Mount Thorley Warkworth

Monthly Environmental Report

June 2017

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Revision History

Version No.	Person Responsible	Document Status	Date
1.0	**Environmental Graduate**	**Draft**	**4/08/2017**
1.1	**Environmental Specialist**	**Final**	**8/08/2017**

1.0 INTRODUCTION

This report has been compiled to provide a monthly summary of environmental monitoring results for Mount Thorley Warkworth (MTW). This report includes all monitoring data collected for the period 1 June to 30 June 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)
June	28.8	271.8

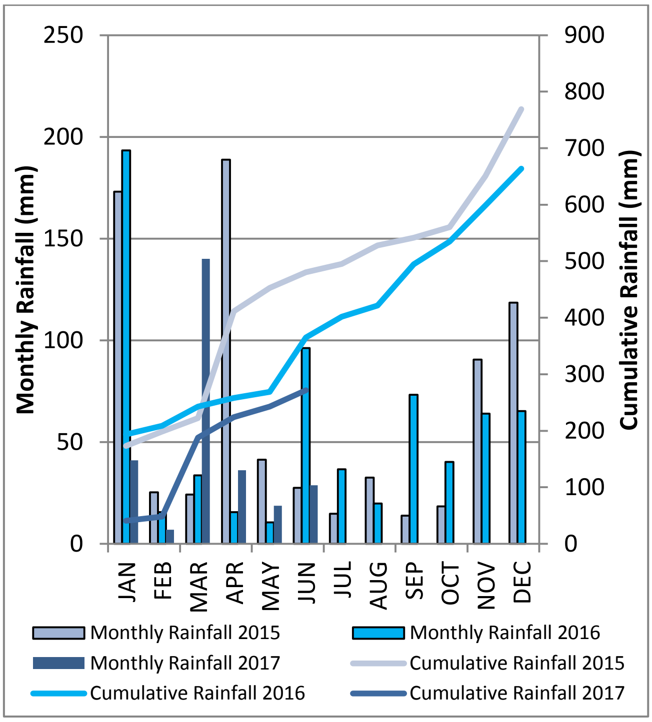

Figure 1: Rainfall Trends YTD

2.1.2 Wind Speed and Direction

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

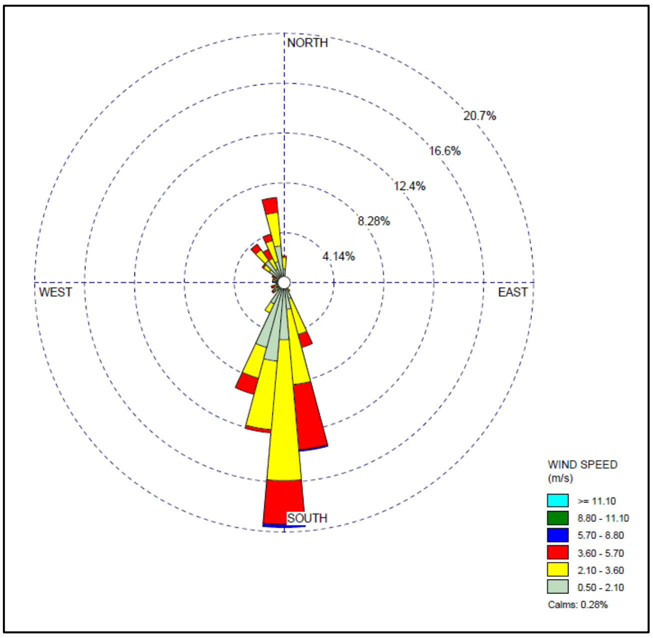

Figure 2: Charlton Ridge Wind Rose – June 2017

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

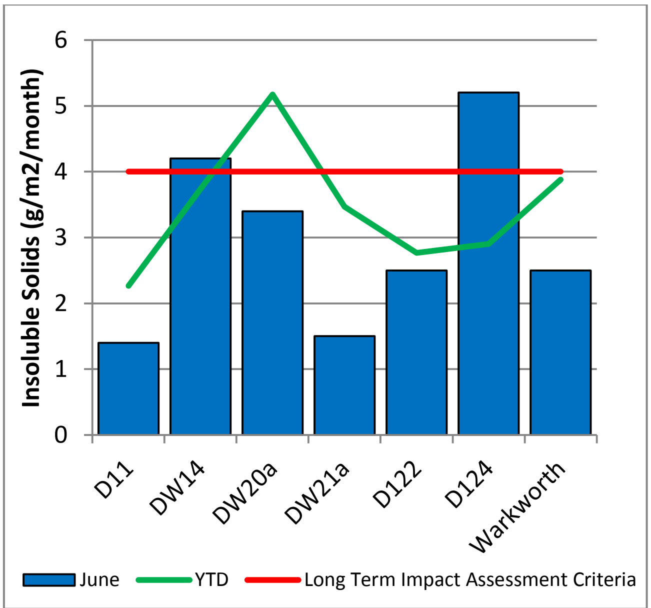

Figure 4: Depositional Dust – June 2017

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_{10}). The location of these monitors can be found in Figure 3. Each HVAS was run for 24 hours on a six-day cycle in accordance with EPA requirements.

2.3.1 HVAS PM_{10} Results

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

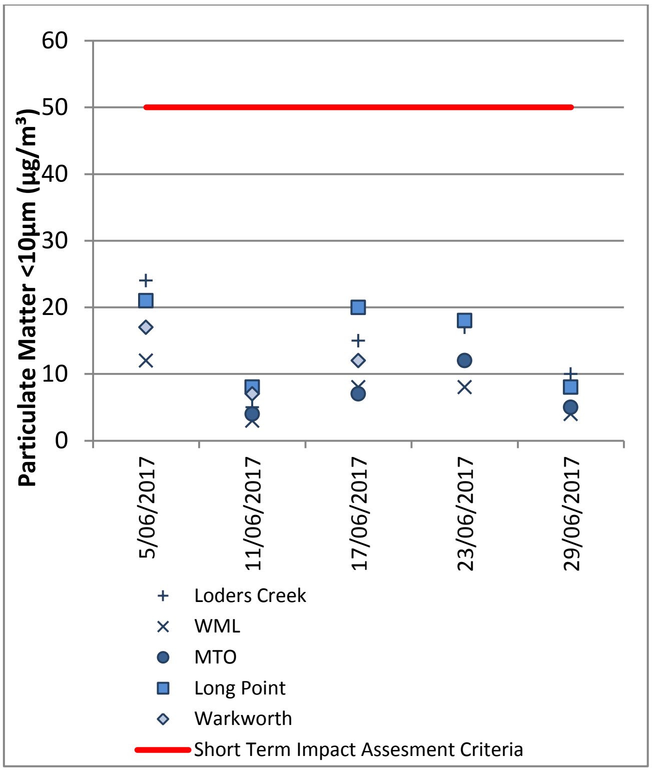

Figure 5: Individual PM_{10} Results – June 2017

Figure 6 shows the annual average PM_{10} results against the long term impact assessment criteria.

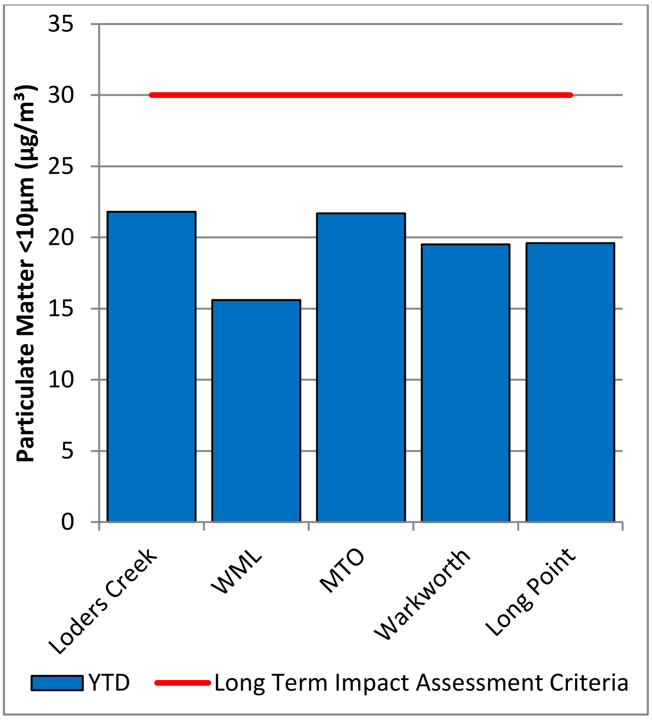

Figure 6: Annual Average PM_{10} – June 2017

2.3.2 TSP Results

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

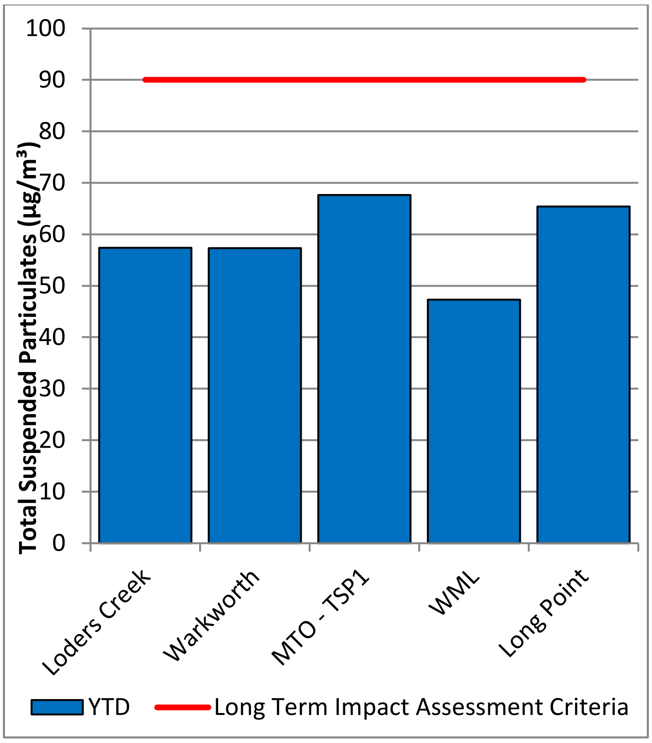

Figure 7: Annual Average Total Suspended Particulates – June 2017

2.3.3 Real Time PM_{10} Results

Mount Thorley Warkworth maintains a network of real time PM_{10} monitors. The real time air quality monitoring stations continuously log information and transmit data to a central database, generating 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_{10} result and the annual PM_{10} average.

2.3.4 Real Time Alarms for Air Quality

During June, the real time monitoring system did not generate any air quality related alarms.

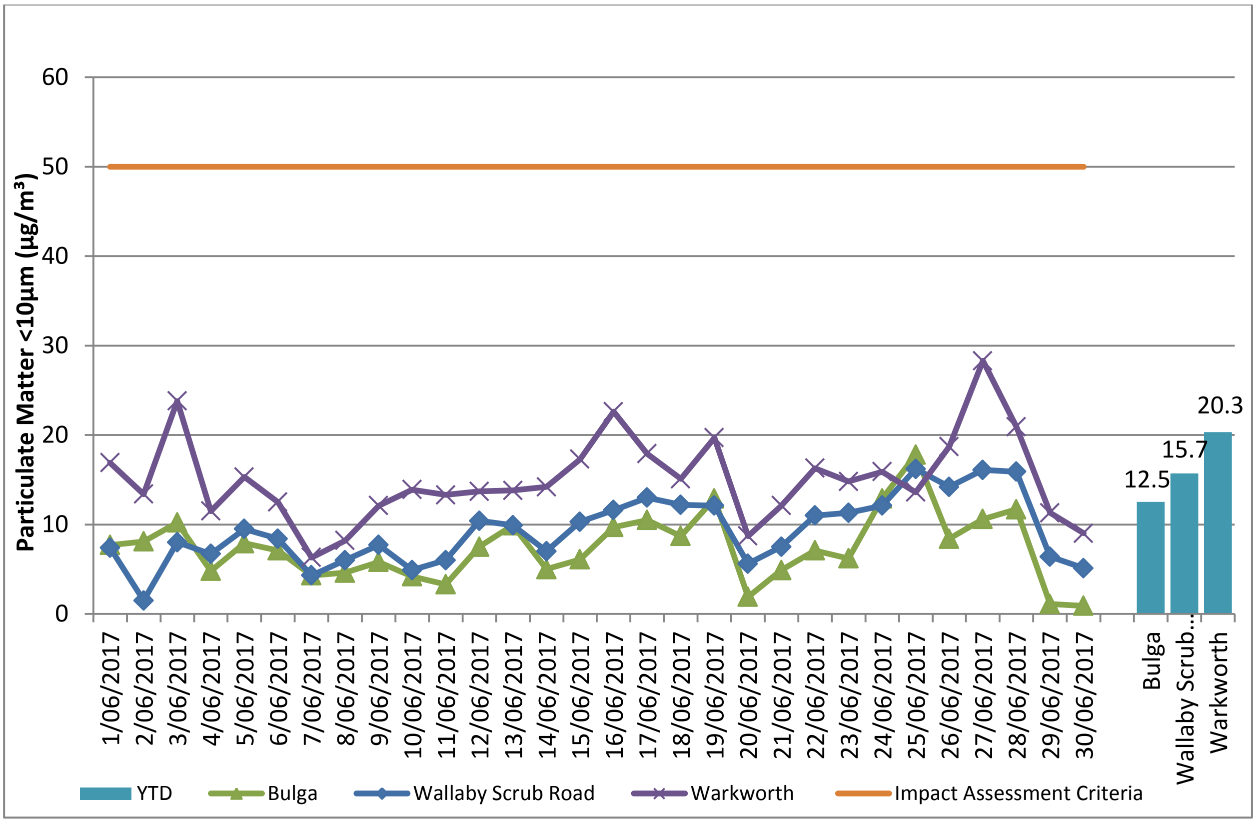

Figure 8: Real Time PM_{10} 24hr average and Year-to-date average – June 2017

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.

