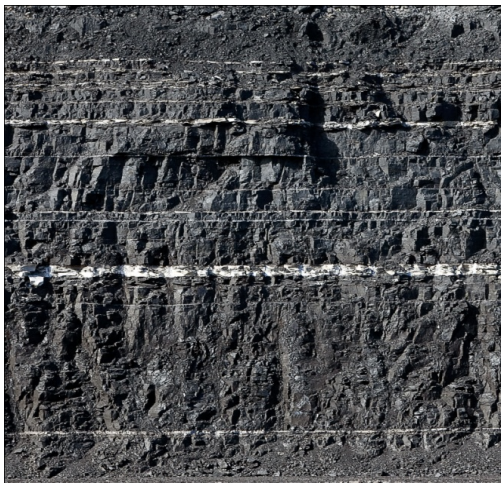
HUNTER VALLEY OPERATIONS



Monthly Environmental Monitoring Report

Hunter Valley Operations

June 2018

CONTENTS

Figures

Tables

Revision History

Version No.	Person Responsible	Document Status	Date
1.0	**Environment & Community Officer**	**Draft**	**15/10/2018**
1.1	**Environment & Community Coordinator**	**Final**	**18/10/2018**

1.0 INTRODUCTION

This report has been compiled to provide a monthly summary of environmental monitoring results for Hunter Valley Operations (HVO). This report includes all monitoring data collected for the period 1st June to 30th June 2018.

2.0 AIR QUALITY

2.1 Meteorological Monitoring

HVO maintains two meteorological stations; 'Corporate' and 'Cheshunt' (Refer to Figure 4: Air Quality Monitoring Location Plan).

2.1.1 Rainfall

Rainfall for the period is summarised in Table 1, the 2018 trend and historical trend are shown in Figure 1.

Table 1: Monthly Rainfall HVO

2018	Monthly Rainfall (mm)	Cumulative Rainfall (mm)
June	26.4	195.0

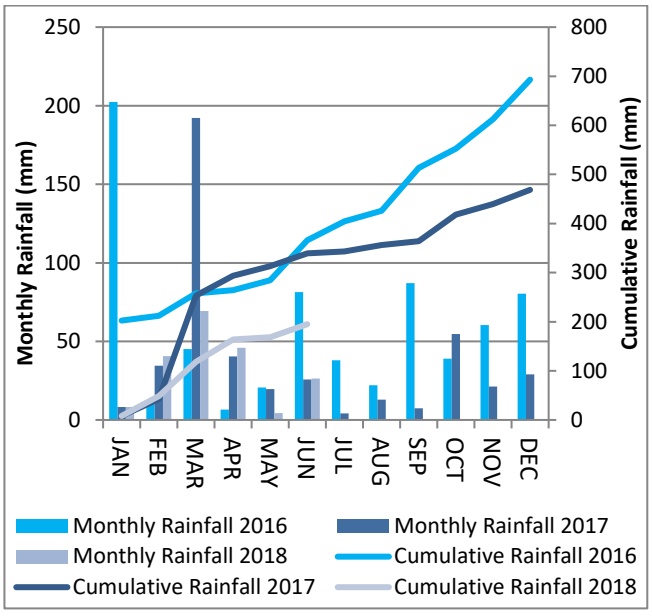


Figure 1: Rainfall Summary 2018

2.1.2 Wind Speed and Direction

Westerly and North - Westerly winds were dominant during June as shown in Figure 2 (HVO Corporate) and Figure 3 (HVO Cheshunt).

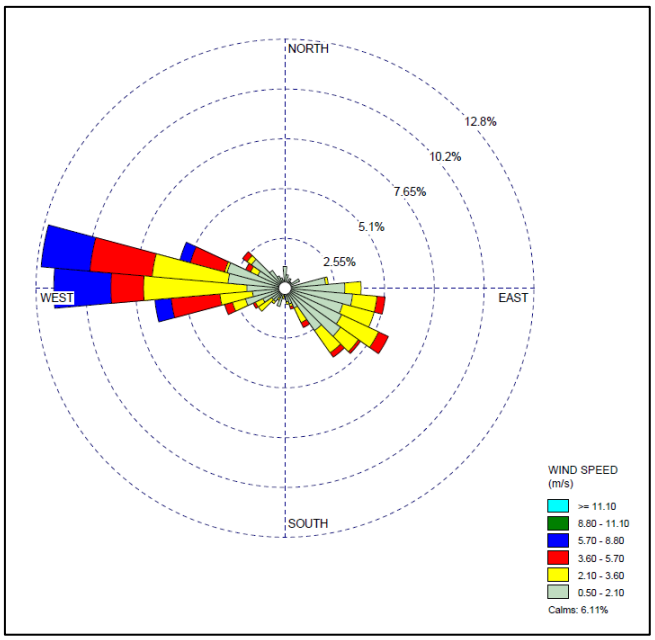


Figure 2: HVO Corporate Wind Rose – June 2018

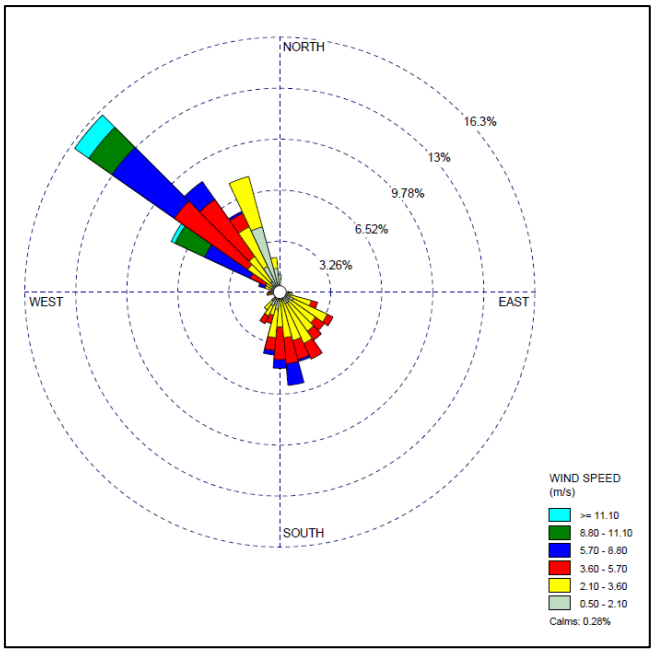


Figure 3: HVO Cheshunt Wind Rose – June 2018

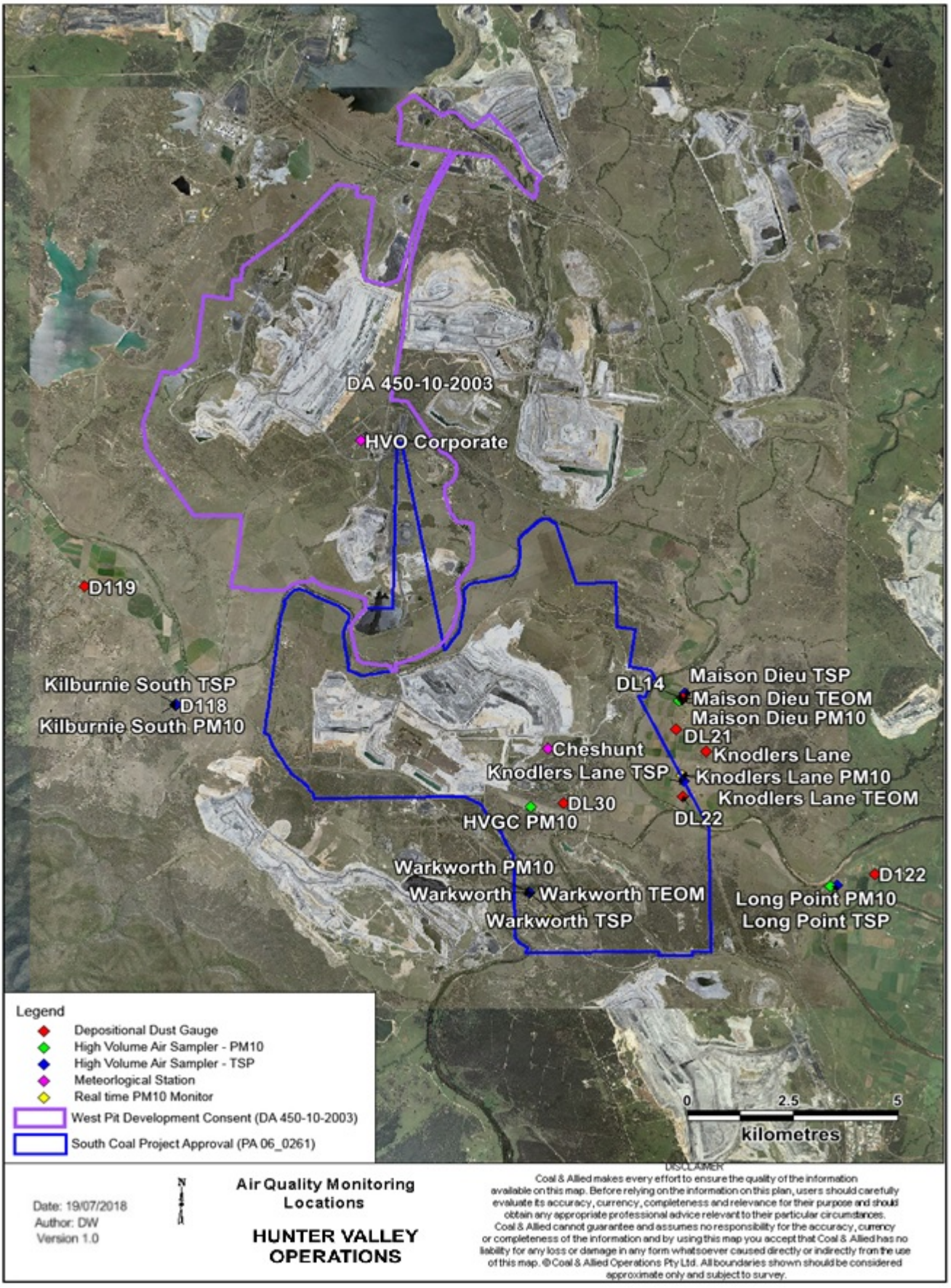


Figure 4: Air Quality Monitoring Location Plan

2.2 Depositional Dust

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

Figure 5 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 DL14, D118, D122 and DL30 monitors recorded monthly results above the long term impact assessment criteria of 4.0 g/m^2 per month.

The field notes associated with the DL14 monitor's result indicate that the sample was contaminated with bird droppings and insects. Accordingly, this result will not be included in the annual average calculation.

The field notes associated with the D118, D122 and DL30 monitor's result indicates no evidence to suggest that the result was contaminated. Accordingly, this result will be included in the annual average calculation.

During June the DL21 Depositional Dust monitor was unable to produce a result due to it being dislodged from the stand.

An assessment of HVO's contribution against the long term impact assessment criteria will be provided in the 2018 Annual Review.

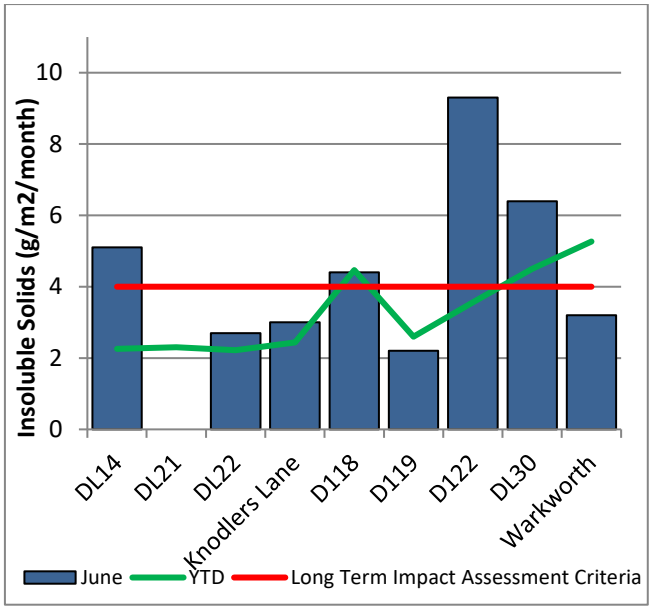


Figure 5: Depositional Dust Results – June 2018

2.3 Suspended Particulates

Suspended particulates are measured by a network of High Volume Air Samplers (HVAS) measuring Total Suspended Particulates (TSP) and Particulate Matter <10µm (PM_{10}). The location of these monitors can be found in Figure 4. Each HVAS was run for 24 hours on a six-day cycle.

2.3.1 HVAS PM_{10} Results

Figure 6 shows individual PM_{10} results at each monitoring station against the short term impact assessment criteria of 50 µg/m3.

The Glider Club HVAS PM_{10} monitor failed to produce a result on the 30/06/2018 due to technical difficulties.

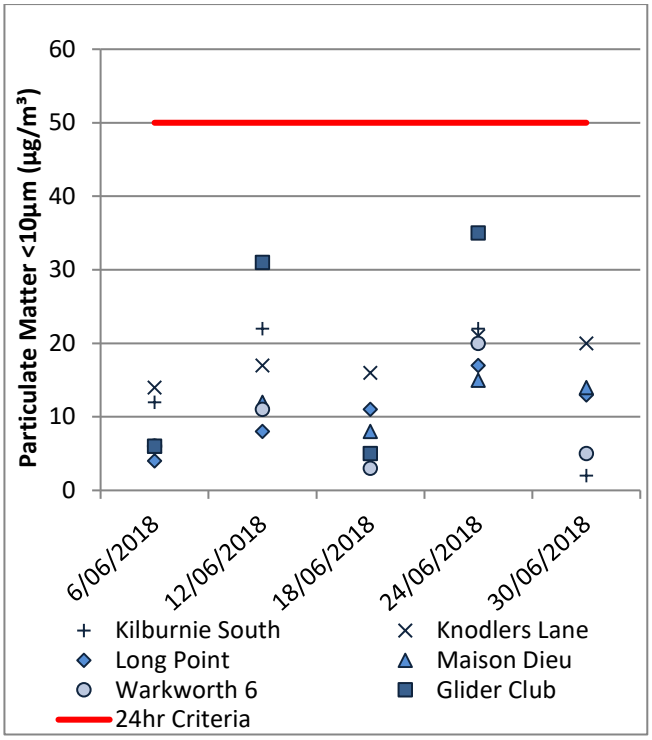


Figure 6: Individual PM_{10} Results – June 2018

Figure 7 shows the year to date annual average PM_{10} results.

An assessment of HVO's contribution against the long term impact assessment criteria will be provided in the 2018 Annual Review.

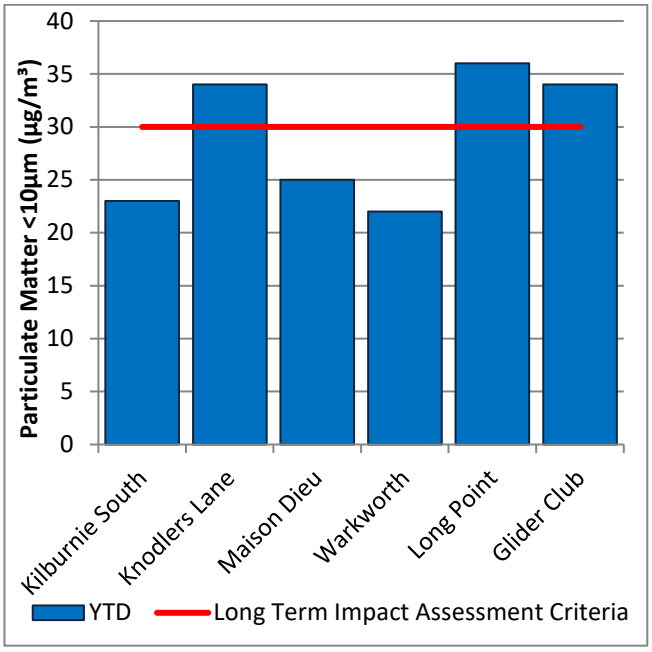


Figure 7: Year to Date Average PM_{10} – June 2018

2.3.2 TSP Results

Figure 8 shows the annual average TSP results compared against the long term impact assessment criteria of 90µg/m³.

An assessment of HVO's contribution against the long term impact assessment criteria will be provided in the 2018 Annual Review.

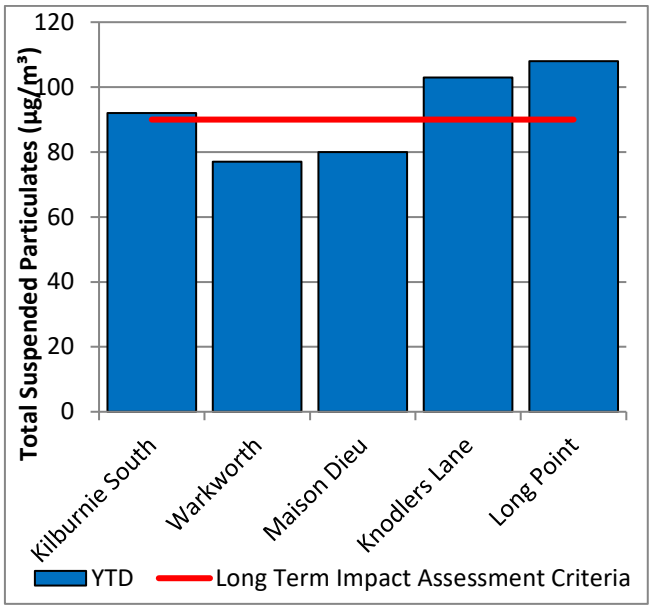


Figure 8: Year to Date Average Total Suspended Particulates – June 2018

2.3.3 Real Time PM_{10} Results

Hunter Valley Operations 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 from real time PM_{10} monitoring are used as a reactive measure to guide mining operations to ensure compliance with the relevant conditions of the project approval.

Results for real time dust sampling is shown in Figure 9, including the daily 24 hour average PM_{10} result and the year to date 24 hour PM_{10} annual average.

2.3.4 Real Time Alarms for Air Quality

During June the real time monitoring system generated 21 automated air quality related alarms. 18 were related to adverse weather conditions and 3 alarms relating to PM_{10}.

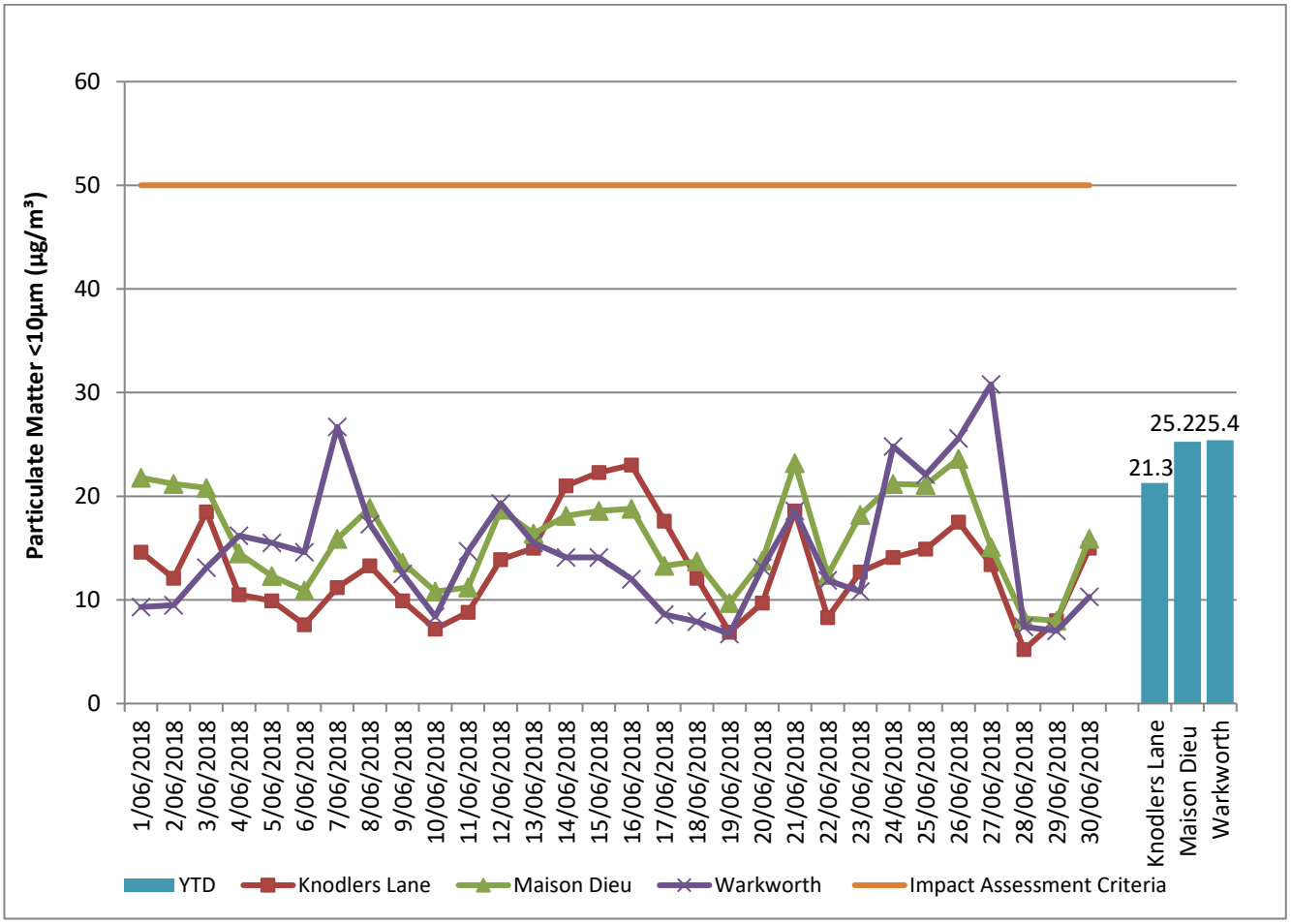


Figure 9: Real Time PM_{10} 24hr average and YTD average – June 2018

Table 2: Real-time PM10 Investigation Results

During June there were no real-time PM_{10} exceedances.

3.0 SURFACE WATER

3.1.1 Surface Water Monitoring

Surface water courses are sampled on a quarterly or rain event sampling regime. Water quality is evaluated through the parameters of pH, Electrical Conductivity (EC) and Total Suspended Solids (TSS).

Watercourses are assessed against ANZECC Guidelines for Fresh and Marine Water Quality (2000) for:

- pH (6.5 to 8.5);
- Electrical Conductivity (125 to 2200µS/cm); and
- Total Suspended Solids (maximum 50mg/L)

The location of Surface Water monitoring locations is shown in Figure 22.

Figure 10 to Figure 12 show the long term surface water trend (2015 – current) within HVO mine dams. Figure 13 to Figure 21 show the long term surface water trend (2015 – current) in surrounding watercourses.

