

Silent Valley Waste Services Limited

Silent Valley Landfill

2022 Second Quarter Monitoring Report

Reference: Issue

Issue 01 | 29th July 2022



This report takes into account the particular instructions and requirements of our client. It is not intended for and should not be relied upon by any third party and no responsibility is undertaken to any third party.

Job number 115825-00

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1. Introduction

This 2022 Second 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 April to June 2022 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 2022 First Quarter Monitoring Report^[3] and the 2021 Annual Monitoring Report^[4].

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 A1, Figures A1 to A3**.

Based on the available data, June recorded the highest monthly rainfall of the quarter (82.4mm) while May recorded the highest daily rainfall total (17mm on 15th May). June's monthly rainfall total has increased from the June 2021 records. April recorded the lowest monthly rainfall of the quarter (29.4mm) and recorded 13 consecutive days of no rain from the 18th-30th April inclusive.

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 A2, Table B1**.

The monthly average well concentrations for the site remain compliant this quarter against the Acceptable Maximum Concentration (AMC). Most of the individual well concentrations remain compliant with exceptions identified below.

LC2A well continues to exceed the AMC for nickel (0.0681mg/l) with a concentration of 0.14mg/l, this has increased from the previous quarter (0.12mg/l). This exceedance has been recorded continuously throughout 2021^[4].

LC2A well remains elevated above the AMC concentration for ammoniacal nitrogen recording 560mg/l, this concentration has decreased from the last quarter. Historically ammoniacal nitrogen readings have been known to fluctuate in this well. The ammoniacal nitrogen and nickel concentration exceedances were discussed in the LC2A Technical Note appended to the 2021 Annual report ^[4].

In accordance with the Aftercare Phase Environmental and Infrastructure Monitoring Program report^[6], the contingency plan is to be implemented after three consecutive exceedances have been recorded.

The installation within LC5A has failed and works are ongoing to replace this well in the near future.

2.2.2 Leachate Level Monitoring

Leachate level monitoring results are presented in **Appendix A2, Table B2**. The monthly average level for all the wells remains below the required 3.0m, as per the Permit^[1].

2.3 Surface Water Quality

The surface water quality monitoring results are presented in **Appendix A2, Table B3**, and graphically in **Appendix A1, Figure A4**.

Commentaries are provided for upstream and downstream monitoring points in the Nant Merddog, including locations SW1 to SW10 located downstream of the landfill, as discussed below.

A number of surface water samples are exceeding the EQS for ammoniacal nitrogen. It is noted that chemical testing is now being undertaken by a different laboratory, an investigation is ongoing as to whether this is a lab error, or an issue with the landfill.

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. They are monitored this quarter.

SWU, SW2AI and SWW4

SWU remains compliant with exception of unionised ammoniacal nitrogen with a concentration of 0.348mg/l exceeding the Freshwater EQS of 0.015mg/l. Unionised ammoniacal nitrogen did not exceed throughout 2020 or 2021 nor has it approached these levels historically upstream.

Both SW2AI and SWW4 wells were recorded as dry and unable to be monitored this quarter.

SWWI and SWW2

Both wells remain compliant with exception of SWWI which recorded a unionised ammoniacal nitrogen concentration of 0.057mg/l exceeding Freshwater EQS of 0.015mg/l. Unionised ammoniacal nitrogen did not exceed throughout 2020 or 2021 nor has it approached these levels historically.

SWW2 has recorded a chloride exceedance of 300mg/l. Chloride has never exceeded the EQS value, this is likely an anomaly but will be monitored closely again in Q3.

2.3.2 Downstream Surface Water

SWD and SWD1

Results show both SWD and SWD1 are compliant with the exception of unionised ammoniacal nitrogen recording exceedances of 0.064mg/l in SWD and 0.124 mg/l in SWD1. Unionised ammoniacal nitrogen has increased from previous exceedances last quarter. Bioavailable nickel has exceeded EQS with a value of 0.0426 this quarter. This has not exceeded throughout 2020 or 2021. It can be assumed this is an anomaly but will be monitored next quarter.

2.4 Groundwater

2.4.1 Groundwater Quality Monitoring

Groundwater quality monitoring results are presented in **Appendix A1, Figures A5 and A6** and in **Appendix A2, Table B4**.

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

A number of groundwater samples are exceeding the trigger and control levels for ammoniacal nitrogen. It is noted that chemical testing is now being undertaken by a different laboratory, an investigation is ongoing as to whether this is a lab error, or an issue with the landfill.

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.

Mercury concentrations have remained below the trigger and control level at <0.05ug/l in GW3A. Concentrations had exceeded the Trigger Level for all of 2021 but have significantly dropped last quarter. These will be accessed again in the next quarter to further understand the trend.

Manganese continues to exceed assessment levels in GW4 with continued fluctuations over the years whilst showing no recognisable trend. Manganese has exceeded assessment level again this quarter. These elevated concentrations recorded upstream are likely to be from steel works waste deposited to the north of the landfill and old mine workings in the area. Manganese is a typical contaminant of mine drainage, which is impacting the groundwater in the locale of the landfill.

Ammoniacal nitrogen levels continue to be recorded above the trigger Level (of 1mg/l) in GW3A with concentrations of 5.10mg/l and exceed the control level with 0.86mg/l in GW4. These exceedances have decreased from the previous quarter however both remain non-compliant.

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 were recorded during 2021 and 2022.

Well GW10

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

GW10 has exceeded the assessment level (of 1.0mg/l) with a manganese concentration of 5.5mg/l. This is a significant exceedance but historically has known to fluctuate throughout 2021. The concentration may be an anomaly and will be monitored closely again in Q3.

Well GW9

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

GW9 continues to be non-compliant for Ammoniacal Nitrogen in relation to the trigger level with a level of 4.7mg/l. The levels for ammoniacal nitrogen have been increasing since the first quarter of 2021, but this contaminant has been shown to fluctuate. Ammoniacal nitrogen has decreased from the previous quarter.

Well GW12

GW12 is installed in the sandstone strata classified as S2-West.

Sulphate levels have exceeded the control level of 300mg/l recording a concentration of 320mg/l. These concentrations have generally been increasing since April 2021 but remained compliant with exception of Q4 2021.

Wells GW6 and GW7

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

GW6 and GW7 are now both compliant for ammoniacal nitrogen this quarter. Additionally, manganese has decreased below the assessment level in GW7 for the first time since April 2021.

GW7 exceeded the control level for zinc this quarter with a value of 0.021mg/l. Zinc did not record any exceedances in GW7 throughout 2021 and will be monitored again next quarter.

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 A1, Figure A7**. Water levels have remained relatively consistent this quarter with no significant differences from the 2021 readings^[4].

2.5 Landfill Gas

Methane

The landfill gas monitoring results are presented in **Appendix A2, Table B5**.

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

Carbon Dioxide

There were a number of exceedances throughout this quarter exceeding both control and trigger levels. Wells which remained non-compliant include GMW2, GMW3, GMW6, GMW12 and GMW14/14A.

- GMW2 Red Valve for June (2%) exceeded trigger level of 1.5%, this is the first exceedance in this well during 2022.
- GMW3 Yellow Valve for April (2.6%) exceeded control level of 2.17%. These levels have fluctuated throughout 2021.

- GMW6 Red Valve for April (3.9%) exceeded control level of 3.8% and June (5.7%) exceeded trigger level of 4.3%. Levels significantly exceeded trigger levels from June to November 2021 and were compliant in December 2021, March 2022, and May 2022. These levels are fluctuating with no clear trend.
- GMW12 Yellow Valve for June (2.6%) exceeded control level of 2.4%.
- GMW14/14A consecutive concentration exceedances were recorded in 2020 and fluctuations throughout 2021. This quarter continue to exceed in the below levels;
 - Red Valve April (2.8%), May (3.2%) and June (1.9%) exceeding trigger level of 1.5%.
 - Yellow Valve April (6.2%), May (6.1%) and June (7.1%) for trigger level of 5.9%
 - White Valve April (6.1%) and May (6.1%) exceeding trigger level of 5.4%.

The GMW14/14A concentration exceedances were discussed in the GMW14/14A Technical Note appended to the 2021 Annual report [4].

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 second quarterly report noted the following:

- LC2A individually continues to exceed the Acceptable Maximum Concentration (AMC), however, the averaged leachate wells are compliant against the AMC. It has been concluded in the LC2A Technical Note appended to the 2021 Annual report ^[4] that there is no significant threat to the surrounding site area with this well's exceedance.
- SWW2 exceeded EQS values for chloride. Chloride has never exceeded at this concentration before and the result will be closely monitored next quarter.
- GW7 exceeded the EQS value for zinc after not exceeding throughout 2021 or last quarter. This will be monitored through the next quarter to identify if there is a trend.
- A number of groundwater and surface water samples are exceeding the permit concentrations for ammoniacal nitrogen. We are currently investigating whether this is a lab error (due to recent change in laboratory), or an issue with the landfill.
- GMW6 continues to record elevated carbon dioxide concentrations this quarter. These concentrations are fluctuating above and below the control levels and this well will be reviewed again next quarter.
- GMW14/14A continues to exceed the Trigger Levels for carbon dioxide concentrations, this was discussed within the 2021 GMW14/14A Technical Note appended to the 2021 Annual Report ^[4]. The optional recommendations to close out this issue are to be discussed with the regulators and further future investigation agreed, if necessary.

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, 2022 First Quarter Monitoring Report, Issue April 29th 2022.
- [4] Arup, Silent Valley Landfill, 2021 Annual Monitoring Report, 30th 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.

A.1 Monitoring Results- Graphs

Figure A1
Daily rainfall totals and sampling events (April 2015 - June 2022)

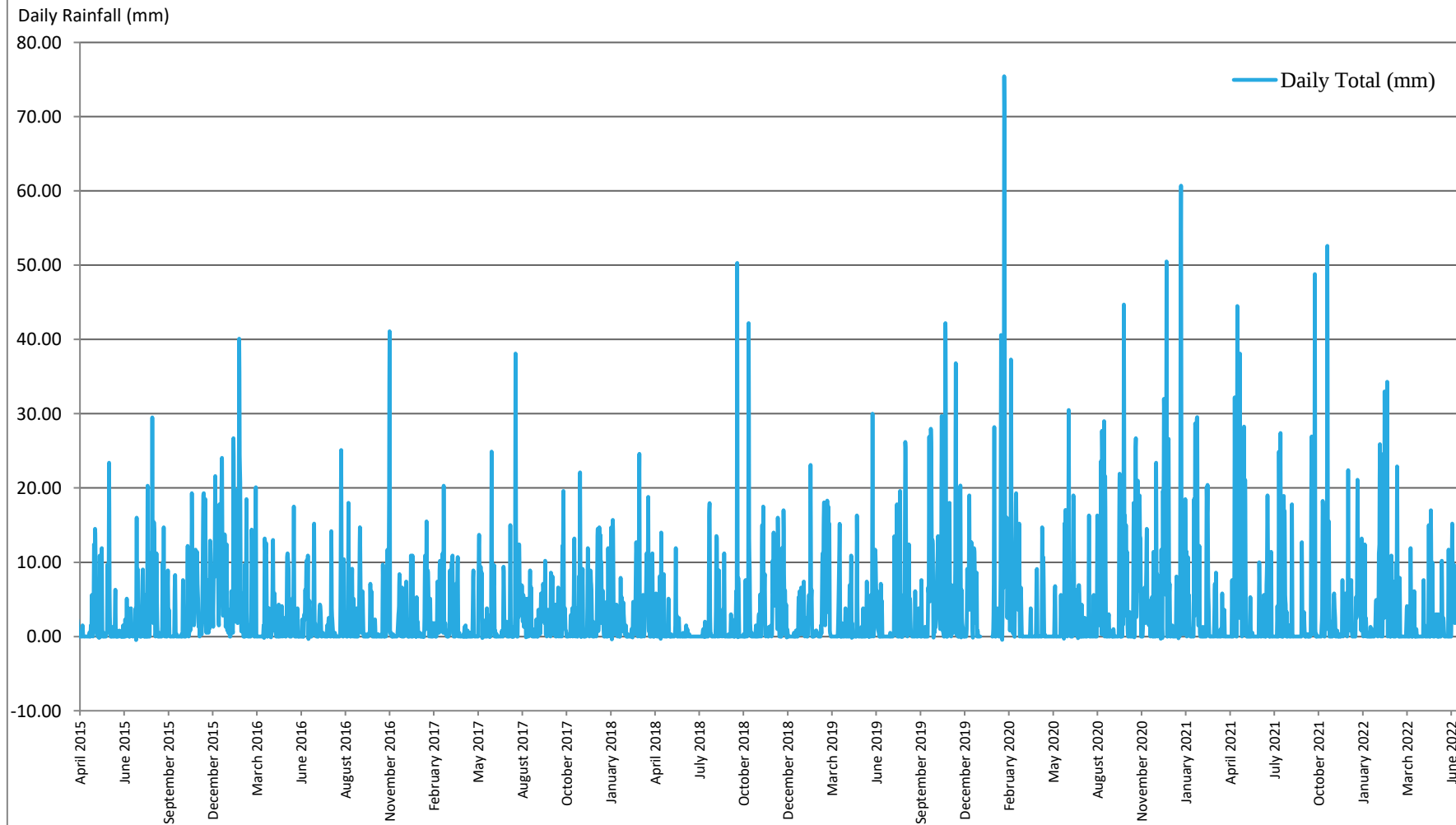


Figure A2
Monthly rainfall totals (April 2015 - July 2022)

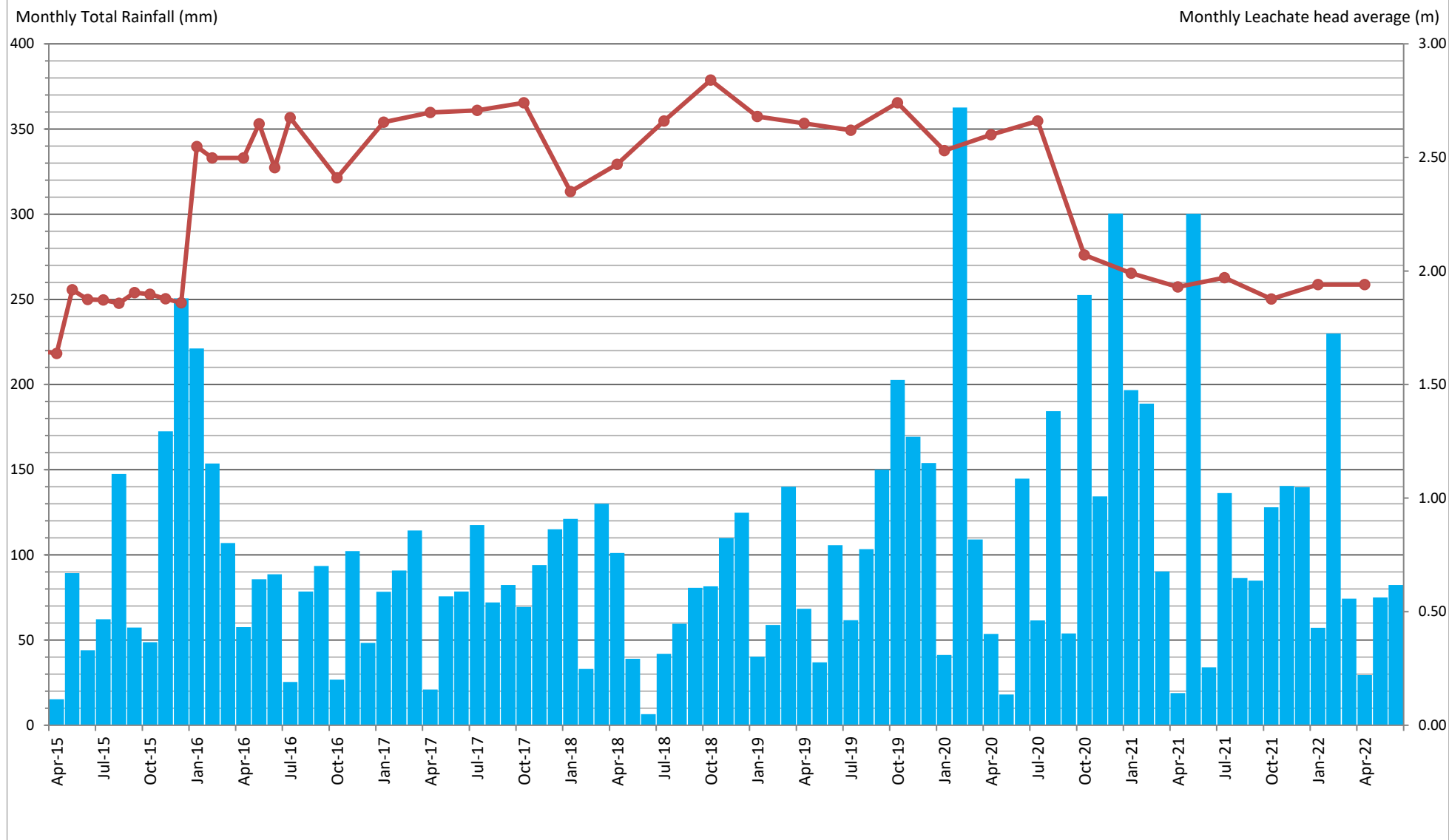


Figure A3
Monthly total rainfall (April 2015- June 2022)

Monthly Total Rainfall (mm)

