EPL298-01 Monitoring Report

Katherine Waste Management Facility

Reporting period 1 August 2023 – 31 July 2024

Prepared for: Katherine Town Council

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KATHERINE TOWN COUNCIL

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Appendices

Appendix A Field Sheets
Appendix B Historical data

Appendix C Historical Data Trends
Appendix D Laboratory Reports
Appendix E Monthly operational checklist (August 2023 to July 2024)

ACRONYMS

Al	Aluminium
BOD	Biological Oxygen Demand
BOM	Bureau Of Meteorology
BTEXN	Benzene, Toluene, Ethylbenzene, Xylene, Naphthalene
Ca	Calcium
CaCO3	Alkalinity
Cd	Cadmium
Cl	Chloride
COD	Chemical Oxygen Demand
Cr III	Trivalent chromium
Cr VI	Hexavalent chromium
Cu	Copper
DO	Dissolved Oxygen
EC	Electrical Conductivity
EMP	Environmental Management Plan
EPL	Environment Protection Licence
Fe	Iron
GC-MS	Gas Chromatography-Mass Spectrometry
K	Potassium
KTC	Katherine Town Council
KWMF	Katherine Waste Management Facility
LOR	Limit of Reporting
mAHD	Metres with respect to the Australian Height Datum
mBGL	Metres Below Ground Level
Mg	Magnesium
Mn	Manganese
MTBE	Methyl Tert-Butyl Ether
NO_3	Nitrate (as N)
Na	Sodium
NATA	National Association of Testing Authorities
NEMP	National Environmental Management Plan (PFAS)
NH_4	Ammonium
Ni	Nickel
NT	Northern Territory
NT EPA	Northern Territory Environment Protection Authority
PAH	Polycyclic Aromatic Hydrocarbons
Pb	Lead
PCB	Polychlorinated Bi-Phenyls
PFAS	Per- And Polyfluoroalkyl Substances
PFOS	Perfluorooctanesulfonic acid

QA/QC	Quality Assurance and Quality Control
RAAF	Royal Australian Air Force
REDOX	Oxidation Reduction
RPD	Relative Percentage DIfference
Se	Selenium
SO_4	Sulfate
SWL	Standing Water Level
TDS	Total Dissolved Solids
TN	Total Nitrogen
TOC	Total Organic Carbon / Top of Casing
TP	Total Phosphorus
TRH/TPH	Total Recoverable Hydrocarbons / Total Petroleum Hydrocarbons
VFA	Volatile Acids as Acetic Acid
VOC	Volatile Organic Compounds
WMPC Act	*Waste Management and Pollution Control Act*
Zn	Zinc

EXECUTIVE SUMMARY

The Katherine Waste Management Facility (KWMF) is a municipal waste resource recovery and disposal site operated by Katherine Town Council (KTC). Located approximately 7 km south of Katherine town centre on Novis Quarry Road, the facility serves both domestic and commercial customers in the region.

The storage, treatment and disposal of some listed waste is covered by the Environment Protection Licence 298-01 (EPL298-01). Under the licence, KTC is required to conduct surface and groundwater monitoring in accordance with Appendix 3 and Appendix 4 of the licence. An annual Monitoring Report is also required under the licence.

This Monitoring Report was prepared in accordance with conditions 61 and 62 of the licence and covers the period starting 1 August 2023 and ending 31 July 2024.

In the reporting period, sampling of the surface water (SWB and SWC), leachate (LD) and groundwater sites (GWA, GWE, GWB01, GWB02, GWB03 and GWB04) was mostly conducted as per the licence frequency requirements. However, no sampling occurred from July to October 2023 due to limited staff availability.

The parameters to be measured during each monitoring round were mostly compliant, except for the absence of field data from July 2023 until March 2024. This was due to field sheets being mistakenly sent to the laboratory and as such, resulting in no records of the data collected. In addition, parameters to be measured annually at SWB were missed, standing water levels were not recorded at GW3 in July 2024, and some quarterly parameters were not monitored at GWA and GWB04.

Multiple Quality Assessment and Quality Control (QA/QC) outliers were identified in the data available for the reporting period. This led to the exclusion of some laboratory data. Additionally, there are uncertainties regarding the use of an appropriately calibrated pH meter. Therefore, all pH collected in the reporting period was deemed as unreliable.

During the 2023-24 reporting period, concentrations that did not comply with respective trigger values were reported in the downstream surface water site SWC and non-compliances were recorded in the following parameters:

- Total Copper and Iron in November 2023 and February 2024. Although, it is worth noting that in February 2024, these two metals had equal concentrations at SWB (upstream/background site) and SWC, indicating that the exceedances recorded that month was not associated with the operations of KWMF. SWB was not sampled in November 2023.
- Zinc in February 2024.

Ad-hoc sampling was conducted in June 2024, when samples from two pits on site were collected for field and laboratory analysis. The results of these samples indicate that their levels of Electrical Conductivity (EC), Dissolved Oxygen (DO), Total Nitrogen (TN) and some total metals were above the EPL298-01 trigger values for SWC. In addition, at one of the sites, Total Recoverable Hydrocarbons (TRH) were detected, as well as Per- and Polyfluoroalkyl Substances (PFAS), which were above the concentrations recorded for leachate in November 2024. Such results evidence that leachate is likely draining into these pits, impacting their water quality.

As it has been seen in previous monitoring periods, the impact of KWMF on groundwater quality is evident in the downgradient bores GWB01 and GWB02. Higher concentrations in some major ions (sodium and chloride), ammonium, metals (copper, aluminium, cadmium, lead, manganese, nickel and zinc), Total Organic Carbon (TOC), Total Dissolved Solids (TDS), Biological Oxygen Demand (BOD) and a wide mixture of PFAS types were detected at these bores. TRH were detected for the first time at GWA; however, further testing of the

sample showed that the TRH fractions in it were non-petrogenic in nature. Such may also be the case of the TRH that have been detected at GWA and GWB01.

As required by Condition 62.6 of EPL298-01, most of the measures specified in the *Environmental Management Plan- Katherine Waste Management Facility* have been implemented; however, breaches were reported in measures 'water quality monitoring as per schedule', 'ensure water quality monitoring is undertaken in accordance with the monitoring plan' and 'no impacts to surface water or groundwater within KWMF'.

The *Integrated Environmental Management Plan* prepared by Taft Engineering, addresses most of the recommendations specified in *Katherine Town Council Waste Management Facility Closure Plan Stage 2 Report – Landfill Gas Risk Assessment and Hydrogeological Assessment.* The implementation of most recommendations is on-going or have not been implemented yet; therefore, completion dates are not provided in this report.

Overall, improvements in the water quality monitoring are recommended in order to comply with the frequency and parameters to be monitored as per the EPL298-01. In addition, it is recommended that sampling is conducted in accordance with Australian Standards and guidelines to guarantee the representativeness, validity and reliability of the data obtained.

1 INTRODUCTION

The KWMF is a municipal waste resource recovery and disposal site operated by KTC. The facility is located approximately 7 km south of Katherine town centre within NT Portion 5043, on Novis Quarry Road (Figure 1-1). KWMF provides services to domestic and commercial customers in the Katherine area.

The current Environment Protection Licence (EPL) covering the KWMF (i.e. EPL298 - 01), was issued by the Northern Territory Environment Protection Authority (NT EPA) to KTC on 4 August 2022 (expired on 3 August 2024). EPL298-01 licences KTC to collect, transport, store, re-cycle, treat or dispose of materials at the KWMF, which are classified as 'listed wastes' under the Northern Territory *Waste Management and Pollution Control Act*.

1.1 Purpose and scope

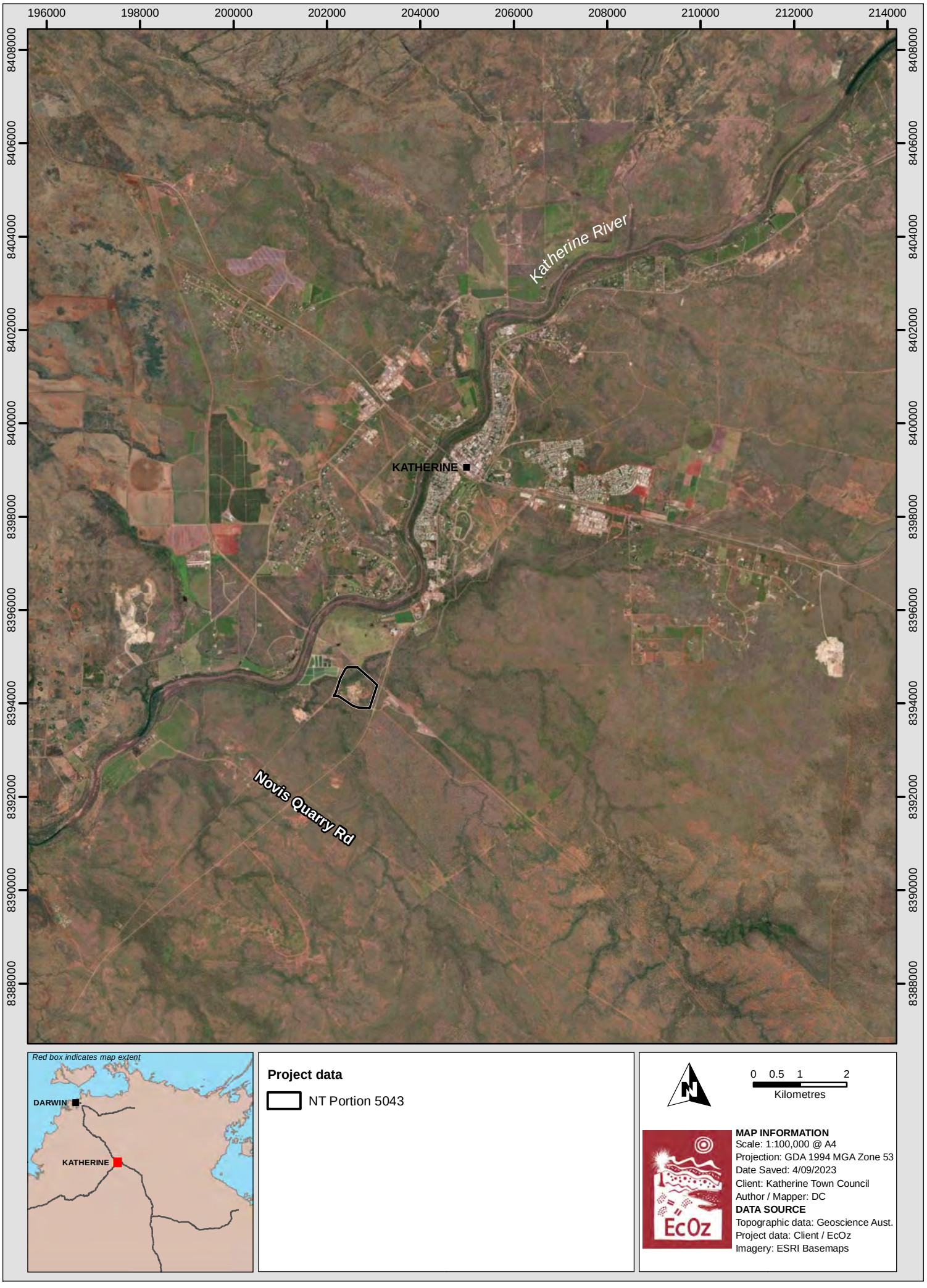
This Monitoring Report is required as per EPL298-01 conditions 61 and 62, as reproduced below:

61. The licensee must complete and provide to the NT EPA a Monitoring Report, as prescribed by this licence, within 10 business days after each anniversary date of this licence.

62. The licensee must ensure that each Monitoring Report is prepared in consultation with a qualified professional and:

> *62.1 is prepared in accordance with the requirements of the NT EPA 'Guideline for Reporting on Environmental Monitoring'*
>
> *62.2 includes a tabulation of all monitoring data required as a condition of this licence;*
>
> *62.3 includes long term trend analysis of monitoring data to demonstrate any environmental impact associated with the activity, including potential impacts on beneficial uses of groundwater, over a minimum period of three years (where the data is available);*
>
> *62.4 includes an assessment of environmental impact from the activity;*
>
> *62.5 includes a review of performance against the measures specified in Document Number 1 of Table 2* [in EPL298 - 01]*;*
>
> *62.6 incorporates a progress report, that includes implementation and completion dates, on all recommendations specified in Document Number 2 of Table 2* [in EPL298 - 01]*; and*
>
> *62.7 includes a copy of the qualified professional's endorsement.*

The Monitoring Report will cover the period starting 1 August 2023 and ending 31 July 2024. EcOz Environmental Consultants (EcOz) has prepared this report on behalf of KWMF.



Path: Z:\01 EcOz_Documents\04 EcOz Vantage GIS\EZ19181 - KTC EPL Update and EMP\01 Project Files\Figure 2-1 Map showing site layout and infrastructure.mxd

Figure 1-1. KWMF location

2 LANDFILL OPERATIONS OVERVIEW

KTC manage operations at KWMF, and contractors manage kerbside collection.

The KWMF accepts and disposes of general waste from domestic and commercial users and is currently licenced to accept asbestos and tyres (listed wastes) for disposal.

The KWMF also accepts the following materials for landfill or subsequent resource recovery and disposal by contractors at external facilities:

- Chemical drums (only empty and triple washed containers accepted for DrumMuster)
- Tyres (whole or shredded)
- Metal
- Green waste
- Batteries
- Empty gas bottles
- Animal carcasses
- E-waste

The KWMF layout is shown in Figure 2-1. The area method of landfilling (as depicted in Figure 2-2) is used at KWMF whereby, waste is disposed of at an active tip face and is then compacted in a mound above ground (as opposed to trench filling below ground). All landfilling activities occur over the existing landfill that has been in operation since the 1980's.

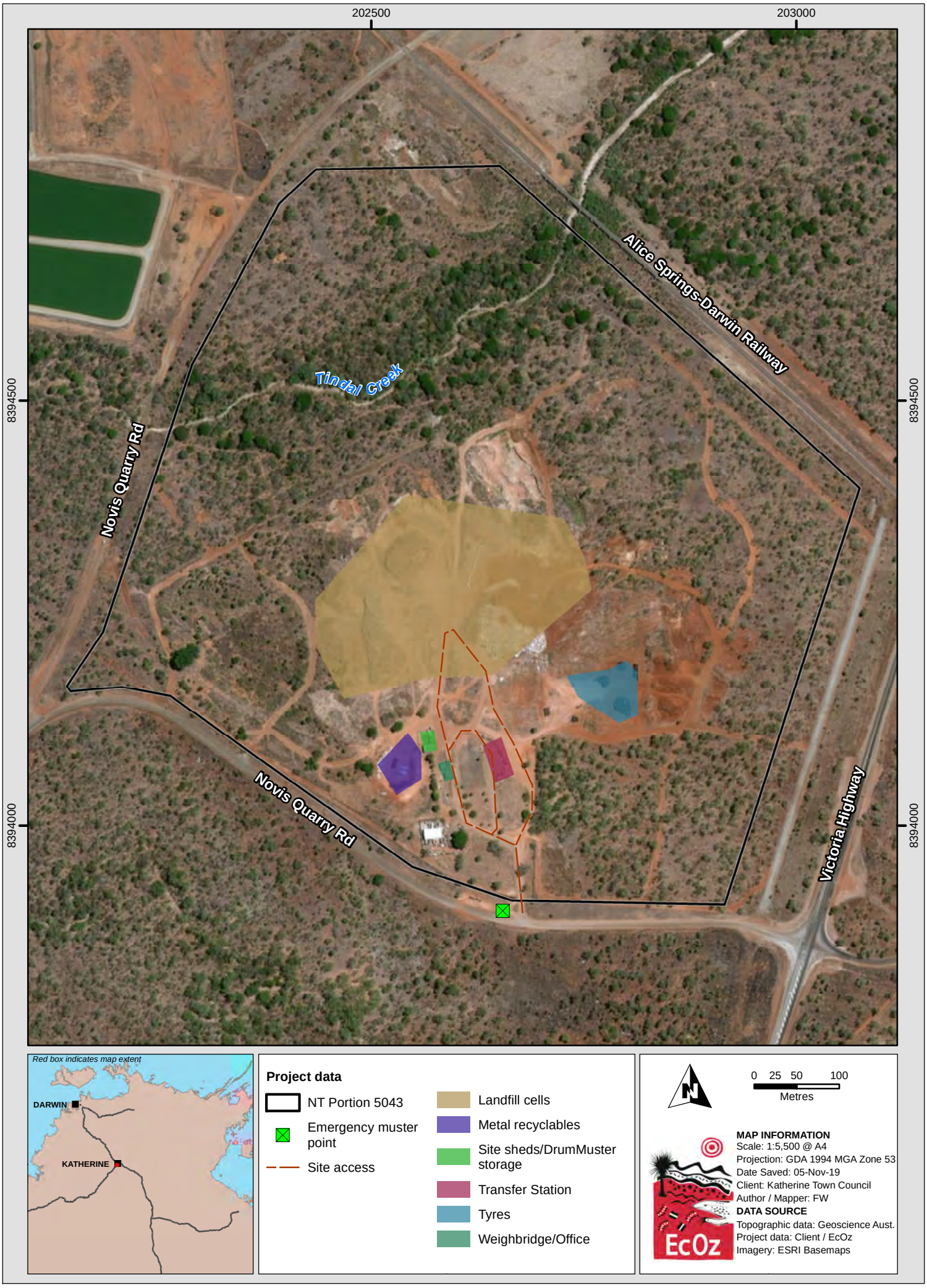
Each day, the waste is covered with daily cover, which is generally spoil material extracted from site or clean fill material accepted at the facility. Daily cover is applied at a minimum thickness of 150 mm, most of which can be retrieved on the following day prior to new waste disposal.

As the active tip area moves progressively along the existing landform (building up the height), the waste disposal areas are covered with a 300 mm intermediate layer of cover material to minimise rainfall infiltration. Final capping layers and rehabilitation are discussed in the GHD (2019) report *Katherine Town Council, Waste Management Facility Closure Plan, Stage 2 Report - Landfill Gas Risk Assessment and Hydrogeological Assessment*.

As landfill operations have been occurring on the site since the 1980's, it is unlikely an engineered liner has been installed beneath the landfill and there is currently no leachate recovery system.

In accordance with the *WMPC Act,* any lateral expansion of the landfill beyond the current footprint will require an Environment Protection Approval. The approval will factor in design considerations detailed in the *Guidelines for the Siting, Design and Management of Solid Waste Disposal Sites in the Northern Territory* (NT EPA 2013) and construction is required to undergo a rigorous quality assurance process. At the present time, there is no intention to expand the current landfill site, and the site has been earmarked for closure and rehabilitation.

KTC is required to complete siting, approvals, design, and construction of a new landfill at an alternative site prior to closure of the existing KWMF, which is planned to take place in 2035.



Path: Z:\01 EcOz_Documents\04 EcOz Vantage GIS\EZ19181 - KTC EPL Update and EMP\01 Project Files\Figure 2-1 Map showing site layout and infrastructure.mxd

Figure 2-1. Map of KWMP layout and infrastructure

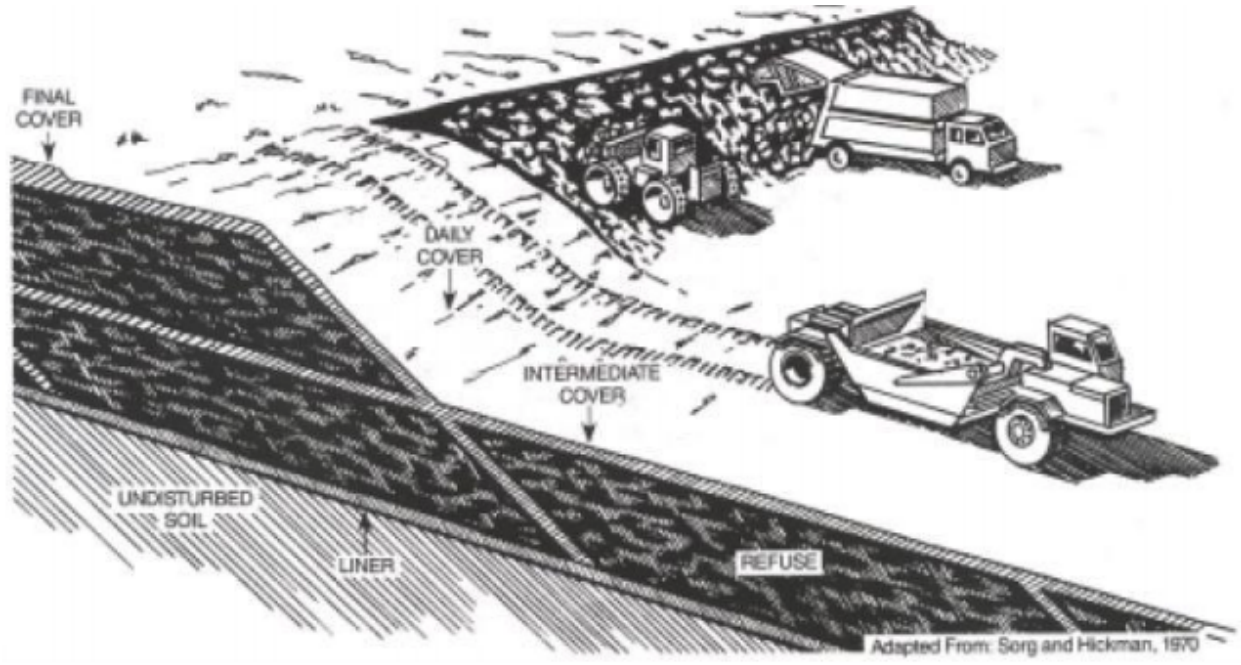


Figure 2-2. Area method of landfilling (taken from NT EPA 2013)

3 ENVIRONMENTAL SETTING

3.1 Climate

Katherine has a tropical savannah climate with distinct wet and dry seasons. The wet season typically occurs from November to April, and the dry season from May to October (see Figure 3-1). The average annual rainfall for Katherine is 972 mm (taken from Bureau of Meteorology Katherine Council Station No. 014902). The driest months are June, July and August, which all have mean monthly rainfall totals of less than 2 mm. The wettest months are December, January and February, with mean monthly rainfall totals of between 157 mm and 238 mm.

The hottest months are September, October, November and December, with mean maximum temperatures between 35°C and 38°C. The coolest months are June, July and August, with mean minimum temperatures between 13°C and 15°C (taken from Bureau of Meteorology Katherine Council Station No. 014932).

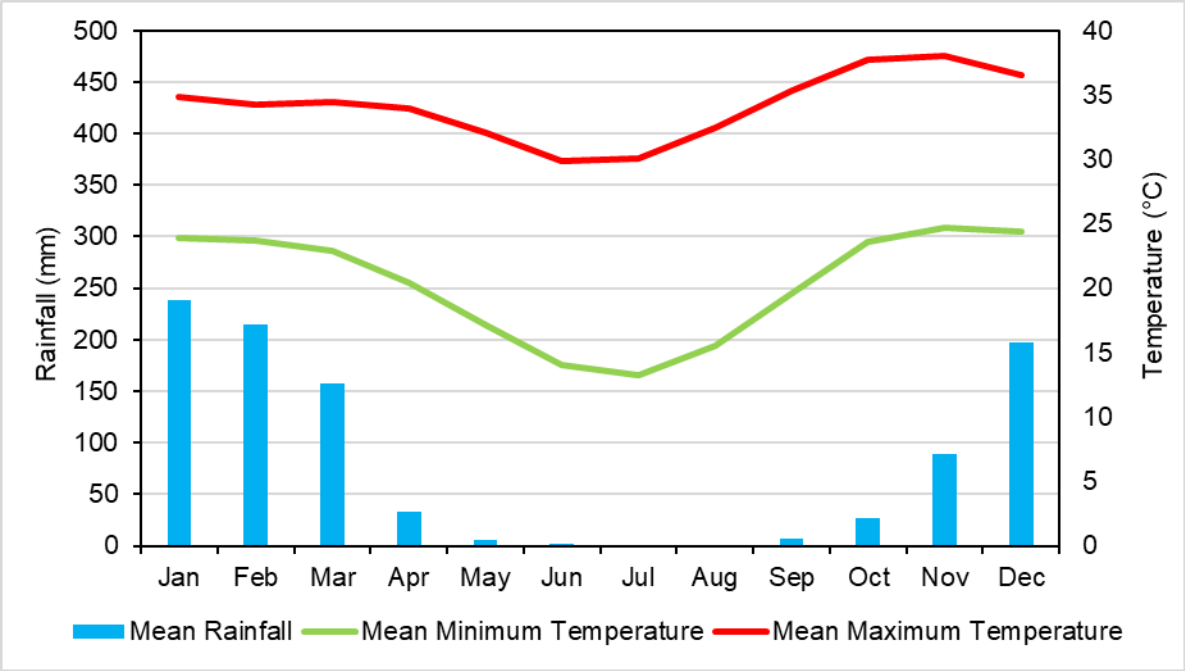


Figure 3-1. Average climate data for Katherine (taken from BoM station ID 014902).

3.1.1 Rainfall during the reporting period

Rainfall during the reporting period in Katherine is shown in Figure 3-2. Of note is that monthly rainfall data from April until July 2024 had not been reported for BoM Station No. 014932 at the time of writing this report. Data from other two stations (014902 and 014979) close to the sites was reviewed, but also not available for the same period.

As shown in Figure 3-2, most of the rain occurred during the wet season months of November to March. November, January and March had monthly rainfall above their respective average. On the contrary, December and February were below average.

From August 2023 to March 2024, a total rainfall of 815.3 mm was recorded, which is below the average of 931 mm for this period. It was also lower than the rainfall recorded during the August 2022 – March 2023 monitoring period.

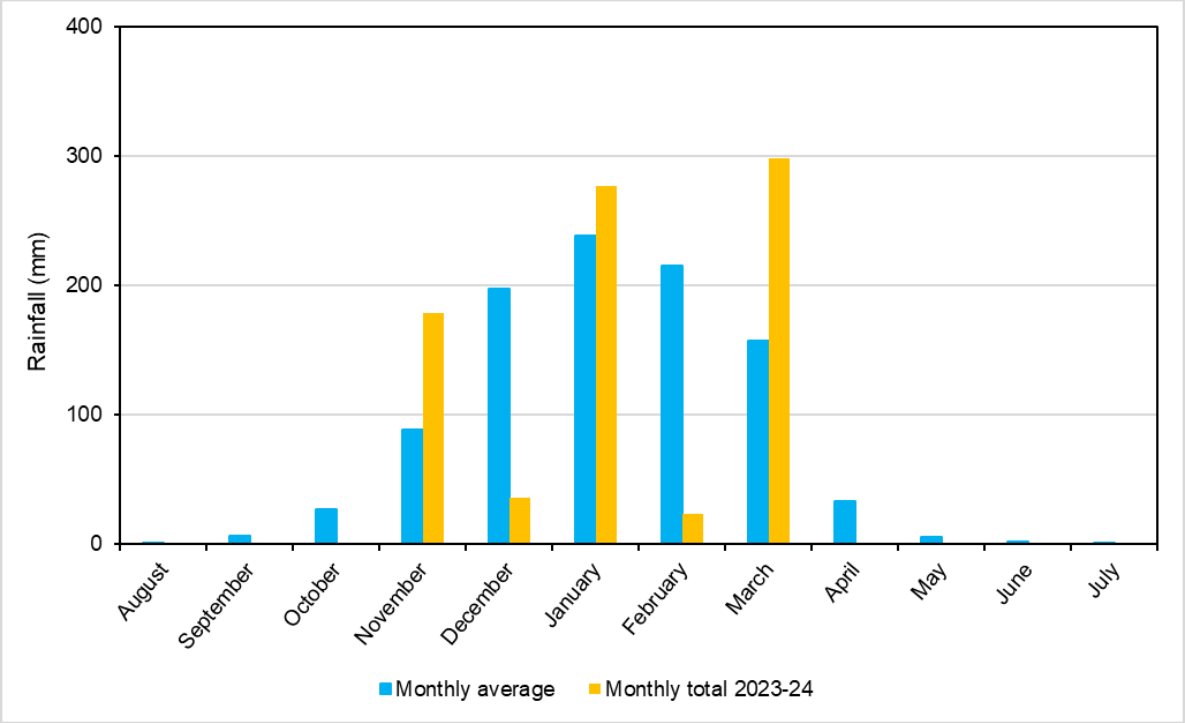


Figure 3-2. Monthly and average rainfall during the reporting period (taken from BoM station ID 014902). Data from April until July 2024 not included in this figure.

3.2 Topography and landform

The KWMF is on almost-level terrain; very gently sloping towards the northwest. The elevation change is only six metres (not including landfill mounds) starting at 108 metres with respect to the Australian Height Datum (mAHD) in the south-east, falling to 102 mAHD in the north-west.

Land unit mapping by Howe (2006) indicates that there are three land units within the site (3a, 3b and 7e), and two landforms. The landform is mostly plains, with a small area of drainage system.

Land unit 3b covers most of the site and is described as very gentle undulating terrain; slopes less than 2%; scattered limestone pavement or rock outcrop.

Land unit 3a is present on the eastern side of the site and is described as gentle slopes or undulating and dissected terrain; slopes to 2%; severe limestone and sandstone pavement and outcrop.

Land unit 7e is only present along the north-western side of the site associated with Tindal Creek and is described as major creeks and severely gullied tributaries; includes permanent and ephemeral waters, with poorly drained soils.

3.3 Surface water

The KWMF is approximately 1 km east of the Katherine River and lies within the Katherine River flood plain. Tindal Creek flows in a northeast to southwest direction across the northern part of the site (see Figure 2-1) and surface water runoff from most of the KWMF area flows in a north-westerly direction, towards this creek.

Tindal Creek has a catchment area of 173 km^2, most of which is upstream of the KWMF. This catchment includes most of the township of Katherine, as well as wide mix of industries, and areas used for horticulture and cattle grazing. The Royal Australian Air Force (RAAF) Base Tindal is also within the catchment and is a known contamination source of PFAS; see the *Department of Defence, RAAF Base Tindal, Supplementary Detailed Site Investigation Report* (Coffey 2018b).

Tindal Creek is ephemeral and typically only flows during the wet season. In its upper reaches, the creek is fed by surface water from bushland and scrubland but becomes groundwater-fed in the wet season from Uralla through to the southern edge of Katherine.

South of the KWMF, a tributary of Tindal Creek flows from east to west and joins Tindal Creek approximately 650 m south-west of the site, which then flows into the Katherine River approximately 2 km downstream from KWMF (following the bends of the creek channel).

Flood modelling of the Katherine region (see NRETA 2006a, NRETA 2006b & NRETA 2006c) indicates that during a 1 in 20-year flood event, the northern third of the KWMF, along Tindal Creek, would be flooded i.e. under at least 2 m of water. During a 1 in 50-year event, the northern half of the site would be flooded, and during a 1 in 100-year event, most of the site would be flooded.

3.4 Geology and groundwater

The KWMF is underlain by rocks of the Daly River Group; namely the middle Cambrian-age Jinduckin Formation, which is predominantly dolomitic siltstone, with interbeds of dolostone and sandstone. Simplified geological sequences recorded at or close to the site (GHD 2019) generally comprise:

- Clay materials to depths up to 3 m
- Limestone (dolomitic) from 3 to 30 m
- Mudstone (siltstone) from 30 to 60 m
- Fractured limestone from 60 to 80 m.

The Jinduckin Formation comprises the dolomitic limestone and mudstone/siltstone sequences to 60 m depth, and the fractured limestone at depths greater than 60 m is the Tindall Limestone.

The Tindall Limestone Aquifer is a highly productive and important water resource for the Katherine region (see the *Katherine Tindall Limestone Aquifer Water Allocation Plan 2019-2024*, DENR 2019). The Tindall Limestone Aquifer is used for the Katherine Township water supply, domestic supply for many rural properties, and supports the region's agricultural and other industries. The Tindall Limestone Aquifer also provides base flow to the Katherine River through springs and seepage along the riverbanks and is responsible for the river maintaining steady flow throughout the dry season.

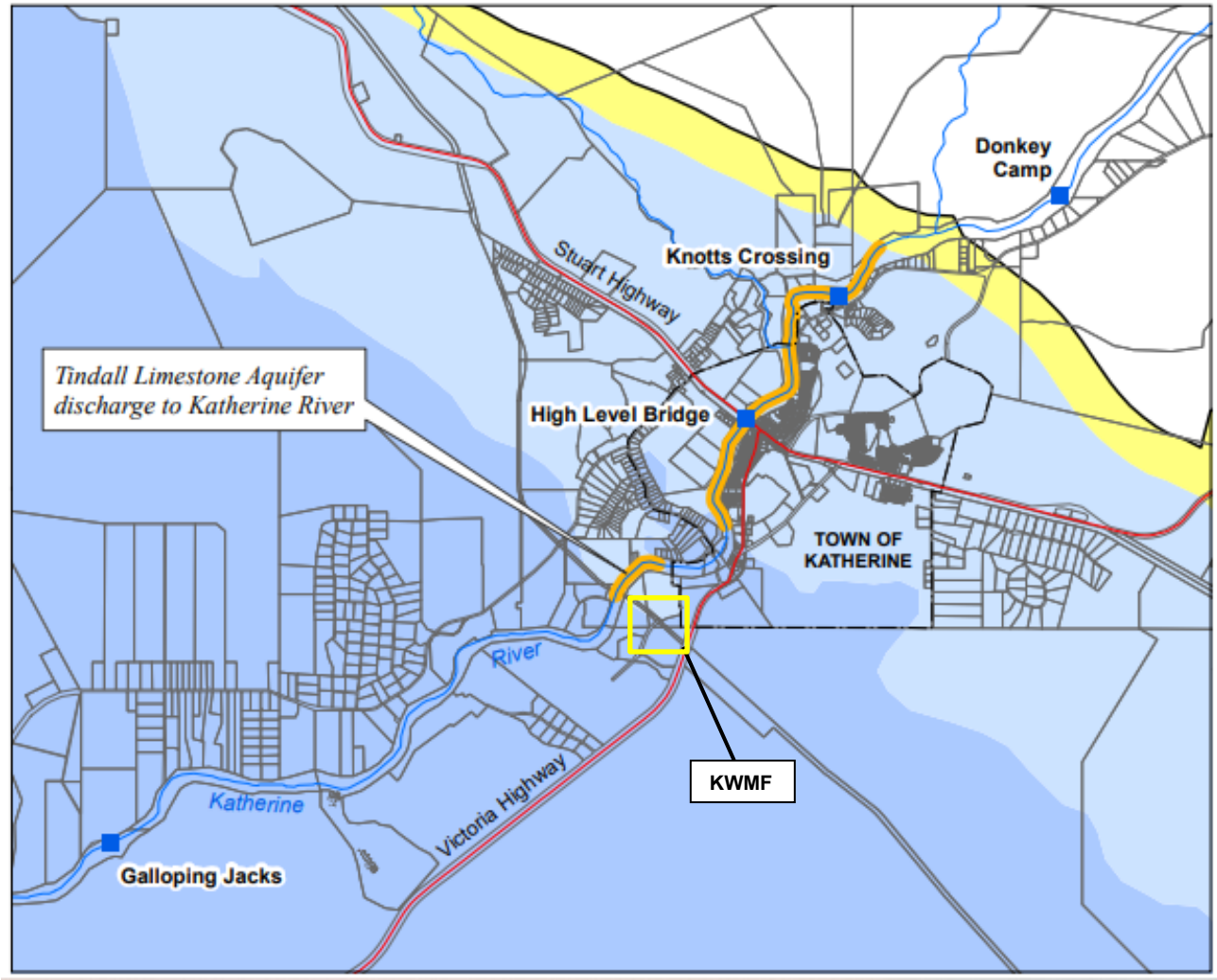
In the area of KWMF, and elsewhere where the Jinduckin Formation occurs, this formation acts as a confining layer and prevents recharge to the Tindall Limestone Aquifer (see Figure 3-3). Recharge to the Tindall Aquifer only occurs in areas where it is in direct contact with the ground surface. These areas are described as 'unconfined' in Figure 3-3 and do not include the KWMF. Similarly, discharge to the Katherine River through springs and seepage from the Tindall Aquifer only occur where the river crosses the unconfined Tindall Aquifer. These sections of river occur upstream of the KWMF, but do not occur at the section nearest the KWMF (Figure 3-3).

Groundwater bores drilled into the Tindall Limestone Aquifer have yields of typically 50 L/s or more and good water quality. Whereas bores drilled into the Jinduckin Formation have yields of typically less than 5 L/s, sometimes up 10 L/s, with poor water quality (excessive salinity).

Bore RN040476 located around 670 m north-east and up-gradient of the KWMF, was installed in 2017 as part of a network of bores to investigate the extent of PFAS contamination extending from RAAF Base Tindal; see Coffey (2018b). This bore has a depth of 20 m and groundwater levels monitored in this bore vary seasonally by around 5.2 m, from 3.4 metres below ground level (mBGL) during the mid-wet season, to 8.6 mBGL at the end of the dry season.

PFAS concentrations measured by Coffey (2018b) in this bore range from <0.01 µg/L up to 0.02 µg/L for PFOS+PFHxS. This is below the *PFAS National Environmental Management Plan* (NEMP) drinking water guideline of 0.07 µg/L (HEPA 2020). Given this shallow bore is in the Jinduckin Formation, and groundwater transport of PFAS from RAAF Base Tindal to the Katherine River is through the Tindall Aquifer, these PFAS concentrations are likely derived from surface water groundwater interaction, where the Katherine River is recharging the Jinduckin aquifer. Perfluorooctanesulfonic acid (PFOS) concentrations in the Katherine River can at times be above the PFAS NEMP freshwater ecosystem 95% species protection guideline value of 0.13 µg/L.

At a regional scale, groundwater hydraulic gradients fall towards the Katherine River. Standing water levels measured in bores within the KWMF are generally around 10 mBGL, and the differences in levels between these bores show that on-site groundwater gradients generally fall towards central landfilled areas from the northern, eastern and southern site boundaries, before discharging from the site in a northwest direction, towards Tindal Creek and the Katherine River (GHD 2019).



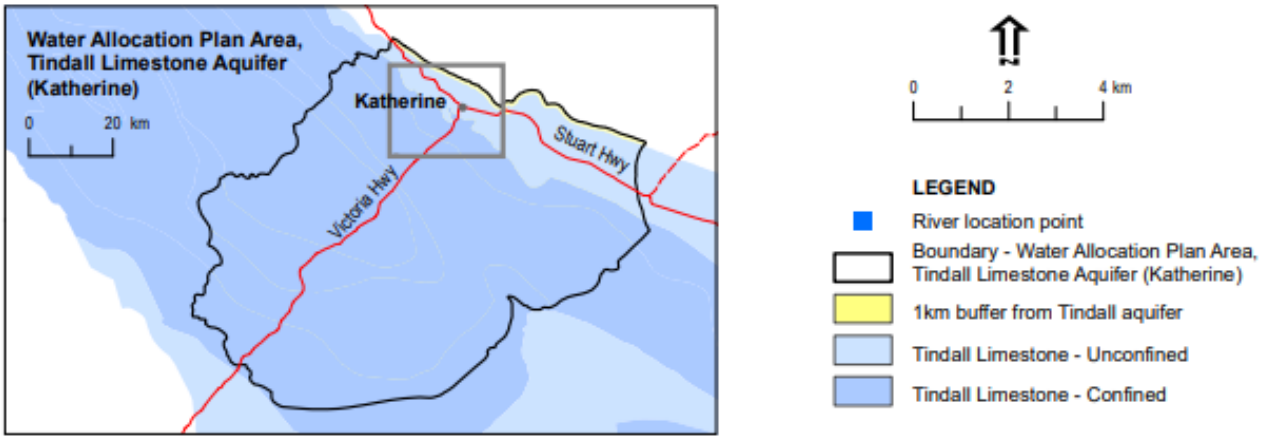


Figure 3-3. Discharge zones into the Katherine River, taken from NRETAS (2009).

4 MONITORING UNDERTAKEN

4.1 Monitoring sites

Surface water and groundwater monitoring sites are detailed in Table 4-1 and Table 4-2 respectively and shown in Figure 4-1.

Table 4-1. Surface water monitoring site details

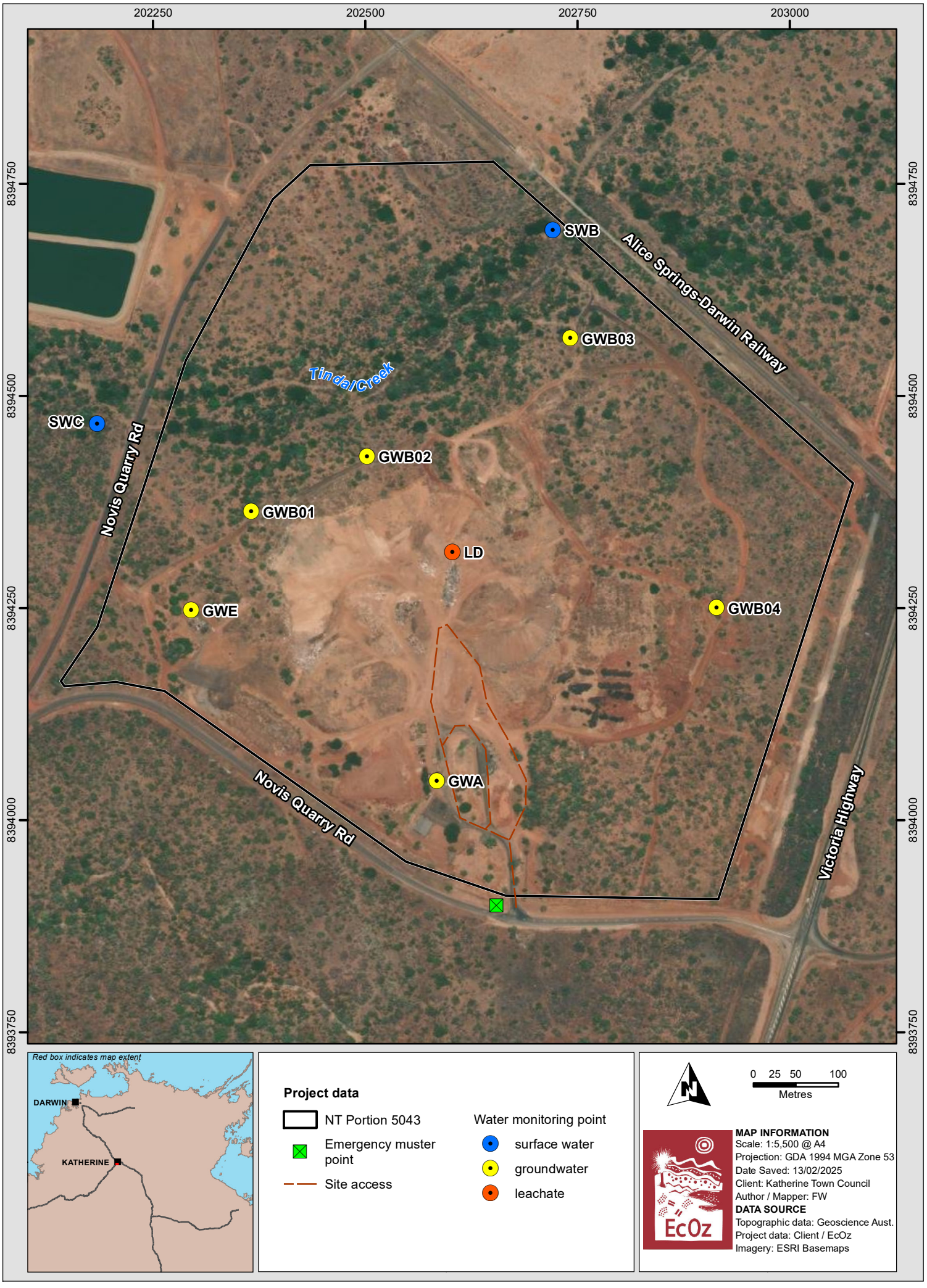
Site Name	GPS Location	Purpose	Type
SWB	-14.5044°S, 132.242°E	Tindal Creek at railway crossing - upstream of the landfill and any leachate impacts	Surface water
SWC	-14.5064°S, 132.237°E	Tindal Creek - at Novis Quarry Rd bridge crossing – downstream of the landfill and any potential landfill impacts - this is the EPL298-01 compliance point where trigger values apply	Surface water
LD	Active tip face	Determine quality of leachate source water	Leachate

Table 4-2. Groundwater monitoring bore details

Site Name	GPS Location	Purpose	Screened depth (mBGL)	General lithology
GWA (RN031131)	-14.5103°S, 132.241°E	Water supply (and now also monitoring) installed in 1997 - located upgradient of the landfill	26.3 – 33 m in Jinduckin Formation	Clay, limestone
GWE (RN022487)	-14.5084°S, 132.238°E	Water supply (and now monitoring) bore installed in 1983 – located upgradient of the landfill	Screened 16-23 m in Jinduckin Formation Open hole 28-80 m in Tindall Limestone from 57 m+	Siltstone, limestone, mudstone, limestone and fractures
GWB01	-14.5057°S, 132.239°E	Monitoring bores installed by GHD in 2018 – located downgradient of the landfill	6.4-12.4 m in Jinduckin Formation	Clayey silt, silty clay, silty siltstone, silty sand, sand, sandy gravel
GWB02	-14.5068°S, 132.240°E		8.0-17.0 m in Jinduckin Formation	Clay, clayey phyllite, sand, clayey phyllite, phyllite, siltstone
GWB03	-14.5055°S, 132.242°E	Monitoring bore installed by GHD in 2018 – located upgradient of the landfill	5.6-10.1 m in Jinduckin Formation	Topsoil, silty clay, clay, clayey phyllite, phyllite, siltstone
GWB04	-14.5084°S, 132.244°E		8.0-17.0 m in Jinduckin Formation	Silty clay, clayey phyllite, phyllite, siltstone, sandstone

4.2 Ad-hoc surface water sampling

Water quality samples were collected in June 2024 from two pits: Pit 2, located east of the site near the tyres designated area, and Pit 1, located northwest of the site. Sampling was conducted in response to concerns raised by the NT EPA about the impacts of the facility on surface water quality. Coordinates for these sampling points are not available.



Path: Z:\01 EcOz_Documents\04 EcOz Vantage GIS\EZ19181 - KTC EPL Update and EMP\01 Project Files\Figure 8-1 Map of KWMF water monitoring locations.mxd

Figure 4-1 Map of monitoring site locations

4.3 Monitoring frequency, parameters, and trigger values

Monitoring frequency, parameters and trigger values, as required in EPL298-01, are provided in Table 4-3. Trigger values only apply to the downstream surface water monitoring site SWC.

Table 4-3. EPL298 – 01 required parameters, sampling frequency and trigger values.

			Surface water		Leachate	Groundwater					
			SWB	SWC		GWA	GWE	GWB01	GWB02	GWB03	GWB04
Parameter	**Unit**	**Trigger values (only apply to SWC)**	**Frequency**								
Field Measurements											
pH	-	6.0-8.0	Quarterly			Monthly					
Temperature	°C	-									
Electrical Conductivity (EC)	µS/cm	20-250									
Dissolved Oxygen (DO)	% Sat	85-120									
REDOX (groundwater only)	mV	-	N/A								
Standing water level (groundwater only)	mAHD	-									
Major ions											
Potassium (K)	mg/L	400	Quarterly			Monthly					
Alkalinity ($CaCO_3$)		-									
Calcium (Ca)		500									
Chloride (Cl)		-									
Sodium (Na)		300									
Sulfate (SO_4)		400									
Magnesium (Mg)		-									
Nutrients											
Total Nitrogen (TN)	µg/L	200-300	Quarterly			Quarterly					
Total Phosphorus (TP)		-									
Nitrate (NO_3 as N)		-									
Ammonium (NH_4)		10				Monthly					
Metals											
Aluminium (Al)	µg/L	-	Quarterly			Quarterly					
Cadmium (Cd)		0.2									
Chromium (CrIII)		3.3									

			Surface water		Leachate	Groundwater					
			SWB	SWC		GWA	GWE	GWB01	GWB02	GWB03	GWB04
Parameter	**Unit**	**Trigger values (only apply to SWC)**	**Frequency**								
Metals continued											
Chromium (CrVI)	µg/L	1.0	Quarterly			Quarterly					
Copper (Cu)		1.4									
Iron (Fe)		300									
Lead (Pb)		3.4									
Manganese (Mn)		1900									
Nickel (Ni)		11									
Selenium (Se)		5									
Zinc (Zn)		8.0									
Other Leachate Indicators											
Total Organic Carbon (TOC)	mg/L	-	Quarterly			Monthly					
Total Dissolved Solids (TDS)		-									
Chemical Oxygen Demand (COD)		-									
Biological Oxygen Demand (BOD)		-									
Volatile acids as acetic acid (VFA)		-				Quarterly					
Other											
Total Recoverable Hydrocarbons (TRH)	µg/L	-	Annually			Quarterly					
Polycyclic Aromatic Hydrocarbons (PAHs)		16									
Benzene, toluene, ethylbenzene, xylene and naphthalene (BTEXN)		950									
Polychlorinated biphenyls (PCB)		-									
Perfluorooctanesulfonic acid (PFOS)/ Per- and polyfluoroalkyl substances (PFAS) (in any form)		-									

4.4 Sampling procedures

All water sampling is undertaken by KTC. Water quality meters are used for measuring in-situ surface water, leachate and groundwater physical parameters. These meters required to be calibrated prior to each sampling round, but it is uncertain whether such calibration is completed given that no calibration sheets were provided to EcOz. KTC has advised that the meter used in the reporting period was purchased in September 2023 and requires to be sent for calibration in September 2024.

It is understood that in the reporting period, field data was always collected when sampling was undertaken (November – July). However, field sheets, with field data, are only available from March until July. The missing field sheets were mistakenly sent to the laboratory and no other records of the field data were kept by KTC, as required by Condition 51.6 of the Licence. The documentation provided by the lab did not include such field sheets.

All laboratory samples are analysed by a NATA-accredited laboratory (Envirolabs), which incorporates laboratory duplicates, blanks, and spikes to assess data accuracy.

4.5 Monitoring undertaken during the reporting period

Table 4-4 lists the monitoring that was undertaken during the reporting period. Compliance against EPL298-01 monitoring requirements is shown. All monitoring including the collection of field measurements and physical grab samples was completed by KTC, and data provided to EcOz to prepare this report. The monitoring locations are shown on Figure 4-1.

It is worth noting that sampling between August and October 2023 was not conducted due to the unavailability of qualified staff during that period.

Table 4-4. Compliance with EPL298-01 monitoring requirements.