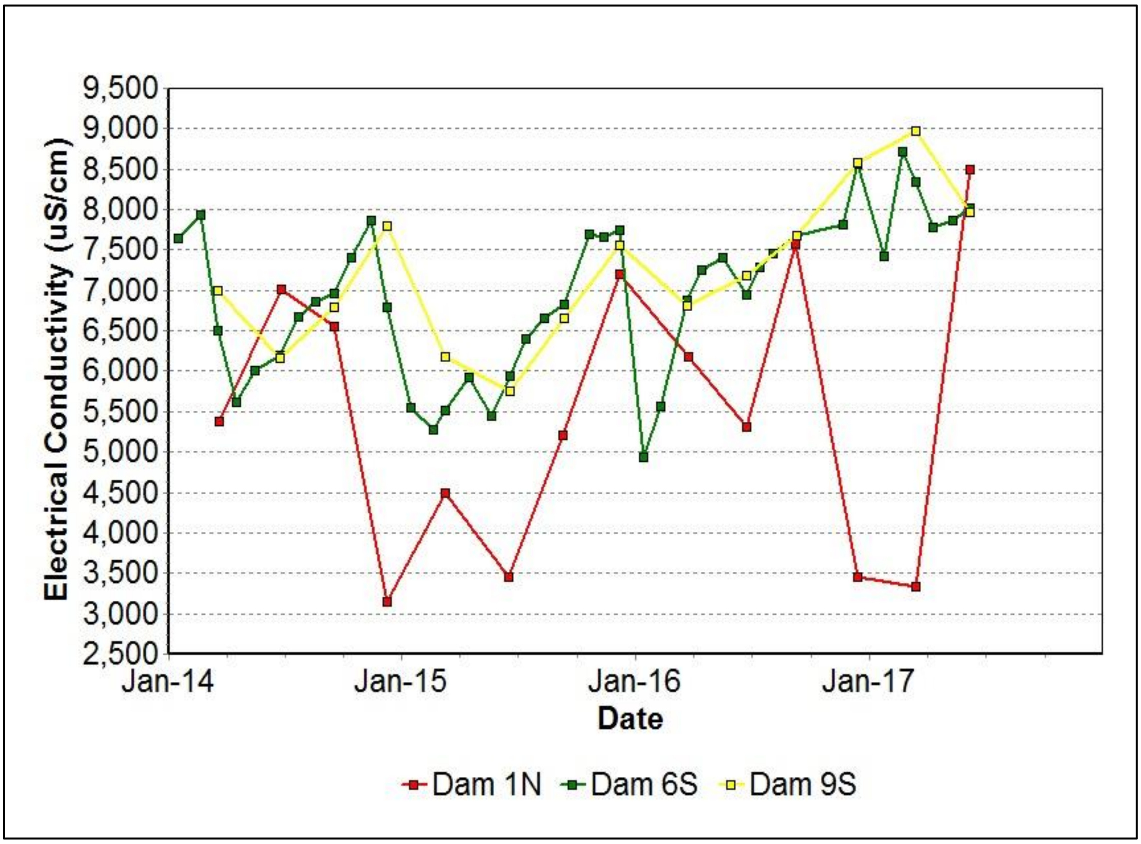

Figure 9: Site Dams Electrical Conductivity Trend 2014 – Current

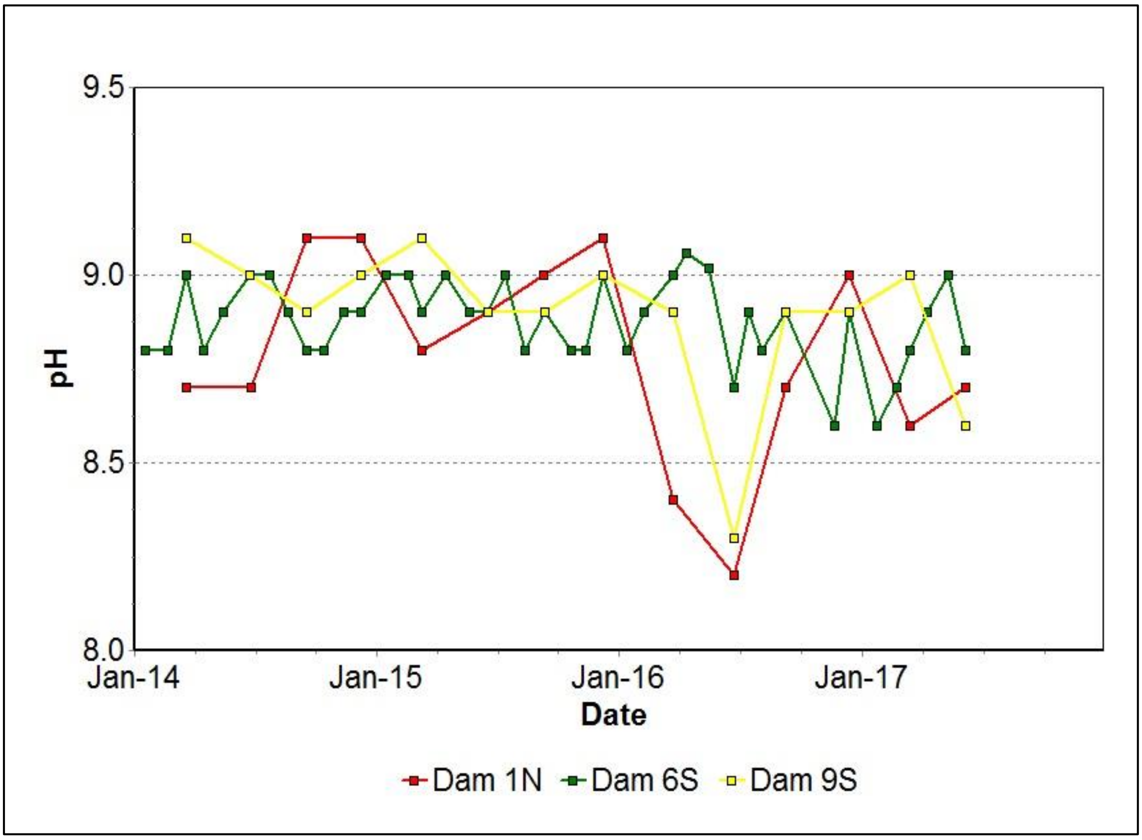

Figure 10: Site Dams pH Trend 2014 - Current

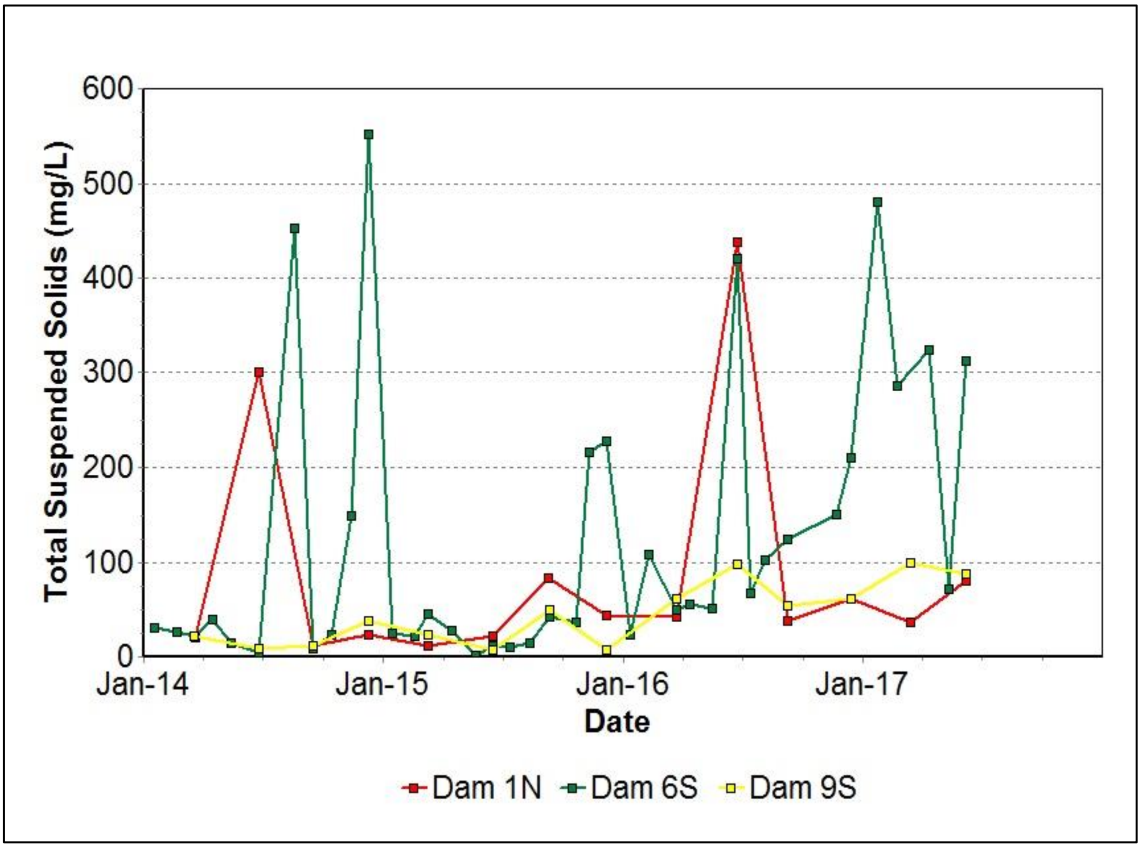

Figure 11: Site Dams Total Suspended Solids Trend 2014 – Current

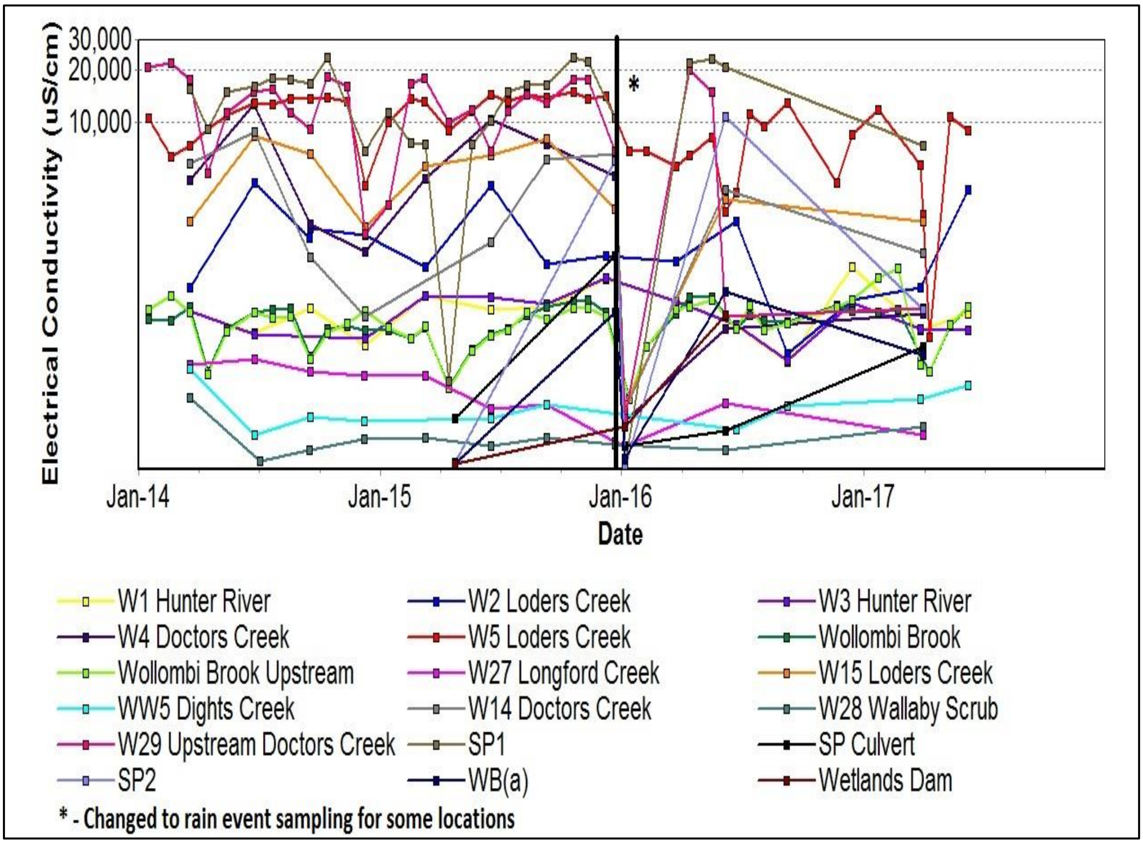

Figure 12: Watercourse Electrical Conductivity Trend 2014 - Current

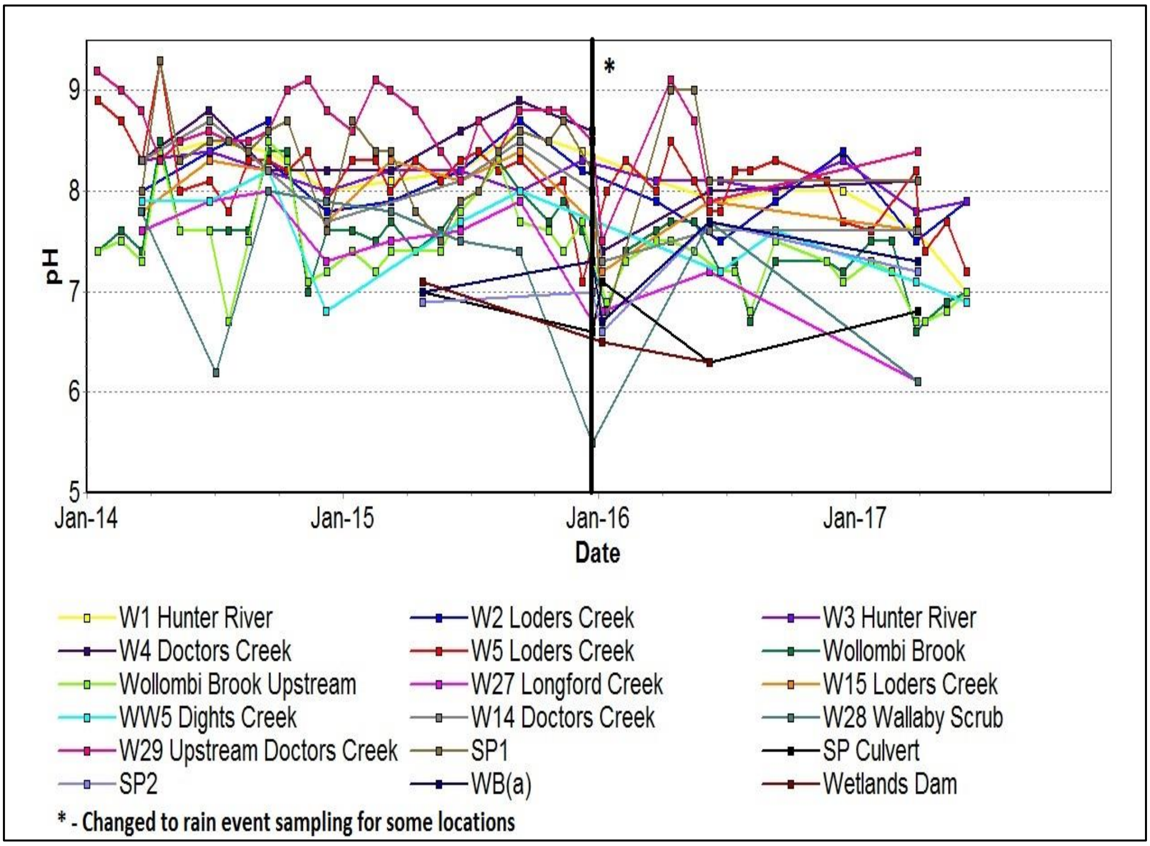

Figure 13: Watercourse pH Trend 2014 – Current

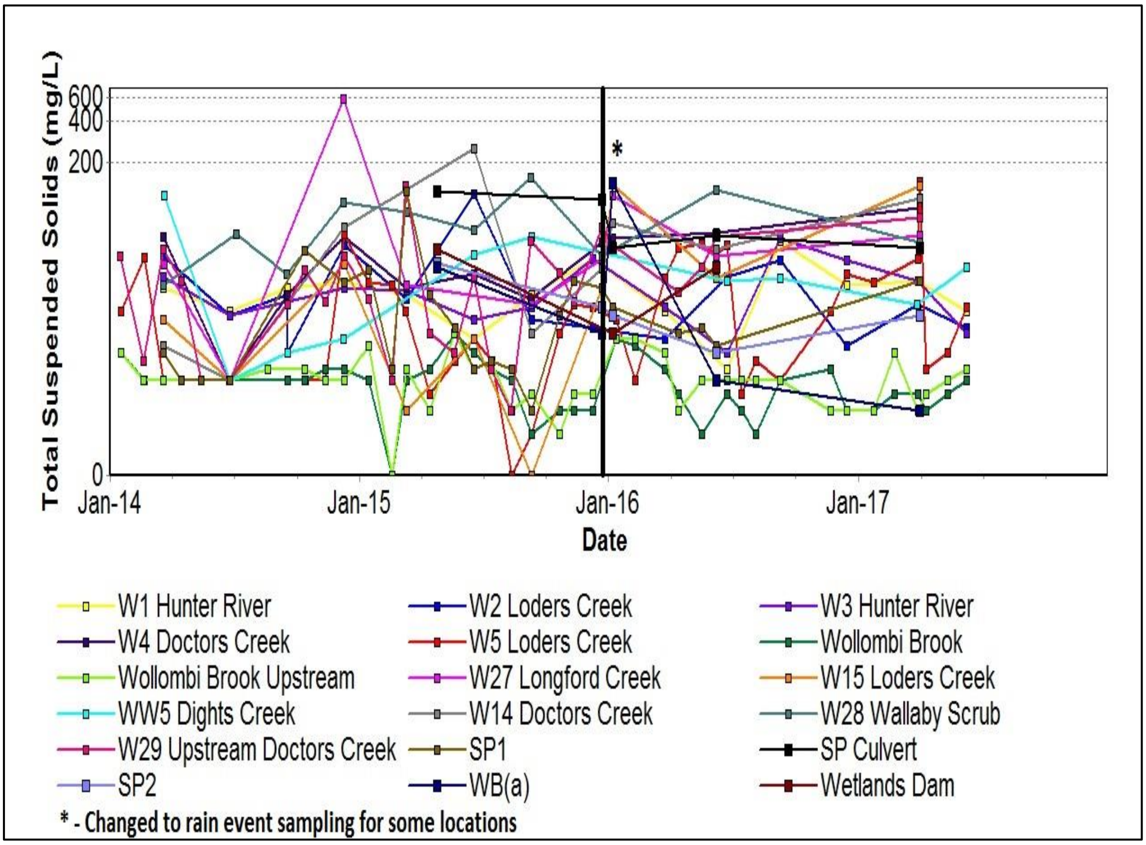

Figure 14: Watercourse Total Suspended Solids Trend 2014 – Current

3.1.2 Surface Water Trigger Tracking

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

During H1 2017 24 internal trigger limits were breached, summarised in Table 2.

Table 2: Surface Water Trigger Tracking - June 2017

Site	Date	Trigger Limit Breached	Action Taken in Response
W5	28/03/2017	EC –95th Percentile	Watching Brief*
W1	28/03/2017	EC –95th Percentile	Watching Brief*
W1	28/03/2017	pH –5th Percentile	Watching Brief*
W1	08/06/2017	pH –5th Percentile	Watching Brief*
W2	28/03/2017	pH –5th Percentile	Watching Brief*
W4	31/03/2017	pH –5th Percentile	Watching Brief*
W5	28/03/2017	pH –5th Percentile	Watching Brief*
W5	10/04/2017	pH –5th Percentile	Watching Brief*
W5	11/05/2017	pH –5th Percentile	Watching Brief*
W5	08/06/2017	pH –5th Percentile	Low flow conditions in Loders Creek; pH low but within historical range. Continue to watch and monitor.
W15	31/03/2017	pH –5th Percentile	Watching Brief*
W27	31/03/2017	pH –5th Percentile	Watching Brief*
W28	31/03/2017	pH –5th Percentile	Watching Brief*
Wollombi Brook	28/03/2017	pH –5th Percentile	Watching Brief*
Wollombi Brook	10/04/2017	pH –5th Percentile	Watching Brief*
Wollombi Brook Upstream	28/03/2017	pH –5th Percentile	Watching Brief*

Wollombi Brook Upstream	10/04/2017	pH –5th Percentile	Watching Brief*
Wollombi Brook Upstream	11/05/2017	pH –5th Percentile	Low flow conditions in Wollombi Brook; pH low but within historical range. Continue to watch and monitor.
W4	31/03/2017	TSS – 50mg/L (ANZECC criteria)	Field investigation did not identify any mining-related sources of sediment. Elevated TSS associated with high-intensity rainfall event. No further action.
W14	31/03/2017	TSS – 50mg/L (ANZECC criteria)	Field investigation did not identify any mining-related sources of sediment. Elevated TSS associated with high-intensity rainfall event. No further action.
W15	31/03/2017	TSS – 50mg/L (ANZECC criteria)	Investigation did not identify any mining-related sources of sediment. Elevated TSS associated with high-intensity rainfall event. No further action.
W27	31/03/2017	TSS – 50mg/L (ANZECC criteria)	Investigation did not identify any mining-related sources of sediment. Elevated TSS associated with high-intensity rainfall event; data consistent with historical range. No further action.
W28	31/03/2017	TSS – 50mg/L (ANZECC criteria)	Investigation did not identify any mining-related sources of sediment. Elevated TSS associated with high-intensity rainfall event; data consistent with historical range. No further action.
W29	31/03/2017	TSS – 50mg/L (ANZECC criteria)	Field investigation did not identify any mining-related sources of sediment. Elevated TSS associated with high-intensity rainfall event. No further action.

