

21 March 2025

WDL 249 Environmental Monitoring Report

22 December 2023- 21 December 2024

Toms Gully Mine Project Area



Endorsement

Prepared by Sally Horsnell on behalf of Hanking Australia Investment Pty Ltd

MLN1058	Waste Discharge Licence No. 249
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Photos on front page: SWTG1A upstream monitoring sites Mount Bunday creek and Toms Gully RO water treatment plant.

Endorsement

Endorsement

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Signature				

I Charles Hastie, PGO General Manager- Mining and Permitting, have reviewed this report and I confirm that to the best of my knowledge and ability, all information provided in the report is true and accurate.



SIGNATURE:

DATE: Friday 21 March 2025

Environmental Monitoring Report Checklist

Y/N	Page	Requirement	Department's Comment
Y	0	Title Page -Does it include report name, reporting period, submission date, version number, Licence number, Report author and business details	
Y	0	Certification	
Y	1	Executive summary	
Y	3	Monitoring Objective	
Y	10	Monitoring Method	
N/A	-	Where there is an approved monitoring plan – details of approved plan title, version number, date of submission)	
Y	23-26	Where there is no approved monitoring plan – details map, sample locations, site layout, description of receiving environment, description of sampling and analysis methods, factors affecting variability in monitoring results	
Y	30	Monitoring Results	
Y	App A	Has all monitoring data been included?	
Y	52	Calculations/exceedance of assessment criteria	
Y	28	QAQC	
Y	37, 38, 41, 44, 45	Presentation including graphs against trigger levels/benchmarks.	
Y	34	Discussion analysis and data interpretation against trends included?	
Y	59	Conclusions and proposed actions,	
Y	52	Have non-conformances been identified?	
Y	59	Have changes made to monitoring programs been identified and detailed?	
Y	63	Have corrective actions taken and improvements made been detailed?	
Y	65	Incident Reporting: Have environmental incidents been detailed?	
Y	69	Glossary	
Y	70	References	
Y	71	Appendices	

Table of Contents

Endorsement.....	ii
Environmental Monitoring Report Checklist	iii
Executive Summary.....	1
1 Introduction	2
1.1 Monitoring Objectives	2
1.2 Operator Details	3
1.2.1 Organisational Structure and Responsibility.....	3
1.2.2 Workforce	5
1.3 Title Details	5
1.4 Location	6
1.5 Site Activities.....	6
1.5.1 Care and Maintenance.....	6
1.5.2 Waste Discharge Licence	7
2 Monitoring Method	10
2.1 Receiving Environment	10
2.1.1 Catchment	10
2.1.2 Sensitive Receptors.....	18
2.1.3 Rainfall	20
2.2 Sampling and Analysis Method.....	22
2.3 Monitoring Locations.....	23
2.4 Variability of Results	27
3 QA/QC Evaluation	28
3.1 Completeness	28
3.2 Quality Control.....	28
3.2.1 Discharges.....	28
3.2.2 Calibration of Probe Equipment	28
3.2.3 Sampling Method.....	28
3.2.4 Laboratory Analysis.....	29
3.2.5 Data Management	29

Environmental Monitoring Report Checklist

4	Monitoring Results 2023- 24.....	30
4.1	Presentation.....	30
4.1.1	Field Physical Parameters and Major Chemistry	31
4.1.2	Dissolved Metals	32
4.1.1	Loading Calculations	33
4.2	Spatial and Temporal Trends and Analysis	34
4.2.1	Field Parameters	34
4.2.2	General Chemistry	39
4.2.3	Dissolved Metals	42
4.2.4	Total Loading	46
4.3	Summary of Exceedances	52
4.4	Discussion of Anomalies	55
4.5	Discussion of Results and Conclusions.....	56
4.5.1	Authorised Discharge Point (ADP1)	56
4.5.2	Compliance Point (SWTG2).....	58
4.5.3	Other Monitoring Points.....	58
5	Conclusions and Proposed Actions	60
5.1	Compliance with Assessment Criteria	60
5.2	Potential Environmental Harm	62
5.2.1	Assumptions	63
5.2.2	Uncertainties	64
5.3	Proposed Changes and Actions.....	64
6	Sediment and Macroinvertebrate Monitoring	66
7	Incident Reporting	67
7.1	Incident Response.....	67
7.2	Incidents Recorded/ Reported During the Reporting Period.....	67
8	Glossary.....	71
9	References	72
10	Appendices.....	73
Appendix A.	Water Quality Data	73

Environmental Monitoring Report Checklist

Appendix B.	Regulatory Communication's Register	74
Appendix C.	PGO Water Monitoring Procedure.....	76
Appendix D.	Macroinvertebrate and Sediment Sampling Report (AES, 2024)	80
Appendix E.	WDL249 Surface Water Monitoring Locations 2024.....	81
Appendix F.	QAQC Documentation.....	85

Tables

Table 1-1 Operator Details	3
Table 1-2 TGPA Workforce and Responsibility	5
Table 1-3 TGPA Tenement Information.....	5
Table 1-4 WDL 249 Authorised Discharge Points and Compliance Points Coordinates	7
Table 2-1 Monitoring Program as per Appendix 2 of the Licence	25
Table 2-2 Monitoring Parameters	26
Table 2-3 Monitoring Frequency Descriptions	26
Table 2-4 Factors possibly affecting variability in results	27
Table 4-1 Surface Water Field Parameters and Major Chemistry Results.....	31
Table 4-2 Surface Water Dissolved Metals Results	32
Table 4-3 Loading Calculations for General Chemistry at ADP1 2023-24 Reporting Period	33
Table 4-4 Loading Calculations for Dissolved Metals at ADP1 2023-24 Reporting Period	33
Table 4-5 Summary of Reportable Exceedances at SWTG2, Compliance Point	53
Table 5-1 Compliance Against Assessment Criteria.....	61
Table 5-2 Outcomes of the proposed changes done during the 2023-24 reporting period.....	65
Table 7-1 Incident Reporting Contact Details	68

Figures

Figure 1-1 Organisation structure (Care and Maintenance).....	4
Figure 1-2 Toms Gully Mine Pit Water Level (2023- 24)	9
Figure 2-1 Toms Gully Project Area Sub Catchments	11
Figure 2-2 Toms Gully Project Area Sensitive Receptors.....	19
Figure 2-3 Toms Gully Rainfall (mm) for 2023- 24 Wet Season.....	20

Environmental Monitoring Report Checklist

Figure 2-4 SWTG2 water levels (m) during the 2023-24 wet season	21
Figure 2-5 WDL 249 monitoring locations	24
Figure 4-1 Spatial Trend for Physical Parameters	36
Figure 4-2 Authorised Discharge Point1 and Other Monitoring Sites Trend Analysis for Physical Parameters ..	38
Figure 4-3 Spatial Trend for General Chemistry	40
Figure 4-4 Authorised Discharge Point 1 and Other Monitor Sites Trend Analysis for General Chemistry	41
Figure 4-5 Spatial Trend for Dissolved Metals	43
Figure 4-6 Authorised Discharge Point 1 and Other Monitor Sites Trend Analysis for Reported Dissolved Metals Dissolved.....	45
Figure 4-7 ADP1 General Chemistry Loadings	48
Figure 4-8 ADP1 Dissolved Metals Loadings	51

Photos

Photo 1-1 TGPA Reverse Osmosis Plant and Pump Pontoon	6
Photo 1-2 Authorised Discharge Point 1 and Compliance Point Telemetry Station	8
Photo 4-1 Authorised Discharge Point 1 pond and flow meter	57

Executive Summary

Primary Gold Limited (PGO) is the Licence holder of Waste Discharge Licence 249, for the controlled discharge of treated wastewater by reverse osmosis from mine influenced water collected on MLN 1058, Toms Gully Mine into the Mount Bunday Creek via the authorised discharge point.

This Environmental Monitoring Report is a requirement under Condition 39 of the WDL and includes data and information obtained through the implementation and performance as prescribed by the Licence during the period from 22 December 2023 to 21 December 2024 at the Toms Gully Mine.

Treated water discharge commenced in mid-January 2024 and ceased at the end of April 2024 covering fifteen weekly sample events. A total of 60,480 KL of good quality treated water was discharged from the Authorised Point (ADP1) to Mount Bunday Creek. This was done when there was a natural, continuous and sufficient flow of water through the Compliance Point, SWTG2. During the reporting period, the total volume of treated water discharged accounted for less than 0.1% of the average volume of creek water flowing through the Compliance Point in Mount Bunday Creek.

The Compliance Point recorded several reportable exceedances of SWTG2 trigger values for several dissolved metals triggering Item 10 (a) An exceedance of a trigger value, on three consecutive sampling occasions; and/or Item 10 (c) An exceedance of three or more times a trigger value. All were reported to NT EPA.

Aquatic Ecology Services conducted biological monitoring in accordance with Item 11 (Condition 27) of the WDL 249 in April 2024 involving sediment and macroinvertebrate sample, analysis and reporting. This report is provided in Appendix D. Future monitoring should focus on sites upstream and downstream of the ADP on Mount Bunday Creek, where the downstream site is further from the mine. Site MBC03, SWTG3A or SWTG3 could be utilised as a downstream monitoring point.

Based on an assessment of information gathered during the reporting period, the overall risk to Mount Bunday Creek is considered low. The licensed activity involving the discharge of treated water to Mount Bunday Creek via ADP1 during the 2023- 24 reporting period was evaluated as to whether the licensed activity is having an adverse effect on, or potential harm to the environment. The risk rating decision was determined based on overall success of the monitoring programmes (conditions 27-36) and authorised discharge water quality (conditions 20-23) during the reporting period.

PGO has proposed amendments to the WDL 249 in line with PGO's management goals and focusing on the licensed activity involving the discharge of RO treated water. Although in care and maintenance, these activities will reduce the overall poor water quality inventory and prevent the potential for pit water overtopping off MLN 1058. Based on current pit water levels, PGO are meeting their objective with an overall reduction of pit water levels of 0.54 metres over an 11-month period. In the course of re- mining Toms Gully Mine (TGM), PGO has committed to significant remediation activities to repair old and technically complex mined domains with the objective to stabilise and prevent offsite pollution.

1 Introduction

In accordance with Conditions 39 and 40 of Waste Discharge Licence 249 (the Licence), this Environmental Monitoring Report (EMR) addresses Primary Gold Ltd (PGO) performance monitoring and management activities at Toms Gully Project Area (TGPA) during the 2023/2024 reporting period.

Under the provisions of the License conditions, and during this reporting period, treated wastewater discharge via ADP1 from mid-January 2024 and ceased at the end of April 2024. This is the first year of active discharge with a total of 60 ML released via ADP1.

Communications between the Department of Lands, Planning and Environment (DLPE) and PGO is recorded in the communications register provided in Appendix B.

1.1 Monitoring Objectives

WDL 249 Conditions 39 and 40 outline the monitoring objectives PGO will address in this EMR during the period from 22 December 2023 to 21 December 2024 (12-month reporting period).

As a minimum, this EMR will:

- Be drafted in accordance with the 'Guideline for Reporting on Environmental Monitoring';
- Include a tabulation of all surface water, sediment, macroinvertebrate monitoring data collected in accordance with WDL 249 (Provided electronically in Microsoft Excel format);
- Include a tabulation of contaminant loads discharged from the ADP1 and calculated for metals, metalloids and general chemistry (excluding physical parameters). Calculations on daily discharge volumes and concentrations of contaminants present and use Linear Interpolation methodology used on days when a sample was not taken.
- Include long term trend analysis of monitoring data to demonstrate any environmental impact associated with the discharge of RO treated water to Mount Bunday Creek (over a minimum of three years or part thereof);
- Include all exceedances and investigations; and
- Include an assessment of environmental impact.

1.2 Operator Details

The Project proponent is PGO, a Company formed through the union of the listed entity Hydrotech International and the privately-owned Primary Minerals PGL acquisition of several gold assets from Crocodile Gold in early 2013. The Company was delisted on the Australian Stock Exchange (ASX) in 2018 after HGM Resources Pty Ltd bought 100% of the shares in April 2018. PGO is now a privately-owned company and since 11 October 2018 the entity's name changed (no change to ABN number) from Primary Gold Limited to Primary Gold Pty Ltd. PGO's assets are focused on the Northern Territory, which in addition to TGPA, include Rustlers Roost and Quest 29 Project Areas and ~2,000 km² of exploration tenure.

A Summary of operator details is included in Table 1-1.

Table 1-1 Operator Details

Operator Information			
Business Name	Primary Gold Pty Ltd (PGO)		
ACN/ABN	ACN: 122 726 283		
Street and Postal Address	Level 26, 140 St Georges Terrace, Perth WA 6000		
Key Contact(s)	Name:	Dr Mark Qiu	Charles Hastie
	Position:	Managing Director	General Manager- Mining and Permitting
	Phone number:	0424 288 016	0419 963 250
	Email:	Mark.Qiu@hanking.com.au	Charles.Hastie@hanking.com.au

1.2.1 Organisational Structure and Responsibility

PGO's overall management/organisational structure is illustrated in Figure 1-1. The organisational structure reflects the relatively new nature of the Company. As operations and development of PGO's assets expand, the organisational structure will develop and be updated to reflect this.

Managing Director and Departmental Managers are responsible for:

- Ensuring compliance with all relevant Statutory Acts and Regulations;
- Ensuring compliance with Safety Management and Emergency Response Plans;
- Ensuring regulatory documents (MMP/EMR; WDL) are adhered to;
- Establishing and maintaining environmental and safety performance monitoring; and
- Overall environmental management and compliance at TGPA lies with the Managing Director for PGO, the General Manager- Mining and Permitting and delegated personnel.

Introduction

Managing Director is responsible for:

- Accountable for the overall environmental management and compliance

General Manager and delegated personnel are responsible for:

- Responsible for resourcing and maintaining environmental management as per the Care and Maintenance MMP;
- Responsible for defining and communicating relevant environmental responsibilities and accountabilities to employees, consultants, and contractors within their area of responsibility; and
- All contractors/consultants contract obligations outline clear environmental and safety performance standards that are regularly assessed by PGO prior to and during their contract work at TGPA.

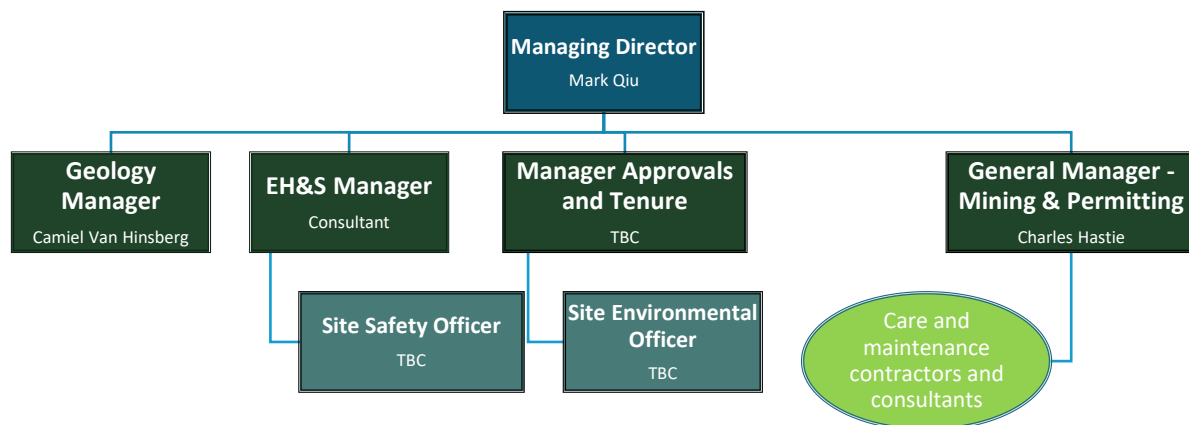


Figure 1-1 Organisation structure (Care and Maintenance)

1.2.2 Workforce

PGO employees operate the Reverse Osmosis (RO) treatment plant. Contractor/consultant workforce is summarised in Table 1-2.

Table 1-2 TGPA Workforce and Responsibility

Care and Maintenance	
PGO employees/Contractor/Consultant	Task
Sally Horsnell/Savannah Roots	MMP management, monitoring and reporting
	WDL management, monitoring and reporting
	Inspections: Dam/pit water heights
	Surface and groundwater sampling and data analysis and reporting
	Quarterly Inspection (weeds, erosion and sediment controls, security, access, fire mapping and reporting)
Envirolab Pty Ltd	Analytical lab services
Mount Bunday Pastoral Lease Holder	Weed spraying
	Fire mitigation
	Water management/transfer – pipe and pump set-up, maintenance
	Access roads/bund maintenance
	Fencing and gate maintenance
	Tenement access and point of contact for safety and security
RO Plant operations	Day to day operations of plant
Cross Solutions	Survey

1.3 Title Details

All licences for TGPA are held in the name of Primary Minerals Pty Ltd, a wholly owned subsidiary of Primary Gold Pty Ltd. Tenement information has been provided Table 1-3.

Table 1-3 TGPA Tenement Information

Title Number	Title Holder	%	Expiry Date	Land Tenure
MLN 1058	Primary Minerals Pty Ltd	100	02/08/2039	PPL 1163, NT Portion 4937
MLN 29812	Primary Minerals Pty Ltd	100	05/02/2033	PPL 1163, NT Portion 4937
MLN 29814	Primary Minerals Pty Ltd	100	05/02/2033	PPL 1163, NT Portion 4937

1.4 Location

TGPA is located approximately 90 km south-east of Darwin (131°34'E and 12°50'S). Toms Gully Mine workings including the RO Plant is situated on MLN 1058, within Old Mount Bunday Station (PPL 1163, NT Portion 4937), which is an active station used for cattle grazing. Access is restricted by locked gates.

The mine site is directly accessed off the Arnhem Highway via a 2km access track. The turnoff is approximately 10 km from the rural subdivision of Marrakai and the Corroboree Park Inn and 63 km from services at Humpty Doo.

1.5 Site Activities

1.5.1 Care and Maintenance

TGPA remained in care and maintenance during 2023-2024 reporting period and has been since PGO's purchase of tenements in 2013. No exploration activities occurred at TGPA during this reporting period. The Environmental Impact Statement (EIS) for TGPA was formally approved in 2020 under the *NT Environmental Protection Act* 2019. The RO water Treatment Plant received approval from the then Department of Infrastructure, Tourism and Trade (now Department of Lands Planning and Environment [DLPE]) in December 2022 under the *Mining Management Act* 2001. Construction of the plant and auxiliary infrastructure (including reconnection of mains power) occurred during 2023 with commissioning of the RO Plant in October 2023 (Photo 1-1).



TGPA RO Plant (September 2023)



RO Pontoon in TGM Pit (September 2023)

Photo 1-1 TGPA Reverse Osmosis Plant and Pump Pontoon

1.5.2 Waste Discharge Licence

PGO was issued a ten-year WDL on 22 December 2022 (22/12/2022- 22/12/2032) under section 74 of the *Water Act 1992* that authorises for the controlled discharge of treated wastewater from mine influenced water collected on MLN 1058 into Mount Bunday Creek via the ADP1 as per the conditions of the Licence. PGO obtained the License to manage on site water inventories and maintain Toms Gully Main Pit (TGM Pit) water levels to a safe freeboard eliminating the risk of uncontrolled flows off tenement.

As part of the approved TGPA water management programme, the Main Pit is used as the repository for all pumped water received from the onsite dams/pits during the wet season months. Pit water is treated through the RO Treatment Plant and released via ADP1 when there is a natural, continuous, and sufficient flow of water at the authorised compliance point (SWG2) and only includes wastewater treated by the RO Plant via the authorised discharge point (ADP1).

1.5.2.1 Authorised Discharge Points and Compliance Points

As per Conditions 20 and 21 of The Licence, there is one Authorised Discharge Point (ADP1) situated on tenement located at the entry to the Oxbow Wetlands. The Compliance Point (SWG2) is situated approximately 0.8km downstream of the Oxbow wetlands and ADP1 in Mount Bunday Creek. Coordinates are included in Table 1-4 and locations of all WDL249 monitoring sites are included in Figure 2-5.

Table 1-4 WDL 249 Authorised Discharge Points and Compliance Points Coordinates

Creek	Site	Type	Latitude	Longitude
			GDA94	
Mt Bunday Creek	SWG2	Compliance point/ Telemetry Station	-12.8287	131.5742
	ADP1	Authorised Discharge Point	-12.8292	131.5639

Introduction

Photos include ADP1 and the telemetry station setup at the Compliance Site, SWTG2 (Photo 1-2).



TGPA ADP1 (January 2024)



SWTG2 WDL 249 Compliance Point, telemetry station

Photo 1-2 Authorised Discharge Point 1 and Compliance Point Telemetry Station

Active discharge of treated water to ADP1 occurred from January 2024 to end of April 2024. During discharge, flow data is recorded continuously at the at the RO plant release point where data can be retrieved as required. Height levels were taken regularly at the TGM Pit. The RO Plant and pumps are connected to mains power.

A solar powered telemetry station is situated at the Compliance Point (SWTG2) to continuously monitor physical water quality during creek flow and wastewater discharge as per License conditions. Information provided by the logger is invaluable during controlled/no controlled site discharge events to gain a clearer understanding of creek flows and water quality fluctuations particularly when site access was limited.

Introduction

1.5.2.2 Authorised Discharge from Toms Gully Mine Pit (TGPA PIT)

TGM Pit water levels were recorded regularly during routine monitoring, which is above the monthly requirement as per Appendix 2 of the Licence. Water levels were recorded using relative levels from a surveyed marker. Figure 1-2 shows levels of the TGM Pit since 30 November 2023. Current levels of 18.38 mRL as of 27 November 2024 compared to this time 11 months ago with an overall reduction of -0.54m.

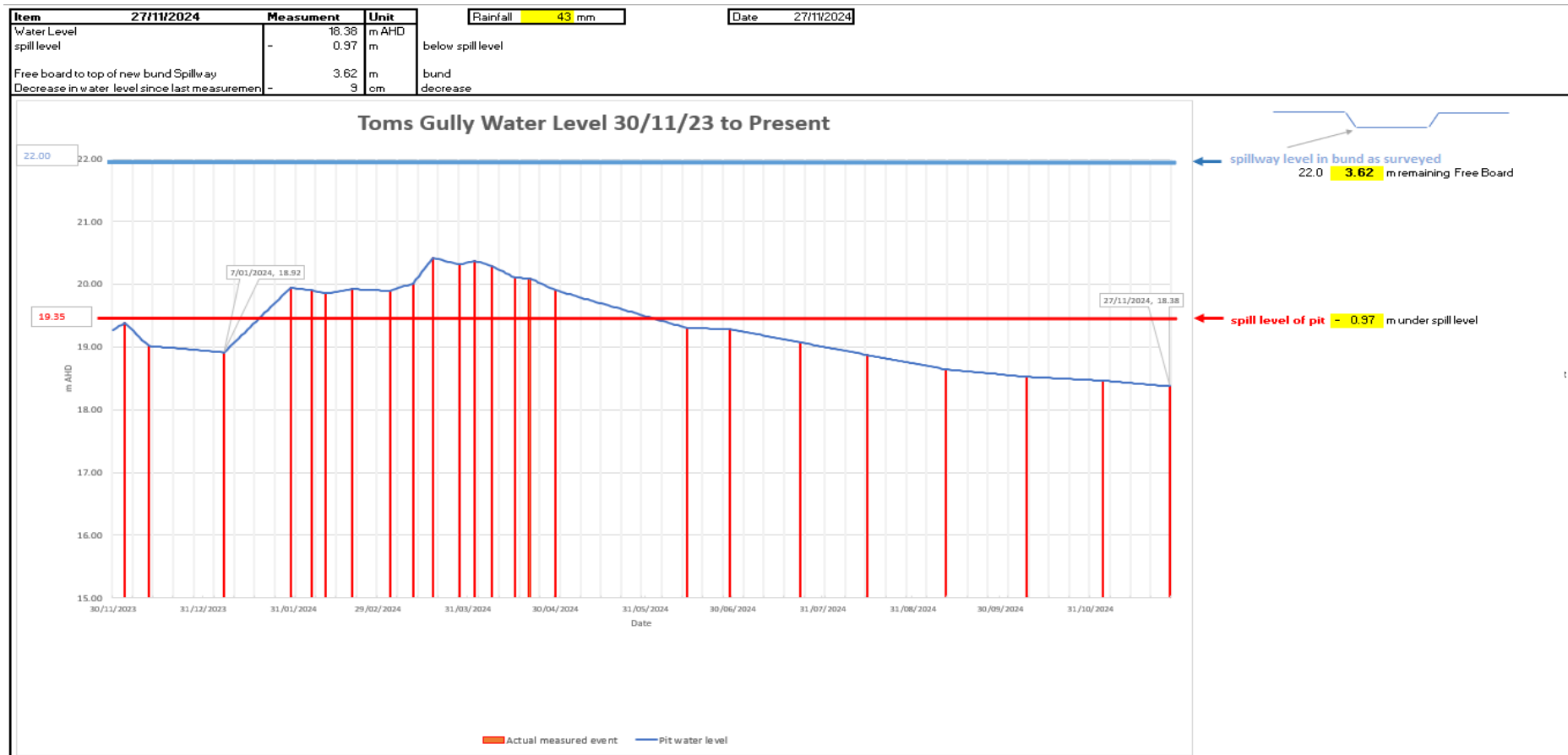


Figure 1-2 Toms Gully Mine Pit Water Level (2023- 24)

2 Monitoring Method

2.1 Receiving Environment

2.1.1 Catchment

The TGPA is positioned primarily over the Mary River Basin with the Mount Bundey Creek draining through the mineral leases from west to east (Figure 2-1). The mineral leases catchment covers an area of 924 ha.

Upstream of the TGPA are two other projects owned and managed by PGO, Rustlers Roost and Quest 29. Whilst also in care and maintenance, these two sites report to head waters of the Mount Bundey Creek and contribute to water quality and creek flows. During the reporting period the Rustlers Roost site held a Waste Discharge Licence (WDL247-2) however no active discharge occurred during the reporting period and the Licence was surrendered June 2024.

All of Toms Gully's existing mining domains are located on MLN 1058 which include a Run of Mine pad, processing infrastructure and office areas, two waste rock dumps, Toms Gully Main open pit, two evaporation ponds, two tailings dams, process water dams and wetlands. The RO plant is located on an existing hard stand adjacent to the old process area. Wet seasonal surface water captured in the evaporation ponds, tailings dams, decant pond and process pond is pumped to the TGM Pit during wet season months to manage the potential for uncontrolled discharges. Surface flows report to the oxbow wetlands which is a purpose-built wetland to retain water runoff from the mine prior to passively flowing over weir boards and entering Mount Bundey Creek. Mount Bundey creek surface flows to the Mary River, ~5 km downstream of the TGPA.