Type	Site ID	Frequency required	Dates sampled	Compliance with sampling frequency	Compliance with parameters measured
Surface water	SWB	Quarterly (field measurements, major ions, nutrients, metals and metalloids, other leachate indicators)	18/02/2024	Compliant – Sites attended quarterly, but SWB was dry on three occasions, and SWC was dry on two occasions. Further sampling attempts were not conducted between August and October 2023 due to the unavailability of qualified staff during that period.	Compliant except for: - No field measurements. - Annual parameters not analysed in the reporting period at SWB.
		Annually (TRH, PAH, BTEXN, PCB and PFAS/PFOS)	-		
	SWC	Quarterly (field measurements, major ions, nutrients, metals and metalloids, other leachate indicators)	27/11/2023 18/02/2024		
		Annually (TRH, PAH, BTEXN, PCB and PFAS/PFOS)	27/11/2023		
Leachate		Quarterly (field measurements, major ions, nutrients, metals and metalloids, other leachate indicators)	27/11/2023	Compliant – Sites attended quarterly but leachate ponding only once in the reporting period	Compliant except for: - No field measurements
		Annually (TRH, PAH, BTEXN, PCB and PFAS/PFOS)	27/11/2023	Compliant	
Groundwater	GWA	Monthly (field measurements, major ions, NH_4, TOC. TDS, COD, BOD)	27/11/2023 17/12/2023 21/01/2024 18/02/2024 17/03/2024 21/04/2024 21/05/2024 23/06/2024 28/07/2024	Nine out of the twelve required sampling rounds completed. Sampling between August and October 2023 was not conducted due to the unavailability of qualified staff during that period.	Compliant except for: - No field measurements from November until March - SWL not measured in the reporting period given that the bore is equipped with a tap. Samples from this bore are collected from a tap.
		Quarterly (TN, TP, N, metals, VFA, TRH, PAH, BTEXN, PCB, PFOS/PFAS)	27/11/2023 08/02/2024 21/05/2024	Three out of the four required sampling rounds completed Sampling between August and October 2023 was not conducted due to the unavailability of qualified staff during that period.	Compliant, except for: - TRH, BTEXN, PCB and PAHs not analysed in February
	GWE	Monthly (field measurements, major ions, NH_4, TOC. TDS, COD, BOD)	27/11/2023 17/12/2023 21/01/2024	Nine out of the twelve required sampling rounds completed	Compliant except for: - No field measurements from November until March

Type	Site ID	Frequency required	Dates sampled	Compliance with sampling frequency	Compliance with parameters measured
			18/02/2024 17/03/2024 21/04/2024 21/05/2024 23/06/2024 28/07/2024	Sampling between August and October 2023 was not conducted due to the unavailability of qualified staff during that period.	- No SWL in July
		Quarterly (TN, TP, N, metals, VFA, TRH, PAH, BTEXN, PCB, PFOS/PFAS)	27/11/2023 08/02/2024 21/05/2024	Three out of the four required sampling rounds completed. Sampling between August and October 2023 was not conducted due to the unavailability of qualified staff during that period.	Compliant
	GWB01	Monthly (field measurements, major ions, NH_4, TOC. TDS, COD, BOD)	17/12/2023 21/01/2024 18/02/2024 17/03/2024 21/04/2024 21/05/2024 23/06/2024 28/07/2024	Eight out of the twelve required sampling rounds completed. Bore was dry in November. Sampling between August and October 2023 was not conducted due to the unavailability of qualified staff during that period.	Compliant, except for: - TDS and BOD not analysed in February. - No field measurements from December until March
		Quarterly (TN, TP, N, metals, VFA, TRH, PAH, BTEXN, PCB, PFOS/PFAS)	08/02/2024 21/05/2024	Two out of the four required sampling rounds completed. Bore was dry when sampling was attempted in November. Sampling between August and October 2023 was not conducted due to the unavailability of qualified staff during that period.	Compliant
	GWB02	Monthly (field measurements, major ions, NH_4, TOC. TDS, COD, BOD)	27/11/2023 17/12/2023 21/01/2024 18/02/2024	Nine out of the twelve required sampling rounds completed. Sampling between August and October 2023 was not conducted due	Compliant, except for: - TDS not analysed in June. - No field measurements from November until March

Type	Site ID	Frequency required	Dates sampled	Compliance with sampling frequency	Compliance with parameters measured
			17/03/2024 21/04/2024 21/05/2024 23/06/2024 28/07/2024	to the unavailability of qualified staff during that period.	
		Quarterly (TN, TP, N, metals, VFA, TRH, PAH, BTEXN, PCB, PFOS/PFAS)	27/11/2023 08/02/2024 21/05/2024	Three out of the four required sampling rounds completed. Sampling between August and October 2023 was not conducted due to the unavailability of qualified staff during that period.	Compliant
	GWB03	Monthly (field measurements, major ions, NH_4, TOC. TDS, COD, BOD)	27/11/2023 17/12/2023 21/01/2024 18/02/2024 17/03/2024 21/04/2024 21/05/2024 23/06/2024 28/07/2024	Nine out of the twelve required sampling rounds completed. Sampling between August and October 2023 was not conducted due to the unavailability of qualified staff during that period.	Compliant, except for: - TDS not analysed in June. - No field measurements from November until March
		Quarterly (TN, TP, N, metals, VFA, TRH, PAH, BTEXN, PCB, PFOS/PFAS)	27/11/2023 08/02/2024 21/05/2024	Three out of the four required sampling rounds completed. Sampling between August and October 2023 was not conducted due to the unavailability of qualified staff during that period.	Compliant
	GWB04	Monthly (field measurements, major ions, NH_4, TOC. TDS, COD, BOD)	27/11/2023 17/12/2023 21/01/2024 18/02/2024 17/03/2024 21/04/2024	Nine out of the twelve required sampling rounds completed. Sampling between August and October 2023 was not conducted due to the unavailability of qualified staff during that period.	Compliant, except for: - TDS not analysed in June. - No field measurements from November until March

Type	Site ID	Frequency required	Dates sampled	Compliance with sampling frequency	Compliance with parameters measured
			21/05/2024 23/06/2024 28/07/2024		
		Quarterly (TN, TP, N, metals, VFA, TRH, PAH, BTEXN, PCB, PFOS/PFAS)	27/11/2023 08/02/2024 21/05/2024	Three out of the four required sampling rounds completed. Sampling between August and October 2023 was not conducted due to the unavailability of qualified staff during that period.	Compliant except for: - VFA, TRH, BTEXN and PFOS/PFAS not analysed in November

5 RESULTS AND DISCUSSION

5.1 Quality Assurance and Quality Control (QA/QC)

Multiple laboratory reports indicated that sampling bottles were received with headspace, which can impact on the analytical results. Details about the specific bottles affected were not provided. In addition to this, the outliers below were also identified in the reporting period.

It is worth noting that the EC recorded at Pit 2 and standing water level (SWL) for GWE in June are presented in the field sheets, but the data is illegible or inconsistent with historical data for the site (GWE); as such, such data was not included in this report

5.1.1 Duplicates

Duplicate samples were collected in the samplings undertaken from February to July. Although information in regard to where the samples were collected is not included in the field sheets provided to EcOz and presented in Appendix A, EcOz has been advised that duplicates were collected from GWA (February – June) and GWE (July).

Duplicates were collected during the reporting period to evaluate the precision of sampling methods. For this assessment, the Relative Percentage Difference (RPD) was estimated, when possible. As shown in Table 5-1, in most cases, differences between primary samples and duplicates did not exceed 20% (adopted criteria), when concentrations were at least ten times the limit of reporting (LOR). Therefore, the results are acceptable. However, some PRDs were well above the adopted criteria even when at least one of the results was more than 10 times higher than the LOR. In such cases, RPDs of over 20%, and in particular, over 80% indicate problems with the sampling methodology and uncertainty of the representativeness of the results obtained. Therefore, these results are excluded from this report.

Table 5-1. RPD assessment

RPDs >20% and where at least one of the results was more than 10 times the LOR are indicated in red.

Date	Site	Parameter	RPD Assessment
18/02/2024	GWA	Total and dissolved metals, TDS, VFA, major ions, TOC, nutrients, BOD, COD and PFAS.	Compliant - results below detection limits or RPD <20%, except for: <u>Total metals</u> - Copper – 142% - Iron – 183% - Manganese – 128% - Zinc – 165% <u>Dissolved metals</u> - Copper – 111% - Zinc – 162% <u>Major ions</u> - Chloride – 23% - Sulfate – 52% - Potassium – 31% <u>Nutrients</u> - Nitrate as N - 198% - Total Nitrogen – 166% <u>Leachate indicators</u>

Date	Site	Parameter	RPD Assessment
			- BOD – 91%
17/03/2024	GWA	TDS, major ions, TOC, ammonium, BOD and COD.	Compliant - results below detection limits or RPD <20% except for: <u>Leachate indicators</u> - TDS – 40% <u>Major ions</u> - Total alkalinity – 37% - Chloride – 75% - Sulfate – 45% - Calcium – 63% - Magnesium – 40% - Potassium – 33% - Sodium – 82%
21/04/2024	GWA	TDS, major ions, TOC, Ammonium, BOD and COD.	Compliant - results below detection limits or RPD <20%
21/05/2024	GWA	TRH, BTEXN, PAH, PCBs, total and dissolved metals, major ions, TOC, nutrients, TDS, VFA, BOD, COD and PFAS.	Compliant - results below detection limits or RPD <20%, except for: <u>Total metals</u> - Zinc – 67% <u>Dissolved metals</u> - Zinc – 53% <u>PFAS</u> - PFOS – 21%
23/06/2024	GWA	TDS, major ions, TOC, Ammonium, BOD and COD.	Compliant - results below detection limits or RPD <20%, except for: <u>Major ions</u> - Chloride – 32% - Potassium – 31%
28/07/2024	GWE	TDS, major ions, TOC, Ammonium, BOD and COD.	Compliant - results below detection limits or RPD <20%.

5.1.2 Trip and field blanks

Field and trip blanks were also analysed alongside the primary samples to determine any potential cross-contamination during sample collection (field blank) and handling and transportation (trip blank). As shown in Table 5-2, multiple analytes were detected in the trip and field blank samples. Based on the laboratory report for the samples submitted in February, the nitrate results for the field blank sample were 'confirmed through re-analysis' by the laboratory. Such re-analysis was also conducted for COD in the trip blank sample submitted in June 2024 and TOC in the field blank from July 2024. As such, it is unlikely that such results were detected due to an error at the time of analysing the sample.

Given the consistent detections of some analytes in the trip and field blanks, the laboratory was queried about their uncertainty levels for each sampling method. Envirolab advised EcOz that most of their methods yield approximately +/- 30% uncertainty, which increases significantly near detection limits up to >100% of the LOR. VFA and TRH results were also re-analysed by the laboratory in the field blank and trip blank (VFA only) samples collected in May. Although no report was provided by the laboratory, EcOz was informed that both

results were confirmed, and that these results were screened by Gas Chromatography-Mass Spectrometry (GC-MS) which indicated that the source of VFA and TRH were non-petrogenic and naturally occurring (phenol/fatty acid in nature). It is important to note that the GC-MS is commonly undertaken by the laboratory only under request and were conducted in this case to confirm May's results only. The re-analysis of all samples and screening by GC-MS cannot be requested as most of the samples have been discarded by the laboratory.

The concentrations recorded in the trip and field blank samples were used to assess the integrity and accuracy of the results obtained. When analytes were at higher concentrations in the trip or field blanks than in the primary samples, it was concluded that the uncertainty regarding their accuracy is high due to a potential cross-contamination. As such, these results are not included in the tables in Sections 5.2 to 5.5, and in Appendix B. All laboratory reports are included in 0 for reference. All other results were deemed as accurate, under the assumption that if cross-contamination occurred, its impact on the primary sample results is minimal.

Table 5-2. Trip and field blank results summary.

Columns in red indicate analytes where the concentration in the trip or field blank was higher than in the primary sample, excepting those with results <LOR.

Date	Sample	Analyte	Units	LOR	Detections ± 30%	Primary samples where concentration below or equal to Trip/Field blank result	Primary samples concentration range
27/11/2023	Trip Blank	TDS	mg/L	5.0	12 ± 3.6	None	170 - 730
		Ammonium	mg/L	0.0070	0.0076 ± 0.0023	GWB03	0.0096 -0.10
17/12/2023	Trip Blank	BOD[1]	mg/L	5.0	10 ± 3	None	<5.0 – 25
21/01/2024	Trip Blank	N/A	N/A	N/A	None	N/A	N/A
18/02/2024	Trip Blak	Zinc	mg/L	1.0	1.0 ± 0.3	None	3.3 – 330
		Total alkalinity	mg/L	5.0	6.3 ± 1.9	None	210 – 430
		Nitrate as N	mg/L	0.0050	0.0062 ± 0.0019	None	0.014 – 5.5
	Field Blank	Cadmium	mg/L	0.10	0.12 ± 0.04	None	<0.10
		Zinc	mg/L	1.0	1.2 ± 0.4	None	3.3 – 330
		Total alkalinity	mg/L	5.0	6.5 ± 1.9	None	210 – 430
		Nitrate as N	mg/L	0.0050	0.0084[2] ± 0.0025	None	0.014 – 5.5
17/03/2024	Trip Blak	TDS	mg/L	5.0	7.0 ± 2.1	None	220 – 480
		BOD[1]	mg/L	5.0	14 ± 4.2	GWA	9.7 – 17
	Field Blank	TDS	mg/L	5.0	9.0 ± 2.7	None	220 – 480
		Ammonium	mg/L	0.0070	0.016 ± 0.005	GWB01	<0.0050 – 0.0081
		BOD[1]	mg/L	5.0	15 ± 4.5	GWA, GWE, GWB02, GWB03	9.7 – 17
21/04/2024	Trip Blak	N/A	N/A	N/A	None	N/A	N/A
	Field Blank	TDS	mg/L	5.0	5.0 ± 1.5	None	270 – 540

Date	Sample	Analyte	Units	LOR	Detections ± 30%	Primary samples where concentration below or equal to Trip/Field blank result	Primary samples concentration range
21/05/2024	Trip Blank	TDS	mg/L	5.0	5.0 ± 1.5	None	290 – 620
		VFA	mg/L	5.0	7.0 ± 2.1	None	110 – 240
		Nitrate as N	mg/	0.0050	0.0065 ± 0.0019	None	0.012 – 3.1
		Total Nitrogen	mg/L	0.10	0.13 ± 0.04	None	0.51 – 3.9
	Field Blank	TRH C10-C14	µg/L	50	98 ± 29.4	All below LOR	<50
		TRH C15-C28	µg/L	100	210 ± 63	GWB01	<100 - 160
		TRH >C10-C16	µg/L	50	220 ± 66	All below LOR	<50
		TDS	mg/L	5.0	11 ± 3.3	None	290 – 620
		VFA	mg/L	5.0	10 ± 12	None	110 – 240
		Nitrate as N	mg/L	0.0050	0.014 ± 2.16	GWB01	0.012 – 3.1
		Total Nitrogen	mg/L	0.0050	0.10 ± 0.03	None	0.51 – 3.9
23/06/2024	Trip Blank	BOD[1]	mg/L	5.0	11 ± 3.3	GWB01, GWB04	<5.0 – 18
		COD	mg/L	20	40 ± 12	GWB03[3]	<20 – 93
	Field Blank	BOD[1]	mg/L	5.0	7.2 ± 2.16	GWB01, GWB04	<5.0 – 18
28/07/2024	Trip Blank	TDS	mg/L	5.0	12 ± 3.6	None	240 – 490
	Field Blank	TDS	mg/L	5.0	31 ± 9.3	None	240 – 490
		TOC	mg/L	1.0	11 ± 3.3	GWB01, GWB02, GWB03	<1.0 – 2.9
		COD	mg/L	20	32 ± 9.6	All below LOR	<20

[1]All BOD samples exceeded the recommended holding time in this sampling round.
[2]Sample re-analysed and result confirmed by laboratory.
[3]Concentration of 54 mg/L

5.1.3 Field parameters

As it will be shown in Section 5.4.2, the pH recorded in groundwater during the reporting period, was well below the historical range for all monitoring sites and months. Given the drop in pH, EcOz contacted KTC about these results and requested information regarding calibration methods of the meter used to collect in-situ data. EcOz was informed that the meter used was purchased in September 2023 and was due for calibration, which may have caused the results obtained. EcOz has requested the staff in charge of sampling to provide any calibration sheets available that could show that monthly calibrations of the equipment (with buffer solutions) were conducted, but, if available, such information is yet to be provided.

It is worth noting that the laboratory provided the pH results obtained in their alkalinity analysis for samples submitted in February 2024. Such results ranged from 5.51 to 8.22, these being more consistent with the historical data available. Although field data sheets from February 2024 were not provided by KTC to EcOz, field pH and temperature were provided to the laboratory by KTC and are included in the laboratory report for this sampling round (0). A comparison between the data reported by KTC (ranged from 2.52 – 3.26) evidences

the significant difference between the field and laboratory results. The results provided by the laboratory are not included here, as pH has a short holding time (a few hours), and as such, the results cannot be relied upon. However, based on this data and the information provided by KTC regarding meter calibration, it is inferred that the pH results for the reporting period are unlikely accurate and should not be presented as representative of the monitoring sites conditions. All field pH data is included in Section 5.4.2 for reference, but is excluded from Sections 5.5 and 6, and Appendix B and 0.

Other field parameters (i.e. temperature, EC, DO and redox) results were consistent with historical data and are thus included in this report. However, recommendations will be included in this report regarding the management of such data once more data from future monitoring rounds is available.

It is understood that field data was provided to Envirolab as it was required for the calculation of ammonia as Free Ammonia, which is based on field pH and temperature data. Given that this analyte is not part of those to be monitored as per the EPL298-01, it is concluded that erroneous field data has not impacted on the laboratory results included and discussed in this report.

5.1.4 Nitrate vs Total Nitrogen

In February, samples collected from GWA, GWE, GWB03 and SWC had TN concentrations below those for nitrate (see Table 5-3). Given that TN is the sum of all nitrogen forms, it is unusual for its concentration to be below that of nitrate. As shown in Table 5-3 the difference between the TN and nitrate results well exceeded the 30% uncertainty provided by the laboratory for the analytical method.

The laboratory advised that such discrepancies may be associated with the potential contamination of the sample or interferences in the sample (e.g. colour). The analysis of TN and nitrate is undertaken from different sampling bottles, which may have also led to the results obtained if sampling procedures where different for the collection of each sample.

The results presented below are included in Sections 5.3.1 and 5.4.2 for reference only, but are not considered representative of the sampling site and are therefore excluded from Section 5.5 and 6 and Appendix B.

Table 5-3. Total Nitrogen and Nitrate as N difference for results from GWA, GWE, GWB03 and SWC in February 2024

Bore ID	Total Nitrogen	Nitrate as N	Difference
	µg/L	µg/L	%
SWC	410	1,300	317
GWA	1,300	2,700	207
GWE	300	2,500	833
GWB03	3,800	5,500	145

5.2 Leachate

Results for the reporting period and historic trends are provided in the sections below. Given that leachate was only sampled once in the reporting period, the results are discussed in relation to the available historical data for the sampling site.

5.2.1 Historic trends

The results from the November 2023 sampling, along with the historical data for the leachate site, are presented in Table 5-4. Figures showing the results obtained in the reporting period are not included given the

limited data available. TRH, BTEXN, polychlorinated bi-phenyls (PCBs) and polycyclic aromatic hydrocarbons (PAHs) have consistently been at levels below the limit of reporting (LOR) and are therefore not included in Table 5-4.

All major ions in November 2023 were at their lowest compared to previous monitoring rounds. The results were also below the EPL298-01 trigger values for surface water, a trend observed in all prior monitoring rounds.

As shown in Table 5-4, total phosphorus (TP) and nitrate levels in November 2023 were significantly higher than those recorded in April 2023, the only other time when these parameters were analysed. On the contrary, ammonium (NH_4) was below the LOR, making it the lowest concentration ever recorded at the site. Given that total nitrogen (TN) was analysed at the leachate site for the first time in November 2023, a comparison with historical data cannot be made. However, the result obtained was compared against the trigger value for the surface water site SWC, evidencing the elevated levels of TN, a common characteristic of landfill leachate.

Most total metal concentrations were detected above the limit of reporting (LOR) in November, and dissolved Copper (Cu), Iron (Fe) and Aluminium (Al) concentrations were also above the LOR. Compared to the April 2023 results (the only historical data available for this site), it is evident that metal concentrations are variable. Notably, Total Fe was almost 23 times higher in November than April 2023.

TOC, TDS and BOD levels were at their lowest in November 2023 than in any other monitoring round. Conversely, chemical oxygen demand (COD) and volatile fatty acids (VFA) were at their highest. Elevated VFA and COD are characteristic of landfill leachate.

PFOS and PFOA were detected in the leachate sample collected during the reporting period, but concentrations were well below those reported in April 2023.

Limited data for the reporting period, and historically, limit the identification of any potential trends in leachate characteristics. The decreasing TOC, TDS, BOD and NH_4 along with the elevated levels of COD and VFA, potentially indicated the mixed behaviours of an active landfill, reflecting the varying stages of waste decomposition.

Table 5-4. Leachate results– Field parameters, major ions, nutrients, metals and other indicators.

Concentrations below the laboratory limit of reporting are shown in grey. Hyphens (-) indicate that no trigger values, LOR or units are applicable, or no results available.

LEACHATE MEASUREMENTS							
PARAMETER	UNIT	LOR	TRIGGER VALUE - SWC	2022	2023		
				FEB	MAR	APR	NOV
FIELD MEASUREMENTS							
pH	-	-	6-8	6.10	**8.28**	8.42	-
Temperature	°C	-	-	34.4	31.4	25.0	-
Electrical Conductivity (EC)	µs/cm	-	20-250	275	611	457	-
Dissolved Oxygen (DO)	mg/L	-	-	-	-	-	-
Dissolved Oxygen (DO)	% Sat	-	85-120	7.3	14.9	27.4	-
Redox		-	-		274	225	-
MAJOR IONS							
Potassium (K)		0.5	400	7.6	9.9	10	3.6
Alkalinity (CaCO3)		5	-	110	250	170	51
Calcium (Ca)		0.5	500	25	46	23	13
Chloride (Cl)	mg/L	1	-	9	28	28	3.4
Sodium (Na)		0.5	300	5.1	15	16	2.3
Sulfate (SO4)		1	400	9	47	36	11
Magnesium (Mg)		0.5	-	7	33	31	4.4
NUTRIENTS							
Total Nitrogen (TN)		100	200-300	-	-	-	1600
Total Phosphorus (TP)		50	-	-	-	41	71
Nitrate (as N)	µg/L	5	-	-	-	<5	960
Ammonium (NH4)		7	10	250	33	16	<7
Ammonia (as N)		5	-	190	33	16	6.5
METALS (TOTAL)							
Cadmium (Cd)		0.0001	0.0002	-	-	<0.0010	<0.0001
Chromium (Cr(III))		0.005	0.0033	-	-	<0.005	0.014
Chromium (CrVI)		0.005	0.001	-	-	<0.005	<0.005
Copper (Cu)		0.001	0.0014	-	-	0.032	0.03
Iron (Fe)		0.01	0.3	-	-	0.46	11
Lead (Pb)	mg/L	0.001	0.0034	-	-	<0.001	0.0054
Manganese (Mn)		0.005	1.9	-	-	0.013	0.13
Nickel (Ni)		0.001	0.011	-	-	0.0016	0.011
Zinc (Zn)		0.001	0.008	-	-	0.0025	0.026
Aluminium (Al)		0.01	-	-	-	0.3	0.0072
Selenium (Se)		0.001	-	-	-	<0.001	<0.001
METALS (DISSOLVED)							
Cadmium (Cd)		0.0001	0.0002	-	-	<0.0001	<0.0001
Chromium (Cr(III))		0.005	0.0033	-	-	<0.005	<0.0050
Chromium (CrVI)		0.005	0.001	-	-	<0.005	<0.0050
Copper (Cu)		0.001	0.0014	-	-	0.0019	0.0033
Iron (Fe)		0.01	0.3	-	-	<0.010	0.025
Lead (Pb)	mg/L	0.001	0.0034	-	-	<0.0010	<0.001
Manganese (Mn)		0.005	1.9	-	-	0.0012	<0.001
Nickel (Ni)		0.001	0.011	-	-	0.0011	<0.001
Zinc (Zn)		0.001	0.008	-	-	<0.0010	<0.001
Aluminium (Al)		0.01	-	-	-	<0.010	0.015
Selenium (Se)		0.001	-	-	-	<0.001	<0.001
OTHER LEACHATE INDICATORS							
Total Organic Carbon (TOC)		1	-	14	7.5	9	5.1
Total Dissolved Solids (TDS)		5	-	470	440	270	140
Chemical Oxygen Demand (COD)	mg/L	20	-	66	28	22	70
Biological Oxygen Demand (BOD)		5	-	5	16	18	<5.0
Volatile acids as acetic acid (VFA)		5	-	-		<5	110
PFOS/PFAS (in any form)							
Perfluorobutanesulfonic acid (PFBS)		0.01	-	-	-	0.11	<0.010
erfluoropentanesulfonic acid (PFPeS)		0.01	-	-	-	0.038	<0.010
erfluorohexanesulfonic acid (PFHxS)		0.01	-	-	-	0.19	<0.010
erfluoroheptanesulfonic acid (PFHpS)		0.01	-	-	-	0.01	<0.010
Perfluorooctanesulfonate (PFOS)		0.01	-	-	-	0.27	0.033
Perfluorodecanesulfonic acid (PFDS)		0.02	-	-	-	<0.020	<0.020
Perfluorobutanoic acid (PFBA)		0.02	-	-	-	0.075	<0.020
Perfluoropentanoic acid (PFPeA)		0.02	-	-	-	0.12	<0.020
Perfluorohexanoic acid (PFHxA)		0.01	-	-	-	0.12	<0.010
Perfluoroheptanoic acid (PFHpA)		0.01	-	-	-	0.066	<0.010
Perfluoroctanoic acid PFOA		0.01	-	-	-	0.081	0.010
Perfluorononanoic acid (PFNA)		0.01	-	-	-	<0.010	<0.010
Perfluorodecanoic acid (PFDA)	µg/L	0.02	-	-	-	<0.020	<0.020
Perfluoroundecanoic acid (PFUnDA)		0.02	-	-	-	<0.020	<0.020
Perfluorododecanoic acid (PFDoDA)		0.05	-	-	-	<0.050	<0.050
Perfluorotridecanoic acid (PFTrDA)		0.1	-	-	-	<0.10	<0.10
erfluorotetradecanoic acid (PFTeDA)		0.5	-	-	-	<0.50	<0.50
4:2 FTS		0.01	-	-	-	<0.010	<0.010
6:2 FTS		0.01	-	-	-	<0.010	<0.010
8:2 FTS		0.02	-	-	-	<0.020	<0.020
10:2 FTS		0.02	-	-	-	<0.020	<0.020
erfluorooctane sulfonamide (FOSA)		0.1	-	-	-	<0.10	<0.10
Total Positive PFHxS & PFOS		0.01	-	-	-	0.46	0.033
Total Positive PFOS & PFOA		0.01	-	-	-	0.35	0.043
Total Positive PFAS		0.01	-	-	-	1.1	0.043

5.3 Surface water

Results for the reporting period and historic trends are provided in the sections below. An assessment of the concentrations recorded at SWC with respect to the EPL298-01 trigger values is also provided in Section 5.3.3. Site SWC results are also compared against those from SWB as the latter is considered a background site.

5.3.1 Surface water quality

In the reporting period, field parameters were not measured and are therefore not presented in Table 5-5.

All major ions were below their respective trigger values, and concentrations were largely consistent between the two sampling sites (where data for SWB was available). Most major ions were higher in February than in November, potentially due to a dilution effect caused by the higher rainfall recorded in November.

Overall, nutrient levels were higher at SWC in November compared to February. TN concentrations were above the adopted trigger value in November and NH_4 in November. TN was almost 3 times higher than the trigger value at SWC in November. The TN concentration at SWC in February are not here discussed due to the low reliability on the data quality, as mentioned in Section 5.1.

When comparing the SWB and SWC results from February 2024, the sites showed similar nutrient levels, except for nitrate. Nitrate levels at SWC were nearly 100 times higher than at SWB. While this could suggest a potential impact from the facility, the QAQC assessment (Section 5.1) indicates that the data for this analyte is of low quality and is therefore not considered representative of the site conditions.

Exceedances in Total and dissolved metals were also reported in the two sampling rounds completed at SWC, although, overall, dissolved metals were mostly below respective trigger values.

In February, more Total metals exceedances were recorded at SWC compared to November. However, background levels (SWB) also showed exceedances, which were close to or equal to the results obtained at the downgradient site (SWC).

Perfluorohexanesulfonic acid (PFHxS) and perfluorooctanesulfonic acid (PFOS) were detected at SWC in November, this being the first time these contaminants have been detected at this site. While PFOS was present in the leachate sample collected in November, PFHxS was not detected. Therefore, a potential impact from the facility cannot be discarded, but more data from SWB is required to confirm any potential impact.

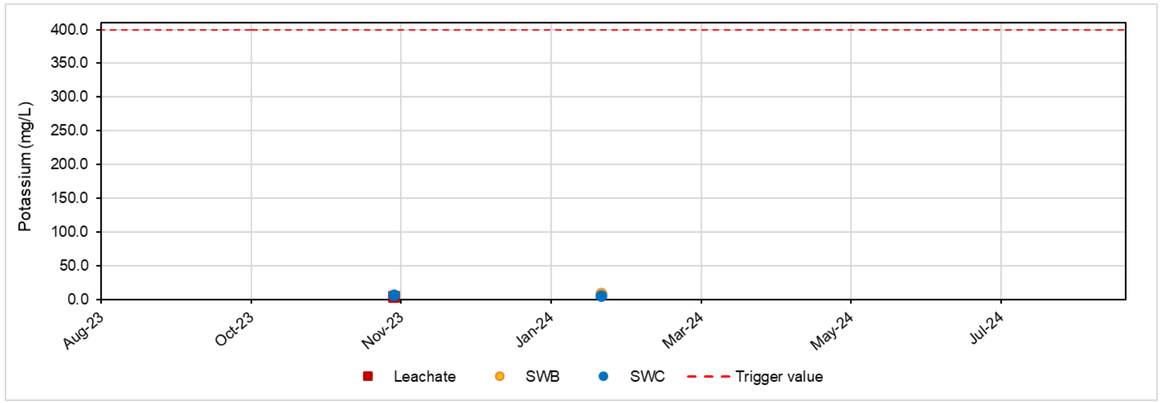
Results for the reporting period are provided in Table 5-5.TRH, BTEXN, PCBs and PAHs were all below their respective LORs. Therefore, results for these group of analytes are not presented in Table 5-5. Results are also shown in Figure 5-1 to Figure 5-4 for parameters where results are available for more than one sampling round and where concentrations were above the LOR at least once within the reporting period.

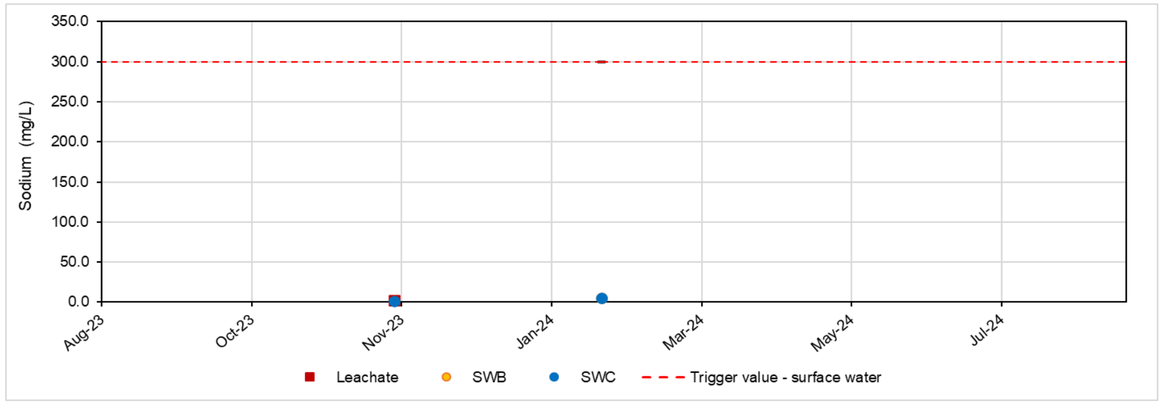
Table 5-5. Surface water quality in the monitoring period.

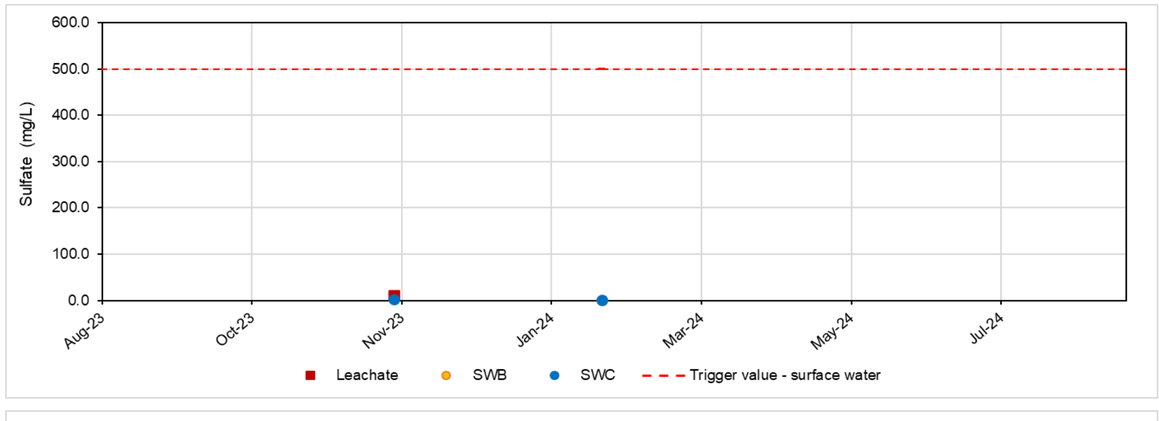
Concentrations below the laboratory limit of reporting are shown in **grey**. Hyphens **(-)** indicate that no trigger values, LOR or units are applicable, or no results available. Concentrations above the trigger value are shown **in red**.

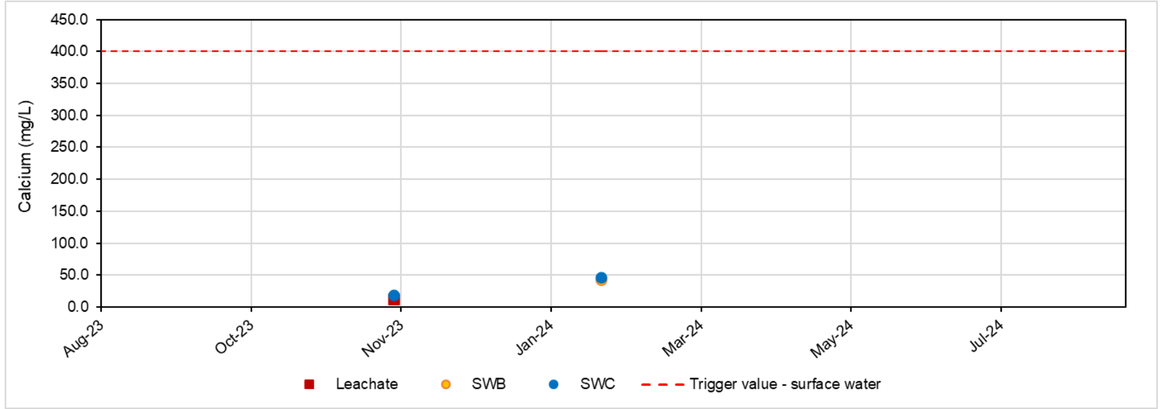
PARAMETER	UNIT	LOR	TRIGGER VALUE	Nov 2023		Feb 2024	
				SWB	SWC	SWB	SWC
FIELD MEASUREMENTS							
pH	0	-	6-8	-	-	-	-
Temperature	-	-	-	-	-	-	-
Electrical Conductivity (EC)	°C	-	20-250	-	-	-	-
Dissolved Oxygen (DO)	% Sat	-	85-120	-	-	-	-
MAJOR IONS							
Potassium (K)	mg/L	0.5	400	-	6.3	8.4	5.6
Alkalinity (CaCO3)		5	-	-	86	210	230
Calcium (Ca)		0.5	400	-	19	43	47
Chloride (Cl)		1	-	-	1.8	6.3	7.1
Sodium (Na)		0.5	300	-	1.1	5.00	5.40
Sulfate (SO4)		1	500	-	3.1	1.70	1.90
Magnesium (Mg)		0.5	-	-	5.8	18	20
NUTRIENTS							
Total Nitrogen (TN)	µg/L	100	200-300	-	**860**	440	-
Total Phosphorus (TP)		50/10	-	-	41	16	10
Nitrate (as N)		5	-	-	<5	14	-
Ammonium (NH4)		7	10	-	**11**	<7	<7
Ammonia (as N)		5	10	-	**11**	<5	<5
METALS (TOTAL)							
Cadmium (Cd)	mg/L	0.0001	0.0002	-	<0.0001	<0.0001	<0.0001
Chromium (Cr(III))		0.005	0.0033	-	<0.0050	<0.0050	<0.0050
Chromium (CrVI)		0.005	0.001	-	<0.0050	<0.0050	<0.0050
Copper (Cu)		0.001	0.0014	-	**0.0067**	0.0023	**0.0023**
Iron (Fe)		0.01	0.3	-	**3.8**	1.6	**1.6**
Lead (Pb)		0.001	0.0034	-	0.0027	<0.001	<0.010
Manganese (Mn)		0.005	1.9	-	0.047	0.027	0.026
Nickel (Ni)		0.001	0.013	-	0.0035	0.0014	**0.014**
Zinc (Zn)		0.001	0.008	-	0.0067	0.0033	**0.034**
Aluminium (Al)		0.01	-	-	2.9	1.0	0.97
Selenium (Se)		0.001	-	-	<0.001	<0.001	<1.0
METALS (DISSOLVED)							
Cadmium (Cd)	mg/L	0.0001	0.0002	-	<0.0001	<0.0001	<0.0001
Chromium (Cr(III))		0.005	0.0033	-	<0.0050	<0.0050	<0.0050
Chromium (CrVI)		0.005	0.001	-	<0.0050	<0.0050	<0.0050
Copper (Cu)		0.001	0.0014	-	**0.0031**	0.0012	0.0011
Iron (Fe)		0.01	0.3	-	0.055	<0.010	<0.010
Lead (Pb)		0.001	0.0034	-	<0.0010	<0.001	<0.001
Manganese (Mn)		0.005	1.9	-	0.0022	0.0048	0.0041
Nickel (Ni)		0.001	0.013	-	<0.001	<0.001	<0.001
Zinc (Zn)		0.001	0.008	-	<0.001	0.0013	0.0022
Aluminium (Al)		0.01	-	-	0.028	<0.010	<0.01
Selenium (Se)		0.001	-	-	<0.001	<0.001	<0.001
OTHER LEACHATE INDICATORS							
Total Organic Carbon (TOC)	mg/L	1	-	-	15	6.4	5.5
Total Dissolved Solids (TDS)		5	-	-	170	220	230
Chemical Oxygen Demand (COD)		20	-	-	90	21	21
Biological Oxygen Demand (BOD)		5	-	-	13	12.00	8.1
Volatile acids as acetic acid (VFA)		5	-	-	240	14	21
PFOS/PFAS (in any form)							
Perfluorobutanesulfonic acid (PFBS)	µg/L	0.01	-	-	<0.010	-	-
Perfluoropentanesulfonic acid (PFPeS)		0.01	-	-	<0.010	-	-
Perfluorohexanesulfonic acid (PFHxS)		0.01	-	-	0.013	-	-
Perfluoroheptanesulfonic acid (PFHpS)		0.01	-	-	<0.010	-	-
Perfluorooctanesulfonate (PFOS)		0.01	-	-	0.088	-	-
Perfluorodecanesulfonic acid (PFDS)		0.02	-	-	<0.020	-	-
Perfluorobutanoic acid (PFBA)		0.02	-	-	<0.020	-	-
Perfluoropentanoic acid (PFPeA)		0.02	-	-	<0.020	-	-
Perfluorohexanoic acid (PFHxA)		0.01	-	-	<0.010	-	-
Perfluoroheptanoic acid (PFHpA)		0.01	-	-	<0.010	-	-
Perfluoroctanoic acid PFOA		0.01	-	-	<0.010	-	-
Perfluorononanoic acid (PFNA)		0.01	-	-	<0.010	-	-
Perfluorodecanoic acid (PFDA)		0.02	-	-	<0.020	-	-
Perfluoroundecanoic acid (PFUnDA)		0.02	-	-	<0.020	-	-
Perfluorododecanoic acid (PFDoDA)		0.05	-	-	<0.050	-	-
Perfluorotridecanoic acid (PFTrDA)		0.1	-	-	<0.10	-	-
Perfluorotetradecanoic acid (PFTeDA)		0.5	-	-	<0.50	-	-
4:2 FTS		0.01	-	-	<0.010	-	-
6:2 FTS		0.01	-	-	<0.010	-	-
8:2 FTS		0.02	-	-	<0.020	-	-
10:2 FTS		0.02	-	-	<0.020	-	-
Perfluorooctance sulfonamide (FOSA)		0.1	-	-	<0.10	-	-
Total Positive PFHxS & PFOS		0.01	-	-	0.01	-	-
Total Positive PFOS & PFOA		0.01	-	-	0.088	-	-
Total Positive PFAS		0.01	-	-	0.01	-	-

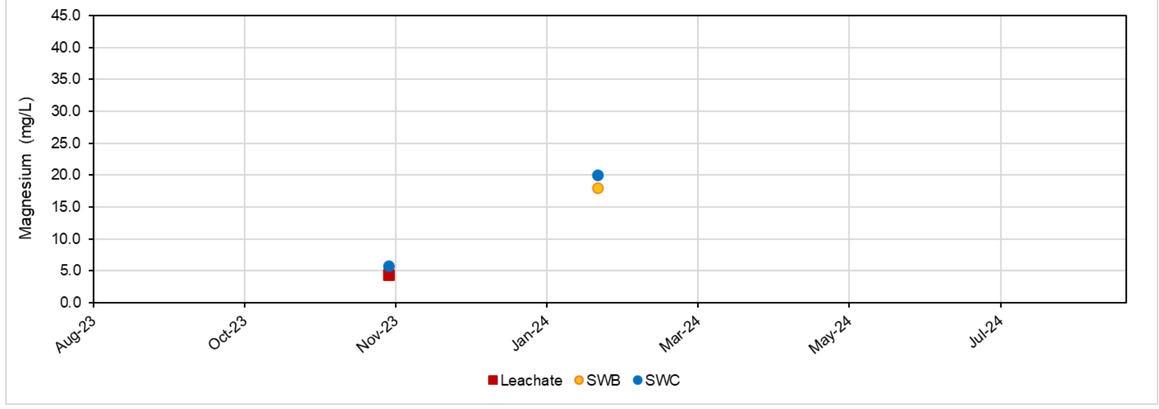
Figure 5-1. Surface water results – Major Ions











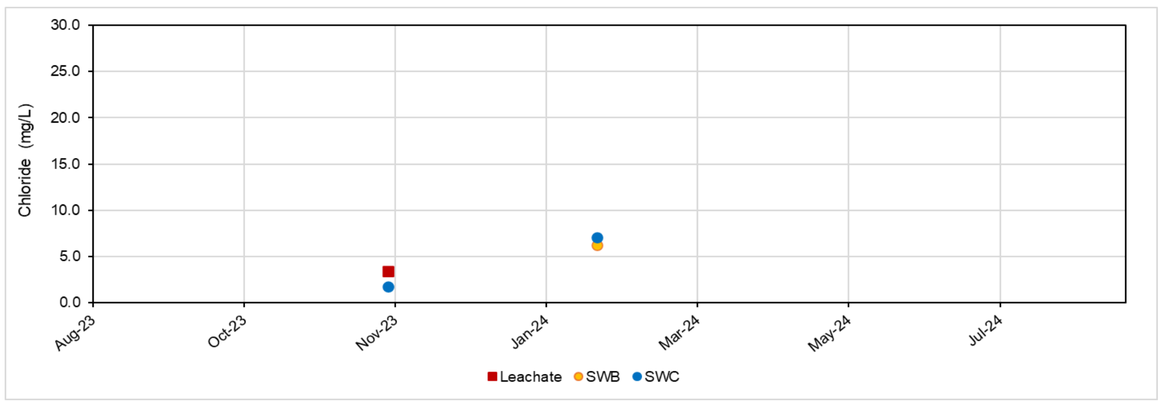
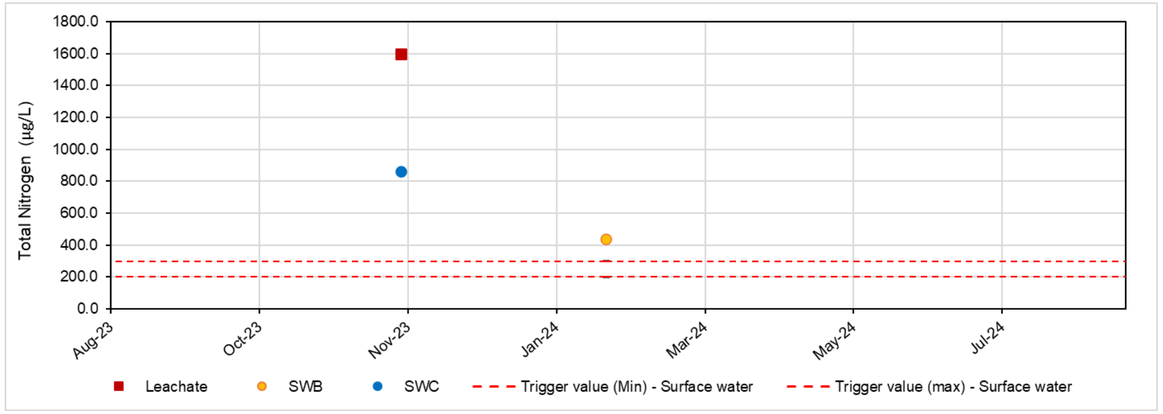
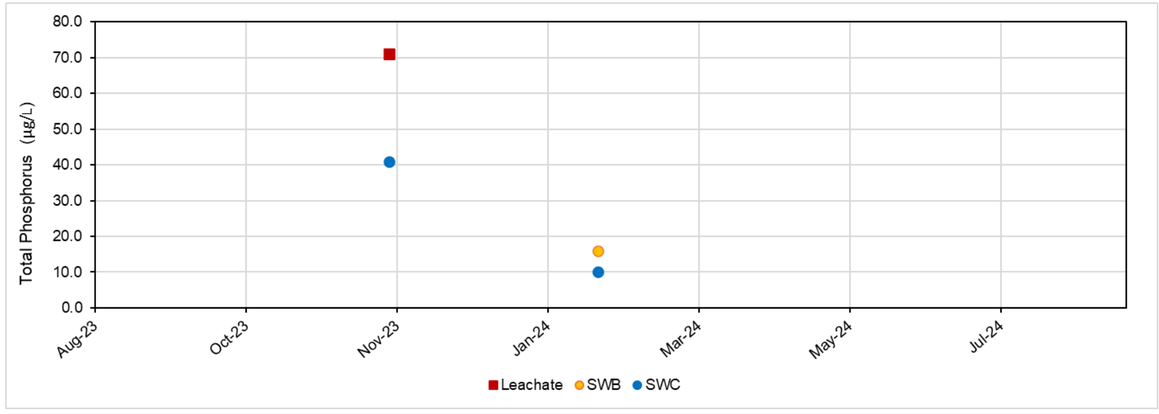
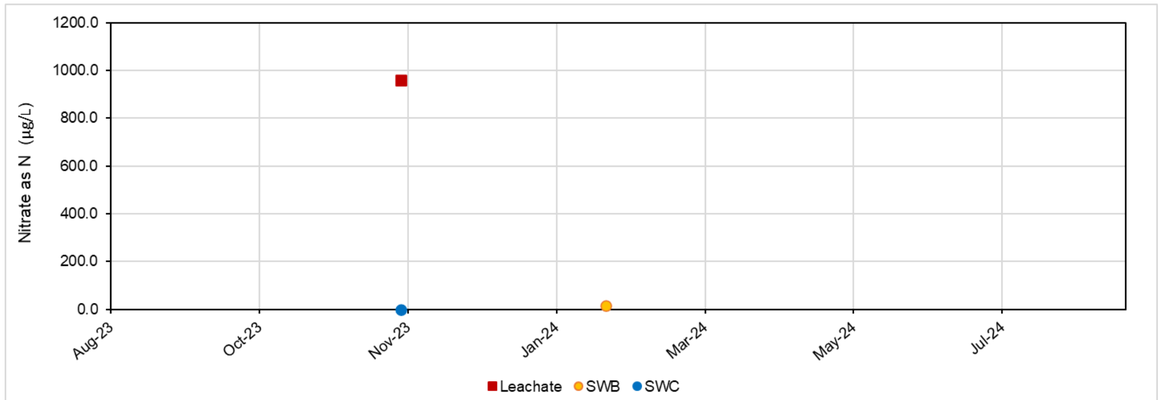


