

Mount Thorley Warkworth

Community Consultative Committee (CCC)

**Business Papers – February 2018**

Materials supplied to members for the meeting on the 19 February 2018.

# Contents page

1.0 Complaints	3
2.0 Incidents	4
3.0 Environmental monitoring	7
October 2017	7
November 2017	7
December 2017	7
4.0 Rehabilitation plan	8
5.0 Acquisition Update	14
6.0 Website Uploads	15
7.0 Community Investment & Support	16
Yancoal Corporate Investment	16

## Appendices

Appendix A – Environmental Monitoring Report July 2017

Appendix B – Environmental Monitoring Report August 2017

Appendix C – Environmental Monitoring Report September 2017

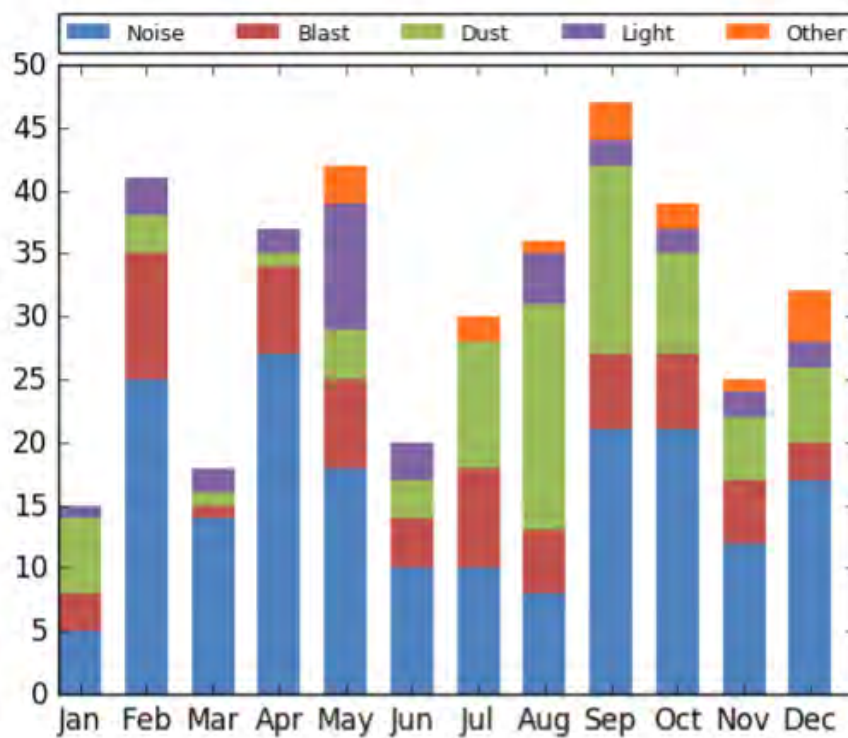
Appendix D – Acquisition Update – Mount Thorley Warkworth Property Portfolio

## 1.0 Complaints

Complaints overview for end of month/end of year period 2017  
(31.12.2017)

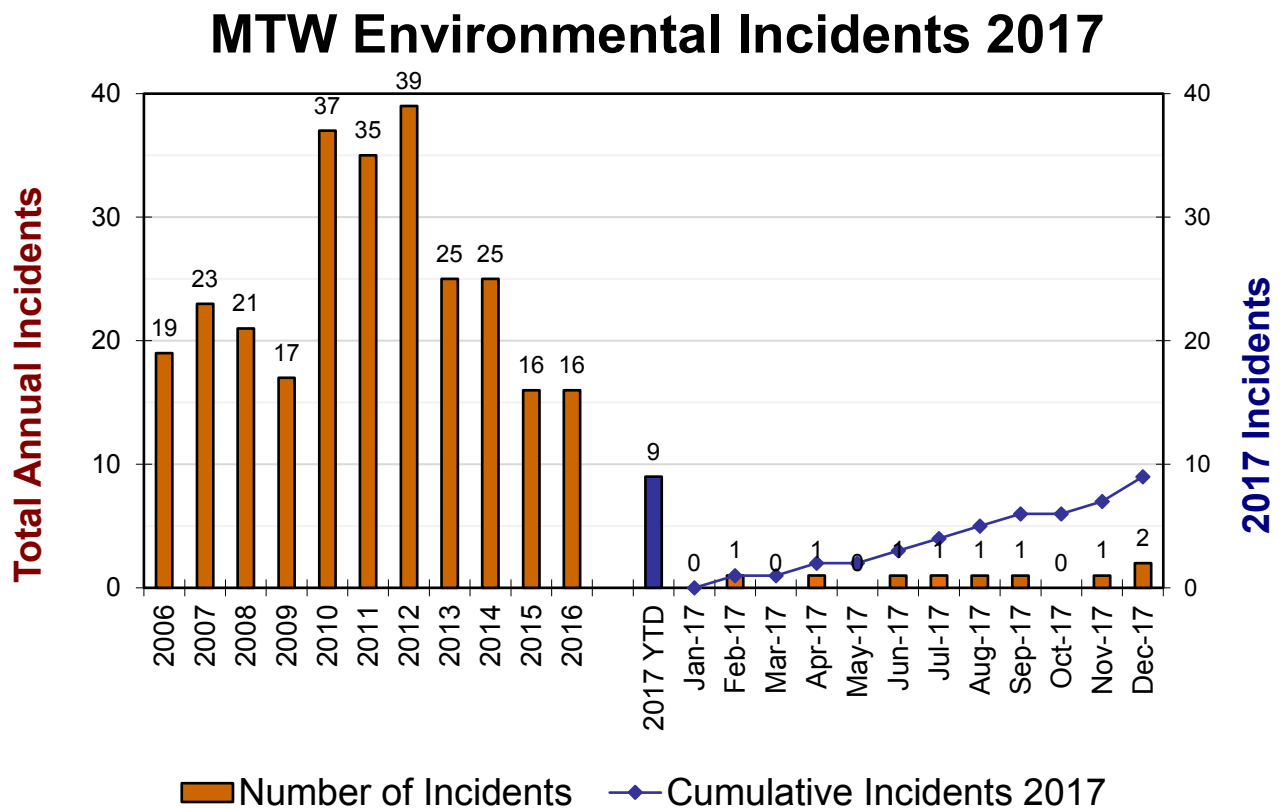
### Mount Thorley Warkworth Monthly Complaints Summary

	Noise	Dust	Blast	Lighting	Other	Total
January	5	6	3	1	0	15
February	25	3	10	3	0	41
March	14	1	1	2	0	18
April	27	1	7	2	0	37
May	18	4	7	10	3	42
June	10	3	4	3	0	20
July	10	10	8	0	2	30
August	8	18	5	4	1	36
September	21	15	6	2	3	47
October	21	8	6	2	2	39
November	12	5	5	2	1	25
December	17	6	3	2	4	32
Total	188	80	65	33	16	382



## 2.0 Incidents

Overview of environmental incidents for period End of Year 2017



## Incident summary for the period 01 November 2017 to 31 January 2018

Date	Details	Key Actions	Aspect
03-Jan-2018	<p>Diesel spill caused by overtopping Orica MMU Process Fuel Tank.</p> <p>Orica MMU being re-fuelled when spill from top of the process fuel tank was noticed. Vehicle was isolated and spill contained. Approximately 100L was spilt; 70L on hard surface recovered using vacuum truck, 30L on soil transported to bioremediation area.</p>	<p>HSE Alert communicated to site.</p> <p>Spill was recovered. Material excavated and transferred to bioremediation pad.</p>	Waste
19-January-2018	<p>Blast Odour – Warkworth West Pit.</p> <p>MTW received complaint regarding odour from WML blast W34-RCD-PR11. Fume ranking of 0 (zero) was assigned by the shotfirer (Australian Explosives Industry and Safety Group rating scale). Change of wind conditions after shot was fired lead to migration of dust plume west as opposed to easterly direction of wind at time of blasting.</p> <p>Dust Plume migrated over established road closure with nil gas reading detected on the road prior to opening.</p> <p>Planning, execution and monitoring of the blast was in accordance with current project approval and relevant management plans.</p>	<p>Incident investigated.</p> <p>Self-report to EPA and DP&amp;E</p> <p>Report provided to the DP&amp;E .</p> <p>MTW reviewing predictive modelling tools, blasting permissions and shot size in the West Pit South area.</p>	Blasting
04-Dec-2017	<p>Storm water overflowed catchment drain.</p> <p>A catchment drain was overtopped resulting in approximately 23KL of water passing under Wallaby Scrub Road via a storm water culvert. Water then drained to MTW owned land and was contained in a dam where it was recovered with a vacuum truck and returned to site</p>	<p>Incident investigated.</p> <p>Self-report to relevant Authorities</p> <p>Water containment infrastructure re-instated.</p> <p>Water recovered</p>	Substance/water

Date	Details	Key Actions	Aspect
20-Nov-2017	Non-Target plant species affected by herbicide.  During weed management activities, non-target juvenile tree species (Angophora) were exposed to herbicide, killing some small saplings.	Incident investigated  No further use of herbicide where juvenile Angophora Species are present.	Vegetation
18-Nov-2017	Minor diesel spill from crane.  Crane dove off from Vehicle Service Bay (VSB) with hose still attached causing diesel spill.  Spill occurred in contained area and recovered by waste management contractor.	HSE Alert communicated to site.	Waste

## 3.0 Environmental monitoring

Monthly summaries of environmental monitoring for the period  
1 July 2017 to 30 September 2017

### **October 2017**

Attached as Appendix A

### **November 2017**

Attached as Appendix B

### **December 2017**

Attached as Appendix C

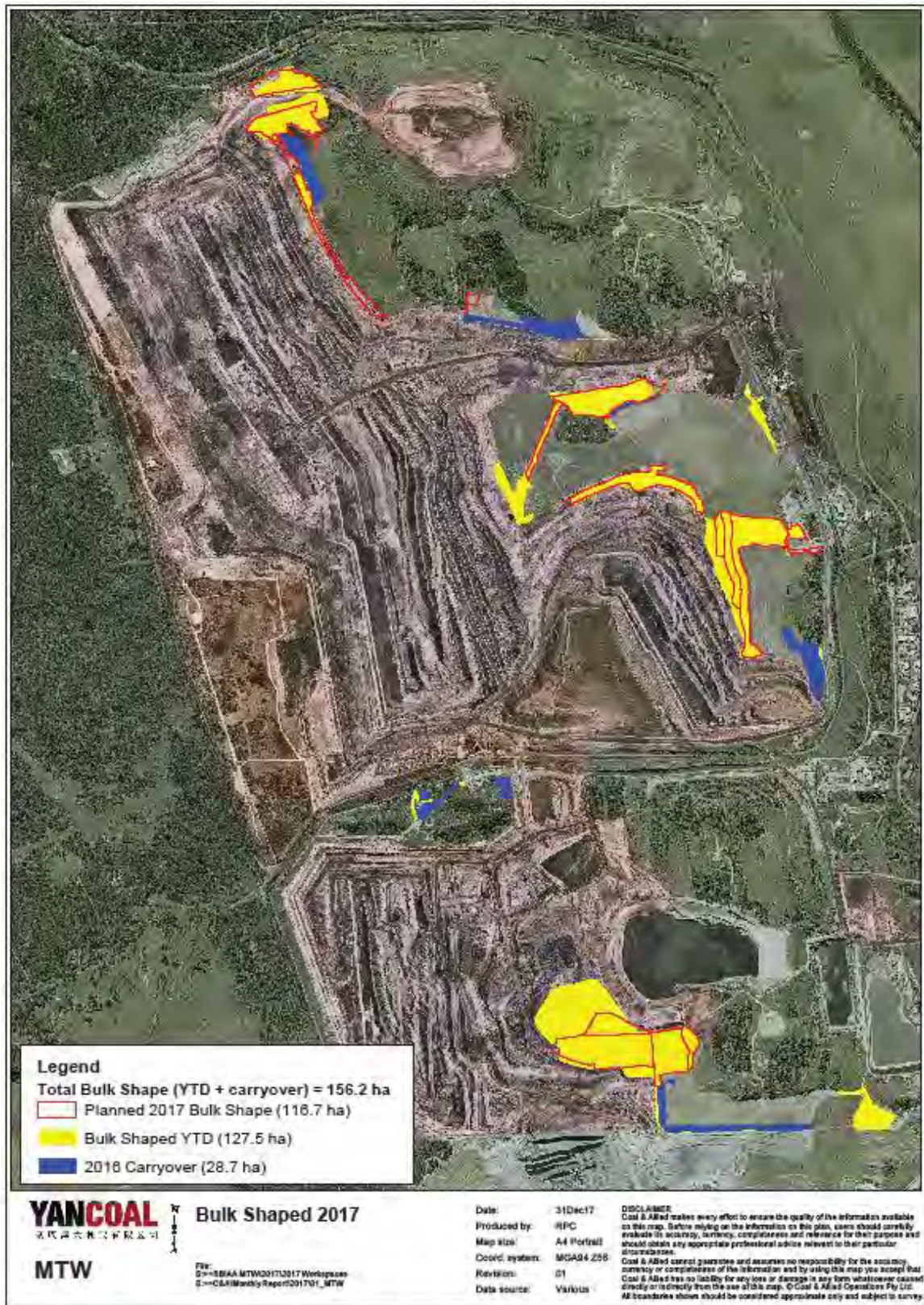
## 4.0 Rehabilitation plan

The 2017 rehabilitation plan was completed ahead of schedule with 124ha of rehabilitated mined land reported against an annual 2017 target of 122ha.

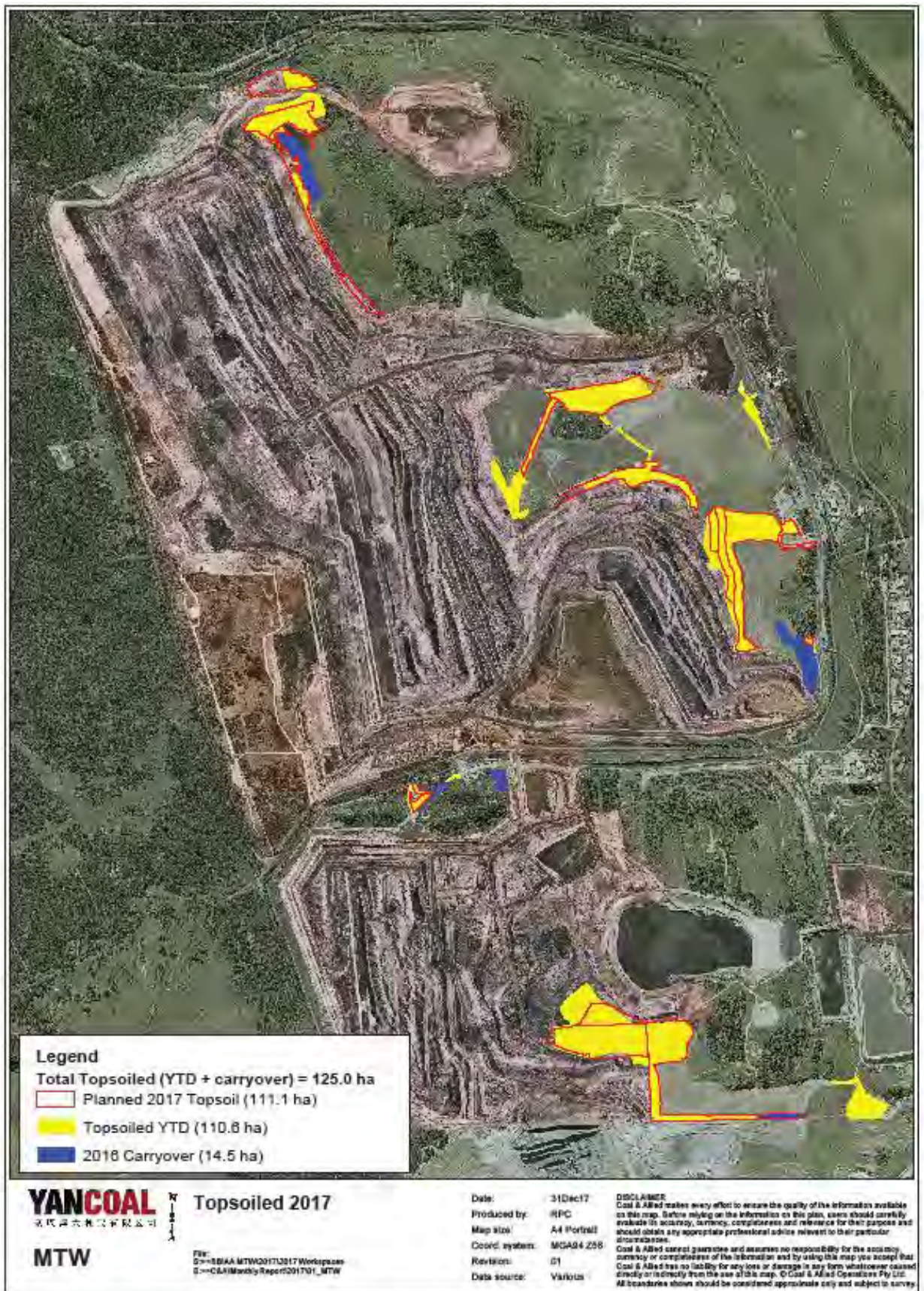
The 2018 rehab target at MTW is 100ha with 9.3ha of rehabilitated mined land currently reported. A further 35.2ha of mined area has been released to prepare for Autumn sowing.

The Year to date disturbance is 16.2ha. The disturbance during this period was evenly distributed between WML and MTO leases as a result of Pit advancement, infrastructure (including implementation of water management) and dumping preparation.

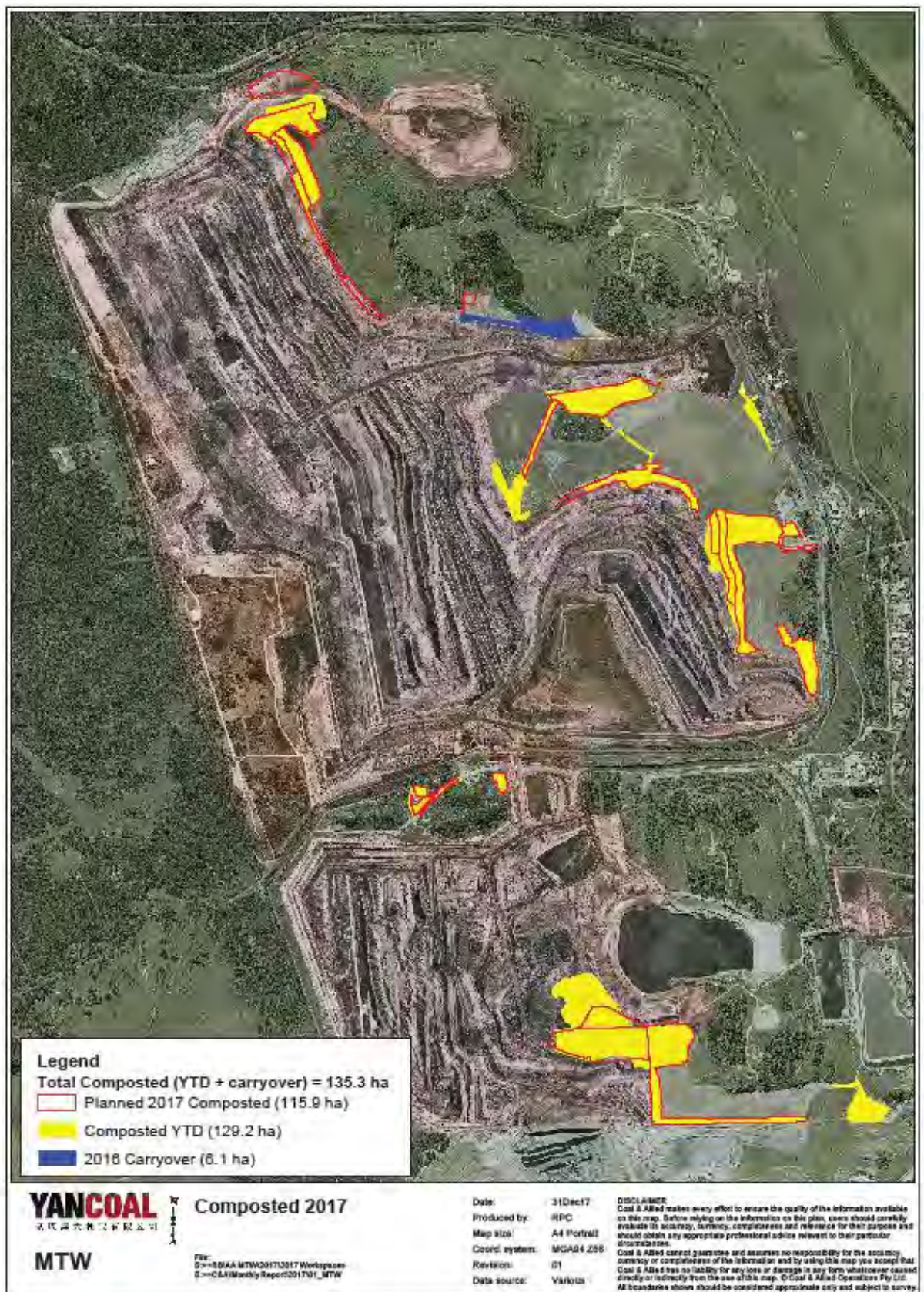




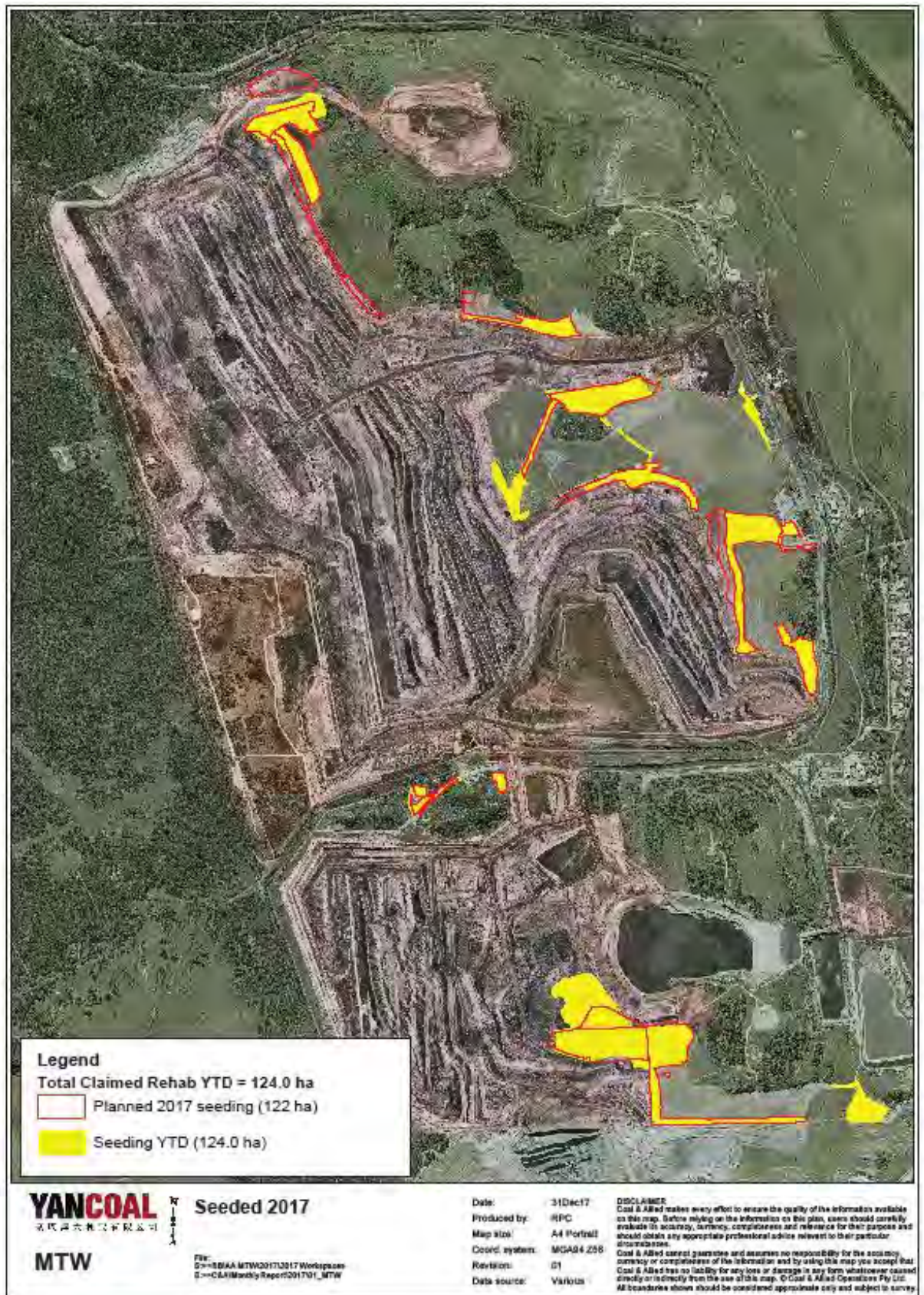
















## 5.0 Acquisition Update

A presentation with a property acquisition update for Mount Thorley Warkworth is included in Appendix D of this Business Paper.

Three properties have been acquired during the October-December 2017 period.

## 6.0 Website Uploads

Table 1 below is a list of all documents uploaded to the MTW library of the Yancoal Australia INSITE website since 01 January 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>

Table 1: Uploaded Documents to the Yancoal Australia INSITE Website

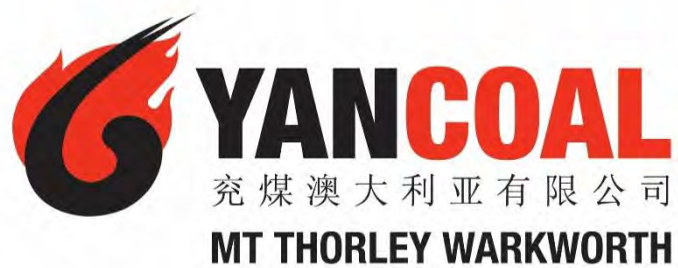
Document Title	Upload
MTW Pollution Incident Response Management Plan	Change
Hunter Valley Operations Environmental Monitoring Report October 2017	Addition
Mount Thorley Warkworth Environment Protection Licence 1376 1976 Monitoring Data December 2017	Addition
Hunter Valley Operations Environment Protection Licence 640 Monitoring Data December 2017	Addition
Hunter Valley Operations Environmental Monitoring Report November 2017	Addition
Mount Thorley Warkworth Environmental Monitoring Report November 2017	Addition
EPBC 2016/7640 Annual Compliance Report - 1 November 2016 to 31 October 2017	Addition

## 7.0 Community Investment & Support

### **Yancoal Corporate Investment**

Details of the Yancoal Corporate investment fund are yet to be announced for 2018.





## Appendix A

Environmental Monitoring  
October 2017





# Monthly Environmental Monitoring Report

Yancoal Mt Thorley Warkworth

October 2017

## 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 <sub>10</sub> Results .....	6
2.3.2	TSP Results .....	7
2.3.3	Real Time PM <sub>10</sub> Results.....	7
2.3.4	Real Time Alarms for Air Quality .....	7
3.0	WATER QUALITY.....	8
3.1	Surface Water .....	8
3.2	Groundwater Monitoring .....	8
3.3	HRSTS Discharge .....	8
4.0	BLAST MONITORING .....	9
4.1	Blast Monitoring Results .....	9
5.0	NOISE.....	12
5.1	Attended Noise Monitoring Results .....	12
5.1.1	WML Noise Assessment .....	12
5.1.3	MTO Noise Assessment .....	13
5.1.4	INP Low Frequency .....	14
5.2	Noise Management Measures .....	16
6.0	OPERATIONAL DOWNTIME .....	16
7.0	REHABILITATION .....	16
8.0	ENVIRONMENTAL INCIDENTS.....	17
9.0	COMPLAINTS .....	17
	Appendix A: Meteorological Data .....	19

## Figures

Figure 1: Rainfall Trend YTD	4
Figure 2: Charlton Ridge Wind Rose – October 2017	4
Figure 3: Air Quality Monitoring Locations	5
Figure 4: Depositional Dust – October 2017	6
Figure 5: Individual PM <sub>10</sub> Results – October 2017	6
Figure 6: Annual Average PM <sub>10</sub> – October 2017	7
Figure 7: Annual Average Total Suspended Particulates – October 2017	7
Figure 8: Real Time PM <sub>10</sub> daily 24hr average and annual average – October 2017	8
Figure 9: Abbey Green Blast Monitoring Results – October 2017	9
Figure 10: Bulga Village Blast Monitoring Results – October 2017	9
Figure 11: MTIE Blast Monitoring Results – October 2017	10
Figure 12: Wollemi Peak Road Blast Monitoring Results - October 2017	10
Figure 13: Wambo Road Blast Monitoring Results – October 2017	10
Figure 14: Warkworth Blast Monitoring Results - October 2017	10
Figure 15: MTW Blast Monitoring Location Plan	11
Figure 16: Noise Monitoring Location Plan	15
Figure 17: Operational Downtime by Equipment Type – October 2017	16
Figure 18: Rehabilitation YTD - October 2017	17
Figure 19: Complaints Summary – YTD October 2017	18

## Tables

Table 1: Monthly Rainfall MTW	4
Table 2: Blasting Limits	9
Table 3: L <sub>Aeq, 15 minute</sub> Warkworth Impact Assessment Criteria –October 2017	12
Table 4: L <sub>A1, 1 minute</sub> Warkworth - Impact Assessment Criteria – October 2017	12
Table 5: L <sub>Aeq, 15minute</sub> Mount Thorley - Impact Assessment Criteria – October 2017	13
Table 6: L <sub>A1, 1Minute</sub> Mount Thorley - Impact Assessment Criteria – October 2017	13
Table 7: Supplementary Attended Noise Monitoring Data – October 2017	16
Table 8: Meteorological Data – Charlton Ridge Meteorological Station – October 2017	20

## Revision History

Version No.	Person Responsible	Document Status	Date
<b>1.0</b>	<b>Environmental Advisor</b>	<b>Draft</b>	<b>04/12/2017</b>
<b>1.1</b>	<b>Environmental Specialist</b>	<b>Final</b>	<b>08/12/2017</b>

# 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<sup>st</sup> October to 31<sup>st</sup> October 2017.

# 2.0 AIR QUALITY

## 2.1 Meteorological Monitoring

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

### 2.1.1 Rainfall

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

Table 1: Monthly Rainfall MTW

2017	Monthly Rainfall (mm)	Cumulative Rainfall (mm)
October	92.8	384.2

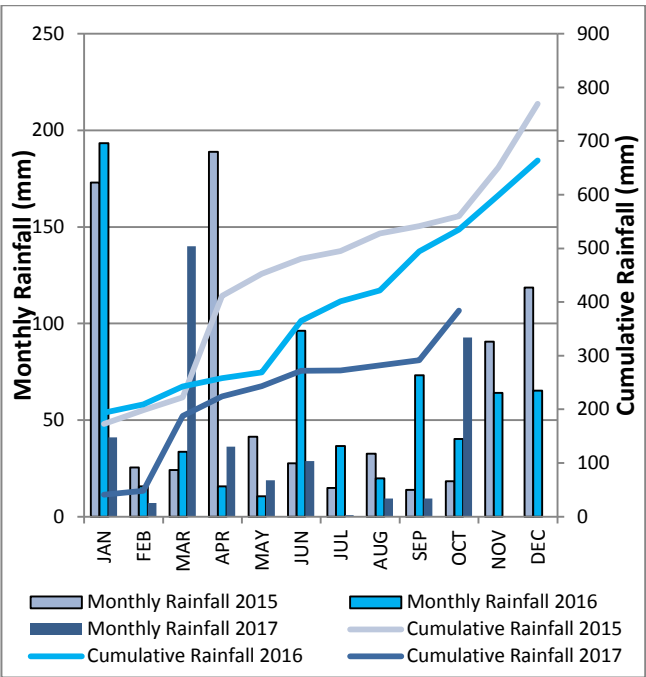


Figure 1: Rainfall Trend YTD

## 2.1.2 Wind Speed and Direction

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

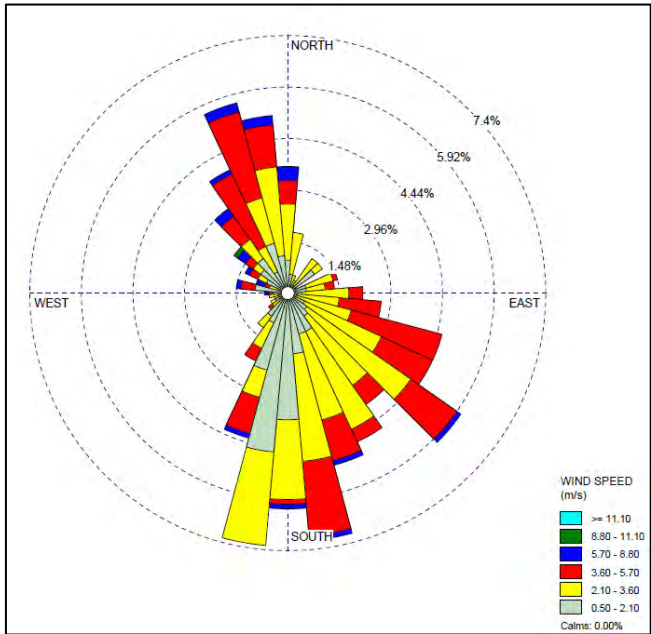


Figure 2: Charlton Ridge Wind Rose – October 2017



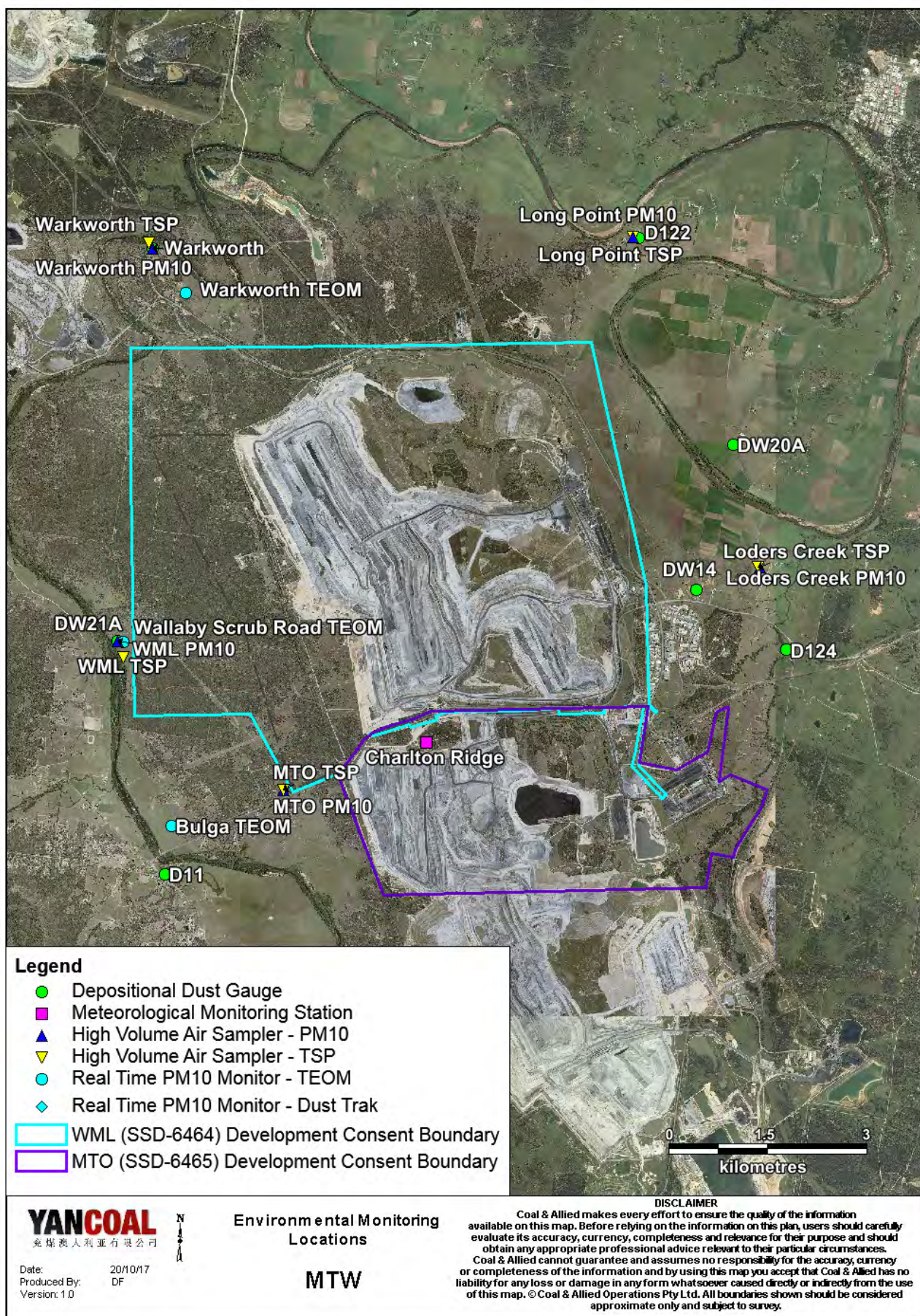


Figure 3: Air Quality Monitoring Locations



## 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 D124 and Warkworth monitors recorded a monthly result above the long term impact assessment criteria of 4.0 g/m<sup>2</sup> per month. Field notes associated with D124 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.

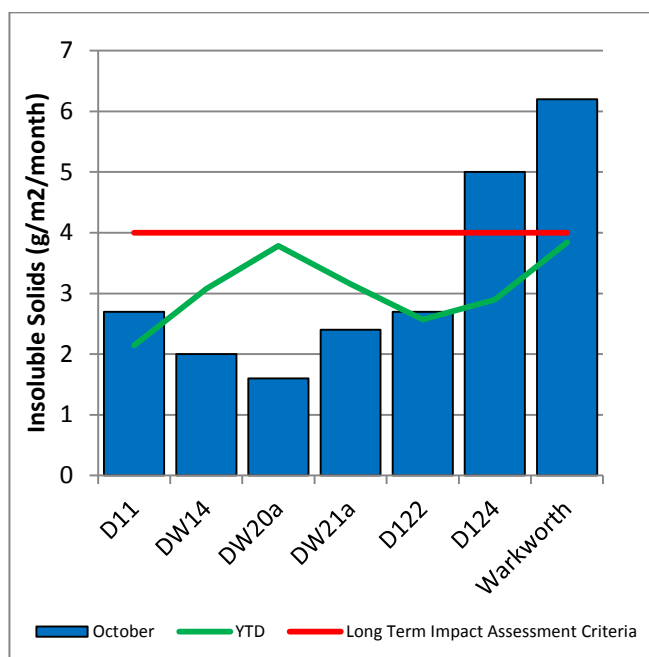


Figure 4: Depositional Dust – October 2017

## 2.3 Suspended Particulates

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

### 2.3.1 HVAS PM<sub>10</sub> Results

Figure 5 shows the individual PM<sub>10</sub> results at each monitoring station against the short term impact assessment criteria of 50µg/m<sup>3</sup>.

On 09/10/2017 the Long Point HVAS PM<sub>10</sub> unit recorded a result of 106µg/m<sup>3</sup>, which is greater than the short term (24hr) PM<sub>10</sub> impact assessment criteria.

Investigation determined that the wind direction was generally not from MTW's angle of influence at Long Point on the 9<sup>th</sup> of October. Accordingly, no further action is required.

Data was not available on 21/10/2017 at Long Point due to a power outage and on 27/10/2017 at Long Point or MTO HVAS due to collection of an invalid sample and a power outage, respectively.

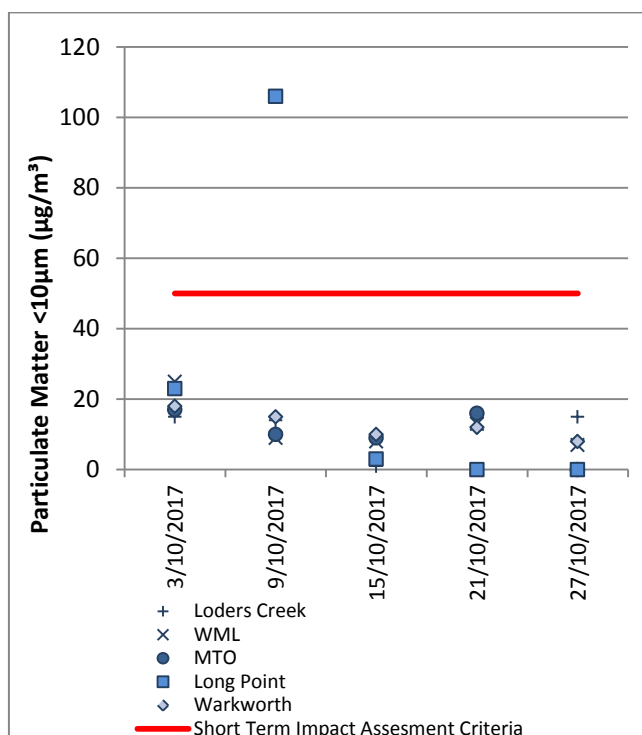


Figure 5: Individual PM<sub>10</sub> Results – October 2017

Figure 6 shows the annual average PM<sub>10</sub> results against the long term impact assessment criteria.



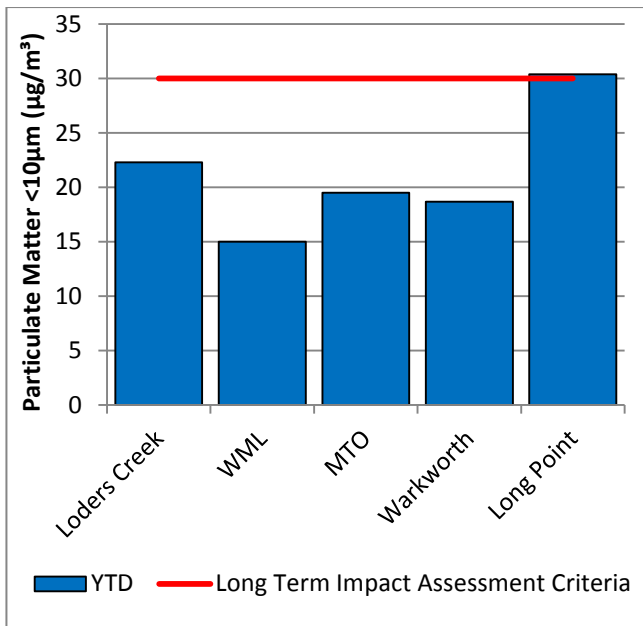


Figure 6: Annual Average PM<sub>10</sub> – October 2017

### 2.3.2 TSP Results

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

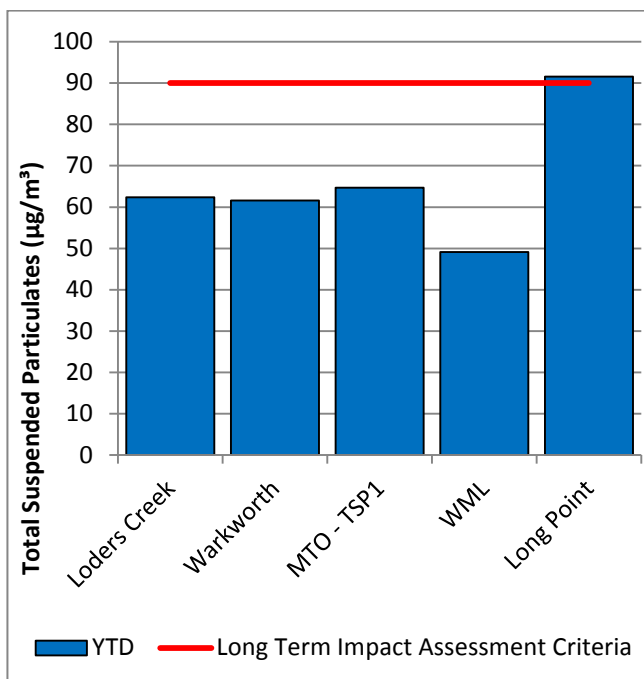


Figure 7: Annual Average Total Suspended Particulates – October 2017

### 2.3.3 Real Time PM<sub>10</sub> Results

Mt Thorley Warkworth maintains a network of real time PM<sub>10</sub> 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 PM<sub>10</sub> result and the annual PM<sub>10</sub> average.

### 2.3.4 Real Time Alarms for Air Quality

During October, the real time monitoring system generated 143 automated air quality related alerts, including 11 alerts for adverse meteorological conditions and 132 alerts for elevated PM<sub>10</sub> levels.

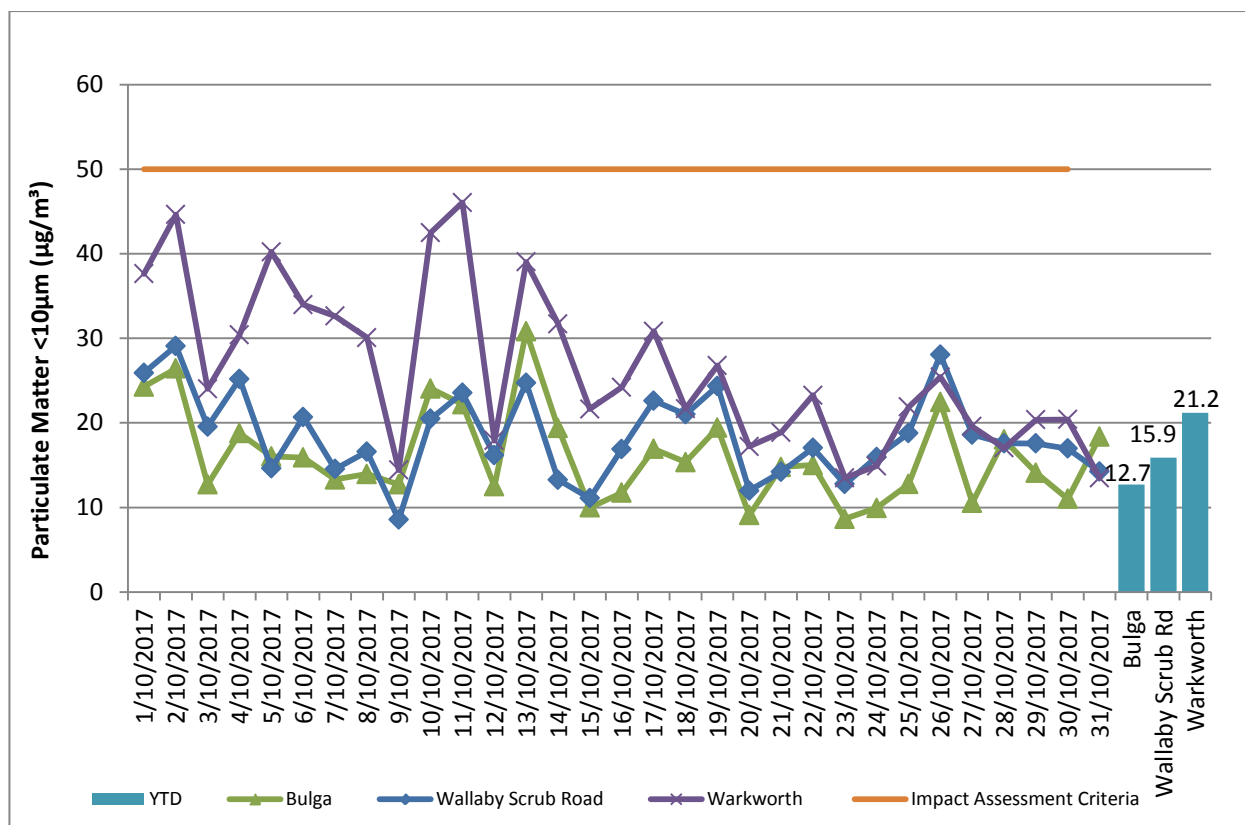


Figure 8: Real Time PM<sub>10</sub> daily 24hr average and annual average – October 2017

### 3.0 WATER QUALITY

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

#### 3.1 Surface Water

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

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

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

#### 3.2 Groundwater Monitoring

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

Groundwater results are reported quarterly, next available in the December 2017 report.