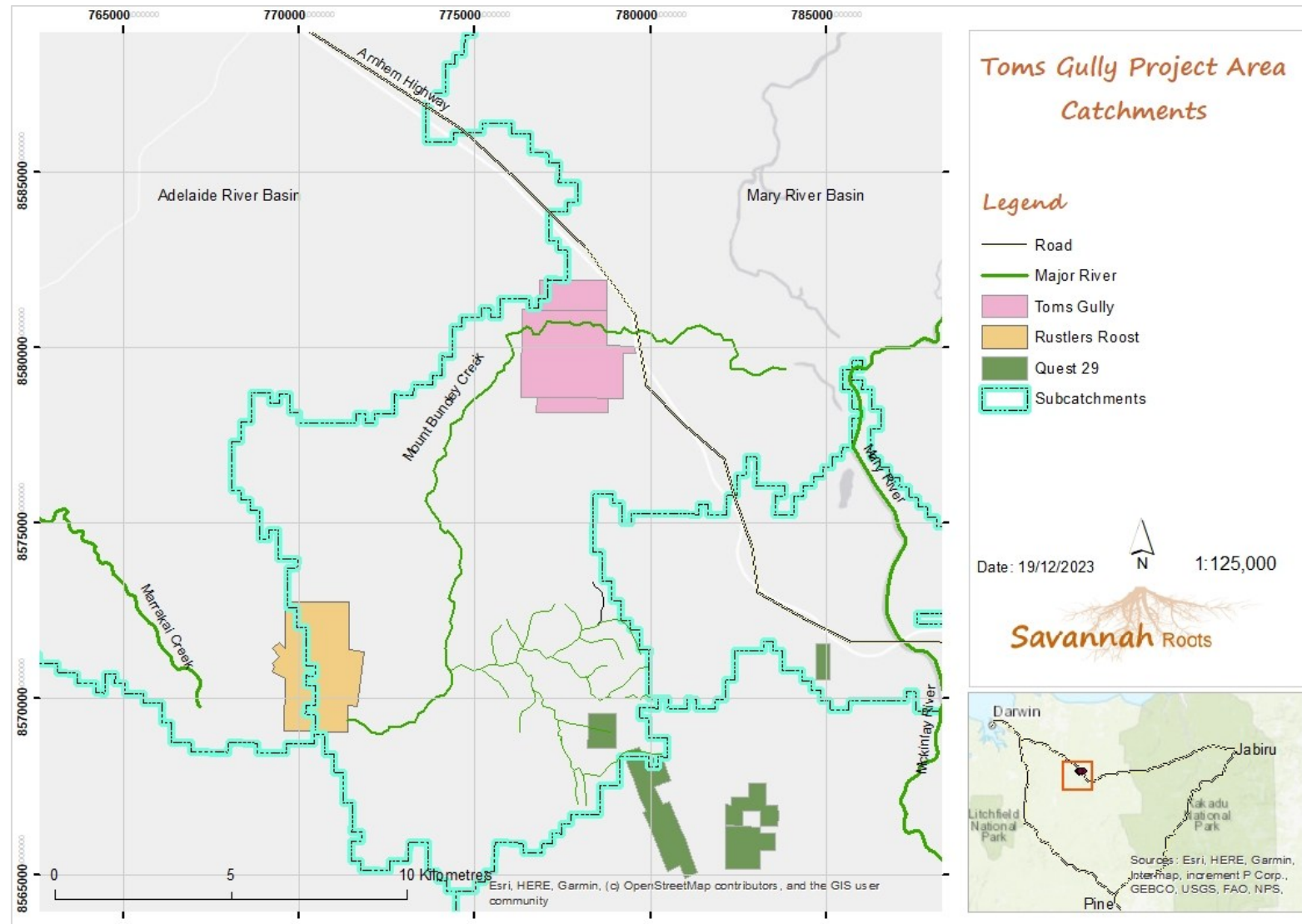


Figure 2-1 Toms Gully Project Area Sub Catchments

2.1.2 Sensitive Receptors

Site runoff and subsurface seepage from the TGPA reports to the Mary River Basin, along the Mount Bunday Creek. The Mary River has beneficial uses for its surface and ground waters. The sub catchment of the Mary River Basin drains through various drains and ephemeral creeks and ultimately enters the Mary River system. TGPA is one of many mines situated in Mary River Basin along with quarries, pastoral properties and horticultural activities and recreational areas. Mary River National Park is also situated in its catchment area downstream of TGPA.

The Mary River system includes the Mary River, all its tributaries, lagoons, lakes, swamps, and marshes situated in the catchment of that waterway (Department of Infrastructure, Planning and Environment [DIPE], 2002). The surface waters of the Mary River catchment are declared beneficial use (BUD) for its environmental, riparian, and cultural values. The ground water of the same catchment has environmental, riparian, and agricultural values (DIPE, 2002). The Beneficial Uses for the section of Mount Bunday Creek where the licensed activity and compliance point is situated is for stock water supply (Gazette No. G23, 11 June 1997), and the upper and lower sections are for aquatic ecosystem protection (Gazette No. G23, 11 June 1987).

As well as the BUDs, there are several identified conservation areas or national parks in the region or downstream of the site (Figure 2-2), these include:

- Mary River Floodplain System Directory of Important Wetlands (NR Maps, 2023);
- Mar River Coastal Floodplain Sites of Conservations Significance (SoCS 13) located ~2 km east (Department of Natural Resources, Environment, The Arts and Sport [DNRETAS], 2009; Figure 2-2);
- Mary River National Park located 4 km to the east via Mount Bunday Creek (NR Maps, 2023; Figure 2-2); and
- Djukdinj National Park located 15 km to the north (NR Maps, 2023);

Monitoring Method

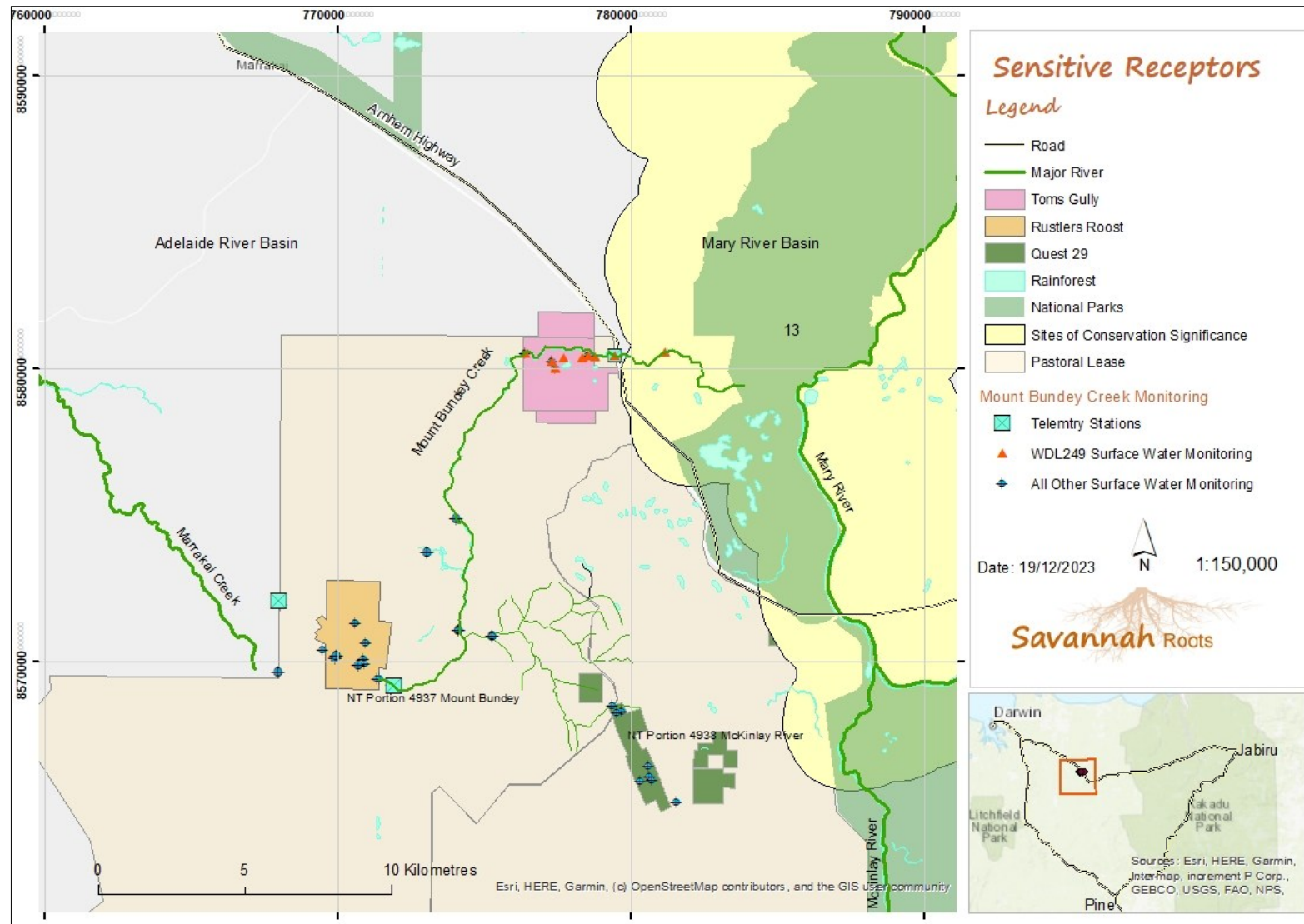


Figure 2-2 Toms Gully Project Area Sensitive Receptors

2.1.3 Rainfall

Three rain gauges have been installed across the Adelaide River and Mary River catchment areas in each mining area. One is located in a cleared area on Toms Gully main WRD and the others are located at Quest 29 and Rustlers Roost. Toms Gullys rain gauge is located 10.2 km from Quest 29 rain gauge and 11.5 km from Rustlers Roost rain gauge. Rain gauges were monitored weekly and fortnightly during the reporting period. (Figure 2-1).

TGPA 2023/24 rainfall received a total of 1409 mm recorded to April with January recording the greatest rainfall event for the season. (Figure 2-3) The previous years rainfall in 2022-23 was 1171 mm and in 2021- 22 of 1132 mm.

Quest 29 Project Area recorded 739 mm and Rustlers Roost Project Area recorded 987mm with the highest rainfall recorded in February 2024 for both sites.

Rainfall generally aligns with creek water level fluctuations (level data recorded at the SWTG2 compliance point telemetry station) and upper catchment only rainfall events.

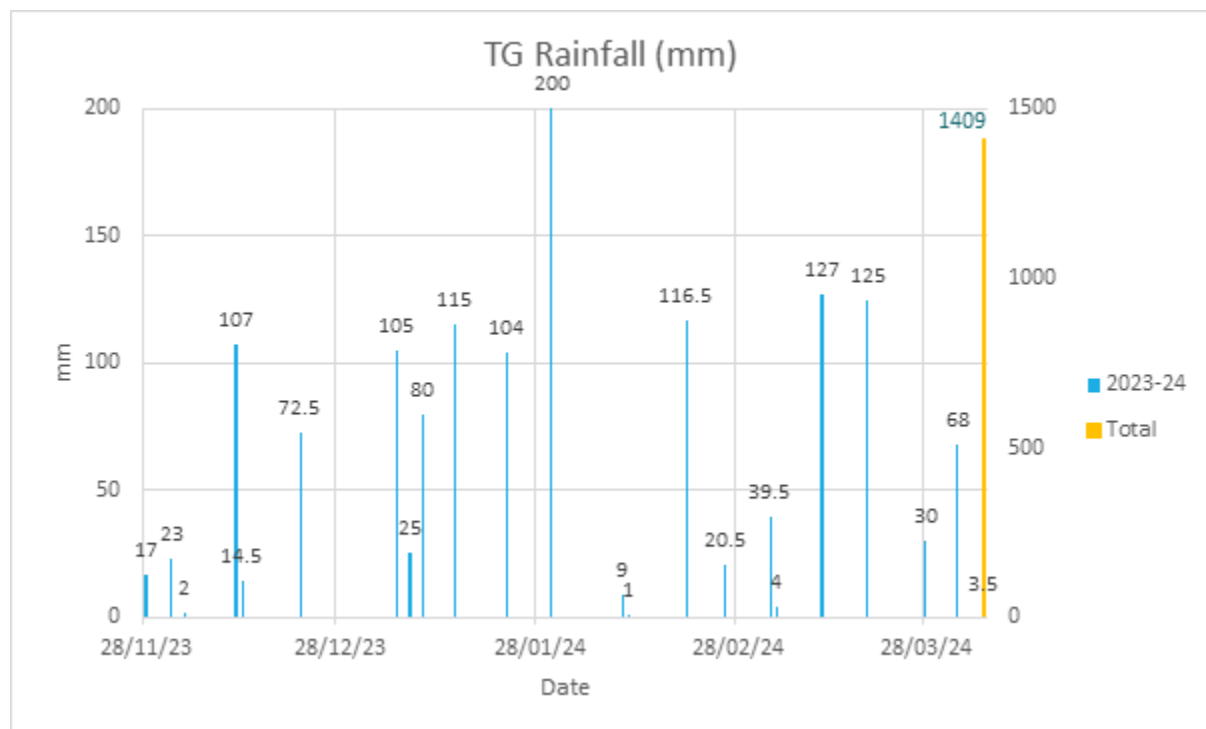


Figure 2-3 Toms Gully Rainfall (mm) for 2023- 24 Wet Season

Monitoring Method

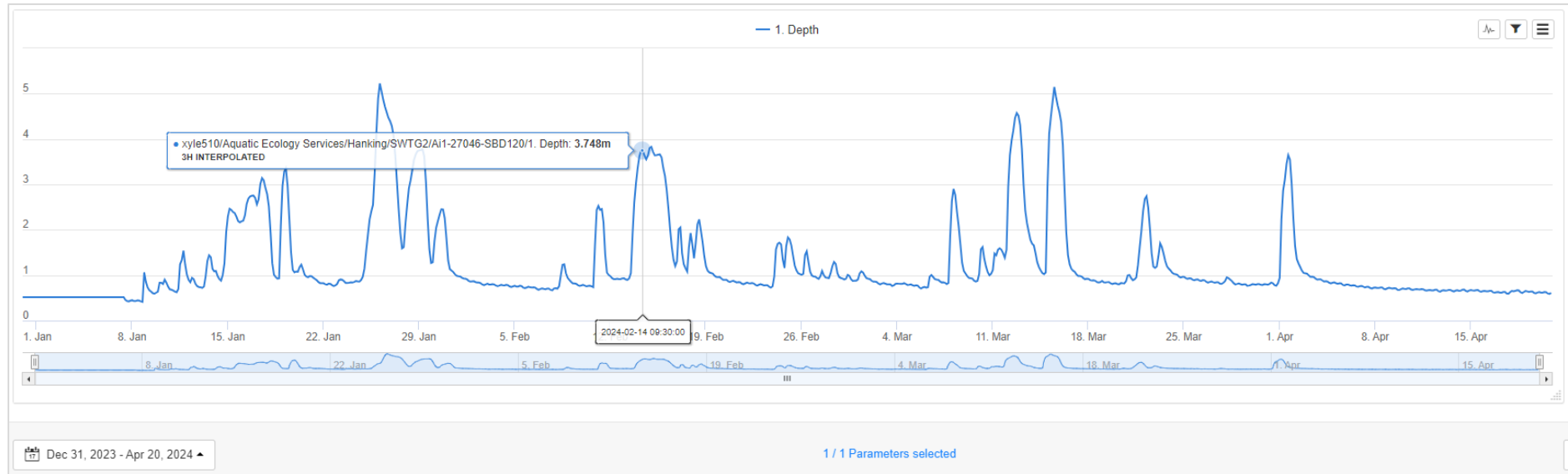


Figure 2-4 SWTG2 water levels (m) during the 2023-24 wet season

2.2 Sampling and Analysis Method

All field sampling was performed as per PGO's water quality monitoring procedure (Appendix C). Various methods were used to capture water movement, levels and quality across the site. Handheld meters were used to record field parameters at all monitoring sites, whilst PGO invested in a permanent solar powered telemetry station, recording continuous creek water quality at the Compliance Site, SWTG2.

A hired Aquaread AP-2000 Handheld meter was used at all sites to measure insitu field measurements. Measurements include pH, electrical conductivity, dissolved oxygen, temperature and turbidity with all data recorded into an electronic field sheet. This is then transferred into an excel spreadsheet database. Calibrations using a Quick Cal Solution was performed weekly prior to field activities.

Compliance site SWTG2 solar powered telemetry station was installed in late November 2022 to provide real time and continuous data during creek flow and wastewater discharge as per licence conditions. Monitoring parameters include water level, pH, electrical conductivity, dissolved oxygen, turbidity, and temperature. Data is captured via the Xylem Eagle internet portal and analysed over a 7-day rolling average which is presented in the results (Section 4.1). The data logger for the telemetry station is deployed at the beginning of the wet season, when there is sufficient depth in the Mount Bunday Creek to submerge the probes. A quick calibration is performed to ensure logger performs accurate readings, further detail is provided in Section 3.2.1.

TGM Pit water levels are measured monthly using a laser level and using a surveyed relative level marker.

During each site monitoring event, a record of general observations is maintained in the field handbook and included, accessibility, fauna siting's, invasive and pest species presence, fish, bird life, recent fires, other observed disturbances including anthropological activities (vehicles tracks, rubbish):

All metals/metalloids, and general chemistry are sampled in the field as per the routine sampling method in pre labelled and preserved bottles provided by the analytical laboratory (EnviroLab NATA accredited for the related analysis). Samples are stored in eskies and kept cool using ice bricks. At the end of each day samples were either moved to a fridge/freezer for overnight holding if field sampling finished after 3pm or delivered to the Darwin EnviroLab before 3 pm. They were then repacked with new ice bricks and delivered to the courier for transport, by air, to Perth EnviroLab laboratory for analysis. To ensure samples were delivered to the lab within the respective holding times and temperature, sampling was performed Monday to Wednesday each week and dispatched the same day or next day at the latest. This would allow for a quick turn around of results for important samples such as SWTG2, the Compliance Point.

2.3 Monitoring Locations

PGO has conducted surface water quality monitoring at TGPA since 2013. Water quality data is maintained electronically in excel format spreadsheet.

Surface water sampling locations are presented in Figure 2-5 which include seven sampling locations, one Authorised Discharge Point (ADP1) and compliance point (SWTG2). The monitoring program sample locations are in Table 2-1 and water quality parameters and monitoring frequencies in Table 2-2 and Table 2-3. Appendix E presents a photo record of each site.



Figure 2-5 WDL 249 monitoring locations

Table 2-1 Monitoring Program as per Appendix 2 of the Licence

Catchment	Monitoring Sites	Lat°	Long°	Sampling Site Description	Analyte Type					
		GDA94			0	1	2	3	4	5
Mount Bunday Creek	ADP1	-12.8292	131.5639	Authorised Discharge Point 1 located to the northeast of the TGM PIT and at the entrance to Oxbow Wetlands	C	-	M	M	M	M
	SWTG2	-12.8287	131.5742	Compliance Point located on the Mount Bunday Creek, 0.8 km east of the ADP1	W	C	C	W	W	W
	SWTG1A	-12.8279	131.5464	Upstream of the Toms Gully Project Area and downstream of Quest 29 and Rustlers Roost Project Areas. Control site located near tenement boundary for Toms Gully.	-	-	M	M	M	M
	SWTG3A	-12.8253	131.5903	Located ~2.5km downstream of the Toms Gully Project Area on the Mount Bunday Creek. This is the last monitoring point.	-	-	M	M	M	M
	SWTG12	-12.8283	131.5661	Located at an existing constructed weir at the end of the Oxbow Wetlands. Water from the wetlands reports to Mound Bunday Creek, upstream of MBC01A	-	-	W	W	W	W
	MBC01A	-12.8285	131.5683	Located downstream of the Toms Gully Project Area and directly downstream of the Oxbow wetlands.	-	-	W	W	W	W
	TGM PIT	-12.8306	131.5621	Main Pit located on tenement MLN1058. Mine water from the Pit is treated through an RO Plant and discharged through ADP1.	-	M	M	M	M	M
	EP1	-12.8326	131.5558	Evaporation Pond 1 is located on tenement MLN 1058 and to the west of TGM PIT. It is located upstream of MBC01A	-	Q	Q	Q	Q	Q
	EP2	-12.8303	131.5546	Evaporation Pond 1 is located on tenement MLN 1058 and to the west of TGM PIT. It is located upstream of MBC01A	-	Q	Q	Q	Q	Q

Table 2-2 Monitoring Parameters

Type	Analysis	Analysis	Parameter
0	Discharge Monitoring	Flow	Flow kilolitres per day
1	Water Level	SWL	Metres, RL for TGM PIT
2	In field parameters	Field	pH, Electro Conductivity (EC), Dissolved Oxygen (DO), Temperature, Turbidity
3	Total and dissolved metals	Total and dissolved	Aluminum (Al), Antimony (Sb), Arsenic (As), Cadmium (Cd), Chromium (Cr), Cobalt (Co), Copper (Cu), Iron (Fe), Lead (Pb), Manganese (Mn), Mercury (Hg), Nickel (Ni), Silver (Ag), Zinc (Zn).
4	Dissolved major cations and anions	Dissolved	Calcium (Ca), Manganese (Mg), Potassium (K), Sodium (Na), Sulphate (SO ₄ ²⁻), Chloride (Cl ⁻)
5	Inorganics	Total and dissolved	Carbonate (CO ₃), Bicarbonate (HCO ₃), Total Suspended Solids (TSS), Total Dissolved Solids (TDS).

Table 2-3 Monitoring Frequency Descriptions

Key	Frequency	Description
C	Continuous	Continuous during discharge events
W	Weekly	Weekly monitoring
M	Monthly	Monthly monitoring
		Weekly during discharge and at least once per discharge event
		During Discharge event

2.4 Variability of Results

Other factors (natural and anthropogenic) other than mining in the catchment area affecting variability in water quality results are described in Table 2-4.

Table 2-4 Factors possibly affecting variability in results

Factors	Activities Affecting Monitoring Results
Track and creek crossing upgrades	Improvements to tracks and creek crossing access resulting in vegetation loss, soil erosion and sedimentation to creeks.
Land clearing	Pastoral land clearing particularly in the upper catchment areas resulting in vegetation loss, soil erosion and sedimentation to creeks
Stock movements	Day to day activities, stock movements over land and through creek lines resulting in, vegetation loss, soil erosion and sedimentation to creeks.
Invasive species	Feral animals i.e. pigs, buffalo wallowing near at sample sites

3 QA/QC Evaluation

3.1 Completeness

All monitoring occasions were met. This is the second year of monitoring and improvements to site access have been made to ensure all sample events were met. Compliance against monitoring performance is detailed in Table 5-1.

3.2 Quality Control

3.2.1 Discharges

Proper controls are in place to meet Conditions 21-23 of WDL 249.

- A flow meter recording real time flow from the permeate tank in (m³/second) is located at the RO Plant.
- A 600-metre pipeline is connected from the permeate tank to the ADP1 location. Treated RO water is the only source to this pipeline.

3.2.2 Calibration of Probe Equipment

Calibration of field equipment was undertaken for both telemetry data logger and the handheld probe as per the manufacturer's recommendations. A quick calibration is performed, prior to deployment, on the data logger located at the SWTG2 telemetry station to ensure data logged is accurate. The data logger is deployed at the beginning of the wet season, when there is sufficient water depth and flow in the Mount Bunday Creek to submerge the probes. The Loggers remain insitu until the end of the wet season where they are sent away for routine servicing. Field readings are performed at SWTG2 each week to compare telemetered data and ensure accuracy.

Field handheld equipment (Aquaread Handheld meter) was calibrated prior to each weekly sampling event for pH, EC, DO and turbidity using buffer, quick Cal solutions and mineralised water. Calibration results were entered into the weekly field monitoring sheet before being stored in a master database (example included in Appendix F). Following the end of the wet season, the handheld meter is sent back to the supplier for annual maintenance.

3.2.3 Sampling Method

Sampling method was consistent for all water sampling events in accordance with the sampling method detailed in Section 2.2. Qualified and experienced environmental consultants undertook the field monitoring since commencement of the Licence. Sampling equipment such as bucket is cleaned and triple rinsed prior to use at

each monitoring site. Single use gloves, 50 ml syringe and 0.45 µm filters are used for each site for laboratory analysis.

Duplicate samples have been incorporated into the monitoring programme for additional QA/QC measures. A total of 10 duplicate samples were taken of the 80 sampling events for the reporting period. This accounts for 10% of samples. All duplicate samples showed similar result to the parent sample, with the exception of TDS and dissolved anions at TGM PIT on several occasions. This may be a result of TDS being sampled outside of its 7-day holding time. Dissolved metal results in particular are within 10% range of the parent sample or doesn't vary greatly from the parent sample.

3.2.4 Laboratory Analysis

All metals/metalloids and general chemistry were sampled as per the routine sampling method in pre labelled and acidified/non acidified bottles provided by the analytical laboratory (Envirolab NATA accredited). All field monitoring is undertaken on days where delivery to the interstate lab does not delay analysis of sent samples or holding times of some analytes. All samples are kept cool, as soon as bottles are filled in the field and during transport to the laboratory.

All analytes are tested by the laboratory (NATA accredited for the analysis) at levels indicated in Appendix 3 of the Licence. Analytes such as silver, do require additional analysis to trace levels to meet the 0.05 µg/L TV. The laboratory performs inhouse quality and compliance checks for each lot of samples or lab report created. The laboratory Certificate of Analysis details random duplicates of select analytes, matrix spikes and also compliance for holding times of some parameters. These results and laboratory comments are checked when entering data. A copy of a CoC and Lab certificate analysis is included in 0.

3.2.5 Data Management

A master excel spreadsheet is used to store analytical results and progress updates from the laboratory. Information from the laboratory includes a copy of the Chain of Custody (CoC) receipt and job number once the laboratory receives the samples, the date results are expected to be issued and ultimately the results. Quality checks of data entered into the database against lab reports is performed.

