

Blaenau Gwent County Borough Council

Silent Valley Landfill

2023 Third Quarter Monitoring Report

Reference: 4-50

Issue | 31 October 2023



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Job number 115825-00

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Document Verification

Project title Silent Valley Landfill
Document title 2023 Third Quarter Monitoring Report
Job number 115825-00
Document ref 4-50
File reference GEO

Revision	Date	Filename	Silent Valley 3rd Quarter Monitoring Report Draft		
Draft 01	27-10-2023	Description	Draft		
			Prepared by	Checked by	Approved by
		Name			
		Signature			

Issue 01	31-10-2023	Filename	Silent Valley_Q3_Monitoring Report_2023_Issue		
		Description	For Issue		
			Prepared by	Checked by	Approved by
		Name			
		Signature			

		Filename			
		Description			
			Prepared by	Checked by	Approved by
		Name			
		Signature			

Issue Document Verification with Document ☒

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1. Introduction

This 2023 Third Quarter Monitoring Report is a consolidated report detailing the findings of this quarter's results from the surface water, groundwater, landfill gas and leachate results for the monitoring undertaken in the period July to September 2023 in accordance with the Silent Valley Environmental Permit^[1] (Permit no. MP3835SV) and the Aftercare Phase Environmental and Infrastructure Monitoring Program^[6].

The data has been collected as referenced in Schedule 3 of the Consolidated Permit^[1]. This report refers to the 2023 Second Quarter Monitoring Report^[3].

1.1 Monitoring Regime

The monitoring regime is undertaken in accordance with the Aftercare Phase Environmental and Infrastructure Monitoring Program^[6] and in line with the Consolidated Permit^[1], which is fully detailed within the 2019 Annual Report^[2].

2. Discussion of Monitoring Results

2.1 Rainfall

Measured rainfall data is illustrated in **Appendix A, Figures A1 to A3**.

Based on the available data the following summary has been provided:

- July recorded the most rainfall with 178.9mm in total and has been the wettest July since recording began in 2008. A total of 25 days during July recorded rainfall.
- August was the driest month of the quarter, recording 91.1mm, this is around average for the time of year, in comparison to 2008-2022 records.
- Despite having the most consecutive days without rainfall (8 days), September recorded the wettest day of the quarter with 30.7mm of rain on the 19th, and the second highest total precipitation for the month (129.8mm).

2.2 Leachate

2.2.1 Leachate Quality Monitoring

Leachate quality monitoring results from within the waste body and from leachate standpipes are presented in **Appendix B, Table B1**.

To note, LC5A has not been in service in this monitoring round, however works have been undertaken to install a new leachate monitoring well (LC5B) in the locale of LC5A, and this will be developed in the coming months and including in subsequent monitoring rounds.

The Acceptable Maximum Concentrations (AMC) have been compared with the overall average (mean) concentrations from the wells. Exceedance of an AMC will trigger contingency actions.

No quarterly average leachate levels were above the AMC.

Notably individual well trends are discussed below;

- LC2A continues to exceed the AMC of 0.0681mg/l for nickel (0.102mg/l). The concentration remains unchanged from the second quarter and decreased from 0.13mg/l in quarter one.
- LC2A continues to exceed the AMC of 526mg/l for ammoniacal nitrogen (588mg/l). Concentrations have decreased from the previous quarter of 802mg/l.

2.2.2 Leachate Level Monitoring

Leachate head level monitoring results are presented in **Appendix B, Table B2**. The monthly average level for all the wells remains below the required 3.0m, as per the Permit^[1].

2.2.3 BSC Pipe

Leachate head measurements are undertaken in BH1 to BH4 which are located along the alignment of the BSC pipe. Leachate levels have remained relatively consistent indicating no rise in leachate levels therefore the pipe is working as required. Results are included **Appendix A Figure A8 and Appendix B Table B6**.

2.3 Surface Water

The surface water quality monitoring results are presented in **Appendix B, Table B3**, and graphically in **Appendix A, Figure A4**.

Commentaries are provided for upstream and downstream monitoring points in the Nant Merddog as discussed below.

2.3.1 Upstream Surface Water

Surface water monitoring locations, SWU, SW2A1, SWW4, SWW1 and SWW2 are located downstream of the landfill and monitored on a six-monthly basis in accordance with the Permit requirements.

These locations were not monitored this quarter.

2.3.2 Downstream Surface Water

SWD and SWD1

Results show both SWD and SWD1 are compliant this quarter.

2.4 Groundwater

2.4.1 Groundwater Quality Monitoring

Groundwater quality monitoring results are presented in **Appendix A, Figures A5 and A6** and in **Appendix B, Table B4**.

Any non-compliances for both upstream and downstream wells are discussed in the following sections.

2.4.1.1 Upstream Groundwater Wells

Well GW3A and GW4

GW3A and GW4 monitor the sandstone strata classified as S3-East, and GW11B are installed in the sandstone strata classified as S2-West. GW11B has not been sampled since the third quarter of 2019 as there has been not enough volume to take a sample.

GW4 continues to exceed assessment level of 1mg/l for manganese (1.51mg/l). Manganese has continuously exceeded assessment level throughout 2022 and 2023. The concentration of manganese has decreased from last quarter (1.94mg/l). Note being upstream these groundwater wells are monitoring background concentrations.

2.4.1.2 Downstream Groundwater Wells

The results from the compliance wells indicate that generally the pumping system at the toe of the landfill is continuing to successfully control the potential egress of leachate from the landfill. No issues associated with pump failure within the cut-off system have been recorded during 2023.

Wells GW6 and GW7

GW6 and GW7 have been installed in the centre of the valley in the sandstone strata classified as S1.

GW7 has exceeded the assessment level of 1mg/l for manganese (1.06mg/l). This is an increase from the last quarter and is the first exceedance of 2023. Manganese has continued to fluctuate in this well throughout 2022 and 2023. Manganese levels have historically been known to fluctuate within this well, and it is considered that the concentrations are also impacted by the upstream groundwater considering GW4 has also exhibited similar concentrations. A trend has identified that manganese exceeds assessment level once every 6 months in GW7 and then returns to compliancy.

Well GW9

GW9 is installed in the sandstone strata classified as S2-East.

GW9 continues to exceed trigger levels of 1mg/l for ammoniacal nitrogen (5.4mg/l). This is an increase from the previous quarter however ammoniacal nitrogen concentrations have been known to fluctuate in this well. It is noted that the unionised ammoniacal nitrogen concentration is compliant in GW9.

GW9 has also exceeded the assessment level of 1mg/l for manganese (1.23mg/l) for the first time since the first quarter of 2022.

Well GW10

GW10 has been installed in the sandstone strata classified as S3-East.

GW10 continues to exceed assessment level of 1mg/l for manganese (1.18mg/l) for the second consecutive quarter. The concentrations of manganese have continued to fluctuate in this well from 2022 with exceedances recorded in quarters two and three.

Well GW12

GW12 has been installed in the sandstone strata classified as S2-West and has remained compliant this quarter with the exception of sulphate (SO₄). GW12 exceeded the control level A of 300mg/l for sulphate (306mg/l). Historically, GW12 exceeded for sulphate concentrations back in quarters three and four in 2022.

2.4.2 Groundwater Levels Monitoring

Groundwater levels are monitored on a quarterly basis in the compliance and upstream wells. The monitoring results are illustrated graphically in **Appendix A, Figure A7**. Water levels have remained relatively consistent this quarter with no significant differences from the 2022 readings^[3].

2.5 Landfill Gas

2.5.1 Methane

The landfill gas monitoring results are presented in **Appendix B, Table B5**.

Methane concentrations continue to be recorded below the respective control and trigger levels (where available) in all monitoring locations.

2.5.2 Carbon Dioxide

All monitoring wells remained compliant this quarter with exception of GMW2, GMW6, GMW12, and GMW13.

The exceedances throughout this quarter of both control and trigger levels include:

- GMW2 red valve: exceeding control levels of 1%v/v in July (1.1%v/v) and September (1.3%v/v) and exceeding trigger levels of 1.5%v/v in August (3.7%v/v). Levels within the red valve had gradually been increasing from the previous quarter. These readings coincide with previous years where higher recordings are recorded during the summer months.
- GMW6 red valve: exceeding trigger levels of 4.3%v/v in July (4.5%v/v), August (5.1%v/v) and September (4.8%v/v). Levels within the red valve had gradually been increasing from the previous quarter. GMW6 is displaying its similar trend to 2018 – 2022 where carbon dioxide levels are higher in the summer months.
- GMW12 yellow valve: exceeding control levels 2.4%v/v in July (2.4%v/v) and August (2.7%v/v). Levels of carbon dioxide reduced to 0.0%v/v in September. This is the first exceedance of 2023 for GMW12.
- GMW13 yellow valve: exceeding trigger levels of 6%v/v in August (6.3%v/v). This is the first and only exceedance of 2023.

3. Conclusion

The monitoring data and interpretation produced in this report has not identified any significant issues relating to contaminant levels recorded above the screening criteria within the leachate and groundwater. Where limited minor exceedances have been identified there is no evidence to suggest they are having a discernible impact on the surrounding environment and the landfill continues to comply with the requirements of the permit.

The third quarterly report of 2023 has noted the following:

- LC2A continues to exceed the AMC for nickel and ammoniacal nitrogen. This has remained unchanged from 2022.
- A review of the ammoniacal nitrogen concentrations in SWD was recommended in the first quarterly report of 2023. However, SWD remains compliant for the second consecutive quarter. It is concluded that the exceeding ammoniacal nitrogen concentrations recorded throughout 2022, and the first quarter of 2023, were reporting errors from the previous laboratory, therefore further investigation is no longer required.
- GW4, GW7, GW9 and GW10 all exceed manganese assessment levels. The elevated concentrations recorded upstream (GW4) are likely to be from steel works waste deposited to the north of the landfill and old mine workings in the area. This is then recorded in the downstream wells. Manganese is also a typical contaminant of mine drainage, which is considered to be impacting the groundwater in the locale of the landfill. Given the history of mine working within the area, and continuous exceedances of manganese, it is recommended that a review of the background concentrations of manganese within the area is assessed to understand whether the adjacent land use is affecting on site concentrations.
- GW9 continues to be non-compliant for ammoniacal nitrogen concentrations, however this has historically been investigated, which concluded that the exceedances of GW9 do not have a discernible impact on downstream receptors.
- GW12 exceeds control level A for sulphate, this is the first exceedance of 2023. On receipt of the next quarter's monitoring results a review of any actions required will be undertaken.
- GMW2 and GMW6 red valves have both exceeded control / trigger levels this quarter for carbon dioxide. It is common for both wells to display higher carbon dioxide readings during the summer months. This trend has been identified in gas monitoring results from 2018 – 2022. It is anticipated levels will drop approaching the winter months, therefore no further action will be required, unless the trend is not followed.
- GMW12 and GMW13 have had their first exceedances of 2023 in their yellow valves. Both wells will be monitored closely next quarter and a review of actions required will be undertaken on receipt of the findings.

References

- [1] Environment Agency, Silent Valley Landfill Site, Pollution Prevention and Control (England and Wales) Regulations 2000, Landfill (England and Wales) Regulations 2002, Permit number MP3835SV, November 2005, Permit amended as of 04/03/16.
- [2] Arup, Silent Valley Landfill, 2019 Annual Monitoring Report, 31st January 2020.
- [3] Arup, Silent Valley Landfill, 2023 Second Quarter Monitoring Report, 28th June 2023.
- [4] Arup, Silent Valley Landfill, 2021 Annual and Fourth Quarter Monitoring Report, 31st January 2022.
- [5] Arup, Silent Valley Landfill, Interim GW9 and Nant Merddog W, Issue May 2015.
- [6] Arup, Silent Valley Landfill, Aftercare Phase Environmental and Infrastructure Monitoring Program, Issue June 2013.
- [7] Arup, Silent Valley Landfill, Hydrogeological Risk Assessment, document reference 04/6363, November 2004.
- [8] Arup, Silent Valley Landfill, Investigation into the Western Flank of the Cut-off System. Compliance Well GW9 and GW10, document reference 115825, August 2011.
- [9] Environment Agency, Guidance on Monitoring of Landfill Leachate, Groundwater and Surface Water, report reference LFTGN02, June 2014.
- [10] Arup, Silent Valley Landfill, Hydrogeological Risk Assessment (Supplementary Revision May 2009), document reference 09/7543, June 2009.
- [11] Environment Agency, Guidance on the management of landfill gas, document reference LFTGN03, June 2014.
- [12] The Water Framework Directive (Standards and Classification) Directions (England and Wales) 2015.
- [13] Water Framework Directive - United Kingdom Technical Advisory Group (WFD-UKTAG), "Metal Bioavailability Assessment Tool (M-BAT)," 2014.
- [14] Arup, Silent Valley Landfill, Hydrogeological Risk assessment, document reference 2019/9559, July 2019.