#### 3.3 HRSTS Discharge

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

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

## 4.0 BLAST MONITORING

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

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

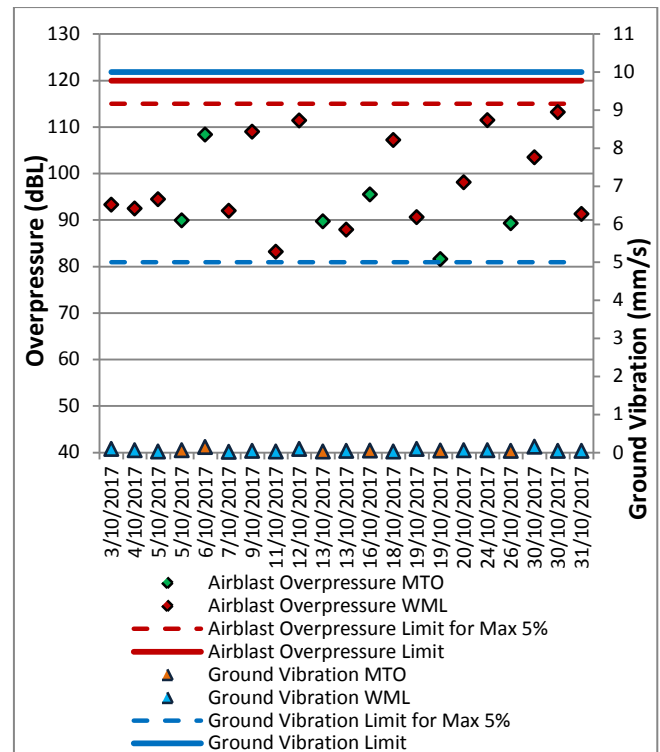
### 4.1 Blast Monitoring Results

During October 2017, 21 blasts were initiated at MTW. Figure 9 to Figure 14 show the blast monitoring results for the reporting period against the impact assessment criteria. The criteria are summarised in Table 2.

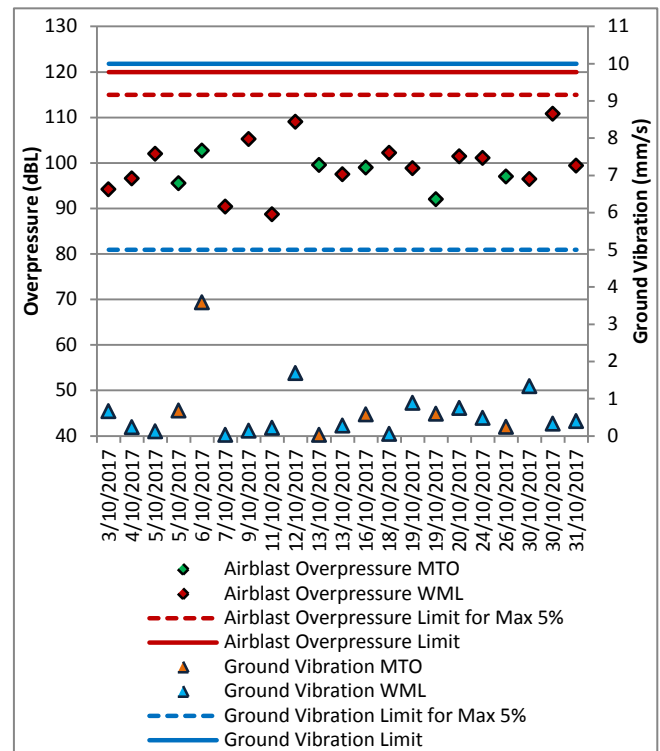
**Table 2: Blasting Limits**

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

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



**Figure 9: Abbey Green Blast Monitoring Results – October 2017**



**Figure 10: Bulga Village Blast Monitoring Results – October 2017**

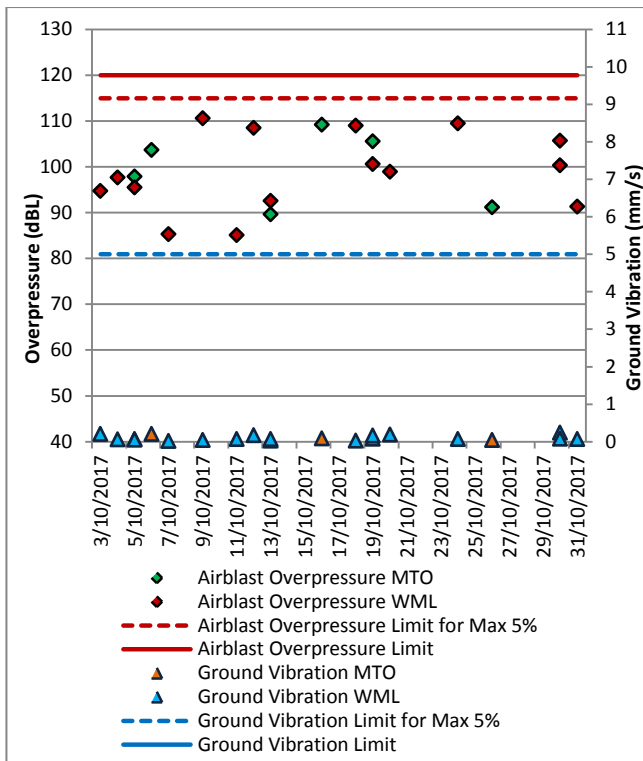


Figure 11: MTIE Blast Monitoring Results – October 2017

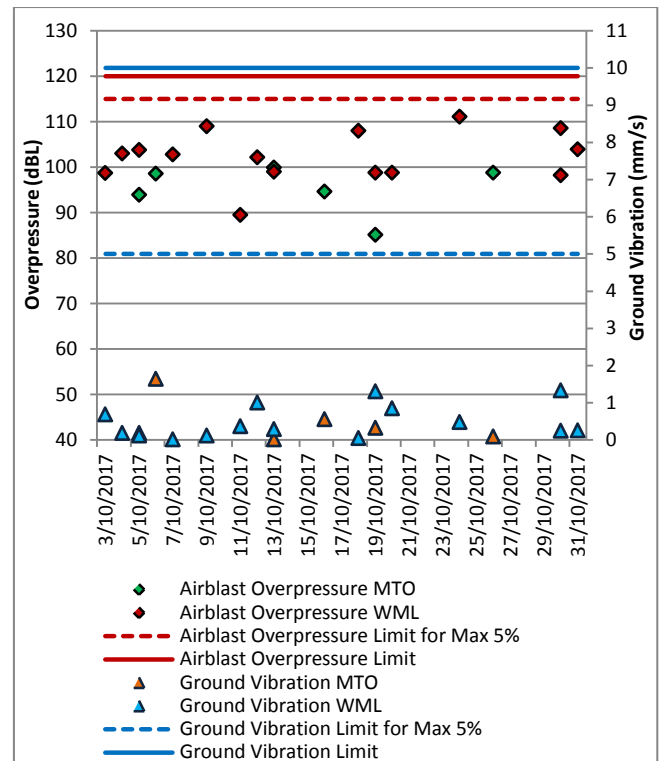


Figure 13: Wambo Road Blast Monitoring Results – October 2017

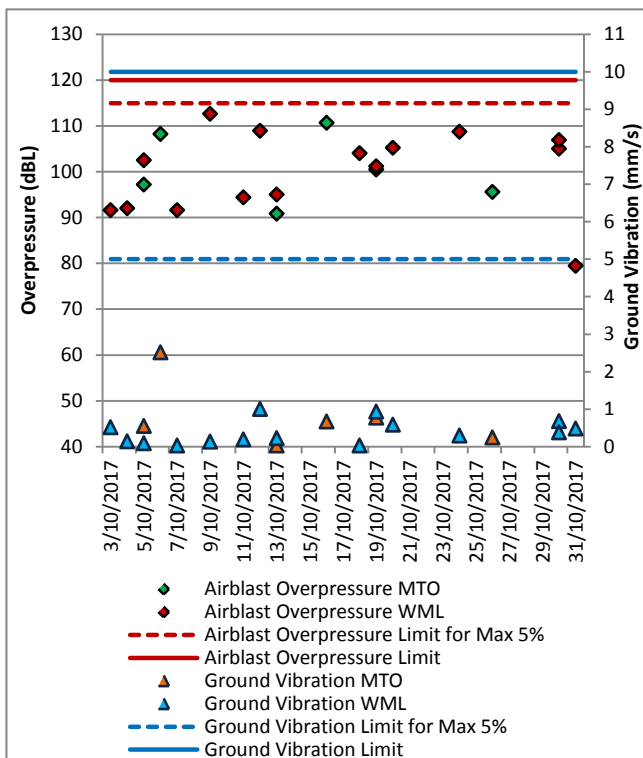


Figure 12: Wollemi Peak Road Blast Monitoring Results - October 2017

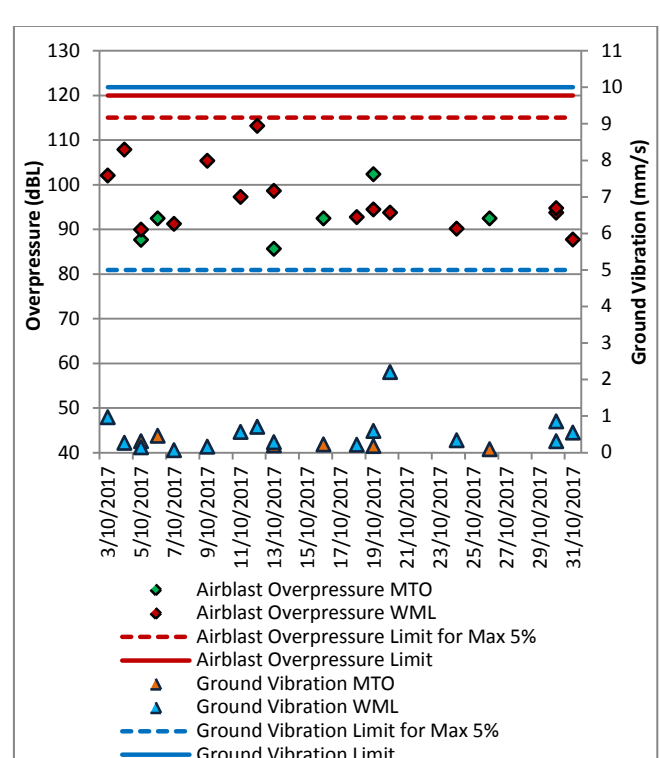


Figure 14: Warkworth Blast Monitoring Results - October 2017



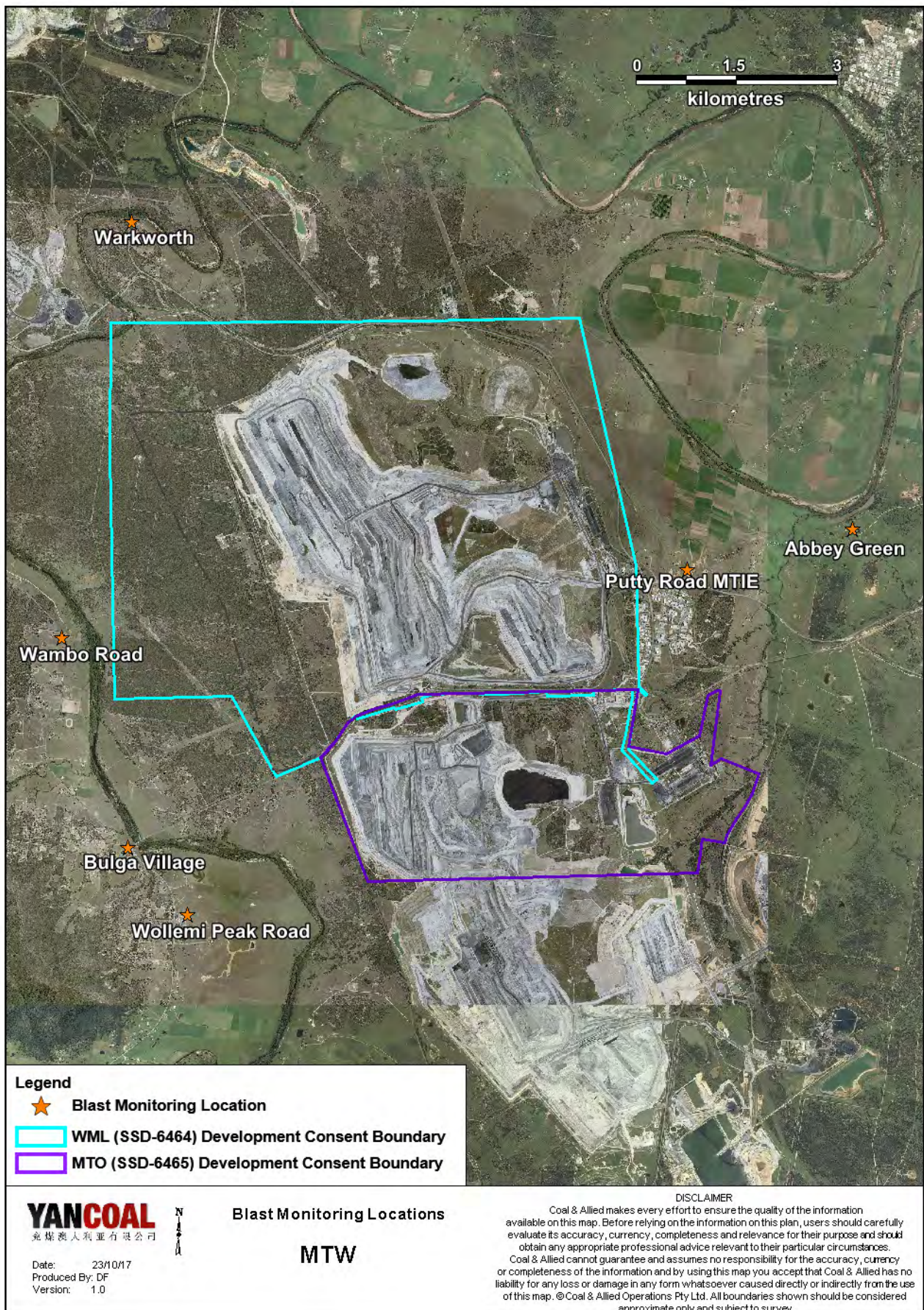


Figure 15: MTW Blast Monitoring Location Plan



## 5.0 NOISE

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

### 5.1 Attended Noise Monitoring Results

Attended monitoring was conducted at receiver locations surrounding MTW on the night of 16<sup>th</sup>-17<sup>th</sup> October 2017. All measurements complied with the relevant criteria. Results are detailed in Table 3 to Table 6.

#### 5.1.1 WML Noise Assessment

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

**Table 3: L<sub>Aeq, 15 minute</sub> Warkworth Impact Assessment Criteria –October 2017**

Location	Date and Time	Wind Speed (m/s) <sup>5</sup>	Stability Class	Criterion (dB(A))	Criterion Applies? <sup>1,5</sup>	WML L <sub>Aeq</sub> dB <sup>2,4</sup>	Exceedance <sup>3</sup>	Total L <sub>Ceq</sub> – L <sub>Aeq</sub>	Revised WML L <sub>Aeq</sub> <sup>5,6</sup>
Bulga RFS	17/10/2017 1:09	3.1	D	37	No	31	NA	13	31
Bulga Village	16/10/2017 21:53	3.2	D	38	No	38	NA	19	NA
Gouldsville	16/10/2017 22:30	2.9	E	38	Yes	IA	Nil	21	IA
Inlet Rd	16/10/2017 21:02	3.3	D	37	No	35	NA	17	NA
Inlet Rd West	16/10/2017 21:26	3	D	35	Yes	<30	Nil	19	<35
Long Point	16/10/2017 22:01	3.1	D	35	No	IA	NA	21	IA
South Bulga	16/10/2017 23:32	2.6	D	35	Yes	IA	Nil	20	IA
Wambo Road	16/10/2017 22:33	2.9	E	38	Yes	34	Nil	15	39

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<sub>Aeq,15minute</sub> 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<sub>Aeq, 15minute</sub> level following application of low frequency noise penalty as per the INP where applicable.

**Table 4: L<sub>A1, 1 minute</sub> Warkworth - Impact Assessment Criteria – October 2017**

Location	Date and Time	Wind Speed (m/s) <sup>5</sup>	Stability Class	Criterion dB	Criterion Applies? <sup>1,5</sup>	WML L <sub>A1, 1min</sub> dB <sup>2,4</sup>	Exceedance <sup>3</sup>
Bulga RFS	17/10/2017 1:09	3.1	D	47	No	NM	NA
Bulga Village	16/10/2017 21:53	3.2	D	48	No	45	NA
Gouldsville	16/10/2017 22:30	2.9	E	48	Yes	IA	Nil
Inlet Rd	16/10/2017 21:02	3.3	D	47	No	43	NA
Inlet Rd West	16/10/2017 21:26	3	D	45	Yes	35	Nil
Long Point	16/10/2017 22:01	3.1	D	45	No	IA	NA
South Bulga	16/10/2017 23:32	2.6	D	45	Yes	IA	Nil
Wambo Road	16/10/2017 22:33	2.9	E	48	Yes	48	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 Tables 5 and 6.

**Table 5: L<sub>Aeq, 15minute</sub> Mount Thorley - Impact Assessment Criteria – October 2017**

Location	Date and Time	Wind Speed (m/s) <sup>5</sup>	Stability Class	Criterion dB	Criterion Applies? <sup>1,5</sup>	MTO L <sub>Aeq</sub> dB <sup>2,4</sup>	Exceedance <sup>3</sup>	Total L <sub>Ceq</sub> – L <sub>Aeq</sub> <sup>7</sup>	Revised MTO L <sub>Aeq</sub> <sup>5,6</sup>
Bulga RFS	17/10/2017 1:09	3.1	D	37	No	34	NA	13	34
Bulga Village	16/10/2017 21:53	3.2	D	38	No	NM	NA	19	NM
Gouldsville	16/10/2017 22:30	2.9	E	35	Yes	IA	Nil	21	IA
Inlet Rd	16/10/2017 21:02	3.3	D	37	No	IA	NA	17	IA
Inlet Rd West	16/10/2017 21:26	3	D	35	Yes	IA	Nil	19	IA
Long Point	16/10/2017 22:01	3.1	D	35	No	IA	NA	21	IA
South Bulga	16/10/2017 23:32	2.6	D	36	Yes	31	Nil	20	36
Wambo Road	16/10/2017 22:33	2.9	E	38	Yes	IA	Nil	15	IA

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<sub>A1, 1Minute</sub> Mount Thorley - Impact Assessment Criteria – October 2017**

Location	Date and Time	Wind Speed (m/s) <sup>5</sup>	Stability Class	Criterion dB	Criterion Applies? <sup>1,5</sup>	MTO L <sub>A1, 1min</sub> dB <sup>2,4</sup>	Exceedance <sup>3</sup>
Bulga RFS	17/10/2017 1:09	3.1	D	47	No	43	NA
Bulga Village	16/10/2017 21:53	3.2	D	48	No	NM	NA
Gouldsville	16/10/2017 22:30	2.9	E	45	Yes	IA	Nil
Inlet Rd	16/10/2017 21:02	3.3	D	47	No	IA	NA
Inlet Rd West	16/10/2017 21:26	3	D	45	Yes	IA	Nil
Long Point	16/10/2017 22:01	3.1	D	45	No	IA	NA
South Bulga	16/10/2017 23:32	2.6	D	46	Yes	35	Nil
Wambo Road	16/10/2017 22:33	2.9	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 INP Low Frequency

In accordance with the requirements of the NSW Industrial Noise Policy (INP), the low frequency modification factor has been applied where appropriate. It should be noted that the Industrial Noise Policy does not give guidance on the application of the penalty where more than one target noise source is audible. The  $L_{Ceq}$  levels reported above are “Total”, or “Total mine noise” at best, and cannot be attributed accurately to a single mine. Accordingly, where the INP criteria for the application of the Low Frequency modification factor is triggered, the penalty has been applied to the dominant mine noise source (either of WML or MTO), as such resulting in the application of a 5 dB penalty to the site only  $L_{Aeq}$  for the measurements taken at Bulga Village, Inlet Road and Inlet Road West, South Bulga and Wambo Road.

Resulting  $L_{Aeq}$  noise levels exceed the WML impact assessment criteria at Wambo Road by 1 dB to the application of a 5 dB penalty to the site only  $L_{Aeq}$ .

MTW reports these measurements so as to ensure full disclosure, however it remains MTW’s position that the prescribed methodology is unsuitable when applied to receptors at large distances from mine noise sources due to the nature of noise attenuation. Excess attenuation of noise with distance is greater for high frequency noise than it is for low frequency noise. At significant distance from a noise source (such as private residences from the MTW complex) this often results in large differentials between  $L_{Aeq}$  and  $L_{Ceq}$ . The NSW Industrial Noise Policy requires the penalty to be applied in these instances, irrespective of actual low frequency affectation. As such, MTW does not consider these instances to constitute non-compliance with the conditions of approval.

The result has been reported to the Department of Planning and Environment.





Figure 16: Noise Monitoring Location Plan



## 5.2 Noise Management Measures

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

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

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

- 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 October are provided in Table 7.

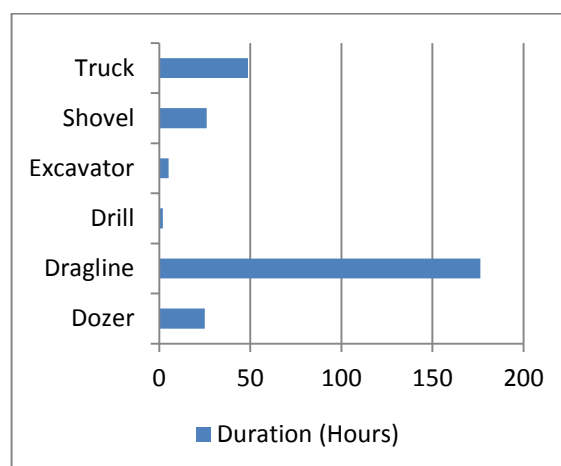
**Table 7: Supplementary Attended Noise Monitoring Data – October 2017**

No. of assessments	No. of assessments > trigger	No. of nights where assessments > trigger	% greater than trigger
324	0	0	0

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

## 6.0 OPERATIONAL DOWNTIME

During October, a total of 283.3 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 – October 2017**

## 7.0 REHABILITATION

During October, 11.08 Ha of land was released, 11.75 Ha of land was bulk shaped, 6.57 Ha of land was topsoiled, 24.81 Ha of land was composted and 1.72 Ha of land was rehabilitated.

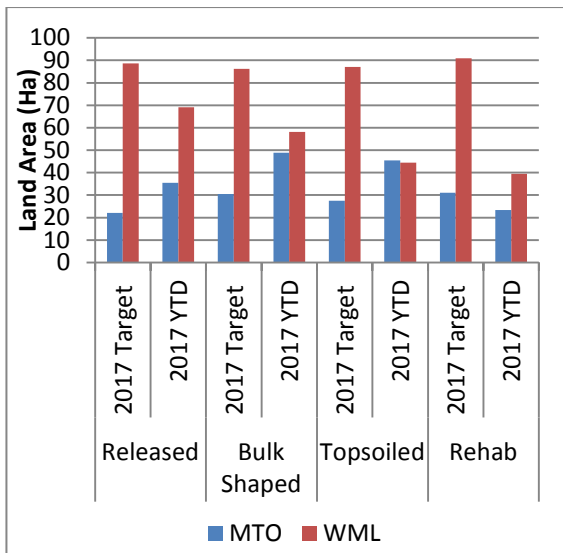


Figure 18: Rehabilitation YTD - October 2017

## 8.0 ENVIRONMENTAL INCIDENTS

During the reporting period there were no reportable environmental incidents.

## 9.0 COMPLAINTS

During the reporting period 39 complaints were received. Details of these complaints are shown in Figure 19 below.

	Noise	Dust	Blast	Lighting	Other	Total
January	5	6	3	1	0	15
February	25	3	10	3	0	41
March	14	1	1	2	0	18
April	27	1	7	2	0	37
May	18	4	7	10	3	42
June	10	3	4	3	0	20
July	10	10	8	0	2	30
August	8	18	5	4	1	36
September	21	15	6	2	3	47
October	21	8	6	2	2	39
November	-	-	-	-	-	-
December	-	-	-	-	-	-
Total	159	69	57	29	11	325

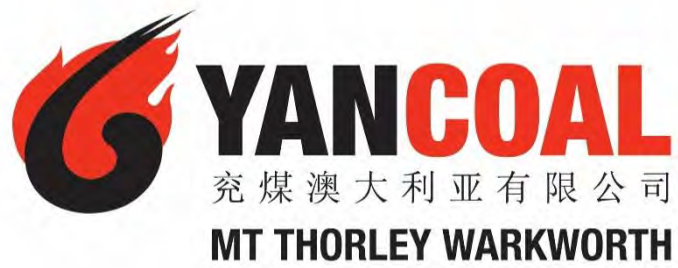
**Figure 19: Complaints Summary – YTD October 2017**

## **Appendix A: Meteorological Data**

**Table 8: Meteorological Data – Charlton Ridge Meteorological Station – October 2017**

Date	Air Temperature Maximum (°C)	Air Temperature Minimum (°C)	Relative Humidity Maximum (%)	Relative Humidity Minimum (%)	Solar Radiation Maximum (W/Sq. M)	Wind Direction Average (°)	Wind Speed Average (m/sec)	Rainfall(mm)
1/10/2017	25.7	7.3	77.0	8.7	959	154.0	2.2	0.0
2/10/2017	22.5	9.5	78.2	27.4	932	159.1	2.3	0.0
3/10/2017	27.0	12.4	89.6	28.9	1201	163.5	1.9	0.2
4/10/2017	28.3	11.8	89.7	31.3	1057	164.0	2.2	0.0
5/10/2017	31.9	14.8	84.0	16.1	1114	208.2	2.5	0.0
6/10/2017	24.7	13.1	74.6	18.7	843	177.0	2.5	0.0
7/10/2017	22.7	11.1	77.6	32.6	1420	145.1	2.6	0.0
8/10/2017	20.5	10.1	89.9	51.8	568	213.0	1.8	1.2
9/10/2017	32.1	14.4	91.5	24.8	1058	254.5	3.6	0.2
10/10/2017	21.8	13.8	88.3	57.8	720	138.9	2.9	0.0
11/10/2017	32.1	15.2	83.5	24.6	1011	164.4	2.3	0.0
12/10/2017	31.0	15.3	86.6	10.7	1221	254.7	4.7	0.0
13/10/2017	29.8	12.3	81.1	16.2	1048	159.2	2.6	0.0
14/10/2017	20.0	13.3	94.6	56.3	968	157.8	4.1	4.0
15/10/2017	24.2	12.9	96.9	45.0	1364	136.9	3.1	6.8
16/10/2017	24.4	10.8	90.8	31.3	1291	143.7	3.2	0.0
17/10/2017	26.4	12.3	82.3	32.9	1364	126.0	3.8	0.0
18/10/2017	27.3	13.4	88.0	30.4	1327	113.8	3.4	0.0
19/10/2017	-	-	27.7	-	1039	132.8	2.2	0.0
20/10/2017	18.6	-	95.1	-	316	223.1	2.9	23.2
21/10/2017	21.1	9.4	86.0	34.9	1428	145.0	3.1	0.0
22/10/2017	22.6	7.6	92.0	30.5	1152	165.0	2.4	8.8
23/10/2017	21.9	9.0	96.4	44.5	1464	145.7	2.1	19.8
24/10/2017	28.9	8.9	94.9	20.3	1076	259.1	2.9	0.0
25/10/2017	31.0	15.0	63.0	16.3	1294	259.3	2.9	0.0
26/10/2017	30.5	10.2	95.3	33.3	1035	152.2	2.7	27.8
27/10/2017	24.6	11.0	96.3	47.3	1452	206.1	1.9	0.8
28/10/2017	27.9	13.2	93.7	32.5	1065	197.1	2.3	0.0
29/10/2017	32.8	17.6	67.3	22.7	1297	255.2	3.6	0.0
30/10/2017	36.2	14.6	74.6	7.4	1109	273.1	4.7	0.0
31/10/2017	22.5	11.1	64.9	19.5	1423	186.3	3.0	0.0

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



## Appendix B

Environmental Monitoring  
November 2017







# Monthly Environmental Monitoring Report

Yancoal Mt Thorley Warkworth

November 2017

## 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 <sub>10</sub> Results.....	6
2.3.2	TSP Results.....	7
2.3.3	Real Time PM <sub>10</sub> Results.....	7
2.3.4	Real Time Alarms for Air Quality.....	7
3.0	WATER QUALITY.....	8
3.1	Surface Water.....	8
	Results of monitoring are reported quarterly, next available in the December 2017 report. ....	8
3.2	Groundwater Monitoring.....	8
3.3	HRSTS Discharge.....	8
4.0	BLAST MONITORING.....	9
4.1	Blast Monitoring Results.....	9
5.0	NOISE.....	12
5.1	Attended Noise Monitoring Results.....	12
5.1.1	WML Noise Assessment.....	12
5.1.3	MTO Noise Assessment.....	13
5.1.4	NPfI Low Frequency Assessment.....	14
5.2	Noise Management Measures.....	16
6.0	OPERATIONAL DOWNTIME.....	16
7.0	REHABILITATION.....	16
8.0	ENVIRONMENTAL INCIDENTS.....	17
9.0	COMPLAINTS.....	17
	Appendix A: Meteorological Data.....	19

## Figures

Figure 1: Rainfall Trend YTD	4
Figure 2: Charlton Ridge Wind Rose – November 2017	4
Figure 3: Air Quality Monitoring Locations	5
Figure 4: Depositional Dust – November 2017	6
Figure 5: Individual PM <sub>10</sub> Results – November 2017	6
Figure 6: Annual Average PM <sub>10</sub> – November 2017	6
Figure 7: Annual Average Total Suspended Particulates – November 2017	7
Figure 8: Real Time PM <sub>10</sub> daily 24hr average and annual average – November 2017	8
Figure 9: Abbey Green Blast Monitoring Results – November 2017	9
Figure 10: Bulga Village Blast Monitoring Results – November 2017	9
Figure 11: MTIE Blast Monitoring Results – November 2017	10
Figure 12: Wollemi Peak Road Blast Monitoring Results - November 2017	10
Figure 13: Wambo Road Blast Monitoring Results – November 2017	10
Figure 14: Warkworth Blast Monitoring Results - November 2017	10
Figure 15: MTW Blast Monitoring Location Plan	11
Figure 16: Noise Monitoring Location Plan	15
Figure 17: Operational Downtime by Equipment Type – November 2017	16
Figure 18: Rehabilitation YTD - November 2017	17
Figure 19: Complaints Summary – YTD November 2017	18

## Tables

Table 1: Monthly Rainfall MTW	4
Table 2: Blasting Limits	9
Table 3: L <sub>Aeq</sub> , 15 minute Warkworth Impact Assessment Criteria – November 2017	12
Table 4: L <sub>A1</sub> , 1 minute Warkworth - Impact Assessment Criteria – November 2017	12
Table 5: L <sub>Aeq</sub> , 15minute Mount Thorley - Impact Assessment Criteria – November 2017	13
Table 6: L <sub>A1</sub> , 1Minute Mount Thorley - Impact Assessment Criteria – November 2017	13
Table 7: Low Frequency Noise Modifying Factor Assessment – November 2017	14
Table 8: Supplementary Attended Noise Monitoring Data – November 2017	16
Table 9: Meteorological Data – Charlton Ridge Meteorological Station – November 2017	20

## Revision History

Version No.	Person Responsible	Document Status	Date
1.0	Environmental Advisor	Draft	12/01/2018
1.1	Environmental Specialist	Final	15/01/2018

## 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<sup>st</sup> November to 30<sup>th</sup> November 2017.

## 2.0 AIR QUALITY

### 2.1 Meteorological Monitoring

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

#### 2.1.1 Rainfall

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

Table 1: Monthly Rainfall MTW

2017	Monthly Rainfall (mm)	Cumulative Rainfall (mm)
November	24.0	408.2

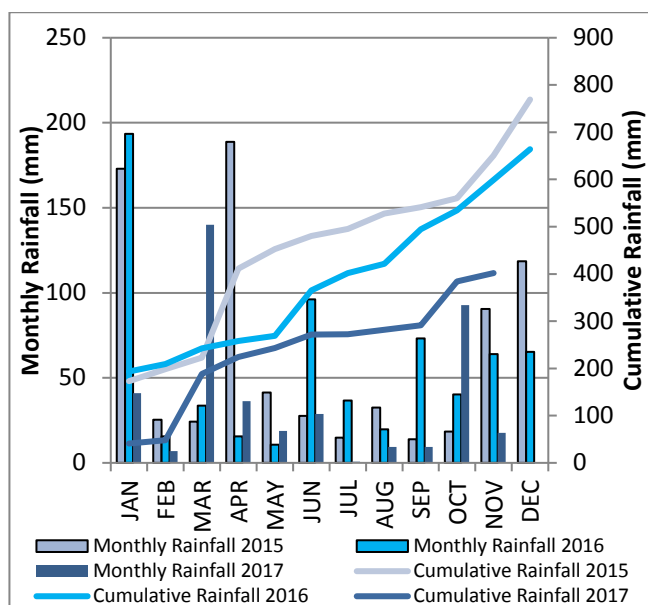


Figure 1: Rainfall Trend YTD

#### 2.1.2 Wind Speed and Direction

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

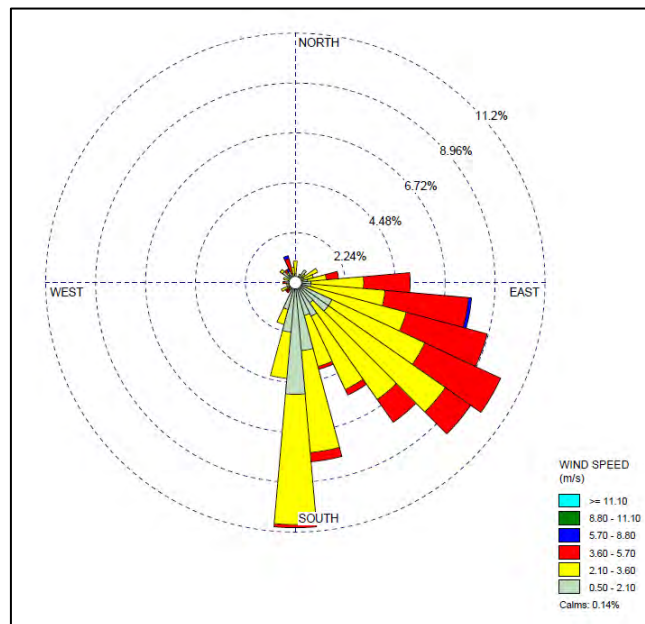


Figure 2: Charlton Ridge Wind Rose – November 2017



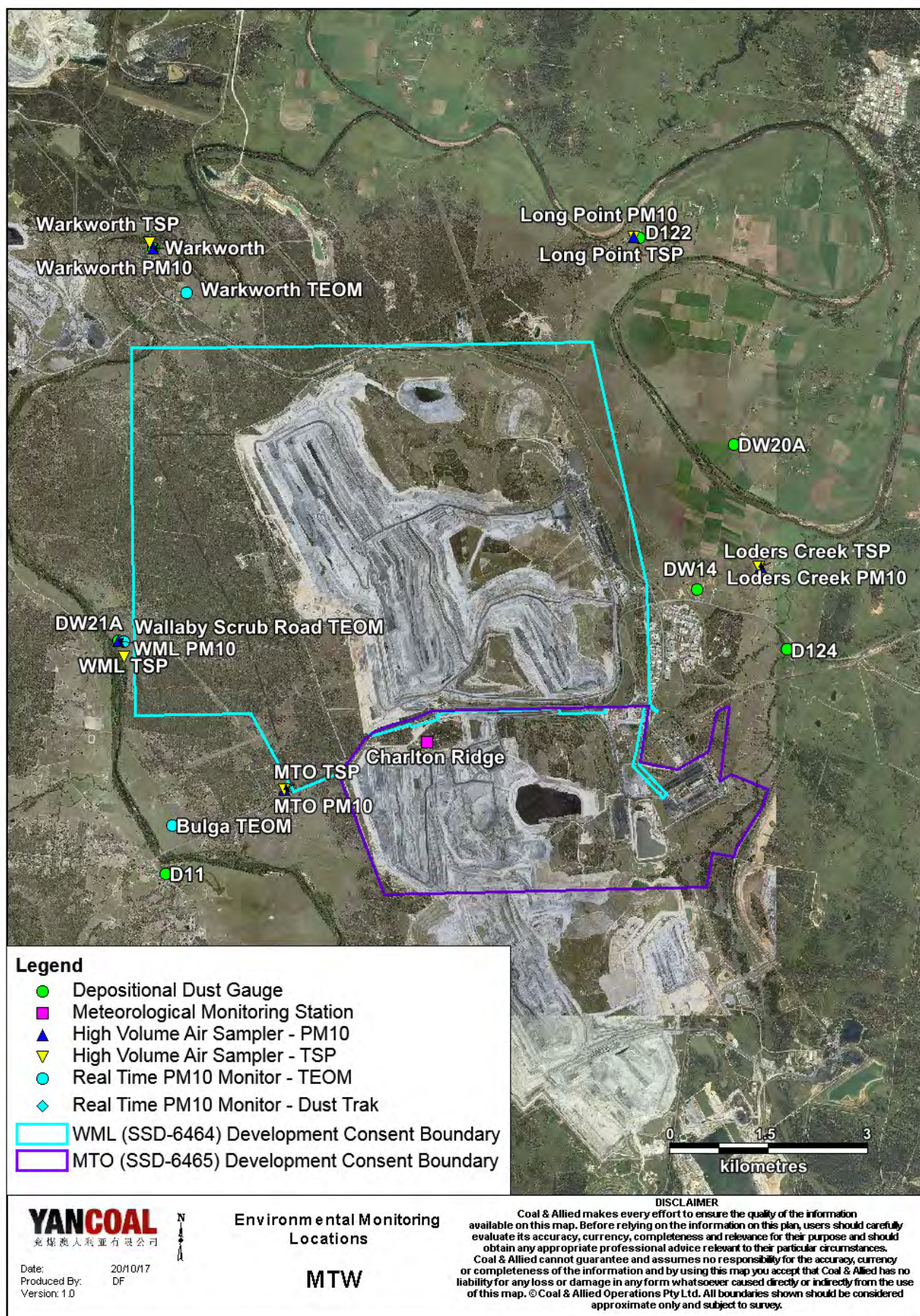


Figure 3: Air Quality Monitoring Locations



## 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.

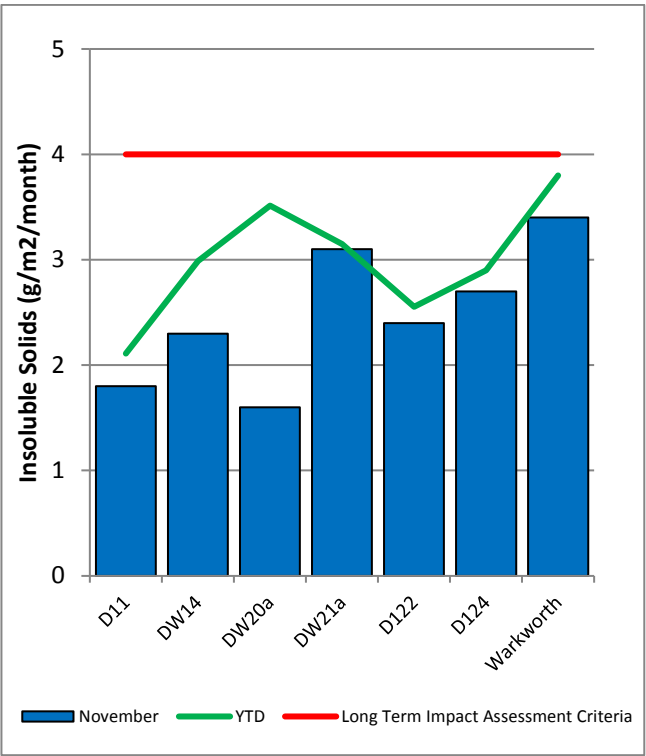


Figure 4: Depositional Dust – November 2017

## 2.3 Suspended Particulates

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

### 2.3.1 HVAS PM<sub>10</sub> Results

Figure 5 shows the individual PM<sub>10</sub> results at each monitoring station against the short term impact assessment criteria of 50µg/m<sup>3</sup>.

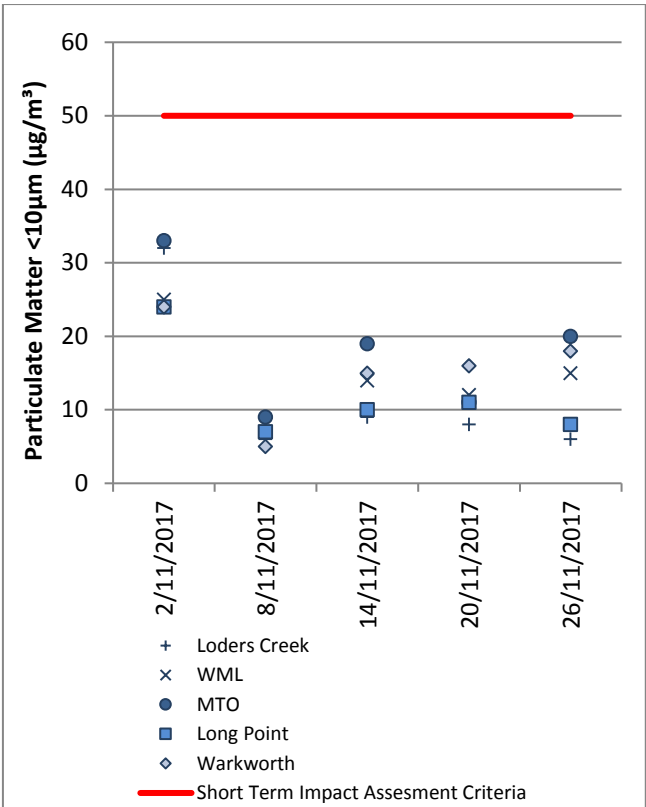


Figure 5: Individual PM<sub>10</sub> Results – November 2017

Figure 6 shows the annual average PM<sub>10</sub> results against the long term impact assessment criteria.

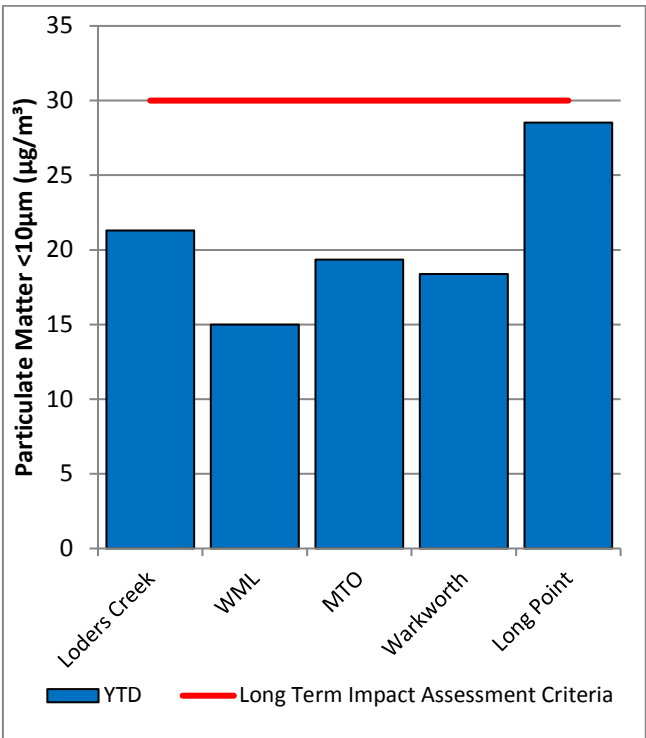


Figure 6: Annual Average PM<sub>10</sub> – November 2017

### 2.3.2 TSP Results

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

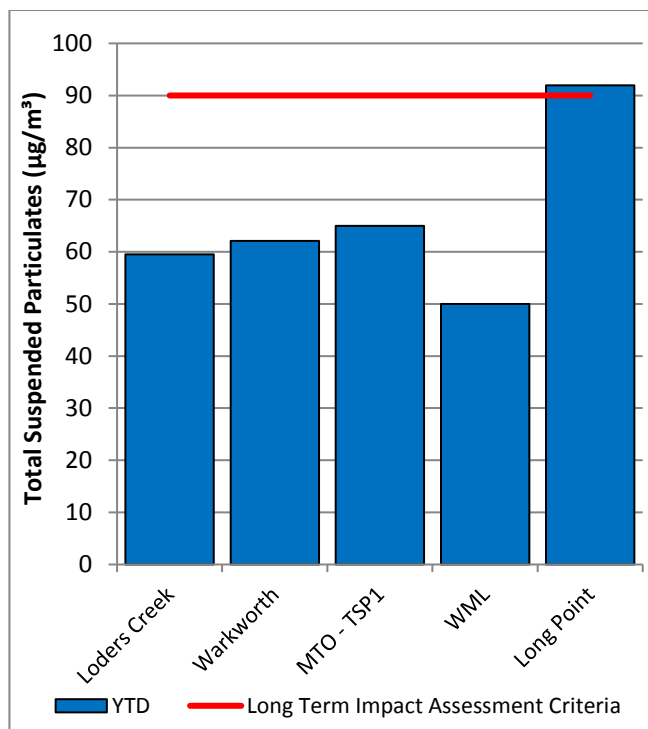


Figure 7: Annual Average Total Suspended Particulates – November 2017

### 2.3.3 Real Time $\text{PM}_{10}$ Results

Mt Thorley Warkworth maintains a network of real time  $\text{PM}_{10}$  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  $\text{PM}_{10}$  result and the annual  $\text{PM}_{10}$  average.