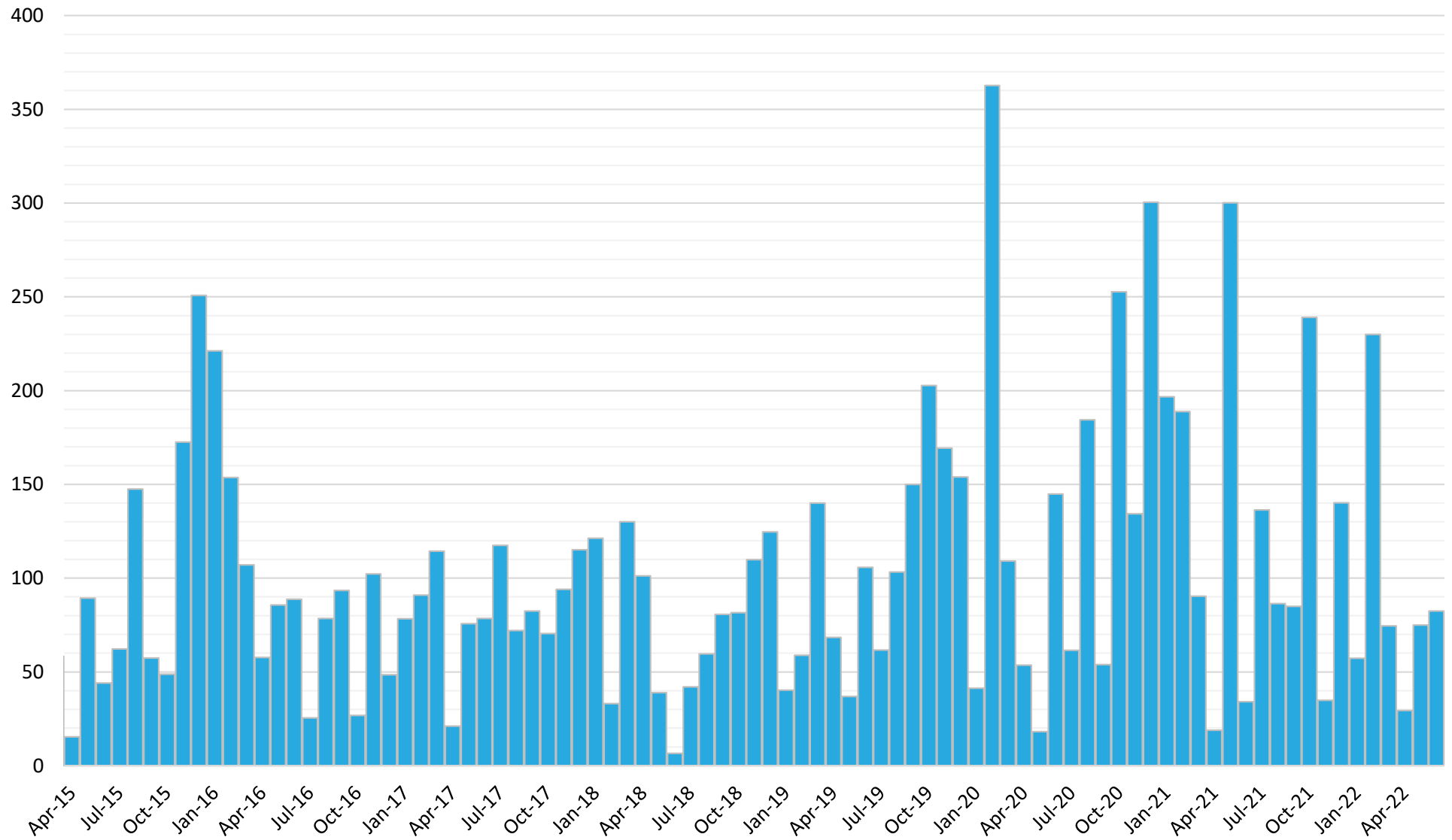


Figure A4
Surface water monitoring graphs

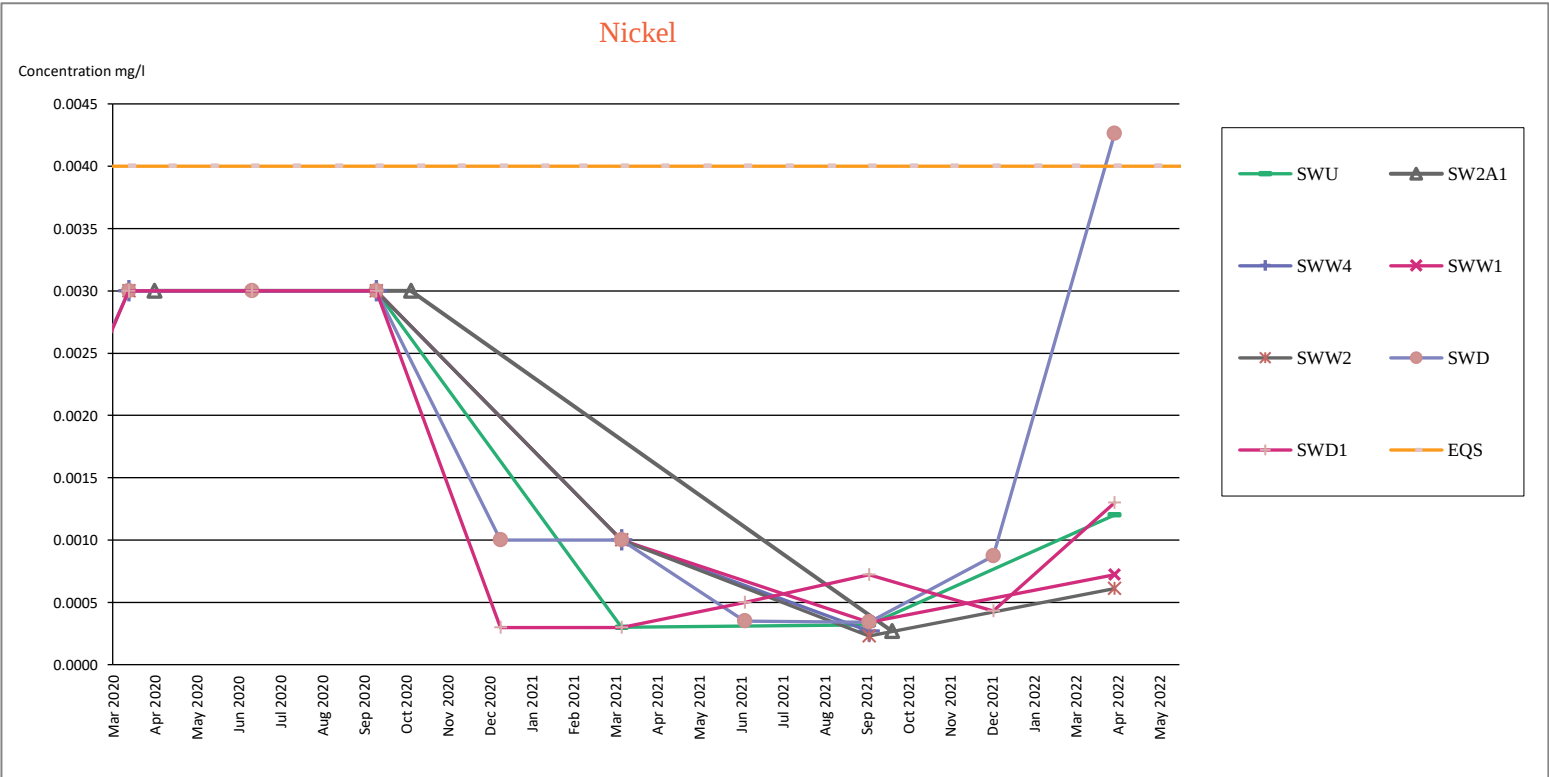
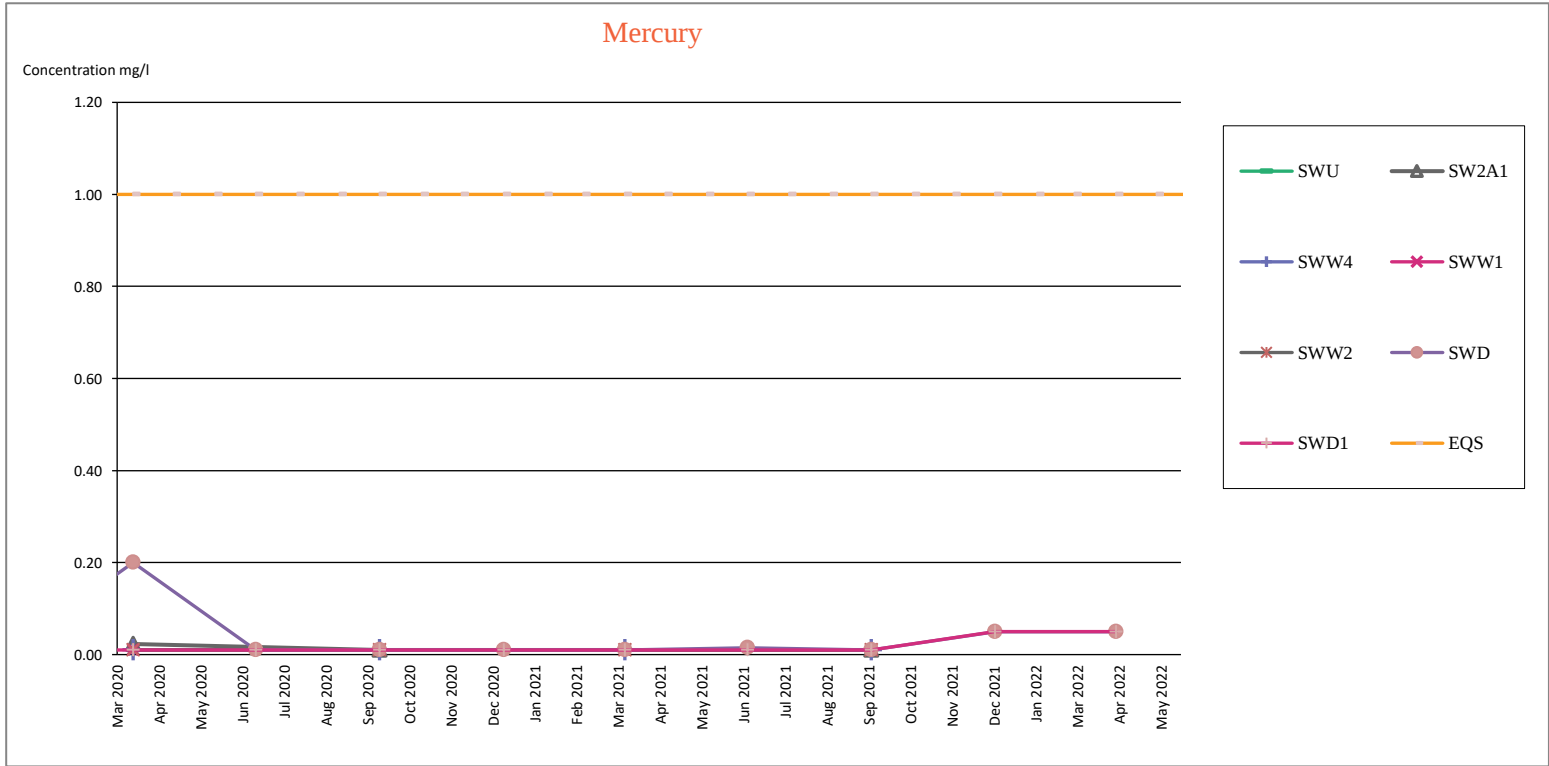
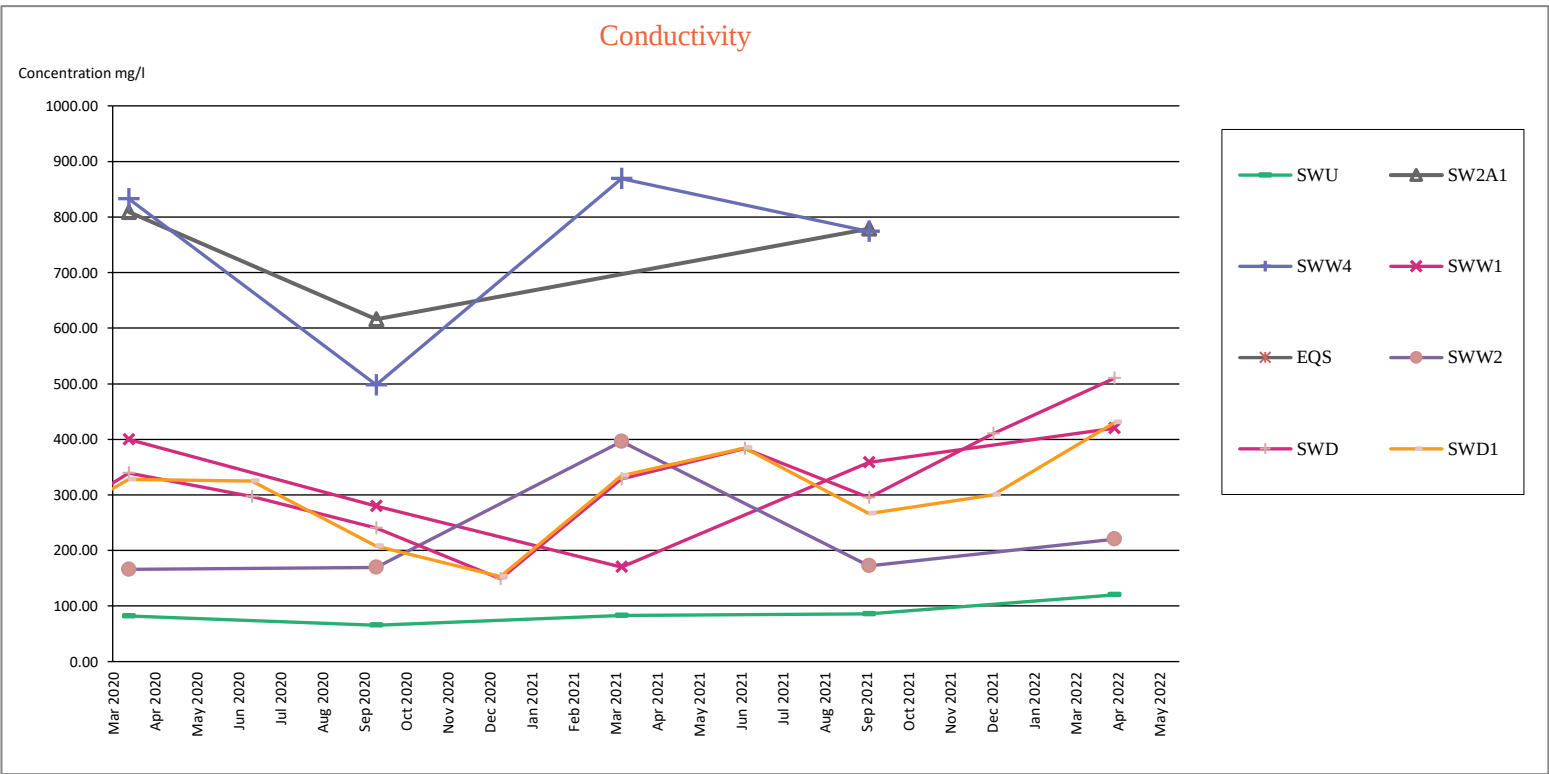
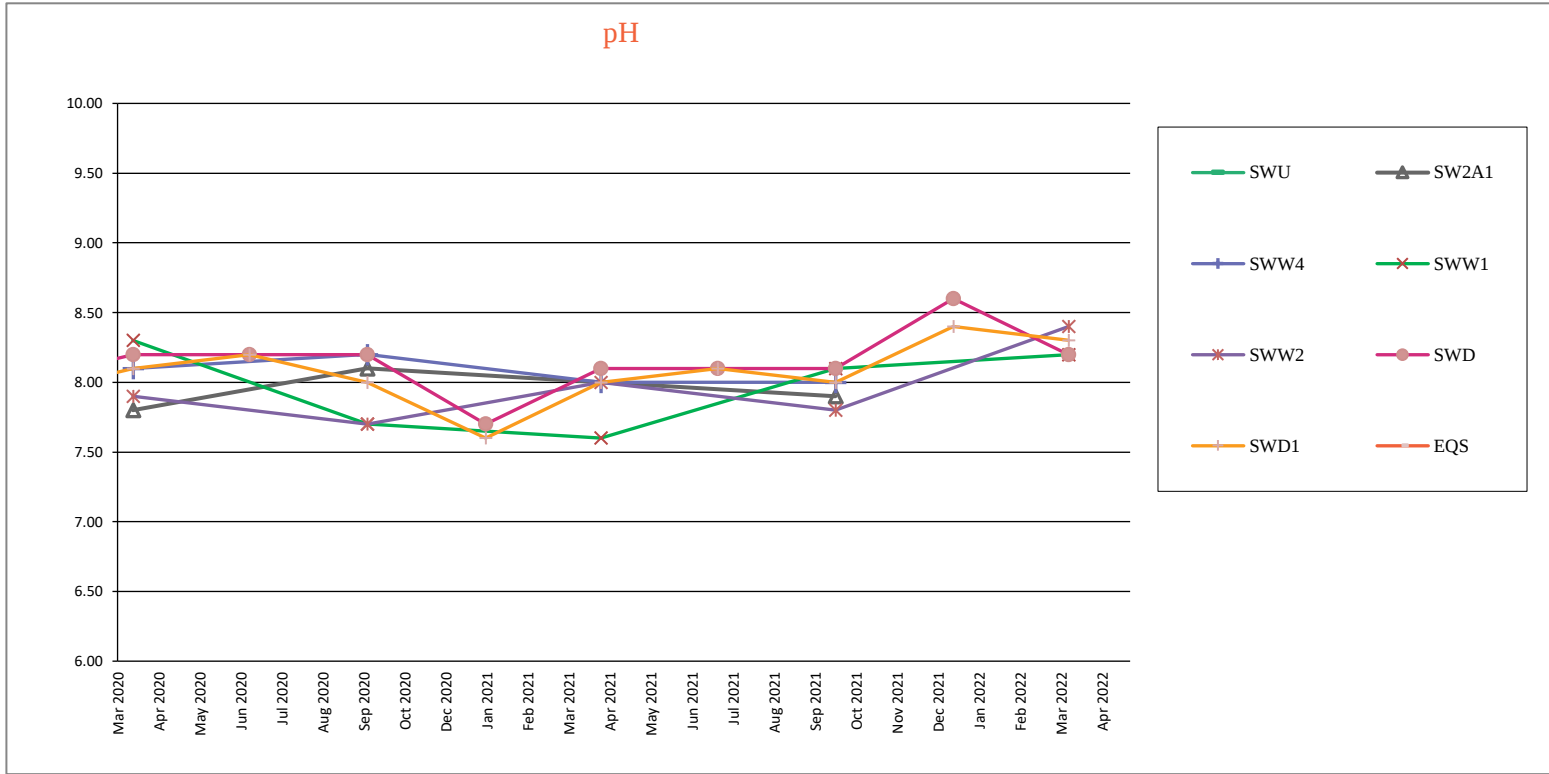