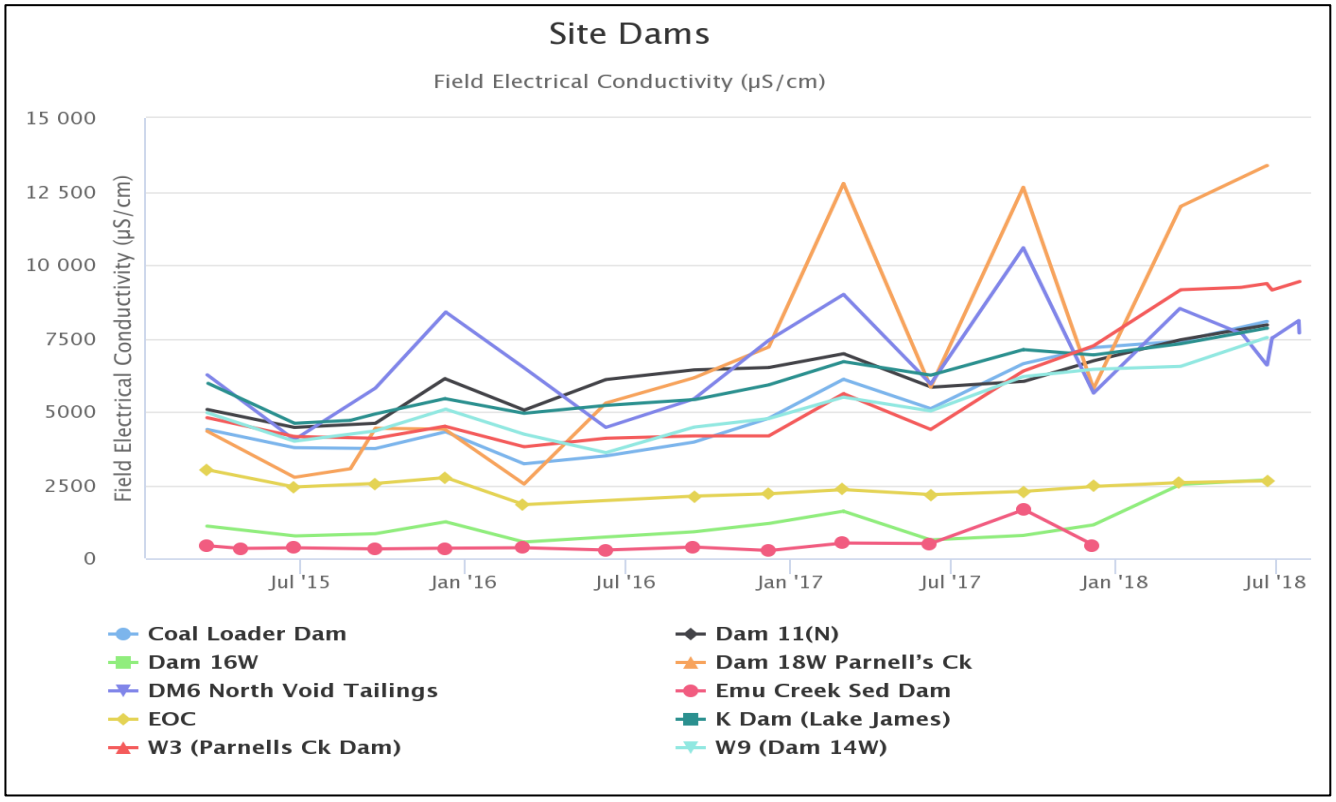


Figure 10: Site Dams Electrical Conductivity Trend – June 2018

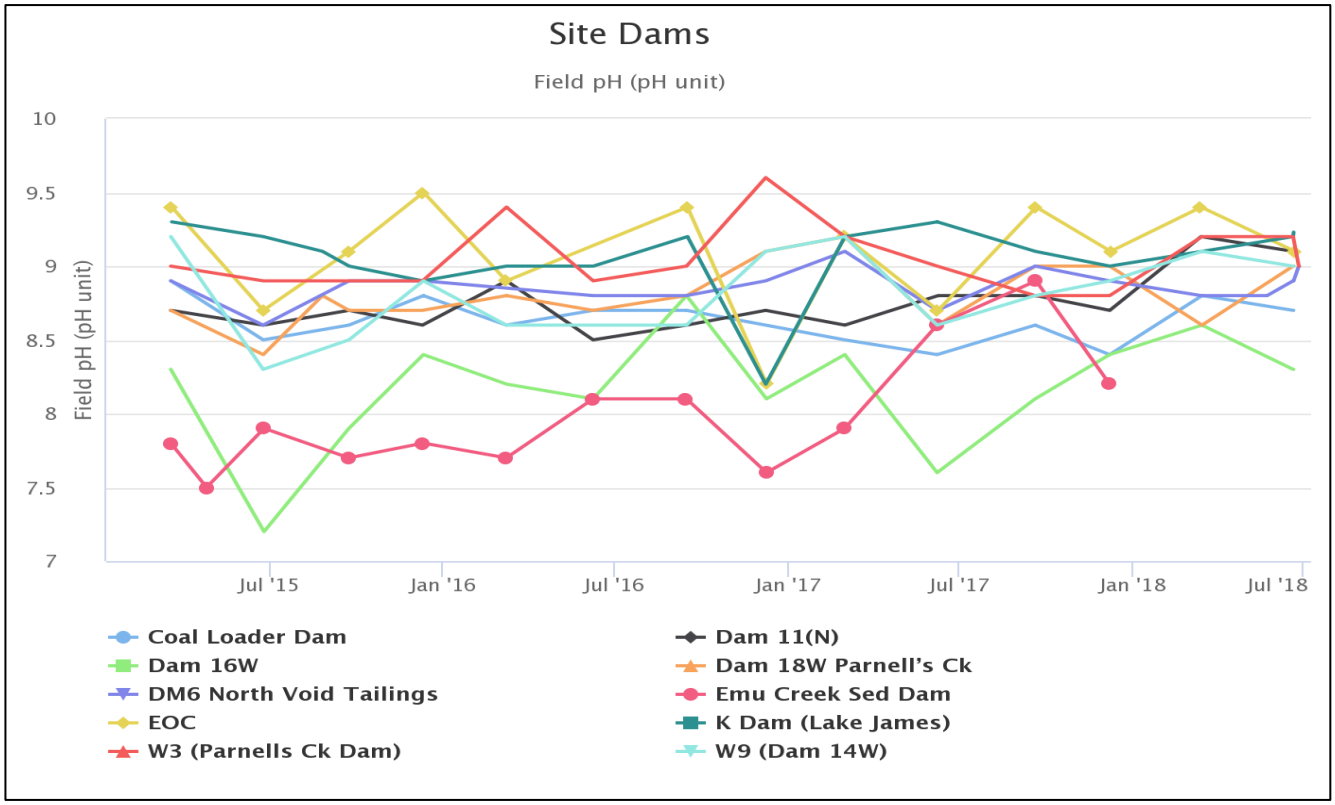


Figure 11: Site Dams pH Trend – June 2018

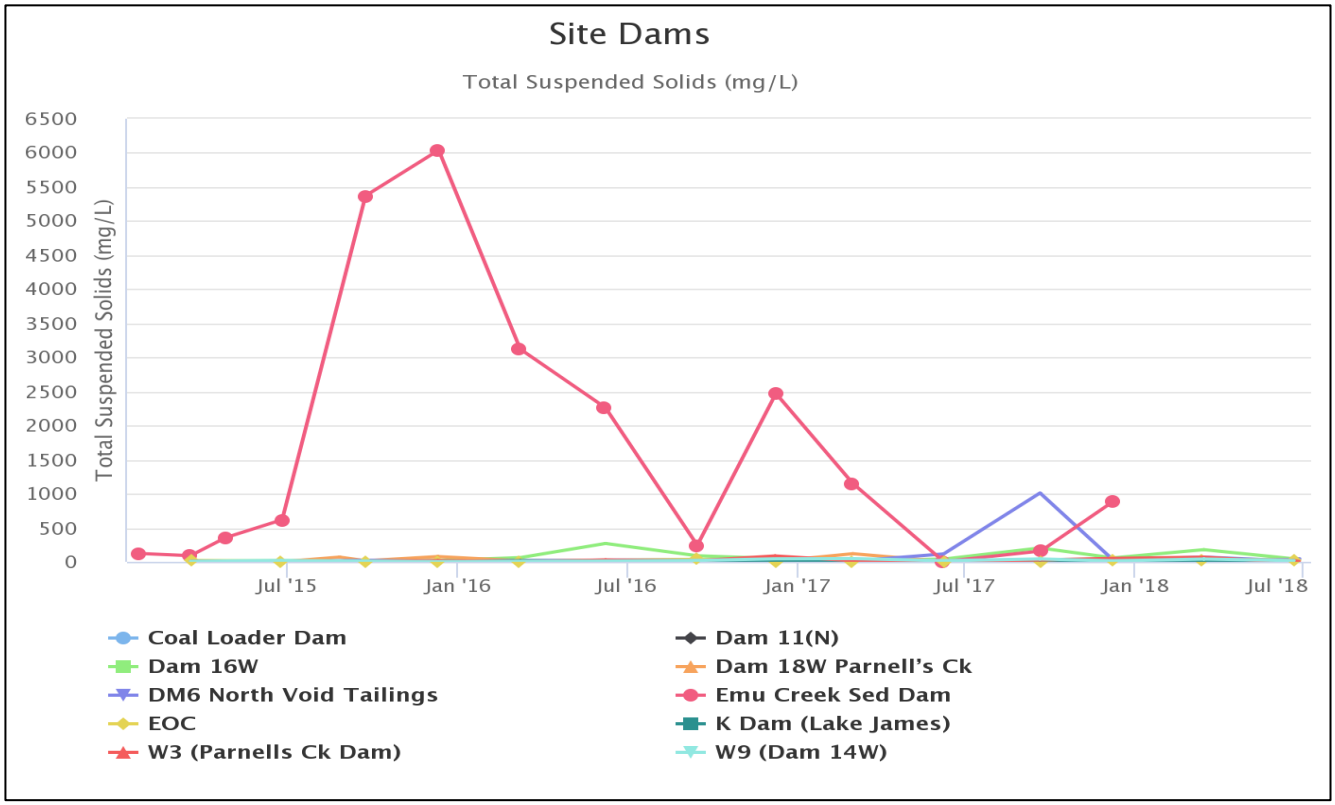


Figure 12: Site Dams Total Suspended Solids Trend – June 2018

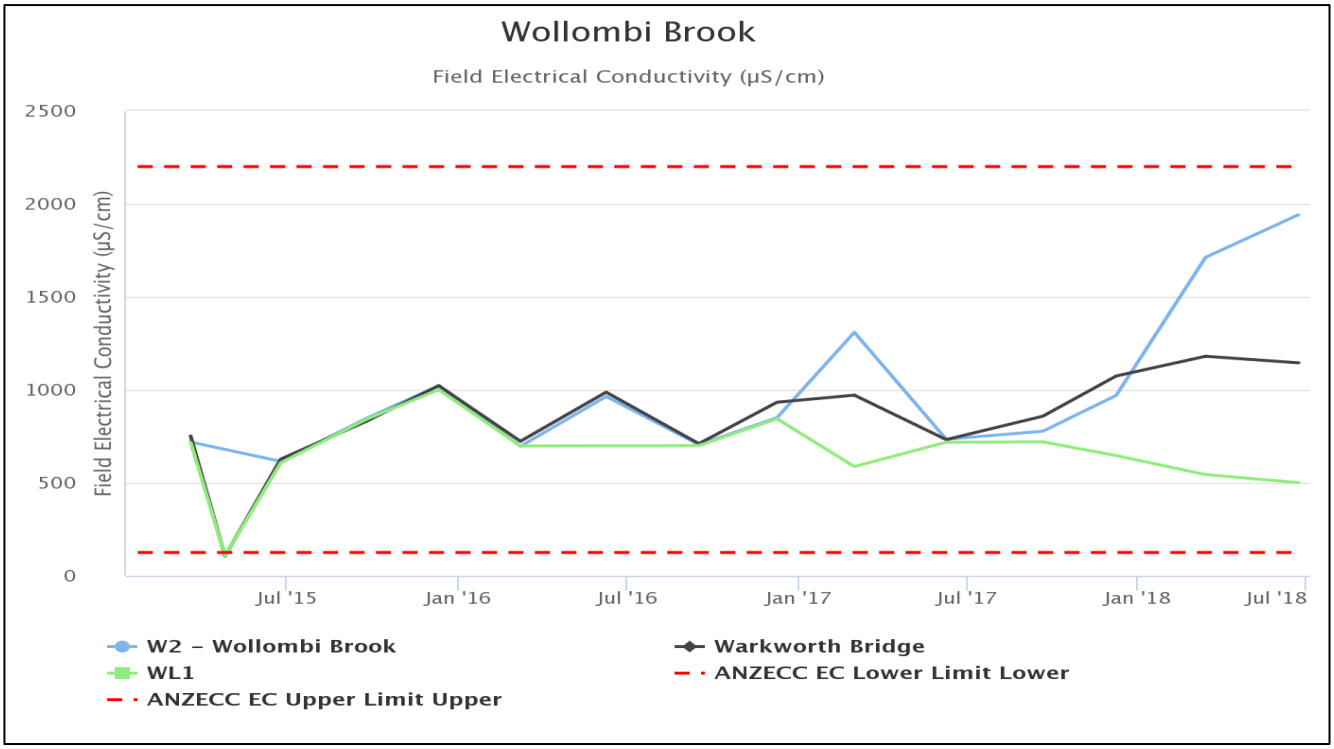


Figure 13: Wollombi Brook Electrical Conductivity Trend – June 2018

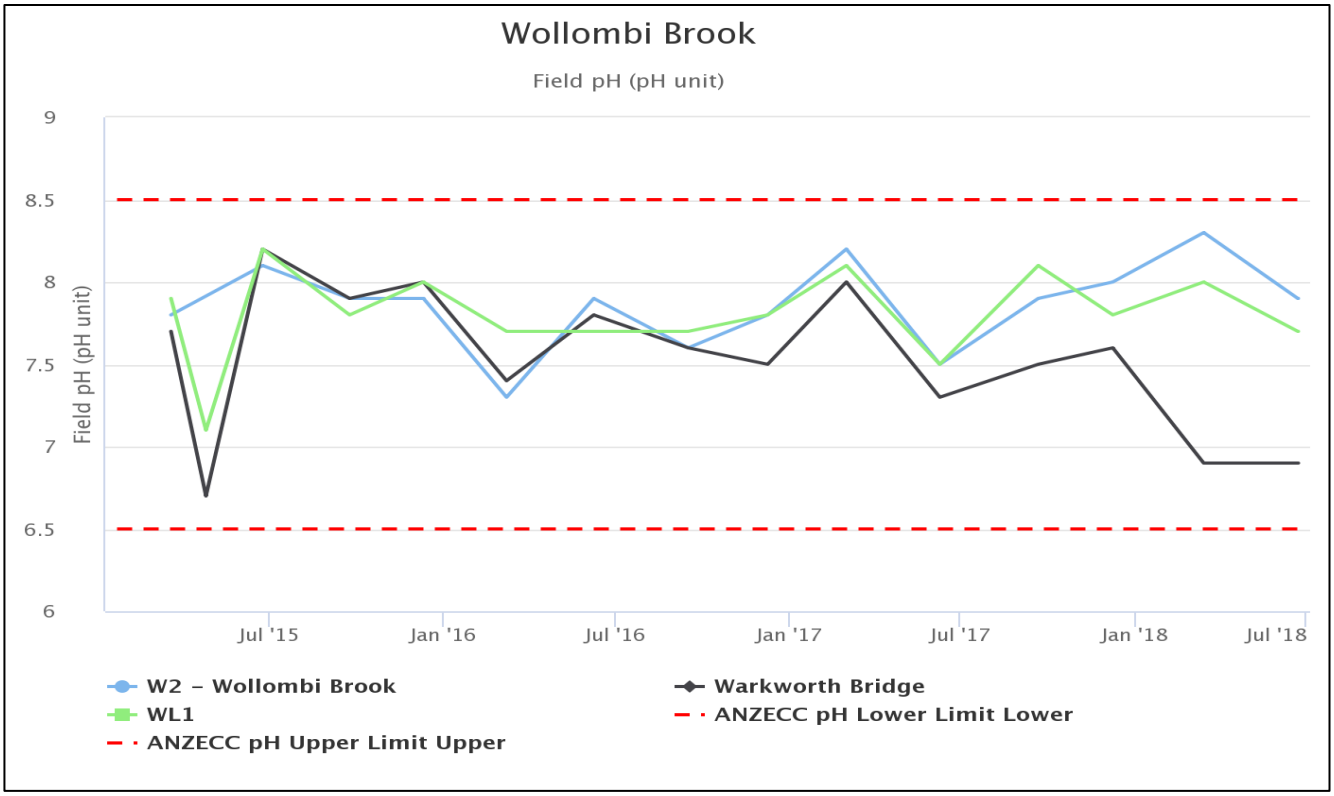


Figure 14: Wollombi Brook pH Trend – June 2018

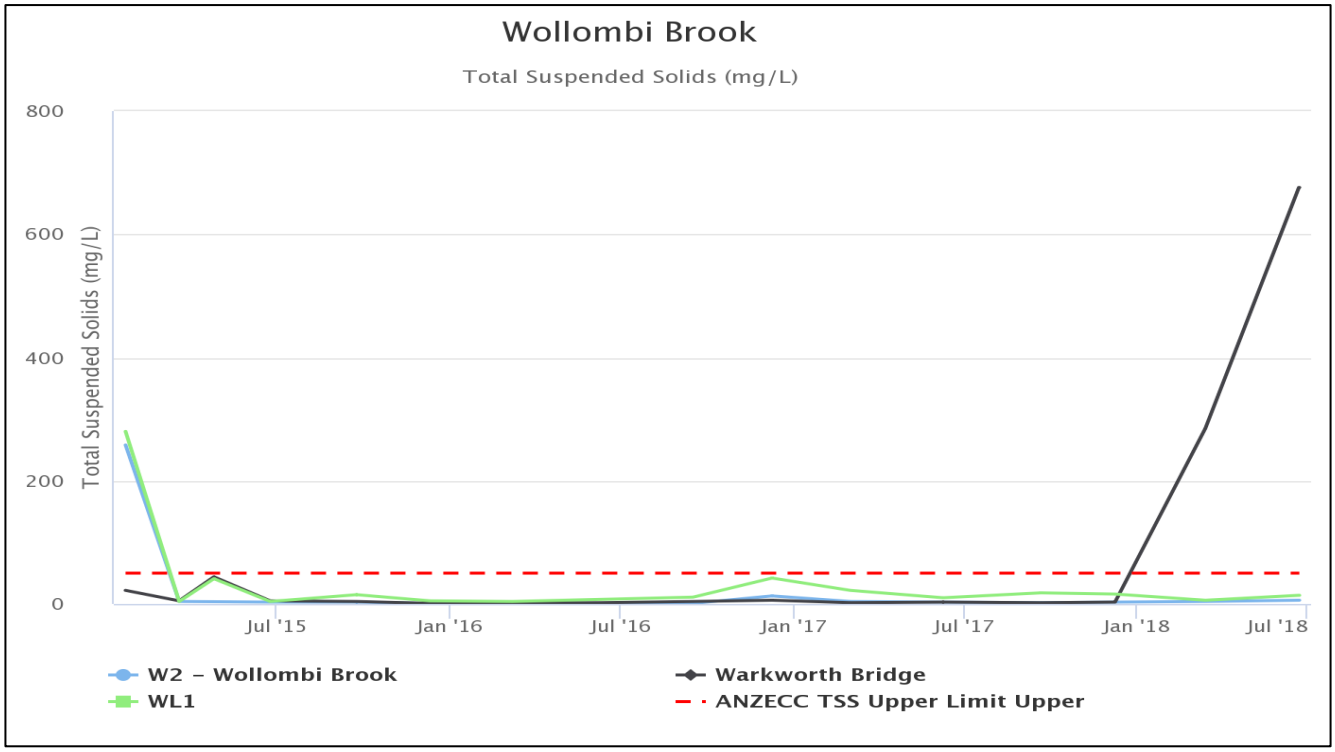


Figure 15: Wollombi Brook Total Suspended Solids Trend – June 2018

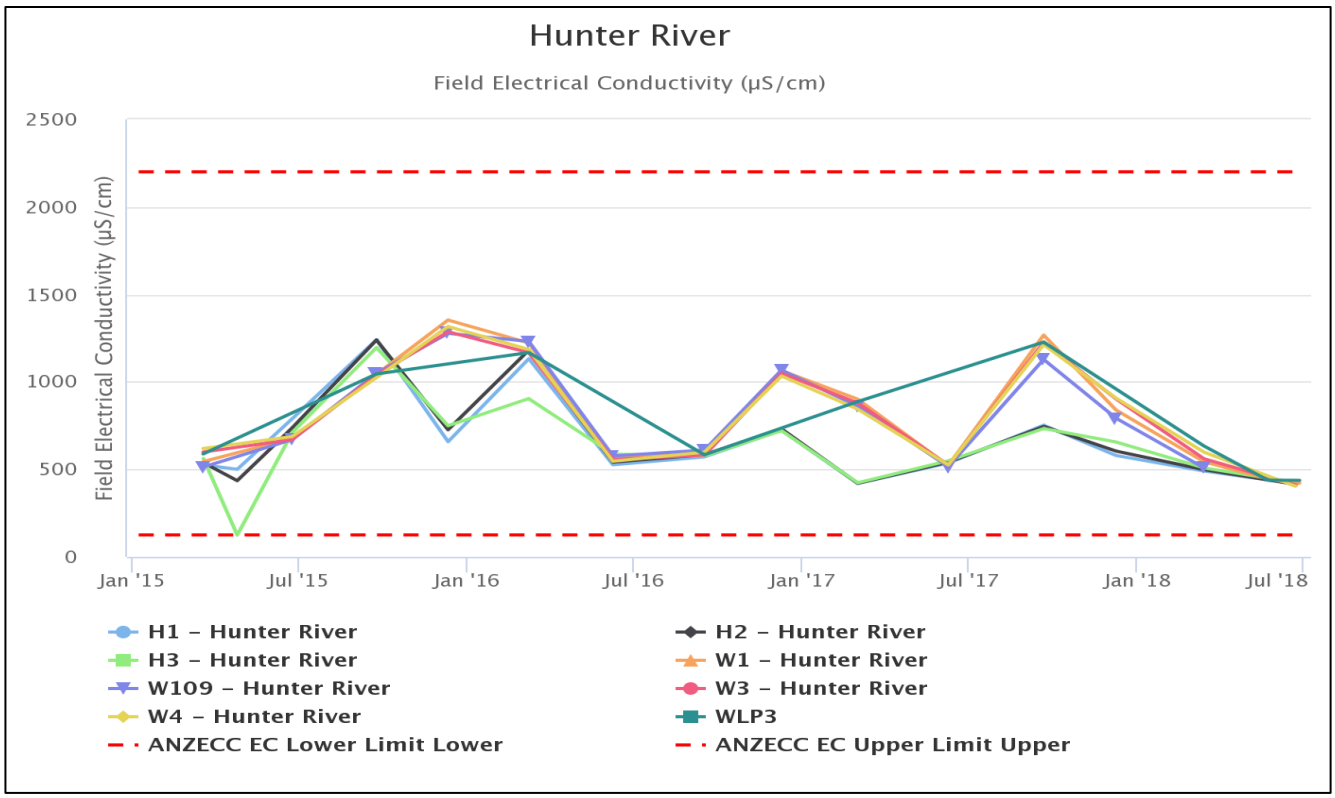


Figure 16: Hunter River Electrical Conductivity Trend – June 2018

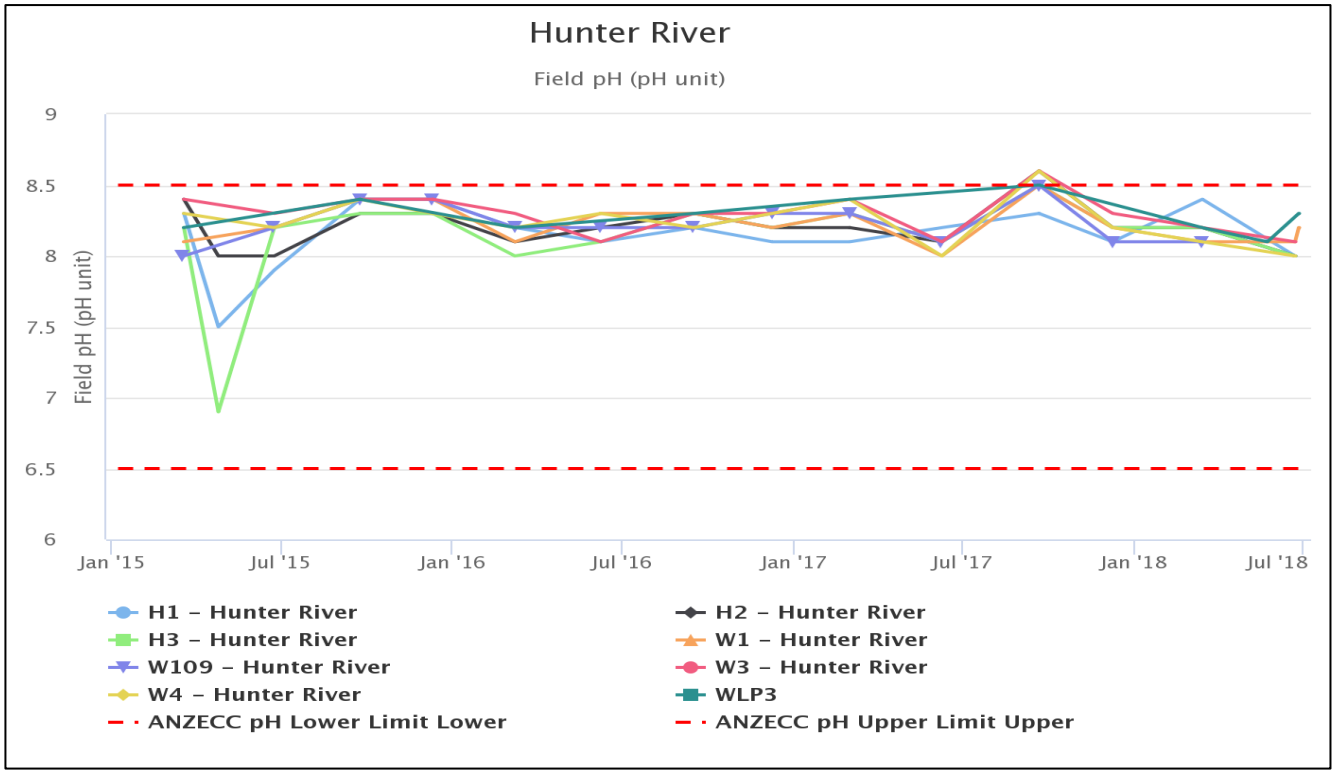


Figure 17: Hunter River pH Trend – June 2018

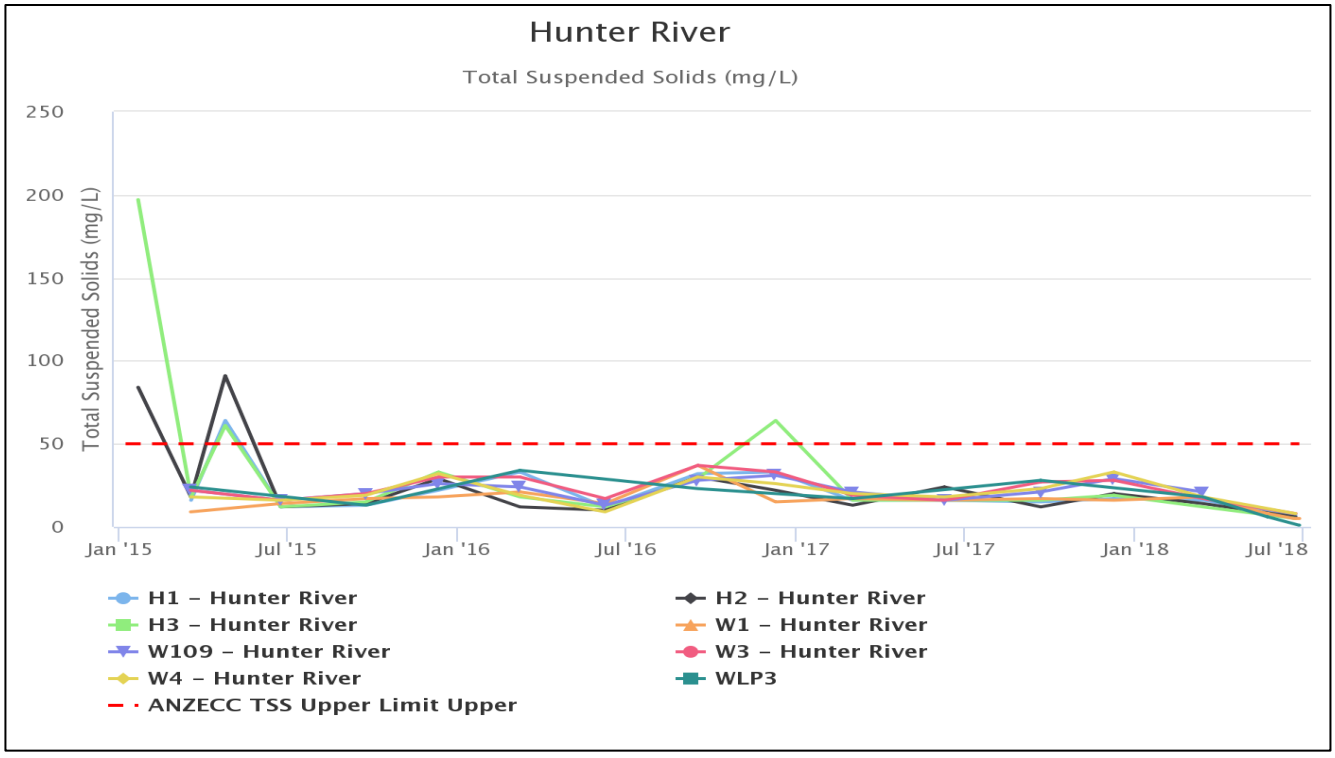


Figure 18: Hunter River Total Suspended Solids – June 2018

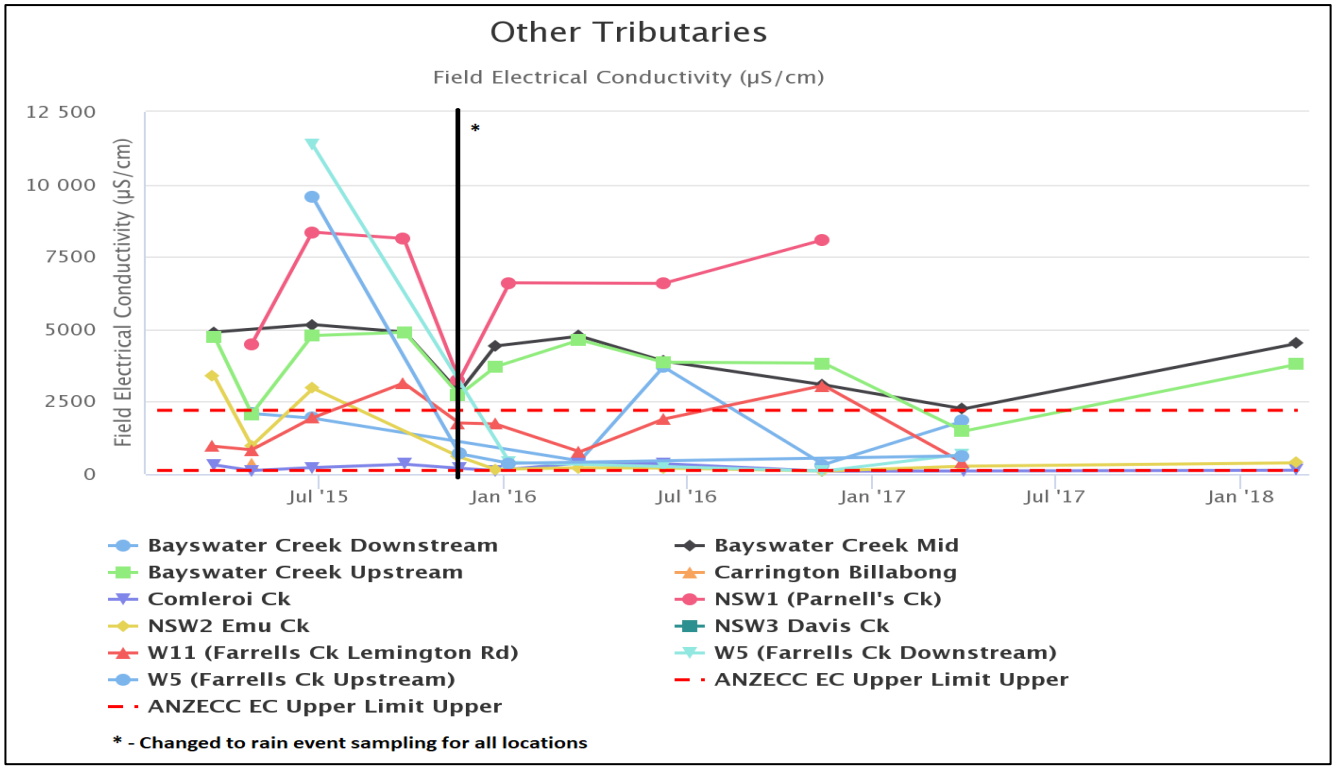


Figure 19: Other Tributaries Electrical Conductivity Trend – June 2018

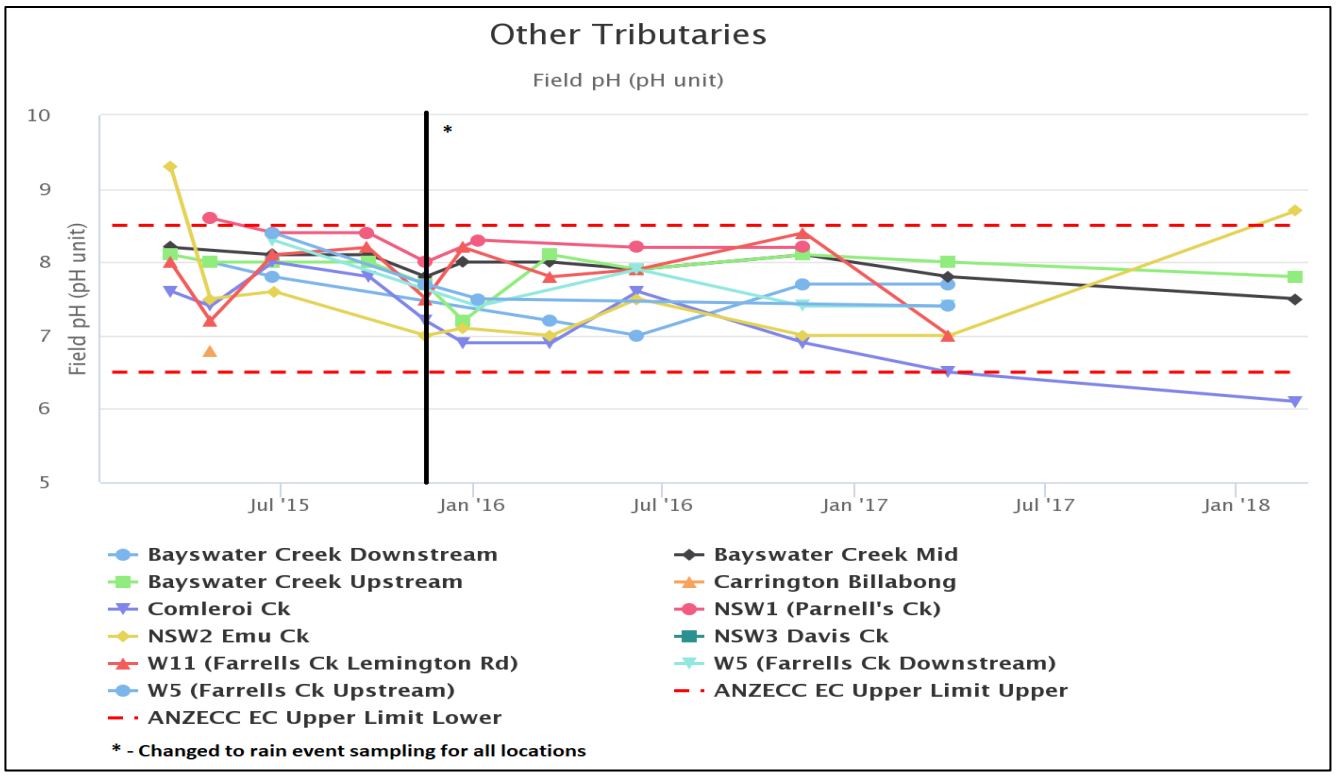


Figure 20: Other Tributaries pH Trend – June 2018

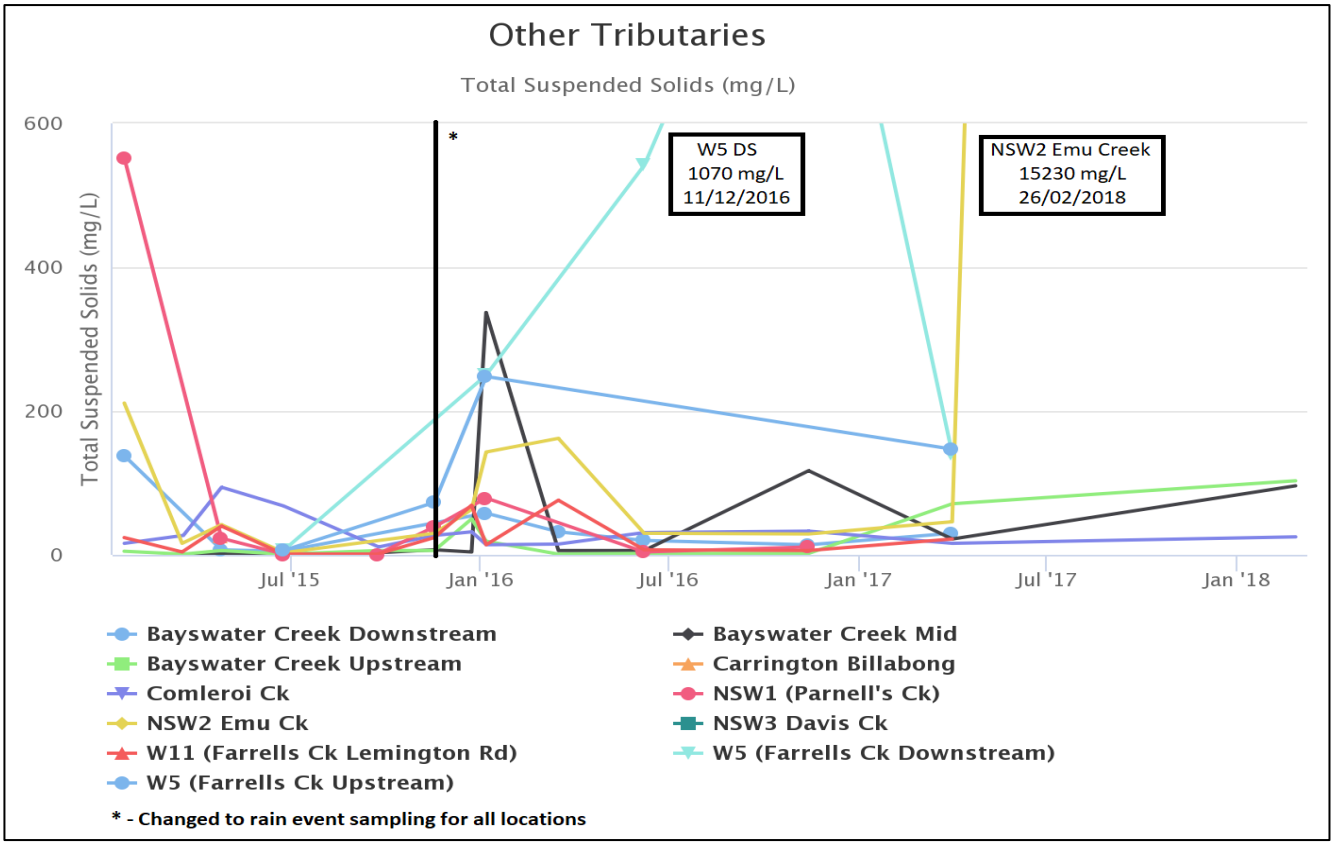


Figure 21: Other Tributaries Total Suspended Solids Trend – June 2018

3.1.2 Site Water Use

Under water allocation licences issued by the NSW Office of Water, HVO is permitted to extract water from the Hunter River. During the reporting period, HVO extracted approximately 62.2ML of water from the Hunter River.

3.1.3 HRSTS Discharge

HVO participates in the HRSTS, allowing it to discharge from licensed discharge points Dam 11N (to Farrell's Creek), Lake James (to the Hunter River) and Parnell's Dam (to Parnell's Creek). Discharges can only take place subject to HRSTS regulations.

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

3.1.4 Surface Water Trigger Limits

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 HVO Water Management Plan.

Current internal trigger limits that have been breached are summarised in Table 2.

Table 3: Surface Water Trigger Limit Summary

Site	Date	Trigger Limit Breached	Action taken in response
W2	14/03/2018	EC – 95th Percentile	Watching Brief*
W2	14/03/2018	pH – 95th Percentile	Watching Brief*
Warkworth Bridge	14/03/2018	EC – 95th Percentile	Watching Brief*
Warkworth Bridge	14/03/2018	pH – 5th Percentile	Watching Brief*
Warkworth Bridge	14/03/2018	TSS – 50mg/L (ANZECC criteria)	First exceedance of TSS trigger. Investigation identified that sample was collected from turbid pooling water in the Wollombi Brook as there was no flow. Samples taken in the Wollombi Brook further downstream at W2 and WL1 recorded TSS levels at 4 and 6mg/L respectively. Continue Watching Brief.
Warkworth Bridge	22/06/2018	TSS – 50mg/L (ANZECC criteria)	Second exceedance of TSS trigger. Investigation identified that sample was collected from turbid pooling water in the Wollombi Brook as there was no flow. Samples taken in the Wollombi Brook further downstream at W2 and WL1 recorded TSS levels at 6 and 14mg/L respectively. Continue Watching Brief.
Bayswater Creek Upstream	26/02/2018	TSS – 50mg/L (ANZECC criteria)	Elevated TSS associated with rainfall event (35mm 25 - 26/02/2018). Observations indicate that public road runoff likely influencing the sampling location. Downstream location was observed dry. No further action required.
Bayswater Creek Midstream	26/02/2018	pH – 5th Percentile	Watching Brief*
Bayswater Creek Midstream	26/02/2018	TSS – 50mg/L (ANZECC criteria)	Elevated TSS associated with rainfall event (35mm 25 - 26/02/2018). Observations indicate that the sample was taken from polling water in the creek line and no flow was observed. Downstream location was observed dry. No further action required.
Comleroi Ck	26/02/2018	pH – 5th Percentile	Watching Brief*
NSW 2 EMU Creek	26/02/2018	TSS – 50mg/L (ANZECC criteria)	Elevated TSS associated with rainfall event

	(35mm 25 - 26/02/2018). Observations indicate that the sample was taken from pooling water in the creek line and no flow was observed. No further downstream catchment exists during to mining operations. No further action required.

* = Watching Brief established pending outcomes of subsequent monitoring events. No further action required.

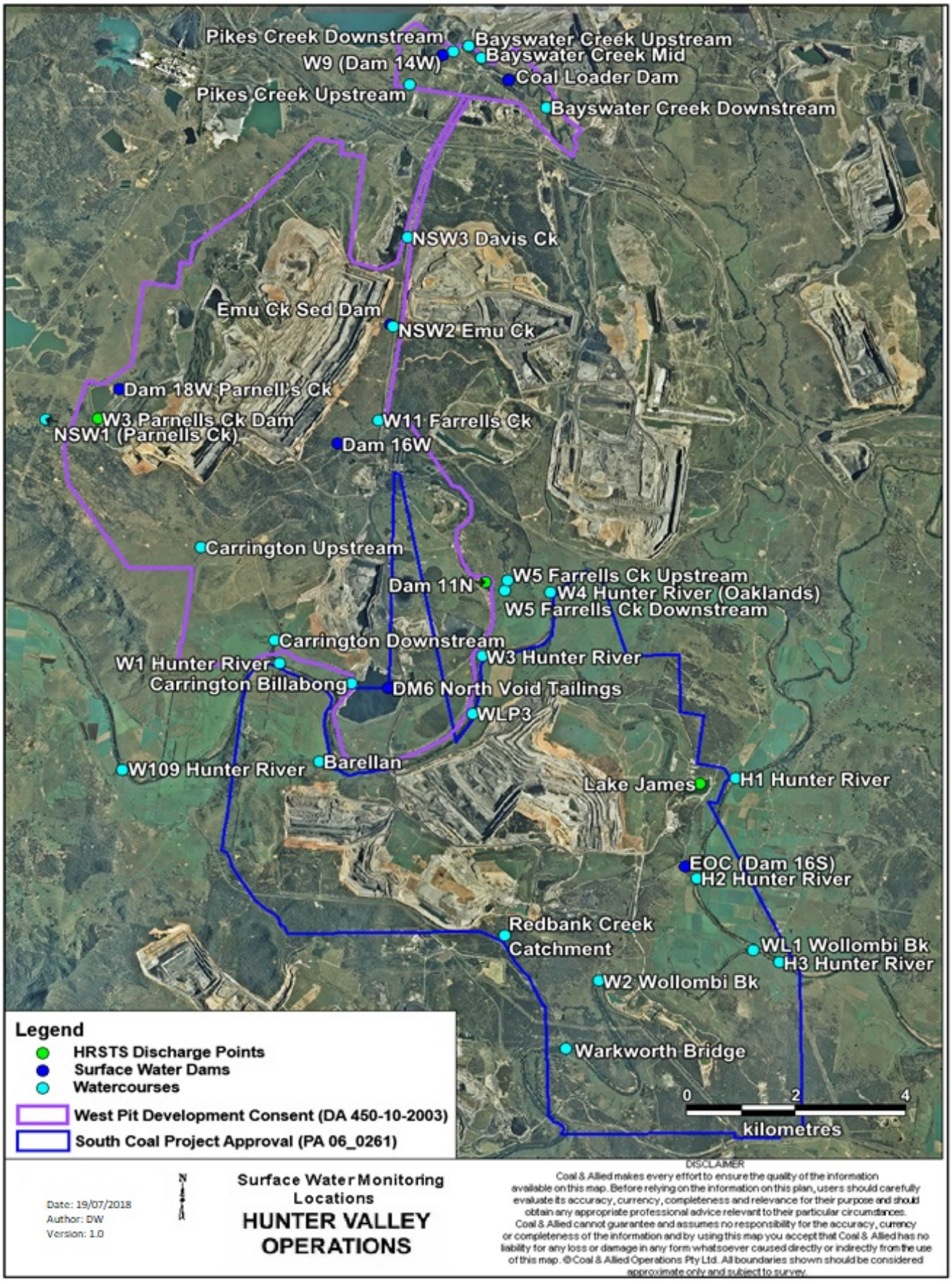


Figure 22: Surface Water Monitoring Location Plan

4.0 GROUNDWATER

4.1.1 Groundwater Monitoring

Groundwater monitoring is undertaken on a quarterly basis in accordance with the HVO Water Management Plan and Ground Water Monitoring Programme. Monitoring sites are shown in Figure 77.

Figure 23 to Figure 76 show the long term trends (2016 – current) for ground water bores monitored at HVO.