Appendix A: Monitoring Results - Graphs

Figure A1
Daily rainfall totals and sampling events (July 2018 - September 2023)

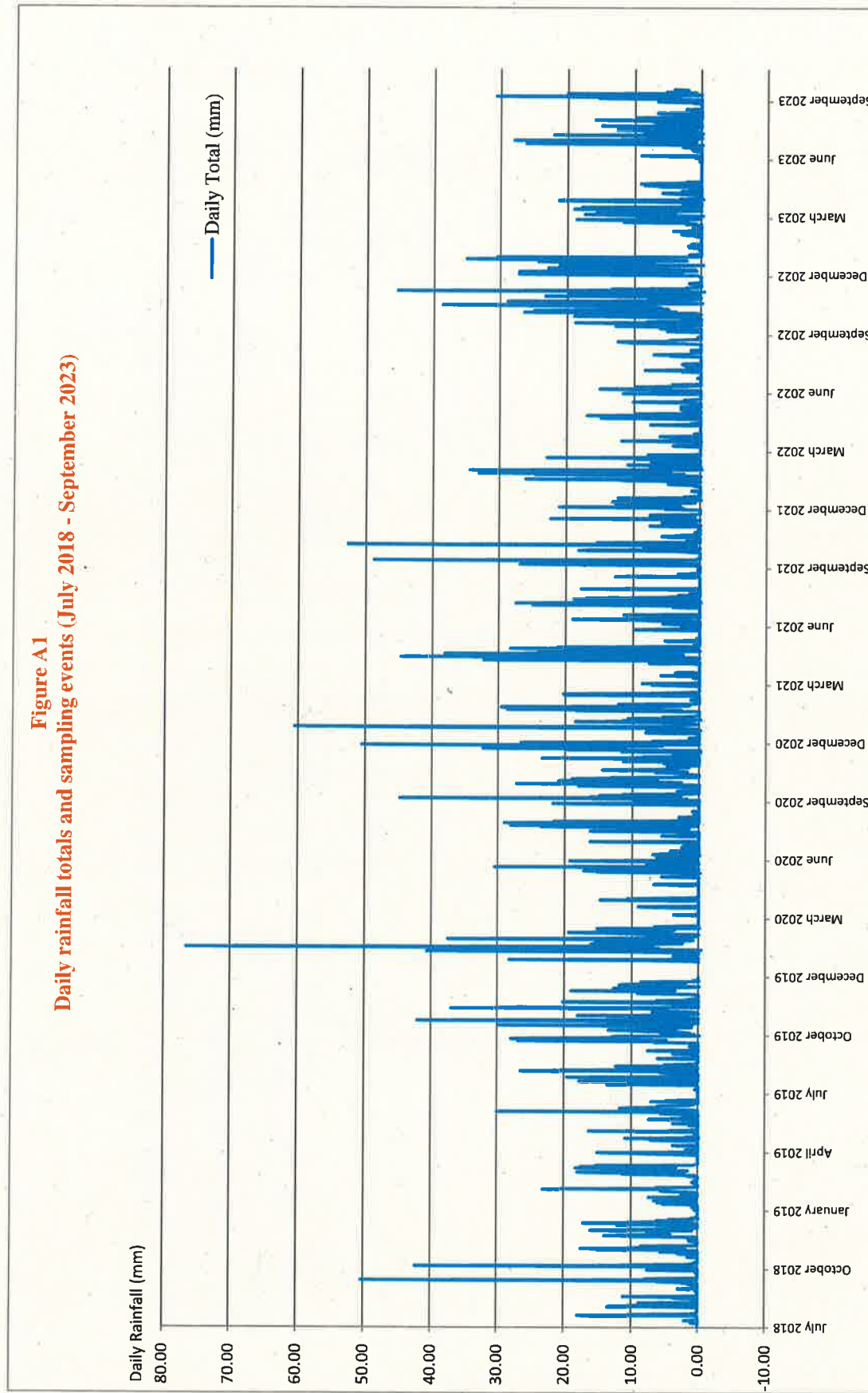


Figure A2
Monthly rainfall totals (July 2018 - September 2023)

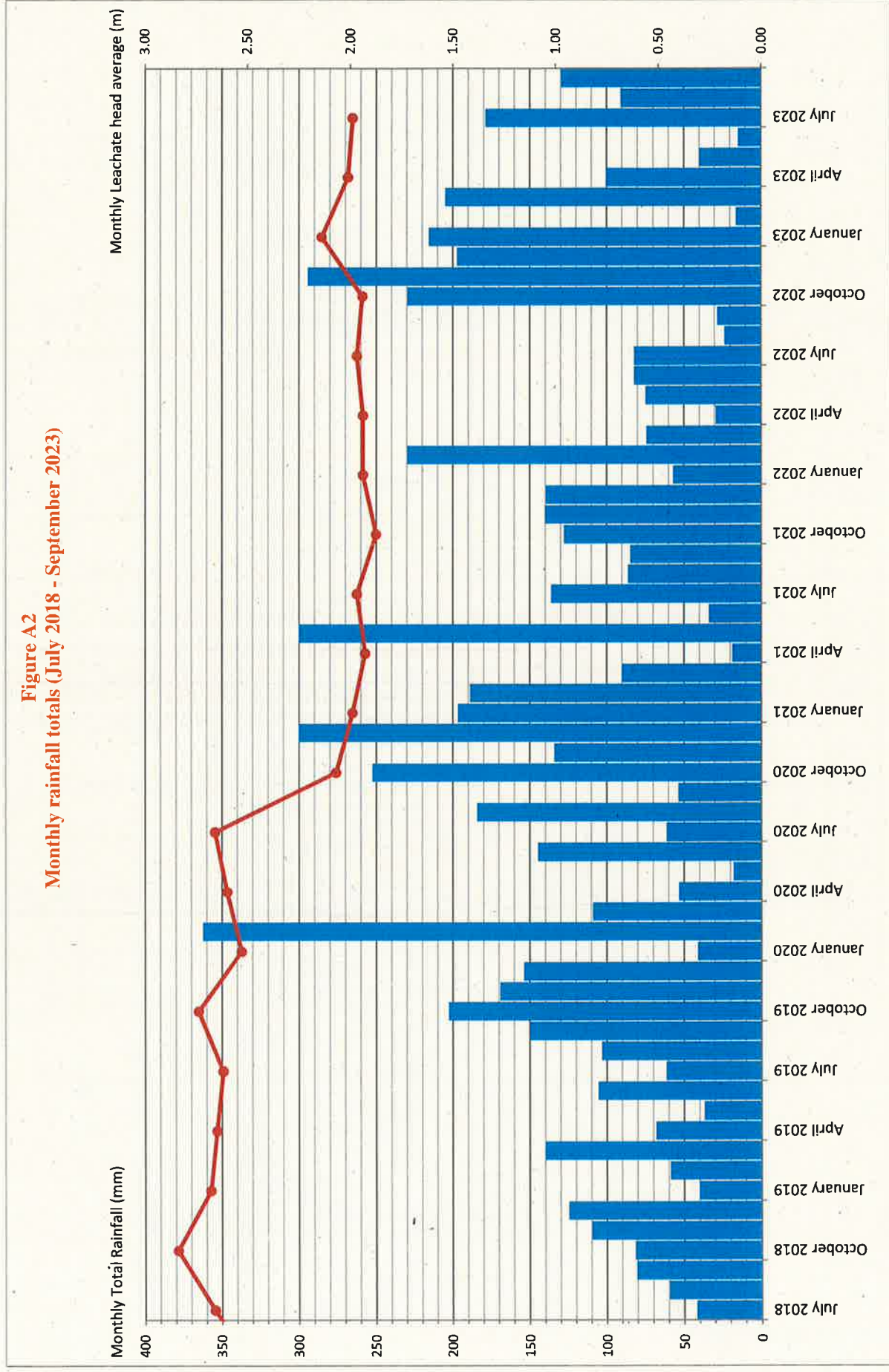


Figure A3
Monthly total rainfall (July 2018 - September 2023)

Monthly Total Rainfall (mm)

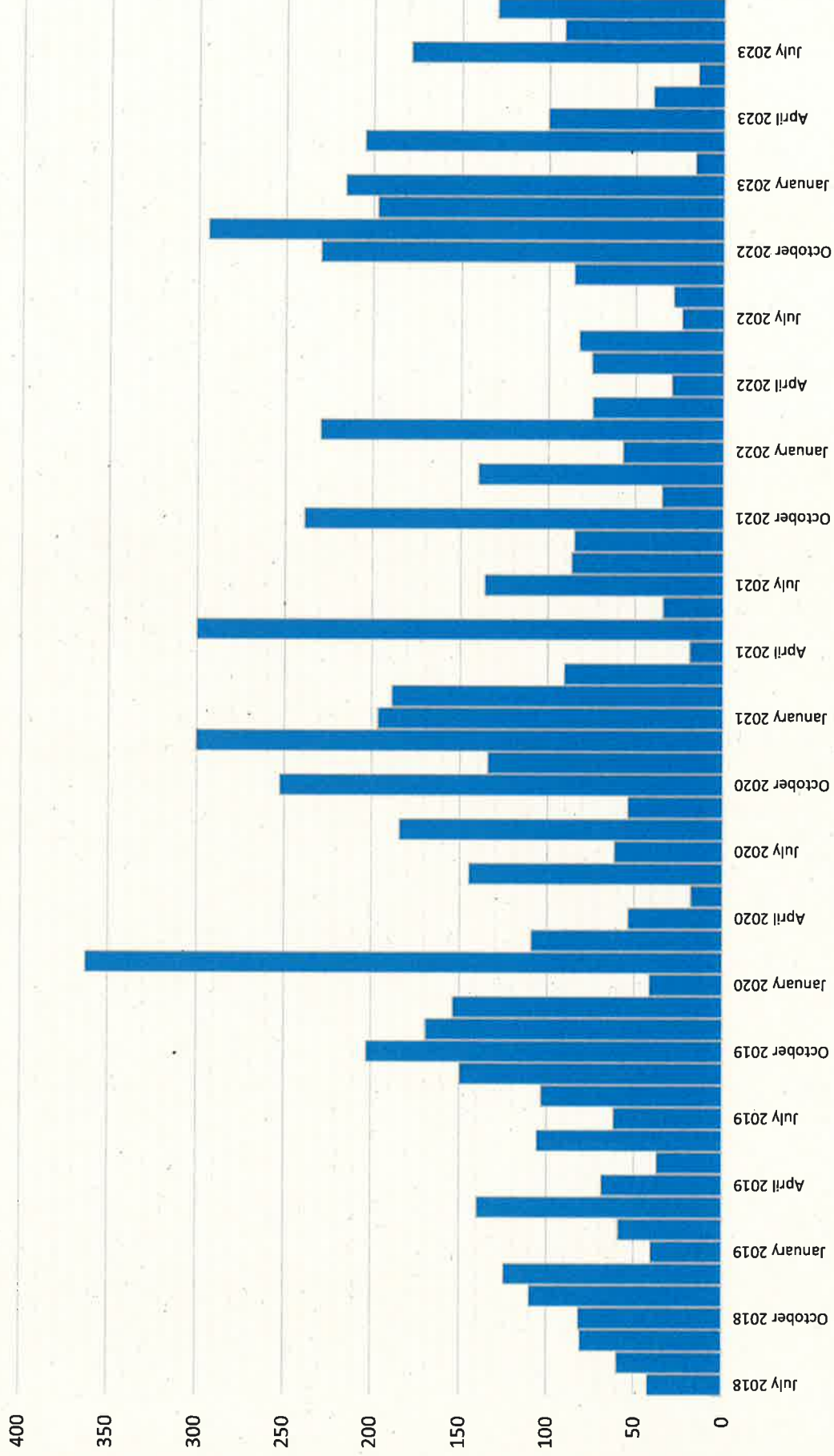


Figure A4
Surface water monitoring graphs

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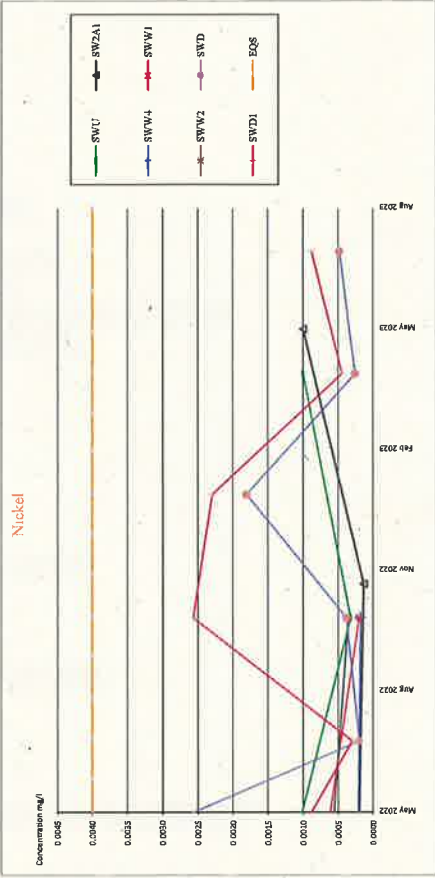
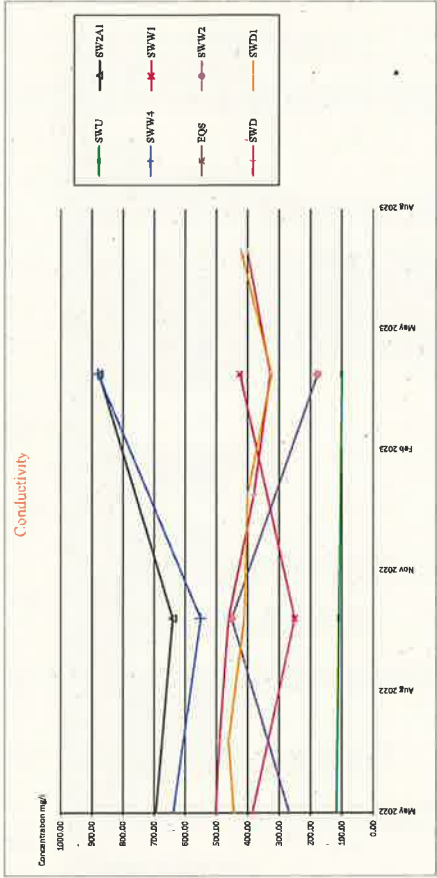
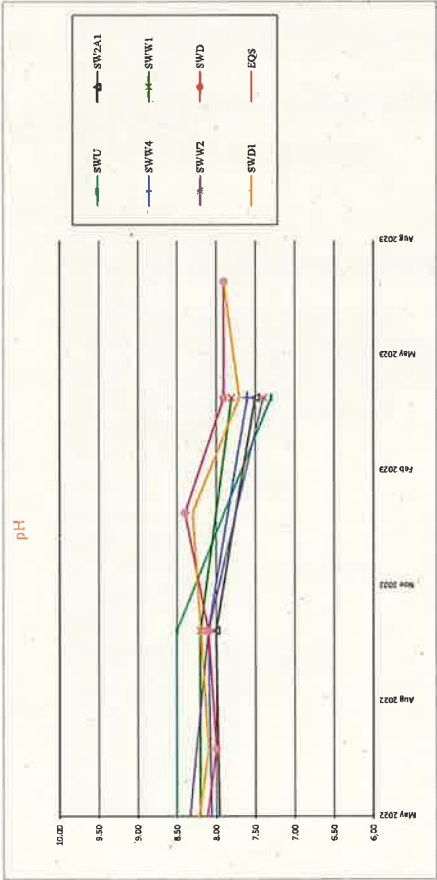