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

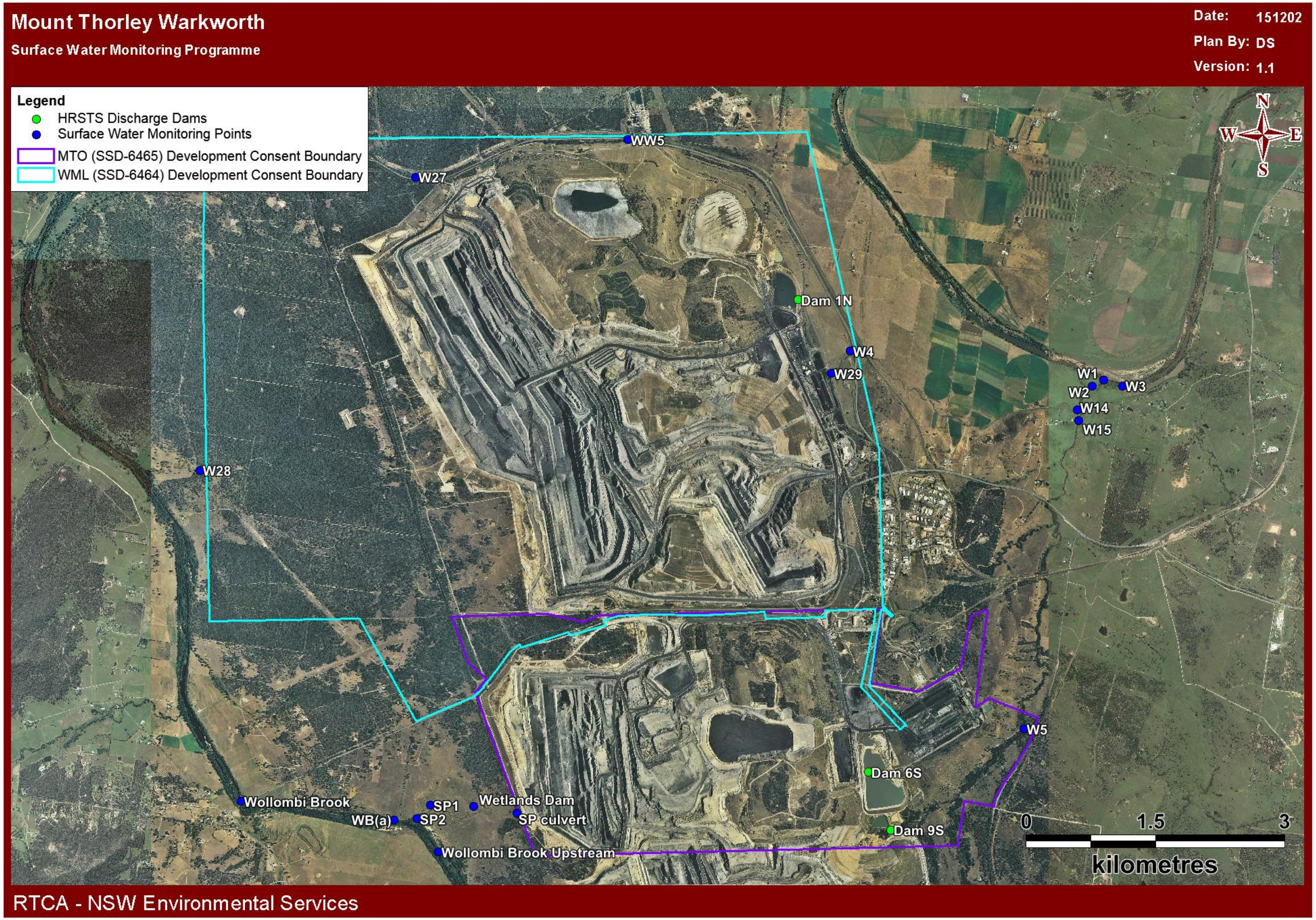

Figure 15: Surface Water Monitoring Location Plan

3.2 Groundwater Monitoring

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

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

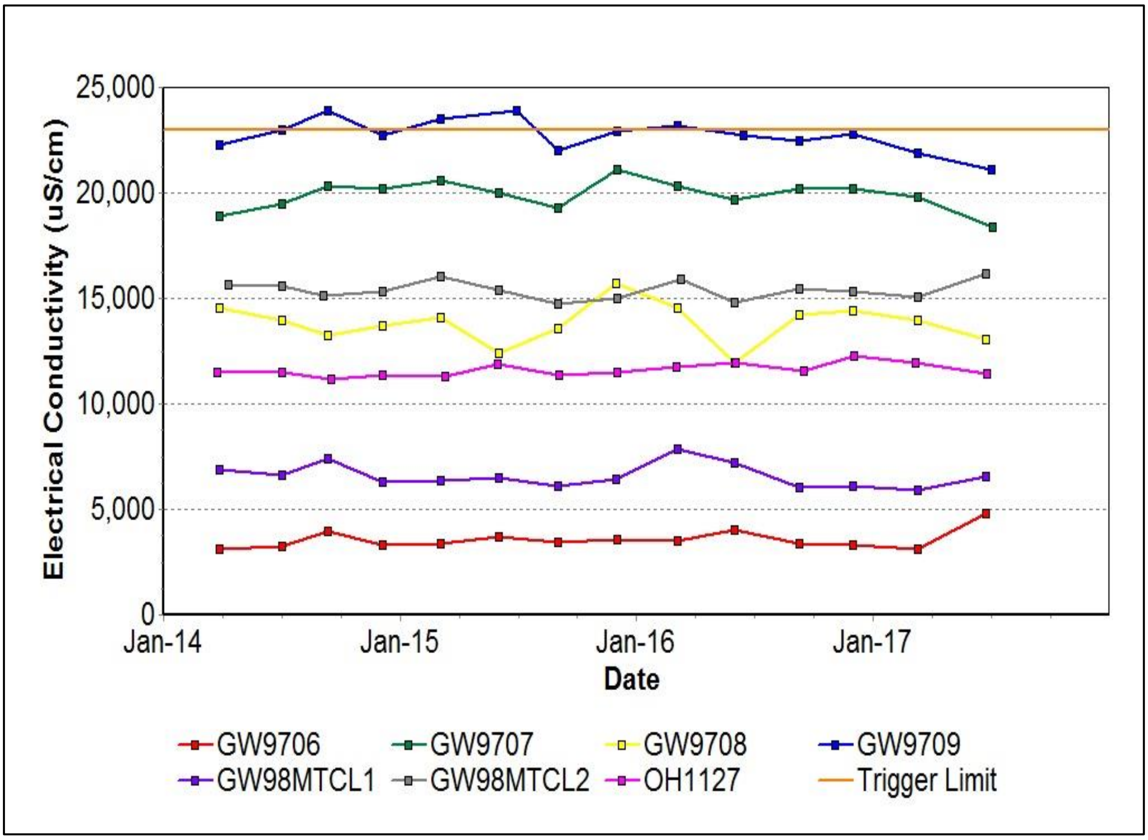

Figure 16: Bayswater Seam Electrical Conductivity Trend – June 2017

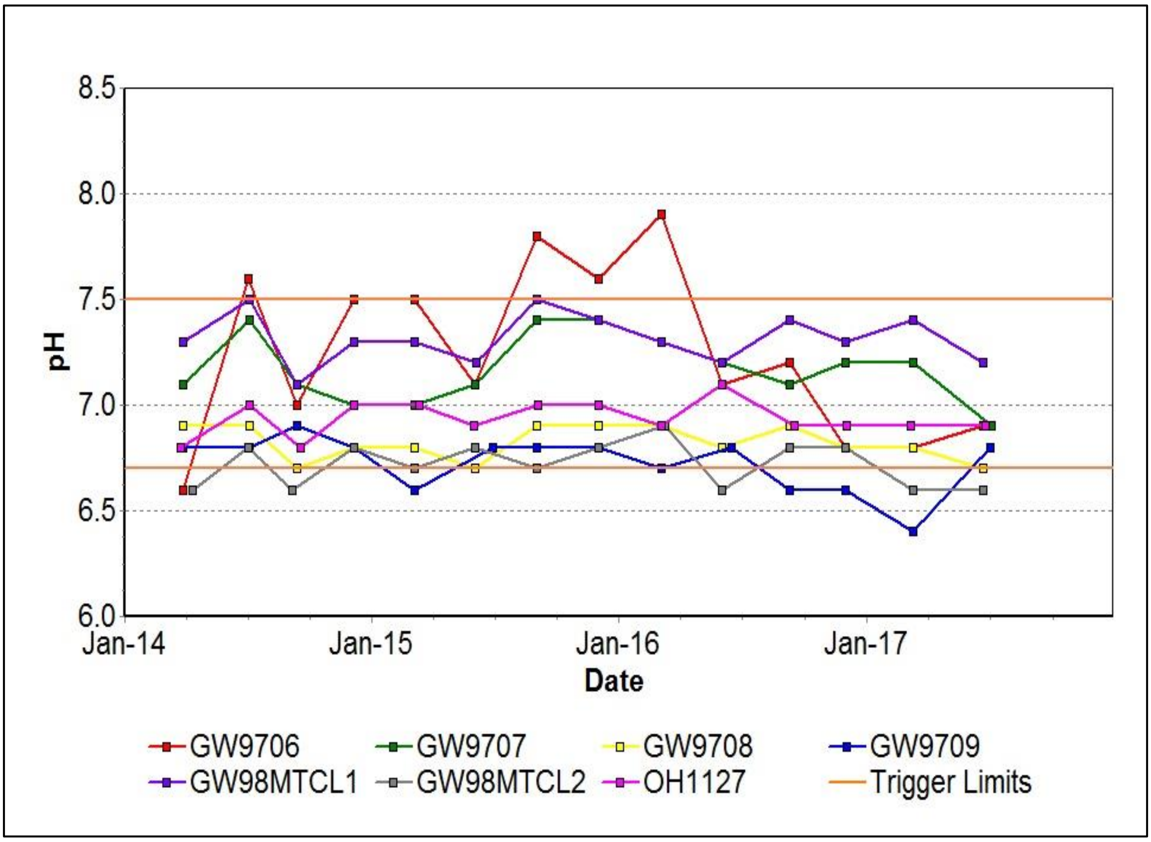

Figure 17: Bayswater Seam pH Trend June 2017

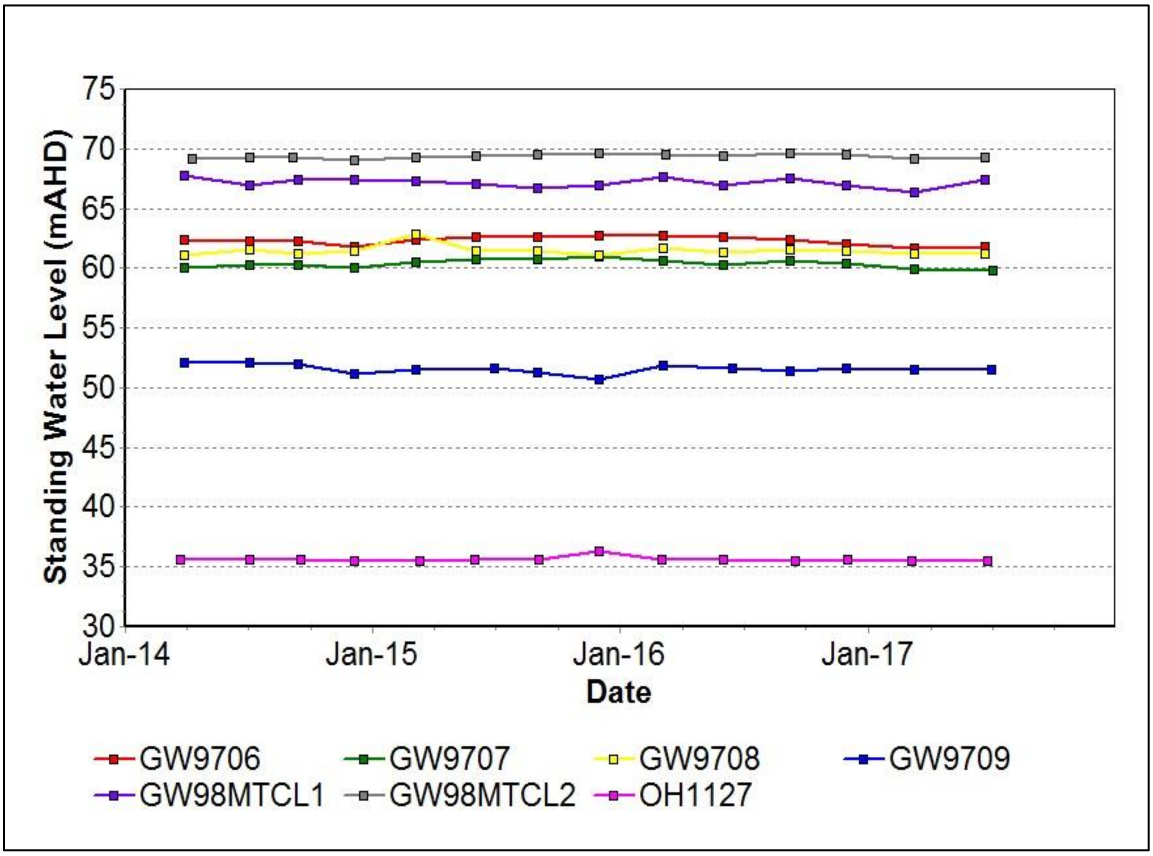

Figure 18: Bayswater Seam Standing Water Level – June 2017

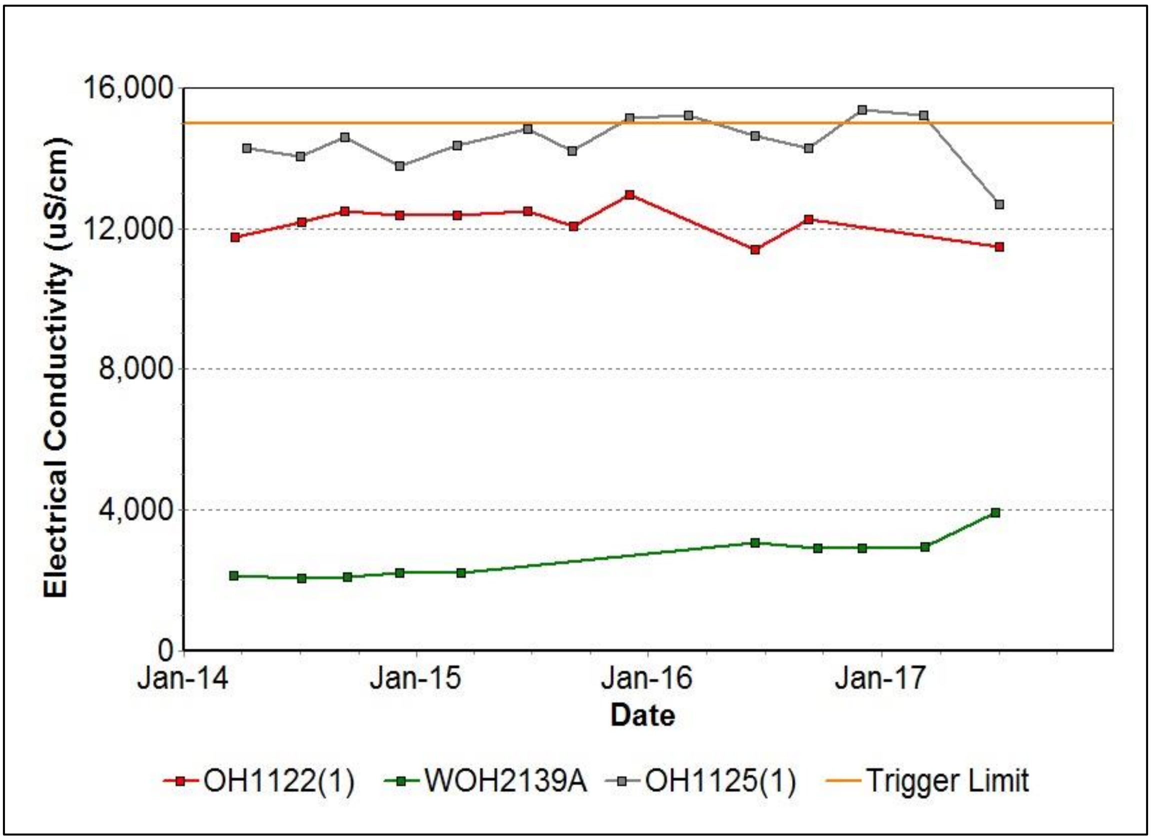

Figure 19: Blakefield Seam Electrical Conductivity Trend - June 2017

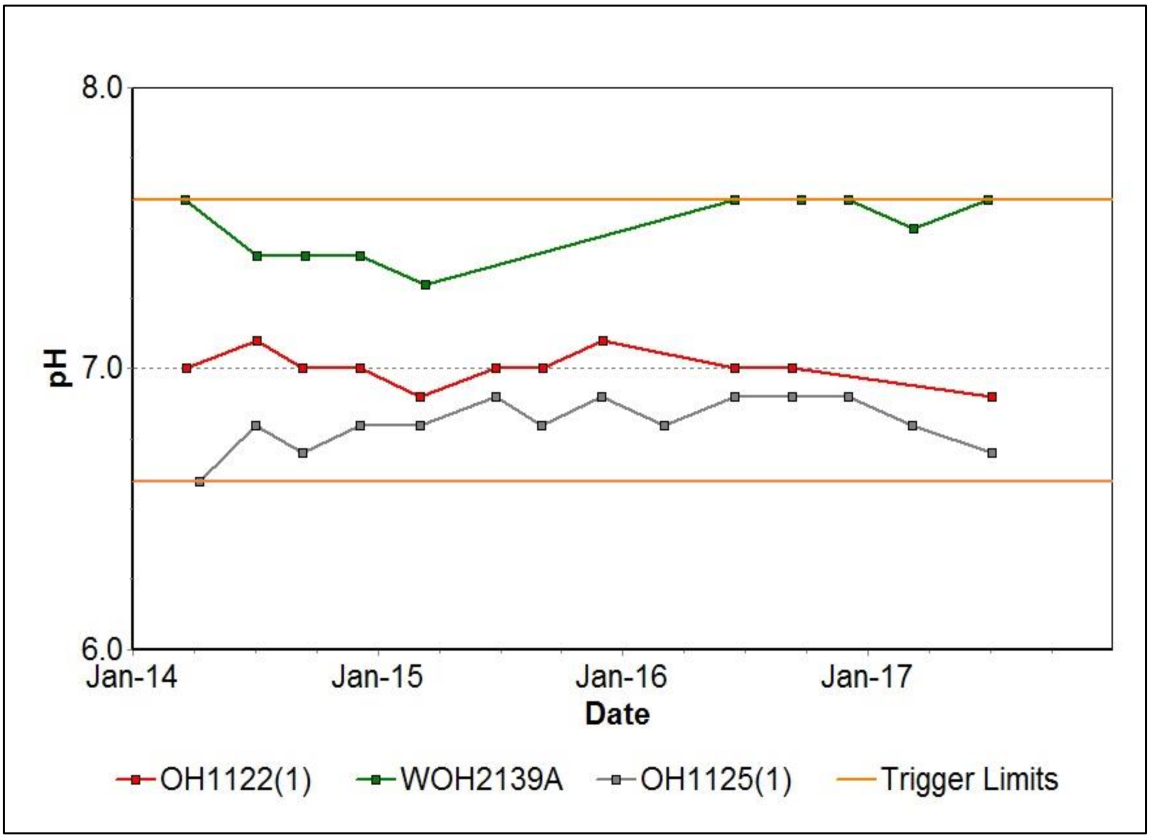

Figure 20: Blakefield Seam pH Trend - June 2017

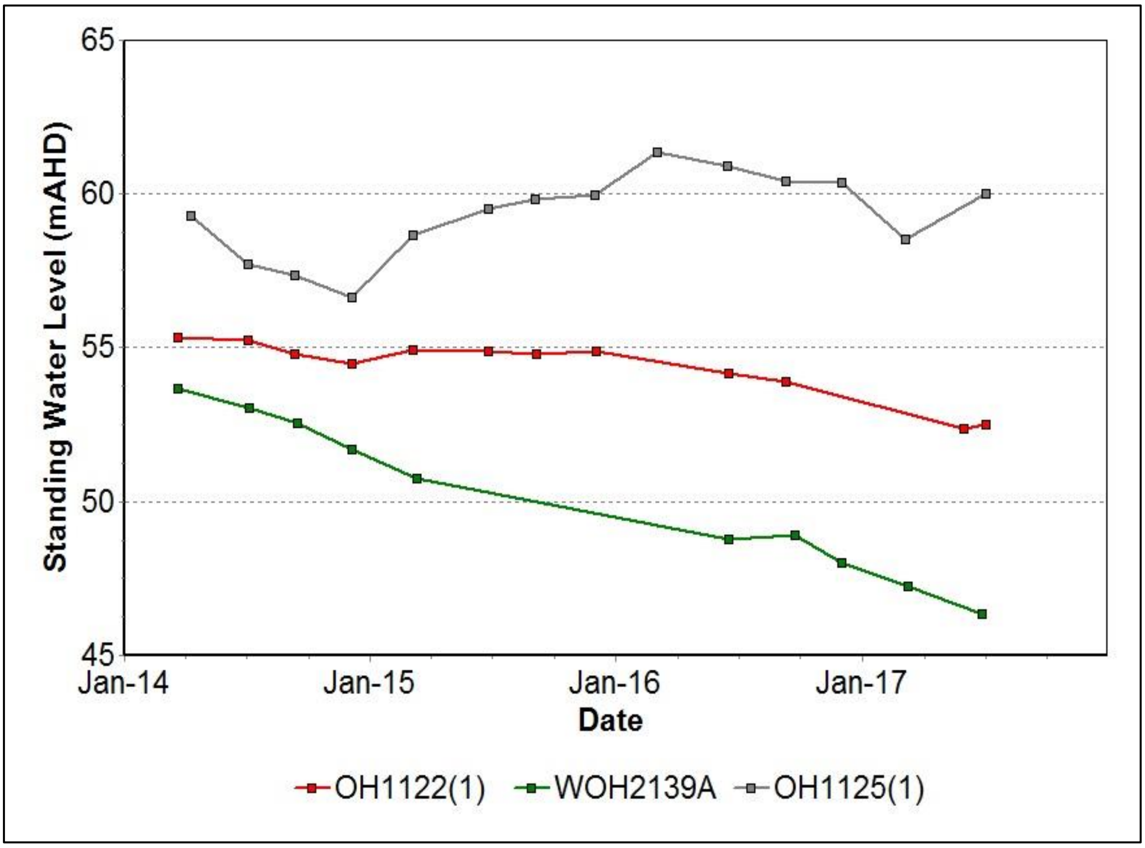

Figure 21: Blakefield Seam Standing Water Level Trend - June 2017

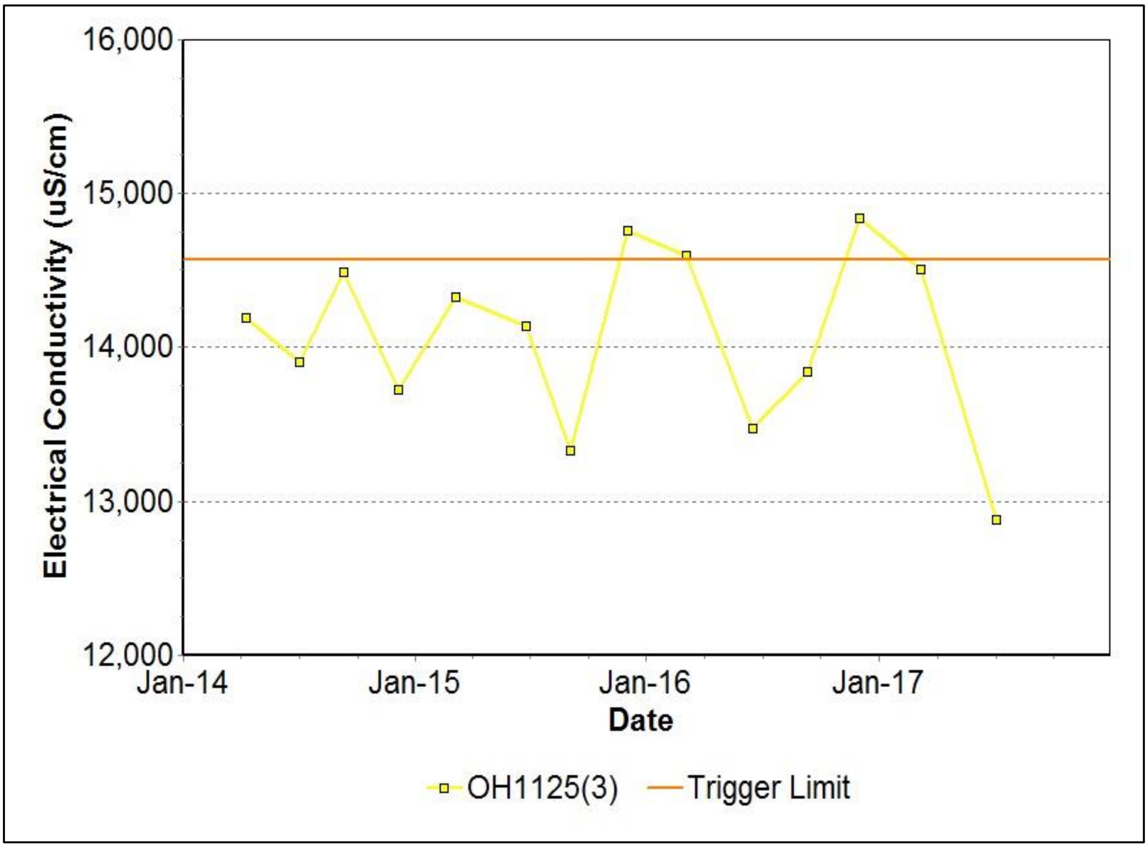

Figure 22: Bowfield Seam Electrical Conductivity Trend - June 2017