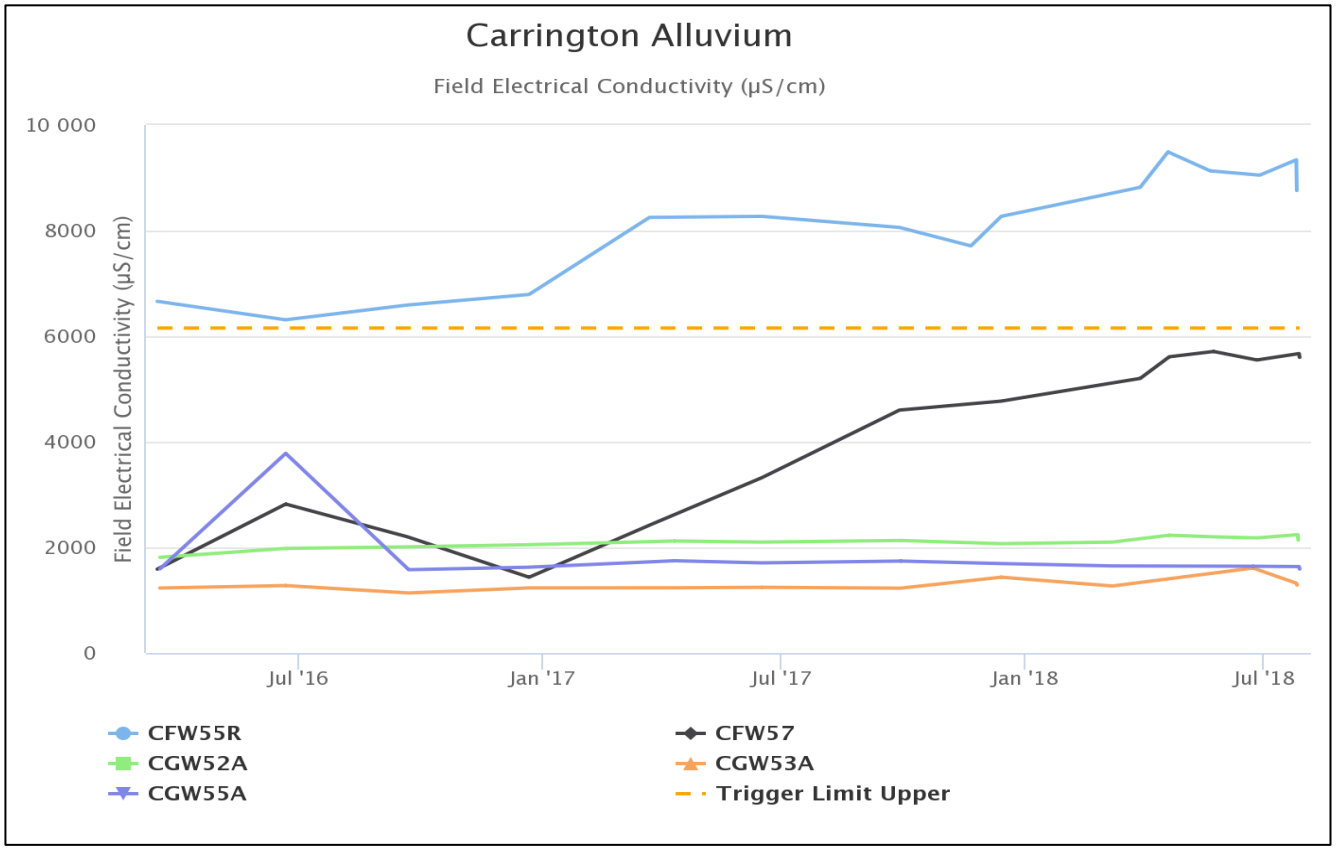


Figure 23: Carrington Alluvium Electrical Conductivity Trend – June 2018

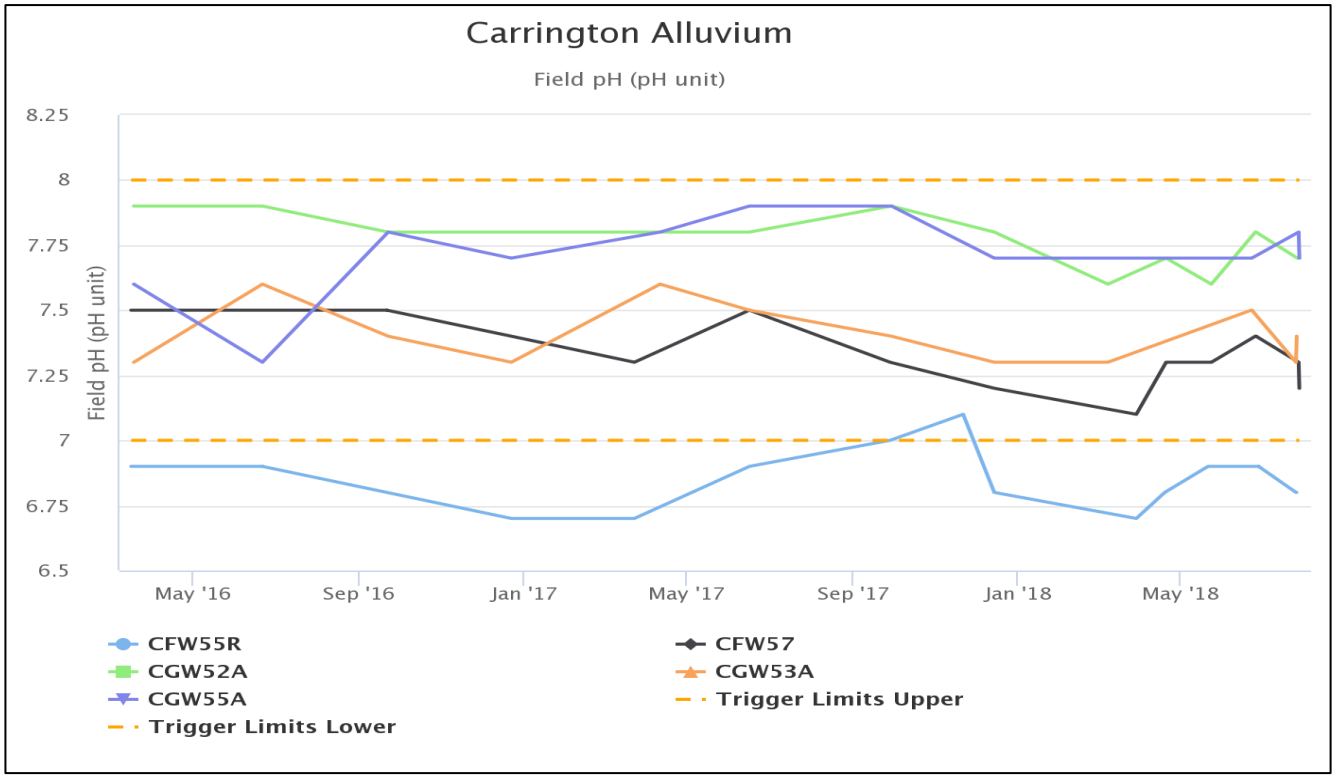


Figure 24: Carrington Alluvium pH Trend – June 2018

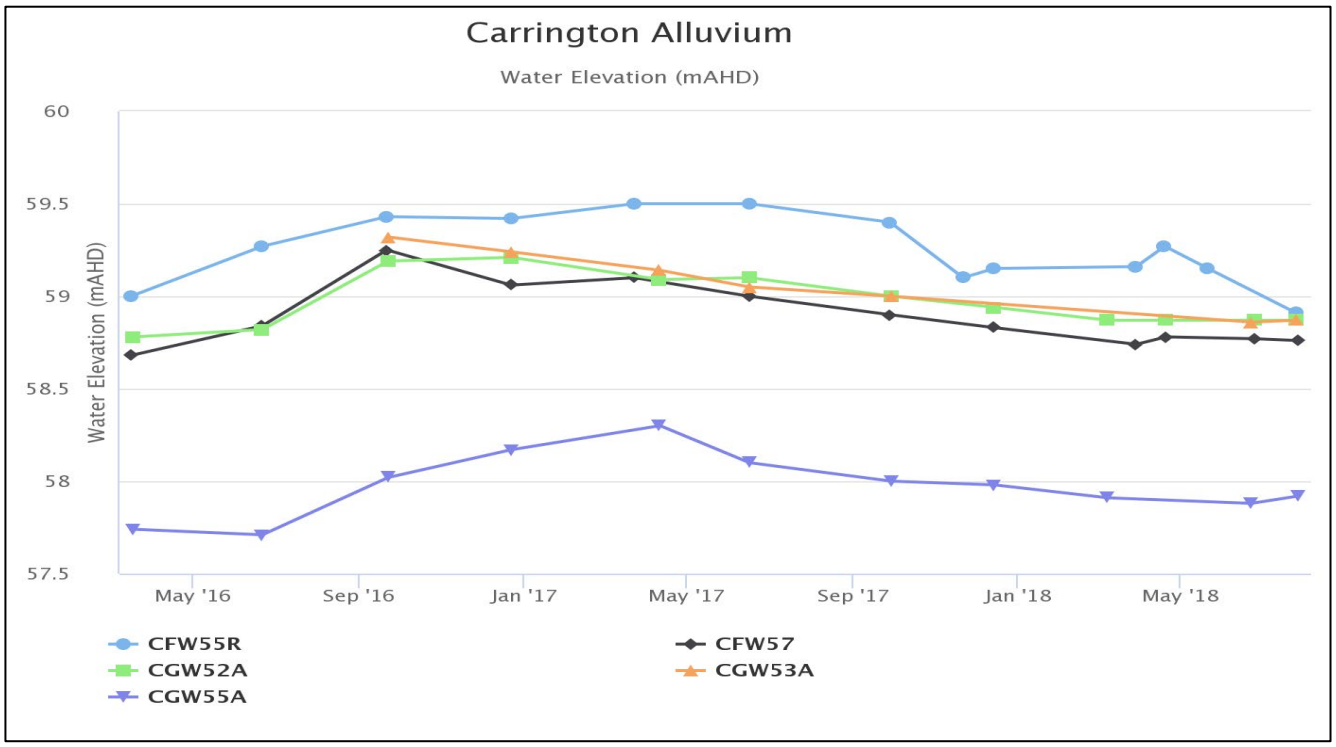


Figure 25: Carrington Alluvium Standing Water Level – June 2017

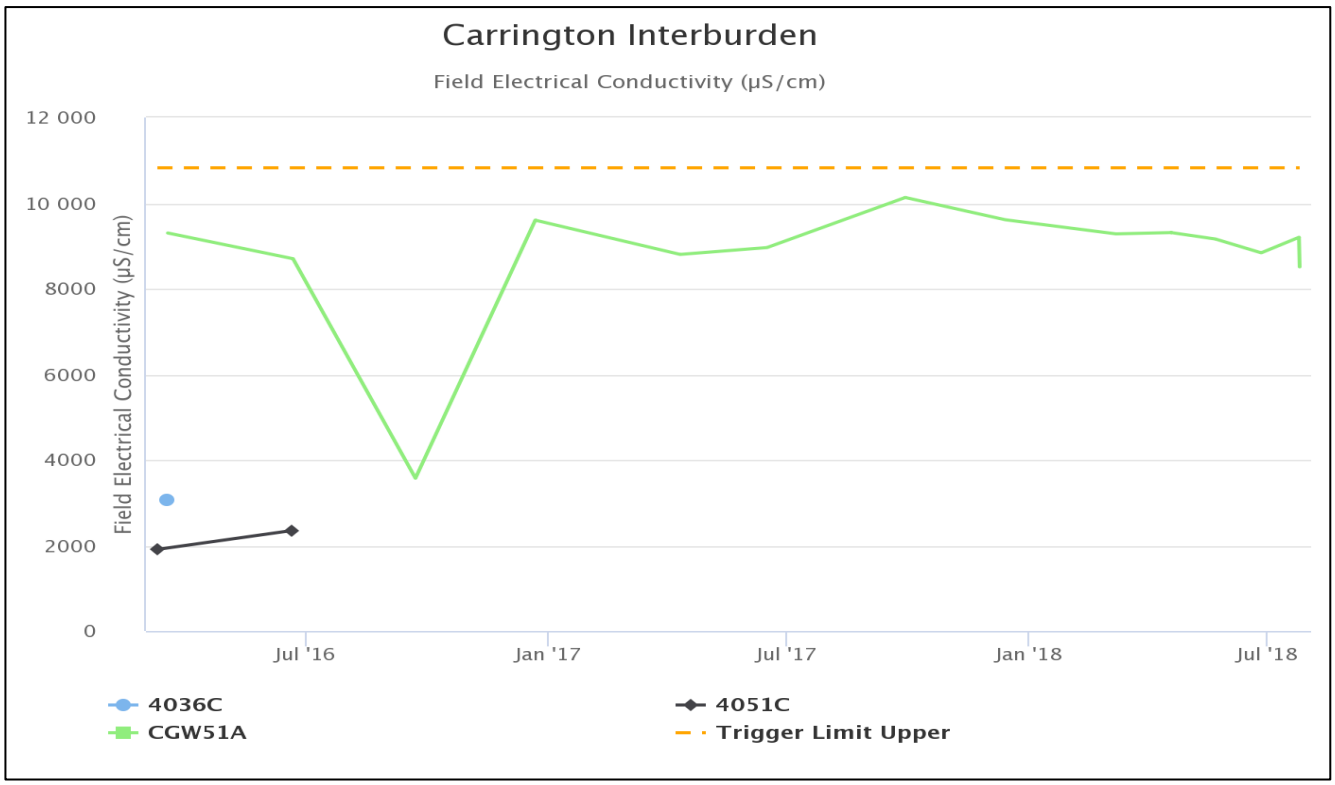


Figure 26: Carrington Interburden Electrical Conductivity Trend – June 2018

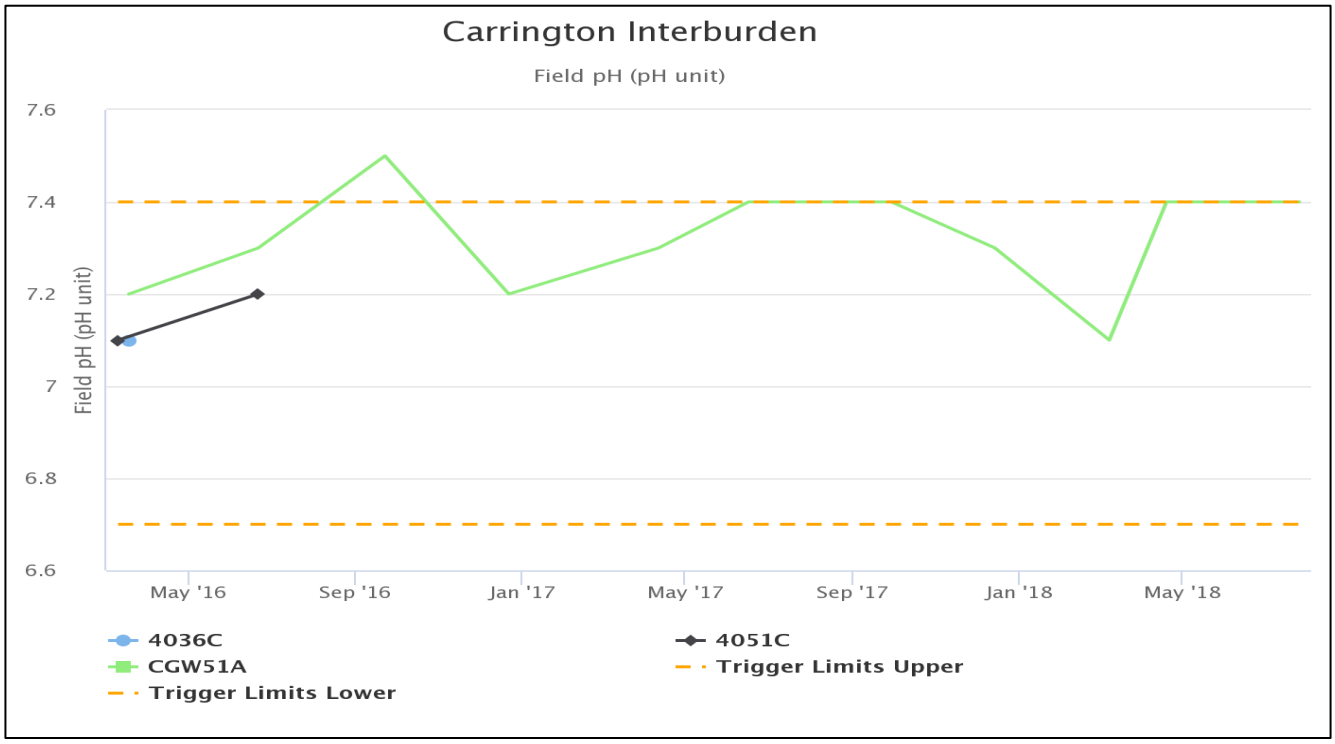


Figure 27: Carrington Interburden pH Trend – June 2018

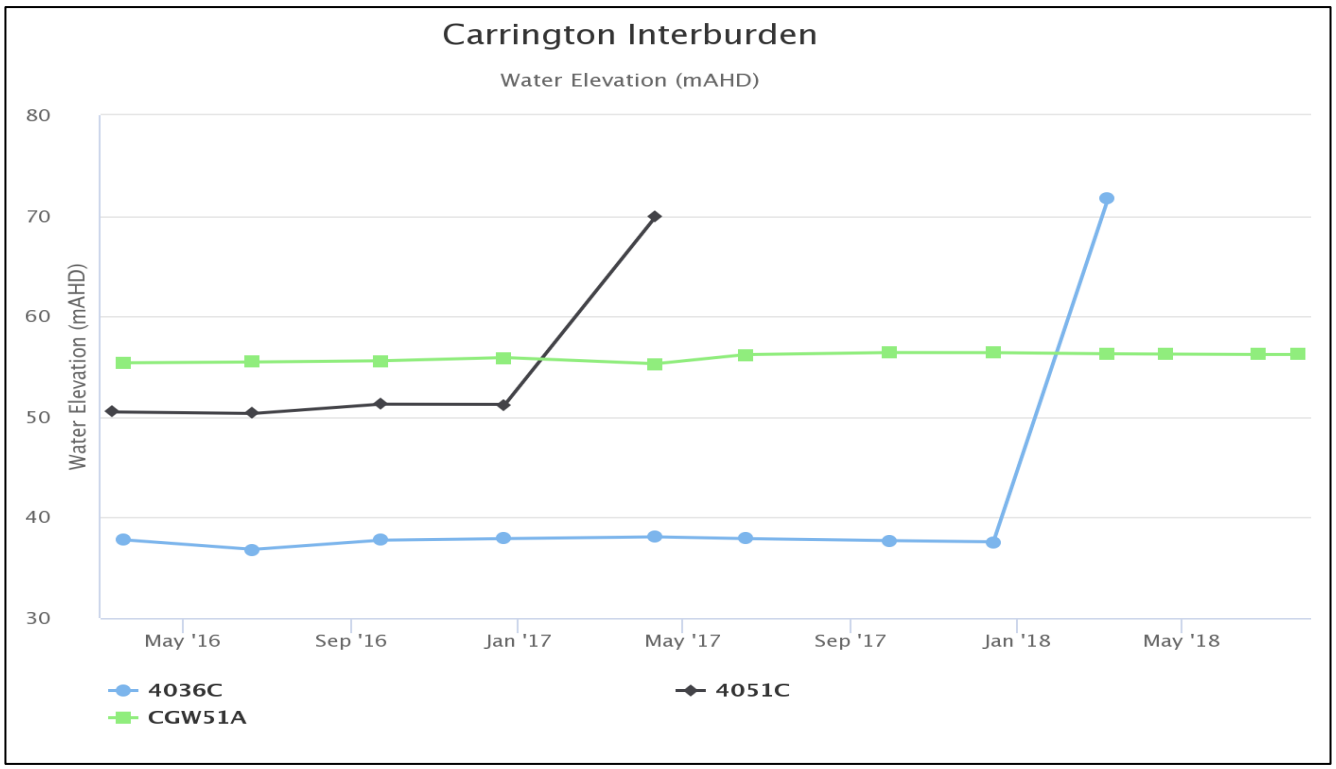


Figure 28: Carrington Interburden Standing Water Level – June 2018

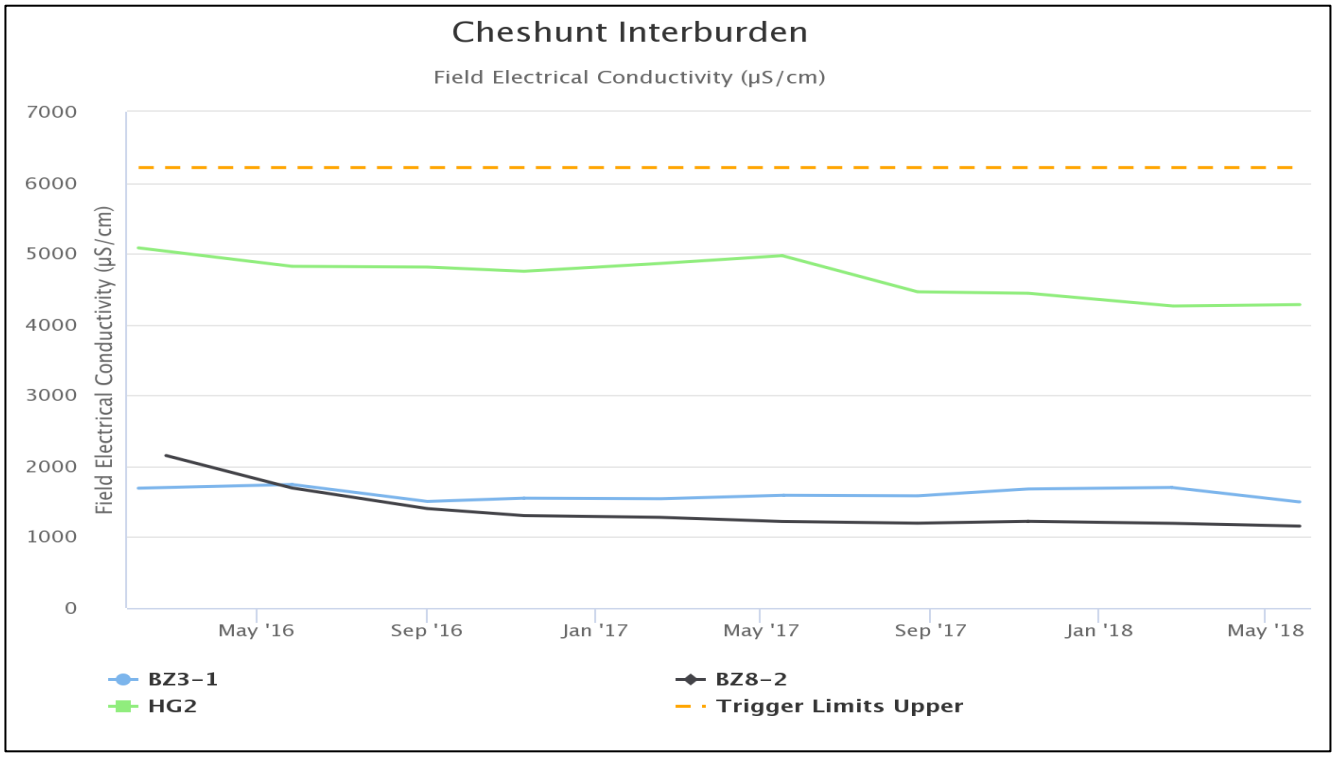


Figure 29: Cheshunt Interburden Electrical Conductivity Trend – June 2018

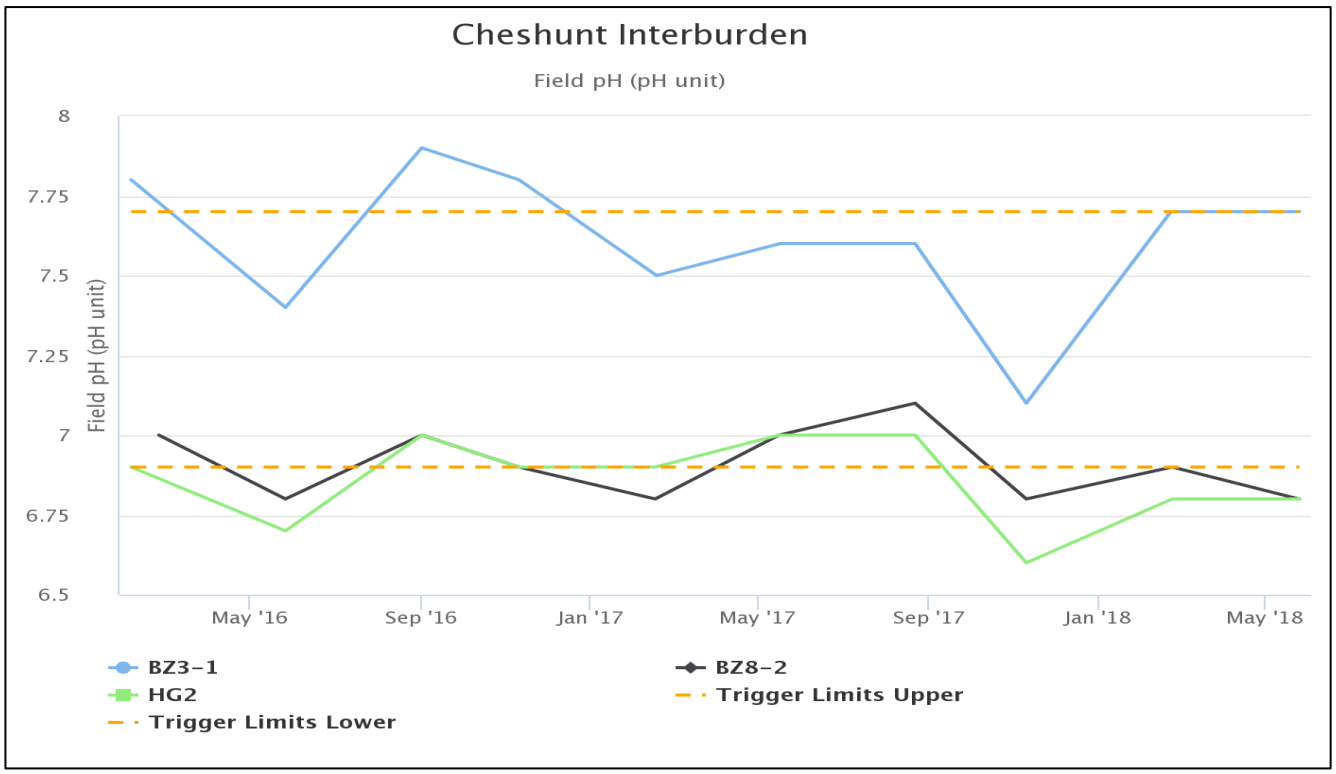


Figure 30: Cheshunt Interburden pH Trend – June 2018

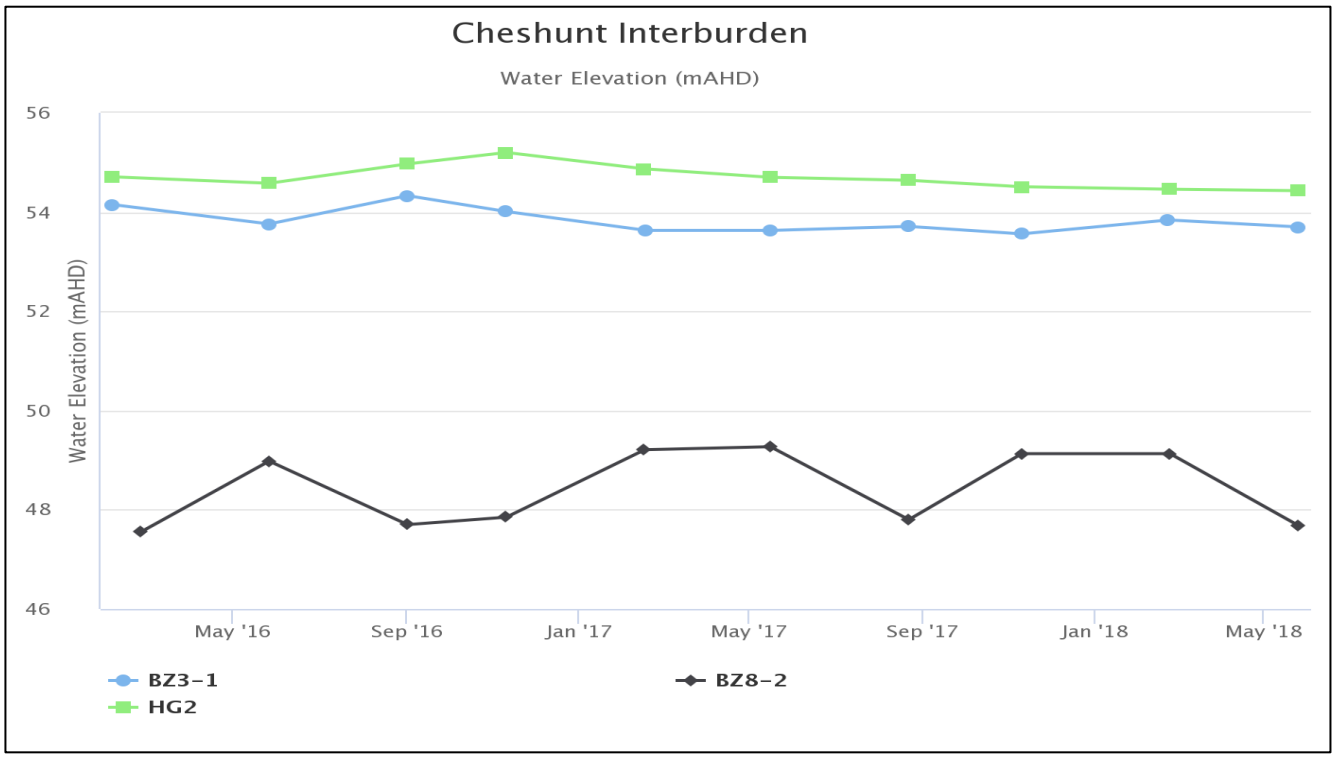


Figure 31: Cheshunt Interburden Standing Water Level – June 2018

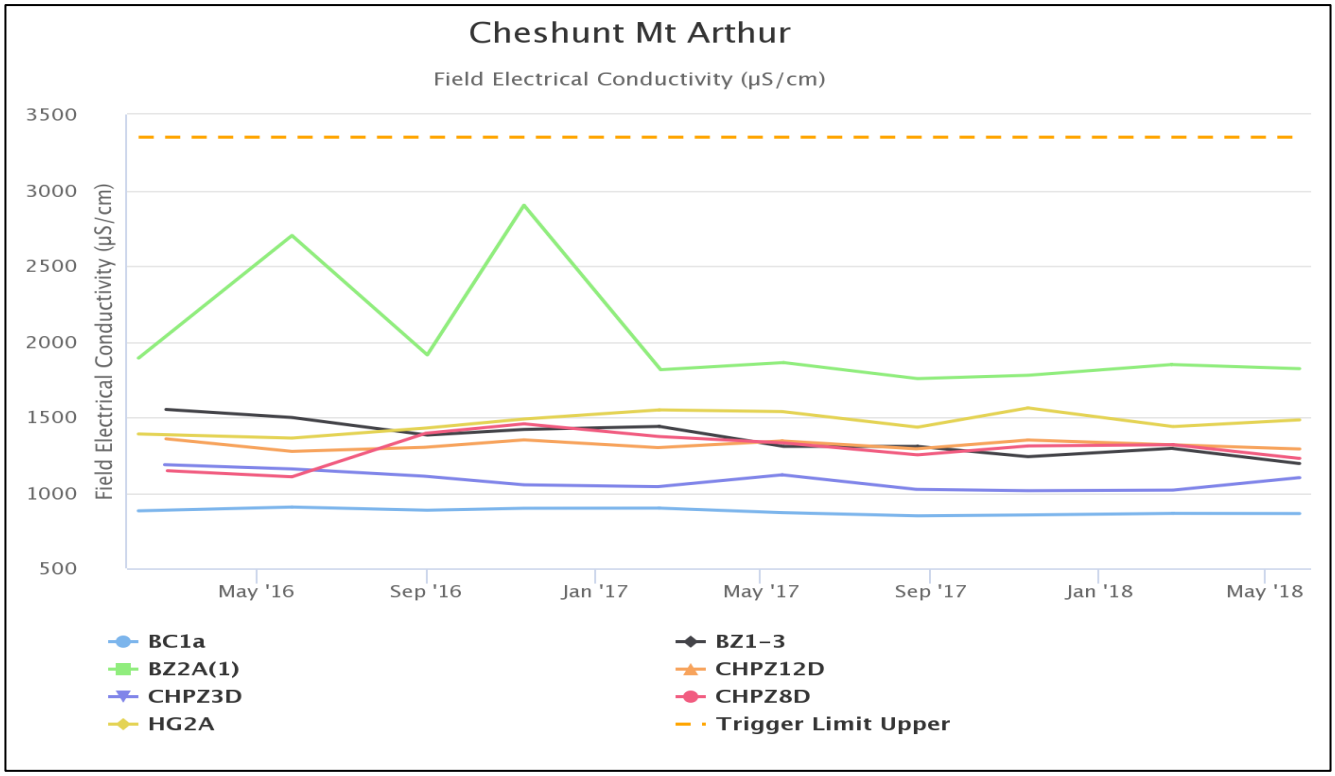


Figure 32: Cheshunt Mt Arthur Electrical Conductivity Trend – June 2018

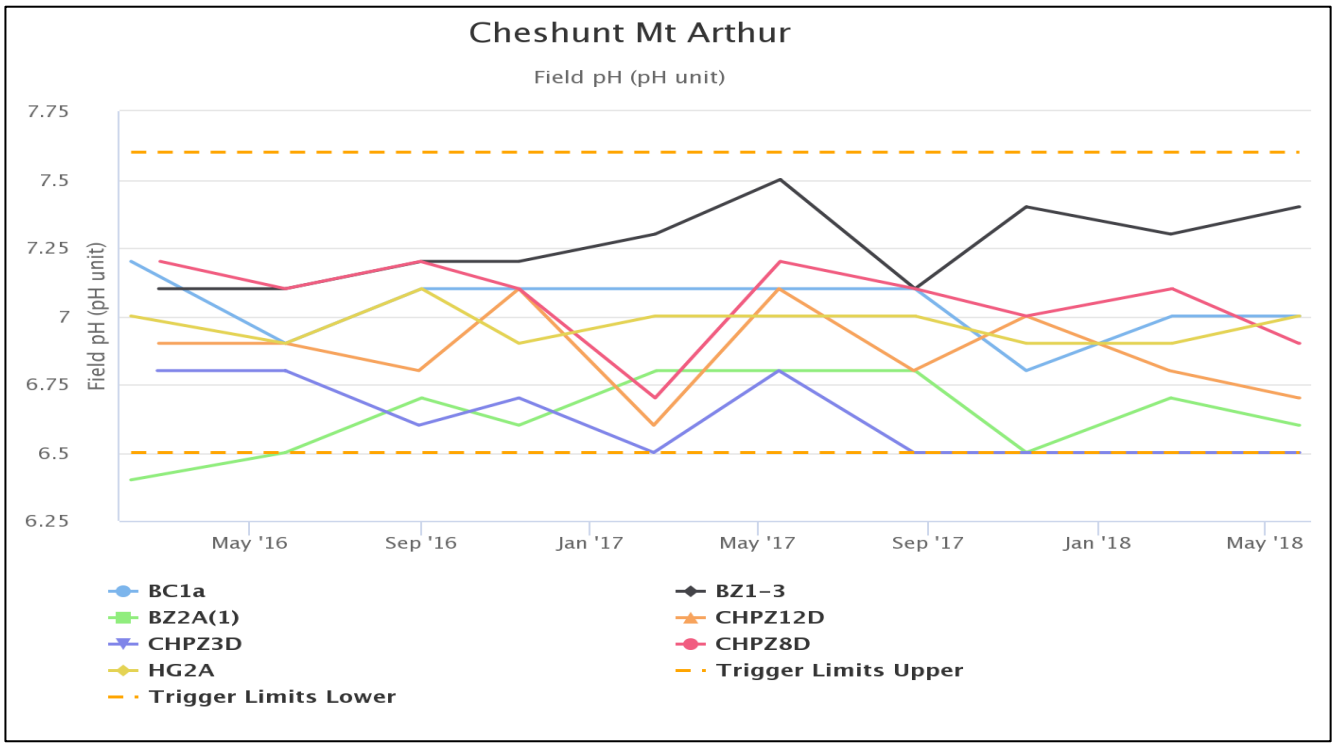


Figure 33: Cheshunt Mt Arthur pH Trend – June 2018

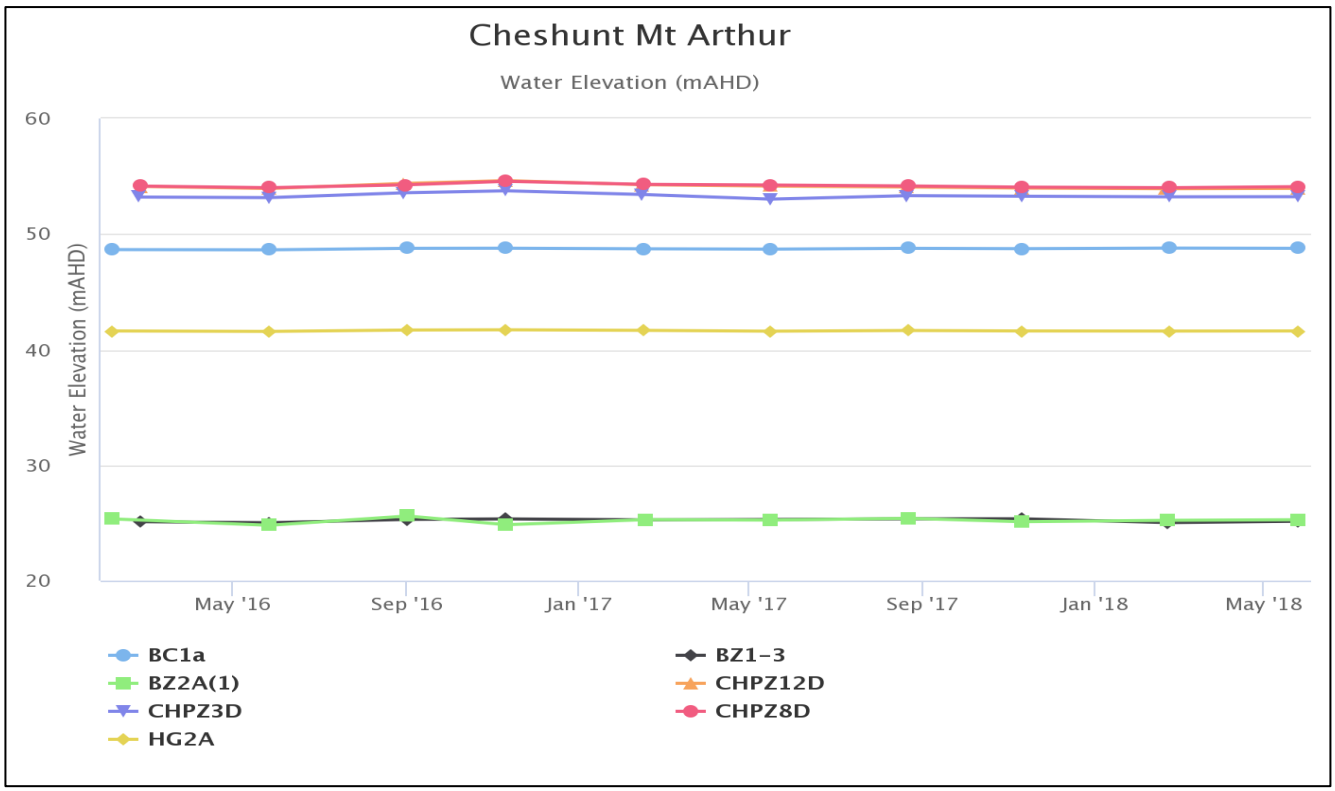


Figure 34: Cheshunt Mt Arthur Standing Water Level – June 2018

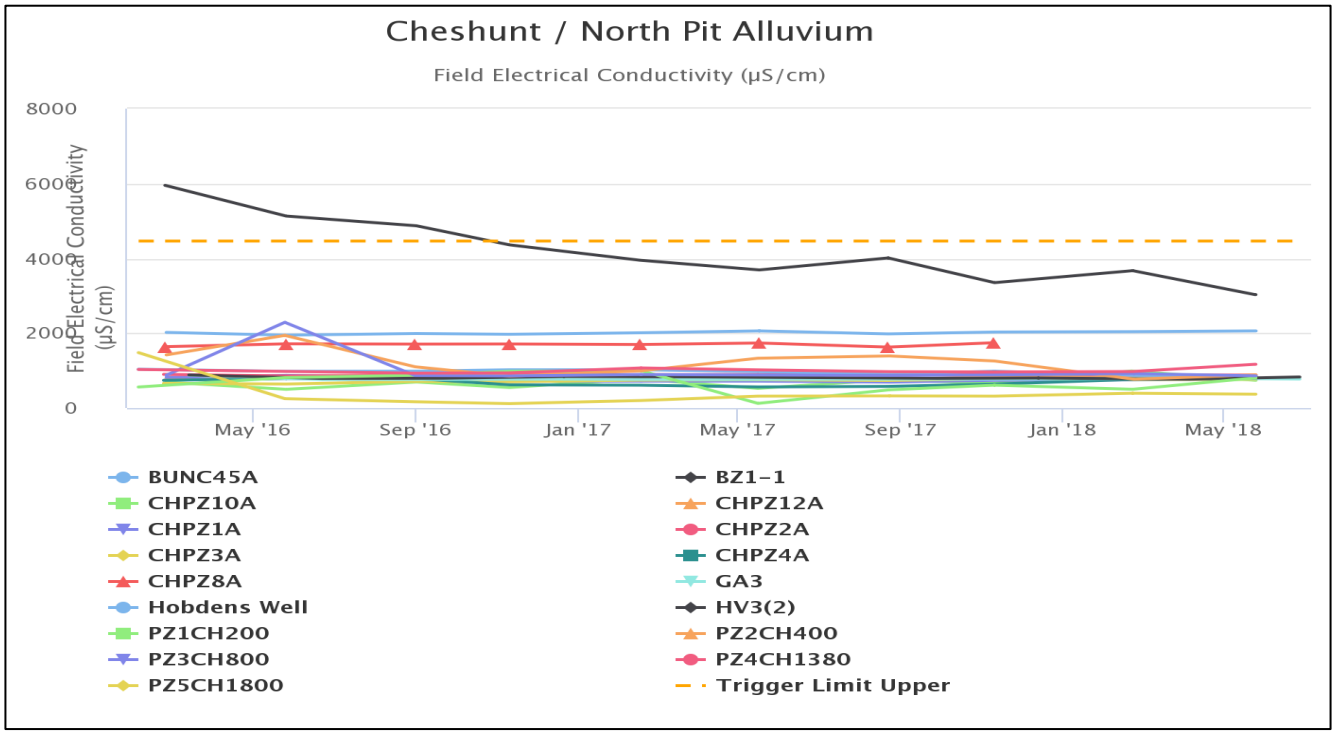


Figure 35: Cheshunt / North Pit Alluvium Electrical Conductivity Trend – June 2018

