HUNTER VALLEY
OPERATIONS

MONTHLY ENVIRONMENTAL MONITORING REPORT MARCH 2024

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[Planned Review Date]

OWNER
Superintendent - Environment and Community

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1 | 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 1 – 31 March 2024 (the 'Reporting Period').

2 | AIR QUALITY

2.1 | METEOROLOGICAL MONITORING

HVO maintains two meteorological stations: 'HVO Corporate' and 'Cheshunt' (refer to **Figure 4**).

2.1.1 | RAINFALL

Rainfall recorded at the HVO Corporate weather station during the period is summarised in **Table 1**. The 2022, 2023 and 2024 trends are shown in **Figure 1**.

Table 1 - Rainfall data for the reporting period

2024	Monthly Rainfall (mm)	Cumulative Rainfall (mm)
March	39.2	155.2

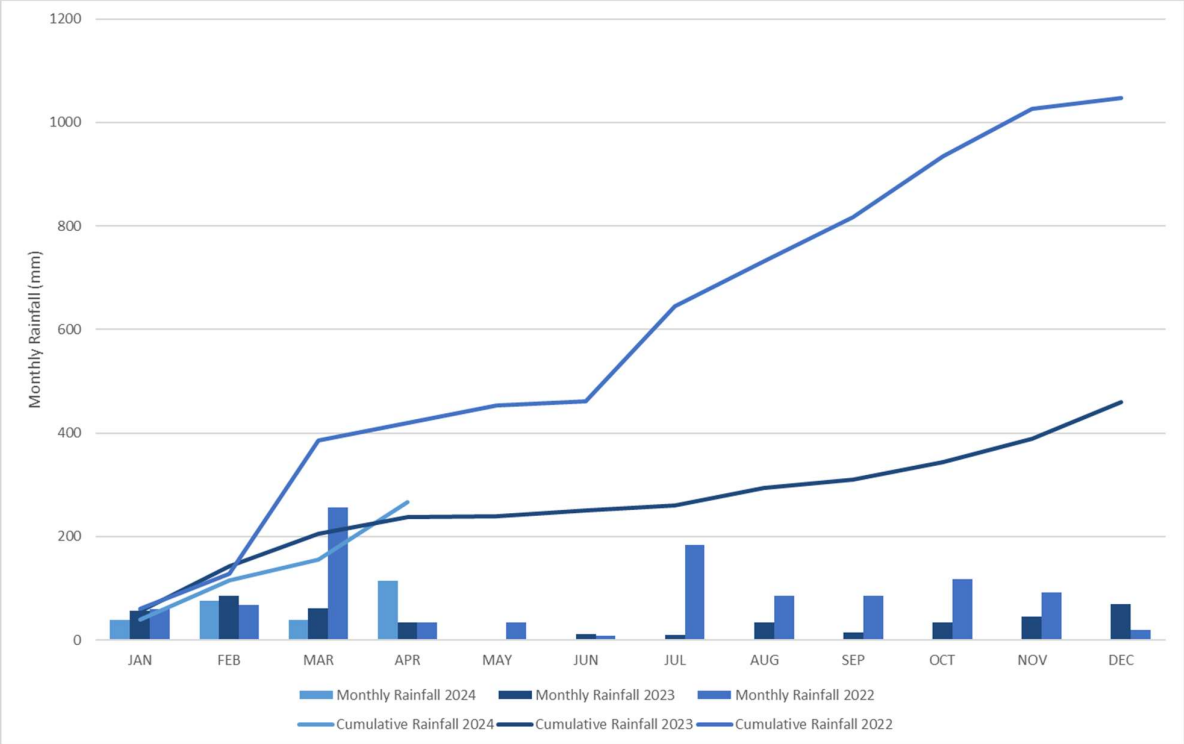

Figure 1: Rainfall Summary 2024

2.1.2 | WIND SPEED AND DIRECTION

South easterly winds were prevailing at both HVO Corporate and HVO Cheshunt weather stations during the reporting period as shown in **Figure 2** and **Figure 3**.

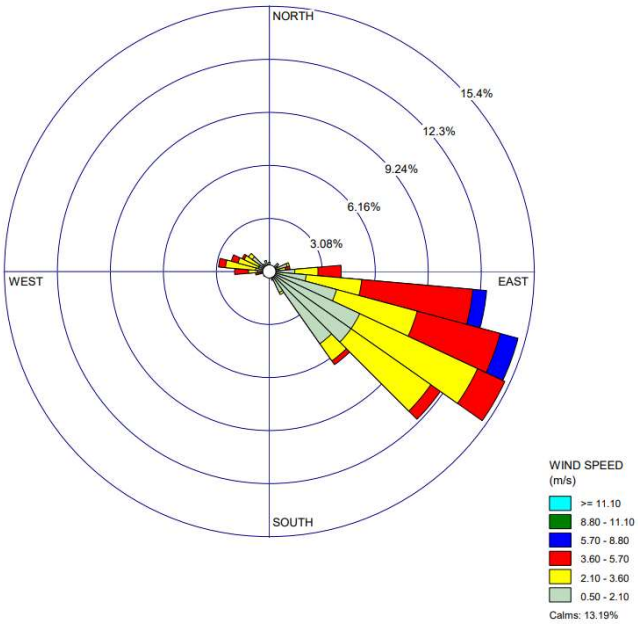

Figure 2: HVO Corporate Wind Rose for the Reporting Period

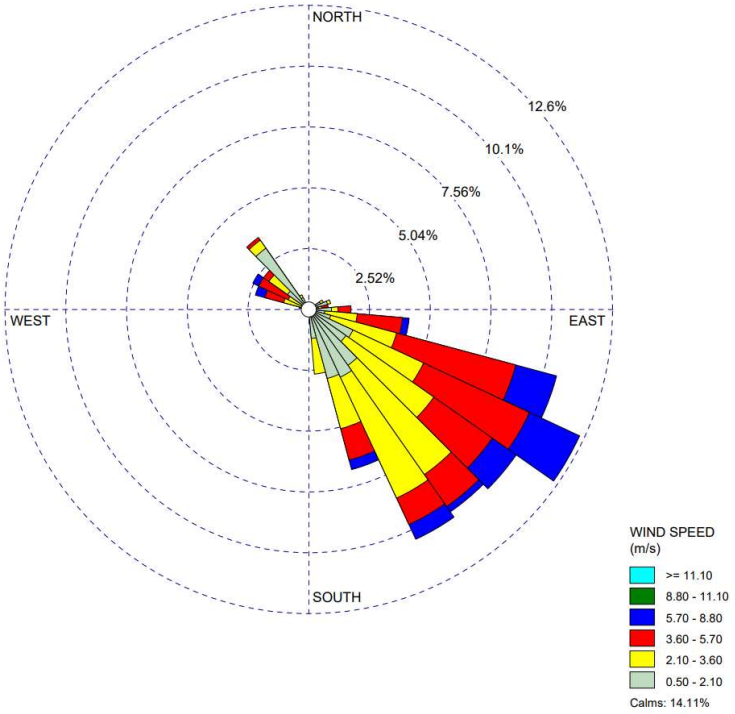

Figure 3: HVO Cheshunt Wind Rose for the Reporting Period

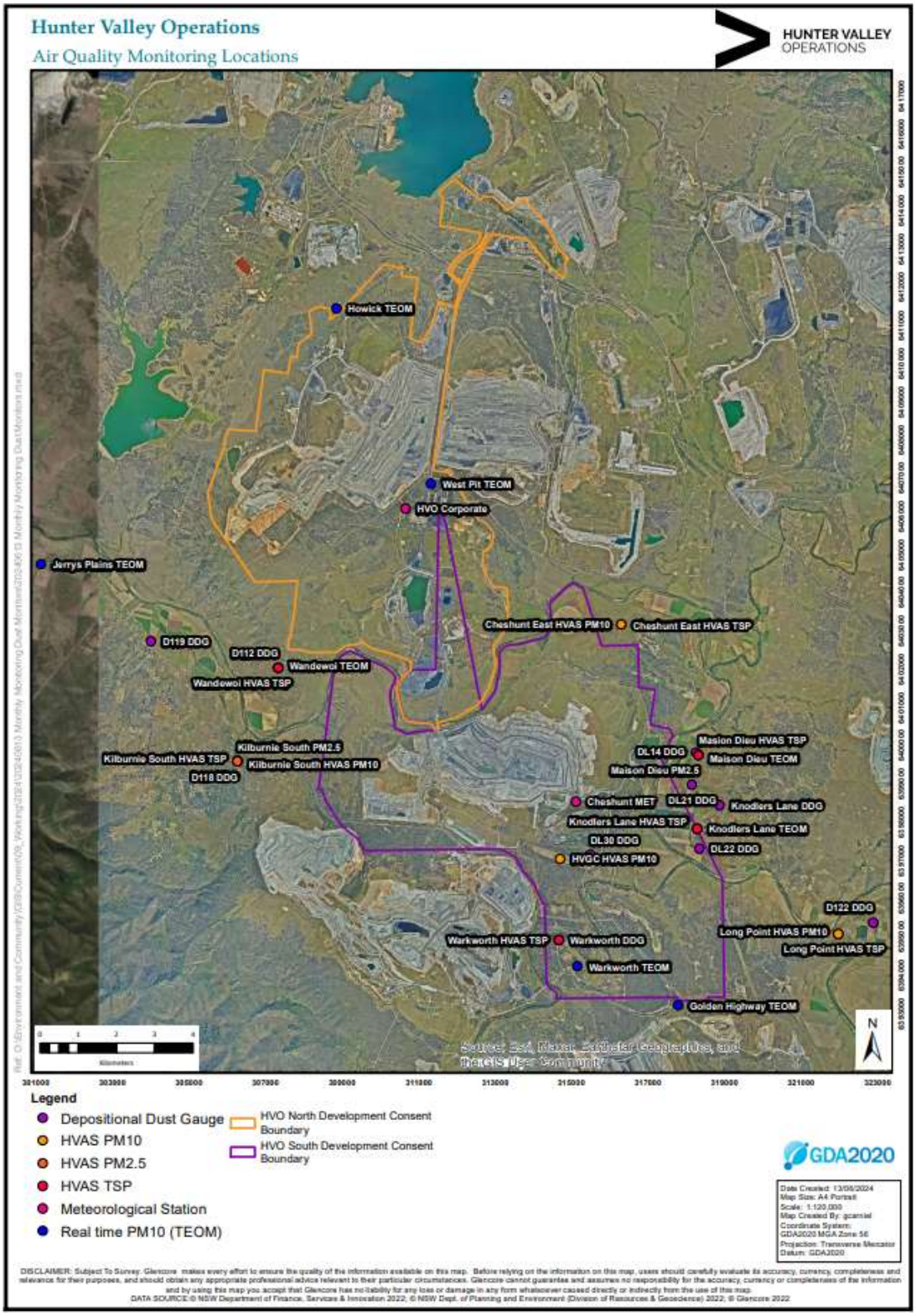

Figure 4: Air Quality Monitoring Location Plan

2.2 | DEPOSITIONAL DUST

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

Error! Reference source not found. displays insoluble solids results from depositional dust gauges during the reporting period compared against the annual impact assessment criteria. Any monthly results deemed to be contaminated (due to presence of bird droppings, insects, etc.) are not displayed. An assessment of HVO's contribution against the long-term impact assessment criteria will be provided in the 2024 Annual Review.

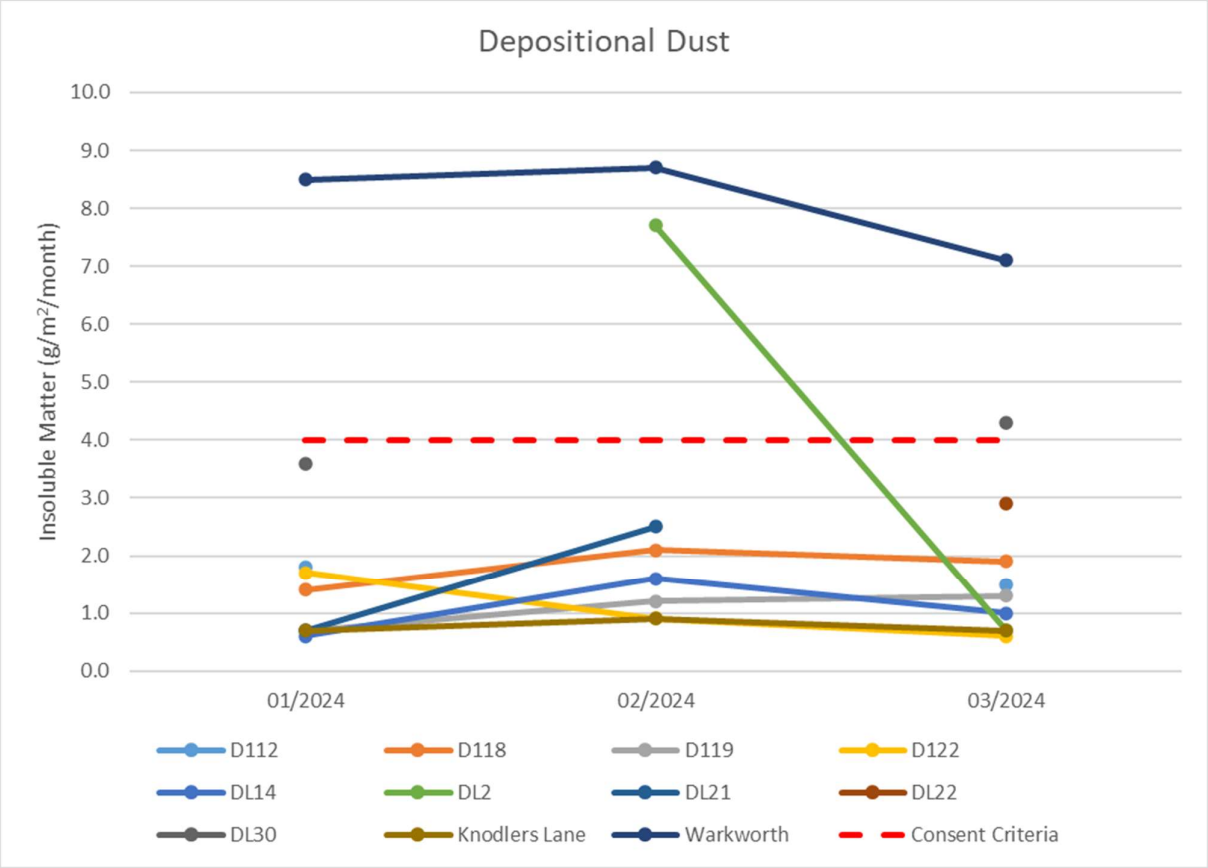

Figure 5: Depositional Dust Results for the Reporting Period

2.3 | SUSPENDED PARTICLES

Suspended particles are measured by a network of High Volume Air Samplers (HVAS) measuring Total Suspended Particulates (TSP) and Particulate Matter <10µm (PM_{10}). The Kilburnie South (Moses Crossing) and Maison Dieu HVAS also monitor Particulate Matter <2.5µm ($PM_{2.5}$). The location of these monitors is presented in **Figure 4**. Each HVAS runs for 24-hours on a six-day cycle.

2.3.1 | HVAS PM_{10} RESULTS

2.3.1.1 | PERFORMANCE AGAINST SHORT TERM IMPACT ASSESSMENT CRITERIA

Figure 6 shows individual PM_{10} results at each monitoring station against the short-term impact assessment criteria of 50µg/m^3. No exceedances were recorded during the reporting period.

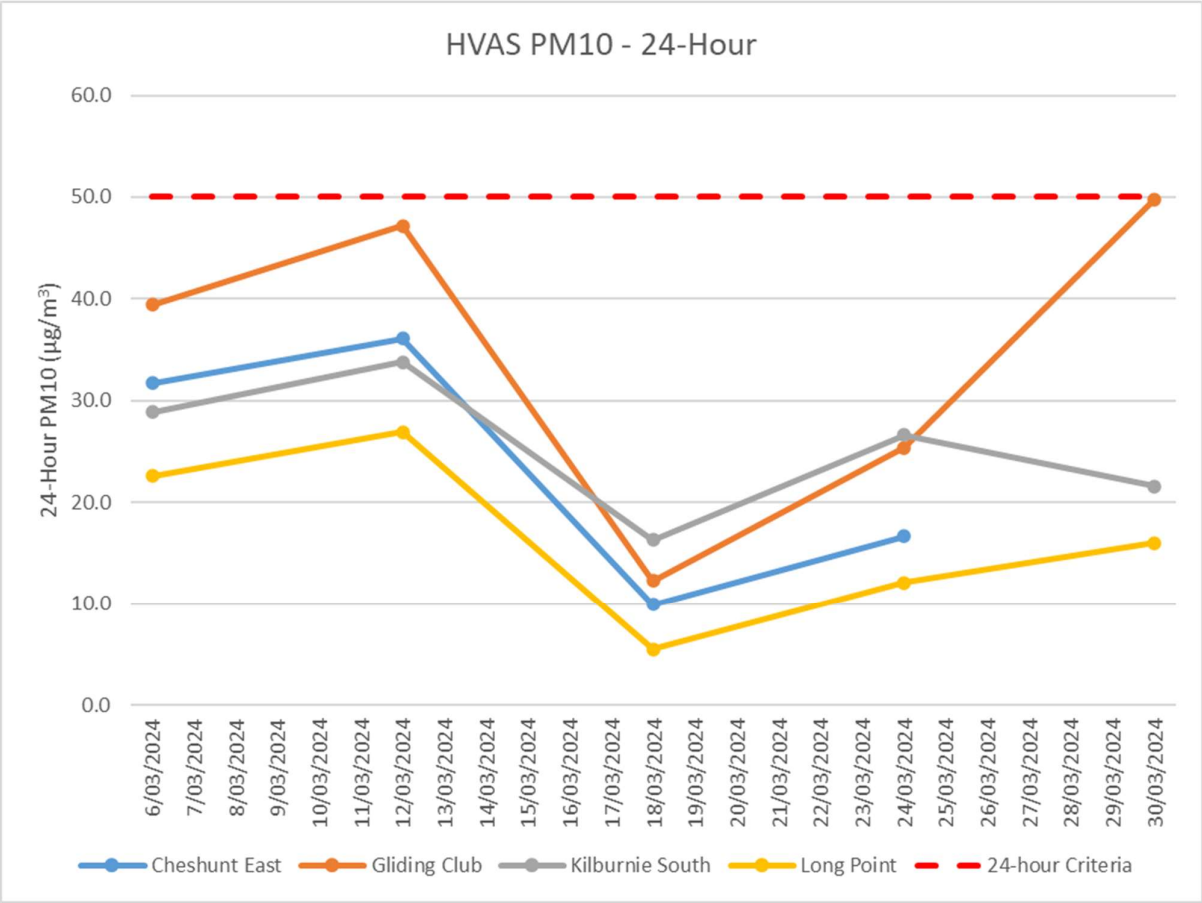

Figure 6: Individual PM_{10} Results for the Reporting Period

2.3.1.2 | PERFORMANCE AGAINST LONG TERM IMPACT ASSESSMENT CRITERIA

Figure 7 shows the year-to-date annual average PM_{10} results. All other monitors were below the relevant long term impact assessment criteria during the reporting period.

An assessment of HVO's contribution against the long-term impact assessment criteria will be provided in the 2024 Annual Review.

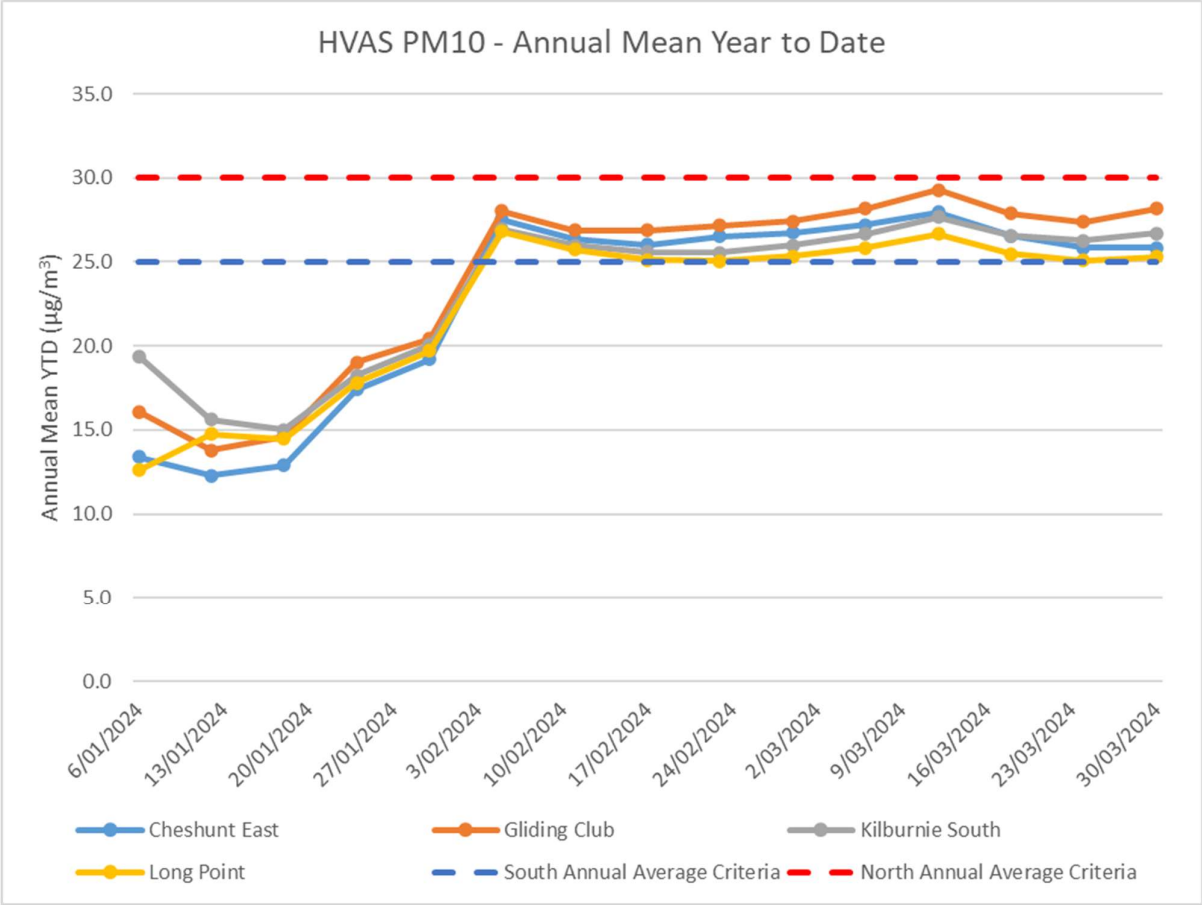

Figure 7: Year to Date Average PM_{10} as at end of the Reporting Period

2.3.2 | HVAS $PM_{2.5}$ RESULTS

HVO monitors $PM_{2.5}$ at two HVAS locations, Kilburnie South (Moses Crossing) and Maison Dieu.

2.3.2.1 | HVAS $PM_{2.5}$ RESULTS

Figure 8 shows individual $PM_{2.5}$ results at each monitoring station against the HVO South short-term impact assessment criteria of 25µg/m^3. Kilburnie South monitor did not report a result on 12 March due to a mis-capture and is therefore not displayed. Both monitors were below the relevant short-term impact assessment criteria during the reporting period.

An assessment of HVO's contribution against the long-term impact assessment criteria will be provided in the 2024 Annual Review.

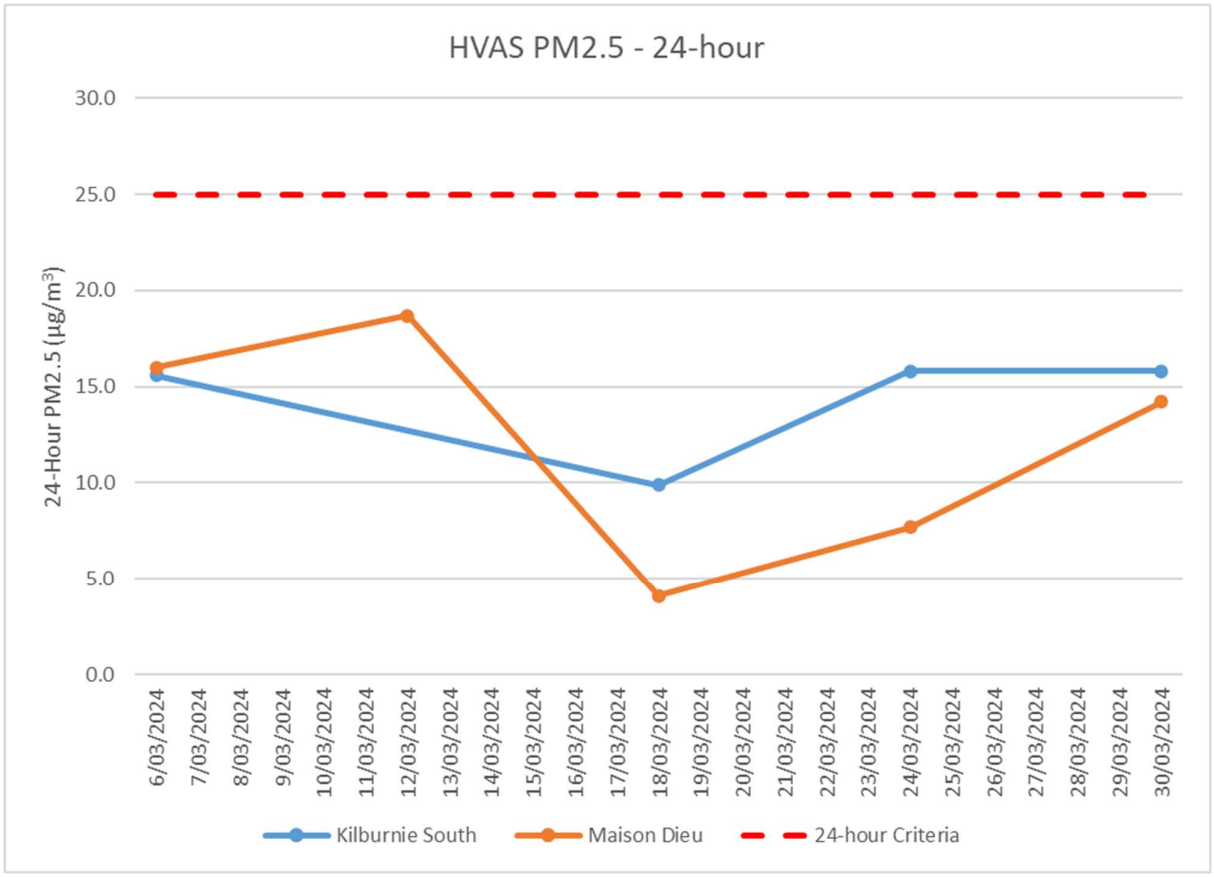

Figure 8: Results for the Reporting Period

2.3.2.2 | PERFORMANCE AGAINST LONG TERM IMPACT ASSESSMENT CRITERIA

Figure 9 shows the year-to-date annual average $PM_{2.5}$ results. During the reporting period, the Kilburnie South monitor annual average year to date results were above the $PM_{2.5}$ Annual Rolling Mean criteria of 8µg/m^3.

An assessment of HVO's contribution against the long-term impact assessment criteria will be provided in the 2024 Annual Review.

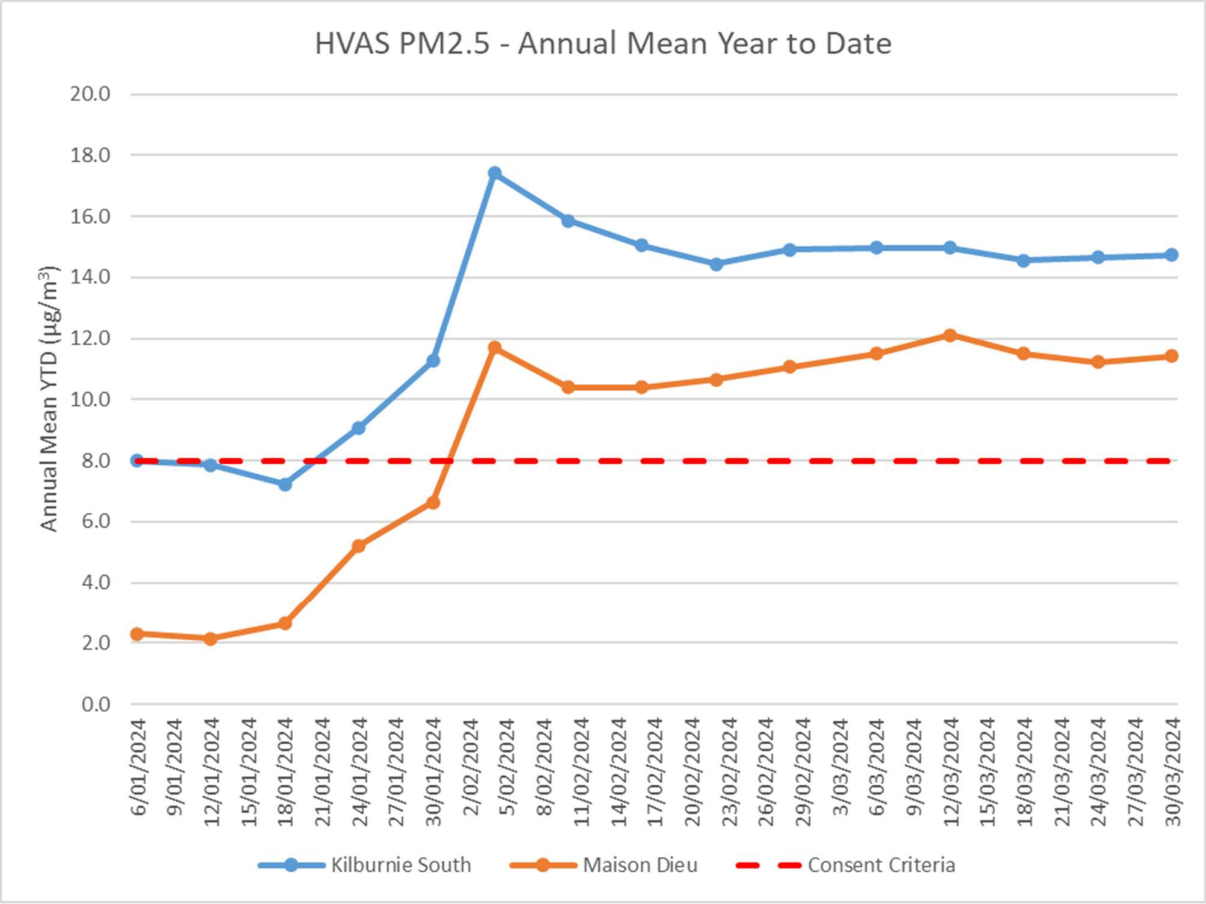

Figure 9: Year to Date Average $PM_{2.5}$ as at end of the Reporting Period

2.3.3 | TSP RESULTS

2.3.3.1 | PERFORMANCE AGAINST LONG TERM IMPACT ASSESSMENT CRITERIA

Figure 10 shows the annual average TSP results compared against the long-term impact assessment criteria of 90µg/m^3.