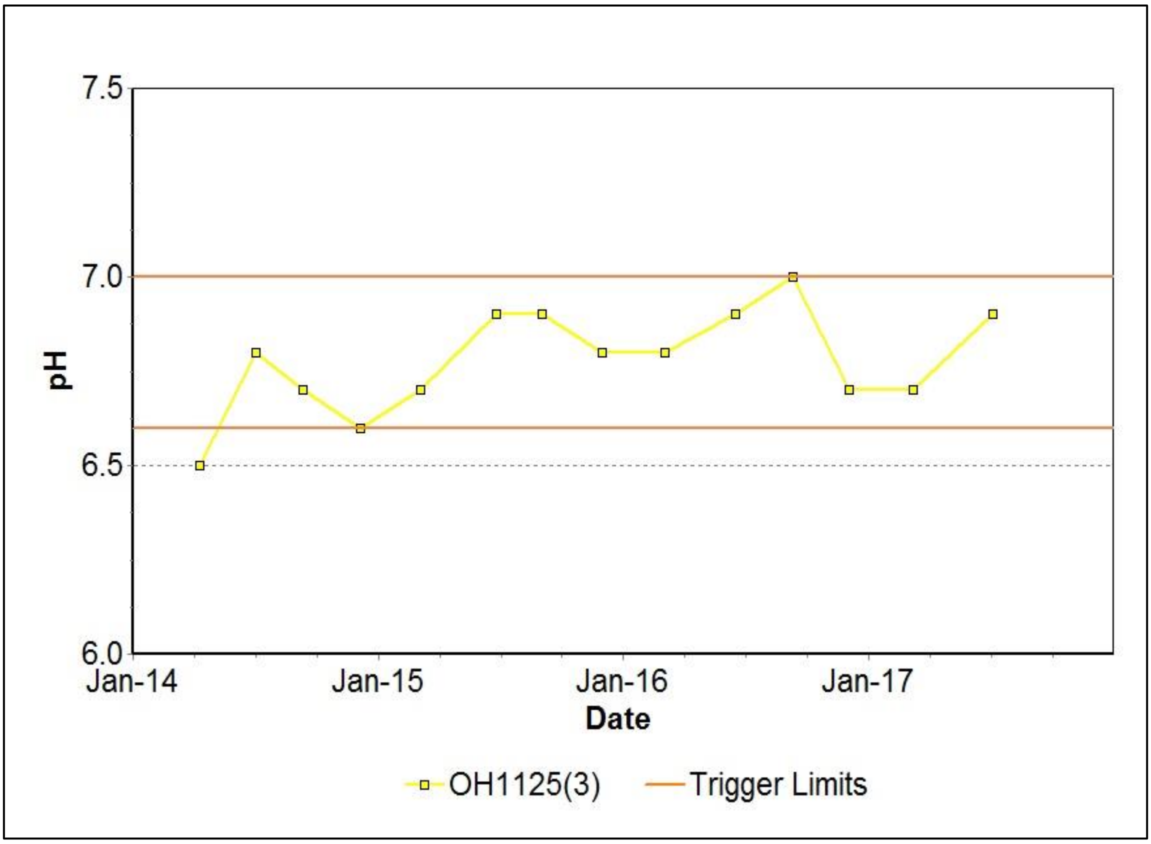

Figure 23: Bowfield Seam pH Trend – June 2017

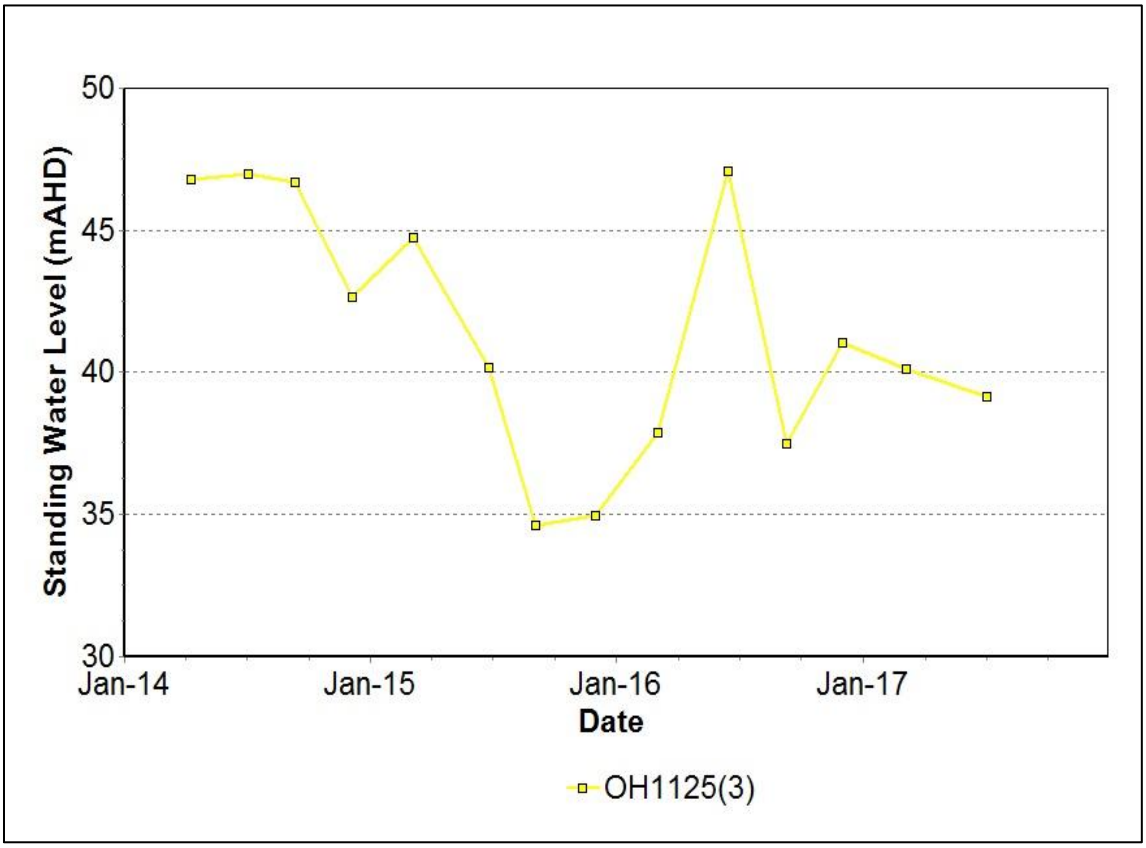

Figure 24: Bowfield Seam Standing Water Level Trend - June 2017

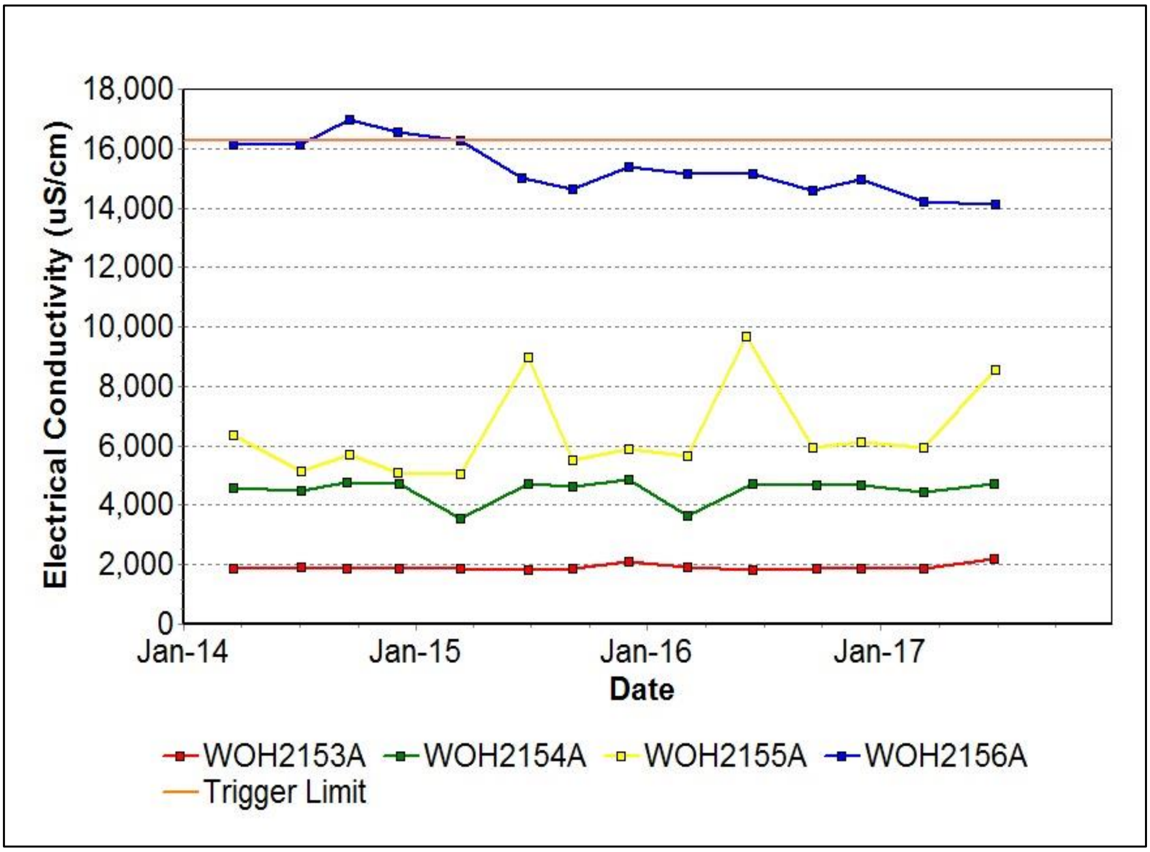

Figure 25: Redbank Seam Electrical Conductivity Trend - June 2017

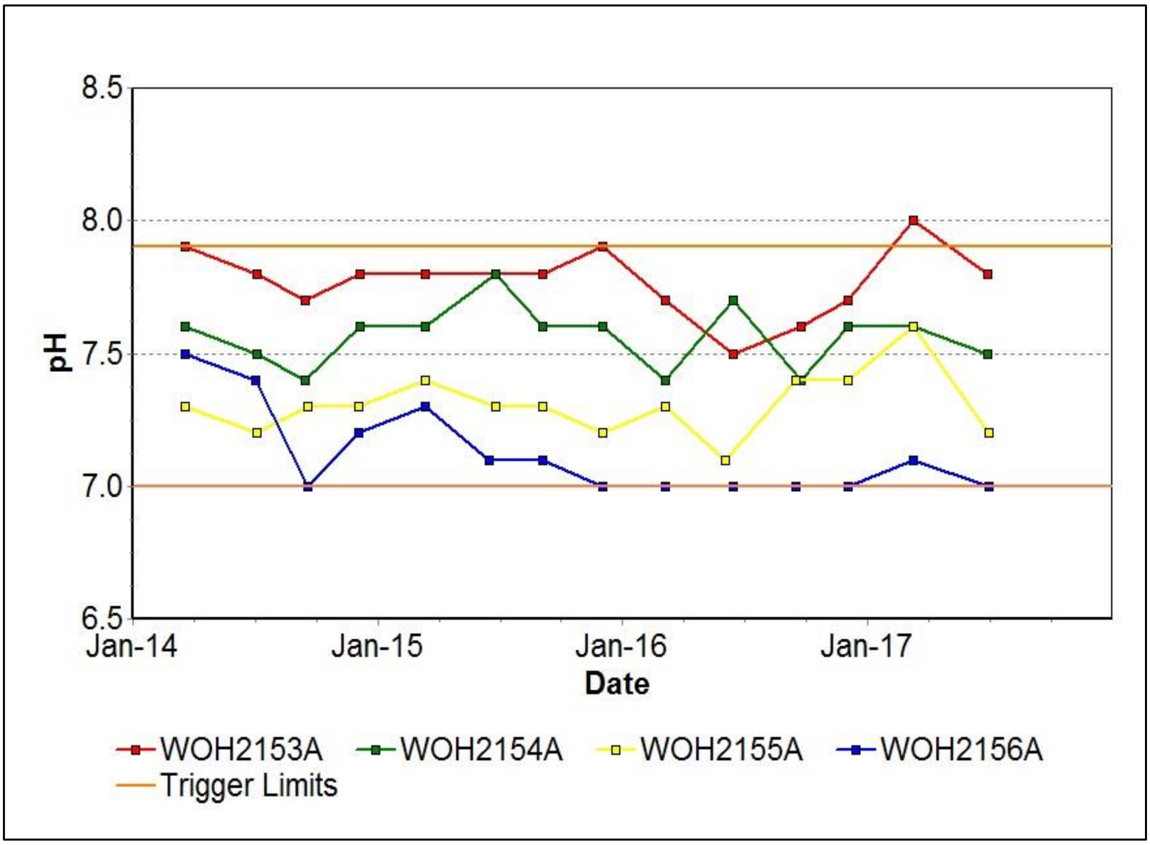

Figure 26: Redbank Seam pH Trend – June 2017

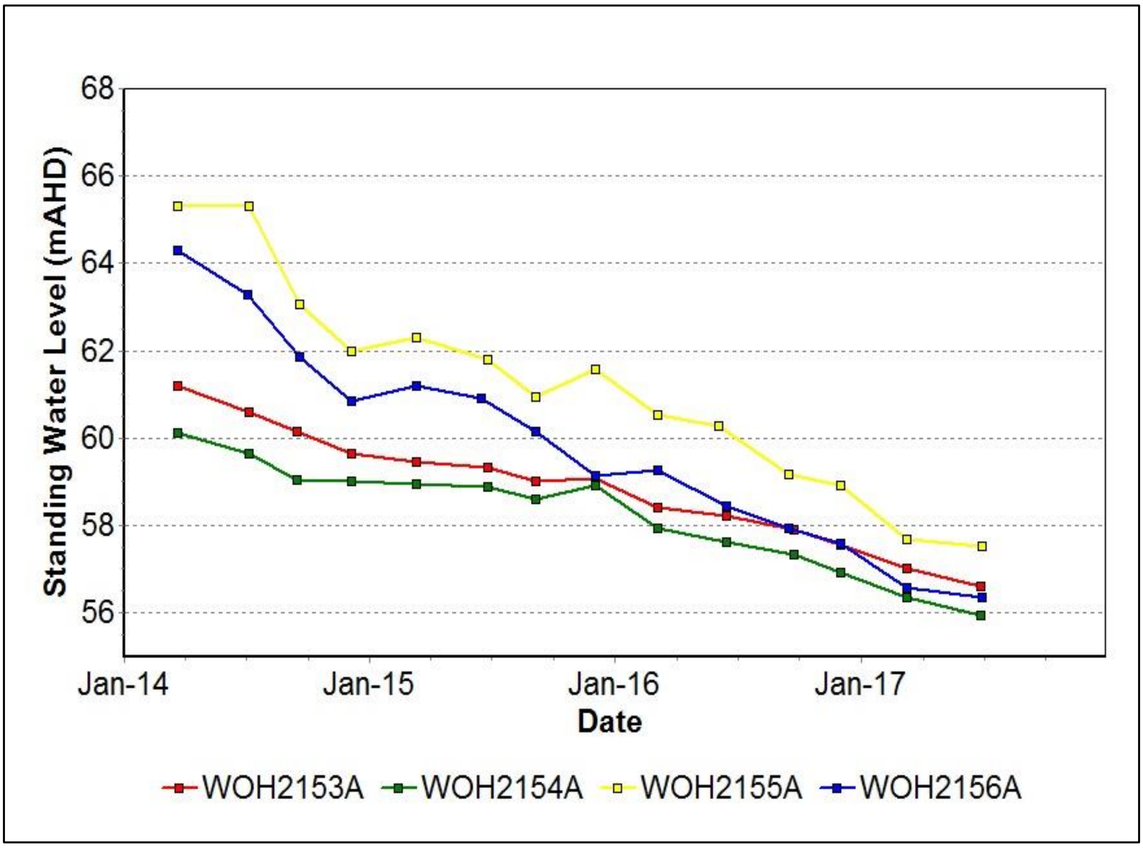

Figure 27: Redbank Seam Standing Water Level - June 2017

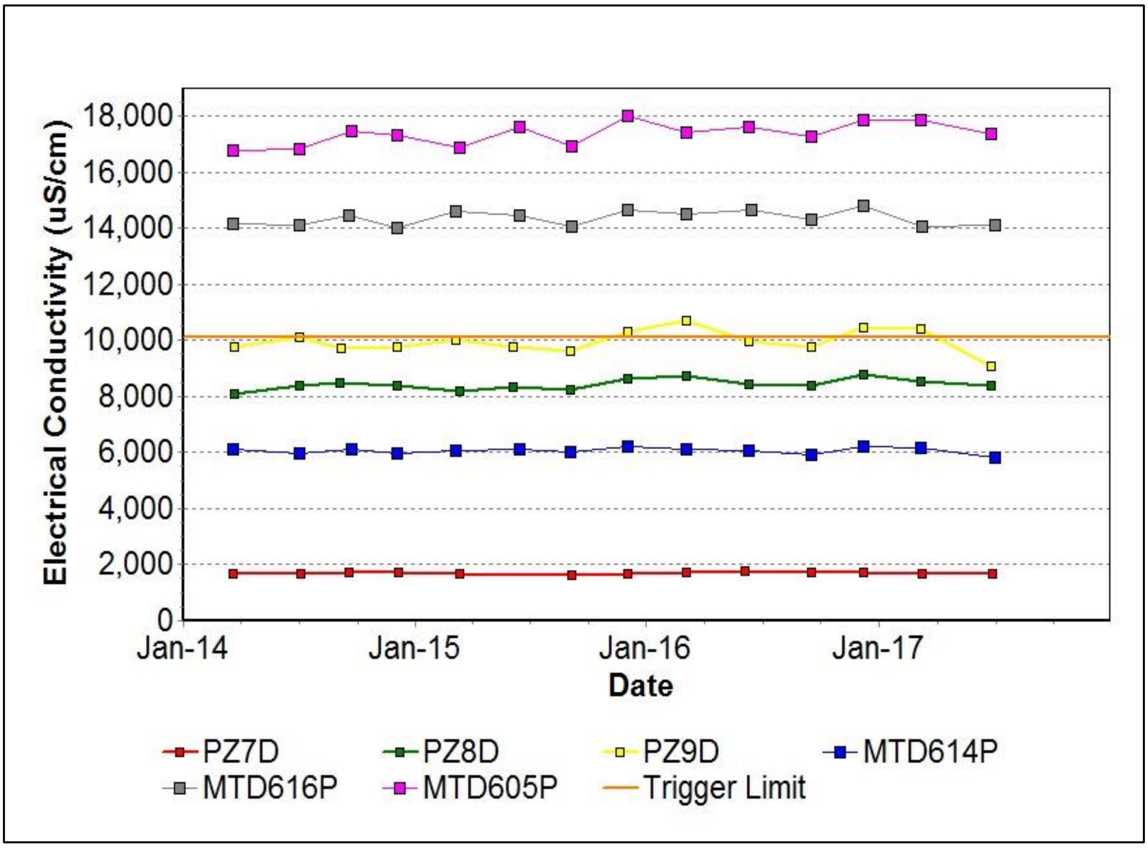

Figure 28: Shallow Overburden Seam Electrical Conductivity Trend - June 2017

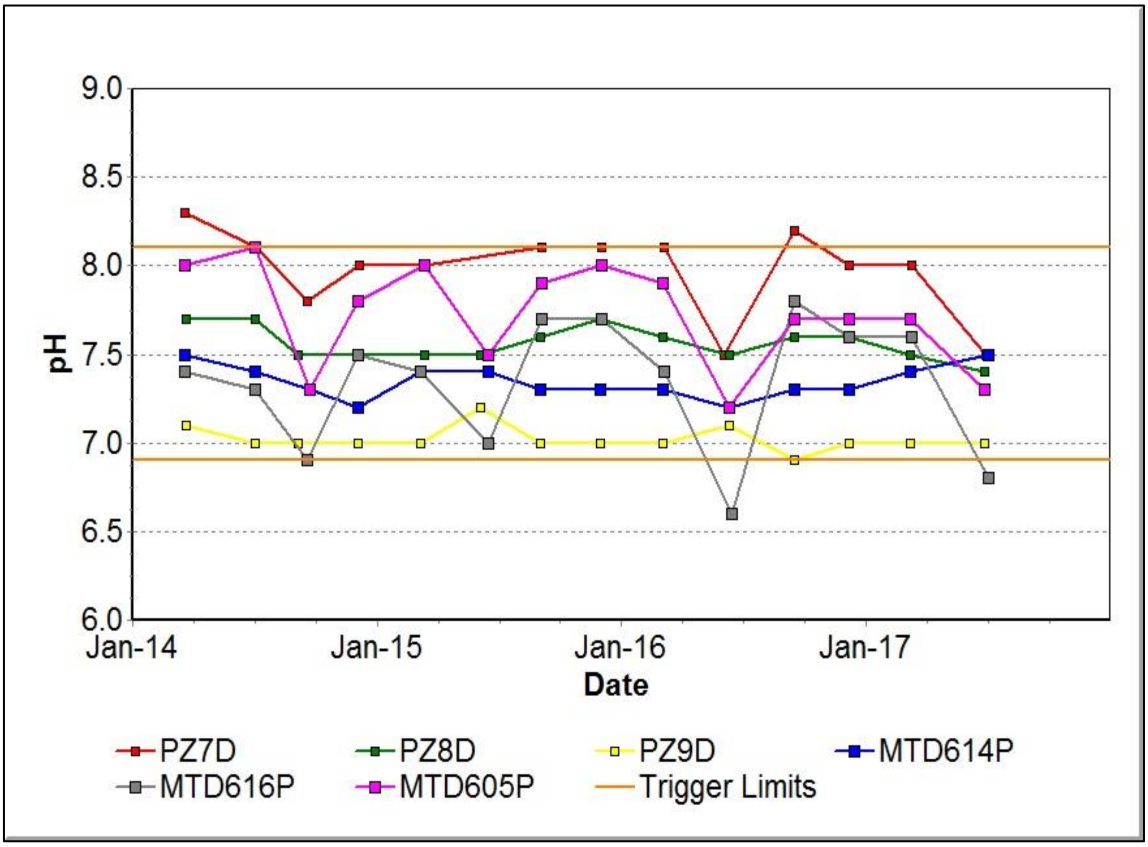

Figure 29: Shallow Overburden Seam pH Trend – June 2017

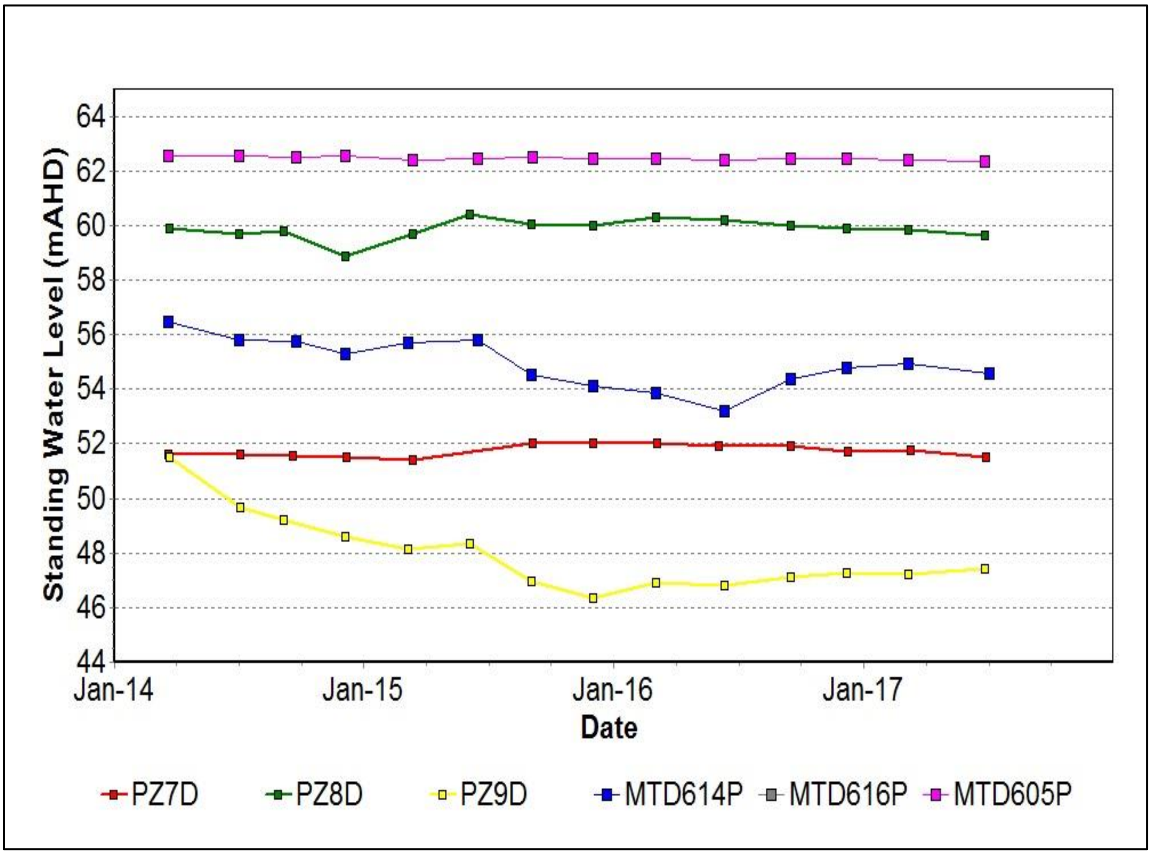

Figure 30: Shallow Overburden Seam Standing Water Level Trend - June 2017

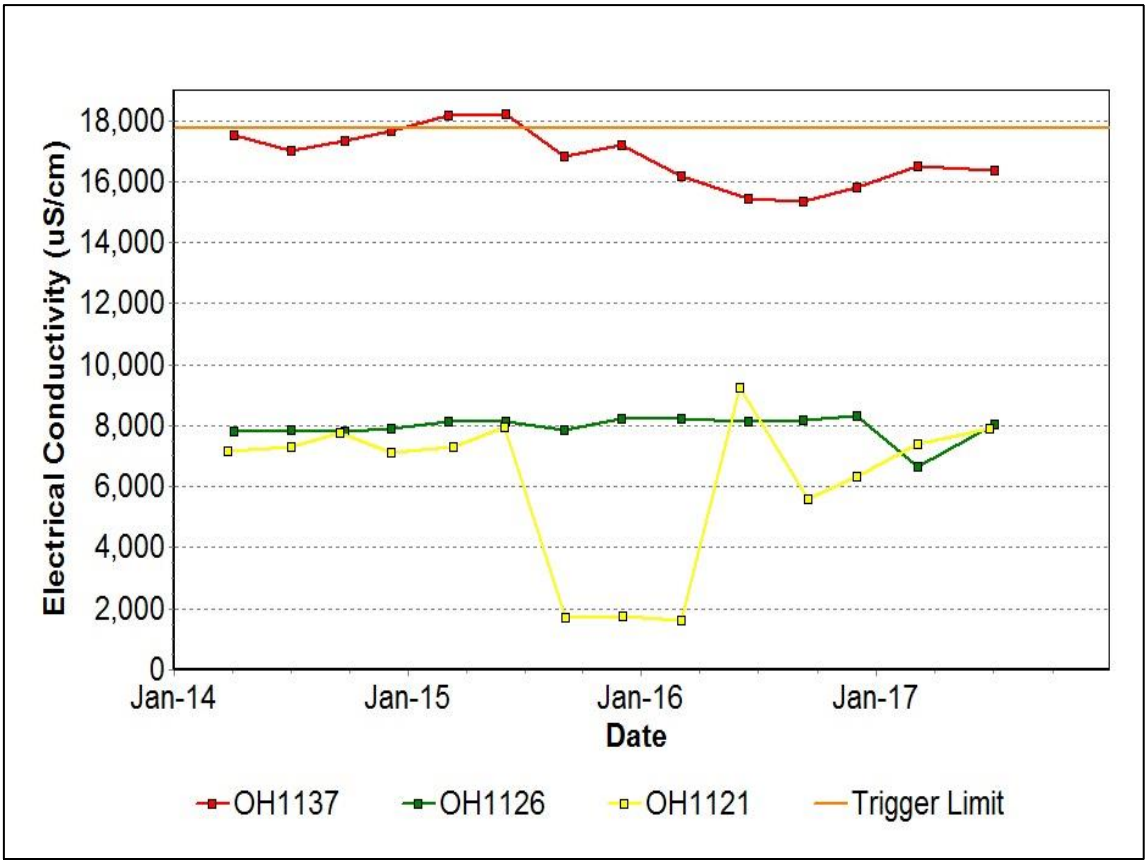

Figure 31: Vaux Seam Electrical Conductivity Trend – June 2017

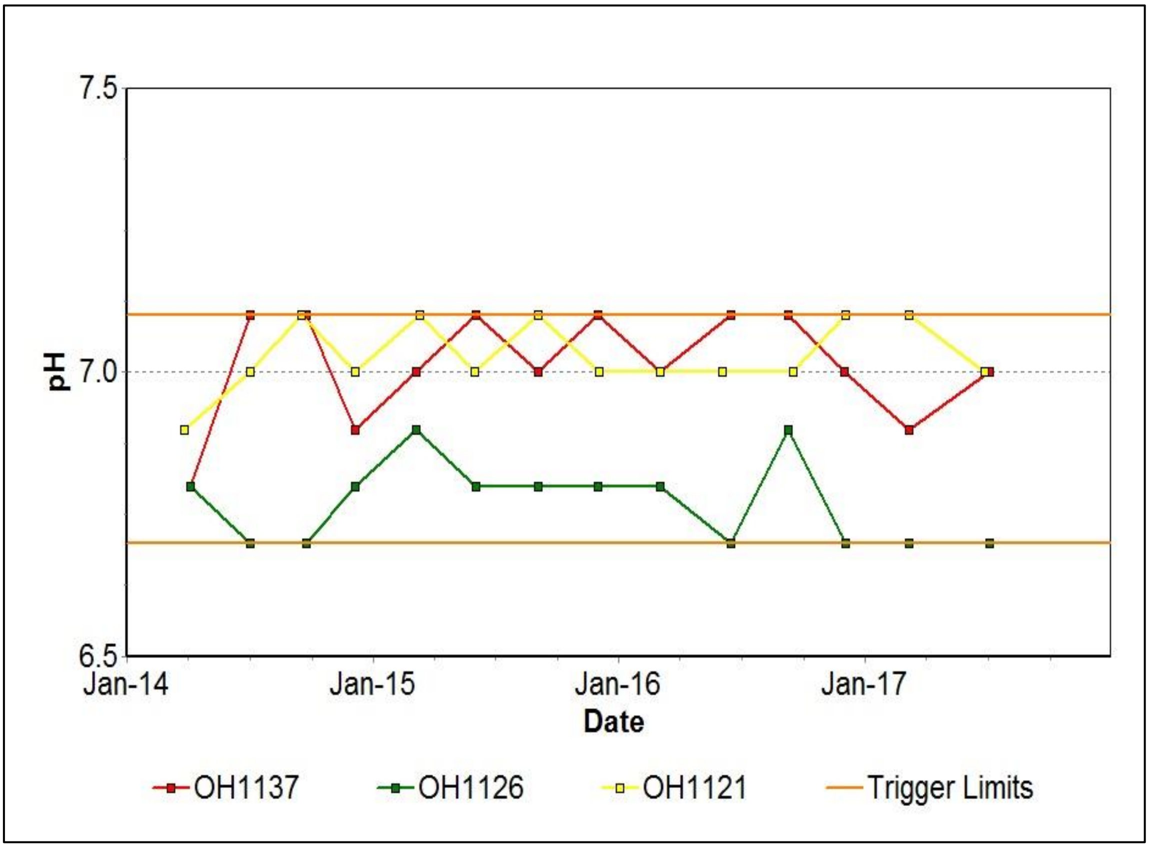

Figure 32: Vaux Seam pH Trend - June 2017