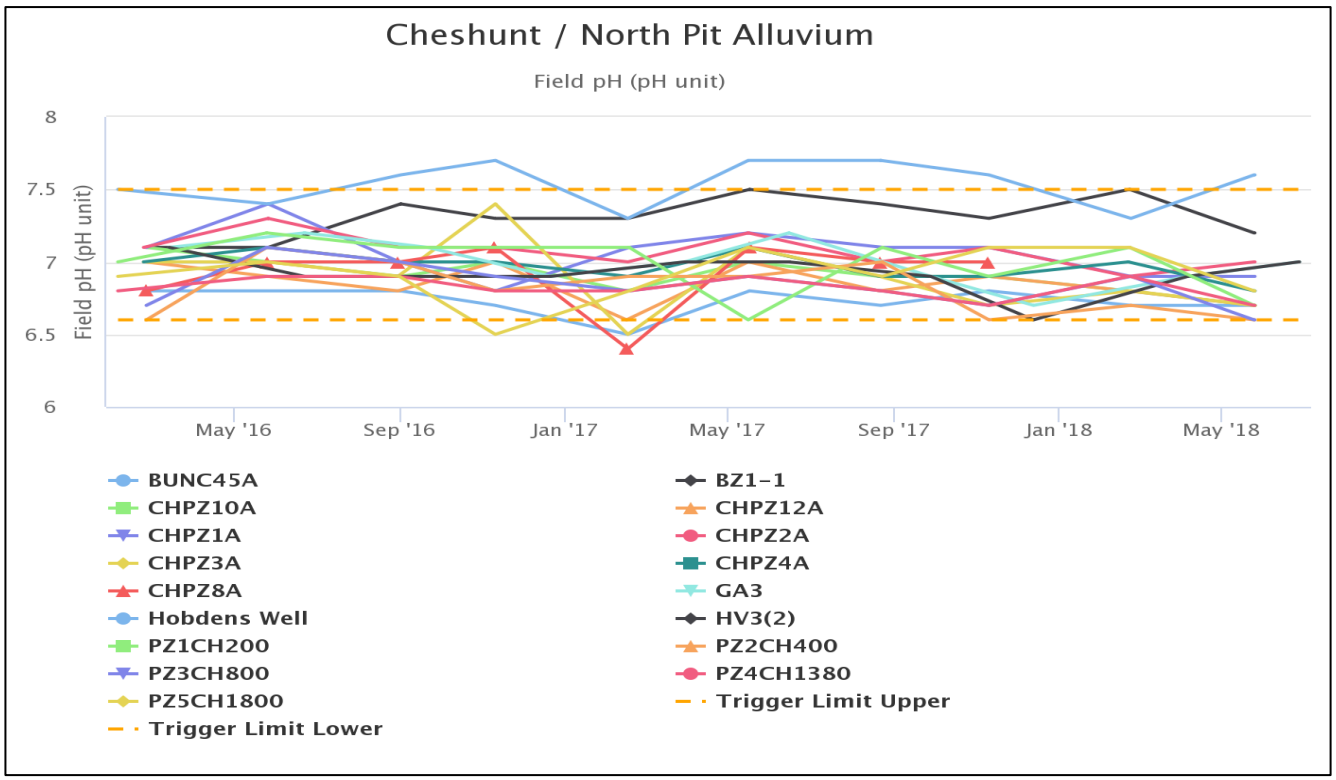


Figure 36: Cheshunt / North Pit Alluvium pH Trend – June 2018

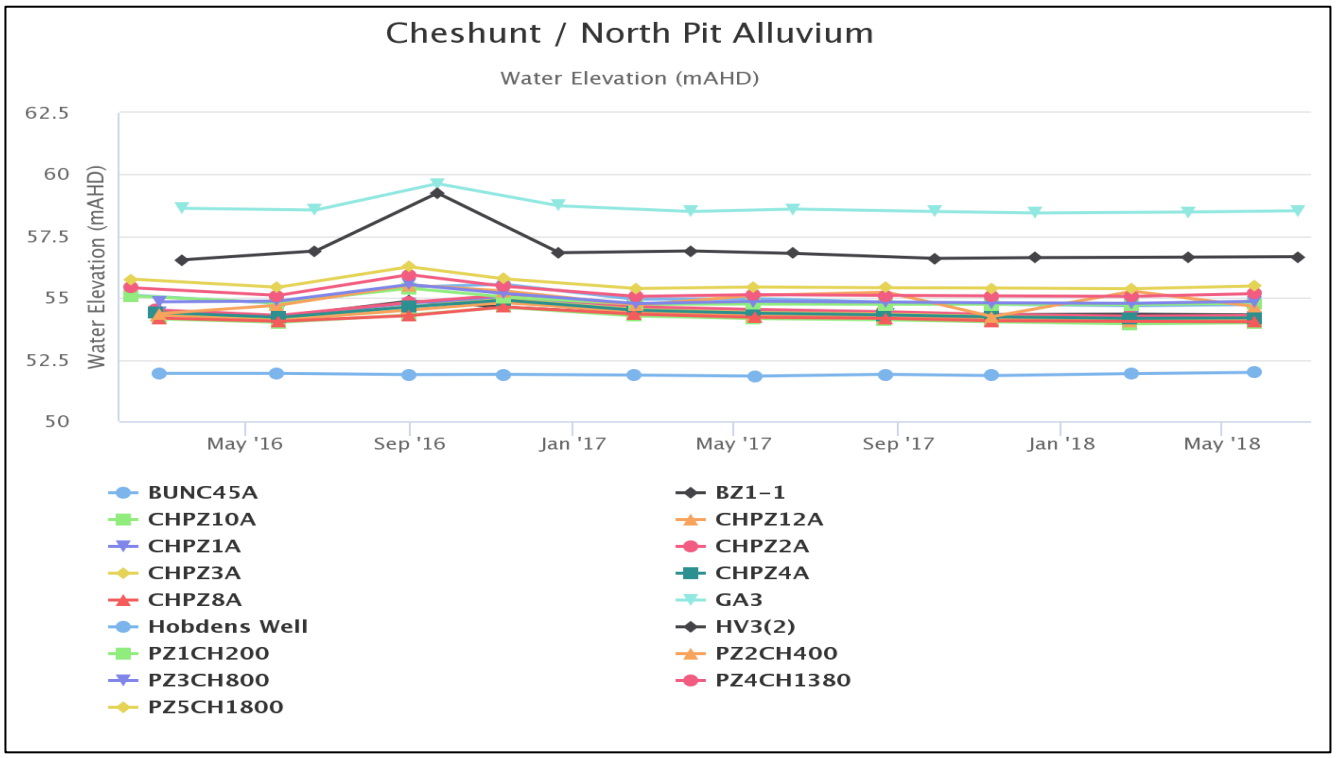


Figure 37: Cheshunt / North Pit Alluvium Standing Water Level – June 2018

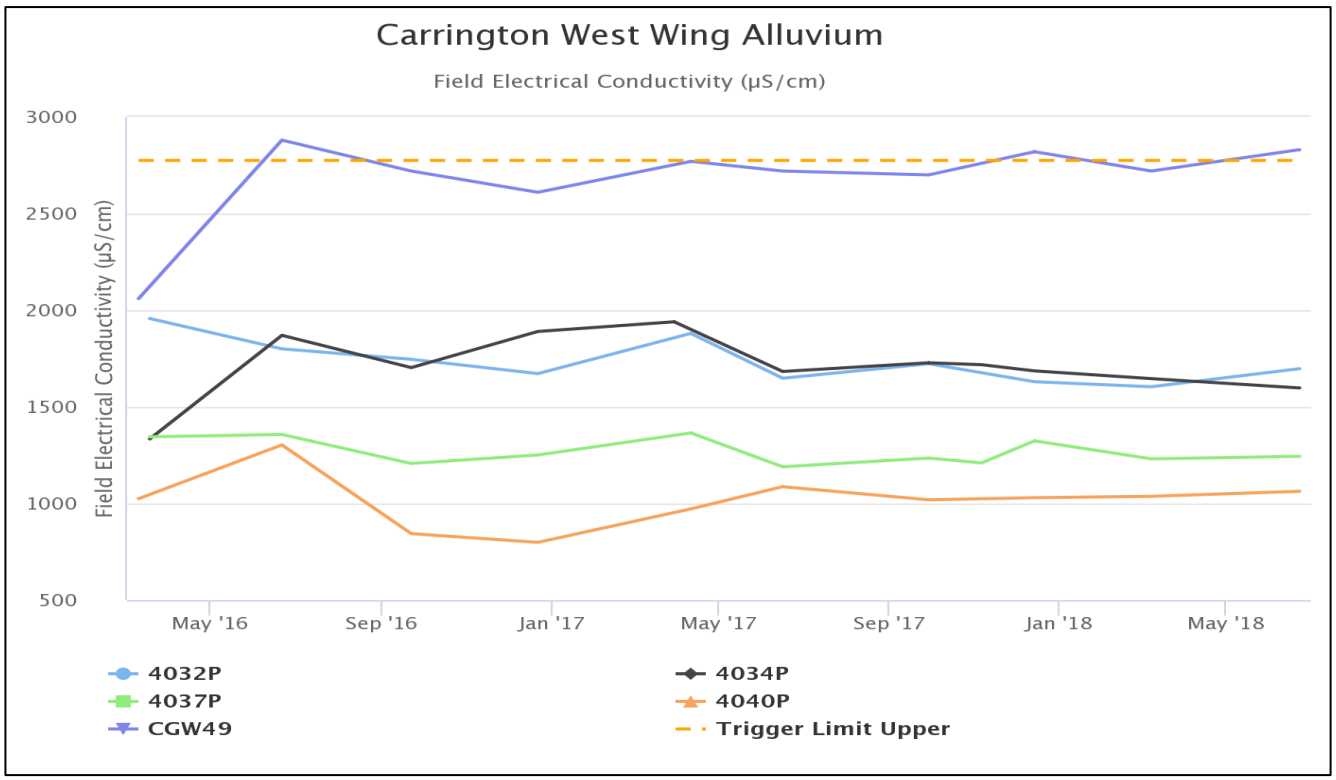


Figure 38: Carrington West Wing Alluvium Electrical Conductivity Trend – June 2018

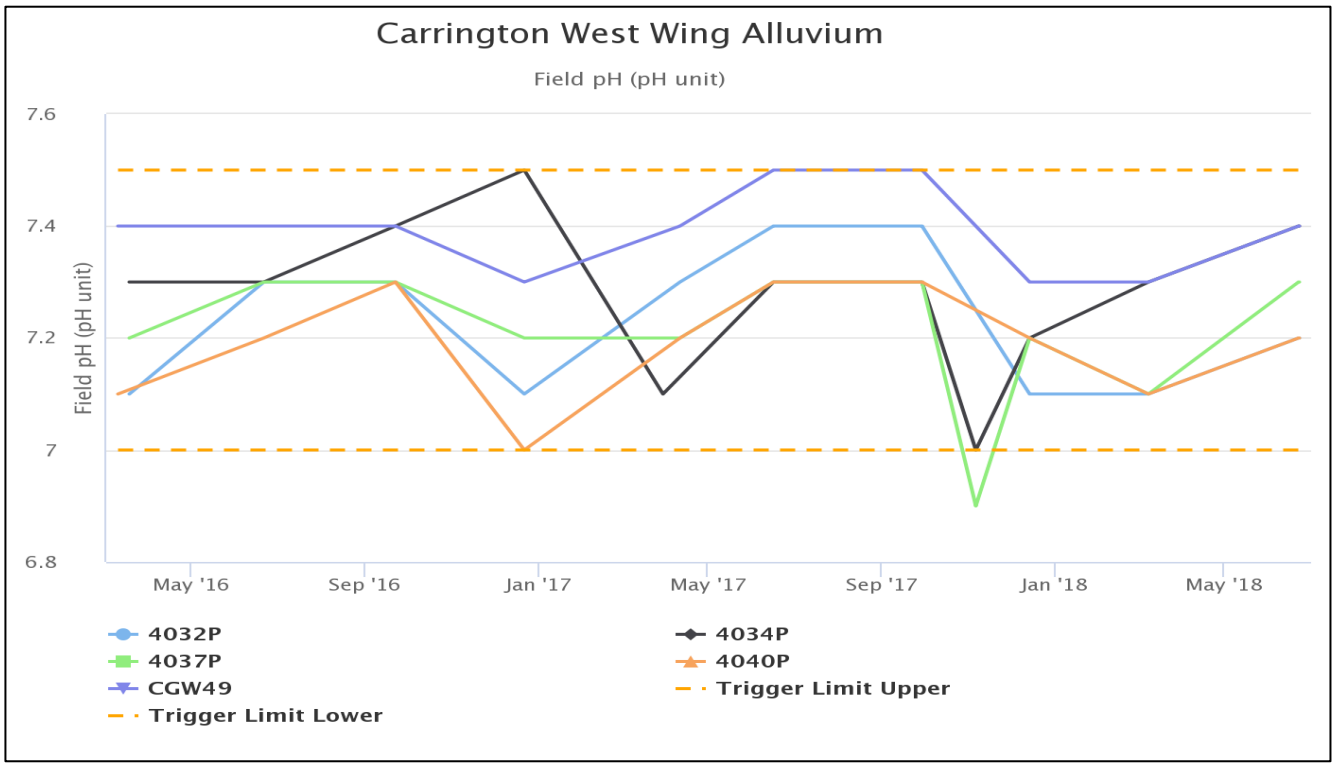


Figure 39: Carrington West Wing Alluvium pH Trend – June 2018

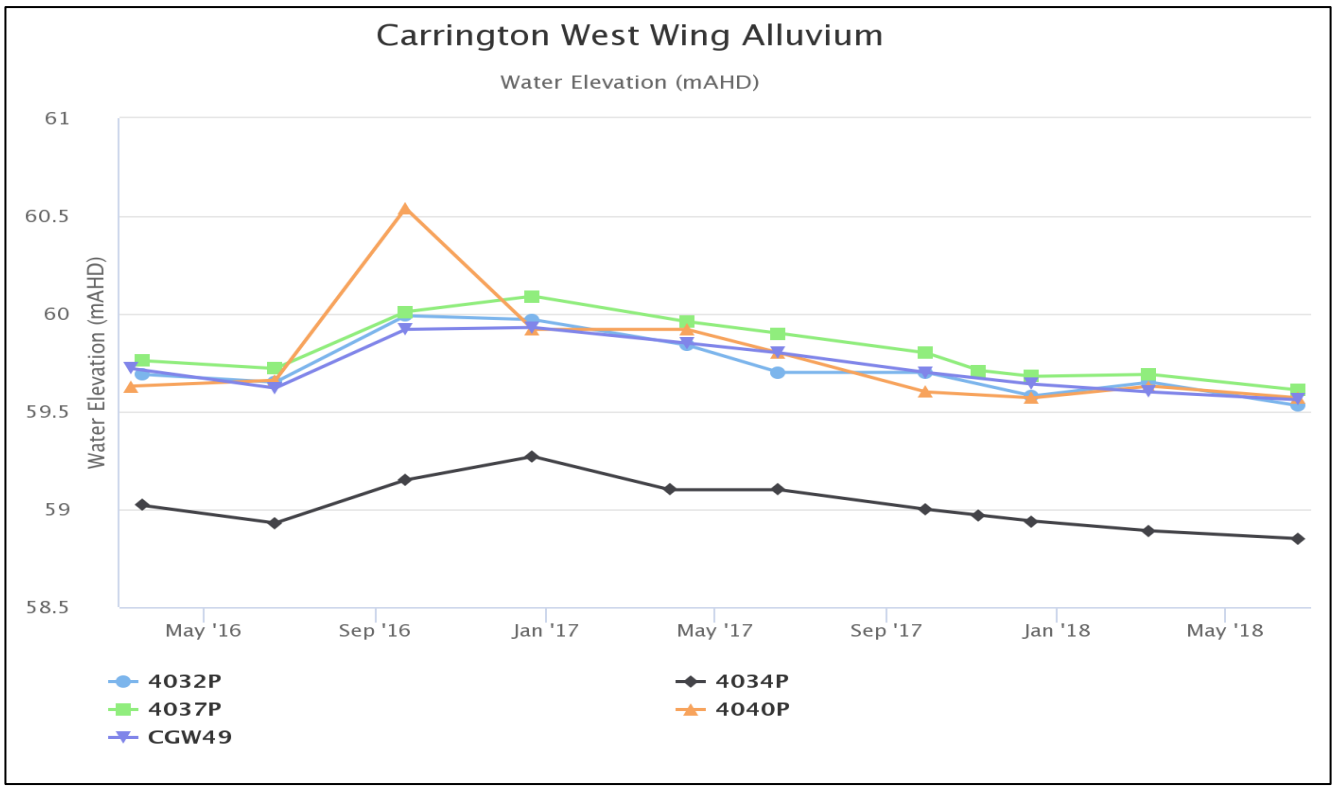


Figure 40: Carrington West Wing Alluvium Standing Water Level – June 2018

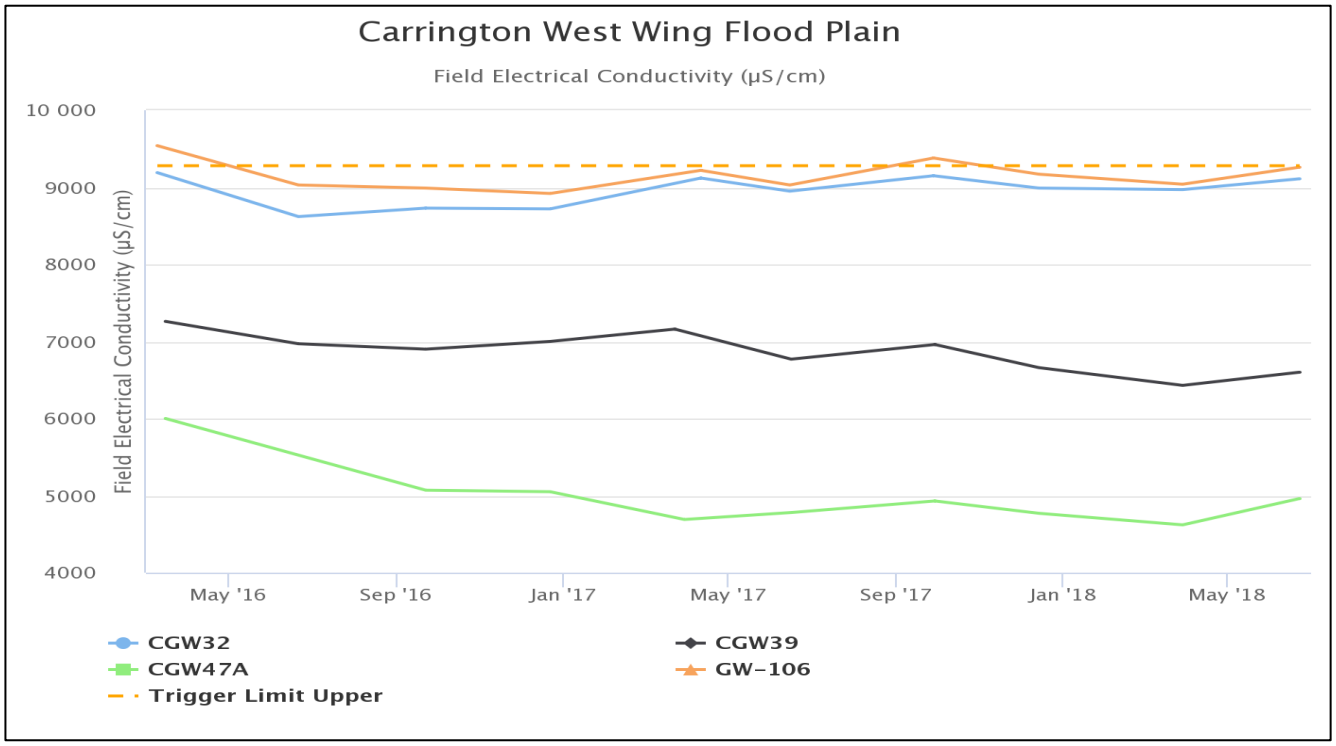


Figure 41: Carrington West Wing Flood Plain Electrical Conductivity Trend – June 2018

