



Tomingley Gold Mine

Water Management Plan

Tomingley Gold Operations Pty Ltd

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Glossary

Alluvial	Deposition from running waters.
Aquifer	Underground water storage within either disturbed or undisturbed strata.
Australian Height Datum	A common national surface level datum approximately corresponding to mean sea level.
Average Recurrence Interval	A statistical estimate of the average period in years between the occurrence of a flood of a given size or larger, e.g. floods with a discharge equivalent to the 1 in 100 year average recurrence interval flood event will occur on average once every 100 years.
Bore	Constructed connection between the surface and a groundwater source that enables groundwater to be transferred to the surface either naturally or through artificial means.
Catchment	The land area draining through the main stream and tributary streams to a particular location.
Clean Water	Water that has not come into physical contact with areas associated with mining, ore processing or tailings storage.
Cumulative Rainfall Departure	Cumulative rainfall departure (CRD) from normal rainfall is an approach to evaluate the temporal correlation of rainfall with surface water or ground water environments.
Datum	A level surface used as a reference in measuring distances.
Dewatering	Transfer of water from underground workings to the surface.
Dirty Water	Water that contains an elevated sediment load.
Discharge	Quantity of water per unit of time flowing in a stream, for example cubic metres per second or megalitres per day.
Drawdown	A reduction in piezometric head within an aquifer.
Electricity conductivity	A measure of the concentration of dissolved salts in water.
Ephemeral	Stream that is usually dry, but may contain water for rare and irregular periods, usually after significant rain.
Flood	Relatively high stream flow which overtops the natural or artificial banks in any part of a stream, river, estuary, lake, or dam, and/or overland runoff before entering a watercourse and/or coastal inundation resulting from super elevated sea levels and/or waves overtopping coastline defences.
Groundwater	Water in a saturated zone, stratum, or aquifer beneath the surface of the land.
Groundwater dependant ecosystem	Communities of plants, animals, and other organisms whose extent and life processes are dependent on groundwater. A GDE may either be entirely dependent on groundwater for survival or it may use groundwater opportunistically or for a supplementary source of water.
Guideline	Numerical concentration or narrative statement that provides appropriate guidance for a designated water use or impact.
Hardness	The concentration of multivalent cations present in water. Hardness is a measure of the concentration of calcium and magnesium ions in water and is expressed in units of calcium carbonate (CaCO ₃) equivalent. Hardness may influence the toxicity and bioavailability of substances in water.
Hydraulics	The physics of channel and floodplain flow relating to depth, velocity, and turbulence.
Hydrogeology	The area of geology that deals with the distribution and movement of groundwater in soils and rocks.
Hydrology	The study of rainfall and surface runoff processes.
Infiltration	Natural flow of surface water through ground surfaces as a result of rainfall events.

MacArthur-Forrest process	The process of applying cyanide to ore to extract gold.
Mine Water	Mine water consists of water generated within the open cut pits and from underground workings.
pH	Value taken to represent the acidity or alkalinity of an aqueous solution. It is defined as the negative logarithm of the hydrogen ion concentration of the solution.
Potable Water	Water of a quality suitable for drinking.
Process water	Water associated with mining, ore processing and tailings storage.
Project	Tomingley Gold Project.
Raw Water	Water sourced from borefield or from a waterway. Raw is defined as not being treated for consumption. Also referred to as non-potable.
Riparian	Pertaining to or situated on the bank of a river or other water body.
Risk	The chance of something happening that will have an impact upon objectives. It is measured in terms of consequence and likelihood.
Runoff	Amount of rainfall that ends up as streamflow.
Sediment	Soil or other particles that settle to the bottom of lakes, rivers, oceans, and other waters.
SILO	An enhanced climate data bank based on historical climate data from 1889 provided by the Bureau of Meteorology. Records are mainly based on observed data, with interpolation where there are data gaps.
Strata	Geological layers below the surface.
Surface Water	Water that is derived from precipitation or pumped from underground and may be stored in dams, rivers, creeks, and drainage lines.
Tailings	The by-product resulting from the processing of ore.
Trigger value	The concentration or load of physicochemical characteristics of an aquatic ecosystem, below which there exists a low risk that adverse ecological effects will occur. They indicate a risk of impact if exceeded and should 'trigger' action to conduct further investigations or to implement management or remedial processes.

Abbreviations

AHD	Australian Height Datum
ARI	Average Recurrence Interval
BOM	Bureau of Meteorology
cm	Centimetre
CRD	Cumulative rainfall departure
DS Act	Dam Safety Act 2015
EC	Electrical conductivity
EIS	Environmental Impact Statement
EP&A Act	Environmental Planning and Assessment Act 1979
EPA	Environment Protection Authority
EPL	Environment protection licence
DPE	Department of Planning and Environment
DPE Water	Department of Planning and Environment
GDE	Groundwater dependant ecosystem
GHD	GHD Pty Ltd
MHRDC	Maximum harvestable rights dam capacity
ML	Mining Lease
Mtpa	Million tonnes per annum
NATA	National Association of Testing Authorities
NRAR	Natural Resource Access Regulatory
PIRMP	Pollution Incident Response Management Plan
POEO Act	Protection of the Environment Operations Act 1997
RSF	Residue Storage Facility
SAR	San Antonio and Roswell
TARP	Trigger Action Response Plan
TDS	Total dissolved solids
TGEP	Tomingley Gold Extension Project
TSS	Total suspended solids
TGO	Tomingley Gold Mine operated by Tomingley Gold Operations Pty Ltd
WAD	Weak Acid Dissociable
WAL	Water Access Licence
Water Act	Water Act 1912
WM Act	Water Management Act 2000
WMP	Water Management Plan
WSP	Water Sharing Plan

1. Introduction

1.1 Overview

Tomingley Gold Operations Pty Ltd, a wholly owned subsidiary of Alkane Resources Ltd, operates the Tomingley Gold Mine in Central Western New South Wales (TGO). TGO is located near the village of Tomingley, approximately 50 km southwest of Dubbo and north of Peak Hill (refer to Figure 1.1).

This Water Management Plan (WMP) has been updated in accordance with relevant guidelines as stipulated in Development Consent (SSD 9176045) which was granted in February 2023, for the development of the Tomingley Gold Extension Project (TGEP).

This WMP will manage all open cut and underground mining activities for the Tomingley Gold Operations (TGO) and TGEP, hereby referred to collectively as the Project. This WMP will be used by TGO personnel as the first point of reference for water management.

Initial Project Approval (PA 09 0155) was granted in July 2012 with the mining lease issued in 2013. The Project includes a processing plant with associated residue storage facilities (RSF1 and RFS2).

The gold processing plant was commissioned in January 2014 and is designed to process up to 1.5 million tonnes per annum (Mtpa). The processing plant will be upgraded to process up to 1.75 Mtpa following Development Consent SSD 9176045.

The four existing open cut pits at TGO are Wyoming One (completed 2019), Wyoming Three (completed 2015), Caloma One (completed 2023) and Caloma Two (completed 2019).

Underground mining development commenced in 2019 from the base of Wyoming One open cut with underground mining taking place in the Wyoming and Caloma ore bodies.

TGEP consists of the San Antonio and Roswell (SAR) deposits which will be mined via open cut and underground methods and additional Residue Storage Facility.

The WMP sits under the overarching Environmental Management Strategy for the Project and with other Environmental Management Plans, forms the basis for environmental management at the Project.

1.2 Tomingley Gold Extension Project

An overview of the TGEP is included in Table 1.1.

Table 1.1 Tomingley extension project overview

Project Element	Description
Realignment of Public Roads	Realignment of the following public roads in accordance with the Austroads Guide to Road Design and the requirements of Transport for NSW and/or Narromine Shire Council. – Newell Highway. – Kyalite Road, including an overpass over the proposed Haul Road and Services Road. – Intersections with Back Tomingley West Road, Kyalite Road and McNivens Lane, including a new section of Back Tomingley West Road.
Relocation of Services/Utilities	The following services and utilities would be relocated. – 22 kV transmission line operated by Essential Energy. – Fibreoptic telecommunications cable operated by Vocus. – Copper telephone cable operated by Telstra.

Project Element	Description
Mining Method	Continued underground mining within the Wyoming 1, Caloma 1 and Caloma 2 deposits. Proposed open cut mining of the SAR Open Cut. Proposed underground mining of the SAR deposits, rock or paste backfill of completed stopes. Access to the SAR Underground would initially be via a drive from the Wyoming 1 underground workings and, potentially late in the life of the Project, a portal within the SAR Open Cut.
Mineral Resource ¹	TGO – 8.614 Mt @ 2.0 g/t for 550 000 oz Gold SAR – 17.378 Mt @ 1.91 g/t Au for 1 066 000 oz
Ore Reserve ¹	TGO – 2.373 Mt @ 1.9 g/t for 144 000 oz Gold SAR – 9.442 Mt @ 1.9 g/t Au for 563 000 oz
Total Annual Production	Ore, low-grade and waste rock, up to 35.25 Mtpa
Mine Life	To 31 December 2032
Total Resource Recovered	1 July 2021 to 31 December 2032, up to 16.350 Mt
Processing	Using the existing, approved processing plant, with an additional ball mill and associated infrastructure, up to 1.75 Mtpa
Management of Waste Rock	Placement of waste rock into the following. – Infrastructure, including for construction of the Haul Road, Services Road, SAR Amenity Bund, SAR Administration Area, and other infrastructure, including public roads if of suitable quality. – Caloma Waste Rock Emplacement comprising an in-pit emplacement that would completely fill the final voids, with a maximum elevation of 277 m AHD or approximately 5 m above the pre-mining land surface. – SAR Waste Rock Emplacement, comprising an in-pit and out-of-pit emplacement that would completely fill the South and Central Pits, with a maximum elevation of 335 m AHD or approximately 72 m above the pre-mining land surface. – Wyoming 1 Open Cut, as required. – The embankment for ongoing lifts for Residue Storage Facility 2 and capping and rehabilitation of Residue Storage Facility 1 and 2. – Temporary surface stockpiles to allow material to be stockpiled for use during the Project lifetime.
Management of Residue/Tailings	Construction and use of the approved RSF1 (to Stage 9, Cell 1) and RSF2 (to Stage 2). – Construction and use of Stages 3 to 9 of RSF2 to form an integrated landform with a maximum elevation of 286.5 m AHD or approximately 21 m above the pre-mining land surface. – Use for pastefill within the underground workings.
General Infrastructure	– Existing TGO infrastructure – SAR Amenity Bund – SAR Administration Area, including but not limited to offices, workshops, stores, a fuel store, wash bay, hardstand, and carparks – SAR Open Cut and Clean Water Diversion Bunds – Surface water control infrastructure, including clean and dirty water diversions, sediment basins, pipelines, and the SAR Site Water Storage – SAR Site Access Road – Pastefill Plant – SAR Exploration Drive and Roswell ventilation rises – Run-in-Mine (RIM) Pad² – SAR Magazine – Various site roads and hardstand areas

Project Element	Description
Transportation	Internal Transportation: – Continued use of the existing Newell Highway underpass and existing site roads and haul roads. – Construction and use of the Haul Road and Services Road linking the TGO Mine Site to the SAR Mine Site. External Transportation: – Continued use of the TGO Site Access Road and intersection with Tomingley West Road. – Construction and use of the SAR Site Access Road and intersection with the realigned Kyalite Road.
Water Management	– Continued use of the approved water supply pipeline from the “Woodlands” bore near Narromine. – Construction and use of an approximately 2.4 km pipeline from the “Dappo” bore to the approved water supply pipeline. – Transfer of up to 1 400 MLpa of water from the above two bores to the TGO Mine Site under existing licences. – Continued separation of process, mine, dirty, raw, and clean water, with process, mine and dirty water retained on site for mining-related purposes and clean water permitted to flow to natural watercourses. – Continued collection and management of groundwater inflows to the open cuts and underground operations and licencing under the relevant Water Sharing Plan. – Construction and use of additional water management structures, including the SAR Water Storage Dam and SAR Open Cut and Administration Clean Water Diversion Bunds. – Construction and use of dirty water diversion bunds and associated SAR sediment basins and use of the captured water for mining-related purposes. – Construction of one or more pipelines between the SAR and TGO Mine Site to permit two-way transfer of water.

1.3 Site history

The original project approval (PA 09 0155) has been modified seven times. A summary of the site history at TGO is included in Table 1.2. SSD 9176045 was approved in February 2023 and has been modified once in August 2023.

Table 1.2 Site history

Year	Month	Activity
2012	July	Original project approval (PA 09 0155)
2013	February	Mining lease granted
		Construction of key processing infrastructure complete including RSF, additional surface water management features constructed and in use
	November	Mining of overburden commenced only necessary surface water management features constructed
		Modification 1 approved
2015	April	Modification 2 approved
	July	Additional Groundwater Bores installed around Raw Water and Process Water Dam
	October	Commencement of Wyoming One Pit
		Modifications to surface water management system around Caloma One Pit
	December	Expansion of Sediment Basin 5 capacity
2016	May	Modification 3 approved
	July	Commencement of Caloma Two Pit

Year	Month	Activity
2017	March	Expansion of Sediment Basin 4 and alteration of clean water diversion
2019	January	Site transitions from open cut to underground operation
2020	May	Modification 4 approved
2021	May	Modification 5 approved
2022	June	Modification 6 Approved
2022	December	Modification 7 Approved
2023	February	Extension project approval (SSD 9176045)
2023	August	SSD 9176045 Modification 1 Approved

The WMP covers all operations at TGO and includes the approved mining operations and associated infrastructure within the site boundary (refer to Figure 1.2).

Land use within and surrounding TGO includes:

- Residential and rural residential
- Agriculture
- Transportation infrastructure (Newell Highway)
- Commercial (Tomingley township)
- Recreation and community facilities
- Former mining operations, south of Tomingley (Myall United Gold Mine)

1.4 Purpose

This WMP addresses the specific water components of the conditions of the Extension Project Approval SSD 9176045 (refer to Appendix A).

1.5 Consultation

The WMP has been prepared in consultation with the NSW Environment Protection Authority (EPA), Department of Planning and Environment Water (DPE Water) and Dam Safety NSW, as required by the condition of the Extension Project Approval SSD 9176045. Details of consultation are provided in Appendix B. Details of where consultation feedback has been addressed can be found in Appendix B.

The WMP has been prepared by Dr Stuart Gray and Ian Gilmore of GHD and David Pritchard of Tomingley Gold Operations Pty Ltd. CVs of GHD personnel involved with preparation of the WMP were provided to EPA and DPE Water during consultation.

1.6 Scope and limitations

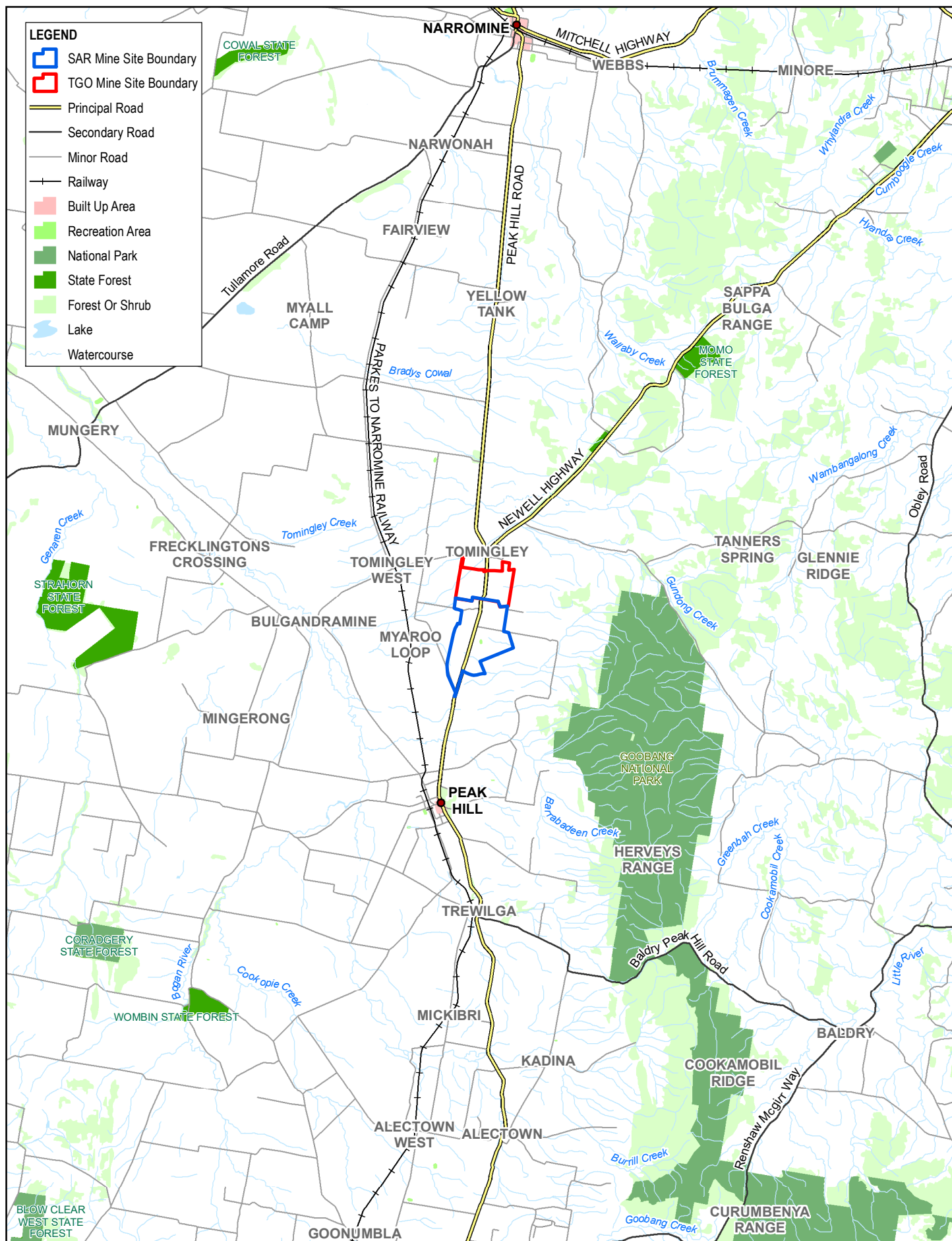
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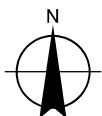
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Grid: GDA 1994 MGA Zone 55

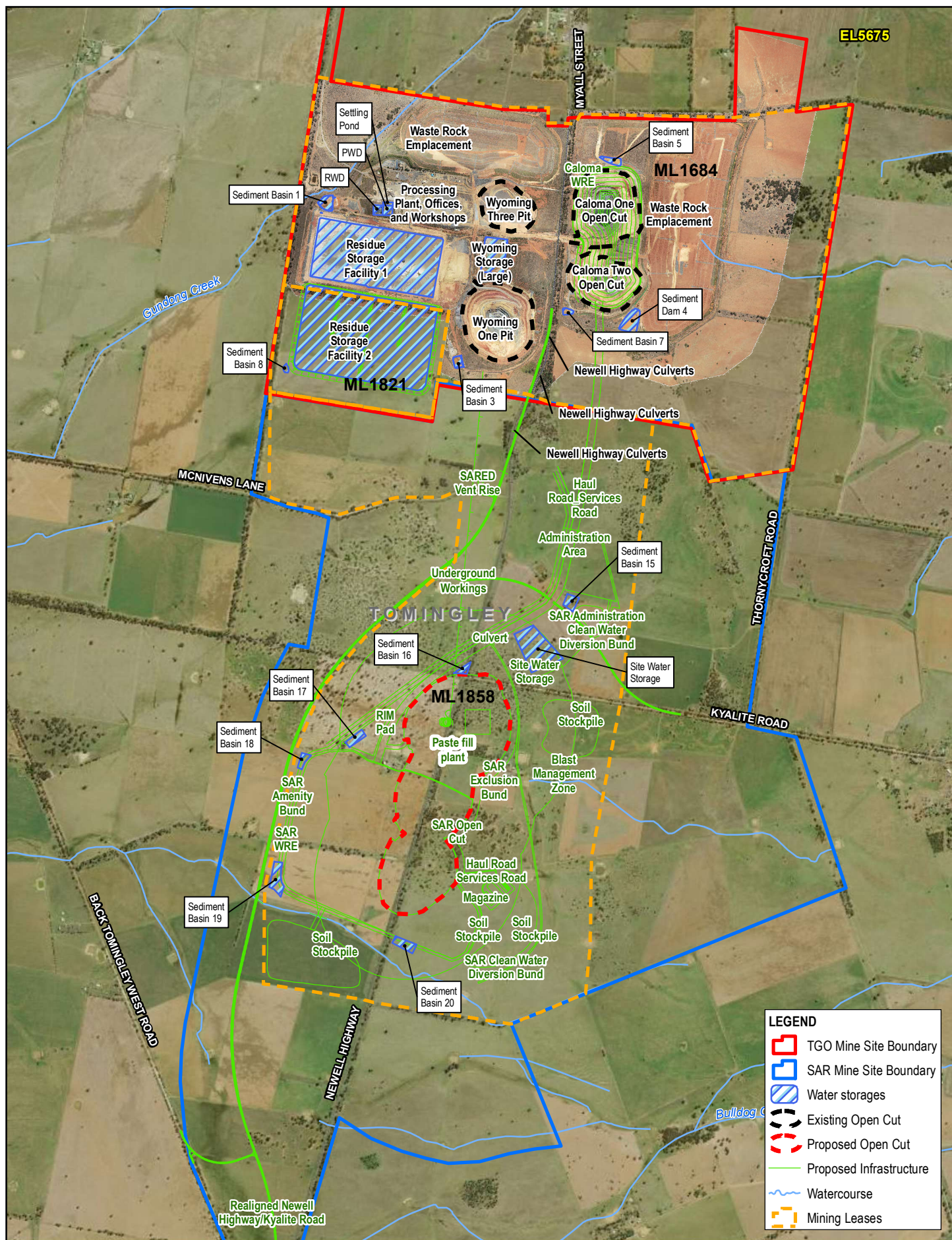


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Water Management Plan - 2023

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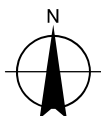
Locality plan

FIGURE 1.1



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Kilometers

Map Projection: Transverse Mercator
Horizontal Datum: GDA 1994
Grid: GDA 1994 MGA Zone 55



Tomingley Gold Operations
Tomingley Gold Extension Project
Water Management Plan - 2023

Project No. 2220240
Revision No. A
Date 3 Nov 2023

Site layout

FIGURE 1.2

2. Regulatory requirements

2.1 Environmental Planning and Assessment Act 1979

The *Environmental Planning and Assessment Act 1979* (EP&A Act) is administered by DPIE and is the core legislation relating to planning and development activities in NSW.

The Project was originally granted approval (09_0155) under Section 75J of the EP&A Act in July 2014. The potential impacts of the Project were assessed in the Environmental Impact Statement (EIS). The Extension Project was granted approval (SSD 9176045) in February 2023. This WMP has been prepared in accordance with the Condition B49 of Extension Project Approval SSD 9176045 that formed part of the EIS (refer to Appendix A).

2.2 Protection of the Environment Operations Act 1997

The *Protection of the Environment Operations Act 1997* (POEO Act) is administered by the EPA. The objectives of the POEO Act are to protect, restore and enhance the quality of the environment.

Under the POEO Act, an EPL is required for premises at which a 'scheduled activity' is conducted. Activities identified as occurring at TGO include, crushing, grinding, or separating; mineral processing; and mining for minerals.

TGO currently holds EPL 20169 which specifies monitoring requirements, discharge concentration limits and storage freeboard requirements for the RSF and Process Water Dam (PWD).

2.3 Water Act 1912

The Water Act 1912 is administered by DPIE Water and Natural Resource Access Regular (NRAR) (formerly Department of Primary Industries – Water) and has historically been the main legislation for managing water resources in NSW. The Water Act 1912 was progressively phased out and replaced by Water Sharing Plans (WSPs) under the Water Management Act 2000 (WM Act), however the Water Act 1912 still applies to aquifer interference activities in all areas of NSW.

Several licences are held by TGO under the Water Act 1912 for groundwater monitoring bores (refer to Table 2.1).

Table 2.1 *Licenced groundwater bore details*

Licence number	Issue date	Expiry date	Purpose
80BL245428	23 September 2009	Perpetuity	Groundwater Monitoring
80BL245429			
80BL245430			
80BL245431			
80BL245432			
80BL620426	27 October 2014		

2.4 Water Management Act 2000

The WM Act is administered by DPE Water and NRAR. The aim of the WM Act is to ensure that water resources are conserved and properly managed for sustainable use.

Fresh water sources throughout NSW are managed via Water Sharing Plans (WSPs) under the WM Act. Key rules within the WSPs specify when licence holders can access water and how water can be traded. An amendment to the WM Act (Section 60I) came into effect on 1 March 2013, prohibiting the taking, removal or diversion of water from a water source, or relocation of water from one part of an aquifer to another part, without an access licence. Various activities are captured by the provisions of the amendment including mining, mineral exploration, and petroleum exploration.

Table 2.2 identifies the WALs currently held by TGO under the WM Act.

Table 2.2 Water sharing plan licences and approvals

WAL	Extraction limit (ML/year)	WSP	Description
Surface Water			
WAL35321	22	Upper Bogan River Water Source under the Macquarie Bogan Unregulated and Alluvial Water Sources 2012	Water Supply Works and Water Use
80FW723901	NA	NA	Flood Work Approval (Levee)
Groundwater			
WAL28643	220	Lachlan Fold Belt Murray Darling Basin (MDB) Groundwater Source	Aquifer
WAL29266	70		
Woodlands Borefield			
80WA705442	NA	Lower Macquarie Zone 6 Groundwater Source, under the WSP for the Macquarie-Castlereagh Groundwater Sources 2020	Works Approval
WAL20270	1000		Aquifer (Woodlands Borefield)
Dappo Bore			
80CA703364	NA	Lower Macquarie Zone 6 Groundwater Source, under the WSP for the Macquarie-Castlereagh Groundwater Sources 2020	Water Supply Works And Water Use Approval
WAL44388	400		Aquifer

Maximum Harvestable Rights

Landholders are permitted to intercept and store a proportion of runoff from their property without a licence under the WM Act. In addition, no licence is required for water stored within dams that:

- Control or prevent soil erosion
- Capture, contain and recirculate drainage
- Have no catchment (i.e. “turkey’s nests”)

The existing surface water storages that are part of TGO all fall into one of the above categories and therefore do not require licensing under the WM Act.

Controlled Actions

Any works within the defined riparian zone of a creek require a Controlled Activity Approval, unless defined as exempt. NRAR has developed *Guidelines for Instream Works on Waterfront Land* (NOW, 2012a) and *Guidelines for Riparian Corridors on Waterfront Land* (NOW, 2012b), which provide recommendations for the design and construction of instream works, including:

- Maintaining the natural geomorphic processes by allowing for natural movement of sediment, woody debris and not increasing scour and erosion within the existing watercourse.
- Maintaining the existing watercourses hydrologic function through accommodation of low flows and not altering the natural bank full or flood flows.
- Installation of scour protection when required.
- Undertaking visual inspections and maintenance on the watercourse during the works.

2.5 Dams Safety Act 2015

Dam safety is regulated by Dam Safety NSW under the *Dam Safety Act 2015* (DS Act). A 'declared dam' is a dam gazetted in accordance with Section 4 of 2019 regulations of the DS Act. 'Notification areas' are declared by Dam Safety NSW under Section 48 of the DS Act.

In accordance with the DS Act, the 'Tomingley Residue Storage Facility' (RSF Cells 1 and 2) and the Wyoming Central Dam are defined as declared dams, by virtue of being published in the NSW Government Gazette on 23 April 2021 (NSW Government 2021).

TGO will notify Dam Safety NSW of its intention to construct the water storage dam in the SAR Mine area, prior to commencing construction in accordance with Part B Condition 52 of Extension Project Approval SSD 9176045.

2.6 Policies and guidelines

2.6.1 NSW Aquifer Interference Policy

The NSW Aquifer Interference Policy (DPIW 2012) clarifies water licensing and approval requirements for aquifer interference activities in NSW, outlining the water licensing requirements under the Water Act and WM Act. Sufficient licences must be held to account for all water taken from a groundwater or surface water source as a result of an aquifer interference activity, both for the life of the activity and after the activity has ceased. Many mining operations continue to take water from groundwater sources after operations have ceased. This take of water continues until an aquifer system reaches equilibrium and must be licensed.

The NSW Aquifer Interference Policy requires that potential impacts on groundwater sources, including their users and groundwater dependent ecosystems (GDEs), be assessed against minimal impact considerations, outlined in Table 1 of the policy. If the predicted impacts meet the Level 1 minimal impact considerations, then these impacts will be considered as acceptable. The minimal impact considerations relevant for to the Project were assessed in the EIS.

2.6.2 NSW State Groundwater Strategy

The objective of the NSW Groundwater Strategy is to manage the State's groundwater resources so that they can sustain environmental, social, and economic uses for the people of NSW. The NSW Groundwater Strategy has three strategic priorities:

- Protect groundwater resources and the ecosystems that depend on them.
- Build community and industry resilience through sustainable groundwater use.
- Improve groundwater information and knowledge.

2.6.3 Guide to Groundwater Management in NSW

The Guide to Groundwater Management in NSW provides details regarding the framework and regulatory context for groundwater management, as described throughout this section of this report. The Guide to Groundwater Management in NSW describes responsibilities of groundwater users, government agencies and development proponents for groundwater management using practical examples.

The Guide to Groundwater Management in NSW describes policies for groundwater management in NSW including:

- NSW Groundwater Quantity Protection Policy.
- NSW Groundwater Quality Protection Policy.
- NSW Groundwater Dependent Ecosystems Policy.

Draft NSW Groundwater Quantity Management Policy

The principles of this policy include:

- Maintain total groundwater use within the sustainable yield of the aquifer from which it is withdrawn.
- Groundwater extraction shall be managed to prevent unacceptable local impacts.
- Provide opportunities for sustainable development that provide cultural, social, or economic benefits.
- Increase community understanding of groundwater management measures.

NSW Groundwater Quality Protection Policy

The objective of this policy is the ecologically sustainable management of the State's groundwater resources so as to:

- Slow, halt or reverse any degradation in groundwater resources.
- Direct potentially polluting activities to the most appropriate local geological setting so as to minimise the risk to groundwater.

NSW Groundwater Dependent Ecosystems Policy

This policy was designed to protect ecosystems that are dependent on groundwater as a primary water source so that the ecological processes and biodiversity of these ecosystems are maintained or restored for the benefit of present and future generations. It provides guidance on how to protect and manage groundwater dependent ecosystems in a practical sense.

2.6.4 Australian and New Zealand Guidelines for Fresh and Marine Water Quality

The Australian and New Zealand Guidelines for Fresh and Marine Water Quality (ANZG 2018) provide guidance for assessing and managing ambient water quality in a wide range of water resource types and according to specified environmental values, such as aquatic ecosystems, primary industries, recreation and drinking water. ANZG (2018) was published in 2018 after a scientific review of the ANZECC (2000a) guidelines.

3. Environment

The purpose of this section is to provide details of the baseline surface and groundwater environment for TGO. Baseline monitoring data collected as part of the monitoring program is presented in Section 6.

3.1 Climate

3.1.1 Rainfall

A historical rainfall record for TGO was obtained for the Peak Hill Post Office Station (station number 50031).¹ This station was selected as it is located approximately 15 kilometres to the south of TGO. The period of rainfall data used for this assessment extended from 1 January 1889 to 1 January 2023 (a total of 134 years). The historical SILO rainfall data between 1889 and 2022 are shown in Figure 3.1.

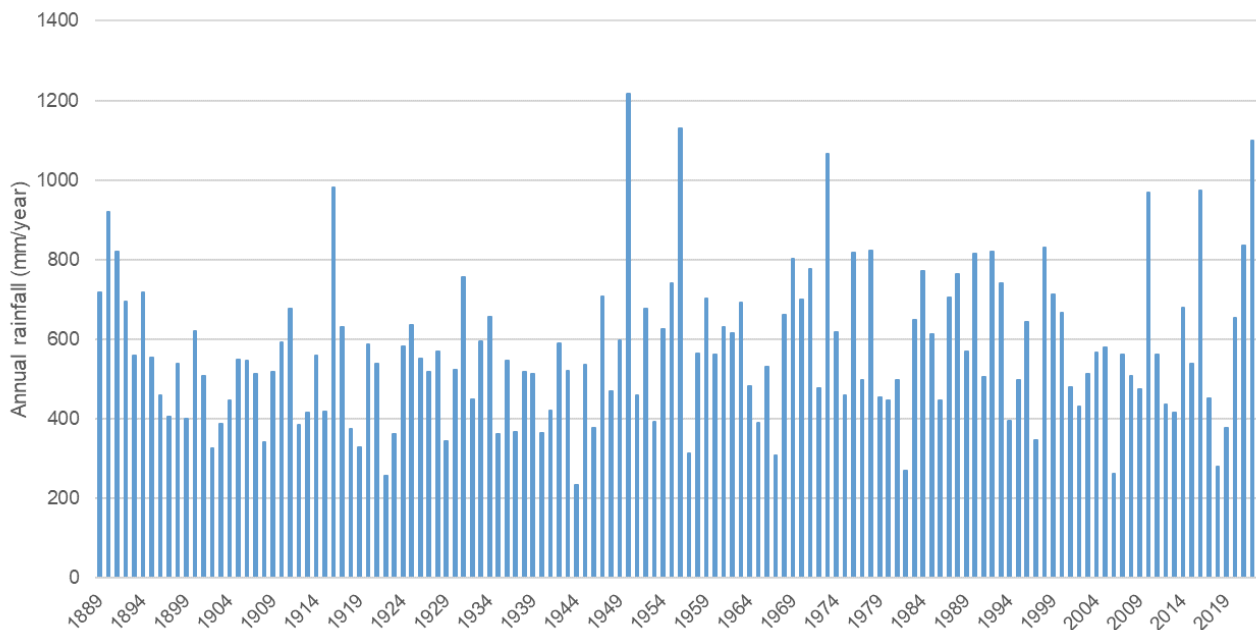


Figure 3.1 Historical rainfall record

The annual statistics associated with the SILO data represented in Figure 3.1 are:

- Minimum rainfall total – 232.6 mm in 1944
- Median rainfall total – 547.8 mm
- Average rainfall total – 570.6 mm
- Maximum rainfall total – 1217.1 in 1950

The total site rainfall for 2022 is 1099.7 mm, which is above the long-term historical average rainfall total of 570.6 mm.

¹ A historical record of daily rainfall depth for TGO was obtained in the form of a patched point data set from the Scientific Information for Land Owners (SILO) database operated by the Queensland Department of Science, Information Technology and Innovation (DSITI). SILO patched point data is based on observed historical data from a particular Bureau of Meteorology (BOM) station with missing data 'patched in' by interpolating with data from nearby stations (DSITI, 2023).

The monthly average rainfall from the SILO data set are summarised in Figure 3.2. From Figure 3.2 it can be seen that:

- Average monthly rainfall is approximately 50 mm.
- All months have experienced periods of no (or very low) rainfall.
- Rare flood events are more likely to occur around summer (October to April).
- Lowest rainfalls typically occur during April and September.
- September has the lowest rainfall of 39.58 mm and January has the highest rainfall of 58.4 mm.

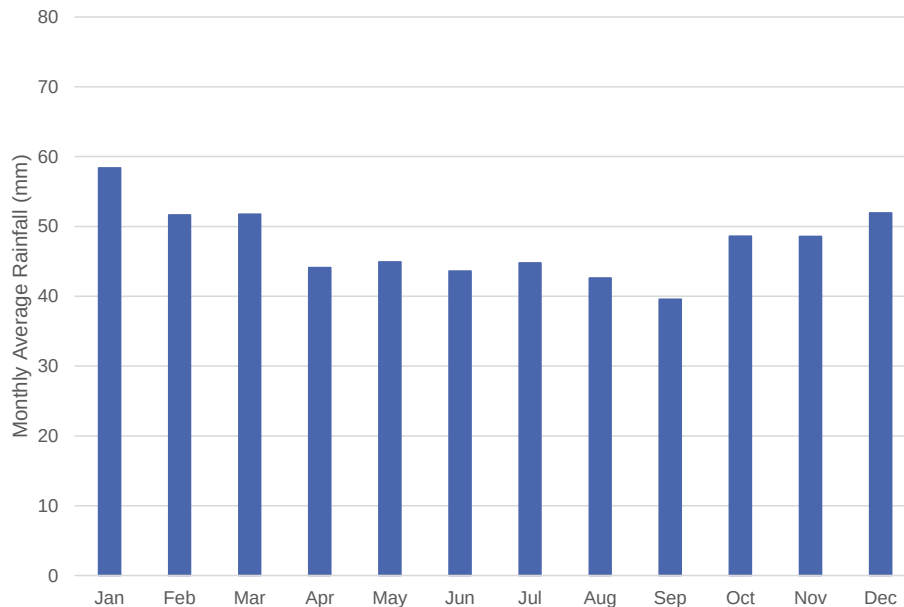


Figure 3.2 Monthly average rainfall - Peak Hill Post Office

3.1.2 Evaporation

Continuous daily evaporation data were obtained from SILO (2023), based on the latitude and longitudinal location of the site, for the same period as the rainfall data series (refer to Section 3.1.1). Figure 3.3 summarises the range of daily evaporation rates for the site for each month and for the entire SILO (2023) data set. From Figure 3.3 evaporation rates within the summer months are significantly higher than those of the winter months.

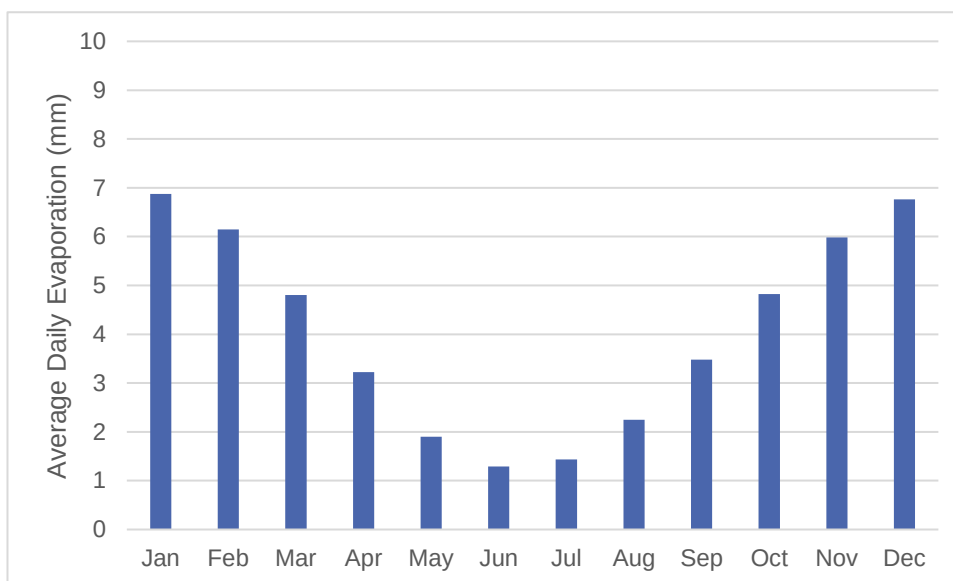


Figure 3.3 Daily evaporation range

3.2 Hydrology and waterways

The Project site is situated within a catchment that encompasses Gundong and Bulldog Creeks (refer to Figure 3.5), along with several minor, unnamed tributaries. The total catchment area of Gundong and Bulldog Creeks, extending to the confluence of Gundong and Bulldog Creeks, is approximately 247 km². These creeks flow from east to west and eventually drain into the Bogan River, around 10 km downstream. The upper catchment is densely forested and contains steeper channel sections. Bulldog Creek, which is a tributary of Gundong Creek, passes through the SAR Mine Site. The catchment area of the Bulldog Creek tributary within the SAR Mine Site is approximately 30 km², with an average vectored slope of 0.86%. Flow from this Bulldog Creek sub-catchment will be diverted via clean water diversion drains as part of the proposed SAR Open Cut.

The waterways near the Project Site do not have a significant groundwater base flow and are highly ephemeral, drying up shortly after rainfall or runoff events. Gundong Creek and Bulldog Creek serve as the primary channels in the catchment; however, they only experience intermittent flow and lack well-defined channels. The minor tributaries further upstream have more clearly defined channel reaches.

Historically, diversions have been constructed along Gundong Creek as part of the development of the Tomingley township. In the vicinity of TGO, Gundong Creek is classified as a third order stream and features a core riparian zone spanning approximately 60 m. Previous clearing and grazing practices have led to bank erosion and instability in Gundong Creek.

3.2.1 Newell Highway

Prior to construction of TGO, flows within Gundong Creek, Bulldog Creek and their tributaries were influenced by the Newell Highway. The Newell Highway crosses Gundong Creek by way of three culverts at the active TGO mining area with a further eight culverts along the Newell Highway in the SAR Infrastructure Area.

Anecdotal evidence (SEEC, 2011) indicated that the Newell Highway periodically overtopped within the vicinity of these culverts during short duration rainfall events.

Hydrological modelling was undertaken to investigate flooding behaviour at the Project and the likely effects of the Project on flooding of the Newell Highway (Jacobs, 2021a). The model was used to estimate the existing and post-mining hydrographs at the Newell Highway culverts for the 20% Annual Exceedance Probability (AEP), 10% AEP, 5% AEP, 2% AEP, 1% AEP, 0.1% AEP, and 5% AEP design storm events.

The model indicated that six of the eleven existing culverts in the Project Area are overtopped in the 20% AEP event.

A number of modifications to drainage along the Newell Highway are proposed to occur prior to mining commencing at the SAR Area:

- 12 culverts to be constructed under the proposed alignment of Newell Highway.
- Four (4) culverts to be constructed under the Haul Road.
- One (1) culvert to be constructed under Kyalite Road.
- One (1) existing culvert under the existing Newell Highway to be upgraded.
- Two (2) existing culverts under the existing Newell Highway to be removed.

The new culverts have been sized to achieve a 5% AEP flood immunity. Therefore, the proposed culvert upgrades will reduce the potential for overtopping of the Newell Highway.

The modelling (Jacobs, 2021a) indicates that the maximum modelled flow rates within Gundong Creek are expected to reduce because of the Project (refer to Figure 3.4). Therefore, the potential for overtopping of the Newell Highway is expected to remain comparable (or slightly reduced) because of the Project as shown in Figure 3.4.

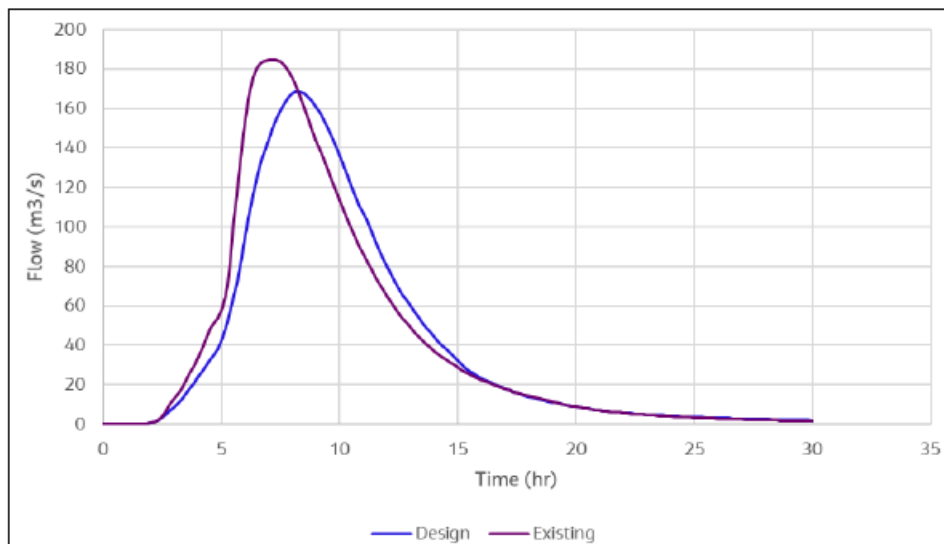
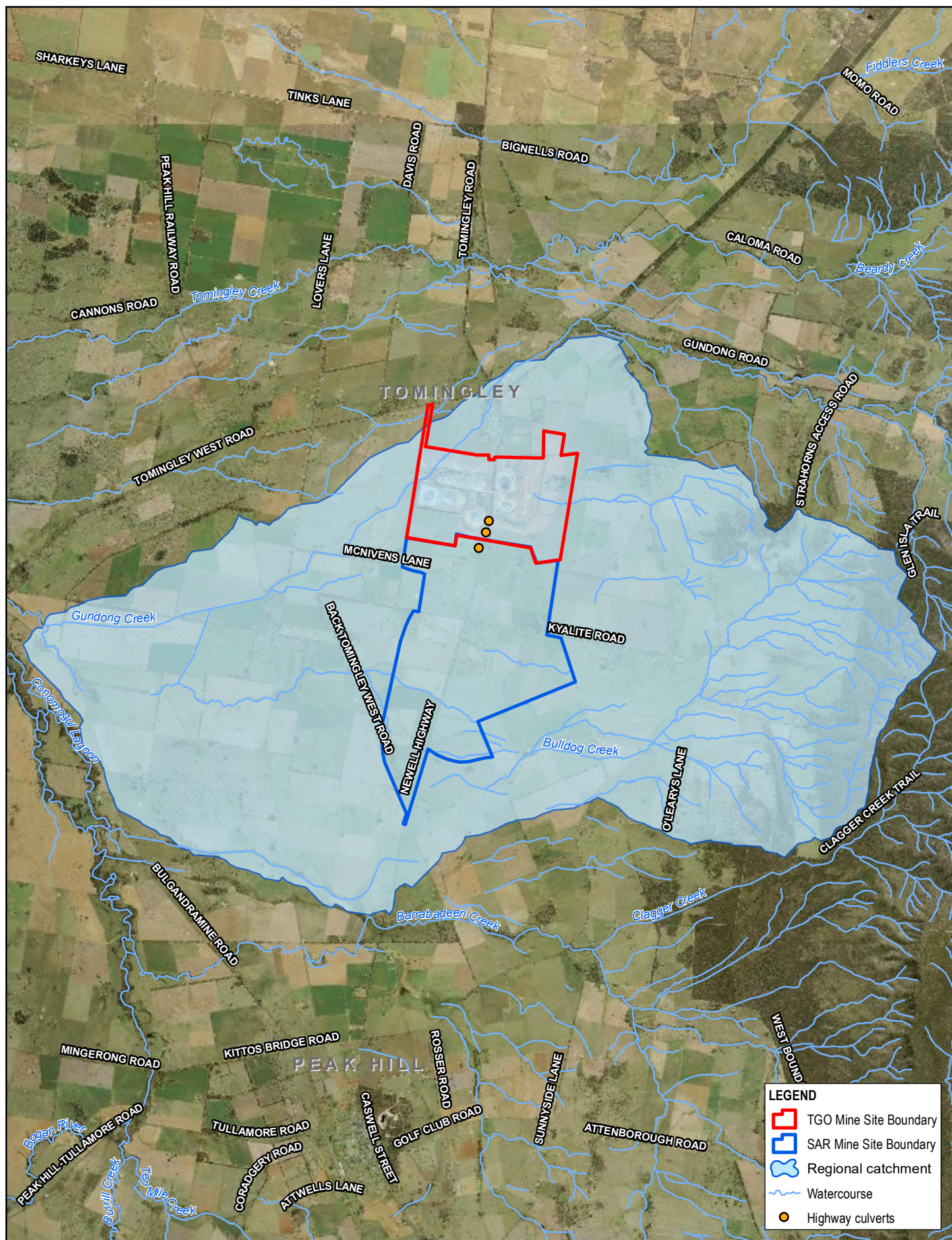
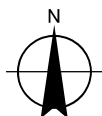
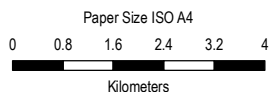


Figure 3.4 Hydrological results for Gundong Creek catchment response downstream of Newell Highway in the 5% AEP event (Jacobs, 2021a)



LEGEND

- TGO Mine Site Boundary
- SAR Mine Site Boundary
- Regional catchment
- Watercourse
- Highway culverts



Map Projection: Transverse Mercator
Horizontal Datum: GDA 1994
Grid: GDA 1994 MGA Zone 55

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Regional catchment plan

FIGURE 3.5

3.3 Geology and soils

TGO mine site and SAR open cut are situated on the Junee-Narromine volcanic belt of the Palaeozoic Lachlan Orogen. This belt comprises sedimentary, volcanic, and intrusive rock formations dating from the early Cambrian to the early Devonian age. In the TGO area, the Ordo-Silurian sequences, which include the Wyoming/Caloma deposits, feature tight isoclinal folding and strong axial planar cleavage with green schist metamorphic assemblages.

Both TGO and SAR are characterized by a predominance of alluvial sequences of clays, sands, and gravel, of Quaternary to Tertiary age, reaching thicknesses between 20-60 m in the SAR area and up to 50 m in the TGO area (Impax Group 2011; Krynen et al., 1990). A well-developed weathering profile extends to 70 m below ground level in TGO, and the presence of occasional Ordovician Mingelo volcanic and Silurian siltstone outcrops in the SAR area.

Both areas exhibit varying soil erodibility values (K factors), with the worst soils often located east of the Newell Highway in the sodic Gilgaied Dermosol soils. Portions of the Mickibri Hydrogeological Landscape (HGL) are highly erodible with dispersive subsoils (SEEC 2011; DPIE, 2023). The topsoil and subsoil depths for both sites range from approximately 30 cm to 70 cm below the natural surface, with the red Dermosol being the most suitable for stripping and stockpiling as per the Mining Operations Plan (MOP). The geotechnical horizons in the SAR Infrastructure Area span from Quaternary Alluvium to slightly weathered and fresh rock (WSP, 2021). Additionally, the project area encompasses gilgai areas, ephemeral lakes formed in expanding clay soils, as part of the Mickibri HGL (DPIE, 2023).

3.4 Hydrogeology

There are three distinct groundwater systems within the vicinity of TGO's mining leases, as identified by Impax Group (2011):

- Shallow alluvium – discrete, shallow alluvium (less than 10-20 m deep) dissects the plains surrounding TGO along creek flow paths. These aquifers are believed to be recharged from rainfall infiltration. Groundwater within these systems is of relatively good quality however yields are relatively low and dependent on rainfall.
- Deep alluvium – up to 100 m deep and located approximately 10 km to the northwest and west of TGO. Groundwater yields are believed to be low and of poor quality. These systems may have some interaction with underlying bedrock however are believed to be primarily recharged from rainfall.
- Fractured rock – the area surrounding Tomingley is typically underlain by shale, siltstone, and chert with several fractured rock aquifers in the vicinity of TGO. Groundwater yields range from 0-3 L/s, generally less than 1.5 L/s, and water quality is poor with high salinity.

Perched groundwater occurs within the shallow alluvium however it is generally not continuous across TGO. Shallow groundwater appears to be more permanent along Gundong Creek to the northeast of the Wyoming 3 pit.

The hydraulic conductivity of the shallow alluvial clay is generally low to very low. Falling head tests on clayey strata between 1.55 and 42.5 m below ground level (bgl) at the RSF area (to the southwest of the Wyoming 3 pit) indicate hydraulic conductivities of 0.0002 to 0.002 m/d or 2.3×10^{-8} to 10^{-9} m/s (DE Cooper & Associates, 2011). In addition, overburden clay from the Wyoming 1 pit was tested for its potential use in the RSF embankment and found to have a compacted hydraulic conductivity of less than 10^{-10} m/s (8.6×10^{-6} m/day) (DE Cooper & Associates, 2011).

A deeper confined groundwater system occurs within the fractured sandstone and siltstone. The water bearing zone most likely occurs at a depth of greater than 100 m in the vicinity of the Wyoming 3 pit, as indicated by the lack of groundwater inflow into the pit. During exploration drilling at the Wyoming 3 pit site, there was no record of water flows into the drill hole at less than 50 m. At 50 to 100 m depth there was some water recorded during rod changes but no flow during drilling. At greater than 100 m depth, some weak flow during drilling was recorded. Therefore, the Wyoming 3 pit is predominantly within the unsaturated zone above the confined water bearing zone. Based on the information available there is no mention of potential hydraulic connectivity from the Wyoming 3 pit to the proposed underground mine 500 m to the south of the pit.

Based on groundwater monitoring data, the hydraulic gradient of the deep groundwater system is approximately 0.01 to the north. Adopting a hydraulic conductivity of 0.07 m/day, the deep groundwater moves to the north at a rate of approximately 0.0007 m/day or 0.3 m/year.

3.4.1 Groundwater bore search

A search of the NSW Groundwater Bore Database (DPIW 2015) (now incorporated into the Australian Groundwater Explorer) was undertaken to identify registered bores within a 10 km buffer of TGO mine site and SAR open cut. The search identified 34 bores within the 10 km buffer zone. Licences for a number of these 34 bores were reported as cancelled, lapsed, or abandoned. Of the 34 bores the majority (21) were licensed as a test or monitoring bore. Of the remaining bores nine were intended for public/municipal water supply, one was registered as stock and domestic, one bore was registered as groundwater exploration, and one bore was registered as irrigation.

Licensed groundwater bores in the vicinity of TGO and SAR are shown in Figure 3.6. Details regarding licensed groundwater bores are summarised in Appendix C.

3.4.2 Groundwater dependant ecosystems

A recent assessment has been conducted to identify GDEs by using the BoM's GDE Atlas and High Priority GDE mapping in the WSP (BOM, 2023; NSW Government, 2020).

Various tributaries of the Bogan River that lie to the north of the site are potential GDEs. The shallow aquifers are unlikely to have any significant hydraulic connection to the regional scale alluvial plains or the underlying fractured rock aquifer (The Impax Group 2013).

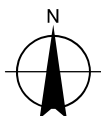
The potential for GDEs in the vicinity of the Project Site was assessed through review of the BoM's GDE Atlas. There are several isolated tracts of high potential terrestrial GDEs in the vicinity of the Project Site based on regional studies. These GDEs, associated with Gundong Creek and Bulldog Creek, are situated over 800 m from the current and proposed mining areas and encompass various tree, shrub, and sedge species (BOM, 2023). There is also some low potential terrestrial GDEs located over 3 km to the east of the Project Site. In terms of potential aquatic GDEs, Tomingley Creek, a section of Bulldog Creek, and a small portion of Gundong Creek have been noted within a 5 km buffer to the TGO Mine Site and the SAR open cut disturbance area (BOM, 2023). These potential aquatic GDEs are all located over 5 km away from existing and proposed mining operations.

The WSP High Priority GDE mapping showed no High Priority GDEs in immediate proximity to TGO or SAR. The largest area of mapped high priority GDEs listed in the NSW Murray Darling Fractured Rock Groundwater Sources Water Sharing Plan are located approximately 8.5 km southwest of SAR site. The closest high priority GDEs are located approximately 5.8 km northwest of TGO (NSW Government, 2020).



Paper Size ISO A4
0 0.6 1.2 1.8 2.4 3
Kilometers

Map Projection: Transverse Mercator
Horizontal Datum: GDA 1994
Grid: GDA 1994 MGA Zone 55



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NSW groundwater bore search

FIGURE 3.6

4. Water management system

The water management system of the Project comprises the water management system of the existing TGO Mine and the SAR Mine, including the construction and operation of the water management infrastructure (drains, dams, pumps, and pipelines).

The purpose of this section is to describe the water management system. The water management system at the TGO Mine and SAR Mine have been designed and are to be operated to enhance the sharing and reuse of water, thereby limiting the reliance on raw groundwater sources and water importation for mining purposes.

The water management system includes measures that are implemented to comply with the requirements and performance criteria summarised in Section 7.1.

4.1 TGO Mine surface water management system

The surface water management system at TGO has been designed to separate the different water streams for the management of clean, raw, dirty, mine and process (contaminated) water, including:

- Clean water consists of flows onto the site from areas upslope of the TGO Mine that are intercepted by clean water diversions and flood levees and conveyed around the site.
- Raw water is externally supplied (clean) water that is used to supply potable water and as make up water to meet site water demands.
- Dirty water typically consists of surface runoff generated within disturbed areas of the site (outside of the mining areas) that reports to sediment basins.
- Mine water typically consists of groundwater intercepted during mining and surface runoff generated from mining areas and is reused on site for dust control as well as make up water for the process water system.
- Process water consists of water that has been used for mining, ore processing and tailings storage.

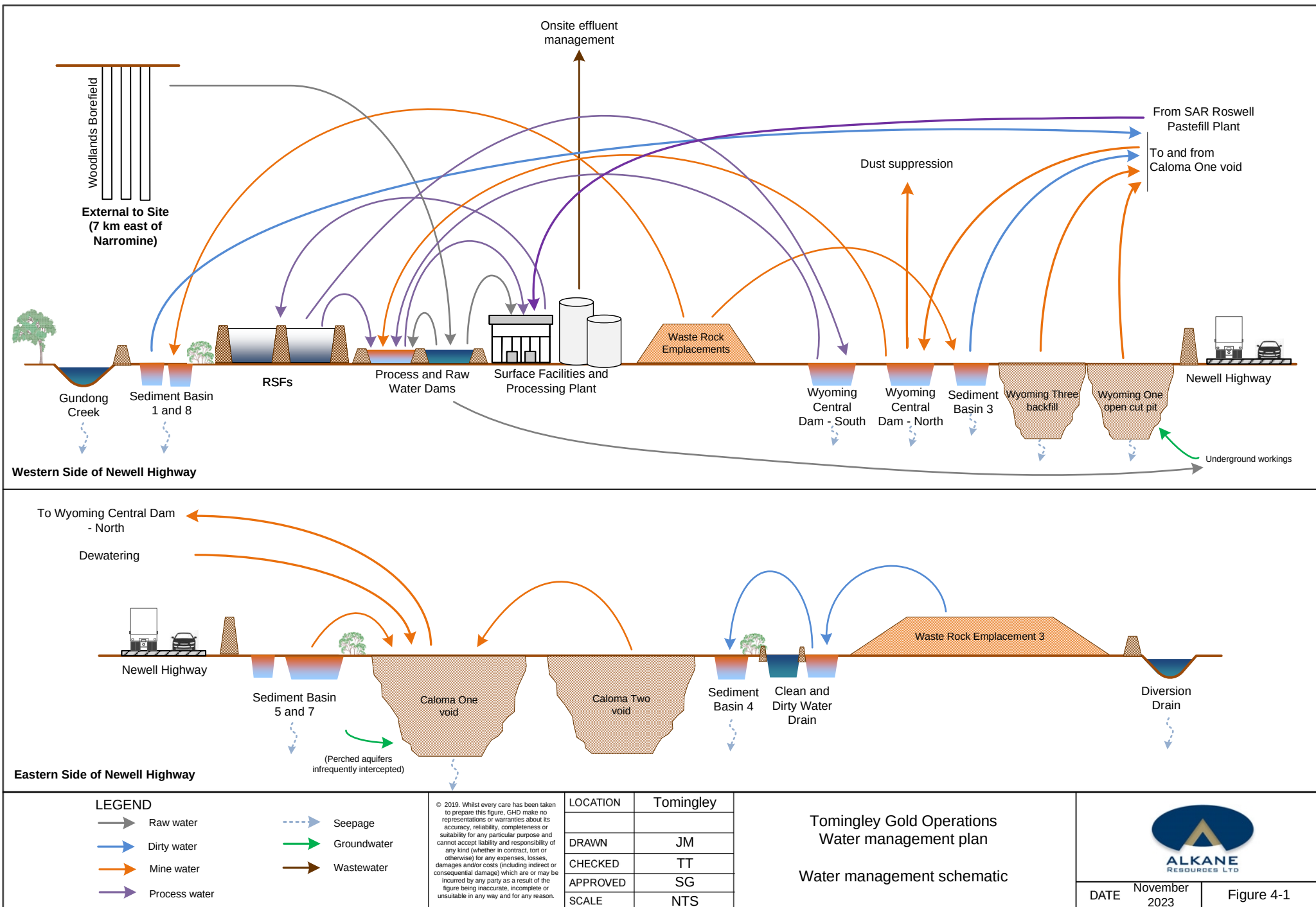
The TGO Mine site water storages are summarised in Table 4.1 while the interactions between the raw, dirty and process water systems are presented in Figure 4.1 and Figure 4.2.

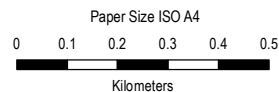
Table 4.1 TGO Mine Water storages

Storage	Capacity (ML)	Primary usage/transfer to	Indicative dewatering pump rate (L/s)
TGO Mine			
Raw water			
Raw Water Dam	10.7	Process Water Dam Wyoming Central Dam - North	-
Dirty water			
Sediment Basin 1	31.0	Wyoming Three Discharged via LDPs	50 L/s
Sediment Basin 3	6.5		20 L/s
Sediment Basin 4	30.4		40 L/s
Sediment Basin 5	4.0		20 L/s
Sediment Basin 7	3.5		5 L/s
Sediment Basin 8	25 (5.7 design)		15 L/s (design)

Storage	Capacity (ML)	Primary usage/transfer to	Indicative dewatering pump rate (L/s)
Mine water			
Wyoming Central Dam – North	17.4	Dust suppression Process water dam	-
Caloma One void	520	Wyoming Three	
Wyoming One open cut pit sump (below underground portal)	195	Wyoming Three	-
Caloma Two void	20		-
Wyoming Three	1300	SAR Site Water Storage Dam	
Process water			
Process Water Dam	9.2	Processing plant	-
Settling pond	1.05	Process Water Dam	-
Wyoming Central Dam - South	162.5	Process Water Dam	-
Residue Storage Facilities * (decant ponds)	2 x 200	Wyoming Central Dam - South Process Water Dam	-

Note to table: Second Residue Storage Facility is planned to be operational in November 2023





Map Projection: Transverse Mercator
Horizontal Datum: GDA 1994
Grid: GDA 1994 MGA Zone 55



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FIGURE 4.2

4.1.1 Clean water

Clean water consists of flows onto the site from areas upslope of TGO Mine that are intercepted by clean water diversions and flood levees and conveyed around the site. The purpose of the clean water management system is to minimise the interception and use of clean water on site.

4.1.1.1 Clean water diversions

Clean water diversions and levees on the northern, eastern and western boundaries provide flood protection to site facilities and infrastructure for flood events up to (and including) the 100 year ARI flood event.

4.1.1.2 Clean water drains

Clean water from the north of the TGO Mine site is conveyed by a clean water drain between the Caloma One and Caloma Two pits and the Waste Rock Emplacement. The clean water drain is separated from the dirty water management system by the clean water and dirty water separation levee.

4.1.1.3 Gundong Creek

Within the vicinity of TGO Mine, Gundong Creek is a third order watercourse, requiring a total core riparian protection zone of approximately 60 m be maintained. Signage and training are used to avoid unauthorised activities that may impact on the creek.

Infrastructure constructed as part of Project within 60 m of Gundong Creek is maintained generally in accordance with the:

- Guidelines for controlled activities on waterfront land (NRAR 2018; formerly DPI 2007)
- Why Do Fish Need to Cross the Road? Fish Passage Requirements for Waterway Crossings (NSW Fisheries 2003)

4.1.2 Raw water

4.1.2.1 Woodlands Borefield

Raw water is supplied from a licensed bore located approximately 7 km to the east of Narromine (Woodlands Borefield), by a water pipeline to TGO.

4.1.2.2 Dappo Bore

The existing bore on the "Dappo" property is set to be replaced with a proposed replacement bore, which will maintain the same groundwater source, extraction depth, and internal diameter as the original, within a 20 m proximity. In addition to the bore replacement, a proposed water supply easement will be constructed, extending 2.4 km to connect to the existing water supply pipeline. This pipeline will link the replacement "Dappo" bore and existing "Woodlands" bore and facilitate water transfer to the TGO Mine Site.

4.1.2.3 Raw water dam

Raw water stored in the Raw Water Dam (RWD) from where it is distributed to the processing plant and for potable use. The RWD is maintained with a minimum freeboard of 200 mm.

4.1.3 Dirty water

Dirty water runoff is intercepted and managed by a series of dirty water drains and sediment basins to allow for treatment and reuse on site.

4.1.3.1 Sediment basins

Water intercepted by the sediment basins may be transferred to the partially backfilled Wyoming Three void and subsequently to the north cell of the Wyoming Central Dam (WCD – North) for reuse in dust suppression and as process water make up.

The sediment basins at TGO were originally designed to provide adequate treatment for sediment laden runoff for design rainfall events up to the 90th percentile 5-day rainfall event.

During operations, to reduce the risk of uncontrolled discharges, the site adopted 90th percentile, 10 day criteria (50.5 mm) for design volume of sediment basins. The existing and design capacity of the sediment basins are summarised in Table 4.2, based on 50% volumetric runoff coefficient and 50% allowance for sediment storage.

Table 4.2 *Assessment of sediment basin volume*

Storage	Catchment area (ha)	Existing capacity (ML)	Required settling zone (ML)	Required sediment storage zone (ML)	Total design capacity (ML)
Sediment Basin 1	93.4	31.0	23.6	11.8	35.4
Sediment Basin 3	49.4	6.5	12.5	6.2	18.7
Sediment Basin 4	85.4	30.4	21.6	10.8	32.4
Sediment Basin 5	18.2	4.0	4.6	2.3	6.9
Sediment Basin 7	4.9	3.5	1.2	0.6	1.8
Sediment Basin 8	28.0	25	7.1	3.5	10.6

Table 4.2 shows that only sediment basins 7 and 8 exceed the design capacity. Given the reduced disturbance as the TGO mine site transitions to underground operations, an upgrade of the capacity of this storage is not considered necessary.

4.1.3.2 Potential off-site discharges

During rainfall events that exceed the design criteria, discharges off site may occur via the licensed discharge points.

The risk of uncontrolled discharges may be minimised by:

- Maintaining minimum retained water levels within the sediment ponds by actively treating and transferring intercepted water for reuse on site for environmental purposes.
- Removing accumulated sediment to ensure no loss of storage capacity, as required.
- Providing additional pumping capacity to allow for increased transfer of intercepted runoff into alternative storages, such as open cut pits or other water storages.

Discharges from the sediment basin will only occur after all reasonable measures to prevent the discharges have been exhausted. If the intercepted water is required to be discharged, it would be first flocculated (with gypsum). Jar testing indicates that at least 300 mg/L of gypsum is required to reduce TSS to a concentration of 50 mg/L (PSM 2014).

EPL 20169 allows for discharges from the site to occur at seven Licensed Discharge Points (LDPs) (refer to Figure 4.2):

- Sediment Basin 1 (EPA 4)
- Sediment Basin 3 (EPA 6)
- Sediment Basin 4 (EPA 7)
- Sediment Basin 5 (EPA 8)
- Sediment Basin 7 (EPA 18)
- Sediment Basin 8 (EPA 20)

Whilst EPL 20169 includes no limit on how much water may be discharged from these LDPs, the concentration of a range of pollutants in the discharge water is limited (refer to Section 7.3.1).

4.1.4 Mine water

Mine water is managed by in-pit sumps, WCD – North and the Wyoming Three Pit. The mine water system removes water accumulating in the open cuts sumps and transfers to either Wyoming Three or WCD – North for use preferentially for dust suppression activities.

4.1.4.1 Open cut pit voids

Open cut pit sumps provide a collection point for any groundwater and direct rainfall that may enter the pits. Water collected from the open cut pit sumps is likely to have elevated electrical conductivity (EC).

Following the completion of open cut mining, four open cut pit voids were formed.

- The Caloma One void is dewatered to maintain critical levels of the ventilation portal and can be dewatered to minimise the overall use of raw water.
- The Caloma Two void is predominantly backfilled with only a very small sump (refer to Table 4.1).
- The Wyoming One void is used to access the underground mine area, and therefore dewatering of the void continues from a sump at the base.
- The Wyoming Three void is partially backfilled, and is the central point for dirty water management, receiving water from the sediment basins and open cut pits, which is used for dust suppression and as process water make up.

Waste rock will be emplaced within the Caloma 1 and Caloma 2 open cut voids, altering the catchment areas of SB4, SB5 and SB7 over the Project life.

4.1.4.2 Final voids

Design objectives and performance criteria for the final voids are defined in the Rehabilitation Management Plan for the Site. The objectives and criteria currently consider issues such as:

- Ensure all final voids are safe, stable, and secure.
- Continued secure access to accumulated water storage.
- Construct a safety bund around all open cut and install a man-proof fence and lockable gate.
- Continued access to the Wyoming 1 portal for mining-related purposes.

4.1.4.3 Wyoming Central Dam - North

WCD – North acts as a staging point for mine water used for dust suppression and supplied to the process water system. WCD – North may also be supplemented by the raw water dam and external water supplies. By shandyng the pit water with low EC water from other parts of the site, EC levels within WCD – North are maintained below 4500 $\mu\text{S}/\text{cm}$.

4.1.5 Process water and residue storage facility

Process water is stored within the PWD (including a settling pond), the south cell of the Wyoming Central Dam (WCD – South) and the residue storage facilities (RSF1 and RSF2). Process water is transferred between storages as necessary to enhance water reuse on site.

4.1.5.1 Process water dam

The PWD supplies water to the processing plant, receiving return water recovered from the processing plant and make up water from the RWD, RSF, WCD – North and WCD – South as necessary.

The PWD has been constructed with a settling pond (both HPDE lined) to assist in improving sediment loads that are returned to the PWD from the processing plant. This improves the quality of the feed water to the plant and reduces the sediment accumulation within the PWD.

The PWD is operated with a minimum freeboard of at least 500 mm as required by EPL 20169.

4.1.5.2 Wyoming Central Dam - South

WCD – South acts as an external decant water storage for the RSFs. WCD – South was previously a mine water dam but was modified and enlarged in 2017 when it became part of the process water system. Typically, WCD - South receives excess decant water from the RSFs during winter and returns process water to the RSF during summer to maximise evaporative losses.

4.1.5.3 Residue storage facilities

RSF1 and the proposed RSF2 are dual cell tailings (residue) storage facilities, comprising of a foundation embankment, residue emplacement, decant pond and decant tower. Residue from the processing plant is pumped as a slurry into one of the RSF storage cells. The placement of residue may be alternated between the two cells within each RSF to allow the accumulated residue to consolidate and additional lifts of the RSF dam walls constructed as required.

Water that enters an RSF, either with the residue or as direct rainfall, accumulates within a decant pond located within the centre of each RSF cell. Water from these decant ponds is returned to the PWD for reuse in the processing plant. Excess decant water is transferred to the WCD – South for storage.

RSF1 and RSF2 have been designed to:

- Provide a minimum freeboard to contain a rainfall depth equivalent to the 72-hour duration probable maximum flood, which exceeds the minimum freeboard of at least 500 mm required by EPL 20169.
- Incorporate a 1 m thick zone of in-situ material which will be ripped and recompacted and tested in accordance with a quality assurance / quality control plan to form a low permeability layer (of less than 1×10^{-9} m/s) across the foundation of the RSF.

4.2 SAR Mine surface water management system

The surface water management system at the SAR Mine includes the separate management systems for clean, dirty and mine affected water, including:

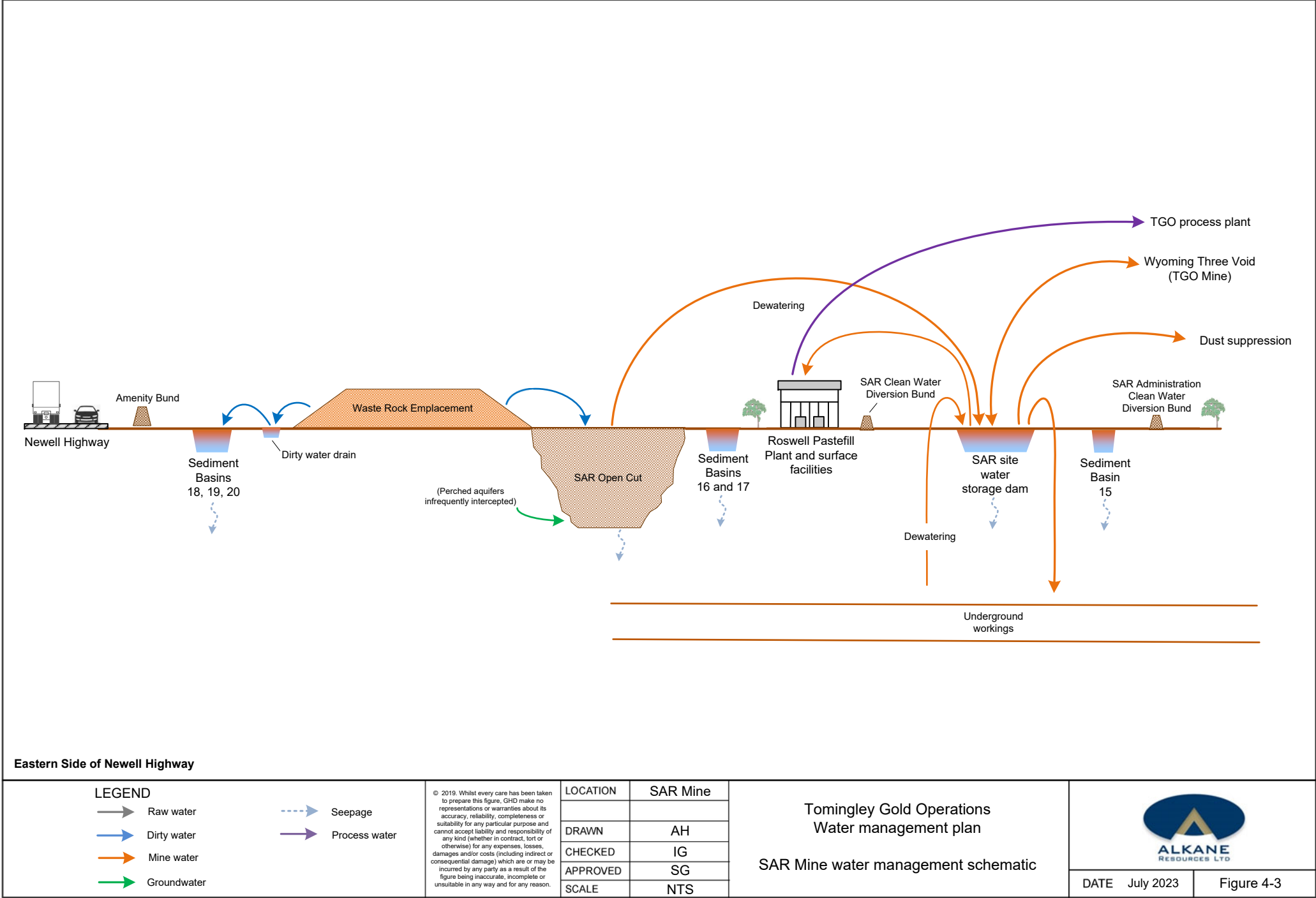
- Clean water is diverted from upslope catchment areas around the SAR Mine site downstream of mining operations.
- Dirty water originating from disturbed or hardstand areas to be captured and contained within the dirty water management system.
- Mine water originating from the open cut pit or mine contact water transferred between TGO Mine and the SAR Mine.

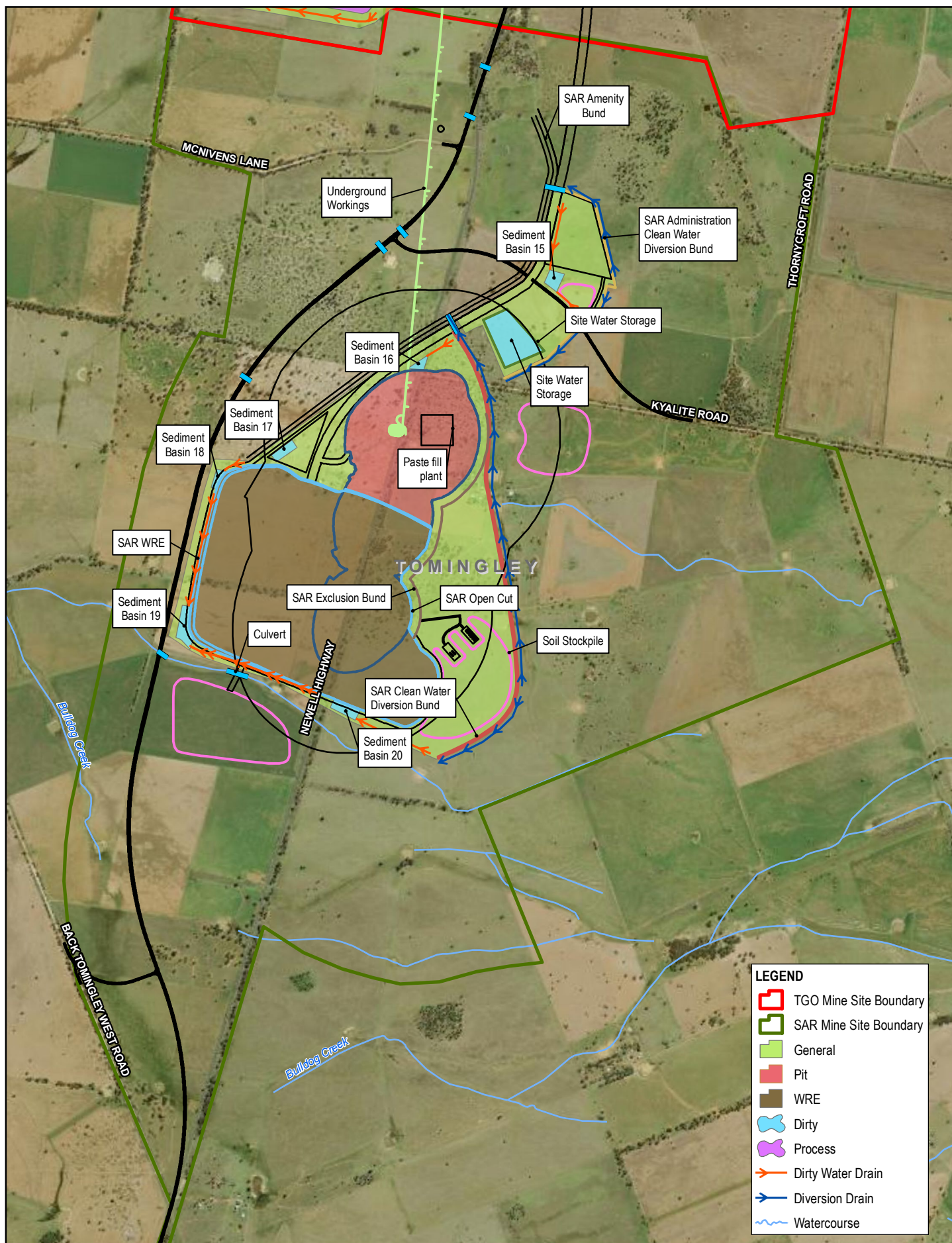
The site water storages at the SAR Mine are summarised in Table 4.3, while the interactions between the dirty and mine water systems are presented in Figure 4.3 and Figure 4.4.

The capacity of Sediment Basin 15 is 4.7 ML. The capacity of the remaining sediment basins at SAR Mine will be confirmed during detailed design.

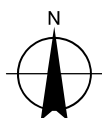
Table 4.3 SAR Mine water storages

Storage	Primary usage/transfer to
SAR Mine	
Dirty water	
Sediment Basin 15	SAR Site Water Storage Dam
Sediment Basin 16	
Sediment Basin 17	
Sediment Basin 18	
Sediment Basin 19	
Sediment Basin 20	
Mine Water	
SAR Site Water Storage Dam	Wyoming Three Dust suppression Paste fill plant Underground Mining operations
Open Cut	SAR Site Water Storage Dam





Paper Size ISO A4
0 0.2 0.4 0.6 0.8 1
Kilometers



Tomingley Gold Operations
Tomingley Gold Extension Project
Water Management Plan - 2023

Project No. 2220240
Revision No. A
Date 27 Jun 2023

**SAR Mine
water management system**

FIGURE 4.4

4.2.1 Clean water

Clean water use is minimised on site via diversion of clean water from upslope catchment areas, with several clean water diversion bunds. The clean water management system also includes a series of box culverts for the Newell Highway and Kyalite Road as well as the SAR Mine Haul and Services Roads.

4.2.1.1 Clean water diversions and bunds

Clean water diversions will be constructed at the SAR Open Cut and SAR Administration Area. Clean water diversions will provide protection to the SAR site facilities and infrastructure for flood events up to (and including) the 100 year ARI flood event.

Two clean water diversion bunds are to be constructed for the SAR Open Cut and the SAR Administration Area. The SAR Clean Water Diversion Bund is to be constructed on the east side of the SAR open cut. Clean water from the east of disturbed areas would be diverted to the north and south of the SAR Open Cut. The SAR Administration Clean Water Diversion Bund - would divert surface water flows to the north of the SAR Administration Area and south of the SAR Site Water Storage Dam. Water from these diversions would ultimately flow north off site via a culvert that will direct water towards the west and under the Newell Highway. A smaller portion of the clean water catchment area would be diverted to Bulldog Creek along the SAR Clean Water Diversion Bund. The design requirements of these diversion bunds are presented in Table 4.4.

Table 4.4 Design requirements of diversion bunds

Diversion Bund	Height	Side slopes (V:H)	Surface cover	Discharge
SAR Clean Water Diversion Bund	Minimum 0.5 m freeboard above modelled 0.1% AEP flood level (varying 0.6 and 2.0 m above natural ground level)	Maximum 1:3	Shaped, topsoiled and grassed	Via rock lined energy dissipators
SAR Administration Clean Water Diversion Bund	Minimum 0.5 m freeboard above natural ground level	Maximum 1:3	Shaped, topsoiled and grassed	Via rock lined energy dissipators

A series of box culverts for the realigned Newell Highway and Kyalite Road as well as the Haul Road between the TGO Mine Site and the SAR Open Cut, and Services Road. In addition, the SAR Amenity Bund would include gaps to permit surface water to pass from the Haul Road culverts to the Newell Highway culverts. The nominated size of each culvert for the Haul Road are presented in Table 4.5.

Table 4.5 Nominated size of each culvert for the Haul road

Culvert Identifier	Type	Size	Number
11	Box Culvert	1,800 x 900	3
12	Box Culvert	1,800 x 1,200	8
13	Pipe	375	1
14	Box Culvert	1,800 x 900	4
15	Box Culvert	1,800 x 900	2

4.2.1.2 Bulldog Creek

Bulldog Creek, located within the SAR Mine Site, serves as a channel for runoff during periods of rainfall. As a result, drainage depressions may form on site where runoff accumulates and ponds following significant rainfall events. Bulldog Creek receives a small portion of diverted clean water catchment flows from the SAR Clean Water Diversion Bund.

Infrastructure constructed as part of Project within 40 m of Bulldog Creek is maintained generally in accordance with the:

- Guidelines for controlled activities on waterfront land (NRAR 2018; formerly DPI 2007)
- Why Do Fish Need to Cross the Road? Fish Passage Requirements for Waterway Crossings (NSW Fisheries 2003)

4.2.2 Dirty water

Dirty water originating from disturbed, or hardstand areas is captured and contained by dirty water drains, sediment basins and erosion controls including silt fencing and hay bale filters. Management of dirty water includes the transfer of dirty water from sediment basins to the SAR Mine Water Dam.

4.2.2.1 Dirty water diversions

These diversions are designed to provide protection from extreme rainfall events (up to the 0.1% AEP event), an Inundation Bund will be constructed to the east of the SAR Open Cut. Diversion drains would retain dirty water on the SAR Mine site, where it would be pumped back to the SAR Site Water Storage and inundation bunds will divert clean water around the disturbed areas.

4.2.2.2 Dirty water drains and storages

Potentially sediment-laden or dirty water generated at the SAR site would be retained within the disturbed section of the mine site and diverted to the SAR site sediment basins (Sediment Basins 15 to 20) via the dirty water drains. The SAR Sediment Basins would contain this water for reuse in mining-related purposes.

The dirty water drain located southwest of the SAR Open Cut will convey dirty water originating from the north and east side, situated between the SAR Open Cut and the Site Water Storage and the SAR WRE, connecting with Sediment Basin 18, Sediment Basin 19 and Sediment Basin 20.

A dirty water drain positioned close to the underground workings will direct dirty water from the northeast to Sediment Basin 16.

Dirty water originating from the north of the site will be conveyed to Sediment Basin 15 by a dirty water drain situated between the underground workings and the Site Water Storage.

No construction discharges from the sediment basins are proposed for the SAR Mine, and dewatering measures will be implemented to prevent dirty water from being discharged from the site. EPL 210169 may be required to be modified to include Sediment Basins 15 to 20 as LDPs, pending the final design of these sediment basins.

4.2.3 Mine water

Mine water management includes dewatering and storage of mine contact water from the open pit to the SAR Mine Water Dam and two-way transfer of mine water between the SAR Mine Water Dam and the Wyoming Three Open Cut (at TGO Mine).

4.2.3.1 Open cut pit void

The SAR Open Cut will collect rainfall, runoff, and groundwater inflows, which will be transferred to SAR Site Water Storage Dam once the mine site commences operations.

4.2.3.2 SAR Site Water Storage Dam

Mine water would be stored in the SAR Site Water Storage Dam. The SAR Site Water Storage Dam is designed as an off stream 'turkeys nest' dam, with no surface catchment and receives only water pumped from the sediment basins within the SAR Mine Site, the proposed open cut and underground mining operations, and the TGO Mine Site. This will be achieved via a proposed water transfer pipeline connecting the Wyoming Three Open Cut at the TGO Mine Site and the SAR Site Water Storage Dam at the SAR Mine Site.

The capacity of SAR Site Water Storage Dam (180ML) was designed to provide adequate treatment for sediment laden runoff for design rainfall events up to the 90th percentile 10-day rainfall event (50.5 mm) for design volume and was based on 50% volumetric runoff coefficient and 50% allowance for sediment storage. This planned dam will capture and store water for subsequent use, particularly for dust suppression, ensuring resource efficiency and environmental protection. Water from the SAR Water Storage Dam would not be discharged to natural drainage.

Table 4.6 Properties of SAR Site Water Storage Dam

Storage	Crest	Side slopes (V:H)	Discharge	Minimum freeboard
SAR Water Storage Dam	Max. elevation 272 mAHD between 2 and 3 m above natural land surface and 6 m above excavated dam floor	1:6	Pipeline only, with an emergency spillway	0.5

4.2.3.3 SAR Waste Rock Emplacement

During operation of the Project, ore will be extracted and waste rock stockpiled within the SAR Waste Rock Emplacement. Waste rock at the TGO site is generally classified as non-acid forming and total metal concentrations are generally not significantly enriched when compared to relevant water quality guidelines (RGS, 2021). Runoff from the waste rock emplacement would be captured and contained by the dirty water management system.

4.2.4 Process water

Two separate pipelines within the pipeline corridor will transfer the following:

- Residue as a slurry from the TGO Processing Plant to the Pastefill Plant at SAR Mine.
- Return process water from the Pastefill Plant at SAR Mine to the TGO Process Plant.

4.3 Potable water and wastewater

4.3.1 Potable supply

Potable water is inherently minimised on site as there is no municipal water supply. Potable water is obtained onsite by treating water supplied from the Woodlands and Dappo Borefield pipeline and is stored within an 80 kL potable water tank. Potable water is used in crib rooms, ablutions, safety showers, and as drinking water. Potable water will be provided during construction of the SAR Mine via a number of sources including rainwater tanks at an existing building that will be used as offices.

4.3.2 Wastewater systems

All effluent generated on site is managed on site by an aerated wastewater treatment system with the treated water reused in drip irrigation along the mine access road. The wastewater treatment system is approved by Narromine Shire Council. A separate wastewater treatment system will be installed at the SAR Mine.

4.4 Hydrocarbon and chemical storage

Fuels, hydrocarbons, and reagents are securely stored. Hydrocarbon and chemical storage tanks are either self-bunded tanks or bunded with an impermeable surface and a capacity to contain a minimum 110 % of the largest storage tank capacity.

Storage, delivery, and handling areas are appropriately sealed and bunded. Overflow pipes are installed in a manner that would minimise the potential for pollution in the event of overfilling.

Refuelling and maintenance involving hydrocarbons occur within designated areas including the maintenance workshop and other designated areas with spill capture and management infrastructure and protocols. Water from wash-down areas and workshops report to oil/water separators within the mine water catchment.

EPL 210169 requires that all above ground storage facilities containing flammable and combustible liquids must be bunded in accordance with Australian Standard AS 1940-2004.

4.5 Groundwater management system

The groundwater management system at TGO and SAR comprises the dewatering of the underground workings and the groundwater monitoring network.

4.5.1 Groundwater monitoring bores

The existing groundwater monitoring network has been progressively established at TGO since 2006 and the groundwater monitoring network at SAR has been established since 2020. Details of groundwater bores are summarised in Table 4.7. Monitoring bore locations and the groundwater monitoring program are described in Section 5.3. As part of the construction of RSF2, three additional bores will be established on the southern perimeter and one additional bore on both the eastern and western perimeter.

Table 4.7 Groundwater monitoring bore details

Bore	Depth (m)	Top of Casing (TOC) Elevation (m AHD)	Monitoring Period	Lithology
SAR Mine groundwater monitoring bore				
RWWB001	150	269.57	November 2020 – present	Fresh fractured rock
RWWB002	150.2	274.58	November 2020 – present	Fresh fractured rock
RWWB003	70.5	272.55	November 2020 – present	- Alluvium to 56 m - Saprolite from 56 m to 70 m - Saprolite rock from 70 m and below
RWWB004	52	271.69	November 2020 – present (dry since installation)	- Alluvium to 40 m - Saprolite from 40 m and below
TGO Mine groundwater monitoring bore				
WYMB01	90	270.046	April 2007 – present	Fresh fractured rock
WYMB02	114	267.634	April 2007 – present	Weathered to fresh rock
WYMB03	84	274.77	April 2007 – present	Weathered to fresh rock
WYMB04	78	271.211	April 2007 – present	Weathered to fresh rock
WYMB06	90	268.091	April 2007 – present	Fresh fractured rock
WYMB10	150	272.757	November 2012 – present	Fresh fractured rock

Bore	Depth (m)	Top of Casing (TOC) Elevation (m AHD)	Monitoring Period	Lithology
GDCMB01	3.5	273.222	November 2012 – present	Gundong Creek Alluvium
RSFMB01	10.95	269.290	March 2014 – September 2021	Shallow strata
RSFMB02	10.58	268.650	March 2014 – September 2021	Shallow strata
RSFMB03A	11.88	267.854	May 2019 – present	Shallow strata
RSFMB04	5.28	266.964	March 2014 – present	Shallow strata
RSFMB05	13	266.524	March 2014 – present	Shallow strata
RSFMB06	4.08	265.826	March 2014 – present	Shallow strata
RSFMB07	5.5	265.694	March 2014 – present	Shallow strata
RSFMB08	4.43	266.953	March 2014 – present	Shallow strata
RSFMB11	5.74	269.434	March 2014 – present	Shallow strata
PWMP01	11.49	268.962	January 2015 – present	Shallow strata
PWMP01A	12	268.602	December 2019 – present	Shallow strata
PWMP02	12	269.414	January 2015 – present	Shallow Strata
PWMP02D	15	268.918	December 2019 – present	Base of Shallow Strata
PWMP03	12	268.655	July 2015 – present	Shallow Strata
PWMP04	11.56	269.283	July 2015 – present	Shallow Strata
PWMP05	11.59	270.153	July 2015 – present	Shallow Strata
PWMP06	12.91	269.933	July 2015 – present	Shallow Strata
PWMP07	11.82	269.522	July 2015 – present	Shallow Strata
PWMP08	9.56	270.667	July 2015 – present	Shallow Strata
PWMP09	12	268.18p	December 2019 – present	Shallow strata
WCD-P1	11	273.636		Shallow Strata
WCD-P2	11	273.594		Shallow Strata
WCD-P3	11	273.574		Shallow Strata
WCD-P4	11	273.495		Shallow Strata
WCD-P5	11	273.521		Shallow Strata
WCD-P6	11	273.527		Shallow Strata
WCD-P7	11	273.494		Shallow Strata
WCD-P8	11	273.473		Shallow Strata

4.5.2 Underground water management

Groundwater encountered within the underground workings is removed by pumping into the mine water management system (refer to Section 4.1.4 and Section 4.2.3).

4.6 Water balance

The site water balance at the TGO Mine and SAR Mine comprises the sources of water, water use and management on site and potential off-site discharge, within the raw water, dirty water, and process water management systems. The site water balance has been estimated using a numerical model implemented using the modelling software GoldSim (version 12.1). A detailed description of the site water balance model is included in the annual update to the site water balance (refer to Section 8.5).

4.6.1 Water balance modelling results

The site water balance model was simulated over the period from 1 January 2021 to 1 January 2033. The year 2026 was selected for the purpose of comparison between existing and proposed conditions, as this corresponded to peak in groundwater inflows and greatest increase in groundwater inflows at SAR Mine relative to existing conditions. The reporting and forecast average annual water balance for combined TGO Mine and SAR Mine is summarised in Table 4.8.

Table 4.8 *Modelled average annual site water balance*

Mine Stage	Existing conditions (2021) (ML/year)	Proposed conditions (2026) (ML/year)
Inputs		
Direct rainfall and catchment runoff	414	850
Supplied from external bores	500	356
Moisture in ore	56	72
Secondary release from residue	22	21
Groundwater inflows	238	766
Total Inputs	1230	2065
Outputs		
Evaporation from water storages	78	145
Discharge from sediment dams	1	1
Potable use	1	2
Water in residue	553	669
Evaporation from active residue	120	178
Losses from rewetting of inactive residue	220	529
Dust Suppression	250	388
Losses from underground workings	8	16
Total Outputs	1231	1928
Change in Storage	-1	137
Balance	0	0

Table 4.4 shows an average annual decrease in water inventory of 1 ML in 2021 under the original TGO project, compared to an average annual increase in water inventory of 137 ML in 2026 under the Extension Project. Although outputs from the water balance model, such as water in residue, evaporation from active residue and water storages, losses from rewetting of inactive residue, and dust suppression, are expected to increase in the proposed conditions due to the Extension Project, an increase in water inventory is also anticipated. The reasons for this are as follows:

- Direct rainfall, catchment runoff, and evaporation rates are expected to increase under the proposed conditions due to the Extension Project, reflecting the addition of more catchment areas and water storages within the combined water management system.
- An increase in total groundwater inflows to both TGO Mine Site and SAR Mine Site is expected as a result of the Extension Project.
- A slight increase in ore moisture is anticipated in these proposed conditions as a result of the Extension Project, reflecting the increase in the planned production rate.

4.6.2 Water supply and security

Raw water for use on Site is supplied from the “Dappo” and “Woodlands” bores. Raw water supplied from the external bores is expected to decrease as a result of the Extension Project. This reflects the increase in water potentially available from groundwater inflows to the SAR Open Cut and underground. The water balance modelling results presented in Table 4.4 indicate no external supply of water (other than the external bores) is needed in proposed conditions reflecting the adequate supply of water for the Extension Project.

A water security sensitivity scenario was conducted to analyse the effect of nil groundwater inflows to the mine workings (GHD, 2021). In this scenario, groundwater inflow was scaled to zero as a result of the halting of underground mining. Under this scenario, external bores were modelled to supply both TGO Mine and SAR Mine. Borefield allocation is forecasted to peak in 2025 with 1360 ML/year required to be sourced from the borefield in a dry (5th percentile) year out of 1400 ML total annual borefield allocation. Therefore, the sensitivity scenario indicates that TGO hold sufficient borefield water licence application to supply the Project.

4.6.3 Water use

The water balance modelling results presented in Table 4.8 indicates that the main water use at the Mine is processing ore, where water is ultimately lost by entrainment in residue or evaporation, and dust suppression.

4.6.4 Off-site discharges

The modelling also indicates that discharges from the site are estimated to account for less than 1 % of water outputs (refer to Table 4.8). Discharges would only occur via LDPs (refer to Section 4.1.3.2) due to rare rainfall events that exceed the relevant design criteria or in periods of above rainfall when all reasonable measures to prevent the discharges have been exhausted (refer to Section 4.1.3.2).

4.6.5 Potable water use

No municipal potable water supply is available at TGO. Therefore, potable water use is inherently minimised. Potable water supply occurs via treatment of raw water sources.

4.6.6 Water prioritisation strategy

The site water management system is designed to enhance water reuse on site. With the exception of potable water supply and raw water for the purpose of ore processing demands, all water demands on site are first sourced from existing mine or dirty water sources.

Mine water from underground and open cut workings (Caloma One and Two and Wyoming One) are dewatered to the inactive mining pit (Wyoming Three void) or mine water storage dams. Runoff from dirty water catchments captured by sediment basins is dewatered to the Wyoming Three Void.

Pumping between site water storages (including the inactive mining pit) occurs to maintain the low operating volumes of the storages to minimise raw water use sourced from the borefield. If the total site mining water inventory falls below 10 ML, water would be supplied externally via tanker at a maximum rate of 1 ML/day to supply in the Raw Water Dam and Wyoming Central Dam – North.

Raw water is primarily used to supply potable water for site personnel and the Raw Water Dam to the processing plant for grinding/CIL and detox processes. Water from the Raw Water Dam may be transferred to the Process Water Dam if deficit cannot first be made up by transfers from the RSF, Wyoming Central Dam - North or Wyoming Central Dam – South.

4.7 Erosion and sediment control

The dirty water management system (refer to Section 4.1.3) forms the permanent erosion and sediment control system for operations at TGO Mine. Erosion and Sediment Control Plans will be developed for construction activities at the SAR Mine, realignment of the Newell Highway and construction of the Dappo Bore pipeline. The purpose of this section is to define the basis for activity specific erosion and sediment control plans. Following construction activities at the SAR Mine, the dirty water management system will form the permanent erosion and sediment control system for operations at the SAR Mine (refer to Section 4.2.2).

4.7.1 Guidelines and standards

The reference guidelines and standards that are considered for erosion and sediment control are:

- Managing Urban Stormwater, Soils and Construction, Volume 1 (Landcom 2004).
- Managing Urban Stormwater, Soils and Construction, Unsealed Roads, Volume 2C (DECC 2008a).
- Managing Urban Stormwater, Soils and Construction, Mines and Quarries, Volume 2E (DECC 2008b).
- International Erosion Control Association, Best Practice Erosion and Sediment Control (IECA 2008).

4.7.2 Disturbance activities

Disturbance activities with the potential to cause sedimentation and erosion at the Site include:

- Clearing activities and remnant disturbed areas
- Stockpiling of materials
- Construction of access roads and ongoing use of unsealed roads
- Construction of bunds
- Pit backfilling
- Reshaping of final landform

When practical, erosion and sediment controls are installed prior to any disturbance activities, and only removed when disturbance activities are completed, and the site stabilised.

4.7.3 Erosion risk

Erosion risk has been estimated on a monthly basis, assuming a hypothetical hillslope with 1 in 3 batter of at least 5 m in length. This was considered typical of constructed features at TGO Mine.

From Table 4.9 it can be seen that the lowest ratings for erosion risk occur through winter, with the greatest risks associated with summer. Despite these elevated risk ratings through summer, the potential for soil loss is still relatively low given the R factor for the site (refer to Table 4.10) and flat grades. The most significant risks for erosion at TGO are considered to be dams, hard stand areas and stockpiles.

Table 4.9 Monthly site erosion risk

	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
Average monthly rainfall (mm)	57.2	51.7	51.1	41.8	43.6	41.9	44.7	42.1	37.1	48.3	48.7	52.4
Erosion Risk Rating	Moderate	Moderate	Moderate	Low	Low	Low	Low	Low	Low	Low-moderate	Low-moderate	Moderate

Controls and constraints

Table 4.10 presents the site constraints that have been considered in the development of erosion and sediment control.

Table 4.10 Constraints table

Aspect	Factor
Sediment Basins	10 day, 90th percentile – 50.5 mm
Soil Type	D (fine dispersible material)
Soil Erodibility - K Factor	0.05
Rainfall – R Factor	1320
Volumetric Runoff Coefficient	0.51
Sediment Volume Allowance	50 % of settling volume will be applied (DECC; 2008)
Batter Slopes	Maximum: 1V in 3H (33%)
Sediment Basin Requirement	Expected soil loss is greater than 150 m ³ /yr

4.7.3.1 Erosion controls

The following erosion controls are implemented on site:

- Temporary groundcover, including rolled erosion control products (RECP) and mulch.
- Application of gypsum (10 t/ha) to improve soil structure.
- Placed rock and energy dissipaters.
- Clean water diversions upslope of disturbed areas convey clean water at non erosive velocities and discharged downstream of disturbed areas.
- Shaping, emplacement of topsoil and vegetation cover on the SAR Open Cut Clean Water Diversion Bund and SAR Amenity Bund.

Temporary groundcovers are flexible, quick to apply and come in a variety of forms. They are a key control measure for the management of exposed soils.

Placed rock are more permanent erosion controls typically included within concentrated flow paths to minimise scouring. The size (D_{50}) of placed rock is dependent on flow velocities (refer to Table 4.11), and typically placed at a thickness of 1.5 times the D_{50} rock size over a suitable geotextile underlay.

Energy dissipaters and level spreaders are typically located at the discharge point of an open channel and include rock or fabric lining. They are intended to reduce the velocity of discharges and spread flows over a larger area and encouraging sheet flow.

Soil binders and dust suppressants have been used on site previously and can be used if appropriate for specific purposes.

Table 4.11 Placed rock specification (Fischenich, 2001)

D_{50} Rock Size (mm)	Permissible Velocity
150 mm	3.1 m/s
250 mm	3.4 m/s
300 mm	4.0 m/s
450 mm	4.9 m/s
600 mm	5.5 m/s

4.7.3.2 Sediment controls

The following sediment controls are implemented on site:

- Sediment basins/sumps (type D / wet), where soil loss is above the threshold
- Sediment filter fences placed prior to construction
- Dirty water channels
- Flow breaks on areas with slope lengths greater than 40 m
- Filter berms/logs/socks
- Straw bale filters
- Stabilised site access points
- Road side drainage installed in accordance with requirements of DECC (2008a)

Sediment basins are constructed at TGO Mine and SAR Mine to capture sediment laden runoff from disturbed areas of the site. Sediment basins are typically constructed in areas where disturbance activities are expected to result in soil loss greater than 150 m³/yr in accordance with Landcom (2004). The design of sediment basins should consider cleanout requirements, stable banks, and pump out facilities.

