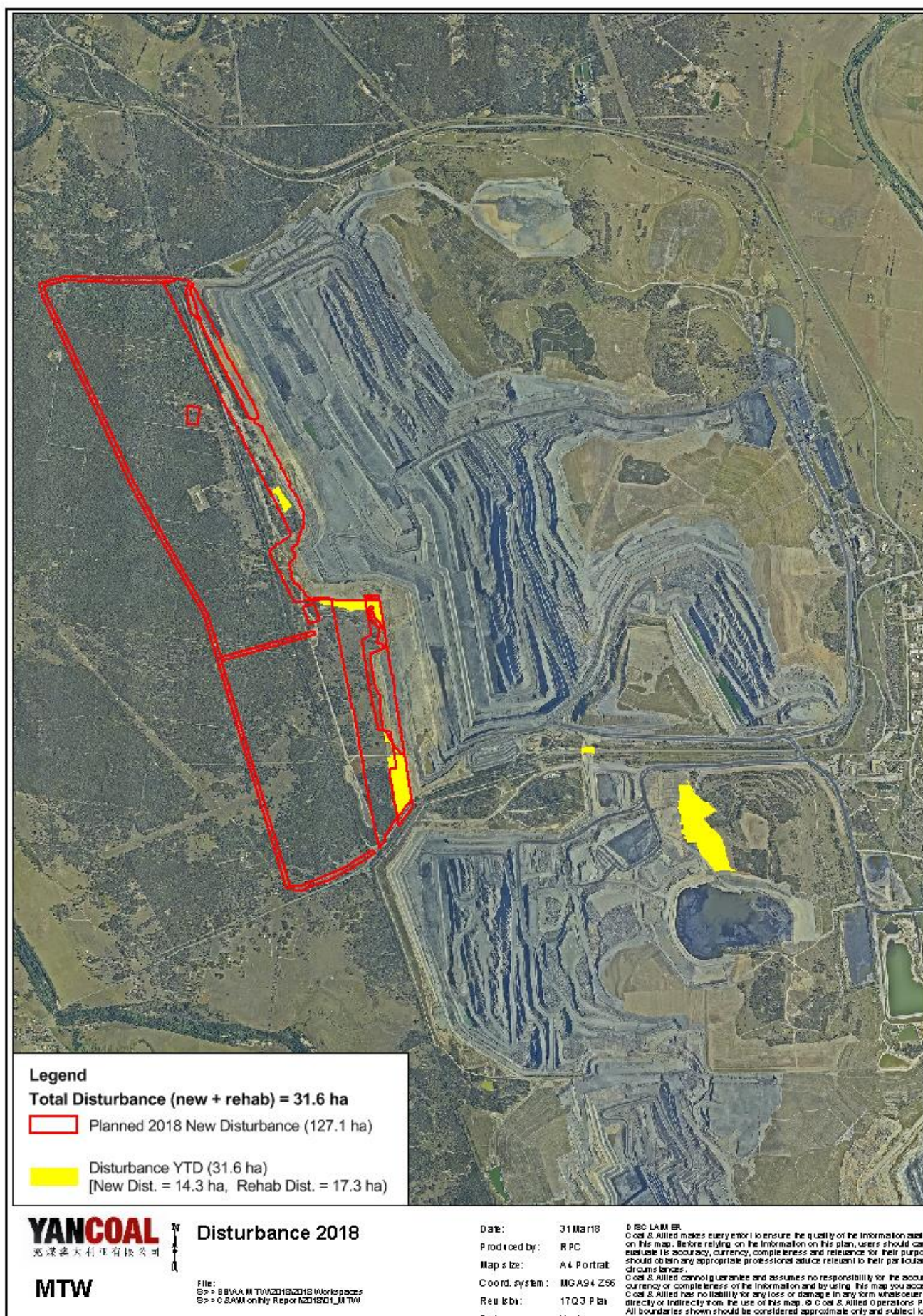
Planned disturbance to the far west of the operations is for construction of the emergency access track/fire trail (schedule 3, cond.50, SSD-6464).











5 ACQUISITION UPDATE

There have been no new land acquisitions by Yancoal. Full summary included in Appendix D.

6 WEBSITE UPLOADS

Table 1 below is a list of all documents uploaded to the MTW library of the Yancoal Australia InSite website since 19 February 2018. 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:

<https://insite.yancoal.com.au/document-library/mtw>

Document Title	Upload
Mount Thorley Warkworth Environmental Monitoring Report - December 2017	Addition
Mount Thorley Warkworth Water Management Plan	Change
Mount Thorley Warkworth Environment Protection Licence 1376 1976 Monitoring Data January 2018	Addition
Mount Thorley Warkworth - Historic Heritage Management Plan	Addition
Wollombi Brook Aboriginal Cultural Heritage Conservation Area - Plan of Management	Addition
Mount Thorley Warkworth Air Quality Management Plan	Change
Mount Thorley Warkworth Blast Management Plan	Change
Mount Thorley Warkworth Noise Management Plan	Change
Mount Thorley Warkworth Environment Protection Licence 1376 1976 Monitoring Data February 2018	Addition
Mount Thorley Warkworth Environmental Monitoring Report January 2018	Addition
Mount Thorley Warkworth Environmental Monitoring Report February 2018	Addition
Mount Thorley Warkworth Environment Protection Licence 1376 1976 Monitoring Data March 2018	Addition
MTW Community Consultative Committee Meeting Minutes - February 2018	Addition
MTW Community Consultative Committee Meeting Presentation - February 2018	Addition
MTW Community Consultative Committee Business Papers - February 2018	Addition

7 YANCOAL CORPORATE INVESTMENT

The MTW site donations program is now active. For information please contact Travis Bates.

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Appendix A: January Monthly Environmental Monitoring Report



Monthly Environmental Monitoring Report

Yancoal Mt Thorley Warkworth

January 2018

CONTENTS

1.0	INTRODUCTION.....	4
2.0	AIR QUALITY.....	4
2.1	Meteorological Monitoring	4
2.1.1	Rainfall.....	4
2.1.2	Wind Speed and Direction	4
2.2	Depositional Dust	6
2.3	Suspended Particulates	6
2.3.1	HVAS PM ₁₀ Results	6
2.3.2	TSP Results	7
2.3.3	Real Time PM ₁₀ Results	8
2.3.4	Real Time Alarms for Air Quality.....	8
3.0	WATER QUALITY	9
3.1	Surface Water	9
3.2	Groundwater Monitoring	9
3.3	HRSTS Discharge	9
4.0	BLAST MONITORING	10
4.1	Blast Monitoring Results	10
5.0	NOISE	13
5.1	Attended Noise Monitoring Results	13
5.1.1	WML Noise Assessment	13
5.1.3	MTO Noise Assessment.....	14
5.1.4	NPfI Low Frequency Assessment.....	15
5.2	Noise Management Measures	17
6.0	OPERATIONAL DOWNTIME.....	17
7.0	REHABILITATION	17
8.0	ENVIRONMENTAL INCIDENTS.....	18
9.0	COMPLAINTS.....	18
	Appendix A: Meteorological Data.....	19

Figures

Figure 1: Rainfall Trend YTD	4
Figure 2: Charlton Ridge Wind Rose – January 2018	4
Figure 3: Air Quality Monitoring Locations	5
Figure 4: Depositional Dust – January 2018	6
Figure 5: Individual PM ₁₀ Results – January 2018	7
Figure 6: Annual Average PM ₁₀ – January 2018	7
Figure 7: Annual Average Total Suspended Particulates – January 2018	7
Figure 8: Real Time PM ₁₀ daily 24hr average and annual average – January 2018	9
Figure 9: Abbey Green Blast Monitoring Results – January 2018	10
Figure 10: Bulga Village Blast Monitoring Results – January 2018	10
Figure 11: MTIE Blast Monitoring Results – January 2018	11
Figure 12: Wollemi Peak Road Blast Monitoring Results – January 2018	11
Figure 13: Wambo Road Blast Monitoring Results – January 2018	11
Figure 14: Warkworth Blast Monitoring Results – January 2018	11
Figure 15: MTW Blast Monitoring Location Plan	12
Figure 16: Noise Monitoring Location Plan	16
Figure 17: Operational Downtime by Equipment Type – January 2018	17
Figure 18: Rehabilitation YTD – January 2018	18

Tables

Table 1: Monthly Rainfall MTW	4
Table 2: Blasting Limits	10
Table 3: L _{Aeq, 15 minute} Warkworth Impact Assessment Criteria – January 2018	13
Table 4: L _{A1, 1 minute} Warkworth - Impact Assessment Criteria – January 2018	13
Table 5: L _{Aeq, 15minute} Mount Thorley - Impact Assessment Criteria – January 2018	14
Table 6: L _{A1, 1Minute} Mount Thorley - Impact Assessment Criteria – January 2018	14
Table 7: Low Frequency Noise Modifying Factor Assessment – January 2018	15
Table 8: Supplementary Attended Noise Monitoring Data – January 2018	17
Table 9: Complaints Summary YTD	18
Table 10: Meteorological Data – Charlton Ridge Meteorological Station – January 2018	20

Revision History

Version No.	Person Responsible	Document Status	Date
1.0	Environmental Advisor	Draft	02/03/2018
1.1	Environmental Specialist	Final	15/03/2018

1.0 INTRODUCTION

This report has been compiled to provide a monthly summary of environmental monitoring results for Mt Thorley Warkworth (MTW). This report includes all monitoring data collected for the period 1st January to 31st January 2018.

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

2018	Monthly Rainfall (mm)	Cumulative Rainfall (mm)
January	10.8	10.8

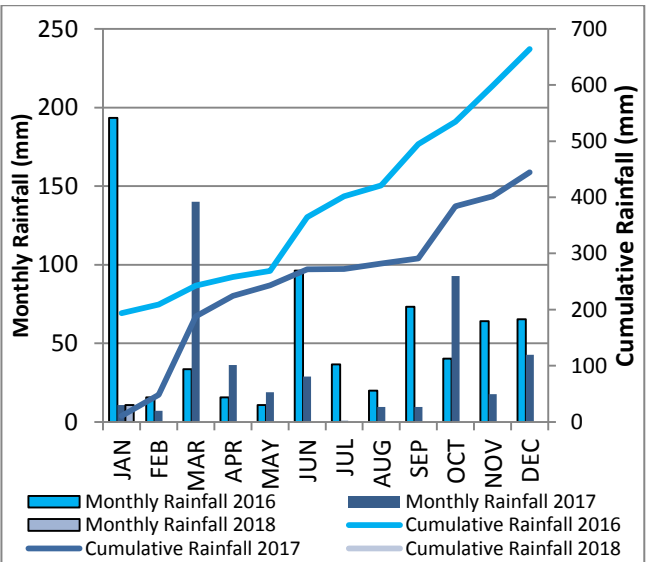


Figure 1: Rainfall Trend YTD

2.1.2 Wind Speed and Direction

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

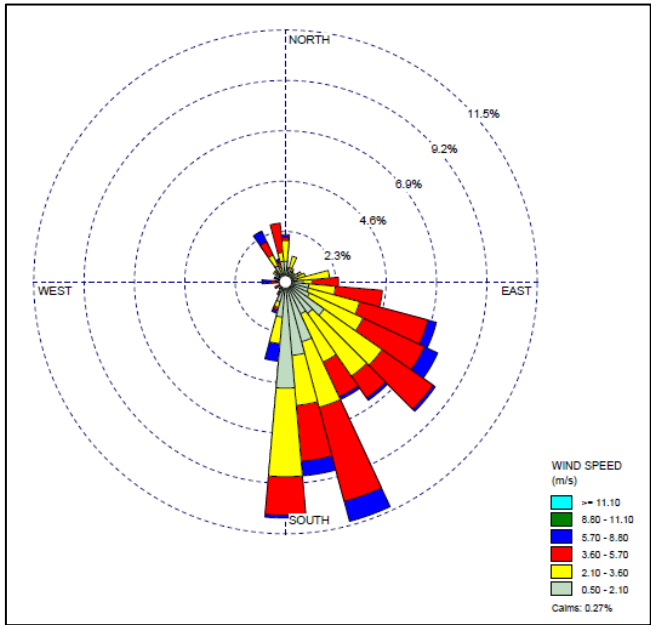


Figure 2: Charlton Ridge Wind Rose – January 2018

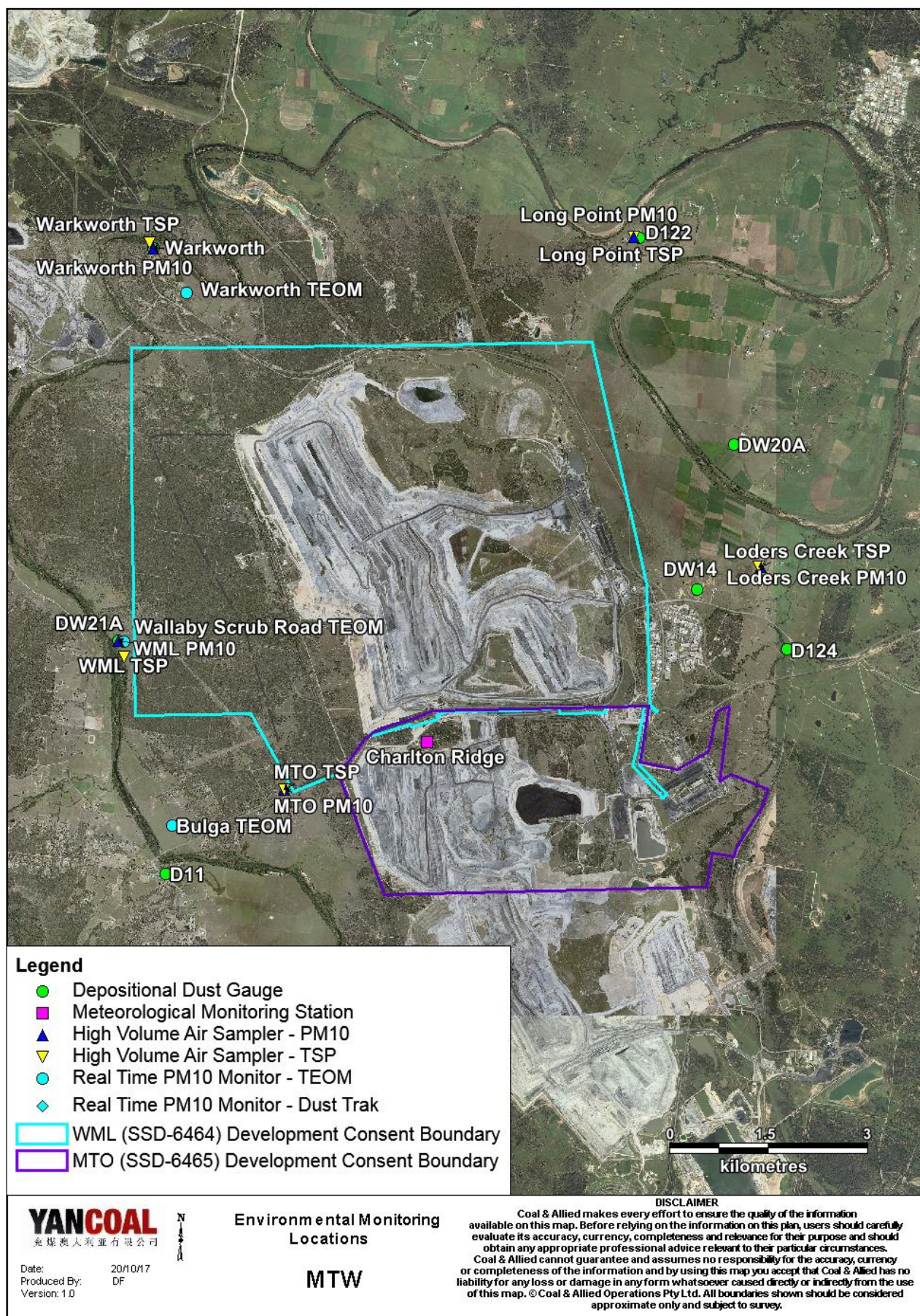


Figure 3: Air Quality Monitoring Locations

2.2 Depositional Dust

To monitor regional air quality, MTW operates and maintains a network of seven 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 DW21A and Warkworth monitors recorded a monthly result above the long term impact assessment criteria of 4.0 g/m² per month. Field notes associated with DW21A confirm the presence of insects and bird droppings. As such the result is considered contaminated and will be excluded from calculation of the annual average. There is no evidence to suggest that the Warkworth result is contaminated. Accordingly, the result will be included in the annual average calculation.

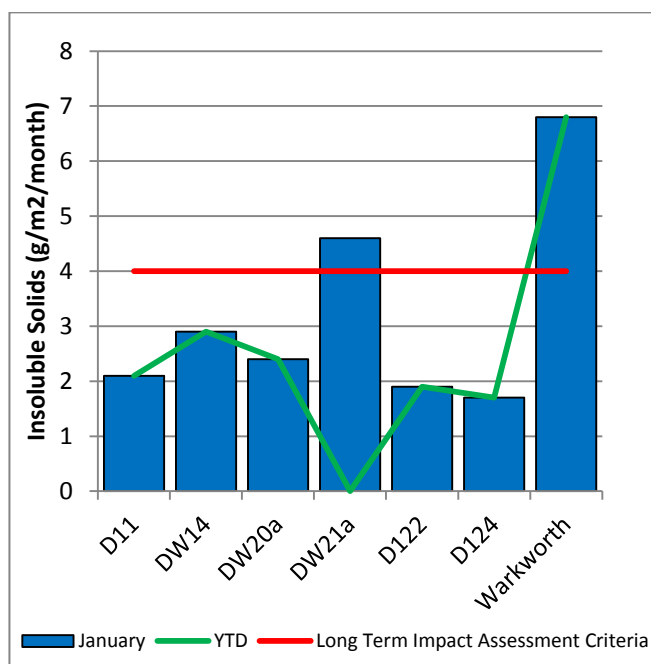


Figure 4: Depositional Dust – January 2018

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

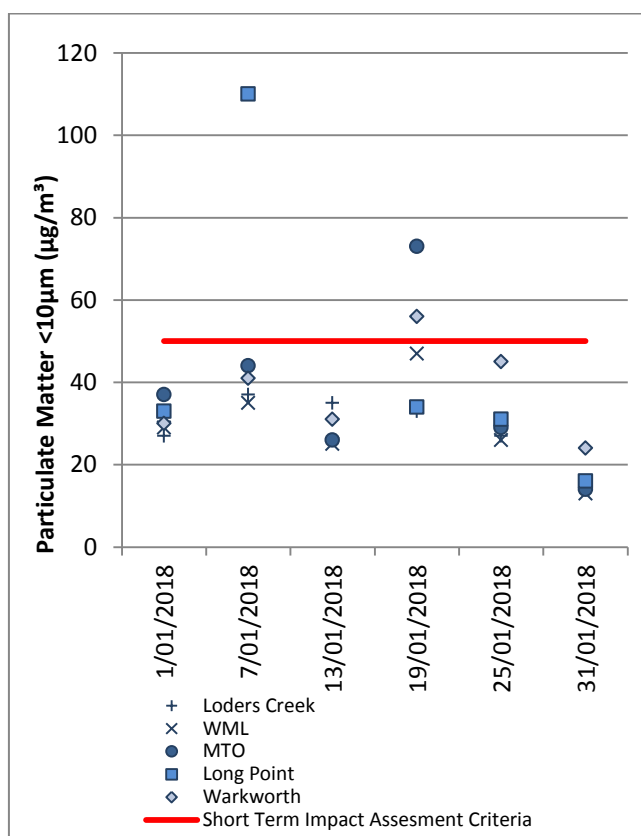


Figure 5 shows the individual PM₁₀ results at each monitoring station against the short term impact assessment criteria of 50µg/m³.

Data was not available on 13/01/2018 at the Long Point HVAS due to HVAS motor fault.

On 7/01/2018 the Long Point HVAS PM₁₀ unit recorded results which were greater than the short term (24hr) PM₁₀ impact assessment criteria of 50µg/m³. Investigation determined that MTW's maximum contribution at the Long Point monitor was <19.5 µg/m³.

Accordingly, no further action is required (as per approved Air Quality Monitoring Programme).

On 19/01/2018, two HVAS PM₁₀ units recorded results which were greater than the short term (24hr) PM₁₀ impact assessment criteria; MTO (73 µg/m³) and Warkworth (56µg/m³).

Investigation determined that HVO's maximum contribution at each monitor is as follows:

- MTO – 42.7 $\mu\text{g}/\text{m}^3$; or 58% of the measured result.
- Warkworth – 23 $\mu\text{g}/\text{m}^3$ or 41% of the measured result.

Accordingly, no further action is required (as per approved Air Quality Monitoring Programme).

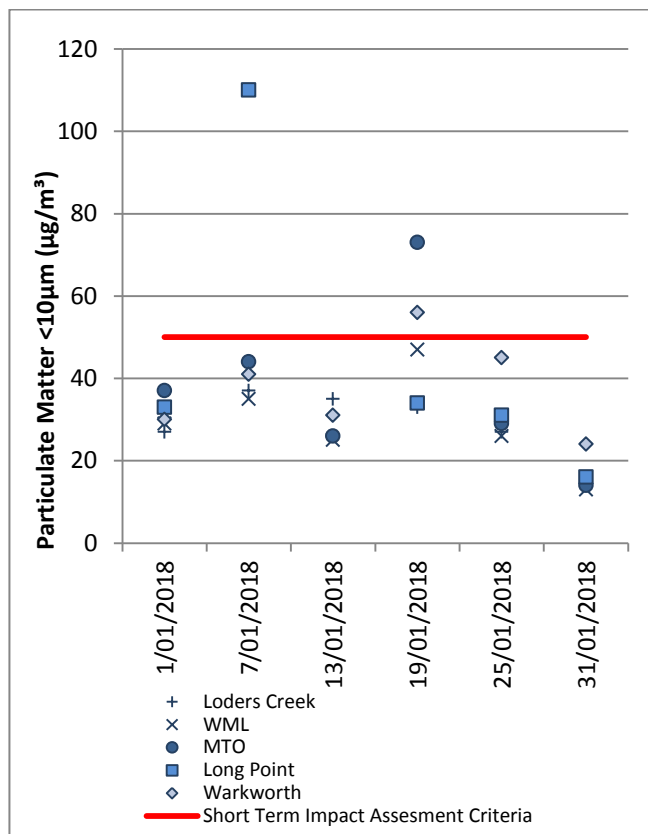


Figure 5: Individual PM₁₀ Results – January 2018

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

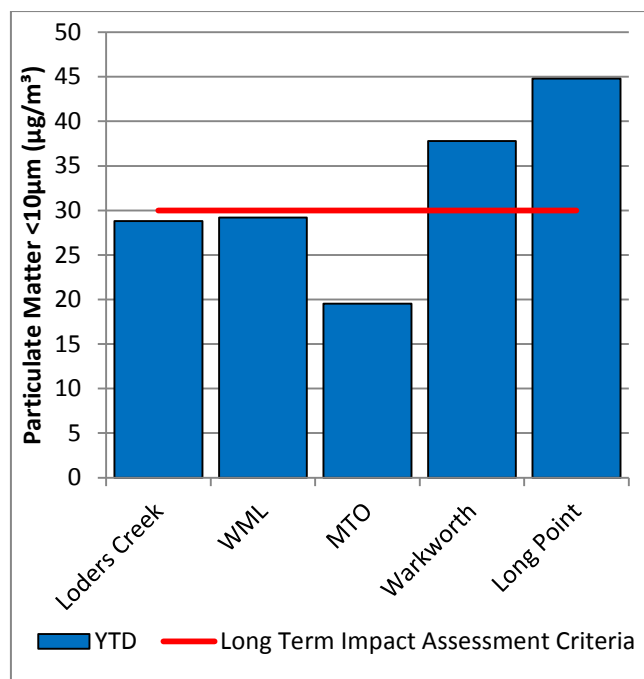


Figure 6: Annual Average PM₁₀ – January 2018

2.3.2 TSP Results

Figure 7 shows the annual average TSP results compared against the long term impact assessment criteria of 90 $\mu\text{g}/\text{m}^3$.

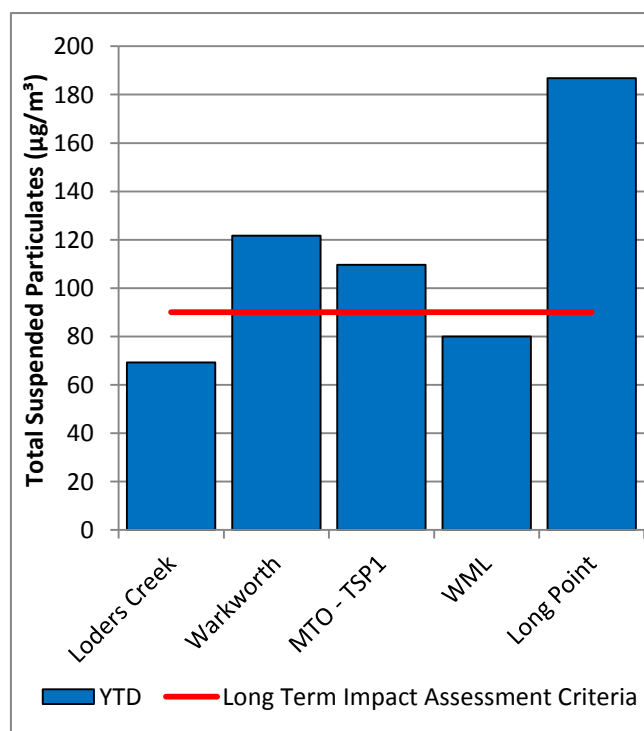


Figure 7: Annual Average Total Suspended Particulates – January 2018

2.3.3 Real Time PM₁₀ Results

Mt 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.

One result recorded elevated levels at the Bulga TEOM (62.4 µg/m³) which exceeded the short term (24hr) criteria on 9th January 2018. This measurement was assessed for MTW's maximum potential contribution based on mining activities and meteorological conditions on this day resulting in a maximum estimated contribution of <8 µg/m³ from the direction of MTW.

Two results recorded elevated levels at the Warkworth TEOM which exceeded the short term (24hr) criteria. These measurements were assessed for MTW's maximum potential contribution based on mining activities and meteorological conditions on these days.

Resulting in the following maximum estimated contributions from the direction of MTW:

- 19 January 2018 – 27.6 µg/m³; and
- 24 January 2018 – 28.4 µg/m³.

2.3.4 Real Time Alarms for Air Quality

During January, the real time monitoring system generated 188 automated air quality related alerts, including 48 alert for adverse meteorological conditions and 140 alerts for elevated PM₁₀ levels.

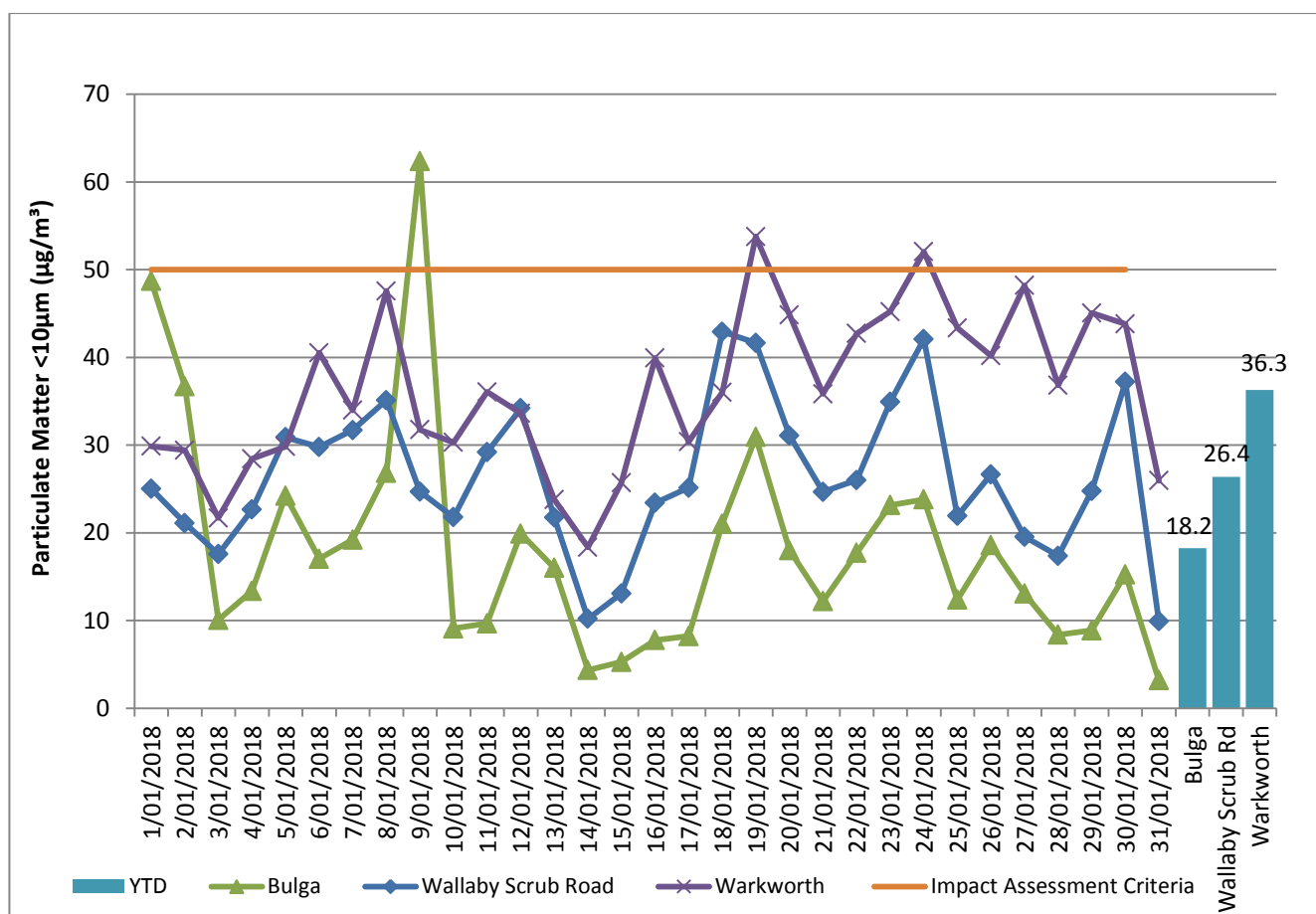


Figure 8: Real Time PM₁₀ daily 24hr average and annual average – January 2018

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 2018 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 2018 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 **Error! eference source not found..**

4.1 Blast Monitoring Results

During January 2018, 24 blasts were initiated at MTW. Figure 9 to Figure 12 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.

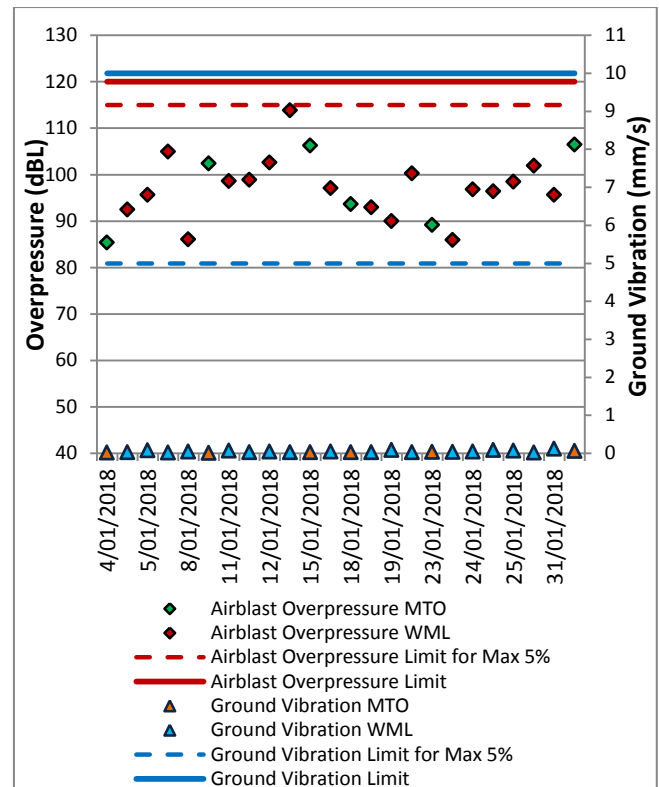


Figure 9: Abbey Green Blast Monitoring Results – January 2018

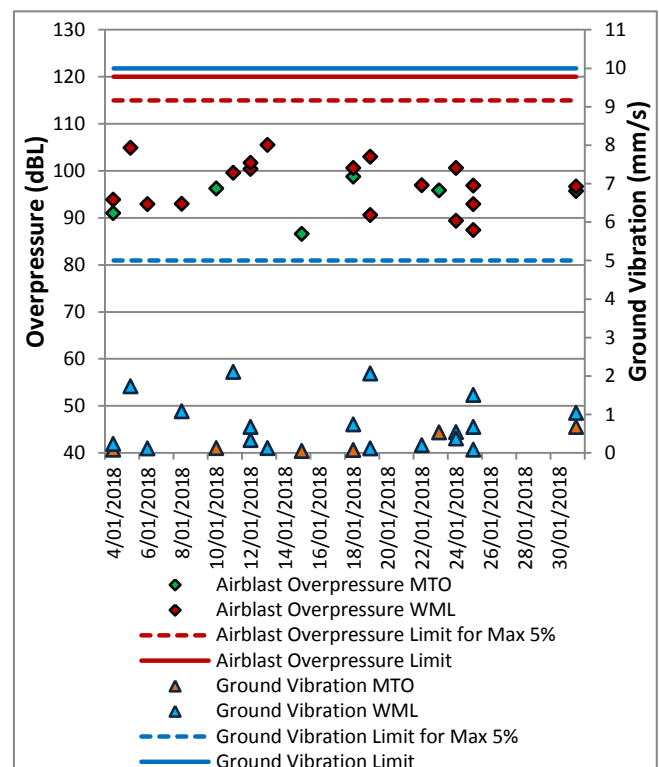


Figure 10: Bulga Village Blast Monitoring Results – January 2018

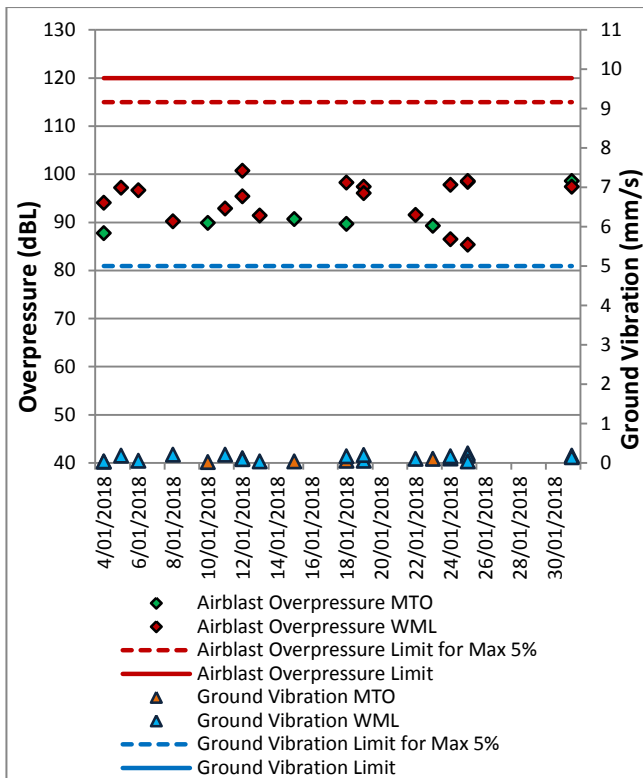


Figure 11: MTIE Blast Monitoring Results – January 2018

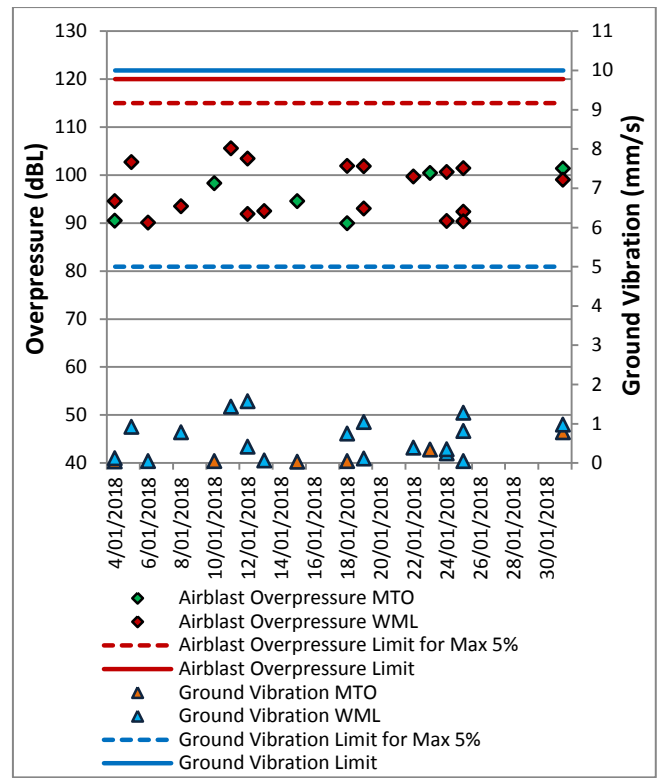


Figure 13: Wambo Road Blast Monitoring Results – January 2018

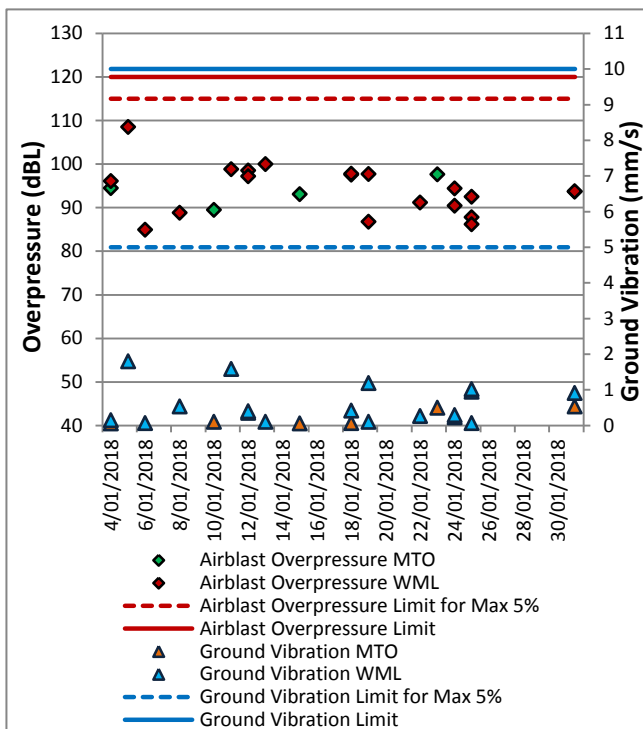


Figure 12: Wollemi Peak Road Blast Monitoring Results – January 2018

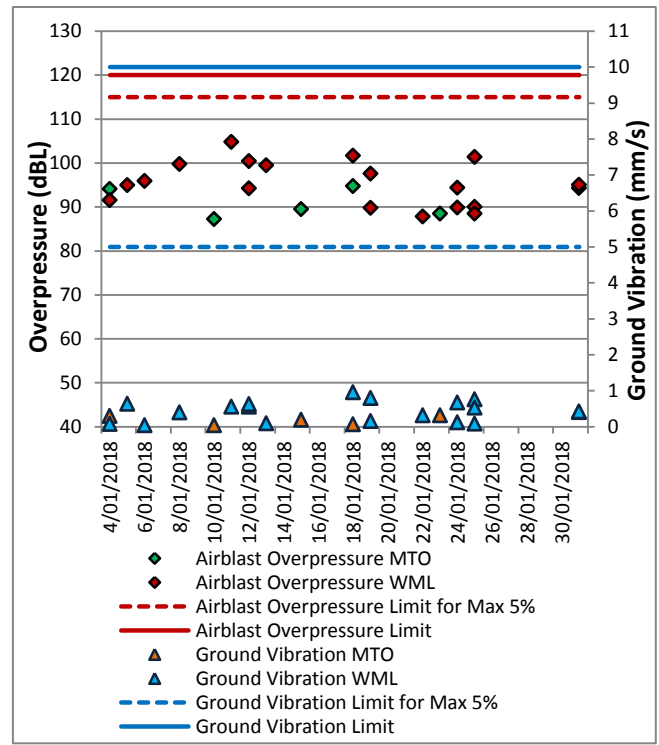


Figure 14: Warkworth Blast Monitoring Results – January 2018

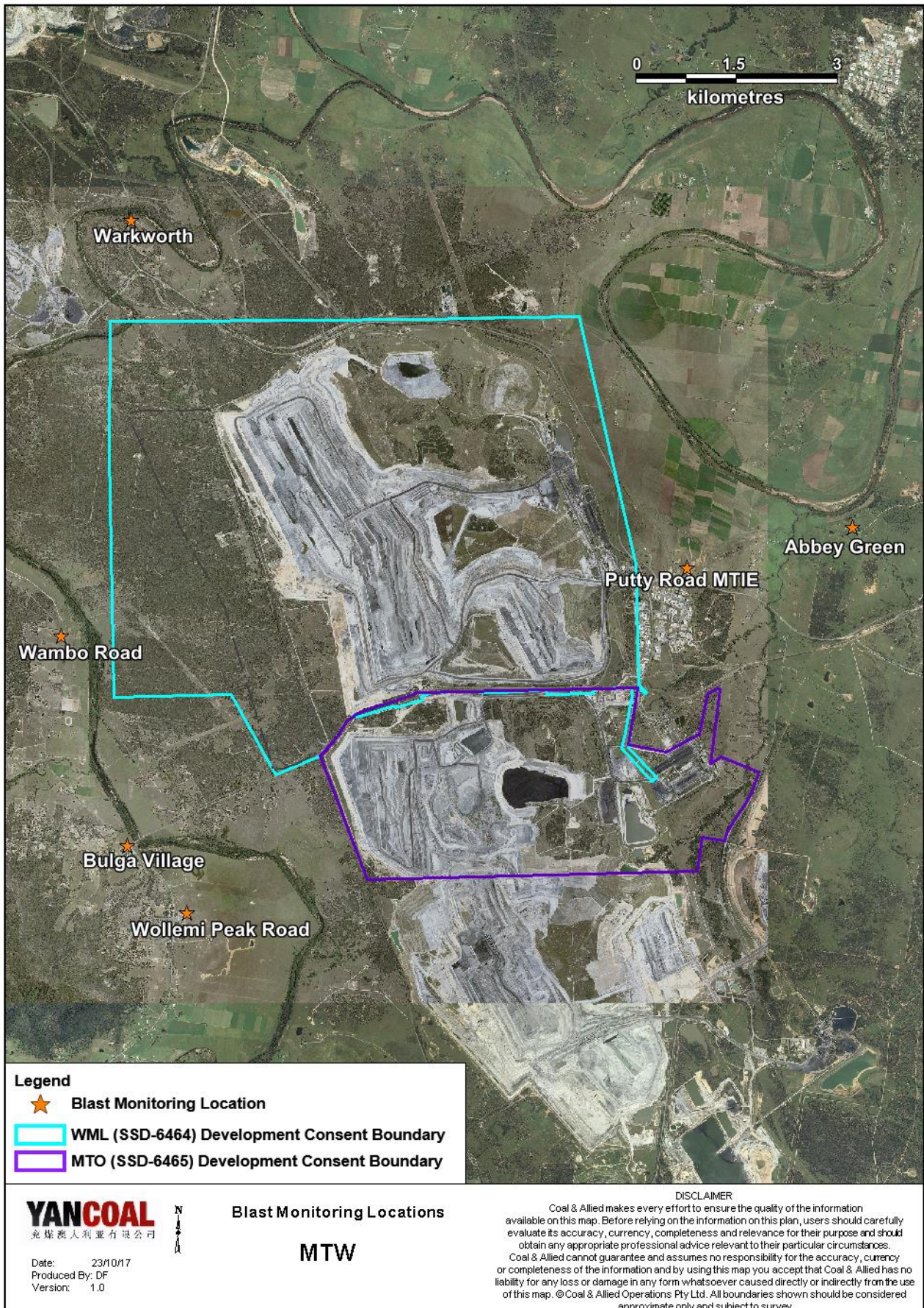


Figure 15: MTW Blast Monitoring Location Plan

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 five sites surrounding MTW. Noise monitoring locations are displayed in Figure 16.

5.1 Attended Noise Monitoring Results

Attended monitoring was conducted at receiver locations surrounding MTW on the night of 16 January 2018. 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 2018

Location	Date and Time	Wind Speed (m/s) ⁵	Stability Class	Criterion dB(A)	Criterion Applies? ^{1,5}	WML L _{Aeq} dB ^{2,4}	Exceedance ³
Bulga RFS	16/01/2018 23:12	4.1	D	37	No	IA	NA
Bulga Village	16/01/2018 23:12	4.2	D	38	No	IA	NA
Gouldsville	16/01/2018 23:12	3.9	D	38	No	IA	NA
Inlet Rd	16/01/2018 23:12	3.9	D	37	No	<25	NA
Inlet Rd West	16/01/2018 23:12	4.4	D	35	No	IA	NA
Long Point	16/01/2018 23:12	4.4	D	35	No	IA	NA
South Bulga	16/01/2018 23:12	2.8	D	35	Yes	IA	Nil
Wambo Road	16/01/2018 23:12	4.0	D	38	No	<25	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_{Aeq,15minute} attributed to WML;

3. NA means atmospheric conditions outside conditions specified in development consent and so criterion is not applicable;

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.

6. Revised L_{Aeq, 15minute} level following application of low frequency noise penalty as per the INP where applicable.

Table 4: L_{A1, 1 minute} Warkworth - Impact Assessment Criteria – January 2018

Location	Date and Time	Wind Speed (m/s) ⁵	Stability Class	Criterion dB(A)	Criterion Applies? ^{1,5}	WML L _{A1, 1min} dB ^{2,4}	Exceedance ³
Bulga RFS	16/01/2018 23:12	4.1	D	47	No	IA	NA
Bulga Village	16/01/2018 23:12	4.2	D	48	No	IA	NA
Gouldsville	16/01/2018 23:12	3.9	D	48	No	IA	NA
Inlet Rd	16/01/2018 23:12	3.9	D	47	No	<30	NA
Inlet Rd West	16/01/2018 23:12	4.4	D	45	No	IA	NA
Long Point	16/01/2018 23:12	4.4	D	45	No	IA	NA
South Bulga	16/01/2018 23:12	2.8	D	45	Yes	IA	Nil
Wambo Road	16/01/2018 23:12	4.0	D	48	No	<25	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 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.