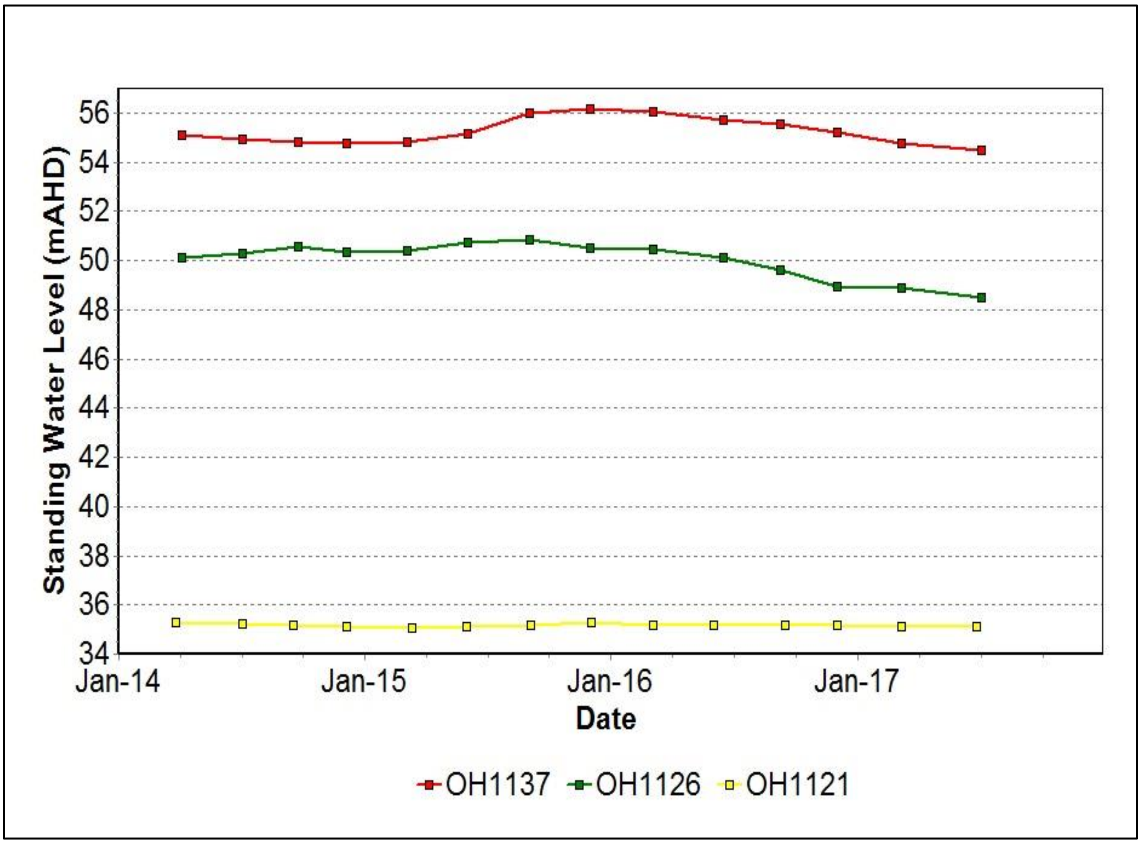

Figure 33: Vaux Seam Standing Water Level Trend - June 2017

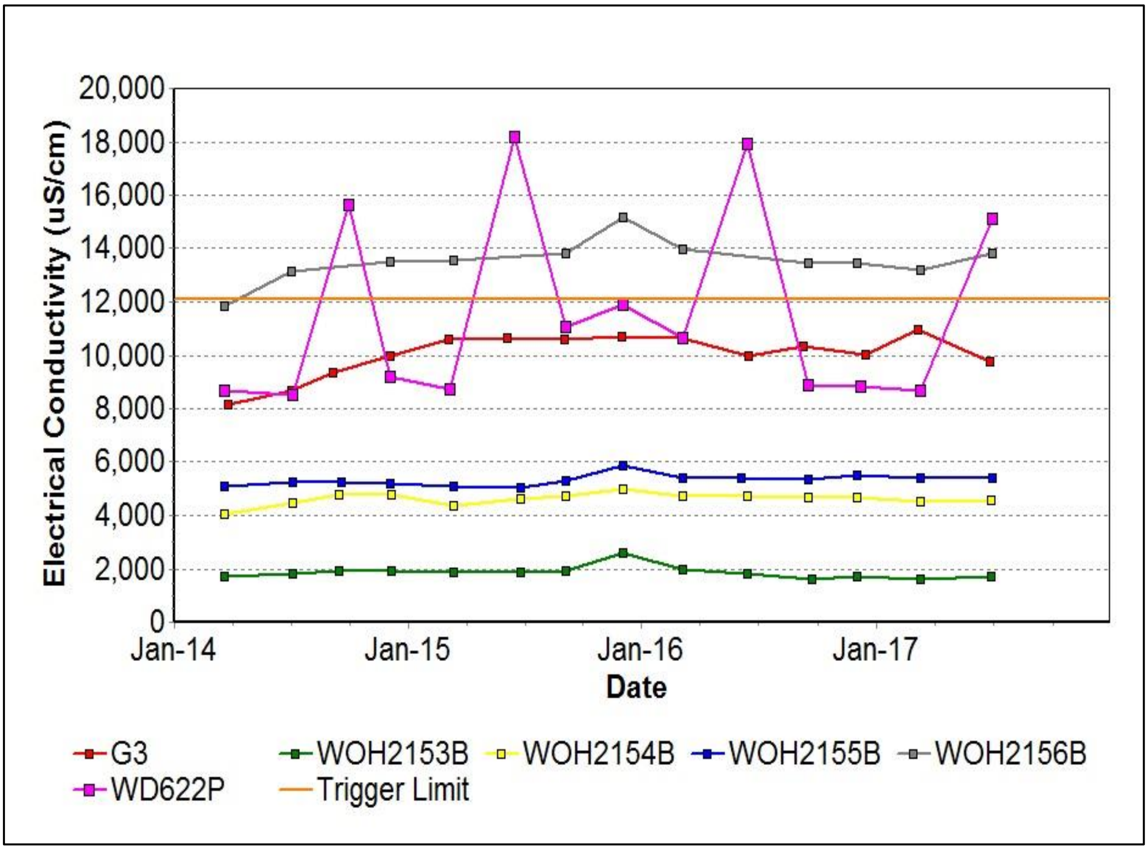

Figure 34: Wambo Seam Electrical Conductivity Trend - June 2017

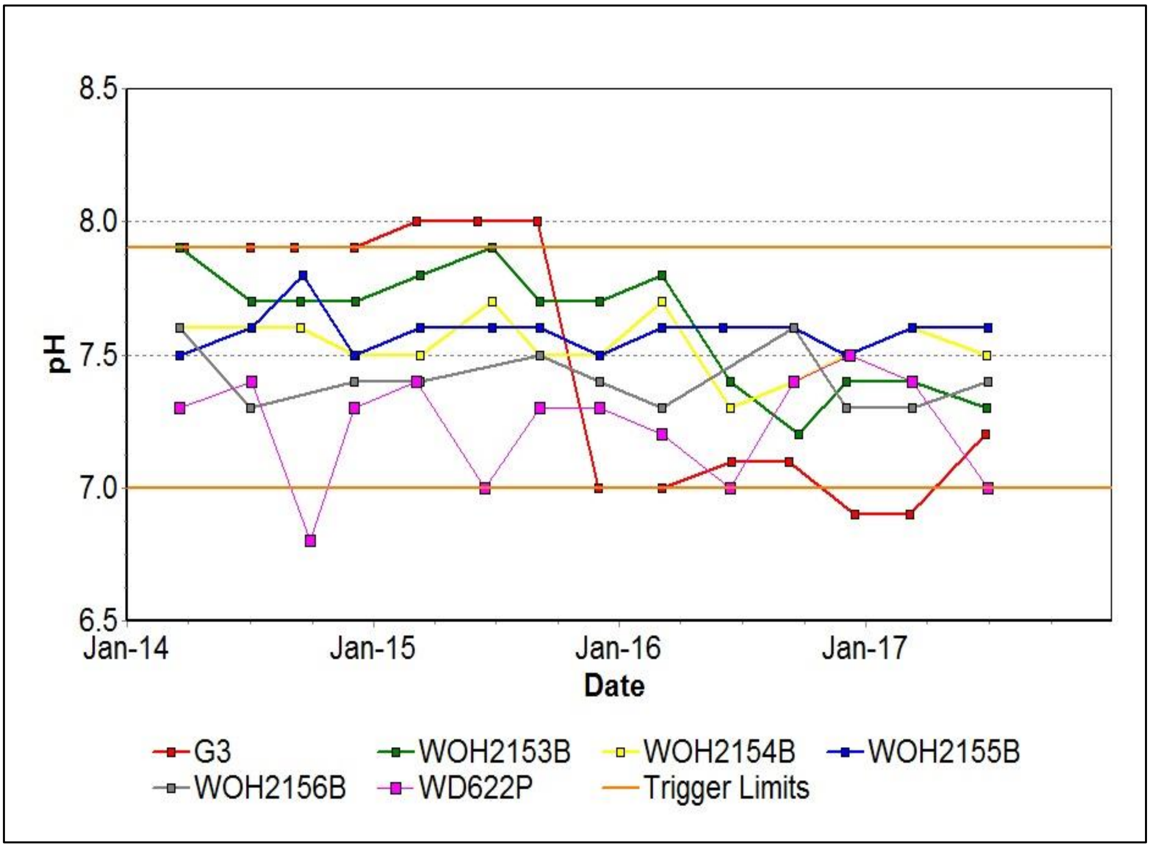

Figure 35: Wambo Seam pH Trend – June 2017

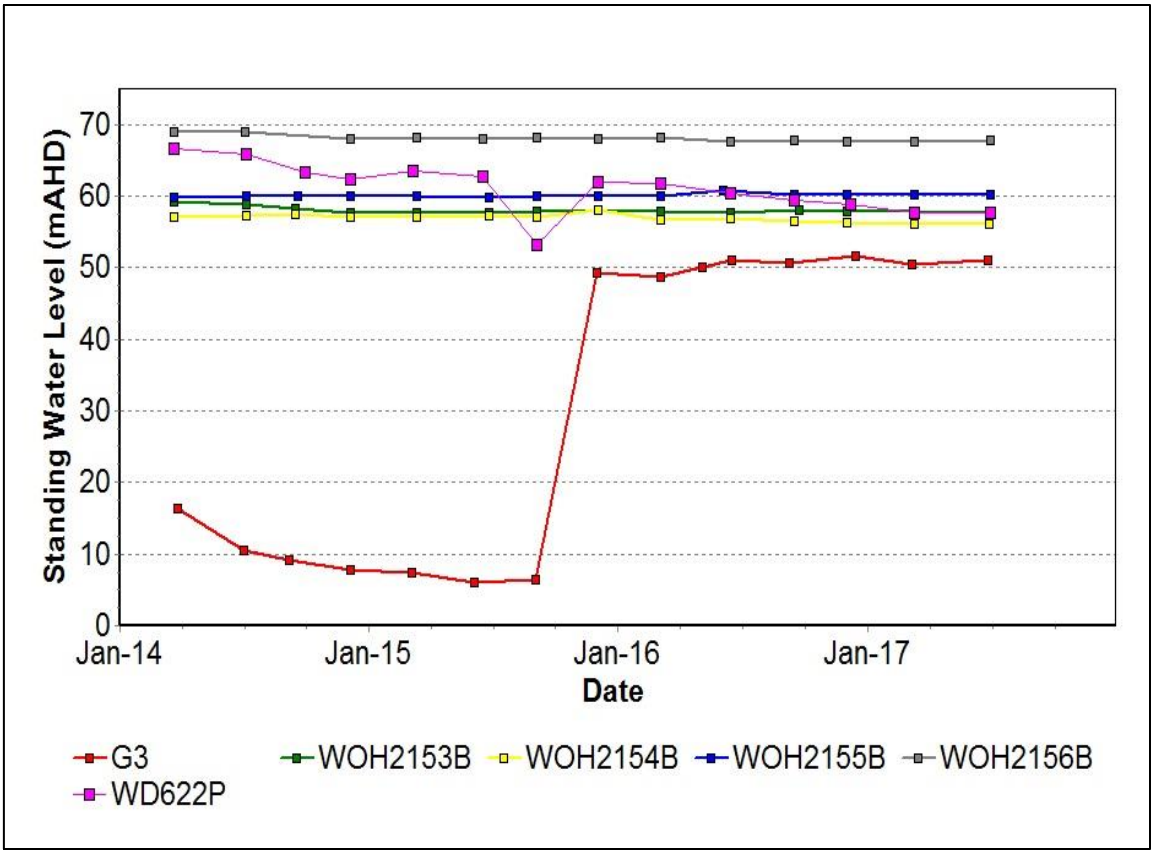

Figure 36: Wambo Seam Standing Water Level Trend - June 2017

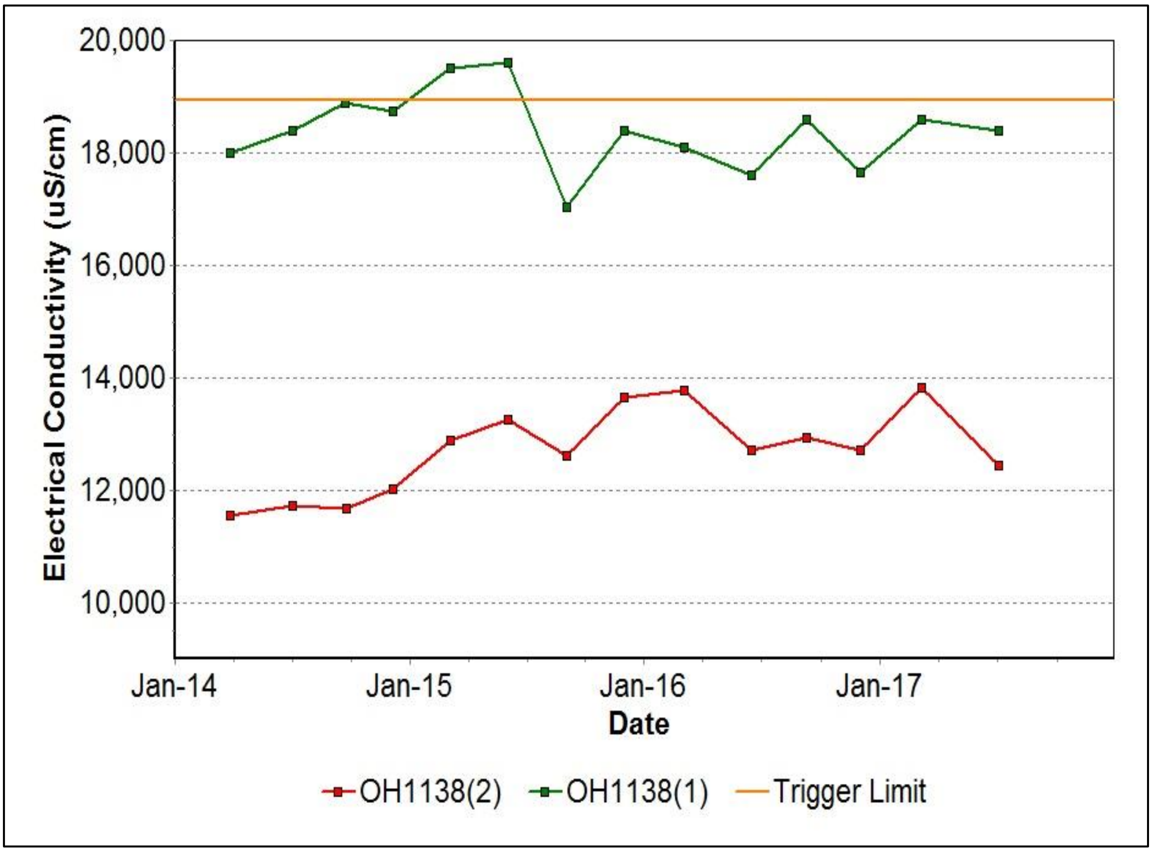

Figure 37: Warkworth Seam Electrical Conductivity Trend – June 2017

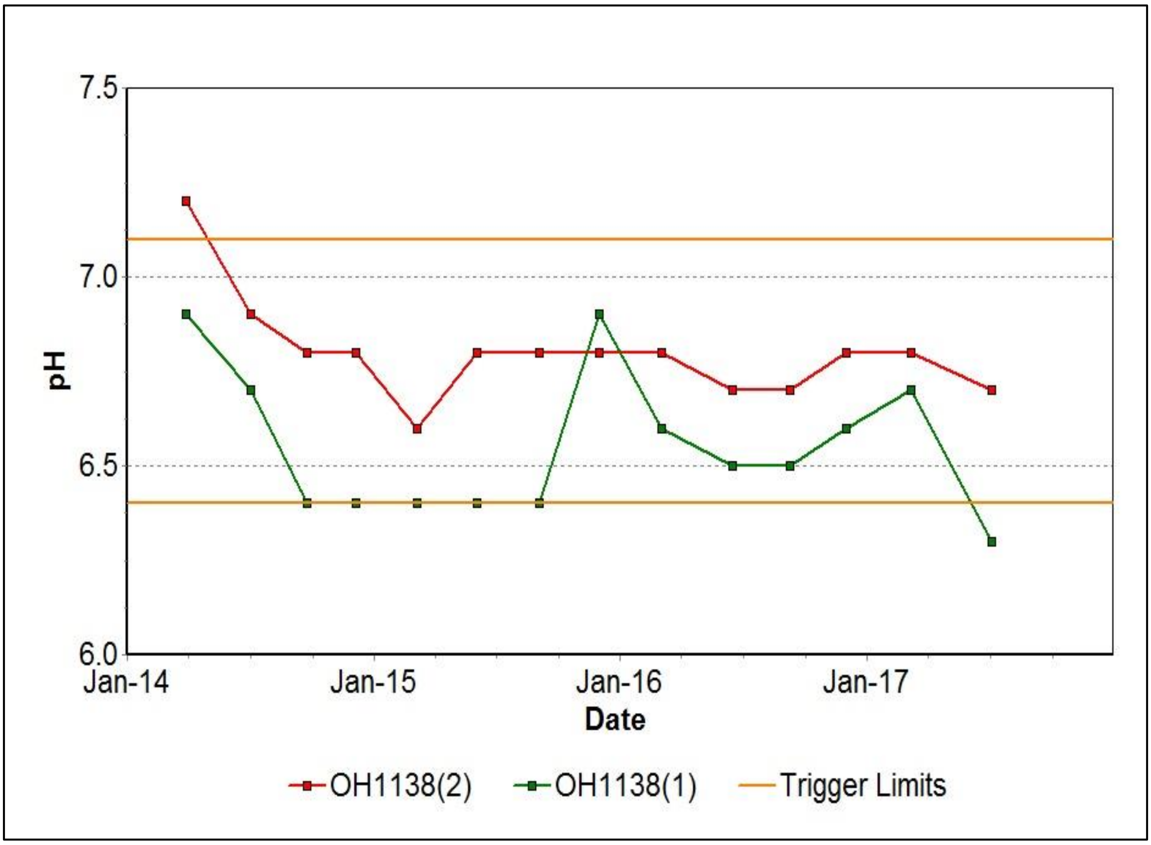

Figure 38: Warkworth Seam pH Trend - June 2017

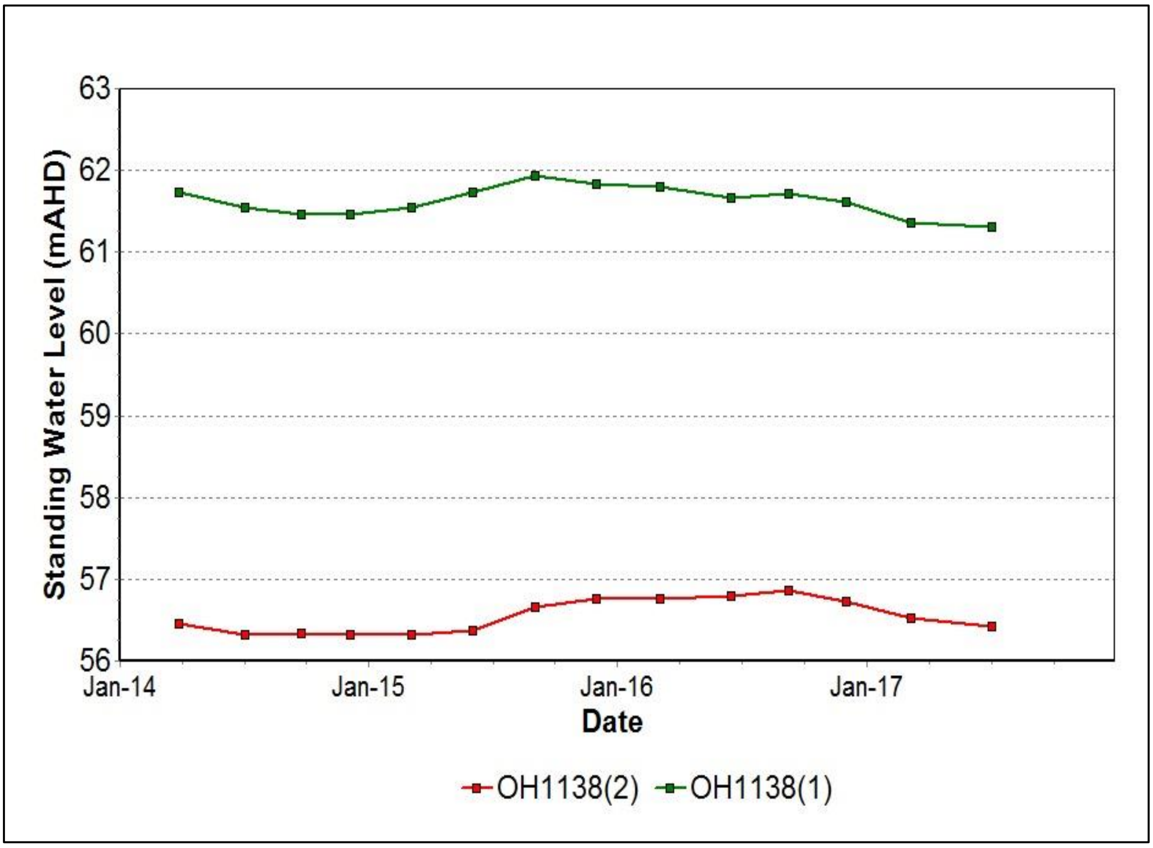

Figure 39: Warkworth Seam Standing Water Level Trend - June 2017

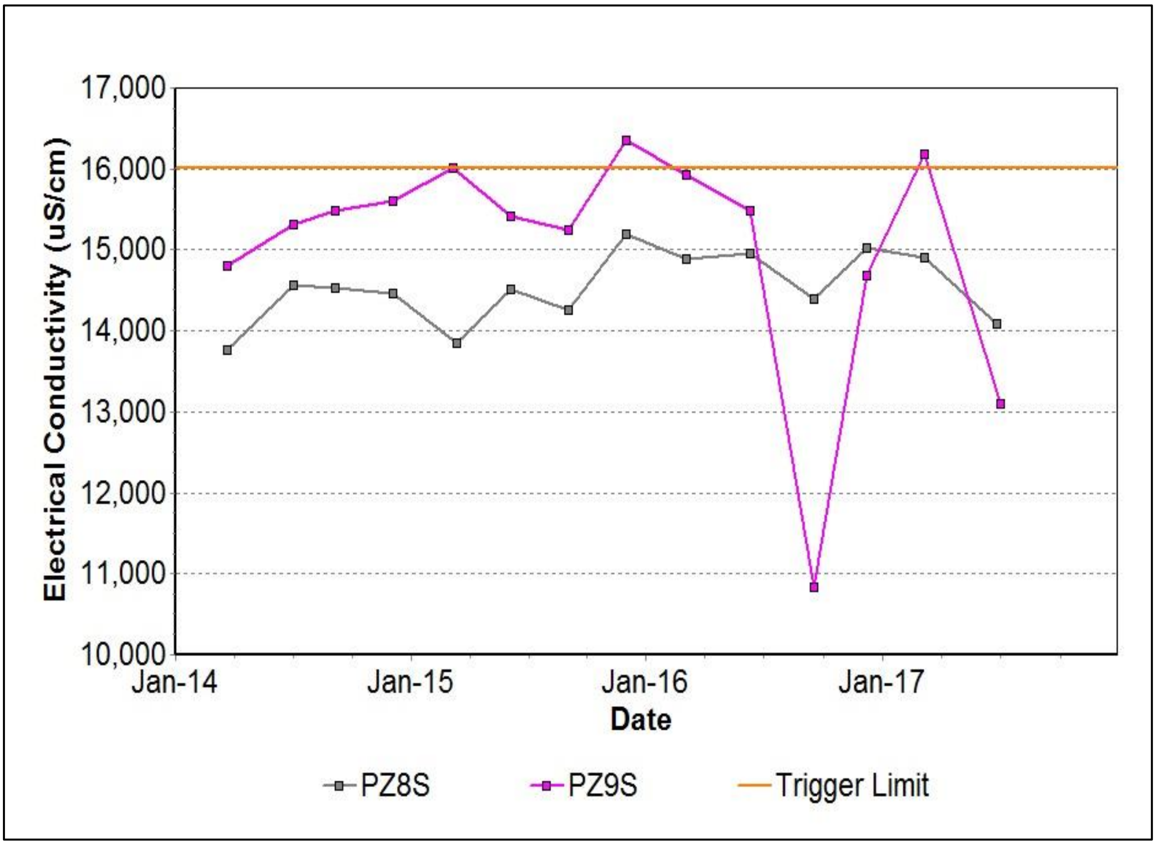

Figure 40: Wollombi Alluvium Electrical Conductivity Trend – June 2017

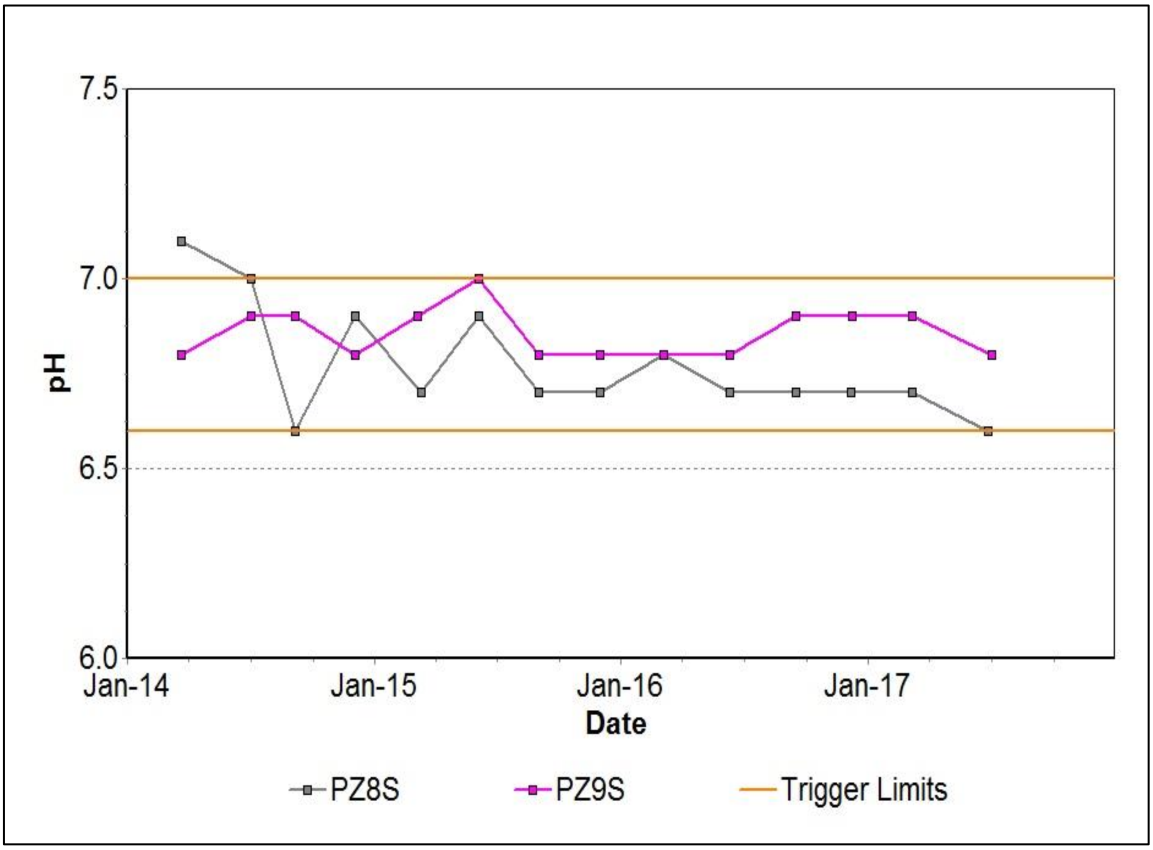

Figure 41: Wollombi Alluvium pH Trend – June 2017

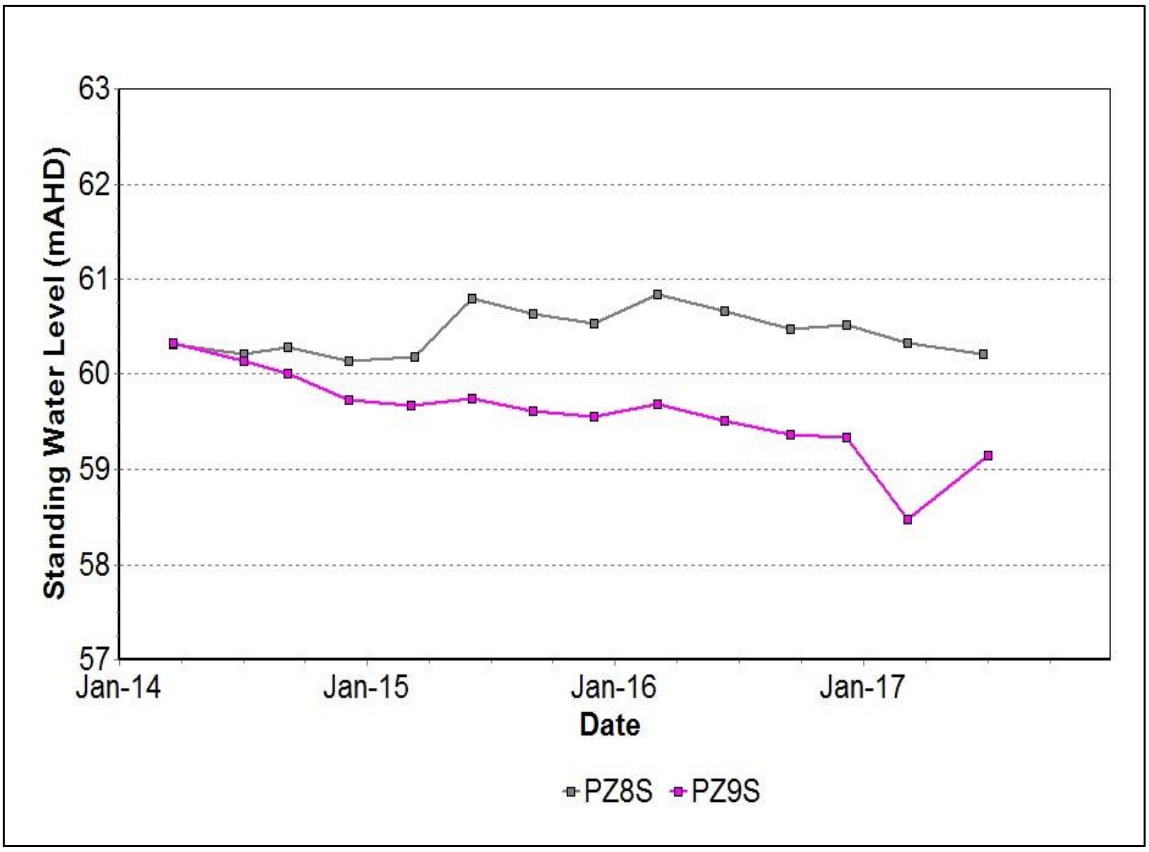