Filter fences are to be implemented in locations of temporary disturbance and stockpiling. For works that are expected to be long term, the construction of a dirty water channel directing runoff to a sediment basin should be considered, however in areas where grades are a constraint, the use of sediment filter fences may prove a more effective long-term strategy.

For disturbed areas, a dirty water channel should be constructed to direct sediment laden runoff to a sediment basin. Dirty water channels are typically formed via excavation of a small channel, with the excavated material being placed on the downslope side to further increase the diversion capacity.

To prevent tracking of sediment and mud onto public roads, access points are to be stable and properly maintained. A bitumen seal is maintained on the site access road to provide stabilisation and minimise the tracking of mud offsite.

4.8 Rehabilitated areas

The final landform at TGO includes rehabilitated areas. Plans of the final landform and design objectives and performance criteria are included in the Rehabilitation Management Plan (RMP) (R. W. Corkery 2023). The RMP has been updated to include the SAR Mine. The existing monitoring program will continue during rehabilitation to control any potential water pollution from the rehabilitated areas of the site. All disturbed areas will be rehabilitated as soon as practicable once they are determined to be no longer required for mining related purposes.

4.9 Potential pipeline leakage or spillage

Pipelines conveying dirty water, mine water, process water or chemicals are contained within both the TGO and SAR water management system. Potential for leakage or spillage would be identified through regular inspection of operational assets or by changes in water quality detected by the surface water monitoring program described in Section 5.2. Regular testing and maintenance of pipelines will ensure any leaks or spills are identified in a timely manner. Design mitigation measures include:

- Pipeline materials, design, and construction suitable for the material to be transferred.
- Leak detection equipment that will detect breakages in the pipelines and immediately stop pumps, close valves, and depressurise the pipeline as required.
- Installation of the pipelines within a bunded area of sufficient capacity that will prevent discharge of residue and/or process water in the event of a failure of the pipeline.

5. Monitoring requirements

TGO undertake regular monitoring to measure environmental performance and the effectiveness of the water management system described in Section 4. Monitoring observations are compared to triggers values presented in Section 6.4.1 and reported in accordance with Section 8.

5.1 Inspections

Environment personnel undertake site inspections on a weekly basis. Additional site inspections are undertaken prior to forecast rainfall events that may exceed 25 mm in 24 hours. As part of these inspections, mine personnel review all water management structures, including pipelines, and complete an inspection checklist. Pipelines will be inspected, tested, and maintained regularly.

5.2 Surface water monitoring program

5.2.1 Surface water quality monitoring

TGO undertakes surface water quality monitoring at several locations within and surrounding the site. Water quality monitoring locations include those locations specified in EPL 20169, as well as additional sampling locations. The intent of the surface water monitoring program is to ensure that the water quality impacts associated with the mining operations at TGO Mine and SAR Mine are minimised.

EPL 20169 requires that surface water quality be monitored following certain events at two locations within the process water system (EPA 2 and EPA 19), seven locations within the dirty water system (EPA 4 to EPA 8, EPA 18, and EPA 20) and two locations within the surrounding clean water system (i.e. Gundong Creek: EPA 16 and EPA 17). The quality of groundwater to be re-used on site is monitored by sampling of the water extracted from the underground workings and open cut pit sumps.

Surface water quality monitoring of clean, dirty and process water management systems is to be undertaken by a suitably qualified professional. The samples collected are to be sent to a NATA accredited laboratory for testing. Sampling frequency and parameters are summarised in Table 5.1. Monitoring locations are shown in Figure 5.1.

Table 5.1 Surface water monitoring program

Location	Frequency	Parameters
EPL 20169		
EPA 16 - SW1 EPA 17 - SW2	During discharge	pH, EC, TSS, As, Cd, Cn (total), Cu, P (total), Pb, Ni, N (total), Oil and Grease, Zn
EPA 4 – Sediment Basin 1 (SP1) EPA 6 – Sediment Basin 3 (SP3) EPA 7 – Sediment Basin 4 (SP4) EPA 8 – Sediment Basin 5 (SP5) EPA 18 – Sediment Basin 7 (SP7) EPA 20 - Sediment Basin 8 (SP8)	During discharge	pH, EC, TSS, Al, As, B, Cd, Cr, Cn (total and WAD), Cu, P (total), Pb, Hg, Mo, Ni, N (total), Oil and Grease, Se, Zn
EPA 2 – RSF EPA 19 – WCD - South	Daily during discharge	Cn (WAD)
Additional monitoring		
SAR-SW01 SAR-SW02 SAR-SW03 SAR-SW04 SAR-SW05	When flowing/ water present	pH, EC, TSS, As, Cd, Cn (total), Cu, P (total), Pb, Ni, N (total), Oil and Grease, Zn

Location	Frequency	Parameters
SAR-SW06		
EPA 16 - SW1 EPA 17 - SW2	Weekly (when flowing)	pH, EC, TSS, Al, As, B, Cd, Cr, Cn (total and WAD), Cu, P (total), Pb, Hg, Mo, Ni, N (total), Oil and Grease, Se, Zn
EPA 4 – Sediment Basin 1 (SP1) EPA 6 – Sediment Basin 3 (SP3) EPA 7 – Sediment Basin 4 (SP4) EPA 8 – Sediment Basin 5 (SP5) EPA 18 – Sediment Basin 7 (SP7) EPA 20 - Sediment Basin 8 (SP8)	Following rainfall exceeding 25 mm in 24 hours	Ca, Mg, Na, K, sulphate, Cl, alkalinity, Fe For locations in Gundong Creek: presence of flow (flowing, not flowing)
Underground dewatering Open cut pit sumps WCD - North WCD – South Process Water Dam SAR Site Water Storage Dam	Monthly	
Residue pipeline Return water pipeline Raw Water pipeline	Continuous	Volume (L) – in-line metre or at pump
SAR Site Water Storage Dam		Water level (to allow volume estimate) – data logger in dam
SAR Site Water Storage Dam Sediment Basin 15 Sediment Basin 16 Sediment Basin 17 Sediment Basin 18 Sediment Basin 19 Sediment Basin 20	Weekly or following rainfall exceeding 25 mm in 24-hours	Physical Inspection

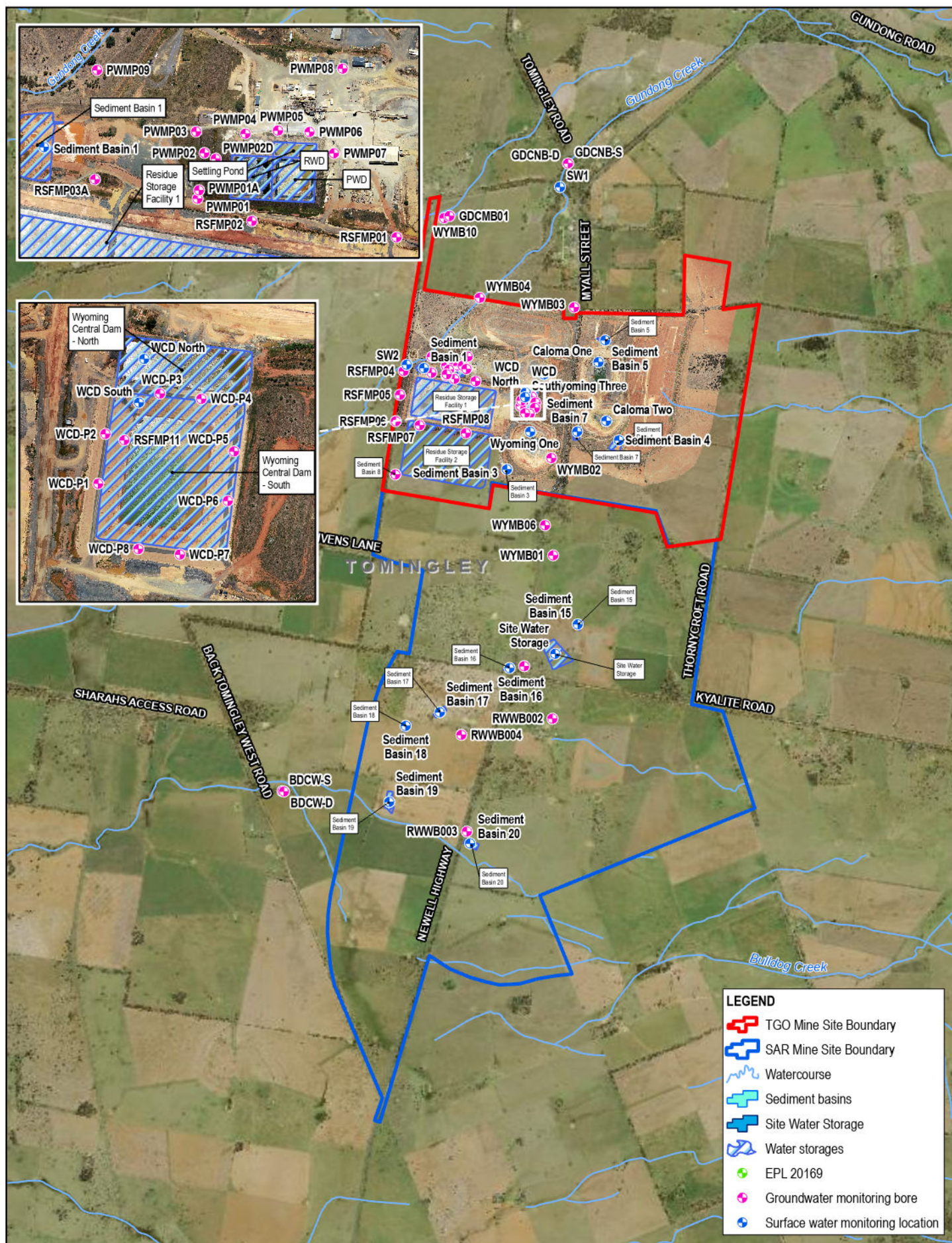
5.2.2 Watercourse stability monitoring

For the SAR Mine, as there are no baseline data available for channel stability along Gundong and Bulldog Creek, TGO will assess both watercourses to determine the current baseline channel stability. During the pre-mining and construction phase of the SAR site, the baseline watercourse stability assessments will be undertaken quarterly and include an inspection following a period of rainfall (exceeding 25 mm). The watercourse stability assessments will include:

- Visual inspection along the Gundong and Bulldog Creek, at locations both upstream and downstream of LDPs, to identify any areas of existing erosion and areas of potential erosion. The inspected reaches will be recorded and included in this section once established. The assessments would have particular focus on impact of existing structures such as culverts, diversions, energy dissipators, etc.
- Geotagged photographs taken during the assessment to establish a photographic record.

The baseline inspections would be documented in Section 6.2 of this WMP.

Following operation of the SAR site, ongoing monitoring would be undertaken on an annual basis or following discharge events from LDPs to either Gundong and Bulldog Creek. Reference to the baseline condition of the watercourses would be made to determine if there are operational impacts.



Paper Size ISO A4
0 0.3 0.6 0.9 1.2 1.5
Kilometers

Map Projection: Transverse Mercator
Horizontal Datum: GDA 1994
Grid: GDA 1994 MGA Zone 55



Tomingley Gold Operations
Tomingley Gold Extension Project
Water Management Plan - 2023

Project No. 2220240
Revision No. A
Date 3 Nov 2023

Monitoring points

FIGURE 5.1

5.3 Groundwater monitoring program

The purpose of the groundwater monitoring program is to provide a framework for monitoring and management of groundwater quality and levels. The aim of groundwater monitoring is to:

- Ensure that requirements of the NSW Aquifer Interference Policy are met.
- Ensure groundwater drawdown is within the predictions of the groundwater modelling undertaken as part of the EIS for the Project (Jacobs, 2021b).
- Monitor any leachate from the RSFs and process water storages.
- Detect any potential impact on surrounding groundwater users.

The groundwater monitoring program outlines the locations, parameter, frequency, and methodology of monitoring.

5.3.1 Monitoring methodology

As specified by DIPNR (2003) (to be adopted as a minimum standard), groundwater monitoring should be undertaken in general accordance with Groundwater Sampling and Analysis – A Field Guide (Geoscience Australia 2009).

Groundwater monitoring methodology includes the following:

- Measurement of groundwater levels prior to sampling.
- In the deep bores to limit the disturbance of possible sediments in the base of each bore, interval sampling (by Hydrasleeve) is completed by lowering the sampling device to the screened interval and collecting a sample directly from the point water is entering the borehole casing.
- For the shallow bores, where interval sampling is not required, water is removed from the borehole by using a hand bailer.
- Measurement of groundwater field parameters (pH, EC) using a calibrated water quality meter. The pH and EC readings are recorded in the field once they have stabilised.
- Groundwater samples are transferred into suitably preserved laboratory supplied sample containers once field parameters have stabilised. Samples to be analysed for dissolved metals are to be filtered in the field using 0.45 µm filters. All sample containers are to be clearly labelled with sample number, sample location, sample depth and sample date. The sample containers are to be transferred to a chilled esky for sample preservation prior to and during shipment to the testing laboratory. A Chain-of-Custody form should be forwarded with the samples to the testing laboratory.
- Decontamination of all non-dedicated sampling equipment between monitoring locations.
- Except for at shallow RSF groundwater bores, monitoring of groundwater levels should be undertaken with data loggers at a daily frequency.

5.3.2 Groundwater transfer metering

To monitor and assess groundwater make at TGO, dewatering volumes from all open cut pits and underground workings require to be metered. Volumetric metering must continue as long as dewatering continues.

Once dewatering from each open cut pit has ceased monitoring of water level in each pit is required. Monitoring of water levels should continue until water levels stabilise and equilibrium of groundwater levels has occurred.

5.3.3 Monitoring parameters and frequency

The samples collected are to be sent to a NATA accredited laboratory for testing. Sampling frequency and parameters are summarised in Table 5.2. Monitoring locations are shown in

Figure 5.1. As part of the construction of RSF2, three additional bores will be established on the southern perimeter and one additional of each on the eastern and western perimeter.

Table 5.2 Groundwater monitoring program

Location	Frequency	Parameter
EPL 20169		
EPA 9 - WYMB01 EPA 10 - WYMB02 EPA 11 - WYMB03 EPA 12 - WYMB04 EPA 13 - WYMB06 EPA 14 - WYMB10 EPA 15 - GDCMB01	Quarterly	Water level Alkalinity (as CaCO ₃), NH ₃ , As, HCO ₃ ⁻ , Cd, Ca (dissolved), CO ₃ ²⁻ , Cl ⁻ , Cr, Cu, Cn (free, total and WAD), EC, hardness (as calcium carbonate), Pb, Mg (dissolved), Hg, Ni, NO ₃ ⁻ , pH, P, K (dissolved), Na (dissolved), SO ₄ ²⁻ , TDS, Fe (total), TSS, Zn
Additional monitoring		
RSFMP01, RSFMP02, RSFMP03A, RSFMP04, RSFMP05, RSFMP06, RSFMP11, PWMP01, PWMP01A, PWMP02, PWMP02D, PWMP03, PWMP04, PWMP05, PWMP06, PWMP07, PWMP08, PWMP09 As part of the construction of RSF2, three additional bores will be established on the southern perimeter and one additional of each on the eastern and western perimeter. Locations to be confirmed during construction of RSF2.	Monthly	Water level Alkalinity (as CaCO ₃), NH ₃ , As, HCO ₃ ⁻ , Cd, Ca (dissolved), CO ₃ ²⁻ , Cl ⁻ , Cr, Cu, Cn (free, total and WAD), EC, hardness (as calcium carbonate), Pb, Mg (dissolved), Hg, Ni, NO ₃ ⁻ , pH, P, K (dissolved), Na (dissolved), SO ₄ ²⁻ , F ⁻ , TDS, Fe (total), TSS, Zn Nitrite, nitrate, nitrate + nitrite, total nitrogen, total phosphorous, ammonia as N, Fe (dissolved)
RWWB001, RWWB002, RWWB003, RWWB004, BDCW-S, BDCW-D, GDCNMB-S, GDCNMB-D	Quarterly	Water level Alkalinity (Hydroxide as CaCO ₃), Alkalinity (Carbonate as CaCO ₃), Alkalinity (Bicarbonate as CaCO ₃), Alkalinity (total as CaCO ₃) NH ₃ , As, HCO ₃ ⁻ , Cd, Ca (dissolved), CO ₃ ²⁻ , Cl ⁻ , Cr, Cu, Cn (free, total and WAD), EC, hardness (as calcium carbonate), Pb, Mg (dissolved), Hg, Ni, NO ₃ ⁻ , pH, P, K (dissolved), Na (dissolved), SO ₄ ²⁻ , F ⁻ , TDS, Fe (total), TSS, Zn Nitrite, nitrate, nitrate + nitrite, ammonia as N, total nitrogen, total phosphorous, Fe (dissolved) Reactive phosphorus as P, reactive phosphate, total anions, total cations, ionic balance
PWMP02	Monthly	Cyanate, thiocyanate
WCD-P1, WCD-P2, WCD-P3, WCD-P4, WCD-P5, WCD-P6, WCD-P7, WCD-P8	Monthly	Water level Cn (free, total and WAD), NH ₃ , SO ₄ ²⁻ , NO ₃ ⁻ + NO ₂ ⁻ , N total, Alkalinity (as CaCO ₃), Cl ⁻ , pH, EC, F ⁻ , Na (dissolved), TDS, hardness (as calcium carbonate), TSS, Al, As, B, Cd, Cr, Cu, Fe, Pb, Mg(dissolved), Hg, Mo, Ni, K(dissolved), Se, Zn, total kjeldahl Nitrogen, nitrite, nitrate, total phosphorus, reactive phosphorus, anions total, cations total, ionic balance
Open cut pits and underground workings	Monthly during dewatering	Dewatering volumes

6. Baseline data

The purpose of this section is to summarise the baseline monitoring data collected as part of the monitoring program. Details of the baseline surface and groundwater environment for TGO are presented in Section 3.

6.1 Surface water quality

Water quality monitoring within the dirty water system commenced as each sediment pond was constructed. Water quality monitoring of the dirty water systems is undertaken following periods of rainfall, which result in the generation of runoff into the sediment ponds.

The monitoring record for the surface water management system is summarised in Table 6.1 and presented in Appendix D.

Table 6.1 Surface water quality monitoring record

ID	Water management system	Monitoring period
WCD - South	Process	May 2015 to present
WCD - North	Mine	May 2015 to present
Underground dewatering (Wyoming 1 void)	Mine	September 2015 to present
Caloma 1 void	Mine	May 2015 to present
Caloma 2 void	Mine	Ceased at completion of mining
Wyoming 1 void	Mine	April 2015 to present
Wyoming 3 Pit	Mine	Ceased when backfilling commenced
EPA 4 – SP1	Dirty	October 2013 to present
EPA 5 – SP2	Dirty	October 2013 to May 2022
EPA 6 – SP3	Dirty	October 2013 to present
EPA 7 – SP4	Dirty	October 2013 to present
EPA 8 – SP5	Dirty	March 2014 to present
EPA 16 – SW1	Clean	June 2014 to present
EPA 17 – SW2	Clean	June 2014 to present
EPA 18 – SP7	Dirty	February 2017 to present

6.2 Watercourse stability

For the SAR Mine, as there are no baseline data available for channel stability along Gundong and Bulldog Creek, TGO will assess both watercourses to determine the current baseline state of channel stability (refer to Section 5.2.2). Over time, this record will establish the baseline condition of the watercourses and identify natural variability due to the ephemeral nature of these watercourses. The documented baseline condition will be included in this section once established.

6.3 Groundwater levels

6.3.1 Fractured rock monitoring bores

6.3.1.1 TGO Mine

Groundwater level hydrographs of all fractured rock groundwater monitoring bores have been plotted and compared with the Cumulative Rainfall Departure (CRD) curve. Hydrographs are shown in Appendix E.

The pre-mining groundwater hydrograph at WYMB001 shows a rise in groundwater levels of 7.02 m between April 2007 and November 2012. During operational years there is an increase in groundwater levels during the period June 2016 to June 2017 which corresponds to a period of above average rainfall. Based on this comparison, WYMB001 appears to be responsive to rainfall recharge. Groundwater levels show a gradual decline from 237.8 m AHD in June 2017 to 233.4 m AHD in April 2021; however these levels are still above pre-mining minimum groundwater levels. Recent groundwater levels show an increase from 233.4 m AHD in April 2021 to 251.2 m AHD in December 2022, and then decrease to 245.1 m AHD in March 2023.

During operational years WYMB002 shows a slight overall declining trend, below the pre-mining minimum groundwater level. The pre-mining groundwater hydrographs for WYMB003 and WYMB004 are generally stable. Both WYMB003 and WYMB004 show a gradual increase in groundwater levels during operational years, above the pre-mining maximum groundwater levels. The hydrographs do not show a response to rainfall recharge.

The pre-mining groundwater hydrograph for WYMB006 shows a response to rainfall recharge. The hydrograph shows a sudden rise around January 2008 which follows two months of above average rainfall in November and December 2007. Coffey (2008) attributed this rainfall response to be related to the filling of the McPhail's historical workings. During operational years there is an increase in groundwater levels during the period June 2016 to June 2017 which corresponds to a period of above average rainfall (Increasing trend of CRD). Groundwater levels show a gradual decline from 241.8 m AHD in February 2017 to 231.8 m AHD in April 2021; however these levels are still above pre-mining minimum groundwater levels. Recent groundwater level measurements show an increase from 231.8 m AHD in April 2021 to 251.2 m AHD in November 2022, followed by a decrease to 244.4 m AHD in March 2023, which is similar to the trend observed at WYMB01.

Groundwater levels at WYMB010 have remained relatively stable over the monitoring period.

Baseline and operational groundwater levels are summarised in Table 6.2.

Table 6.2 Groundwater level summary

Location	Baseline (pre-January 2014) groundwater level (m AHD)		Operational groundwater level (m AHD)	
	Minimum	Maximum	Minimum	Maximum
WYMB001	225.74	233.45	230.42	253.18
WYMB002	208.31	209.17	195.87	214.24
WYMB003	220.19	221.74	220.5	222.50
WYMB004	208.21	208.71	201.23	210.96
WYMB006	231.13	240.31	230.31	252.12
WYMB010	200.44	200.56	196.99	202.16

6.3.1.2 SAR Mine

Groundwater monitoring has been undertaken within bores at the SAR mine since November 2020. Groundwater levels are monitored effectively at three of the four installed bores. Hydrographs are shown in Appendix E.

Groundwater level trends at RWWB001 and RWWB003 between November 2020 and March 2021 were relatively stable. In mid-March 2021, RWWB003 displayed a minor response following a large rainfall event with a lag of approximately 6 days. Over the same duration, RWWB001 showed erratic fluctuations that are attributed to interference from nearby resource drilling operations (Jacobs, 2021b).

As noted in the EIS, groundwater level trends following drilling and bore construction at RWWB002 demonstrate a very slow recovery. RWWB002 was drilled dry with no indication of groundwater. The prolonged recovery, over a period of approximately 130 days is indicative of the very tight and low permeability of the formation at that location.

RWWB004 is screened to a depth of 52 mbgl and is dry, and as such, no water level data is available. Whilst RWWB004 is dry, the monitoring location is valuable for confirmation of the hydraulic separation of the shallow alluvial aquifer and the deeper regional water table. RWWB004 is screened across the interface between the Cainozoic alluvium and underlying weathered bedrock and therefore demonstrates a lack of saturation overlying bedrock at this location. It is noted however, that this does not preclude the potential presence of saturated alluvium within deeper palaeochannels that may exist below the regional water table at other locations.

6.3.2 Shallow bores

6.3.2.1 TGO Mine

There are limited baseline data for the shallow alluvial groundwater monitoring bores. Monitoring commenced at GDCMB01 in November 2011 however monitoring of bores associated with the RSF and the processing area did not begin until after commencement of operations at TGO. Groundwater level hydrographs of all shallow groundwater monitoring bores have been plotted and compared with the CRD curve. Hydrographs are shown in Appendix E.

Gundong Creek

The pre-mining groundwater hydrograph for GDCMB01 is generally stable. Groundwater level measurements show a decline in groundwater levels from 272.3 m AHD in September 2016 to 270.9 m AHD in December 2020, however these levels are still above or equal to the pre-mining minimum groundwater levels. Recent groundwater level measurements show an increase in groundwater levels from 270.9 m AHD in December 2020 to 272 m AHD in March 2023, which respond to rainfall recharge.

Process water dam and RSF monitoring bores

RSFMP02 and RSFMP04 have been dry since installation, however water level measurements have since been obtained at RSFMP04 since mid-2019. RSFMP09 has been dry since May 2014 and RSFMP10 was dry between approximately August 2014 and April 2015. Groundwater levels at RSFMP09 and RSFMP10 have not been monitored since mid-2015 as this is when these two bores were decommissioned following expansion of the RSFs. RSFMP11 has generally been dry however groundwater levels increased by approximately 4.4 m between April 2020 and July 2022. Groundwater levels have since decreased and the bore is dry. The groundwater hydrograph for RSFMP06 shows an overall decline in groundwater levels since October 2016. Recent groundwater level measurements show a slight increase in groundwater levels, from 261.7 m AHD in November 2019 to 262.2 m AHD in March 2023, which respond to rainfall recharge.

RSFMP08 was generally dry until November 2016, and since then recent measurements show a 2.0 m rise in the groundwater level. RSFMP01 was generally dry until December 2017, and since then measurements show a 5.4 m rise in the groundwater level to August 2021. The groundwater hydrographs for RSFMP03, RSFMP05, RSFMP07 show an overall rise in groundwater levels since monitoring began. The rising trend in groundwater levels at these monitoring locations may be due to recovery of shallow groundwater levels following completion of construction of the surface facilities area and/or seepage to groundwater from a process water pipeline in the vicinity of PWMP02 (GHD, 2015).

Monitoring bores PWMP03, PWMP04, PWMP05, PWMP06, PWMP07 and PWMP08 were installed to monitor the rising trend in groundwater in the vicinity of the RSF. Groundwater level at PWMP03 shows a decrease from 265.2 m AHD in December 2017 to 258.1 m AHD in July 2020, and then increase to 263.4 m AHD in June 2021, which respond to rainfall recharge. The hydrographs for PWMP04, PWMP05 and PWMP07 all show water level variability. The water level at PWMP08 has been increasing since November 2019.

6.4 Groundwater quality

6.4.1 TGO Mine

6.4.1.1 Fractured rock bores

Groundwater quality monitoring within the fractured rock bores has occurred since November 2012 at WYMB01, WYMB02, WYMB03, WYMB04, WYMB06 and WYMB10.

Groundwater within the fractured rock since approximately February 2016 has been circumneutral, typically ranging between 6.6 pH units and 7.6 pH units. Prior to this time, between November 2012 and January 2015, pH was generally slightly basic ranging 7.9 pH units up to 8.9 pH units. Groundwater within the fractured rock is generally saline. Salinity is variable across each of the monitoring locations. EC typically ranges between 10,000 $\mu\text{S/cm}$ and 15,000 $\mu\text{S/cm}$ at WYMB01 and WYMB06. At WYMB03 and WYMB02, EC typically ranges between 20,000 $\mu\text{S/cm}$ and 25,000 $\mu\text{S/cm}$. Since monitoring began, EC has ranged between 25,000 $\mu\text{S/cm}$ and 30,000 $\mu\text{S/cm}$ at WYMB04. Similar salinity values were recorded within the WYMB10 bore up until approximately July 2016. Since then, salinity concentrations have been highly variable, ranging approximately 2,500 $\mu\text{S/cm}$ up to 30,000 $\mu\text{S/cm}$. Similar trends in TDS are observed within WYB10.

Free cyanide concentrations have remained below the Laboratory Limit of Reporting (LOR) at all fractured rock bores, except for WYMB06, where between late 2017 and mid 2021 recorded increasing trends. Isolated elevated results at WYMB02 and WYMB01 were also recorded in early 2019. Similar trends were observed in reported WAD cyanide concentrations. Total cyanide concentrations were below the LOR at all sites except for WYMB01 and WYMB06 which have consistently recorded concentrations at below 0.01 mg/L and 0.5 mg/L respectively.

Historical total metals trends within the fractured rock bores include:

- Arsenic concentrations are typically more elevated at WYMB06 compared with other sites though remain below 0.1 mg/L. Concentrations of arsenic at all other sites typically range between 0.001 mg/L and 0.01 mg/L.
- Concentrations of cadmium typically range between 0.001 mg/L and 0.002 mg/L at most sites. Cadmium has increased at WYMB02 since early 2022.
- Increased copper concentrations were observed at WYMB03 and WYMB02 prior to January 2015. Aside from those sites, copper has generally increased at most sites within the fractured rock since monitoring began.
- Concentrations of iron have occasionally been significantly more elevated at WYMB01 and WYMB04 in comparison to other sites, ranging up to approximately 30 mg/L. Other sites have typically remained below 5 mg/L.
- Concentrations of lead and nickel have typically remained below 0.1 mg/L at all sites with no discernible trends. Mercury concentrations have typically remained below the LOR of 0.0001 mg/L at all sites, with occasionally elevated results at WYMB01, WYMB03 and WYMB04.
- Concentrations of zinc have fluctuated at all monitoring sites, typically remaining below 0.15 mg/L. Concentrations have been lower at WYMB10, typically remaining below 0.05 mg/L.

6.4.1.2 Shallow bores

Shallow monitoring bore GDCMB01 has been monitored since November 2012. GDCMB01 is installed within the Gundong Creek Alluvium. Conditions within the alluvium are generally neutral (ranging 6.6 pH units to 7.6 pH units) remaining within the DGV. EC is typically below the DGV of 500 $\mu\text{S/cm}$, with occasional exceedances reported.

Free, WAD and total cyanide concentrations have remained below the LOR (and below the DGV) since monitoring began, indicating there is no migration of cyanide or background presence in the alluvium in the vicinity of the bore. Ammonia has also remained below the DGV.

No exceedances of the DGVs have been reported for total metals arsenic, cadmium or mercury. Concentrations of chromium, copper, iron, lead, and nickel increased between November 2012 and September 2019, exceeding the respective DGVs. Concentrations decreased for these analytes between September 2019 and December 2022. Concentrations of zinc remained below the DGV between November 2012 and December 2020. Concentrations have since exceeded the DGV and have continued to increase up to 1 mg/L.

6.4.1.3 Process water dam monitoring bores

Process water dam monitoring bores PWMP01, PWMP02, PWMP03, PWMP04, PWMP05, PWMP06, PWMP07, PWMP08 have been monitored since 2015. PWMP01A, PWMP02D have been monitored since December 2019.

Groundwater quality results have been compared to the SSGVs for Gundong Creek alluvial bore GDCMB01 as outlined in Section 7.4. Results within the PWD monitoring bores have been compared to these results primarily for means of comparison against historical alluvial groundwater results.

Groundwater within the monitoring bores has varied from circumneutral to slightly basic, ranging from 6.6 pH units to 8.6 pH units, remaining within the SSGVs.

Total cyanide concentrations at PWMP bores are typically elevated above the SSGV at PWMP02, PWMP02D, PWMP06 and PWMP03, remaining less than 5 mg/L prior to late 2018. Since early 2019, concentrations of total cyanide have been observed to generally decrease at these bores and are generally less than 0.5 mg/L. Occasional exceedances of the total cyanide SSGV have been observed at PWMP01 and PWMP01A, typically remaining below 0.1 mg/L. Concentrations were elevated at PWMP07 since early 2020, however have decreased consistently since that time (remaining below the SSGV since mid-2021). Similar concentrations were observed at PWMP08, however have increased since late 2021, generally remaining below 0.1 mg/L.

Free and WAD cyanide concentrations have remained below the LOR (and below the SSGV) at PWMP03 and PWMP04 since monitoring began. Concentrations have typically remained below the SSGVs at PWMP01A, PWMP07, and PWMP08. Free and WAD cyanide exceeded SSGVs at PWMP01 from January 2017 to March 2021, and at PWMP02 from July 2019 to February 2020. Similar decreasing trends at PWMP01 and PWMP02 were observed since October 2019, and have remained below the SSGVs since April 2021. Occasional exceedances of SSGVs are observed at PWMP05 and PWMP02D.

Ammonia levels were typically below the SSGV at all bores. However, exceedances were reported in July 2022 at both PWMP02 and PWMP05, which were considered outliers.

Dissolved metals were sampled at each of the process water dam monitoring bores. The following observations were made:

- Arsenic concentrations are typically more elevated at PWMP01 and PWMP02 compared with other sites though remain below 0.1 mg/L. Concentrations of arsenic at all other sites typically range between 0.001 mg/L and 0.01 mg/L.
- Cadmium and mercury concentrations have remained below the LOR (and below the SSGVs) at all sites since monitoring began.
- Chromium concentration have remained below the SSGV of 0.024 mg/L for all sites, however, chromium at PWMP06 was elevated in comparison to other sites.
- Copper concentrations have been recorded above the SSGV at PWMP02, PWMP02D, PWMP06, PWMP07. Copper was more elevated at PWMP02D compared with PWMP02, PWMP06, PWMP07, with maximum concentrations reported at 0.055 mg/L, 0.021 mg/L, 0.018 mg/L, and 0.024 mg/L, respectively. Apart from those sites, copper was recorded below the SSGVs since monitoring began.
- Nickel concentrations have remained below the SSGVs of 0.014 mg/L for all sites, however, nickel at PWMP03 was elevated in comparison to other sites. Nickel concentration at PWMP02, PWMP05, PWMP06, PWMP07 showed a decreasing trend since November 2021.
- Lead concentrations are typically more elevated at PWMP05 and PWMP07 compared with other sites though they remain below 1.0 mg/L. Concentrations of lead at all other sites typically range between 0.001 mg/L and 0.01 mg/L.
- Zinc concentrations remained below the SSGV of 0.08 mg/L at all sites except PWMP01A. Concentrations of zinc were recorded above the SSGV at PWMP01A at 0.105 mg/L in October 2019.

6.4.1.4 Residue storage facility bores

Groundwater quality monitoring within the RSF bores has been conducted across multiple locations since March 2014, including RSFMB01, RSFMB03, RSFMB04, RSFMB05, RSFMB06, RSFMB07, RSFMB08, and RSFMB11. RSFMB03A has been monitored since May 2019. However, groundwater sampling was not often undertaken at RSFMB04, RSFMB05, RSFMB06, RSFMB07, and RSFMB08 since February 2022 due to the bores being dry. Monitoring at RSFMB01 ceased in September 2021 due to the expansion of the RSF.

Groundwater within the storage bores has varied from circumneutral to slightly basic, ranging from 6.6 pH units to 8.3 pH units, remaining within the SSGVs. RSFMB01 reported acidity before June 2020, ranging from 5.0 pH units to 5.6 pH units, below the lower level SSGVs.

Total cyanide consistently exceeded the SSGVs at RSFMB01 and RSFMB03A since monitoring began. General decreasing trends in total cyanide have been observed at RSFMB03A during this period, with concentrations consistently below 0.1 mg/L. Occasional exceedances of total cyanide SSGVs have been observed at RSFMB08 between early 2020 and early 2022, typically below 0.1 mg/L. Exceedances at RSFMB07 have occurred since late 2019, generally above concentrations at RSFMB08. Infrequent exceedances have been noted at RSFMB03 and RSFMB05. Concentrations at RSFMB11 typically remain below the LOR.

Free and WAD cyanide concentrations typically remain below the LOR and SSGVs at RSFMB03, RSFMB05 and RSFMB06. Concentrations at RSFMB01 increased above the SSGVs between January 2021 and March 2021. Free and total cyanide concentrations exceeded the SSGVs at RSFMB03A between October 2019 and October 2021. Concentrations of cyanide at RSFMB07 have been elevated, similar to observed concentrations at RSFMB03A.

Ammonia levels are typically below the SSGVs at all bores. However, exceedances were reported in July 2022 at both RSFMB03A and RSFMB11, which were considered outliers.

Dissolved metals were sampled at each of the residue storage facility bores. The following observations were made:

- Arsenic concentrations are typically more elevated at RSFMB06 compared with other sites though remain below 0.05 mg/L. Concentrations of arsenic at all other sites typically range between 0.001 mg/L and 0.01 mg/L, below the SSGVs of 0.013 mg/L.
- Cadmium concentrations ranged between 0.0001 mg/L and 0.0002 mg/L at most sites. Concentrations of cadmium were more elevated at RSFMB08, reaching up to 0.001 mg/L.
- Chromium concentration have remained below the SSGVs of 0.024 mg/L for all sites, however, chromium at RSFMB08 was elevated in comparison to other sites.
- Copper concentrations were recorded above the SSGVs at RSFMB01 and RSFMB05 in June (0.025 mg/L at RSFMB05), September (0.063 mg/L at RSFMB05) and October 2019 (0.027 mg/L at RSFMB01). Apart from those sites, copper was recorded below the SSGVs since monitoring began.
- Lead concentrations remained below the SSGVs of 0.015 mg/L at all sites, with the occasional exceptions of RSFMB03, RSFMB07, and RSFMB08. Mercury concentrations typically remained below the LOR of 0.0001 mg/L at all sites.
- Nickel concentration at RSFMB01 showed a decreasing trend since May 2019 and was below the SSGVs by September 2020. Nickel concentrations at RSFMB08 also decreased, with a minor exceedance in February 2022.
- Zinc concentrations remained below the SSGVs of 0.08 mg/L at all sites, with the exception of RSFMB05. Concentrations of zinc recorded at RSFMB05 were above the SSGVs, at 0.247 mg/L in August 2021 and 0.111 mg/L in October 2021, but decreased below the SSGVs by December 2021.

6.4.2 SAR Mine

Baseline groundwater quality monitoring has occurred on four occasions at RWWB001, RWWB002 and RWWB003 since late 2020. Baseline groundwater quality monitoring data is presented in Appendix E.

Groundwater quality was circumneutral ranging from 6.58 to 6.97 pH units. The results indicate that the regional water table is saline, ranging 17,800 to 32,700 $\mu\text{S}/\text{cm}$. RWWB003 is the shallowest of the SAR monitoring bores and has lower salinity (as both EC and TDS) than RWWB001 and RWWB002. Mean TDS at RWWB003 is 12,200 mg/L and is lower than at RWWB001 (19,375 mg/L) and RWWB002 (15,400 mg/L).

Groundwater type at the SAR monitoring bores is of sodium chloride type. RWWB002 is carbonate dominant and is distinctly more influenced by calcium. Remaining bores RWWB001 and RWWB003 are more sodium bicarbonate dominant and more similar to the other regional WYMB bores in comparison.

No background presence of cyanide (free, WAD or total) was detected at any of the bores, with all baseline samples recorded below the LOR.

Total metals were sampled at each of the monitoring bores as part of baseline monitoring. The following is noted:

- Arsenic was recorded below the LOR at RWWB002, however was more elevated at RWWB001 (0.037 mg/L) and RWWB003 (0.012 mg/L).
- Concentrations of cadmium and mercury were below the respective LOR at each site, except one detection of cadmium (0.0002 mg/L) at RWWB001.
- Chromium was more elevated at RWWB002 and RWWB003 in comparison to RWWB001 with maximum concentrations of 0.025 mg/L, 0.096 mg/L and 0.106 mg/L respectively.
- Copper was more elevated at RWWB001 and RWWB002 compared with RWWB003, with maximum concentrations reported at 0.708 mg/L, 0.534 mg/L and 0.056 mg/L respectively.
- Iron was significantly more elevated than other analytes and was more elevated at RWWB003 (25.7 mg/L) in comparison to RWWB001 (12.9 mg/L) and RWWB002 (9.56 mg/L).
- Lead concentrations were elevated at RWWB001 recording a maximum concentration of 0.053 mg/L. Concentrations were lower at RWWB002 and RWWB003, recording a maximum concentration of 0.006 mg/L and 0.01 mg/L respectively.
- Nickel concentrations were more elevated at RWWB003 (maximum concentration of 0.126 mg/L) compared with RWWB001 and RWWB002 (with maximum concentrations of 0.046 mg/L and 0.073 mg/L respectively).
- Zinc concentrations were similar across all the sites, with concentrations at RWWB001, RWWB002 and RWWB003 recorded at 0.081 mg/L, 0.093 mg/L and 0.055 mg/L respectively.

7. Triggers and response plans

7.1 Performance Criteria

The water management system (refer to Section 4) has been developed to satisfy the requirements of the regulatory requirements identified in Section 2. The environmental performance of TGO is measured against performance indicators. The purpose of this section is to specify the performance indicators, including trigger values for assessment of the results of the monitoring program presented in Section 5. Trigger values have been developed considering the baseline data presented in Section 3 and Section 6. A Trigger Action Response Plan (TARP) has been developed for the unlikely exceedance of the performance criteria or other unpredicted impacts. The TARP is outlined in Appendix F.

7.2 Water management system

Triggers for the water management system are based on the water performance measures required by SSD 9176045. These performance measures are achieved by the management measures described in this WMP, as summarised in Table 7.1.

Table 7.1 Water management performance measures

Feature	Performance measure	Where addressed
Water management – General	Maintain separation between clean dirty (i.e. sediment laden) and mine water management systems.	Section 4.1 and Section 4.2
	Minimise the use of clean and potable water on the site.	Section 4.1.1, Section 4.2.1, Section 4.3.1 and Section 4.6.5
	Maximise water recycling, reuse and sharing opportunities.	Section 4.1.3, Section 4.1.4, Section 4.1.5, Section 4.2.3, Section 4.2.3.3, Section 4.2.2, and Section 4.3.2
	Minimise the need for make-up water from external supplies.	Section 4.1.3, Section 4.1.5, and Section 4.3.2
	Design, install, operate, and maintain water management infrastructure in a proper and efficient manner.	Section 4, Section 5, Section 7, and Section 8
	Minimise risks to the receiving environment and downstream water users.	Section 4.1, Section 4.2 and Section 4.6.4
Clean water diversions and storage infrastructure	Design, install and maintain the clean water system to capture and/or convey the 100-year ARI flood event.	Section 4.1.1 and Section 4.2.1
	Maximise, as far as reasonable, the diversion of clean water around disturbed areas on the site.	Section 4.1.1 and Section 4.2.1
Residue Storage Facility	Ensure that the capacity of the residue storage facilities (RSF1 and RSF2) and associated collection pond are designed to meet the requirements of the Australian National Committee on Large Dams' Guidelines on Tailings Dams – Planning, Design and Construction, Operation and Closure (July 2019) or its latest version.	Section 4.1.5.3
	Designed, constructed, and operated in accordance with the requirements of the Dams Safety Act 2015 and Dams Safety Regulation 2019.	Section 2.5
	Ensure that the floor and walls are lined to achieve a permeability standard equivalent to 1,000 mm clay of permeability of at least 1×10^{-9} m/s, unless otherwise agreed by the EPA and the Planning Secretary.	Section 4.1.5.3

Feature	Performance measure	Where addressed
Mine water management system, excluding the residue storage facility	Design, install and maintain mine water storage infrastructure to ensure no unlicensed or uncontrolled discharge of mine water offsite (except in accordance with condition B388).	Section 4.1.4, Section 4.2.3 and Section 4.6.4
	Ensure that all water storages on site, except open cut pit voids, that receive chemical or salt laden water, including the dewatering ponds, raw water dams and process water dams are lined to achieve a permeability standard equivalent to 1,000 mm clay of permeability of at least 1×10^{-9} m/s, unless otherwise agreed by the EPA and the Planning Secretary.	Section 4.1.5.3, Section 4.1.5.1
	Maintain adequate freeboard (i.e. minimum 200 mm) in all process water and raw water storages at all times.	Section 4.1.2.3, Section 4.1.5.3, Section 4.2.1.1, and Section 4.2.3.1
Erosion and sediment control works – including dams	Design, install and maintain erosion and sediment controls in accordance with the best management practice guidance series Managing Urban Stormwater: Soils and Construction – Volume 1 (Landcom, 2004) and 2E Mines and Quarries (DECC, 2008).	Section 4.7.1, Section 4.7.3 and Section 5.1 and Section 5.2
	Design, install and maintain any new infrastructure within 40 metres of watercourses in accordance with the guidance series for Controlled Activities on Waterfront Land (DPI Water, 2012) or latest versions and Guideline for fish habitat conservation and management – Chapter 4 (DPI 2013), or its latest version.	Section 4.1.1.3 and Section 4.2.1.2
Aquifers	Negligible impacts to fractured rock aquifers caused by the development beyond those predicted in the EIS, including: – Negligible change in groundwater levels beyond those predicted. – Negligible change in water quality beyond those predicted. – Negligible impact to other groundwater users. – No exceedance of the minimal impact considerations in the NSW Aquifer Interference Policy.	Section 5.3
Waste Rock Emplacement	Minimise the potential for acid mine drainage	Section 4
	Design, install and maintain emplacements to encapsulate and prevent migration of acid forming and potentially acid forming materials.	Section 4.1.4.1, Section 4.1.1.2, and Section 4.2.3.3
Flood mitigation	Negligible change to off-site flood regime (including flows, levels, storage capacity or velocities) as a result of the development, beyond those predicted in the EIS.	Section 3.2.1, Section 4, and Section 7
	Realigned Newell Highway to be designed and constructed to achieve the same or greater flood immunity as the redundant section of highway.	Section 4.2.1.1
Chemical and hydrocarbon storage	Chemical and hydrocarbon products to be stored in bunded areas in accordance with the relevant Australian Standard.	Section 4.4
Aquatic and riparian ecosystems (including Gundong Creek)	Negligible environmental consequences beyond those predicted in the document/s listed in condition A2A2(c).	Section 7.3.2
	Maintain or improve baseline channel stability.	Section 7.3.3
	Develop site-specific in-stream water quality objectives in accordance with the Australian and New Zealand Guidelines for Fresh and Marine Water Quality (ANZECC & ARMCANZ, 2000) and Using the ANZECC Guidelines and Water Quality Objectives in NSW (DEC, 2006).	Section 7.3.2

7.3 Surface water

Discharges into Gundong Creek are permitted under EPL 20169 at six LDPs (refer to Section 4.1.3.2), subject to the pollutant concentration limits specified within EPL 20169. However, the site is to be managed as a nil-discharge site, meaning discharges are not expected to occur under normal operating conditions.

Water quality monitoring of Gundong Creek indicates that levels of some pollutants are naturally higher than the default trigger values adopted within EPL 20169. Site specific guideline values (SSGVs) have been developed with historical data at SW1 and reference to default trigger values. Ongoing water quality monitoring of Gundong Creek, at locations upstream and downstream of TGO, in particular during large storm events or extended periods of wet weather, will assist in identifying whether instances of potential pollution within Gundong Creek are the result of discharges from TGO or the result of other processes (natural or human) within the catchment.

Where exceedances of water quality trigger values occur within Gundong Creek that are the result of discharges (uncontrolled or otherwise), TGO will:

- If a controlled discharge, cease to discharge and undertake testing of the discharge water to ensure that it meets the requirements of EPL 20169.
- If an uncontrolled discharge, notify the EPA immediately, and, if safe to do so, commence emergency pumping measures to alternative water storages to minimise the volume of uncontrolled discharges off-site.
- If significant erosion or changes to the downstream watercourses are noted, TGO will assess, investigate and determine the cause of such erosion. If the erosion is determined to have been influenced by TGO operations, action will be taken to mitigate erosion and rehabilitate the watercourse. For any erosion management works within a watercourse, TGO will seek advice from a suitably qualified professional (geomorphologist) and implement the management works in accordance with industry standard guidelines.

Following any exceedance of water quality trigger values, an investigation should be undertaken to identify the likely source of the exceedance as per the Trigger Action Response Plan.

7.3.1 Environment Protection Licence discharge limits

EPL 20169 water quality limits on discharges from the sediment ponds and discharges into the RSF and WCD South are summarised in Table 7.2.

Table 7.2 EPL 20169 pollutant concentration limits

Pollutant	Units	90 th percentile	100 th percentile
Sediment basins (EPA 4, 6, 7 and 8)			
Arsenic (As)	mg/L	-	0.024
Cadmium (Cd)	mg/L	-	0.0002
Copper (Cu)	mg/L	-	0.0014
EC	µS/cm	-	350
Lead (Pb)	mg/L	-	0.0034
Nickel (Ni)	mg/L	-	0.011
Nitrogen (total) (N)	µg/L	-	250
pH (-)	pH units	-	6.5 to 8.5
Phosphorous (total) (P)	µg/L	-	20
TSS ^(a)	mg/L	-	50
Zinc (Zn)	mg/L	-	0.008
RSF and WCD South (EPA 2 and 19)			
Cyanide (WAD)	µg/L	20	30

- a. EPA has agreed that the TSS licence limit may be “turned off” during periods of managed overflows provided that other proposed water management components are implemented.

7.3.2 Gundong Creek guideline values

SSGVs for Gundong Creek have been derived as summarised in Table 7.3. The SSGVs were calculated in 2019 as part of a previous revision of the WMP developed to address the requirements of the Initial Project Approval (PA 09 0155).

EPL 20169 requires that discharges from the sediment ponds do not to exceed the concentration limits summarised in Table 7.2. The EPL limits are intended to protect the receiving environment from pollutant levels that are outside of the range typical of the local environment. The current EPL limits are based on the default water quality thresholds for aquatic ecosystems (ANZECC/ARMCANZ 2000).

ANZECC/ARMCANZ (2000) also includes default water quality thresholds for a range of primary industry uses, including irrigation, stock watering and aquaculture and human consumers of aquatic foods. The trigger values for each of these primary industry uses are summarised in Table 7.3. From this table it can be seen that the trigger values for the various water quality parameters vary considerably depending on the water use. The ephemeral nature of Gundong Creek means it is not a secure water supply either for human consumption or agricultural purposes, however, may provide additional irrigation and stock water. The default water quality thresholds for irrigation and livestock are generally higher than those currently included within the EPL (refer to Table 7.3).

ANZECC/ARMCANZ (2000) provides a method for the development of SSGVs which can be adopted in place of the default trigger values (DTV) for assessment of impact of discharges into receiving waterways. The development of SSGVs requires 24 months of monthly water quality sampling data from a nearby reference site. The upstream monitoring site (SW1) is considered to be a reasonable reference site, however due to the ephemeral nature of Gundong Creek, water quality sampling opportunities are limited. Collection of surface water quality data at SW1 has allowed for the identification of SSGVs. SSGVs have been selected as the higher value of the concentration limits in EPL 20169 or the 80th percentile concentration of historical water quality at SW1 as presented in Table 7.3.

Table 7.3 Site specific guideline values for Gundong Creek

Pollutant	Units	EPL 20169 limit	ANZECC / ARMCANZ (2000)				SW1	Adopted SSGV
			Aquatic ecosystems (upland rivers)	Irrigation and general use	Livestock	Aquaculture & human consumption	80 th Percentile (20 th Percentile)	
Arsenic	mg/L	0.024	0.024 ^A	0.1 ^B	0.5	0.05	0.003	0.024
Cadmium	mg/L	0.0002	0.0002 ^A	0.01 ^B	0.01	0.0005	0.0001	0.0002
Copper	mg/L	0.0014	0.0014 ^A	0.2 ^B	0.4 ^E	0.005	0.009	0.009
EC	µS/cm	350	350	650 ^C	3000 ^F	4500 ^G	312.2	350
Lead	mg/L	0.0034	0.0034 ^A	2.0 ^B	0.1	0.007	0.014	0.014
Nickel	mg/L	0.011	0.011 ^A	0.200 ^B	1	0.1	0.008	0.011
Nitrogen (total)	mg/L	250	250	5 ^B	100 ^H	50 ^H	1660	1660
pH (-)	-	6.5 to 8.5	6.5 to 8.0	6.0 to 9.0	-	5.0 to 9.0	(7.54) 8.32	6.5 - 8.5
Phosphorous (total)	µg/L	20	20	50 ^B	-	100 ^I	192	192
TSS	mg/L	50	-	50	-	40	117.2	117.2
Zinc	mg/L	0.008	0.008 ^A	2.0 ^B	20	0.005	0.034	0.034

^A 95% species protections for freshwater systems

^B long-term trigger value

^C guideline value for sensitive crops, assuming light clay soils

^E guideline value for sheep

^F adapted from a TDS concentration of 2,000 mg/L

^G adapted from a TDS concentration of 3000 mg/L (freshwater production)

^H total nitrate concentration

^I phosphates

7.3.3 Watercourse stability

For the SAR Mine, the baseline watercourse stability monitoring undertaken within Gundong and Bulldog Creek will be used for comparison purposes during the operational watercourse stability monitoring assessments. The annual watercourse stability assessment will use the baseline condition to determine if:

- The baseline channel stability of Gundong and Bulldog Creek has been maintained or improved through documentation of areas of instability.
- The occurrence of erosional processes (such as bank instability) do not occur as a result of discharges or construction activities.

7.4 Groundwater

The NSW Aquifer Interference Policy requires that potential impacts on groundwater sources, including users and GDEs, be assessed against minimal impact considerations, outlined in Table 1 of the policy. If the predicted impacts meet the Level 1 minimal impact considerations, then these impacts will be considered acceptable. The Level 1 minimal impact considerations for Less Productive Fractured Groundwater Sources have been adopted for TGO. The Level 1 minimal impact considerations are as follows:

- A cumulative pressure head decline of not more than 2 m at any water supply work.
- If the predicted pressure head decline is greater than the requirement above, then appropriate studies are required to demonstrate that the decline will not prevent the long-term viability of the affected water source unless make good provisions apply.
- No reduction in beneficial use category beyond 40 m from the activity.
- If the above condition is not met then appropriate studies will need to demonstrate that the change in groundwater quality will not prevent the long-term viability of the dependent ecosystem, significant site or affected water supply works.

7.4.1 Groundwater level triggers

The majority of shallow bores have been located to provide early detection of leaks from the RSF and processing areas. Therefore, trigger values for shallow monitoring bores are based on a rise in groundwater level. For all shallow monitoring bores (except GDCMBP01) a Stage 1 trigger would be exceeded if groundwater levels rise over three consecutive months. A Stage 1 trigger would result in an investigation to determine if the rise in groundwater level is attributable to mining related activities.

The Stage 1 investigation will include an analysis of groundwater quality monitoring data to identify whether the increases in groundwater levels are attributable to mining related activities. If it is likely that the rise in groundwater levels is the result of mining related activities, temporary modifications to the responsible mining activities will be made until groundwater levels return to normal levels.

A Stage 2 trigger would be exceeded if groundwater levels rise over six consecutive months. The subsequent investigation will also include an analysis of groundwater quality monitoring data to determine whether the increases are the result of mining related activities. If mining related activities are likely to be responsible for the changes to shallow groundwater levels, longer term changes to water management on site will be implemented.

Groundwater level triggers for deeper groundwater monitoring bores have been developed to monitor drawdown in the fractured rock aquifer. Groundwater level trigger values have been developed based on drawdown predictions from the numerical groundwater model developed by Jacobs (2021b).

Fractured rock monitoring bores WYMB01, WYMB04 and WYMB10 are outside the 2 m modelled drawdown contour for end of mining conditions. The proposed Stage 1 trigger is a drop in groundwater level more than 2 m below minimum pre-mining groundwater level or a complaint from a surrounding landholder. The proposed groundwater level Stage 2 trigger is a drop in groundwater level more than 4 m below the pre-mining groundwater level or two complaints from surrounding landholders within a three-month period.

Drawdown of 2 m to 5 m is predicted at WYMB03, WYMB06 and RWWB003 at the end of mining (Jacobs, 2021b). The proposed Stage 1 trigger is a drop in groundwater level more than 5 m below the minimum pre-mining groundwater level or a complaint from a surrounding landholder. The proposed groundwater level Stage 2 trigger is a drop in groundwater level more than 8 m below the pre-mining groundwater level or two complaints from surrounding landholders within a three-month period.

Drawdown of 5 m to 10 m is predicted at RWWB002 at the end of mining (Jacobs, 2021b). The proposed Stage 1 trigger is a drop in groundwater level more than 10 m below the minimum pre-mining groundwater level or a complaint from a surrounding landholder. The proposed groundwater level Stage 2 trigger is a drop in groundwater level more than 12 m below the pre-mining groundwater level or two complaints from surrounding landholders within a three-month period.

Drawdown of 10 m to 20 m is predicted at RWWB001 and WYMB02 at the end of mining (Jacobs, 2021b). The proposed Stage 1 trigger is a drop in groundwater level more than 20 m below the minimum pre-mining groundwater level or a complaint from a surrounding landholder. The proposed groundwater level Stage 2 trigger is a drop in groundwater level more than 22 m below the pre-mining groundwater level or two complaints from surrounding landholders within a three-month period.

RWB004 has consistently dry since monitoring commenced. Therefore, no groundwater level trigger value is proposed for RWB004.

Alluvial monitoring bore GDCMP01 is outside the modelled 2 m drawdown contour at the end of mining operations (Jacobs, 2021b). Therefore, the groundwater level trigger for GDCMP01 is recommended to be based upon historical groundwater levels. The Stage 1 trigger value for groundwater level at GDCMP01 is proposed to be a groundwater level equal to the minimum historical groundwater level (271.04 m AHD). The Stage 2 trigger value for groundwater level at GDCMP01 is proposed to be a groundwater level of 1 m below minimum historical groundwater level.

Groundwater level triggers for fractured rock and Gundong Creek alluvial bores are shown in Table 7.4.

If the deeper groundwater levels are drawn down to either the stage 1 and stage 2 trigger level, an investigation will be undertaken to ascertain whether the falling groundwater levels are the result of mining related activities, and the result of external factors (for example over-use of the groundwater source by other licensed water users or extended period of drought). If the investigation identifies that the fall in groundwater levels is the result of mining related activities, compensatory water supplies will be provided to the affected landowners. Additionally, the numerical groundwater model will be updated if the investigation indicates that the model is underestimating groundwater level drawdown.

Table 7.4 Groundwater level triggers – fractured rock and Gundong Creek alluvium bores

Bore	Minimum pre-mining groundwater level	Stage 1 Trigger		Stage 2 Trigger	
		Level (m AHD)	Trend	Level (m AHD)	Trend
EPA 9 - WYMB01	230.05 ¹	228.05	Groundwater level for three consecutive months	226.05	Groundwater level for six consecutive months
EPA 10 - WYMB02	208.91 ²	188.91		186.91	
EPA 11 - WYMB03	220.19 ²	215.19		212.19	
EPA 12 - WYMB04	208.62 ²	206.62		204.62	
EPA 13 - WYMB06	231.13 ²	226.13		223.13	
EPA 14 - WYMB10	200.30 ²	198.3		196.3	
RWWB001	204.41 ⁴	184.41		182.41	
RWWB002	205.0 ⁴	195		193	
RWWB003	206.24 ⁴	201.24	-	198.24	-
EPA 15 - GDCMB01	271.04 ³	271.04		270.04	

Note to table:

1. Pre-January 2014 monitoring data – excluding outliers
2. Pre-January 2014 monitoring data
3. Historical minimum
4. Pre-April 2023 monitoring data

7.4.2 Groundwater quality triggers

The NSW Aquifer Interference Policy states that the impact on groundwater quality from TGO operations should not reduce the beneficial use category beyond 40 m from the activity.

The review of historical groundwater quality data indicates that EC at deeper groundwater monitoring bores (WYMB02, WYMB03, WYMB04 and WYMB10) is typically around 20,000 $\mu\text{S}/\text{cm}$. Background EC is approximately 12,000 to 13,000 $\mu\text{S}/\text{cm}$ for WYMB01 and WYMB06. The review of historical groundwater quality data indicates that EC at SAR monitoring bores (RWVB01, RWVB02, and RWVB03) is saline, ranging 17,800 to 32,700 $\mu\text{S}/\text{cm}$. The very high EC at these locations limits the beneficial use of deep groundwater within the porous and fractured groundwater source to industrial use only. The search for registered groundwater works indicates that there are only two monitoring bores registered as stock or domestic within 10 km of the Mine. Both of these bores are over 8 km from the Mine.

Considering the lack of nearby registered groundwater bores, high groundwater EC, and uneconomically low water yield, the trigger for groundwater quality for deep monitoring bores are based on complaints from surrounding landholders. The Stage 1 trigger for groundwater quality for the deep groundwater aquifer is a complaint from a surrounding landholder regarding groundwater quality.

Analysis of water quality data at GDCMB01 compared groundwater quality to SSGVs. Groundwater quality at GDCMB01 exceeds SSGVs for a number of water quality parameters. Recommended trigger values at GDCMB01 are recommended to be a combination of DTVs and historical water quality. The trigger value adopted is the DTV except where 80th percentile concentration limit of historical data exceeds the DTV. Where the 80th percentile exceeds the DTV then the trigger value is proposed to be the 80th percentile of the historical concentration, using pre-June 2019 data. Groundwater quality trigger values are summarised in Table 7.5.

Table 7.5 Groundwater quality trigger values – GDCMB01 (EPA 15)

Parameter	Units	Trigger Value	Source
pH	-	6.5 - 9.0	ANZG 2018 – 95% Species Protection
EC	$\mu\text{S}/\text{cm}$	505.8	80 th Percentile historical concentration
Arsenic	mg/L	0.013	ANZG 2018 – 95% Species Protection
Cadmium	mg/L	0.0002	ANZG 2018 – 95% Species Protection
Chromium	mg/L	0.024	80 th Percentile historical concentration
Copper	mg/L	0.017	80 th Percentile historical concentration
Lead	mg/L	0.015	80 th Percentile historical concentration
Mercury	mg/L	0.0006	ANZG 2018 – 95% Species Protection
Nickel	mg/L	0.014	80 th Percentile historical concentration
Zinc	mg/L	0.08	ANZG 2018 – 95% Species Protection
Iron (dissolved)	mg/L	1.54	80 th Percentile historical concentration
Iron (total)	mg/L	21.86	80 th Percentile historical concentration
Cyanide (Total, Free and WAD)	mg/L	0.007	ANZG 2018 – 95% Species Protection
Ammonia	mg/L	1.09	ANZG 2018 – 95% Species Protection

In order to identify any impacts from the RSF or the PWD the water quality triggers for GDCMB01 are adopted for shallow groundwater monitoring locations associated with the RSF and the processing plant. The exception to this is the trigger for EC, since the shallow groundwater near the site appears to be influenced by the deeper porous and fractured rock aquifer.

The stage 1 trigger for all shallow groundwater monitoring locations is an exceedance of a trigger value for any water quality parameter listed in Table 7.5. The stage 1 trigger for all shallow groundwater monitoring bores is also proposed to be a continuous upward trend in any of the parameters listed in Table 7.5 for three consecutive months. The stage 2 trigger value is proposed to be an exceedance of a trigger value listed in Table 7.5 for three consecutive months for any water quality parameter. The stage 2 trigger for all shallow groundwater monitoring bores is also proposed to be a continuous upward trend in any of the parameters listed in Table 7.5 for six consecutive months.

8. Reporting

8.1 Incident reporting

Following an incident causing or threatening material harm to the environment TGO will:

- Notify the EPA by phone via the Environment Line (phone 131 555).
- Immediately notify the Planning Secretary in writing via the Major Projects Website (in accordance with condition D8 and Appendix 8 of SSD 9176045).
- Undertake a comprehensive investigation of the event.
- Complete an Incident Report as per the TGO Pollution Incident Response Management Plan (PIRMP).
- Provide a copy of the Incident report to EPA within seven days of the incident.
- Provide a detailed incident report to Planning Secretary via the Major Projects website within 30 days of the incident occurring in accordance with Appendix 8 of SSD 9176045.

TGO must notify DPE Water and NRAR in writing immediately upon becoming aware of a breach of any conditions set out in WALs held by TGO.

8.2 Non-compliance reporting

Following a non-compliance causing or threatening material harm to the environment TGO will notify the Planning Secretary within 7 days in writing via the Major Projects Website (in accordance with condition D9 and Appendix 8 of SSD 9176045). The notification will include the conditions of the project that is non-compliant with, why it does not comply, the reasons for the non-compliance (if known), and what actions have been, or will be, undertaken to address the non-compliance.

A non-compliance which has been notified as an incident does not need to be also notified as a non-compliance.

8.3 Monitoring results

In accordance with Section 66(6) of the POEO Act and requirements issued by the EPA, TGO must publish water quality monitoring data that has been collected as a result of EPL 20169 requirements.

EPL 20169 requires that surface and groundwater monitoring results be:

- Made publicly available via the TGO website each month
- Included in the Annual Return
- Held on site

The conditions of the WALs require TGO to record:

- The date and duration during which water is taken
- The volume of water taken
- The water supply work approval number used to take the water
- The purpose for which the water was taken

The records must be kept for at least five years and be produced for inspection when requested by DPE.

8.4 Complaints

EPL 20169 requires that TGO keep a record of any complaint made to TGO or any employee or agent of TGO in relation to pollution arising from any TGO activities.

The record of the complaint must be kept for at least four years and must include the following details:

- The date and time of the complaint
- The method by which the complaint was made

- Any details of the complaint
- The nature of the complaint

Complaints are to be included in the Annual Return under the requirements of EPL 20169.

8.4.1 Compensatory water supply

Following a complaint regarding loss of water supply from a surrounding landholder the appropriate TARP should be followed:

- Investigate groundwater monitoring levels to confirm potential loss of water supply as a result of mining operations.
- If necessary, provide a compensatory water supply to the landholder from existing groundwater licences or from existing surface water storages, within 24 hours of the loss being identified unless otherwise agreed with the landowner. The compensatory water supply should be provided in consultation with DPE Water, and to the satisfaction of the Planning Secretary. If a compensatory supply of water is unable to be provided, TGO will provide compensation to the satisfaction of the Planning Secretary.
- Notify the Planning Secretary in writing via the Major Projects Website immediately (in accordance with condition D8 and Appendix 8 of SSD 9176045).
- Document the results of the investigation and any subsequent actions taken by TGO.
- Provide a detailed incident report to Planning Secretary via the Major Projects website within 30 days of the complaint occurring in accordance with Appendix 8 of SSD 9176045.

If TGO and the landholder cannot agree on whether the loss of water is attributed to TGO, the matter may be referred to the Planning Secretary by either party for resolution, unless TGO and landowner have an established compensatory water agreement and the Department has been notified in writing of the terms of this agreement.

8.5 Annual review

TGO are required to prepare an Annual Review that:

- Reviews the performance of operations at TGO against the requirements of the WMP.
- Provides an overview of environmental management actions taken.
- Summarises the monitoring results and complaints over the 12 month period.

The Annual Review typically includes:

- Any amendments to licencing or statutory approvals.
- An evaluation of any trends in the monitoring results occurring across the site over the life of the Project.
- Any non-compliance recorded during the reporting period and the actions taken to ensure compliance.
- Identification of any discrepancies between the predicted and actual impacts of the operations and an analysis of the potential cause of any significant discrepancies.
- Reporting of the site water balance and water transfers in and out of the site and water take including water taken under each water licence.
- Comparison of modelled and observed groundwater inflow into the mine workings and groundwater level drawdown.
- A summary of management actions to be implemented over the next year to improve the environmental performance of the Project.

Management actions identified in the Annual Review relating to the water management system may include:

- Refinements to performance criteria and objectives.
- Changes to monitoring frequency, parameters, or locations.
- The initiation of any remedial actions.
- A copy of the Annual Review will be submitted to Council and will be made available to the CCC and any interested person upon request.

8.6 Access to Information

In line with Condition D15 of SS9176045, within three months of the date of physical commencement of development under this consent, until the completion of all rehabilitation required under this consent, TGO will:

- a) make the following information and documents (as they are obtained, approved or as otherwise stipulated within the conditions of this consent) publicly available on its website:
 - i. the document/s listed in condition A2(c);
 - ii. all current statutory approvals for the development;
 - iii. all approved strategies, plans and programs required under the conditions of this consent;
 - iv. minutes of CCC meetings;
 - v. regular reporting on the environmental performance of the development in accordance with the reporting requirements in any plans or programs approved under the conditions of this consent;
 - vi. a comprehensive summary of the monitoring results of the development, reported in accordance with the specifications in any conditions of this consent, or any approved plans and programs;
 - vii. a summary of the current phase and progress of the development;
 - viii. contact details to enquire about the development or to make a complaint;
 - ix. a complaints register, updated monthly;
 - x. the Annual Reviews of the development;
 - xi. audit reports prepared as part of any Independent Environmental Audit of the development and the Applicant's response to the recommendations in any audit report; and
 - xii. any other matter required by the Planning Secretary; and
- b) keep such information up to date, to the satisfaction of the Planning Secretary.

A copy of this WMP will also be made available on the Major Project's website,

9. Roles, responsibilities, and training

9.1 Roles and responsibilities

The key roles and responsibilities with respect to the management of surface and groundwater at TGO are provided in Table 9.1.

Table 9.1 Roles and responsibilities

Role	Responsibility
General Manager Operations	Ensure adequate resources are available to enable implementation of the Plan. Accountable for the overall environmental performance of the Operation, including the outcomes of the Plan.
TGO Environment & Community Manager	Ensure the implementation of the Plan, including the reporting of non-compliances with the trigger values, and subsequent implementation of the relevant action plan. Ensure employees are competent through training and awareness programs.
Mobile Equipment/Fixed Plant Operators	Ensure operations are undertaken in accordance with instructions. Ensure appropriate notification and response in the event of an environmental incident. Show due care not to cause environmental harm.
All Personnel	Follow direction provided by the TGO General Manager and TGO Environment & Community Manager. Show due care not to cause environmental harm. Notify Supervisor and Environment Manager immediately of any environmental non-compliance or potential non-compliance.

9.2 Training

All necessary site and contract personnel shall undergo water management awareness training as part of the site inductions. Any additional task specific training will be undertaken on an 'as needed basis in the form of toolbox talks or formal training sessions.

10. Plan review

10.1 WMP revisions

The WMP will be reviewed and revised in accordance with Part D Condition 6 of Extension Project Approval SSD 9176045 as reproduced below:

- Within three months, unless the Secretary agrees otherwise, of:
 - a. The submission of an incident report under condition D8.
 - b. The submission of an Annual Review under condition D10.
 - c. The submission of an Independent Environmental Audit under condition D12.
 - d. The approval of any modification of the conditions of this consent (unless the conditions require otherwise).
 - e. Notification of a change in development phase under condition A5.
 - f. A direction of the Secretary under condition A3.

The suitability of existing strategies, plans and programs required under this consent must be reviewed by the Applicant.

If necessary, to either improve the environmental performance of the development or cater for a modification or comply with a direction, the strategies, plans and programs required under this consent must be revised, to the satisfaction of the Planning Secretary. Where revisions are required, the revised document must be submitted to the Planning Secretary for approval within six weeks of the review.

Note: This is to ensure the strategies, plans and programs are updated on a regular basis, and incorporate any recommended measures to improve the environmental performance of the development.

In addition to SSD 9176045 requirements, TGO will review this plan if the following occur:

- Any significant change to water management practices.
- Construction of additional significant surface water storages.
- Development of new open cut or underground mining areas.
- Continual exceedances of any surface or groundwater trigger values.

10.2 Hydrogeological model review

As part of confirming the predictions of the numerical hydrogeological modelling undertaken for the Tomingley Gold Project (Jacobs, 2021b), verification of the model results is required.

It is proposed that review of the hydrogeological model is undertaken after 12 months of mining at the SAR Mine. It is then proposed that review of the hydrogeological model is undertaken annually. This review will include comparison of modelled predictions of the hydrogeological model for groundwater inflow and level drawdown against observed groundwater make of the mine workings and observed groundwater levels.

Where the validation process identifies significant variances between monitored and predicted mine groundwater inflows or the hydrogeological model is underestimating drawdown in groundwater level, then a recalibration process may be required to be undertaken in consultation with an independent reviewer. Model recalibration will be undertaken as required, with a minimum frequency of once every three years. A summary of the hydrogeological model validation will be prepared as part of the Annual Review.

10.3 Surface water model review

Annual results of the water balance model will be reported as part of the Annual Review.

A model review will take place every year during the Annual Review. Where the water balance model indicates significant variances between observed and predicted off site discharges; or where the mine water management systems have significantly changed; then a model update and recalibration process will be undertaken. The results of the recalibration will be undertaken in consultation with an independent reviewer. Model recalibration will be undertaken as required, with a minimum frequency of once every three years. A summary of the model validation and recalibration will be prepared as part of the Annual Review.

10.4 Auditing

This WMP will be audited in accordance with the internal auditing processes incorporated into the TGO EMS. Any findings from the audit will be implemented as needed.

As per Schedule 2, Condition D12 of the Development Consent, within one year of the date of physical commencement of development under this consent, and every three years after, unless the Planning Secretary directs otherwise, TGO will commission and pay the full cost of an Independent Environmental Audit.

As per Schedule 2, Condition D13 of the Development Consent, in accordance with the specific requirements of the Independent Audit Post Approval Requirements (NSW Government 2020), the Applicant will:

- a) review and respond to each Independent Audit Report prepared under condition D12 of this consent;
- b) submit a response to the Planning Secretary and any other NSW agency that requests it, together with a timetable for the implementation of the recommendations of the Independent Audit Report;
- c) implement the recommendations to the satisfaction of the Planning Secretary; and
- d) make each Independent Audit Report and response to it publicly available no later than 60 days after submission to the Planning Secretary.

The audit will:

- a) Be prepared in accordance with the Independent Audit Post Approval Requirements (NSW Government 2020); and
- b) Be submitted, to the satisfaction of the Planning Secretary, within two months of undertaking the independent audit site inspection, unless otherwise agreed by the Planning Secretary. In accordance with the specific requirements of the Independent Audit Post Approval Requirements (NSW Government 2020),

TGO will:

- a) Review and respond to each Independent Audit Report prepared under condition D12 of this consent;
- b) Submit a response to the Planning Secretary and any other NSW agency that requests it, together with a timetable for the implementation of the recommendations of the Independent Audit Report;
- c) Implement the recommendations to the satisfaction of the Planning Secretary; and
- d) make each Independent Audit Report and response to it publicly available no later than 60 days after submission to the Planning Secretary.

11. References

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Appendices

Appendix A

Conditions of consent

Table A-1 Part B, Condition 49 - Water management plan requirements

Condition of Consent (9176045)	Where addressed
B49 The Applicant must prepare a Water Management Plan for the mine development to the satisfaction of the Planning Secretary. This plan must:	This WMP
a. Be prepared by a suitably qualified and experienced person/s and in consultation with DPE Water, EPA, and Dams Safety NSW.	
b. Describe the measures to be implemented to ensure that the Applicant complies with the water management performance measures.	Section 4 and Section 5
c. include a:	
i. Site Water Balance that includes details of	Section 4.6
– Predicted annual inflows to and outflows from the site.	Section 4.5.1
– Sources and security of water supply for the life of the mine (including authorised entitlements and licences).	Section 4.5.1, Section 4.5.2 and Section 2.4
– Prioritisation strategy for water sources;	Section 4.6.6
– Water storage capacity;	Section 4.5.1
– Water use and management on the site, including opportunities to improve the efficiency of site water use and minimise the use of clean water on the site;	Section 4.6.3
– Licensed discharge points and limits; and	Section 4.6.4
– Reporting procedures, including annual revision of the site water balance;	Section 8.5
ii. Erosion and Sediment Control Plan, that:	Section 4.7
– Is consistent with the requirements of the Managing Urban Stormwater: Soils and Construction Manual (Landcom 2004, or its latest version);	Section 4.7.1
– Identifies activities that could cause soil erosion or generate sediment;	Section 4.7.2
– Includes a program to review the adequacy of flood protection works, and ensure they comply with the relevant performance measures	Section 4.7.3
– Describes measures to minimise soil erosion;	Section 4.7.3.1
– Describes the location, function, and capacity of erosion and sediment control structures.	Section 4.7.3.2
– Describes what measures would be implemented to maintain (and if necessary, decommission) the structures over time.	Section 4.7.3.2
iii. Surface Water Management Plan, that includes:	
– Detailed baseline data on surface water flows, quality of watercourses and/or waterbodies potentially impacted by the development, including: - Stream and riparian health. - Channel stability (geomorphology).	Section 6
– A detailed description of the surface water management system.	Section 4.1 and Section 4.2

Condition of Consent (9176045)	Where addressed
– Detailed plans, design objectives and performance criteria for water management infrastructure, including: • Water run-off diversions and catch drains, including the clean water and dirty water separation levee. • Clean water storages, mine water storages and sediment dams. • Emplacement areas, including monitoring and management protocol for emplacement of potentially acid or sulfate generating materials. • Residue storage facilities (RSF1 and RSF2) and decant ponds. • The final voids. • Control of any potential water pollution from the rehabilitated areas of the site.	Section 4.1.1 and Section 4.2.1; Section 4.1.2 and Section 4.2.2; Section 4.1.3 and Section 4.2.2; Section 4.1.4 and Section 4.2.3; Section 4.1.5 and Section 4.2.3.3
Detailed objectives and performance criteria, including trigger levels for investigating any potentially adverse impacts (or trends) associated with the mine development for: • Downstream surface water flows and quality. • Stream and riparian health and channel stability (geomorphology). • Post-mining water pollution from rehabilitated areas of the site.	Section 7.3
– A program to monitor and evaluate: • Compliance with the relevant performance measures and the performance criteria in this plan. • Potential leakage or spillage from pipelines. • Potential acid and metalliferous drainage. • Controlled and uncontrolled discharges and seepage/leachate from the site. • Surface water inflows, outflows, and storage volumes, to inform the Site Water Balance. • The effectiveness of the surface water management system, including contingency measures to be implemented during a potential failure of the water management system infrastructure. • the effectiveness of the Erosion and Sediment Control Plan.	Section 5.1 and Section 5.2
– Reporting procedures for the results of the monitoring program.	Section 8.3
– A trigger action response plan to respond to any exceedances of the performance measures or performance criteria, and repair, mitigate and/or offset any adverse surface water impacts of the development,	Section 7.3
– A program to periodically upgrade and validate the surface water model for the mine development, including an independent review of the model every 3 years, and at least annual comparison of monitoring results with modelled predictions;	Section 10.3
iv. Groundwater Management Plan, that includes:	
– Detailed baseline data on groundwater levels, yield and quality for groundwater resources that could be affected by the development, including privately-owned groundwater bores and groundwater dependent ecosystems.	Section 3.4 and Section 6.2
– A detailed description of the groundwater management system.	Section 4.5

Condition of Consent (9176045)		Where addressed
	- Groundwater performance criteria, including trigger levels for identifying and investigating potentially adverse impacts associated with the development, on: - Local and regional aquifers. - Groundwater supply for other water users, such as licensed privately-owned groundwater bores. - Groundwater inflows to the mining operations. - Seepage/leachate from underground voids, water storages, residue storage facilities, waste rock emplacements, infrastructure and processing areas, backfilled voids and final voids. - Groundwater dependent ecosystems.	Section 7.4
	- A program to monitor and evaluate: - Compliance with the relevant performance measures listed in Table 5 and the performance criteria in this plan. - Seepage/leachate from underground voids, water storages, residue storage facilities, waste rock emplacements, infrastructure and processing areas, backfilled voids, and final voids, including migration over the short and long term. - Groundwater inflows, outflows, and storage columes, to inform the Site Water Balance. - The effectiveness of the groundwater management system.	Section 5.3
	Reporting procedures for the results of the monitoring program.	Section 8.3
	A trigger action response plan to respond to any exceedances of the groundwater performance criteria, and repair, mitigate any/or offset any adverse groundwater impacts of the development.	Section 7.4
	v. A program to periodically upgrade and validate the groundwater model for the development, including a model update plan and independent review of the model every 3 years, and at least annual comparison of monitoring results with modelled predictions.	Section 8.5 and Section 10.2

Table A-2 Other water management consent conditions

Condition of Consent (9176045)		Where addressed
Part B		
B38	The Applicant must ensure that all surface discharges from the site comply with all relevant provisions of the POEO Act, including any discharge limits (both volume and quality) set for the development in any EPL.	Section 4.1 and Section 7.3
B39	The concentration of Weak Acid Dissociable (WAD) cyanide in tailings discharged from the discharge point to the residue storage facility must not exceed 20 mg/L (90th percentile) or 30 mg/L (maximum).	Section 7.3.1
B40	The Applicant must ensure that it has sufficient water for all stages of the development, and if necessary, adjust the scale of the development to match its available water supply.	Section 4.6.2
B41	The Applicant must report on water extracted from the development each year (direct and indirect) in the Annual Review, including water taken under each water licence.	Section 8.5
B42,43,44,45,45,47	The Applicant must provide a compensatory water supply to any landowner of privately-owned land whose rightful water supply is adversely and directly impacted by mining operations (other than an impact that is minor or negligible) as a result of the development, in consultation with DPE Water, and to the satisfaction of the Planning Secretary. The compensatory water supply measures must provide an alternative long term supply of water that is equivalent, in quality and volume, to the loss attributable to the development. Equivalent water supply should be provided (at least on an interim basis) as soon as practicable after the loss is identified, unless otherwise agreed with the landowner.	Section 8.4.1

Condition of Consent (9176045)		Where addressed										
	If the Applicant and the landowner cannot agree on whether the loss of water is attributed to the development or the measures to be implemented, or there is a dispute about the implementation of these measures, then either party may refer the matter to the Planning Secretary for resolution. If the Applicant is unable to provide an alternative long term supply of water, then the Applicant must provide compensation, to the satisfaction of the Planning Secretary. However, conditions B42 to B44 do not apply if the Applicant has a compensatory water agreement with the owner/s of the land and the Applicant has advised the Department in writing of the terms of this agreement. In the event of any complaint related to a privately-owned licensed groundwater bore which may, in the opinion of the Planning Secretary, have been adversely and directly impacted as a result of the development (other than an impact that is minor or negligible), the Applicant must, as soon as practicable, facilitate the provision of a temporary water supply, pending the outcome of any groundwater investigation and/or provision of an alternative long-term supply of water as required under condition B43, the satisfaction of the Planning Secretary.											
B48	The Applicant must ensure that the development complies with the performance measures in Table 4. <i>Table 4 Water management performance measures</i> <table><tr><th>Feature</th><th>Performance measure</th></tr><tr><td>Water management – General</td><td> – Maintain separation between clean dirty (i.e. sediment laden) and mine water management systems – Minimise the use of clean and potable water on the site – Maximise water recycling, reuse and sharing opportunities – Minimise the need for make-up water from external supplies – Design, install, operate, and maintain water management infrastructure in a proper and efficient manner – Minimise risks to the receiving environment and downstream water users </td></tr><tr><td>Clean water diversions and storage infrastructure</td><td> – Design, install and maintain the clean water system to capture and/or convey the 100-year ARI flood event. – Maximise, as far as reasonable, the diversion of clean water around disturbed areas on the site. </td></tr><tr><td>Residue Storage Facility</td><td> – Ensure that the capacity of the residue storage facilities (RSF1 and RSF2) and associated collection pond are designed to meet the requirements of. the <i>Australian National Committee on Large Dams’ Guidelines on Tailings Dams – Planning, Design and Construction, Operation and Closure</i> (July 2019) or its latest version. – Designed, constructed and operated in accordance with the requirements of the <i>Dams Safety Act 2015</i> and <i>Dams Safety Regulation 2019</i>. – Ensure that the floor and walls are lined to achieve a permeability standard equivalent to 1,000 mm clay of permeability of at least 1 x 10⁻⁹ m/s, unless otherwise agreed by the EPA and the Planning Secretary. </td></tr><tr><td>Mine water management system, excluding the residue storage facility</td><td> – Design, install and maintain mine water storage infrastructure to ensure no unlicensed or uncontrolled discharge of mine water off-site (except in accordance with condition B388). – Ensure that all water storages on site, except open cut pit voids, that receive chemical or salt laden water, including the dewatering ponds, raw water dams and process water dams are lined to achieve a permeability standard equivalent to 1,000 mm clay of permeability of at least 1 x 10⁻⁹ m/s, unless otherwise agreed by the EPA and the Planning Secretary. </td></tr></table>	Feature	Performance measure	Water management – General	– Maintain separation between clean dirty (i.e. sediment laden) and mine water management systems – Minimise the use of clean and potable water on the site – Maximise water recycling, reuse and sharing opportunities – Minimise the need for make-up water from external supplies – Design, install, operate, and maintain water management infrastructure in a proper and efficient manner – Minimise risks to the receiving environment and downstream water users	Clean water diversions and storage infrastructure	– Design, install and maintain the clean water system to capture and/or convey the 100-year ARI flood event. – Maximise, as far as reasonable, the diversion of clean water around disturbed areas on the site.	Residue Storage Facility	– Ensure that the capacity of the residue storage facilities (RSF1 and RSF2) and associated collection pond are designed to meet the requirements of. the <i>Australian National Committee on Large Dams’ Guidelines on Tailings Dams – Planning, Design and Construction, Operation and Closure</i> (July 2019) or its latest version. – Designed, constructed and operated in accordance with the requirements of the <i>Dams Safety Act 2015</i> and <i>Dams Safety Regulation 2019</i>. – Ensure that the floor and walls are lined to achieve a permeability standard equivalent to 1,000 mm clay of permeability of at least 1 x 10⁻⁹ m/s, unless otherwise agreed by the EPA and the Planning Secretary.	Mine water management system, excluding the residue storage facility	– Design, install and maintain mine water storage infrastructure to ensure no unlicensed or uncontrolled discharge of mine water off-site (except in accordance with condition B388). – Ensure that all water storages on site, except open cut pit voids, that receive chemical or salt laden water, including the dewatering ponds, raw water dams and process water dams are lined to achieve a permeability standard equivalent to 1,000 mm clay of permeability of at least 1 x 10⁻⁹ m/s, unless otherwise agreed by the EPA and the Planning Secretary.	Section 7.1
Feature	Performance measure											
Water management – General	– Maintain separation between clean dirty (i.e. sediment laden) and mine water management systems – Minimise the use of clean and potable water on the site – Maximise water recycling, reuse and sharing opportunities – Minimise the need for make-up water from external supplies – Design, install, operate, and maintain water management infrastructure in a proper and efficient manner – Minimise risks to the receiving environment and downstream water users											
Clean water diversions and storage infrastructure	– Design, install and maintain the clean water system to capture and/or convey the 100-year ARI flood event. – Maximise, as far as reasonable, the diversion of clean water around disturbed areas on the site.											
Residue Storage Facility	– Ensure that the capacity of the residue storage facilities (RSF1 and RSF2) and associated collection pond are designed to meet the requirements of. the <i>Australian National Committee on Large Dams’ Guidelines on Tailings Dams – Planning, Design and Construction, Operation and Closure</i> (July 2019) or its latest version. – Designed, constructed and operated in accordance with the requirements of the <i>Dams Safety Act 2015</i> and <i>Dams Safety Regulation 2019</i>. – Ensure that the floor and walls are lined to achieve a permeability standard equivalent to 1,000 mm clay of permeability of at least 1 x 10⁻⁹ m/s, unless otherwise agreed by the EPA and the Planning Secretary.											
Mine water management system, excluding the residue storage facility	– Design, install and maintain mine water storage infrastructure to ensure no unlicensed or uncontrolled discharge of mine water off-site (except in accordance with condition B388). – Ensure that all water storages on site, except open cut pit voids, that receive chemical or salt laden water, including the dewatering ponds, raw water dams and process water dams are lined to achieve a permeability standard equivalent to 1,000 mm clay of permeability of at least 1 x 10⁻⁹ m/s, unless otherwise agreed by the EPA and the Planning Secretary.											

Condition of Consent (9176045)			Where addressed
		– Maintain adequate freeboard (i.e. minimum 200 mm) in all process water and raw water storages at all times	
	Erosion and sediment control works – including dams	– Design, install and maintain erosion and sediment controls in accordance with the best management practice guidance series <i>Managing Urban Stormwater: Soils and Construction – Volume 1</i> (Landcom, 2004) and <i>2E Mines and Quarries</i> (DECC, 2008). – Design, install and maintain any new infrastructure within 40 metres of watercourses in accordance with the guidance series for <i>Controlled Activities on Waterfront Land</i> (DPI Water, 2012) or latest versions and <i>Guideline for fish habitat conservation and management – Chapter 4</i> (DPI 2013), or its latest version.	
	Aquifers	– Negligible impacts to fractured rock aquifers caused by the development beyond those predicted in the EIS, including: • Negligible change in groundwater levels beyond those predicted. • Negligible change in water quality beyond those predicted. • Negligible impact to other groundwater users. • No exceedance of the minimal impact considerations in the NSW Aquifer Interference Policy.	
	Waste Rock Emplacement	– Minimise the potential for acid mine drainage. – Design, install and maintain emplacements to encapsulate and prevent migration of acid forming and potentially acid forming materials.	
	Flood mitigation	– Negligible change to off-site flood regime (including flows, levels, storage capacity or velocities) as a result of the development, beyond those predicted in the EIS. – Realigned Newell Highway to be designed and constructed to achieve the same or greater flood immunity as the redundant section of highway.	
	Chemical and hydrocarbon storage	– Chemical and hydrocarbon products to be stored in bunded areas in accordance with the relevant Australian Standard.	
	Aquatic and riparian ecosystems (including Gundong Creek)	– Negligible environmental consequences beyond those predicted in the document/s listed in condition A2A2(c). – Maintain or improve baseline channel stability. – Develop site-specific in-stream water quality objectives in accordance with the <i>Australian and New Zealand Guidelines for Fresh and Marine Water Quality</i> (ANZECC & ARMICANZ, 2000) and <i>Using the ANZECC Guidelines and Water Quality Objectives in NSW</i> (DEC, 2006).	

Appendix B

**Correspondence and responses to
regulators**

Department of Planning and Environment

Our ref: OUT23/20780

David Pritchard
Alkane Resources

Email: DPritchard@alkane.com.au

19 December 2023

Subject: Tomingley Gold Extension Project (SSD 9176045) - Water Management Plan update

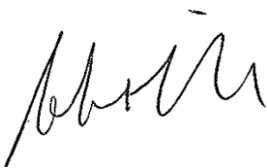
Dear David Pritchard

I refer to your request for advice sent on 10 November 2023 to the Department of Planning and Environment (DPE) Water about the above matter.

DPE Water has reviewed the updated Tomingley Gold Water Management Plan and makes recommendations regarding monitoring and management of geomorphic stability and riparian condition, and water licensing. Please see Attachment A for further detail.

Should you have any further queries in relation to this submission please do not hesitate to contact DPE Water Assessments at water.assessments@dpie.nsw.gov.au

Yours sincerely,

A handwritten signature in black ink, appearing to read "Rob Brownbill".

Rob Brownbill
Manager Assessments
Department of Planning and Environment: Water

Attachment A

Detailed advice regarding the Tomingley Gold Extension Project – Water Management Plan

1.0 Water Take and Licensing

1.1 Recommendation – prior to approval

The proponent should update Table 2.2 to reflect updates to water sharing plans and the repeal of Part 8 of the *Water Act 1912*.

Explanation

Table 2.2 does not reflect updates to water sharing plans. This affects 80WA705442, WAL20270, 80CA703364 and WAL44388 which should be listed as in the Lower Macquarie Zone 6 Groundwater Source under the Water Sharing Plan for the Macquarie-Castlereagh Groundwater Sources 2020.

Approval 80CW809661 needs to be updated to 80FW723901 as it was converted in 2015 following the repeal of Part 8 of the *Water Act 1912*.

1.2 Recommendation – post approval

The proponent should ensure sufficient entitlement is held in a water access licence/s to account for the maximum predicted water take for each water source prior to take occurring.

Explanation

The average site water balance in Table 4.8 indicates insufficient entitlement is held for water take in 2026. The proponent should hold entitlement to account for the maximum potential take prior to the take occurring.

2.0 Geomorphic stability and riparian condition monitoring and management

2.1 Recommendation prior to approval

The proponent should update the Water Management Plan (WMP) to include baseline information on geomorphic and riparian condition and a monitoring program. This is to include:

- inspection and photographic record of the geomorphic stability and riparian condition of any watercourse or drainage line downstream of an altered flow path. This should include any area where flow will be concentrated due to a diversion or culvert, and also cover the area below discharge energy dissipators to ensure the design is effective.
 - inspection and photographic record prior to construction and for at least four flow events (where rainfall is greater than 25 mm in 24 hours leading to stream flows) or two years (whichever is longer) after works have been completed to confirm the design of diversion, culvert or discharge energy dissipators is adequate.
-

Explanation

The WMP has not included baseline information on geomorphic and riparian condition and an ongoing monitoring program. This is required to ensure the relevant water management performance measures of Condition B48 and the requirements of Condition B49(c)(iii) are met. Justification for design of the monitoring program should include explanation of objectives, timing, frequency and duration.

2.2 Recommendation prior to approval

The proponent should update the Trigger Action Response Plan (TARP) of the WMP to address stream and riparian health and channel stability.

Explanation

Condition B49(c)(iii) of development consent SSD-9176045 requires the development of detailed objectives, performance criteria, trigger levels and a TARP for stream and riparian health and channel stability. Table 7.1 of the WMP refers to section 7.3.2 as potentially addressing this however its content is limited to water quality.

Triggers for remedial action should be specified and provided to DPE Water for review. Justification for the TARPs and how the TARPs response triggers will be followed and reported should be included. Any remedial actions or stream rehabilitation should be guided by the Rehabilitation Manual for Australian Streams (Rutherford et al. 2000).

End Attachment A

Dams Safety NSW

Our ref: OUT23/19379

Your ref: SDD-9176045

David Pritchard
Tomingley Gold Operations
Environment and Community Manager
DPritchard@alkane.com.au

24 Nov 2023

Subject: Tomingley Gold Mine Water Management Plan (SDD-9176045)

Dear David,

Dam Safety NSW (DSNSW) has reviewed the Tomingley Gold Mine Extension Project (TGEP) Water Management Plan and appreciates the opportunity to comment. DSNSW's regulatory emphasis is centred on the safe operation and prevention of the failure of declared dams, consequently the scope of DSNSW's comments are restricted to the impact of the proposal on the declared dams within the project area.

There are currently three dams declared under the *2015 NSW Dams Safety Act* within the Project Area all of which are owned by Tomingley Gold Operations (TGO). The declared dams are Tomingley Residue Storage Facility 1 (TSF1), Tomingley Residue Storage Facility 2 (TSF2) and Wyoming Dam all of which are currently regulated under the *2019 NSW Dams Safety Regulation*. The Project proposes construction of a significant water storage dam to the south of the Project Area near the San Antonio and Rosewell Prospects (SAR Water Storage Dam). It is probable that this dam would be declarable.

Prior to construction (preferably at concept design stage) TGO will need to contact Dams Safety NSW on info@damsafety.nsw.gov.gov and provide details of the proposed SAR Water Storage Dam. Required details will include a consequence category assessment undertaken by a suitably qualified dams engineer. Relevant information can be found on the Dam Safety NSW's website at <https://www.damsafety.nsw.gov.au>.

Please don't hesitate to contact me at heather.middleton@damsafety.nsw.gov or phone 04282 88 391 on if you have any queries.

Yours faithfully,

Department of Planning and Environment

A handwritten signature in black ink, appearing to read "A. Salkovic".

For Chris Salkovic
CEO Dams Safety NSW

Table B.1 Regulator consultation – November and December 2023

Regulator	Number	Regulator comment	Response
DPE	19 December 2023		
	1.0	Water Take and Licensing	
	1.1	Recommendation – prior to approval The proponent should update Table 2.2 to reflect updates to water sharing plans and the repeal of Part 8 of the Water Act 1912.	Table 2.2 has been updated to reflect the updated WSP for the Macquarie-Castlereagh Groundwater Sources 2020. Licences converted following the repeal of Part 8 of the Water Act 1912 are also updated.
	1.2	Recommendation – post approval The proponent should ensure sufficient entitlement is held in a water access licence/s to account for the maximum predicted water take for each water source prior to take occurring.	The maximum groundwater take is forecast to occur in year 2026, based on the predictions of the site water balance (GHD 2021) and predictions of the numerical groundwater model (Jacobs 2021b). Of this groundwater take, 766 ML is predicted to be groundwater inflow into the mine workings and (under average rainfall conditions) 356 ML will be sourced from the borefield. The predicted mine inflows are greater than the existing groundwater entitlement for the Lachlan Fold Belt MDB Groundwater Source under WAL28643 and WAL29266. As discussed in the Groundwater Impact Assessment (Jacobs 2021b), an additional 477 ML of entitlement will need to be sourced during the operation of the mine. Jacobs (2021b) recommended that TGO initially obtain entitlement to cover the predicted groundwater take in the year 2025, which is 427 ML and obtain additional entitlement as required after re-running the groundwater model in the year 2024, following recalibration if necessary. Note that, as discussed in Section 4.6.2, borefield allocation is forecasted to peak in 2025 with 1360 ML/year required to be sourced from the borefield in a dry (5th percentile rainfall) year out of 1400 ML total annual borefield allocation. The proposed take from the borefield is less than the combined entitlement of WAL20270 and WAL44388.
	2.0	Geomorphic stability and riparian condition monitoring and management	

Regulator	Number	Regulator comment	Response
	2.1	Recommendation prior to approval The proponent should update the Water Management Plan (WMP) to include baseline information on geomorphic and riparian condition and a monitoring program. This is to include: – Inspection and photographic record of the geomorphic stability and riparian condition of any watercourses or drainage line downstream of an altered flow path. This should include any area where flow will be concentrated due to a diversion or culvert and also cover the area below discharge energy dissipators to ensure the design is effective. – Inspection and photographic record prior to construction and for at least four flow events (where rainfall is greater than 25 mm in 24 hours leading to stream flows) or two years (whichever is longer) after works have been completed to confirm the design of diversion culvert or discharge energy dissipators is adequate.	Inclusion of a geomorphic monitoring program is not considered necessary given the zero-discharge nature of the site and lack of predicted impacts arising from potential discharges in downstream watercourses. The site water balance (GHD 2021) indicated no increased potential for offsite discharge. We also refer to the outcomes of the Surface Water Impact Assessment (Jacobs 2021a) which indicated the ephemeral drainage lines downstream of altered flow paths are highly unlikely to be impacted: – Impacts to Drainage Line E and Drainage Line F are of very low sensitivity, minor magnitude and insignificant consequence. These drainage lines have no defined channel banks, which result in erosion and scour potential being low during flood or high rain. – Impacts to Gundog Creek and Bulldog Creek were considered to be of a very low sensitivity and minor magnitude and minor consequence. Gundog Creek will not be impacted as runoff would be contained within project site (as a zero-discharge site) and would not reach Gundog Creek. The culverts at Bulldog creek are designed to not increase flows or velocities during flood. – Site infrastructure is designed for storm events greater than 25 mm in 24 hours (1% AEP 72 Hour duration). Impacts may instead be detected more perceptibly through the surface water quality monitoring program, through notable changes to TSS or turbidity.
	2.2	Recommendation prior to approval The proponent should update the Trigger Action Response Plan (TARP) of the WMP to address stream and riparian health and channel stability.	
Dam Safety NSW	24 November 2023		
	N/A	Dam Safety NSW (DSNSW) has reviewed the Tomingley Gold Mine Extension Project (TGEP) Water Management Plan and appreciates the opportunity to comment. DSNSW's regulatory emphasis is centred on the safe operation and prevention of the failure of declared dams, consequently the scope of DSNSW's comments are restricted to the impact of the proposal on the declared dams within the project area.	As outlined in Section 2.5, TGO will notify Dam Safety NSW of its intention to construct the water storage dam in the SAR Mine area, to provide details of the proposed SAW Water Storage Dam, prior to commencing construction in accordance with Part B Condition 52 of Extension Project Approval SSD 9176045.

Regulator	Number	Regulator comment	Response
		There are currently three dams declared under the 2015 NSW Dams Safety Act within the Project Area all of which are owned by Tomingley Gold Operations (TGO). The declared dams are Tomingley Residue Storage Facility 1 (TSF1), Tomingley Residue Storage Facility 2 (TSF2) and Wyoming Dam all of which are currently regulated under the 2019 NSW Dams Safety Regulation. The Project proposes construction of a significant water storage dam to the south of the Project Area near the San Antonio and Roswell Prospects (SAR Water Storage Dam). It is probable that this dam would be declarable. Prior to construction (preferably at concept design stage) TGO will need to contact Dams Safety NSW on info@damsafety.nsw.gov.au and provide details of the proposed SAR Water Storage Dam. Required details will include a consequence category assessment undertaken by a suitably qualified.	

Our ref: OUT24/10322

Scotney Moore
Planning and Assessment
Department of Planning, Housing and Infrastructure
Email: scotney.moore@dpie.nsw.gov.au

12 July 2024

Subject: Tomingley Gold Extension Project (SSD 9176045) Water Management Plan –
additional information

Dear Scotney Moore

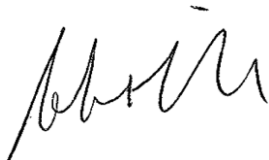
I refer to your request for advice sent on 5 July 2024 to the NSW Department of Climate Change, Energy, the Environment and Water (DCCEE Water) about the above matter.

NSW DCCEE Water has reviewed the additional information provided by the proponent in response to recommendations 2.1 and 2.2 from previous advice (OUT23/20780). DCCEE Water maintains the previous recommendations with further justification provided as follows.

- Monitoring of the geomorphic stability and riparian condition is to ensure that design and construction of the site infrastructure related to waterways is effective. It is noted that the likelihood of geomorphic impacts is low, and so the monitoring request is minimal. This includes inspections and photographs of the locations prior to construction and after significant rainfall/flow events to confirm the design of diversion, culvert, or discharge energy dissipators is adequate. This monitoring is likely able to be incorporated into other monitoring activities.
- The request for inclusion in the Trigger Action Response Plan (TARP) is required to ensure a clear process to address any issues based on the monitoring. The Rehabilitation Manual for Australian Streams (Rutherford et al. 2000) is considered appropriate as it is a standard industry guideline for stream rehabilitation.

