HUNTER VALLEY
OPERATIONS

MONTHLY ENVIRONMENTAL MONITORING REPORT SEPTEMBER 2024

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REVIEW
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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 – 30 September 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)
September	30.8	537.4

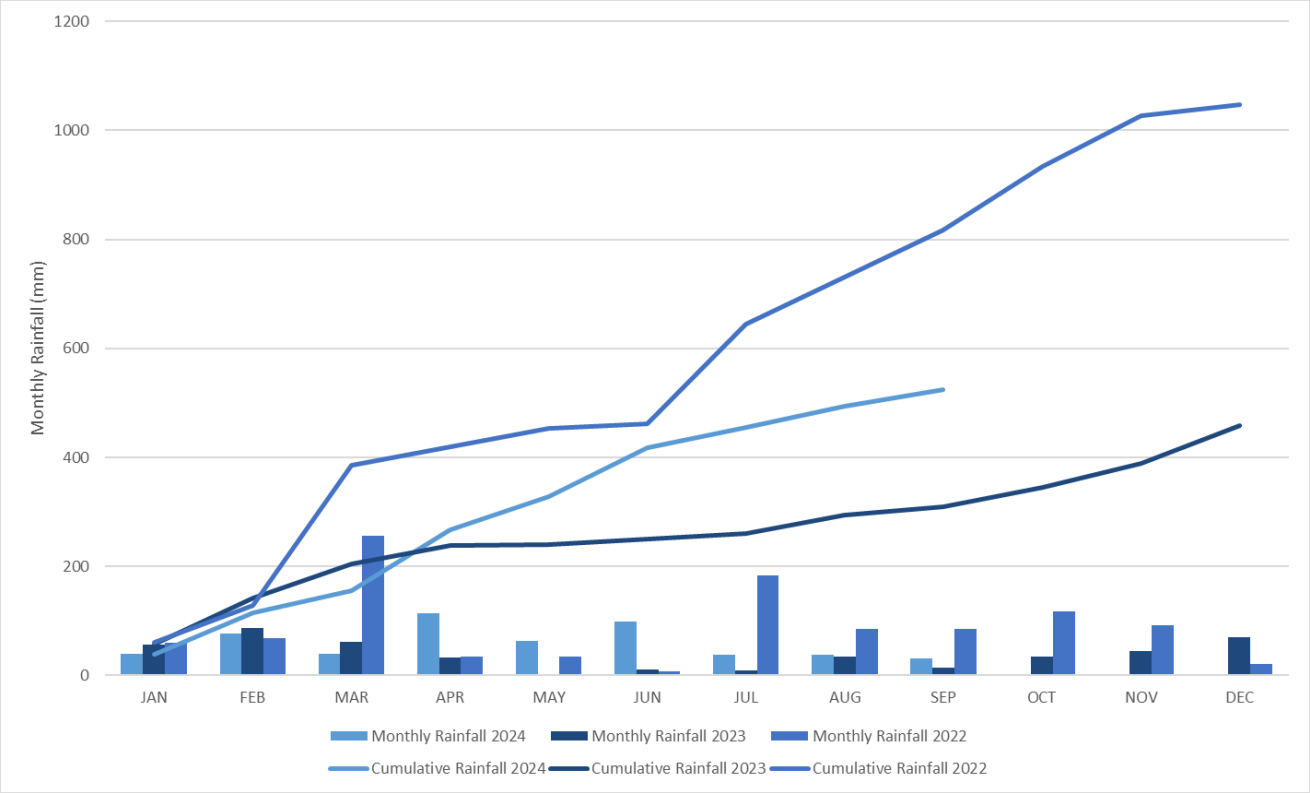

Figure 1: Rainfall Summary 2024

2.1.2 | WIND SPEED AND DIRECTION

West to north westerly winds were prevailing at both the HVO Corporate and Cheshunt weather stations during the reporting period as shown in **Figure 2** and **Figure 3**.

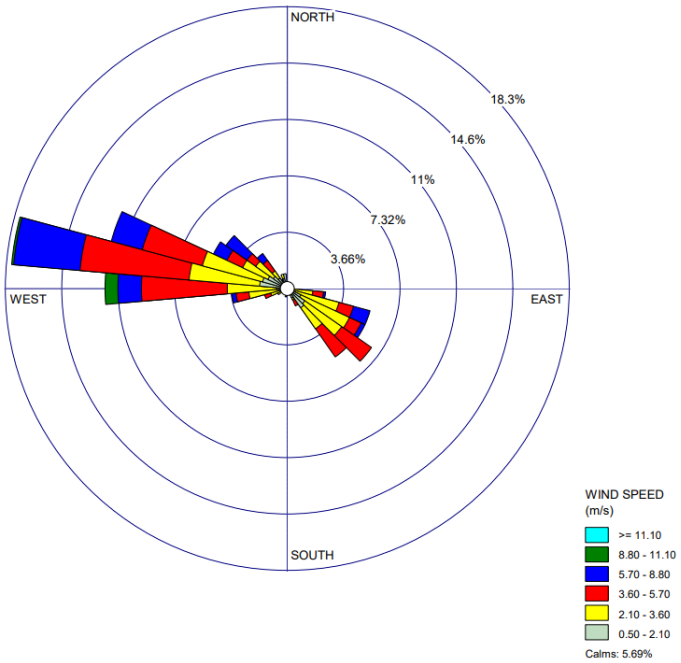

Figure 2: HVO Corporate Wind Rose for the Reporting Period

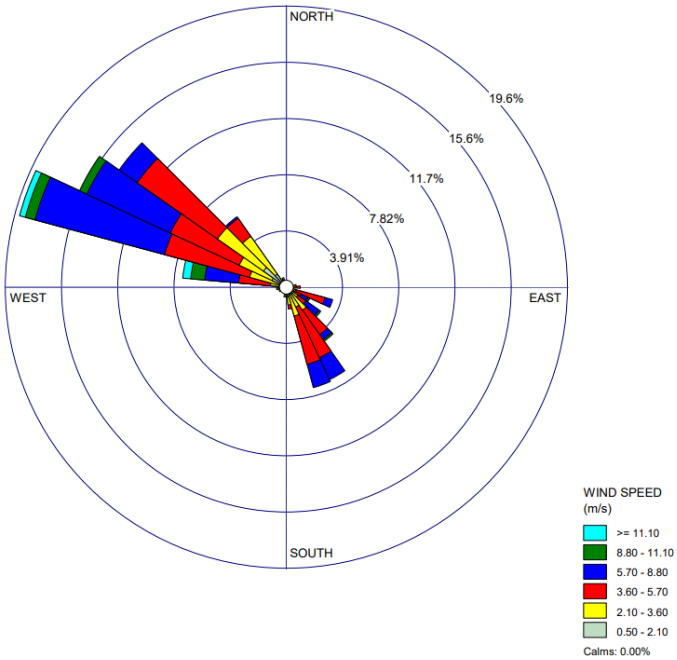

Figure 3: HVO Cheshunt Wind Rose for the Reporting Period

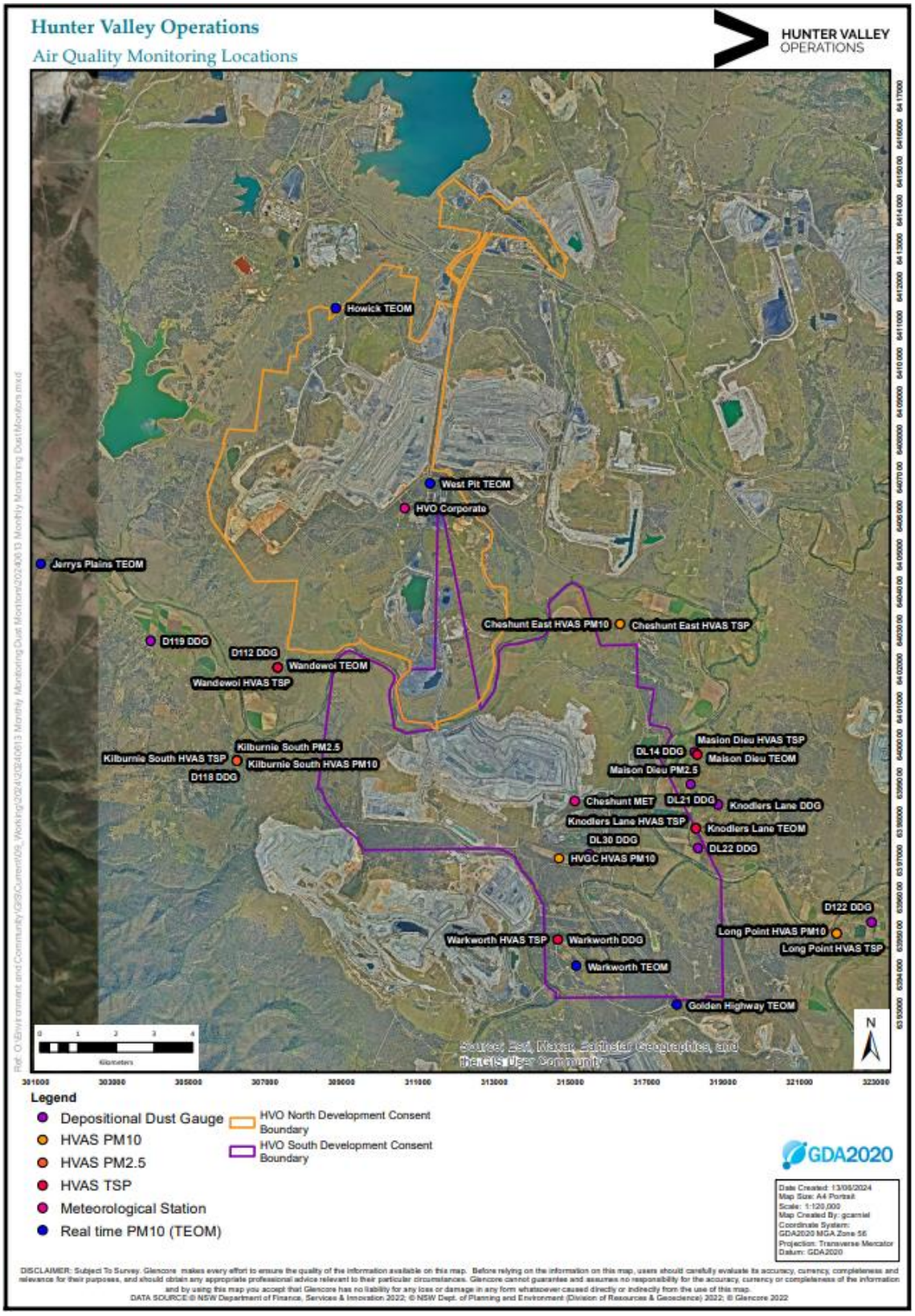

Figure 4: Air Quality Monitoring Location Plan

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.

Figure 5 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.

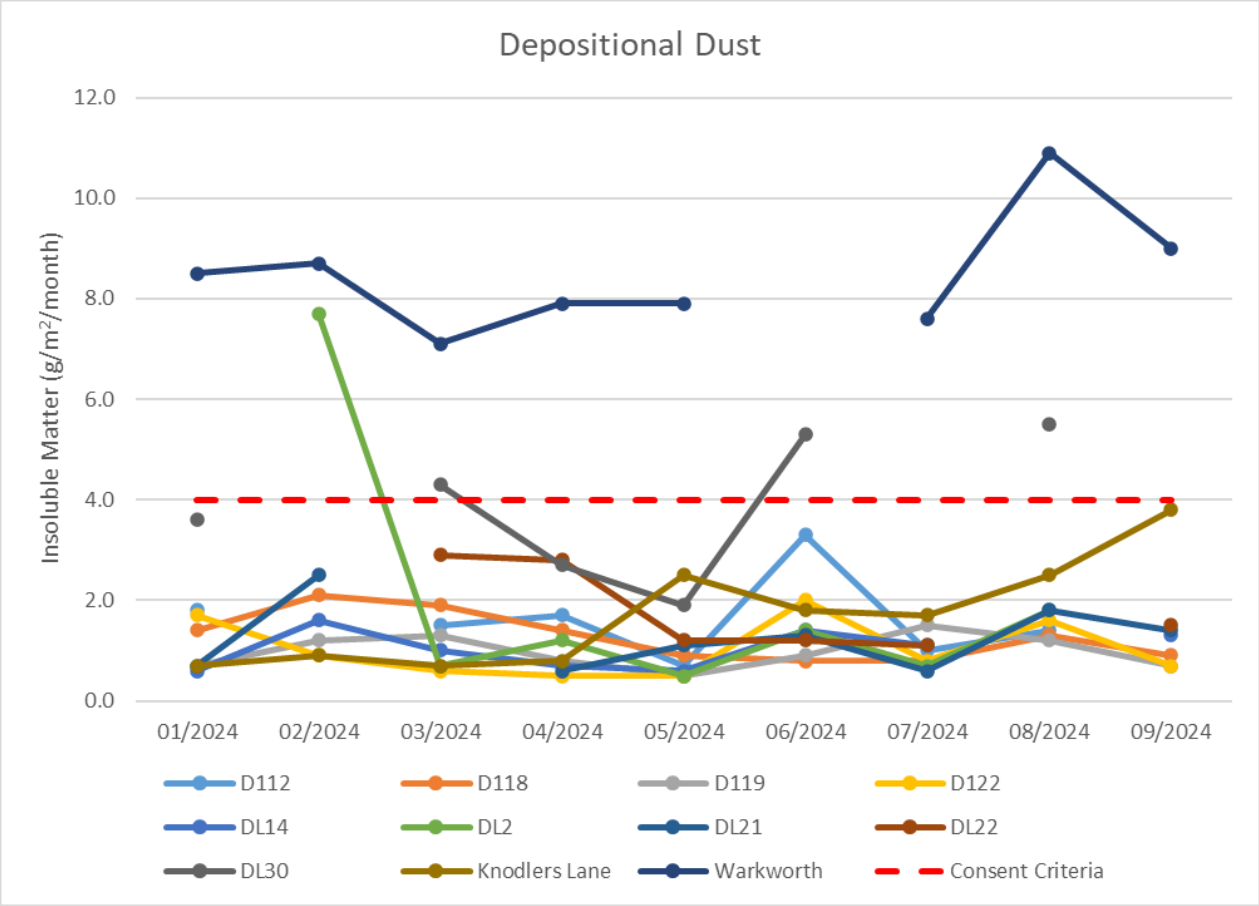

Figure 5: Depositional Dust Results for the Reporting Period

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. All monitors were below the short-term impact assessment criteria during the reporting period with the exception of Gliding Club on 8 and 20 September. The potential exceedance on 8 September was investigated internally by HVO and found that the maximum calculated HVO contribution was below the compliance limit. The potential exceedance on 20 September was investigated by a third-party air quality specialist and found that the maximum calculated HVO contribution was below the compliance limit.

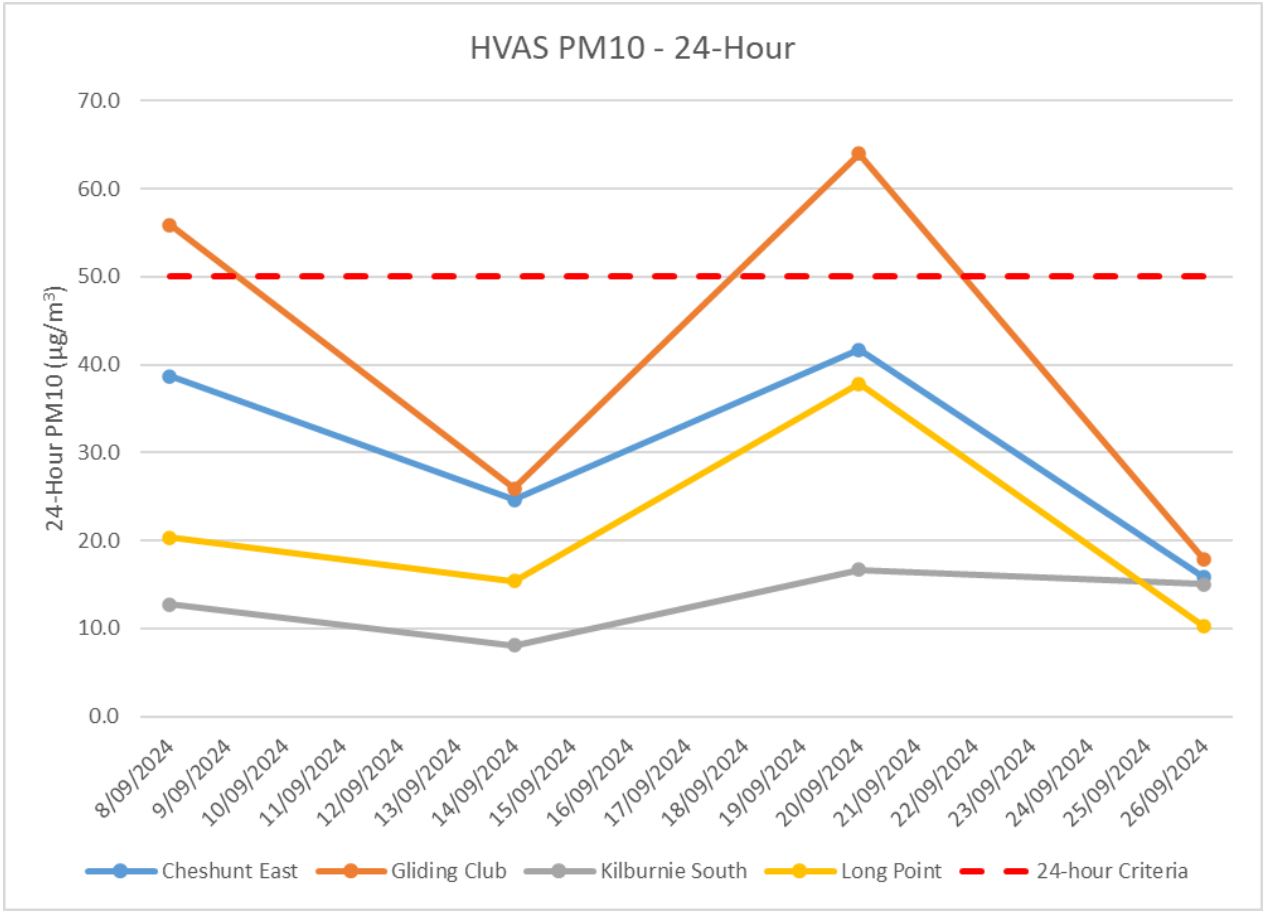

Figure 6: Individual PM_{10} Results for the Reporting Period

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.

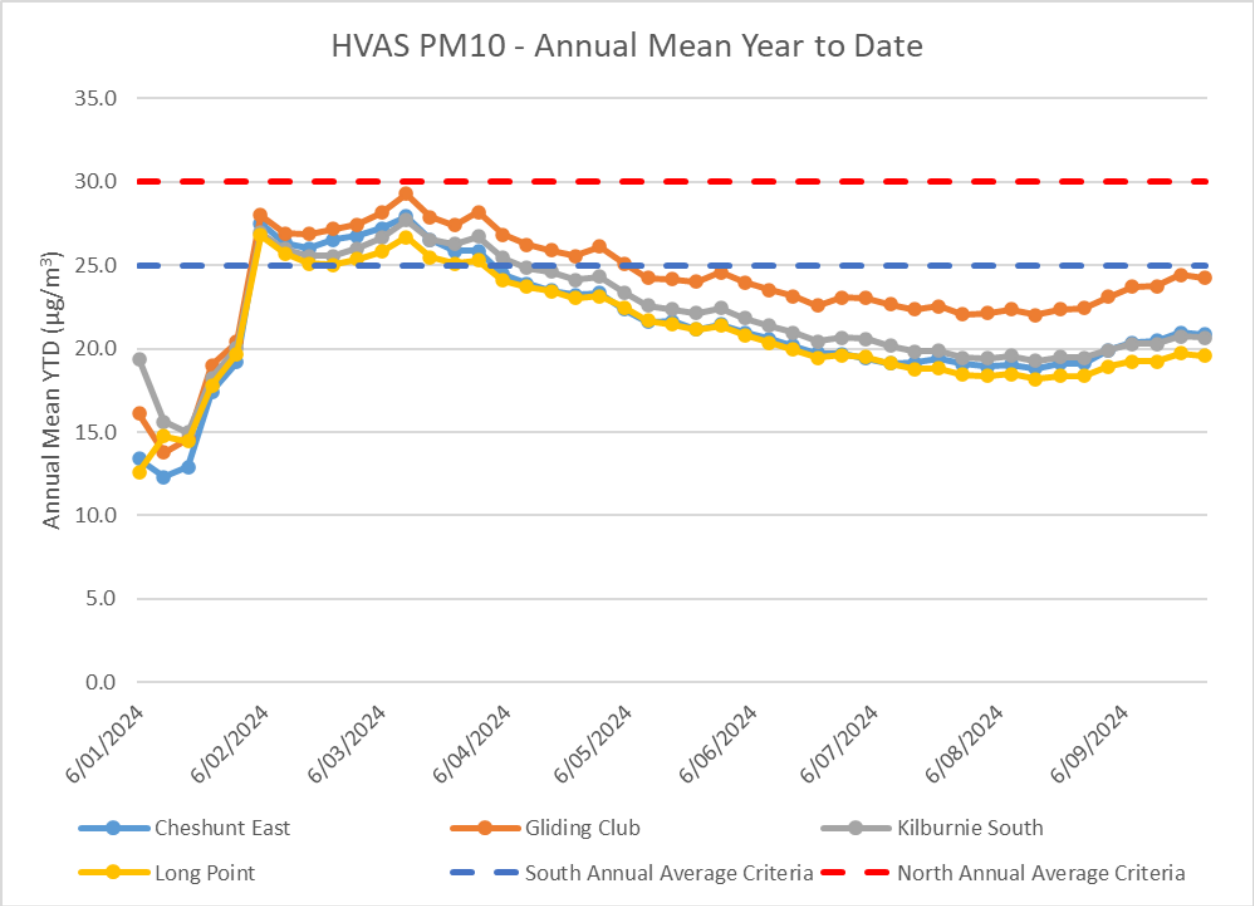

Figure 7: Year to Date Average PM_{10} as at end of the Reporting Period

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. Monitoring locations were below the relevant short-term impact assessment criteria during the reporting period, with the exception of Maison Dieu on 2 September 2024. HVO internally investigated this potential exceedance and found that the maximum calculated HVO contribution was below the compliance limit.

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

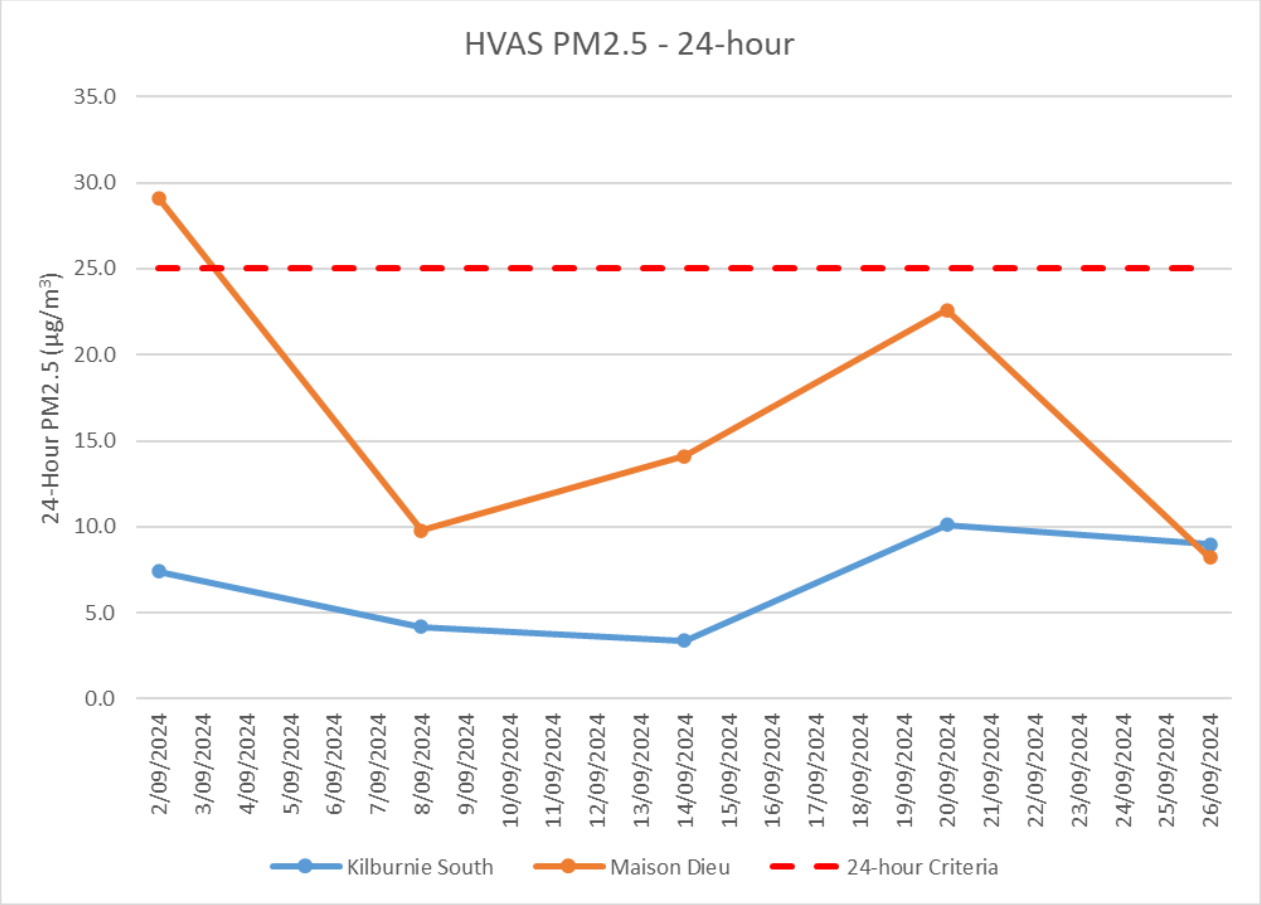

Figure 8: Results for the Reporting Period

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 Maison Dieu monitors annual average year to date result was 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.

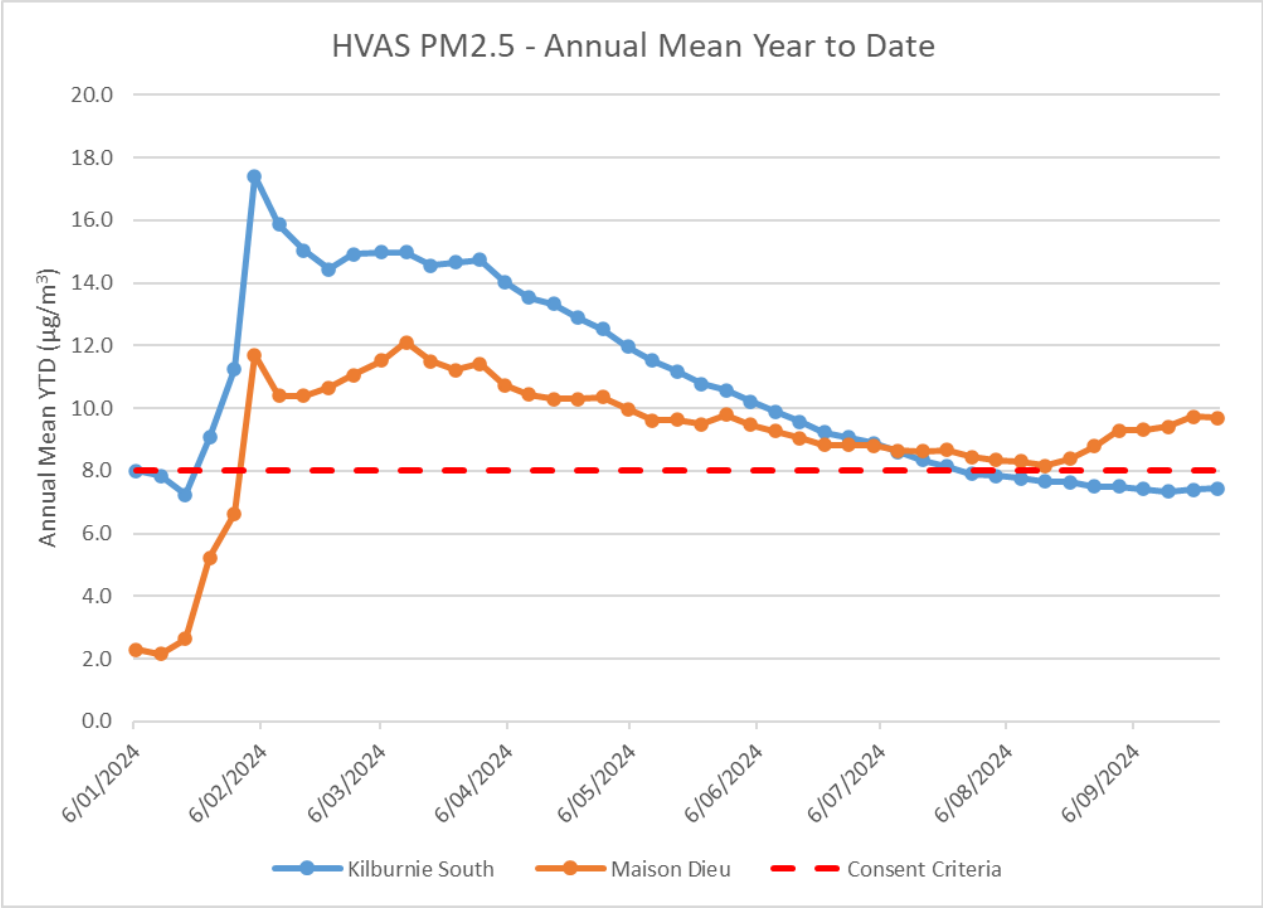

Figure 9: Year to Date Average $PM_{2.5}$ as at end of the Reporting Period

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.

Six of the seven monitors were below the relevant long-term impact assessment criteria during the reporting period. The Warkworth monitor was 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.

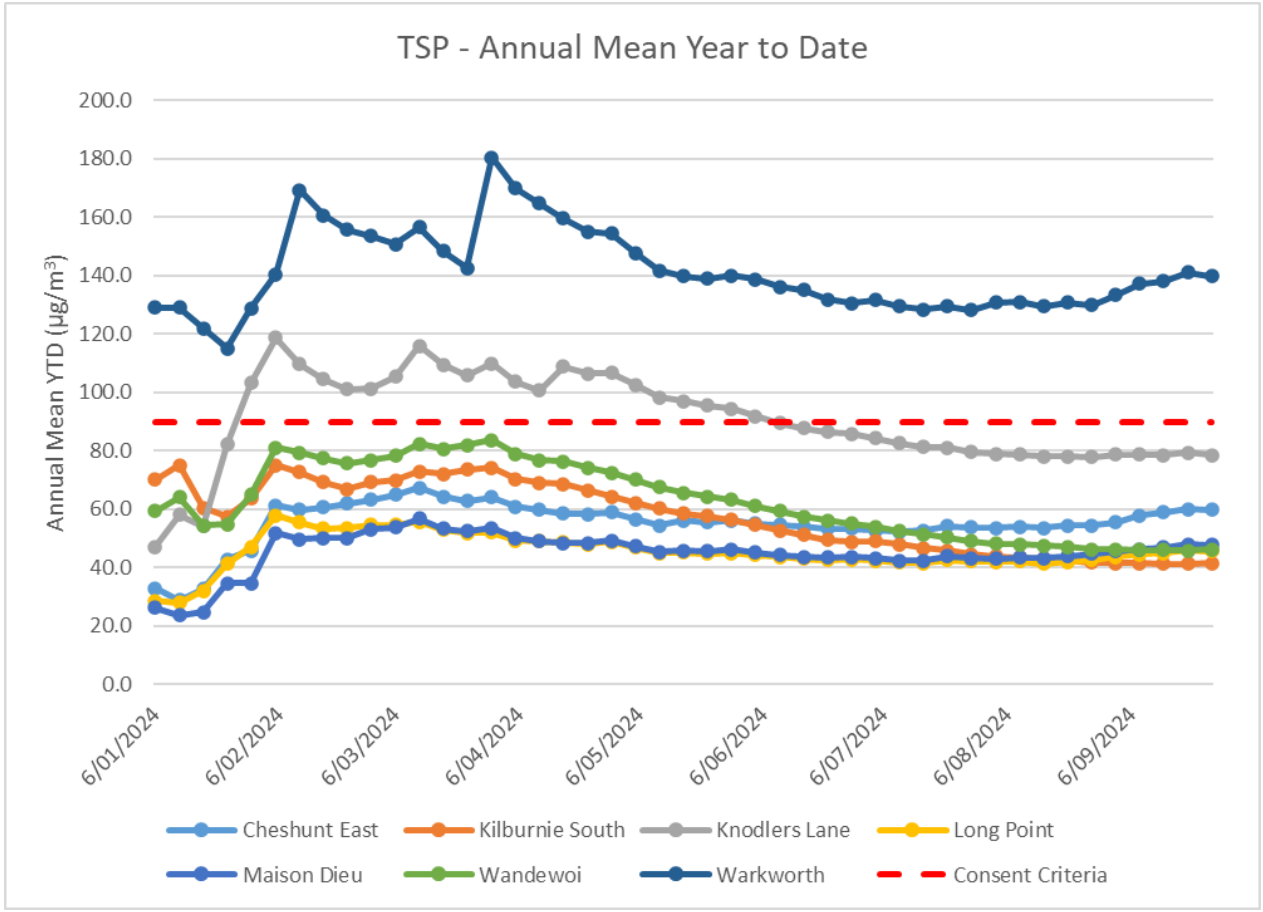

Figure 10: Year to Date Average Total Suspended Particulates as at end of the Reporting Period

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:

- Warkworth monitor on 1, 2, 5, 7, 8, 18 – 25 September
- Knodlers Lane on 2 and 25 September

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

Maison Dieu monitor reported data capture rates of less than 75% on 24 and 25 September and therefore these are not displayed on **Figure 11**.