Data was not available on the 2<sup>nd</sup> and 6<sup>th</sup> November 2017 at the Wallaby Scrub Road monitor due to equipment malfunction resulting in erroneous data.

### 2.3.4 Real Time Alarms for Air Quality

During November, the real time monitoring system generated 47 automated air quality related alerts, including 1 alert for adverse meteorological conditions and 46 alerts for elevated  $\text{PM}_{10}$  levels.



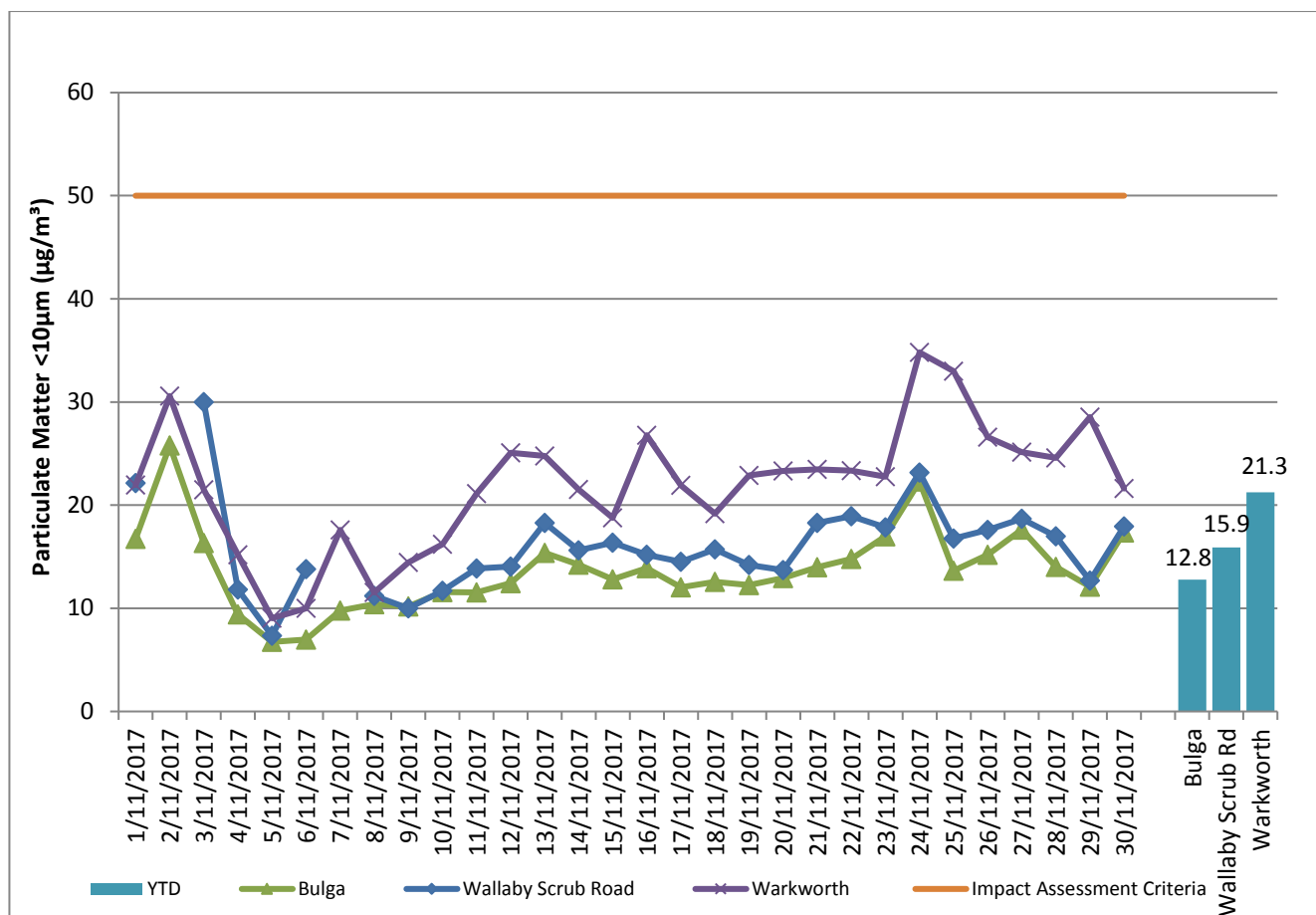


Figure 8: Real Time PM<sub>10</sub> daily 24hr average and annual average – November 2017

### 3.0 WATER QUALITY

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

#### 3.1 Surface Water

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

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

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

### 3.2 Groundwater Monitoring

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

Groundwater results are reported quarterly, next available in the December 2017 report.

### 3.3 HRSTS Discharge

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

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

## 4.0 BLAST MONITORING

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

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

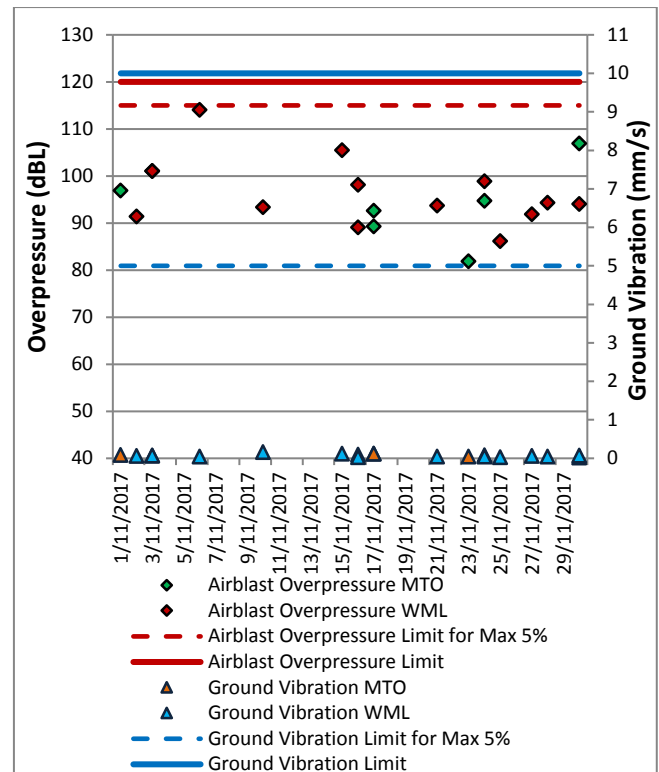
### 4.1 Blast Monitoring Results

During November 2017, 20 blasts were initiated at MTW. Figure 9 to Figure 14 show the blast monitoring results for the reporting period against the impact assessment criteria. The criteria are summarised in Table 2.

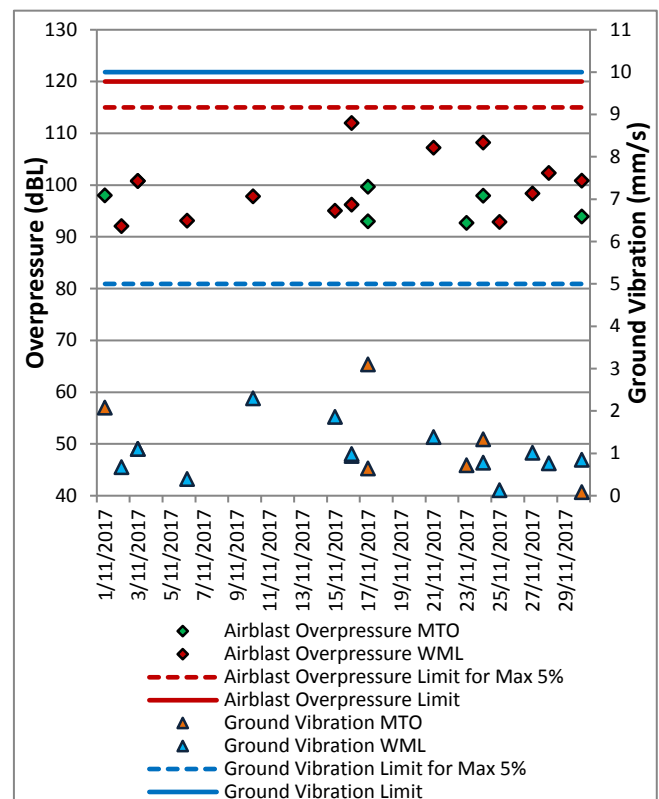
**Table 2: Blasting Limits**

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

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



**Figure 9: Abbey Green Blast Monitoring Results – November 2017**



**Figure 10: Bulga Village Blast Monitoring Results – November 2017**

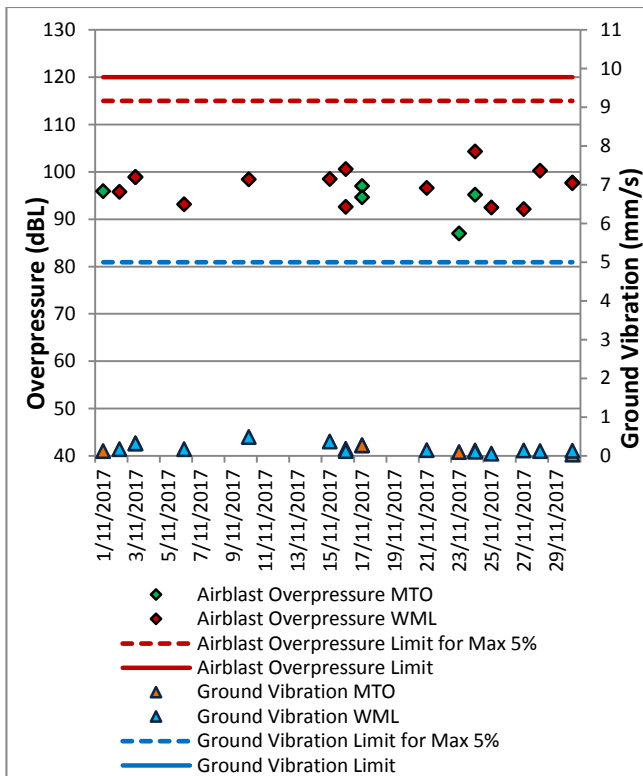


Figure 11: MTIE Blast Monitoring Results – November 2017

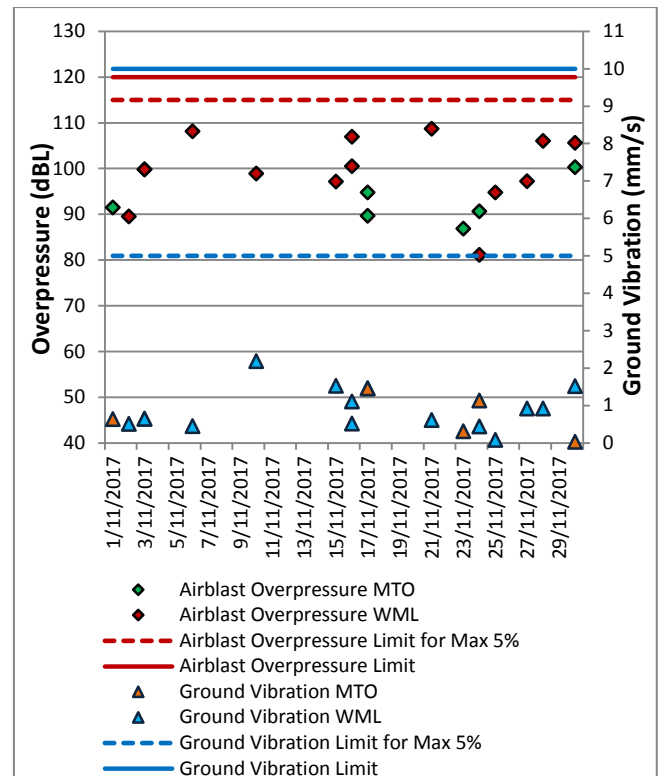


Figure 13: Wambo Road Blast Monitoring Results – November 2017

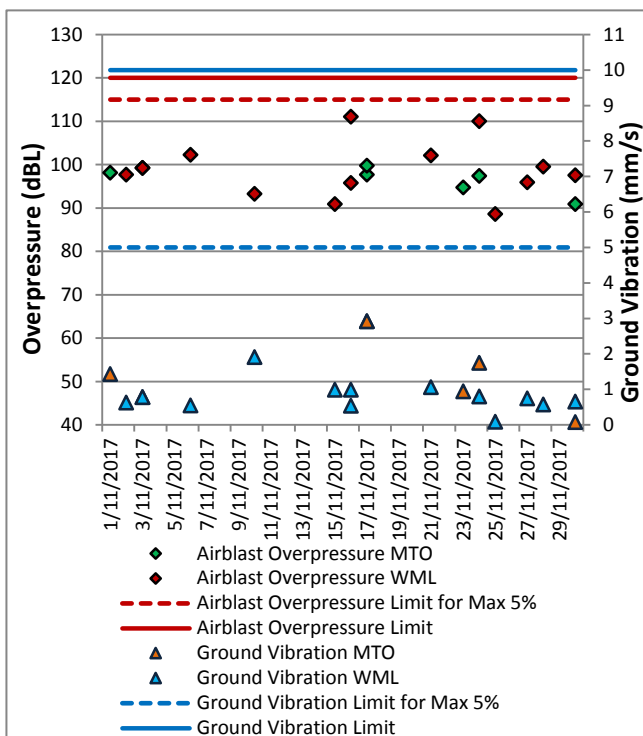


Figure 12: Wollemi Peak Road Blast Monitoring Results - November 2017

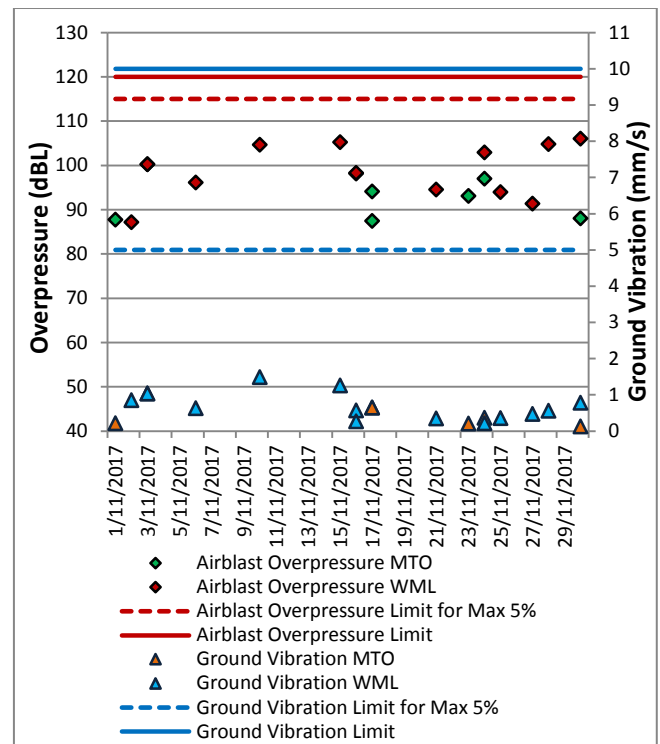


Figure 14: Warkworth Blast Monitoring Results - November 2017



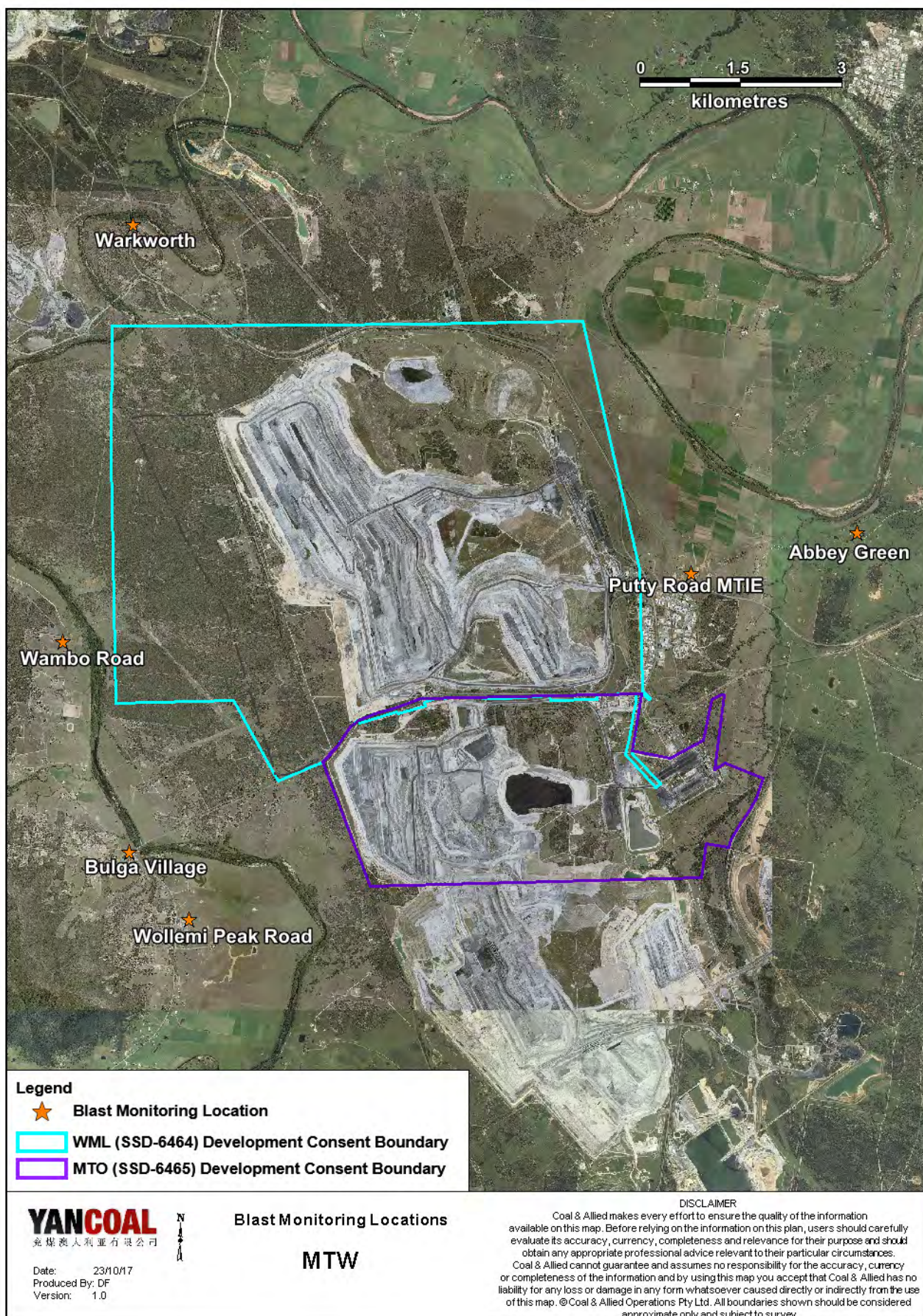


Figure 15: MTW Blast Monitoring Location Plan



## 5.0 NOISE

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

### 5.1 Attended Noise Monitoring Results

Attended monitoring was conducted at receiver locations surrounding MTW on the night of 13-14 November 2017. All measurements complied with the relevant criteria. Results are detailed in Table 3 to Table 6.

#### 5.1.1 WML Noise Assessment

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

**Table 3: L<sub>Aeq</sub>, 15 minute Warkworth Impact Assessment Criteria – November 2017**

Location	Date and Time	Wind Speed (m/s) <sup>5</sup>	Stability Class	Criterion dB(A)	Criterion Applies? <sup>1,5</sup>	WML L <sub>Aeq</sub> dB <sup>2,4</sup>	Exceedance <sup>3</sup>
Bulga RFS	13/11/2017 23:27	2.6	E	37	Yes	IA	Nil
Bulga Village	13/11/2017 22:01	2.8	E	38	Yes	IA	Nil
Gouldsville	13/11/2017 21:00	2.4	F	38	No	<30	NA
Inlet Rd	13/11/2017 21:37	3	D	37	Yes	NM	Nil
Inlet Rd West	13/11/2017 21:10	2.6	E	35	Yes	<25	Nil
Long Point	13/11/2017 21:28	3	D	35	Yes	IA	Nil
South Bulga	14/11/2017 0:53	2.5	D	35	Yes	<25	Nil
Wambo Road	13/11/2017 22:30	2.3	F	38	No	29	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<sub>Aeq</sub>,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<sub>Aeq</sub>, 15minute level following application of low frequency noise penalty as per the INP where applicable.

**Table 4: L<sub>A1</sub>, 1 minute Warkworth - Impact Assessment Criteria – November 2017**

Location	Date and Time	Wind Speed (m/s) <sup>5</sup>	Stability Class	Criterion dB(A)	Criterion Applies? <sup>1,5</sup>	WML L <sub>A1</sub> , 1min dB <sup>2,4</sup>	Exceedance <sup>3</sup>
Bulga RFS	13/11/2017 23:27	2.6	E	47	Yes	IA	Nil
Bulga Village	13/11/2017 22:01	2.8	E	48	Yes	IA	Nil
Gouldsville	13/11/2017 21:00	2.4	F	48	No	30	NA
Inlet Rd	13/11/2017 21:37	3	D	47	Yes	NM	Nil
Inlet Rd West	13/11/2017 21:10	2.6	E	45	Yes	<25	Nil
Long Point	13/11/2017 21:28	3	D	45	Yes	IA	Nil
South Bulga	14/11/2017 0:53	2.5	D	45	Yes	<25	Nil
Wambo Road	13/11/2017 22:30	2.3	F	48	No	39	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 Tables 5 and 6.

**Table 5: LAeq, 15minute Mount Thorley - Impact Assessment Criteria – November 2017**

Location	Date and Time	Wind Speed (m/s) <sup>5</sup>	Stability Class	Criterion dB	Criterion Applies? <sup>1,5</sup>	MTO LAeq, 15min dB <sup>2,4</sup>	Exceedance <sup>3</sup>
Bulga RFS	13/11/2017 23:27	2.6	E	37	Yes	28	Nil
Bulga Village	13/11/2017 22:01	2.8	E	38	Yes	30	Nil
Gouldsville	13/11/2017 21:00	2.4	F	35	No	1A	NA
Inlet Rd	13/11/2017 21:37	3	D	37	Yes	32	Nil
Inlet Rd West	13/11/2017 21:10	0.5	E	35	Yes	26	Nil
Long Point	13/11/2017 21:28	3	D	35	Yes	1A	Nil
South Bulga	14/11/2017 0:53	2.5	D	36	Yes	<25	Nil
Wambo Road	13/11/2017 22:30	2.3	F	38	No	27	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: LA1, 1Minute Mount Thorley - Impact Assessment Criteria – November 2017**

Location	Date and Time	Wind Speed (m/s) <sup>5</sup>	Stability Class	Criterion dB	Criterion Applies? <sup>1,5</sup>	MTO LA1, 1min dB <sup>2,4</sup>	Exceedance <sup>3</sup>
Bulga RFS	13/11/2017 23:27	2.6	E	47	Yes	35	Nil
Bulga Village	13/11/2017 22:01	2.8	E	48	Yes	34	Nil
Gouldsville	13/11/2017 21:00	2.4	F	45	No	1A	NA
Inlet Rd	13/11/2017 21:37	3	D	47	Yes	33	Nil
Inlet Rd West	13/11/2017 21:10	2.6	E	45	Yes	31	Nil
Long Point	13/11/2017 21:28	3	D	45	Yes	1A	Nil
South Bulga	14/11/2017 0:53	2.5	D	46	Yes	<25	Nil
Wambo Road	13/11/2017 22:30	2.3	F	48	No	29	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 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 November 2017 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 – November 2017**

Location	Date and Time	Measured Site Only LA <sub>eq</sub> dB (WML/MTO)	Site Only L <sub>Ceq</sub> dB <sup>4</sup> (WML/MTO)	Site Only L <sub>Ceq</sub> – LA <sub>eq</sub> dB <sup>1,4</sup> (WML/MTO)	Result Max exceedance of ref spectrum dB (WML/MTO) <sub>2,3,4</sub>	Penalty dB(A)	Exceedance
Bulga RFS	13/11/2017 23:27	IA/28	NA	NA	NA	0	Nil
Bulga Village	13/11/2017 22:01	IA/30	NA/55	NA/25	NA/Nil	0	Nil
Gouldsville	13/11/2017 21:00	<30/IA	NA	NA	NA	0	Nil
Inlet Rd	13/11/2017 21:37	NM/32	NA/55	NA/23	NA/Nil	0	Nil
Inlet Rd West	13/11/2017 21:10	<25/26	NA/52	NA/24	NA/Nil	0	Nil
Long Point	13/11/2017 21:28	IA/IA	NA	NA	NA	0	Nil
South Bulga	14/11/2017 0:53	<25/<25	NA	NA	NA	0	Nil
Wambo Road	13/11/2017 22:30	29/27	51/49	22/22	Nil/Nil	0	Nil

**Notes:**

1. As per NPfl, if L<sub>Ceq</sub> – LA<sub>eq</sub> >= 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 November are provided in Table 8.

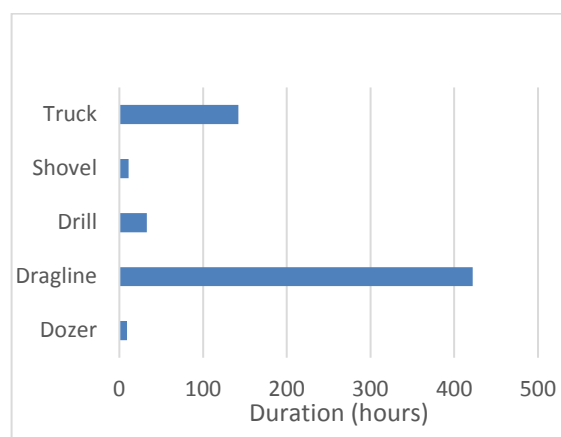
**Table 8: Supplementary Attended Noise Monitoring Data – November 2017**

No. of assessments	No. of assessments > trigger	No. of nights where assessments > trigger	% greater than trigger
516	0	0	0

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

## 6.0 OPERATIONAL DOWNTIME

During November, a total of 617 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 – November 2017**

## 7.0 REHABILITATION

During November, 14.8 Ha of land was released, 18.6 Ha of land was bulk shaped, 15.5 Ha of land was topsoiled, 22.6 Ha of land was composted and 55.7 Ha of land was rehabilitated.

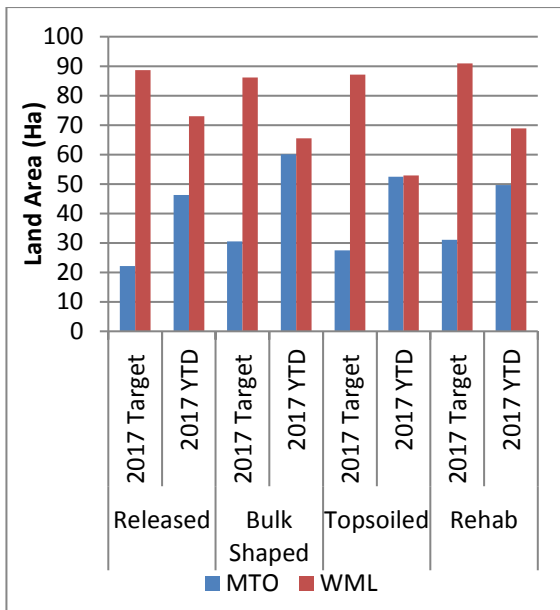


Figure 18: Rehabilitation YTD - November 2017

## 8.0 ENVIRONMENTAL INCIDENTS

During the reporting period there were no reportable environmental incidents.

## 9.0 COMPLAINTS

During the reporting period 25 complaints were received. Details of these complaints are shown in Figure 19 below.



	Noise	Dust	Blast	Lighting	Other	Total
January	5	6	3	1	0	15
February	25	3	10	3	0	41
March	14	1	1	2	0	18
April	27	1	7	2	0	37
May	18	4	7	10	3	42
June	10	3	4	3	0	20
July	10	10	8	0	2	30
August	8	18	5	4	1	36
September	21	15	6	2	3	47
October	21	8	6	2	2	39
November	12	5	5	2	1	25
December	-	-	-	-	-	-
Total	171	74	62	31	12	350

**Figure 19: Complaints Summary – YTD November 2017**

## **Appendix A: Meteorological Data**

**Table 9: Meteorological Data – Charlton Ridge Meteorological Station – November 2017**

Date	Air Temperature Maximum (°C)	Air Temperature Minimum (°C)	Relative Humidity Maximum (%)	Relative Humidity Minimum (%)	Solar Radiation Maximum (W/Sq. M)	Wind Direction Average (°)	Wind Speed Average (m/sec)	Rainfall(mm)
1/11/2017	24.6	10.6	70.0	20.1	1364	167.3	2.3	0.0
2/11/2017	25.9	9.6	78.7	25.4	1099	156.8	2.5	0.0
3/11/2017	31.5	12.0	85.7	13.5	1119	244.3	3.0	0.6
4/11/2017	20.0	12.2	94.6	66.4	1162	152.4	2.5	7.8
5/11/2017	16.5	11.6	98.0	74.2	358	141.6	3.1	6.4
6/11/2017	27.7	13.0	96.1	36.1	1361	215.1	3.3	6.8
7/11/2017	22.9	9.9	87.9	33.6	1415	156.3	2.5	0.0
8/11/2017	20.0	10.6	94.1	47.2	1600	130.0	2.4	2.4
9/11/2017	22.9	8.6	91.4	37.7	1437	139.1	2.7	0.0
10/11/2017	24.6	9.3	87.9	33.6	1311	134.6	2.9	0.0
11/11/2017	24.7	10.6	88.1	33.2	1413	132.3	2.9	0.0
12/11/2017	25.2	10.4	88.0	31.5	1345	138.6	3.0	0.0
13/11/2017	24.5	13.1	79.4	36.5	1489	140.6	2.9	0.0
14/11/2017	25.4	10.6	84.1	35.6	1383	137.7	2.7	0.0
15/11/2017	28.5	12.2	86.2	24.5	1117	142.6	2.6	0.0
16/11/2017	24.8	13.0	87.3	41.6	1196	174.1	1.9	0.0
17/11/2017	27.9	14.2	91.6	43.4	1435	124.1	2.7	0.0
18/11/2017	24.4	15.2	78.9	38.8	941	107.0	2.6	0.0
19/11/2017	24.7	14.2	87.1	37.6	1063	128.7	3.3	0.0
20/11/2017	26.6	12.2	89.2	33.3	1430	135.5	3.3	0.0
21/11/2017	26.5	13.6	84.4	27.5	1249	133.6	3.2	0.0
22/11/2017	26.3	14.6	82.2	35.4	1446	123.6	2.9	0.0
23/11/2017	29.2	13.4	88.0	27.1	1217	140.6	2.0	0.0
24/11/2017	32.9	17.2	77.8	20.4	1063	151.6	2.9	0.0
25/11/2017	31.3	13.8	87.2	19.0	1118	143.0	3.3	0.0
26/11/2017	32.5	16.8	84.1	22.3	1157	126.5	2.9	0.0
27/11/2017	26.0	17.6	87.4	55.0	864	157.1	2.2	0.0
28/11/2017	30.7	15.9	92.5	36.6	1314	141.2	2.9	0.0
29/11/2017	30.0	17.7	86.6	40.9	1364	137.5	3.1	0.0
30/11/2017	32.3	18.2	88.2	30.5	1323	130.8	2.5	0.0

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



## Appendix C

Environmental Monitoring  
December 2017





# **Monthly Environmental Monitoring Report**

**Yancoal Mt Thorley Warkworth**

**December 2017**

## 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 <sub>10</sub> Results.....	7
2.3.2	TSP Results.....	8
2.3.3	Real Time PM <sub>10</sub> Results.....	8
2.3.4	Real Time Alarms for Air Quality.....	9
3.0	WATER QUALITY.....	10
3.1	Surface Water.....	10
3.1.1	Surface Water Monitoring Results.....	10
3.1.2	Surface Water Trigger Tracking.....	14
3.2	Groundwater Monitoring.....	16
3.2.1	Groundwater Trigger Tracking.....	38
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.....	50
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 – December 2017	5
Figure 3: Air Quality Monitoring Locations	6
Figure 4: Depositional Dust – December 2017	7
Figure 5: Individual PM <sub>10</sub> Results – December 2017	7
Figure 6: Annual Average PM <sub>10</sub> –December 2017	8
Figure 7: Annual Average Total Suspended Particulates – December 2017	8
Figure 8: Real Time PM <sub>10</sub> 24hr average and Year-to-date average – December 2017	10
Figure 9: Site Dams Electrical Conductivity Trend – December 2017	11
Figure 10: Site Dams pH Trend – December 2017	11
Figure 11: Site Dams Total Suspended Solids Trend – December 2017	12
Figure 12: Watercourse Electrical Conductivity Trend – December 2017	12
Figure 13: Watercourse pH Trend – December 2017	13
Figure 14: Watercourse Total Suspended Solids Trend – December 2017	13
Figure 15: Surface Water Monitoring Location Plan	15
Figure 16: Bayswater Seam Electrical Conductivity Trend – December 2017	16
Figure 17: Bayswater Seam pH Trend – December 2017	17
Figure 18: Bayswater Seam Standing Water Level Trend – December 2017	17
Figure 19: Blakefield Seam Electrical Conductivity Trend – December 2017	18
Figure 20: Blakefield Seam pH Trend – December 2017	18
Figure 21: Blakefield Seam Standing Water Level Trend – December 2017	19
Figure 22: Bowfield Seam Electrical Conductivity Trend – December 2017	19
Figure 23: Bowfield Seam pH Trend – December 2017	20
Figure 24: Bowfield Seam Standing Water Level Trend – December 2017	20
Figure 25: Redbank Seam Electrical Conductivity Trend – December 2017	21
Figure 26: Redbank Seam pH Trend – December 2017	21
Figure 27: Redbank Seam Standing Water Level Trend – December 2017	22
Figure 28: Shallow Overburden Seam Electrical Conductivity Trend – December 2017	23
Figure 29: Shallow Overburden Seam pH Trend – December 2017	23
Figure 30: Shallow Overburden Seam Standing Water Level Trend – December 2017	24
Figure 31: Vaux Seam Electrical Conductivity Trend – December 2017	24
Figure 32: Vaux Seam pH Trend – December 2017	25
Figure 33: Vaux Seam Standing Water Level Trend – December 2017	25
Figure 34: Wambo Seam Electrical Conductivity Trend – December 2017	26
Figure 35: Wambo Seam pH Trend – December 2017	26
Figure 36: Wambo Seam Standing Water Level Trend – December 2017	27
Figure 37: Warkworth Seam Electrical Conductivity Trend – December 2017	27
Figure 38: Warkworth Seam pH Trend – December 2017	28
Figure 39: Warkworth Seam Standing Water Level Trend – December 2017	28
Figure 40: Wollombi Alluvium Electrical Conductivity Trend – December 2017	29
Figure 41: Wollombi Alluvium pH Trend – December 2017	29
Figure 42: Wollombi Alluvium Standing Water Level Trend – December 2017	30
Figure 43: Aeolian Warkworth Sands Electrical Conductivity Trend – December 2017	30
Figure 44: Aeolian Warkworth Sands pH Trend – December 2017	31
Figure 45: Aeolian Warkworth Sands Standing Water Level Trend – December 2017	31
Figure 46: Hunter River Alluvium 1 Seam Electrical Conductivity Trend – December 2017	32
Figure 47: Hunter River Alluvium 1 Seam pH Trend – December 2017	32

Figure 48: Hunter River Alluvium 2 Seam Electrical Conductivity Trend – December 2017	33
Figure 49: Hunter River Alluvium 2 Seam pH Trend – December 2017	33
Figure 50: Hunter River Alluvium 3 Seam Electrical Conductivity Trend – December 2017	34
Figure 51: Hunter River Alluvium 3 Seam pH Trend – December 2017	34
Figure 52: Hunter River Alluvium 4 Seam Electrical Conductivity Trend – December 2017	35
Figure 53: Hunter River Alluvium 4 Seam pH Trend – December 2017	35
Figure 54: Hunter River Alluvium 5 Seam Electrical Conductivity Trend – December 2017	36
Figure 55: Hunter River Alluvium 5 Seam pH Trend – December 2017	36
Figure 56: Hunter River Alluvium 6 Seam Electrical Conductivity – December 2017	37
Figure 57: Hunter River Alluvium 6 Seam pH Trend – December 2017	37
Figure 58: Hunter River Alluvium Standing Water Level Trend – December 2017	38
Figure 59: Groundwater Monitoring Location Plan	42
Figure 60: Abbey Green Blast Monitoring Results – December 2017	43
Figure 61: Bulga Village Blast Monitoring Results – December 2017	43
Figure 62: MTIE Blast Monitoring Results – December 2017	44
Figure 63: Warkworth Blast Monitoring Results - December 2017	44
Figure 64: Wambo Road Blast Monitoring Results – December 2017	44
Figure 65: Wollemi Peak Road Blast Monitoring Results - December 2017	44
Figure 66: Blast and Vibration Monitoring Location Plan	45
Figure 67: Noise Monitoring Location Plan	49
Figure 68: Operational Downtime by Equipment Type – December 2017	50
Figure 69: Rehabilitation YTD - December 2017	51
Figure 70: Complaints Summary - YTD December 2017	51

## Tables

Table 1: Monthly Rainfall MTW	5
Table 2: Surface Water Trigger Tracking – December YTD 2017	14
Table 3: Groundwater Triggers - 2017	39
Table 4: Blasting Limits	43
Table 5: $L_{Aeq, 15 \text{ minute}}$ Warkworth Impact Assessment Criteria – December 2017	46
Table 6: $L_{A1, 1 \text{ minute}}$ Warkworth – Impact Assessment Criteria – December 2017	46
Table 7: $L_{Aeq, 15 \text{ minute}}$ Mount Thorley - Impact Assessment Criteria – December 2017	47
Table 8: $L_{A1, 1 \text{ Minute}}$ Mount Thorley - Impact Assessment Criteria – December 2017	47
Table 9: Low Frequency Noise Assessment - December 2017	48
Table 10: Supplementary Attended Noise Monitoring Data –December 2017	50
Table 11: Meteorological Data – Charlton Ridge Meteorological Station – December 2017	53

## Revision History

Version No.	Person Responsible	Document Status	Date
1.0	Environmental Advisor	Draft	05/02/2018
1.1	Environmental Specialist	Final	7/02/2018



# 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 December to 31 December 2017.

# 2.0 AIR QUALITY

## 2.1 Meteorological Monitoring

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

### 2.1.1 Rainfall

Rainfall for the period is summarised in Table 1, the year-to-date trend and historical trend are shown in **Error! Reference source not found..**

Table 1: Monthly Rainfall MTW

2017	Monthly Rainfall (mm)	Cumulative Rainfall (mm)
December	42.6	444.4

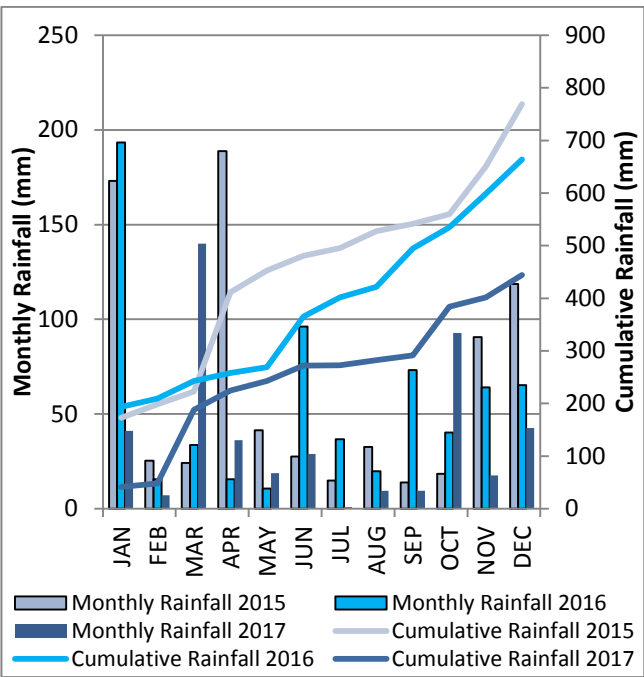


Figure 1: Rainfall Trends YTD

## 2.1.2 Wind Speed and Direction

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

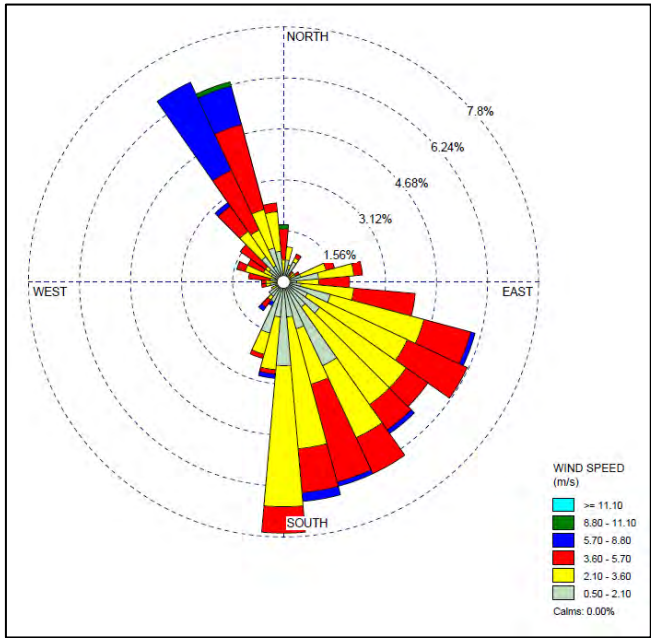


Figure 2: Charlton Ridge Wind Rose – December 2017



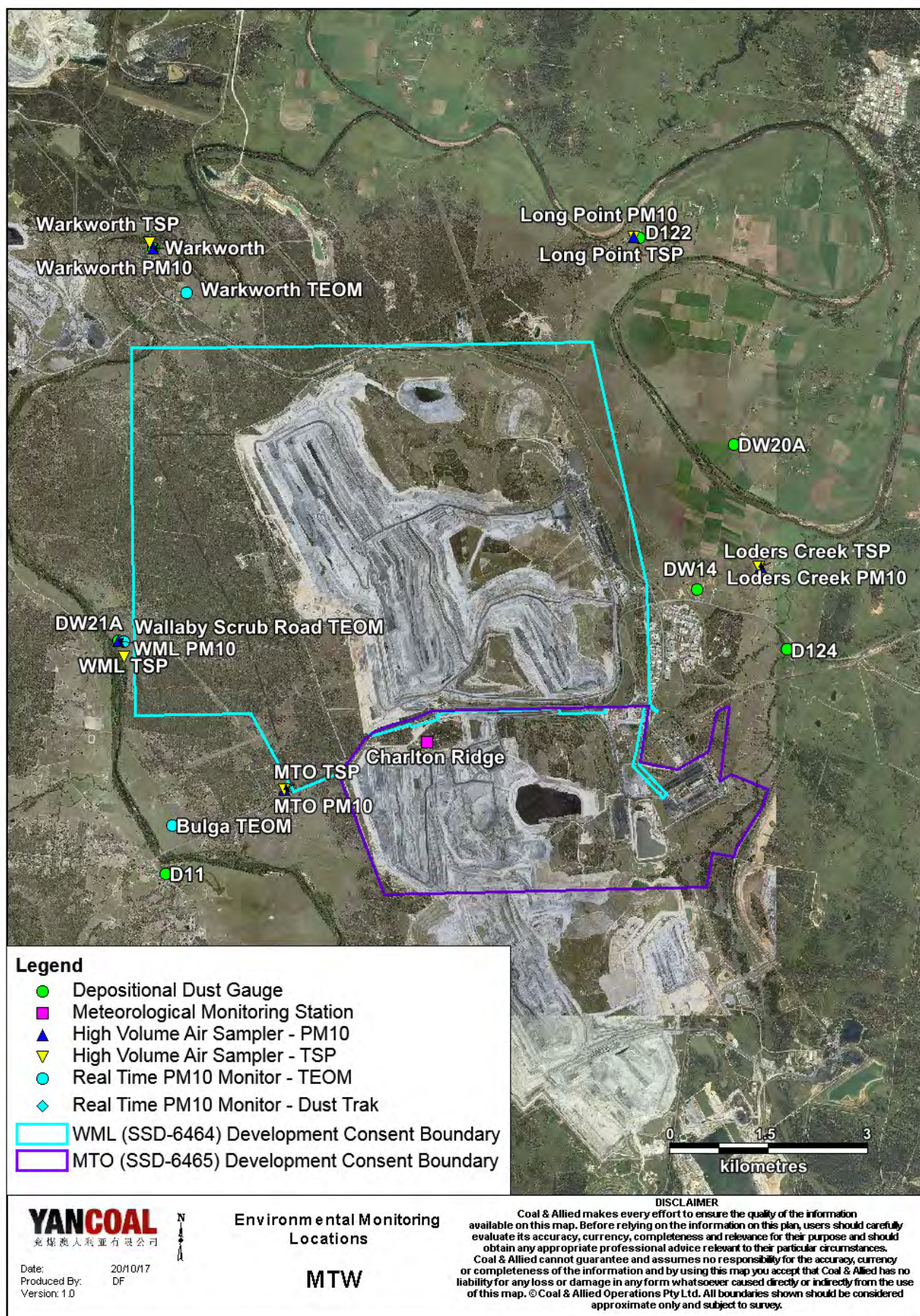


Figure 3: Air Quality Monitoring Locations



## 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 DW20a, DW21a, D122 and Warkworth monitors recorded monthly results above the long term impact assessment criteria of 4.0 g/m<sup>2</sup> per month. Field notes associated with monitor D122 results confirm the presence of bird droppings and/or 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 DW20a, DW21a 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 2017 Annual Review.