Figure 5-2. Surface Water Results – Nutrients







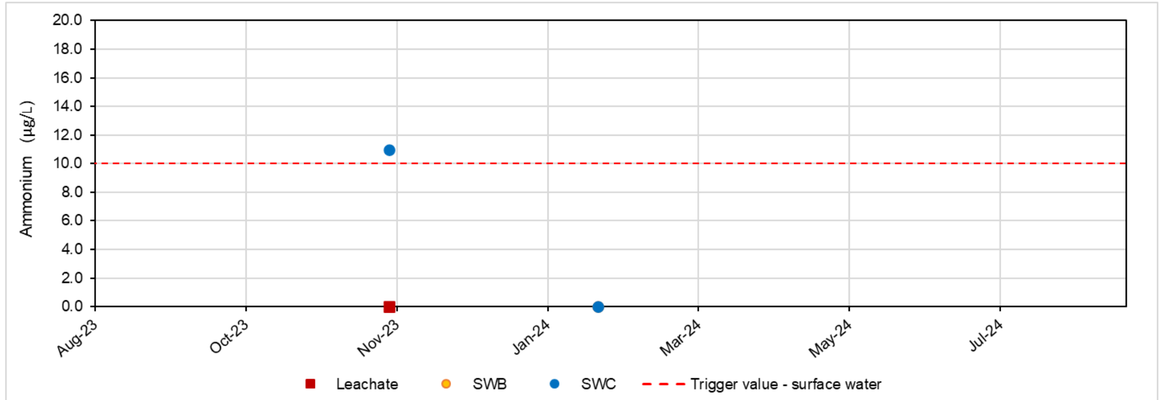
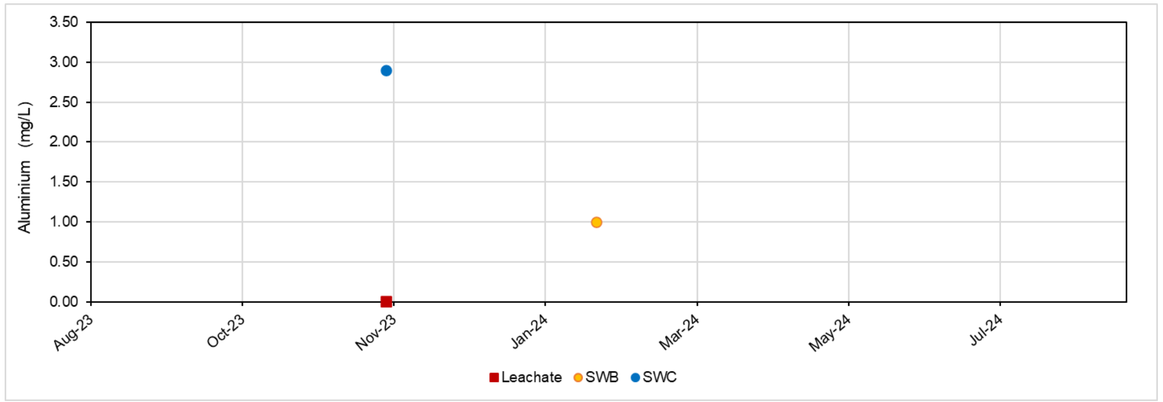
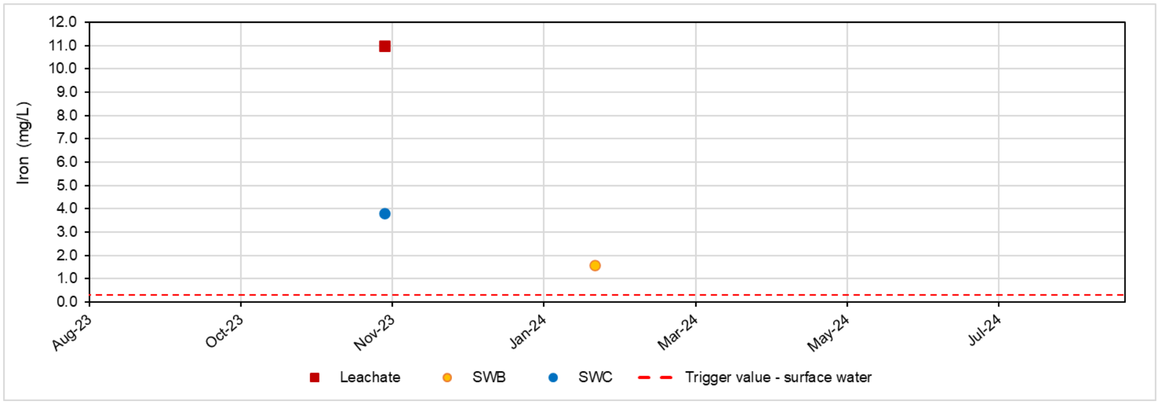
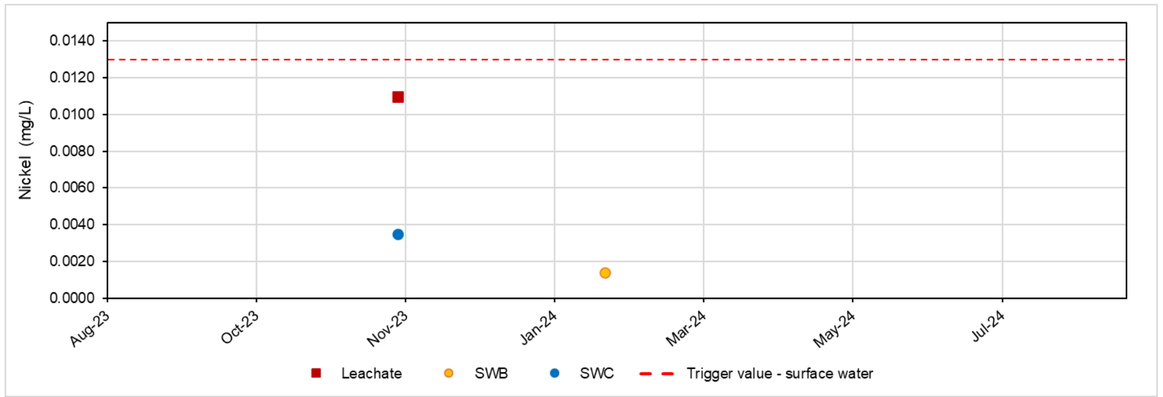
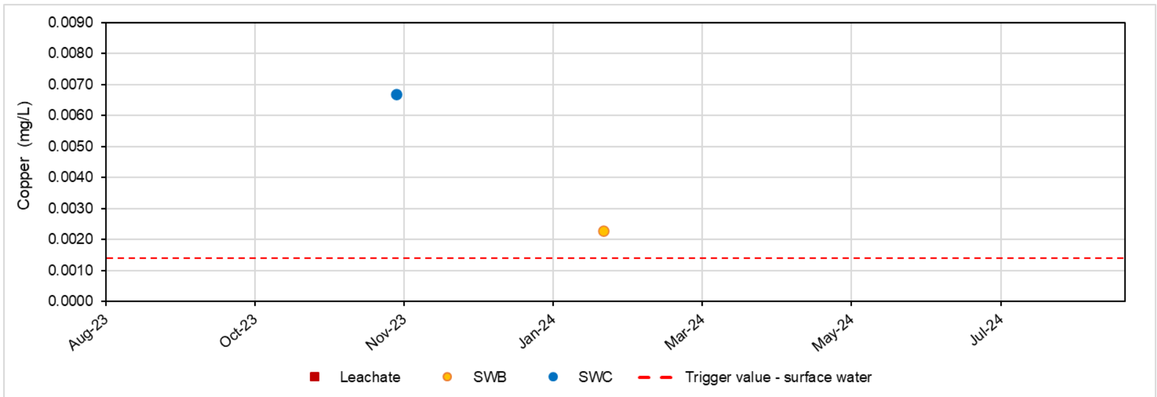


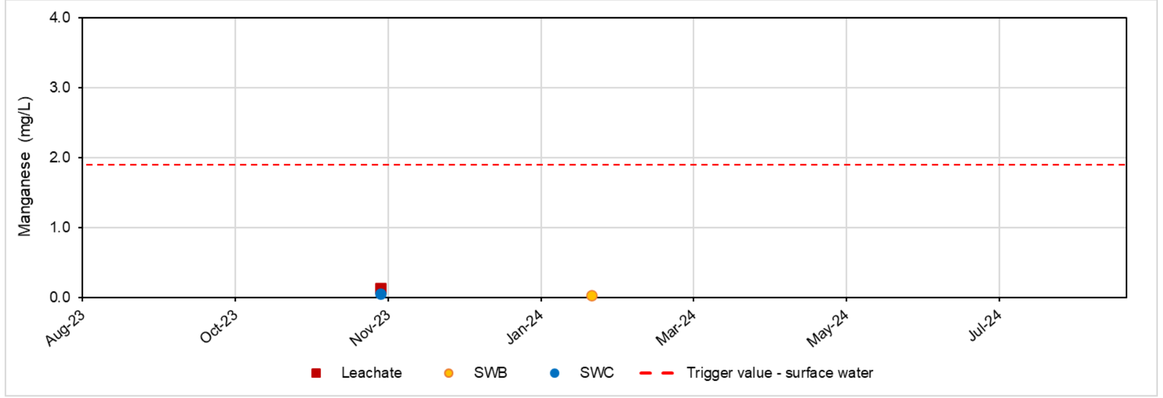
Figure 5-3. Surface Water Results – Total metals











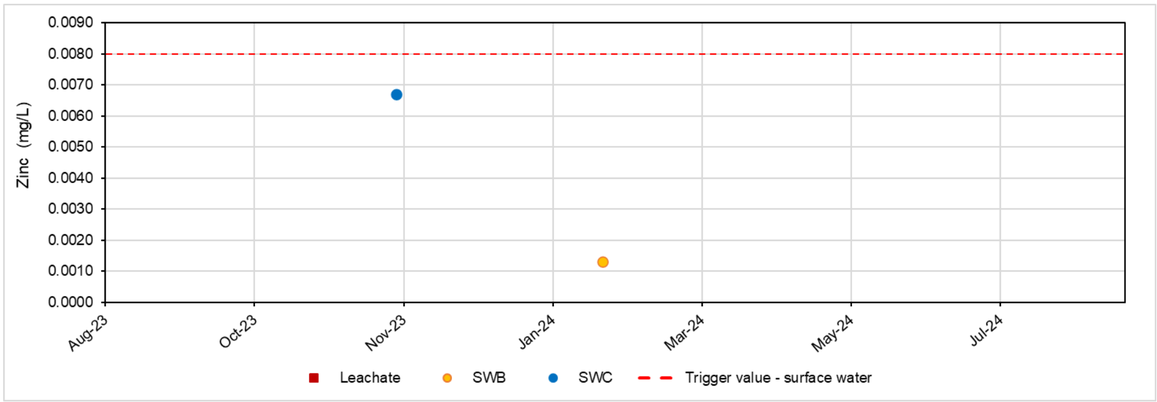
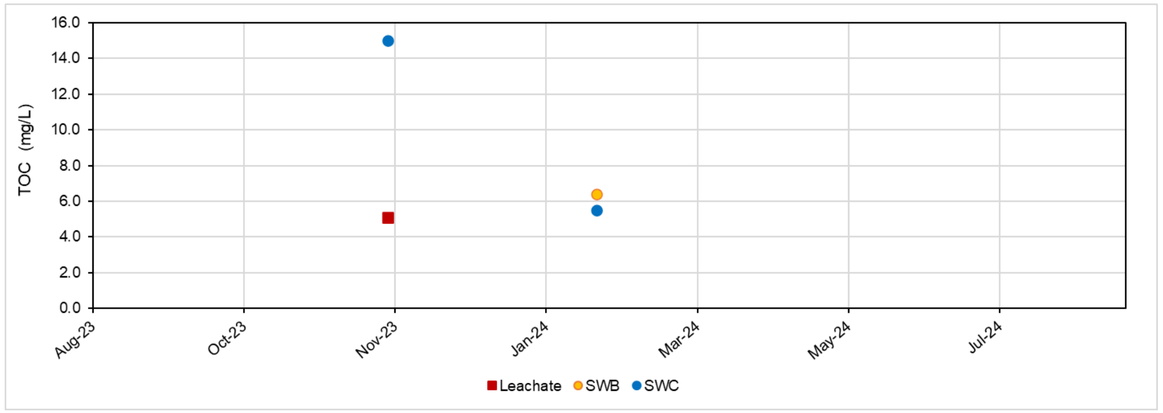
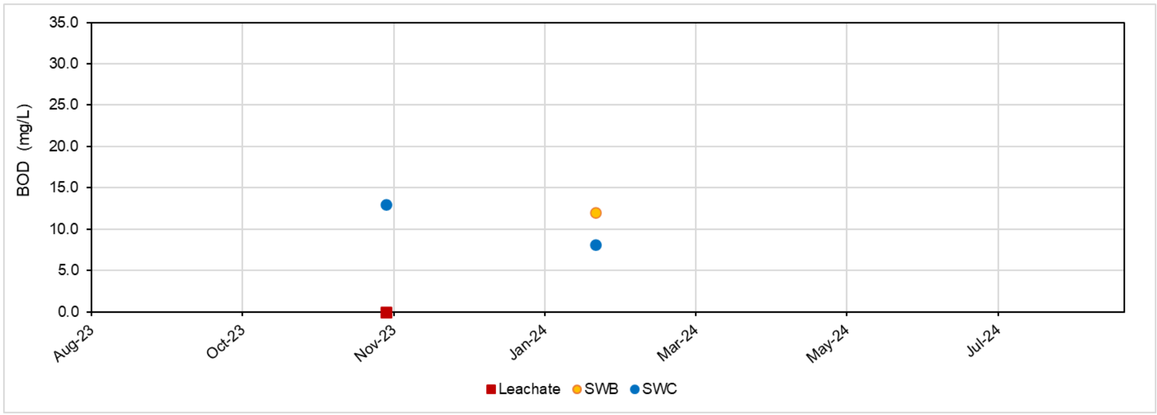
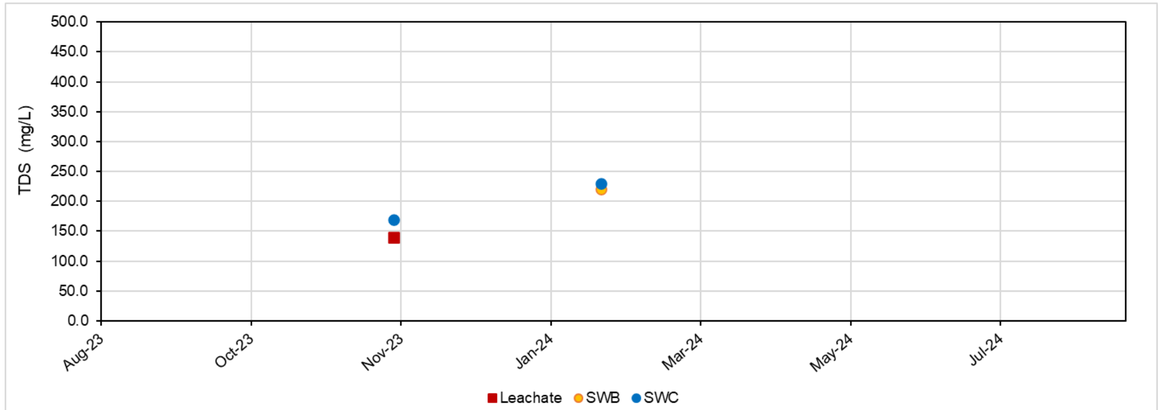
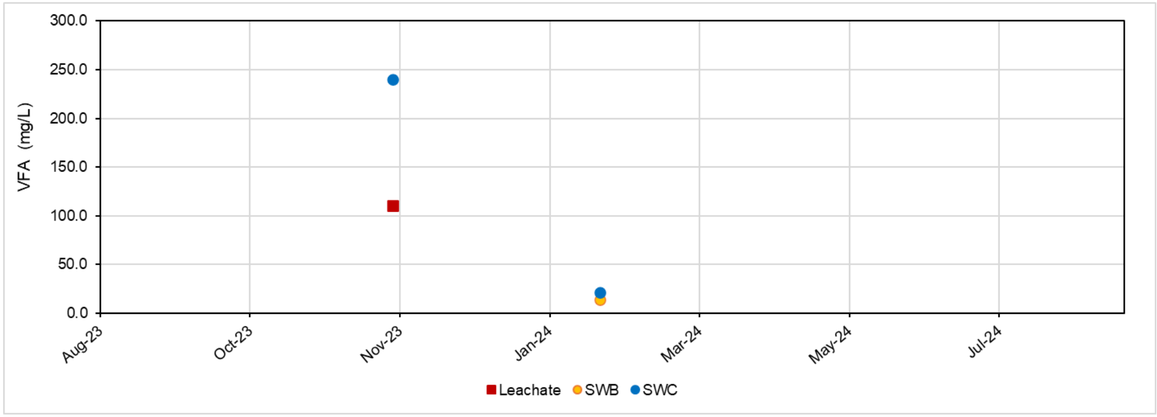


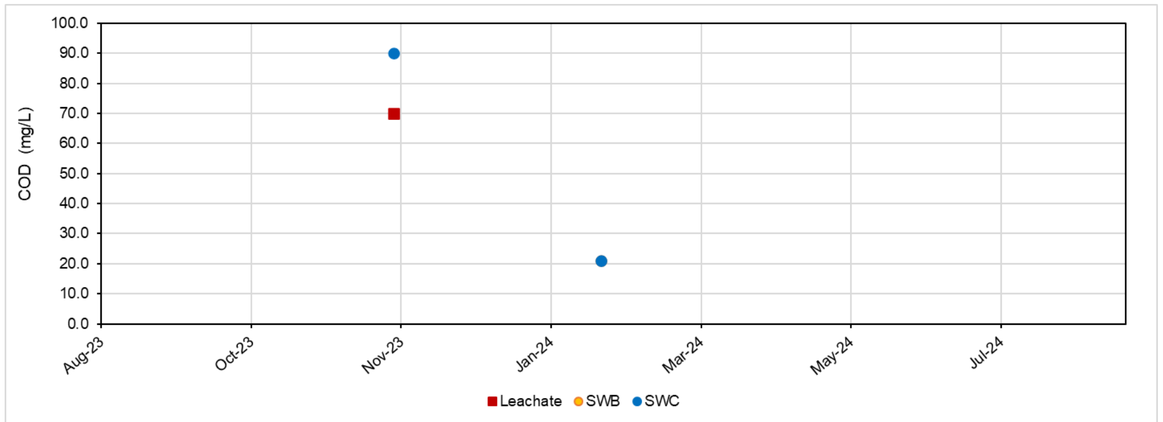
Figure 5-4. Surface Water Results – Other leachate indicators











5.3.2 Historic trends

All surface water quality data available since 2017 are included in Appendix B. Leachate and surface water quality results for parameters with enough data available are graphed in 0.

No increasing, or decreasing, trends were observed in any of the parameters analysed at SWC and SWB. As observed in the graphs presented in 0, when results for both surface water sites are available, concentrations tend to be almost at the same levels at both sites.

The elevated TN recorded at SWC in November 2023 (860 µg/L), is the highest ever recorded since monitoring started. TN at the leachate site (1,600 µg/L), was above the trigger value at SWC the same month, potentially indicating an impact from the activities undertaken at the facility. However, in December 2020, elevated TN was also reported at SWB and SWC (600 and 700 µg/L, respectively), indicating that background conditions at the time were also above the guideline.

5.3.3 SWC trigger value compliance

Condition 58 of EPL298-01 defines the following as a non-compliance:

> *58.1 An exceedance of a trigger value, as specified in the Monitoring Plan on three consecutive occasions*
> *58.2 An exceedance of a trigger value, as specified in the Monitoring Plan on a single occasion where the parameter measured greater than or equal to three times the trigger value; or*
> *58.3 any subsequent consecutive exceedances of a trigger value, as specified in the Monitoring Plan.*

Total Copper, Iron and Zinc were reported at concentrations three times higher than their respective trigger value as shown in Table 5-6. Total Copper was also above the trigger value in February 2024 and is therefore a non-compliance as per Condition 58.3 of the EPL298-01. It is worth noting that the concentrations in February 2024 were equal to those reported at the background site SWB, indicating that the background concentration at the time of sampling was also above the trigger value, a pattern also seen in previous monitoring rounds (December 2020).

Given that no data is available for SWB in November 2023, it cannot be determined if the elevated concentrations of Total Iron recorded at SWC are associated with high background concentrations.

An exceedance of a trigger value for three consecutive occasions has not been reported at any bore since monitoring started.

Table 5-6. SWC trigger values compliance

Exceedance results highlighted in red indicate that the recorded concentration is three times the trigger value.

Parameter	Unit	LOP	Trigger Value	Nov-23		Feb-24	
				SWC	Exceedance	SWC	Exceedance
Nutrients							
Total Nitrogen	µg/L	100	200-300	860	2.9	410	1.4
Ammonium	µg/L	7	10	11	1.1	-	-
TOTAL METALS							
Copper	mg/L	0.001	0.0014	0.007	**5**	0.002	**1.4***
Iron	mg/L	0.01	0.3	3.8	**12.7**	1.6	**5.3**
Nickel	mg/L	0.001	0.013	-	-	0.014	1.07
Zinc	mg/L	0.001	0.008	-	-	0.034	**4.25**

Parameter	Unit	LOP	Trigger Value	Nov-23		Feb-24	
				SWC	Exceedance	SWC	Exceedance
DISSOLVED METALS							
Copper	mg/L	0.001	0.0014	0.003	2.1		

* exceedance as per condition 58.3 of EPL298-01

Ad-hoc surface water sites results

Results for the samples collected in June 2024 at the two pits on site are presented in Table 5-7. Results for field pH are here included for reference only but are unlikely to be representative of the Pits condition.

PAHs were not detected in the samples collected and as such, their results are not presented in Table 5-7. Results were compared against the trigger values for SWC for reference.

As shown in Table 5-7, water at both sites is acidic and high in nitrogen and metals concentrations, although metals were higher in Pit 2 than Pit 1. Of note is that the TN results obtained at these two sites are higher than the concentrations recorded at the leachate site in November 2023.

TRH Fraction C15-C28 and various PFAS forms were detected at Pit 1. The number of PFAS types and their concentration were higher at this site than at the leachate site in November 2023.

These results evidence an impact on the water quality at these two pits and a higher contamination at Pit 1 than at the leachate sampling site in November.

EcOz was informed by the staff in charge of the sampling, that these pits have dried out and are therefore no longer found at the site.

Table 5-7. Water quality ad-hoc sampling sites

MEASUREMENTS					
PARAMETER	UNIT	LOR	TRIGGER VALUE	Jun-24	
				PIT 1	PIT 2
FIELD MEASUREMENTS					
pH	-	-	6-8	4.28	4.92
Temperature	°C	-	-	26.7	23.9
Electrical Conductivity (EC)	µs/cm	-	20-250	745	-
Dissolved Oxygen (DO)	% Sat	-	85-120	30.1	36.4
Redox				132	128
MAJOR IONS					
Potassium (K)		0.5	400	21	9.0
Alkalinity (CaCO3)		5	-	270	69
Calcium (Ca)		0.5	500	34	4.9
Chloride (Cl)	mg/L	1	-	84	2.7
Sodium (Na)		0.5	300	40	17
Sulfate (SO4)		1	400	98	<1.0
Magnesium (Mg)		0.5	-	60	2.7
NUTRIENTS					
Total Nitrogen (TN)		100	200-300	4000	1600
Total Phosphorus (TP)		50	-	130	21
Nitrate (as N)	µg/L	5	-	-	-
Ammonium (NH4)		7	10	-	-
Ammonia (as N)		5	-	-	-
METALS (TOTAL)					
Cadmium (Cd)		0.0001	0.0002	<0.0001	<0.0001
Chromium (Cr(III))		0.005	0.0033	0.001	0.063
Chromium (CrVI)		0.005	0.001	-	-
Copper (Cu)		0.001	0.0014	0.002	0.04
Iron (Fe)		0.01	0.3	0.7	55
Lead (Pb)	mg/L	0.001	0.0034	<0.001	0.02
Manganese (Mn)		0.005	1.9	0.057	0.23
Nickel (Ni)		0.001	0.011	0.0039	0.021
Zinc (Zn)		0.001	0.008	0.005	0.024
Aluminium (Al)		0.01	-	0.46	0.019
Selenium (Se)		0.001	-	<1.0	<0.001
METALS (DISSOLVED)					
Cadmium (Cd)		0.0001	0.0002	<0.0001	<0.0001
Chromium (Cr(III))		0.005	0.0033	<0.001	0.0031
Chromium (CrVI)		0.005	0.001	-	-
Copper (Cu)		0.001	0.0014	<0.001	<0.001
Iron (Fe)		0.01	0.3	<0.010	0.011
Lead (Pb)	mg/L	0.001	0.0034	<0.001	<0.001
Manganese (Mn)		0.005	1.9	0.0064	<0.001
Nickel (Ni)		0.001	0.011	0.003	<0.001
Zinc (Zn)		0.001	0.008	<0.001	<0.001
Aluminium (Al)		0.01	-	<0.010	0.013
Selenium (Se)		0.001	-	<0.001	<0.001
OTHER LEACHATE INDICATORS					
Total Organic Carbon (TOC)		1	-	23	4.0
Total Dissolved Solids (TDS)		5	-	570	450
Chemical Oxygen Demand (COD)	mg/L	20	-	69	57
Biological Oxygen Demand (BOD)		5	-	-	
Volatile acids as acetic acid (VFA)		5	-	47	5.6
OTHER					
TRH C6 - C9 Fraction		10	-	<10	<10
TRH C10-C14 Fraction		50	-	<50	<50
TRH C15-C28 Fraction		100	-	170	<100
TRH C29-C36		100	-	<100	<100
MTBE		1	-	<1.0	<1.0
Benzene		1	950	<1.0	<1.0
Toluene		1	950	<1.0	<1.0
Ethylbenzene		1	950	<1.0	<1.0
Xylene (m&p)	µg/L	2	950	<2.0	<2.0
Xylene (o)		1	950	<1.0	<1.0
Naphthalene		1	950	<1.0	<1.0
Aroclor 1016		2	-	<2.0	<2.0
Aroclor 1221		2	-	<2.0	<2.0
Aroclor 1232		2	-	<2.0	<2.0
Aroclor 1242		2	-	<2.0	<2.0
Aroclor 1248		2	-	<2.0	<2.0
Aroclor 1254		2	-	<2.0	<2.0
Aroclor 1260		2	-	<2.0	<2.0
PFOS/PFAS (in any form)					
Perfluorobutanesulfonic acid (PFBS)		0.01	-	0.25	<0.010
Perfluoropentanesulfonic acid (PFPeS)		0.01	-	0.088	<0.010
Perfluorohexanesulfonic acid (PFHxS)		0.01	-	0.53	<0.010
Perfluoroheptanesulfonic acid (PFHpS)		0.01	-	0.030	<0.010
Perfluorooctanesulfonate (PFOS)		0.01	-	0.78	<0.010
Perfluorodecanesulfonic acid (PFDS)		0.02	-	<0.020	<0.020
Perfluorobutanoic acid (PFBA)		0.02	-	0.13	<0.020
Perfluoropentanoic acid (PFPeA)		0.02	-	0.35	<0.020
Perfluorohexanoic acid (PFHxA)		0.01	-	0.46	<0.010
Perfluoroheptanoic acid (PFHpA)		0.01	-	0.19	<0.010
Perfluorooctanoic acid PFOA		0.01	-	0.29	<0.010
Perfluorononanoic acid (PFNA)		0.01	-	0.020	<0.010
Perfluorodecanoic acid (PFDA)	µg/L	0.02	-	<0.020	<0.020
Perfluoroundecanoic acid (PFUnDA)		0.02	-	<0.020	<0.020
Perfluorododecanoic acid (PFDoDA)		0.05	-	<0.050	<0.050
Perfluorotridecanoic acid (PFTrDA)		0.1	-	<0.10	<0.10
Perfluorotetradecanoic acid (PFTeDA)		0.5	-	<0.50	<0.50
4:2 FTS		0.01	-	<0.010	<0.010
6:2 FTS		0.01	-	<0.010	<0.010
8:2 FTS		0.02	-	<0.020	<0.020
10:2 FTS		0.02	-	<0.020	<0.020
Perfluorooctance sulfonamide (FOSA)		0.1	-	<0.10	<0.10
Total Positive PFHxS & PFOS		0.01	-	1.3	<0.010
Total Positive PFOS & PFOA		0.01	-	1.1	<0.010
Total Positive PFAS		0.01	-	3.1	<0.010
PAHs					
Naphthalene		0.1	16	<0.10	<0.10
Acenaphthylene		0.1	16	<0.10	<0.10
Acenaphthene		0.1	16	<0.10	<0.10
Fluorene		0.1	16	<0.10	<0.10
Phenanthrene		0.1	16	<0.10	<0.10
Anthracene		0.1	16	<0.10	<0.10
Fluoranthene		0.1	16	<0.10	<0.10
Pyrene		0.1	16	<0.10	<0.10
Benzo(a)anthracene	µg/L	0.1	16	<0.10	<0.10
Chrysene		0.1	16	<0.10	<0.10
Benzo(b,j+k)fluoranthene		0.2	16	<0.20	<0.20
Benzo(a)pyrene		0.1	16	<0.10	<0.10
Indeno(1,2,3-c,d)pyrene		0.1	16	<0.10	<0.10
Dibenzo(a,h)anthracene		0.1	16	<0.10	<0.10
Benzo(g,h,i)perylene		0.1	16	<0.10	<0.10
Benzo(a)pyrene TEQ		0.5	16	-	-
Total positive PAHs		0.1	16	<0.10	<0.10

5.4 Groundwater

Groundwater levels, quality and historic trends are provided in the sections below.

5.4.1 Groundwater levels and flow

Limited SWLs data was available for the 2023-24 monitoring period (see Table 5-8).The data available evidence the influence of rainfall seasonality, as it is clear that SWLs started to decrease after March (mid-Wet season), this being the month when levels were most likely the highest. It is worth noting that the levels recorded in March 2024 are, as shown in Figure 5-5, the second highest recorded since monitoring started.

The groundwater elevation in the six on-site bores indicates that groundwater predominately flows in a north-west direction across the site towards Tindal Creek.

Table 5-8. SWL measured in KWMF bores from August 2023 to July 2024.

BORE ID	Mar-24		Apr-24		May-24		Jun-24		Jul-24	
	mbTOC	mAHD	mbTOC	mAHD	mbTOC	mAHD	mbTOC	mAHD	mbTOC	mAHD
GWA (RN031131)	-		-		-		-		-	
GWE (RN022487)	4.5	97.6464	6.13	96.0164	7.8	93.9234	-		10.2	91.5234
GWB01	2.45	97.1714	6.4	93.2214	**8.8**	90.1227	10.2	89.4214	11.2	88.4214
GWB02	2.5	97.2951	6.2	93.5951	8.6	90.5063	8.7	91.0951	10.7	89.0951
GWB03	1.82	97.8593	4.8	94.8793	6.16	92.8973	8.2	91.4793	8.9	90.7793
GWB04	4.56	98.303	5.9	96.963	9.18	93.0366	11.4	91.463	12	90.863

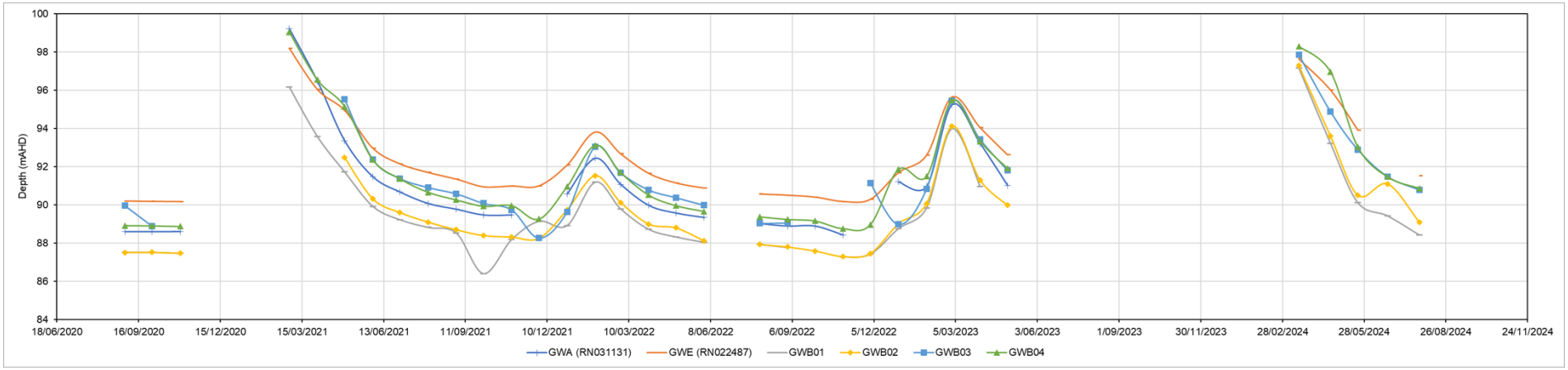


Figure 5-5. Groundwater depths, in mAHD, at each of the six bores monitored since monitoring started in August 2020 at the KWMF.

5.4.2 Groundwater quality

Groundwater quality monitoring results for the reporting period are presented below in Table 5-9 to Table 5-52, and Figure 5-6 to Figure 5-45. Average concentrations are based on all data available since monitoring started. Trigger values are not defined for groundwater quality in EPL298-01, rather, concentrations in the two downgradient bores GWB01 and GWB02, are compared to the four upgradient bores.

Appendix B contains the tables with all the historic data available for the groundwater bores, including the results of single monitoring rounds undertaken in 2006, 2017 and 2018. Groundwater bores GWB01 to GWB04 were also only installed in 2018, and historic data for these bores is only available for a single monitoring round in 2018. A number of parameters were also not measured during the earlier monitoring rounds e.g., TN, VFA, and not all 28 PFAS that are currently analysed were analysed pre-2020.

Note that months when monitoring was not undertaken (variable for each parameter; see Table 4-4) were not included in the tables below. In addition, based on the data assessment (see Section 5.1) multiple data was not included in the sections below due to uncertainties regarding its representativeness.

Results tables are not provided below for parameters that recorded concentrations below the LOR for all bores, for all monitoring rounds.

Field parameters

Field pH levels measured in the reporting period are presented in Table 5-9. However, and as discussed in Section 5.1.3, these results are unlikely representative of groundwater at the site and are thus presented for reference, but not included in further discussions in this report. No graph is included for these results.

As shown in Table 5-11, EC ranged between 450 and 921 µS/cm during the monitoring period. The highest EC levels were consistently recorded at the downgradient bores GWB01 and GWB02, which potentially indicate an impact from leachate infiltration.

DO was consistently low at all monitoring bores, with levels ranging from 2.4 to 26.7 %Saturation (see Table 5-12).

Table 5-9. pH in the monitoring bores during the reporting period

pH	2024				
	17-Mar	21-Apr	26-May	23-Jun	28-Jul
GWA	4.9	3.2	3.3	3.5	2.8
GWE	5.6	3.1	3.4	3.0	2.8
GWB01	3.2	3.4	3.5	3.0	2.2
GWB02	3.2	3.4	3.8	3.1	2.8
GWB03	3.5	3.5	3.4	3.6	3.0
GWB04	3.2	3.4	3.7	3.1	3.3

Table 5-10. Temperature at the monitoring bores in the reporting period.

T (°C)	2024				
	17-Mar	21-Apr	26-May	23-Jun	28-Jul
GWA	31.3	31.8	32.4	32.0	31.8
GWE	27.9	32.2	31.8	32.3	29.0
GWB01	28.1	30.1	33.0	31.3	27.2
GWB02	28.8	30.8	32.0	35.3	27.7
GWB03	27.7	29.8	31.0	28.6	24.9
GWB04	29.2	29.5	36.0	30.2	27.1

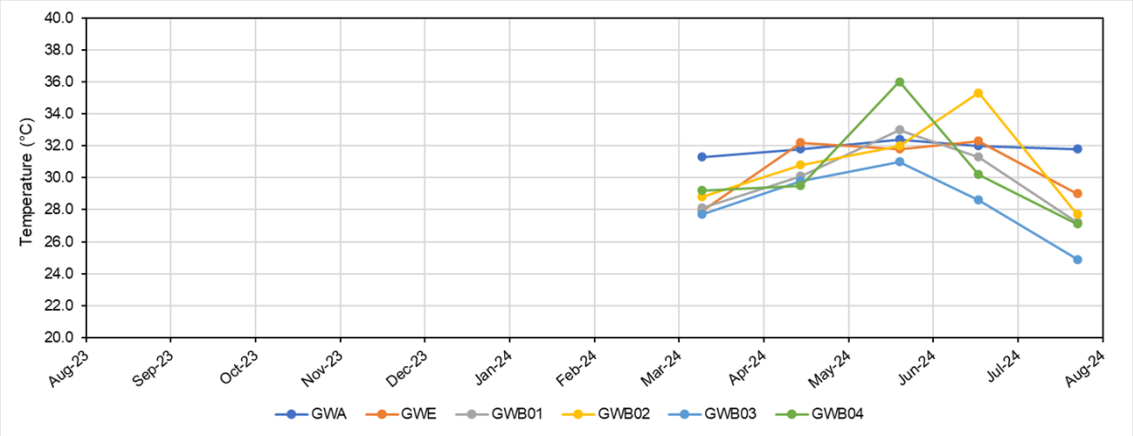


Figure 5-6. Temperature in the reporting period

Table 5-11. Electrical conductivity in the monitoring bores during the reporting period

EC (µS/cm)	2024				
	17-Mar	21-Apr	26-May	23-Jun	28-Jul
GWA	605	600	616	602	575
GWE	450	450	464	489	469
GWB01	625	797	921	809	880
GWB02	757	630	775	786	804
GWB03	540	553	622	918	781
GWB04	681	701	752	795	799

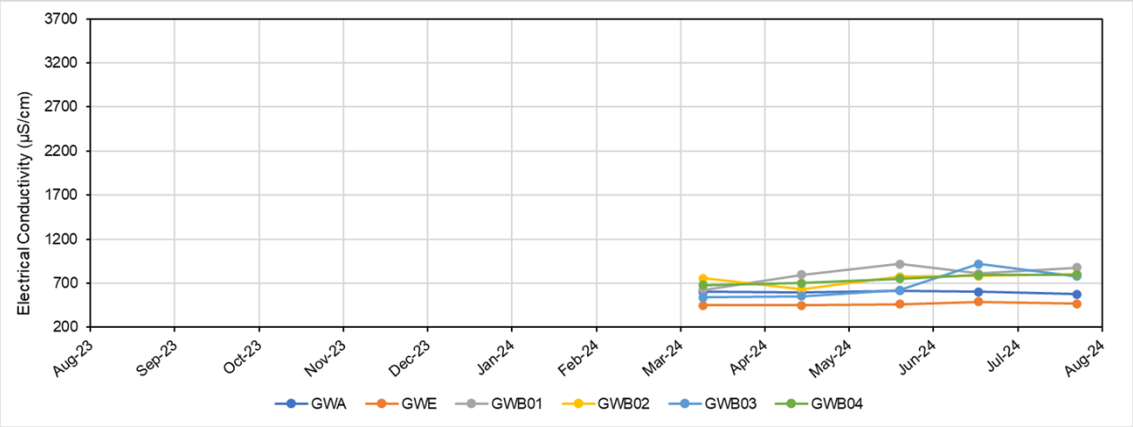


Figure 5-7. Electrical conductivity in the reporting period

Table 5-12. Dissolved oxygen in the monitoring bores during the reporting period

DO (%)	2024				
	17-Mar	21-Apr	26-May	23-Jun	28-Jul
GWA	8.6	4.9	10.2	21.2	10.4
GWE	26.7	3.7	11.2	9.0	3.9
GWB01	4.7	6.5	9.7	10.3	2.4
GWB02	12.0	7.2	8.1	11.7	6.4
GWB03	13.3	7.6	10.0	7.0	12.5
GWB04	18.8	7.6	25.5	17.4	7.0

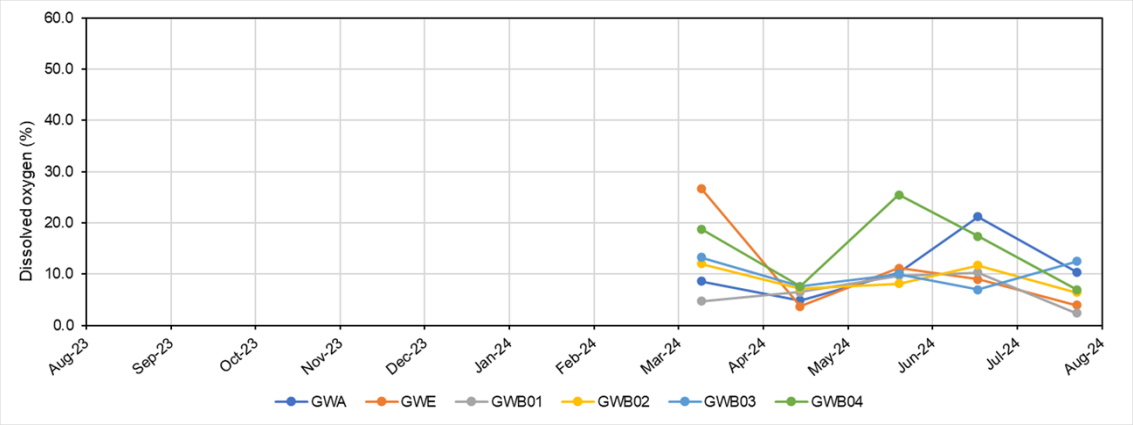


Figure 5-8. Dissolved oxygen in the reporting period

Table 5-13. Redox in the monitoring bores during the reporting period

Redox	2024				
	17-Mar	21-Apr	26-May	23-Jun	28-Jul
GWA	135.0	178.0	179.0	147.0	244.0
GWE	125.0	177.0	155.0	192.0	207.0
GWB01	194.0	182.0	158.0	222.0	314.0
GWB02	183.0	169.0	160.0	215.0	225.0
GWB03	157.0	176.0	179.0	150.0	224.0
GWB04	221.0	176.0	177.0	215.0	840.0

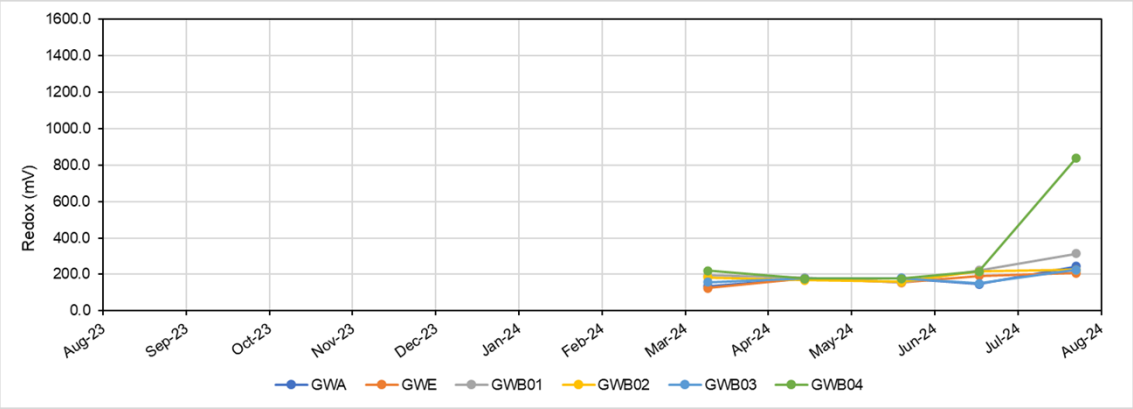


Figure 5-9. Redox in the reporting period,

Major ions

In the reporting period, potassium (K) concentrations were consistently higher at GWB01 (downgradient bore) and GWB04 (upgradient bore) than in the other bores (see Table 5-14). The elevated concentrations recorded at GWB01 are not likely associated with an impact from the KWMF, as K in leachate is typically at lower concentrations than those at this bore.

The deeper bores GWA and GWE consistently recorded the lowest alkalinity and magnesium (Mg) concentrations (see Table 5-16 and Table 5-20). Given these bores are up the hydraulic gradient, the concentrations reported are potentially an indication of the natural characteristics of groundwater intercepted at deeper depths. Calcium (Ca) was also frequently lower at GWE than at any other bore.

As seen in Table 5-18 and Table 5-17, sodium (Na) and chloride (Cl) were commonly elevated at the two downgradient bores GWB01 and GWB02. These results, and particularly Cl, may indicate a potential impact associated with leachate infiltration. However, historical data indicate that these major ions are commonly at

lower concentrations in leachate than at these two bores, but leachate quality data is limited; therefore, a potential impact cannot be discarded.

In the reporting period, sulfate (SO_4) concentrations spiked at GWA in January and July. The source of these spikes is yet unknown.

Table 5-14. Potassium in the monitoring bores during the reporting period.

K (mg/L)	2023		2024						
	27-Nov	17-Dec	21-Jan	18-Feb	17-Mar	21-Apr	26-May	23-Jun	28-Jul
GWA	4.8	8.9	4.4	5.9		5.9	5.2	6.7	4.8
GWE	7.1	6.5	13.0	6.3	11.0	5.8	8.2	6.3	6.5
GWB01		17.0	5.5	11.0	15.0	10.0	16.0	13.0	14.0
GWB02	43.0	12.0	5.6	8.3	6.0	5.9	9.9	5.1	5.4
GWB03	5.8	8.8	7.7	4.2	3.7	4.0	8.4	4.7	5.5
GWB04	7.9	9.7	8.1	7.7	8.2	8.4	12.0	8.9	9.0

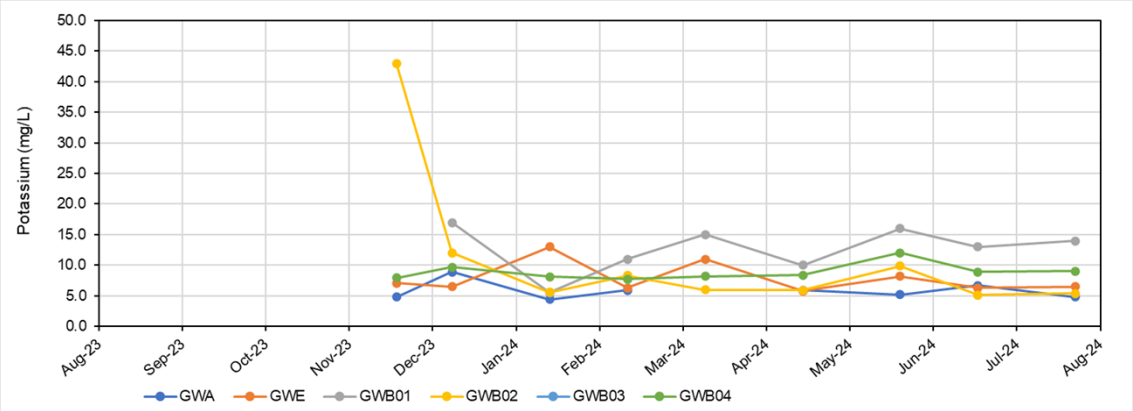


Figure 5-10. Potassium in the reporting period

Table 5-15. Alkalinity in the monitoring bores during the reporting period.

Alkalinity (mg/L)	2023		2024						
	27-Nov	17-Dec	21-Jan	18-Feb	17-Mar	21-Apr	26-May	23-Jun	28-Jul
GWA	360	280	360	340		380	376	390	330
GWE	210	330	440	230	360	270	270	260	260
GWB01		360	250	430	390	420	490	440	410
GWB02	510	350	470	420	410	380	520	450	440
GWB03	500	480	490	420	310	340	400	550	470
GWB04	450	440	460	430	400	420	550	490	500

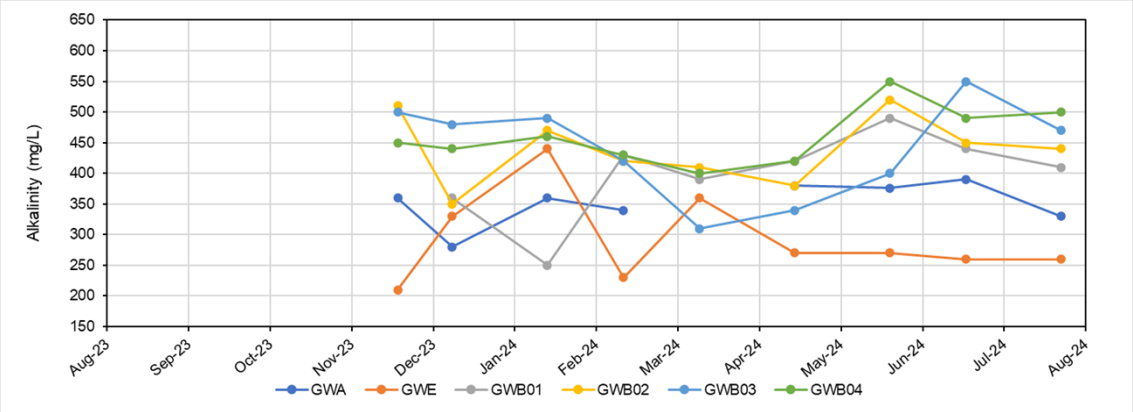


Figure 5-11. Alkalinity in the reporting period

Table 5-16. Calcium in the monitoring bores during the reporting period.

Ca (mg/L)	2023		2024						
	27-Nov	17-Dec	21-Jan	18-Feb	17-Mar	21-Apr	26-May	23-Jun	28-Jul
GWA	73	36	72	74		79	81	72	57
GWE	30	48	89	27	64	41	42	38	37
GWB01		54	37	82	61	76	110	96	67
GWB02	89	46	90	99	81	64	110	78	55
GWB03	96	77	110	81	46	59	82	100	51
GWB04	79	64	76	71	58	68	84	76	47

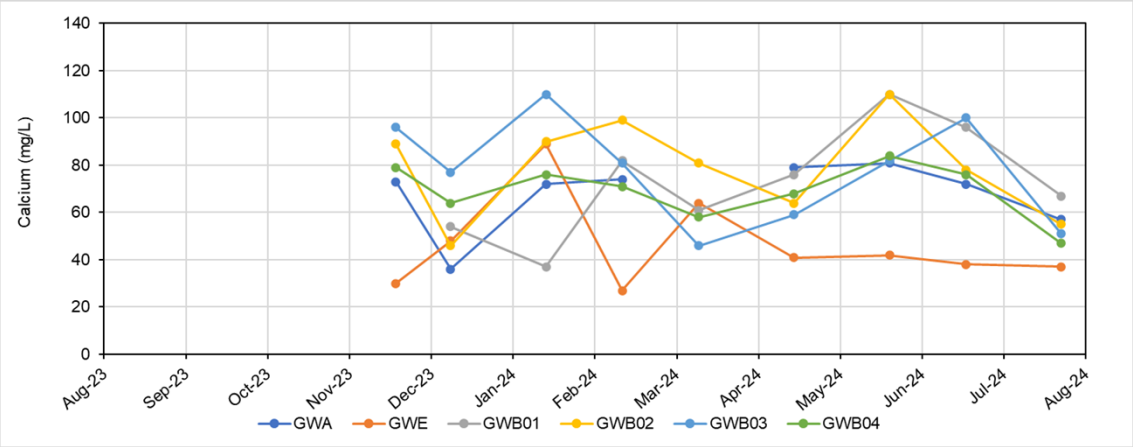


Figure 5-12. Calcium in the reporting period

Table 5-17. Chloride in the monitoring bores during the reporting period.

Cl (mg/L)	2023		2024						
	27-Nov	17-Dec	21-Jan	18-Feb	17-Mar	21-Apr	26-May	23-Jun	28-Jul
GWA	5	10	5	6		5	3	7	5
GWE	10	39	43	10	10	13	10	12	12
GWB01		44	13	37	28	49	91	80	64
GWB02	14	22	23	35	18	14	20	32	30
GWB03	12	17		7	10	4	13	13	12
GWB04	5	8	5	9	4	4	7	8	6

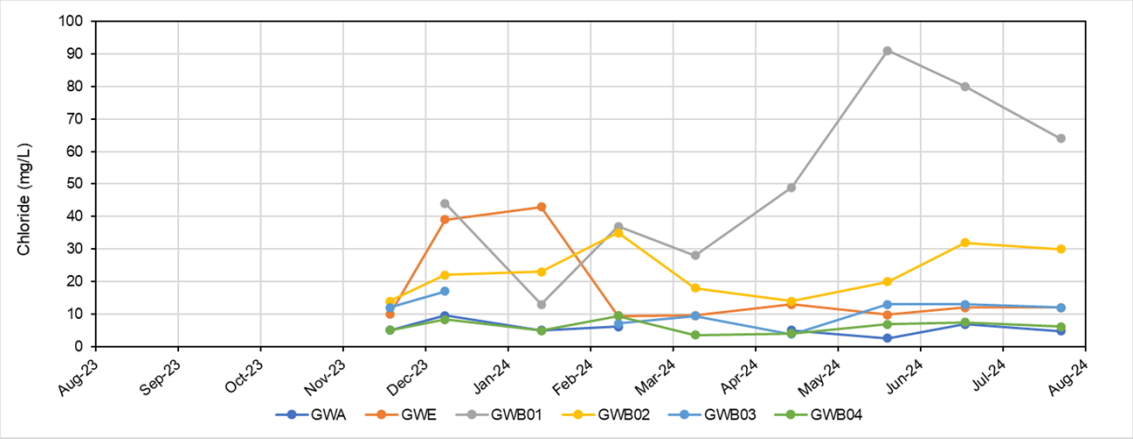


Figure 5-13. Chloride in the reporting period

Table 5-18. Sodium in the monitoring bores during the reporting period.