5.1.3 MTO Noise Assessment

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

Table 5: L_{Aeq, 15minute} Mount Thorley - Impact Assessment Criteria – January 2018

Location	Date and Time	Wind Speed (m/s) ⁵	Stability Class	Criterion dB	Criterion Applies? ^{1,5}	MTO L _{Aeq} dB ^{2,4}	Exceedance ³
Bulga RFS	16/01/2018 23:12	4.1	D	37	No	IA	NA
Bulga Village	16/01/2018 23:12	4.2	D	38	No	IA	NA
Gouldsville	16/01/2018 23:12	3.9	D	35	No	<30	NA
Inlet Rd	16/01/2018 23:12	3.9	D	37	No	IA	NA
Inlet Rd West	16/01/2018 23:12	4.4	D	35	No	IA	NA
Long Point	16/01/2018 23:12	4.4	D	35	No	IA	NA
South Bulga	16/01/2018 23:12	2.8	D	36	Yes	IA	Nil
Wambo Road	16/01/2018 23:12	4.0	D	38	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 LAeq,15minute attributed to WML;
3. NA means atmospheric conditions outside conditions specified in development consent and so criterion is not applicable;
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.
6. Revised LAeq, 15minute level following application of low frequency noise penalty as per the INP where applicable.

Table 6: L_{A1, 1Minute} Mount Thorley - Impact Assessment Criteria – January 2018

Location	Date and Time	Wind Speed (m/s) ⁵	Stability Class	Criterion dB	Criterion Applies? ^{1,5}	MTO L _{A1, 1min} dB ^{2,4}	Exceedance ³
Bulga RFS	16/01/2018 23:12	4.1	D	47	No	IA	NA
Bulga Village	16/01/2018 23:12	4.2	D	48	No	IA	NA
Gouldsville	16/01/2018 23:12	3.9	D	45	No	<30	NA
Inlet Rd	16/01/2018 23:12	3.9	D	47	No	IA	NA
Inlet Rd West	16/01/2018 23:12	4.4	D	45	No	IA	NA
Long Point	16/01/2018 23:12	4.4	D	45	No	IA	NA
South Bulga	16/01/2018 23:12	2.8	D	46	Yes	IA	Nil
Wambo Road	16/01/2018 23:12	4.0	D	48	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 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.

5.1.4 NPfI Low Frequency Assessment

In accordance with the requirements of the EPA's Noise Policy for Industry (NPfI), the applicability of the low frequency modification penalty has been assessed. During January 2018 no measurements required the penalty to be applied. The assessment for low frequency noise is shown in Table 7.

Table 7: Low Frequency Noise Modifying Factor Assessment – January 2018

Location	Date and Time	Measured Site Only LA _{eq} dB (WML/MTO)	Site Only L _{Ceq} dB ⁴ (WML/MTO)	Site Only LC _{eq} – LA _{eq} dB ^{1,4} (WML/MTO)	Result Max exceedance of ref spectrum dB (WML/MTO) ^{2,3,4}	Penalty dB(A)	Exceedance
Bulga RFS	16/01/2018 23:12	IA/IA	NA/NA	NA/NA	NA/NA	NA/NA	NA
Bulga Village	16/01/2018 23:12	IA/IA	NA/NA	NA/NA	NA/NA	NA/NA	NA
Gouldsville	16/01/2018 23:12	IA/<30	NA/NA	NA/NA	NA/NA	NA/NA	NA
Inlet Rd	16/01/2018 23:12	<25/IA	NA/NA	NA/NA	NA/NA	NA/NA	NA
Inlet Rd West	16/01/2018 23:12	IA/IA	NA/NA	NA/NA	NA/NA	NA/NA	NA
Long Point	16/01/2018 23:12	IA/IA	NA/NA	NA/NA	NA/NA	NA/NA	NA
South Bulga	16/01/2018 23:12	IA/IA	NA/NA	NA/NA	NA/NA	NA/NA	NA
Wambo Road	16/01/2018 23:12	<25/IA	NA/NA	NA/NA	NA/NA	NA/NA	NA

Notes:

1. As per NPfI, if LC_{eq} – LA_{eq} >= 15 dB further assessment of low frequency noise required.

2. As per NPfI, compare measured spectrum against reference spectrum to determine if the low frequency modifying factor is triggered and application of penalty is required;

3. Bold results and penalties in red are where the relevant modifying factor trigger was exceeded; and

4. Where it is not possible to determine the site only result due to the presence of other low frequency noise sources occurring during the measurement, or where criteria were not applicable due to meteorological conditions, this is noted as NA (not available) and no further assessment has been undertaken.

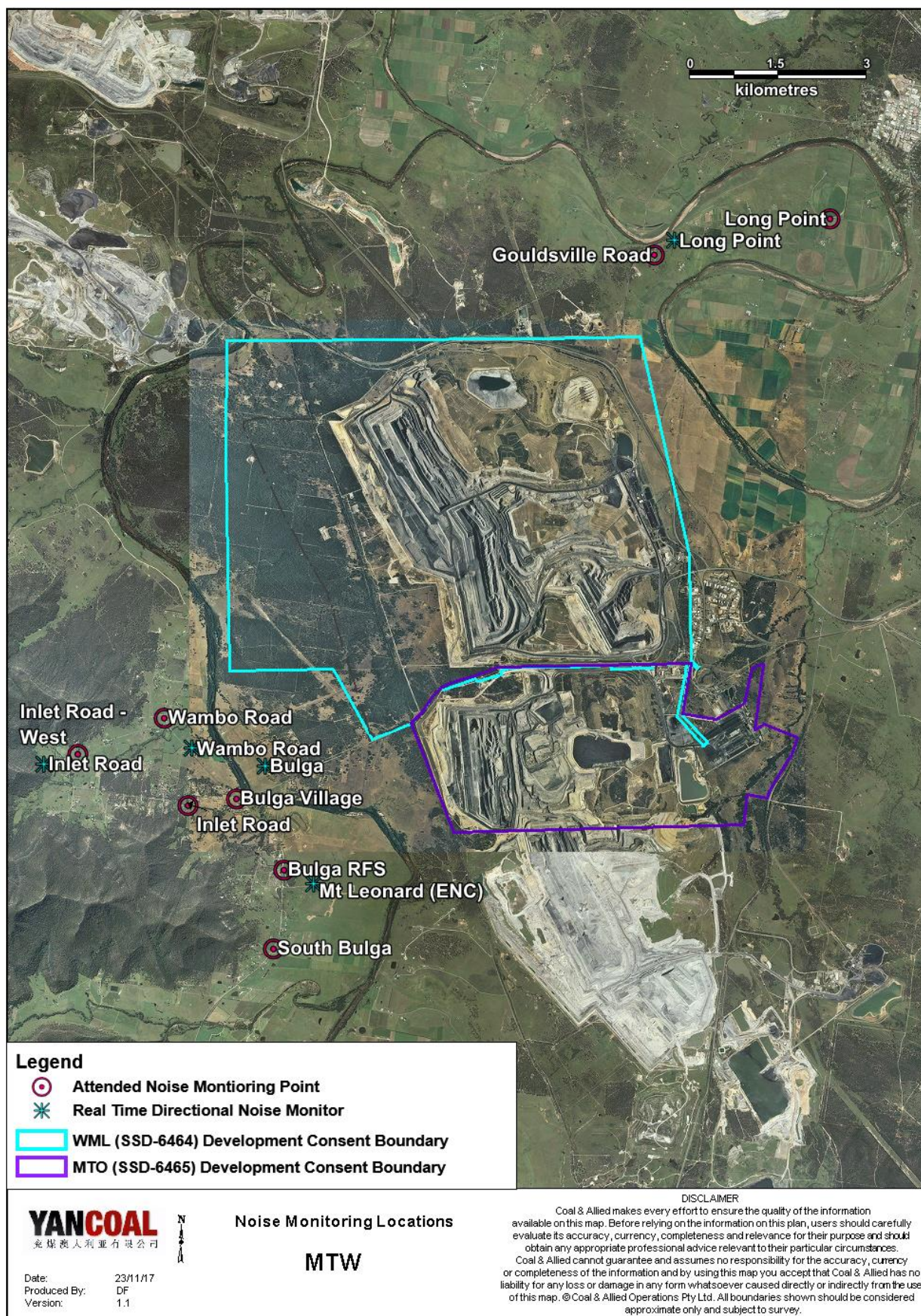


Figure 16: Noise Monitoring Location Plan

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:

- 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 8.

Table 8: Supplementary Attended Noise Monitoring Data – January 2018

No. of assessments	No. of assessments > trigger	No. of nights where assessments > trigger	% greater than trigger
539	3	3	0.6

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 2531 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.

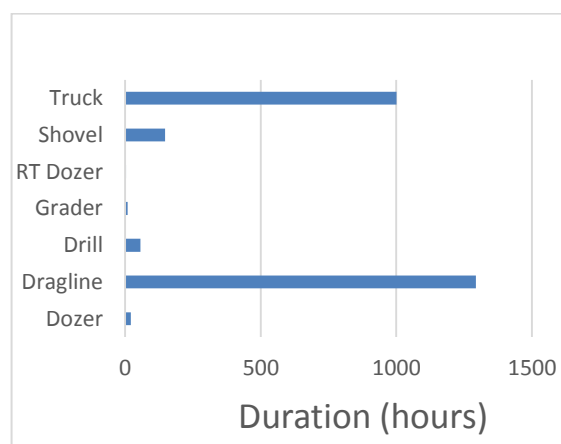


Figure 17: Operational Downtime by Equipment Type – January 2018

7.0 REHABILITATION

During January, 1.3 Ha of land was released, 1.8 Ha of land was bulk shaped and 9.3 Ha of land was rehabilitated.

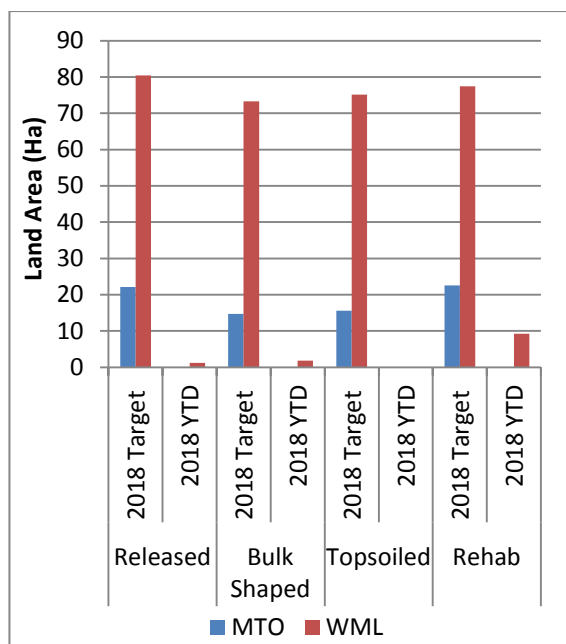


Figure 18: Rehabilitation YTD – January 2018

8.0 ENVIRONMENTAL INCIDENTS

During the reporting period there were no reportable environmental incidents.

9.0 COMPLAINTS

During the reporting period 30 complaints were received. Details of these complaints are shown in Table 9 below.

Table 9: Complaints Summary YTD

	Noise	Dust	Blast	Lighting	Other	Total
January	9	6	14	1	1	31
February	-	-	-	-	-	-
March	-	-	-	-	-	-
April	-	-	-	-	-	-
May	-	-	-	-	-	-
June	-	-	-	-	-	-
July	-	-	-	-	-	-
August	-	-	-	-	-	-
September	-	-	-	-	-	-
October	-	-	-	-	-	-
November	-	-	-	-	-	-
December	-	-	-	-	-	-
Total	9	6	14	1	1	31

Appendix A: Meteorological Data

Table 10: Meteorological Data – Charlton Ridge Meteorological Station – January 2018

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)
1/01/2018	35	19	84	21	1278	152	2.9	0.0
2/01/2018	32	19	84	35	1301	137	3.0	0.0
3/01/2018	28	18	88	41	1435	145	3.8	0.0
4/01/2018	29	17	75	33	1602	136	2.5	0.0
5/01/2018	35	14	84	16	1214	147	2.3	0.0
6/01/2018	41	18	74	10	1105	177	2.7	0.0
7/01/2018	44	22	58	9	1103	235	3.7	0.0
8/01/2018	42	21	83	13	1126	161	2.5	10.2
9/01/2018	34	21	82	33	1356	159	3.2	0.2
10/01/2018	24	18	87	61	924	132	3.0	0.2
11/01/2018	28	18	80	48	1556	135	2.2	0.0
12/01/2018	38	19	87	24	1258	137	1.8	0.0
13/01/2018	37	20	80	24	1455	253	4.5	0.0
14/01/2018	26	16	85	20	1535	177	5.1	0.0
15/01/2018	28	13	64	19	1454	166	3.9	0.0
16/01/2018	27	16	60	25	1492	153	4.6	0.0
17/01/2018	30	13	72	16	1146	169	2.4	0.0
18/01/2018	35	11	78	5	1139	154	2.1	0.0
19/01/2018	39	13	68	7	1115	156	2.5	0.0
20/01/2018	39	13	76	1	1143	148	2.9	0.0
21/01/2018	38	16	81	14	1187	144	2.6	0.0
22/01/2018	41	27	29	7	777	123	3.5	0.0
23/01/2018	39	20	69	9	1285	151	2.2	0.0
24/01/2018	39	23	66	11	1287	129	2.8	0.0
25/01/2018	36	20	82	25	1431	158	2.5	0.0
26/01/2018	36	21	84	29	1344	157	2.4	0.2
27/01/2018	37	21	87	22	1187	154	2.7	0.0
28/01/2018	35	21	80	29	1403	130	3.8	0.0
29/01/2018	34	19	88	30	1323	124	3.5	0.0
30/01/2018	36	17	85	14	1084	148	2.4	0.0
31/01/2018	26	17	81	57	253	162	4.5	0.0

“-“ Indicates that data was not available due to technical issues.

Appendix B: February Monthly Environmental Monitoring Report



Monthly Environmental Monitoring Report

Yancoal Mt Thorley Warkworth

February 2018

CONTENTS

1.0	INTRODUCTION	4
2.0	AIR QUALITY	4
2.1	Meteorological Monitoring	4
2.1.1	Rainfall	4
2.1.2	Wind Speed and Direction	4
2.2	Depositional Dust	6
2.3	Suspended Particulates	6
2.3.1	HVAS PM ₁₀ Results.....	6
2.3.2	TSP Results	7
2.3.3	Real Time PM ₁₀ Results.....	8
2.3.4	Real Time Alarms for Air Quality	10
3.0	WATER QUALITY	11
3.1	Surface Water.....	11
3.2	Groundwater Monitoring.....	11
3.3	HRSTS Discharge.....	11
4.0	BLAST MONITORING.....	12
4.1	Blast Monitoring Results	12
5.0	NOISE	15
5.1	Attended Noise Monitoring Results	15
5.1.1	WML Noise Assessment.....	15
5.1.3	MTO Noise Assessment	16
5.1.4	NPfl Low Frequency Assessment	17
5.2	Noise Management Measures	19
6.0	OPERATIONAL DOWNTIME.....	19
7.0	REHABILITATION	19
8.0	ENVIRONMENTAL INCIDENTS	20
9.0	COMPLAINTS	20
	Appendix A: Meteorological Data	22

Figures

Figure 1: Rainfall Trend YTD	4
Figure 2: Charlton Ridge Wind Rose – February 2018	4
Figure 3: Air Quality Monitoring Locations	5
Figure 4: Depositional Dust – February 2018	6
Figure 5: Individual PM ₁₀ Results – February 2018	7
Figure 6: Annual Average PM ₁₀ – February 2018	7
Figure 7: Annual Average Total Suspended Particulates – February 2018	8
Figure 8: Real Time PM ₁₀ daily 24hr average and annual average – February 2018	11
Figure 9: Abbey Green Blast Monitoring Results – February 2018	12
Figure 10: Bulga Village Blast Monitoring Results – February 2018	12
Figure 11: MTIE Blast Monitoring Results – February 2018	13
Figure 13: Wambo Road Blast Monitoring Results – February 2018	13
Figure 12: Wollemi Peak Road Blast Monitoring Results – February 2018	13
Figure 14: Warkworth Blast Monitoring Results – February 2018	13
Figure 15: MTW Blast Monitoring Location Plan	14
Figure 16: Noise Monitoring Location Plan	18
Figure 17: Operational Downtime by Equipment Type – February 2018	19
Figure 18: Rehabilitation YTD – February 2018	20
Figure 19: Complaints Summary – YTD February	21

Tables

Table 1: Monthly Rainfall MTW	4
Table 2: 24hr PM ₁₀ Investigations	8
Table 3: Blasting Limits	12
Table 4: L _{Aeq, 15 minute} Warkworth Impact Assessment Criteria – February 2018	15
Table 5: L _{A1, 1 minute} Warkworth - Impact Assessment Criteria – February 2018	15
Table 6: L _{Aeq, 15minute} Mount Thorley - Impact Assessment Criteria – February 2018	16
Table 7: L _{A1, 1Minute} Mount Thorley - Impact Assessment Criteria – February 2018	16
Table 8: Low Frequency Noise Modifying Factor Assessment – February 2018	17
Table 9: Supplementary Attended Noise Monitoring Data – February 2018	19
Table 10: Meteorological Data – Charlton Ridge Meteorological Station – February 2018	23

Revision History

Version No.	Person Responsible	Document Status	Date
1.0	Environmental Advisor	Draft	27/03/2018
1.1	Environmental Specialist	Final	05/04/2018

1.0 INTRODUCTION

This report has been compiled to provide a monthly summary of environmental monitoring results for Mt Thorley Warkworth (MTW). This report includes all monitoring data collected for the period 1st February to 28th February 2018.

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 Error! Reference source not found..

Table 1: Monthly Rainfall MTW

2018	Monthly Rainfall (mm)	Cumulative YTD Rainfall (mm)
February	68.6	79.4

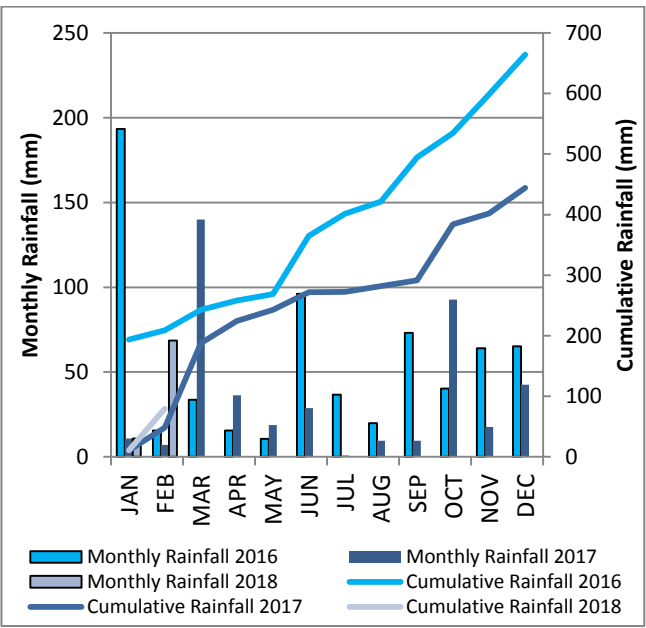


Figure 1: Rainfall Trend YTD

2.1.2 Wind Speed and Direction

Winds from the South – East were dominant throughout the reporting period as shown in Error! Reference source not found..

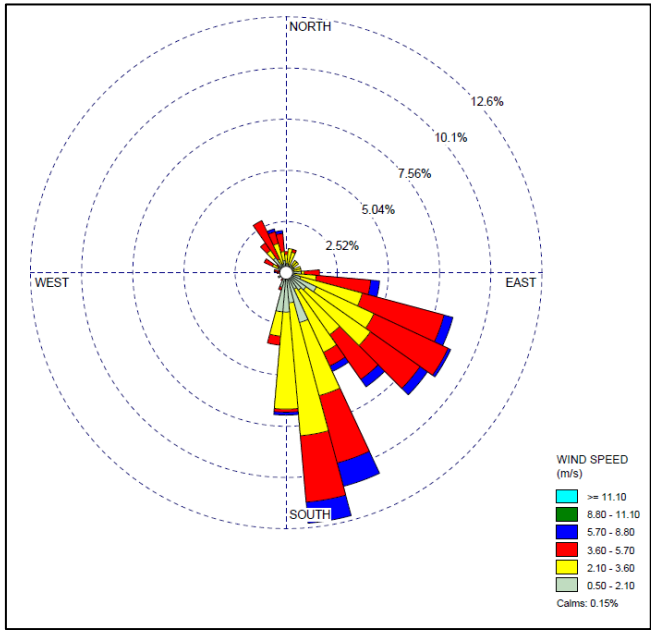


Figure 2: Charlton Ridge Wind Rose – February 2018

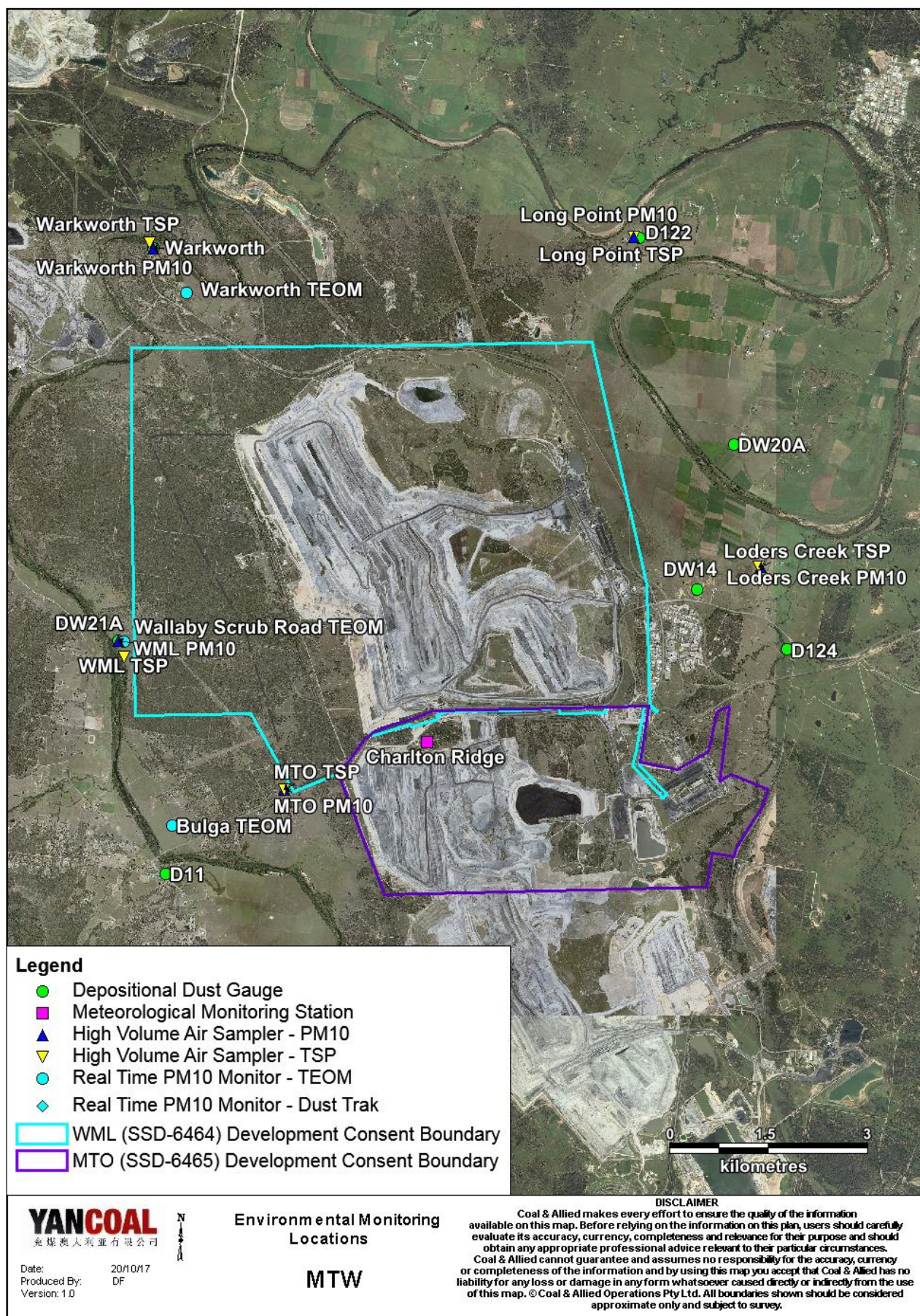


Figure 3: Air Quality Monitoring Locations

2.2 Depositional Dust

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

Error! Reference source not found. 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 D122, 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 D122, D124 and Warkworth confirm the presence of bird droppings and/or vegetation and/or insects. As such the results are considered contaminated and will be excluded from calculation of the annual average.

An assessment of MTW's contribution to the long term assessment criteria will be reported in the 2018 Annual Return.

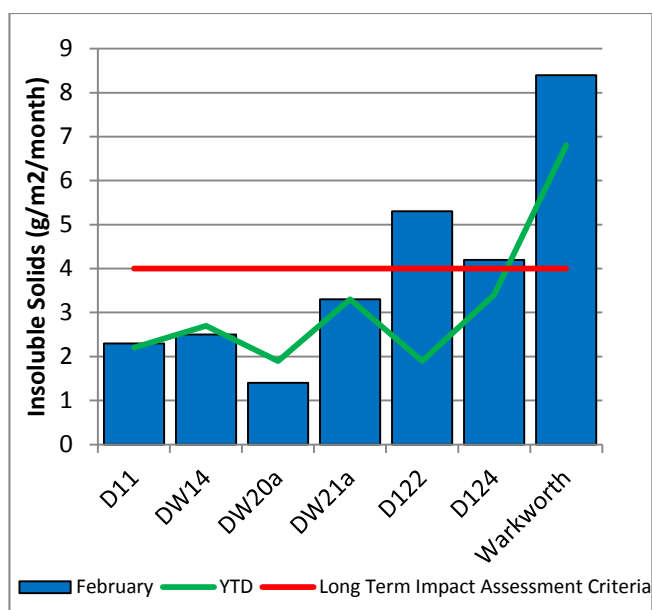


Figure 4: Depositional Dust – February 2018

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

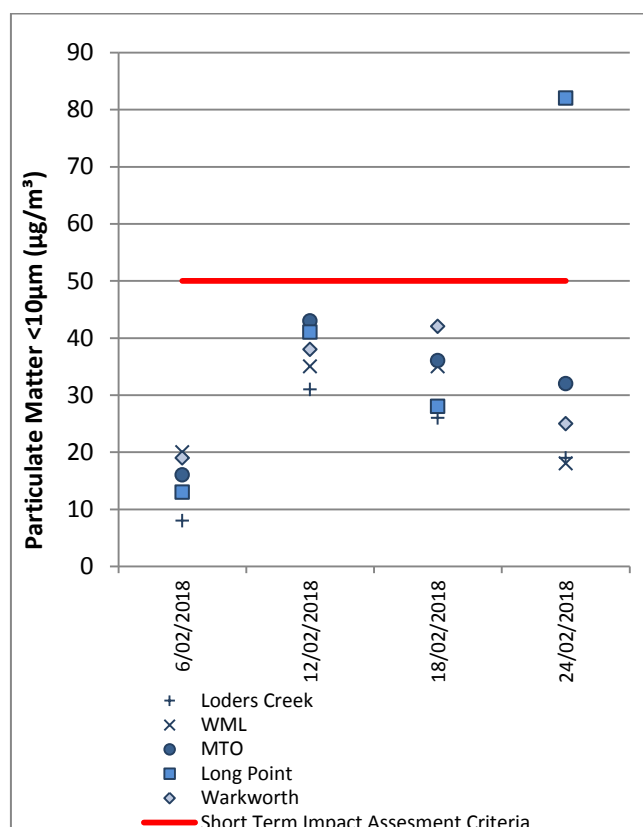


Figure 5 shows the individual PM₁₀ results at each monitoring station against the short term impact assessment criteria of 50µg/m³.

On 24/02/2018 the Long Point HVAS PM₁₀ unit recorded a result of 82µg/m³, which is greater than the short term (24hr) PM₁₀ impact assessment criteria.

An Investigation determined that the wind direction was generally not from MTW's angle of influence at Long Point on the 24th February. Accordingly, no further action is required.

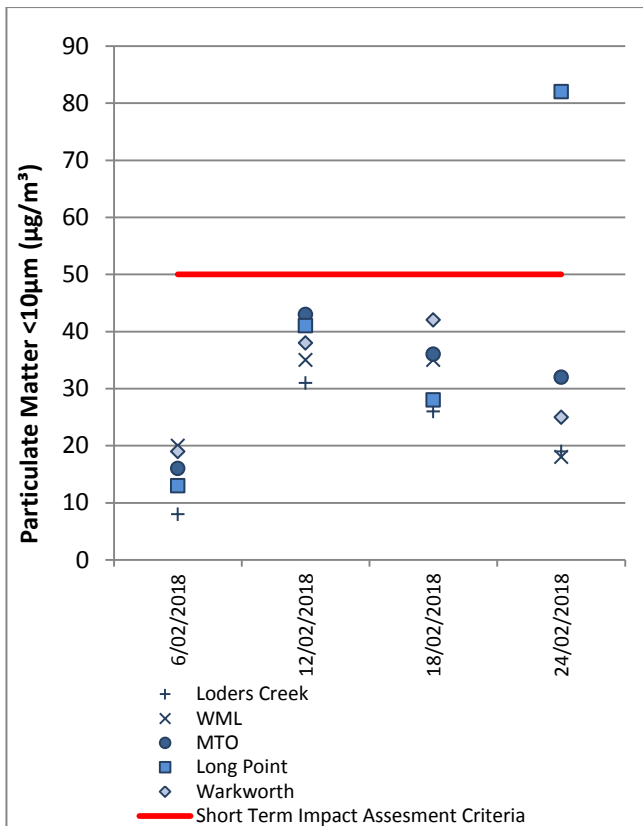


Figure 5: Individual PM₁₀ Results – February 2018

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

An assessment of MTW's contribution to the long term assessment criteria will be reported in the 2018 Annual Return.

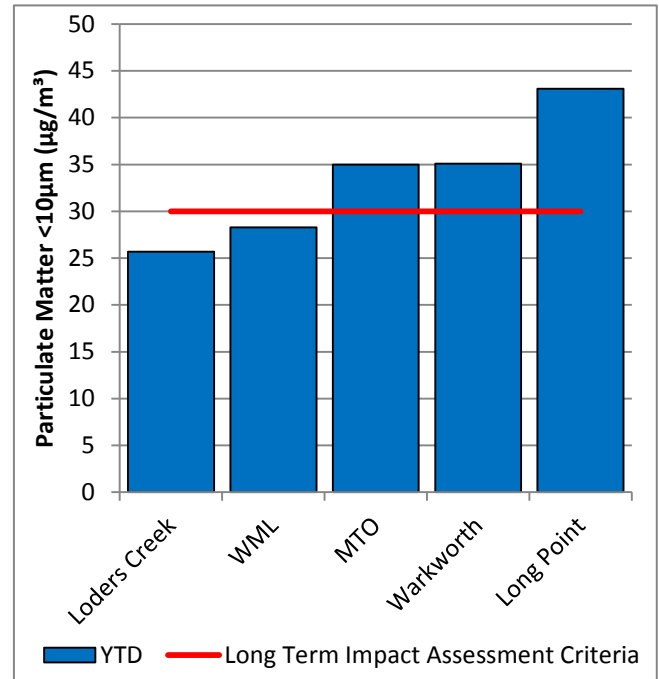


Figure 6: Annual Average PM₁₀ – February 2018

2.3.2 TSP Results

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

An assessment of MTW's contribution to the long term assessment criteria will be reported in the 2018 Annual Return.

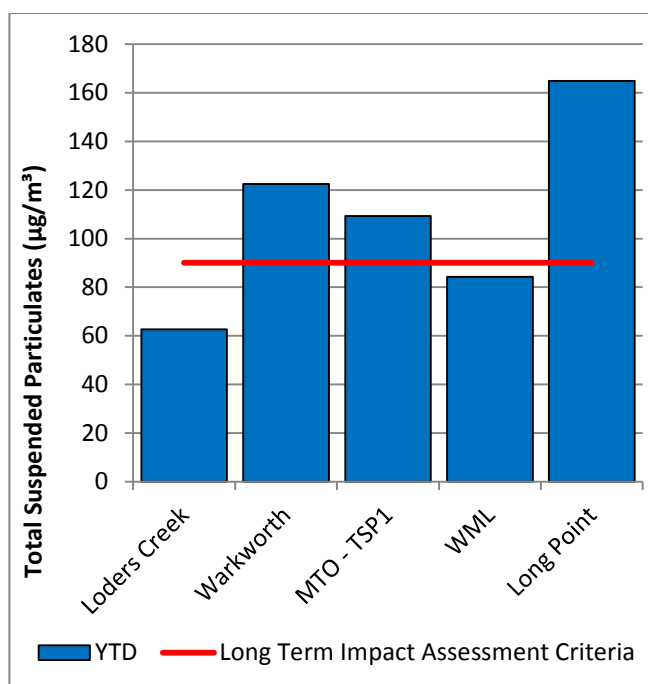


Figure 7: Annual Average Total Suspended Particulates – February 2018

Mt 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.

Seven TEOM PM₁₀ measurements exceeded the 24 hour short term impact assessment criteria during the reporting period. Each was investigated to determine the level of contribution from MTW activities in accordance with the compliance protocol outlined in the MTW Air Quality Management Plan. All recorded exceedances were determined to be compliant with the relevant criterion.

A summary of the investigations undertaken for each short term PM₁₀ exceedance are provided in Table 2.

2.3.3 Real Time PM₁₀ Results

Table 2: 24hr PM₁₀ Investigations

Date	Site	24hr PM ₁₀ result (µg/m ³)	Estimated contribution from MTW (µg/m ³)	Discussion
15/02/2018	Bulga TEOM	66.7	3.9	An analysis of meteorological data has determined the maximum potential MTW contribution to the result to be in the order of 3.9µg/m ³ or ~5.8% of the measured result. As the calculated contribution was less than 75% of the measured result MTW operations are not considered to be a significant contributor to the result as described in the MTW Air Quality Management Plan.
16/02/2018	Bulga TEOM	57.9	1.6	An analysis of meteorological data has determined the maximum potential MTW contribution to the result to be in the order of 1.6µg/m ³ or ~2.8% of the measured result. As the calculated contribution was less than 75% of the measured result MTW operations are not considered to be a significant contributor to the result as described in the MTW Air Quality Management Plan.

15/02/2018	Wallaby Scrub Road TEOM	62.3	40.8	An analysis of meteorological data has determined the maximum potential MTW contribution to the result to be in the order of 40.8µg/m ³ or ~65.5% of the measured result. As the calculated contribution was less than 75% of the measured result MTW operations are not considered to be a significant contributor to the result as described in the MTW Air Quality Management Plan.
09/02/2018	Warkworth OEH TEOM	52.5	16.7	An analysis of meteorological data has determined the maximum potential MTW contribution to the result to be in the order of 16.7µg/m ³ or ~31.8% of the measured result. As the calculated contribution was less than 75% of the measured result MTW operations are not considered to be a significant contributor to the result as described in the MTW Air Quality Management Plan.
15/02/2018	Warkworth OEH TEOM	92.6	29.8	An analysis of meteorological data has determined the maximum potential MTW contribution to the result to be in the order of 29.8µg/m ³ or ~32.2% of the measured result. As the calculated contribution was less than 75% of the measured result MTW operations are not considered to be a significant contributor to the result as described in the MTW Air Quality Management Plan.
16/02/2018	Warkworth OEH TEOM	52.4	23.3	An analysis of meteorological data has determined the maximum potential MTW contribution to the result to be in the order of 23.3µg/m ³ or ~44.6% of the measured result. As the calculated contribution was less than 75% of the measured result MTW operations are not considered to be a significant contributor to the result as described in the MTW Air Quality Management Plan.
19/02/2018	Warkworth OEH TEOM	58.1	34.8	An analysis of meteorological data has determined the maximum potential MTW contribution to the result to be in the order of 34.8µg/m ³ or ~59.9% of the measured result. As the calculated contribution was less than 75% of the measured result MTW operations are not considered to be a significant contributor to the result as described in the MTW Air Quality Management Plan.

2.3.4 Real Time Alarms for Air Quality

During February, the real time monitoring system generated 196 automated air quality related alerts, including 6 alerts for adverse meteorological conditions and 190 alerts for elevated PM₁₀ levels.

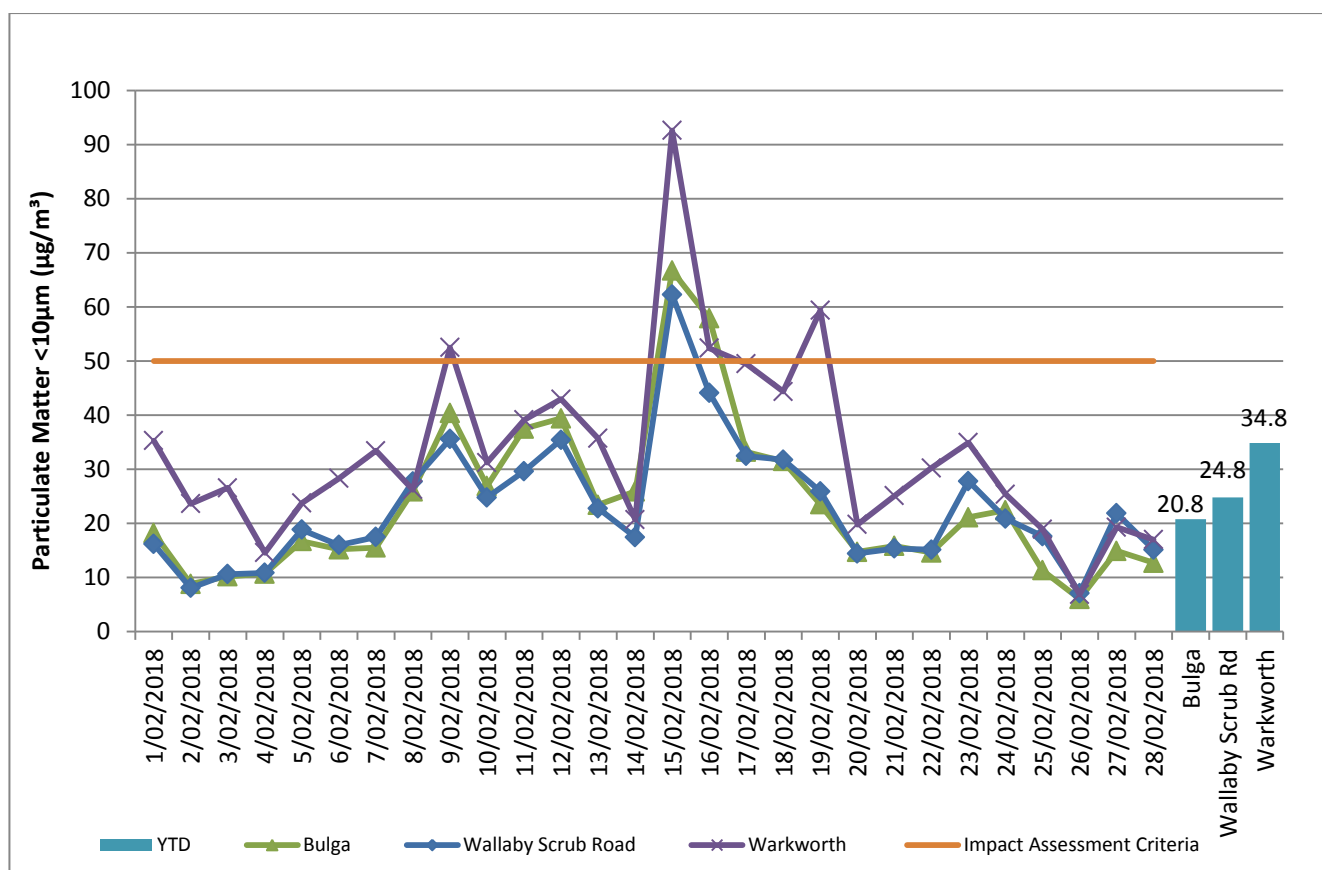


Figure 8: Real Time PM₁₀ daily 24hr average and annual average – February 2018

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 2018 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 2018 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 **Error! Reference source not found.**

4.1 Blast Monitoring Results

During February 2018, 26 blasts were initiated at MTW. **Error! Reference source not found.** to **Error! Reference source not found.** show the blast monitoring results for the reporting period against the impact assessment criteria. The criteria are summarised in Table 3.

Table 3: 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.