Figure A4
Surface water monitoring graphs

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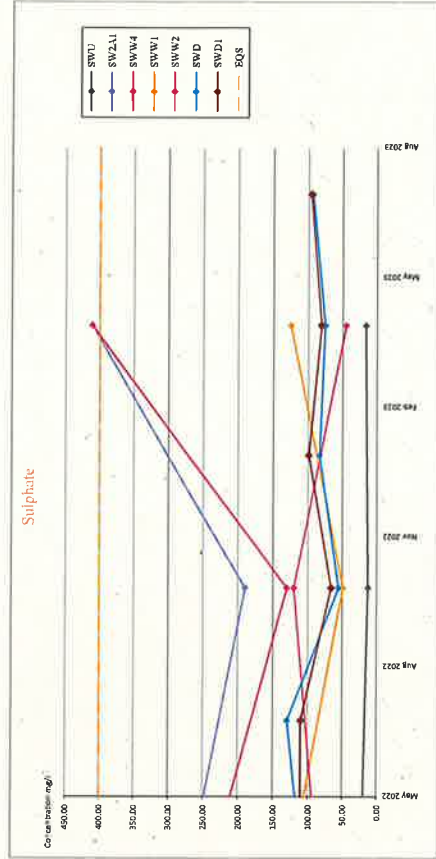
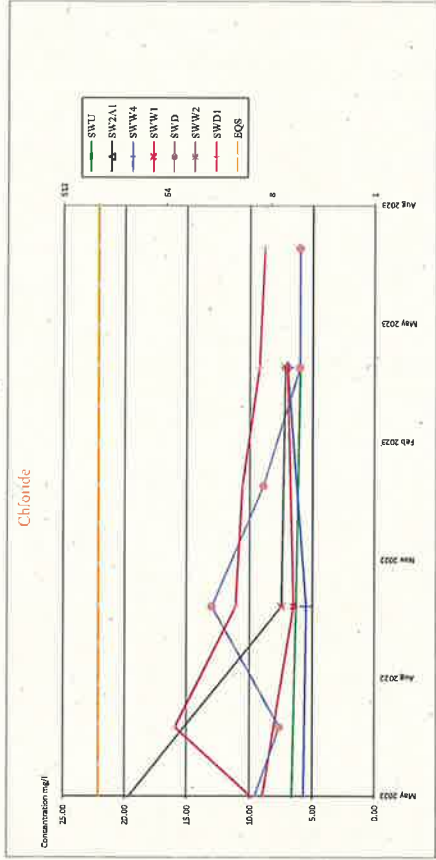
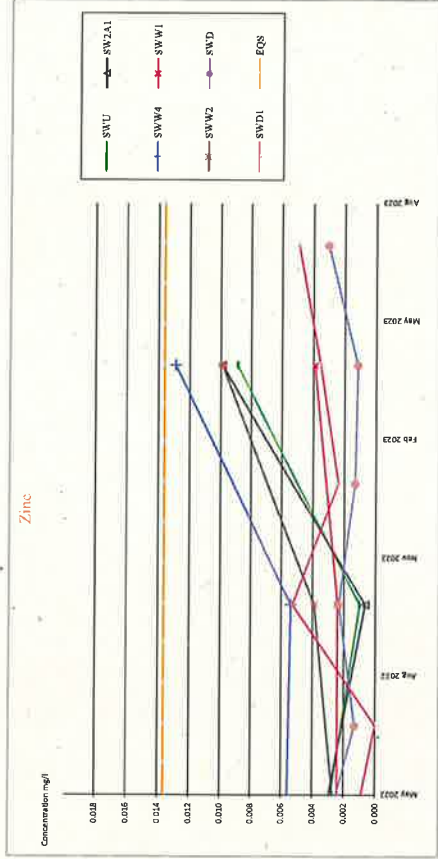
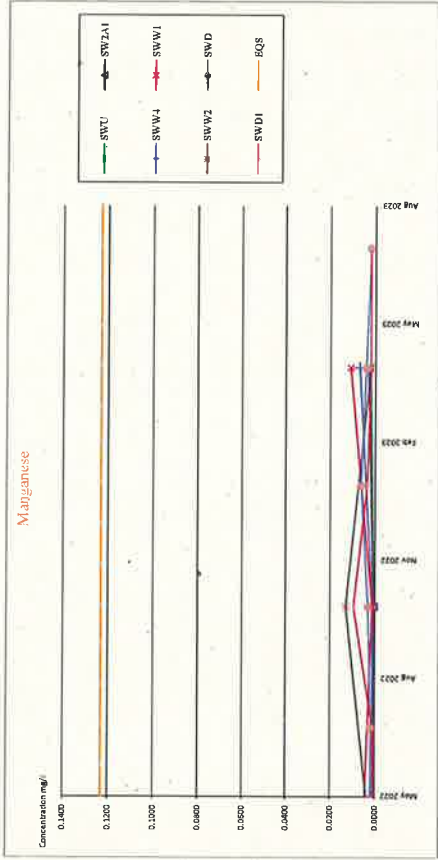


Figure A4
Surface water monitoring graphs

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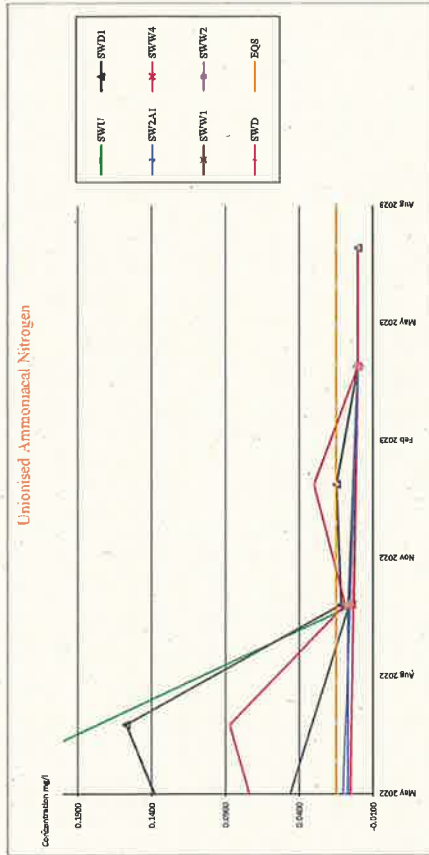
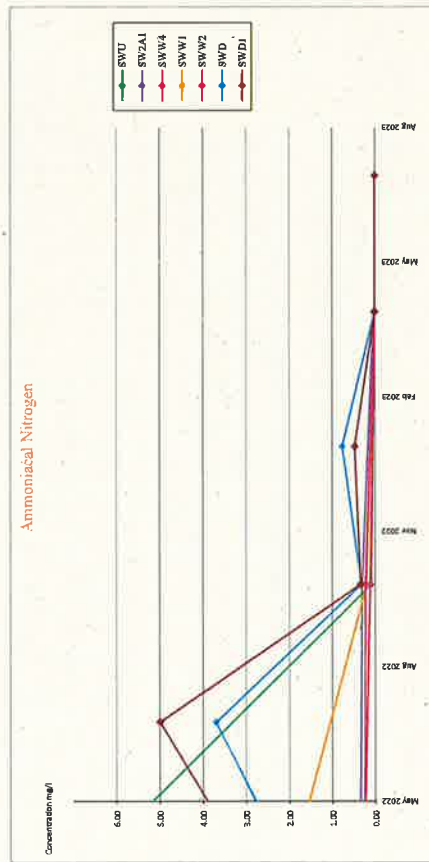
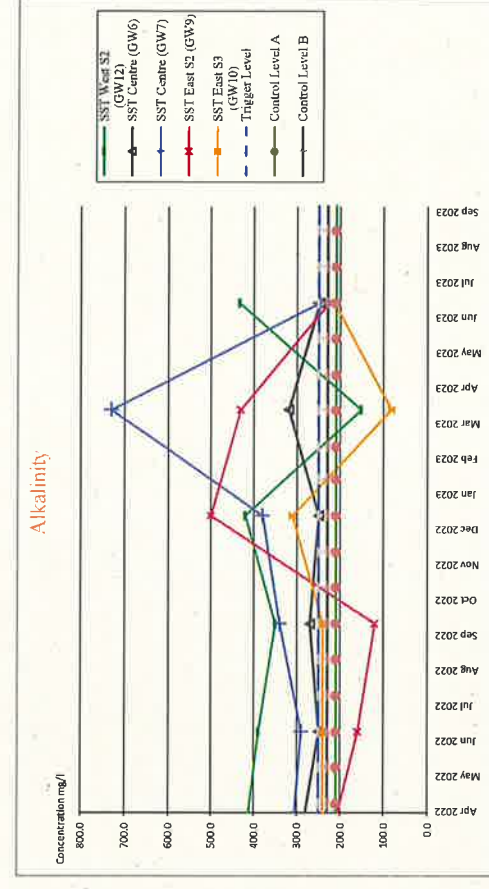
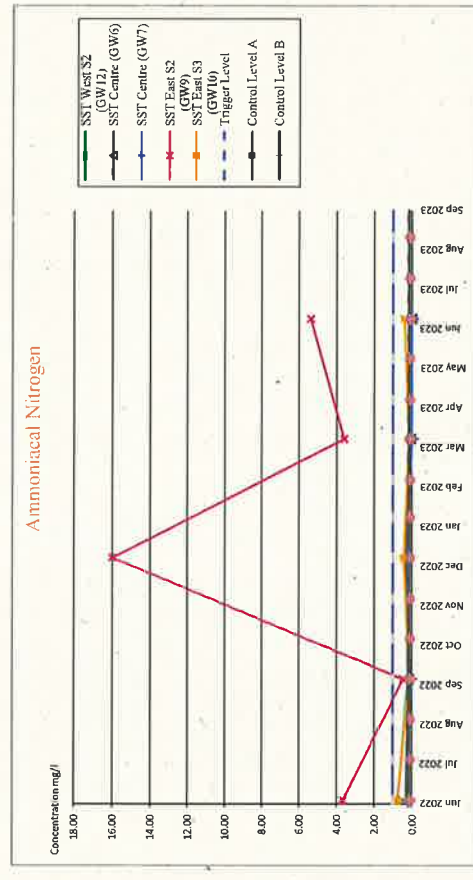
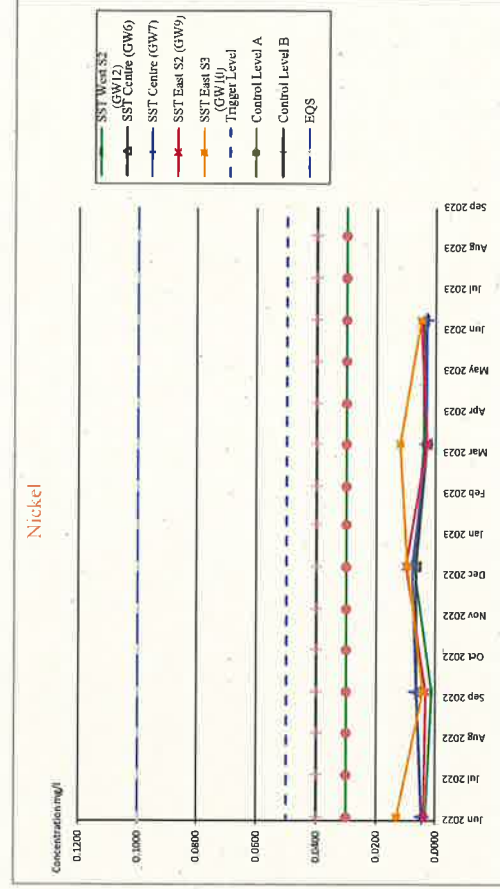
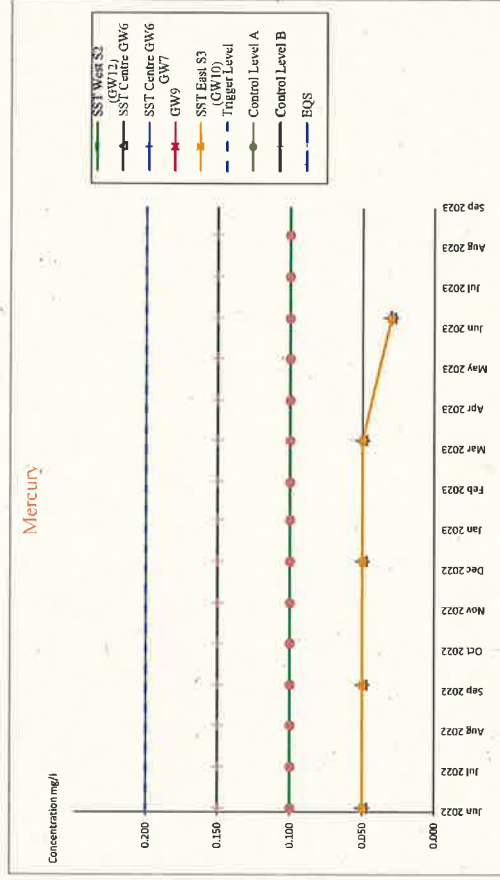
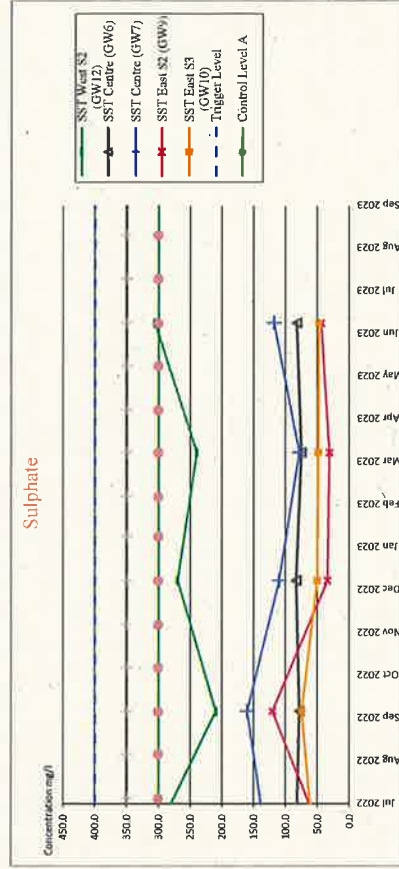
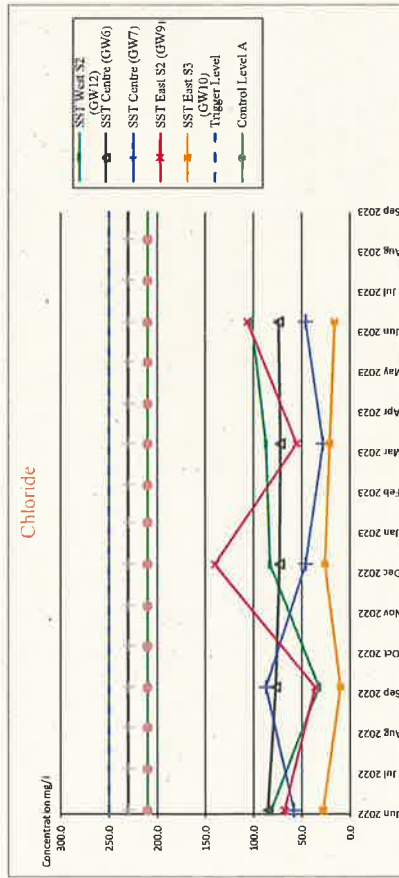
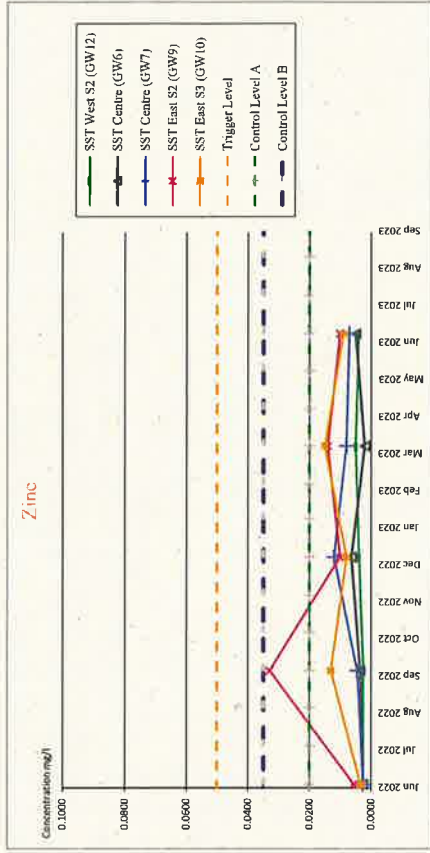
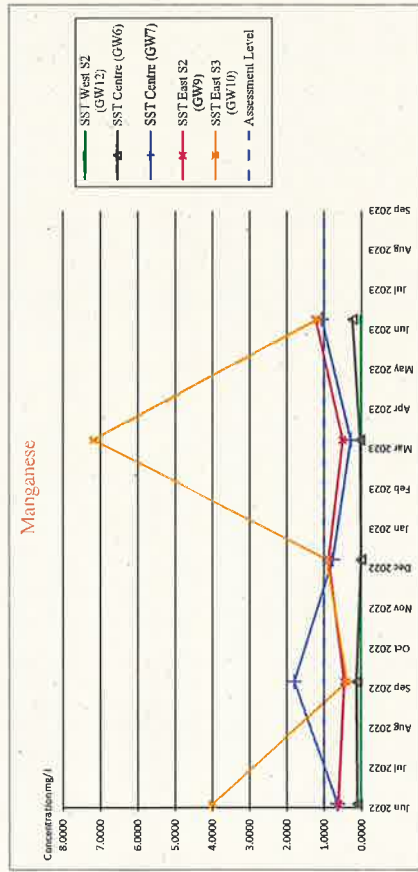