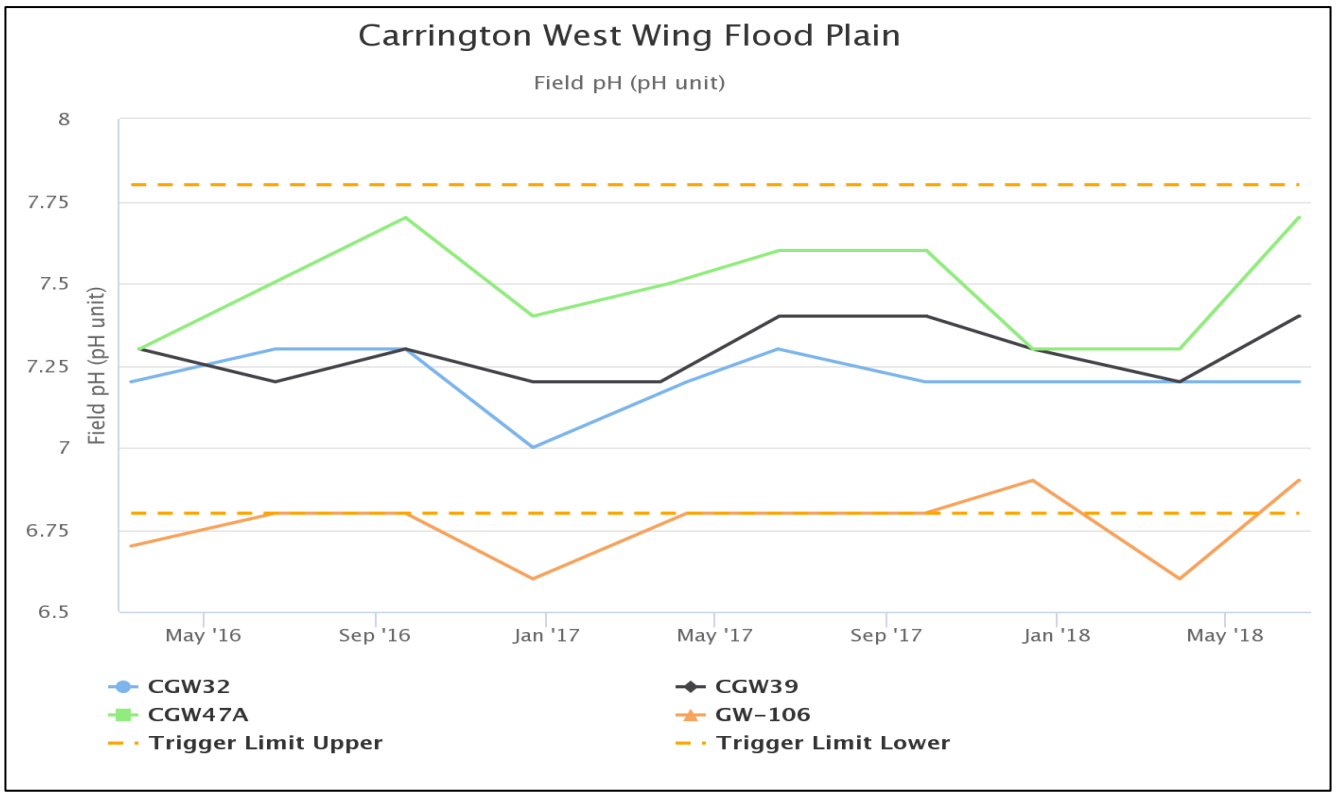


Figure 42: Carrington West Wing Flood Plain pH Trend – June 2018

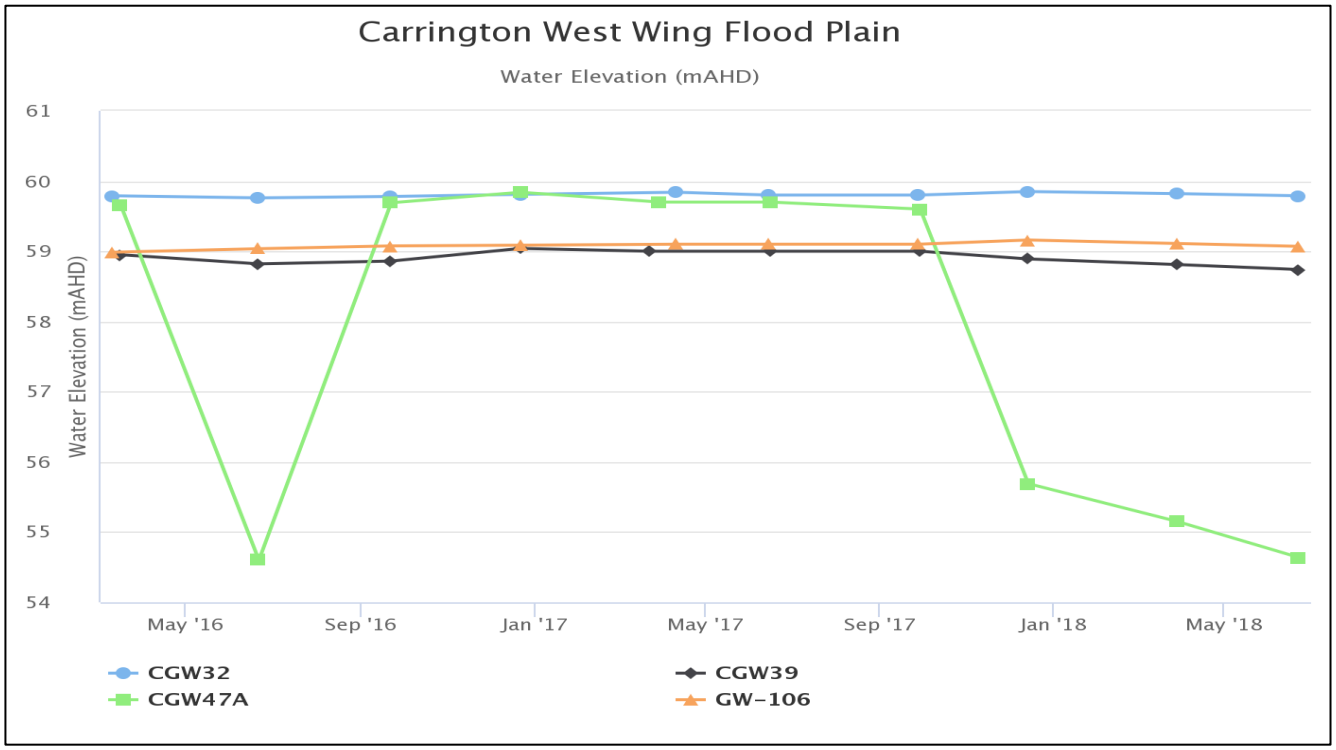


Figure 43: Carrington West Wing Flood Plain Standing Water Level – June 2018

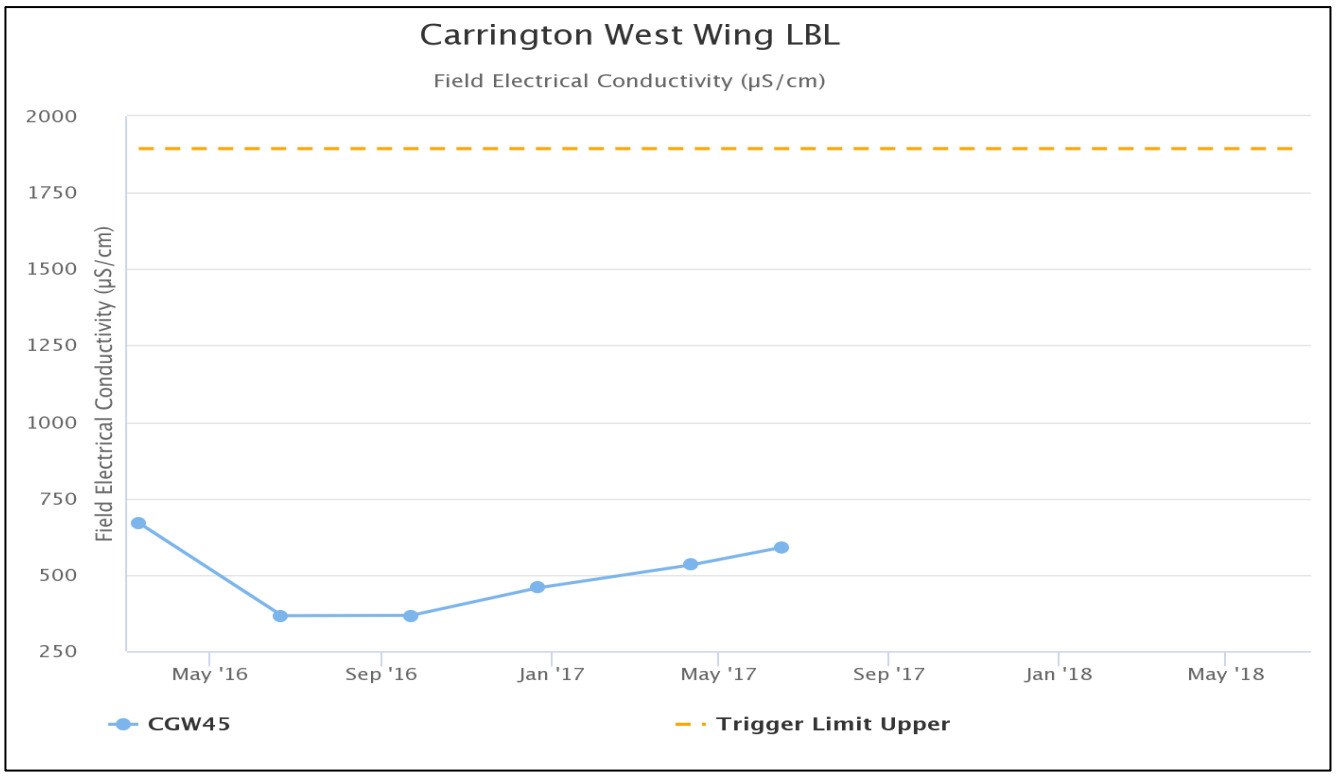


Figure 44: Carrington West Wing LBL Electrical Conductivity Trend – June 2018

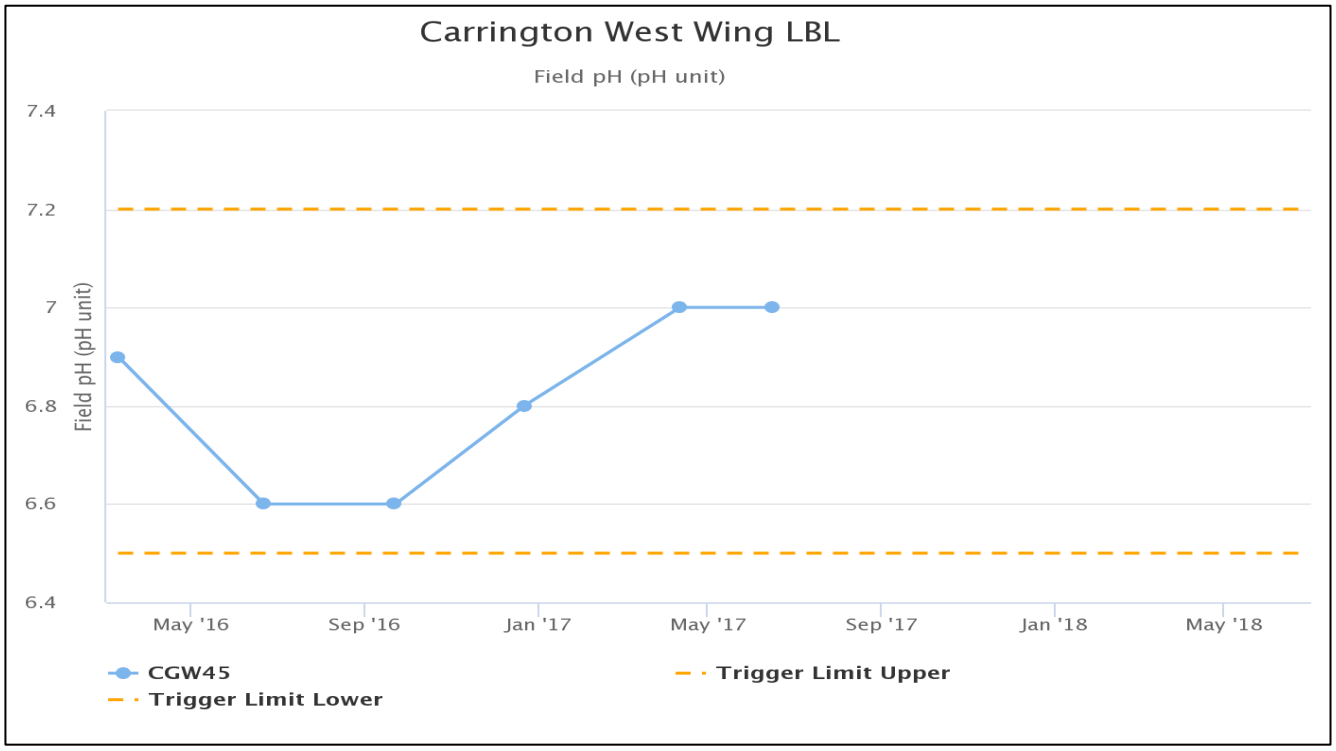


Figure 45: Carrington West Wing LBL pH Trend – June 2018

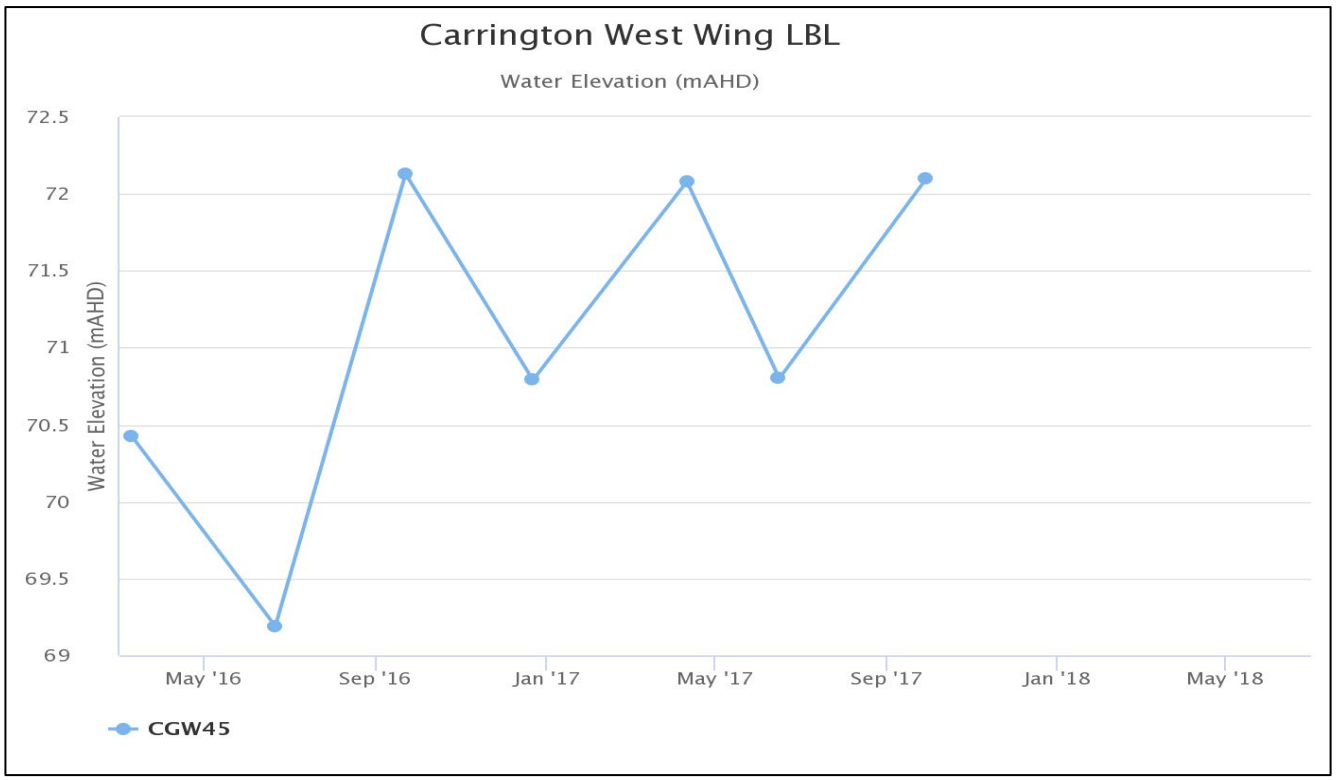


Figure 46: Carrington West Wing LBL Standing Water Level – June 2018

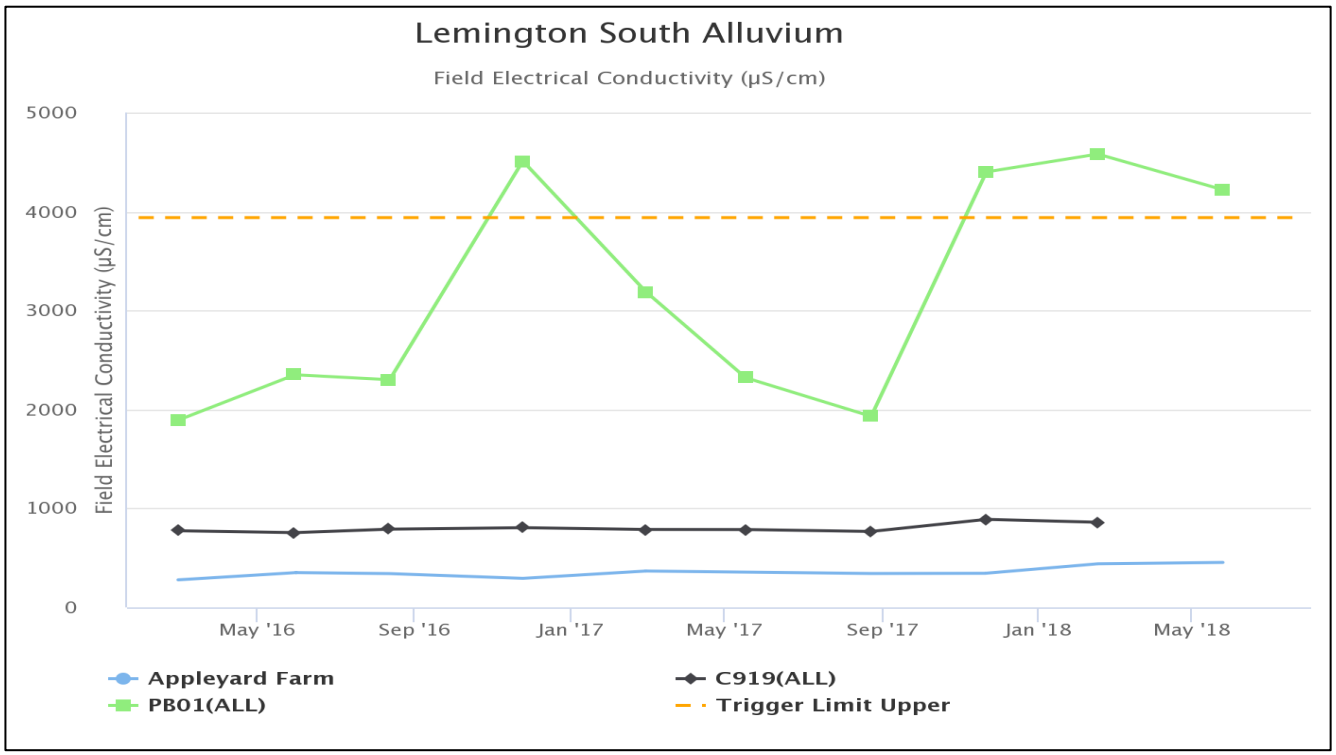


Figure 47: Lemington South Alluvium Electrical Conductivity Trend – June 2018

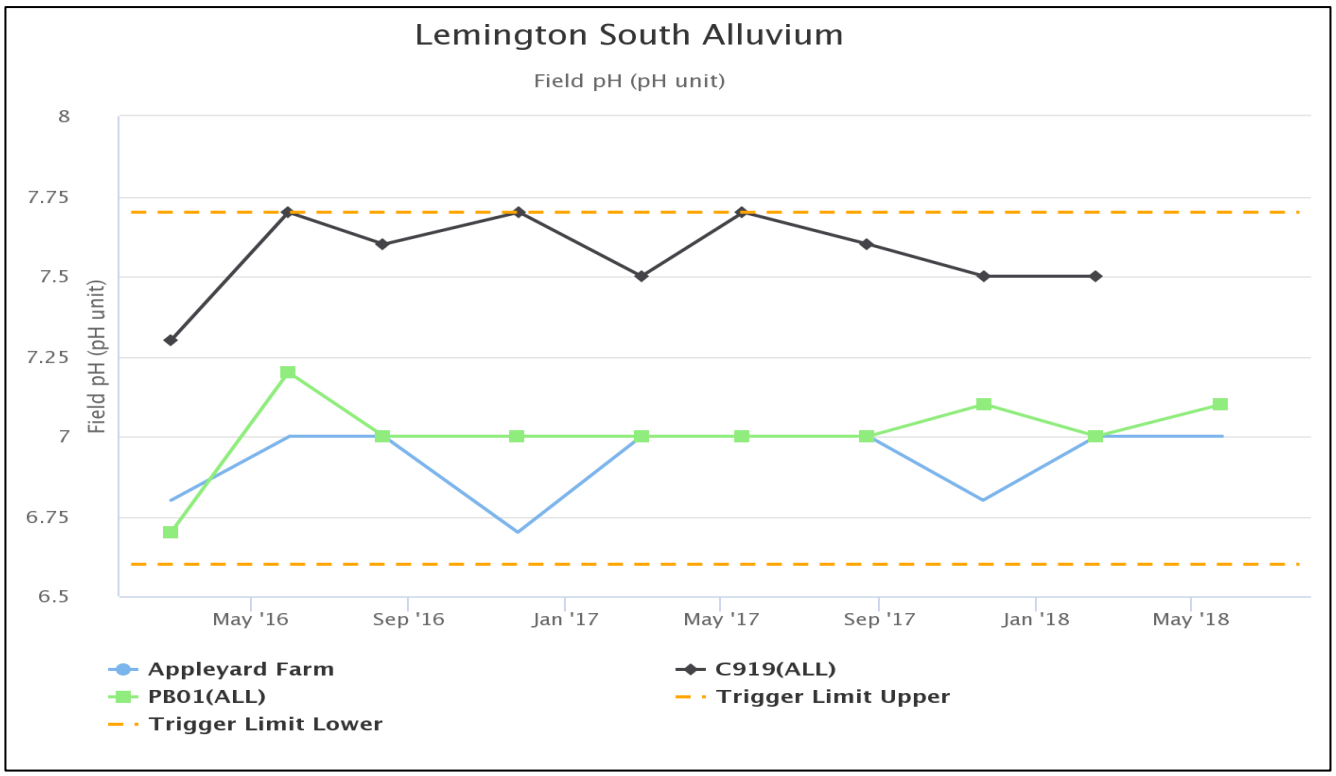


Figure 48: Lemington South Alluvium pH Trend – June 2018

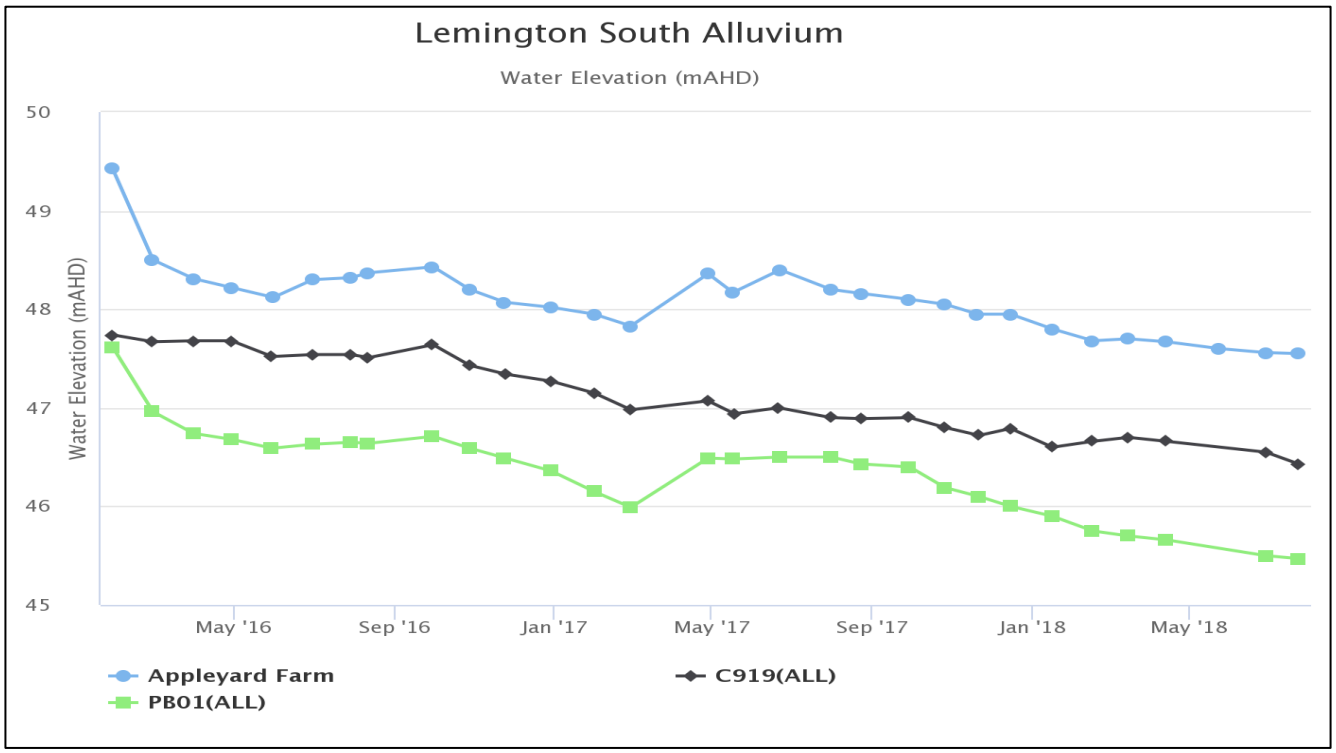


Figure 49: Lemington South Alluvium Standing Water Level Trend – June 2018

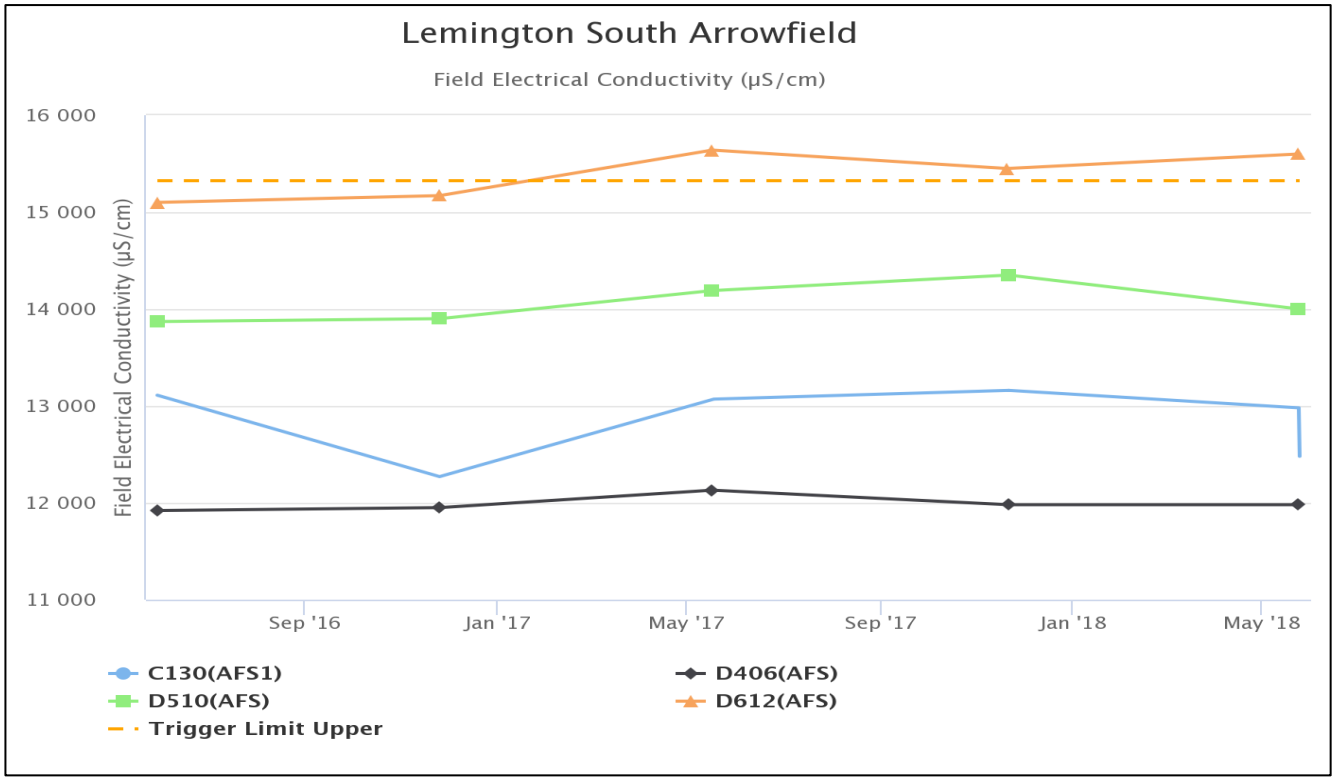


Figure 50: Lemington South Arrowfield Electrical Conductivity Trend – June 2018

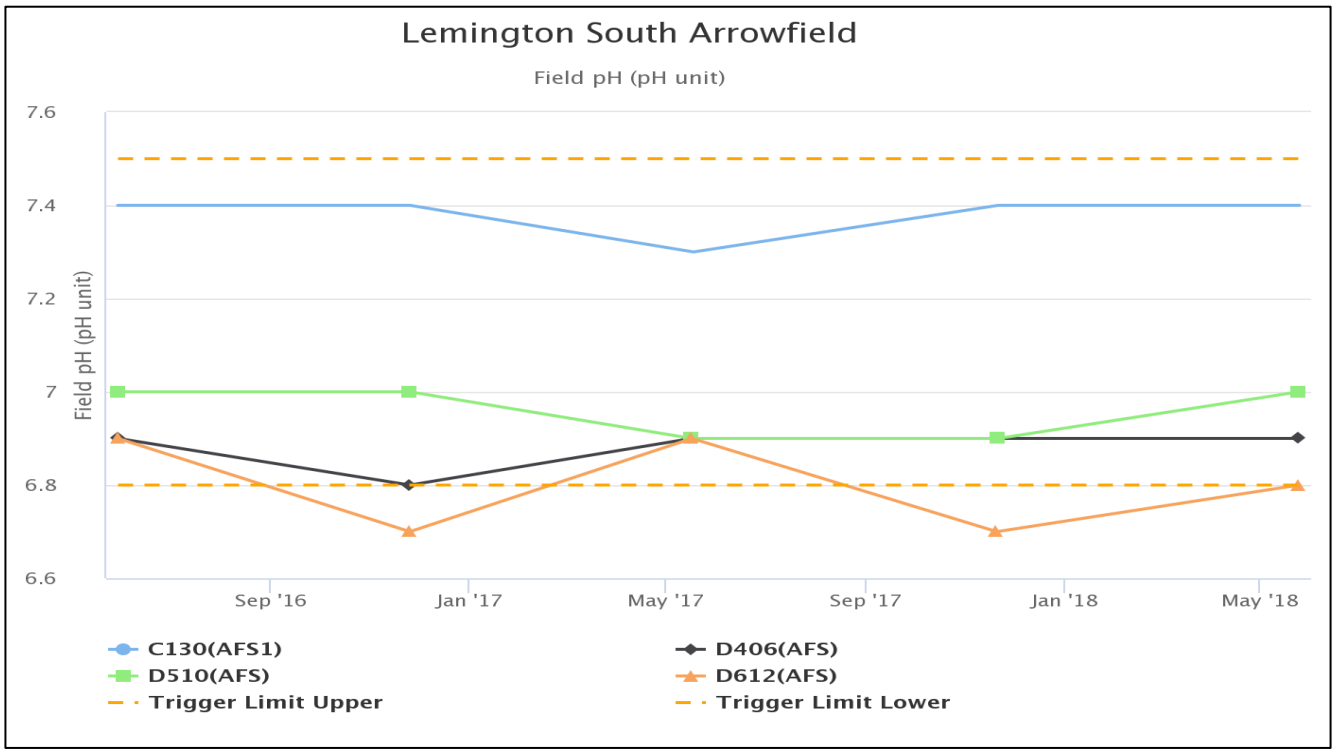


Figure 51: Lemington South Arrowfield pH Trend – June 2018

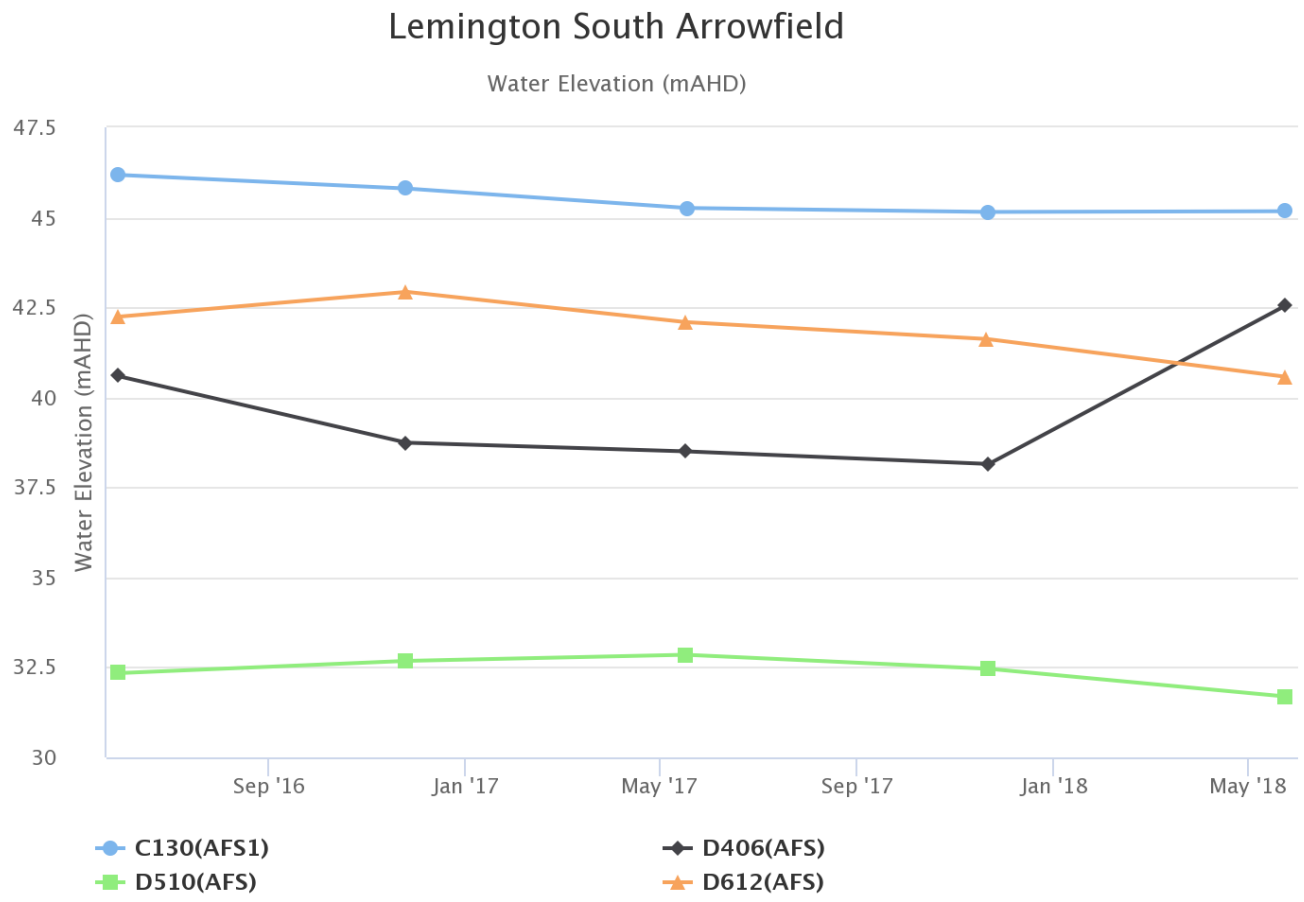


Figure 52: Lemington South Arrowfield Standing Water Level – June 2018

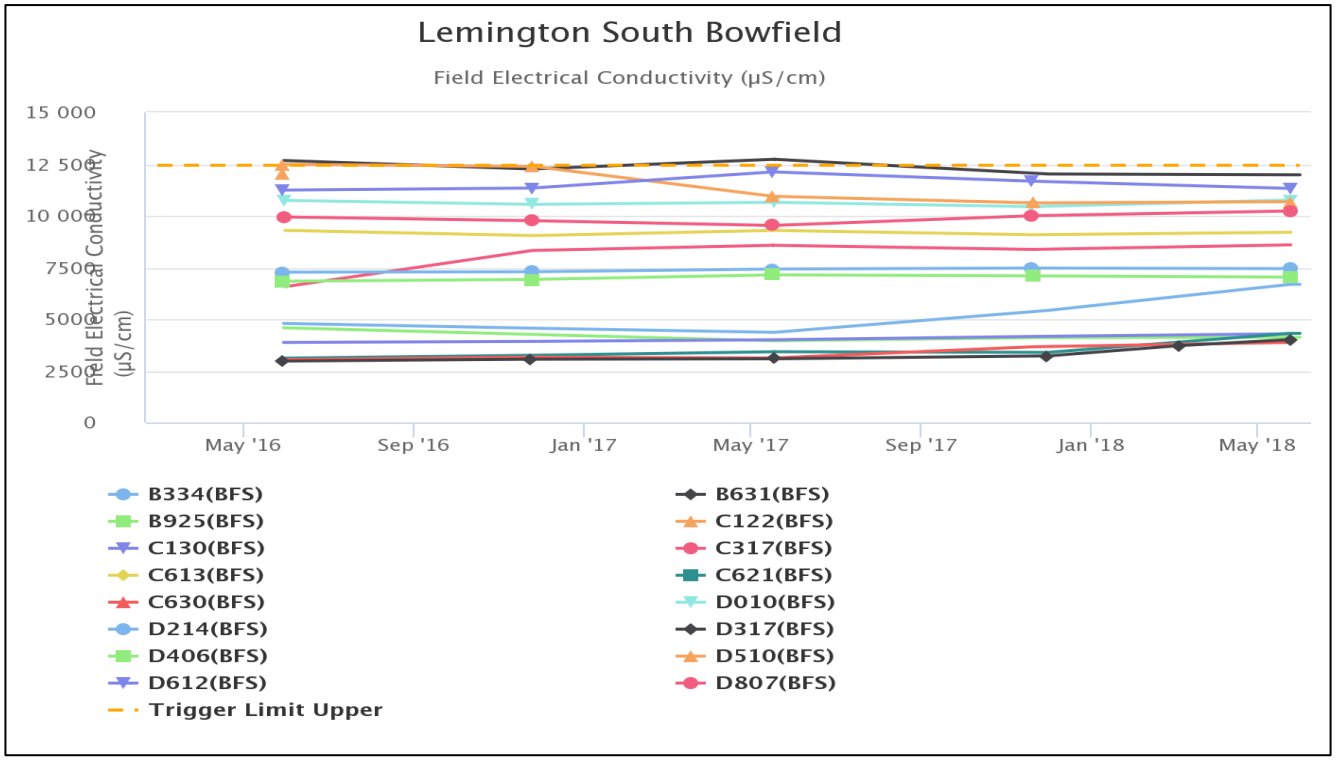


Figure 53: Lemington South Bowfield Electrical Conductivity Trend – June 2018

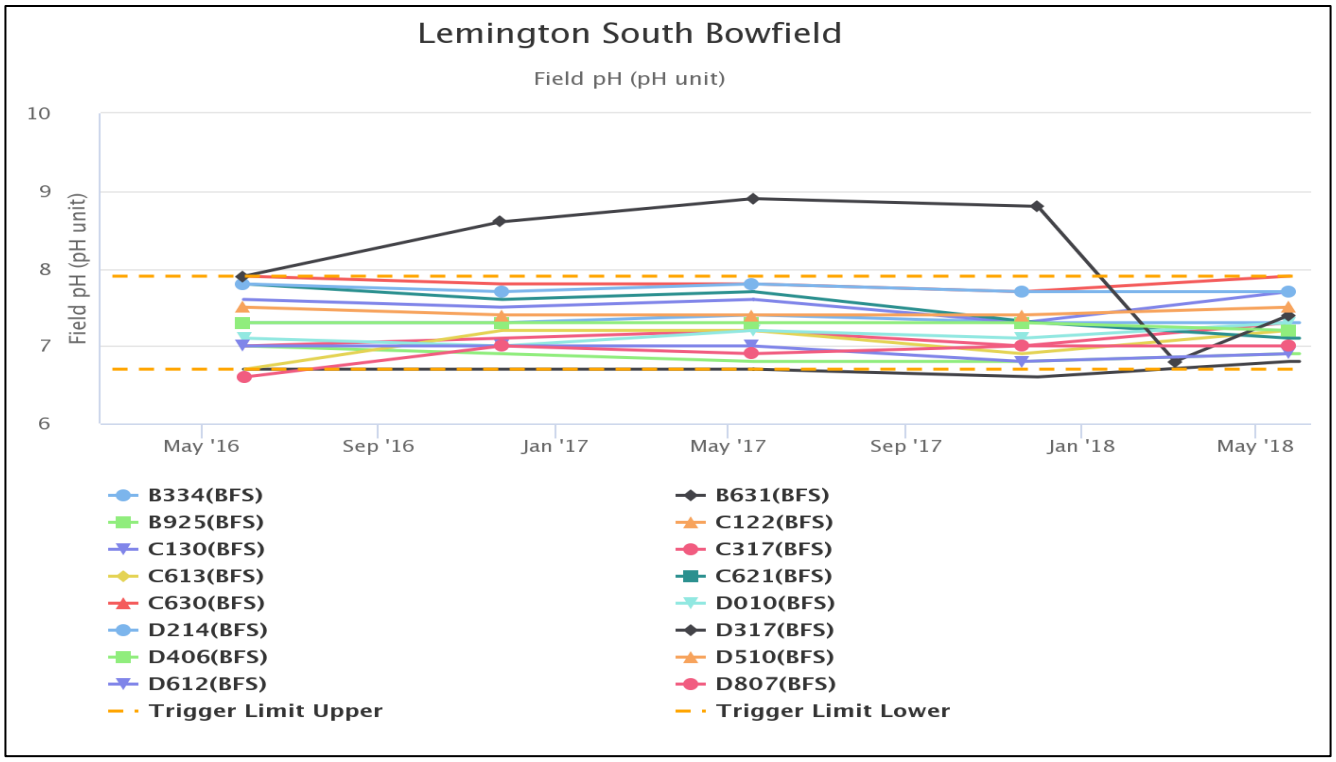


Figure 54: Lemington South Bowfield pH Trend – June 2018

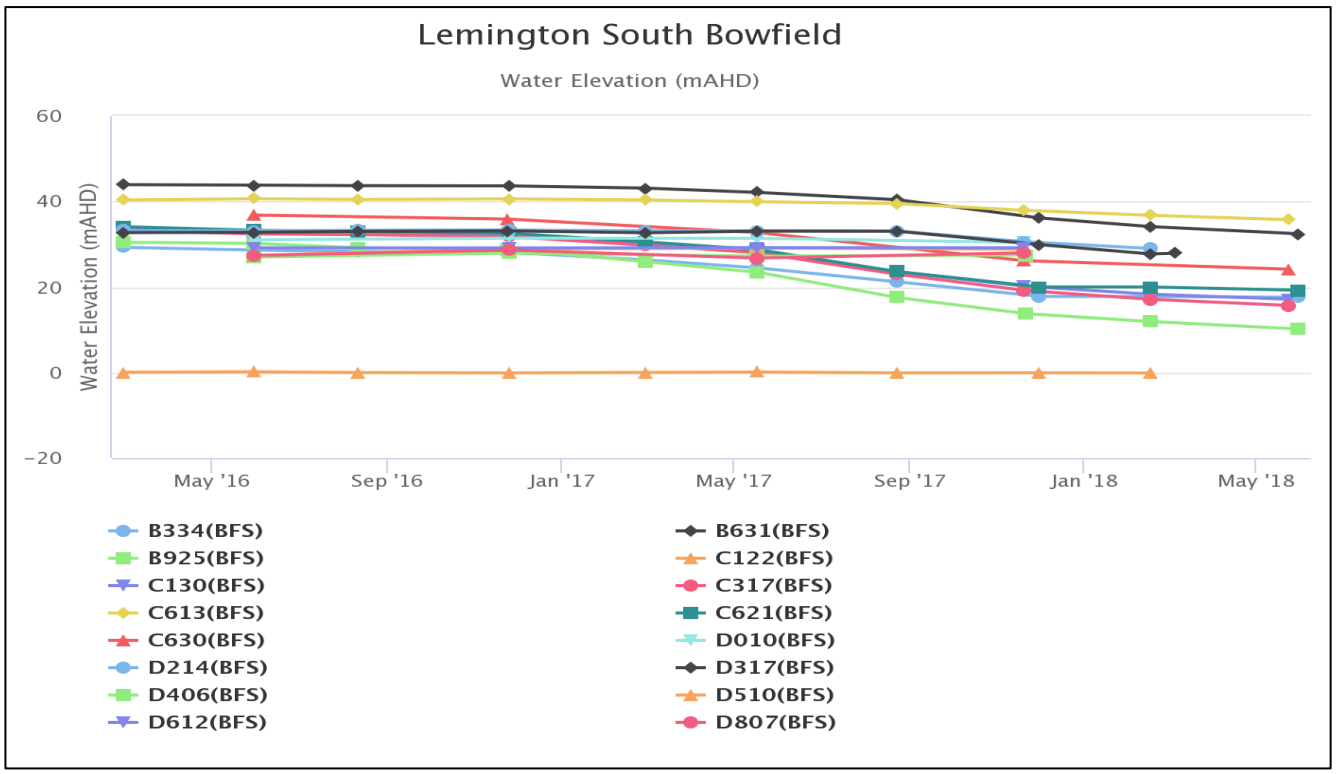


Figure 55: Lemington South Bowfield Standing Water Level – June 2018

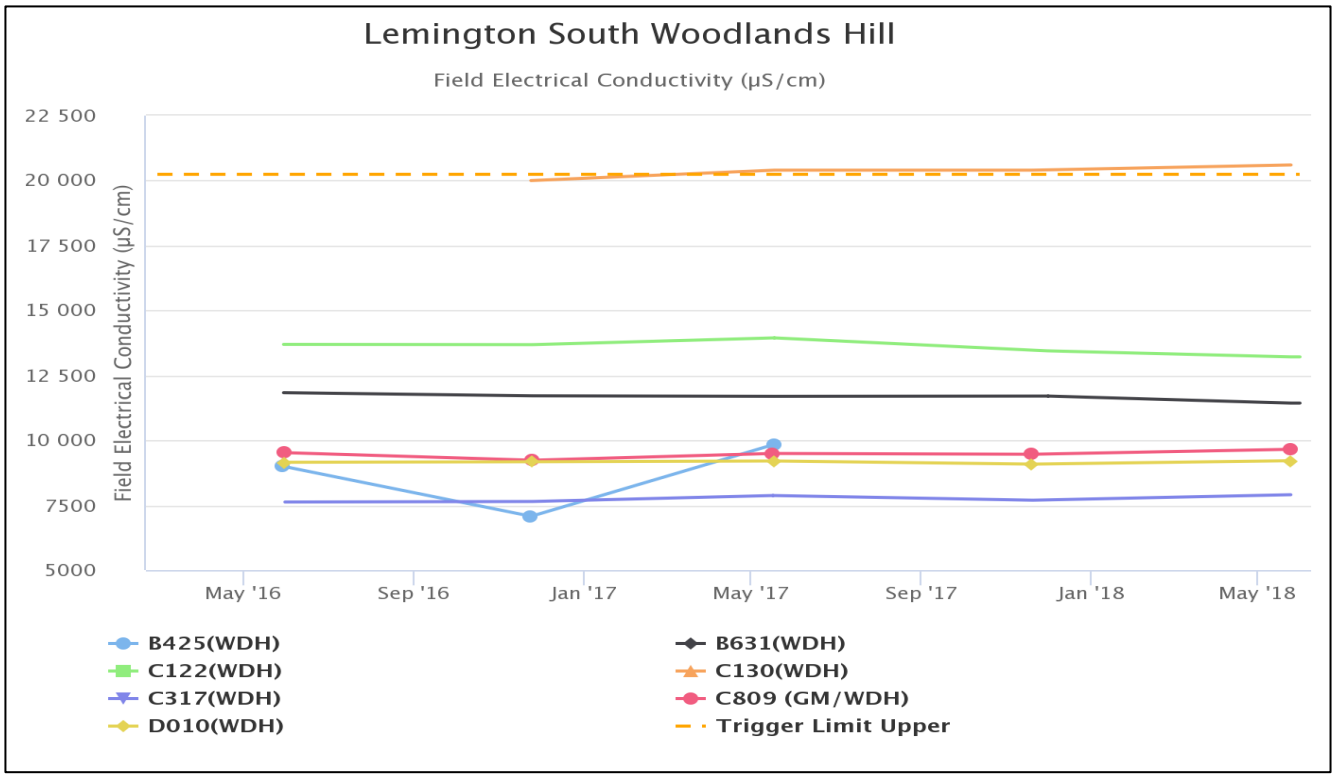


Figure 56: Lemington South Woodlands Hill Electrical Conductivity Trend – June 2018