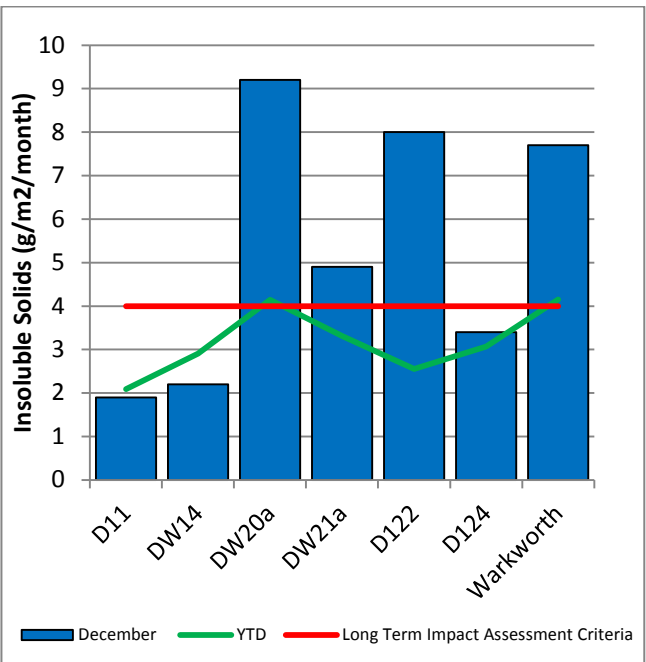


Figure 4: Depositional Dust – December 2017

## 2.3 Suspended Particulates

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

### 2.3.1 HVAS PM<sub>10</sub> Results

Figure 5 shows the individual PM<sub>10</sub> results at each monitoring station against the short term impact assessment criteria of 50µg/m<sup>3</sup>.

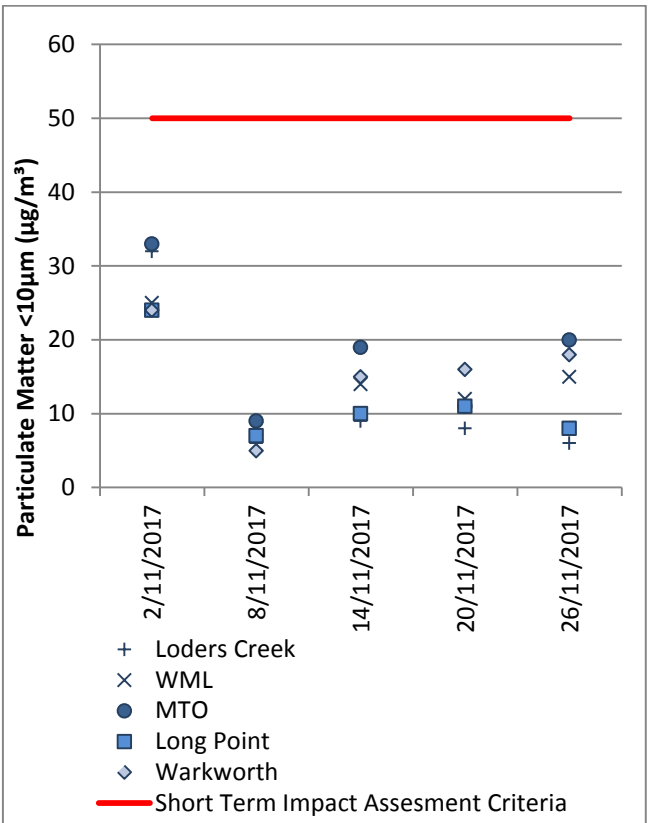


Figure 5: Individual PM<sub>10</sub> Results – December 2017

Figure 6 shows the annual average PM<sub>10</sub> 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 2017 Annual Review.

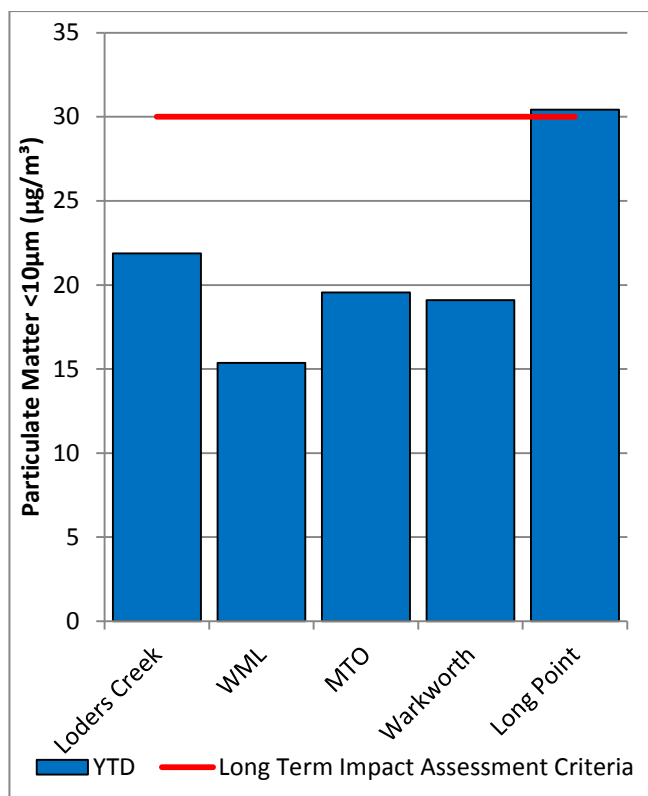


Figure 6: Annual Average PM<sub>10</sub> –December 2017

### 2.3.2 TSP Results

Figure 7 shows the annual average TSP results compared against the long term impact assessment criteria of 90µg/m<sup>3</sup>. An annual assessment of MTW's compliance with the Long Term Impact Assessment Criteria will be provided in the 2017 Annual Review.

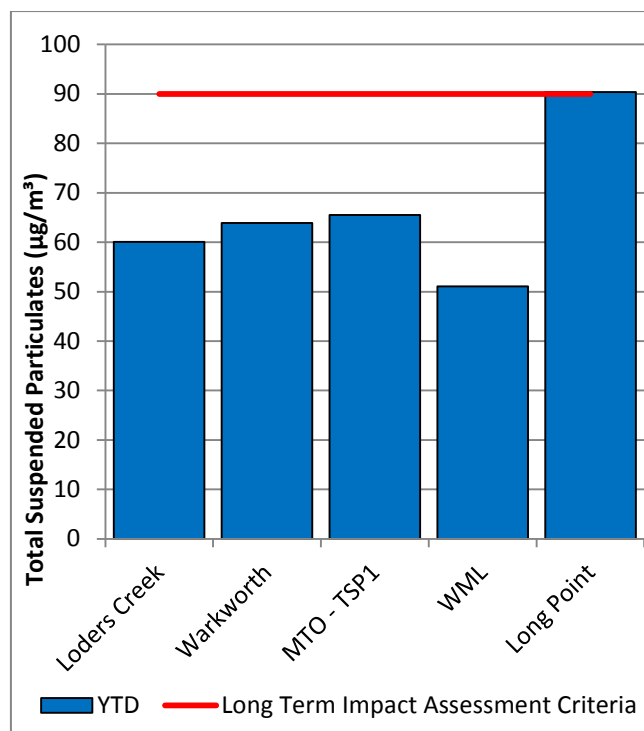


Figure 7: Annual Average Total Suspended Particulates – December 2017

### 2.3.3 Real Time PM<sub>10</sub> Results

Mt Thorley Warkworth maintains a network of real time PM<sub>10</sub> 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 PM<sub>10</sub> result and the year to date annual average PM<sub>10</sub> result.

Ten 24 hour average PM<sub>10</sub> results recorded at the Bulga TEOM which exceeded the short term (24hr) criteria during December 2017. An internal investigation determined that these elevated results had been heavily influenced by a local source to the monitor. As such data from the nearby Bulga OEH Air Quality Monitor has been used as representative data points for these days (15-19 December, 23-24 December and 28-30 December inclusive).



#### **2.3.4 Real Time Alarms for Air Quality**

During December, the real time monitoring system generated 118 automated air quality related alerts, including 11 alerts for adverse meteorological conditions and 107 alerts for elevated PM<sub>10</sub> levels.

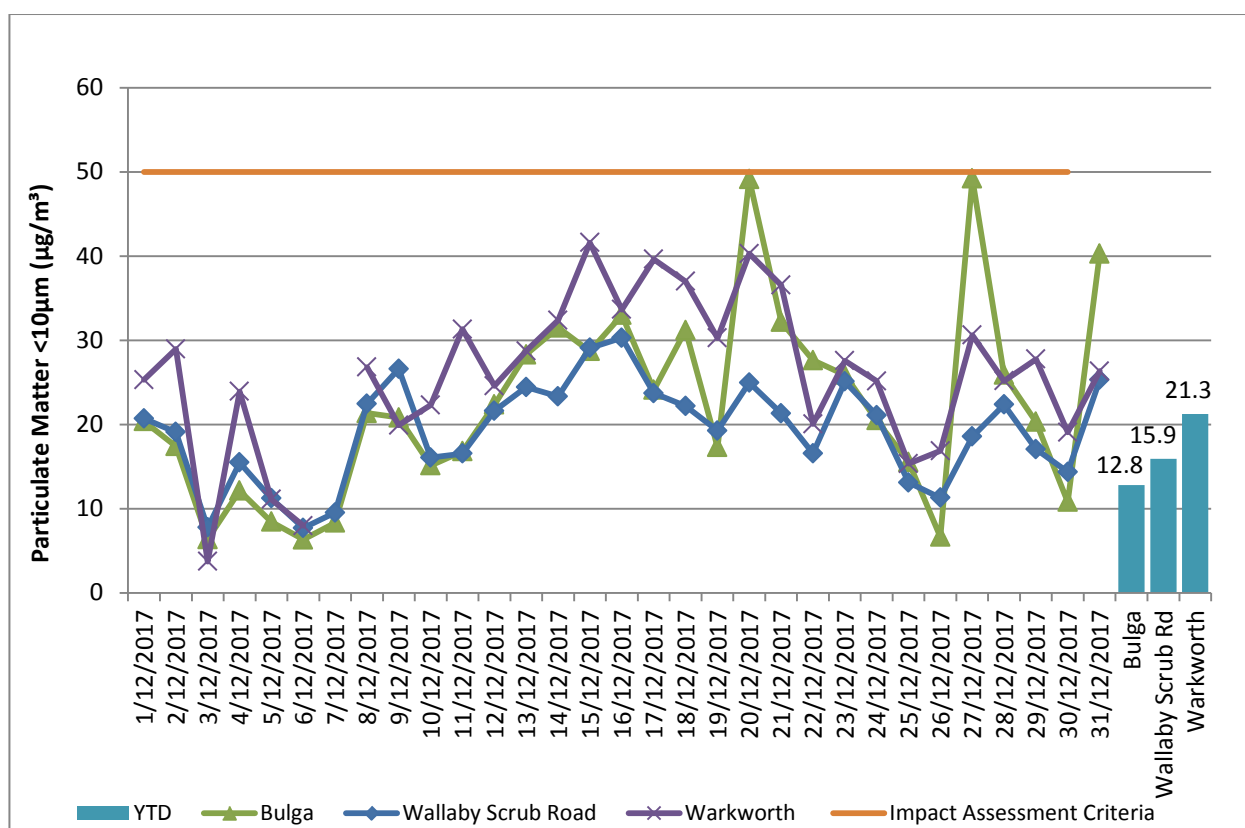


Figure 8: Real Time PM<sub>10</sub> 24hr average and Year-to-date average – December 2017

### 3.0 WATER QUALITY

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

#### 3.1 Surface Water

Monitoring is conducted at mine site dams and surrounding natural watercourses. The surface water monitoring locations are outlined in Figure 15.

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

##### 3.1.1 Surface Water Monitoring Results

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

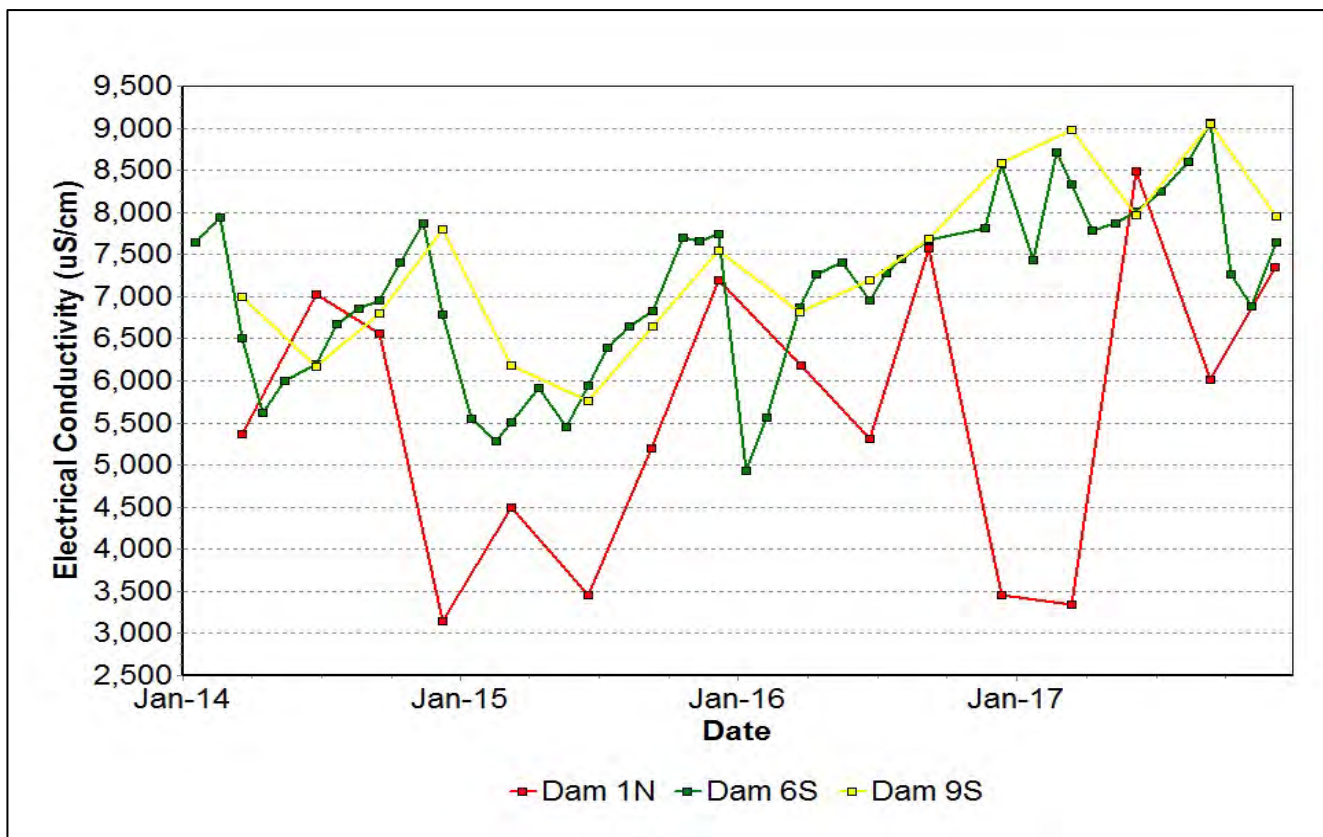


Figure 9: Site Dams Electrical Conductivity Trend – December 2017

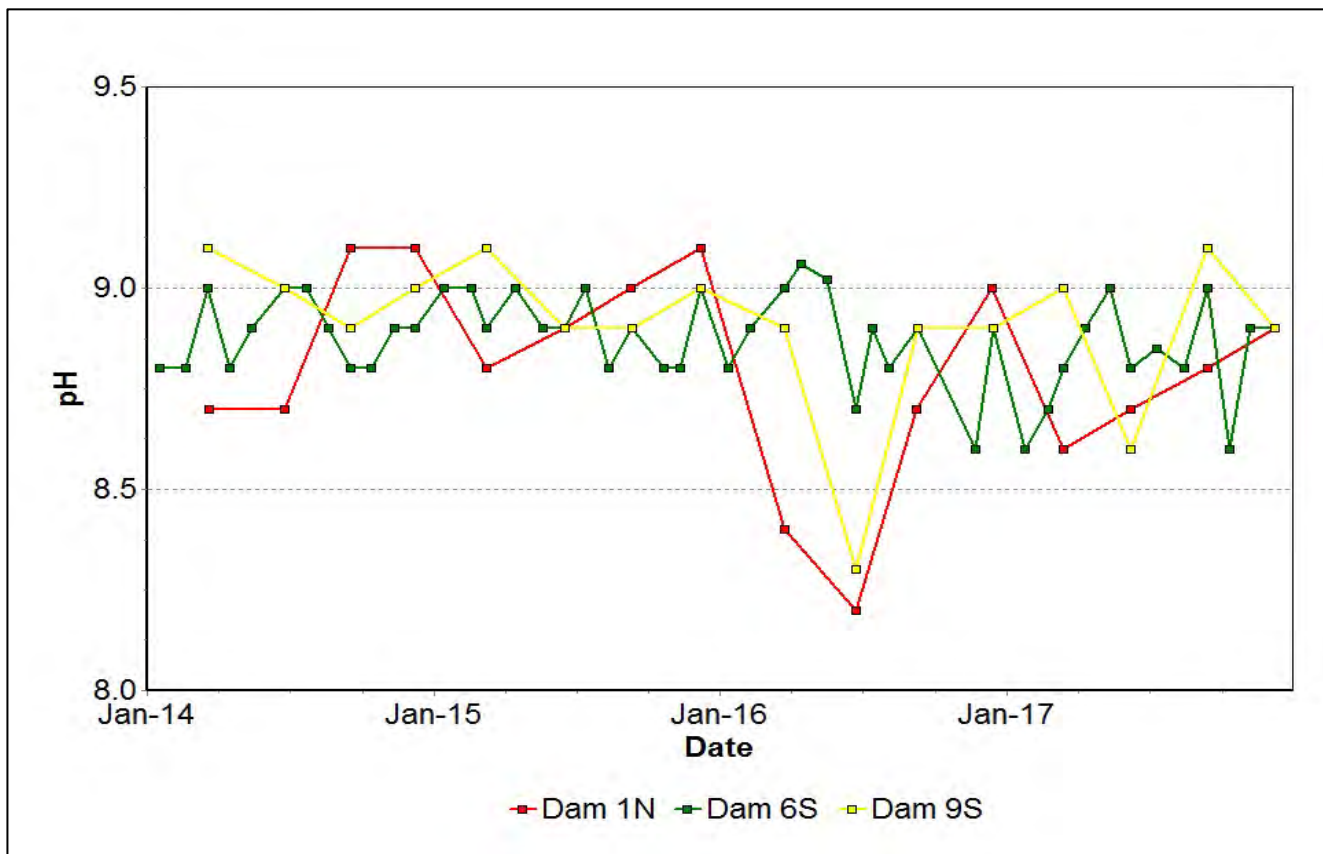


Figure 10: Site Dams pH Trend – December 2017

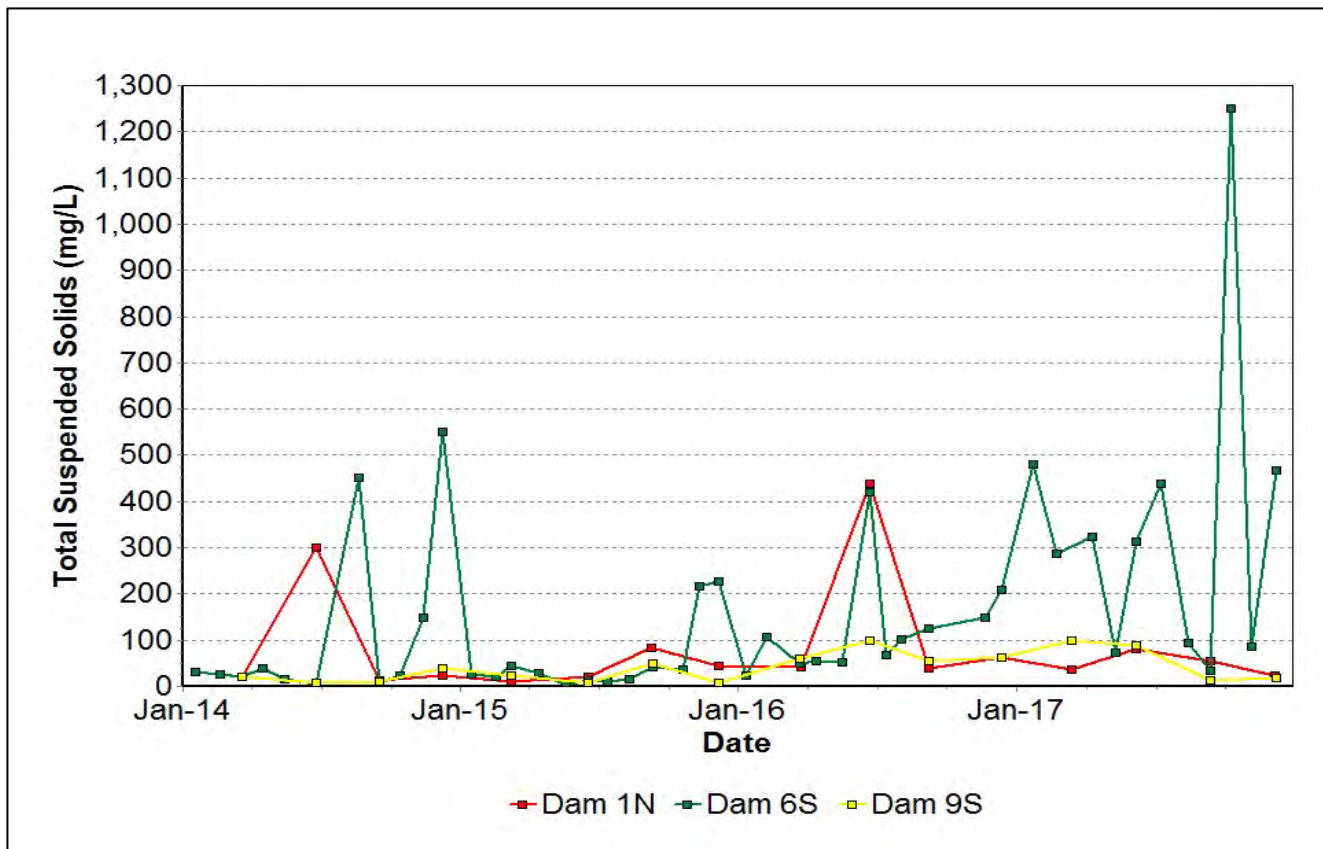


Figure 11: Site Dams Total Suspended Solids Trend – December 2017

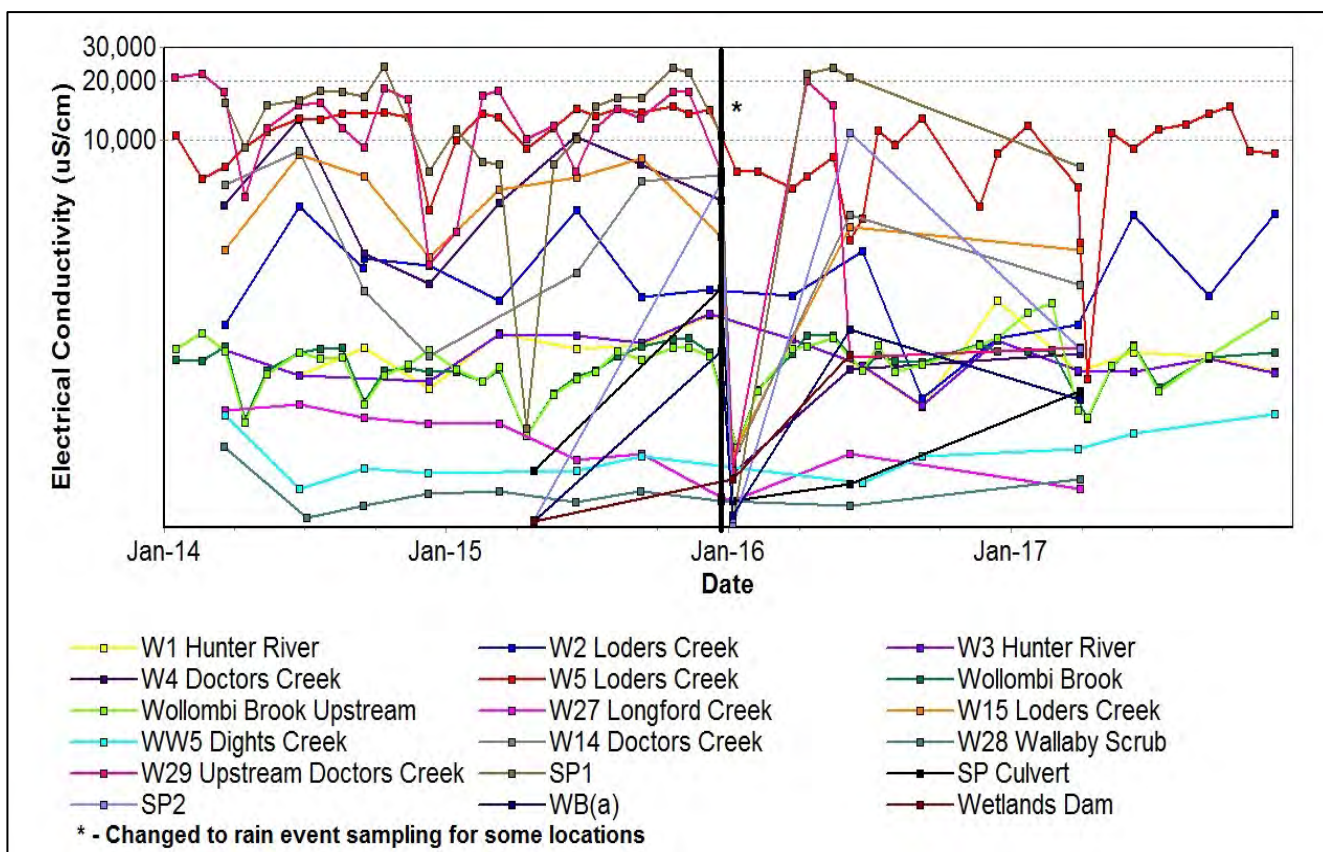


Figure 12: Watercourse Electrical Conductivity Trend – December 2017



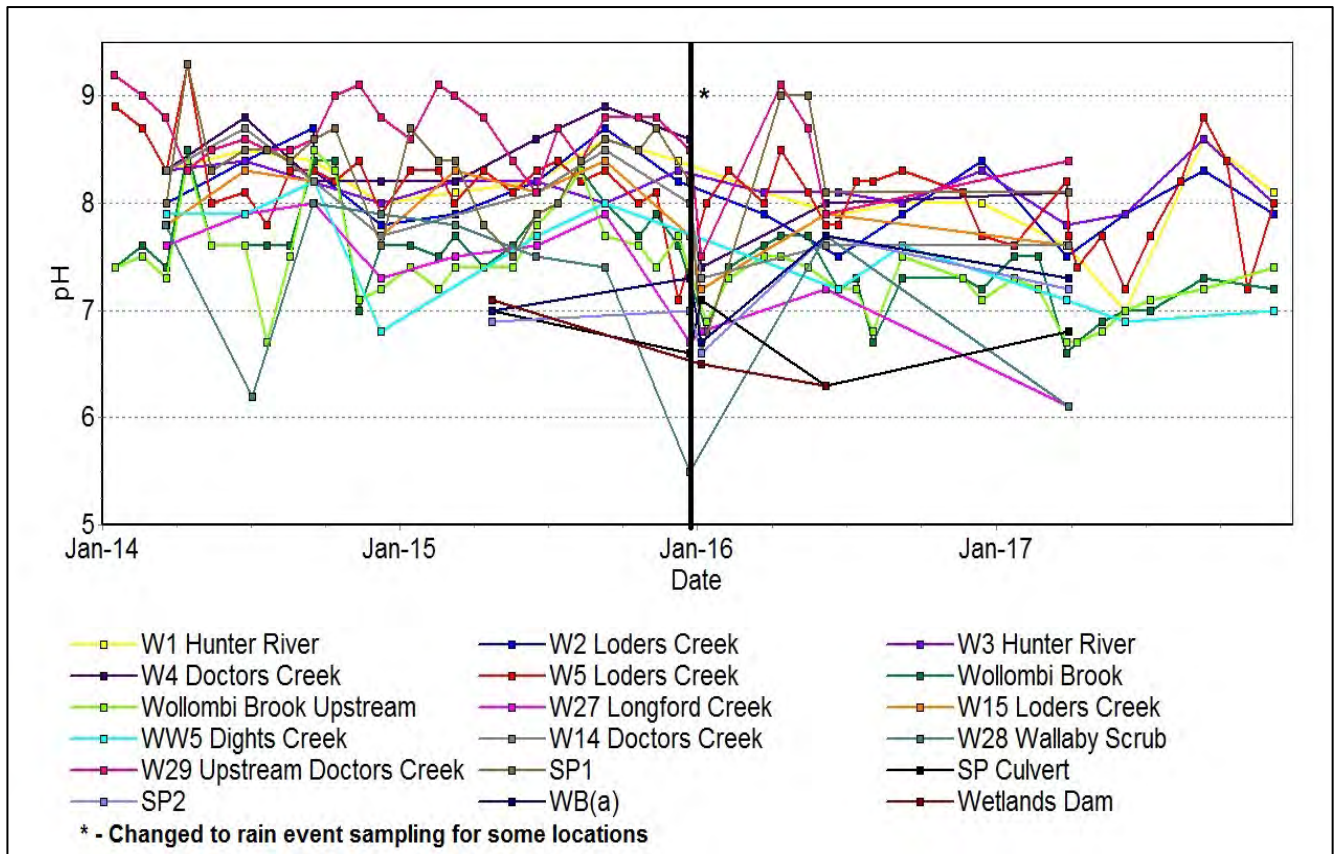


Figure 13: Watercourse pH Trend – December 2017

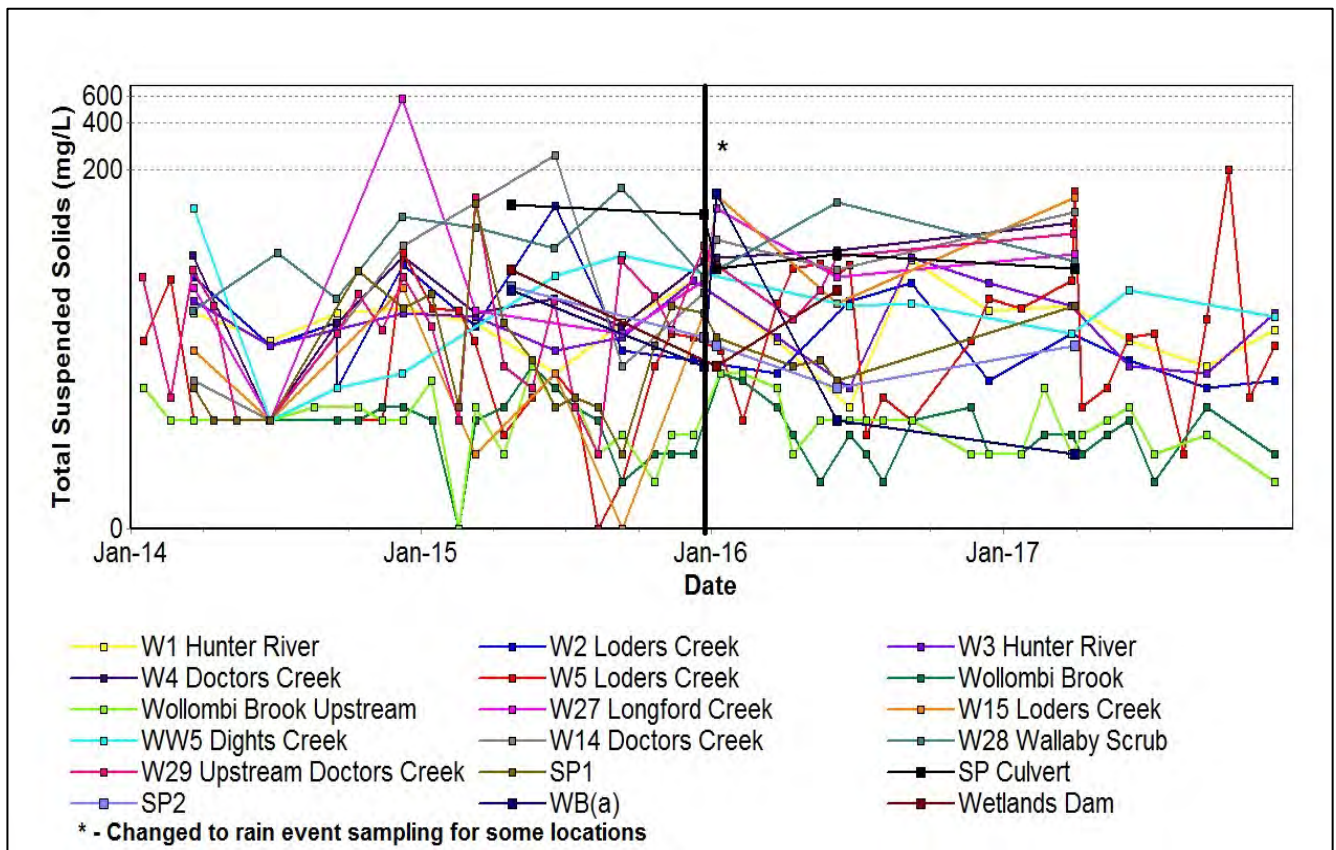


Figure 14: Watercourse Total Suspended Solids Trend – December 2017

### 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 2.

**Table 2: Surface Water Trigger Tracking – December YTD 2017**

Site	Date	Trigger Limit Breached	Action Taken in Response
W5	15/08/2017	EC –95 <sup>th</sup> Percentile	Watching Brief*
W5	13/09/2017	EC –95 <sup>th</sup> Percentile	Watching Brief*
W5	11/10/2017	EC –95 <sup>th</sup> Percentile	Dry weather conditions and lack of surface flow in preceding months likely to have resulted in elevated EC reading, unlikely to be anthropogenic impact. Watching Brief to continue*
W1	28/03/2017	pH –5 <sup>th</sup> Percentile	Watching Brief*
W1	08/06/2017	pH –5 <sup>th</sup> Percentile	Watching Brief*
W1	13/09/2017	pH –95 <sup>th</sup> Percentile	Natural Variability, watching brief.
W2	28/03/2017	pH –5 <sup>th</sup> Percentile	Watching Brief*
W3	13/09/2017	pH –95 <sup>th</sup> Percentile	Watching Brief*
W4	31/03/2017	pH –5 <sup>th</sup> Percentile	Watching Brief*
W5	06/11/2017	pH –5 <sup>th</sup> Percentile	Watching Brief*
W15	31/03/2017	pH –5 <sup>th</sup> Percentile	Watching Brief*
W27	31/03/2017	pH –5 <sup>th</sup> Percentile	Watching Brief*
W28	31/03/2017	pH –5 <sup>th</sup> Percentile	Watching Brief*