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

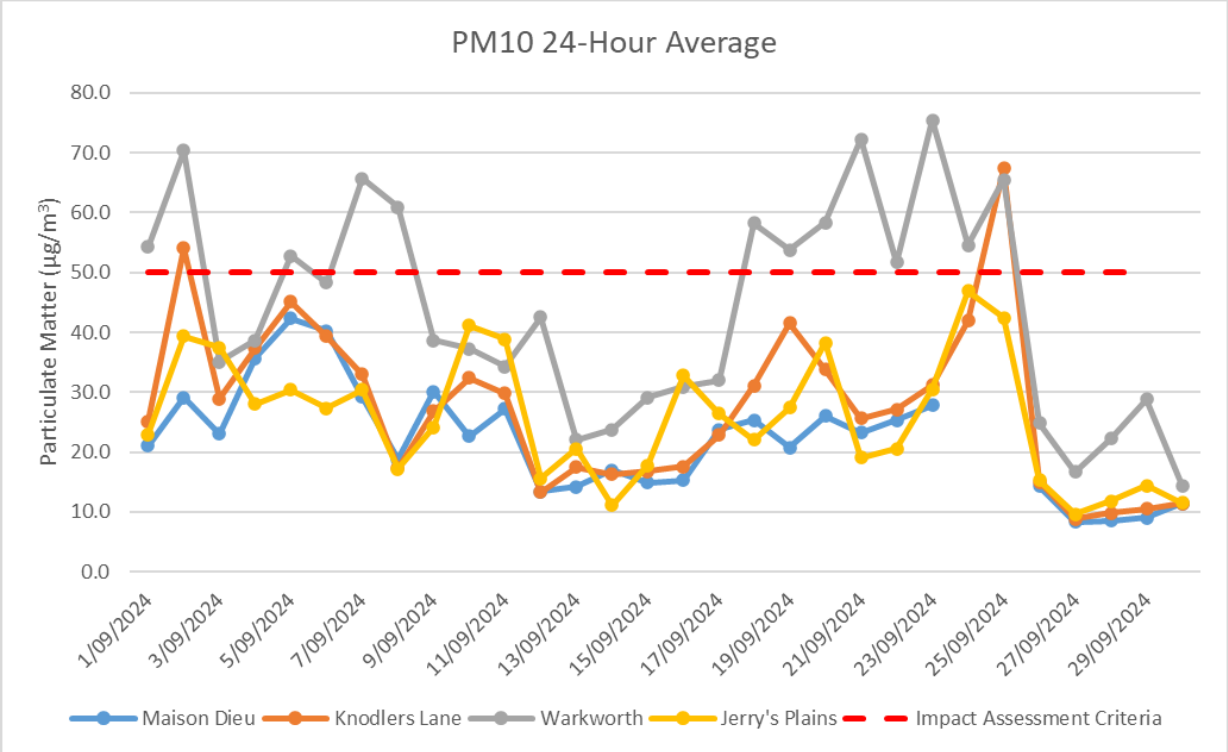

Figure 11: Real Time PM_{10} 24hr for the Reporting Period

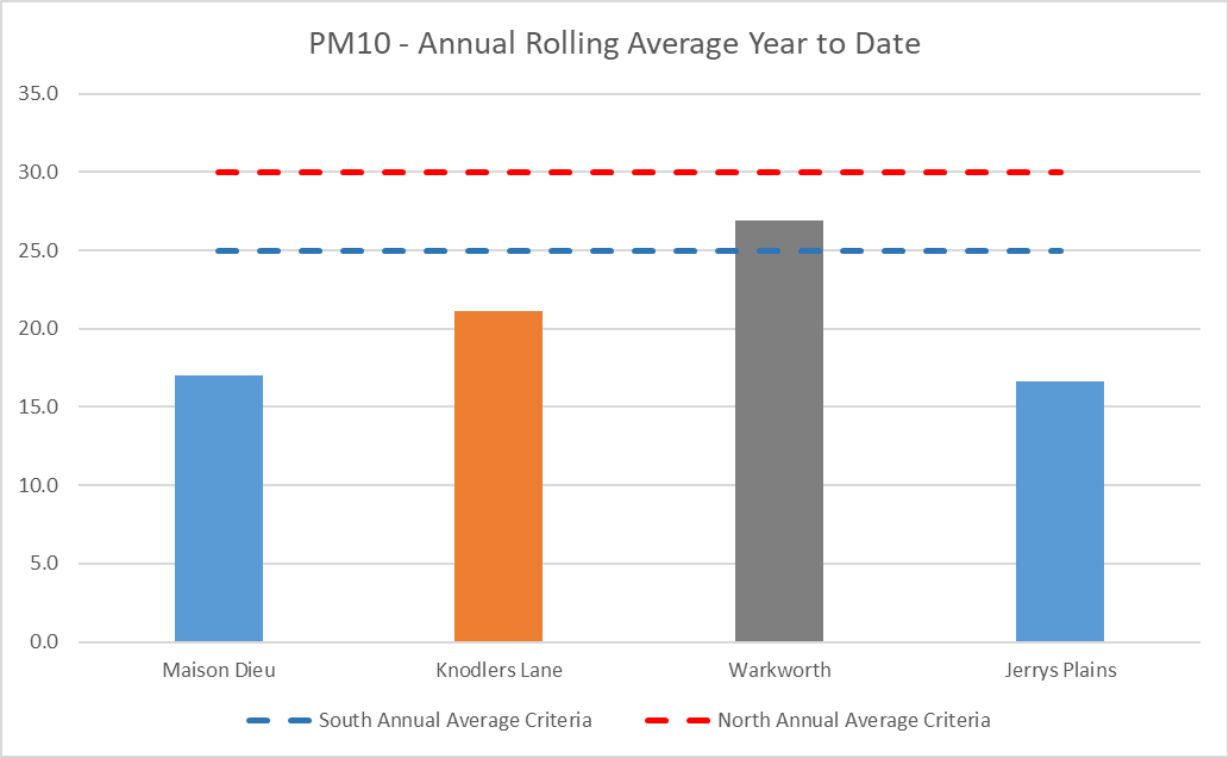

Figure 12: Real Time PM_{10} Annual Average for the Reporting Period

2.3.5 | REAL TIME ALARMS FOR AIR QUALITY

The real time monitoring system generated three hundred and three (303) automated air quality related alarms during the reporting period. Forty-three (43) alarms related to adverse weather conditions (wind or rain) and two hundred and sixty (260) 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, Wollombi Brook, the Hunter River and other natural tributaries are provided in **Figure 14 to Figure 25.**

Note: Other natural tributaries are only sampled following a significant rain event (>30mm). Results displayed are those following the last significant rain event which may have been outside the reporting period.