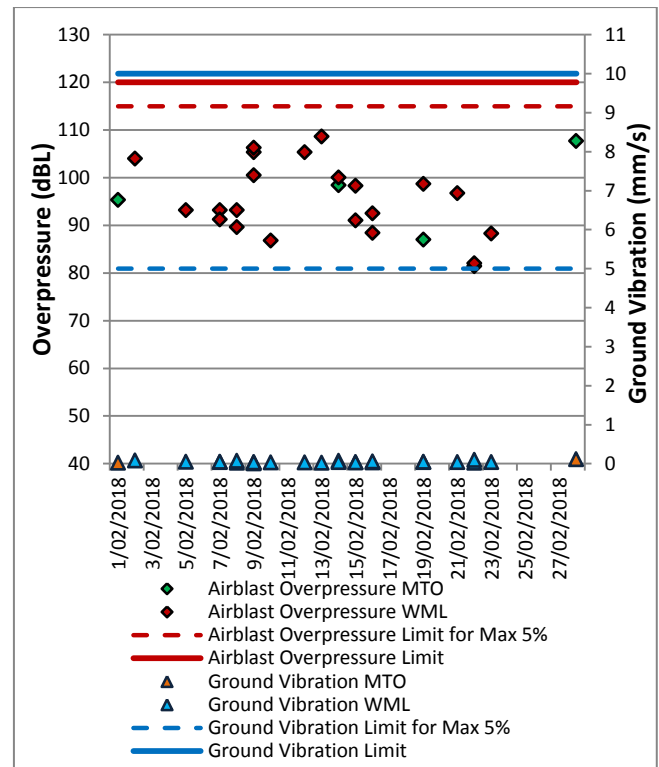


Figure 9: Abbey Green Blast Monitoring Results – February 2018

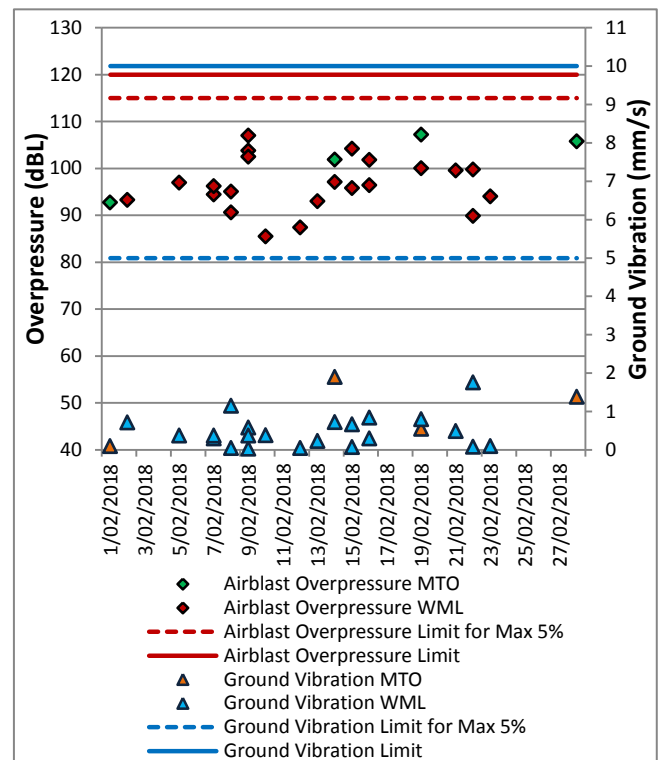


Figure 10: Bulga Village Blast Monitoring Results – February 2018

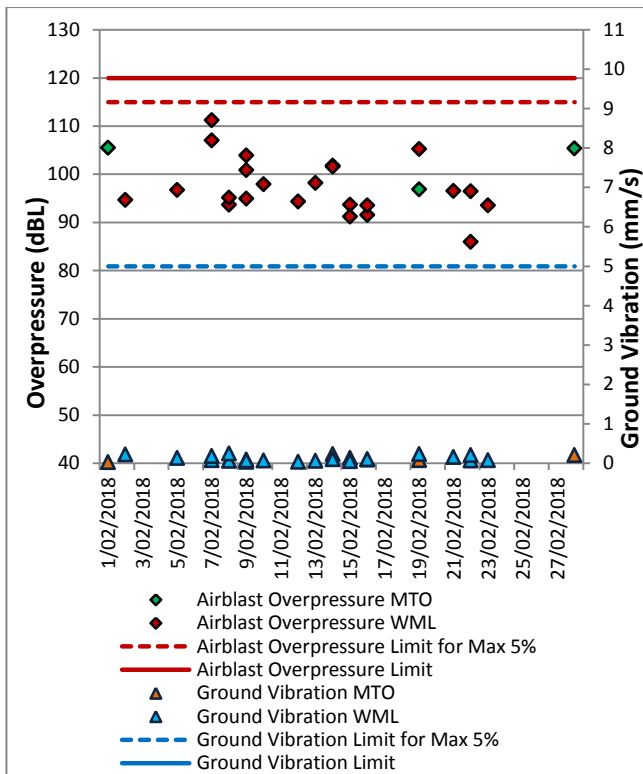


Figure 12: MTIE Blast Monitoring Results – February 2018

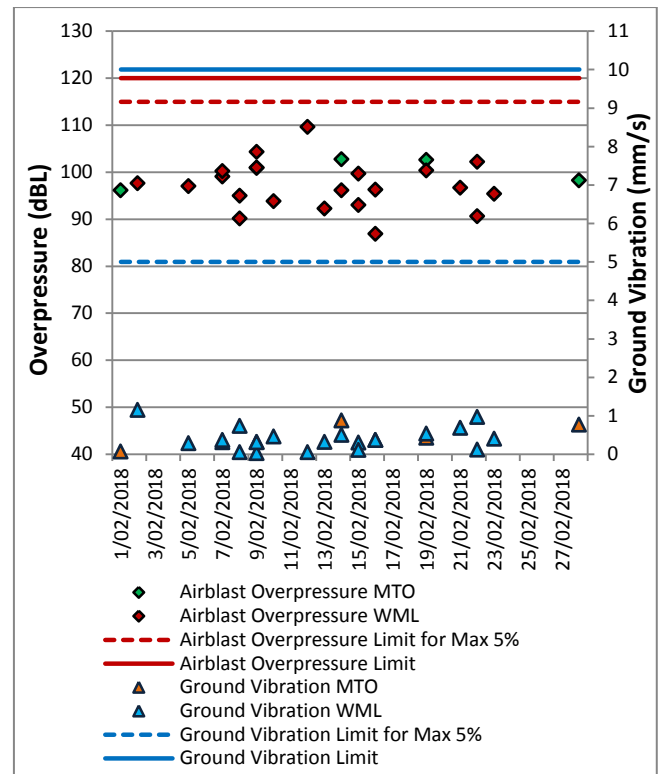


Figure 11: Wambo Road Blast Monitoring Results – February 2018

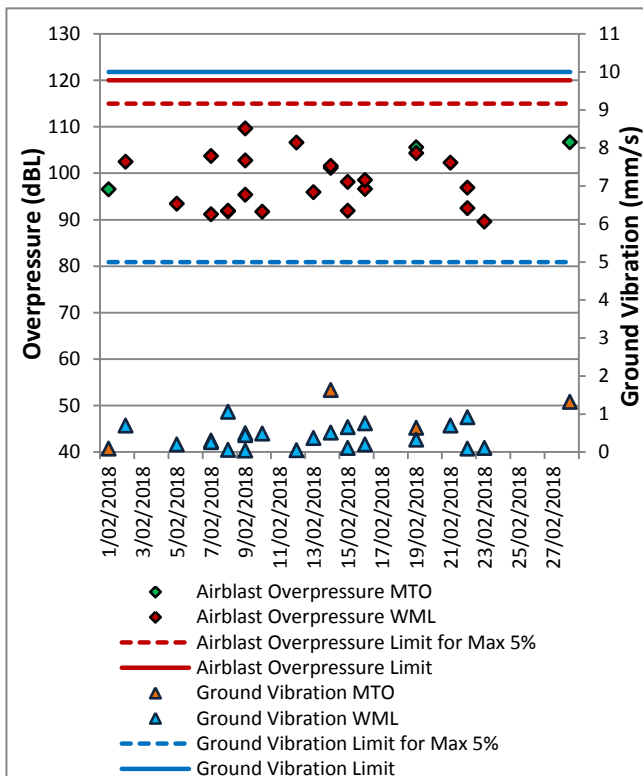


Figure 13: Wollemi Peak Road Blast Monitoring Results – February 2018

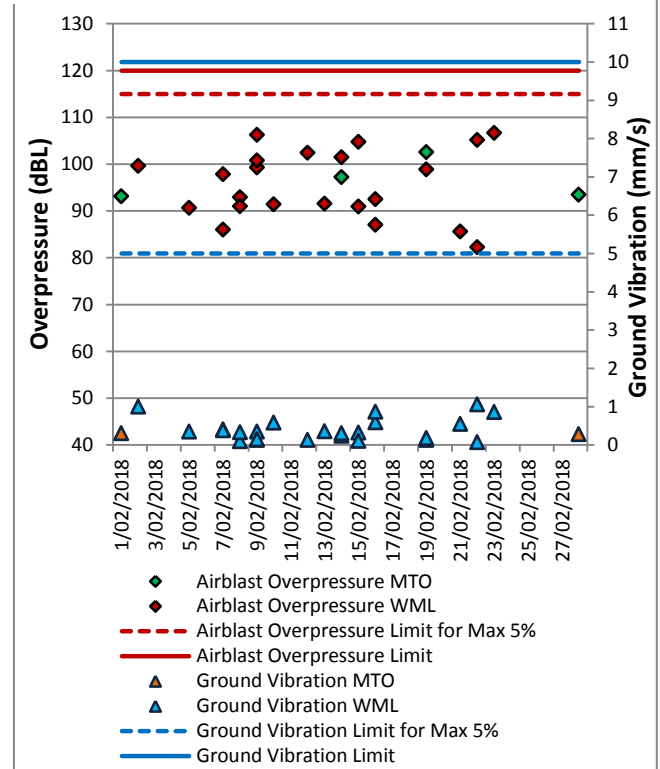


Figure 14: Warkworth Blast Monitoring Results – February 2018

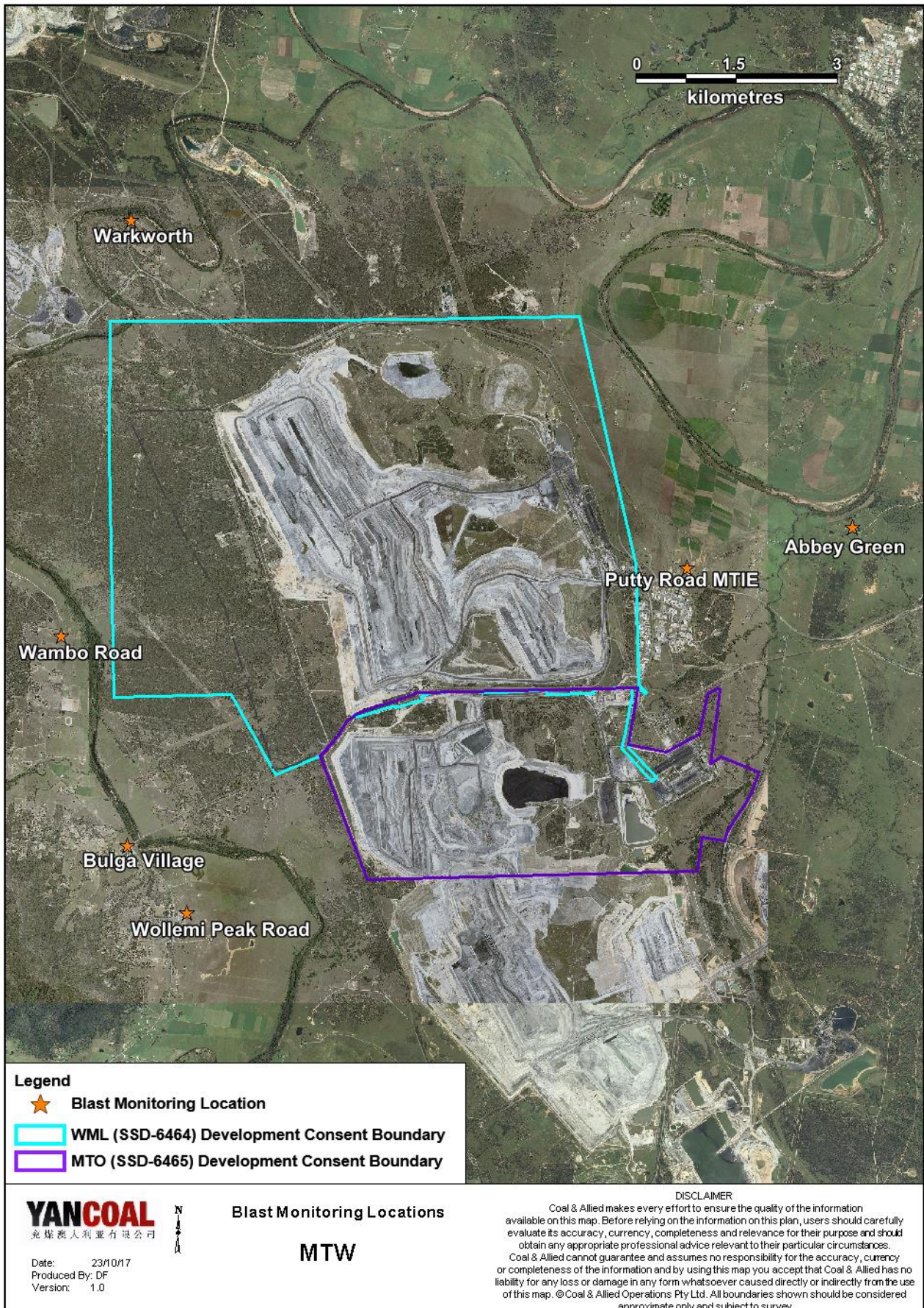


Figure 15: MTW Blast Monitoring Location Plan

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 five sites surrounding MTW. Noise monitoring locations are displayed in Figure 16.

5.1 Attended Noise Monitoring Results

Attended monitoring was conducted at receiver locations surrounding MTW on the night of 20 February 2018. All measurements complied with the relevant criteria. Results are detailed in Table 4 to **Error! Reference source not found..**

5.1.1 WML Noise Assessment

Compliance assessments undertaken against the WML noise criteria are presented in Tables 4 and 5.

Table 4: L_{Aeq, 15 minute} Warkworth Impact Assessment Criteria – February 2018

Location	Date and Time	Wind Speed (m/s) ⁵	Stability Class	Criterion dB(A)	Criterion Applies? ^{1,5}	WML L _{Aeq} dB ^{2,4}	Exceedance ³
Bulga RFS	21/02/2018 0:04	3.0	D	37	Yes	IA	Nil
Bulga Village	20/02/2018 22:01	2.7	E	38	Yes	<20	Nil
Gouldsville	20/02/2018 22:00	2.7	E	38	Yes	30	Nil
Inlet Rd	20/02/2018 21:34	4.2	D	37	No	IA	NA
Inlet Rd West	20/02/2018 21:08	2.8	F	35	No	IA	NA
Long Point	20/02/2018 21:38	4.2	D	35	No	IA	NA
South Bulga	21/02/2018 0:47	2.9	D	35	Yes	IA	Nil
Wambo Road	20/02/2018 22:37	2.6	E	38	Yes	<25	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_{Aeq,15minute} attributed to WML;

3. NA means atmospheric conditions outside conditions specified in development consent and so criterion is not applicable;

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.

Table 5: L_{A1, 1 minute} Warkworth - Impact Assessment Criteria – February 2018

Location	Date and Time	Wind Speed (m/s) ⁵	Stability Class	Criterion dB(A)	Criterion Applies? ^{1,5}	WML L _{A1, 1min} dB ^{2,4}	Exceedance ³
Bulga RFS	21/02/2018 0:04	3.0	D	47	Yes	IA	Nil
Bulga Village	20/02/2018 22:01	2.7	E	48	Yes	<20	Nil
Gouldsville	20/02/2018 22:00	2.7	E	48	Yes	37	Nil
Inlet Rd	20/02/2018 21:34	4.2	D	47	No	IA	NA
Inlet Rd West	20/02/2018 21:08	2.8	F	45	No	IA	NA
Long Point	20/02/2018 21:38	4.2	D	45	No	IA	NA
South Bulga	21/02/2018 0:47	2.9	D	45	Yes	IA	Nil
Wambo Road	20/02/2018 22:37	2.6	E	48	Yes	26	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.

5.1.3 MTO Noise Assessment

Compliance assessments undertaken against the MTO noise criteria are presented in Table 6 and 7.

Table 6: L_{Aeq, 15minute} Mount Thorley - Impact Assessment Criteria – February 2018

Location	Date and Time	Wind Speed (m/s) ⁵	Stability Class	Criterion dB	Criterion Applies? ^{1,5}	MTO L _{Aeq} dB ^{2,4}	Exceedance ³
Bulga RFS	21/02/2018 0:04	3.0	D	37	Yes	IA	Nil
Bulga Village	20/02/2018 22:01	2.7	E	38	Yes	IA	Nil
Gouldsville	20/02/2018 22:00	2.7	E	35	Yes	IA	Nil
Inlet Rd	20/02/2018 21:34	4.2	D	37	No	<25	NA
Inlet Rd West	20/02/2018 21:08	2.8	F	35	No	<20	NA
Long Point	20/02/2018 21:38	4.2	D	35	No	26	NA
South Bulga	21/02/2018 0:47	2.9	D	36	Yes	IA	Nil
Wambo Road	20/02/2018 22:37	2.6	E	38	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 LAeq,15minute attributed to Mt Thorley Operations (MTO);
3. NA means atmospheric conditions outside conditions specified in development consent and so criterion is not applicable;
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.

Table 7: L_{A1, 1Minute} Mount Thorley - Impact Assessment Criteria – February 2018

Location	Date and Time	Wind Speed (m/s) ⁵	Stability Class	Criterion dB	Criterion Applies? ^{1,5}	MTO L _{A1, 1min} dB ^{2,4}	Exceedance ³
Bulga RFS	21/02/2018 0:04	3.0	D	47	Yes	IA	Nil
Bulga Village	20/02/2018 22:01	2.7	E	48	Yes	IA	Nil
Gouldsville	20/02/2018 22:00	2.7	E	45	Yes	IA	Nil
Inlet Rd	20/02/2018 21:34	4.2	D	47	No	<25	NA
Inlet Rd West	20/02/2018 21:08	2.8	F	45	No	<20	NA
Long Point	20/02/2018 21:38	4.2	D	45	No	30	NA
South Bulga	21/02/2018 0:47	2.9	D	46	Yes	IA	Nil
Wambo Road	20/02/2018 22:37	2.6	E	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.

5.1.4 NPfl Low Frequency Assessment

In accordance with the requirements of the EPA's Noise Policy for Industry (NPfl), the applicability of the low frequency modification penalty has been assessed. During February 2018 no measurements required the penalty to be applied. The assessment for low frequency noise is shown in **Error! Reference source not found.**

Table 8: Low Frequency Noise Modifying Factor Assessment – February 2018

Location	Date and Time	Measured Site Only LA _{eq} dB (WML/MTO)	Site Only L _{Ceq} dB ⁴ (WML/MTO)	Site Only L _{Ceq} – LA _{eq} dB ^{1,4} (WML/MTO)	Result Max exceedance of ref spectrum dB (WML/MTO) _{2,3,4}	Penalty dB(A)	Exceedance
Bulga RFS	21/02/2018 0:04	IA/IA	NA/NA	NA/NA	NA/NA	NA/NA	NA/NA
Bulga Village	20/02/2018 22:01	<20/IA	NA/NA	NA/NA	NA/NA	NA/NA	NA/NA
Gouldsville	20/02/2018 22:00	30/IA	NA/NA	NA/NA	NA/NA	NA/NA	NA/NA
Inlet Rd	20/02/2018 21:34	IA/<25	NA/NA	NA/NA	NA/NA	NA/NA	NA/NA
Inlet Rd West	20/02/2018 21:08	IA/<20	NA/NA	NA/NA	NA/NA	NA/NA	NA/NA
Long Point	20/02/2018 21:38	IA/26	NA/NA	NA/NA	NA/NA	NA/NA	NA/NA
South Bulga	21/02/2018 0:47	IA/IA	NA/NA	NA/NA	NA/NA	NA/NA	NA/NA
Wambo Road	20/02/2018 22:37	<25/IA	NA/NA	NA/NA	NA/NA	NA/NA	NA/NA

Notes:

1. As per NPfl, if L_{Ceq} – LA_{eq} >= 15 dB further assessment of low frequency noise required.

2. As per NPfl, compare measured spectrum against reference spectrum to determine if the low frequency modifying factor is triggered and application of penalty is required;

3. Bold results and penalties in red are where the relevant modifying factor trigger was exceeded; and

4. Where it is not possible to determine the site only result due to the presence of other low frequency noise sources occurring during the measurement, or where criteria were not applicable due to meteorological conditions, this is noted as NA (not available) and no further assessment has been undertaken.

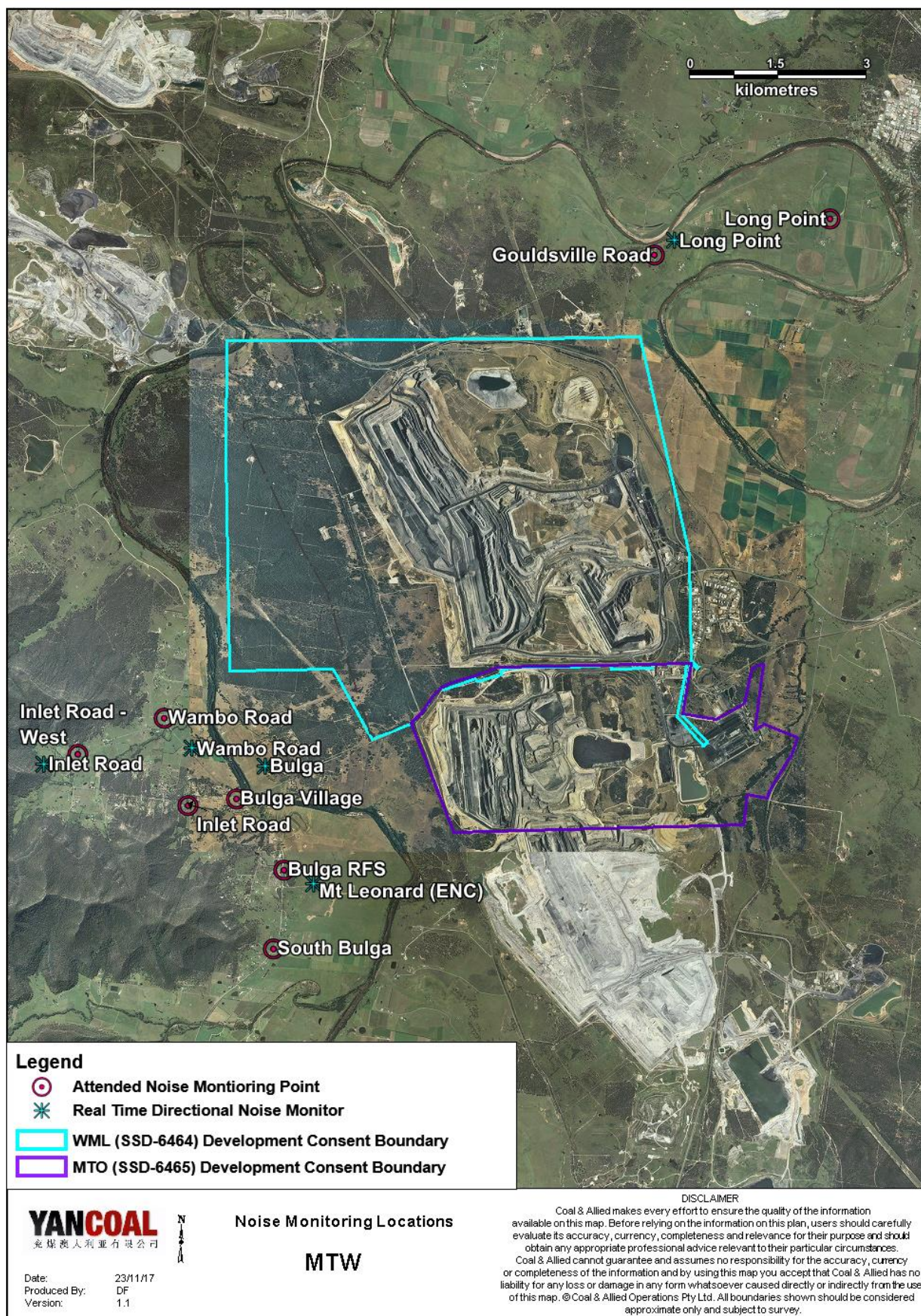


Figure 16: Noise Monitoring Location Plan

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:

- 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 9.

Table 9: Supplementary Attended Noise Monitoring Data – February 2018

No. of assessments	No. of assessments > trigger	No. of nights where assessments > trigger	% greater than trigger
489	6	2	1.2

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 346 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.

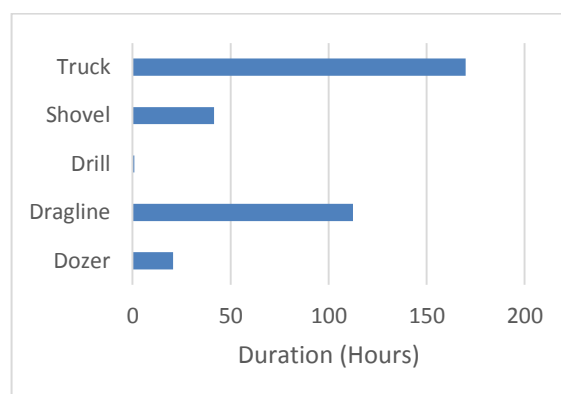


Figure 17: Operational Downtime by Equipment Type – February 2018

7.0 REHABILITATION

During February, 8.9 Ha of land was released, 9.7 Ha of land was bulk shaped and 2.4 Ha of land was composted.

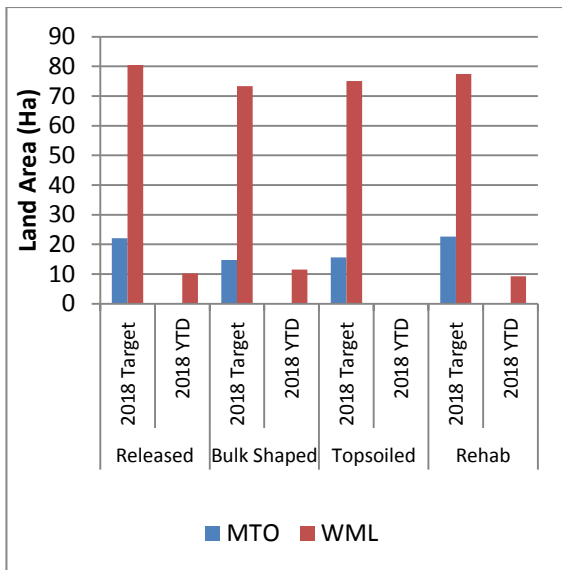


Figure 18: Rehabilitation YTD – February 2018

8.0 ENVIRONMENTAL INCIDENTS

During the reporting period there were no reportable environmental incidents.

9.0 COMPLAINTS

During the reporting period 19 complaints were received. Details of these complaints are shown in **Error! Reference source not found.** below.

	Noise	Dust	Blast	Lighting	Other	Total
January	9	6	14	0	1	30
February	8	4	2	3	2	19
March	-	-	-	-	-	-
April	-	-	-	-	-	-
May	-	-	-	-	-	-
June	-	-	-	-	-	-
July	-	-	-	-	-	-
August	-	-	-	-	-	-
September	-	-	-	-	-	-
October	-	-	-	-	-	-
November	-	-	-	-	-	-
December	-	-	-	-	-	-
Total	17	10	16	3	3	49

Figure 19: Complaints Summary – YTD February

Appendix A: Meteorological Data

Table 10: Meteorological Data – Charlton Ridge Meteorological Station – February 2018

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)
1/02/2018 0:00	23	16	67	39	1212	138	3.3	0.0
2/02/2018 0:00	23	14	79	40	969	153	3.4	0.0
3/02/2018 0:00	27	14	90	37	1465	155	4.1	3.4
4/02/2018 0:00	28	14	83	31	1545	142	3.8	0.0
5/02/2018 0:00	32	13	84	19	1102	153	2.4	0.0
6/02/2018 0:00	31	15	81	22	1344	135	3.1	0.0
7/02/2018 0:00	32	16	78	24	1205	130	3.1	0.0
8/02/2018 0:00	35	14	74	12	1082	145	1.9	0.0
9/02/2018 0:00	40	18	79	10	1233	159	2.9	2.2
10/02/2018	36	18	89	22	1051	156	2.4	0.0
11/02/2018	39	20	73	11	1301	186	3.4	0.0
12/02/2018	38	20	79	6	1163	153	3.0	0.0
13/02/2018	34	20	83	26	1137	134	3.2	0.0
14/02/2018	40	21	84	4	1161	205	3.1	0.0
15/02/2018	37	19	71	7	1064	157	3.2	0.0
16/02/2018	37	16	86	3	1300	184	2.9	0.0
17/02/2018	32	19	75	30	1137	131	3.3	0.0
18/02/2018	37	17	82	17	1008	144	2.7	0.0
19/02/2018	31	18	70	27	1316	141	3.4	0.0
20/02/2018	22	15	92	56	560	145	4.3	5.8
21/02/2018	28	14	88	31	1384	140	3.5	0.0
22/02/2018	30	15	78	28	1452	137	2.9	0.0
23/02/2018	33	16	81	25	1175	149	2.4	0.0
24/02/2018	35	18	84	29	1525	246	2.8	0.0
25/02/2018	35	15	95	32	1321	244	4.1	40.8
26/02/2018	19	14	98	77	1413	172	4.1	16.4
27/02/2018	27	13	85	37	1443	139	3.1	0.0
28/02/2018	34	11	92	29	1045	235	2.5	0.0

“-“ Indicates that data was not available due to technical issues.

Appendix C: March Monthly Environmental Monitoring Report



Monthly Environmental Monitoring Report

Yancoal Mt Thorley Warkworth

March 2018

CONTENTS

1.0	INTRODUCTION.....	5
2.0	AIR QUALITY.....	5
2.1	Meteorological Monitoring.....	5
2.1.1	Rainfall.....	5
2.1.2	Wind Speed and Direction.....	5
2.2	Depositional Dust.....	7
2.3	Suspended Particulates.....	7
2.3.1	HVAS PM ₁₀ Results.....	7
2.3.2	TSP Results.....	8
2.3.3	Real Time PM ₁₀ Results.....	8
2.3.4	Real Time Alarms for Air Quality.....	10
3.0	WATER QUALITY.....	11
3.1	Surface Water.....	11
3.1.1	Surface Water Monitoring Results.....	11
3.1.2	Surface Water Trigger Tracking.....	15
3.2	Groundwater Monitoring.....	17
3.2.1	Groundwater Trigger Tracking.....	40
4.0	BLAST MONITORING.....	43
4.1	Blast Monitoring Results.....	43
5.0	NOISE.....	46
5.1	Attended Noise Monitoring Results.....	46
5.1.1	WML Noise Assessment.....	46
5.1.2	MTO Noise Assessment.....	47
5.1.3	Low Frequency Assessment.....	48
5.2	Noise Management Measures.....	50
6.0	OPERATIONAL DOWNTIME.....	50
7.0	REHABILITATION.....	51
8.0	ENVIRONMENTAL INCIDENTS.....	51
9.0	COMPLAINTS.....	51
	Appendix A: Meteorological Data.....	52

Figures

Figure 1: Rainfall Trends YTD	5
Figure 2: Charlton Ridge Wind Rose –March 2018	5
Figure 3: Air Quality Monitoring Locations	6
Figure 4: Depositional Dust – March 2018	7
Figure 5: Individual PM ₁₀ Results – March 2018	7
Figure 6: Annual Average PM ₁₀ –March 2018	8
Figure 7: Annual Average Total Suspended Particulates – March 2018	8
Figure 8: Real Time PM ₁₀ 24hr average and Year-to-date average – March 2018	11
Figure 9: Site Dams Electrical Conductivity Trend – March 2018	12
Figure 10: Site Dams pH Trend – March 2018	12
Figure 11: Site Dams Total Suspended Solids Trend – March 2018	13
Figure 12: Watercourse Electrical Conductivity Trend – March 2018	13
Figure 13: Watercourse pH Trend – March 2018	14
Figure 14: Watercourse Total Suspended Solids Trend – March 2018	14
Figure 15: Surface Water Monitoring Location Plan	16
Figure 16: Bayswater Seam Electrical Conductivity Trend – March 2018	17
Figure 17: Bayswater Seam pH Trend – March 2018	18
Figure 18: Bayswater Seam Standing Water Level Trend – March 2018	18
Figure 19: Blakefield Seam Electrical Conductivity Trend – March 2018	19
Figure 20: Blakefield Seam pH Trend – March 2018	19
Figure 21: Blakefield Seam Standing Water Level Trend – March 2018	20
Figure 22: Bowfield Seam Electrical Conductivity Trend – March 2018	20
Figure 23: Bowfield Seam pH Trend – March 2018	21
Figure 24: Bowfield Seam Standing Water Level Trend – March 2018	21
Figure 25: Redbank Seam Electrical Conductivity Trend – March 2018	22
Figure 26: Redbank Seam pH Trend – March 2018	22
Figure 27: Redbank Seam Standing Water Level Trend – March 2018	23
Figure 28: Shallow Overburden Seam Electrical Conductivity Trend – March 2018	23
Figure 29: Shallow Overburden Seam pH Trend – March 2018	24
Figure 30: Shallow Overburden Seam Standing Water Level Trend – March 2018	24
Figure 31: Vaux Seam Electrical Conductivity Trend – March 2018	25
Figure 32: Vaux Seam pH Trend – March 2018	25
Figure 33: Vaux Seam Standing Water Level Trend – March 2018	26
Figure 34: Wambo Seam Electrical Conductivity Trend – March 2018	26
Figure 35: Wambo Seam pH Trend – March 2018	27
Figure 36: Wambo Seam Standing Water Level Trend – March 2018	27
Figure 37: Warkworth Seam Electrical Conductivity Trend – March 2018	28
Figure 38: Warkworth Seam pH Trend –March 2018	28
Figure 39: Warkworth Seam Standing Water Level Trend – March 2018	29
Figure 40: Wollombi Alluvium 1 Electrical Conductivity Trend – March 2018	29
Figure 41: Wollombi Alluvium 1 pH Trend – March 2018	30
Figure 42: Wollombi Alluvium 2 Electrical Conductivity Trend – March 2018	30
Figure 43: Wollombi Alluvium 2 pH Trend – March 2018	31
Figure 44: Wollombi Alluvium Standing Water Level Trend – March 2018	31
Figure 45: Aeolian Warkworth Sands Electrical Conductivity Trend – March 2018	32
Figure 46: Aeolian Warkworth Sands pH Trend – March 2018	32
Figure 47: Aeolian Warkworth Sands Standing Water Level Trend – March 2018	33

Figure 48: Hunter River Alluvium 1 Seam Electrical Conductivity Trend – March 2018	33
Figure 49: Hunter River Alluvium 1 Seam pH Trend – March 2018	34
Figure 50: Hunter River Alluvium 2 Seam Electrical Conductivity Trend – March 2018	34
Figure 51: Hunter River Alluvium 2 Seam pH Trend – March 2018	35
Figure 52: Hunter River Alluvium 3 Seam Electrical Conductivity Trend – March 2018	35
Figure 53: Hunter River Alluvium 3 Seam pH Trend – March 2018	36
Figure 54: Hunter River Alluvium 4 Seam Electrical Conductivity Trend – March 2018	36
Figure 55: Hunter River Alluvium 4 Seam pH Trend – March 2018	37
Figure 56: Hunter River Alluvium 5 Seam Electrical Conductivity Trend – March 2018	37
Figure 57: Hunter River Alluvium 5 Seam pH Trend – March 2018	38
Figure 58: Hunter River Alluvium 6 Seam Electrical Conductivity – March 2018	38
Figure 59: Hunter River Alluvium 6 Seam pH Trend – March 2018	39
Figure 60: Hunter River Alluvium Standing Water Level Trend – March 2018	39
Figure 61: Groundwater Monitoring Location Plan	42
Figure 62: Abbey Green Blast Monitoring Results – March 2018	43
Figure 63: Bulga Village Blast Monitoring Results – March 2018	43
Figure 64: MTIE Blast Monitoring Results – March 2018	44
Figure 65: Warkworth Blast Monitoring Results - March 2018	44
Figure 66: Wambo Road Blast Monitoring Results – March 2018	44
Figure 67: Wollemi Peak Road Blast Monitoring Results - March 2018	44
Figure 68: Blast and Vibration Monitoring Location Plan	45
Figure 69: Noise Monitoring Location Plan	49
Figure 70: Operational Downtime by Equipment Type – March 2018	51
Figure 71: Rehabilitation YTD - March 2018	51
Figure 72: Complaints Summary - YTD March 2018	52

Tables

Table 1: Monthly Rainfall MTW	5
Table 2: 24hr PM ₁₀ Investigations	9
Table 3: Surface Water Trigger Tracking – March YTD 2018	15
Table 4: Groundwater Triggers - 2018	41
Table 5: Blasting Limits	43
Table 6: L _{Aeq} , 15 minute Warkworth Impact Assessment Criteria – March 2018	46
Table 7: L _{A1} , 1 minute Warkworth Impact Assessment Criteria – March 2018	46
Table 8: L _{Aeq} , 15minute Mount Thorley Operations - Impact Assessment Criteria – March 2018	47
Table 9: L _{A1} , 1Minute Mount Thorley Operations - Impact Assessment Criteria – March 2018	47
Table 10: Low Frequency Noise Assessment - March 2018	48
Table 11: Supplementary Attended Noise Monitoring Data – March 2018	50
Table 12: Meteorological Data – Charlton Ridge Meteorological Station – March 2018	53

Revision History

Version No.	Person Responsible	Document Status	Date
1.0	Environmental Advisor	Draft	24/04/2018
1.1	Environmental Specialist	Final	26/04/2018

1.0 INTRODUCTION

This report has been compiled to provide a monthly summary of environmental monitoring results for Mt Thorley Warkworth (MTW). This report includes all monitoring data collected for the period 1 March to 31 March 2018.

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

2018	Monthly Rainfall (mm)	Cumulative Rainfall (mm)
March	73.2	152.6

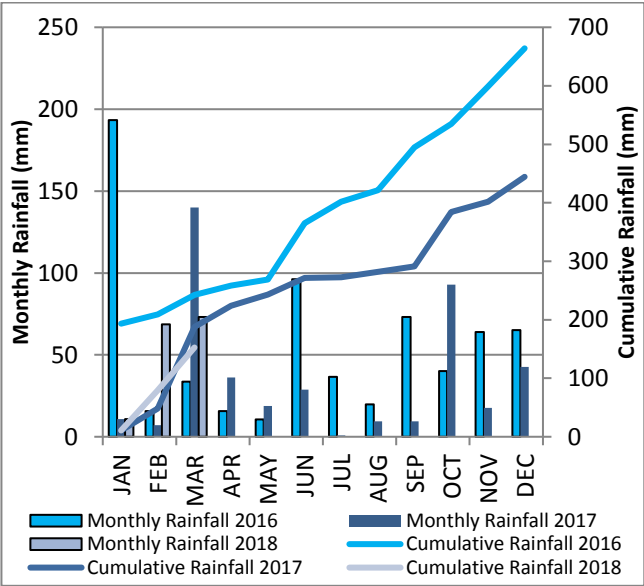


Figure 1: Rainfall Trends YTD

2.1.2 Wind Speed and Direction

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

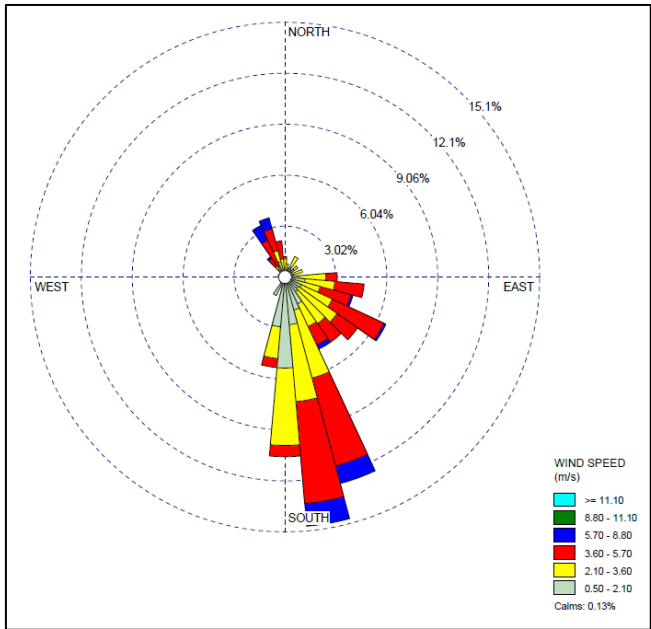


Figure 2: Charlton Ridge Wind Rose –March 2018

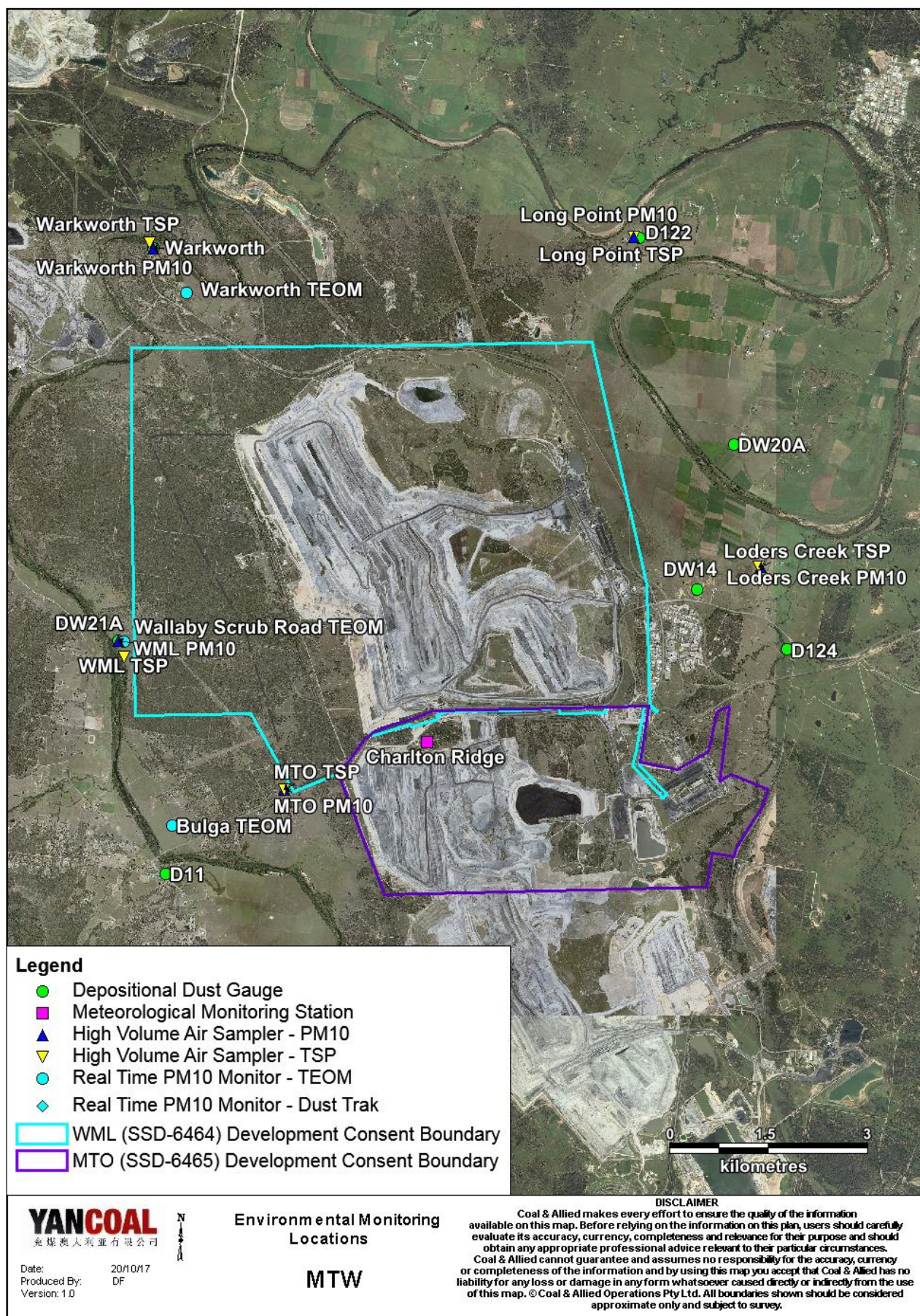


Figure 3: Air Quality Monitoring Locations

2.2 Depositional Dust

To monitor regional air quality, MTW operates and maintains a network of seven 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 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 monitor DW21a results confirm the presence of insects. 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 D124 and Warkworth results are contaminated. Accordingly, the results will be included in the annual average calculation.

An annual assessment of MTW's compliance with the Long Term Impact Assessment Criteria will be provided in the 2018 Annual Review.

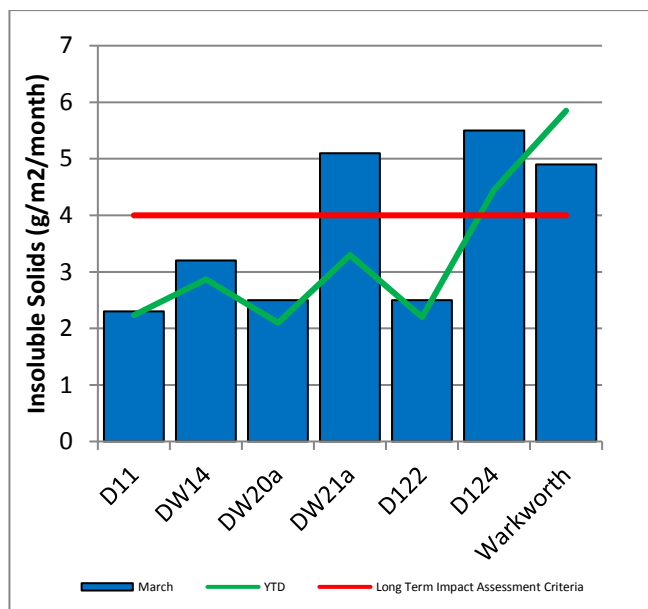


Figure 4: Depositional Dust – March 2018

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.

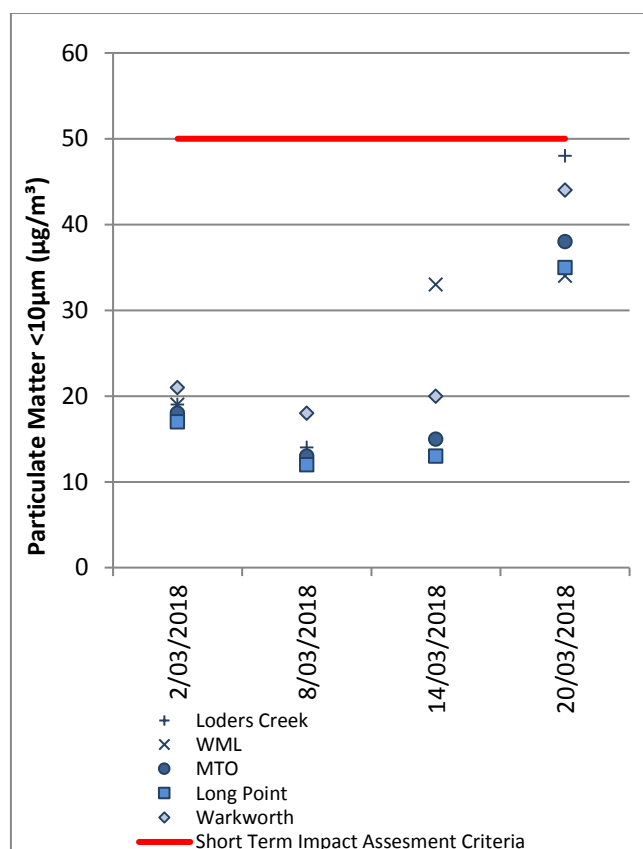


Figure 5: Individual PM₁₀ Results – March 2018

Figure 6 shows the annual average PM₁₀ results against the long term impact assessment criteria. An annual assessment of MTW's compliance with the Long Term Impact Assessment Criteria will be provided in the 2018 Annual Review.

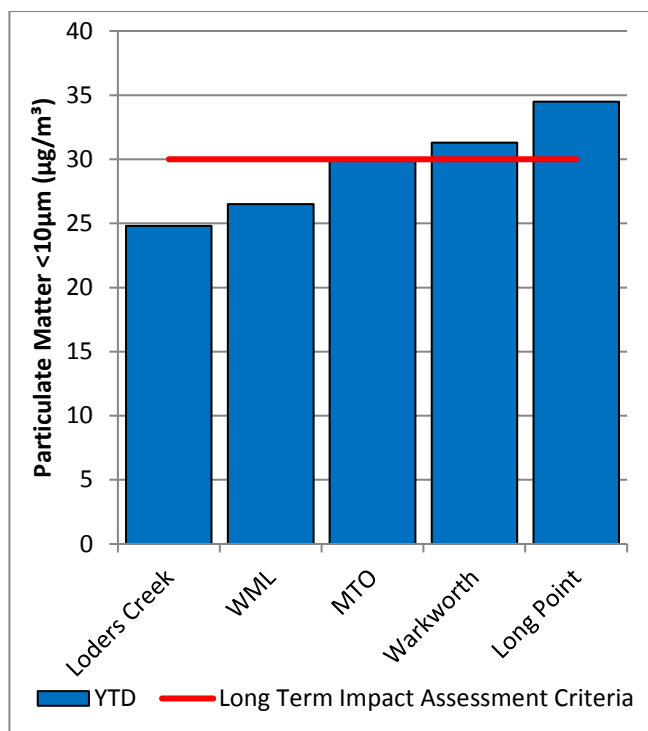


Figure 6: Annual Average PM₁₀ –March 2018

2.3.2 TSP Results

Figure 7 shows the annual average TSP results compared against the long term impact assessment criteria of 90µg/m³. An annual assessment of MTW's compliance with the Long Term Impact Assessment Criteria will be provided in the 2018 Annual Review.

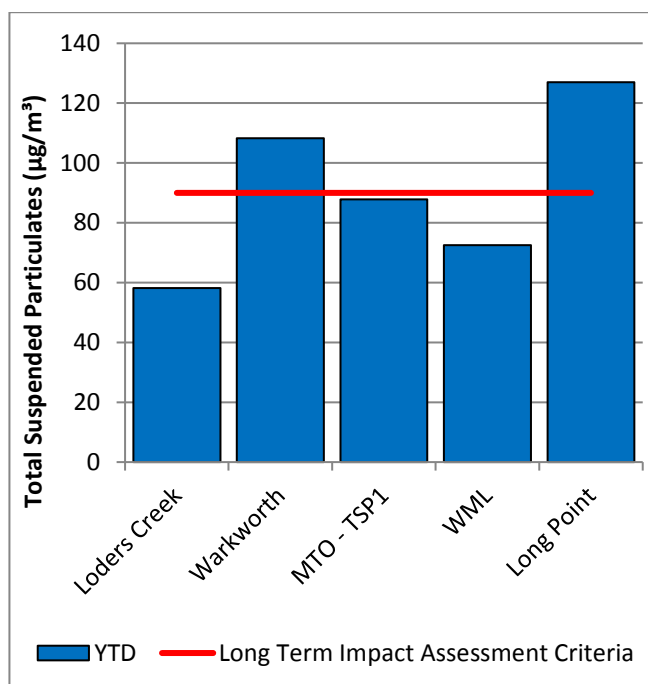


Figure 7: Annual Average Total Suspended Particulates – March 2018

2.3.3 Real Time PM₁₀ Results

Mt 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

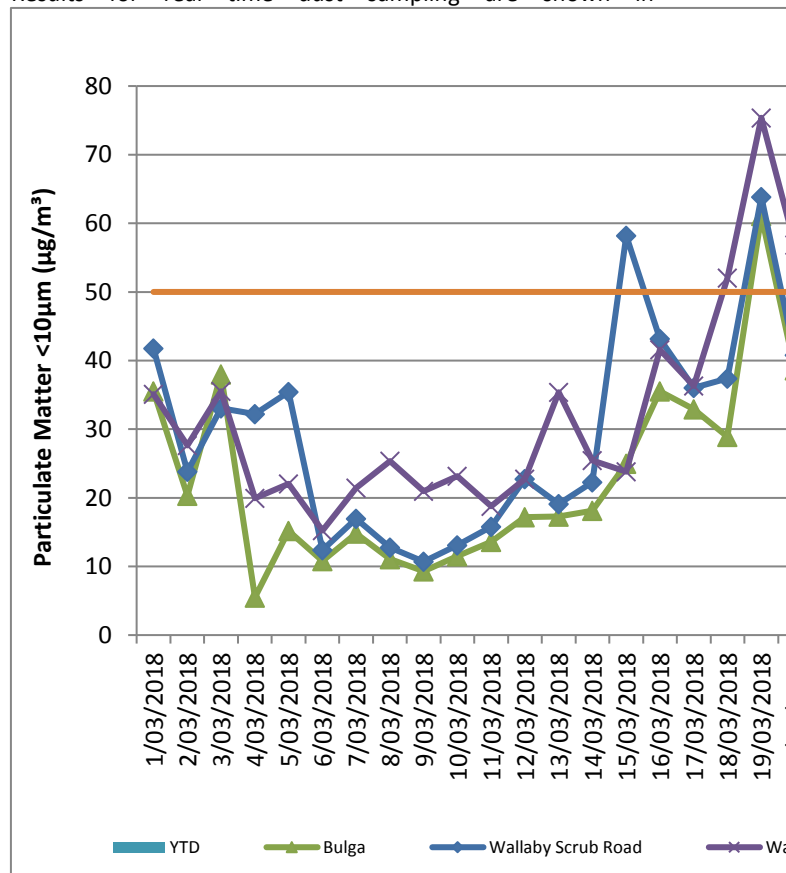


Figure 8, including the daily 24 hour average PM₁₀ result and the year to date annual average PM₁₀ result.