Figure A4
Surface water monitoring graphs

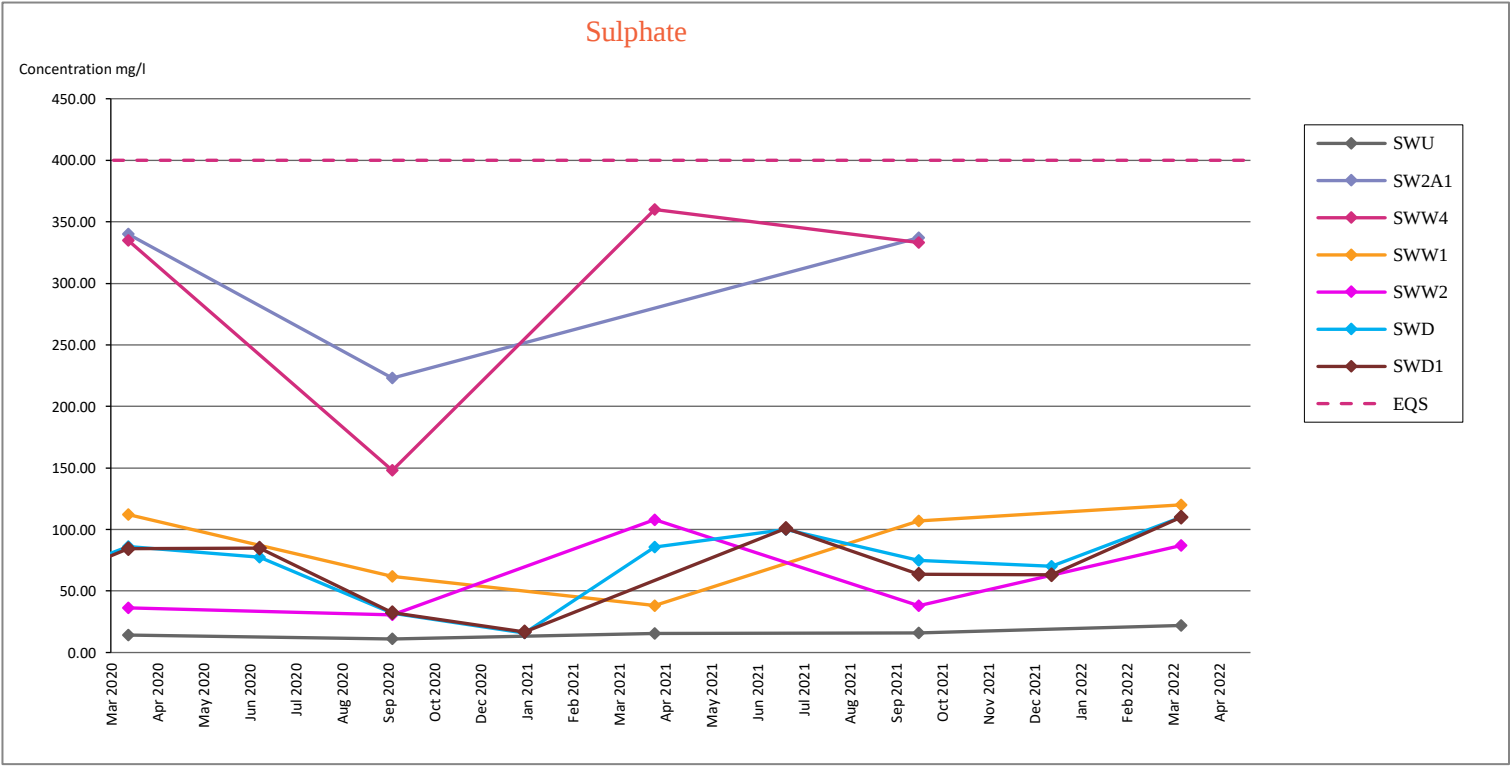
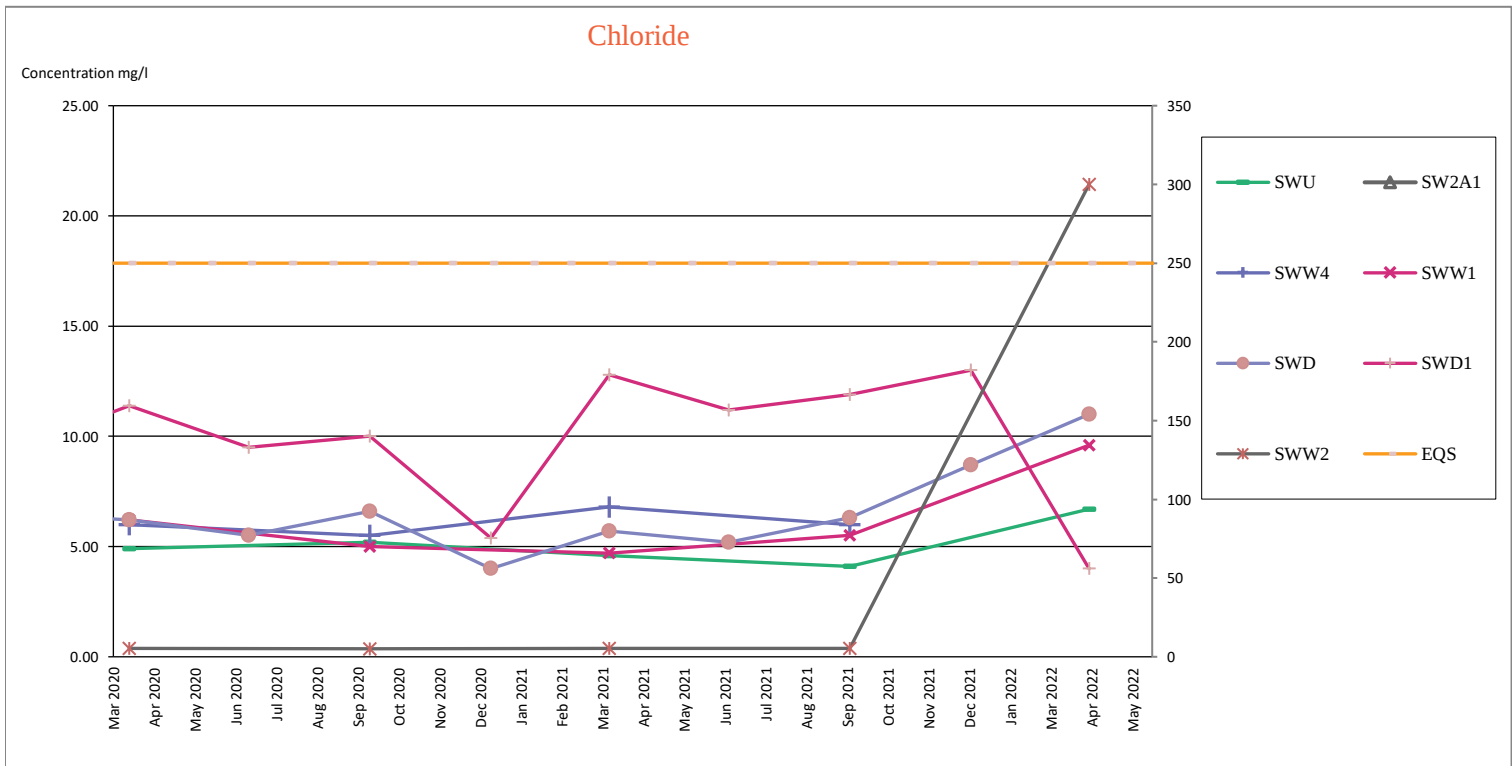
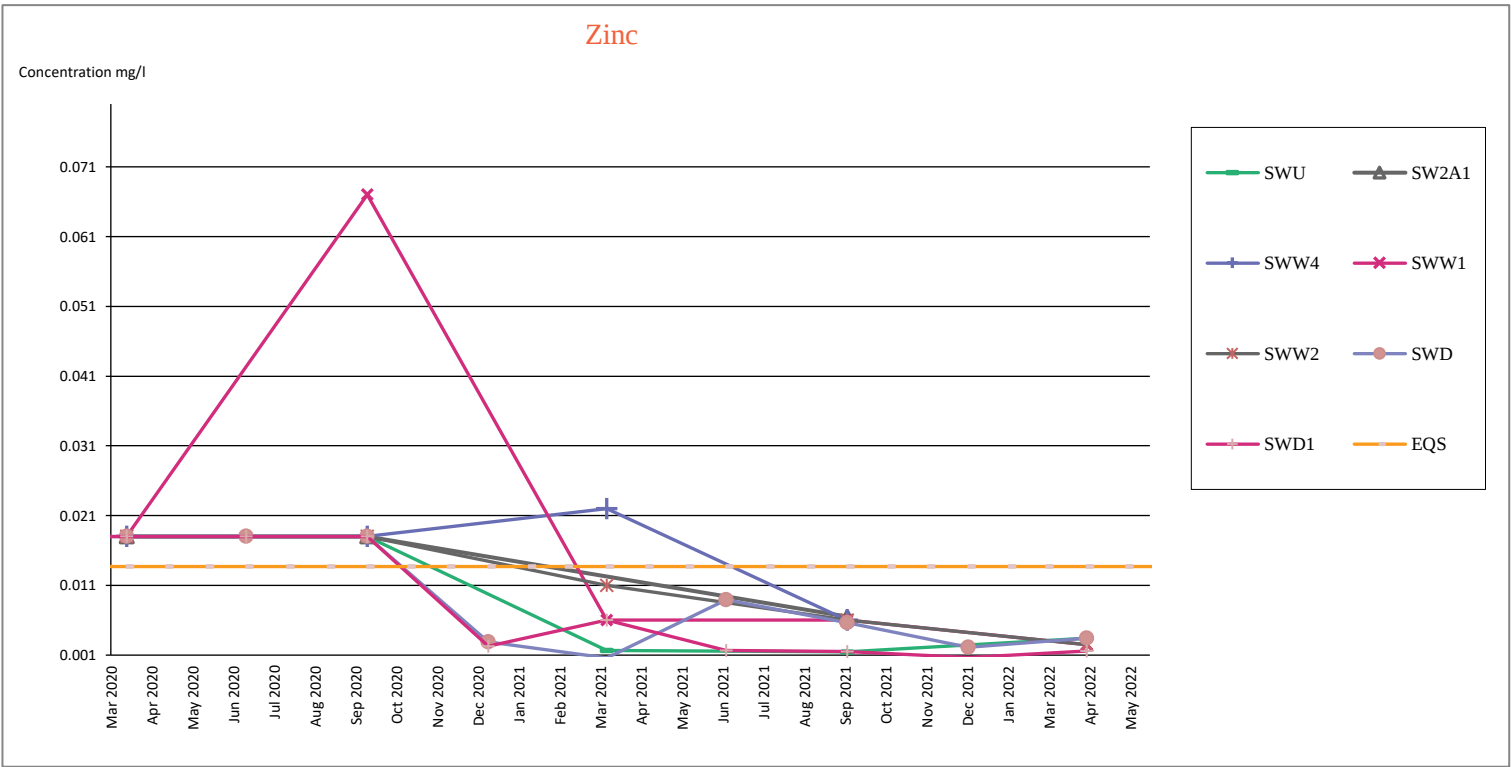
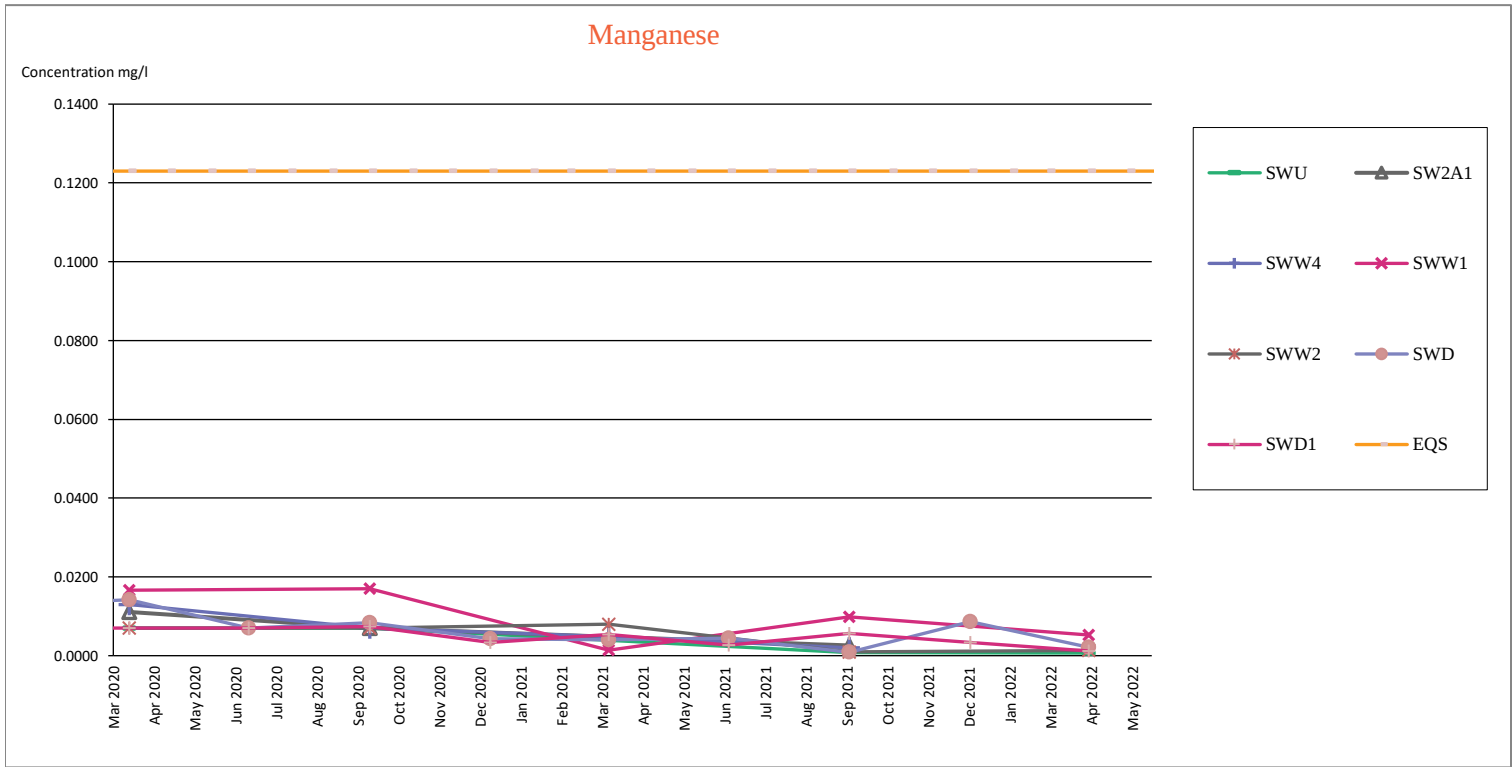


Figure A4
Surface water monitoring graphs

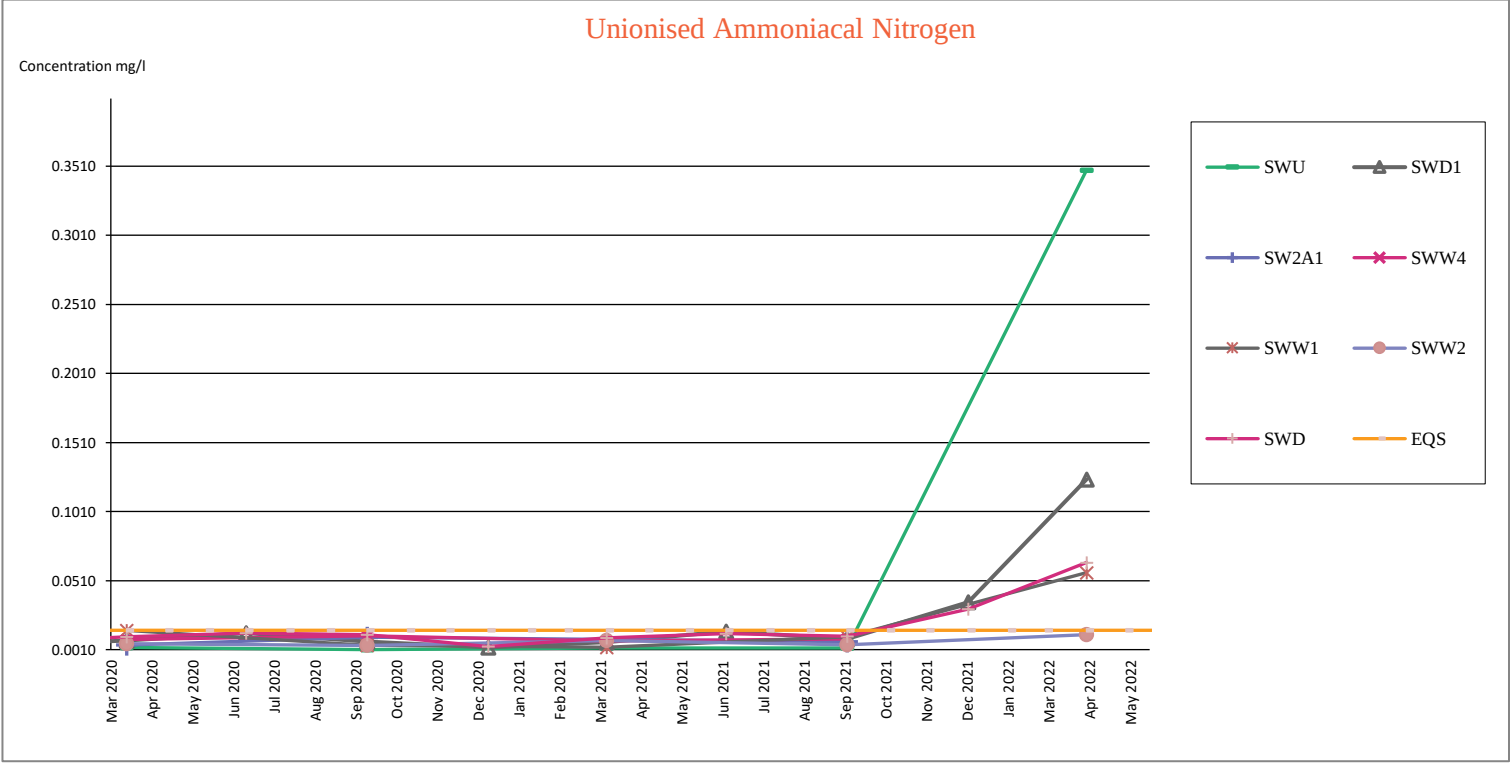
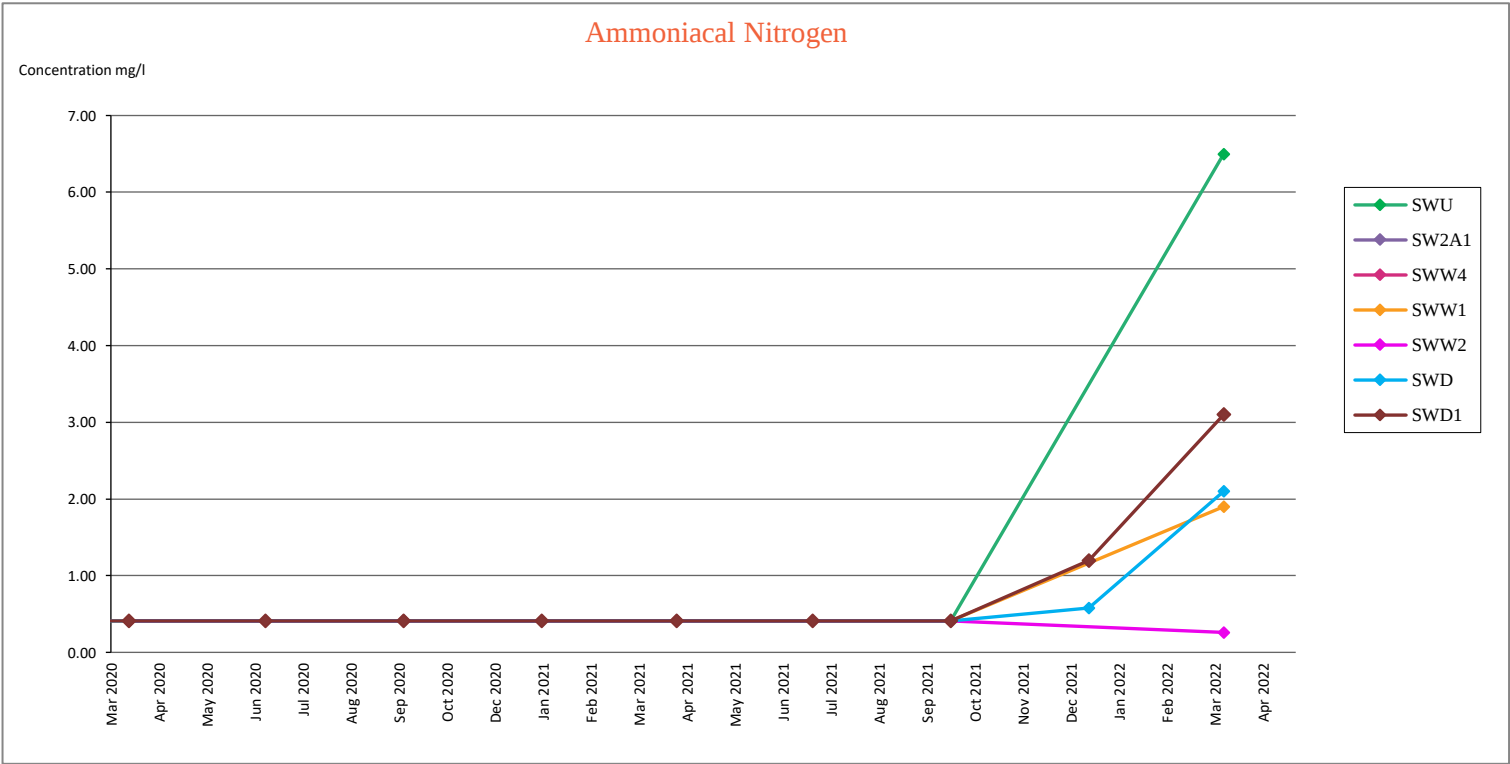