4 Monitoring Results 2023- 24

4.1 Presentation

Water quality results for the WDL249 monitoring sites have been included in the following tables. Water quality data has been divided into two tables - field physical parameters and general chemistry (Table 4-1) and dissolved metals (Table 4-2). All raw water quality data has been presented in Appendix A.

Each table includes:

- Unit of measure;
- WDL249 Discharge Trigger Value (TV) for the Compliance Point, SWTG2;
- Short- and long-term medians for all monitoring sites including ADP1 and SWTG2 where available.

As per Item 7 of the Licence, Discharge TVs have been used for each monitoring event at the Compliance Point and assessed. Values outside of Discharge TV have been highlighted.

All other data has been included for comparison purposes and to report water quality at each of the Sample Locations listed in the Licence. For all other monitoring sites, short term (2022- 24) and long term (2016- 24) median values were used, instead of averages, to assess water quality trends. Using medians values avoids data outliers which would otherwise skew average values. Median values were calculated using three or more data points. If insufficient data points were available, the median cell was left blank (-). Median values with parameters below Laboratory Limits of Reporting (LoR) have been represented as 'N/A'. Minimum and Maximums were also included for the reporting period (2016- 24) to identify anomalies.

Some sites have been monitored as part of the TGPA MMP ultimately accumulating long term data, with eight years of water quality data collected. New sites introduced with the Licence have been monitored since the commencement of the Licence in 2022 or less in which only three to six monitoring events may have been captured.

Dissolved oxygen, antimony, mercury and silver values have short term data trends had not been previous monitoring under the MMP water quality programme. pH, Electrical conductivity, dissolved oxygen and turbidity long term trends have been obtained from the laboratory and short-term trends have been taken from the telemetry data 7-day rolling average and presented in the results section.

Total loading calculations has been done for each of the discharge trigger values (general chemistry and metals and metalloids). Field data was not included, as per WDL 249 monitoring schedule. Data sourced for calculations are based on surface water samples (N=4) collected during the reporting period at ADP1 discharge point and continuous flow data. Data was then calculated into monthly and grand totals. All <LOR values were taken as half of the LOR. Location calculations are in kg and presented in graphs displaying each analyte monthly loads and total loads (refer to 4.2.4 and Appendix A).

4.1.1 Field Physical Parameters and Major Chemistry

Field parameter and major chemistry results for the 2023-24 monitoring period are shown in Table 4-1. Appendix A includes all raw monitoring data.

Table 4-1 Surface Water Field Parameters and Major Chemistry Results

Site	Date/ Range	DO	EC	pH	Turbidity	TSS	SO ₄ ²⁻
		%	µS/cm	Units	NTU	mg/L	mg/L
WDL249 Discharge TV for SWTG2		85-120	250	5.8-8.0	87	54	295
Authorized Discharge Point							
ADP1	Short term median (2024)	77.4	35	7.81	1	N/A	5.4
ADP1	Long term median	-	-	-	-	-	-
Compliance Site							
SWTG2	Short term median (2023- 24)	89.1	56	6.2	24.3	21.5	19
SWTG2	Long term median (2017- 24)	89	54	6.2	23.4	20	8
SWTG2	Telemetry 7 day rolling average median (N=2685 data points)	88.4	62	6.16	24.0	-	-
All Other Monitoring Sites							
EP1	Short term median (2023- 24)	57	4100	3.2	5.52	7.75	4900
EP1	Long term median (2017- 24)	57	5662	3.38	5.12	10	5400
EP2	Short term median (2023- 24)	61.8	5720	3.24	3.12	7.5	4700
EP2	Long term median (2017- 24)	67.5	4647	3.2	2.78	12.5	5050
TGM PIT	Short term median (2023- 24)	82	2172	3.4	1.5	N/A	1300
TGM PIT	Long term median (2017- 24)	74	2142	3.4	1.5	N/A	1300
SWTG12	Short term median (2023- 24)	56	617	3.8	2.8	6	260
SWTG12	Long term median (2016- 24)	58	509	3.9	-	6	210
MBC01A	Short term median (2024)	75.3	74	6.23	20.15	22	11
SWTG3A	Short term median (2023- 24)	74.9	86	6.2	18.5	N/A	18
SWTG1A	Short term median (2023- 24)	139.7	33	6.29	35.2	58	2.1
SWTG1A	Long term median (2017- 24)	95.8	36	6.6	20.3	47.5	2.7

4.1.2 Dissolved Metals

Dissolved metal results for the 2023-24 monitoring period are shown in Table 4-2. Appendix A includes all monitoring data.

Table 4-2 Surface Water Dissolved Metals Results

Site	Date	Al	Sb	As	Cd	Cr	Co	Cu	Fe	Pb	Mn	Hg	Ni	Ag	Zn
		µg/L													
WDL249 Discharge TV at SWTG2		295	9	13	0.2	1	1.4	1.4	2700	3.4	1900	0.6	11	0.05	8
Authorized Discharge Point															
ADP1	Short term median (2024)	20	N/A	N/A	0.2	N/A	1.2	N/A	N/A	N/A	23.95	N/A	4.3	N/A	15.5
Compliance Site															
SWTG2	Short term median (2023- 24)	42	N/A	N/A	0.76	N/A	7.1	2.4	160	N/A	130	N/A	8.9	N/A	26
SWTG2	Long term median (2017- 24)	50	-	N/A	0.32	N/A	3	2.6	190	N/A	86	-	4.7	-	22
All other monitoring locations															
EP1	Short term median (2023- 24)	415000	1	24.5	380	49	3100	3600	6700	10.35	33000	N/A	13500	N/A	29500
EP1	Long term median (2017- 24)	420000	-	19	460	41	2700	3700	5800	2.01	35000	-	13500	-	35000
EP2	Short term median (2023- 24)	355000	N/A	18.5	300	44	2600	2100	4750	11.65	28500	N/A	10600	N/A	27500
EP2	Long term median (2017- 24)	445000	-	18.5	403	73	2800	5705	7100	5	30000	-	13000	-	28000
TGM PIT	Short term median (2023- 24)	26000	N/A	6.1	53	2	320	280	1100	7.6	11000	N/A	1300	N/A	6000
TGM PIT	Long term median (2017- 24)	22000	N/A	5.4	51	1.8	290	260	1100	7.2	11000	-	1200	-	6200
SWTG12	Short term median (2023- 24)	2900	N/A	4.4	6.8	N/A	110	51	560	2.4	3100	N/A	250	N/A	1000
SWTG12	Long term median (2016- 24)	2100	-	4.35	5.4	N/A	94	40.5	420	2.3	2400	-	220	-	840
MBC01A	Short term median (2024)	76	N/A	N/A	0.5	N/A	5.9	2.9	220	N/A	150	N/A	9.05	N/A	37
MBC01A	Long term median	-	-	-	-	-	-	-	-	-	-	-	-	-	-
SWTG3A	Short term median (2023- 24)	34	N/A	N/A	0.7	N/A	6.2	1.8	210	N/A	210	N/A	14	N/A	57
SWTG3A	Long term median	-	-	-	-	-	-	-	-	-	-	-	-	-	-
SWTG1A	Short term median (2023- 24)	89.5	N/A	1.45	N/A	N/A	N/A	N/A	290	N/A	14.5	N/A	N/A	N/A	2.4
SWTG1A	Long term median (2017- 24)	92.5	-	1.45	N/A	N/A	N/A	N/A	285	N/A	14.5	-	N/A	-	3

4.1.1 Loading Calculations

Loading calculations for ADP1 for the 2023-24 monitoring period are shown in Table 4-3 and Table 4-4. Appendix A includes all monitoring data.

Table 4-3 Loading Calculations for General Chemistry at ADP1 2023-24 Reporting Period

Month	Lab Inorganics		Alkalinity as CaC03				Total Hardness	Acidity as CaCO3	Anions Dissolved		Cations Dissolved			
	TDS	TSS	Bicarbonate	Carbonate	Hydroxide	Total		Total	Chloride	Sulfate	Calcium	Magnesium	Potassium	Sodium
	kg													
January	284.0659	25.272	80.68723	25.272	81.55642	80.68723	47.44397	25.272	87.71674	46.61626	8.73504	2.5272	2.5272	9.762336
February	242.3372	31.752	100.0115	31.752	53.47345	100.0115	31.8909	31.752	57.71816	31.66692	5.642537	3.220539	3.1752	40.6303
March	264.9394	33.48	40.65614	33.48	33.48	40.65614	62.01751	33.48	46.18327	69.17225	10.91861	8.514309	3.348	47.42784
April	226.5408	29.808	29.808	29.808	29.808	29.808	65.5776	29.808	40.53888	67.96224	11.08858	9.180864	2.9808	42.92352
Total	1017.883	120.312	251.1628	120.312	198.3179	251.1628	206.93	120.312	232.157	215.4177	36.38477	23.44291	12.0312	140.744

Table 4-4 Loading Calculations for Dissolved Metals at ADP1 2023-24 Reporting Period

Month	Metals Dissolved													
	Ag	Al	As (total)	Cd	Cr	Co	Cu	Fe	Hg	Pb	Sb	Mn	Ni	Zn
	kg													
January	0.000253	0.050544	0.005054	0.000505	0.005054	0.005054	0.005054	0.050544	0.005054	0.005054	0.005054	0.046575	0.006703	0.063051
February	0.000318	0.065771	0.00635	0.000649	0.00635	0.00641	0.00635	0.063504	0.00635	0.00635	0.00635	0.08276	0.015252	0.277254
March	0.000335	0.262882	0.006696	0.002492	0.006696	0.014391	0.006696	0.06696	0.006696	0.006696	0.006696	0.524554	0.058723	0.204924
April	0.000298	0.190771	0.005962	0.0031	0.005962	0.016692	0.005962	0.059616	0.005962	0.005962	0.005962	0.548467	0.065578	0.250387
Total	0.001204	0.569968	0.024062	0.006746	0.024062	0.042548	0.024062	0.240624	0.024062	0.024062	0.024062	1.20235	0.146255	0.795617

4.2 Spatial and Temporal Trends and Analysis

4.2.1 Field Parameters

Physical parameter results from field sampling and telemetry data for the reporting period are presented below. Appendix A includes all monitoring data. Figure 4-1 shows spatial short and long term median trends in physical parameters across the site and within the Mount Bunday Creek

Physical parameters monitoring data points (from 2017-2024) are presented in the following graphs. ADP1 data is presented separately from the other monitoring sites and compared to the respective WDL 249 SWTG2 TV. All other monitoring sites data are presented in Figure 4-2.

ADP1

ADP1 physical parameters generally did not exceed trigger value limits with most analytes reporting below SWTG2 TV. The exception was Dissolved Oxygen on four events.

- Dissolved oxygen short-term median trends were below respective WDL 249 TV's of between 85-120 % saturation on four sampling occasions during the reporting period.
- pH short- term median trends were within respective WDL 249 TV's of 5.8- 8.0 pH units during the reporting period.
- Electrical Conductivity short-term median trends were within respective WDL 249 TV's of 250 μ S/cm during the reporting period.
- Turbidity short-term median trends and analytical results (N=4) were within respective WDL 249 TV's of 87 NTU during the reporting period.
- Continuous flows recorded daily at the flow meter located in the permeate container RO plant from a total number of records (N=107) ranged from 0-864 kL/day and a total amount discharged of 60,480 kL.

SWTG2

SWTG2 physical parameters did not exceed trigger value limits with most analytes reporting below LoR concentrations.

- Dissolved oxygen (%) short- and long-term median trends were within respective WDL 249 TV's. DO analytical results (N=15) were outside of WDL 249 TV range of 85-120 % at SWTG2 (compliance point) on two sampling occasions (23/01/2024) and (30/04/2024). Continuous water quality results recorded at the telemetry station indicated that DO fluctuated between 80.48 %-91.74 % (based on the 7-day rolling average).

Of the total number of data points (N=2685) DO lowest reading of 67.12 % was recorded on 05/05/2024 and highest reading recorded 95.6 % on the 11/03/2024. The overall median is calculated to be 88.36 %.

- pH (units) short- and long-term median trends were within respective WDL 249 TV's. pH Analytical results (N=15) were outside of WDL 249 TV range of 5.8- 8.0 pH units at SWTG2 (compliance point) on one sampling occasion (30/04/2024). Continuous water quality results recorded at the telemetry station indicated that pH fluctuated between 5.68 -6.36 pH (based on the 7-day rolling average). Of the total number of data points (N=2685), lowest reading of 5.37 pH recorded on the 26/01/2024 and highest reading recorded 6.66 pH on the 08/02/2024. The overall median is calculated to be 6.18 pH.
- Electrical Conductivity ($\mu\text{S}/\text{cm}$) short- and long-term median trends were within respective WDL 249 TV's. EC analytical results (N=15) were outside of WDL 249 TV of 250 $\mu\text{S}/\text{cm}$ at SWTG2 (compliance point) on one sampling occasion (30/04/2024) during the reporting period. Continuous water quality results recorded at the telemetry station indicate that EC fluctuated between 27- 284 $\mu\text{S}/\text{cm}$ (based on the 7-day rolling average). Of the total number of data points (N=2685) lowest reading of 9 $\mu\text{S}/\text{cm}$ recorded on the 15/03/2024 and highest reading recorded 475 $\mu\text{S}/\text{cm}$ on the 05/05/2024. The overall median is calculated to be 62 $\mu\text{S}/\text{cm}$.
- Turbidity (NTU) short- and long-term median trends and analytical results (n=15) were within respective WDL 249 TV of 87 NTU at SWTG2 (compliance point). Continuous water quality results recorded at the telemetry station indicated that turbidity fluctuated between 11- 47 NTU (based on the 7-day rolling average). Of the total number of data points (N=2685) lowest reading of 7 NTU recorded on the 27/03/2024 and highest reading recorded 366 NTU recorded on the 01/04/2024. The overall median is calculated to be 24 NTU.
- Temperature ($^{\circ}\text{C}$) continuous water quality results recorded at the telemetry station from a total number of data points (N=2685) lowest reading of 25 $^{\circ}\text{C}$ recorded on the 22/04/2024 and highest reading recorded 31 $^{\circ}\text{C}$ on the 19/02/2024. Overall median calculated at 29 $^{\circ}\text{C}$.
- Water level (m) continuous water level results (hourly) recorded at the telemetry station from a total number of data points (N=2685) levels lowest reading of 0.46 m recorded on 04/05/2024 and highest reading recorded 5.2 m recorded on the 26/01/2024. Overall median calculated at 0.86 m.
- Continuous flows (KL/day) calculated from the telemetry station recorded (N=16) events ranging from 85,370kl/day with a creek depth of 0.52metres recorded on the 30/04/2024 to 1,354,752 KL/day with a creek depth of 3.2 m recorded on the 29/01/2024.

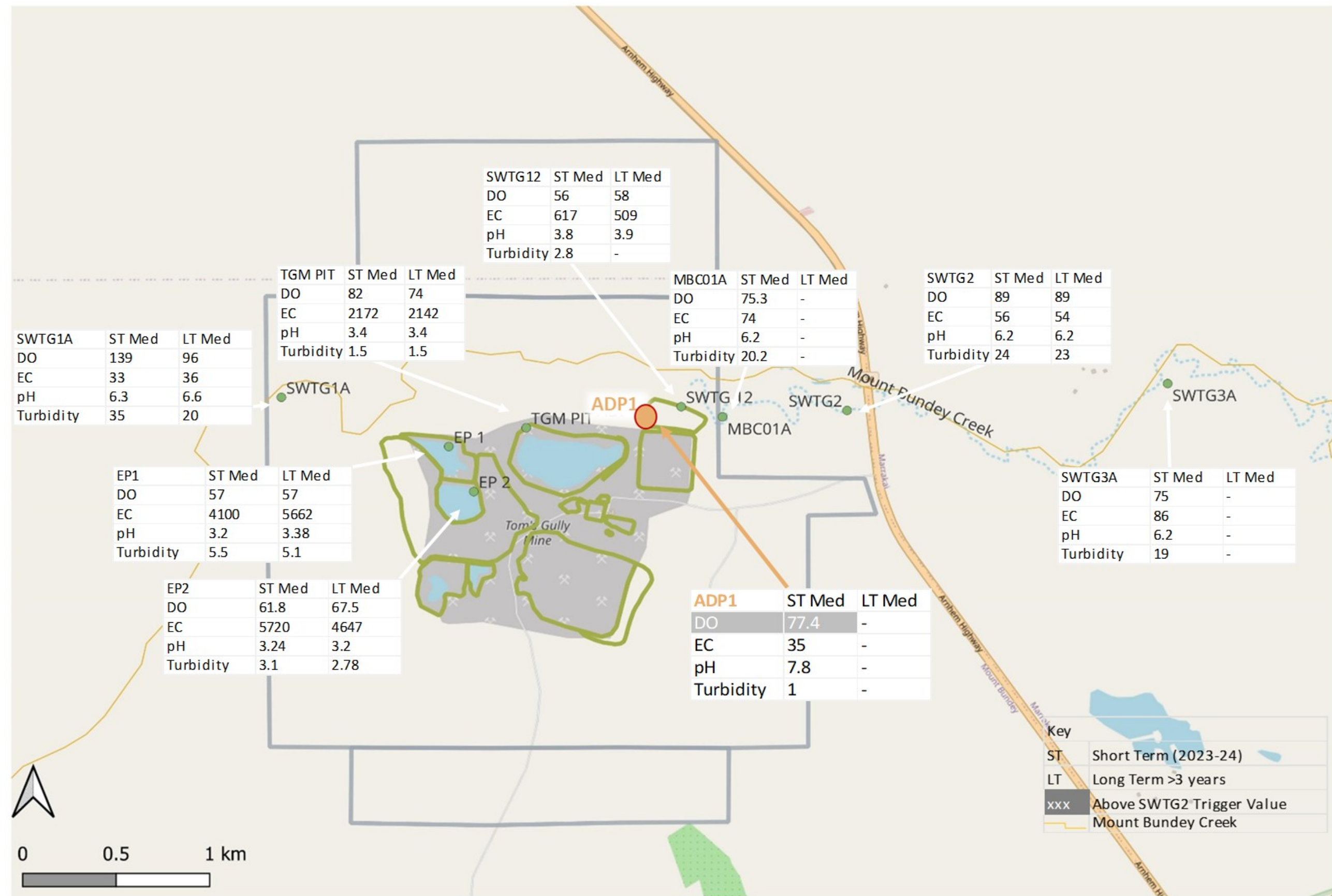
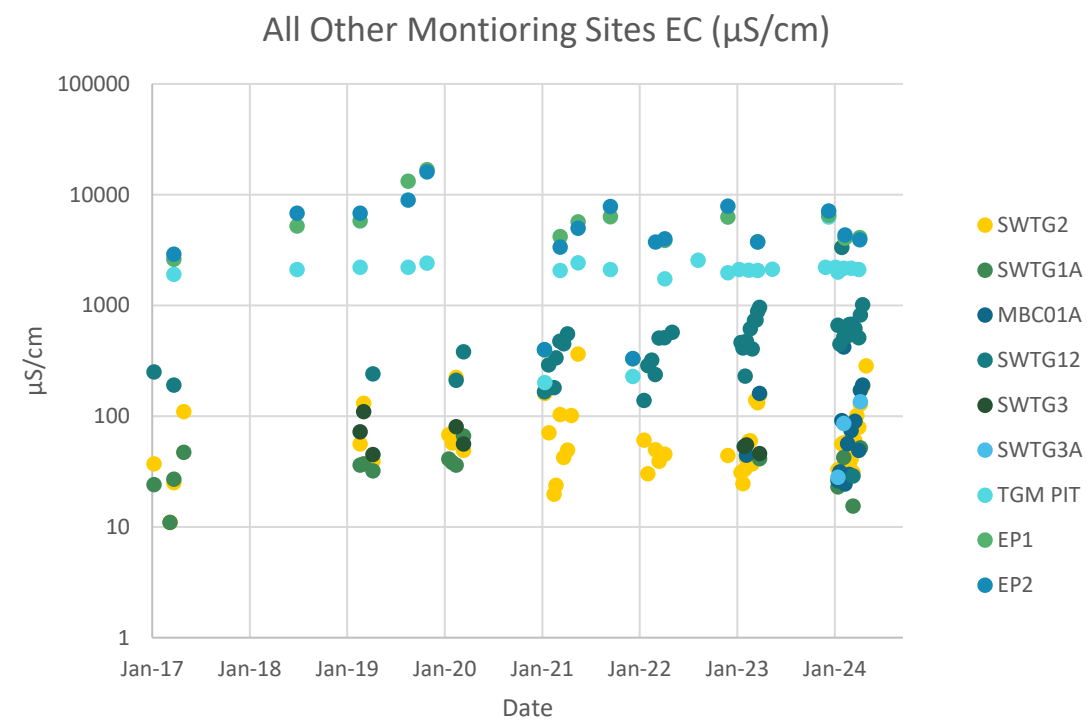
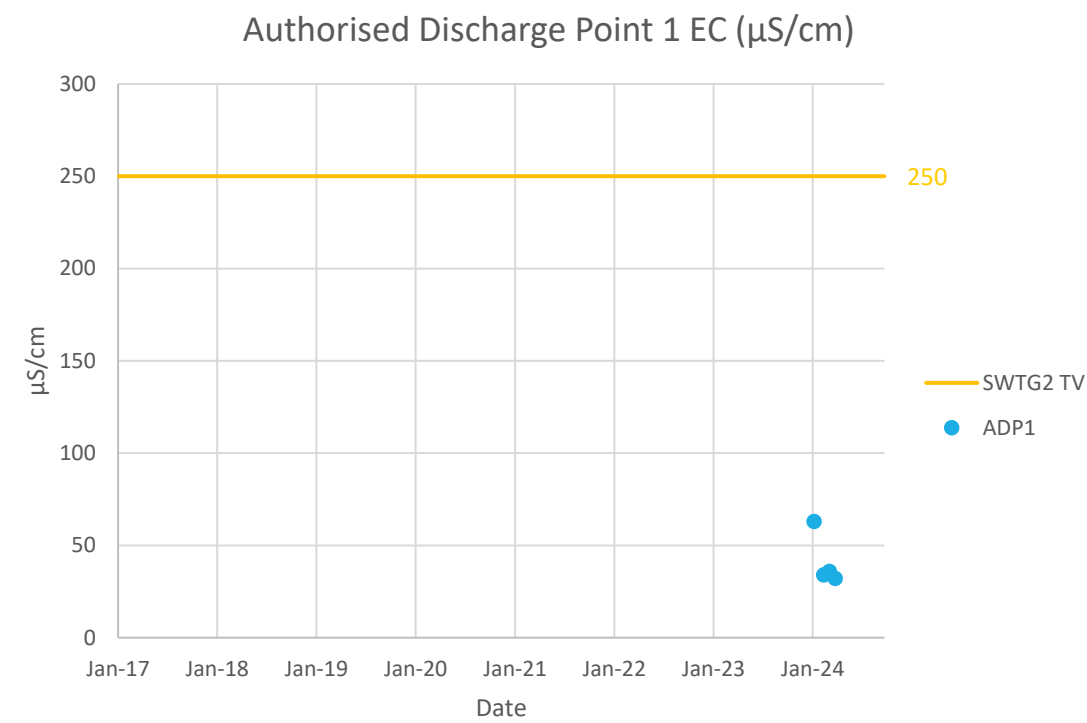
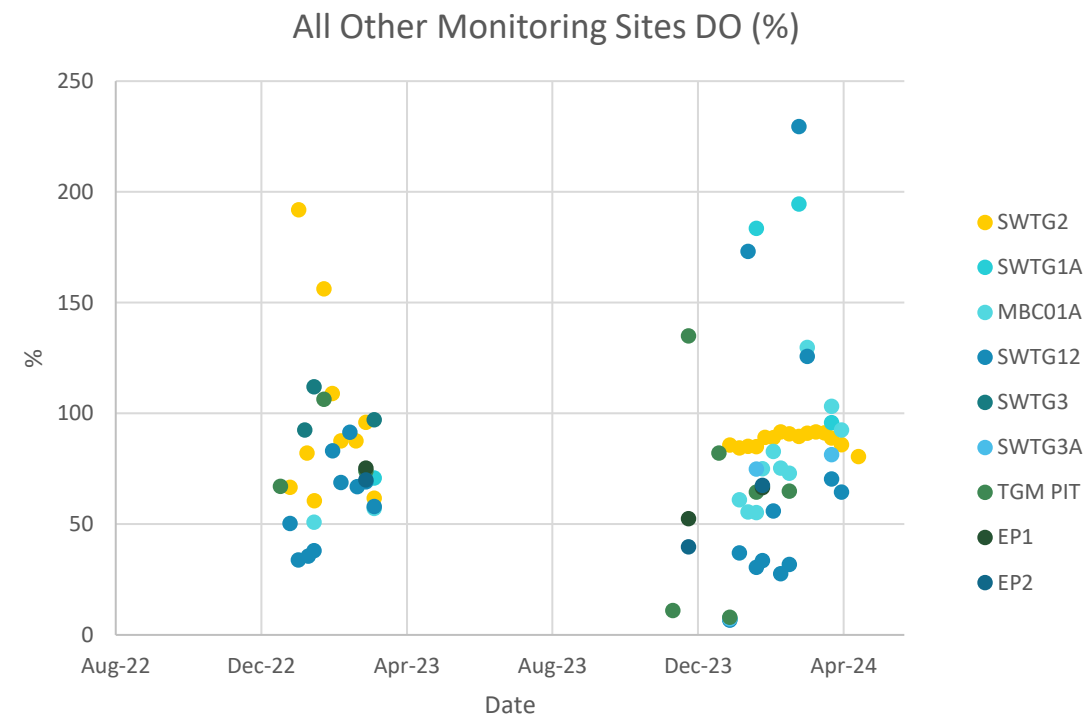
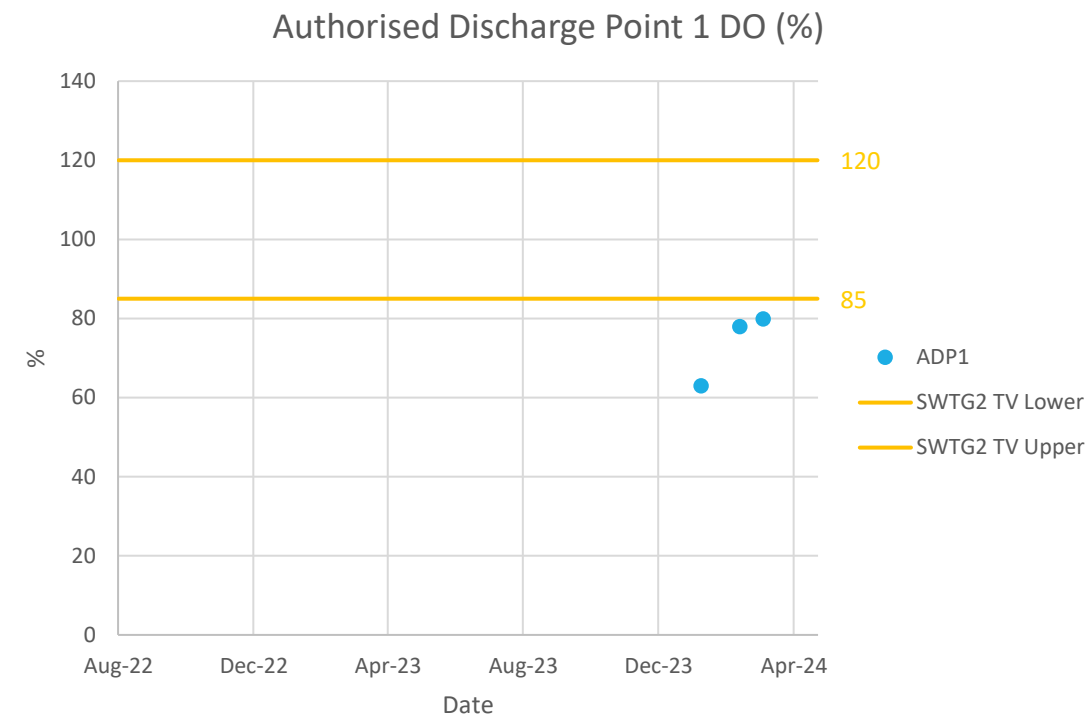