Six TEOM PM₁₀ measurements exceeded the 24 hour short term impact assessment criteria during the reporting period. Each was investigated to determine the level of contribution from MTW activities in accordance with the compliance protocol outlined in the MTW Air Quality Management Plan. All recorded exceedances were determined to be compliant with the relevant criterion.

A summary of the investigations undertaken for each short term PM₁₀ exceedance are provided in Table 2.

Note: Where reliable data was unable to be collected from the Bulga TEOM, data from the nearby OEH operated TEOM was sourced.

2.3.3 Real Time PM₁₀ Results

Table 2: 24hr PM₁₀ Investigations

Date	Site	24hr PM ₁₀ result (µg/m ³)	Estimated contribution from MTW (µg/m ³)	Discussion
15/03/2018	Wallaby Scrub Road TEOM	58.2	4.6	An analysis of meteorological data has determined the maximum potential MTW contribution to the result to be in the order of 4.6µg/m ³ or 8% of the measured result. As the calculated contribution was less than 75% of the measured result MTW is not considered to be a significant contributor to the result as described in the MTW Air Quality Management Plan.
18/03/2018	Warkworth OEH TEOM	52.1	8.8	An analysis of meteorological data has determined the maximum potential MTW contribution to the result to be in the order of 8.8µg/m ³ or 16.9% of the measured result. As the calculated contribution was less than 75% of the measured result MTW is not considered to be a significant contributor to the result as described in the MTW Air Quality Management Plan.
19/03/2018	Bulga OEH TEOM	61.1	N/A	An analysis of meteorological data has determined that the Bulga OEH monitoring location was predominantly upwind of MTW throughout the day. Therefore, it is unlikely that MTW was a significant contributor to the result and thus an estimation of contribution has not been calculated.
19/03/2018	Wallaby Scrub Road TEOM	63.8	23.0	An analysis of meteorological data has determined the maximum potential MTW contribution to the result to be in the order of 23µg/m ³ or 36.1% of the measured result. As the calculated contribution was less than 75% of the measured result MTW is not considered to be a significant contributor to

				the result as described in the MTW Air Quality Management Plan.
19/03/2018	Warkworth OEH TEOM	75.4	34.9	An analysis of meteorological data has determined the maximum potential MTW contribution to the result to be in the order of 34.9µg/m ³ or 46.3% of the measured result. As the calculated contribution was less than 75% of the measured result MTW is not considered to be a significant contributor to the result as described in the MTW Air Quality Management Plan.
20/03/2018	Warkworth OEH TEOM	56.8	30.6	An analysis of meteorological data has determined the maximum potential MTW contribution to the result to be in the order of 30.6µg/m ³ or 53.9% of the measured result. As the calculated contribution was less than 75% of the measured result MTW is not considered to be a significant contributor to the result as described in the MTW Air Quality Management Plan.

2.3.4 Real Time Alarms for Air Quality

During March, the real time monitoring system generated 80 automated air quality related alerts, including 5 alerts for adverse meteorological conditions and 75 alerts for elevated PM₁₀ levels.

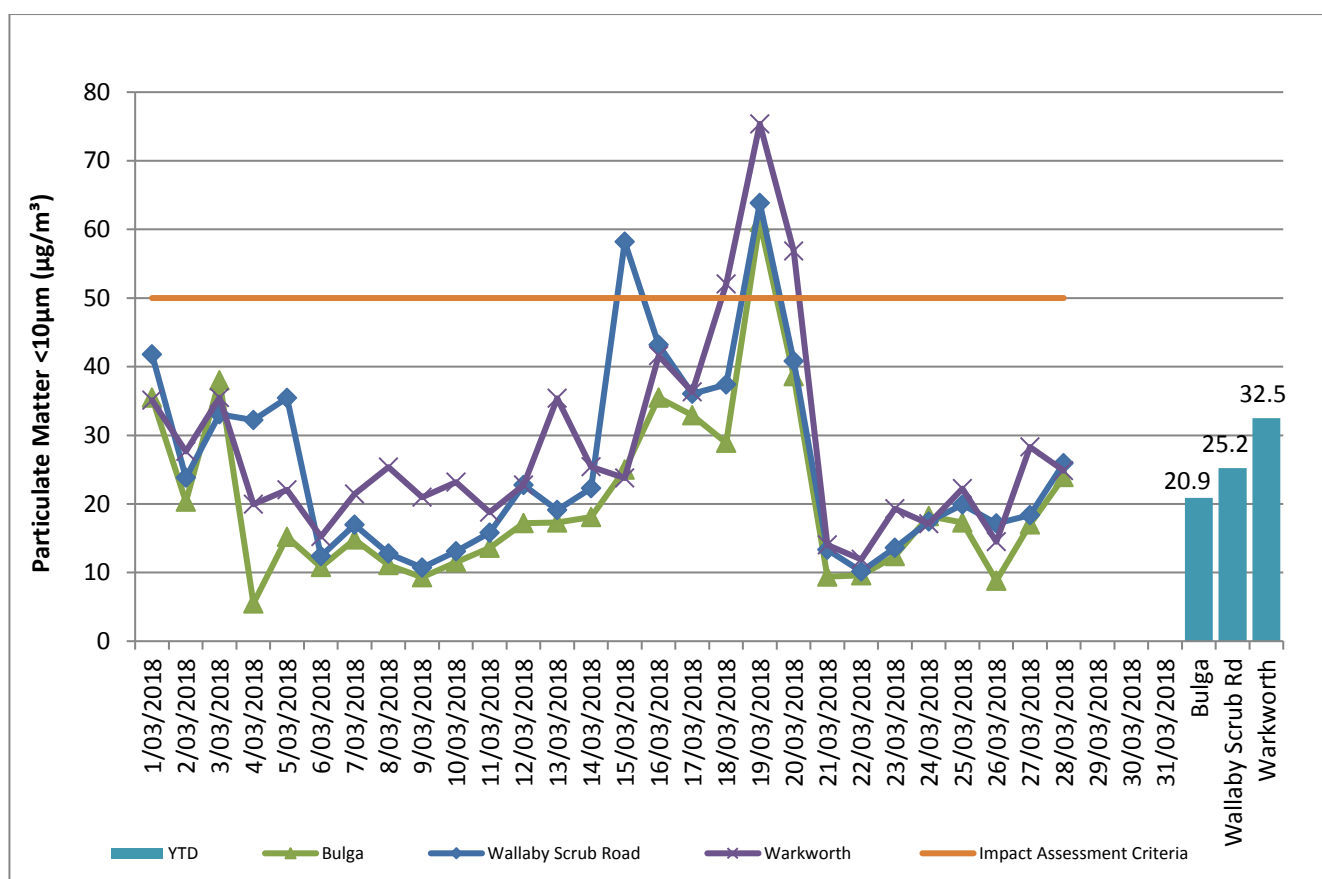


Figure 8: Real Time PM₁₀ 24hr average and Year-to-date average – March 2018

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. 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 (2015 – current) within MTW mine dams. Figure 12 to Figure 14 show the long term surface water trend (2015 - current) in surrounding watercourses.

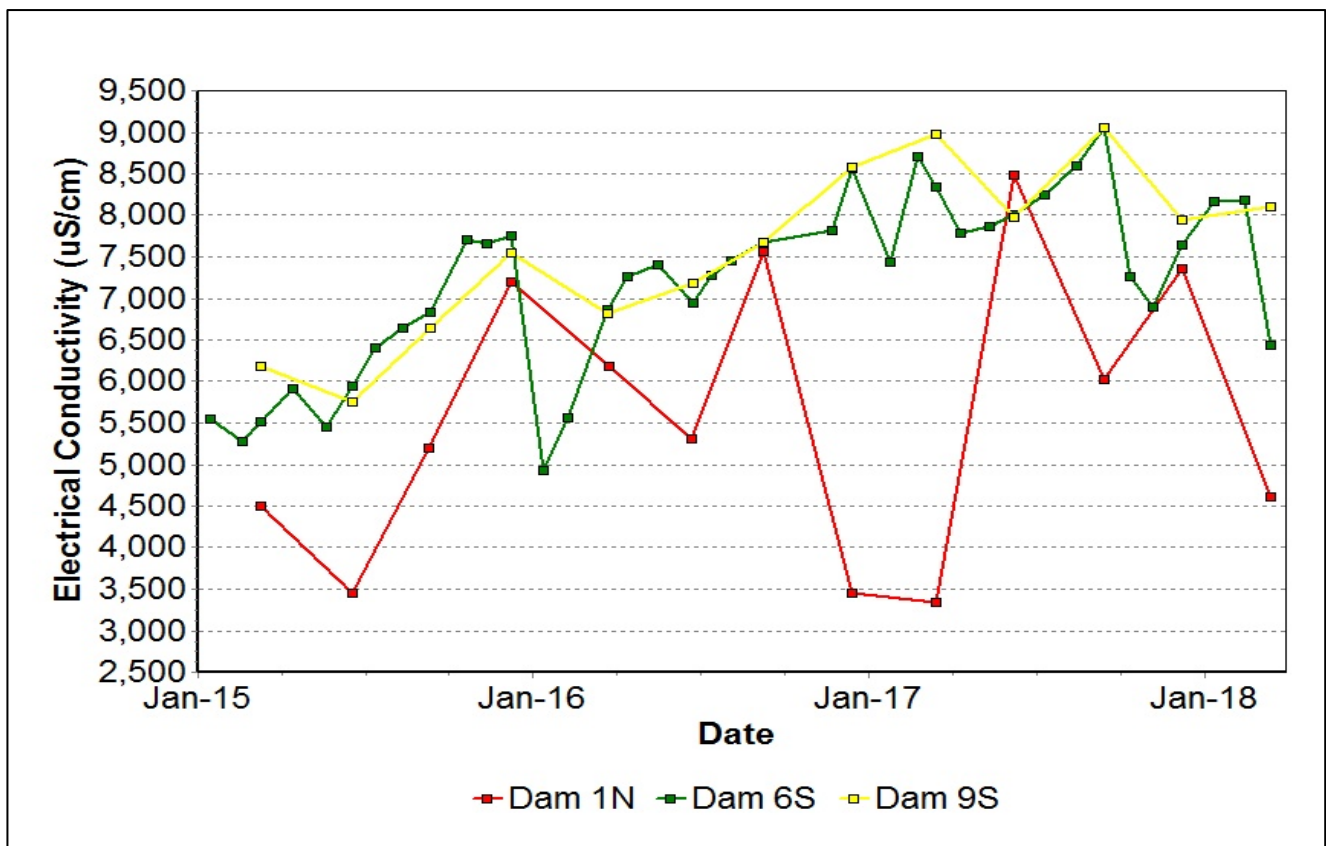


Figure 9: Site Dams Electrical Conductivity Trend – March 2018

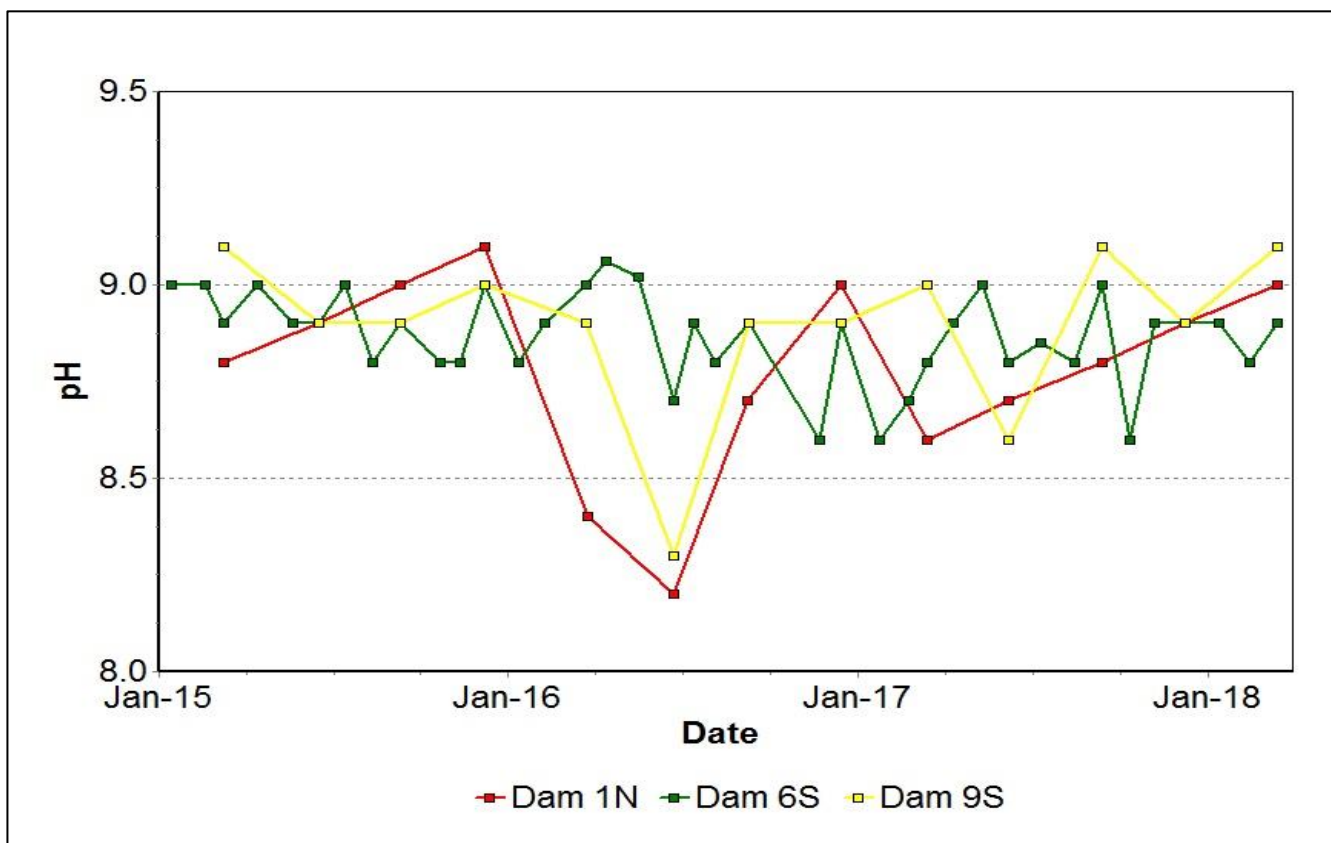


Figure 10: Site Dams pH Trend – March 2018

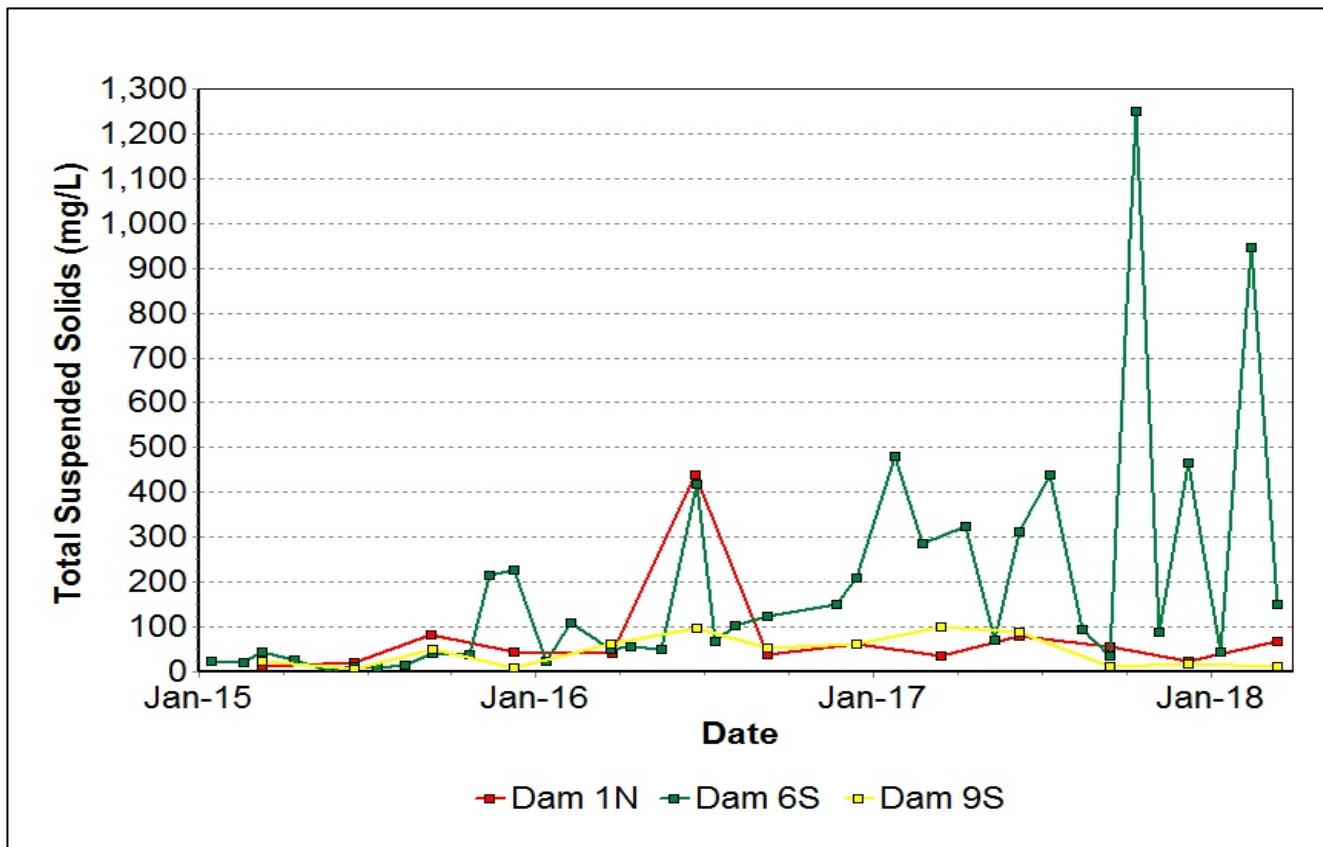


Figure 11: Site Dams Total Suspended Solids Trend – March 2018

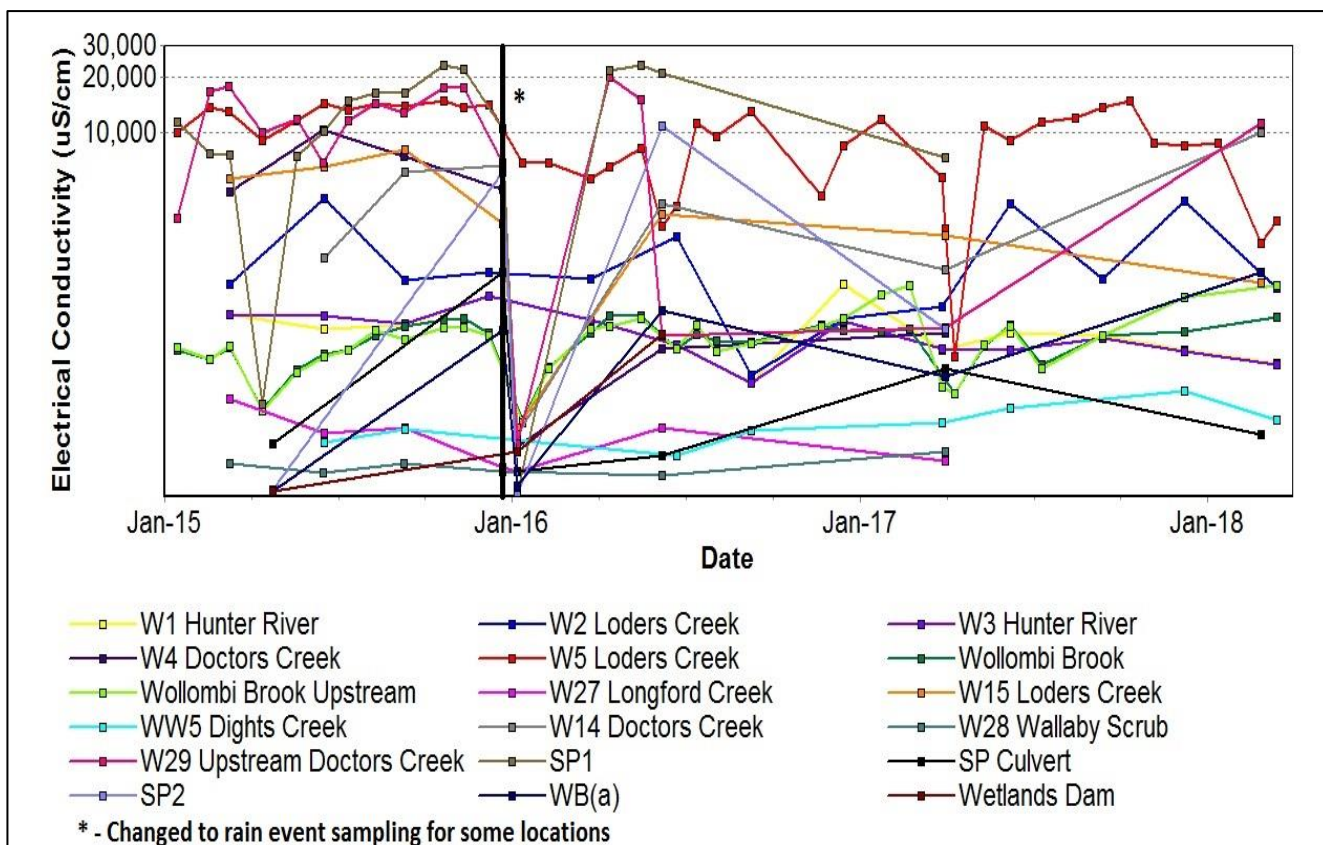


Figure 12: Watercourse Electrical Conductivity Trend – March 2018

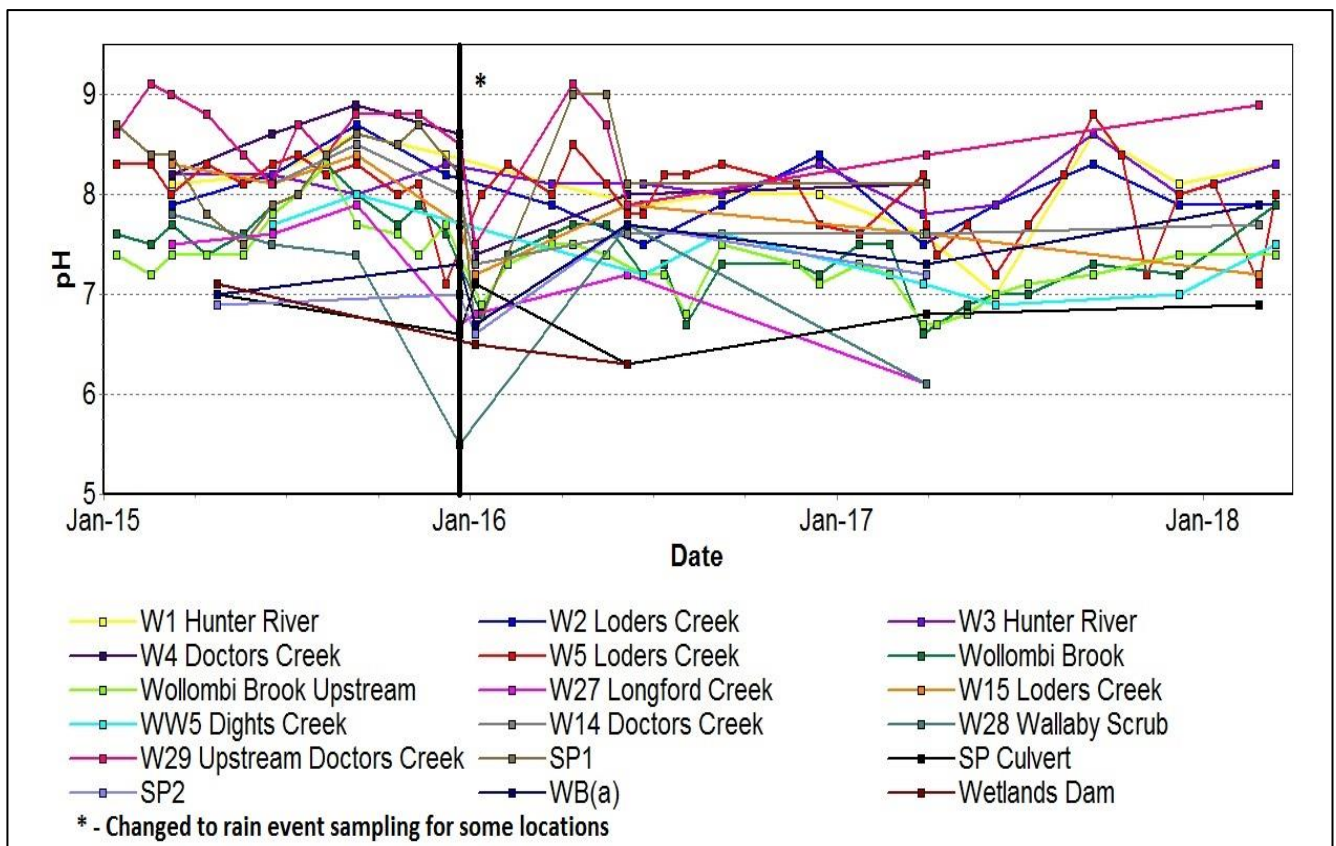


Figure 13: Watercourse pH Trend – March 2018

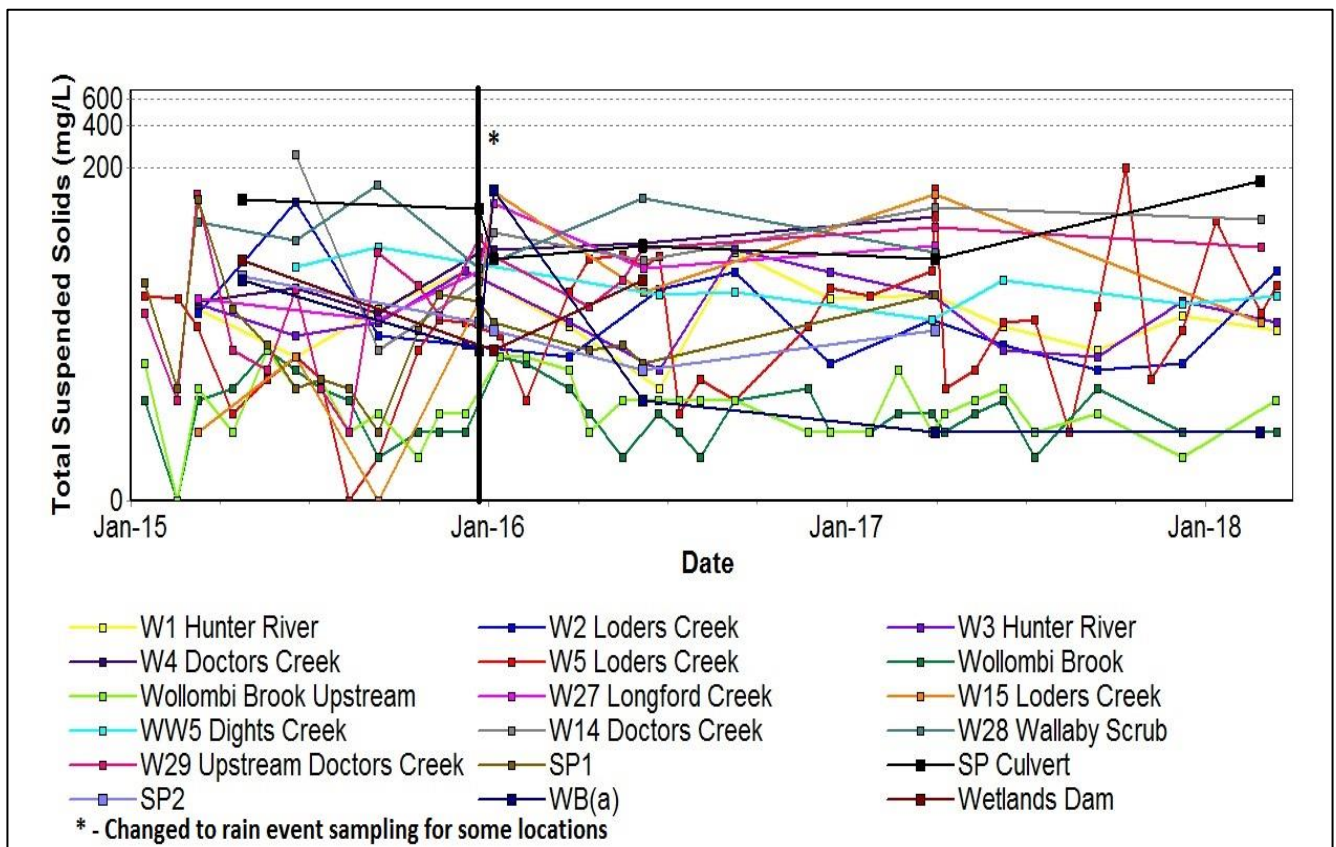


Figure 14: Watercourse Total Suspended Solids Trend – March 2018

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.

Current internal surface water trigger limit breaches are summarised in Table 3.

Table 3: Surface Water Trigger Tracking – March YTD 2018

Site	Date	Trigger Limit Breached	Action Taken in Response
W14	26/02/2018	EC –95 th Percentile	Watching Brief*
W5	14/02/2018	pH –5 th Percentile	Watching Brief*
W15	26/02/2018	pH –5 th Percentile	Watching Brief*
W5	12/01/2018	TSS – 50mg/L (ANZECC criteria)	Field investigation did not identify any mining related sources of sediment. Elevated TSS associated with high intensity rainfall event after prolonged dry period. No further action taken
W14	26/02/2018	TSS – 50mg/L (ANZECC criteria)	Field investigation did not identify any mining related sources of sediment. Elevated TSS associated with high intensity rainfall event after prolonged dry period. No further action taken
W29	26/02/2018	TSS – 50mg/L (ANZECC criteria)	Field investigation did not identify any mining related sources of sediment. Elevated TSS associated with high intensity rainfall event after prolonged dry period. No further action taken

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

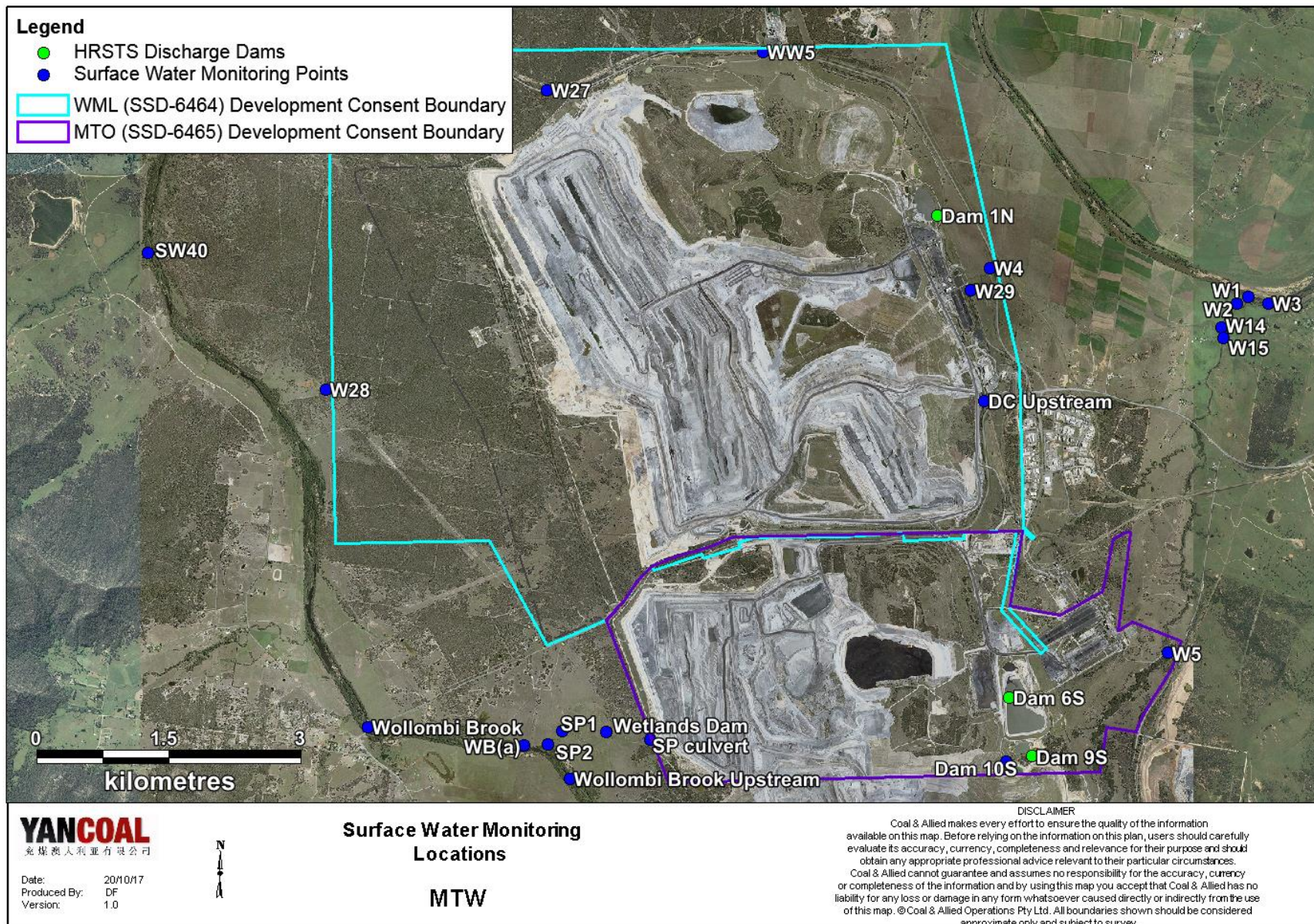


Figure 15: Surface Water Monitoring Location Plan

3.2 Groundwater Monitoring

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

Figure 16 to Figure 60 show the long term water quality trends (2015 – current) for groundwater bores monitored at MTW.