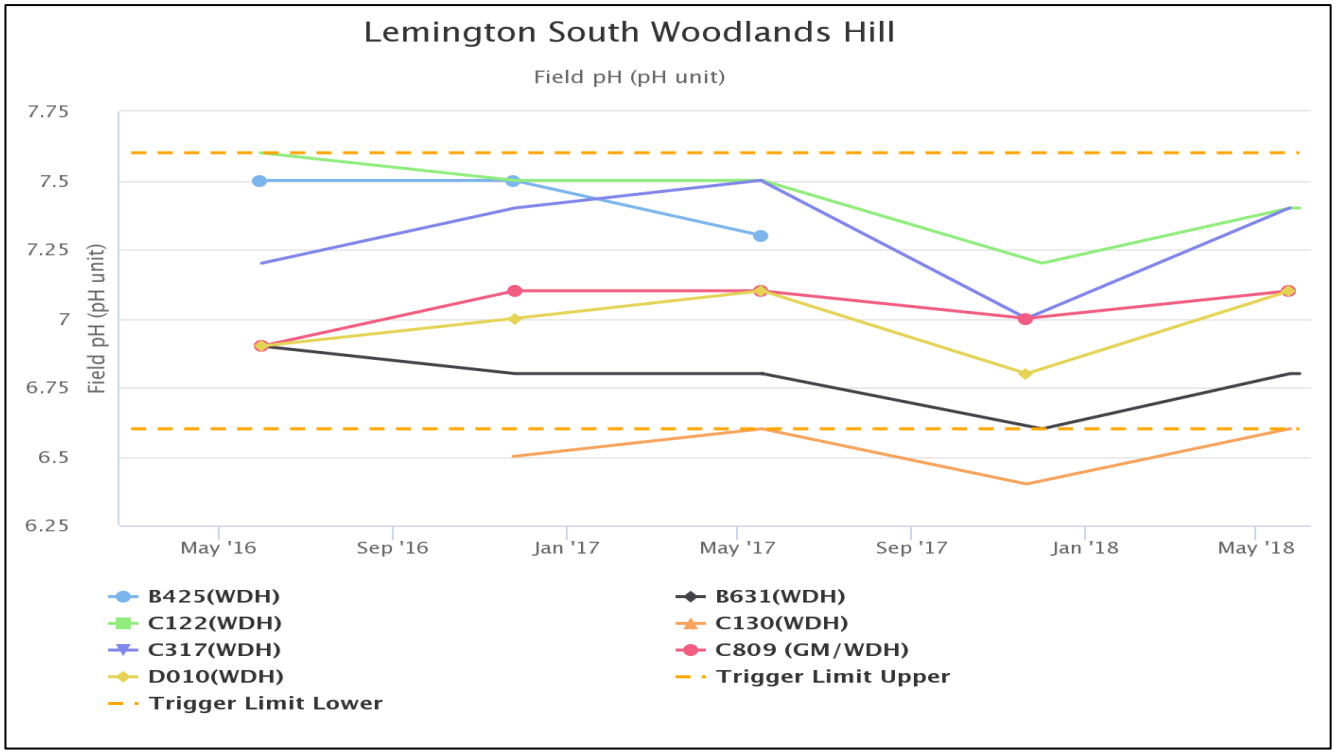


Figure 57: Lemington South Woodlands Hill pH Trend – June 2018

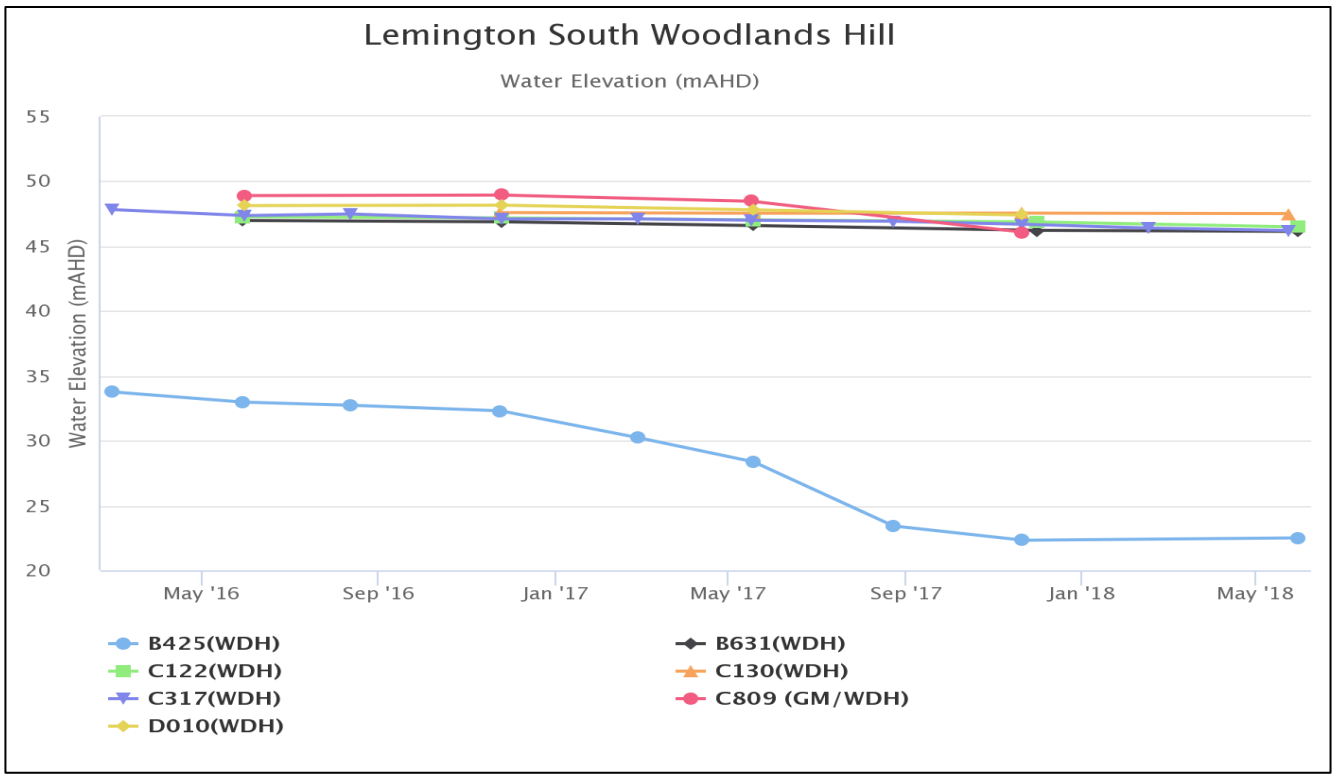


Figure 58: Lemington South Woodlands Hill Standing Water Level – June 2018

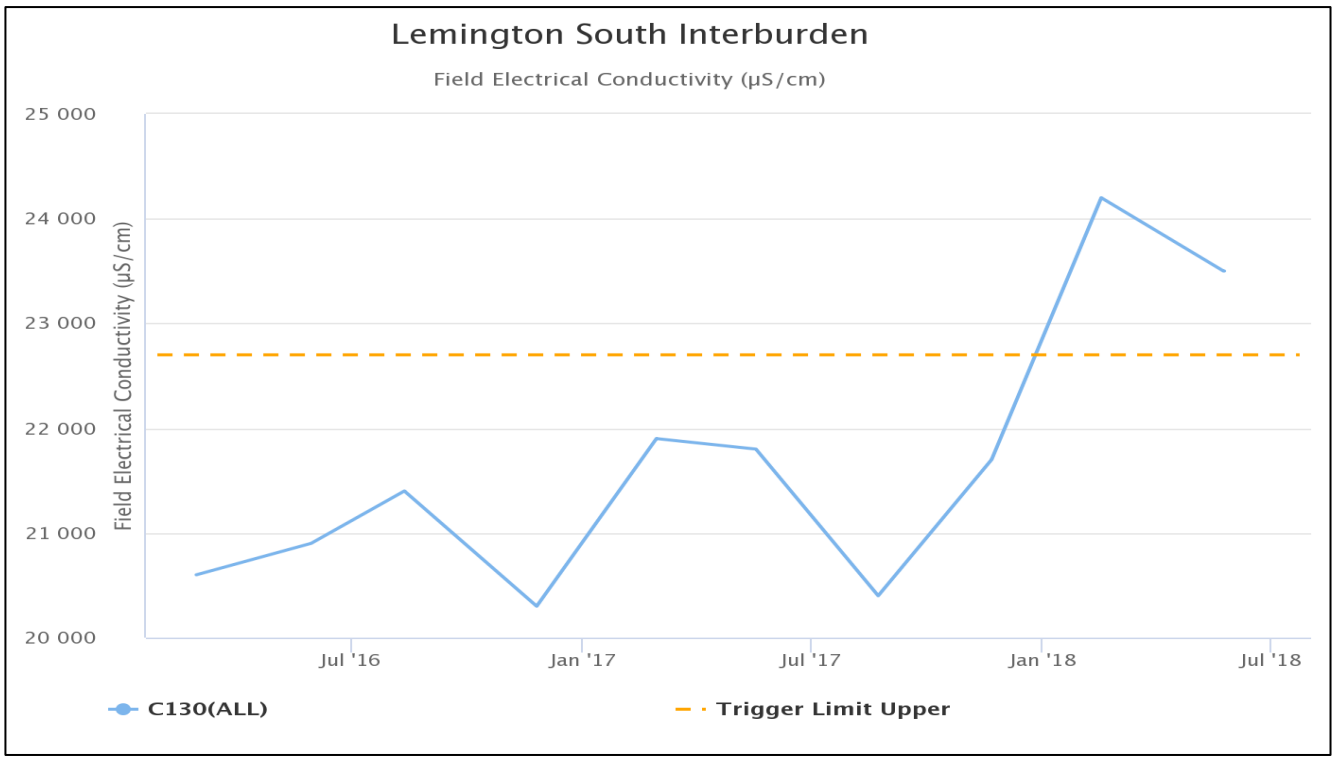


Figure 59: Lemington South Interburden Electrical Conductivity Trend – June 2018

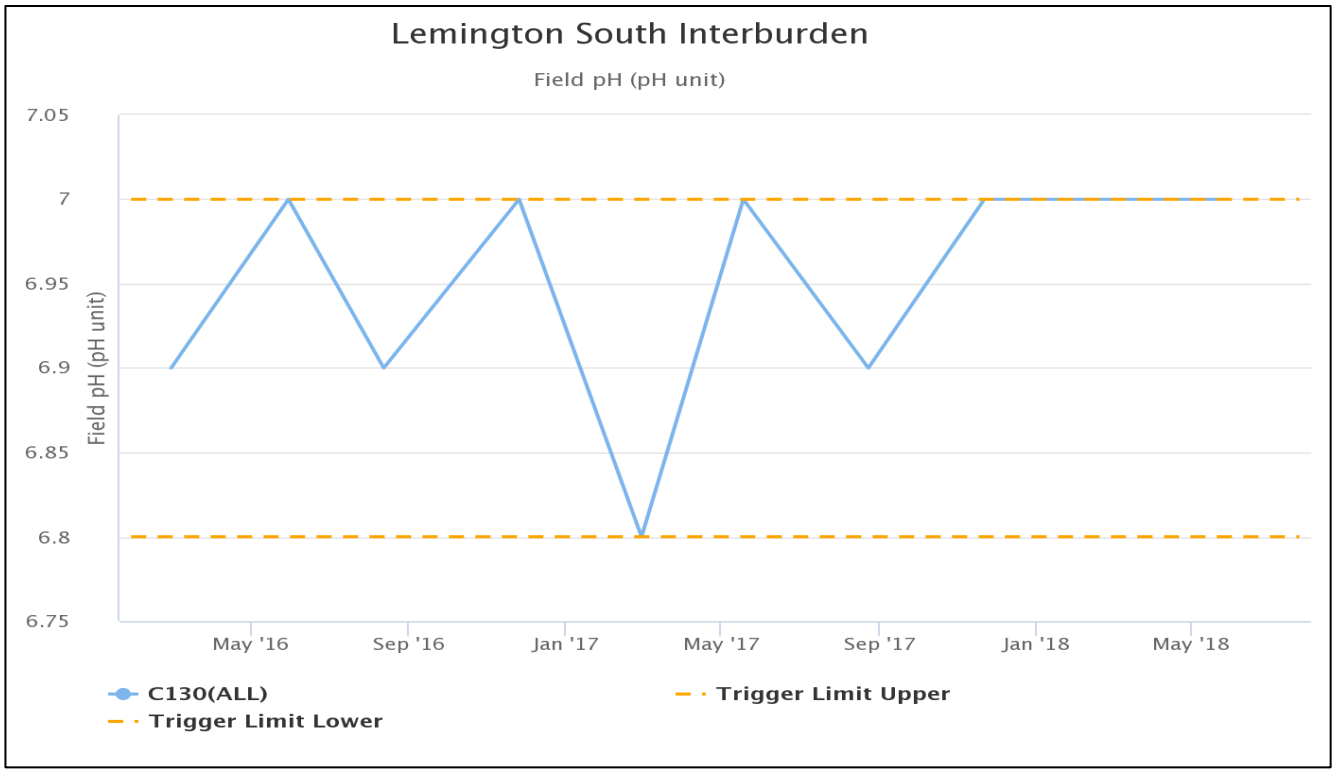


Figure 60: Lemington South Interburden pH Trend – June 2018

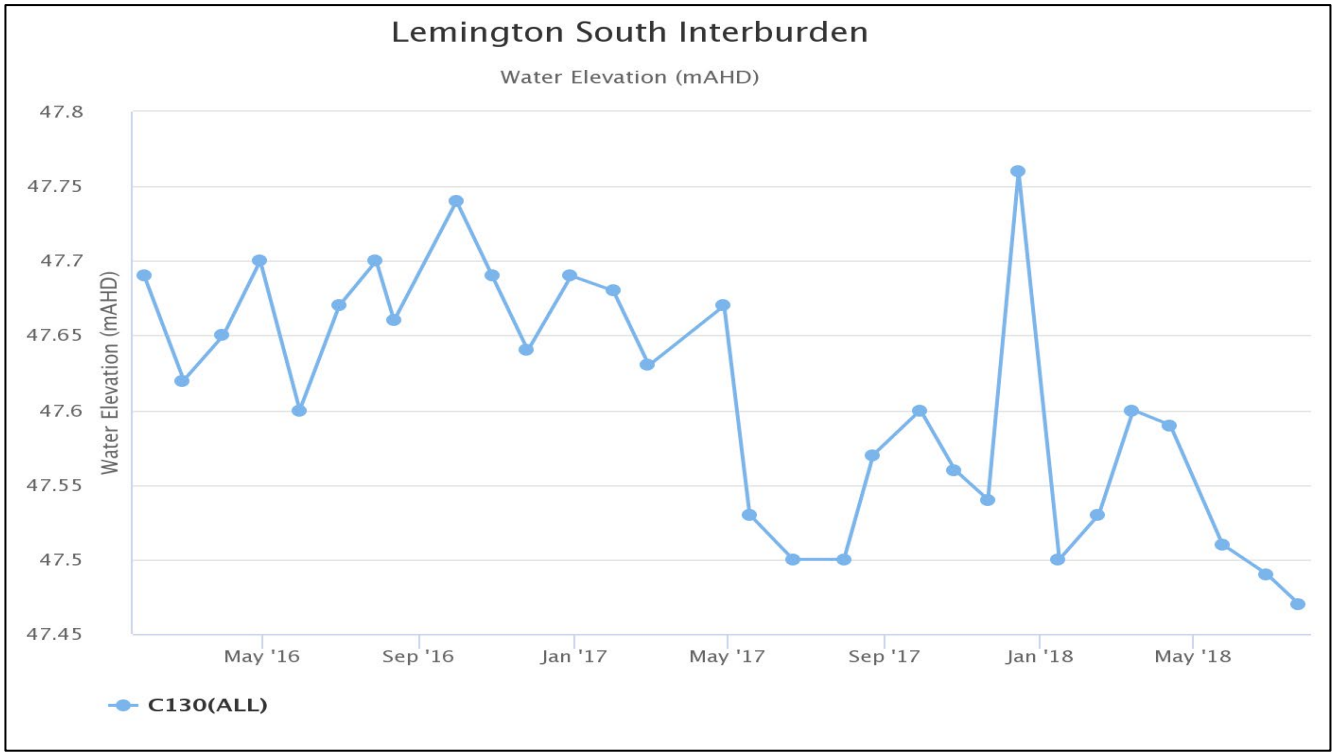


Figure 61: Lemington South Interburden Standing Water Level – June 2018

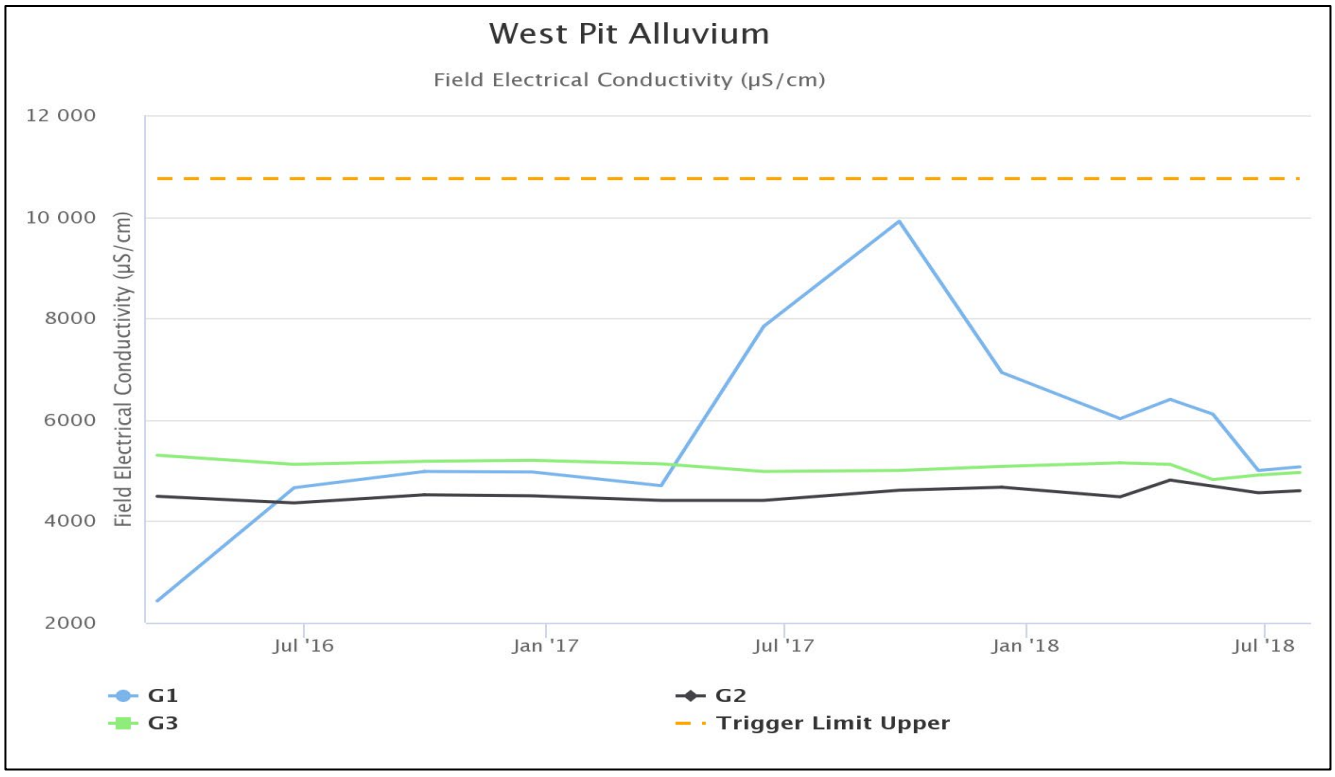


Figure 62: West Pit Alluvium Electrical Conductivity Trend – June 2018

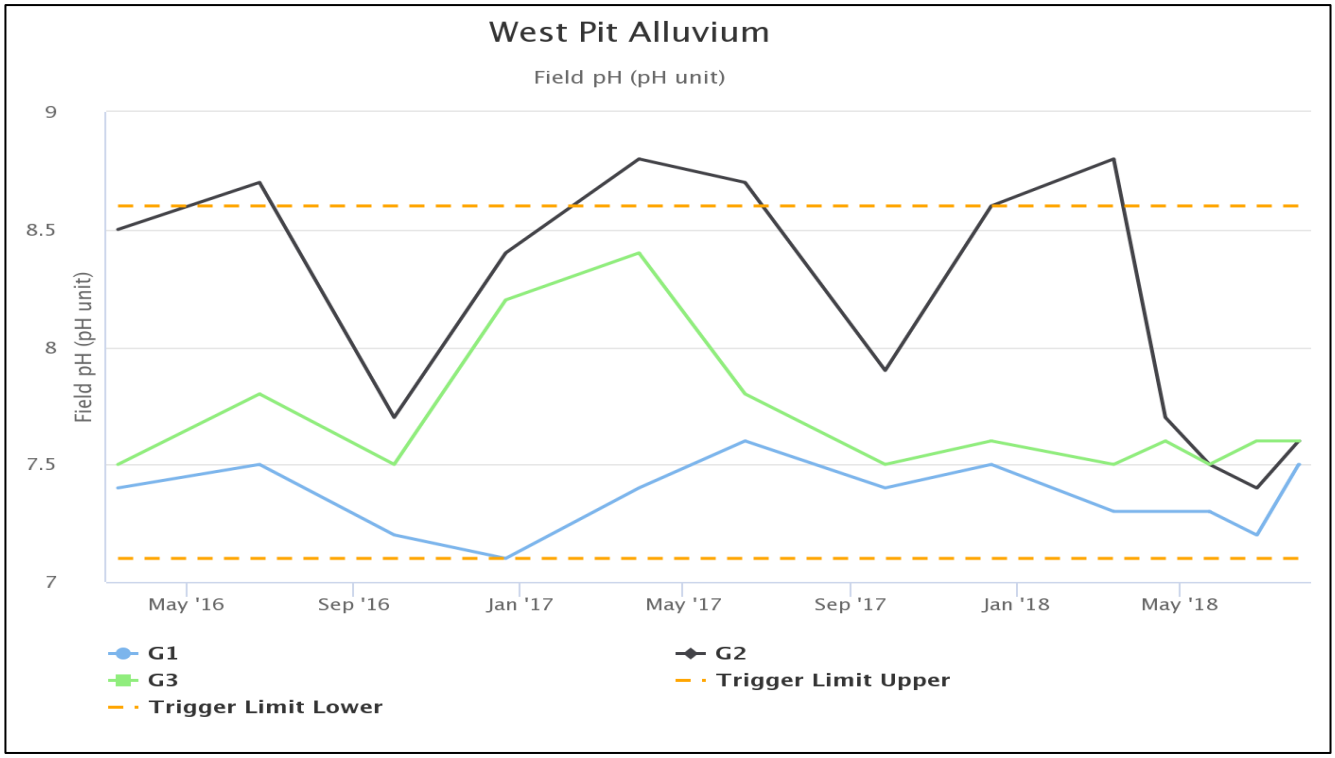


Figure 63: West Pit Alluvium pH Trend – June 2018

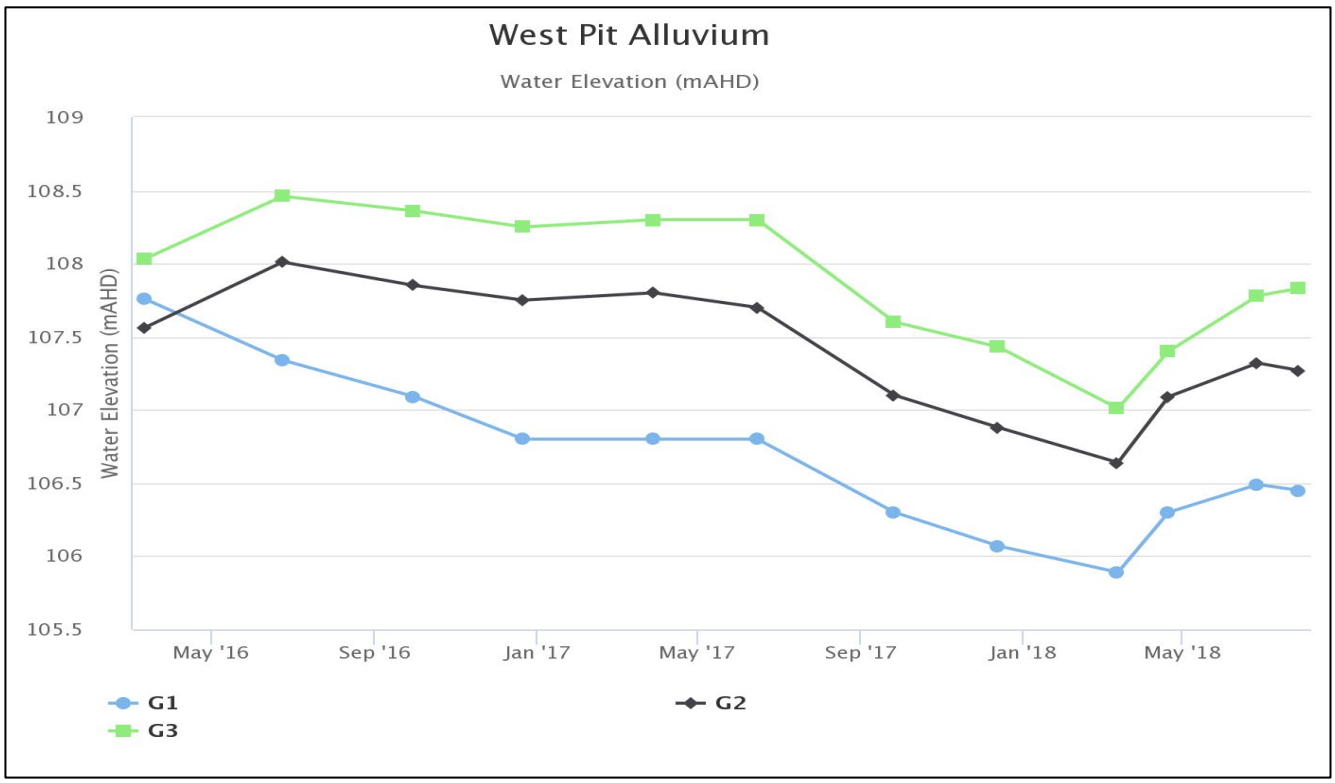


Figure 64: West Pit Alluvium Standing Water Level – June 2018

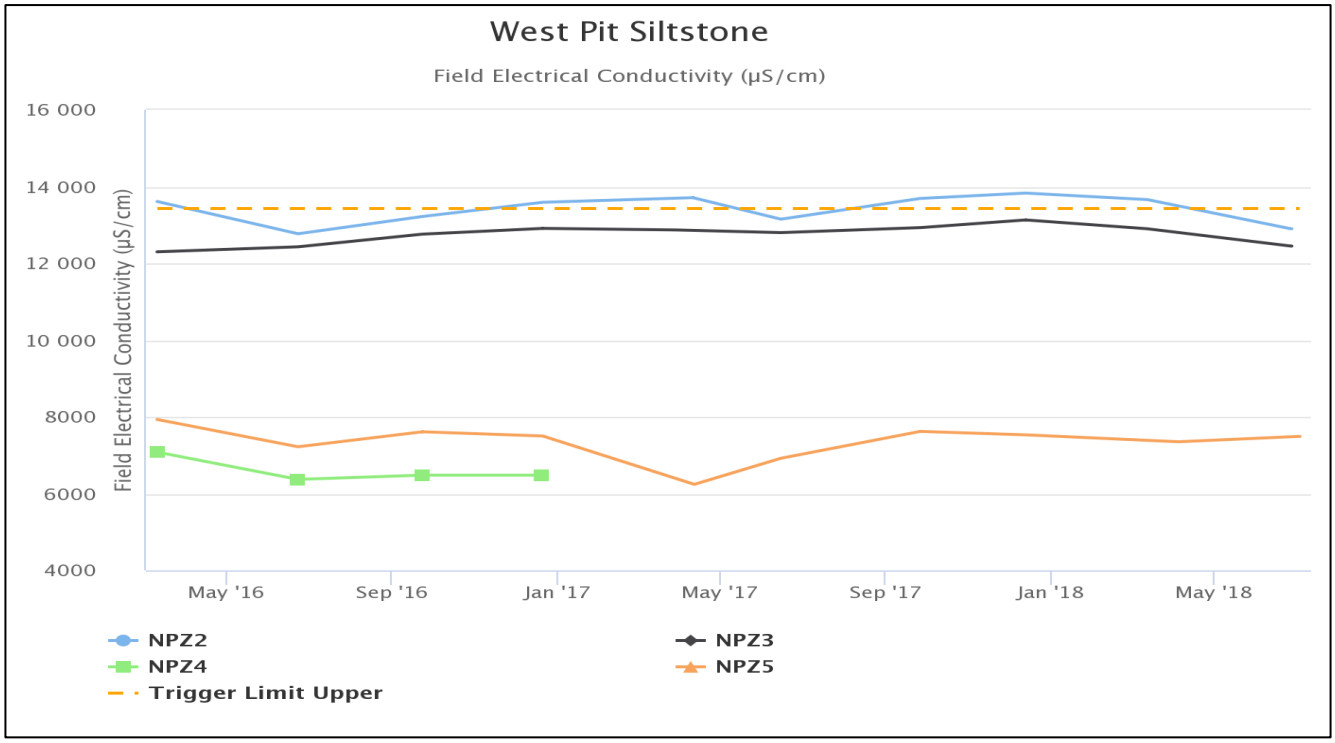


Figure 65: West Pit Siltstone Electrical Conductivity Trend – June 2018

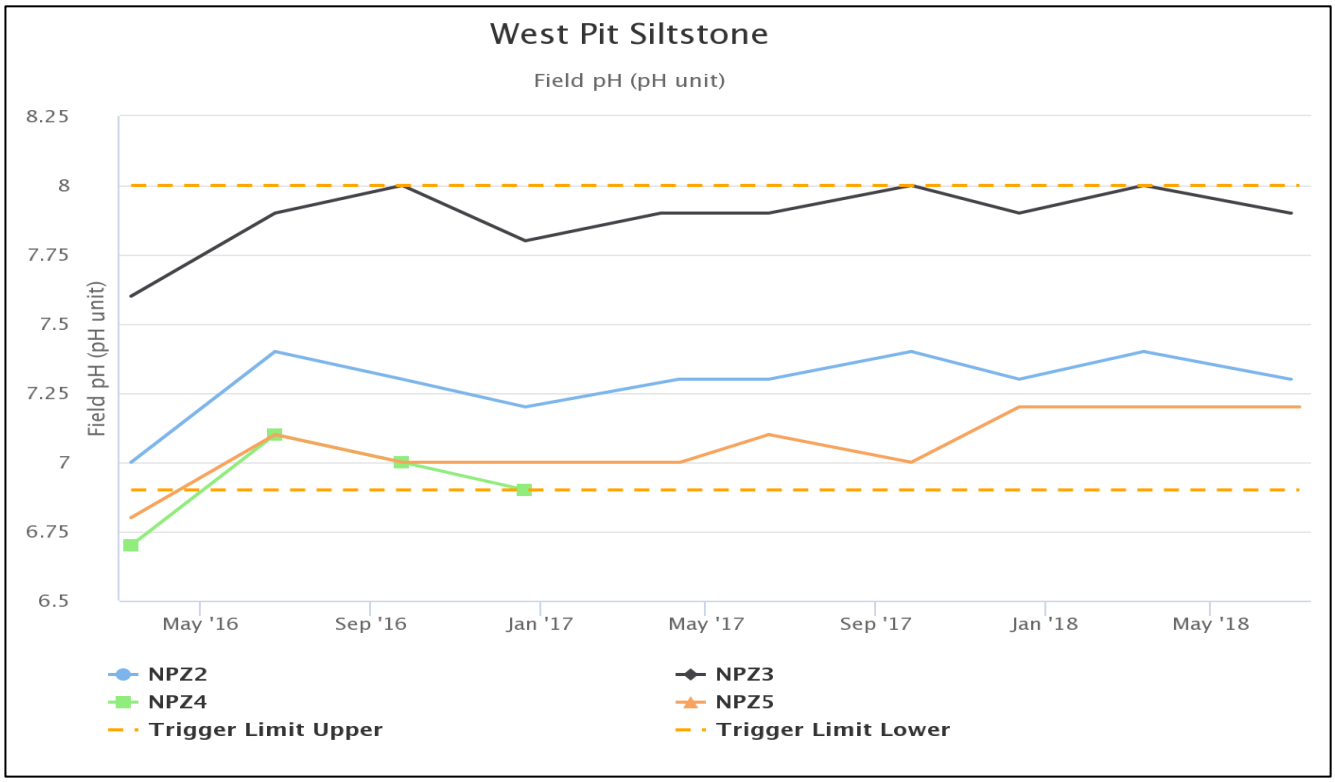


Figure 66: West Pit Siltstone pH Trend – June 2018

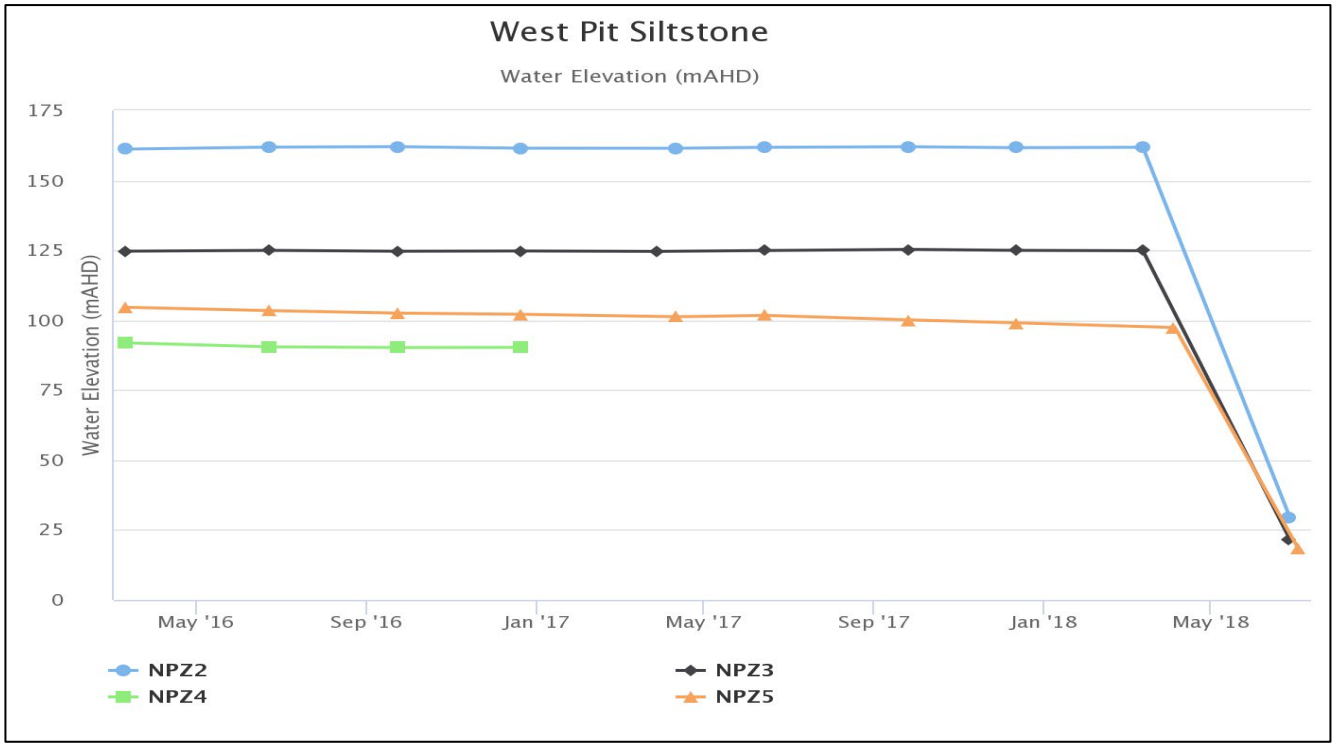


Figure 67: West Pit Siltstone Standing Water Level – June 2018

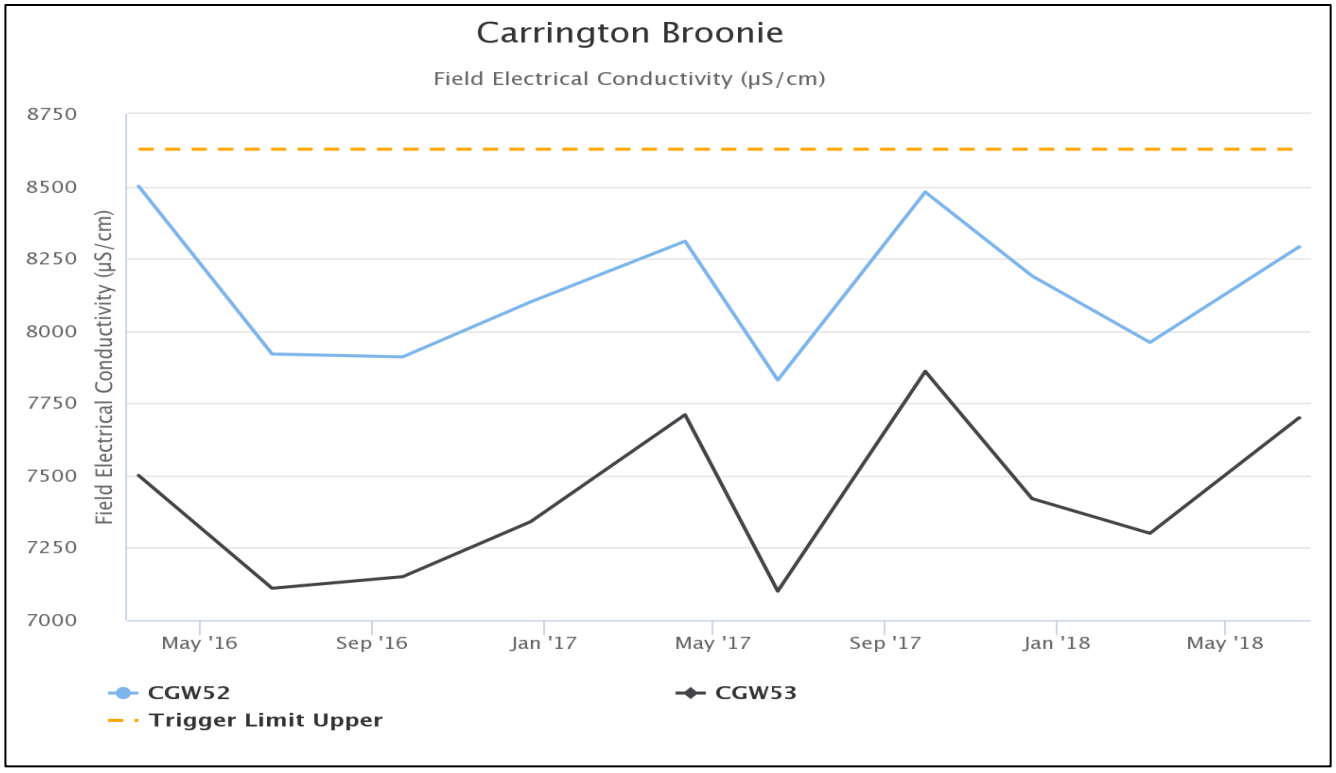


Figure 68: Carrington Broonie Electrical Conductivity Trend – June 2018

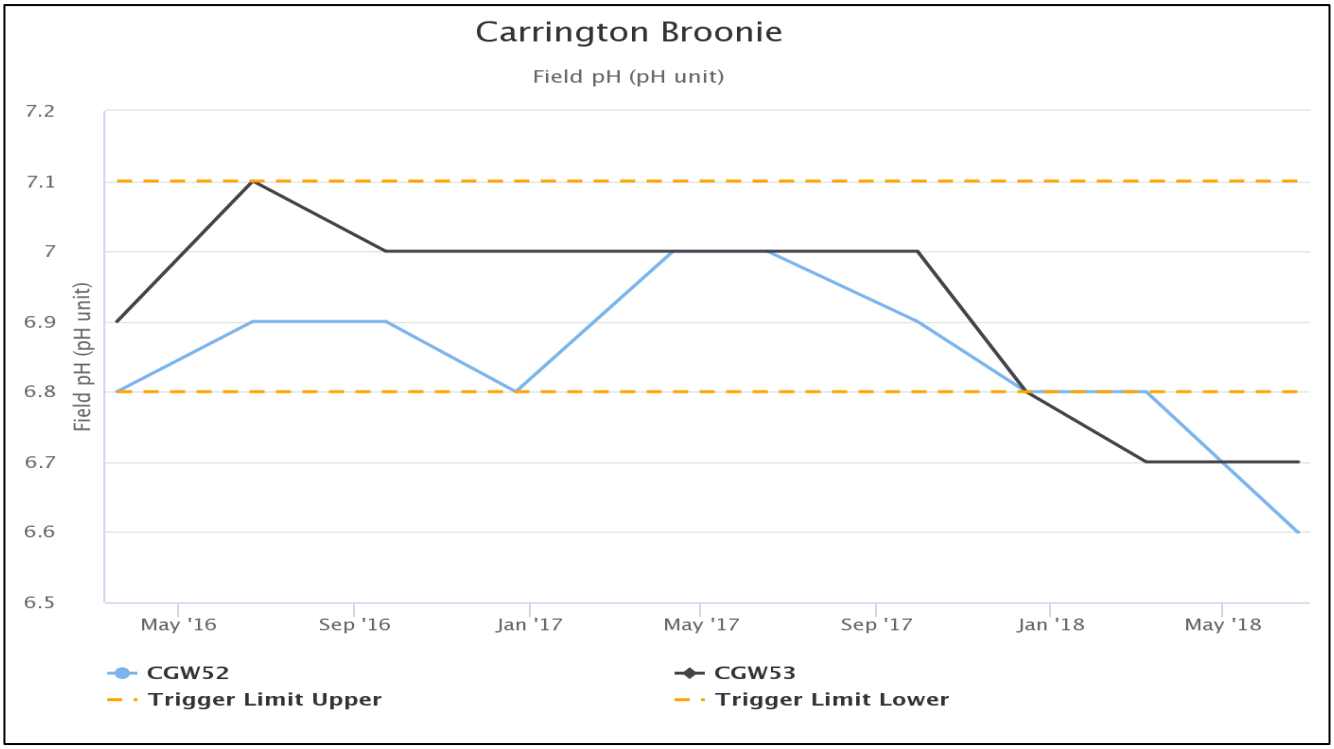


Figure 69: Carrington Broonie pH Trend – June 2018

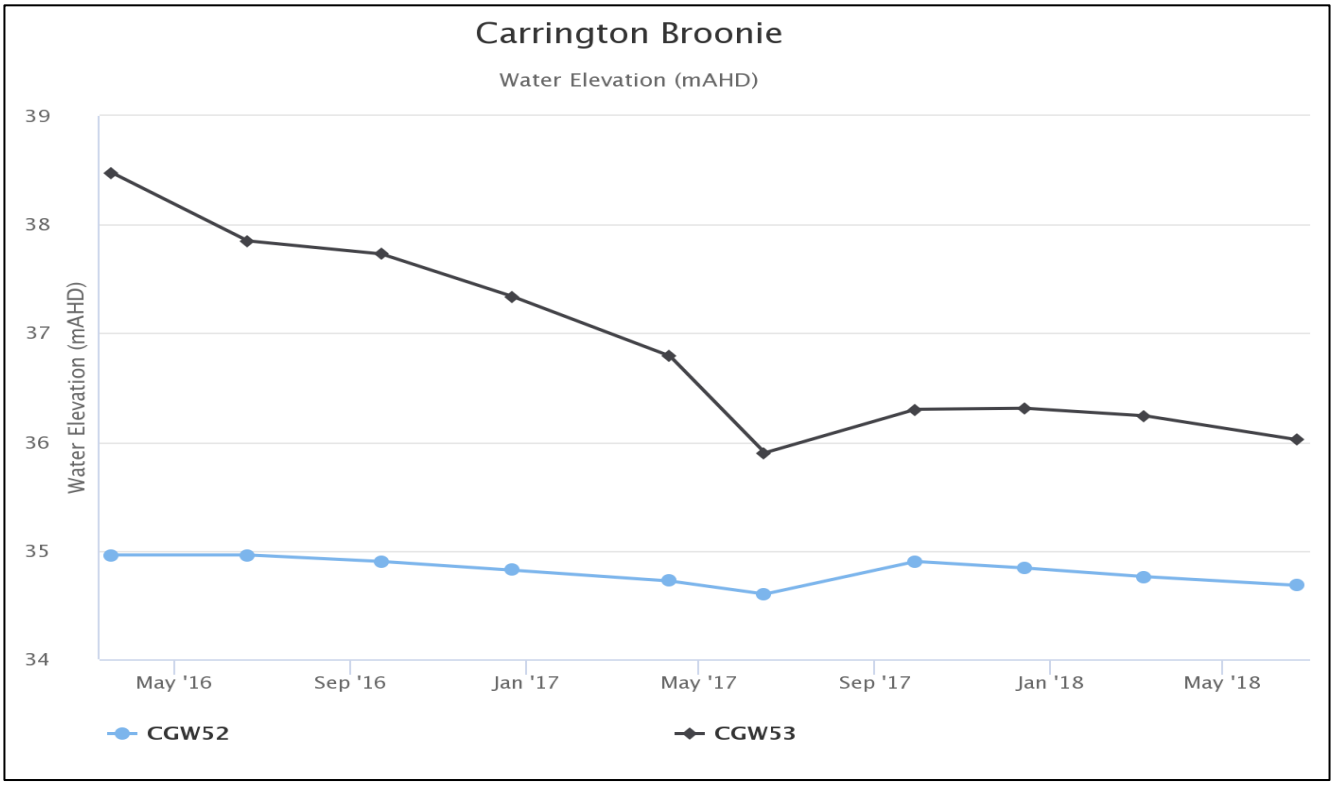


Figure 70: Carrington Broonie Standing Water Level – June 2018

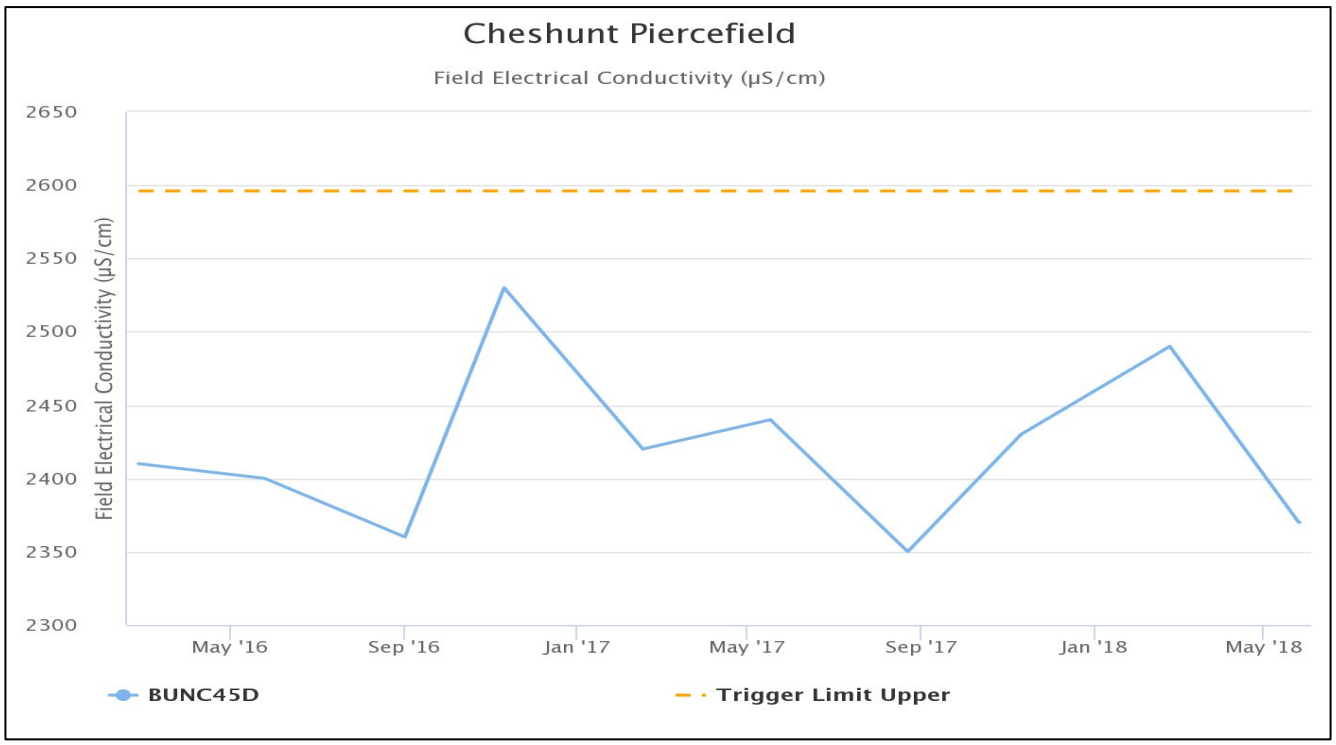


Figure 71: Cheshunt Piercefield Electrical Conductivity Trend – June 2018

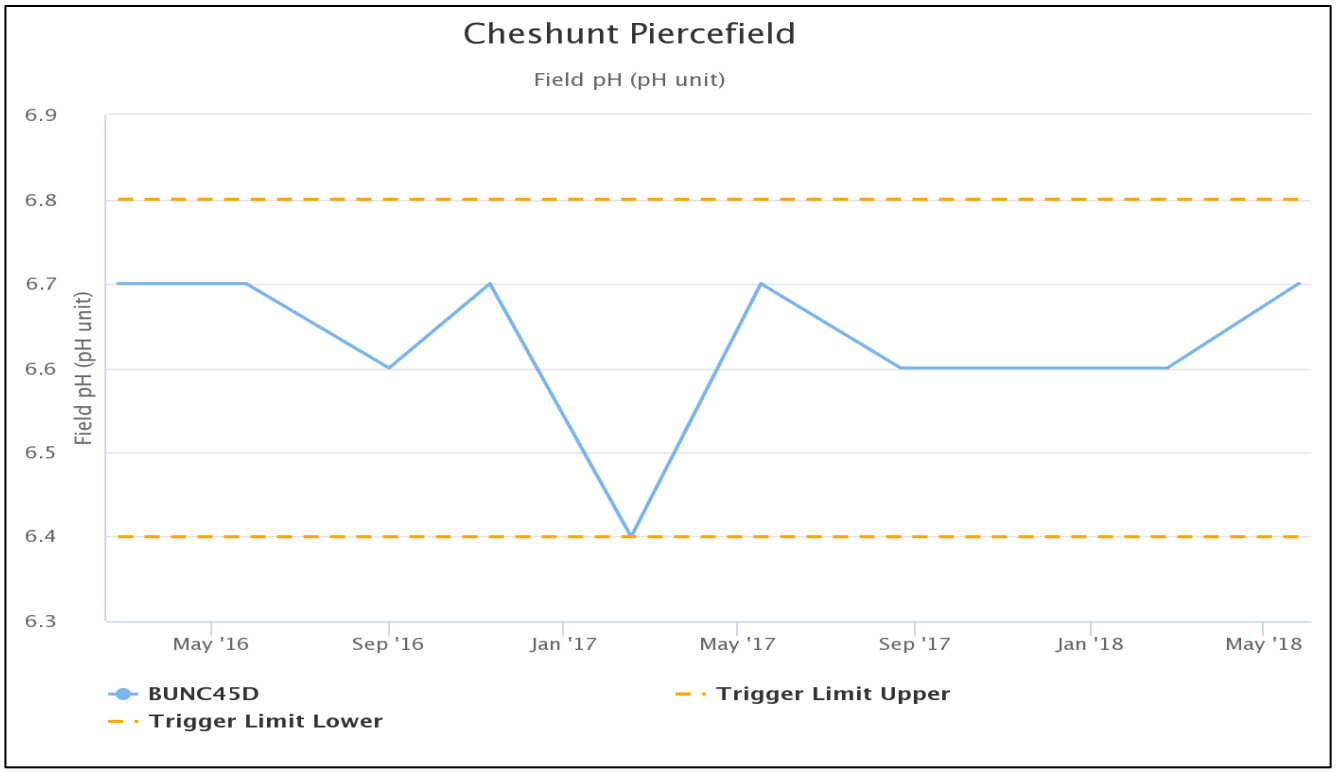


Figure 72: Cheshunt Piercefield pH Trend – June 2018

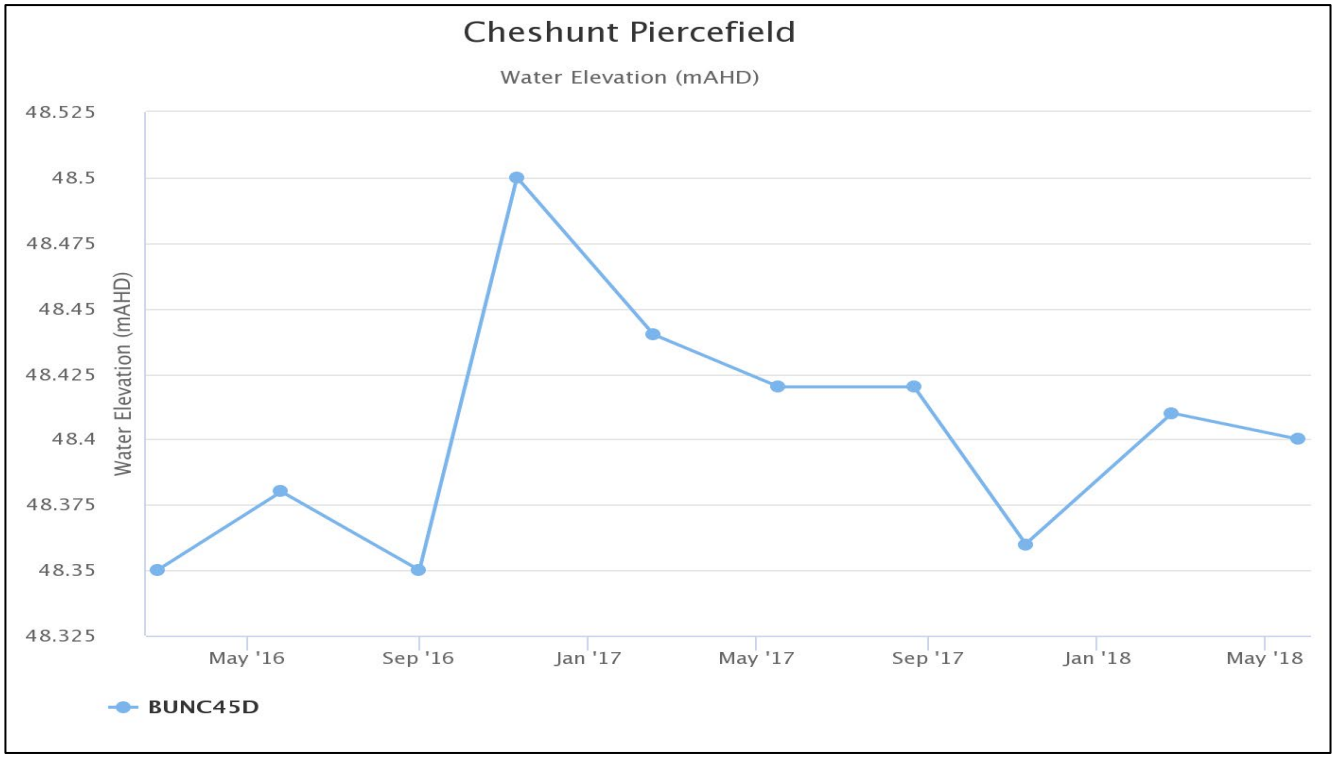


Figure 73: Cheshunt Piercefield Standing Water Level – June 2018

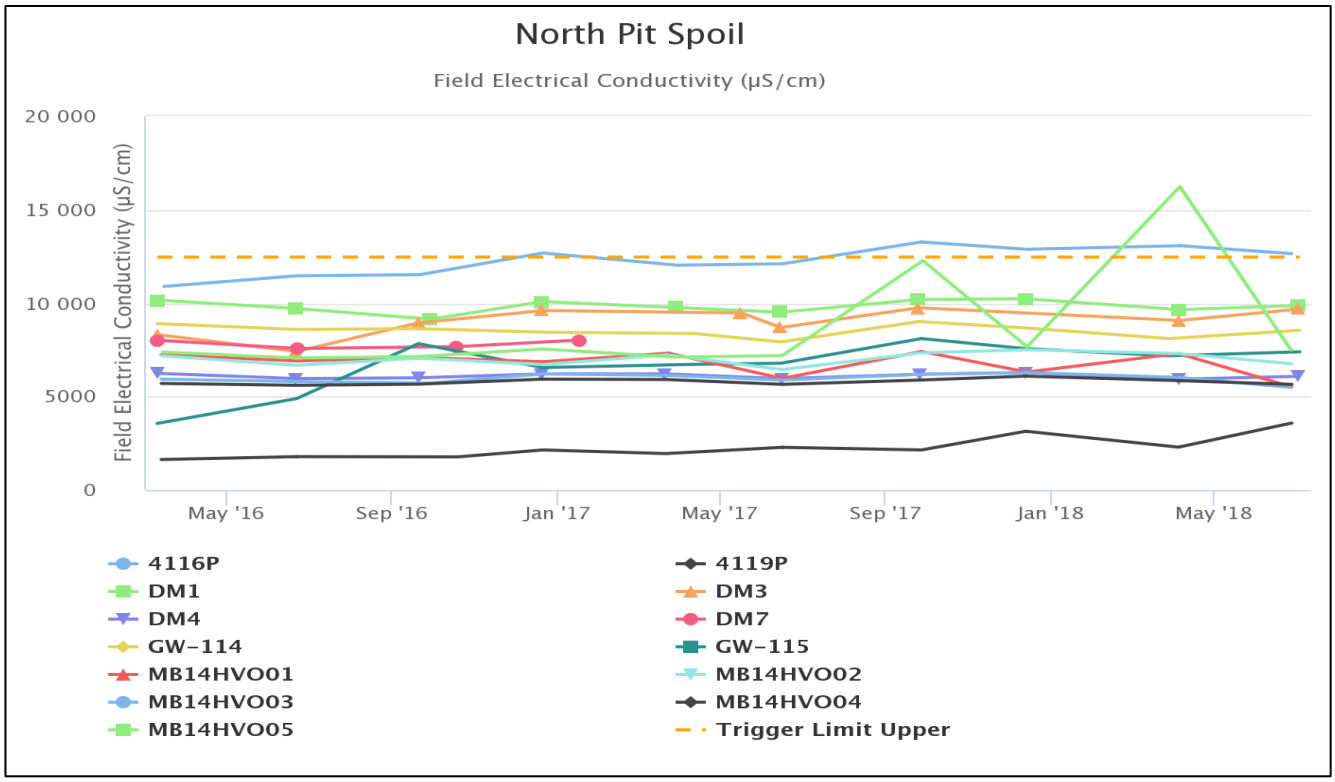


Figure 74: North Pit Spoil Electrical Conductivity Trend – June 2018

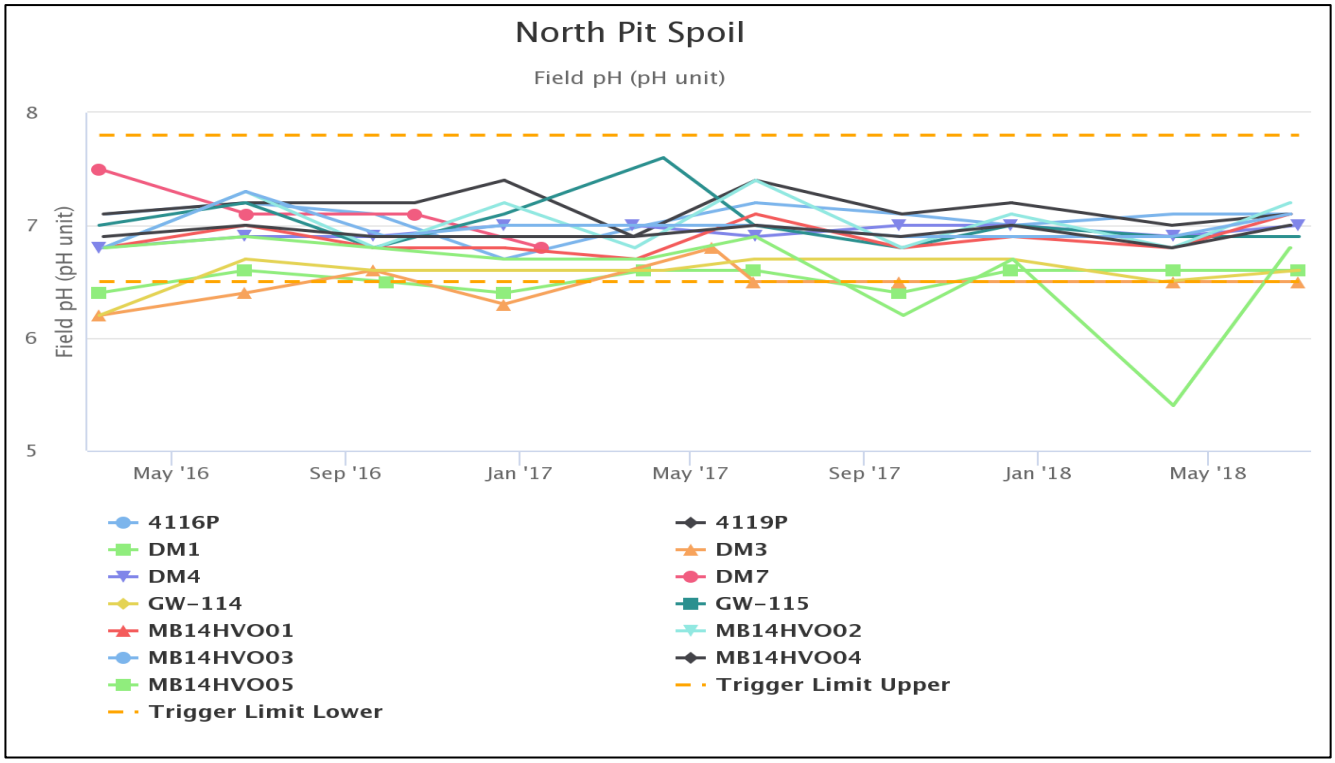


Figure 75: North Pit Spoil pH Trend – June 2018

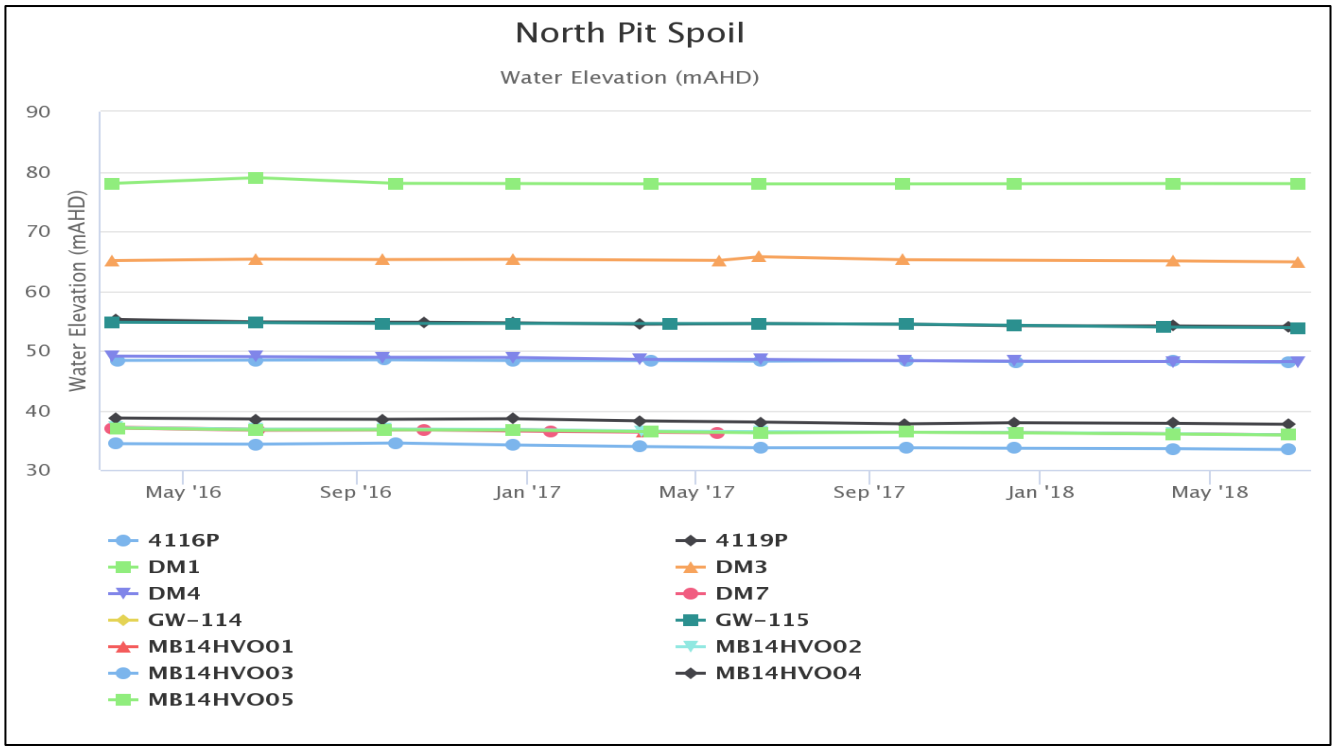


Figure 76: North Pit Spoil Standing Water Level – June 2018

4.2.1 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 HVO Water Management Plan.

Current internal trigger limits breaches are summarised in Table 4.

Table 4: Groundwater Triggers - 2018

Site	Date	Trigger Limit Breached	Action Taken in Response
CFW55R	29/03/2018	EC – 95th Percentile	Investigation currently in progress
CFW55R	19/04/2018	EC – 95th Percentile	
CFW55R	21/05/2018	EC – 95th Percentile	
CFW55R	27/06/2018	EC – 95th Percentile	
4116P	27/08/2017	EC – 95th Percentile	Watching Brief*