Figure A5
Groundwater quality monitoring results - Compliance wells graphs

Compliance wells graphs



Compliance wells graphs



Groundwater quality monitoring results - Compliance wells graphs

Compliance wells graphs

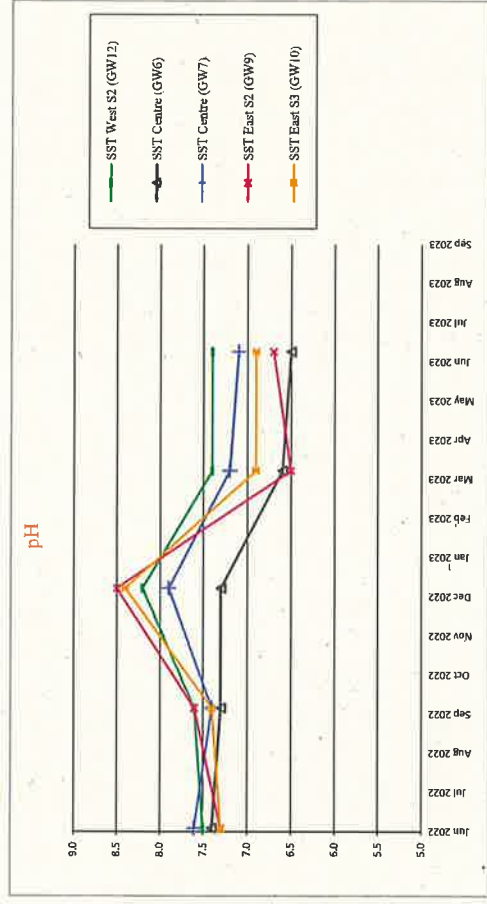


Figure A6
Groundwater quality monitoring results - Upstream wells graphs

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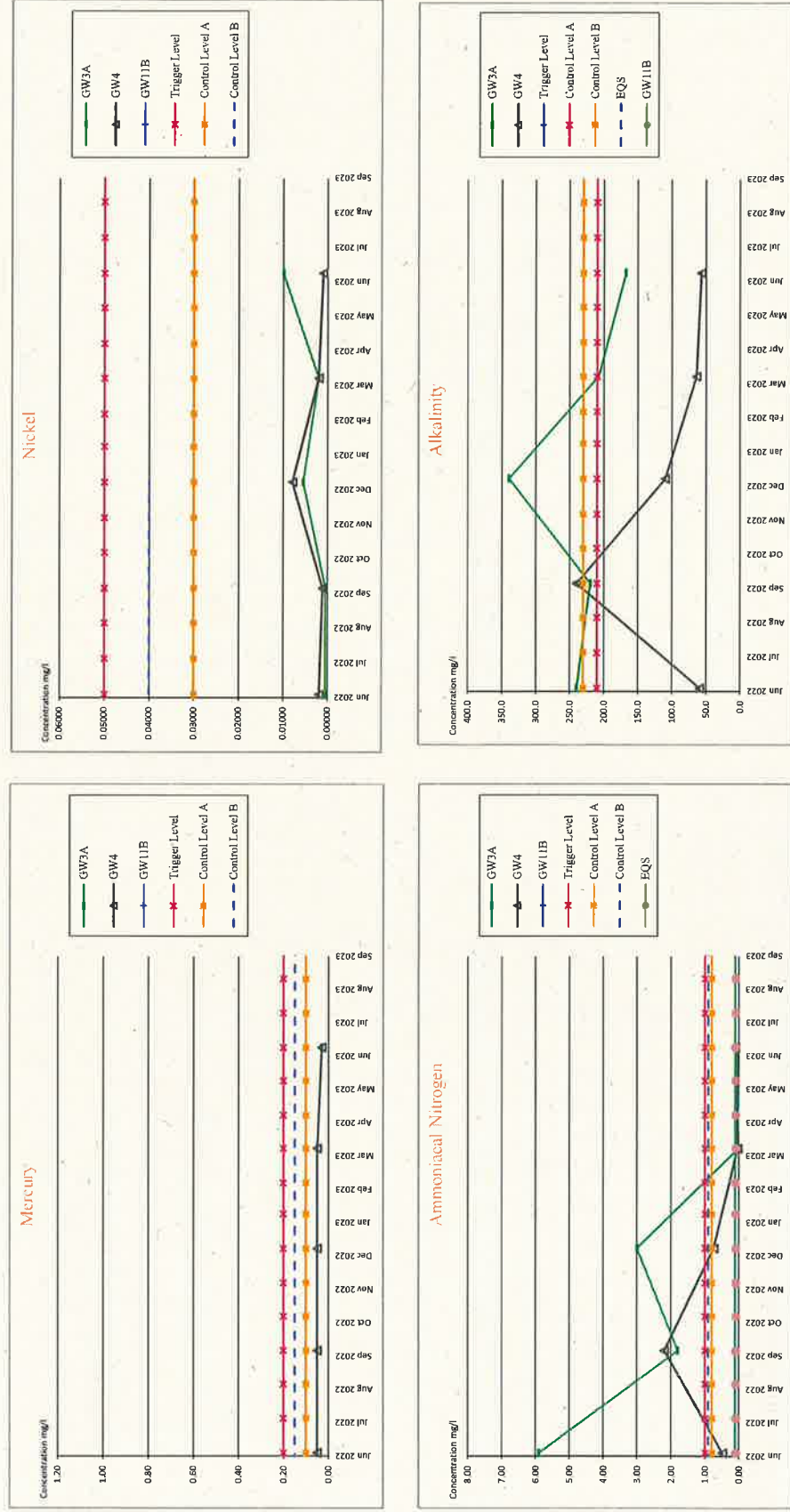


Figure A6
Groundwater quality monitoring results - Upstream wells graphs

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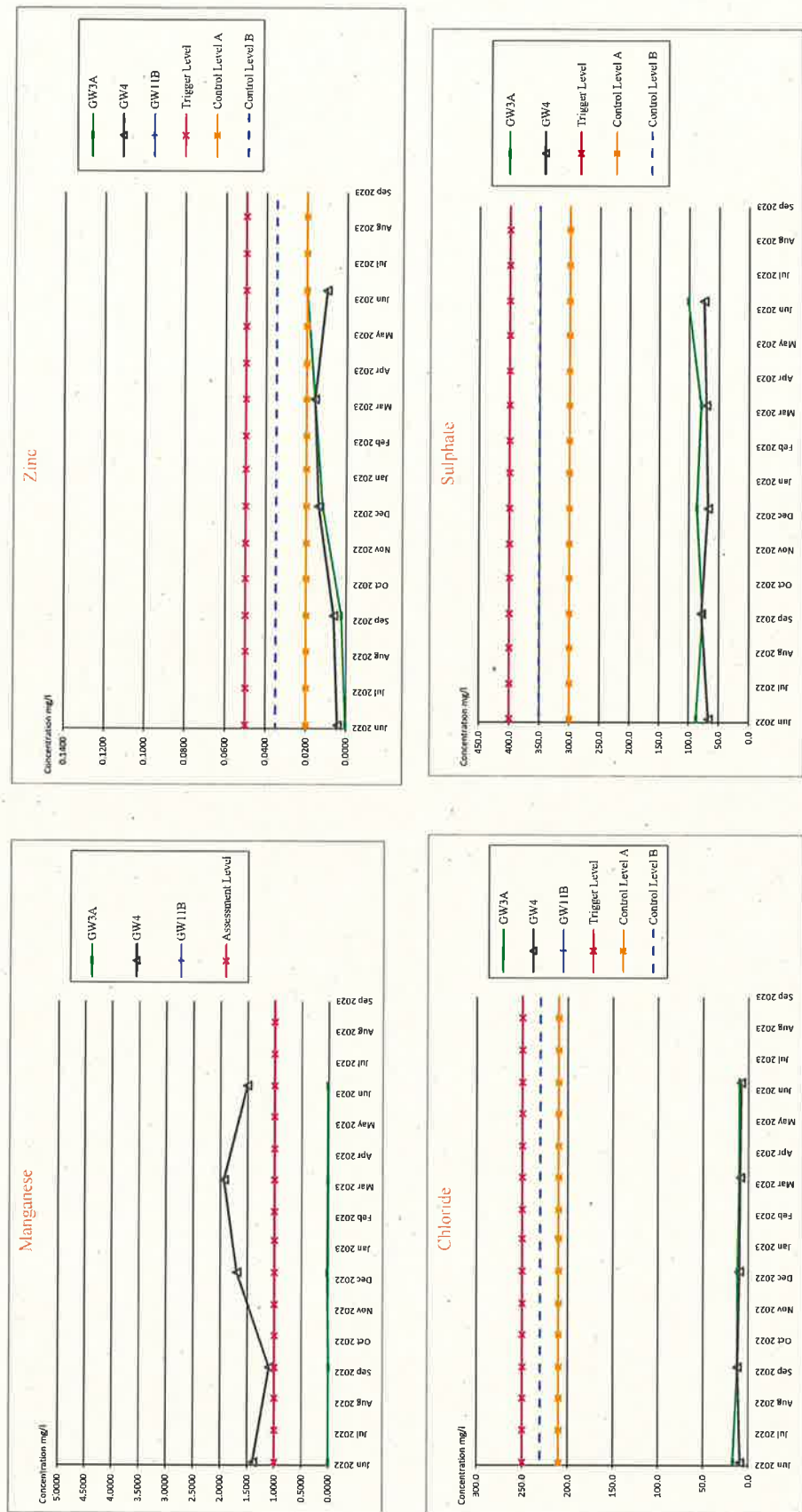