Five of the seven monitors were below the relevant long-term impact assessment criteria during the reporting period. The Warkworth and Knodlers Lane monitors were greater than the long-term impact assessment criteria during the reporting period.

An assessment of HVO's contribution against the long-term impact assessment criteria will be provided in the 2024 Annual Review.

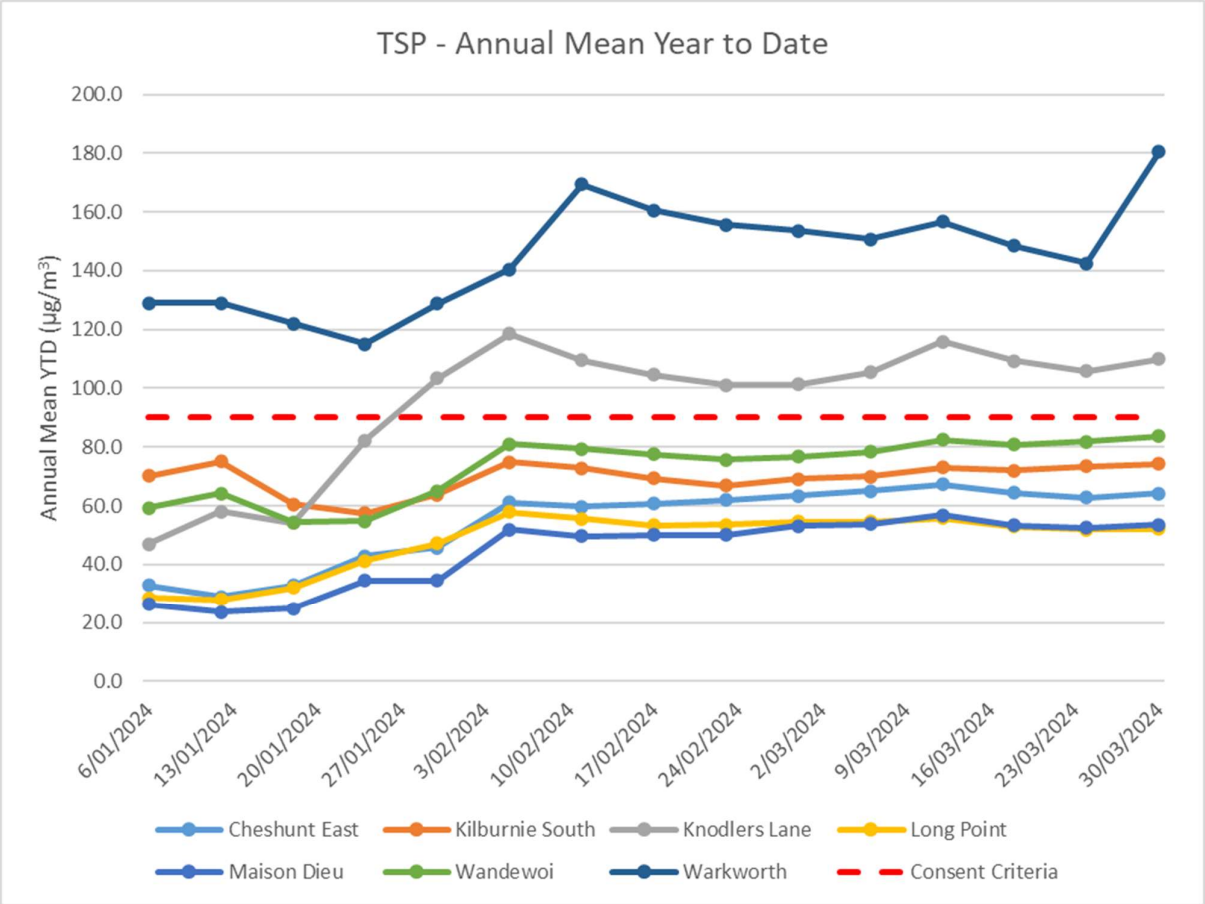

Figure 10: Year to Date Average Total Suspended Particulates as at end of the Reporting Period

2.3.4 | REAL TIME PM_{10} RESULTS

HVO maintains a network of real time PM_{10} monitors. The real time air quality monitoring stations continuously record information and transmit data to a central database, generating alarms when particulate matter levels exceed internal trigger levels. Results from real time PM_{10} monitoring are used as a reactive measure to guide mining operations to help achieve compliance with the relevant conditions of the project approval.

Figure 11 shows the daily 24-hour average PM_{10} result from the real time monitoring sites. During the reporting period, daily results were below the 24-hr average criteria of 50µg/m^3 with the exception of:

- Knodler's Lane monitor on 13 and 14 March; and
- Jerrys Plains on 13 March.

These exceedances were investigated internally by HVO and it was found that the maximum calculated HVO contribution was below the compliance limit.

Figure 12 shows the annual rolling average PM_{10} results from the real time monitoring sites. The annual average results for all monitors are currently below the relevant long-term impact assessment criteria for the reporting period.

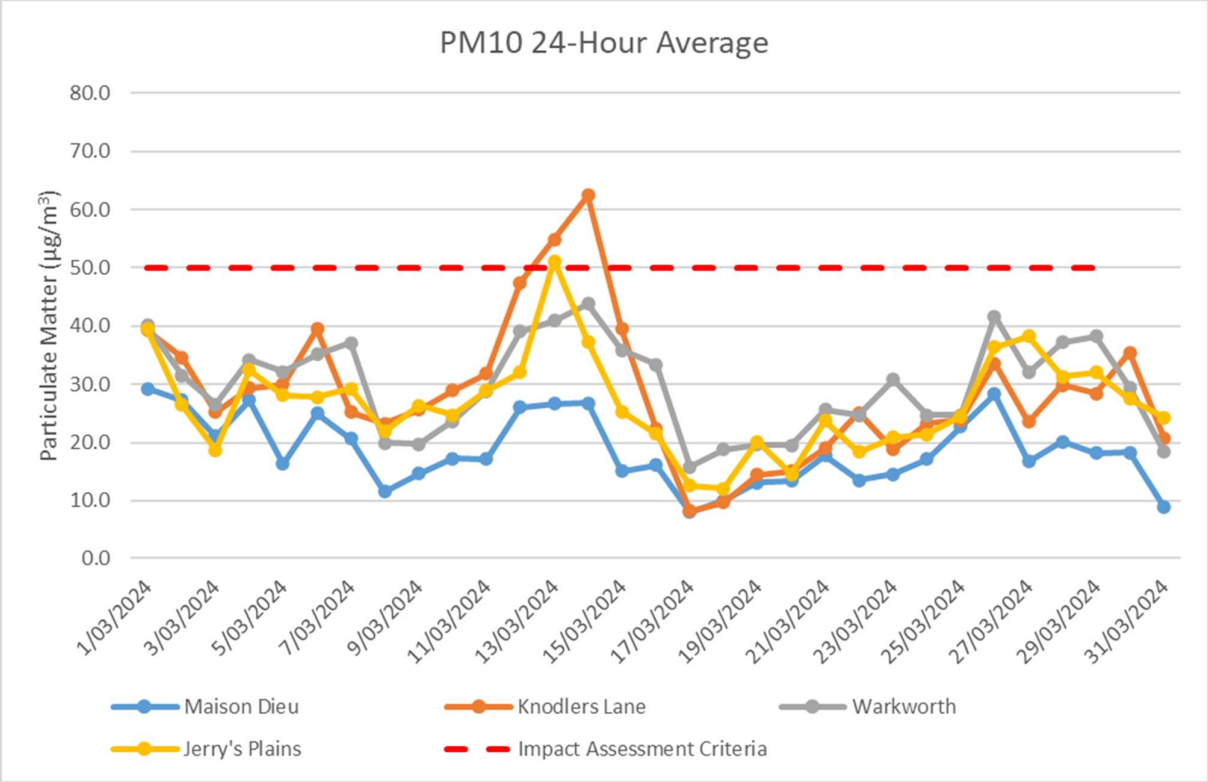

Figure 11: Real Time PM_{10} 24hr for the Reporting Period

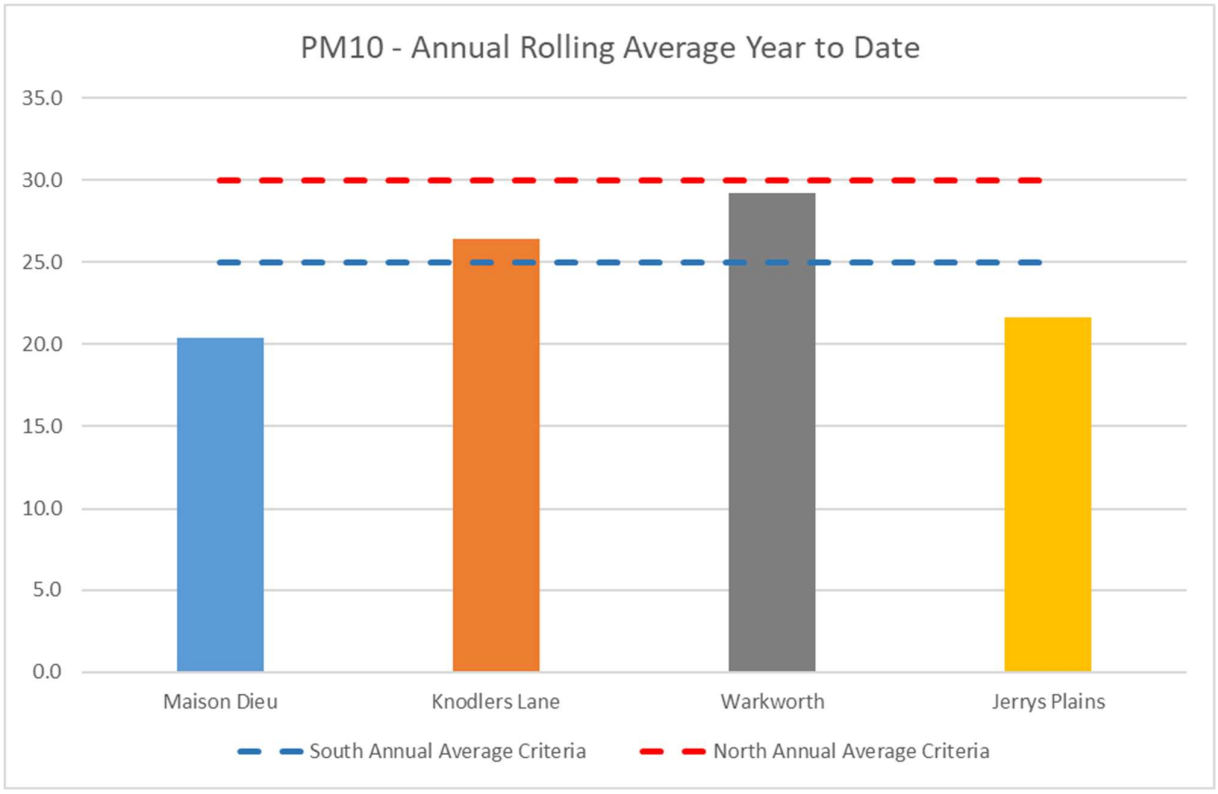

Figure 12: Real Time PM_{10} Annual Average for the Reporting Period

2.3.5 | REAL TIME ALARMS FOR AIR QUALITY

The real time monitoring system generated ninety-four (94) automated air quality related alarms during the reporting period. Thirty-seven (37) alarms related to adverse weather conditions (wind or rain) and fifty-seven (57) alarms related to dust conditions.

3 | WATER QUALITY

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

3.1 | SURFACE WATER

Surface watercourses are sampled on a quarterly sampling regime. Water quality is assessed through the parameters of pH, electrical conductivity (EC) and Total Suspended Solids (TSS). The location of surface water monitoring points across HVO is shown in **Figure 13.**

Results from monitoring on site dams, the Hunter River and other natural tributaries are provided in **Figure 14 to 25**.