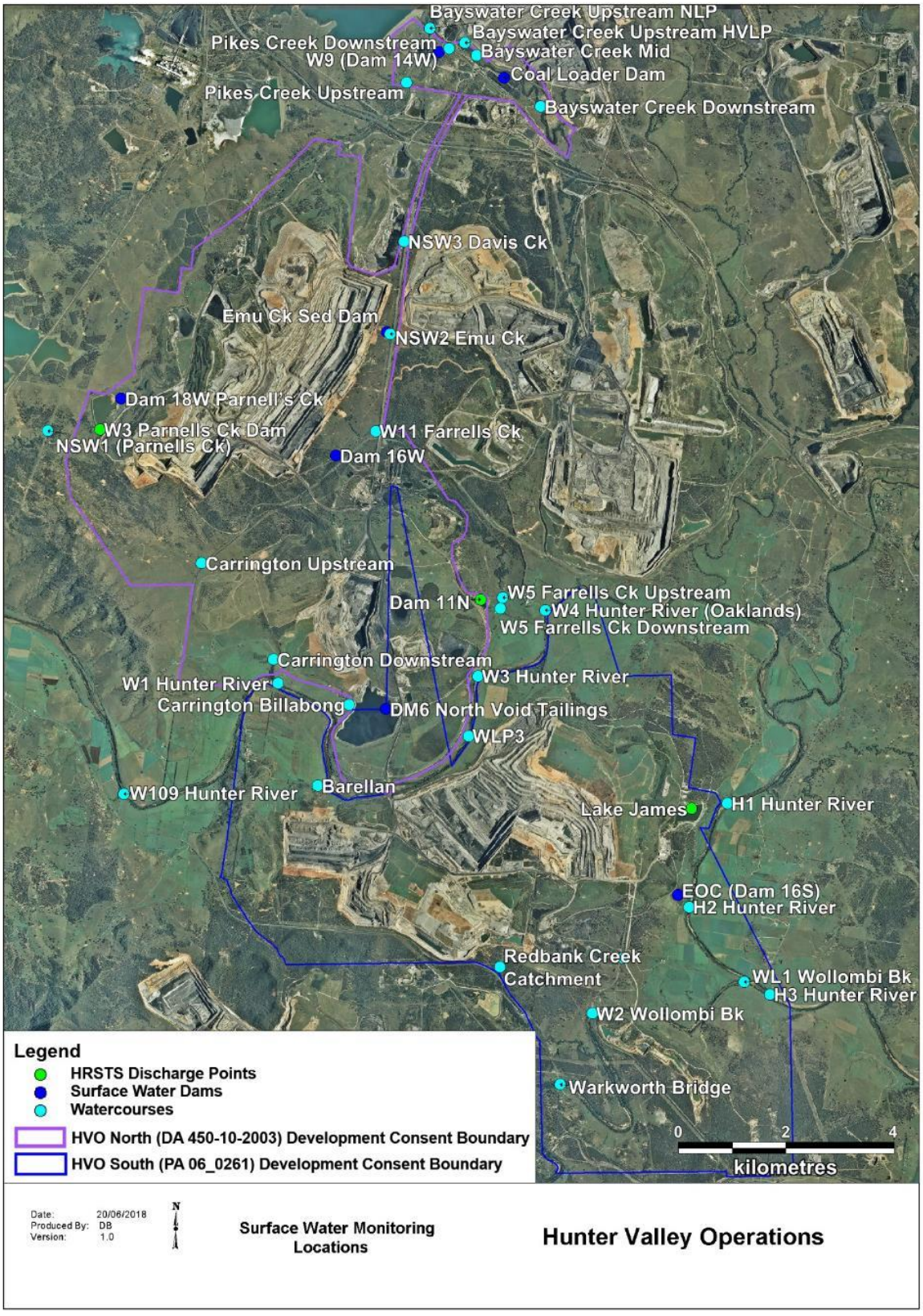

Figure 13: HVO Surface Water Monitoring Locations

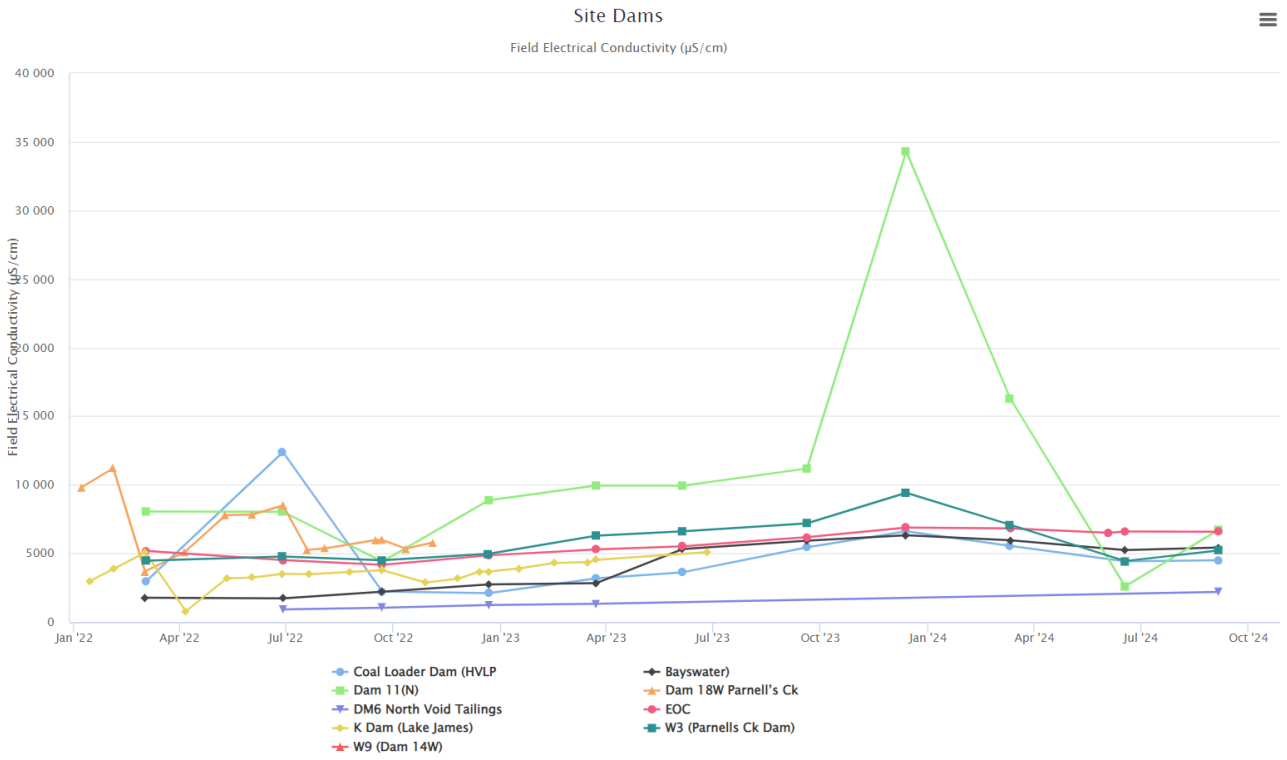

Figure 14 Site Dams Electrical Conductivity – Q3 2024

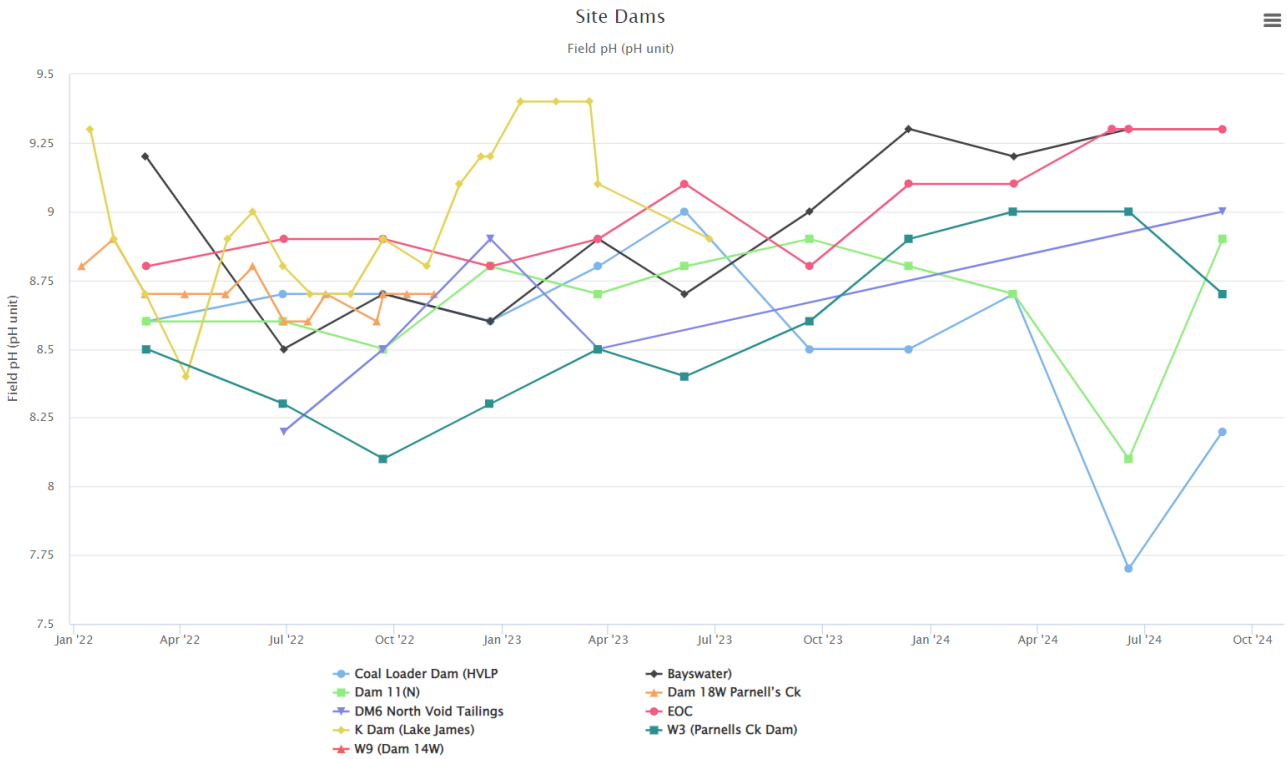

Figure 15 Site Dams Field pH – Q3 2024

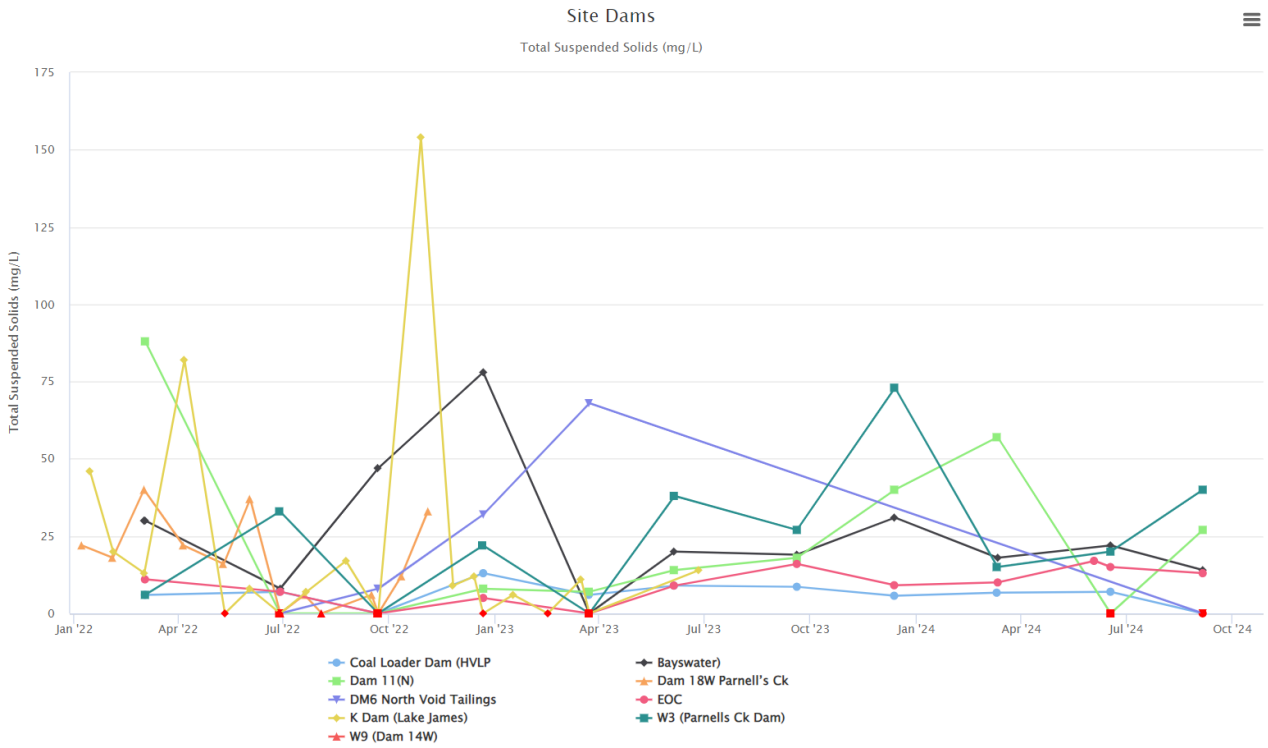

Figure 16 Site Dams Total Suspended Solids – Q3 2024

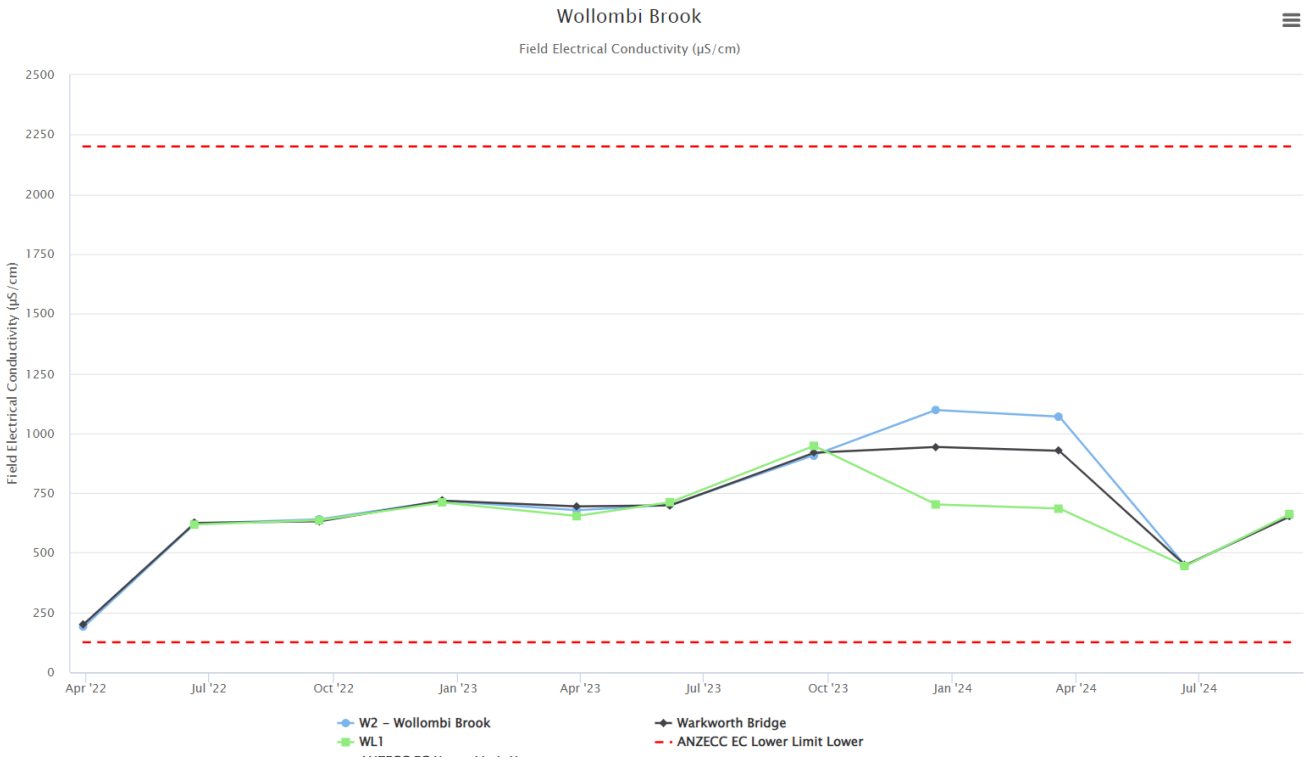

Figure 17 Wollombi Brook Electrical Conductivity – Q3 2024

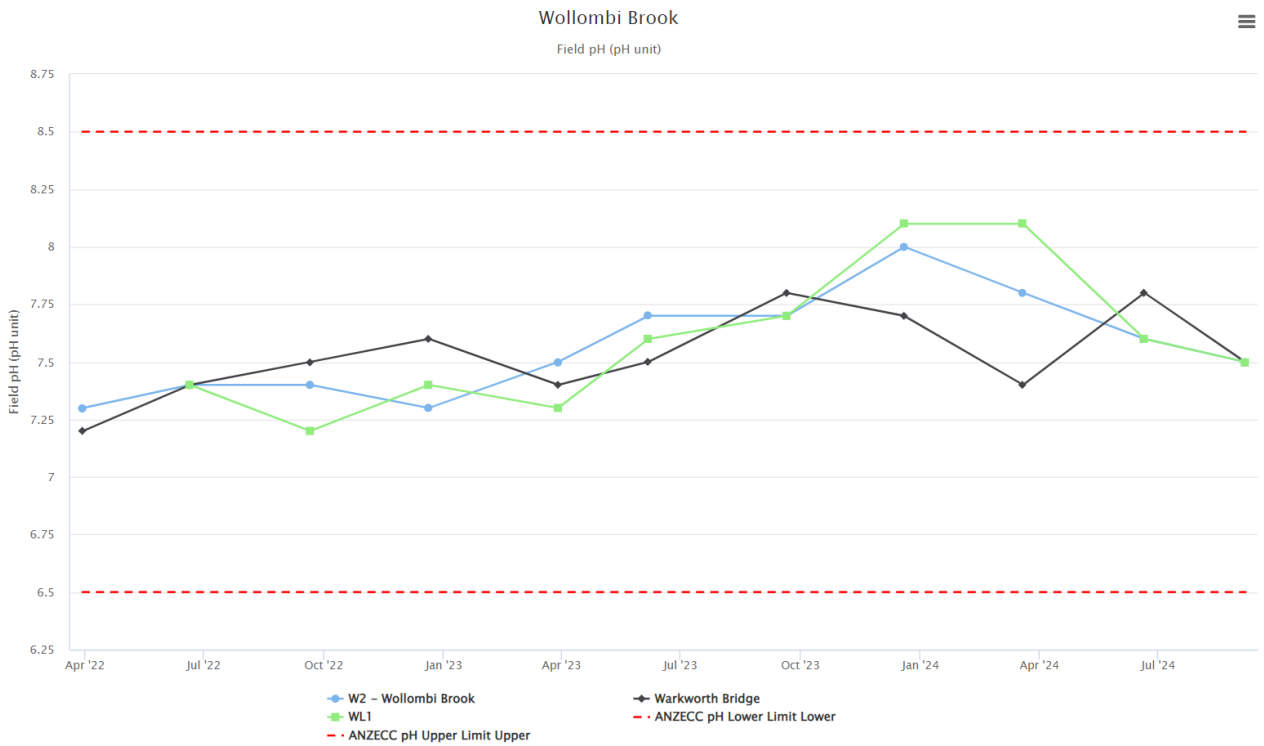

Figure 18 Wollombi Brook Field pH – Q3 2024

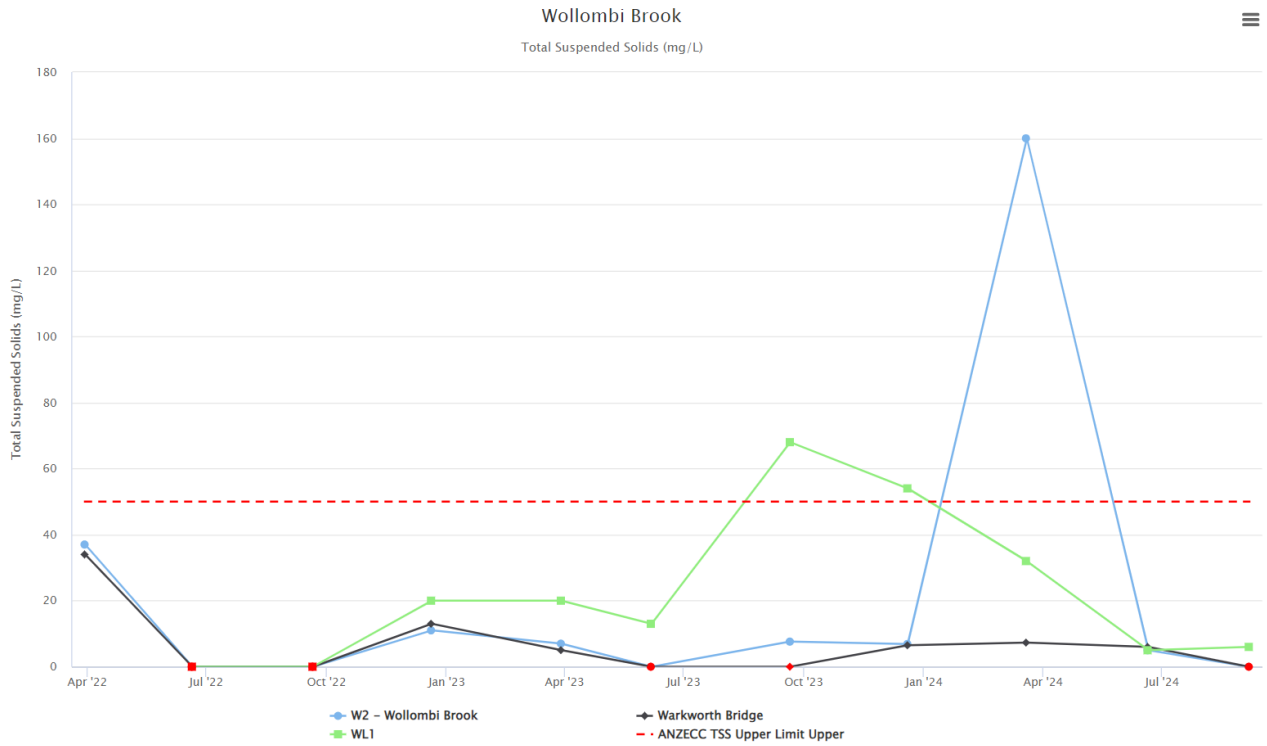

Figure 19 Wollombi Brook Total Suspended Solids – Q3 2024

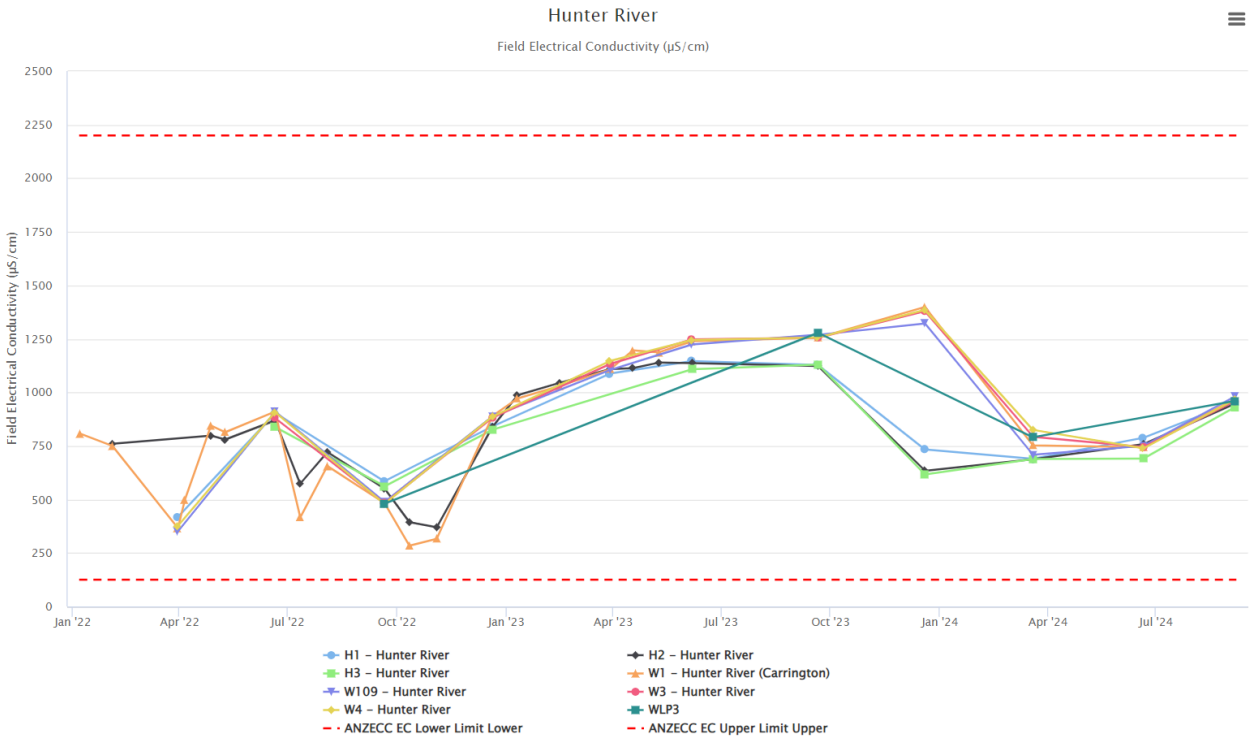

Figure 20 Hunter River Electrical Conductivity – Q3 2024

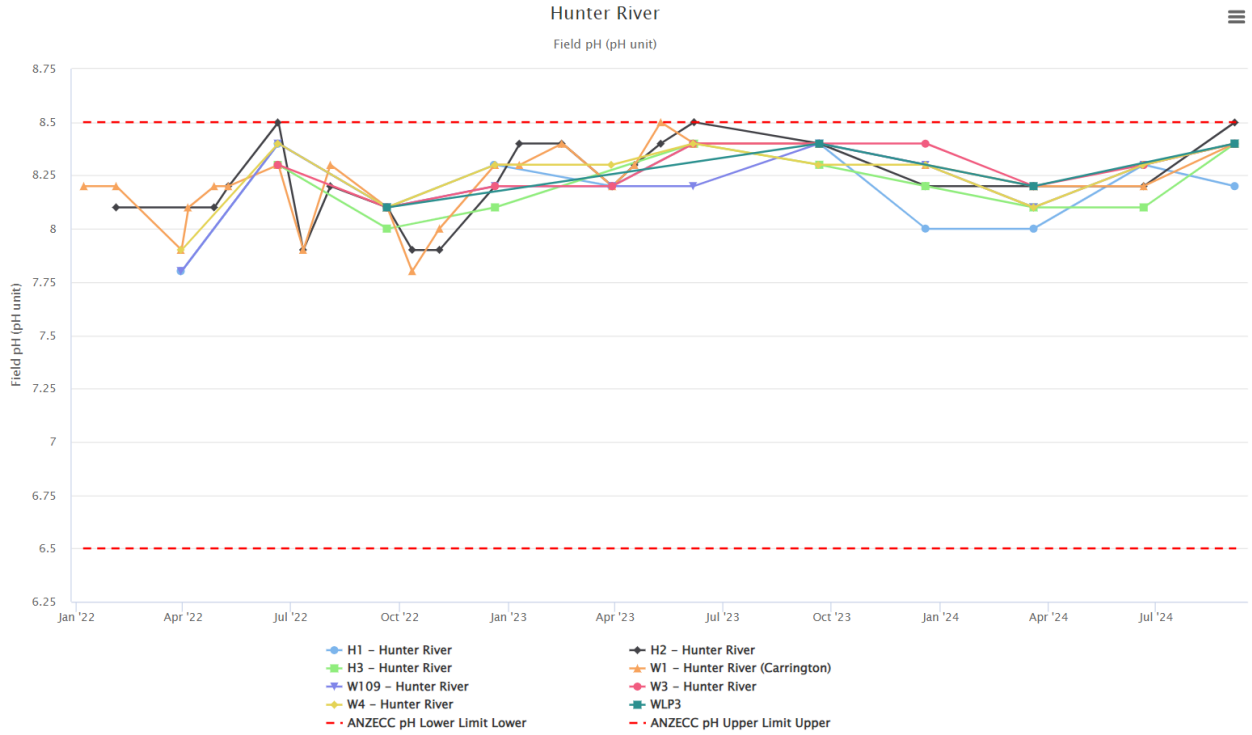

Figure 21 Hunter River Field pH – Q3 2024

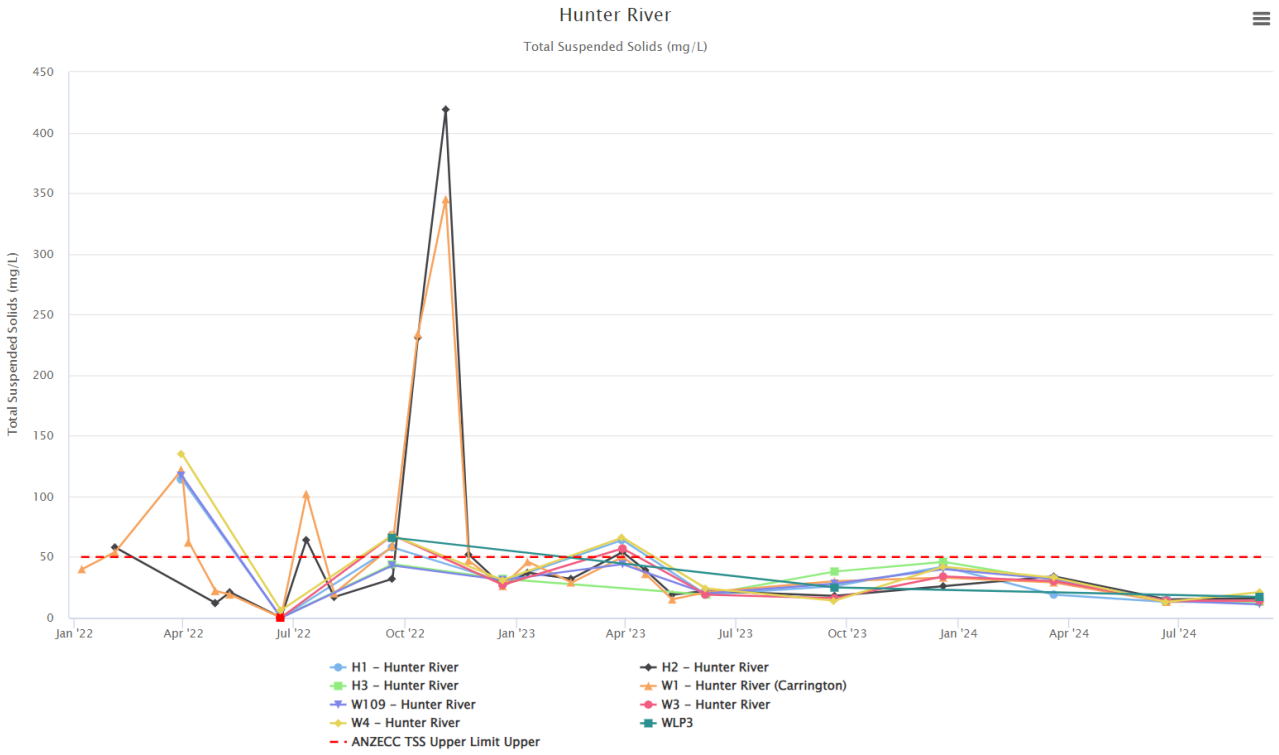

Figure 22 Hunter River Field TSS – Q3 2024

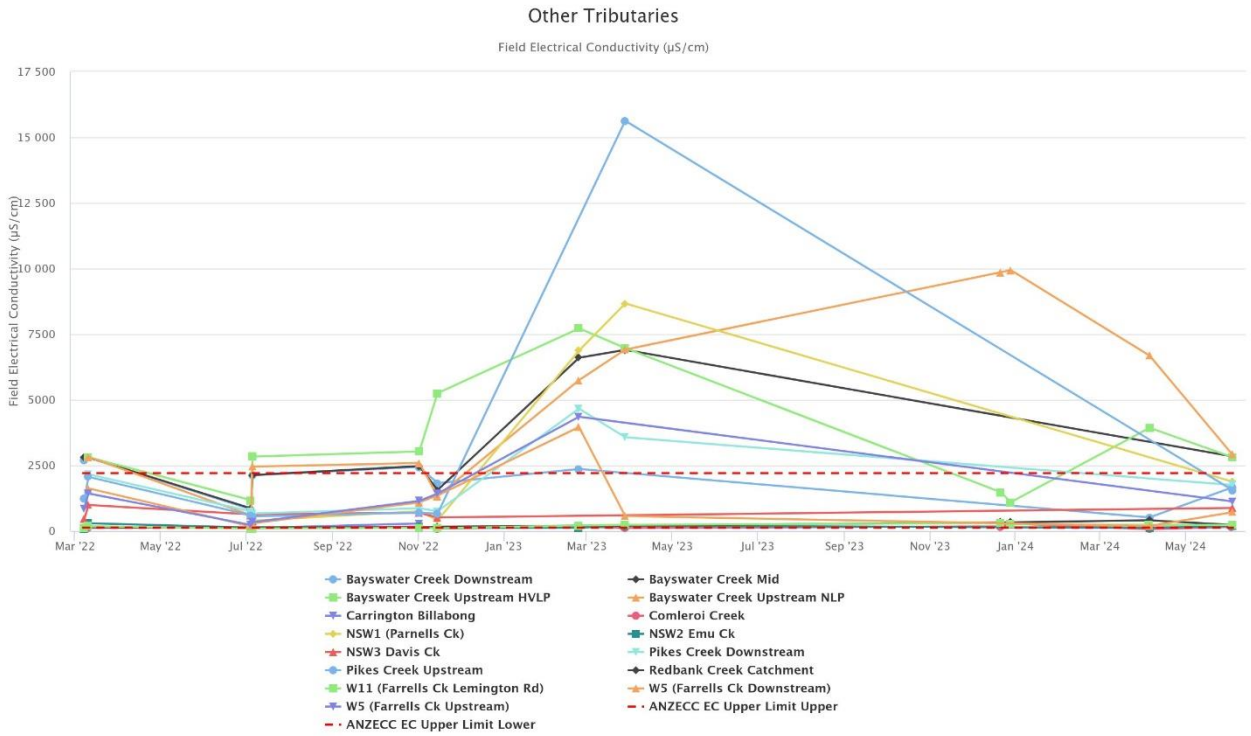

Figure 23 Other Tributaries Electrical Conductivity – Q3 2024

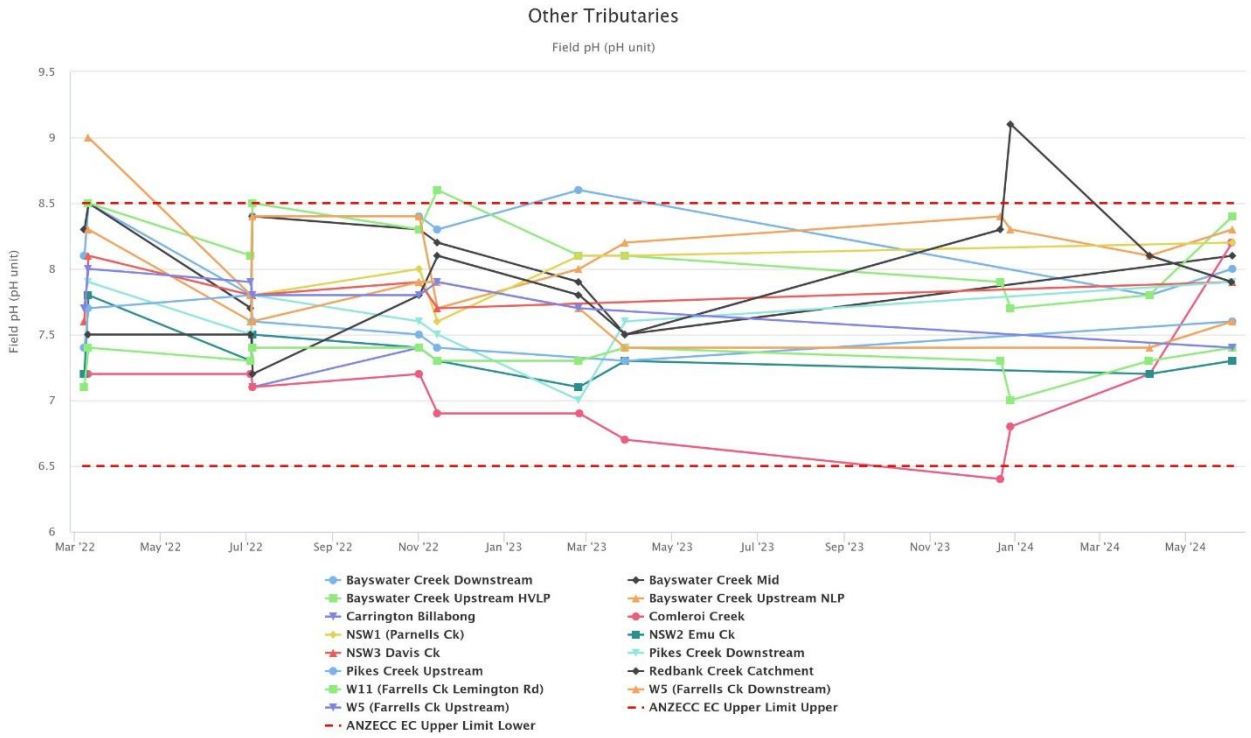

Figure 24 Other Tributaries Field pH – Q3 2024

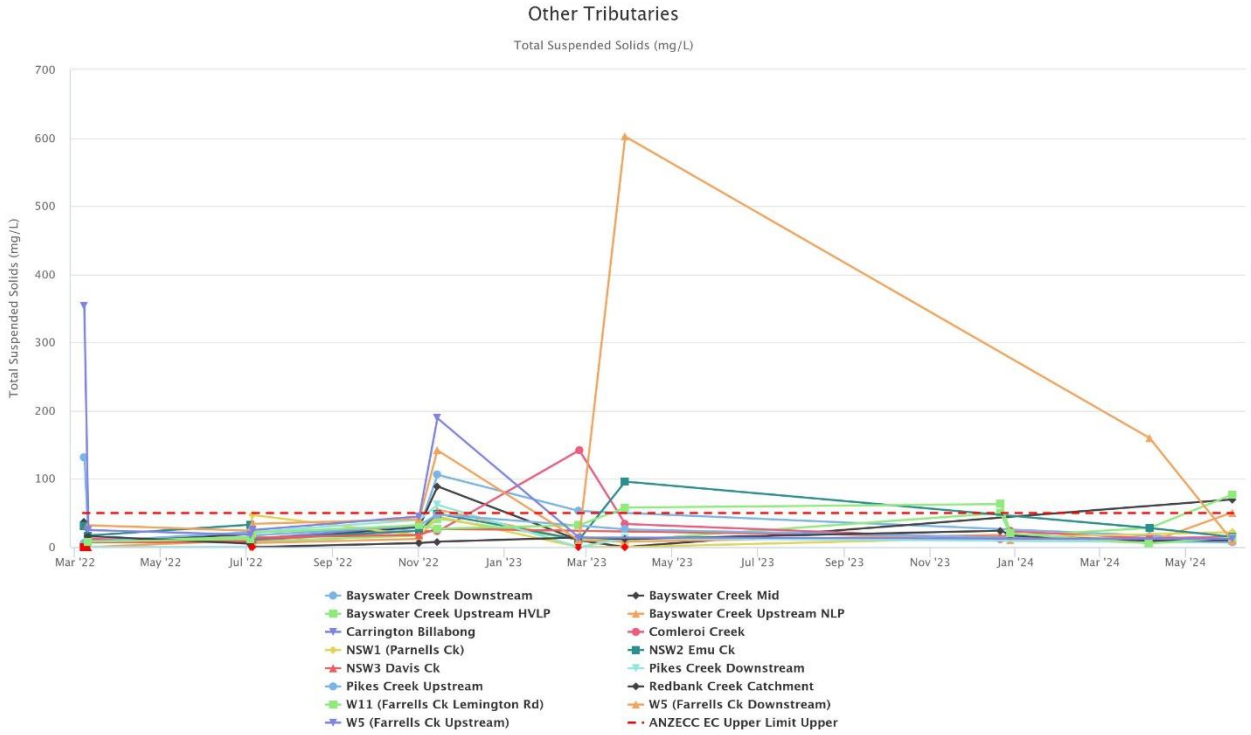

Figure 25 Other Tributaries Total Suspended Solids – Q3 2024

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 – Q3 2024

Site	Date	Trigger Limit	Response Action
H3 – Hunter River	5/09/2024	Electrical Conductivity (uS/cm)	First exceedance of EC. No Investigation required.

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 shown in **Figure 26**.

Groundwater monitoring results are provided in **Figure 27 to Figure 687** - Lemington South Glen Munro Water Elevation Trend - Q3 2024.

Notes: Some or all sites within Lemington South Arrowfield, Lemington South Bowfield, Lemington South Glen Munro and Lemington South Woodlands Hill groupings are sampled bi-annually. Results displayed are the most recent, which may be outside the reporting period.

Bore NPZ3 within the West Pit Siltstone grouping blocked and unable to be sampled since December 2022.