Figure A5
Groundwater quality monitoring results - Compliance wells graphs

Compliance wells graphs

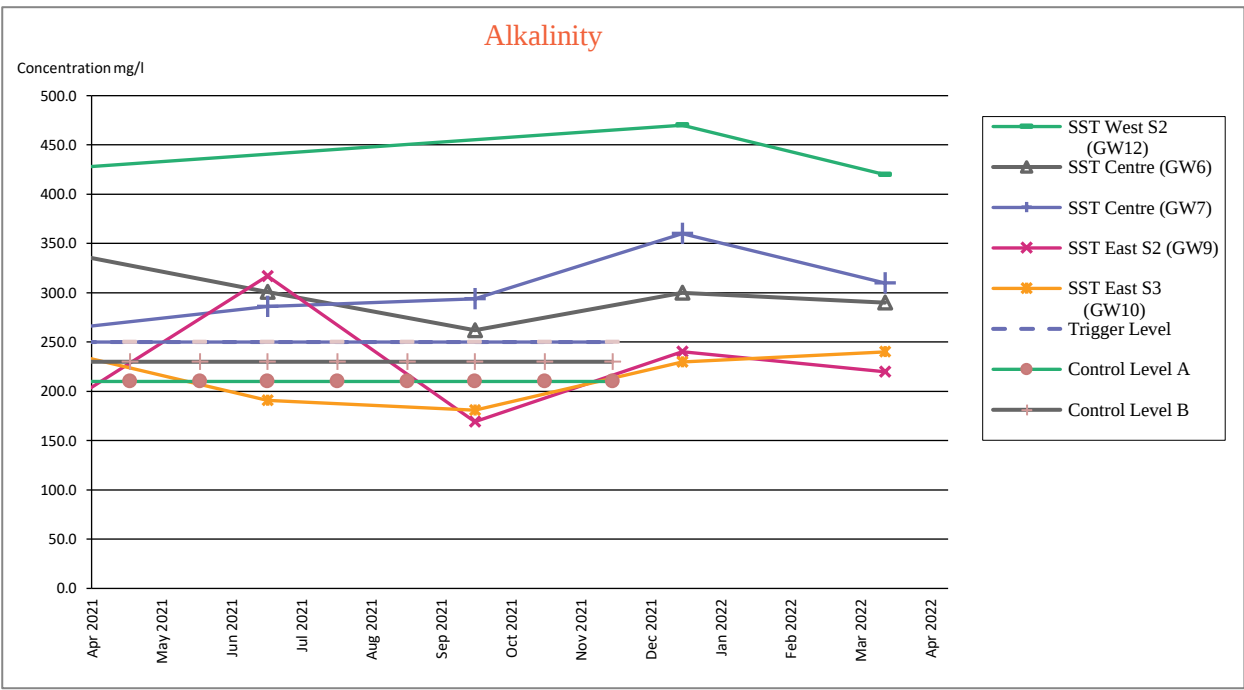
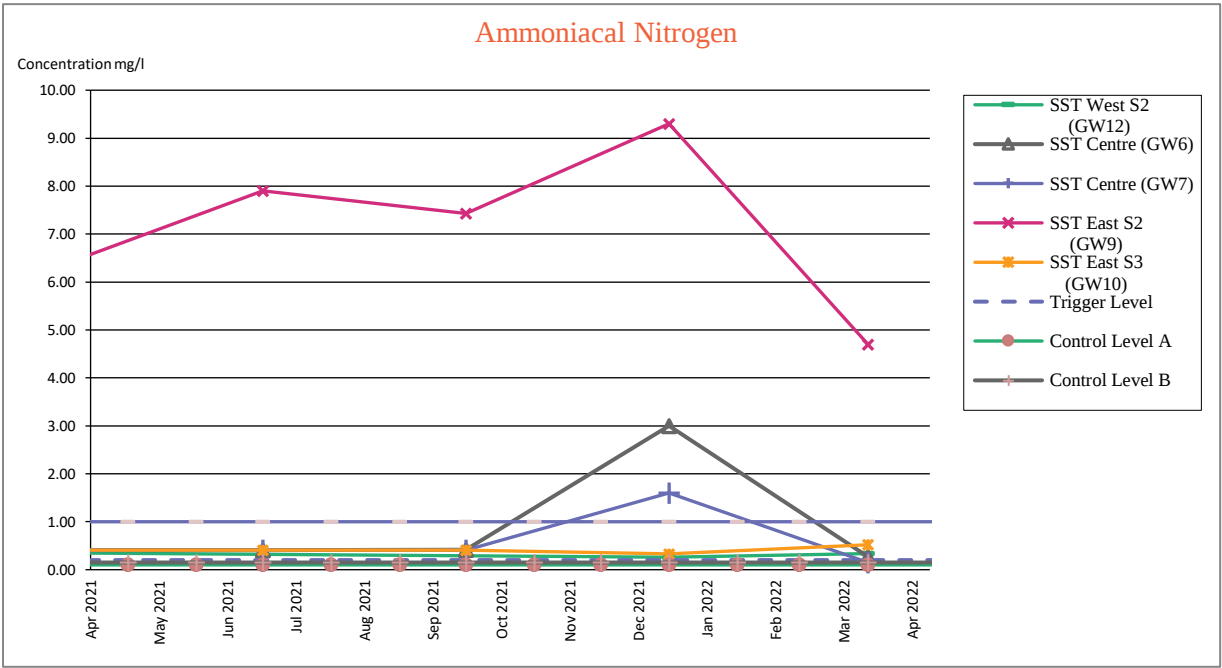
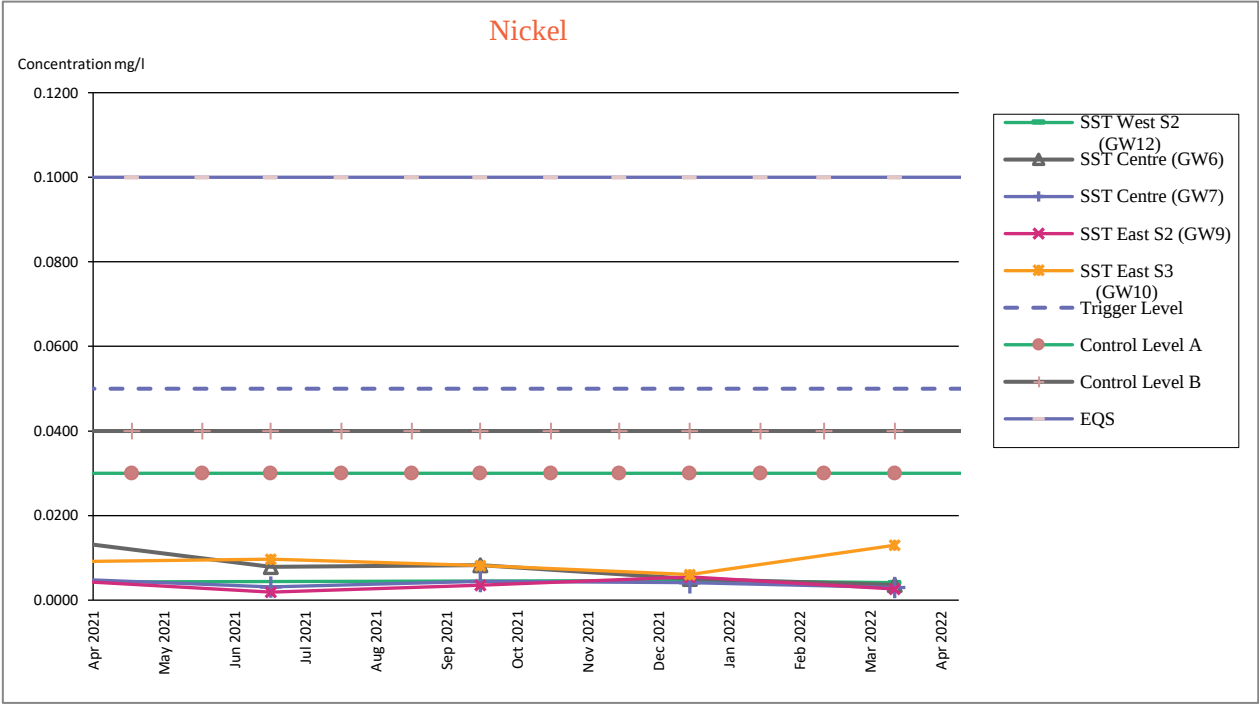
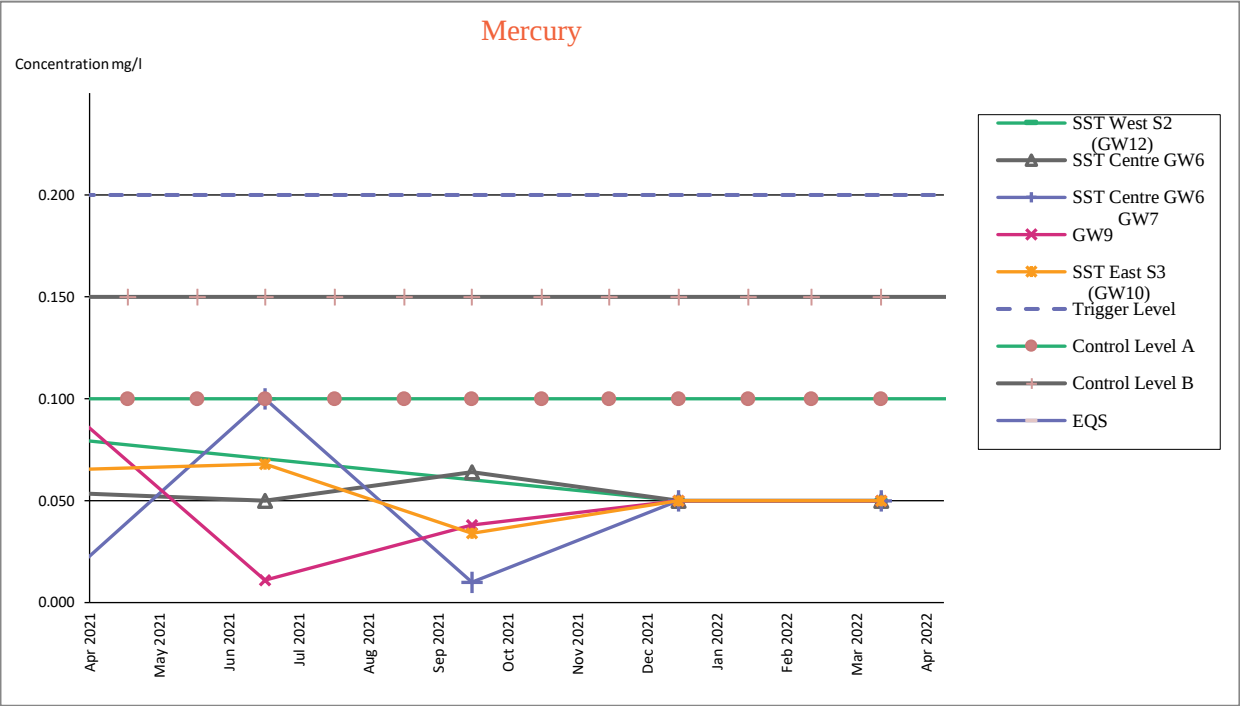