Figure A6
Groundwater quality monitoring results - Upstream wells graphs

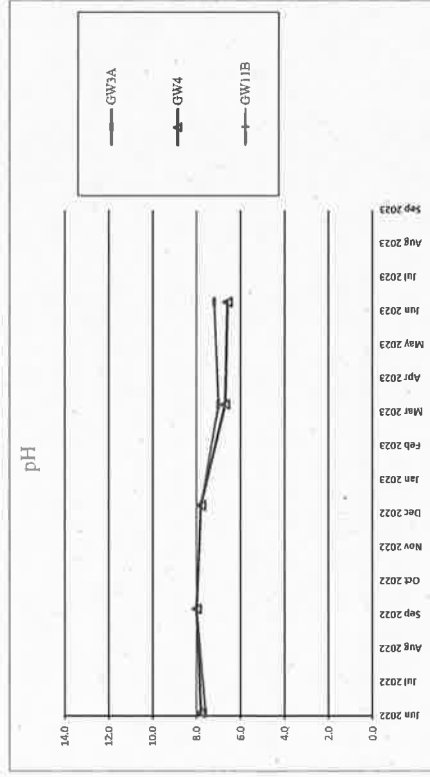
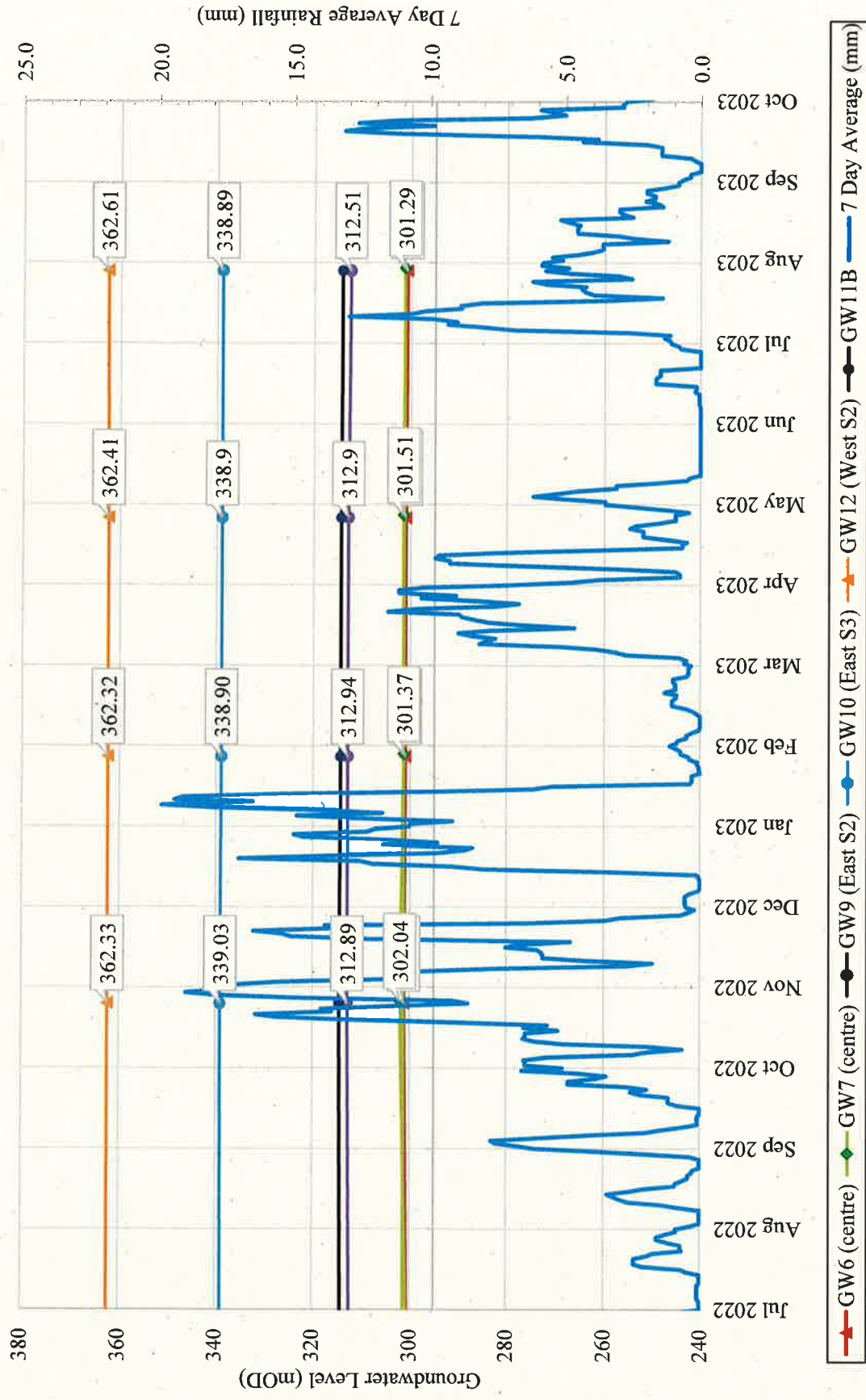
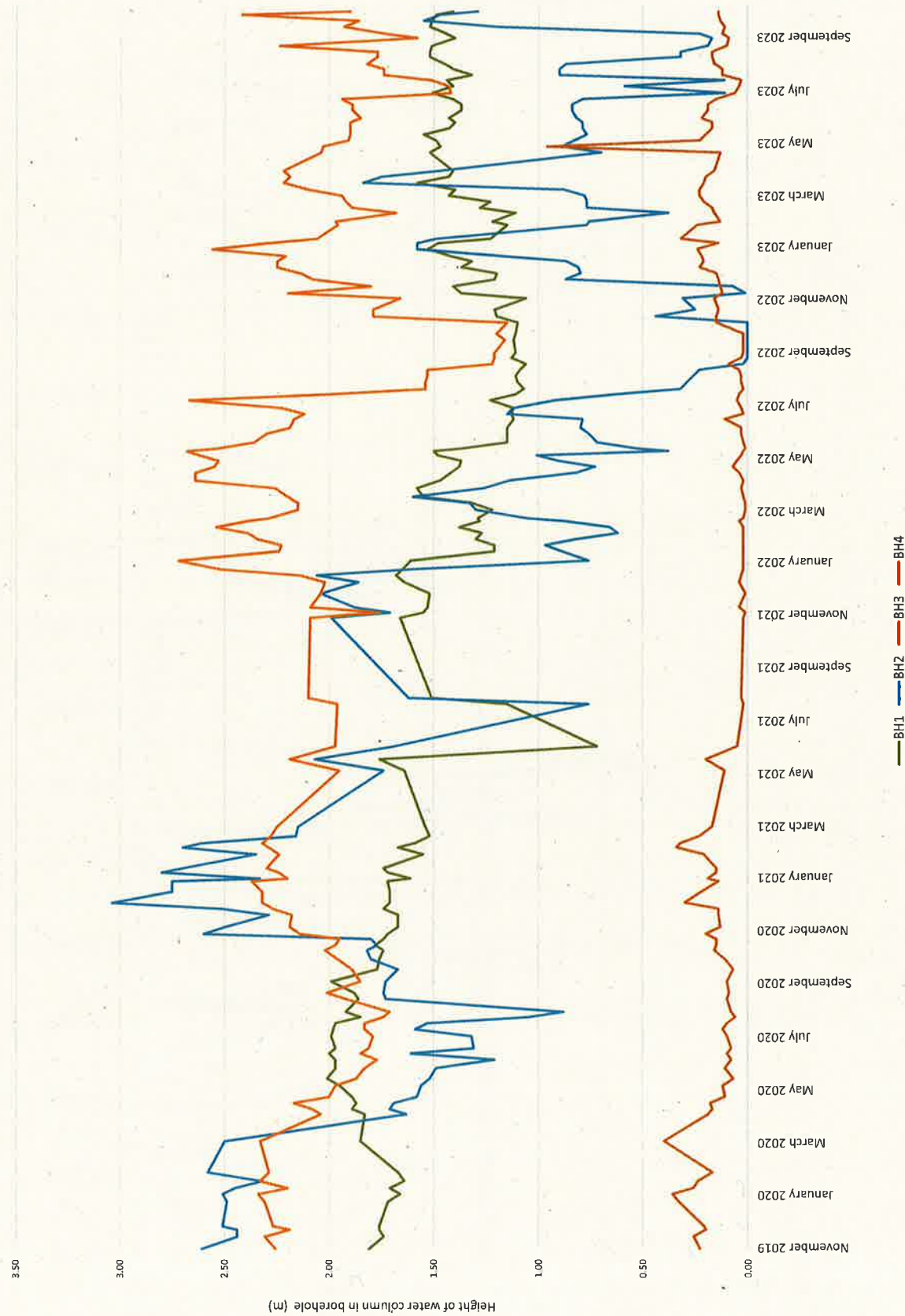


Figure A7
Groundwater monitoring levels downstream of compliance wells



Height of water column (m) from base of well in boreholes BH1 to BH 4



Appendix B: Monitoring Results - Tables

LOCATION	Units	L1A	L1B	LC1A	LC2A	LC4A	LC5A	Maximum concentration (mg/l)	Monthly Average (mg/l)	Acceptable Maximum Concentration (AMC) (mg/l)	LP3A	LP4
Date Sampled 20-07-2023												
Manganese in filtrate as Mn	mg/l	N/S	0.581	N/S	0.11	0.801	N/S	0.801	0.50	--	< 0.02	0.133
Mercury: filt trace as Hg	mg/l	N/S	< 0.00003	N/S	< 0.00003	< 0.00003	N/S	0.00003	0.00003	0.00056	< 0.00003	< 0.00003
Nickel in filtrate as Ni	mg/l	N/S	< 0.01	N/S	0.102	< 0.01	N/S	0.102	0.04	0.0681	< 0.01	< 0.01
Zinc, ultra-low filtered as Zn	mg/l	N/S	0.022	N/S	0.028	< 0.02	N/S	0.028	0.02	1.38	< 0.02	< 0.02
pH	pH Units	N/S	7.6	N/S	8.2	7.3	N/S	8.2	7.70	--	8.3	8.1
Conductivity- Electrical 20C	uS/cm	N/S	2100	N/S	11000	3980	N/S	11000	5693	--	1730	1940
Alkalinity as CaCO3	mg/l	N/S	503	N/S	4510	1950	N/S	4510	2321	--	415	653
Ammoniacal Nitrogen as N	mg/l	N/S	0.03	N/S	588	215	N/S	588	268	526	0.04	13.6
Chloride as Cl	mg/l	N/S	153	N/S	672	157	N/S	672	327	1408	133	135
Sulphate as SO4	mg/l	N/S	326	N/S	647	8	N/S	647	327	999	266	166
Redox Potential (see note 4)	mV	N/S	255.8	N/S	151.4	101.4	N/S	255.8	170	--	245.3	220.6
Total Suspended Solids	mg/l	N/S	5	N/S	1880	1180	N/S	1880	1022	--	5	8
Solids, Total Dissolved 180 deg C	mg/l	N/S	64600	N/S	5530	1710	N/S	64600	23947	--	1170	1290
Dissolved Oxygen: Fixed*	mg/l	N/S	7.8	N/S	8.3	4.4	N/S	--	--	--	13	8.8
TOC (filtered)	mg/l	N/S	18.1	N/S	415	168	N/S	415	200.4	--	11.9	8

Notes

1. < denotes 'less than'.
2. L1A,L1B, LC1A, LC2A,LC4A, LC5A: Wells in Waste.
3. -- denotes 'no acceptable maximum concentration available'.
4. The redox potential was not measured on site and there is a possibility that it has changed between sampling and analysis
5. LC5A is a replacement for LC5 well.
6. N/S denotes 'not sampled'.

Exceedance of AMC (per well)

Exceedance of AMC (monthly average)

Table B2
Leachate Head Levels

	Jan-23	Feb-23	Mar-23	Apr-23	May-23	Jun-23	Jul-23	Aug-23	Sep-23	Oct-23	Nov-23	Dec-23
LC1A	Elevation of base of landfill mAOD	357.62					357.62					
	Elevation at top of casing mAOD	398.85					398.85					
	Depth to leachate from top of casing (m)	40.30					40.29					
	Leachate elevation (mAOD)	358.55					358.56					
LC2A	Calculated leachate head (m)	0.93					0.94					
	Elevation of base of landfill mAOD	362.49					362.49					
	Elevation at top of casing mAOD	401.12					401.12					
	Depth to leachate from top of casing (m)	35.20					35.63					
LC4A	Leachate elevation (mAOD)	365.92					365.49					
	Calculated leachate head (m)	3.43					3.00					
	Elevation of base of landfill mAOD	372.27					372.27					
	Elevation at top of casing mAOD	401.14					401.14					
LC5A	Depth to leachate from top of casing (m)	26.81					26.84					
	Leachate elevation (mAOD)	374.33					374.30					
	Calculated leachate head (m)	2.06					2.03					
	Elevation of base of landfill mAOD	350.14					350.14					
L1	Elevation at top of casing mAOD	380.75					380.75					
	Depth to leachate from top of casing (m)	DAMAGED					DAMAGED					
	Leachate elevation (mAOD)											
	Calculated leachate head (m)											
L1A*	Casing height (mAOD)	357.00					357.00					
	Leachate (mbgl)	DRY					DRY					
	Leachate (m AOD)											
	Base of landfill (m AOD)	336.80					336.80					
L1B*	Depth of well from top of casing (m)	21.03					21.03					
	Base of well (m AOD)	335.97					335.97					
	Calculated leachate head (m)											
	Elevation of base of landfill mAOD	355.79					355.79					
L1B*	Leachate (mbgl)	DRY					DRY					
	Leachate (m AOD)											
	Base of landfill (m AOD)	316.64					316.64					
	Depth of well from top of casing (m)	20.89					20.90					
L1B*	Base of well (m AOD)	334.90					334.89					
	Calculated leachate head (m)											
	Elevation of base of landfill mAOD	354.80					354.80					
	Leachate (mbgl)	25.77					25.57					
L1B*	Leachate (m AOD)	329.03					329.23					
	Base of landfill (m AOD)	319.60					319.60					
	Depth of well from top of casing (m)	34.84					34.80					
	Base of well (m AOD)	319.96					320.00					
L1B*	Calculated leachate head (m)	9.43					9.63					
	Elevation of base of landfill mAOD											
	Elevation at top of casing mAOD											
	Depth to leachate from top of casing (m)											

2023	Quarterly Leachate Head Averages (m)
January	
February	
March	2.14
April	
May	2.01
June	
July	
August	1.99
September	
October	
November	
December	

Minimum monthly leachate head average
Maximum monthly leachate head average

Notes:

Top of casings were re-surveyed in August 2019

1. LC1A top of casing is 1710mm above ground level.

2. LC2A top of casing is 820mm above GL.

3. LC4A top of casing is 1040mm above GL.

4. LC5A top of casing is 1050mm above GL.

* Well not included in monthly average

Note: L1 is generally dry or with very little water in it.