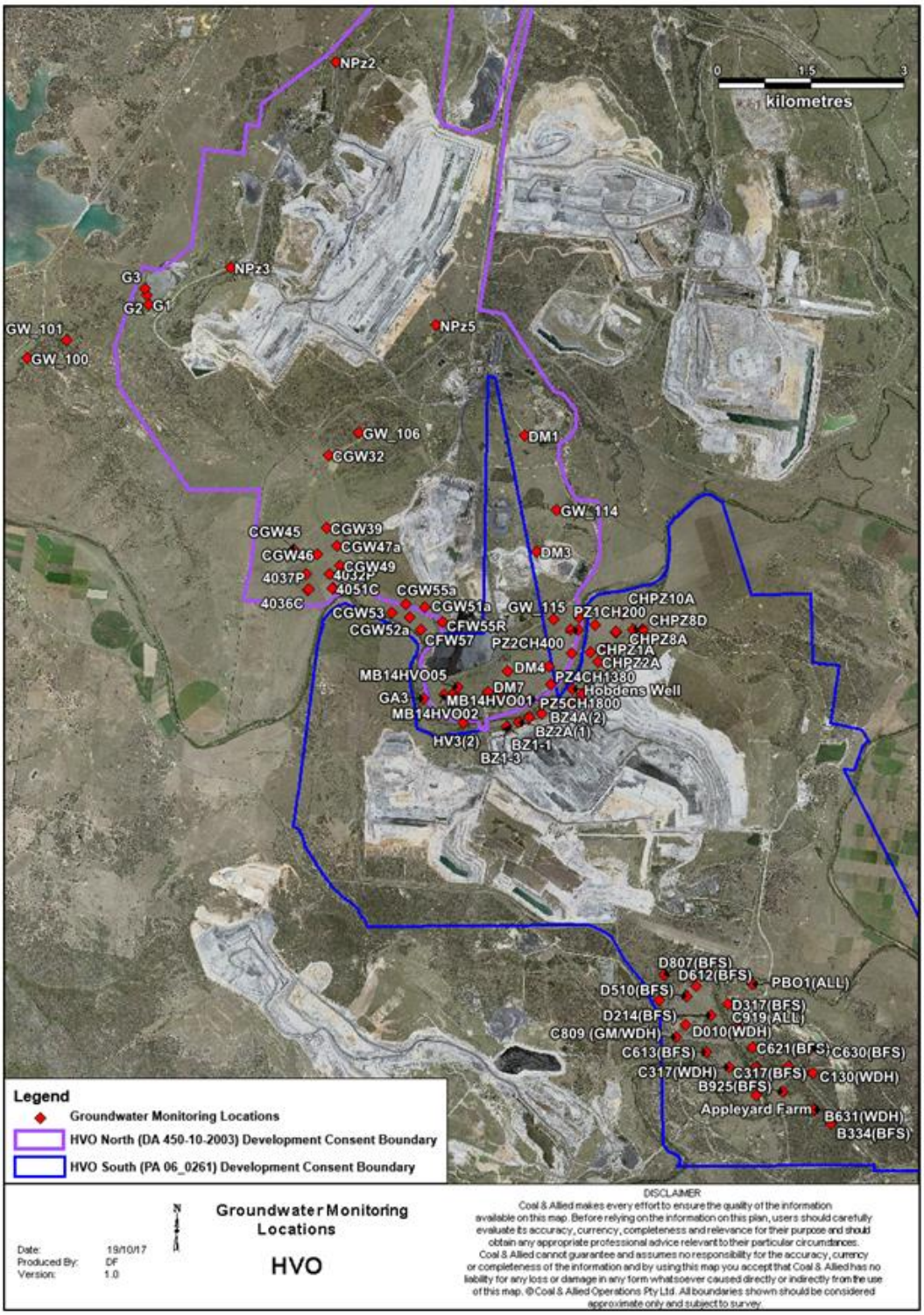

Figure 26: Groundwater Monitoring Locations at HVO

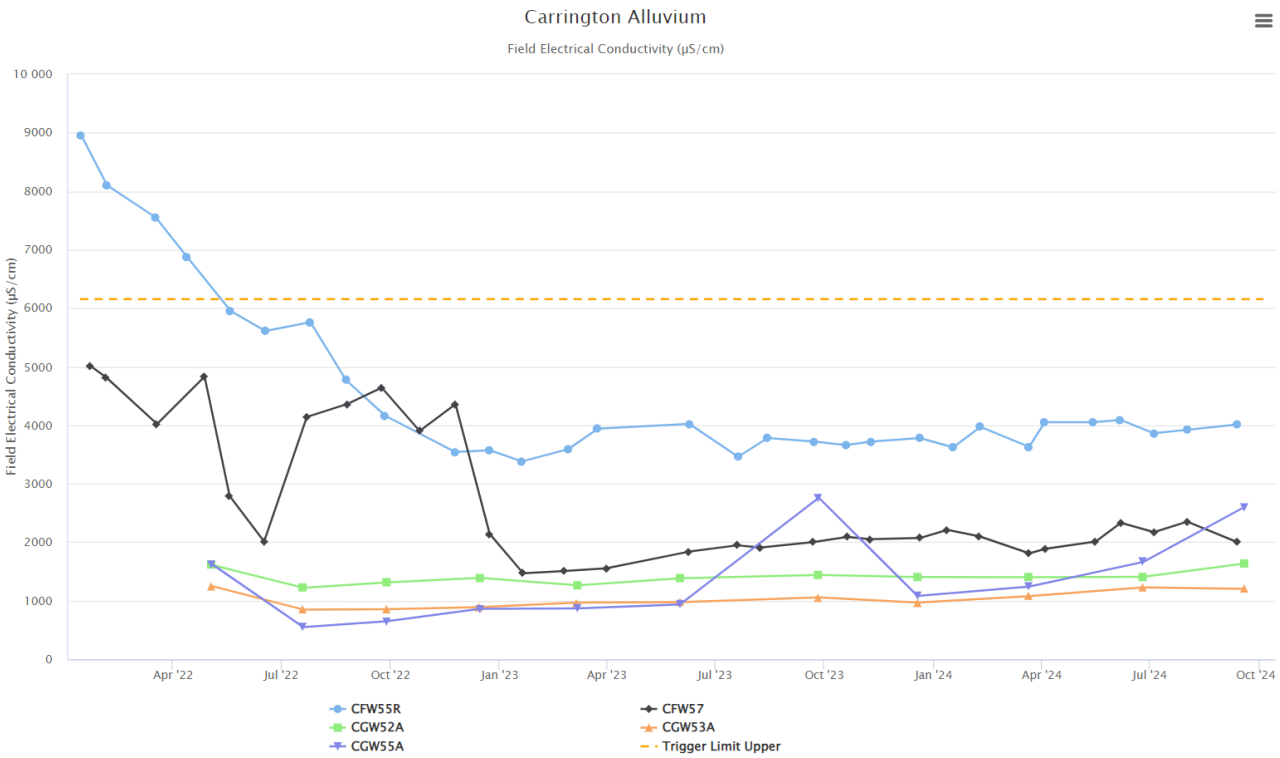

Figure 27 - Carrington Alluvium Electrical Conductivity Trend - Q3 2024

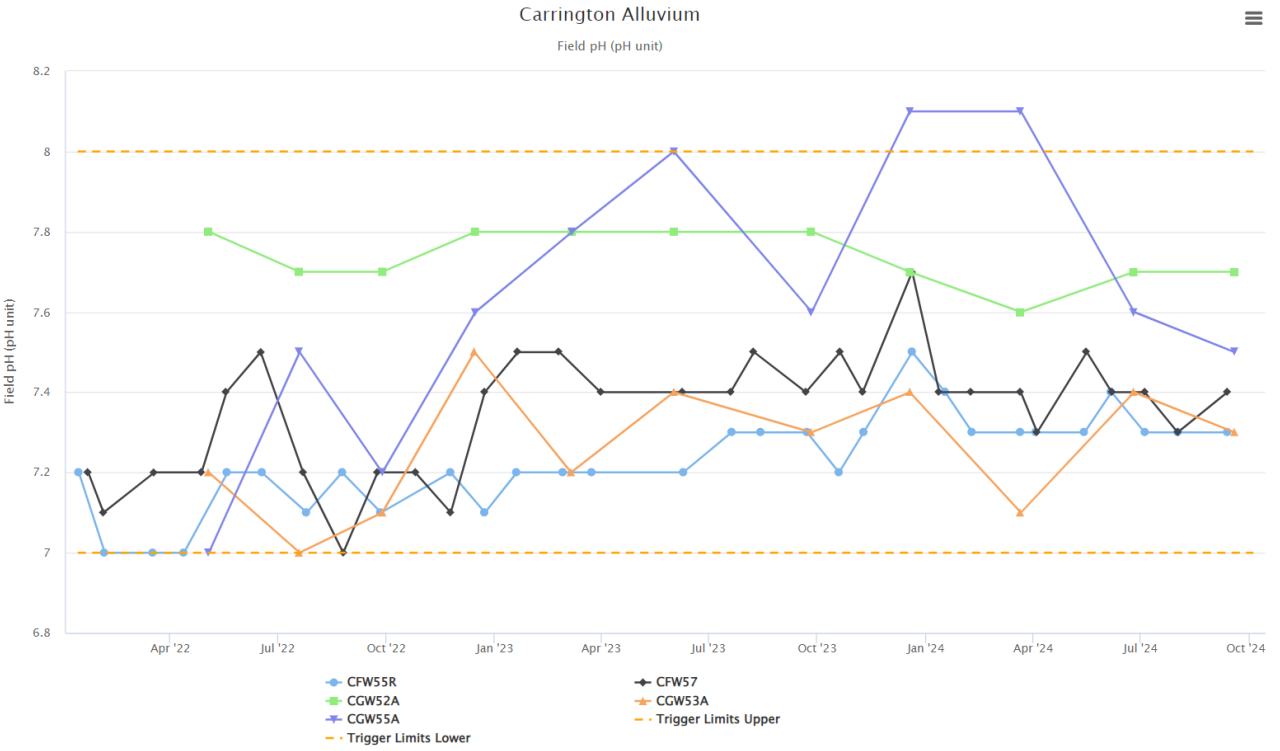

Figure 28 Carrington Alluvium Field pH Trend - Q3 2024

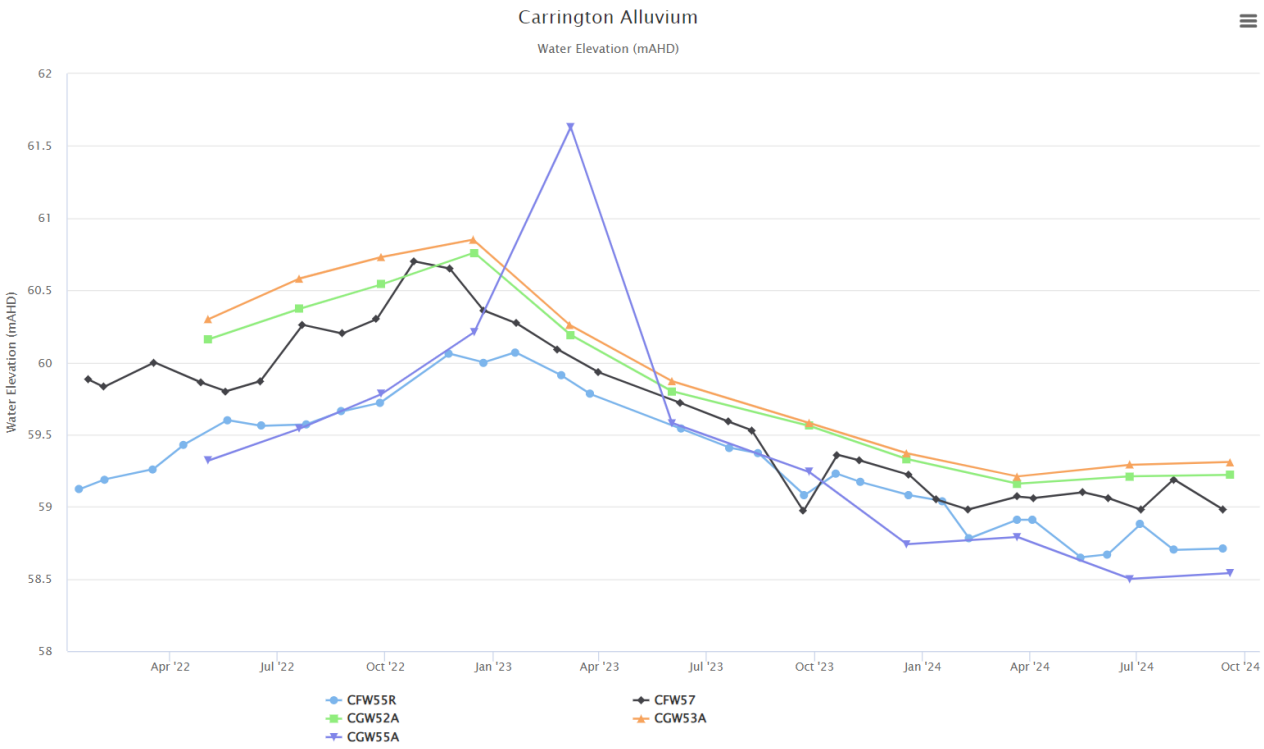

Figure 29 - Carrington Alluvium Water Elevation Trend - Q3 2024

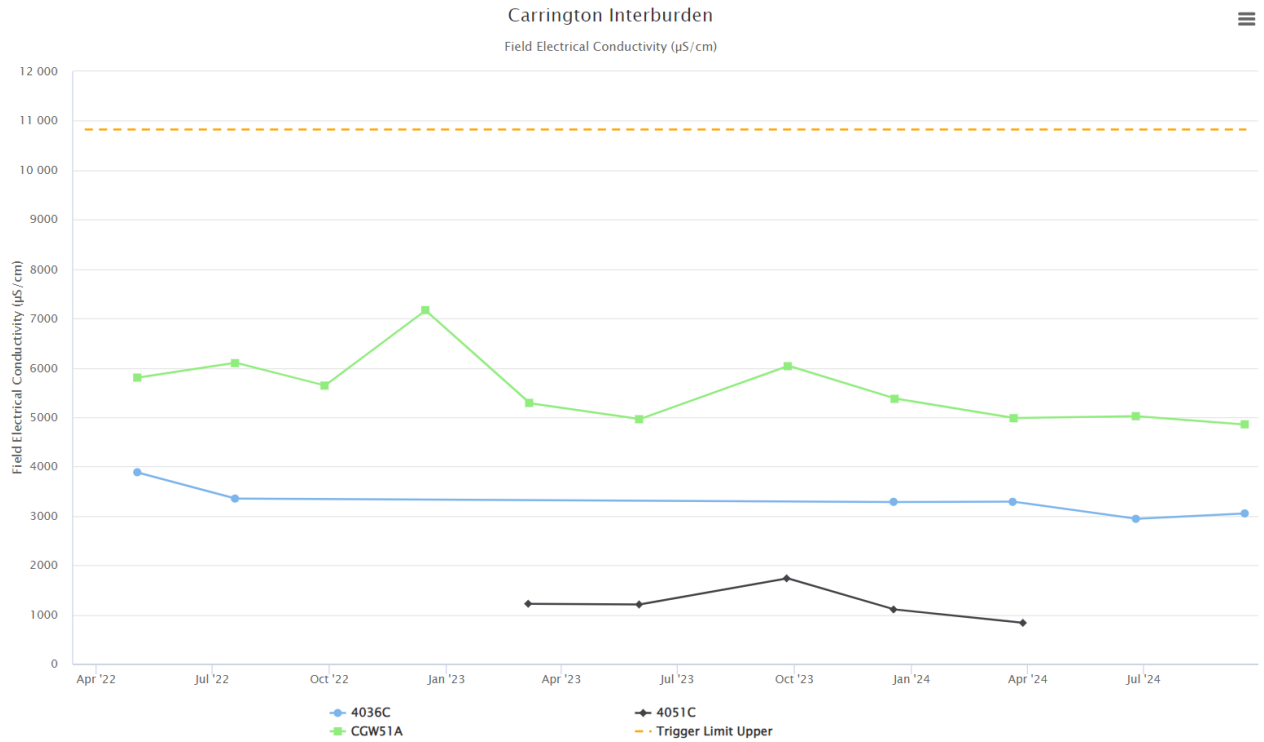

Figure 30 - Carrington Interburden Electrical Conductivity Trend - Q3 2024

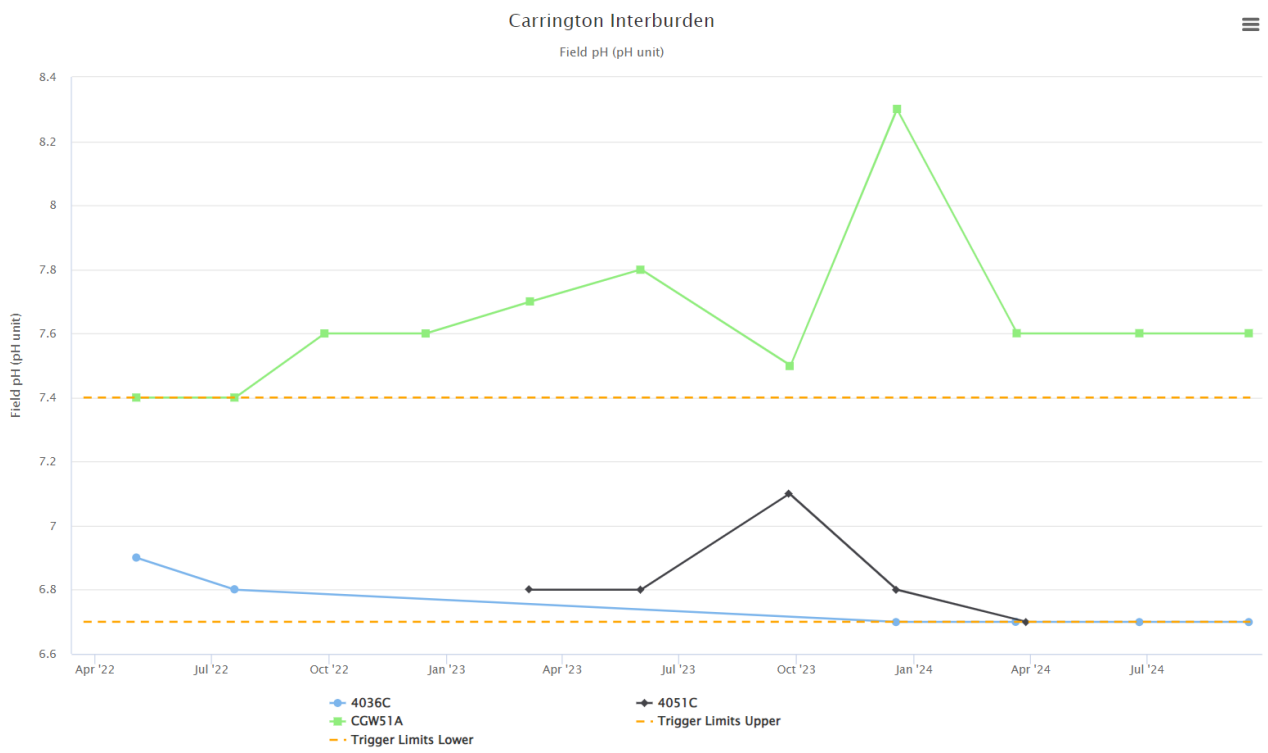

Figure 31 - Carrington Interburden Field pH Trend - Q3 2024

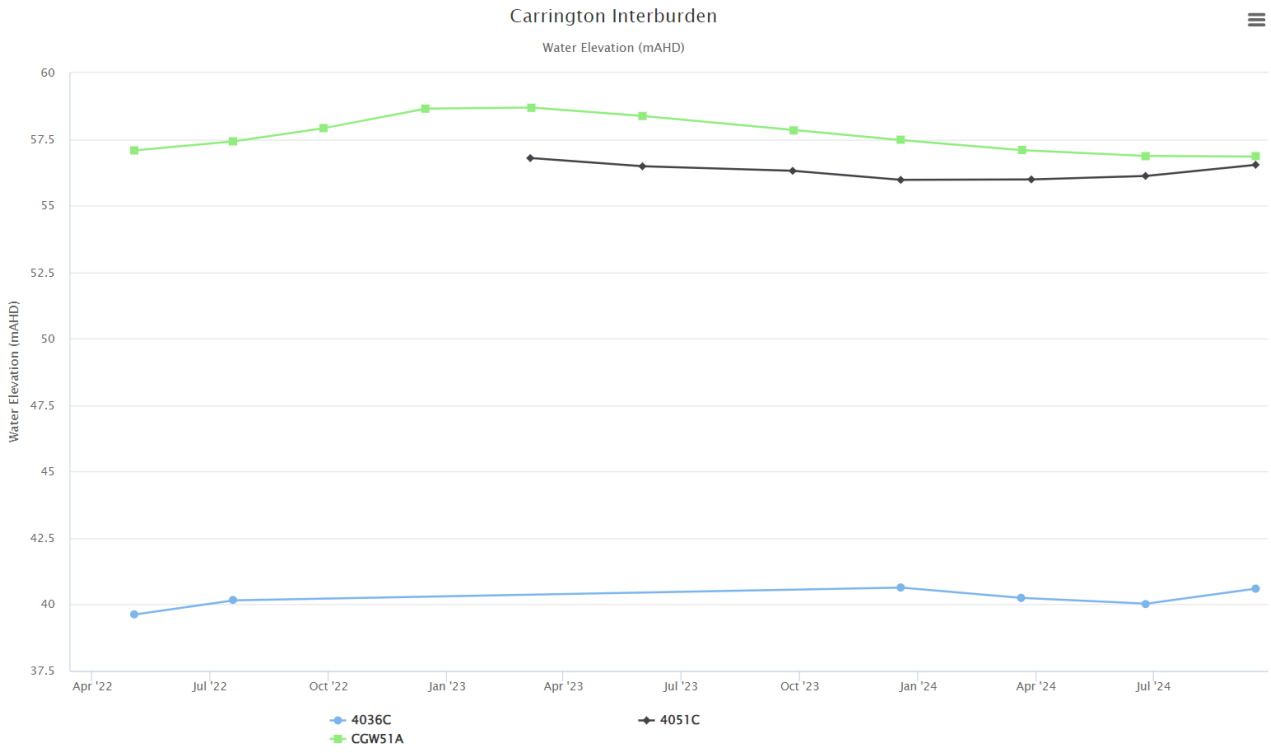

Figure 32 - Carrington Interburden Water Elevation Trend - Q3 2024

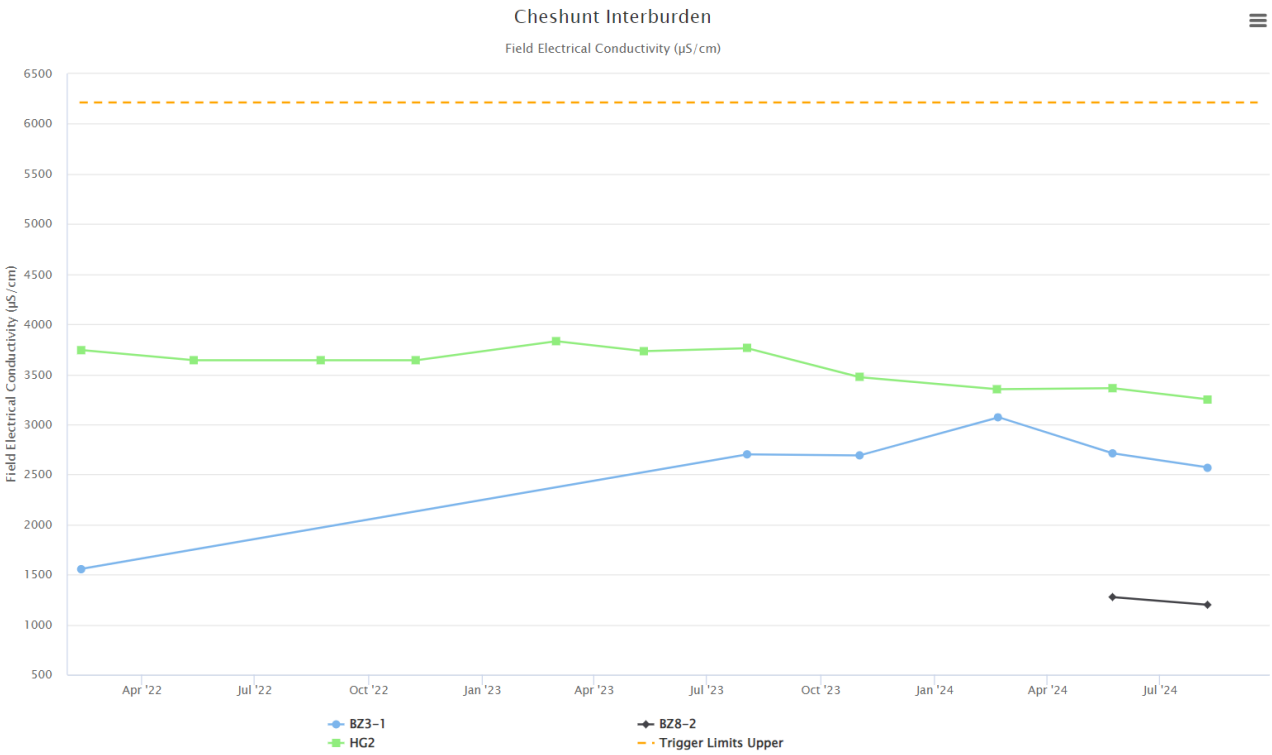

Figure 33 - Cheshunt Interburden Electrical Conductivity Trend - Q3 2024

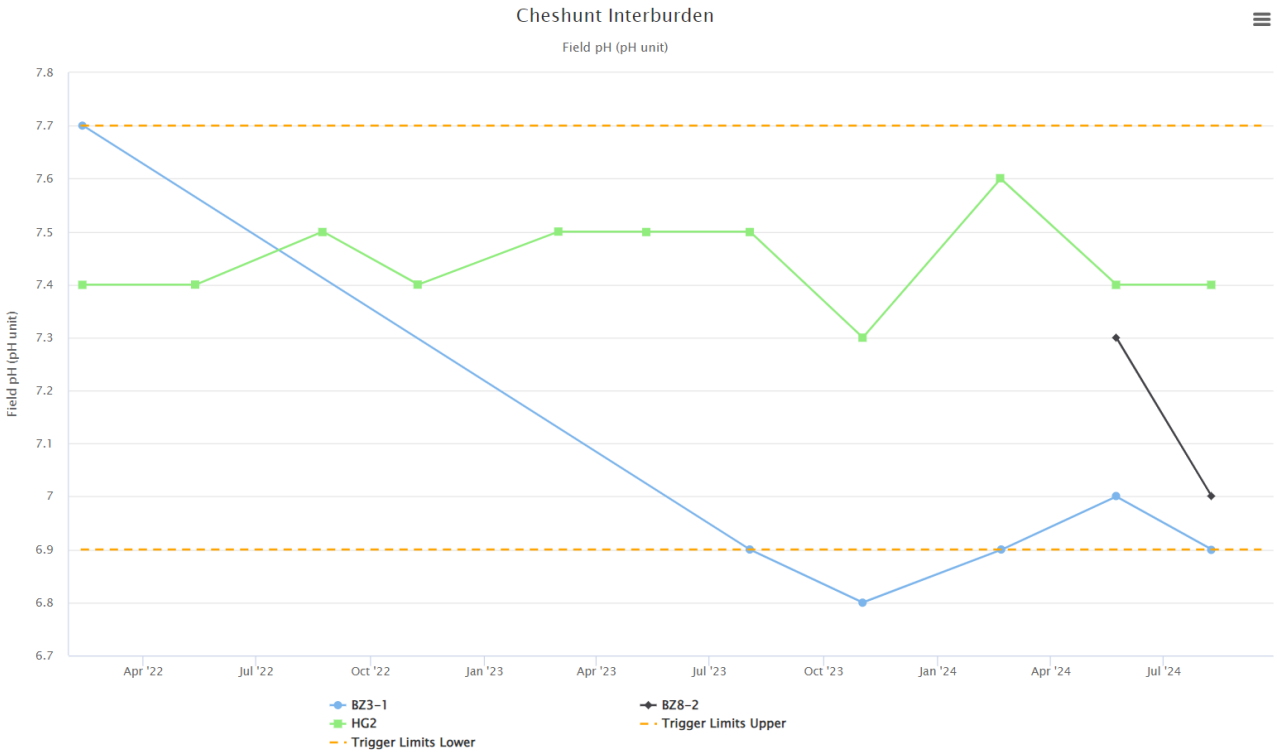

Figure 34 - Cheshunt Interburden Field pH Trend - Q3 2024

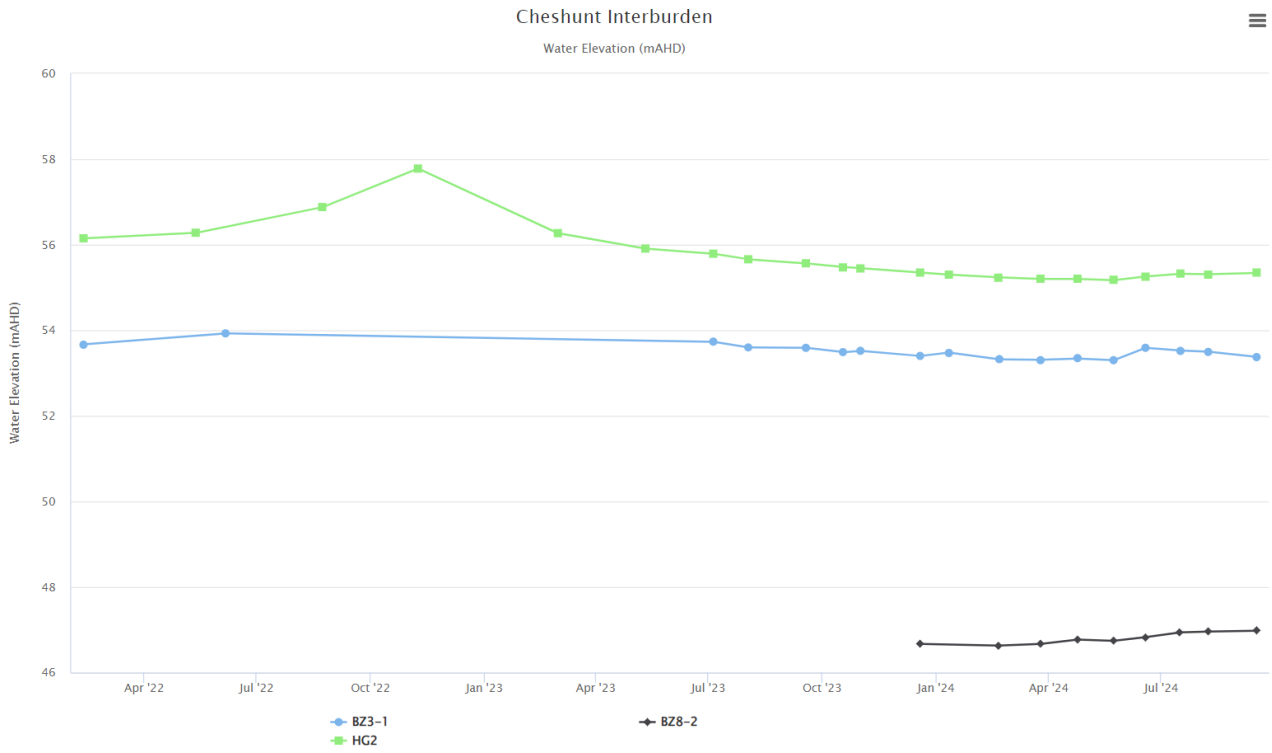

Figure 35 - Cheshunt Interburden Water Elevation Trend - Q3 2024

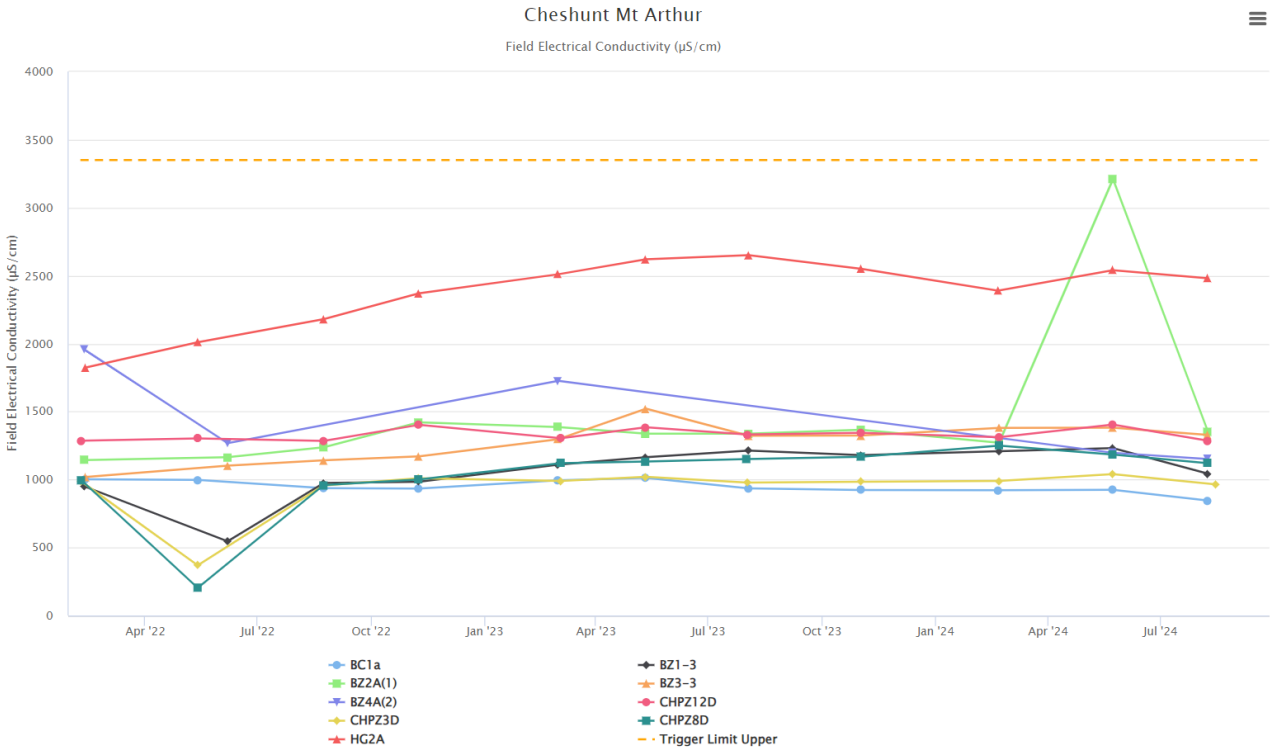

Figure 36 – Cheshunt Mt Arthur Electrical Conductivity Trend – Q3 2024

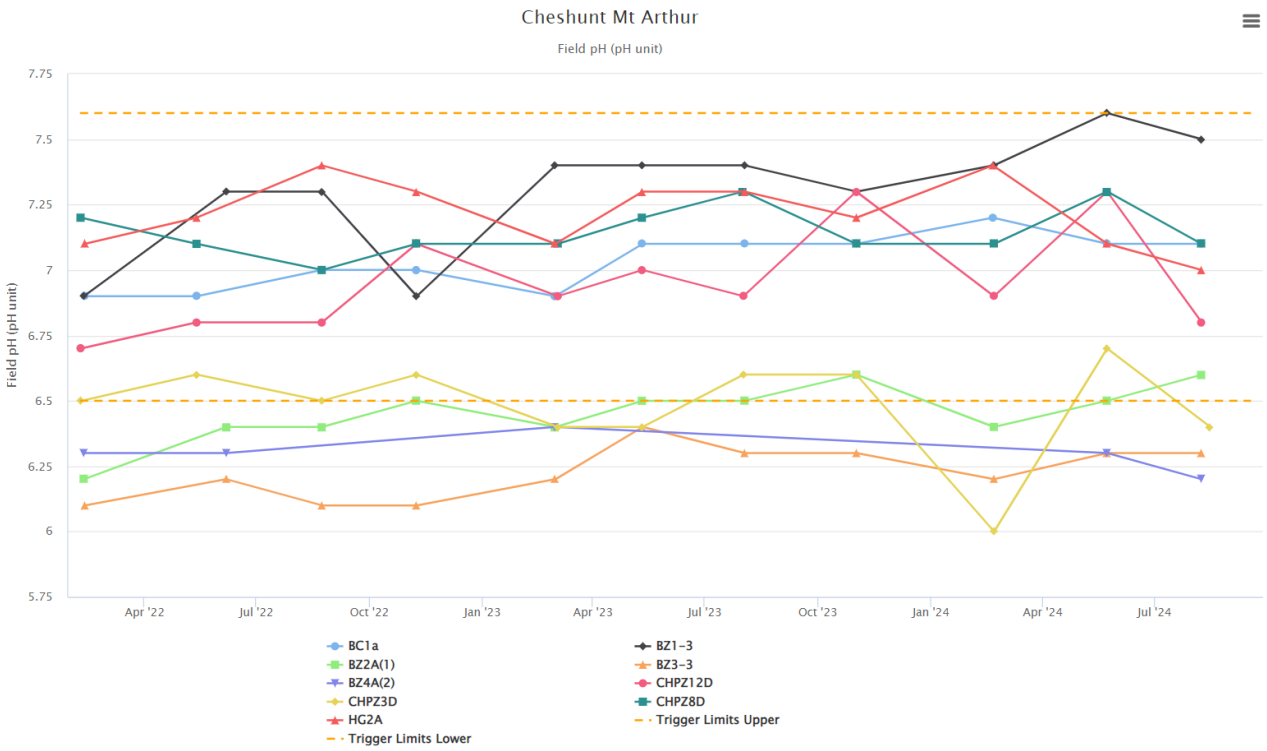

Figure - 37 Cheshunt Mt Arthur Field pH Trend - Q3 2024

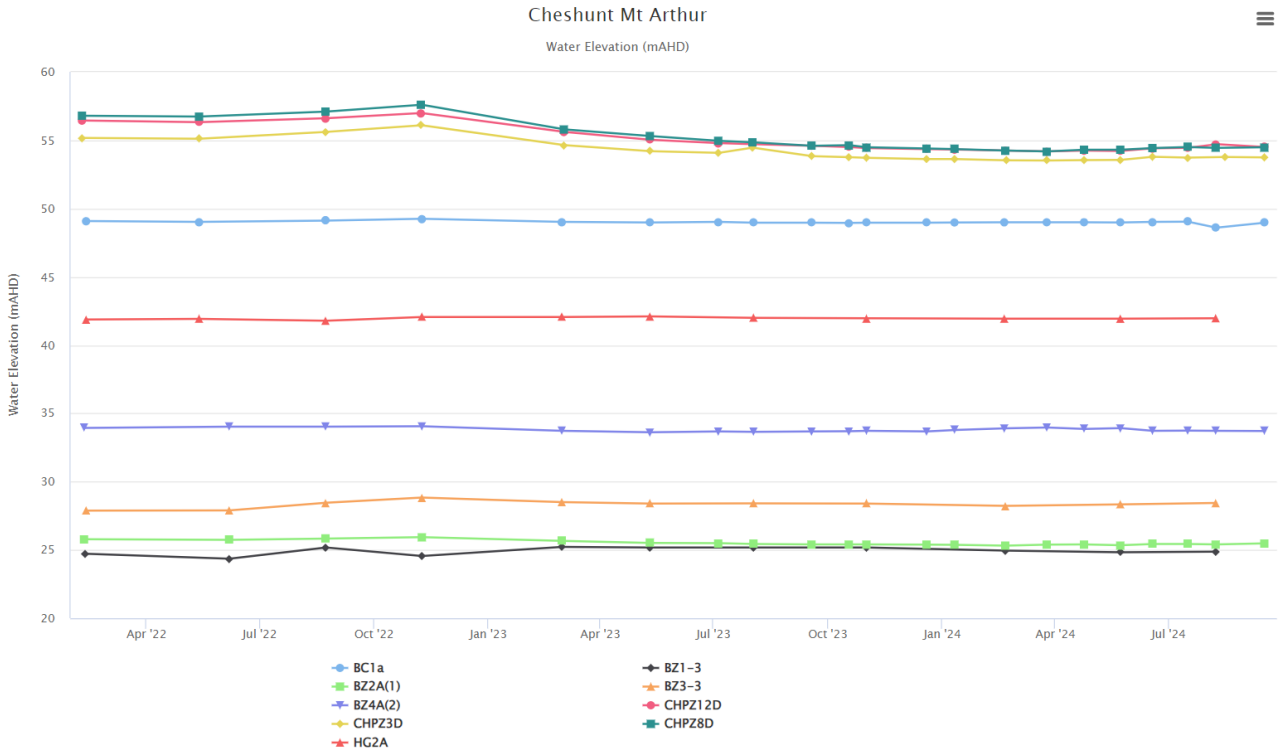

Figure 38 - Cheshunt Mt Arthur Water Elevation Trend - Q3 2024

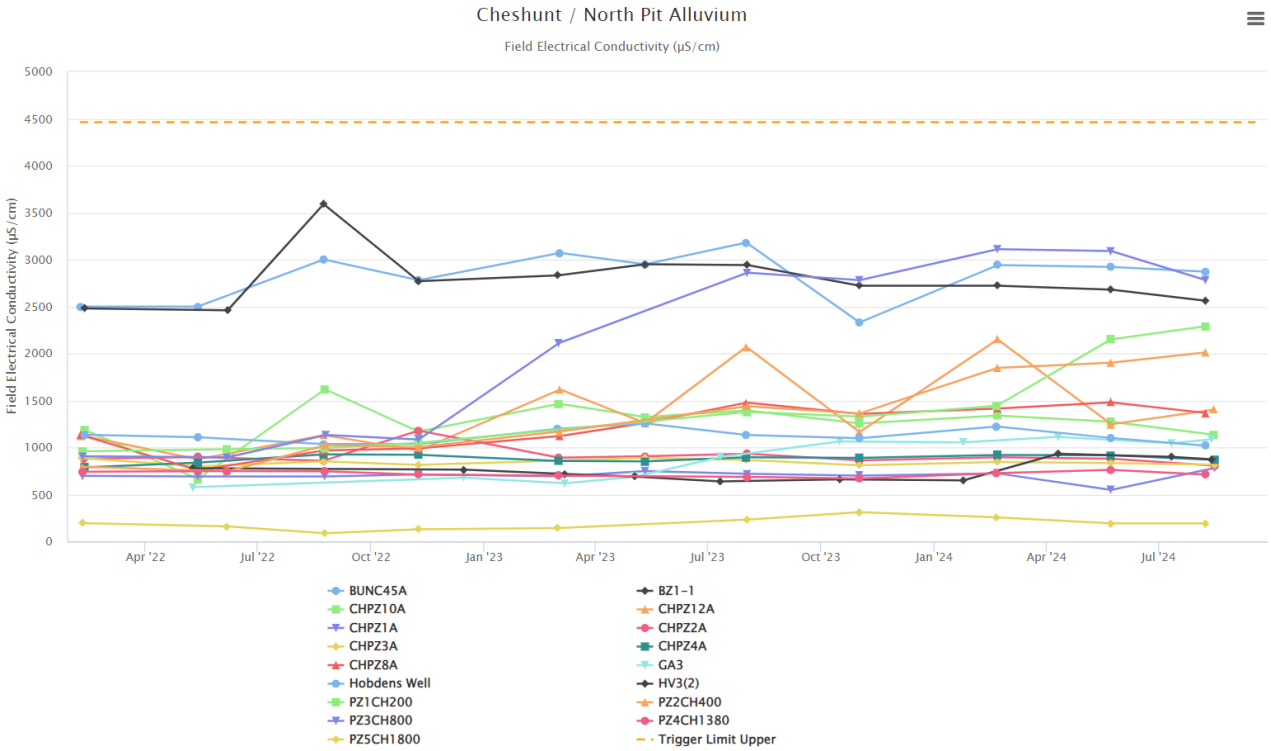

Figure 39 - Cheshunt North Pit Alluvium Electrical Conductivity Trend – Q3 2024

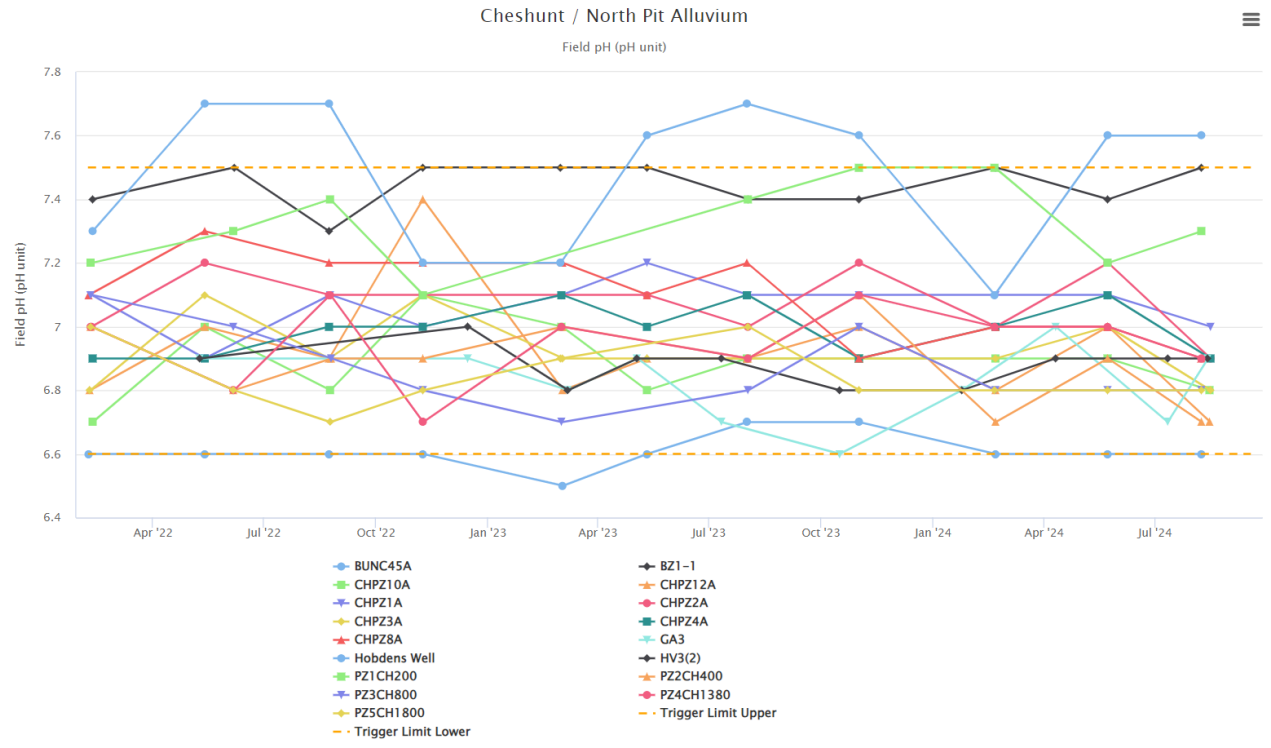

Figure 40 - Cheshunt North Alluvium Field pH Trend – Q3 2024

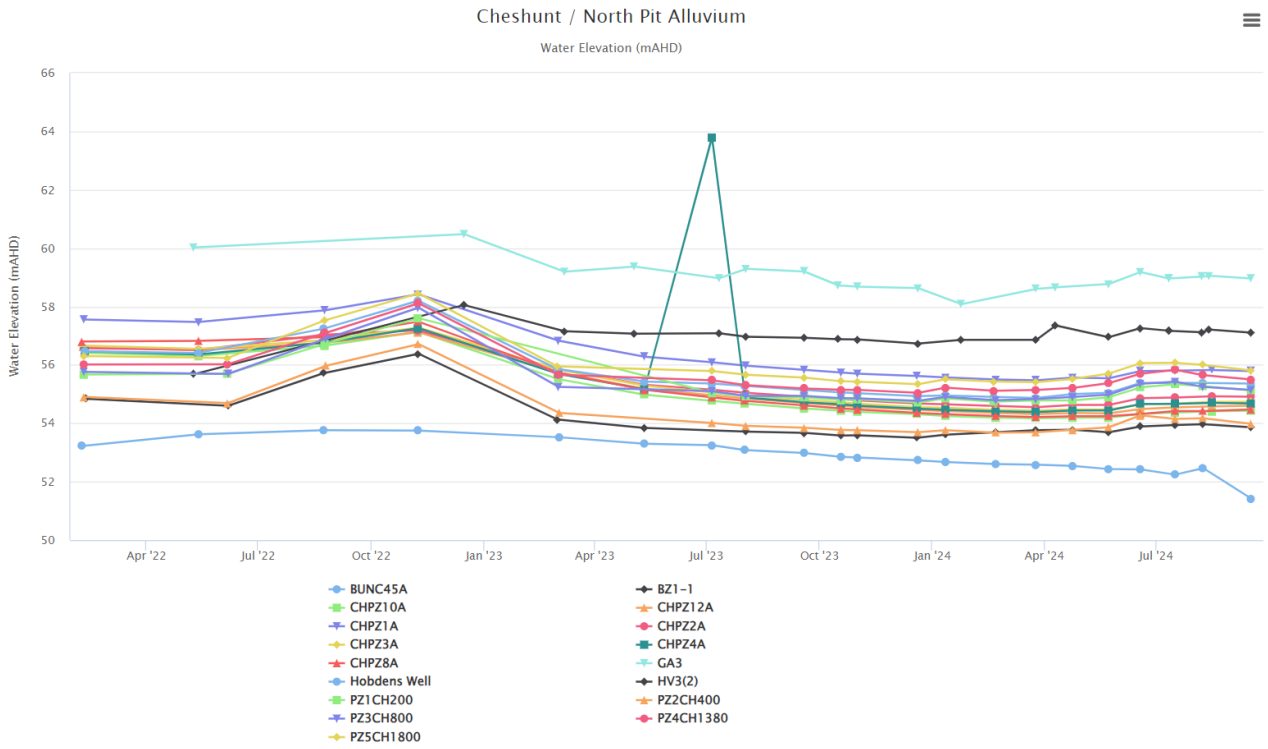

Figure 41 - Cheshunt North Pit Alluvium Water Elevation Trend - Q3 2024

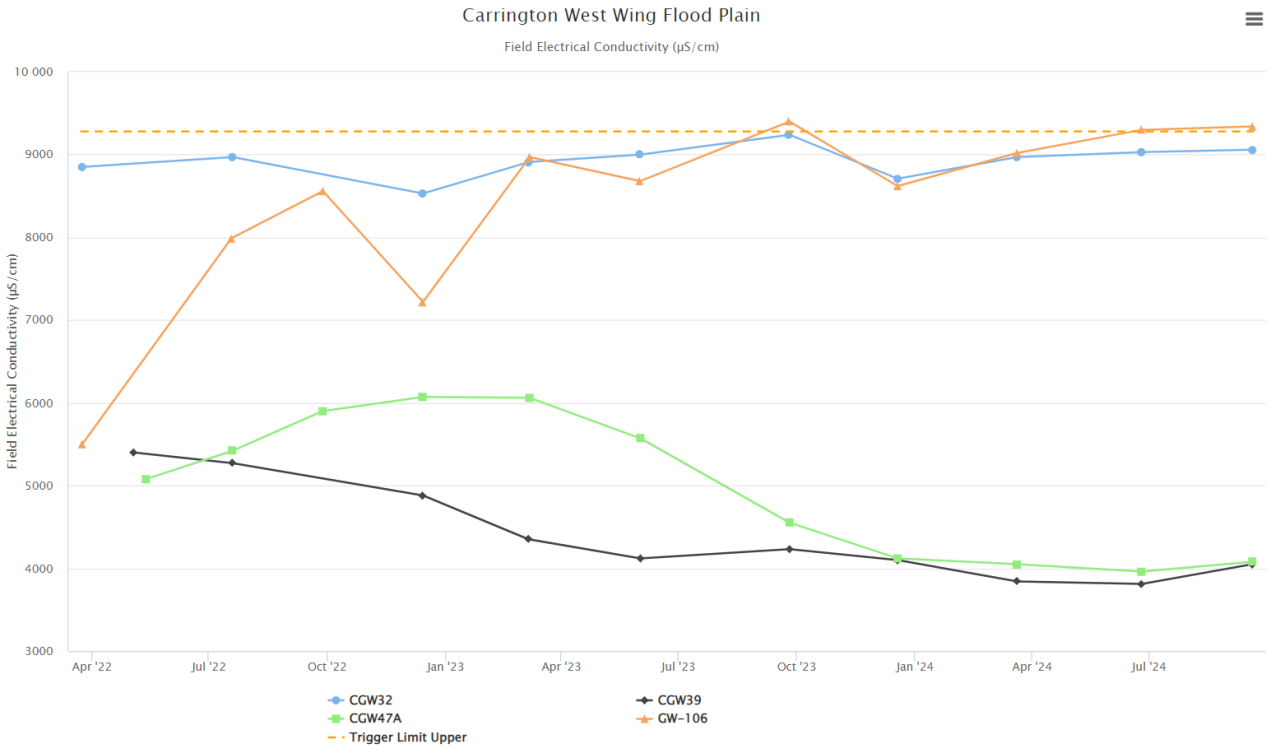

Figure 42 - Carrington West Wing Flood Plain Electrical Conductivity Trend - Q3 2024