4116P	14/12/2017	EC – 95th Percentile	Watching Brief*
4116P	6/04/2017	EC – 95th Percentile	Watching Brief*
4116P	27/06/2017	EC – 95th Percentile	Investigation commenced
CGW49	22/06/2018	EC – 95th Percentile	Watching Brief*
C130(WDH)	18/05/2017	EC – 95th Percentile	Watching Brief*
C130(WDH)	20/11/2017	EC – 95th Percentile	Watching Brief*
C130(WDH)	24/05/2018	EC – 95th Percentile	Investigation commenced
D612 (AFS)	17/05/2017	EC – 95th Percentile	Watching Brief*
D612 (AFS)	20/11/2017	EC – 95th Percentile	Watching Brief*
D612 (AFS)	24/05/2017	EC – 95th Percentile	Investigation commenced
PB01(ALL)	21/11/2017	EC – 95th Percentile	Watching Brief*
PB01(ALL)	16/02/2018	EC – 95th Percentile	Watching Brief*
PB01(ALL)	24/05/2018	EC – 95th Percentile	Investigation commenced

NPz2	26/09/2017	EC – 95th Percentile	Watching Brief*
NPz2	13/12/2017	EC – 95th Percentile	Watching Brief*
NPz2	13/03/2018	EC – 95th Percentile	Investigation commenced
GW-100	13/03/2018	EC – 95th Percentile	Watching Brief*
C130(ALL)	16/02/2018	EC – 95th Percentile	Watching Brief*
C130(ALL)	24/05/2018	EC – 95th Percentile	Watching Brief*
PB01(ALL)	16/02/2018	EC – 95th Percentile	Watching Brief*
BZ3-1	22/02/2018	pH – 95th Percentile	Watching Brief*
G2	13/12/2017	PH – 95th Percentile	Watching Brief*
G2	13/03/2018	PH – 95th Percentile	Watching Brief*
Hobdens Well	25/05/2018	PH – 95th Percentile	Watching Brief*
NPz3	13/03/2018	pH – 95th Percentile	Watching Brief*
BZ4A(2)	22/02/2018	PH – 5th Percentile	Watching Brief*
BZ8-2	25/05/2018	PH – 5th Percentile	Watching Brief*
CFW55R	14/12/2017	PH – 5th Percentile	Investigation currently in progress
CFW55R	29/03/2018	PH – 5th Percentile	
CFW55R	19/04/2018	PH – 5th Percentile	
CFW55R	21/05/2018	PH – 5th Percentile	
CFW55R	27/06/2018	PH – 5th Percentile	
CGW52	22/06/2018	pH – 5th Percentile	Watching Brief*
CGW53	8/03/2018	pH – 5th Percentile	Watching Brief*
CGW53	22/06/2018	pH – 5th Percentile	Watching Brief*
GW_106	29/03/2018	pH – 5th Percentile	Watching Brief*

HG2	10/11/2017	pH – 5th Percentile	Watching Brief*
HG2	23/02/2018	pH – 5th Percentile	Watching Brief*
HG2	25/05/2018	pH – 5th Percentile	Investigation commenced
MB14HVO05	6/04/2018	pH – 5th Percentile	Watching Brief*

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

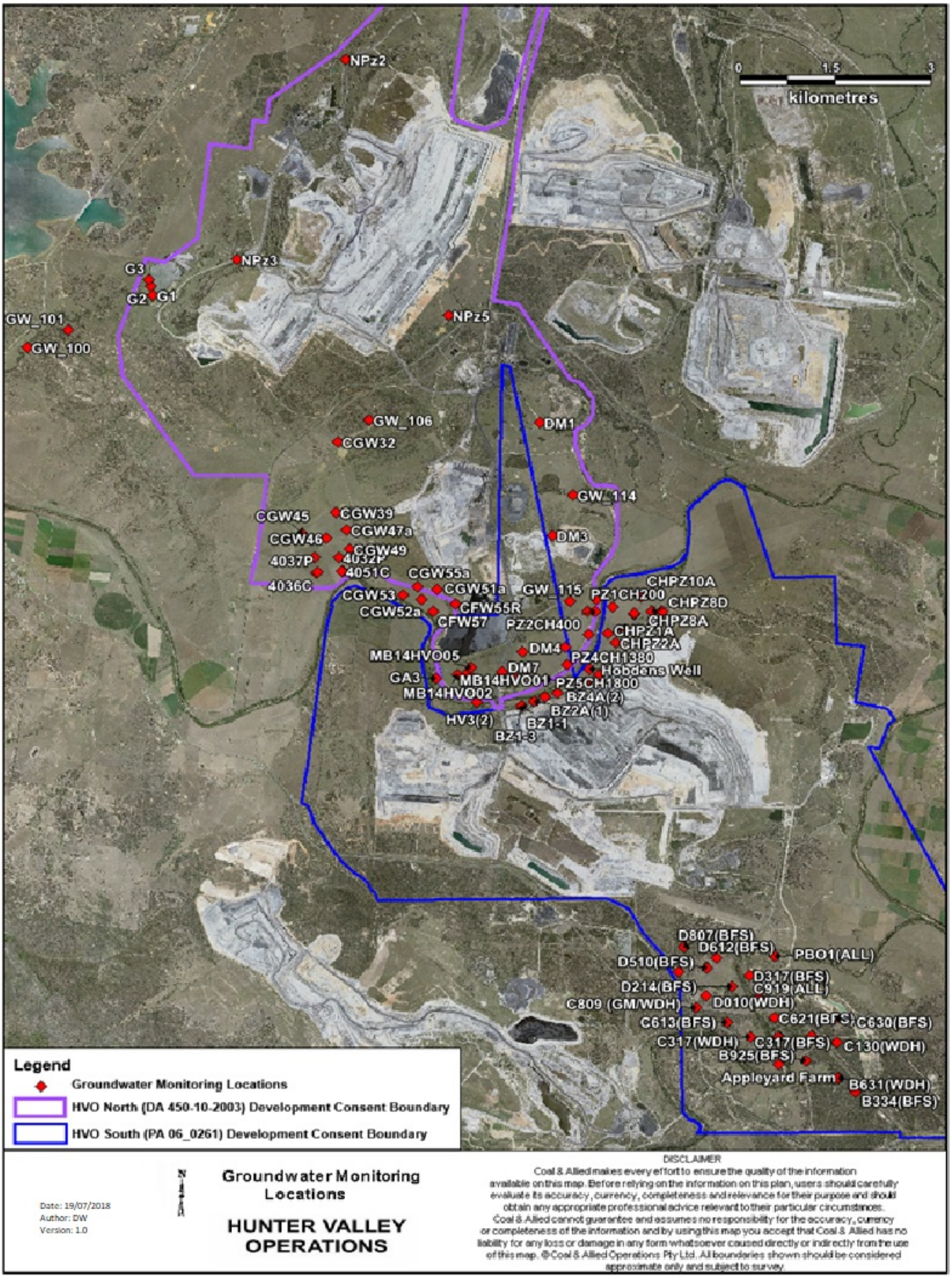


Figure 77: Groundwater Monitoring Location Plan

5.0 BLASTING

5.1.1 Blast Monitoring

HVO have a network of five 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 83.

During June, 18 blasts were initiated at HVO. Figure 78 through to Figure 82 show the blast monitoring results for the reporting period against the impact assessment criteria. The criteria are summarised in Table 5.