Should you have any further queries in relation to this submission please do not hesitate to contact DCCEE Water Assessments at water.assessments@dpie.nsw.gov.au

Yours sincerely,



Rob Brownbill
Manager Assessments
Department of Climate Change, Energy, the Environment and Water

Post Approval Review



Planning &
Environment

Documents: TGEF – Water Management Plan

Revision: Revision 1, 15/01/2024

Reviewed: 12/06/2024

Condition	Sufficient (Yes/No/ Partial)	Document reference and comment	Action Required	Company Response
SOIL AND WATER Water Discharges B38. The Applicant must ensure that all surface discharges from the site comply with all relevant provisions of the POEO Act, including any discharge limits (both volume and quality) set for the development in any EPL.	Noted			
B39. The concentration of Weak Acid Dissociable (WAD) cyanide in tailings discharged from the discharge point to the residue storage facility must not exceed 20 mg/L (90 th percentile) or 30 mg/ L (maximum).	Yes	Section 7.3.1 (Table 7.2)		
Water Supply B40. The Applicant must ensure that it has sufficient water for all stages of the development, and if necessary, adjust the scale of the development to match its available water supply.	Yes	Section 4.6.2		
B41. The Applicant must report on water extracted from the development each year (direct and indirect) in the Annual Review, including water taken under each water licence. <i>Note: Under the Water Act 1912 and/or the Water Management Act 2000, the Applicant is required to obtain all necessary water licences for the development, including during rehabilitation and post mine closure.</i>	Yes	Section 8.4		
Compensatory Water Supply B42. The Applicant must provide a compensatory water supply to any landowner of privately-owned land whose rightful water supply is adversely and directly impacted by mining operations (other than an impact that is minor or negligible) as a result of the development, in consultation with DPE Water, and to the satisfaction of the Planning Secretary.	Yes	Section 8.3.1		

Post Approval Review



Planning &
Environment

Documents: TGEF – Water Management Plan

Revision: Revision 1, 15/01/2024

Reviewed: 12/06/2024

Condition	Sufficient (Yes/No/ Partial)	Document reference and comment	Action Required	Company Response
B43. The compensatory water supply measures must provide an alternative long term supply of water that is equivalent, in quality and volume, to the loss attributable to the development. Equivalent water supply should be provided (at least on an interim basis) as soon as practicable after the loss is identified, unless otherwise agreed with the landowner.	Yes	Section 8.3.1		
B44. If the Applicant and the landowner cannot agree on whether the loss of water is attributed to the development or the measures to be implemented, or there is a dispute about the implementation of these measures, then either party may refer the matter to the Planning Secretary for resolution.	No		Include references to dispute resolution in Section 8.3.1	Added into Section 8.3.1
B45. If the Applicant is unable to provide an alternative long term supply of water, then the Applicant must provide compensation, to the satisfaction of the Planning Secretary.	No		Include references if Tomingley is unable to provide alternate long-term supply of water in Section 8.3.1	Added into Section 8.3.1
B46. However, conditions B42 to B44 do not apply if the Applicant has a compensatory water agreement with the owner/s of the land and the Applicant has advised the Department in writing of the terms of this agreement. Notes: • The Water Management Plan (see condition B49) is required to include trigger levels for investigating potentially adverse impacts on water supplies. • The burden of proof that any loss of water supply is not due to mining impacts rests with the Applicant.	Noted		Include this condition in Section 8.3.1	Added into Section 8.3.1
B47. In the event of any complaint related to a privately-owned licensed groundwater bore which may, in the opinion of the Planning Secretary, have been adversely and directly impacted as a result of the development (other than an impact that is minor or negligible), the Applicant must, as soon as practicable, facilitate the provision of a temporary water supply, pending the outcome of any groundwater investigation and/or provision of an alternative long-term supply of water as required under condition B43, the satisfaction of the Planning Secretary.	Yes	Section 8.3.1		
Water Management Performance Measures B48. The Applicant must ensure that the development complies with the performance measures in Table 4 .				

Post Approval Review



Planning &
Environment

Documents: TGEF – Water Management Plan

Revision: Revision 1, 15/01/2024

Reviewed: 12/06/2024

Condition	Sufficient (Yes/No/ Partial)	Document reference and comment	Action Required	Company Response
Water management – General • Maintain separation between clean dirty (i.e. sediment laden) and mine water management systems • Minimise the use of clean and potable water on the site • Maximise water recycling, reuse and sharing opportunities • Minimise the need for make-up water from external supplies • Design, install, operate and maintain water management infrastructure in a proper and efficient manner • Minimise risks to the receiving environment and downstream water users	Yes	• Section 4.1.1.2 • Section 4.3 • Section 4.3.2 • Section 4.1.3 and 4.1.5 • Section 4.2.1.1 • Section 4.2		
Clean water diversions and storage infrastructure • Design, install and maintain the clean water system to capture and/or convey the 100-year ARI flood event • • Maximise, as far as reasonable, the diversion of clean water around disturbed areas on the site	Yes	• Section 4.2.1.1 • Section 4.2		
Residue Storage Facility • Ensure that the capacity of the residue storage facilities (RSF1 and RSF2) and associated collection pond are designed to meet the requirements of the <i>Australian National Committee on Large Dams' Guidelines on Tailings Dams – Planning, Design and Construction, Operation and Closure</i> (July 2019) or its latest version • Designed, constructed and operated in accordance with the requirements of the Dams Safety Act 2015 and Dams Safety Regulation 2019 • Ensure that the floor and walls are lined to achieve a permeability standard equivalent to 1,000mm clay of permeability of at least 1×10^{-9} m/s, unless otherwise agreed by the EPA and the Planning Secretary	Yes	• Section 4.1.5.3 • Section 2.5 • Section 4.1.5.3		

Post Approval Review



Planning &
Environment

Documents: TGEP – Water Management Plan

Revision: Revision 1, 15/01/2024

Reviewed: 12/06/2024

Condition	Sufficient (Yes/No/ Partial)	Document reference and comment	Action Required	Company Response
Mine water management system, excluding the residue storage facility - Design, install and maintain mine water storage infrastructure to ensure no unlicensed or uncontrolled discharge of mine water offsite (except in accordance with condition B388). - Ensure that all water storages on site, except open cut pit voids, that receive chemical or salt laden water, including the dewatering ponds, raw water dams and process water dams are lined to achieve a permeability standard equivalent to 1,000mm clay of permeability of at least 1×10^{-9} m/s, unless otherwise agreed by the EPA and the Planning Secretary. - Maintain adequate freeboard (i.e. minimum 200 mm) in all process water and raw water storages at all times.	Yes	- Section 4.1.4/ 4.2.3 - Section 4.1.5.3 - Section 4.1.5.1/ 4.1.5.3/ 4.2.3.2/ 4.1.2.3		
Erosion and sediment control works – including dams - Design, install and maintain erosion and sediment controls in accordance with the best management practice guidance series <i>Managing Urban Stormwater: Soils and Construction – Volume 1 (Landcom, 2004)</i> and <i>2E Mines and Quarries (DECC, 2008)</i> - Design, install and maintain any new infrastructure within 40 metres of watercourses in accordance with the guidance series for <i>Controlled Activities on Waterfront Land (DPI Water, 2012)</i> or latest versions and <i>Guideline for fish habitat conservation and management – Chapter 4 (DPI 2013)</i>, or its latest version	Yes	- Section 4.7.1/4.7.3.1 - Section 4.1.1.3/ 4.2.1.2		

Post Approval Review



Planning &
Environment

Documents: TGEF – Water Management Plan

Revision: Revision 1, 15/01/2024

Reviewed: 12/06/2024

Condition	Sufficient (Yes/No/ Partial)	Document reference and comment	Action Required	Company Response
Aquifers Negligible impacts to fractured rock aquifers caused by the development beyond those predicted in the EIS, including: - negligible change in groundwater levels beyond those predicted; - negligible change in water quality beyond those predicted; - negligible impact to other groundwater users; and - no exceedance of the minimal impact considerations in the <i>NSW Aquifer Interference Policy</i>	Yes	Section 5.3/ 7.4		
Waste Rock Emplacement - Minimise the potential for acid mine drainage - Design, install and maintain emplacements to encapsulate and prevent migration forming and potentially acid forming materials	Yes	- Section 4.2.3.3 - Section 4.2.3.3		
Flood mitigation - Negligible change to off-site flood regime (including flows, levels, storage capacity or velocities) as a result of the development, beyond those predicted in the EIS - Realigned Newell Highway to be designed and constructed to achieve the same or greater flood immunity as the redundant section of highway.	Yes	- Section 3.2.1/ Section 4 - Section 4.2.1.1		
Chemical and hydrocarbon storage Chemical and hydrocarbon products to be stored in bunded areas in accordance with the relevant Australian Standard	Yes	Section 4.4		

Post Approval Review



Planning &
Environment

Documents: TGEF – Water Management Plan

Revision: Revision 1, 15/01/2024

Reviewed: 12/06/2024

Condition	Sufficient (Yes/No/ Partial)	Document reference and comment	Action Required	Company Response
Aquatic and riparian ecosystems (including Gundong Creek) - Negligible environmental consequences beyond those predicted in the document/s listed in condition A2A2(c) Maintain or improve baseline channel stability - Develop site-specific in-stream water quality objectives in accordance with the <i>Australian and New Zealand Guidelines for Fresh and Marine Water Quality (ANZECC & ARMCANZ, 2000)</i> and <i>Using the ANZECC Guidelines and Water Quality Objectives in NSW (DEC, 2006)</i>	Partial	- Section 7.3.2 - No - Section 7.3.2 It is noted in Section 3.2 that: <i>The upper catchment is densely forested and contains steeper channel sections. Bulldog Creek, which is a tributary of Gundong Creek, passes through the SAR Mine Site.</i>	Include references to how TGO will maintain or improve baseline channel stability.	Added into Section 7.3, 7.3.2 and Appendix F Baseline channel stability will be determined by physical inspection along the waterways as well as photographs taken routinely. These inspections will be used to determine if any erosion that occurs is beyond what is to be naturally expected. If unexpected erosion occurs, TGO will assess, investigate and determine the causes of erosion and take action designed to mitigate erosion and encourage the return of any creek line to a more stable state. When taking action to mitigate erosion, TGO will seek advice from a geomorphologist or from appropriate industry guidelines around stream rehabilitation.
Water Management Plan B49. The Applicant must prepare a Water Management Plan for the mine development to the satisfaction of the Planning Secretary. This plan must: a) be prepared by a suitably qualified and experienced person/s and in consultation with DPE Water, EPA, and Dams Safety NSW;	Yes	Section 1.5		
b) describe the measures to be implemented to ensure that the Applicant complies with the water management performance measures (see Table 4);	Yes	Section 4/5		

Post Approval Review



Planning &
Environment

Documents: TGEP – Water Management Plan

Revision: Revision 1, 15/01/2024

Reviewed: 12/06/2024

Condition	Sufficient (Yes/No/ Partial)	Document reference and comment	Action Required	Company Response
c) include a I) Site Water Balance that includes details of: • predicted annual inflows to and outflows from the site; • sources and security of water supply for the life of the mine (including authorised entitlements and licences); • prioritisation strategy for water sources; • water storage capacity; • water use and management on the site, including opportunities to improve the efficiency of site water use and minimise the use of clean water on the site; • licensed discharge points and limits; and • reporting procedures, including annual revision of the site water balance;	Partial	Water Balance – Section 4.6 • Section 4.6.1 • Section 4.6.2 • Section 4.6.6 • Section 4.1 • Section 4.6 • Section 4.1.3.2/ 4.6.4 • No	Include reference to the annual revision of the Site Water Balance. Current Management Plan references Section 8.4 (annual review). Section 10.3 mentions the water balance model will be reported yearly in Annual Review, Neither section does not detail annual revision of SWB as per the condition.	Added to Section 10.3

Post Approval Review



Planning &
Environment

Documents: TGEF – Water Management Plan

Revision: Revision 1, 15/01/2024

Reviewed: 12/06/2024

Condition	Sufficient (Yes/No/ Partial)	Document reference and comment	Action Required	Company Response
II) Erosion and Sediment Control Plan , that: • is consistent with the requirements of the <i>Managing Urban Stormwater: Soils and Construction Manual</i> (Landcom 2004, or its latest version); • identifies activities that could cause soil erosion or generate sediment; • includes a program to review the adequacy of flood protection works, and ensure they comply with the relevant performance measures listed in Table 4; • describes measures to minimise soil erosion; • describes the location, function, and capacity of erosion and sediment control structures; and • describes what measures would be implemented to maintain (and if necessary decommission) the structures over time;	Yes	Section 4.7 – Erosion and Sediment Control • Section 4.7.1 • Section 4.7.2 • Section 4.7.3 • Section 4.7.3.1 • Section 4.7.3.2 • Section 2.4		
III) Surface Water Management Plan , that includes: • detailed baseline data on surface water flows, quality of watercourses and/or waterbodies potentially impacted by the development, including: ○ stream and riparian health; and ○ channel stability (geomorphology); • a detailed description of the surface water management system;	Yes	Section 4 – Water Management System •Section 6.1 • Section 4.1/4.2 We see response to requirements within App B.		

Post Approval Review



**Planning &
Environment**

Documents: TGEF – Water Management Plan

Revision: Revision 1, 15/01/2024

Reviewed: 12/06/2024

Condition	Sufficient (Yes/No/ Partial)	Document reference and comment	Action Required	Company Response
• detailed plans, design objectives and performance criteria for water management infrastructure, including: ○ water run-off diversions and catch drains, including the clean water and dirty water separation levee; ○ clean water storages, mine water storages and sediment dams; ○ emplacement areas, including monitoring and management protocol for emplacement of potentially acid or sulfate generating materials; ○ residue storage facilities (RSF1 and RSF2) and decant ponds; ○ the final voids; ○ control of any potential water pollution from the rehabilitated areas of the site;	Yes	• Section 4.1 ○ Section 4.1.1 ○ Section 4.1.1.2/4.1.3.1 ○ Section 4.2.3.3 ○ Section 4.1.5.3 ○ Section 4.2.3 ○ Section 4.8		
• detailed objectives and performance criteria, including trigger levels for investigating any potentially adverse impacts (or trends) associated with the mine development for: ○ downstream surface water flows and quality; ○ stream and riparian health and channel stability (geomorphology); ○ post-mining water pollution from rehabilitated areas of the site;	Yes	• Section 7.3/ Appendix F – TARPS/ Section 4.8		

Post Approval Review



Planning &
Environment

Documents: TGEF – Water Management Plan

Revision: Revision 1, 15/01/2024

Reviewed: 12/06/2024

Condition	Sufficient (Yes/No/ Partial)	Document reference and comment	Action Required	Company Response
• a program to monitor and evaluate: ○ compliance with the relevant performance measures in Table 4 and the performance criteria in this plan; ○ potential leakage or spillage from pipelines; ○ potential acid and metalliferous drainage; ○ controlled and uncontrolled discharges and seepage/leachate from the site; ○ surface water inflows, outflows and storage volumes, to inform the Site Water Balance; ○ the effectiveness of the surface water management system, including contingency measures to be implemented during a potential failure of the water management system infrastructure; ○ the effectiveness of the Erosion and Sediment Control Plan;	Yes	Section 5.1/5.2		
• reporting procedures for the results of the monitoring program; and • a trigger action response plan to respond to any exceedances of the performance measures or performance criteria, and repair, mitigate and/or offset any adverse surface water impacts of the development, • a program to periodically upgrade and validate the surface water model for the mine development, including an independent review of the model every 3 years, and at least annual comparison of monitoring results with modelled predictions;	Yes	• Section 8.2 • TARPS – appendix F • Section 10.3		

Post Approval Review



Planning &
Environment

Documents: TGEF – Water Management Plan

Revision: Revision 1, 15/01/2024

Reviewed: 12/06/2024

Condition	Sufficient (Yes/No/ Partial)	Document reference and comment	Action Required	Company Response
IV) Groundwater Management Plan , that includes: • detailed baseline data on groundwater levels, yield and quality for groundwater resources that could be affected by the development, including privately-owned groundwater bores and groundwater dependent ecosystems; • a detailed description of the groundwater management system;	Yes	• Section 6.2/ Appendix E • Section 4.5/5.3		
• groundwater performance criteria, including trigger levels for identifying and investigating potentially adverse impacts associated with the development, on: ○ local and regional aquifers; ○ groundwater supply for other water users, such as licensed privately-owned ground water bores; ○ groundwater inflows to the mining operations; ○ seepage/leachate from underground voids, water storages, residue storage facilities, waste rock emplacements, infrastructure and processing areas, backfilled voids and final voids; and ○ groundwater dependent ecosystems;	Yes	Section 7.4.1/7.4.2 ○ TARPS ○ TARP – Complaints ○ TARPS/ Section 5.3 ○ Section 3.4.2		

Post Approval Review



Planning &
Environment

Documents: TGEF – Water Management Plan

Revision: Revision 1, 15/01/2024

Reviewed: 12/06/2024

Condition	Sufficient (Yes/No/ Partial)	Document reference and comment	Action Required	Company Response
- a program to monitor and evaluate: - compliance with the relevant performance measures listed in Table 4 and the performance criteria in this plan; - seepage/leachate from underground voids, water storages, residue storage facilities, waste rock emplacements, infrastructure and processing areas, backfilled voids and final voids, including migration over the short and long term; - groundwater inflows, outflows and storage columns, to inform the Site Water Balance; - the effectiveness of the groundwater management system;	Yes	Section 5.3 - Section 5.3.3 - Section 5.3 - Section 4.6.1 - Section 5		
- reporting procedures for the results of the monitoring program; and - a trigger action response plan to respond to any exceedances of the groundwater performance criteria, and repair, mitigate any/or offset any adverse groundwater impacts of the development; and	Yes	- Section 8 - TARPS – Appendix F		
V) a program to periodically upgrade and validate the groundwater model for the development, including a model update plan and independent review of the model every 3 years, and at least annual comparison of monitoring results with modelled predictions.	Yes	Section 8.4 Section 10.2		
B50. The Applicant must not commence construction of the SAR Mine until the Water Management Plan is approved by the Planning Secretary.	Noted			
B51. The Applicant must implement the approved Water Management Plan.	Noted			
B52. The Applicant must notify Dams Safety NSW of its intention to construct the water storage dam in the SAR Mine area, prior to commencing construction.	Noted	Condition referenced in Section 2.5		

Post Approval Review



Planning &
Environment

Documents: TGEF – Water Management Plan

Revision: Revision 1, 15/01/2024

Reviewed: 12/06/2024

Condition	Sufficient (Yes/No/ Partial)	Document reference and comment	Action Required	Company Response
Adaptive Management Condition D4 Schedule 2 Part D The Applicant must assess and manage development-related risks to ensure that there are no exceedances of the criteria and performance measures in this consent. Any exceedance of these criteria or performance measures constitutes a breach of this consent and may be subject to penalty or offence provisions under the EP&A Act or EP&A Regulation. Where any exceedance of these criteria or performance measures has occurred, the Applicant must, at the earliest opportunity: a) take all reasonable and feasible steps to ensure that the exceedance ceases and does not recur; b) consider all reasonable and feasible options for remediation (where relevant) and submit a report to the Department describing those options and any preferred remediation measures or other course of action; and c) implement reasonable remediation measures as directed by the Planning Secretary.	Yes	a) TARPS b) Section 8 c) noted		
Management Plan Requirements Condition D5 Schedule 2 Part D Management plans required under this consent must be prepared in accordance with relevant guidelines, and include where relevant:				
a) summary of relevant background or baseline data;	Yes	Section 6		
b) details of: (i) the relevant statutory requirements (including any relevant approval, licence or lease conditions); (ii) any relevant limits or performance measures and criteria; and (iii) the specific performance indicators that are proposed to be used to judge the performance of, or guide the implementation of, the development or any management measures;	Yes	Section 2		
c) any relevant commitments or recommendations identified in the document/s listed in condition A2(c);	Yes	Section 5.3		

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**Planning &
Environment**

Documents: TGEP – Water Management Plan

Revision: Revision 1, 15/01/2024

Reviewed: 12/06/2024

Condition	Sufficient (Yes/No/ Partial)	Document reference and comment	Action Required	Company Response
d) a description of the measures to be implemented to comply with the relevant statutory requirements, limits, or performance measures and criteria;	Yes	Section 4/5		
e) a program to monitor and report on the: (i) impacts and environmental performance of the development; and (ii) effectiveness of the management measures set out pursuant to paragraph (d);	Yes	Section 5		
f) a contingency plan to manage any unpredicted impacts and their consequences and to ensure that ongoing impacts reduce to levels below relevant impact assessment criteria as quickly as possible;	Yes		This is covered under Appendix F	
g) a program to investigate and implement ways to improve the environmental performance of the development over time;	Yes	Section 8.4		
h) a protocol for managing and reporting any: (i) incident, non-compliance or exceedance of any impact assessment criterion or performance measure; (ii) complaint; or (iii) failure to comply with other statutory requirements;	Partial	Section 8.4	Include reference to conditions ii) complaints; and iii) failure to comply with other statutory requirements; within Section 8.4	Added into new Section 8.2 Complaints addressed in 8.4
i) public sources of information and data to assist stakeholders in understanding environmental impacts of the development; and	Yes	Section 8.2		
j) a protocol for periodic review of the plan.	Yes	Section 10		

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Planning &
Environment

Documents: TGEF – Water Management Plan

Revision: Revision 1, 15/01/2024

Reviewed: 12/06/2024

Condition	Sufficient (Yes/No/ Partial)	Document reference and comment	Action Required	Company Response
Revision of Strategies, Plans and Programs <u>Condition D6 Schedule 2 Part D</u> Within three months of: a) the submission of an incident report under condition D8; b) the submission of an Annual Review under condition D10; c) the submission of an Independent Environmental Audit under condition D12; or d) the modification of the conditions of this consent (unless the conditions require otherwise), e) notification of a change in development phase under condition A5; or f) a direction of the Secretary under condition A3, the suitability of existing strategies, plans and programs required under this consent must be reviewed by the Applicant.	Yes	Section 10.1		
<u>Condition D7 Schedule 2 Part D</u> If necessary, to either improve the environmental performance of the development or cater for a modification or comply with a direction, the strategies, plans and programs required under this consent must be revised, to the satisfaction of the Planning Secretary. Where revisions are required, the revised document must be submitted to the Planning Secretary for approval within six weeks of the review. Note: <i>This is to ensure strategies, plans and programs are updated on a regular basis and to incorporate any recommended measures to improve the environmental performance of the development.</i>	Yes	Section 10.1		

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Planning &
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Documents: TGEF – Water Management Plan

Revision: Revision 1, 15/01/2024

Reviewed: 12/06/2024

Condition	Sufficient (Yes/No/ Partial)	Document reference and comment	Action Required	Company Response
Incident Notification <u>Condition D8 Schedule 2 Part D</u> The Planning Secretary must be notified in writing via the Major Projects website immediately after the Applicant becomes aware of an incident. The notification must identify the development (including the development application number and the name of the development if it has one) and set out the location and nature of the incident. Subsequent notification requirements must be given, and reports submitted in accordance with the requirements set out in Appendix 88.	Yes	Appendix F - TARPS		
Non-Compliance Notification <u>Condition D9 Schedule 2 Part D</u> The Planning Secretary must be notified in writing via the Major Projects website within seven days after the Applicant becomes aware of any non-compliance. A non-compliance notification must identify the development and the application number for it, set out the condition of consent that the development is non-compliant with, the way in which it does not comply and the reasons for the non-compliance (if known) and what actions have been, or will be, undertaken to address the non-compliance. <i>Note: A non-compliance which has been notified as an incident does not need to also be notified as a non-compliance.</i>	Partial	TARPS only reference Groundwater Monitoring bores for condition D9 reporting	Ensure that Condition D9 is correctly referenced throughout the Management Plan. Only appears in the Groundwater Monitoring Bores as a conditional requirement.	Added into Section 8.2



Annual Review

Condition D10 Schedule 2 Part D

By the end of September each year after the date of physical commencement of development under this consent, or other timeframe agreed by the Planning Secretary, a report must be submitted to the Department reviewing the environmental performance of the development, to the satisfaction of the Planning Secretary. This review must:

- a) describe the development (including any rehabilitation) that was carried out in the previous financial year, and the development that is proposed to be carried out over the current financial year;
- b) include a comprehensive review of the monitoring results and complaints records of the development over the previous financial year, including a comparison of these results against the:
 - (i) relevant statutory requirements, limits or performance measures/criteria;
 - (ii) requirements of any plan or program required under this consent;
 - (iii) monitoring results of previous years; and
 - (iv) relevant predictions in the document/s listed in condition A2(c);
- c) identify any non-compliance or incident which occurred in the previous financial year, and describe what actions were (or are being) taken to rectify the non-compliance and avoid reoccurrence;
- d) evaluate and report on compliance with the performance measures, criteria and operating conditions of this consent;
- e) identify any trends in the monitoring data over the life of the development;
- f) identify any discrepancies between the predicted and actual impacts of the development, and analyse the potential cause of any significant discrepancies; and
- g) describe what measures will be implemented over the next financial year to improve the environmental performance of the development.

Yes

Section 8.4

Post Approval Review



**Planning &
Environment**

Documents: TGEF – Water Management Plan

Revision: Revision 1, 15/01/2024

Reviewed: 12/06/2024

Condition	Sufficient (Yes/No/ Partial)	Document reference and comment	Action Required	Company Response
<u>Condition D11 Schedule 2 Part D</u> Copies of the Annual Review must be submitted to Council and made available to the CCC and any interested person upon request.	No		Include reference to this condition in Section 8.4	Added into Section 8.5
<u>Independent Environmental Audit</u> <u>Condition D12 Schedule 2 Part D</u> Within one year of the date of physical commencement of development under this consent, and every three years after, unless the Planning Secretary directs otherwise, the Applicant must commission and pay the full cost of an Independent Environmental Audit of the development. The audit must: a) be prepared in accordance with the <i>Independent Audit Post Approval Requirements</i> (NSW Government 2020); and b) be submitted, to the satisfaction of the Planning Secretary, within two months of undertaking the independent audit site inspection, unless otherwise agreed by the Planning Secretary.	No		Include this condition in the Management Plan	Added to Section 10.4
<u>Condition D13 Schedule 2 Part D</u> In accordance with the specific requirements of the <i>Independent Audit Post Approval Requirements</i> (NSW Government 2020), the Applicant must: a) review and respond to each Independent Audit Report prepared under condition D12 of this consent; b) submit a response to the Planning Secretary and any other NSW agency that requests it, together with a timetable for the implementation of the recommendations of the Independent Audit Report; c) implement the recommendations to the satisfaction of the Planning Secretary; and d) make each Independent Audit Report and response to it publicly available no later than 60 days after submission to the Planning Secretary.	No		Include this condition in the Management Plan	Added to Section 10.4

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Documents: TGEP – Water Management Plan

Revision: Revision 1, 15/01/2024

Reviewed: 12/06/2024

Condition	Sufficient (Yes/No/ Partial)	Document reference and comment	Action Required	Company Response
Access To Information <u>Condition D15 Schedule 2 Part D</u> Within three months of the date of physical commencement of development under this consent, until the completion of all rehabilitation required under this consent, the Applicant must: a) make the following information and documents (as they are obtained, approved or as otherwise stipulated within the conditions of this consent) publicly available on its website: (i) the document/s listed in condition A2(c); (ii) all current statutory approvals for the development; (iii) all approved strategies, plans and programs required under the conditions of this consent; (iv) minutes of CCC meetings; (v) regular reporting on the environmental performance of the development in accordance with the reporting requirements in any plans or programs approved under the conditions of this consent; (vi) a comprehensive summary of the monitoring results of the development, reported in accordance with the specifications in any conditions of this consent, or any approved plans and programs; (vii) a summary of the current phase and progress of the development; (viii) contact details to enquire about the development or to make a complaint; (ix) a complaints register, updated monthly; (x) the Annual Reviews of the development; (xi) audit reports prepared as part of any Independent Environmental Audit of the development and the Applicant's response to the recommendations in any audit report; and (xii) any other matter required by the Planning Secretary; and b) keep such information up to date, to the satisfaction of the Planning Secretary.	Partial	Management Plan only references Section 8.2 – Monitoring Results “publicly available via the TGO website” And Section 8.4 (Annual Review)	Ensure that this entire condition is included in the Management Plan	Added into Section 8.6

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**Planning &
Environment**

Documents: TGEF – Water Management Plan

Revision: Revision 1, 15/01/2024

Reviewed: 12/06/2024

Condition	Sufficient (Yes/No/ Partial)	Document reference and comment	Action Required	Company Response
General Comments		Action Required		Company Response
Other Agency Comments		Action Required		Company Response
DPE Water Water Take and Licensing 1.1 Recommendation – prior to approval Table 2.2 does not reflect updates to water sharing plans. This affects 80WA705442, WAL20270, 80CA703364 and WAL44388 which should be listed as in the Lower Macquarie Zone 6 Groundwater Source under the Water Sharing Plan for the Macquarie-Castlereagh Groundwater Sources 2020. Approval 80CW809661 needs to be updated to 80FW723901 as it was converted in 2015 following the repeal of Part 8 of the Water Act 1912.		The proponent should update Table 2.2 to reflect updates to water sharing plans and the repeal of Part 8 of the Water Act 1912.		Table 2.2 has been updated to reflect the updated WSP for the Macquarie-Castlereagh Groundwater Sources 2020. Licences converted following the repeal of Part 8 of the Water Act 1912 are also updated. Ok

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Documents: TGEP – Water Management Plan

Revision: Revision 1, 15/01/2024

Reviewed: 12/06/2024

Condition	Sufficient (Yes/No/ Partial)	Document reference and comment	Action Required	Company Response
1.2 Recommendation – post approval The average site water balance in Table 4.8 indicates insufficient entitlement is held for water take in 2026. The proponent should hold entitlement to account for the maximum potential take prior to the take occurring.		The proponent should ensure sufficient entitlement is held in a water access licence/s to account for the maximum predicted water take for each water source prior to take occurring.		The maximum groundwater take is forecast to occur in year 2026, based on the predictions of the site water balance (GHD 2021) and predictions of the numerical groundwater model (Jacobs 2021b). Of this groundwater take, 766 ML is predicted to be groundwater inflow into the mine workings and (under average rainfall conditions) 356 ML will be sourced from the borefield. The predicted mine inflows are greater than the existing groundwater entitlement for the Lachlan Fold Belt MDB Groundwater Source under WAL28643 and WAL29266. As discussed in the Groundwater Impact Assessment (Jacobs 2021b), an additional 477 ML of entitlement will need to be sourced during the operation of the mine. Jacobs (2021b) recommended that TGO initially obtain entitlement to cover the predicted groundwater take in the year 2025, which is 427 ML and obtain additional entitlement as required after re-running the groundwater model in the year 2024, following recalibration if necessary. Note that, as discussed in Section 4.6.2, borefield allocation is forecasted to peak in 2025 with 1360 ML/year required to be sourced from the borefield in a dry (5th percentile rainfall) year out of 1400 ML total annual borefield allocation. The proposed take from the borefield is less than the combined entitlement of WAL20270 and WAL44388. Ok



Geomorphic stability and riparian condition monitoring and management

2.1 Recommendation prior to approval

The WMP has not included baseline information on geomorphic and riparian condition and an ongoing monitoring program. This is required to ensure the relevant water management performance measures of Condition B48 and the requirements of B49(c)(iii) are met. Justification for design of the monitoring program should include explanation of objectives, timing, frequency and duration.

2.2 Recommendation prior to approval

Condition B49(c)(iii) of the development consent SSD-9176045 requires the development of detailed objectives, performance criteria, trigger levels and a TARP for stream and riparian health and channel stability. Table 7.1 of the WMP refers to Section 7.3.2 as potentially addressing this however its content is limited to water quality. Triggers for remedial action should be specified and provided to DPE Water for review. Justification for the TARPs and how the TARPs response triggers will be followed and reported should be included. Any remedial actions or stream rehabilitation should be guided by the Rehabilitation Manual for Australian Streams (Rutherford et al. 2000).

The proponent should update the Water Management Plan (WMP) to include baseline information on geomorphic and riparian condition and a monitoring program. This is to include:

- Inspection and photographic record of the geomorphic stability and riparian condition of any watercourses or drainage line downstream of an altered flow path. This should include any area where flow will be concentrated due to a diversion or culvert and also cover the area below discharge energy dissipators to ensure the design is effective.
- Inspection and photographic record prior to construction and for at least four flow events (where rainfall is greater than 25 mm in 24 hours leading to stream flows) or two years (whichever is longer) after works have been completed to confirm the design of diversion culvert or discharge energy dissipators is adequate.

The proponent should update the Trigger Action Response Plan (TARP) of the WMP to address stream and riparian health and channel stability.

Inclusion of a geomorphic monitoring program is not considered necessary given the zero-discharge nature of the site and lack of predicted impacts arising from potential discharges in downstream watercourses.

The site water balance (GHD 2021) indicated no increased potential for offsite discharge. We also refer to the outcomes of the Surface Water Impact Assessment (Jacobs 2021a) which indicated the ephemeral drainage lines downstream of altered flow paths are highly unlikely to be impacted:

- Impacts to Drainage Line E and Drainage Line F are of very low sensitivity, minor magnitude and insignificant consequence. These drainage lines have no defined channel banks, which result in erosion and scour potential being low during flood or high rain.
- Impacts to Gundog Creek and Bulldog Creek were considered to be of a very low sensitivity and minor magnitude and minor consequence. Gundog Creek will not be impacted as runoff would be contained within project site (as a zero-discharge site) and would not reach Gundog Creek. The culverts at Bulldog creek are designed to not increase flows or velocities during flood.
- Site infrastructure is designed for storm events greater than 25mm in 24 hours (1% AEP 72 Hour duration).

Impacts may instead be detected more perceptibly through the surface water quality monitoring program, through notable changes to TSS or turbidity.

NSW DCCEE Water has reviewed Tomingley's response to their 2.1 and 2.2 recommendations and have provided the following feedback, please address in WMP.

NSW DCCEE Water has reviewed the additional information provided by the proponent in response to recommendations 2.1 and 2.2 from previous advice

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Documents: TGEP – Water Management Plan

Revision: Revision 1, 15/01/2024

Reviewed: 12/06/2024

Condition	Sufficient (Yes/No/ Partial)	Document reference and comment	Action Required	Company Response
				(OUT23/20780). DCCEEW Water maintains the previous recommendations with further justification provided as follows. - Monitoring of the geomorphic stability and riparian condition is to ensure that design and construction of the site infrastructure related to waterways is effective. It is noted that the likelihood of geomorphic impacts is low, and so the monitoring request is minimal. This includes inspections and photographs of the locations prior to construction and after significant rainfall/flow events to confirm the design of diversion, culvert, or discharge energy dissipators is adequate. This monitoring is likely able to be incorporated into other monitoring activities. - The request for inclusion in the Trigger Action Response Plan (TARP) is required to ensure a clear process to address any issues based on the monitoring. The Rehabilitation Manual for Australian Streams (Rutherford et al. 2000) is considered appropriate as it is a standard industry guideline for stream rehabilitation.

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Planning &
Environment

Documents: TGEF – Water Management Plan

Revision: Revision 1, 15/01/2024

Reviewed: 12/06/2024

Condition	Sufficient (Yes/No/ Partial)	Document reference and comment	Action Required	Company Response
Dam Safety NSW (DSNSW) DSNSW's regulatory emphasis is centred on the safe operation and prevention of the failure of declared dams, consequently the scope of DSNSW's comments are restricted to the impact of the proposal on the declared dams within the project area. There are currently three dams declared under the 2015 NSW Dams Safety Act within the Project Area all of which are owned by Tomingley Gold Operations (TGO). The declared dams are Tomingley Residue Storage Facility 1 (TSF1), Tomingley Residue Storage Facility 2 (TSF2) and Wyoming Dam all of which are currently regulated under the 2019 NSW Dams Safety Regulation. The Project proposes construction of a significant water storage dam to the south of the Project Area near the San Antonio and Roswell Prospects (SAR Water Storage Dam). It is probable that this dam would be declarable.		Prior to construction (preferably at concept design stage) TGO will need to contact Dams Safety NSW on info@damsafety.nsw.gov.gov and provide details of the proposed SAR Water Storage Dam. Required details will include a consequence category assessment undertaken by a suitably qualified dams engineer.		As outlined in Section 2.5, TGO will notify Dam Safety NSW of its intention to construct the water storage dam in the SAR Mine area, to provide details of the proposed SAR Water Storage Dam, prior to commencing construction in accordance with Part B Condition 52 of Extension Project Approval SSD 9176045. Done

Table B.2 Regulator consultation – Department of Planning, Housing and Infrastructure – July 2024

Condition	Sufficient (Yes/No/Partial)	Document reference and comment	Action Required	Company Response
SOIL AND WATER Water Discharges B38. The Applicant must ensure that all surface discharges from the site comply with all relevant provisions of the POEO Act, including any discharge limits (both volume and quality) set for the development in any EPL.	Noted			
B39. The concentration of Weak Acid Dissociable (WAD) cyanide in tailings discharged from the discharge point to the residue storage facility must not exceed 20 mg/L (90 th percentile) or 30 mg/ L (maximum).	Yes	Section 7.3.1 (Table 7.2)		
Water Supply B40. The Applicant must ensure that it has sufficient water for all stages of the development, and if necessary, adjust the scale of the development to match its available water supply.	Yes	Section 4.6.2		
B41. The Applicant must report on water extracted from the development each year (direct and indirect) in the Annual Review, including water taken under each water licence. <i>Note: Under the Water Act 1912 and/or the Water Management Act 2000, the Applicant is required to obtain all necessary water licences for the development, including during rehabilitation and post mine closure.</i>	Yes	Section 8.4		
Compensatory Water Supply B42. The Applicant must provide a compensatory water supply to any landowner of privately-owned land whose rightful water supply is adversely and directly impacted by mining operations (other than an impact that is minor or negligible) as a result of the development, in consultation with DPE Water, and to the satisfaction of the Planning Secretary.	Yes	Section 8.3.1		
B43. The compensatory water supply measures must provide an alternative long term supply of water that is equivalent, in quality and volume, to the loss attributable to the development. Equivalent water supply should be provided (at least on an interim basis) as soon as practicable after the loss is identified, unless otherwise agreed with the landowner.	Yes	Section 8.3.1		
B44. If the Applicant and the landowner cannot agree on whether the loss of water is attributed to the development or the measures to be implemented, or there is a dispute about the implementation of these measures, then either party may refer the matter to the Planning Secretary for resolution.	No		Include references to dispute resolution in Section 8.3.1	These requirements have been added into Section 8.4.1 (Compensatory water supply)

Condition	Sufficient (Yes/No/ Partial)	Document reference and comment	Action Required	Company Response
B45. If the Applicant is unable to provide an alternative long term supply of water, then the Applicant must provide compensation, to the satisfaction of the Planning Secretary.	No		Include references if Tomingley is unable to provide alternate long-term supply of water in Section 8.3.1	These requirements have been added into Section 8.4.1 (Compensatory water supply)
B46. However, conditions B42 to B44 do not apply if the Applicant has a compensatory water agreement with the owner/s of the land and the Applicant has advised the Department in writing of the terms of this agreement. Notes: • The Water Management Plan (see condition B49) is required to include trigger levels for investigating potentially adverse impacts on water supplies. • The burden of proof that any loss of water supply is not due to mining impacts rests with the Applicant.	Noted		Include this condition in Section 8.3.1	These requirements have been added into Section 8.4.1 (Compensatory water supply)
B47. In the event of any complaint related to a privately-owned licensed groundwater bore which may, in the opinion of the Planning Secretary, have been adversely and directly impacted as a result of the development (other than an impact that is minor or negligible), the Applicant must, as soon as practicable, facilitate the provision of a temporary water supply, pending the outcome of any groundwater investigation and/or provision of an alternative long-term supply of water as required under condition B43, the satisfaction of the Planning Secretary.	Yes	Section 8.3.1		
Water Management Performance Measures B48. The Applicant must ensure that the development complies with the performance measures in Table 4 .				
Water management – General - Maintain separation between clean dirty (i.e. sediment laden) and mine water management systems - Minimise the use of clean and potable water on the site - Maximise water recycling, reuse and sharing opportunities - Minimise the need for make-up water from external supplies - Design, install, operate and maintain water management infrastructure in a proper and efficient manner - Minimise risks to the receiving environment and downstream water users	Yes	- Section 4.1.1.2 - Section 4.3 - Section 4.3.2 - Section 4.1.3 and 4.1.5 - Section 4.2.1.1 - Section 4.2		

Condition	Sufficient (Yes/No/ Partial)	Document reference and comment	Action Required	Company Response
Clean water diversions and storage infrastructure - Design, install and maintain the clean water system to capture and/or convey the 100-year ARI flood event • Maximise, as far as reasonable, the diversion of clean water around disturbed areas on the site	Yes	• Section 4.2.1.1 • Section 4.2		
Residue Storage Facility - Ensure that the capacity of the residue storage facilities (RSF1 and RSF2) and associated collection pond are designed to meet the requirements of the <i>Australian National Committee on Large Dams' Guidelines on Tailings Dams – Planning, Design and Construction, Operation and Closure</i> (July 2019) or its latest version - Designed, constructed and operated in accordance with the requirements of the Dams Safety Act 2015 and Dams Safety Regulation 2019 - Ensure that the floor and walls are lined to achieve a permeability standard equivalent to 1,000 mm clay of permeability of at least 1×10^{-9} m/s, unless otherwise agreed by the EPA and the Planning Secretary	Yes	• Section 4.1.5.3 • Section 2.5 • Section 4.1.5.3		
Mine water management system, excluding the residue storage facility - Design, install and maintain mine water storage infrastructure to ensure no unlicensed or uncontrolled discharge of mine water offsite (except in accordance with condition B388). - Ensure that all water storages on site, except open cut pit voids, that receive chemical or salt laden water, including the dewatering ponds, raw water dams and process water dams are lined to achieve a permeability standard equivalent to 1,000 mm clay of permeability of at least 1×10^{-9} m/s, unless otherwise agreed by the EPA and the Planning Secretary. - Maintain adequate freeboard (i.e. minimum 200 mm) in all process water and raw water storages at all times.	Yes	• Section 4.1.4/ 4.2.3 • Section 4.1.5.3 • Section 4.1.5.1/ 4.1.5.3/ 4.2.3.2/ 4.1.2.3		

Condition	Sufficient (Yes/No/ Partial)	Document reference and comment	Action Required	Company Response
Erosion and sediment control works – including dams - Design, install and maintain erosion and sediment controls in accordance with the best management practice guidance series <i>Managing Urban Stormwater: Soils and Construction – Volume 1 (Landcom, 2004)</i> and <i>2E Mines and Quarries (DECC, 2008)</i>. - Design, install and maintain any new infrastructure within 40 metres of watercourses in accordance with the guidance series for <i>Controlled Activities on Waterfront Land (DPI Water, 2012)</i> or latest versions and <i>Guideline for fish habitat conservation and management – Chapter 4 (DPI 2013)</i>, or its latest version.	Yes	- Section 4.7.1/4.7.3.1 - Section 4.1.1.3/ 4.2.1.2		
Aquifers Negligible impacts to fractured rock aquifers caused by the development beyond those predicted in the EIS, including: - negligible change in groundwater levels beyond those predicted; - negligible change in water quality beyond those predicted; - negligible impact to other groundwater users; and - no exceedance of the minimal impact considerations in the <i>NSW Aquifer Interference Policy</i>	Yes	Section 5.3/ 7.4		
Waste Rock Emplacement - Minimise the potential for acid mine drainage. - Design, install and maintain emplacements to encapsulate and prevent migration forming and potentially acid forming materials.	Yes	- Section 4.2.3.3 - Section 4.2.3.3		
Flood mitigation - Negligible change to off-site flood regime (including flows, levels, storage capacity or velocities) as a result of the development, beyond those predicted in the EIS. - Realigned Newell Highway to be designed and constructed to achieve the same or greater flood immunity as the redundant section of highway.	Yes	- Section 3.2.1/ Section 4 - Section 4.2.1.1		

Condition	Sufficient (Yes/No/ Partial)	Document reference and comment	Action Required	Company Response
Chemical and hydrocarbon storage Chemical and hydrocarbon products to be stored in bunded areas in accordance with the relevant Australian Standard.	Yes	Section 4.4		
Aquatic and riparian ecosystems (including Gundong Creek) - Negligible environmental consequences beyond those predicted in the document/s listed in condition A2A2(c) - Maintain or improve baseline channel stability - Develop site-specific in-stream water quality objectives in accordance with the <i>Australian and New Zealand Guidelines for Fresh and Marine Water Quality (ANZECC & ARMCANZ, 2000)</i> and <i>Using the ANZECC Guidelines and Water Quality Objectives in NSW (DEC, 2006)</i>	Partial	- Section 7.3.2 - No - Section 7.3.2 It is noted in Section 3.2 that: <i>The upper catchment is densely forested and contains steeper channel sections. Bulldog Creek, which is a tributary of Gundong Creek, passes through the SAR Mine Site.</i>	Include references to how TGO will maintain or improve baseline channel stability.	Added into Section 5.2.2, 6.2, 7.3, 7.3.3 and Appendix F A baseline monitoring program and routine monitoring program have been included in Section 5.2.2. Baseline channel stability will be determined by physical inspection along the waterways as well as photographs taken routinely. These baseline inspections will be used to determine if any erosion that occurs is beyond what is to be naturally expected during operational routine inspections. As identified in Section 6.2 The baseline condition will be documented in the WMP once a suitable baseline is complete. As included in Section 7.3, if significant erosion or changes to the downstream watercourses are noted, TGO will assess, investigate and determine the cause of such erosion. If the erosion is determined to have been influenced by TGO operations, action will be taken to mitigate erosion and rehabilitate the watercourse. For any erosion management works within a watercourse, TGO will seek advice from a suitably qualified professional (geomorphologist) and implement the management works in accordance with industry standard guidelines.

Condition	Sufficient (Yes/No/ Partial)	Document reference and comment	Action Required	Company Response
				When taking action to mitigate erosion, TGO will seek advice from a geomorphologist or from appropriate industry guidelines around stream rehabilitation.
Water Management Plan B49. The Applicant must prepare a Water Management Plan for the mine development to the satisfaction of the Planning Secretary. This plan must: a) be prepared by a suitably qualified and experienced person/s and in consultation with DPE Water, EPA, and Dams Safety NSW;	Yes	Section 1.5		
b) describe the measures to be implemented to ensure that the Applicant complies with the water management performance measures (see Table 4);	Yes	• Section 4/5		
c) include a I) Site Water Balance that includes details of: • predicted annual inflows to and outflows from the site; • sources and security of water supply for the life of the mine (including authorised entitlements and licences); • prioritisation strategy for water sources; • water storage capacity; • water use and management on the site, including opportunities to improve the efficiency of site water use and minimise the use of clean water on the site; • licensed discharge points and limits; and • reporting procedures, including annual revision of the site water balance;	Partial	Water Balance – Section 4.6 • Section 4.6.1 • Section 4.6.2 • Section 4.6.6 • Section 4.1 • Section 4.6 • Section 4.1.3.2/ 4.6.4 • No	Include reference to the annual revision of the Site Water Balance. Current Management Plan references Section 8.4 (annual review). Section 10.3 mentions the water balance model will be reported yearly in Annual Review, Neither section does not detail annual revision of SWB as per the condition.	Added to Section 10.3

Condition	Sufficient (Yes/No/ Partial)	Document reference and comment	Action Required	Company Response
II) Erosion and Sediment Control Plan , that: • is consistent with the requirements of the <i>Managing Urban Stormwater: Soils and Construction Manual</i> (Landcom 2004, or its latest version); • identifies activities that could cause soil erosion or generate sediment; • includes a program to review the adequacy of flood protection works, and ensure they comply with the relevant performance measures listed in Table 4; • describes measures to minimise soil erosion; • describes the location, function, and capacity of erosion and sediment control structures; and • describes what measures would be implemented to maintain (and if necessary decommission) the structures over time;	Yes	Section 4.7 – Erosion and Sediment Control • Section 4.7.1 • Section 4.7.2 • Section 4.7.3 • Section 4.7.3.1 • Section 4.7.3.2 • Section 2.4		
III) Surface Water Management Plan , that includes: • detailed baseline data on surface water flows, quality of watercourses and/or waterbodies potentially impacted by the development, including: ○ stream and riparian health; and ○ channel stability (geomorphology); • a detailed description of the surface water management system;	Yes	Section 4 – Water Management System •Section 6.1 • Section 4.1/4.2 We see response to requirements within App B.		
• detailed plans, design objectives and performance criteria for water management infrastructure, including: ○ water run-off diversions and catch drains, including the clean water and dirty water separation levee; ○ clean water storages, mine water storages and sediment dams; ○ emplacement areas, including monitoring and management protocol for emplacement of potentially acid or sulfate generating materials; ○ residue storage facilities (RSF1 and RSF2) and decant ponds; ○ the final voids; ○ control of any potential water pollution from the rehabilitated areas of the site;	Yes	• Section 4.1 ○ Section 4.1.1 ○ Section 4.1.1.2/4.1.3.1 ○ Section 4.2.3.3 ○ Section 4.1.5.3 ○ Section 4.2.3 ○ Section 4.8		

Condition	Sufficient (Yes/No/ Partial)	Document reference and comment	Action Required	Company Response
• detailed objectives and performance criteria, including trigger levels for investigating any potentially adverse impacts (or trends) associated with the mine development for: ○ downstream surface water flows and quality; ○ stream and riparian health and channel stability (geomorphology); ○ post-mining water pollution from rehabilitated areas of the site;	Yes	• Section 7.3/ Appendix F – TARPS/ Section 4.8		
• a program to monitor and evaluate: ○ compliance with the relevant performance measures in Table 4 and the performance criteria in this plan; ○ potential leakage or spillage from pipelines; ○ potential acid and metalliferous drainage; ○ controlled and uncontrolled discharges and seepage/leachate from the site; ○ surface water inflows, outflows and storage volumes, to inform the Site Water Balance; ○ the effectiveness of the surface water management system, including contingency measures to be implemented during a potential failure of the water management system infrastructure; ○ the effectiveness of the Erosion and Sediment Control Plan;	Yes	Section 5.1/5.2		
• reporting procedures for the results of the monitoring program; and • a trigger action response plan to respond to any exceedances of the performance measures or performance criteria, and repair, mitigate and/or offset any adverse surface water impacts of the development, • a program to periodically upgrade and validate the surface water model for the mine development, including an independent review of the model every 3 years, and at least annual comparison of monitoring results with modelled predictions;	Yes	• Section 8.2 • TARPS – appendix F • Section 10.3		
IV) Groundwater Management Plan, that includes: • detailed baseline data on groundwater levels, yield and quality for groundwater resources that could be affected by the development, including privately-owned groundwater bores and groundwater dependent ecosystems; • a detailed description of the groundwater management system;	Yes	• Section 6.2/ Appendix E • Section 4.5/5.3		

Condition	Sufficient (Yes/No/Partial)	Document reference and comment	Action Required	Company Response
- groundwater performance criteria, including trigger levels for identifying and investigating potentially adverse impacts associated with the development, on: - local and regional aquifers; - groundwater supply for other water users, such as licensed privately-owned ground water bores; - groundwater inflows to the mining operations; - seepage/leachate from underground voids, water storages, residue storage facilities, waste rock emplacements, infrastructure and processing areas, backfilled voids and final voids; and - groundwater dependent ecosystems;	Yes	Section 7.4.1/7.4.2 - TARPS - TARP – Complaints - TARPS/ Section 5.3 - Section 3.4.2		
- a program to monitor and evaluate: - compliance with the relevant performance measures listed in Table 4 and the performance criteria in this plan; - seepage/leachate from underground voids, water storages, residue storage facilities, waste rock emplacements, infrastructure and processing areas, backfilled voids and final voids, including migration over the short and long term; - groundwater inflows, outflows and storage columns, to inform the Site Water Balance; - the effectiveness of the groundwater management system;	Yes	Section 5.3 - Section 5.3.3 - Section 5.3 - Section 4.6.1 - Section 5		
- reporting procedures for the results of the monitoring program; and - a trigger action response plan to respond to any exceedances of the groundwater performance criteria, and repair, mitigate any/or offset any adverse groundwater impacts of the development; and	Yes	- Section 8 - TARPS – Appendix F		
V) a program to periodically upgrade and validate the groundwater model for the development, including a model update plan and independent review of the model every 3 years, and at least annual comparison of monitoring results with modelled predictions.	Yes	Section 8.4 Section 10.2		
B50. The Applicant must not commence construction of the SAR Mine until the Water Management Plan is approved by the Planning Secretary.	Noted			

Condition	Sufficient (Yes/No/ Partial)	Document reference and comment	Action Required	Company Response
B51. The Applicant must implement the approved Water Management Plan.	Noted			
B52. The Applicant must notify Dams Safety NSW of its intention to construct the water storage dam in the SAR Mine area, prior to commencing construction.	Noted	Condition referenced in Section 2.5		
Adaptive Management Condition D4 Schedule 2 Part D The Applicant must assess and manage development-related risks to ensure that there are no exceedances of the criteria and performance measures in this consent. Any exceedance of these criteria or performance measures constitutes a breach of this consent and may be subject to penalty or offence provisions under the EP&A Act or EP&A Regulation. Where any exceedance of these criteria or performance measures has occurred, the Applicant must, at the earliest opportunity: a) take all reasonable and feasible steps to ensure that the exceedance ceases and does not recur; b) consider all reasonable and feasible options for remediation (where relevant) and submit a report to the Department describing those options and any preferred remediation measures or other course of action; and c) implement reasonable remediation measures as directed by the Planning Secretary.	Yes	a) TARPS b) Section 8 c) noted		
Management Plan Requirements Condition D5 Schedule 2 Part D Management plans required under this consent must be prepared in accordance with relevant guidelines, and include where relevant:				
a) summary of relevant background or baseline data;	Yes	Section 6		
b) details of: (i) the relevant statutory requirements (including any relevant approval, licence or lease conditions); (ii) any relevant limits or performance measures and criteria; and (iii) the specific performance indicators that are proposed to be used to judge the performance of, or guide the implementation of, the development or any management measures;	Yes	Section 2		

Condition	Sufficient (Yes/No/ Partial)	Document reference and comment	Action Required	Company Response
c) any relevant commitments or recommendations identified in the document/s listed in condition A2(c);	Yes	Section 5.3		
d) a description of the measures to be implemented to comply with the relevant statutory requirements, limits, or performance measures and criteria;	Yes	Section 4/5		
e) a program to monitor and report on the: (i) impacts and environmental performance of the development; and (ii) effectiveness of the management measures set out pursuant to paragraph (d);	Yes	Section 5		
f) a contingency plan to manage any unpredicted impacts and their consequences and to ensure that ongoing impacts reduce to levels below relevant impact assessment criteria as quickly as possible;	Yes		This is covered under Appendix F	
g) a program to investigate and implement ways to improve the environmental performance of the development over time;	Yes	Section 8.4		
h) a protocol for managing and reporting any: (i) incident, non-compliance or exceedance of any impact assessment criterion or performance measure; (ii) complaint; or (iii) failure to comply with other statutory requirements;	Partial	Section 8.4	Include reference to conditions ii) complaints; and iii) failure to comply with other statutory requirements; within Section 8.4	Added into new Section 8.2 Complaints addressed in 8.4
i) public sources of information and data to assist stakeholders in understanding environmental impacts of the development; and	Yes	Section 8.2		
j) a protocol for periodic review of the plan.	Yes	Section 10		
Revision of Strategies, Plans and Programs Condition D6 Schedule 2 Part D Within three months of: a) the submission of an incident report under condition D8; b) the submission of an Annual Review under condition D10; c) the submission of an Independent Environmental Audit under condition D12; or d) the modification of the conditions of this consent (unless the conditions require otherwise), e) notification of a change in development phase under condition A5; or f) a direction of the Secretary under condition A3, the suitability of existing strategies, plans and programs required under this consent must be reviewed by the Applicant.	Yes	Section 10.1		

Condition	Sufficient (Yes/No/ Partial)	Document reference and comment	Action Required	Company Response
<u>Condition D7 Schedule 2 Part D</u> If necessary, to either improve the environmental performance of the development or cater for a modification or comply with a direction, the strategies, plans and programs required under this consent must be revised, to the satisfaction of the Planning Secretary. Where revisions are required, the revised document must be submitted to the Planning Secretary for approval within six weeks of the review. <i>Note: This is to ensure strategies, plans and programs are updated on a regular basis and to incorporate any recommended measures to improve the environmental performance of the development.</i>	Yes	Section 10.1		
<u>Incident Notification</u> <u>Condition D8 Schedule 2 Part D</u> The Planning Secretary must be notified in writing via the Major Projects website immediately after the Applicant becomes aware of an incident. The notification must identify the development (including the development application number and the name of the development if it has one) and set out the location and nature of the incident. Subsequent notification requirements must be given, and reports submitted in accordance with the requirements set out in Appendix 88.	Yes	Appendix F - TARPS		
<u>Non-Compliance Notification</u> <u>Condition D9 Schedule 2 Part D</u> The Planning Secretary must be notified in writing via the Major Projects website within seven days after the Applicant becomes aware of any non-compliance. A non-compliance notification must identify the development and the application number for it, set out the condition of consent that the development is non-compliant with, the way in which it does not comply and the reasons for the non-compliance (if known) and what actions have been, or will be, undertaken to address the non-compliance. <i>Note: A non-compliance which has been notified as an incident does not need to also be notified as a non-compliance.</i>	Partial	TARPS only reference Groundwater Monitoring bores for condition D9 reporting	Ensure that Condition D9 is correctly referenced throughout the Management Plan. Only appears in the Groundwater Monitoring Bores as a conditional requirement.	Added into Section 8.2 Included in Appendix F TARPS where relevant

Condition	Sufficient (Yes/No/ Partial)	Document reference and comment	Action Required	Company Response
Annual Review <u>Condition D10 Schedule 2 Part D</u> By the end of September each year after the date of physical commencement of development under this consent, or other timeframe agreed by the Planning Secretary, a report must be submitted to the Department reviewing the environmental performance of the development, to the satisfaction of the Planning Secretary. This review must: a) describe the development (including any rehabilitation) that was carried out in the previous financial year, and the development that is proposed to be carried out over the current financial year; b) include a comprehensive review of the monitoring results and complaints records of the development over the previous financial year, including a comparison of these results against the: (i) relevant statutory requirements, limits or performance measures/criteria; (ii) requirements of any plan or program required under this consent; (iii) monitoring results of previous years; and (iv) relevant predictions in the document/s listed in condition A2(c); c) identify any non-compliance or incident which occurred in the previous financial year, and describe what actions were (or are being) taken to rectify the non-compliance and avoid reoccurrence; d) evaluate and report on compliance with the performance measures, criteria and operating conditions of this consent; e) identify any trends in the monitoring data over the life of the development; f) identify any discrepancies between the predicted and actual impacts of the development, and analyse the potential cause of any significant discrepancies; and g) describe what measures will be implemented over the next financial year to improve the environmental performance of the development.	Yes	Section 8.4		

Condition	Sufficient (Yes/No/ Partial)	Document reference and comment	Action Required	Company Response
<u>Condition D11 Schedule 2 Part D</u> Copies of the Annual Review must be submitted to Council and made available to the CCC and any interested person upon request.	No		Include reference to this condition in Section 8.4	Added into Section 8.5
<u>Independent Environmental Audit</u> <u>Condition D12 Schedule 2 Part D</u> Within one year of the date of physical commencement of development under this consent, and every three years after, unless the Planning Secretary directs otherwise, the Applicant must commission and pay the full cost of an Independent Environmental Audit of the development. The audit must: a) be prepared in accordance with the <i>Independent Audit Post Approval Requirements</i> (NSW Government 2020); and b) be submitted, to the satisfaction of the Planning Secretary, within two months of undertaking the independent audit site inspection, unless otherwise agreed by the Planning Secretary.	No		Include this condition in the Management Plan	Added to Section 10.4
<u>Condition D13 Schedule 2 Part D</u> In accordance with the specific requirements of the <i>Independent Audit Post Approval Requirements</i> (NSW Government 2020), the Applicant must: a) review and respond to each Independent Audit Report prepared under condition D12 of this consent; b) submit a response to the Planning Secretary and any other NSW agency that requests it, together with a timetable for the implementation of the recommendations of the Independent Audit Report; c) implement the recommendations to the satisfaction of the Planning Secretary; and d) make each Independent Audit Report and response to it publicly available no later than 60 days after submission to the Planning Secretary.	No		Include this condition in the Management Plan	Added to Section 10.4

Condition	Sufficient (Yes/No/ Partial)	Document reference and comment	Action Required	Company Response
Access To Information Condition D15 Schedule 2 Part D Within three months of the date of physical commencement of development under this consent, until the completion of all rehabilitation required under this consent, the Applicant must: a) make the following information and documents (as they are obtained, approved or as otherwise stipulated within the conditions of this consent) publicly available on its website: (i) the document/s listed in condition A2(c); (ii) all current statutory approvals for the development; (iii) all approved strategies, plans and programs required under the conditions of this consent; (iv) minutes of CCC meetings; (v) regular reporting on the environmental performance of the development in accordance with the reporting requirements in any plans or programs approved under the conditions of this consent; (vi) a comprehensive summary of the monitoring results of the development, reported in accordance with the specifications in any conditions of this consent, or any approved plans and programs; (vii) a summary of the current phase and progress of the development; (viii) contact details to enquire about the development or to make a complaint; (ix) a complaints register, updated monthly; (x) the Annual Reviews of the development; (xi) audit reports prepared as part of any Independent Environmental Audit of the development and the Applicant's response to the recommendations in any audit report; and (xii) any other matter required by the Planning Secretary; and b) keep such information up to date, to the satisfaction of the Planning Secretary.	Partial	Management Plan only references Section 8.2 – Monitoring Results “publicly available via the TGO website” And Section 8.4 (Annual Review)	Ensure that this entire condition is included in the Management Plan	Added into Section 8.6
General Comments		Action Required		Company Response

Other Agency Comments	Action Required	Company Response
DPE Water Water Take and Licensing 1.1 Recommendation – prior to approval Table 2.2 does not reflect updates to water sharing plans. This affects 80WA705442, WAL20270, 80CA703364 and WAL44388 which should be listed as in the Lower Macquarie Zone 6 Groundwater Source under the Water Sharing Plan for the Macquarie-Castlereagh Groundwater Sources 2020. Approval 80CW809661 needs to be updated to 80FW723901 as it was converted in 2015 following the repeal of Part 8 of the Water Act 1912.	The proponent should update Table 2.2 to reflect updates to water sharing plans and the repeal of Part 8 of the Water Act 1912.	Table 2.2 has been updated to reflect the updated WSP for the Macquarie-Castlereagh Groundwater Sources 2020. Licences converted following the repeal of Part 8 of the Water Act 1912 are also updated. Ok
1.2 Recommendation – post approval The average site water balance in Table 4.8 indicates insufficient entitlement is held for water take in 2026. The proponent should hold entitlement to account for the maximum potential take prior to the take occurring.	The proponent should ensure sufficient entitlement is held in a water access licence/s to account for the maximum predicted water take for each water source prior to take occurring.	The maximum groundwater take is forecast to occur in year 2026, based on the predictions of the site water balance (GHD 2021) and predictions of the numerical groundwater model (Jacobs 2021b). Of this groundwater take, 766 ML is predicted to be groundwater inflow into the mine workings and (under average rainfall conditions) 356 ML will be sourced from the borefield. The predicted mine inflows are greater than the existing groundwater entitlement for the Lachlan Fold Belt MDB Groundwater Source under WAL28643 and WAL29266. As discussed in the Groundwater Impact Assessment (Jacobs 2021b), an additional 477 ML of entitlement will need to be sourced during the operation of the mine. Jacobs (2021b) recommended that TGO initially obtain entitlement to cover the predicted groundwater take in the year 2025, which is 427 ML and obtain additional entitlement as required after re-running the groundwater model in the year 2024, following recalibration if necessary. Note that, as discussed in Section 4.6.2, borefield allocation is forecasted to peak in 2025 with 1360 ML/year required to be sourced from the borefield in a dry (5th percentile rainfall) year out of 1400 ML total annual borefield allocation. The proposed take from the borefield is less than the combined entitlement of WAL20270 and WAL44388. Ok

Other Agency Comments	Action Required	Company Response
Geomorphic stability and riparian condition monitoring and management 2.1 Recommendation prior to approval The WMP has not included baseline information on geomorphic and riparian condition and an ongoing monitoring program. This is required to ensure the relevant water management performance measures of Condition B48 and the requirements of B49(c)(iii) are met. Justification for design of the monitoring program should include explanation of objectives, timing, frequency and duration. 2.2 Recommendation prior to approval Condition B49(c)(iii) of the development consent SSD-9176045 requires the development of detailed objectives, performance criteria, trigger levels and a TARP for stream and riparian health and channel stability. Table 7.1 of the WMP refers to Section 7.3.2 as potentially addressing this however its content is limited to water quality. Triggers for remedial action should be specified and provided to DPE Water for review. Justification for the TARPs and how the TARPs response triggers will be followed and reported should be included. Any remedial actions or stream rehabilitation should be guided by the Rehabilitation Manual for Australian Streams (Rutherford et al. 2000).	The proponent should update the Water Management Plan (WMP) to include baseline information on geomorphic and riparian condition and a monitoring program. This is to include: - Inspection and photographic record of the geomorphic stability and riparian condition of any watercourses or drainage line downstream of an altered flow path. This should include any area where flow will be concentrated due to a diversion or culvert and also cover the area below discharge energy dissipators to ensure the design is effective. - Inspection and photographic record prior to construction and for at least four flow events (where rainfall is greater than 25 mm in 24 hours leading to stream flows) or two years (whichever is longer) after works have been completed to confirm the design of diversion culvert or discharge energy dissipators is adequate. The proponent should update the Trigger Action Response Plan (TARP) of the WMP to address stream and riparian health and channel stability.	Inclusion of a geomorphic monitoring program is not considered necessary given the zero-discharge nature of the site and lack of predicted impacts arising from potential discharges in downstream watercourses. The site water balance (GHD 2021) indicated no increased potential for offsite discharge. We also refer to the outcomes of the Surface Water Impact Assessment (Jacobs 2021a) which indicated the ephemeral drainage lines downstream of altered flow paths are highly unlikely to be impacted: • Impacts to Drainage Line E and Drainage Line F are of very low sensitivity, minor magnitude and insignificant consequence. These drainage lines have no defined channel banks, which result in erosion and scour potential being low during flood or high rain. • Impacts to Gundog Creek and Bulldog Creek were considered to be of a very low sensitivity and minor magnitude and minor consequence. Gundog Creek will not be impacted as runoff would be contained within project site (as a zero-discharge site) and would not reach Gundog Creek. The culverts at Bulldog creek are designed to not increase flows or velocities during flood. • Site infrastructure is designed for storm events greater than 25mm in 24 hours (1% AEP 72 Hour duration). Impacts may instead be detected more perceptibly through the surface water quality monitoring program, through notable changes to TSS or turbidity. NSW DCCEEW Water has reviewed Tomingley's response to their 2.1 and 2.2 recommendations and have provided the following feedback, please address in WMP.

Other Agency Comments	Action Required	Company Response
		<i>NSW DCCEE Water has reviewed the additional information provided by the proponent in response to recommendations 2.1 and 2.2 from previous advice (OUT23/20780). DCCEE Water maintains the previous recommendations with further justification provided as follows.</i> <i>Monitoring of the geomorphic stability and riparian condition is to ensure that design and construction of the site infrastructure related to waterways is effective. It is noted that the likelihood of geomorphic impacts is low, and so the monitoring request is minimal. This includes inspections and photographs of the locations prior to construction and after significant rainfall/flow events to confirm the design of diversion, culvert, or discharge energy dissipators is adequate. This monitoring is likely able to be incorporated into other monitoring activities.</i> <i>The request for inclusion in the Trigger Action Response Plan (TARP) is required to ensure a clear process to address any issues based on the monitoring. The Rehabilitation Manual for Australian Streams (Rutherford et al. 2000) is considered appropriate as it is a standard industry guideline for stream rehabilitation.</i> A monitoring program for baseline and operational watercourse stability has been included in Section 5.2.2, with placeholder for baseline monitoring results in Section 6.2. Performance criteria and triggers have also been included in Section 7.3.3. The TARPs have been updated to reflect the required actions and response plan if criteria is exceeded, including reference to the Rehabilitation Manual for Australian Streams and for escalation of incidents to non compliance notification to the Department.

Other Agency Comments	Action Required	Company Response
Dam Safety NSW (DSNSW) DSNSW's regulatory emphasis is centred on the safe operation and prevention of the failure of declared dams, consequently the scope of DSNSW's comments are restricted to the impact of the proposal on the declared dams within the project area. There are currently three dams declared under the 2015 NSW Dams Safety Act within the Project Area all of which are owned by Tomingley Gold Operations (TGO). The declared dams are Tomingley Residue Storage Facility 1 (TSF1), Tomingley Residue Storage Facility 2 (TSF2) and Wyoming Dam all of which are currently regulated under the 2019 NSW Dams Safety Regulation. The Project proposes construction of a significant water storage dam to the south of the Project Area near the San Antonio and Roswell Prospects (SAR Water Storage Dam). It is probable that this dam would be declarable.	Prior to construction (preferably at concept design stage) TGO will need to contact Dams Safety NSW on info@damsafety.nsw.gov.gov and provide details of the proposed SAR Water Storage Dam. Required details will include a consequence category assessment undertaken by a suitably qualified dams engineer.	As outlined in Section 2.5, TGO will notify Dam Safety NSW of its intention to construct the water storage dam in the SAR Mine area, to provide details of the proposed SAR Water Storage Dam, prior to commencing construction in accordance with Part B Condition 52 of Extension Project Approval SSD 9176045. Done

Appendix C

Registered groundwater works

Table C.1 *Registered groundwater works within 10 km of TGO Mine boundary and SAR open cut*

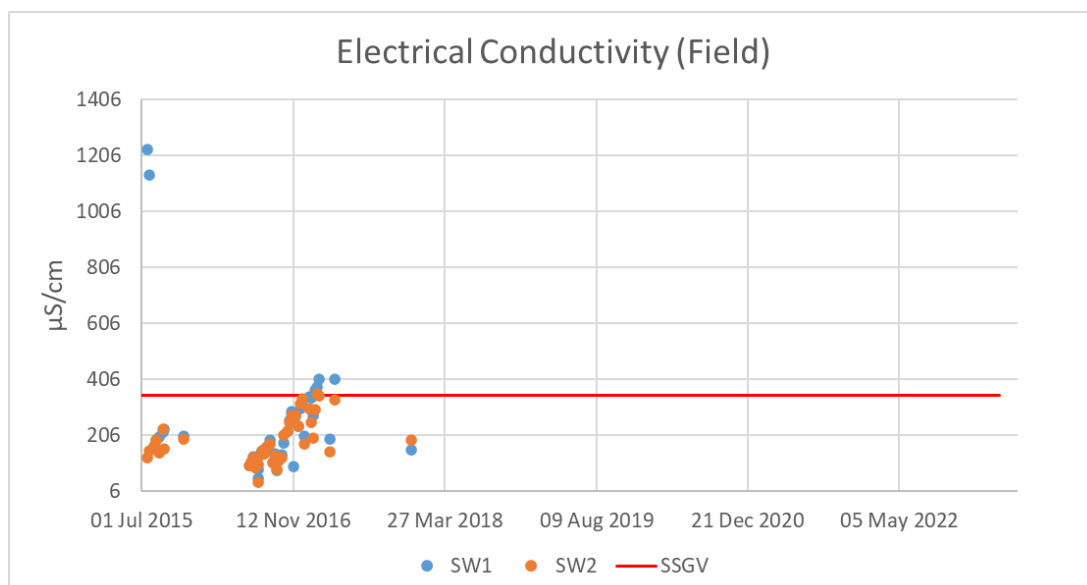
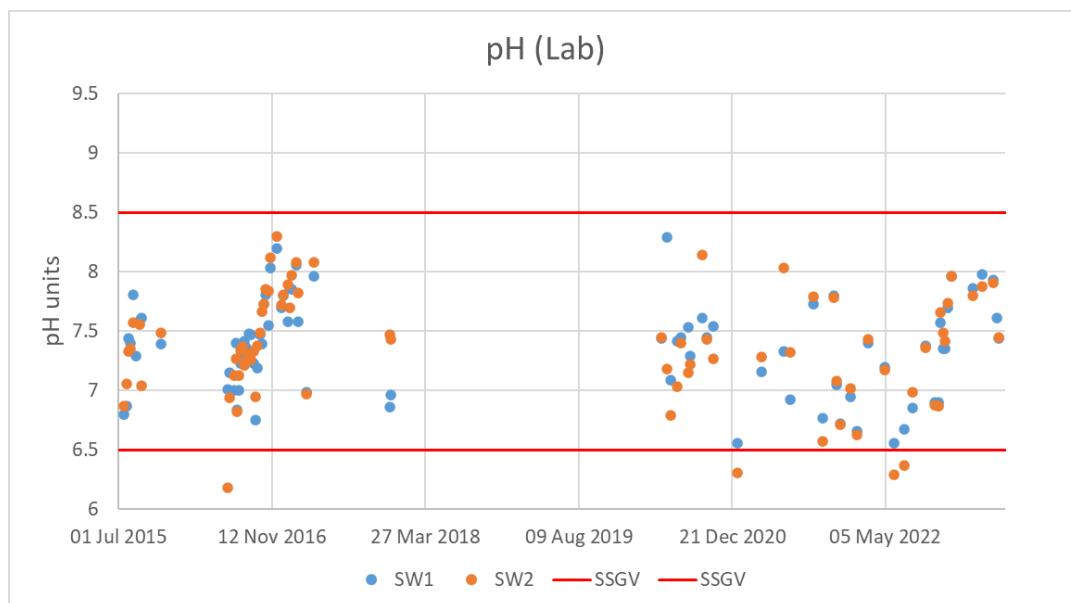
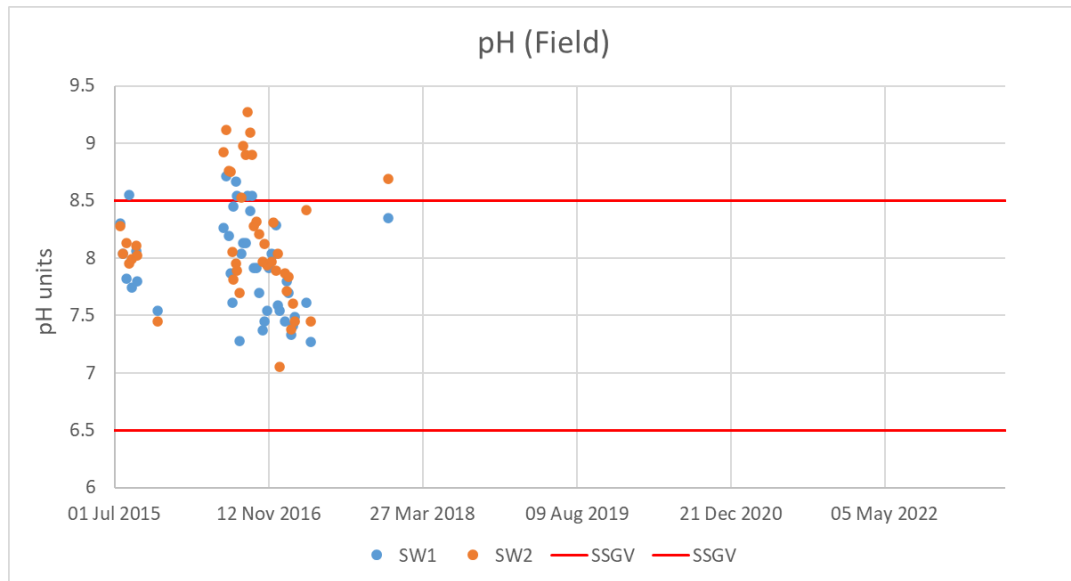
Bore ID	Bore depth (m)	Drilled date	Purpose	Status	Standing water level depth (m)	Latitude	Longitude
GW012385	44.1	1/10/1959	Exploration	Unknown	7.3	-32.5332	148.1234
GW023198	48.8	1/01/1965	Stock and Domestic	Unknown	36.6	-32.6515	148.1201
GW028886	121.9	1/09/1967	Stock and Domestic	Unknown		-32.7001	148.1867
GW034897	1.8		Water Supply	Unknown		-32.5462	148.2031
GW037395	4.5		Irrigation	Unknown	2.1	-32.5498	148.2409
GW045134	18.3	1/06/1975	Water Supply	Proposed		-32.5607	148.2223
GW045135	3.7	1/06/1975	Water Supply	Proposed	0.9	-32.5496	148.2526
GW045136	5.2	1/06/1975	Water Supply	Proposed		-32.5462	148.2545
GW045137	12.2	1/06/1975	Water Supply	Proposed		-32.5646	148.2298
GW054594	61.6		Water Supply	Functioning		-32.6801	148.2481
GW066562	73	28/04/1990	Monitoring	Proposed		-32.6426	148.2504
GW068651	97	27/04/1990	Commercial and Industrial	Proposed		-32.6818	148.2424
GW800177	113.88	18/10/1995	Monitoring	Removed	1	-32.5284	148.2706
GW800178	80	19/10/1995	Monitoring	Removed		-32.5284	148.2706
GW801568	81	30/03/2002	Water Supply	Removed		-32.6646	148.2692
GW802834	77	25/05/1997	Monitoring	Proposed	42	-32.6797	148.2504
GW802842	83	7/08/1997	Water Supply	Functioning	44	-32.6821	148.2503
GW803148	5.8	31/05/2005	Water Supply	Functioning	4.4	-32.5495	148.2514
GW803678	4	12/07/2008	Monitoring	Functioning		-32.5698	148.2219
GW803679	4	12/07/2008	Monitoring	Functioning		-32.5697	148.2217
GW803680	4.5	12/07/2008	Monitoring	Functioning		-32.5696	148.2217
GW803681	3.5	14/07/2008	Monitoring	Functioning		-32.5698	148.2218
GW803682	3.5	14/07/2008	Monitoring	Functioning		-32.5697	148.2218
GW804130	69	28/05/1998	Monitoring	Abandoned		-32.6328	148.1151

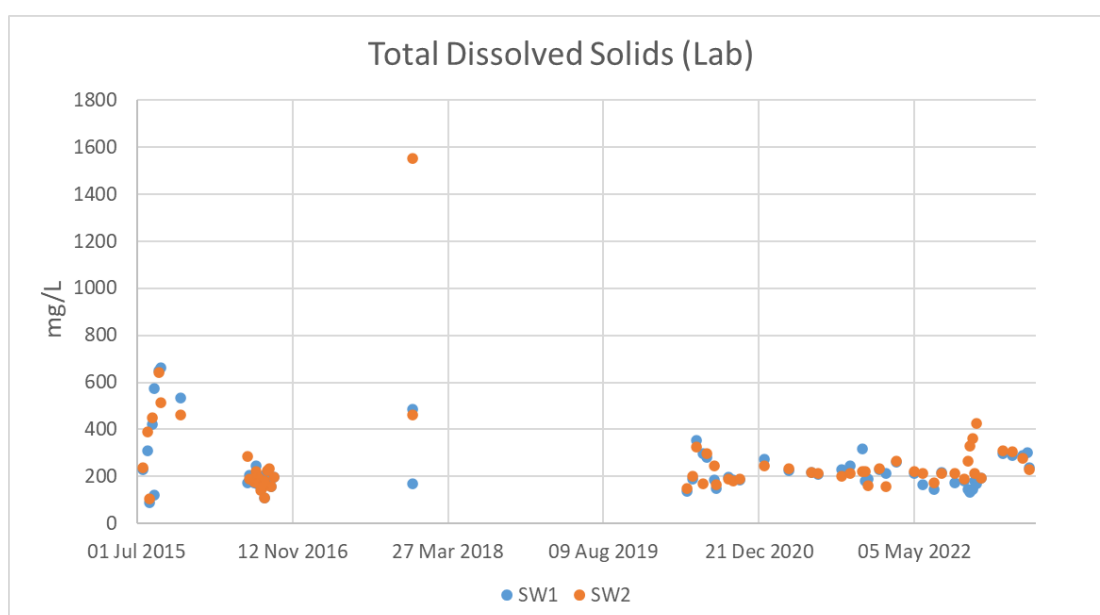
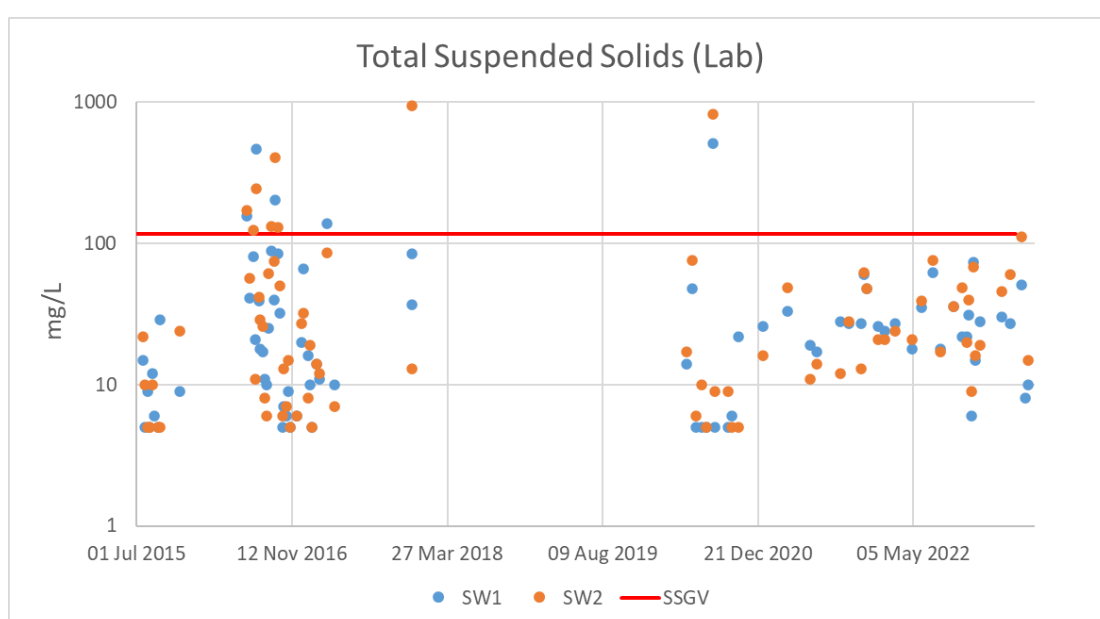
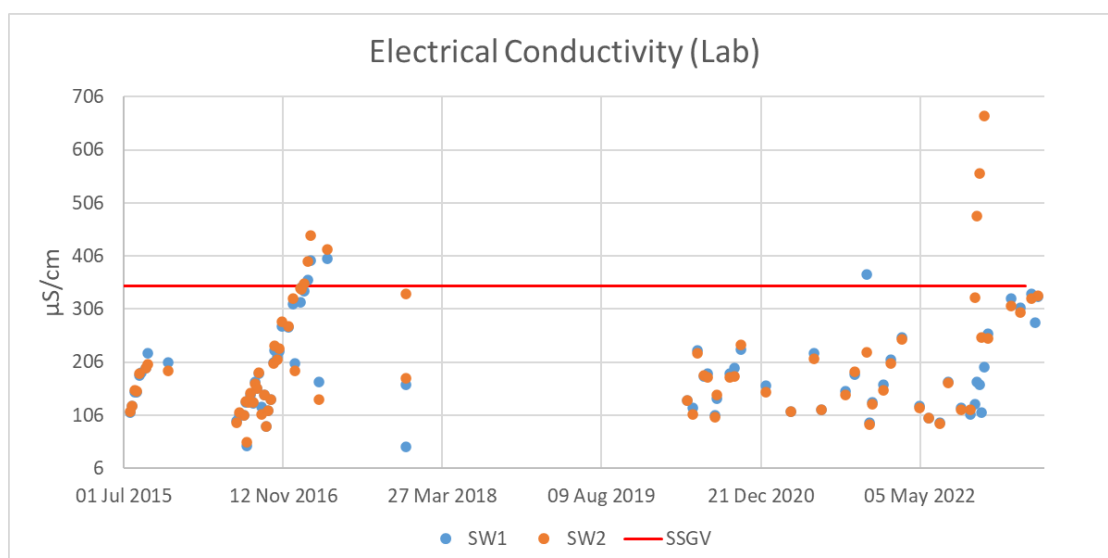
Bore ID	Bore depth (m)	Drilled date	Purpose	Status	Standing water level depth (m)	Latitude	Longitude
GW804132	61	26/05/1998	Monitoring	Abandoned		-32.6897	148.1355
GW804133	81	26/05/1998	Monitoring	Abandoned		-32.6912	148.1367
GW804136	84	29/05/1998	Monitoring	Abandoned		-32.6378	148.103
GW804137	64	11/06/1998	Monitoring	Removed		-32.5738	148.1033
GW805526	11	29/06/2015	Monitoring	Functioning		-32.5821	148.2069
GW805527	11	29/06/2015	Monitoring	Functioning		-32.5821	148.2078
GW805528	11	30/06/2015	Monitoring	Functioning		-32.582	148.2084
GW805529	12	30/06/2015	Monitoring	Functioning		-32.5821	148.2089
GW805530	11	29/06/2015	Monitoring	Functioning		-32.5823	148.2092
GW805531	11	30/06/2015	Monitoring	Functioning		-32.5817	148.2094

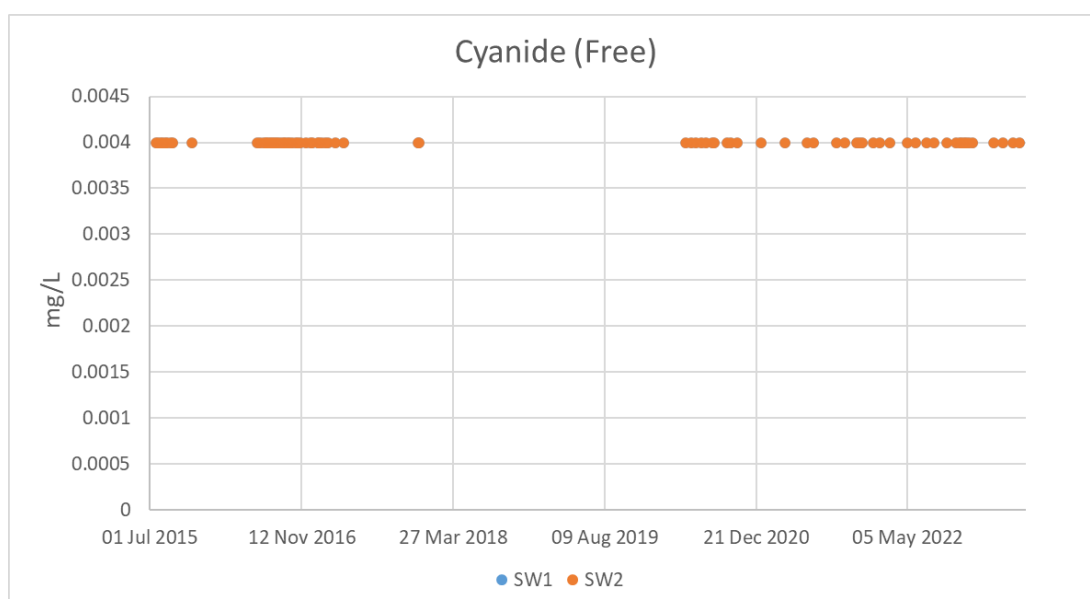
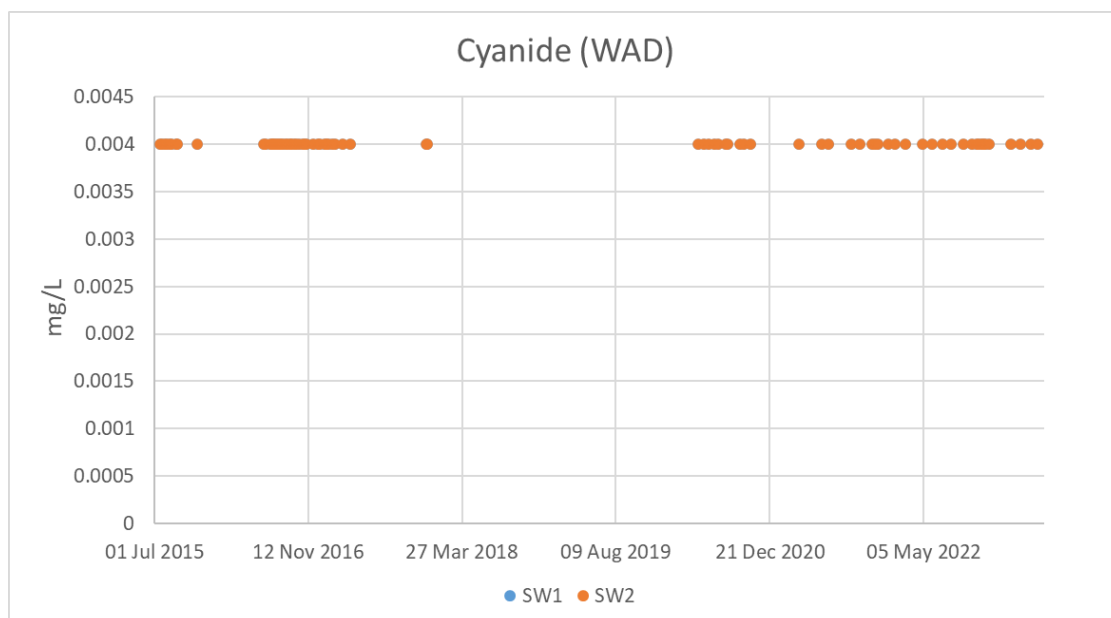
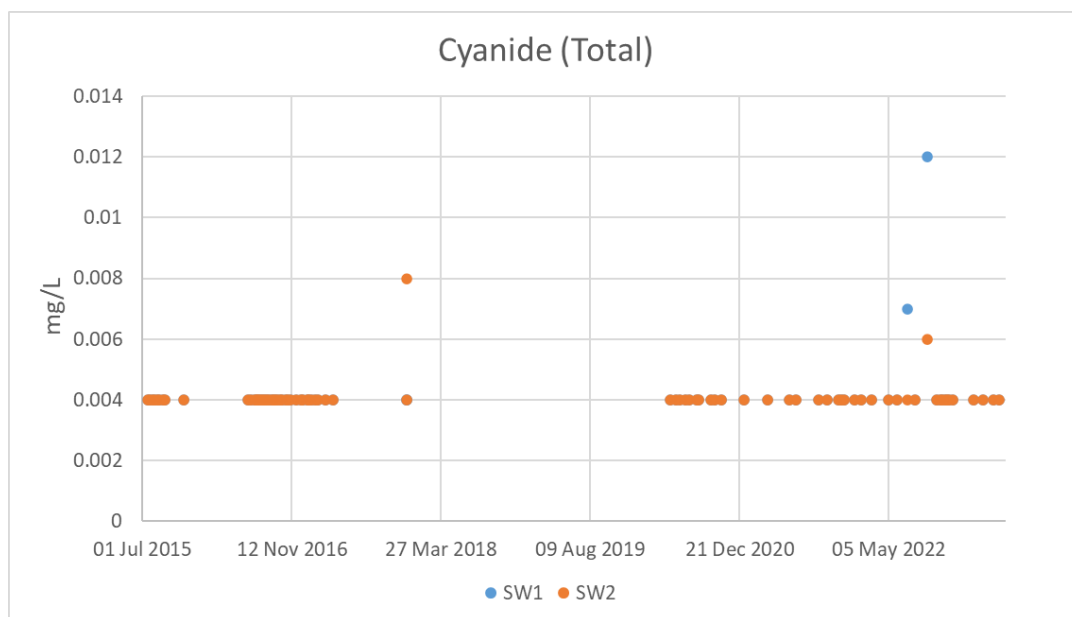
Appendix D

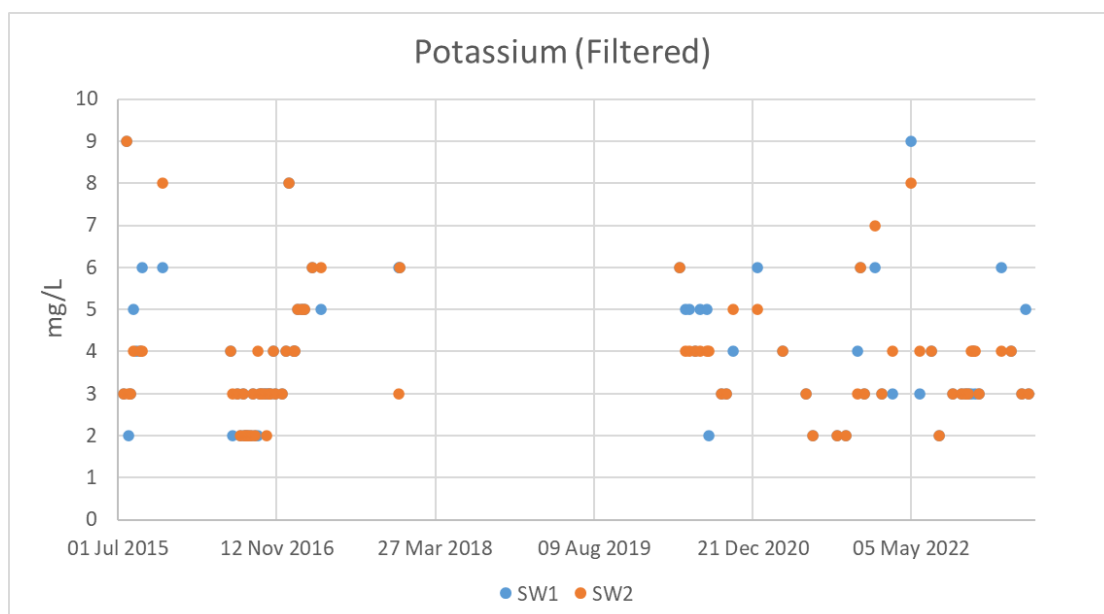
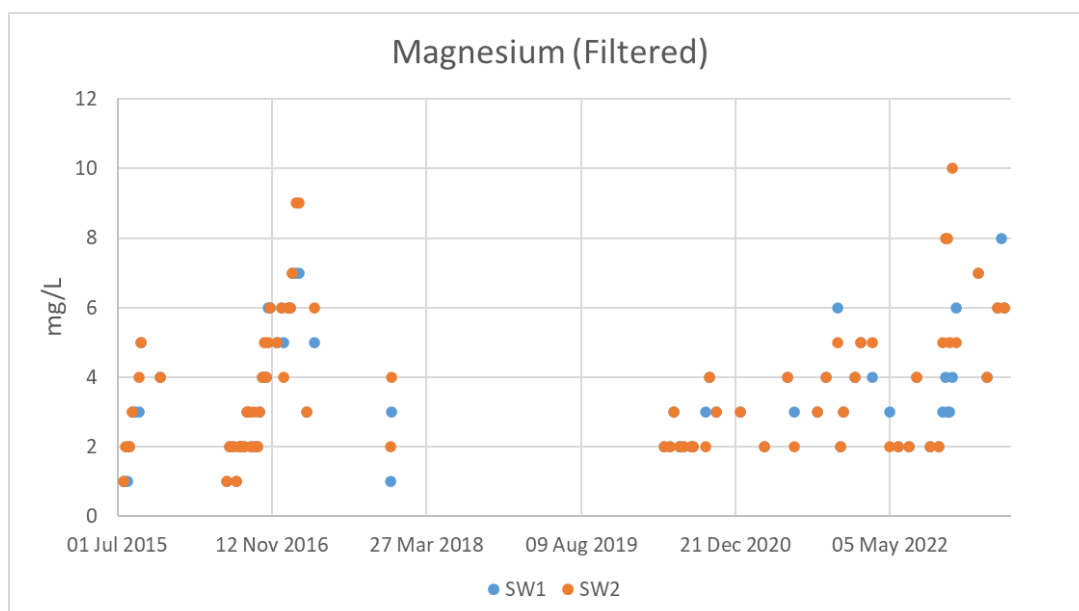
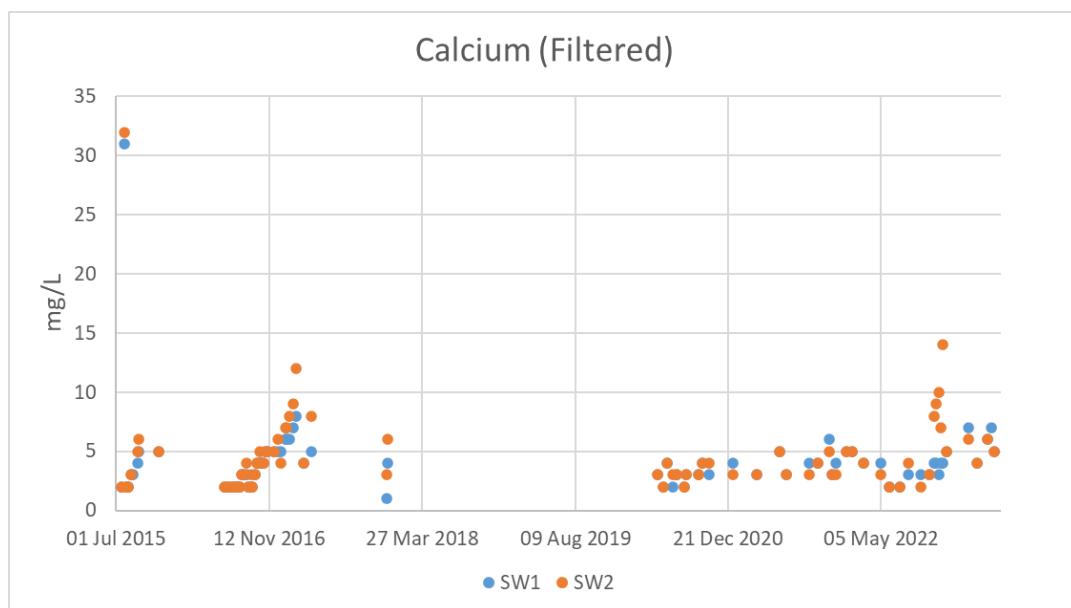
Surface water quality data

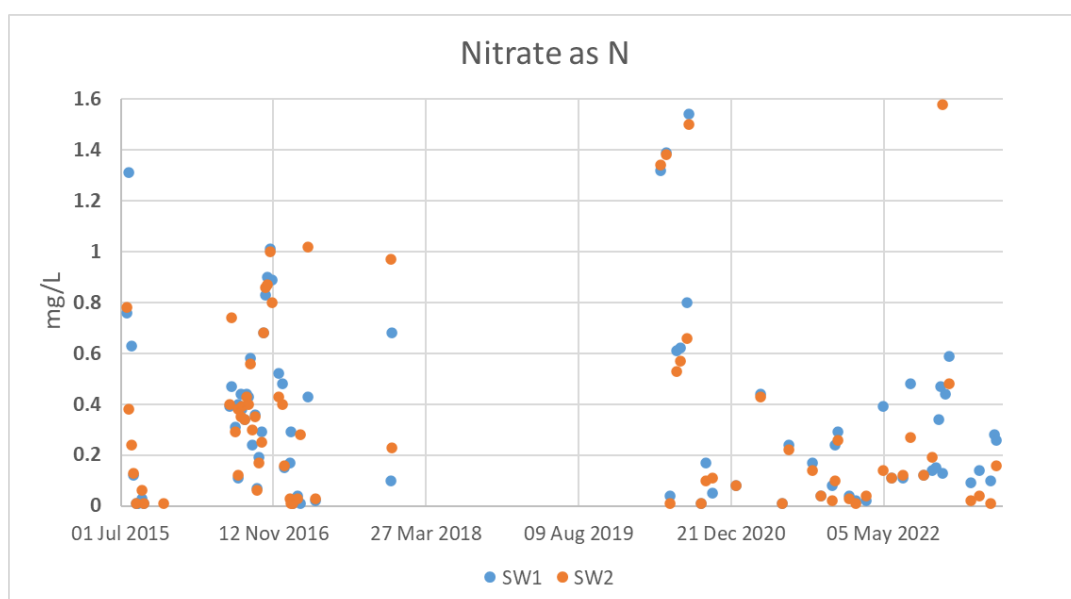
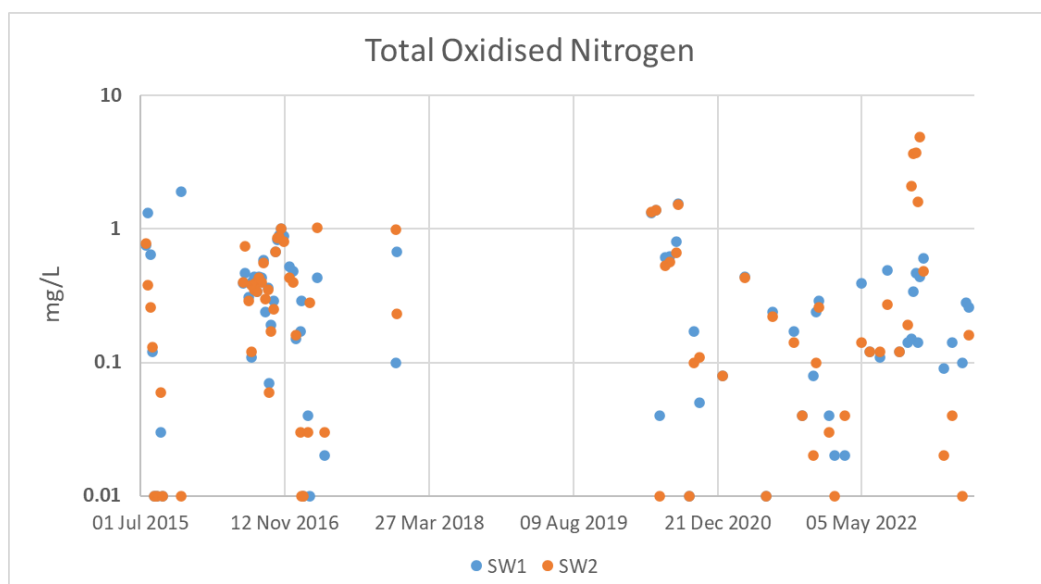
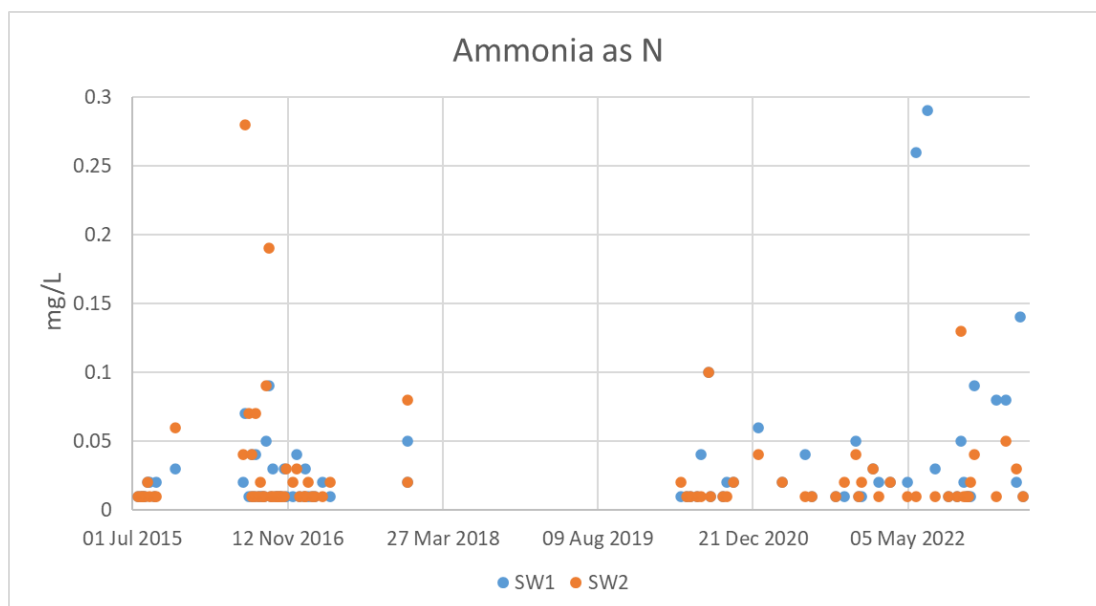
Gundong Creek