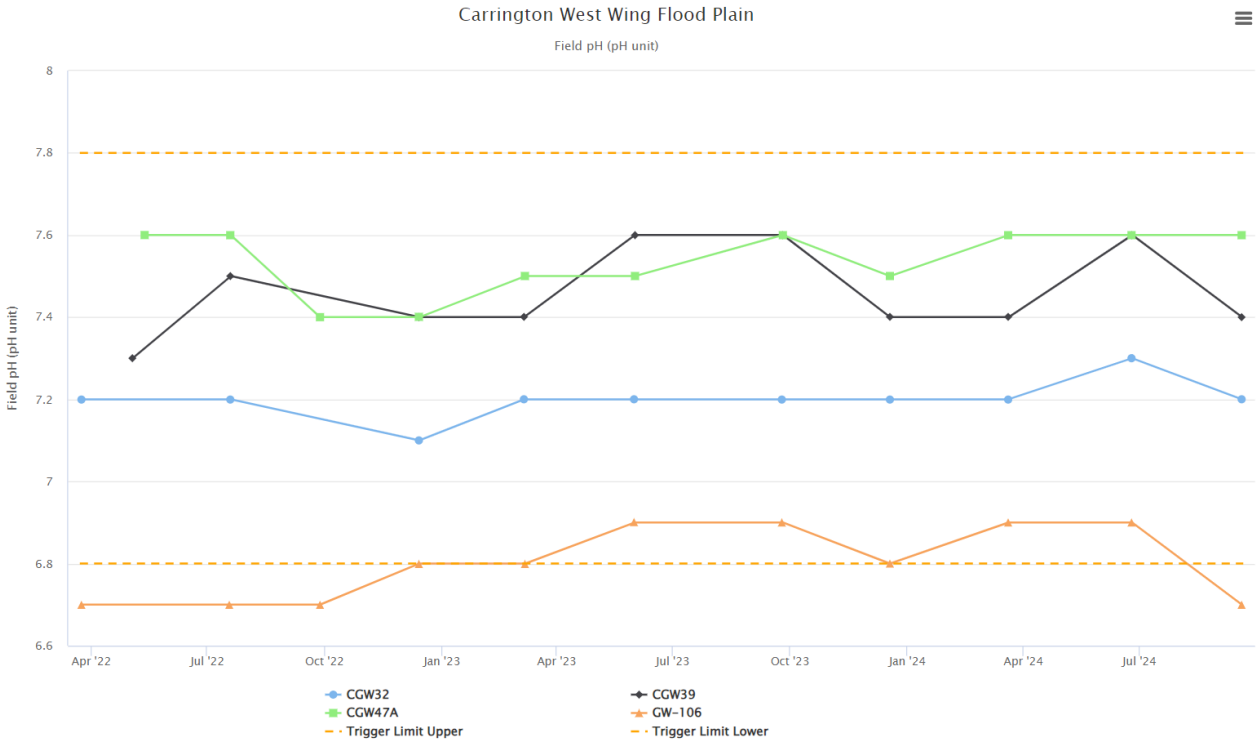

Figure 413 - Carrington West Wing Flood Plain pH Trend - Q3 2024

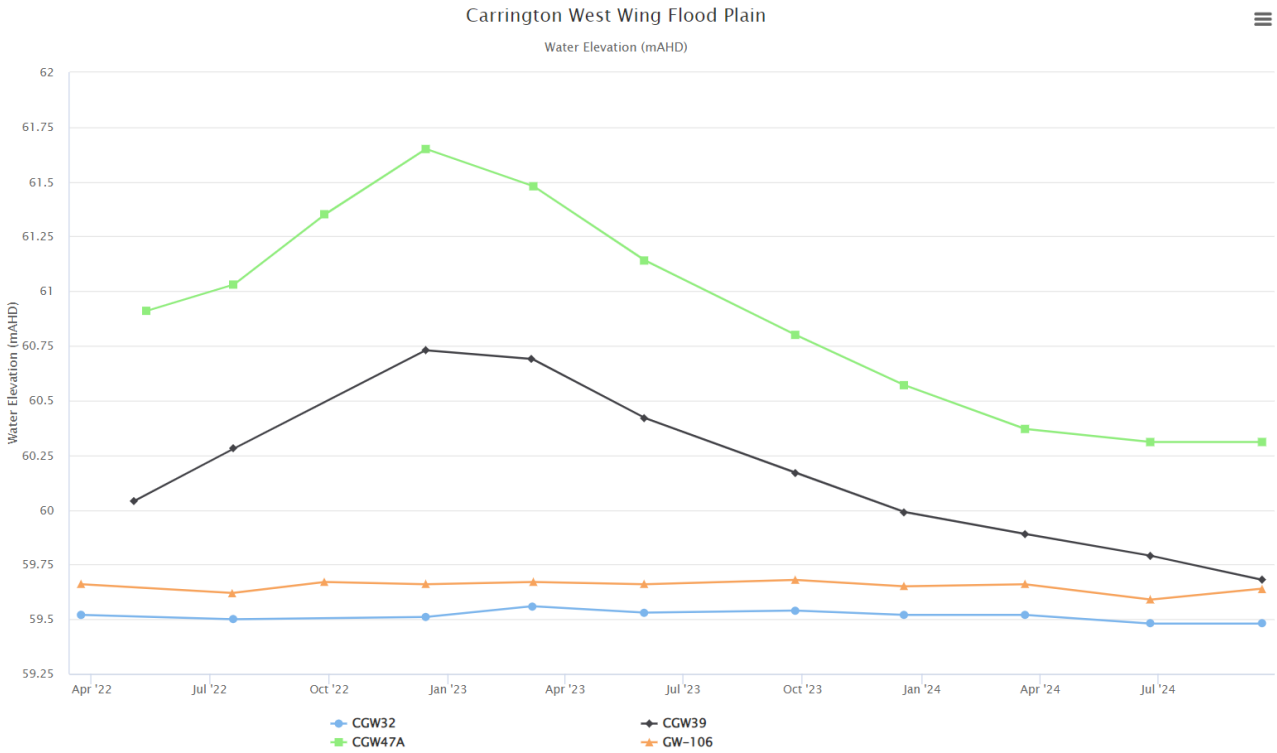

Figure 424 - Carrington West Wing Flood Plain Water Elevation Trend - Q3 2024

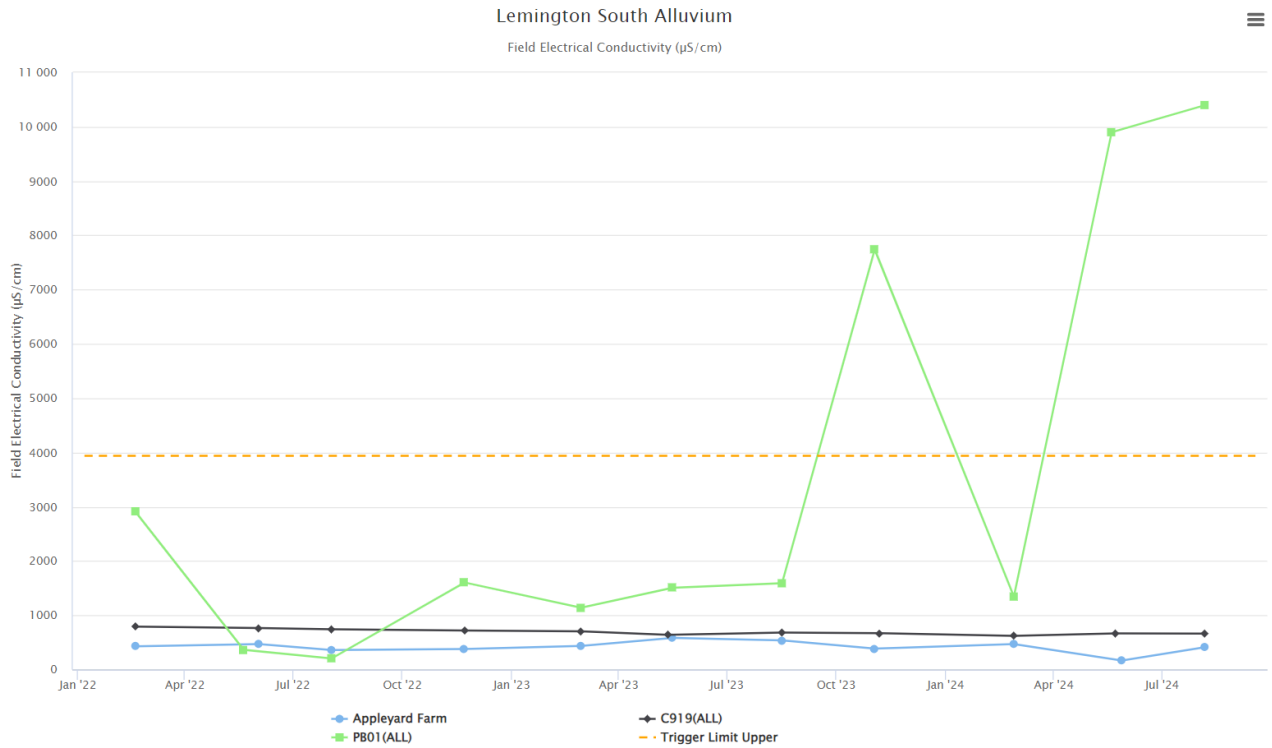

Figure 435 - Lemington South Alluvium Electrical Conductivity Trend - Q3 2024

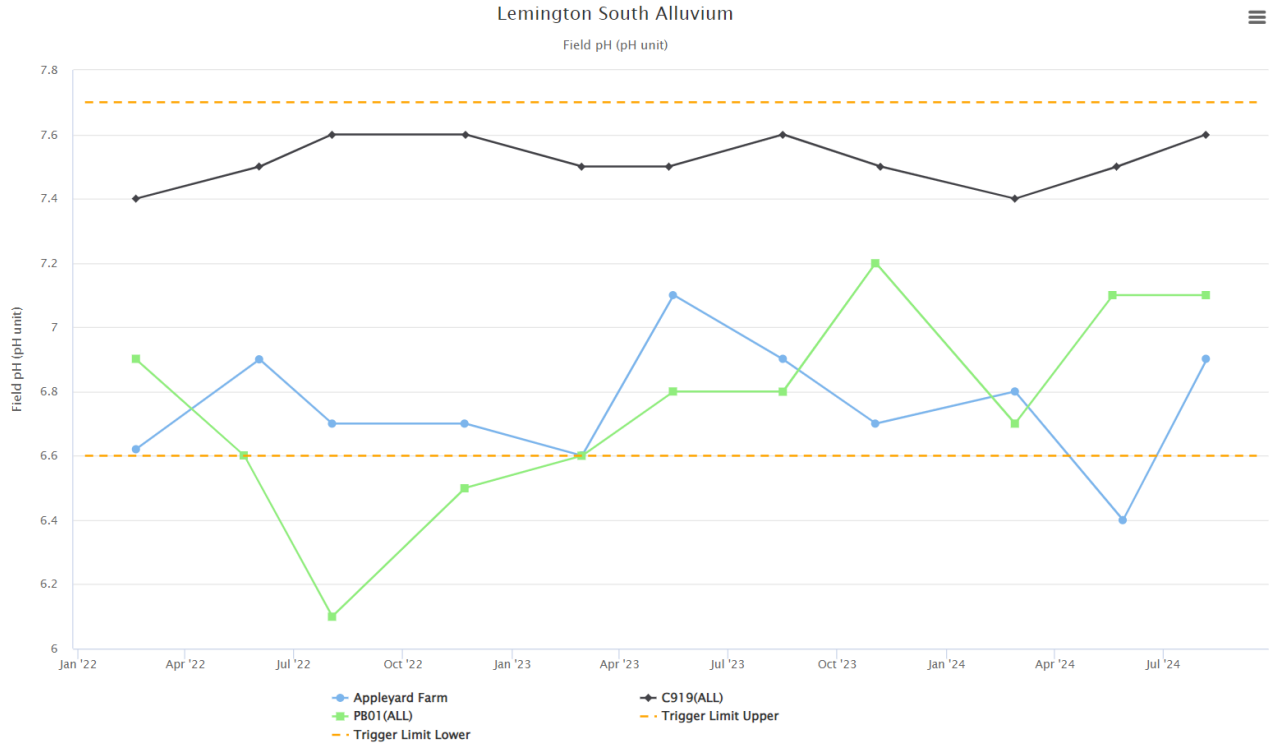

Figure 446 - Lemington South Alluvium Field pH Trend - Q3 2024

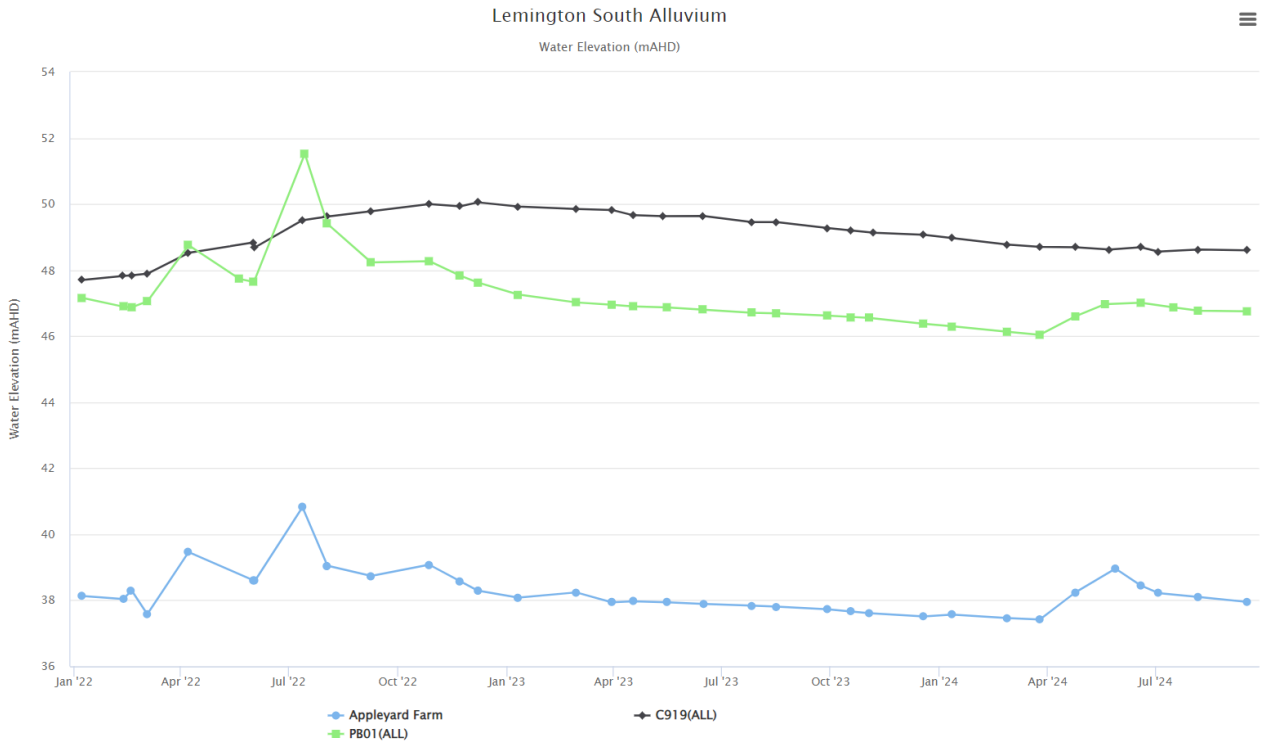

Figure 457 - Lemington South Alluvium Water Elevation Trend - Q3 2024

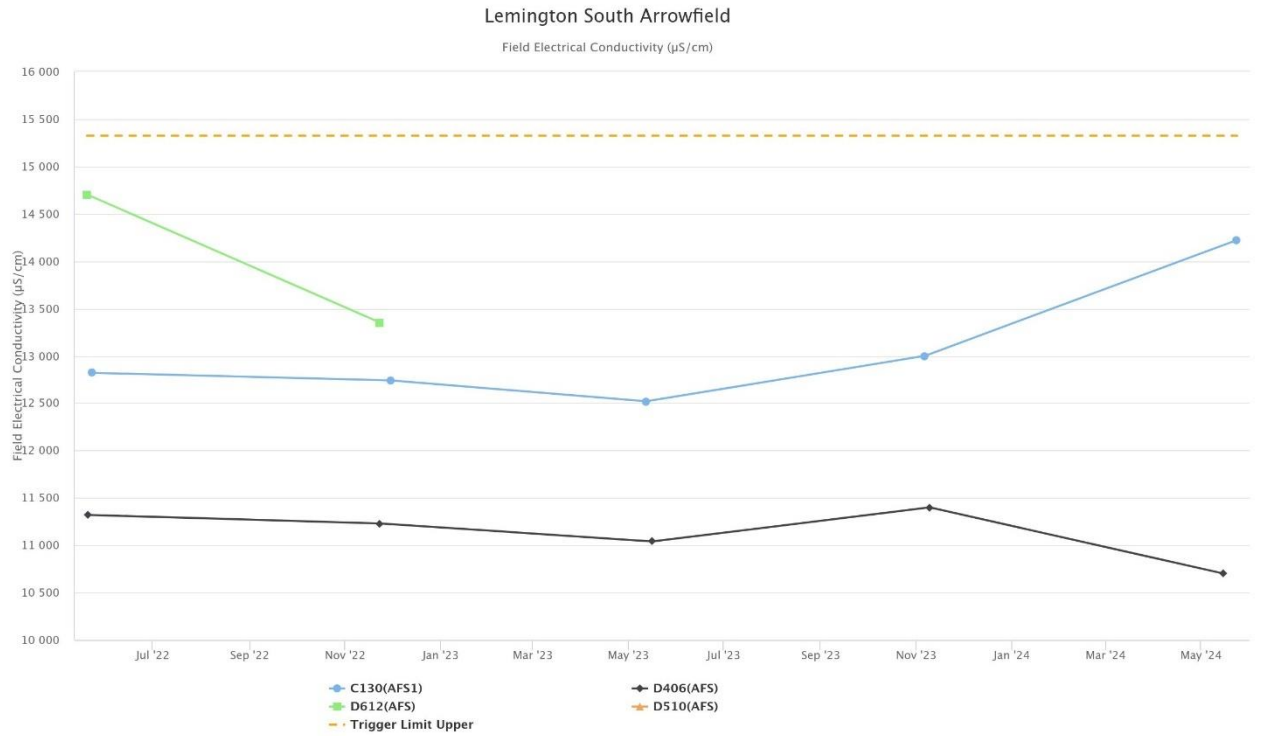

Figure 468 - Lemington South Arrowfield Electrical Conductivity Trend - Q3 2024

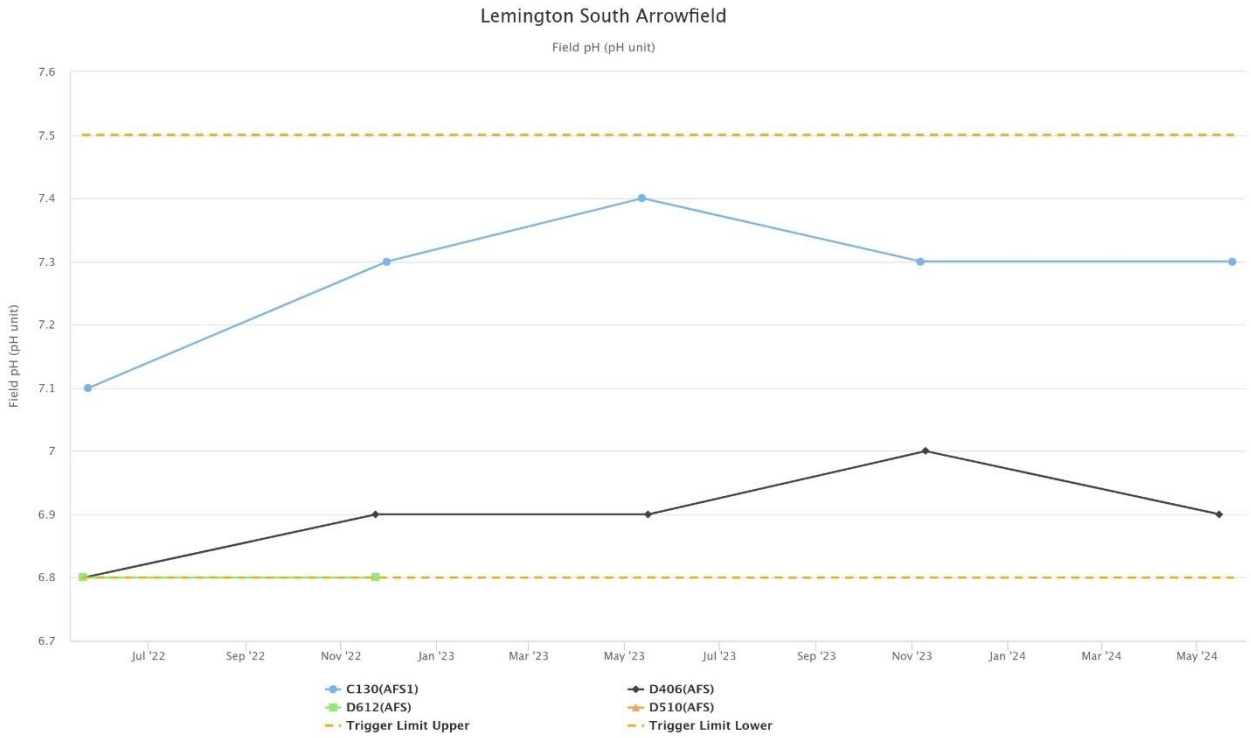

Figure 479 - Lemington South Arrowfield Field pH Trend - Q3 2024

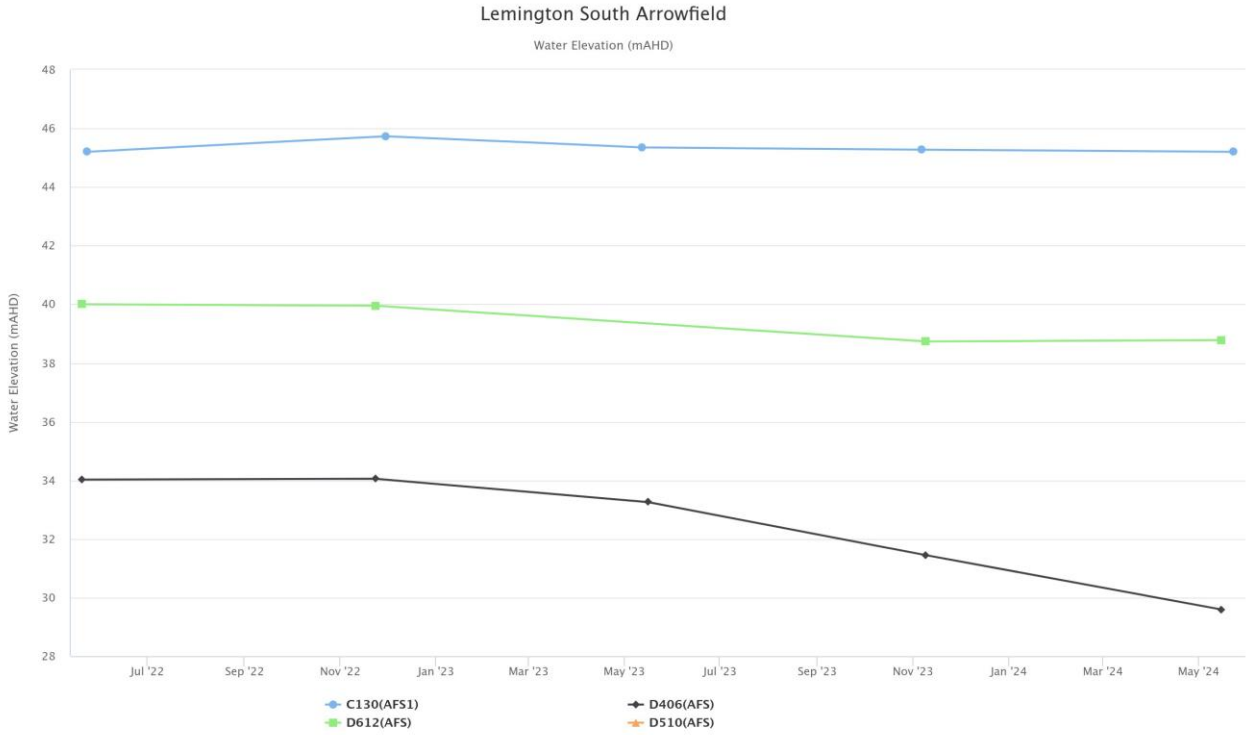

Figure 50 – Lemington South Arrowfield Water Elevation Trend – Q3 2024

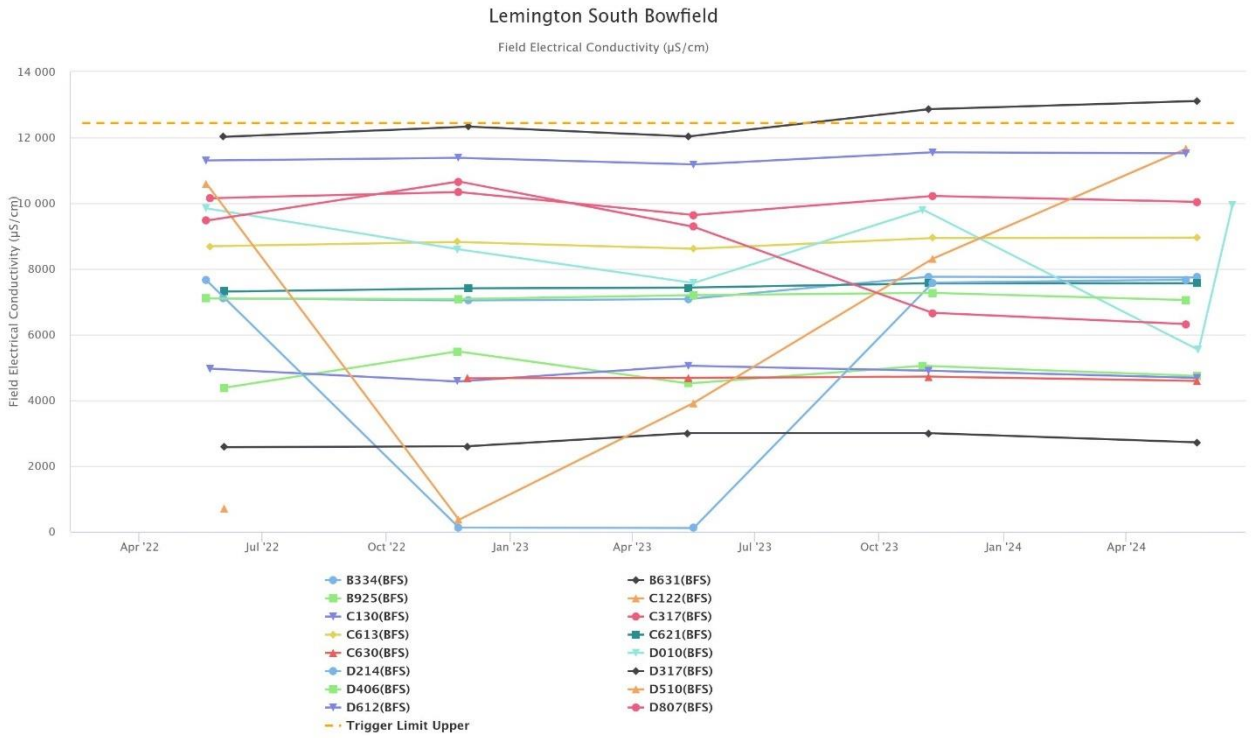

Figure 51 - Lemington South Bowfield Electrical Conductivity Trend - Q3 2024

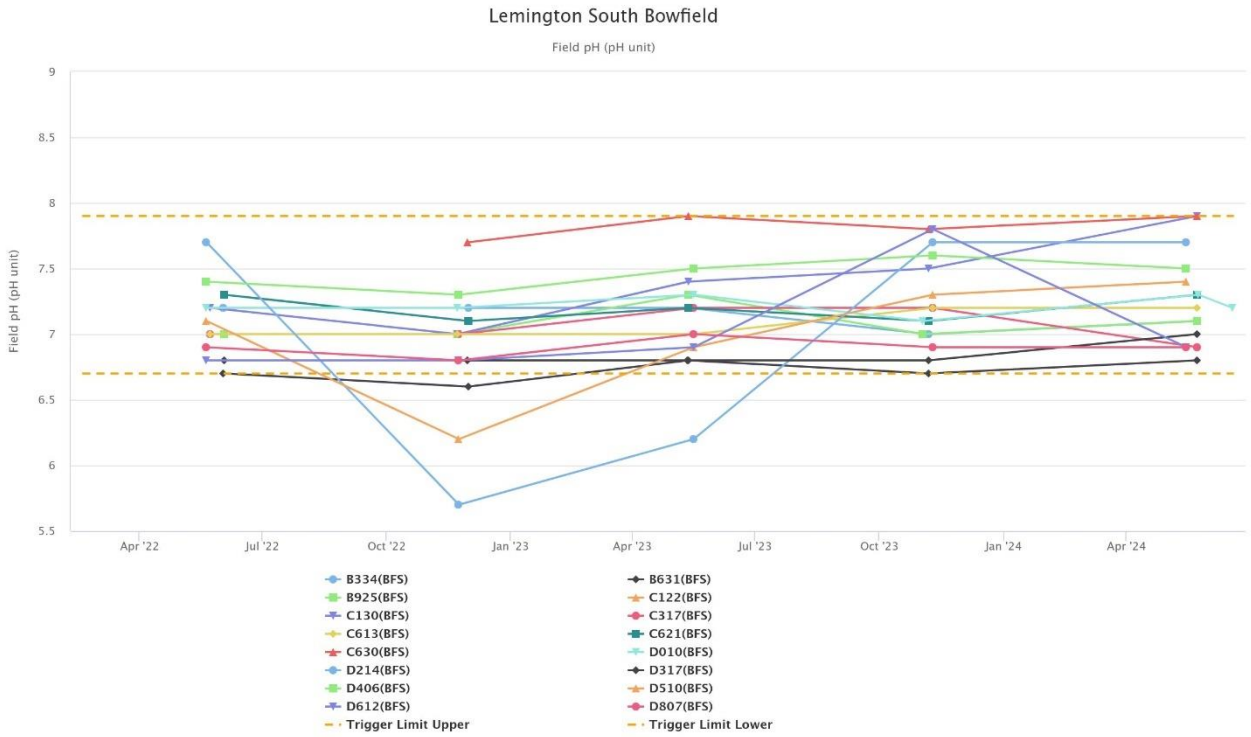

Figure 52 - Lemington South Bowfield pH Trend - Q3 2024

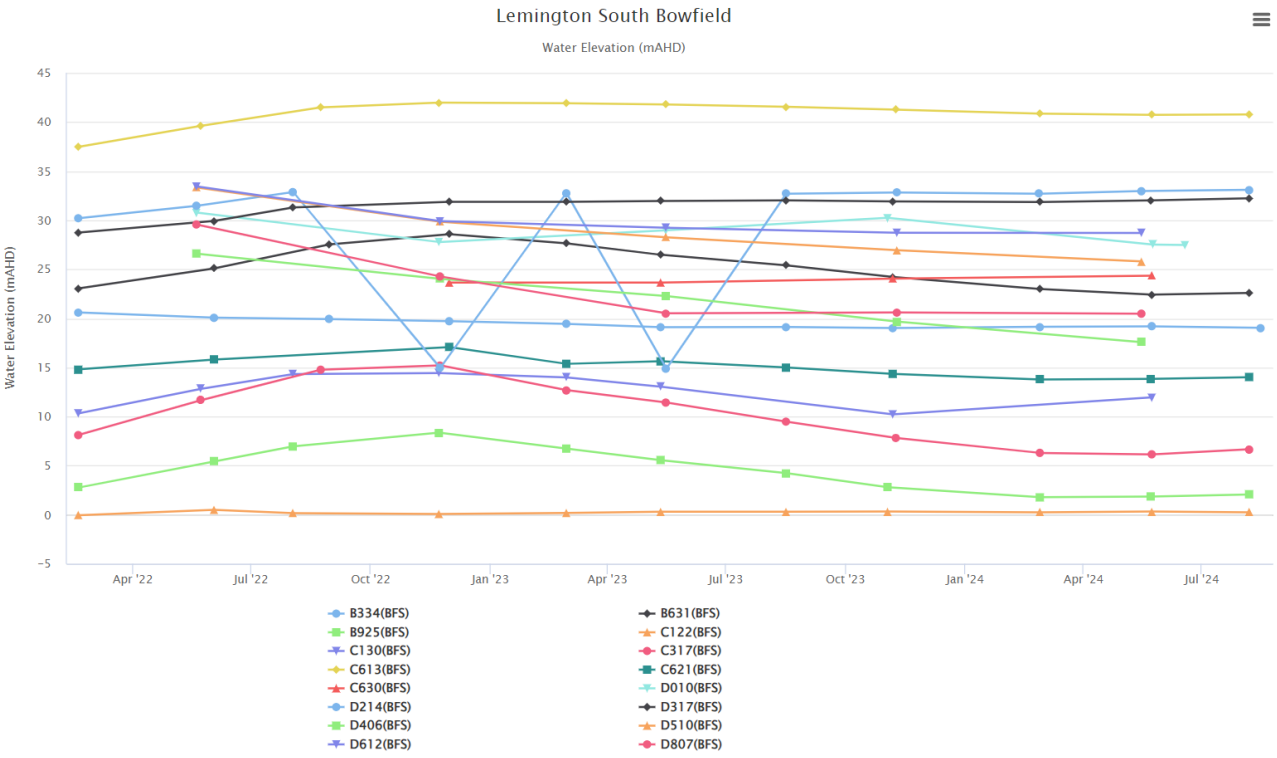

Figure 48 - Lemington South Bowfield Water Elevation Trend - Q3 2024

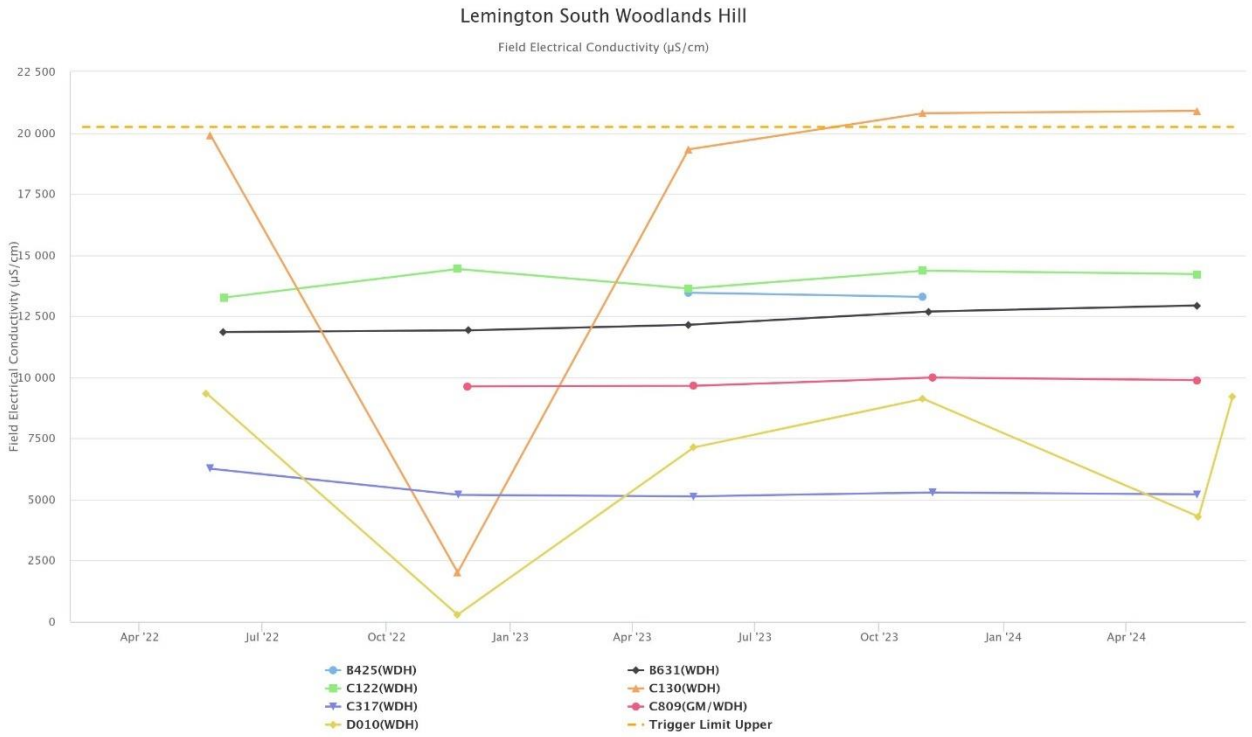

Figure 494 - Lemington South Woodlands Hill Electrical Conductivity Trend - Q3 2024