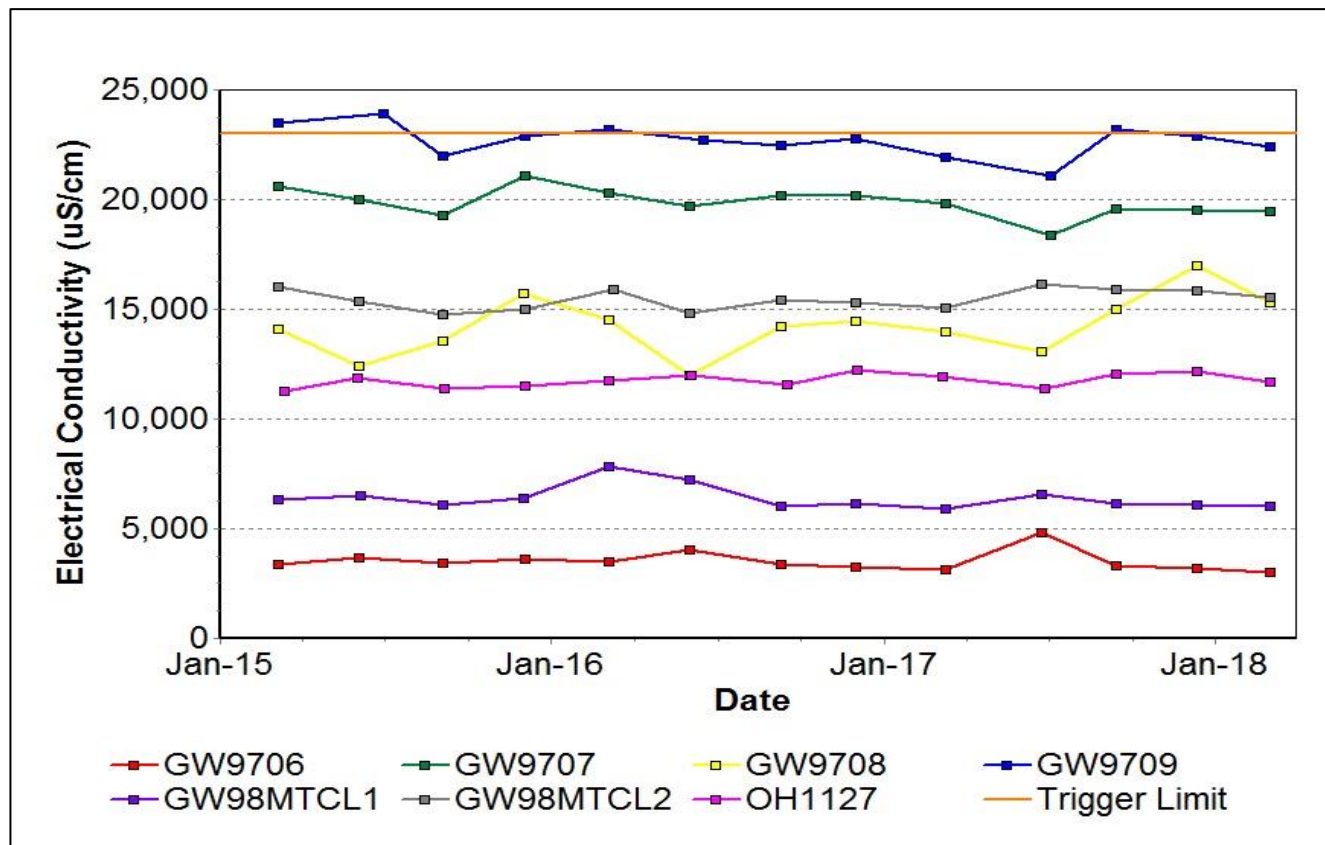


Figure 16: Bayswater Seam Electrical Conductivity Trend – March 2018

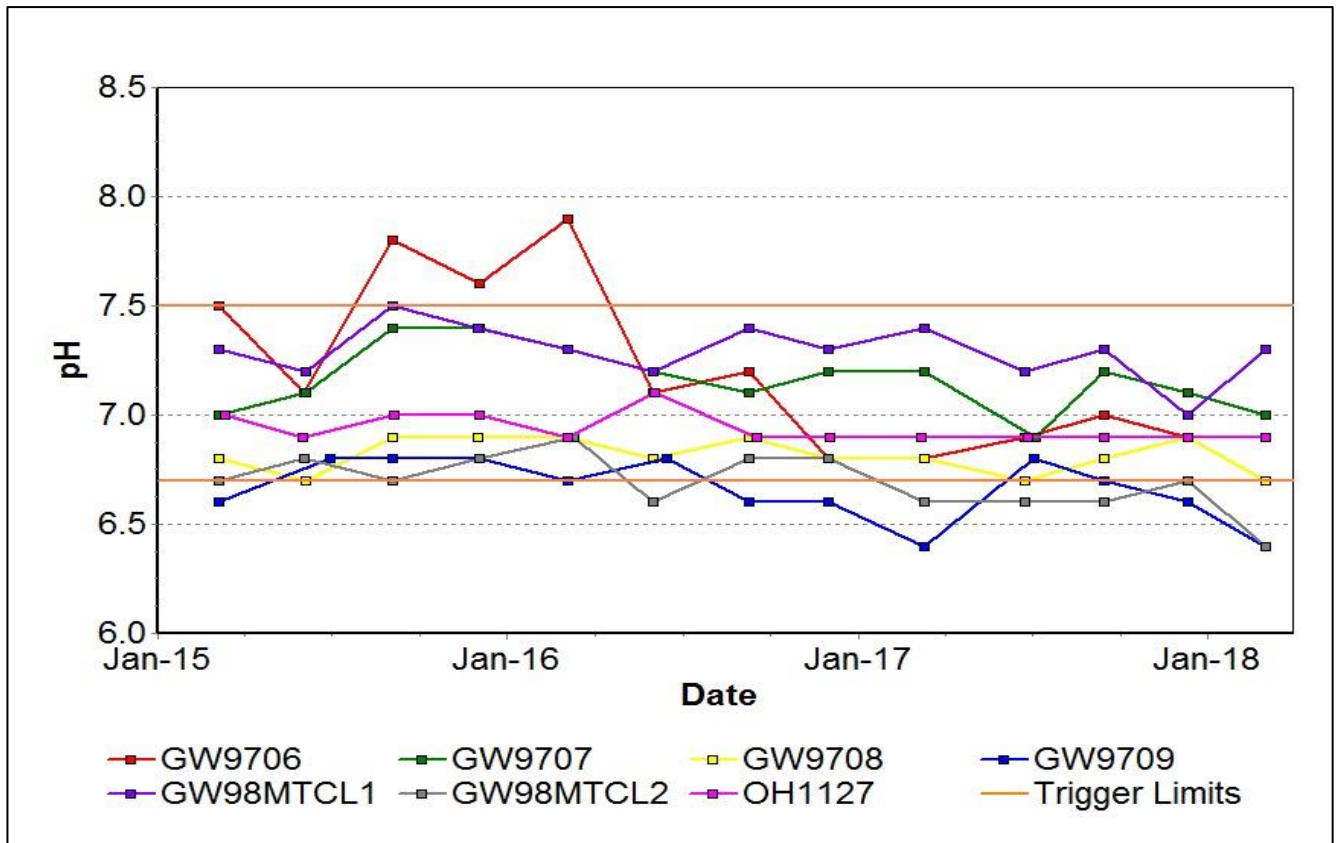


Figure 17: Bayswater Seam pH Trend – March 2018

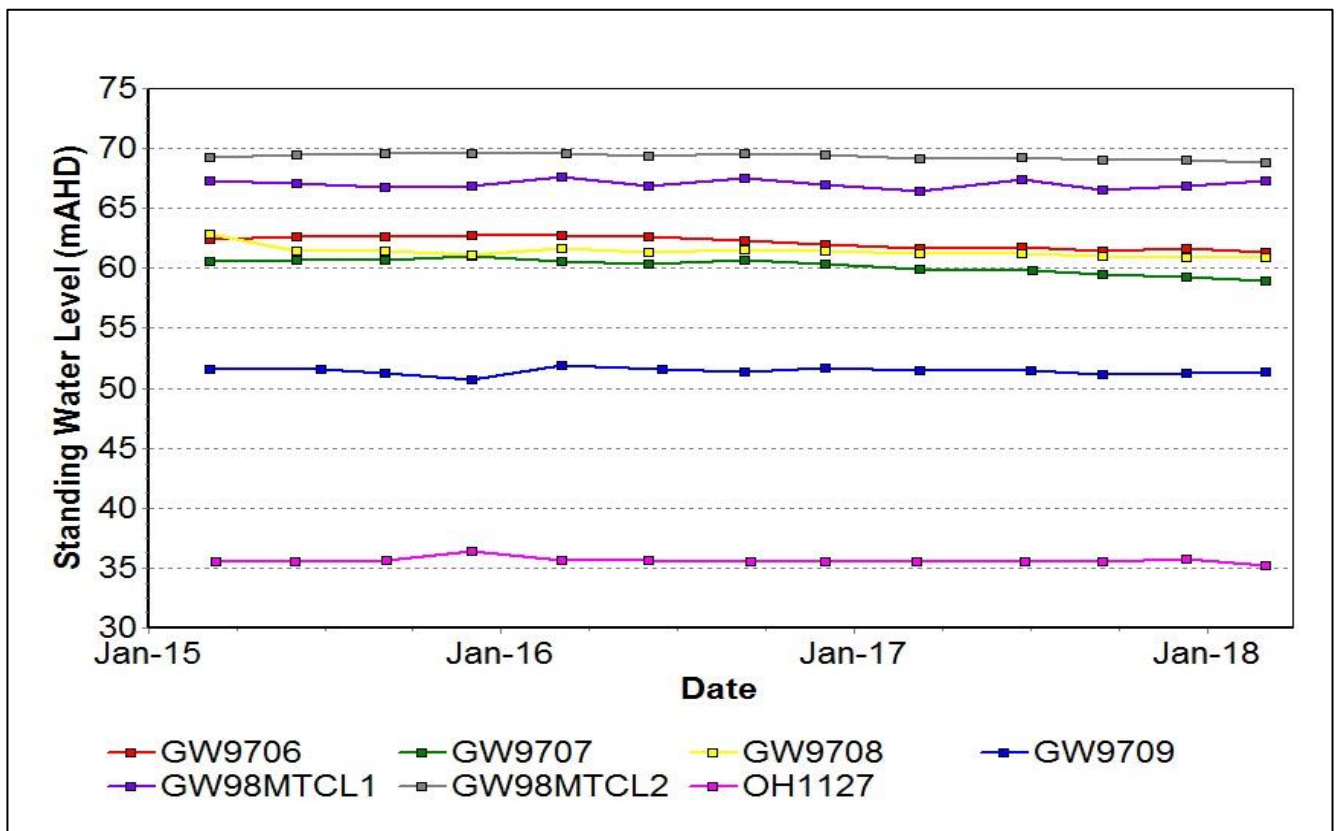


Figure 18: Bayswater Seam Standing Water Level Trend – March 2018

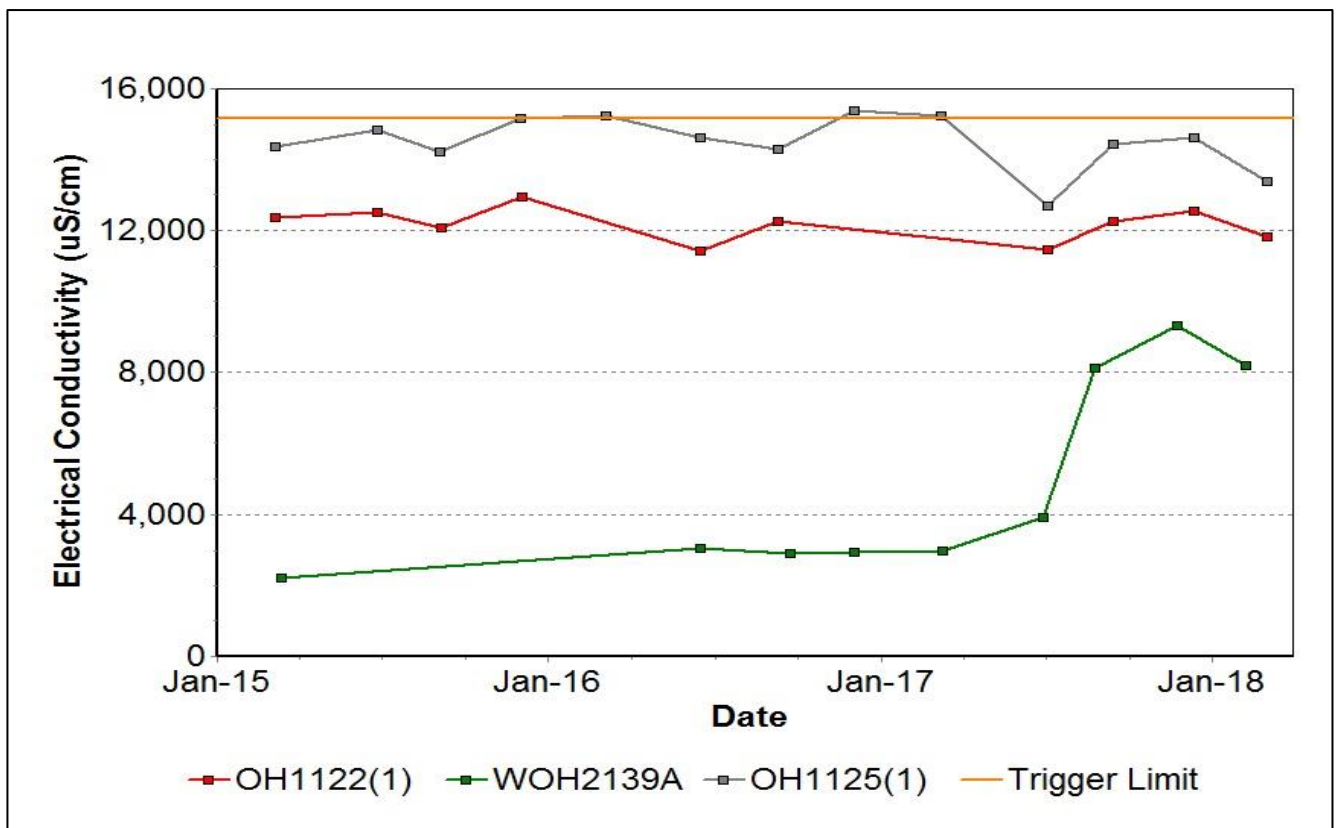


Figure 19: Blakefield Seam Electrical Conductivity Trend – March 2018

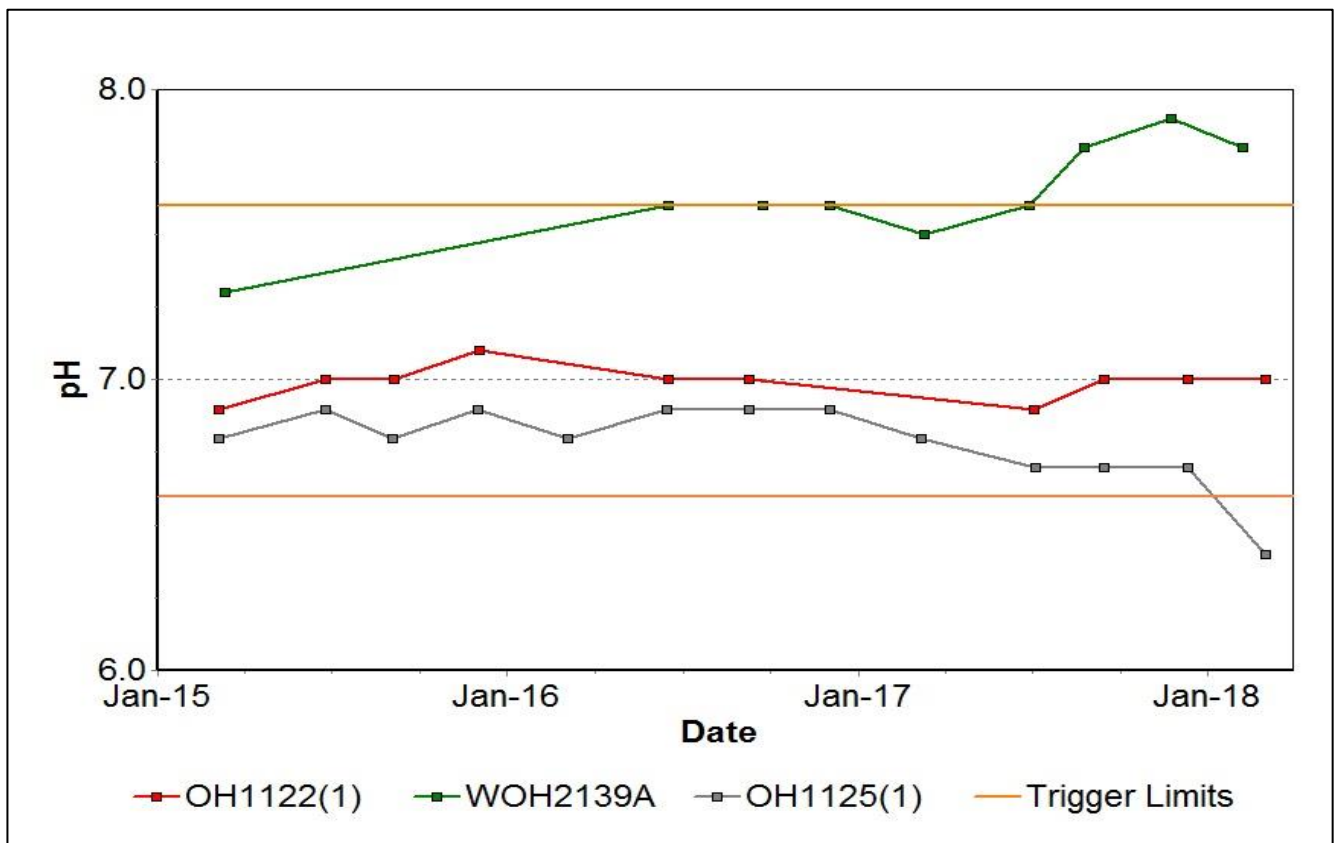


Figure 20: Blakefield Seam pH Trend – March 2018

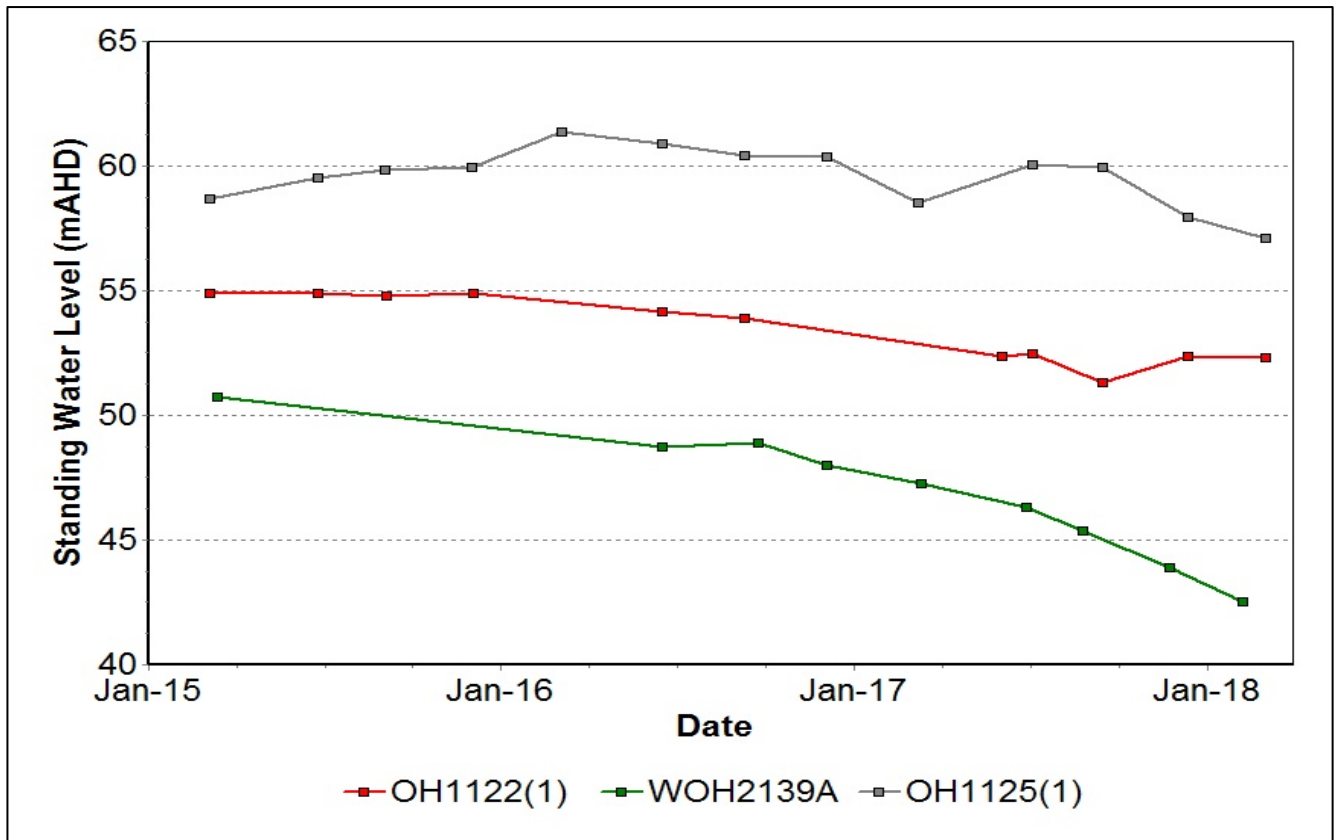


Figure 21: Blakefield Seam Standing Water Level Trend – March 2018

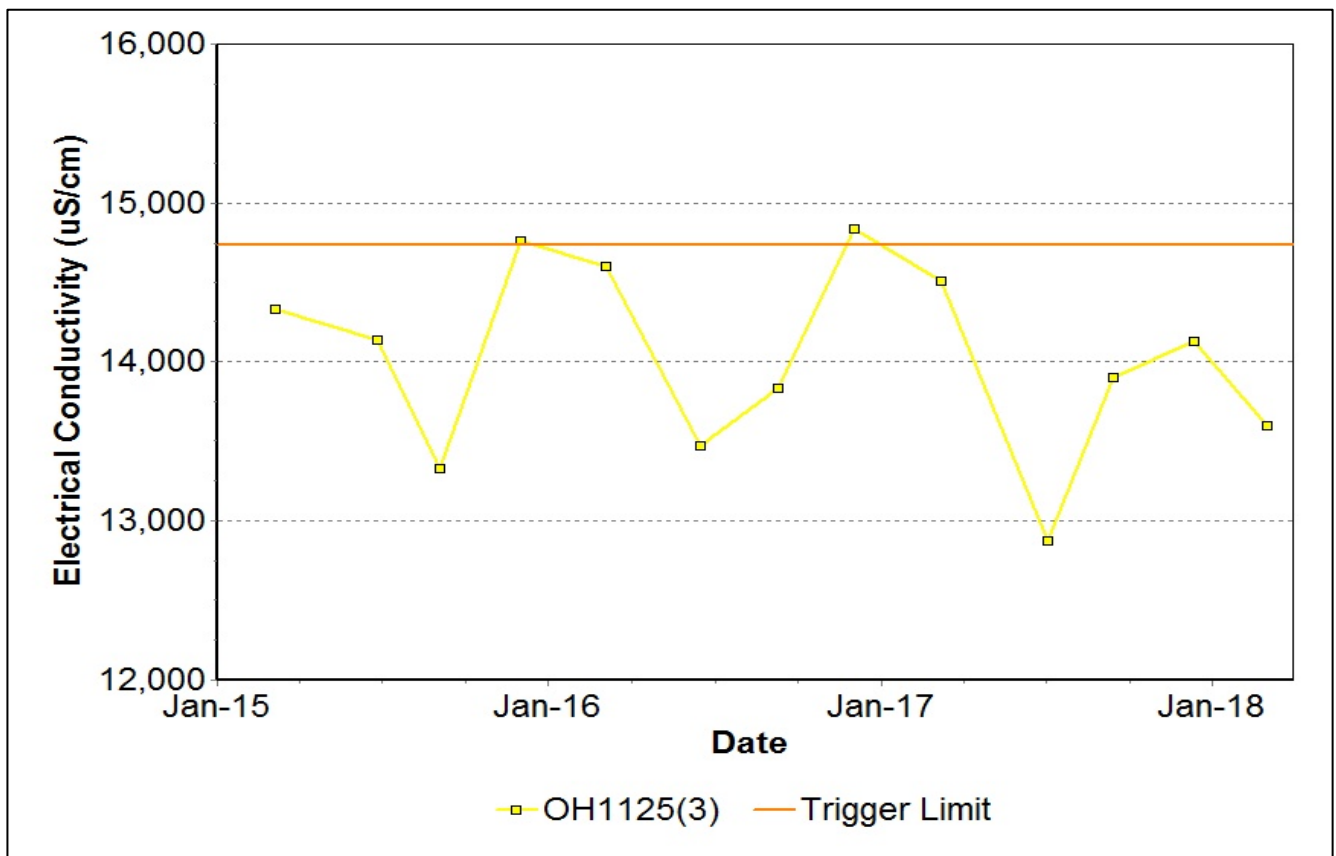


Figure 22: Bowfield Seam Electrical Conductivity Trend – March 2018

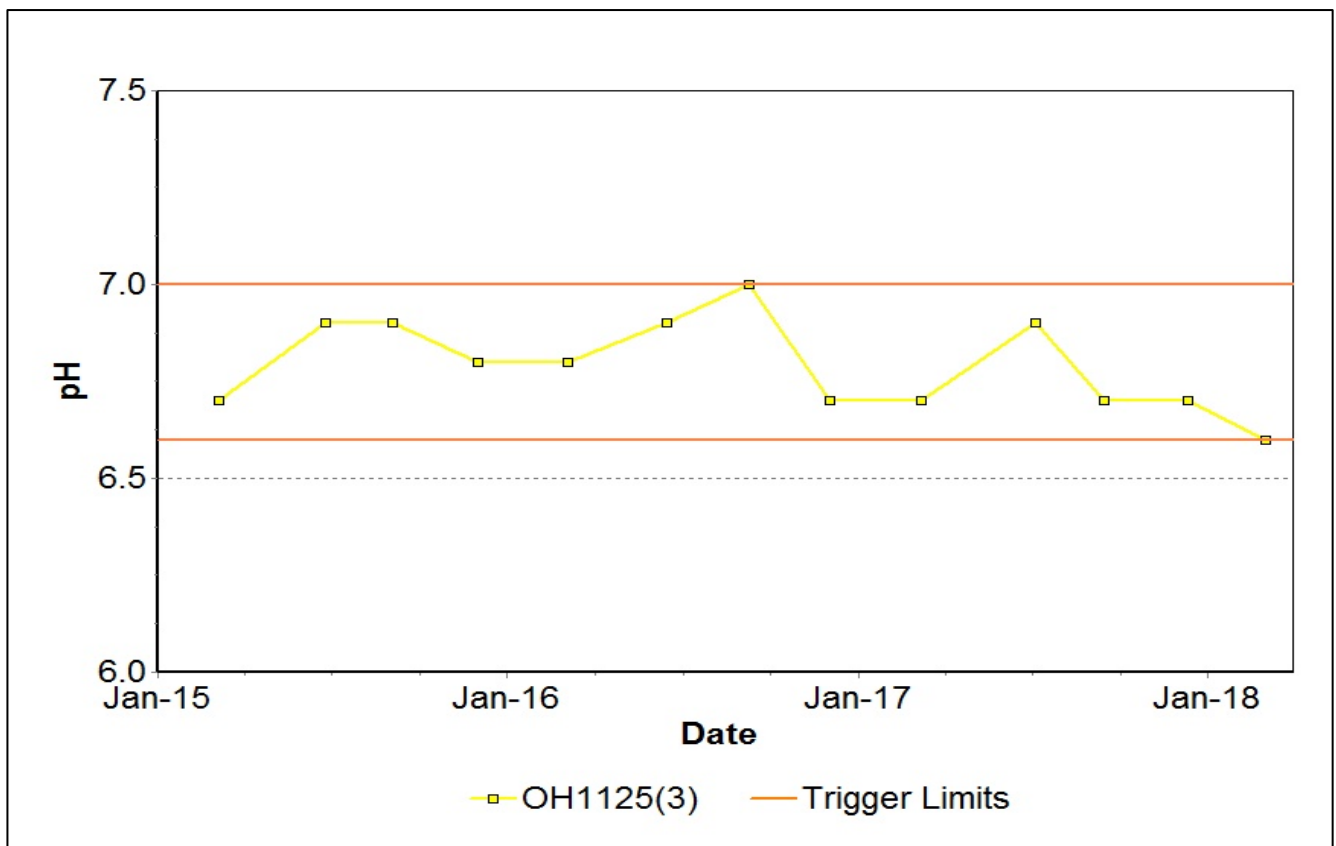


Figure 23: Bowfield Seam pH Trend – March 2018

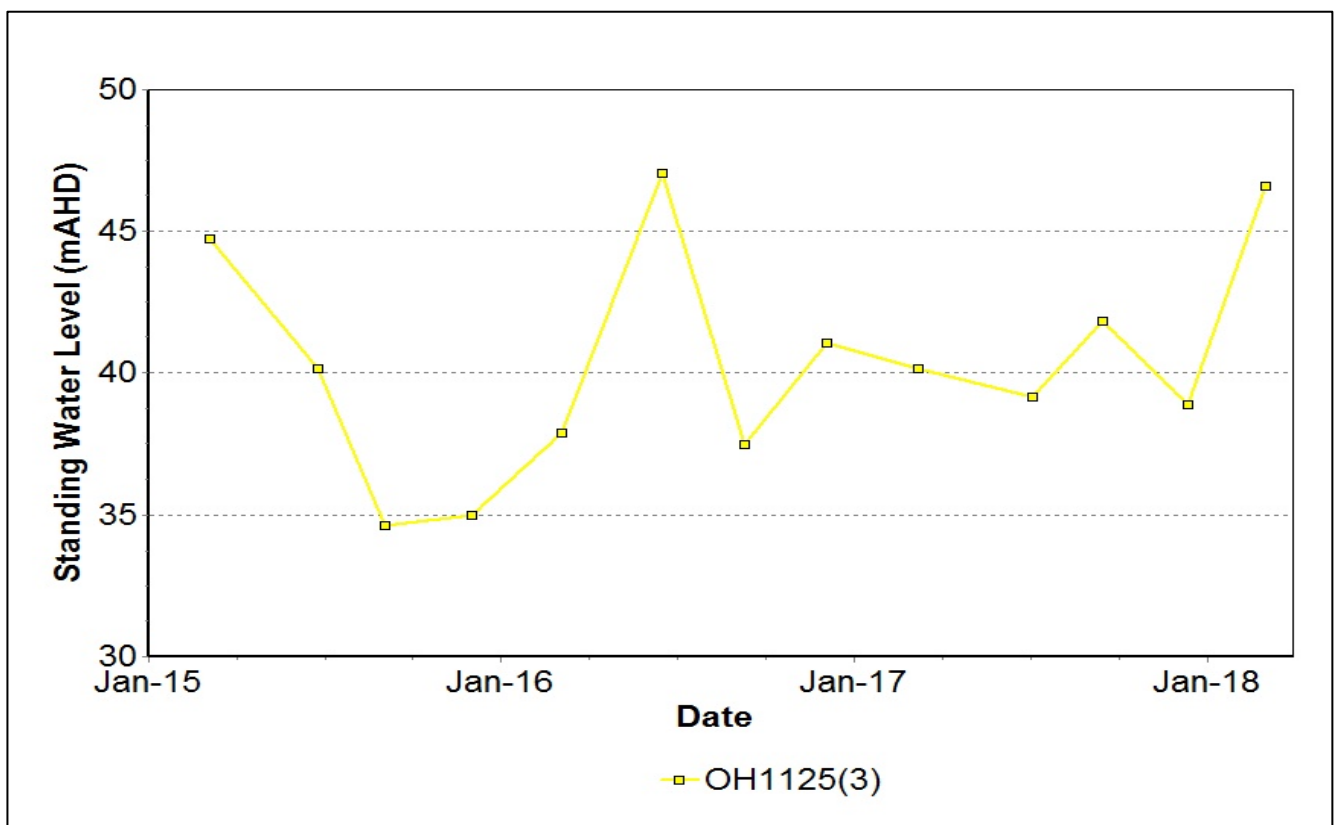


Figure 24: Bowfield Seam Standing Water Level Trend – March 2018

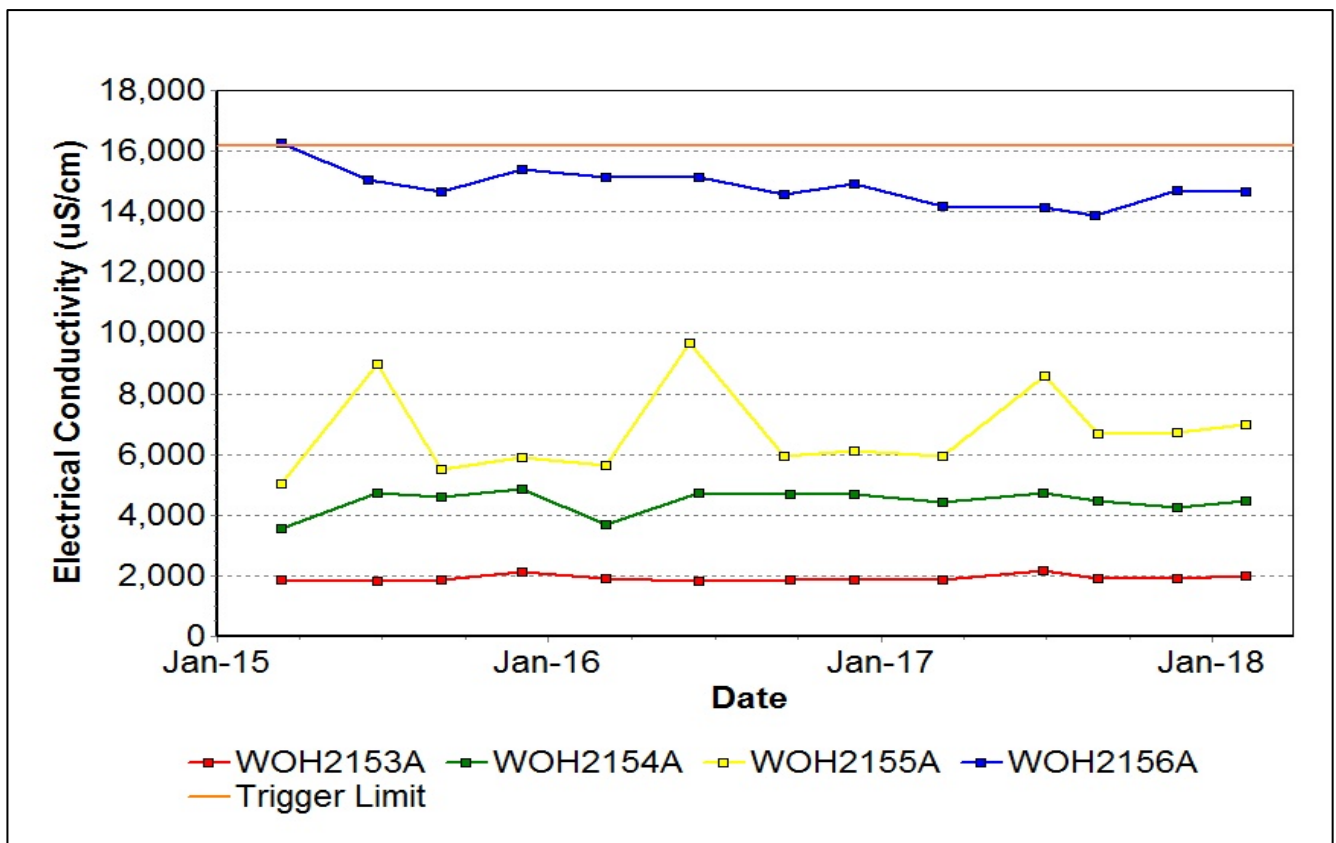


Figure 25: Redbank Seam Electrical Conductivity Trend – March 2018

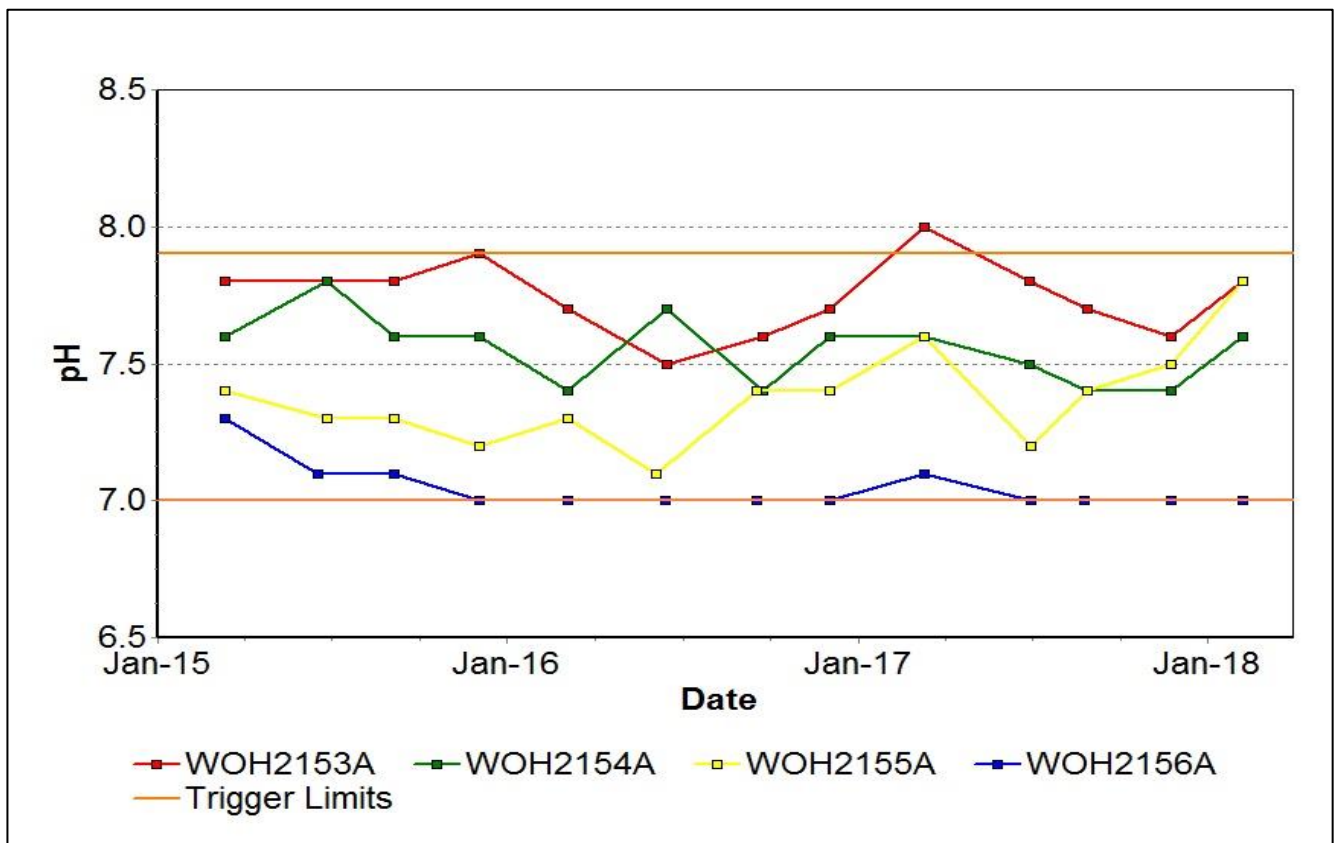


Figure 26: Redbank Seam pH Trend – March 2018

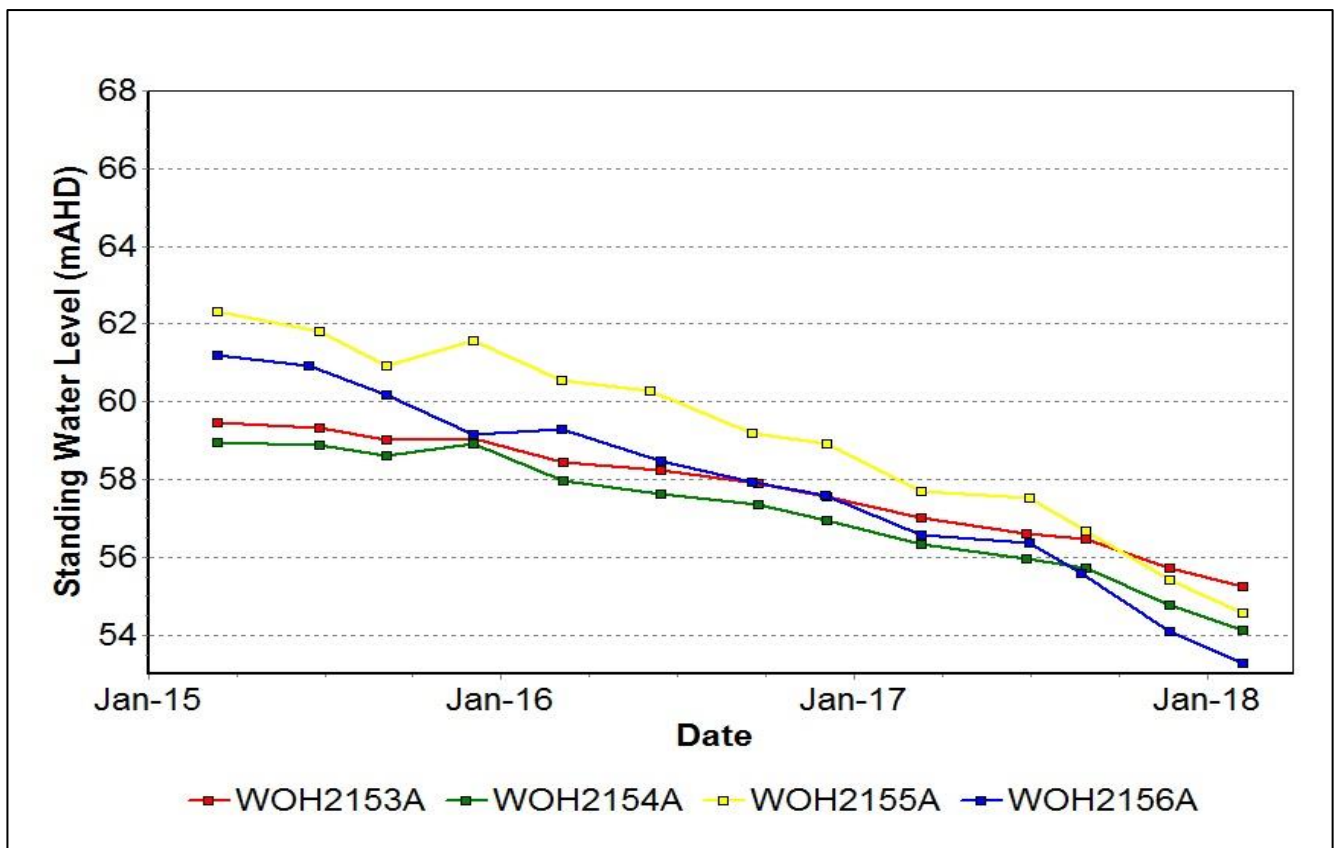


Figure 27: Redbank Seam Standing Water Level Trend – March 2018

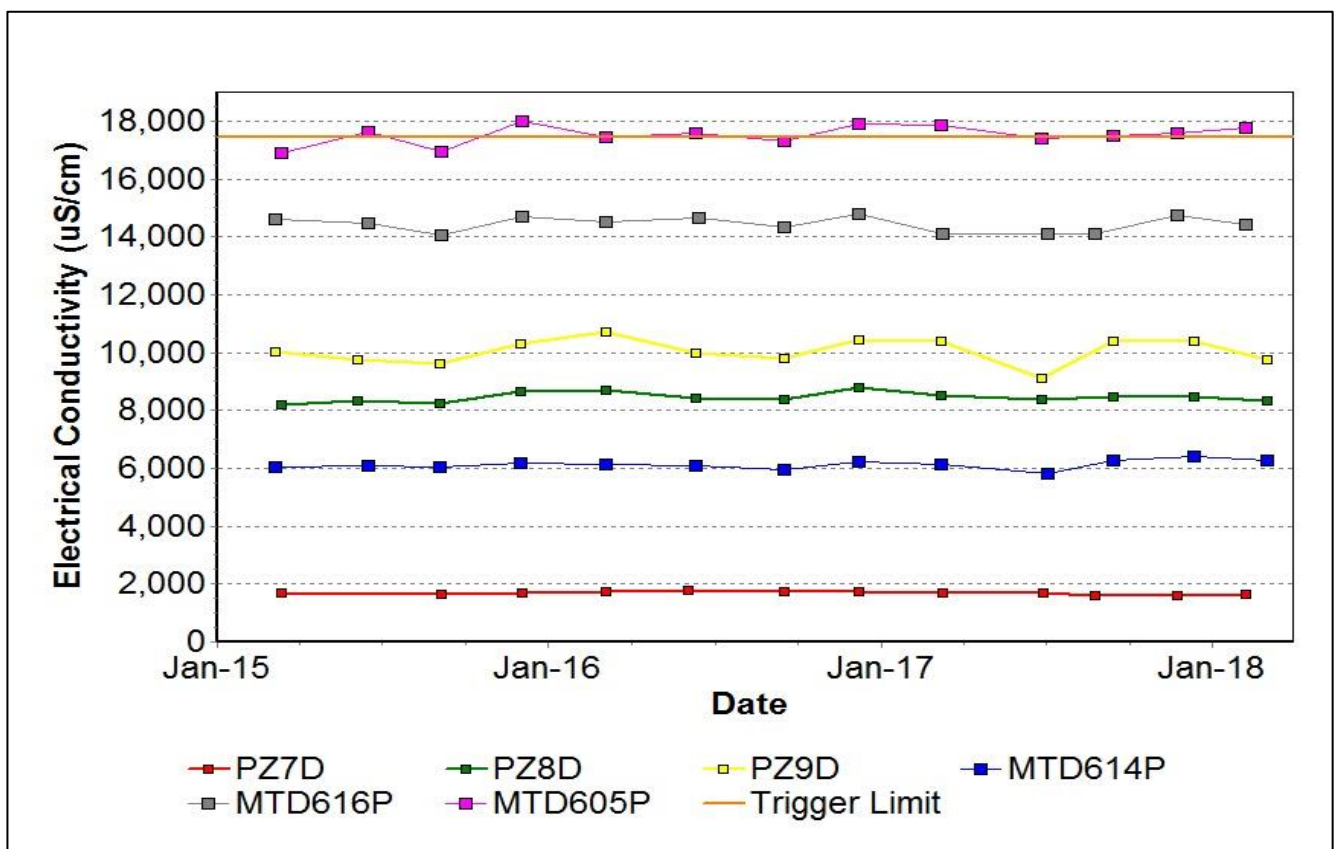


Figure 28: Shallow Overburden Seam Electrical Conductivity Trend – March 2018

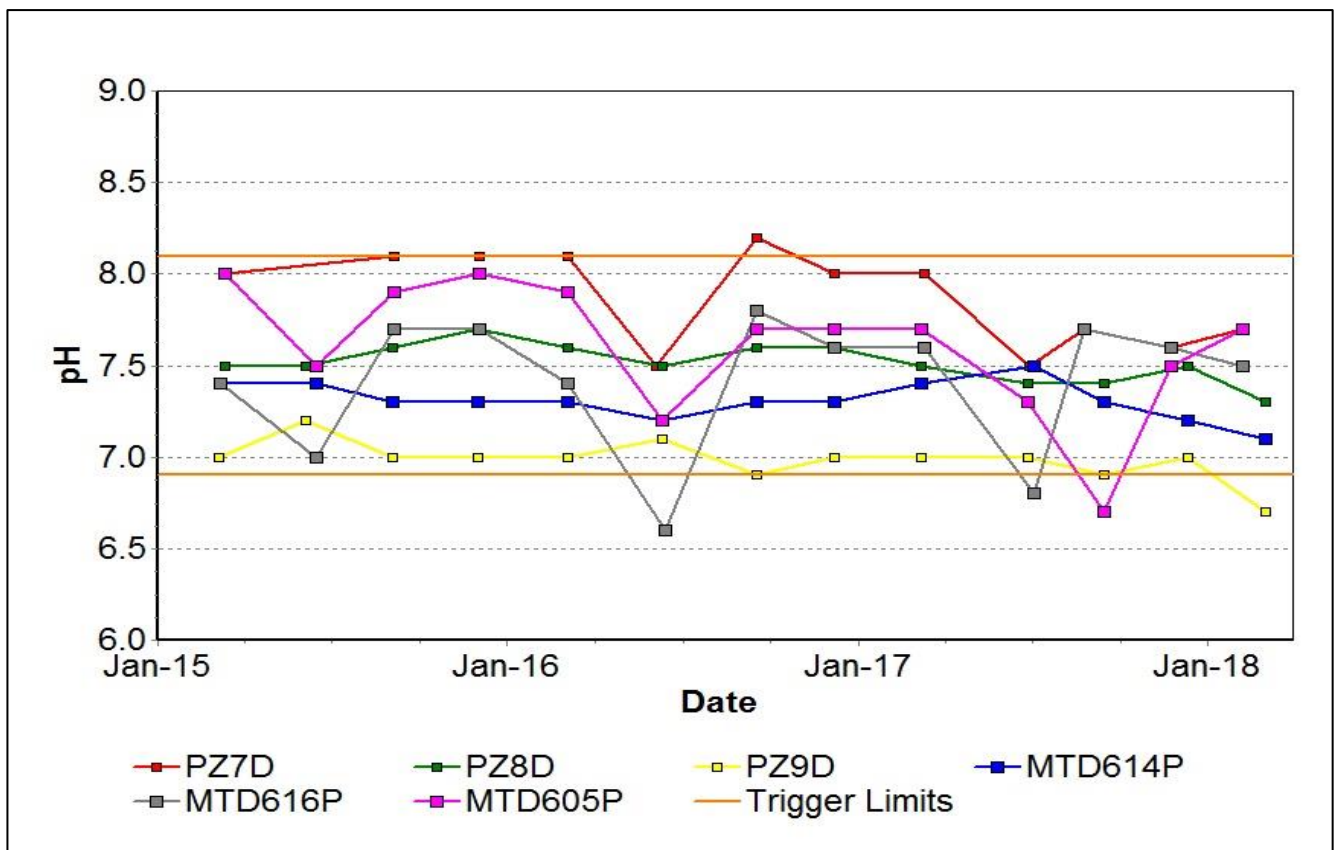


Figure 29: Shallow Overburden Seam pH Trend – March 2018

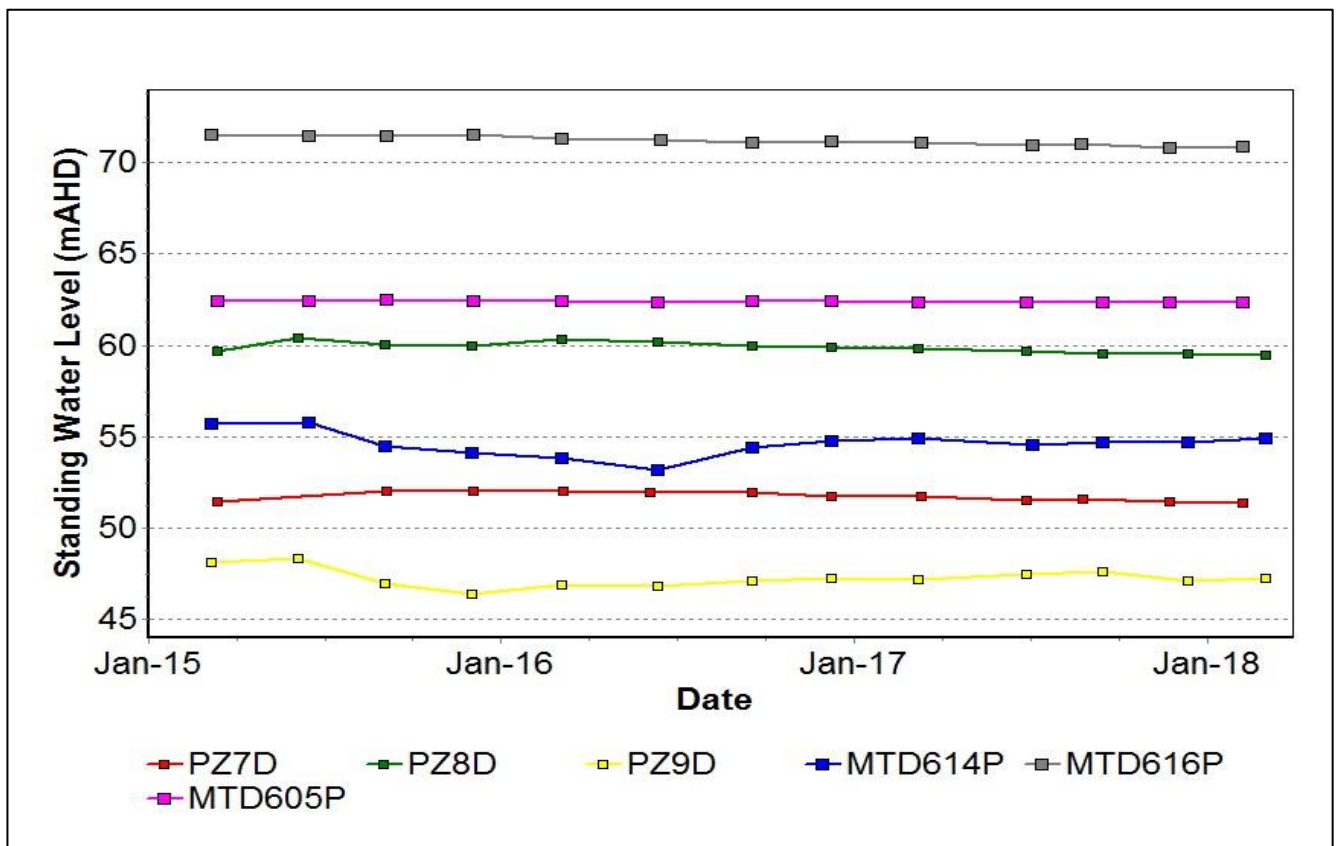