Table 5: Blasting Limits

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

During the reporting period there were no exceedances of the airblast overpressure or ground vibration criteria.

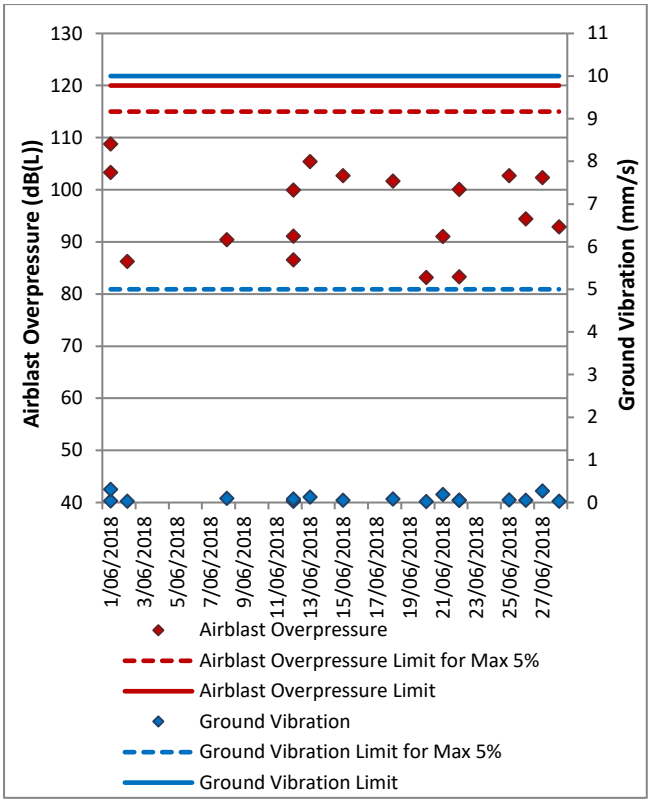


Figure 78: Moses Crossing Blast Monitoring Results – June 2018

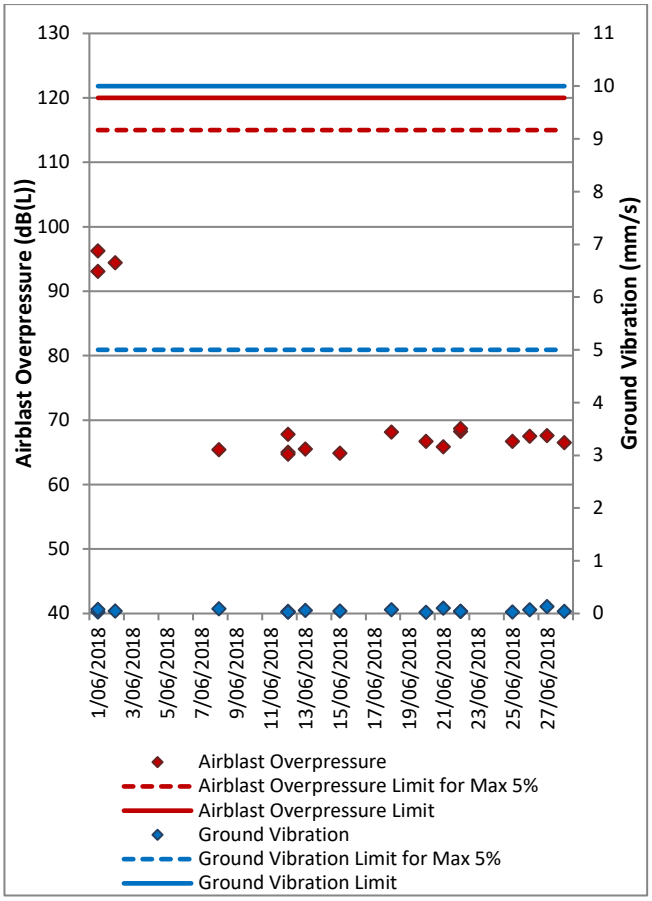


Figure 79: Jerrys Plains Blast Monitoring Results – March 2018

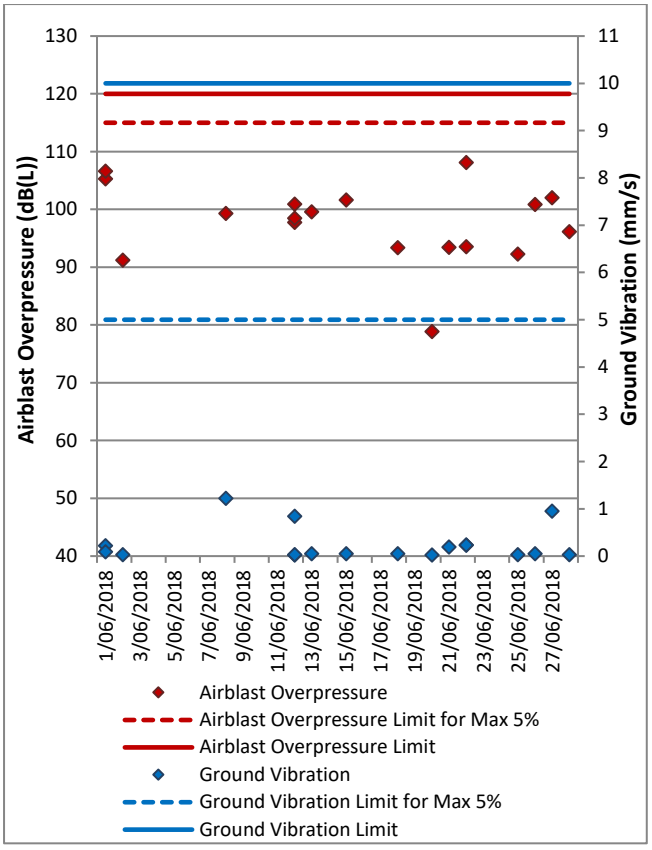


Figure 80: Maison Dieu Blast Monitoring Results – June 2018

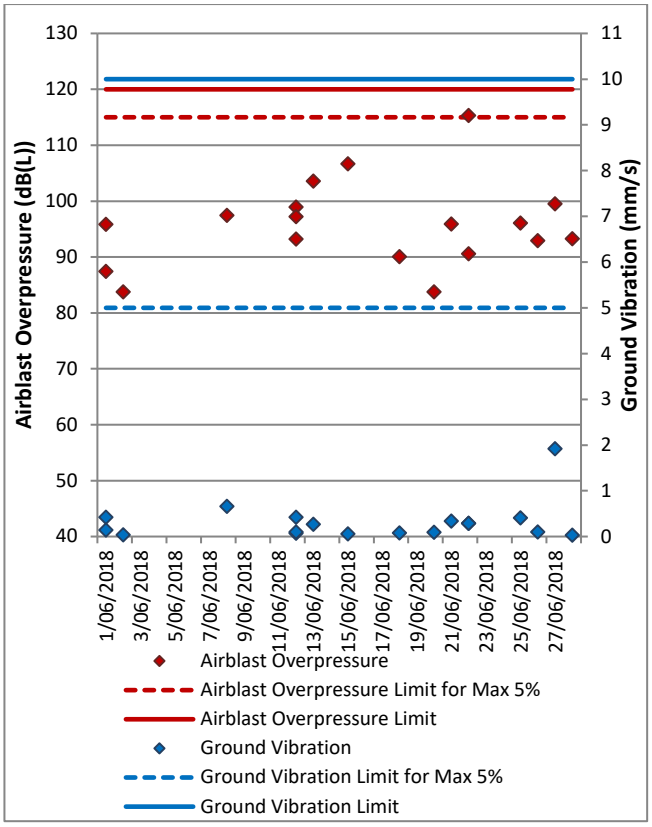


Figure 81: Warkworth Blast Monitoring Results – June 2018

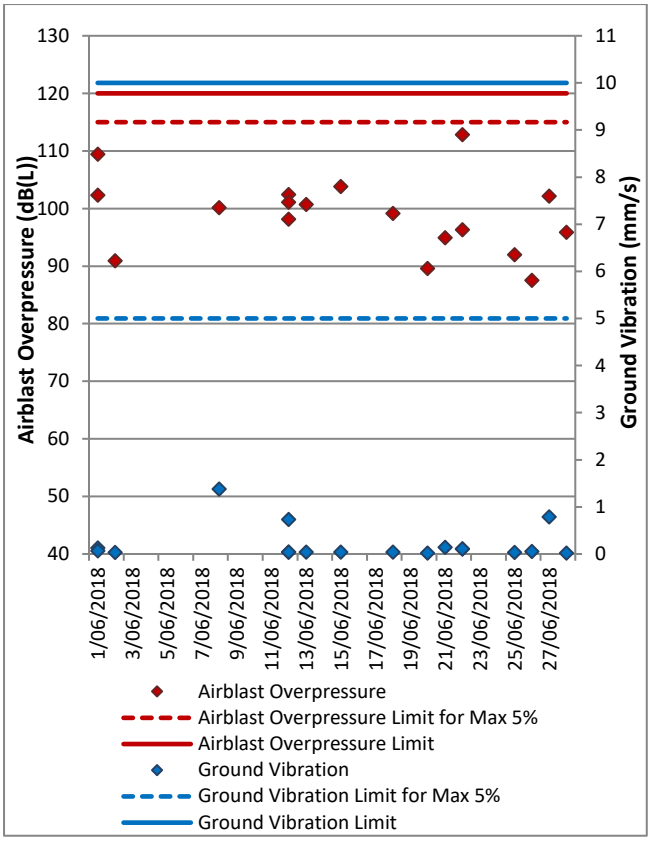


Figure 82: Knodlers Lane Blast Monitoring Results – June 2018

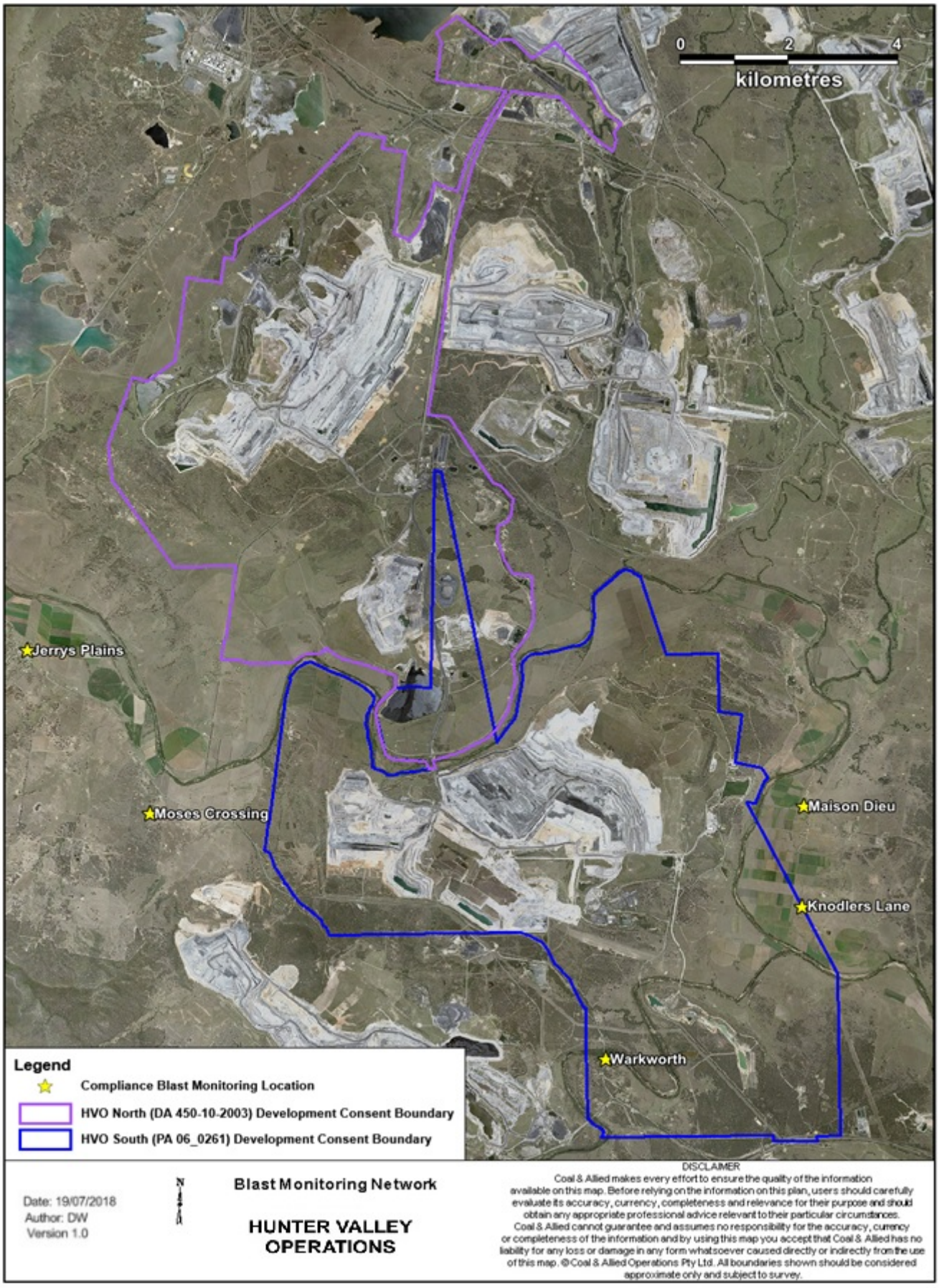


Figure 83: Blast Monitoring Location Plan

6.0 NOISE

Routine attended noise monitoring is carried out at defined locations around HVO as described in the HVO Noise Monitoring Programme. 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 HVO. The attended noise monitoring locations are displayed in Figure 84

6.1 Attended Noise Monitoring Results

Attended monitoring was conducted at receiver locations surrounding HVO on the night shift of 20 and 22 June 2018. Monitoring results are detailed in Table 6 to Table 11 .

Table 6: $L_{Aeq,\ 15\ minute}$ HVO South - Impact Assessment Criteria – June 2018

Location	Date and Time	Wind Speed (m/s)[1]	VTG[1]	Criterion dB (A)	Criterion Applies?[2]	HVO South L_{Aeq} dB3[3,4]	Exceedance[4,5]
Knodlers Lane	20/06/2018 22:18	1	-1	37	Yes	27	Nil
Maison Dieu	20/06/2018 21:46	0.8	-1	37	Yes	33	Nil
Shearers Lane	20/06/2018 21:01	0.8	0.5	41	Yes	36	Nil
Kilburnie South	20/06/2018 22:54	0.3	3	36	No	IA	NA
Jerrys Plains Village	20/06/2018 21:29	0.9	-1	35	Yes	<30	Nil
Jerrys Plains East	20/06/2018 21:00	0.8	0.5	35	Yes	<30	Nil
Long Point Road	20/06/2018 23:40	0.2	3	55	No	<30	NA
HVGC	22/06/2018 0:20	2.4	-1	35	Yes	IA	Nil

Notes:
1. Atmospheric data is sourced from the HVO Cheshunt or HVO Corp. weather station using logged meteorological data;
2. Assumed noise emission limits (see Section 2.2 of this report for more information) apply for wind speeds up to 3 metres per second (at a height of 10m), or temperature inversion conditions of up to 3 degrees/100m (at a height of 10m). Criterion may or may not apply due to rounding of meteorological data values;
3. Estimated or measured LAeq,15minute atributed to HVO South Pit Area;
4. Bold results in red indicate exceedance of criteria; and
5. NA in exceedance column means atmospheric conditions outside specifed in approval and so criterion is not applicable.

Table 7: $L_{Aeq,\ 15\ minute}$ HVO South - Land Acquisition Criteria – June 2018

Location	Date and Time	Wind Speed (m/s)[1]	VTG[1]	Criterion dB (A)	Criterion Applies?[2]	HVO South L_{Aeq} dB[3,4]	Exceedance[4,5]
Knodlers Lane	20/06/2018 22:18	1	-1	41	Yes	27	Nil
Maison Dieu	20/06/2018 21:46	0.8	-1	41	Yes	33	Nil
Shearers Lane	20/06/2018 21:01	0.8	0.5	41	Yes	36	Nil
Kilburnie South	20/06/2018 22:54	0.3	3	41	No	IA	NA
Jerrys Plains Village	20/06/2018 21:29	0.9	-1	40	Yes	<30	Nil
Jerrys Plains East	20/06/2018 21:00	0.8	0.5	40	Yes	<30	Nil
Long Point Road	20/06/2018 23:40	0.2	3	NA	NA	<30	NA
HVGC	22/06/2018 0:20	2.4	-1	40	Yes	IA	Nil

Notes:
1. Atmospheric data is sourced from the HVO Cheshunt or HVO Corp. weather station using logged meteorological data;
2. Assumed noise emission limits (see Section 2.2 of this report for more information) apply for wind speeds up to 3 metres per second (at a height of 10m), or temperature inversion conditions of up to 3 degrees/100m (at a height of 10m). Criterion may or may not apply due to rounding of meteorological data values;
3. Estimated or measured LAeq,15minute atributed to HVO South Pit Area;
4. Bold results in red indicate exceedance of criteria; and
5. NA in exceedance column means atmospheric conditions outside specifed in approval and so criterion is not applicable.

Table 8: $L_{A1,\ 1minute}$ HVO South - Impact Assessment Criteria – June 2018

Location	Date and Time	Wind Speed (m/s)[1]	VTG[1]	Criterion dB (A)	Criterion Applies?[2]	HVO South $L_{A1,\ 1min}$ dB[3,4]	Exceedance[4,5]
Knodlers Lane	20/06/2018 22:18	1	-1	45	Yes	39	Nil
Maison Dieu	20/06/2018 21:46	0.8	-1	45	Yes	36	Nil
Shearers Lane	20/06/2018 21:01	0.8	0.5	45	Yes	42	Nil
Kilburnie South	20/06/2018 22:54	0.3	3	45	No	IA	NA
Jerrys Plains Village	20/06/2018 21:29	0.9	-1	45	Yes	43	Nil
Jerrys Plains East	20/06/2018 21:00	0.8	0.5	45	Yes	35	Nil
Long Point Road	20/06/2018 23:40	0.2	3	NA	NA	<30	NA
HVGC	22/06/2018 0:20	2.4	-1	45	Yes	IA	Nil

Notes:
1. Atmospheric data is sourced from the HVO Cheshunt or HVO Corp. weather station using logged meteorological data;
2. Assumed noise emission limits (see Section 2.3 of this report for more information) apply for wind speeds up to 3 metres per second (at a height of 10m), or temperature inversion conditions of up to 3 degrees/100m (at a height of 10m). Criterion may or may not apply due to rounding of meteorological data values;
3. These are results for HVO South Pit Area in the absence of all other noise sources;
4. Bold results in red indicate exceedance of criteria; and
5. NA in exceedance column means atmospheric conditions outside specifed in approval and so criterion is not applicable.

Table 9: $L_{Aeq,\ 15minute}$ HVO North – Impact Assessment Criteria – June 2018

Location	Date and Time	Wind Speed (m/s)[1]	VTG[1]	Criterion dB (A)	Criterion Applies?[2]	HVO North L_{Aeq} dB[3,4]	Exceedance[4,5]
Knodlers Lane	20/06/2018	2.1	-1	35	Yes	IA	Nil
Maison Dieu	20/06/2018	1.1	3	35	Yes	IA	Nil
Shearers Lane	20/06/2018	2.1	0.5	35	Yes	NM	Nil
Kilburnie South	20/06/2018	2.2	0.5	39	No	IA	Nil
Jerrys Plains Village	20/06/2018	1.5	3	36	Yes	IA	Nil
Jerrys Plains East	20/06/2018	2.1	0.5	39	Yes	IA	Nil
Long Point Road	20/06/2018	0.7	3	NA	NA	<30	NA
HVGC	22/06/2018 0:20	2.4	-1	35	Yes	IA	Nil

Notes:
1. Atmospheric data is sourced from the HVO Corporate or HVO Corp. weather station using logged meteorological data;
2. Noise emission limits apply under all meteorological conditions, except during periods of rain or hail, when average winds speed at microphone heights exceeds 5 metres per second, when wind speeds greater than 3 metres per second are measured at 10m above ground level, or during temperature inversion conditions greater than 3 degrees C/100m. Criterion may or may not apply due to rounding of meteorological data values;
3. Estimated or measured LAeq,15minute atributed to HVO North Pit Area;
4. Bold results in red indicate exceedance of criteria; and
5. NA in exceedance column means atmospheric conditions outside specifed in approval and so criterion is not applicable.

Table 10: $L_{Aeq,15minute}$ HVO North - Land Acquisition Criteria – June 2018

Location	Date and Time	Wind Speed (m/s)[1]	VTG[1]	Criterion dB (A)	Criterion Applies?[2]	HVO North L_{Aeq} dB[3,4]	Exceedance[4,5]
Knodlers Lane	20/06/2018 22:18	2.1	-1	41	Yes	IA	Nil
Maison Dieu	20/06/2018 21:46	1.1	3	41	Yes	IA	Nil
Shearers Lane	20/06/2018 21:01	2.1	0.5	41	Yes	NM	Nil
Kilburnie South	20/06/2018 22:54	2.2	0.5	41	Yes	IA	Nil
Jerrys Plains Village	20/06/2018 21:29	1.5	3	41	Yes	IA	Nil
Jerrys Plains East	20/06/2018 21:00	2.1	0.5	41	Yes	IA	Nil
Long Point Road	20/06/2018 23:40	0.7	3	NA	NA	<30	NA
HVGC	22/06/2018 0:20	2.4	-1	41	Yes	IA	Nil

Notes:
1. Atmospheric data is sourced from the HVO Corporate or HVO Corp. weather station using logged meteorological data;
2. Noise emission limits apply under all meteorological conditions, except during periods of rain or hail, when average winds speed at microphone heights exceeds 5 metres per second, when wind speeds greater than 3 metres per second are measured at 10m above ground level, or during temperature inversion conditions greater than 3 degrees C/100m. Criterion may or may not apply due to rounding of meteorological data values;
3. Estimated or measured LAeq,15minute atributed to HVO North Pit Area;
4. Bold results in red indicate exceedance of criteria; and
5. NA in exceedance column means atmospheric conditions outside specifed in approval and so criterion is not applicable.

Table 11: $L_{A1, 1Minute}$ HVO North - Impact Assessment Criteria – June 2018

Location	Date and Time	Wind Speed (m/s)[1]	VTG[1]	Criterion dB (A)	Criterion Applies?[2]	HVO North $L_{A1, 1min}$ dB[3,4]	Exceedance[4,5]
Knodlers Lane	20/06/2018 22:18	2.1	-1	46	Yes	IA	Nil
Maison Dieu	20/06/2018 21:46	1.1	3	46	Yes	IA	Nil
Shearers Lane	20/06/2018 21:01	2.1	0.5	46	Yes	NM	Nil
Kilburnie South	20/06/2018 22:54	2.2	0.5	46	Yes	IA	Nil
Jerrys Plains Village	20/06/2018 21:29	1.5	3	46	Yes	IA	Nil
Jerrys Plains East	20/06/2018 21:00	2.1	0.5	46	Yes	IA	Nil
Long Point Road	20/06/2018 23:40	0.7	3	NA	NA	<30	NA
HVGC	22/06/2018 0:20	2.4	-1	46	Yes	IA	Nil

Notes:
1. Atmospheric data is sourced from the HVO Corporate or MTW Charlton Ridge weather station using logged meteorological data;
2. Noise emission limits apply under all meteorological conditions, except during periods of rain or hail, when average winds speed at microphone heights exceeds 5 metres per second, when wind speeds greater than 3 metres per second are measured at 10m above ground level, or during temperature inversion conditions greater than 3 degrees C/100m. Criterion may or may not apply due to rounding of meteorological data values;
3. These are results for HVO North Pit Area in the absence of all other noise sources;
4. Bold results in red indicate exceedance of criteria; and
5. NA in exceedance column means atmospheric conditions outside specifed in approval and so criterion is not applicable.

5.2 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 June 2018 no measurements required the penalty to be applied. The assessment for low frequency noise is shown in Table 11.

Table 12: Low Frequency Noise Assessment – June 2018

Location	Date and Time	Measured Site Only LA_{eq} dB (Sth/Nth)	Site Only LC_{eq} dB[1] (Sth/Nth)	Site Only LC_{eq}-LA_{eq} dB [1,2] (Sth/Nth)	Result Max exceedance of ref spectrum dB[1,3] (Sth/Nth)	Penalty dB(A)[1]	Site LAeq,15min dB with modifying factor (if applicable)
Knodlers Lane	20/06/2018 22:18	27/IA	56/NA	29/NA	0/NA	0/NA	27/NA
Maison Dieu	20/06/2018 21:46	33/IA	56/NA	23/NA	0/NA	0/NA	33/NA
Shearers Lane	20/06/2018 21:01	36/NM	56/NA	20/NA	0/NA	0/NA	36/NA
Kilburnie South	20/06/2018 22:54	IA/IA	NA/NA	NA/NA	NA/NA	NA/NA	NA/NA
Jerrys Plains	20/06/2018 21:29	<30/IA	NA/NA	NA/NA	NA/NA	NA/NA	NA/NA
Jerrys Plains East	20/06/2018 21:00	<30/IA	NA/NA	NA/NA	NA/NA	NA/NA	NA/NA
HVGC	20/06/2018 23:40	<30/<30	NA/NA	NA/NA	NA/NA	NA/NA	NA/NA
Long Point	22/06/2018 0:20	IA/<25	NA/NA	NA/NA	NA/NA	NA/NA	NA/NA

Notes:
1. 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;
2. As per NPfI, if LCeq – LAeq ≥ 15 dB further assessment of low frequency noise required as detailed in Sections 2.4 and 3.3 of this report; and
3. 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.

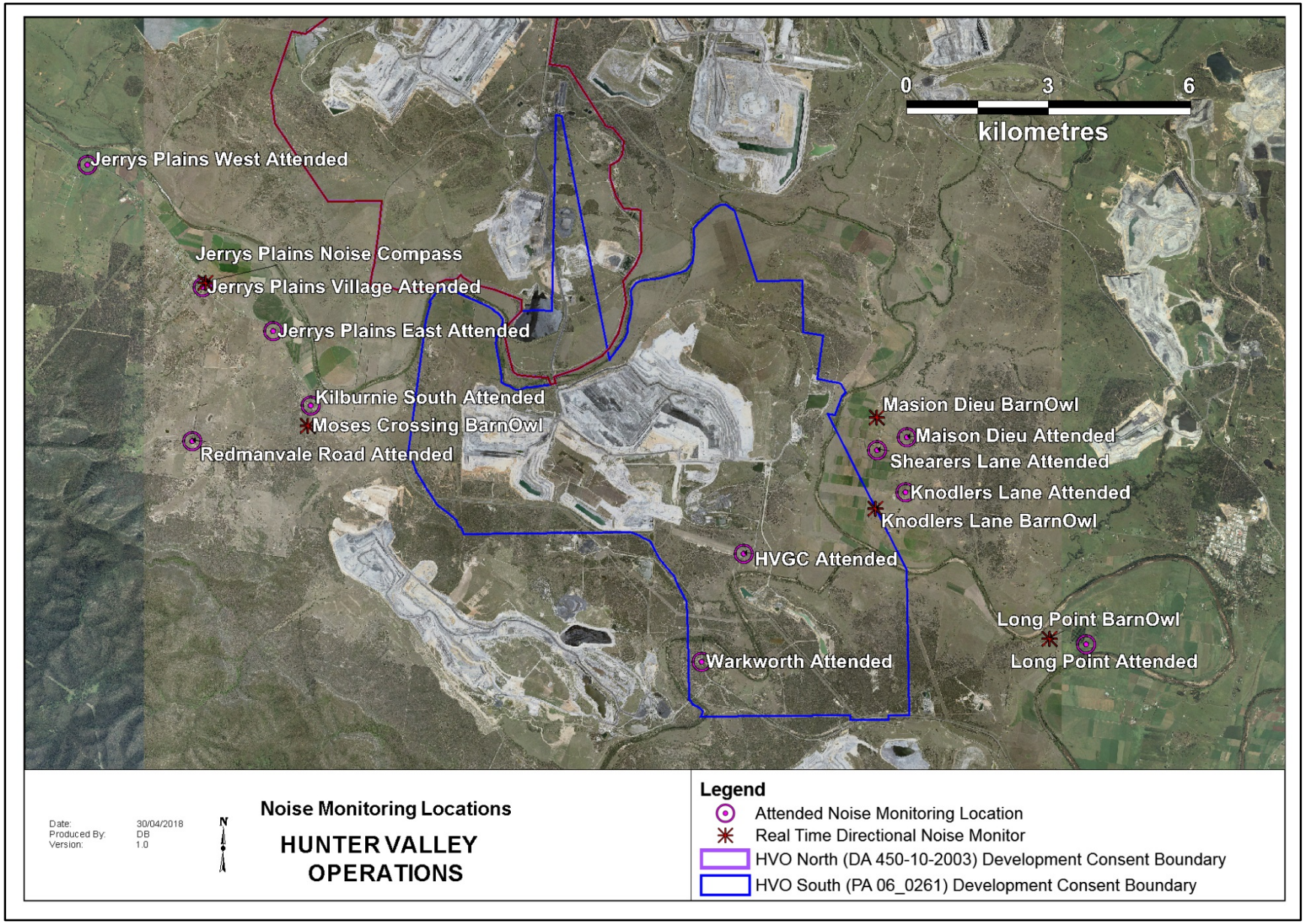


Figure 84: Noise Monitoring Location Plan

6.2 Real Time Noise Monitoring

HVO utilises a network of real-time directional noise monitors to manage noise impacts on a continuous basis. Noise alarms are in place at five monitoring locations (Knodlers Lane, Maison Dieu, Jerrys Plains, Moses Crossing, and Long Point), which alert HVO staff to elevated noise levels likely to be attributable to HVO. Noise alarms are investigated and responded to with the appropriate level of operational modification. Changes in response to a noise alarm can include replacing equipment with quieter (noise attenuated) units, changing or relocating tasks, and shutting down equipment.

It should be noted that this assessment does not compliment or conflict with attended noise monitoring detailed in Section 6.1, and that real time monitoring data includes non-mine noise sources such as dogs, cows, or more commonly, road traffic.

7.0 OPERATIONAL DOWNTIME

During June, a total of 218 hours of equipment downtime was logged in response to real time monitoring and visual inspections for environmental reasons such as dust, noise and meteorological conditions. Operational downtime by equipment type is shown in Figure 85.

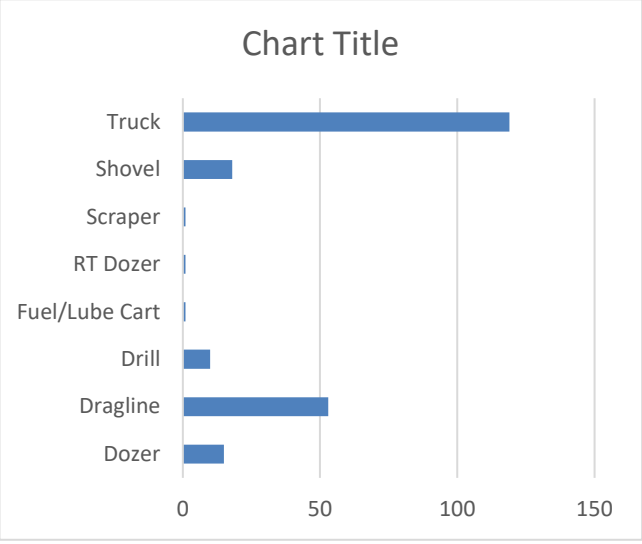


Figure 85: Operational Downtime by Equipment Type – June 2018

8.0 REHABILITATION

During June 32.8 Ha of land was released and 8.7 Ha of land was bulk shaped. Year to date progress can be viewed in Figure 86.

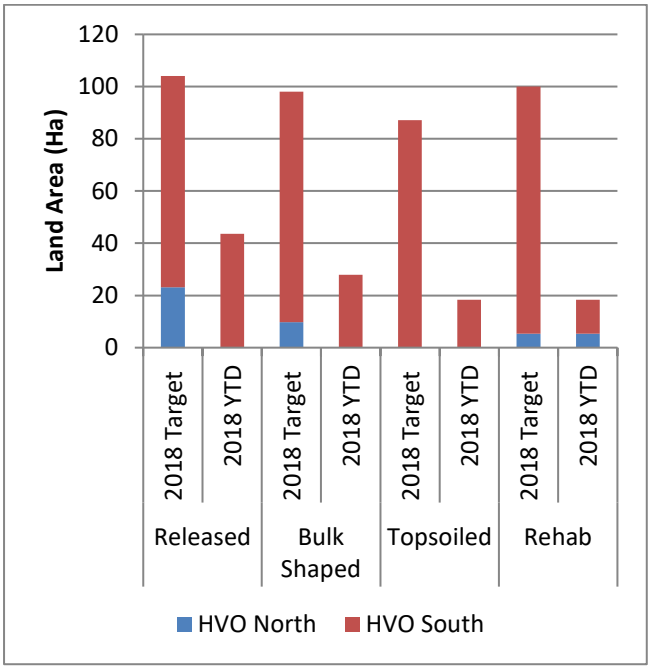


Figure 86: Rehabilitation YTD – June 2018

9.0 COMPLAINTS

During June three complaints were received. Details of complaints received YTD are shown in Table 13.

Table 13: Complaints Summary YTD

	Noise	Dust	Blast	Lighting	Other	Total
January	-	2	4	-	-	6
February	1	-	-	-	1	2
March	-	-	-	-	-	0
April	-	-	1	-	-	1
May	4	1	2	-	-	7
June	1	-	1	-	1	3
July	-	-	-	-	-	-
August	-	-	-	-	-	-
September	-	-	-	-	-	-
October	-	-	-	-	-	-
November	-	-	-	-	-	-
December	-	-	-	-	-	-
Total	6	3	8	-	2	19

Figure 87: Complaints Graph – June 2018

10.0 ENVIRONMENTAL INCIDENTS

During the reporting period there were two recordable environmental incidents.

22 June 2018 – Ground Disturbance Permit area Breach

During dozer activities to expand a coal stockpile area in the HVO North area, it was observed that the approved disturbance area had been breach. As such the material in the area was retracted. Minor impact occurred within an existing mining area. Further disturbance approval was sort before works continued.

26 June 2018 – Excavator Hydraulic Oil Leak

During excavation works, excavator 313 has sustained damage from a rock which has release approximately 2000L of hydraulic oil in the Cheshunt Pit. Works ceased and the spill was contained in pit. Contaminated soil was removed to the bioremediation area for treatment.

Appendix A: Meteorological Data

Table 14: Meteorological Data - HVO Corporate Meteorological Station – June 2018

Date	Air Temperature Maximum (°C)	Air Temperature Minimum (°C)	Relative Humidity Maximum (%)	Relative Humidity Minimum (%)	Solar Radiation Maximum (W/Sq. M)	Wind Direction Average (°)	Wind Speed Average (m/sec)	Rainfall(mm)
1/06/2018	17	5	64	35	813	168	2.2	0.0
2/06/2018	15	8	100	47	493	261	1.9	3.6
3/06/2018	19	8	100	43	628	128	2.1	0.0
4/06/2018	19	8	91	45	746	158	1.5	0.0
5/06/2018	16	7	100	57	705	120	1.4	1.2
6/06/2018	13	7	100	92	246	103	1.2	1.0
7/06/2018	19	7	100	54	865	112	1.9	0.0
8/06/2018	16	7	100	60	260	238	1.3	0.8
9/06/2018	16	9	100	70	227	248	1.4	2.4
10/06/2018	14	5	100	85	544	175	1.0	1.0
11/06/2018	16	9	100	59	819	146	0.7	0.2
12/06/2018	20	7	92	48	347	156	1.0	0.2
13/06/2018	18	4	88	34	661	268	3.2	0.0
14/06/2018	18	3	76	29	705	273	3.5	0.0
15/06/2018	19	5	65	24	578	272	5.1	0.0
16/06/2018	16	6	68	24	616	282	5.4	0.0
17/06/2018	13	3	77	42	794	280	6.6	0.0
18/06/2018	17	7	87	30	632	235	3.8	0.0
19/06/2018	15	5	100	59	802	208	1.8	10.2
20/06/2018	17	6	99	55	761	137	2.2	0.6
21/06/2018	17	6	100	52	675	177	1.0	0.0
22/06/2018	18	4	100	56	670	224	1.2	0.2
23/06/2018	19	5	93	24	525	265	2.7	0.2
24/06/2018	16	1	89	39	510	176	1.2	0.0
25/06/2018	16	2	100	42	518	-	1.3	0.0
26/06/2018	16	1	100	41	515	163	1.2	0.0
27/06/2018	15	1	100	69	771	146	1.3	0.0
28/06/2018	17	4	100	66	808	199	1.3	4.6
29/06/2018	14	1	100	50	638	265	3.3	0.2
30/06/2018	18	4	86	28	657	263	4.4	0.0

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