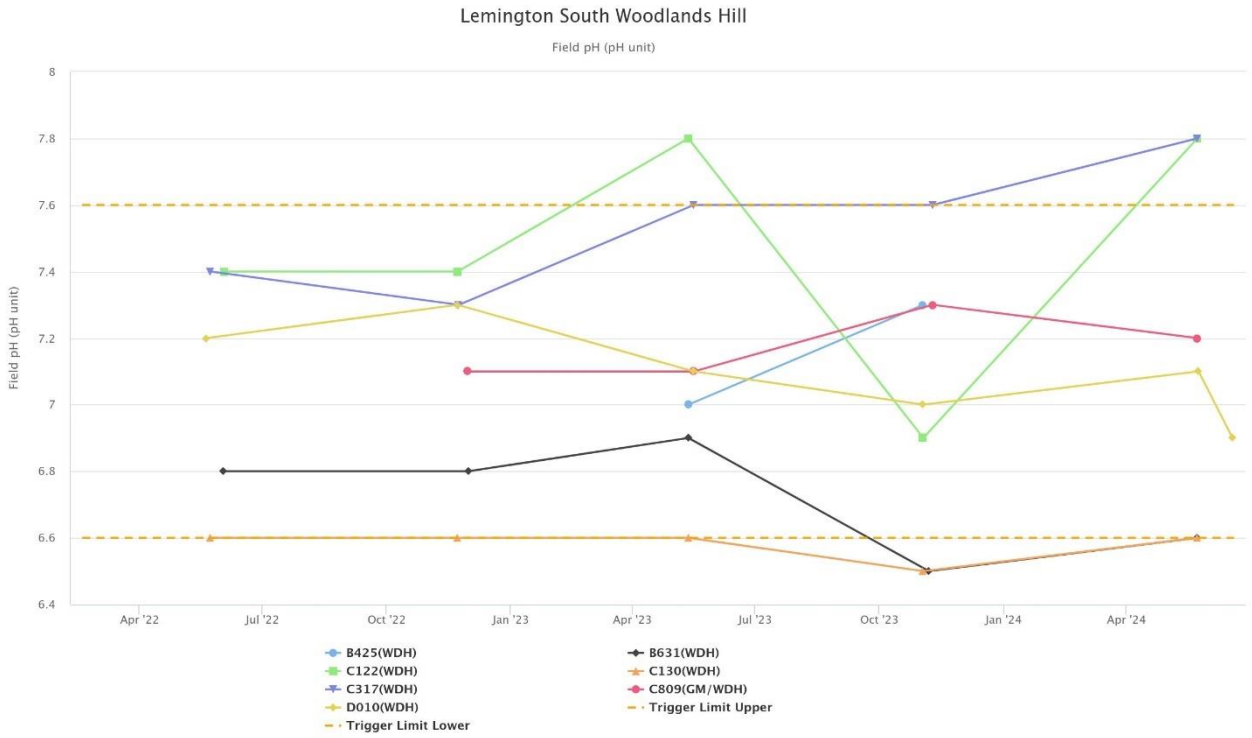

Figure 505 - Lemington South Woodlands Hill Field pH Trend - Q3 2024

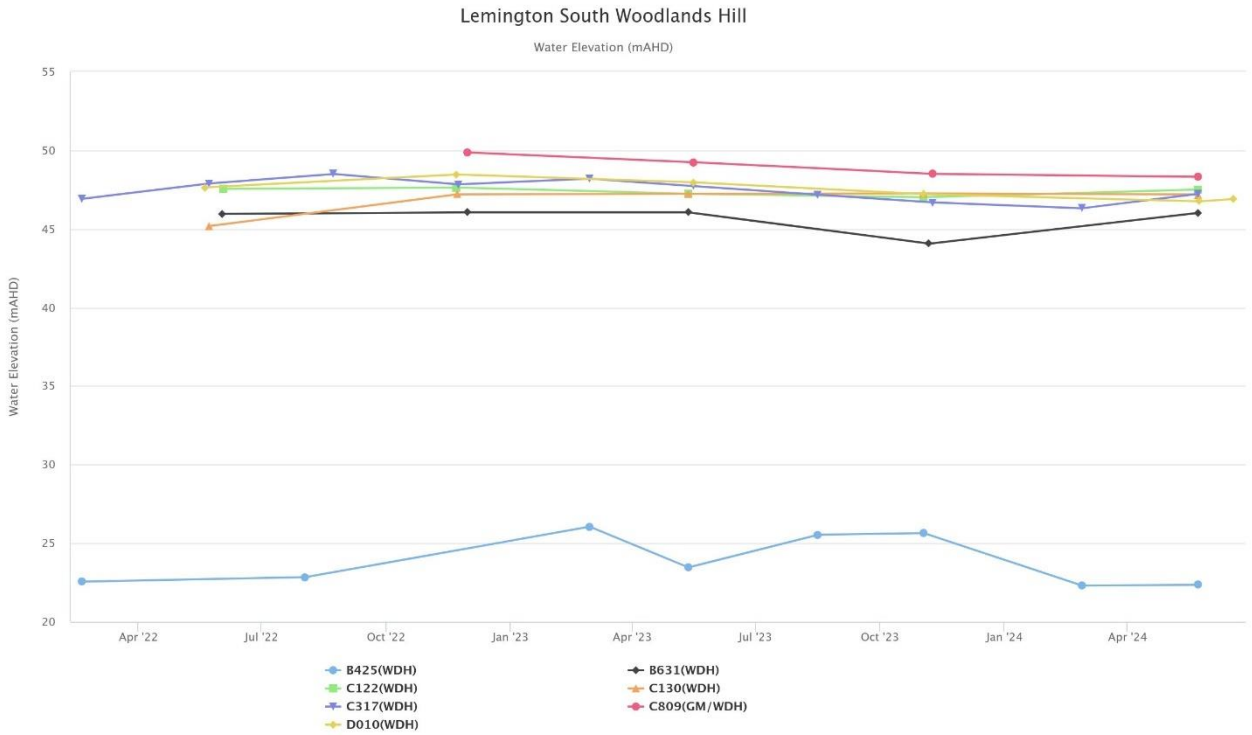

Figure 516 - Lemington South Woodlands Hill Water Elevation Trend - Q3 2024

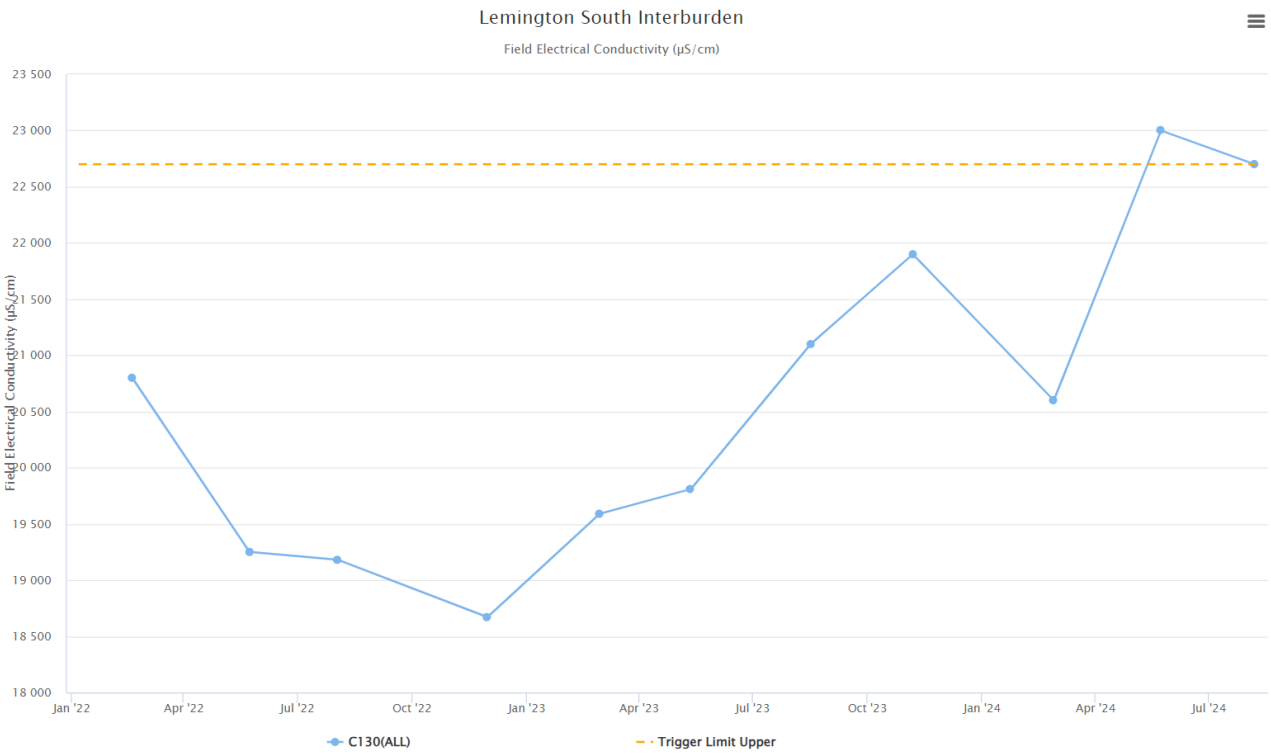

Figure 527 - Lemington South Interburden Electrical Conductivity Trend - Q3 2024

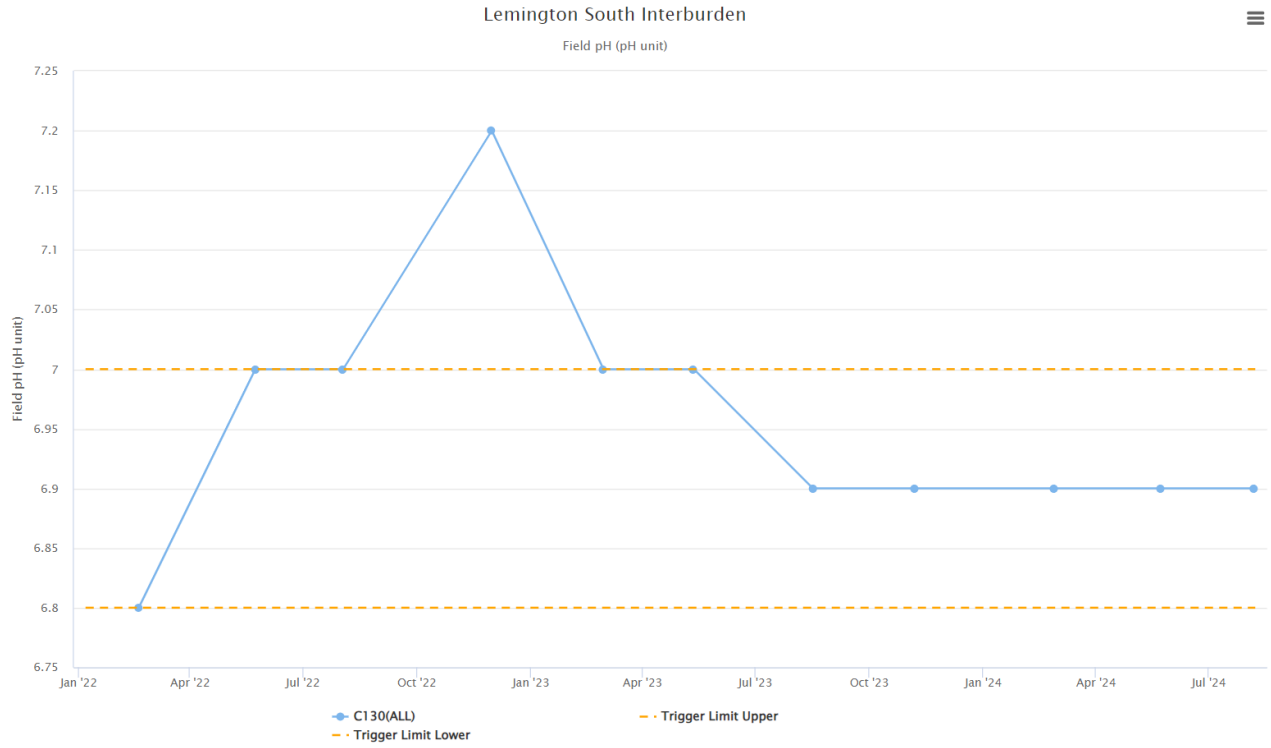

Figure 538 - Lemington South Interburden Field pH Trend - Q3 2024

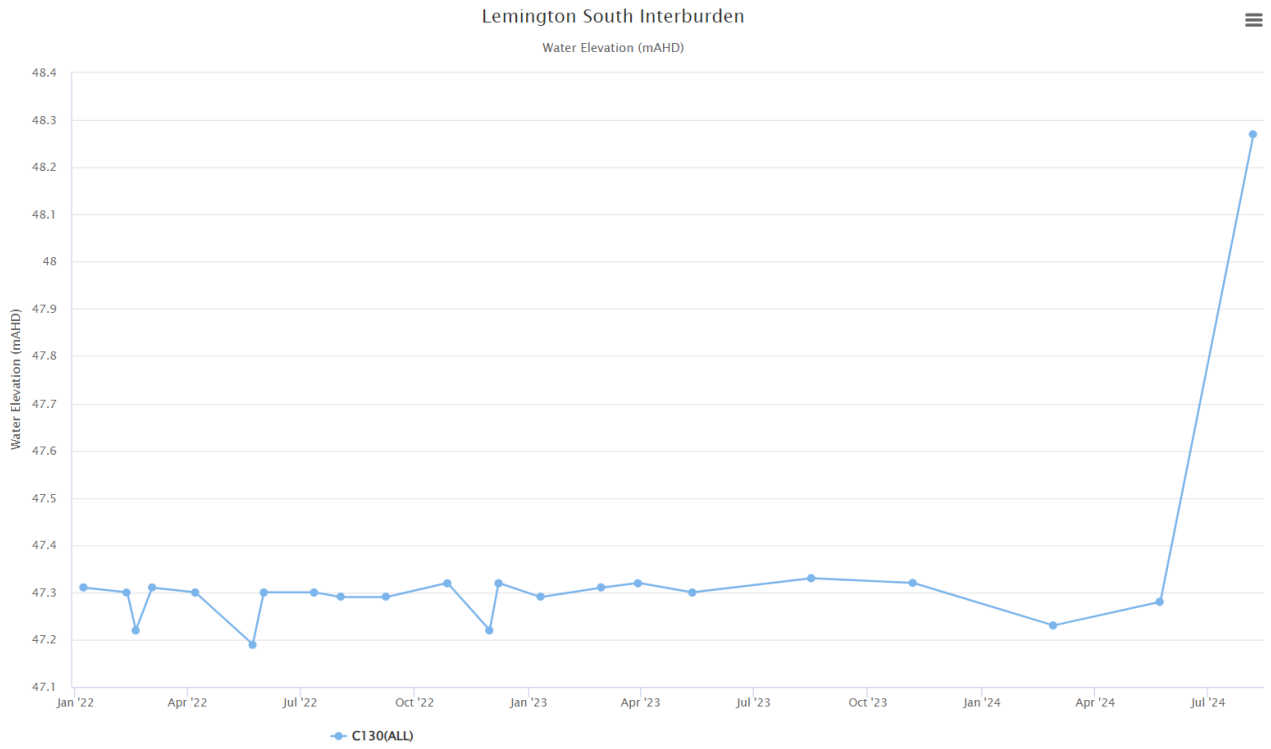

Figure 549 - Lemington South Interburden Water Elevation Trend - Q3 2024

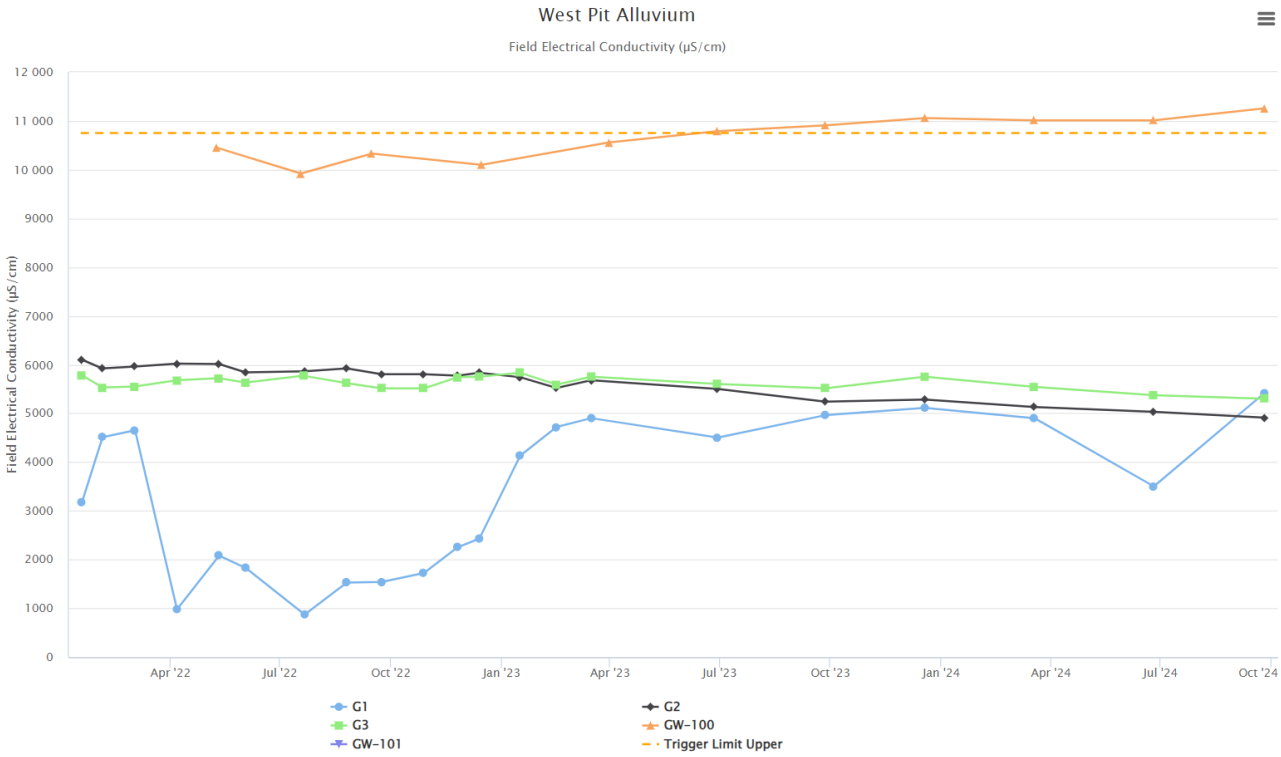

Figure 60 - West Pit Alluvium Electrical Conductivity Trend - Q3 2024

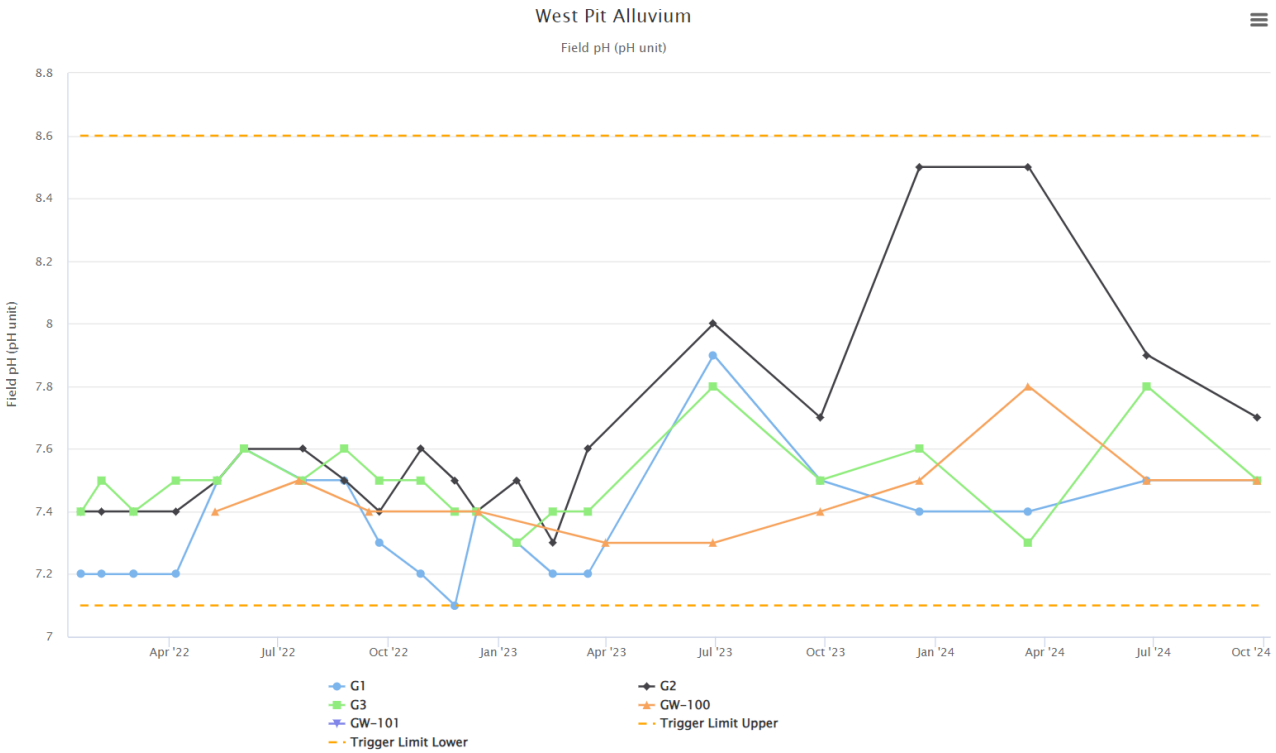

Figure 61 - West Pit Alluvium pH Trend - Q3 2024

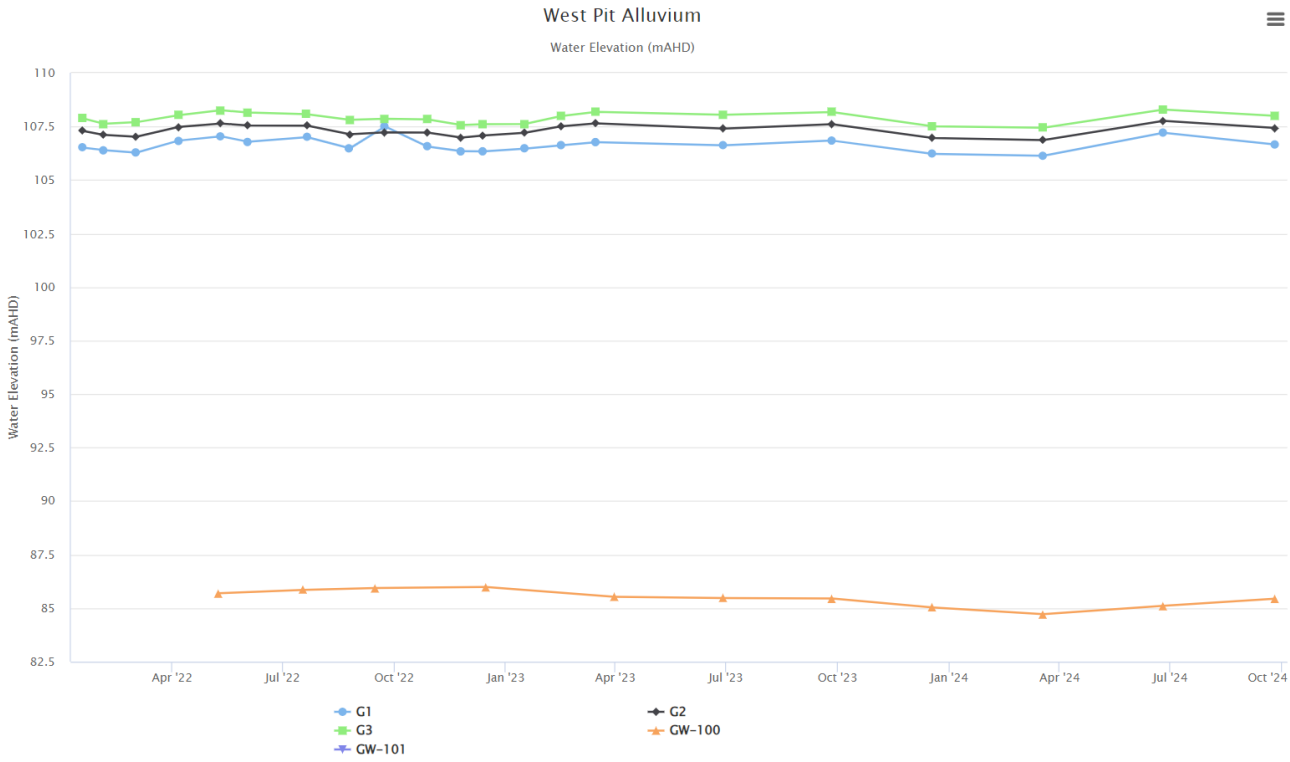

Figure 552 - West Pit Alluvium Water Elevation Trend - Q3 2024

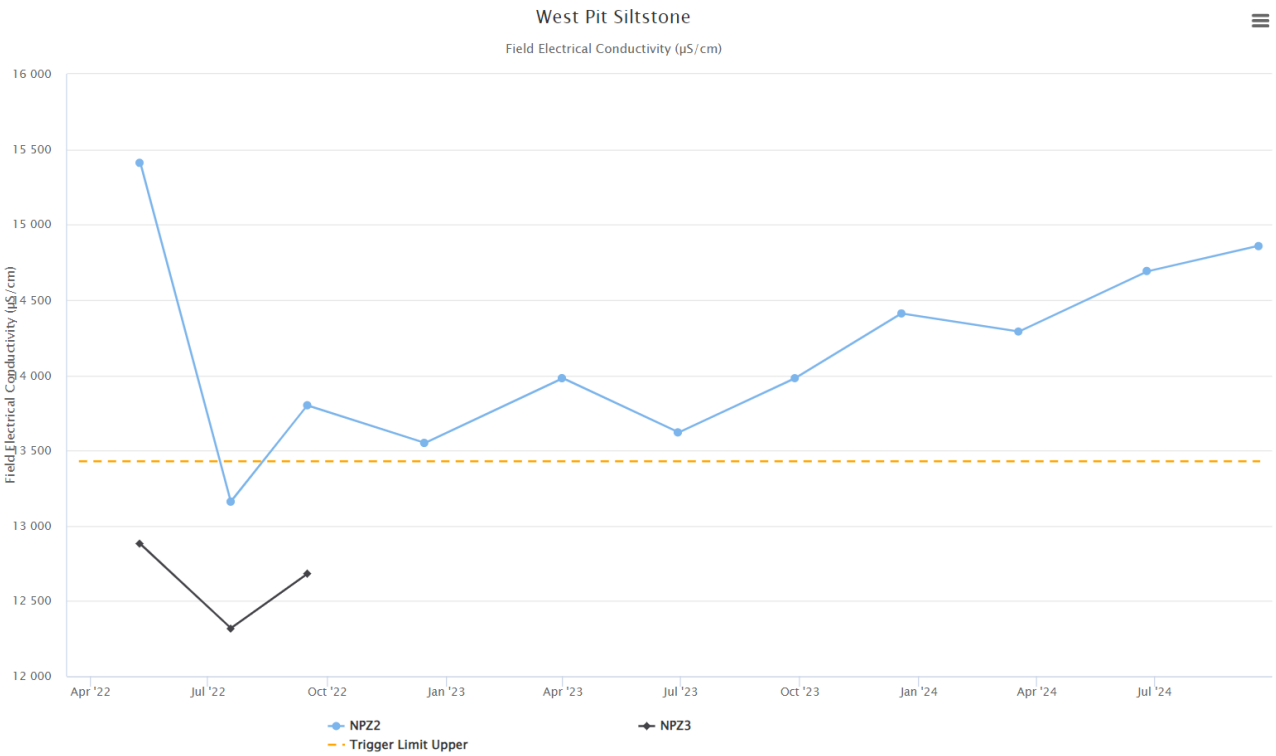

Figure 563 - West Pit Siltstone Electrical Conductivity Trend - Q3 2024

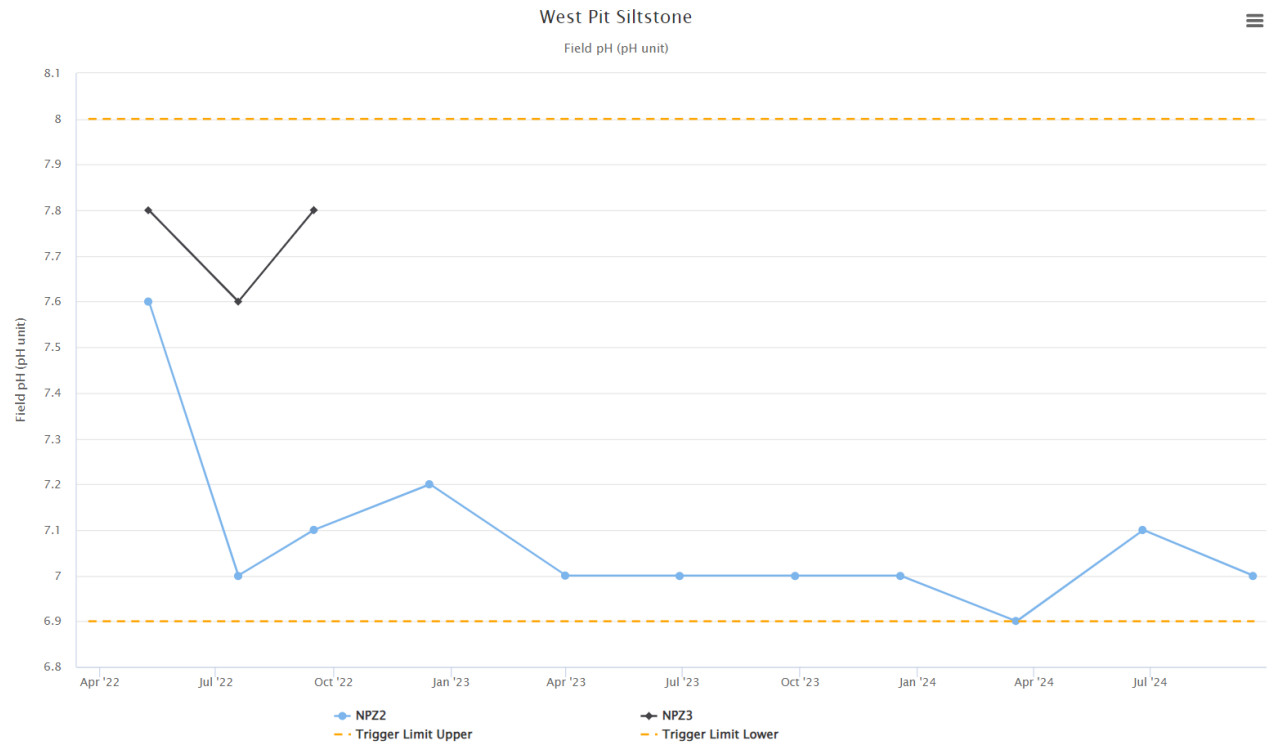

Figure 64 - West Pit Siltstone Field pH Trend - Q3 2024

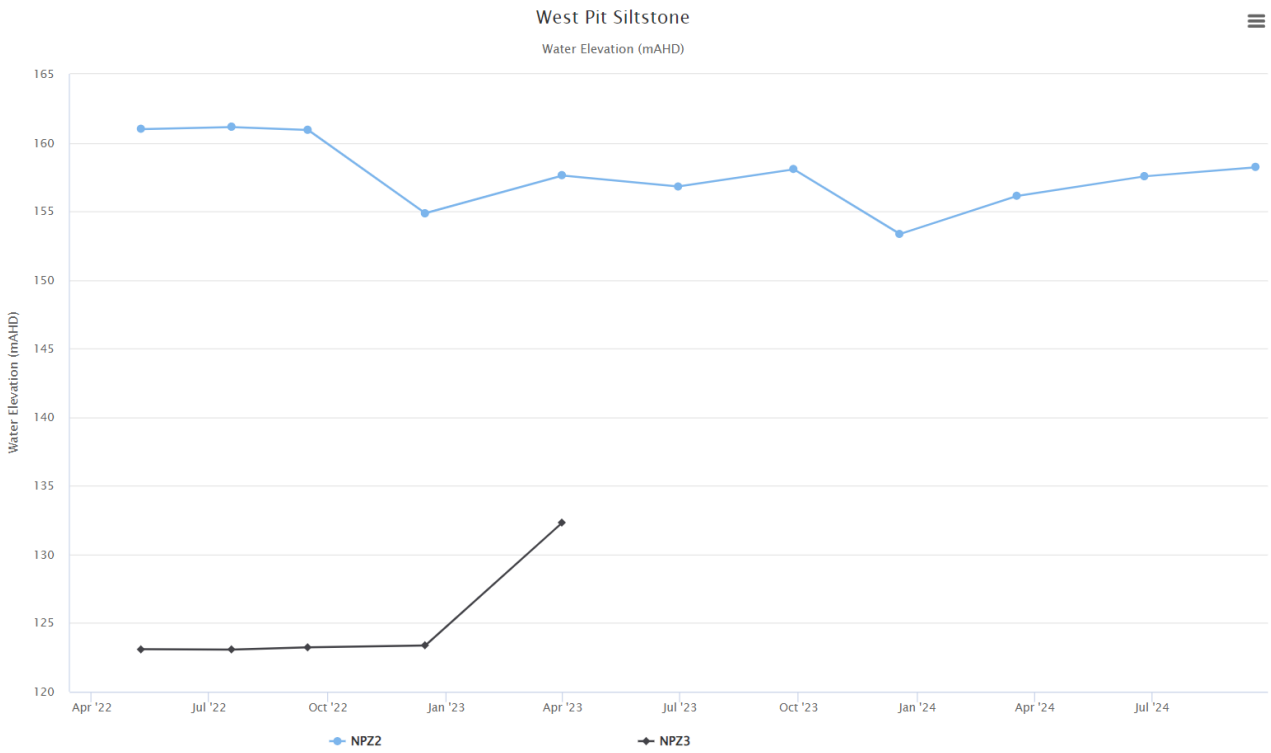

Figure 575 - West Pit Siltstone Water Elevation Trend- Q3 2024

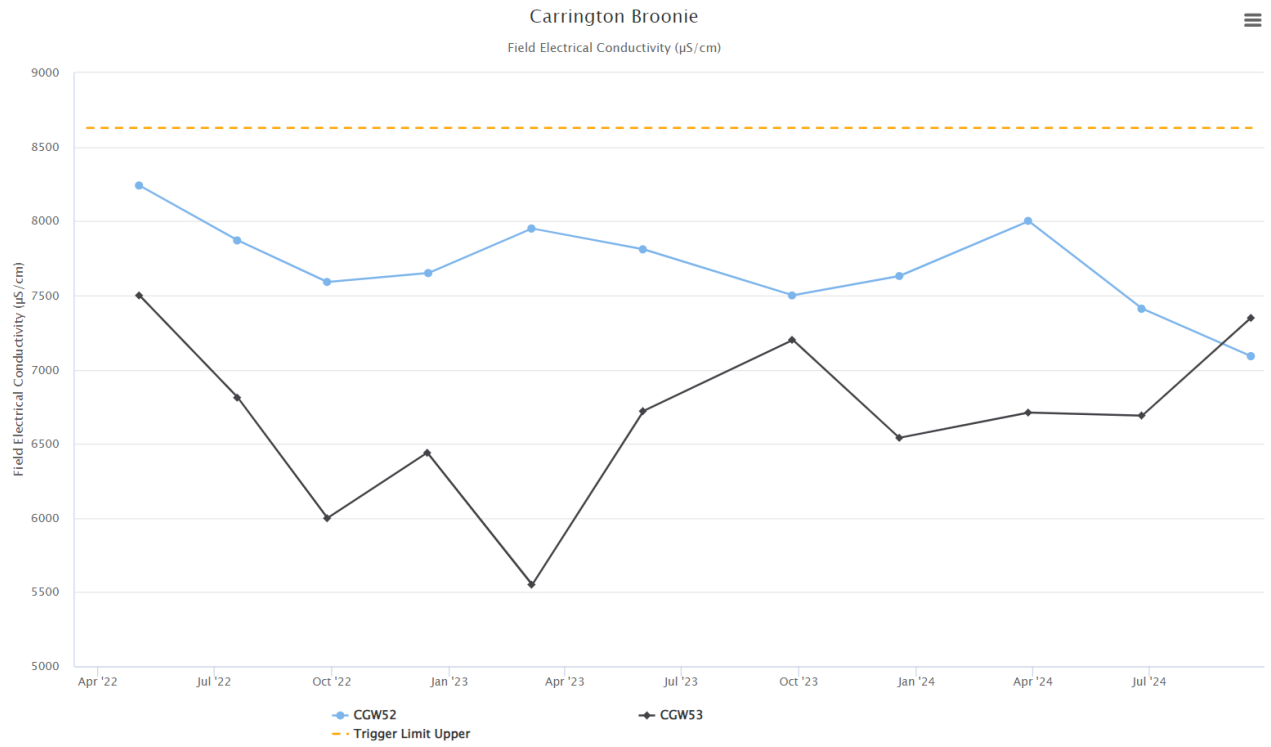

Figure 586 - Carrington Broonie Electrical Conductivity Trend - Q3 2024

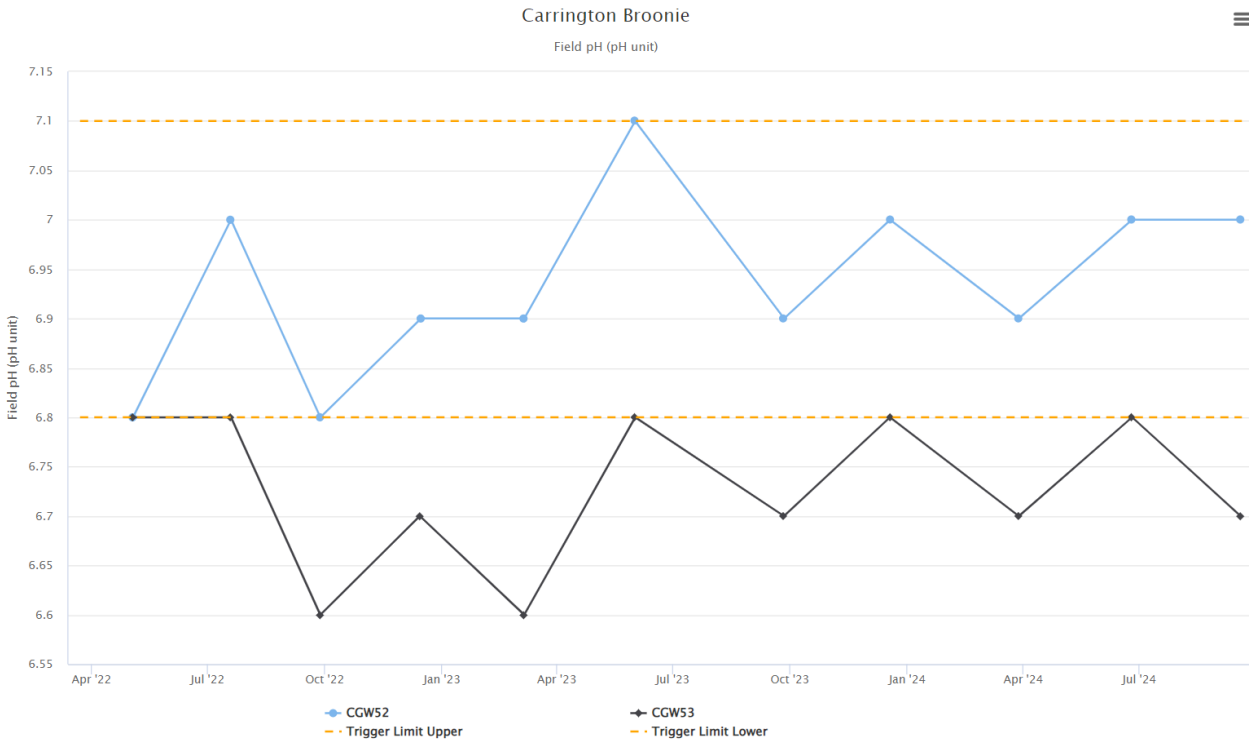

Figure 597 - Carrington Broonie Field pH Trend - Q3 2024

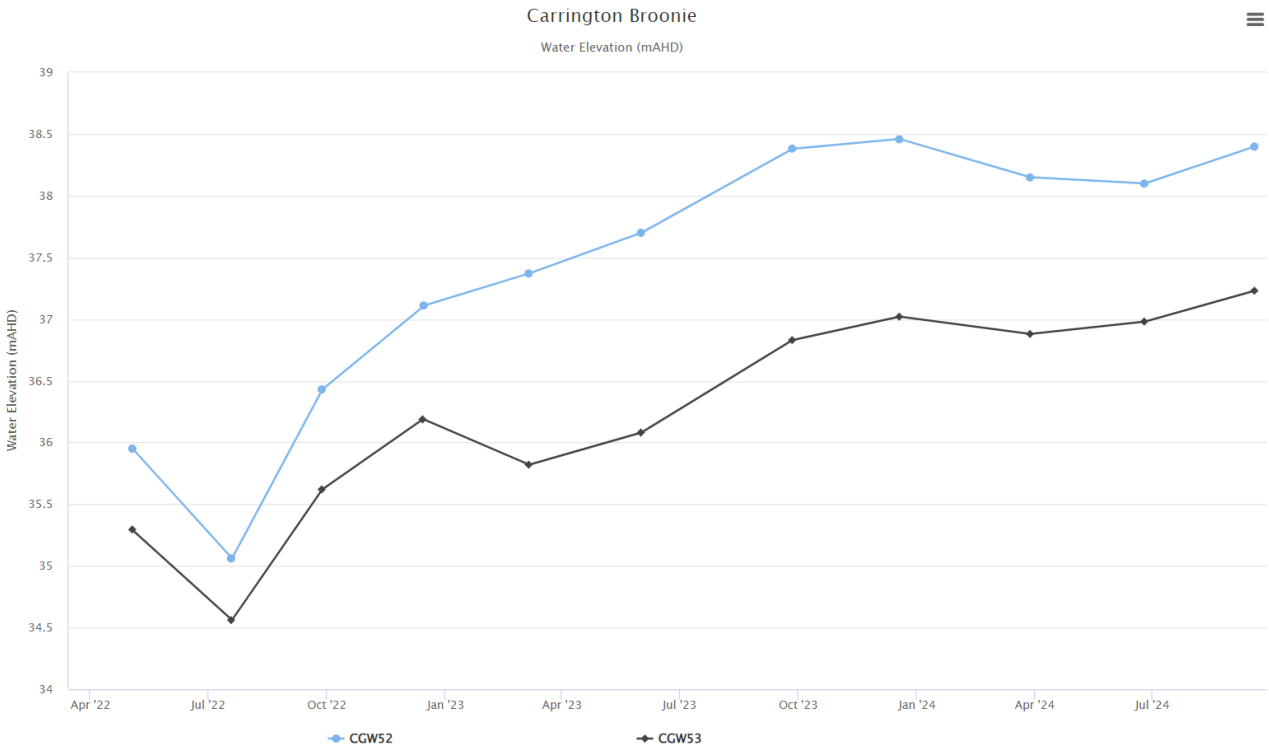

Figure 608 - Carrington Broonie Water Elevation Trend - Q3 2024

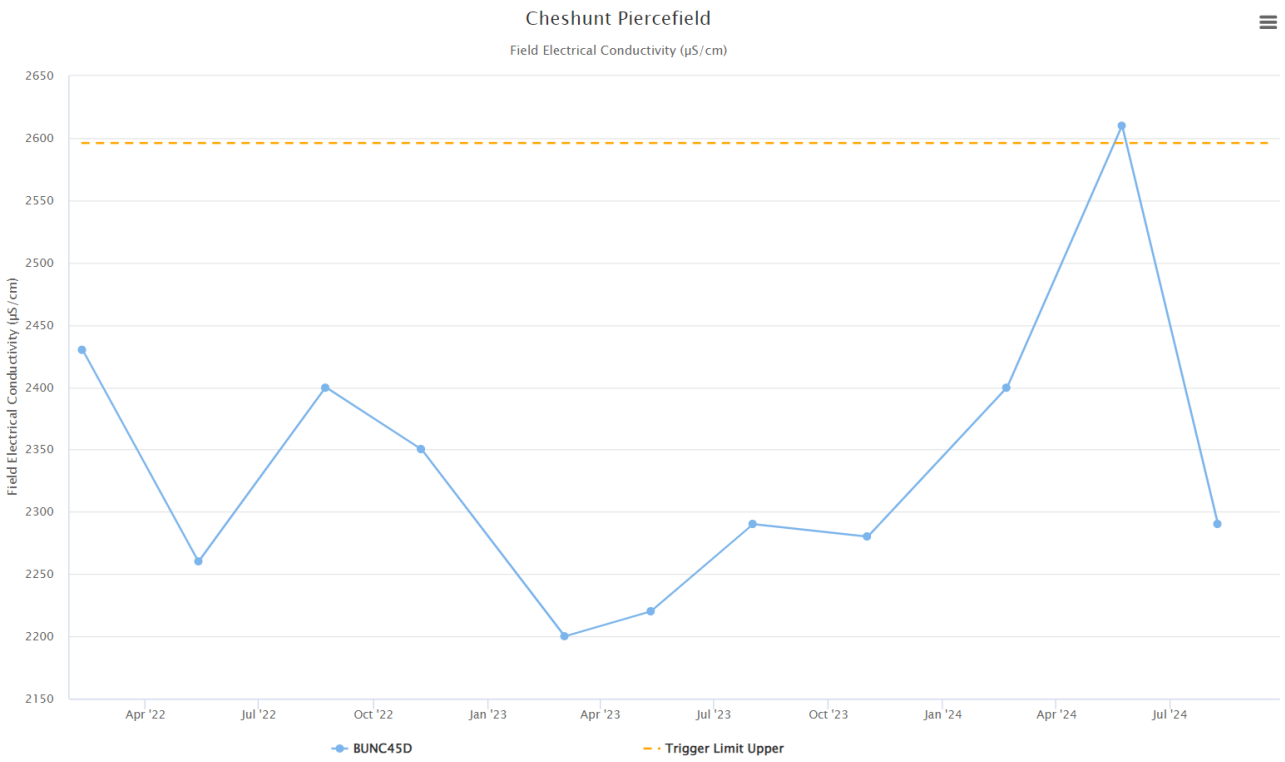

Figure 619 - Cheshunt Piercefield Electrical Conductivity Trend - Q3 2024

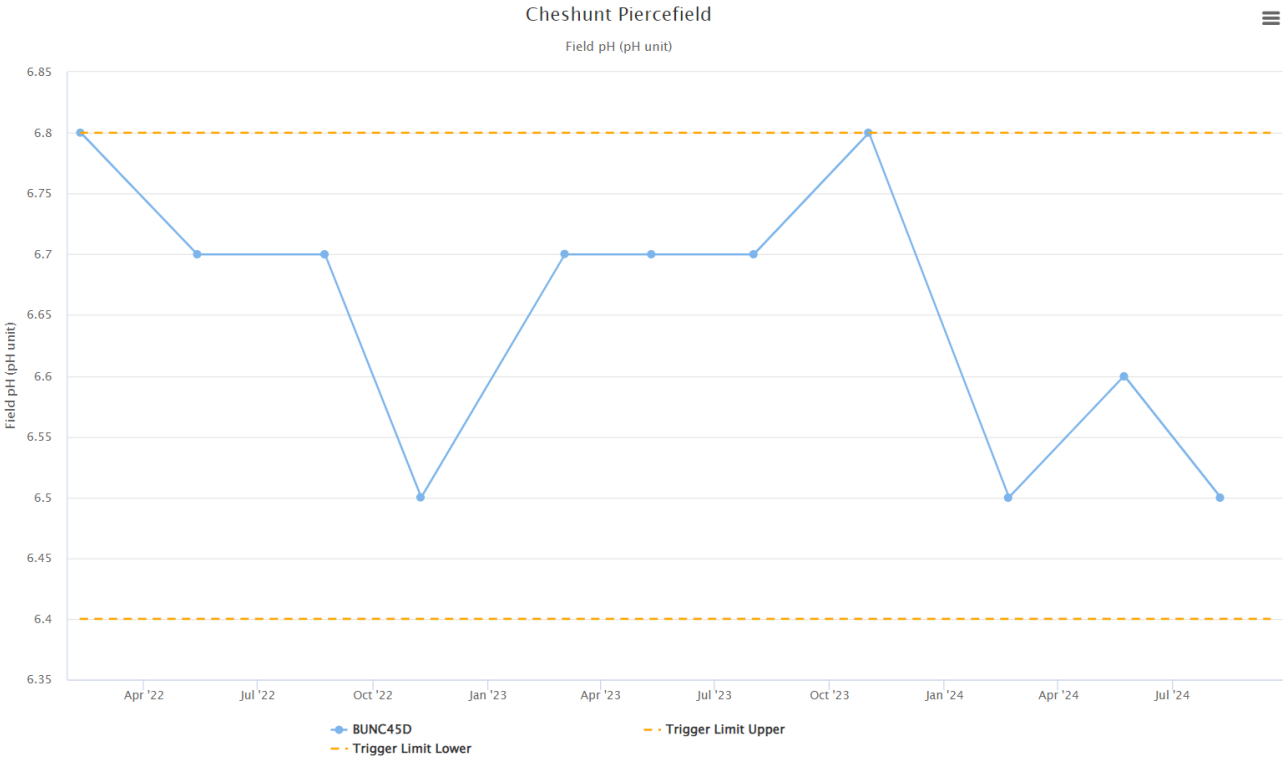

Figure 70 – Cheshunt Piercefield Field pH Trend – Q3 2024

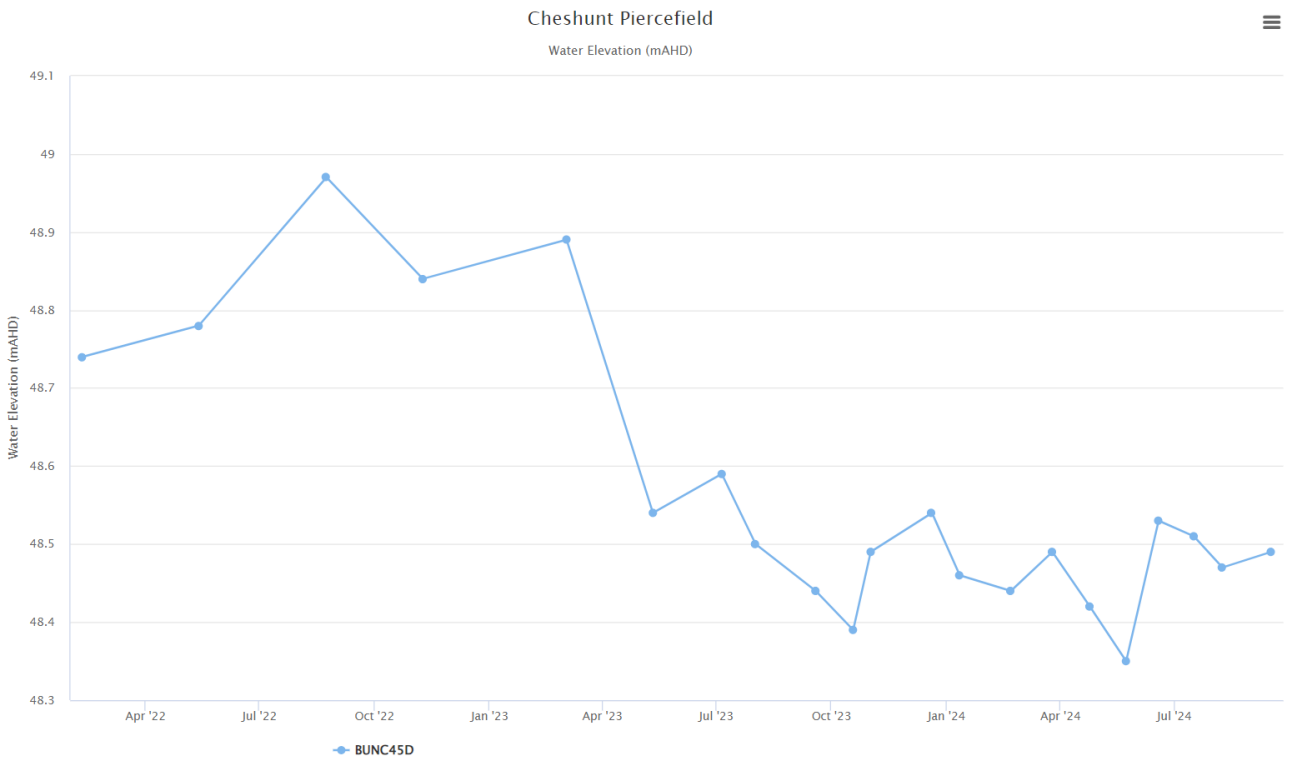

Figure 7162 - Cheshunt Piercefield Water Elevation Trend - Q3 2024

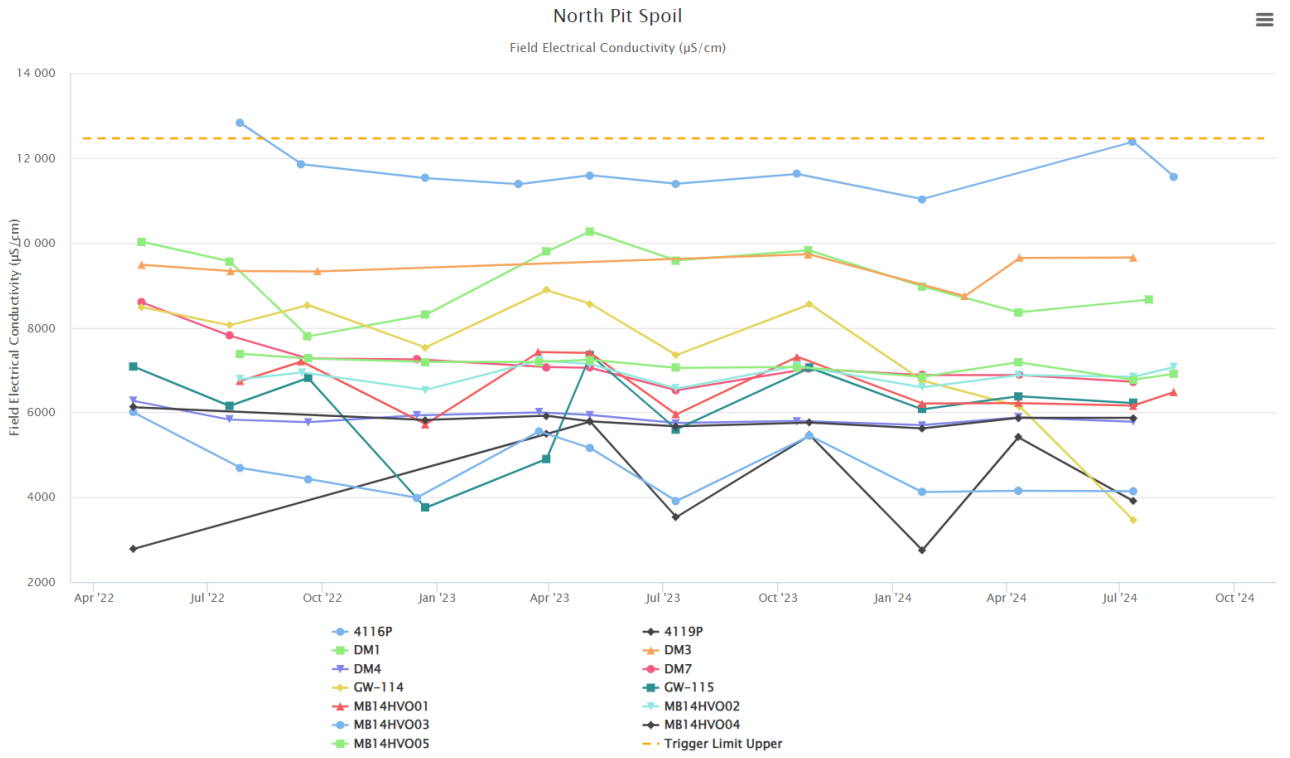

Figure 632 - North Pit Spoil Electrical Conductivity Trend - Q3 2024

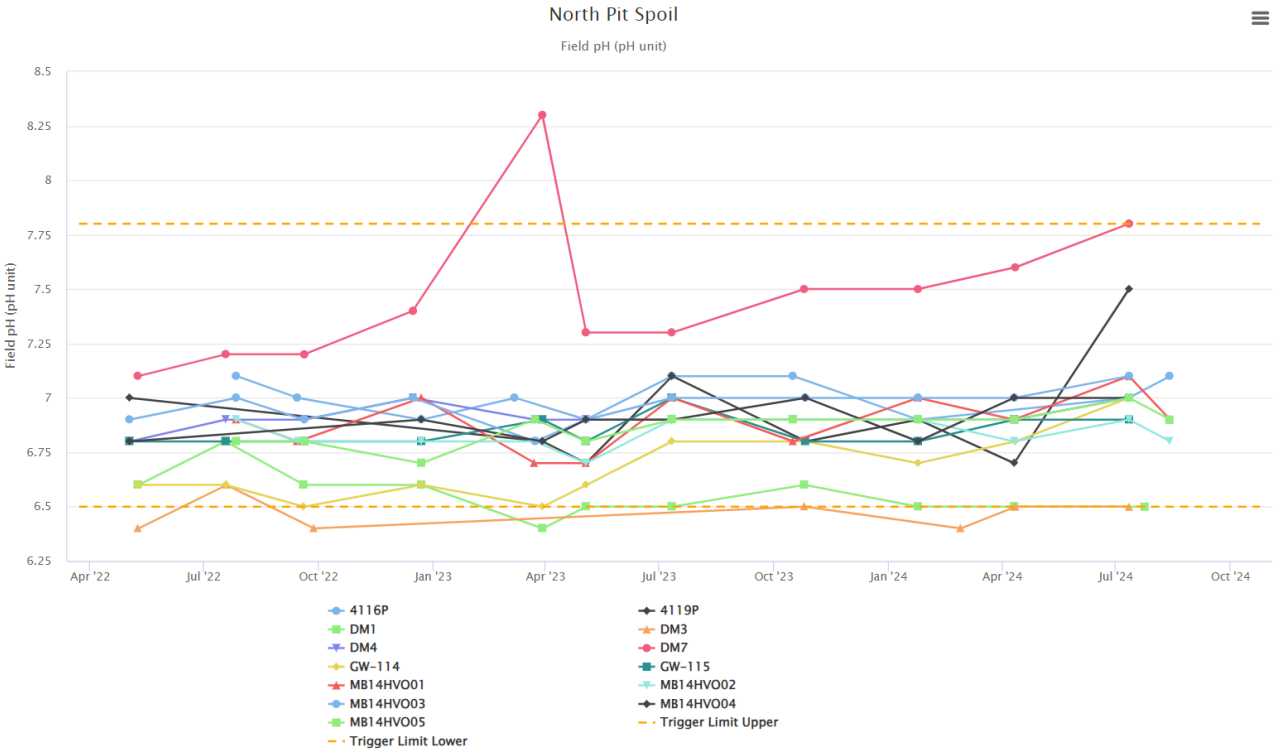

Figure 643 - North Pit Spoil Field pH Trend - Q3 2024

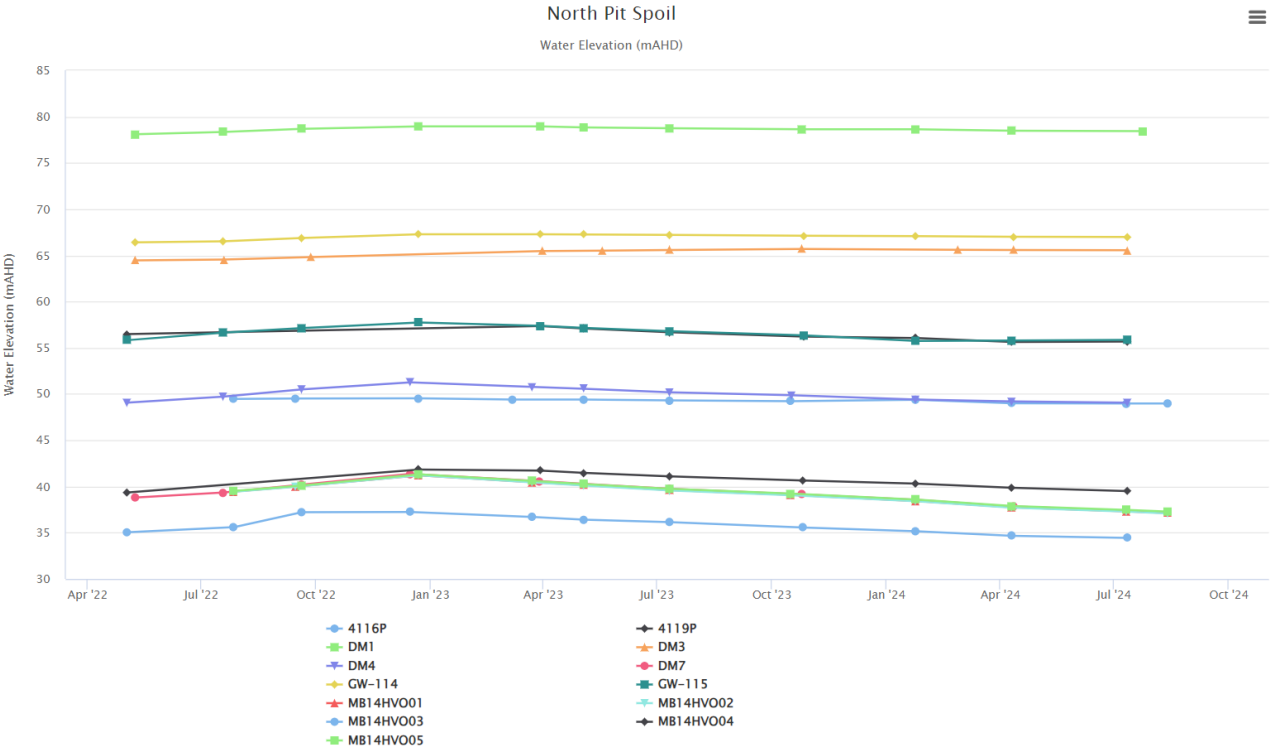

Figure 654 - North Pit Spoil Water Elevation Trend - Q3 2024

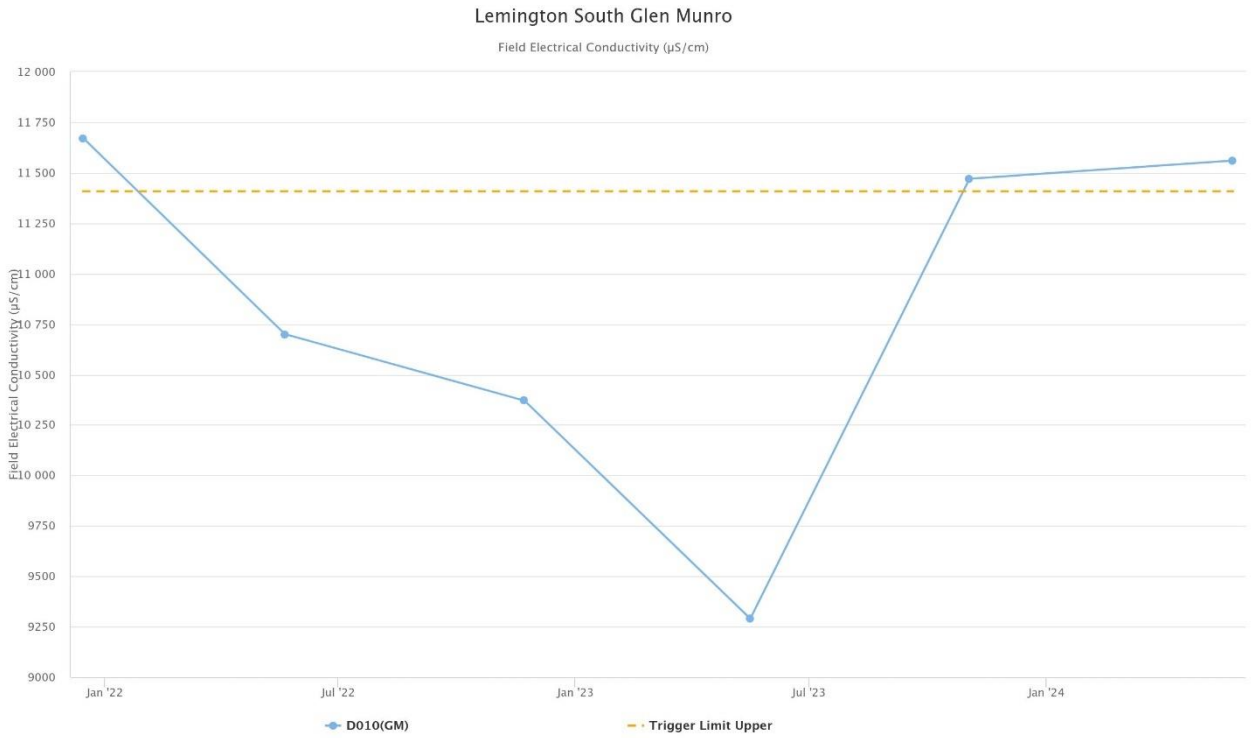

Figure 665 - Lemington South Glen Munro Electrical Conductivity Trend - Q3 2024

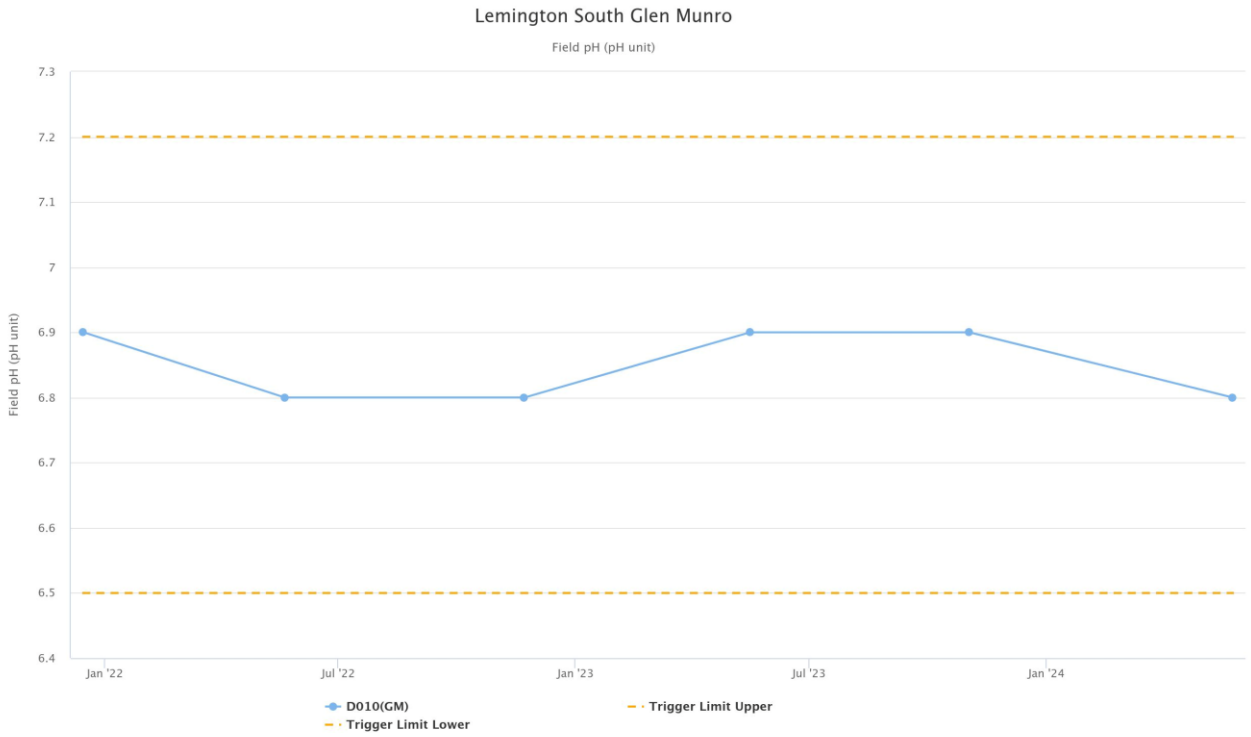

Figure 676 - Lemington South Glen Munro Field pH Trend - Q3 2024

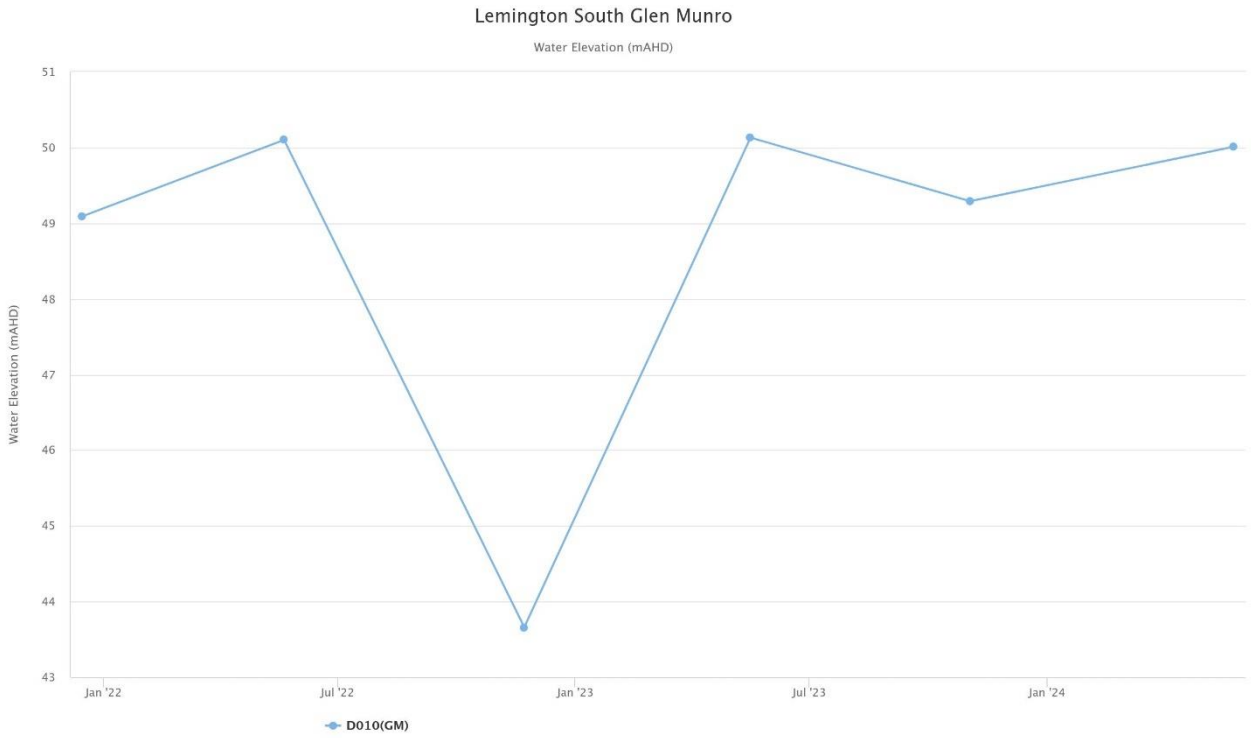

Figure 687 - Lemington South Glen Munro Water Elevation Trend - Q3 2024