Figure 30: Shallow Overburden Seam Standing Water Level Trend – March 2018

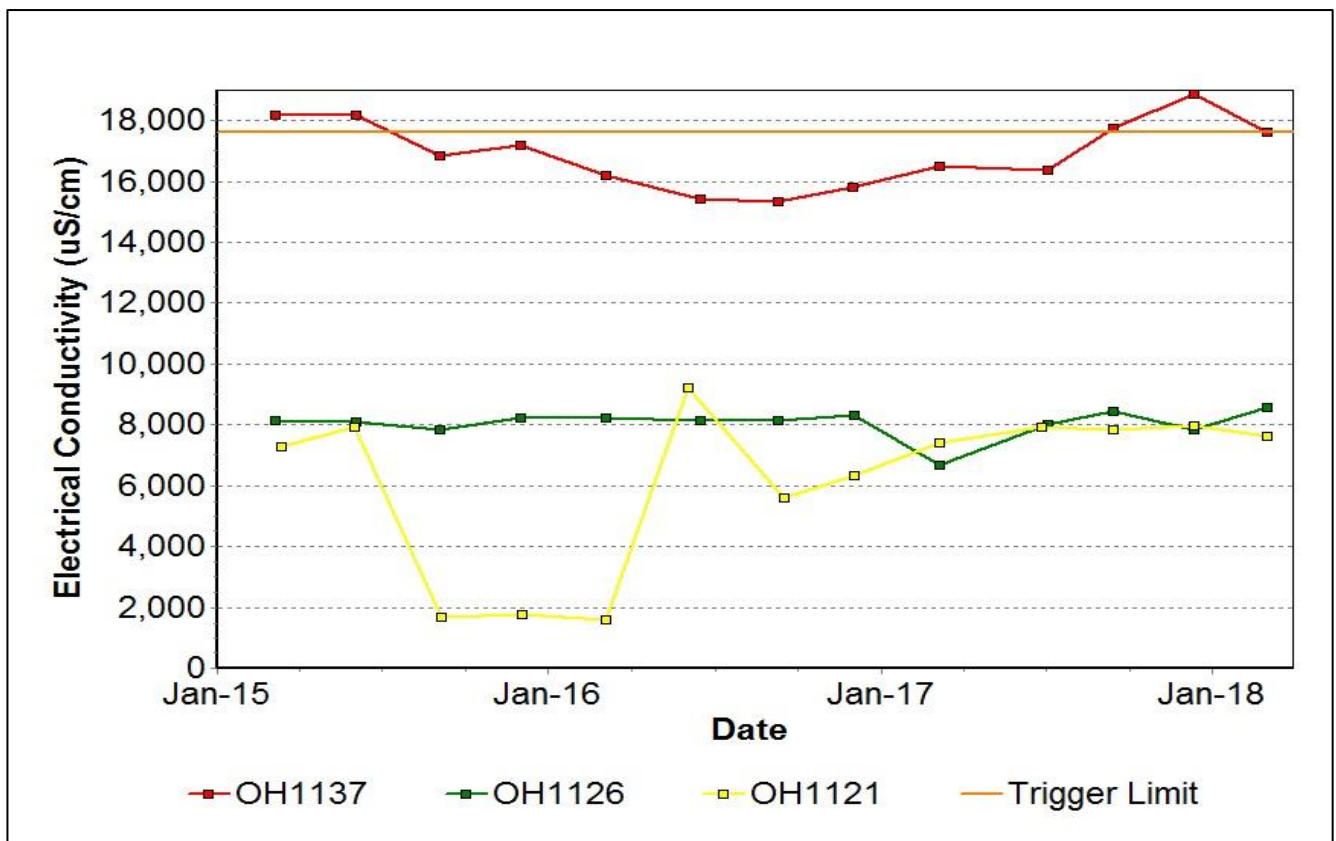


Figure 31: Vaux Seam Electrical Conductivity Trend – March 2018

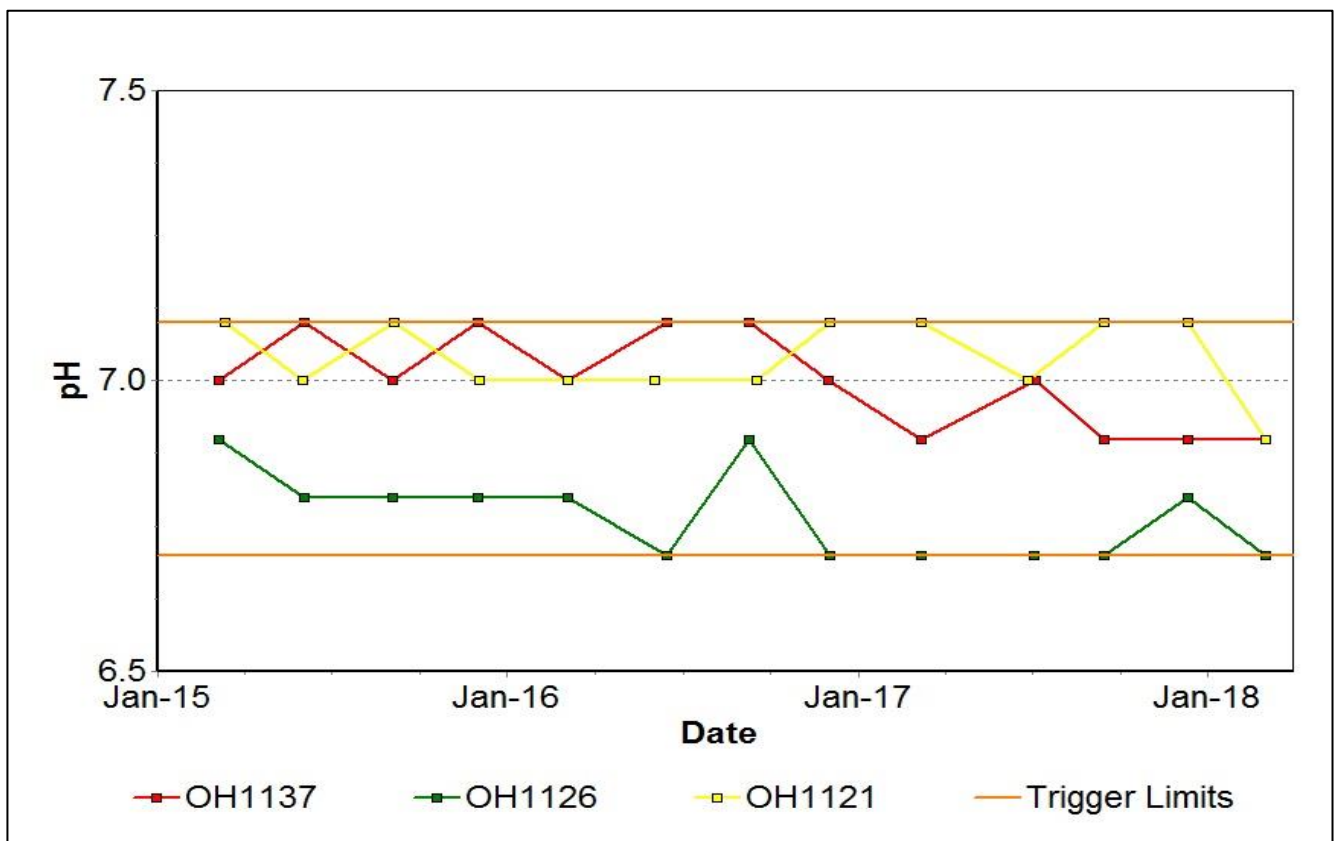


Figure 32: Vaux Seam pH Trend – March 2018

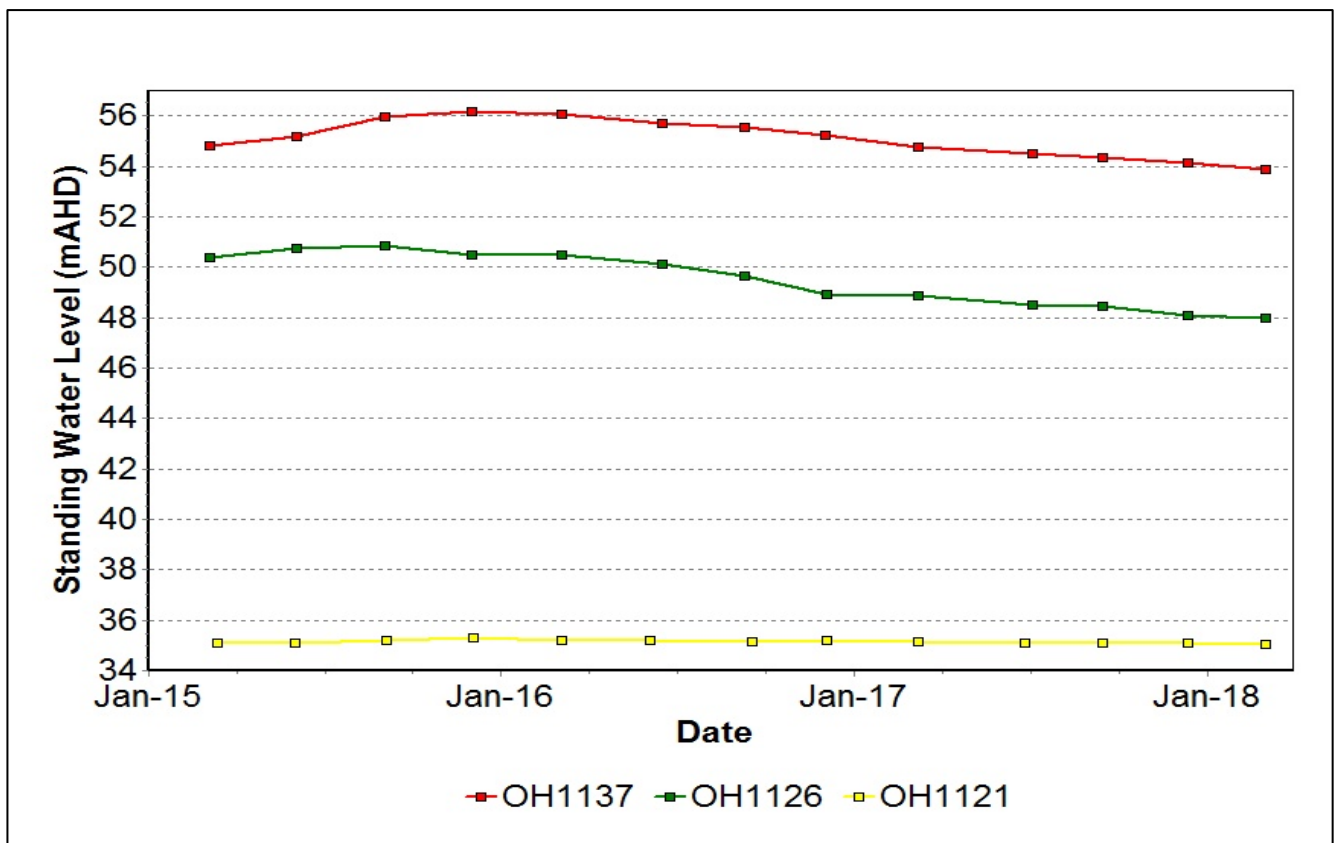


Figure 33: Vaux Seam Standing Water Level Trend – March 2018

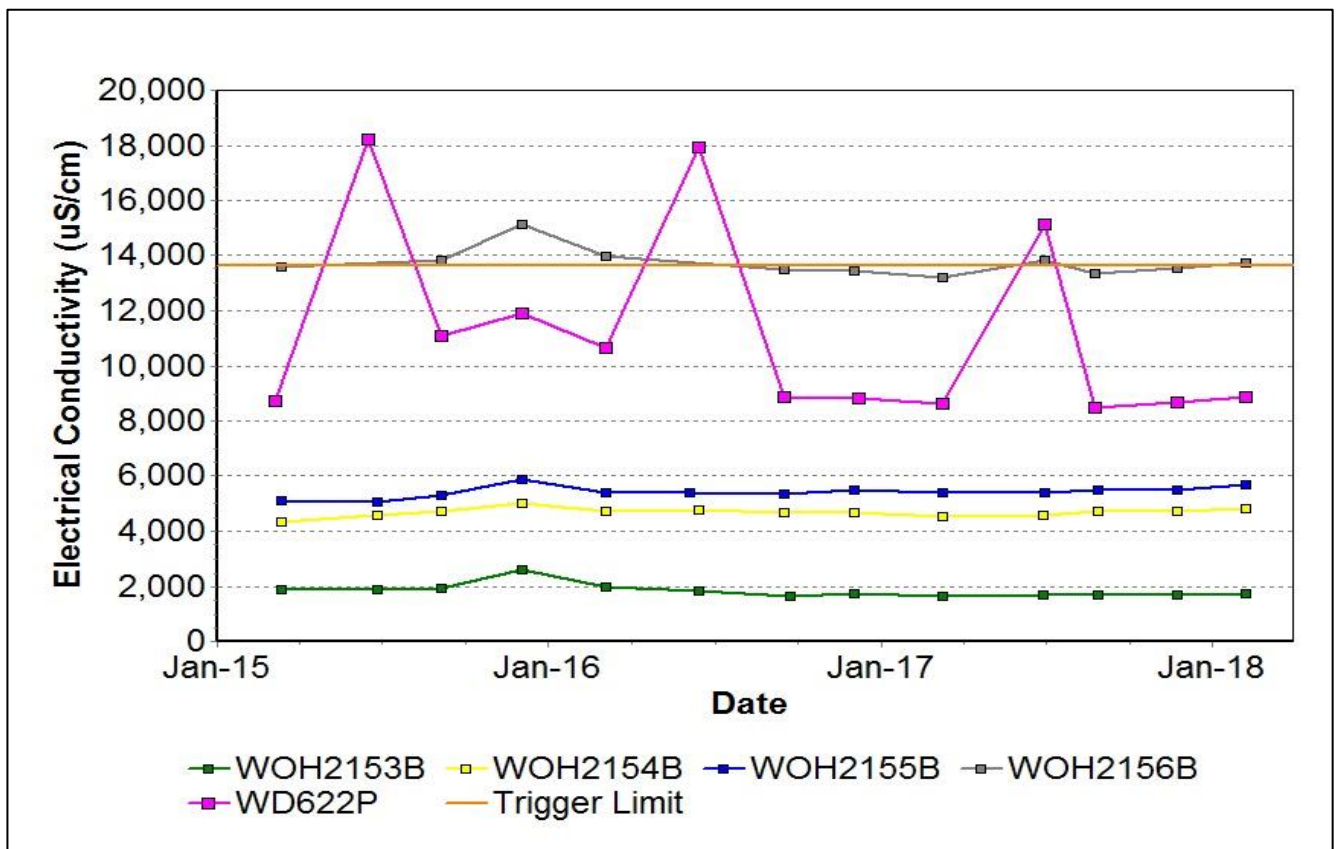


Figure 34: Wambo Seam Electrical Conductivity Trend – March 2018

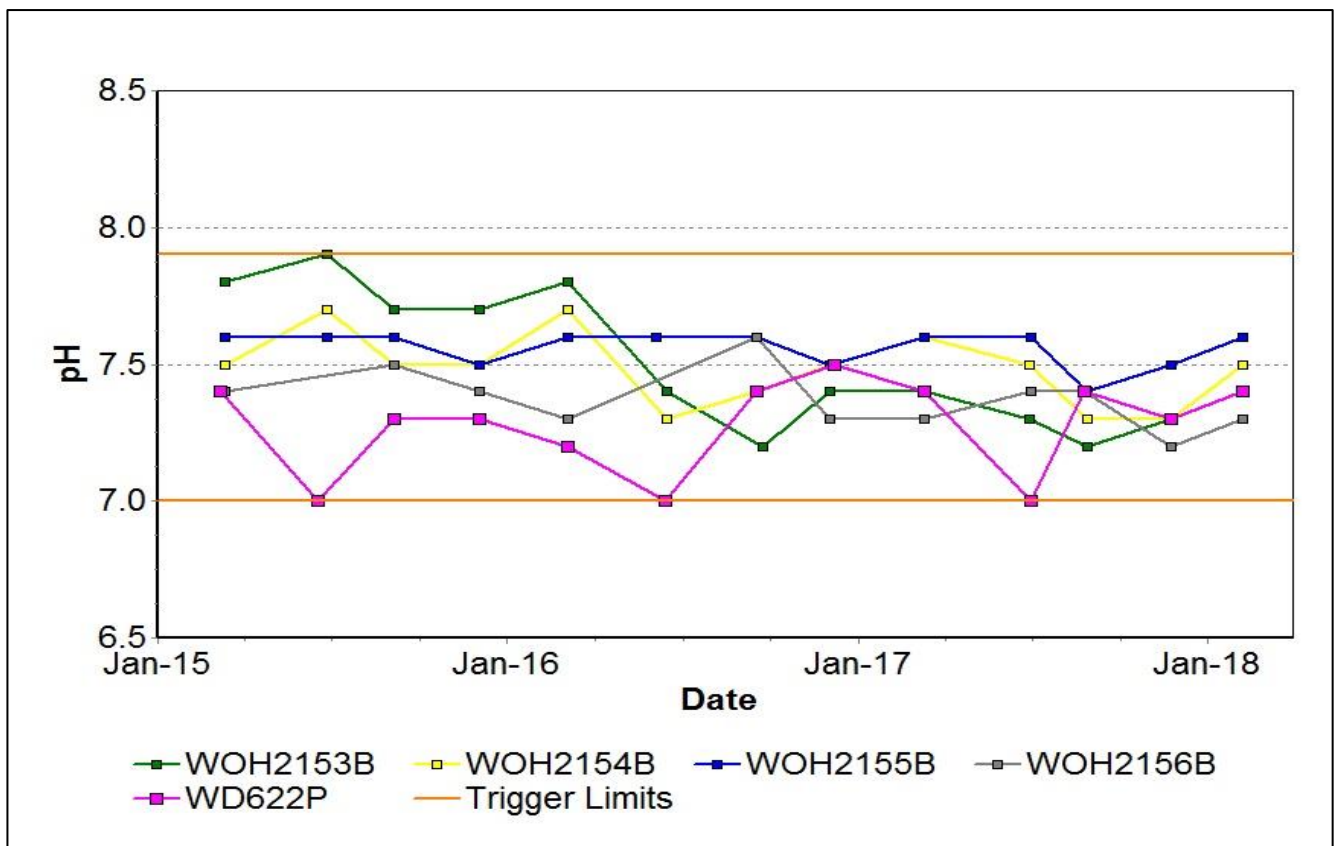


Figure 35: Wambo Seam pH Trend – March 2018

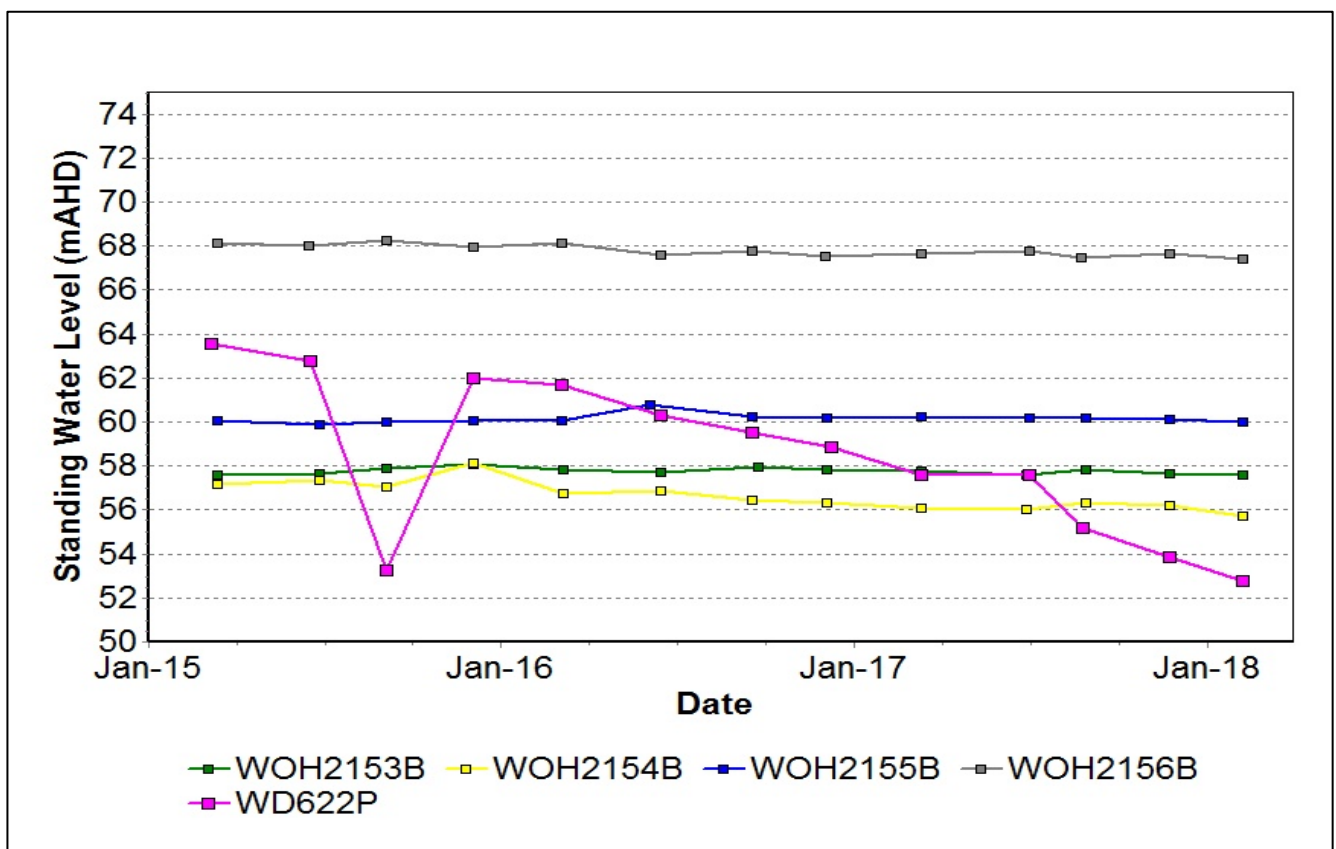


Figure 36: Wambo Seam Standing Water Level Trend – March 2018

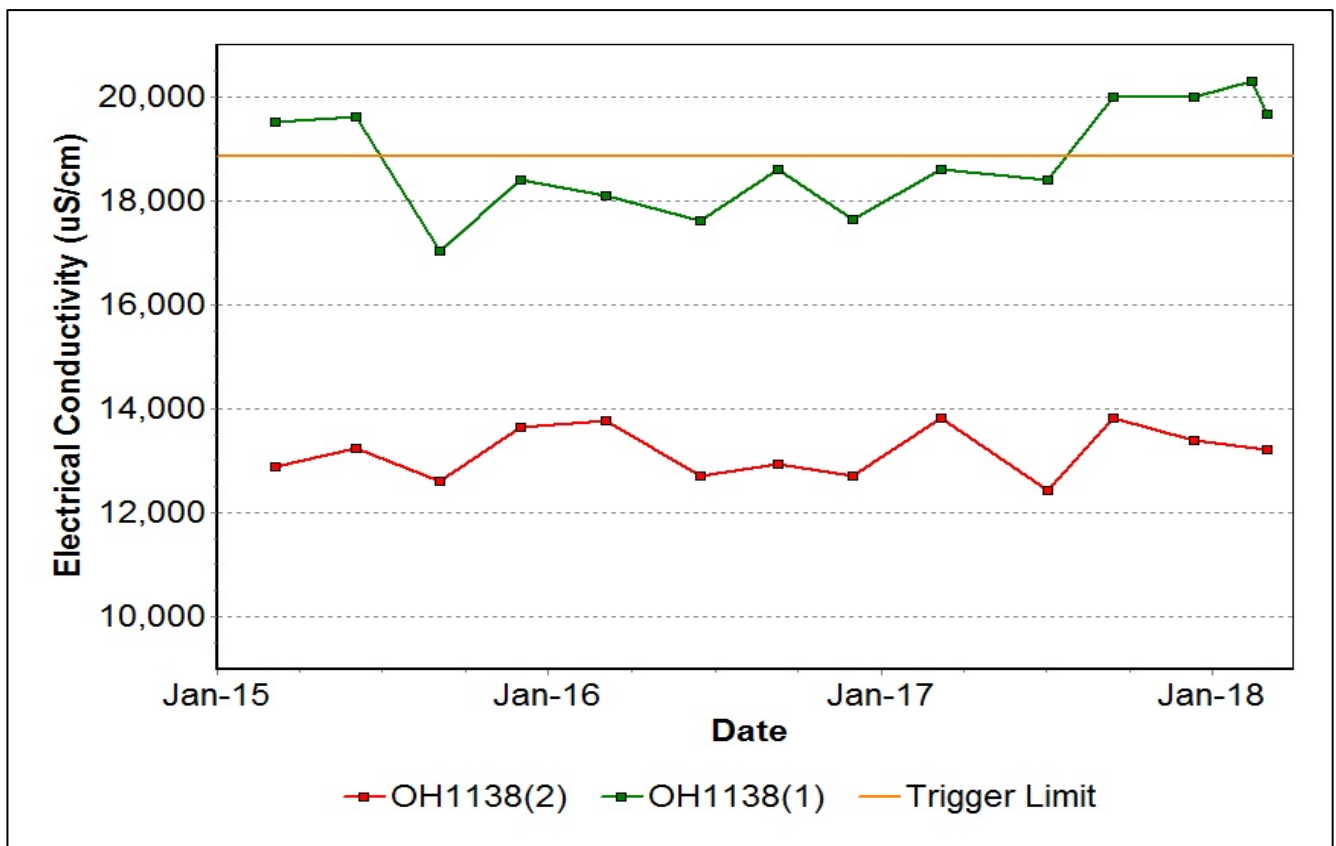


Figure 37: Warkworth Seam Electrical Conductivity Trend – March 2018

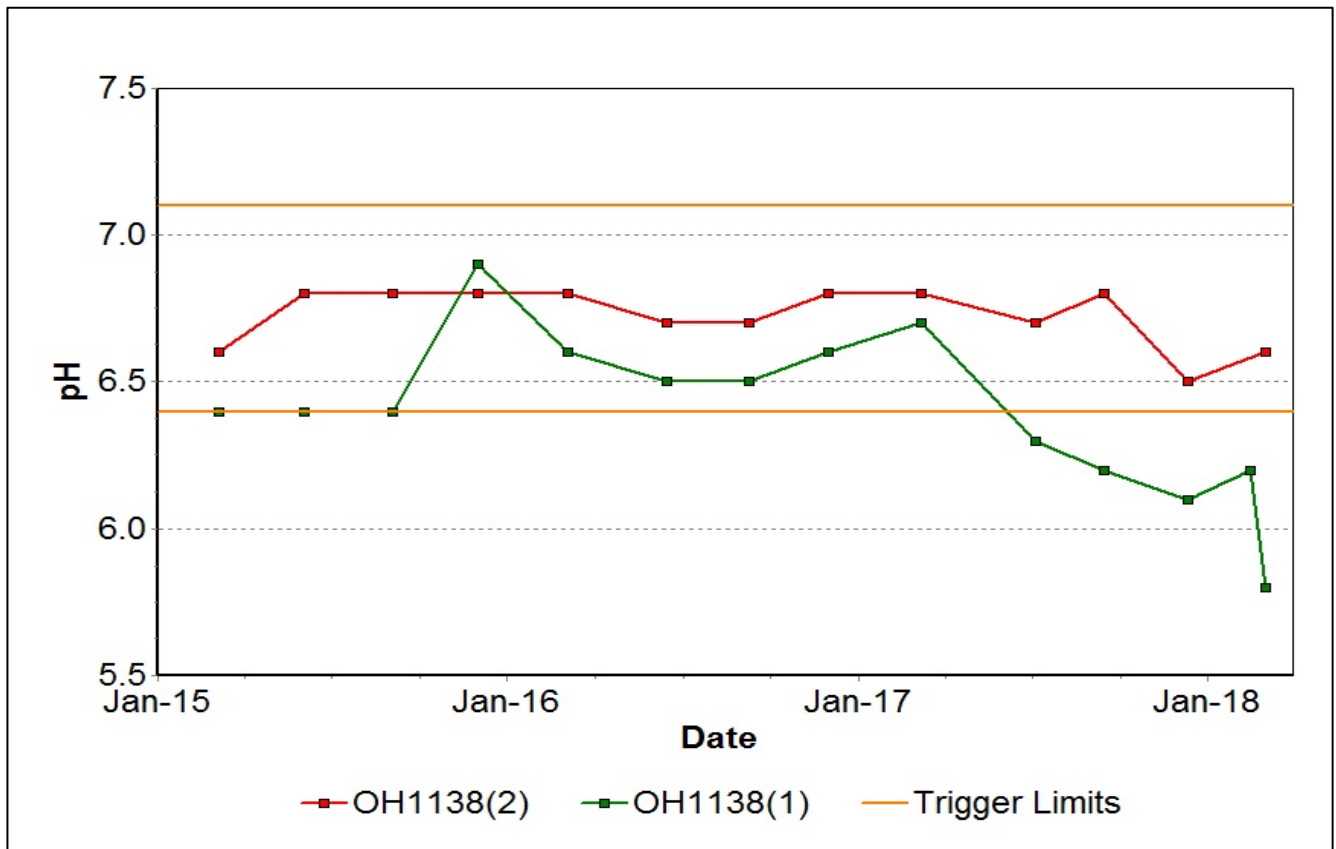


Figure 38: Warkworth Seam pH Trend –March 2018

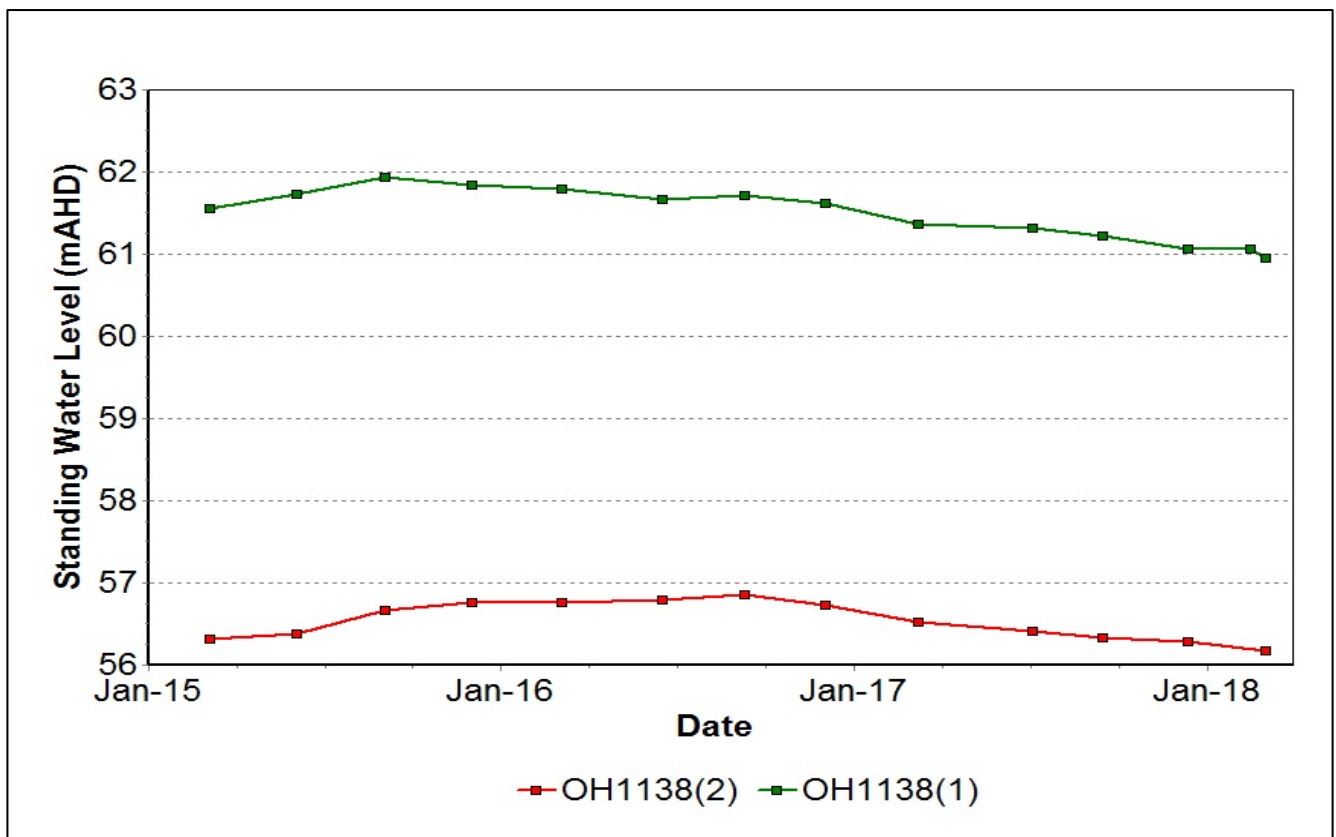


Figure 39: Warkworth Seam Standing Water Level Trend – March 2018

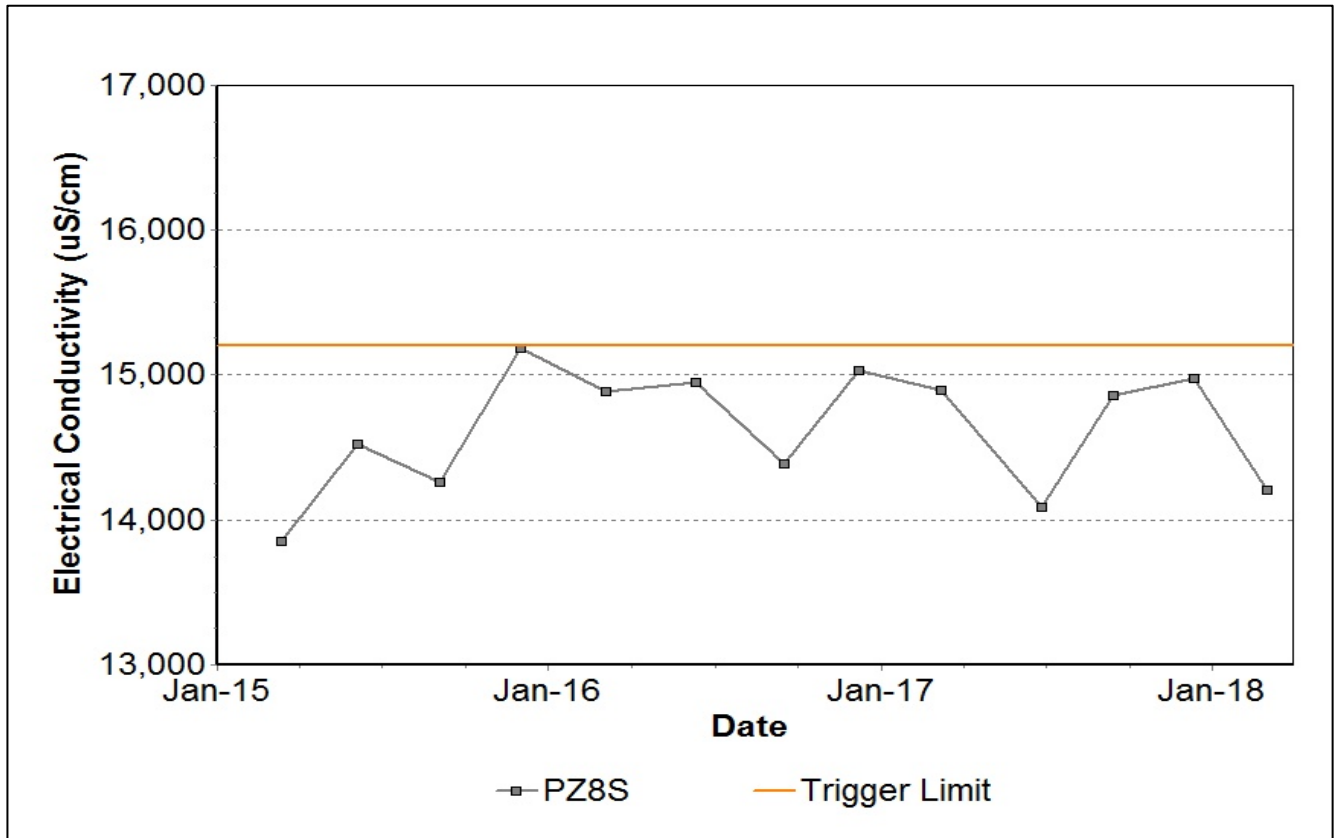


Figure 40: Wollombi Alluvium 1 Electrical Conductivity Trend – March 2018

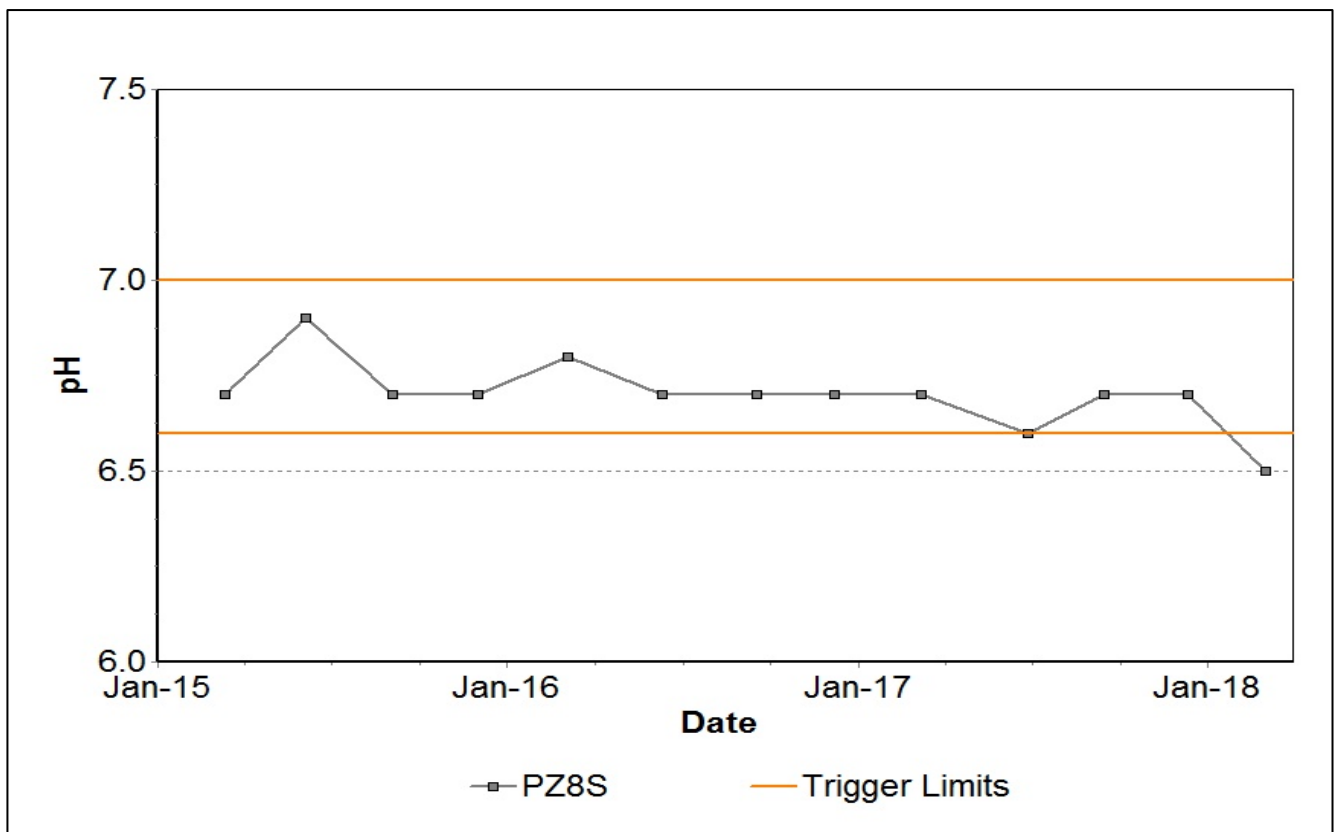


Figure 41: Wollombi Alluvium 1 pH Trend – March 2018

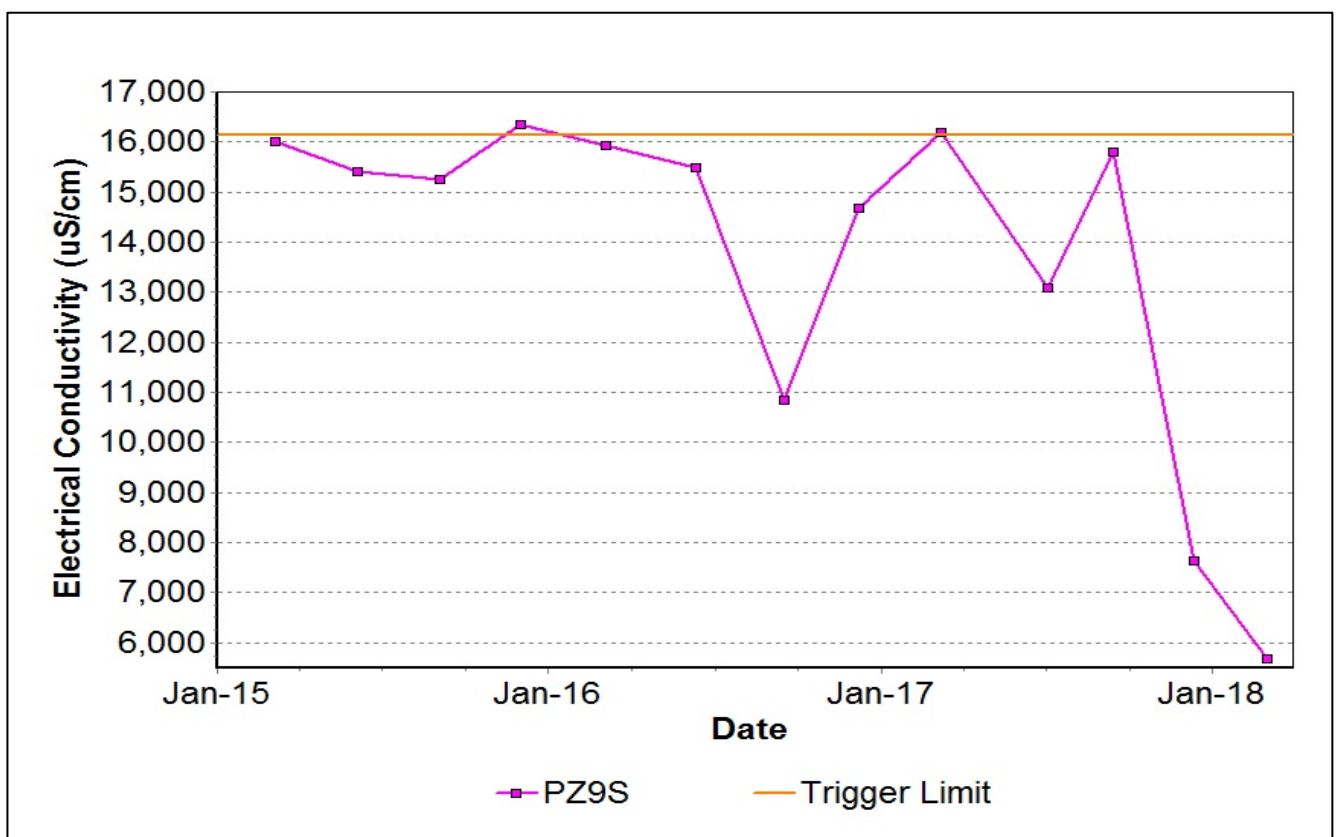


Figure 42: Wollombi Alluvium 2 Electrical Conductivity Trend – March 2018

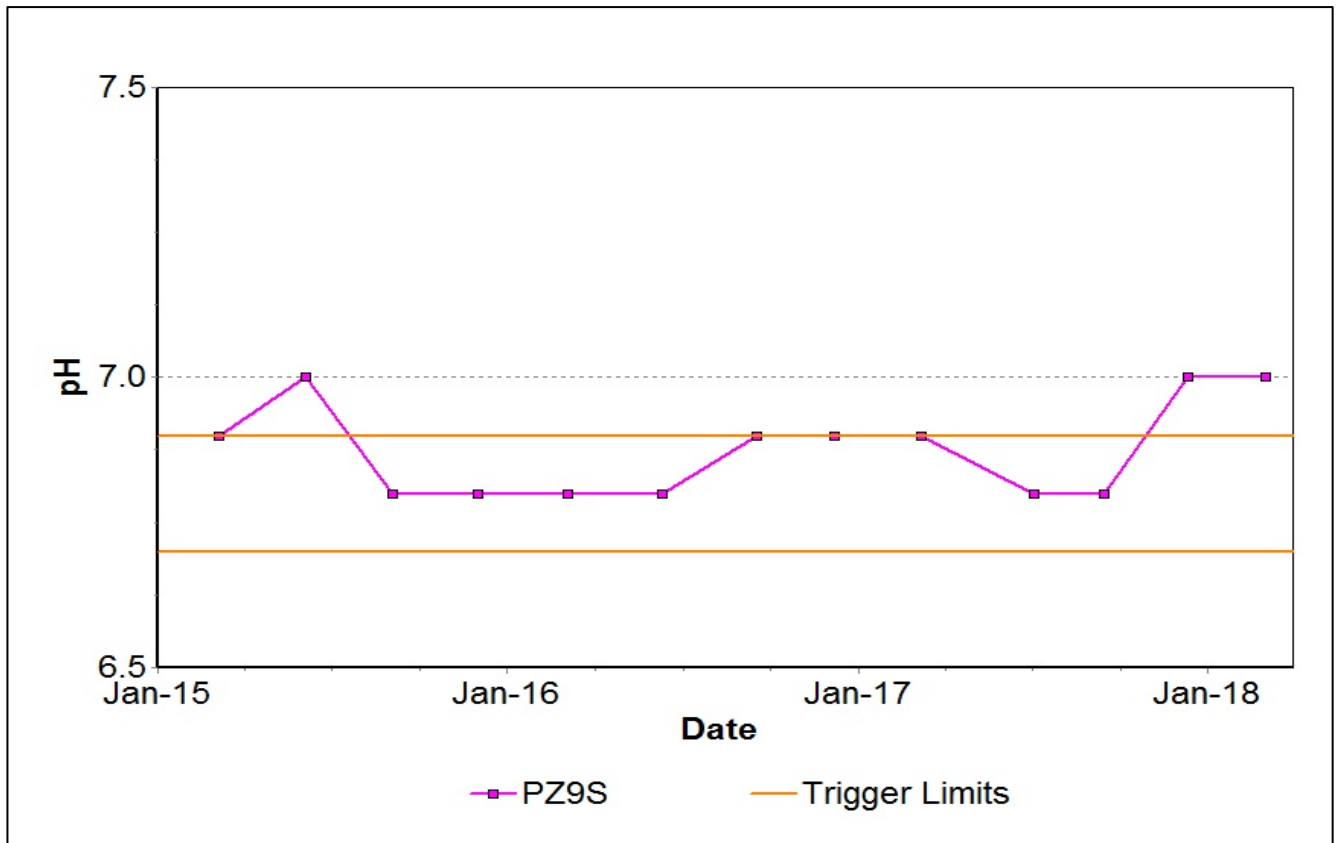


Figure 43: Wollombi Alluvium 2 pH Trend – March 2018

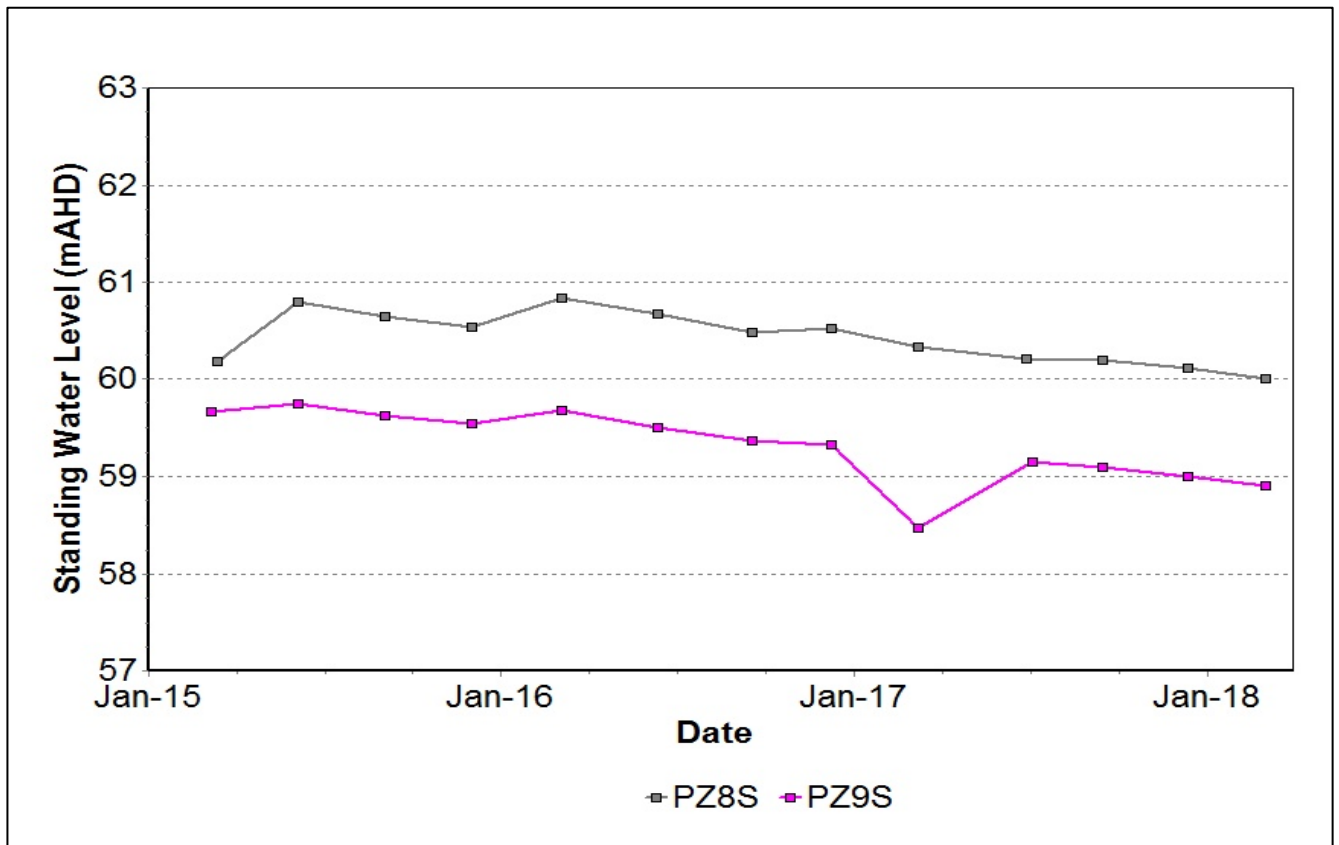


Figure 44: Wollombi Alluvium Standing Water Level Trend – March 2018

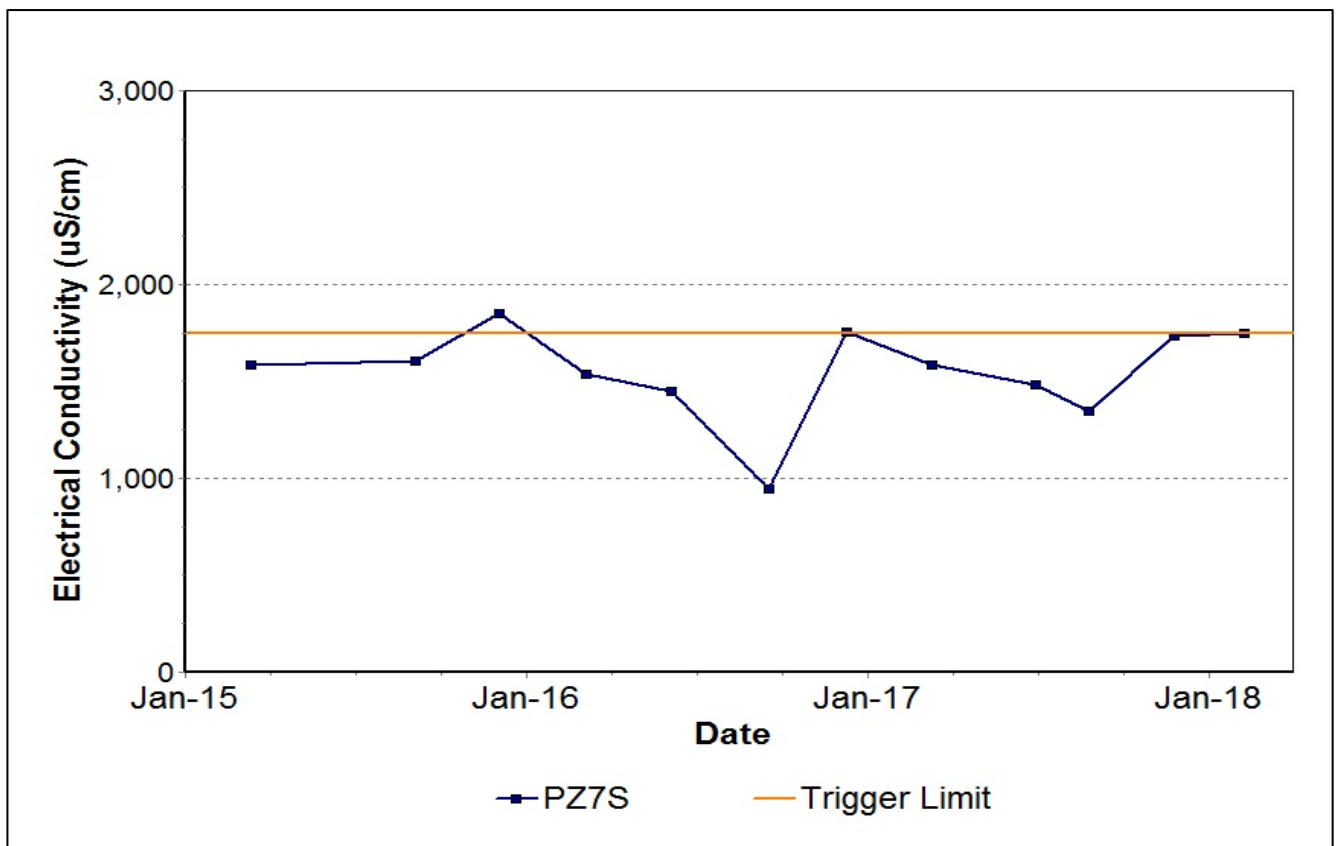