Na (mg/L)	2023		2024						
	27-Nov	17-Dec	21-Jan	18-Feb	17-Mar	21-Apr	26-May	23-Jun	28-Jul
GWA	6	6	5	6		6	6	6	6
GWE	16	27	26	14	6	15	15	13	14
GWB01		21	13	21	17	22	37	36	34
GWB02	51	12	15	21	18	11	20	17	16
GWB03	22	18	23	6	8	5	9	18	10
GWB04	9	9	7	6	7	6	14	9	9

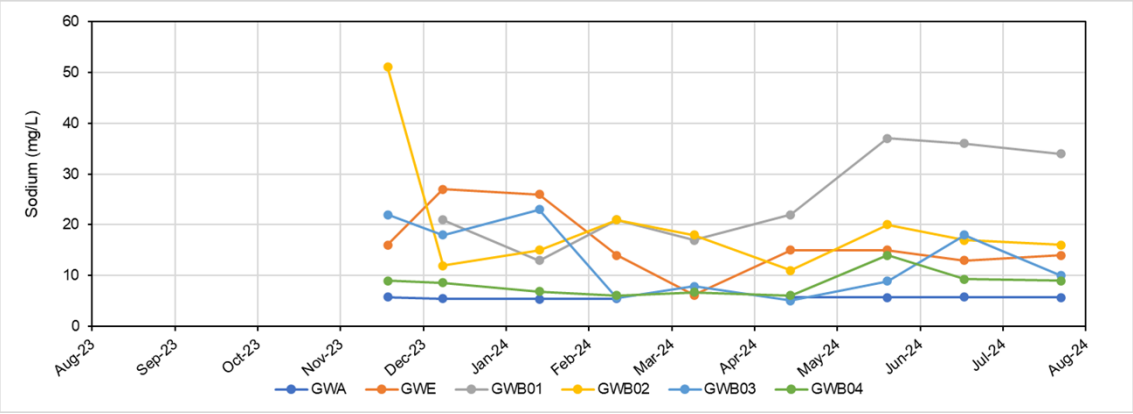


Figure 5-14. Sodium in the reporting period

Table 5-19. Sulphate in the monitoring bores during the reporting period.

SO4 (mg/L)	2023		2024						
	27-Nov	17-Dec	21-Jan	18-Feb	17-Mar	21-Apr	26-May	23-Jun	28-Jul
GWA	5	5	6	8	8	18	5	7	5
GWE	12	12	18	7	11	6	5	6	6
GWB01		16	4	21	16	28	37	24	19
GWB02	21	36	29	32	20	12	23	32	32
GWB03	79	89	170	7	5	6	5	73	15
GWB04	5	10	8	9	5	6	15	10	11

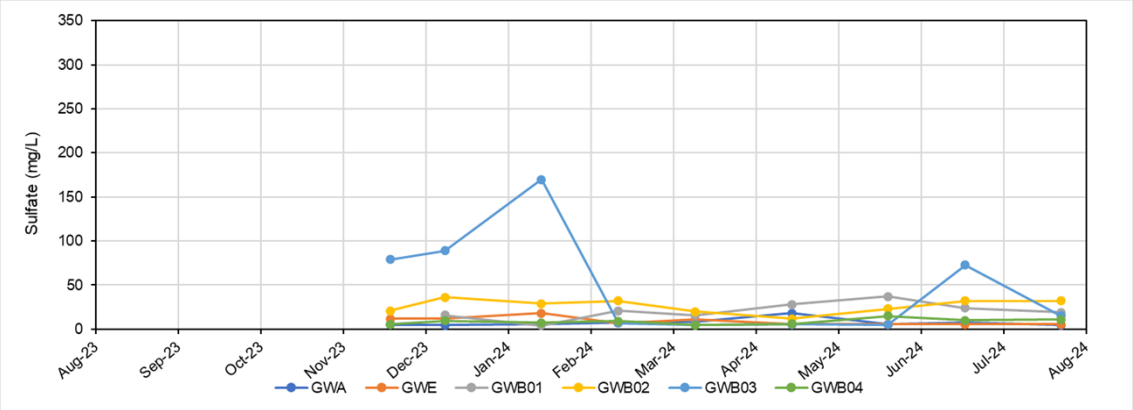


Figure 5-15. Sulfate in the reporting period

Table 5-20. Magnesium in the monitoring bores during the reporting period.

Mg (mg/L)	2023		2024						
	27-Nov	17-Dec	21-Jan	18-Feb	17-Mar	21-Apr	26-May	23-Jun	28-Jul
GWA	34	29	33	35		39	35	35	35
GWE	27	38	45	28	36	33	33	30	32
GWB01		38	28	41	39	51	52	45	45
GWB02	49	44	52	48	46	44	52	50	53
GWB03	68	58	79	41	36	36	43	71	55
GWB04	57	54	58	54	54	55	65	60	65

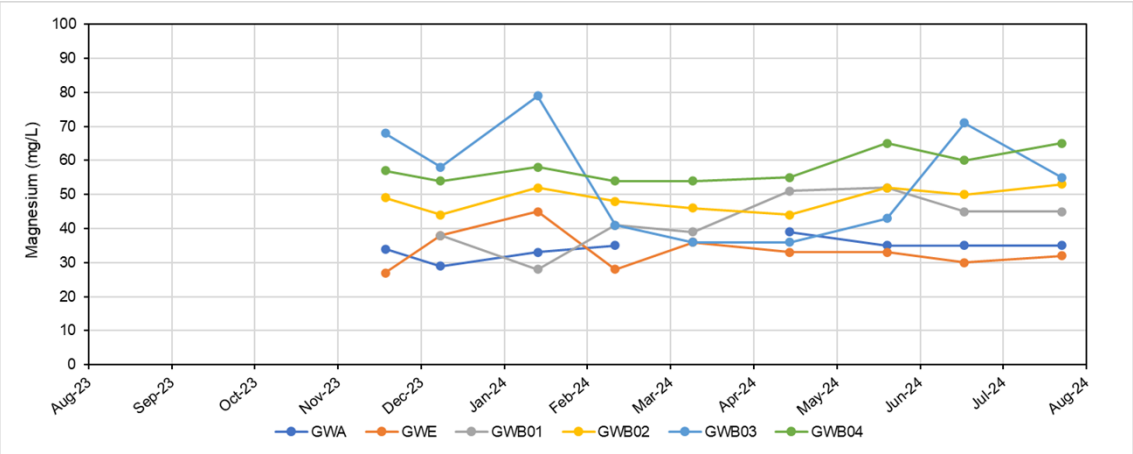


Figure 5-16. Magnesium in the reporting period

Nutrients

TN and nitrate (NO_3 as N) were mostly higher in GWB02 than at GWB01; however, concentrations in the reporting period were most commonly the highest at GWB03 and GWB04, suggestive of elevated nutrient concentrations in these bores.

Overall, ammonium levels were the highest at GWB01, and an order of magnitude or more, higher than the other bores. Such result is a likely indication of leachate infiltration, although ammonium in November at the leachate site were lower than the highest concentrations recorded in June and July at GWB01, but higher than that recorded in December at this bore. Of note is that the occasional presence of ammonium at the upgradient monitoring bores potentially indicates and impact from the landfill, but at a lower level.

As shown in Table 5-22, TP concentrations were elevated at all of the shallow bores (GWB01-GWB04). The source of TP at these sites may be associated to an impact from the facility.

Table 5-21. Total nitrogen in the monitoring bores during the reporting period.
(Concentrations below the LOR are greyed out)

TN (µg/L)	2023	2024	
	27-Nov	18-Feb	26-May
GWA	270		590
GWE	140		970
GWB01		1200	1600
GWB02	1400	2600	840
GWB03	3200		720
GWB04	3200	3900	3900

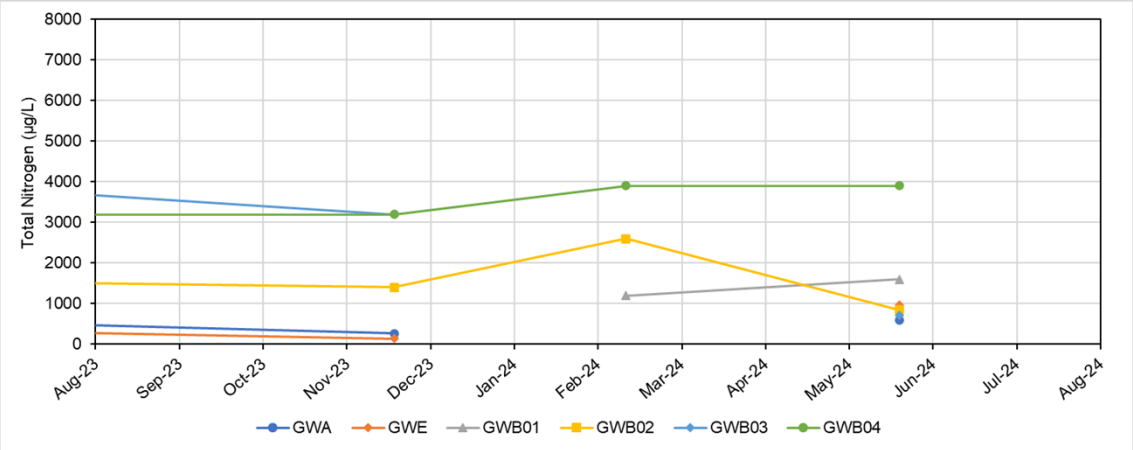


Figure 5-17. Total nitrogen in the reporting period

Table 5-22. Total phosphorus in the monitoring bores during the reporting period.
(Concentrations below the LOR are greyed out)

TP (µg/L)	2023	2024	
	27-Nov	18-Feb	26-May
GWA	<10	57	<10
GWE	<10	<10	24
GWB01		<10	49
GWB02	65	<10	33
GWB03	810	<10	59
GWB04	23	<10	160

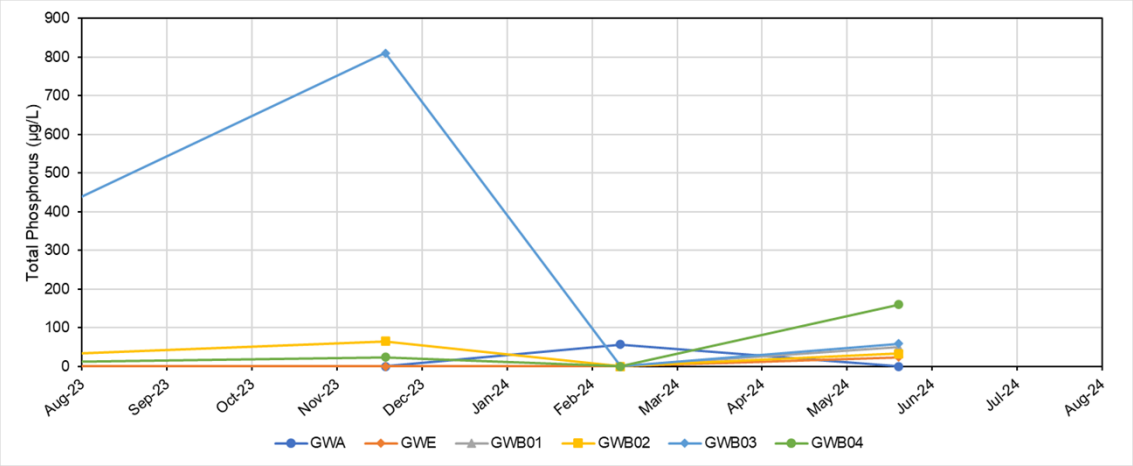


Figure 5-18. Total phosphorus in the reporting period

Table 5-23. Nitrate as N in the monitoring bores during the reporting period.
(Concentrations below the LOR are greyed out)

NO3-N (µg/L)	2023	2024	
	27-Nov	18-Feb	26-May
GWA	<5		290
GWE	31		640
GWB01		790	
GWB02	<5	2300	380
GWB03	2800		680
GWB04	<5	3800	3100

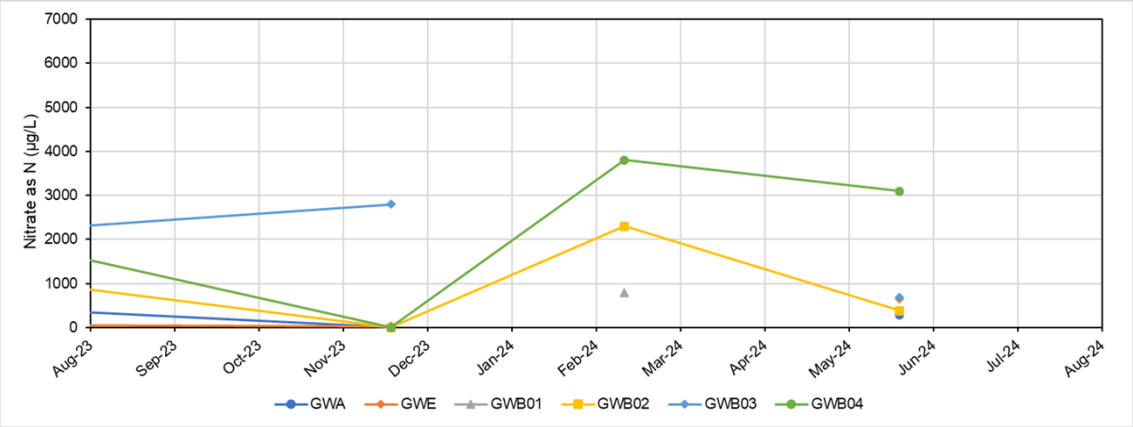


Figure 5-19. Nitrate as N in the reporting period

Table 5-24. Ammonium in the monitoring bores during the reporting period.
(Concentrations below the LOR are greyed out)

NH4 (µg/L)	2023		2024						
	27-Nov	17-Dec	21-Jan	18-Feb	17-Mar	21-Apr	26-May	23-Jun	28-Jul
GWA	31	<7	<7	<7	<7	<7	<5	<7	8
GWE	22	58	110	<7	<7	<7	17	29	57
GWB01		1300	45	160		<7	730	2100	2700
GWB02	29	24	<7	39	16	<7	<5	<7	9
GWB03		15	<7	18	<7	<7	7	21	7
GWB04	100	<7	<7	<7	<7	<7	8	<7	7

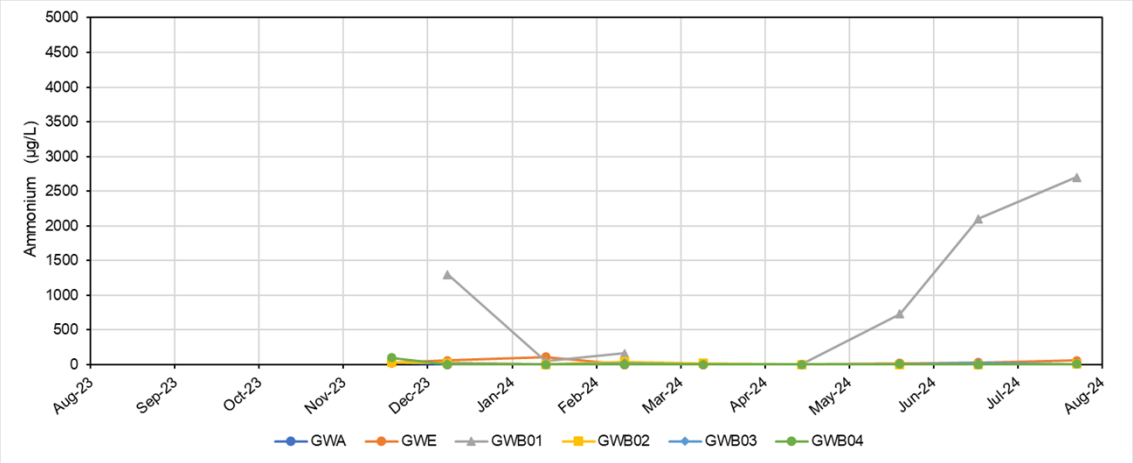


Figure 5-20. Ammonium in the reporting period.

Dissolved metals

Concentrations of chromium - CrIII, CrVI and selenium (Se) were below their respective LOR in the three sampling rounds when metals were analysed. As such, results for these metals are not presented in the tables below.

As shown in Table 5-25 and Table 5-26, cadmium (Cd) and aluminium (Al) were detected in at least one of the downgradient bores, while lead (Pb) was detected in both the downgradient bore GWB02 and the upgradient bore GWB04. However, the concentration of Pb at the downgradient bore was seven times higher than that at the upgradient bore.

During the reporting period, copper (Cu), manganese (Mn), nickel (Ni), and zinc (Zn) concentrations were higher and/or more frequently detected in the downgradient bores compared to the upgradient bores. The highest levels recorded at GWB02 occurred in December, while elevated concentrations at GWB01 were mostly reported in May.

Spikes in iron (Fe) levels were reported in most bores in November, followed by a decrease in February. The detection of this metal in the downgradient bores is unlikely to be caused by leachate infiltration, as the upgradient bore GWA consistently recorded the highest levels.

Results are also presented in Figure 5-21 to Figure 5-27. Cadmium results were not graphed, as concentrations above the LOR only once during the reporting period.

Table 5-25. Cadmium in the monitoring bores during the reporting period.
(Concentrations below the LOR are greyed out)

Cd (mg/L)	2023	2024	
	27-Nov	18-Feb	26-May
GWA	<0.00010	<0.00010	<0.00010
GWE	<0.0001	<0.0001	<0.0001
GWB01		<0.0001	<0.0001
GWB02	0.00036	<0.0001	<0.0001
GWB03	<0.0001	<0.0001	<0.0001
GWB04	<0.0001	<0.0001	<0.0001

Table 5-26. Aluminium in the monitoring bores during the reporting period.
(Concentrations below the LOR are greyed out)

Al (mg/L)	2023	2024	
	27-Nov	18-Feb	26-May
GWA	<0.010	<0.010	<0.010
GWE	<0.010	<0.010	<0.010
GWB01		0.036	<0.010
GWB02	0.016	<0.010	<0.010
GWB03	<0.010	<0.010	<0.010
GWB04	<0.010	<0.010	<0.010

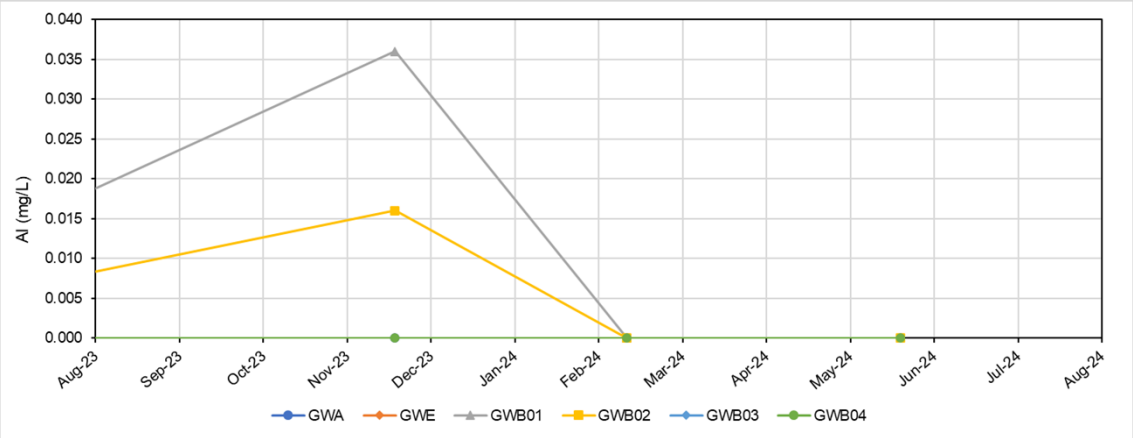


Figure 5-21. Aluminium in the reporting period.

Table 5-27. Lead in the monitoring bores during the reporting period.
(Concentrations below the LOR are greyed out)

Pb (mg/L)	2023	2024	
	27-Nov	18-Feb	26-May
GWA	<0.001	<0.001	<0.001
GWE	<0.001	<0.001	<0.001
GWB01		<0.001	<0.001
GWB02	0.014	<0.001	<0.001
GWB03	<0.001	<0.001	<0.001
GWB04	0.002	0.002	<0.001

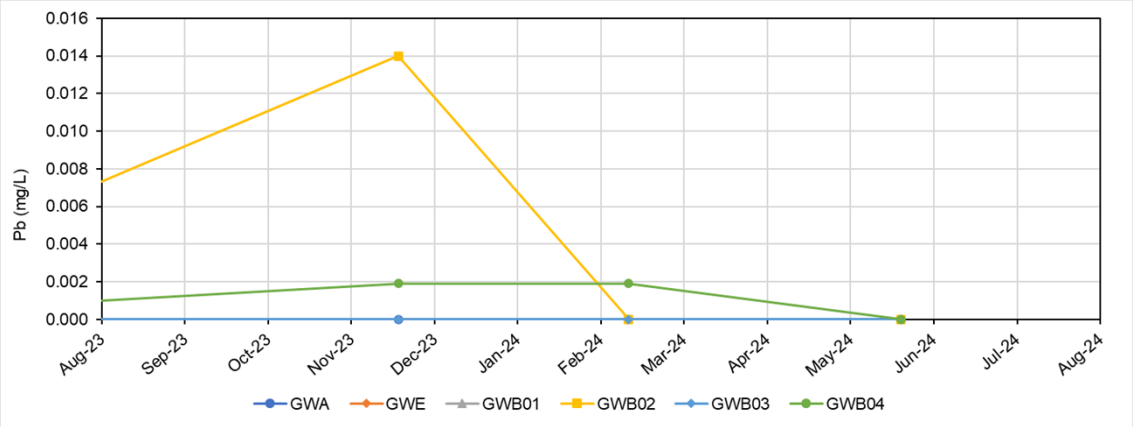


Figure 5-22. Lead in the reporting period.

Table 5-28. Copper in the monitoring bores during the reporting period.
(Concentrations below the LOR are greyed out)

Cu (mg/L)	2023	2024	
	27-Nov	18-Feb	26-May
GWA	0.003		<1.0
GWE	0.002	<0.001	<0.001
GWB01		0.005	<0.0050
GWB02	1.400	0.002	0.002
GWB03	0.005	<0.001	<0.001
GWB04	0.003	<0.001	0.003

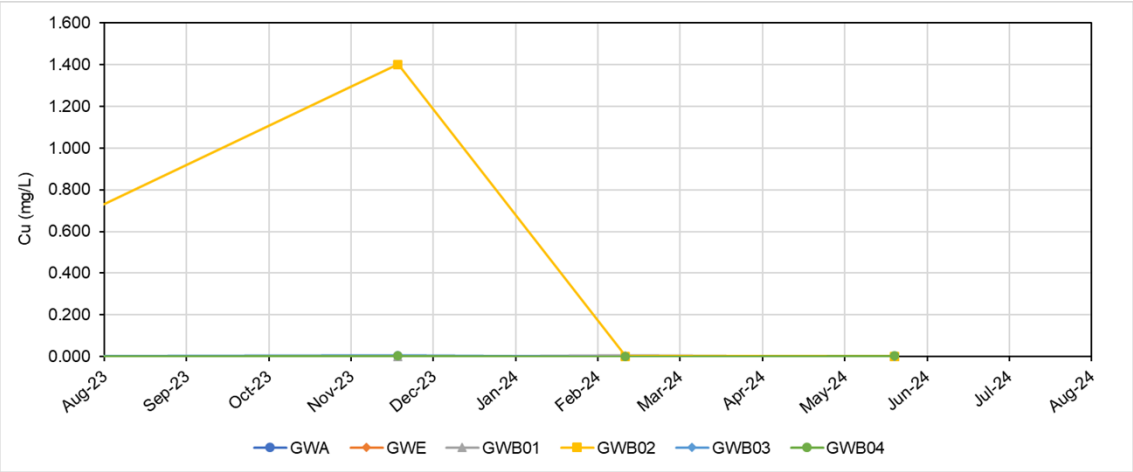


Figure 5-23. Cadmium in the reporting period.

Table 5-29. Iron in the monitoring bores during the reporting period.
(Concentrations below the LOR are greyed out)

Fe (mg/L)	2023	2024	
	27-Nov	18-Feb	26-May
GWA	1.10	0.02	0.01
GWE	0.20	0.02	<0.010
GWB01		0.04	<0.010
GWB02	0.32	<0.010	<0.010
GWB03	0.02	<0.010	<0.010
GWB04	<0.010	<0.010	<0.010

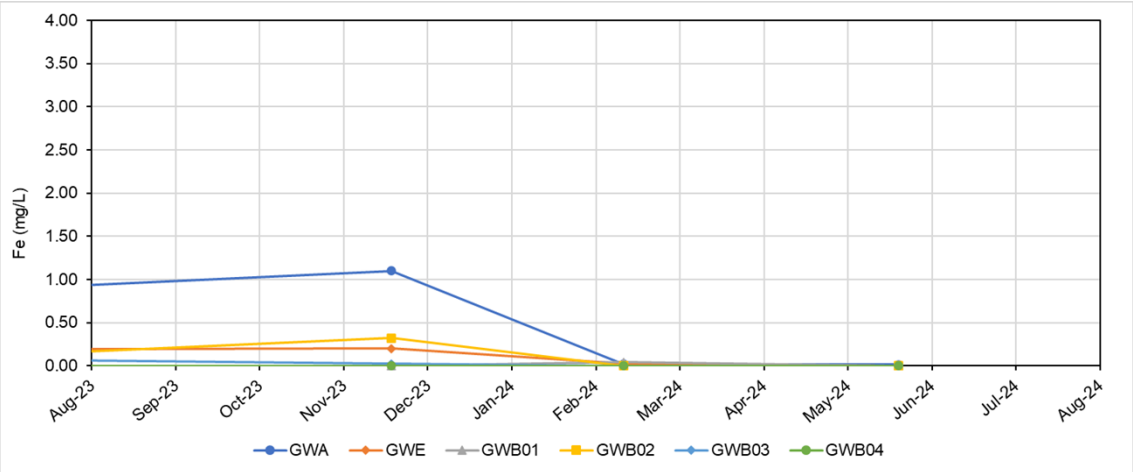


Figure 5-24. Iron in the reporting period.

Table 5-30. Manganese in the monitoring bores during the reporting period.
(Concentrations below the LOR are greyed out)

Mn (mg/L)	2023	2024	
	27-Nov	18-Feb	26-May
GWA	0.010	0.004	0.002
GWE	0.020	0.007	0.009
GWB01		0.031	0.160
GWB02	0.150	<0.001	0.010
GWB03	0.020	<0.001	0.008
GWB04	<0.001	<0.001	0.002

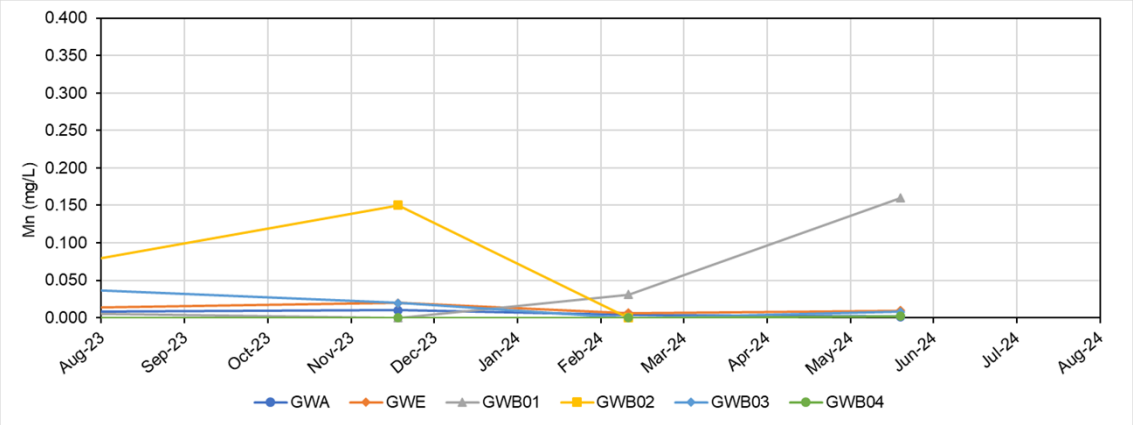


Figure 5-25. Manganese in the reporting period.

Table 5-31. Nickel in the monitoring bores during the reporting period.
(Concentrations below the LOR are greyed out)

Ni (mg/L)	2023	2024	
	27-Nov	18-Feb	26-May
GWA	<0.001	0.002	<0.001
GWE	<0.001	<0.001	<0.001
GWB01		0.003	0.003
GWB02	0.005	0.001	0.002
GWB03	0.002	<0.001	<0.001
GWB04	<0.001	<0.001	0.002

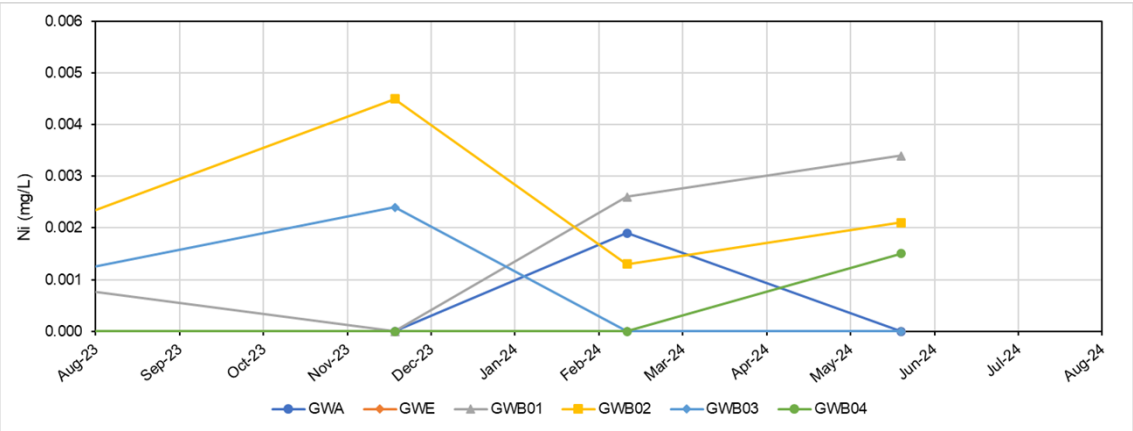


Figure 5-26. Nickel in the reporting period.

Table 5-32. Zinc in the monitoring bores during the reporting period.
(Concentrations below the LOR are greyed out)

Zn (mg/L)	2023	2024	
	27-Nov	18-Feb	26-May
GWA	0.066		0.007
GWE	0.086	<0.001	0.003
GWB01		0.007	0.009
GWB02	1.100	0.003	0.009
GWB03	0.032	0.002	0.008
GWB04	0.045	0.033	0.029

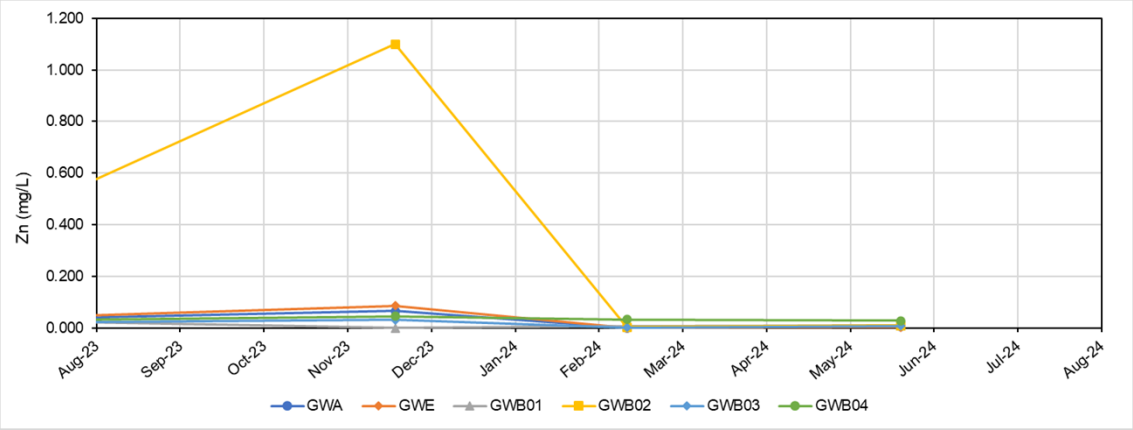


Figure 5-27. Zinc in the reporting period.

Other leachate indicators

As shown in Table 5-33 to Table 5-37, TOC, TDS, BOD and VFA were variable during the reporting period, with no trends observed. Overall, concentrations in upgradient and downgradient bores do not appear to be significantly different, although slightly higher levels of TOC, BOD and TDS appear to be more commonly present in the downgradient bores.

Spikes in COD levels were recorded at almost all bores in January, although concentrations decreased the following month. Of note is that the LOR for this analyte was raised in December for GWB01, given that the sample 'contained elevated chloride levels' and due to 'matrix requiring dilution', as stated in the laboratory report.

Table 5-33. Total organic carbon in the monitoring bores during the reporting period.
(Concentrations below the LOR are greyed out)

TOC (mg/L)	2023		2024						
	27-Nov	17-Dec	21-Jan	18-Feb	17-Mar	21-Apr	26-May	23-Jun	28-Jul
GWA	4	<1.0	<1.0	2	1	1	<1.0	<1.0	<1.0
GWE	1	3	4	<1.0	6	2	<1.0	2	<1.0
GWB01		3	1	3	5	3	8	8	
GWB02	2	2	2	2	5	3	2		
GWB03		5	5	<1.0	2	1	4	2	
GWB04		1	<1.0	2	1	7	<1.0	<1.0	1

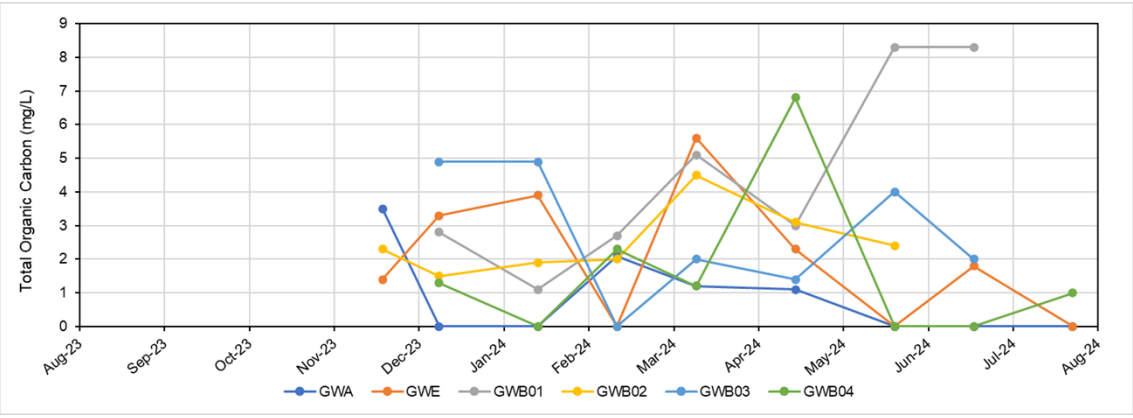


Figure 5-28. Total organic carbon in the reporting period.

Table 5-34. Total dissolved solids in the monitoring bores during the reporting period.
(Concentrations below the LOR are greyed out)

TDS (mg/L)	2023		2024						
	27-Nov	17-Dec	21-Jan	18-Feb	17-Mar	21-Apr	26-May	23-Jun	28-Jul
GWA	350	300	380	340		420	360	390	330
GWE	200	420	510	220	360	270	290	270	260
GWB01		480	260		420	540	620	600	490
GWB02	730	480	510	510	480	430	590		420
GWB03	630	570	670	400	320	340	350		390
GWB04		490	460	450	380	440	550		440

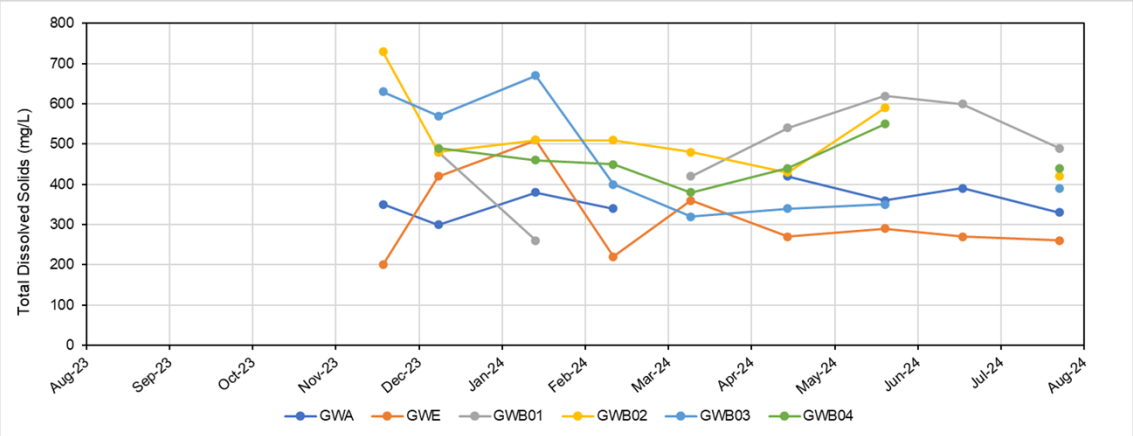


Figure 5-29. Total dissolved solids in the reporting period.

Table 5-35. Chemical oxygen demand in the monitoring bores during the reporting period.
(Concentrations below the LOR are greyed out)

COD (mg/L)	2023		2024						
	27-Nov	17-Dec	21-Jan	18-Feb	17-Mar	21-Apr	26-May	23-Jun	28-Jul
GWA	<20	<20	<20	<20	<20	<20	<20	<20	<20
GWE	<20	<20	66	<20	<20	<20	<20	<20	<20
GWB01		<100	25	<20	<20	<20	<20	93	<20
GWB02	290	<20	120	<20	<20	<20	<20		<20
GWB03	370	60	120	<20	<20	<20	<20	54	<20
GWB04		58	<20	<20	<20	<20	<20	<20	<20

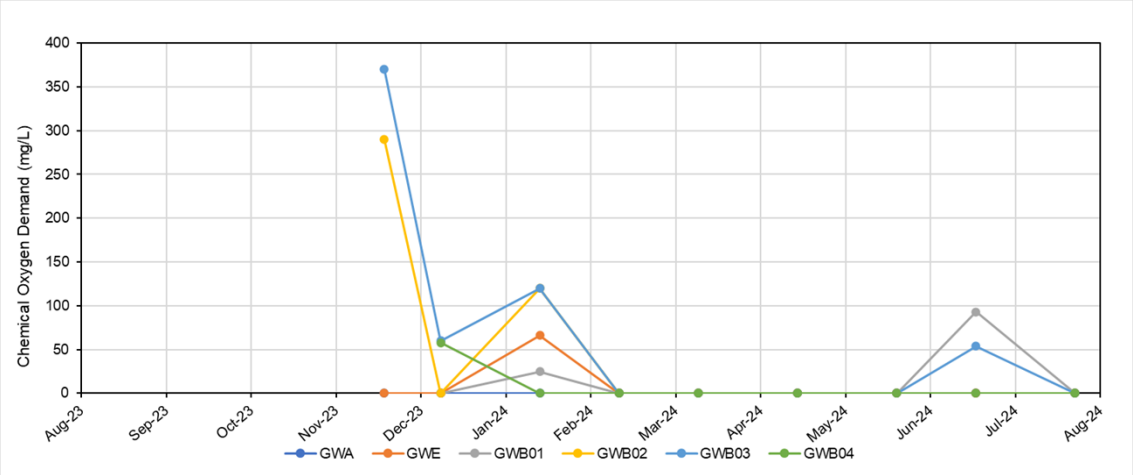


Figure 5-30. Chemical oxygen demand in the reporting period.

Table 5-36. Biochemical oxygen demand in the monitoring bores during the reporting period.
(Concentrations below the LOR are greyed out)

BOD (mg/L)	2023		2024						
	27-Nov	17-Dec	21-Jan	18-Feb	17-Mar	21-Apr	26-May	23-Jun	28-Jul
GWA	5	<5.0	<5.0	15		<5.0	<5.0	18	<5.0
GWE	<5.0	15	13	7		<5.0	<5.0	16	<5.0
GWB01		25	<5.0			<5.0	12		<5.0
GWB02	13	20	11	17		<5.0	6		<5.0
GWB03	23	18	11	12	15	<5.0	<5.0	<5.0	<5.0
GWB04		17	6	18	17	<5.0	7		<5.0

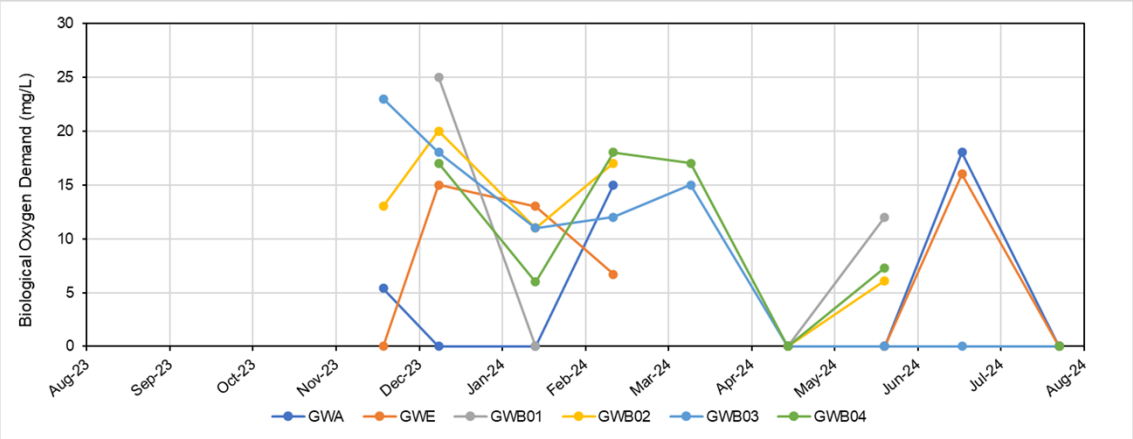


Figure 5-31. Biological oxygen demand in the reporting period.

Table 5-37. VFA in the monitoring bores during the reporting period.
(Concentrations below the LOR are greyed out)

VFA (mg/L)	2023	2024	
	27-Nov	18-Feb	26-May
GWA	110	81	160
GWE	130	49	110
GWB01		100	190
GWB02	120	290	140
GWB03	130	180	180
GWB04		140	240

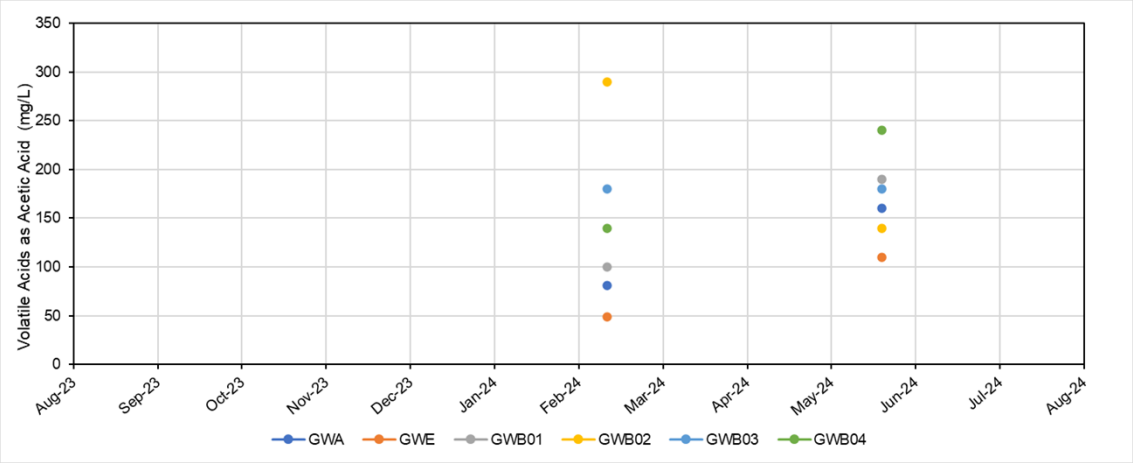


Figure 5-32. VFA in the reporting period.

Total Recoverable Hydrocarbons

As shown in Table 5-38, TRH fraction C_{15}-C_{28} was at GWB01 in May. As mentioned in Section 5.1.2, the detection of this fraction in the field blank submitted in the same sampling round is indicative of a potential cross-contamination of the samples. Therefore, the results presented in Table 5-38 are not considered representative of the water quality at this bore.

TRH fraction C_{10}-C_{14} was detected at GWA, this being the first time that TRH are detected in a bore other than GWB01.

It is important to note that the LORs for TRH C_6-C_9, C_6-C_{10}, Methyl Tert Butyl Ether (MTBE) and BTEXN were all raised at GWB02 in November due to the sample being 'foamy' and 'therefore required dilution', as reported by the laboratory.

Graphs for the reporting period are not included, as TRH fractions C15-C28 and C10-C14 exceeded the LOR on only one occasion.

Table 5-38. TRH C_{15}-C_{28} fraction concentration in the monitoring bores during the reporting period.
(Concentrations below the LOR are greyed out)

TRH C15-C28 (µg/L)	2023	2024	
	27-Nov	18-Feb	26-May
GWA	<100		<100
GWE	<100	<100	<100
GWB01		<100	160
GWB02	<100	<100	<100
GWB03	<100	<100	<100
GWB04	<100	<100	<100

Table 5-39. TRH C_{10}-C_{14} fraction concentration in the monitoring bores during the reporting period.
(Concentrations below the LOR are greyed out)

TRH C10-C14 (µg/L)	2023	2024	
	27-Nov	18-Feb	26-May
GWA	440		<50
GWE	<50	<50	<50
GWB01		<50	<50
GWB02	<50	<50	<50
GWB03	<50	<50	<50
GWB04	<50	<50	<50

PFAS

PFAS concentrations were higher and more frequently detected at the downgradient bores GWB01 and GWB02 compared to those upgradient; see Table 5-40 to Table 5-52. In addition, PFAS forms PFBS, PFPeS and PFHpS were only detected at the downgradient bores. The wide mixture of different PFAS types detected in the downgradient bores is indicative of a landfill source.

In the upgradient bore GWB04, all PFAS forms remained below the LOR, while at GWB03, only two PFAS forms were detected in May. At bores GWA and GWE, PFAS was more frequently detected than at GWB03 and GWB04, particularly at GWA. Based on historical groundwater levels at this bore, it appears that groundwater may also flow south of the site, although this is not the predominant direction.

PFDS, PFNA, PFDA, PFUnDA, PFDoDA, PFTrDA, PFTA, 4:2 FTS, 6:2 FTS, 8:2 FTS, 10:2 FTS and PFOSA concentrations were all below respective LORs.

Table 5-40. PFBS in the monitoring bores during the reporting period.
(Concentrations below the LOR are greyed out)

PFBS (mg/L)	2023	2024	
	27-Nov	18-Feb	26-May
GWA	<0.010	<0.010	<0.010
GWE	<0.010	<0.010	<0.010
GWB01		0.10	0.15
GWB02	0.03	0.11	0.14
GWB03	<0.010	<0.010	<0.010
GWB04		<0.010	<0.010

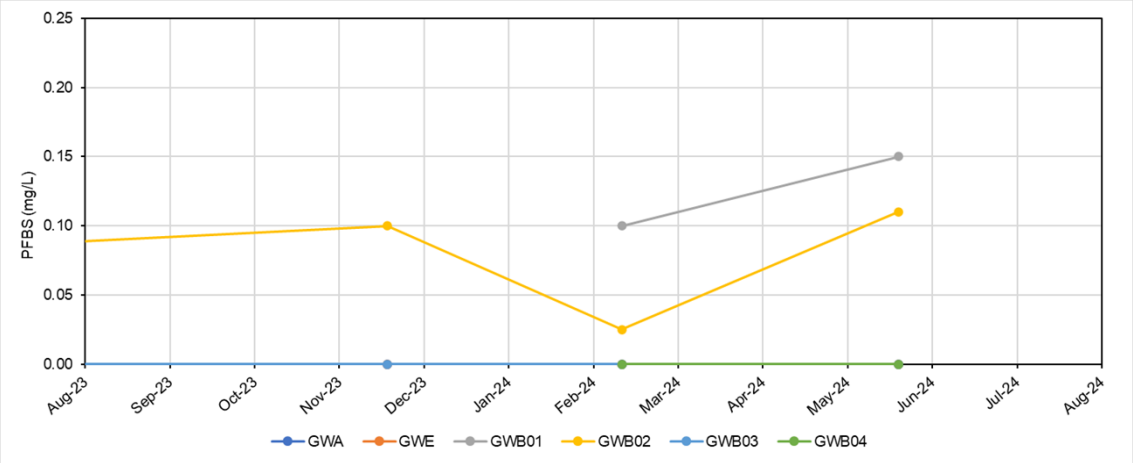


Figure 5-33. PFBS in the reporting period.

Table 5-41. PFPeS in the monitoring bores during the reporting period.
(Concentrations below the LOR are greyed out)

PFPeS (mg/L)	2023	2024	
	27-Nov	18-Feb	26-May
GWA	<0.010	<0.010	<0.010
GWE	<0.010	<0.010	<0.010
GWB01		0.08	0.09
GWB02	0.02	0.08	0.07
GWB03	<0.010	<0.010	<0.010
GWB04		<0.010	<0.010

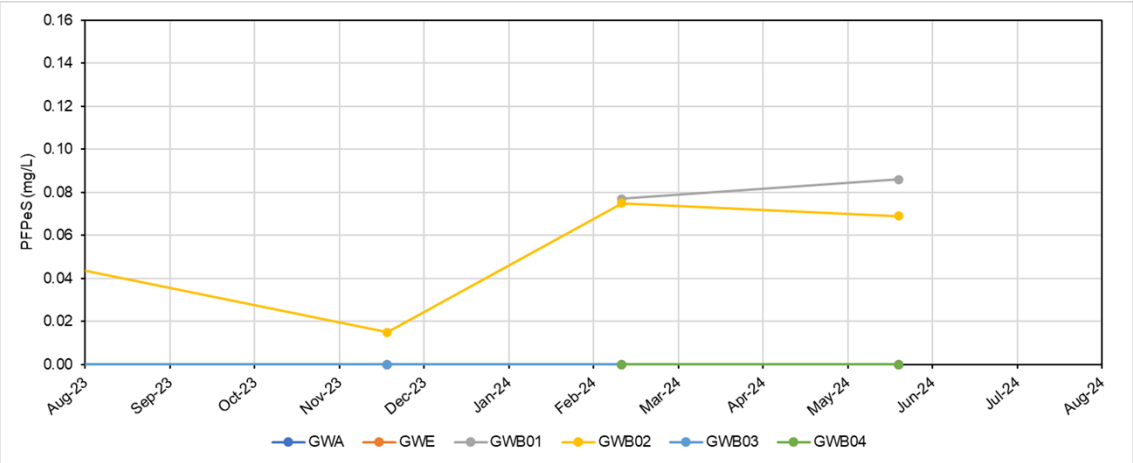


Figure 5-34. PFPeS in the reporting period.