Figure 4-1 Spatial Trend for Physical Parameters



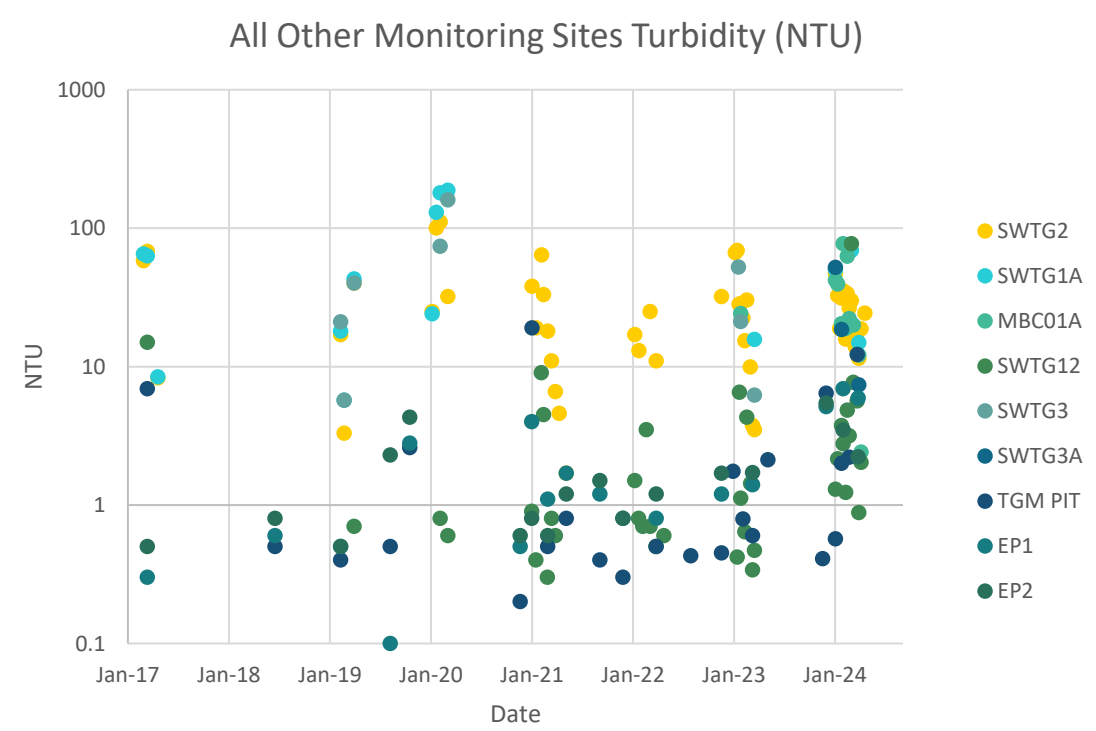
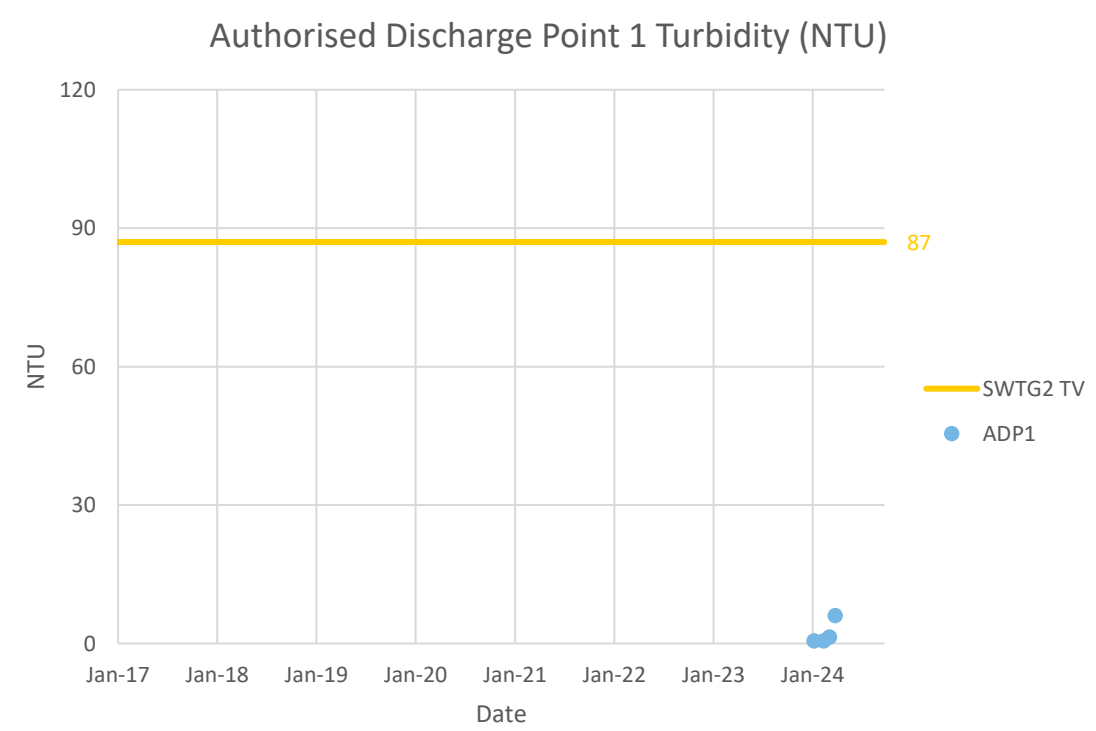
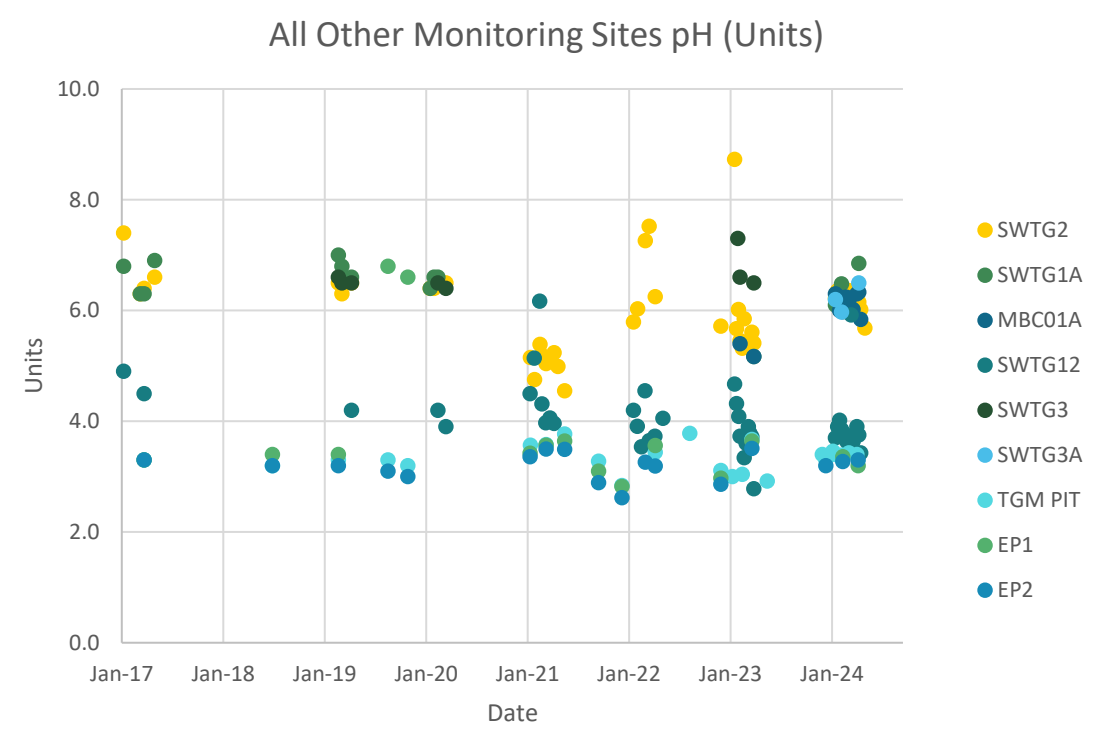
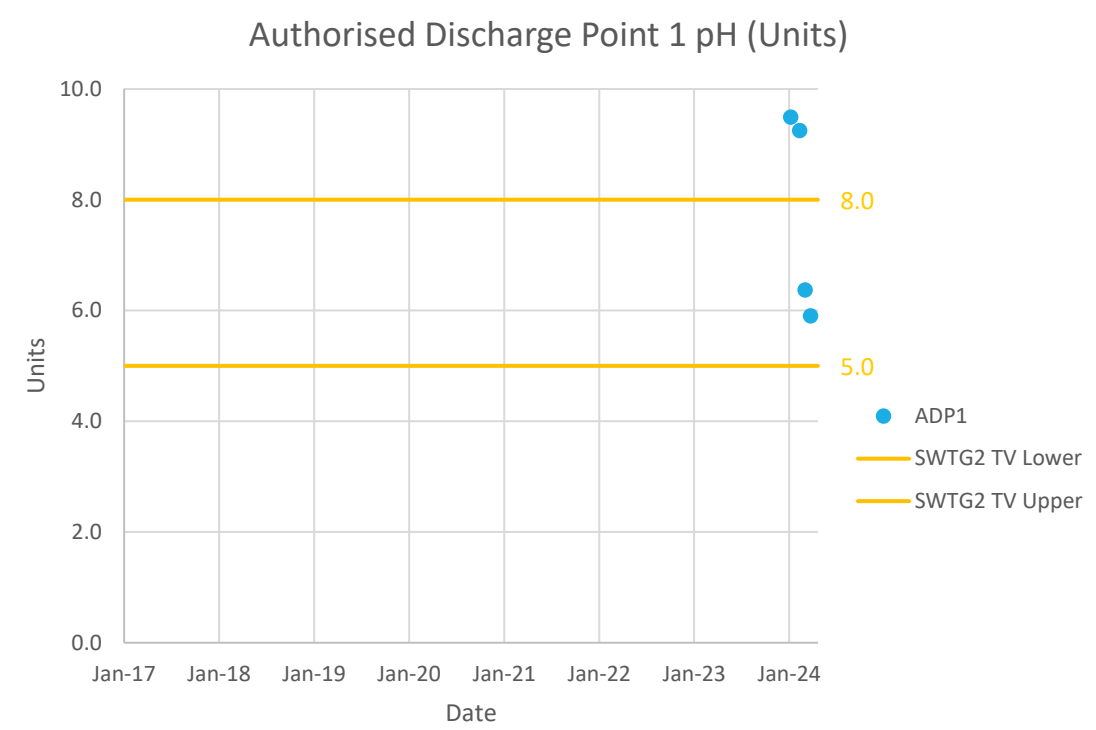


Figure 4-2 Authorised Discharge Point1 and Other Monitoring Sites Trend Analysis for Physical Parameters

4.2.2 General Chemistry

General chemistry analytical results from field sampling temporal and spatial trends at all creek sites for the reporting period are presented below. Appendix A includes all monitoring data. Figure 4-3 depicts spatial trend for sulphate parameters at all monitoring sites, including ADP1. TSS was not included in the spatial analysis as levels for the reporting period were below laboratory LOR at ADP1.

General chemistry monitoring data points (from 2017-2024) are presented in the following graphs to show temporal trends. The ADP1 data is presented separately from the other monitoring sites and compared to the respective WDL 249 SWTG2 TV's (Figure 4-4).

ADP1

- General chemistry concentrations generally did not exceed trigger value limits with both analytes reporting data below WDL249 TV or laboratory LoR.

SWTG2

- General chemistry concentrations exceeded WDL249 TV for total suspended solids on several occasions though not for sulphate which remained below TV The highest recording for TSS was 130 mg/L on 30/01/2024.



Figure 4-3 Spatial Trend for General Chemistry

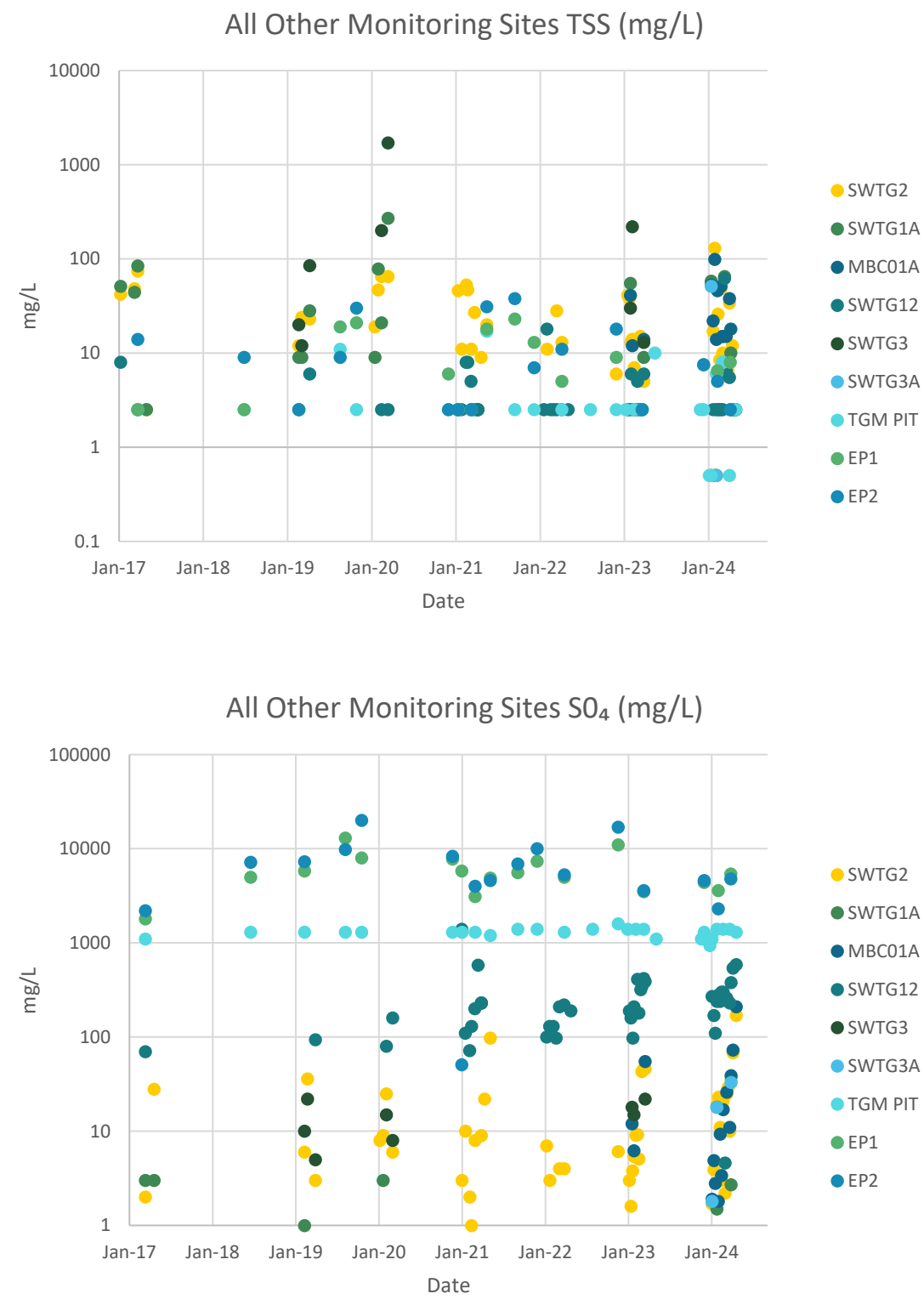
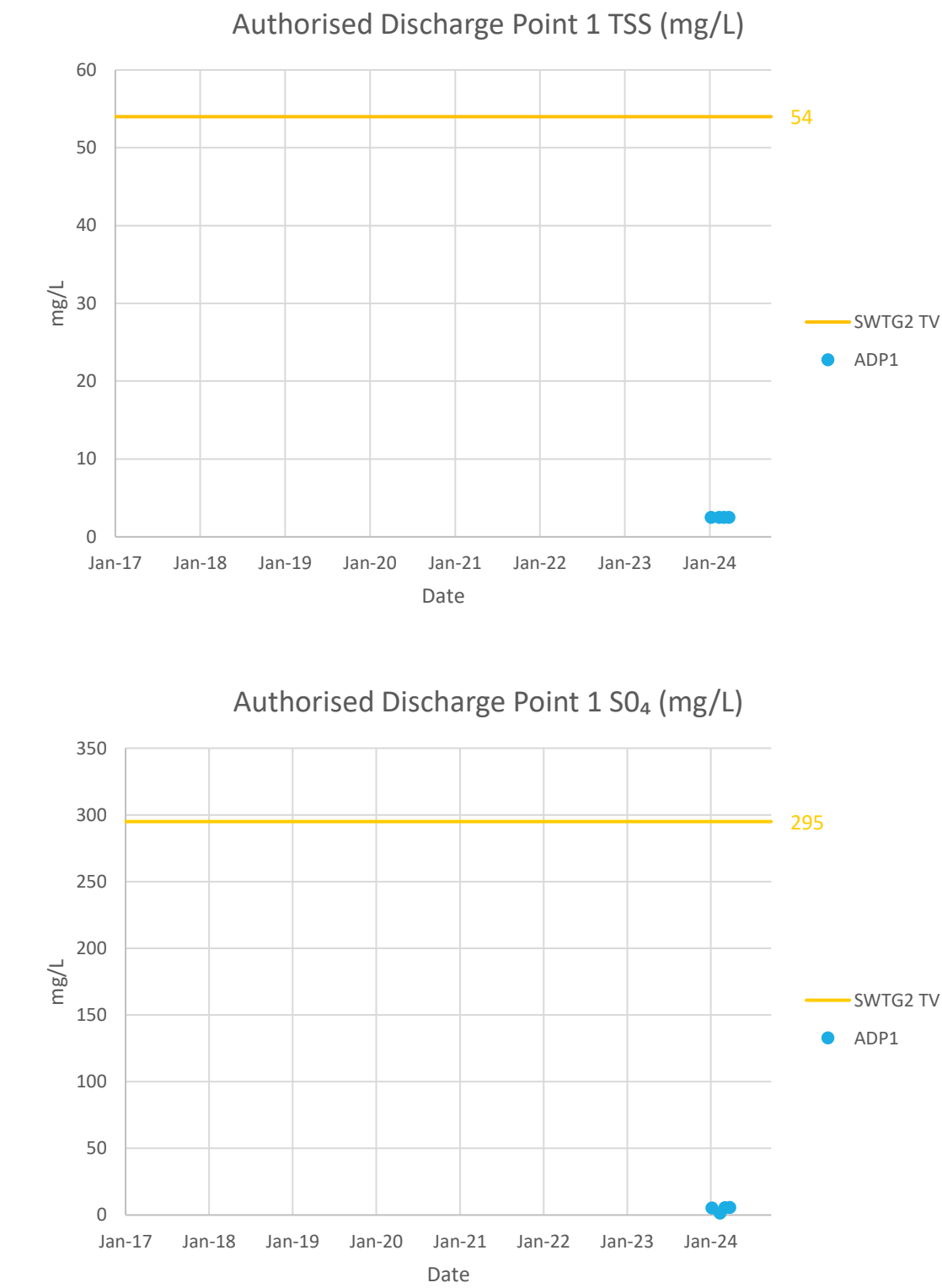


Figure 4-4 Authorised Discharge Point 1 and Other Monitor Sites Trend Analysis for General Chemistry

4.2.3 Dissolved Metals

Spatial and trend analysis for dissolved metals is presented in the following graphs and figures. Figure 4-5 shows spatial short and long term median trends in water quality across the site and within the Mount Bunday Creek. Figure 4-6 shows the temporal trend for dissolved metals from the ADP1 against SWTG2 TV and all other monitoring sites.

ADP1

Dissolved metals concentrations generally did not exceed trigger value limits with most analytes reporting below laboratory LoR. The exceptions were dissolved zinc on three events and dissolved cadmium on one occasion, however, both metal concentrations were within the 80% s.p. level of protection for freshwater (ANZG, 2018).

SWTG2

Dissolved metals concentrations for Aluminium, Iron, Arsenic and Manganese did not exceed trigger value limits. Antimony, Lead, Silver, Chromium, Mercury were below laboratory LoR whilst Cadmium, Copper, Nickel and Zinc exceeded trigger values on several occasions which were all recorded and investigated.