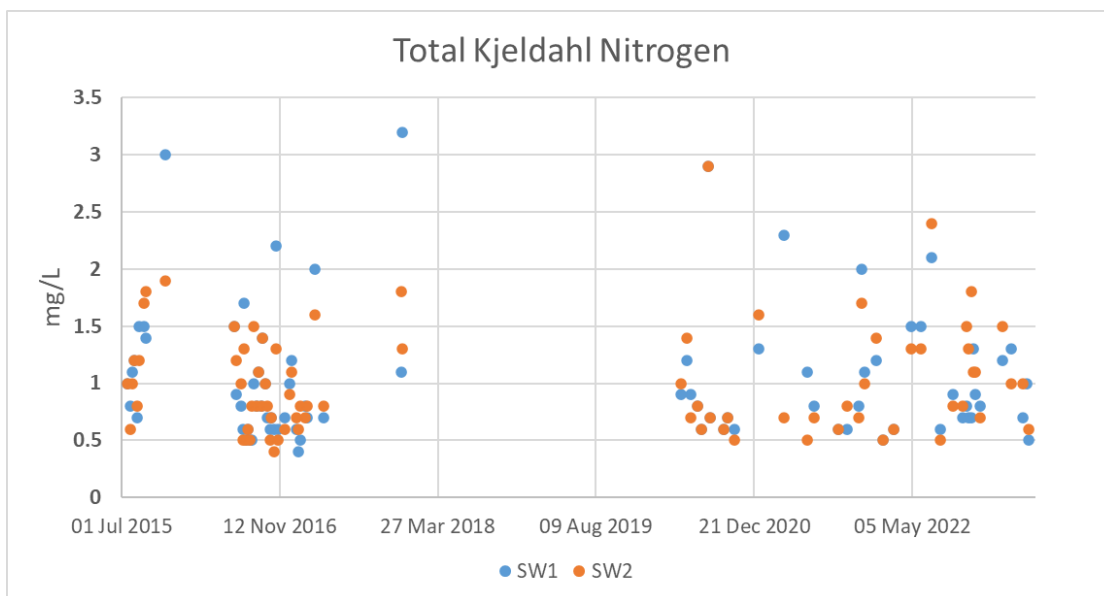
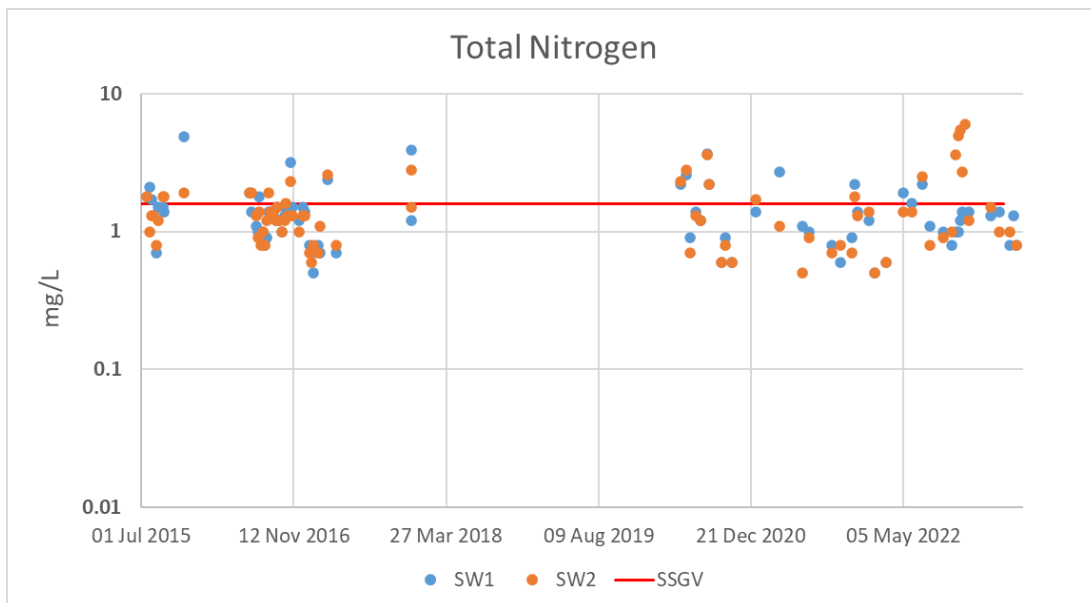
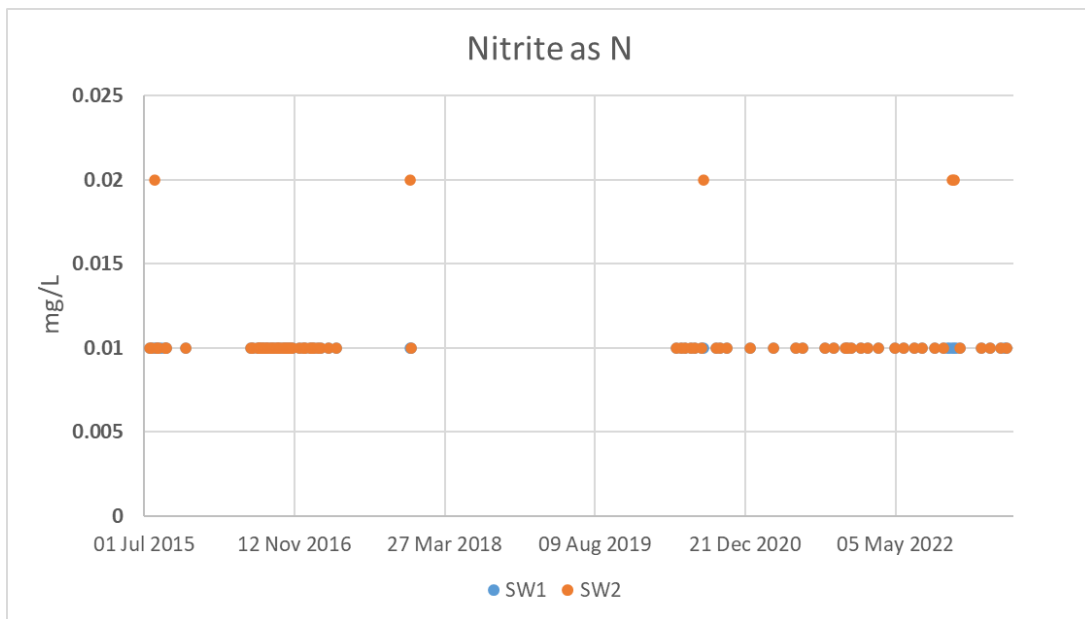




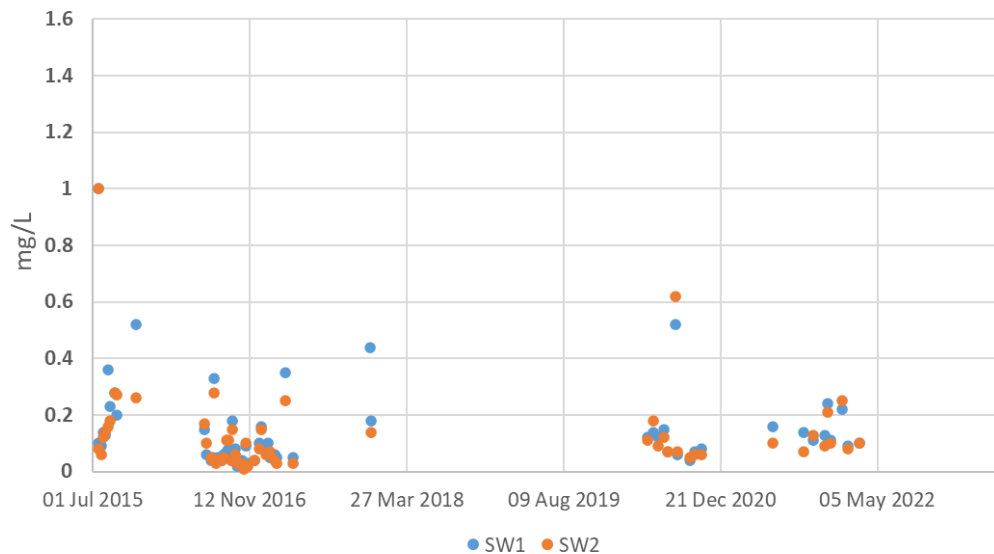




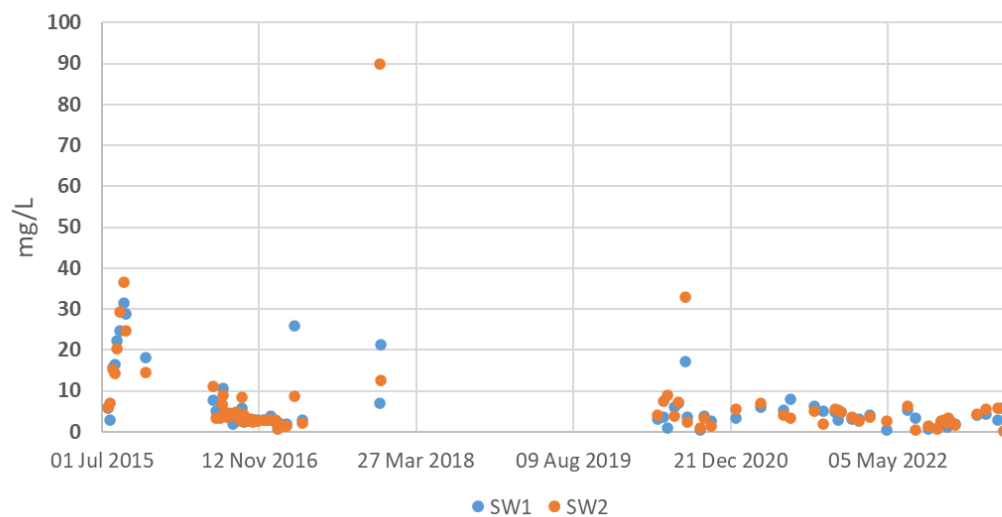




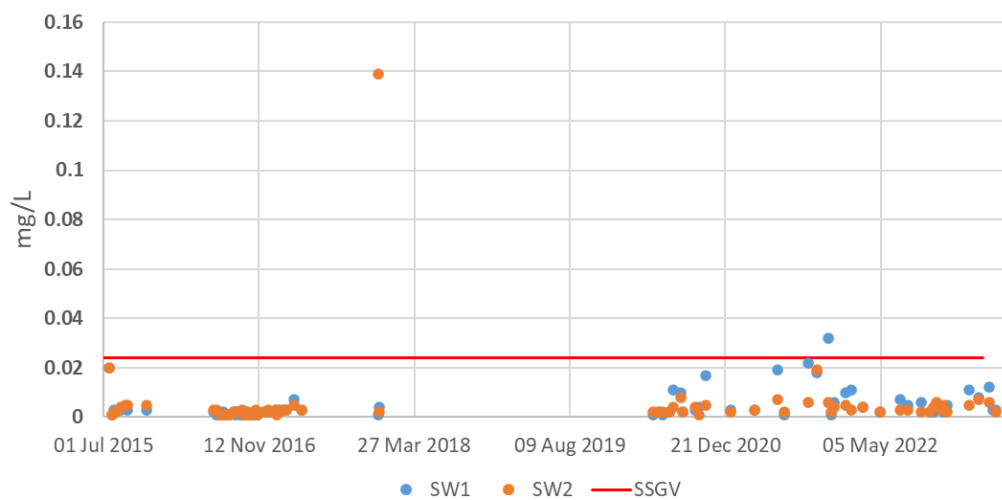
Total Phosphorus (Organic Phosphate)

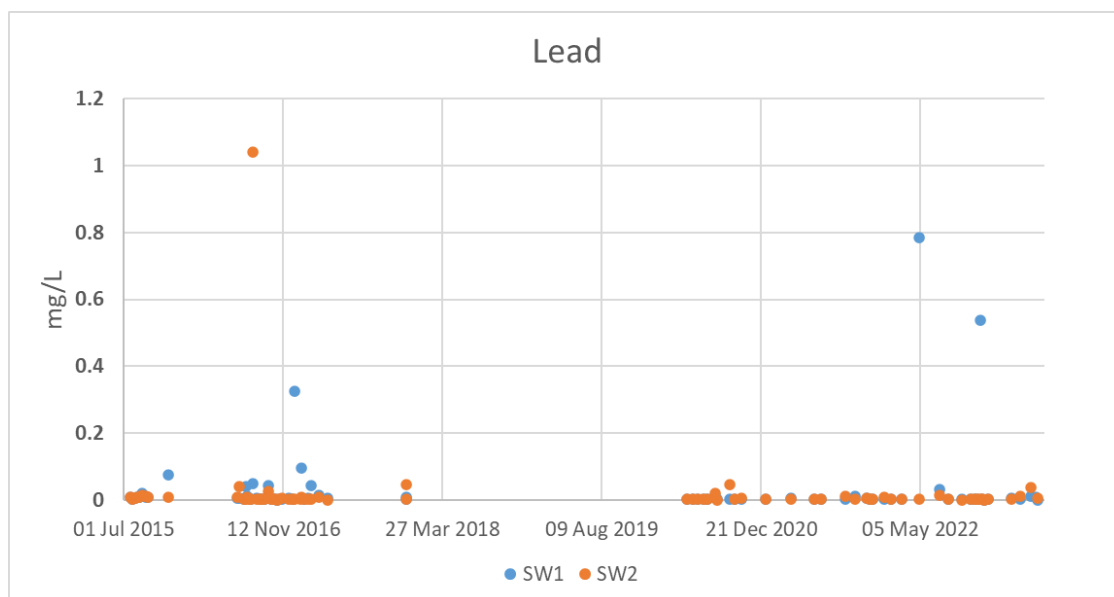
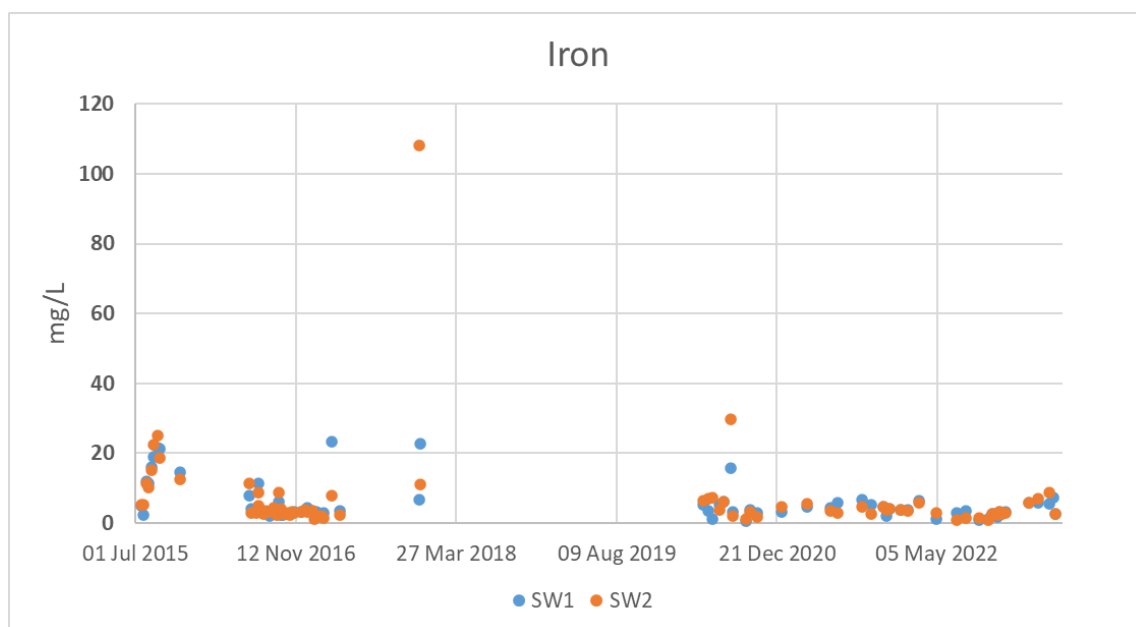
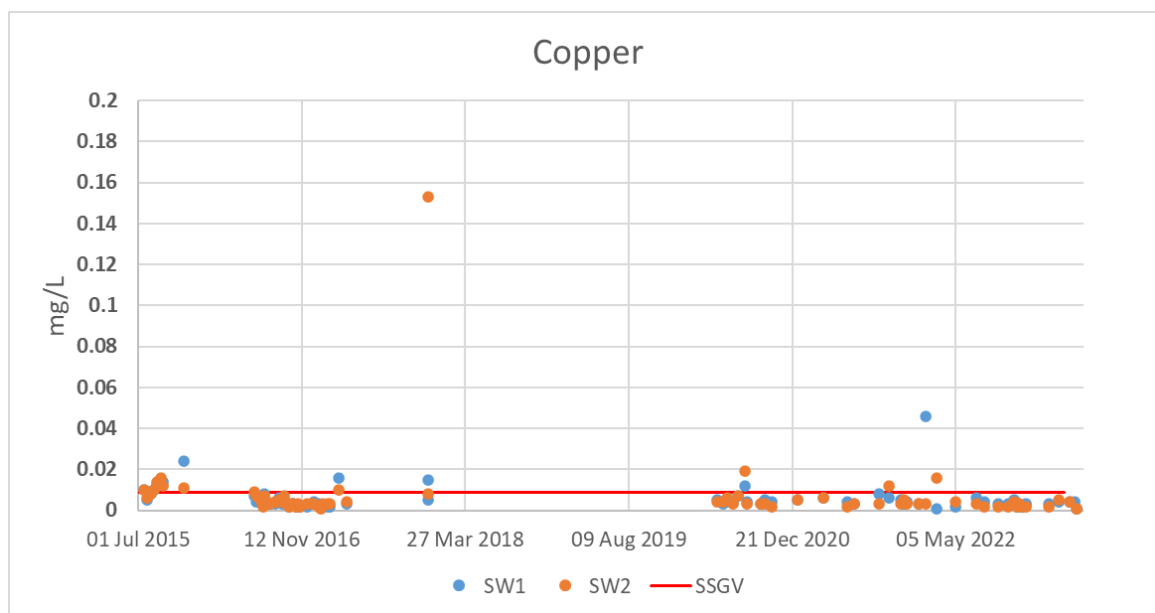


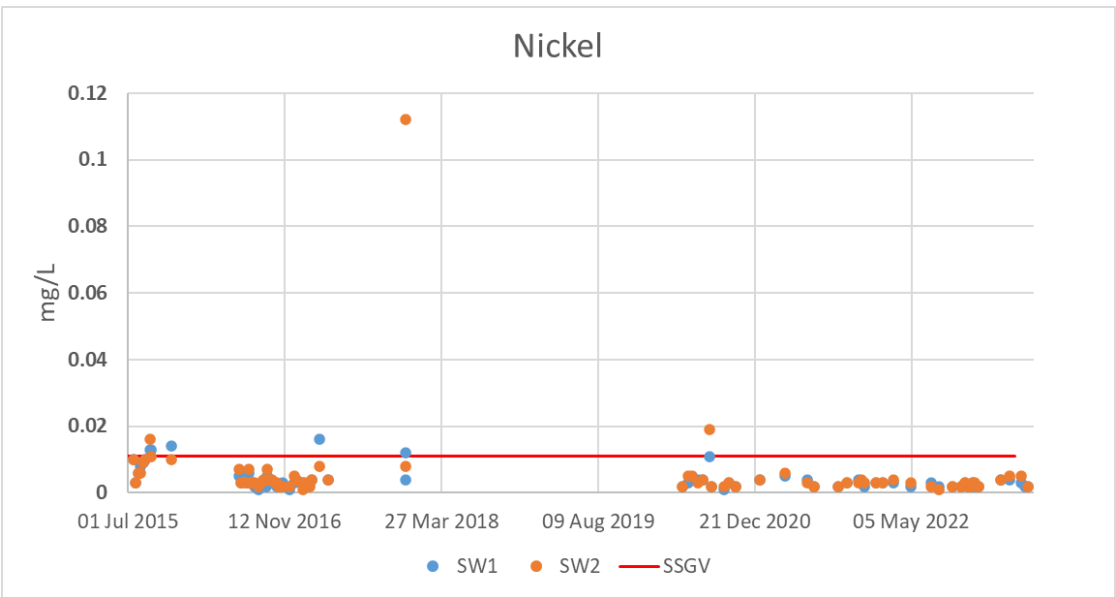
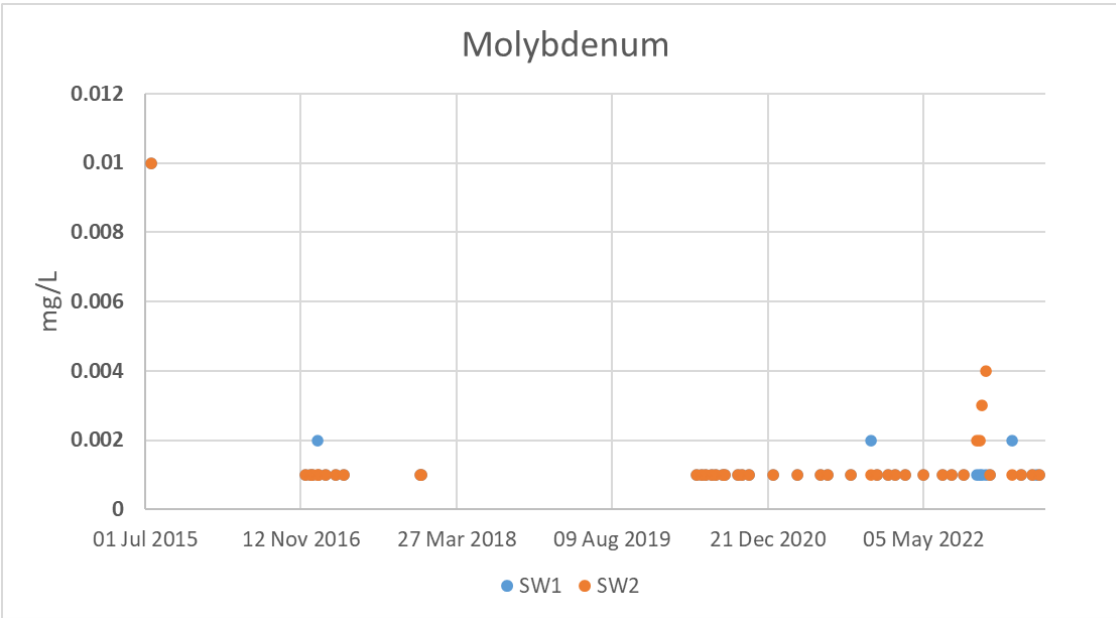
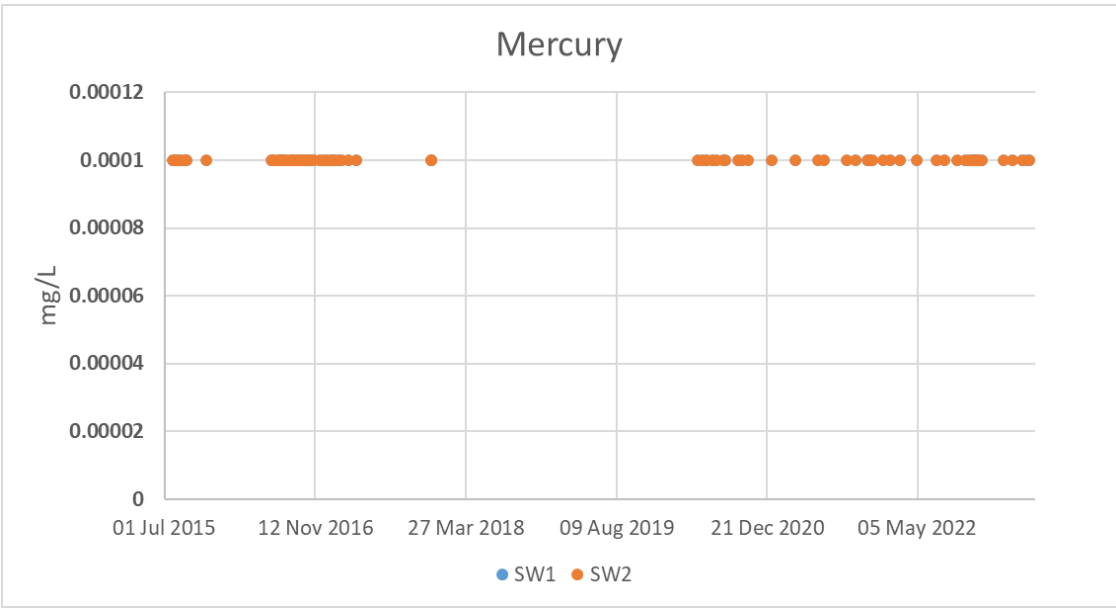
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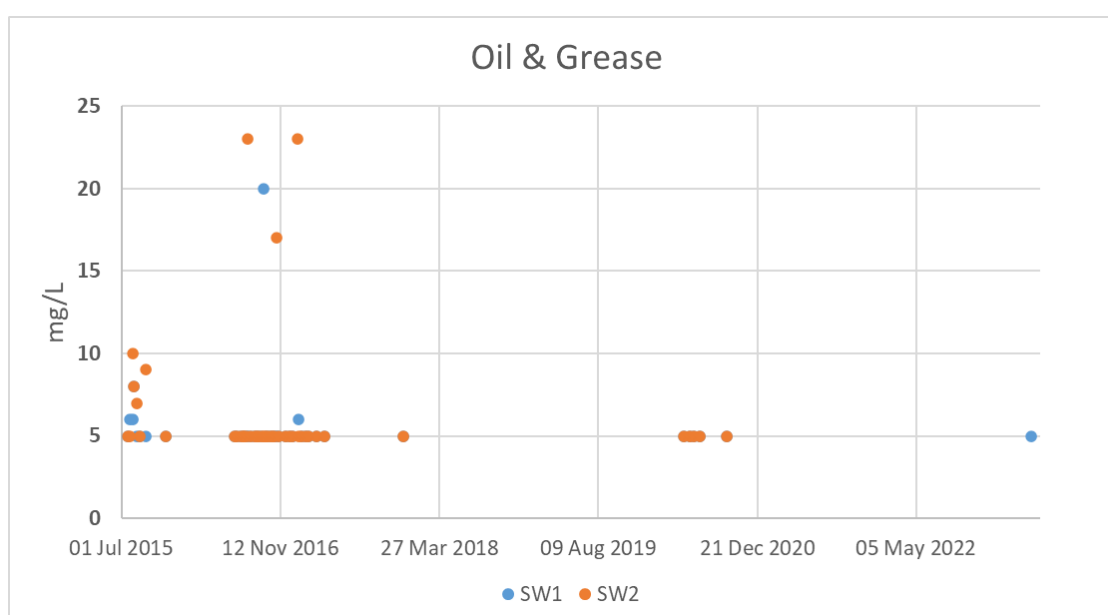
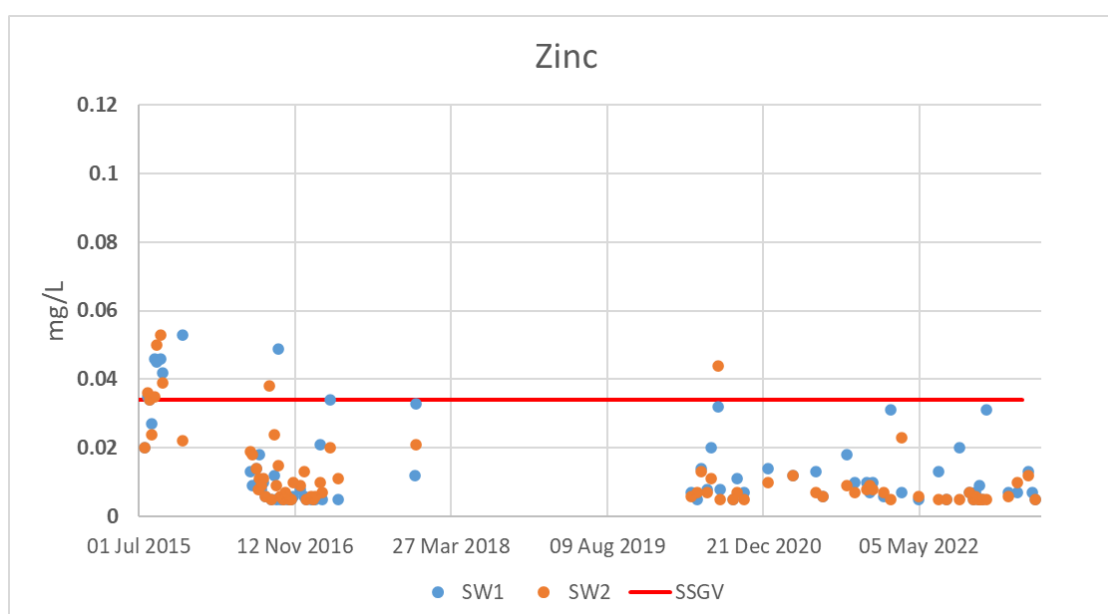
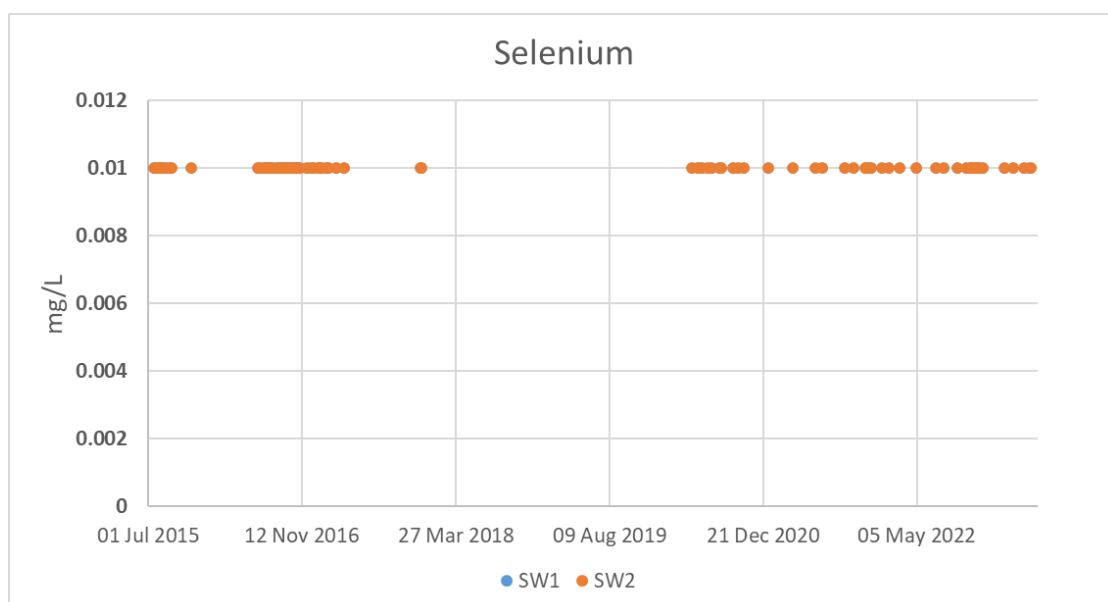


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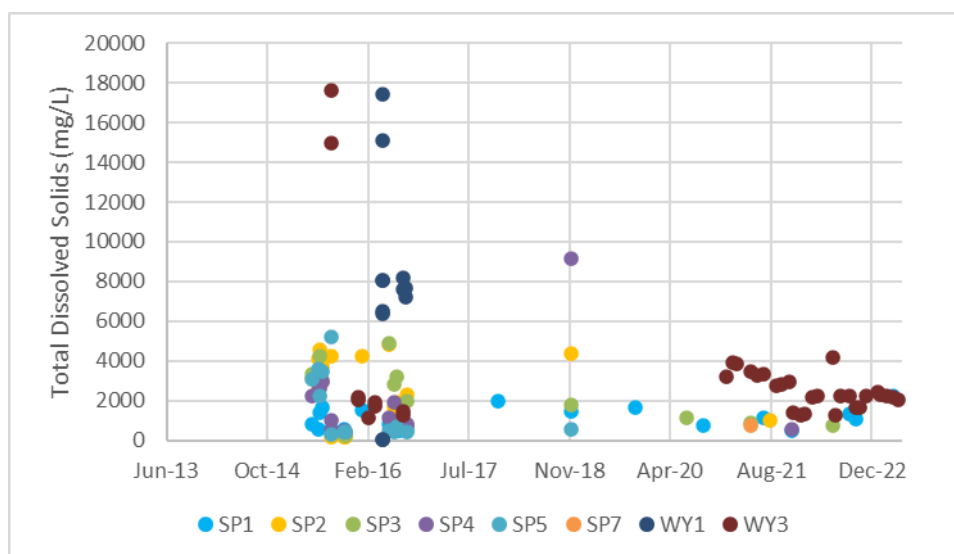
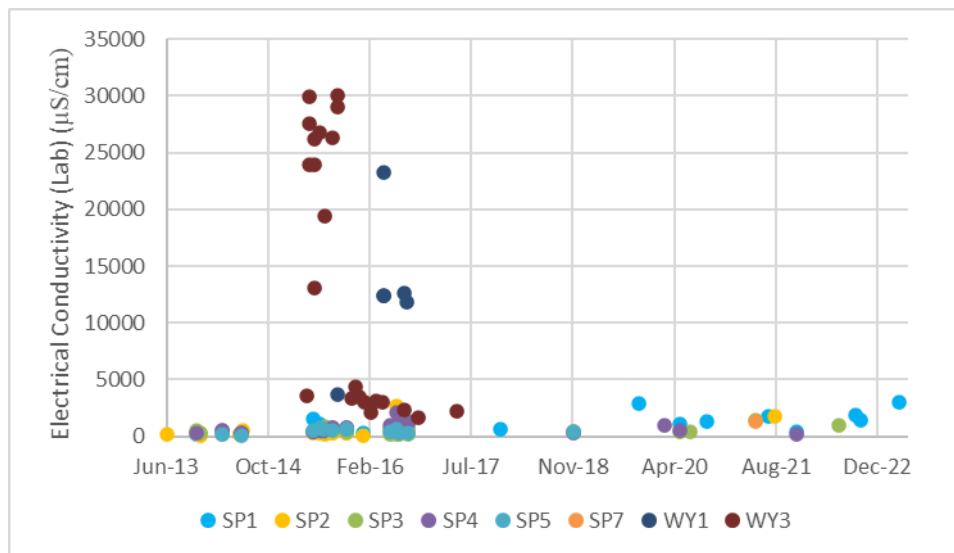
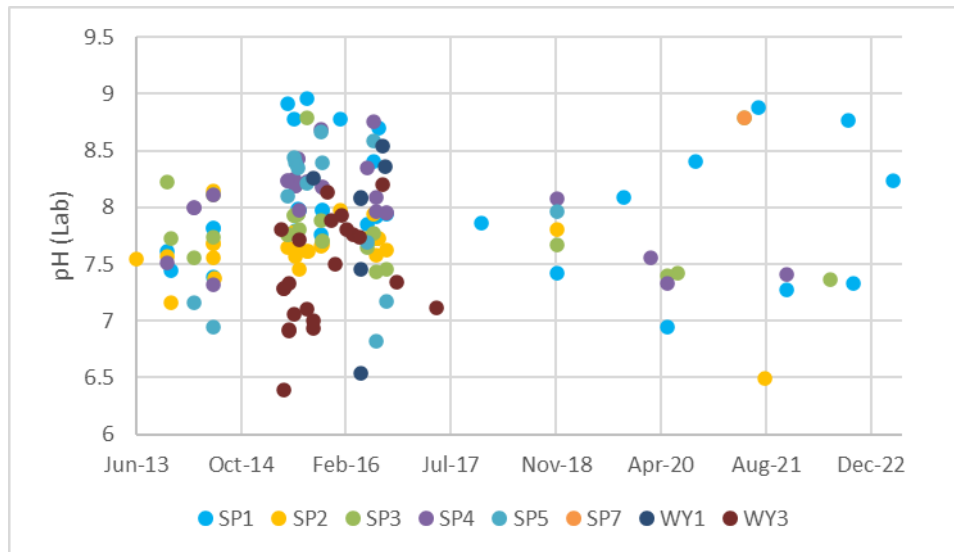


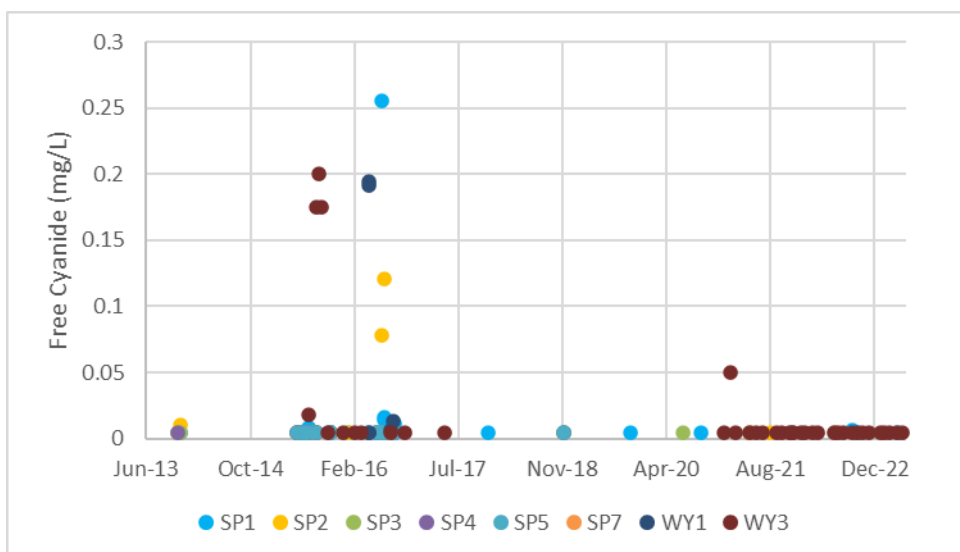
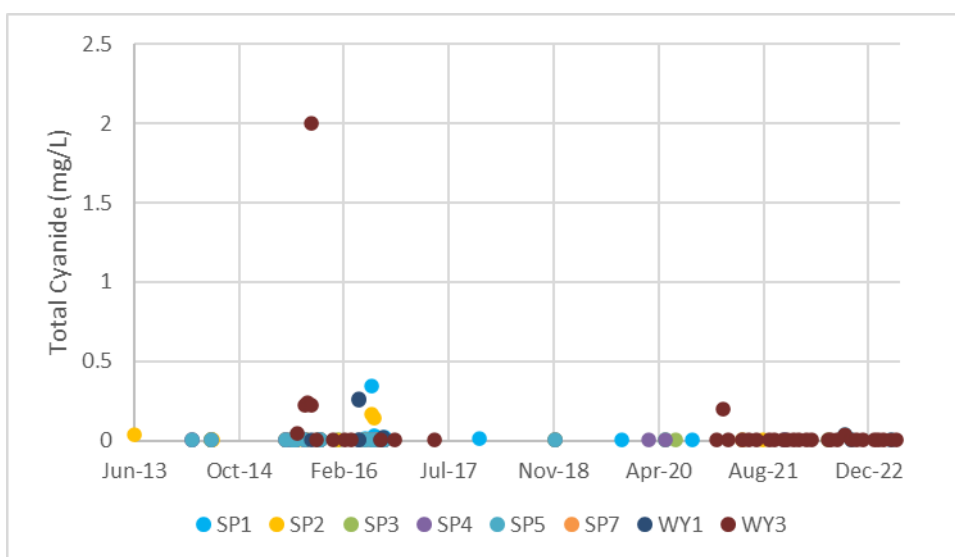
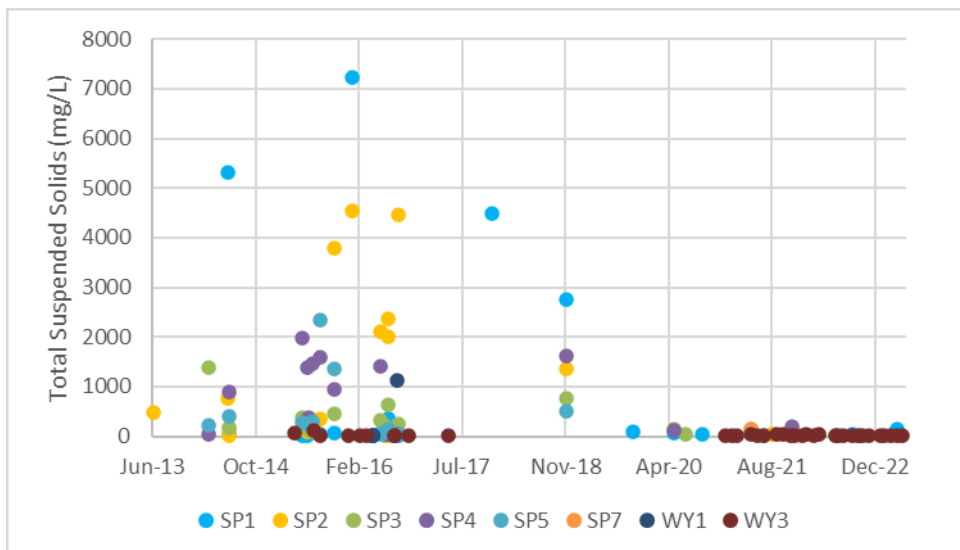


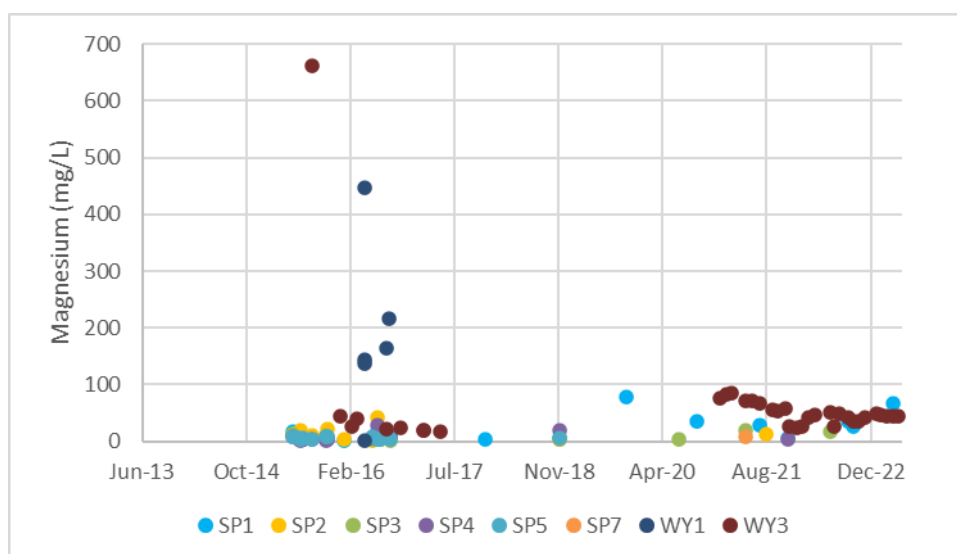
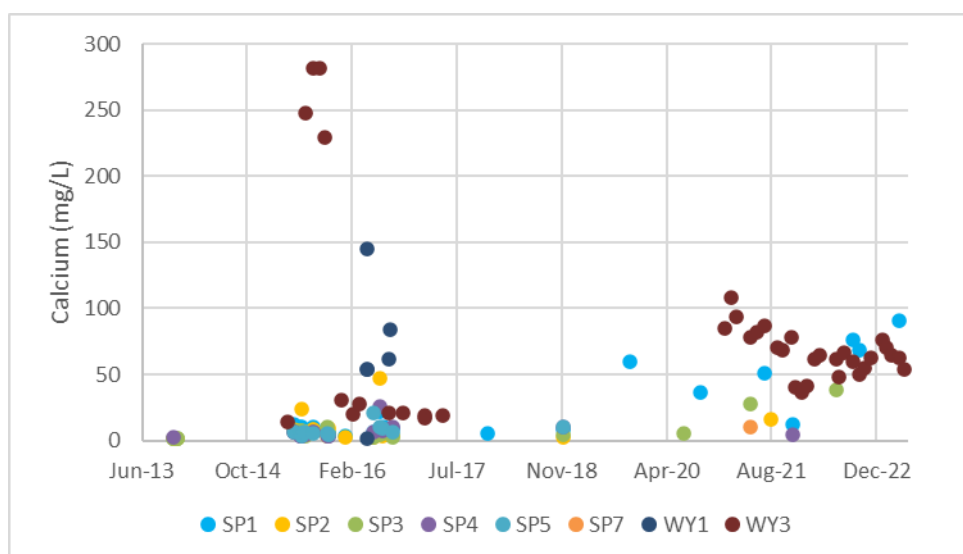
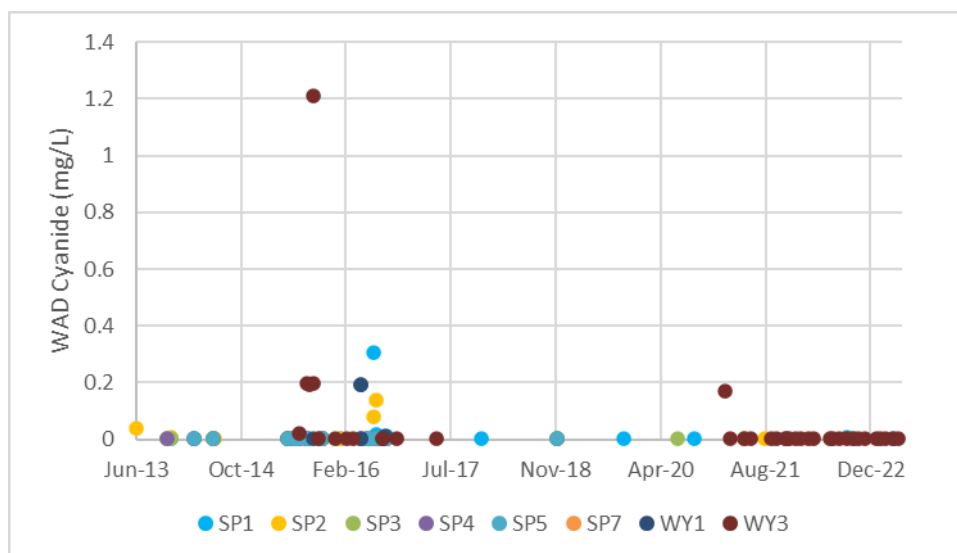


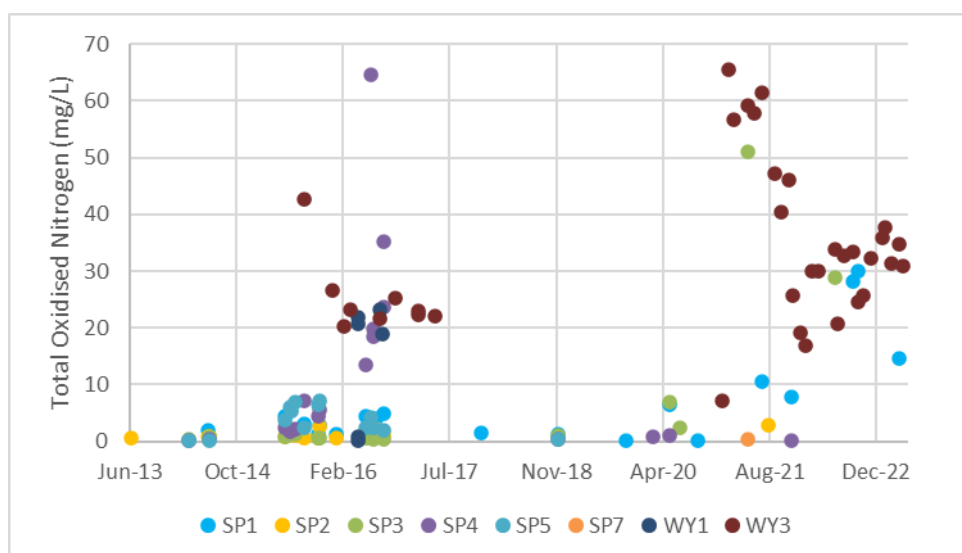
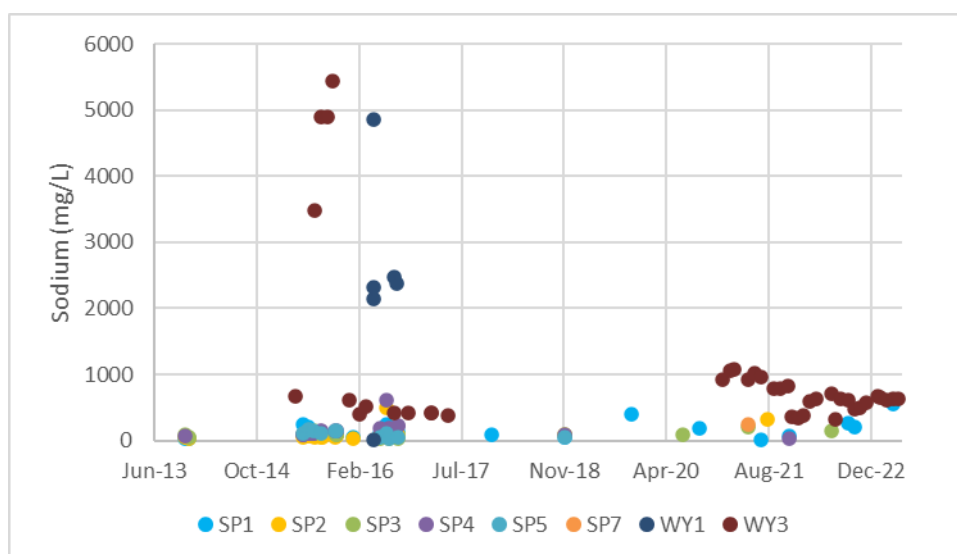
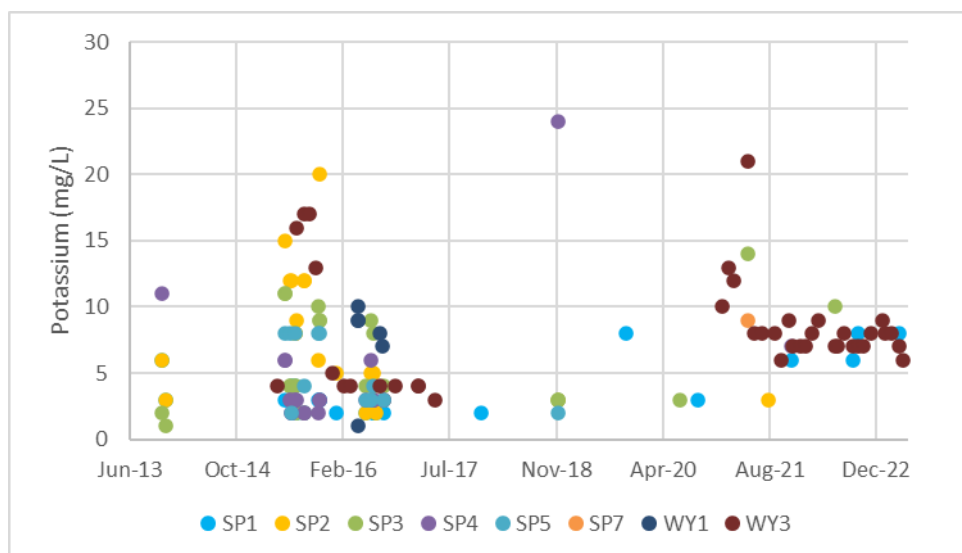


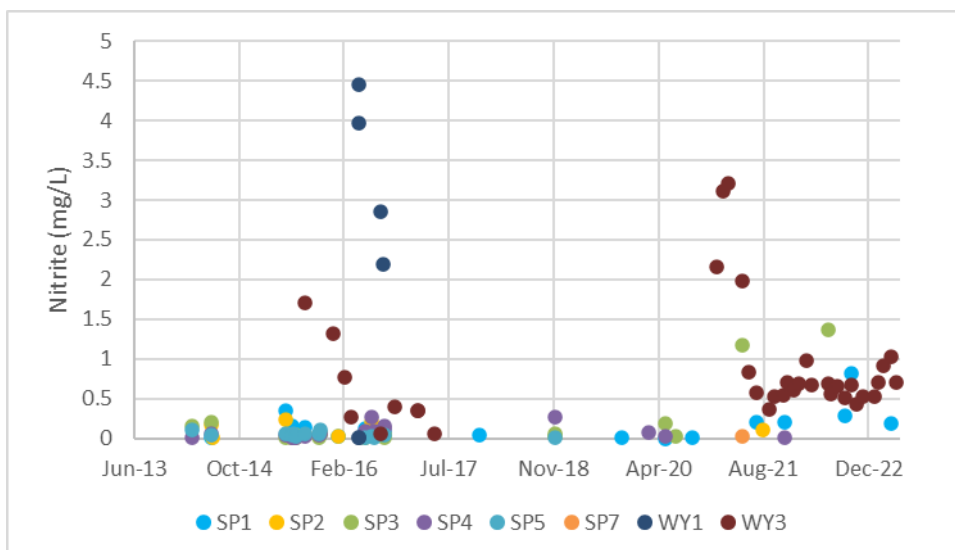
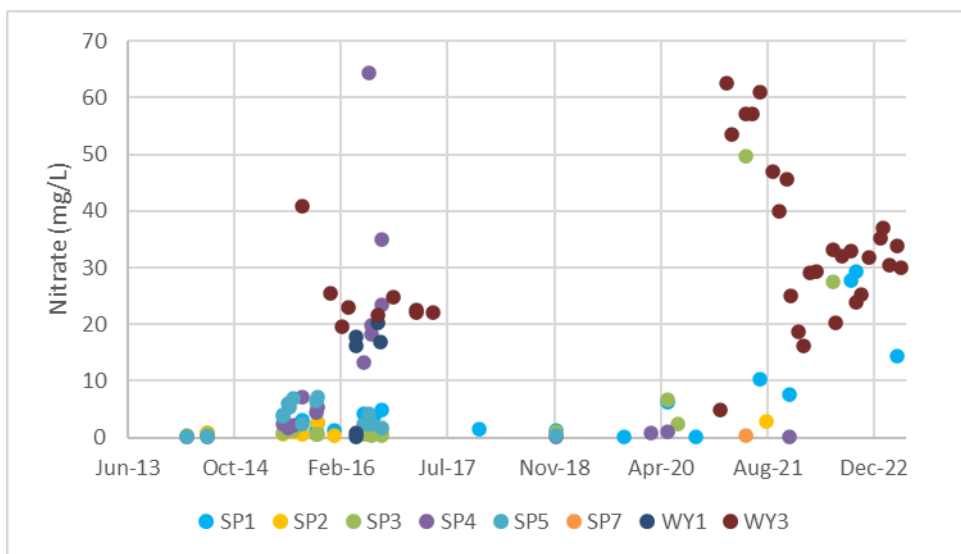
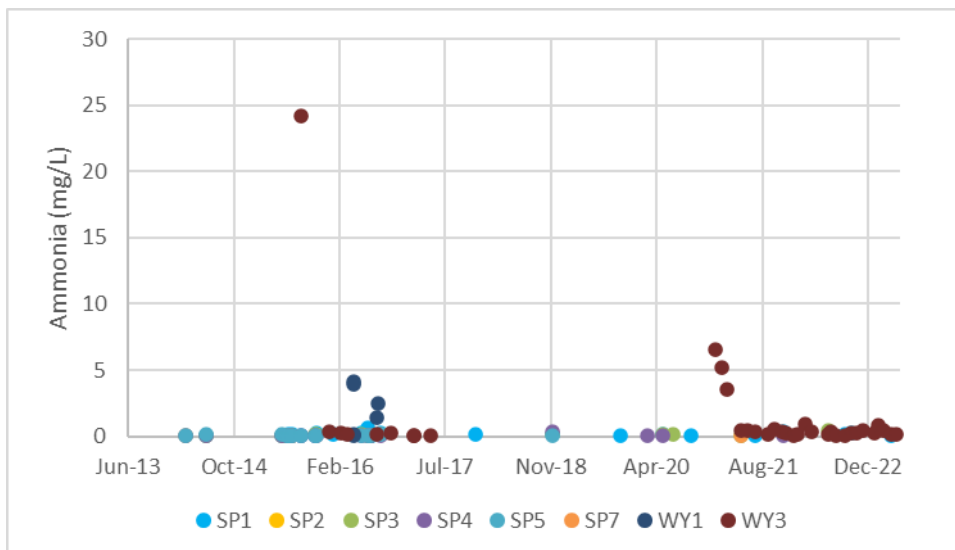
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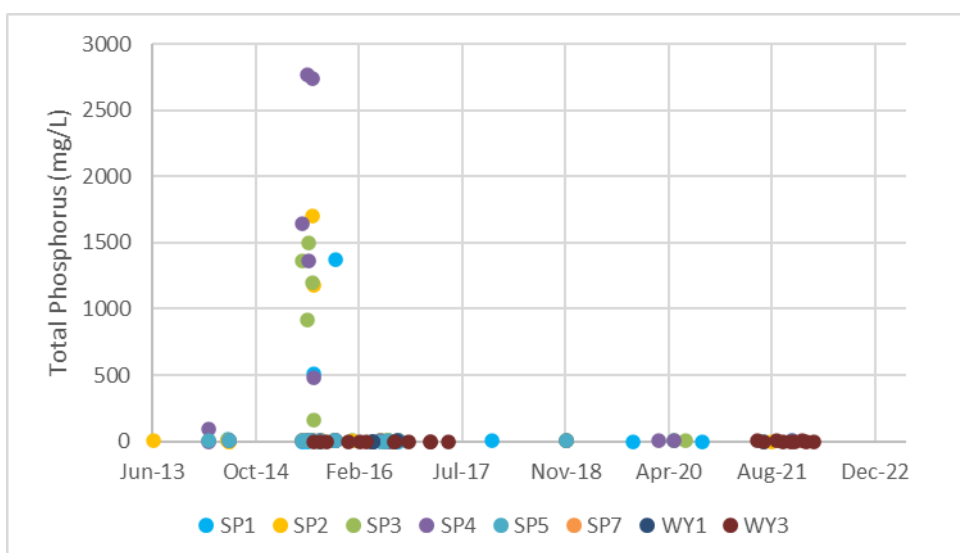
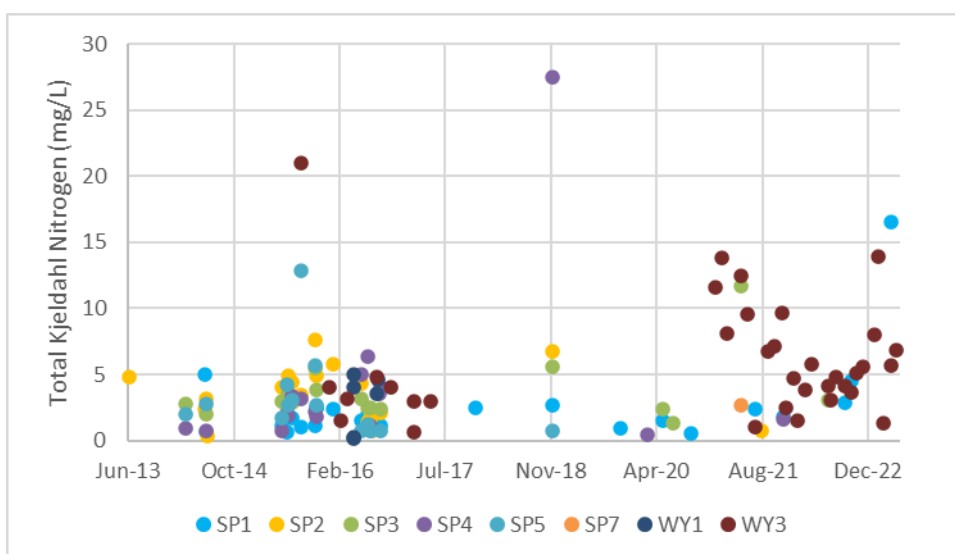
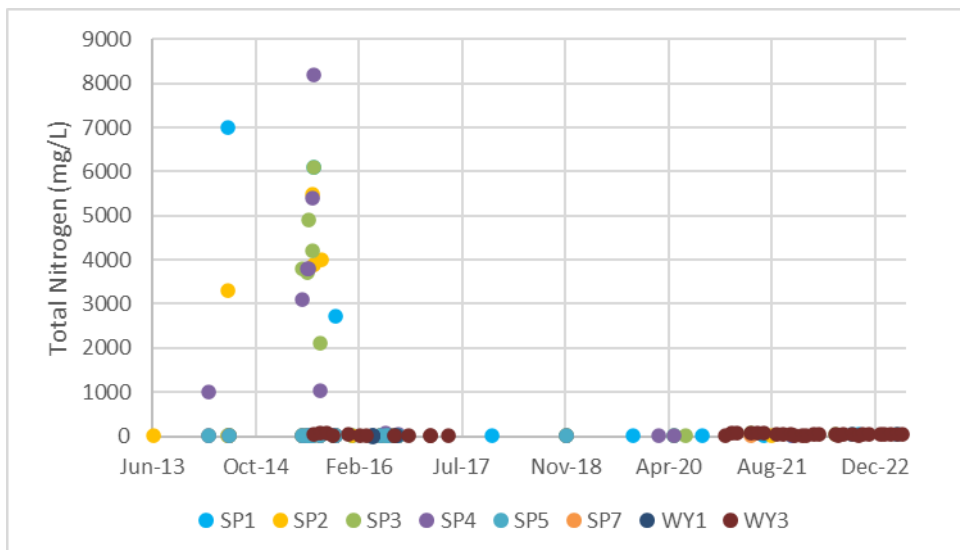


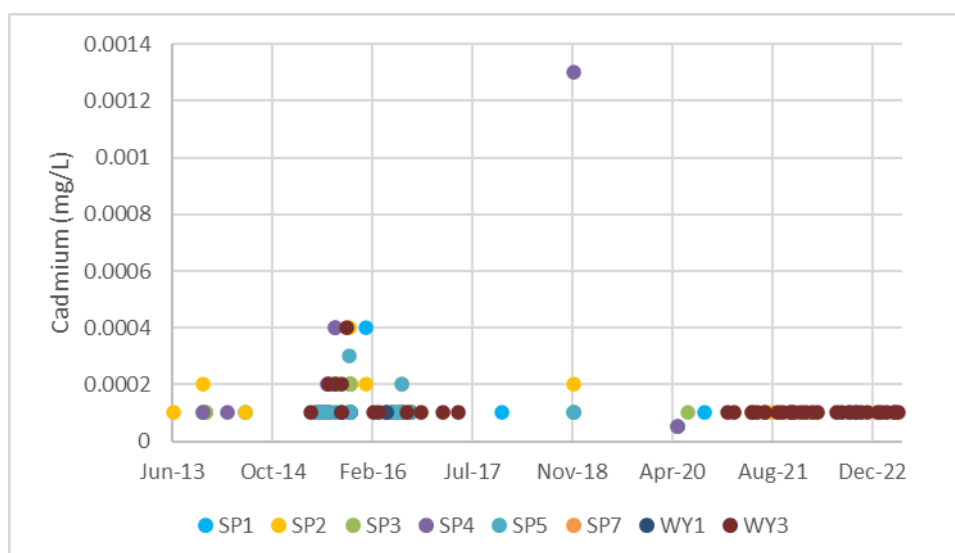
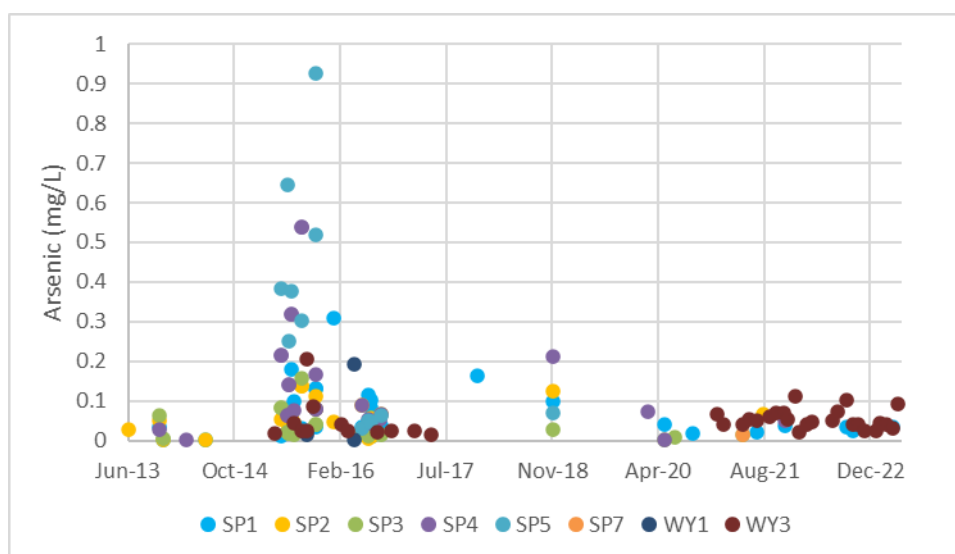
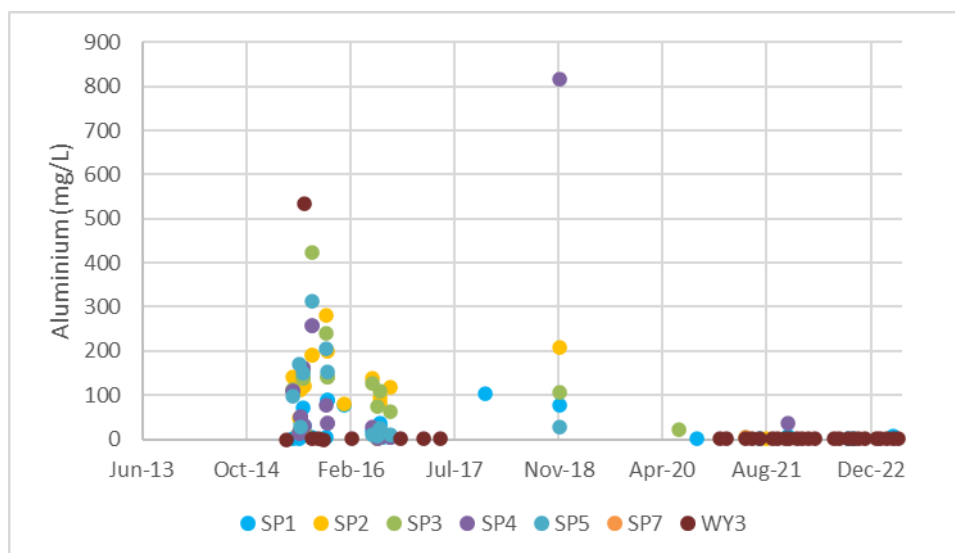


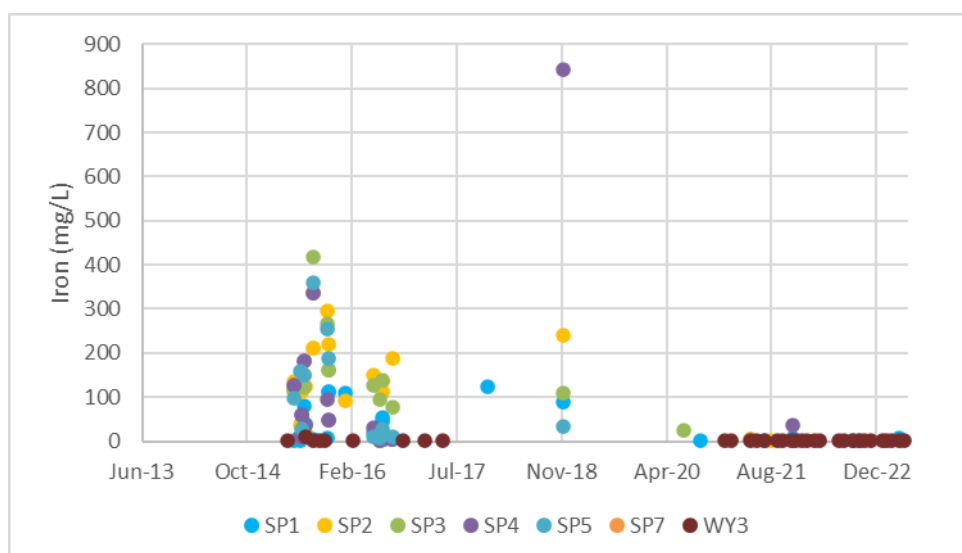
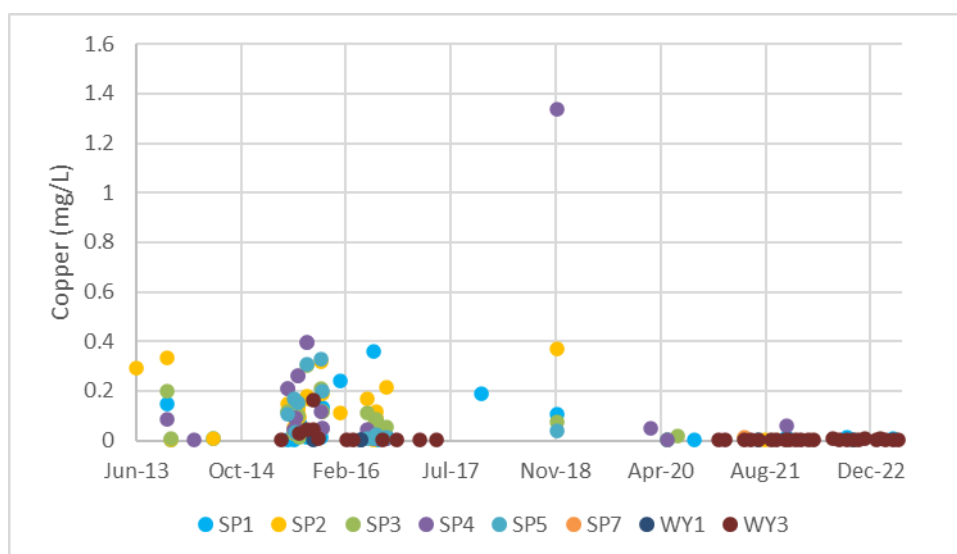
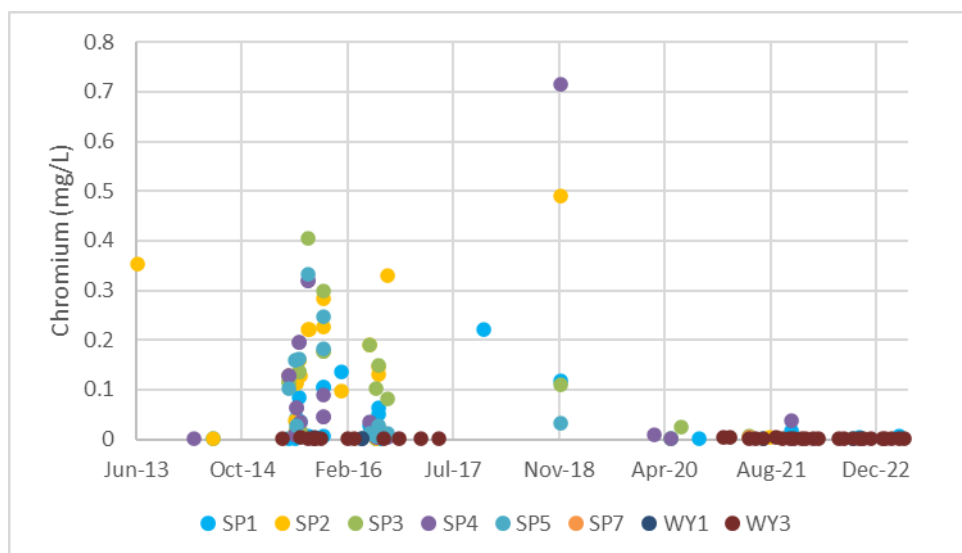


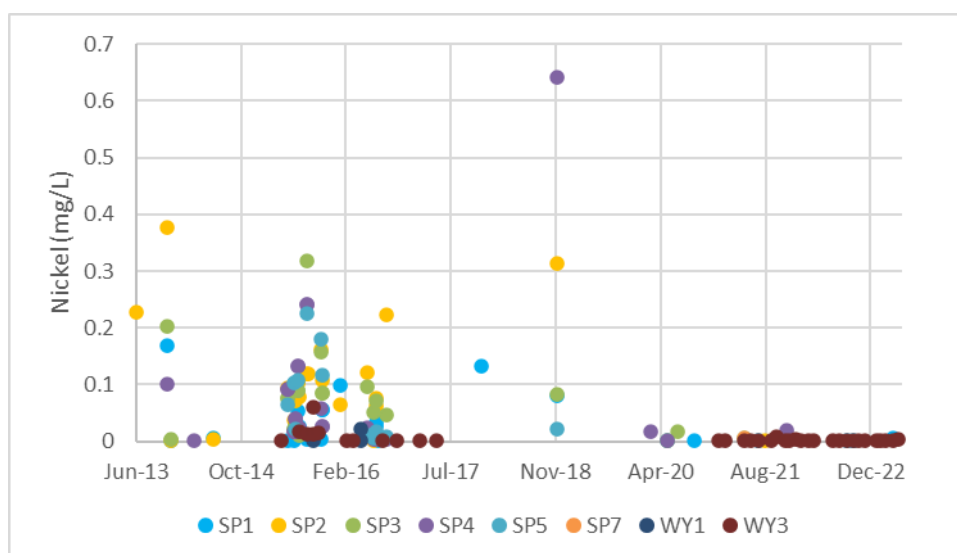
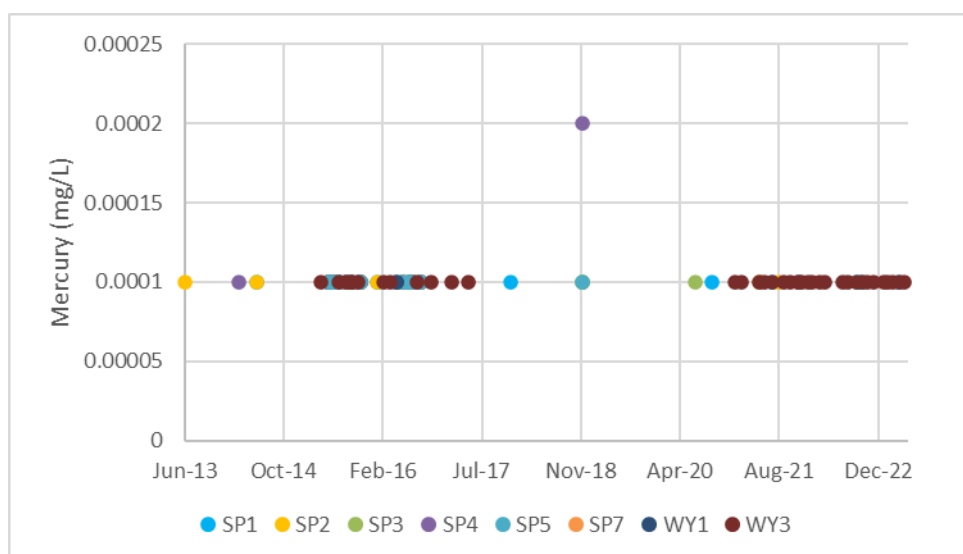
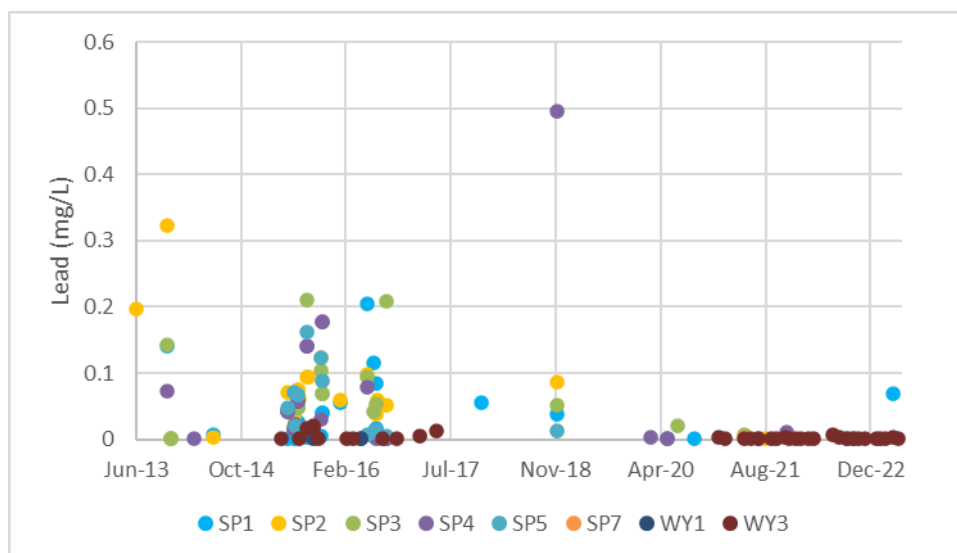


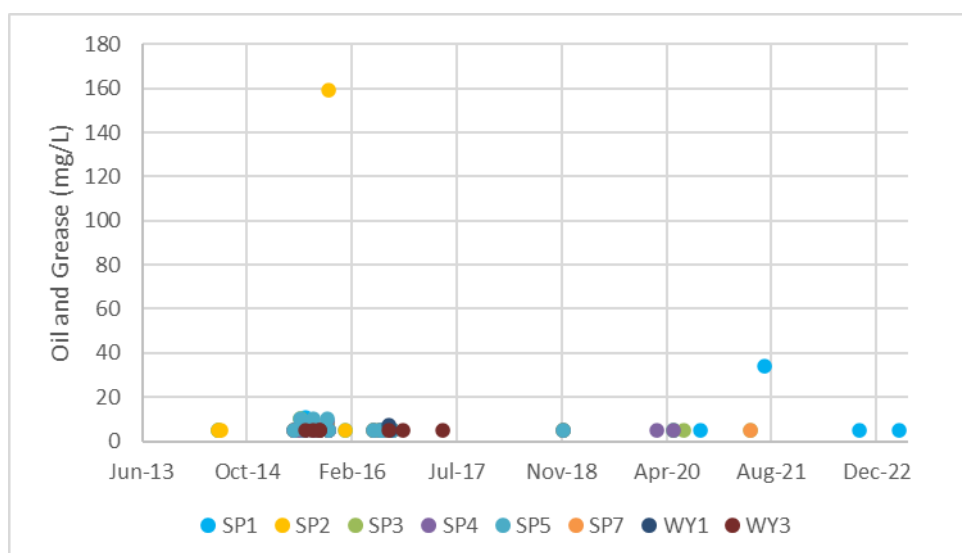
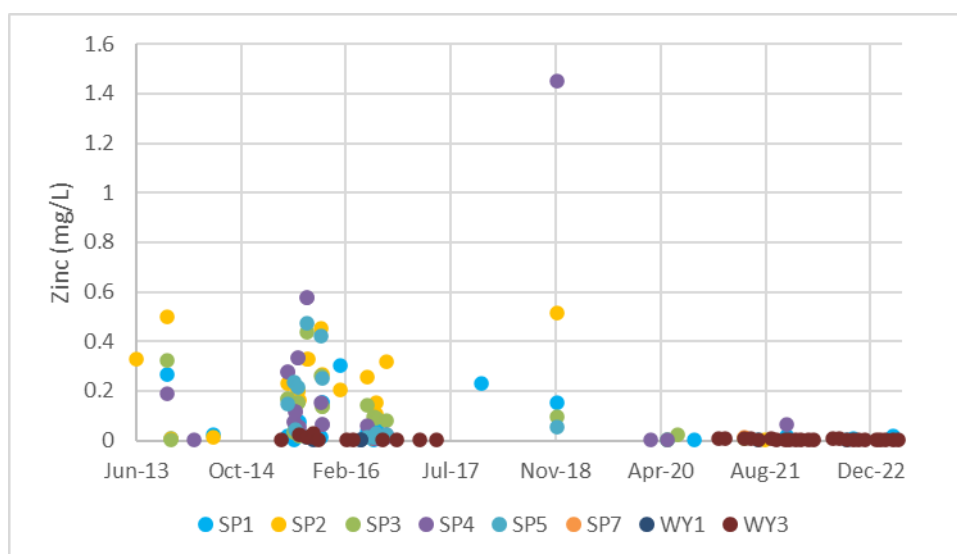
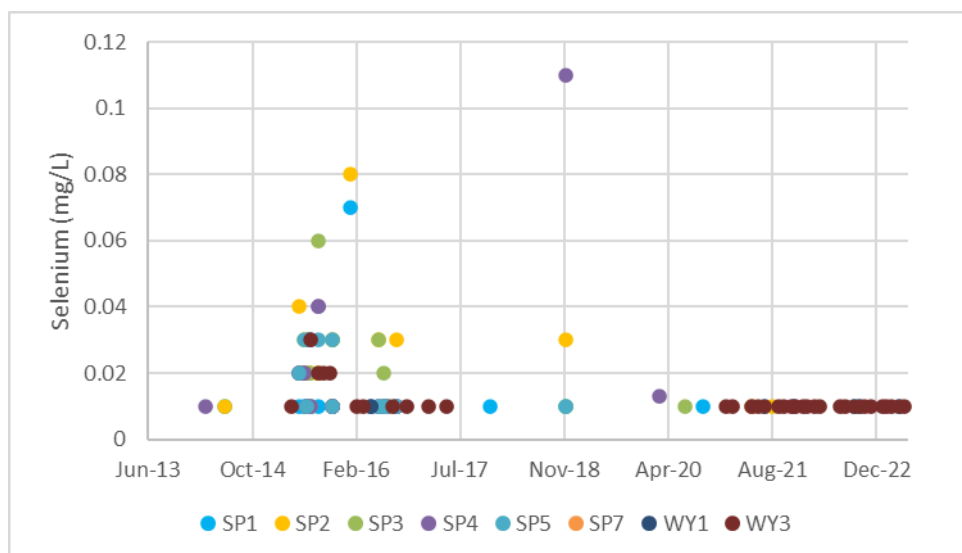




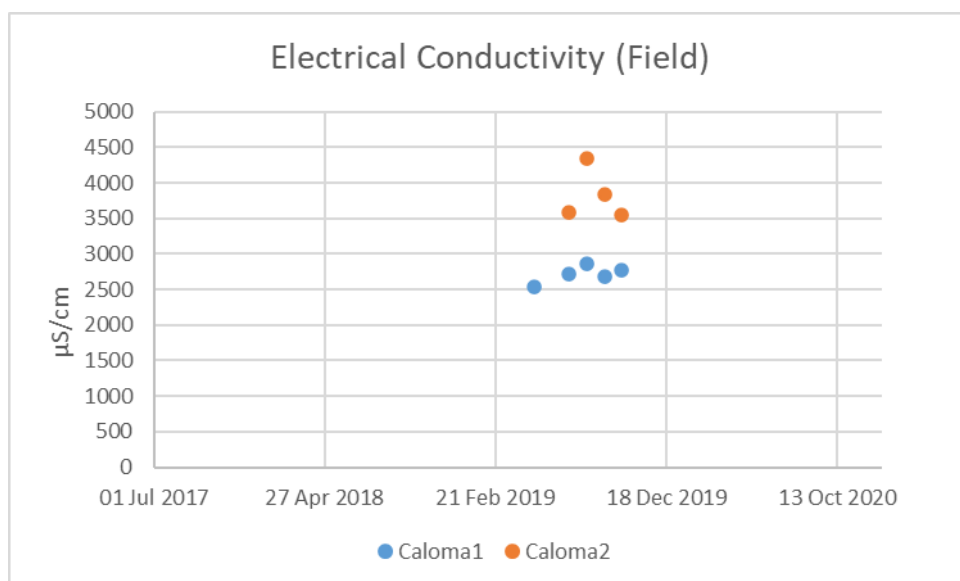
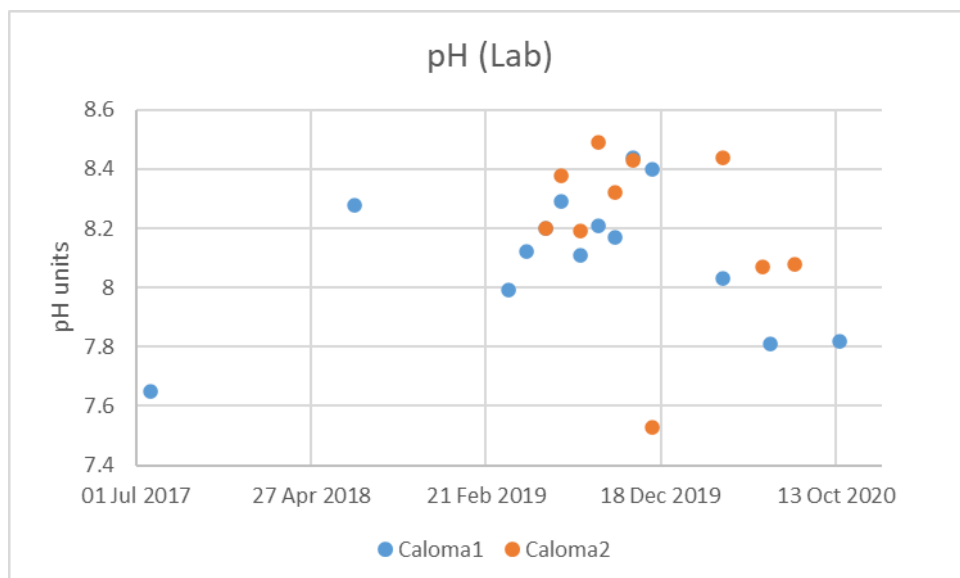
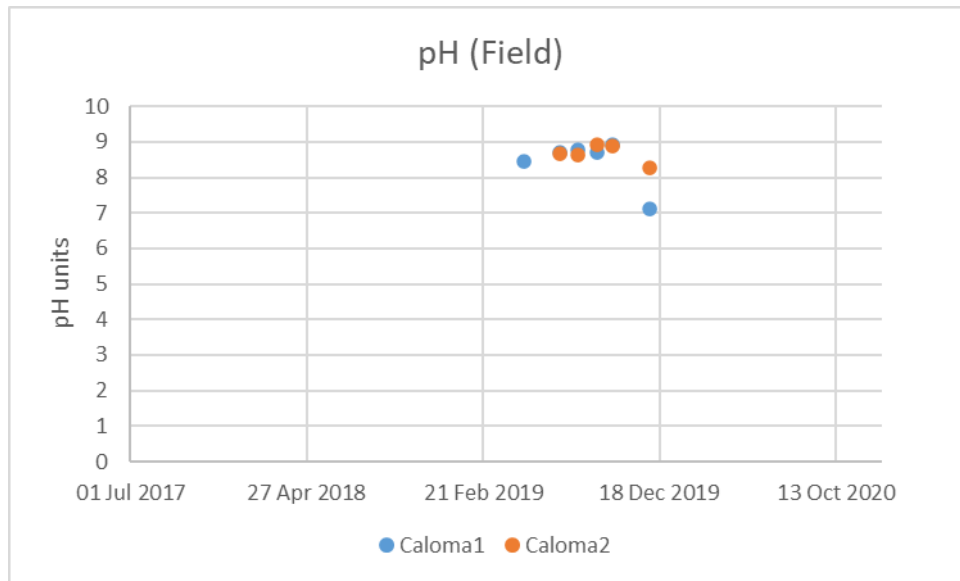




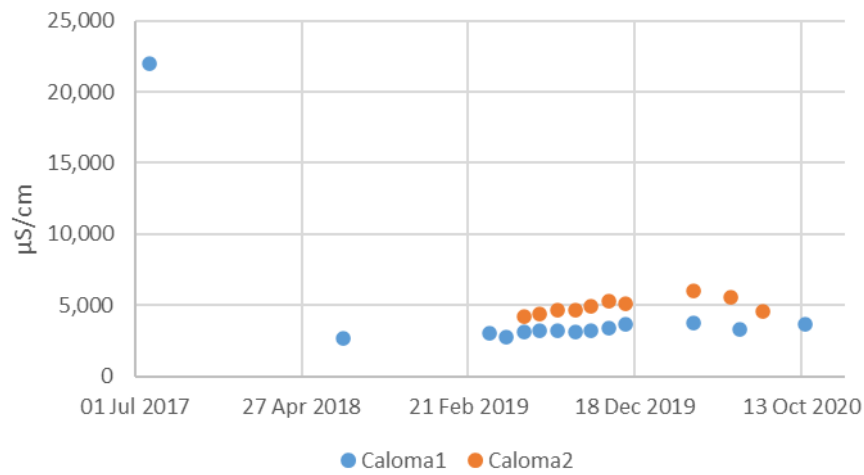




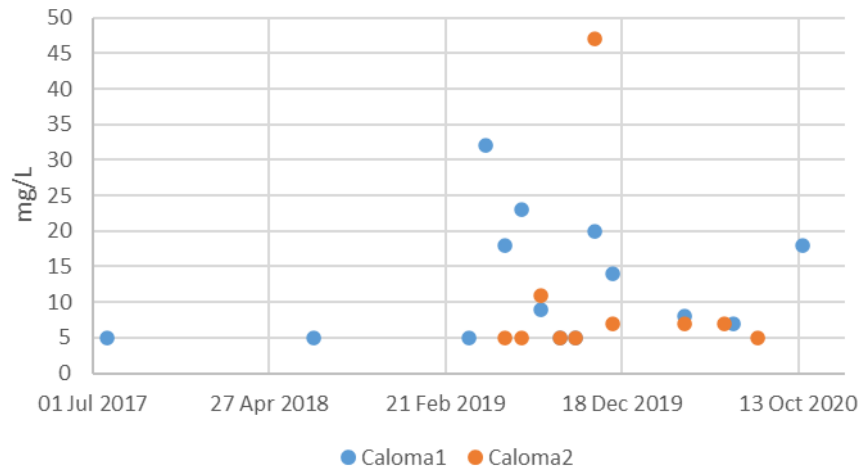
Caloma 1&3



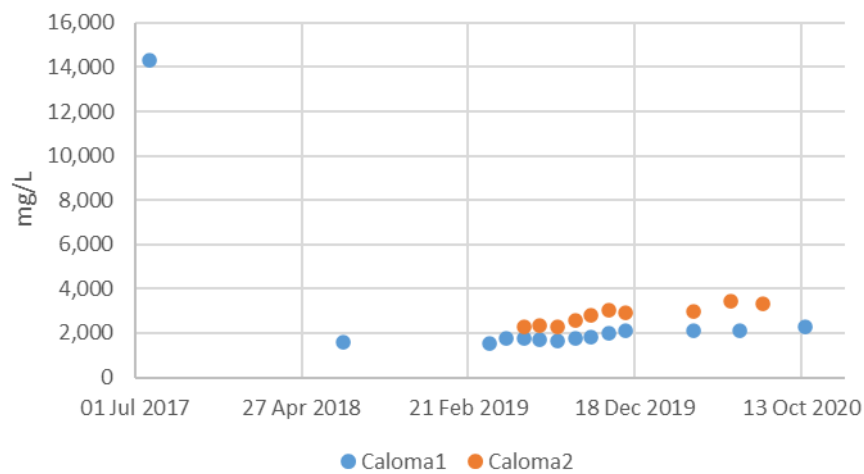
Electrical Conductivity (Lab)

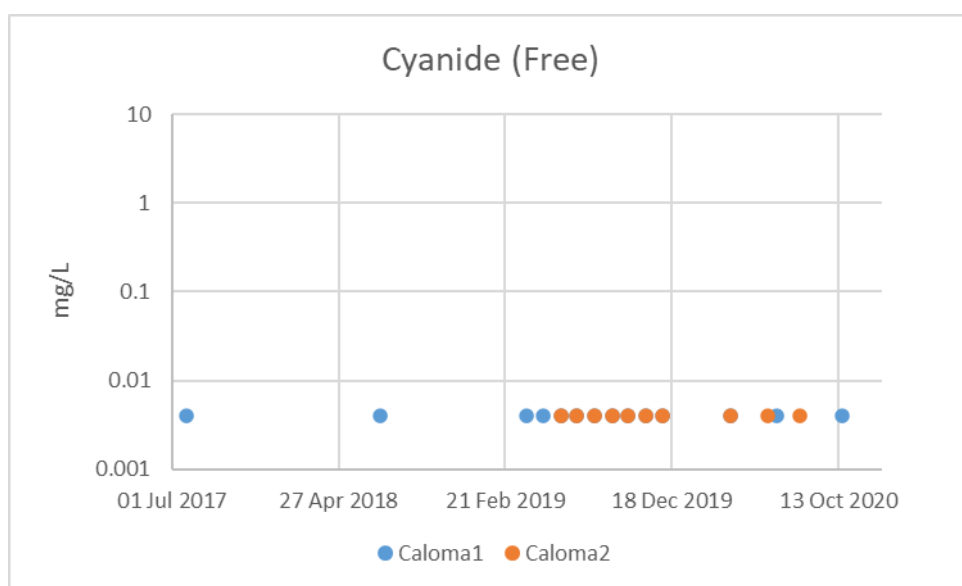
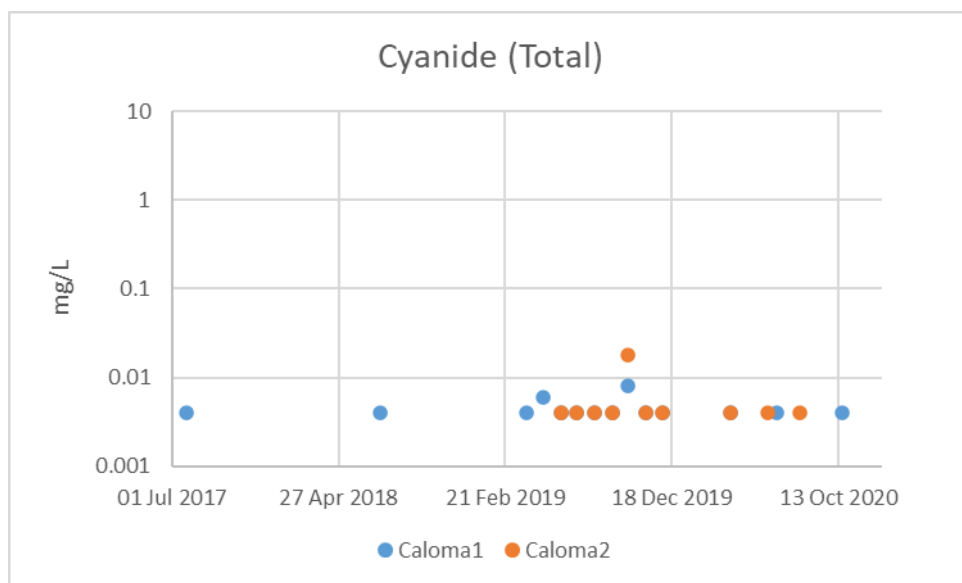


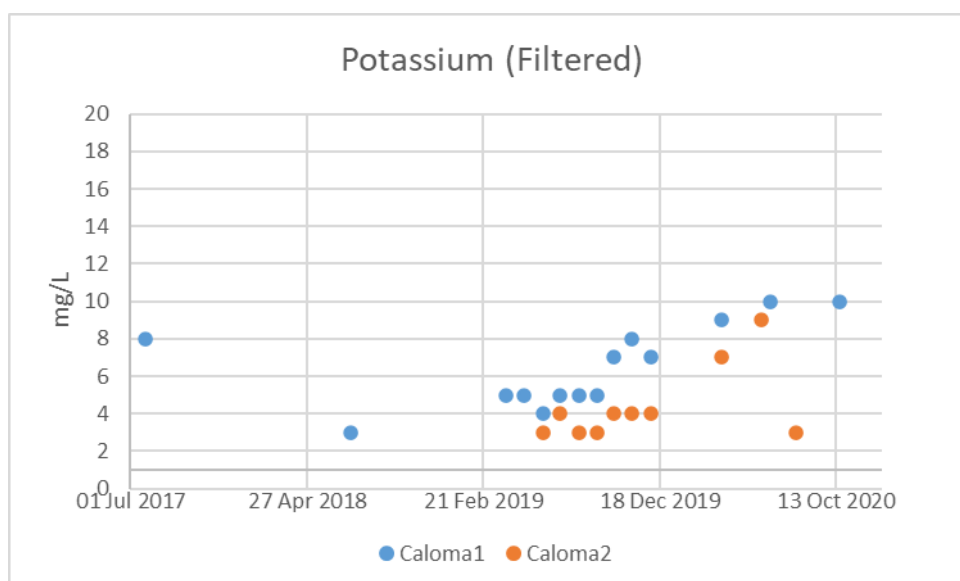
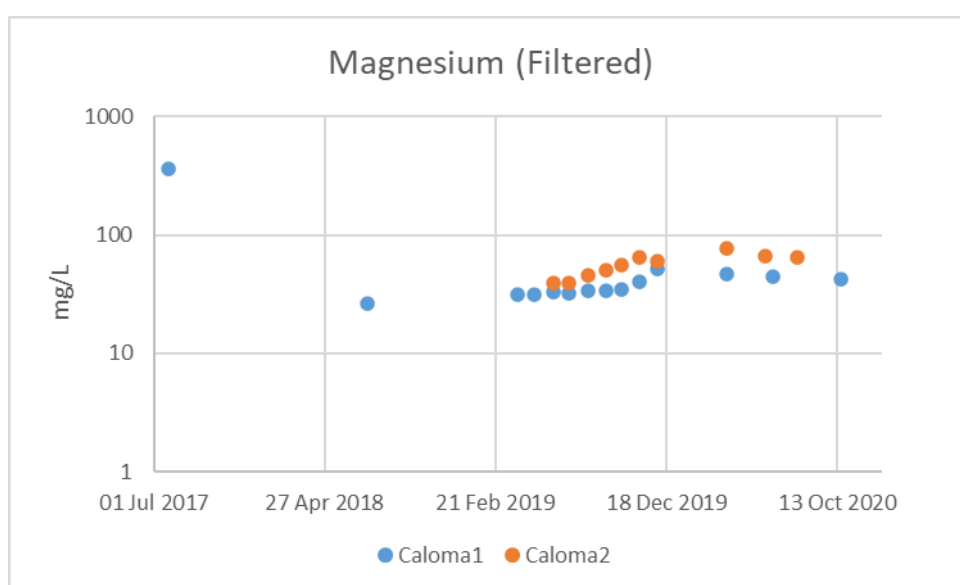
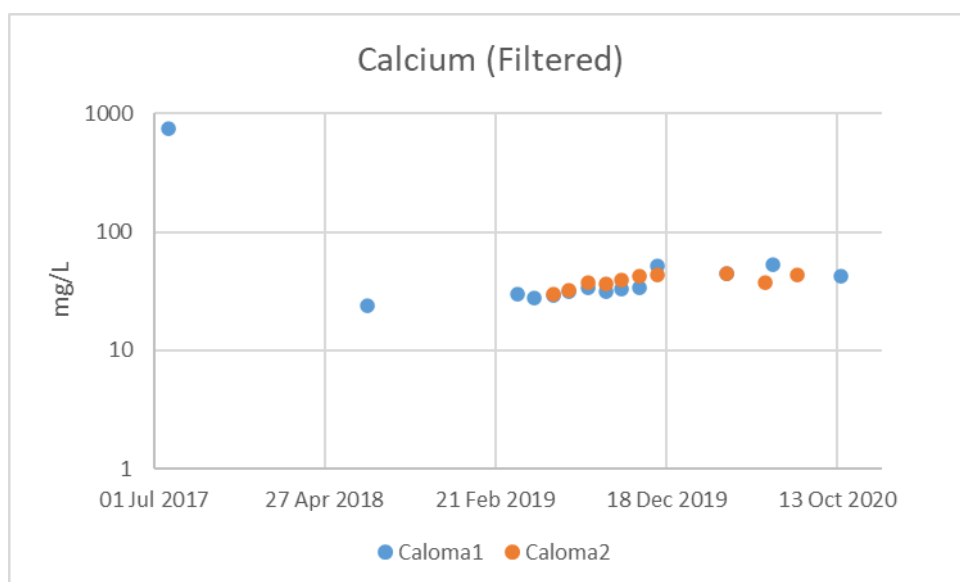
Total Suspended Solids (Lab)