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



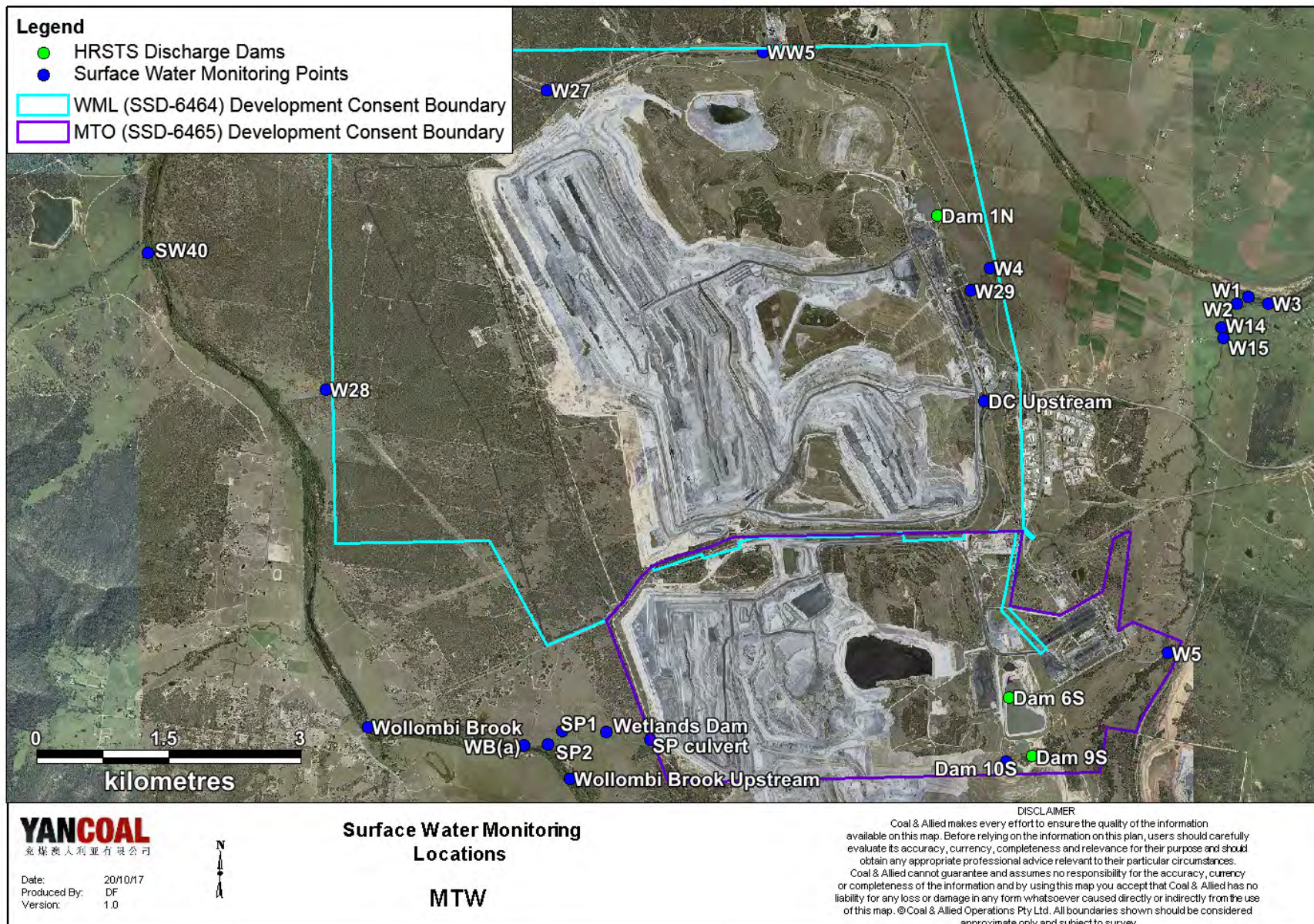


Figure 15: Surface Water Monitoring Location Plan



### 3.2 Groundwater Monitoring

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

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

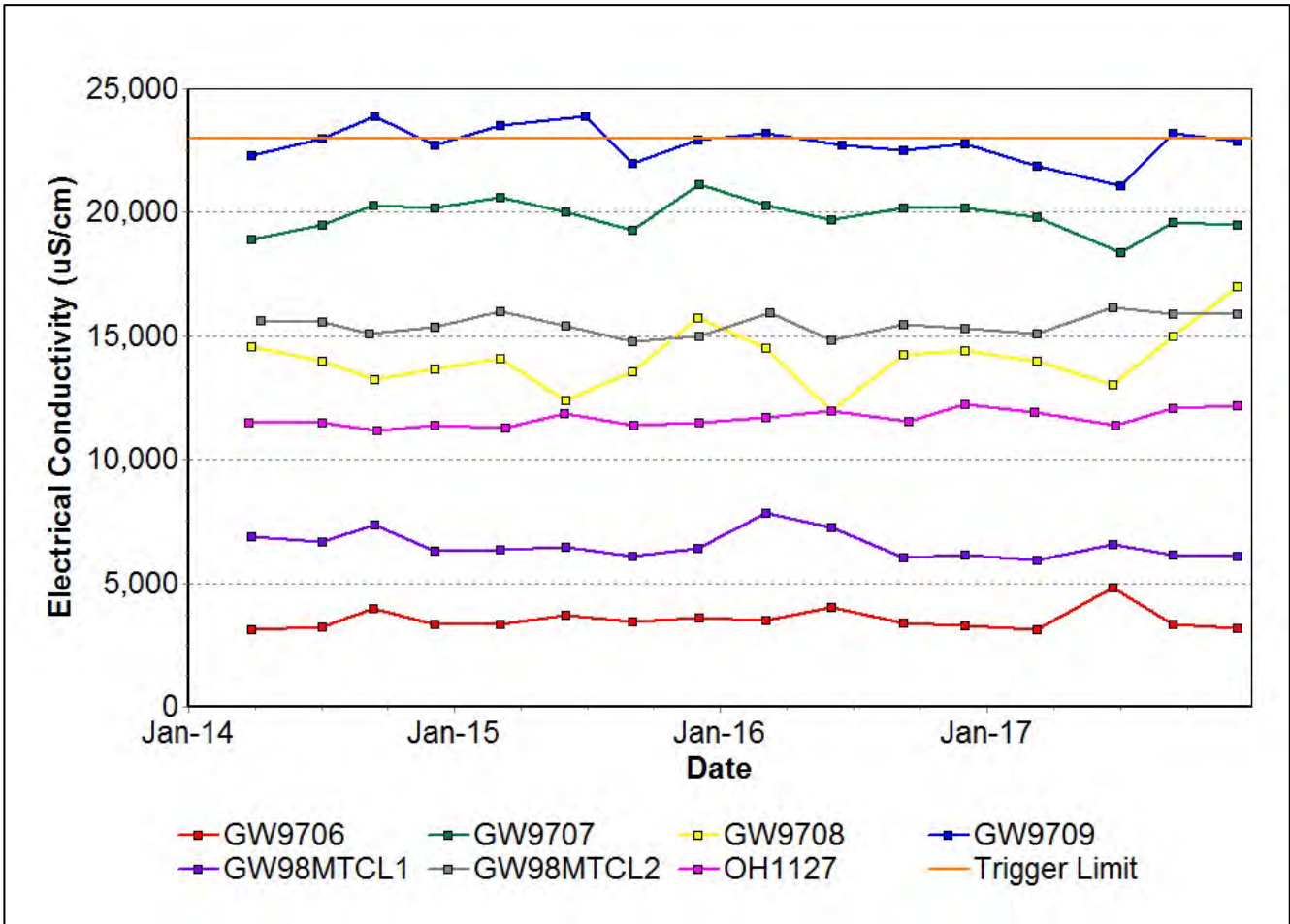


Figure 16: Bayswater Seam Electrical Conductivity Trend – December 2017



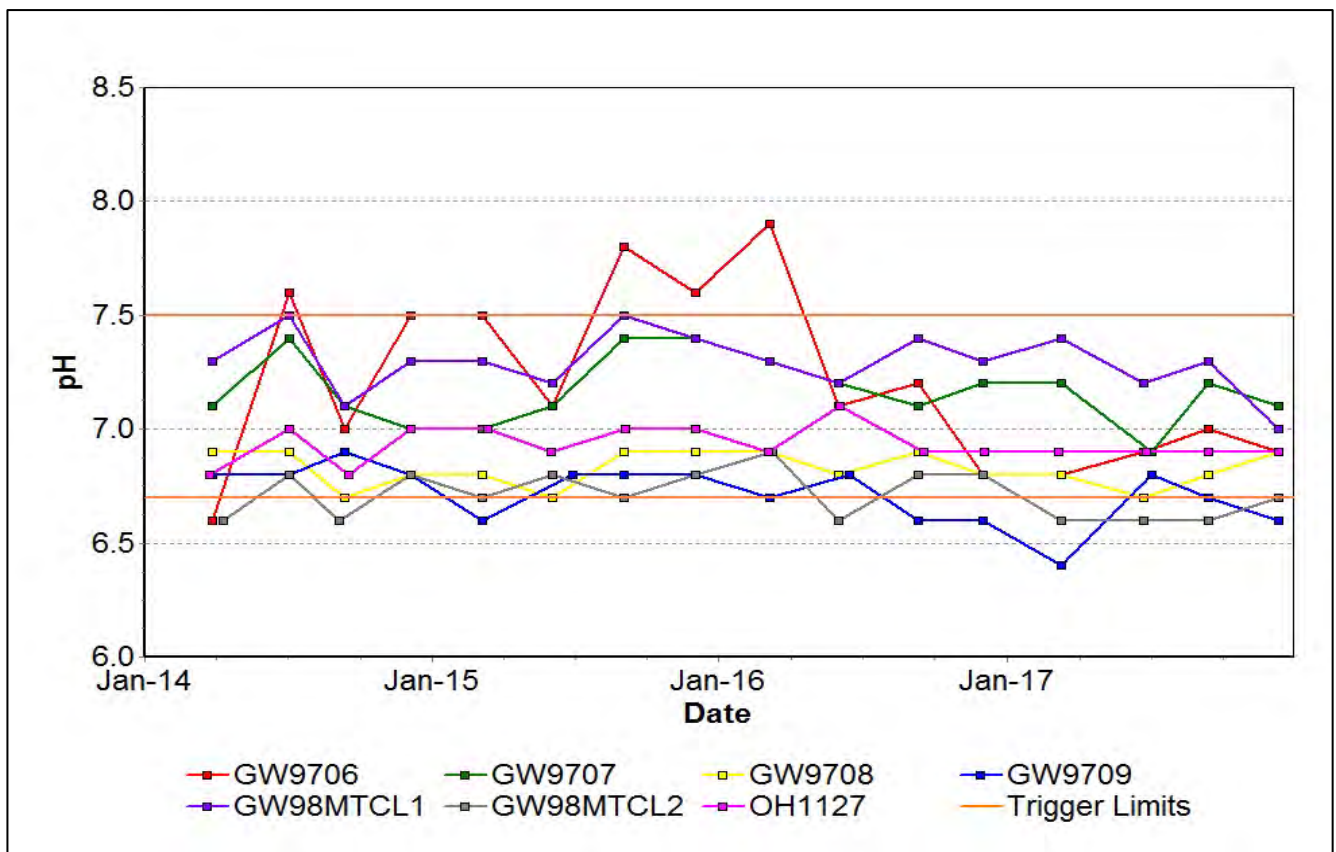


Figure 17: Bayswater Seam pH Trend – December 2017

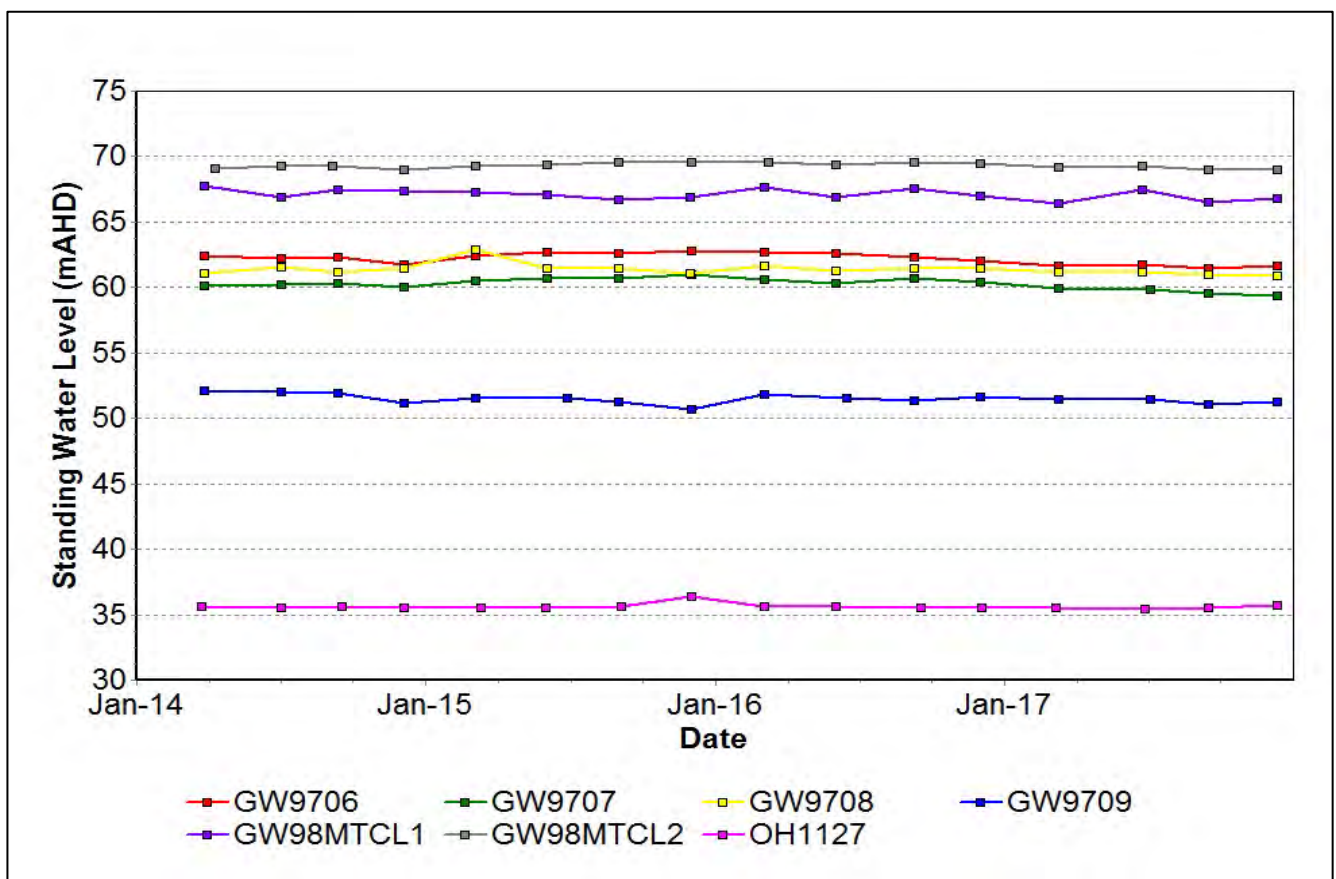


Figure 18: Bayswater Seam Standing Water Level Trend – December 2017

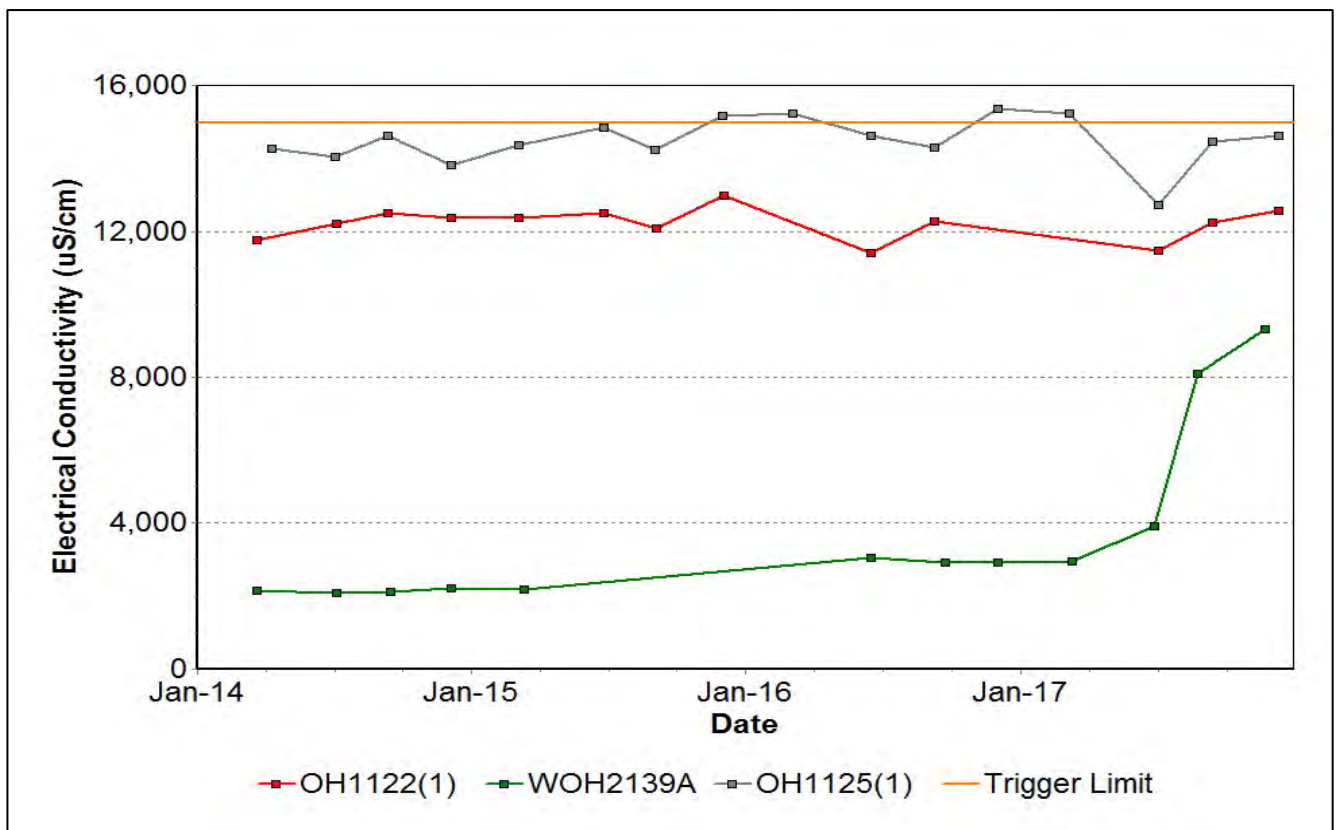


Figure 19: Blakefield Seam Electrical Conductivity Trend – December 2017

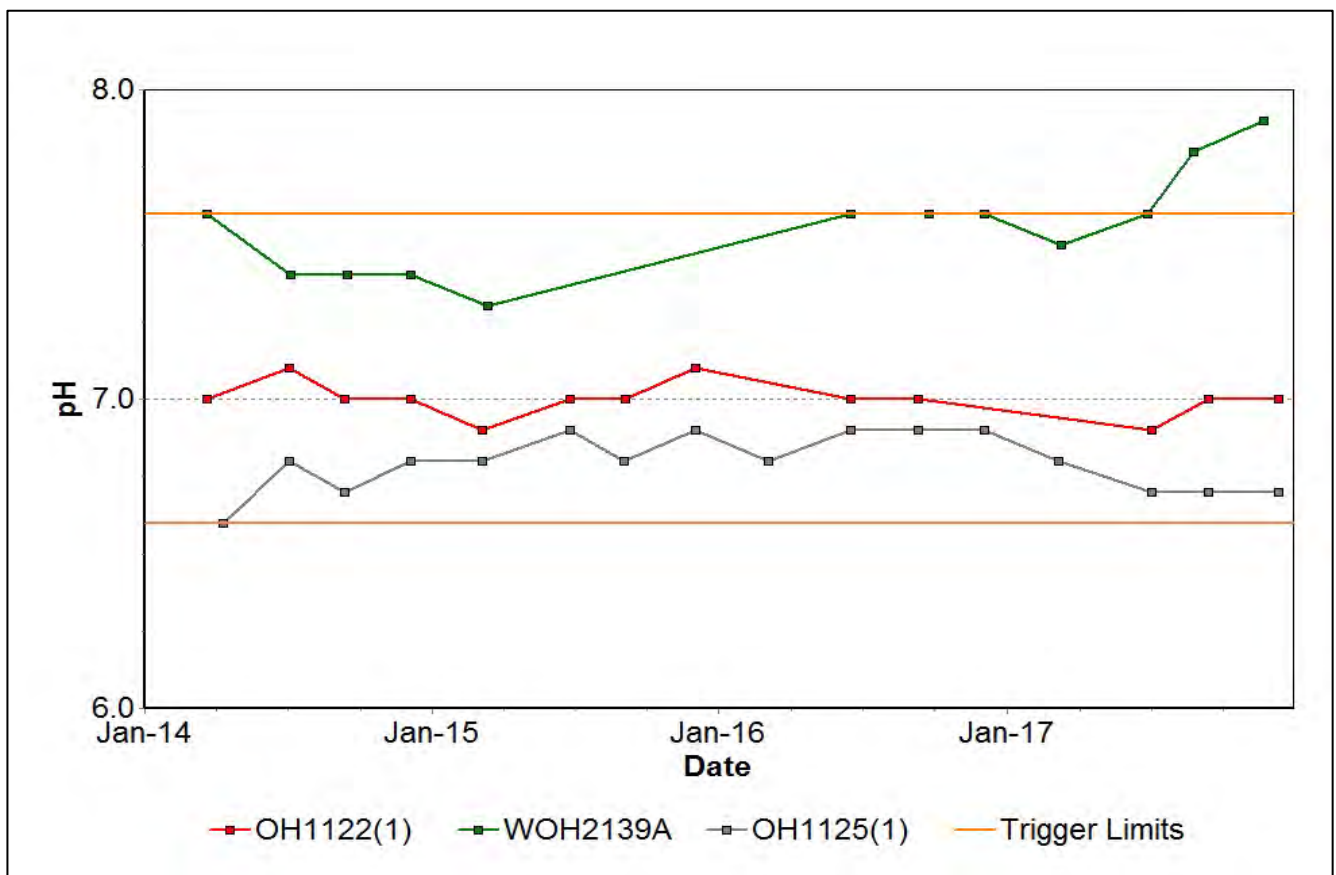


Figure 20: Blakefield Seam pH Trend – December 2017

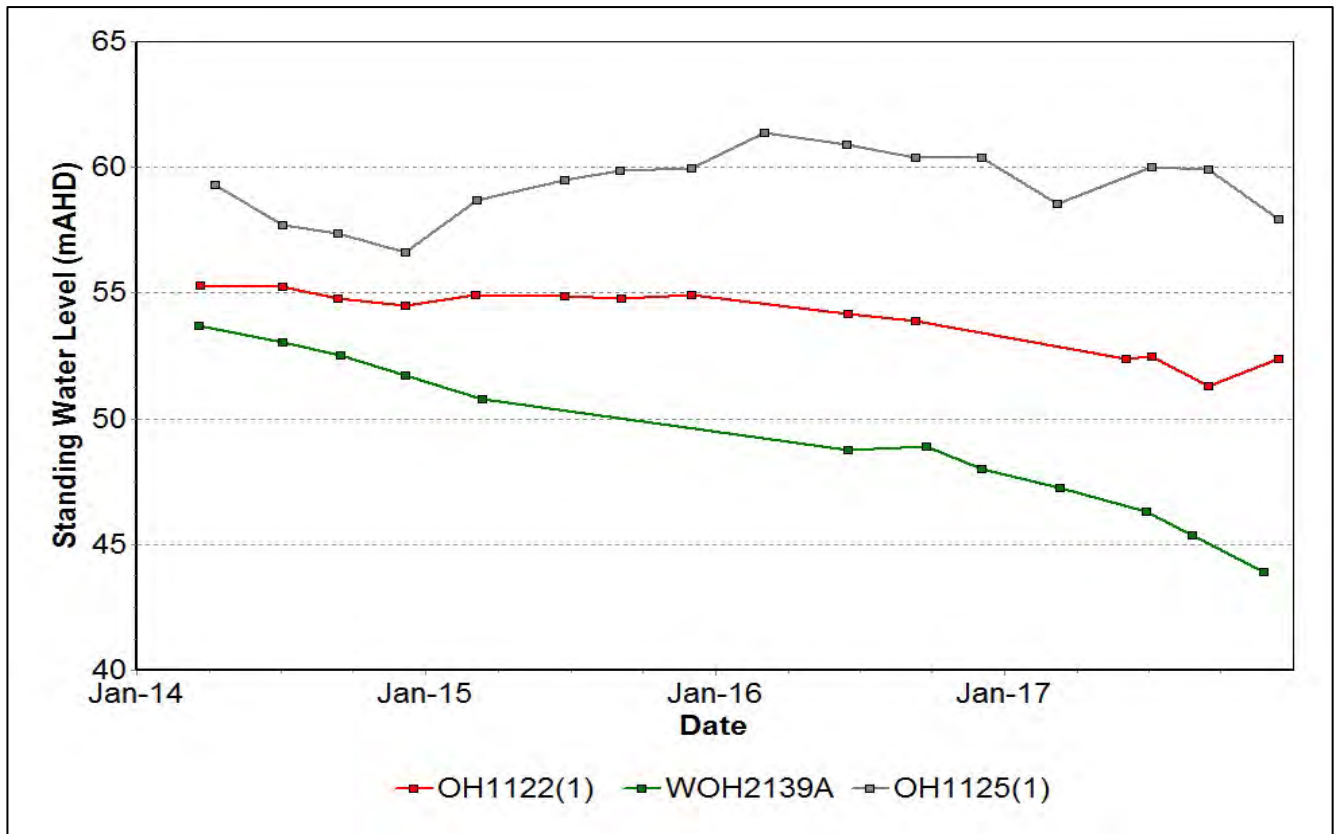


Figure 21: Blakefield Seam Standing Water Level Trend – December 2017

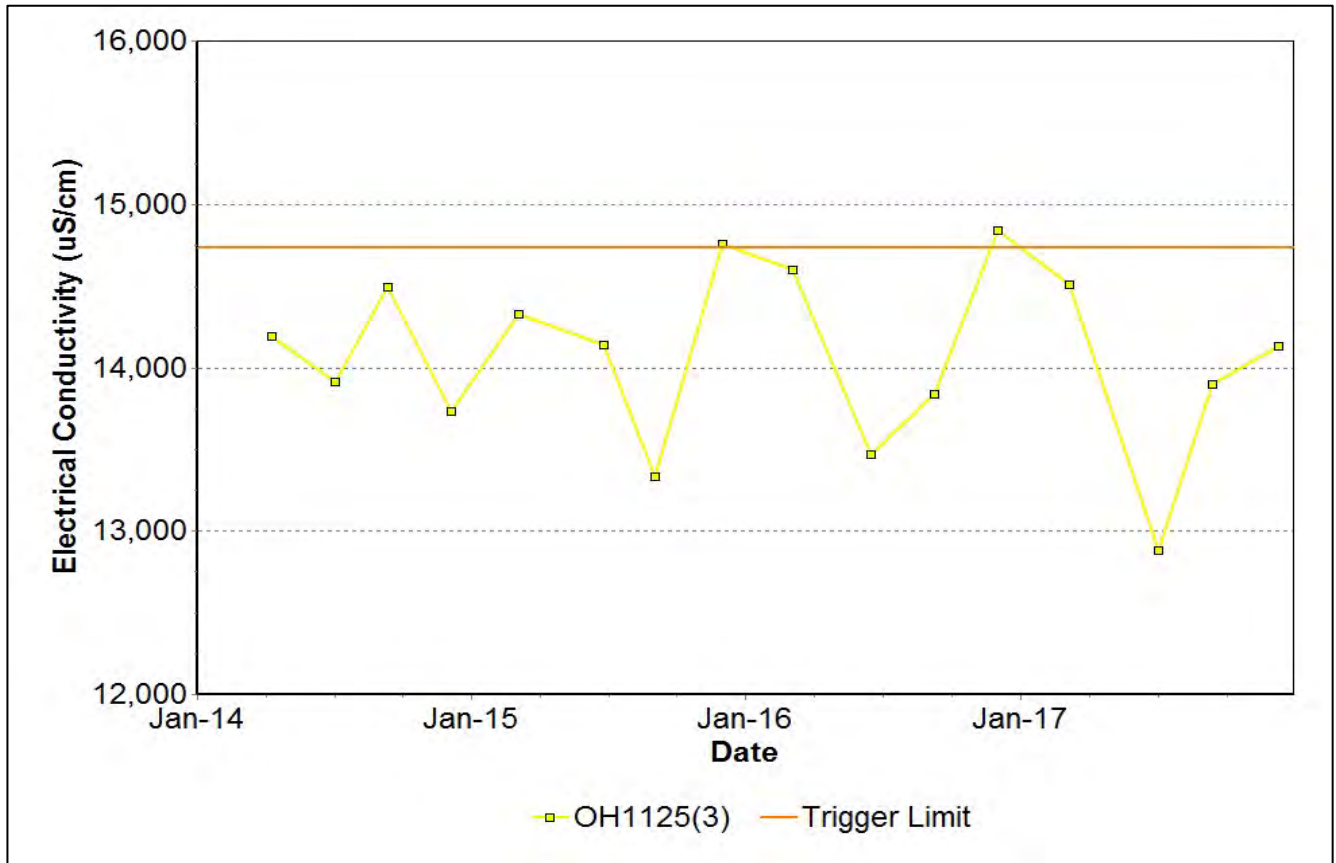


Figure 22: Bowfield Seam Electrical Conductivity Trend – December 2017

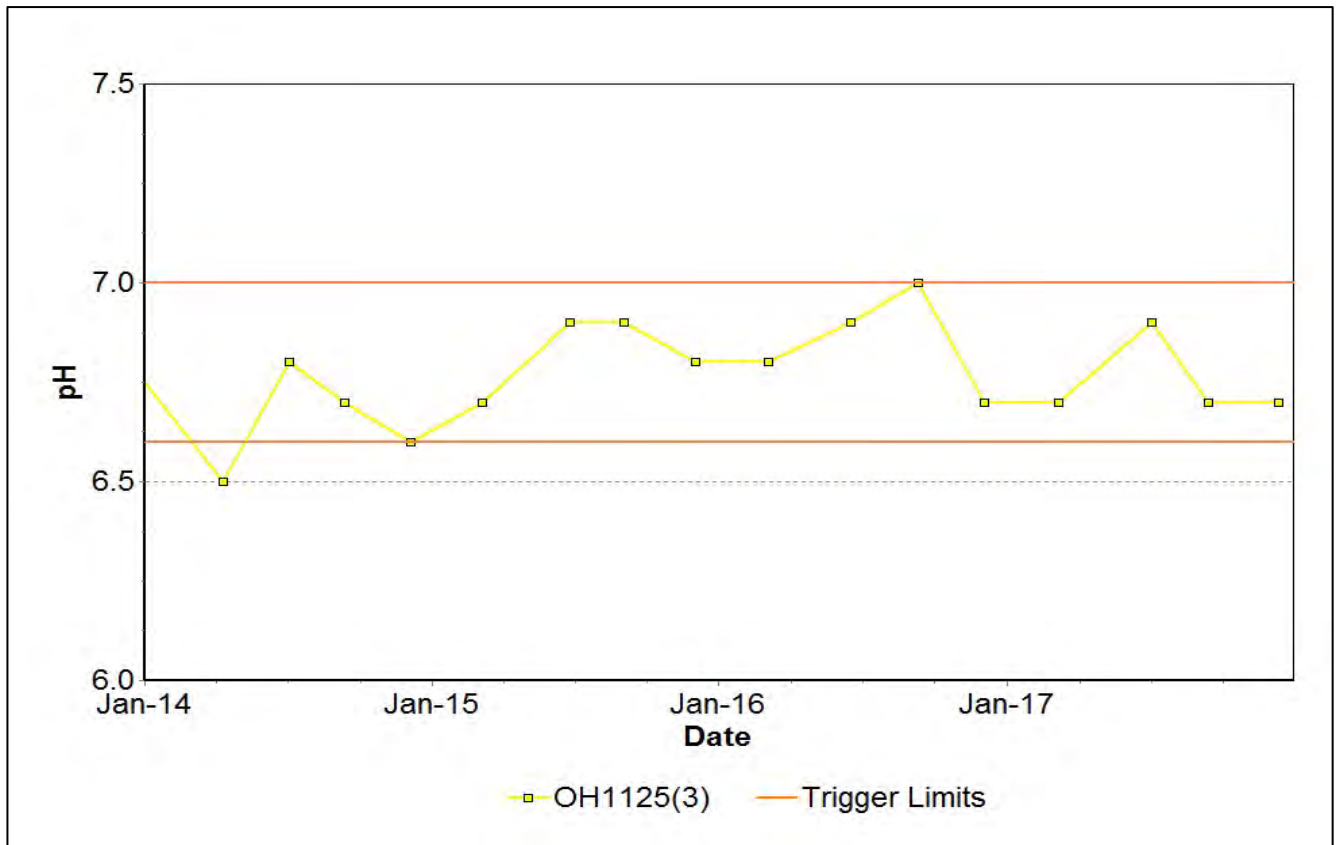


Figure 23: Bowfield Seam pH Trend – December 2017

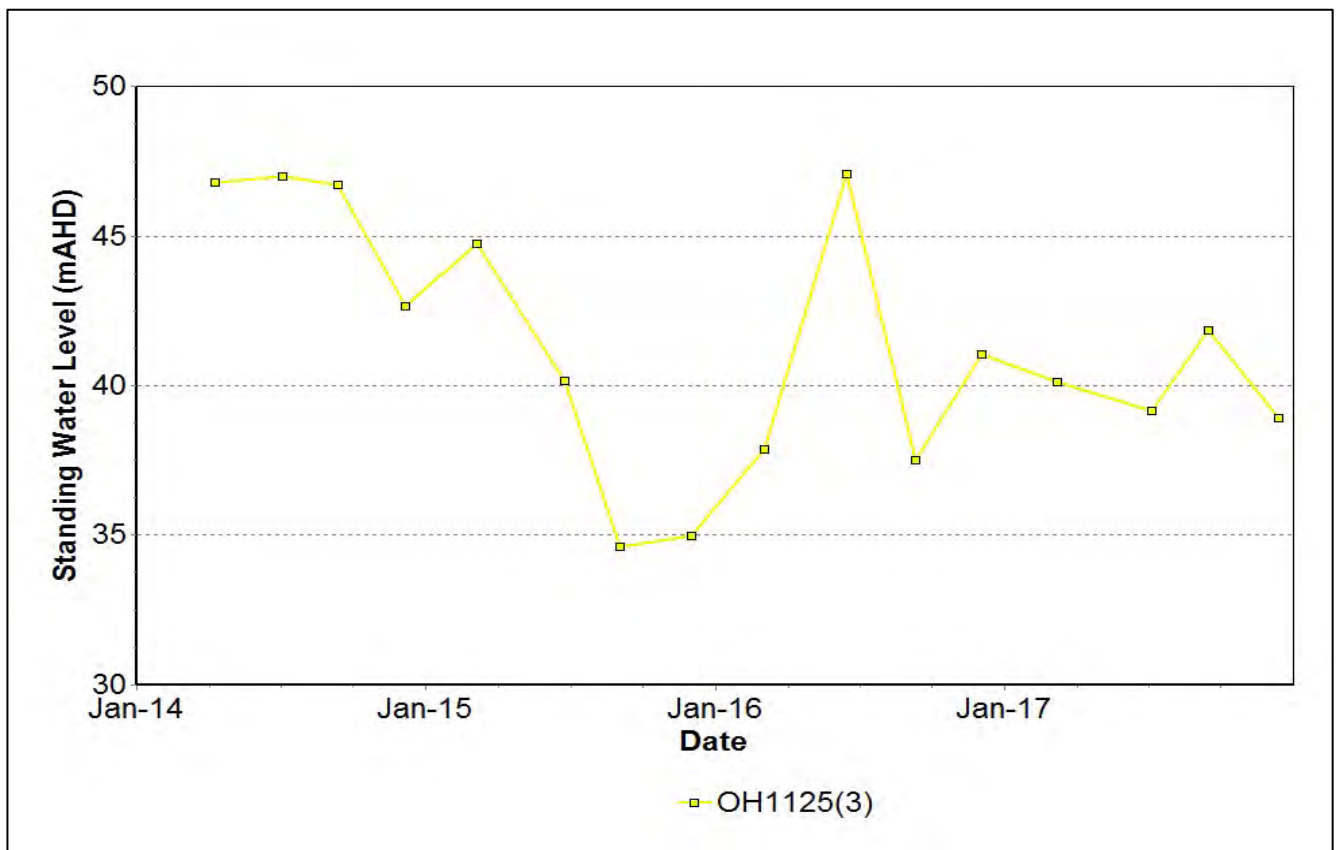


Figure 24: Bowfield Seam Standing Water Level Trend – December 2017



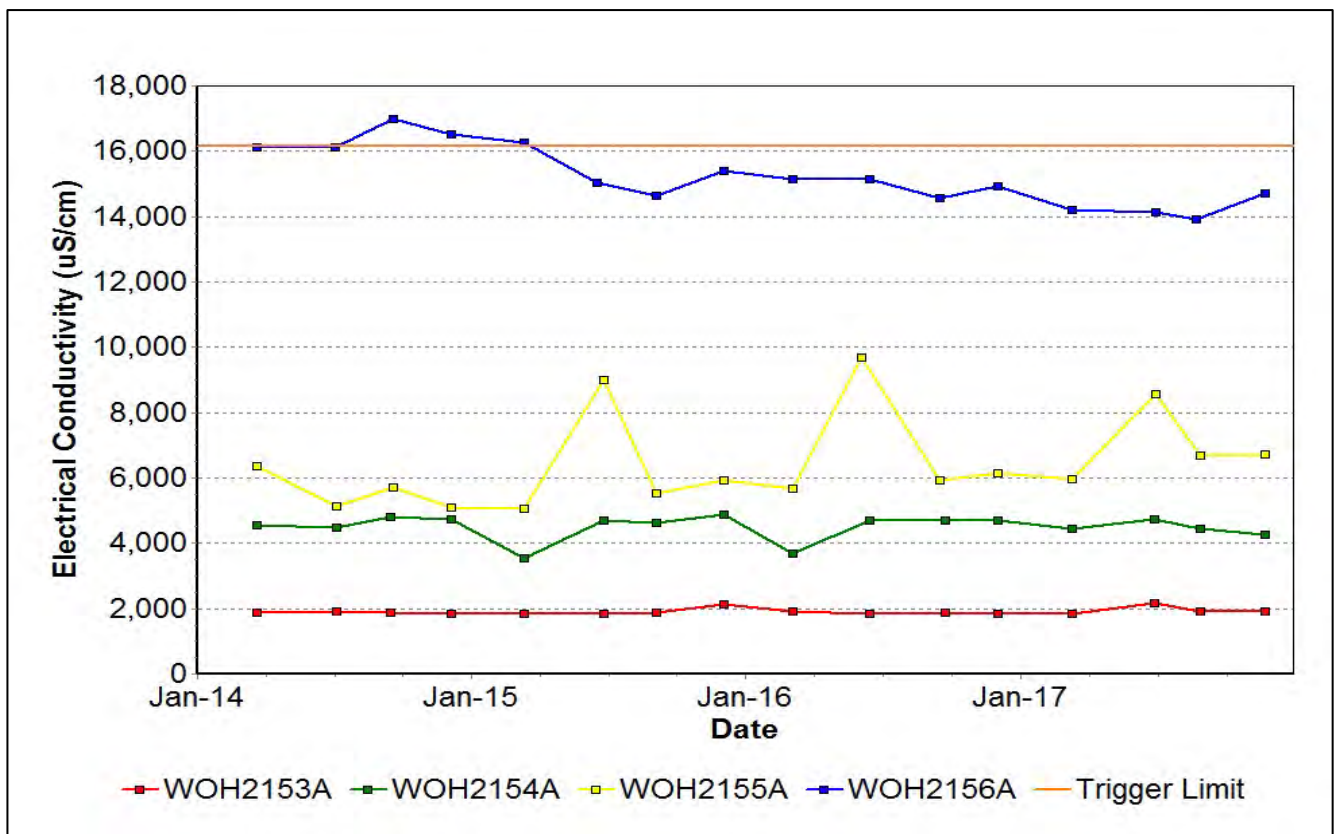


Figure 25: Redbank Seam Electrical Conductivity Trend – December 2017

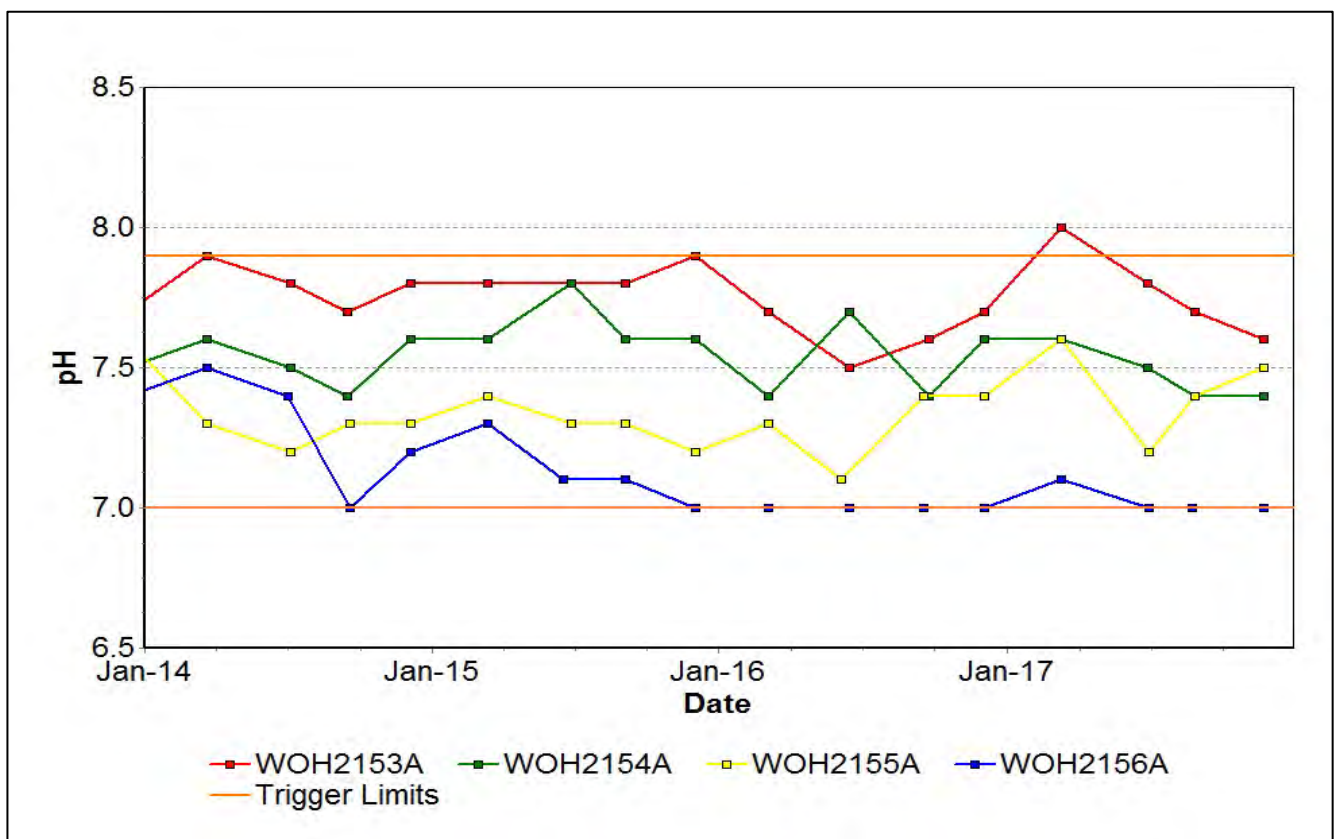


Figure 26: Redbank Seam pH Trend – December 2017

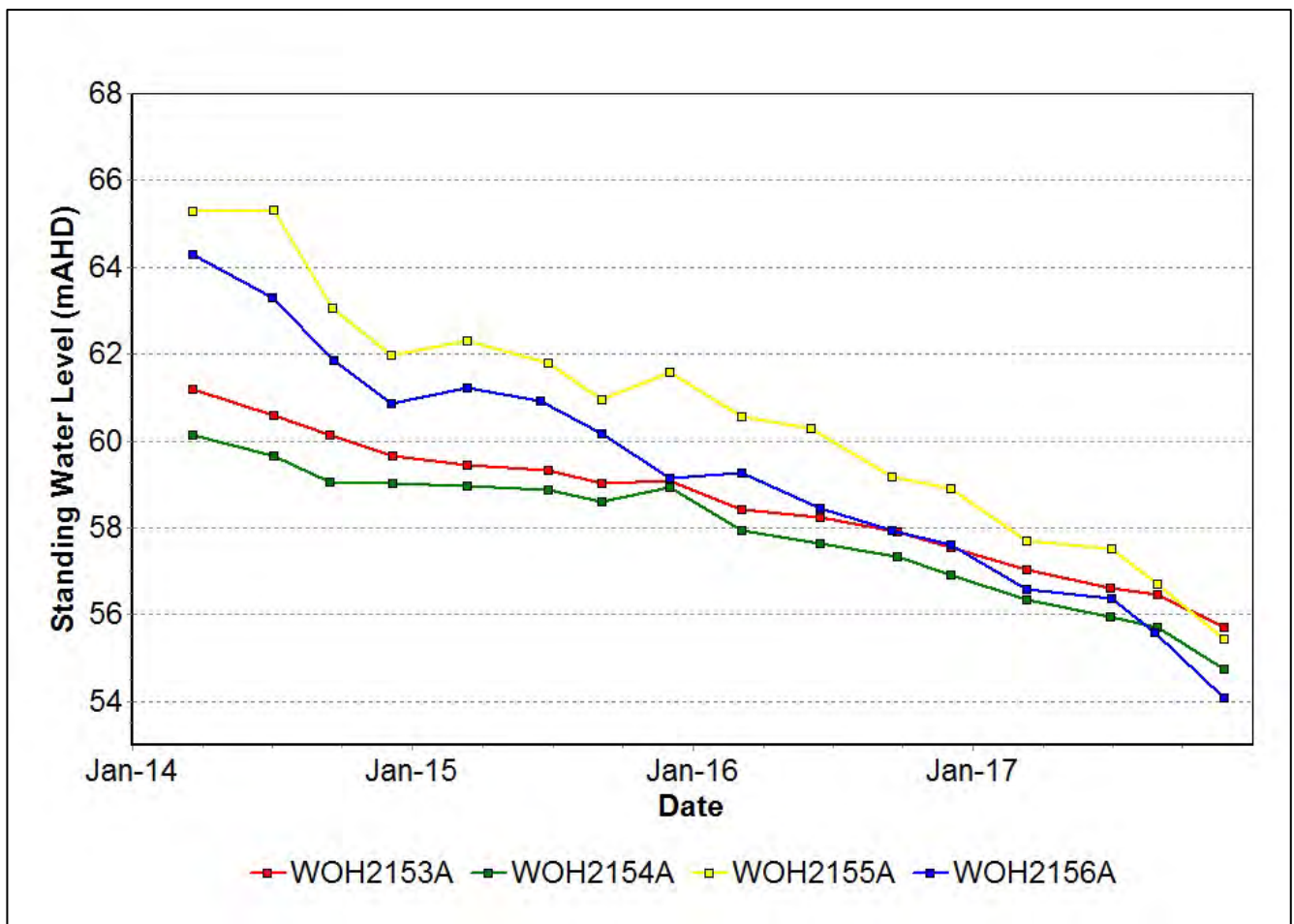


Figure 27: Redbank Seam Standing Water Level Trend – December 2017