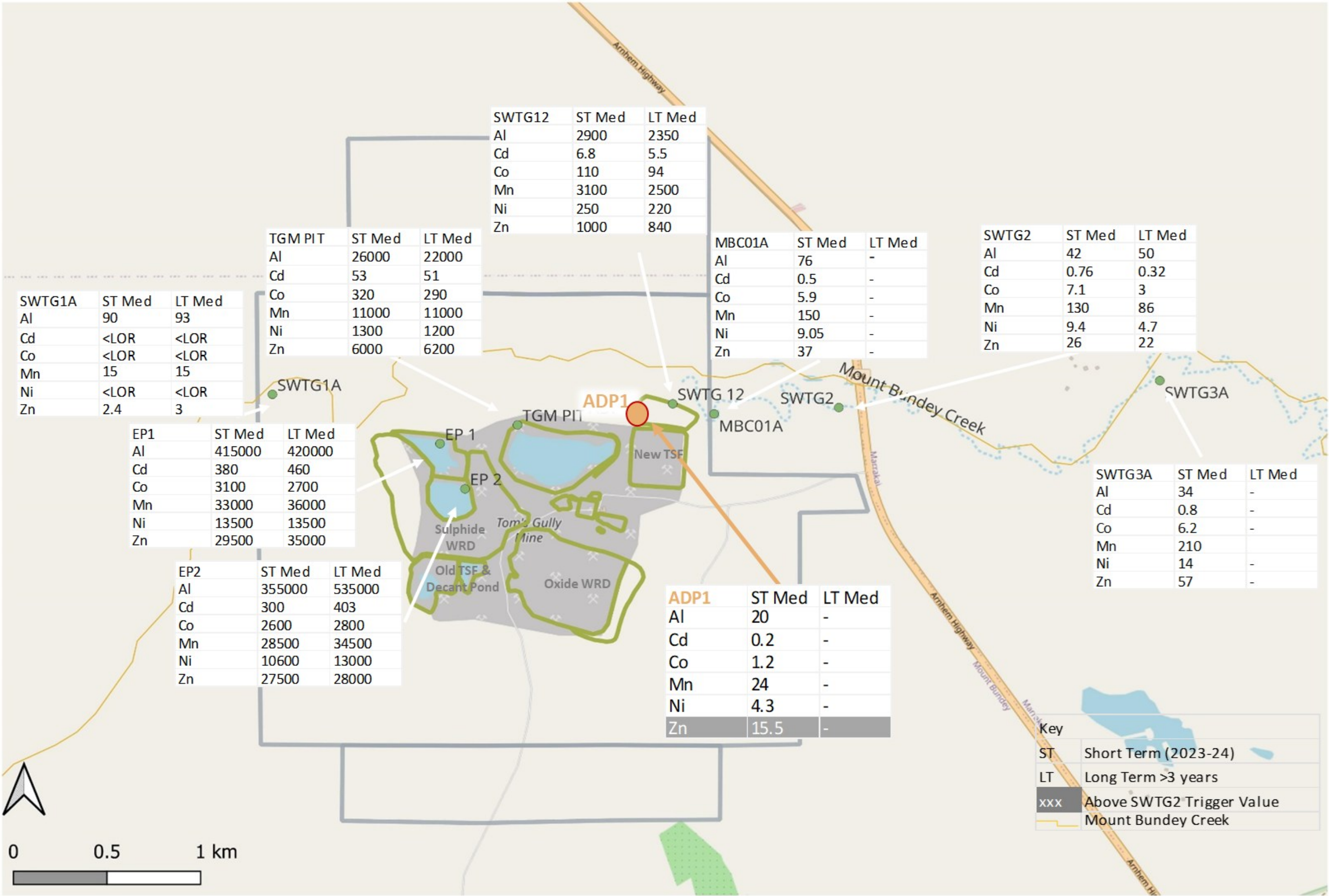
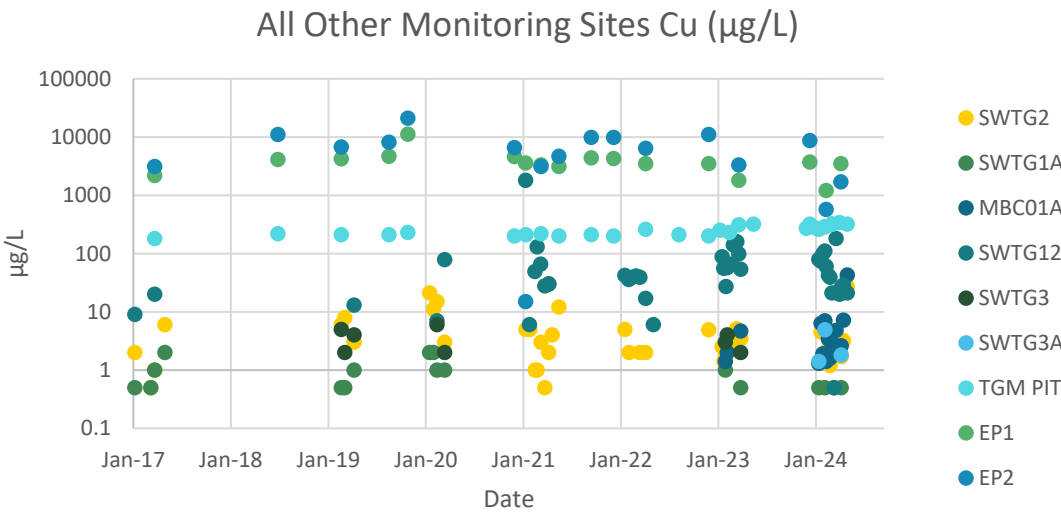
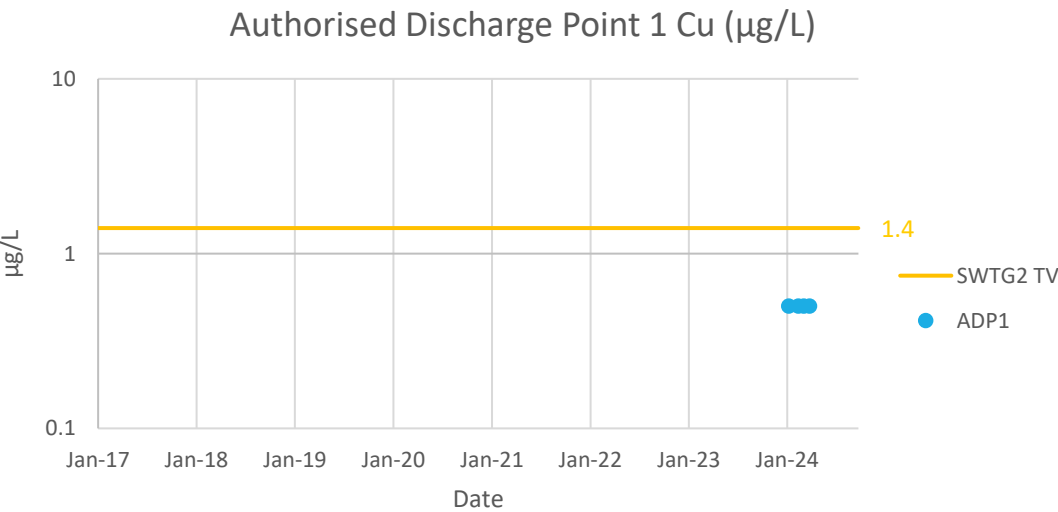
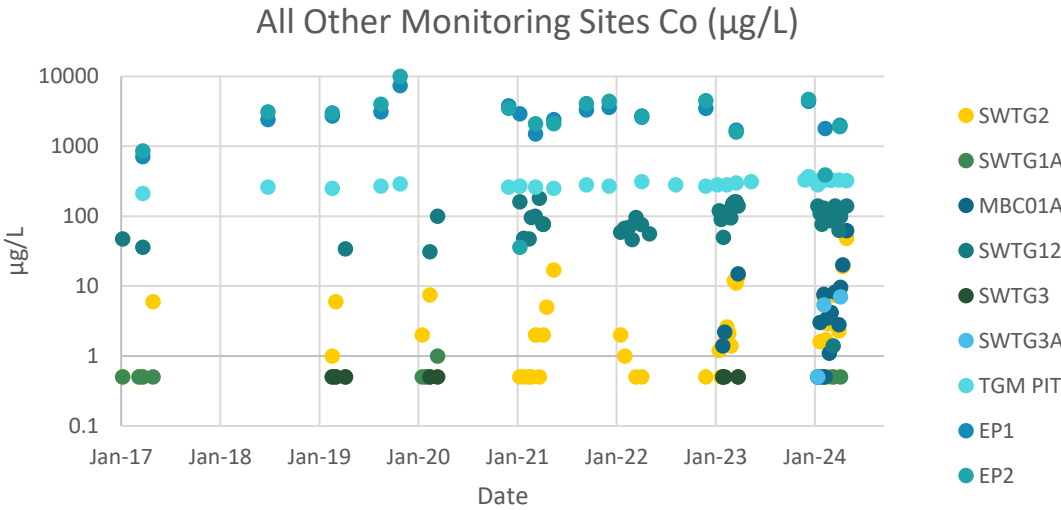
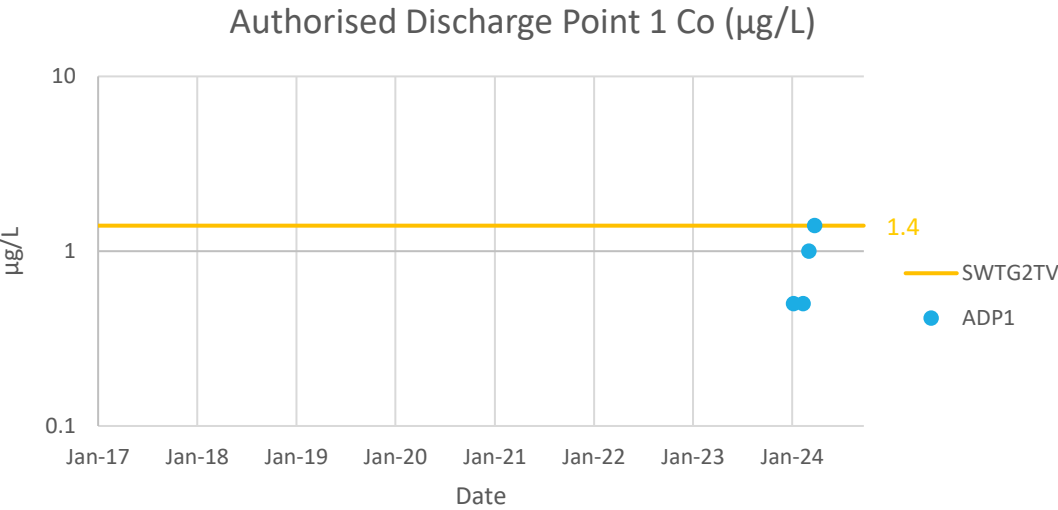
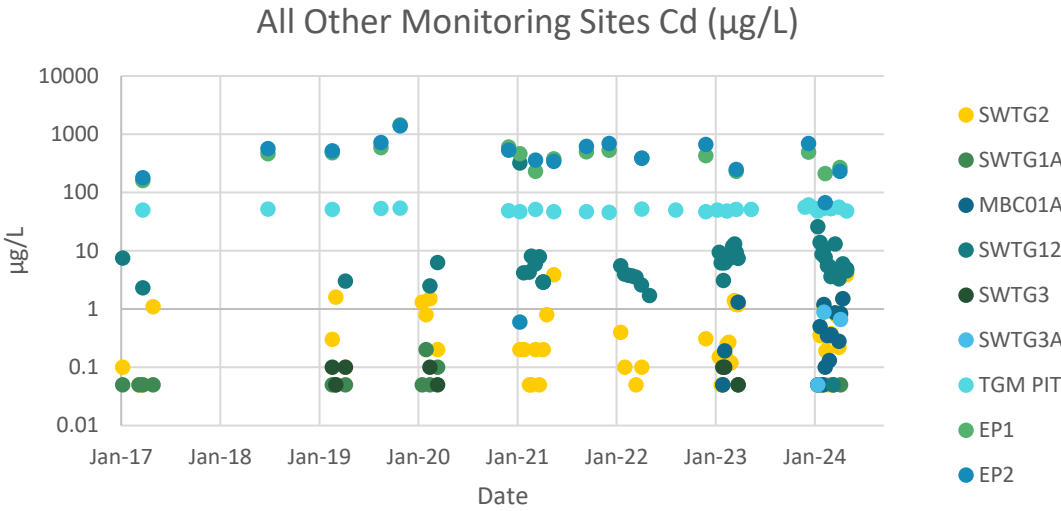
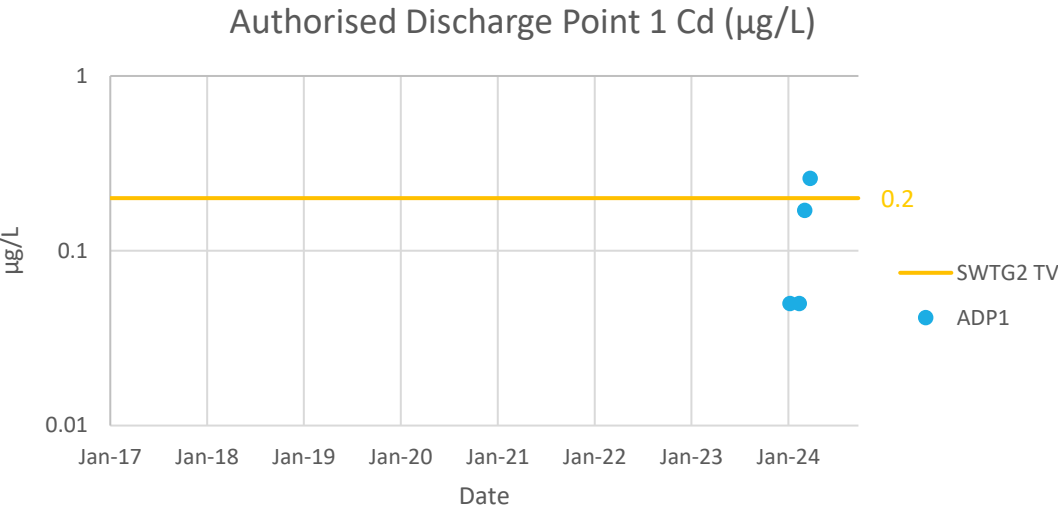


Figure 4-5 Spatial Trend for Dissolved Metals



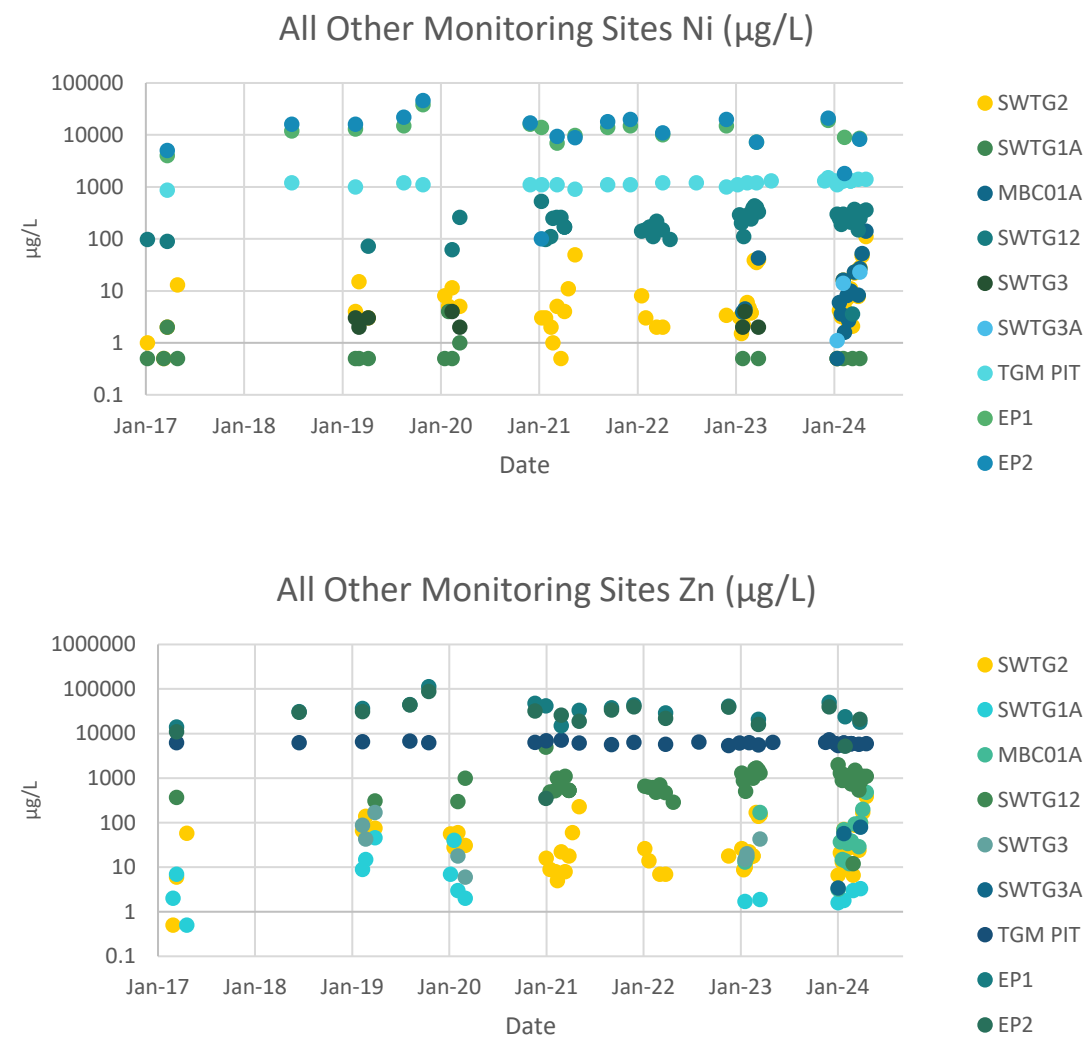
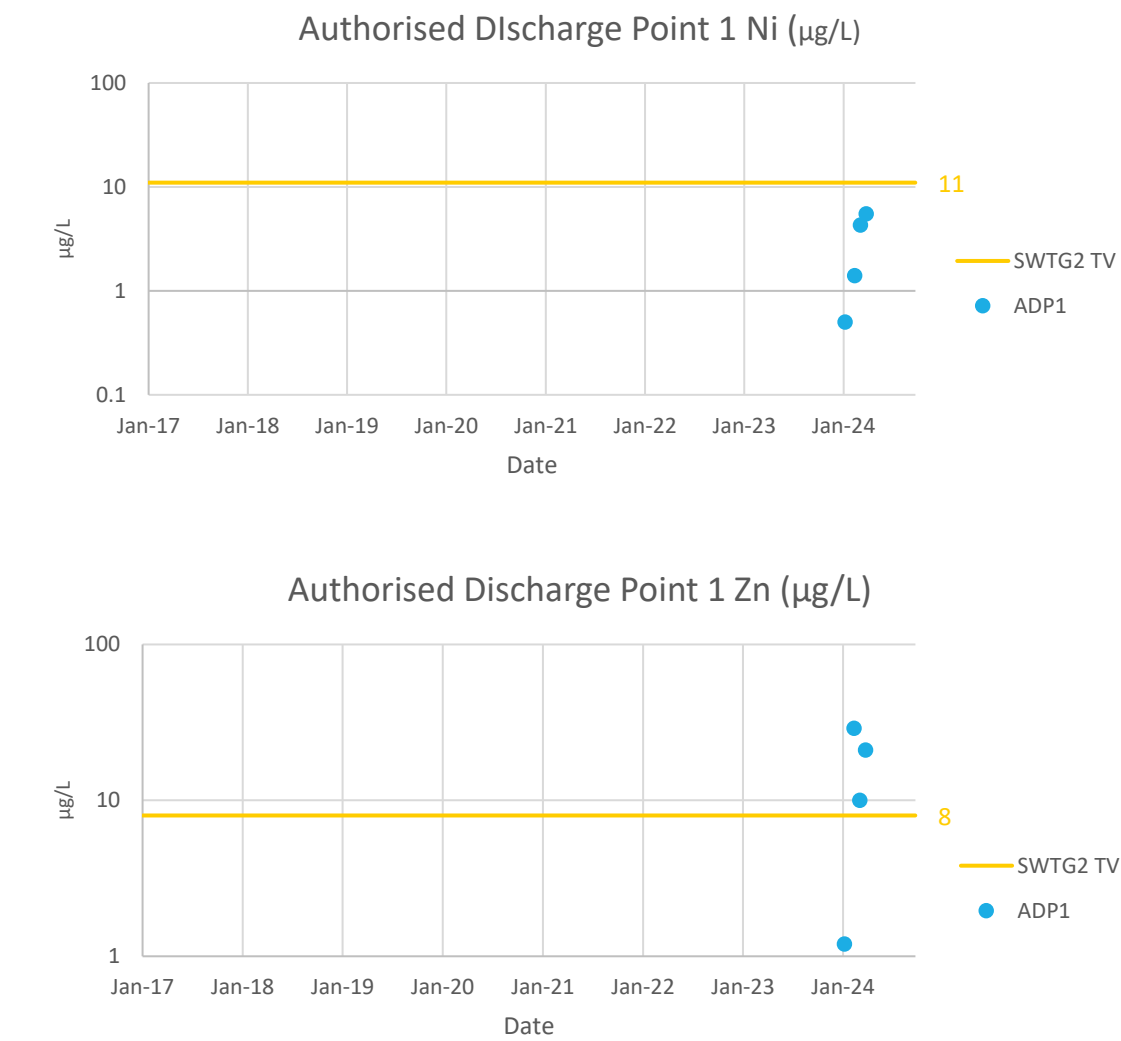


Figure 4-6 Authorised Discharge Point 1 and Other Monitor Sites Trend Analysis for Reported Dissolved Metals Dissolved

4.2.4 Total Loading

ADP1 total loadings for general chemistry are provided in Figure 4-7. Total loadings for metals/metalloids from ADP1 are provided in Figure 4-8. ADP1 discharge water was used to calculate total loading. The NSW EPA 'Load Calculation Protocol' (2008) was applied to measure the mass load of a specified analyte from controlled discharge activities. Continuous flow allowed for an accurate load calculation. A total of 60,480 KL of treated water was discharged from ADP1 during the 2023- 24 wet season. Total load calculations were assessed, and the following analysis has been made:

- Total loads concentrations at ADP1 with the highest concentration of bicarbonates (250kg), with cation loads dominated by sodium (150kg) followed by calcium (36kg);
- Chloride (232kg) load was slightly higher load compared to sulphates (215kg); and
- Total load concentrations at ADP1 with the highest concentration (kg) included Manganese (1.2kg), followed by Zinc (0.7kg), Aluminium (0.5kg) and Iron (0.2kg).