Figure 42: Wollombi Alluvium Standing Water Level Trend - June 2017

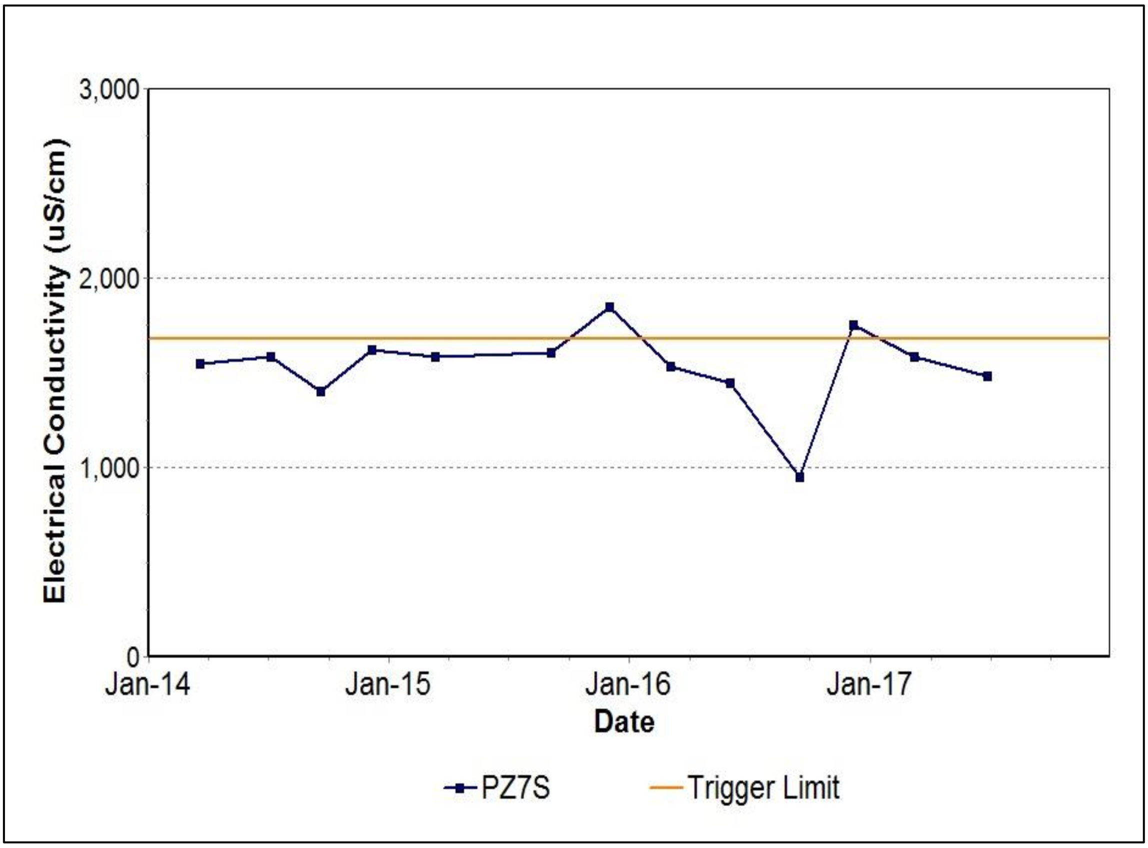

Figure 43: Aeolian Warkworth Sands Electrical Conductivity Trend – June 2017

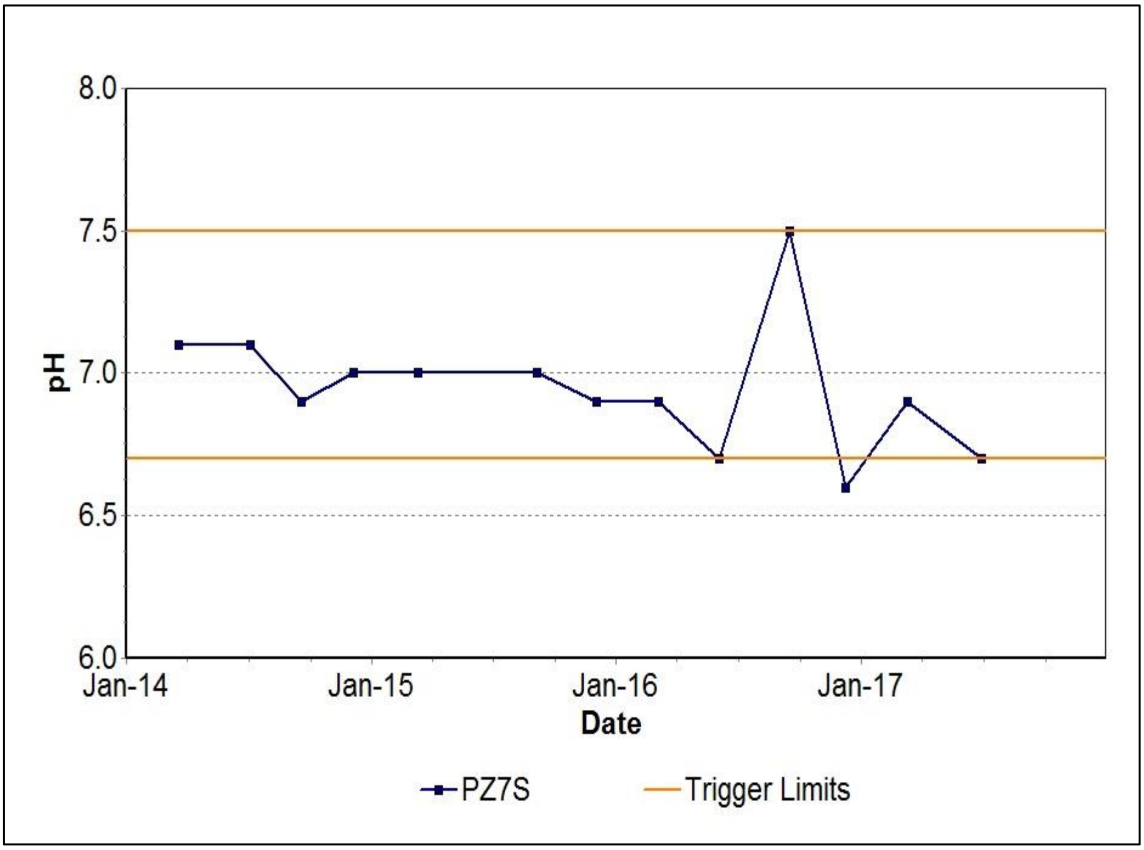

Figure 44: Aeolian Warkworth Sands pH Trend - June 2017

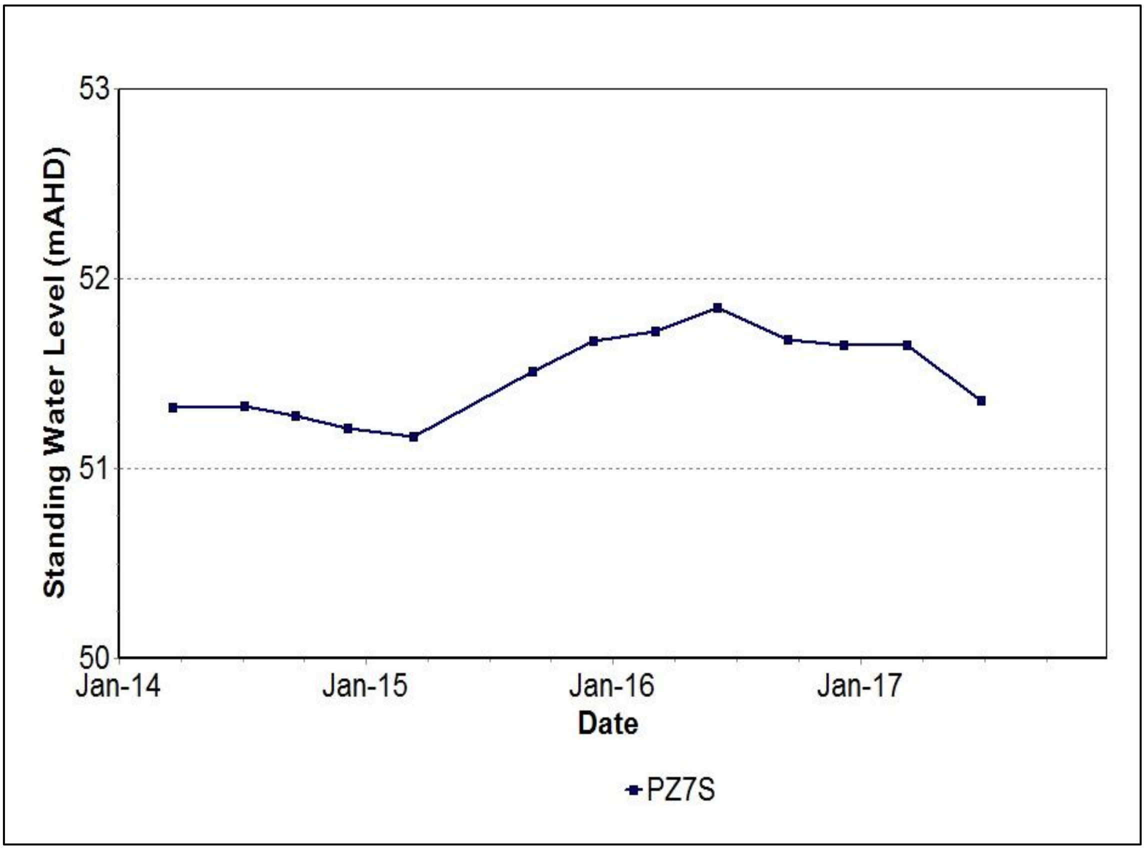

Figure 45: Aeolian Warkworth Sands Standing Water Level Trend - June 2017

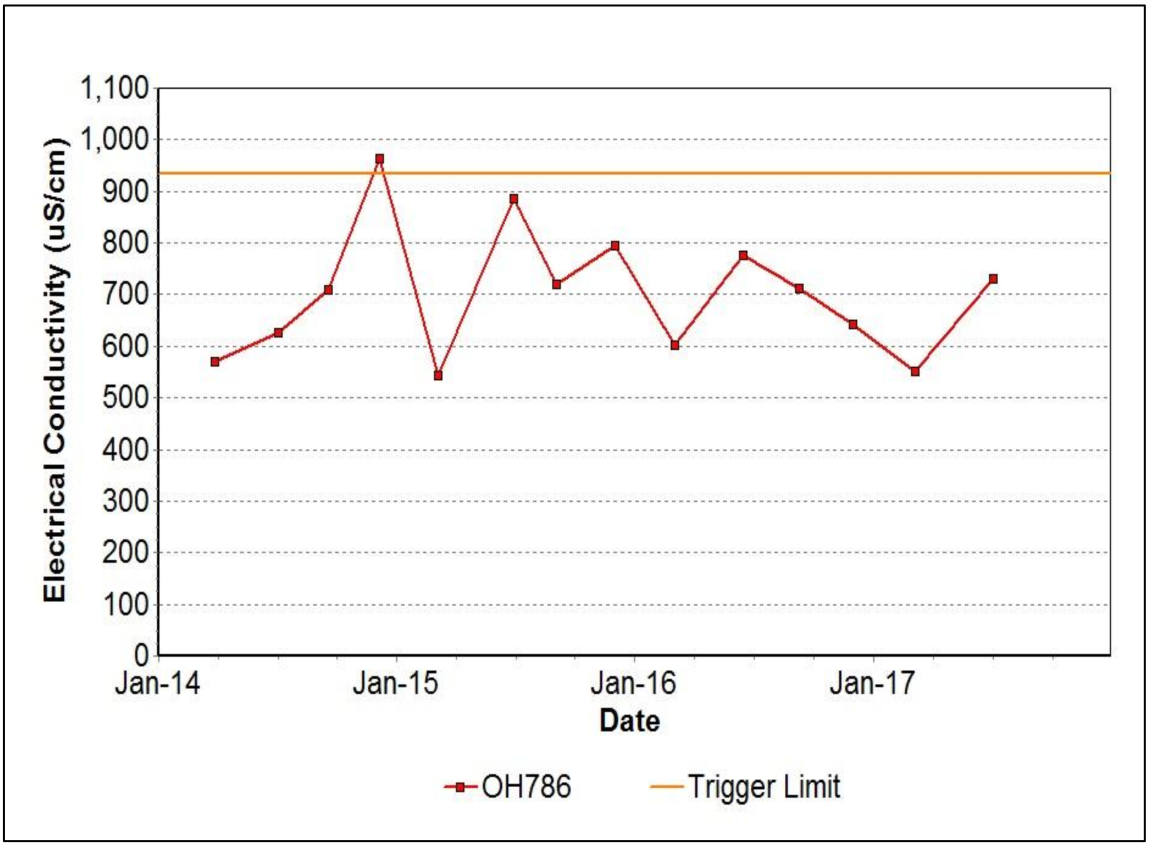

Figure 46: Hunter River Alluvium 1 Seam Electrical Conductivity - June 2017

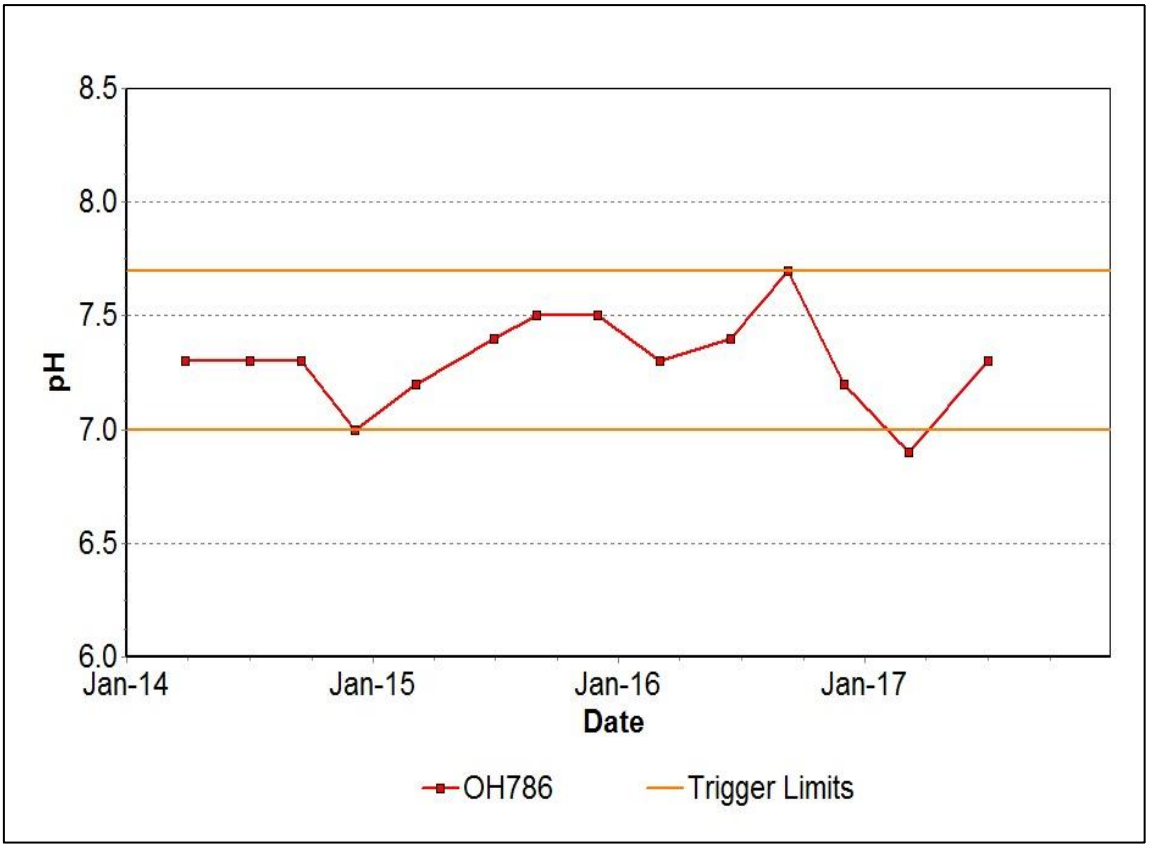

Figure 47: Hunter River Alluvium 1 Seam pH Trend - June 2017

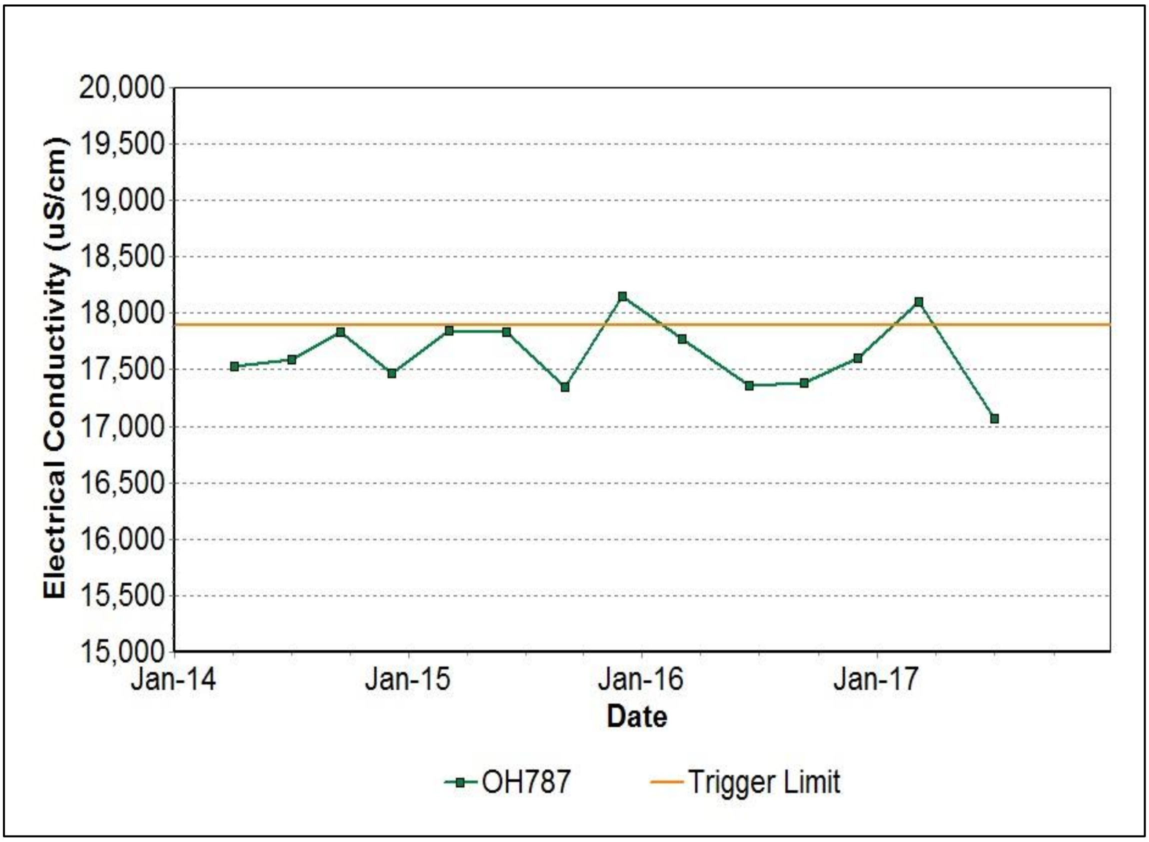

Figure 48: Hunter River Alluvium 2 Seam Electrical Conductivity - June 2017

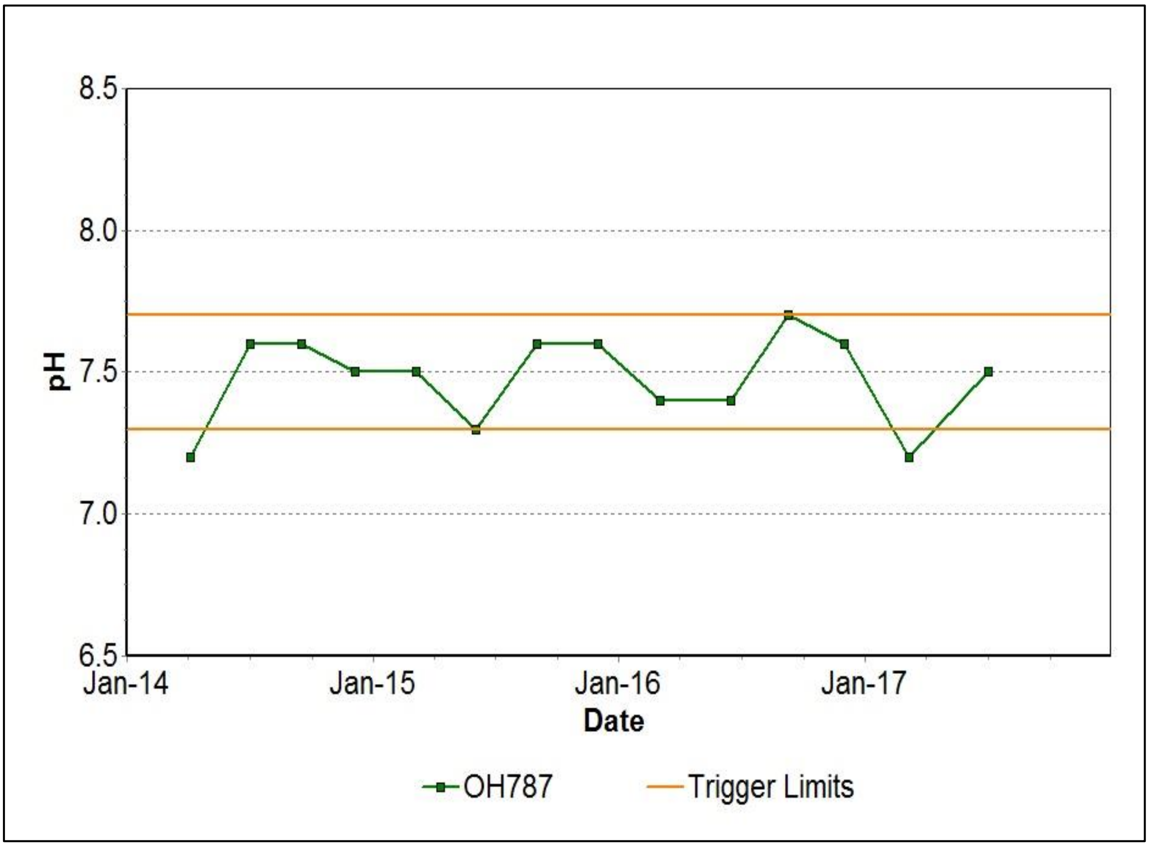

Figure 49: Hunter River Alluvium 2 Seam pH Trend - June 2017

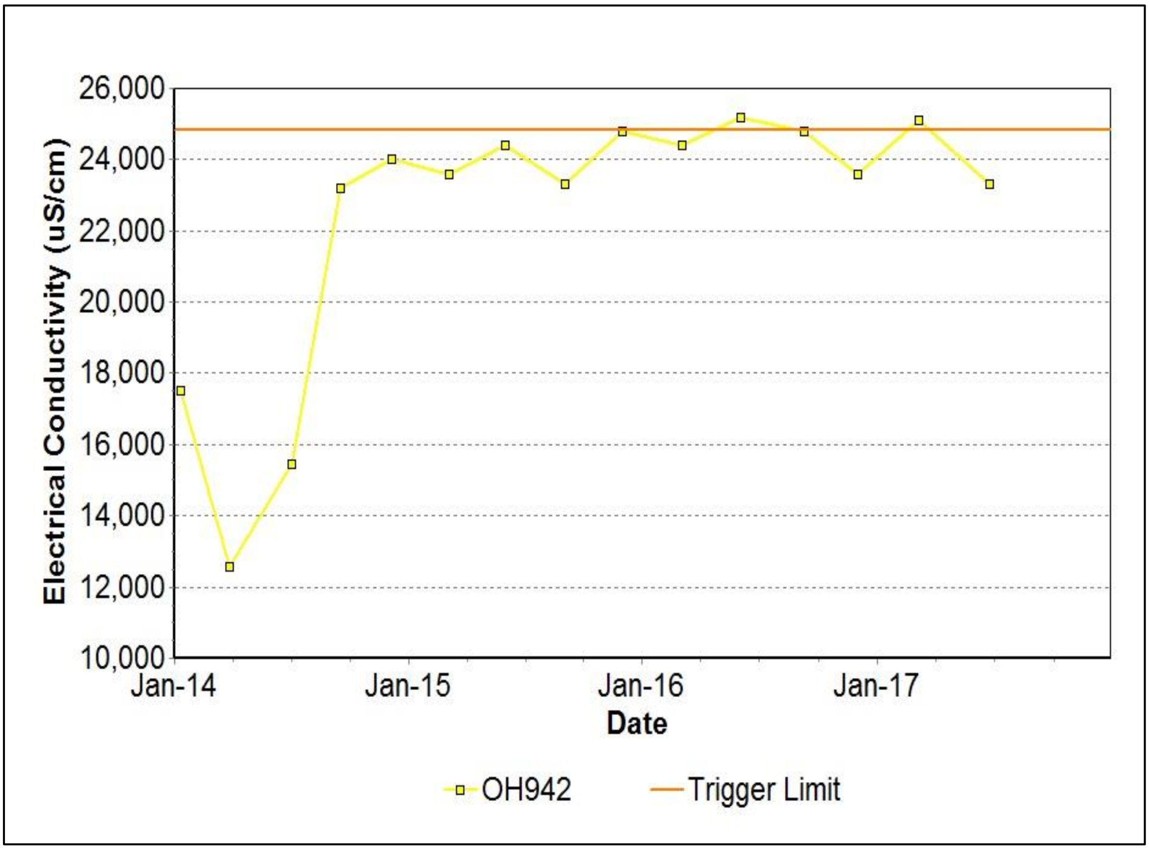

Figure 50: Hunter River Alluvium 3 Seam Electrical Conductivity - June 2017

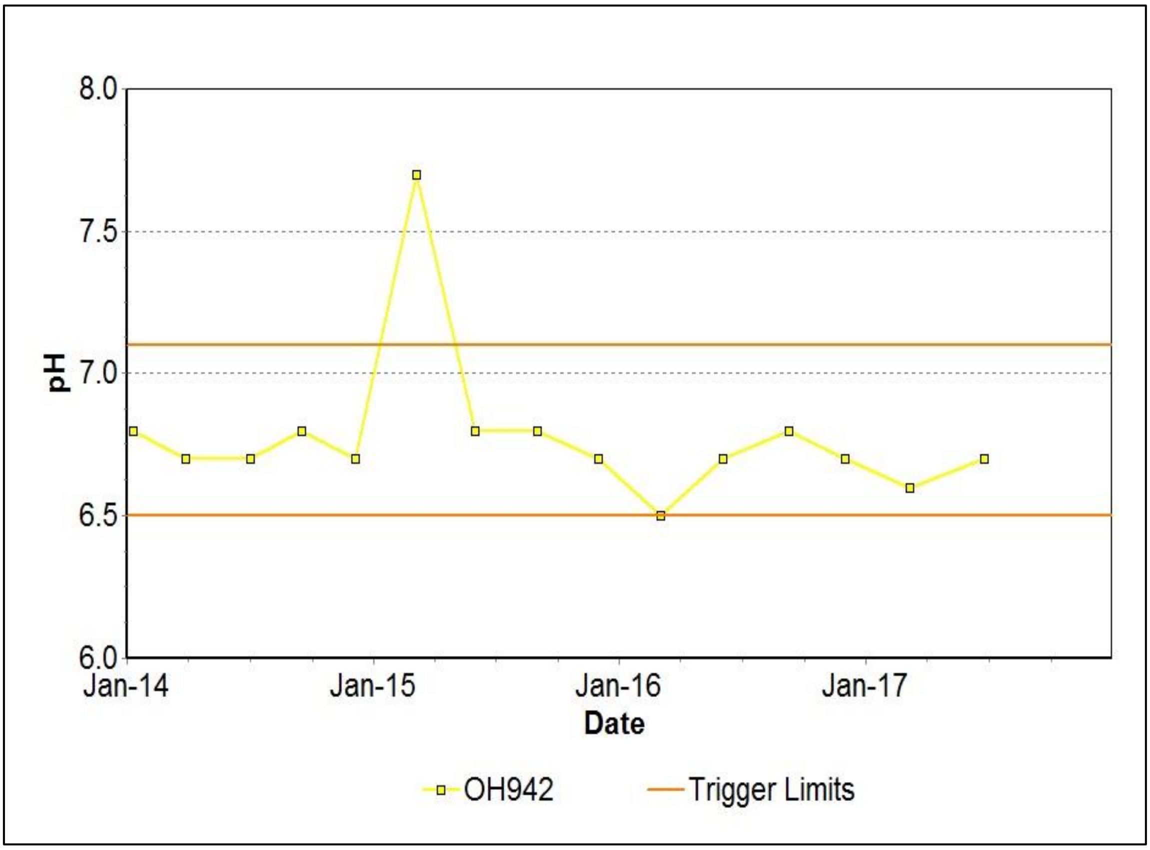