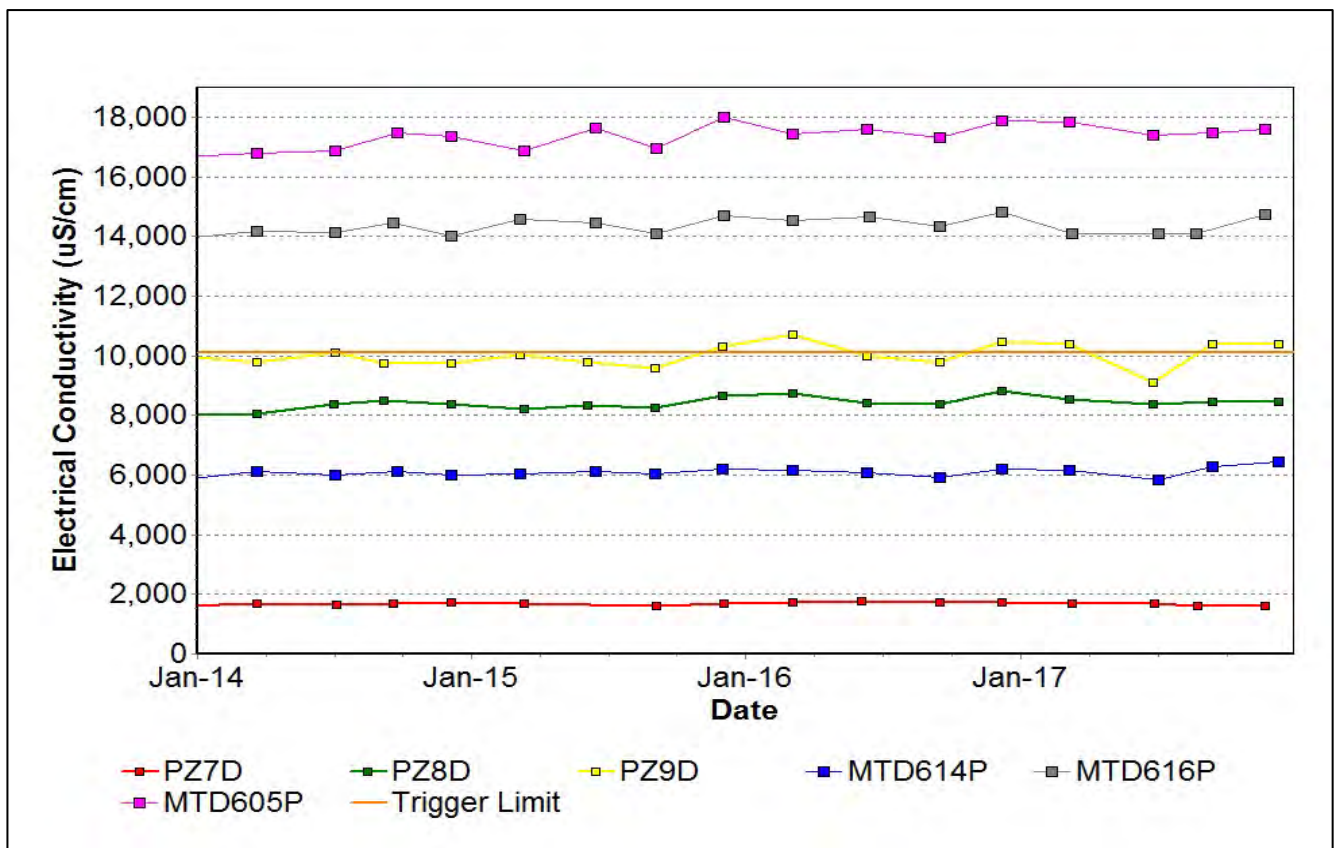


Figure 28: Shallow Overburden Seam Electrical Conductivity Trend – December 2017

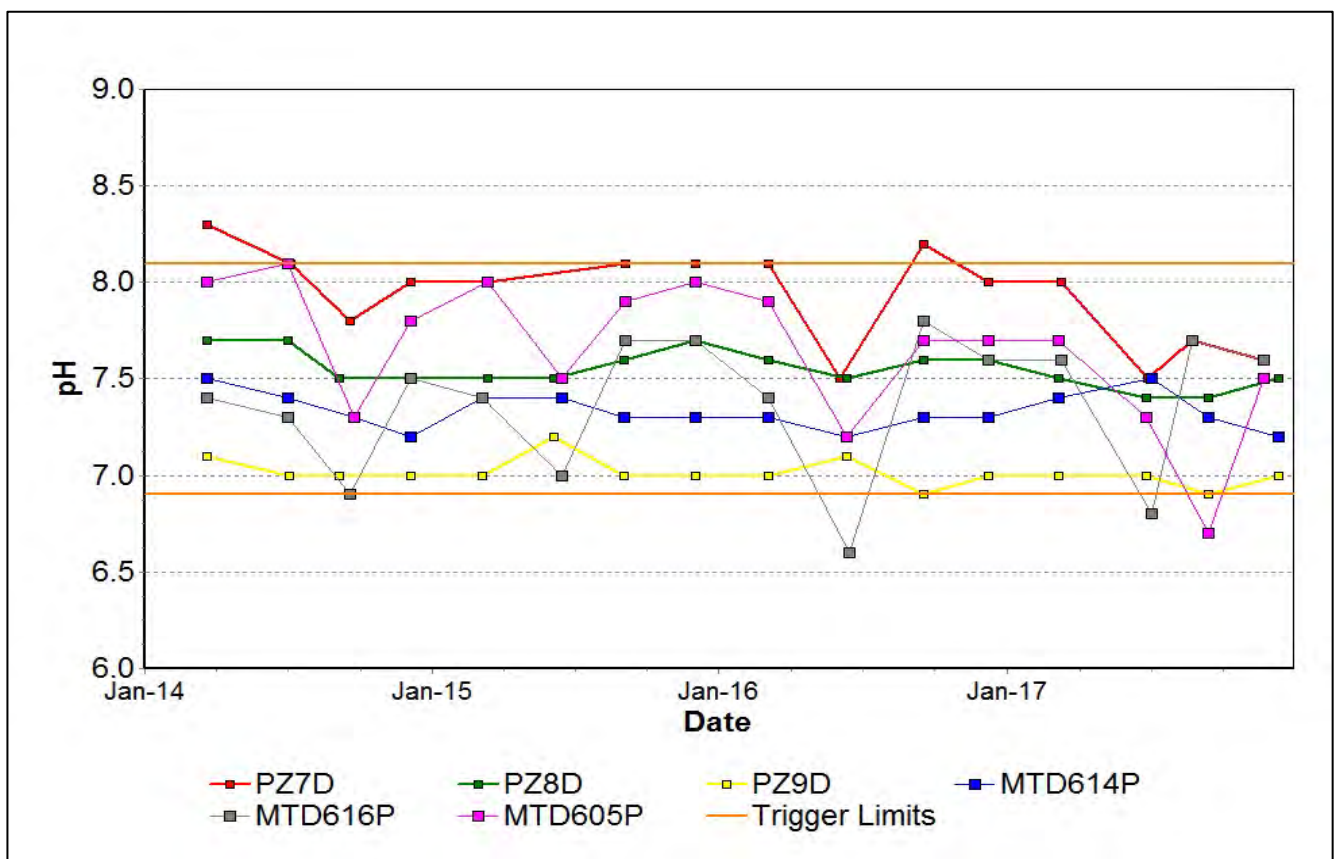


Figure 29: Shallow Overburden Seam pH Trend – December 2017



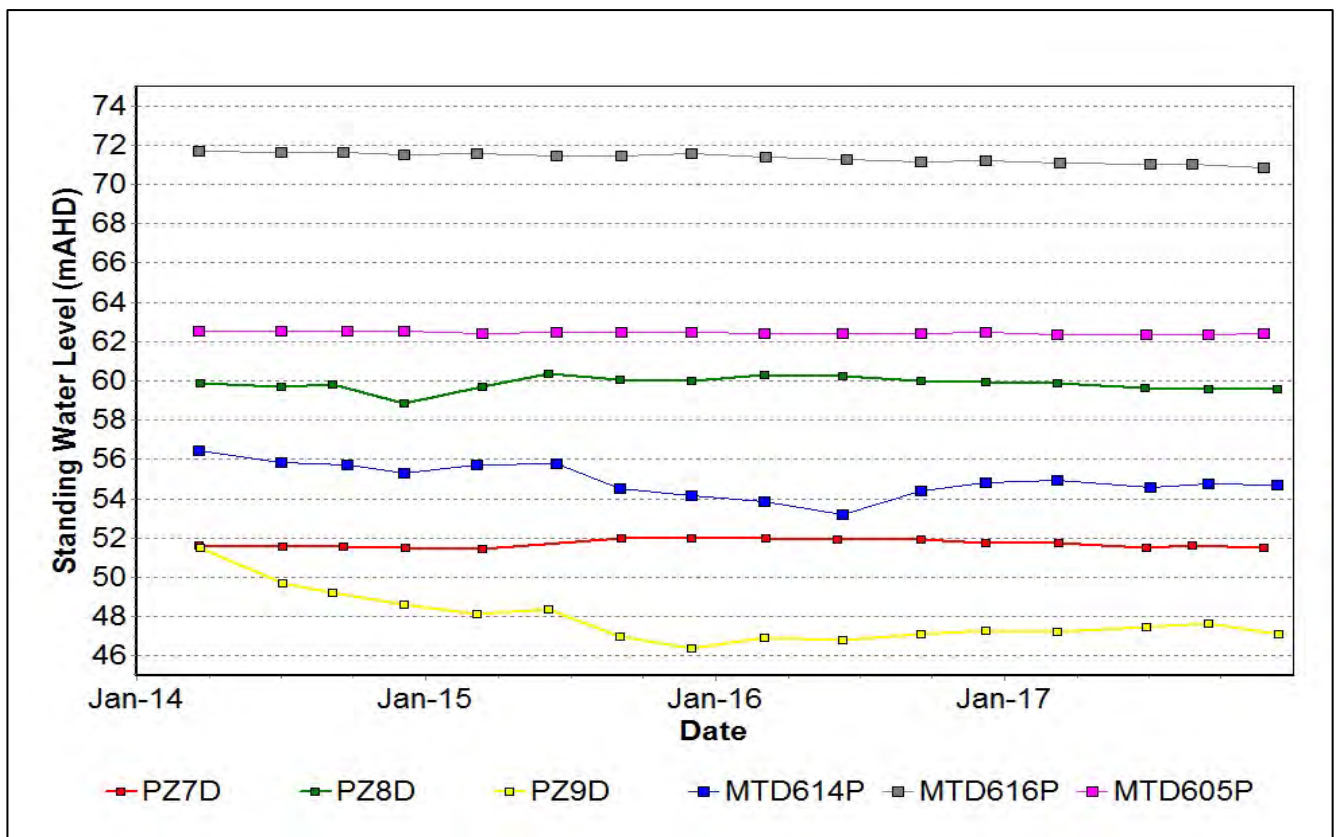


Figure 30: Shallow Overburden Seam Standing Water Level Trend – December 2017

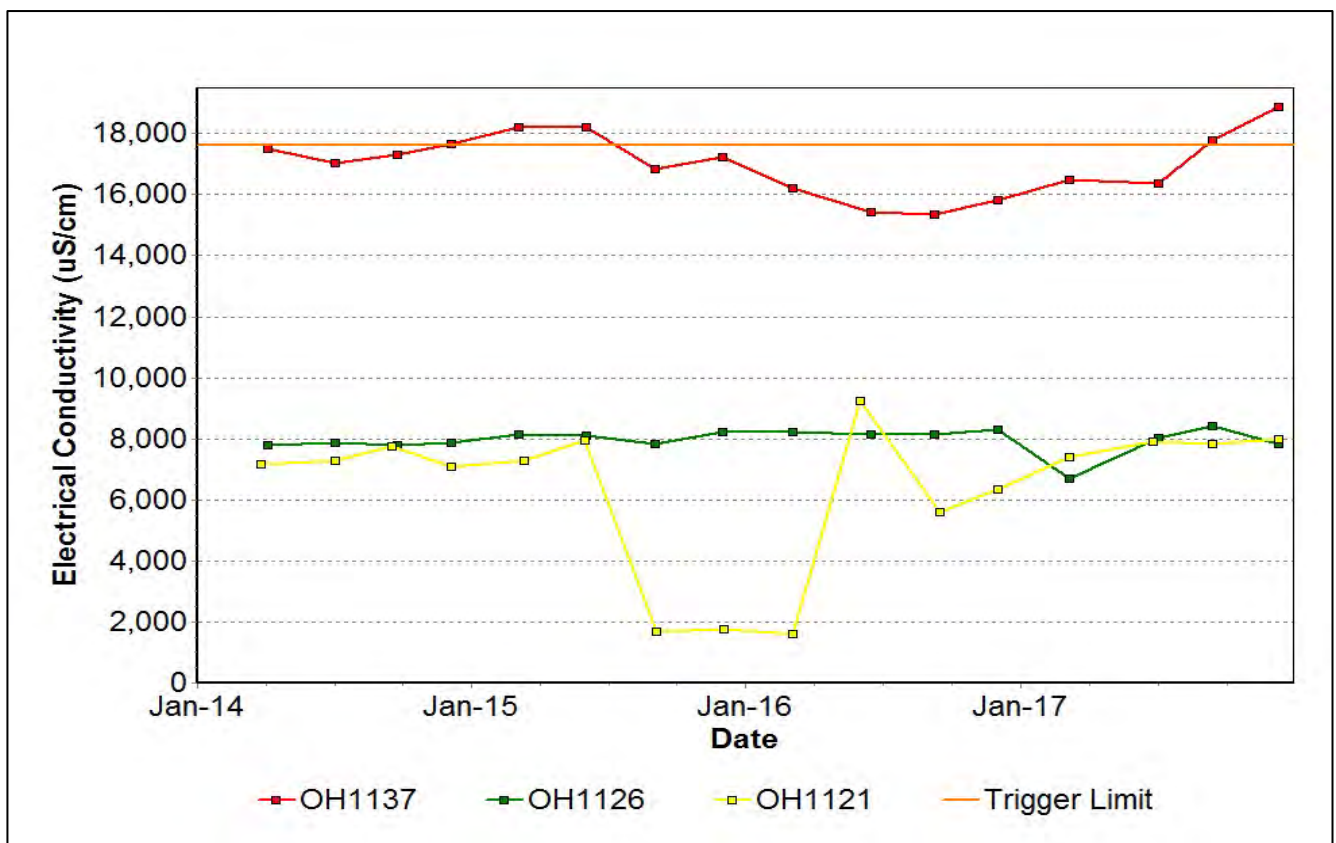


Figure 31: Vaux Seam Electrical Conductivity Trend – December 2017



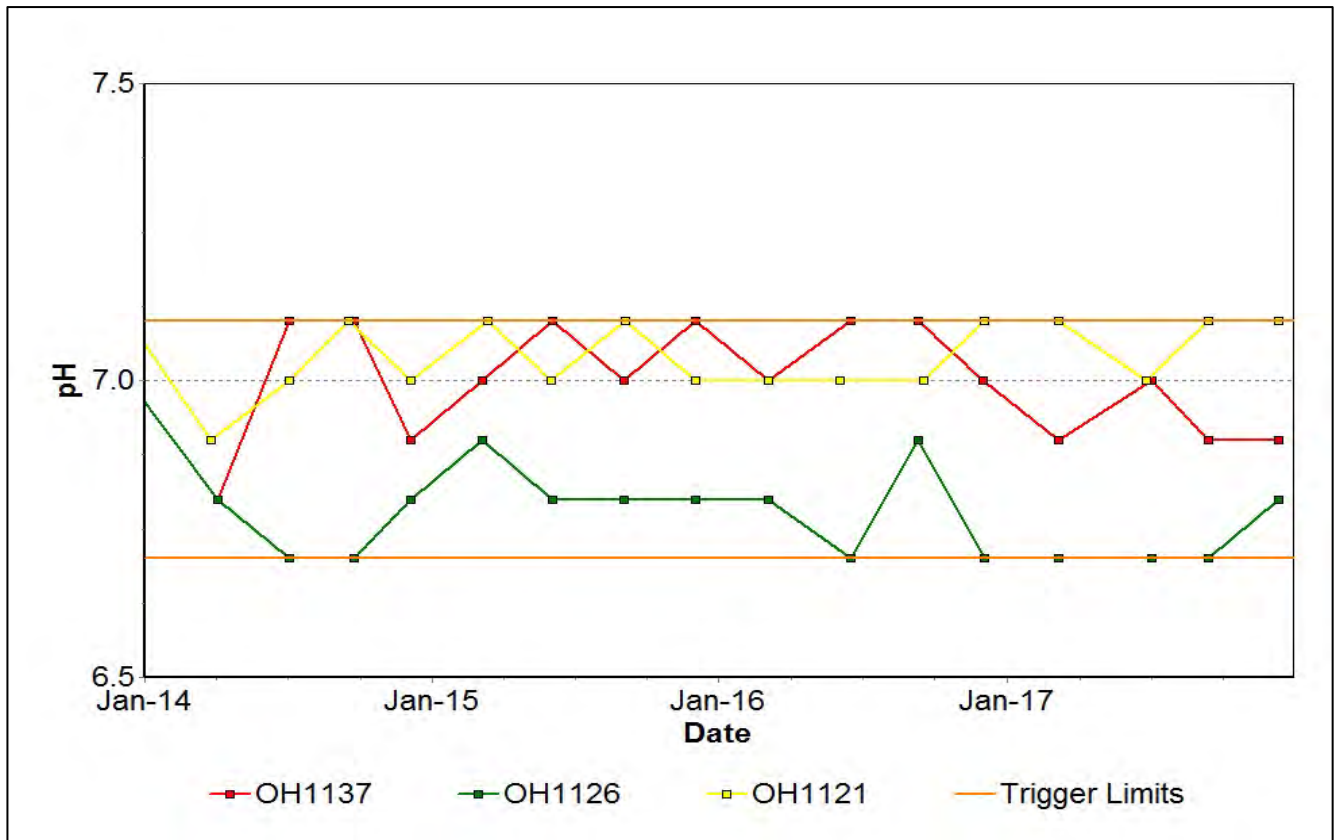


Figure 32: Vaux Seam pH Trend – December 2017

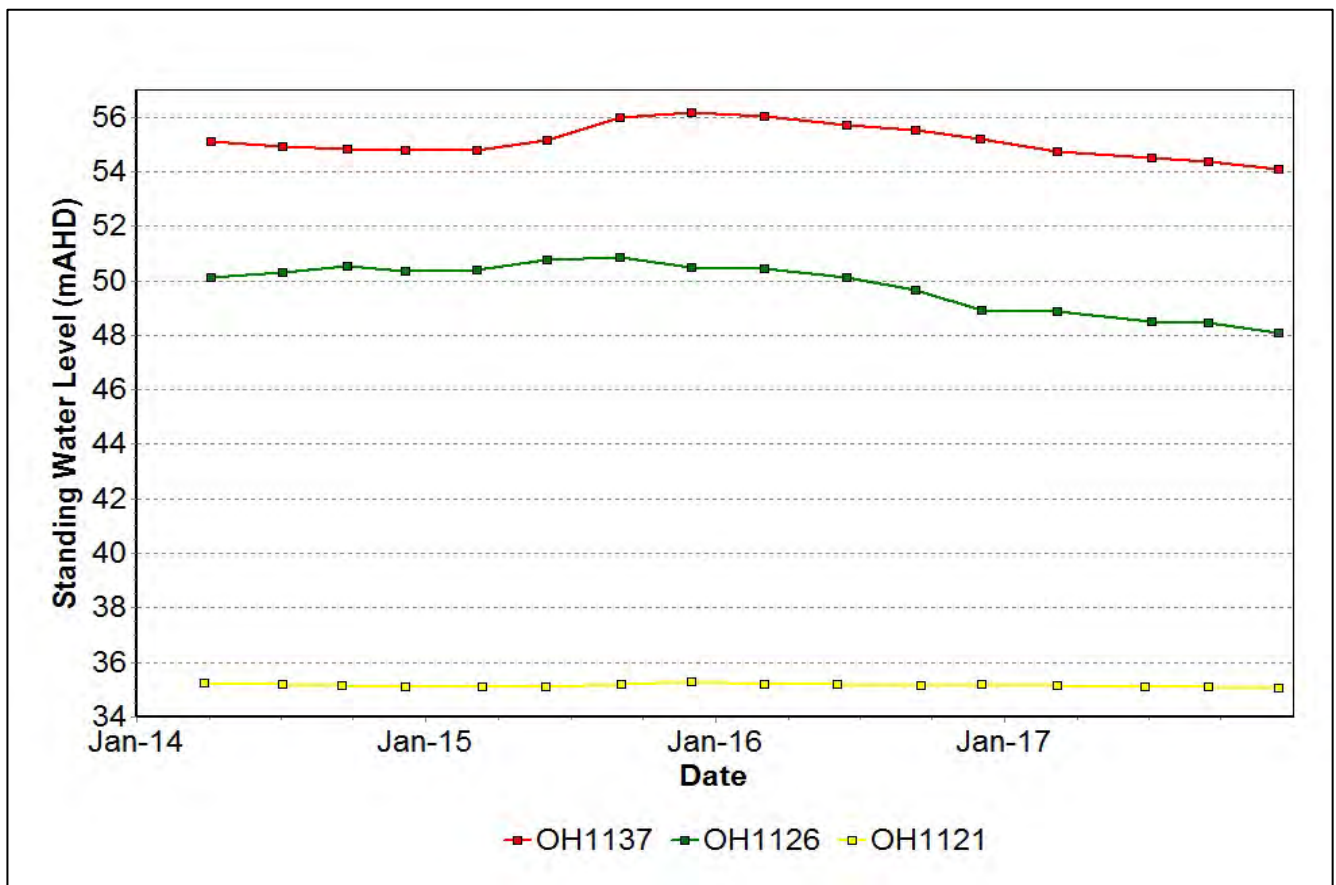


Figure 33: Vaux Seam Standing Water Level Trend – December 2017

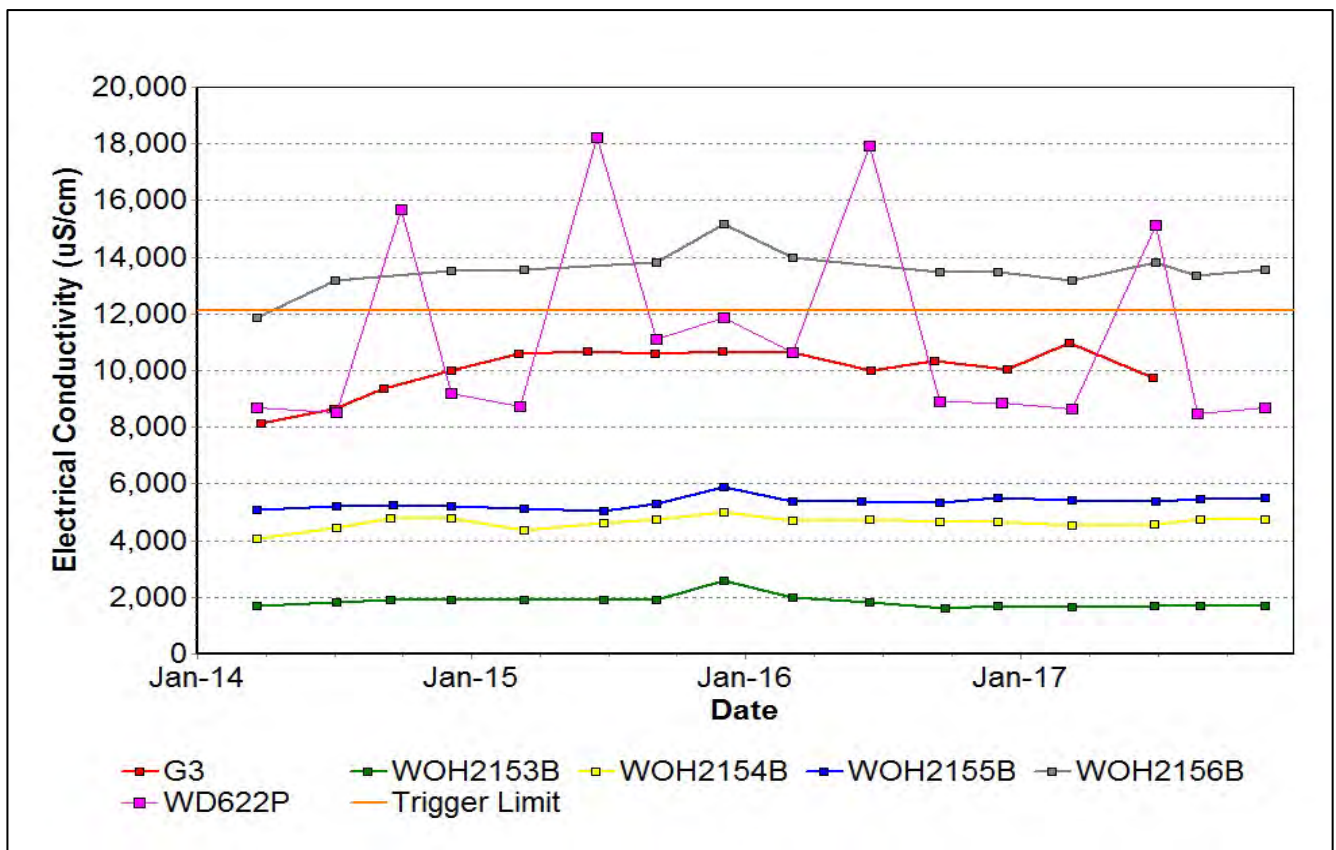


Figure 34: Wambo Seam Electrical Conductivity Trend – December 2017

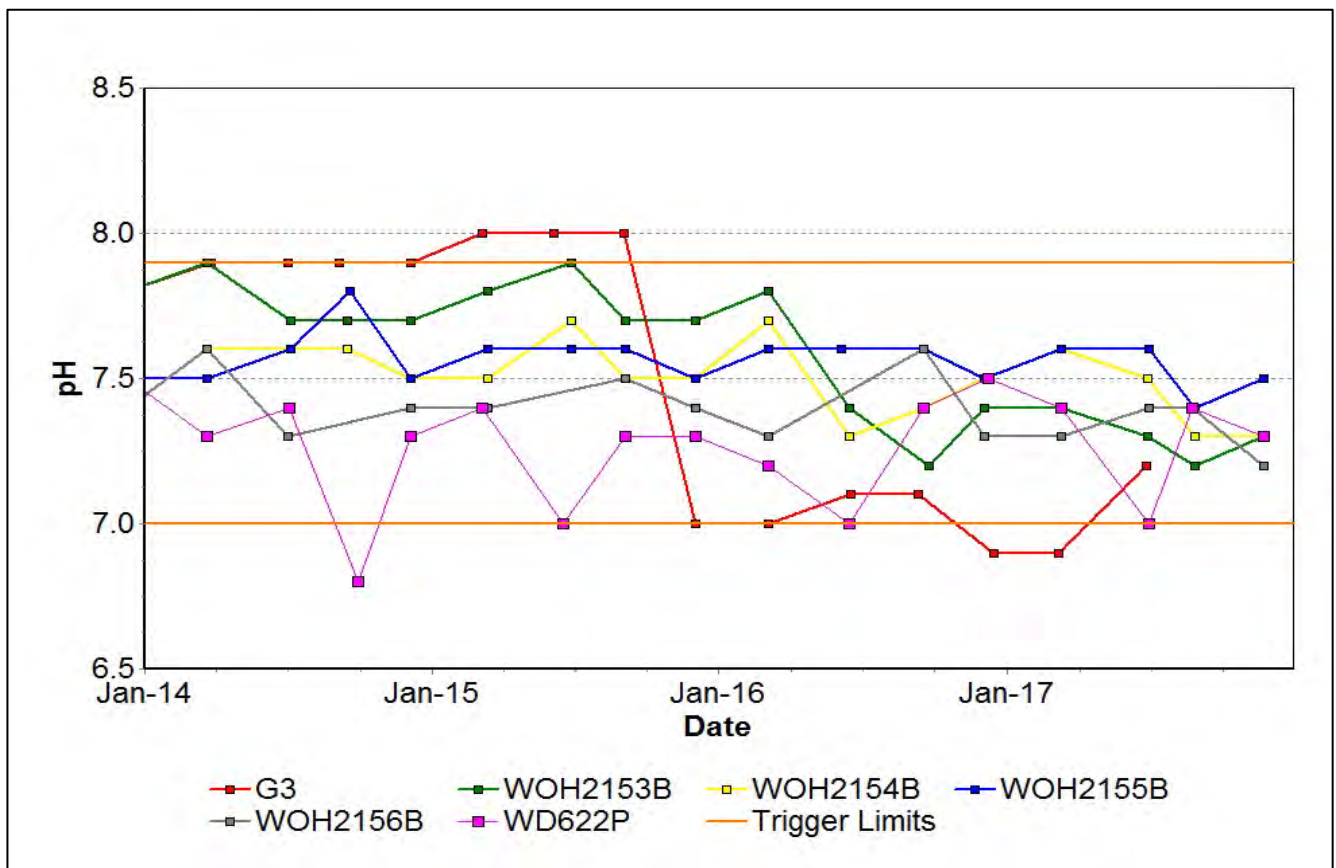


Figure 35: Wambo Seam pH Trend – December 2017

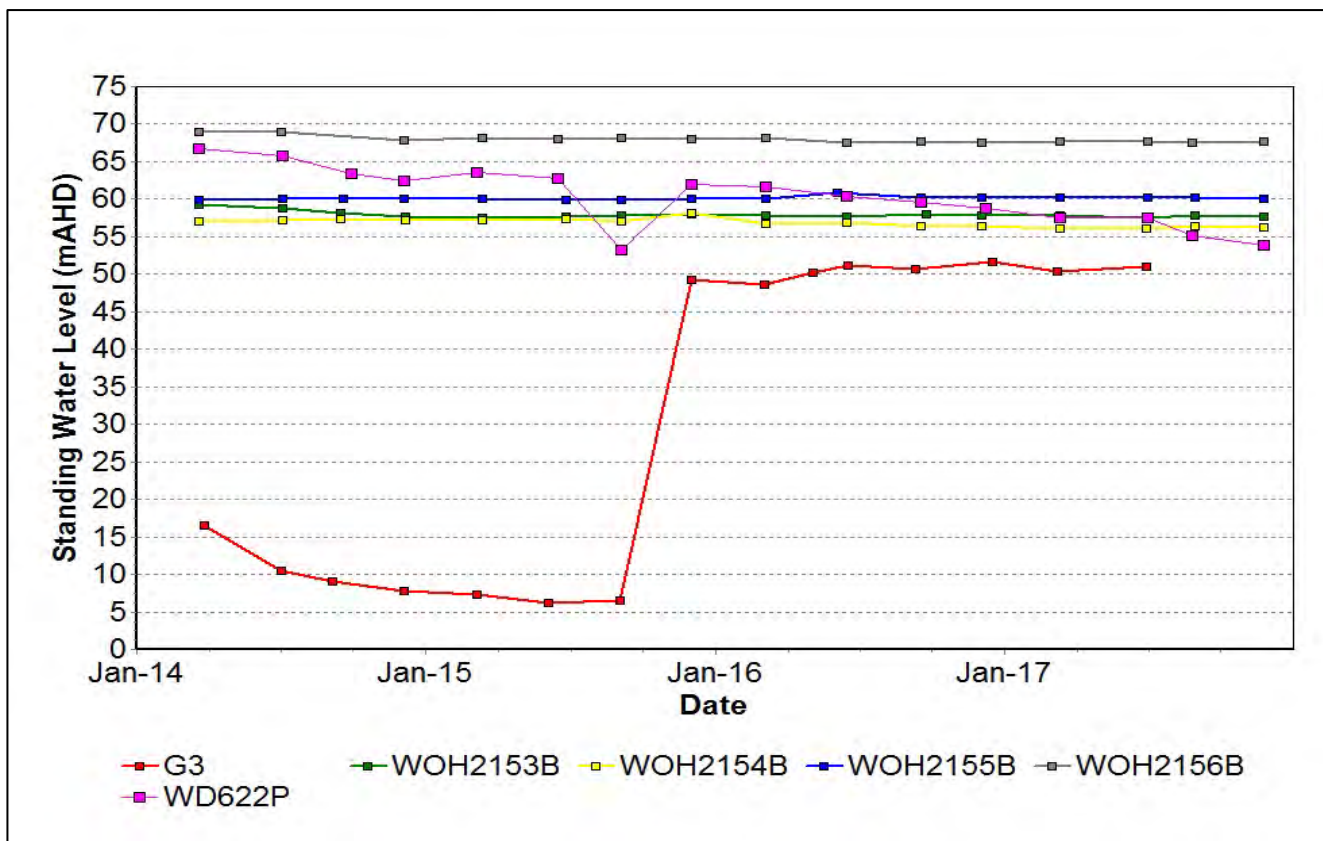


Figure 36: Wambo Seam Standing Water Level Trend – December 2017

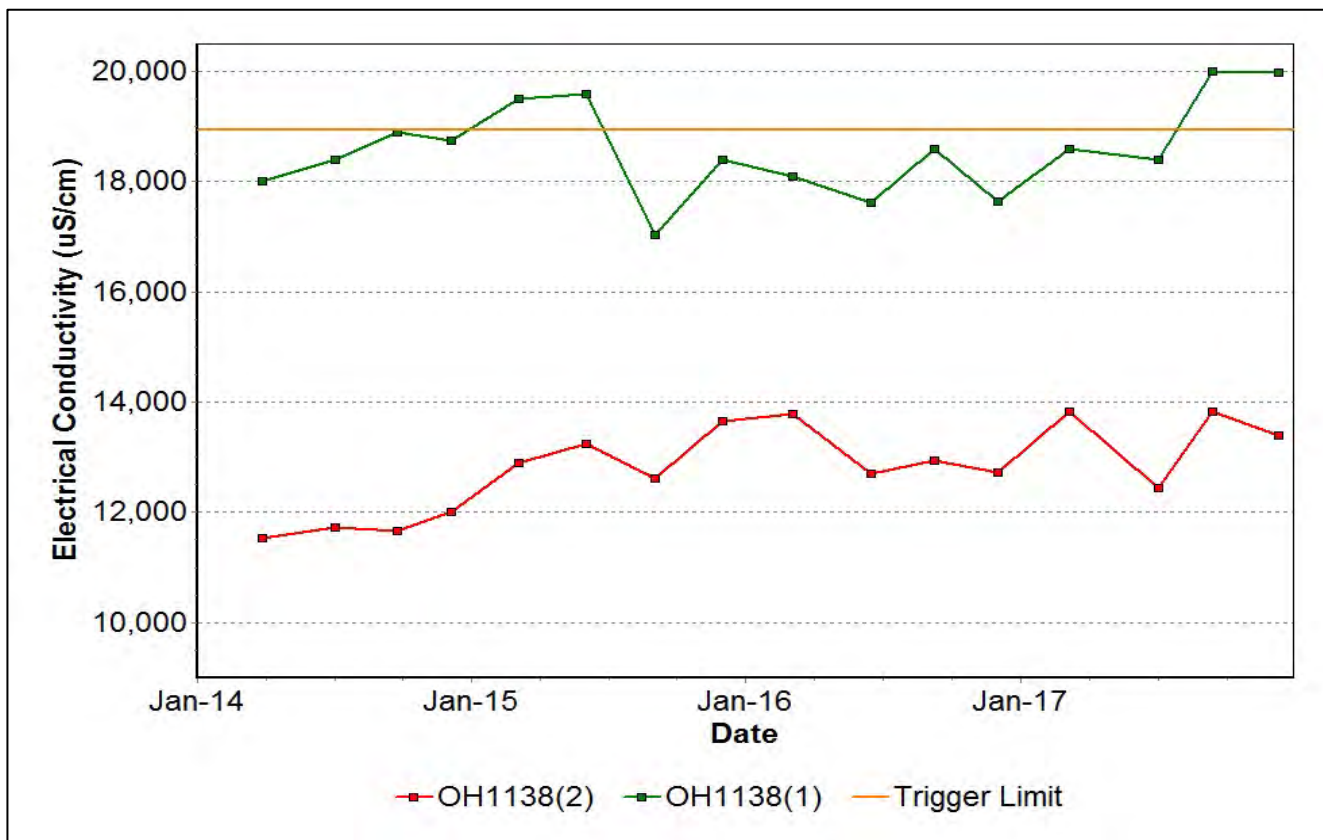


Figure 37: Warkworth Seam Electrical Conductivity Trend – December 2017



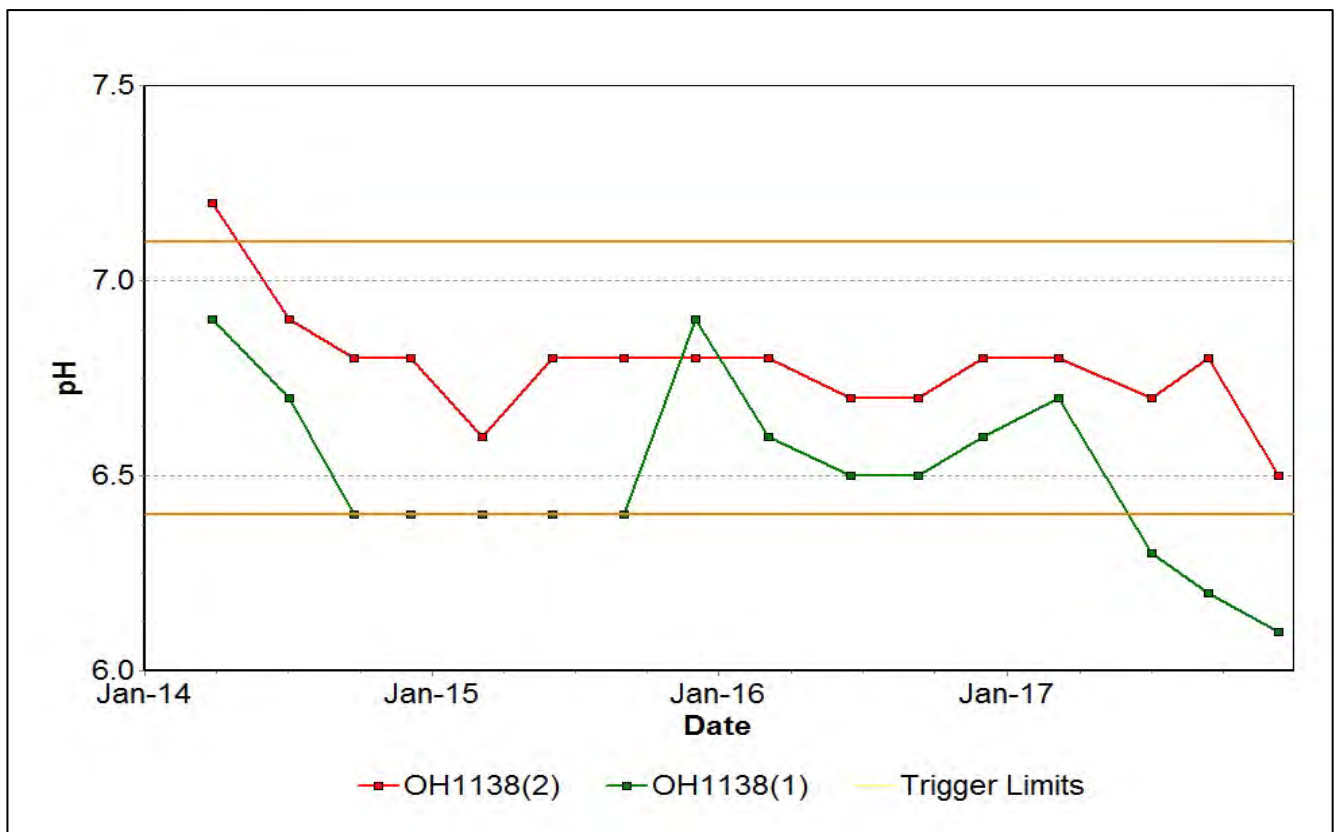


Figure 38: Warkworth Seam pH Trend – December 2017

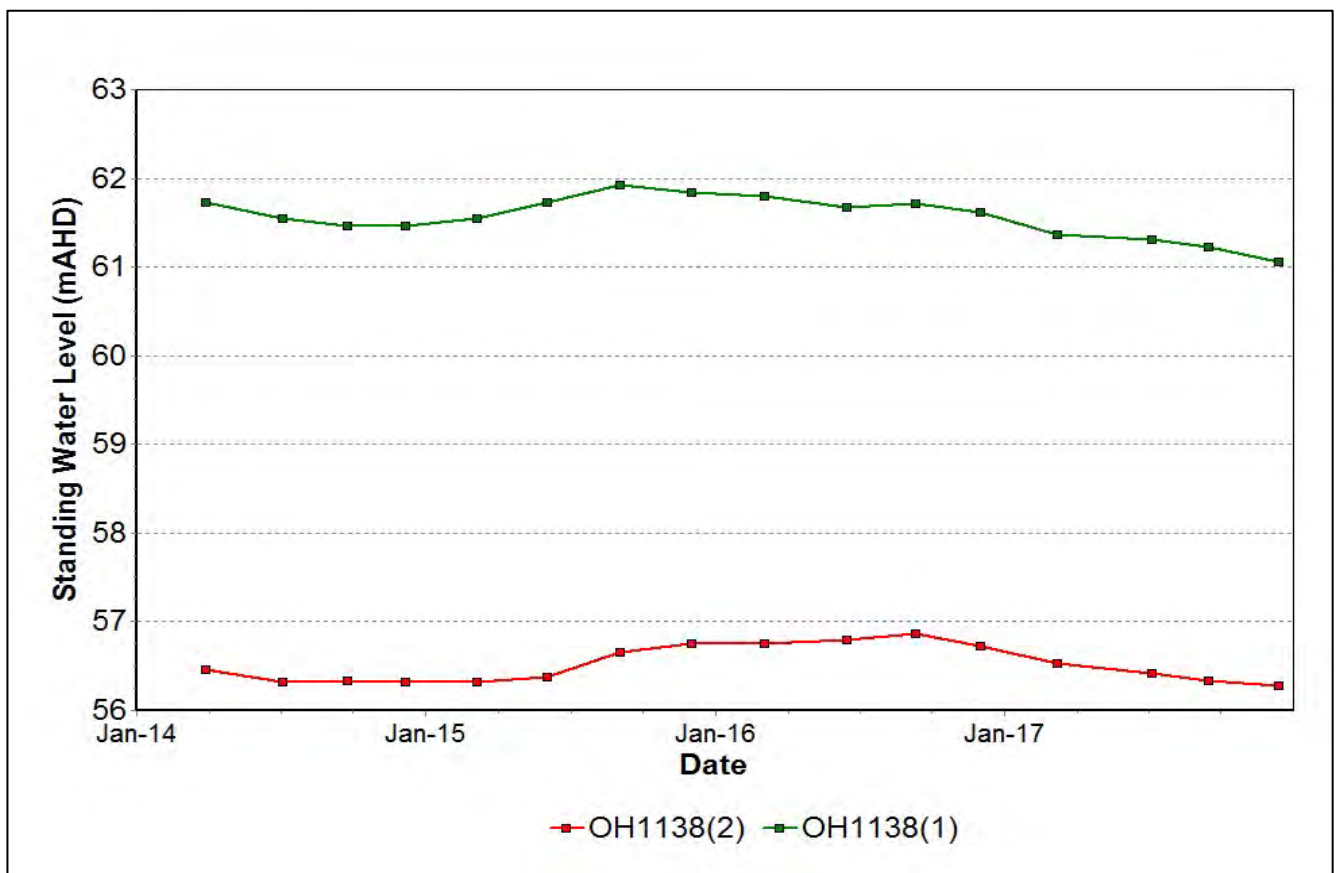


Figure 39: Warkworth Seam Standing Water Level Trend – December 2017



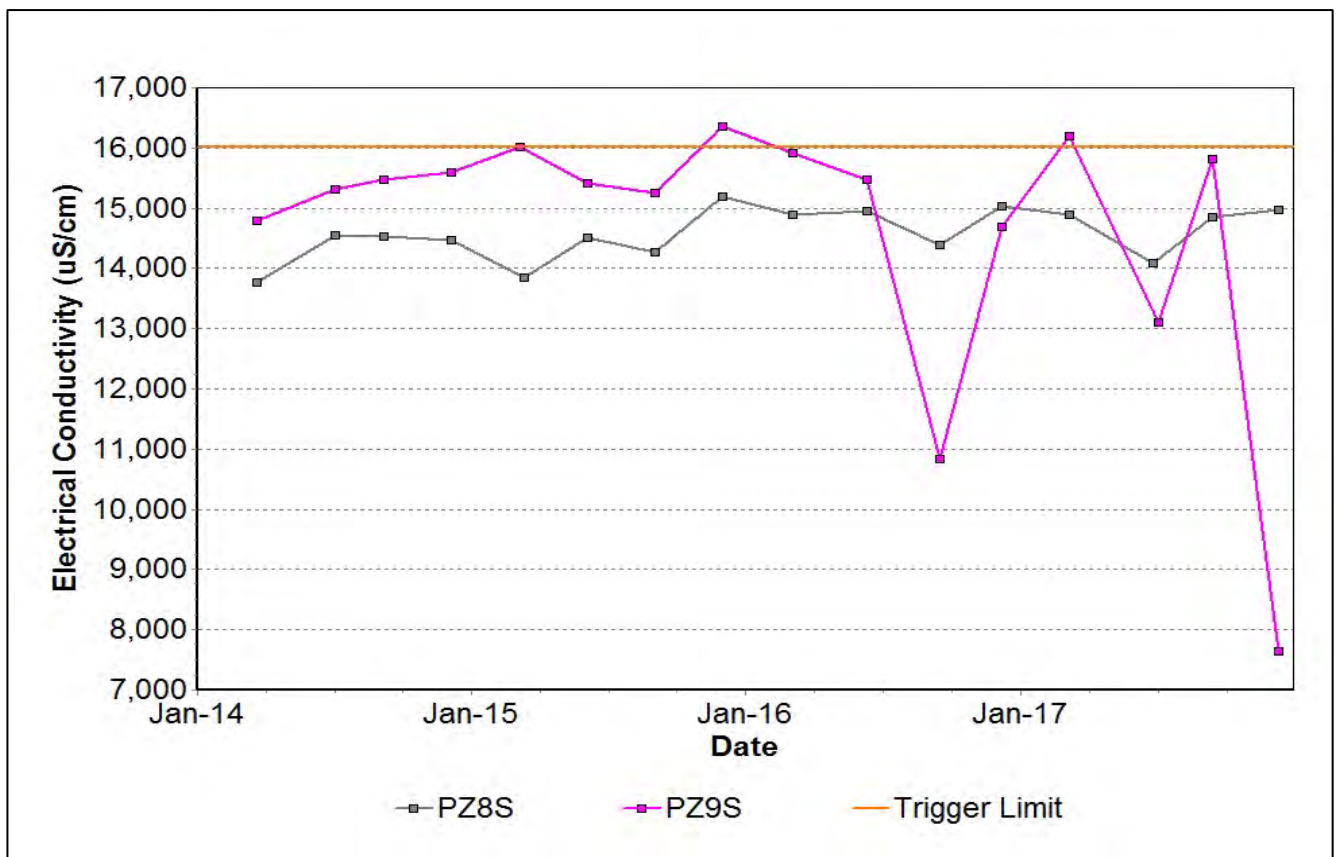


Figure 40: Wollombi Alluvium Electrical Conductivity Trend – December 2017

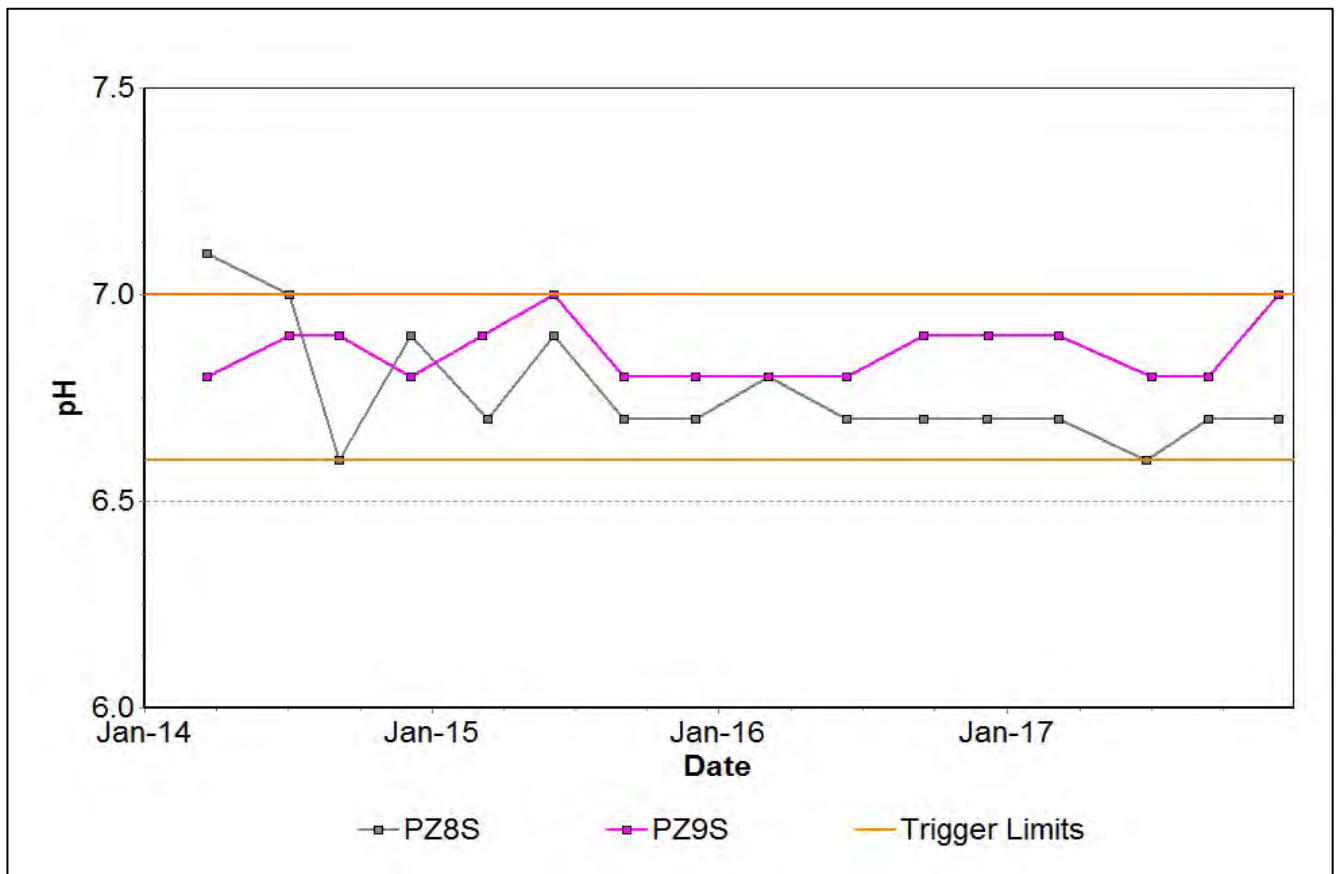


Figure 41: Wollombi Alluvium pH Trend – December 2017

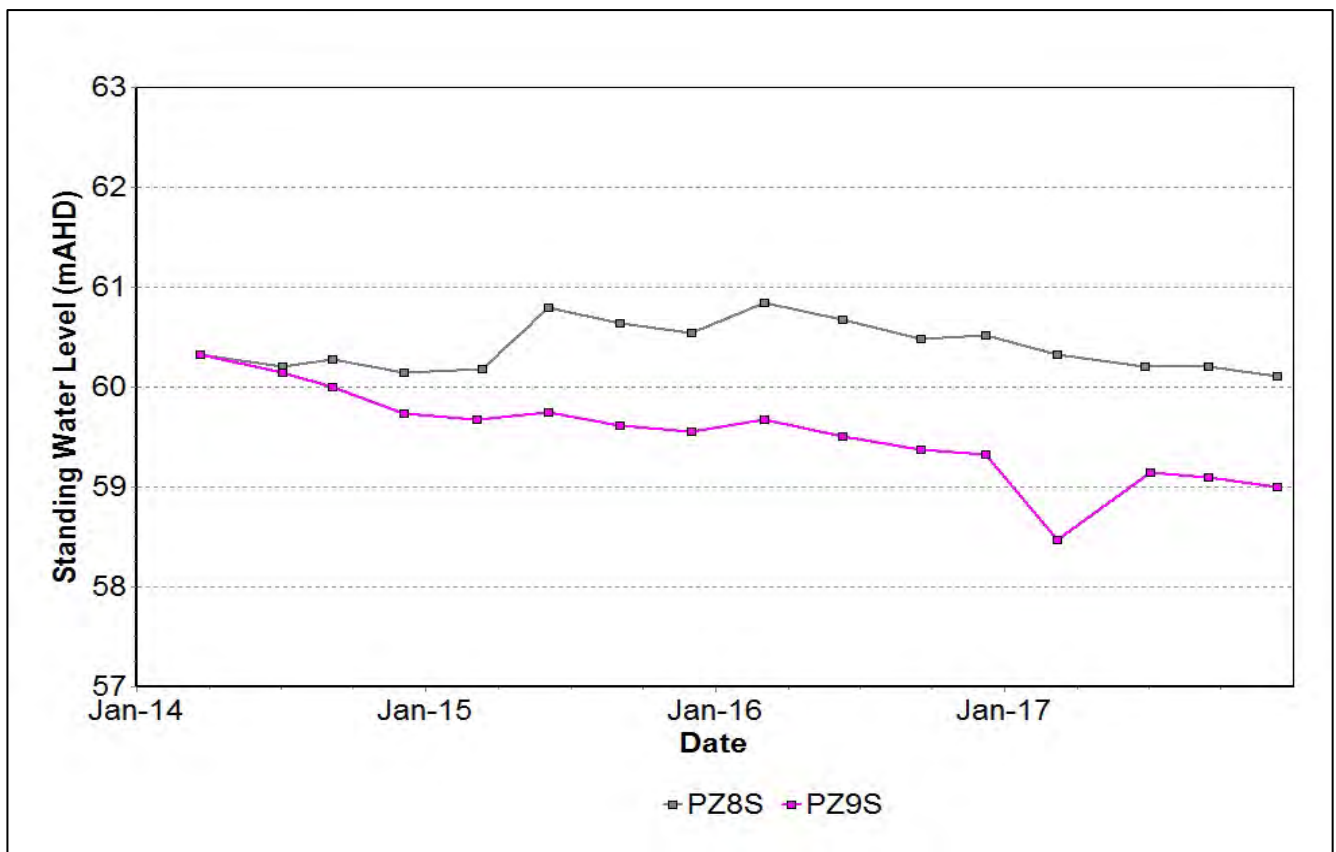