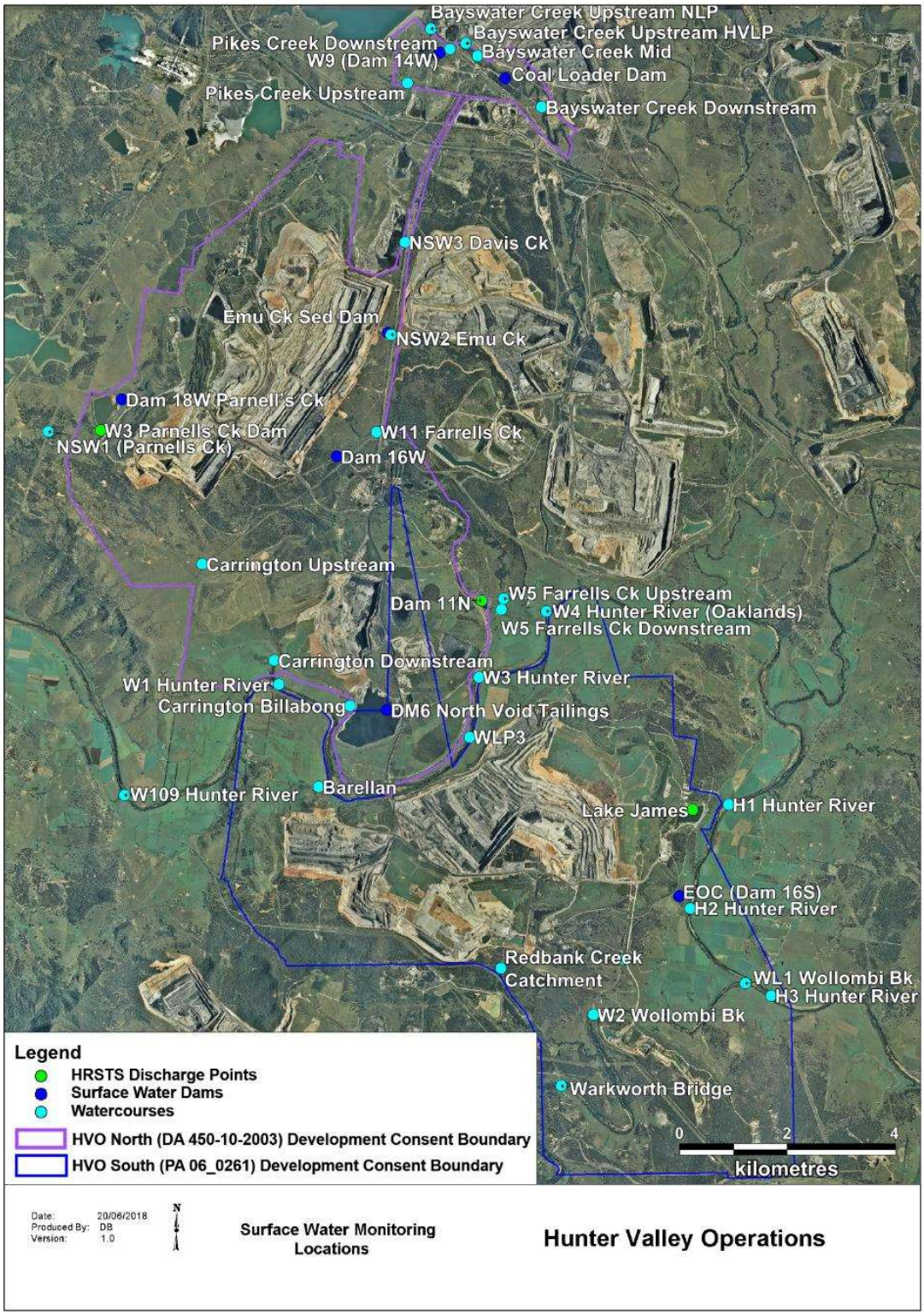

Figure 13: HVO Surface Water Monitoring Locations

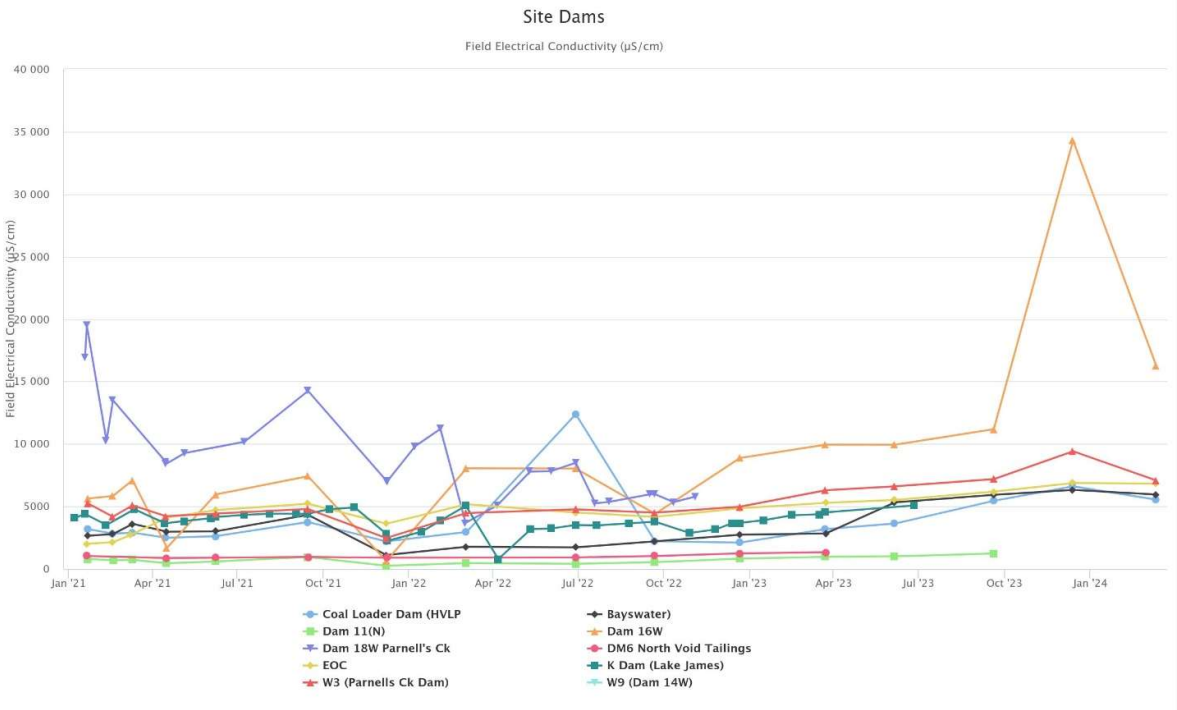

Figure 14 Site Dams Electrical Conductivity - March 2024

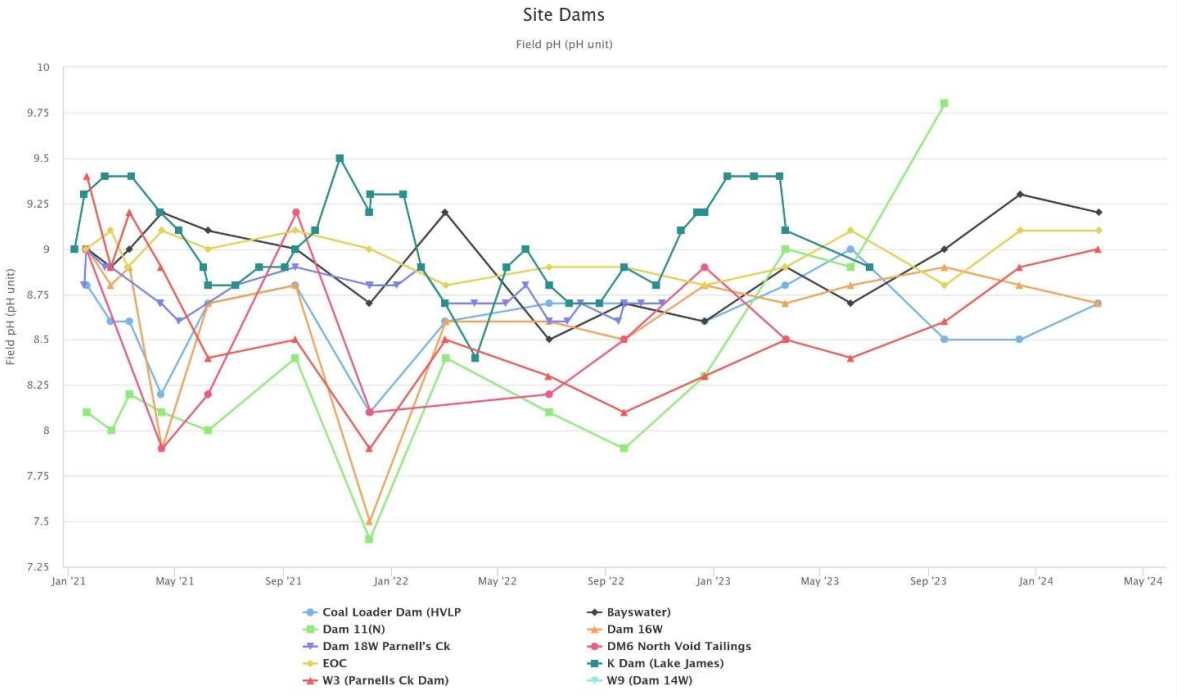

Figure 15 Site Dams Field pH - March 2024

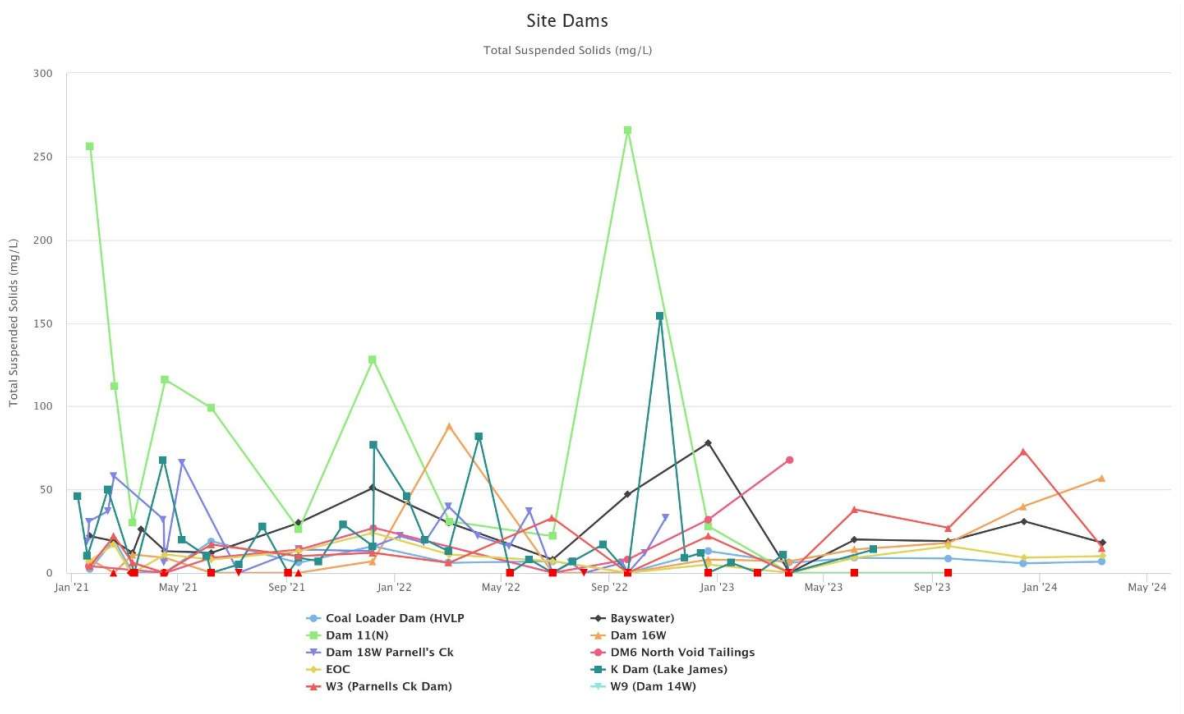

Figure 16 Site Dams Total Suspended Solids - March 2024

Figure 17 Wollombi Brook Electrical Conductivity - March 2024

Figure 18 Wollombi Brook Field pH - March 2024

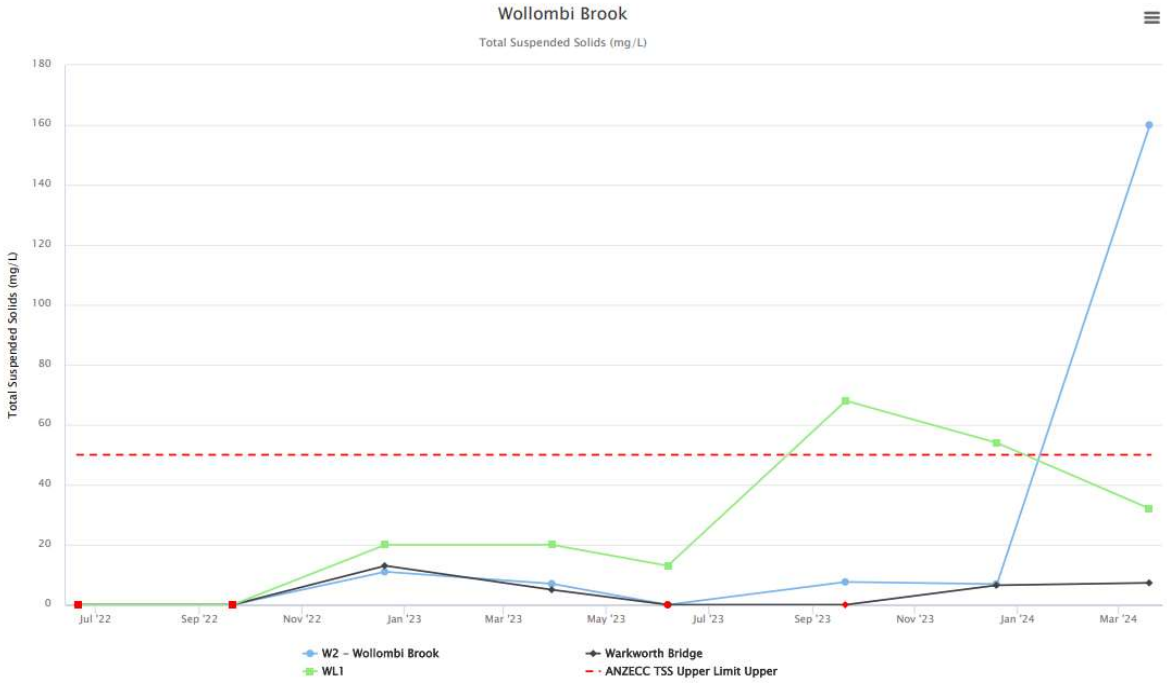

Figure 19 Wollombi Brook Total Suspended Solids - March 2024

Figure 20 Hunter River Electrical Conductivity - March 2024

Figure 21 Hunter River Field pH - March 2024

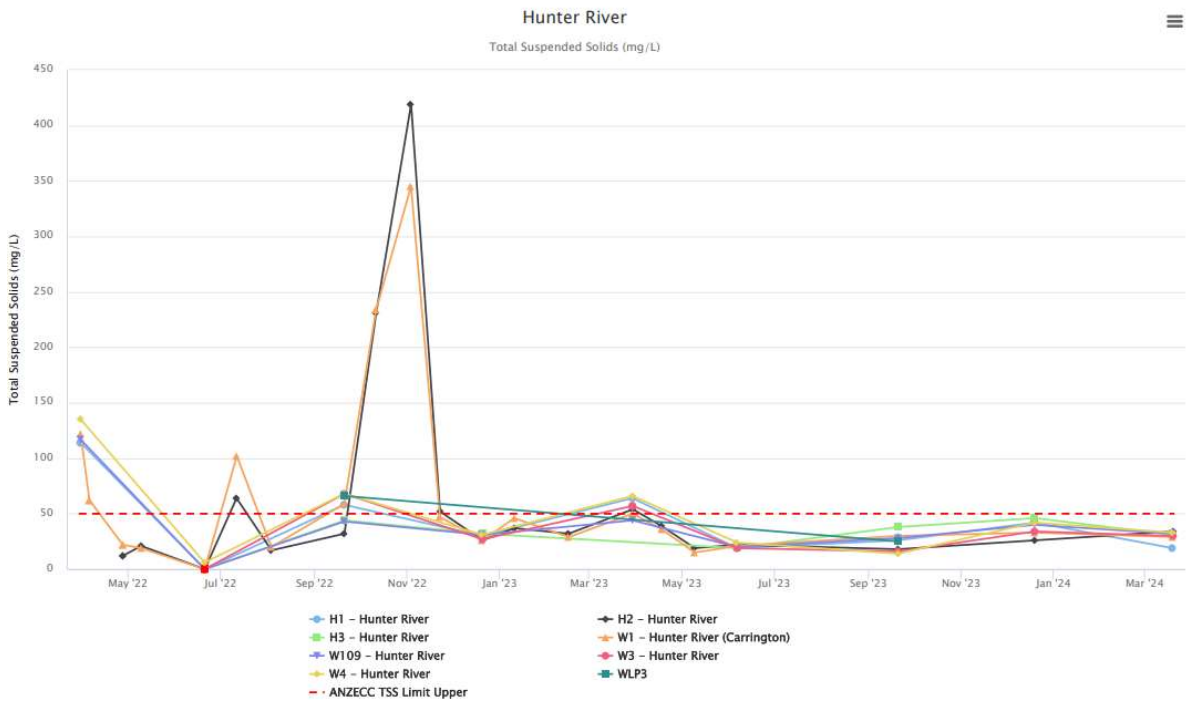

Figure 22 Hunter River Field TSS - March 2024

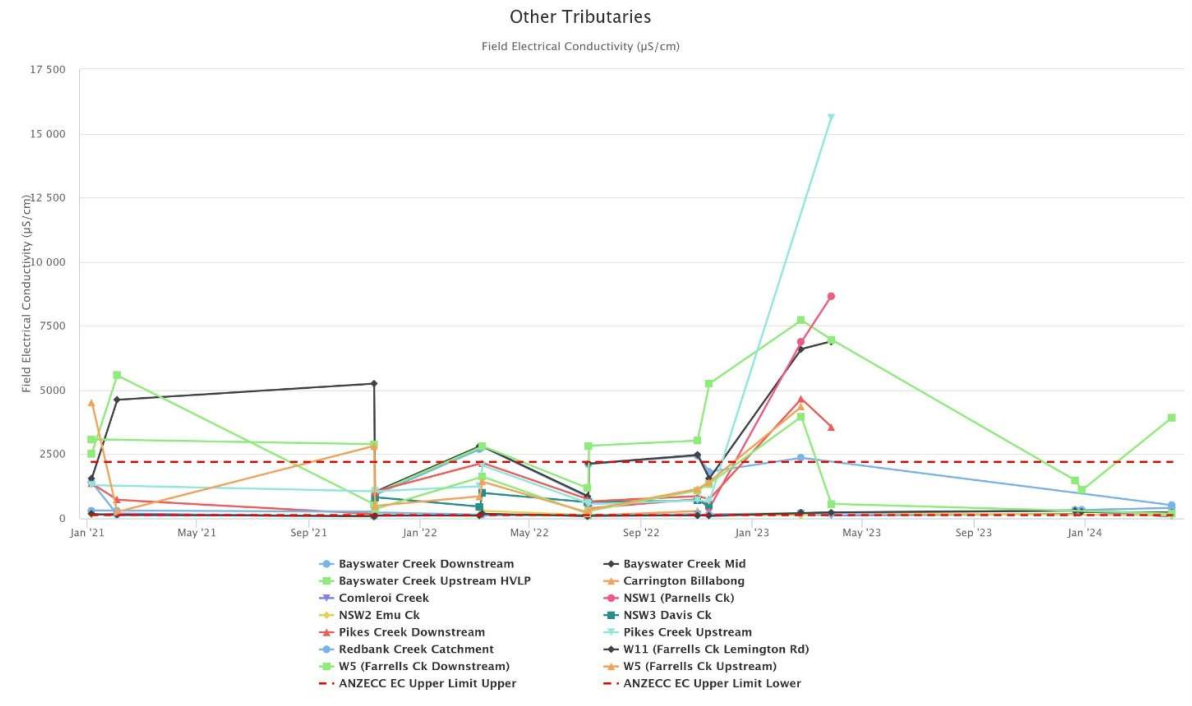

Figure 23 Other Tributaries Electrical Conductivity - March 2024

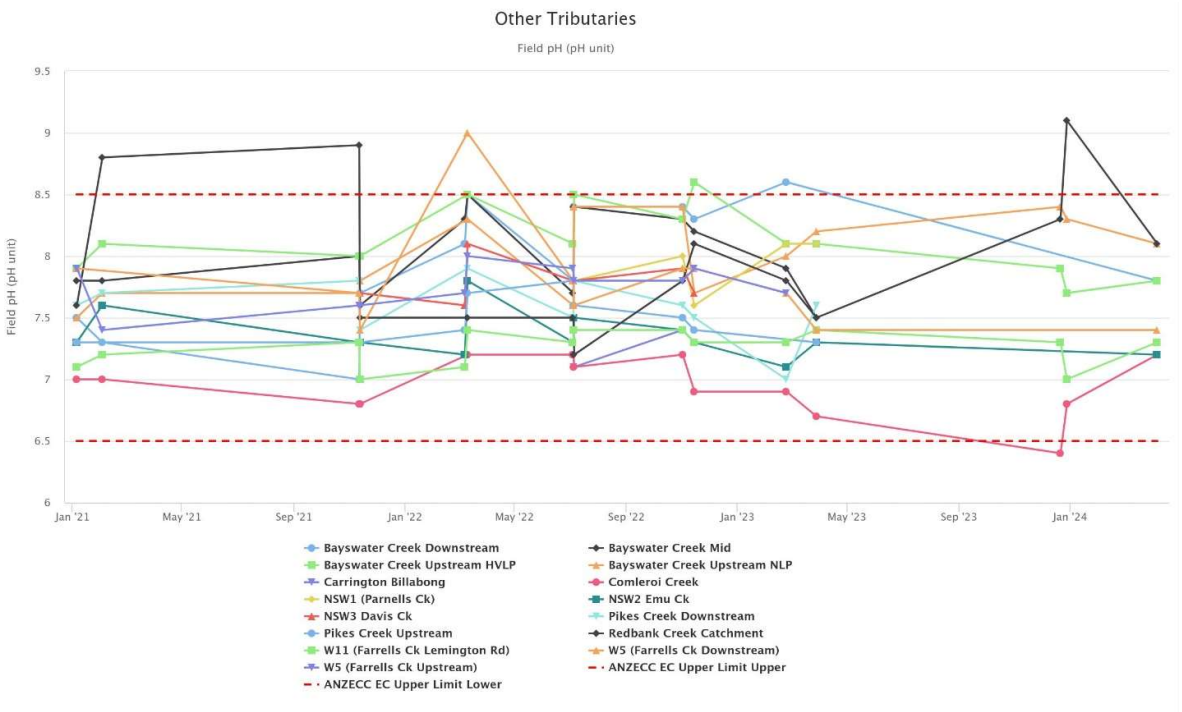

Figure 24 Other Tributaries Field pH - March 2024

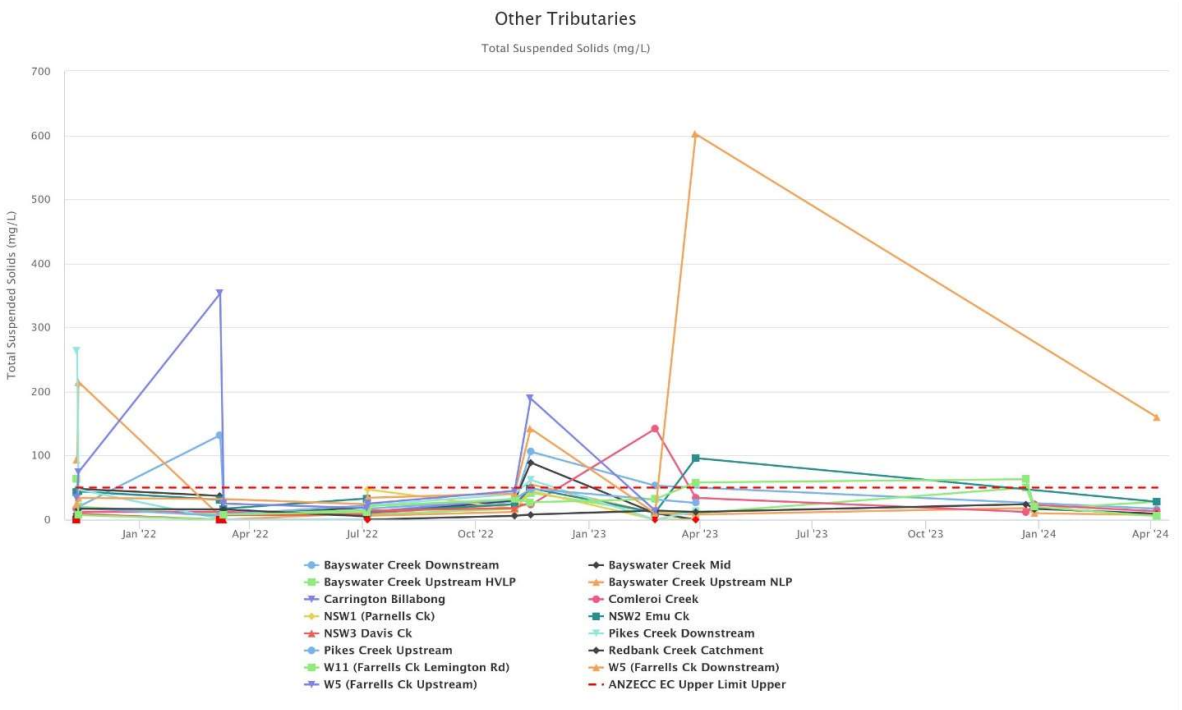

Figure 25 Other Tributaries Total Suspended Solids - March 2024

3.1.1 | 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 HVO Water Management Plan.

Surface water trigger tracking results are summarised in **Table 2**.

Table 2 - Surface Water Trigger Tracking - Q1 2024

Site	Date	Trigger Limit Breached	Response Action
W2 - Wollombi Brook	11/03/2024	Total Suspended Solids	No investigation required - first trigger exceedance
W2 - Wollombi Brook	19/03/2024	Field Electrical Conductivity	No investigation required - second consecutive trigger exceedance
H2 - Hunter River	29/03/2024	Total Suspended Solids (mg/L)	First Exceedance of TSS. Investigation: There were no onsite events identified to indicate that the TSS exceedance was associated with a HVO mining impact. The TSS exceedance appears to be a result of rainfall prior to sampling leading to elevated suspended solids concentrations in broader catchment runoff. Action: Continue monitoring this location for further trigger exceedances.

3.2 | SITE WATER USE

HVO is permitted to extract water from the Hunter River under water allocation licenses issued by Water NSW.

HVO did not extract water from the Hunter River during the reporting period.

3.3 | HRSTS DISCHARGE

HVO participates in the Hunter River Salinity Trading Scheme (HRSTS), allowing 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.

HVO did not undertake any HRSTS discharges during the reporting period.

3.4 | GROUNDWATER MONITORING RESULTS

Groundwater monitoring is undertaken on a quarterly basis in accordance with the HVO Water Management Plan and Groundwater Monitoring Programme. The location of groundwater monitoring points across HVO are show in **Figure 26**.

Groundwater monitoring results are provided in **Figures 27 to 77**.