Figure 51: Hunter River Alluvium 3 Seam pH Trend - June 2017

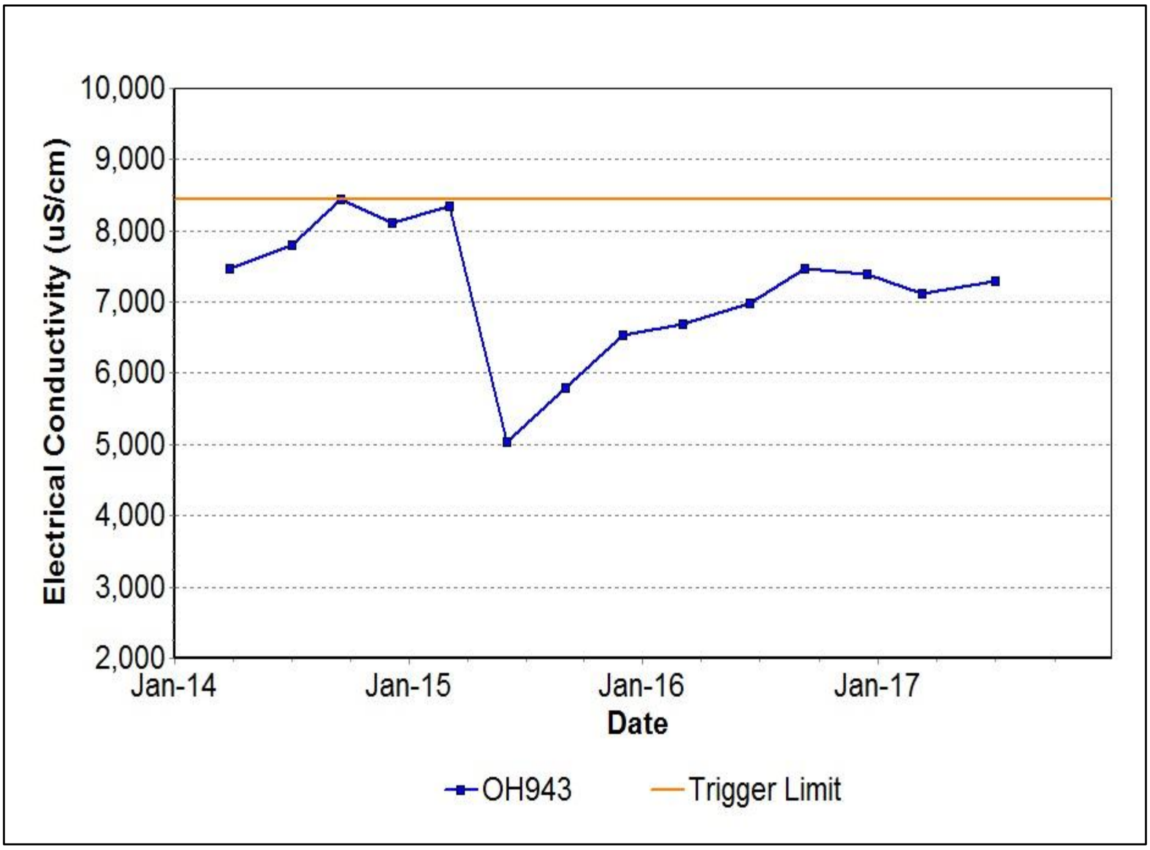

Figure 52: Hunter River Alluvium 4 Seam Electrical Conductivity - June 2017

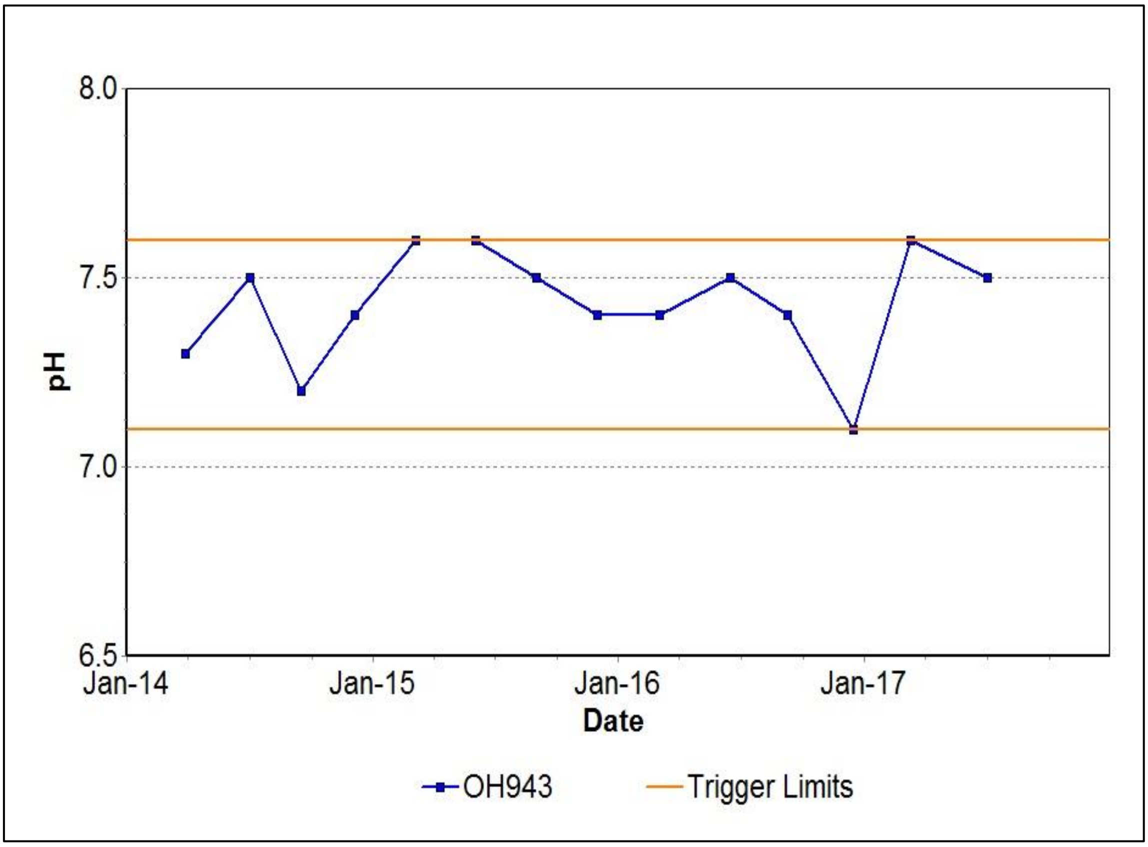

Figure 53: Hunter River Alluvium 4 Seam pH Trend - June 2017

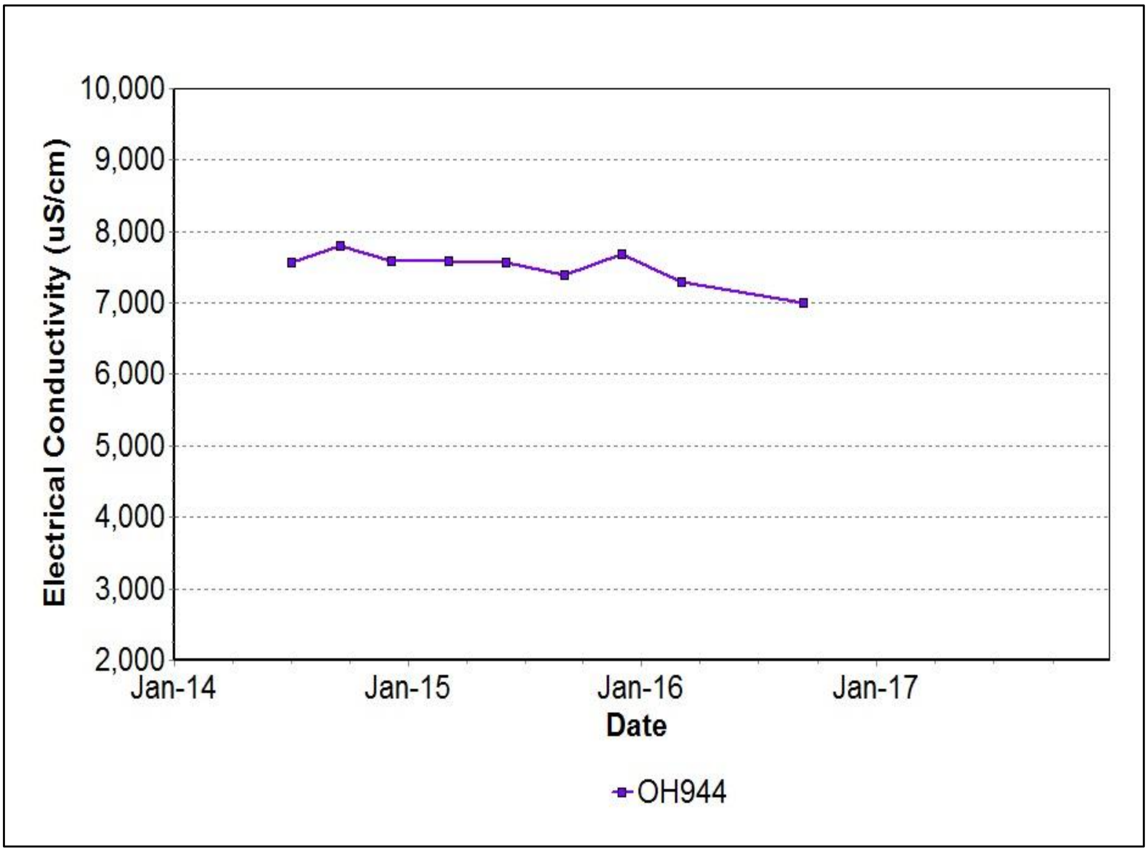

Figure 54: Hunter River Alluvium 5 Seam Electrical Conductivity - June 2017

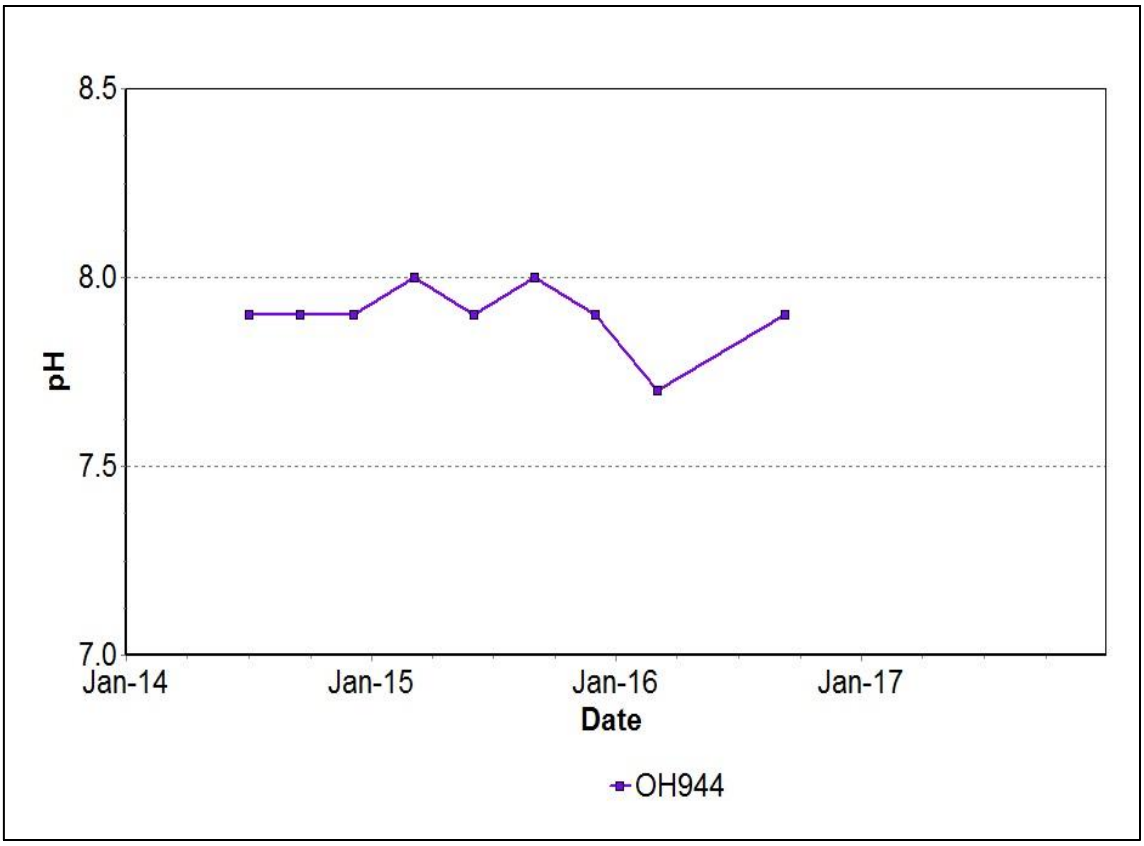

Figure 55: Hunter River Alluvium 5 Seam pH Trend - June 2017

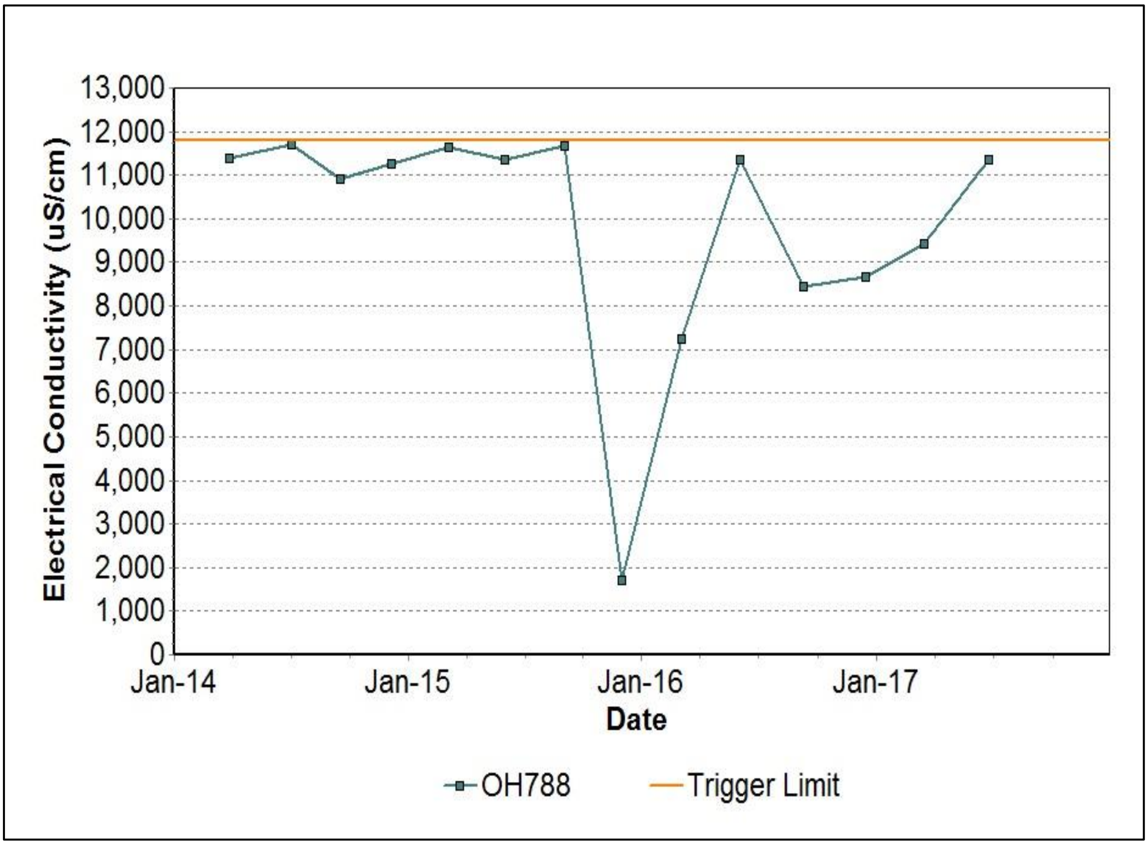

Figure 56: Hunter River Alluvium 6 Seam Electrical Conductivity - June 2017

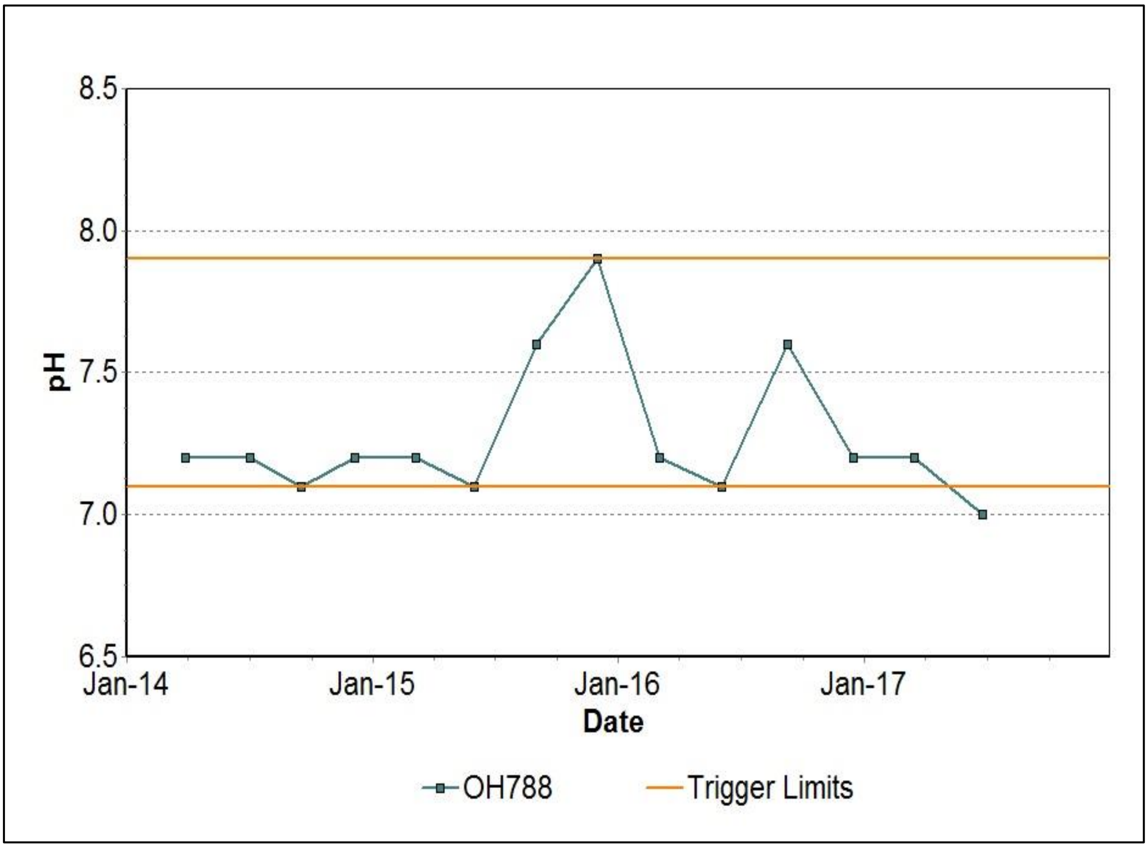

Figure 57: Hunter River Alluvium 6 Seam pH Trend - June 2017

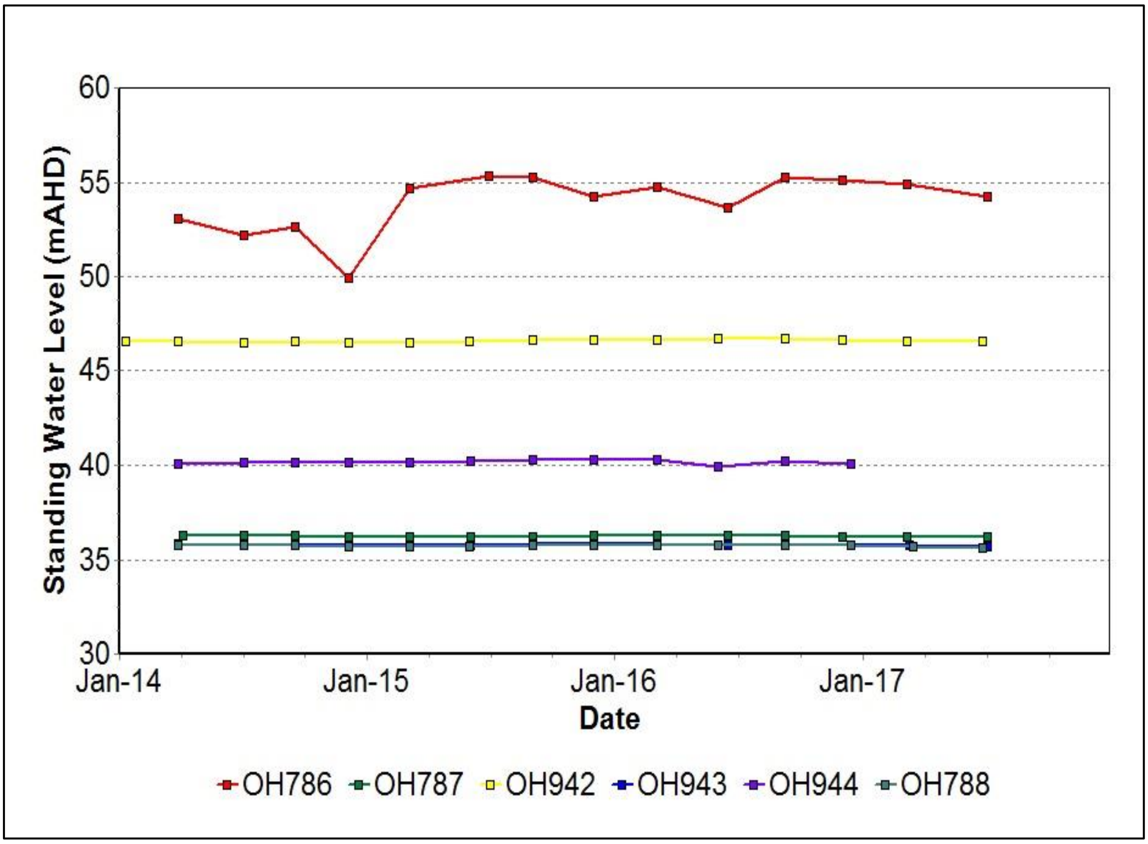

Figure 58: Hunter River Alluvium Standing Water Level Trend - June 2017

3.2.1 Groundwater Trigger Tracking

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

During H1 2017 24 trigger limits were breached and investigated, summarised in Table 3.