Table 5-42. PFHxS in the monitoring bores during the reporting period.
(Concentrations below the LOR are greyed out)

PFHxS (mg/L)	2023	2024	
	27-Nov	18-Feb	26-May
GWA	0.01	<0.010	0.02
GWE	0.01	0.01	0.01
GWB01		0.57	1.00
GWB02	0.07	0.39	0.35
GWB03	<0.010	<0.010	0.01
GWB04		<0.010	<0.010

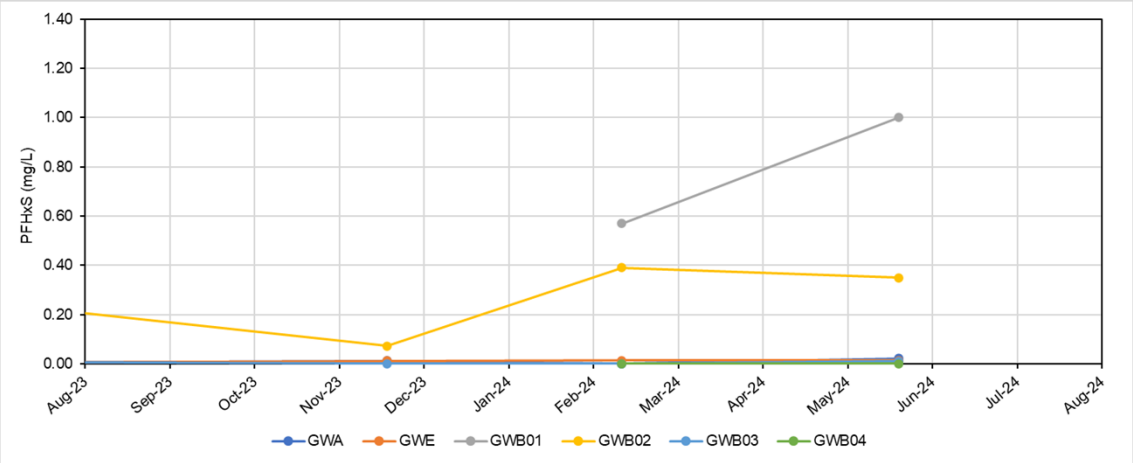


Figure 5-35. PFHxS in the reporting period.

Table 5-43. PFHpS in the monitoring bores during the reporting period.
(Concentrations below the LOR are greyed out)

PFHpS (mg/L)	2023	2024	
	27-Nov	18-Feb	26-May
GWA	<0.010	<0.010	<0.010
GWE	<0.010	<0.010	<0.010
GWB01		0.03	0.11
GWB02	<0.010	0.05	0.04
GWB03	<0.010	<0.010	<0.010
GWB04		<0.010	<0.010

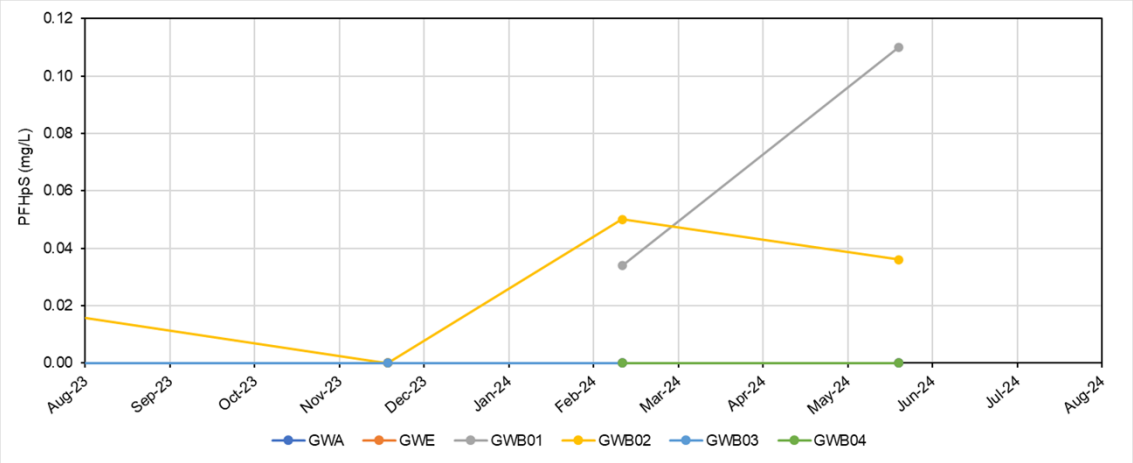


Figure 5-36. PFHpS in the reporting period.

Table 5-44. PFOS in the monitoring bores during the reporting period.
(Concentrations below the LOR are greyed out)

PFOS (mg/L)	2023	2024	
	27-Nov	18-Feb	26-May
GWA	0.01	<0.010	0.05
GWE	0.01	0.02	0.07
GWB01		1.20	3.00
GWB02	0.08	0.67	0.45
GWB03	<0.010	<0.010	0.02
GWB04		<0.010	<0.010

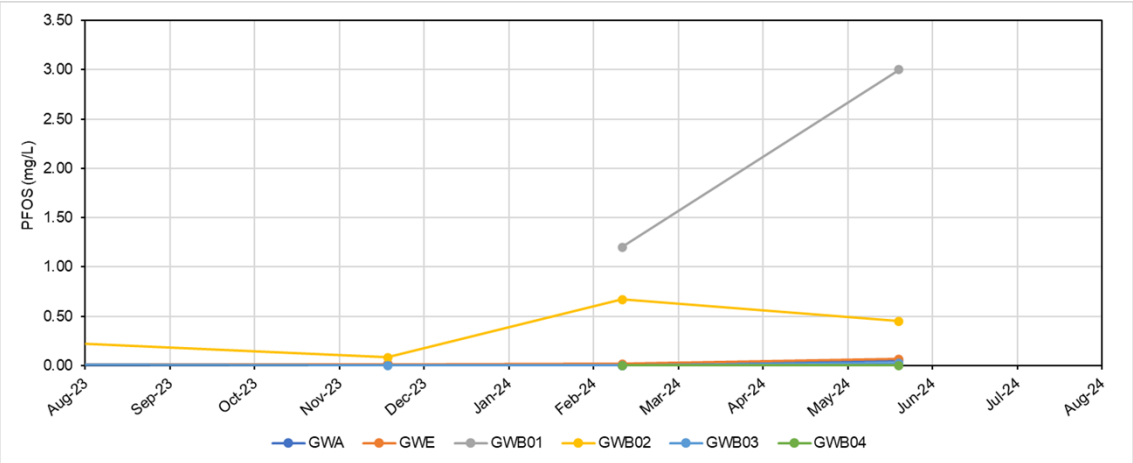


Figure 5-37. PFOS in the reporting period.

Table 5-45. PFBA in the monitoring bores during the reporting period.
(Concentrations below the LOR are greyed out)

PFBA (mg/L)	2023	2024	
	27-Nov	18-Feb	26-May
GWA	0.12	0.02	0.13
GWE	<0.020	<0.020	<0.020
GWB01		0.07	0.14
GWB02	0.03	0.09	0.10
GWB03	<0.020	<0.020	<0.020
GWB04		<0.020	<0.020

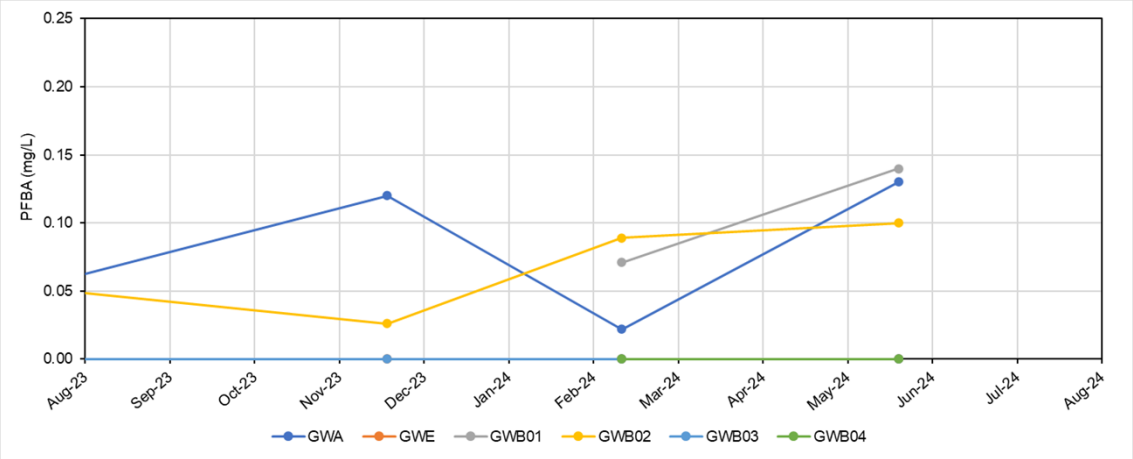


Figure 5-38. PFBA in the reporting period.

Table 5-46. PFPeA in the monitoring bores during the reporting period.
(Concentrations below the LOR are greyed out)

PFPeA (mg/L)	2023	2024	
	27-Nov	18-Feb	26-May
GWA	0.21	0.04	0.22
GWE	<0.020	<0.020	<0.020
GWB01		0.04	0.17
GWB02	<0.020	0.09	0.15
GWB03	<0.020	<0.020	<0.020
GWB04		<0.020	<0.020

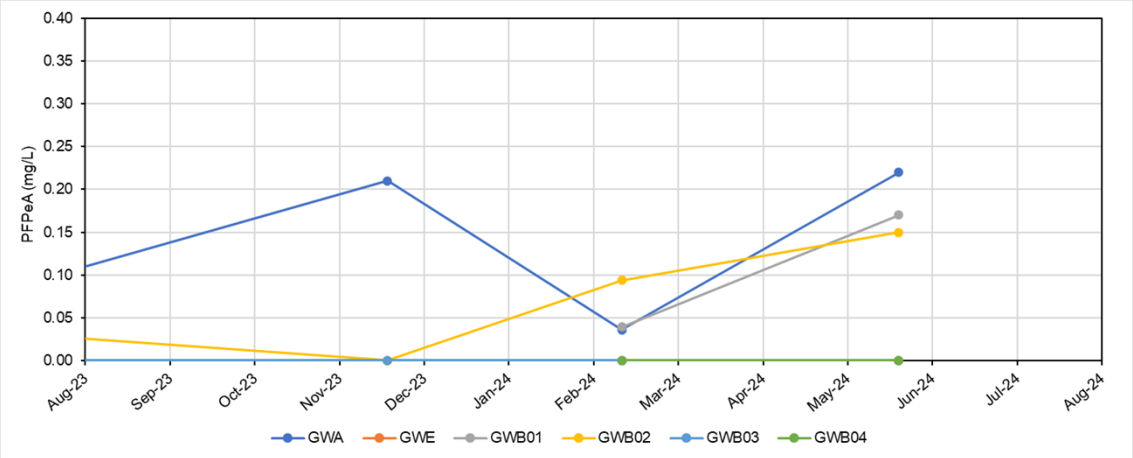


Figure 5-39. PFPeA in the reporting period.

Table 5-47. PFHxA in the monitoring bores during the reporting period.
(Concentrations below the LOR are greyed out)

PFHxA (mg/L)	2023	2024	
	27-Nov	18-Feb	26-May
GWA	0.11	0.02	0.10
GWE	<0.010	<0.010	<0.010
GWB01		0.07	0.26
GWB02	0.05	0.17	0.24
GWB03	<0.010	<0.010	<0.010
GWB04		<0.010	<0.010

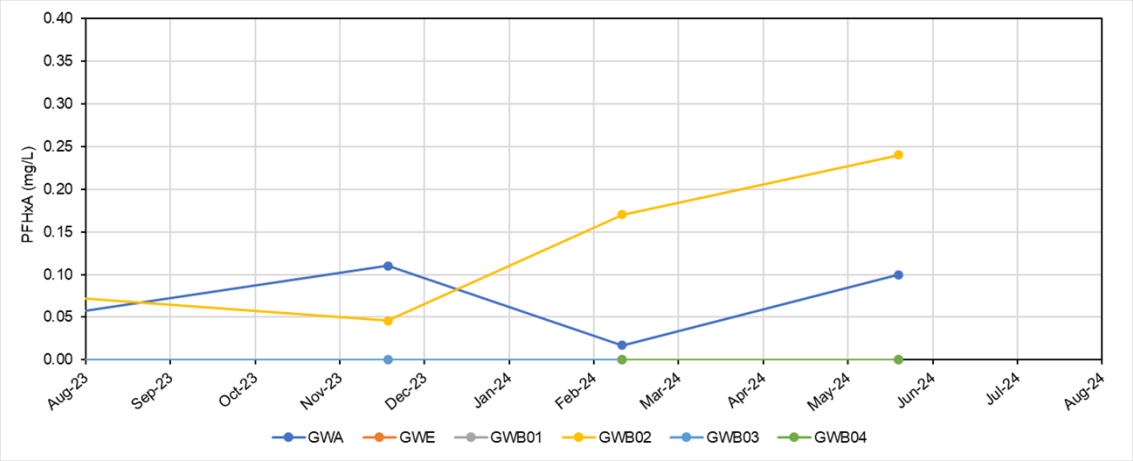


Figure 5-40. PFHxA in the reporting period.

Table 5-48. PFHpA in the monitoring bores during the reporting period.
(Concentrations below the LOR are greyed out)

PFHpA (mg/L)	2023	2024	
	27-Nov	18-Feb	26-May
GWA	0.08	0.02	0.09
GWE	<0.010	<0.010	<0.010
GWB01		0.03	0.11
GWB02	0.02	0.07	0.09
GWB03	<0.010	<0.010	<0.010
GWB04		<0.010	<0.010

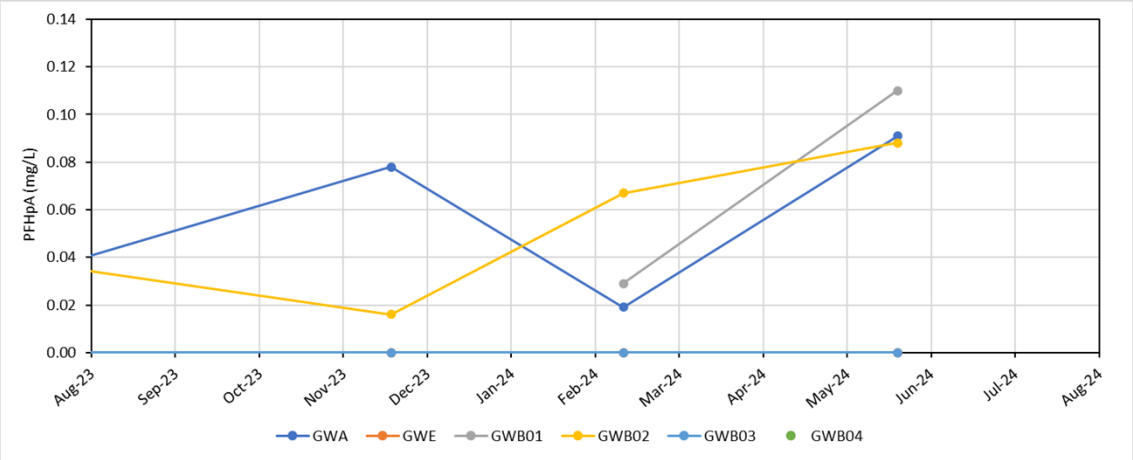


Figure 5-41. PFHpA in the reporting period.

Table 5-49. PFOA in the monitoring bores during the reporting period.
(Concentrations below the LOR are greyed out)

PFOA (mg/L)	2023	2024	
	27-Nov	18-Feb	26-May
GWA	0.04	0.01	0.06
GWE	<0.010	<0.010	<0.010
GWB01		0.08	0.28
GWB02	0.03	0.14	0.16
GWB03	<0.010	<0.010	<0.010
GWB04		<0.010	<0.010

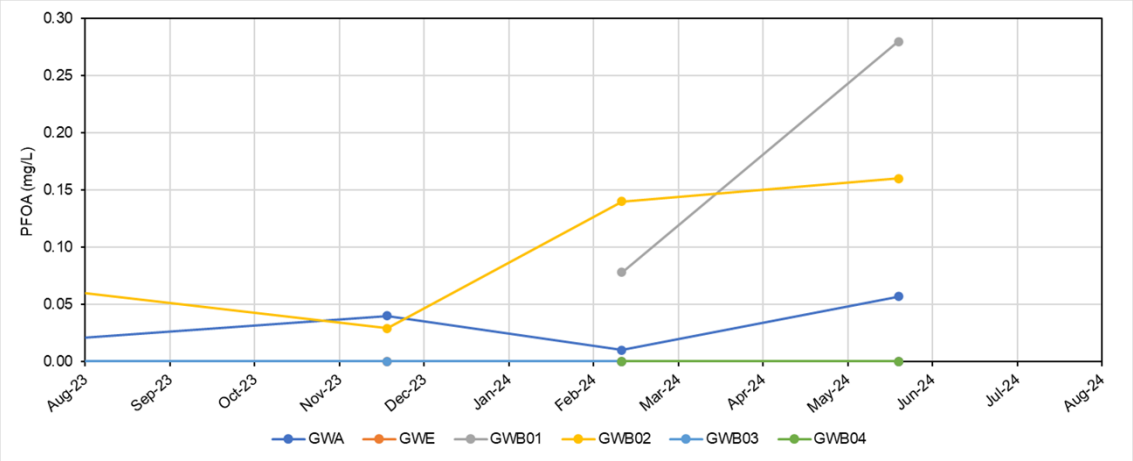


Figure 5-42. PFOA in the reporting period.

Table 5-50. Total PFHxS + PFOS in the monitoring bores during the reporting period.
(Concentrations below the LOR are greyed out)

TOTAL PFHxS + PFOS (mg/L)	2023	2024	
	27-Nov	18-Feb	26-May
GWA	0.03	<0.010	0.07
GWE	0.03	0.03	0.08
GWB01		1.80	4.00
GWB02	0.15	1.10	0.80
GWB03	<0.010	<0.010	0.03
GWB04		<0.010	<0.010

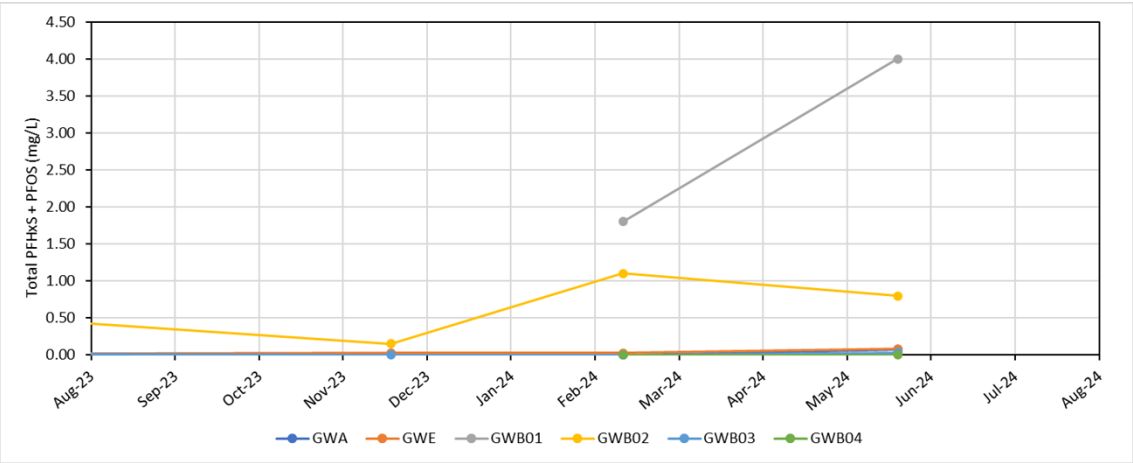


Figure 5-43. Total PFHxS + PFOS in the reporting period.

Table 5-51. Total PFOS + PFOA in the monitoring bores during the reporting period.
(Concentrations below the LOR are greyed out)

TOTAL PFOS+PFOA (mg/L)	2023	2024	
	27-Nov	18-Feb	26-May
GWA	0.05	0.01	0.11
GWE	0.01	0.02	0.07
GWB01		1.30	3.30
GWB02	0.11	0.81	0.61
GWB03	<0.010	<0.010	0.02
GWB04		<0.010	<0.010

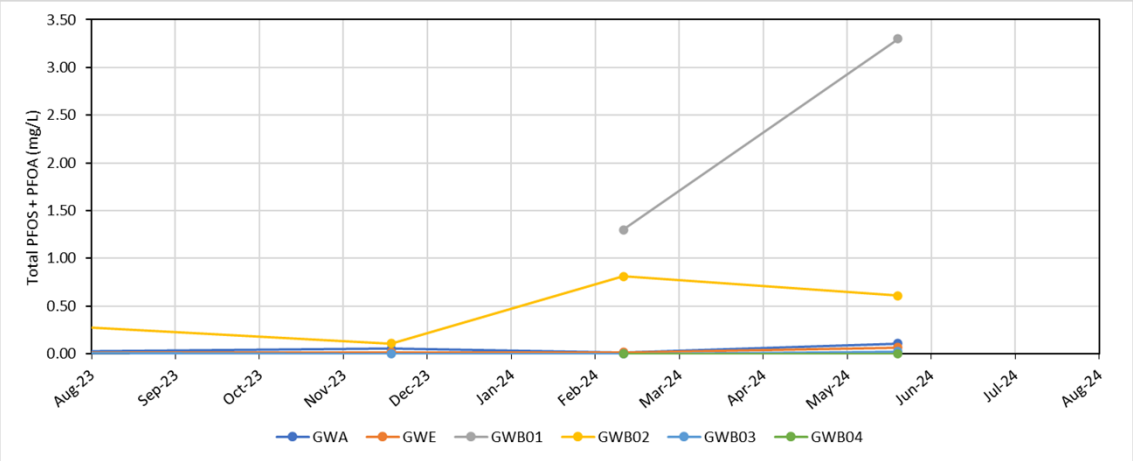


Figure 5-44. Total PFOS + PFOA in the reporting period.

Table 5-52. Total PFAS in the monitoring bores during the reporting period.
(Concentrations below the LOR are greyed out)

TOTAL PFAS (mg/L)	2023	2024	
	27-Nov	18-Feb	26-May
GWA	0.58	0.09	0.66
GWE	0.03	0.03	0.08
GWB01		2.30	5.30
GWB02	0.31	1.90	1.80
GWB03	<0.010	<0.010	0.03
GWB04		<0.010	<0.010

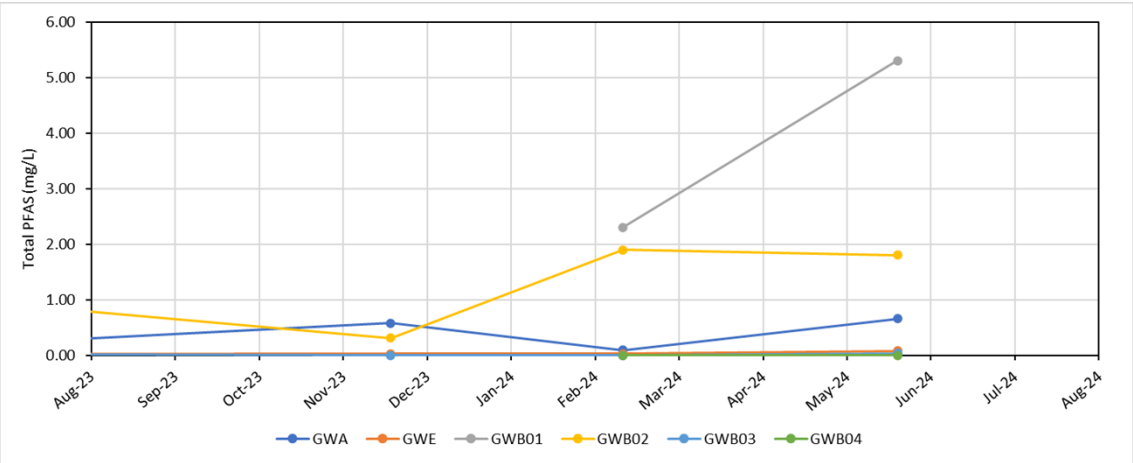


Figure 5-45. Total PFAS in the reporting period.

Other parameters

PAH, BTEXN and PCBs were all below LOR in all bores during the reporting period.

5.4.3 Historic trends

Temperature and DO have been highly variable since monitoring began. Historical data indicates that EC is typically lower in GWA and GWE than in the other bores. Results for pH have been variable since monitoring began, although in the 2021-22 monitoring period, levels increased at all bores, but then decreased in the following reporting period.

As shown in 0, seasonal trends are not observed in major ions at the monitoring bores, but distinctive trends are seen when comparing results between monitoring bores. The deep bores GWA and GWE consistently have the lowest concentrations of alkalinity, Ca and Mg. In contrast, the shallow and downgradient bores GWB01 and GWB02 commonly showed higher concentrations of Cl and Na than the other monitoring bores, with GWB01 often recording higher K concentrations as well. Major ion concentrations typically displayed less variability at GWA, GWE and GWB04, while greater variability was observed in the other three monitoring bores, particularly GWB03. However, during this reporting period, alkalinity and Ca were quite variable at all bores.

TN and TP do not appear to follow seasonal trends, but they do exhibit a more stable concentration in the deep bores GWA and GWE. No seasonal trend is observed in nitrate levels at any bores, but it appears to be commonly higher at GWB03 and GWB04.

Data on NH_4 clearly shows that concentrations are higher at GWB01 than in any other monitoring bore. In addition, a seasonal trend is seen at this bore, with concentrations increasing from April to August/September, followed by a decrease, reaching the lowest levels in February/March.

Since monitoring commenced, Cu, Fe, Mn, Ni, and Zn concentrations have displayed high variability at most monitoring bores, particularly at the shallow bores GWB01, GWB02, GWB03 and GWB04, except for Fe which is more variable at GWA and GWE. At the GWB02, Ni concentrations appear to increase early in the Wet season.

Although no increasing trend is observed in the concentration of any of the monitored metals, it is evident that during the reporting period, the highest levels of Al, Zn, Pb, and Cu ever recorded were detected at the downgradient bores, particularly at GWB02.

TOC, COD and BOD have been highly variable since monitoring started at all bores, although spikes in concentration appear to be more frequently detected at all bores but GWA and GWE. At these two bores, TDS is usually the lowest.

As shown in Appendix C, VFA appears to be increasing in all bores but GWE, such trend is particularly seen since October 2022.

PFAS concentrations in the downgradient bores GWB01 and GWB02 have always been higher than at the upgradient bores. The PFAS types detected at GWA and GWE have been commonly detected at these upgradient bores since monitoring started. Although the total PFAS concentration recorded at GWB01 is the highest recorded at this bore, and any other, no increasing trend is observed.

Overall, VFA is the only analyte that appears to show an increasing trend in concentration at all bores, except for GWE.

5.5 Discussion

Trigger value exceedances for TN, NH_4, and some total and dissolved metals were reported during the monitoring period at the downstream surface water site SWC. Although SWB was not sampled in November,

when some exceedances were reported at SWC, historical data for these sites indicates that background concentrations of these analytes are often above the trigger values when exceedances occur at SWC.

PFAS was detected in the sample collected from SWC in November, this being the first time they are detected in at any of the surface water monitoring sites. Prior to November 2023, PFAS had only been sampled once at SWB and SWC. As such, it is not possible to determine if these contaminants are occasionally detected at the surface water sites, or if they are only present at the downstream site (SWC). These uncertainties limit the assessment of the potential impacts from KWMF on surface water quality.

Groundwater monitoring results indicate a likely impact of landfill activities on groundwater quality. Contaminants elevated in the two downgradient bores (GWB01 and GWB02), compared to the upgradient bores were: some major ions (Na and Cl), ammonium, metals (Cu, Al, Cd, Pb, Mn, Ni, Zn) TOC, TDS, BOD, and a wide mixture of PFAS types.

The presence of TRH at GWA in November 2023, historical nitrate and Ni concentrations at GWB03 and 04, as well as those of Pb at GWB04, the occasional detection of ammonium at all upgradient bores and the increasing VFA levels recorded at all bores in the reporting period, may also indicate that the impact on groundwater quality is not limited to those bores identified as downgradient bores. However, more leachate data is required to confirm any potential impact, as results from the leachate site are limited and, in many cases, concentrations at this site are lower than in the groundwater bores. More importantly, the results obtained from Pit 1 and Pit 2, were mostly higher than those recorded at the leachate site in November at 2024, hindering the need of more leachate results to better assess the impacts on surface and groundwater.

It is worth noting that the GC-MS run by the laboratory for the field blank sample, indicated that the TRH fractions detected in this sample were non-petrogenic in nature. Such may also be the case of the TRH that have been detected at GWA and GWB01.

6 POTENTIAL ENVIRONMENTAL IMPACTS

Based on the data available, it appears that landfill activities are impacting on groundwater quality, as more evidently seen in bores GWB01 and GWB02, where the highest concentrations of some dissolved metals, hydrocarbons, nitrogen species and PFAS were detected. However, the upgradient bores GWA, GWE, GWB03 and GWB04 may also be indicating impacts on groundwater quality, although at a lesser level.

Potential human receptors to contaminated groundwater downgradient of the KWMF appear limited. There are no known bores used for any purpose downgradient of the KWMF i.e. no bores to the northwest or west of the facility are used for groundwater extraction. The sewage ponds for Katherine are located in this area and as such, use of groundwater and/or surface water in this area would not generally be desirable.

It is possible that groundwater from beneath the KWMF discharges to the Katherine River, although the Jinduckin Formation is a relatively poor aquifer in the region, and the Katherine River receives its most important groundwater inputs from springs located upstream that discharge groundwater from the Tindall Limestone Aquifer. The Tindall Limestone Aquifer is not readily recharged by surface water from the KWMF, where the Jinduckin Formation occurs.

Groundwater used at the KWMF is sourced from a bore upgradient of the landfill and as such, on-site workers are not at risk.

Over the monitoring period, exceedances and non-compliances were recorded in some total metals at SWC. Where available, data from the upgradient site SWB indicates that background concentrations are equal to those recorded at SWC. However, in the sampling conducted in November, samples were not collected from SWB, limiting the assessment of results from SWC against the upgradient site. Therefore, an impact from the facility on the water quality of Tindal Creek cannot be discarded, particularly if the PFAS and VFA concentrations in November at SWC are considered.

It is worth noting that limited surface water and leachate data are available for the monitoring sites, restricting the assessment of any potential impact of the facility on the water quality of Tindal Creek.

7 REVIEW OF PERFORMANCE AGAINST EMP MEASURES

As required by Condition 62.5 of EPL298-01, Table 7-1 to Table 7-12 below, provide a review of performance against the measures specified in the *Environmental Management Plan (EMP)- Katherine Waste Management Facility* (EcOz 2020).

Table 7-1. Measures for general environmental management, specified in the Environmental Management Plan- Katherine Waste Management Facility (EcOz 2020).

EMP measure:		Current implementation progress:
Mitigation / Control	Ensure the implementation and compliance of this EMP	Ongoing
	Annual environmental audit of EPL conditions and EMP	EcOz engaged to prepare annual Monitoring Report (i.e. this report)
	Ensure all personnel working at KWMF are given an induction detailing environmental risks and mitigation measures in this EMP, as well as emergency response procedures	All operators are inducted with protocol they have to follow in an emergency situation and evacuation procedure
Target / performance criteria	Impacts/risks to environment are reduced to acceptable levels	Impacts/risks to water quality are discussed in this Monitoring Report
Monitoring	Daily visual site inspection (general parameters)	Any loose rubbish is picked up every morning
	Monthly environmental inspection against EPL conditions and this EMP, as per site inspection checklist	Implemented

Table 7-2. Measures for communication, consultation and heritage management, specified in the Environmental Management Plan- Katherine Waste Management Facility (EcOz 2020).

EMP measure:		Current implementation progress:
Mitigation / Control	Seek and maintain required approvals from NT EPA regarding landfill design upgrades, monitoring and reporting in accordance with the EPL conditions	TAFT Engineering have developed Integrated Environmental Management Plan and provided recommendations to optimise use of current facility and engage with the NT EPA to assist Council with approval processes.
	Develop and distribute newsletters or leaflets to inform users of KWMF of any updates or changes to the landfill operations or site. Have this information also on the KTC website.	KTC website and social media is used to update users about, accepted waste streams, alternative disposal and/or recycling options and cost benefits for separating waste streams.
	Place notices in the newspaper when any significant works or changes are being planned/undertaken	N/A

EMP measure:		Current implementation progress:
	In the event a sacred site or heritage artefact is uncovered, the KTC must inform the Heritage Branch as soon as possible and follow further advice	N/A
	All complaints shall be logged in the complaints register and appropriate action undertaken	No complaints received in the reporting period
Target / performance criteria	Minimal complaints from users of KWMF and surrounding landowners/users	No Complaints this year
	Minimal complaints from local community	Nil
	Appropriate management of sacred sites or heritage items discoveries	Complain actioned as soon as possible
	Any complaints have been addressed and responded to	Nil N/A
Monitoring	Review of complaints register to ensure it is being used correctly	N/A
	Annual audit to ensure that monitoring and reporting are being undertaken as per the EPL conditions and EMP	Implemented

Table 7-3. Measures for waste acceptance and disposal management, specified in the Environmental Management Plan- Katherine Waste Management Facility (EcOz 2020).

EMP measure:		Current implementation progress:
Mitigation / Control	Relevant staff are to be trained on the types of waste accepted and pre-approvals required – this will be done through inductions and toolbox talks/staff meetings	Ongoing – On the job training provided to staff and discussed in regular staff meetings
	Clear signage and communication to make landfill users aware of the types of waste accepted at KWMF	Clear signs are in place. Users are also instructed on the weighbridge as they drive in. Plans are in place to implement more signs Updated signage
	At the weighbridge – conduct visual inspections of waste loads and question driver regarding types of wastes within the load	Manual and visual inspections are carried out for every load that comes in. Weighbridge staff go out and have a closer look at the waste pile. Closed Circuit Television (CCTV) is also in place to monitor the incoming waste loads
	If not general waste, seek compliance documentation to verify type of wastes and prior approval if applicable	Any disposal of asbestos requires prior application before user bring it to the waste facility Acceptance of any degassed white goods will require certificate, if not, users will be charged extra for KTC to organise onsite degassing
	Any waste not listed in the EPL can only be accepted after special approval from NT EPA	Anything that is non-compliant with NT EPA is not accepted

EMP measure:		Current implementation progress:
	Only clean fill can be accepted for disposal. Soil being brought to KWMF from potentially contaminated sites will require validation sampling results to be assessed against the NSW EPA *Waste Classification Guidelines*	Soil from potentially contaminated site is verified with NT EPA before being accepted at the facility
	Provide assistance and clear directions on correct waste disposal areas	Weighbridge staff provide clear directions to users as they drive in
	Clearly labelled signs at transfer stations	Implemented
	Salvage of recyclable materials incorrectly disposed of	Implemented – When the waste from transfer station is transferred to the tip face, staff go through the waste and remove any recyclables or hazardous objects and are placed on respective pile
	Regular clean-up of scattered and inappropriately disposed waste	Any loose rubbish is picked up every morning and disposed appropriately
	Apply daily cover, temporary cover and capping as required	Implemented
	Only domestic users are permitted to use the transfer station unless directed by the weighbridge operator	Implemented
	Accepted wastes are only to be stored within approved areas and storage vessels	Implemented
	All liquid waste (toilets, ablutions etc.) will be disposed of directly into site septic tanks, which will be managed as required	Liquid waste is not accepted – not licenced
	All drivers will be instructed to remain on alert for evidence of hot loads (smoke/fire) and to alert KWMF staff	Implemented – Staff are constantly alert for evidence of hot loads. Firefighting equipment is located at accessible area for use when required
Target / performance criteria	No acceptance of unapproved wastes	Nil
	No significant impacts or environmental harm	Nil
	No breach of EPL conditions	Nil
	All wastes disposed of in accordance with EPL and industry standards	Implemented
Monitoring	Visual monitoring of loads to ensure appropriate acceptance of wastes	Visual monitoring of every waste load is carried out at the Weighbridge
	Water quality monitoring as per schedule	Minor breaches as outlined in this Monitoring Report. Unable to complete some samplings in August, September and October due to resignation of staff and the inability to find a qualified contractor
	Visual inspections of waste transfer stations and active tip face shall occur at least daily in the dry season and at least twice daily in the wet season	Implemented

Table 7-4. Measures for storage and use of chemicals, oils and fuels management, specified in the Environmental Management Plan- Katherine Waste Management Facility (EcOz 2020).

EMP measure:		Current implementation progress:
Mitigation / Control	Any spills or leaks of hazardous materials will be treated in accordance with the emergency response plan – spill response procedure	The facility does not accept hazardous materials. Battery storage is underneath the shade which keeps rain away. Spill kit is ready for use when required
	All chemicals, oils and fuels will be stored appropriately in locked areas that are bunded, impervious areas in accordance with their SDS	All chemicals and fuels are bunded and stored on a shed and are locked appropriately. In the reporting period, receiving and storing waste oil ceased at the facility
	SDS will be available in a folder where the chemicals, oils and fuels are stored	Implemented. The folder is kept in the office. All operators and tradesmen are made aware about the location of the folder
	Storage of oils and fuels must be in accordance with Australian Standards (AS1940 – The storage and handling of flammable and combustible liquids)	Implemented
	Chemical use will be in accordance with the appropriate SDS	Implemented
	Volumes of stored chemicals, oils and fuels will be kept to a minimum where possible	Implemented
	Spill response kits to be stored and maintained in all storage areas	Implemented
	Site staff to be trained in spill response as part of the induction process	Implemented
Target / performance criteria	No spills or leaks of hazardous substances	Nil
	No breach of EPL	Nil in relation to this aspect
	Reporting of spills/leaks to NT EPA	Nil
Monitoring	Daily visual inspections of waste disposal areas to identify any hazards or spills	Daily inspection is carried out
	Monthly site inspection to check correct use and storage of hazardous materials and for signs of any spills or leaks	Implemented

Table 7-5. Measures for storm water, erosion and sediment control management, specified in the Environmental Management Plan- Katherine Waste Management Facility (EcOz 2020).

EMP measure:		Current implementation progress:
Mitigation / Control	Install and maintain surface water diversion structures as required to ensure that clean and dirty water do not mix	Ongoing – Implementation of drain and bunding
	Use appropriate cover and capping materials (temporary daily cover where required)	Implemented - Constant supply of capping material is delivered to site.
	Implement and maintain erosion and sediment control measures where necessary	Ongoing – Bunding upgrade when required

EMP measure:		Current implementation progress:
	Prevent contamination of storm water from chemicals, oils and fuels stored and used on site by use of appropriate bunding and covers	Implemented
	Ensure appropriate management of spills	Implemented
	Ensure progressive rehabilitation of disturbed areas	Ongoing noxious weed management implemented.
	Monitor for signs of erosion and take corrective actions where required	Daily site inspection
Target / performance criteria	No sedimentation of the surrounding environment	Nil to date
	No impacts to surface water or groundwater within KWMF	Minor impacts detected, as outlined in Section 5 of this Monitoring Report
	Erosion and sediment control measures are implemented and maintained where necessary	Implemented
	Disturbed areas are rehabilitated as soon as possible	Implemented
Monitoring	Ensure water quality monitoring is undertaken in accordance with the monitoring plan	Minor breaches as outlined in this Monitoring Report. Unable to complete some samplings in August, September and October due to resignation of staff and the inability to find a qualified contractor
	Inspection of waste disposal areas following heavy rainfall events	Implemented
	Site inspections to include checks for signs of erosion and monitoring of erosion and sediment control measures as well as surface water diversion structures, as per the site inspection schedule	Implemented

Table 7-6. Measures for leachate management, specified in the Environmental Management Plan- Katherine Waste Management Facility (EcOz 2020).

EMP measure:		Current implementation progress:
Mitigation / Control	Ensure appropriate disposal of wastes into landfill cells	5:1 batters around the edge of landfill filled with waste and covered in capping
	Use of appropriate cover and capping for landfill cells	Use of 2 types of soil (lower grade soil and higher dry content) for cover and capping
	Minimise exposed tip face area to reduce rainfall infiltration Monitor all active waste areas following high rainfall events for signs of discoloured runoff / leachate Where leachate contamination of surface run-off is visible, construct diversions to direct leachate back into landfill	Implemented – construction of drains where required
	Minimise the surface area and volumes of green waste kept on site	Constant heaping of the mulch/green waste to reduce risk of fire
Target / performance criteria	No incidents or monitoring results in breach of the EPL	Some water quality trigger values were breached, but these are not likely associated with the activities carried at the facility

EMP measure:		Current implementation progress:
	No detectable leachate flowing from KWMF operations area	Likely infiltration into groundwater as seen in groundwater monitoring results presented in this Monitoring Report, but does not represent a potential risk for receptors, as discussed in Section 5.4.3 It is yet to be confirmed if the presence of PFAS at SWC is associated with the activities undertaken at the facility
	No impacts to the surface water or groundwater at KWMF	Minor impacts, as described in Section 5 of this Monitoring Report
Monitoring	Ensure water quality monitoring is undertaken in accordance with the monitoring plan	Minor breaches as outlined in this Monitoring Report. Unable to complete some samplings in August, September and October due to resignation of staff and the inability to find a qualified contractor
	Inspection of waste disposal areas following heavy rainfall events	Implemented
	Conduct site inspections on water quality controls as per the site inspection schedule	Daily and monthly inspections

Table 7-7. Measures for dust, odour and aesthetics management, specified in the Environmental Management Plan- Katherine Waste Management Facility (EcOz 2020).

EMP measure:		Current implementation progress:
Mitigation / Control	Dust suppression through the use of a water cart/truck will be undertaken when necessary	Implemented as required
	Speed limits on site will be enforced to reduce the amount of dust	Speed limit of 10km/hr implemented within the facility
	Progressive revegetation of disturbed areas will be undertaken to reduce generation of dust	Revegetation will be carried out after capping is implemented
	Transfer station skip bins will be emptied when full and at least at the close of each working day	Implemented
	Skip bins used at the transfer station are to be cleaned at least monthly to prevent build-up of odours	Monthly clean
	Wastes that cause odour are to be covered immediately	Implemented
	Scattered rubbish will be cleaned up regularly	Implemented - daily
	Waste stations / storage areas are to be kept tidy	Implemented
Target / performance criteria	No complaints received from KWMF users, employees and surrounding landowners/users relating to dust, odour or aesthetics	Nil received
Monitoring	Daily site inspection to include visual checks of cleanliness and tidiness	Implemented
	Visual monitoring for excessive dust generation	Implemented

Table 7-8. Measures for noise management, specified in the Environmental Management Plan- Katherine Waste Management Facility (EcOz 2020).

EMP measure:		Current implementation progress:
Mitigation / Control	Maintain all equipment and machinery to manufacturers standards	Implemented- daily check and regular service of machinery is carried out.
	Conduct all operations during standard work hours	Implemented
Target / performance criteria	No complaints received from KWMF users, employees and surrounding landowners/users relating to noise	Nil received
Monitoring	If noise outside of what is considered normal operational noise is to occur, notification and details will be given to the public and surrounding landowners via newspapers and letter drops	Work not carried out outside of normal operational hours.
	Noise monitoring will be undertaken in the event of a complaint	N/A

Table 7-9. Measures for litter management, specified in the Environmental Management Plan- Katherine Waste Management Facility (EcOz 2020).

EMP measure:		Current implementation progress:
Mitigation / Control	Litter will be regularly cleaned up and disposed of appropriately by KWMF staff	Implemented daily
	The perimeter fence is designed to reduce wind-blown litter leaving the KWMF. This fence will be maintained	Implemented – fence recently upgraded.
	Additional litter fencing should be installed near Tindal Creek if existing fencing is inadequate in preventing windblown litter from entering the waterway	Implemented (temporary fencing around active tip face)
Target / performance criteria	No complaints received from KWMF users, employees and surrounding landowners/users relating to litter	Nil received
Monitoring	Daily site inspections to include a visual check for litter	Implemented
	Monthly formal site inspection including inspection of litter and litter controls	See Appendix E for *Monthly Operational Checklist* from August 2032 to July 2024.

Table 7-10. Measures for flora and fauna management, specified in the Environmental Management Plan- Katherine Waste Management Facility (EcOz 2020).

EMP measure:		Current implementation progress:
Mitigation / Control	All clearing at KWMF will have the required approvals undertaken by KTC	Implemented
	Any sightings of threatened fauna species are to be reported to the Site Manager to determine whether the animal is at risk and requires relocation	Nil

EMP measure:		Current implementation progress:
	Report any injured fauna to the Site Manager	Nil
	No pets / domestic animals allowed to be brought onto KWMF	Implemented
	Speed limits will be enforced to minimise potential for fauna impact	Implemented - Speed limit of 10km/hr
	Disturbed areas will be progressively rehabilitated, and done so with species local to the surrounding environment	The rehabilitation of the site will be progressive as areas reach final levels (Taft Engineering, 2022). Species to be used are yet to be defined
	Perimeter fencing around the landfill site to prevent large fauna entering the site	Implemented
Target / performance criteria	No significant impacts to flora and fauna	Nil
	No injured fauna as a result of KWMF activities	Nil
	Disturbed areas progressively rehabilitated with local native species, and achieving a minimum 80% groundcover within the first year	The rehabilitation of the site will be progressive as areas reach final levels (Taft Engineering, 2022). Species to be used are yet to be defined
Monitoring	Monthly site inspections to check for signs of impacted flora and fauna	Implemented
	Monitoring of rehabilitation areas will be undertaken to ensure it is to an acceptable standard (i.e. a minimum 80% groundcover within the first year)	The rehabilitation of the site will be progressive as areas reach final levels (Taft Engineering, 2022). Species to be used are yet to be defined

Table 7-11. Measures for pests and weeds management, specified in the Environmental Management Plan- Katherine Waste Management Facility (EcOz 2020).

EMP measure:		Current implementation progress:
Mitigation / Control	Declared weeds are not to be disposed of at KWMF without prior approval from KTC and the NT EPA	Declared weeds not accepted at the facility
	Weeds identified on site will be managed in accordance with the KTC WMP	Ongoing
	Regular pest control activities to be undertaken at KWMF, including use of bait stations etc.	Ongoing
	Where an infestation has been identified, a qualified, licensed pest control contractor will be called in to control the infestation	Implemented
	Boundary fence to be regularly inspected and maintained to prevent access to animals	Implemented
	The pooling of water will be prevented where possible, to decrease the breeding grounds for mosquitos	Implemented
Target / performance criteria	No declared weeds or introduction of noxious weeds at KWMF	Ongoing
	No spread of weeds from KWMF to surrounding environment	Bellyache bush (*Jatropha gossypiifolia*) is growing within the facility and reported to weed management and dealt with appropriately. Regular weed control undertaken

EMP measure:		Current implementation progress:
	No introduction of feral / pest species at KWMF	Nil
	No feral / pest / vector infestations at KWMF	Nil
Monitoring	A weed survey is to be undertaken at least annually	Nil
	Monthly site inspection to check for presence of pests and weeds in operational areas	Implemented

Table 7-12. Measures for fire prevention management, specified in the Environmental Management Plan- Katherine Waste Management Facility (EcOz 2020).

EMP measure:		Current implementation progress:
Mitigation / Control	Appropriate management of waste disposal into landfill cells to ensure no hot loads or smoking loads	Implemented
	Ensure a clean and tidy operations area to minimise ignition sources	Implemented
	Appropriate hot works procedures – no hot works undertaken during fire bans or near flammable materials	Implemented
	Maintain fire-fighting equipment including extinguishers in date and accessible water cart	Implemented
	Smoking only to occur in designated smoking areas	Implemented
	Maintain a 4 m wide fire break around the perimeter of the KWMF, around buildings and operational areas	Implemented
Target / performance criteria	Fire risk from and to the KWMF is reduced	Implemented
	No fires started at KWMF	Nil
Monitoring	Visual monitoring of loads going to landfill cells for evidence of smoking or hot loads	Implemented – frequent checks carried out
	Site inspections to include checks for firefighting equipment and fire risks such as site tidiness, appropriate hot works permits etc.	Implemented

8 PROGRESS ON RECOMMENDATIONS

As required by Condition 62.6 of EPL298-01, Table 8-1 provides a progress report, that includes implementation and completion dates, on all recommendations specified in *Katherine Town Council Waste Management Facility Closure Plan Stage 2 Report – Landfill Gas Risk Assessment and Hydrogeological Assessment* (GHD 2019).

Table 8-1. Progress report on recommendations specified in *Katherine Town Council Waste Management Facility Closure Plan Stage 2 Report – Landfill Gas Risk Assessment and Hydrogeological Assessment* (GHD 2019).

Recommendations		Implementation
1.(i) Adopt a passive venting system to allow LFG to vent safely from the landfill		On-going. The incorporation of a passive landfill gas collection system underneath the capping system will be explored for management of residual gas underneath the final system (Taft Engineering, 2022)
1.(ii) Monitoring inside the WMF office using a continuous monitor to detect methane for a period of one month		Not undertaken yet
1.(iii) Update the LFGRA when conditions at, or near, the site change such that the LFG risk profile may change (conditions specified in Waste Management Facility Closure Plan)		No changes in the LFG risk profile have been identified so far
2. Continue to implement existing leachate management practices around operational areas of the landfill, including:	Diversion of surface water away from active tipping areas to minimise leachate generation	On-going. According to the report developed by Taft Engineering (2022), a clean surface diversion is proposed to be established to prevent clean stormwater from entering within the site operating area
	Keep size of tipping area as small as possible to reduce leachate generation	On-going. A track loader is currently used to place and compact the waste to guarantee that active or exposed tipping areas remain as small as possible (Taft Engineering, 2022)
	Use intermediate cover to close off a cell which will not receive additional lifts of waste or final cover for some time Spread at least 300 mm of soil over the waste, so it is not left exposed	On-going. In areas not active or not expected to be active for greater than 3 months Interim Cover will be placed. Interim cover will be 500mm average depth. The Intermediate Cover must be constructed with appropriate material and compacted, graded and sloped towards surface water drains (Taft Engineering, 2022)
	Consider engineering lining and leachate collection systems for areas constructed beyond current landfill footprint	To be considered
2.(i) Placement of additional cover soils on landfill areas where intermediate cover is presently less than 300 mm		On-going
2.(ii) Progressive construction of a final cap on areas filled to final surface contours		On-going. A conceptual layout of the proposed final landform is provided in the *Integrated Environmental Management Plan – Katherine Town Council Waste Management Facility* by Taft Engineering (2022)
3. Incorporation of full lateral extent of wastes in the final cap designed during Stage 3		To be implemented. A conceptual layout of the proposed final landform is provided in the *Integrated Environmental Management Plan – Katherine Town Council Waste Management Facility* by Taft Engineering (2022)

Recommendations	Implementation
4. Biannual surface water and groundwater monitoring, undertaken at the end of dry season and the end of the wet season	On-going – Please refer to Table 4-4 for details on groundwater and surface water monitoring undertaken in the reporting period
5. Installation of two leachate monitoring bores within closed landfill areas	None installed so far

9 CONCLUSIONS AND RECOMMENDATIONS

Multiple QAQC outliers were identified in the data available for the reporting period. This led to the exclusion of some laboratory data given that of the concentration of some analytes were recorded in trip and field blanks (and in some cases above the concentrations reported for the primary samples) above the LOR. In addition, there is no certainty that the meter used to measure field parameters, but particularly pH, was adequately calibrated. Therefore, all pH collected in the reporting period was deemed as unreliable. Finally, the discrepancy in the results for nitrate and total nitrogen from some groundwater samples collected in February also led to the exclusion of laboratory results from this report.

During the 2023-24 reporting period, concentrations that did not comply with respective trigger values were reported in the downstream surface water site SWC. For instance, Total Iron, Copper and Zinc concentrations at the site were three times higher than the adopted criteria, which is a non-compliance with the EPL298-01 licence. These results are unlikely associated with the activities undertaken at the KWMF, as similar concentrations were recorded in the upstream site SWB. Although SWB was not sampled in November, when some exceedances were reported at SWC, historical data for these sites indicates that background levels are often above the trigger values when exceedances occur at SWC. Of note is that the assessment of SWC water quality is highly influenced by the assumption that SWB is representative of background conditions.