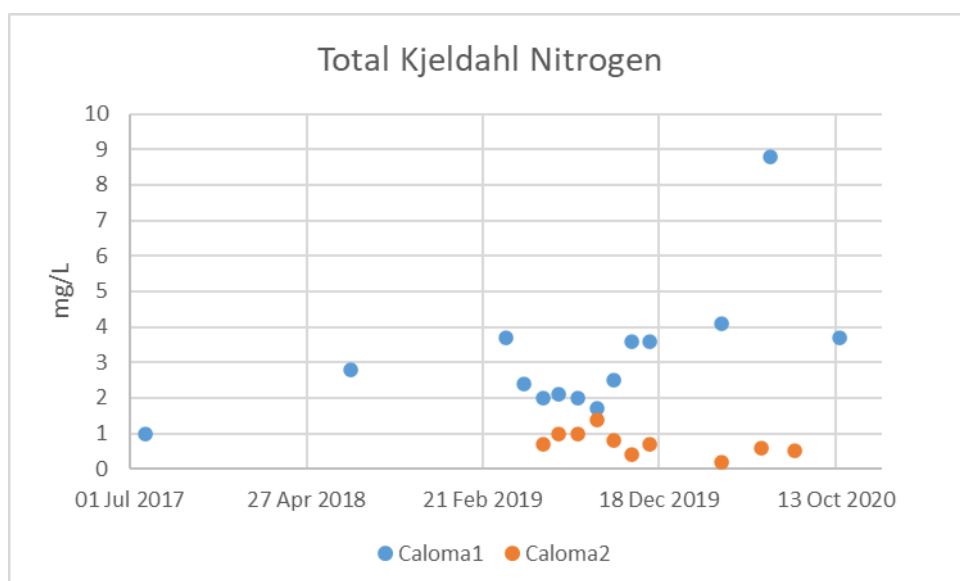
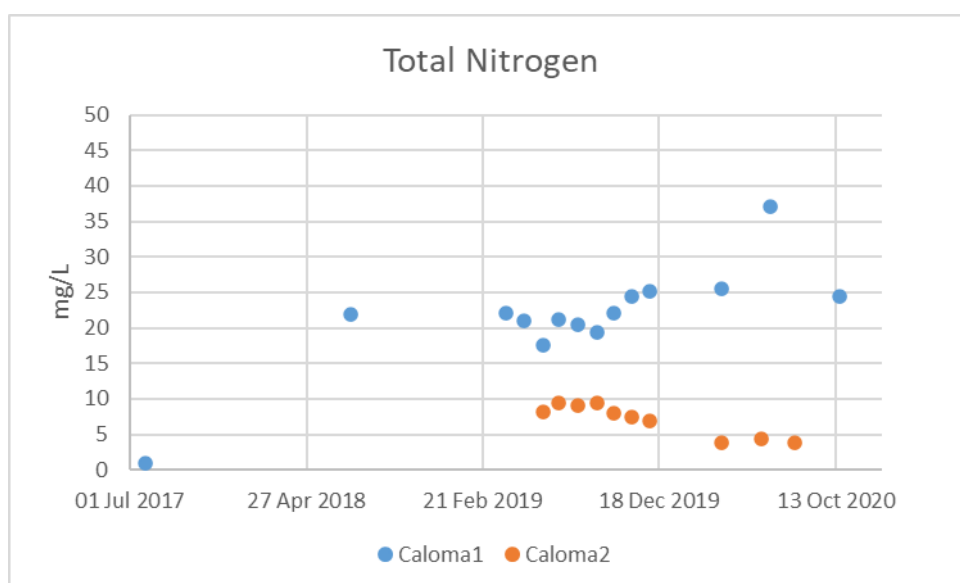
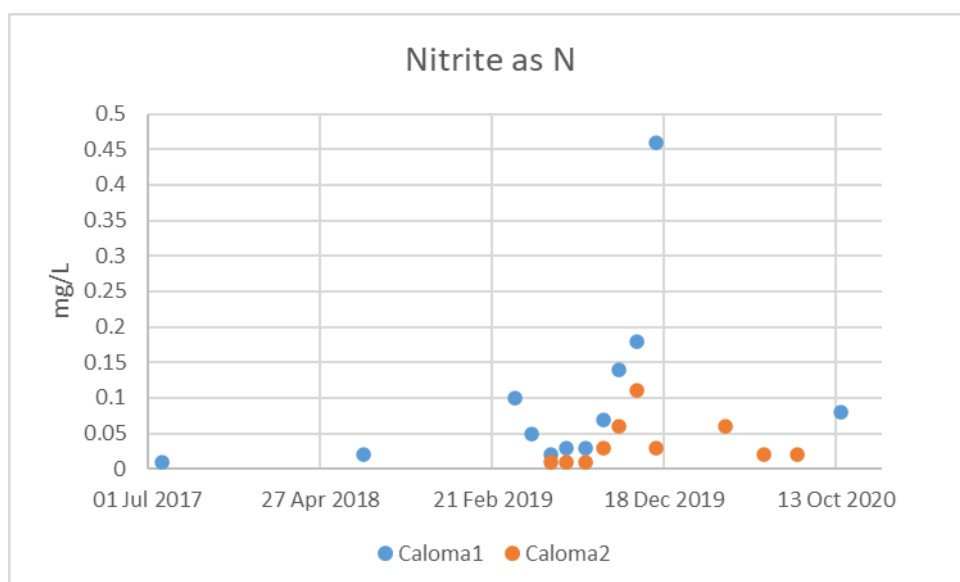


Total Dissolved Solids (Lab)

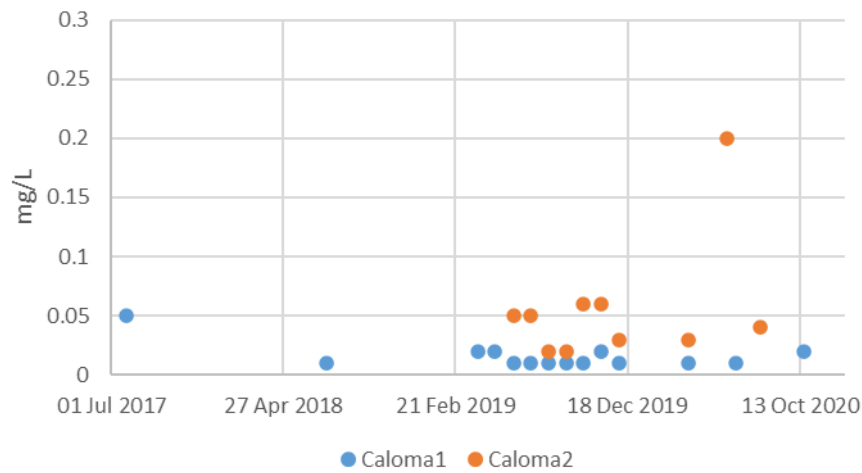




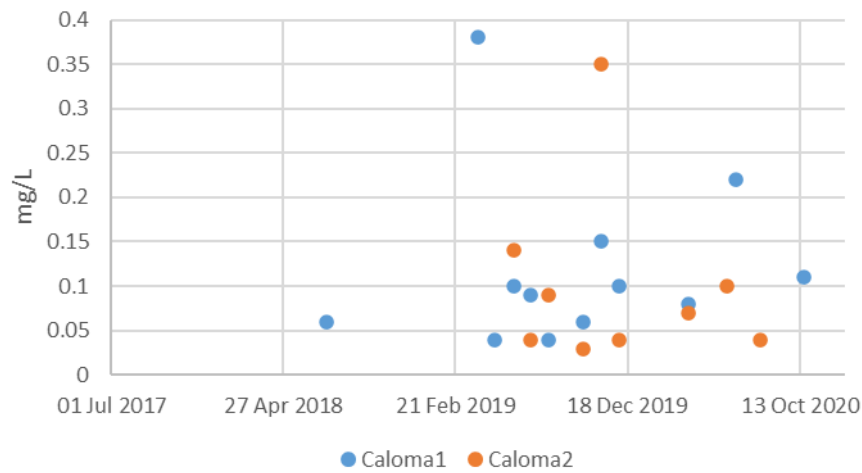




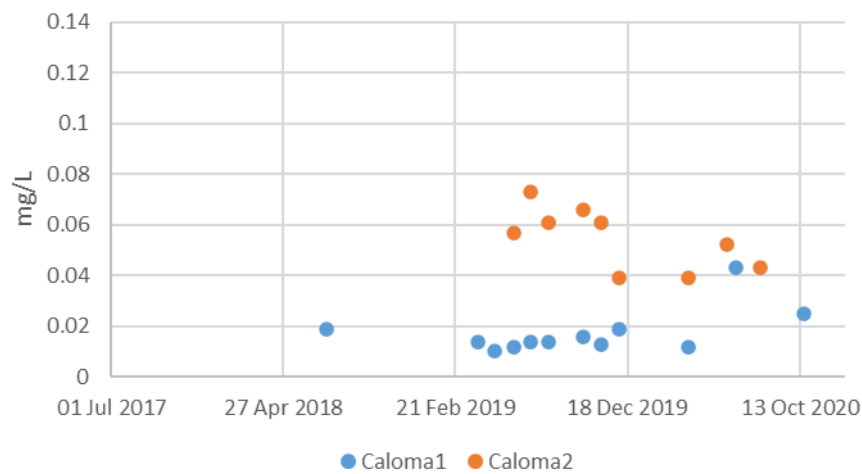
Total Phosphorus (Organic Phosphate)

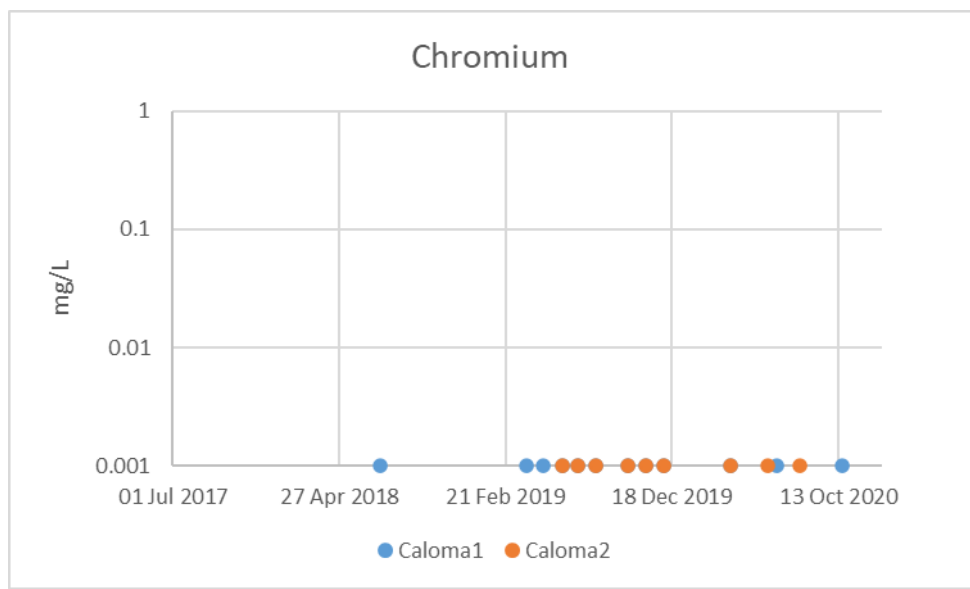
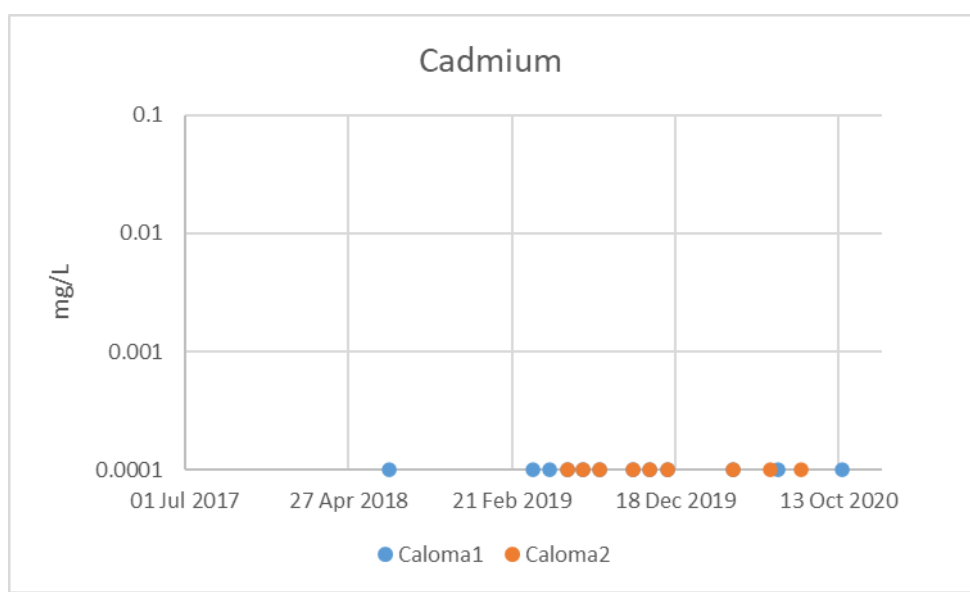
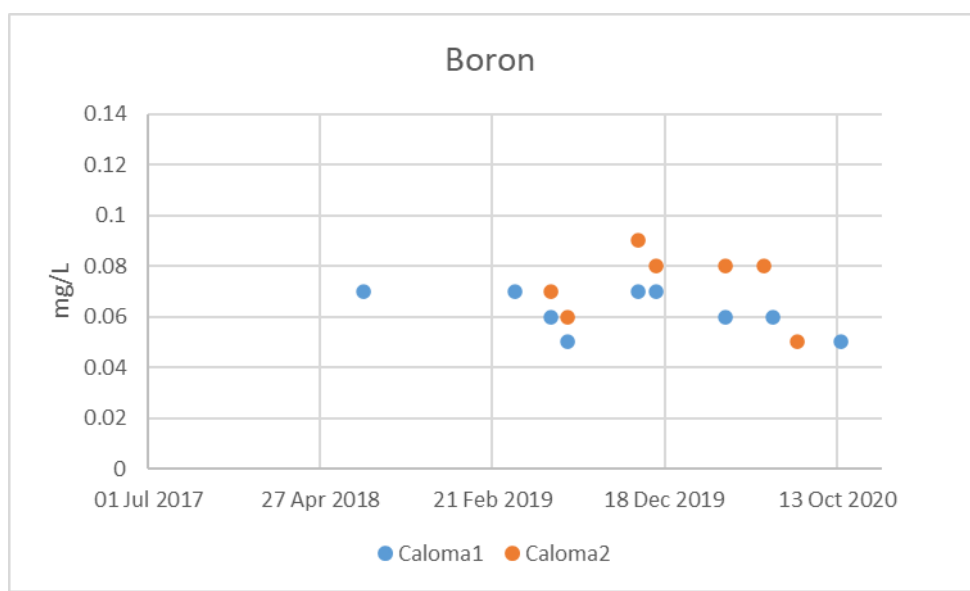


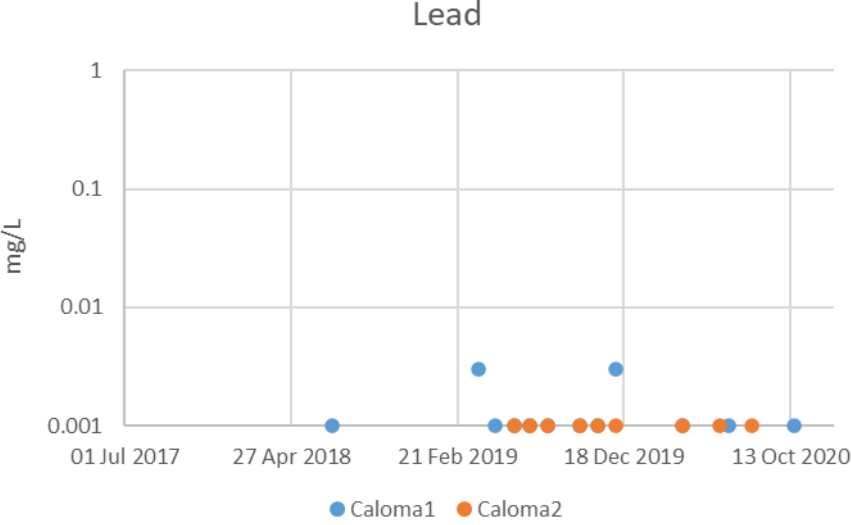
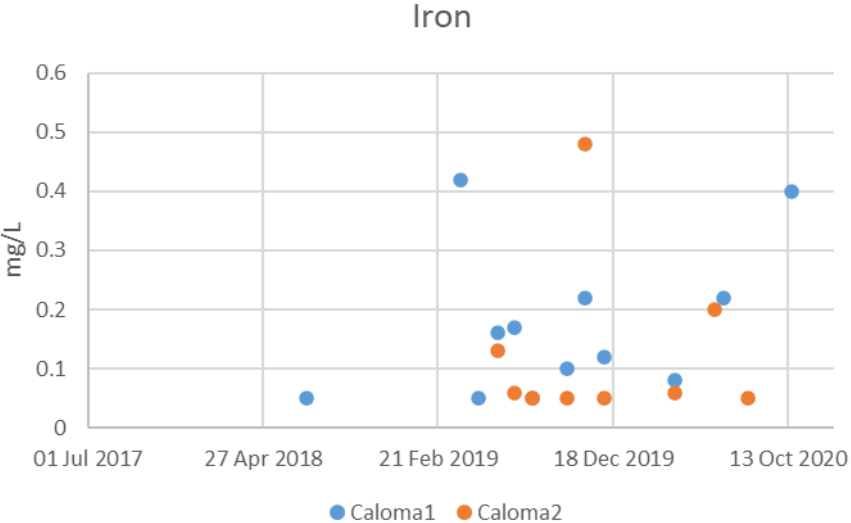
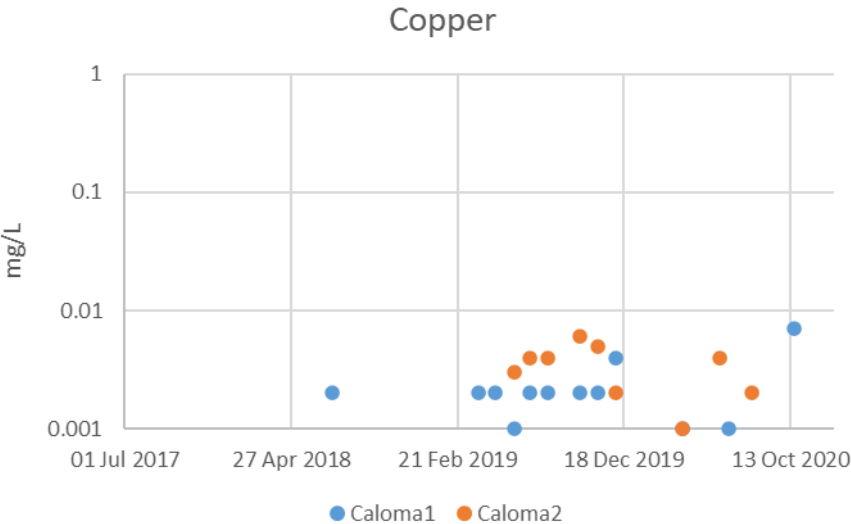
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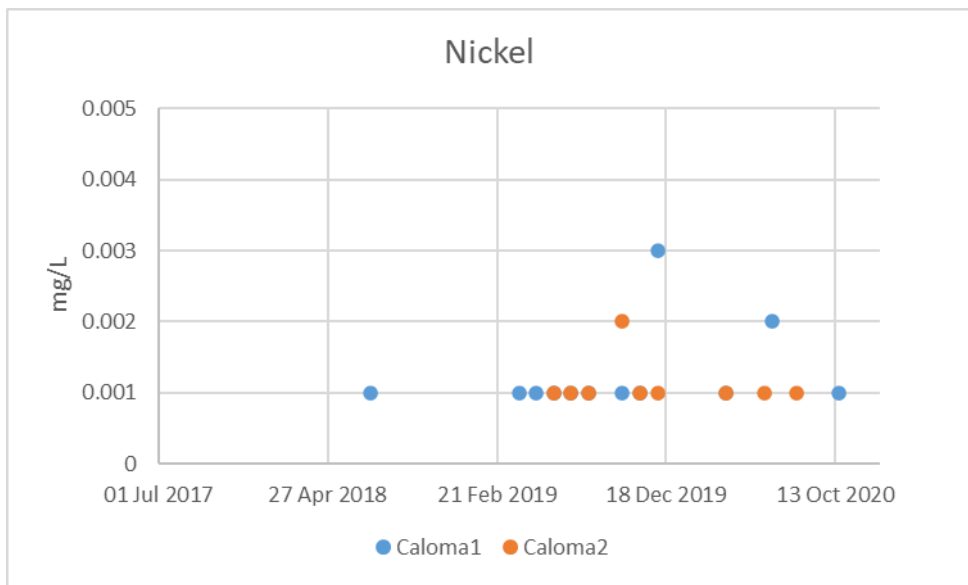
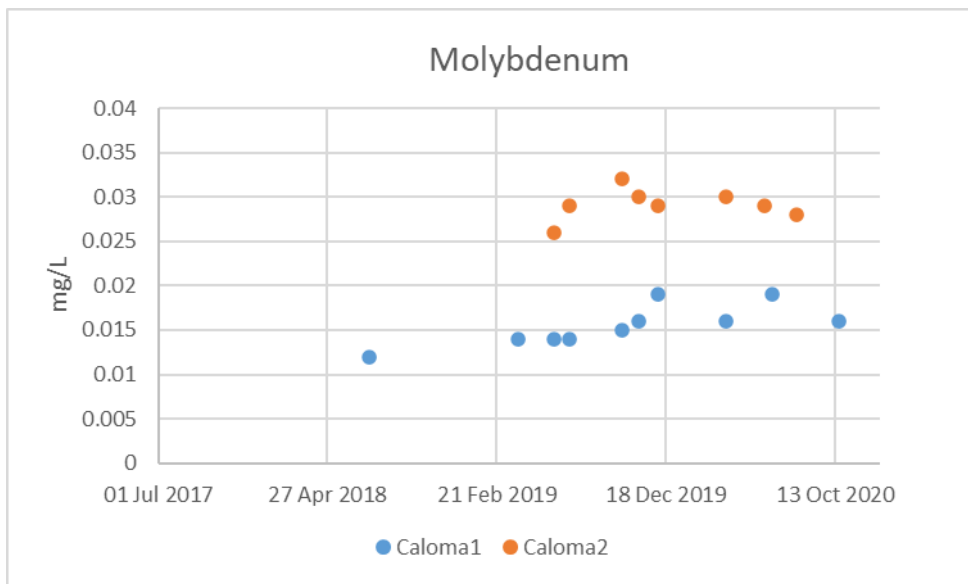
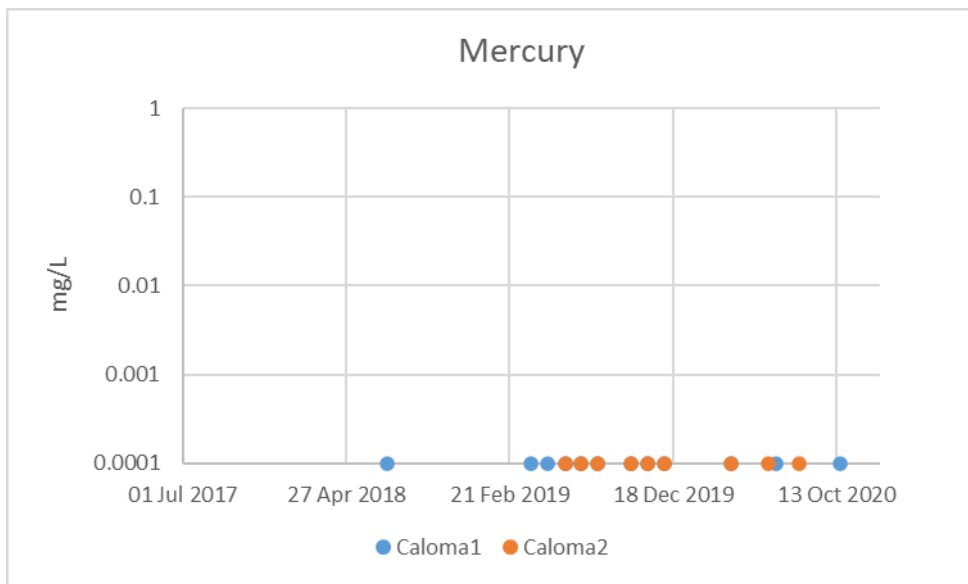


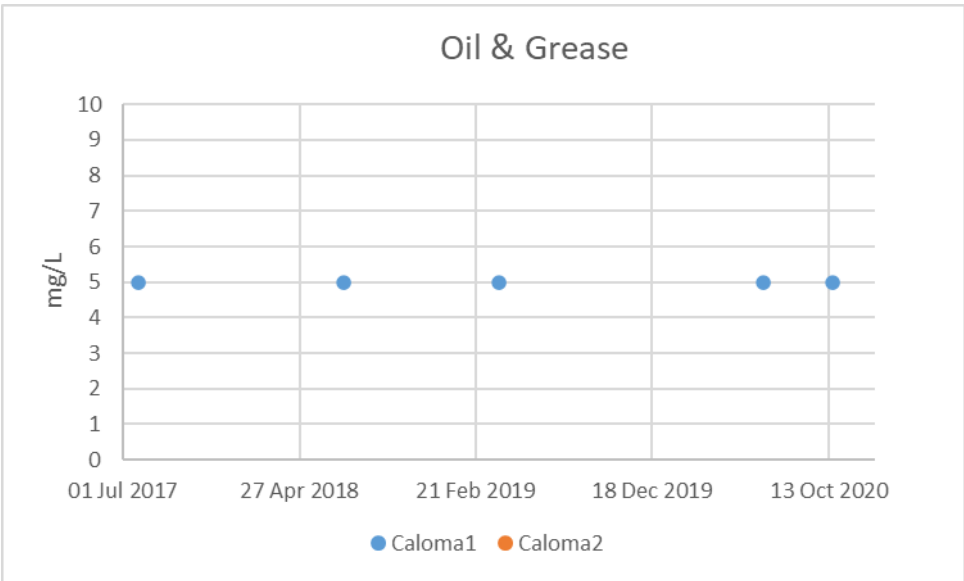
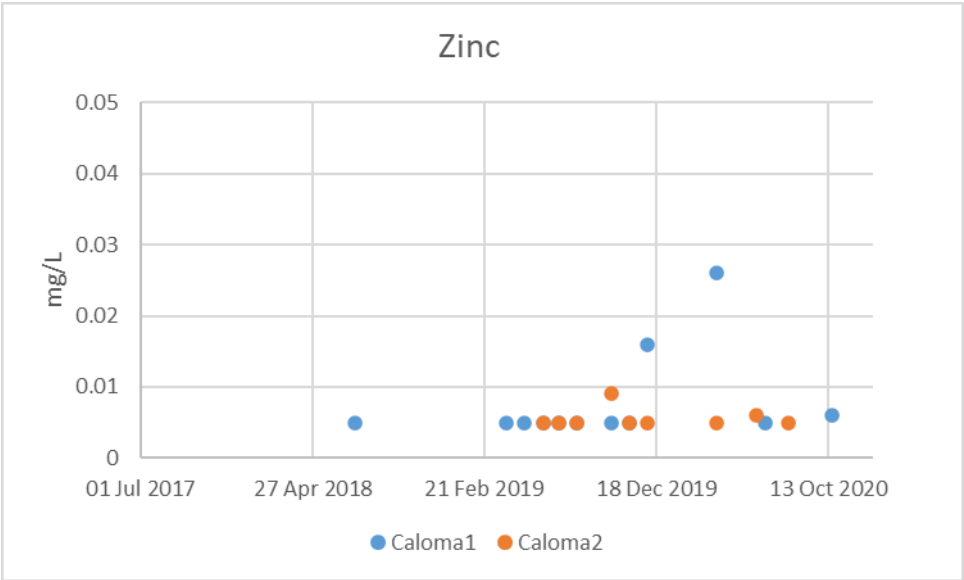
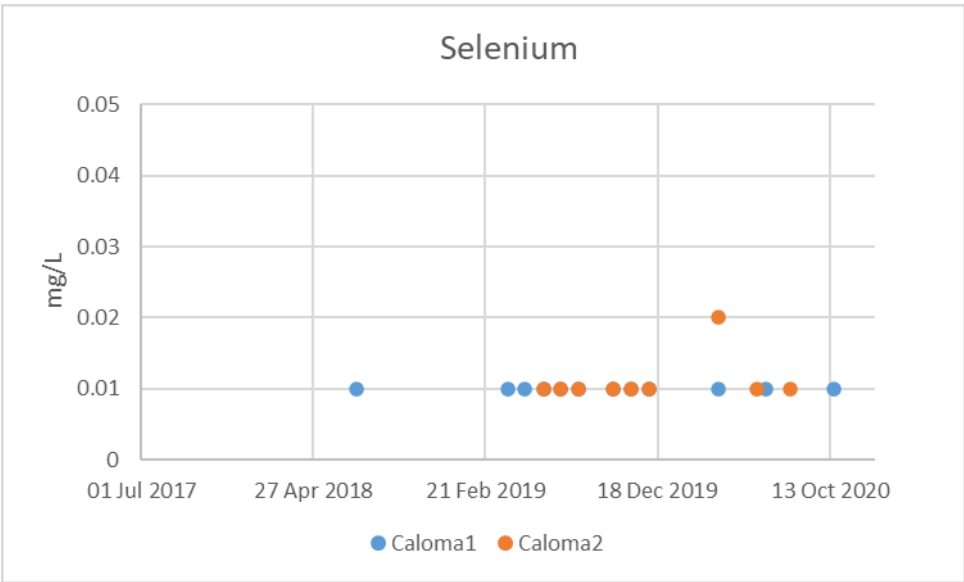
Arsenic



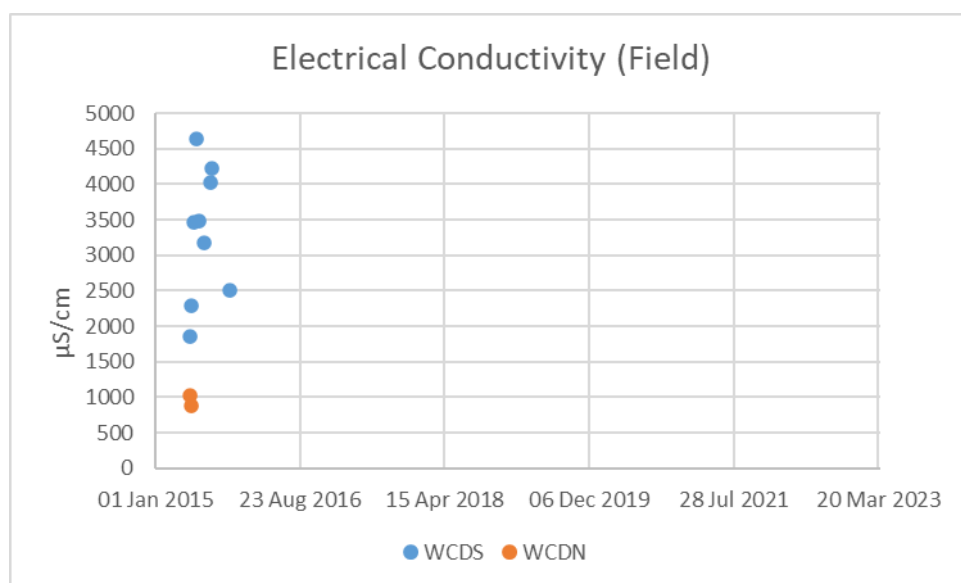
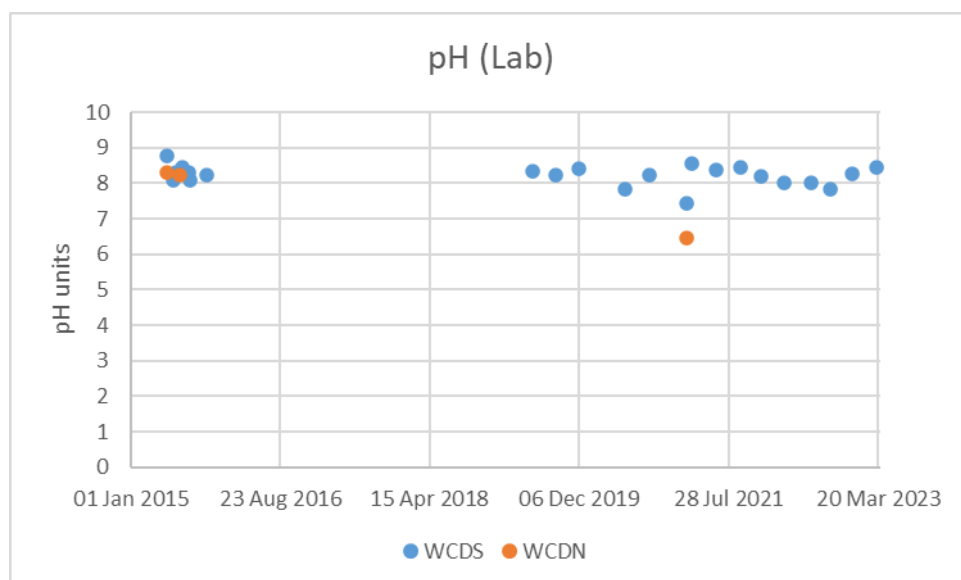
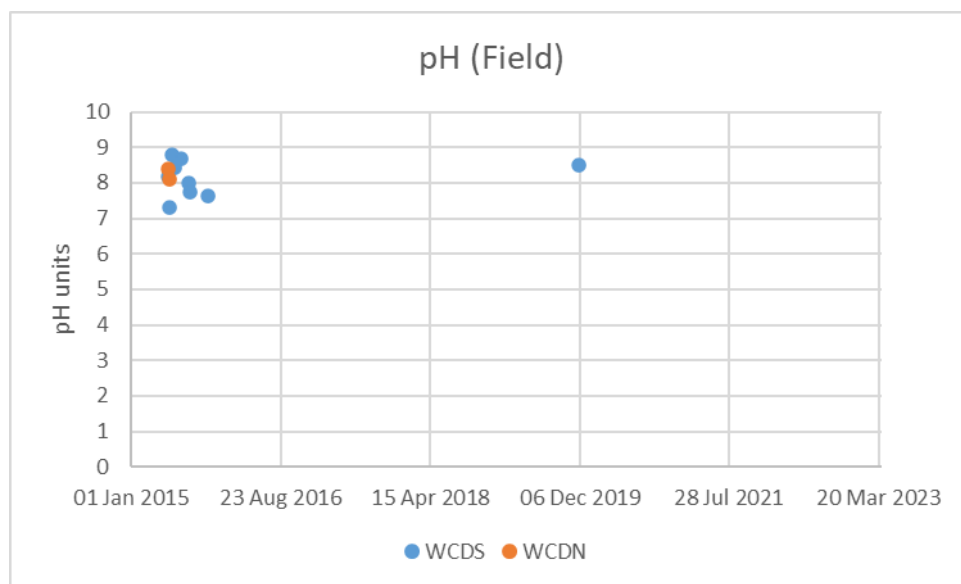


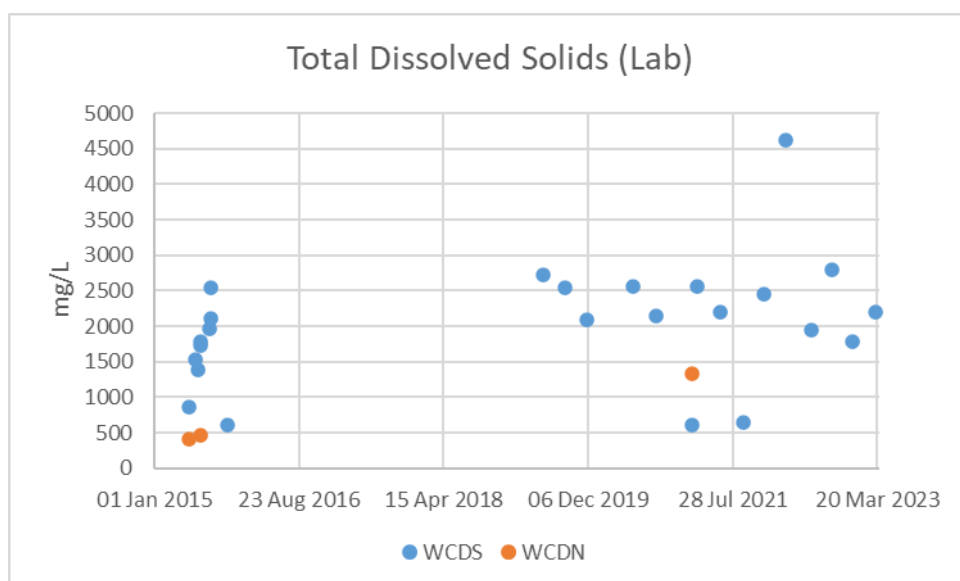
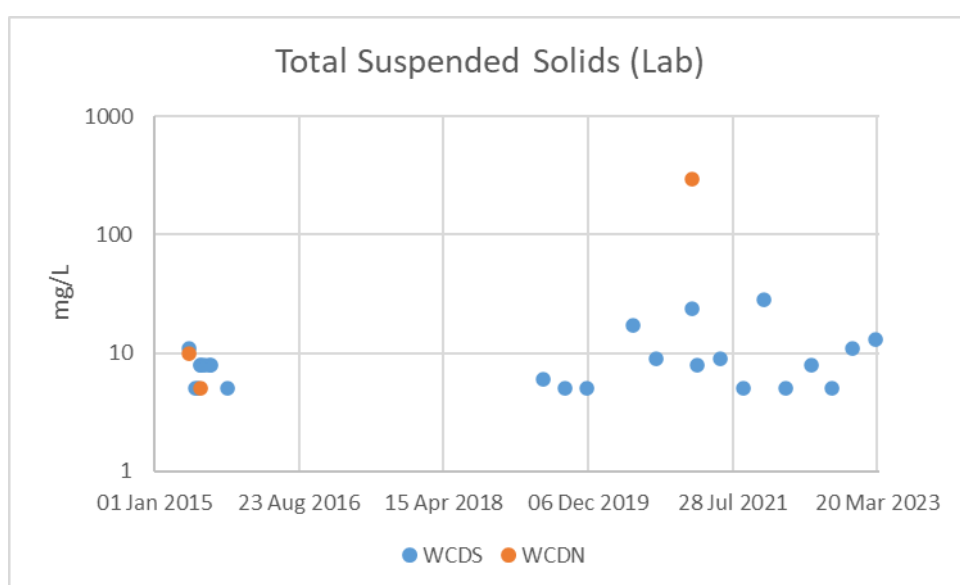
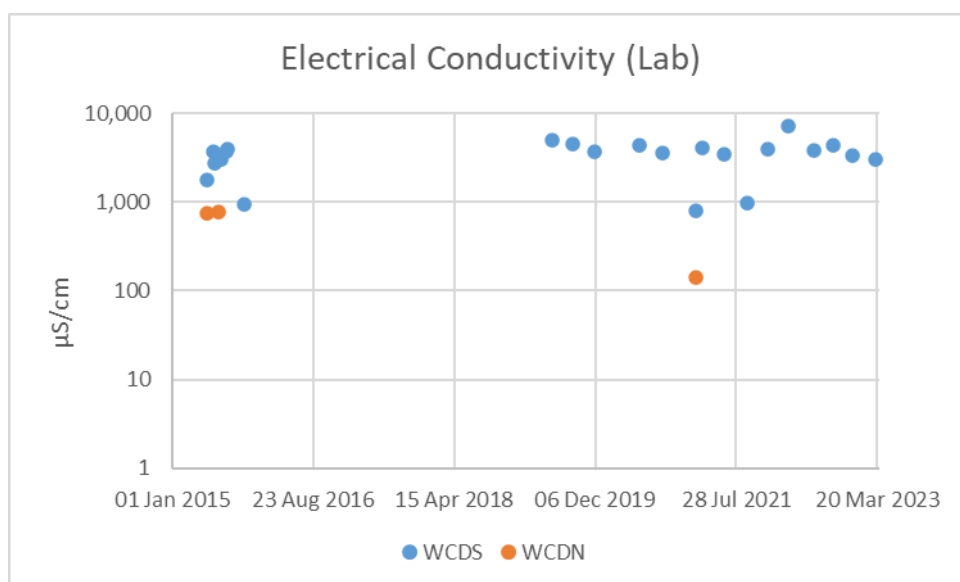


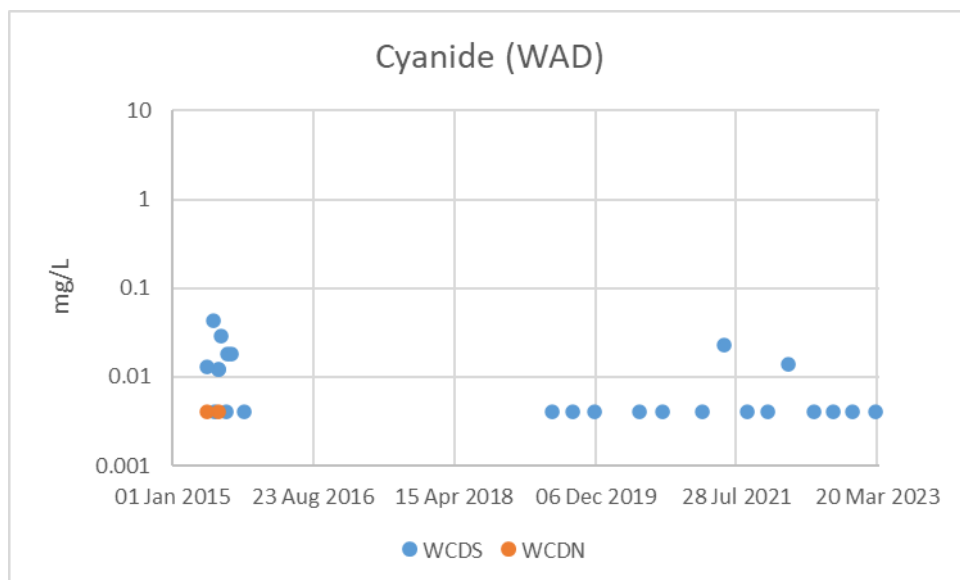
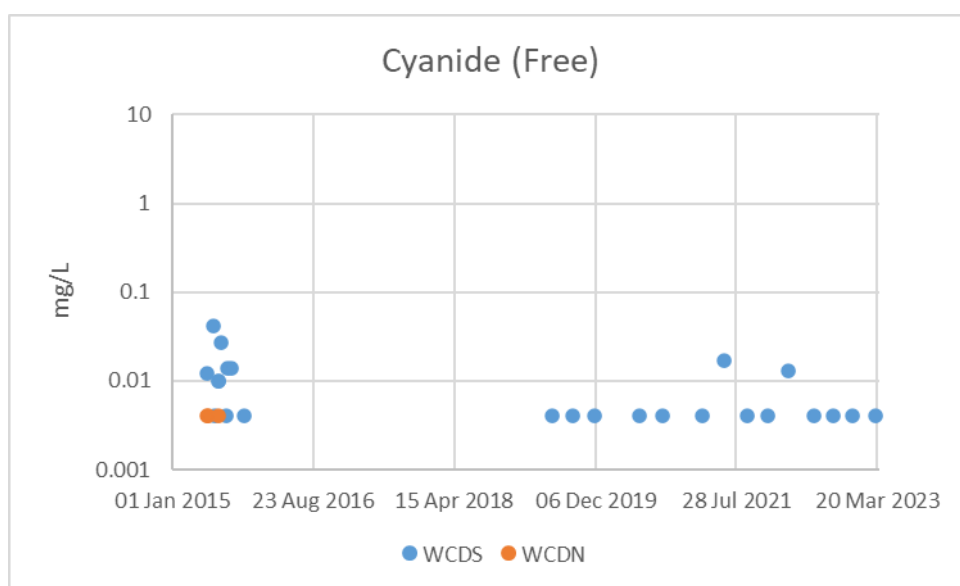
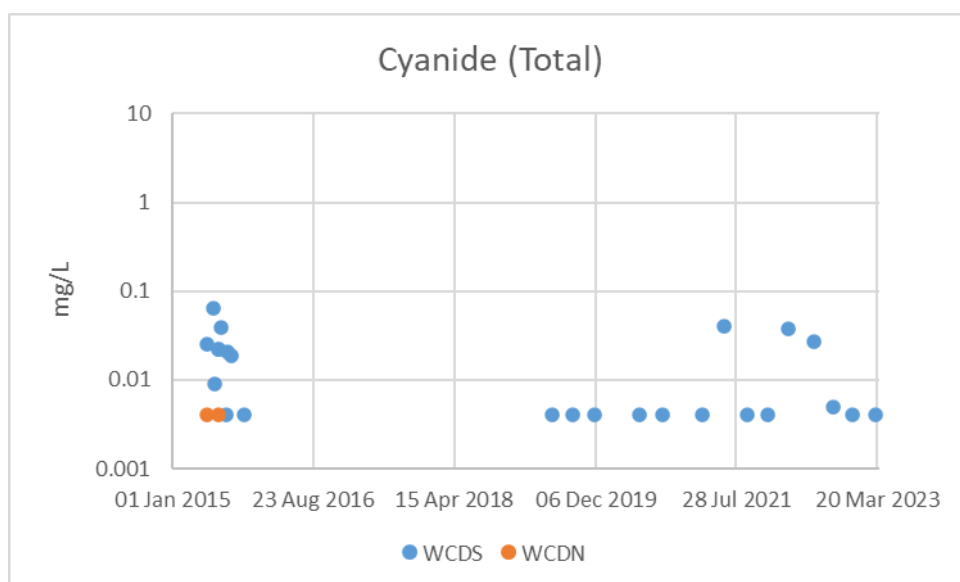


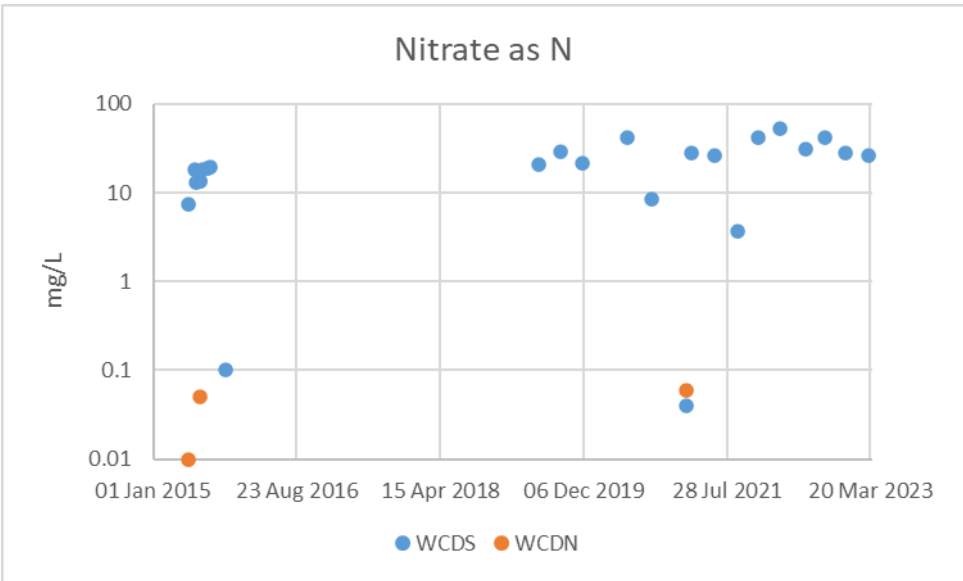
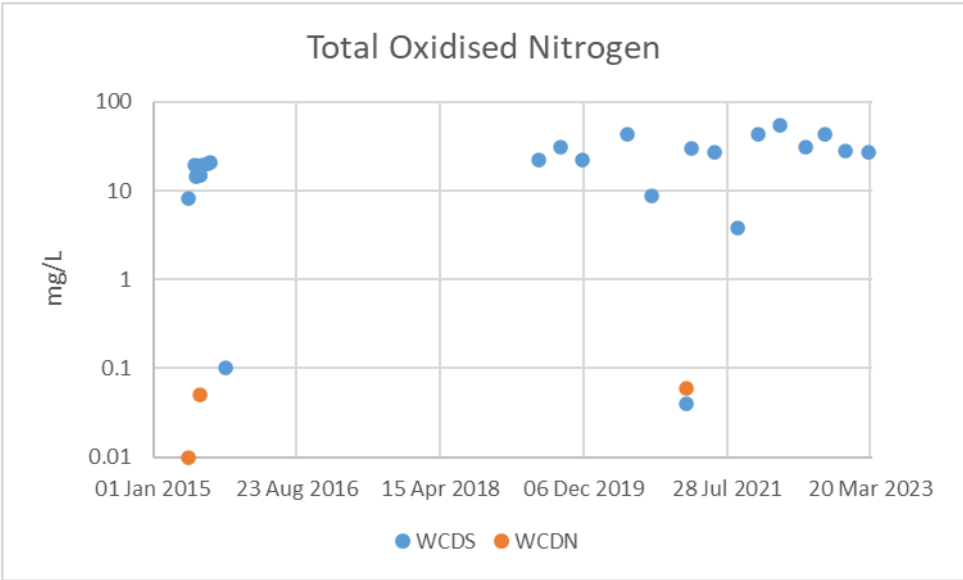
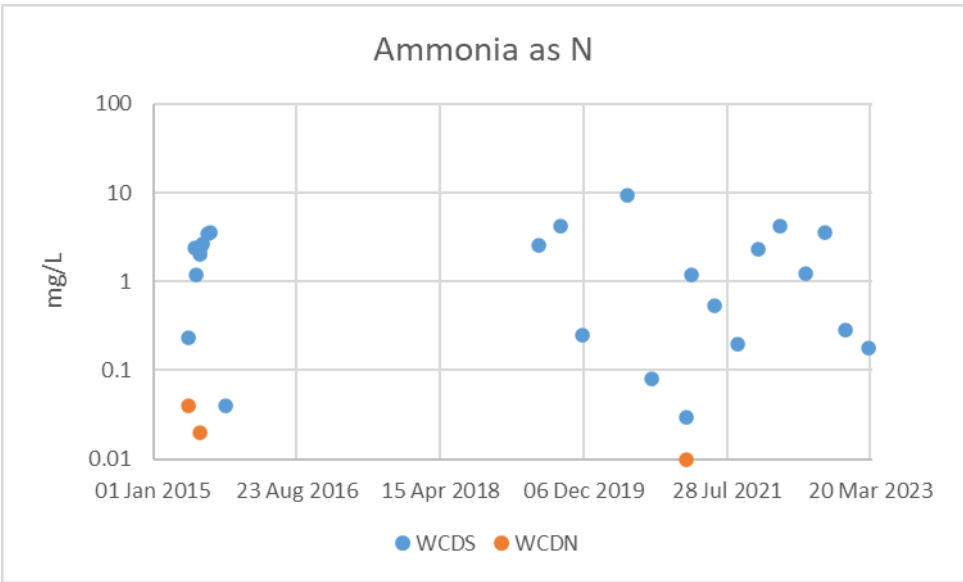


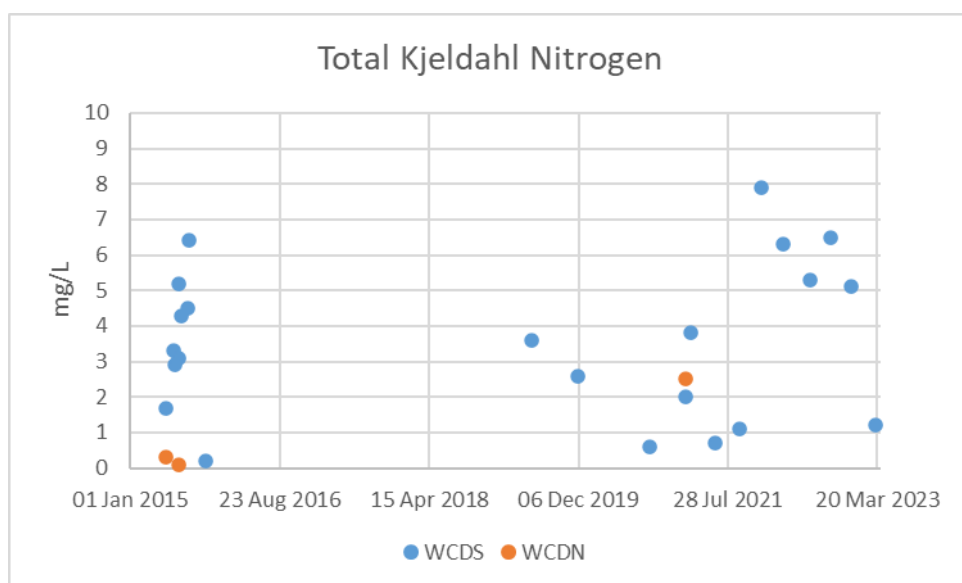
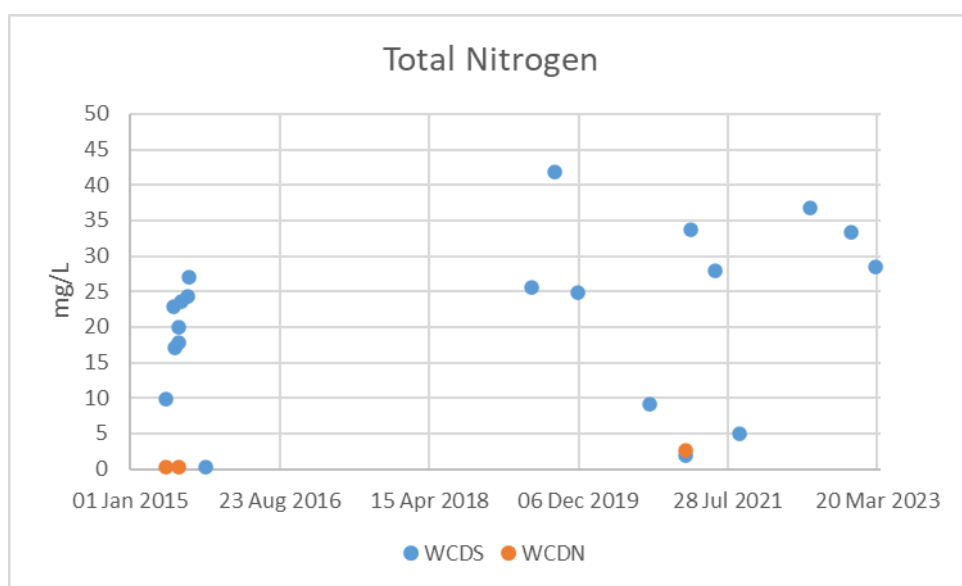
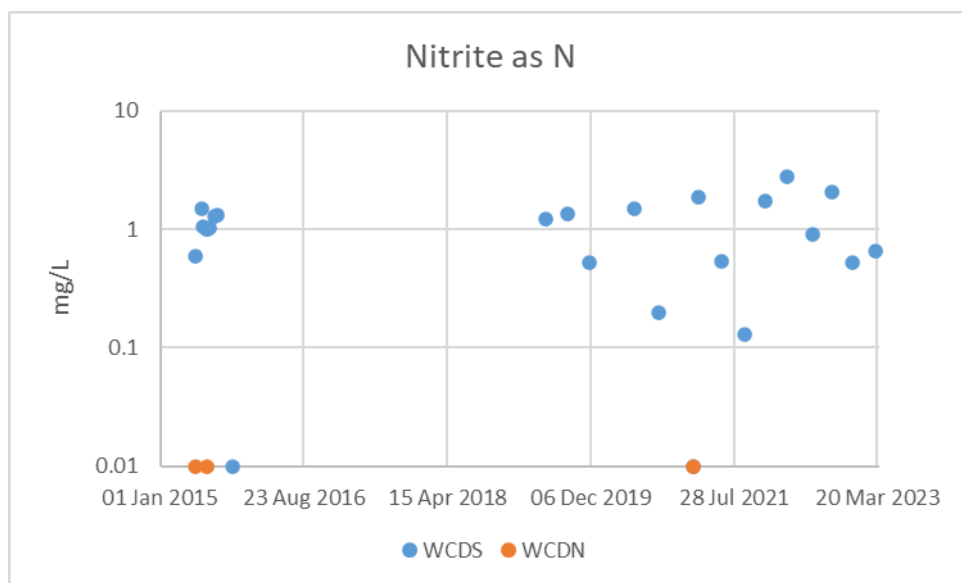
Wyoming Central Dam



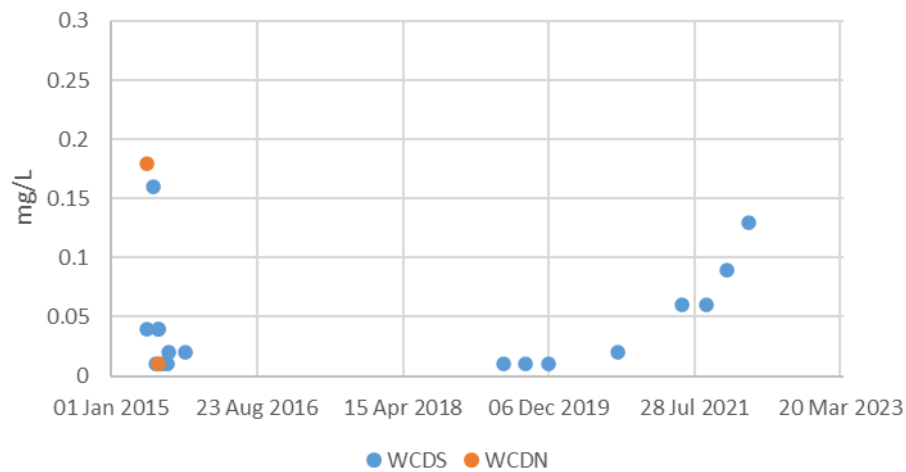




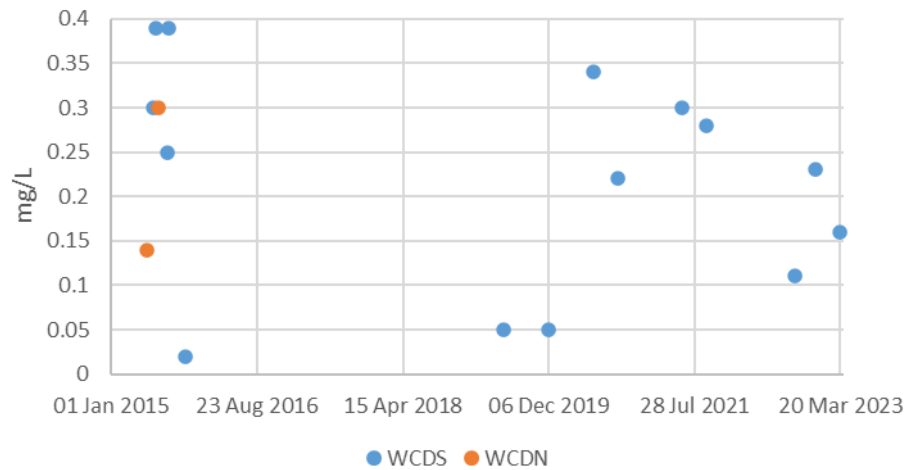




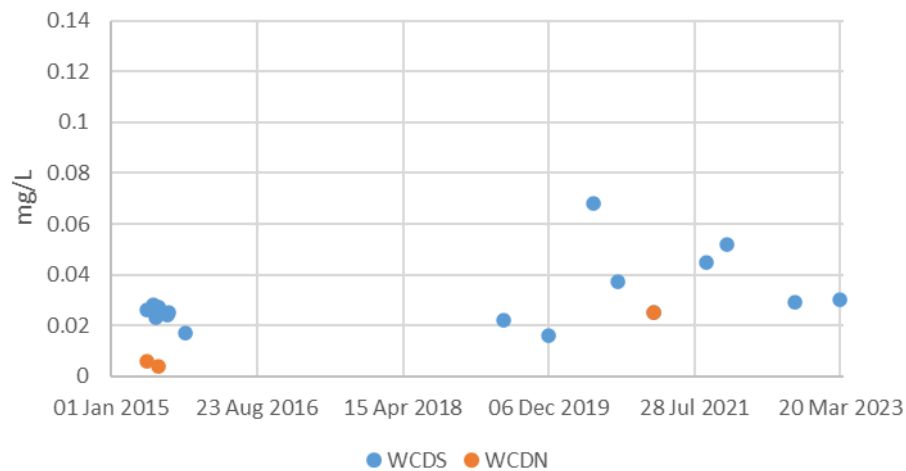
Total Phosphorus (Organic Phosphate)

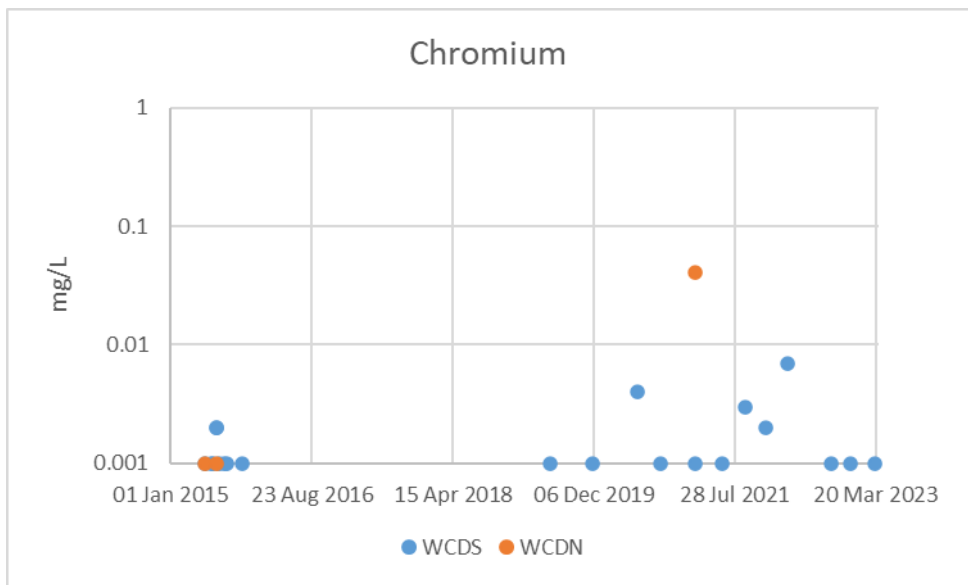
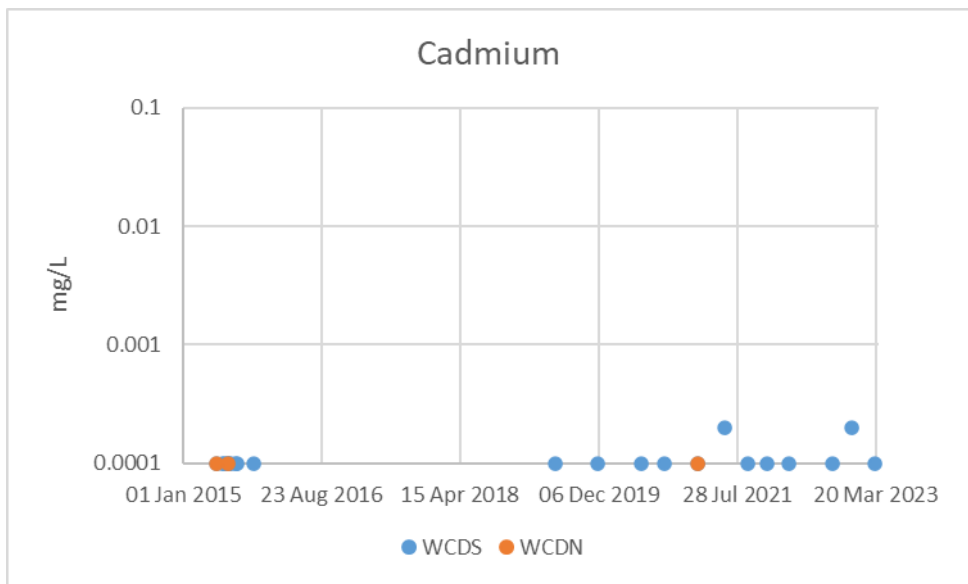
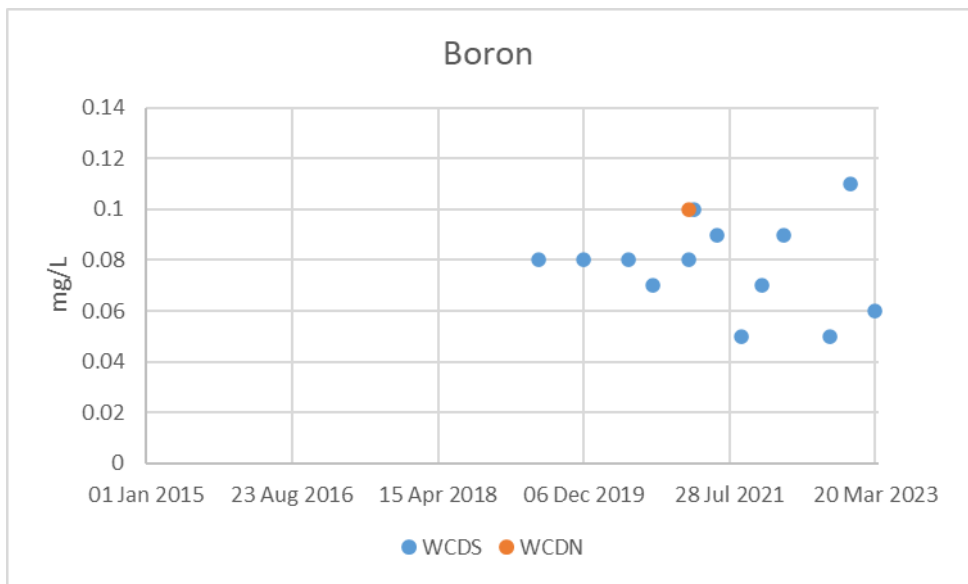


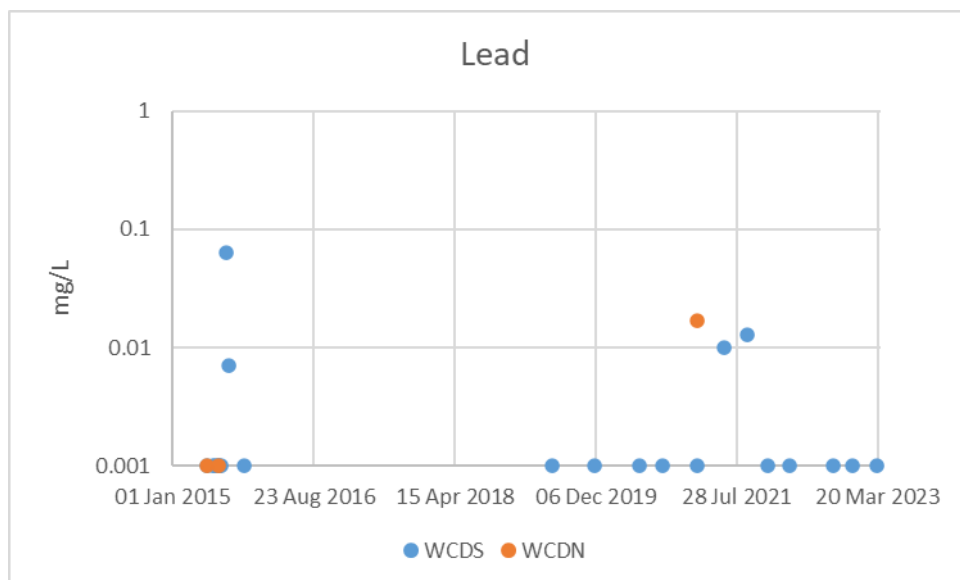
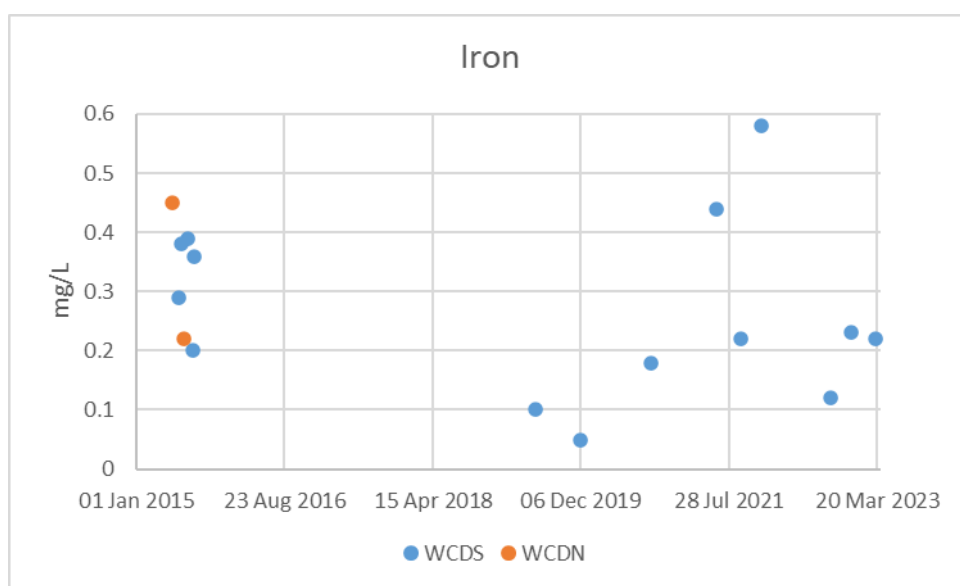
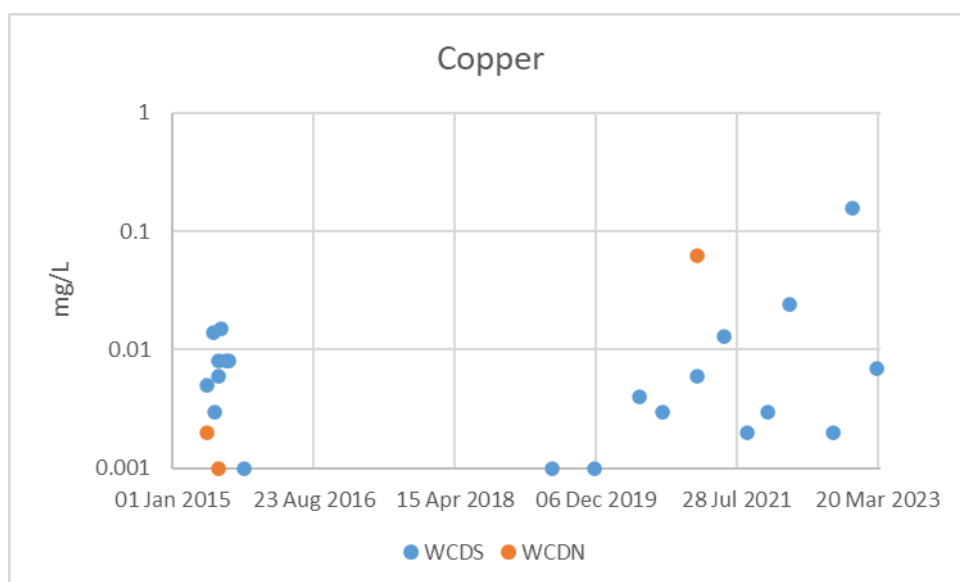
Aluminium

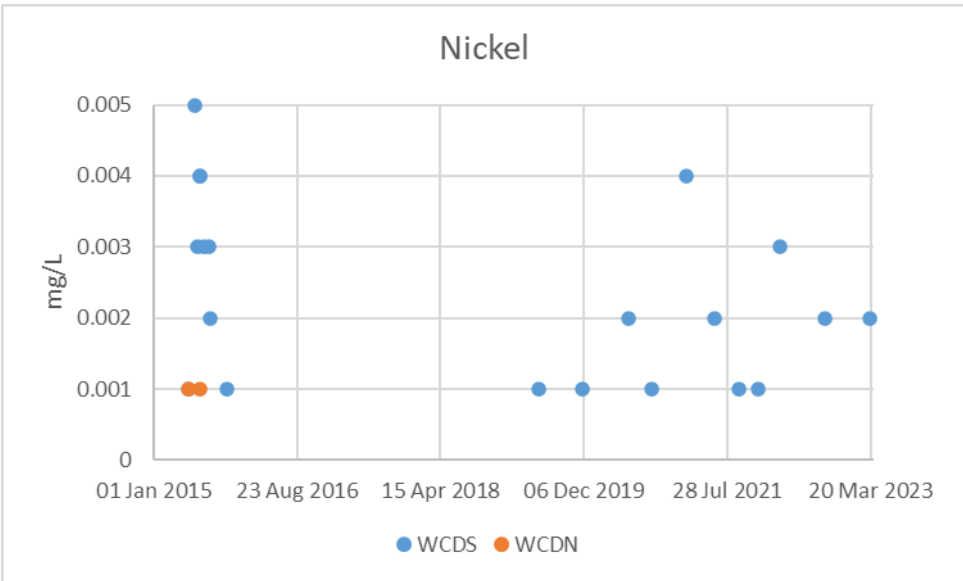
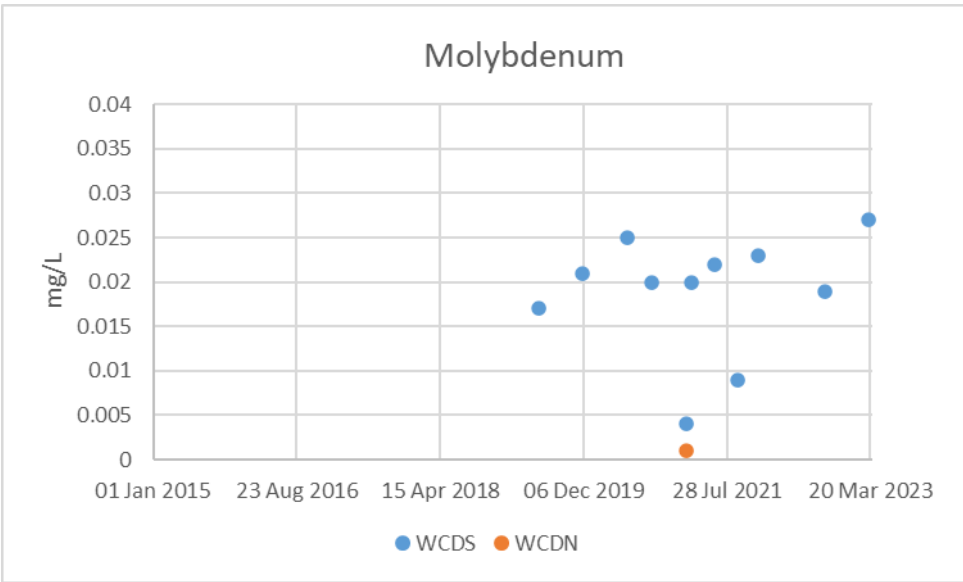
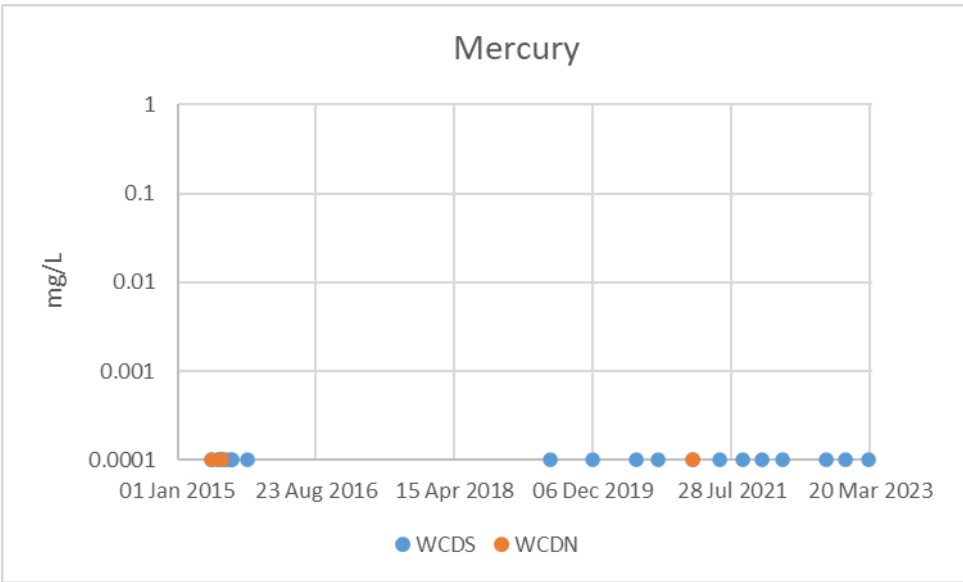


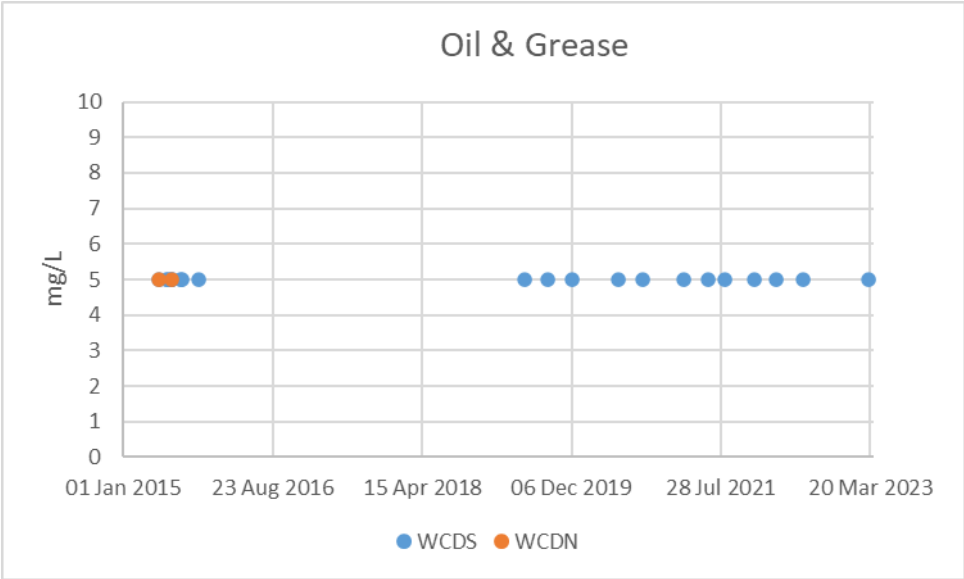
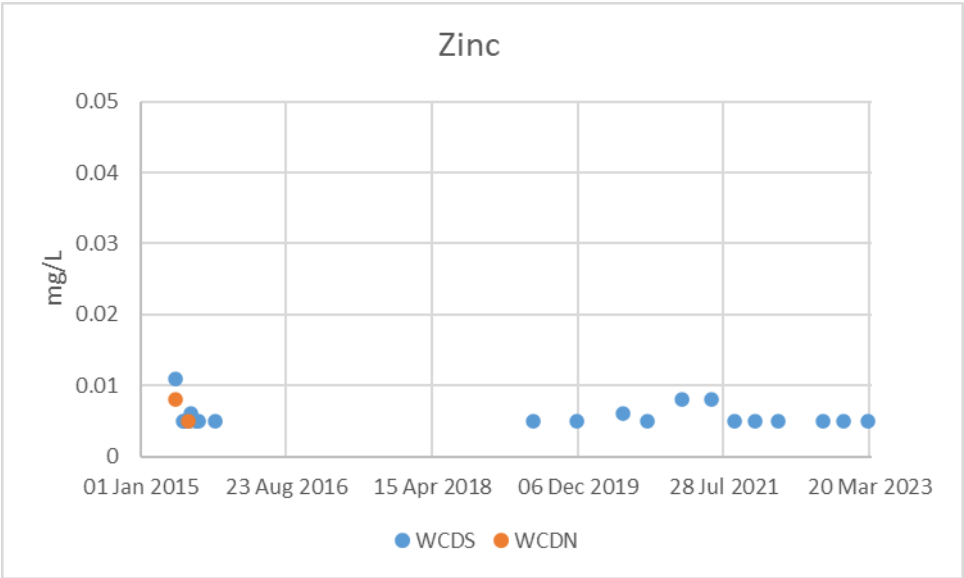
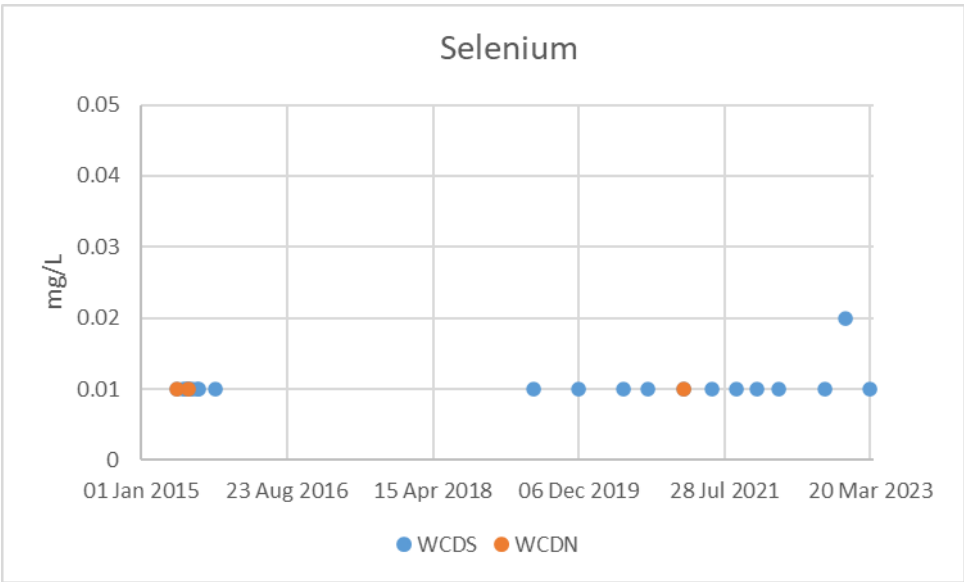
Arsenic











Appendix E

Baseline groundwater data

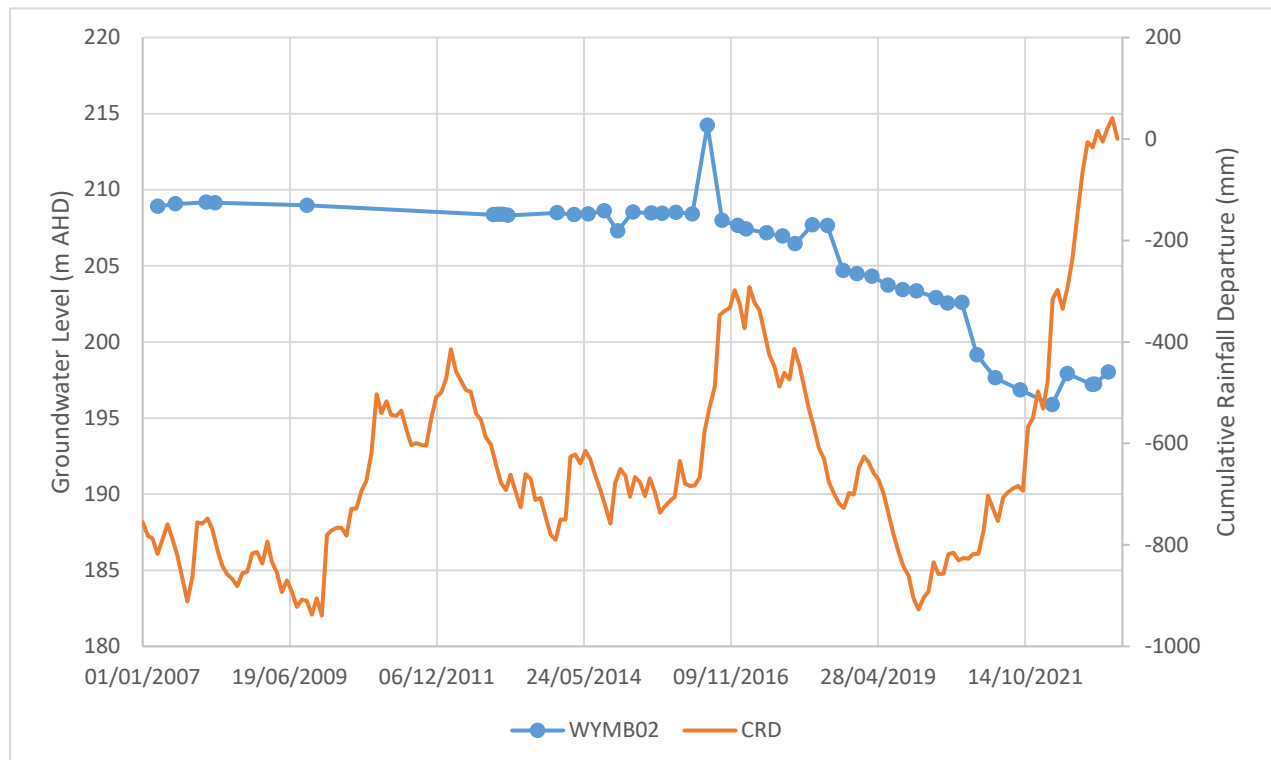
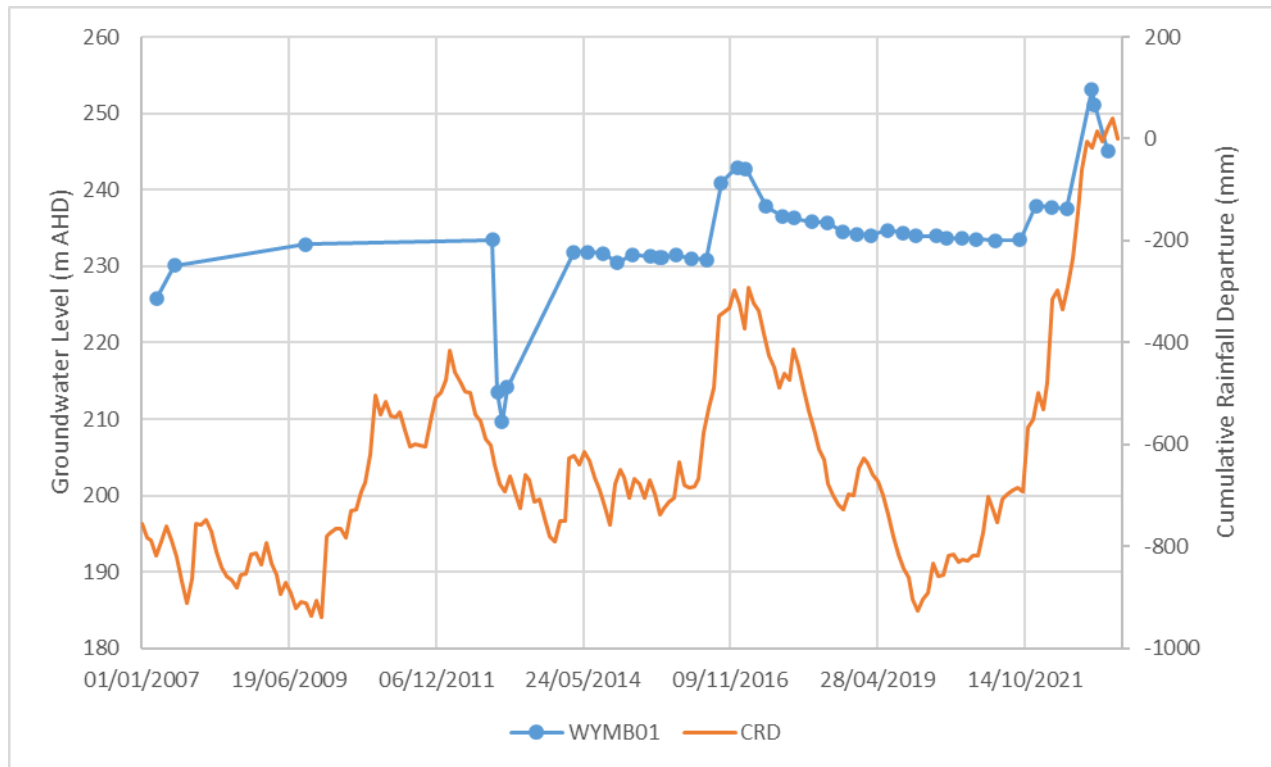
Table C-1 *Registered bore details - TGO*

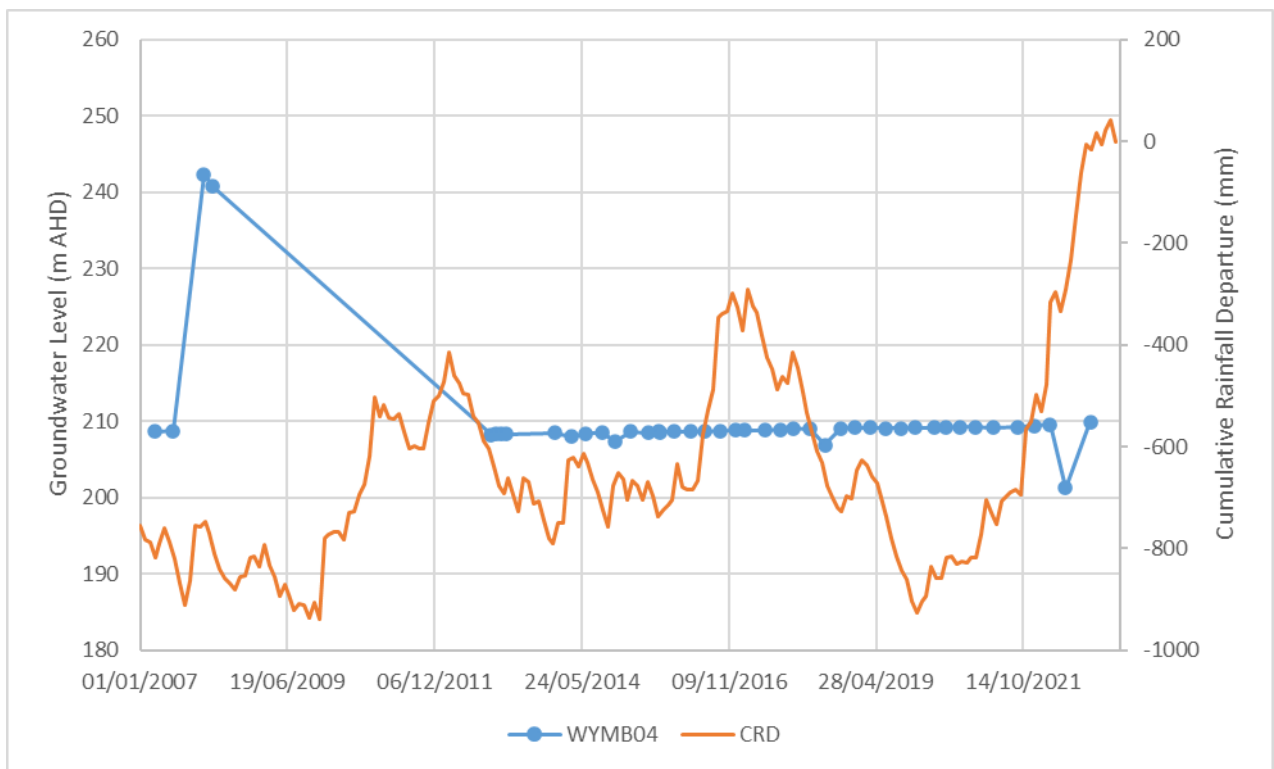
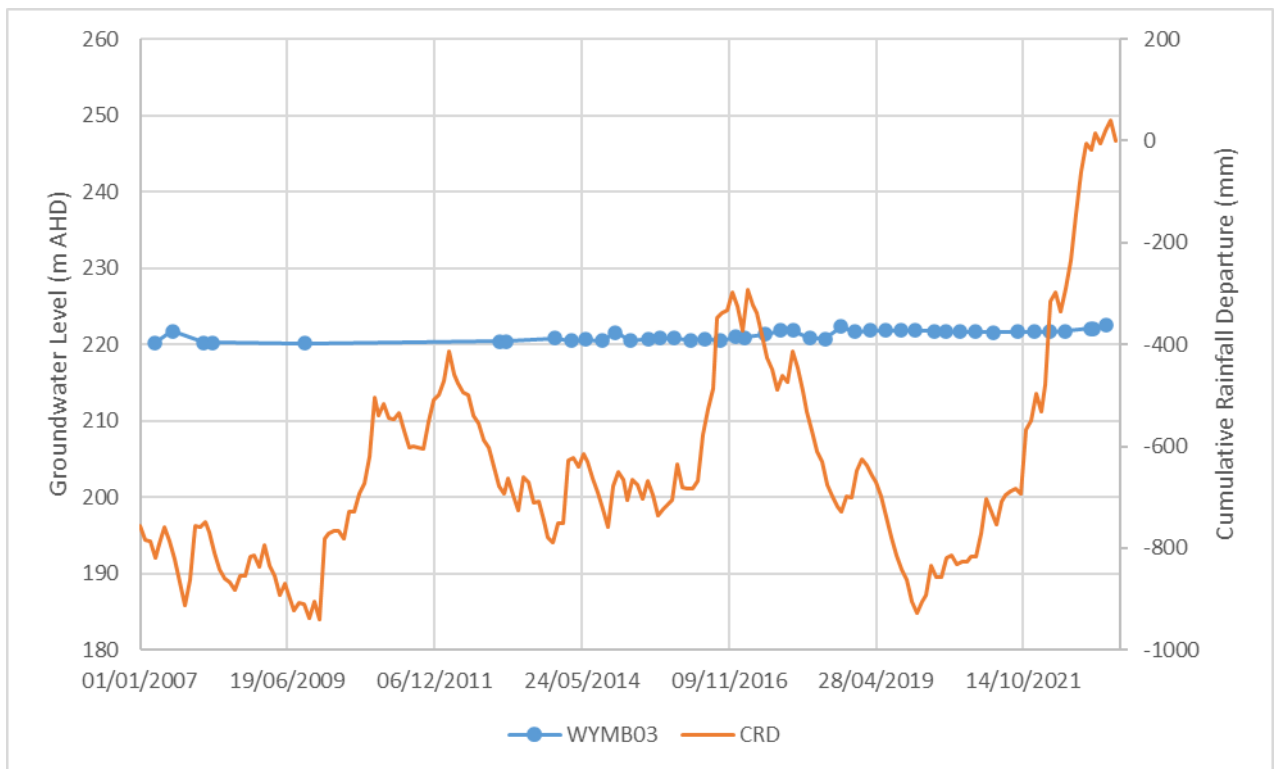
Bore	Depth	Authorised Purpose	Intended Purpose	Easting	Northing	Licence	Licence Status	WBZ	Aquifer	SWL	Yield	Salinity
GW012385	44.1		Groundwater Exploration	605497	6399909	-	-	19.5-19.8, 33.5-35	Gravelly Clay	9.1, 7.3	1.14	-
GW034897	1.8	Stock, Domestic	Stock, Domestic	612967	6398380	80BL028144	Converted	1.8	-	-	-	-
GW066562	73	Test Bore	Test Bore	617276	6387642	80BL141280	Cancelled					
GW054594	61.6	Stock, Domestic	Stock, Domestic	617018	6383487	80BL116653	Converted	-	-	-	-	-
GW045134	18.3	Test Bore	Public/ Municipal	614748	6396758	80BL105282	Cancelled	-	-	-	-	-
GW045135	3.7	Test Bore	Public/ Municipal	617605	6397956	80BL105283	Cancelled	3	Clay white sandy	0.9	0.76	-
GW045136	5.2	Test Bore	Public/ Municipal	617792	6398324	80BL105284	Cancelled	4.6-5.2	Unconsolidated Sandy Clay	-	-	-
GW045137	12.2	Test Bore	Public/Municipal	615448	6396318	80BL105285	Cancelled	-	-	-	-	-
GW800177	113.88	Test Bore	Test Bore	619322	6400284	80BL237099	Cancelled	2-4.5	Sand	1	0.32	Good
GW801568	81	Domestic, Stock	Domestic, Stock	619013	6385184	80BL239686	Converted	-	-	-	-	-
GW800178	80	Test Bore	Test Bore	619329	6400277	80BL237099	Cancelled	-	-	-	-	-
GW068651	97	-	Mining	616478	6383302	-	-	82-82.1, 94-94.1	Fresh siltstone	-	-	-
GW037395	4.5	Irrigation	Irrigation	616510	6397938	80BL030552	Converted	3.6-4.5	Unconsolidated Sandy Clay	2.1	1.26	-
GW802834	77	Test Bore	Test Bore	617229	6383531	80BL237359	Lapsed	54-77	Shale and siltstone	42	1.5	3900 mg/L
GW803148	5.8	Town Water Supply	Town Water Supply	617498	6397966	80BL242918	Converted	-	-	4.4	1	-
GW803681	3.5	Monitoring Bore	-	614686	6395749	80BL245013	Active	-	Weathered shale	-	-	-

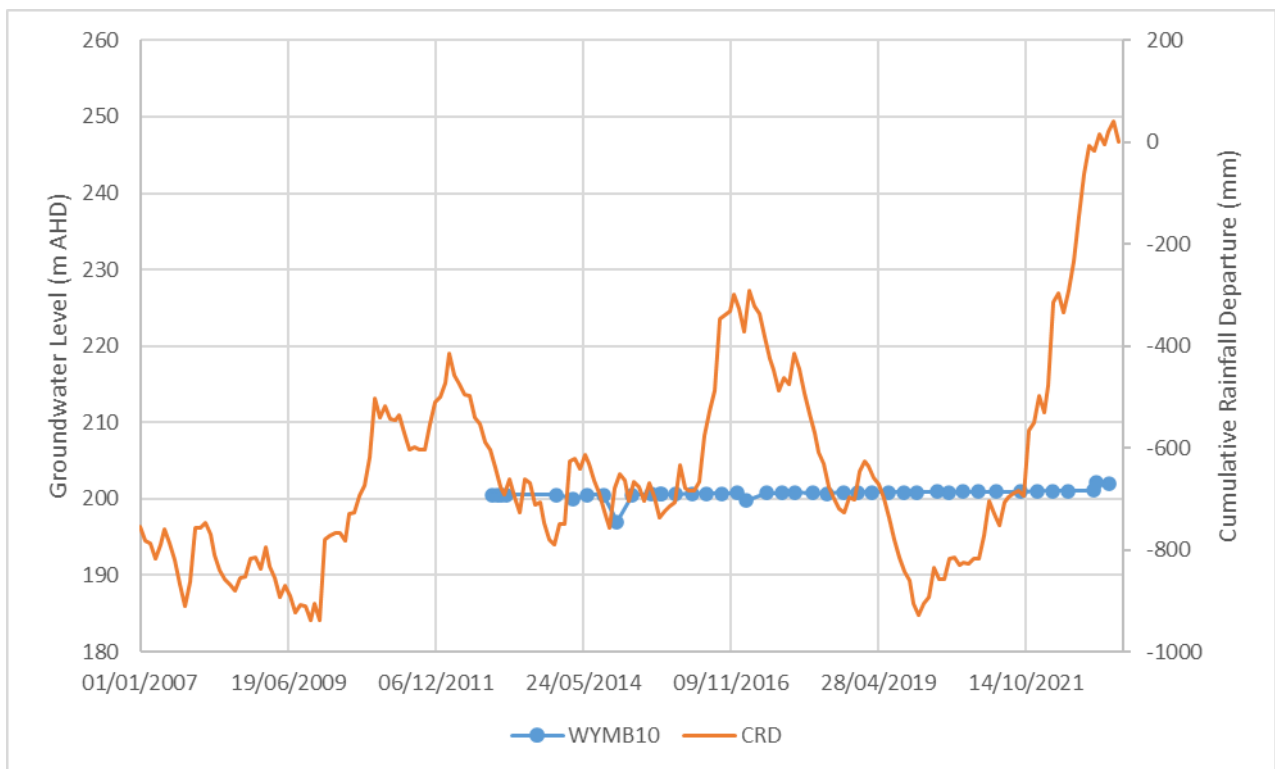
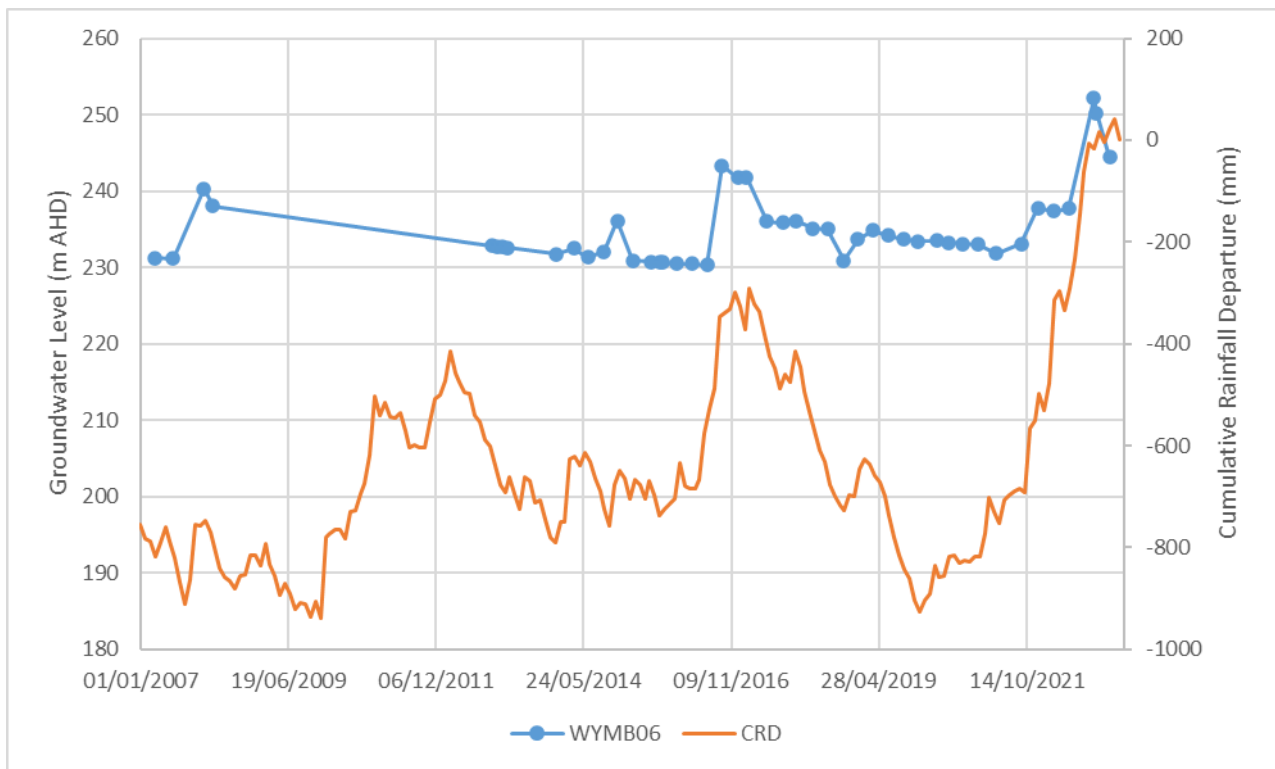
Bore	Depth	Authorised Purpose	Intended Purpose	Easting	Northing	Licence	Licence Status	WBZ	Aquifer	SWL	Yield	Salinity
GW803678	4	Monitoring Bore	-	614695	6395743	80BL245013	Active	-	Claystone	-	-	-
GW803682	3.5	Monitoring Bore	-	614688	6395758	80BL245013	Active	-	Weathered shale	-	-	-
GW803680	4.5	Monitoring Bore	-	614685	6395767	80BL245013	Active	-	Sandy Clay/Clay	-	-	-
GW803679	4	Monitoring Bore	-	614680	6395761	80BL245013	Active	-	Claystone/ Shale	-	-	-
GW804130	69	-	Test Bore	604604	6388873	-	Abandoned	-	-	-	-	-
GW804137	64	-	Test Bore	603562	6395423	-	-	-	-	-	-	-