Table B4
Groundwater monitoring results

Location	Month	Date	Test reference number	Robot Potentiometer	Moisture, fibrous as Hg	Manganese in fibres in Mn	Noted in fibrous in Ni	Zinc, ultra-deep Borehole in Zn	pH	Electrical Conductivity (EC) in $\mu S/cm$	Alkalinity as $CaCO_3$	Ammoniacal Nitrogen as N	Ammoniacal Nitrogen as N	Mercury-water Temperature	Chloride as Cl	Sulphate as SO_4	Calcium	D.O. concentration	TOC (Filtered)
TUGAYIN Central Level A Central Level B Groundwater Level	Jan-22	20/01/22	157903	87	< 0.05	0.0085	< 0.0005	0.0029	8.0	480.0	240.0	1.90	0.1668	12.9	14.0	86.0	58.0	-	3.1
	Feb-22	16/02/22	1430019	12	0.05	0.011	< 0.0005	0.0023	7.7	1102.0	260.0	1.90	0.0018	13.7	16.0	84.0	61.0	-	2.0
	Mar-22	16/03/22	1430019	12	0.05	0.011	< 0.0005	0.0023	7.7	1102.0	260.0	1.90	0.0018	13.7	16.0	84.0	61.0	-	2.0
	Apr-22	11/04/22	1487914	50	0.05	0.0010	0.0025	0.0024	7.6	640.0	240.0	1.90	0.0446	15.4	17.0	88.0	67.0	8.0	51.0
	May-22	20/05/22	1579795	44	< 0.050	0.0027	< 0.0005	0.0023	8.0	720.0	220	1.89	0.0463	14.7	12.0	77.0	74.0	8.1	2.5
	Jun-22	21/06/22	1579147	150	< 0.050	0.0240	0.0050	0.0120	7.8	580.0	340.0	1.90	0.0444	13.9	12.0	87.0	76.0	8.7	4.9
	Jul-22	04/07/22	21050429-006	235.8	< 0.050	0.016	0.002	0.016	7	556	208	0.01	0.00034	13.4	10	80	84	8.7	1.77
	Aug-22	20/07/22	21072702-006	12.1	< 0.05	0.0200	< 0.0100	0.0200	7.2	537.0	168.0	0.05	0.000195	13.8	10.0	102.0	32.0	12.1	3.3
	Sep-22																		
	Oct-22																		
	Nov-22																		
	Dec-22																		
TUGAYIN Central Level A Central Level B Groundwater Level	Jan-22	20/01/22	157906	59	< 0.05	1.39	0.0021	0.0014	8.0	330.0	91.0	4.70	0.0745	9.5	11.0	72.0	15.0	-	2.0
	Feb-22	16/02/22	1430018	34	< 0.050	1.4	0.0025	0.0140	7.9	200.0	140.0	0.80	0.0121	9.5	13.0	69.0	14.0	-	2.0
	Mar-22	11/03/22	1487920	66	0.05	1.8040	0.0019	0.0042	7.8	330.0	56.0	0.48	0.0019	10.9	9.1	67.0	16.0	4.0	16.0
	Apr-22	20/04/22	1579796	44	< 0.050	1.1906	0.0011	0.0055	8.0	710.0	340	1.70	0.0422	10.7	12.0	79.0	19.0	8.6	2.7
	May-22	21/05/22	1579148	140	< 0.050	1.70	0.0079	0.0140	7.8	280.0	110.0	0.74	0.0083	8.5	9.9	68.0	21.0	7.5	3.3
	Jun-22	04/06/22	21050429-007	270.9	< 0.050	1.94	0.003	0.016	6.7	281	64	0.01	0.00078	10.0	9	71	19	9.5	1.52
	Jul-22	20/07/22	21072702-007	158.2	< 0.05	1.5100	0.0010	0.0100	6.6	301.0	54.8	0.10	0.00074	10.0	8.0	75.0	18.0	9.8	0.7
	Aug-22																		
	Sep-22																		
	Oct-22																		
	Nov-22																		
	Dec-22																		

Table B4
Groundwater monitoring results

Location	Month	Date	Test reference number	Radio Potential mV	Mercury, Bismuth, Hg ug/L	Manganese, Mn mg/L	Nickel, Ni mg/L	Chloride, Cl- mg/L	pH	Electrical Conductivity, uS/cm	Alkalinity as CaCO3 meq/L	Ammonia, NH3-N mg/L	Estimated Ammonia, mg/L	Mercury, Hg ug/L	Chloride, Cl- mg/L	Sulfate, SO4 mg/L	Calcium, Ca mg/L	D.O. concentration, mg/L
DOWNSTREAM WELLS COMPLIANCE WELLS S1 West 25	Jan-21	26/01/22	1570111 Quantity	62	< 0.050	0.0100	0.0047	0.0030	8.5	1600.0	470.0	0.26	0.0285	18.8	99.0	190.0	130.0	< 2.0
	Feb-21																	
	Mar-21																	
	Apr-21	10/05/22	143023 Quantity	70	< 0.050	0.022	0.0041	< 0.0025	7.6	1600.0	420.0	0.34	0.0044	17.6	97.0	130.0	130.0	7.1
	May-21																	
	Jun-21																	
	Jul-21	11/08/22	148725 Quantity	56	< 0.05	0.0041	0.0033	< 0.0025	7.5	1500.0	390.0	0.75	0.0076	17.5	82.0	110.0	110.0	100.0
	Aug-21																	
	Sep-21	26/07/22	151801 Quantity	8.4	< 0.050	0.0077	0.0015	< 0.0025	7.6	1100.0	350	0.20	0.0025	17.4	23.0	210.0	130.0	6.5
	Oct-21																	
	Nov-21																	
CIN12	Dec-21	21/02/23	159715 Quantity	-72	< 0.050	0.0090	0.0073	0.0039	8.2	1600.0	430.0	0.20	0.0111	18.2	83.0	270.0	150.0	7.3
	Jan-22																	
	Feb-22																	
	Mar-22	04/05/23	2350825-012 Quantity	287.8	< 0.050	< 0.002	0.004	0.0050	7.4	1650	152	0.01	0.0001	19.2	87	240.0	151	8.9
	Apr-22																	
	May-22																	
	Jun-22	20/07/23	23072702-012 Quantity	11.2	< 0.03	< 0.0030	0.0040	0.0040	7.4	1810.0	434.0	< 0.10	0.0008	18.1	102.0	300.0	162.0	11.2
	Jul-22																	
	Aug-22																	
	Sep-22																	
	Oct-22																	
	Nov-22																	
CIN14	Dec-22	20/02/22	1317009 Quantity	62	< 0.05	0.0100	0.0031	0.0020	7.5	850.0	300.0	< 0.05	0.0105	11.5	81.0	82.0	33.0	< 3.0
	Jan-23																	
	Feb-23																	
	Mar-23	10/05/22	143019 Quantity	62	< 0.050	0.0061	0.0054	0.0036	7.3	850.0	290.0	0.27	0.0012	12.0	87.0	85.0	46.0	< 3.3
	Apr-23																	
	May-23																	
	Jun-23	11/08/22	148721 Quantity	61	< 0.050	0.0100	0.0046	< 0.0025	7.4	780.0	250.0	0.30	0.0016	12.2	85.0	82.0	41.0	8.6
	Jul-23																	
	Aug-23																	
	Sep-23	26/07/22	1516797 Quantity	-13	< 0.050	0.0100	0.0055	0.0015	7.3	890.0	270	0.19	0.0009	12.6	77.0	78.0	52.0	8.6
	Oct-23																	
	Nov-23																	
CIN16	Dec-23	31/02/23	1597146 Quantity	-120	< 0.050	0.0071	0.0067	0.0065	7.3	770.0	250.0	0.22	0.0013	11.7	73.0	81.0	34.0	8.5
	Jan-24																	
	Feb-24																	
	Mar-24	04/05/23	2350825-018 Quantity	289.1	< 0.050	0.04	0.003	0.002	6.6	922	319	0.08	0.0001	12.0	72	75	77	9
	Apr-24																	
	May-24																	
	Jun-24	20/07/23	23072702-018 Quantity	569.9	< 0.050	0.0410	0.0040	0.0050	6.5	890.0	248.0	0.02	0.0001	11.7	74.0	82.0	50.0	10.5
	Jul-24																	
	Aug-24																	
	Sep-24																	
	Oct-24																	
	Nov-24																	
CIN17	Dec-24	20/01/22	1317008 Quantity	54	< 0.03	0.0000	0.0041	0.0016	8.2	860.0	360.0	< 0.05	0.0120	11.3	38.0	87.0	73.0	< 5.3
	Jan-25																	
	Feb-25																	
	Mar-25	10/05/22	143008 Quantity	56	< 0.050	0.03	0.0010	< 0.0010	7.7	790.0	310.0	0.15	0.002	11.5	38.0	87.0	71.0	< 4.8
	Apr-25																	
	May-25																	
	Jun-25	11/08/22	148723 Quantity	61	< 0.050	0.0000	0.0045	< 0.0025	7.6	900.0	290.0	0.18	0.002	11.8	58.0	130.0	78.0	74.0
	Jul-25																	
	Aug-25																	
	Sep-25	26/07/22	1516798 Quantity	-6.6	< 0.050	0.0000	0.0066	0.0045	7.4	1200.0	340	0.08	0.0004	12.4	87.0	160.0	120.0	8.9
	Oct-25																	
	Nov-25																	
CIN18	Dec-25	21/02/23	1597150 Quantity	-45	< 0.050	0.0000	0.0079	0.0020	7.9	830.0	380.0	0.28	0.0043	11.7	46.0	110.0	76.0	8.0
	Jan-26																	
	Feb-26																	
	Mar-26	04/05/23	2350825-019 Quantity	284.8	< 0.050	0.0000	0.003	0.008	7.2	714	731	0.02	0.0001	11.6	29	78	74	8.7
	Apr-26																	
	May-26																	
	Jun-26	23/07/23	23072702-019 Quantity	349.5	< 0.030	0.0000	0.0010	0.0070	7.1	903.0	248.0	< 0.01	0.0003	12.0	46.0	118.0	99.0	5.0
	Jul-26																	
	Aug-26																	
	Sep-26																	
	Oct-26																	
	Nov-26																	

Table B4
Groundwater monitoring results

115925

Location	Month	Date	Type of sample	Redox Potential	Mercury, thallium as Hg	Vanadium as Van	Nickel as Nickel	Flow, direction filtered as Zn	pH	Electrical Conductivity 20C	Alkalinity as CaCO3	Ammoniacal Nitrogen as N	Unfiltered Ammoniacal Nitrogen as N	Mercury as Hg	Chloride as Cl	Sulfate as SO4	Calcium	D.O. concentration	TDS (Filtered)
GW1	Trigger Level																		
	Control Level A																		
	Control Level B																		
	Alarm Level																		
	Alarm Level																		
	Alarm Level																		
	Alarm Level																		
	Alarm Level																		
	Alarm Level																		
	Alarm Level																		
	Alarm Level																		
	Alarm Level																		
GW2	Jan-22	1377009	Quarterly	66	< 0.05	1.1000	0.0055	0.0075	8.1	1200.0	240.0	0.40	0.2	11.7	120.0	35.0	50.0	-	6.1
	Feb-22																		
	Mar-22																		
	Apr-22	1450021	Quarterly	68	< 0.05	0.35	0.0026	0.0075	7.2	510.0	230.0	0.70	0.016	12.4	38.0	34.0	25.0	-	2.9
	May-22																		
	Jun-22																		
	Jul-22	1487925	Quarterly	67	< 0.05	0.6200	0.0038	0.0055	7.3	870.0	160.0	0.20	0.017	13.2	68.0	36.0	34.0	7.0	37.0
	Aug-22																		
	Sep-22																		
	Oct-22	1578799	Quarterly	-5.9	< 0.050	0.4000	0.0032	0.0070	7.6	620.0	120	0.47	0.004	12.5	36.0	120.0	25.0	8.3	6.3
	Nov-22																		
	Dec-22																		
GW3	Jan-25	1597131	Quarterly	44	< 0.050	0.8800	0.0100	0.0100	8.5	7500.0	500.0	0.40	0.006	11.7	140.0	34.0	47.0	6.2	15.0
	Feb-25																		
	Mar-25																		
	Apr-25	2310509-010	Quarterly	244.1	< 0.050	0.505	0.003	0.014	6.5	697	451	0.40	0.005	15.4	55	31	40	7.6	12.6
	May-25																		
	Jun-25																		
	Jul-25	2310702-010	Quarterly	341.2	< 0.05	1.2700	0.0050	0.0100	6.7	1080.0	226.0	0.40	0.006	12.3	100.0	44.0	61.0	9.3	6.7
	Aug-25																		
	Sep-25																		
	Oct-25																		
	Nov-25																		
	Dec-25																		
GW4	Jan-22	1377010	Quarterly	71	< 0.05	0.8900	0.0061	0.0077	8.3	670.0	230.0	0.35	0.0135	10.6	21.0	49.0	41.0	-	5.2
	Feb-22																		
	Mar-22																		
	Apr-22	1470022	Quarterly	74	< 0.05	5.5	0.0130	0.0035	7.4	670.0	240.0	0.32	0.0027	11.3	31.0	59.0	52.0	-	6.0
	May-22																		
	Jun-22																		
	Jul-22	1487924	Quarterly	60	< 0.05	4.6000	0.0130	0.0035	7.3	580.0	240.0	0.77	0.0033	12.1	28.0	56.0	55.0	7.8	54.0
	Aug-22																		
	Sep-22	1554800	Quarterly	-0.4	< 0.050	0.3900	0.0042	0.0130	7.4	580.0	240	0.14	0.0008	12.0	10.0	74.0	84.0	8.6	5.9
	Oct-22																		
	Nov-22																		
	Dec-22																		
GW5	Jan-25	1597132	Quarterly	427	< 0.050	0.9300	0.0095	0.0079	8.4	620.0	310.0	0.44	0.02	16.8	36.0	50.0	66.0	7.0	7.4
	Feb-25																		
	Mar-25																		
	Apr-25	2310509-011	Quarterly	388.3	< 0.05	2.10	0.012	0.015	6.9	477	87.8	0.16	0.0025	10.6	21	49	78	15.6	
	May-25																		
	Jun-25																		
	Jul-25	2307202-011	Quarterly	377.1	< 0.05	1.1800	0.0050	0.0090	6.9	410.0	214.0	0.40	0.0001	10.3	16.0	48.0	80.0	8.4	9.9
	Aug-25																		
	Sep-25																		
	Oct-25																		
	Nov-25																		
	Dec-25																		

Notes:
* Trigger level is set at 0.05 mg/L for all analytes except for Vanadium which is set at 0.01 mg/L.
** Unfiltered Ammoniacal Nitrogen has not been measured for GW1 and GW2.
*** Ammonia results confirmed on duplicate analysis.