Figure A5
Groundwater quality monitoring results - Compliance wells graphs

Compliance wells graphs

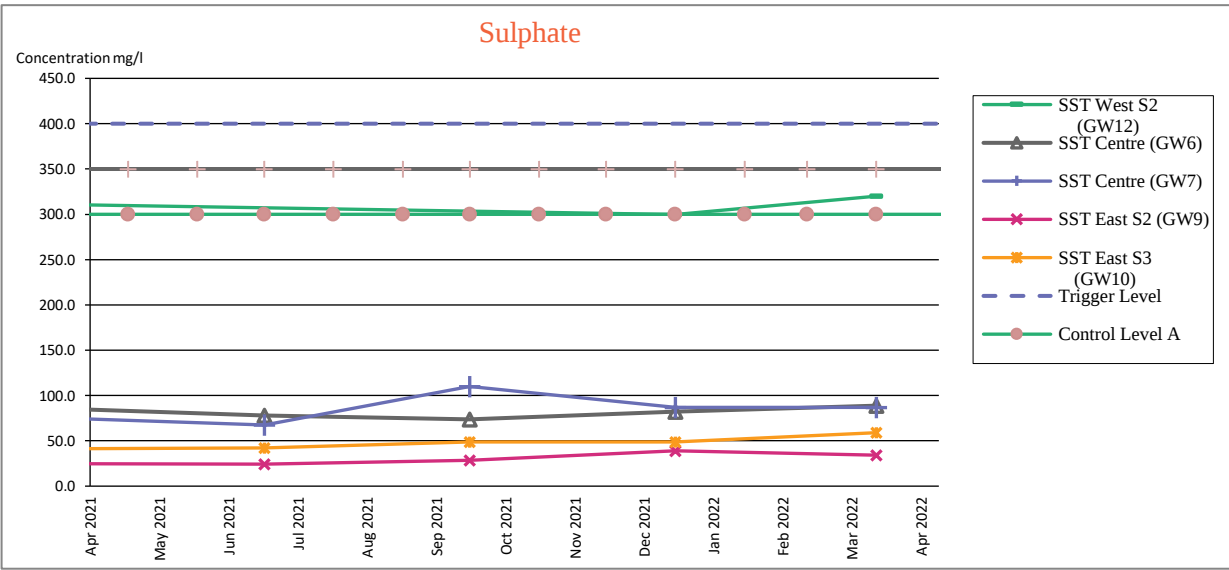
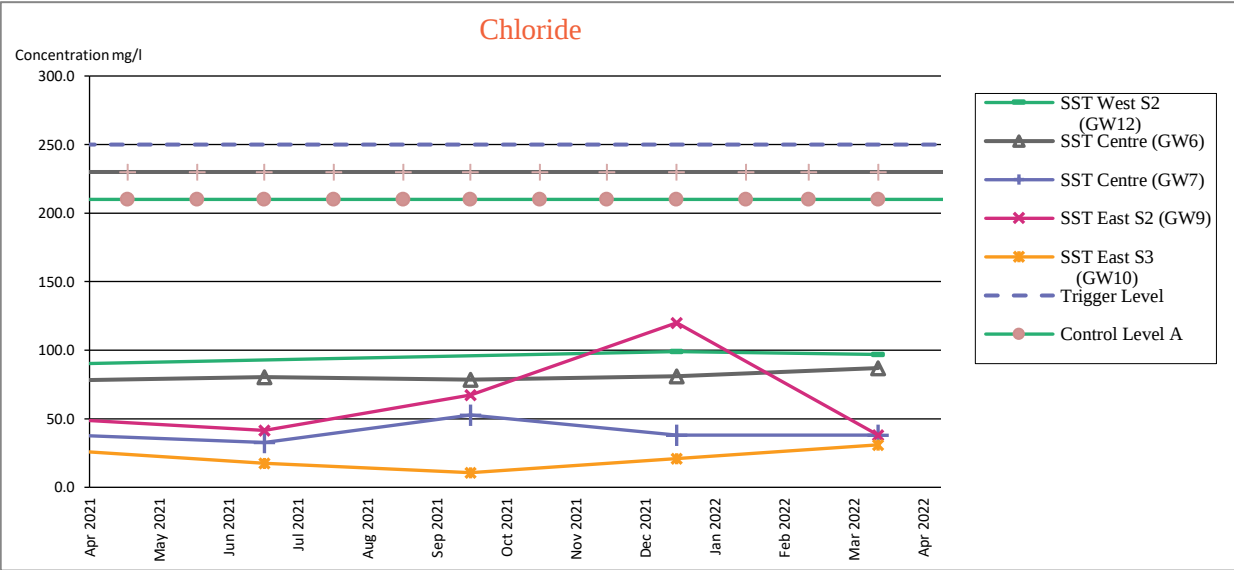
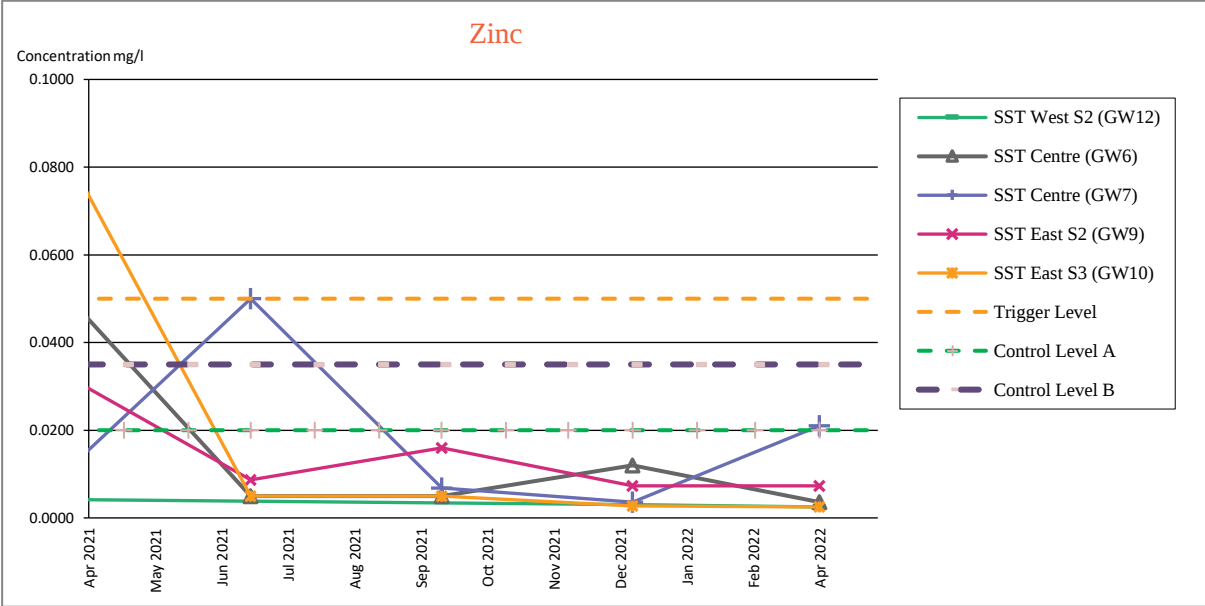
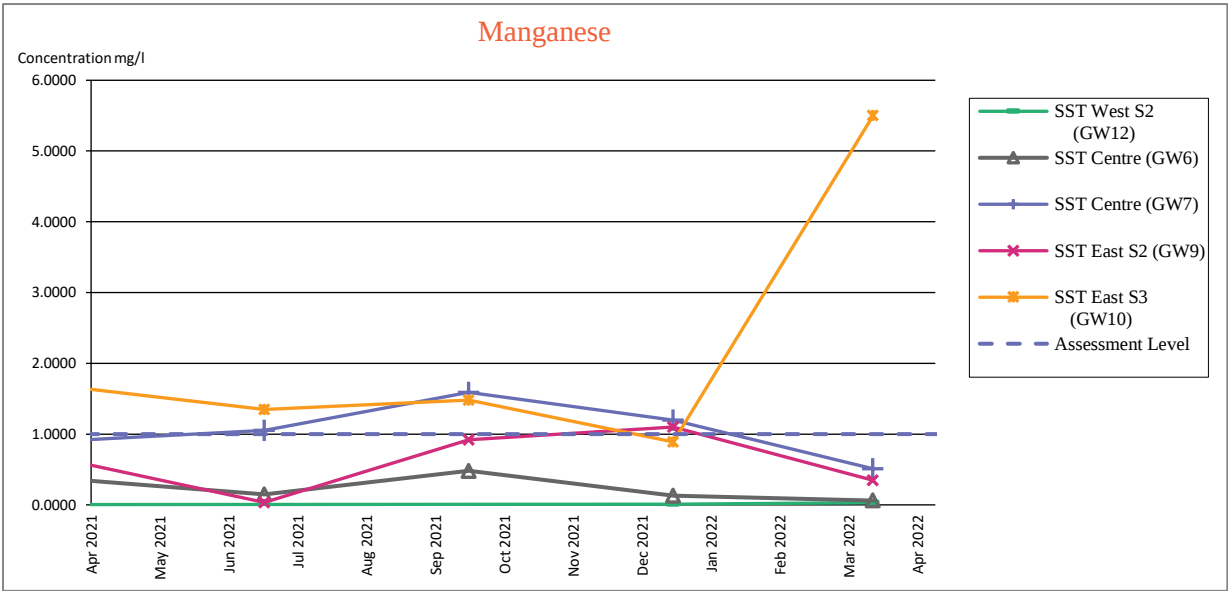


Figure A5
Groundwater quality monitoring results - Compliance wells graphs

Compliance wells graphs

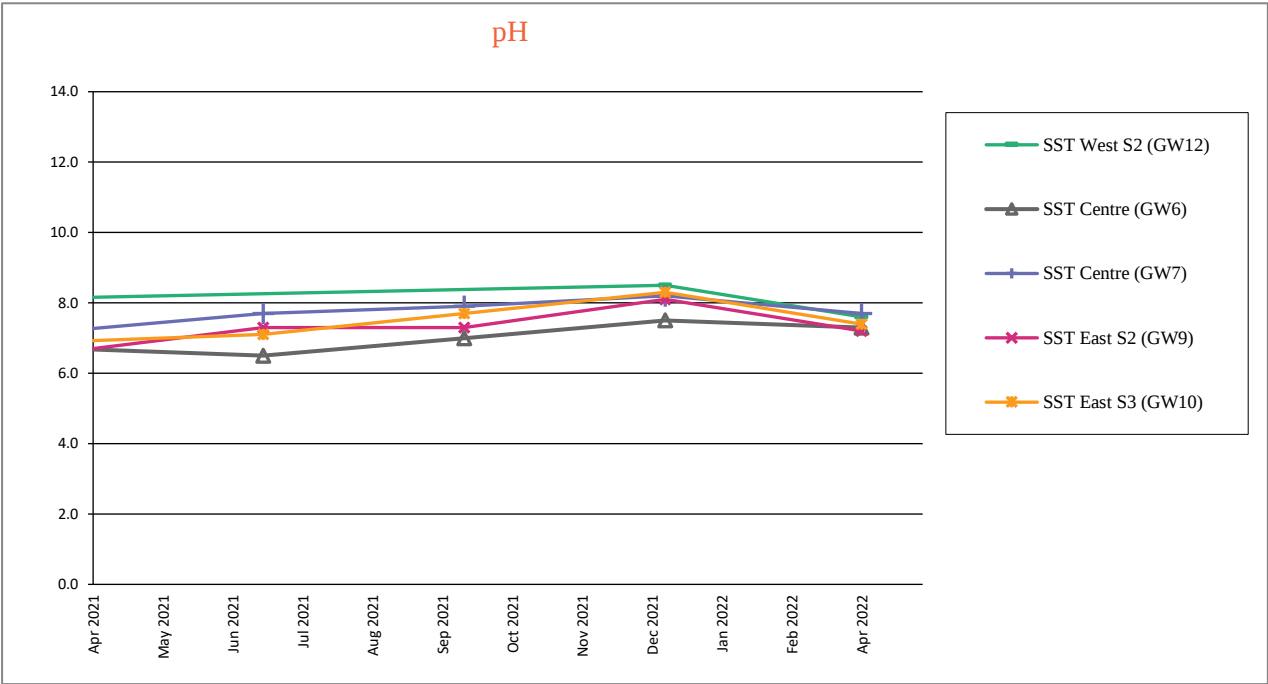


Figure A6
Groundwater quality monitoring results - Upstream wells graphs

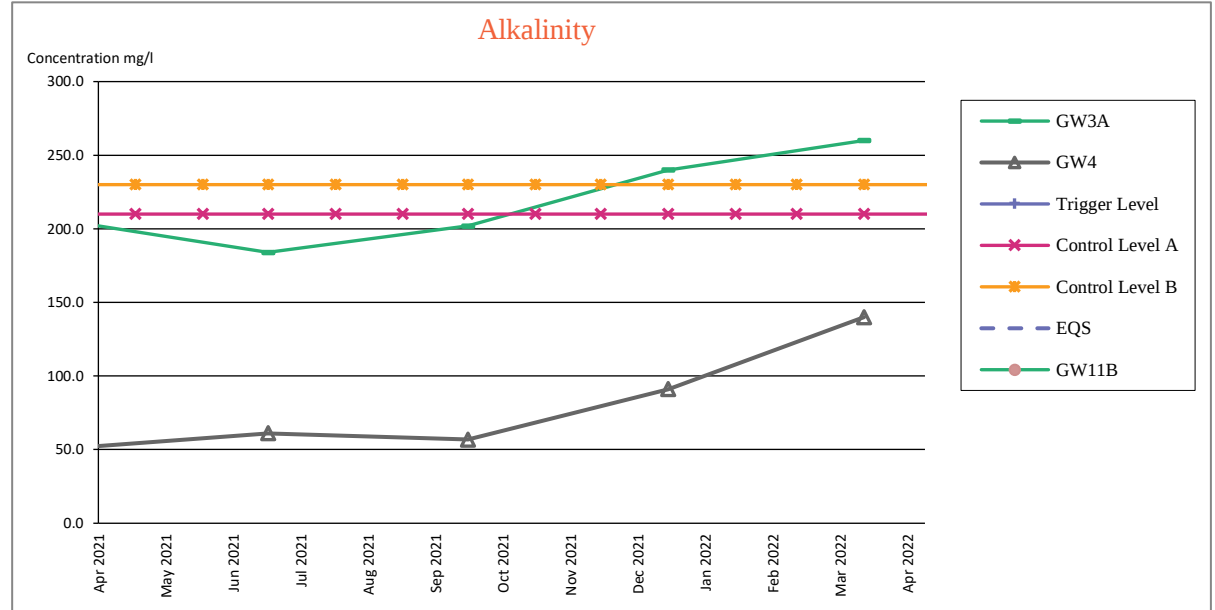
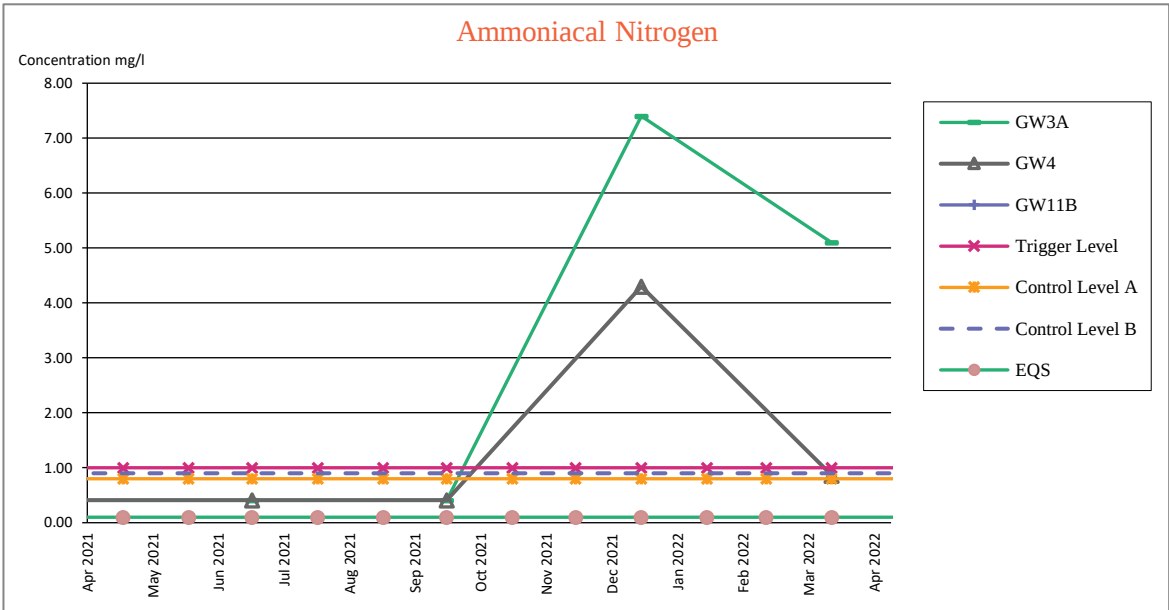
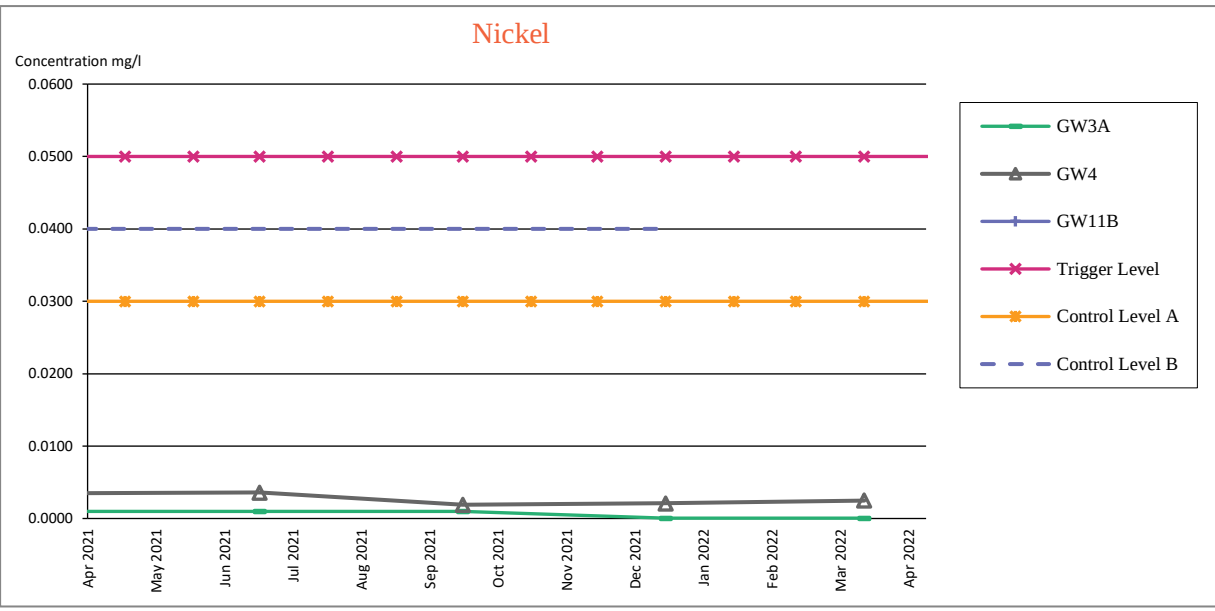
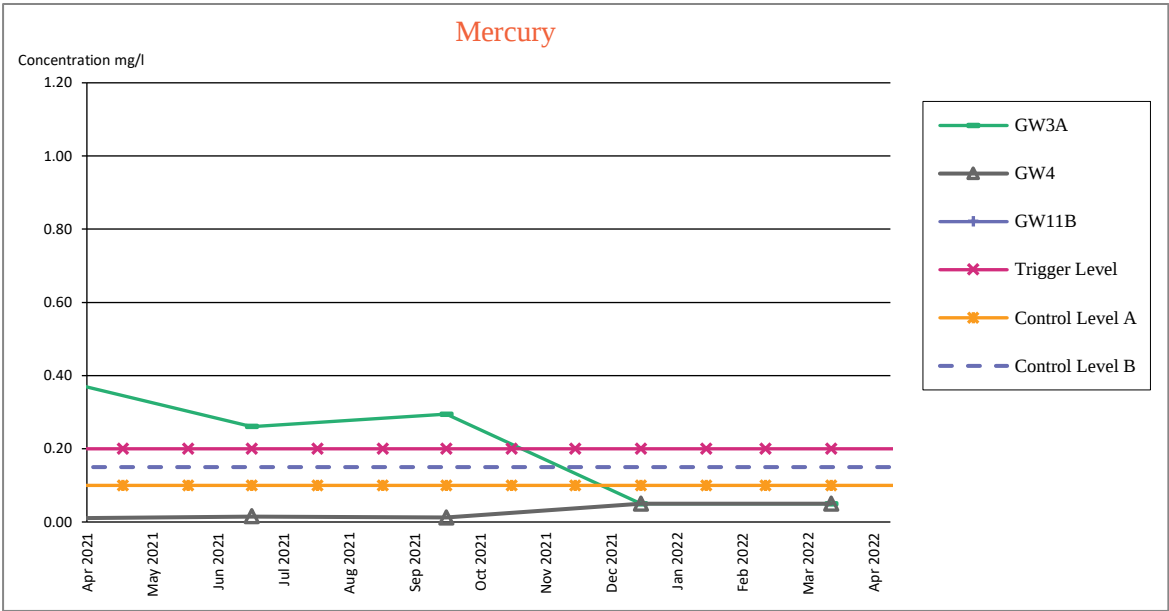