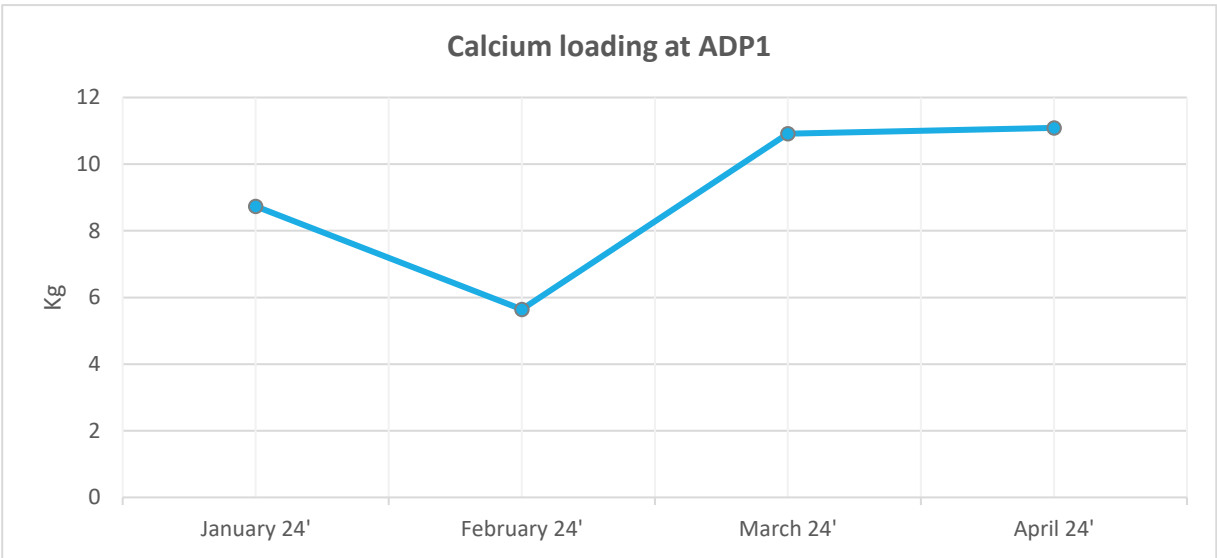
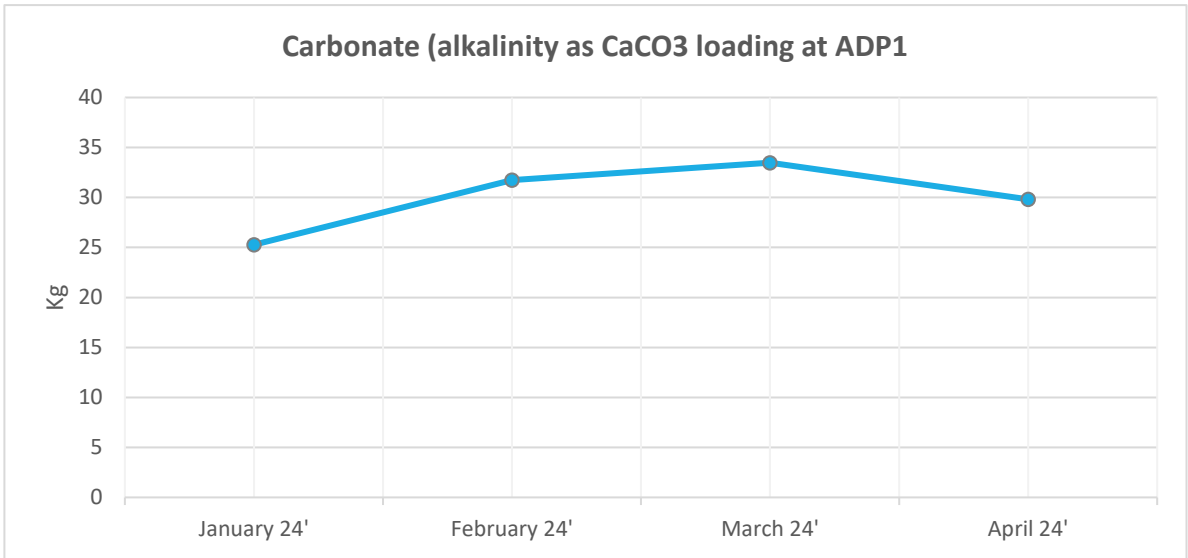
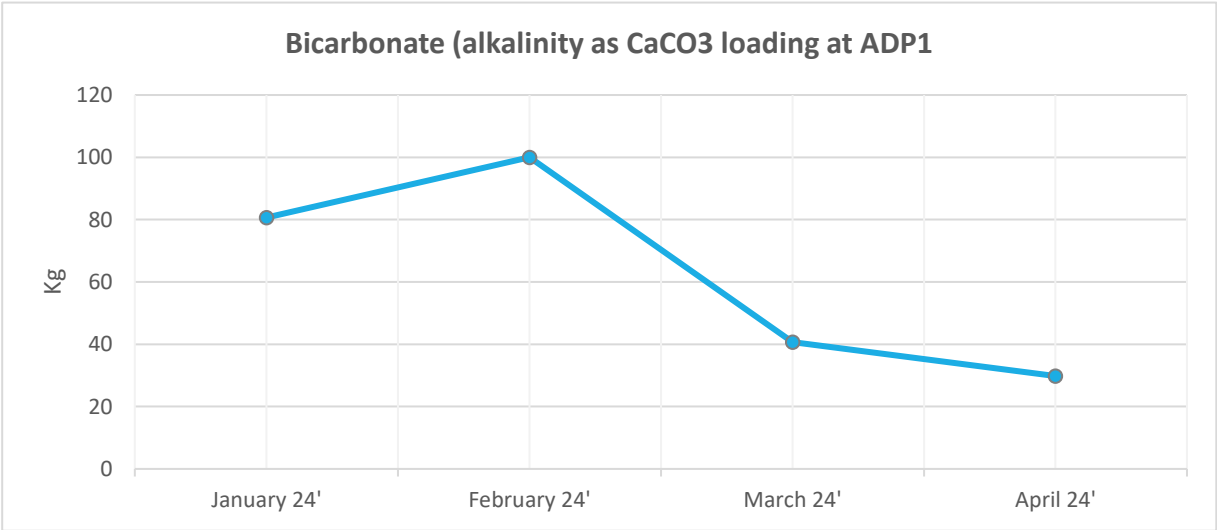
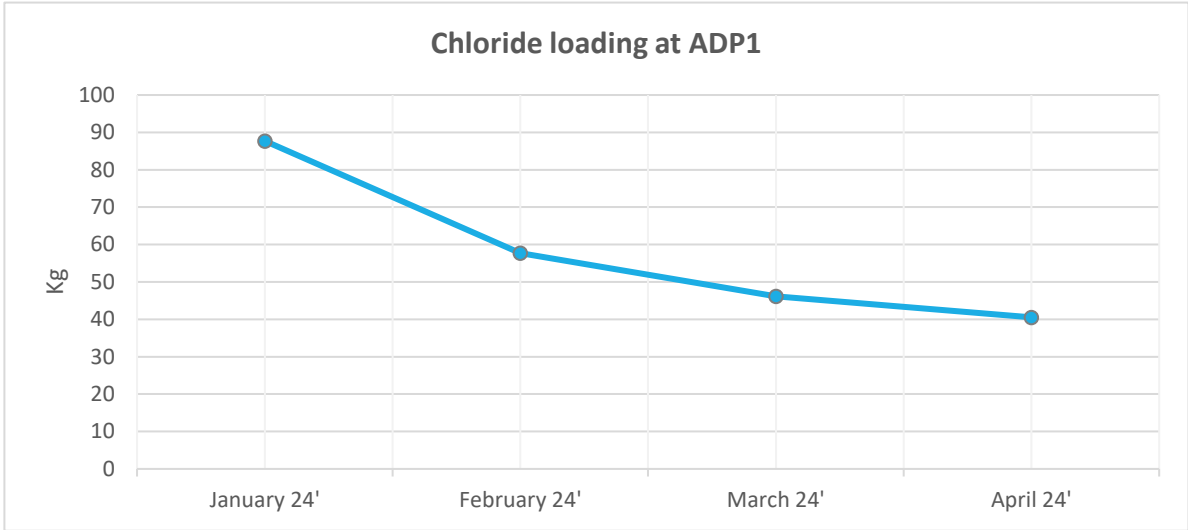
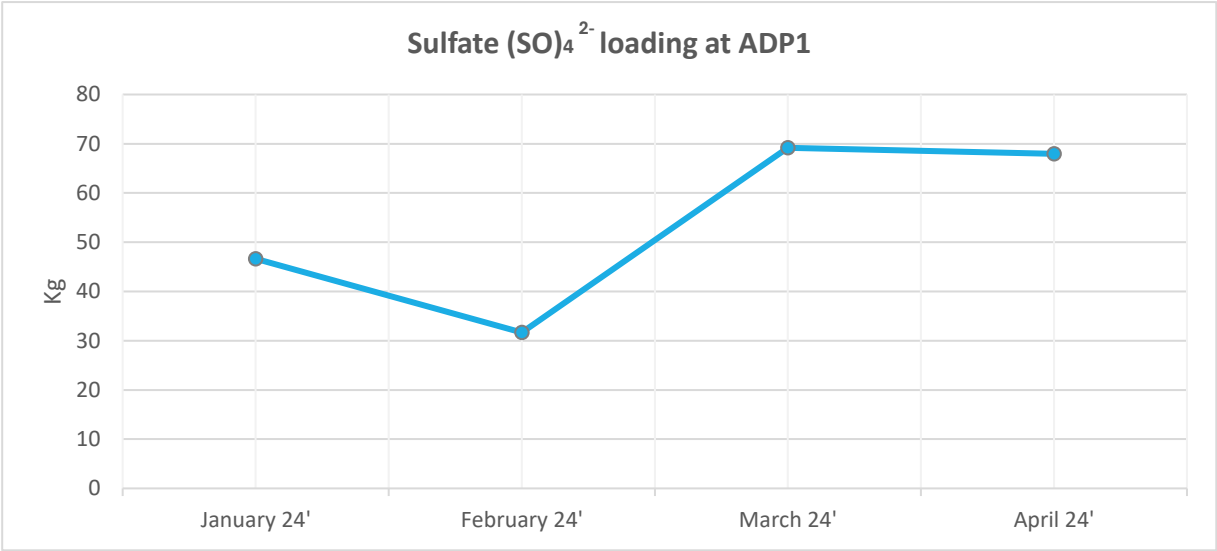
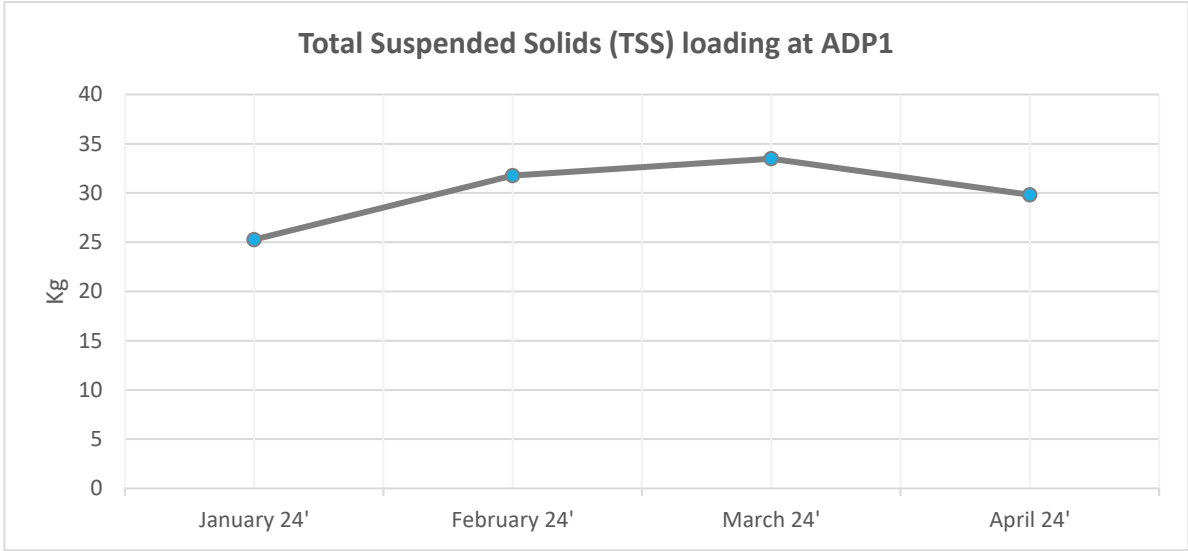
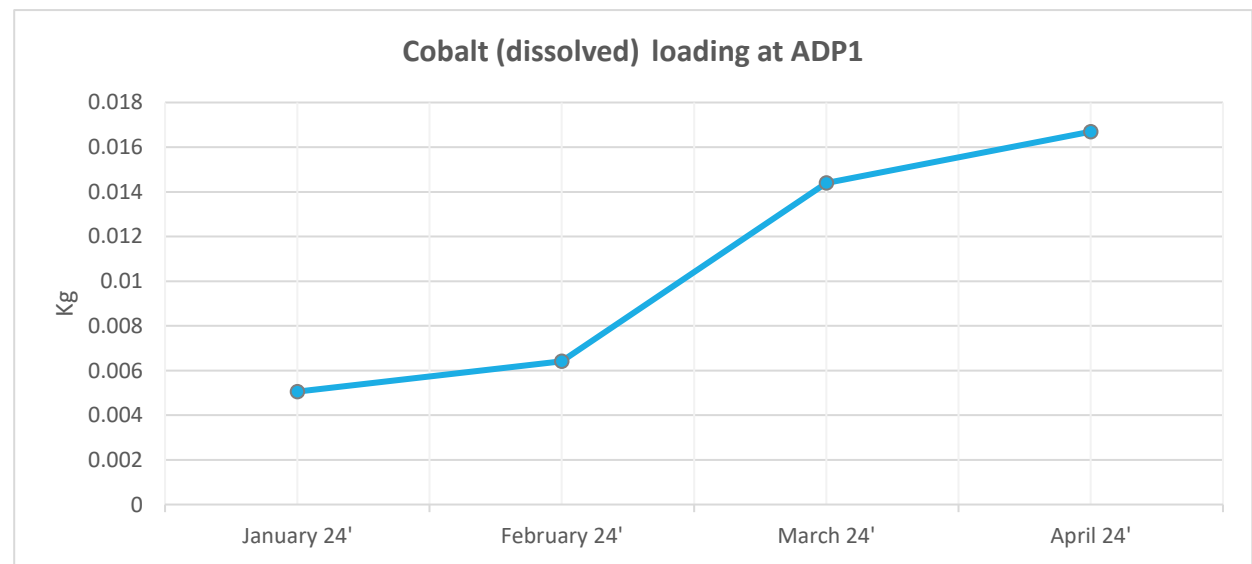
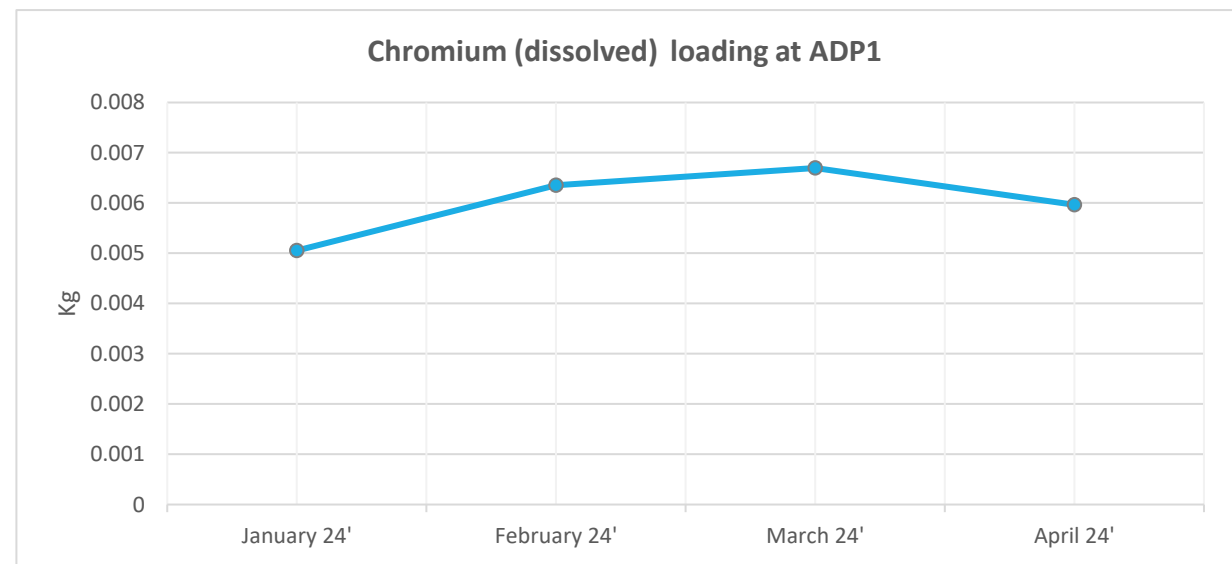
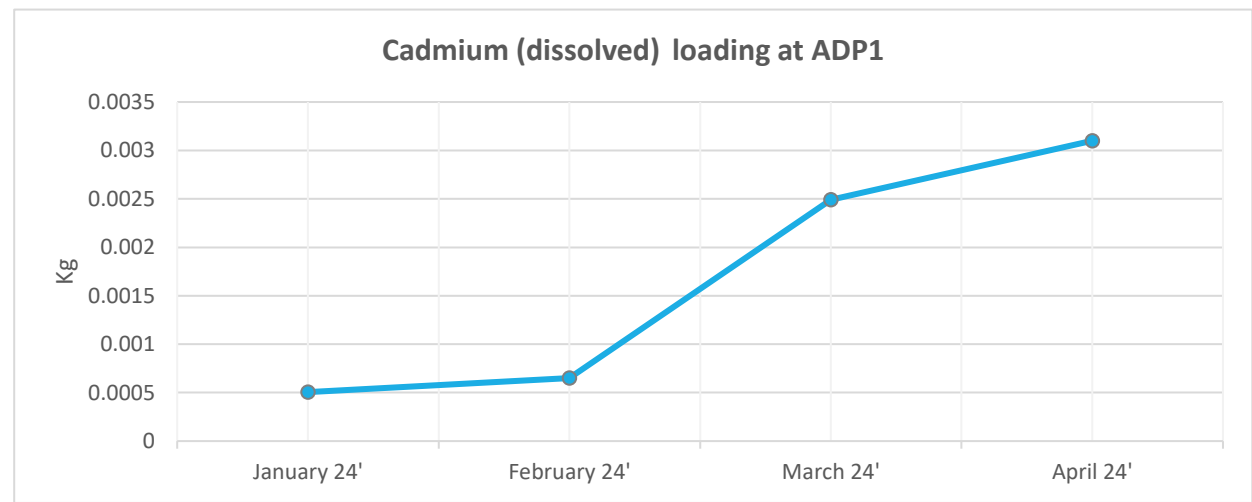
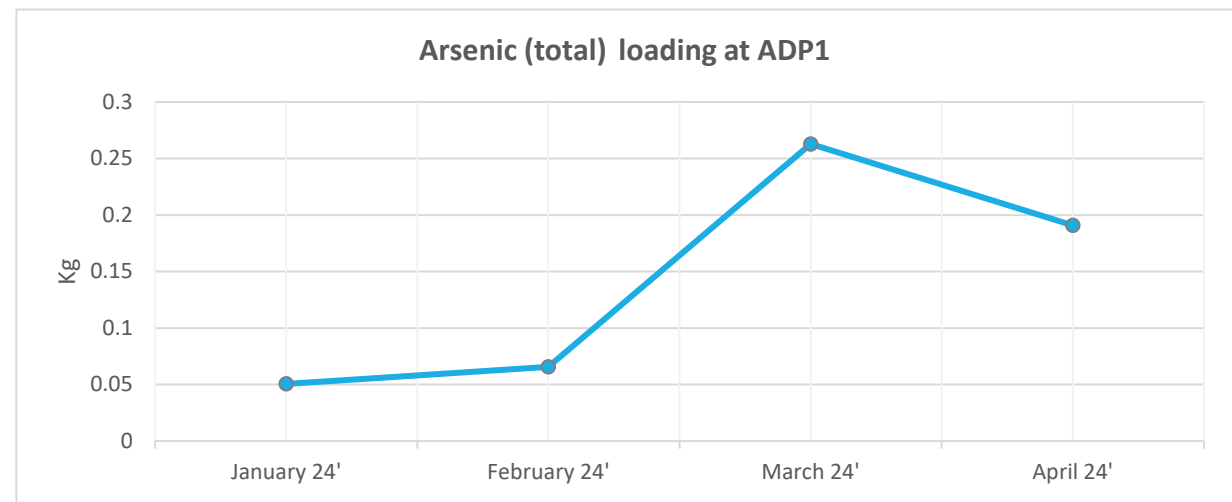
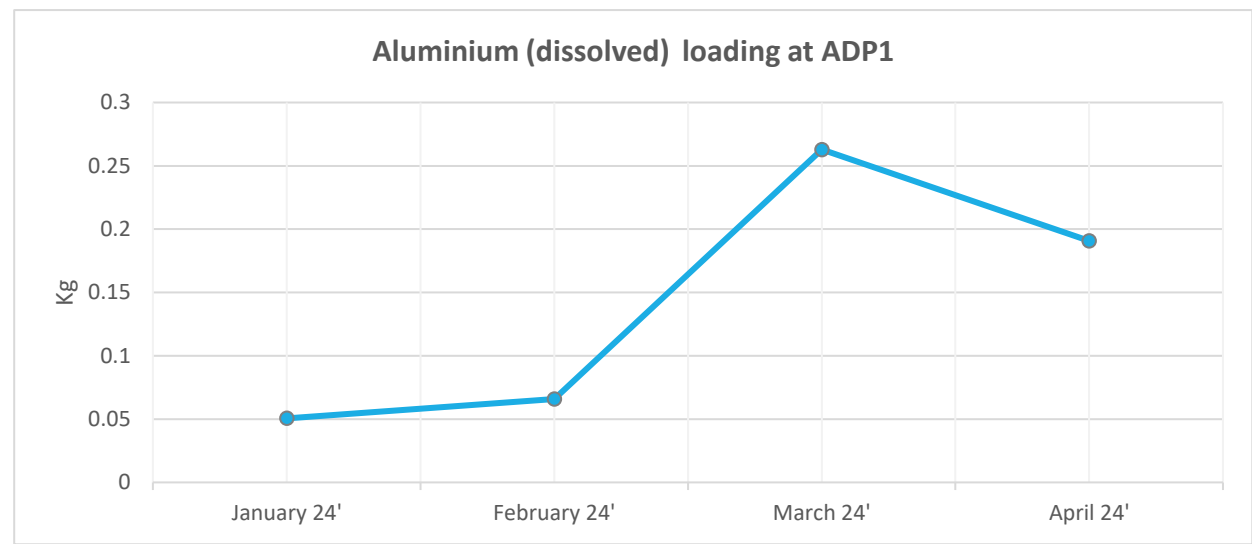
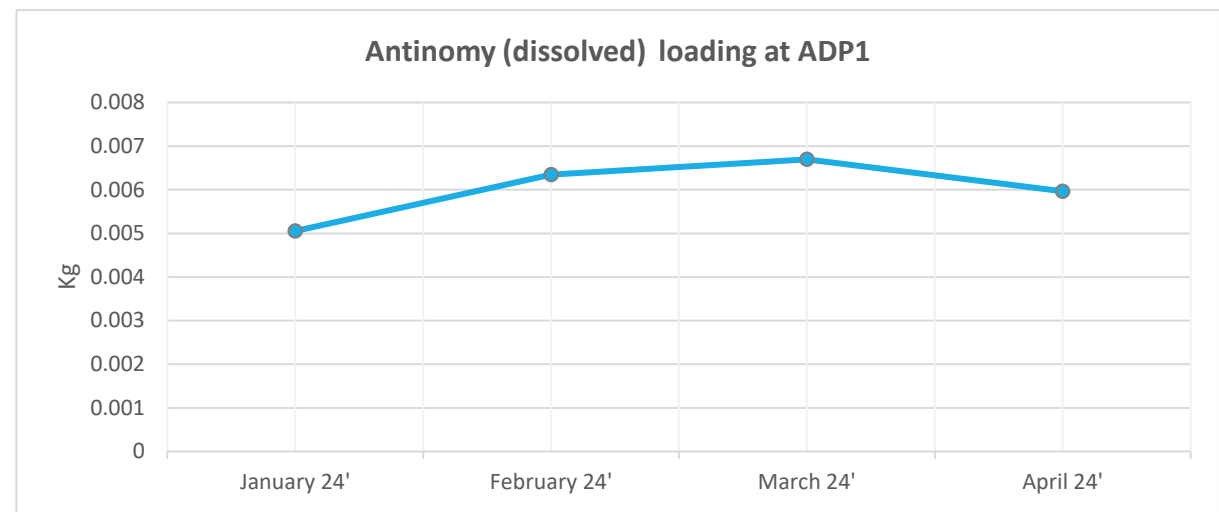
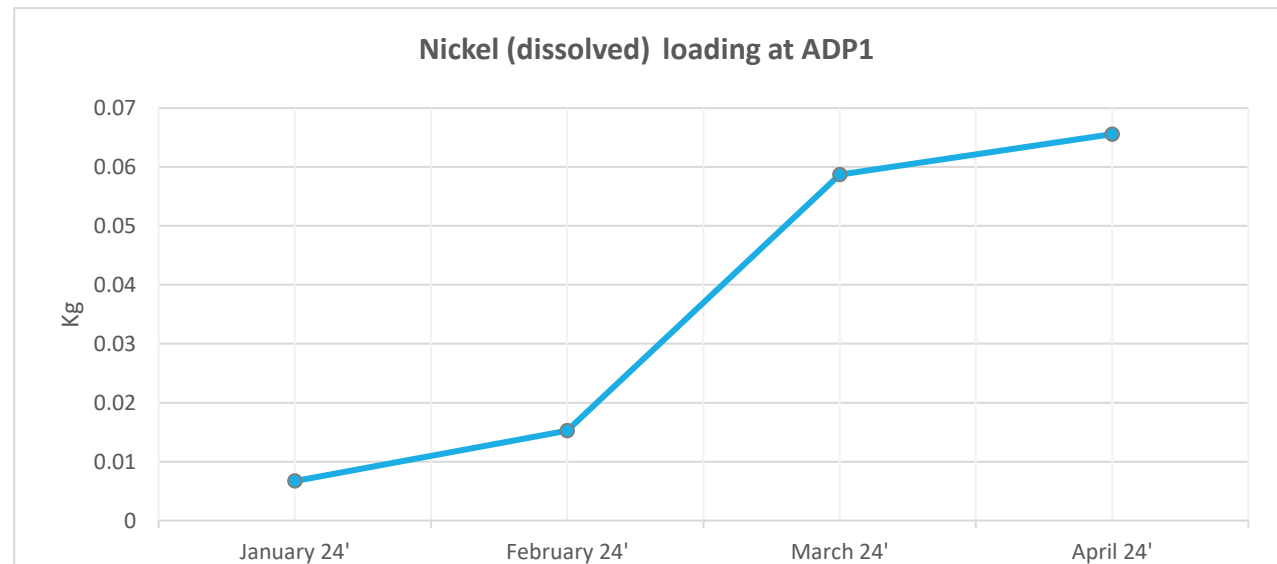
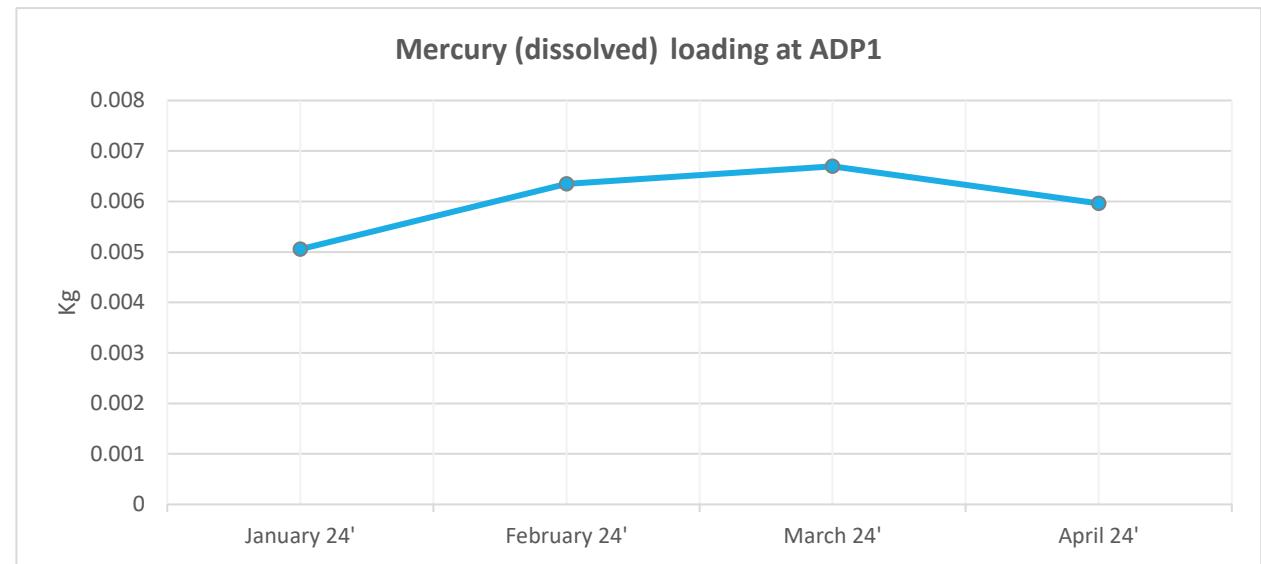
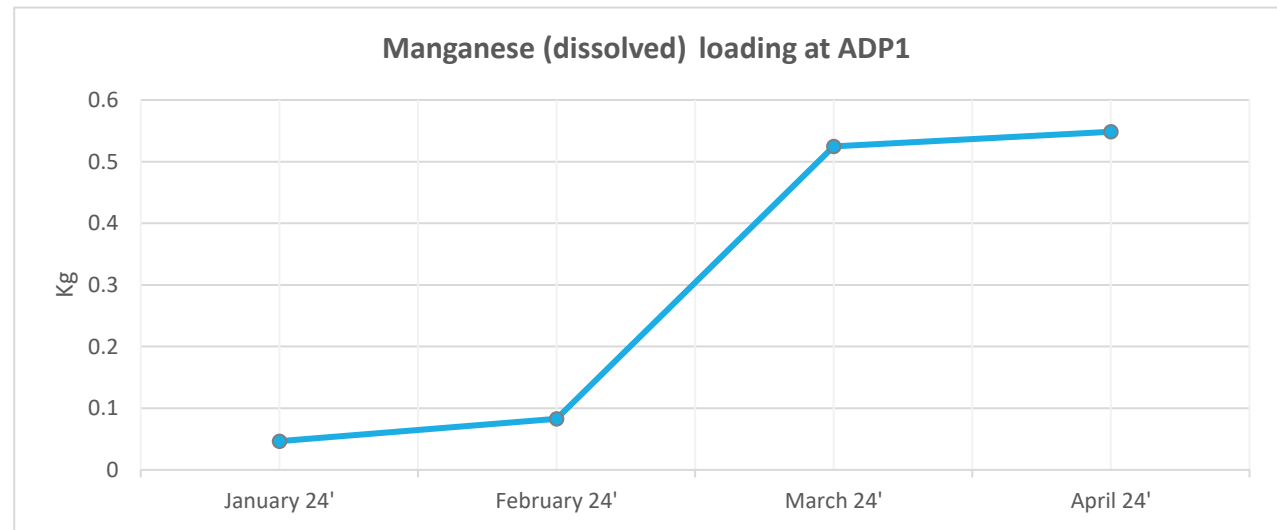
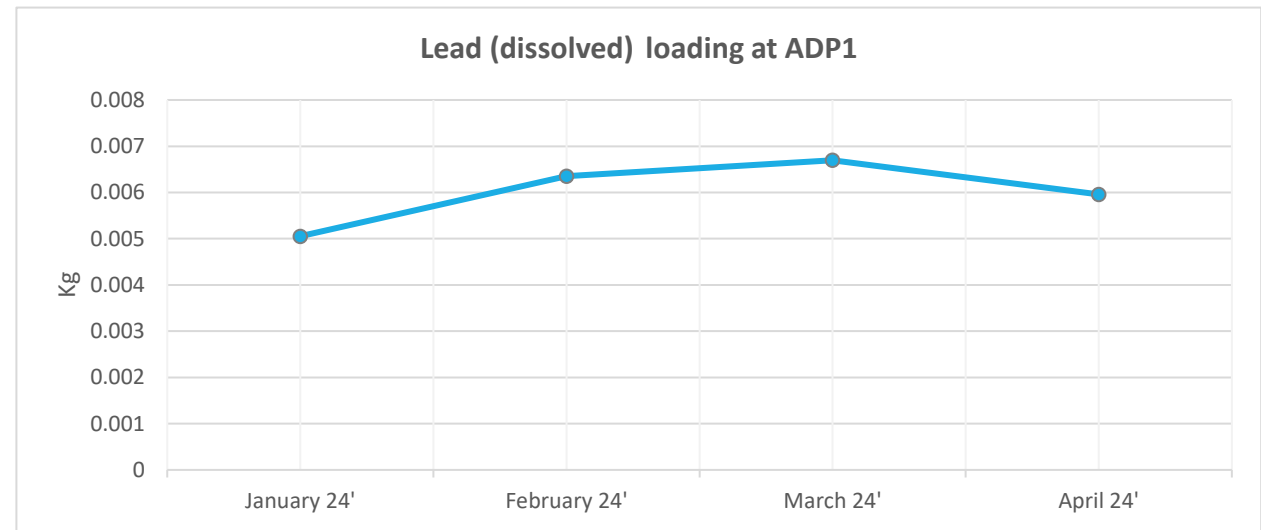
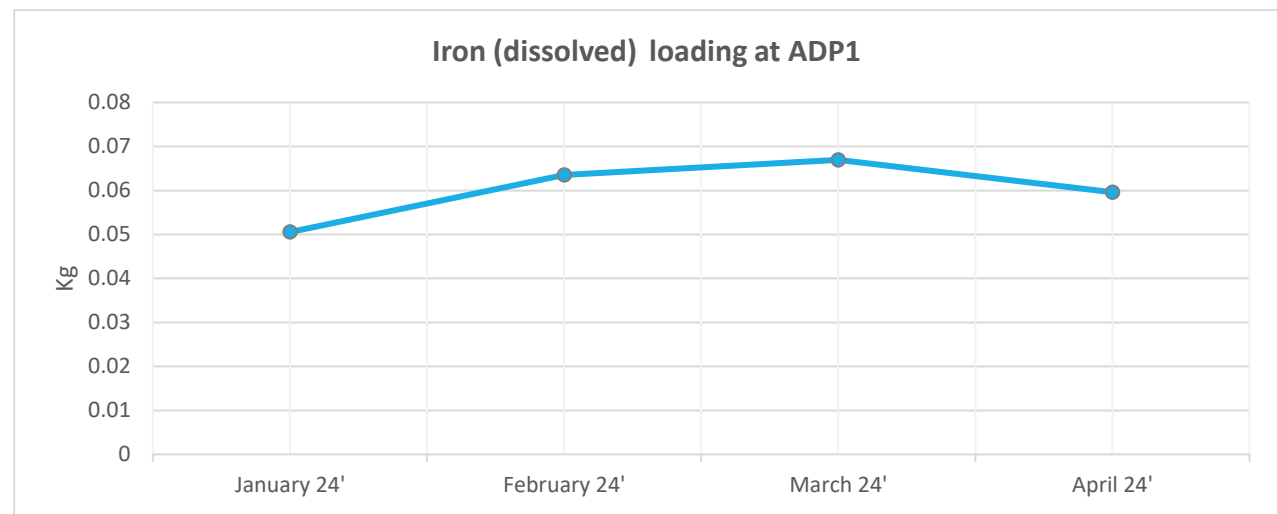
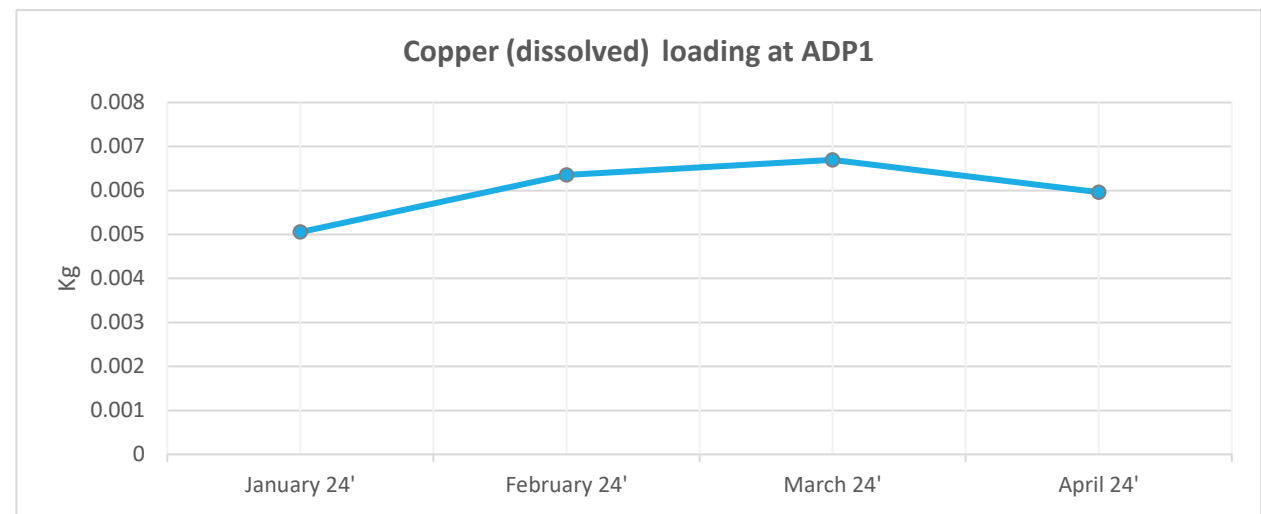