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 Q3 2024

Site	Date	Trigger Limit Breached	Response Action
CGW53a	18/09/2024	Water Elevation (mAHD)	Fourteenth 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 slightly by June 2023 in response to below average rainfall. A minor increase was recorded in June and September 2024 in response to above average rainfall over the reporting period. 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	18/09/2024	Water Elevation (mAHD)	Twelfth consecutive water level readings above the 95th percentile trigger level of 58.43mAHD 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 then declined until June 2024 in response to below average rainfall, then stabilising over the reporting period. 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.
BZ3-3	8/08/2024	pH	Seventeenth consecutive reading below the lower pH trigger level of 6.5 since November 2019. Increasing pH trend between June 2006 (6.0) and August 2012 (7.1) followed by a decreasing trend between December 2012 (7.1) and November 2022 (6.1) then remained stable to September 2024. The Q3 reading of 6.3 is within the historical range. 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.
CGW51a	18/09/2024	pH	Nineth consecutive reading above the upper pH trigger level of 7.4 since September 2022. pH ranging between 6.8 (November 2006) and 8.3 (December 2023), with an increasing trend from September 2019 to December 2023 followed by a stable trend over 2024. The Q3 reading of 7.6 is within the historical range. 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.
GW-100	25/09/2024	Electrical Conductivity (EC)	Sixth consecutive reading above the upper EC trigger level of 10,751µS/cm since January 2023. EC ranging between 9,570µS/cm in September 2019 to 11,510µS/cm in December 2017. EC remained relatively stable until December 2022, following which there has been an increasing trend until September 2024. The Q3 reading of 11,260 µS/cm is within the historical range. The EC trend correlates with fluctuations in rainfall over time.
NPz2	19/09/2024	Electrical Conductivity (EC)	Nineth consecutive reading above the EC trigger level of 13,428µS/cm since September 2022. EC has ranged between 12,590µS/cm (December 2014) and 19,400µS/cm (December 2009). EC levels have remained relatively stable since March 2013. The Q3 reading of 14,860µS/cm is within the historical range. 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.