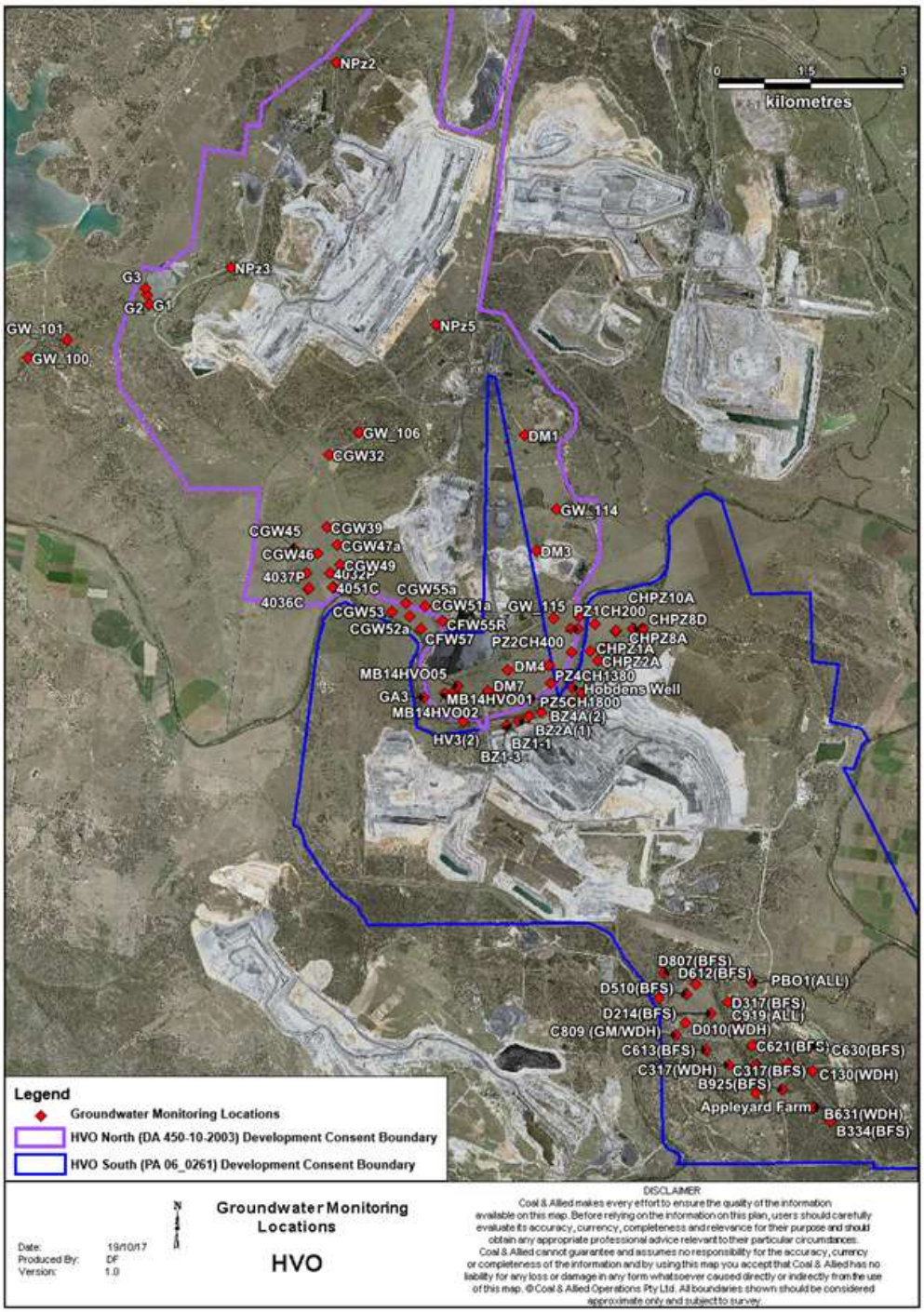

Figure 26: Groundwater Monitoring Locations at HVO

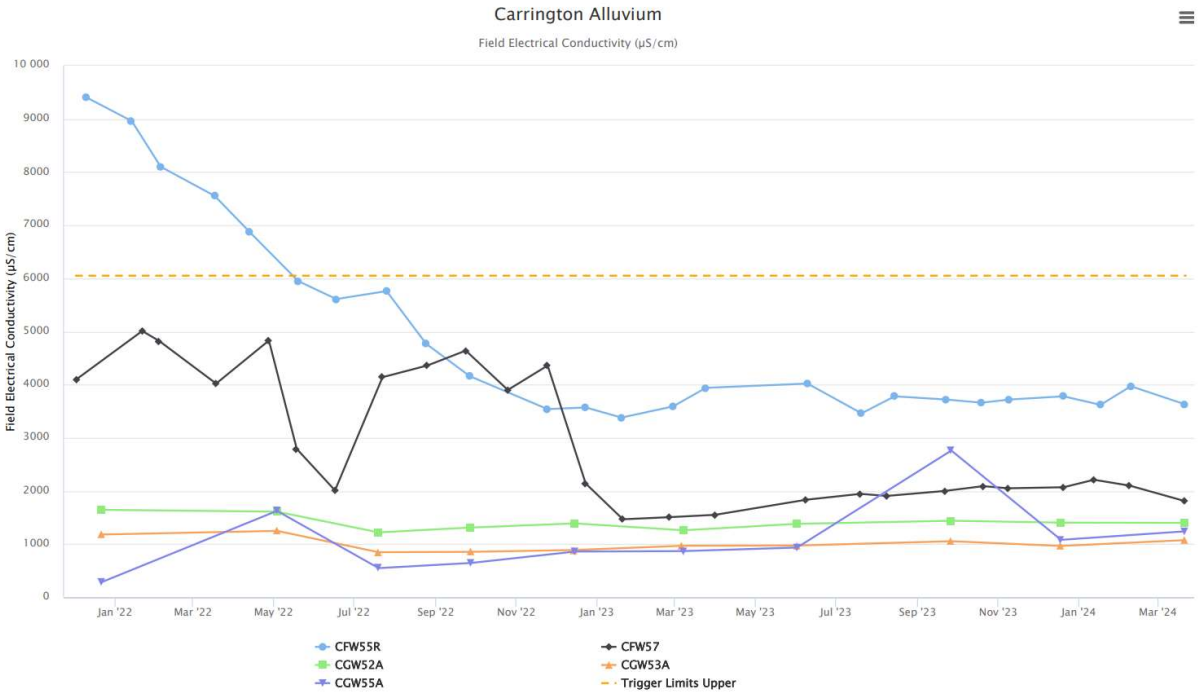

Figure 27 - Carrington Alluvium Electrical Conductivity Trend - Q1 2024

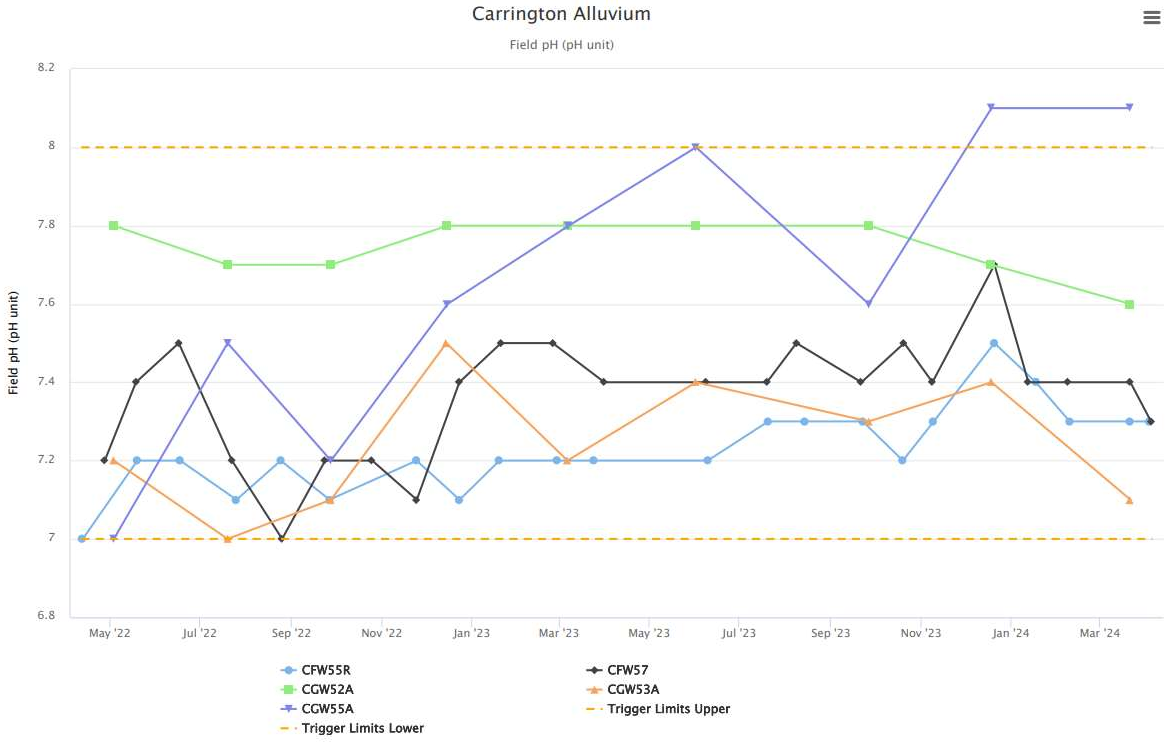

Figure 28 Carrington Alluvium Field pH Trend - Q1 2024

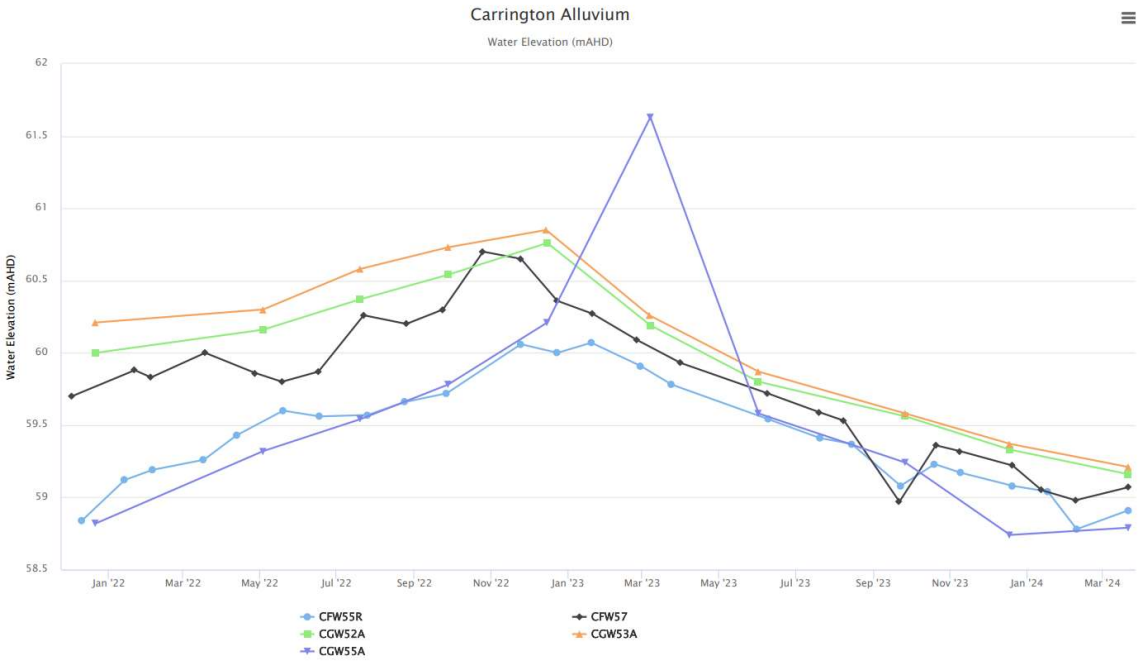

Figure 29 - Carrington Alluvium Water Elevation Trend - Q1 2024

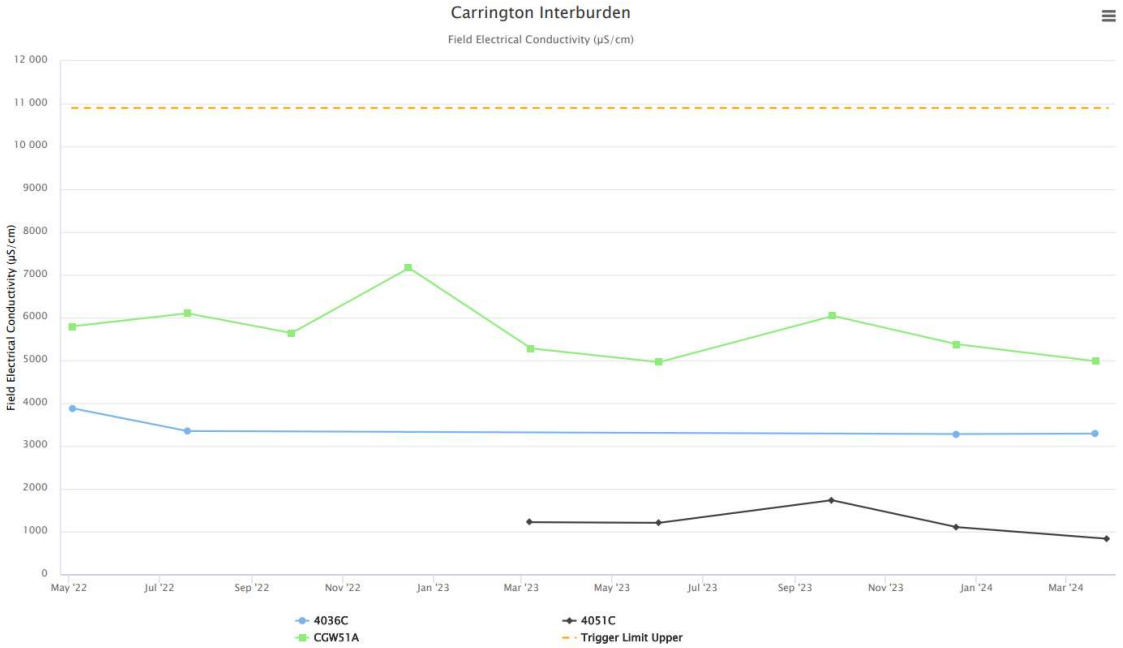

Figure 30 - Carrington Interburden Electrical Conductivity Trend - Q1 2024

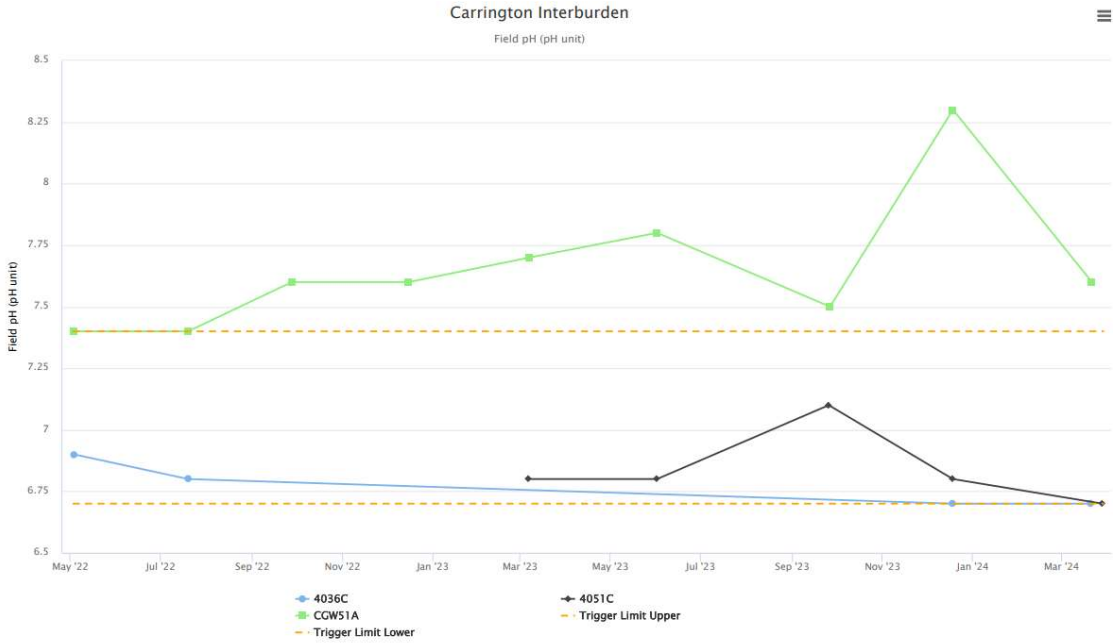

Figure 31 - Carrington Interburden Field pH Trend - Q1 2024

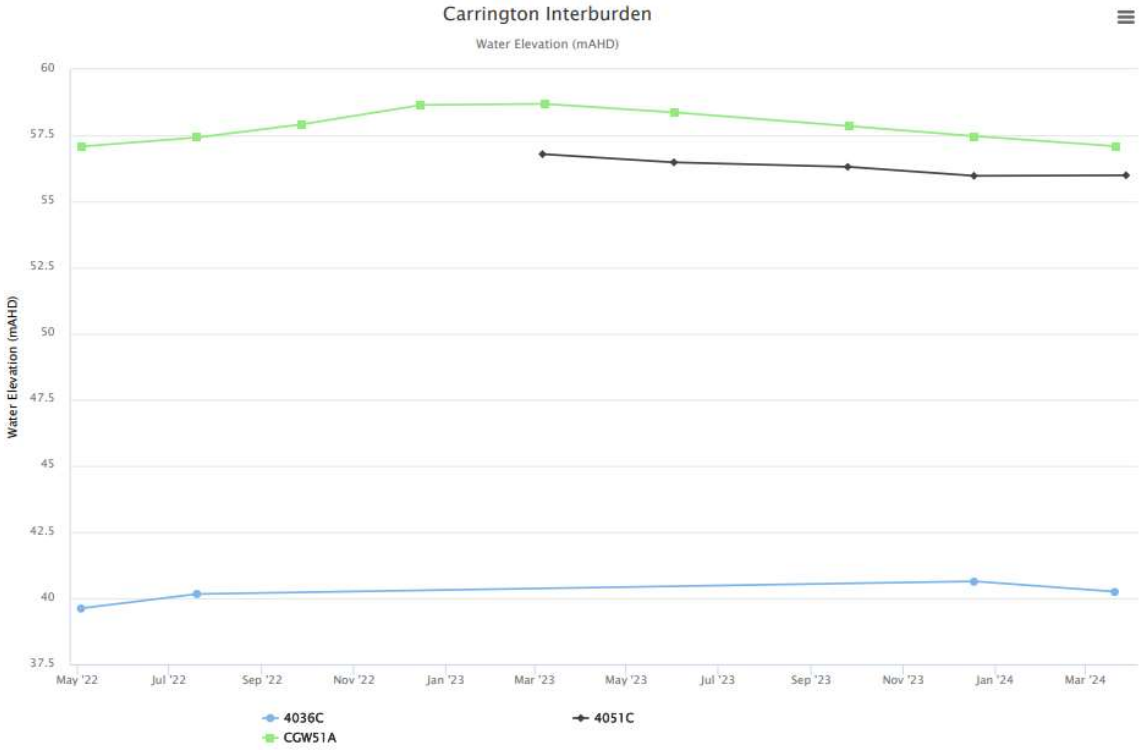

Figure 32 - Carrington Interburden Water Elevation Trend - Q1 2024

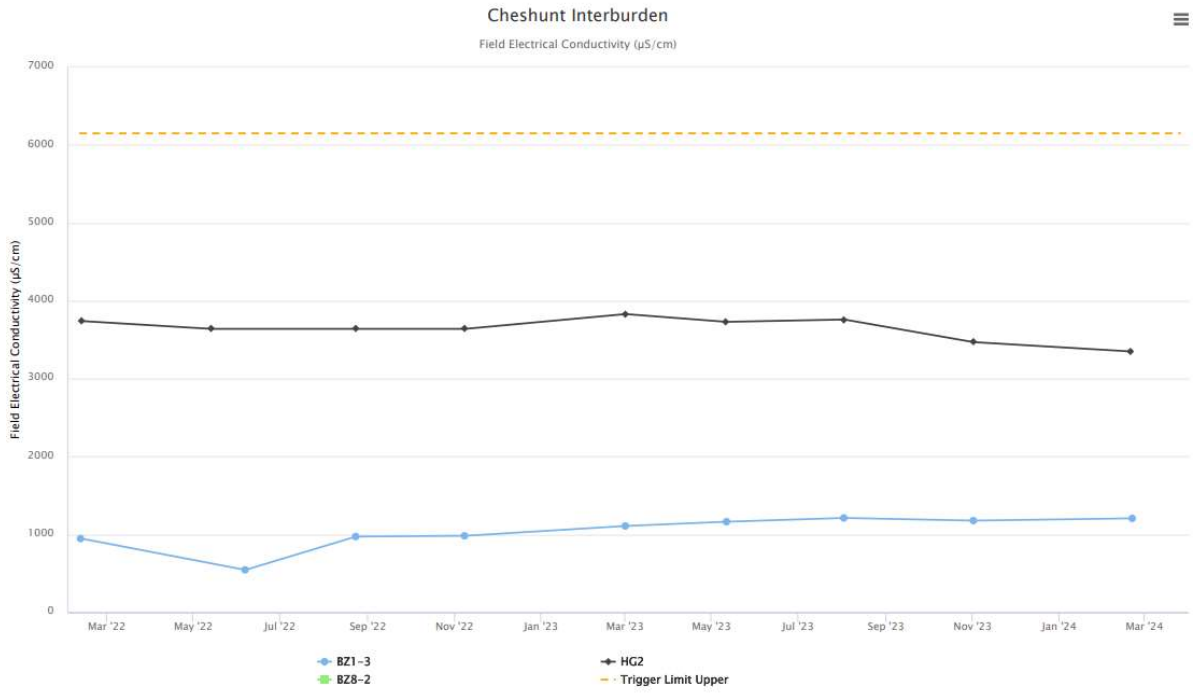

Figure 33 - Cheshunt Interburden Electrical Conductivity Trend - Q1 2024

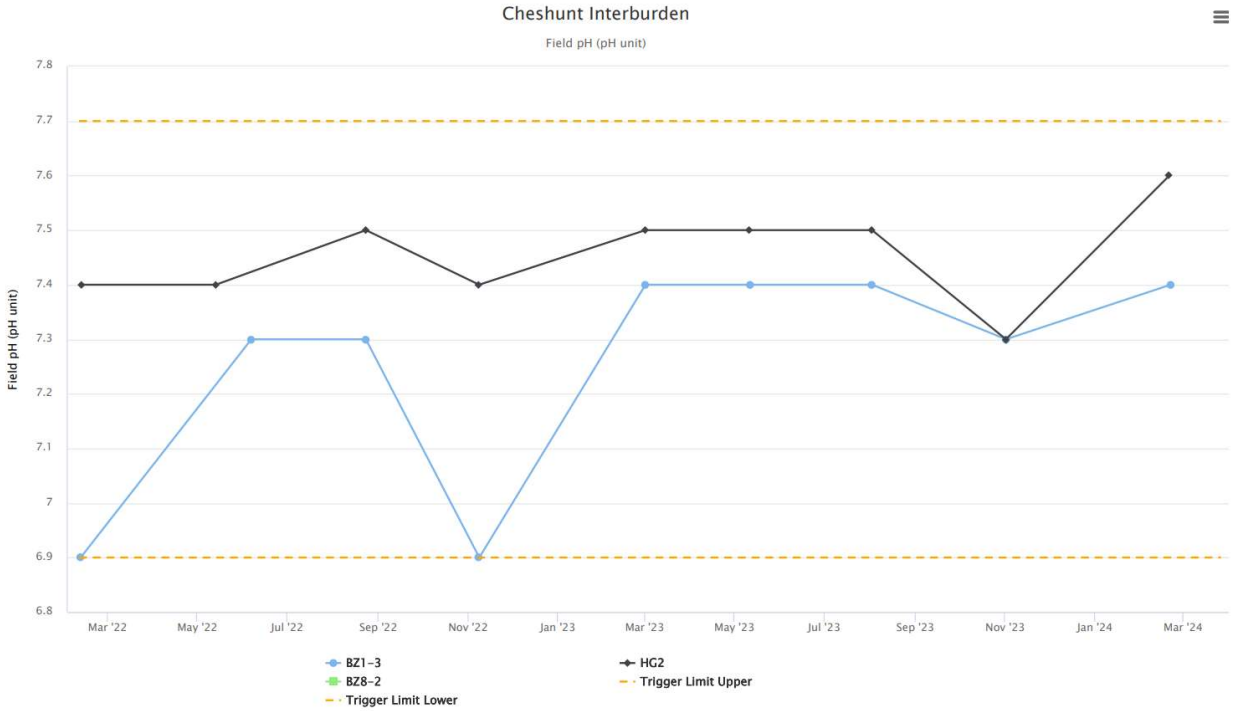

Figure 34 - Cheshunt Interburden Field pH Trend - Q1 2024

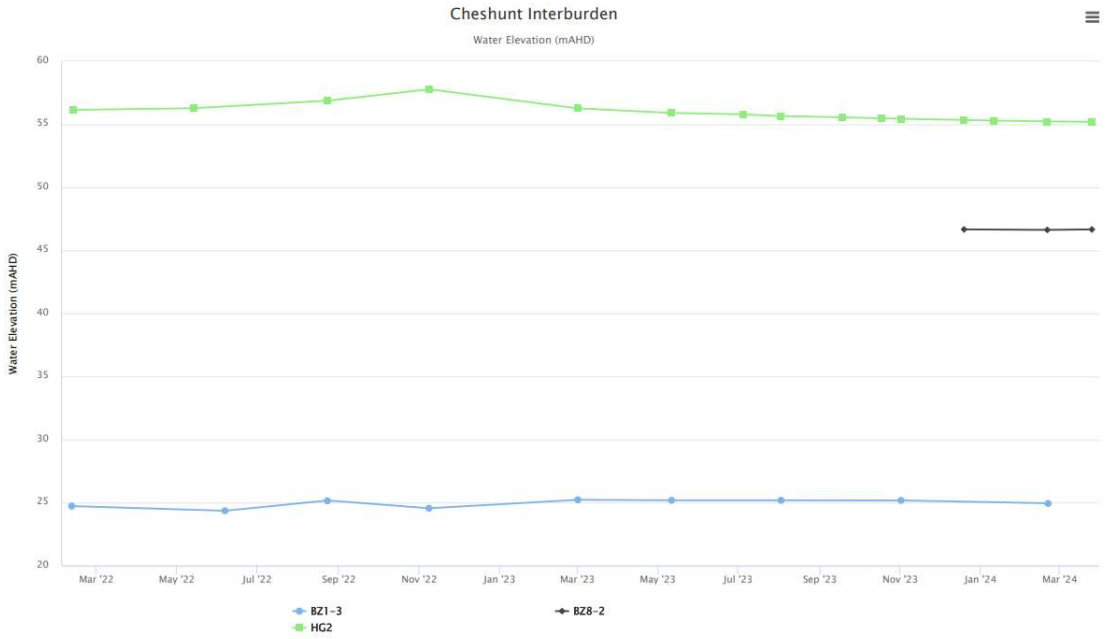

Figure 35 - Cheshunt Interburden Water Elevation Trend - Q1 2024

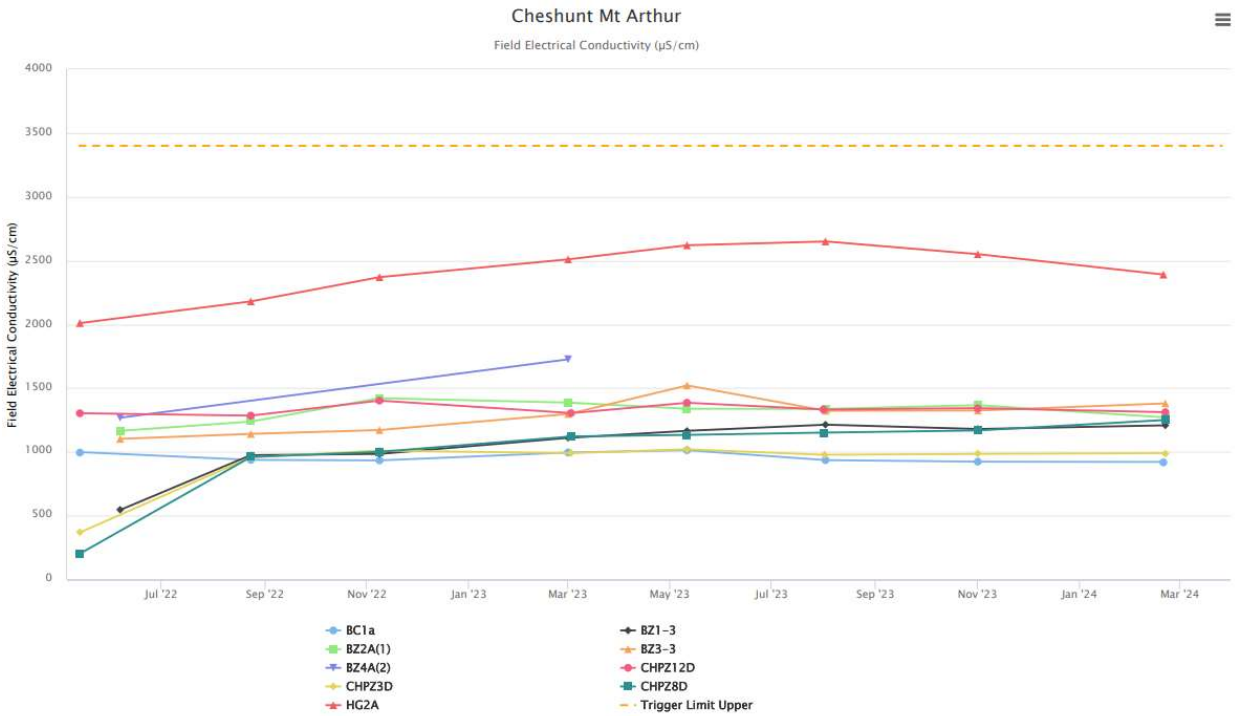

Figure 36 – Cheshunt Mt Arthur Electrical Conductivity Trend – Q1 2024

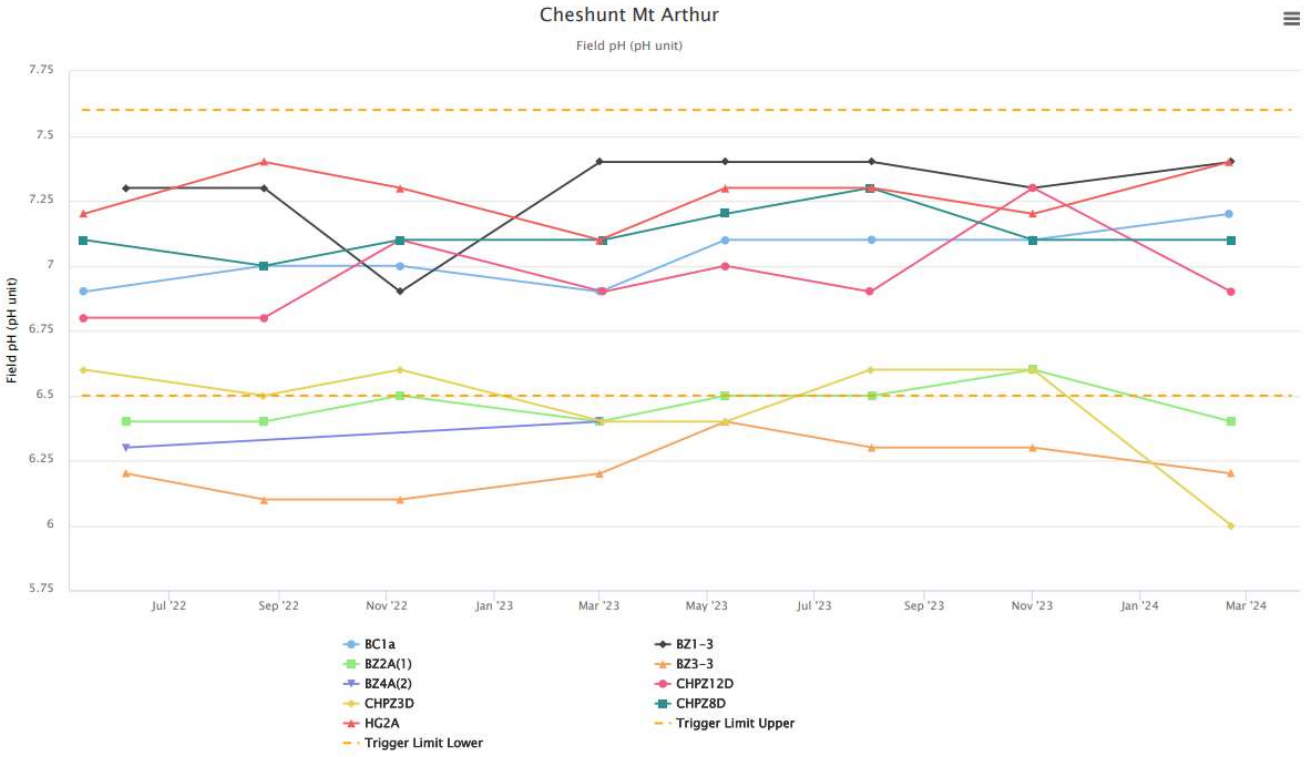

Figure - 37 Cheshunt Mt Arthur Field pH Trend - Q1 2024

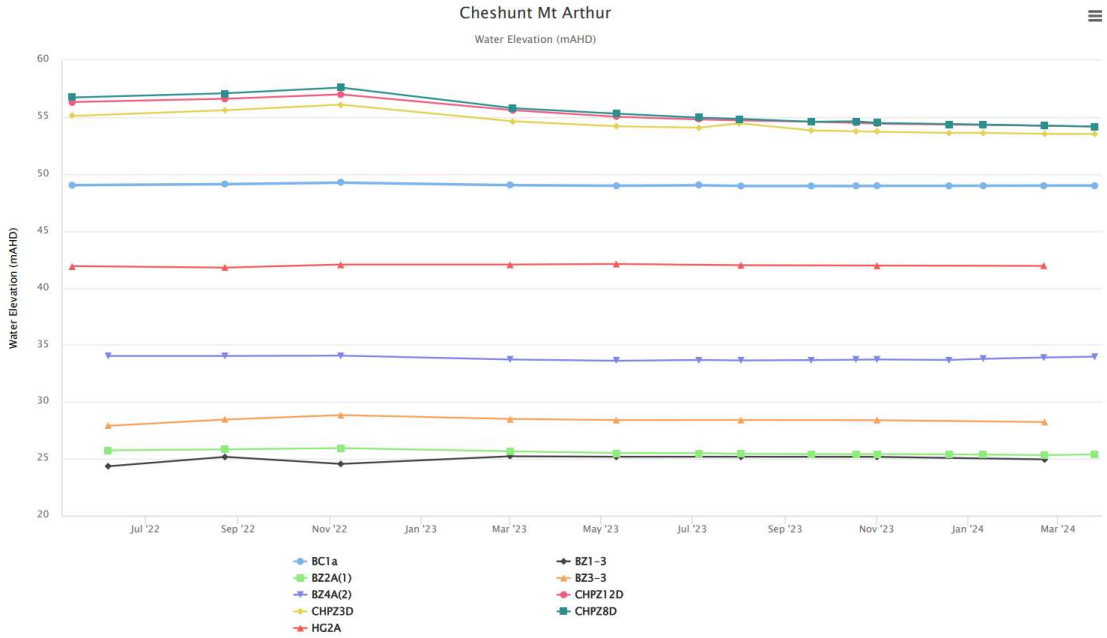

Figure 38 - Cheshunt Mt Arthur Water Elevation Trend - Q1 2024

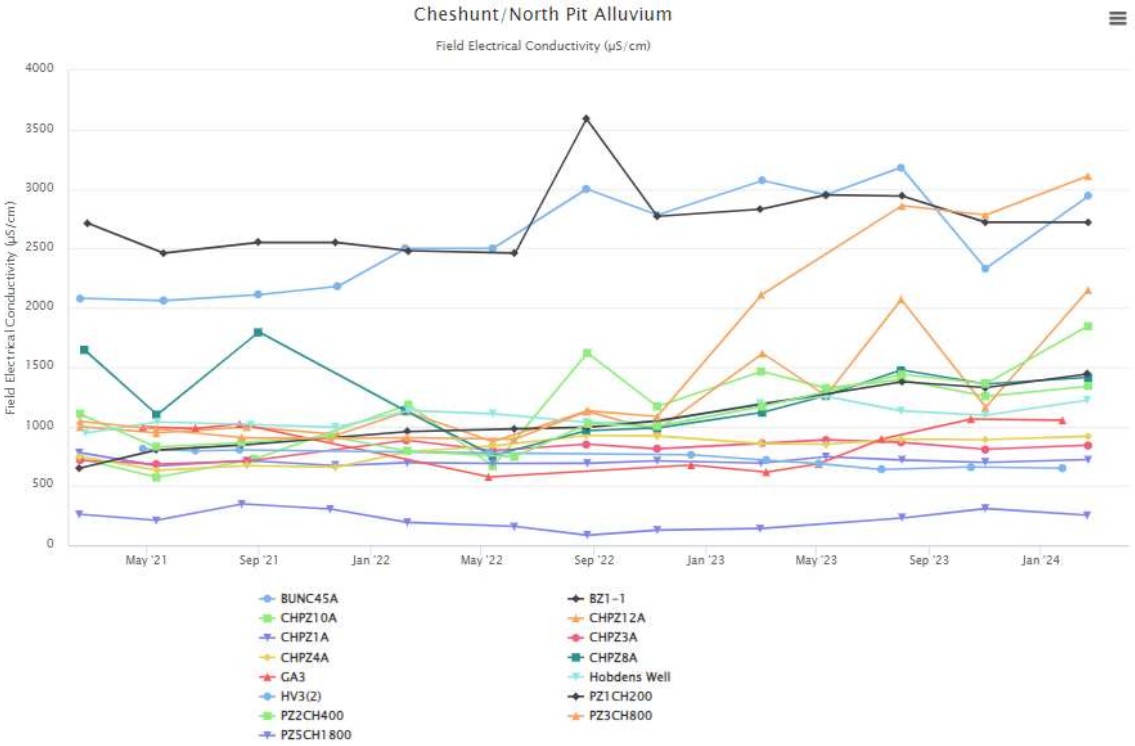

Figure 39 - Cheshunt North Pit Alluvium Electrical Conductivity Trend – Q1 2024

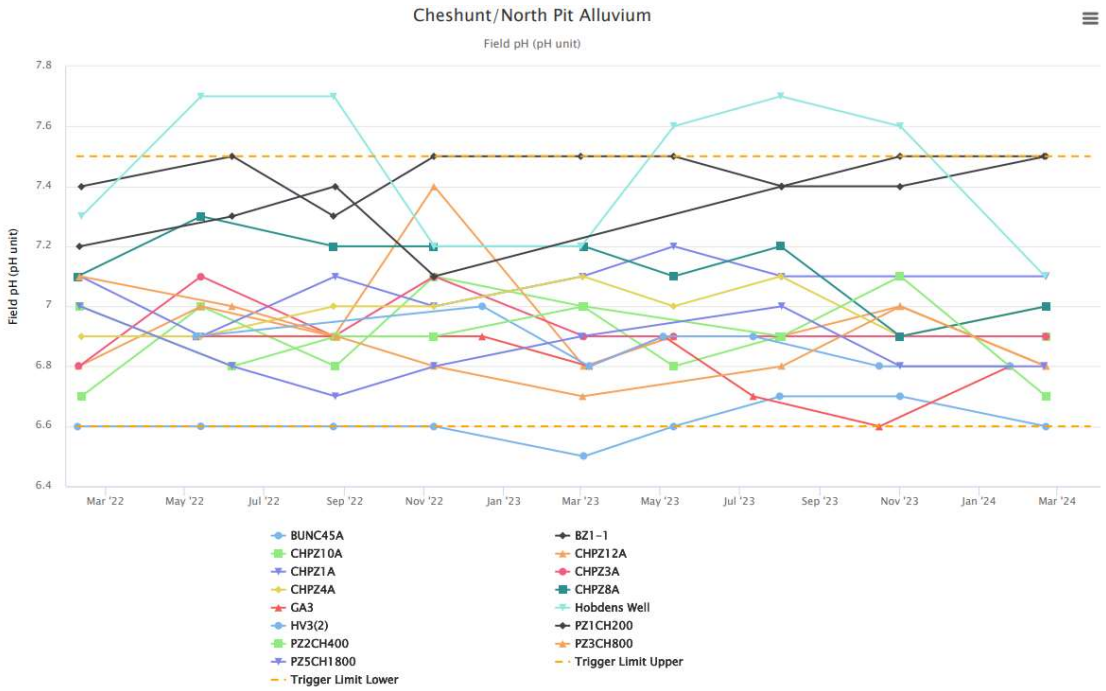

Figure 40 - Cheshunt North Alluvium Field pH Trend – Q1 2024

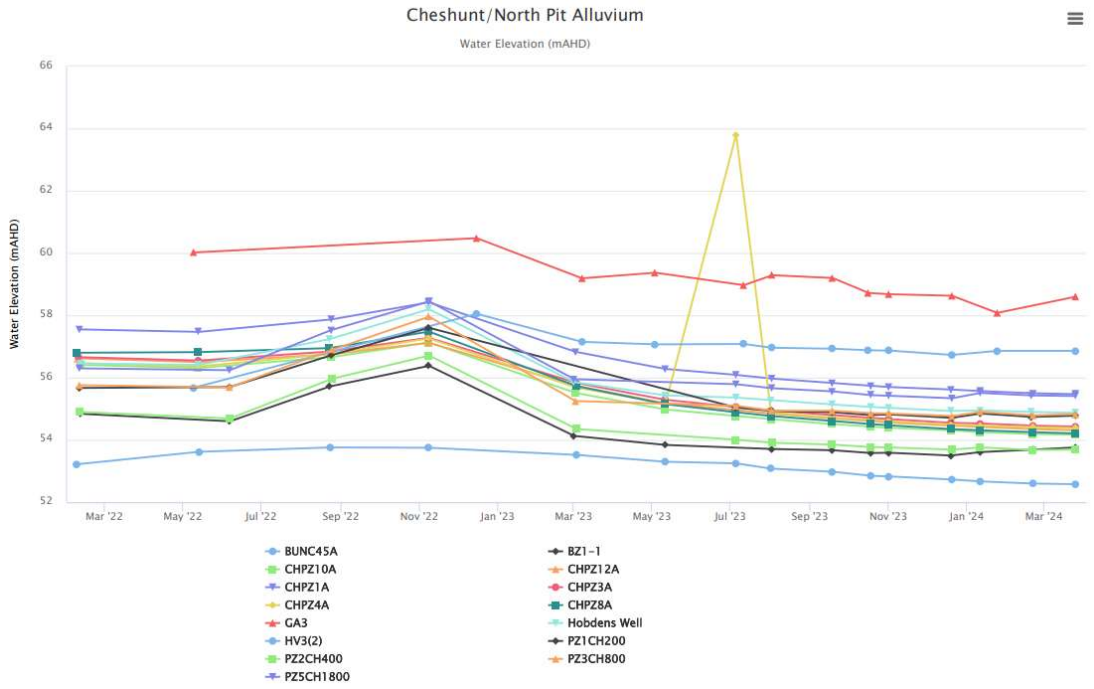

Figure 41 - Cheshunt North Pit Alluvium Water Elevation Trend - Q1 2024

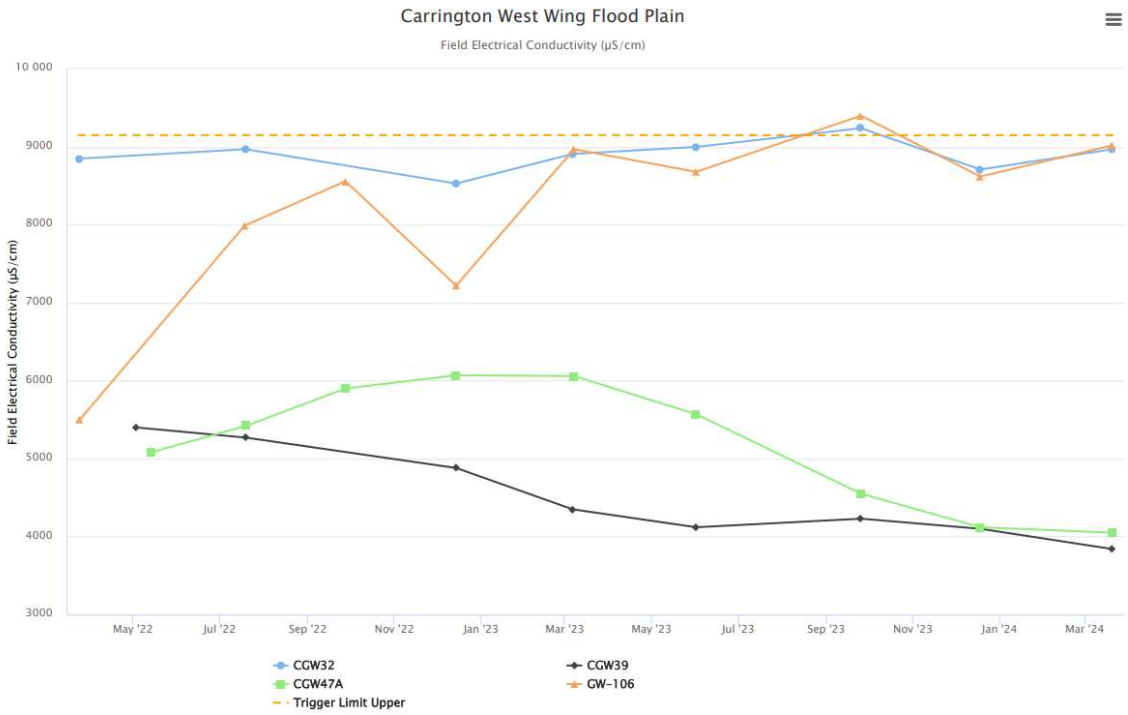

Figure 41 - Carrington West Wing Flood Plain Electrical Conductivity Trend - Q1 2024