Ad-hoc sampling was conducted in June 2024, when samples from two pits on site were collected for field and laboratory analysis. The results of these samples indicate that their levels of EC, DO, TN and some total metals were above the EPL298-01 trigger values for SWC. In addition, at one of the sites, TRH were detected, as well as PFAS, which were above the concentrations recorded for leachate in November 2024. Such results evidence that leachate is likely draining into these pits, impacting their water quality.

As it has been seen in previous monitoring periods, the impact of KWMF on groundwater quality is evident in the downgradient bores GWB01 and GWB02. Higher concentrations in some major ions (Na and Cl), ammonium, metals (Cu, Al, Cd, Pb, Mn, Ni, Zn) TOC, TDS, BOD and a wide mixture of PFAS types were detected at these bores.

TRH were detected for the first time at GWA, likely indicating an impact from the facility. It is worth noting that the GC-MS run by the laboratory for a field blank sample, indicated that the TRH fractions in it were non-petrogenic in nature. Such may also be the case of the TRH that have been detected at GWA and GWB01.

The monitoring frequency and parameters analysed were not always compliant with the EPL298-01 requirements. Some of these non-compliances were caused because the sites were dry at the time of sampling, particularly leachate and surface water sites, or due limited staff availability to undertake the sampling.

As required by Condition 62.6 of EPL298-01, most of the measures specified in the *Environmental Management Plan- Katherine Waste Management Facility* have been implemented; however:

- Breaches reported in measures ‘water quality monitoring as per schedule’ mentioned in Table 7-3 and ‘Ensure water quality monitoring is undertaken in accordance with the monitoring plan’ mentioned in Table 7-5 and Table 7-6. Improvements in the water quality monitoring are recommended.
- Minor breaches reported in measures ‘no impacts to surface water or groundwater within KWMF’ mentioned in Table 7-5 and Table 7-6 and ‘no detectable leachate flowing from KWMF operations area’ in Table 7-6 as impacts were identified, as mentioned in Section 5.

The *Integrated Environmental Management Plan* prepared by Taft Engineering, addresses most of the recommendations specified in *Katherine Town Council Waste Management Facility Closure Plan Stage 2 Report – Landfill Gas Risk Assessment and Hydrogeological Assessment.* The implementation of most

recommendations is on-going or have not been implemented yet; therefore, completion dates are not provided in this report.

Based on the results obtained in this monitoring period, the following are recommended:

- All field parameters but pH were deemed as valid and representative of the sampling sites, despite the potential risk of the use of an uncalibrated meter for their collection. However, in the report for the next monitoring round, all field data for this reporting period should be assessed based on data from the coming monitoring, to determine its accuracy.
- Improve future surface water and leachate monitoring, so its regime is compliant with EPL298-01 requirements. The collection of more data is also essential to better assess the potential impacts of the facility on the water quality of Tindal Creek and the Katherine River. In addition, it is essential that all parameters are monitored in accordance with EPL298-01.
- Improve groundwater monitoring to comply with the regime and parameters required to be monitored by the EPL298-01.
- Undertake the sampling in accordance with the guidelines and standards listed below, as well as with any other internal procedure established for the water monitoring.
    - Australian/New Zealand Standard on Water Quality Sampling - Part 1: Guidance on the design of sampling programs, sampling techniques and the preservation and handling of samples (AS/NZS 5667.1:1998)
    - Australian/New Zealand Standard on Water Quality Sampling – Part 6: Guidance on sampling of rivers and streams (AS/NZS 5667.6:1998).
    - Australian/New Zealand Standard on Water Quality Sampling – Part 11: Guidance on sampling of groundwater (AS/NZS 5667.11:1998), Standards Australia, New South Wales.
    - ANZECC & AMRCANZ 2000, Australian Guidelines for Water Quality Monitoring and Reporting, National Water Quality Management Strategy Paper No 7, Australian and New Zealand Environment and Conservation Council and Agriculture and Resource Management Council of Australia and New Zealand, Canberra.
    - ANZECC & AMRCANZ 2000, Australian and New Zealand Guidelines for Fresh and Marine Water Quality, National Water Quality Management Strategy Paper No 4, Australian and New Zealand Environment and Conservation Council and Agriculture and Resource Management Council of Australia and New Zealand, Canberra.
- Ensure that the following are completed prior to any sampling:
    - Monthly calibration of the meter used.
    - Decontamination of all equipment used for the collection or primary and QAQC sample.
- Improve record keeping so information such as where duplicate samples were collected are included in all field sheets. In addition, it is essential that all field sheets are kept by KTC at least until the completion of each annual monitoring report. Although some field data is required by the laboratory for some of their analyses, this can be provided in the CoC or via email; as such, field data sheets should be kept by KTC and not by the laboratory.
- Improve sample collection procedures so any cross-contamination at the time of collection and/or transport of the sample. In addition, it is recommended that bottles are filled up as per laboratory requirements, leaving no headspace when required, as this can lead to inaccurate data. Such improvements are required to guarantee the compliance with Condition 46 of the EPL298-01.

- Develop a Standard Operating Procedure (SOP) for the surface water and groundwater monitoring.
- When TRH fractions are detected at any sample site, screening by GC-MS should be requested to the laboratory to confirm the nature of the hydrocarbons detected.
- Undertake a review of the conceptual site model, and all available data to confirm shallow and deep groundwater flows, and assumption of upgradient and downgradient allocation to bores.
- Consider appropriateness of SWB as the upstream surface water sampling site and the influence of other catchment sources.

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APPENDIX A FIELD SHEETS

Field Measurement Sheet – Waste Management Facility

Date of Sampling: 17/03/2024

Staff Name: Jaidyn Eastaughffe

Bore	Radius (m)	Total depth bore (m)
RN022487	0.076	33
RN031131	0.140	80
GWB01	0.0575	15.5
GWB02	0.0575	17.5
GWB03	0.0575	10.7
GWB04	0.0575	17.2

Bore Name	Groundwater						Surface Water		Leachate
	RN022487 (Car yard)	RNO31131 (near weighbridge)	GWB01	GWB02	GWB03	GWB04	SWB - highway	SWC	
Time of Arrival									
Time of Departure									
Weather Condition									
Environment – Description									

	Bore Name		Groundwater						Surface Water		Leachate
			RN022487 (Car yard)	RNO31131 (near weighbridge)	GWB01	GWB02	GWB03	GWB04	SWB - highway	SWC	
Groundwater Level	GW to top of casing (m)		4.5		7.45	2.5	1.82	4.56			
	Top of casing to surface (m)										
	Standing water level (SWL) (m)										
	Bladder pump depth (m)										
	Pump time on		5.35		6.00	6.10	6.25	6.40			
	Pump time off		5.55		6.05	6.17	6.35	6.45			
Purging	Length water column (m)										
	Volume (L)										
	Purging Volume (L)	Required									
		Actual									
Field Measurements	Observations (Colour, Odour, etc.)		clear odourless	clear, odourless	clear odourless	clear odourless	clear odourless	clear odourless			
	Time		5.42	5.10	6.05	6.17	6.30	6.45			
	pH		5.6	4.9	3.2	3.2	3.5	3.2			
	Temperature (°C)		27.9	31.3	28.1	28.8	27.7	29.2			
	Redox (Oxidation Reduction Potential) (mv)		125	135	194	183	157	221			
	Dissolved oxygen (%)		26.7	8.6	4.7	12	13.3	18.8			
	Electric Conductivity (ms)		0.450	0.605	0.625	0.757	0.540	0.681			

* smart sensor needs storage solution + calibration

Field Measurement Sheet – Waste Management Facility

Bore	Radius (m)	Total depth bore (m)
RN022487	0.076	33
RN031131	0.140	80
GWB01	0.0575	15.5
GWB02	0.0575	17.5
GWB03	0.0575	10.7
GWB04	0.0575	17.2

Date of Sampling: 21.04.24

Staff Name: Jaidyn Eastaughffe

Bore Name	Groundwater						Surface Water		Leachate
	RN022487 (Car yard)	RNO31131 (near weighbridge)	GWB01	GWB02	GWB03	GWB04	SWB - highway	SWC	
Time of Arrival	10.54	11.07	10.39	10.26	10.12	9.55			
Time of Departure	11.03		10.48	10.37	10.22	10.10			
Weather Condition	Sunny, windy		Sunny, no wind	Sunny, windy	Sunny, windy	Sunny, slight wind.			
Environment – Description									

	Bore Name		Groundwater						Surface Water		Leachate
			RN022487 (Car yard)	RNO31131 (near weighbridge)	GWB01	GWB02	GWB03	GWB04	SWB - highway	SWC	
Groundwater Level	GW to top of casing (m)		6.13m	X	6.4m	6.2m	4.8m	5.9m			
	Top of casing to surface (m)										
	Standing water level (SWL) (m)										
	Bladder pump depth (m)										
	Pump time on		10.55	X	10.40	10.28	10.14	9.58			
	Pump time off		11.01	X	10.46	10.35	10.20	10.06			
Purging	Length water column (m)										
	Volume (L)										
	Purging Volume (L)	Required									
		Actual									
Field Measurements	Observations (Colour, Odour, etc.)		clear odourless	clear odourless	clear odourless	clear odourless	clear odourless	clear slight odour			
	Time		10.57	11.12	10.42	10.31	10.18	10.00			
	pH		3.07	317	3.36	3.38	3.52	3.36			
	Temperature (°C)		32.2	31.8	30.1	30.8	29.8	29.5			
	Redox (Oxidation Reduction Potential) (mv)		177	178	182	169	156	176			
	Dissolved oxygen (%)		3.7	4.9	6.5	7.2	2.7	7.6			
	Electric Conductivity (ms)		0.450	0.600	0.797	0.630	0.553	0.701			

Field Measurement Sheet – Waste Management Facility

Date of Sampling: 26.05.24

Staff Name: Jaidyn

Bore	Radius (m)	Total depth bore (m)
RN022487	0.076	33
RN031131	0.140	80
GWB01	0.0575	15.5
GWB02	0.0575	17.5
GWB03	0.0575	10.7
GWB04	0.0575	17.2

Bore Name	GWE	GWA	Groundwater				Surface Water		Leachate
	RN022487 (Car yard)	RNO31131 (near weighbridge)	GWB01	GWB02	GWB03	GWB04	SWB - highway	SWC	
Time of Arrival			3.57	3-30	3.05	2.40			
Time of Departure			4.05	3~~.45~~	3.25	3.00			
Weather Condition				sunny, no wind					
Environment – Description									

	Bore Name		Groundwater						Surface Water		Leachate
			RN022487 (Car yard)	RNO31131 (near weighbridge)	GWB01	GWB02	GWB03	GWB04	SWB - highway	SWC	
Groundwater Level	GW to top of casing (m) A							9.1			
	Top of casing to surface (m) B		7.80		8.80	8.60	0.16	9.18			
	Standing water level (SWL) (m) A-B										
	Bladder pump depth (m) A+2m										
	Pump time on		4.12		3.50	3.30	3.08	2.45			
	Pump time off				4.04	3.45	3.25	3.00			
Purging	Length water column (m)										
	Volume (L)										
	Purging Volume (L)	Required									
		Actual									
Field Measurements	Observations (Colour, Odour, etc.)		clear, no odour	" "	a muni4.1	clear, no odour	" "	" "			
	Time		4.16	5.00	3.55	3.35	3.10	2.50			
	pH		3.38	3.26	3.48	3.82	3.42	3.72			
	Temperature (°C)		31.8	32.4	33	32	31.0	36.0			
	Redox (Oxidation Reduction Potential) (mv)		155	179	158	160	179	177			
	Dissolved oxygen (%)		11.2	10.2	9.7	8.1	10.0	25.5			
	Electric Conductivity (ms)		0.464	0.616	0.921	0.775	0.622	0.752			

Field Measurement Sheet – Waste Management Facility

Bore	Radius (m)	Total depth bore (m)
RN022487	0.076	33
RN031131	0.140	80
GWB01	0.0575	15.5
GWB02	0.0575	17.5
GWB03	0.0575	10.7
GWB04	0.0575	17.2

Date of Sampling: 23.06.2024

Staff Name: Jaidyn Eastaughfe

Bore Name	Groundwater						Surface Water		Leachate
	RN022487 (Car yard)	RNO31131 (near weighbridge)	GWB01	GWB02	GWB03	GWB04	SWB - highway	SWC	
Time of Arrival	2.52	12.35	2.40	2.25	2.05	1.20			
Time of Departure									
Weather Condition	Sunny, Slight wind.	Sunny, Slight wind	Sunny, Slight wind	Sunny Slight wind	Sunny windy	Sunny, Slight wind			
Environment – Description									

	Bore Name		Groundwater						Surface Water		Leachate
			RN022487 (Car yard)	RNO31131 (near weighbridge)	GWB01	GWB02	GWB03	GWB04	SWB - highway	SWC	
Groundwater Level	GW to top of casing (m) A		2.00 8.00		10.2	8.7	8.2	11.4			
	Top of casing to surface (m) B										
	Standing water level (SWL) (m) A-B										
	Bladder pump depth (m) A+2m										
	Pump time on		2.55		2.42	2.27	2.05	1.20			
	Pump time off		3.10		2.50	2.36	2.25	1.24			
Purging	Length water column (m)										
	Volume (L)										
	Purging Volume (L)	Required									
		Actual									
Field Measurements	Observations (Colour, Odour, etc.)		odourless slightly cloudy	clear, odourless	no odour very murky	odourless cloudy	murky cloudy odourless	clear, odourless			
	Time		2.58	12.37	2.45	2.36	2.20	1.20			
	pH		3.04	3.46	3.00	3.05	3.6	3.07			
	Temperature (°C)		32.3	32.0	31.3	35.3	28.6	30.2			
	Redox (Oxidation Reduction Potential) (mv)		192	147	222	215	150	215			
	Dissolved oxygen (%)		9.0	21.2	10.3	11.7	7.0	17.4			
	Electric Conductivity (ms)		0.489	0.602	0.869	0.786	0.918	0.795			

- *Additional urgent pond testing

Field Measurement Sheet – Waste Management Facility

Bore	Radius (m)	Total depth bore (m)
RN022487	0.076	33
RN031131	0.140	80
GWB01	0.0575	15.5
GWB02	0.0575	17.5
GWB03	0.0575	10.7
GWB04	0.0575	17.2

Date of Sampling: 02.06.24

Staff Name: Jaidyn Eastaughfe

Bore Name	PIT 1 ~~RN022487~~ ~~(Car yard)~~ (North West)	PIT 2 ~~RN031131~~ ~~(near weighbridge)~~ (near fires)	Groundwater GWB01	GWB02	GWB03	GWB04	Surface Water SWB - highway	SWC	Leachate
Time of Arrival									
Time of Departure									
Weather Condition	sunny slight wind	sunny slight wind.							
Environment – Description									

* Old bottles were used - FB (field blank (DI water)) included (unsure of date of arrival)

	Bore Name	PIT 1	PIT 2	Groundwater				Surface Water		Leachate
		~~RN022487~~ (~~Car yard~~)	RNO31131 (near weighbridge)	GWB01	GWB02	GWB03	GWB04	SWB - highway	SWC	
Groundwater Level	GW to top of casing (m) A									
	Top of casing to surface (m) B									
	Standing water level (SWL) (m) A-B									
	Bladder pump depth (m) A+2m									
	Pump time on									
	Pump time off									
Purging	Length water column (m)									
	Volume (L)									
	Purging Volume (L) Required									
	Purging Volume (L) Actual									
Field Measurements	Observations (Colour, Odour, etc.)	slight odour murky sediment	~~No~~ odour murky / silty lots of sediment *							
	Time	9.50	9.25							
	pH	4.28	4.92							
	Temperature (°C)	26.7	23.9							
	Redox (Oxidation Reduction Potential) (mv)	132	128							
	Dissolved oxygen (%)	30.1	36.4							
	Electric Conductivity (ms)	0.745	125 ~~0~~							

* field filtering wasn't possible, didn't have enough filters as ~~sediment~~ there is alot of sediment

Field Measurement Sheet – Waste Management Facility

Bore	Radius (m)	Total depth bore (m)
RN022487	0.076	33
RN031131	0.140	80
GWB01	0.0575	15.5
GWB02	0.0575	17.5
GWB03	0.0575	10.7
GWB04	0.0575	17.2

Date of Sampling: 28.7.24

Staff Name: Jaidyn Eastaughffe

Bore Name	Groundwater						Surface Water		Leachate
	RN022487 (Car yard)	RNO31131 (near weighbridge)	GWB01	GWB02	GWB03	GWB04	SWB - highway	SWC	
Time of Arrival		~~10.20~~	9.40	9.25	9.00	8.35			
Time of Departure		~~10.35~~	10-15	9.35	9.20	8.55			
Weather Condition	overcast windy	overcast windy	overcast, windy	overcast, windy	overcast. windy	overcast, windy			
Environment – Description									

	Bore Name		Groundwater						Surface Water		Leachate
			RN022487 (Car yard)	RNO31131 (near weighbridge)	GWB01	GWB02	GWB03	GWB04	SWB - highway	SWC	
Groundwater Level	GW to top of casing (m) A			10.2	11.2	10.7	8.9	12m			
	Top of casing to surface (m) B										
	Standing water level (SWL) (m) A-B										
	Bladder pump depth (m) A+2m										
	Pump time on				9.40	9.25	8~~.55~~	8.35			
	Pump time off				10.10	9~~.30~~	9.20	8.4~~5~~			
Purging	Length water column (m)										
	Volume (L)										
	Purging Volume (L)	Required									
		Actual									
Field Measurements	Observations (Colour, Odour, etc.)		clear odourless	clear odourless	clear odourless	clear, odourless	murky, odourless	clear, odourless			
	Time		10.40	10.20	~~10~~ 9.50	9.28	9.10	8.35			
	pH		2.78	2.78	~~2.24~~	2.84	3.02	3.32			
	Temperature (°C)		29.0	31.8	27.2	27.7	24.9	27.1			
	Redox (Oxidation Reduction Potential) (mv)		207	244 ~~217~~	314	225 ~~218~~	224	840			
	Dissolved oxygen (%)		3.9	10.1	2.4	6.4	12.5	7.0			
	Electric Conductivity (ms)		0.469	0.575	0.880	0.804	0.781	0.799			

APPENDIX B HISTORICAL DATA

All historical data for surface water, groundwater and leachate are presented in the tables below.

Leachate

Concentrations below the laboratory limit of reporting are shown in grey. Hyphens (-) indicate that no trigger values, LOR or units are applicable, or no results available.

LEACHATE MEASUREMENTS								
PARAMETER	UNIT	LOR	TRIGGER VALUE - SWC	2022		2023		
				JAN	FEB	MAR	APR	NOV
FIELD MEASUREMENTS								
pH	-	-	6-8	-	6.10	**8.28**	8.42	-
Temperature	°C	-	-	-	34.4	31.4	25.0	-
Electrical Conductivity (EC)	µs/cm	-	20-250	-	275	611	457	-
Dissolved Oxygen (DO)	mg/L	-	-	-	-	-	-	-
Dissolved Oxygen (DO)	% Sat	-	85-120	-	7.3	14.9	27.4	-
Redox		-	-			274	225	-
MAJOR IONS								
Potassium (K)		0.5	400	-	7.6	9.9	10	3.6
Alkalinity (CaCO3)		5	-	-	110	250	170	51
Calcium (Ca)		0.5	500	-	25	46	23	13
Chloride (Cl)	mg/L	1	-	-	9	28	28	3.4
Sodium (Na)		0.5	300	-	5.1	15	16	2.3
Sulfate (SO4)		1	400	-	9	47	36	11
Magnesium (Mg)		0.5	-	-	7	33	31	4.4
NUTRIENTS								
Total Nitrogen (TN)		100	200-300	-	-	-	-	1600
Total Phosphorus (TP)		50	-	-	-	-	41	71
Nitrate (as N)	µg/L	5	-	-	-	-	<5	960
Ammonium (NH4)		7	10	-	250	33	16	<7
Ammonia (as N)		5	-	-	190	33	16	6.5
METALS (TOTAL)								
Cadmium (Cd)		0.0001	0.0002	-	-	-	<0.0010	<0.0001
Chromium (Cr(III))		0.005	0.0033	-	-	-	<0.005	0.014
Chromium (CrVI)		0.005	0.001	-	-	-	<0.005	<0.005
Copper (Cu)		0.001	0.0014	-	-	-	0.032	0.03
Iron (Fe)		0.01	0.3	-	-	-	0.46	11
Lead (Pb)	mg/L	0.001	0.0034	-	-	-	<0.001	0.0054
Manganese (Mn)		0.005	1.9	-	-	-	0.013	0.13
Nickel (Ni)		0.001	0.011	-	-	-	0.0016	0.011
Zinc (Zn)		0.001	0.008	-	-	-	0.0025	0.026
Aluminium (Al)		0.01	-	-	-	-	0.3	0.0072
Selenium (Se)		0.001	-	-	-	-	<0.001	<0.001
METALS (DISSOLVED)								
Cadmium (Cd)		0.0001	0.0002	-	-	-	<0.0001	<0.0001
Chromium (Cr(III))		0.005	0.0033	-	-	-	<0.005	<0.0050
Chromium (CrVI)		0.005	0.001	-	-	-	<0.005	<0.0050
Copper (Cu)		0.001	0.0014	-	-	-	0.0019	0.0033
Iron (Fe)		0.01	0.3	-	-	-	<0.010	0.025
Lead (Pb)	mg/L	0.001	0.0034	-	-	-	<0.0010	<0.001
Manganese (Mn)		0.005	1.9	-	-	-	0.0012	<0.001
Nickel (Ni)		0.001	0.011	-	-	-	0.0011	<0.001
Zinc (Zn)		0.001	0.008	-	-	-	<0.0010	<0.001
Aluminium (Al)		0.01	-	-	-	-	<0.010	0.015
Selenium (Se)		0.001	-	-	-	-	<0.001	<0.001
OTHER LEACHATE INDICATORS								
Total Organic Carbon (TOC)		1	-	-	14	7.5	9	5.1
Total Dissolved Solids (TDS)		5	-	-	470	440	270	140
Chemical Oxygen Demand (COD)	mg/L	20	-	-	66	28	22	70
Biological Oxygen Demand (BOD)		5	-	-	5	16	18	<5.0
Volatile acids as acetic acid (VFA)		5	-	-	-		<5	110
OTHER								
TRH C6 - C9 Fraction		10	-	-	-	-	<10	<10
TRH C10-C14 Fraction		50	-	-	-	-	<50	<50
TRH C15-C28 Fraction		100	-	-	-	-	<100	<100
TRH C29-C36		100	-	-	-	-	<100	<100
MTBE		1	-	-	-	-	<1	<1.0
Benzene		1	950	-	-	-	<1	<1.0
Toluene		1	950	-	-	-	<1	<1.0
Ethylbenzene		1	950	-	-	-	<1	<1.0
Xylene (m&p)	µg/L	2	950	-	-	-	<2	<2.0
Xylene (o)		1	950	-	-	-	<1	<1.0
Naphthalene		1	950	-	-	-	<1	<1.0
Aroclor 1016		2	-	-	-	-	<2	<2.0
Aroclor 1221		2	-	-	-	-	<2	<2.0
Aroclor 1232		2	-	-	-	-	<2	<2.0
Aroclor 1242		2	-	-	-	-	<2	<2.0
Aroclor 1248		2	-	-	-	-	<2	<2.0
Aroclor 1254		2	-	-	-	-	<2	<2.0
Aroclor 1260		2	-	-	-	-	<2	<2.0
PFOS/PFAS (in any form)								
Perfluorobutanesulfonic acid (PFBS)		0.01	-	-	-	-	0.11	<0.010
erfluoropentanesulfonic acid (PFPeS)		0.01	-	-	-	-	0.038	<0.010
erfluorohexanesulfonic acid (PFHxS)		0.01	-	-	-	-	0.19	<0.010
rfluoroheptanesulfonic acid (PFHpS)		0.01	-	-	-	-	0.01	<0.010
Perfluorooctanesulfonate (PFOS)		0.01	-	-	-	-	0.27	0.033
Perfluorodecanesulfonic acid (PFDS)		0.02	-	-	-	-	<0.020	<0.020
Perfluorobutanoic acid (PFBA)		0.02	-	-	-	-	0.075	<0.020
Perfluoropentanoic acid (PFPeA)		0.02	-	-	-	-	0.12	<0.020
Perfluorohexanoic acid (PFHxA)		0.01	-	-	-	-	0.12	<0.010
Perfluoroheptanoic acid (PFHpA)		0.01	-	-	-	-	0.066	<0.010
Perfluorooctanoic acid PFOA		0.01	-	-	-	-	0.081	0.010
Perfluorononanoic acid (PFNA)		0.01	-	-	-	-	<0.010	<0.010
Perfluorodecanoic acid (PFDA)	µg/L	0.02	-	-	-	-	<0.020	<0.020
Perfluoroundecanoic acid (PFUnDA)		0.02	-	-	-	-	<0.020	<0.020
Perfluorododecanoic acid (PFDoDA)		0.05	-	-	-	-	<0.050	<0.050
Perfluorotridecanoic acid (PFTrDA)		0.1	-	-	-	-	<0.10	<0.10
erfluorotetradecanoic acid (PFTeDA)		0.5	-	-	-	-	<0.50	<0.50
4:2 FTS		0.01	-	-	-	-	<0.010	<0.010
6:2 FTS		0.01	-	-	-	-	<0.010	<0.010
8:2 FTS		0.02	-	-	-	-	<0.020	<0.020
10:2 FTS		0.02	-	-	-	-	<0.020	<0.020
erfluorooctane sulfonamide (FOSA)		0.1	-	-	-	-	<0.10	<0.10
Total Positive PFHxS & PFOS		0.01	-	-	-	-	0.46	0.033
Total Positive PFOS & PFOA		0.01	-	-	-	-	0.35	0.043
Total Positive PFAS		0.01	-	-	-	-	1.1	0.043
PAHs								
Naphthalene		0.1	16	-	-	-	<0.1	<0.10
Acenaphthylene		0.1	16	-	-	-	<0.1	<0.10
Acenaphthene		0.1	16	-	-	-	<0.1	<0.10
Fluorene		0.1	16	-	-	-	<0.1	<0.10
Phenanthrene		0.1	16	-	-	-	<0.1	<0.10
Anthracene		0.1	16	-	-	-	<0.1	<0.10
Fluoranthene		0.1	16	-	-	-	<0.1	<0.10
Pyrene		0.1	16	-	-	-	<0.1	<0.10
Benzo(a)anthracene	µg/L	0.1	16	-	-	-	<0.1	<0.10
Chrysene		0.1	16	-	-	-	<0.1	<0.10
Benzo(b,j+k)fluoranthene		0.2	16	-	-	-	<0.2	<0.20
Benzo(a)pyrene		0.1	16	-	-	-	<0.1	<0.10
Indeno(1,2,3-c,d)pyrene		0.1	16	-	-	-	<0.1	<0.10
Dibenzo(a,h)anthracene		0.1	16	-	-	-	<0.1	<0.10
Benzo(g,h,i)perylene		0.1	16	-	-	-	<0.1	<0.10
Benzo(a)pyrene TEQ		0.5	16	-	-	-	<0.5	-
Total positive PAHs		0.1	16	-	-	-	<0.1	<0.10

Surface water

Concentrations below the laboratory limit of reporting are shown in **grey**. Hyphens **(-)** indicate that no trigger values, LOR or units are applicable, or no results available. Concentrations above the trigger value are shown **in red**.

PARAMETER	UNIT	LOR	TRIGGER VALUE	May 2017		Dec 2020		Mar 2021		Apr 2021		Feb 2023		Mar 2023		Nov 2023		Feb 2024	
				SWB	SWC	SWB	SWC	SWB	SWC	SWB	SWC	SWB	SWC	SWB	SWC	SWB	SWC	SWB	SWC
FIELD MEASUREMENTS																			
pH	0	-	6-8	8.40	8.60	-	-	8.52	8.84	8.42	8.23	7.96	7.9	7.89	8.39	-	-	-	-
Temperature	-	-	-	-	-	-	-	28.7	28.2	26	26	27.8	29.1	34.1	29.2	-	-	-	-
Electrical Conductivity (EC)	°C	-	20-250	600	580	-	-	566	561	884	884	145.2	179.4	407	407	-	-	-	-
Dissolved Oxygen (DO)	% Sat	-	85-120	-	-	-	-	-	14.1	15.2	15.2	-	8.3	8.3	9.4	-	-	-	-
MAJOR IONS																			
Potassium (K)		0.5	400	-	-	4.2	5.1	5.7	5.5	3.8	2.9	4.8	4.2	4.6	4.7	-	6.3	8.4	5.6
Alkalinity (CaCO3)		5	-	-	-	77	81	280	280	370	350	68	74	220	200	-	86	210	230
Calcium (Ca)		0.5	400	-	-	19	18	54	53	55	39	16	18	36	35	-	19	43	47
Chloride (Cl)	mg/L	1	-	9	9	1	1	8	7	9	9	1.6	1.6	7.6	7.3	-	1.8	6.3	7.1
Sodium (Na)		0.5	300	-	-	1.7	1.3	9	8.4	9.4	7.6	0.95	1.2	7.2	6.6	-	1.1	5.00	5.40
Sulfate (SO4)		1	500	-	-	<1	<1	7	6	4	4	<1	<1	4.3	4.3	-	3.1	1.70	1.90
Magnesium (Mg)		0.5	-	-	-	5.5	5.8	31	30	40	30	5.3	5.5	24	23	-	5.8	18	20
NUTRIENTS																			
Total Nitrogen (TN)		100	200-300	-	-	600	700	-	-	400	300	-	-	-	-	-	860	440	-
Total Phosphorus (TP)		50/10	-	-	-	<50	60	-	-	<50	<50	-	-	-	-	-	41	16	10
Nitrate (as N)	µg/L	5	-	-	-	<5	<5	-	-	<5	<5	-	-	-	-	-	<5	14	-
Ammonium (NH4)		7	10	-	-	38	82	-	-	-	-	<7	9.6	22	13	-	11	<7	<7
Ammonia (as N)		5	10	<5	<5	29	64	-	-	<5	<5	6.1	<5	22	13	-	11	<5	<5
METALS (TOTAL)																			
Cadmium (Cd)		0.0001	0.0002	<0.0001	<0.0001	<0.0001	<0.0001	-	-	<0.0001	<0.0001	-	-	-	-	-	<0.0001	<0.0001	<0.0001
Chromium (Cr(III))		0.005	0.0033	-	-	<0.005	<0.005	-	-	<0.005	<0.005	-	-	-	-	-	<0.0050	<0.0050	<0.0050
Chromium (CrVI)		0.005	0.001	-	-	<0.005	<0.005	-	-	<0.005	<0.005	-	-	-	-	-	<0.0050	<0.0050	<0.0050
Copper (Cu)		0.001	0.0014	<0.001	<0.001	0.003	0.003	-	-	<0.001	<0.001	-	-	-	-	-	0.0067	0.0023	0.0023
Iron (Fe)		0.01	0.3	-	-	1.9	2	-	-	0.05	0.04	-	-	-	-	-	3.8	1.6	1.6
Lead (Pb)	mg/L	0.001	0.0034	<0.001	<0.001	<0.001	<0.001	-	-	<0.001	<0.001	-	-	-	-	-	0.0027	<0.001	<0.010
Manganese (Mn)		0.005	1.9	-	-	0.025	0.029	-	-	<0.005	<0.005	-	-	-	-	-	0.047	0.027	0.026
Nickel (Ni)		0.001	0.013	<0.001	<0.001	0.001	0.002	-	-	<0.001	<0.001	-	-	-	-	-	0.0035	0.0014	0.014
Zinc (Zn)		0.001	0.008	0.002	0.001	0.007	0.005	-	-	0.001	0.002	-	-	-	-	-	0.0067	0.0033	0.034
Aluminium (Al)		0.01	-	-	-	-	-	-	-	-	-	-	-	-	-	-	2.9	1.0	0.97
Selenium (Se)		0.001	-	<0.001	<0.001	-	-	-	-	-	-	-	-	-	-	-	<0.001	<0.001	<1.0
METALS (DISSOLVED)																			
Cadmium (Cd)		0.0001	0.0002	<0.0001	<0.0001	-	<0.0001	-	-	<0.0001	<0.0001	-	-	-	-	-	<0.0001	<0.0001	<0.0001
Chromium (Cr(III))		0.005	0.0033	-	-	-	<0.005	-	-	<0.005	<0.005	-	-	-	-	-	<0.0050	<0.0050	<0.0050
Chromium (CrVI)		0.005	0.001	-	-	-	<0.005	-	-	<0.005	<0.005	-	-	-	-	-	<0.0050	<0.0050	<0.0050
Copper (Cu)		0.001	0.0014	<0.001	<0.001	-	0.002	-	-	<0.001	<0.001	-	-	-	-	-	0.0031	0.0012	0.0011
Iron (Fe)		0.01	0.3	-	-	-	0.03	-	-	<0.01	<0.01	-	-	-	-	-	0.055	<0.010	<0.010
Lead (Pb)	mg/L	0.001	0.0034	<0.001	<0.001	-	<0.001	-	-	<0.001	<0.001	-	-	-	-	-	<0.0010	<0.001	<0.001
Manganese (Mn)		0.005	1.9	-	-	-	0.007	-	-	<0.005	<0.005	-	-	-	-	-	0.0022	0.0048	0.0041
Nickel (Ni)		0.001	0.013	<0.001	<0.001	-	<0.001	-	-	<0.001	<0.001	-	-	-	-	-	<0.001	<0.001	<0.001
Zinc (Zn)		0.001	0.008	0.005	0.006	-	0.002	-	-	0.001	0.001	-	-	-	-	-	<0.001	0.0013	0.0022
Aluminium (Al)		0.01	-	-	-	-	-	-	-	-	-	-	-	-	-	-	0.028	<0.010	<0.01
Selenium (Se)		0.001	-	<0.001	<0.001	-	-	-	-	-	-	-	-	-	-	-	<0.001	<0.001	<0.001
OTHER LEACHATE INDICATORS																			
Total Organic Carbon (TOC)		1	-	-	-	11	9	8	8	5	5	10	9.9	5.4	5.5	-	15	6.4	5.5
Total Dissolved Solids (TDS)		5	-	-	-	86	100	310	310	420	380	150	180	360	420	-	170	220	230
Chemical Oxygen Demand (COD)	mg/L	20	-	35	45	<20	<20	<40	<40	<20	<20	43	41	29	32	-	90	21	21
Biological Oxygen Demand (BOD)		5	-	-	-	28	28	20	26	<5	10	28	32	13	9.1	-	13	12.00	8.1
Volatile acids as acetic acid (VFA)		5	-	-	-	13	13	-	-	<5	<5	-	-	-	-	-	240	14	21
OTHER																			
TRH C6 - C9 Fraction		10	-	-	-	-	-	-	-	<10	<10	-	-	-	-	-	<10	-	-
TRH C10-C14 Fraction		50	-	-	-	-	-	-	-	<50	<50	-	-	-	-	-	<50	-	-
TRH C15-C28 Fraction		100	-	-	-	-	-	-	-	<100	<100	-	-	-	-	-	<100	-	-
TRH C29-C36		100	-	-	-	-	-	-	-	<100	<100	-	-	-	-	-	<100	-	-
MTBE		1	-	-	-	-	-	-	-	<1	<1	-	-	-	-	-	<1.0	-	-
Benzene		1	950	-	-	-	-	-	-	<1	<1	-	-	-	-	-	<1.0	-	-
Toluene		1	950	-	-	-	-	-	-	<1	<1	-	-	-	-	-	<1.0	-	-
Ethylbenzene		1	950	-	-	-	-	-	-	<1	<1	-	-	-	-	-	<1.0	-	-
Xylene (m&p)	µg/L	2	950	-	-	-	-	-	-	<2	<2	-	-	-	-	-	<2.0	-	-
Xylene (o)		1	950	-	-	-	-	-	-	<1	<1	-	-	-	-	-	<1.0	-	-
Naphthalene		1	950	-	-	-	-	-	-	<1	<1	-	-	-	-	-	<1.0	-	-
Aroclor 1016		2	-	-	-	-	-	-	-	<2	<2	-	-	-	-	-	<2.0	-	-
Aroclor 1221		2	-	-	-	-	-	-	-	<2	<2	-	-	-	-	-	<2.0	-	-
Aroclor 1232		2	-	-	-	-	-	-	-	<2	<2	-	-	-	-	-	<2.0	-	-
Aroclor 1242		2	-	-	-	-	-	-	-	<2	<2	-	-	-	-	-	<2.0	-	-
Aroclor 1248		2	-	-	-	-	-	-	-	<2	<2	-	-	-	-	-	<2.0	-	-
Aroclor 1254		2	-	-	-	-	-	-	-	<2	<2	-	-	-	-	-	<2.0	-	-
Aroclor 1260		2	-	-	-	-	-	-	-	<2	<2	-	-	-	-	-	<2.0	-	-
PFOS/PFAS (in any form)																			
Perfluorobutanesulfonic acid (PFBS)		0.01	-	-	-	-	-	-	-	<0.01	<0.01	-	-	-	-	-	<0.010	-	-
Perfluoropentanesulfonic acid (PFPeS)		0.01	-	-	-	-	-	-	-	<0.01	<0.01	-	-	-	-	-	<0.010	-	-
Perfluorohexanesulfonic acid (PFHxS)		0.01	-	-	-	-	-	-	-	<0.01	<0.01	-	-	-	-	-	0.013	-	-
Perfluoroheptanesulfonic acid (PFHpS)		0.01	-	-	-	-	-	-	-	<0.01	<0.01	-	-	-	-	-	<0.010	-	-
Perfluorooctanesulfonate (PFOS)		0.01	-	-	-	-	-	-	-	<0.01	<0.01	-	-	-	-	-	0.088	-	-
Perfluorodecanesulfonic acid (PFDS)		0.02	-	-	-	-	-	-	-	<0.02	<0.02	-	-	-	-	-	<0.020	-	-
Perfluorobutanoic acid (PFBA)		0.02	-	-	-	-	-	-	-	<0.02	<0.02	-	-	-	-	-	<0.020	-	-
Perfluoropentanoic acid (PFPeA)		0.02	-	-	-	-	-	-	-	<0.02	<0.02	-	-	-	-	-	<0.020	-	-
Perfluorohexanoic acid (PFHxA)		0.01	-	-	-	-	-	-	-	<0.01	<0.01	-	-	-	-	-	<0.010	-	-
Perfluoroheptanoic acid (PFHpA)		0.01	-	-	-	-	-	-	-	<0.01	<0.01	-	-	-	-	-	<0.010	-	-
Perfluorooctanoic acid PFOA		0.01	-	-	-	-	-	-	-	<0.01	<0.01	-	-	-	-	-	<0.010	-	-
Perfluorononanoic acid (PFNA)		0.01	-	-	-	-	-	-	-	<0.01	<0.01	-	-	-	-	-	<0.010	-	-
Perfluorodecanoic acid (PFDA)	µg/L	0.02	-	-	-	-	-	-	-	<0.02	<0.02	-	-	-	-	-	<0.020	-	-
Perfluoroundecanoic acid (PFUnDA)		0.02	-	-	-	-	-	-	-	<0.02	<0.02	-	-	-	-	-	<0.020	-	-
Perfluorododecanoic acid (PFDoDA)		0.05	-	-	-	-	-	-	-	<0.05	<0.05	-	-	-	-	-	<0.050	-	-
Perfluorotridecanoic acid (PFTrDA)		0.1	-	-	-	-	-	-	-	<0.1	<0.1	-	-	-	-	-	<0.10	-	-
Perfluorotetradecanoic acid (PFTeDA)		0.5	-	-	-	-	-	-	-	<0.5	<0.5	-	-	-	-	-	<0.50	-	-
4:2 FTS		0.01	-	-	-	-	-	-	-	<0.01	<0.01	-	-	-	-	-	<0.010	-	-
6:2 FTS		0.01	-	-	-	-	-	-	-	<0.01	<0.01	-	-	-	-	-	<0.010	-	-
8:2 FTS		0.02	-	-	-	-	-	-	-	<0.02	<0.02	-	-	-	-	-	<0.020	-	-
10:2 FTS		0.02	-	-	-	-	-	-	-	<0.02	<0.02	-	-	-	-	-	<0.020	-	-
Perfluorooctance sulfonamide (FOSA)		0.1	-	-	-	-	-	-	-	<0.1	<0.1	-	-	-	-	-	<0.10	-	-
Total Positive PFHxS & PFOS		0.01	-	-	-	-	-	-	-	<0.01	<0.01	-	-	-	-	-	0.01	-	-
Total Positive PFOS & PFOA		0.01	-	-	-	-	-	-	-	<0.01	<0.01	-	-	-	-	-	0.088	-	-
Total Positive PFAS		0.01	-	-	-	-	-	-	-	<0.01	<0.01	-	-	-	-	-	0.01	-	-
PAHs																			
Naphthalene		0.1	16	-	-	-	-	-	-	<0.1	<0.1	-	-	-	-	-	<0.10	-	-
Acenaphthylene		0.1	16	-	-	-	-	-	-	<0.1	<0.1	-	-	-	-	-	<0.10	-	-
Acenaphthene		0.1	16	-	-	-	-	-	-	<0.1	<0.1	-	-	-	-	-	<0.10	-	-
Fluorene		0.1	16	-	-	-	-	-	-	<0.1	<0.1	-	-	-	-	-	<0.10	-	-
Phenanthrene		0.1	16	-	-	-	-	-	-	<0.1	<0.1	-	-	-	-	-	<0.10	-	-
Anthracene		0.1	16	-	-	-	-	-	-	<0.1	<0.1	-	-	-	-	-	<0.10	-	-
Fluoranthene		0.1	16	-	-	-	-	-	-	<0.1	<0.1	-	-	-	-	-	<0.10	-	-
Pyrene		0.1	16	-	-	-	-	-	-	<0.1	<0.1	-	-	-	-	-	<0.10	-	-
Benzo(a)anthracene	µg/L	0.1	16	-	-	-	-	-	-	<0.1	<0.1	-	-	-	-	-	<0.10	-	-
Chrysene		0.1	16	-	-	-	-	-	-	<0.1	<0.1	-	-	-	-	-	<0.10	-	-
Benzo(b,j+k)fluoranthene		0.2	16	-	-	-	-	-	-	<0.2	<0.2	-	-	-	-	-	<0.20	-	-
Benzo(a)pyrene		0.1	16	-	-	-	-	-	-	<0.1	<0.1	-	-	-	-	-	<0.10	-	-
Indeno(1,2,3-c,d)pyrene		0.1	16	-	-	-	-	-	-	<0.1	<0.1	-	-	-	-	-	<0.10	-	-
Dibenzo(a,h)anthracene		0.1	16	-	-	-	-	-	-	<0.1	<0.1	-	-	-	-	-	<0.10	-	-
Benzo(g,h,i)perylene		0.1	16	-	-	-	-	-	-	<0.1	<0.1	-	-	-	-	-	<0.10	-	-
Benzo(a)pyrene TEQ		0.5	16	-	-	-	-	-	-	<0.5	<0.5	-	-	-	-	-	<0.10	-	-
Total positive PAHs		0.1	16	-	-	-	-	-	-	<0.1	<0.1	-	-	-	-	-	<0.10	-	-

Groundwater

Standing Water Levels

BORE ID	2020				2021																	
	Oct-20		Nov-20		Mar-21		Apr-21		May-21		Jun-21		Jul-21		Aug-21		Sep-21		Oct-21		Nov-21		Dec-21	
	mbTOC	mAHD	mbTOC	mAHD	mbTOC	mAHD	mbTOC	mAHD	mbTOC	mAHD	mbTOC	mAHD	mbTOC	mAHD	mbTOC	mAHD	mbTOC	mAHD	mbTOC	mAHD	mbTOC	mAHD	mbTOC	mAHD
GWA (RN031131)	14.072	88.6034	14.07	88.6054	3.45	99.2254	6.2	96.4754	9.32	93.3554	11.2	91.4754	12	90.6754	12.6	90.0754	12.9	89.7754	13.2	89.4754	13.2	89.4754	Not measured	
GWE (RN022487)	11.964	90.1824	11.976	90.1704	3.94	98.2064	6.1	96.0464	7.2	94.9464	9.18	92.9664	10	92.1464	10.45	91.6964	10.8	91.3464	11.2	90.9464	11.16	90.9864	11.15	90.9964
GWB01	12.106	87.5154	12.154	87.4674	3.45	96.1714	6.05	93.5714	7.9	91.7214	9.7	89.9214	10.4	89.2214	10.8	88.8214	11.1	88.5214	13.22	86.4014	11.43	88.1914	10.48	89.1414
GWB02	12.283	87.5121	12.332	87.4631	-		-		7.32	92.4751	9.48	90.3151	10.2	89.5951	10.7	89.0951	11.1	88.6951	11.4	88.3951	11.48	88.3151	11.54	88.2551
GWB03	10.795	88.8843	-		-		-		4.16	95.5193	7.3	92.3793	8.3	91.3793	8.77	90.9093	9.1	90.5793	9.6	90.0793	9.94	89.7393	11.41	88.2693
GWB04	13.957	88.906	13.99	88.873	3.82	99.043	6.32	96.543	7.71	95.153	10.5	92.363	11.5	91.363	12.2	90.663	12.6	90.263	12.93	89.933	12.9	89.963	13.6	89.263

BORE ID	2022																								2023											
	Jan-22		Feb-22		Mar-22		Apr-22		May-22		Jun-22		Aug-22		Sep-22		Oct-22		Nov-22		Dec-22		Jan-23		Feb-23		Mar-23		Apr-23		May-23		Mar-24		Apr-24		May-24		Jun-24		Jul-24	
	mbTOC	mAHD	mbTOC	mAHD	mbTOC	mAHD	mbTOC	mAHD	mbTOC	mAHD	mbTOC	mAHD	mbTOC	mAHD	mbTOC	mAHD	mbTOC	mAHD	mbTOC	mAHD	mbTOC	mAHD	mbTOC	mAHD	mbTOC	mAHD	mbTOC	mAHD	mbTOC	mAHD	mbTOC	mAHD	mbTOC	mAHD	mbTOC	mAHD	mbTOC	mAHD	mbTOC	mAHD
GWA (RN031131)	12.1	90.5754	10.23	92.4454	11.6	91.0754	12.7	89.9754	13.1	89.5754	13.33	89.3454	13.65	89.0254	13.78	88.8954	13.78	88.8954	14.25	88.4254	Dry		11.47	91.2054	11.69	90.9854	7.42	95.2554	9.47	93.2054	11.65	91.0254	-		-		-		-		-		10.2	91.5234		
GWE (RN022487)	10.06	92.0864	8.33	93.8164	9.47	92.6764	10.5	91.6464	11	91.1464	11.27	90.8764	11.58	90.5664	11.64	90.5064	11.74	90.4064	11.97	90.1764	11.86	90.2864	10.46	91.6864	9.54	92.6064	6.5	95.6464	8.1	94.0464	9.52	92.6264	4.5	97.6464	6.13	96.0164	7.8	93.9234	-			
GWB01	10.7	88.9214	8.43	91.1914	9.83	89.7914	10.9	88.7214	11.3	88.3214	11.58	88.0414	11.69	87.9314	11.85	87.7714	Dry		12.35	87.2714	12.2	87.4214	10.86	88.7614	9.78	89.8414	5.63	93.9914	8.66	90.9614	Dry		2.45	97.1714	6.4	93.2214	8.8	90.1227	10.2	89.4214	11.2	88.4214
GWB02	10.06	89.7351	8.27	91.5251	9.67	90.1251	10.8	88.9951	11	88.7951	11.68	88.1151	11.87	87.9251	12	87.7951	12.21	87.5851	12.5	87.2951	12.34	87.4551	10.78	89.0151	9.72	90.0751	5.69	94.1051	8.5	91.2951	9.81	89.9851	2.5	97.2951	6.2	93.5951	8.6	90.5063	8.7	91.0951	10.7	89.0951
GWB03	10.05	89.6293	6.63	93.0493	8.01	91.6693	8.9	90.7793	9.3	90.3793	9.7	89.9793	10.65	89.0293	10.62	89.0593	Dry		Dry		8.53	91.1493	10.70	88.9793	8.84	90.8393	4.24	95.4393	6.26	93.4193	7.86	91.8193	1.82	97.8593	4.8	94.8793	6.16	92.8973	8.2	91.4793	8.9	90.7793		
GWB04	11.9	90.963	9.74	93.123	11.17	91.693	12.35	90.513	12.9	89.963	13.2	89.663	13.48	89.383	13.62	89.243	13.7	89.163	14.1	88.763	13.89	88.973	11.00	91.863	11.37	91.493	7.39	95.473	9.53	93.333	10.94	91.923	4.56	98.303	5.9	96.963	9.18	93.0366	11.4	91.463	12	90.863

Field measurements

Redox only started to be measured in April 2022, as such, the table below only comprises the months since monitoring of this parameter started.

pH	2006	2017	2018	2020					2021									2022										2023							2024						
	JUN	MAY	JUL	1-Aug	14-Sep	26-Oct	16-Nov	17-Mar	29-Apr	18-May	29-Jun	27-Jul	24-Aug	21-Sep	26-Oct	24-Nov	14-Dec	10-Jan	22-Feb	7-Mar	11-Apr	10-May	14-Jun	9-Aug	12-Sep	11-Oct	9-Nov	6-Dec	17-Jan	14-Feb	14-Mar	17-Apr	15-May	27-Nov	17-Dec	21-Jan	18-Feb	17-Mar	21-Apr	26-May	23-Jun	28-Jul
GWA	7.1	7.2	6.9	7.8	5.6	5.8	6.7	7.2	7.1	7.2	6.4	6.3	5.8	6.9	7.9	8.1	5.3	8.4	6.0	9.1	8.5	8.1	6.0	6.2	6.3	5.8	6.1	6.7	6.8	7.8	7.5	8.0	6.5								
GWE				7.7	5.5	5.8	6.5	7.6	7.8	8.5	6.4	6.6	7.0	7.9	8.5	8.2	6.9	8.5	6.1	9.3	8.6	8.0	9.1	7.0	6.5	4.2	7.4		5.7	8.7	7.2	7.6	6.7								
GWB01			6.6		5.7	5.7		7.1	7.2	7.1	6.6	6.5	6.0	7.0		7.5	7.1	7.9	6.7	9.0	7.8	8.8	4.2	6.8	6.6		6.7		5.0	8.3	5.2	7.4									
GWB02			7.0		6.1	4.4	6.3			7.1	6.5	6.0	6.7	7.6	7.9	6.6	5.9	8.2	6.3	8.9	7.5	8.5	5.0	6.9	3.7	3.2	7.2	6.0	6.3	8.2	7.4	7.3	3.4								
GWB03			7.1							7.1	6.9	5.8	7.1	7.8	8.1	7.5	5.9	8.7	6.0	8.7	6.6	7.0	6.7	5.7				5.8		8.0	7.2	7.1	6.4								
GWB04			6.7		6.6	5.7	6.4	7.2	7.0	7.1	6.8	7.0	6.1	7.1	8.3	7.8	5.5	7.7	5.5	8.6	6.5	6.0	6.2	4.3	3.7	3.5	6.8	6.0	4.8	7.8	6.8		6.1								