Figure 42: Wollombi Alluvium Standing Water Level Trend – December 2017

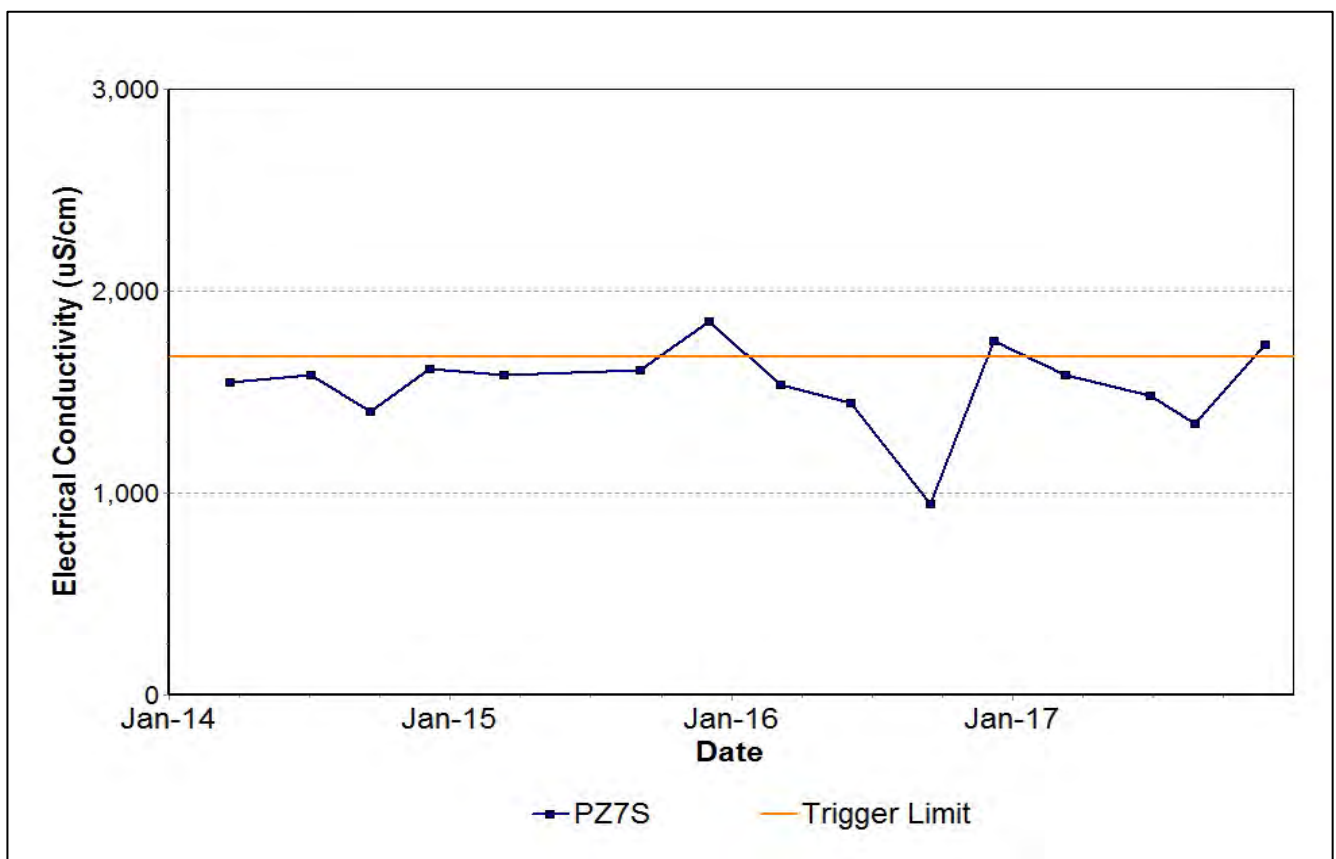


Figure 43: Aeolian Warkworth Sands Electrical Conductivity Trend – December 2017

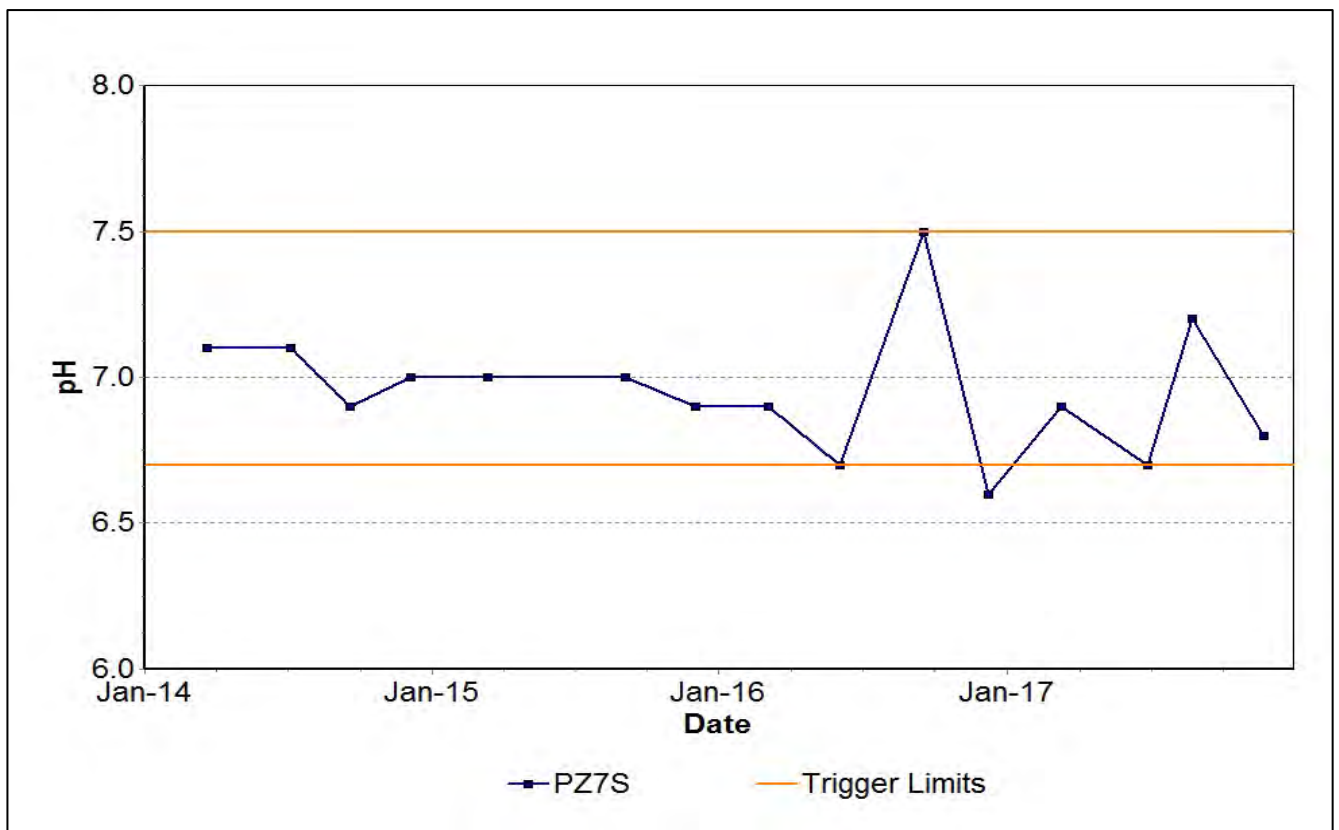


Figure 44: Aeolian Warkworth Sands pH Trend – December 2017

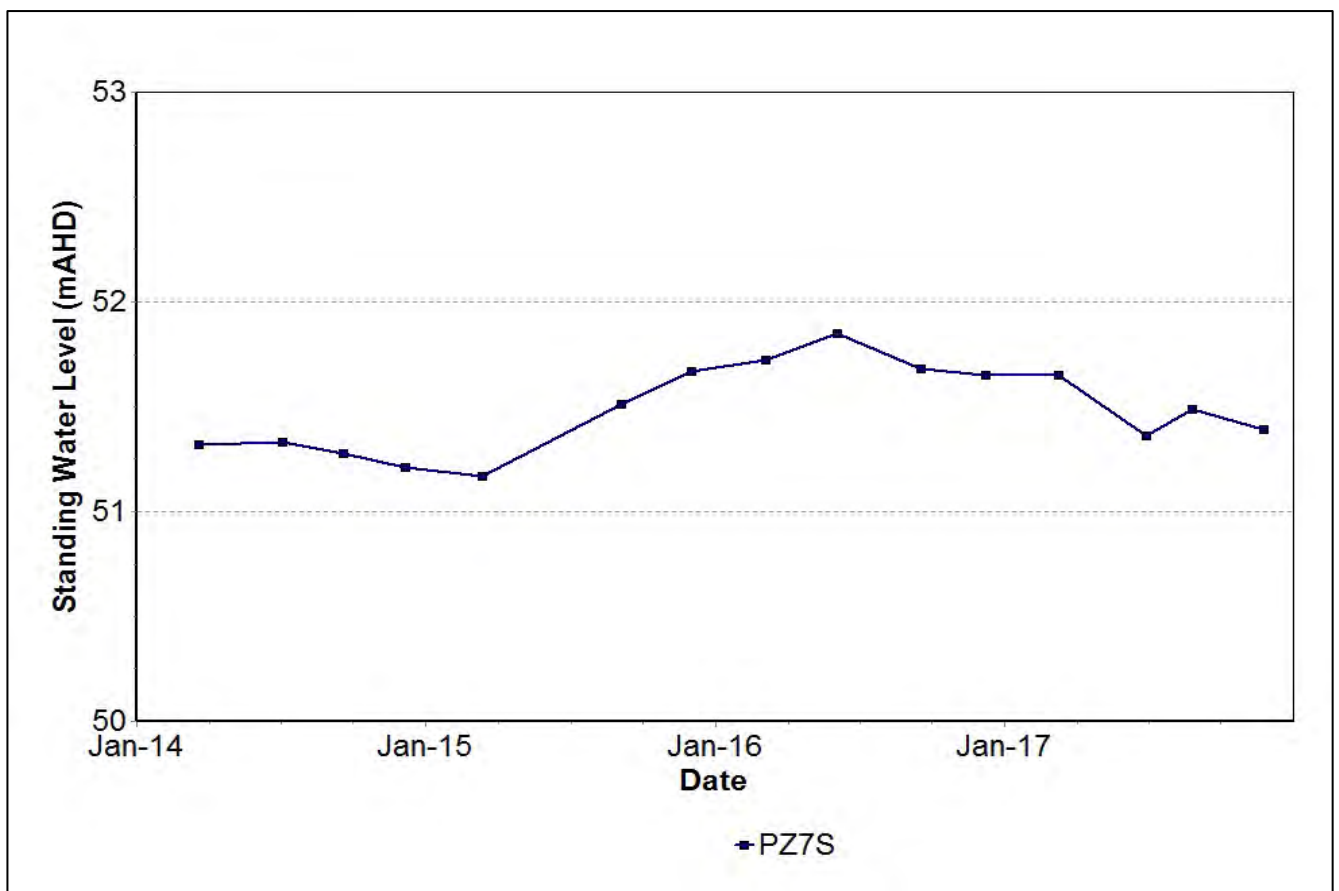


Figure 45: Aeolian Warkworth Sands Standing Water Level Trend – December 2017

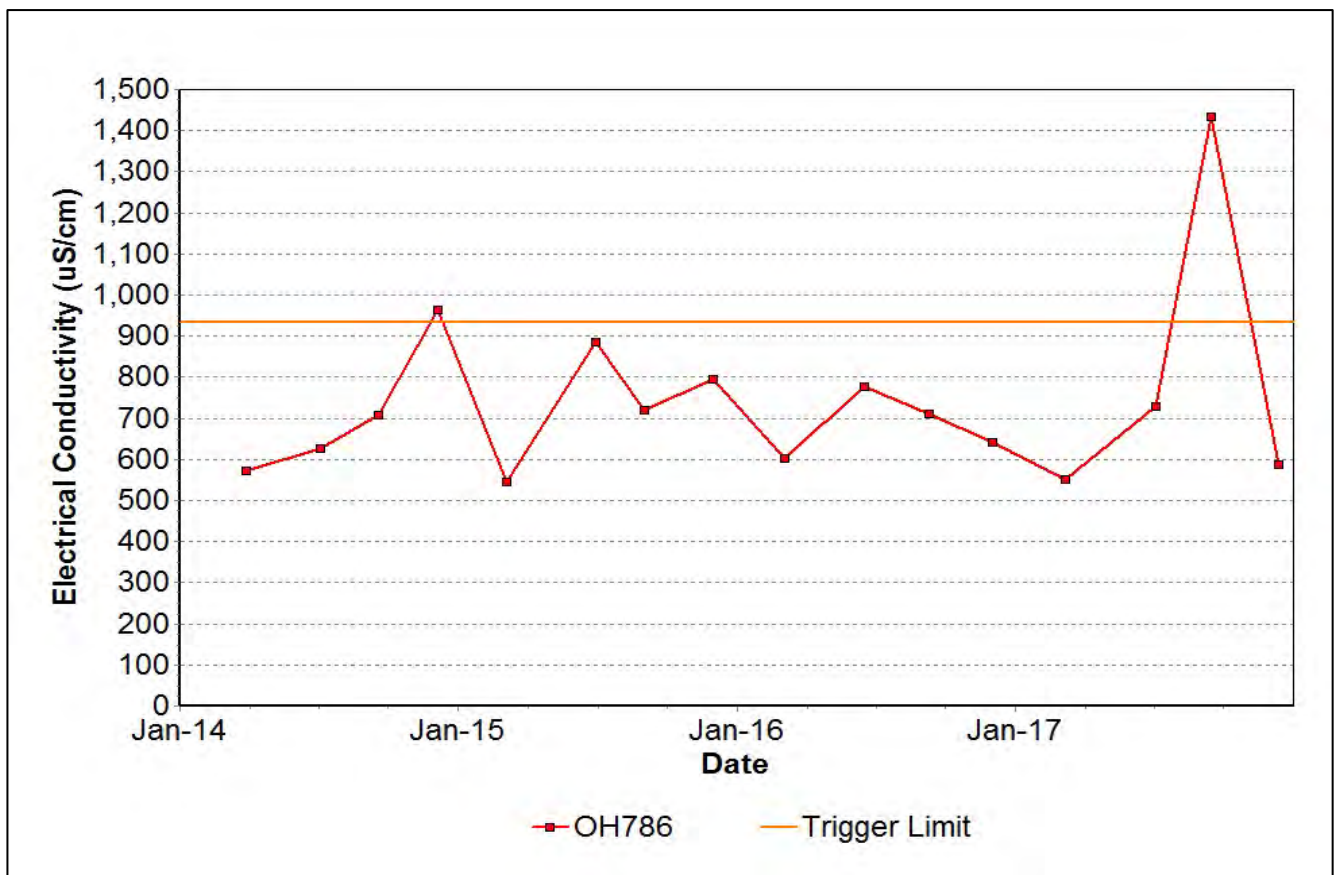


Figure 46: Hunter River Alluvium 1 Seam Electrical Conductivity Trend – December 2017

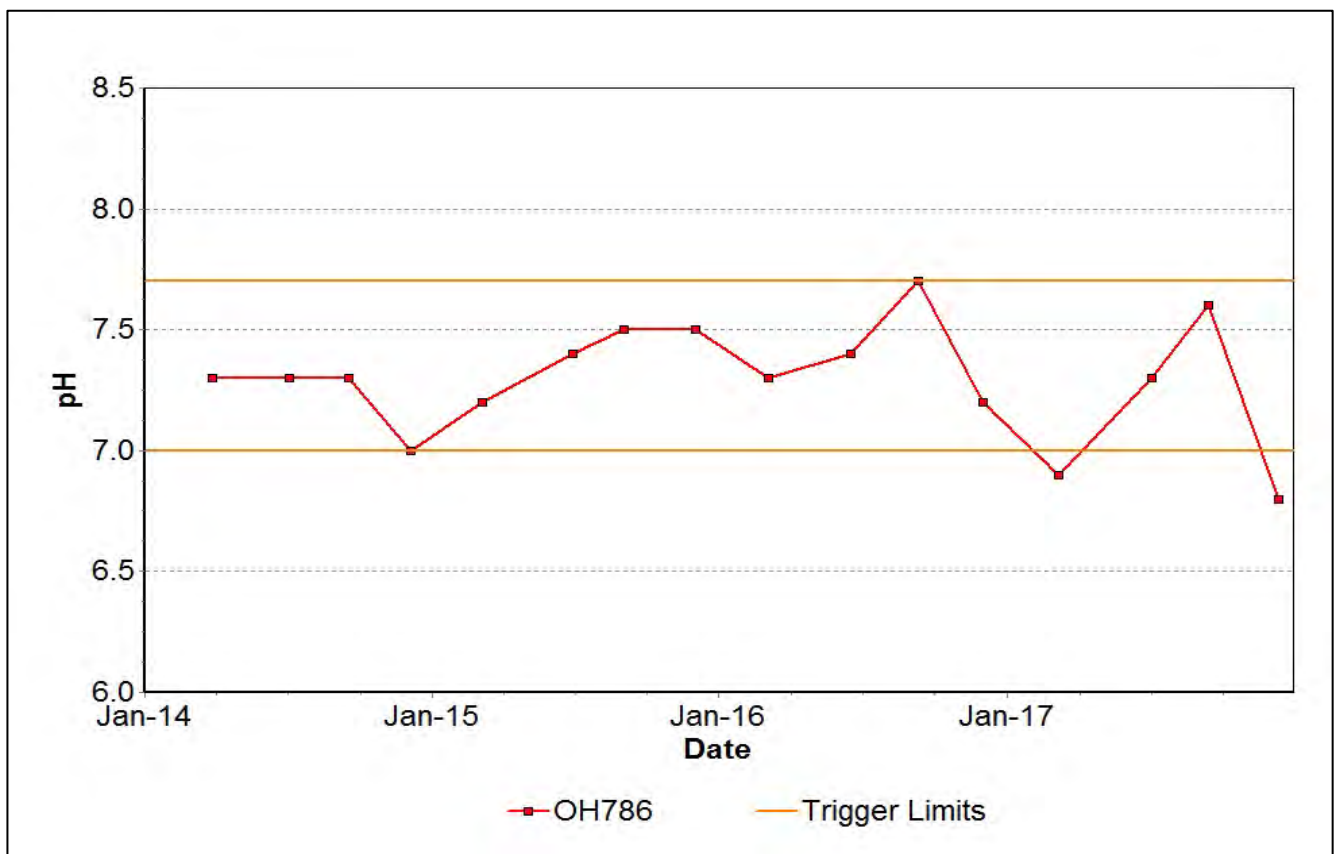


Figure 47: Hunter River Alluvium 1 Seam pH Trend – December 2017



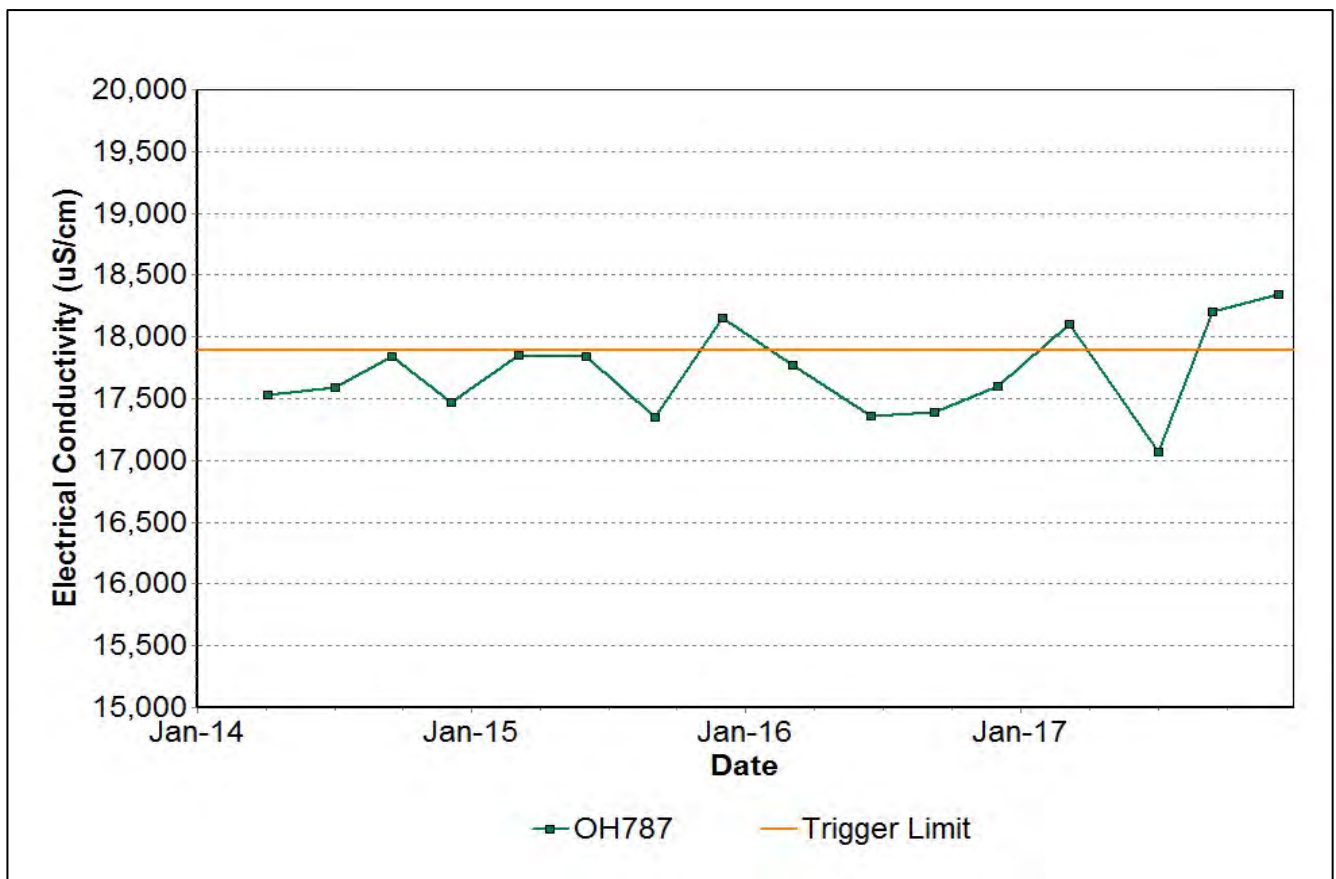


Figure 48: Hunter River Alluvium 2 Seam Electrical Conductivity Trend – December 2017

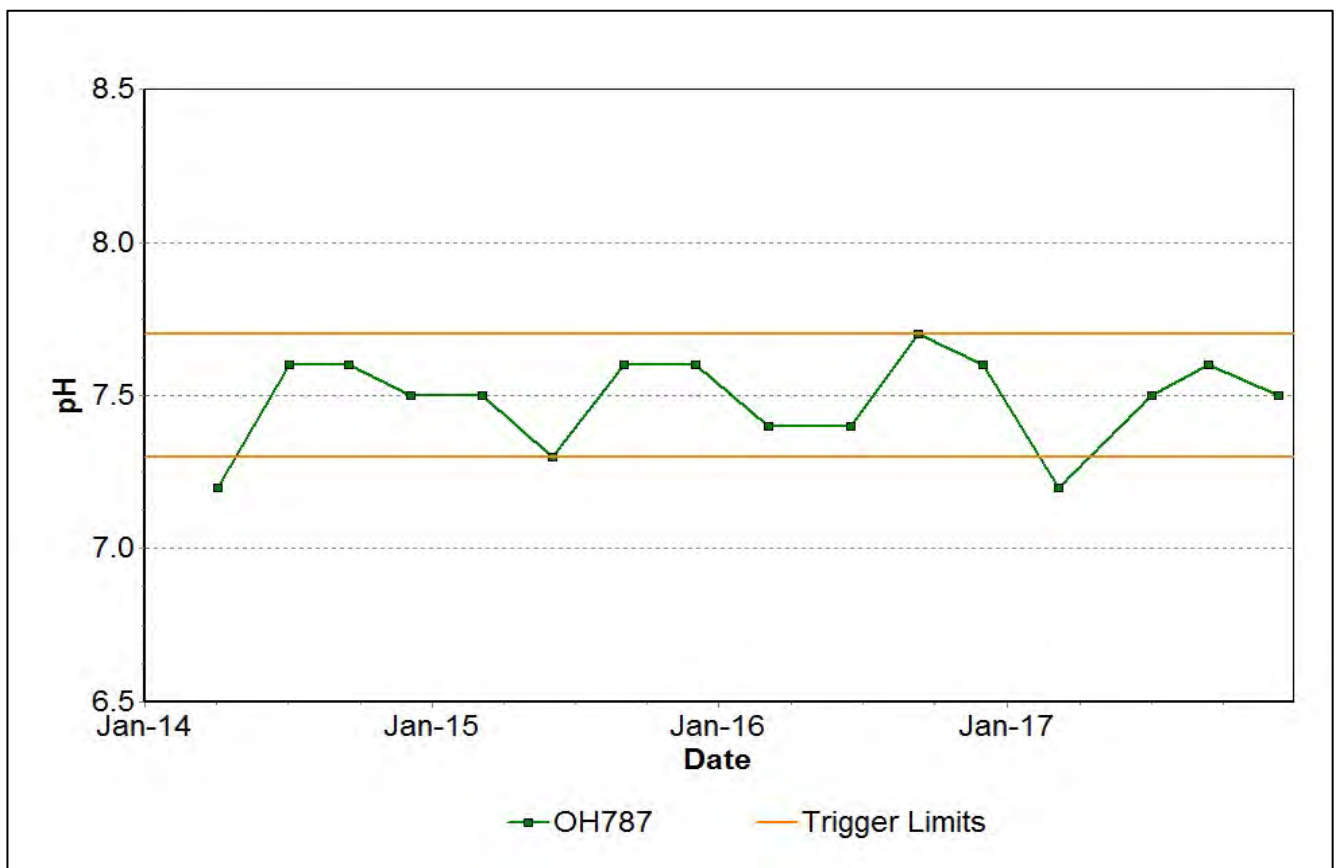


Figure 49: Hunter River Alluvium 2 Seam pH Trend – December 2017

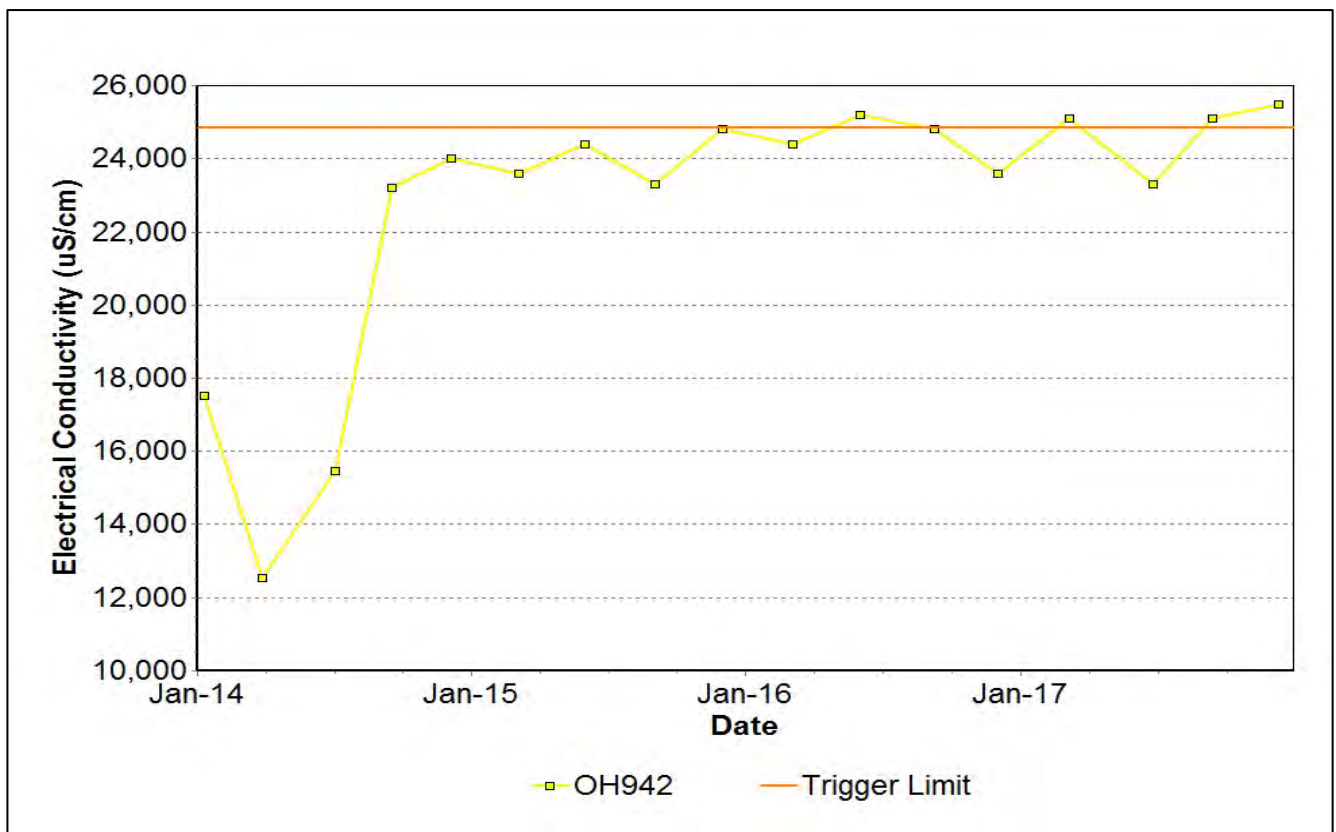


Figure 50: Hunter River Alluvium 3 Seam Electrical Conductivity Trend – December 2017

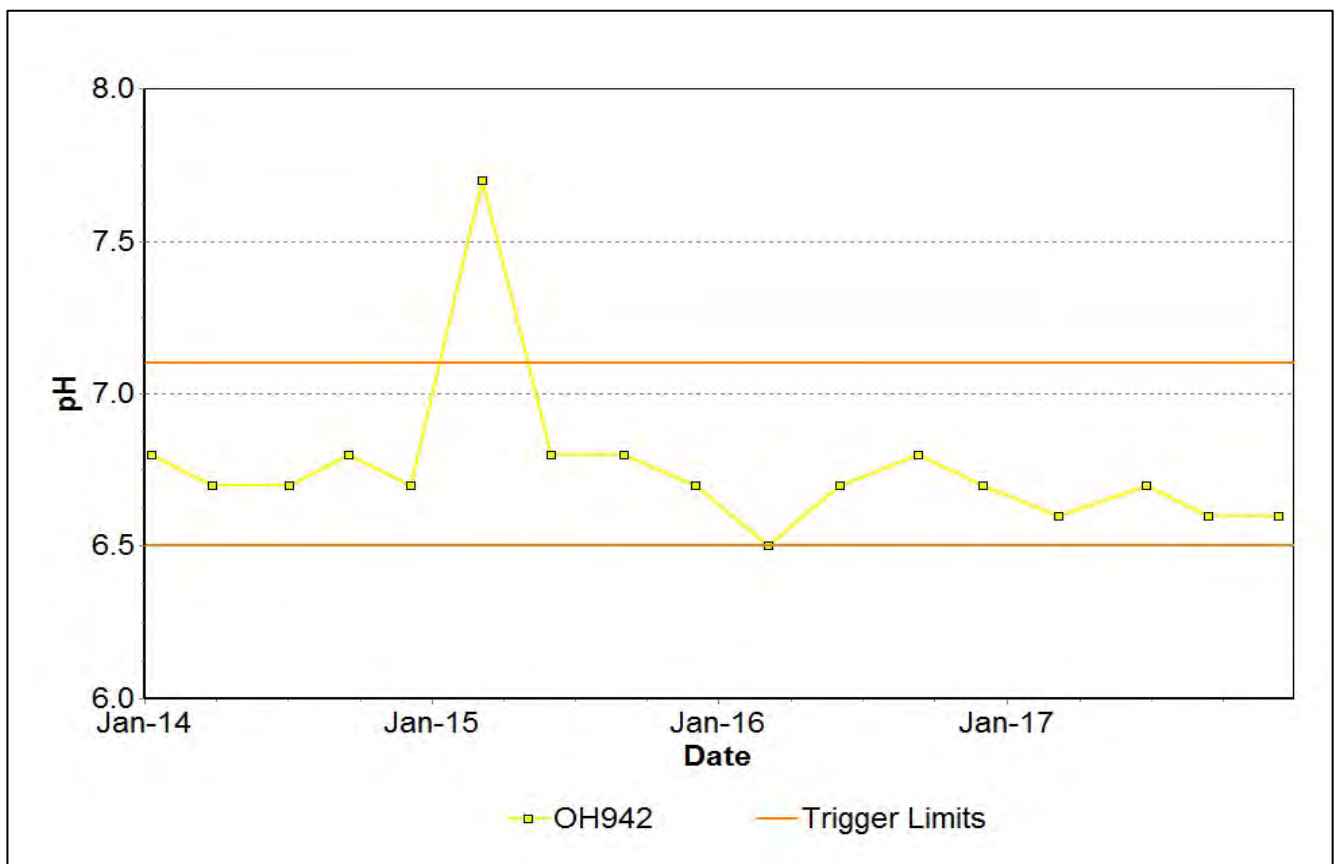


Figure 51: Hunter River Alluvium 3 Seam pH Trend – December 2017

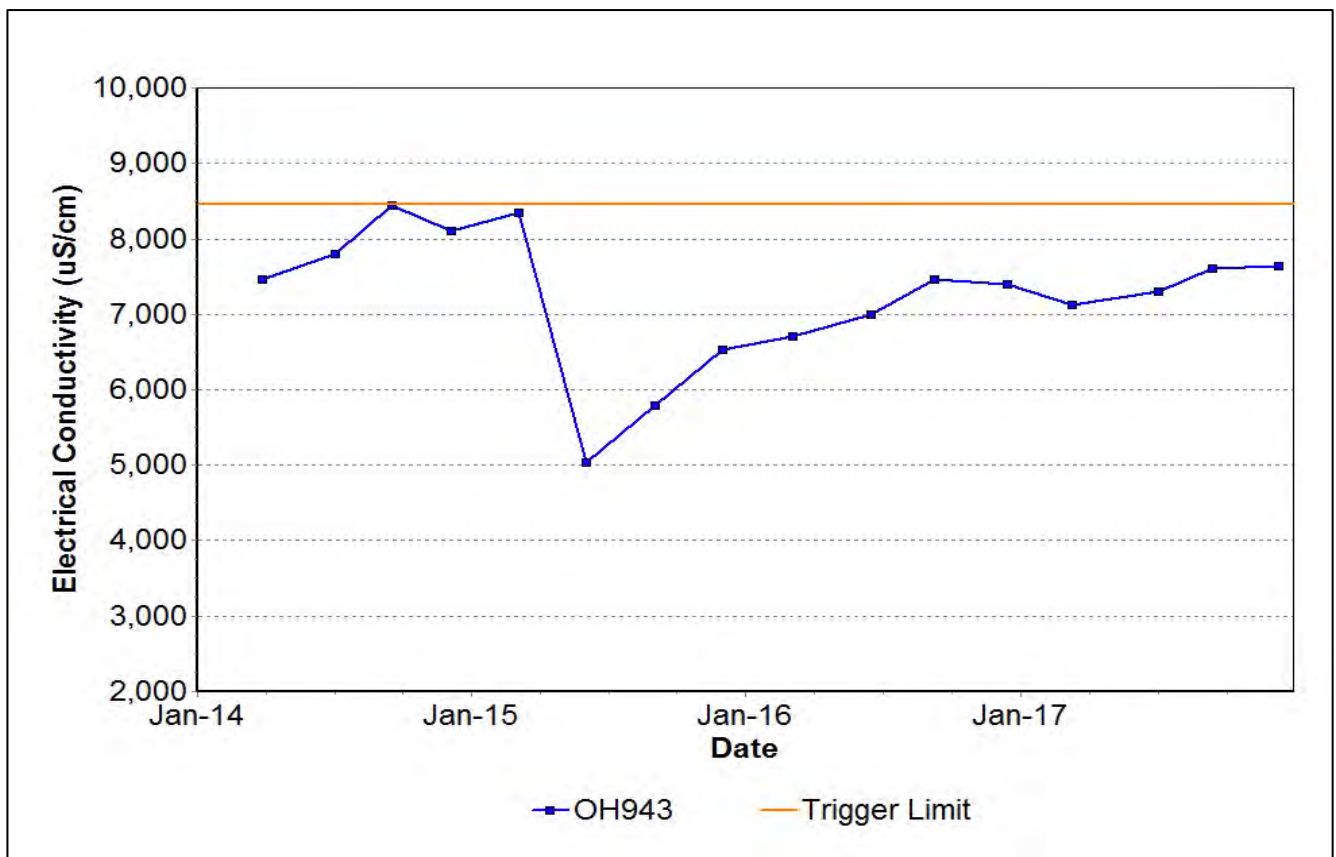


Figure 52: Hunter River Alluvium 4 Seam Electrical Conductivity Trend – December 2017

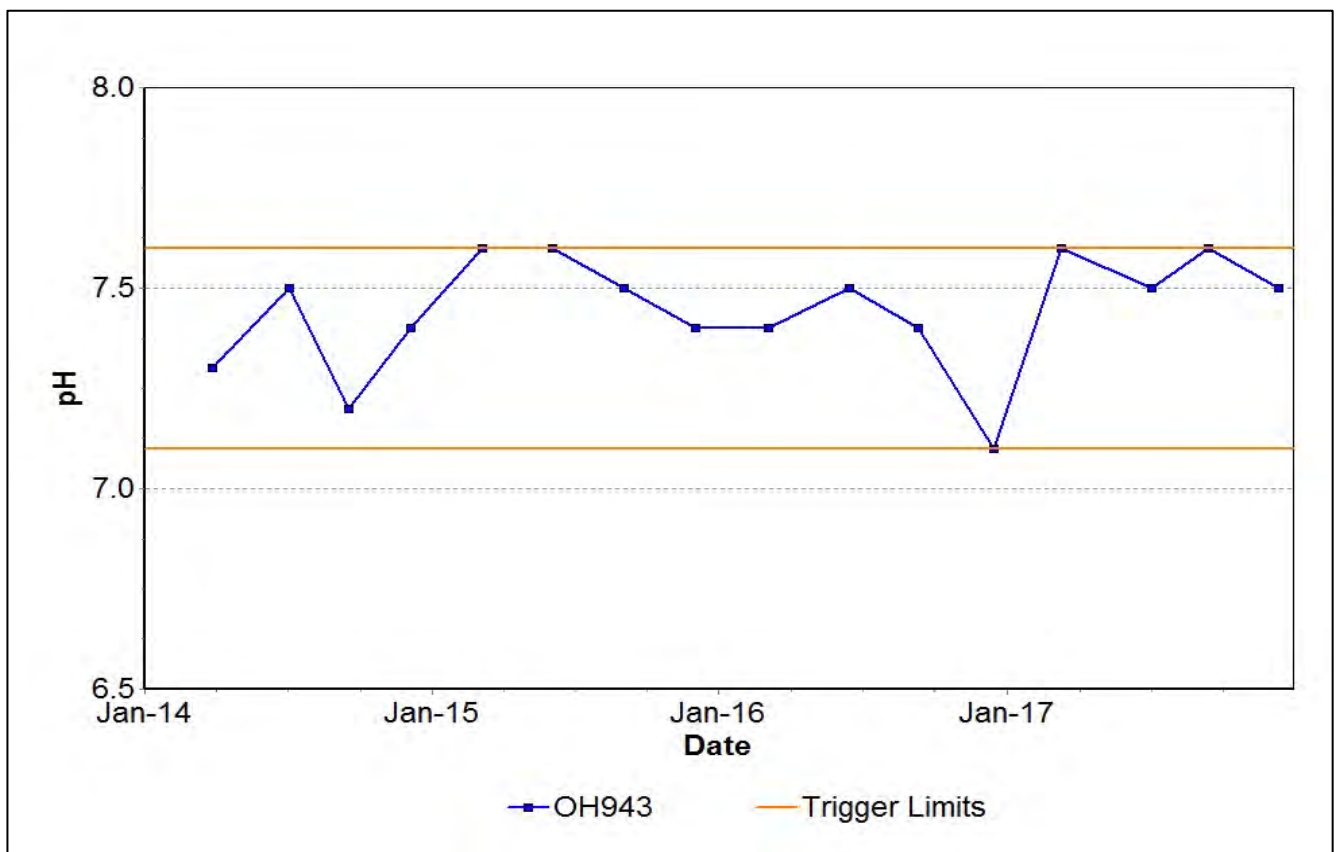
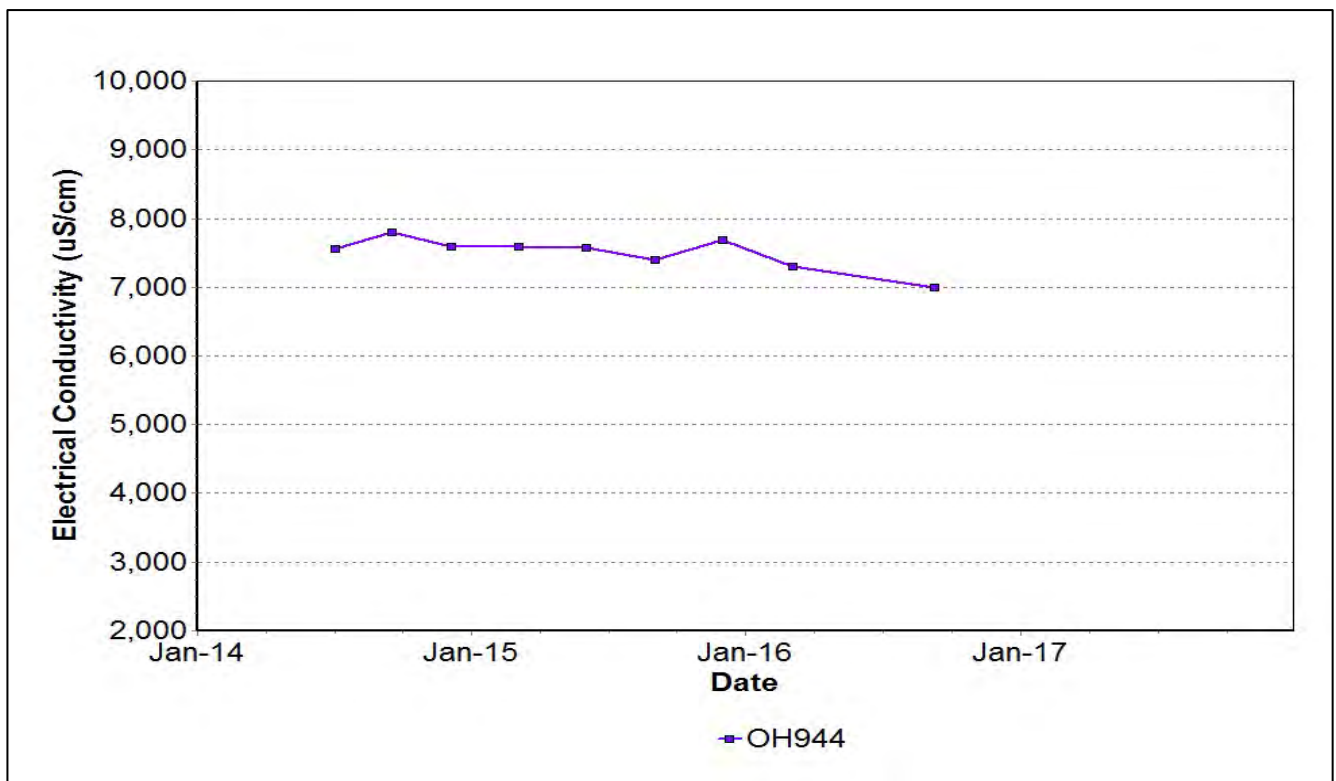


Figure 53: Hunter River Alluvium 4 Seam pH Trend – December 2017



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

Figure 54: Hunter River Alluvium 5 Seam Electrical Conductivity Trend – December 2017