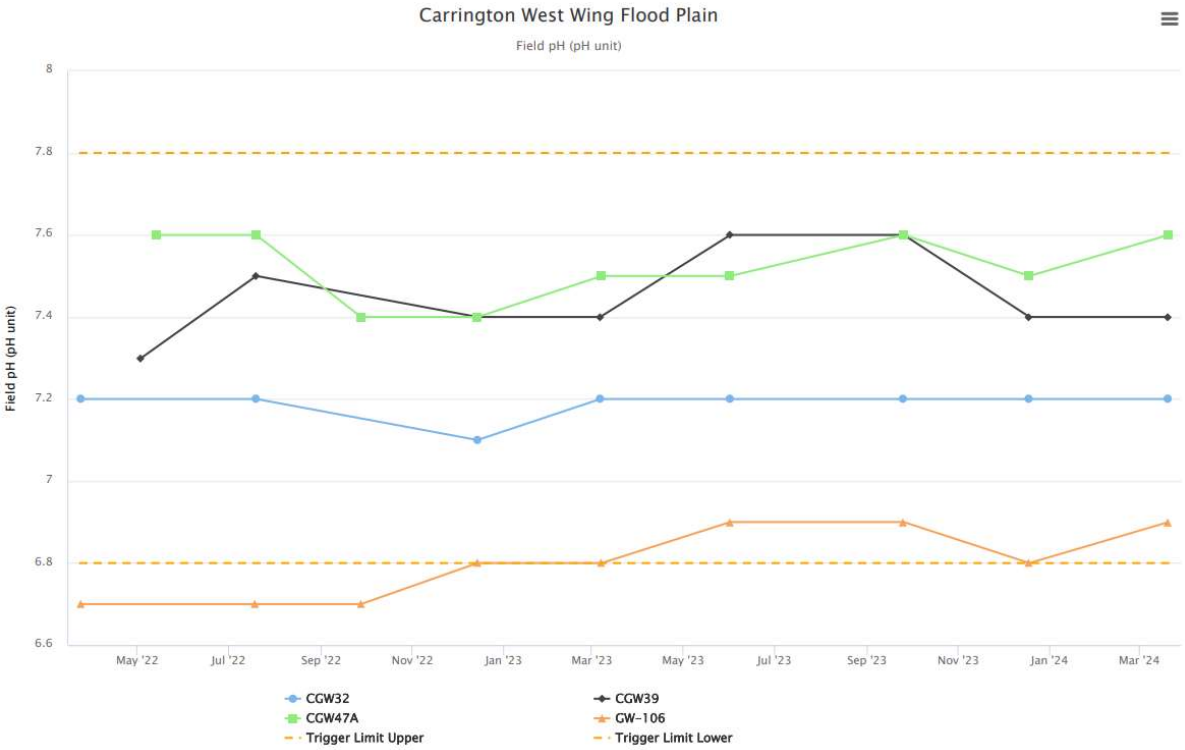

Figure 42 - Carrington West Wing Flood Plain pH Trend - Q1 2024

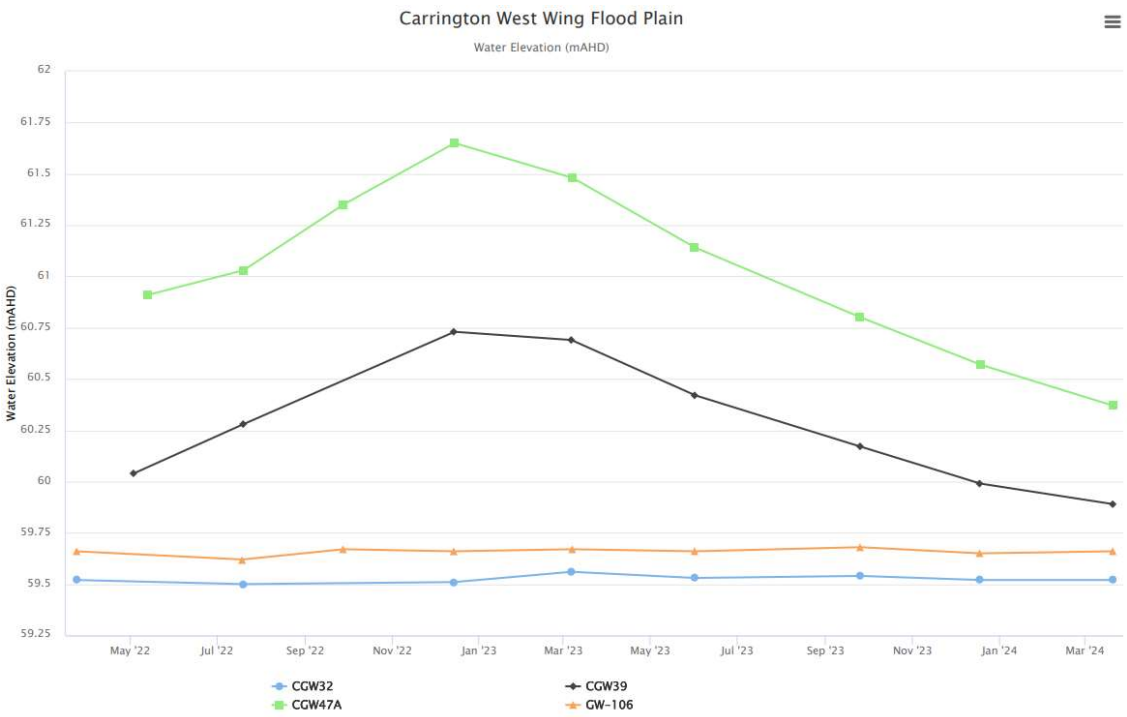

Figure 43 - Carrington West Wing Flood Plain Water Elevation Trend - Q1 2024

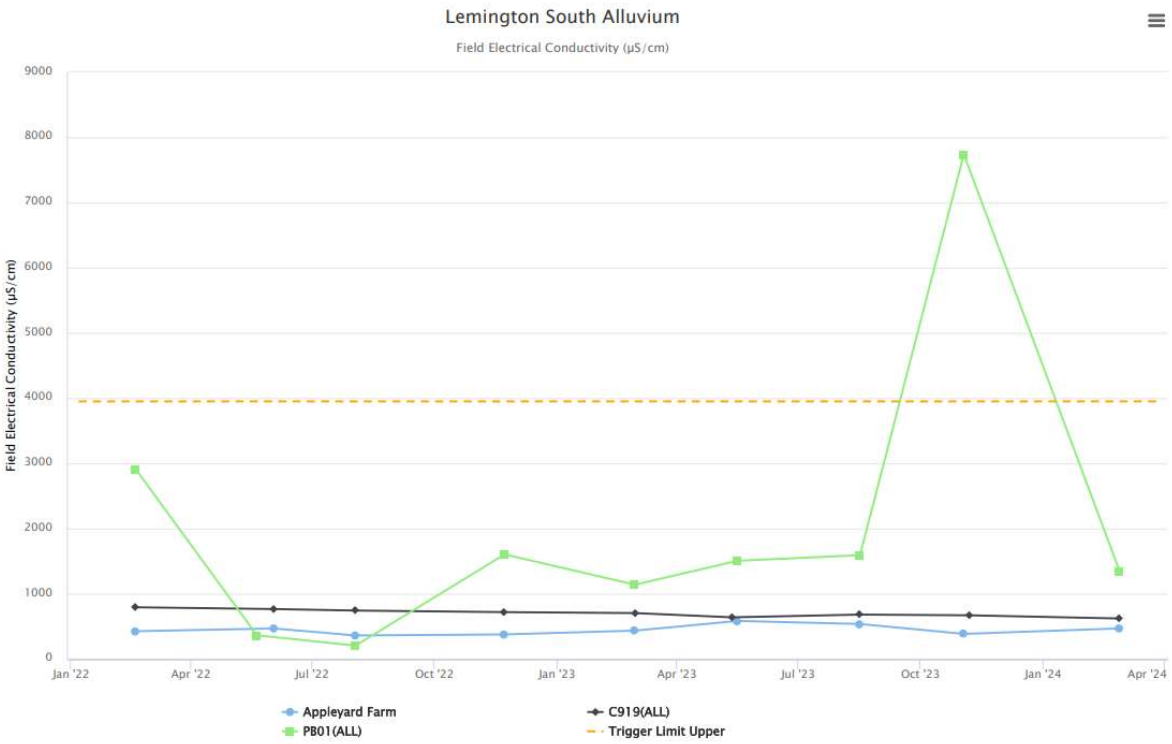

Figure 44 - Lemington South Alluvium Electrical Conductivity Trend - Q1 2024

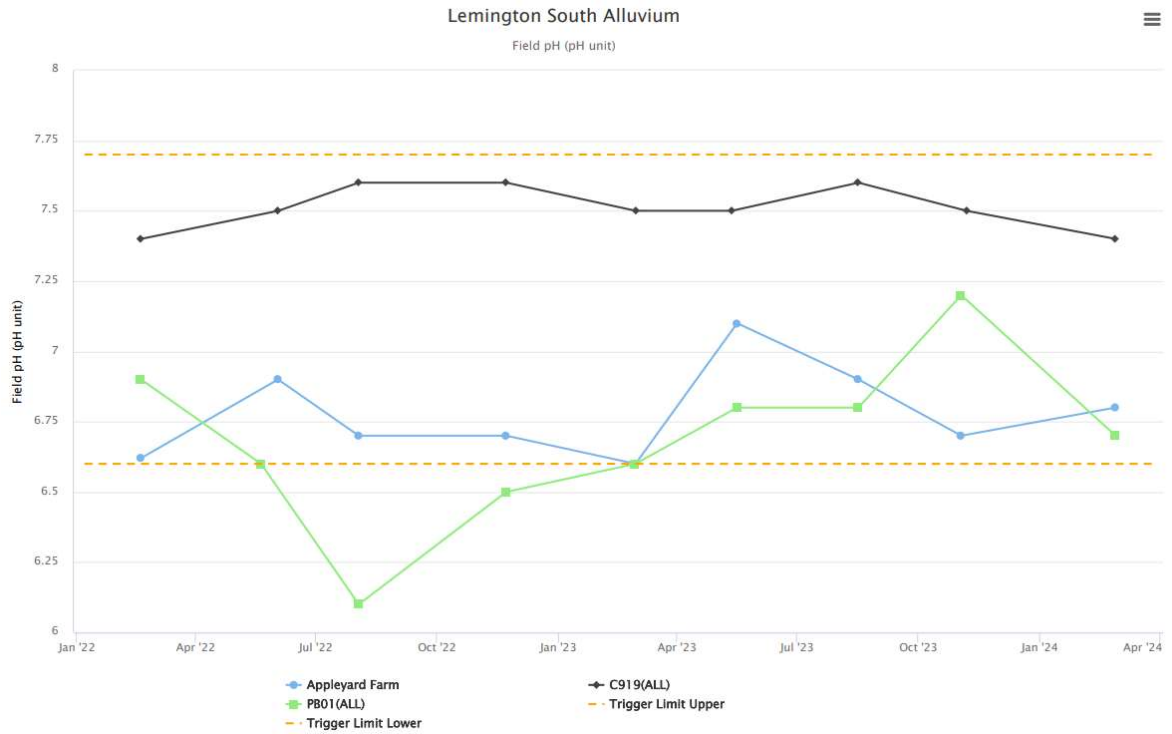

Figure 45 - Lemington South Alluvium Field pH Trend - Q1 2024

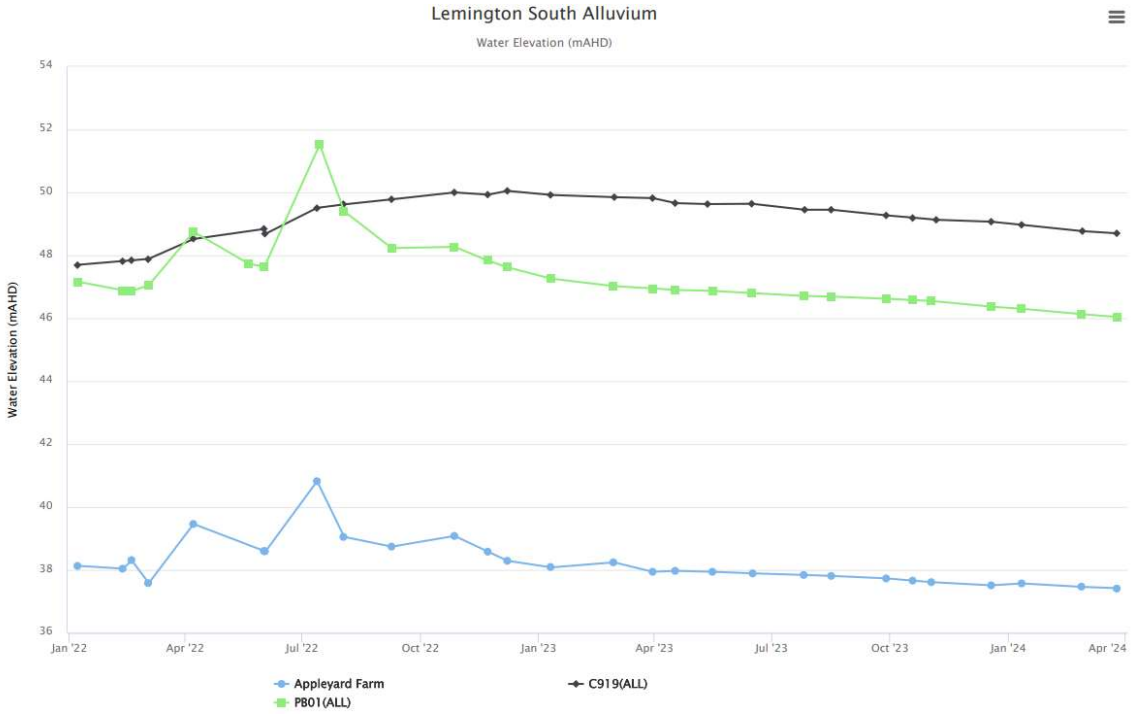

Figure 46 - Lemington South Alluvium Water Elevation Trend - Q1 2024

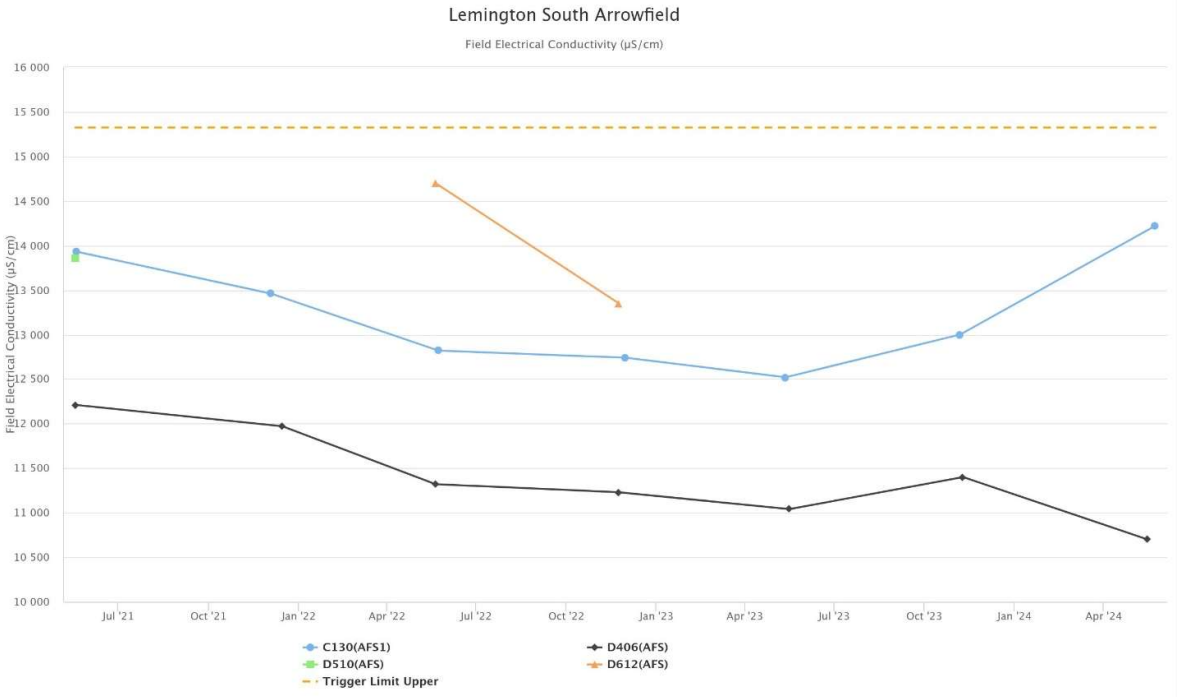

Figure 47 - Lemington South Arrowfield Electrical Conductivity Trend - Q1 2024

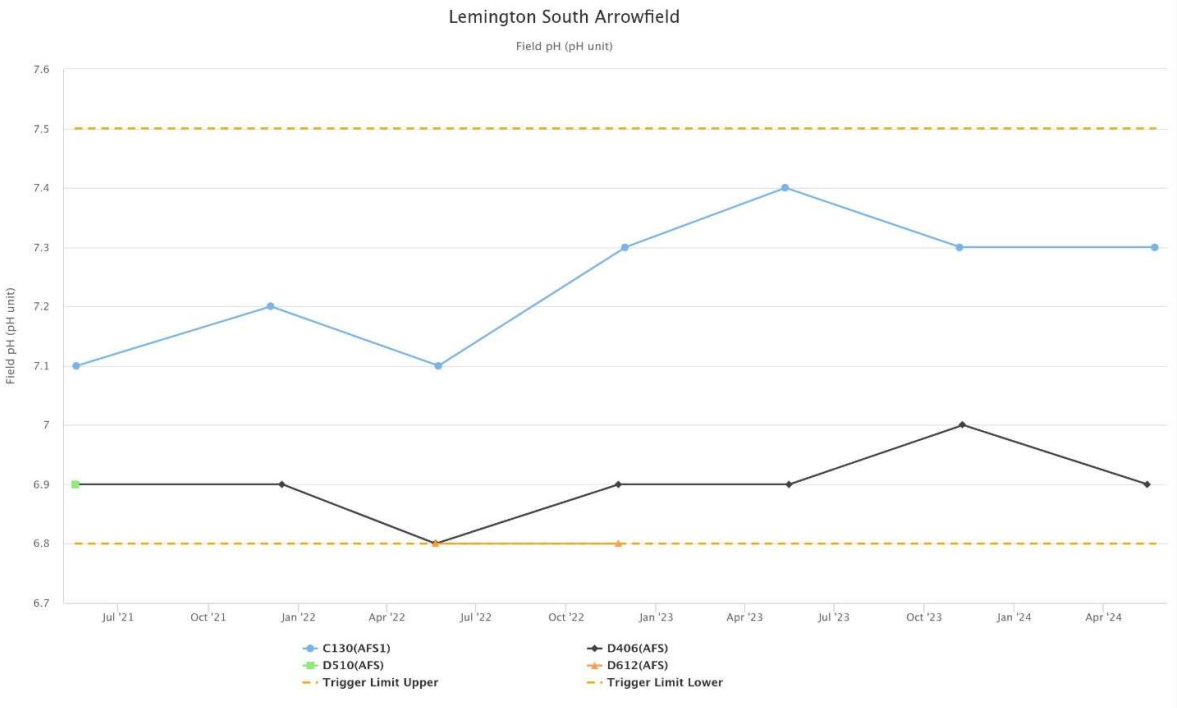

Figure 48 - Lemington South Arrowfield Field pH Trend - Q1 2024

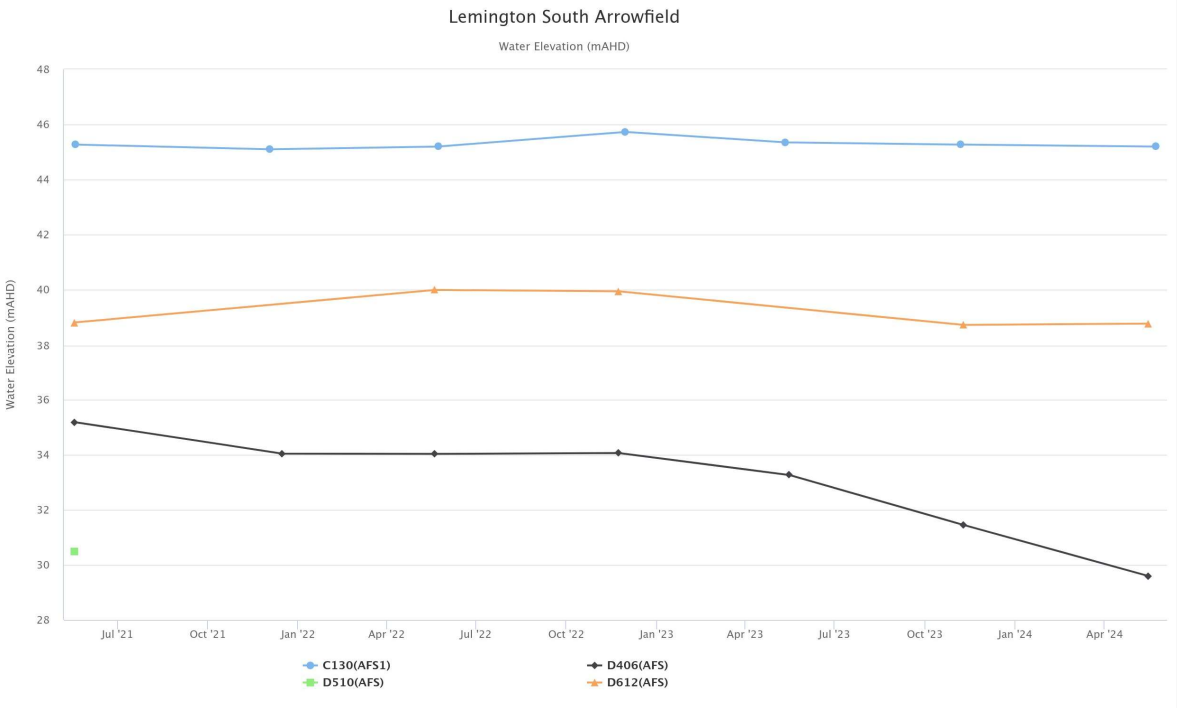

Figure 49 – Lemington South Arrowfield Water Elevation Trend – Q1 2024

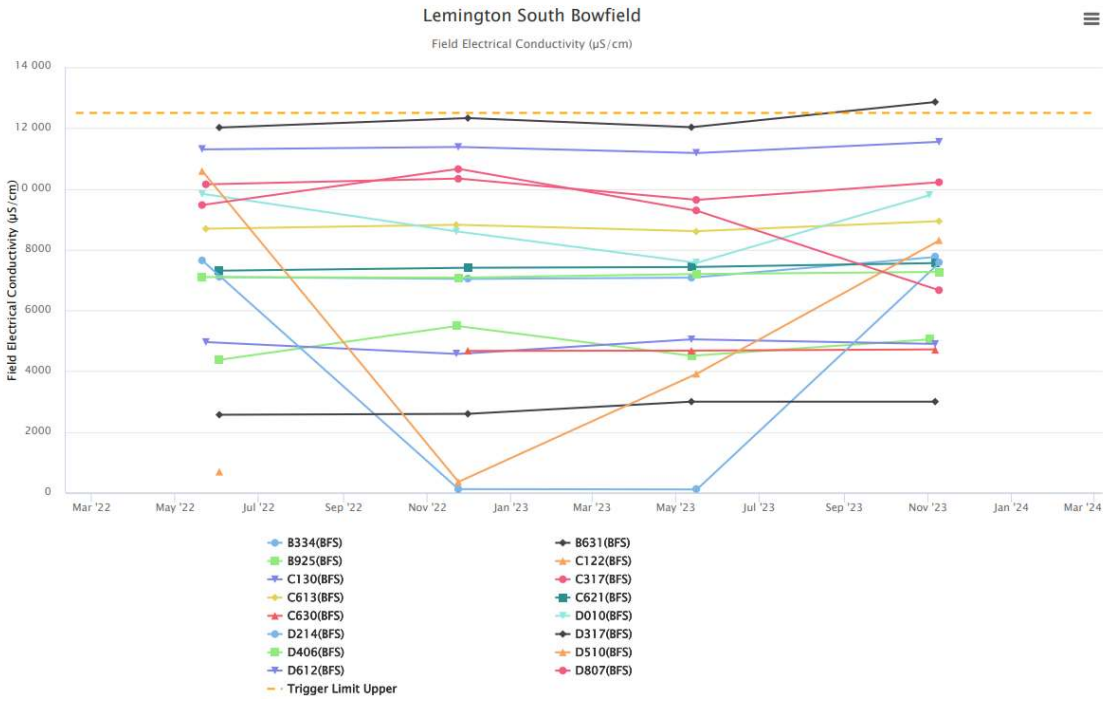

Figure 50 - Lemington South Bowfield Electrical Conductivity Trend - Q1 2024

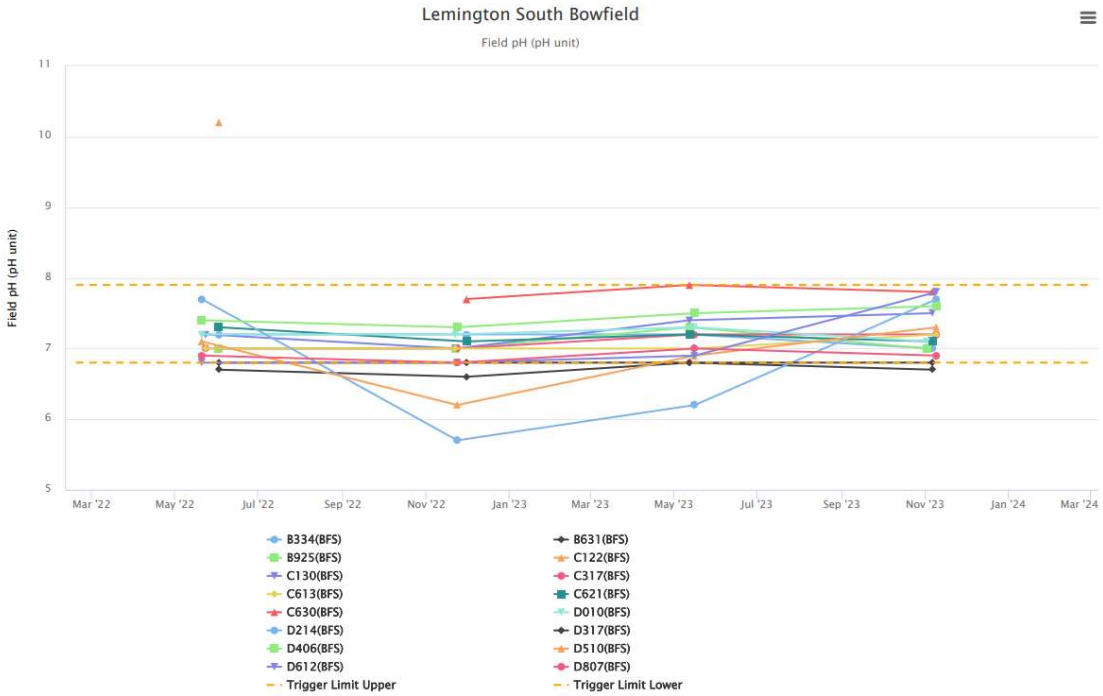

Figure 51 - Lemington South Bowfield pH Trend - Q1 2024

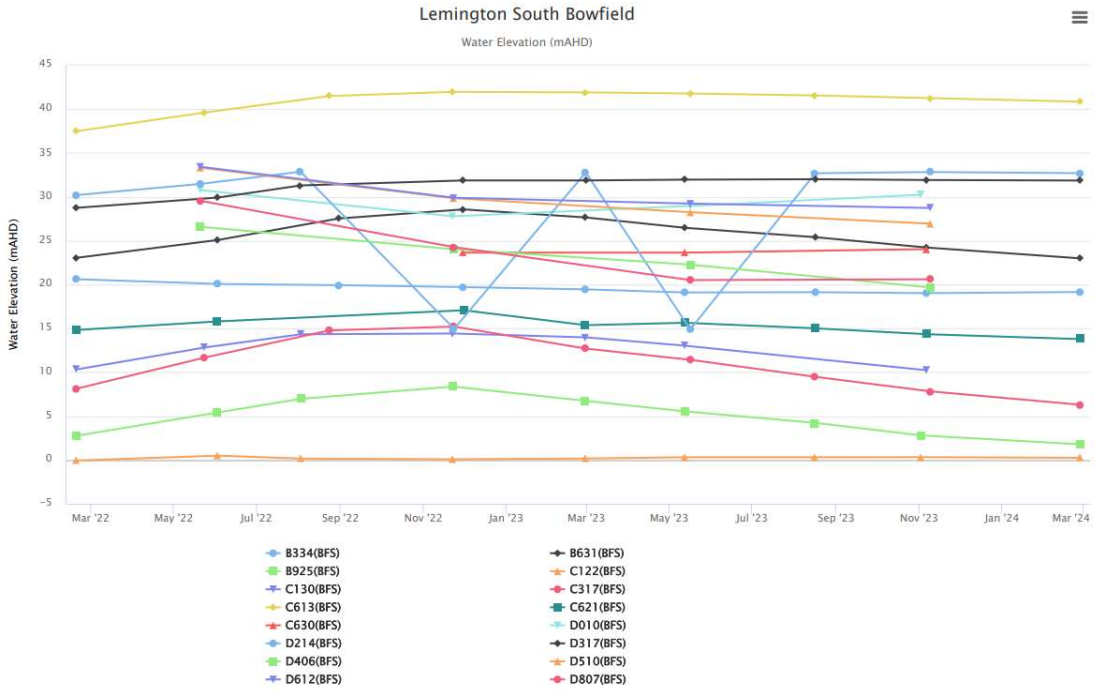

Figure 52 - Lemington South Bowfield Water Elevation Trend - Q1 2024

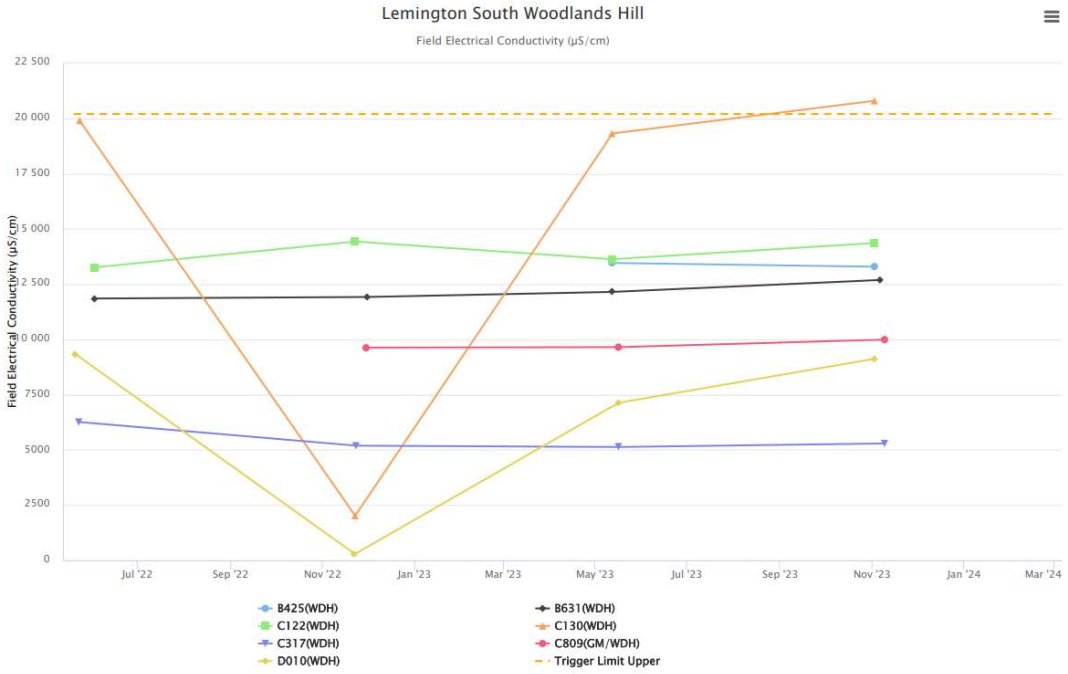

Figure 53 - Lemington South Woodlands Hill Electrical Conductivity Trend - Q1 2024