Figure A6
Groundwater quality monitoring results - Upstream wells graphs

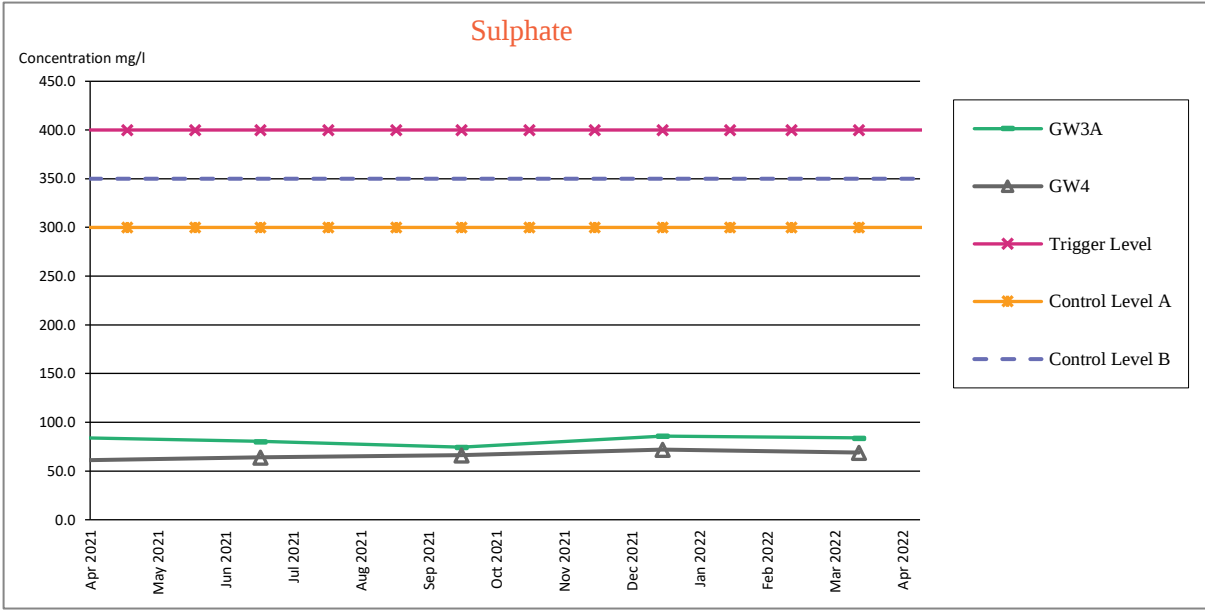
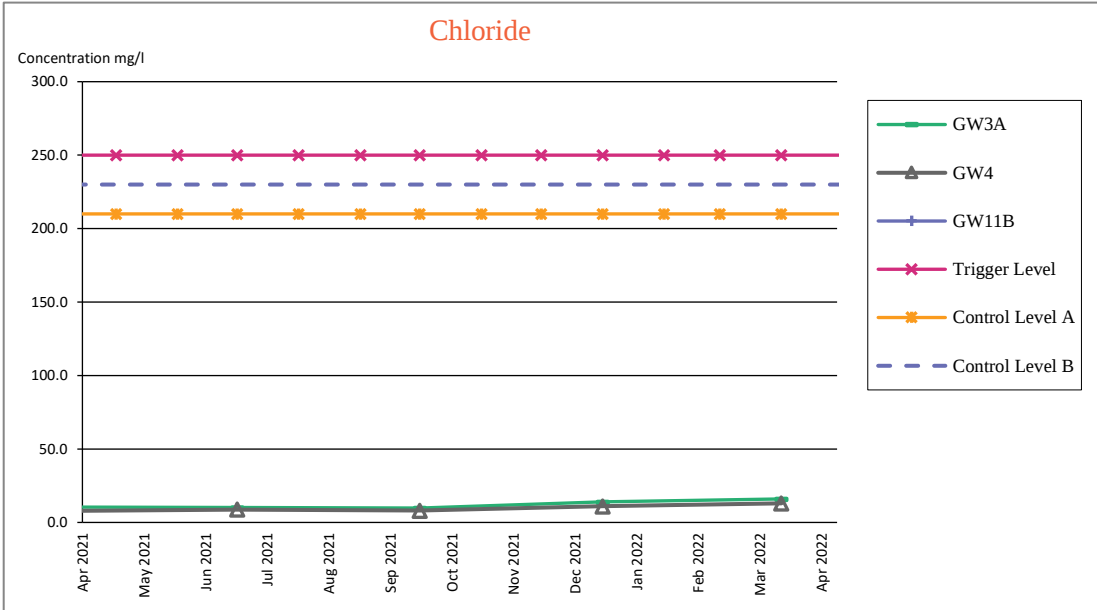
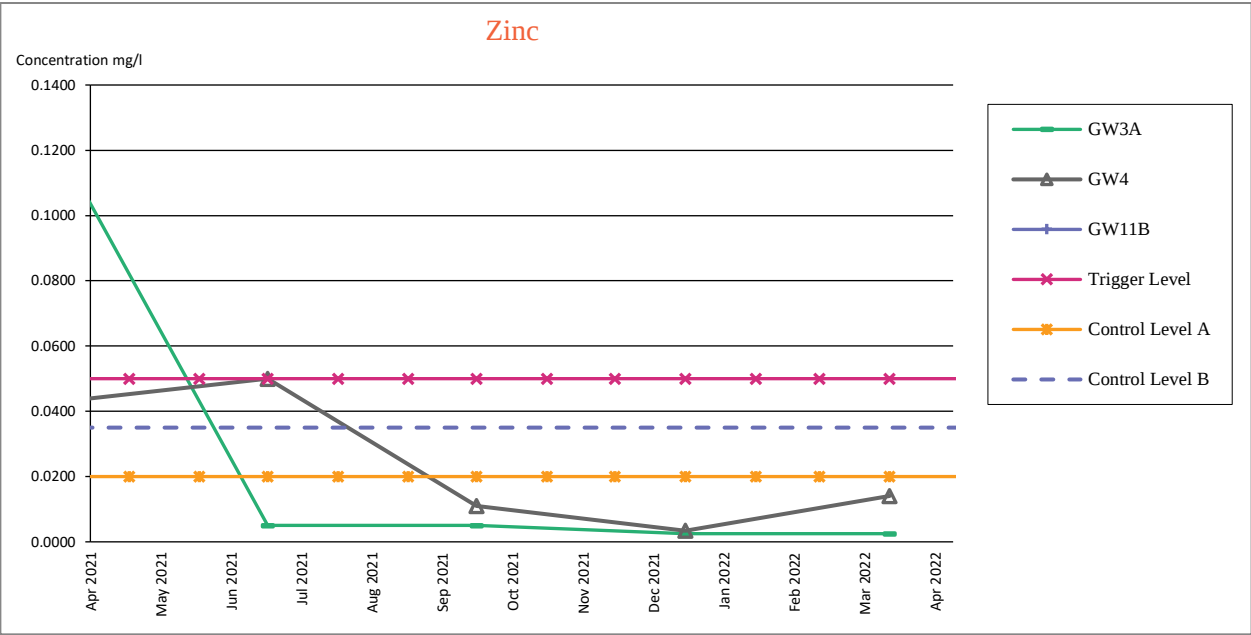
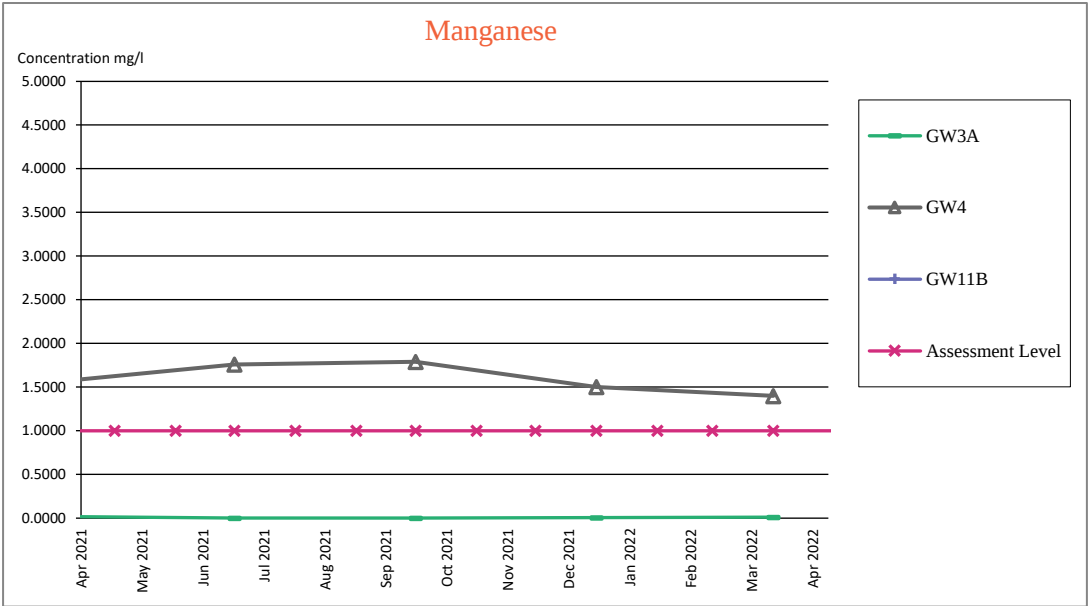


Figure A6
Groundwater quality monitoring results - Upstream wells graphs

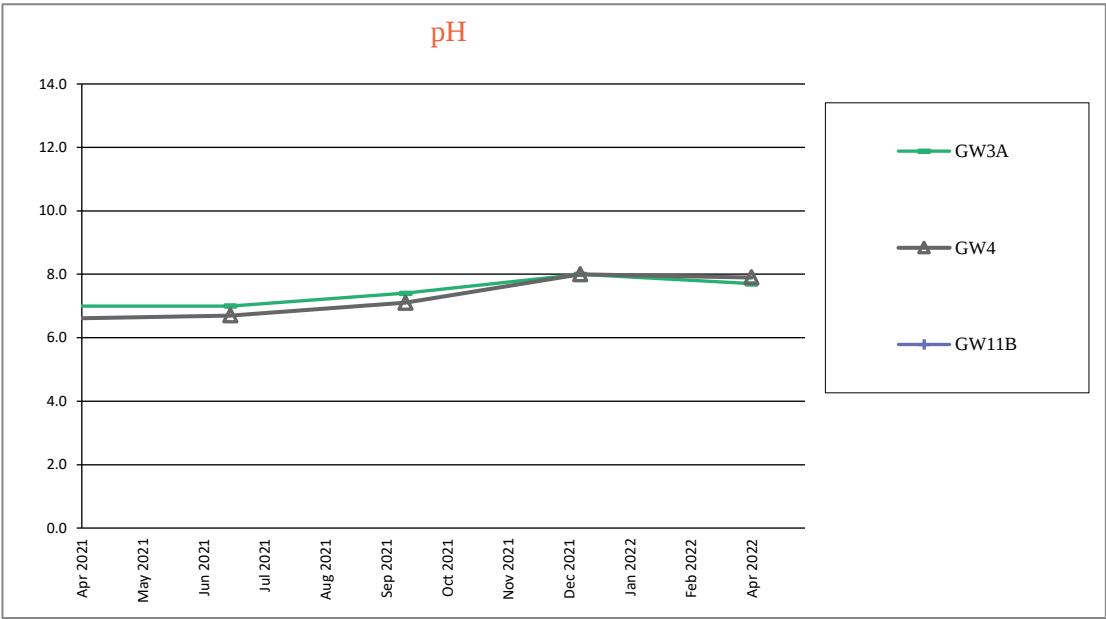
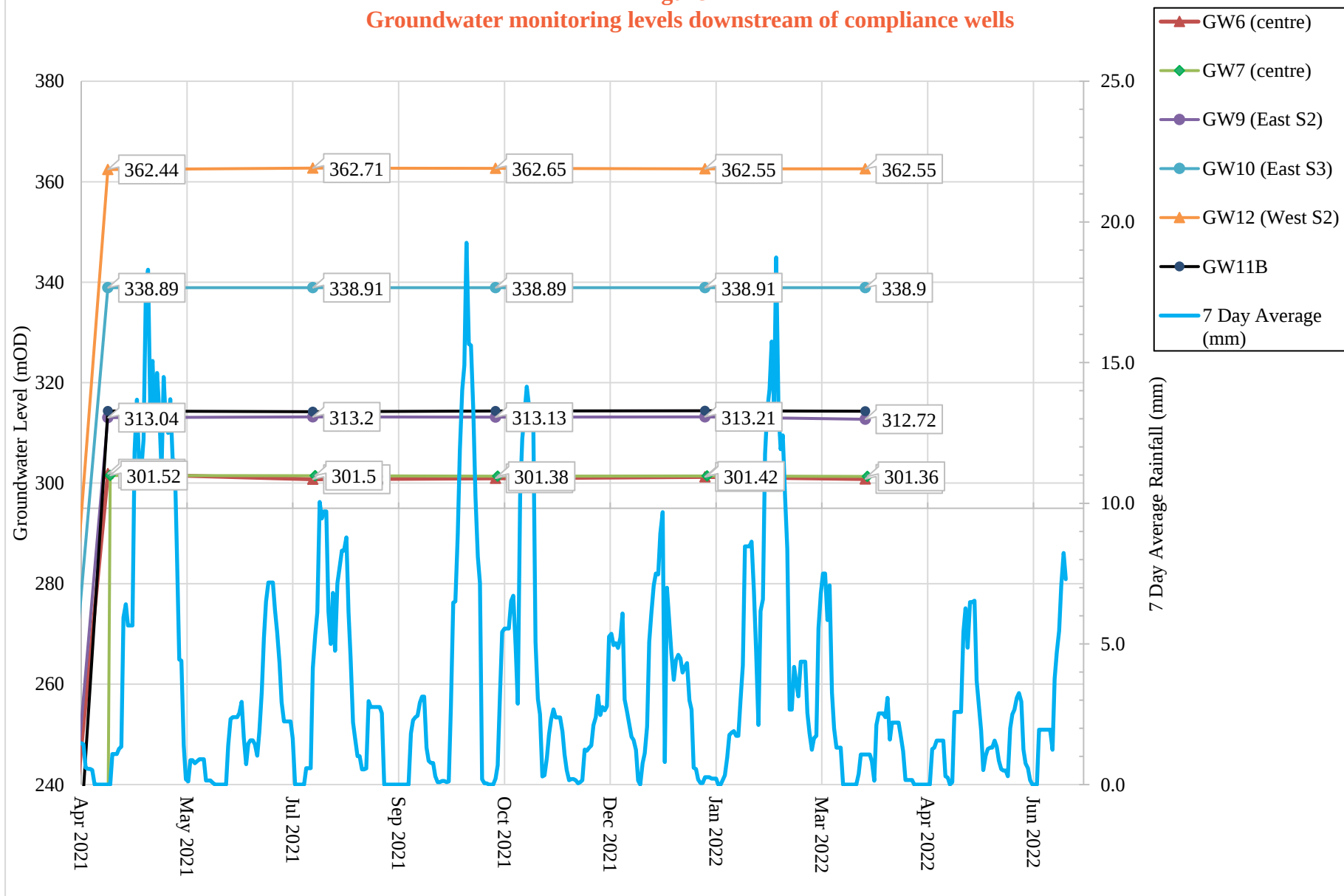


Figure A7
Groundwater monitoring levels downstream of compliance wells



A.2 Monitoring Results- Tables

May 2022														
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	-							-	-	-				
Manganese in filtrate as Mn	mg/l	N/S	0.57	N/S	0.2	0.76	N/S	0.76	0.51	--	0.24	0.085		
Mercury, filt trace as Hg	mg/l	N/S	< 0.0005	N/S	< 0.00013	< 0.00005	N/S	0.0005	0.0002	0.00056	< 0.00005	< 0.00005		
Nickel in filtrate as Ni	mg/l	N/S	< 0.0065	N/S	0.14	0.012	N/S	0.14	0.05	0.0681	0.0066	0.0073		
Zinc, ultra-low filtered as Zn	mg/l	N/S	0.0098	N/S	0.11	< 0.011	N/S	0.11	0.04	1.38	0.044	0.0086		
pH	pH Units	N/S	7.6	N/S	8.3	8	N/S	8.3	7.97	--	7.8	8.1		
Conductivity- Electrical 20C	uS/cm	N/S	2000	N/S	11000	5100	N/S	11000	6033	--	1700	2600		
Alkalinity as CaCO3	mg/l	N/S	470	N/S	4200	420	N/S	4200	1697	--	510	950		
Ammoniacal Nitrogen as N	mg/l	N/S	0.26	N/S	560	170	N/S	560	243	526	2.7	61		
Chloride as Cl	mg/l	N/S	140	N/S	940	240	N/S	940	440	1408	130	170		
Sulphate as SO4	mg/l	N/S	410	N/S	990	55	N/S	990	485	999	210	180		
Redox Potential ^(see note 4)	mV	N/S	57	N/S	14	21	N/S	57	31	--	56	45		
Total Suspended Solids	mg/l	N/S	48	N/S	1100	710	N/S	1100	619	--	98	20		
Solids, Total Dissolved 180 deg C	mg/l	N/S	1300	N/S	7100	3300	N/S	7100	3900	--	1100	1700		
Dissolved Oxygen, Fixed*	mg/l	N/S	-	N/S	-	-	N/S	-	-	--	-	-		
TOC (filtered)	mg/l	N/S	14	N/S	350	63	N/S	350	142.3	--	23	86		

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)

*Dissolved Oxygen, Fixed was not sampled this quarter

Table B2
Leachate Head Levels

		Jan-22	Feb-22	Mar-22	Apr-22	May-22	Jun-22	Jul-22	Aug-22	Sep-22	Oct-22	Nov-22	Dec-22
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)	40.34			40.32								
	Leachate elevation (mAOD)	358.51			358.53								
	Calculated leachate head (m)	0.89			0.91								
LC2A	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)	35.76			35.75								
	Leachate elevation (mAOD)	365.36			365.37								
	Calculated leachate head (m)	2.87			2.88								
LC4A	Elevation of base of landfill mAOD	372.27			372.27								
	Elevation at top of casing mAOD	401.14			401.14								
	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								
LC5A	Elevation of base of landfill mAOD	350.14			350.14								
	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)												
L1	Casing height (mAOD)	357.00			357.00								
	Leachate (mbgl)	DRY			DRY								
	Leachate (m AOD)	-			-								
	Base of landfill (m AOD)	336.80			336.80								
	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)												
L1A*	Casing height (mAOD)	355.79			355.79								
	Leachate (mbgl)	DRY			20.90								
	Leachate (m AOD)	-			334.89								
	Base of landfill (m AOD)	316.64			316.64								
	Depth of well from top of casing (m)	20.89			20.91								
	Base of well (m AOD)	334.90			334.88								
	Calculated leachate head (m)				18.25								
L1B*	Casing height (mAOD)	354.80			354.80								
	Leachate (mbgl)	24.97			25.87								
	Leachate (m AOD)	329.83			328.93								
	Base of landfill (m AOD)	319.60			319.60								
	Depth of well from top of casing (m)	34.84			34.84								
	Base of well (m AOD)	319.96			319.96								
	Calculated leachate head (m)	10.23			9.33								

2022	Quarterly Leachate Head Averages (m)
January	1.94
February	
March	
April	
May	
June	
July	
August	
September	
October	
November	
December	