Exceedance of Control Level
Exceedance of Trigger Level
Exceedance of Assessment Level

Table B5
Landfill Gas Monitoring Results

CARBON DIOXIDE (% by Volume)

METHANE (% by Volume)

Location	Jan-23	Feb-23	Mar-23	Apr-23	May-23	Jun-23	Jul-23	Aug-23	Sep-23	Oct-23	Nov-23	Dec-23	Jan-24	Feb-24	Mar-24	Apr-24	May-24	Jun-24	Jul-24	Aug-24	Sep-24	Oct-24	Nov-24	Dec-24
Date monitored																								
GMW2	Red Valve	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
	Yellow Valve	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
	White Valve	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
	Trigger Levels	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1
	Control Levels	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5
GMW3	Red Valve	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
	Yellow Valve	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
	White Valve	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
	Trigger Levels	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1
	Control Levels	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5
GMW4	Red Valve	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
	Yellow Valve	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
	White Valve	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
	Trigger Levels	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1
	Control Levels	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5
GMW5	Red Valve	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
	Yellow Valve	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
	White Valve	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
	Trigger Levels	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1
	Control Levels	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5
GMW6	Red Valve	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
	Yellow Valve	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
	White Valve	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
	Trigger Levels	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1
	Control Levels	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5

Table B6
Landfill Gas Monitoring Results

115823

METHANE (cc by Volume)

CARBON DIOXIDE (cc by Volume)

Location	Valve	Jan-23	Feb-23	Mar-23	Apr-23	May-23	Jun-23	Jul-23	Aug-23	Sep-23	Oct-23	Nov-23	Dec-23	Comments
GSMW7	Yellow Valve	0	0	0	0	0	0	0.1	0.1	0.1	0.1	0.1	0.1	Yellow Valve 12 depth
	White Valve	nt	nt	nt	nt	nt	nt	nt	nt	nt	nt	nt	nt	White Valve 5m depth
	Trigger Level	1	1	1	1	1	1	1	1	1	1	1	1	Trigger Level
	Control Level	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5	Control Level
	Control Level Yellow	1.8	1.8	1.8	1.8	1.8	1.8	1.8	1.8	1.8	1.8	1.8	1.8	Control Level Yellow
GSMW12	Yellow Valve	0	0	0	0	0	0	0.1	0.1	0.1	0.1	0.1	0.1	Yellow Valve 26.3m depth
	White Valve	0	0	0	0	0	0	0.1	0.1	0.1	0.1	0.1	0.1	White Valve 5m depth
	Trigger Level	1	1	1	1	1	1	1	1	1	1	1	1	Trigger Level
	Control Level	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5	Control Level
	Control Level Yellow	1.8	1.8	1.8	1.8	1.8	1.8	1.8	1.8	1.8	1.8	1.8	1.8	Control Level Yellow
GSMW13	Yellow Valve	0	0	0	0	0	0	0.1	0.1	0.1	0.1	0.1	0.1	Yellow Valve 26.3m depth
	White Valve	0	0	0	0	0	0	0.1	0.1	0.1	0.1	0.1	0.1	White Valve 5m depth
	Trigger Level	1	1	1	1	1	1	1	1	1	1	1	1	Trigger Level
	Control Level	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5	Control Level
	Control Level Yellow	1.8	1.8	1.8	1.8	1.8	1.8	1.8	1.8	1.8	1.8	1.8	1.8	Control Level Yellow
GSMW14/14A	Yellow Valve	0	0	0	0	0	0	0.1	0.1	0.1	0.1	0.1	0.1	Yellow Valve 26.3m depth
	White Valve	0	0	0	0	0	0	0.1	0.1	0.1	0.1	0.1	0.1	White Valve 5m depth
	Trigger Level	1	1	1	1	1	1	1	1	1	1	1	1	Trigger Level
	Control Level	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5	Control Level
	Control Level Yellow	1.8	1.8	1.8	1.8	1.8	1.8	1.8	1.8	1.8	1.8	1.8	1.8	Control Level Yellow
GSMW15	Yellow Valve	0	0	0	0	0	0	0.1	0.1	0.1	0.1	0.1	0.1	Yellow Valve 26.3m depth
	White Valve	0	0	0	0	0	0	0.1	0.1	0.1	0.1	0.1	0.1	White Valve 5m depth
	Trigger Level	1	1	1	1	1	1	1	1	1	1	1	1	Trigger Level
	Control Level	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5	Control Level
	Control Level Yellow	1.8	1.8	1.8	1.8	1.8	1.8	1.8	1.8	1.8	1.8	1.8	1.8	Control Level Yellow
GSMW16	Yellow Valve	0	0	0	0	0	0	0.1	0.1	0.1	0.1	0.1	0.1	Yellow Valve 26.3m depth
	White Valve	0	0	0	0	0	0	0.1	0.1	0.1	0.1	0.1	0.1	White Valve 5m depth
	Trigger Level	1	1	1	1	1	1	1	1	1	1	1	1	Trigger Level
	Control Level	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5	Control Level
	Control Level Yellow	1.8	1.8	1.8	1.8	1.8	1.8	1.8	1.8	1.8	1.8	1.8	1.8	Control Level Yellow
GSMW17	Yellow Valve	0	0	0	0	0	0	0.1	0.1	0.1	0.1	0.1	0.1	Yellow Valve 26.3m depth
	White Valve	0	0	0	0	0	0	0.1	0.1	0.1	0.1	0.1	0.1	White Valve 5m depth
	Trigger Level	1	1	1	1	1	1	1	1	1	1	1	1	Trigger Level
	Control Level	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5	Control Level
	Control Level Yellow	1.8	1.8	1.8	1.8	1.8	1.8	1.8	1.8	1.8	1.8	1.8	1.8	Control Level Yellow
GSMW18	Yellow Valve	0	0	0	0	0	0	0.1	0.1	0.1	0.1	0.1	0.1	Yellow Valve 26.3m depth
	White Valve	0	0	0	0	0	0	0.1	0.1	0.1	0.1	0.1	0.1	White Valve 5m depth
	Trigger Level	1	1	1	1	1	1	1	1	1	1	1	1	Trigger Level
	Control Level	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5	Control Level
	Control Level Yellow	1.8	1.8	1.8	1.8	1.8	1.8	1.8	1.8	1.8	1.8	1.8	1.8	Control Level Yellow

Notes:

1. Water ditches water in well - reading abandoned!

2. NT denotes reading not taken!

3. NT in GSMW14 is due to cattle quarantine paddock around well location.

4. Where the asterisk (*) is present, no trigger levels have been set, as high levels of methane and carbon dioxide gas are recorded. This is likely to be associated with the presence of bog/marshland.

5. Where two asterisks (**) are present, no trigger levels have been set as not required by the Permit (Confidence 2).

nt = reading not taken due to carbon presence at location of the well

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Date	BH1		BH2		BH3		BH4		Water column (m)			
	Water level depth (m)	Well depth to base (m)	Water level depth (m)	Well depth to base (m)	Water level depth (m)	Well depth to base (m)	Water level depth (m)	Well depth to base (m)	BH1	BH2	BH3	BH4
21/11/2019	18.24	20.05	6.11	8.72	4.51	6.77	9.89	10.12	1.81	2.61	2.26	0.23
05/12/2019	18.31	20.05	6.26	8.70	4.44	6.75	9.86	10.12	1.74	2.44	2.31	0.26
13/12/2019	18.28	20.04	6.26	8.70	4.57	6.76	9.91	10.11	1.76	2.44	2.19	0.20
17/12/2019	18.28	20.04	6.19	8.70	4.49	6.76	9.90	10.11	1.76	2.51	2.27	0.21
14/01/2020	18.32	20.04	6.21	8.70	4.45	6.76	9.79	10.12	1.72	2.49	2.31	0.33
23/01/2020	18.38	20.04	6.19	8.70	4.42	6.76	9.76	10.12	1.66	2.51	2.34	0.36
30/01/2020	18.33	20.04	6.27	8.72	4.57	6.77	9.86	10.12	1.71	2.45	2.20	0.26
07/02/2020	18.40	20.04	6.40	8.72	4.44	6.77	9.88	10.12	1.64	2.32	2.33	0.24
17/02/2020	18.37	20.04	6.14	8.72	4.48	6.77	9.95	10.12	1.67	2.58	2.29	0.17
24/03/2020	18.19	20.04	6.22	8.72	4.44	6.77	9.72	10.12	1.85	2.50	2.33	0.40
24/04/2020	18.20	20.03	7.08	8.71	4.73	6.77	9.93	10.12	1.83	1.63	2.04	0.19
30/04/2020	18.14	20.03	7.00	8.71	4.69	6.77	9.95	10.12	1.89	1.71	2.08	0.17
07/05/2020	18.16	20.03	7.02	8.71	4.60	6.77	9.94	10.12	1.87	1.69	2.17	0.18
14/05/2020	18.14	20.03	7.13	8.71	4.77	6.77	10.01	10.12	1.89	1.58	2.00	0.11
27/05/2020	18.08	20.03	7.15	8.71	4.80	6.77	10.00	10.12	1.95	1.56	1.97	0.12
04/06/2020	18.08	20.09	7.20	8.72	4.90	6.77	10.05	10.12	2.01	1.52	1.87	0.07
16/06/2020	18.07	20.04	7.24	8.73	4.94	6.77	10.02	10.13	1.97	1.49	1.83	0.11
26/06/2020	18.12	20.09	7.51	8.72	5.00	6.77	10.04	10.12	1.97	1.21	1.77	0.08
03/07/2020	18.09	20.09	7.10	8.71	4.92	6.77	10.02	10.12	2.00	1.61	1.85	0.10
09/07/2020	18.07	20.04	7.41	8.72	4.96	6.77	10.04	10.12	1.97	1.31	1.81	0.08
23/07/2020	18.05	20.04	7.40	8.72	4.98	6.77	10.02	10.12	1.99	1.32	1.79	0.10
31/07/2020	18.06	20.04	7.13	8.72	4.94	6.77	10.02	10.14	1.98	1.59	1.83	0.12
07/08/2020	18.07	20.04	7.19	8.72	4.94	6.77	10.02	10.12	1.97	1.53	1.83	0.10
14/08/2020	18.19	20.04	7.67	8.72	5.03	6.77	10.06	10.12	1.85	1.05	1.74	0.06
20/08/2020	18.17	20.09	7.83	8.71	5.06	6.77	10.05	10.13	1.92	0.88	1.71	0.08

Date	BH1		BH2		BH3		BH4		Water column (m)			
	Water level depth (m)	Well depth to base (m)	Water level depth (m)	Well depth to base (m)	Water level depth (m)	Well depth to base (m)	Water level depth (m)	Well depth to base (m)	BH1	BH2	BH3	BH4
04/09/2020	18.18	20.04	6.99	8.72	4.85	6.77	10.02	10.12	1.86	1.73	1.92	0.10
11/09/2020	18.21	20.09	6.97	8.71	4.76	6.77	10.03	10.12	1.88	1.74	2.01	0.09
24/09/2020	18.10	20.09	6.98	8.71	4.92	6.77	10.02	10.12	1.99	1.73	1.85	0.10
08/10/2020	18.28	20.05	7.05	8.72	4.88	6.77	10.06	10.13	1.77	1.67	1.89	0.07
20/10/2020	18.29	20.05	6.92	8.72	4.81	6.77	10.01	10.12	1.76	1.80	1.96	0.11
30/10/2020	18.30	20.04	6.90	8.72	4.75	6.77	9.96	10.12	1.74	1.82	2.02	0.16
05/11/2020	18.26	20.04	6.94	8.71	4.80	6.77	9.97	10.12	1.78	1.77	1.97	0.15
12/11/2020	18.30	20.04	6.92	8.72	4.82	6.77	9.98	10.13	1.74	1.80	1.95	0.15
18/11/2020	18.32	20.04	6.12	8.72	4.63	6.77	9.93	10.13	1.72	2.60	2.14	0.20
26/11/2020	18.37	20.04	6.22	8.72	4.58	6.77	9.99	10.12	1.67	2.50	2.19	0.13
10/12/2020	18.37	20.04	6.43	8.72	4.59	6.77	9.98	10.12	1.67	2.29	2.18	0.14
17/12/2020	18.30	20.04	6.21	8.72	4.50	6.77	9.98	10.12	1.74	2.51	2.27	0.14
24/12/2020	18.33	20.04	5.68	8.72	4.45	6.77	9.82	10.12	1.71	3.04	2.32	0.30
06/01/2021	18.35	20.06	5.97	8.72	4.45	6.77	9.90	10.12	1.71	2.75	2.32	0.22
18/01/2021	18.30	20.02	5.97	8.72	4.40	6.77	9.98	10.12	1.72	2.75	2.37	0.14
21/01/2021	18.42	20.03	6.37	8.70	4.56	6.76	9.93	10.12	1.61	2.33	2.20	0.19
28/01/2021	18.32	20.04	5.90	8.70	4.53	6.77	9.97	10.12	1.72	2.80	2.24	0.15
02/02/2021	18.30	20.04	6.00	8.70	4.47	6.77	9.97	10.12	1.74	2.70	2.30	0.15
18/02/2021	18.49	20.04	6.37	8.72	4.53	6.77	9.92	10.13	1.55	2.35	2.24	0.21
26/02/2021	18.35	20.02	6.00	8.70	4.48	6.77	9.77	10.11	1.67	2.70	2.29	0.34
03/03/2021	18.43	20.02	6.09	8.70	4.45	6.77	9.79	10.11	1.59	2.61	2.32	0.32
11/03/2021	18.50	20.02	6.55	8.71	4.49	6.77	9.89	10.12	1.52	2.16	2.28	0.23
22/03/2021	18.49	20.03	6.55	8.70	4.52	6.77	9.94	10.11	1.54	2.15	2.25	0.17
26/05/2021	18.40	20.04	6.98	8.72	4.82	6.77	10.02	10.13	1.64	1.74	1.95	0.11
08/06/2021	18.28	20.04	6.64	8.71	4.58	6.77	9.92	10.12	1.76	2.07	2.19	0.20