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 698** - Blast Monitoring Location Plan**.** Blasting criteria for HVO are summarised in **Table 4** – Blasting Criteria

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-one (21) blasts were initiated at HVO during the reporting period. Blast monitoring results for the period are shown in **Table 5 and Table 6**.

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)
3/09/2024 14:18	95.80	91.59	92.75	91.14	87.37
4/09/2024 13:14	90.73	85.64	85.17	94.73	86.92
5/09/2024 13:04	103.93	103.25	107.75	91.77	109.68
6/09/2024 10:09	88.84	84.97	108.13	101.98	99.97
6/09/2024 10:11	92.22	87.87	102.70	99.34	101.28
7/09/2024 13:08	106.07	106.32	103.42	97.35	105.40
10/09/2024 13:49	82.41	91.56	101.54	85.44	90.86
11/09/2024 14:12	91.01	95.22	102.29	94.18	92.01
13/09/2024 13:21	83.46	96.48	95.23	93.35	83.23
14/09/2024 13:13	98.51	97.85	85.45	104.53	101.11
16/09/2024 13:30	95.49	103.47	108.65	97.93	103.33
17/09/2024 13:20	93.42	77.89	100.81	90.06	90.85
17/09/2024 16:05	91.53	90.76	96.74	98.19	99.78
18/09/2024 13:00	100.03	106.57	112.09	106.49	112.77
23/09/2024 13:29	94.05	107.26	112.74	114.01	114.6
23/09/2024 13:31	98.80	107.81	98.73	102.82	104.39
24/09/2024 13:28	89.77	77.14	90.40	92.05	89.32
26/09/2024 16:12	87.99	89.96	102.02	92.94	100.09
27/09/2024 13:18	101.45	106.85	102.81	96.75	106.09
28/09/2024 17:49	102.76	97.11	97.33	97.79	94.94
28/09/2024 17:50	99.98	97.16	93.50	89.44	92.87

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)
3/09/2024 14:18	0.14	0.05	0.10	0.58	0.09
4/09/2024 13:14	0.05	0.06	0.07	0.36	0.07
5/09/2024 13:04	0.11	0.18	0.09	0.81	0.06
6/09/2024 10:09	0.18	0.11	0.18	0.52	0.14
6/09/2024 10:11	0.10	0.08	0.15	0.41	0.14
7/09/2024 13:08	0.22	0.18	0.14	0.11	0.08
10/09/2024 13:49	0.17	0.05	0.10	0.19	0.07
11/09/2024 14:12	0.13	0.06	0.09	0.63	0.05
13/09/2024 13:21	0.12	0.05	0.10	0.22	0.05
14/09/2024 13:13	0.07	0.05	0.06	0.09	0.04
16/09/2024 13:30	0.18	0.05	0.28	0.42	0.20
17/09/2024 13:20	0.13	0.05	0.09	0.37	0.04
17/09/2024 16:05	0.10	0.05	0.25	0.66	0.24
18/09/2024 13:00	0.13	0.05	0.07	0.49	0.05
23/09/2024 13:29	0.21	0.08	0.33	0.85	0.26
23/09/2024 13:31	0.18	0.12	0.20	0.72	0.15
24/09/2024 13:28	0.07	0.05	0.10	0.55	0.04
26/09/2024 16:12	0.17	0.05	0.07	0.42	0.08
27/09/2024 13:18	0.11	0.09	0.05	0.12	0.05
28/09/2024 17:49	0.14	0.05	0.12	0.56	0.05
28/09/2024 17:50	0.20	0.05	0.11	0.29	0.08

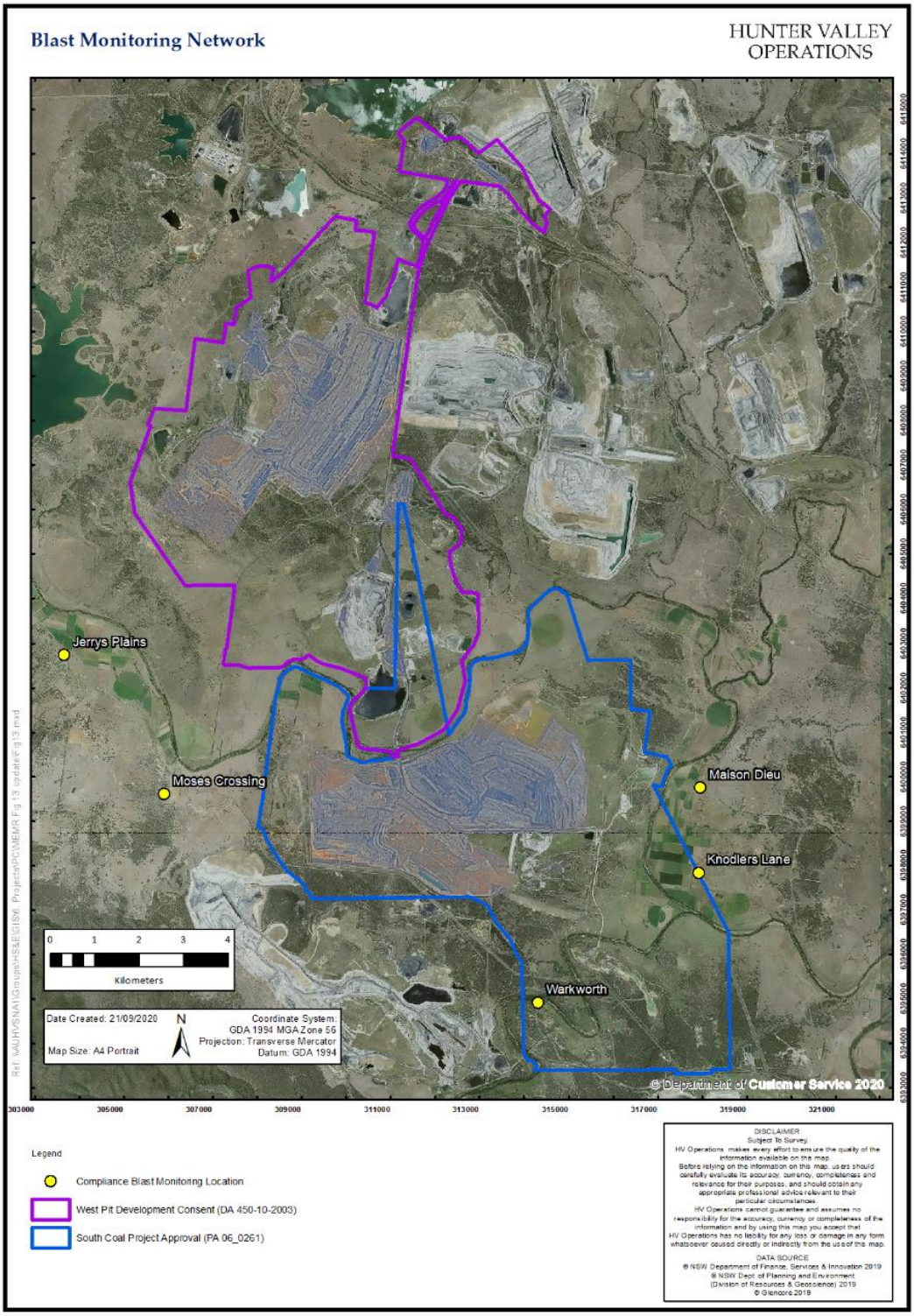

Figure 698 - Blast Monitoring Location Plan

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 709**.

5.1 | ATTENDED NOISE MONITORING RESULTS

Attended monitoring was conducted at receiver locations around HVO during the night period of the 25 September 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 7 and Table 8**.

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	25/09/2024 21:00	3.3	288	D	No	35	46	IA	IA	N/A	N/A
Knodlers Lane	25/09/2024 21:46	2.7	275	D	Yes	35	46	IA	IA	Nil	Nil
Maison Dieu	25/09/2024 21:23	2.9	285	D	Yes	35	46	IA	IA	Nil	Nil
Long Point (Dights Crossing)	25/09/2024 22:42	3.1	272	D	No	35	46	IA	IA	N/A	N/A
Kilburnie South	25/09/2024 23:21	2.9	272	D	Yes	39	46	<20	<20	Nil	Nil
Jerrys Plains East	25/09/2024 23:00	3	276	D	Yes	39	46	<20	<20	Nil	Nil
Jerrys Plains Village	25/09/2024 21:33	2.9	285	D	Yes	40	46	IA	IA	Nil	Nil
Jerrys Plains West	25/09/2024 21:10	3.1	280	D	No	40	46	IA	IA	N/A	N/A
Kilburnie South	25/09/2024 21:55	4.7	270	D	No	39	46	IA	IA	N/A	N/A
Jerrys Plain East	25/09/2024 21:26	4.3	256	D	No	39	46	IA	IA	N/A	N/A
Jerrys Plain Village	25/09/2024 21:00	3.7	264	D	No	40	46	IA	IA	N/A	N/A

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	25/09/2024 21:00	3.0	284	D	Yes	41	45	30	34	N/A	N/A
Knodlers Lane	25/09/2024 21:46	2.8	277	D	Yes	40	45	32	34	Nil	Nil
Maison Dieu	25/09/2024 21:23	3.4	282	D	No	39	45	28	29	Nil	Nil
Long Point (Dights Crossing)	25/09/2024 22:42	2.5	265	D	Yes	37	45	<25	27	N/A	N/A
Kilburnie South (Moses Crossing)	25/09/2024 23:21	1.4	181	F	Yes	39	45	IA	IA	Nil	Nil
Jerrys Plains East	25/09/2024 23:00	3.1	283	D	No	38	45	IA	IA	Nil	Nil
Jerrys Plains Village	25/09/2024 21:33	3.4	282	D	No	35	45	IA	IA	Nil	Nil
Jerrys Plains West	25/09/2024 21:10	3.0	284	D	Yes	35	45	IA	IA	N/A	N/A
HVGC	25/09/2024 23:48	3.0	284	D	Yes	55	--	-	N/A	Nil	N/A

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 9 and Table 10**

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	25/09/2024 21:00	IA	No	N/A	N/A	N/A	N/A	N/A	N/A
Knodlers Lane	25/09/2024 21:46	IA	Yes	No	No	N/A	No	N/A	Nil
Maison Dieu	25/09/2024 21:23	IA	Yes	No	No	N/A	No	N/A	Nil
Long Point (Dights Crossing)	25/09/2024 22:42	IA	No	N/A	N/A	N/A	N/A	N/A	N/A
Kilburnie South	25/09/2024 23:21	<20	Yes	No	No	N/A	No	N/A	Nil
Jerrys Plains East	25/09/2024 23:00	<20	Yes	No	No	N/A	No	N/A	Nil
Jerrys Plains Village	25/09/2024 21:33	IA	Yes	No	No	N/A	No	N/A	Nil
Jerrys Plains West	25/09/2024 21:10	IA	No	N/A	N/A	N/A	N/A	N/A	N/A
Kilburnie South	25/09/2024 21:55	IA	No	N/A	N/A	N/A	N/A	N/A	N/A
Jerrys Plains East	25/09/2024 21:26	IA	No	N/A	N/A	N/A	N/A	N/A	N/A
Jerrys Plains Village	25/09/2024 21:00	IA	No	N/A	N/A	N/A	N/A	N/A	N/A

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	25/09/2024 21:00	30	Yes	No	No	N/A	No	N/A	Nil
Knodlers Lane	25/09/2024 21:46	32	Yes	No	No	N/A	No	N/A	Nil
Maison Dieu	25/09/2024 21:23	28	No	N/A	N/A	N/A	N/A	N/A	N/A
Long Point (Dights Crossing)	25/09/2024 22:42	<25	Yes	No	No	N/A	No	N/A	Nil
Kilburnie South (Moses Crossing)	25/09/2024 23:21	IA	Yes	No	No	N/A	No	N/A	Nil
Jerrys Plains East	25/09/2024 23:00	IA	No	N/A	N/A	N/A	N/A	N/A	N/A
Jerrys Plains Village	25/09/2024 21:33	IA	No	N/A	N/A	N/A	N/A	N/A	N/A
Jerrys Plains West	25/09/2024 21:10	IA	Yes	No	No	N/A	No	N/A	Nil
HVGC	25/09/2024 23:48	<25	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 709**. 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.

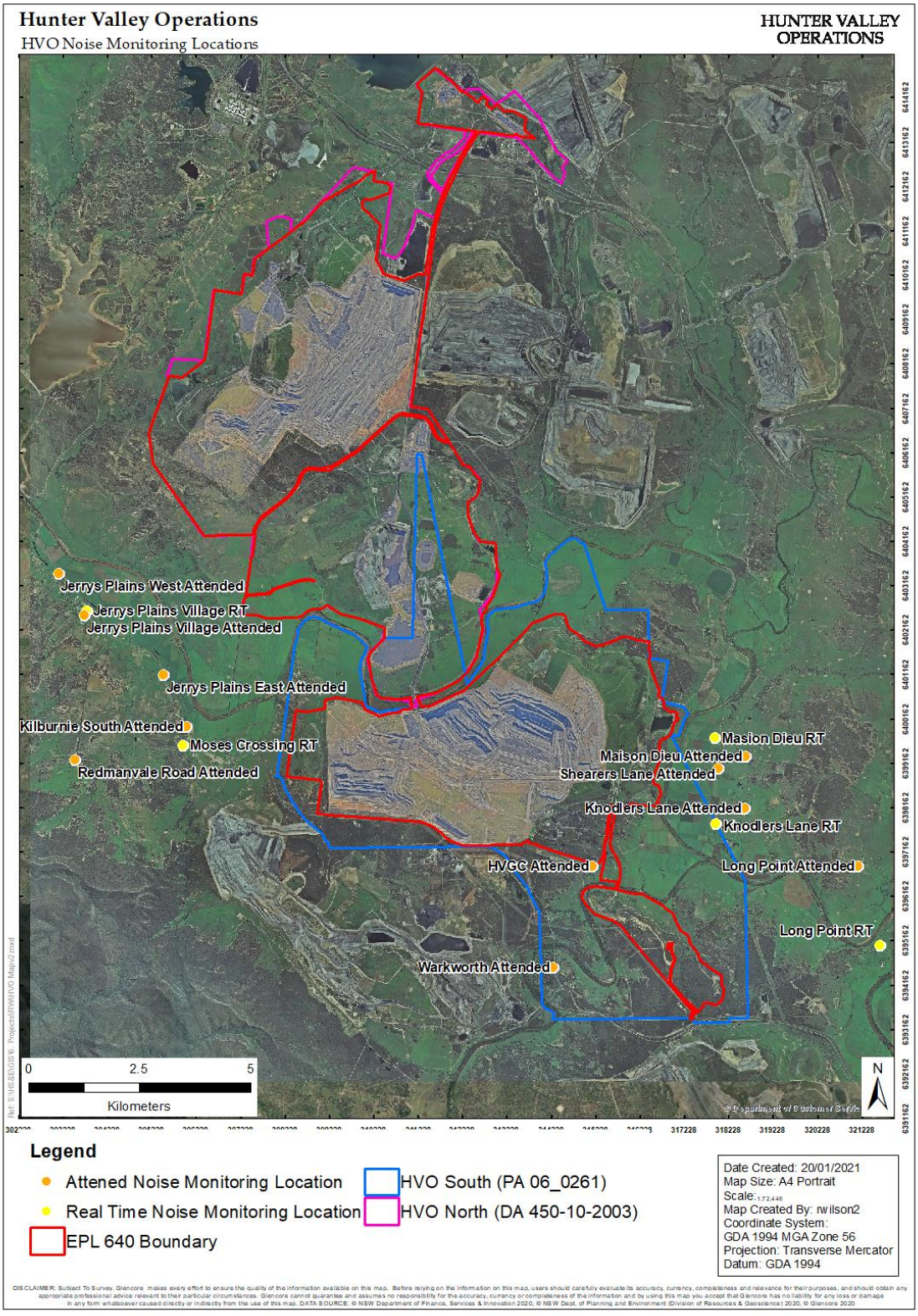

Figure 709 - Noise Monitoring Location Plan

6 | OPERATIONAL DOWNTIME

A total of approximately three hundred and eighty-eight (388) 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 80**. 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).

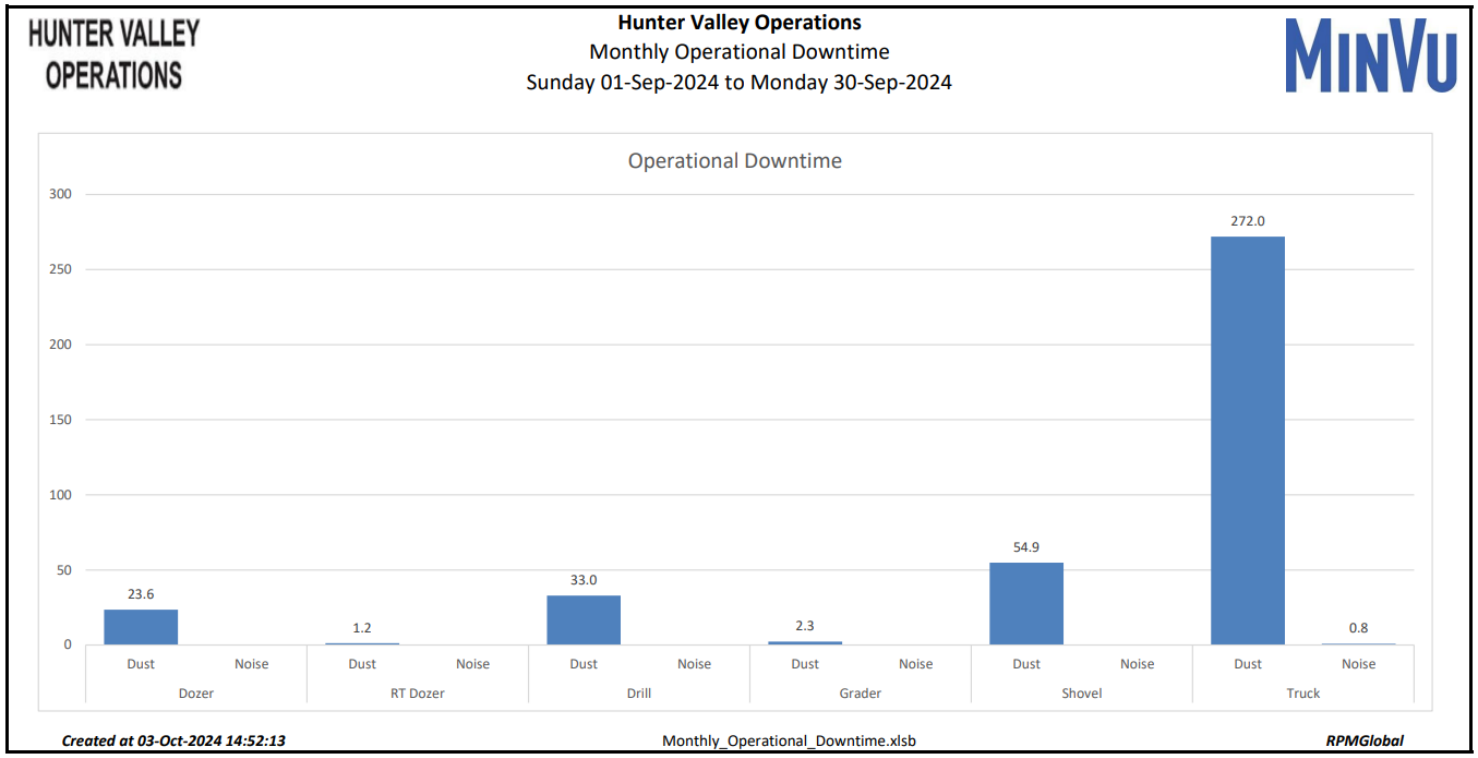

Figure 80: Operational Downtime by Equipment Type for the Reporting Period

7 | REHABILITATION

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

- 4.77ha of land was released (became available for the application of topsoil);
- 4.77ha 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 817181.

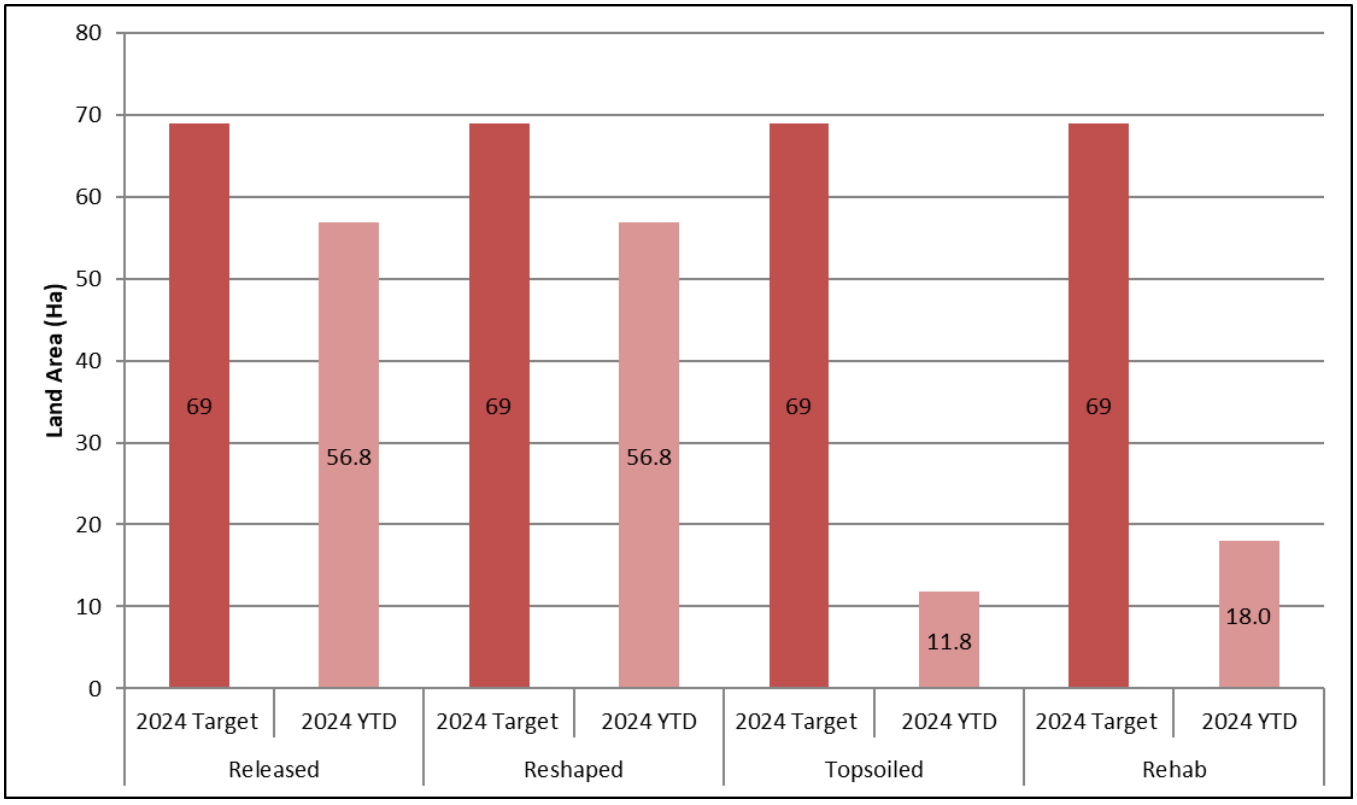

Figure 8171 – Rehabilitation YTD September 2024

8 | COMPLAINTS

There was one community complaint received during the reporting period. Details of complaints received during 2024 are shown in **Table 11.**

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 equiment 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 blasting 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.
2	2 April	1:31pm	2	Blast	Community Hotline	• A resident of Jerrys Plains called the United Wambo Joint Venture (UWJV) Community Complaints Hotline at 1:31pm regarding noise and vibration from a blast. This was relayed to HVO given they did not have a blast at that time. • A member of the HVO Environment and Community team contacted the resident to advise a blast had been fired in the Mitchell Pit at 1:29pm.

Complaint Number	Date	Time	Complainant ID	Nature of Complaint	Mode of Complaint	Brief Description and Response
						• The closest monitor to the resident recorded overpressure of 105.5 dBL against a criteria of 120 dBL and ground vibration of 0.11mm/s against a criteria of 10mm/s.
3	4 April	12:30pm	3	Traffic	Community Hotline	• A resident of Jerrys Plains called the Community Complaints Hotline at 12:30pm regarding traffic incidents at HVO North entry off Lemington Road. • The resident reported that a vehicle exiting HVO North on the afternoon of 3 April failed to stop at the stop sign and almost collided with his wifes vehicle. They have witnessed other vehicles failing to stop at the same location within the past two months. • An internal investigation following the complaint resulted in a site-wide presentation about the importance of road safety whilst travelling to and from HVO delivered at daily HCOMs. Vegetation maintenance will be performed to increase visibility at the intersection.
4	3 May	7:40am	3	Traffic	Direct call to Environment and Community Officer	• A resident of Jerrys Plains called the Environment and Community Officer directly regarding a traffic incident at HVO North's intersection with Lemington Road. • The resident reported that a vehicle (small truck) exiting HVO North at approximately 7:40am on 3 May failed to stop at the stop sign and almost collided with his wifes vehicle. • Following an internal investigation into the complaint, a site-wide communication about road safety and the 100km/h speed limit along Lemington Road was delivered at daily HCOMs. In addition, road marking, signs and the surveillance camera near the intersection will be upgraded.
No community complaints were received during June						

Complaint Number	Date	Time	Complainant ID	Nature of Complaint	Mode of Complaint	Brief Description and Response
No community complaints were received during July						
5	30 August	10:05am	4	Blast	Direct call to Environment and Community Officer	• A resident of Jerrys Plains contacted the HVO Environment and Community officer directly via telephone at 10:05am describing two loud blasts in succession as well as floor movement and house shudder. The Environment and Community Officer communicated to the resident advising that a blast had been fired in the HVO Mitchell Pit at 10:04am. • The closest monitor to the resident recorded overpressure of 100.18 dBL against a criteria of 120 dBL and ground vibration of 0.06mm/s against a criteria of 10mm/s.
6	30 August	10:13am	5	Blast	Community Hotline	• A resident of Jerrys Plains contacted the HVO Community Complaints Hotline at 10:13am describing their house rattling as well as two loud bangs. The Environment and Community Officer communicated to the resident via telephone shortly after the call to advise a blast had been fired in the HVO Mitchell Pit at 10:04am. • The closest monitors to the resident – Jerrys Plains and Moses Crossing – recorded overpressure results of 100.18 dBL and 112.37 dBL respectively against a criteria of 120dBL and ground vibration results of 0.06mm/s and 0.21mm/s respectively against a criteria of 10mm/s. • HVO conducted an internal investigation into the blast and as requested provided the outcomes to the resident via email.
7	30 August	10:19am	1	Blast	Community Hotline	• A resident of Jerrys Plains contacted the HVO Community Complaints Hotline at 10:19am describing ground movement worse than a recent earthquake. The Environment and Community Officer communicated to the resident via telephone shortly after the call to advise a blast had been fired in the HVO

Complaint Number	Date	Time	Complainant ID	Nature of Complaint	Mode of Complaint	Brief Description and Response
						Mitchell Pit at 10:04am. • The closest monitors to the resident – Jerrys Plains and Moses Crossing – recorded overpressure results of 100.18 dBL and 112.37 dBL respectivelyt against a criteria of 120dBL and ground vibration results of 0.06mm/s and 0.21mm/s respectively against a criteria of 10mm/s. • HVO conducted an internal investigation into the blast and as requested provided the outcomes to the resident via email.
8	24 September	1:50pm	6	Blast	Community Hotline	• A resident of Maison Dieu contacted the HVO Community Complaints Hotline at 1:50pm describing a blast that occurred at 1.30pm that shook their house and left dust over their cars. • The HVO Environment and Community Officer communicated to the resident via telephone shortly after the call to advise a blast had been fired in the HVO Cheshunt Pit at 1:29pm. • The closest monitors to the resident, Maison Dieu and Knodlers Lane, recorded blasting levels below relevant criteria. These monitors recorded overpressures of 112.74 and 114.6dBL respectively against a criteria of 120dBL and ground vibration of 0.33 and 0.26mm/s respectively against a criteria of 10mm/s. • HVO conducted an internal investigation into the blast and as requested, provided the outcomes to the resident.

9 | ENVIRONMENTAL INCIDENTS

Nil (0) reportable environmental incidents occurred during the reporting period.

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)
1/09/2024	24.92	13.33	54.32	25.76	784	281	5.63	0.00
2/09/2024	23.35	11.44	52.42	17.72	811	275	6.88	0.00
3/09/2024	18.00	6.80	60.10	21.75	822	180	2.38	0.00
4/09/2024	20.97	4.21	81.70	24.81	817	254	1.21	0.00
5/09/2024	24.13	11.09	61.94	33.16	792	290	4.12	0.00
6/09/2024	25.11	11.90	70.90	33.93	807	292	4.73	0.00
7/09/2024	28.81	15.12	76.71	29.14	820	237	4.44	0.00
8/09/2024	21.28	12.15	92.00	39.43	1036	254	3.02	0.00
9/09/2024	20.99	10.25	64.62	30.00	967	281	3.66	0.00
10/09/2024	21.15	8.86	88.40	32.26	833	172	1.94	0.00
11/09/2024	25.82	8.73	95.00	37.94	882	242	1.82	3.60
12/09/2024	20.79	10.96	90.20	40.43	1065	183	3.63	0.00
13/09/2024	18.55	9.50	82.90	44.00	1190	114	2.25	0.00
14/09/2024	21.31	6.42	93.70	31.21	848	257	2.53	0.00
15/09/2024	16.05	7.77	81.40	26.56	1122	131	2.91	0.00
16/09/2024	20.32	3.92	76.00	18.46	891	244	2.84	0.00
17/09/2024	20.11	5.68	83.80	31.32	851	247	1.82	0.00
18/09/2024	23.18	8.49	63.92	16.67	899	289	4.26	0.00
19/09/2024	25.11	11.15	48.50	9.18	894	274	4.56	0.00
20/09/2024	22.82	9.89	44.73	18.66	892	280	4.30	0.00
21/09/2024	22.32	8.10	58.70	22.09	878	277	3.97	0.00
22/09/2024	23.81	9.61	55.76	21.45	898	280	3.90	0.00
23/09/2024	26.08	10.33	61.12	20.62	887	279	3.74	0.00
24/09/2024	24.63	11.18	67.63	29.03	1015	227	1.10	0.00
25/09/2024	27.28	15.21	56.06	26.94	1117	287	3.83	21.40
26/09/2024	22.03	9.03	94.30	41.61	154	138	2.65	4.00
27/09/2024	15.89	9.22	92.80	46.12	1164	123	4.67	0.20
28/09/2024	18.27	8.72	91.70	52.37	1257	118	3.69	0.00
29/09/2024	21.55	11.35	92.90	60.94	1322	128	2.75	1.80
30/09/2024	22.21	11.42	94.00	38.91	1323	160	2.26	0.00