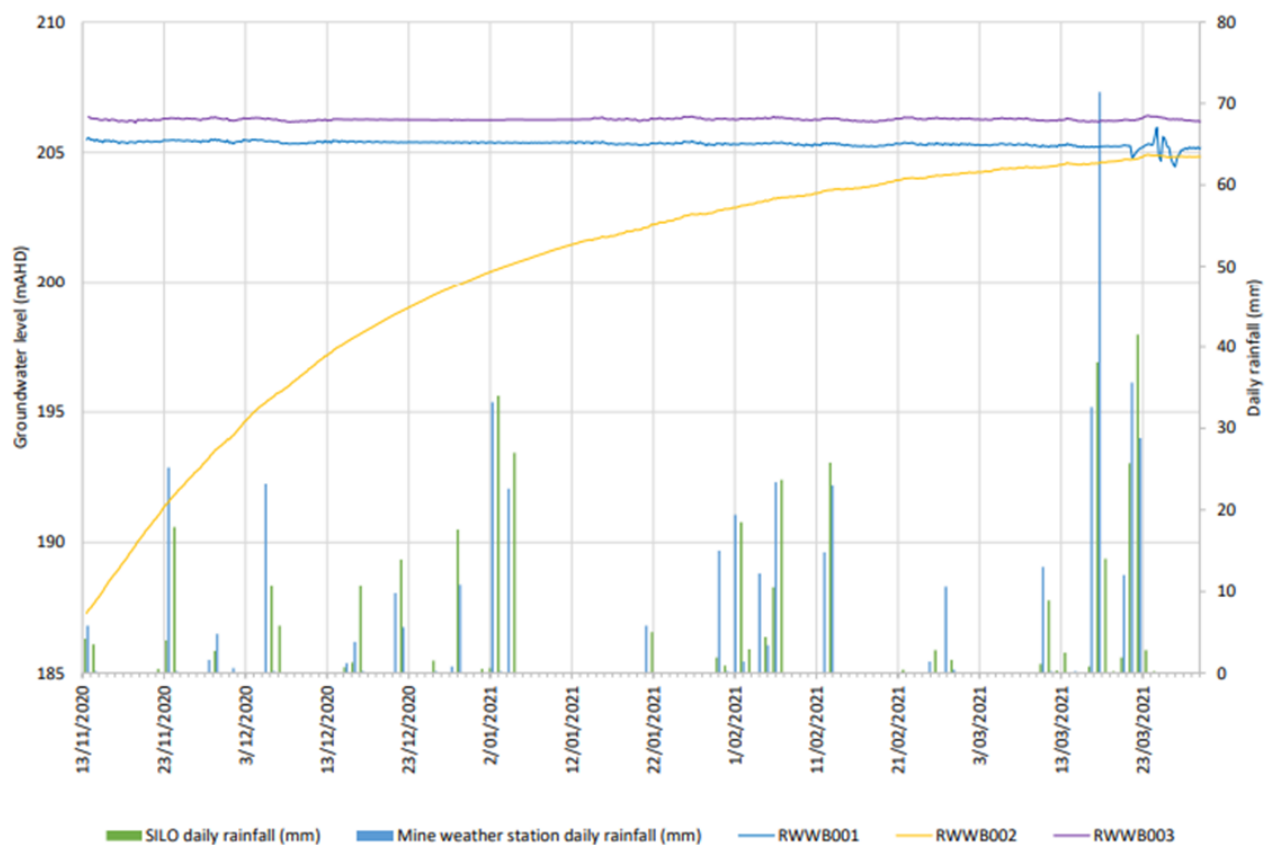
Groundwater hydrographs

Fractured rock bores

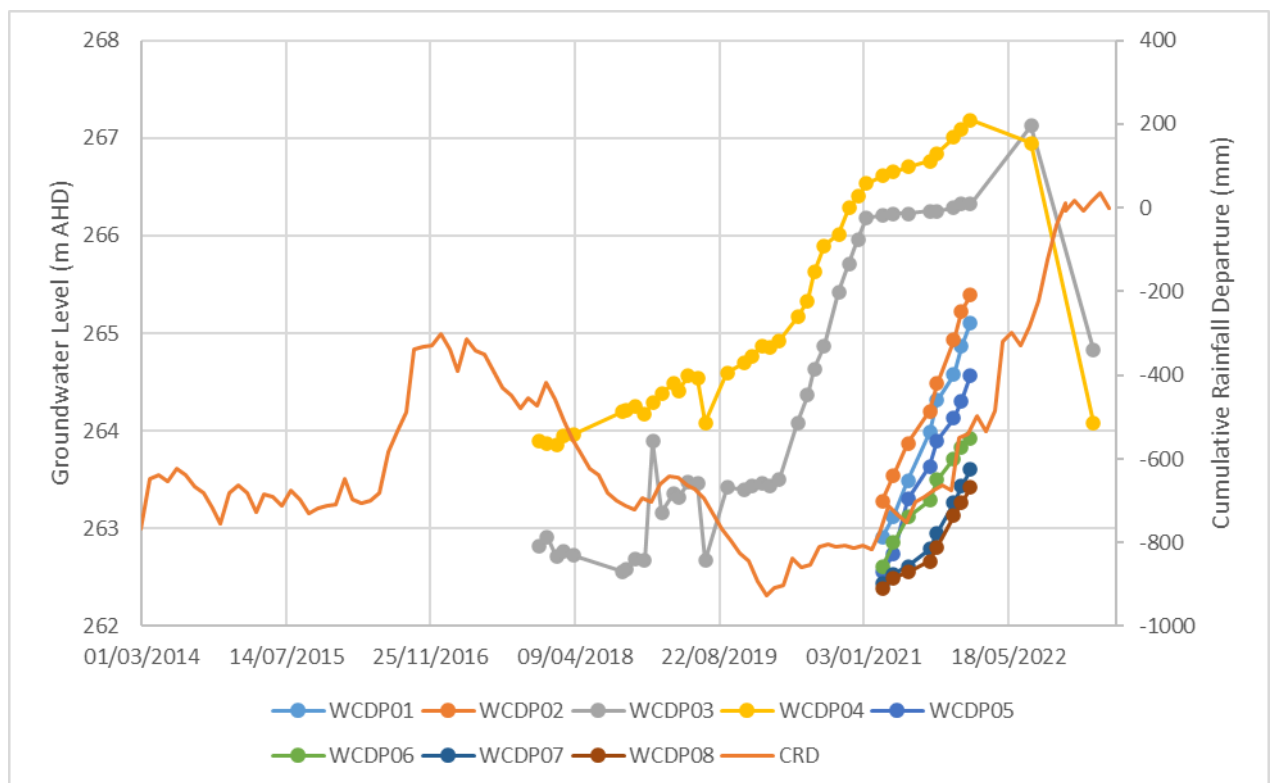
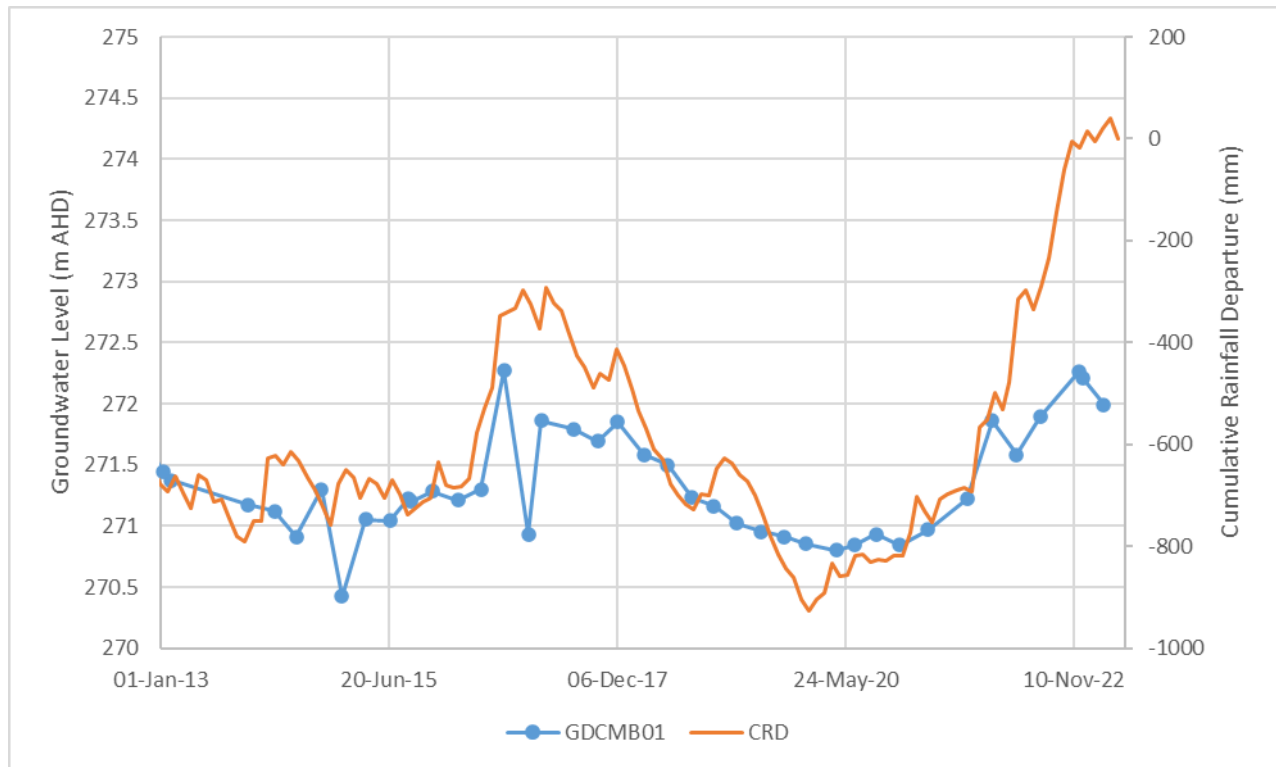


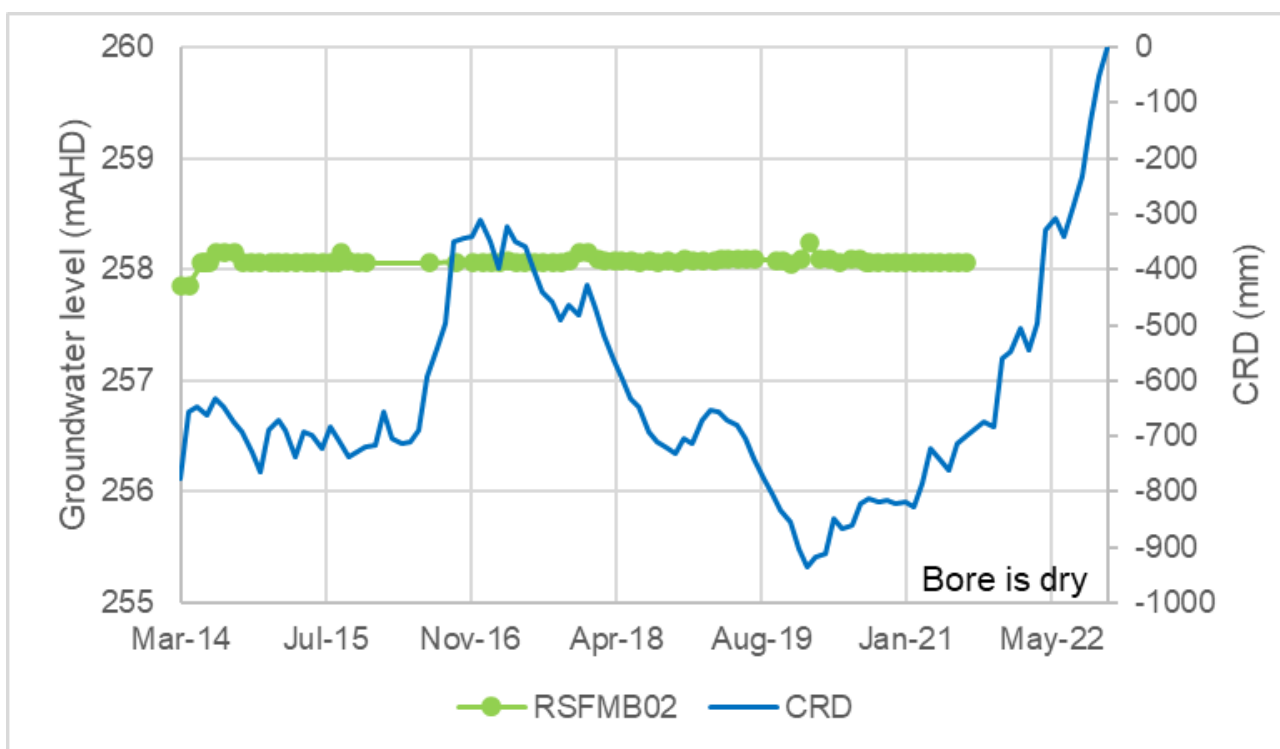
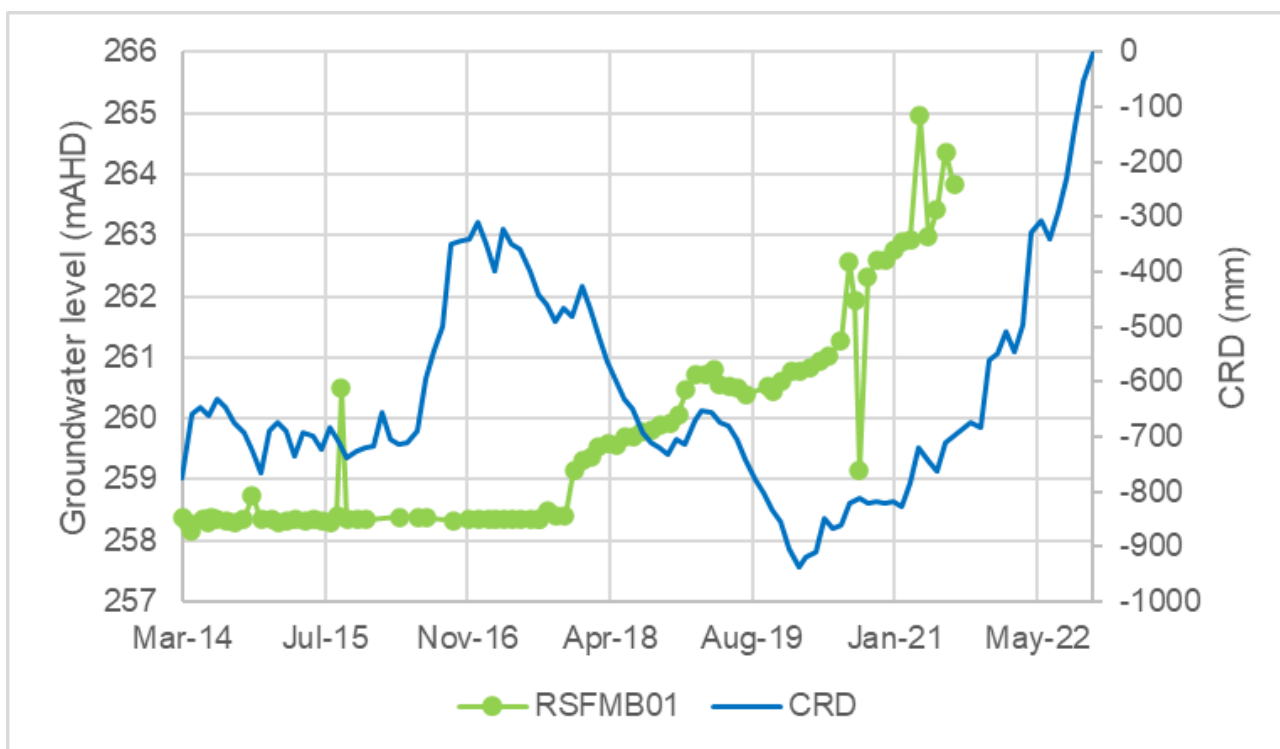


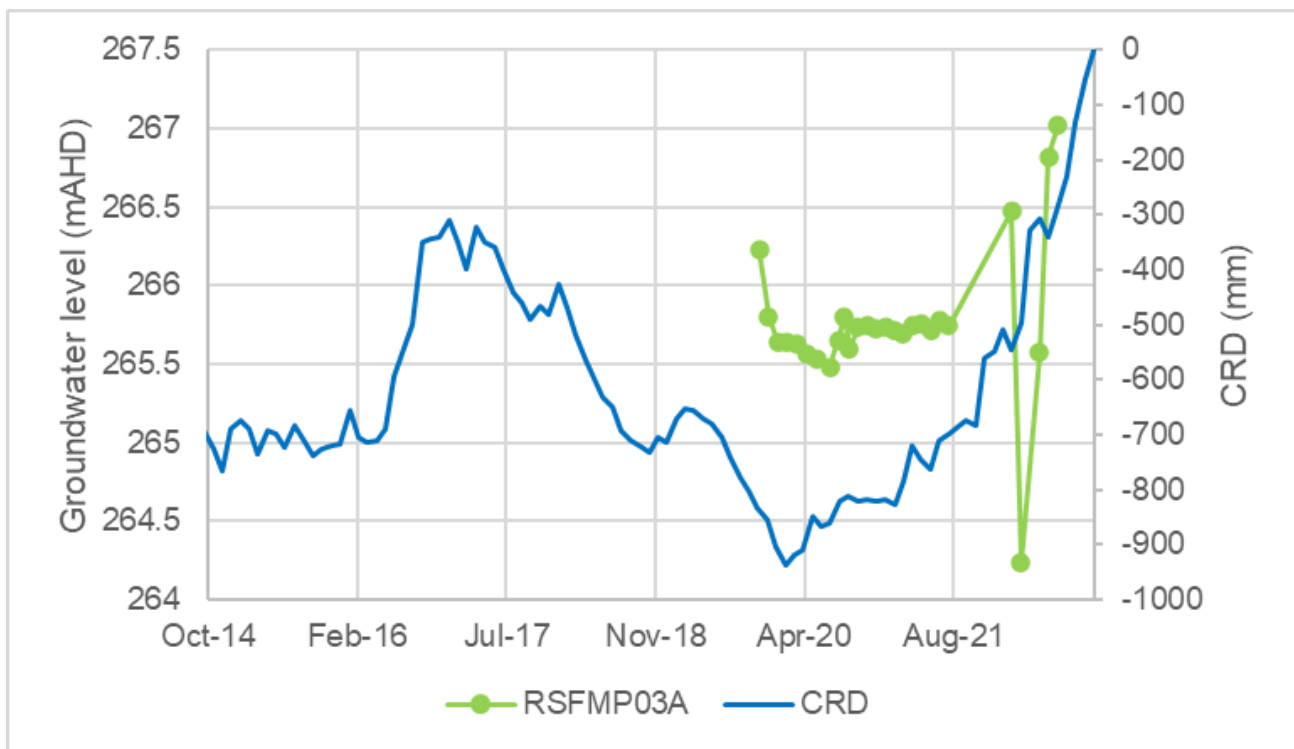
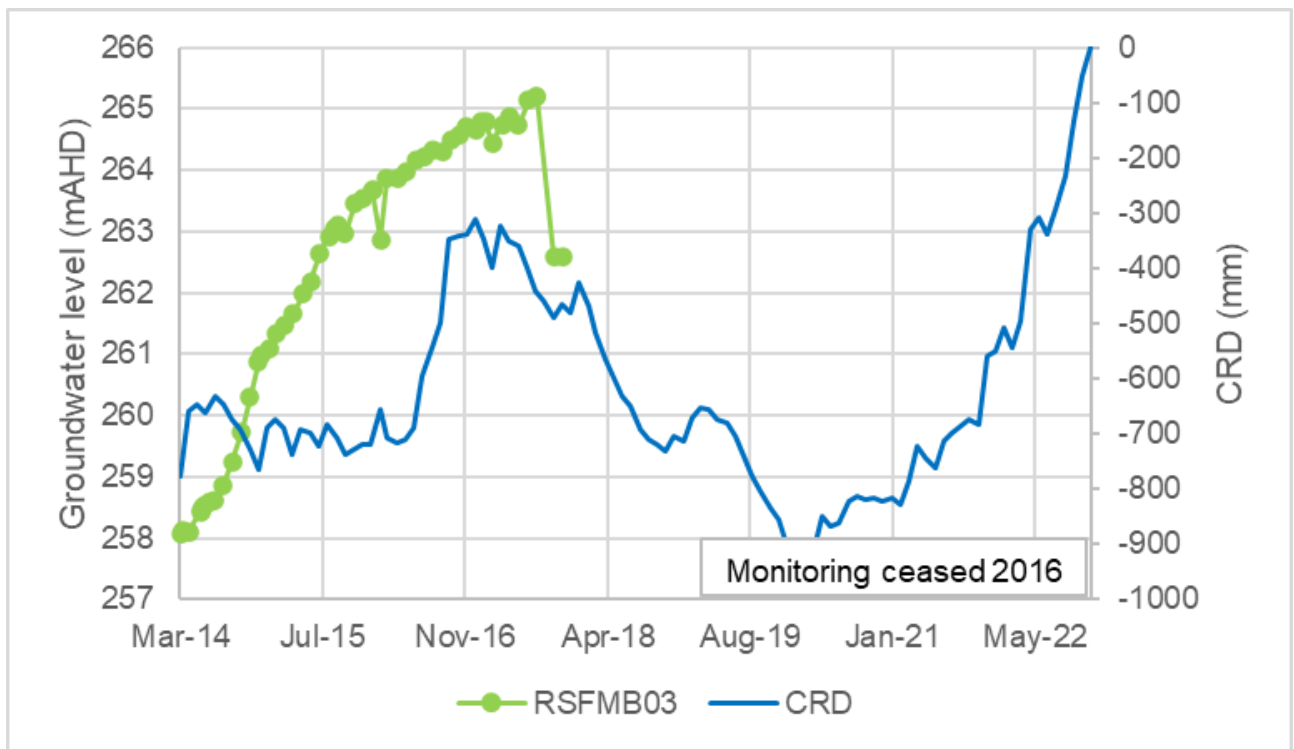


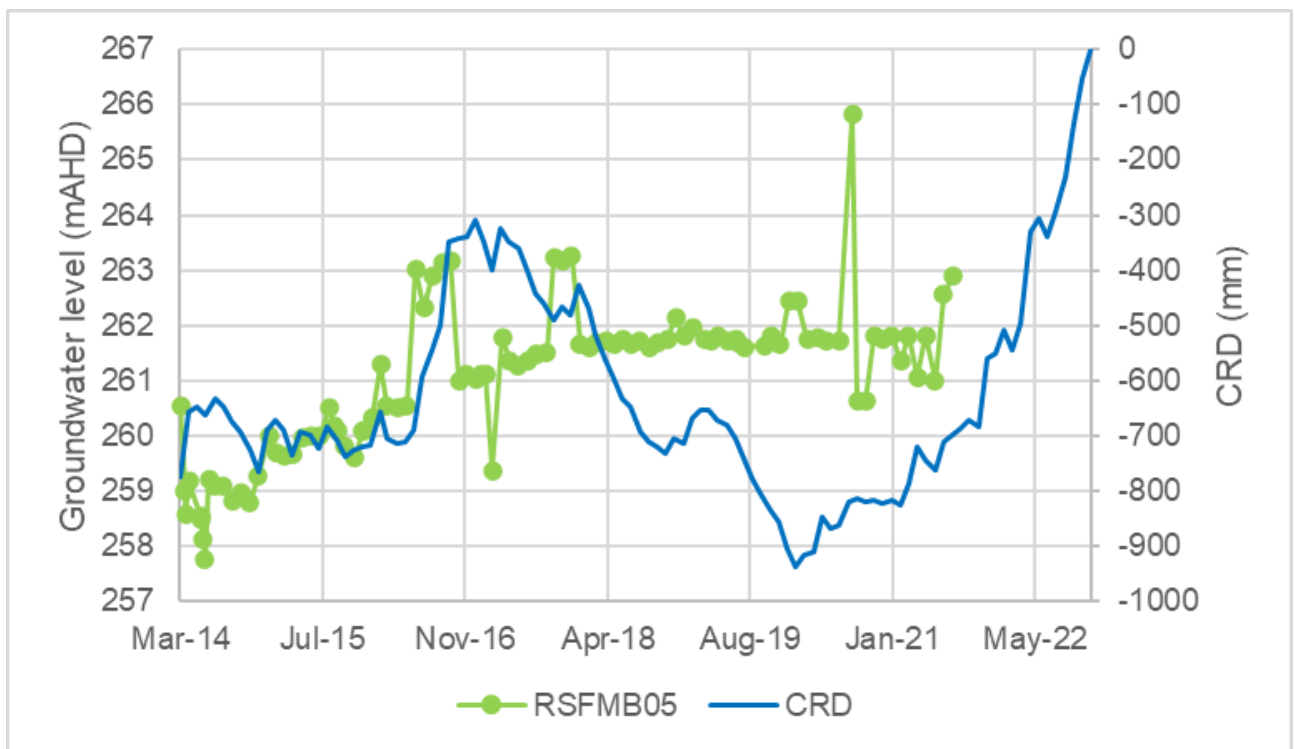
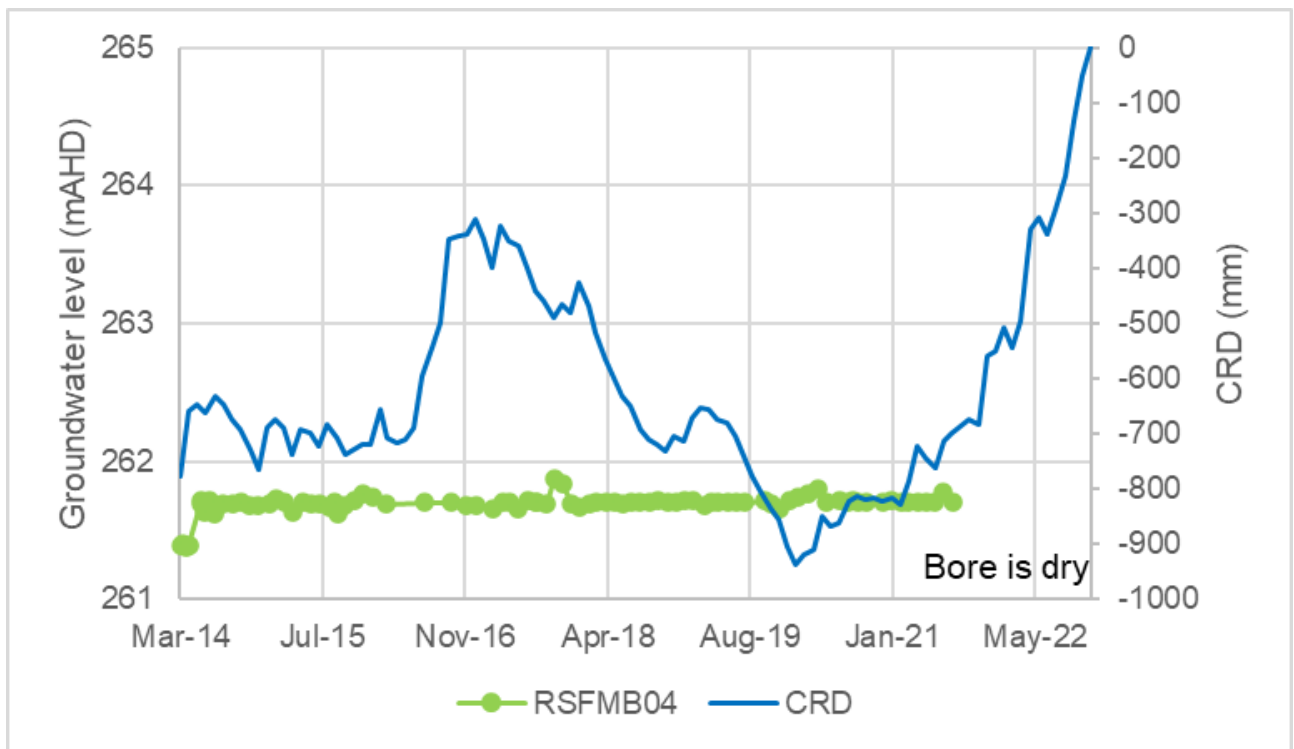


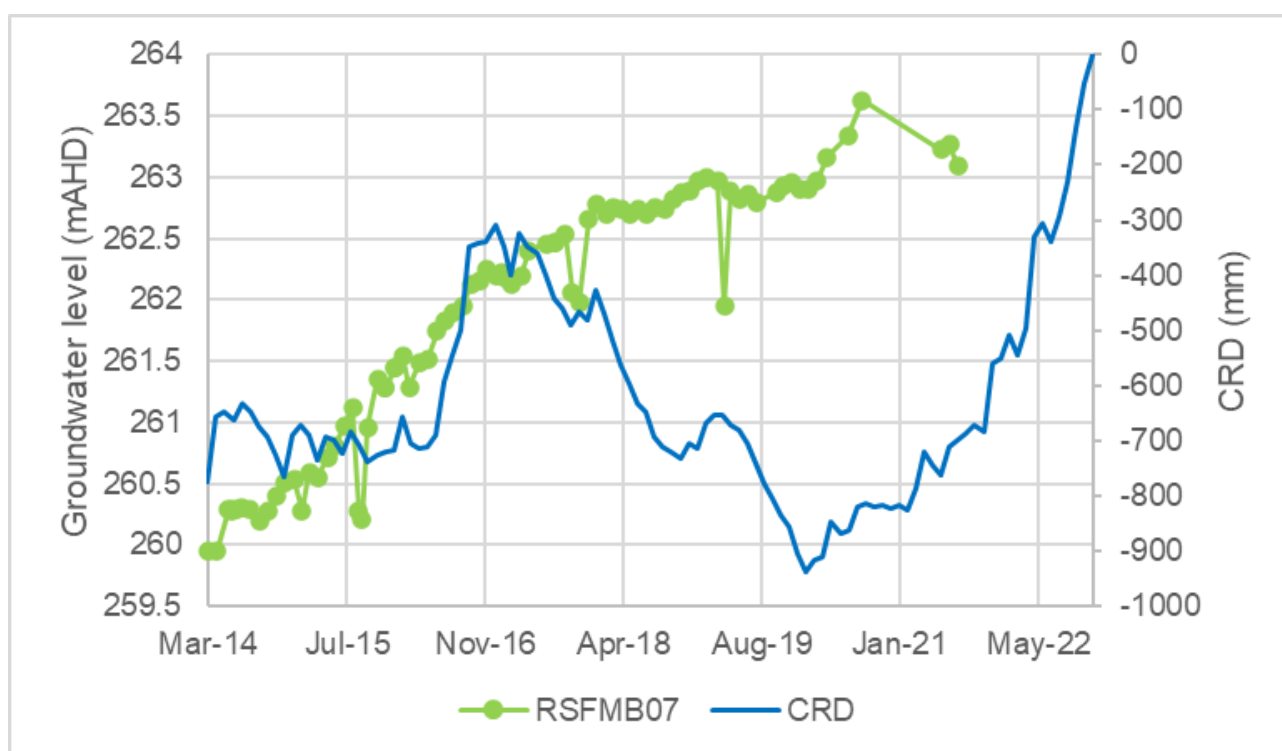
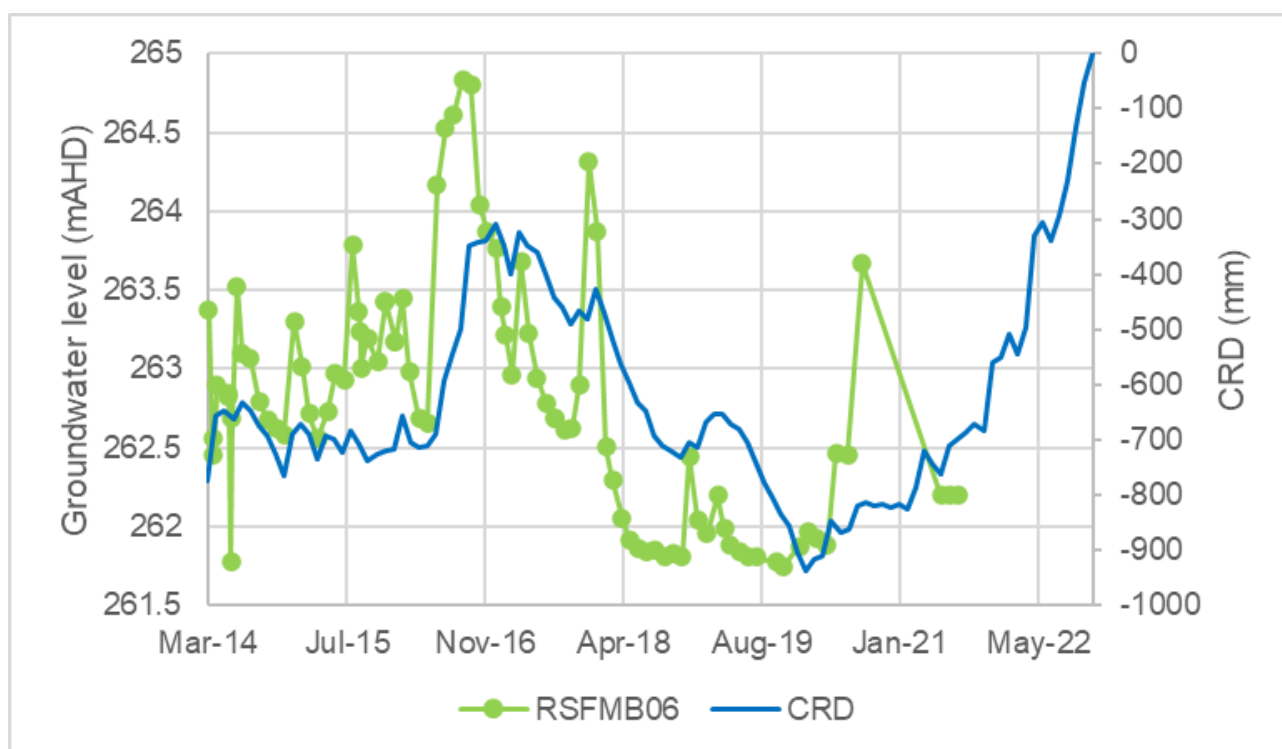
Shallow bores

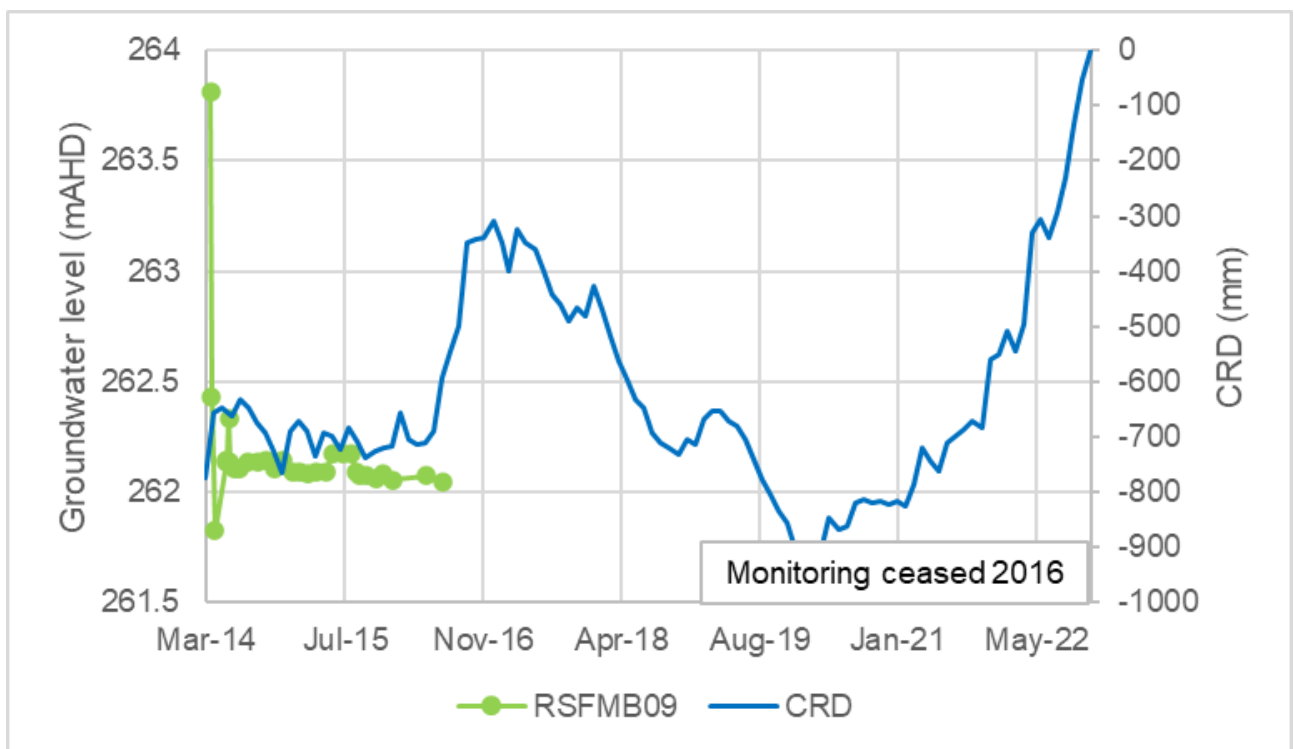
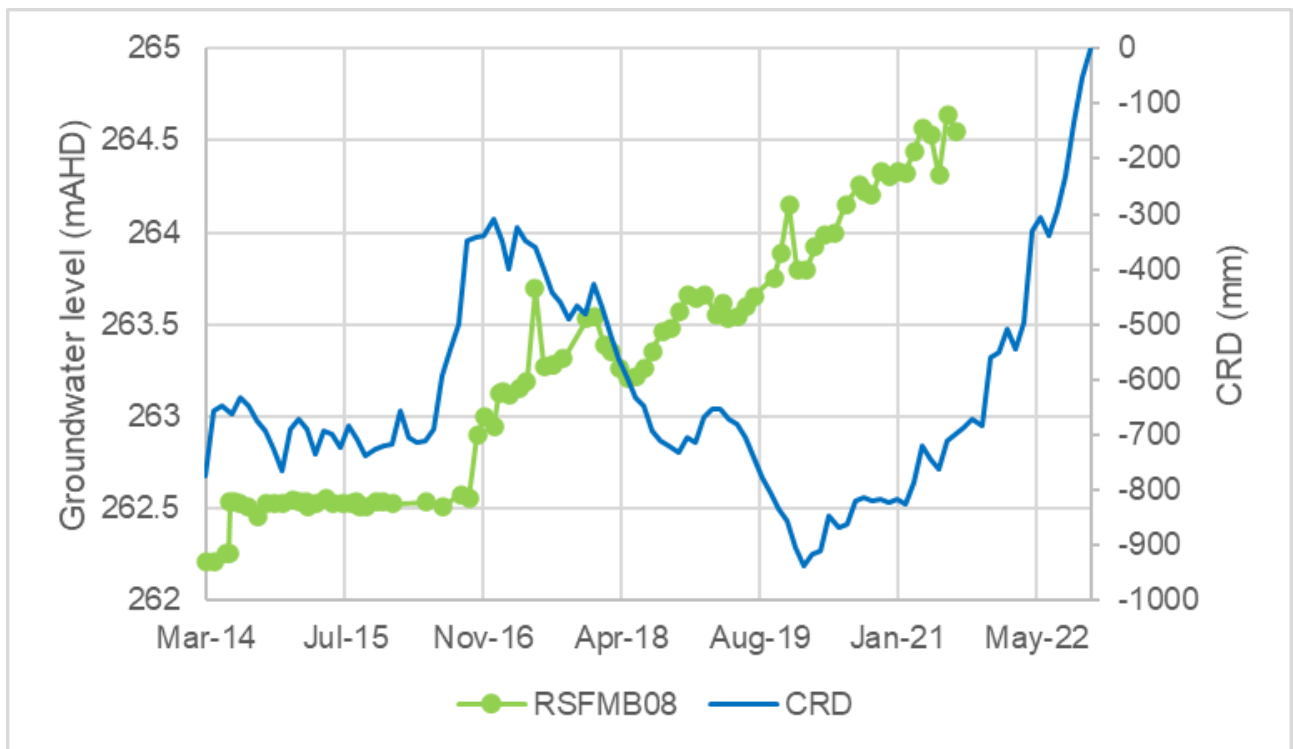


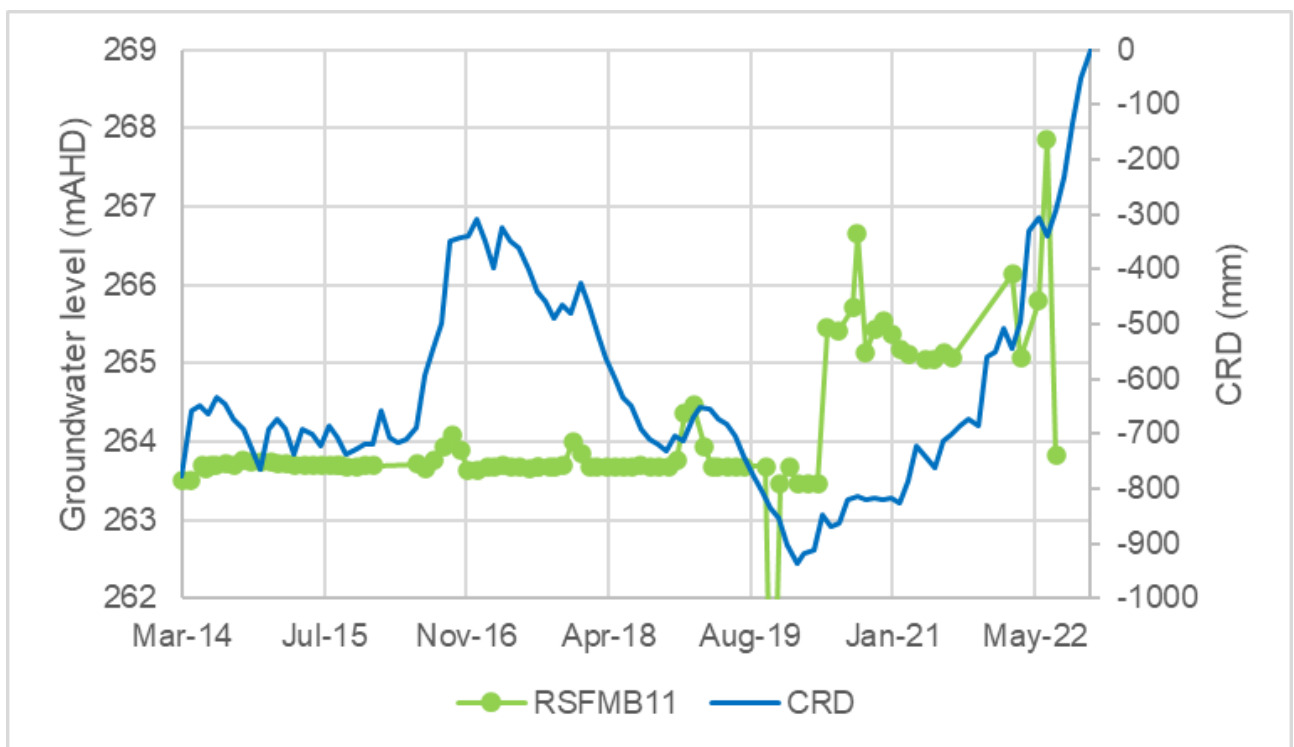
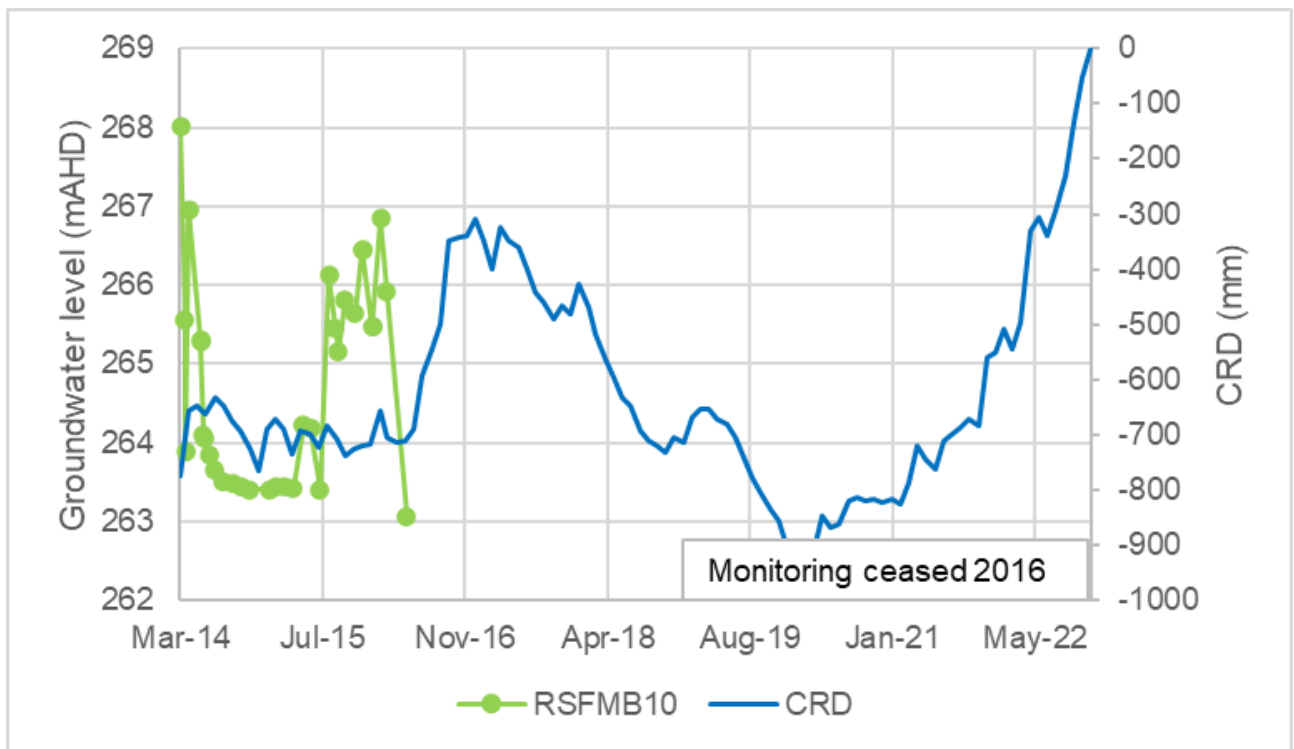


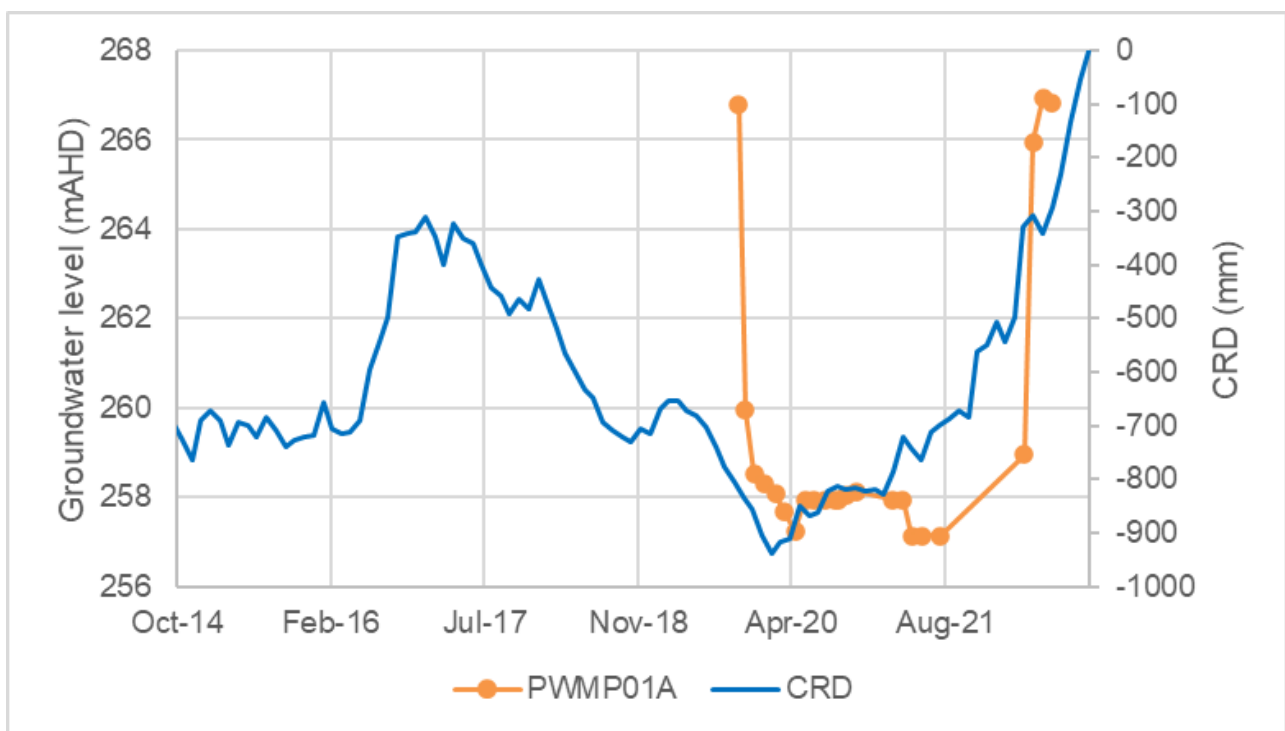
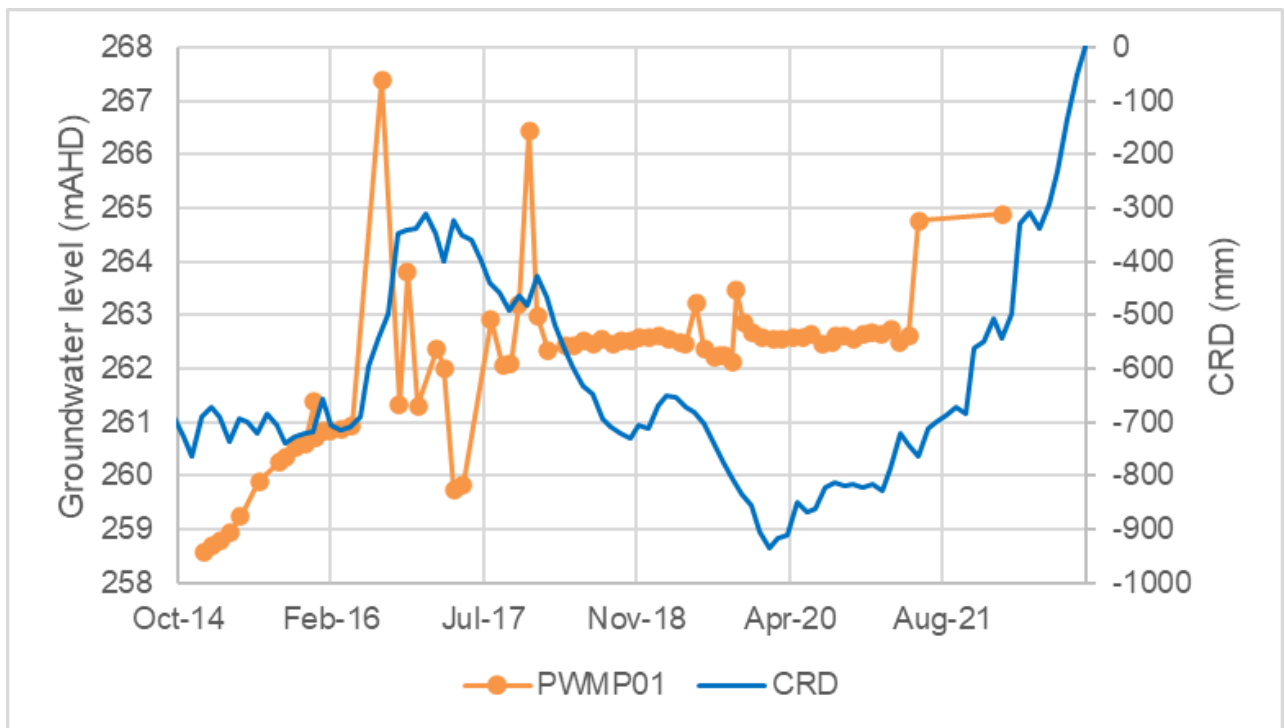


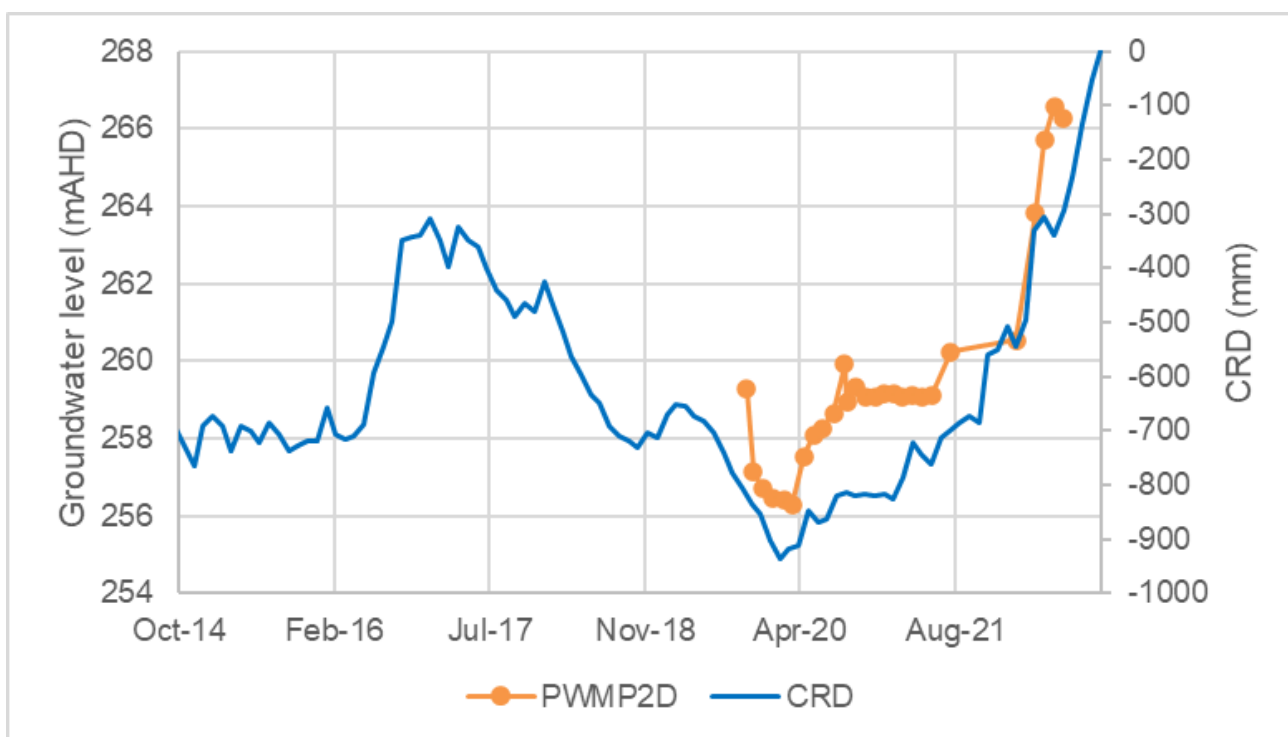
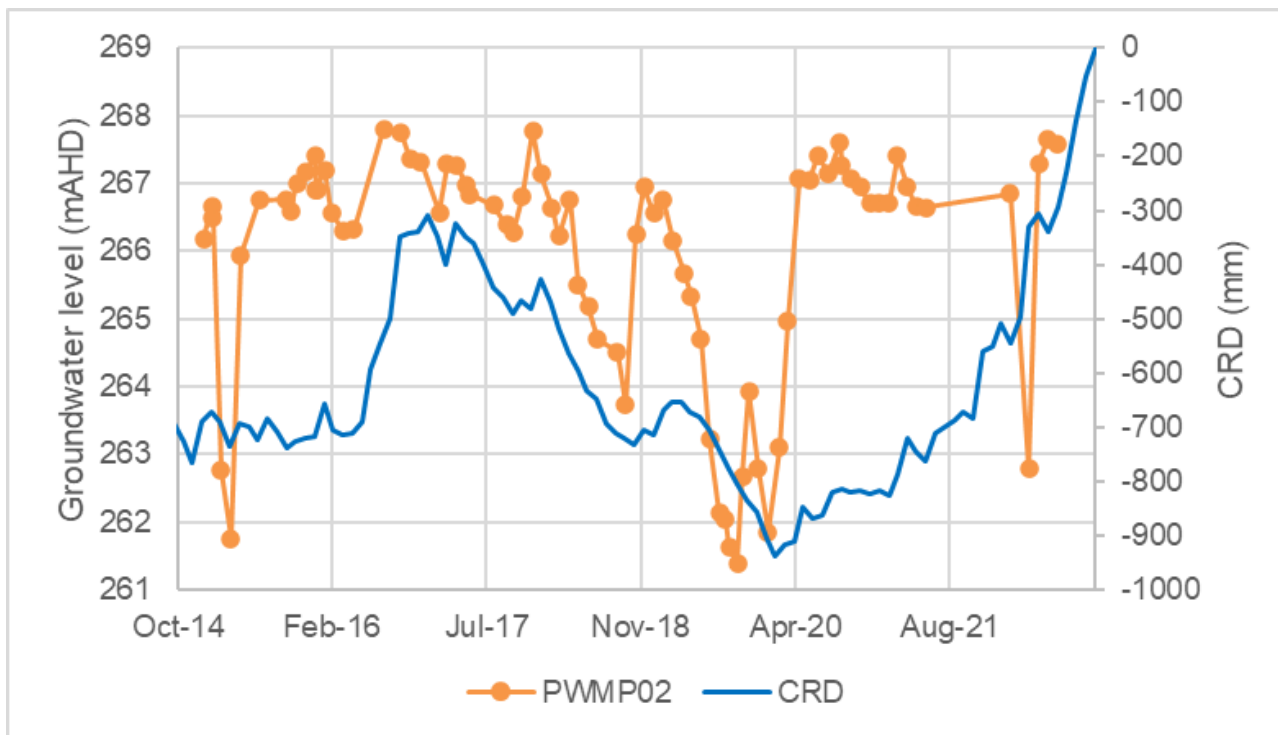


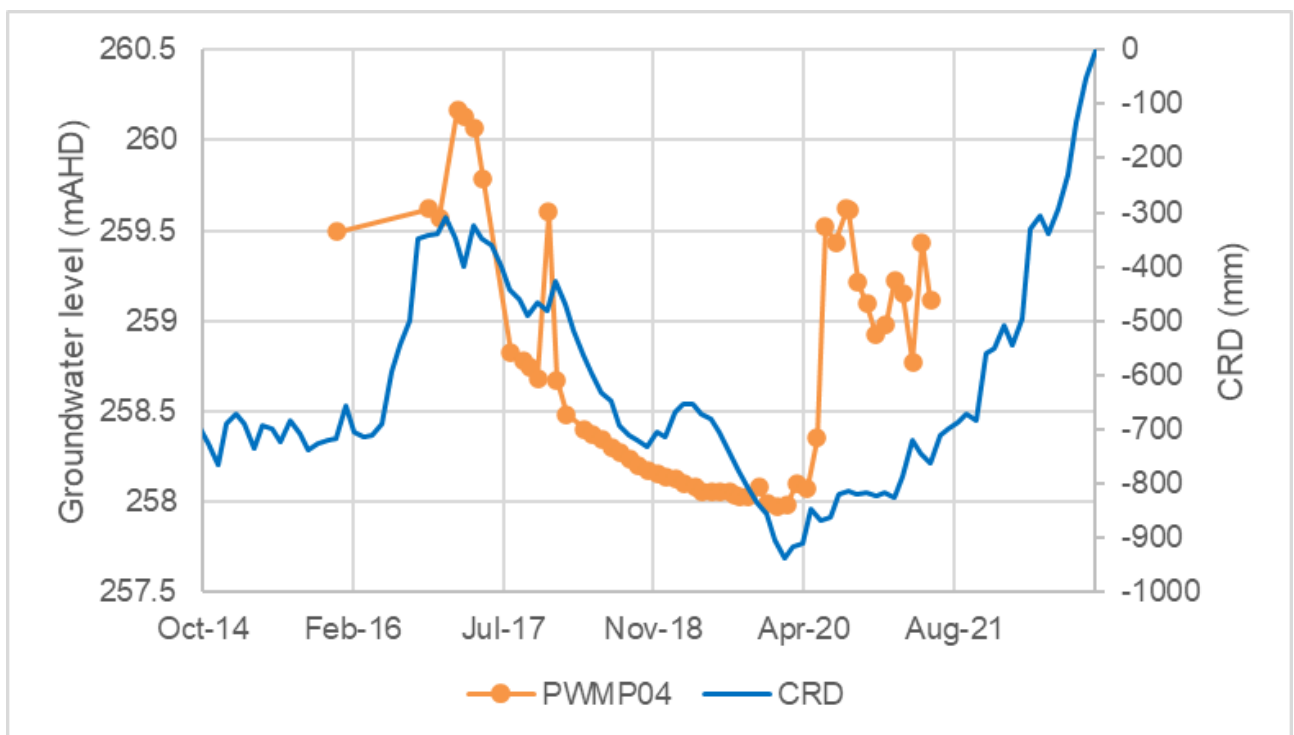
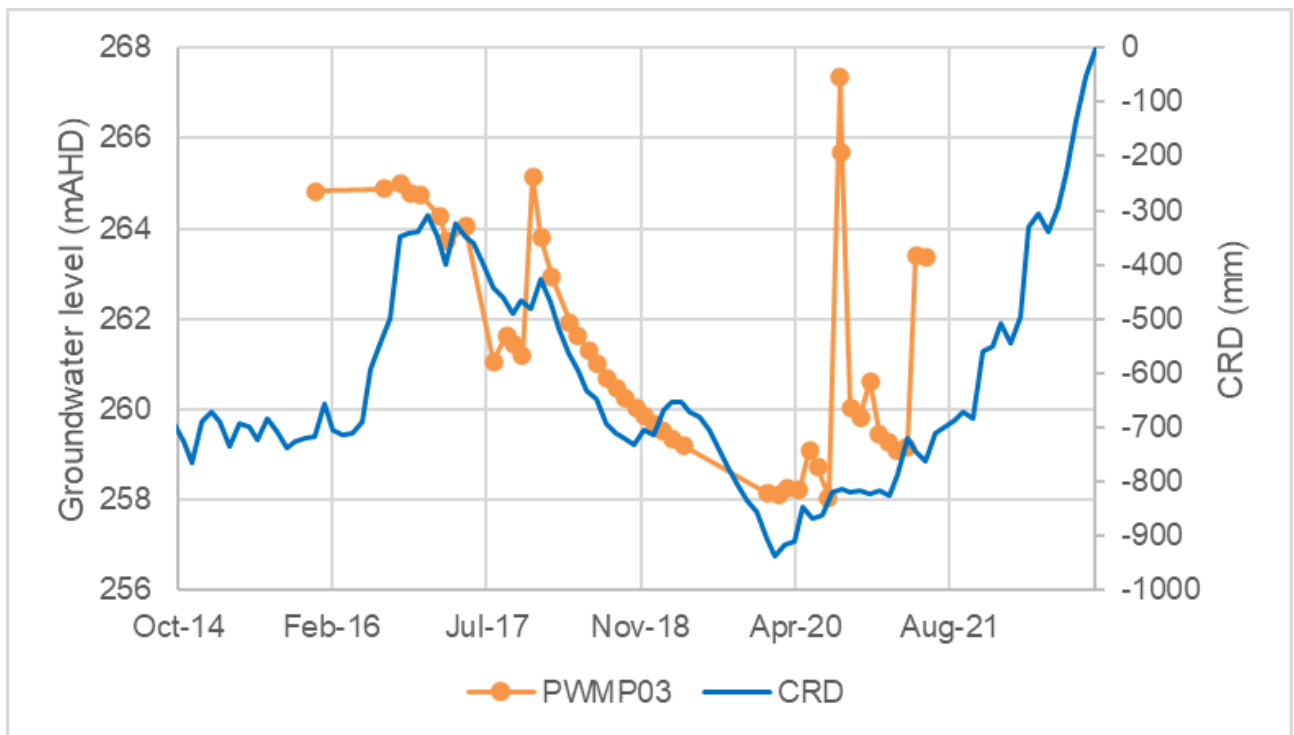


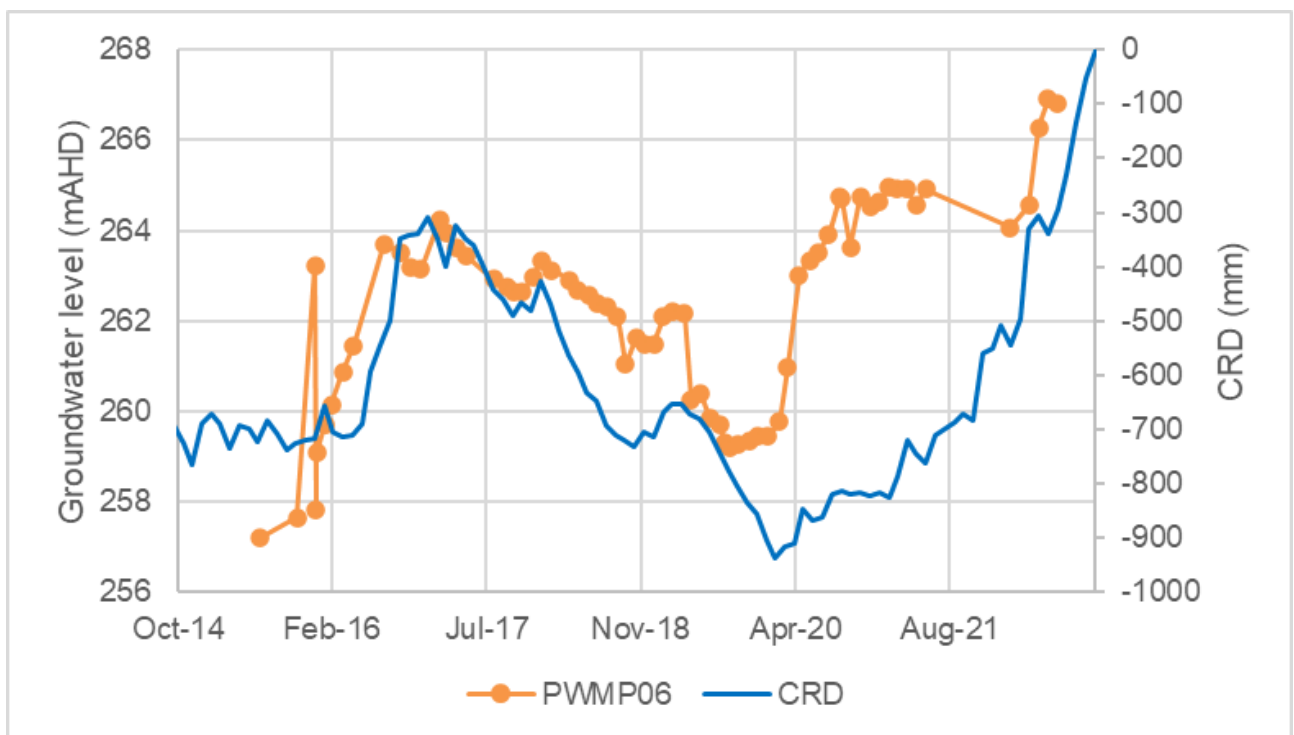
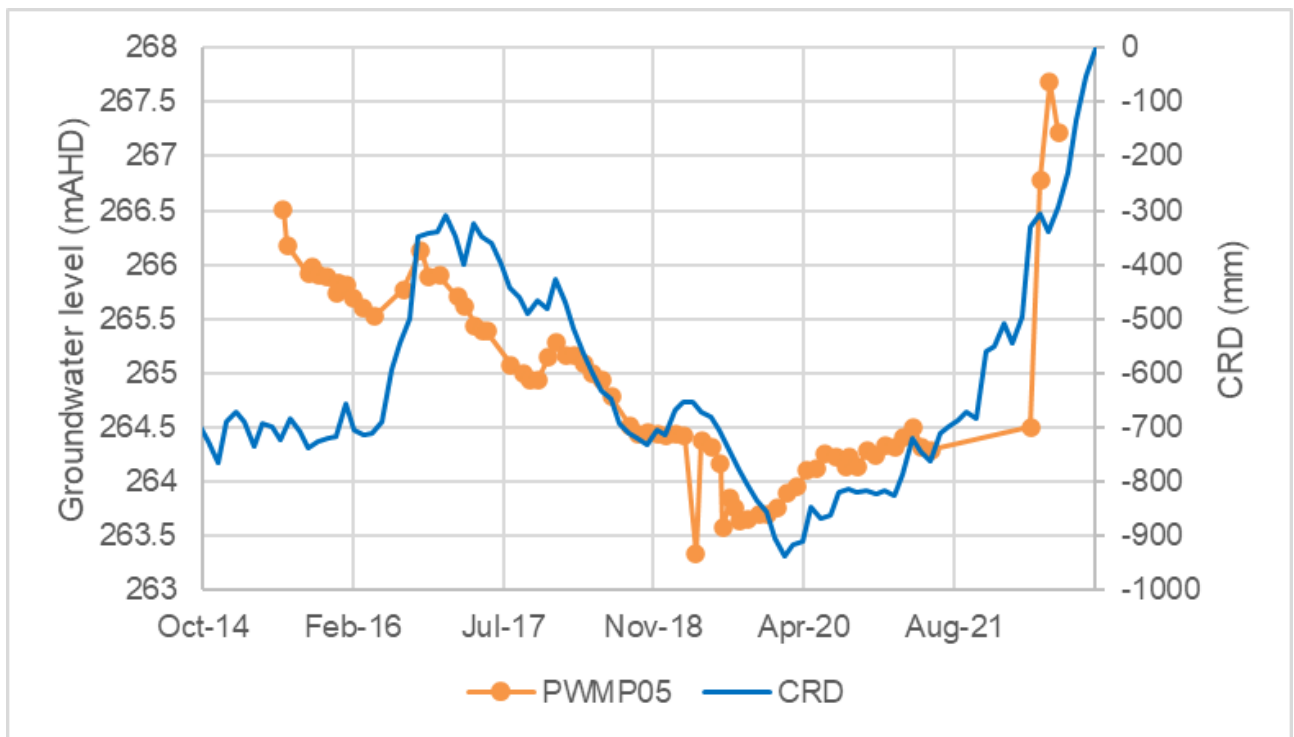


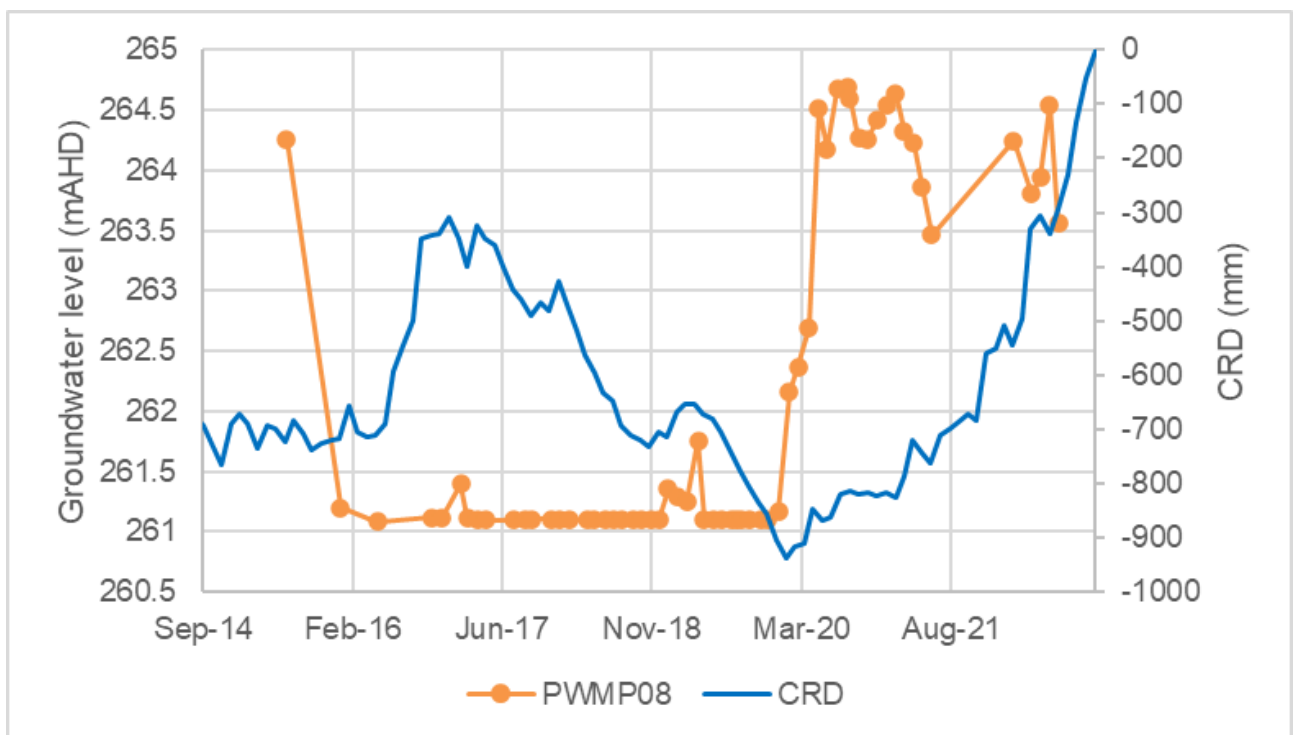
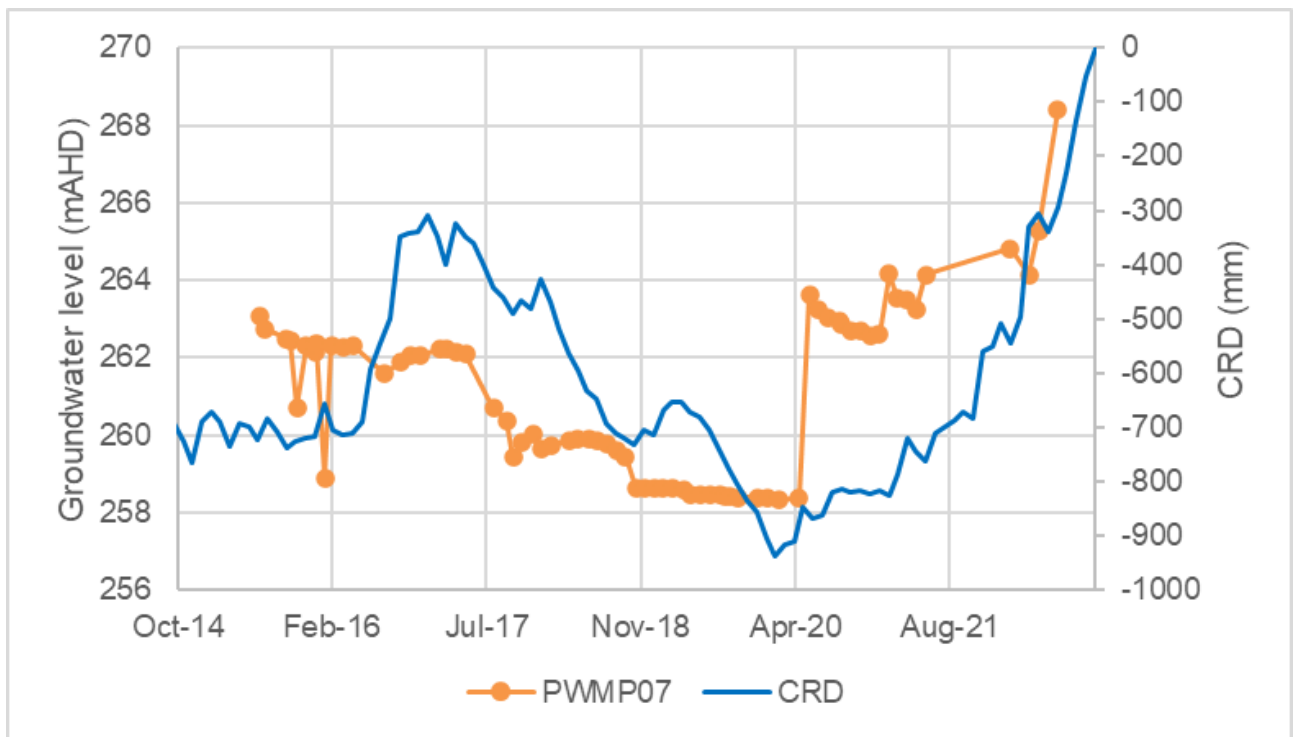


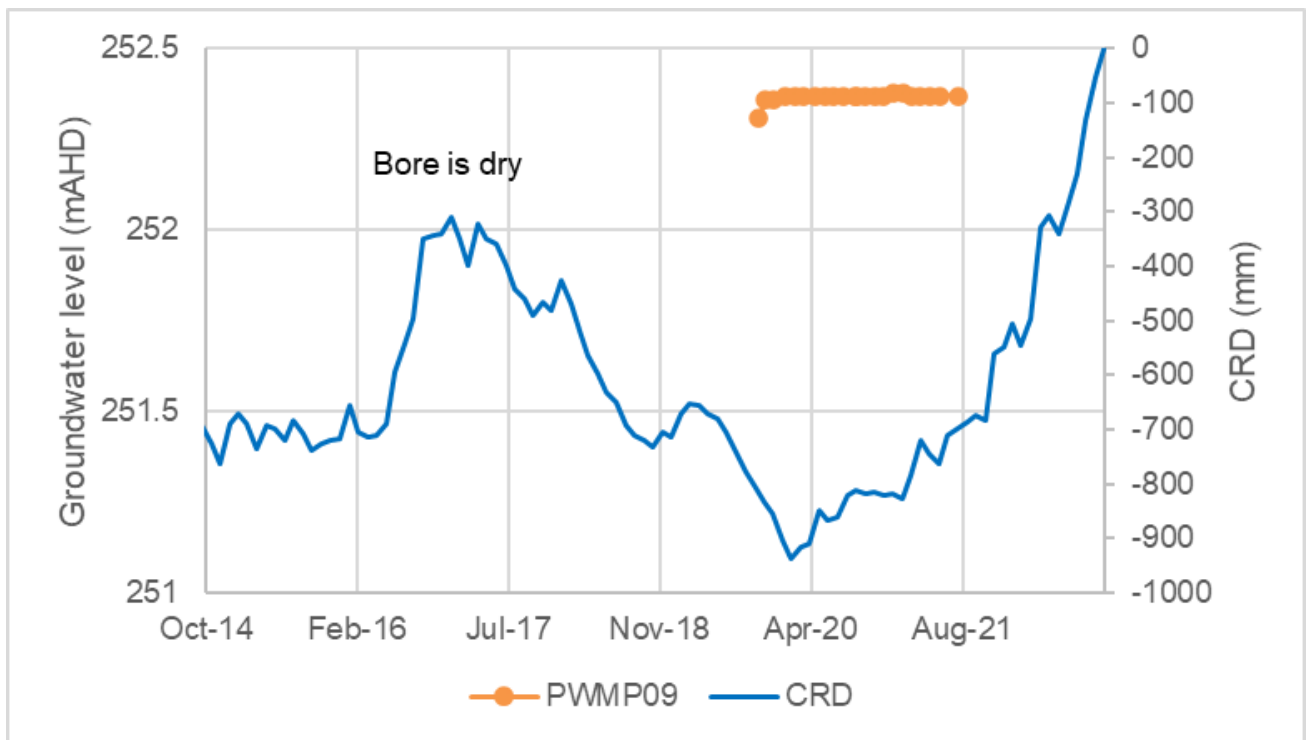




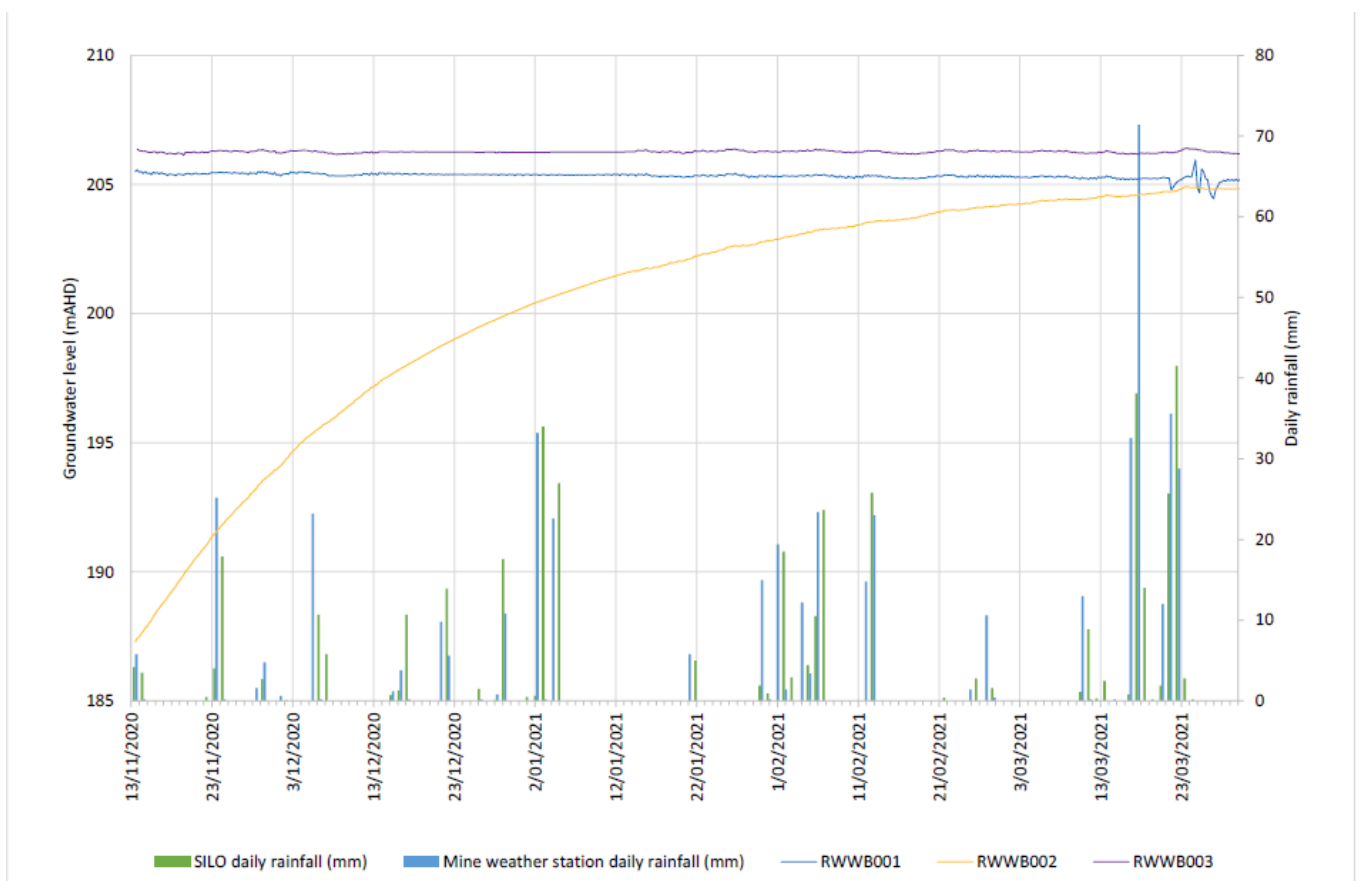








SAR monitoring bores



Note: RWWB004 is dry

Groundwater quality data

Fractured rock bores

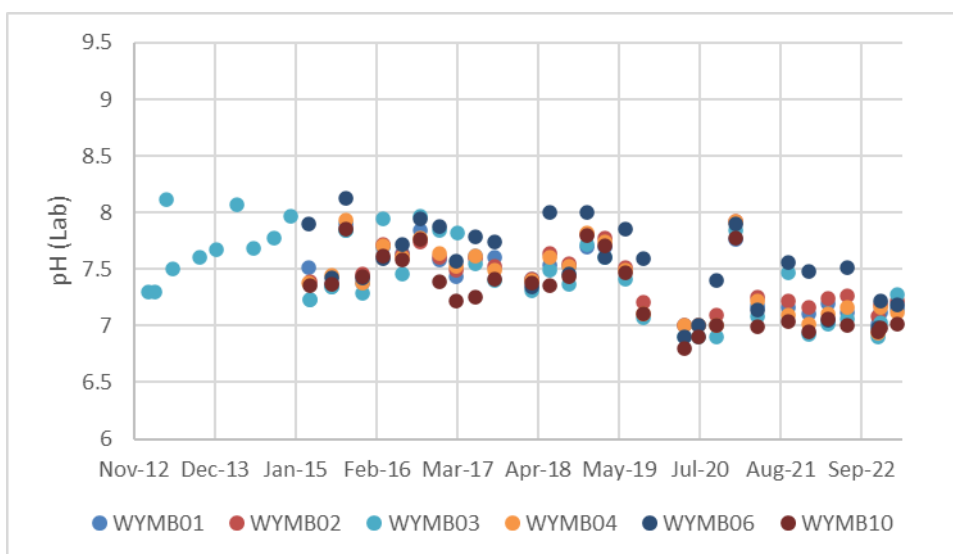
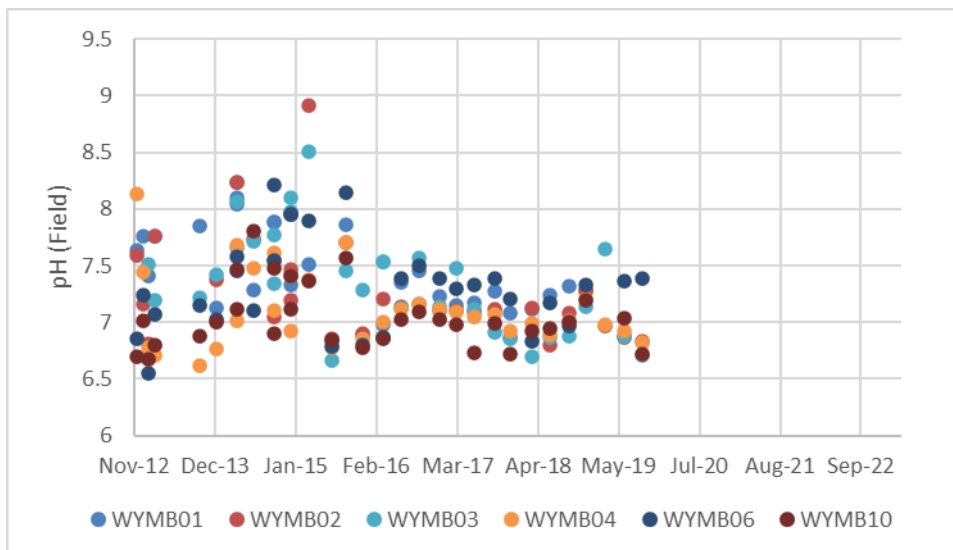
Table C1 Water quality data for BDCW-D and GDCNMB-D in March 2023

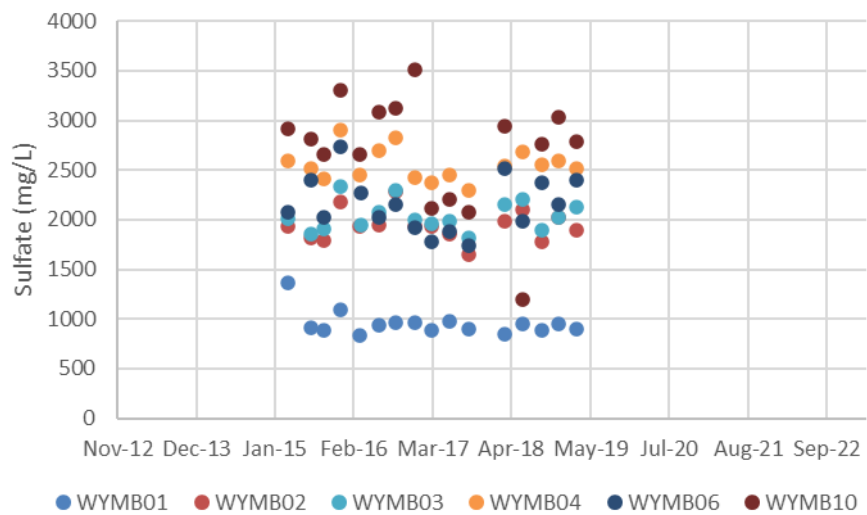
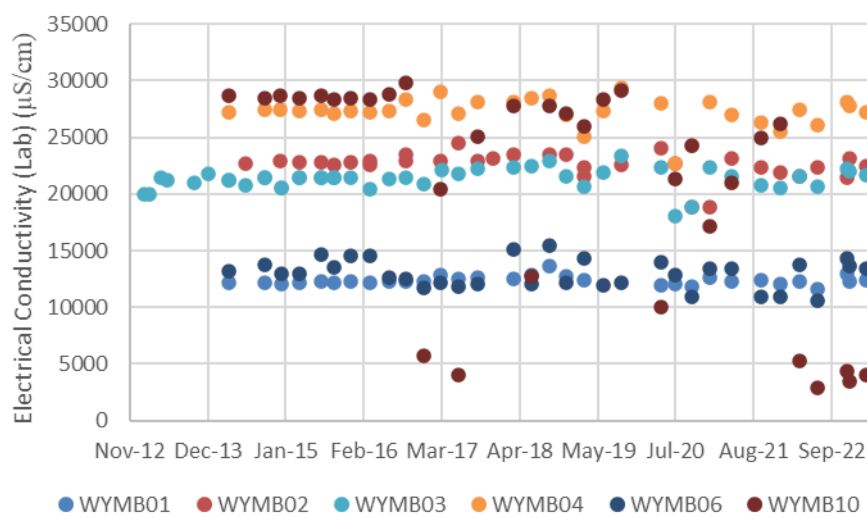
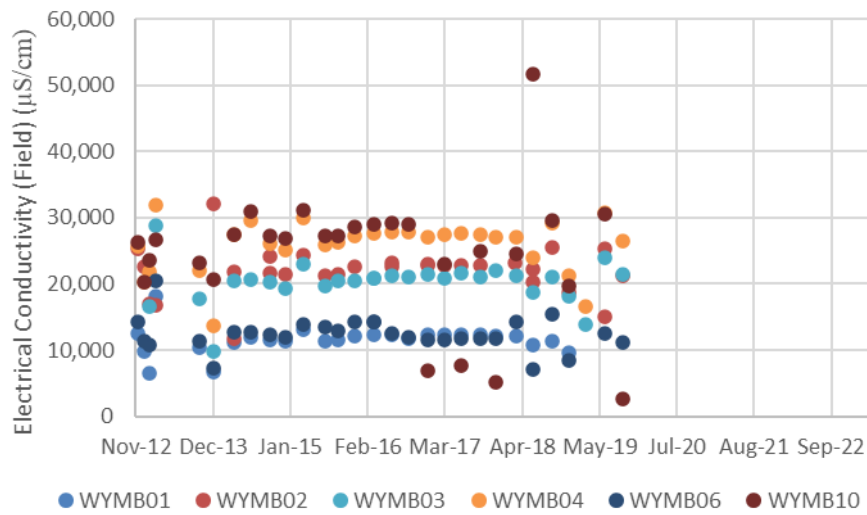
Analyte	Unit	BDCW-D	GDCNMB – D
pH (Field)	pH units	6.92	6.75
Electrical conductivity (field)	µS/cm	13,700	22,700
Dissolved Oxygen (Field)	mg/L	1.96	1.74
Redox mV	mV	-25	-25
Temperature	°C	28.2	-
pH (Lab)	pH units	7.15	7.02
Electrical conductivity (Lab)	µS/cm	15,200	22,600
Total Dissolved Solids (est.)	mg/L	9,770	17,600
Suspended Solids (SS)	mg/L	200	112
Alkalinity (Hydroxide as CaCO ₃)	mg/L	<1	<1
Alkalinity (Carbonate as CaCO ₃)	mg/L	<1	<1
Alkalinity (Bicarbonate as CaCO ₃)	mg/L	964	1250
Alkalinity (total as CaCO ₃)	mg/L	964	1250
Sulfate as SO ₄	mg/L	918	2350
Chloride	mg/L	4350	7270
Calcium (Filtered)	mg/L	150	283
Magnesium (Filtered)	mg/L	293	521
Sodium (Filtered)	mg/L	2700	4470
Potassium (Filtered)	mg/L	17	32
Total Hardness as CaCO ₃	mg/L	1580	2850
Arsenic	mg/L	0.002	0.001
Cadmium	mg/L	0.0003	0.0001
Chromium (III+VI)	mg/L	0.01	0.004
Copper	mg/L	0.026	0.009
Nickel	mg/L	0.017	0.009
Lead	mg/L	0.008	0.002
Zinc	mg/L	0.438	0.085
Iron	mg/L	9.14	2.74
Mercury	mg/L	<0.0001	<0.0001
Free Cyanide	mg/L	<0.004	<0.004
Total Cyanide	mg/L	<0.004	<0.004
WAD Cyanide	mg/L	<0.004	<0.004
Fluoride	mg/L	0.4	0.4
Ammonia as N	mg/L	0.17	0.80
Nitrite as N	mg/L	0.02	<0.01

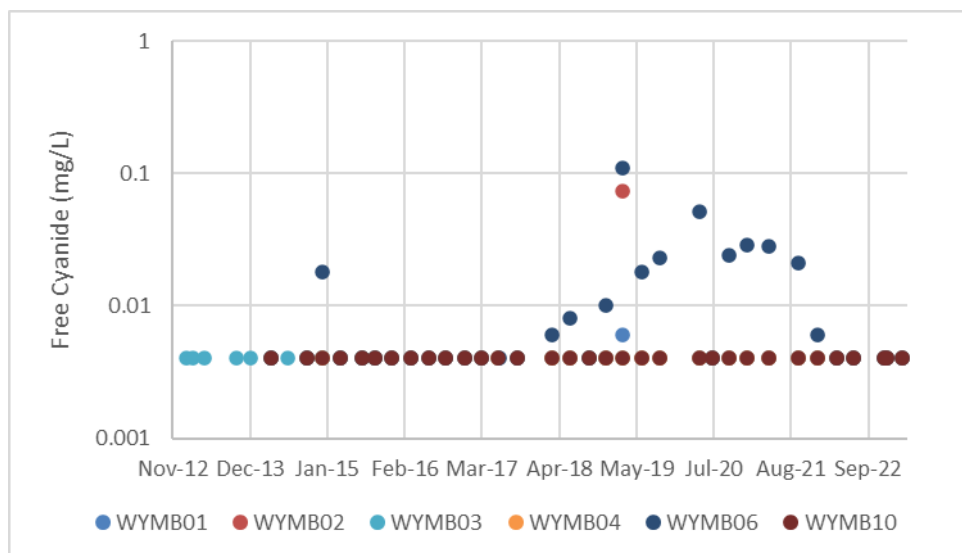
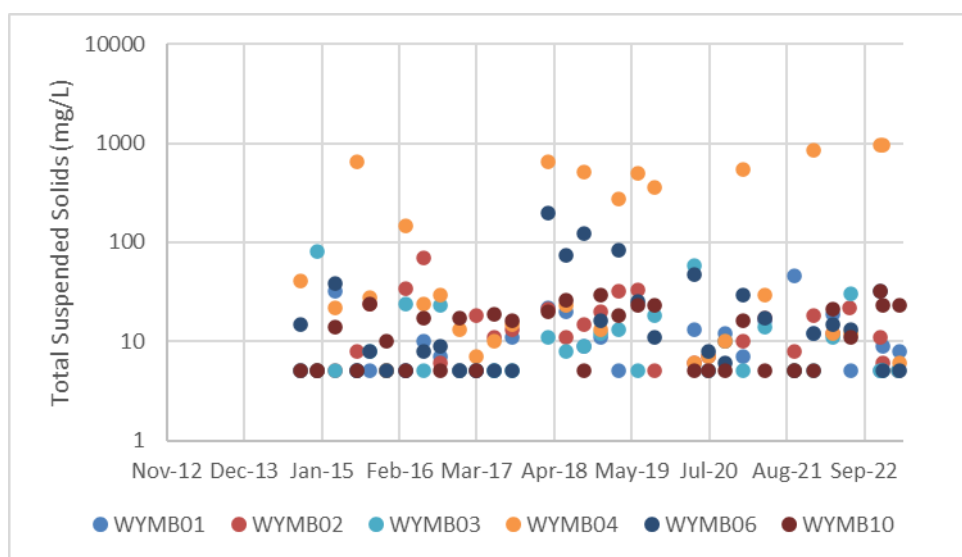
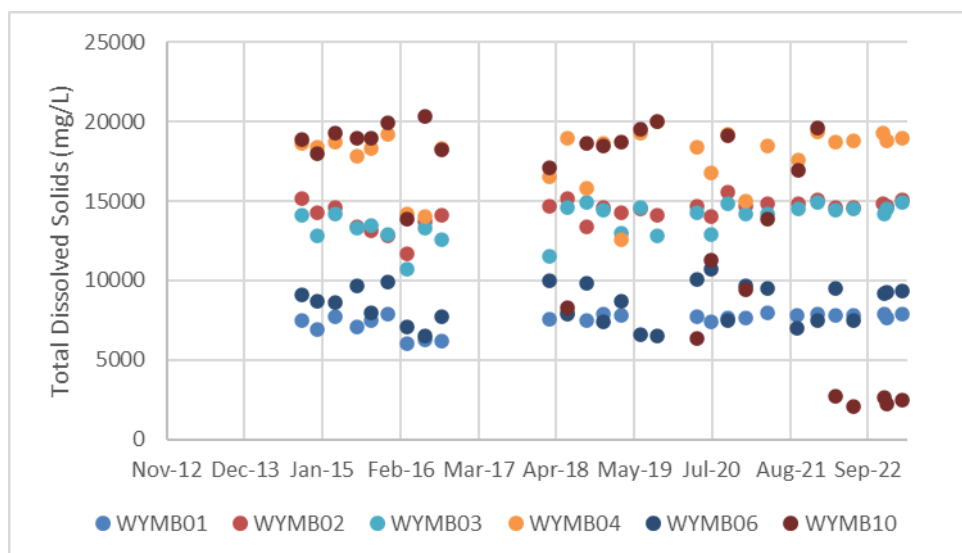
Analyte	Unit	BDCW-D	GDCNMB – D
Nitrate as N	mg/L	0.03	0.03
Nitrite + Nitrate as N	mg/L	0.05	0.03
Reactive Phosphorous as P	mg/L	<0.01	<0.01
Reactive Phosphate	mg/L	<0.1	<0.1
Total Anions	meq/L	161	279
Total Cations	meq/L	149	252
Ionic Balance	%	3.74	5.03

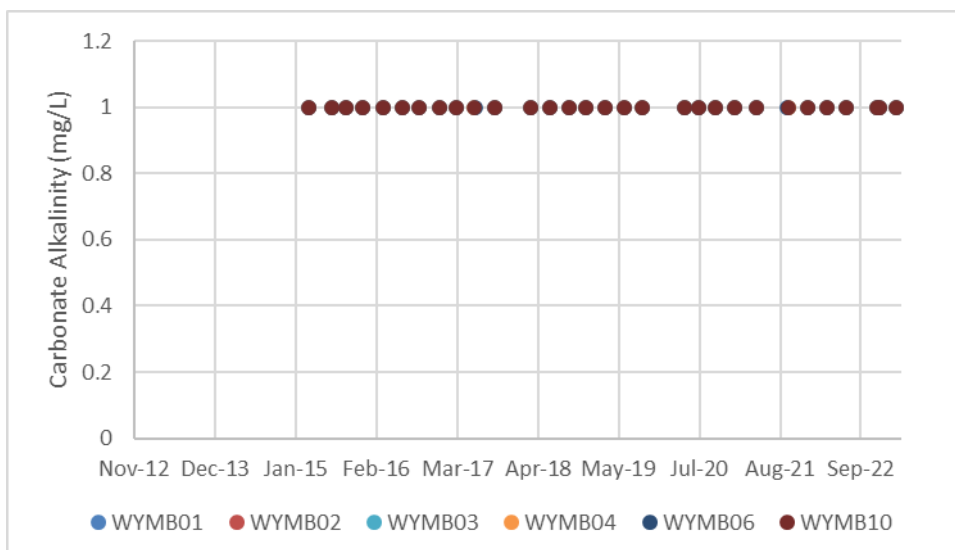
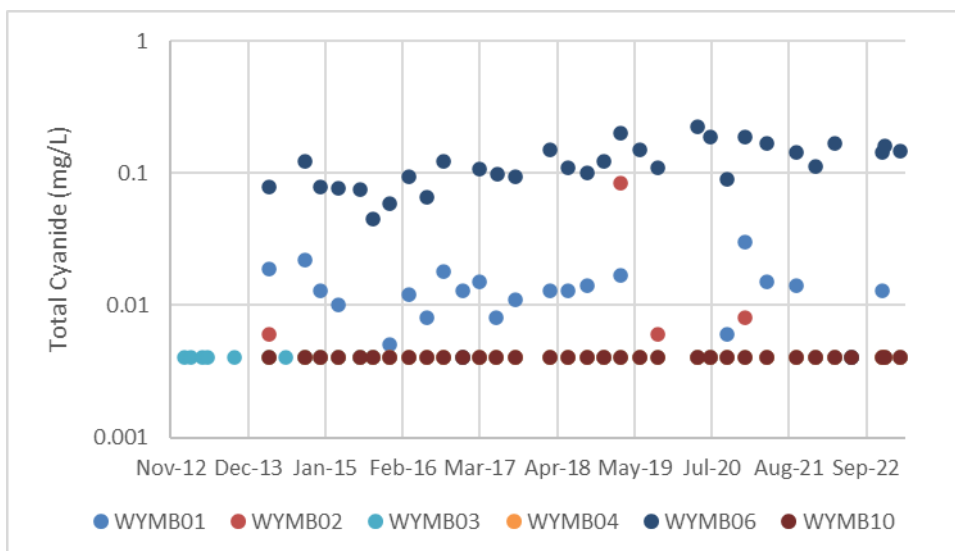
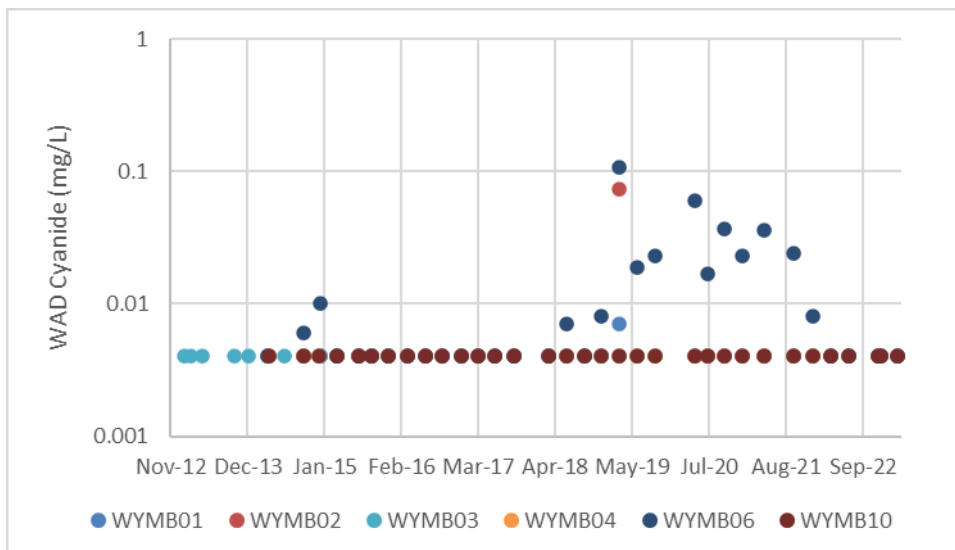
Table C2 Groundwater level data for BDCW-D and GDCNMB-D in March 2023