Minimum monthly leachate head average

Maximum monthly leachate head average

- Notes:
- Top of casings were re-surveyed in August 2019
- LC1A top of casing is 1710mm above ground level.
 - LC2A top of casing is 820mm above GL.
 - LC4A top of casing is 1040mm above GL.
 - 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 B3
Surface Water Monitoring Results

Month	Location	Date	Mercury, ultra-low total as Hg	Manganese in filtrate as Mn	Nickel in filtrate as Ni	Bioavailable Ni	Zinc, ultra-low total as Zn	Bioavailable Zn	pH	Conductivity-Electrical 20C	Ammoniacal Nitrogen as N	*Unionised Ammoniacal Nitrogen based on measured Temperature	Measured surface water temperature	Chloride as Cl	Sulphate as SO4	Total Suspended Solids	Dissolved Oxygen, fixed	TOC, filtered	Redox Potential	Alkalinity as CaCO3	Calcium		
Freshwater EQS**			ug/l	mg/l	mg/l	mg/l	mg/l	mg/l		uS/cm	mg/l	mg/l	°C	mg/l	mg/l	mg/l	mg/l	mg/l	mV	mg/l	mg/l		
January	Upstream of Landfill	SWU	N/S	N/S	N/S	N/S	N/S	N/S	N/S	N/S	N/S	N/S	N/S	N/S	N/S	N/S	N/S	N/S	N/S	N/S	N/S		
		SW2AI	N/S	N/S	N/S	N/S	N/S	N/S	N/S	N/S	N/S	N/S	N/S	N/S	N/S	N/S	N/S	N/S	N/S	N/S	N/S		
		SWW4	N/S	N/S	N/S	N/S	N/S	N/S	N/S	N/S	N/S	N/S	N/S	N/S	N/S	N/S	N/S	N/S	N/S	N/S	N/S		
	SWW2	N/S	N/S	N/S	N/S	N/S	N/S	N/S	N/S	N/S	N/S	N/S	N/S	N/S	N/S	N/S	N/S	N/S	N/S	N/S			
	SWD1	<	0.05	0.003	0.002	<	0.001	0.005	<	0.001	8.40	300	1.20	0.035	4.20	13.00	63.00	5.00	-	17.00	56.00	75.00	26.00
	April	Upstream of Landfill	SWU	<	0.050	0.001	0.001	0.001	0.004	8.50	120	6.500	0.348	9.5	6.7	22.0	30.0	-	<	2.0	51.0	130.0	6.4
SW2AI			N/S	N/S	N/S	N/S	N/S	N/S	N/S	N/S	N/S	N/S	N/S	N/S	N/S	N/S	N/S	N/S	N/S	N/S	N/S	N/S	
SWW4			N/S	N/S	N/S	N/S	N/S	N/S	N/S	N/S	N/S	N/S	N/S	N/S	N/S	N/S	N/S	N/S	N/S	N/S	N/S	N/S	
SWW2		<	0.050	0.001	0.001	0.001	<	0.003	8.400	220	0.260	0.012	10.3	300.0	87.0	13.0	-	<	2.0	72.0	140.0	16.0	
SWD1		<	0.050	0.001	0.001	0.001	<	0.003	8.300	430	3.100	0.124	11.6	4.0	110.0	92.0	-	<	2.0	57.0	180.0	38.0	
September		Upstream of Landfill	SWU	N/S	N/S	N/S	N/S	N/S	N/S	N/S	N/S	N/S	N/S	N/S	N/S	N/S	N/S	N/S	N/S	N/S	N/S	N/S	N/S
	SW2AI		N/S	N/S	N/S	N/S	N/S	N/S	N/S	N/S	N/S	N/S	N/S	N/S	N/S	N/S	N/S	N/S	N/S	N/S	N/S	N/S	
	SWW4		N/S	N/S	N/S	N/S	N/S	N/S	N/S	N/S	N/S	N/S	N/S	N/S	N/S	N/S	N/S	N/S	N/S	N/S	N/S	N/S	
	SWW2	N/S	N/S	N/S	N/S	N/S	N/S	N/S	N/S	N/S	N/S	N/S	N/S	N/S	N/S	N/S	N/S	N/S	N/S	N/S	N/S		
	SWD1	N/S	N/S	N/S	N/S	N/S	N/S	N/S	N/S	N/S	N/S	N/S	N/S	N/S	N/S	N/S	N/S	N/S	N/S	N/S	N/S		
	Minimum			<	0.0000	<	0.0000	<	0.0000	<	0.0000	<	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	
Maximum			<	0.0000	<	0.0000	<	0.0000	<	0.0000	<	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000		

- Exceedance of EQS
- Upstream of Nant Merddog
- Downstream of Nant Merddog
- Notes

1.The redox potential was not measured on site and there is a possibility that it has changed between sampling and analysis

2.N/S - Not analysed

3.Unionised ammoniacal nitrogen based on measured

4.Environmental Quality Standard EQS 1 for freshwater is derived to protect the most sensitive aquatic life.

5.NW Ditch - North Western (ditch system)

[illegible]

Table B4
Groundwater monitoring results

Location	Month	Date	Test reference number	Redox Potential	Mercury, filtrate as Hg	Manganese in filtrate as Mn	Nickel in filtrate as Ni	Zinc, ultra-low filtered as Zn	pH	Electrical Conductivity 20C	Alkalinity as CaCO3	Ammoniacal Nitrogen as N	Unionised Ammoniacal Nitrogen ***	Measure water temperature	Chloride as Cl	Sulphate as SO4	Calcium	D.O. concentration	TOC (Filtered)			
				mV	ug/l	mg/l	mg/l	mg/l	pH units	uS/cm	mg/l	mg/l	mg/l	°C	mg/l	mg/l	mg/l	mg/l	mg/l			
Trigger Level					(0.2*)		0.05	(0.05*)	--	--	--	1	--	--	250	400	--	--	--			
Control Level A					(0.1**)	--	0.03	(0.02**)	--	--	--	0.8	--	--	210	300	--	--	--			
Control Level B					(0.15**)	--	0.04	(0.035**)	--	--	--	0.9	--	--	230	350	--	--	--			
Assessment Level					--	(1.0*)	--	--	--	--	--	--	--	--	--	--	--	--	--			
DOWNSTREAM WELLS / COMPLIANCE WELLS																						
SST West S2																						
GW12	Jan-21	20/01/21	20069623	137	0.019	0.0081	0.0013	<	0.0050	7.0	454.0	184.0	<	0.41	0.0016	20.1	15.0	48.3	55.0	8.8	2.4	
	Feb-21	Quarterly																				
	Mar-21																					
	Apr-21	27/04/21	20384858	-173	0.15	0.0015	0.0051	0.1700	7.4	1530.0	420.0	<	0.41	0.0038	19.3	93.8	276.0	N/S	6.0	10.9		
	May-21	Quarterly																				
	Jun-21																					
	Jul-21	27/07/21	20670064	-271	0.06	0.0009	0.0050	<	0.0050	8.1	1620.0	444.0	<	0.41	0.0190	19.8	97.8	298.0	146.0	5.7	9.2	
	Aug-21	Quarterly																				
	Sep-21																					
	Oct-21	18/10/21	20977677	-296	0.10	0.0005	0.0040	<	0.0050	7.9	1520.0	397.0	<	0.41	0.0122	18.5	83.8	318.0	161.0	6.6	8.5	
	Nov-21	Quarterly																				
	Dec-21																					
	Jan-22	20/01/22	1357011	62	<	0.050	0.0100	0.0047	0.0030	8.5	1600.0	470.0	0.26	0.0265	18.8	99.0	300.0	130.0	-	<	2.0	
	Feb-22	Quarterly																				
	Mar-22																					
	Apr-22	10/05/22	1430023	70	<	0.050	0.032	0.0041	<	0.0025	7.6	1600.0	420.0	0.34	0.0044	17.6	97.0	320.0	130.0	-	7.1	
	May-22	Quarterly																				
	Jun-22																					
	Jul-22																					
	Aug-22																					
	Sep-22																					
	Oct-22																					
	Nov-22																					
	Dec-22																					
SST Centre																						
GW6	Jan-21	20/01/21	20069618	137	0.036	0.4410	0.0098	<	0.0050	6.6	901.0	303.0	<	0.41	0.0004	12.0	82.2	96.6	54.0	4.1	4.8	
	Feb-21	Quarterly																				
	Mar-21																					
	Apr-21	27/04/21	20384853	-94	0.05	0.3740	0.0140	0.0520	6.7	935.0	341.0	<	0.41	0.0004	11.8	77.9	85.5	N/S	3.2	4.7		
	May-21	Quarterly																				
	Jun-21																					
	Jul-21	27/07/21	20670059	-318	0.05	0.1480	0.0079	<	0.0050	6.5	879.0	301.0	<	0.41	0.0003	12.8	80.4	77.9	57.0	2.5	5.1	
	Aug-21	Quarterly																				
	Sep-21																					
	Oct-21	18/10/21	20977672	-252	0.06	0.4820	0.0083	<	0.0050	7.0	799.0	262.0	<	0.42	0.0009	12.4	78.6	73.7	54.0	2.6	3.6	
	Nov-21	Quarterly																				
	Dec-21																					
	Jan-22	20/02/22	1357007	62	<	0.05	0.1300	0.0051	0.0120	7.5	850.0	300.0	3.00	0.0193	11.3	81.0	82.0	33.0	-	3.9		
	Feb-22	Quarterly																				
	Mar-22																					
	Apr-22	10/05/22	1430019	62	<	0.050	0.061	0.0036	0.0036	7.3	850.0	290.0	0.27	0.0012	12.0	87.0	89.0	46.0	-	3.3		
	May-22	Quarterly																				
	Jun-22																					
	Jul-22																					
	Aug-22																					
	Sep-22																					
	Oct-22																					
	Nov-22																					
	Dec-22																					
GW7	Jan-21	20/01/21	20069619	111	<	0.010	0.0071	0.0052	0.0120	7.1	837.0	312.0	<	0.41	0.0011	11.8	46.9	80.6	85.0	4.1	5.3	
	Feb-21	Quarterly																				
	Mar-21																					
	Apr-21	27/04/21	20384854	-168	<	0.010	0.9050	0.0051	0.0097	7.2	736.0	263.0	<	0.41	0.0014	11.7	38.3	75.1	N/S	4.5	4.7	
	May-21	Quarterly																				
	Jun-21																					
	Jul-21	27/07/21	20670060	-321	<	0.10	1.0500	0.0031	<	0.0500	7.7	679.0	286.0	<	0.41	0.0048	13.2	32.7	67.5	84.0	3.5	5.2
	Aug-21	Quarterly																				
	Sep-21																					
	Oct-21	18/10/21	20977673	-254	<	0.01	1.5900	0.0044	0.0068	7.9	853.0	294.0	<	0.41	0.0075	12.0	52.7	110.0	85.0	3.6	5.9	
Nov-21	Quarterly																					
Dec-21																						
GW7	Jan-22	20/01/22	1357008	54	<	0.05	1.2000	0.0041	0.0036	8.2	860.0	360.0	1.60	0.050	11.3	38.0	87.0	75.0	-	5.5		
	Feb-22	Quarterly																				
	Mar-22																					
	Apr-22	10/05/22	1430020	56	<	0.050	0.51	0.0030	0.0210	7.7	790.0	310.0	0.15	0.002	11.5	38.0	87.0	71.0	-	4.8		
	May-22	Quarterly																				
	Jun-22																					
	Jul-22																					
	Aug-22																					
	Sep-22																					
	Oct-22																					
Nov-22																						
Dec-22																						

Table B4
Groundwater monitoring results

Location	Month	Date	Test reference number	Redox Potential	Mercury, filtrate as Hg	Manganese in filtrate as Mn	Nickel in filtrate as Ni	Zinc, ultra-low filtered as Zn	pH	Electrical Conductivity 20C	Alkalinity as CaCO3	Ammoniacal Nitrogen as N	Unionised Ammoniacal Nitrogen ***	Measure water temperature	Chloride as Cl	Sulphate as SO4	Calcium	D.O. concentration	TOC (Filtered)			
				mV	ug/l	mg/l	mg/l	mg/l	pH units	uS/cm	mg/l	mg/l	mg/l	°C	mg/l	mg/l	mg/l	mg/l	mg/l			
			Trigger Level		(0.2*)		0.05	(0.05*)	--	--	--	1	--	--	250	400	--	--	--			
			Control Level A		(0.1**)	--	0.03	(0.02**)	--	--	--	0.8	--	--	210	300	--	--	--			
			Control Level B		(0.15**)	--	0.04	(0.035**)	--	--	--	0.9	--	--	230	350	--	--	--			
			Assessment Level		--	(1.0*)	--	--	--	--	--	--	--	--	--	--	--	--	--			
SST East S2	GW9	Jan-21	20/01/21	20069620	110	0.015	0.2920	0.0028	0.0050	6.6	376.0	129.0	5.85	0.0049	11.7	28.5	15.1	21.0	2.9	3.7		
		Feb-21		Quarterly																		
		Mar-21																				
		Apr-21	27/04/21	20384855	-170	0.10	0.6490	0.0046	0.0330	6.6	664.0	185.0	6.35	0.0054	11.8	49.9	24.9	N/S	2.5	5.6		
		May-21		Quarterly																		
		Jun-21																				
		Jul-21	27/07/21	20670061	-285	0.01	0.0347	0.0019	0.0087	7.3	926.0	317.0	7.90	0.0402	14.3	41.4	24.1	71.0	3.4	8.0		
		Aug-21		Quarterly																		
		Sep-21																				
		Oct-21	18/10/21	20977674	-307	0.04	0.9200	0.0035	0.0160	7.3	772.0	169.0	7.43	0.0378	12.7	67.4	28.6	45.0	1.8	4.7		
		Nov-21		Quarterly																		
		Dec-21																				
	Jan-22	20/01/22	1357009	66	<	0.05	1.1000	0.0055	0.0073	8.1	1200.0	240.0	9.30	0.2	11.7	120.0	39.0	50.0	-	6.1		
	Feb-22		Quarterly																			
	Mar-22																					
	Apr-22	10/05/22	1430021	68	<	0.05	0.35	0.0026	0.0073	7.2	550.0	220.0	4.70	0.016	12.4	38.0	34.0	23.0	-	2.9		
	May-22		Quarterly																			
	Jun-22																					
	Jul-22																					
	Aug-22																					
Sep-22																						
Oct-22																						
Nov-22																						
Dec-22																						
SST East S3	GW10	Jan-21	20/01/21	20069621	104	0.07	0.2140	0.0027	<	0.0050	6.8	254.0	124.0	<	0.41	0.0006	13.1	5.5	19.5	45.0	9.2	2.3
		Feb-21																				
		Mar-21																				
		Apr-21	27/04/21	20384856	-251	0.07	1.6800	0.0091	0.085	6.9	639.0	240.0	<	0.41	0.0006	10.1	27.1	41.1	N/S	2.9	7.0	
		May-21		Quarterly																		
		Jun-21																				
		Jul-21	27/07/21	20670062	-310	0.07	1.3500	0.0097	<	0.0050	7.1	480.0	191.0	<	0.41	0.0012	13.4	17.5	42.3	61.0	5.4	5.3
		Aug-21		Quarterly																		
		Sep-21																				
		Oct-21	18/10/21	20977675	-281	0.03	1.4800	0.0082	<	0.0050	7.7	439.0	181.0	<	0.41	0.0049	11.1	10.8	48.7	61	5.3	4.1
		Nov-21		Quarterly																		
		Dec-21																				
	Jan-22	20/01/22	1357010	71	<	0.05	0.8900	0.0061	0.0027	8.3	630.0	230.0	0.33	0.0123	10.6	21.0	49.0	61.0	-	5.2		
	Feb-22																					
	Mar-22																					
	Apr-22	10/05/22	1430022	74	<	0.05	5.5	0.0130	<	0.0025	7.4	630.0	240.0	0.52	0.0027	11.3	31.0	59.0	52.0	-	6.0	
	May-22																					
	Jun-22																					
	Jul-22																					
	Aug-22																					
Sep-22																						
Oct-22																						
Nov-22																						
Dec-22																						

Exceedance of Control Level

Exceedance of Trigger Level

Exceedance of Assessment Level

Notes

* The redox potential was not measured on site and there is a possibility that it has changed between sampling and analysis (*)

** Unionised ammoniacal nitrogen based on measured Temperature and pH; unionised ammoniacal nitrogen = total ammonia/(1+10^{(10.055-(0.0324+T)-pH)}), where T°C is measured water temperature.

^ Ammonia result confirmed on duplicate analysis.