Figure 45: Aeolian Warkworth Sands Electrical Conductivity Trend – March 2018

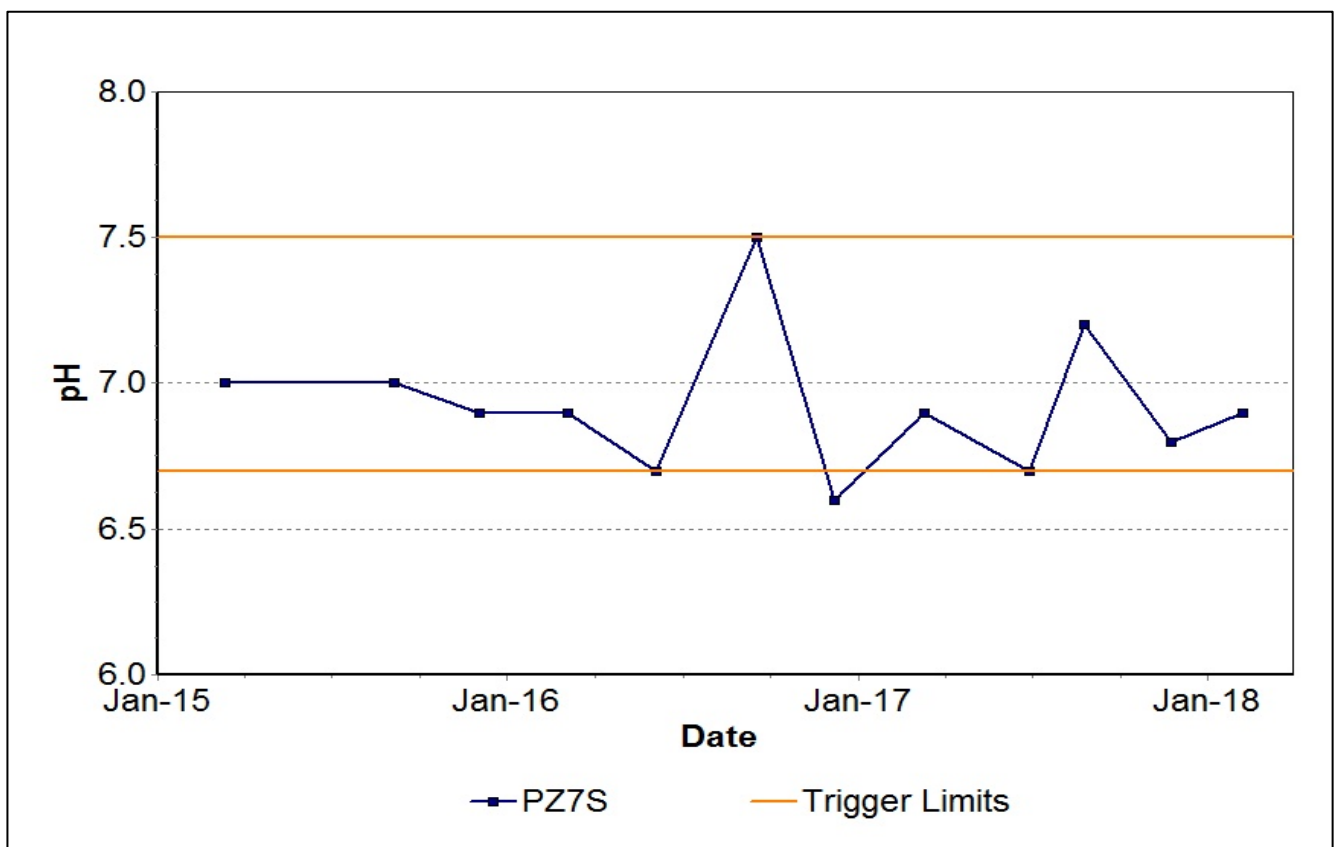


Figure 46: Aeolian Warkworth Sands pH Trend – March 2018

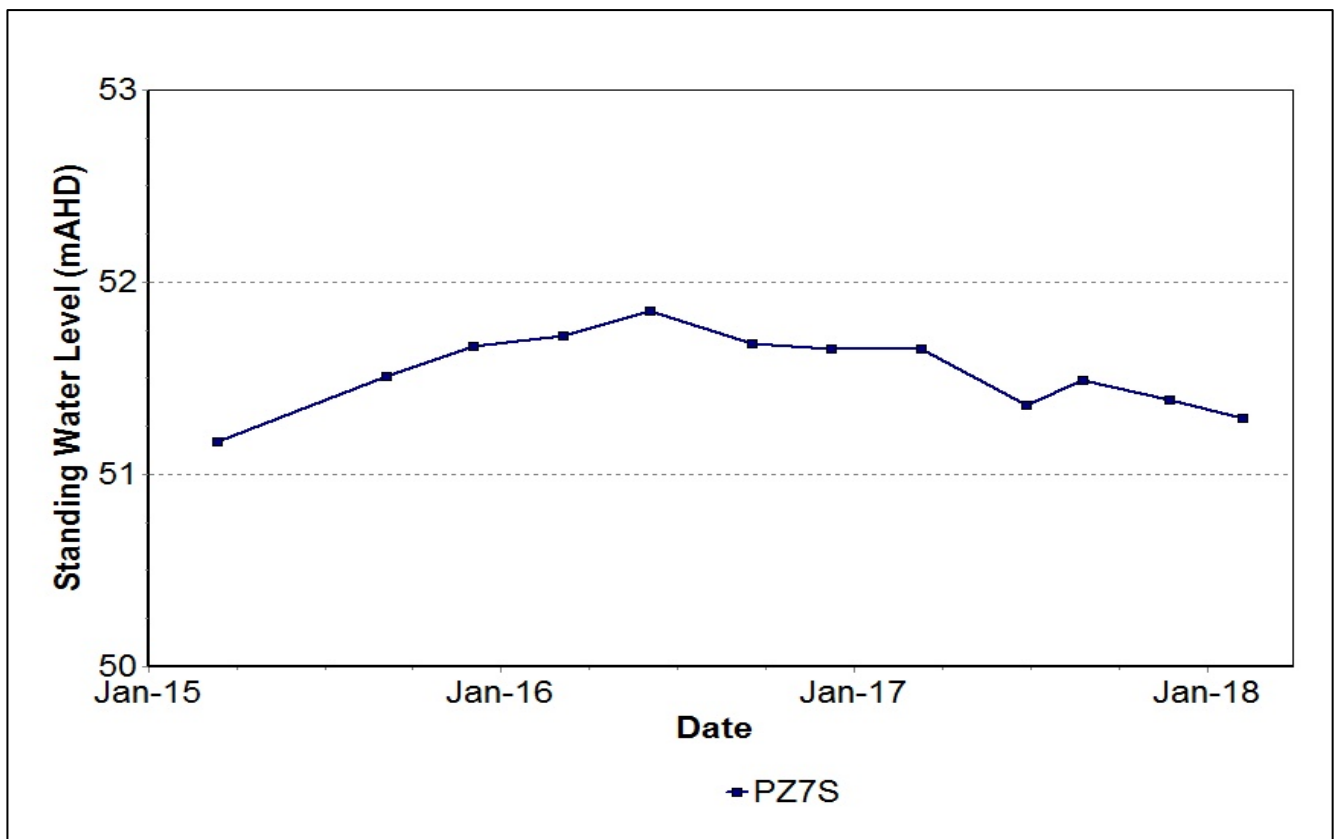


Figure 47: Aeolian Warkworth Sands Standing Water Level Trend – March 2018

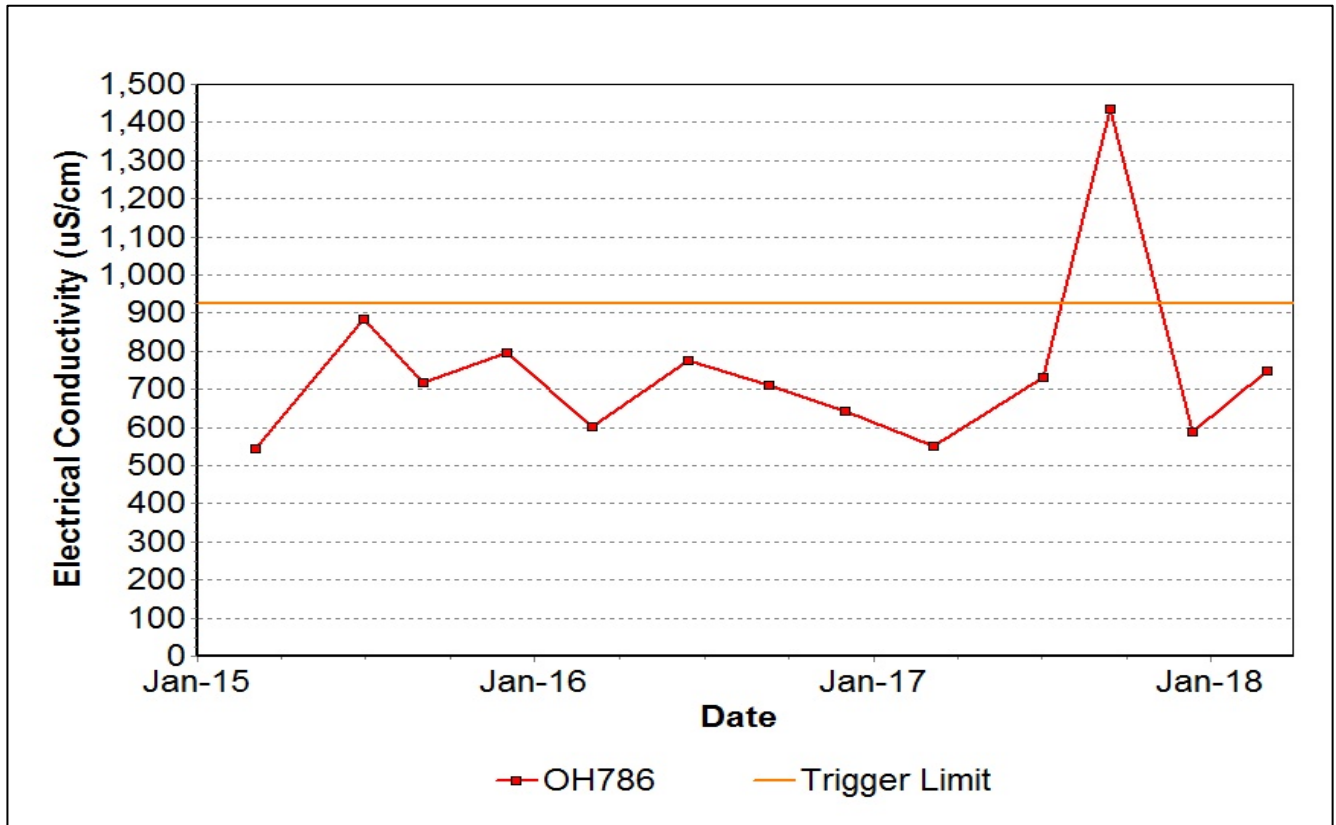


Figure 48: Hunter River Alluvium 1 Seam Electrical Conductivity Trend – March 2018

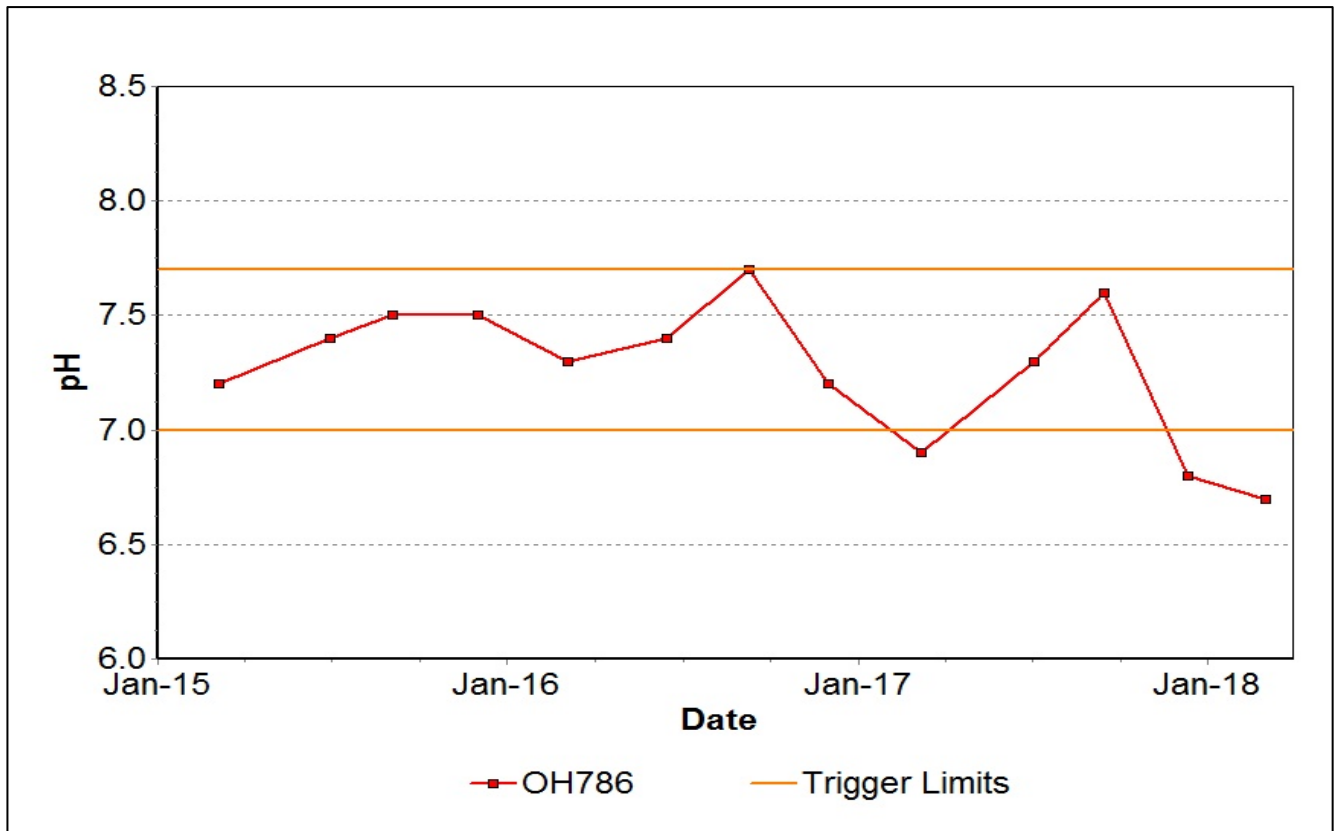


Figure 49: Hunter River Alluvium 1 Seam pH Trend – March 2018

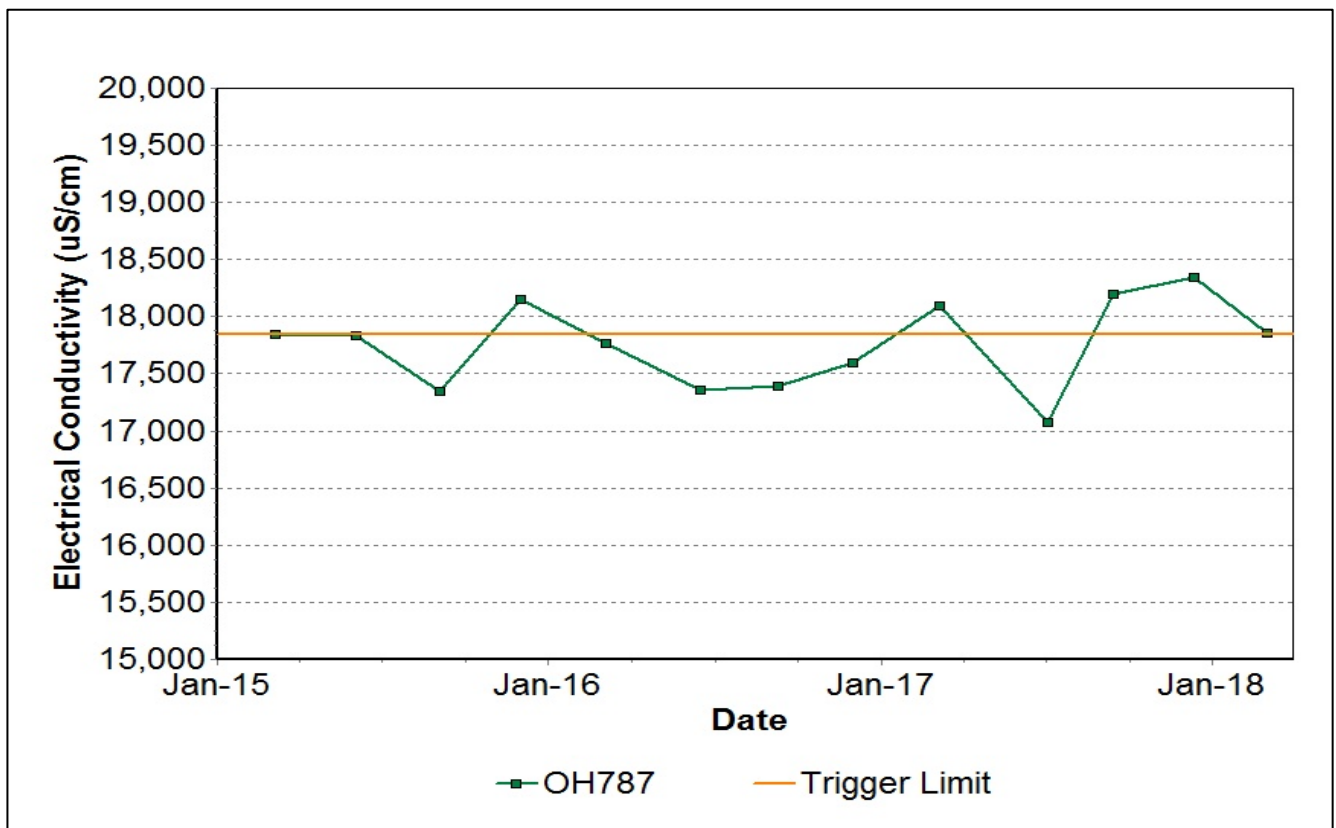


Figure 50: Hunter River Alluvium 2 Seam Electrical Conductivity Trend – March 2018

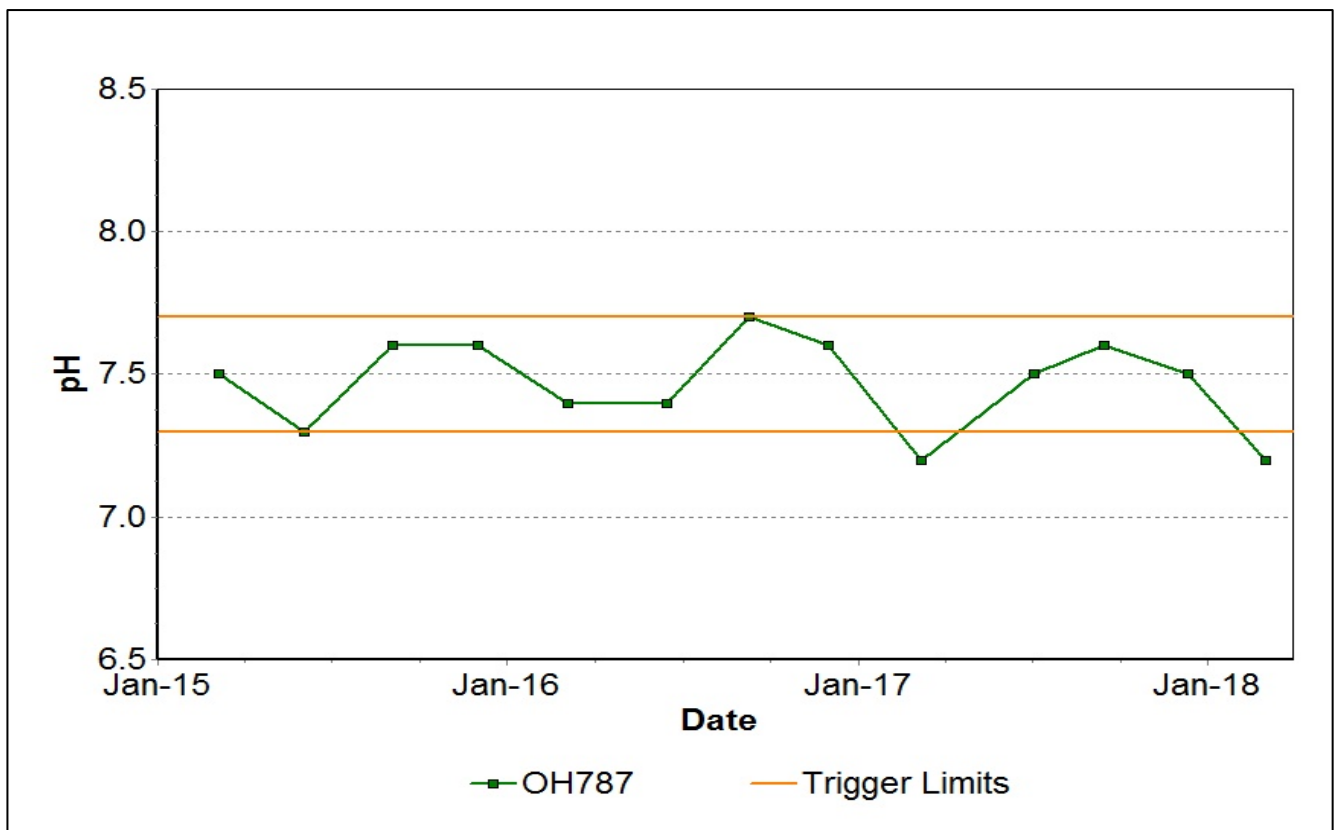


Figure 51: Hunter River Alluvium 2 Seam pH Trend – March 2018

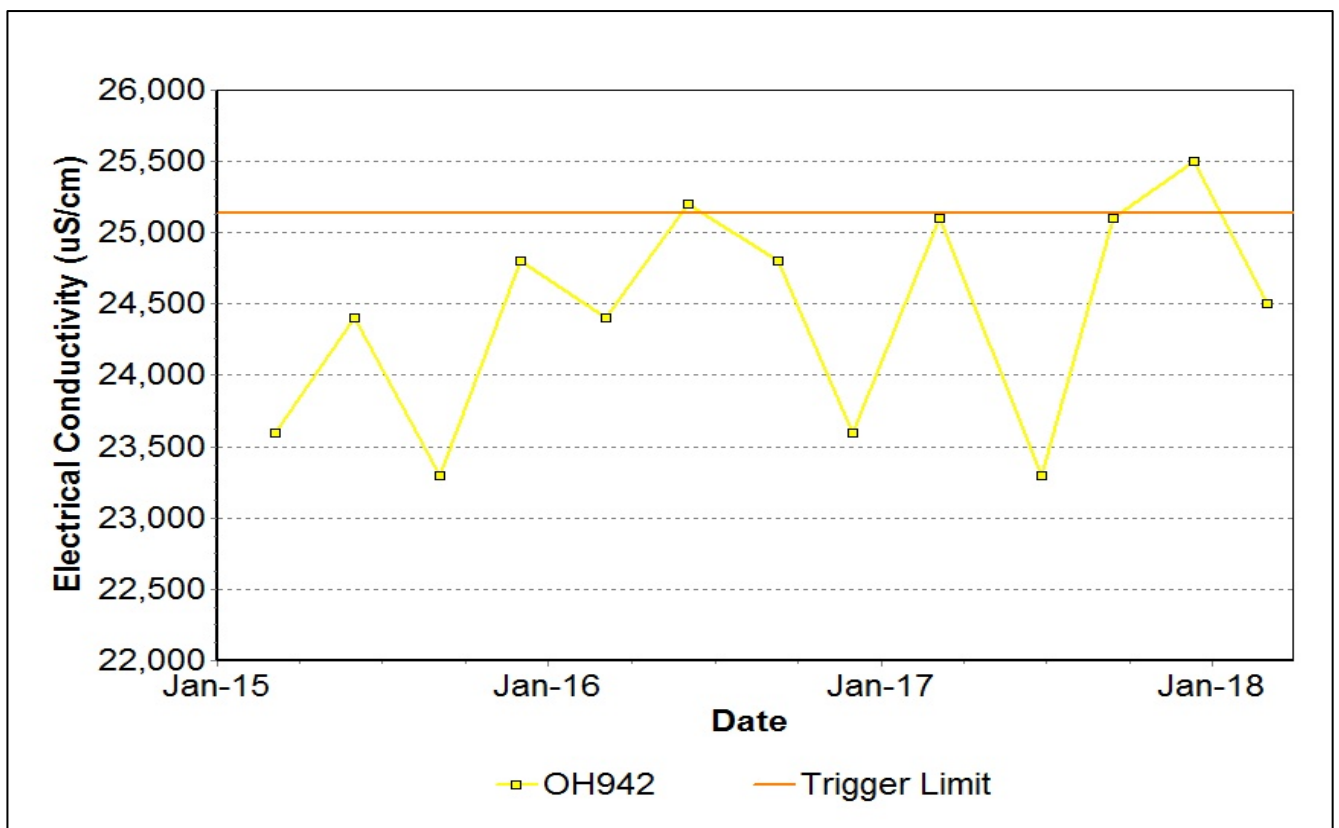


Figure 52: Hunter River Alluvium 3 Seam Electrical Conductivity Trend – March 2018

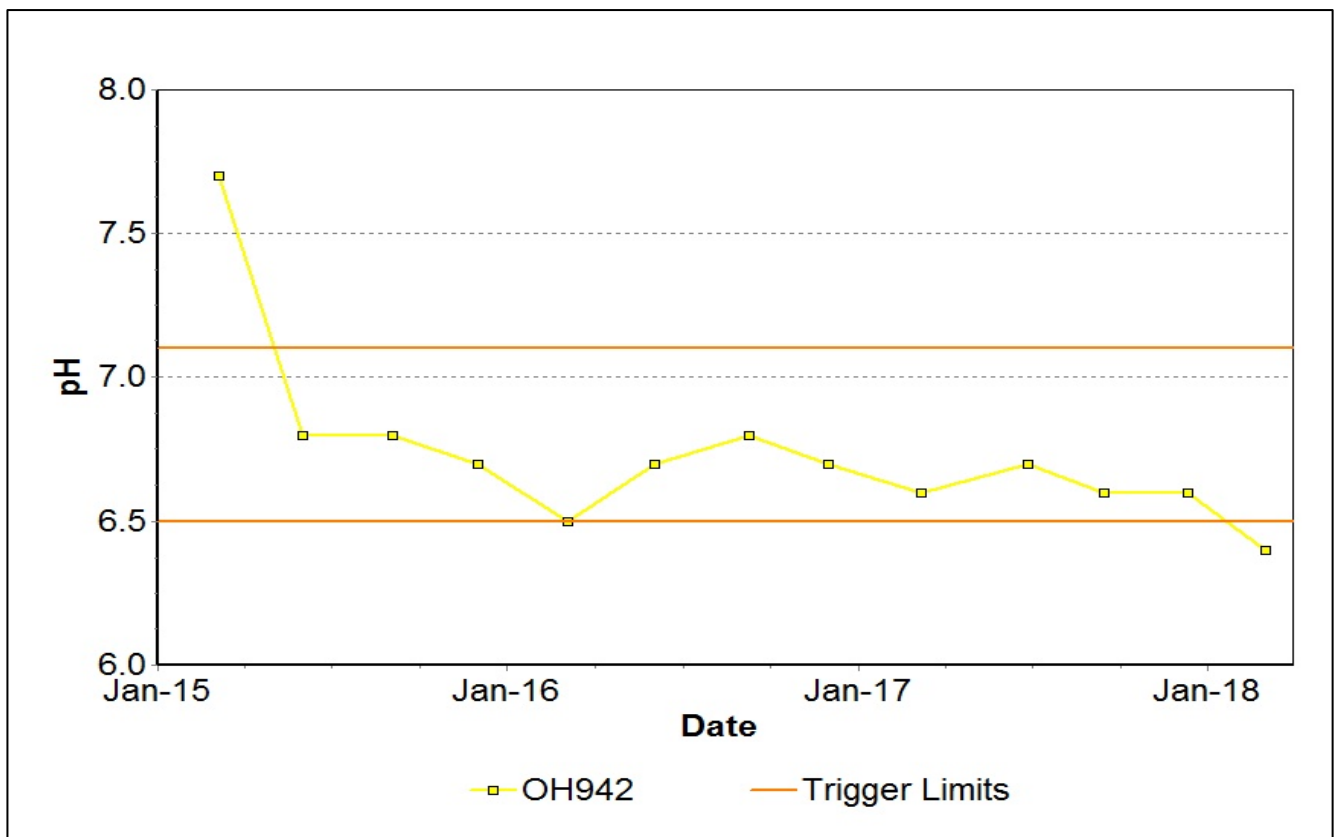


Figure 53: Hunter River Alluvium 3 Seam pH Trend – March 2018

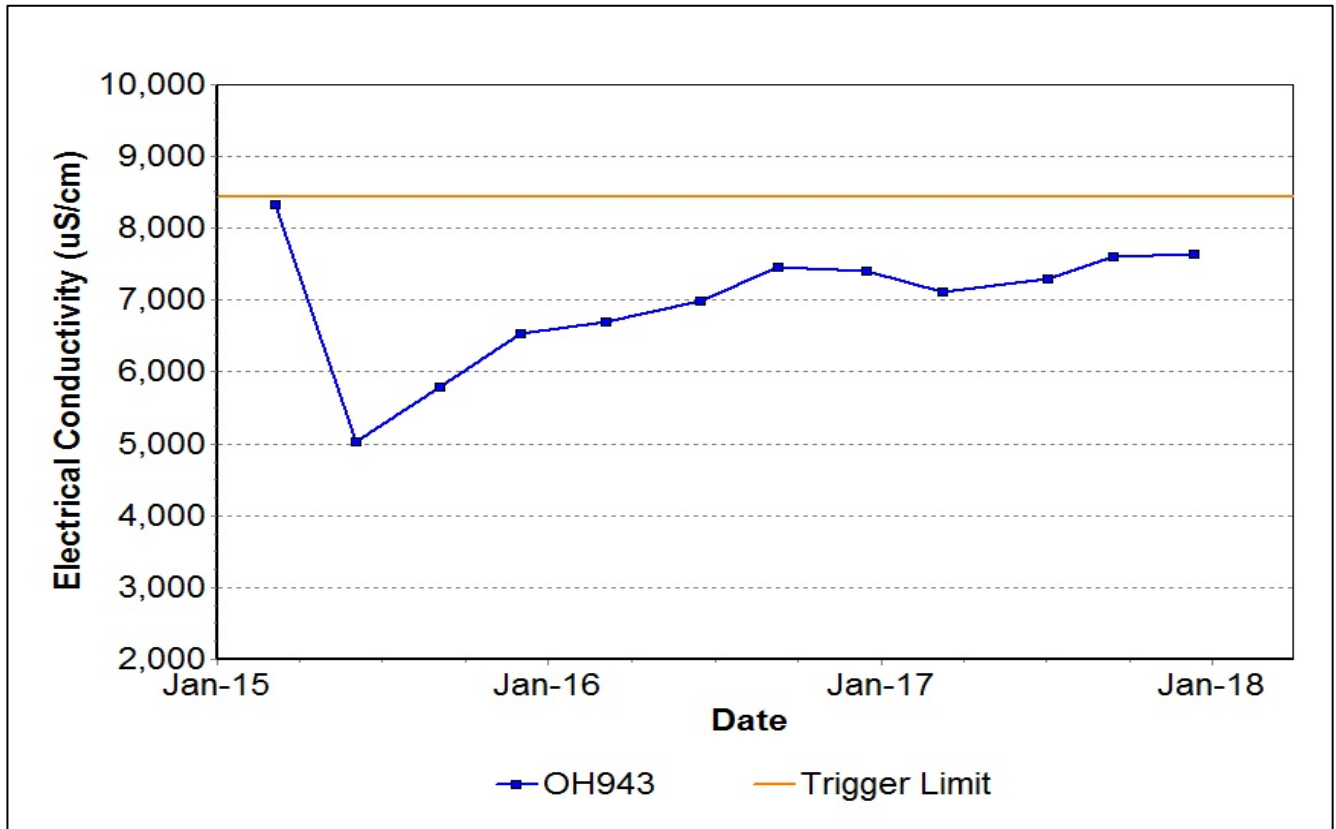


Figure 54: Hunter River Alluvium 4 Seam Electrical Conductivity Trend – March 2018

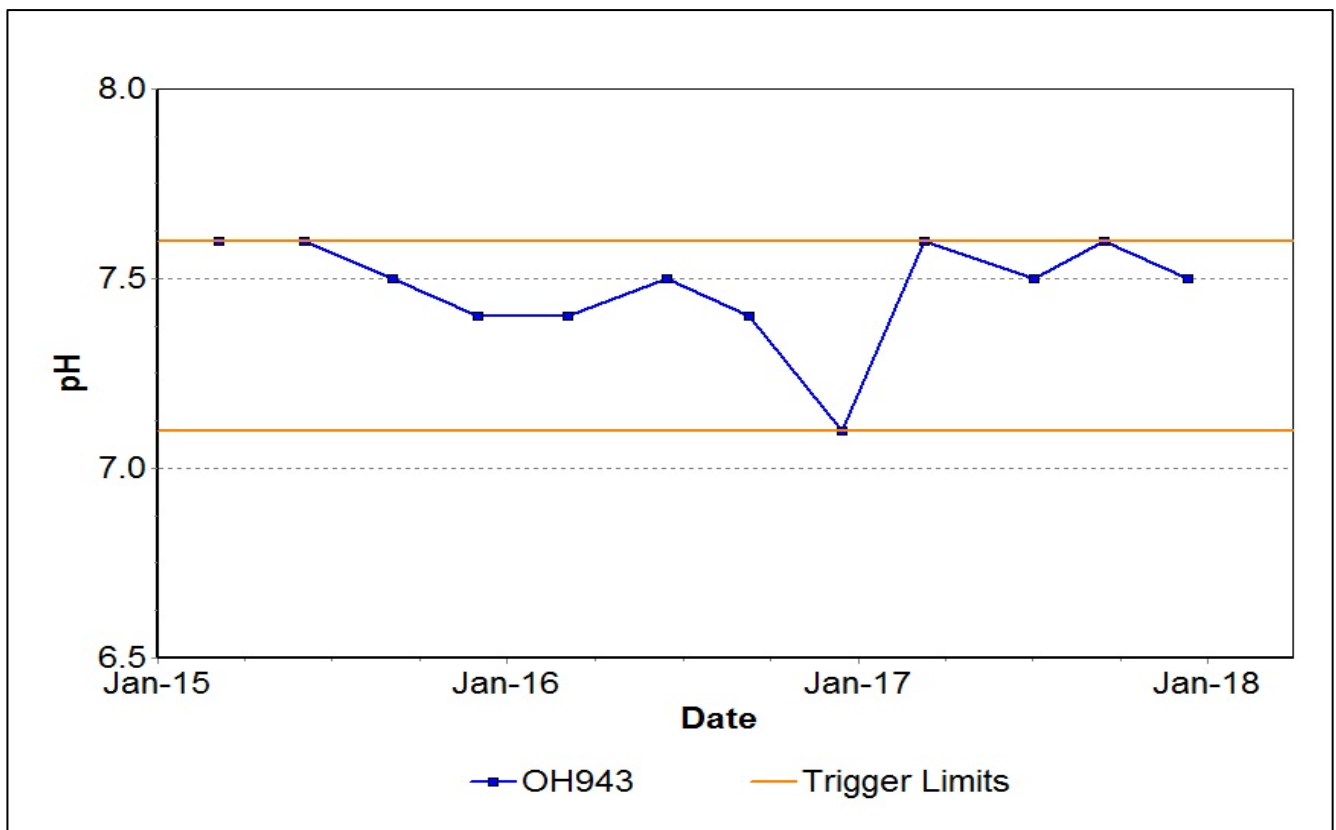
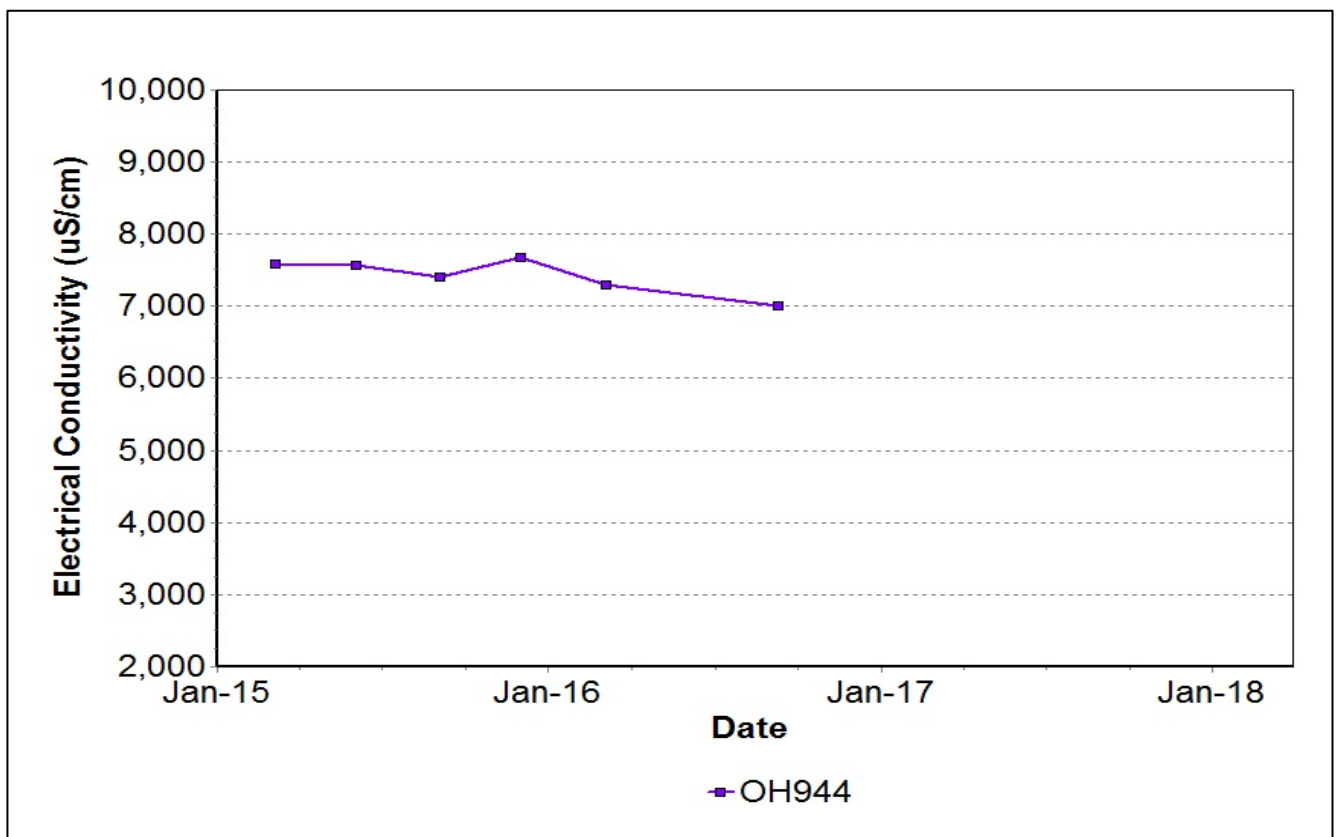
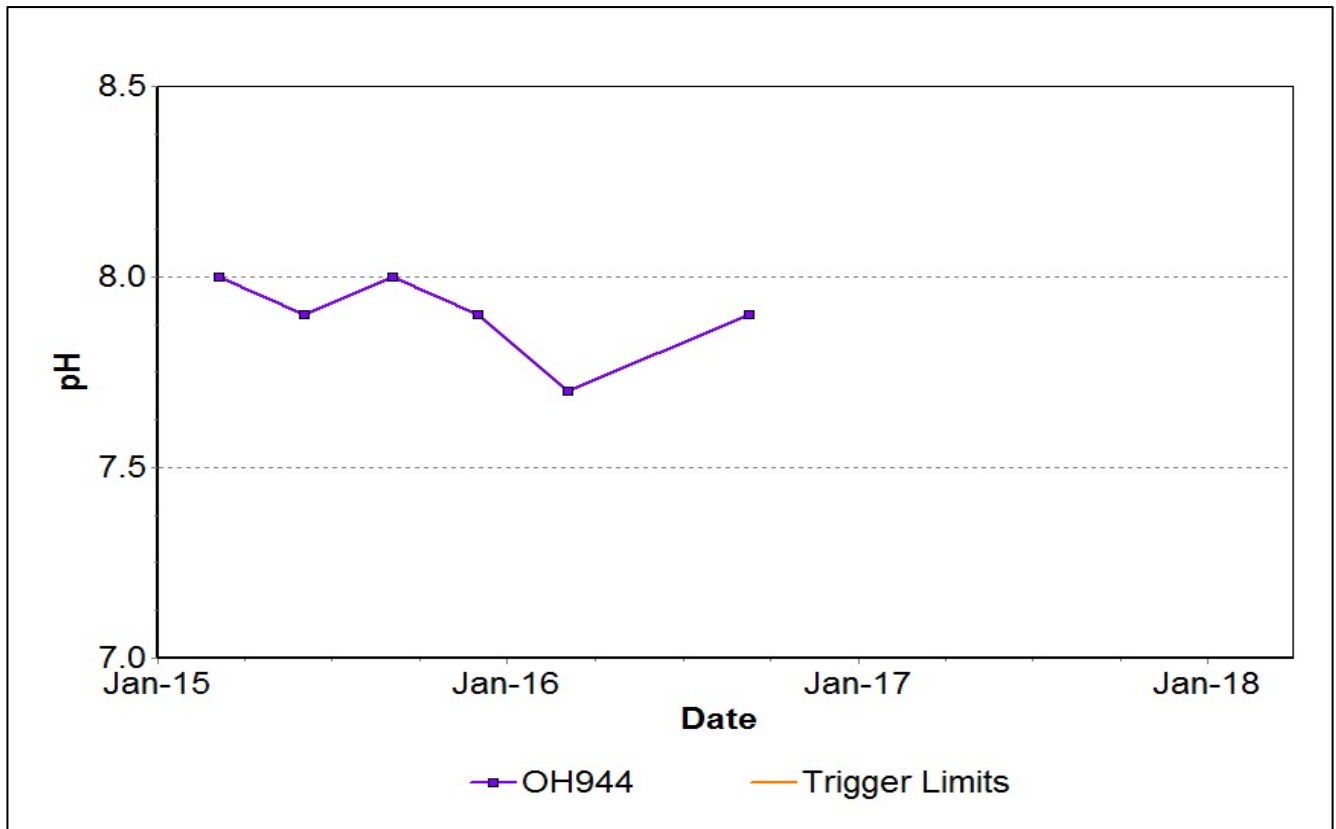


Figure 55: Hunter River Alluvium 4 Seam pH Trend – March 2018



Note: There has been insufficient water to sample since September 2016.

Figure 56: Hunter River Alluvium 5 Seam Electrical Conductivity Trend – March 2018



Note: There has been insufficient water to sample since September 2016.