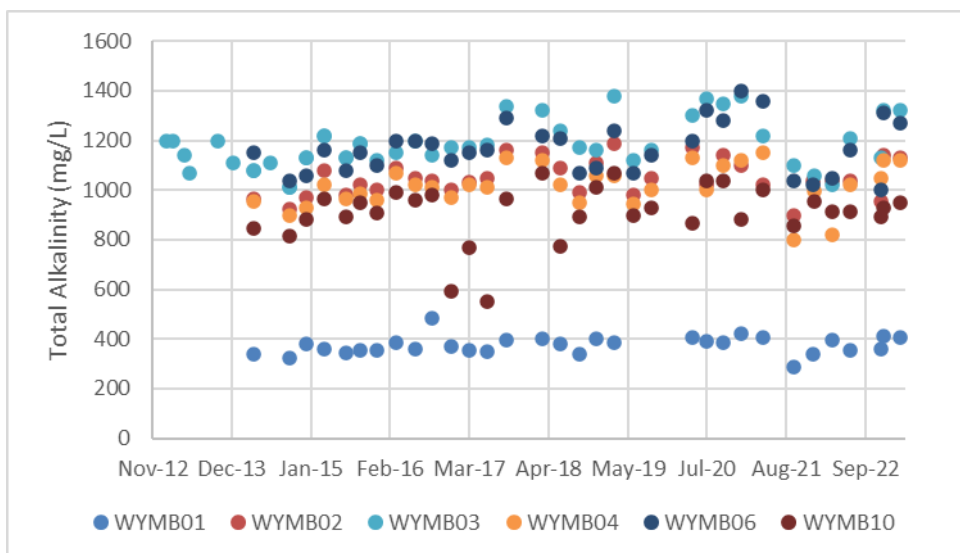
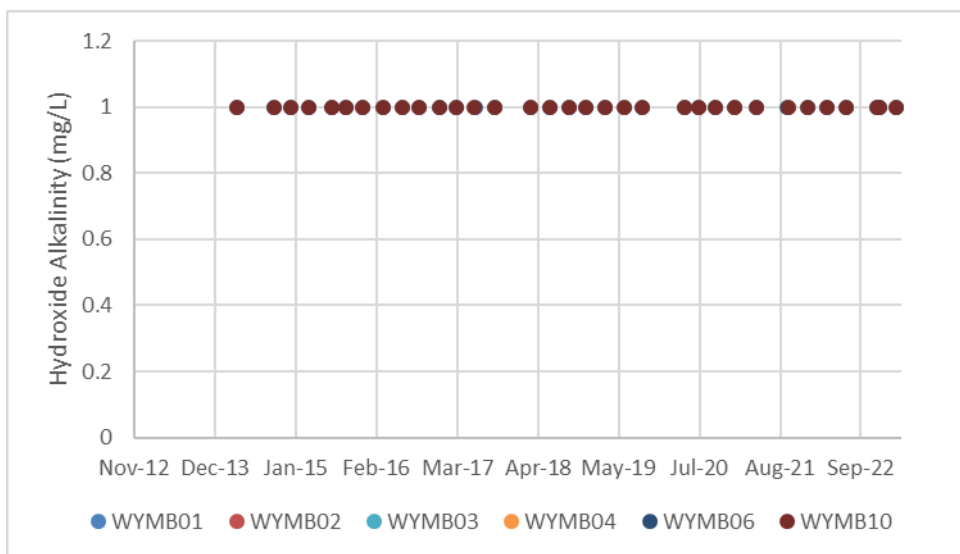
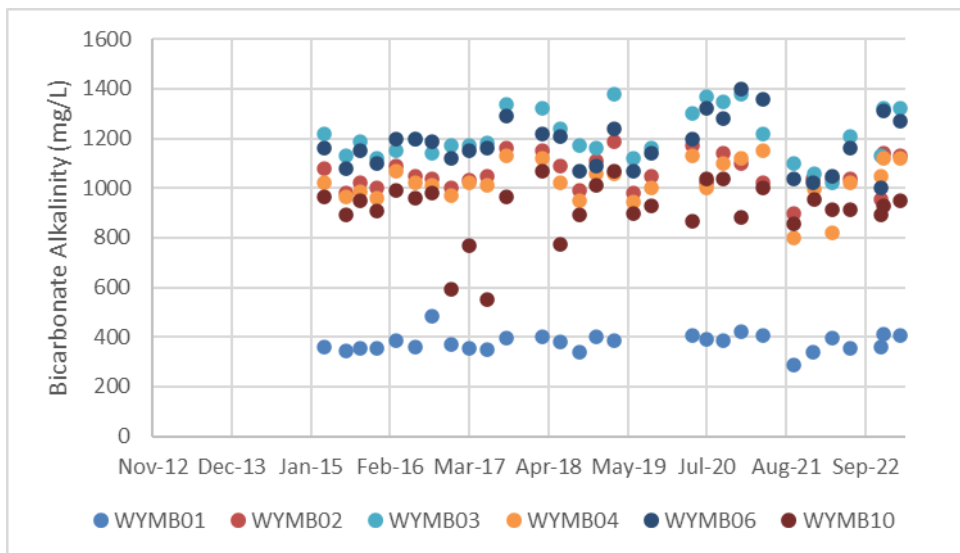
Bore ID	SWL (m)
BDCW-D	13.0
GDCNMB-D	13.5

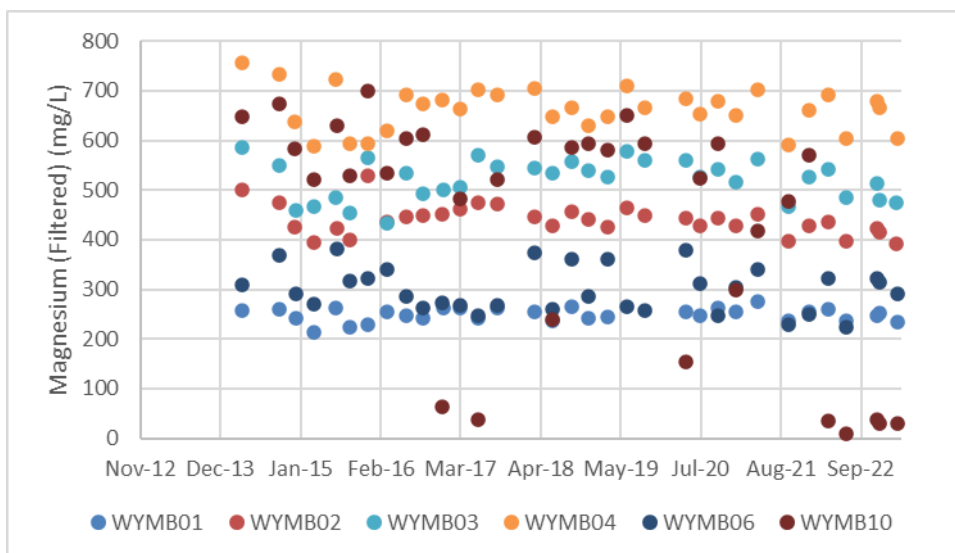
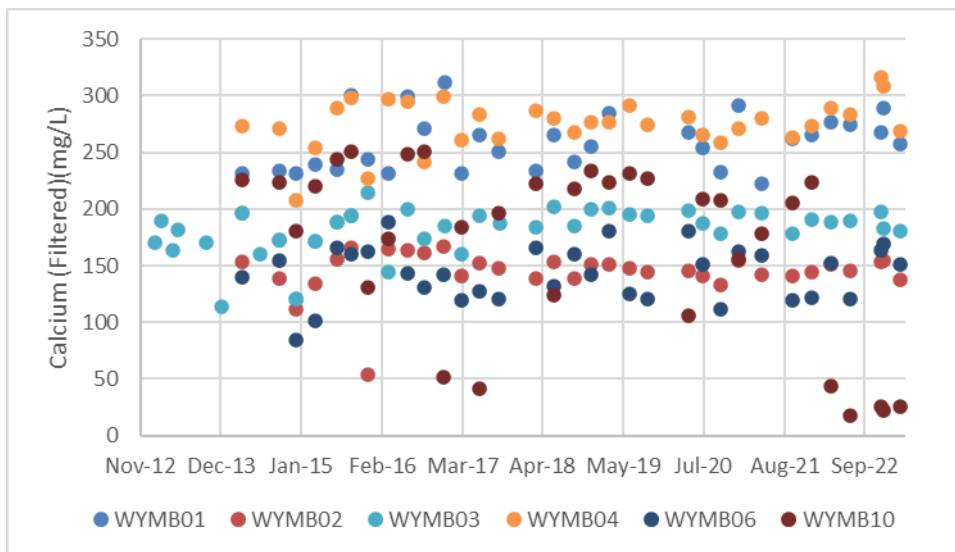
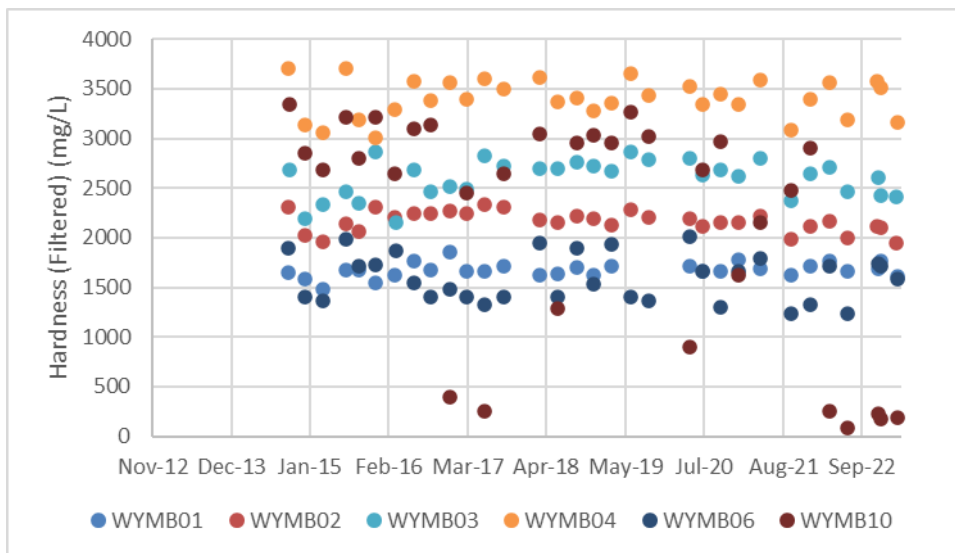


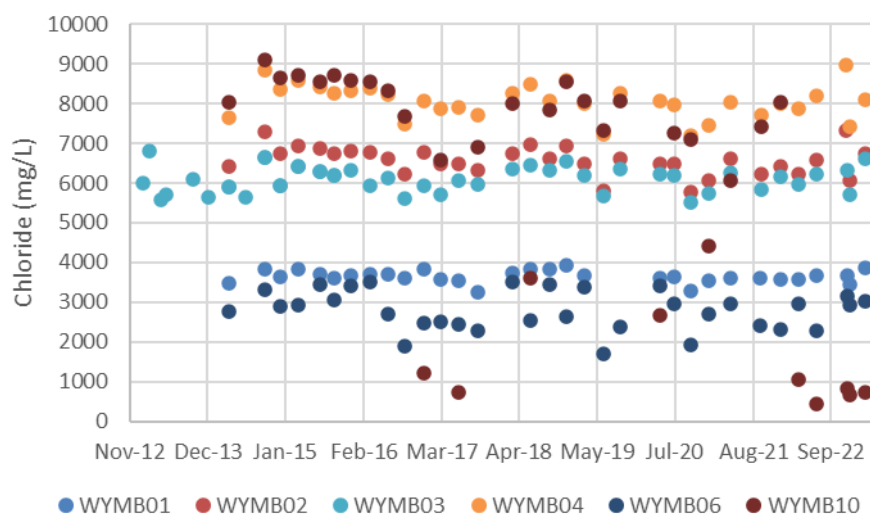
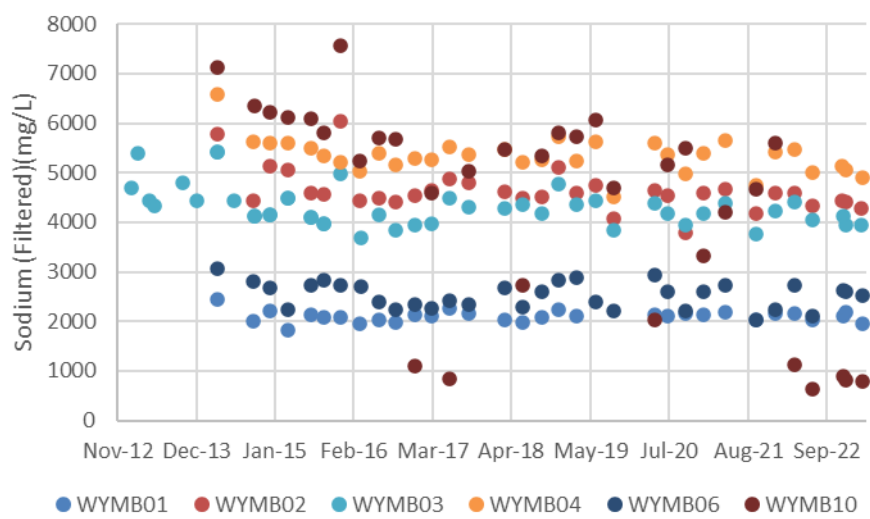
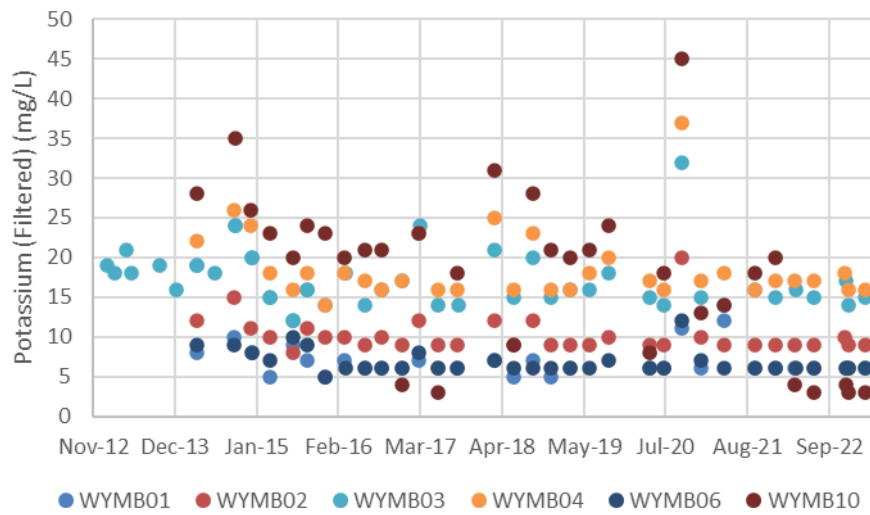


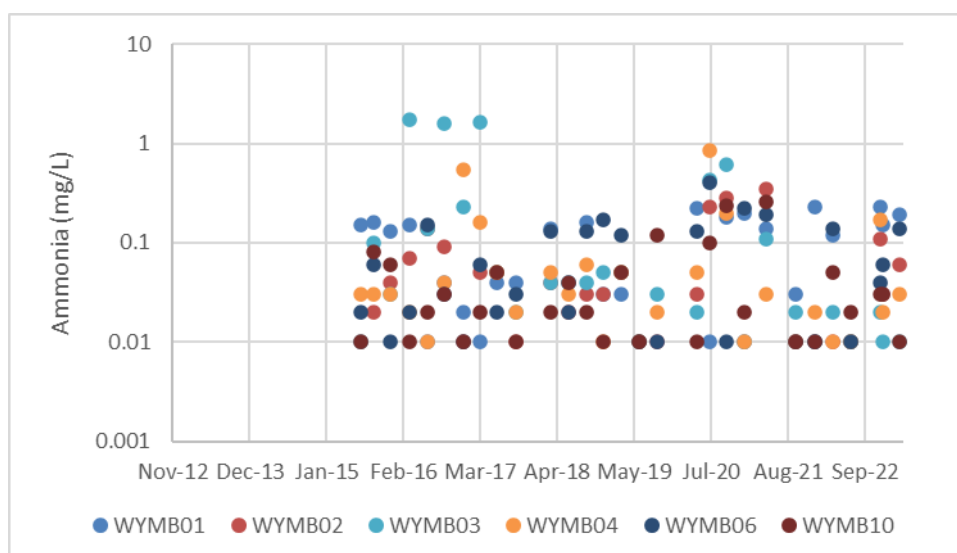
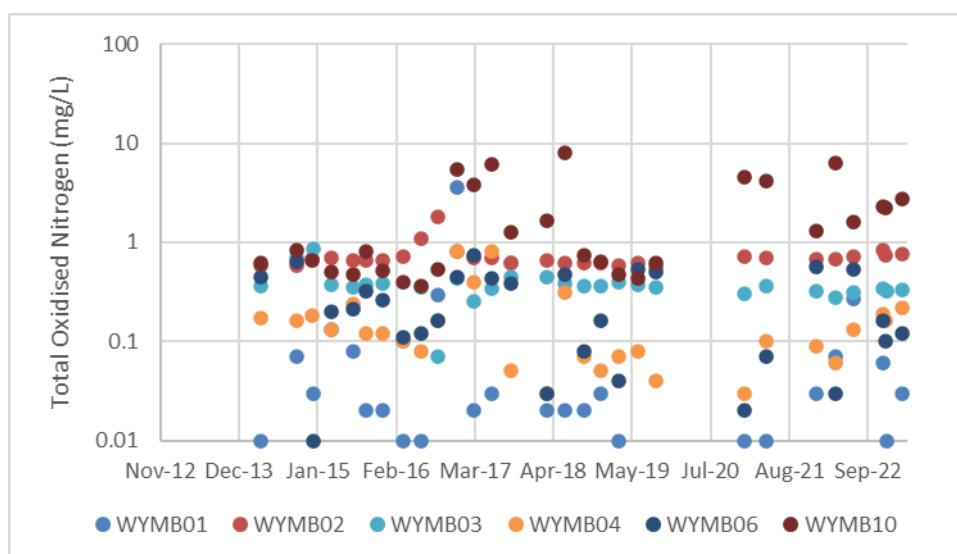
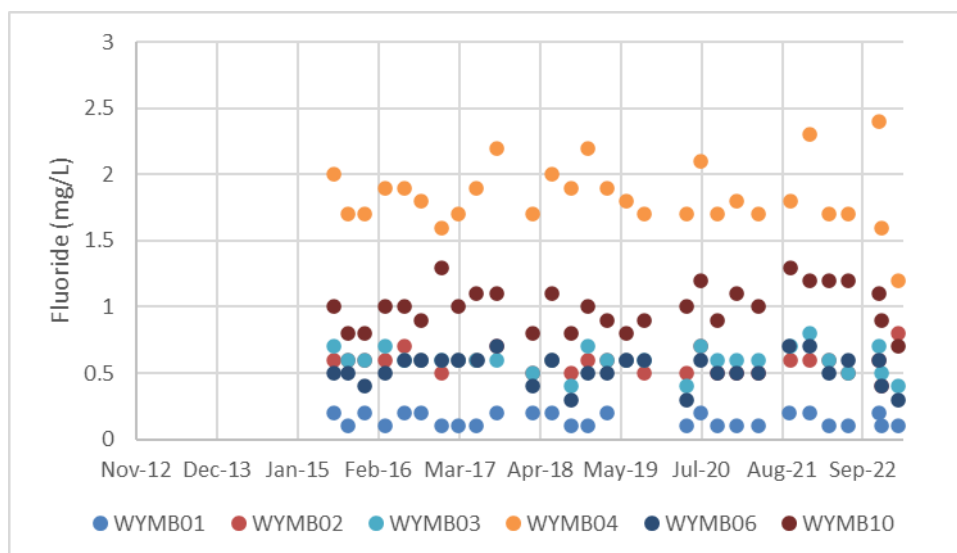


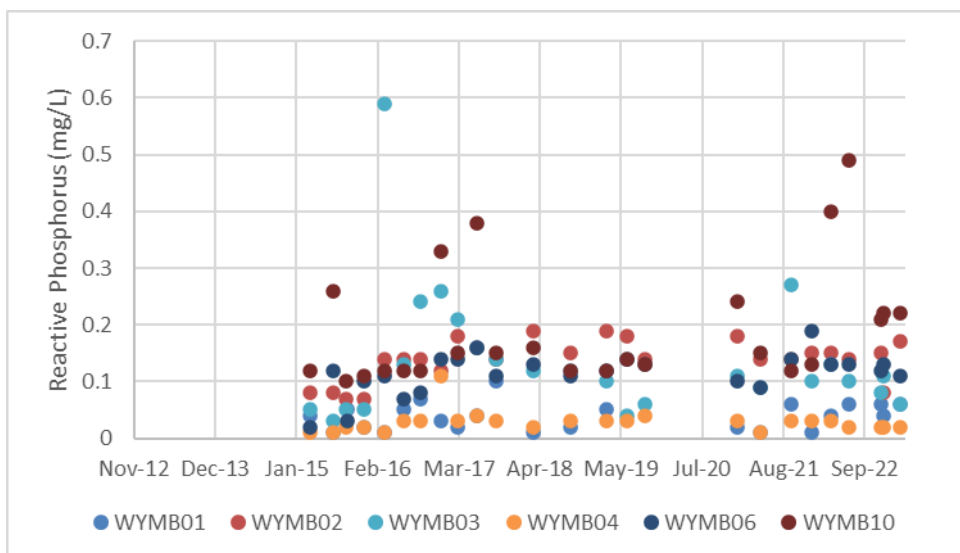
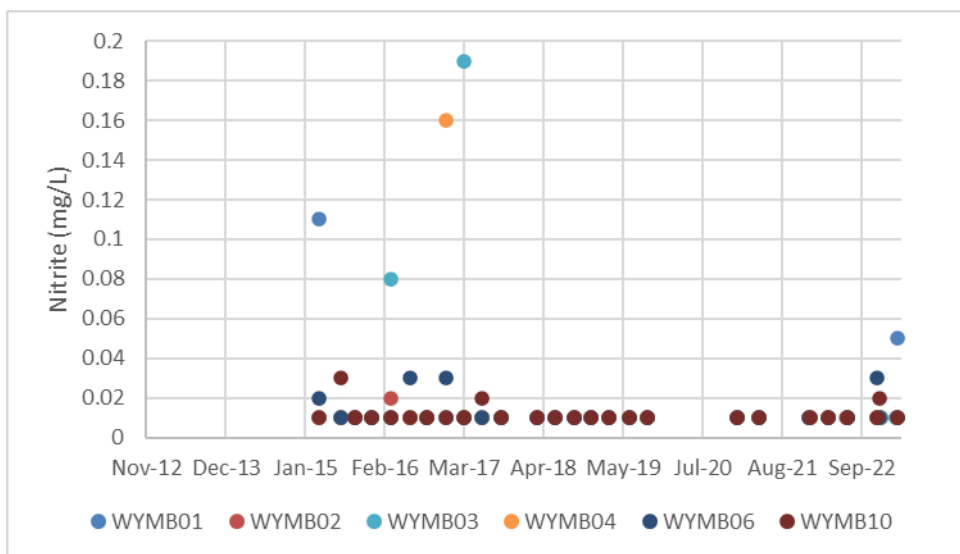
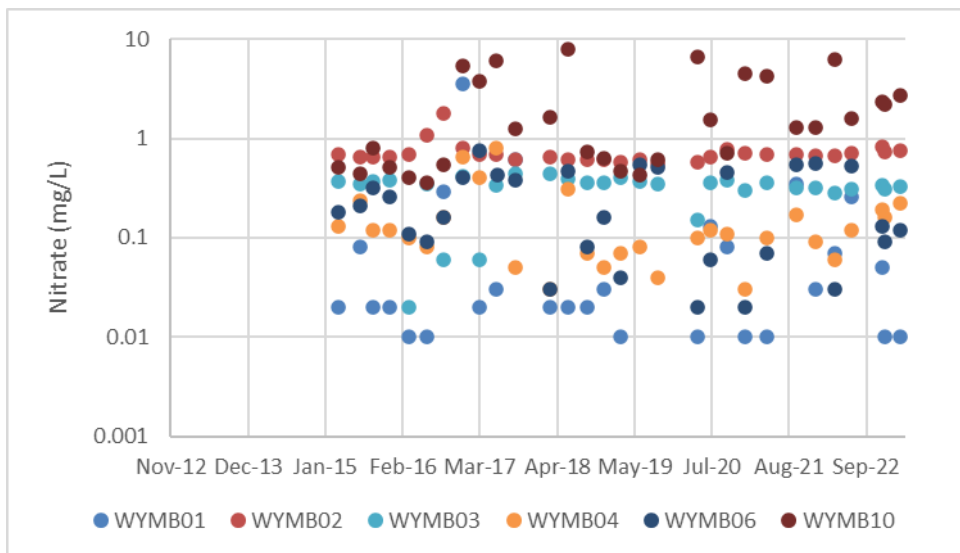


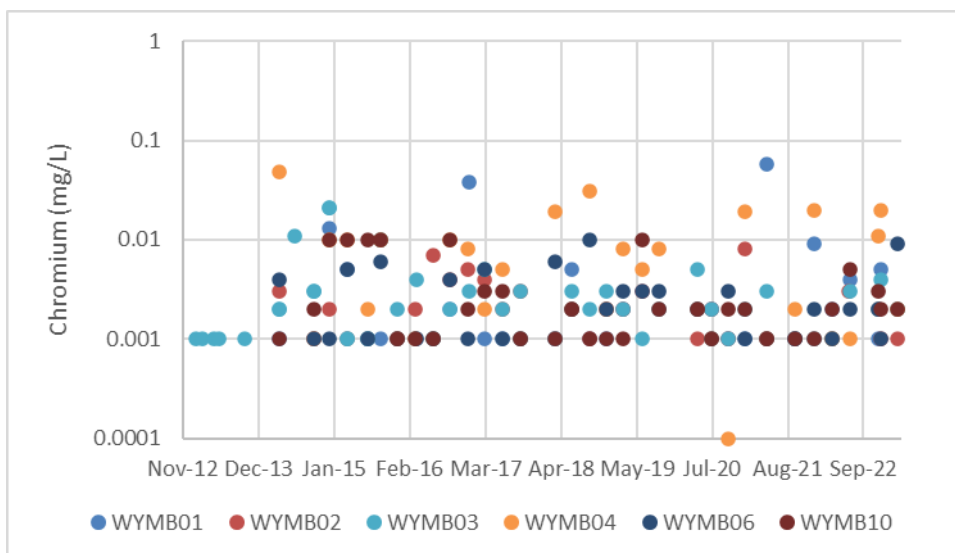
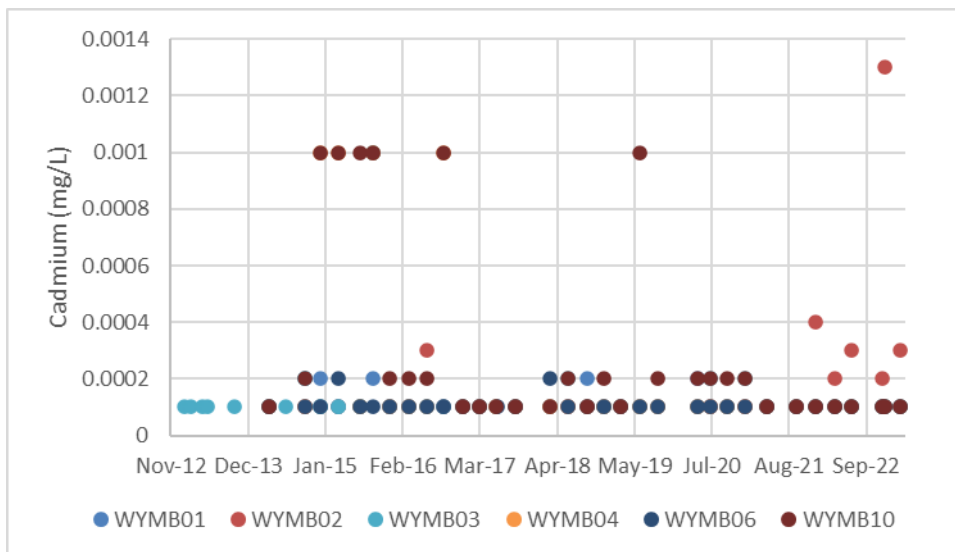
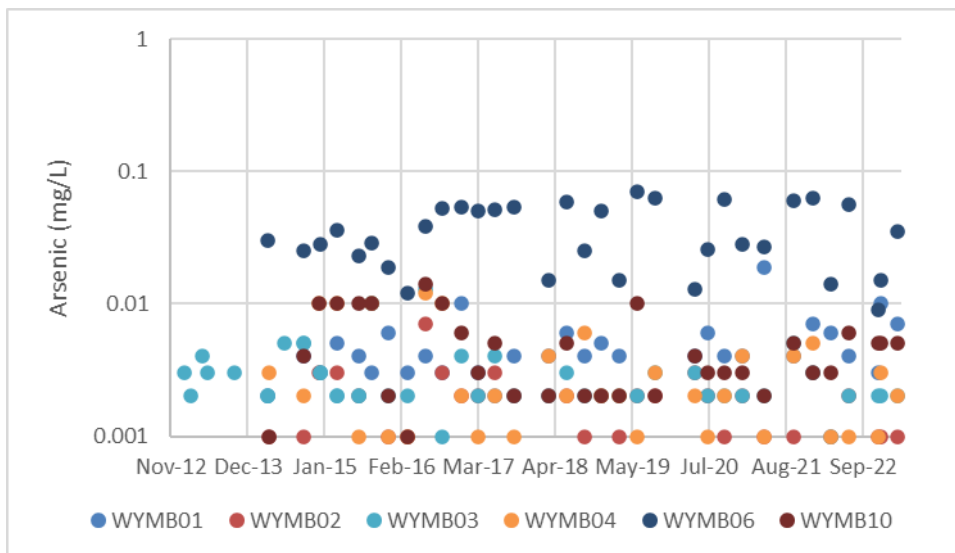


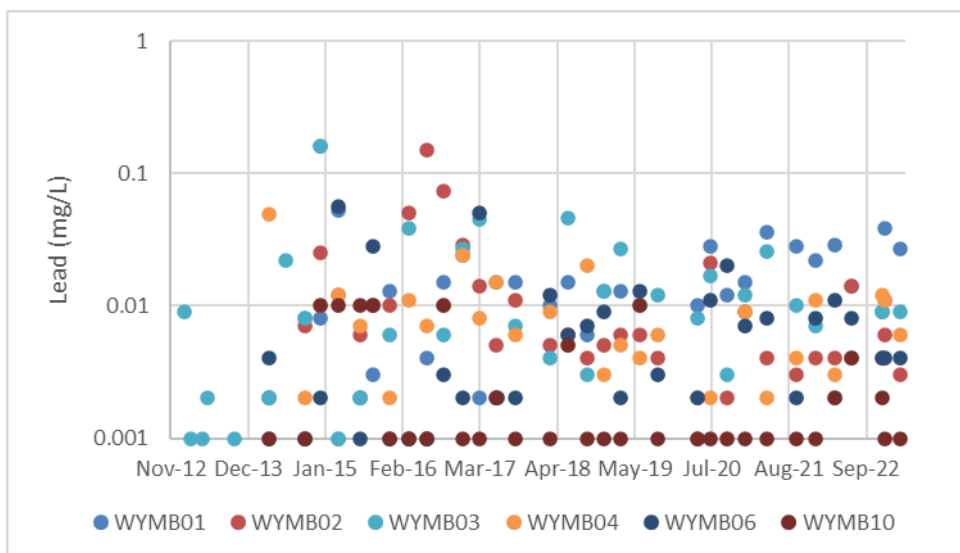
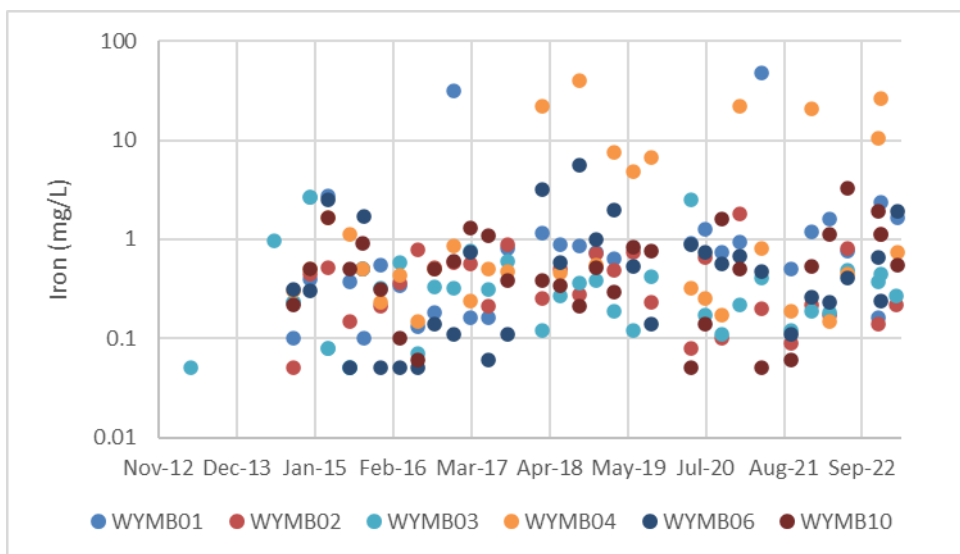
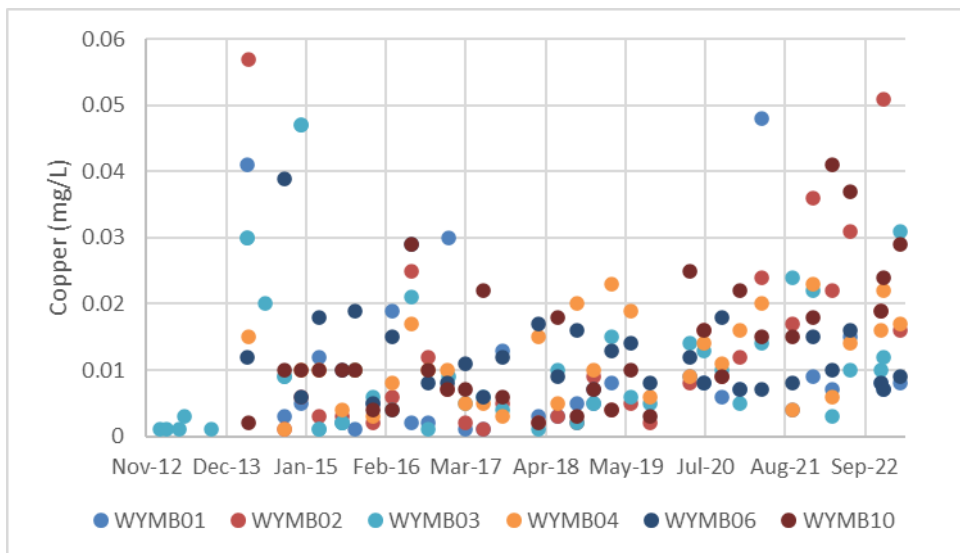


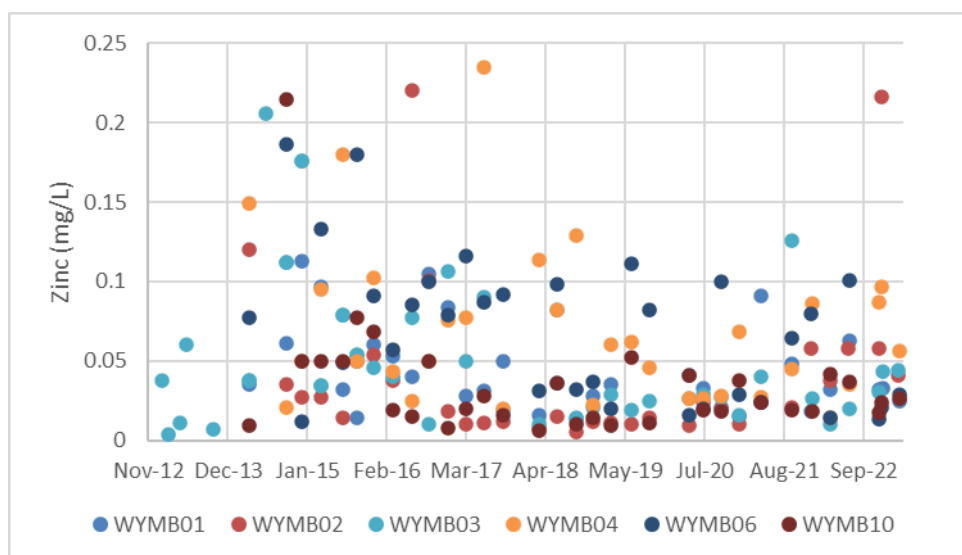
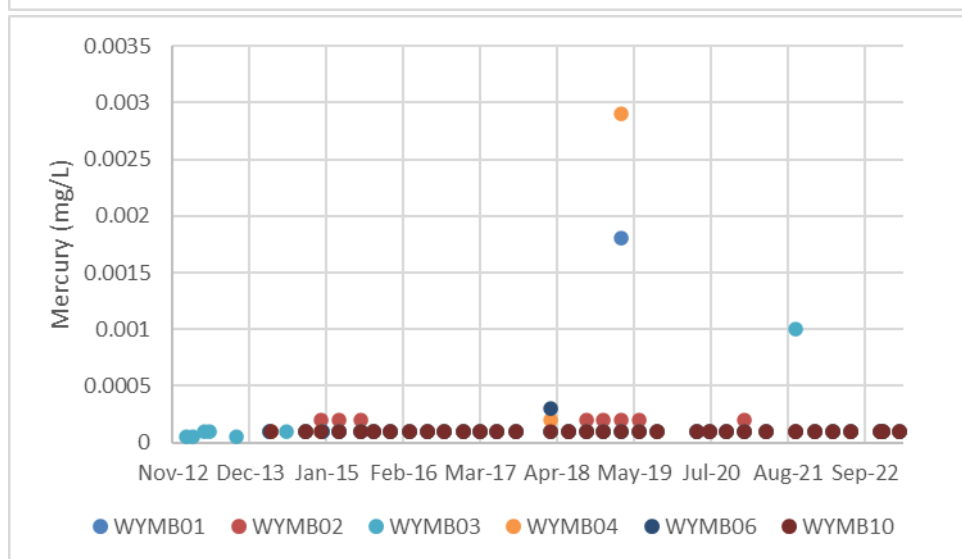
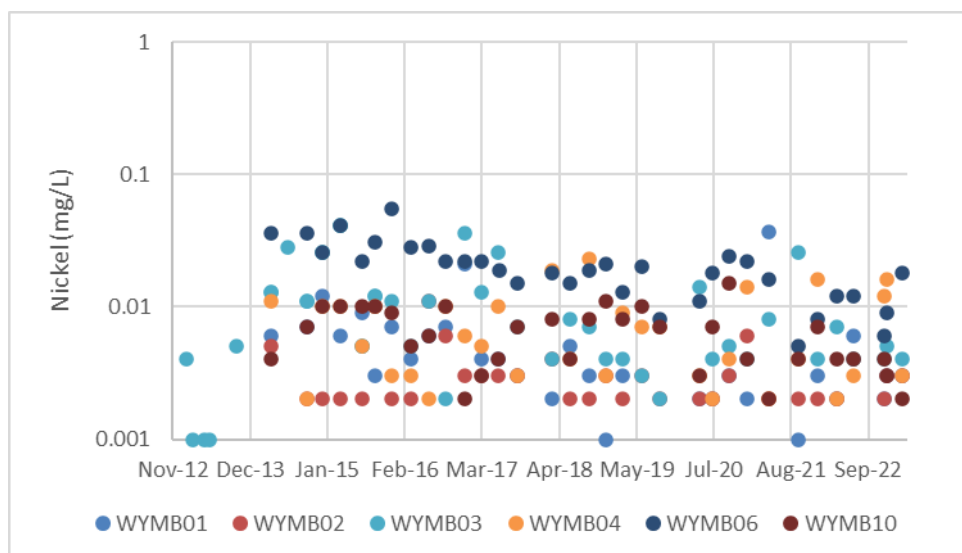




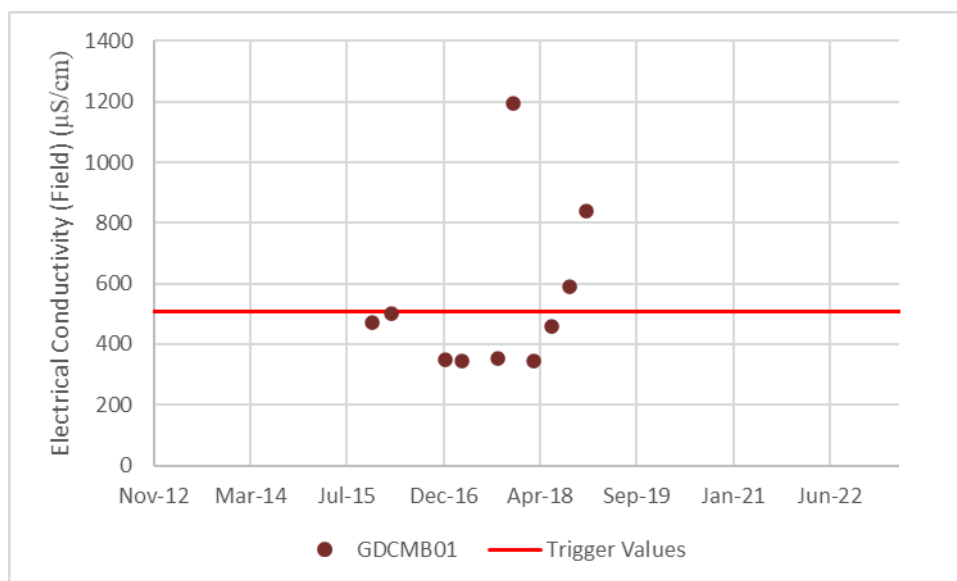
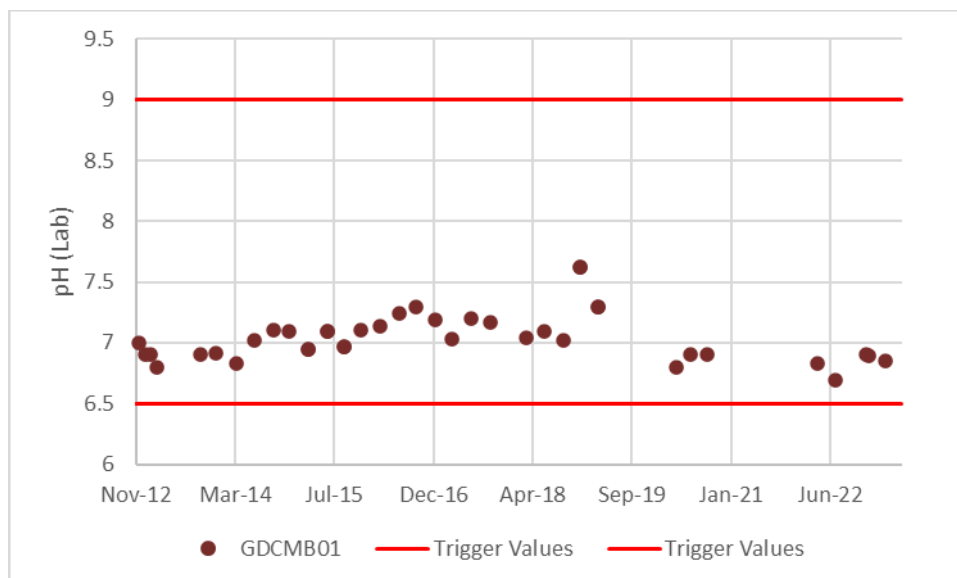
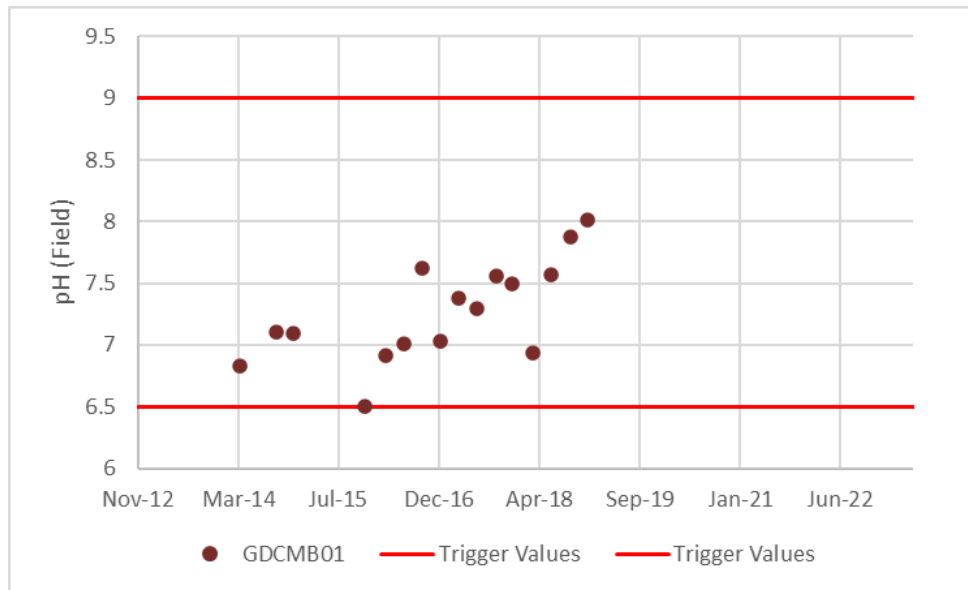


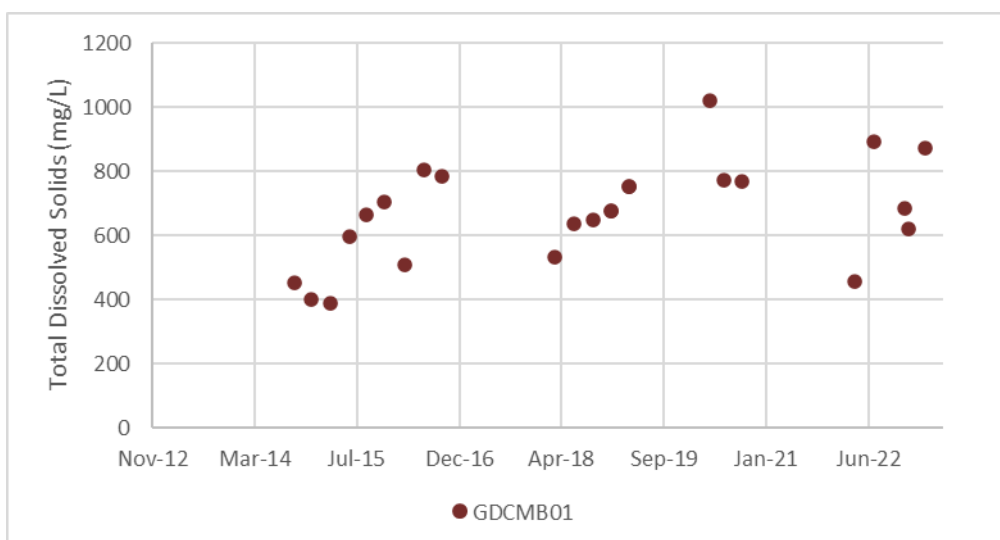
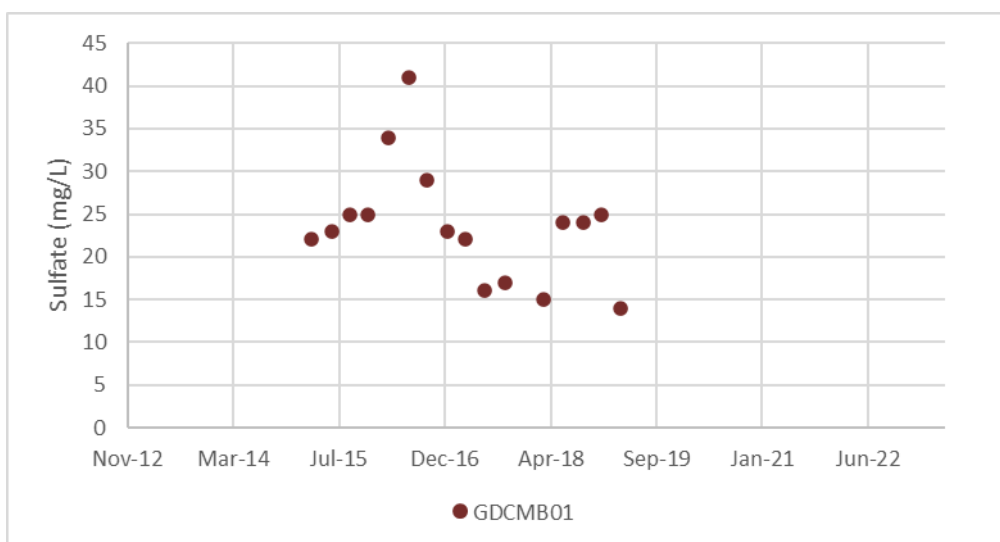
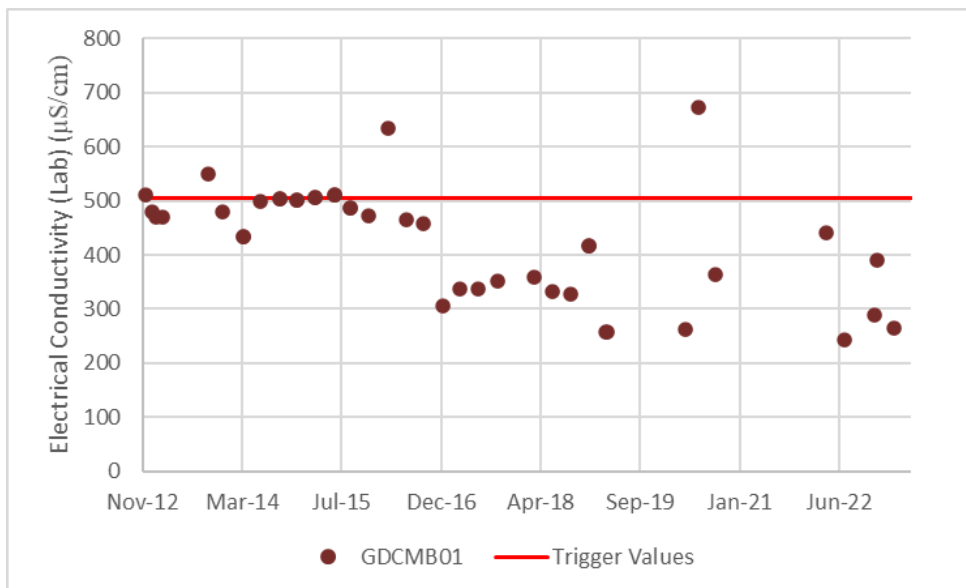


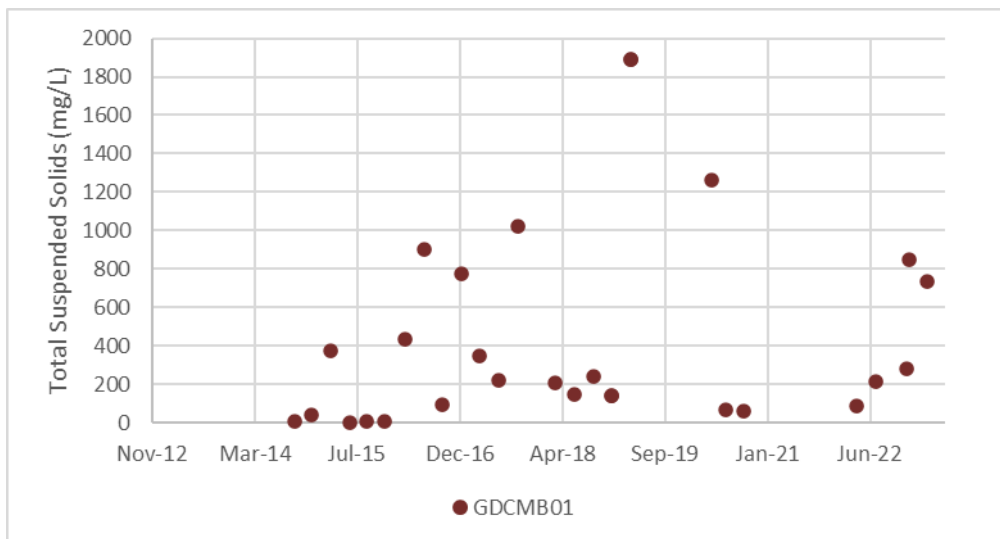


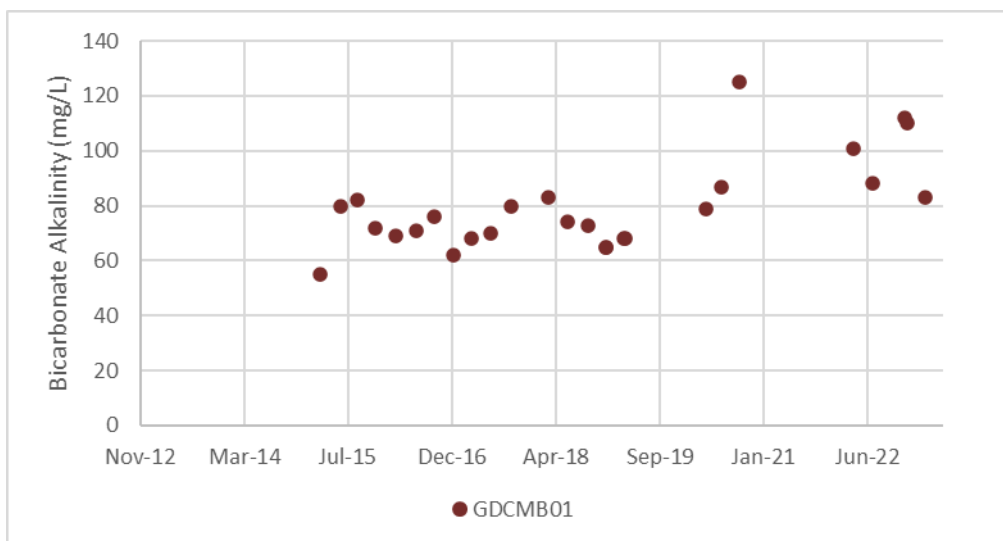
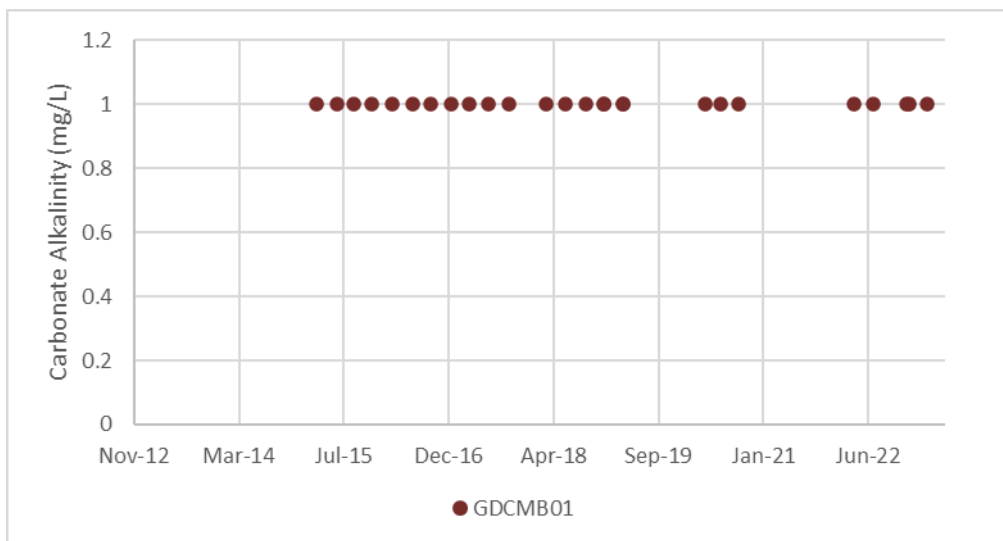
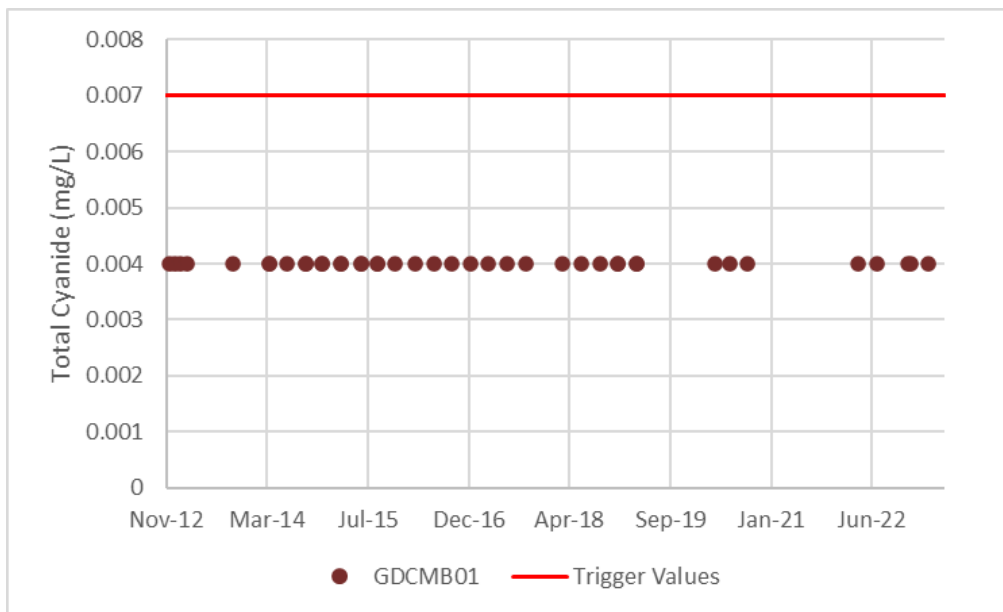


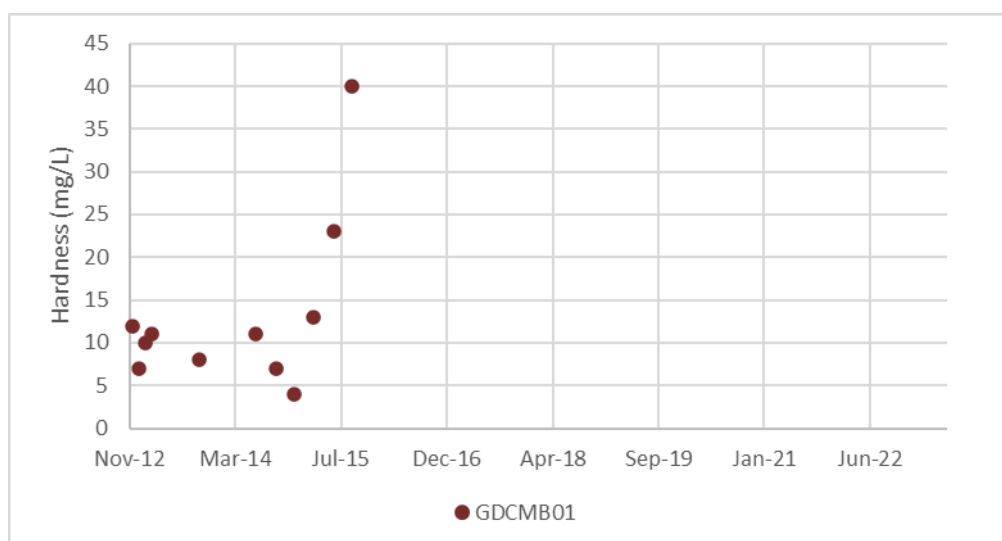
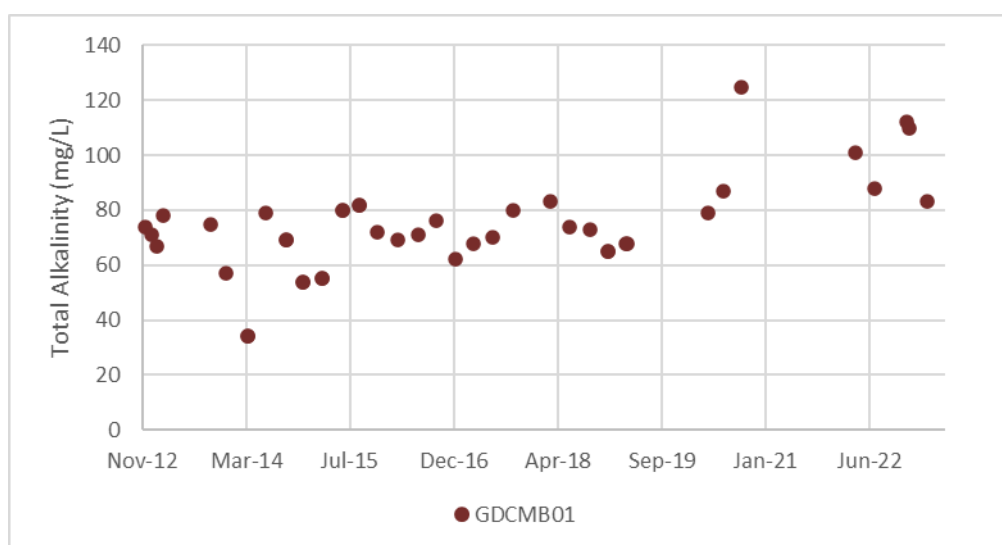
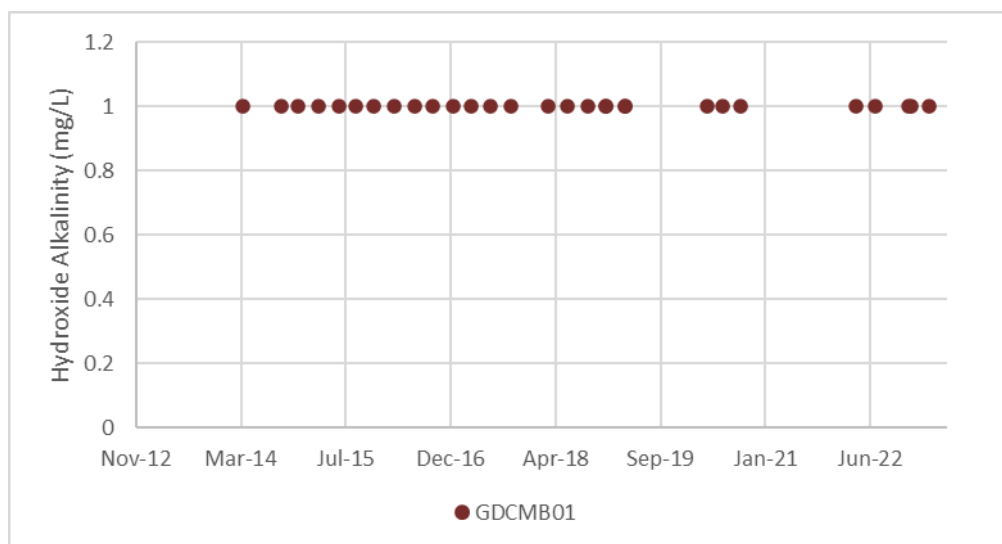
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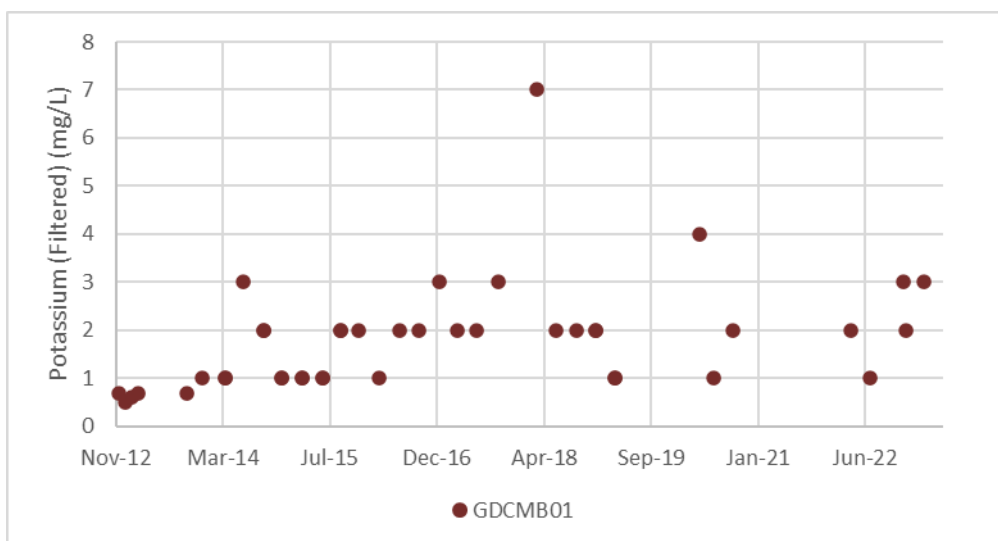
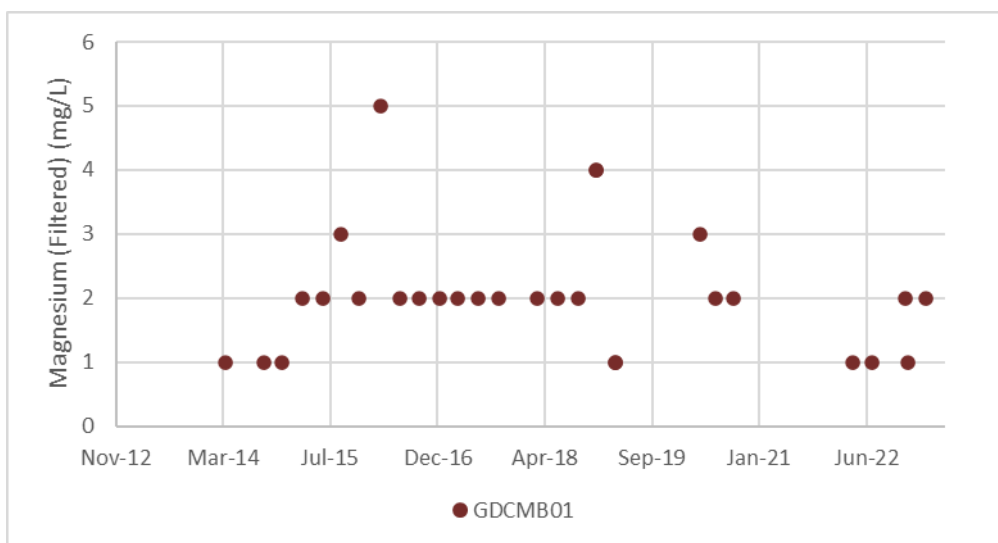
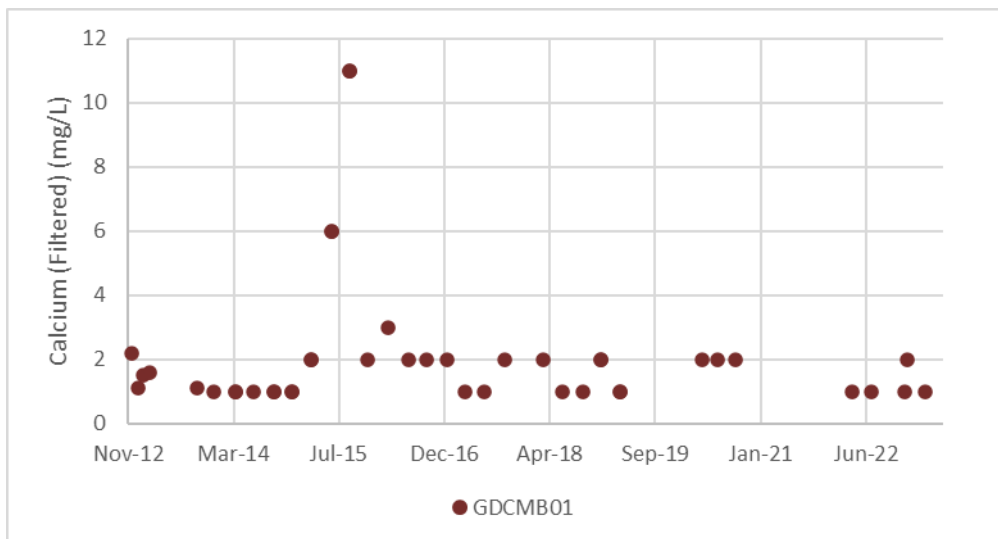


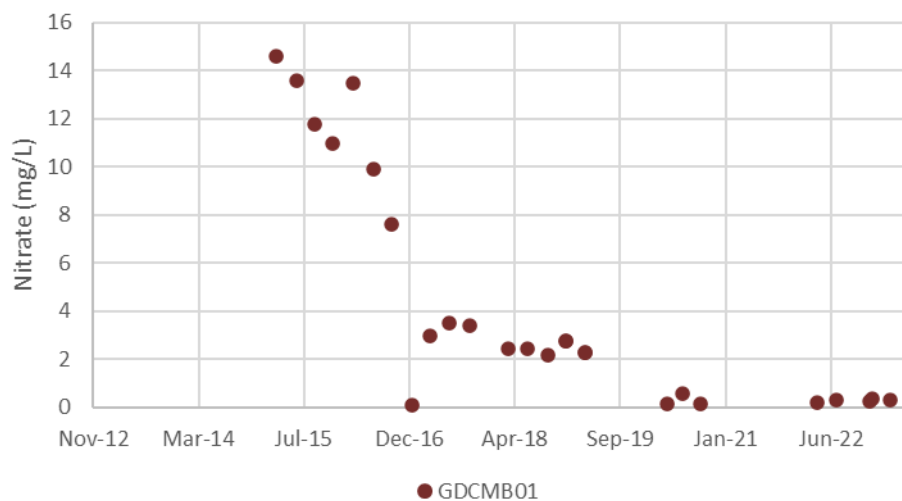
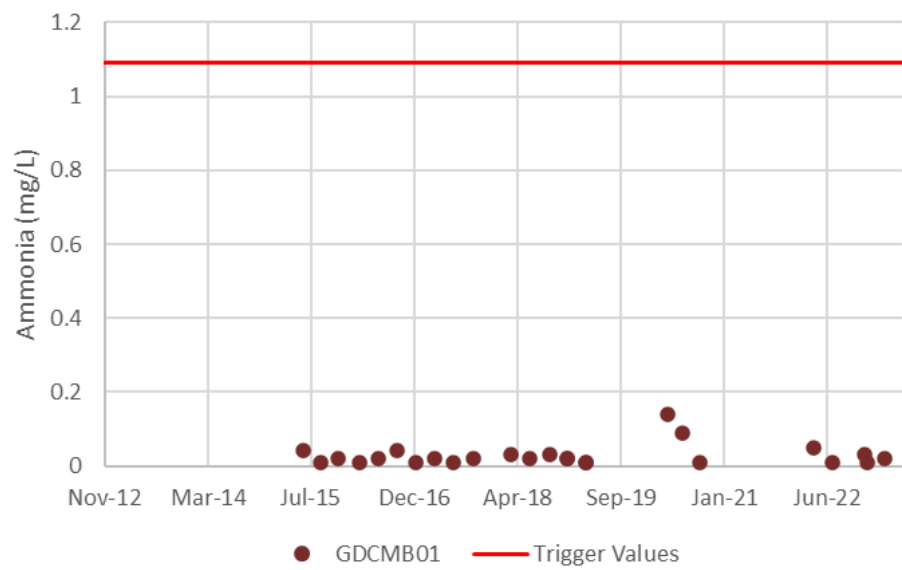
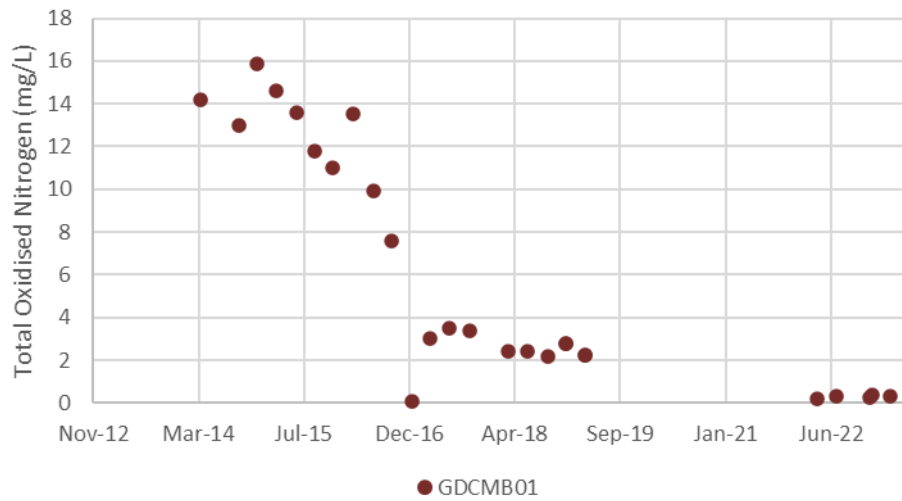


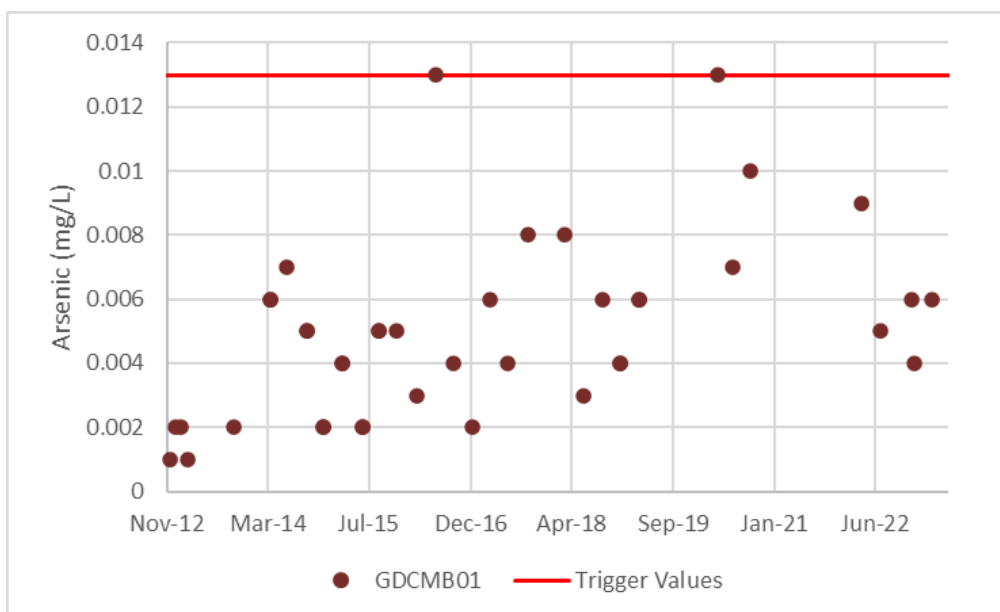
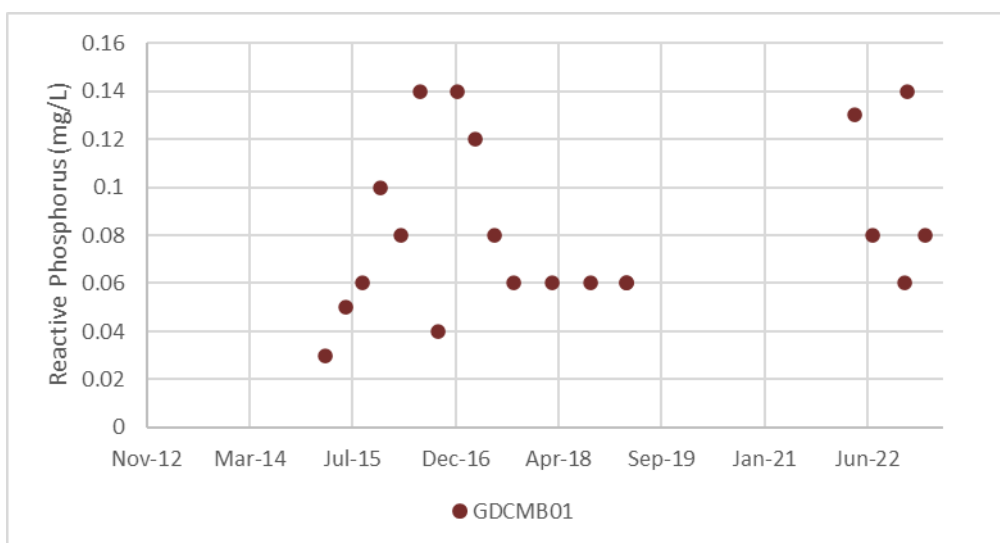
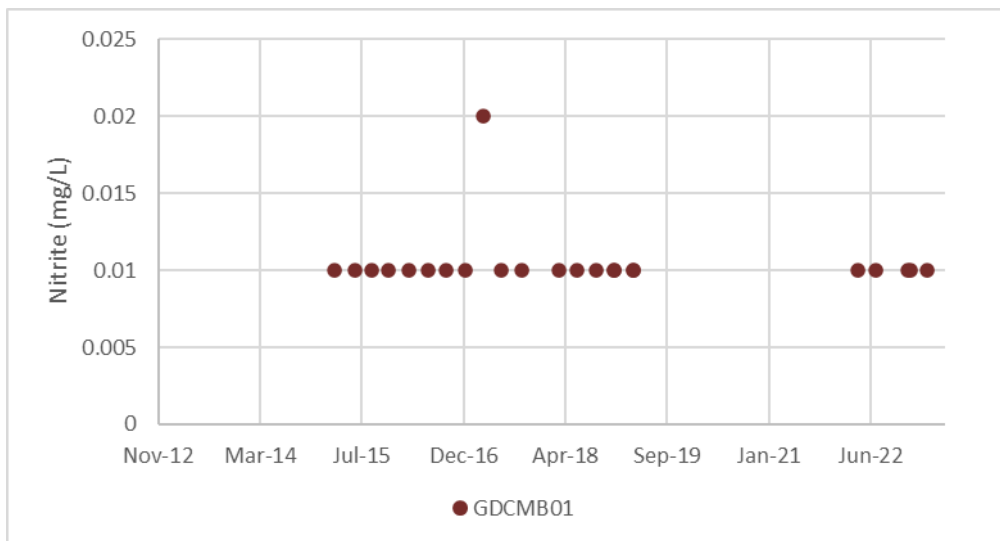


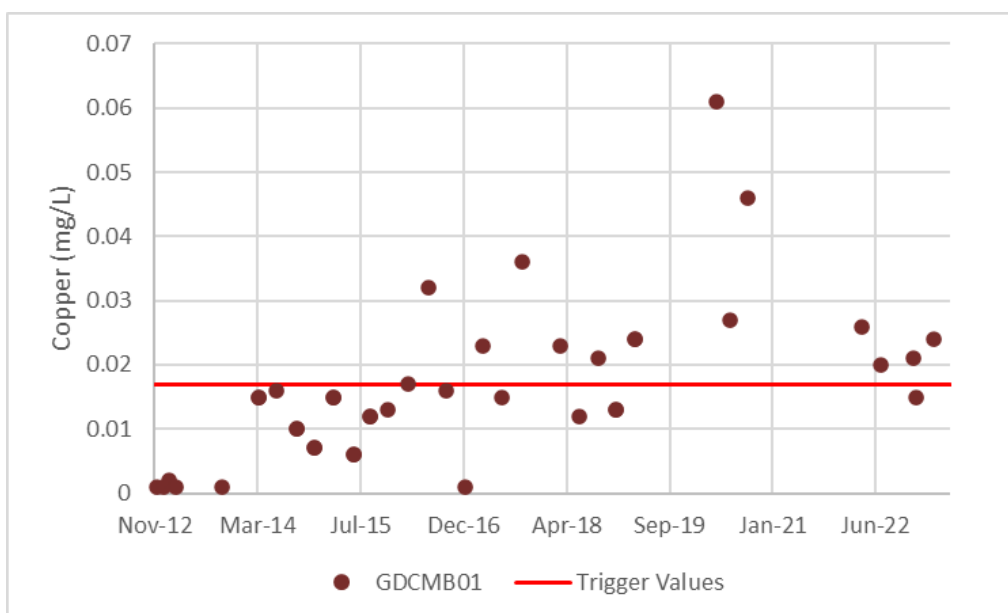
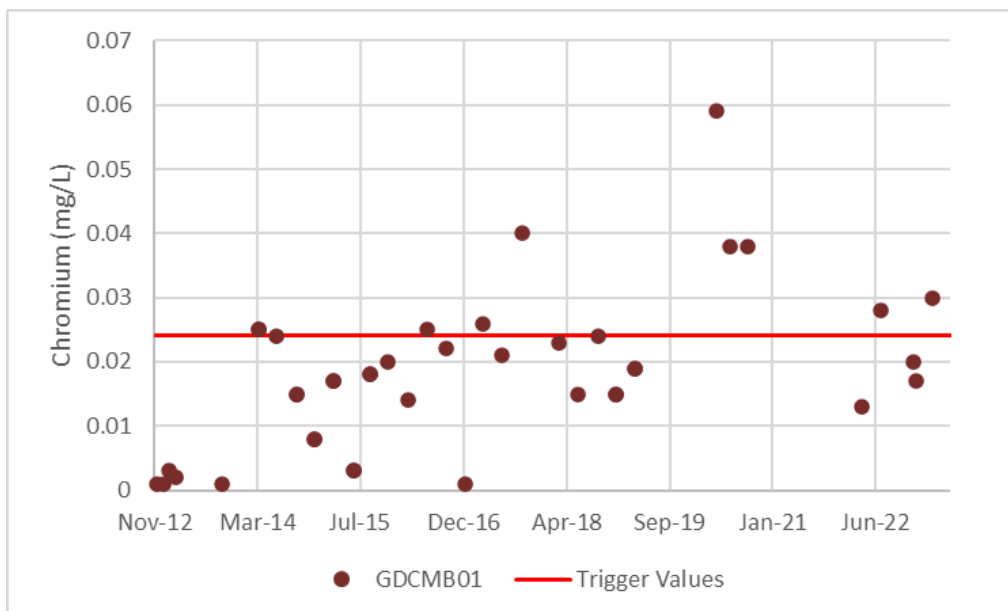
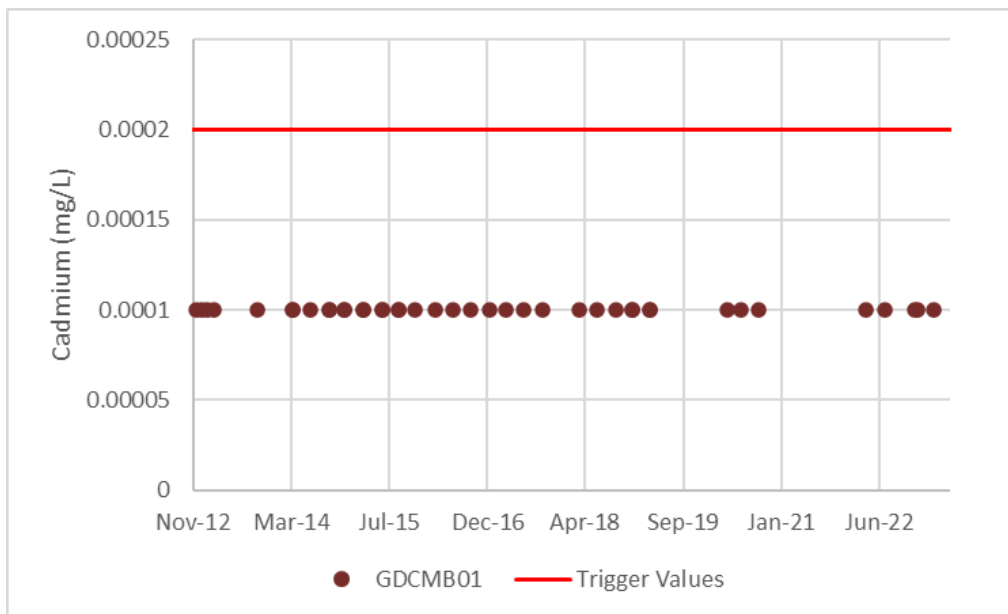


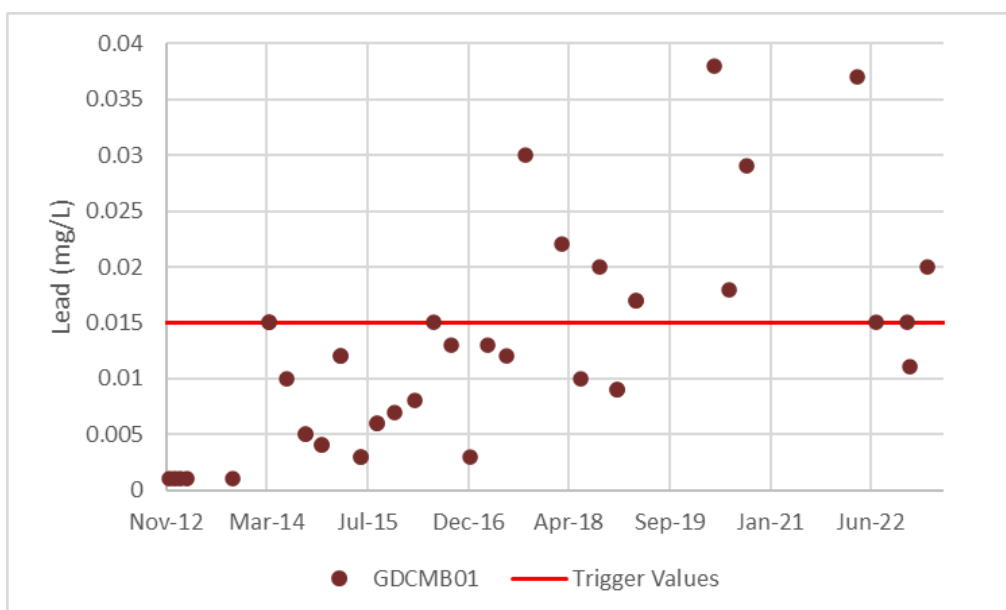
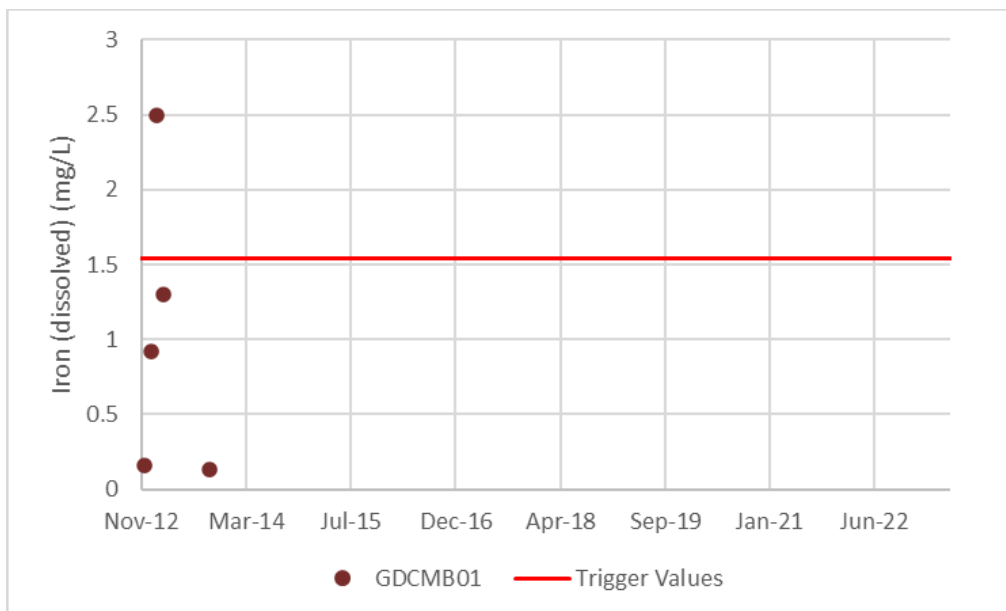
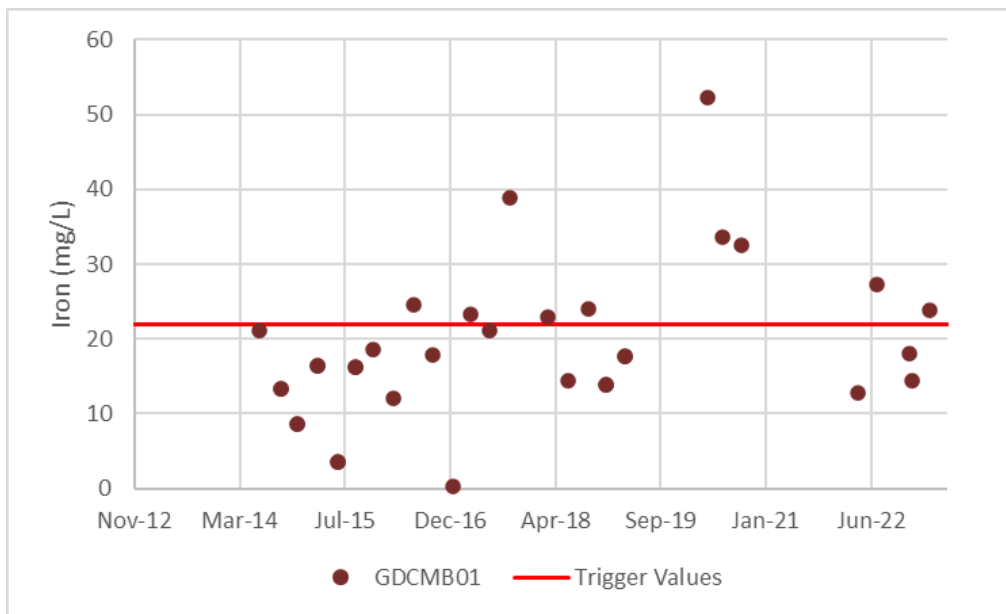




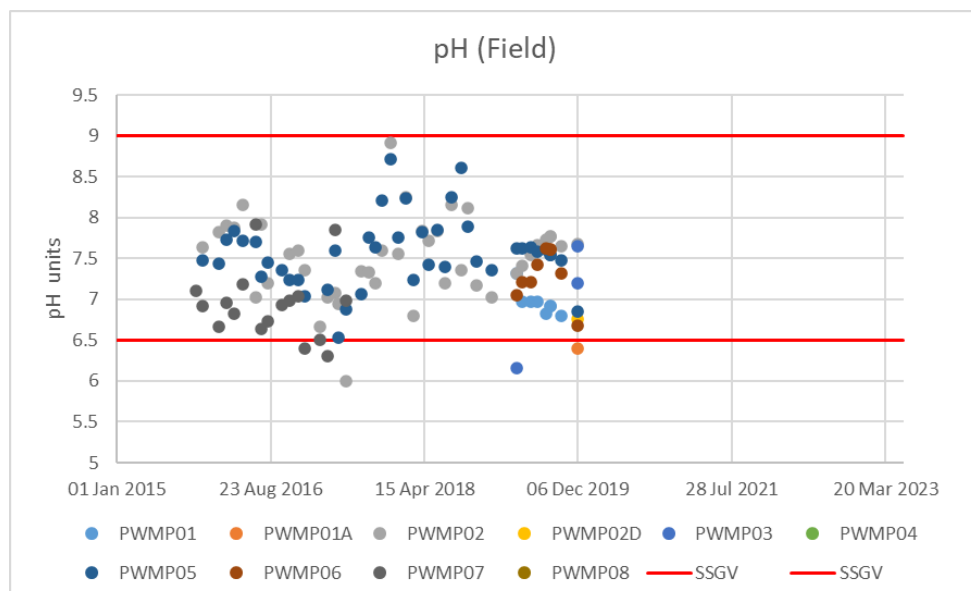
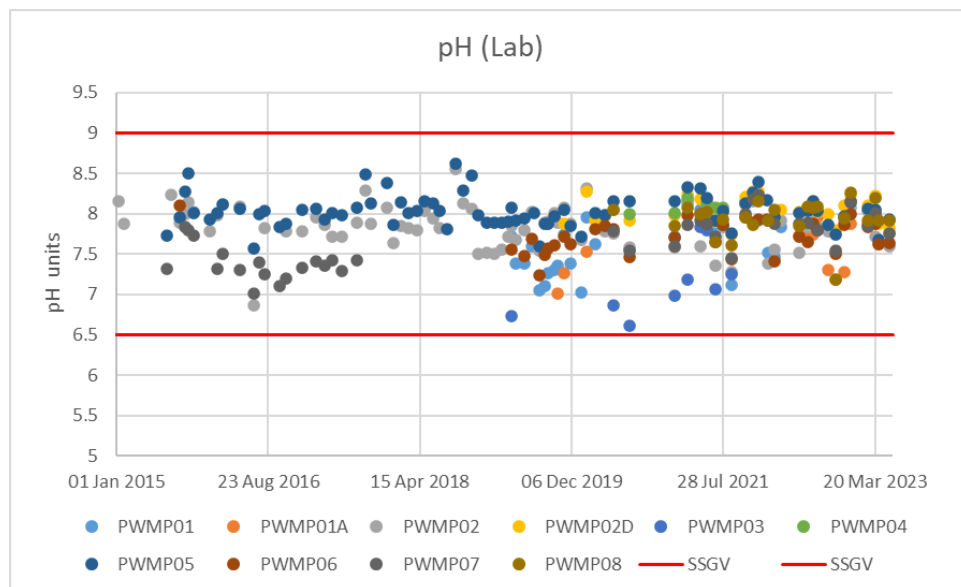


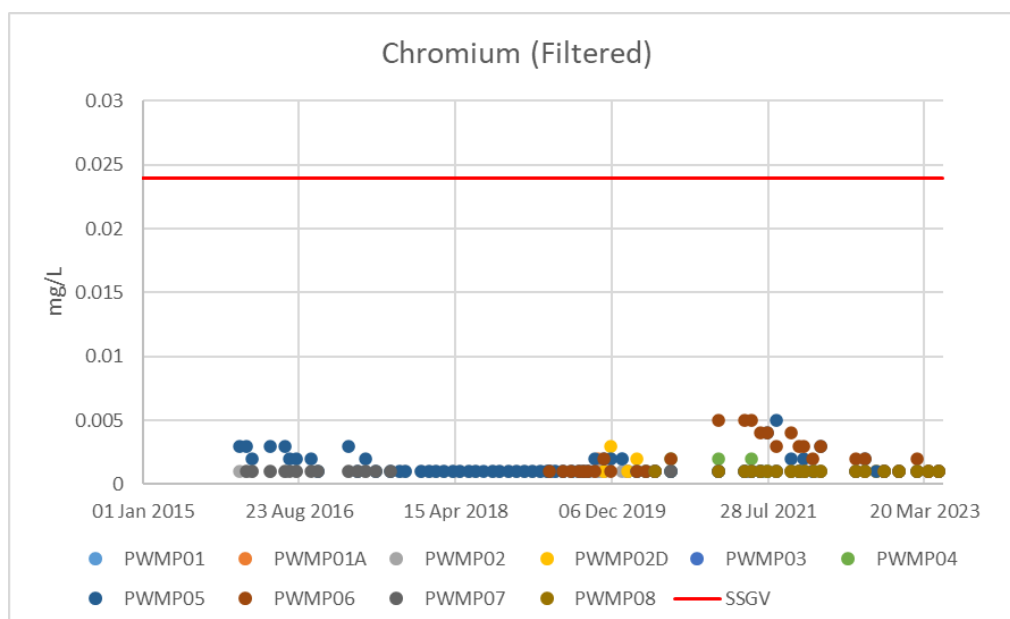
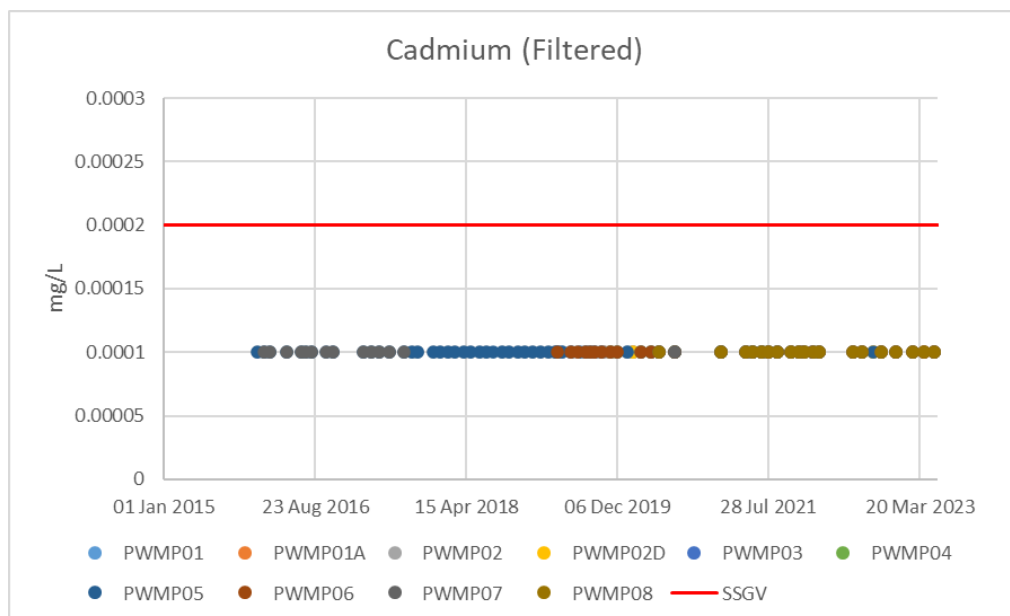
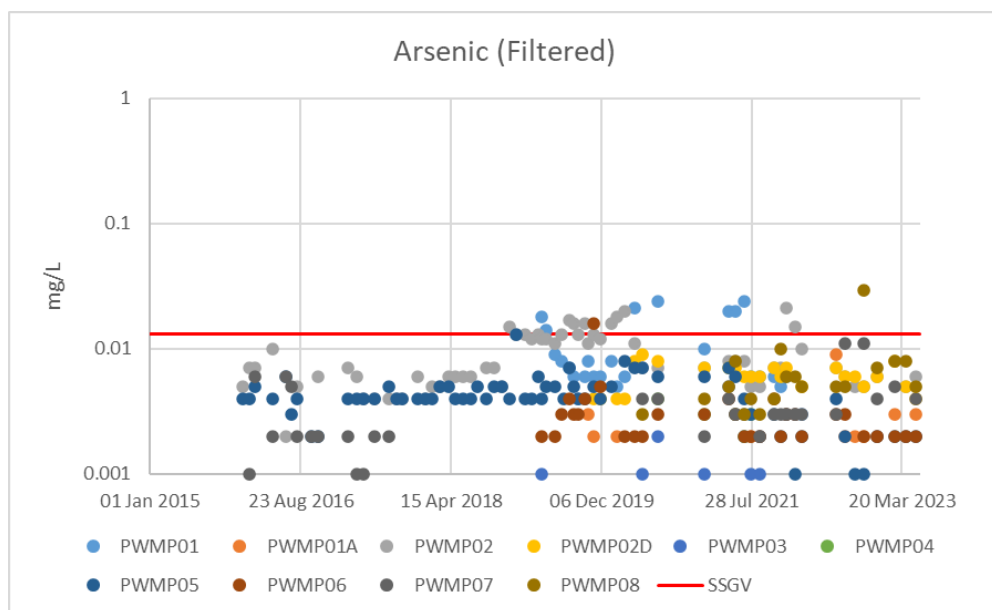