Table B5
Landfill Gas Monitoring Results

METHANE (% by Volume)														CARBON DIOXIDE (% by Volume)													
Location	Valve	Jan-22	Feb-22	Mar-22	Apr-22	May-22	Jun-22	Jul-22	Aug-22	Sep-22	Oct-22	Nov-22	Dec-22	Jan-22	Feb-22	Mar-22	Apr-22	May-22	Jun-22	Jul-22	Aug-22	Sep-22	Oct-22	Nov-22	Dec-22	Comments	
Date monitored		18/01/22	02/02/22	01/04/22	21/04/22	16/05/22	12/07/22							18/01/22	02/02/22	01/04/22	21/04/22	16/05/22	12/07/22								
GMW2	Red Valve	0	0	0	0	0	0							0.7	0.7	0.4	0.7	0.1	2							Red Valve, 25.5m depth	
	Yellow Valve	0	0	0	0	0	0							0	0	0.2	0.4	0	1.4							Yellow Valve,14m depth	
	White Valve	0	0	0	0	0	0							0	0	0.1	2.2	1.7	2.4							White Valve, 4m depth	
	Trigger Levels	1	1	1	1	1	1	1	1	1	1	1	1	-	-	-	-	-	-	-	-	-	-	-	-	Trigger Levels	
	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	-	-	-	-	-	-	-	-	-	-	-	-	Control Levels	
	Trigger Level Red	-	-	-	-	-	-	-	-	-	-	-	-	1.5	1.5	1.5	1.5	1.5	1.5	1.5	1.5	1.5	1.5	1.5	1.5	Trigger Level Red	
	Trigger Level Yellow	-	-	-	-	-	-	-	-	-	-	-	-	4.3	4.3	4.3	4.3	4.3	4.3	4.3	4.3	4.3	4.3	4.3	4.3	Trigger Level Yellow	
	Trigger Level White	-	-	-	-	-	-	-	-	-	-	-	-	12.1	12.1	12.1	12.1	12.1	12.1	12.1	12.1	12.1	12.1	12.1	12.1	Trigger Level White	
	Control Level Red	-	-	-	-	-	-	-	-	-	-	-	-	1	1	1	1	1	1	1	1	1	1	1	1	Control Level Red	
	Control Level Yellow	-	-	-	-	-	-	-	-	-	-	-	-	3.8	3.8	3.8	3.8	3.8	3.8	3.8	3.8	3.8	3.8	3.8	3.8	Control Level Yellow	
Control Level White	-	-	-	-	-	-	-	-	-	-	-	-	11.6	11.6	11.6	11.6	11.6	11.6	11.6	11.6	11.6	11.6	11.6	11.6	Control Level White		
GMW3	Red Valve	0	0	0	0	0	0							2.0	2.0	4.9	4.8	6	4							Red Valve, 19m depth	
	Yellow Valve	0	0	0	0.8	0	0							3.8	3.9	1.1	2.6	0	2							Yellow Valve,9m depth	
	White Valve	0	0	0	0.9	0	0							4.3	4.5	0.9	2.7	0.5	2.1							White Valve, 3.5m depth	
	Trigger Levels	1	1	1	1	1	1	1	1	1	1	1	1	-	-	-	-	-	-	-	-	-	-	-	-	Trigger Levels	
	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	-	-	-	-	-	-	-	-	-	-	-	-	Control Levels	
	Trigger Level Red	-	-	-	-	-	-	-	-	-	-	-	-	7.3	7.3	7.3	7.3	7.3	7.3	7.3	7.3	7.3	7.3	7.3	7.3	Trigger Level Red	
	Trigger Level Yellow	-	-	-	-	-	-	-	-	-	-	-	-	2.67	2.67	2.67	2.67	2.67	2.67	2.67	2.67	2.67	2.67	2.67	2.67	Trigger Level Yellow	
	Trigger Level White	-	-	-	-	-	-	-	-	-	-	-	-	24.02	24.02	24.02	24.02	24.02	24.02	24.02	24.02	24.02	24.02	24.02	24.02	Trigger Level White	
	Control Level Red	-	-	-	-	-	-	-	-	-	-	-	-	6.8	6.8	6.8	6.8	6.8	6.8	6.8	6.8	6.8	6.8	6.8	6.8	Control Level Red	
	Control Level Yellow	-	-	-	-	-	-	-	-	-	-	-	-	2.17	2.17	2.17	2.17	2.17	2.17	2.17	2.17	2.17	2.17	2.17	2.17	Control Level Yellow	
Control Level White	-	-	-	-	-	-	-	-	-	-	-	-	23.5	23.5	23.5	23.5	23.5	23.5	23.5	23.5	23.5	23.5	23.5	23.5	Control Level White		
GMW4	Red Valve	0	0	0	0	0	0							0.2	0.1	0.1	0.1	0	0.8							Red Valve, 30m depth	
	Yellow Valve	0	0	0	0	0	0							0	0.1	0.1	0.2	0.1	0.2							Yellow Valve,20m depth	
	White Valve	0	0	0	0	0	0							0	0	0	0.2	0	0.4							White Valve, 5m depth	
	Trigger Levels	1	1	1	1	1	1	1	1	1	1	1	1	-	-	-	-	-	-	-	-	-	-	-	-	Trigger Levels	
	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	-	-	-	-	-	-	-	-	-	-	-	-	Control Levels	
	Trigger Level Red	-	-	-	-	-	-	-	-	-	-	-	-	1.5	1.5	1.5	1.5	1.5	1.5	1.5	1.5	1.5	1.5	1.5	1.5	Trigger Level Red	
	Trigger Level Yellow	-	-	-	-	-	-	-	-	-	-	-	-	4.3	4.3	4.3	4.3	4.3	4.3	4.3	4.3	4.3	4.3	4.3	4.3	Trigger Level Yellow	
	Trigger Level White	-	-	-	-	-	-	-	-	-	-	-	-	12.1	12.1	12.1	12.1	12.1	12.1	12.1	12.1	12.1	12.1	12.1	12.1	Trigger Level White	
	Control Level Red	-	-	-	-	-	-	-	-	-	-	-	-	1	1	1	1	1	1	1	1	1	1	1	1	Control Level Red	
	Control Level Yellow	-	-	-	-	-	-	-	-	-	-	-	-	3.8	3.8	3.8	3.8	3.8	3.8	3.8	3.8	3.8	3.8	3.8	3.8	Control Level Yellow	
Control Level White	-	-	-	-	-	-	-	-	-	-	-	-	11.6	11.6	11.6	11.6	11.6	11.6	11.6	11.6	11.6	11.6	11.6	11.6	Control Level White		
GMW5	Red Valve	0	0	0	0	0	0							5.5	5.4	5.7	5.3	5	5.4							Red Valve, 26.3m depth	
	Yellow Valve	0	0	0	0	0	0							2.8	2.8	3.4	3.2	1.9	3.4							Yellow Valve,15m depth	
	White Valve	0	0	0	0	0	0							4.6	4.4	4	3.4	2.8	2.5							White Valve, 5m depth	
	Trigger Levels	1	1	1	1	1	1	1	1	1	1	1	1	-	-	-	-	-	-	-	-	-	-	-	-	Trigger Levels	
	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	-	-	-	-	-	-	-	-	-	-	-	-	Control Levels	
	Trigger Level Red	-	-	-	-	-	-	-	-	-	-	-	-	8.48	8.48	8.48	8.48	8.48	8.48	8.48	8.48	8.48	8.48	8.48	8.48	Trigger Level Red	
	Trigger Level Yellow	-	-	-	-	-	-	-	-	-	-	-	-	4.1	4.1	4.1	4.1	4.1	4.1	4.1	4.1	4.1	4.1	4.1	4.1	Trigger Level Yellow	
	Trigger Level White	-	-	-	-	-	-	-	-	-	-	-	-	4.8	4.8	4.8	4.8	4.8	4.8	4.8	4.8	4.8	4.8	4.8	4.8	Trigger Level White	
	Control Level Red	-	-	-	-	-	-	-	-	-	-	-	-	7.98	7.98	7.98	7.98	7.98	7.98	7.98	7.98	7.98	7.98	7.98	7.98	Control Level Red	
	Control Level Yellow	-	-	-	-	-	-	-	-	-	-	-	-	3.6	3.6	3.6	3.6	3.6	3.6	3.6	3.6	3.6	3.6	3.6	3.6	Control Level Yellow	
Control Level White	-	-	-	-	-	-	-	-	-	-	-	-	4.3	4.3	4.3	4.3	4.3	4.3	4.3	4.3	4.3	4.3	4.3	4.3	Control Level White		
GMW6	Red Valve	0	0	0	0	0	0							4.2	4.2	3.6	3.9	2.8	5.7							Red Valve, 26.3m depth	
	Yellow Valve	0	0	0	0	0	0							2.1	1.6	2.1	2.1	2.8	1.5							Yellow Valve,15m depth	
	White Valve	0	0	0	0	0	0							1.7	1.8	1.8	1.6	1.1	1.6							White Valve, 5m depth	
	Trigger Levels	1	1	1	1	1	1	1	1	1	1	1	1	-	-	-	-	-	-	-	-	-	-	-	-	Trigger Levels	
	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	-	-	-	-	-	-	-	-	-	-	-	-	Control Levels	
	Trigger Level Red	-	-	-	-	-	-	-	-	-	-	-	-	4.3	4.3	4.3	4.3	4.3	4.3	4.3	4.3	4.3	4.3	4.3	4.3	Trigger Level Red	
	Trigger Level Yellow	-	-	-	-	-	-	-	-	-	-	-	-	5	5	5	5	5	5	5	5	5	5	5	5	Trigger Level Yellow	
	Trigger Level White	-	-	-	-	-	-	-	-	-	-	-	-	3.76	3.76	3.76	3.76	3.76	3.76	3.76	3.76	3.76	3.76	3.76	3.76	Trigger Level White	
	Control Level Red	-	-	-	-	-	-	-	-	-	-	-	-	3.8	3.8	3.8	3.8	3.8	3.8	3.8	3.8	3.8	3.8	3.8	3.8	Control Level Red	
	Control Level Yellow	-	-	-	-	-	-	-	-	-	-	-	-	4.5	4.5	4.5	4.5	4.5	4.5	4.5	4.5	4.5	4.5	4.5	4.5	Control Level Yellow	
Control Level White	-	-	-	-	-	-	-	-	-	-	-	-	3.26	3.26	3.26	3.26	3.26	3.26	3.26	3.26	3.26	3.26	3.26	3.26	Control Level White		

Table B5
Landfill Gas Monitoring Results

METHANE (% by Volume)														CARBON DIOXIDE (% by Volume)														
Location	Valve	Jan-22	Feb-22	Mar-22	Apr-22	May-22	Jun-22	Jul-22	Aug-22	Sep-22	Oct-22	Nov-22	Dec-22	Jan-22	Feb-22	Mar-22	Apr-22	May-22	Jun-22	Jul-22	Aug-22	Sep-22	Oct-22	Nov-22	Dec-22	Comments		
GMW7	Yellow Valve	0	0	0	0	0	0								0.3	0.2	0.1	0	0.9	0.8								Yellow Valve,12 depth
	White Valve	0	0	0	0	0	ap broken							0.3	0	0	0.1	1	ap broken							White Valve, 5m depth		
	Trigger Levels	1	1	1	1	1	1	1	1	1	1	1	1	-	-	-	-	-	-	-	-	-	-	-	-	-	Trigger Levels	
	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	-	-	-	-	-	-	-	-	-	-	-	-	-	Control Levels	
	Trigger 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	1.8	Trigger Level Yellow	
	Trigger Level White	-	-	-	-	-	-	-	-	-	-	-	-	1.82	1.82	1.82	1.82	1.82	1.82	1.82	1.82	1.82	1.82	1.82	1.82	1.82	Trigger Level White	
	Control Level Yellow	-	-	-	-	-	-	-	-	-	-	-	-	1.3	1.3	1.3	1.3	1.3	1.3	1.3	1.3	1.3	1.3	1.3	1.3	Control Level Yellow		
	Control Level White	-	-	-	-	-	-	-	-	-	-	-	-	1.32	1.32	1.32	1.32	1.32	1.32	1.32	1.32	1.32	1.32	1.32	1.32	Control Level White		
GMW12	Red Valve	0	0	0	0	0	0								1.2	0	0	2	0.9	1.1								Red Valve, 26.3m depth
	Yellow Valve	0	0	0	0	0	0								0.7	0	2.7	1.5	1	2.6								Yellow Valve,15m depth
	White Valve	0	0	0	0	0	0								0.9	0	1	2.1	1	1								White Valve, 5m depth
	Trigger Level Red	1.89	1.89	1.89	1.89	1.89	1.89	1.89	1.89	1.89	1.89	1.89	1.89	4.5	4.5	4.5	4.5	4.5	4.5	4.5	4.5	4.5	4.5	4.5	4.5	4.5	Trigger Level Red	
	Trigger Level Yellow	1	1	1	1	1	1	1	1	1	1	1	1	2.9	2.9	2.9	2.9	2.9	2.9	2.9	2.9	2.9	2.9	2.9	2.9	2.9	Trigger Level Yellow	
	Trigger Level White	1	1	1	1	1	1	1	1	1	1	1	1	5.5	5.5	5.5	5.5	5.5	5.5	5.5	5.5	5.5	5.5	5.5	5.5	5.5	Trigger Level White	
	Control Level Red	1.39	1.39	1.39	1.39	1.39	1.39	1.39	1.39	1.39	1.39	1.39	1.39	4	4	4	4	4	4	4	4	4	4	4	4	4	Control Level Red	
	Control Level Yellow	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5	2.4	2.4	2.4	2.4	2.4	2.4	2.4	2.4	2.4	2.4	2.4	2.4	2.4	Control Level Yellow	
Control Level White	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5	5	5	5	5	5	5	5	5	5	5	5	5	5	Control Level White		
GMW13	Red Valve	0	0	0	0	0	0								1.2	1.2	1.3	1.1	1.5	1.3								Red Valve, 26.3m depth
	Yellow Valve	0.1	0.1	0.1	0.1	0	0.1								4.5	4.4	4.8	4.5	4	4.9								Yellow Valve,15m depth
	White Valve	0	0	0	0	0	0								3.9	4	4	3	4.1	3.5								White Valve, 5m depth
	Trigger Level Red	1.14	1.14	1.14	1.14	1.14	1.14	1.14	1.14	1.14	1.14	1.14	1.14	7.9	7.9	7.9	7.9	7.9	7.9	7.9	7.9	7.9	7.9	7.9	7.9	7.9	Trigger Level Red	
	Trigger Level Yellow	1.2	1.2	1.2	1.2	1.2	1.2	1.2	1.2	1.2	1.2	1.2	1.2	6	6	6	6	6	6	6	6	6	6	6	6	6	Trigger Level Yellow	
	Trigger Level White	1	1	1	1	1	1	1	1	1	1	1	1	5.82	5.82	5.82	5.82	5.82	5.82	5.82	5.82	5.82	5.82	5.82	5.82	5.82	Trigger Level White	
	Control Level Red	0.64	0.64	0.64	0.64	0.64	0.64	0.64	0.64	0.64	0.64	0.64	0.64	7.4	7.4	7.4	7.4	7.4	7.4	7.4	7.4	7.4	7.4	7.4	7.4	7.4	Control Level Red	
	Control Level Yellow	0.7	0.7	0.7	0.7	0.7	0.7	0.7	0.7	0.7	0.7	0.7	0.7	5.5	5.5	5.5	5.5	5.5	5.5	5.5	5.5	5.5	5.5	5.5	5.5	5.5	Control Level Yellow	
Control Level White	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5	5.32	5.32	5.32	5.32	5.32	5.32	5.32	5.32	5.32	5.32	5.32	5.32	5.32	Control Level White		
GMW14/14A	Red Valve	0	0	0	0	0	0								4.6	4.9	2.8	2.8	3.2	1.9								Red Valve, 26.3m depth
	Yellow Valve	0	0	0	0	0	0								5.9	6.5	6.4	6.2	6.1	7.1								Yellow Valve,15m depth
	White Valve	0	0	0	0	0	0								6.7	6.5	6.5	6.1	6.1	3.1								White Valve, 5m depth
	Trigger Level Red	1	1	1	1	1	1	1	1	1	1	1	1	1.5	1.5	1.5	1.5	1.5	1.5	1.5	1.5	1.5	1.5	1.5	1.5	1.5	Trigger Level Red	
	Trigger Level Yellow	1.2	1.2	1.2	1.2	1.2	1.2	1.2	1.2	1.2	1.2	1.2	1.2	5.9	5.9	5.9	5.9	5.9	5.9	5.9	5.9	5.9	5.9	5.9	5.9	5.9	Trigger Level Yellow	
	Trigger Level White	1.2	1.2	1.2	1.2	1.2	1.2	1.2	1.2	1.2	1.2	1.2	1.2	5.4	5.4	5.4	5.4	5.4	5.4	5.4	5.4	5.4	5.4	5.4	5.4	5.4	Trigger Level White	
	Control Level Red	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5	1	1	1	1	1	1	1	1	1	1	1	1	1	Control Level Red	
	Control Level Yellow	0.7	0.7	0.7	0.7	0.7	0.7	0.7	0.7	0.7	0.7	0.7	0.7	5.4	5.4	5.4	5.4	5.4	5.4	5.4	5.4	5.4	5.4	5.4	5.4	5.4	Control Level Yellow	
Control Level White	0.7	0.7	0.7	0.7	0.7	0.7	0.7	0.7	0.7	0.7	0.7	0.7	4.9	4.9	4.9	4.9	4.9	4.9	4.9	4.9	4.9	4.9	4.9	4.9	4.9	Control Level White		
GMW1**	Red Valve	1.7	0.1	nt	0.9	0.5	2.2								2.4	0.3	nt	2.2	2.5	1.9								Red Valve, 23.5m depth
	Yellow Valve	0	17.3	nt	0	7.5	9.1								0	5.1	nt	0	4.2	10.9								Yellow Valve,14.7m depth
	White Valve	damage	0	nt	0.2	0	0								damage	0	nt	0.6	0	2.4								White Valve, 6.5m depth
GMW8*	Yellow Valve	6.6	6.8	6.8	4	6.5	1.8								7.7	7.8	7.7	4.7	12	3.3								Yellow Valve,17.5m depth
	White Valve	0	0	0	0	0	0								4.7	5	4.5	4.3	3.9	2.8								White Valve, 5.7m depth
GMW9*	Red Valve	0	0	0	0	0	0								2	2	2.1	1.9	0.6	1.8								Red Valve, 27m depth
	Yellow Valve	20.2	18.3	18.5	17.4	20	11.7								8.4	8.8	8.3	9	10.4	10.3								Yellow Valve,15m depth
	White Valve	0	0	0	0	0.1	0								0.1	0.1	0.1	0.1	0.2	0.1								White Valve, 8.5m depth
GMW10*	Red Valve	0	0	20.4	0	0	20.7								4.4	4.2	5.1	6.3	6.5	7.9								Red Valve, 19.5m depth
	Yellow Valve	14.5	7	29.2	9.6	8.6	6.8								2.4	1.3	4.7	2	5.6	1.5								Yellow Valve,15m depth
	White Valve	0	0	17.7	1.2	0	16.7								4.7	4.1	5	6.6	5.7	8.1								White Valve, 8m depth
GMW17**	Red Valve	0	0	0	0	0	0								1.6	1.5	1.6	1.4	1.1	1.2								Red Valve, 26.3m depth
	Yellow Valve	0	0	0	0	0	0								5.9	5.3	5.3	4	4.2	3.8								Yellow Valve,15m depth
	White Valve	0	0	0	0	0	0								3.3	4.6	4	4.2	4.5	3.9								White Valve, 5m depth
GMW18**	Yellow Valve	0	0	0	0	0	0								0.1	1.6	0.1	1.7	0	2.3								Yellow Valve,12 depth
	White Valve	0	0	0	0	0	0								6	5.3	5.1	4.1	7.9	3.7								White Valve, 5m depth

Notes:
1. Water denotes 'water in well - reading abandoned'.
2. NT denotes 'reading not taken'.
3. NT in GMW14 is due to cattle quarantine paddock around well location.
4. Where the asterisc (*) 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 asteriscs (**) are present, no trigger levels have been set, as not require by the Permit (Reference [2]).

Exceedance of Trigger

Exceedance of Control