T (°C)	2018	2020					2021									2022										2023							2024						
	JUL	1-Aug	14-Sep	26-Oct	16-Nov	17-Mar	29-Apr	18-May	29-Jun	27-Jul	24-Aug	21-Sep	26-Oct	24-Nov	14-Dec	10-Jan	22-Feb	7-Mar	11-Apr	10-May	14-Jun	9-Aug	12-Sep	11-Oct	9-Nov	6-Dec	17-Jan	14-Feb	14-Mar	17-Apr	15-May	17-Mar	21-Apr	26-May	23-Jun	28-Jul					
GWA	33.1	33.2	33.1	33.3	32.8	33.4	32.9	33.2	31.4	31.3	30.1	31.4	32.4	32.6	35.6	35.3	32.0	30.7	32.9	31.2	28.0	29.3	31.8	31.4	29.5	36.2	32.7	32.6	36.4	25.0	25.0	31.3	31.8	32.4	32.0	31.8			
GWE		30.1	34.9	33.2	34.1	34.6	32.7	32.0	32.0	31.2	31.2	31.4	32.4	31.1	33.4	35.0	32.4	32.9	31.3	30.3	27.9	28.8	29.8	34.6	30.4		31.8	32.4	33.8	24.1	24.8	27.9	32.2	31.8	32.3	29.0			
GWB01	31.2		30.0	29.4		36.2	33.1	29.9	30.3	31.3	30.0	30.1		30.9	33.0	32.2	31.8	31.9	31.5	30.7	28.6	27.0	28.7		32.2		30.6	32.4	29.5	25.0		28.1	30.1	33.0	31.3	27.2			
GWB02	30.6		36.3	32.7	31.5			30.7	30.6	30.6	30.9	31.4	34.0	29.9	34.2	33.3	31.1	31.9	31.6	31.8	25.2	28.5	29.0	37.6	35.3	31.4	33.5	31.2	29.9	25.0	26.2	28.8	30.8	32.0	35.3	27.7			
GWB03	27.1							27.3	29.6	27.7	29.7	31.1	31.8	27.4	32.2	36.4	28.8	31.0	29.3	29.8	24.5	27.9				29.5		29.3	21.5	23.1	24.3	27.7	29.8	31.0	28.6	24.9			
GWB04	30.9		31.5	30.4	30.7	33.8	31.2	32.0	28.7	28.7	29.4	29.5	31.9	31.6	31.7	31.3	30.9	32.0	28.2	29.9	24.4	27.3	28.7	25.8	31.3	30.0	28.4	30.9	29.0		23.5	29.2	29.5	36.0	30.2	27.1			

EC (µS/cm)	2018	2020					2021									2022										2023							2024						
	JUL	1-Aug	14-Sep	26-Oct	16-Nov	17-Mar	29-Apr	18-May	29-Jun	27-Jul	24-Aug	21-Sep	26-Oct	24-Nov	14-Dec	10-Jan	22-Feb	7-Mar	11-Apr	10-May	14-Jun	9-Aug	12-Sep	11-Oct	9-Nov	6-Dec	17-Jan	14-Feb	14-Mar	17-Apr	15-May	17-Mar	21-Apr	26-May	23-Jun	28-Jul					
GWA	770	578	640	645	540	915	710	352	811	1120	766	835	759	737	619	735	700	710	730	729	730	317	681	636	696	645	631	704	677	734	656	605	600	616	602	575			
GWE		664	588	708	661	679	652	478	715	587	611	513	579	448	598	459	630	626	622	605	570	1707	570	406	488		812	802	702	662	664	450	450	464	489	469			
GWB01	1111		788	738		813	791	617	1220	1120	1177	1073		1010	984	1020	1010	1020	1020	1045	1030	1022	947		868		930	945	940	734		625	797	921	809	880			
GWB02	894		765	866	748			553	1018	1154	1063	1086	863	1000	955	1034	1100	1701	984	1005	1000	847	987	856	881	912	865	961	814	944	848	757	630	775	786	804			
GWB03	684							435	952	1120	973	1050	1600	1049	1077	1192	892	998	966	1017	1060	3081				1220		907	799	879	949	540	553	622	918	781			
GWB04	1043		839	911	776	838	1120	478	971	1016	1000	1030	894	910	887	975	982	930	1014	920	850	1059	914	932	897	852	923	889	762		274	681	701	752	795	799			

DO (%)	2018	2020					2021									2022										2023							2024						
	JUL	1-Aug	14-Sep	26-Oct	16-Nov	17-Mar	29-Apr	18-May	29-Jun	27-Jul	24-Aug	21-Sep	26-Oct	24-Nov	14-Dec	10-Jan	22-Feb	7-Mar	11-Apr	10-May	14-Jun	9-Aug	12-Sep	11-Oct	9-Nov	6-Dec	17-Jan	14-Feb	14-Mar	17-Apr	15-May	17-Mar	21-Apr	26-May	23-Jun	28-Jul					
GWA	22.7	5.3	5.7	3.9	4.4	11.1	6.0	7.6	5.6	4.1	3.8	1.9	4.1	11.9	2.4	3.6	5.3	22.9	4.4	10.1	8.2	3.3	13.3	3.0	7.2	1.2	2.6		24.1	7.9	24.3	8.6	4.9	10.2	21.2	10.4			
GWE		2.7	1.7	1.7	3.4	11.9	4.5	6.9	6.7	3.7	4.3	6.3	3.0	9.1	2.0	4.1	5.5	5.4	3.0	2.4	4.5	6.5	12.1	2.8	1.0		2.2	6.0	7.2	8.2	18.8	26.7	3.7	11.2	9.0	3.9			
GWB01	3.9		1.9	0.8		12.7	4.1	5.9	3.7	4.1	4.2	2.0		5.8	2.4	4.4	5.6	20.6	3.3	2.9	2.4	39.3	9.5		1.9		0.9	13.9	13.7	8.0		4.7	6.5	9.7	10.3	2.4			
GWB02	63.5		5.2	2.7	3.1			7.7	3.8	6.0	4.0	2.1	4.7	4.0	8.6	4.0	4.2	4.0	2.1	2.1	1.8		9.0	1.3	1.9	2.7	1.5		4.7	11.4	14.0	12.0	7.2	8.1	11.7	6.4			
GWB03	44.2							9.5	3.5	4.9	3.2	1.4	7.3	4.9	2.0	3.8	3.7	12.6	3.5	1.7	2.1	34.3				5.2			5.0	10.0	50.5	13.3	7.6	10.0	7.0	12.5			
GWB04	27.7		6.7	4.5	4.3	8.1	7.6	6.9	7.4	4.0	4.3	33.0	6.6	4.2	2.9	4.8	8.3	5.7	2.0	2.3	5.9	7.6	7.6	4.0	5.0	3.0	2.4		3.9		23.1	18.8	7.6	25.5	17.4	7.0			

Redox	2022								2023									
	11-Apr	10-May	14-Jun	9-Aug	12-Sep	11-Oct	9-Nov	6-Dec	17-Jan	14-Feb	14-Mar	17-Apr	15-May	17-Mar	21-Apr	26-May	23-Jun	28-Jul
GWA	369.0	400.0	418.0	1475.7	397.0	390.0	270.0	381.0	379.0	341.0	348.0	213.0	292.0	135.0	178.0	179.0	147.0	244.0
GWE	85.0	124.0	162.0	163.0	183.0	387.0	147.0		159.0	121.0	297.0	287.0	189.0	125.0	177.0	155.0	192.0	207.0
GWB01	277.0	367.0	395.0	363.0	345.0		350.0		390.0	416.0	375.0	311.0		194.0	182.0	158.0	222.0	314.0
GWB02	299.0	382.0	335.0	350.0	370.0	386.0	330.0	752.6	369.0	295.0	354.0	278.0	191.0	183.0	169.0	160.0	215.0	225.0
GWB03	233.0	320.0	318.0	391.0				268.0		359.0	353.0	244.0	274.0	157.0	176.0	179.0	150.0	224.0
GWB04	338.0	220.0	333.0		358.0	385.0	342.0	358.0	387.0	346.0	339.0		813.0	221.0	176.0	177.0	215.0	840.0

Major ions

K (mg/L)	2018	2020					2021										2022													2023							2024						
	JUL	1-Aug	14-Sep	26-Oct	16-Nov	1-Dec	17-Mar	29-Apr	18-May	29-Jun	27-Jul	24-Aug	21-Sep	26-Oct	24-Nov	14-Dec	10-Jan	22-Feb	7-Mar	11-Apr	10-May	14-Jun	1-Jul	9-Aug	12-Sep	11-Oct	9-Nov	6-Dec	17-Jan	14-Feb	14-Mar	17-Apr	15-May	27-Nov	17-Dec	21-Jan	18-Feb	17-Mar	21-Apr	26-May	23-Jun	28-Jul
GWA	5.7	4.4	4.6	4.5	5.7	5.0	9.4	4.1		4.4	5.0	5.2	4.5	3.9	5.1	5.3	4.7	4.8	4.8	4.7	5.2	5.1		4.6	4.4	4.7	4.7	4.8	4.6	4.7	4.9	4.5	5.4	4.8	8.9	4.4	5.9		5.9	5.2	6.7	4.8
GWE		5.7	5.9	6.5	7.1		7.6	4.6		5.5	5.5	5.4	5.0	4.8	6.5	5.7	6.0	5.5	5.4	6.3	5.2	5.4		5.2	5.1	7.3	6.0		7.1	7.8	5.3	5.6	4.9	7.1	6.5	13.0	6.3	11.0	5.8	8.2	6.3	6.5
GWB01	15.0		11.0	11.0			11.0	7.6		15.0	16.0	16.0	14.0		14.0	14.0	14.0	14.0	14.0	14.0	14.0	14.0		12.0	13.0		12.0		12.0			14.0			17.0	5.5	11.0	15.0	10.0	16.0	13.0	14.0
GWB02	7.7		5.7	6.1	6.5				5.9	5.3	6.0	6.0	6.9	5.4	5.8	6.4	6.0	6.8	6.7	5.3	6.4	6.0		5.9	6.0	6.3	6.0	6.0	5.8	6.1	6.7	5.4	5.9	43.0	12.0	5.6	8.3	6.0	5.9	9.9	5.1	5.4
GWB03	4.4								4.4	4.1	4.6	4.9	4.5	4.7	5.4	6.5	5.9	4.8	4.8	4.9	5.2	5.7		7.8				6.2		4.7	4.4	4.5	4.6	5.8	8.8	7.7	4.2	3.7	4.0	8.4	4.7	5.5
GWB04	8.8		7.9	8.2	7.7		9.0	6.8		8.0	8.2	8.9	7.8	8.0	8.4	9.6	8.4	8.6	8.3	7.8	8.4	8.4		7.9	8.1	8.6	8.4	8.4	8.5	8.6	9.3	8.8	8.5	7.9	9.7	8.1	7.7	8.2	8.4	12.0	8.9	9.0

Alkalinity (mg/L)	2018	2020					2021										2022													2023							2024						
	JUL	1-Aug	14-Sep	26-Oct	16-Nov	1-Dec	17-Mar	29-Apr	18-May	29-Jun	27-Jul	24-Aug	21-Sep	26-Oct	24-Nov	14-Dec	10-Jan	22-Feb	7-Mar	11-Apr	10-May	14-Jun	1-Jul	9-Aug	12-Sep	11-Oct	9-Nov	6-Dec	17-Jan	14-Feb	14-Mar	17-Apr	15-May	27-Nov	17-Dec	21-Jan	18-Feb	17-Mar	21-Apr	26-May	23-Jun	28-Jul
GWA	360	350	350	350	340	350	400	340		340	360	370	350	340	340	350	340	340	340	360	350	350		330	360	350	300	330	310	320	330	360	430	360	280	360	340		380	376	390	330
GWE		340	330	390	390		320	320		290	280	300	280	280	200	300	250	320	300	290	280	250		240	270	200	200		350	360	340	349	407	210	330	440	230	360	270	270	260	260
GWB01	440		430	430			350	390		440	440	440	440		390	420	430	450	440	420	430	420		400	430		360		400	410	380	470			360	250	430	390	420	490	440	410
GWB02	370		450	460	460				420	440	450	460	460	460	450	460	450	460	450	450	470	460		440	450	470	430	440	410	470	450	450	560	510	350	470	420	410	380	520	450	440
GWB03	300								380	420	460	490	480	500	450	500	530	400	460	470	490	480		510				480		500	350	370	540	500	480	490	420	310	340	400	550	470
GWB04	520		510	510	510		420	450		450	460	490	480	470	450	470	480	470	470	480	470	490		450	480	490	420	430	430	460	450	490	407	450	440	460	430	400	420	550	490	500

Ca (mg/L)	2018	2020					2021										2022													2023							2024						
	JUL	1-Aug	14-Sep	26-Oct	16-Nov	1-Dec	17-Mar	29-Apr	18-May	29-Jun	27-Jul	24-Aug	21-Sep	26-Oct	24-Nov	14-Dec	10-Jan	22-Feb	7-Mar	11-Apr	10-May	14-Jun	1-Jul	9-Aug	12-Sep	11-Oct	9-Nov	6-Dec	17-Jan	14-Feb	14-Mar	17-Apr	15-May	27-Nov	17-Dec	21-Jan	18-Feb	17-Mar	21-Apr	26-May	23-Jun	28-Jul
GWA	76	75	74	73	79	69	100	68		73	76	69	71	66	72	71	71	65	74	67	74	74		72	68	63	66	72	69	69	77	70	81	73	36	72	74		79	81	72	57
GWE		60	54	69	75		67	48		53	53	53	48	54	26	57	29	49	59	52	50	47		41	39	22	33		60	63	68	63	69	30	48	89	27	64	41	42	38	37
GWB01	95		80	81			83	77		100	95	86	87		84	94	92	88	100	92	96	91		85	88		74		82	87	90	110			54	37	82	61	76	110	96	67
GWB02	76		91	96	97				100	98	100	90	95	94	91	95	92	91	110	83	110	97		94	96	83	84	92	92	94	67	94	92	89	46	90	99	81	64	110	78	55
GWB03	53								77	86	98	84	89	93	84	95	95	77	98	86	89	92		100				120		93	72	91	100	96	77	110	81	46	59	82	100	51
GWB04	83		84	83	85		73	59		78	78	75	79	80	77	87	76	68	80	75	80	82		81	75	69	74	76	72	74	74	81	81	79	64	76	71	58	68	84	76	47

Cl (mg/L)	2018	2020					2021										2022													2023							2024						
	JUL	1-Aug	14-Sep	26-Oct	16-Nov	1-Dec	17-Mar	29-Apr	18-May	29-Jun	27-Jul	24-Aug	21-Sep	26-Oct	24-Nov	14-Dec	10-Jan	22-Feb	7-Mar	11-Apr	10-May	14-Jun	1-Jul	9-Aug	12-Sep	11-Oct	9-Nov	6-Dec	17-Jan	14-Feb	14-Mar	17-Apr	15-May	27-Nov	17-Dec	21-Jan	18-Feb	17-Mar	21-Apr	26-May	23-Jun	28-Jul
GWA	6	5	5	5	5	4	10	4		5	5	4	5	6	5	5	5	5	5	5	5	5		5	5	5	6	5	5	5	5	5	5	5	10	5	6		5	3	7	5
GWE		24	25	31	32		9	7		7	7	6	7	8	5	8	6	9	10	10	10	10		16	17	4	10		41	40	15	8	8	10	39	43	10	10	13	10	12	12
GWB01	56		28	27			24	42		86	75	66	56		52	48	51	53	57	60	56	51		48	43		46		39	40	32	89			44	13	37	28	49	91	80	64
GWB02	18		10	12	14				51	44	42	37	51	38	27	25	39	48	48	43	37	27		29	24	20	24	5	29	28	31	25	31	14	22	23	35	18	14	20	32	30
GWB03	10								12	15	11	10	10	11	8	7	7	11	11	10	9	9		10				5		7	11	12	14	12	17		7	10	4	13	13	12
GWB04	11		11	12	12		5	5		7	7	6	7	7	6	6	6	5	6	10	7	7		8	7	7	9	7	7	7	4	6	6	5	8	5	9	4	4	7	8	6

Na (mg/L)	2018	2020					2021										2022													2023							2024						
	JUL	1-Aug	14-Sep	26-Oct	16-Nov	1-Dec	17-Mar	29-Apr	18-May	29-Jun	27-Jul	24-Aug	21-Sep	26-Oct	24-Nov	14-Dec	10-Jan	22-Feb	7-Mar	11-Apr	10-May	14-Jun	1-Jul	9-Aug	12-Sep	11-Oct	9-Nov	6-Dec	17-Jan	14-Feb	14-Mar	17-Apr	15-May	27-Nov	17-Dec	21-Jan	18-Feb	17-Mar	21-Apr	26-May	23-Jun	28-Jul
GWA	7	6	6	6	6	6	13	6		6	6	6	6	5	6	7	6	6	6	6	7	6		6	6	6	6	6	6	6	6	6	6	6	6	5	6		6	6	6	6
GWE		22	21	28	31		11	8		9	8	8	8	9	9	8	10	9	10	12	11	10		14	13	12	10		34	32	15	10	9	16	27	26	14	6	15	15	13	14
GWB01	38		22	22			18	16		38	36	34	31		28	28	30	29	29	29	29	29		27	27		23		25	27	22	32			21	13	21	17	22	37	36	34
GWB02	17		11	11	12				25	22	20	18	24	16	14	15	18	25	26	18	20	16		16	6	15	13	13	15	16	41	19	29	51	12	15	21	18	11	20	17	16
GWB03	18								11	16	21	20	22	22	23	26	27	14	18	18	22	22		30				31		12	10	13	14	22	18	23	6	8	5	9	18	10
GWB04	15		14	14	15		10	10		10	9	9	10	9	9	10	10	10	9	9	10	10		10	9	10	10	10	11	9	8	9	9	9	9	7	6	7	6	14	9	9

SO4 (mg/L)	2018	2020					2021										2022													2023							2024						
	JUL	1-Aug	14-Sep	26-Oct	16-Nov	1-Dec	17-Mar	29-Apr	18-May	29-Jun	27-Jul	24-Aug	21-Sep	26-Oct	24-Nov	14-Dec	10-Jan	22-Feb	7-Mar	11-Apr	10-May	14-Jun	1-Jul	9-Aug	12-Sep	11-Oct	9-Nov	6-Dec	17-Jan	14-Feb	14-Mar	17-Apr	15-May	27-Nov	17-Dec	21-Jan	18-Feb	17-Mar	21-Apr	26-May	23-Jun	28-Jul
GWA	5	4	4	4	4	4	59	5		5	6	7	6	6	5	5	6	5	2	7	6	6		5	4	5	5	5	6	5	9	9	10	5	5	6	8	8	18	5	7	5
GWE		<1	<1	11	11		6	5		6	6	7	6	5	5	<1	3	2	2	5	7	6		11	9	6	8		12	14	9	7	7	12	12	18	7	11	6	5	6	6
GWB01	19		14	13			34	37		35	25	25	21		19	21	23	29	30	25	23	20		18	16		16		18	19	18	20			16	4	21	16	28	37	24	19
GWB02	28		17	27	33				38	36	38	39	42	36	35	35	42	50	49	45	41	36		34	29	30	30	28	31	41	32	26	35	21	36	29	32	20	12	23	32	32
GWB03	8								6	23	68	51	75	76	99	110	150	11	26	32	62	67		180				290		43	7	8	26	79	89	170	7	5	6	5	73	15
GWB04	8		7	8	8		5	7		10	11	13	14	11	10	10	11	9	10	13	11	10		9	8	9	10	9	8	12	7	11	12	5	10	8	9	5	6	15	10	11

Mg (mg/L)	2018	2020					2021										2022													2023							2024						
	JUL	1-Aug	14-Sep	26-Oct	16-Nov	1-Dec	17-Mar	29-Apr	18-May	29-Jun	27-Jul	24-Aug	21-Sep	26-Oct	24-Nov	14-Dec	10-Jan	22-Feb	7-Mar	11-Apr	10-May	14-Jun	1-Jul	9-Aug	12-Sep	11-Oct	9-Nov	6-Dec	17-Jan	14-Feb	14-Mar	17-Apr	15-May	27-Nov	17-Dec	21-Jan	18-Feb	17-Mar	21-Apr	26-May	23-Jun	28-Jul
GWA	39	36	35	36	34	37	41	31		33	34	34	34	28	33	32	33	31	33	32	36	36		35	32	32	33	34	34	33	35	33	36	34	29	33	35		39	35	35	35
GWE		39	36	43	43		31	26		31	29	31	29	31	26	31	28	30	34	33	32	31		33	30	26	29		45	45	36	37	34	27	38	45	28	36	33	33	30	32
GWB01	44		45	45			40	38		45	43	40	41		37	41	41	44	45	44	45	43		43	43		39		44	46	44	55			38	28	41	39	51	52	45	45
GWB02	44		50	52	53				44	49	53	51	51	52	52	52	49	48	55	49	59	54		54	51	47	48	53	54	58	53	49	50	49	44	52	48	46	44	52	50	53
GWB03	36								40	49	63	52	60	63	62	68	68	41	59	56	62	64		80				93		59	40	51	57	68	58	79	41	36	36	43	71	55
GWB04	66		63	62	63		50	47		58	57	54	57	57	56	61	55	52	60	54	58	58		61	56	53	54	58	56	61	53	65	61	57	54	58	54	54	55	65	60	65

Nutrients

TN (µg/L)	2017	2018	2020					2021									2022											2023									2024						
	MAY	JUL	1-Aug	14-Sep	26-Oct	16-Nov	DEC	17-Mar	29-Apr	18-May	29-Jun	27-Jul	24-Aug	21-Sep	26-Oct	24-Nov	14-Dec	10-Jan	22-Feb	7-Mar	11-Apr	10-May	14-Jun	1-Jul	9-Aug	12-Sep	11-Oct	9-Nov	6-Dec	17-Jan	14-Feb	14-Mar	17-Apr	15-May	1-Jun	1-Jul	1-Aug	1-Sep	1-Oct	27-Nov	17-Dec	21-Jan	18-Feb	17-Mar	21-Apr	26-May	23-Jun	28-Jul
GWA			200		200			100			600			500			600			700						<100			200			680							270					590		
GWE			500		300			300			300			300			1000			200						<100			200			420							140					970		
GWB01				1900	2000			1700			4900						7500			1500									2100			920										1200			1600		
GWB02				<100	100					1100	600			600			600			1500						380			160			1600							1400			2600			840		
GWB03										1900	7100			4100			1000			5300												4200							3200					720		
GWB04				200	300				4000		2800			2800			2300			1300						380			2700			3200							3200			3900		3900		

TP (µg/L)	2017	2018	2020					2021									2022											2023									2024						
	MAY	JUL	AUG	14-Sep	26-Oct	16-Nov	20-Dec	17-Mar	29-Apr	18-May	29-Jun	27-Jul	24-Aug	21-Sep	26-Oct	24-Nov	14-Dec	10-Jan	22-Feb	7-Mar	11-Apr	10-May	14-Jun	1-Jul	9-Aug	12-Sep	11-Oct	9-Nov	6-Dec	17-Jan	14-Feb	14-Mar	17-Apr	15-May	1-Jun	1-Jul	1-Aug	1-Sep	1-Oct	27-Nov	17-Dec	21-Jan	18-Feb	17-Mar	21-Apr	26-May	23-Jun	28-Jul
GWA		<50	<50		<50				<50			<50			<50			<50			<50						<10			<10			<10							<10			57		<10		
GWE		<50	<50		<50				<50			<50			<50			<50			<50						<10			<10			<10							<10			<10		24		
GWB01		<50		<50	<50				<50			<50						<50			110									20			<10										<10			49		
GWB02		<50		<50	<50					<50		<50			80			<50			<50						20			10			<10							65			<10		33		
GWB03		60								<50		<50			140			750			370												33							810			<10		59		
GWB04		<50		<50	<50				<50			<50			<50			<50			<50						10			<10			<10							23			<10		160		

NO3-N (µg/L)	2017	2018	2020					2021									2022											2023									2024						
	MAY	JUL	AUG	14-Sep	26-Oct	16-Nov	20-Dec	17-Mar	29-Apr	18-May	29-Jun	27-Jul	24-Aug	21-Sep	26-Oct	24-Nov	14-Dec	10-Jan	22-Feb	7-Mar	11-Apr	10-May	14-Jun	1-Jul	9-Aug	12-Sep	11-Oct	9-Nov	6-Dec	17-Jan	14-Feb	14-Mar	17-Apr	15-May	1-Jun	1-Jul	1-Aug	1-Sep	1-Oct	27-Nov	17-Dec	21-Jan	18-Feb	17-Mar	21-Apr	26-May	23-Jun	28-Jul
GWA		270	130		100				8			450			340			470			540						9			190			720							<5					290		
GWE			7		17				100			<5			9			9			<5						7			7			77							31					640		
GWB01		220		18	13				1300			170						5400			12									620			780										790					
GWB02		94		<5	<5					630		150			32			320			1200						46			20			1800							<5			2300			380		
GWB03		47								1900		6400			3600			300			5100												1800							2800					680		
GWB04		150		160	160				3800			2400			2600			2100			1200						2300			2500			3200							<5			3800		3100		

NH4 (µg/L)	2017	2018	2020					2021									2022											2023									2024						
	MAY	JUL	1-Aug	14-Sep	26-Oct	16-Nov	1-Dec	17-Mar	29-Apr	18-May	29-Jun	27-Jul	24-Aug	21-Sep	26-Oct	24-Nov	14-Dec	10-Jan	22-Feb	7-Mar	11-Apr	10-May	14-Jun	1-Jul	9-Aug	12-Sep	11-Oct	9-Nov	6-Dec	17-Jan	14-Feb	14-Mar	17-Apr	15-May	1-Jun	1-Jul	1-Aug	1-Sep	1-Oct	27-Nov	17-Dec	21-Jan	18-Feb	17-Mar	21-Apr	26-May	23-Jun	28-Jul
GWA	<5	<5	<7			<7	<7				17			10		<7	63		55	17	<7	9	<7		9	45	11	<7	<7	<7	11	11	<7							31	<7	<7	<7	<7	<5	<7	8
GWE			370			49					29			110		11	150		83	42	120	120	150		190	220	11	63		79	54	9	<7							22	58	110	<7	<7	<7	17	29	57
GWB01		2900									3500			6100		5400	4000		740	380	1100	1200	1900		2100	1600		2000		990	110	8	<7								1300	45	160		<7	730	2100	2700
GWB02		1000				<7				71	8			800		<7	51		<7	<7	<7	<7	10		10	42	21	<7	<7	7	<7	<7	<7							29	24	<7	39	16	<7	<5	<7	9
GWB03		360								<7	<7			13		26	42		<7	<7	8	35	34		44			<7			<7	<7	<7								15	<7	18	<7	<7	7	21	7
GWB04		130				<7					<7			13		9	64		18	7	<7	12	13		13	37	9	<7	<7	<7	<7	<7	<7							100	<7	<7	<7	<7	<7	8	<7	7

Dissolved metals

Cd (mg/L)	2017	2018	2020			2021					2022			2023			2024	
	MAY	JUL	1-Aug	14-Sep	26-Oct	29-Apr	18-May	27-Jul	21-Sep	26-Oct	10-Jan	11-Apr	11-Oct	17-Jan	17-Apr	27-Nov	18-Feb	26-May
GWA	<0.0001	<0.0001	<0.0001		<0.0001	<0.0001		<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010
GWE			<0.0001		<0.0001	<0.0001		<0.0001		<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001
GWB01		<0.0001		<0.0001	<0.0001	<0.0001		<0.0001			<0.0001	<0.0001		<0.0001	<0.0001		<0.0001	<0.0001
GWB02		<0.0001		<0.0001	<0.0001		<0.0001	<0.0001		<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	0.00036	<0.0001	<0.0001
GWB03		<0.0001					<0.0001	<0.0001		<0.0001	<0.0001	<0.0001			<0.0001	<0.0001	<0.0001	<0.0001
GWB04		<0.0001		<0.0001	<0.0001	<0.0001		<0.0001		<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001

CrIII (mg/L)	2017	2018	2020			2021					2022			2023			2024	
	MAY	JUL	1-Aug	14-Sep	26-Oct	29-Apr	18-May	27-Jul	21-Sep	26-Oct	10-Jan	11-Apr	11-Oct	17-Jan	17-Apr	27-Nov	18-Feb	26-May
GWA			<0.005		<0.005	<0.005		<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.0050	<0.0050	<0.0050
GWE			<0.005		<0.005	<0.005		<0.005		<0.005	<0.005	<0.005	<0.001	<0.005	<0.005	<0.0050	<0.0050	<0.0050
GWB01				<0.005	<0.005	<0.005		<0.005			<0.005	<0.005		<0.005	<0.005		<0.0050	<0.0050
GWB02				<0.005	<0.005		<0.005	<0.005		<0.005	<0.005	<0.005	<0.0050	<0.005	<0.005	<0.001	<0.0050	<0.0050
GWB03							<0.005	<0.005		<0.005	<0.005	<0.005			<0.005	<0.0050	<0.001	<0.0050
GWB04				<0.005	<0.005	<0.005		<0.005		<0.005	<0.005	<0.005	<0.001	<0.005	<0.001	<0.0050	<0.0050	<0.0050

CrVI (mg/L)	2017	2018	2020			2021					2022			2023			2024	
	MAY	JUL	1-Aug	14-Sep	26-Oct	29-Apr	18-May	27-Jul	21-Sep	26-Oct	10-Jan	11-Apr	11-Oct	17-Jan	17-Apr	27-Nov	18-Feb	26-May
GWA			<0.005		<0.005	<0.005		<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.0050	<0.0050	<0.0050
GWE			<0.005		<0.005	<0.005		<0.005		<0.005	<0.005	<0.005	<0.001	<0.005	<0.005	<0.0050	<0.0050	<0.0050
GWB01				<0.005	<0.005	<0.005		<0.005			<0.005	<0.005		<0.005	<0.005		<0.0050	<0.0050
GWB02				<0.005	<0.005		<0.005	<0.005		<0.005	<0.005	<0.005	<0.0050	<0.005	<0.005		<0.0050	<0.0050
GWB03							<0.005	<0.005		<0.005	<0.005	<0.005			<0.005	<0.0050	<0.0050	<0.0050
GWB04				<0.005	<0.005	<0.005		<0.005		<0.005	<0.005	<0.005	<0.001	<0.005	<0.001	<0.0050	<0.0050	<0.0050

Cu (mg/L)	2017	2018	2020			2021					2022			2023			2024	
	MAY	JUL	1-Aug	14-Sep	26-Oct	29-Apr	18-May	27-Jul	21-Sep	26-Oct	10-Jan	11-Apr	11-Oct	17-Jan	17-Apr	27-Nov	18-Feb	26-May
GWA	<0.001	<0.001	<0.001		<0.001	<0.001		<0.001	0.002	0.001	0.006	0.010	<0.010	0.001	<0.010	0.003		<1.0
GWE			<0.001		<0.001	<0.001		<0.001		<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	0.002	<0.001	<0.001
GWB01		0.018		<0.001	<0.001	0.002		0.005			0.007	0.005		0.005	0.004		0.005	<0.0050
GWB02		0.014		<0.001	<0.001		0.005	0.003		0.003	0.003	0.002	0.004	<0.0001	<0.0001	1.400	0.002	0.002
GWB03		0.023					<0.001	0.002		<0.001	0.001	<0.001			<0.001	0.005	<0.001	<0.001
GWB04		0.008		0.002	0.002	<0.001		0.020		0.002	0.003	0.002	0.002	0.029	<0.001	0.003	<0.001	0.003

Fe (mg/L)	2017	2018	2020			2021					2022			2023			2024	
	MAY	JUL	1-Aug	14-Sep	26-Oct	29-Apr	18-May	27-Jul	21-Sep	26-Oct	10-Jan	11-Apr	11-Oct	17-Jan	17-Apr	27-Nov	18-Feb	26-May
GWA		0.03	<0.1		<0.01	0.03		<0.01	0.03	0.08	0.01	<0.01	0.14	0.05	0.76	1.10	0.02	0.01
GWE			3.70		0.39	<0.01		0.11		1.10	<0.01	0.68	<0.01	3.00	0.18	0.20	0.02	<0.010
GWB01		0.01		0.18	0.24	<0.01		<0.01			<0.01	0.01		0.01	<0.01		0.04	<0.010
GWB02		0.01		<0.01	<0.01		<0.01	<0.01		<0.01	<0.01	<0.01	<0.01	0.08	<0.01	0.32	<0.010	<0.010
GWB03		0.01					<0.01	<0.01		<0.01	<0.01	0.09			0.10	0.02	<0.010	<0.010
GWB04		0.01		<0.01	<0.01	<0.01		<0.01		0.03	<0..01	<0.01	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010

Pb (mg/L)	2017	2018	2020			2021					2022			2023			2024	
	MAY	JUL	1-Aug	14-Sep	26-Oct	29-Apr	18-May	27-Jul	21-Sep	26-Oct	10-Jan	11-Apr	11-Oct	17-Jan	17-Apr	27-Nov	18-Feb	26-May
GWA	<0.001	<0.001	<0.001		<0.001	<0.001		<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001
GWE			<0.001		<0.001	<0.001		<0.001		<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001
GWB01		<0.001		<0.001	<0.001	<0.001		<0.001			<0.001	<0.001		0.001	<0.001		<0.001	<0.001
GWB02		<0.001		<0.001	<0.001		<0.001	<0.001		<0.001	<0.001	<0.001	<0.001	<0.0001	<0.001	0.014	<0.001	<0.001
GWB03		0.001					<0.001	<0.001		<0.001	<0.001	<0.001			<0.001	<0.001	<0.001	<0.001
GWB04		<0.001		<0.001	<0.001	<0.001		<0.001		<0.001	<0.001	0.001	<0.001	<0.001	<0.001	0.002	0.002	<0.001

Mn (mg/L)	2017	2018	2020			2021					2022			2023			2024	
	MAY	JUL	1-Aug	14-Sep	26-Oct	29-Apr	18-May	27-Jul	21-Sep	26-Oct	10-Jan	11-Apr	11-Oct	17-Jan	17-Apr	27-Nov	18-Feb	26-May
GWA		<0.005	<0.005		<0.005	0.018		<0.005	<0.005	<0.005	<0.005	<0.005	0.004	0.003	0.006	0.010	0.004	0.002
GWE			0.012		<0.005	<0.005		0.008		0.019	<0.005	0.020	0.007	0.031	0.007	0.020	0.007	0.009
GWB01		0.210		0.240	0.220	0.006		0.380			0.015	0.140		0.130	0.012		0.031	0.160
GWB02		<0.005		0.016	0.007		0.005	0.029		0.032	0.009	0.022	0.018	0.270	0.003	0.150	<0.001	0.010
GWB03		0.007					<0.005	0.054		0.097	0.110	0.100			0.054	0.020	<0.001	0.008
GWB04		0.029		<0.005	<0.005	<0.005		<0.005		<0.005	<0.005	<0.005	<0.001	0.004	<0.001	<0.001	<0.001	0.002

Ni (mg/L)	2017	2018	2020			2021					2022			2023			2024	
	MAY	JUL	1-Aug	14-Sep	26-Oct	29-Apr	18-May	27-Jul	21-Sep	26-Oct	10-Jan	11-Apr	11-Oct	17-Jan	17-Apr	27-Nov	18-Feb	26-May
GWA	<0.001	<0.001	<0.001		<0.001	<0.001		<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	0.002	<0.001
GWE			0.002		<0.001	<0.001		<0.001		<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001
GWB01		0.010		0.002	0.002	0.001		0.004			0.002	0.003		0.003	0.002		0.003	0.003
GWB02		0.007		0.002	0.002		0.002	0.003		0.004	0.003	0.003	0.004	0.003	<0.0010	0.005	0.001	0.002
GWB03		0.004					<0.001	0.002		0.003	0.005	0.003			<0.001	0.002	<0.001	<0.001
GWB04		0.003		<0.001	<0.001	<0.001		0.004		<0.001	0.002	<0.001	<0.001	0.002	<0.001	<0.001	<0.001	0.002

Zn (mg/L)	2017	2018	2020			2021					2022			2023			2024	
	MAY	JUL	1-Aug	14-Sep	26-Oct	29-Apr	18-May	27-Jul	21-Sep	26-Oct	10-Jan	11-Apr	11-Oct	17-Jan	17-Apr	27-Nov	18-Feb	26-May
GWA	0.005	0.008	0.005		0.004	0.015		0.011	0.032	0.009	0.071	0.025	0.007	0.012	0.015	0.066		0.007
GWE			<0.001		0.001	0.002		0.002		0.003	0.007	0.004	0.003	0.007	0.009	0.086	<0.001	0.003
GWB01		0.015		0.002	0.003	0.004		0.004			0.009	0.008		0.007	0.046		0.007	0.009
GWB02		0.019		<0.001	<0.001		0.003	0.003		0.005	0.005	0.003	0.008	0.044	0.005	1.100	0.003	0.009
GWB03		0.025					0.003	0.007		0.005	0.007	0.008			0.013	0.032	0.002	0.008
GWB04		0.013		0.021	0.016	0.015		0.033		0.032	0.046	0.051	0.024	0.018	0.020	0.045	0.033	0.029

Al (mg/L)	2017	2018	2020			2021					2022			2023			2024	
	MAY	JUL	1-Aug	14-Sep	26-Oct	29-Apr	18-May	27-Jul	21-Sep	26-Oct	10-Jan	11-Apr	11-Oct	17-Jan	17-Apr	27-Nov	18-Feb	26-May
GWA								<0.01		<0.01		<0.01	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010
GWE								<0.01		<0.01		<0.01	<0.01	<0.01	<0.01	<0.010	<0.010	<0.010
GWB01								<0.01				<0.01		<0.01	<0.01		0.036	<0.010
GWB02							<0.01	<0.01		<0.01		<0.01	<0.01	0.010	<0.01	0.016	<0.010	<0.010
GWB03							<0.01	<0.01		<0.01		<0.01			<0.01	<0.010	<0.010	<0.010
GWB04								<0.01		<0.01		<0.01	<0.01	<0.01	<0.01	<0.010	<0.010	<0.010

Se (mg/L)	2017	2018	2020			2021					2022			2023			2024	
	MAY	JUL	1-Aug	14-Sep	26-Oct	29-Apr	18-May	27-Jul	21-Sep	26-Oct	10-Jan	11-Apr	11-Oct	17-Jan	17-Apr	27-Nov	18-Feb	26-May
GWA								<0.001		<0.001		<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001
GWE								<0.001		<0.001		<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001
GWB01								<0.001				<0.001	<0.001	<0.001	<0.001		<0.001	<0.001
GWB02							<0.001	<0.001		<0.001		<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001
GWB03							<0.001	<0.001		0.001		<0.001			<0.001	<0.0010	<0.001	<0.001
GWB04								0.002		0.002		0.001	0.001	<0.001	<0.001	<0.001	<0.001	<0.001

Other leachate

TOC (mg/L)	2018	2020					2021										2022											2023							2024						
	JUL	1-Aug	14-Sep	26-Oct	16-Nov	1-Dec	17-Mar	29-Apr	18-May	29-Jun	27-Jul	24-Aug	21-Sep	26-Oct	24-Nov	14-Dec	10-Jan	22-Feb	7-Mar	11-Apr	10-May	14-Jun	9-Aug	12-Sep	11-Oct	9-Nov	6-Dec	17-Jan	14-Feb	14-Mar	17-Apr	15-May	27-Nov	17-Dec	21-Jan	18-Feb	17-Mar	21-Apr	26-May	23-Jun	28-Jul
GWA	<1	<1	<1	<1	<1	<1	<1	<1		<1	<1	<1	<1	<1	<1	<1	<1	<1	1	<1	<1	1	<1	<1	<1	<1	1	<1	<1	<1	2	<1	4	<1.0	<1.0	2	1	1	<1.0	<1.0	<1.0
GWE		<1	<1	<1	1		<1	<1		<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	1		2	<1	<1	2	<1	1	3	4	<1.0	6	2	<1.0	2	<1.0
GWB01	5		2	1			2	2		6	5	5	5		3	4	3	2	2	4	4	4	3	3		4		3	2	<1	10			3	1	3	5	3	8	8	
GWB02	<1		<1	<1	<1				3	2	2	2	3	2	<1	<1	3	2	2	2	2	2	1	1	3	1	1	1	2	1	2	1	2	2	2	2	5	3	2	
GWB03	1								<1	2	3	2	1	4	4	<1	4	2	<1	1	9	3	6				<1		1	1	2	1		5	5	<1.0	2	1	4	2	
GWB04	<1		<1	<1	<1		1	<1		<1	3	<1	<1	<1	<1	<1	<1	<1	<1	5	<1	2	1	<1	<1	2	<1	<1	<1	<1	2	1		1	<1.0	2	1	7	<1.0	<1.0	1

TDS (mg/L)	2018	2020					2021										2022											2023							2024						
	JUL	1-Aug	14-Sep	26-Oct	16-Nov	1-Dec	17-Mar	29-Apr	18-May	29-Jun	27-Jul	24-Aug	21-Sep	26-Oct	24-Nov	14-Dec	10-Jan	22-Feb	7-Mar	11-Apr	10-May	14-Jun	9-Aug	12-Sep	11-Oct	9-Nov	6-Dec	17-Jan	14-Feb	14-Mar	17-Apr	15-May	27-Nov	17-Dec	21-Jan	18-Feb	17-Mar	21-Apr	26-May	23-Jun	28-Jul
GWA	380	370	370	350	350	340	470	360		400	320	380	330	360	350	380	320	320	260	360	310	360	330	350	320	<5	360	360	340	430	410	370	350	300	380	340		420	360	390	330
GWE		400	370	430	450		300	380		320	260	340	250	300	180	540	220	290	240	260	260	290	260	310	180	<5		470	460	440	380	340	200	420	510	220	360	270	290	270	260
GWB01	590		480	450			450	630		680	640	520	520		530	490	550	560	530	500	510	540	500	490		<5		530	540	570	660			480	260		420	540	620	600	490
GWB02	440		470	450	500				560	620	570	620	610	520	550	520	530	590	560	540	500	550	500	500	540	500	<5	500	540	570	570	500	520	730	480	510	510	480	430	590		420
GWB03	340								390	530	540	630	520	580	590	670	580	450	450	490	530	610	670				830		550	420	390	540	630	570	670	400	320	340	350		390
GWB04	530		540	470	510		420	510		460	460	500	470	650	500	540	440	480	390	520	470	490	440	480	500	<5	480	480	480	520	520	470		490	460	450	380	440	550		440

COD (mg/L)	2018	2020					2021										2022											2023							2024						
	JUL	1-Aug	14-Sep	26-Oct	16-Nov	1-Dec	17-Mar	29-Apr	18-May	29-Jun	27-Jul	24-Aug	21-Sep	26-Oct	24-Nov	14-Dec	10-Jan	22-Feb	7-Mar	11-Apr	10-May	14-Jun	9-Aug	12-Sep	11-Oct	9-Nov	6-Dec	17-Jan	14-Feb	14-Mar	17-Apr	15-May	27-Nov	17-Dec	21-Jan	18-Feb	17-Mar	21-Apr	26-May	23-Jun	28-Jul
GWA		<20	<20	<20	<20	<20	<40	<20		<20	<20	<20	<20	<20	<20	<20	<20	<20	<20	<20	<20	<20	<20	<20	<20	<20	<20	<20	<20	<20	<20	<20	<20	<20	<20	<20	<20	<20	<20	<20	<20
GWE		<20	<20	<20	<20		<40	<20		<20	<20	<20	<20	<20	<20	<20	<20	<20	<20	<20	<20	<20	<20	<20	<20	<20		<20	<20	<20	<20	<20	<20	<20	66	<20	<20	<20	<20	<20	<20
GWB01			<20	<20			<40	<20		64	<20	<20	220		<20	240	<20	<20	38	50	360	24	120	<20		<20		50	<20	<20	<20			<100	25	<20	<20	<20	<20	93	<20
GWB02			<20	<20	<20				46	<20	<20	<20	<20	67	<20	<20	<20	21	<20	<20	<20	<20	<20	<20	<20	<20	<20	<20	<20	<20	<20	290	<20	120	<20	<20	<20	<20	<20	<20
GWB03									33	39	<20	<20	<20	100	220	<20	72	<20	<20	<20	<20	48	60				<20		<20	<20	<20	<20	370	60	120	<20	<20	<20	<20	54	<20
GWB04			<20	<20	<20		<40	<20		<20	<20	<20	<20	<20	<20	<20	<20	<20	<20	<20	<20	<20	<20	<20	<20	<20	<20	<20	<20	<20	<20	<20		58	<20	<20	<20	<20	<20	<20	<20

BOD (mg/L)	2018	2020					2021										2022											2023							2024						
	JUL	1-Aug	14-Sep	26-Oct	16-Nov	1-Dec	17-Mar	29-Apr	18-May	29-Jun	27-Jul	24-Aug	21-Sep	26-Oct	24-Nov	14-Dec	10-Jan	22-Feb	7-Mar	11-Apr	10-May	14-Jun	9-Aug	12-Sep	11-Oct	9-Nov	6-Dec	17-Jan	14-Feb	14-Mar	17-Apr	15-May	27-Nov	17-Dec	21-Jan	18-Feb	17-Mar	21-Apr	26-May	23-Jun	28-Jul
GWA	<5	<5	10	13	6	14	32	11		<5	<5	20	<5	19	14	<5	<5	5	<5	6	<5	<5	<5	<5	<5	16	15	12	15	11	19	<5	5	<5.0	<5.0	15		<5.0	18	<5.0
GWE		<5	13	12	<5		<5	7		<5	<5	19	<5	23	13	<5	<5	<5	<5	<5	<5	<5	<5	<5	<5	15		10	14	14	19	<5	<5.0	15	13	7		<5.0	<5.0	16	<5.0
GWB01	<5		13	18			31	12		13	<5	22	6		20	<5	9	6	7	10	8	8	7	7		22		15	18	9	24			25	<5.0			<5.0	12		<5.0
GWB02	<5		13	17	10				7	<5	<5	29	<5	29	17	<5	9	6	<5	6	<5	9	<5	<5	<5	18	17	15	18	13	23	<5	13	20	11	17		<5.0	6		<5.0
GWB03	<5								<5	17	<5	22	11	28	19	<5	15	14	<5	7	7	10	7			14			17	16	23	<5	23	18	11	12	15	<5.0	<5.0	<5.0	<5.0
GWB04	<5		<5	20	10		29	9		6	<5	<5	6	6	18	<5	10	6	<5	13	6	8	<5	<5	6	19	14	15	19	15	20	<5		17	6	18	17	<5.0	7		<5.0

VFA (mg/L)	2020				2021			2022			2023			2024	
	1-Aug	14-Sep	26-Oct	29-Apr	18-May	27-Jul	26-Oct	10-Jan	11-Apr	11-Oct	17-Jan	17-Apr	27-Nov	18-Feb	26-May
GWA	<5		<5	5		9	<5	33	<5	54	54	33	110	81	160
GWE	<5		76	5		<5	<5	<5	9	<5	82	51	130	49	110
GWB01		16	20	6		16		7	29		36	44		100	190
GWB02		<5	29		16	12	<5	18	19	14	100	93	120	290	140
GWB03					12	22	11	7	18			26	130	180	180
GWB04		<5	12	5		11	10	6	11	10	48	36		140	240

TRH, PAH, BTEXN and PCB

TRH C6-C9 (µg/L)	2018	2020				2021			2022			2023			2024	
	JUL	AUG	14-Sep	26-Oct	29-Apr	18-May	27-Jul	26-Oct	10-Jan	11-Apr	11-Oct	17-Jan	17-Apr	27-Nov	18-Feb	26-May
GWA	<10	<10		<10	<10		<10	<10	<10	<10	<10	<10	<10	<10		<10
GWE		<10		<10	<10		<10	<10	<10	<10	<10	<10	<10	<10	<10	<10
GWB01	<10		<10	<10	<10		<10		<10	<10		<10	<10		<10	<10
GWB02	<10		<10	<10		<10	<10	<10	<10	<10	<10	<10	<10	<50	<10	<10
GWB03	<10					<10	<10	<10	<10	<10			<10	<10	<10	<10
GWB04	<10		<10	<10	<10		<10	<10	<10	<10	<10	<10	<10		<10	<10

TRH C10-C14 (µg/L)	2018	2020				2021			2022			2023			2024	
	JUL	AUG	14-Sep	26-Oct	29-Apr	18-May	27-Jul	26-Oct	10-Jan	11-Apr	11-Oct	17-Jan	17-Apr	27-Nov	18-Feb	26-May
GWA	<50	<10		<10	<50		<50	<50	<50	<50	<50	<50	<50	440		<50
GWE		<10		<10	<50		<50	<50	<50	<50	<50	<50	<50	<50	<50	<50
GWB01	<10		<50	<50	<50		<50		<50	<50		<50	<50		<50	<50
GWB02	<10		<50	<50		<50	<50	<50	<50	<50	<50	<50	<50	<50	<50	<50
GWB03	<10					<50	<50	<50	<50	<50			<50	<50	<50	<50
GWB04	<10		<50	<50	<50		<50	<50	<50	<50	<50	<50	<50	<50	<50	<50

TRH C15-C28 (µg/L)	2018	2020				2021			2022			2023			2024	
	JUL	AUG	14-Sep	26-Oct	29-Apr	18-May	27-Jul	26-Oct	10-Jan	11-Apr	11-Oct	17-Jan	17-Apr	27-Nov	18-Feb	26-May
GWA	<100	<100		<100	<100		<100	<100	<100	<100	<100	<100	<100	<100		<100
GWE		<100		<100	<100		<100	<100	<100	<100	<100	<100	<100	<100	<100	<100
GWB01	<10		<100	<100	<100		<100		<100	<100		820	<100		<100	
GWB02	<10		<100	<100		<100	<100	<100	<100	<100	<100	<100	<100	<100	<100	<100
GWB03	<10					<100	<100	<100	<100	<100			200	<100	<100	<100
GWB04	<10		<100	<100	<100		<100	<100	<100	<100	<100	<100	150	<100	<100	<100

TRH C29-C36 (µg/L)	2018	2020				2021			2022			2023			2024	
	JUL	AUG	14-Sep	26-Oct	29-Apr	18-May	27-Jul	26-Oct	10-Jan	11-Apr	11-Oct	17-Jan	17-Apr	27-Nov	18-Feb	26-May
GWA	<100	<100		<100	<100		<100	<100	<100	<100	<100	<100	<100	<100		<100
GWE		<100		<100	<100		<100	<100	<100	<100	<100	<100	<100	<100	<100	<100
GWB01	<100		<100	<100	<100		<100		<100	<100		<100	<100		<100	<100
GWB02	<100		<100	<100		<100	<100	<100	<100	<100	<100	<100	<100	<100	<100	<100
GWB03	<100					<100	<100	<100	<100	<100			<100	<100	<100	<100
GWB04	<100		<100	<100	<100		<100	<100	<100	<100	<100	<100	<100	<100	<100	<100

MTBE (µg/L)	2018	2020				2021			2022			2023			2024	
	JUL	AUG	14-Sep	26-Oct	29-Apr	18-May	27-Jul	26-Oct	10-Jan	11-Apr	11-Oct	17-Jan	17-Apr	27-Nov	18-Feb	26-May
GWA	<1	<1		<1	<1		<1	<1	<1	<1	<1	<1	<1	<1.0		<1.0
GWE		<1		<1	<1		<1	<1	<1	<1	<1	<1	<1	<1.0	<1.0	<1.0
GWB01			<1	<1	<1		<1		<1	<1		<1	<1		<1.0	<1.0
GWB02			<1	<1		<1	<1	<1	<1	<1	<1	<1	<1	<5.0	<1.0	<1.0
GWB03						<1	<1	<1	<1	<1			<1	<1.0	<1.0	<1.0
GWB04			<1	<1	<1		<1	<1	<1	<1	<1	<1	<1		<1.0	<1.0