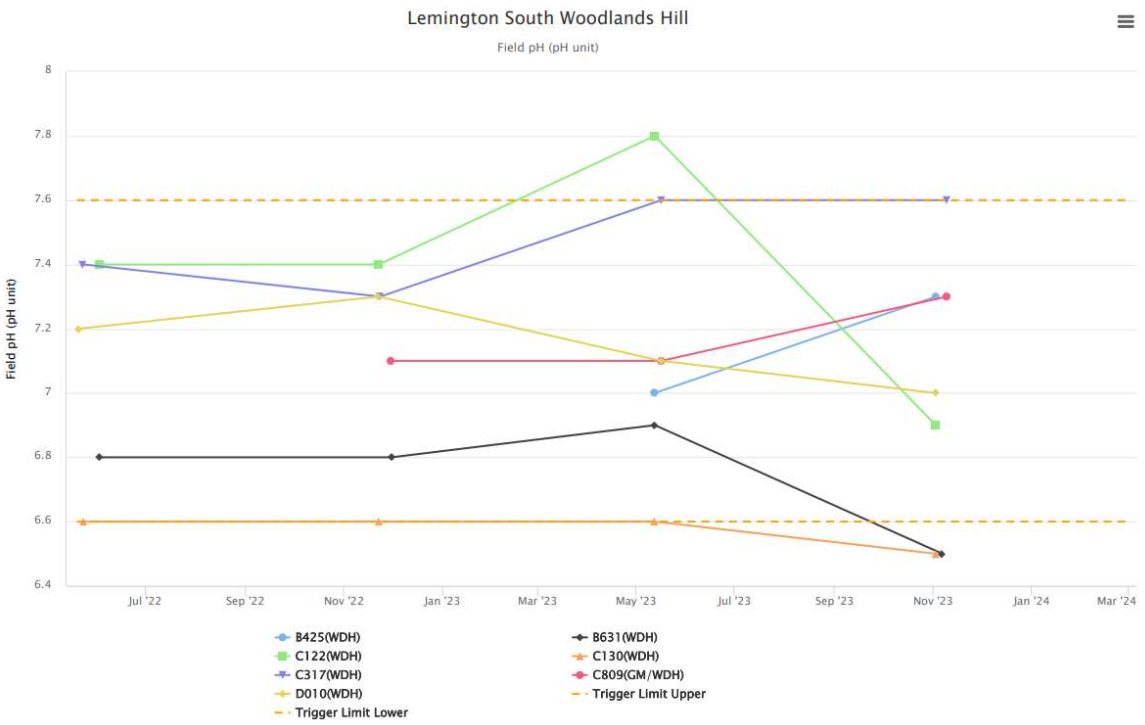

Figure 54 - Lemington South Woodlands Hill Field pH Trend - Q1 2024

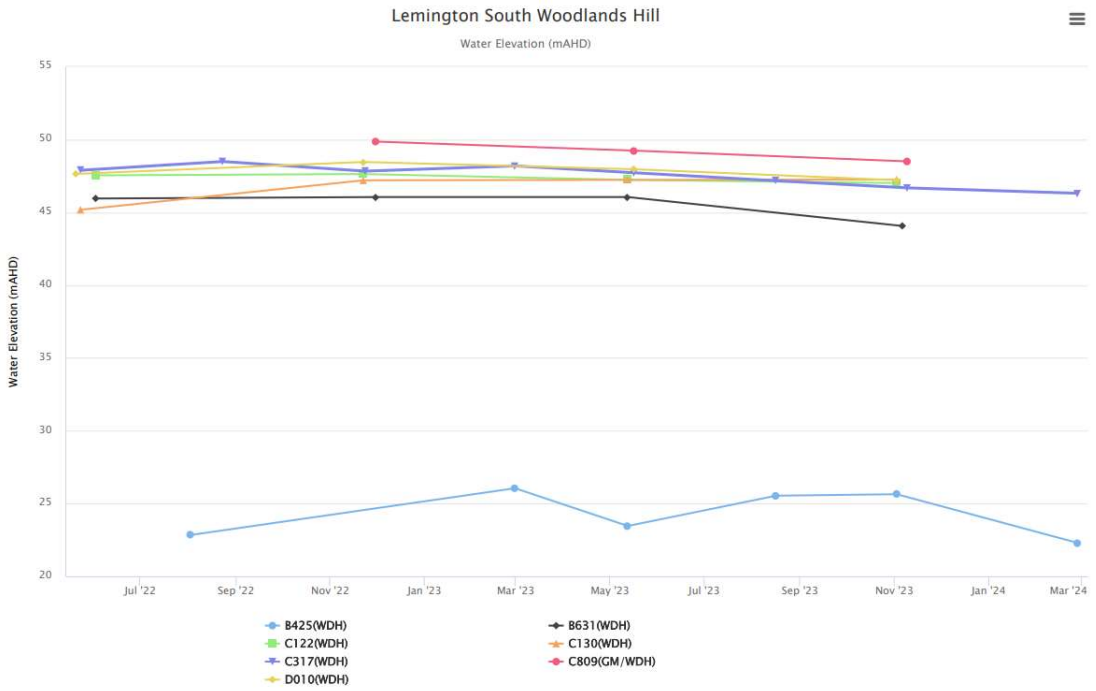

Figure 55 - Lemington South Woodlands Hill Water Elevation Trend - Q1 2024

Figure 56 - Lemington South Interburden Electrical Conductivity Trend - Q1 2024

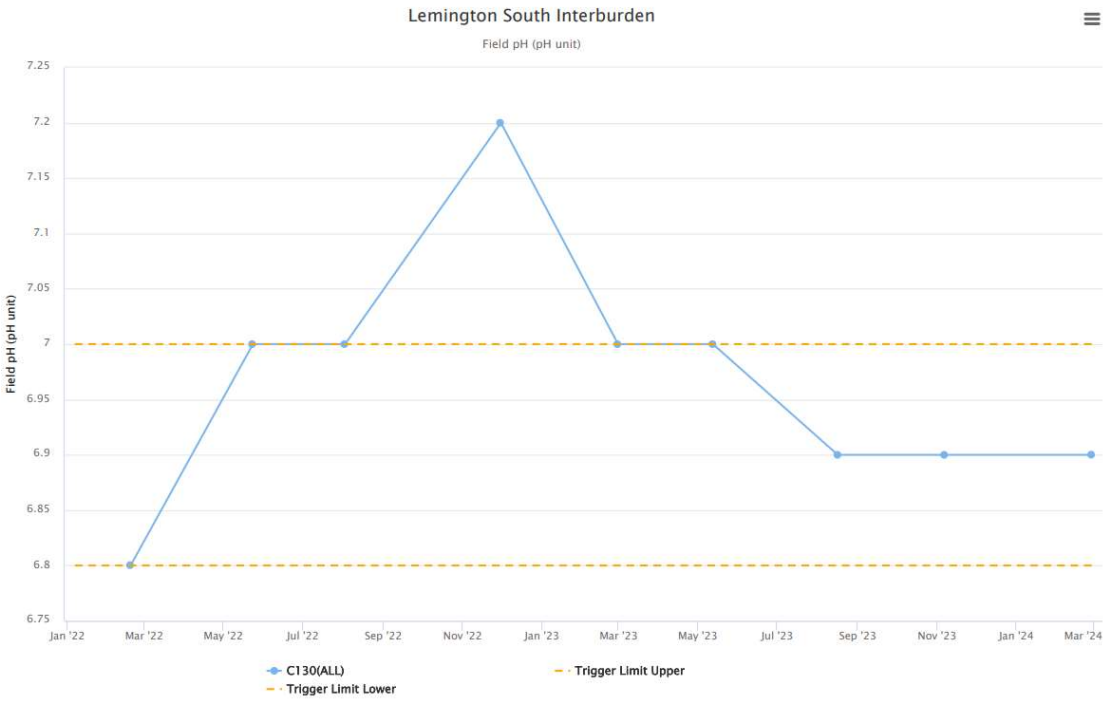

Figure 57 - Lemington South Interburden Field pH Trend - Q1 2024

Figure 58 - Lemington South Interburden Water Elevation Trend - Q1 2024

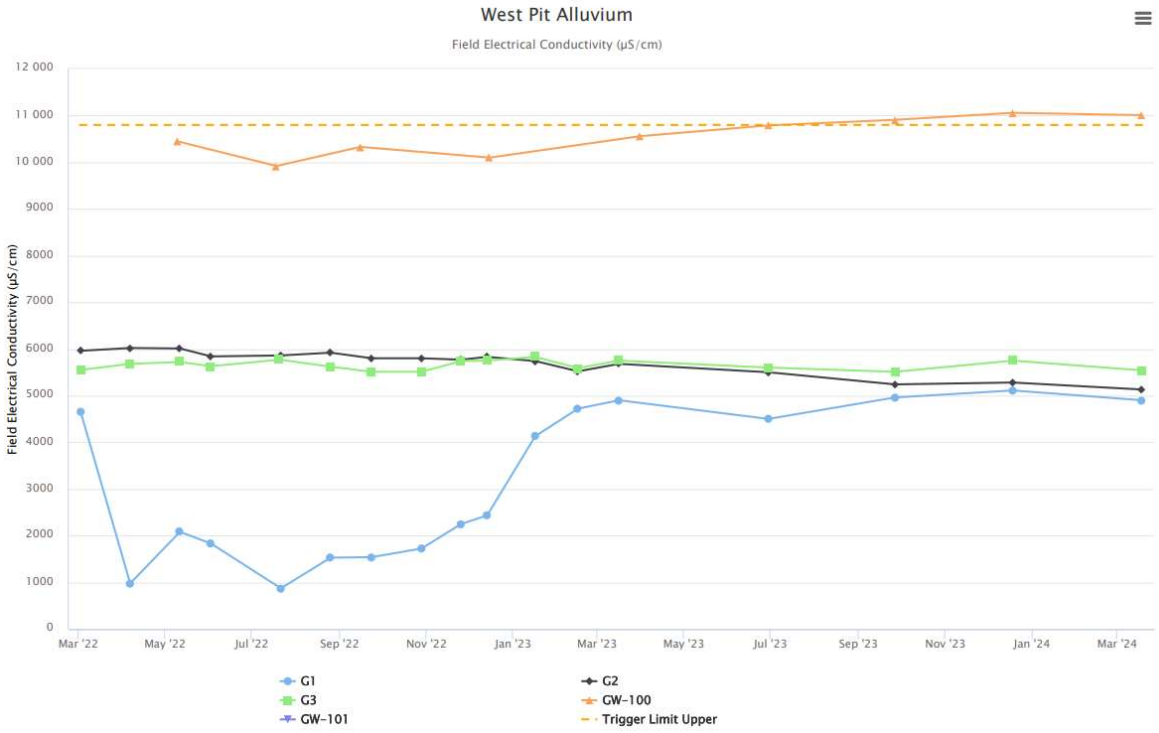

Figure 59 - West Pit Alluvium Electrical Conductivity Trend - Q1 2024

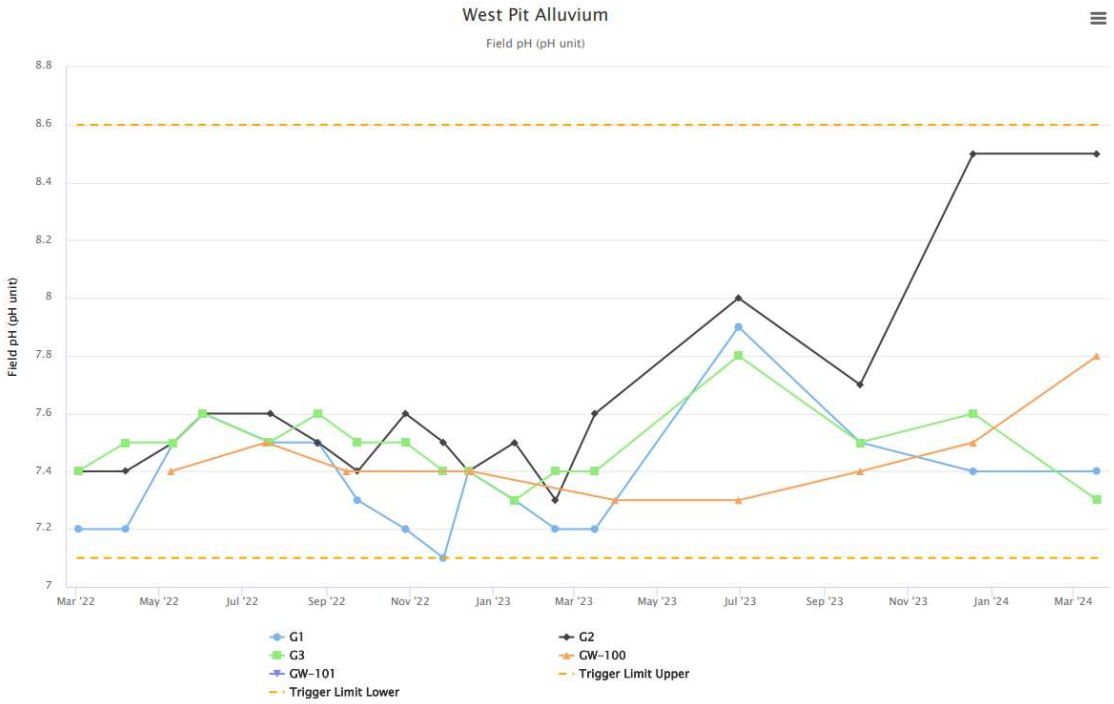

Figure 60 - West Pit Alluvium pH Trend - Q1 2024

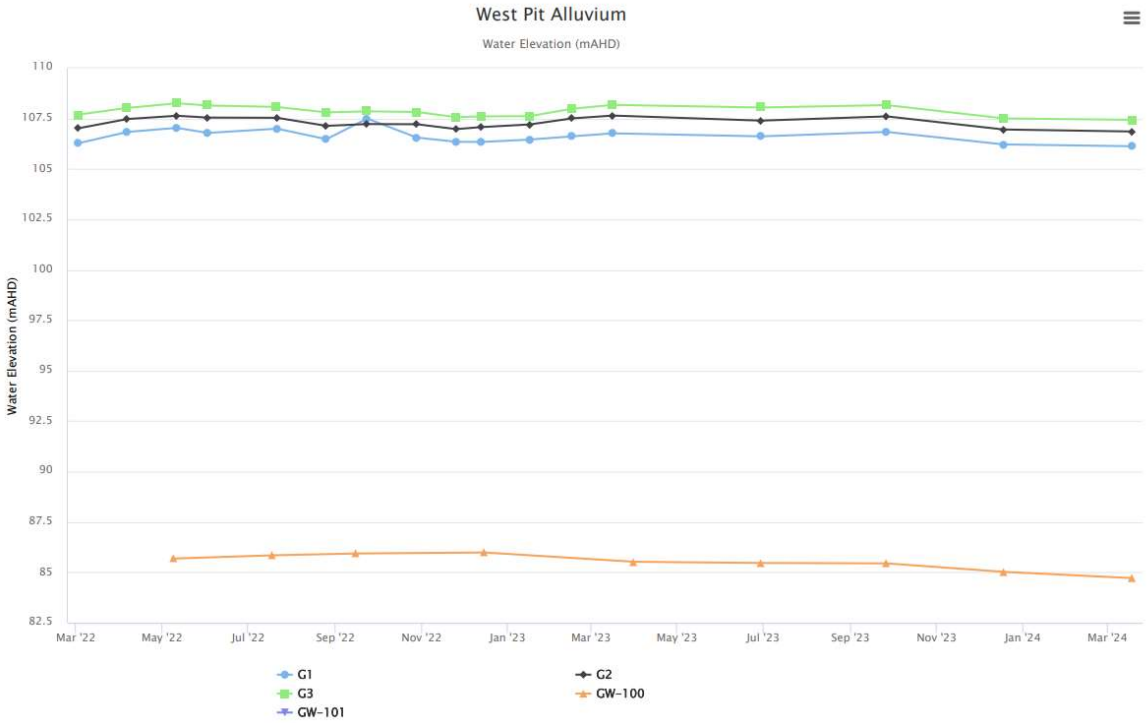

Figure 61 - West Pit Alluvium Water Elevation Trend - Q1 2024

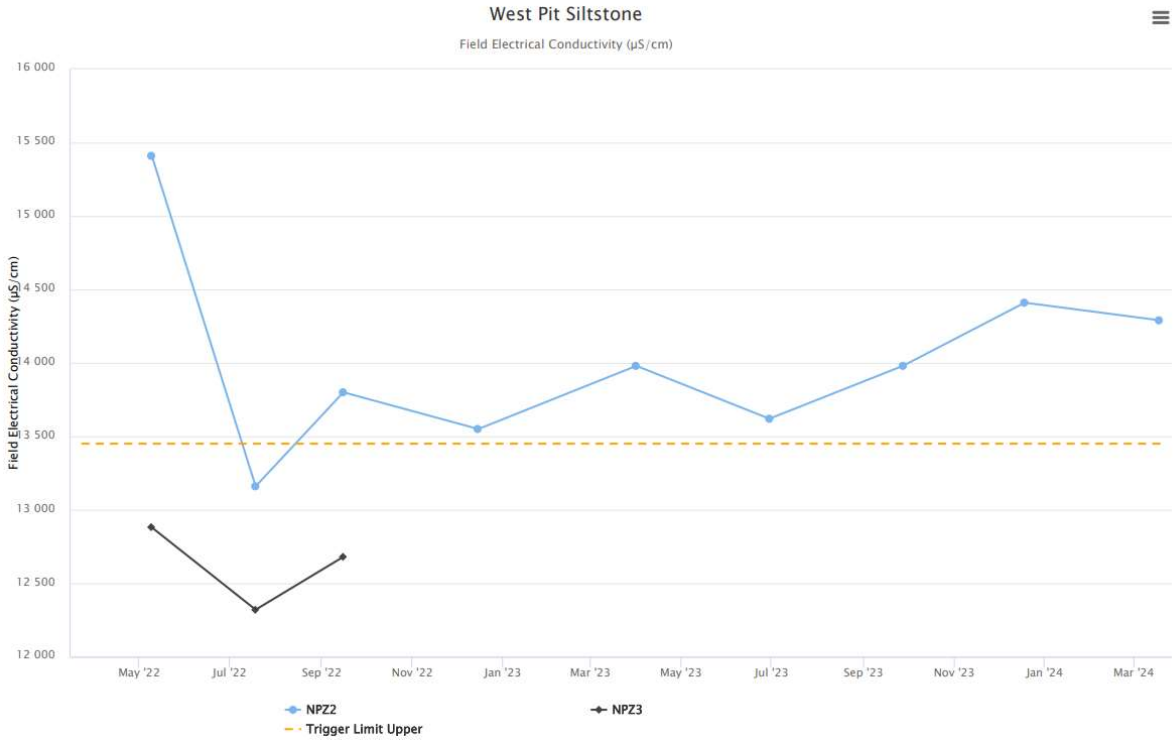

Figure 62 - West Pit Siltstone Electrical Conductivity Trend - Q1 2024

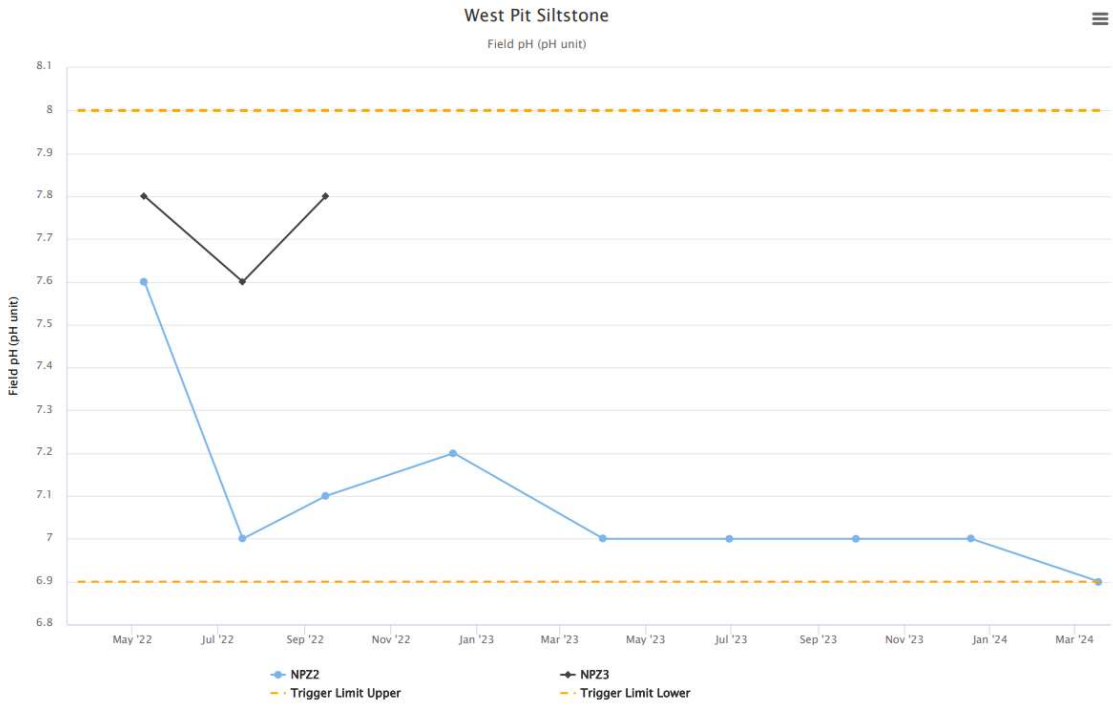

Figure 63 - West Pit Siltstone Field pH Trend - Q1 2024

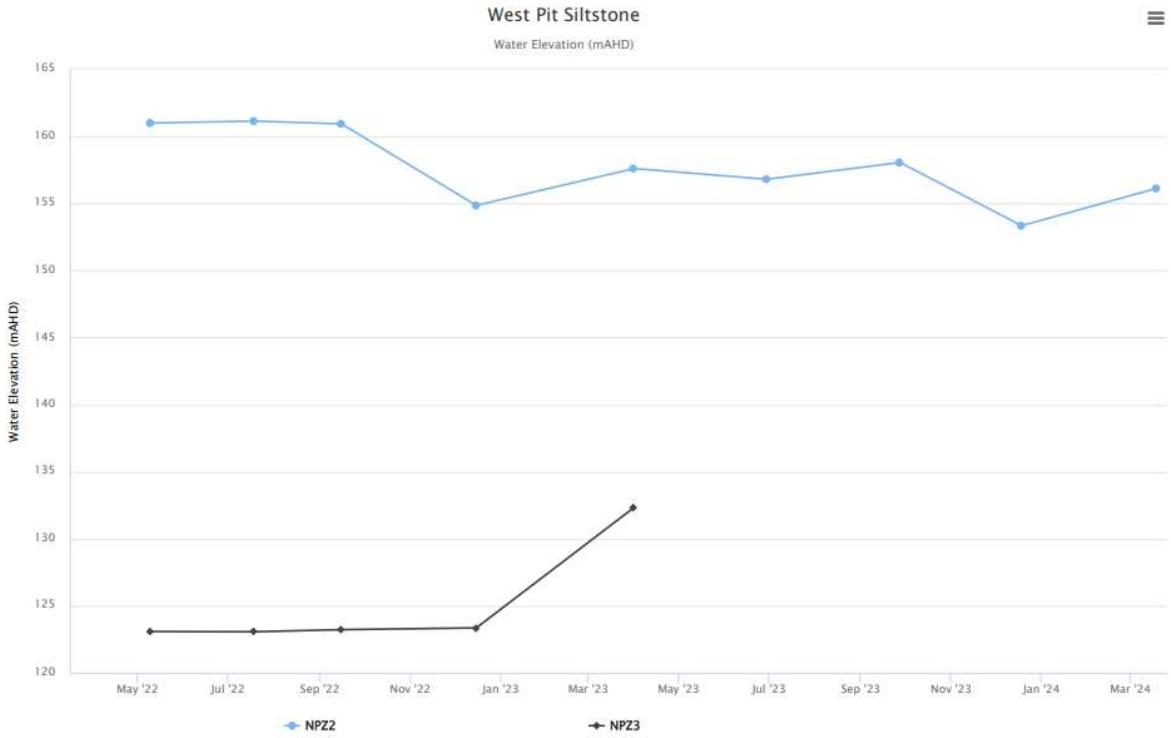

Figure 64 - West Pit Siltstone Water Elevation Trend- Q1 2024

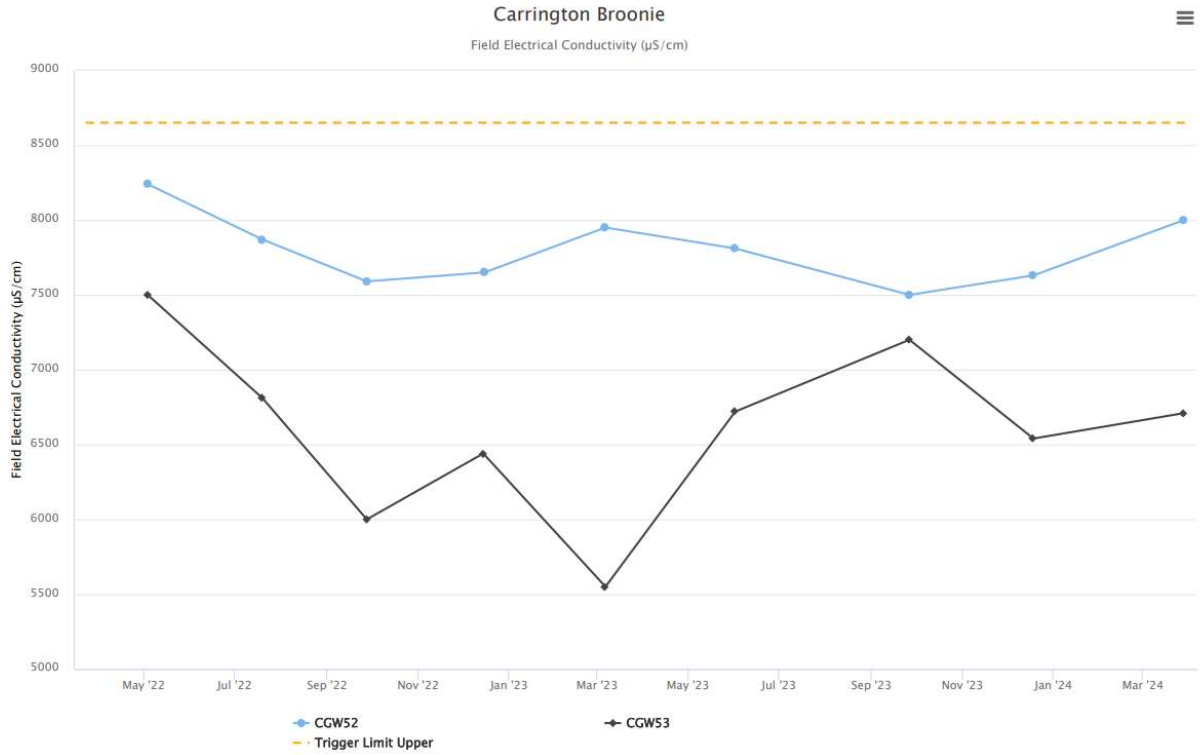

Figure 65 - Carrington Broonie Electrical Conductivity Trend - Q1 2024

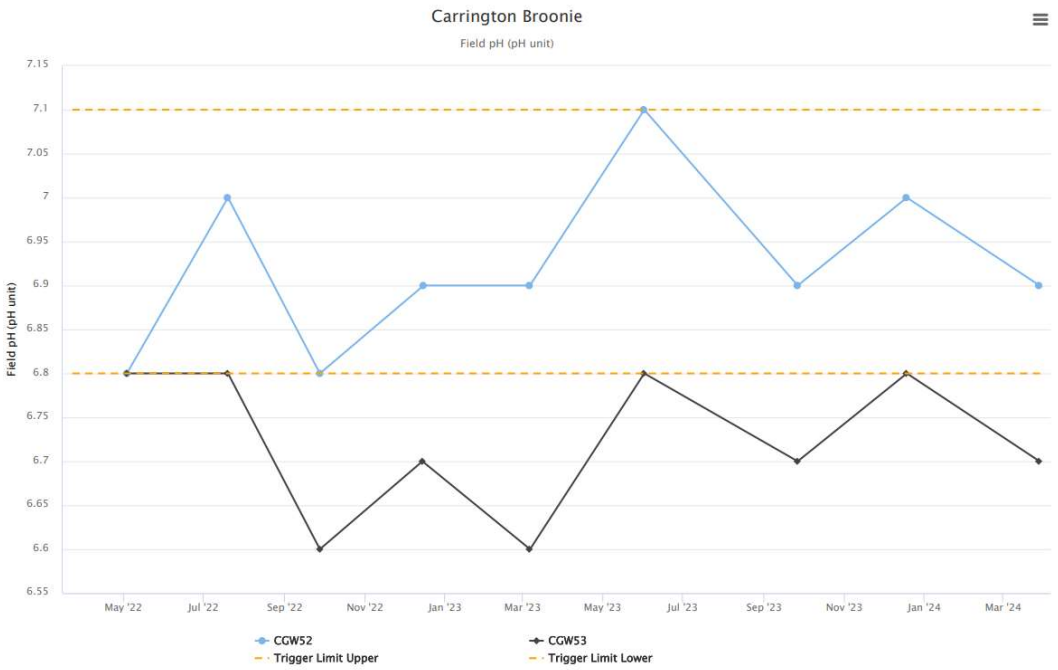

Figure 66 - Carrington Broonie Field pH Trend - Q1 2024

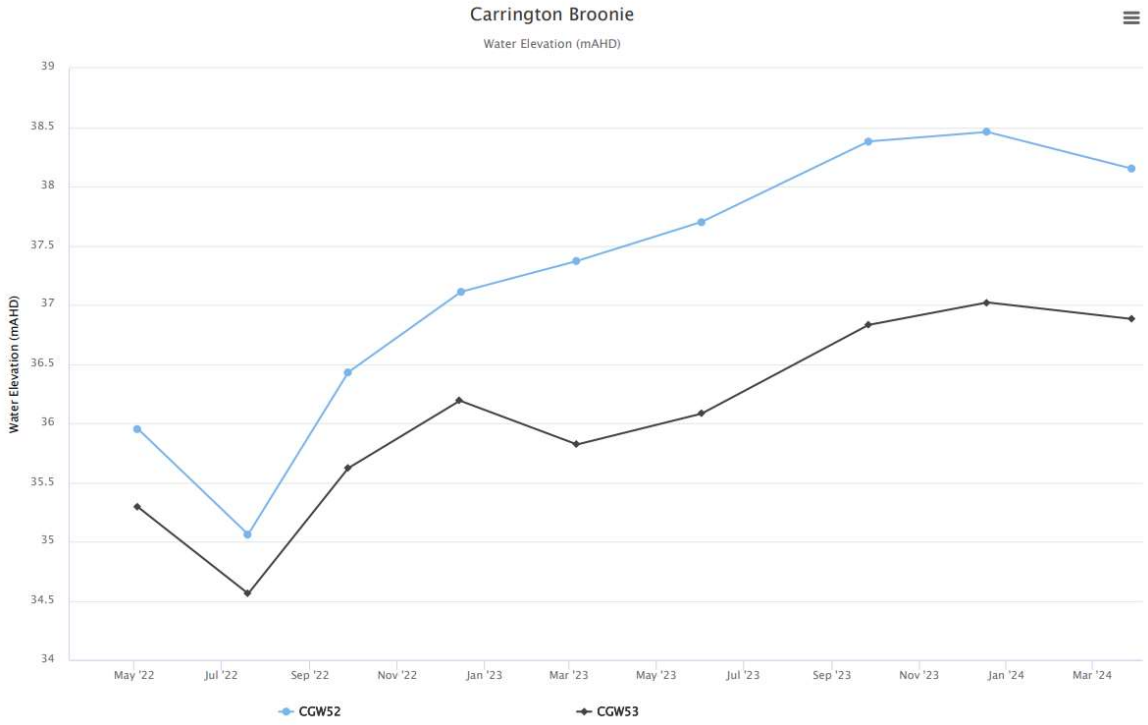

Figure 67 - Carrington Broonie Water Elevation Trend - Q1 2024

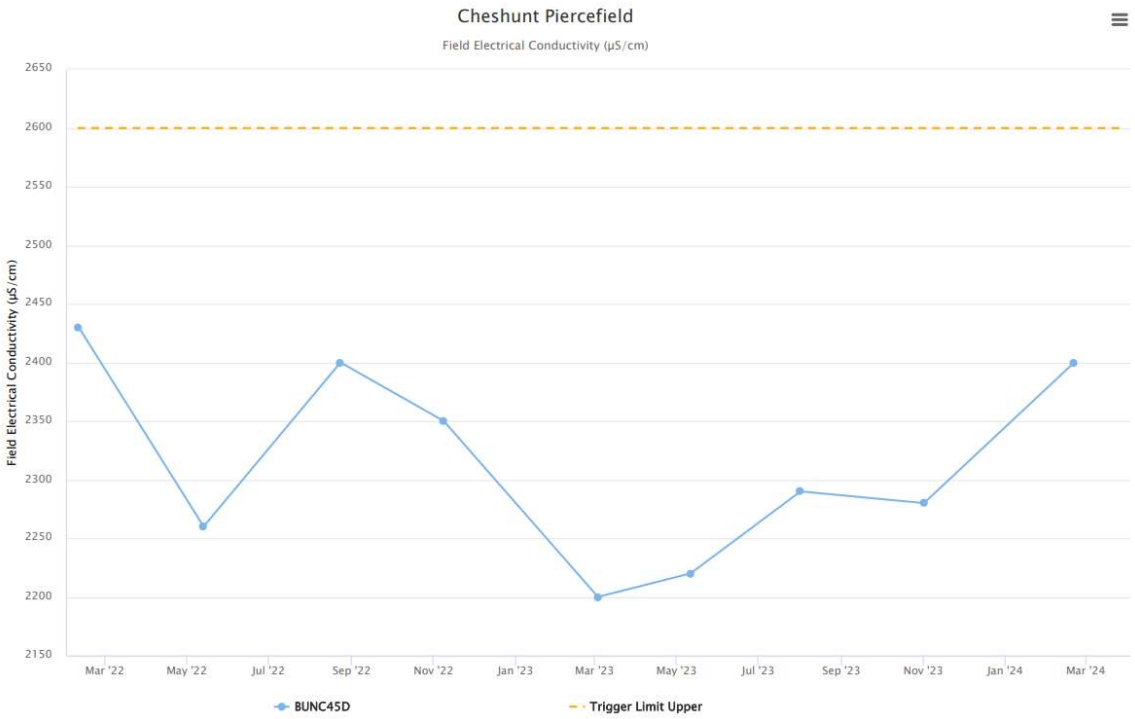

Figure 68 - Cheshunt Piercefield Electrical Conductivity Trend - Q1 2024

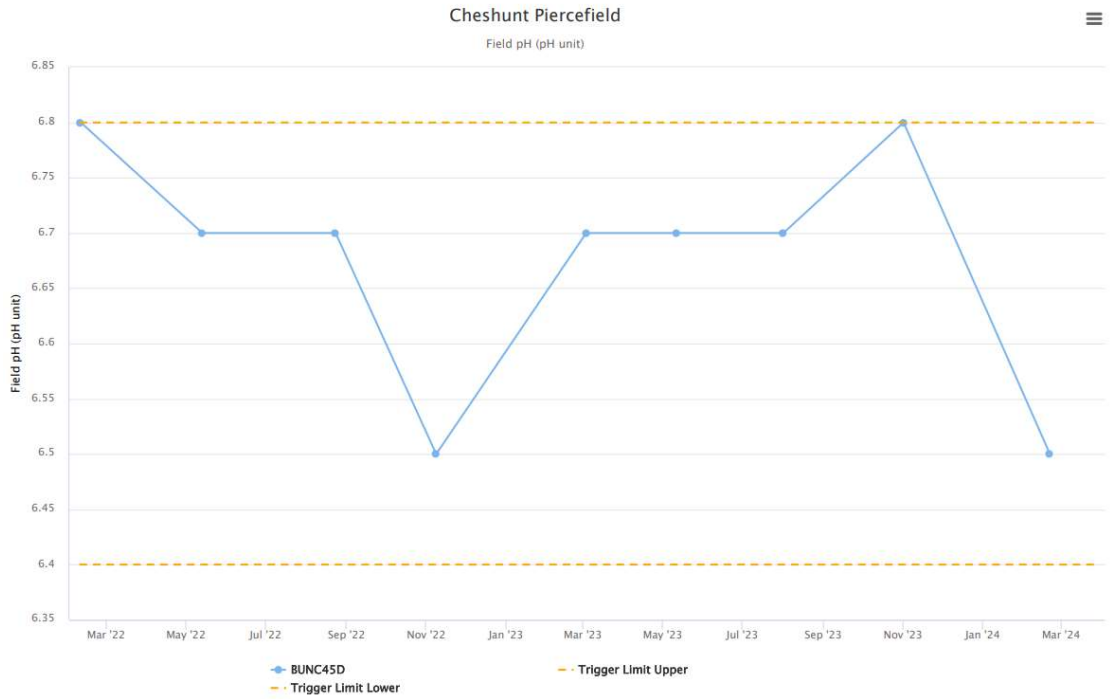

Figure 69 – Cheshunt Piercefield Field pH Trend – Q1 2024

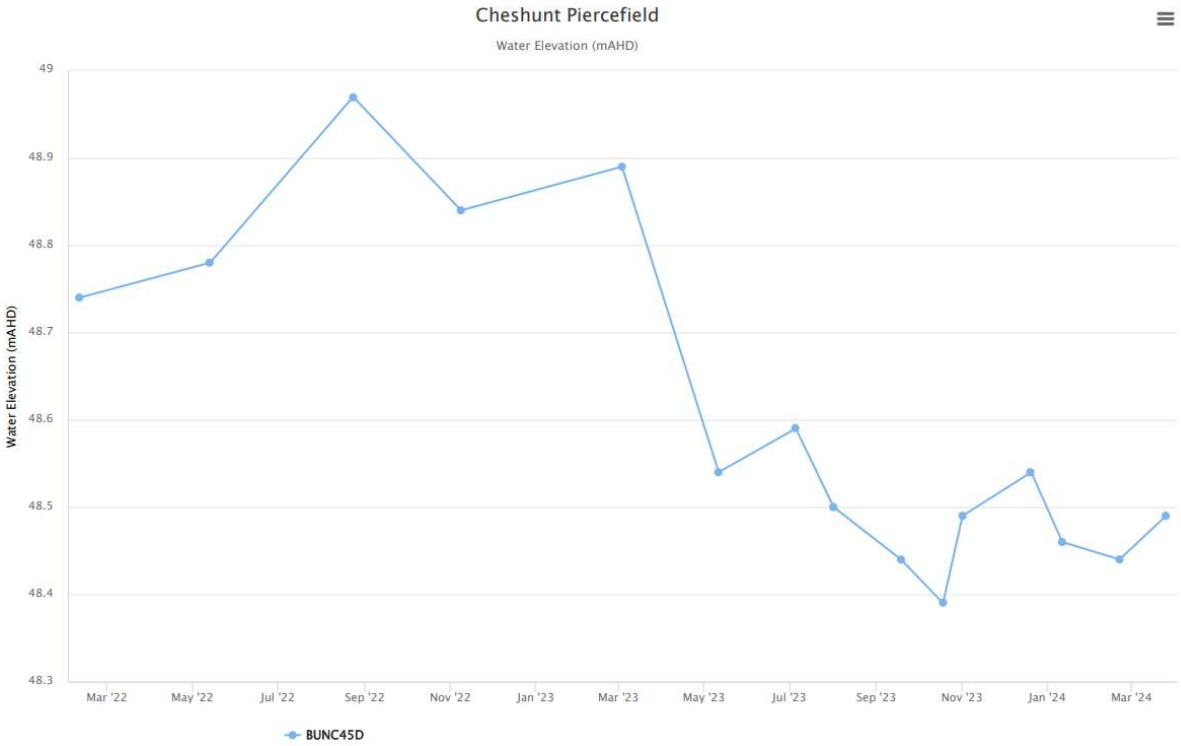

Figure 70 - Cheshunt Piercefield Water Elevation Trend - Q1 2024

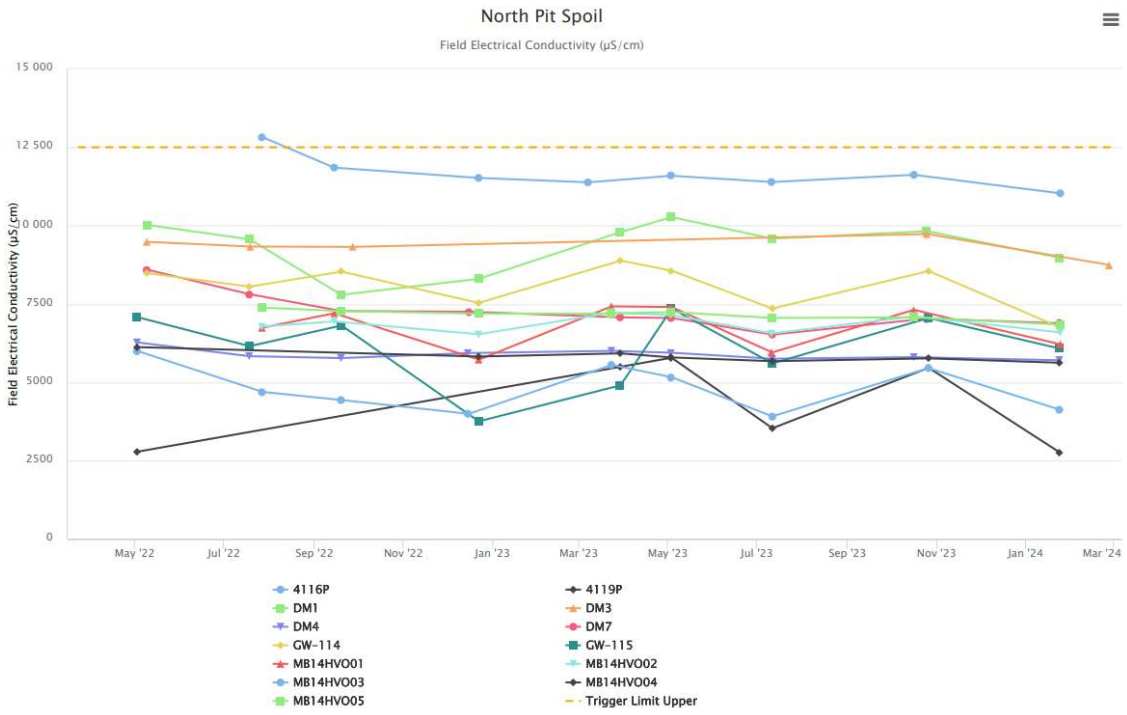

Figure 71 - North Pit Spoil Electrical Conductivity Trend - Q1 2024

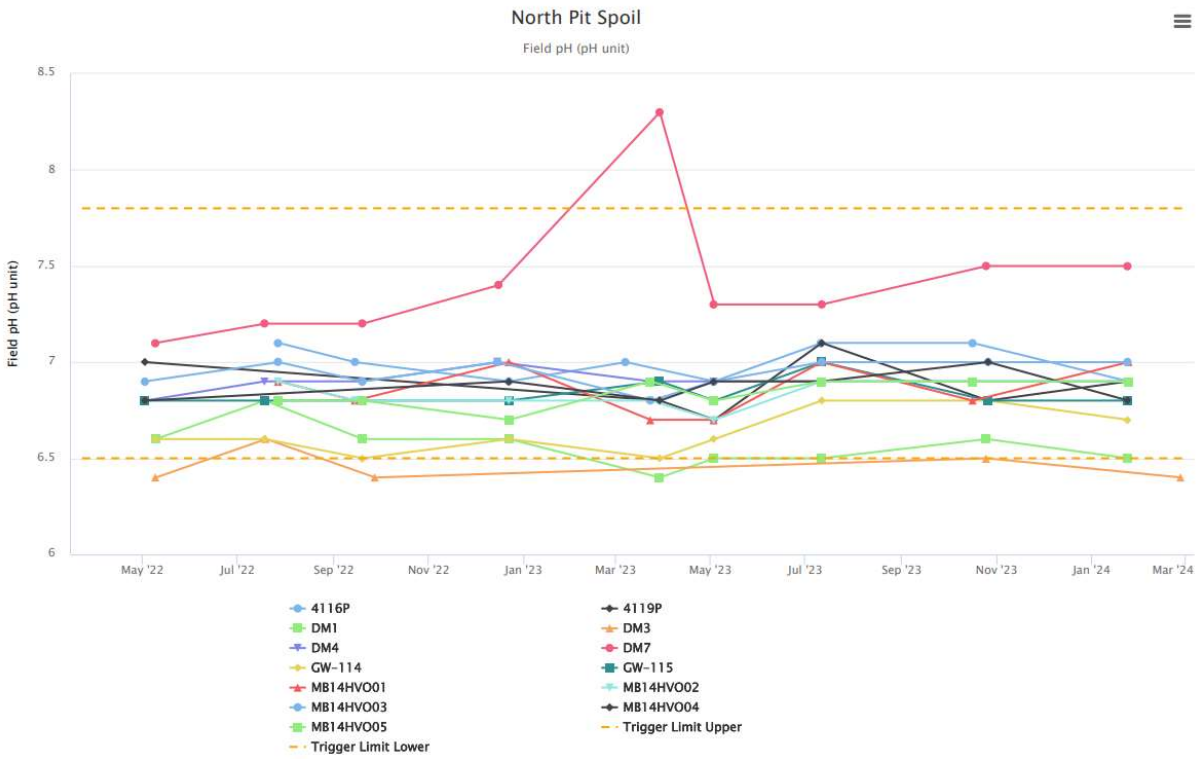

Figure 72 - North Pit Spoil Field pH Trend - Q1 2024

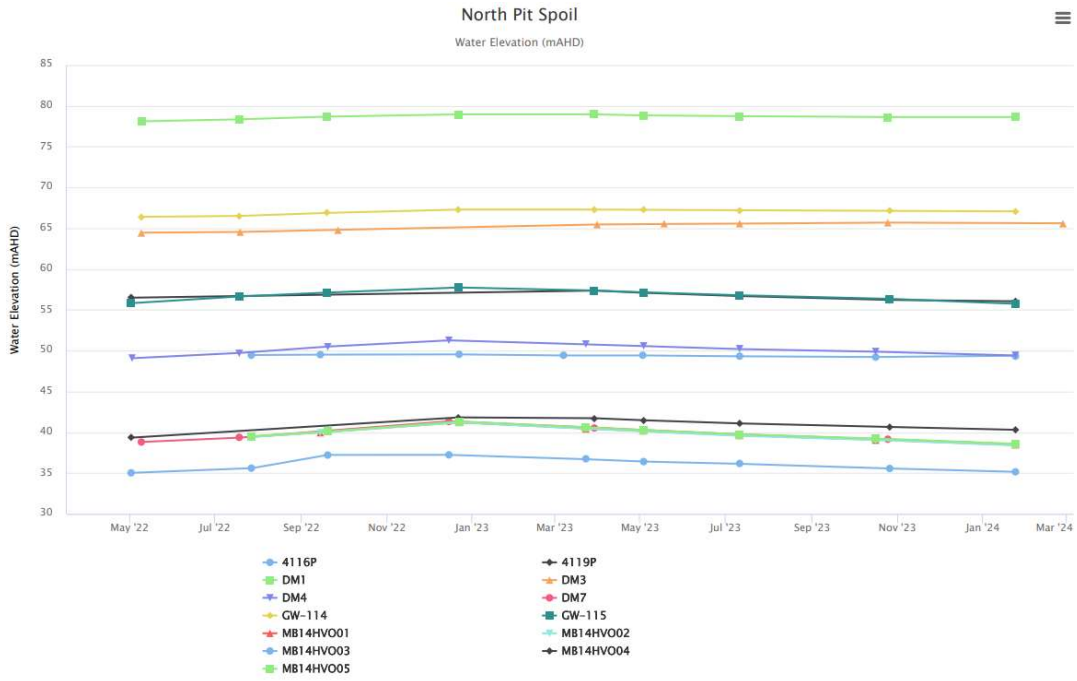

Figure 73 - North Pit Spoil Water Elevation Trend - Q1 2024

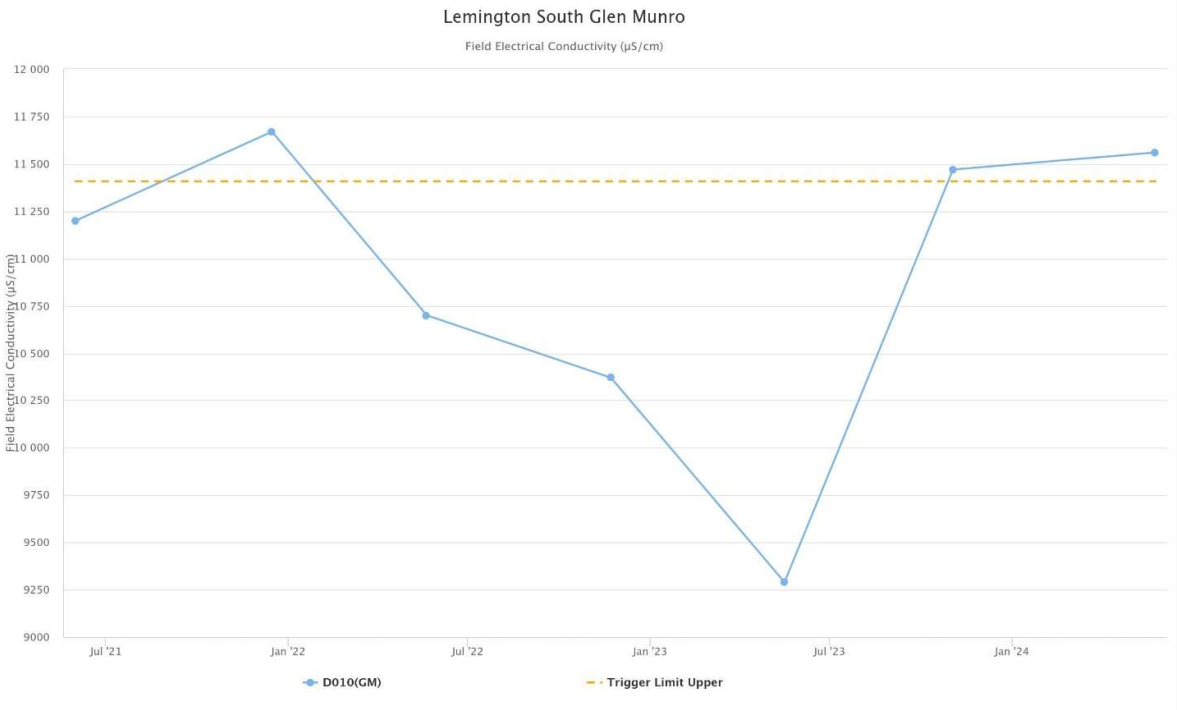

Figure 74 - Lemington South Glen Munro Electrical Conductivity Trend - Q1 2024

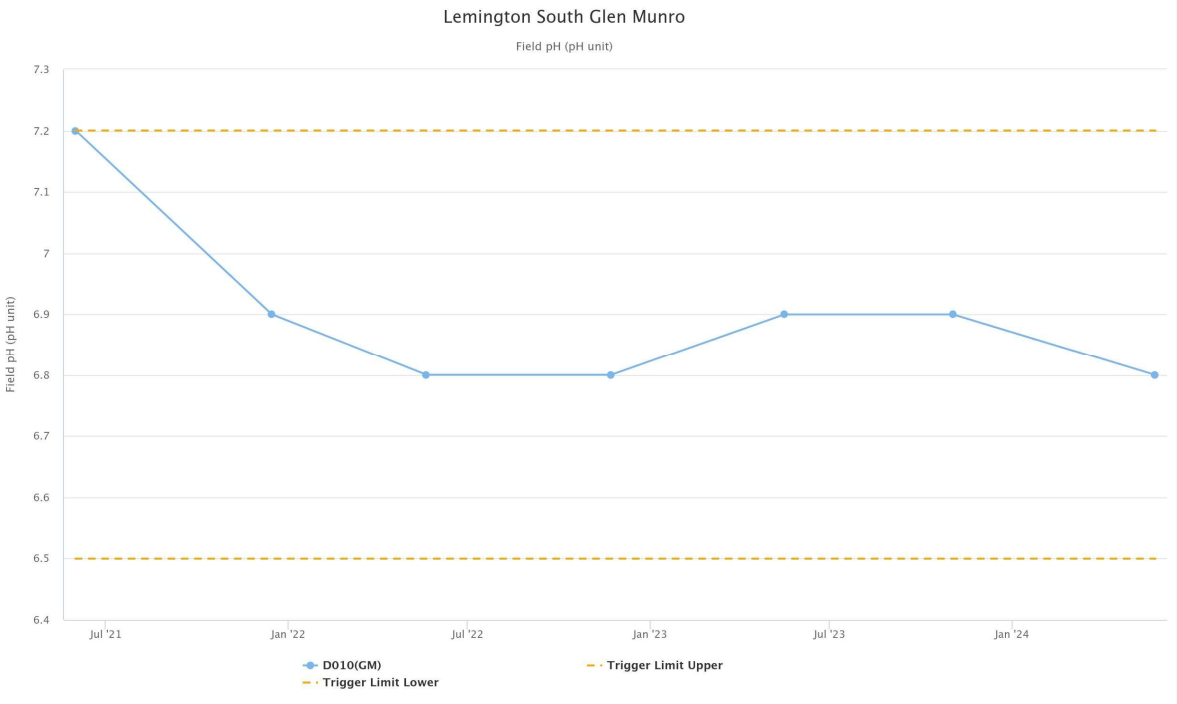

Figure 75 - Lemington South Glen Munro Field pH Trend - Q1 2024

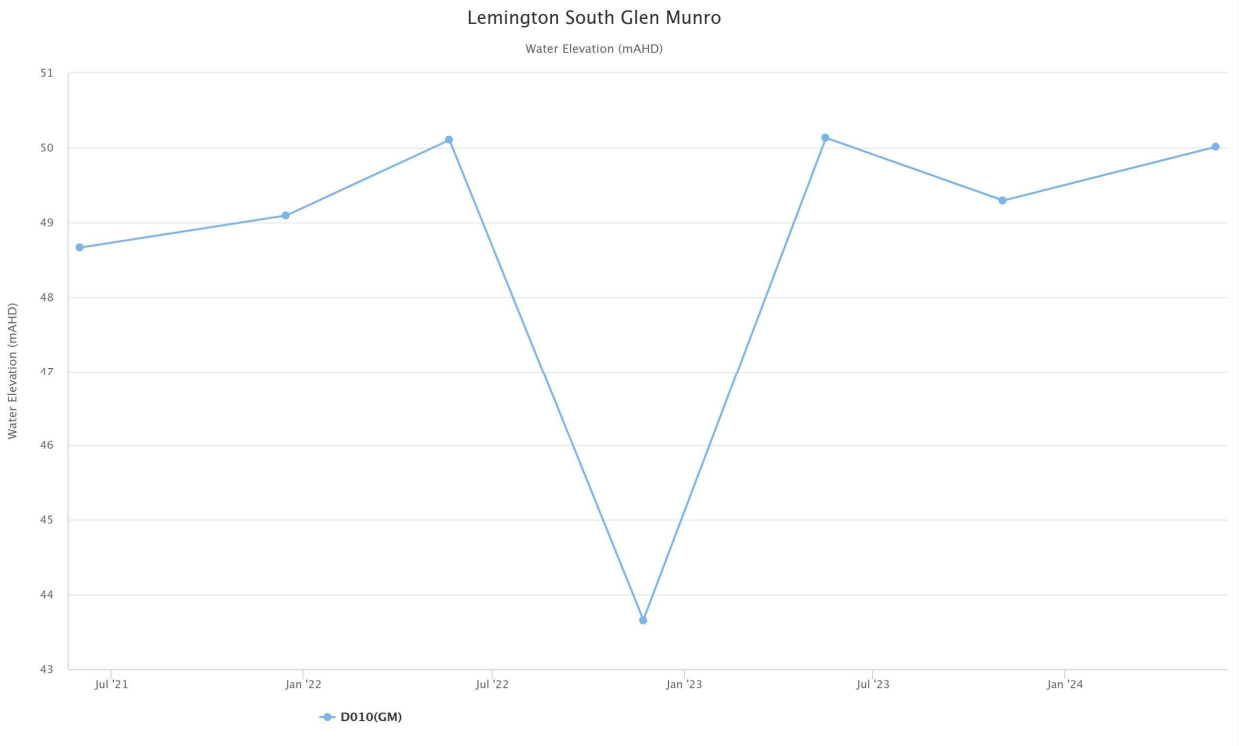

Figure 76 - Lemington South Glen Munro Water Elevation Trend - Q1 2024

3.4.1 | 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 is outlined in the HVO Water Management Plan.

Groundwater trigger tracking results are summarised below in Table 3.

Table 3 - Groundwater Trigger Tracking Q1 2024

Site	Date	Trigger Limit Breached	Response Action
NPz2	18/03/2024	Electrical Conductivity (µS/cm)	Seven consecutive readings above the trigger level of 13,428 µS/cm between September 2022. It is noted that the bore has already been removed from the compliance monitoring network in the updated draft WMP which is currently with DPHI for approval. No further action is required