Figure 4-7 ADP1 General Chemistry Loadings





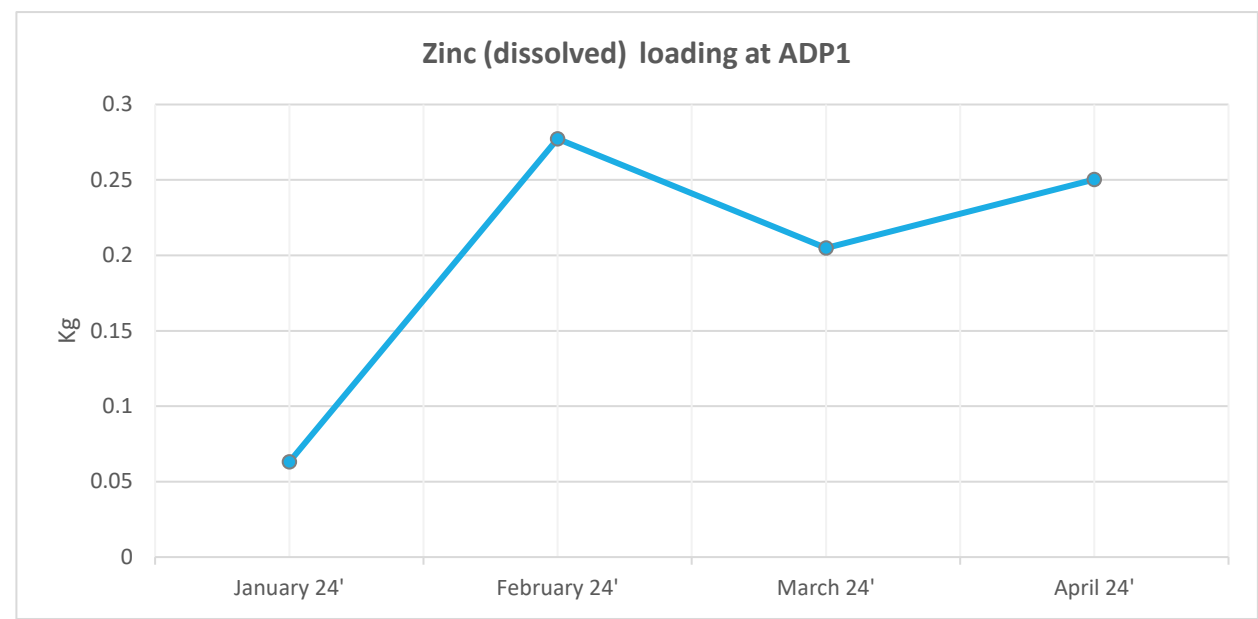
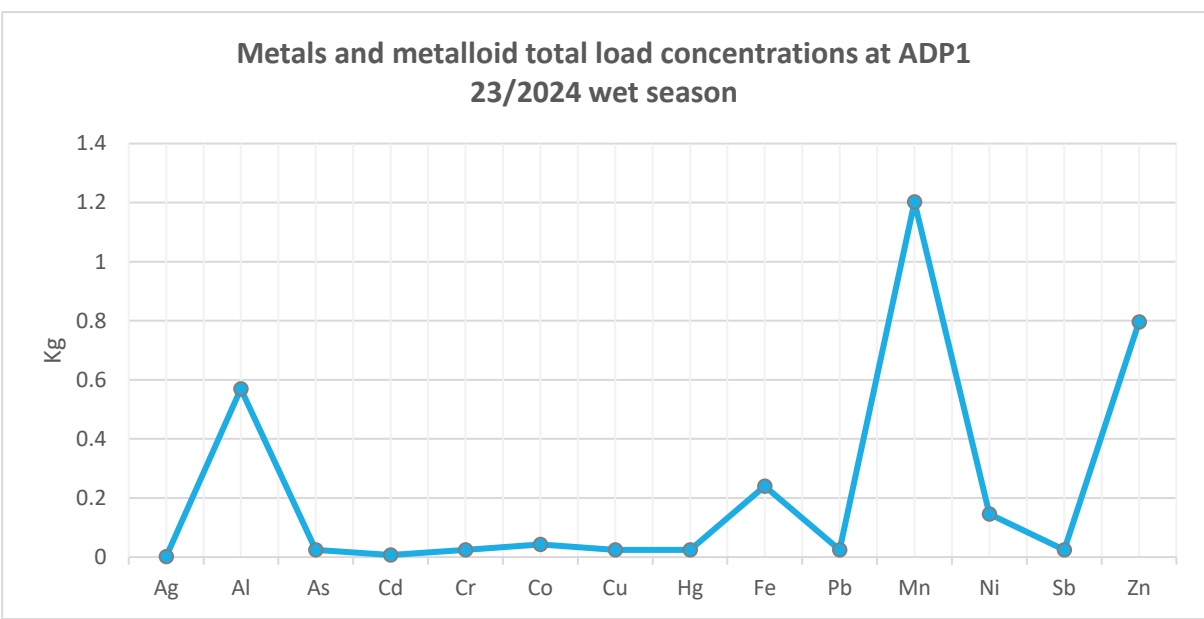


Figure 4-8 ADP1 Dissolved Metals Loadings



4.3 Summary of Exceedances

As per Condition 24 of the Licence, all exceedances at the Compliance Point were recorded, investigated and corrective actions were performed when required. Exceedances for the reporting period are highlighted in Appendix A. Investigations for all exceedances included a checklist of potential factors such as quality of authorised discharged water, creek flow, depth, real time field parameters at SWTG2, rainfall, upstream field parameters and comparison of water quality to onsite sources.

Corrective actions during the period included servicing of the RO Plant to replace screens used during the water treatment process when zinc was recorded elevated at ADP1. Other corrective measures include continuous monitoring of field results and fast turnaround of laboratory analysed samples from the Compliance Point.

Notifiable incidents as per Item 10 of the Licence are explained below. Exceedances in water quality parameters above the SWTG2 TV that were notifiable for the reporting period are listed in Table 4-5. In accordance with the Licence, a reportable exceedance is if one or both of the following items occurs:

- 10 (a) An exceedance of a trigger value specified in Item 7 at the Compliance Point SWTG2, on three consecutive sampling occasions; and/ or
- 10 (c) An exceedance of three or more times a trigger value specified in Item 7 at Compliance Point SWTG2 of the Licence.

Table 4-5 Summary of Reportable Exceedances at SWTG2, Compliance Point

Sample Date	Analyte	Trigger Value (µg/L)	Result (µg/L)	Detected	Item	Date Notified	Method of Notification
06/02/2024	Cadmium	0.2	1.1	12/02/2024	10 (c)	12/02/2024	Email
19/03/2024			0.84	27/03/2024	10 (c)	27/03/2024	Email
26/03/2024			0.76	4/04/2024	10 (c)	4/04/2024	Email
2/04/2024			0.22	12/04/2024	10 (a)	12/04/2024	Email
8/04/2024			0.78	16/04/2024	10 (a)	16/04/2024	Email
8/04/2024			0.78	16/04/2024	10 (c)	16/04/2024	Email
06/02/2024	Cobalt	1.4	7.1	12/02/2024	10 (c)	12/02/2024	Email
20/02/2024			2.9	27/02/2024	10 (a)	27/02/2024	Email
4/03/2024			4	12/03/2024	10 (c)	12/03/2024	Email
19/03/2024			7.3	27/03/2024	10 (a)	27/03/2024	Email
26/03/2024			7.4	4/04/2024	10 (c)	4/04/2024	Email
2/04/2024			2.3	12/04/2024	10 (a)	12/04/2024	Email
8/04/2024			9.4	16/04/2024	10 (a)	16/04/2024	Email
8/04/2024			9.4	16/04/2024	10 (c)	16/04/2024	Email
23/01/2024	Copper	1.4	4.5	1/02/2024	10 (c)	1/02/2024	Phone call and later an email
06/02/2024			5.6	12/02/2024	10 (c)	12/02/2024	Email
06/02/2024			4.5 1.8 5.6	12/02/2024	10 (a)	12/02/2024	Email
13/02/2024			1.5	19/02/2024	10 (a)	19/02/2024	Email
20/02/2024			2.3	27/02/2024	10 (a)	27/02/2024	Email
2/04/2024			1.8	12/04/2024	10 (a)	12/04/2024	Email
8/04/2024			1.7	16/04/2024	10 (a)	16/04/2024	Email
30/04/2024	Nickel	11	47	16/04/2024	10 (c)	16/04/2024	Email
06/02/2024	Zinc	8	71	12/02/2024	10 (c)	12/02/2024	Email
06/02/2024			21 13 71	12/02/2024	10 (a)	12/02/2024	Email
13/02/2024			13	19/02/2024	10 (a)	19/02/2024	Email

Sample Date	Analyte	Trigger Value (µg/L)	Result (µg/L)	Detected	Item	Date Notified	Method of Notification
20/02/2024			26	27/02/2024	10 (a)	27/02/2024	Email
20/02/2024			26	27/02/2024	10 (c)	27/02/2024	Email
26/02/2024			8.6	6/03/2024	10 (a)	6/03/2024	Email
4/03/2024			36	12/03/2024	10 (c)	12/03/2024	Email
4/03/2024			36	12/03/2024	10 (a)	12/03/2024	Email
19/03/2024			87	27/03/2024	10 (c)	27/03/2024	Email
26/03/2024			92	4/04/2024	10 (c)	5/04/2024	Email
2/04/2024			24	12/04/2024	10 (a)	12/04/2024	Email
2/04/2024			24	12/04/2024	10 (c)	12/04/2024	Email
8/04/2024			100	16/04/2024	10 (a)	16/04/2024	Email
8/04/2024			100	16/04/2024	10 (c)	16/04/2024	Email

4.4 Discussion of Anomalies

Anomalous have been detected in data results at several monitoring sites from early monitoring events, prior to PGO obtaining the Licence. SWTG2 in particular shows anomalies in laboratory results for the entire 2016 monitoring period. The inclusion of this data would skew temporal data trends in water quality at the site. All data during this period has been excluded from analysis due to lack of certainty of field sampling protocols and data quality. The 2016 data will remain in the database though greyed to highlight the uncertain dataset.

Other anomalies specific to the reporting period include sampling undertaken on the 12 March 2024. Flood events such as the one recorded in March 2024 cause the Mount Bunday Creek to reach capacity and create irregular changes in water quality. Monitoring data for sites sampled in the Mount Bunday Creek during this monitoring event recorded less concentrations of total and dissolved metals and anions and cations. These fluctuations are not consistent with long term trends though only make up for one or two monitoring events since the commencement of the Licence. Conversely, low flows contributed to higher concentrations of analytes during the last sample event, 30 April 2024, for Mount Bunday Creek monitoring sites.

Due to variations in the data, median values were used during analysis of spatial trends in water quality across the site (Figure 4-1; Figure 4-3; Figure 4-5).

4.5 Discussion of Results and Conclusions

This is the first year of water treatment and discharge under WDL 249. Controlled discharge of treated RO water from the Toms Gully Mine Pit commenced from January to April 2024 with a total of 60,480 KL of treated water discharged from the ADP1. A total of 1409 mm of rainfall was recorded during the reporting period at Tom Gully which is slightly higher compared to the previous 2 years of rainfall data collection.

Creek flow in the upper catchment commenced in early January 2024 with creek heights and flows recorded at the SWTG2 Compliance Point. Cessation of creek flows were recorded at the end of April 2024. Creek flows and water depths aligned with rainfall events in the Mount Bunday Creek catchment. Creek heights varied from 0.4-5.2m with an average height of 1.15m. The largest flood events were in late January and mid-March (5.2 metres and 5.1 metres respectively) breaching the Arnhem Highway bridge guard rails.

During controlled discharge from January to April, there were 15 weekly water sampling events.

4.5.1 Authorised Discharge Point (ADP1)

Water quality at the ADP1 short term median trends (n=4) were within WDL 249 GV's or below limits of laboratory LoR except for dissolved zinc, cadmium and dissolved oxygen. The elevated dissolved zinc and cadmium concentrations were a result of clogged process screens at the RO plant. The investigation resulted in the process plant being shut down temporarily for cleaning. The RO plant was resampled prior to the commencement of discharge with dissolved zinc and cadmium concentrations recorded below TV's. An internal review of the cleaning and monitoring procedures was completed in which as a result, monitoring frequency was increased to weekly and water quality sampling and checks against the daily TDS measurements were performed to prevent future occurrences.

It should be noted that when compared to the ANZG thresholds, dissolved zinc and cadmium values exceeded 95% species protection thresholds for freshwater (ANZG, 2018), however were within the 90% and 80% species protection for freshwater (ANZG, 2018).

Dissolved oxygen saturation at ADP1 was consistently low and is unlikely to ever meet limits set in the WDL 249. This is because dissolved oxygen is generally consumed during the chemical treatment process. Treated water is pumped directly from the RO plant permeate tank along a 600-metre pipeline and sampled at end of pipe at ADP1. Dissolved oxygen TV's were sourced from the ANZECC (2000) default trigger values for slightly disturbed ecosystems in lowland rivers within tropical Australia which is not fit for purpose for end of pipe thresholds. A review of dissolved oxygen limits at the ADP1 location for acceptable levels is required.

During sampling events at ADP1, there was no observed floating debris, oil, greases, petroleum hydrocarbon sheen, scum, littler or other objectionable matter, caused no odours which would adversely affect the use and amenity of surrounding waters, or no algal blooms in the receiving water. There was no erosion or degradation to the beds and banks of a watercourse that would cause adverse impacts on plants and animals. There was no visible change in the behaviour of fish or other aquatic organisms in the receiving water. During sampling events there was observed small fish and aquatic insects in the ADP1 pond.

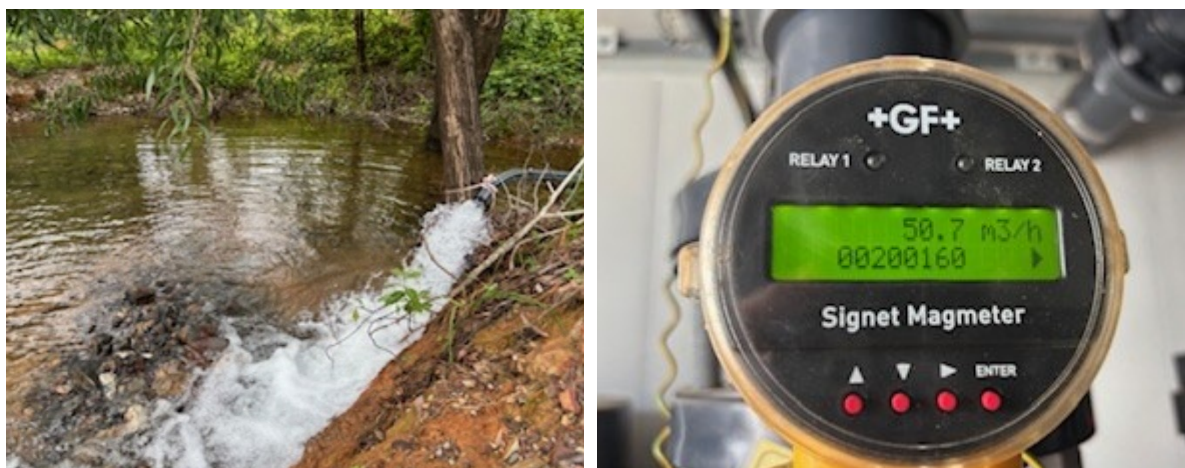


Photo 4-1 Authorised Discharge Point 1 pond and flow meter

4.5.2 Compliance Point (SWTG2)

The WDL249 Compliance Point, SWTG2, is located downstream of Toms Gully Mine. The Compliance Point captures water from the upper catchments, TGPA and authorised discharge water. Surface water physical and general chemistry median trends were within respective WDL 249 GV's. Dissolved metals were generally similar to their long-term trends with some analytes (cadmium, cobalt, copper, nickel and zinc) elevated above their respective discharge Trigger Values (TV's), and consistent with long term trends (2016-2024). When comparing water quality at the compliance point and authorized discharge, it is clear that other causes are impacting concentrations at SWTG2 rather than the authorised discharged water. Particularly, the Oxbow Wetland (SWTG12) water quality which is a main contributor to the exceedances found at SWTG2. The wetlands were constructed as part of rehabilitation in the 2000's to capture, partially retain and ameliorate the surface water flows from the TGM disturbances areas (waste rock dump seepage, old mill site surface flows and TSF 1 and 2 seepage).

There were several reportable exceedances of TV's for metals triggering Item 10 (a) An exceedance of a trigger value, on three consecutive sampling occasions; and/ or Item 10 (c) An exceedance of three or more times a trigger value. All were reported to NT EPA.

A review of TV limits at SWTG2 is necessary with particular attention required into developing site-specific TV's based on previous water quality data in this section of Mount Bunday Creek whilst considering existing and future site conditions. The site-specific TV's should also consider the Beneficial Uses for this section of Mount Bunday Creek (middle section) which is gazette for stock water supply (Gazette No. G23, 11 June 1997). Development of site-specific TV's is also one of PGO's commitments as part of remining the Toms Gully site.

4.5.3 Other Monitoring Points

The upstream water monitoring site, SWTG1A, short term median trends were representative of no impact from mining activities and recorded generally below laboratory LoR except for dissolved zinc concentrations which were elevated.

The downstream water monitoring site, SWTG3A, water quality short term median trends were elevated for cadmium, cobalt, copper, nickel, and zinc or below laboratory LoR. A review of the downstream location will be conducted, as this may still be in a downstream impact area of Mount Bunday creek or affected by the nearby pastoral activities.

SWTG12 (Oxbow wetlands) water quality long term median trends were elevated for cadmium, cobalt, copper, nickel and zinc or below laboratory LoR. Water quality is indicative of influences from TGM disturbances and surface flows and seepage.

The downstream water monitoring site of TGM and upstream monitoring site of Compliance Point, MBC01A, water quality short term median trends were elevated for cadmium, cobalt, copper, nickel, and zinc or below

Laboratory LoR. Water quality is indicative of influences from TGM surface flows and dilution in Mount Bunday Creek.

TGM Pit and the Evaporation Ponds 1 and 2 (onsite poor water quality impoundments is representative of the existing disturbances at the TGM. Water from all the impoundments is pumped to the water treatment plant. These Ponds and Pits form part of PGO's commitment to reduce poor water inventory onsite.

This is the first year of water treatment and release. PGO have invested significant financial commitments to manage water at the TGM with the objective to reduce water inventory and prevent the potential for pit overtopping resulting in discharge off tenement. Further, in the course of re- mining Toms Gully Mine, PGO has committed to significant remediation activities to repair old and technically complex mined domains with the objective to stabilise and prevent offsite pollution during mining and ultimately reduce cumulative impacts.

Surface water quality short- and long-term trends comparisons between upstream and downstream of TGPA reflects the impacts of existing historical mine disturbances.

5 Conclusions and Proposed Actions

5.1 Compliance with Assessment Criteria

All monitoring requirements (as per conditions C27-C36) were met during the reporting period and detailed in Table 5-1. Treated water at ADP1 has met the conditions of the WDL 249. The Compliance Point was triggered several times including other surface water monitoring sites at TGPA and downstream during the reporting period due to the influence of poor water quality passively discharging from degraded mined domains. In the course of remining Toms Gully mine, PGO has commitment to significant remediation activities to repair old, mined domains with the objective to stabilise and prevent offsite pollution.

Whilst access to sites for monitoring was not an issue during this reporting period, SWTG1A, MBC01A will continue to be a challenge particularly after heavy rain events and flooding.

Table 5-1 Compliance Against Assessment Criteria

Green coloured dots indicate the specified Condition of the Licence has been met, yellow-coloured dots indicate the Condition was partially met with explanatory notes, and red coloured dots indicate the Condition has not been met.

WDL 249 Monitoring Conditions													
Mount Bunday Creek monitoring sites	Monitoring locations		C27	C28	C29 (29.1-29.2)	C30	C31	C32	C33	C34 (34.1- 34.3)	C35 (35.1-35.6)	C36 (36.1)	C36 (36.2)
	SWTG1A	Upstream	●	●	●	●	●	●	●	●	●	●	●
	MBC01A	Upstream (Downstream of Oxbow Wetlands)	●	●	●	●	●	●	●	●	●	●	●
	SWTG2	Compliance Point	●	●	●	●	●	●	●	●	●	●	●
	SWTG3A	Downstream	●	●	●	●	●	●	●	●	●	●	●
Other monitoring sites on tenement	ADP1	Authorised Discharge Point	●	●	●	●	●	●	●	●	●	●	●
	SWTG12	Onsite- Oxbow Wetland	●	●	●	●	●	●	●	●	●	●	●
	EP1	Evaporation Pond 1	●	●	●	●	●	●	●	●	●	●	●
	EP2	Evaporation Pond 2	●	●	●	●	●	●	●	●	●	●	●
	TGM PIT	Toms Gully Pit	●	●	●	●	●	●	●	●	●	●	●
Explanatory Notes			Samples were collected as per the monitoring programme timeframe when access was permissible and flow occurring.										

5.2 Potential Environmental Harm

Under the *Water Act 1992*, Environmental harm as defined in the as:

'Any harm to or adverse effect on, or potential harm to or adverse effect on, the environment'.

Based on the information and assessment of information gathered during the reporting period, the licenced activity involving discharge of treated water to Mount Bunday creek via ADP1 during the 2023/24 reporting period was assessed as to whether the Licensed Action is having an adverse effect on, or potential harm to or adverse effect on, the environment. The overall risk to Mount Bunday Creek is considered low.

The risk rating decision was determined based on the following.

- Discharge treated water consisted only of RO water and generally met WDL 249 trigger values, with most analytes below LoR.
- There was appropriate measurement devices installed to measure and record each discharge event;
- During sampling events at ADP1, there was no observed floating debris, oil, greases, petroleum hydrocarbon sheen, scum, littler or other objectionable matter, caused no odours which would adversely affect the use and amenity of surrounding waters, or no algal blooms in the receiving water. There was no erosion or degradation to the beds and banks of a watercourse that would cause adverse impacts on plants and animals. There was no visible change in the behaviour of fish or other aquatic organisms in the receiving water. There was observed small fish and aquatic insects in the ADP1 pond.
- Treated water discharged accounted for less than 0.1% of the average volumes flowing through Mount Bunday creek.
- Confidence of data robustness with the adherence to the WDL 249 field monitoring programme to ensure appropriate QA/QC, data gathering, analysis and interpretation.