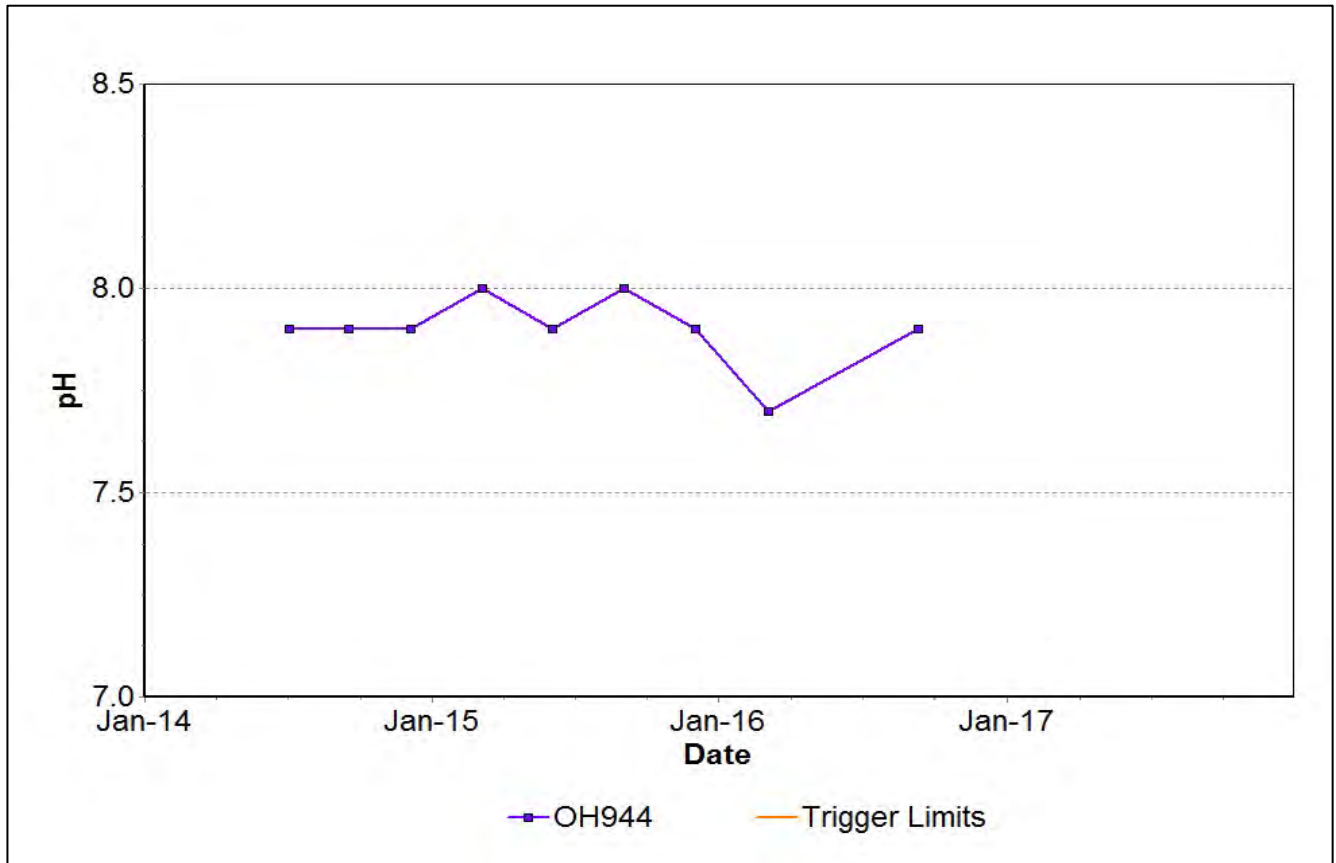


Figure 55: Hunter River Alluvium 5 Seam pH Trend – December 2017



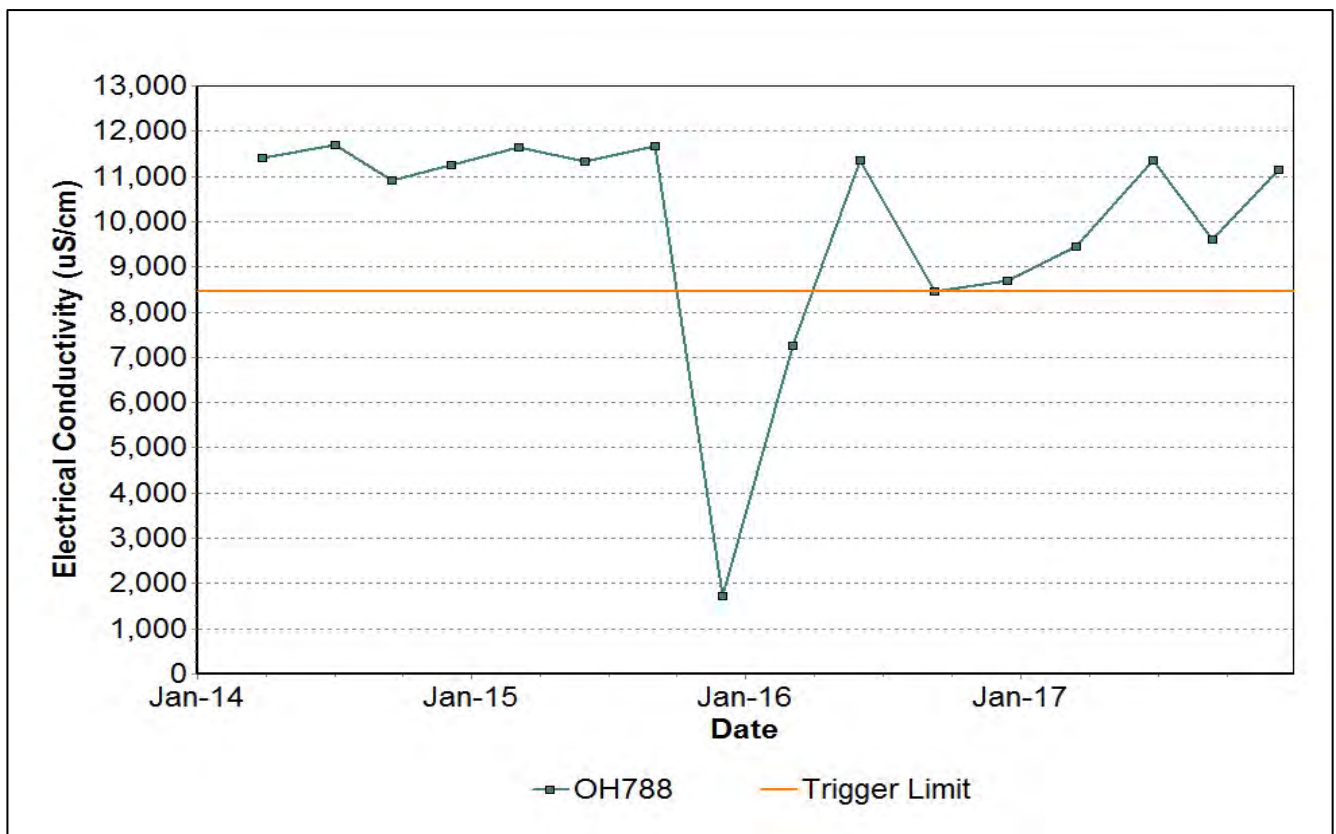


Figure 56: Hunter River Alluvium 6 Seam Electrical Conductivity – December 2017

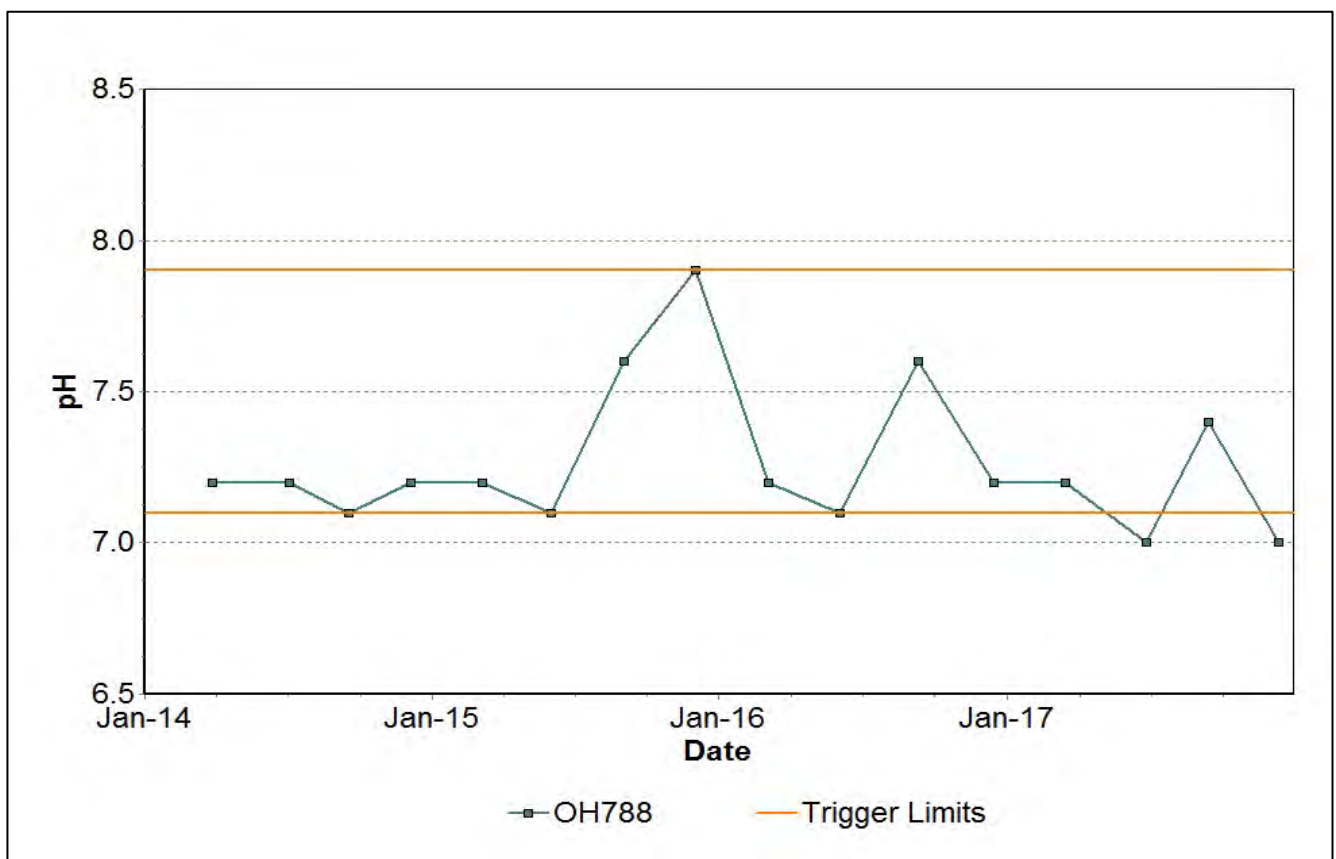


Figure 57: Hunter River Alluvium 6 Seam pH Trend – December 2017

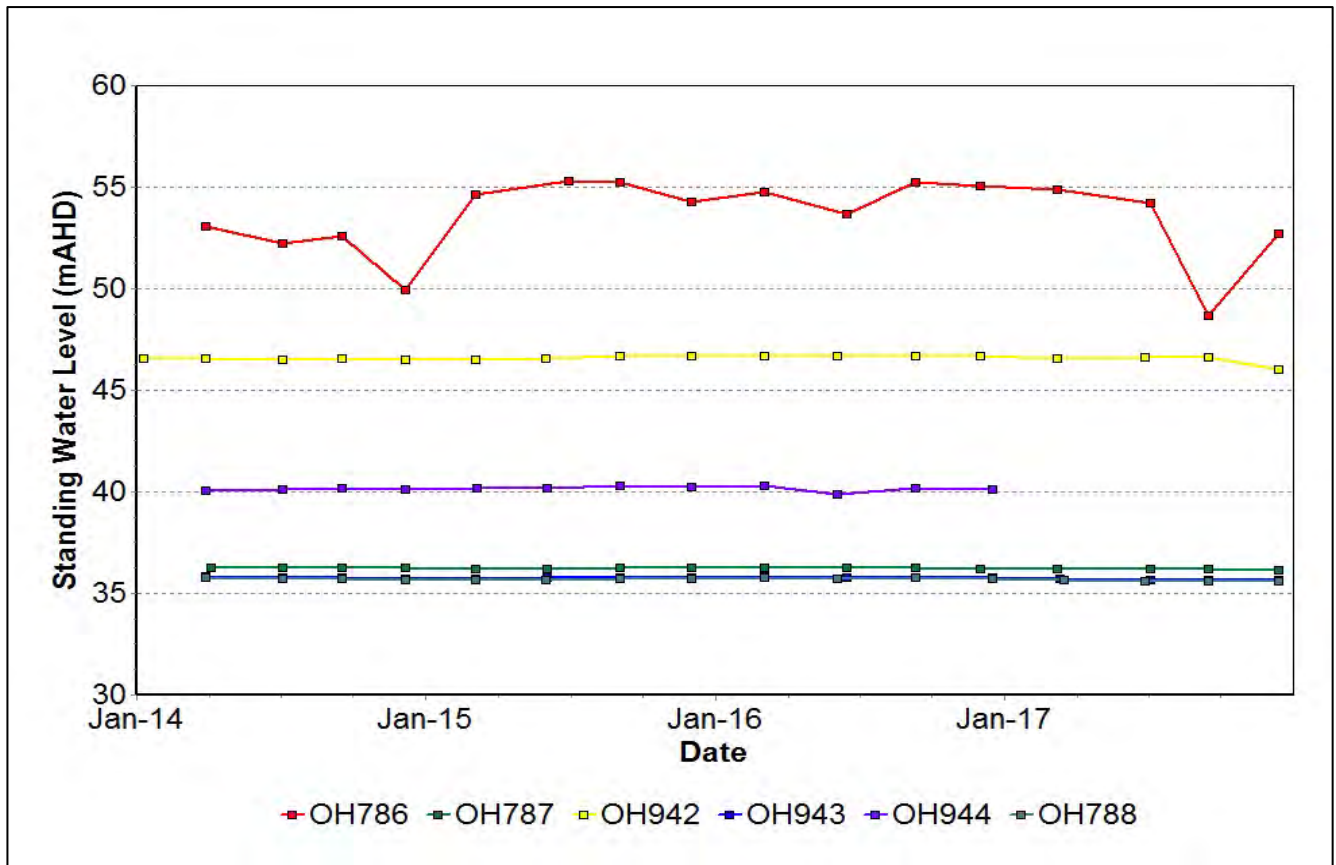


Figure 58: Hunter River Alluvium Standing Water Level Trend – December 2017

### 3.2.1 Groundwater Trigger Tracking

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

Current internal groundwater trigger limit breaches are summarised in Table 3.

**Table 3: Groundwater Triggers - 2017**

Site	Date	Trigger Limit Breached	Action Taken in Response
OH 786	14/09/2017	EC – 95th Percentile	Watching Brief*
OH 787	07/03/2017	EC – 95th Percentile	Watching Brief*
OH 787	14/09/2017	EC – 95th Percentile	Watching Brief*
OH 787	11/12/2017	EC – 95th Percentile	Watching Brief*
OH942	07/03/2017	EC – 95th Percentile	Watching Brief*
OH942	14/09/2017	EC – 95th Percentile	Watching Brief*
PZ7S	23/11/2017	EC – 95th Percentile	Watching Brief*
GW 9709	14/09/2017	EC – 95th Percentile	Watching Brief*
MTD616P	10/03/2017	EC – 95th Percentile	Data is stable and consistent with historical trend; significant natural variability in water quality is typical of low-conductivity shallow overburden material. No further action.
MTD616P	03/07/2017	EC – 95th Percentile	Watching Brief*
MTD616P	24/08/2017	EC – 95th Percentile	Data is stable and consistent with historical trend; significant natural variability in water quality is typical of low-conductivity shallow overburden material. No further action.
MTD616P	23/11/2017	EC – 95th Percentile	Watching Brief*
MB15MTW02D	25/08/2017	EC – 95th Percentile	Watching Brief*
MBW02	01/09/2017	EC – 95th Percentile	Watching Brief*
MB15MTW03	28/08/2017	EC – 95th Percentile	Watching Brief*
MTD605P	07/03/2017	EC – 95th Percentile	Data is stable and consistent with historical trend; significant natural variability in water quality is typical of low-conductivity shallow overburden material. No further action.
MTD605P	27/06/2017	EC – 95th Percentile	Watching Brief*
MTD605P	14/09/2017	EC – 95th Percentile	Data is stable and consistent with historical trend; significant natural variability in water quality is typical of low-conductivity shallow overburden material. No further action.

MTD605P	23/11/2017	EC – 95th Percentile	Watching Brief*
MB15MTW03	25/08/2017	EC – 95th Percentile	Watching Brief*
MB15MTW03	23/11/2017	EC – 95th Percentile	Watching Brief*
PZ9D	07/03/2017	EC – 95th Percentile	Watching Brief*
PZ9D	14/09/2017	EC – 95th Percentile	Watching Brief*
PZ9D	11/12/2017	EC – 95th Percentile	Watching Brief*
OH1137	14/09/2017	EC – 95th Percentile	Watching Brief*
OH1137	11/12/2017	EC – 95th Percentile	Watching Brief*
WD622P	30/06/2017	EC – 95th Percentile	Watching Brief*
MBW04	01/09/2017	EC – 95th Percentile	Watching Brief*
MBW04	24/11/2017	EC – 95th Percentile	Watching Brief*
WOH2156B	10/03/2017	EC – 95th Percentile	Data is stable and consistent with historical trend; no further action.
WOH2156B	30/06/2017	EC – 95th Percentile	Watching Brief*
WOH2156B	24/08/2017	EC – 95th Percentile	Data is stable and consistent with historical trend; no further action.
WOH2156B	23/11/2017	EC – 95th Percentile	Watching Brief*
OH1138(1)	14/09/2017	EC – 95th Percentile	Watching Brief*
OH1138(2)	11/12/2017	EC – 95th Percentile	Watching Brief*
OH786	07/03/2017	PH –5th Percentile	Watching Brief*
OH786	11/12/2017	PH –5th Percentile	Watching Brief*
OH787	07/03/2017	PH –5th Percentile	Watching Brief*
OH943	11/12/2017	PH –5th Percentile	Watching Brief*
OH788	26/06/2017	PH –5th Percentile	Watching Brief*
GW9709	10/03/2017	PH –5th Percentile	Data broadly in line with historical range; EC or water level do not show a rising or falling trend. Watching brief to be maintained.



GW9709	11/12/2017	PH –5th Percentile	Watching Brief*
GW98MTCL2	10/03/2017	PH –5th Percentile	Watching Brief*
GW98MTCL2	23/07/2017	PH –5th Percentile	Watching Brief*
GW98MTCL2	14/09/2017	PH –5th Percentile	Results in line with historical data, continue to watch and monitor.
MTD616P	03/07/2017	PH –5th Percentile	Watching Brief*
MTD605P	14/09/2017	PH –5th Percentile	Watching Brief*
G3	07/03/2017	PH –5th Percentile	Bore partially collapsed in early 2016 so data may not be representative of aquifer. Removal from monitoring programme has been recommended following review of data from nearby bores.
OH1138(1)	04/07/2017	PH –5th Percentile	Watching Brief*
OH1138(1)	14/09/2017	PH –5th Percentile	Watching Brief*
OH1138(1)	11/12/2017	PH –5th Percentile	Investigation into pH trend commenced. Results to be reported in Annual Review
MB15MTW03	23/11/2017	PH –5th Percentile	Watching Brief*
WOH2139A	25/08/2017	PH –95th Percentile	Watching Brief*
WOH2139A	23/11/2017	PH –95th Percentile	Watching Brief*

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



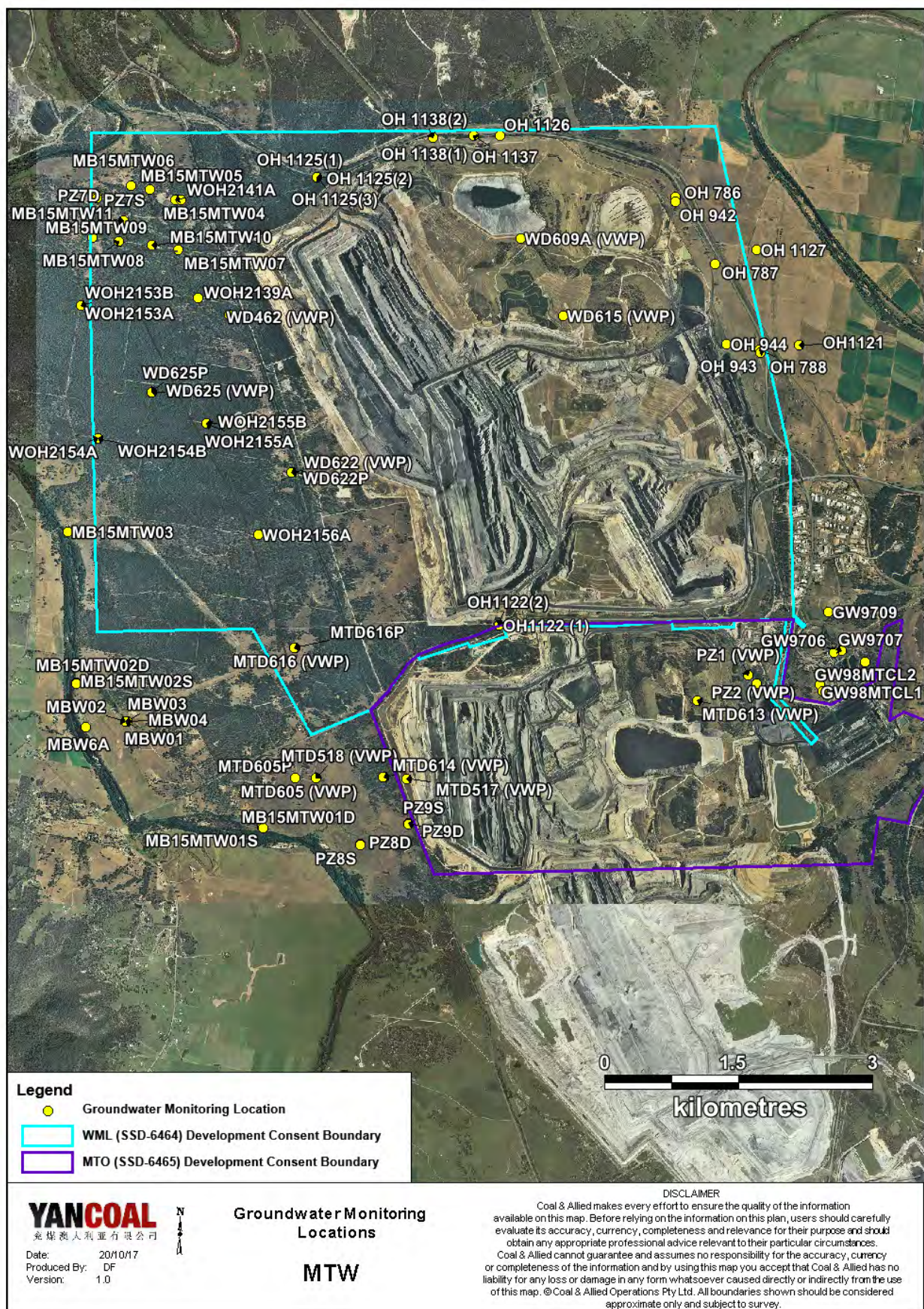


Figure 59: Groundwater Monitoring Location Plan



## 4.0 BLAST MONITORING

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

The location of these monitors can be found in Figure 66.

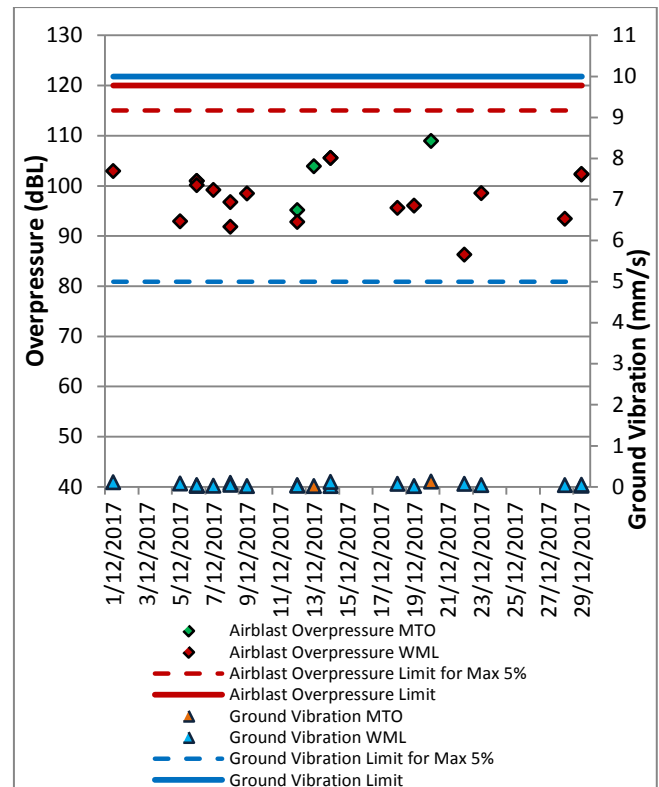
### 4.1 Blast Monitoring Results

During December 2017, 22 blasts were initiated at MTW. Figure 60 to Figure 65 show the blast monitoring results for the reporting period against the impact assessment criteria. The criteria are summarised in Table 4.

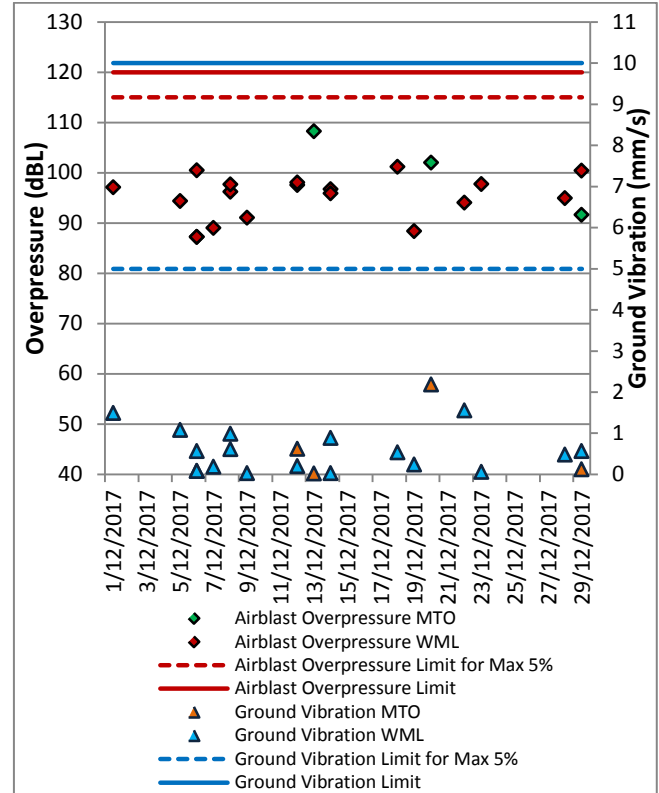
**Table 4: Blasting Limits**

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

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



**Figure 60: Abbey Green Blast Monitoring Results – December 2017**



**Figure 61: Bulga Village Blast Monitoring Results – December 2017**

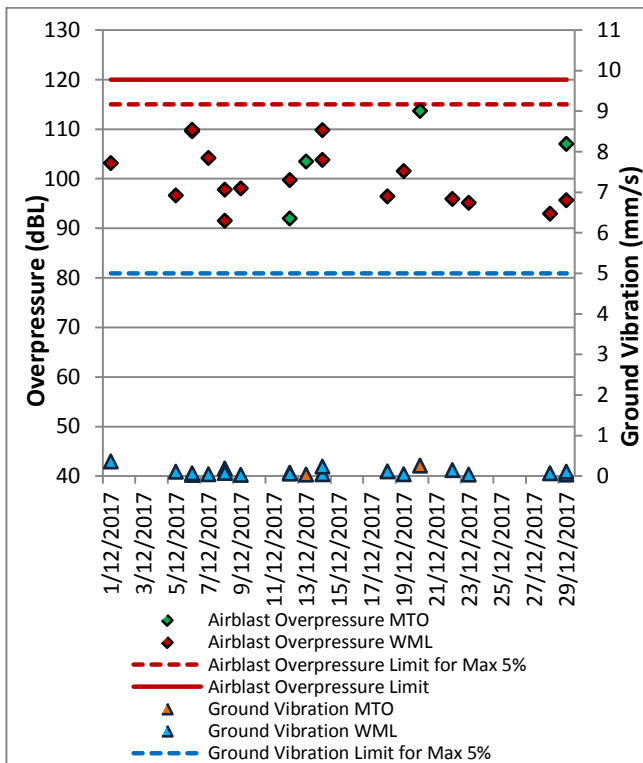


Figure 62: MTIE Blast Monitoring Results – December 2017

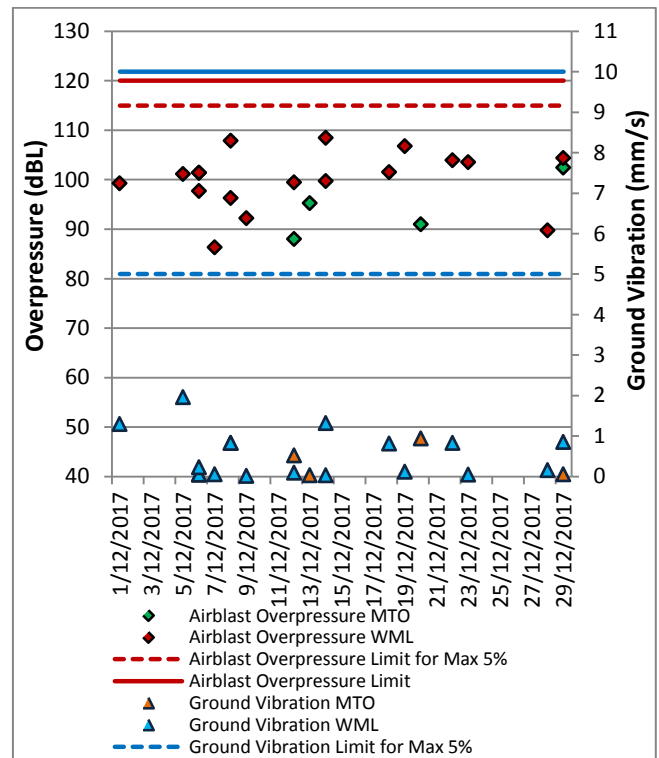


Figure 64: Wambo Road Blast Monitoring Results – December 2017

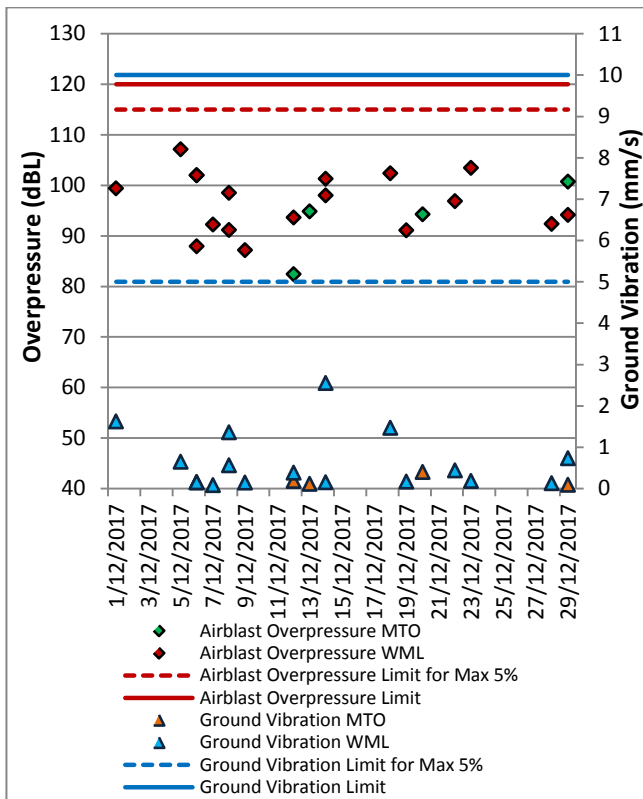


Figure 63: Warkworth Blast Monitoring Results - December 2017

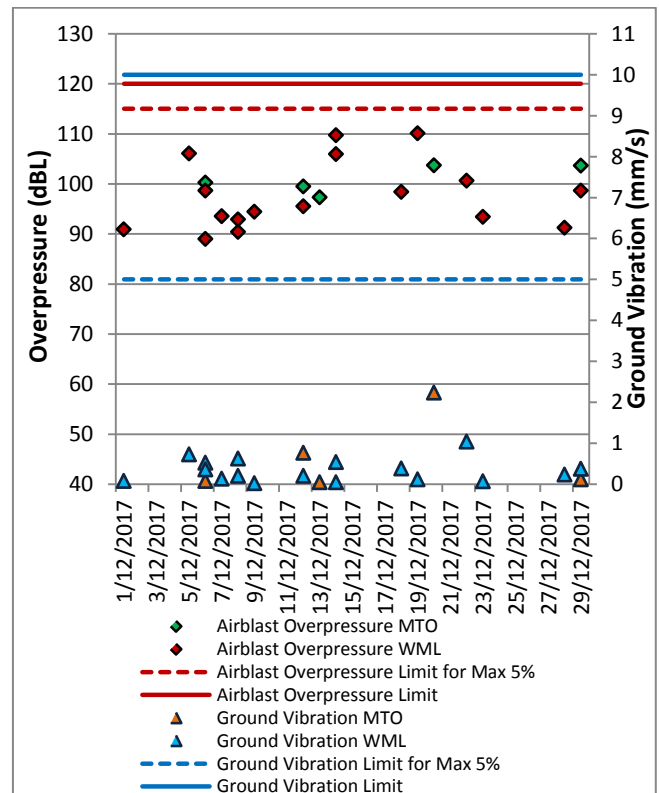


Figure 65: Wollemi Peak Road Blast Monitoring Results - December 2017





Figure 66: Blast and Vibration Monitoring Location Plan



## 5.0 NOISE

Routine attended noise monitoring is carried out in accordance with the MTW Noise Management Plan. A review against EIS predictions will be reported in the Annual Review. The purpose of the noise surveys is to quantify and describe the acoustic environment around the site and compare results with specified limits. Unattended monitoring (real time noise monitoring) also occurs at five sites surrounding MTW. The attended noise monitoring locations are displayed in Figure 67.

## 5.1 Attended Noise Monitoring Results

Attended monitoring was conducted at receiver locations surrounding MTW on the night of 4 December 2017. All measurements complied with the relevant criteria. Results are detailed in Table 5 to Table 8.

### 5.1.1 WML Noise Assessment

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

**Table 5: L<sub>Aeq</sub> 15 minute Warkworth Impact Assessment Criteria – December 2017**

Location	Date and Time	Wind Speed (m/s) <sup>5</sup>	Stability Class	Criterion (dB(A))	Criterion Applies? <sup>1,5</sup>	WML L <sub>Aeq</sub> dB <sup>2,4</sup>	Exceedance <sup>3</sup>
Bulga RFS	4/12/2017 21:02	3.7	D	37	No	IA	NA
Bulga Village	4/12/2017 21:59	3.7	D	38	No	IA	NA
Gouldsville	4/12/2017 22:53	3.9	D	38	No	<30	NA
Inlet Rd	4/12/2017 21:09	3.7	D	37	No	IA	NA
Inlet Rd West	4/12/2017 21:32	3.5	D	35	No	IA	NA
Long Point	4/12/2017 22:29	4.4	D	35	No	IA	NA
South Bulga	4/12/2017 21:40	4.6	D	35	No	IA	NA
Wambo Road	4/12/2017 22:22	4.1	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 L<sub>Aeq</sub>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 6: L<sub>A1</sub> 1 minute Warkworth Impact Assessment Criteria – December 2017**

Location	Date and Time	Wind Speed (m/s) <sup>5</sup>	Stability Class	Criterion (dB(A))	Criterion Applies? <sup>1,5</sup>	WML L <sub>Aeq</sub> dB <sup>2,4</sup>	Exceedance <sup>3</sup>
Bulga RFS	4/12/2017 21:02	3.7	D	47	No	IA	NA
Bulga Village	4/12/2017 21:59	3.7	D	48	No	IA	NA
Gouldsville	4/12/2017 22:53	3.9	D	48	No	<30	NA
Inlet Rd	4/12/2017 21:09	3.7	D	47	No	IA	NA
Inlet Rd West	4/12/2017 21:32	3.5	D	45	No	IA	NA
Long Point	4/12/2017 22:29	4.4	D	45	No	IA	NA
South Bulga	4/12/2017 21:40	4.6	D	45	No	IA	NA
Wambo Road	4/12/2017 22:22	4.1	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 L<sub>A1</sub>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 7 and Table 8.

**Table 7: L<sub>Aeq, 15minute</sub> Mount Thorley Operations - Impact Assessment Criteria – December 2017**

Location	Date and Time	Wind Speed (m/s) <sup>5</sup>	Stability Class	Criterion dB	Criterion Applies? <sup>1,5</sup>	MTO L <sub>Aeq</sub> dB <sup>2,4</sup>	Exceedance <sup>3</sup>
Bulga RFS	4/12/2017 21:02	3.7	D	37	No	25	NA
Bulga Village	4/12/2017 21:59	3.7	D	38	No	28	NA
Gouldsville	4/12/2017 22:53	3.9	D	35	No	IA	NA
Inlet Rd	4/12/2017 21:09	3.7	D	37	No	<25	NA
Inlet Rd West	4/12/2017 21:32	3.5	D	35	No	26	NA
Long Point	4/12/2017 22:29	4.4	D	35	No	IA	NA
South Bulga	4/12/2017 21:40	4.6	D	36	No	25	NA
Wambo Road	4/12/2017 22:22	4.1	D	38	No	30	NA

**Notes:**

- Noise emission limits apply during all meteorological conditions except the following: during periods of rain or hail; average wind speed at microphone height exceeds 5 m/s; wind speeds greater than 3 m/s measured at 10 metres above ground level; stability category F temperature inversion conditions and wind speeds greater than 2m/s at 10m above ground level; or stability category G temperature inversion conditions;
- Estimated or measured L<sub>Aeq,15minute</sub> attributed to MTO;
- NA means atmospheric conditions outside conditions specified in development consent and so criterion is not applicable;
- Bolded results in red are possible exceedances of relevant criteria; and
- Criterion may or may not apply due to rounding of meteorological data values.

**Table 8: L<sub>A1, 1Minute</sub> Mount Thorley Operations - Impact Assessment Criteria – December 2017**

Location	Date and Time	Wind Speed (m/s) <sup>5</sup>	Stability Class	Criterion dB	Criterion Applies? <sup>1,5</sup>	MTO L <sub>A1, 1min</sub> dB <sup>2,4</sup>	Exceedance <sup>3</sup>
Bulga RFS	4/12/2017 21:02	3.7	D	47	No	30	NA
Bulga Village	4/12/2017 21:59	3.7	D	48	No	32	NA
Gouldsville	4/12/2017 22:53	3.9	D	45	No	IA	NA
Inlet Rd	4/12/2017 21:09	3.7	D	47	No	NM	NA
Inlet Rd West	4/12/2017 21:32	3.5	D	45	No	NM	NA
Long Point	4/12/2017 22:29	4.4	D	45	No	IA	NA
South Bulga	4/12/2017 21:40	4.6	D	46	No	33	NA
Wambo Road	4/12/2017 22:22	4.1	D	48	No	33	NA

**Notes**

- Noise emission limits apply during all meteorological conditions except the following: during periods of rain or hail; average wind speed at microphone height exceeds 5 m/s; wind speeds greater than 3 m/s measured at 10 metres above ground level; stability category F temperature inversion conditions and wind speeds greater than 2m/s at 10m above ground level; or stability category G temperature inversion conditions;
- Estimated or measured L<sub>A1,1minute</sub> attributed to MTO;
- NA in exceedance column means atmospheric conditions outside conditions specified in project approval and so criterion is not applicable.
- Bolded results in red are possible exceedances of relevant criteria; and
- Criterion may or may not apply due to rounding of meteorological data values.

### 5.1.3 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 December 2017 no measurements required the penalty to be applied. The assessment for low frequency noise is shown in Table 9

**Table 9: Low Frequency Noise Assessment - December 2017**

Location	Date and Time	Measured Site Only LA <sub>eq</sub> dB (WML/MTO)	Site Only LC <sub>eq</sub> dB <sup>4</sup> (WML/MTO)	Site Only LC <sub>eq</sub> -LA <sub>eq</sub> dB <sup>1,4</sup> (WML/MTO)	Result Max exceedance of ref spectrum dB <sup>2,3,4</sup> (WML/MTO)	Penalty dB(A) (WML/MTO)	Exceedance
Bulga RFS	4/12/2017 21:02	IA/25	NA/NA	NA/NA	NA/NA	NA/NA	NA
Bulga Village	4/12/2017 21:59	IA/28	NA/55	NA/27	NA/Nil	NA/0	NA
Gouldsville	4/12/2017 22:53	<30/IA	NA/NA	NA/NA	NA/NA	NA/NA	NA
Inlet Rd	4/12/2017 21:09	IA/<25	NA/NA	NA/NA	NA/NA	NA/NA	NA
Inlet Rd West	4/12/2017 21:32	IA/26	NA/52	NA/26	NA/Nil	NA/0	NA
Long Point	4/12/2017 22:29	IA/IA	NA/NA	NA/NA	NA/NA	NA/NA	NA
South Bulga	4/12/2017 21:40	IA/25	NA/NA	NA/NA	NA/NA	NA/NA	NA
Wambo Road	4/12/2017 22:22	IA/30	NA/54	NA/24	NA/Nil	NA/0	NA

**Notes:**

1. As per NPfI, if LC<sub>eq</sub> – LA<sub>eq</sub> >= 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 67: Noise Monitoring Location Plan



## 5.2 Noise Management Measures

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

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

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

- 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 December are provided in Table 10.

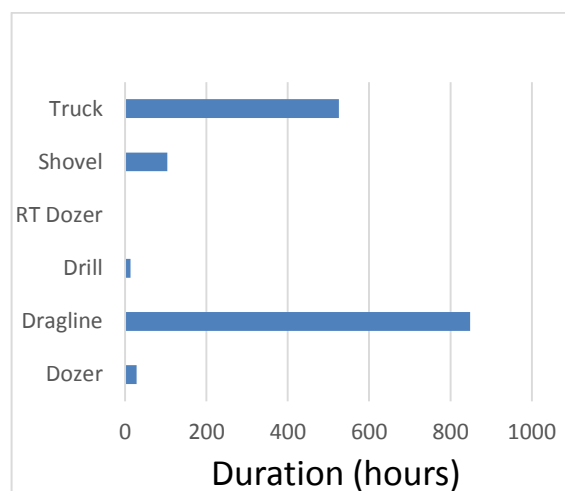
**Table 10: Supplementary Attended Noise Monitoring Data –December 2017**

No. of assessments	No. of assessments > trigger	No. of nights where assessments > trigger	% greater than trigger
525	3	2	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 December a total of 1520 hours of equipment downtime was logged in response to environmental events such as dust, noise and elevated wind impacts. Operational downtime by equipment type is shown in Figure 68.



**Figure 68: Operational Downtime by Equipment Type – December 2017**

## 7.0 REHABILITATION

During December, 0.8Ha of land was released, 2.0Ha was bulk shaped, 5.2Ha was top soiled, 2.8Ha was composted and 5.5Ha was rehabilitated. Year-to-date progress can be viewed in Figure 69

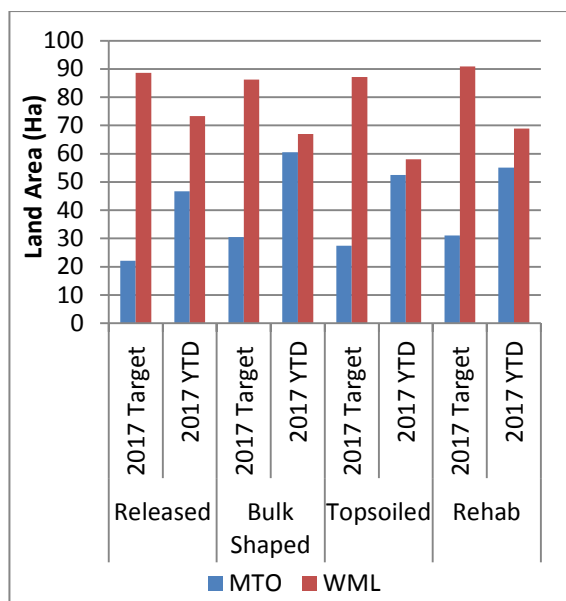


Figure 69: Rehabilitation YTD - December 2017

## 8.0 ENVIRONMENTAL INCIDENTS

There were no reportable environmental incidents during the reporting period.

## 9.0 COMPLAINTS

During the reporting period 32 complaints were received, details of these complaints are displayed in Figure 70 below.

	Noise	Dust	Blast	Lighting	Other	Total
January	5	6	3	1	0	15
February	25	3	10	3	0	41
March	14	1	1	2	0	18
April	27	1	7	2	0	37
May	18	4	7	10	3	42
June	10	3	4	3	0	20
July	10	10	8	0	2	30
August	8	18	5	4	1	36
September	21	15	6	2	3	47
October	21	8	6	2	2	39
November	12	5	5	2	1	25
December	17	6	3	2	4	32
Total	188	80	65	33	16	382

Figure 70: Complaints Summary - YTD December 2017

## **Appendix A: Meteorological Data**

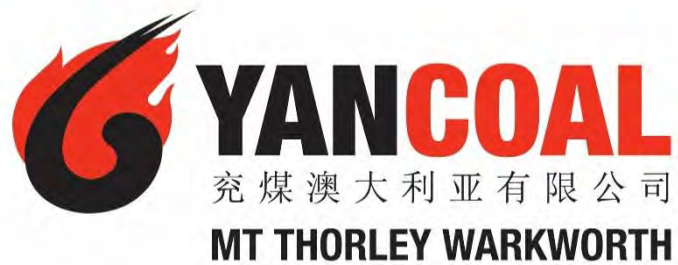


**Table 11: Meteorological Data – Charlton Ridge Meteorological Station – December 2017**

Date	Air Temperature Maximum (°C)	Air Temperature Minimum (°C)	Relative Humidity Maximum (%)	Relative Humidity Minimum (%)	Solar Radiation Maximum (W/Sq. M)	Wind Direction Average (°)	Wind Speed Average (m/sec)	Rainfall(mm)
1/12/2017	36	17	88	22	1208	162	2.5	0.0
2/12/2017	30	15	96	38	1144	237	4.3	13.8
3/12/2017	27	15	89	32	1223	299	5.0	0.2
4/12/2017	25	15	84	47	1455	164	3.2	0.0
5/12/2017	28	14	94	38	1478	159	2.8	16.2
6/12/2017	25	18	67	35	1003	277	2.6	0.0
7/12/2017	33	14	82	12	1271	253	2.5	0.0
8/12/2017	35	15	82	13	1417	173	2.9	0.0
9/12/2017	27	15	90	35	1561	141	2.7	0.8
10/12/2017	30	13	85	27	1396	140	2.5	0.0
11/12/2017	32	13	83	24	1124	142	2.8	0.0
12/12/2017	34	16	81	22	1108	136	2.9	0.0
13/12/2017	37	17	83	15	1171	182	2.4	0.0
14/12/2017	40	19	63	9	1119	221	3.1	0.0
15/12/2017	34	21	80	32	1207	150	3.4	0.4
16/12/2017	39	19	93	12	1302	141	2.2	3.0
17/12/2017	34	20	80	35	1098	156	3.2	0.0
18/12/2017	36	19	86	26	1181	166	2.3	0.6
19/12/2017	39	20	89	19	1328	256	3.1	3.2
20/12/2017	42	20	89	12	1228	240	4.0	0.0
21/12/2017	25	17	91	54	402	130	2.9	0.0
22/12/2017	27	17	96	49	1270	133	2.1	0.6
23/12/2017	36	18	87	22	1248	150	2.1	0.0
24/12/2017	40	19	81	7	1271	222	3.5	0.0
25/12/2017	23	16	88	64	550	155	3.7	0.0
26/12/2017	21	15	97	67	604	145	3.0	2.8
27/12/2017	30	16	96	41	1606	122	3.5	0.2
28/12/2017	36	15	91	15	1251	137	2.1	0.0
29/12/2017	39	20	84	15	1210	209	2.5	0.0
30/12/2017	36	20	88	23	1385	276	4.3	0.8
31/12/2017	28	19	86	50	1558	117	3.4	0.0

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





## Appendix D

### Acquisition Update - Mount Thorley Warkworth Property Portfolio





The background of the slide is a large-scale photograph of a coal mining operation. In the upper left, a white excavator is positioned on a pile of dark coal. To its right, a large yellow haul truck is parked. In the lower center, another yellow excavator, with 'KOMATSU' visible on its side, is working in a deep pit. The ground is covered in dark, loose coal material, and the overall scene is one of active industrial mining.

# Mount Thorley Warkworth Property Portfolio Update

As of 31<sup>st</sup> January 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