BZ3-3	21/02/2024	pH	Fifteen consecutive readings below the lower pH trigger level of 6.5 since November 2019. Comprehensive water quality analysis was undertaken in August 2022. The results indicated the declining pH trend is not due to connectivity to spoil water via the nearby fault. It is noted that the bore has already been removed from

			the compliance monitoring network in version 3.4 of the revised WMP which is currently with DPHI for approval.
CGW51a	21/03/2024	pH	Seven consecutive readings above the trigger level of 7.4 since September 2022. The 2019 Annual Review (SLR, 2019) noted the bore is screened within alluvium and weathered coal measures. It was recommended the bore be decommissioned and replaced with a new bore as the current bore does not provide representative results from one groundwater unit. It is noted that the bore has already been removed from the compliance monitoring network in version 3.4 of the revised WMP which is currently with DPHI for approval.
CGW53a	21/03/2024	Water Elevation (mAHD)	Twelfth consecutive water level readings above the 95th percentile trigger level of 59.19 mAHD since June 2021. Groundwater levels in bore CGW53a have gradually increased since December 2019 with a sharp increase between September 2021 and December 2022 in response to above average rainfall. Levels continued to decline sharply since January 2023 in response to below average rainfall. It is noted that the trigger level has already been aligned with the EPL conditions in version 3.4 of the revised WMP which is currently with DPHI for approval. No further action required.
CGW55a	21/03/2024	Water Elevation (mAHD)	Tenth consecutive water level readings above the 95th percentile trigger level of 58.43 mAHD since December 2021. Groundwater levels in bore CGW55a have gradually increased since March 2020 with a sharp increase between September 2021 and March 2023 in response to above average rainfall. Levels have continued to decline sharply since 2023 in response to below average rainfall. It is noted that the trigger level has already been aligned with the EPL conditions in version 3.4 of the revised WMP which is currently with DPHI for approval. No further action required.

4 | BLASTING

HVO maintains a network of blast monitoring units located at nearby privately owned residences and function as regulatory compliance monitors. The location of these monitors can be found in **Figure 15**. Blasting criteria for HVO are summarised in **Table 2**.

Table 4 – Blasting Criteria

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

4.1 | BLAST MONITORING RESULTS

Twenty-seven (20) blasts were initiated at HVO during the reporting period. Blast monitoring results for the period are shown in **Table 3** and **Table 4**.