Date	BH1		BH2		BH3		BH4		Water column (m)			
	Water level depth (m)	Well depth to base (m)	Water level depth (m)	Well depth to base (m)	Water level depth (m)	Well depth to base (m)	Water level depth (m)	Well depth to base (m)	BH1	BH2	BH3	BH4
23/06/2021	19.32	20.04	7.02	8.71	4.80	6.77	10.07	10.12	0.72	1.69	1.97	0.05
11/08/2021	18.87	20.02	7.92	8.68	4.79	6.75	10.09	10.11	1.15	0.76	1.96	0.02
18/08/2021	18.51	20.02	7.10	8.72	4.65	6.75	10.09	10.12	1.51	1.62	2.10	0.03
19/11/2021	18.37	20.03	6.70	8.69	4.67	6.76	10.09	10.11	1.66	1.99	2.09	0.02
25/11/2021	18.48	20.03	7.01	8.72	4.98	6.74	10.11	10.12	1.55	1.71	1.76	0.01
01/12/2021	18.49	20.02	6.79	8.67	4.65	6.74	10.08	10.12	1.53	1.88	2.09	0.04
17/12/2021	18.50	20.02	6.64	8.68	4.70	6.74	10.11	10.12	1.52	2.04	2.04	0.01
30/12/2021	18.39	20.03	6.85	8.71	4.71	6.73	10.09	10.13	1.64	1.86	2.02	0.04
07/01/2022	18.35	20.03	6.65	8.71	4.59	6.73	10.09	10.12	1.68	2.06	2.14	0.03
14/01/2022	18.38	20.03	7.10	8.71	4.21	6.73	10.10	10.12	1.65	1.61	2.52	0.02
24/01/2022	18.41	20.02	7.95	8.71	4.01	6.73	10.10	10.12	1.61	0.76	2.72	0.02
04/02/2022	18.81	20.02	7.83	8.72	4.50	6.74	10.10	10.12	1.21	0.89	2.24	0.02
11/02/2022	18.82	20.03	7.75	8.72	4.51	6.74	10.10	10.12	1.21	0.97	2.23	0.02
18/02/2022	18.73	20.03	7.90	8.72	4.40	6.74	10.10	10.12	1.30	0.82	2.34	0.02
25/02/2022	18.75	20.02	8.10	8.72	4.35	6.74	10.1	10.12	1.27	0.62	2.39	0.02
04/03/2022	18.65	20.03	8.06	8.72	4.20	6.74	10.11	10.13	1.38	0.66	2.54	0.02
11/03/2022	18.75	20.03	7.84	8.72	4.35	6.74	10.09	10.13	1.28	0.88	2.39	0.04
14/03/2022	18.73	20.02	7.68	8.73	4.45	6.74	10.09	10.11	1.29	1.05	2.29	0.02
24/03/2022	18.81	20.03	7.41	8.71	4.61	6.76	10.11	10.12	1.22	1.30	2.15	0.01
01/04/2022	18.71	20.03	7.38	8.71	4.60	6.75	10.11	10.12	1.32	1.33	2.15	0.01
08/04/2022	18.48	20.03	7.10	8.7	4.54	6.74	10.1	10.12	1.55	1.60	2.20	0.02
18/04/2022	18.44	20.02	7.45	8.71	4.48	6.74	10.09	10.12	1.58	1.26	2.26	0.03
27/04/2022	18.55	20.02	7.58	8.72	4.10	6.74	10.09	10.11	1.47	1.14	2.64	0.02
06/05/2022	18.60	20.02	7.90	8.72	4.11	6.75	10.07	10.11	1.42	0.82	2.64	0.04
13/05/2022	18.65	20.03	7.99	8.72	4.20	6.75	10.05	10.12	1.38	0.73	2.55	0.07

Date	BH1		BH2		BH3		BH4		Water column (m)			
	Water level depth (m)	Well depth to base (m)	Water level depth (m)	Well depth to base (m)	Water level depth (m)	Well depth to base (m)	Water level depth (m)	Well depth to base (m)	BH1	BH2	BH3	BH4
20/05/2022	18.66	20.03	7.81	8.72	4.21	6.74	10.07	10.12	1.37	0.91	2.53	0.05
26/05/2022	18.55	20.03	7.71	8.72	4.12	6.74	10.09	10.12	1.48	1.01	2.62	0.03
31/05/2022	18.53	20.03	8.34	8.72	4.06	6.74	10.11	10.13	1.50	0.38	2.68	0.02
03/06/2022	18.65	20.02	8.19	8.72	4.20	6.74	10.11	10.12	1.37	0.53	2.54	0.01
10/06/2022	18.88	20.03	7.99	8.71	4.40	6.76	10.11	10.13	1.15	0.72	2.36	0.02
20/06/2022	18.88	20.03	7.95	8.71	4.45	6.75	10.09	10.12	1.15	0.76	2.30	0.03
27/06/2022	18.87	20.02	7.90	8.70	4.55	6.74	10.09	10.12	1.15	0.80	2.19	0.03
07/07/2022	18.91	20.03	7.91	8.70	4.57	6.74	10.01	10.12	1.12	0.79	2.17	0.11
13/07/2022	18.90	20.03	7.57	8.72	4.62	6.74	10.11	10.13	1.13	1.15	2.12	0.02
20/07/2022	18.91	20.03	7.60	8.72	4.51	6.74	10.10	10.13	1.12	1.12	2.23	0.03
29/07/2022	18.80	20.03	7.80	8.72	4.07	6.74	10.08	10.13	1.23	0.92	2.67	0.05
05/08/2022	18.92	20.03	8.10	8.72	4.75	6.74	10.09	10.13	1.11	0.62	1.99	0.04
11/08/2022	18.95	20.02	8.39	8.71	5.20	6.74	10.11	10.13	1.07	0.32	1.54	0.02
19/08/2022	18.92	20.02	8.42	8.71	5.20	6.74	10.10	10.13	1.10	0.29	1.54	0.03
26/08/2022	18.91	20.02	8.46	8.72	5.21	6.74	10.09	10.12	1.11	0.26	1.53	0.03
02/09/2022	18.93	20.02	8.49	8.72	5.21	6.74	10.09	10.13	1.09	0.23	1.53	0.04
09/09/2022	18.97	20.03	8.69	8.71	5.52	6.74	10.09	10.18	1.06	0.02	1.22	0.09
16/09/2022	18.90	20.03	8.71	8.71	5.53	6.74	10.11	10.14	1.13	0.00	1.21	0.03
22/09/2022	18.91	20.02	8.71	8.71	5.53	6.74	10.10	10.12	1.11	0.00	1.21	0.02
07/10/2022	18.90	20.02	8.71	8.71	5.58	6.74	10.10	10.12	1.12	0.00	1.16	0.02
14/10/2022	18.92	20.03	8.68	8.68	5.56	6.76	10.11	10.13	1.11	0.00	1.20	0.02
27/10/2022	18.92	20.02	8.68	8.68	5.61	6.76	9.98	10.13	1.10	0.00	1.15	0.15
03/11/2022	18.82	20.02	8.24	8.68	4.97	6.76	9.97	10.12	1.20	0.44	1.79	0.15
11/11/2022	18.80	20.01	8.40	8.65	4.97	6.76	9.98	10.12	1.21	0.25	1.79	0.14
24/11/2022	18.95	20.01	8.36	8.67	5.10	6.76	9.97	10.13	1.06	0.31	1.66	0.16

Date	BH1		BH2		BH3		BH4		Water column (m)			
	Water level depth (m)	Well depth to base (m)	Water level depth (m)	Well depth to base (m)	Water level depth (m)	Well depth to base (m)	Water level depth (m)	Well depth to base (m)	BH1	BH2	BH3	BH4
30/11/2022	18.64	20.01	8.69	8.70	4.56	6.76	10.01	10.13	1.37	0.01	2.20	0.12
08/12/2022	18.60	20.01	8.61	8.68	4.97	6.77	9.99	10.12	1.41	0.07	1.80	0.13
16/12/2022	18.82	20.03	7.80	8.67	4.67	6.75	9.98	10.12	1.21	0.87	2.08	0.14
23/12/2022	18.82	20.02	7.87	8.67	4.63	6.77	9.97	10.12	1.20	0.80	2.14	0.15
30/12/2022	18.65	20.02	7.81	8.62	4.51	6.76	9.90	10.13	1.37	0.81	2.25	0.23
06/01/2023	18.70	20.02	7.81	8.68	4.51	6.76	9.91	10.12	1.32	0.87	2.25	0.21
12/01/2023	18.60	20.02	7.50	8.68	4.55	6.76	9.90	10.12	1.42	1.18	2.21	0.22
20/01/2023	18.50	20.03	7.10	8.68	4.20	6.76	9.89	10.13	1.53	1.58	2.56	0.24
27/01/2023	18.55	20.03	7.10	8.68	4.46	6.76	9.98	10.12	1.48	1.58	2.30	0.14
01/02/2023	18.80	20.03	7.19	8.68	4.70	6.76	9.80	10.12	1.23	1.49	2.06	0.32
17/02/2023	18.87	20.02	7.91	8.68	4.80	6.76	9.88	10.12	1.15	0.77	1.96	0.24
21/02/2023	18.81	20.03	7.90	8.66	4.80	6.77	9.99	10.12	1.22	0.76	1.97	0.13
03/03/2023	18.91	20.02	8.30	8.68	5.08	6.76	9.95	10.11	1.11	0.38	1.68	0.16
09/03/2023	18.75	20.03	7.90	8.67	4.88	6.77	9.94	10.11	1.28	0.77	1.89	0.17
16/03/2023	18.80	20.03	7.90	8.67	4.85	6.77	9.91	10.12	1.23	0.77	1.92	0.21
23/03/2023	18.60	20.03	7.90	8.68	4.80	6.74	9.90	10.13	1.43	0.78	1.94	0.23
30/03/2023	18.62	20.02	7.80	8.68	4.64	6.74	9.89	10.12	1.40	0.88	2.10	0.23
07/04/2023	18.45	20.03	6.83	8.67	4.52	6.74	9.92	10.13	1.58	1.84	2.22	0.21
14/04/2023	18.59	20.02	6.92	8.67	4.55	6.74	9.92	10.12	1.43	1.75	2.19	0.20
21/04/2023	18.61	20.02	7.15	8.62	4.52	6.74	9.96	10.12	1.41	1.47	2.22	0.16
12/05/2023	18.56	20.08	7.96	8.66	4.70	6.74	9.99	10.12	1.52	0.70	2.04	0.13
19/05/2023	18.51	19.98	7.80	8.69	4.71	6.74	9.99	10.95	1.47	0.89	2.03	0.96
26/05/2023	18.53	20.02	7.85	8.68	4.83	6.74	9.90	10.13	1.49	0.83	1.91	0.23
02/06/2023	18.48	20.03	7.91	8.68	4.86	6.76	9.93	10.13	1.55	0.77	1.90	0.20
09/06/2023	18.59	20.02	7.98	8.77	4.84	6.74	9.95	10.12	1.43	0.79	1.90	0.17

Date	BH1		BH2		BH3		BH4		Water column (m)			
	Water level depth (m)	Well depth to base (m)	Water level depth (m)	Well depth to base (m)	Water level depth (m)	Well depth to base (m)	Water level depth (m)	Well depth to base (m)	BH1	BH2	BH3	BH4
16/06/2023	18.62	20.02	7.98	8.77	4.84	6.74	9.95	10.12	1.40	0.79	1.90	0.17
21/06/2023	18.60	20.03	7.86	8.68	4.89	6.74	9.90	10.12	1.43	0.82	1.85	0.22
30/06/2023	18.65	20.02	7.85	8.69	4.85	6.74	9.94	10.13	1.37	0.84	1.89	0.19
07/07/2023	18.65	20.02	7.85	8.69	4.85	6.74	9.94	10.13	1.37	0.84	1.89	0.19
13/07/2023	18.61	20.02	7.90	8.69	4.80	6.74	9.98	10.13	1.41	0.79	1.94	0.15
20/07/2023	18.51	20.02	8.59	8.70	5.33	6.75	10.08	10.14	1.51	0.11	1.42	0.06
28/07/2023	18.60	20.01	8.10	8.69	5.31	6.74	10.09	10.13	1.41	0.59	1.43	0.04
04/08/2023	18.57	20.01	8.60	8.71	5.23	6.74	10.07	10.10	1.44	0.11	1.51	0.03
10/08/2023	18.70	20.02	7.79	8.69	4.98	6.72	10.01	10.13	1.32	0.90	1.74	0.12
17/08/2023	18.60	20.01	7.79	8.69	4.98	6.72	10.01	10.13	1.41	0.90	1.74	0.12
23/08/2023	18.56	20.01	7.80	8.67	4.92	6.74	9.96	10.12	1.45	0.87	1.82	0.16
31/08/2023	18.49	20.01	8.35	8.67	4.95	6.72	9.96	10.13	1.52	0.32	1.77	0.17
06/09/2023	18.49	20.01	8.35	8.67	4.95	6.72	9.96	10.13	1.52	0.32	1.77	0.17
13/09/2023	18.51	20.02	8.50	8.69	4.50	6.74	10.02	10.12	1.51	0.19	2.24	0.10
22/09/2023	18.62	20.02	8.52	8.69	5.15	6.73	10.03	10.12	1.40	0.17	1.58	0.09
27/09/2023	18.59	20.03	8.46	8.69	5.00	6.73	10.01	10.13	1.44	0.23	1.73	0.12
05/10/2023	18.50	20.02	7.49	8.69	4.80	6.73	10.01	10.12	1.52	1.20	1.93	0.11
12/10/2023	18.50	20.01	7.14	8.69	4.86	6.72	9.99	10.12	1.51	1.55	1.86	0.13
19/10/2023	18.52	20.01	7.14	8.61	4.30	6.72	9.99	10.13	1.49	1.47	2.42	0.14
23/10/2023	18.60	20.01	7.40	8.69	4.82	6.72	9.98	10.12	1.41	1.29	1.90	0.14