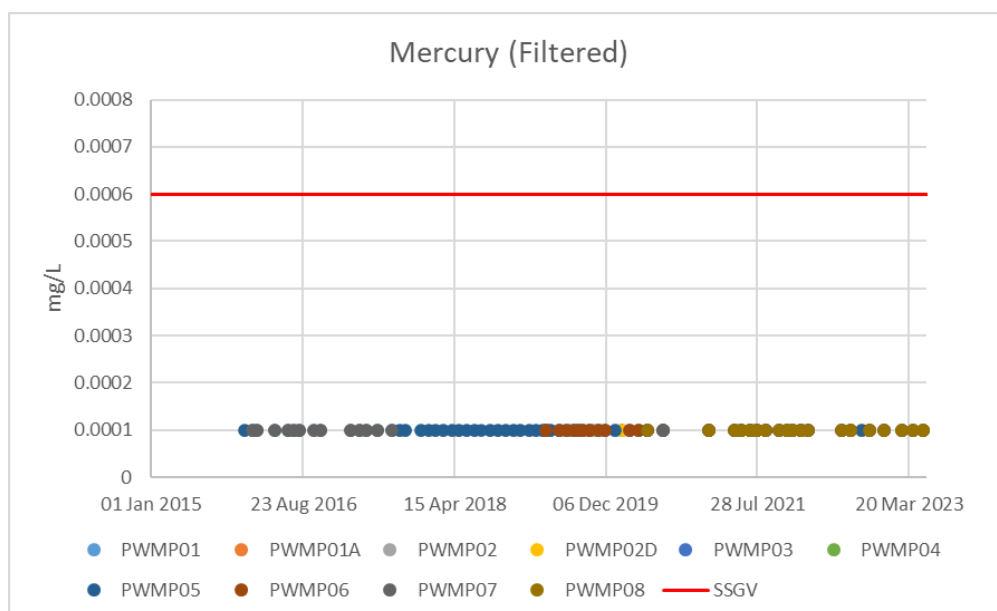
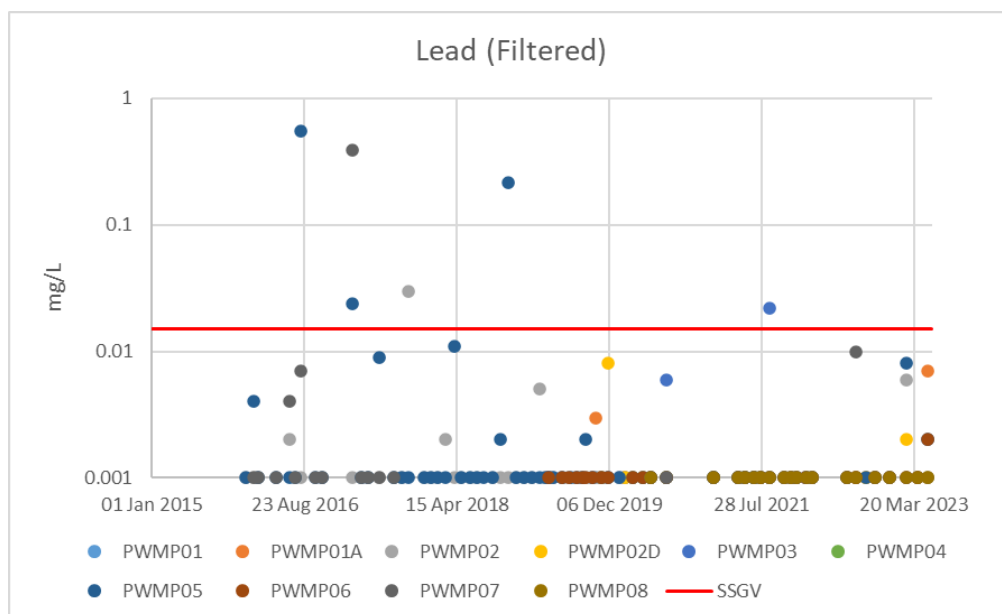
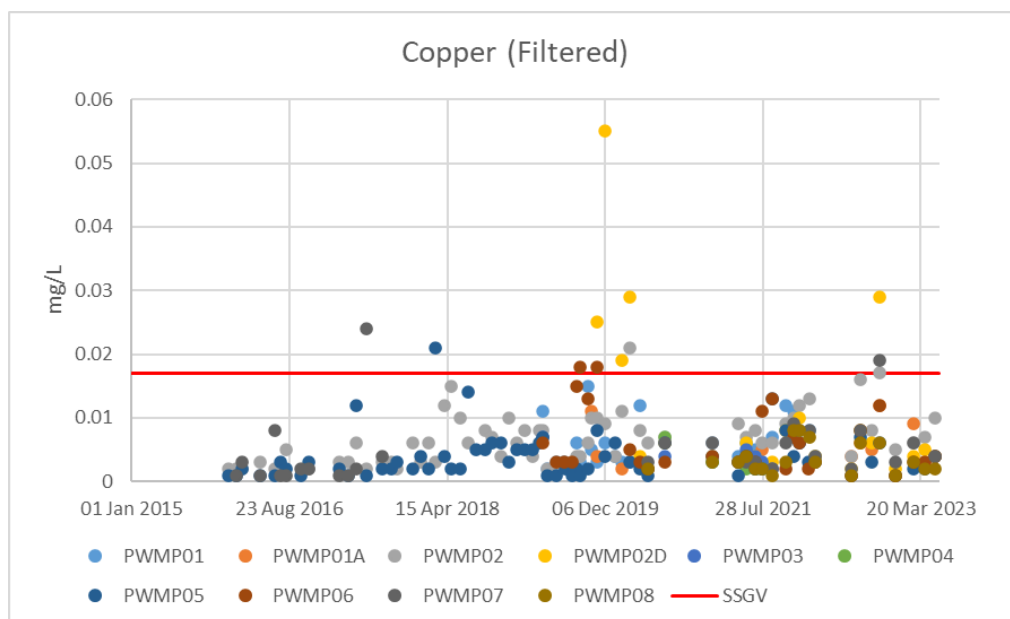


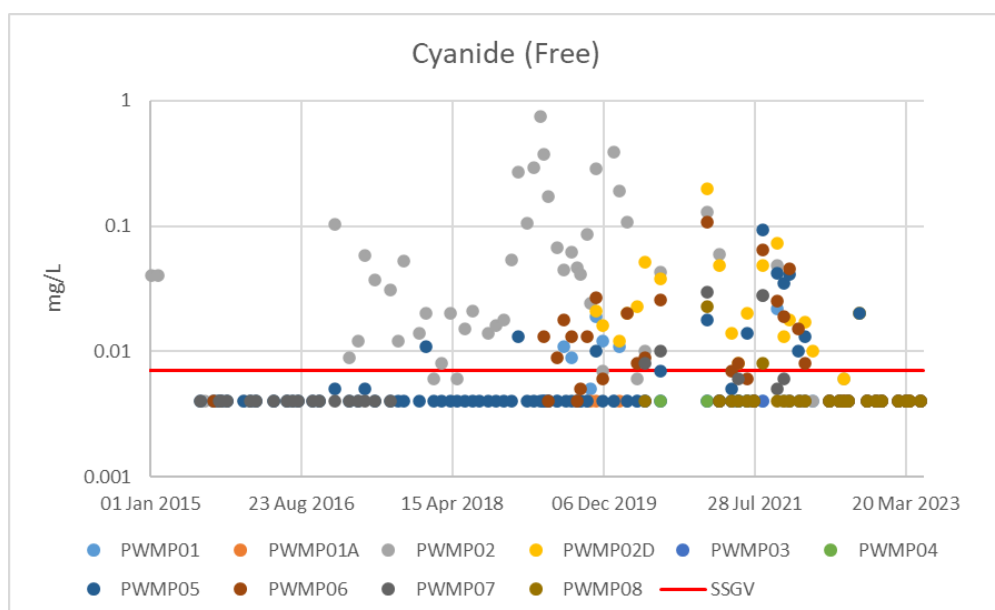
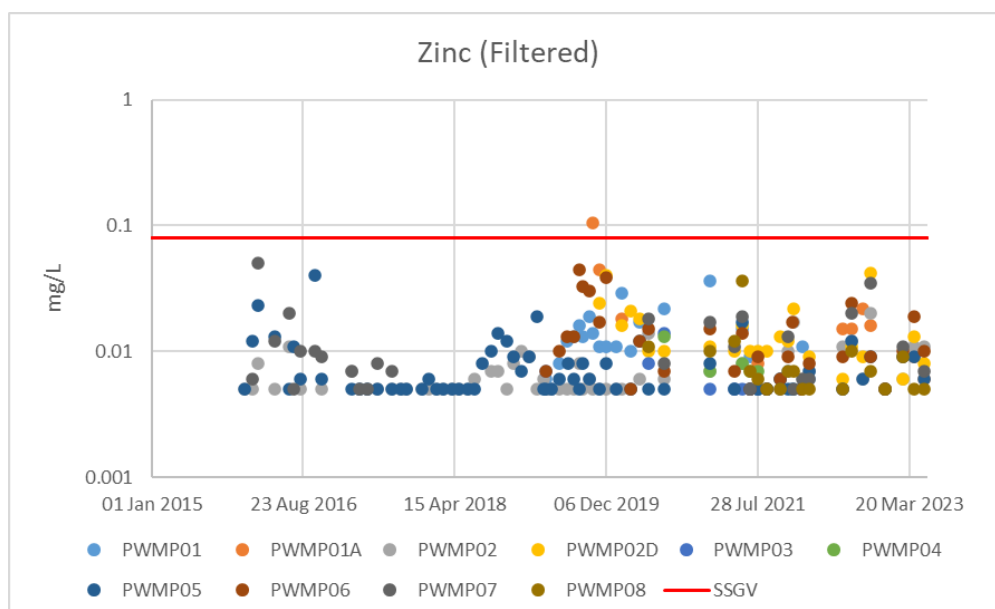
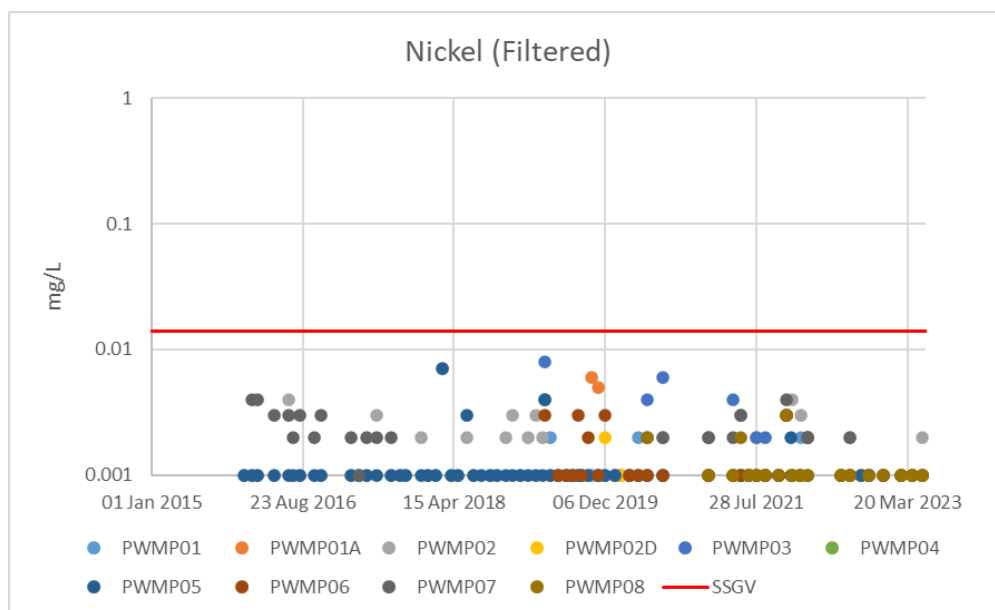


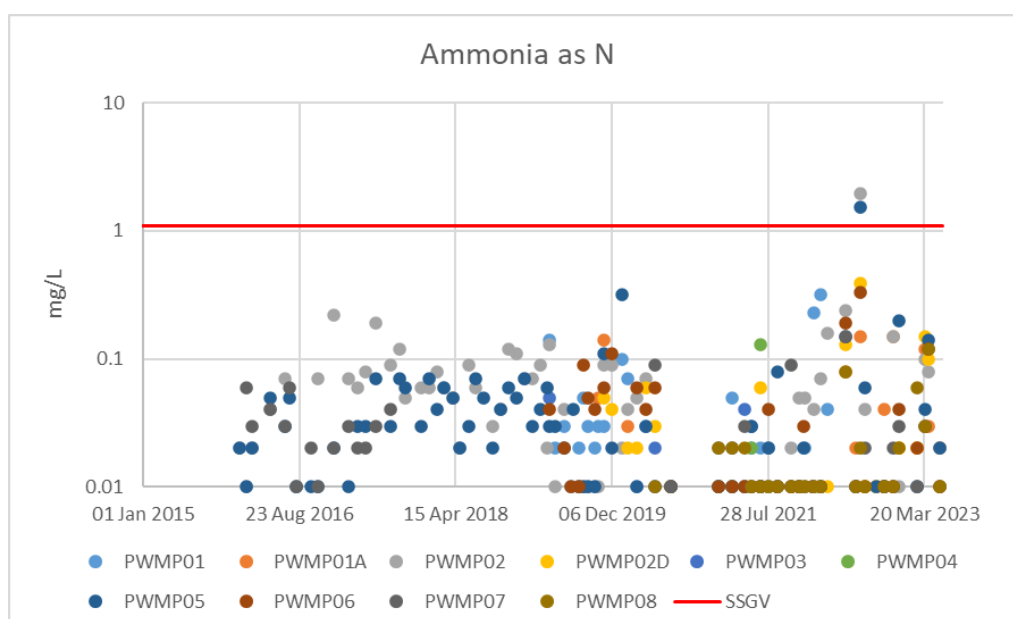
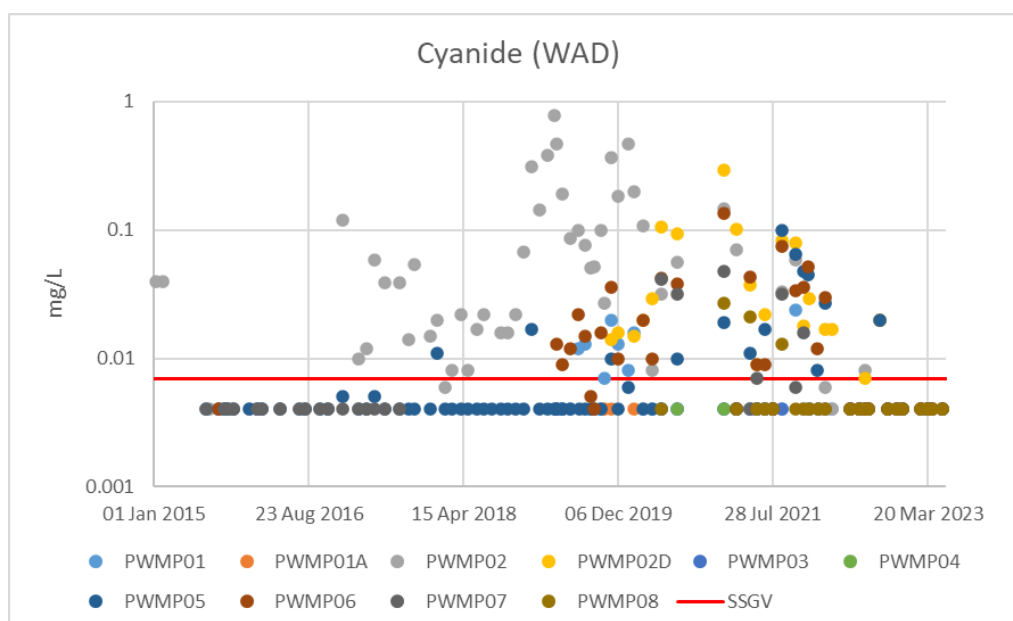
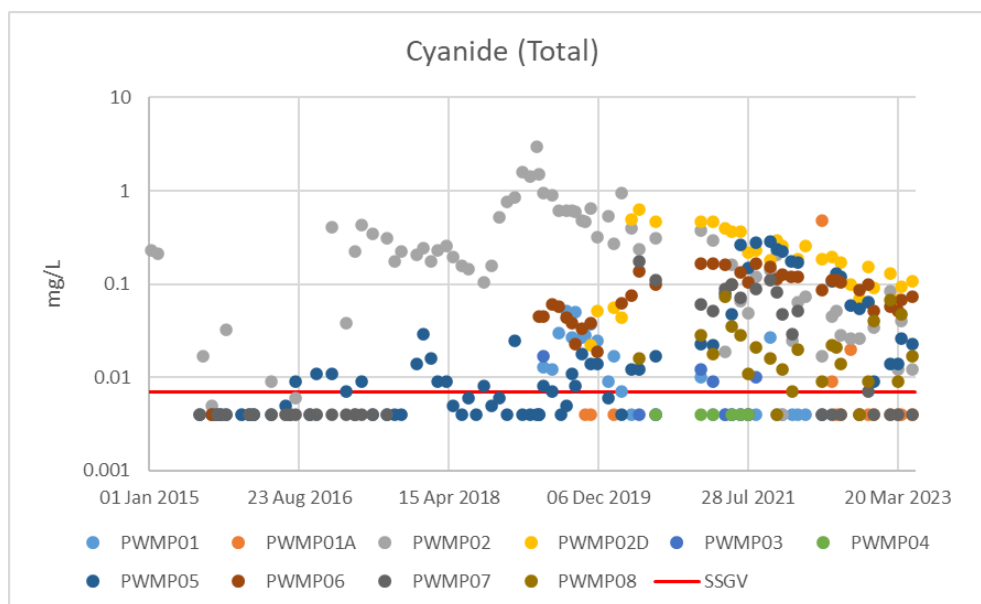
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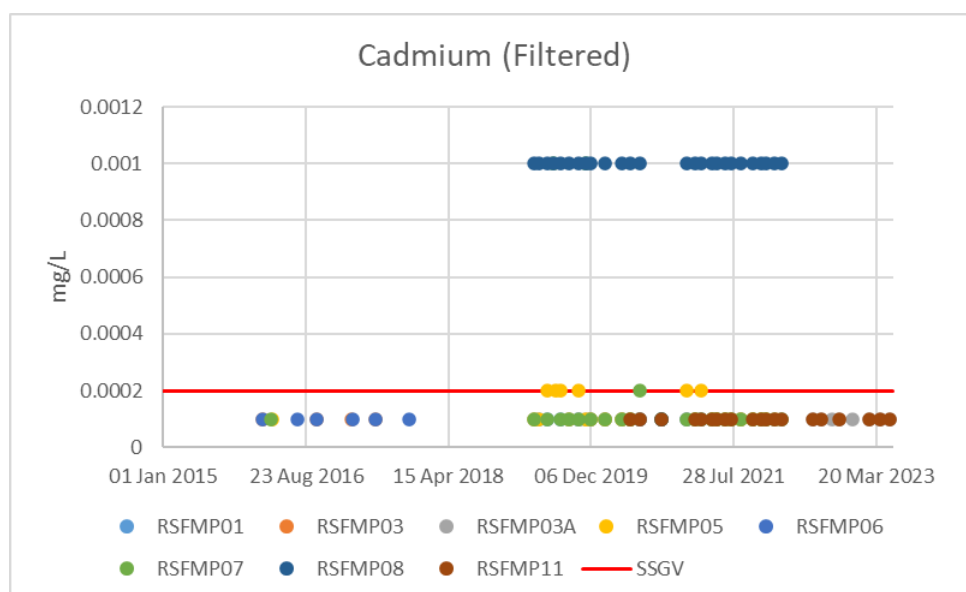
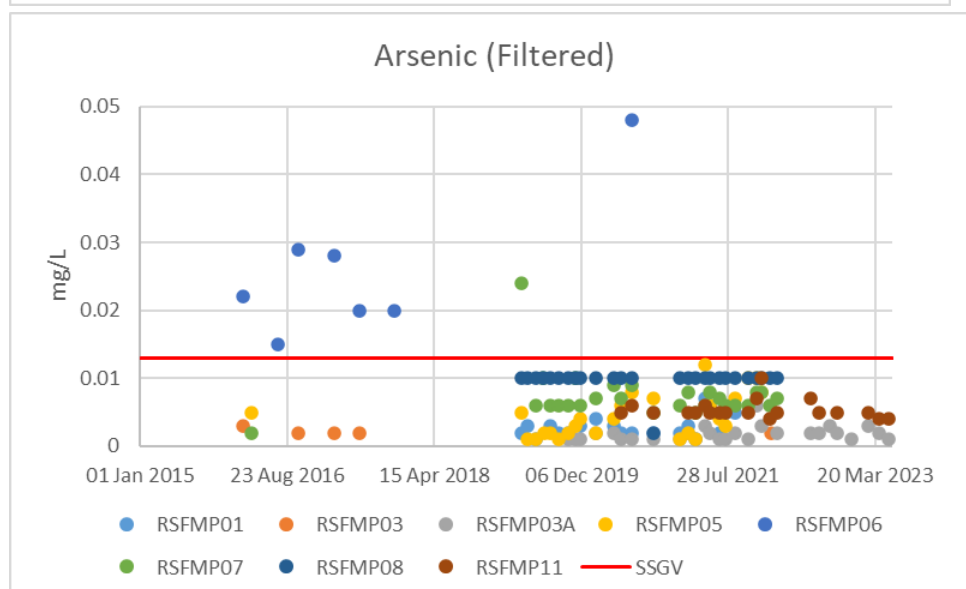
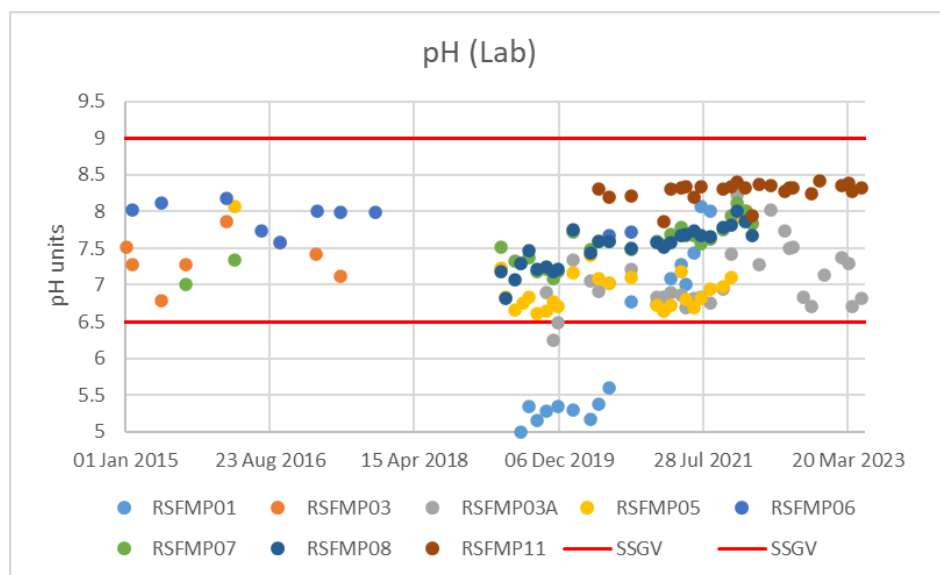




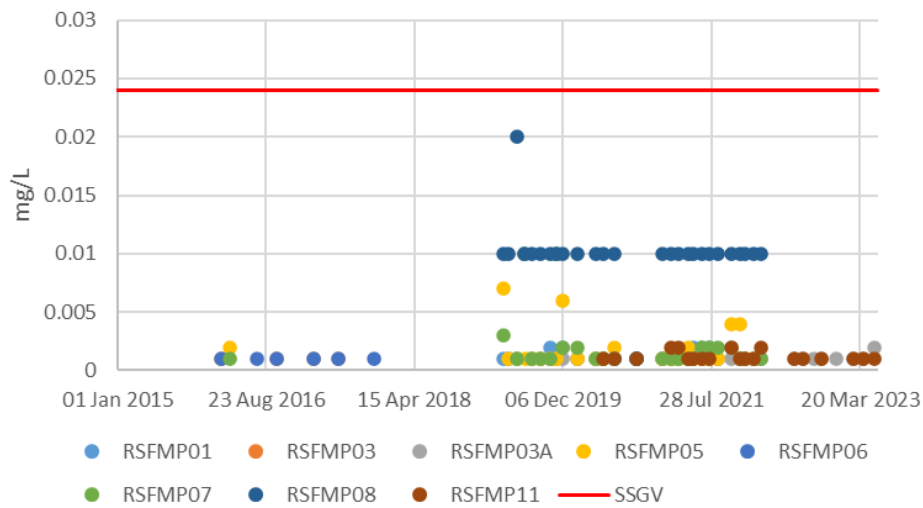




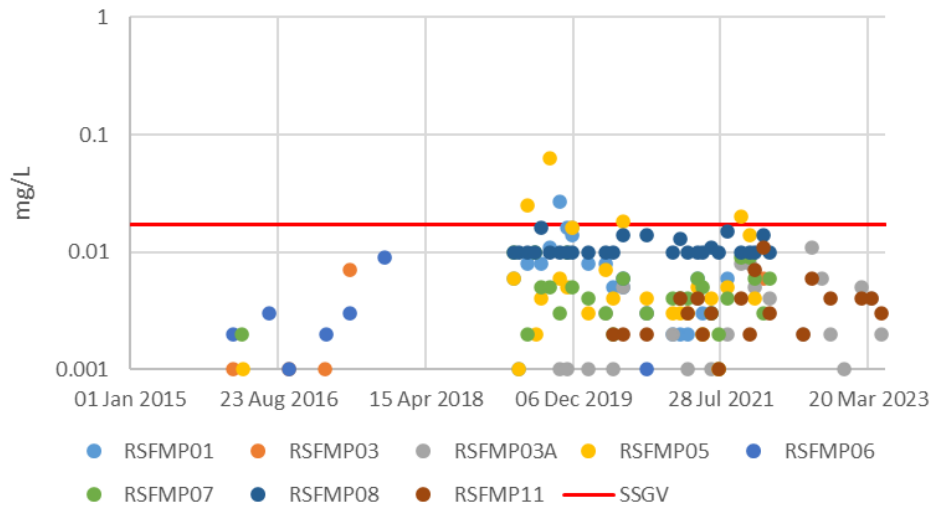
Residue storage facility



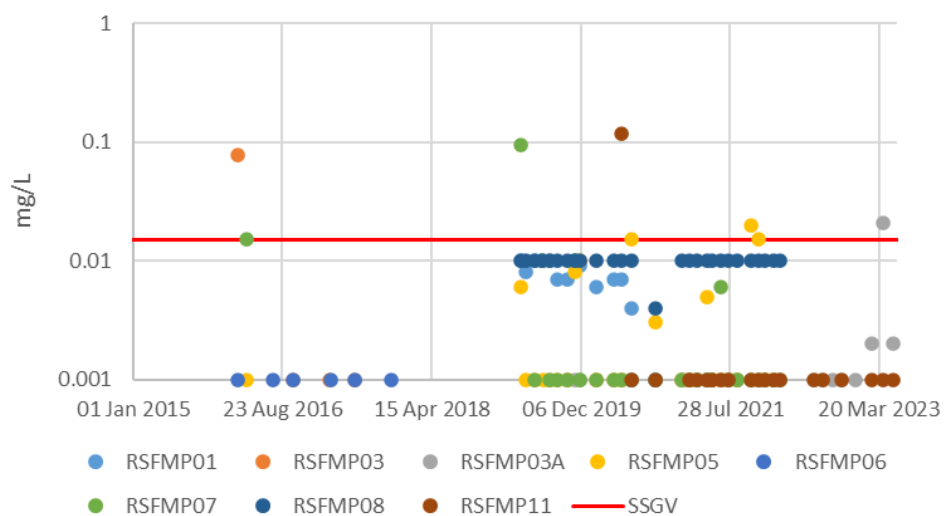
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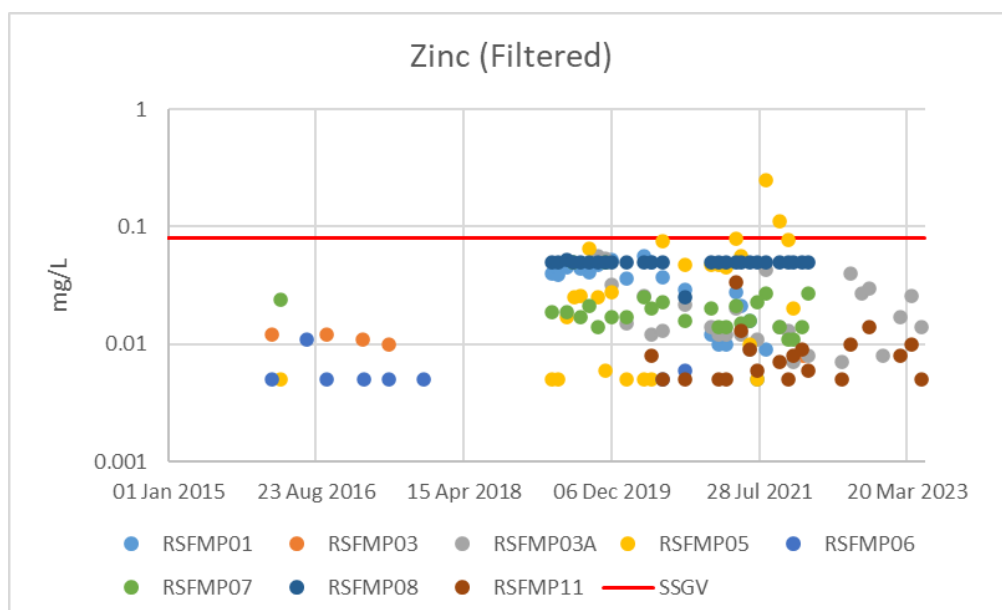
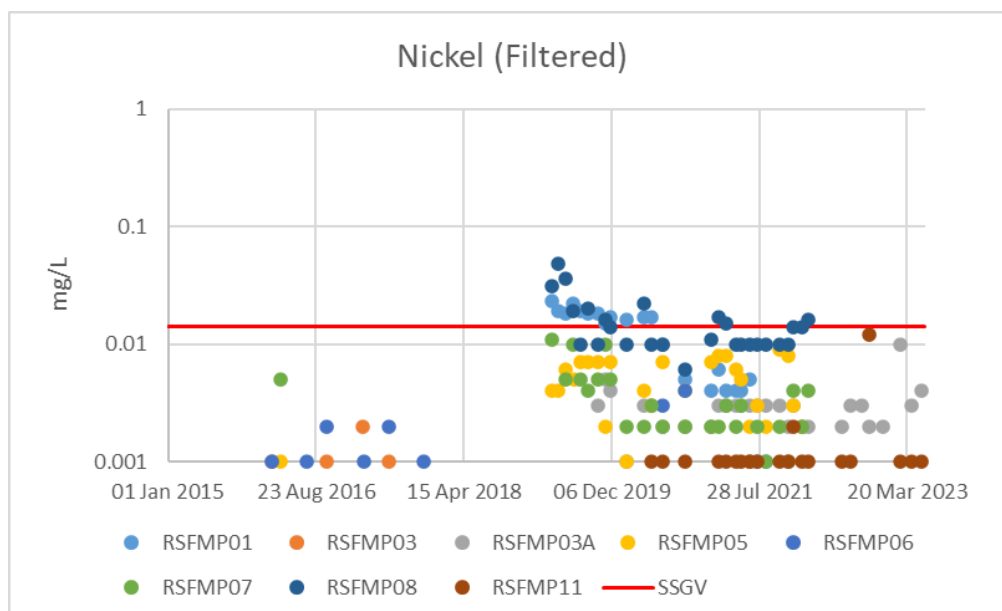
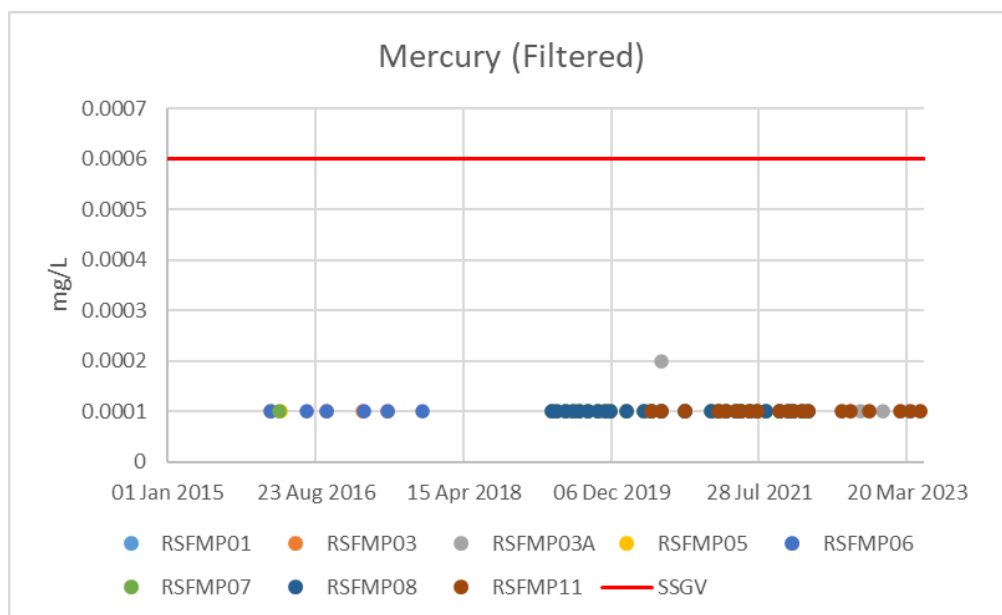


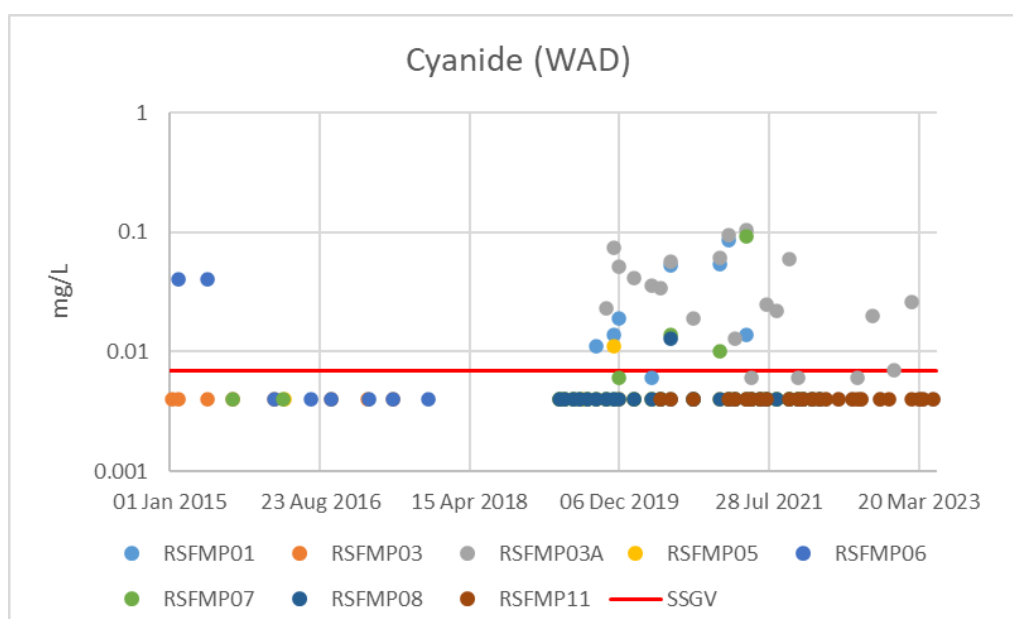
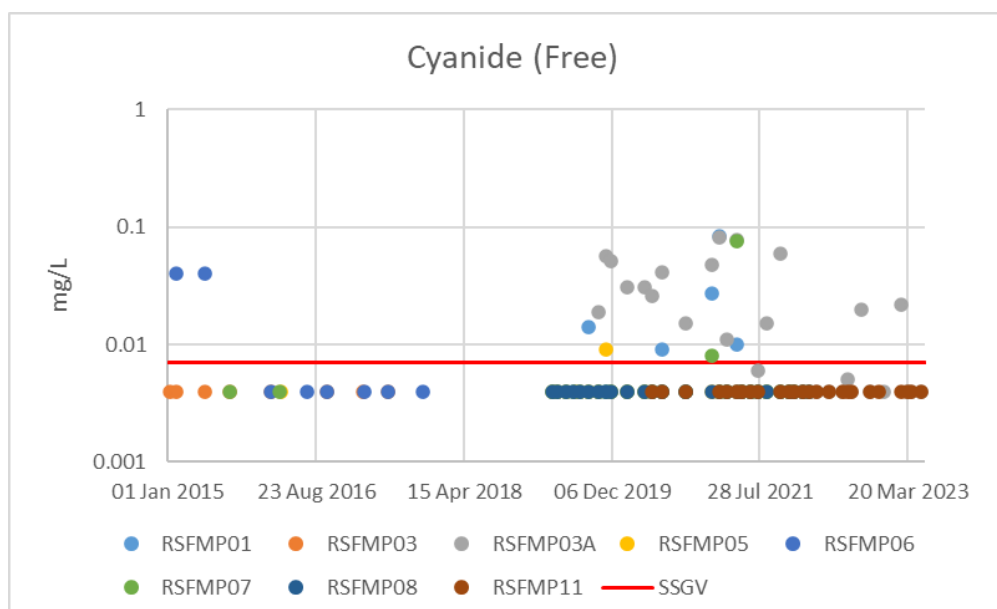
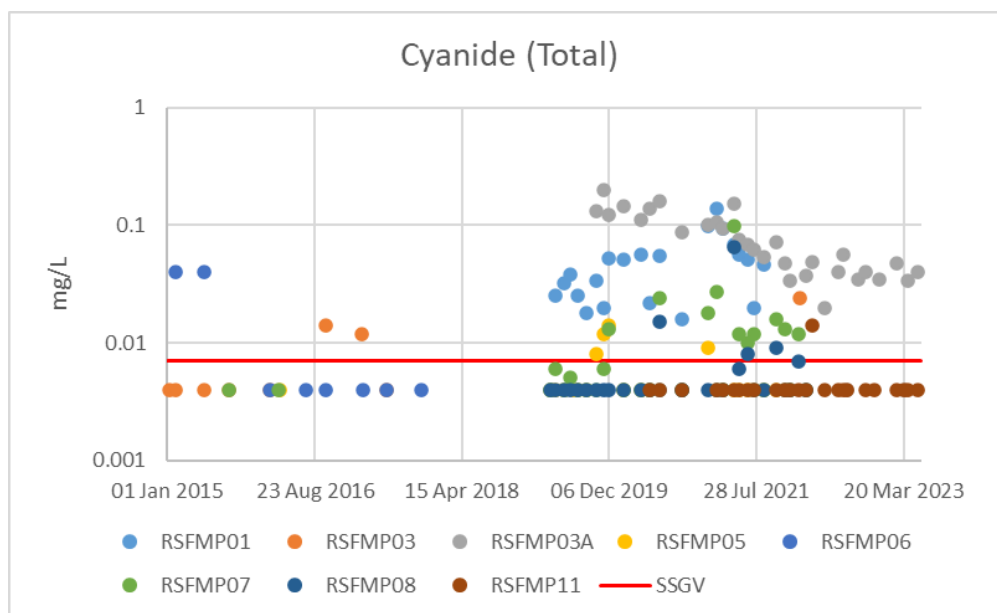
Copper (Filtered)

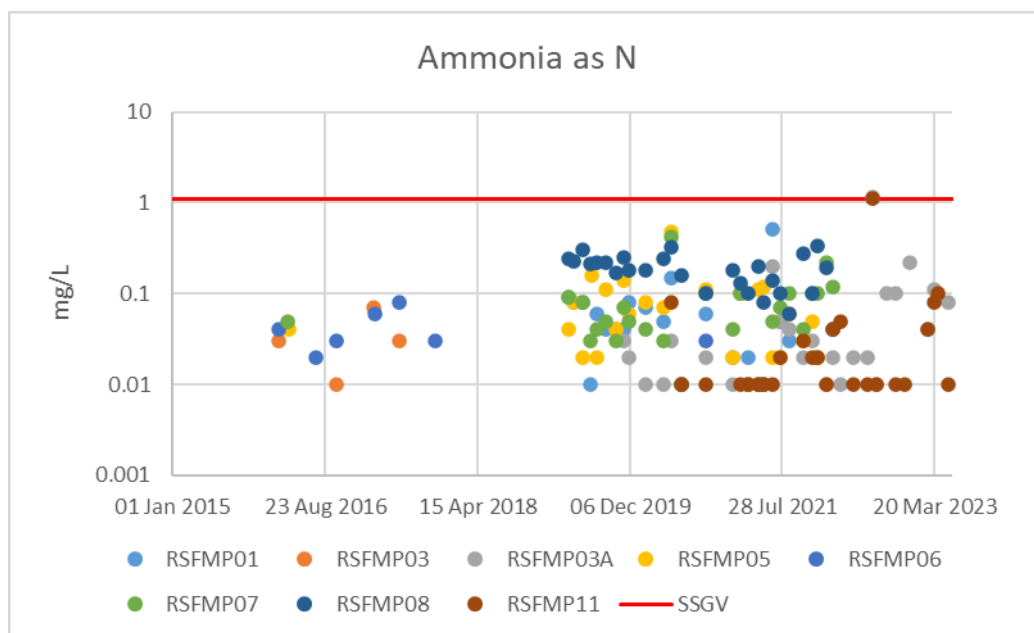


Lead (Filtered)

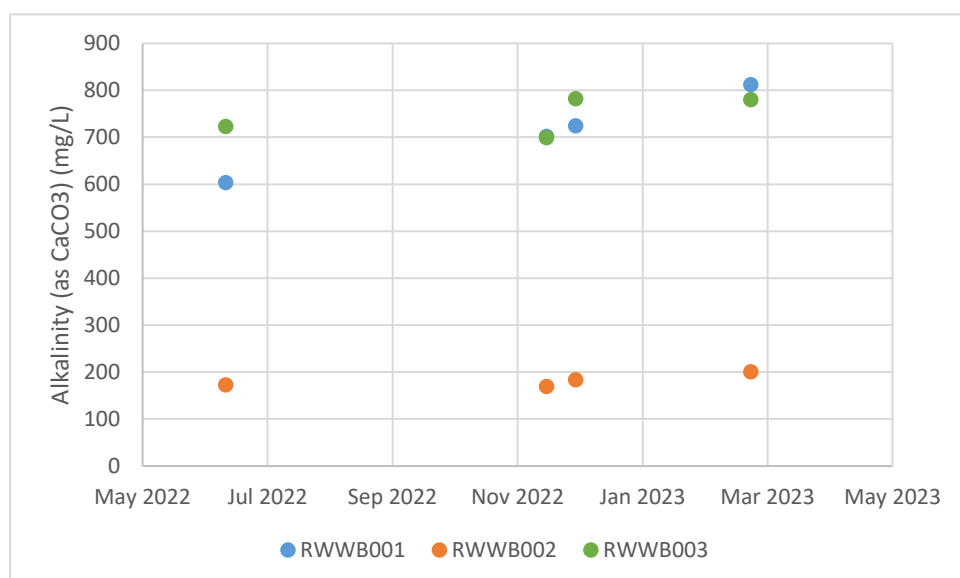


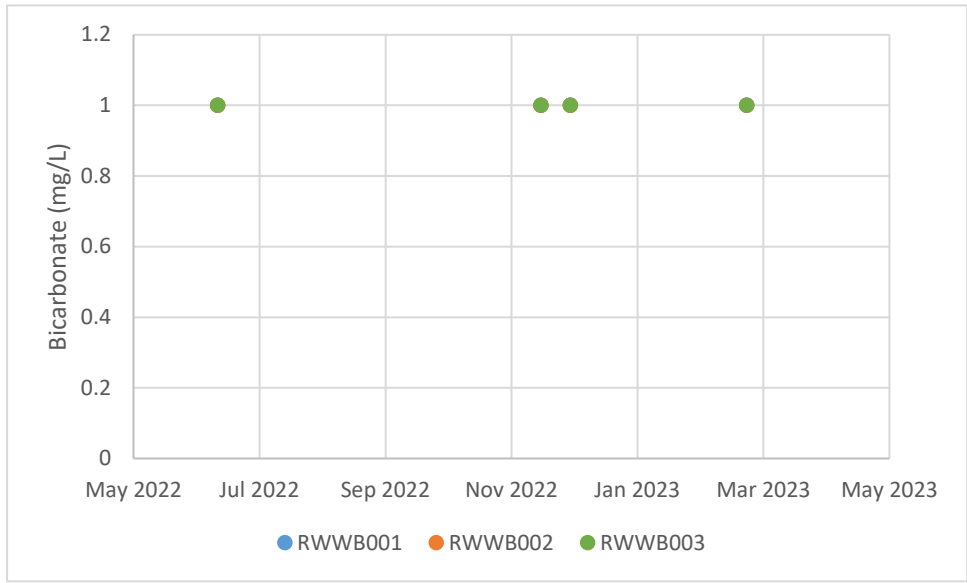
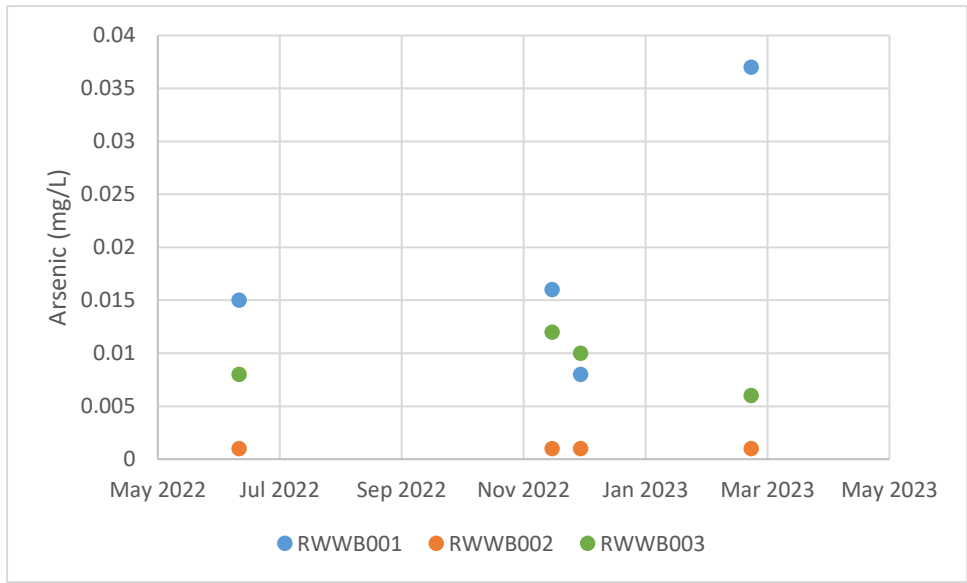
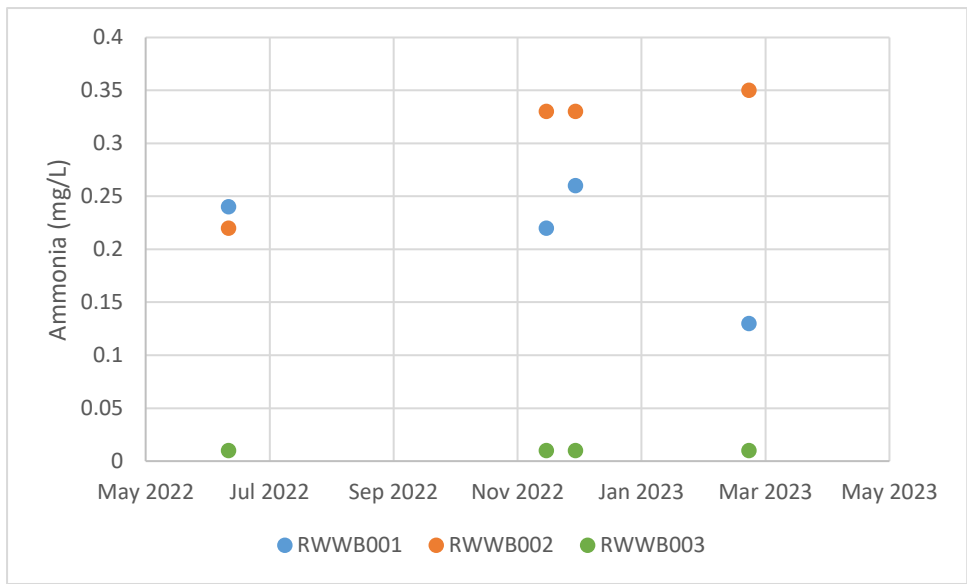


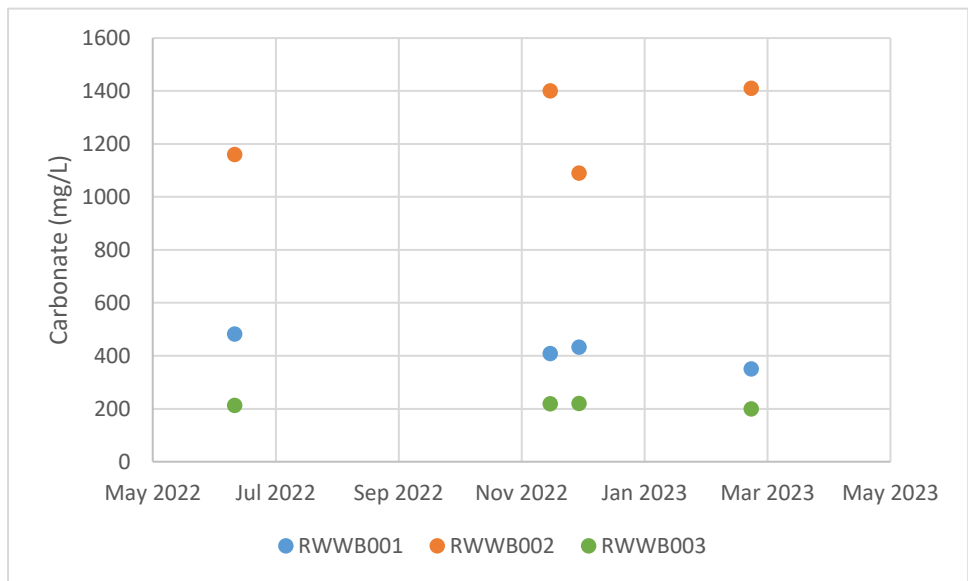
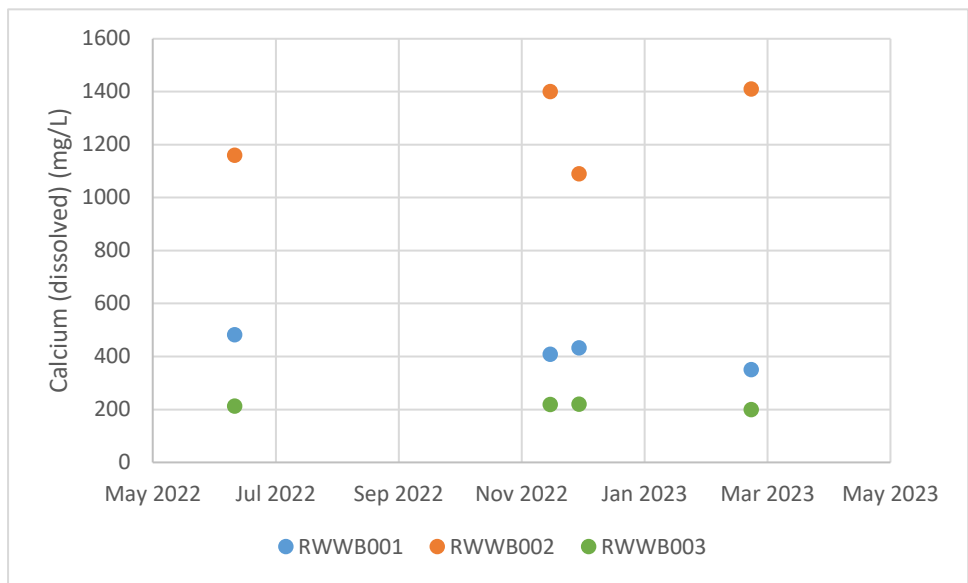
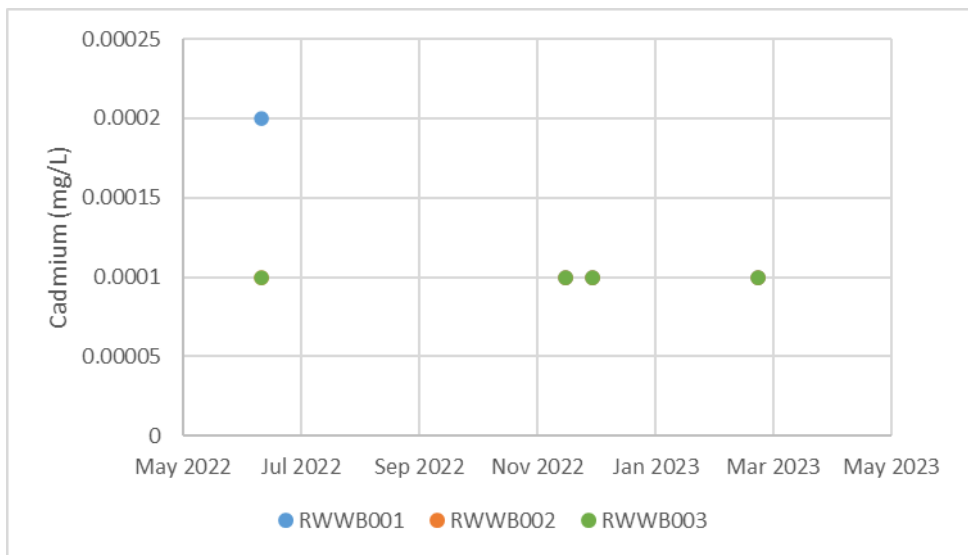


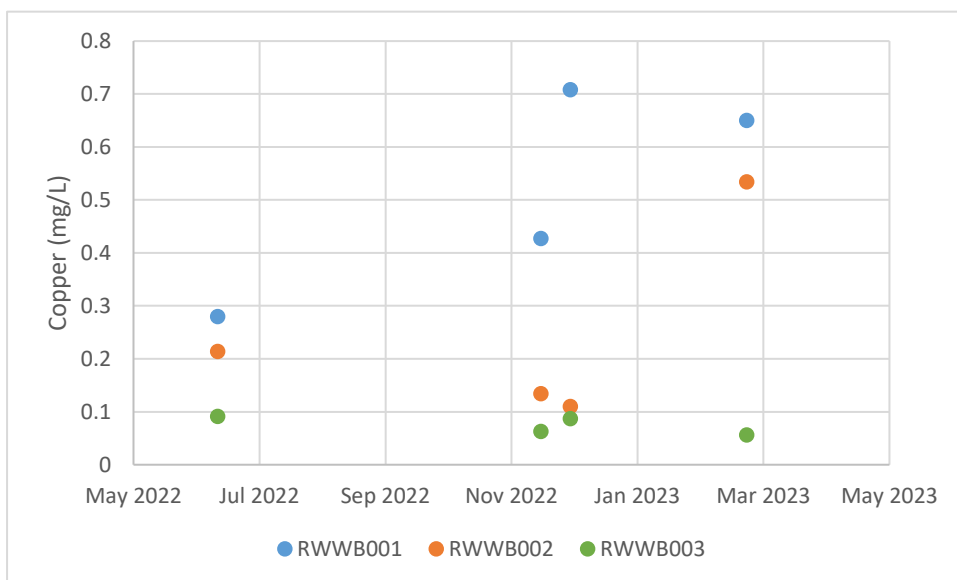
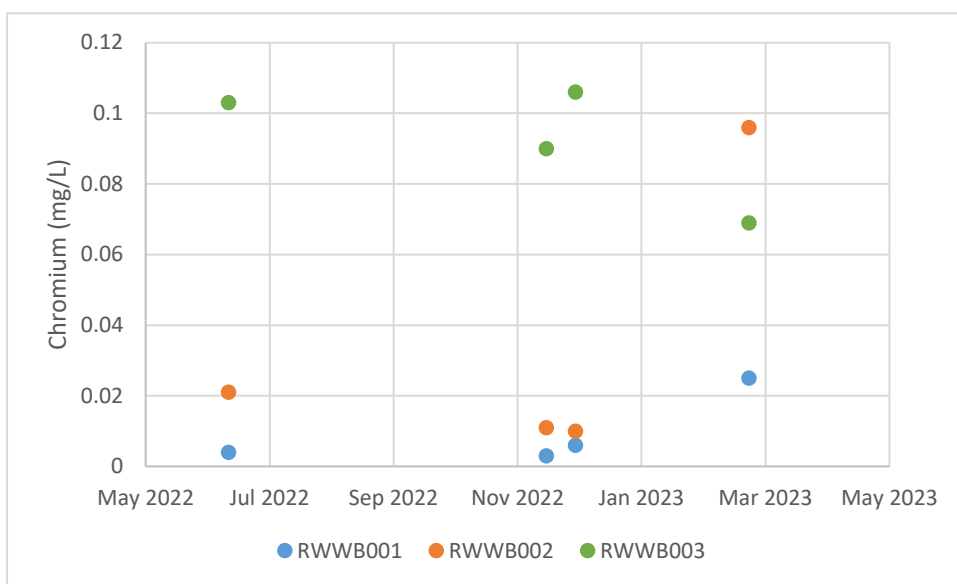
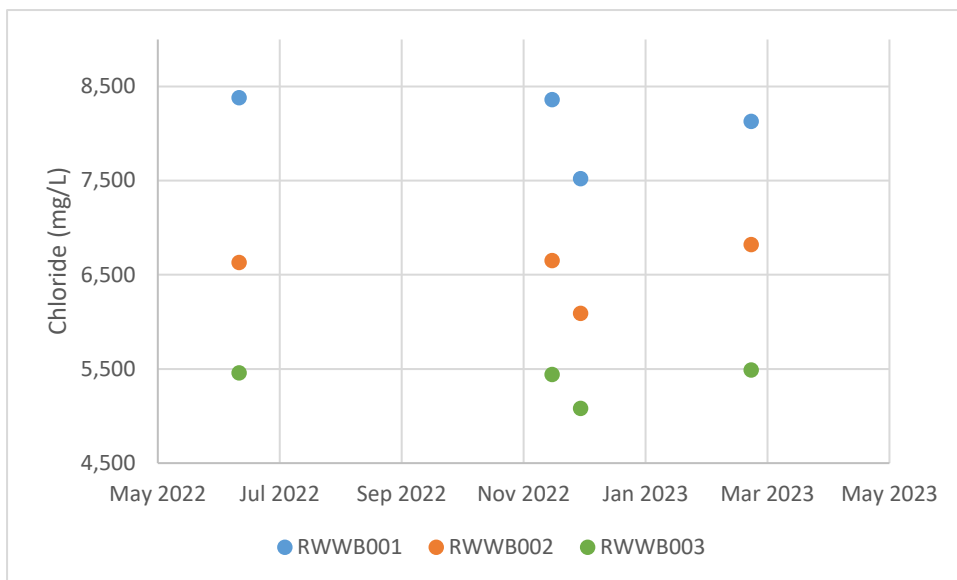


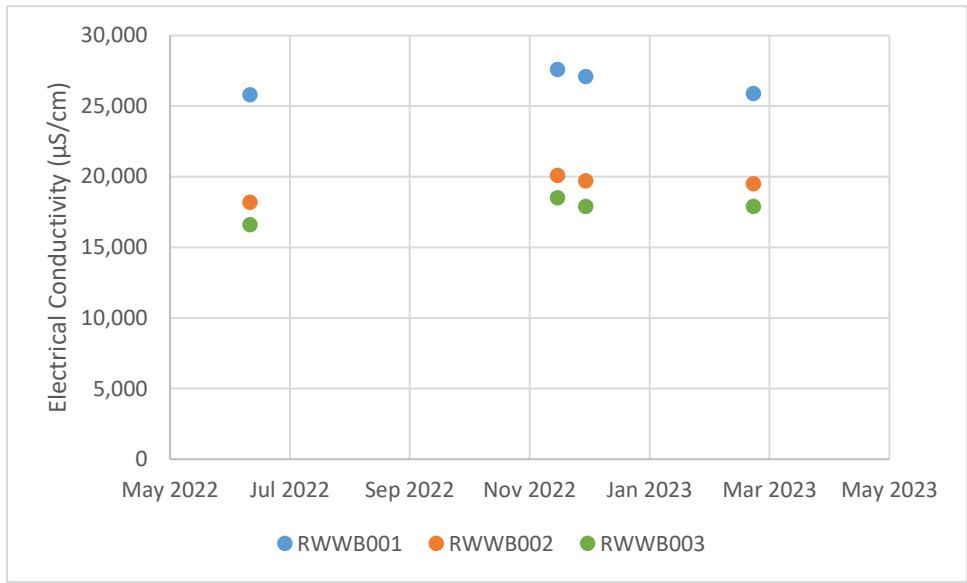
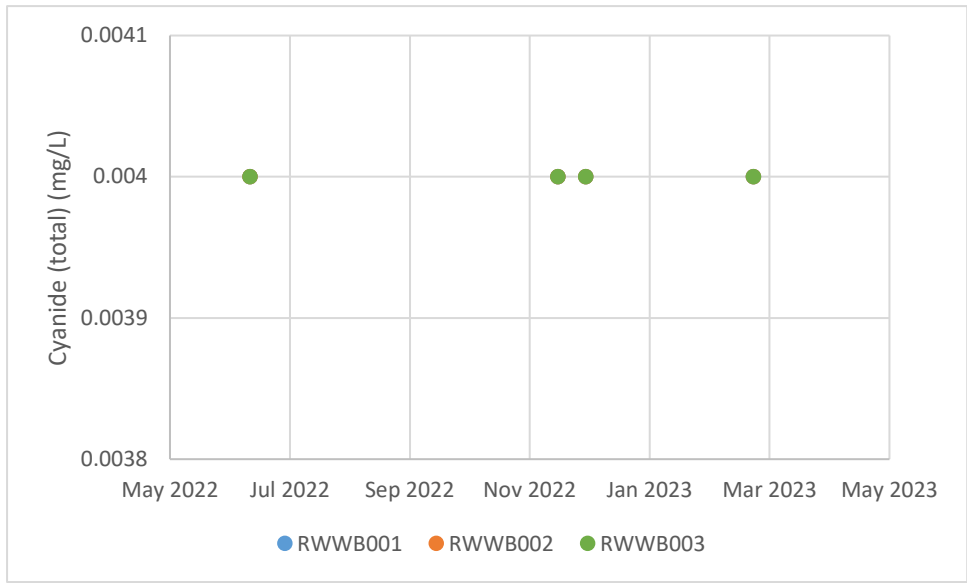
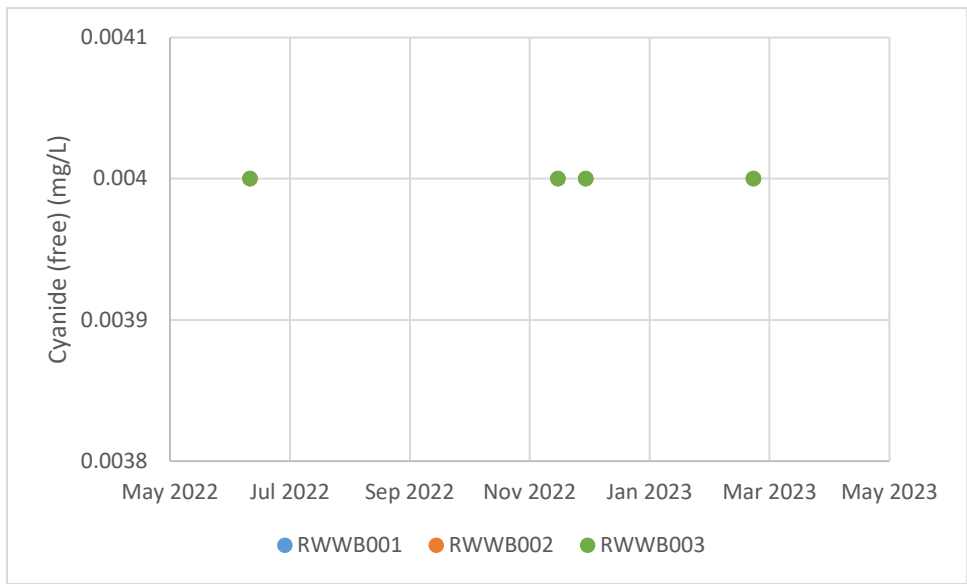
SAR monitoring bores

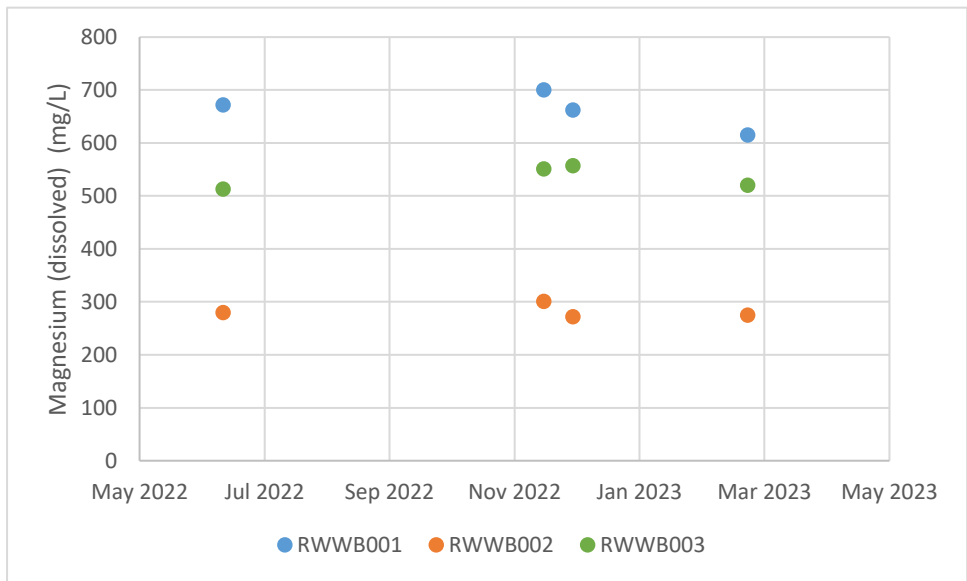
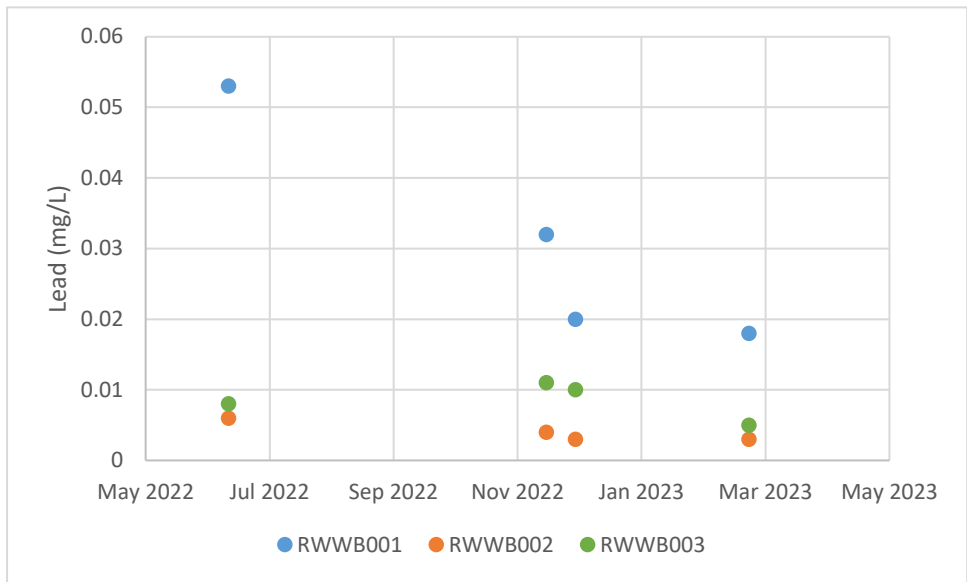
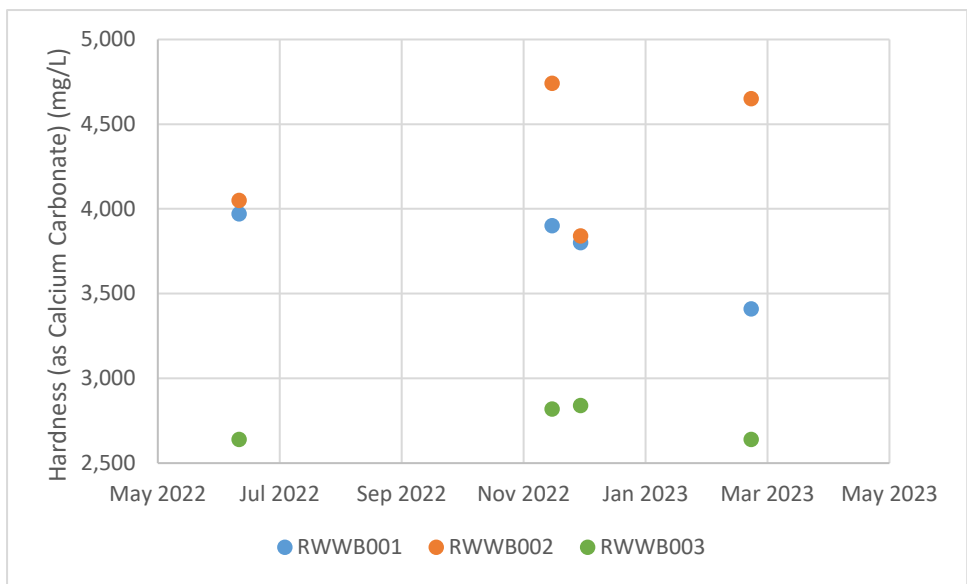


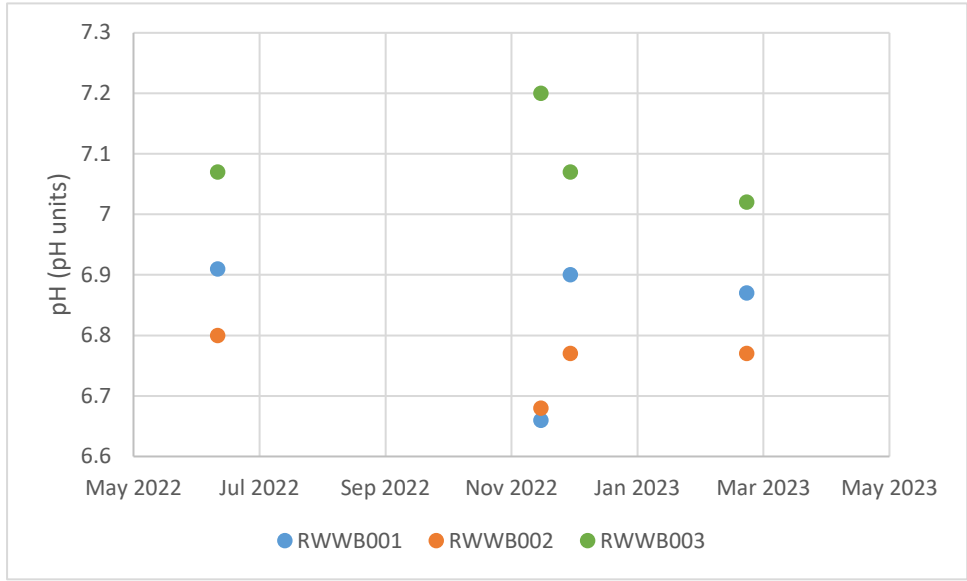
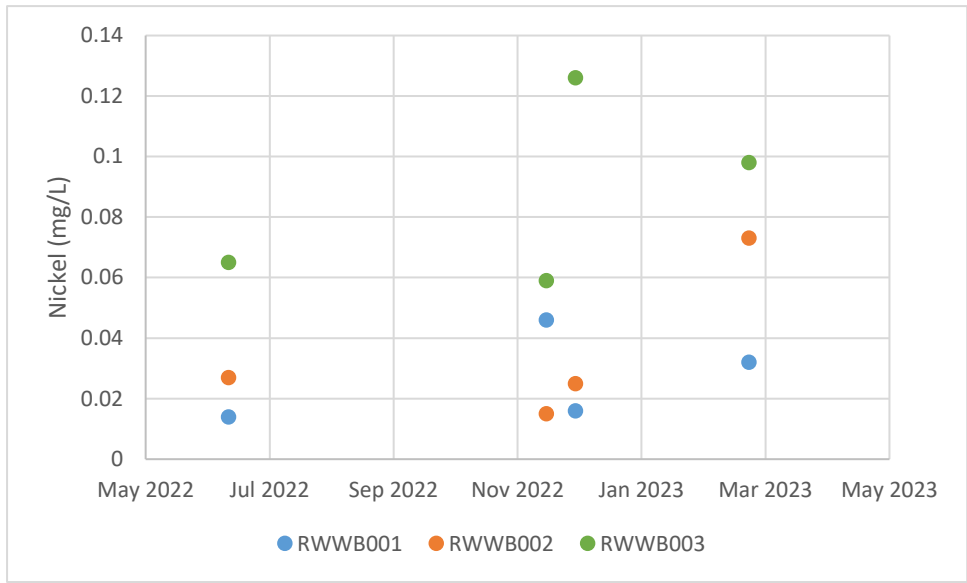
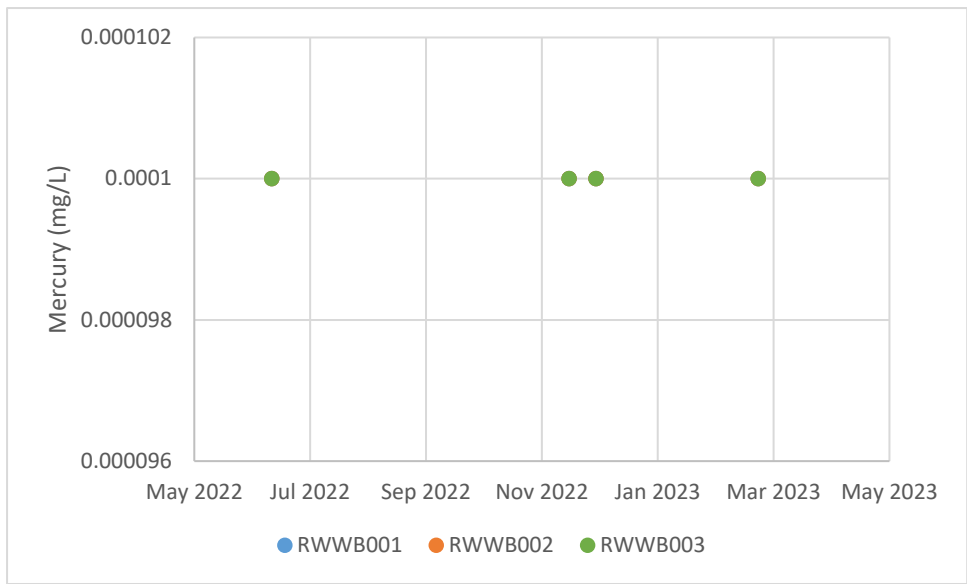


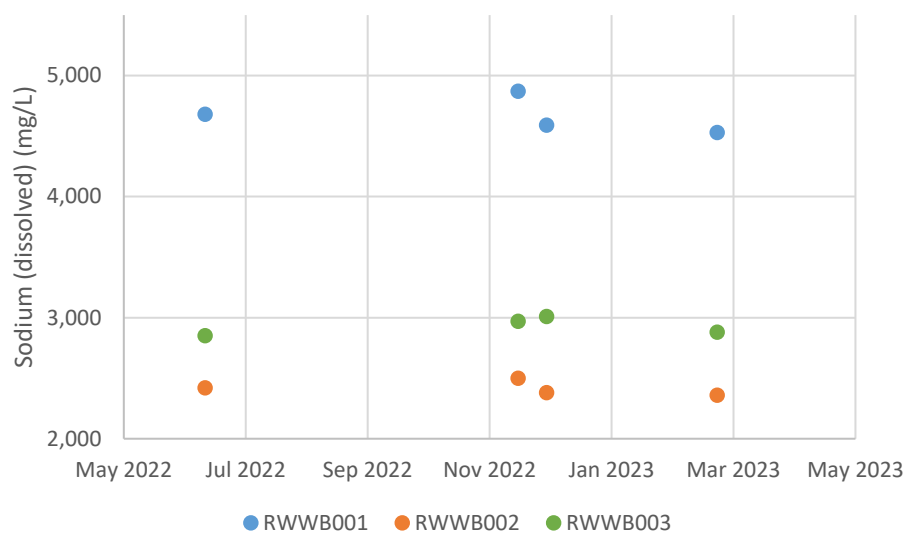
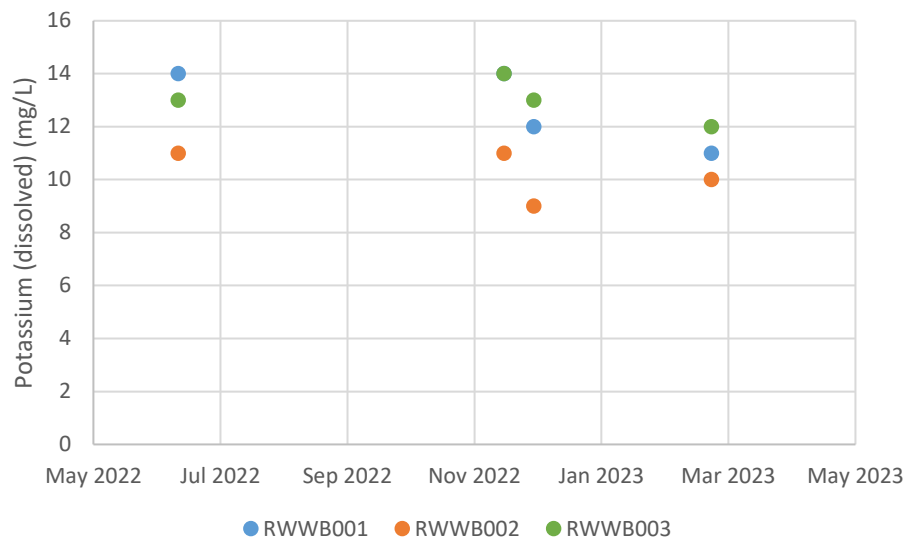
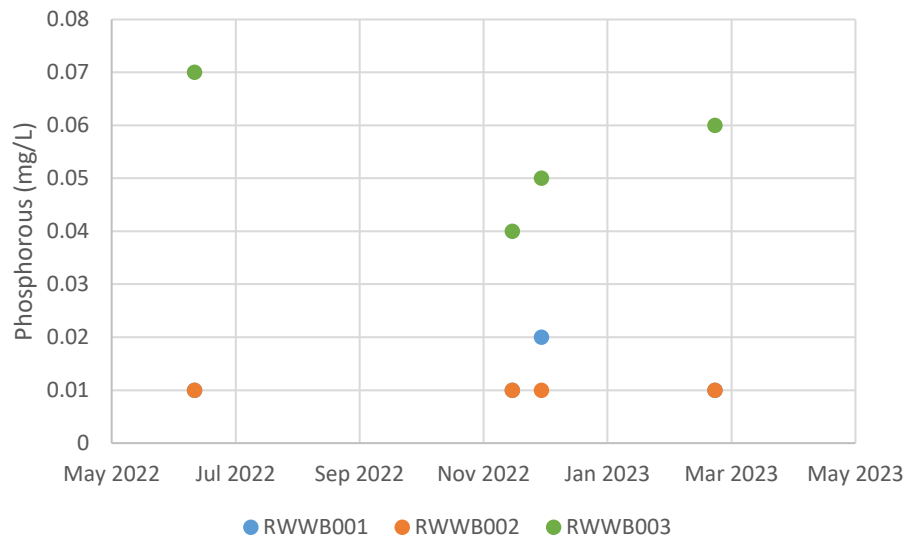


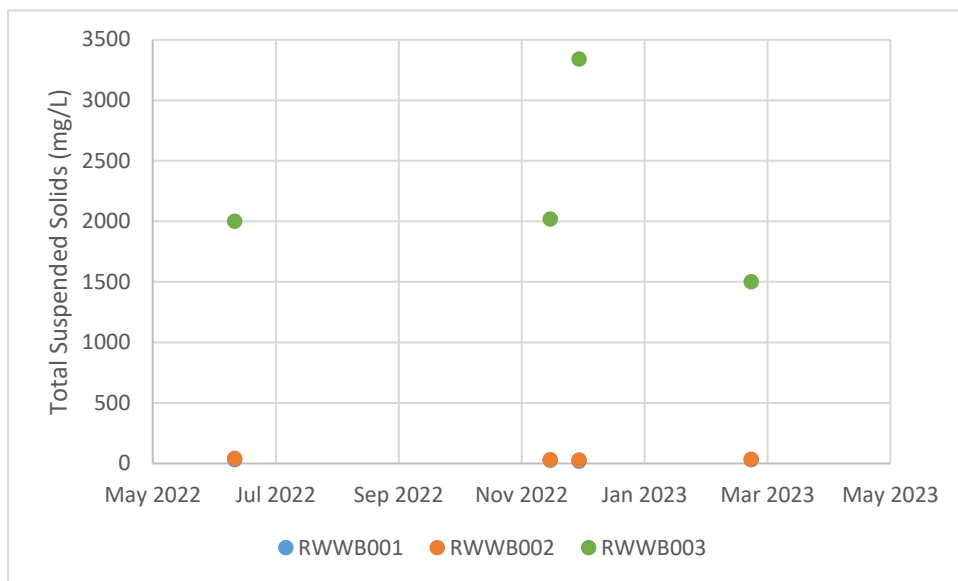
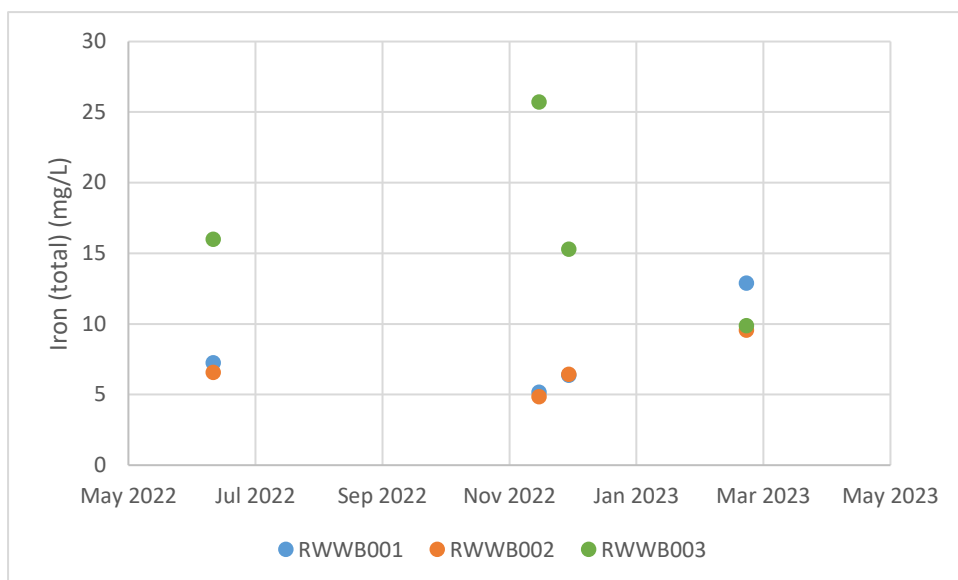
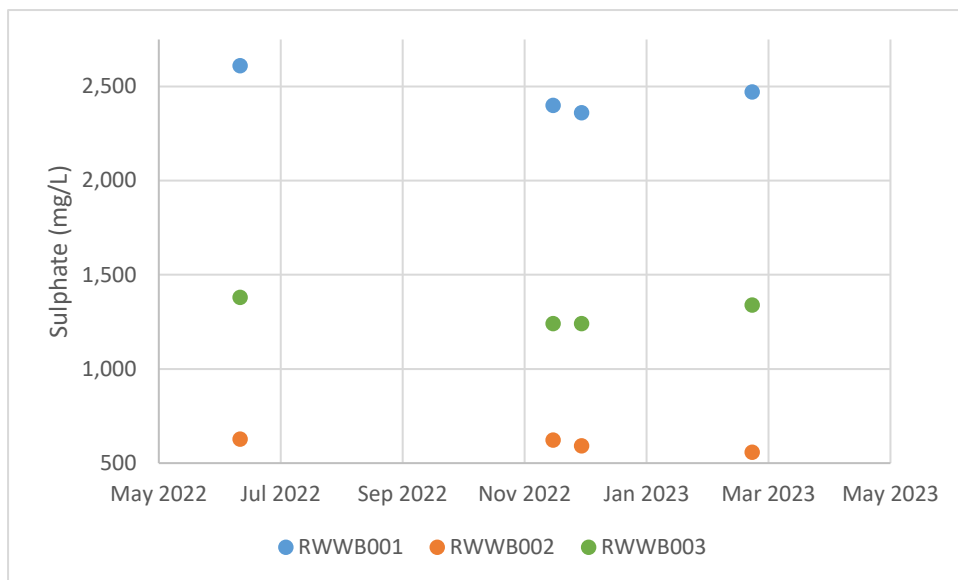


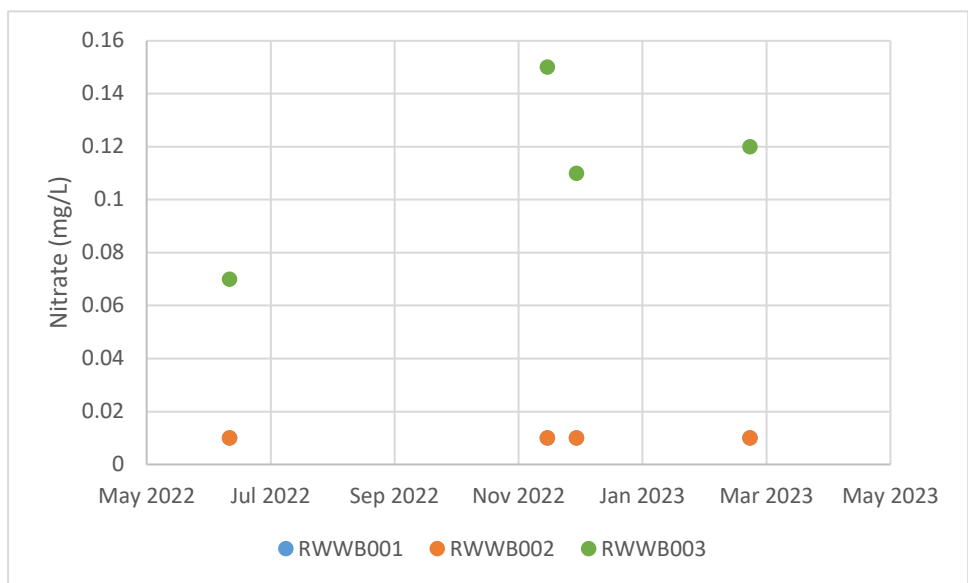
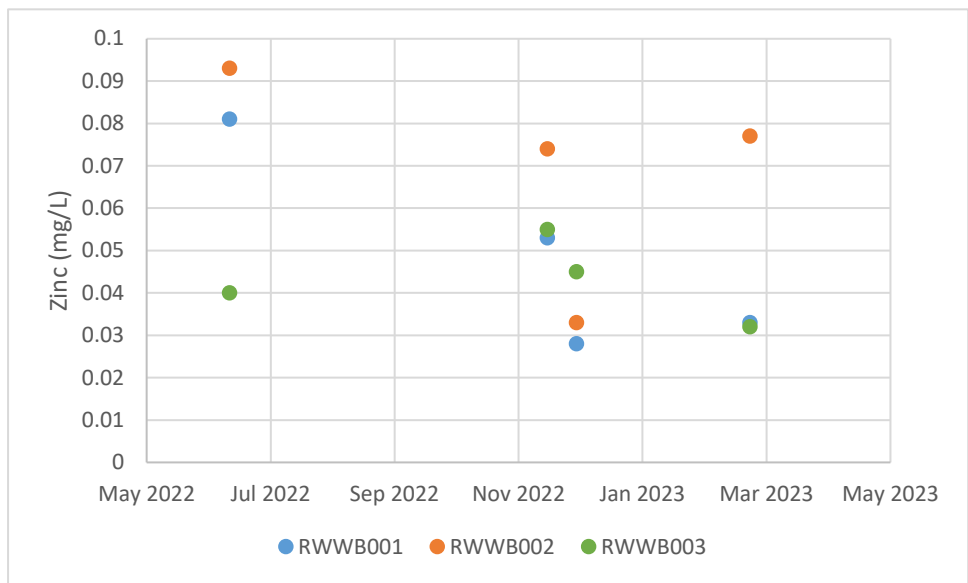
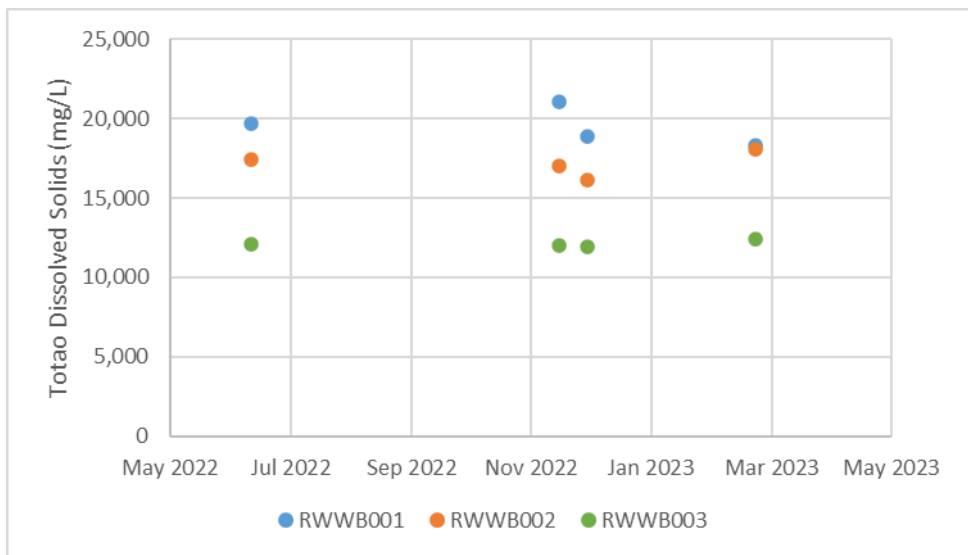














Appendix F

Trigger Action Response Plans

Surface water quality – Gundong Creek

	Trigger	Action	Response
Normal	Surface water quality in Gundong Creek is below or within trigger values (Table 7.3)	-	Continue to monitor in accordance with a frequency specified in Table 5.2.
	Watercourse is considered to be unaffected by operations by a suitably qualified professional compared to the baseline condition, or within expected range		Continue to conduct routine inspections and monitor watercourse stability.
Surface water quality			
Stage 1	Surface quality parameters exceed triggers (Table 7.3)	1. Alert site manager. 2. Immediately notify the Planning Secretary in writing via the Major Projects Website (in accordance with condition D8 and Appendix 8 of SSD 9176045) if it is identified that the change is due to any spill, seepage or leachate.	Investigate if change in surface water quality is due to any spill, seepage or leachate. Provide a detailed incident report to Planning Secretary via the Major Projects website within 30 days of the incident occurring in accordance with Appendix 8 of SSD 9176045. If the incident would result in a non-compliance, notify the Planning Secretary via the Major Projects website within seven days after determination of the non-compliance.
	Upward trend in any of the water quality parameters, outside the typical range of results, for three consecutive months.	1. Alert site manager. 2. Immediately notify the Planning Secretary in writing via the Major Projects Website (in accordance with condition D8 and Appendix 8 of SSD 9176045) if it is identified that the change is due to any spill, seepage or leachate.	Investigate if change in surface water quality is due to any spill, seepage or leachate. Provide a detailed incident report to Planning Secretary via the Major Projects website within 30 days of the incident occurring in accordance with Appendix 8 of SSD 9176045. If the incident would result in a non compliance, notify the Planning Secretary via the Major Projects website within seven days after determination of the non-compliance.
Stage 2	Investigation results show that site operations are resulting in adverse surface water impacts	1. Alert site manager. 2. Immediately notify the Planning Secretary in writing via the Major Projects Website (in accordance with condition D8 and Appendix 8 of SSD 9176045) if it is identified that the change is due to any spill, seepage or leachate.	Design and construct appropriate engineering controls to mitigate impacts. Provide a detailed incident report to Planning Secretary via the Major Projects website within 30 days of the incident occurring in accordance with Appendix 8 of SSD 9176045. If the incident would result in a non-compliance, notify the Planning Secretary via the Major Projects website within seven days after determination of the non-compliance.

	Trigger	Action	Response
Complaints			
Stage 1	Complaint from a surrounding landholder	1. Alert site manager. 2. Immediately notify the Planning Secretary in writing via the Major Projects Website (in accordance with condition D8 and Appendix 8 of SSD 9176045) 3. Investigate if change in surface water quality is due to mining related activities.	Document results and outcomes of investigation. Provide a detailed incident report to Planning Secretary via the Major Projects website within 30 days of the incident occurring in accordance with Appendix 8 of SSD 9176045.
Watercourse stability			
Stage 1	Minor erosion is identified within channels compared to baseline condition	1. Alert Environmental Manager	Investigate if erosion has been influenced or increased due to site activities (site discharges or from changing water flows).
Stage 2	Significant erosion is present within channels compared to baseline condition	1. Alert site manager. 2. Immediately notify the Planning Secretary in writing via the Major Projects Website (in accordance with condition D8 and Appendix 8 of SSD 9176045) if it is identified that the change is due to any spill, seepage or leachate.	Design and construct appropriate engineering controls for stream rehabilitation in accordance with the rehabilitation Manual for Australian Streams (Rutherford et al. 2000). Provide a detailed incident report to Planning Secretary via the Major Projects website within 30 days of the incident occurring in accordance with Appendix 8 of SSD 9176045. If the incident would result in a non compliance, notify the Planning Secretary via the Major Projects website within seven days after determination of the non-compliance.

Flooding

	Trigger	Action	Response
Normal	-	Maintain water storage level within open cut pit sumps.	-
Stage 1	7 day rainfall forecast includes >50 % chance of at least 50 mm in 24 hours	Inspect levees and diversions, and repair as necessary. Dewater open cut pit sumps.	-
Stage 2	Minor flood warning issued	Alert person in charge (PIC). Monitor BOM radar and warnings. Dewater open cut pit sumps.	-
Stage 3	Flows observed in the clean water diversions	Alert PIC. Monitor BOM radar and warnings. Minimise traffic on haul road to WRE 3. Monitor flows in Central Clean Water Drain (CCD).	Inspect clean water diversions and levees for damage, repair as necessary.
Stage 4	Major flood warning issued	Alert PIC. Monitor BOM radar and warnings. All mobile plant and personnel to evacuate underground. Relocate personnel and mobile plant to higher bench. Remove all dump trucks from open cut pits. Prepare mobile plant for evacuation.	-
Stage 5	Flows in CCD at or above haul road culvert obvert	Alert PIC. All mobile plant and personnel to evacuate open cut pits. Monitor BOM radar and warnings.	Inspect clean water diversions and levees for damage, repair as necessary.

Sediment basins

	Trigger	Action	Response
Level			
Normal	-	Dewater sediment basins to Wyoming Three, as required.	-
Stage 1	7 day rainfall forecast includes >50 % chance of at least 25 mm in 24 hours	Inspect sediment basins. Dewater sediment basins to provide minimum freeboard. Flocculate storage (TSS < 50 mg/L). Prepare for discharges from LDPs.	-
Stage 2	Minor flood warning issued	Alert person in charge (PIC). Monitor BOM radar and warnings.	-
Stage 3	Storage volume is greater than 30 % of capacity	Dewater sediment basins to Wyoming Three.	-
Stage 4	Storage volume is greater than 90% of capacity	Alert site manager. Increase pump rate or add additional pumps. Flocculate storage (TSS < 50 mg/L). Prepare for discharges from LDPs.	
Stage 5	Overflows to receiving environment occur from one or more Sediment Basins	Alert site manager. Notify the Planning Secretary in writing via the Major Projects Website immediately (in accordance with condition D8 and Appendix 8 of SSD 9176045)	Notify EPA. Undertake water quality sampling of both the storage and downstream environment. Provide a detailed incident report to Planning Secretary via the Major Projects website within 30 days of the incident occurring in accordance with Appendix 8 of SSD 9176045. If the incident would result in a non compliance, notify the Planning Secretary via the Major Projects website within seven days after determination of the non-compliance.

RSF operation

	Trigger	Action	Response
Level			
Normal	Volume of water on RSF surface is below normal operating level	Captured water is decanted back to Process Water Dam.	-
Stage 1	Volume of water on RSF surface is above normal operating level	Increase pump rate of transfers to Process Water Dam or transfer water to WCD - South.	Increase inspection frequency. Undertake a round of groundwater monitoring.
Stage 2	Volume of water on RSF surface is above high operating level	Alert Mine and Operations manager. Dewatering to any suitable open cut pit or available storage.	Undertake round of water quality assessment. Increase inspection frequency. Undertake a round of groundwater monitoring.
Quality			
Normal	Water quality sampling for cyanide on RSF is below EPL limit.	Captured water is decanted back to Process Water Dam.	-
Stage 1	One quality sample records cyanide (WAD) above 90th percentile EPL limit	Investigate potential sources. Record results and resample.	-
Stage 3	One quality sample records cyanide (WAD) above 100th percentile EPL limit.	Alert Mine and Operations manager. Notify EPA.	Investigate potential sources. Record results and resample.
	Multiple samples record cyanide (WAD) above 90th percentile EPL limit	Alert Mine and Operations manager. Notify EPA.	Investigate potential sources. Record results and resample.

Water security

	Trigger	Action	Response
Dust suppression			
Normal	WCD - North volume > 25 % of capacity	-	-
Stage 1	WCD - North volume < 25 % of capacity	Supply raw water to WCD - North from borefield. Review annual allocations and record transfer.	-
Stage 2	Allocation from bore is exhausted	Alert mine and operations manager. Arrange for external transfers to be trucked in.	-
Process water			
Normal	Raw Water Dam capacity is greater than 9774 m ³	-	-
Stage 1	Raw Water Dam capacity is less than 9774 m ³	Supply raw water to Raw Water Dam and Process Water Dam. Review annual allocations and record transfer.	-
	Process Water Dam capacity is less than 8925 m ³	Supply raw water to Raw Water Dam and Process Water Dam. Review annual allocations and record transfer.	-
Stage 2	Allocation from bore is exceeded	Alert mine and operations manager. Arrange for external transfers to be trucked in.	-

Groundwater levels

	Trigger	Action	Response
Normal		-	Continue to monitor in accordance with a frequency specified in Table 5.2.
Groundwater monitoring bores			
Stage 1	Groundwater elevation falls below Stage 1 Trigger (Table 7.4).	Alert site manager. Investigate if change in groundwater level is due to mine related activity. Notify the Planning Secretary in writing via the Major Projects Website within seven days of the non-compliance being identified (in accordance with condition D9 and Appendix 8 of SSD 9176045).	Investigate if change in groundwater level is due to mining related activity. Report outcomes of any investigation in the Annual Review.
Stage 2	Groundwater elevation falls below Stage 2 Trigger (Table 7.4).	Alert site manager. Investigate if change in groundwater level is due to mine related activity. Notify the Planning Secretary in writing via the Major Projects Website within seven days of the non-compliance being identified (in accordance with condition D9 and Appendix 8 of SSD 9176045).	Investigate if change in groundwater level is due to mining related activity. Report outcomes of any investigation in the Annual Review.
Shallow monitoring bores (except GDCMP01)			
Stage 1	Groundwater levels rise over three consecutive months.	Alert site manager. Investigate if change in groundwater level is due to mine related activity.	Document results and outcomes of investigation within Groundwater Data Review required by Condition U1.1 of EPL 20169.
Stage 2	Groundwater levels rise over six consecutive months	Alert site manager. Investigate if change in groundwater level is due to mine related activity.	Investigate and implement mitigation measures. Document results and outcomes of investigation within Groundwater Data Review required by Condition U1.1 of EPL 20169.
Complaints			
Stage 1	Complaint from a surrounding landholder	Alert site manager. Investigate if change in groundwater level is due to mining related activities. Notify the Planning Secretary in writing via the Major Projects Website immediately (in accordance with condition D8 and Appendix 8 of SSD 9176045) Provide compensatory water supply as needed. Provision of compensatory water supply should be provided in consultation with DPE Water and to the satisfaction of the Planning Secretary.	Document results and outcomes of investigation. Provide a detailed incident report to Planning Secretary via the Major Projects website within 30 days of the incident occurring in accordance with Appendix 8 of SSD 9176045. If the incident would result in a non compliance, notify the Planning Secretary via the Major Projects website within seven days after determination of the non-compliance.

Groundwater quality

	Trigger	Action	Response
Normal		-	Continue to monitor in accordance with a frequency specified in Table 5.2.
GDCMP01			
Stage 1	Groundwater quality parameters exceed triggers	Alert site manager.	Investigate if change in groundwater level is due to any spill, seepage or leachate.
	Upward trend in any of the water quality parameters listed for three consecutive months.	Alert site manager.	Investigate if change in groundwater level is due to any spill, seepage or leachate.
Stage 2	Groundwater quality parameters exceed triggers for three consecutive months	Alert site manager.	Investigate if change in groundwater level is due to any spill, seepage or leachate. Investigate and implement mitigation measures.
	Upward trend in any of the water quality parameters listed in for six consecutive months.	Alert site manager.	Investigate if change in groundwater level is due to any spill, seepage or leachate. Investigate and implement mitigation measures.
Shallow monitoring bore (except GDCMP01)			
Stage 1	Groundwater quality parameters exceed triggers	Document in Groundwater Data Review	Investigate and implement mitigation measures. Document results and outcomes of investigation within Groundwater Data Review required by Condition U1.1 of EPL 20169.
Stage 2	Groundwater quality parameters exceed trigger values (Table 7.5) and is outside the historical range of results	Alert site manager Investigate if change in groundwater level is due to mine related activity.	Investigate and implement mitigation measures. Document results and outcomes of investigation within Groundwater Data Review required by Condition U1.1 of EPL 20169.
Complaints			
Stage 1	Complaint from a surrounding landholder	Alert site manager. Investigate if change in groundwater level is due to mining related activities. Notify the Planning Secretary in writing via the Major Projects Website immediately (in accordance with condition D8 and Appendix 8 of SSD 9176045) Provide compensatory water supply as needed. Provision of compensatory water supply should be provided in consultation with DPE Water and to the satisfaction of the Planning Secretary.	Document results and outcomes of investigation. Provide a detailed incident report to Planning Secretary via the Major Projects website within 30 days of the incident occurring in accordance with Appendix 8 of SSD 9176045. If the incident would result in a non compliance, notify the Planning Secretary via the Major Projects website within seven days after determination of the non-compliance.



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