Table 5 – Overpressure Blast Monitoring Results for the reporting period

Date and Time	Moses Crossing (dBL)	Jerrys Plains Village (dBL)	Maison Dieu (dBL)	Warkworth (dBL)	Knodlers Lane (dBL)
1/03/2024 13:16	95.15	86.34	89.76	78.95	88.05
1/03/2024 15:15	92.77	87.10	92.05	94.40	91.00
4/03/2024 13:29	101.91	103.60	101.33	92.72	101.00
6/03/2024 16:21	94.53	80.10	76.57	94.78	80.60
6/03/2024 16:22	90.21	83.59	84.56	88.95	83.80
8/03/2024 12:59	104.70	94.33	103.09	91.10	96.29
9/03/2024 16:18	94.43	97.97	106.80	100.18	100.23
11/03/2024 13:15	104.90	98.68	100.82	85.68	98.54
15/03/2024 11:32	105.35	94.46	98.22	93.66	102.20
15/03/2024 12:58	99.76	107.51	90.12	85.57	87.20
16/03/2024 12:58	101.62	91.76	95.95	88.18	95.84
21/03/2024 13:14	108.90	102.53	103.54	94.14	99.06
23/03/2024 13:11	86.06	83.70	80.37	80.95	90.78
23/03/2024 13:12	91.66	73.28	88.35	85.97	80.48
25/03/2024 13:27	103.77	85.68	96.21	89.77	100.98
25/03/2024 13:29	101.41	89.00	93.70	95.49	100.94
26/03/2024 16:25	98.33	84.95	85.48	90.87	85.25
28/03/2024 16:23	91.82	104.61	108.87	98.55	109.81
28/03/2024 16:25	105.08	101.71	107.66	90.24	90.90
28/03/2024 17:42	104.73	102.64	104.60	97.23	90.48

Table 6 – Ground Vibration Blast Monitoring Results for the reporting period

Date and Time	Moses Crossing (mm/s)	Jerrys Plains Village (mm/s)	Maison Dieu (mm/s)	Warkworth (mm/s)	Knodlers Lane (mm/s)
1/03/2024 13:16	0.15	0.12	0.17	0.09	0.13
1/03/2024 15:15	0.14	0.06	0.13	0.26	0.12
4/03/2024 13:29	0.19	0.12	0.67	1.10	0.68
6/03/2024 16:21	0.10	0.05	0.08	0.26	0.09
6/03/2024 16:22	0.09	0.04	0.08	0.11	0.09
8/03/2024 12:59	0.12	0.06	0.51	0.60	0.44
9/03/2024 16:18	0.11	0.11	0.09	0.09	0.12
11/03/2024 13:15	0.15	0.07	0.13	0.13	0.12
15/03/2024 11:32	0.10	0.03	0.15	0.39	0.28
15/03/2024 12:58	0.10	0.11	0.07	0.15	0.12
16/03/2024 12:58	0.19	0.08	0.09	0.17	0.15
21/03/2024 13:14	0.13	0.09	0.33	0.91	0.31
23/03/2024 13:11	0.08	0.06	0.05	0.08	0.10
23/03/2024 13:12	0.08	0.02	0.05	0.05	0.09
25/03/2024 13:27	0.30	0.14	0.32	0.80	0.17
25/03/2024 13:29	0.18	0.09	0.18	0.27	0.16
26/03/2024 16:25	0.09	0.07	0.09	0.41	0.10
28/03/2024 16:23	0.09	0.05	0.08	0.06	0.12
28/03/2024 16:25	0.13	0.08	0.09	0.34	0.13
28/03/2024 17:42	0.08	0.03	0.04	0.34	0.09

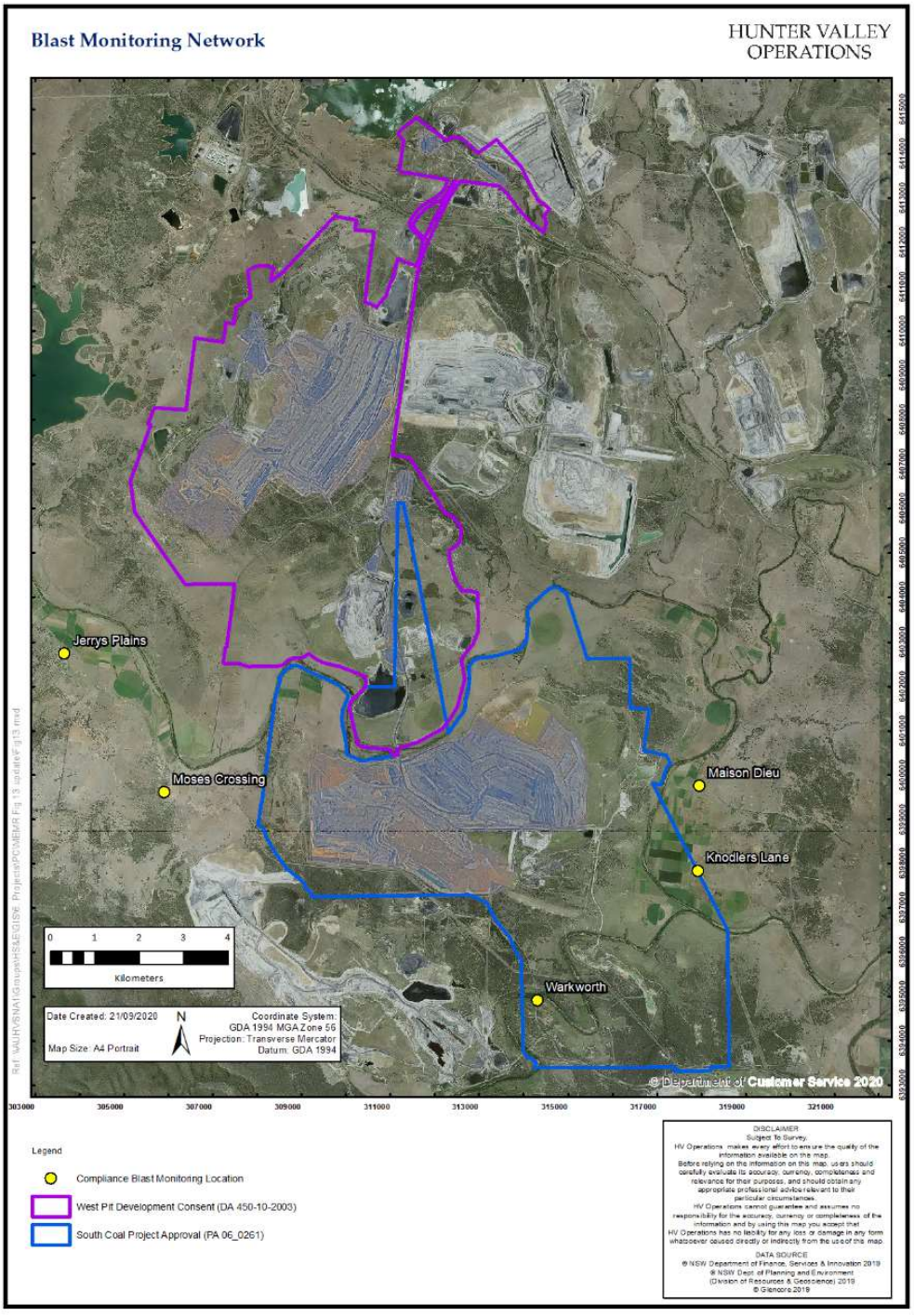

Figure 77 - Blast Monitoring Location Plan

5 | NOISE

Routine attended noise monitoring occurs at defined locations around HVO, as described in the HVO Noise Monitoring Programme. The noise monitoring aims to quantify and describe the acoustic environment around the site and compare results with specified limits. The attended noise monitoring locations are displayed in **Figure 16**.

5.1 | ATTENDED NOISE MONITORING RESULTS

Attended monitoring was conducted at receiver locations around HVO during the night period of the 6 March 2024.

Compliance with the HVO noise impact limits ensures compliance with the land acquisition criteria. Therefore, since no noise impact exceedances occurred for the reporting period the land acquisition assessment has not been presented. These will only be reported in instances of noise impact exceedances.

Monitoring results are detailed in **Table 5** and **Table 6**.

Table 7 - LAeq,15minute and 1minute HVO North Against Impact Assessment Criteria for the Reporting Period

Location	Start date and time	Wind		Stability class	Very enhancing? [1]	HVO North limits, dB [1]		HVO North levels, dB		Exceedances, dB	
		Speed m/s	Direction [3]			$L_{Aeq,15minute}$	$L_{A1,1min}$	$L_{Aeq,15minute}$ [2]	$L_{A1,1min}$	$L_{Aeq,15minute}$	$L_{A1,1min}$
Shearers Lane	6/03/2024 21:00	2.6	121	E	No	41	46	IA	IA	Nil	Nil
Knodlers Lane	6/03/2024 21:51	2.4	143	E	No	40	46	IA	IA	Nil	Nil
Maison Dieu	6/03/2024 21:24	2.5	142	E	No	39	46	IA	IA	Nil	Nil
Long Point (Dights Crossing)	6/03/2024 23:07	2.1	151	E	No	37	46	IA	IA	Nil	Nil
Kilburnie South (Moses Crossing)	6/03/2024 23:36	2.3	156	E	No	39	46	38	38	Nil	Nil
Jerrys Plains East	6/03/2024 23:10	2.4	148	E	No	39	46	33	33	Nil	Nil
Jerrys Plains Village	6/03/2024 21:33	2.5	142	E	No	40	46	34	34	Nil	Nil
Jerrys Plains West	6/03/2024 21:01	2.6	121	E	No	40	46	35	35	Nil	Nil

1. Noise limits are adjusted by +5 dB during 'very noise-enhancing meteorological conditions' in accordance with the NPfI.
2. Site-only LAeq,15minute, includes modifying factor penalties if applicable.
3. Degrees magnetic north, "-" indicates calm conditions.

Table 8 - LAeq,15minute and 1minute HVO South Against Impact Assessment Criteria for the Reporting Period

Location	Start date and time	Wind		Stability class	Very enhancing? [1]	HVO South limits, dB [1]		HVO South levels, dB		Exceedances, dB	
		Speed m/s	Direction [3]			$L_{Aeq,15minute}$	$L_{A1,1min}$	$L_{Aeq,15minute}$ [2]	$L_{A1,1min}$	$L_{Aeq,15minute}$	$L_{A1,1min}$
Shearers Lane	6/03/2024 21:00	2.6	121	E	Yes	41	45	IA	IA	Nil	Nil
Knodlers Lane	6/03/2024 21:51	2.4	143	E	Yes	40	45	IA	IA	Nil	Nil
Maison Dieu	6/03/2024 21:24	2.5	142	E	Yes	39	45	IA	IA	Nil	Nil
Long Point (Dights Crossing)	6/03/2024 23:07	2.1	151	E	Yes	37	45	IA	IA	Nil	Nil
Kilburnie South (Moses Crossing)	6/03/2024 23:36	2.3	156	E	Yes	39	45	<30	<30	Nil	Nil
Jerrys Plains East	6/03/2024 23:10	2.4	148	E	Yes	38	45	IA	IA	Nil	Nil
Jerrys Plains Village	6/03/2024 21:33	2.5	142	E	Yes	35	45	IA	IA	Nil	Nil
Jerrys Plains West	6/03/2024 21:01	2.6	121	E	Yes	35	45	IA	IA	Nil	Nil
HVGC	7/03/2024 0:07	2.2	124	E	Yes	35	--	NM	NM	Nil	Nil

1. Noise limits are adjusted by +5 dB during 'very noise-enhancing meteorological conditions' in accordance with the NPfI.
2. Site-only LAeq,15minute, includes modifying factor penalties if applicable.
3. Degrees magnetic north, "-" indicates calm conditions.

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. No penalties were applied for monitoring undertaken through the reporting period. The assessments for the low frequency noise are shown in **Table 7** and **Table 8**.

Table 9: Modifying Factor Assessment HVO North for the Reporting Period

Location	Start date and time	Measured HVO South L_{Aeq} dB	Very enhancing? [1]	Intermittency modifying factor?	Tonality modifying factor?	Frequency of tonality	Low-frequency modifying factor? [1,2]	Exceedance of reference spectrum [2,3]	Total penalty dB [2,3]
Shearers Lane	6/03/2024 21:00	IA	Yes	No	No	N/A	No	N/A	Nil
Knodlers Lane	6/03/2024 21:51	IA	Yes	No	No	N/A	No	N/A	Nil
Maison Dieu	6/03/2024 21:24	IA	Yes	No	No	N/A	No	N/A	Nil
Long Point (Dights Crossing)	6/03/2024 23:07	IA	Yes	No	No	N/A	No	N/A	Nil
Kilburnie South (Moses Crossing)	6/03/2024 23:36	33	Yes	No	No	N/A	No	N/A	Nil
Jerrys Plains East	6/03/2024 23:10	30	Yes	No	No	N/A	No	N/A	Nil
Jerrys Plains Village	6/03/2024 21:33	30	Yes	No	No	N/A	No	N/A	Nil
Jerrys Plains West	6/03/2024 21:01	31	Yes	No	No	N/A	No	N/A	Nil

1. Low-frequency modifying factors are not applicable during 'very noise-enhancing meteorological conditions' in accordance with the NPfI.

2. NA denotes 'not applicable'.

3. Bold results indicate that application of NPfI modifying factor(s) is required.

Table 10 - Modifying Factor Assessment HVO South for the Reporting Period

Location	Start date and time	Measured HVO South LAeq dB	Very enhancing? [1]	Intermittency modifying factor?	Tonality modifying factor?	Frequency of tonality	Low-frequency modifying factor? 1,2	Exceedance of reference spectrum 2,3	Total penalty dB 2,3
Shearers Lane	6/03/2024 21:00	IA	Yes	No	No	N/A	No	N/A	Nil
Knodlers Lane	6/03/2024 21:51	IA	Yes	No	No	N/A	No	N/A	Nil
Maison Dieu	6/03/2024 21:24	IA	Yes	No	No	N/A	No	N/A	Nil
Long Point (Dights Crossing)	6/03/2024 23:07	IA	Yes	No	No	N/A	No	N/A	Nil
Kilburnie South (Moses Crossing)	6/03/2024 23:36	<30	Yes	No	No	N/A	No	N/A	Nil
Jerrys Plains East	6/03/2024 23:10	IA	Yes	No	No	N/A	No	N/A	Nil
Jerrys Plains Village	6/03/2024 21:33	IA	Yes	No	No	N/A	No	N/A	Nil
Jerrys Plains West	6/03/2024 21:01	IA	Yes	No	No	N/A	No	N/A	Nil
HVGC	7/03/2024 0:07	NM	Yes	No	No	N/A	No	N/A	Nil

1. NA denotes 'not applicable'

2. NM denotes 'not measurable'

3. Bold results indicate that application of NPfI modifying factor/s is required

5.3 | REAL TIME NOISE MONITORING

HVO utilises a network of real-time directional noise monitors to manage noise impacts on a continuous basis, shown in **Figure 16**. Noise alarms are in place at five monitoring locations (Knodlers Lane, Maison Dieu, Jerrys Plains, Kilburnie South [Moses Crossing] and Long Point) which alert HVO staff to elevated noise levels that require investigation.

HVO investigates and responds to noise alarms with appropriate modification to operations. Changes in response to a noise alarm can include replacing equipment with alternative units, changing or relocating tasks, or shutting down equipment. It should be noted that this assessment does not compliment or conflict with attended noise monitoring detailed in **Section 5.1**. Real time monitoring data includes non-mine noise sources such as animals, road traffic and weather.

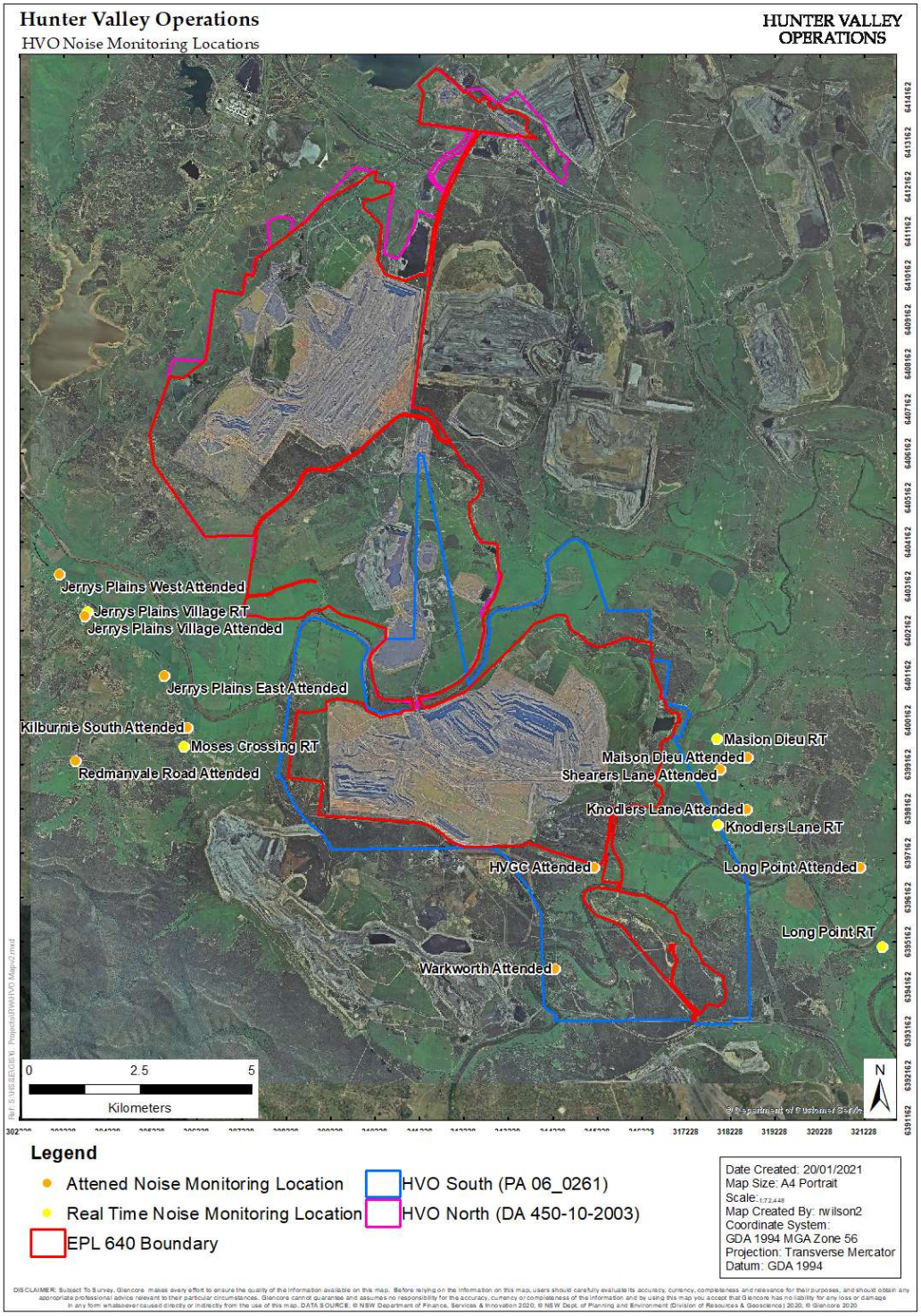

Figure 78 - Noise Monitoring Location Plan

6 | OPERATIONAL DOWNTIME

A total of five fifty-five and a half (55.5) hours of equipment downtime was logged in response to real time monitoring and inspections for environmental factors such as noise and dust during the reporting period. Operational downtime by equipment type is show in **Figure 79**. Note that these delays are instances where operations were completely stopped and does not include occasions where operations were changed/modified but not stopped (e.g. changed from exposed dump to in-pit dump).

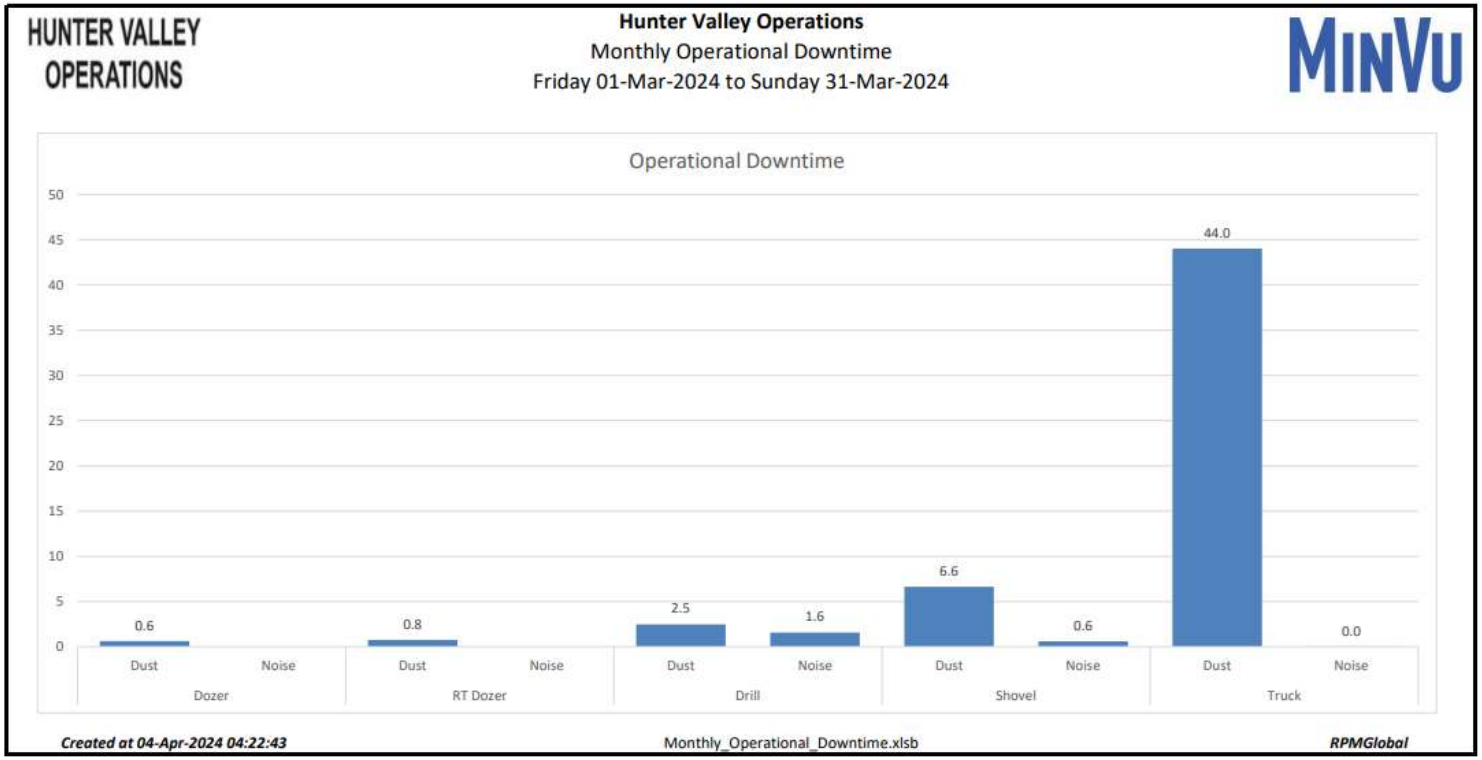

Figure 79: Operational Downtime by Equipment Type for the Reporting Period

7 | REHABILITATION

The following activities related to rehabilitation were completed during the reporting period:

- 0.58ha of land was released (became available for the application of topsoil);
- 0.58ha of land was reshaped;
- 0.00ha of land was topsoiled; and
- 0.00ha of land was rehabilitated.

Year to date progress is shown in **Figure 80**.

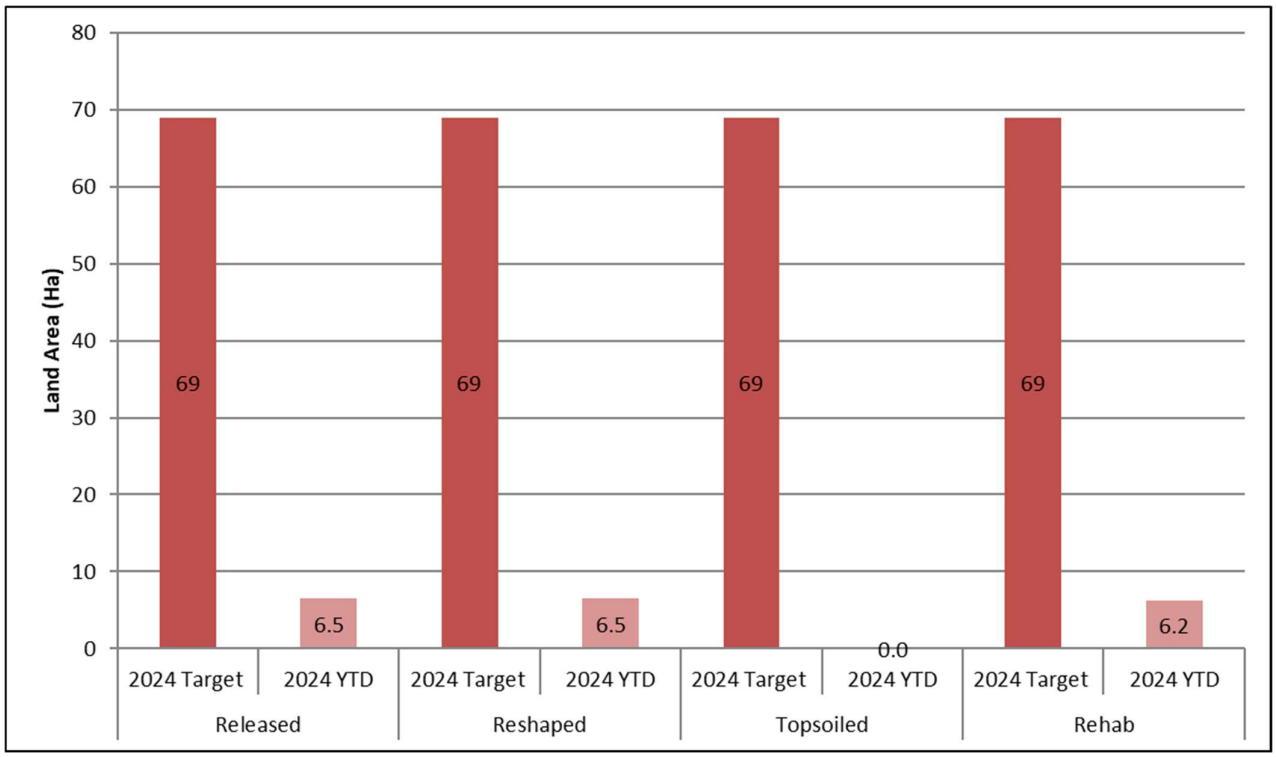

Figure 80 – Rehabilitation YTD March 2024

8 | COMPLAINTS

One (1) noise complaint was received during the reporting period. Details of complaints received during 2024 are shown in **Table 9**.

Table 11 – Complaints Summary 2024

Complaint Number	Date	Time	Complainant ID	Nature of Complaint	Mode of Complaint	Brief Description and Response
No community complaints were received during January						
No community complaints were received during February						
1	12 March	8:59pm	1	Noise	Community Hotline	• A resident of Jerrys Plains called the Community Complaints Hotline at 8:59pm regarding noise, commenting that "noise is pretty loud tonight" as well as equipment horns could be heard. • The OCE on duty in South Pit contacted the resident at 9:02pm and subsequently notified the OCE on duty in West Pit. Following communication between West Pit OCE and relevant equipment operators, horn use and dumping practices – thought to be the causes of the disturbance – were altered and/or stopped. • An internal investigation conducted following the complaint found that no noise alarms had triggered within one hour of the complaint. Horn noise was audible from noise recordings at the Jerrys Plains noise monitor.

9 | ENVIRONMENTAL INCIDENTS

Two (2) reportable environmental incident occurred during the reporting period. A summary of the incidents are provided below:

12/03/2024 – Kilburnie South HVAS $PM_{2.5}$ mis-capture

HVO were notified by the monitoring contractor that the Kilburnie South $PM_{2.5}$ HVAS failed to run for the full monitoring period on 12 March 2024. The monitoring contractor collecting the filter paper noted that the unit was without power upon their arrival. An inspection of the unit's power supply on 14 March by a monitoring technician found that the cause of the power supply issue was a blown internal fuse. The fuse was replaced and unit successfully test run. The unit was reset and ran successfully on 18 March. DPHI were notified of the mis-capture.

13/03/2024 – PM_{10} Dust Exceedance – Jerrys Plains

Monitoring results indicate that on 13 March 2024, the Jerrys Plains TEOM recorded a result of 51.2µg/m^3 for the 24-hour averaging period for PM_{10}, exceeding the relevant criteria of 50ug/m^3. A specialist air quality consultant was engaged to investigate the result and determined HVO's maximum possible contribution to be 13.3ug/m^3. The Department of Planning Housing Infrastructure (DPHI) were advised of the exceedance on 15 March and an incident report was submitted. No further information was requested from DPHI.

APPENDIX A: METEOROLOGICAL DATA (HVO CORPORATE)

Date	Air Temp Max (°C)	Air Temp Min (°C)	Relative Humidity (Max %)	Relative Humidity (Min %)	Solar Radiation Maximum (W/Sq. M)	Average Wind Direction (°)	Average Wind Speed (m/sec)	Rainfall (mm)
1/03/2024	35.58	21.35	84	30.55	1270	177	1.76	0.60
2/03/2024	32.86	19.69	92.2	38.29	1098	200.1	2.82	15.80
3/03/2024	32.42	17.81	92.2	22.22	1470	185.8	1.64	0.00
4/03/2024	24.09	16.84	87.9	48.28	1301	110.7	4.04	0.00
5/03/2024	26.5	13.73	84.2	43.4	1405	111.3	2.39	0.00
6/03/2024	32.02	14.66	89.3	34.8	1042	166.9	1.31	0.00
7/03/2024	32.48	19.36	86.4	29.66	1175	141.4	2.47	0.00
8/03/2024	30.01	17.82	93.6	35.54	1147	112.1	3.10	0.00
9/03/2024	30.01	16.4	90.7	34.41	1232	110.8	2.78	0.00
10/03/2024	30.3	16.87	91.8	34.08	1083	110.6	2.93	0.00
11/03/2024	29.32	16.85	90	34.54	1068	115.5	2.83	0.00
12/03/2024	33.41	15.4	91.6	25.27	925	166.6	1.45	0.00
13/03/2024	30.45	16.8	79.89	21.95	1222	104.4	1.89	0.00
14/03/2024	36.24	15.78	92.7	19.91	855	215.7	3.02	0.00
15/03/2024	23.13	15.83	81.1	45.85	903	119.7	4.22	0.00
16/03/2024	23.13	14.88	82.7	51.34	598.1	118.3	2.86	0.20
17/03/2024	24.22	15.08	95.7	54.67	1396	126.2	2.10	8.80
18/03/2024	24.46	16.27	95.4	57.72	1317	122.9	1.48	11.20
19/03/2024	28.3	18.09	92.7	48.84	1153	127.8	1.17	0.00
20/03/2024	25.77	16.39	93.7	61.4	432.1	223.3	2.50	2.40
21/03/2024	21.87	14.12	83.8	36.69	1463	113.1	3.97	0.00
22/03/2024	23.61	13.6	91.5	51.8	1365	122.4	1.60	0.00
23/03/2024	23.82	12.85	91.8	48.12	978	132.9	1.12	0.00
24/03/2024	27.62	15.94	83.8	36.98	1010	129.3	1.03	0.00
25/03/2024	30.21	15.06	91.4	23.35	881	229.2	1.57	0.00
26/03/2024	30.08	14.58	81.6	28.19	846	145.1	1.20	0.00
27/03/2024	27.48	15.3	93.4	43.07	1111	110.4	2.64	0.00
28/03/2024	27.58	17.33	88.6	39.14	1021	123.7	2.83	0.00
29/03/2024	25.96	16.7	91.5	48.77	1081	115.2	2.74	0.00
30/03/2024	28.23	13.65	93.4	35.81	781.9	174.5	1.24	0.00
31/03/2024	26.7	14.86	95.6	41.78	977	113.3	1.67	0.00