Figure 57: Hunter River Alluvium 5 Seam pH Trend – March 2018

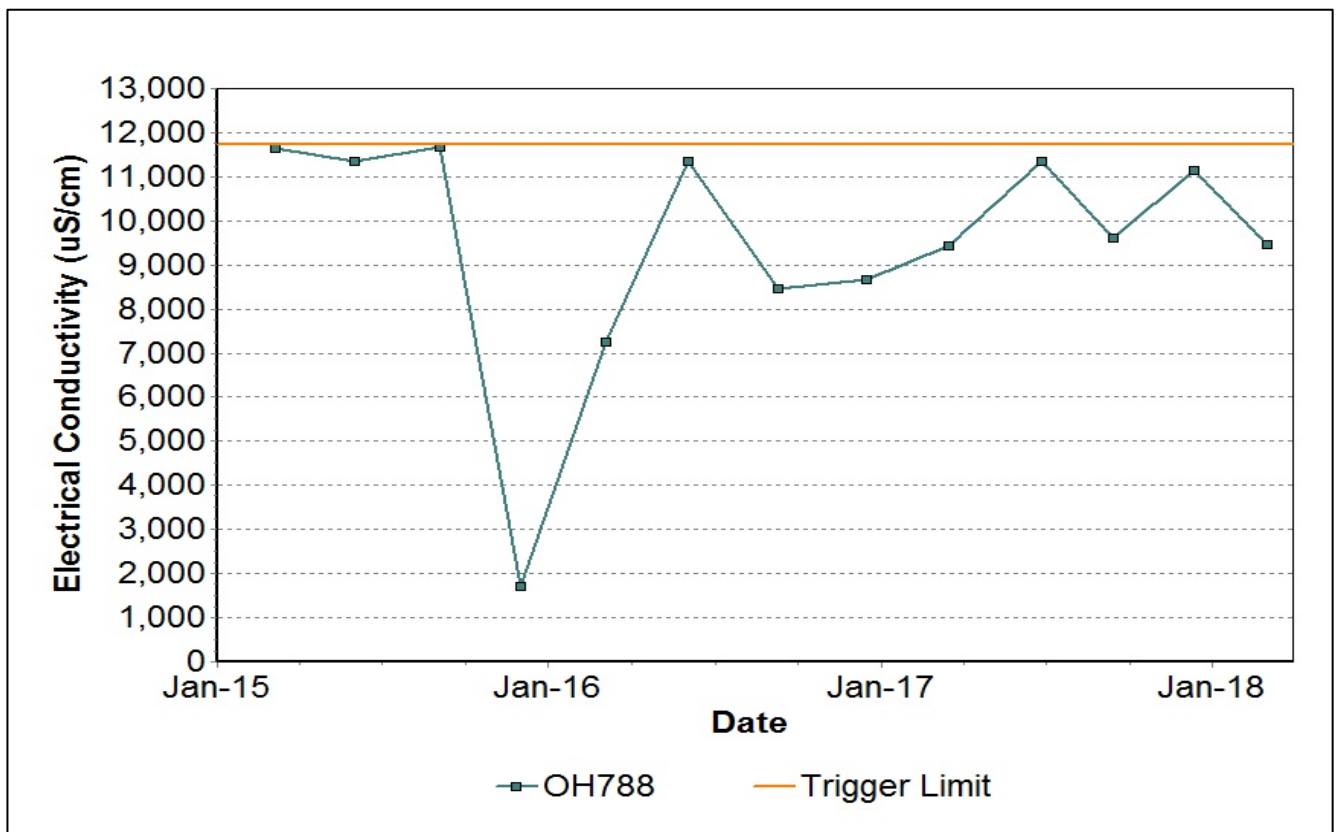


Figure 58: Hunter River Alluvium 6 Seam Electrical Conductivity – March 2018

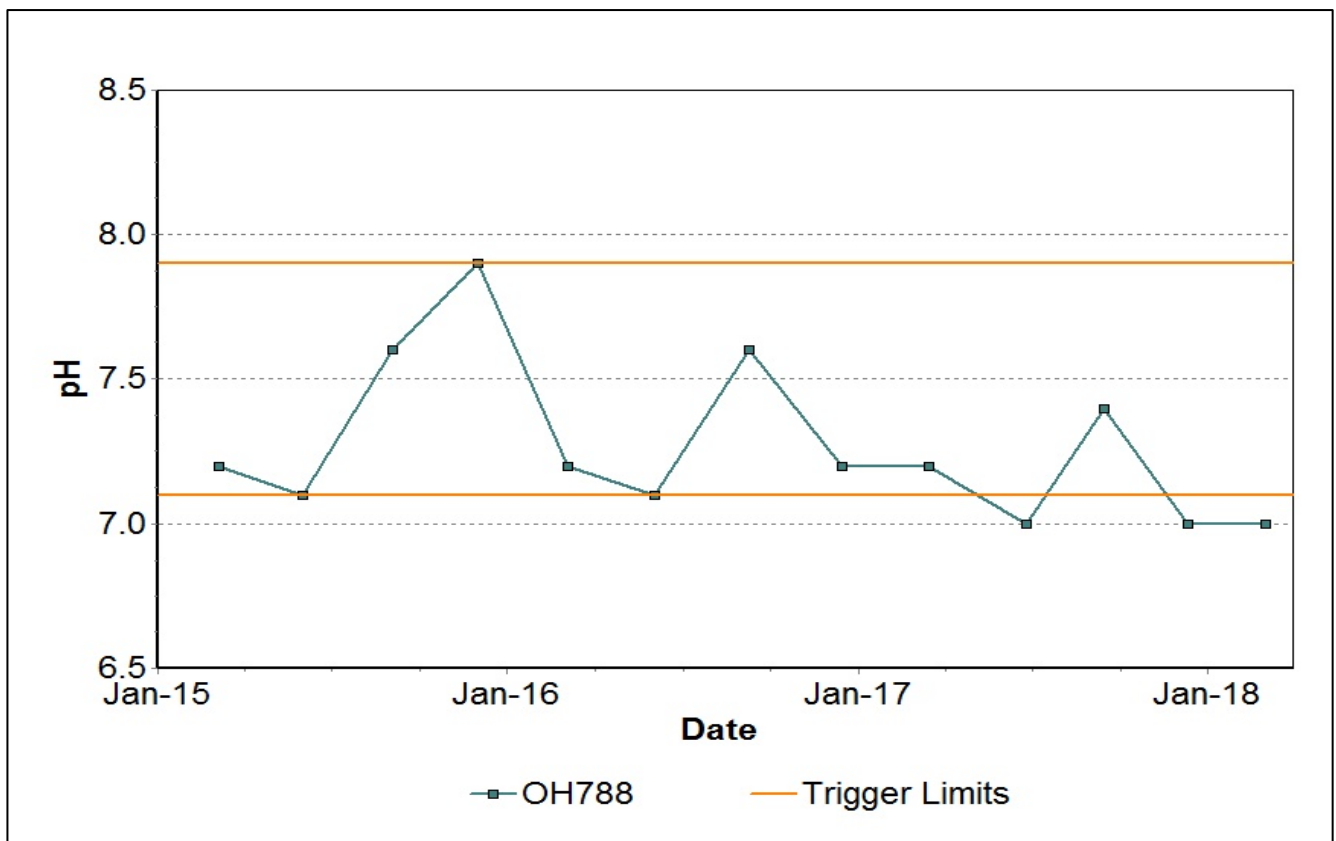


Figure 59: Hunter River Alluvium 6 Seam pH Trend – March 2018

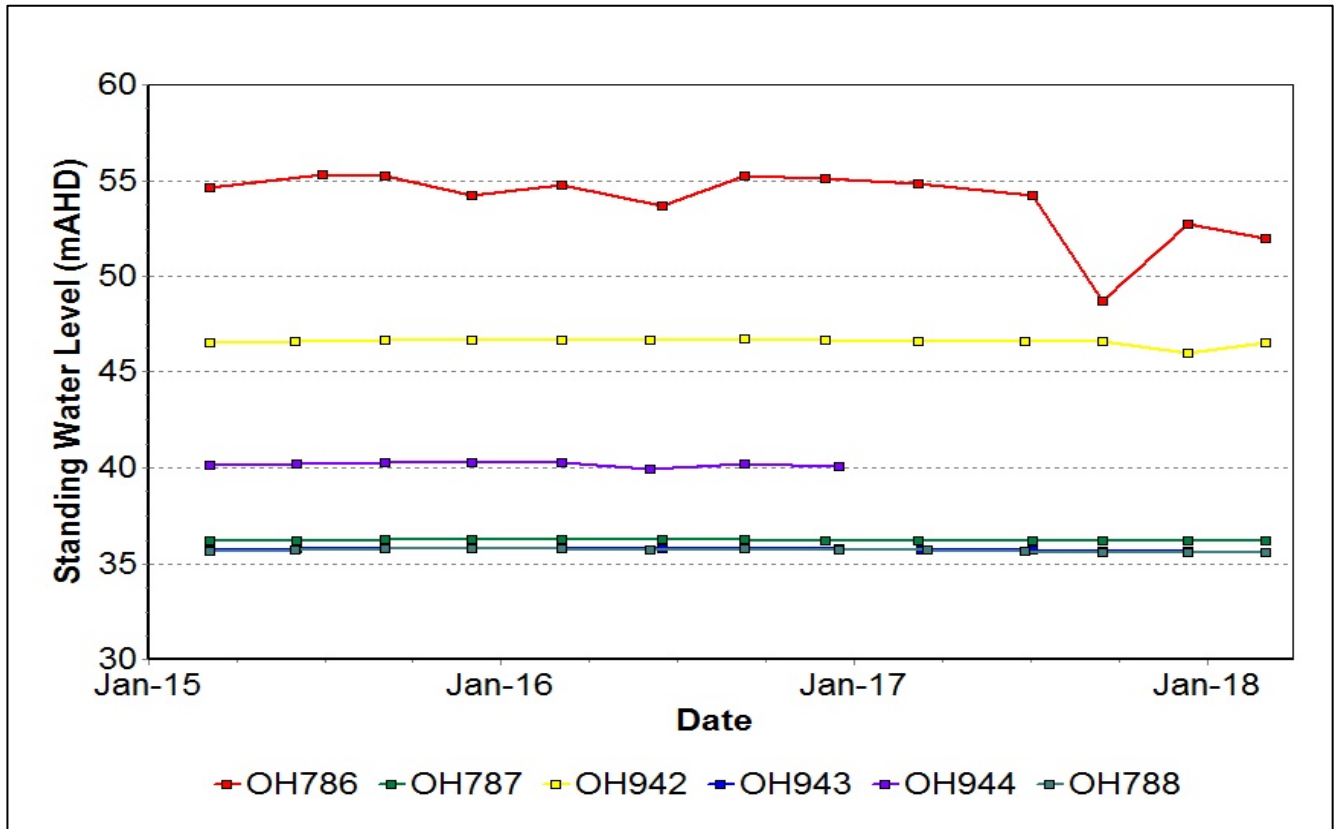


Figure 60: Hunter River Alluvium Standing Water Level Trend – March 2018

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 61.

Current internal groundwater trigger limit breaches are summarised in Table 4.

Table 4: Groundwater Triggers - 2018

Site	Date	Trigger Limit Breached	Action Taken in Response
OH 787	02/03/2018	EC – 95th Percentile	Data is stable and consistent with historical trend; no further action
MTD605P	06/02/2018	EC – 95th Percentile	Data is stable and consistent with historical trend; no further action
WOH2156B	06/02/2018	EC – 95th Percentile	Data is stable and consistent with historical trend; no further action
OH 1138(1)	02/03/2018	EC – 95th Percentile	Data is stable and consistent with historical trend; no further action
OH 786	02/03/2018	pH –5th Percentile	Watching Brief*
OH 787	02/03/2018	pH –5th Percentile	Watching Brief*
OH 942	02/03/2018	pH –5th Percentile	Watching Brief*
OH 788	02/03/2018	pH –5th Percentile	Watching Brief*
PZ8S	02/03/2018	pH –5th Percentile	Watching Brief*
PZ9S	02/03/2018	pH – 95th Percentile	Watching Brief*
GW9709	02/03/2018	pH –5th Percentile	Watching Brief*
GW98MTCL2	02/03/2018	pH –5th Percentile	Watching Brief*
WOH2139A	06/02/2018	pH – 95th Percentile	Data is stable and consistent with historical trend; no further action
OH 1125(1)	02/03/2018	pH –5th Percentile	Watching Brief*
MB15MTW01D	06/02/2018	pH –5th Percentile	Watching Brief*
PZ9D	02/03/2018	pH –5th Percentile	Watching Brief*
OH 1138(1)	06/02/2018	pH –5th Percentile	Investigation commenced.

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

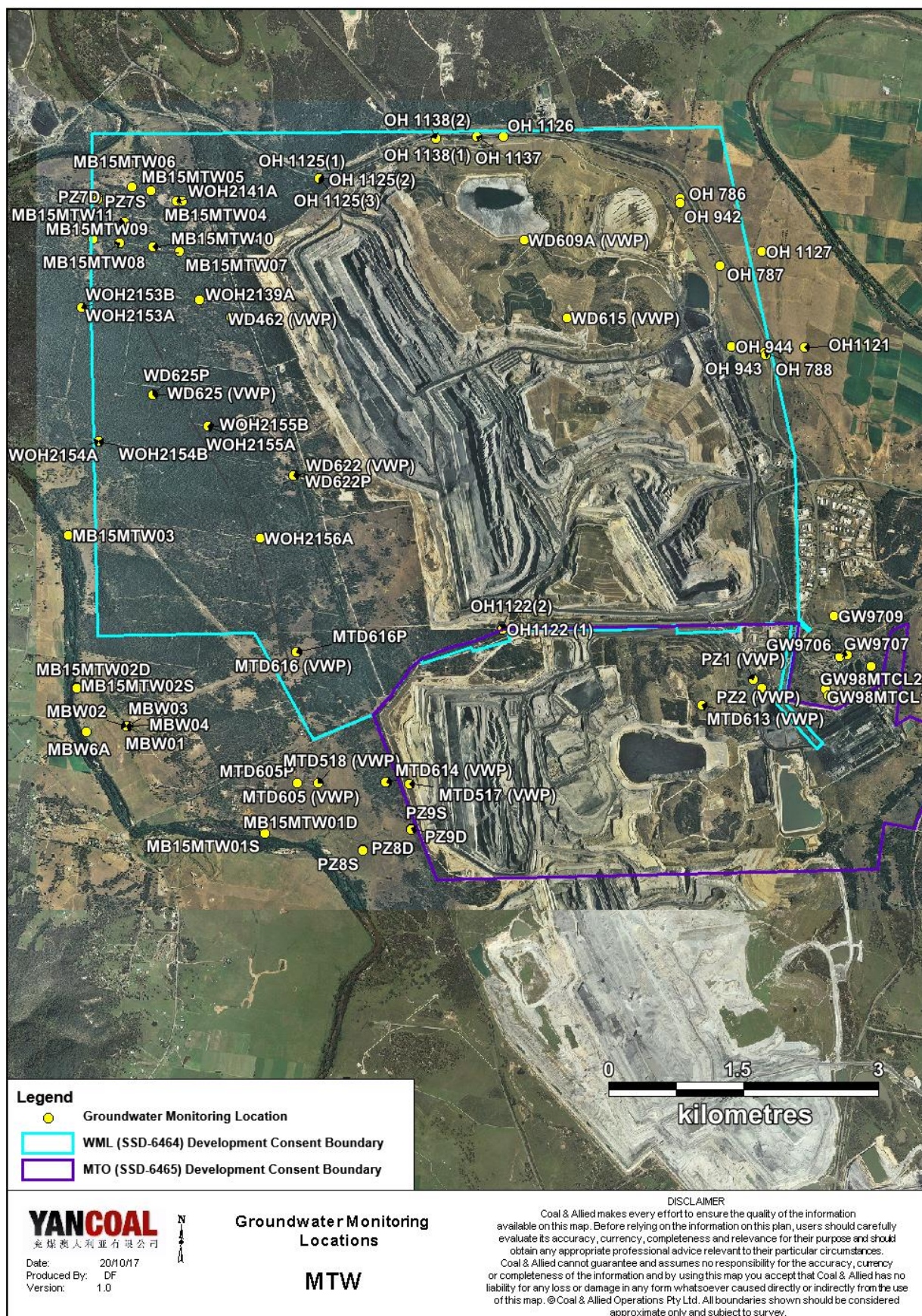


Figure 61: Groundwater Monitoring Location Plan

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 68.

4.1 Blast Monitoring Results

During March 2018, 26 blasts were initiated at MTW. Figure 62 to Figure 67 show the blast monitoring results for the reporting period against the impact assessment criteria. The criteria are summarised in Table 5.

Table 5: 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

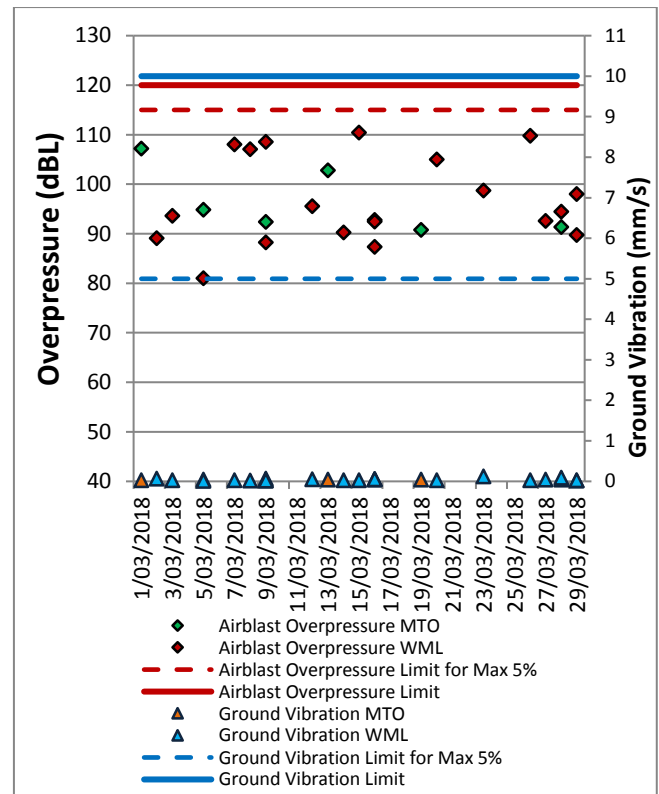


Figure 62: Abbey Green Blast Monitoring Results – March 2018

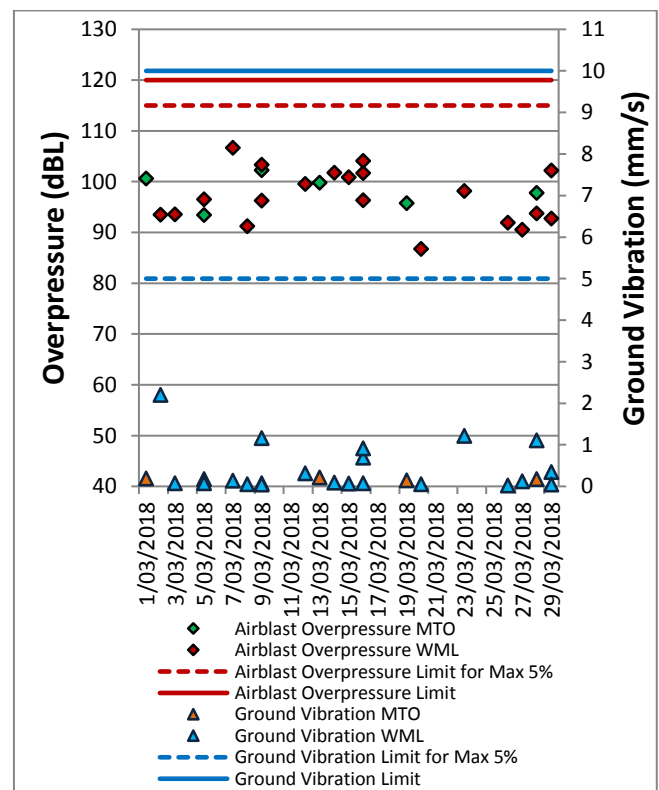


Figure 63: Bulga Village Blast Monitoring Results – March 2018

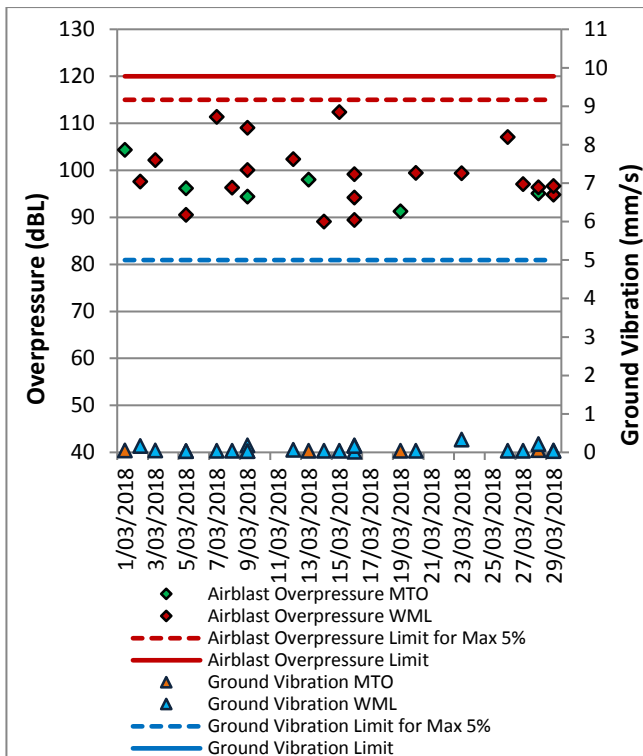


Figure 64: MTIE Blast Monitoring Results – March 2018

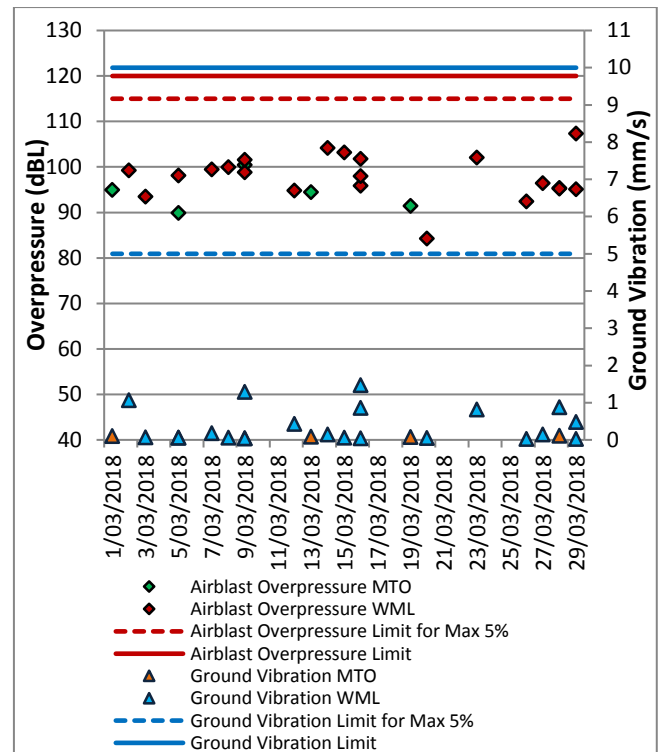


Figure 66: Wambo Road Blast Monitoring Results – March 2018

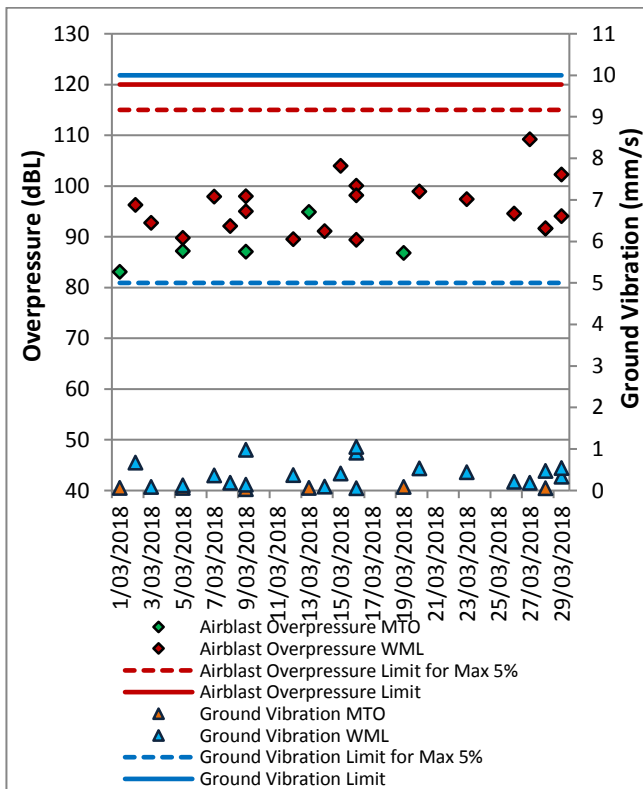


Figure 65: Warkworth Blast Monitoring Results - March 2018

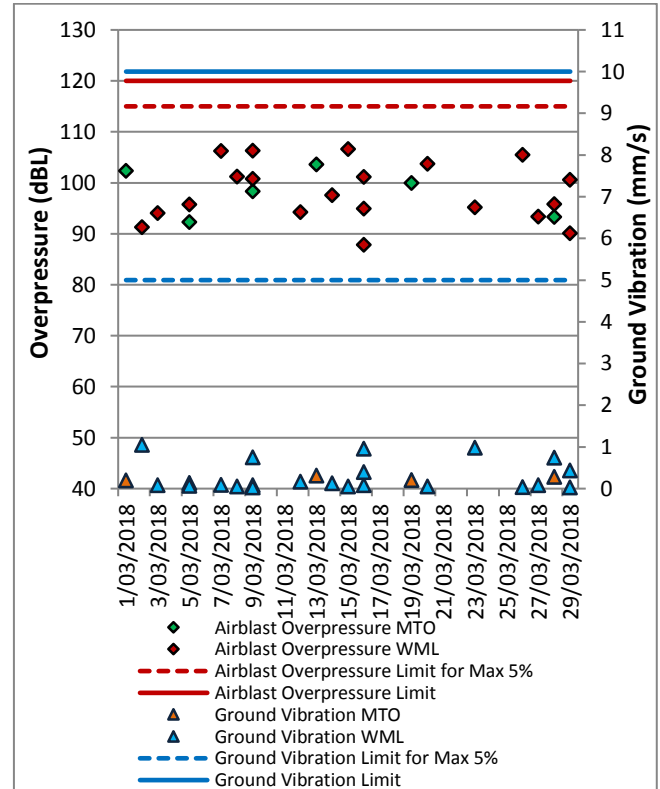


Figure 67: Wollemi Peak Road Blast Monitoring Results - March 2018

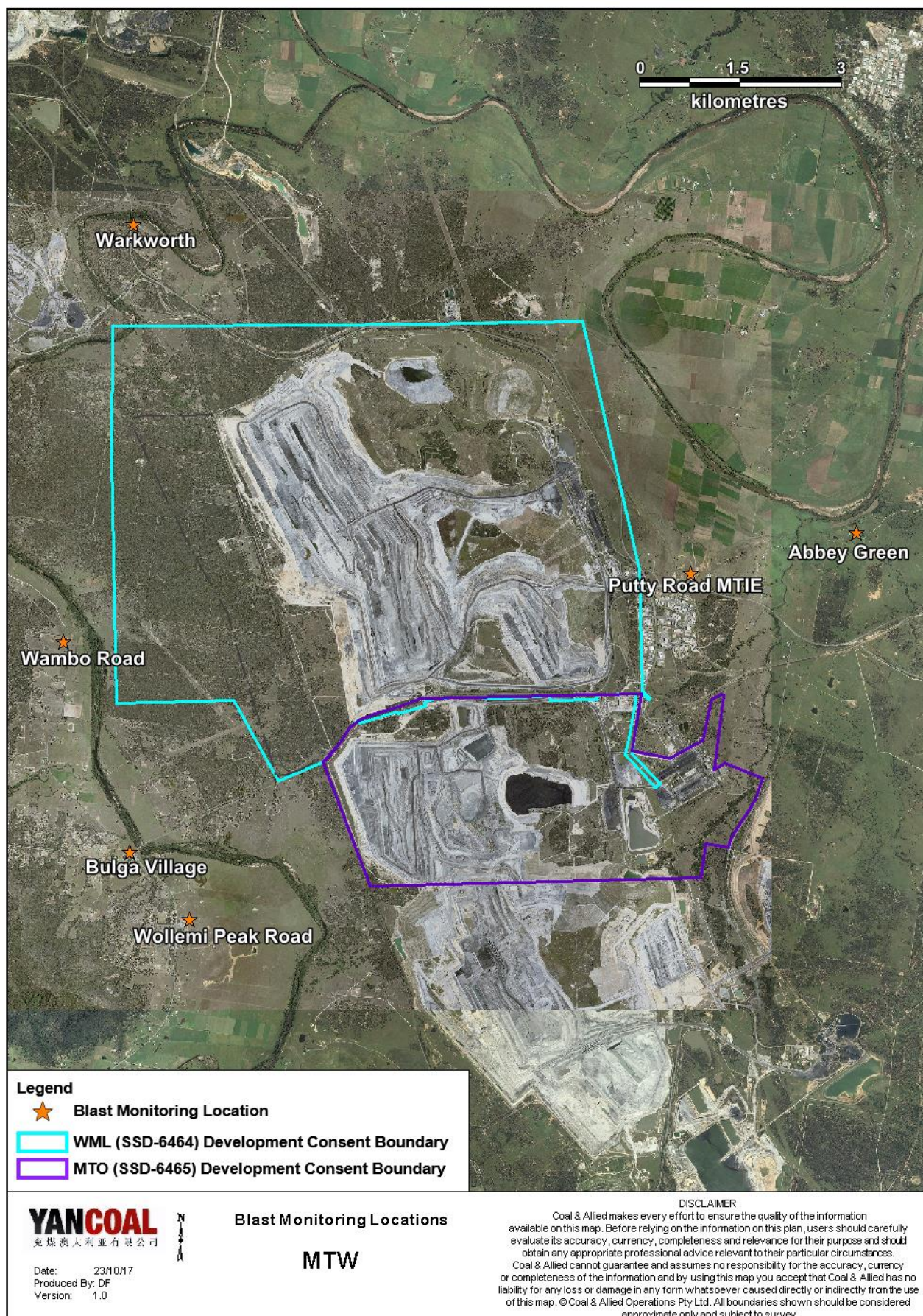


Figure 68: Blast and Vibration Monitoring Location Plan

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 five sites surrounding MTW. The attended noise monitoring locations are displayed in Figure 69.

5.1 Attended Noise Monitoring Results

Attended monitoring was conducted at receiver locations surrounding MTW on the night of 8 March 2018. All measurements complied with the relevant criteria. Results are detailed in Table 6 to Table 9.

5.1.1 WML Noise Assessment

Compliance assessments undertaken against the WML noise criteria are presented in Table 6 and Table 7.

Table 6: L_{Aeq}, 15 minute Warkworth Impact Assessment Criteria – March 2018

Location	Date and Time	Wind Speed (m/s) ⁵	Stability Class	Criterion (dB(A))	Criterion Applies? ^{1,5}	WML L _{Aeq} dB ^{2,4}	Exceedance ³
Bulga RFS	8/03/2018 21:02	2.8	D	37	Yes	IA	Nil
Bulga Village	8/03/2018 23:16	3.1	D	38	No	IA	NA
Gouldsville	9/03/2018 0:56	3.1	D	38	No	30	NA
Inlet Rd	8/03/2018 21:22	2.7	D	37	Yes	<25	Nil
Inlet Rd West	8/03/2018 21:00	2.8	D	35	Yes	IA	Nil
Long Point	9/03/2018 0:30	4.1	D	35	No	<25	NA
South Bulga	8/03/2018 21:37	2.6	D	35	Yes	IA	Nil
Wambo Road	8/03/2018 22:51	3.5	D	38	No	<25	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_{Aeq},15minute attributed to WML;
3. NA means atmospheric conditions outside conditions specified in development consent and so criterion is not applicable;
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.

Table 7: L_{A1}, 1 minute Warkworth Impact Assessment Criteria – March 2018

Location	Date and Time	Wind Speed (m/s) ⁵	Stability Class	Criterion (dB(A))	Criterion Applies? ^{1,5}	WML L _{Aeq} dB ^{2,4}	Exceedance ³
Bulga RFS	8/03/2018 21:02	2.8	D	47	Yes	IA	Nil
Bulga Village	8/03/2018 23:16	3.1	D	48	No	IA	NA
Gouldsville	9/03/2018 0:56	3.1	D	48	No	33	NA
Inlet Rd	8/03/2018 21:22	2.7	D	47	Yes	<25	Nil
Inlet Rd West	8/03/2018 21:00	2.8	D	45	Yes	IA	Nil
Long Point	9/03/2018 0:30	4.1	D	45	No	28	NA
South Bulga	8/03/2018 21:37	2.6	D	45	Yes	IA	Nil
Wambo Road	8/03/2018 22:51	3.5	D	48	No	<25	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.
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 Table 8 and Table 9.

Table 8: L_{Aeq, 15minute} Mount Thorley Operations - Impact Assessment Criteria – March 2018

Location	Date and Time	Wind Speed (m/s) ⁵	Stability Class	Criterion dB	Criterion Applies? ^{1,5}	MTO L _{Aeq} dB ^{2,4}	Exceedance ³
Bulga RFS	8/03/2018 21:02	2.8	D	37	Yes	IA	Nil
Bulga Village	8/03/2018 23:16	3.1	D	38	No	NM	NA
Gouldsville	9/03/2018 0:56	3.1	D	35	No	IA	NA
Inlet Rd	8/03/2018 21:22	2.7	D	37	Yes	<25	Nil
Inlet Rd West	8/03/2018 21:00	2.8	D	35	Yes	IA	Nil
Long Point	9/03/2018 0:30	4.1	D	35	No	IA	NA
South Bulga	8/03/2018 21:37	2.6	D	36	Yes	IA	Nil
Wambo Road	8/03/2018 22:51	3.5	D	38	No	<25	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_{Aeq,15minute} attributed to MTO;
3. NA means atmospheric conditions outside conditions specified in development consent and so criterion is not applicable;
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.

Table 9: L_{A1, 1Minute} Mount Thorley Operations - Impact Assessment Criteria – March 2018

Location	Date and Time	Wind Speed (m/s) ⁵	Stability Class	Criterion dB	Criterion Applies? ^{1,5}	MTO L _{A1, 1min} dB ^{2,4}	Exceedance ³
Bulga RFS	8/03/2018 21:02	2.8	D	47	Yes	IA	Nil
Bulga Village	8/03/2018 23:16	3.1	D	48	No	NM	NA
Gouldsville	9/03/2018 0:56	3.1	D	45	No	IA	NA
Inlet Rd	8/03/2018 21:22	2.7	D	47	Yes	<25	Nil
Inlet Rd West	8/03/2018 21:00	2.8	D	45	Yes	IA	Nil
Long Point	9/03/2018 0:30	4.1	D	45	No	IA	NA
South Bulga	8/03/2018 21:37	2.6	D	46	Yes	IA	Nil
Wambo Road	8/03/2018 22:51	3.5	D	48	No	<30	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 MTO;
3. NA in exceedance column means atmospheric conditions outside conditions specified in project approval and so criterion is not applicable.
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 Low Frequency Assessment

In accordance with the requirements of the EPA's Noise Policy for Industry (NPfI), the applicability of the low frequency modification penalty has been assessed. During March 2018 no measurements required the penalty to be applied. The assessment for low frequency noise is shown in Table 10.

Table 10: Low Frequency Noise Assessment - March 2018

Location	Date and Time	Measured Site Only LA _{eq} dB (WML/MTO)	Site Only LC _{eq} dB ⁴ (WML/MTO)	Site Only LC _{eq} -LA _{eq} dB ^{1,4} (WML/MTO)	Result Max exceedance of ref spectrum dB ^{2,3,4} (WML/MTO)	Penalty dB(A) (WML/MTO)	Exceedance
Bulga RFS	8/03/2018 21:02	IA/IA	NA/NA	NA/NA	NA/NA	NA/NA	NA
Bulga Village	8/03/2018 23:16	IA/NM	NA/NA	NA/NA	NA/NA	NA/NA	NA
Gouldsville	9/03/2018 0:56	30/IA	NA/NA	NA/NA	NA/NA	NA/NA	NA
Inlet Rd	8/03/2018 21:22	<25/<25	NA/NA	NA/NA	NA/NA	NA/NA	NA
Inlet Rd West	8/03/2018 21:00	IA/IA	NA/NA	NA/NA	NA/NA	NA/NA	NA
Long Point	9/03/2018 0:30	<25/IA	NA/NA	NA/NA	NA/NA	NA/NA	NA
South Bulga	8/03/2018 21:37	IA/IA	NA/NA	NA/NA	NA/NA	NA/NA	NA
Wambo Road	8/03/2018 22:51	<25/<25	NA/NA	NA/NA	NA/NA	NA/NA	NA

Notes:

1. As per NPfI, if LC_{eq} – LA_{eq} ≥ 15 dB further assessment of low frequency noise required.
2. As per NPfI, compare measured spectrum against reference spectrum to determine if the low frequency modifying factor is triggered and application of penalty is required;
3. Bold results and penalties in red are where the relevant modifying factor trigger was exceeded; and
4. Where it is not possible to determine the site only result due to the presence of other low frequency noise sources occurring during the measurement, or where criteria were not applicable due to meteorological conditions, this is noted as NA (not available) and no further assessment has been undertaken.

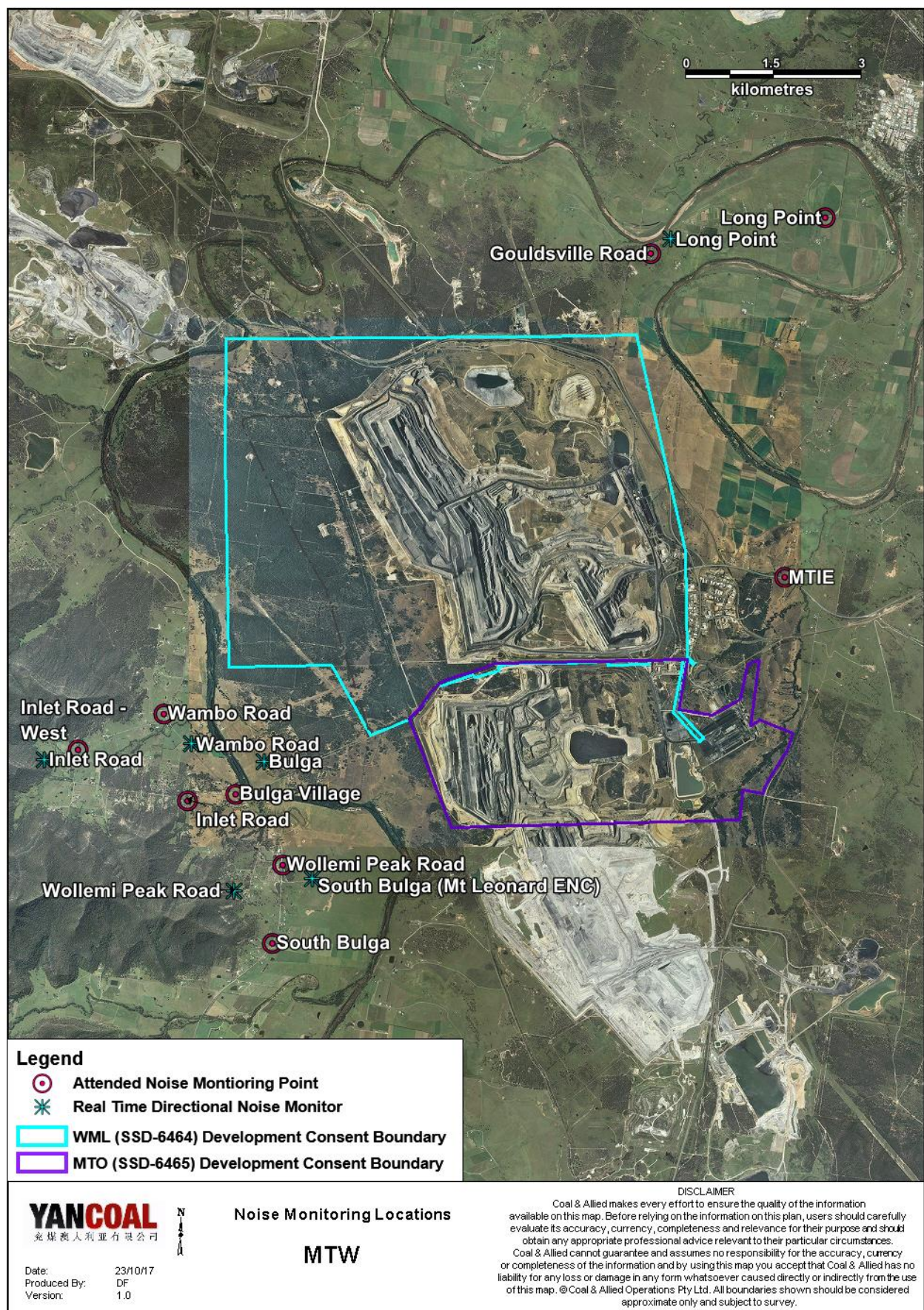


Figure 69: Noise Monitoring Location Plan

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:

- 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 11: Supplementary Attended Noise Monitoring Data – March 2018

No. of assessments	No. of assessments > trigger	No. of nights where assessments > trigger	% greater than trigger
589	8	3	1.4

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 213 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

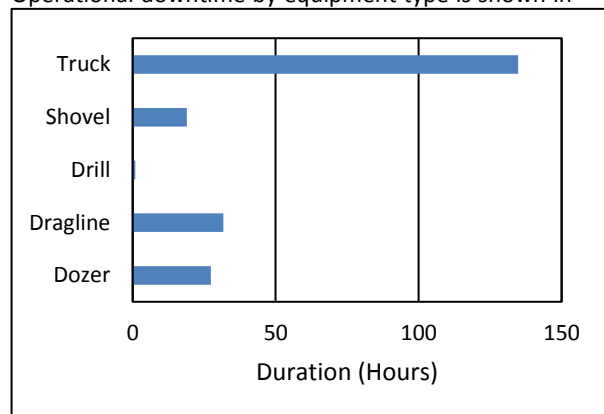


Figure 70.

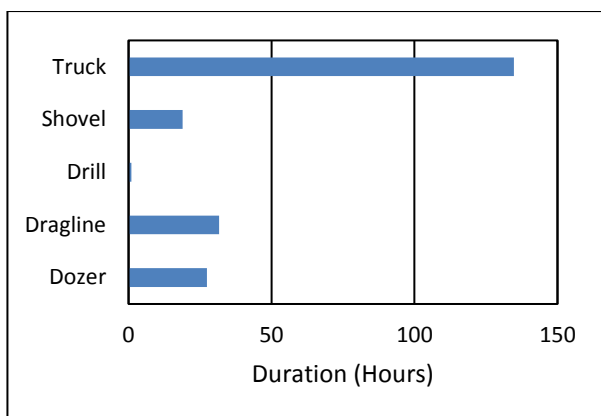


Figure 70: Operational Downtime by Equipment Type – March 2018

9.0 COMPLAINTS

During the reporting period 27 complaints were received, details of these complaints are displayed in Figure 72 below.

7.0 REHABILITATION

During March, 9.4Ha of land was released, 10.0Ha was bulk shaped and 1.9Ha was top soiled. Year-to-date progress can be viewed in Figure 71

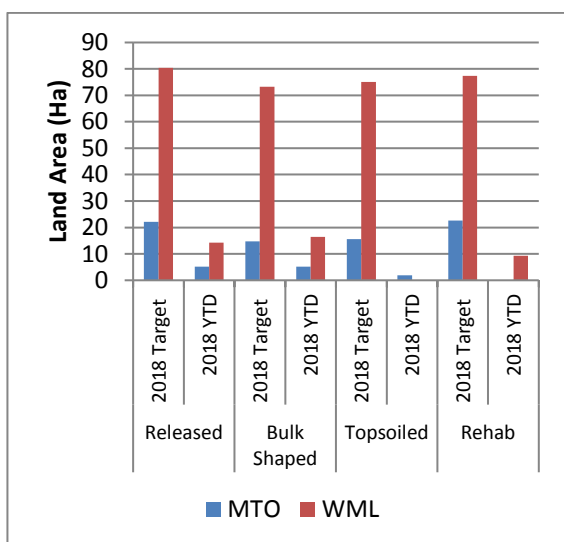


Figure 71: Rehabilitation YTD - March 2018

8.0 ENVIRONMENTAL INCIDENTS

There were no reportable environmental incidents during the reporting period.

	January	February	March	Total
Blasting	14	2	0	16
Air (Dust)	6	3	0	9
Air (Odour)	1	2	0	3

Lighting	1	3	3	7
Noise	9	7	24	40
Other	0	0	0	0
Grand Total	31	17	27	75

Figure 72: Complaints Summary - YTD March 2018

Appendix A: Meteorological Data

Table 12: Meteorological Data – Charlton Ridge Meteorological Station – March 2018

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)
1/03/2018 0:00	28	19	71	41	1132	166	3.1	0.0
2/03/2018 0:00	28	16	84	40	1286	130	2.7	0.0
3/03/2018 0:00	33	16	84	28	982	148	2.0	0.0
4/03/2018 0:00	34	15	97	34	1314	190	2.8	22.6
5/03/2018 0:00	27	18	96	58	982	151	2.1	0.2
6/03/2018 0:00	23	16	95	53	1383	160	4.2	6.8
7/03/2018 0:00	26	16	90	36	1444	145	4.3	0.6
8/03/2018 0:00	25	14	86	43	1471	148	3.9	0.0
9/03/2018 0:00	26	15	83	44	1520	148	3.9	0.0
10/03/2018	28	16	83	34	1403	141	2.9	0.0
11/03/2018	28	14	85	35	1129	149	2.0	0.0
12/03/2018	29	12	92	35	1172	143	2.2	0.0
13/03/2018	28	15	85	43	1149	149	3.2	0.0
14/03/2018	31	18	86	35	1132	126	2.5	0.0
15/03/2018	35	16	90	25	1091	210	2.7	0.0
16/03/2018	30	20	77	42	1106	137	2.9	0.0
17/03/2018	36	20	82	14	933	213	2.8	0.0
18/03/2018	38	18	73	15	924	257	3.4	0.0
19/03/2018	38	20	75	13	911	179	2.7	0.0
20/03/2018	30	18	80	34	1034	170	3.7	0.0
21/03/2018	22	15	94	70	909	166	5.8	15.4
22/03/2018	21	14	97	67	1257	160	4.4	8.4
23/03/2018	22	15	94	67	796.6	142	3.1	5.2
24/03/2018	28	16	94	50	1083	140	1.6	0.0
25/03/2018	32	16	94	31	1056	273	3.3	0.0
26/03/2018	27	16	94	30	1057	259	3.8	14.0
27/03/2018	25	9	79	28	1321	150	3.0	0.0

28/03/2018	29	14	91	45	901	148	2.0	0.0
29/03/2018	29	15	95	43	942	135	1.9	0.0
30/03/2018	32	16	95	29	862	190	2.3	0.0
31/03/2018	28	18	87	46	1067	139	2.9	0.0

“-“ Indicates that data was not available due to technical issues.

Appendix D: Land Acquisition Update



Mount Thorley Warkworth Property Portfolio Update

As of 31st March 2018

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 and land 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
- 910A Putty Road, Mt Thorley
- 218 Wambo Road, Bulga
- 100 Trefolly Road, Wylies Flat
- 2038 Putty Road, Bulga