Table 3: Groundwater Triggers - 2017

Site	Date	Trigger Limit Breached	Action Taken in Response
OH 787	07/03/2017	EC – 95th Percentile	Watching Brief*
OH942	07/03/2017	EC – 95th Percentile	Watching Brief*
PZ9S	07/03/2017	EC – 95th Percentile	Watching Brief*
OH1125(1)	07/03/2017	EC – 95th Percentile	Watching Brief*
MTD616P	10/03/2017	EC – 95th Percentile	Data is stable and consistent with historical trend; significant natural variability in water quality is typical of low-conductivity shallow overburden material. No further action.
MTD616P	03/07/2017	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*
PZ9D	07/03/2017	EC – 95th Percentile	Watching Brief*
WD622P	30/06/2017	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*
OH786	07/03/2017	PH –5th Percentile	Watching Brief*
OH787	07/03/2017	PH –5th Percentile	Watching Brief*
OH788	26/06/2017	PH –5th Percentile	Watching Brief*
PZ8S	07/03/2017	PH –5th Percentile	Watching Brief*
PZ8S	27/06/2017	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.
GW98MTCL2	10/03/2017	PH –5th Percentile	Watching Brief*

GW98MTCL2	23/07/2017	PH –5th Percentile	Watching Brief*
MTD616P	03/07/2017	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*
WOH2153A	10/03/2017	PH –95th Percentile	Watching Brief*

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

Figure 59: Groundwater Monitoring Location Plan

4.0 BLAST MONITORING

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

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

4.1 Blast Monitoring Results

During June 2017, 24 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

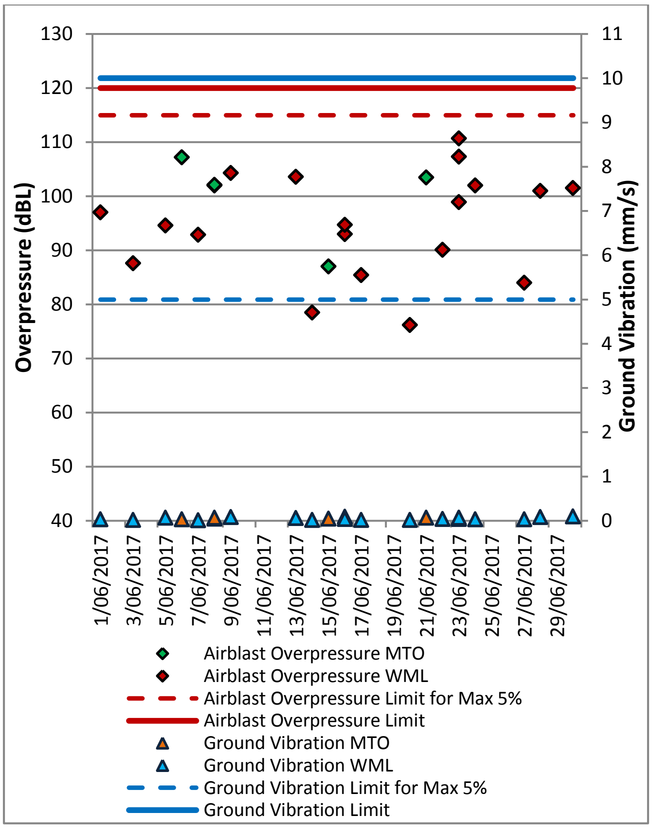

Figure 60: Abbey Green Blast Monitoring Results – June 2017

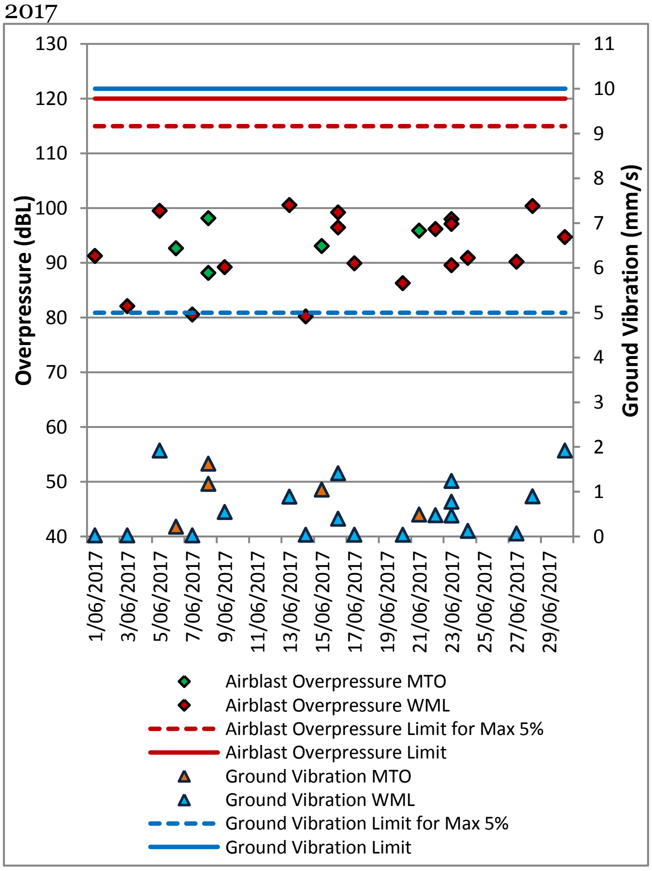

Figure 61: Bulga Village Blast Monitoring Results – June 2017

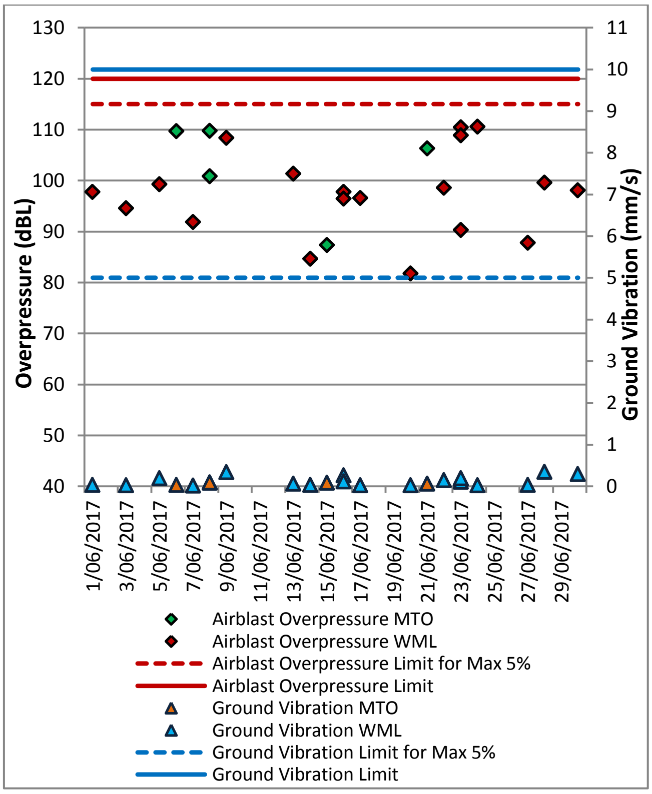

Figure 62: MTIE Blast Monitoring Results – June 2017

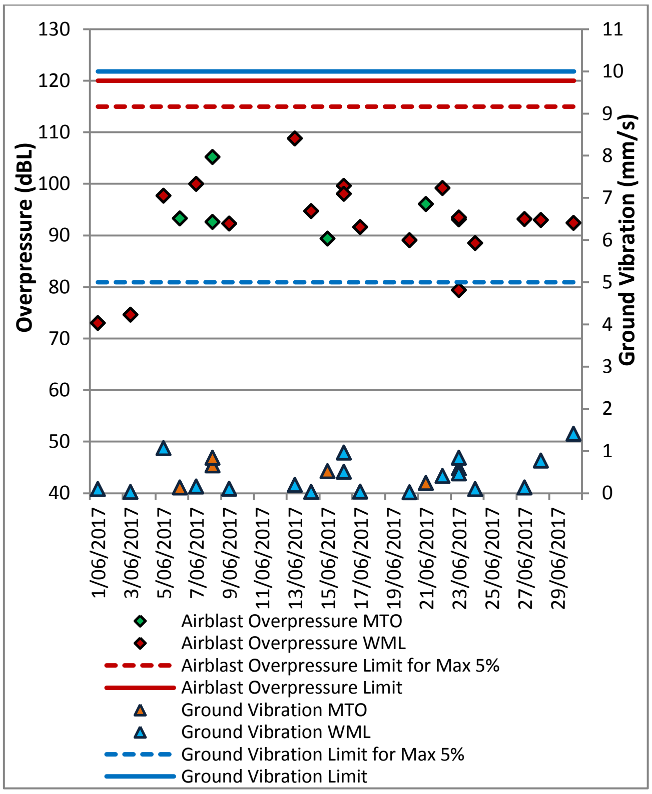

Figure 64: Wambo Road Blast Monitoring Results – June 2017

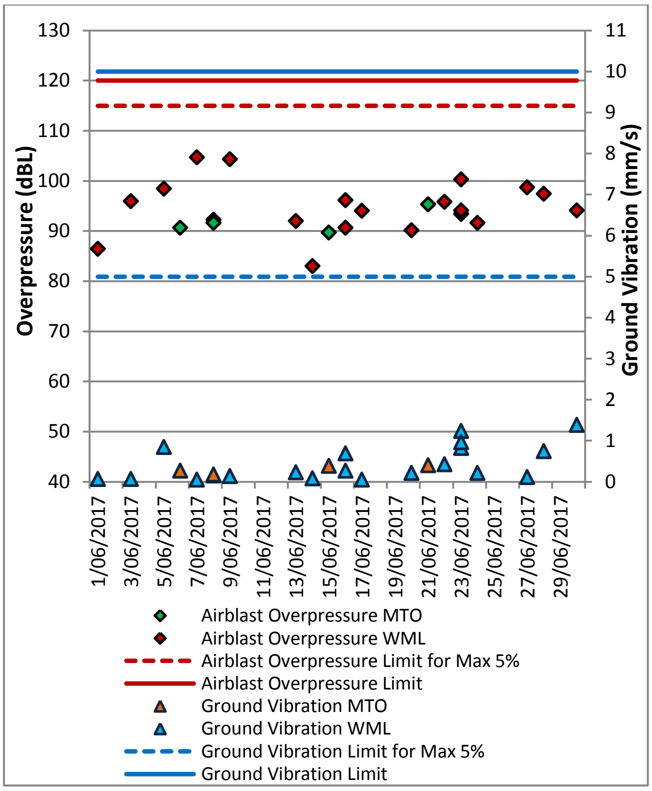

Figure 63: Warkworth Blast Monitoring Results - June 2017

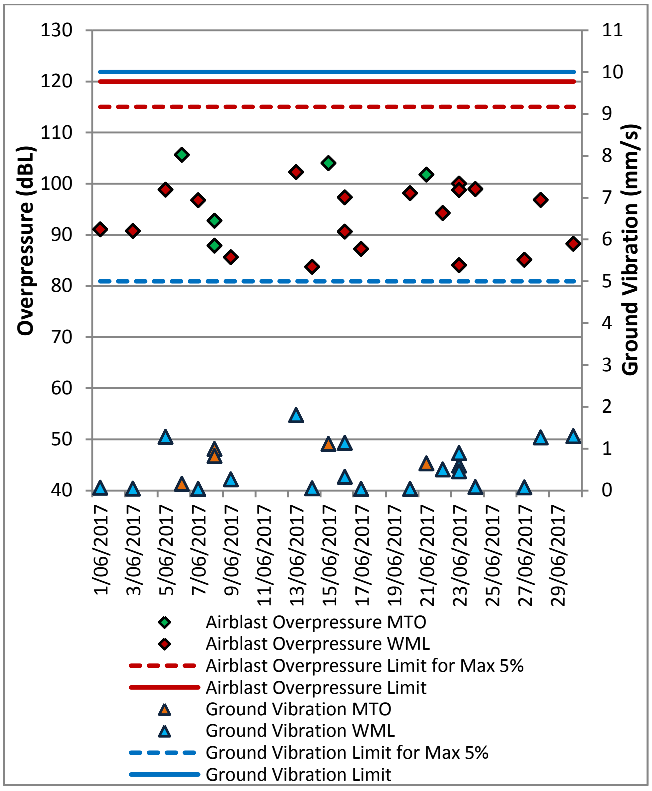

Figure 65: Wollemi Peak Road Blast Monitoring Results - June 2017

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 15 June 2017. All measurements complied with the relevant criteria. Results are detailed in Table 5 to Table 8.

5.1.1 WML Noise Assessment

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

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

Location	Date and Time	Wind Speed (m/s)[5]	Stability Class	Criterion (dB(A))	Criterion Applies?[1,5]	WML L_{Aeq} dB[2,4]	Exceedance[3]	Total L_{Ceq} – L_{Aeq}	Revised WML L_{Aeq} [4,5,6]
Bulga RFS	15/06/2017 21:27	1.6	D	37	Yes	35	Nil	19	**40**
Bulga Village	15/06/2017 21:55	1.5	D	38	Yes	33	Nil	20	38
Gouldsville Road	15/06/2017 21:24	1.6	D	38	Yes	IA	Nil	22	IA
Inlet Rd	15/06/2017 21:00	2.5	E	37	Yes	31	Nil	21	36
Inlet Rd West	15/06/2017 21:23	1.6	D	35	Yes	26	Nil	20	31
Long point	15/06/2017 21:00	2.5	E	35	Yes	IA	Nil	19	IA
South Bulga	15/06/2017 21:02	2.5	E	35	Yes	32	Nil	16	**37**
Wambo Road	15/06/2017 21:54	1.5	D	38	Yes	30	Nil	19	35

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, 1 minute Warkworth – Impact Assessment Criteria – June 2017

Location	Date and Time	Wind Speed (m/s)[5]	Stability Class	Criterion (dB(A))	Criterion Applies?[1,5]	WML L_{Aeq} dB[2,4]	Exceedance[3]
Bulga RFS	15/06/2017 21:27	1.6	D	47	Yes	38	Nil
Bulga Village	15/06/2017 21:55	1.5	D	48	Yes	38	Nil
Gouldsville Road	15/06/2017 21:24	1.6	D	48	Yes	IA	Nil
Inlet Rd	15/06/2017 21:00	2.5	E	47	Yes	38	Nil
Inlet Rd West	15/06/2017 21:23	1.6	D	45	Yes	32	Nil
Long point	15/06/2017 21:00	2.5	E	45	Yes	IA	Nil
South Bulga	15/06/2017 21:02	2.5	E	45	Yes	42	Nil
Wambo Road	15/06/2017 21:54	1.5	D	48	Yes	33	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.
4. Bolded results in red are possible exceedances of relevant criteria; and
5. Criterion may or may not apply due to rounding of meteorological data values.

5.1.2 MTO Noise Assessment

Compliance assessments undertaken against the MTO noise criteria are presented in Tables **Error! Reference source not found.**7 and 8.

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

Location	Date and Time	Wind Speed (m/s)[5]	Stability Class	Criterion dB	Criterion Applies?[1,5]	MTO L_{Aeq} dB[2,4]	Exceedance[3]	Total L_{Ceq} – L_{Aeq}	Revised MTO L_{Aeq}[4,5,6]
Bulga RFS	15/06/2017 21:27	1.6	D	37	Yes	NM	Nil	19	NM
Bulga Village	15/06/2017 21:55	1.5	D	38	Yes	IA	Nil	20	IA
Gouldsville Road	15/06/2017 21:24	1.6	D	35	Yes	IA	Nil	22	IA
Inlet Rd	15/06/2017 21:00	2.5	E	37	Yes	IA	Nil	21	IA
Inlet Rd West	15/06/2017 21:23	1.6	D	35	Yes	IA	Nil	20	IA
Long point	15/06/2017 21:00	2.5	E	35	Yes	IA	Nil	19	IA
South Bulga	15/06/2017 21:02	2.5	E	36	Yes	IA	Nil	16	IA
Wambo Road	15/06/2017 21:54	1.5	D	38	Yes	IA	Nil	19	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 MTO;
3. NA means atmospheric conditions outside conditions specified in development consent and so criterion is not applicable;
4. Bolded results in red are possible exceedances of relevant criteria; and
5. Criterion may or may not apply due to rounding of meteorological data values.
6. Revised LAeq, 15minute level following application of low frequency noise penalty as per the INP where applicable.

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

Location	Date and Time	Wind Speed (m/s)[5]	Stability Class	Criterion dB	Criterion Applies?[1,5]	MTO $L_{A1,1min}$ dB[2,4]	Exceedance[3]
Bulga RFS	15/06/2017 21:27	1.6	D	47	Yes	NM	Nil
Bulga Village	15/06/2017 21:55	1.5	D	48	Yes	IA	Nil
Gouldsville Road	15/06/2017 21:24	1.6	D	45	Yes	IA	Nil
Inlet Rd	15/06/2017 21:00	2.5	E	47	Yes	IA	Nil
Inlet Rd West	15/06/2017 21:23	1.6	D	45	Yes	IA	Nil
Long point	15/06/2017 21:00	2.5	E	45	Yes	IA	Nil
South Bulga	15/06/2017 21:02	2.5	E	46	Yes	IA	Nil
Wambo Road	15/06/2017 21:54	1.5	D	48	Yes	IA	Nil

Notes
1. Noise emission limits apply during all meteorological conditions except the following: during periods of rain or hail; average wind speed at microphone height exceeds 5 m/s; wind speeds greater than 3 m/s measured at 10 metres above ground level; stability category F temperature inversion conditions and wind speeds greater than 2m/s at 10m above ground level; or stability category G temperature inversion conditions;
2. Estimated or measured LA1,1minute attributed to Warkworth mine (MTO);
3. NA in exceedance column means atmospheric conditions outside conditions specified in project approval and so criterion is not applicable.
4. Bolded results in red are possible exceedances of relevant criteria; and
5. Criterion may or may not apply due to rounding of meteorological data values.

5.1.3 INP Low Frequency Assessment

In accordance with the requirements of the Industrial Noise Policy, the low frequency modification factor has been applied where appropriate. It should be noted that the Industrial Noise Policy does not give guidance on the application of the penalty where more than one target source is audible. The 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 penalty is triggered, the penalty has been applied to the dominant mine noise source (either of WML or MTO).

Resulting LAeq noise levels exceed the WML impact assessment criteria at Bulga RFS and South Bulga by 3dB and 2dB respectively due 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 results have been reported to the Department of Planning and Environment.

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 June are provided in Table 9.

Table 9: Supplementary Attended Noise Monitoring Data –June 2017

No. of assessments	No. of assessments > trigger	No. of nights where assessments > trigger	% greater than trigger
500	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 June a total of 15.0 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.

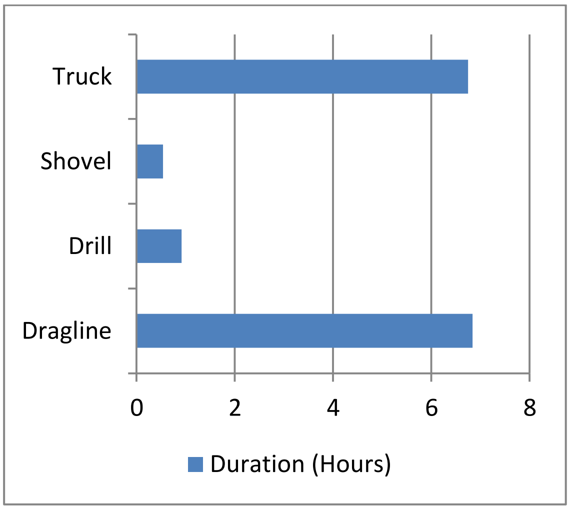

Figure 68: Operational Downtime by Equipment Type – June 2017

7.0 REHABILITATION

During June, 10.1 Ha of land was released, 9.1Ha was bulk shaped, 11.2Ha was top soiled, 4.7Ha was composted and 10.6Ha was rehabilitated. Year-to-date progress can be viewed in Figure 69.

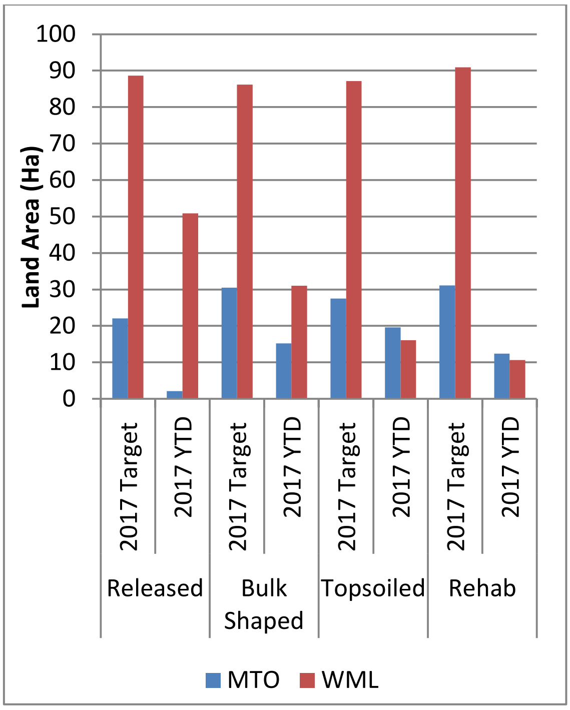

Figure 69: Rehabilitation YTD - June 2017

8.0 ENVIRONMENTAL INCIDENTS

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

9.0 COMPLAINTS

During the reporting period 20 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	-	-	-	-	-	-
August	-	-	-	-	-	-
September	-	-	-	-	-	-
October	-	-	-	-	-	-
November	-	-	-	-	-	-
December	-	-	-	-	-	-
Total	99	18	32	21	3	173

Figure 70: Complaints Summary - YTD June 2017

Appendix A: Meteorological Data

Table 10: Meteorological Data – Charlton Ridge Meteorological Station – June 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)
1/06/2017	14.5	5.3	80.4	47.5	748	245.9	2.3	0.0
2/06/2017	16.8	3.6	76.7	37.3	719	200.7	2.5	0.0
3/06/2017	17.5	3.5	85.6	39.5	630	230.5	1.8	0.0
4/06/2017	17.8	7.4	77.5	53.0	689	178.8	2.2	0.0
5/06/2017	19.1	6.7	93.4	48.6	701	174.8	1.7	0.0
6/06/2017	18.0	3.7	97.3	54.0	603	250.1	2.1	0.0
7/06/2017	17.9	3.8	88.6	32.8	712	270.1	3.7	0.0
8/06/2017	12.3	7.0	95.6	69.1	202	198.8	3.2	13.0
9/06/2017	17.4	8.8	95.6	70.2	810	184.1	3.3	0.6
10/06/2017	16.3	10.0	95.7	73.1	727	173.0	3.3	2.8
11/06/2017	16.4	9.9	95.6	73.1	433	169.4	3.2	3.0
12/06/2017	16.9	10.5	94.6	74.2	847	181.5	2.3	1.0
13/06/2017	19.8	9.1	96.8	53.4	759	177.2	1.7	1.0
14/06/2017	16.9	11.0	85.7	67.7	67	169.2	3.4	0.0
15/06/2017	18.0	10.6	92.0	68.4	821	175.2	2.5	0.2
16/06/2017	18.4	9.1	97.3	60.8	701	177.3	1.3	0.0
17/06/2017	16.9	8.0	96.8	69.4	662	196.1	1.6	0.2
18/06/2017	16.4	11.1	87.6	70.9	666	192.8	2.4	0.0
19/06/2017	16.8	10.0	88.5	61.2	803	175.1	4.1	0.0
20/06/2017	18.1	9.4	92.4	54.5	741	168.4	3.8	0.0
21/06/2017	18.1	8.1	94.7	58.4	700	180.7	2.8	0.0
22/06/2017	16.9	4.3	97.9	49.5	526	219.4	1.9	0.2
23/06/2017	18.9	6.1	93.9	47.2	686	193.7	1.4	0.0
24/06/2017	17.9	3.7	97.3	46.8	677	274.8	2.2	0.0
25/06/2017	18.6	5.5	78.4	35.4	647	280.6	2.6	0.0
26/06/2017	19.1	6.8	82.2	38.0	553	266.2	2.1	0.0
27/06/2017	18.4	4.5	88.8	32.8	563	217.6	1.7	0.0
28/06/2017	15.0	2.0	91.9	49.4	669	177.8	1.7	0.0
29/06/2017	-	-	-	-	-	-	-	-
30/06/2017	12.7	7.0	97.6	64.3	443	236.8	1.6	6.8

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