PGO water management goals at TGPA whilst under care and maintenance are to reduce the overall poor water quality inventory and prevent the potential for pit water overtopping off MLN 1058. Based on pit water levels in Figure 1-2, PGO are meeting their objectives to reduce pit water inventory showing an overall reduction of - 0.54m over an 11-month period. In the course of remining Toms Gully mine, PGO has commitment to significant remediation activities to repair old and technically complex mined domains with the objective to stabilise and prevent offsite pollution.

This is the first year of water treatment and release and further monitoring will continue in 2024-25 to better understand conditions, and refinement of treatment processes.

5.2.1 Assumptions

In order to meet the WDL 249 monitoring objectives the following set of assumptions were followed:

- Sample method bias was minimised by having the same consultants conducting the field programme throughout the entire season.
- Field meters and other equipment maintained and calibrated to PGO water sampling programme procedure.
- Field instrumentation (including handheld meters, telemetry equipment and in situ probes) and maintained in accordance with retailers' instrumentation specification and maintenance documents.
- Sampling techniques, as per PGO water sampling programme and guidance with the AS/NZS 5667 and ANZECC/ARMCANZ.
- Sample containers, preservation techniques, holding times compliant with lab specifications.
- The statistical analysis method applied was median values short- and long-term trend analysis.
- To obtain a representative surface water sample to compare against guideline values and avoid high variability, creek sampling occurred only when creeks at the first flush, in full and recessional flows (not pooled areas), during daylight hours and in the same location where safe to do so.

5.2.2 Uncertainties

Uncertainties for the TGPA is weather conditions with unpredicted rainfall in upper or lower catchments impacting fluctuations in the Mount Bunday Creek system. This ultimately prevents opportunities for discharge or conversely constrains onsite inventory.

5.3 Proposed Changes and Actions

The following actions are proposed to improve the WDL 249 programme for the upcoming reporting period. details the outcomes of the changes in the last reporting period.

Table 5-2 details the outcomes of the changes in the last reporting period.

Table 5-2 Outcomes of the proposed changes done during the 2023-24 reporting period

Actions 2023- 24	Rationale	Timeline	Outcome
A croc spotter will accompany Officers to monitor MBC03A site and weeds along access tracks maintained.	The site was difficult to access due to weed infestations, low visibility of access walking track and potential for crocodile or other feral animal presence. The site is a ~100 m walk through dense overgrown weeds that make visibility poor.	Ongoing during wet season	A croc spotter was hired to accompany Officers to monitor MBC03A. All monitoring events were met. Weed spraying was done along the access track to improve visibility.
Commence monitoring at SWTG3A	Approval was not obtained by the pastoral manager for access to SWTG3A. numerous phone calls were made and messages left. Contact has been made and approval granted as long as notification is given prior to accessing the Station.	Ongoing during wet season	Approval was gained from the pastoral manager for access to SWTG3A. All sampling events were met
Review of the database to take out outliers	Several anomalies were identified during analysis of long-term data. The database needs to be reviewed	May, following wet season	Data outliers particularly for long term trends were

Conclusions and Proposed Actions

Actions 2023- 24	Rationale	Timeline	Outcome
	and anomalies such as these are to be reviewed		removed from the data analysis
Access to SWTG1A	Whilst no improvements are being proposed, the site will be accessed during periods of lower rainfall and with attendance of a crocodile spotter	Ongoing during wet season	Access to SWTG1A was improved with the Pastoral owner clearing the main track and fencing. The croc spotter attended all visits to maintain safety from threat of crocodiles, buffalo and pigs.

6 Sediment and Macroinvertebrate Monitoring

Aquatic Ecology Services conducted biological monitoring in accordance with Item 11 (Condition 27) of the WDL 249 in April 2024 involving sediment and macroinvertebrate sample, analysis and reporting. The Biological Monitoring Report is provided in Appendix D.

Future monitoring should focus on sites upstream and downstream of the ADP on Mount Bunday Creek, where the downstream site is further from the mine. Doing this will enable the biological monitoring programme to be in line the Licensed activity rather than the broader TGM and old mine disturbances and site MBC03, SWTG3A or SWTG3 could be utilised as a downstream monitoring point.

Aquatic ecology surveys were successfully completed at Toms Gully Mine in 2024 where access, sufficient water and safety allowed. The monitoring, which involved sediment and macroinvertebrate sampling, captured broader site activities rather than just the Licensed activity. Key findings included:

- Exceedances of metal guideline values in water and sediment, particularly arsenic at SWTG2, with some metals potentially becoming ecotoxic at low pH levels. Impaired aquatic health was evident in macroinvertebrate metrics downstream of the mine, with a notable absence of fish at SWTG2 in 2024, indicating the negative impact of poor water quality.
- Surface water sampling pointed to possible point-source pollution from the mine's infrastructure. The monitoring suggests that while wet season discharges in 2023-2024 haven't significantly affected aquatic ecosystems, future discharge may improve water quality.
- Continued monitoring, including at additional downstream sites, is recommended to fully assess the spatial extent of the impacts. A shorter than average wet season hindered sampling at Coulter Creek due to insufficient water, but similar habitat sites on Mount Bunday Creek provided valuable comparisons.

7 Incident Reporting

7.1 Incident Response

Anyone working at the TGPA must report an incident that causes or threatens material or significant environmental harm. This is known as a notifiable incident and the DLPE Mining Division must be notified within 24 hours of the incident occurring. This is required under Section 225 of the EP Act.

Under a care and maintenance regime, typical environmental incidents that may occur at TGPA include:

- Waste Discharge Licence noncompliance;
- Uncontrolled discharge of wastewater from pipe;
- Hydrocarbon spills and leaks from vehicles/machinery/pumps/generators;
- Disturbance/destruction to or contravene the AAPA Certificate, heritage site;
- Destruction to Pastoral Lease holder property (i.e., cattle, fencing, gates, designated access tracks);
- Unauthorised access;
- Wildfires destroying assets (property, pumps, fencing, cattle);
- Breach of Pit water; and
- Noise and dust complaints.

7.2 Incidents Recorded/ Reported During the Reporting Period

Nil environmental incidents related to activities under WDL 249 occurred at the TGPA during 2023/2024 reporting period. The Environment Incident Reporting contact are detailed in Table 7-1.

Table 7-1 Incident Reporting Contact Details

Cause/incident event	Department	Notification/ Inform	Timeline	Contact
Environmental/ community relations and cultural heritage incidents occurring on and off tenement. An Incident which causes or is threatening or may threaten to cause pollution resulting in material environmental harm or serious harm.	NT Department of Lands Planning and Environment (DLPE)	<i>From 1 July 2024, activities will be regulated under the Environment Protection Act (EP) 2019</i> Waste Discharge Licences _Notifiable Incidents are to be reported to Environmentregulation@NT.gov.au and notifications and Investigations cc'd to DLPE Mining Division as per_Condition 17 of TGM Authorisation. All other Notifiable Incidents are to be reported to DLPE Mining Division MineralInfo.DLPE@nt.gov.au and Environment Regulation Division and DLPE Environment Regulation Team. Environmentregulation@NT.gov.au (In accordance with Section 225 <i>Environment Protection Act 2019</i>). https://nt.gov.au/_data/assets/pdf_file/0012/203412/notification-of-environmental-incident-form.pdf	Notification within 24 hours.	<i>From the 1 July 2024 the new contact is:</i> 08) 8999 5324 Emergency outside business hours (8am-7pm ACST)- 0419 036 035 DLPE , Mining Division Email: MineralInfo.DLPE@nt.gov.au GPO Box 4550 Darwin NT 0801 Waste Discharge Licences – Notifiable Incidents are to be reported to Environment Regulation Team, division of DLPE Environmentregulation@NT.gov.au GPO Box 3675, Darwin NT 0801

Incident Reporting

Cause/incident event	Department	Notification/ Inform	Timeline	Contact
Interference, damage, /destruction of a sacred site or unauthorised activity/entry in a restricted work area/ sacred site	Aboriginal Areas Protection Authority	Provide the following information (site name, location, type of damage, who discovered damage, who caused damage, witnesses, actions taken to prevent damage, ongoing threats to site) <i>NT Aboriginal Sacred Sites Act 1989</i> https://www.aapant.org.au/our-services/register-sacred-site#reporting	Notification as soon as possible after first becoming aware of incident.	(08) 8999 4365 or 08 8951 5023 e-mail to: enquiries.aapa@nt.gov.au GPO Box 1890, Darwin NT 0801
Interference, damage, removal, destruction, not inform of discovery of Aboriginal or Macassan archaeological objects/places with heritage value.	NT Dept of Territory Families, Housing and Communities (TFHC), Heritage Branch	Provide the following information to the Heritage Council CEO including the description, location of the Aboriginal or Macassan archaeological object/place, person name and address, owner or occupier of the place, if known. <i>NT Heritage Act 2011</i> https://tfhc.nt.gov.au/heritage,-libraries-and-archives/heritage-council-members	A report to the CEO within 7 days of the discovery of Aboriginal or Macassan archaeological objects/places.	(08) 8999 5039 e-mail to: heritagecouncil@nt.gov.au PO Box 4198 Darwin NT 0801

Incident Reporting

Cause/incident event	Department	Notification/ Inform	Timeline	Contact
For all mining work- related injury, illness or dangerous incident occurring on and off tenement. Incidents including: - Serious injury or illness; - dangerous incident; - death of a person	NT Work Safe on 1800 019 115 fax (08) 8999 5141 and report a notifiable incident/event. Contact NT police, fire, and emergency services for life-threatening situation on 000.	Section 35 to 39 Incident Notification form (in accordance with the <i>Work Health and Safety (National Uniform Act 2011)</i> of a 'notifiable incident. https://worksafe.nt.gov.au/forms-and-resources/bulletins/work-health-and-safety-incident-notification	Notification as soon as reasonably practical. And if required by the regulator provide a written notice of the incident within 48 hours of that requirement being made.	e-mail to: NTWorkSafe@nt.gov.au GPO Box 1722 Darwin NT 0801

8 Glossary

Abbreviations	Definitions
ADP	Authorised Discharge Point
BUD	Beneficial Use Declaration
CoC	Chain of Custody
DLPE	Department of Lands Planning and Environment
DITT	Department of Industry, Tourism and Trade
DNRETAS	Department of Natural Resources, Environment, The Arts and Sport
EA Act	<i>Environmental Assessment Act 1982 (NT)</i> Please note - This instrument has been Repealed by the Environment Protection Act 2019, NO. 31 which commenced on the 28/06/2020.
EP Act	<i>Environment Protection Act 2019 (NT)</i>
EMP	Environmental Management Plan
EMR	Environmental Monitoring Report
KL	Kilolitre
KL/Sec	Kilolitre per second
Km	Kilometre
LoR	Laboratory Limits of Reporting
ML	Megalitre
mm	Millimetre
N/A	Not Applicable
NATA	National Association of Testing Authorities
NT EPA	Northern Territory Environment Protection Authority
PL	Pastoral Lease
PGO	Primary Gold Limited
PPL	Perpetual Pastoral Lease
RoM	Run of Mine
RRPA	Rustlers Roost Project Area
SoCs	Sites of Conservations Significance
TGPA	Toms Gully Mine
TGPA	Toms Gully Project Area
TV	Trigger Values
WA	<i>Water Act 1999</i>
WRD	Waste Rock Dump
QA/QC	Quality Assurance and Quality Control

9 References

1. Aquatic Ecology Services. 2024. *Toms Gully Mine Aquatic Ecology Baseline Studies*. Report prepared for Primary Gold Limited.
2. Department of Environment, Parks and Water Security. 2024. *NR Maps*. Northern Territory Government. Viewed on 12 December 2024, retrieved from <https://nrmaps.nt.gov.au/nrmaps.html>
3. Department of Natural Resources, Environment, The Arts and Sport. 2009. *Sites of Conservation Significance; Mary River Coastal Floodplain*. Northern Territory Government, Darwin.
4. Department of Infrastructure, Planning and Environment. 2002. *Declaration of Beneficial Uses and Objectives of Water May River Surface Water*. Northern Territory Government, Darwin.
5. Northern Territory Environment Protection Authority. 2022. *Waste Discharge Licence; WDL249*. Northern Territory Government, Issued to Primary Gold Limited.
6. Northern Territory Environment Protection Authority. 2016. *Guideline for Reporting on Environmental Monitoring; Version 1.0*. Northern Territory Government, Darwin.
7. Schultz, T. D. (2002). Water quality monitoring in the Mary River Catchment, Technical Report 42/2002. Department of Infrastructure, Planning and Environment.

10 Appendices

Appendix A. Water Quality Data

To be provided in excel under a separate cover.

Appendix B. Regulatory Communication's Register

Communication Type/Date/ref	Direction	Feedback	Action/response and reference in EMR
16/01/2024 Email Communications	PGO to NT EPA	Notification of commencement of RO treated wastewater discharge as per WDL 249	No response
19/01/2024 Email Communications	PGO to NT EPA	Query on WDL 249 ITEM 9 Limitations on discharge	No response
02/02/2024 Email Communications	PGO to NT EPA	Investigation Report for the exceedance copper concentration more than 3 times the trigger value at SWTG2.	No response
12/02/2024 Email Communications	PGO to NT EPA	Notification for the exceedance of copper, cadmium, cobalt and zinc concentrations more than 3 times the trigger value at SWTG2 on the 6/02/24.	12/02/2024 response from Ranid May
16/02/2024 Email Communications	PGO to NT EPA	Investigation Report for the exceedance copper, cobalt, Cadmium and Zinc at SWTG2.	20/02/2024 response from Mia Sandgren
21/02/2024 Email Communications	PGO to NT EPA	Notification for the exceedance of copper more than 3 times the trigger value at SWTG2 on the 13/02/24.	22/02/2024 response from Ranid May
21/02/2024 Email Communications	PGO to NT EPA	Trigger level exceedance at swtg2 Tom's Gully' Hi Ranid, we have just had an exceedance again at swtg2 for copper and zinc. Do we report this as 3 consecutive sampling occasions given then the previous two exceedances were already captured in the previous investigation report?'	21/02/2024 response from Ranid May
23/02/2024 Email Communications	PGO to NT EPA	Investigation Report for the exceedance Copper and Zinc at SWTG2.	23/02/2024 response from Ranid May
28/02/2024 Email Communications	PGO to NT EPA	Notification for the exceedance of copper, cobalt and zinc on 3 consecutive occasions and zinc more than 3 times the trigger value at SWTG2 on the 20/02/24.	28/02/2024 response from Ranid May
01/03/2024 Email Communications	PGO to NT EPA	Investigation Report for the exceedance Cobalt, Copper and Zinc at SWTG2.	01/03/2024 response from Ranid May
07/03/2024 Email Communications	PGO to NT EPA	Notification for the exceedance of zinc on 3 consecutive occasions at SWTG2 on the 26/02/24.	11/03/2024 response from Ranid May
13/03/2024 Email Communications	PGO to NT EPA	Investigation Report for the exceedance Zinc at SWTG2.	13/03/2024 response from Ranid May
13/03/2024 Email Communications	PGO to NT EPA	Notification for the exceedance of zinc and cobalt trigger values at SWTG2 on the 4/03/24.	13/03/2024 response from Ranid May
24/03/2024 Email Communications	PGO to NT EPA	Investigation Report for the exceedance Cobalt and Zinc at SWTG2.	25/03/2024 response from Ranid May
27/03/2024 Email Communications	PGO to NT EPA	Notification for the exceedance of zinc, cobalt and cadmium trigger values at SWTG2 on the 19/03/24.	
05/04/2024 Email Communications	PGO to NT EPA	Investigation Report for the exceedance Cobalt, Cadmium and Zinc at SWTG2.	

Communication Type/Date/ref	Direction	Feedback	Action/response and reference in EMR
05/04/2024 Email Communications	PGO to NT EPA	Notification for the exceedance of zinc, cobalt and cadmium trigger values at SWTG2 on the 26/03/24.	
12/04/2024 Email Communications	PGO to NT EPA	Notification for the exceedance of zinc, copper, cobalt and cadmium trigger values at SWTG2 on the 02/04/24.	
22/04/2024 Email Communications	PGO to NT EPA	Notification for the exceedance of zinc, copper, cobalt and cadmium trigger values at SWTG2 on the 08/04/24.	
22/04/2024 Email Communications	PGO to NT EPA	Investigation Report for the exceedance Cobalt, Copper, Cadmium and Zinc at SWTG2.	
26/04/2024 Email Communications	PGO to NT EPA	Investigation Report for the exceedance Cobalt, Copper, Cadmium and Zinc at SWTG2.	25/03/2024 response from Ranid May
22/12/2024 Email Document Submission	PGO to NTEPA	Submission of Tom Gully WDL 249 EMR and Annual Return	

PRIMARY GOLD PROJECTS WATER QUALITY PRIMARY GOLD PROJECTS WATER MONITORING PROCEDURE

1.1 Purpose

To ensure all surface water sampling is consistent, representative, undertaken in a safe manner and follows best-practice procedures in accordance with relevant standards.

1.2 Scope

This procedure applies to all surface water sampling undertaken at the Primary Gold mining leases located on the Arnhem Highway, approximately 100 km south-east of Darwin. Primary Gold undertake routine water monitoring of surface water bodies upstream, within and downstream of their mining leases. This procedure applies to all water monitoring including the measurement of water quality parameters in the field, and the collection of water samples for subsequent laboratory analysis.

1.3 Standards and other requirements

To ensure the quality and accuracy of the measurements, sampling procedures have been developed in accordance with the following standards and guidelines:

1. Australian Standard on Water Quality Sampling - *Part 1: Guidance on the design of sampling programs, sampling techniques and the preservation and handling of samples* (AS/NZS 5667.1:1998);
2. Australian Standard on Water Quality Sampling - *Part 4: Guidance on sampling from lakes, natural and man-made* (AS/NZS 5667.4:1998);
3. Australian Standard on Water Quality Sampling - *Part 6: Guidance on sampling of rivers and streams* (AS/NZS 5667.6:1998);
4. Australian Standard on Water Quality Sampling - *Part 10: Guidance on sampling of waste waters* (AN/NZS 5667.10:1998)
5. ANZECC & ARMCANZ 2000, *Australian Guidelines for Water Quality Monitoring and Reporting*, National Water Quality Management Strategy Paper No 7, Australian and New Zealand Environment and Conservation Council and Agriculture and Resource Management Council of Australia and New Zealand, Canberra.
6. ANZECC & ARMCANZ 2000, *Australian and New Zealand Guidelines for Fresh and Marine Water Quality*, National Water Quality Management Strategy Paper No 4, Australian and New Zealand Environment and Conservation Council and Agriculture and Resource Management Council of Australia and New Zealand, Canberra.

1.4 Equipment

The following equipment is required when undertaking surface water sampling at all Primary Gold mine leases:

- **Map** showing monitoring sites
- **GPS** with coordinates uploaded for locating sites
- **Folder/clipboard** and waterproof notebook
- **Stationary:** Pens / pencils, permanent markers for completing sample bottle labelling

- **Sample bottles** obtained from Envirolab, ensuring that specific bottles are obtained for each parameter to be tested and appropriate pre-treatment is undertaken (e.g. preservatives). Remember also to prepare a full set of sample bottles for duplicate samples. Also take some spares, especially the glass bottle types.
- **Eskies** with ice or frozen ice bricks
- **Field meters** (pH, temperature, EC, DO, ORP); calibrated on the day of sampling
- **Calibration solutions** in case of issue with field meters (refer to manufacturers calibration instructions)
- **Camera**
- **Sample pole and Jug**
- **Deionised water** to clean equipment between sample sites
- **Syringes and filters** (for dissolved metals)
- **Powder-free gloves**
- **Spare batteries** for camera, GPS and field test meters
- **Chain of Custody (COC) forms** for Envirolab
- **Plastic sleeves** (snap-lock bags) to protect COC forms inside the eskies
- **Consignment (Con) Notes** for freighting samples to Envirolab
- **Tape and security seal** for eskies; also stickers such as address label, fragile, keep chilled etc.
- **Communications equipment** (e.g. mobile/satellite phone, radio, EPIRB)
- **Personal Protective Equipment (PPE)**
- **Garbage bag** for used filters, syringes, gloves and any other waste generated during sampling.

1.5 Procedure

Preparation

1. Gather all equipment listed in Section 0.
2. Bottles may need to be ordered from Envirolab. Contact the laboratory for advice on what bottles are required (certain analytes require particular bottles and preservatives).
3. Put together a package of sample bottles for each site (i.e. in a large snap-lock bag), including bottles for duplicates.
4. Label each bottle with the site name (or duplicate).
5. For metals, tick the box on the bottle label for either filtered or total, depending on whether samples for metals analysis will be filtered in the field.
6. Calibrate the field test meters (e.g. pH, EC, DO, ORP) according to the manufacturer's instructions.
7. Ensure camera and GPS (if required) are fully charged and have sufficient memory.
8. Depending on the number of sites being sampled, prepare a sufficient volume de-ionised water to use for cleaning sampling equipment in the field.
9. Print out required number of blank Field Data Sheets, COC forms and maps.
10. Ensure that ice bricks have been put in the freezer, or sufficient ice is available to chill samples as they are collected.

Field observations and in-situ parameters

1. Record on field sheets the date, time, site name/number, sampler's name, and field observations such as weather conditions, water colour, clarity, water depth, flow rate, any obvious pollution (e.g. rubbish, odours, surface films etc.), flora/fauna, and any other issues that may affect the samples.
2. Put on gloves.

3. Ideally, in-situ readings (e.g. pH, EC, DO, temperature and ORP) are collected directly from the water body being sampled by immersing the meters in the area to be sampled. However, if safety and/or logistical issues preclude this, field readings may need to be taken from the sampling jug.
4. Record the in-situ parameters just below the water surface (between 0.2 and 0.5 m depth), depending on water depth. Alternatively, if collecting samples from various depths (e.g. depth profiling), ensure the field meter is lowered to the desired depth.
5. If collecting field readings from the sampling jug, collect a representative water sample using the jug mounted on a sampling pole. Ensure that the jug/sampler is fully immersed and rinsed at least three times, tipping the rinse water away from (e.g. on the bank), or downstream of, where the sample is to be collected.
6. If sampling flowing waters, ensure that you are standing downstream of where you are sampling so as not to contaminate the sample.
7. Record all the readings on the Field Data Sheet; one sheet to be filled out per site.

Laboratory sample collection

1. Ensure gloves are on.
2. Take out the snap-lock bag full of sample bottles for the site and fill in any remaining information on the labels with the permanent marker (e.g. time, date, and name of sampler.)
3. Unscrew the cap, making sure not to touch the opening of the bottle with your fingers to avoid contaminating the sample. Put the cap upside-down on a clean surface where it won't pick up any contaminants.
4. If safe to do so (i.e. crocodiles), fill the bottles directly from the water body being sampled; otherwise use the jug on the end of the pole to collect a water sample representative of the site.
5. Fully immerse the sample bottle or jug in the water and rinse at least three times before filling. For sample bottles containing preservatives (e.g. nutrients), do not rinse before filling, use the jug to fill these sample bottles. Bottles should be filled from below the water surface (10-20 cm depending on water depth).
6. Make sure that you are standing downstream of where you are sampling so as not to contaminate the sample.
7. If using the jug, pour the water into each sample bottle.
8. Fill each bottle to the top leaving no headspace and screw on the cap.
9. For samples requiring field filtering (e.g. dissolved metals), draw some water into a syringe, put a filter on the end of the syringe, rinse the filter by pushing a few drops of the sample through onto the ground, then fill the bottle leaving no headspace. Depending on the size of the syringe, it may be necessary to draw several syringes-full of water to fill the sample bottle.
10. Put all the sample bottles back in the snap-lock bag and immediately place them in the esky on ice.

Collection of duplicates

1. For duplicate samples, repeat all the above steps outlined above at the site(s) chosen for these samples (generally at least 1 in 10 sample sites, or one per monitoring event). Label the bottles 'Duplicate' as appropriate. Ensure to note which site these samples were collected at on the Field Data Sheet.

Cleaning of field equipment

1. After sampling each site, rinse all sampling equipment (e.g. jugs) with the deionised water.

2. Dispose of used filters, syringes, and gloves appropriately. Consumables are one use only and fresh gloves, syringes and filters are required at each site.

Sample dispatch

1. Once sampling is completed, pack the samples securely in an esky with ice bricks – note that freight companies generally will not allow ice. Ensure that samples have sufficient contact with the ice bricks to stay as cool as possible.
2. Fill out the COC, put in a plastic sleeve (snap-lock bag) and place inside the esky.
3. Tape up the esky and put on address label and stickers as appropriate (e.g. fragile, keep chilled).
4. Fill out consignment note and stick on esky.
5. Deliver samples direct to freight company or organise pick-up, ensuring that samples will be dispatched in time to meet laboratory holding times (usually by 16:00 on day of sampling for overnight priority service).
6. Note that sample dispatch on Friday and Saturday is not acceptable as samples will not be delivered to labs until Monday morning. Therefore, samples with short holding times (i.e. nutrients) cannot be collected on Friday or Saturday. Other parameters with longer holding times can be kept in fridge until dispatch on Sunday or Monday.

Data management

7. All field sheets should be scanned and saved for future reference, and all photographs are to be saved and labelled according to the relevant site name.
1. Field data and site observations are to be recorded in the Water Quality Database immediately following monitoring.
2. Upon receipt of laboratory results, enter data into the Water Quality Database. All laboratory documents (e.g. results, sample receipt notices, certificate of analysis and QA/QC information) should be grouped and saved in the same folder as the database.
3. Data should be compared to guideline values in the database. Any exceedances of guideline values are to be highlighted in red.
4. Data is analysed annually for reporting in the MMP.

1.6 Monitoring program

All Primary Gold mining leases use the following key for water quality analysis.

Appendix D. Macroinvertebrate and Sediment Sampling Report (AES, 2024)

Appendix E. WDL249 Surface Water Monitoring Locations 2024

ADP1	 January 2024	 February 2024	 March 2024	 April, 2024
SWTG1A	 January 2024	 February 2024	 March 2024	 April 2024
SWTG2	 January 2024	 February 2024	 March 2024	 April 2024

MBC01A	 January 2024	 February 2024	 March 2024	 April 2024
SWG12	 January 2024	 February 2024	 March 2024	 April 2024
SWG3A	 January 2024	 February 2024	 March 2024	 April 2024

EP1	 January 2024	 February 2024	 March 2024	 April 2024
	 January 2024	 February 2024	 March 2024	 April 2024
	 January 2024	 February 2024	 March 2024	 April 2024

Appendix F. QAQC Documentation

Field Sheets

Lab CoC

Lab QAQC

Monitoring schedule QAQC