C6H6 (µg/L)	2018	2020				2021			2022			2023			2024	
	JUL	AUG	14-Sep	26-Oct	29-Apr	18-May	27-Jul	26-Oct	10-Jan	11-Apr	11-Oct	17-Jan	17-Apr	27-Nov	18-Feb	26-May
GWA	<1	<1		<1	<1		<1	<1	<1	<1	<1	<1	<1	<1.0		<1.0
GWE		<1		<1	<1		<1	<1	<1	<1	<1	<1	<1	<1.0	<1.0	<1.0
GWB01	<1		<1	<1	<1		<1		<1	<1		<1	<1		<1.0	<1.0
GWB02	<1		<1	<1		<1	<1	<1	<1	<1	<1	<1	<1	<5.0	<1.0	<1.0
GWB03	<1					<1	<1	<1	<1	<1			<1	<1.0	<1.0	<1.0
GWB04	<1		<1	<1	<1		<1	<1	<1	<1	<1	<1	<1		<1.0	<1.0

C7H8 (µg/L)	2018	2020				2021			2022			2023			2024	
	JUL	AUG	14-Sep	26-Oct	29-Apr	18-May	27-Jul	26-Oct	10-Jan	11-Apr	11-Oct	17-Jan	17-Apr	27-Nov	18-Feb	26-May
GWA	<1	<1		<1	<1		<1	<1	<1	<1	<1	<1	<1	<1.0		<1.0
GWE		<1		<1	<1		<1	<1	<1	<1	<1	<1	<1	<1.0	<1.0	<1.0
GWB01	<1		<1	<1	<1		<1		<1	<1		<1	<1		<1.0	<1.0
GWB02	<1		<1	<1		<1	<1	<1	<1	<1	<1	<1	<1	<5.0	<1.0	<1.0
GWB03	<1					<1	<1	<1	<1	<1			<1	<1.0	<1.0	<1.0
GWB04	<1		<1	<1	<1		<1	<1	<1	<1	<1	<1	<1		<1.0	<1.0

C8H10 (µg/L)	2018	2020				2021			2022			2023			2024	
	JUL	AUG	14-Sep	26-Oct	29-Apr	18-May	27-Jul	26-Oct	10-Jan	11-Apr	11-Oct	17-Jan	17-Apr	27-Nov	18-Feb	26-May
GWA	<1	<1		<1	<1		<1	<1	<1	<1	<1	<1	<1	<1.0		<1.0
GWE		<1		<1	<1		<1	<1	<1	<1	<1	<1	<1	<1.0	<1.0	<1.0
GWB01	<1		<1	<1	<1		<1		<1	<1		<1	<1		<1.0	<1.0
GWB02	<1		<1	<1		<1	<1	<1	<1	<1	<1	<1	<1	<5.0	<1.0	<1.0
GWB03	<1					<1	<1	<1	<1	<1			<1	<1.0	<1.0	<1.0
GWB04	<1		<1	<1	<1		<1	<1	<1	<1	<1	<1	<1		<1.0	<1.0

C8H10 M+P (µg/L)	2018	2020				2021			2022			2023			2024	
	JUL	AUG	14-Sep	26-Oct	29-Apr	18-May	27-Jul	26-Oct	10-Jan	11-Apr	11-Oct	17-Jan	17-Apr	27-Nov	18-Feb	26-May
GWA	<2	<2		<2	<2		<2	<2	<2	<2	<2	<2	<2	<2.0		<2.0
GWE		<2		<2	<2		<2	<2	<2	<2	<2	<2	<2	<2.0	<2.0	<2.0
GWB01	<2		<2	<2	<2		<2		<2	<2		<2	<2		<2.0	<2.0
GWB02	<2		<2	<2		<2	<2	<2	<2	<2	<2	<2	<2	<10	<2.0	<2.0
GWB03	<2					<2	<2	<2	<2	<2			<2	<2.0	<2.0	<2.0
GWB04	<2		<2	<2	<2		<2	<2	<2	<2	<2	<2	<2		<2.0	<2.0

C8H10 O (µg/L)	2018	2020				2021			2022			2023			2024	
	JUL	AUG	14-Sep	26-Oct	29-Apr	18-May	27-Jul	26-Oct	10-Jan	11-Apr	11-Oct	17-Jan	17-Apr	27-Nov	18-Feb	26-May
GWA	<1	<1		<1	<1		<1	<1	<1	<1	<1	<1	<1	<1.0		<1.0
GWE		<1		<1	<1		<1	<1	<1	<1	<1	<1	<1	<1.0	<1.0	<1.0
GWB01	<1		<1	<1	<1		<1		<1	<1		<1	<1		<1.0	<1.0
GWB02	<1		<1	<1		<1	<1	<1	<1	<1	<1	<1	<1	<5.0	<1.0	<1.0
GWB03	<1					<1	<1	<1	<1	<1			<1	<1.0	<1.0	<1.0
GWB04	<1		<1	<1	<1		<1	<1	<1	<1	<1	<1	<1		<1.0	<1.0

C10H8 (µg/L)	2018	2020				2021			2022			2023			2024	
	JUL	AUG	14-Sep	26-Oct	29-Apr	18-May	27-Jul	26-Oct	10-Jan	11-Apr	11-Oct	17-Jan	17-Apr	27-Nov	18-Feb	26-May
GWA	<1	<1		<1	<1		<1	<1	<1	<1	<1	<1	<1	<1.0		<1.0
GWE		<1		<1	<1		<1	<1	<1	<1	<1	<1	<1	<1.0	<1.0	<1.0
GWB01	<1		<1	<1	<1		<1		<1	<1		<1	<1		<1.0	<1.0
GWB02	<1		<1	<1		<1	<1	<1	<1	<1	<1	<1	<1	<5.0	<1.0	<1.0
GWB03	<1					<1	<1	<1	<1	<1			<1	<1.0	<1.0	<1.0
GWB04	<1		<1	<1	<1		<1	<1	<1	<1	<1	<1	<1		<1.0	<1.0

AROCLOR 1016 (µg/L)	2018	2020				2021			2022			2023			2024	
	JUL	AUG	14-Sep	26-Oct	29-Apr	18-May	27-Jul	26-Oct	10-Jan	11-Apr	11-Oct	17-Jan	17-Apr	27-Nov	18-Feb	26-May
GWA		<2		<2	<2		<2	<2	<2	<2	<2	<2	<2	<2.0		<2.0
GWE		<2		<2	<2		<2	<2	<2	<2	<2	<2	<2	<2.0	<2.0	<2.0
GWB01			<2	<2	<2		<2		<2	<2		<2	<2		<2.0	<2.0
GWB02			<2	<2		<2	<2	<2	<2	<2	<2	<2	<2	<2.0	<2.0	<2.0
GWB03						<2	<2	<2	<2	<2			<2	<2.0	<2.0	<2.0
GWB04			<2	<2	<2		<2	<2	<2	<2	<2	<2	<2	<2.0	<2.0	<2.0

AROCLOR 1221 (µg/L)	2018	2020				2021			2022			2023			2024	
	JUL	AUG	14-Sep	26-Oct	29-Apr	18-May	27-Jul	26-Oct	10-Jan	11-Apr	11-Oct	17-Jan	17-Apr	27-Nov	18-Feb	26-May
GWA		<2		<2	<2		<2	<2	<2	<2	<2	<2	<2	<2.0		<2.0
GWE		<2		<2	<2		<2	<2	<2	<2	<2	<2	<2	<2.0	<2.0	<2.0
GWB01			<2	<2	<2		<2		<2	<2		<2	<2		<2.0	<2.0
GWB02			<2	<2		<2	<2	<2	<2	<2	<2	<2	<2	<2.0	<2.0	<2.0
GWB03						<2	<2	<2	<2	<2			<2	<2.0	<2.0	<2.0
GWB04			<2	<2	<2		<2	<2	<2	<2	<2	<2	<2	<2.0	<2.0	<2.0

AROCLOR 1232 (µg/L)	2018	2020				2021			2022			2023			2024	
	JUL	AUG	14-Sep	26-Oct	29-Apr	18-May	27-Jul	26-Oct	10-Jan	11-Apr	11-Oct	17-Jan	17-Apr	27-Nov	18-Feb	26-May
GWA		<2		<2	<2		<2	<2	<2	<2	<2	<2	<2	<2.0		<2.0
GWE		<2		<2	<2		<2	<2	<2	<2	<2	<2	<2	<2.0	<2.0	<2.0
GWB01			<2	<2	<2		<2		<2	<2		<2	<2		<2.0	<2.0
GWB02			<2	<2		<2	<2	<2	<2	<2	<2	<2	<2	<2.0	<2.0	<2.0
GWB03						<2	<2	<2	<2	<2			<2	<2.0	<2.0	<2.0
GWB04			<2	<2	<2		<2	<2	<2	<2	<2	<2	<2	<2.0	<2.0	<2.0

AROCLOR 1242 (µg/L)	2018	2020				2021			2022			2023			2024	
	JUL	AUG	14-Sep	26-Oct	29-Apr	18-May	27-Jul	26-Oct	10-Jan	11-Apr	11-Oct	17-Jan	17-Apr	27-Nov	18-Feb	26-May
GWA		<2		<2	<2		<2	<2	<2	<2	<2	<2	<2	<2.0		<2.0
GWE		<2		<2	<2		<2	<2	<2	<2	<2	<2	<2	<2.0	<2.0	<2.0
GWB01			<2	<2	<2		<2		<2	<2		<2	<2		<2.0	<2.0
GWB02			<2	<2		<2	<2	<2	<2	<2	<2	<2	<2	<2.0	<2.0	<2.0
GWB03						<2	<2	<2	<2	<2			<2	<2.0	<2.0	<2.0
GWB04			<2	<2	<2		<2	<2	<2	<2	<2	<2	<2	<2.0	<2.0	<2.0

AROCLOR 1248 (µg/L)	2018	2020				2021			2022			2023			2024	
	JUL	AUG	14-Sep	26-Oct	29-Apr	18-May	27-Jul	26-Oct	10-Jan	11-Apr	11-Oct	17-Jan	17-Apr	27-Nov	18-Feb	26-May
GWA		<2		<2	<2		<2	<2	<2	<2	<2	<2	<2	<2.0		<2.0
GWE		<2		<2	<2		<2	<2	<2	<2	<2	<2	<2	<2.0	<2.0	<2.0
GWB01			<2	<2	<2		<2		<2	<2		<2	<2		<2.0	<2.0
GWB02			<2	<2		<2	<2	<2	<2	<2	<2	<2	<2	<2.0	<2.0	<2.0
GWB03						<2	<2	<2	<2	<2			<2	<2.0	<2.0	<2.0
GWB04			<2	<2	<2		<2	<2	<2	<2	<2	<2	<2	<2.0	<2.0	<2.0

AROCLOR 1254 (µg/L)	2018	2020				2021			2022			2023			2024	
	JUL	AUG	14-Sep	26-Oct	29-Apr	18-May	27-Jul	26-Oct	10-Jan	11-Apr	11-Oct	17-Jan	17-Apr	27-Nov	18-Feb	26-May
GWA		<2		<2	<2		<2	<2	<2	<2	<2	<2	<2	<2.0		<2.0
GWE		<2		<2	<2		<2	<2	<2	<2	<2	<2	<2	<2.0	<2.0	<2.0
GWB01			<2	<2	<2		<2		<2	<2		<2	<2		<2.0	<2.0
GWB02			<2	<2		<2	<2	<2	<2	<2	<2	<2	<2	<2.0	<2.0	<2.0
GWB03						<2	<2	<2	<2	<2			<2	<2.0	<2.0	<2.0
GWB04			<2	<2	<2		<2	<2	<2	<2	<2	<2	<2	<2.0	<2.0	<2.0

AROCLOR 1260 (µg/L)	2018	2020				2021			2022			2023			2024	
	JUL	AUG	14-Sep	26-Oct	29-Apr	18-May	27-Jul	26-Oct	10-Jan	11-Apr	11-Oct	17-Jan	17-Apr	27-Nov	18-Feb	26-May
GWA		<2		<2	<2		<2	<2	<2	<2	<2	<2	<2	<2.0		<2.0
GWE		<2		<2	<2		<2	<2	<2	<2	<2	<2	<2	<2.0	<2.0	<2.0
GWB01			<2	<2	<2		<2		<2	<2		<2	<2		<2.0	<2.0
GWB02			<2	<2		<2	<2	<2	<2	<2	<2	<2	<2	<2.0	<2.0	<2.0
GWB03						<2	<2	<2	<2	<2			<2	<2.0	<2.0	<2.0
GWB04			<2	<2	<2		<2	<2	<2	<2	<2	<2	<2	<2.0	<2.0	<2.0

PFAS

PFBS (mg/L)	2006	2017	2018	2020					2021			2022			2023			2024	
	JUN	MAY	JUL	1-Aug	14-Sep	26-Oct	29-Apr	18-May	29-Jun	27-Jul	26-Oct	10-Jan	11-Apr	11-Oct	17-Jan	17-Apr	27-Nov	18-Feb	26-May
GWA				<0.01		<0.01	<0.01			<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.010	<0.010	<0.010
GWE				<0.01		<0.01	<0.01			<0.01	0.03	<0.01	<0.01	<0.01	<0.01	<0.01	<0.010	<0.010	<0.010
GWB01					0.05	0.04	0.10			0.10		0.10	0.10		0.08	0.22		0.10	0.15
GWB02					<0.01	0.02		0.18		0.15	0.12	0.14	0.12	0.04	0.08	0.10	0.03	0.11	0.14
GWB03								<0.01		<0.01	<0.01	<0.01	<0.01			<0.01	<0.010	<0.010	<0.010
GWB04					<0.01	<0.01	<0.01			<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01		<0.010	<0.010

PFPeS (mg/L)	2006	2017	2018	2020					2021			2022			2023			2024	
	JUN	MAY	JUL	1-Aug	14-Sep	26-Oct	29-Apr	18-May	29-Jun	27-Jul	26-Oct	10-Jan	11-Apr	11-Oct	17-Jan	17-Apr	27-Nov	18-Feb	26-May
GWA				<0.01		<0.01	<0.01			<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.010	<0.010	<0.010
GWE				<0.01		<0.01	<0.01			<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.010	<0.010	<0.010
GWB01					0.04	0.03	0.07			0.08		0.08	0.08		0.05	0.14		0.08	0.09
GWB02					<0.01	0.02		0.14		0.10	0.07	0.09	0.08	0.03	0.05	0.08	0.02	0.08	0.07
GWB03								<0.01		<0.01	<0.01	<0.01	<0.01			<0.01	<0.010	<0.010	<0.010
GWB04					<0.01	<0.01	<0.01			<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01		<0.010	<0.010

PFHxS (mg/L)	2006	2017	2018	2020					2021			2022			2023			2024	
	JUN	MAY	JUL	1-Aug	14-Sep	26-Oct	29-Apr	18-May	29-Jun	27-Jul	26-Oct	10-Jan	11-Apr	11-Oct	17-Jan	17-Apr	27-Nov	18-Feb	26-May
GWA		0.04		<0.01		<0.01	<0.01			0.03	<0.01	0.02	0.02	<0.01	<0.01	<0.01	0.01	<0.010	0.02
GWE				0.03		0.04	<0.01			0.01	0.04	<0.01	<0.01	<0.01	0.04	<0.01	0.01	0.01	0.01
GWB01					0.19	0.17	0.58			1.10		0.62	0.83		0.37	1.20		0.57	1.00
GWB02					0.04	0.06		0.57		0.49	0.28	0.48	0.42	0.15	0.20	0.35	0.07	0.39	0.35
GWB03								0.02		<0.01	<0.01	<0.01	<0.01			0.01	<0.010	<0.010	0.01
GWB04					<0.01	<0.01	<0.01			0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01		<0.010	<0.010

PFHpS (mg/L)	2006	2017	2018	2020					2021			2022			2023			2024	
	JUN	MAY	JUL	1-Aug	14-Sep	26-Oct	29-Apr	18-May	29-Jun	27-Jul	26-Oct	10-Jan	11-Apr	11-Oct	17-Jan	17-Apr	27-Nov	18-Feb	26-May
GWA				<0.01		<0.01	<0.01			<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.010	<0.010	<0.010
GWE				<0.01		<0.01	<0.01			<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.010	<0.010	<0.010
GWB01					0.01	0.01	0.04			0.10		0.04	0.06		0.03	0.08		0.03	0.11
GWB02					<0.01	<0.01		0.07		0.06	0.05	0.06	0.06	0.02	0.02	0.03	<0.010	0.05	0.04
GWB03								<0.01		<0.01	<0.01	<0.01	<0.01			<0.01	<0.010	<0.010	<0.010
GWB04					<0.01	<0.01	<0.01			<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01		<0.010	<0.010

PFOS (mg/L)	2006	2017	2018	2020					2021			2022			2023			2024	
	JUN	MAY	JUL	1-Aug	14-Sep	26-Oct	29-Apr	18-May	29-Jun	27-Jul	26-Oct	10-Jan	11-Apr	11-Oct	17-Jan	17-Apr	27-Nov	18-Feb	26-May
GWA		0.09		<0.01		<0.01	<0.01			0.05	<0.01	<0.01	0.03	<0.010	<0.010	<0.010	0.01	<0.010	0.05
GWE				0.06		0.06	<0.01			0.04	0.12	<0.01	0.02	0.02	0.08	0.01	0.01	0.02	0.07
GWB01					0.24	0.23	1.20			2.30		0.90	1.40		0.48	1.60		1.20	3.00
GWB02					0.04	0.04		0.69		0.45	0.51	0.69	0.59	0.18	0.22	0.37	0.08	0.67	0.45
GWB03								0.03		0.01	<0.01	<0.01	<0.01			0.02	<0.010	<0.010	0.02
GWB04					<0.01	<0.01	<0.01			0.04	<0.01	<0.01	<0.01	<0.01	<0.01	0.01		<0.010	<0.010

PFDS (mg/L)	2006	2017	2018	2020					2021			2022			2023			2024	
	JUN	MAY	JUL	1-Aug	14-Sep	26-Oct	29-Apr	18-May	29-Jun	27-Jul	26-Oct	10-Jan	11-Apr	11-Oct	17-Jan	17-Apr	27-Nov	18-Feb	26-May
GWA				<0.02		<0.02	<0.02			<0.02	<0.02	<0.02	<0.02	<0.020	<0.020	<0.020	<0.020	<0.020	<0.020
GWE				<0.02		<0.02	<0.02			<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.020	<0.020	<0.020
GWB01					<0.02	<0.02	<0.02			<0.02		<0.02	<0.02		<0.02	<0.02		<0.020	<0.020
GWB02					<0.02	<0.02		<0.02		<0.02	<0.02	<0.02	<0.02	<0.020	<0.020	<0.020	<0.020	<0.020	<0.020
GWB03								<0.02		<0.02	<0.02	<0.02	<0.02			<0.02	<0.020	<0.020	<0.020
GWB04					<0.02	<0.02	<0.02			<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02		<0.020	<0.020

PFBA (mg/L)	2006	2017	2018	2020					2021			2022			2023			2024	
	JUN	MAY	JUL	1-Aug	14-Sep	26-Oct	29-Apr	18-May	29-Jun	27-Jul	26-Oct	10-Jan	11-Apr	11-Oct	17-Jan	17-Apr	27-Nov	18-Feb	26-May
GWA				0.03		0.03	<0.02			0.20	<0.02	0.20	0.20	<0.020	0.10	<0.020	0.12	0.02	0.13
GWE				<0.02		<0.02	<0.02			<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.020	<0.020	<0.020
GWB01					0.05	0.05	0.06			0.10		0.08	0.10		0.07	0.16		0.07	0.14
GWB02					<0.02	0.02		0.10		0.10	0.10	0.10	0.10	0.05	0.07	0.07	0.03	0.09	0.10
GWB03								<0.02		<0.02	<0.02	<0.02	<0.02			<0.02	<0.020	<0.020	<0.020
GWB04					<0.02	<0.02	<0.02			<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02		<0.020	<0.020

PFPeA (mg/L)	2006	2017	2018	2020					2021			2022			2023			2024	
	JUN	MAY	JUL	1-Aug	14-Sep	26-Oct	29-Apr	18-May	29-Jun	27-Jul	26-Oct	10-Jan	11-Apr	11-Oct	17-Jan	17-Apr	27-Nov	18-Feb	26-May
GWA				0.05		0.05	0.04			0.31	0.03	0.32	0.35	<0.020	0.20	<0.020	0.21	0.04	0.22
GWE				<0.02		<0.02	<0.02			<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.020	<0.020	<0.020
GWB01					0.04	0.03	0.07			0.09		0.05	0.06		0.05	0.11		0.04	0.17
GWB02					<0.02	<0.02		0.20		0.10	0.10	0.10	0.10	0.04	0.06	0.05	<0.020	0.09	0.15
GWB03								<0.02		<0.02	<0.02	<0.02	<0.02			<0.02	<0.020	<0.020	<0.020
GWB04					<0.02	<0.02	<0.02			<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02		<0.020	<0.020

PFHxA (mg/L)	2006	2017	2018	2020					2021			2022			2023			2024	
	JUN	MAY	JUL	1-Aug	14-Sep	26-Oct	29-Apr	18-May	29-Jun	27-Jul	26-Oct	10-Jan	11-Apr	11-Oct	17-Jan	17-Apr	27-Nov	18-Feb	26-May
GWA				0.03		0.02	<0.01			0.14	0.01	0.15	0.16	<0.010	0.09	<0.010	0.11	0.02	0.10
GWE				<0.01		<0.01	<0.01			<0.01	0.03	<0.01	<0.01	<0.01	<0.01	<0.01	<0.010	<0.010	<0.010
GWB01					0.06	0.06	0.14			0.23		0.11	0.14		0.09	0.17		0.07	0.26
GWB02					0.02	0.04		0.36		0.34	0.25	0.29	0.26	0.09	0.13	0.10	0.05	0.17	0.24
GWB03								<0.01		<0.01	<0.01	<0.01	<0.01			<0.01	<0.010	<0.010	<0.010
GWB04					<0.01	<0.01	<0.01			<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01		<0.010	<0.010

PFHpA (mg/L)	2006	2017	2018	2020					2021			2022			2023			2024	
	JUN	MAY	JUL	1-Aug	14-Sep	26-Oct	29-Apr	18-May	29-Jun	27-Jul	26-Oct	10-Jan	11-Apr	11-Oct	17-Jan	17-Apr	27-Nov	18-Feb	26-May
GWA				0.01		0.01	<0.01			0.09	<0.01	0.08	0.10	<0.010	0.06	<0.010	0.08	0.02	0.09
GWE				<0.01		<0.01	<0.01			<0.01	0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.010	<0.010	<0.010
GWB01					0.03	0.03	0.07			0.09		0.05	0.05		0.04	0.11		0.03	0.11
GWB02					<0.01	0.01		0.13		0.11	0.09	0.09	0.09	0.03	0.04	0.05	0.02	0.07	0.09
GWB03								<0.01		<0.01	<0.01	<0.01	<0.01			<0.01	<0.010	<0.010	<0.010
GWB04					<0.01	<0.01	<0.01			<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01		<0.010	<0.010

PFOA (mg/L)	2006	2017	2018	2020					2021			2022			2023			2024	
	JUN	MAY	JUL	1-Aug	14-Sep	26-Oct	29-Apr	18-May	29-Jun	27-Jul	26-Oct	10-Jan	11-Apr	11-Oct	17-Jan	17-Apr	27-Nov	18-Feb	26-May
GWA		0.06		<0.01		<0.01	<0.01			0.05	<0.01	0.03	0.05	<0.010	0.02	<0.010	0.04	0.01	0.06
GWE				0.01		<0.01	<0.01			<0.01	0.02	<0.01	<0.01	<0.01	0.02	<0.01	<0.010	<0.010	<0.010
GWB01					0.06	0.06	0.16			0.21		0.12	0.15		0.09	0.22		0.08	0.28
GWB02					<0.01	0.02		0.24		0.16	0.12	0.18	0.16	0.05	0.07	0.09	0.03	0.14	0.16
GWB03								<0.01		<0.01	<0.01	<0.01	<0.01			<0.01	<0.010	<0.010	<0.010
GWB04					<0.01	<0.01	<0.01			<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01		<0.010	<0.010

PFNA (mg/L)	2006	2017	2018	2020					2021			2022			2023			2024	
	JUN	MAY	JUL	1-Aug	14-Sep	26-Oct	29-Apr	18-May	29-Jun	27-Jul	26-Oct	10-Jan	11-Apr	11-Oct	17-Jan	17-Apr	27-Nov	18-Feb	26-May
GWA				<0.01		<0.01	<0.01			<0.01	<0.01	<0.01	<0.01	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010
GWE				<0.01		<0.01	<0.01			<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.010	<0.010	<0.010
GWB01					<0.01	<0.01	<0.01			<0.01		<0.01	<0.01		<0.01	<0.01		<0.010	<0.010
GWB02					<0.01	<0.01		<0.01		<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.010	<0.010	<0.010
GWB03								<0.01		<0.01	<0.01	<0.01	<0.01			<0.01	<0.010	<0.010	<0.010
GWB04					<0.01	<0.01	<0.01			<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01		<0.010	<0.010

PFDA (mg/L)	2006	2017	2018	2020					2021			2022			2023			2024	
	JUN	MAY	JUL	1-Aug	14-Sep	26-Oct	29-Apr	18-May	29-Jun	27-Jul	26-Oct	10-Jan	11-Apr	11-Oct	17-Jan	17-Apr	27-Nov	18-Feb	26-May
GWA				<0.02		<0.02	<0.02			<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.020	<0.020	<0.020
GWE				<0.02		<0.02	<0.02			<0.02	<0.01	<0.02	<0.02	<0.02	<0.02	<0.02	<0.020	<0.020	<0.020
GWB01					<0.02	<0.02	<0.02			<0.02		<0.02	<0.02		<0.02	<0.02		<0.020	<0.020
GWB02					<0.02	<0.02		<0.02		<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.020	<0.020	<0.020
GWB03								<0.02		<0.02	<0.02	<0.02	<0.02			<0.02	<0.020	<0.020	<0.020
GWB04					<0.02	<0.02	<0.02			<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02		<0.020	<0.020

PFUnDA (mg/L)	2006	2017	2018	2020					2021			2022			2023			2024	
	JUN	MAY	JUL	1-Aug	14-Sep	26-Oct	29-Apr	18-May	29-Jun	27-Jul	26-Oct	10-Jan	11-Apr	11-Oct	17-Jan	17-Apr	27-Nov	18-Feb	26-May
GWA				<0.02		<0.02	<0.02			<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.020	<0.020	<0.020
GWE				<0.02		<0.02	<0.02			<0.02	<0.01	<0.02	<0.02	<0.02	<0.02	<0.02	<0.020	<0.020	<0.020
GWB01					<0.02	<0.02	<0.02			<0.02		<0.02	<0.02		<0.02	<0.02		<0.020	<0.020
GWB02					<0.02	<0.02		<0.02		<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.020	<0.020	<0.020
GWB03								<0.02		<0.02	<0.02	<0.02	<0.02			<0.02	<0.020	<0.020	<0.020
GWB04					<0.02	<0.02	<0.02			<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02		<0.020	<0.020

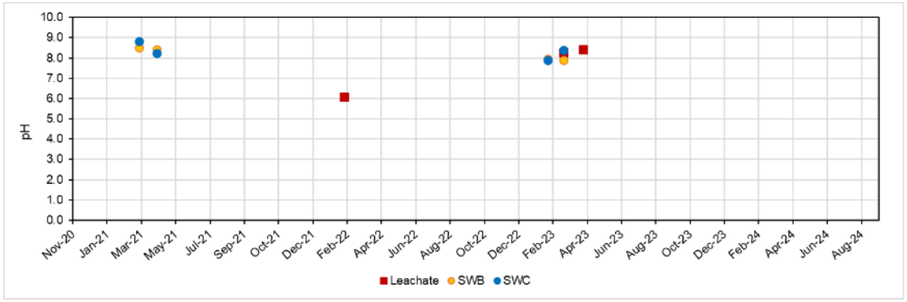
TOTAL PFHxS + PFOS (mg/L)	2006	2017	2018	2020					2021			2022			2023			2024	
	JUN	MAY	JUL	1-Aug	14-Sep	26-Oct	29-Apr	18-May	29-Jun	27-Jul	26-Oct	10-Jan	11-Apr	11-Oct	17-Jan	17-Apr	27-Nov	18-Feb	26-May
GWA				<0.01		<0.01	<0.01			0.08	<0.01	0.02	0.05	<0.010	<0.010	<0.010	0.03	<0.010	0.07
GWE				0.09		0.10	<0.01			0.05	0.16	<0.01	0.02	0.02	0.12	0.01	0.03	0.03	0.08
GWB01					0.43	0.40	1.80			3.40		1.50	2.20		0.85	2.80		1.80	4.00
GWB02					<0.01	0.10		1.30		0.94	0.79	1.20	1.00	0.33	0.42	0.72	0.15	1.10	0.80
GWB03								0.05		0.01	<0.01	<0.01	<0.01			0.03	<0.010	<0.010	0.03
GWB04					<0.01	<0.01	<0.01			0.05	<0.1	<0.1	<0.1	<0.1	<0.1	0.01		<0.010	<0.010

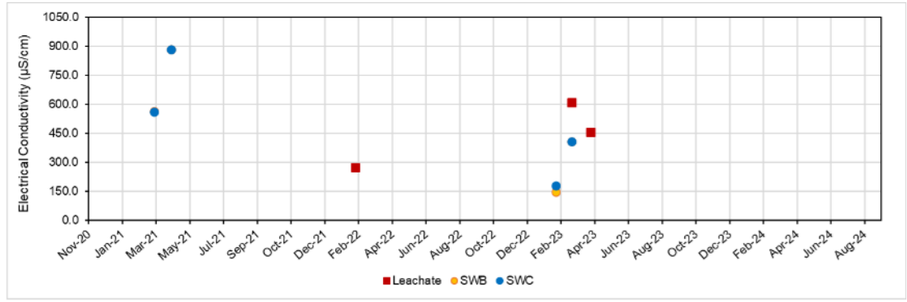
TOTAL PFOS+PFOA (mg/L)	2006	2017	2018	2020					2021			2022			2023			2024	
	JUN	MAY	JUL	1-Aug	14-Sep	26-Oct	29-Apr	18-May	29-Jun	27-Jul	26-Oct	10-Jan	11-Apr	11-Oct	17-Jan	17-Apr	27-Nov	18-Feb	26-May
GWA				<0.01		<0.01	<0.01			0.10	<0.01	0.03	0.08	<0.010	0.02	<0.010	0.05	0.01	0.11
GWE				0.07		0.06	<0.01			0.04	0.14	<0.01	0.02	0.02	0.10	0.01	0.01	0.02	0.07
GWB01					0.30	0.29	1.40			2.50		1.00	1.60		0.57	1.80		1.30	3.30
GWB02					<0.01	0.06		0.93		0.61	0.63	0.87	0.75	0.23	0.29	0.46	0.11	0.81	0.61
GWB03								0.03		0.01	<0.01	<0.01	<0.01			0.02	<0.010	<0.010	0.02
GWB04					<0.01	<0.01	<0.01			0.04	<0.1	<0.1	<0.1	<0.1	<0.1	0.01		<0.010	<0.010

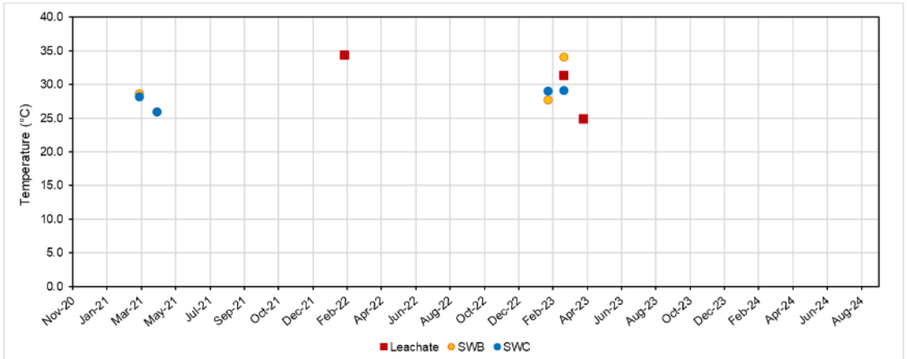
TOTAL PFAS (mg/L)	2006	2017	2018	2020					2021			2022			2023			2024	
	JUN	MAY	JUL	1-Aug	14-Sep	26-Oct	29-Apr	18-May	29-Jun	27-Jul	26-Oct	10-Jan	11-Apr	11-Oct	17-Jan	17-Apr	27-Nov	18-Feb	26-May
GWA				0.12		0.11	0.04			0.87	0.04	0.80	0.91	<0.010	0.47	<0.010	0.58	0.09	0.66
GWE				0.10		0.10	<0.01			0.05	0.25	<0.01	0.02	0.02	0.13	0.01	0.03	0.03	0.08
GWB01					0.77	0.71	2.50			4.40		2.20	3.00		0.47	4.00		2.30	5.30
GWB02					<0.01	0.23		2.70		2.10	1.70	2.20	2.00	0.68	0.95	1.30	0.31	1.90	1.80
GWB03								0.05		0.01	<0.01	<0.01	<0.01			0.03	<0.010	<0.010	0.03
GWB04					<0.01	<0.01	<0.01			0.05	<0.1	<0.1	<0.1	<0.1	<0.1	0.01		<0.010	<0.010

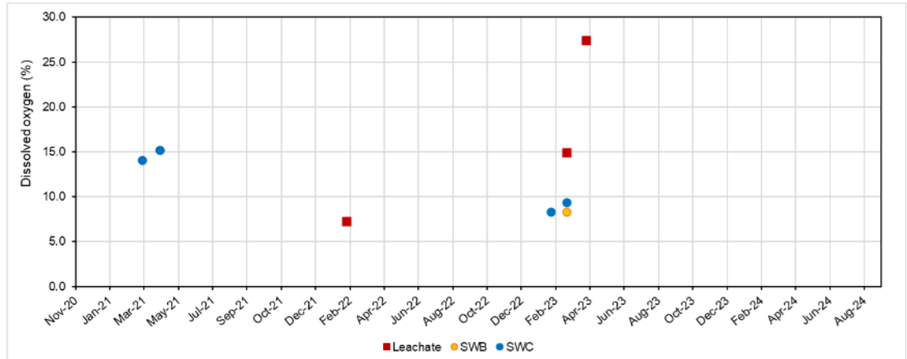
APPENDIX C HISTORICAL DATA TRENDS

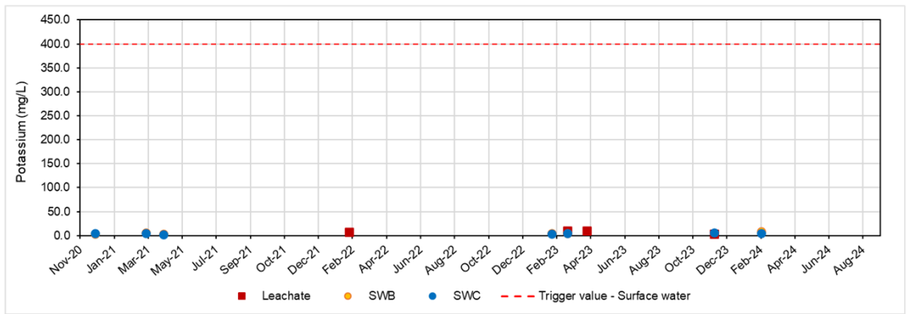
Surface water and leachate

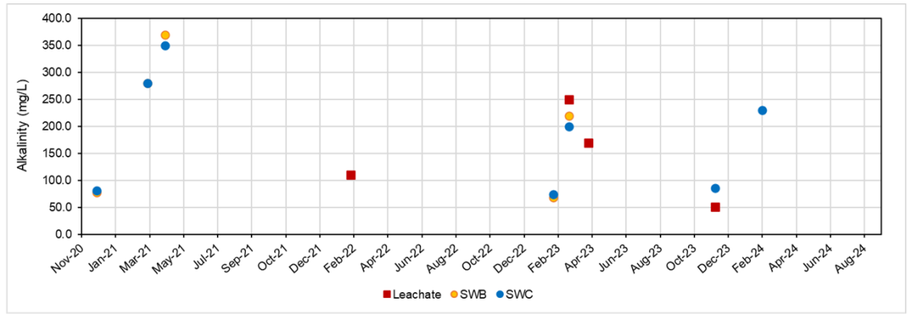


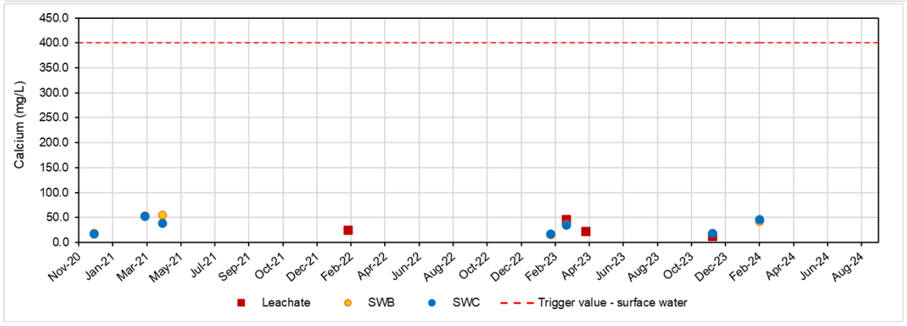


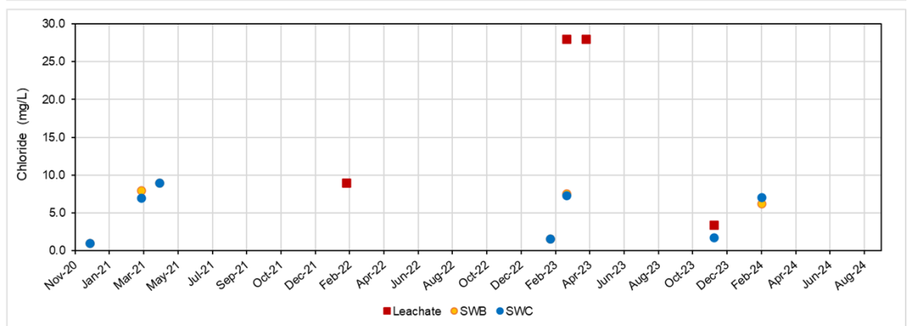


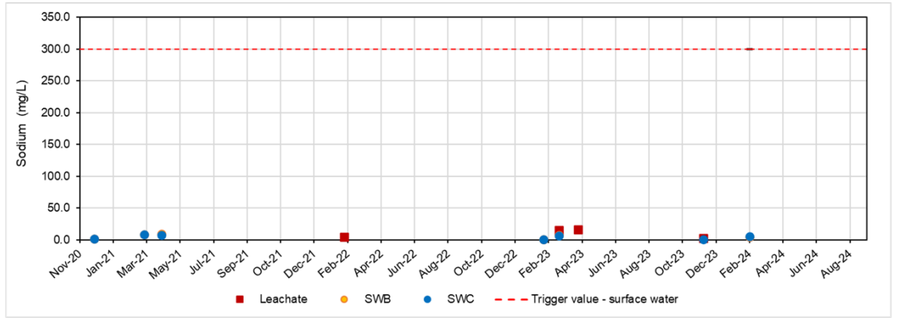


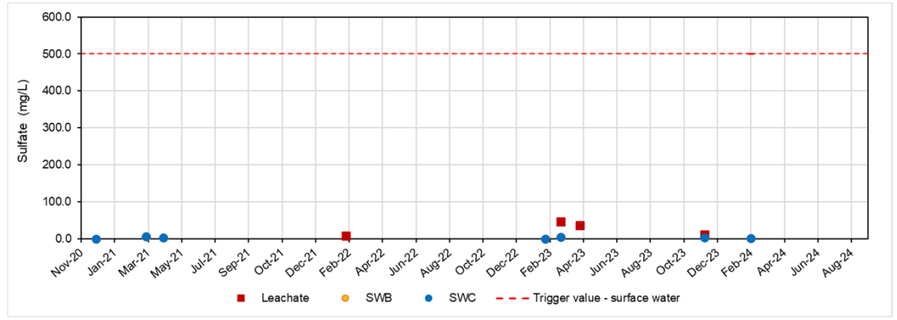


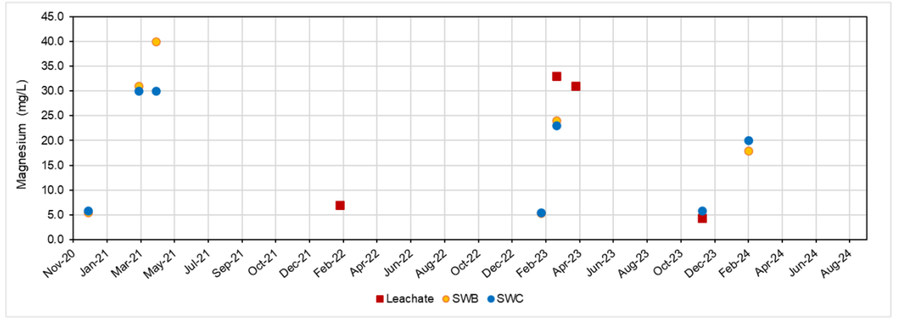


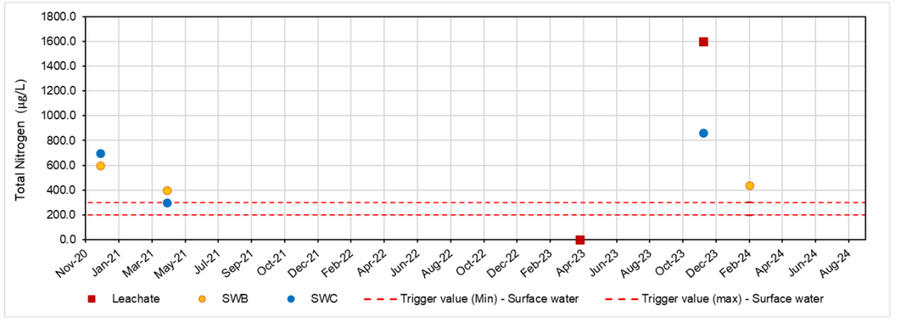


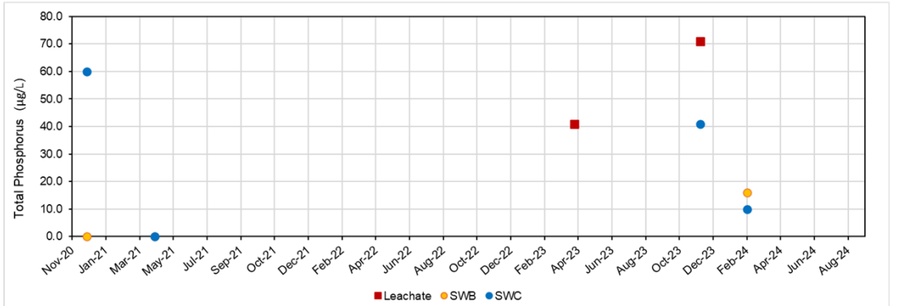


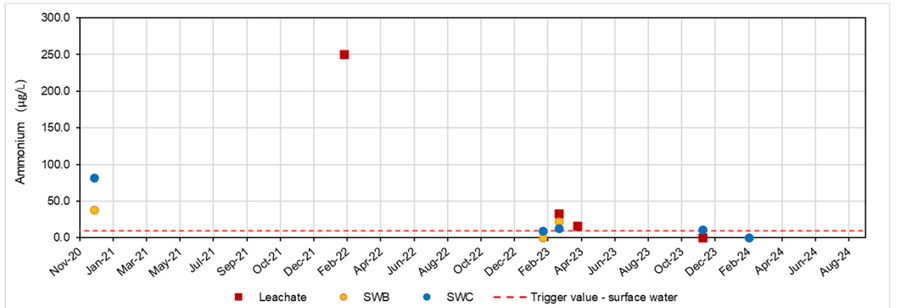

Sodium (mg/L)
Leachate
SWB
SWC
Trigger value - surface water

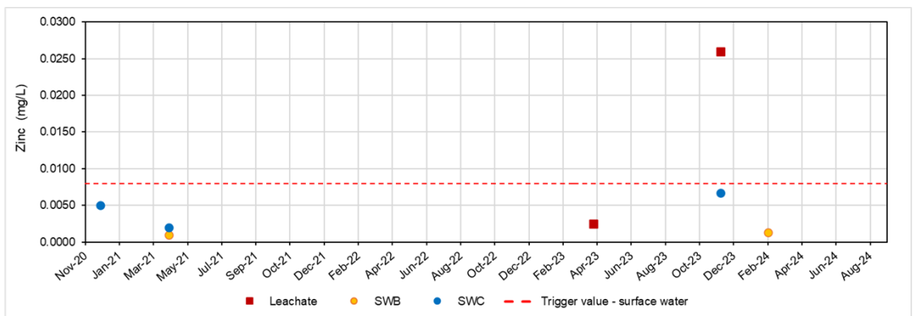

Sulfate (mg/L)
Leachate
SWB
SWC
Trigger value - surface water

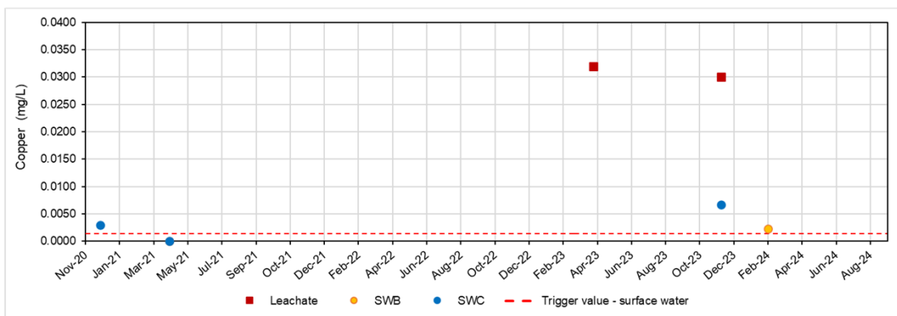

Magnesium (mg/L)
Leachate
SWB
SWC

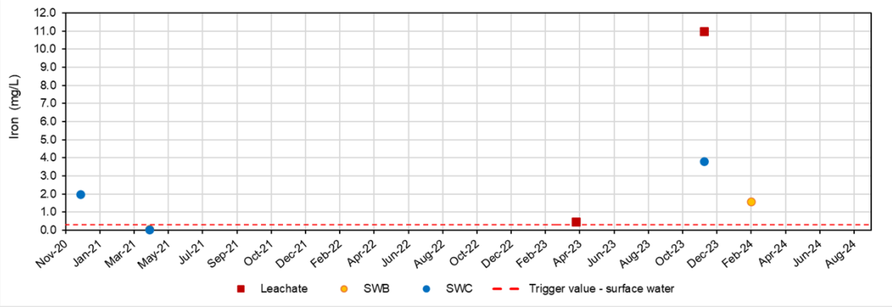

Total Nitrogen (µg/L)
Leachate
SWB
SWC
Trigger value (Min) - Surface water
Trigger value (max) - Surface water

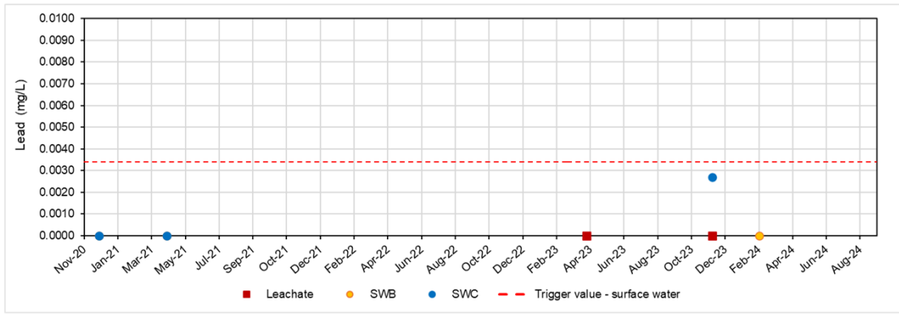

Total Phosphorus (µg/L)
Leachate
SWB
SWC

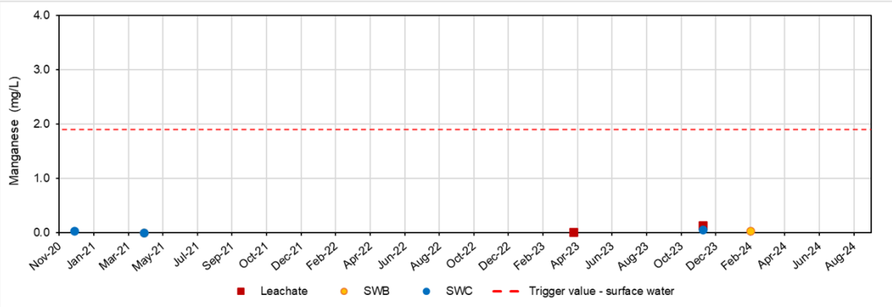

Ammonium (µg/L)
Leachate
SWB
SWC
Trigger value - surface water

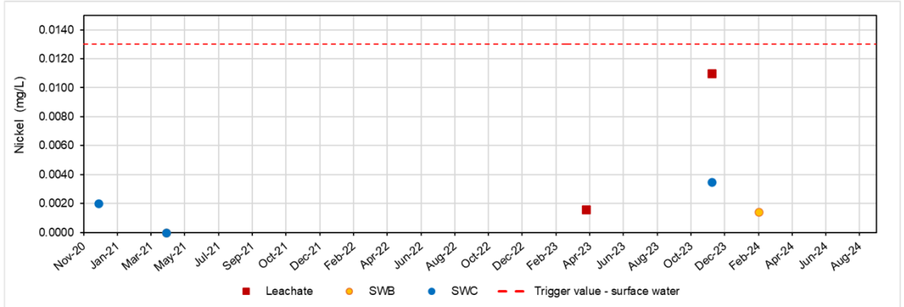

Zinc (mg/L)
Leachate
SWB
SWC
Trigger value - surface water

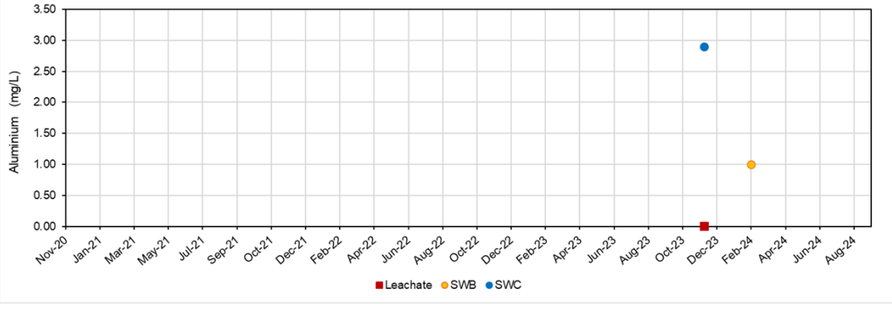

Copper (mg/L)
Leachate
SWB
SWC
Trigger value - surface water

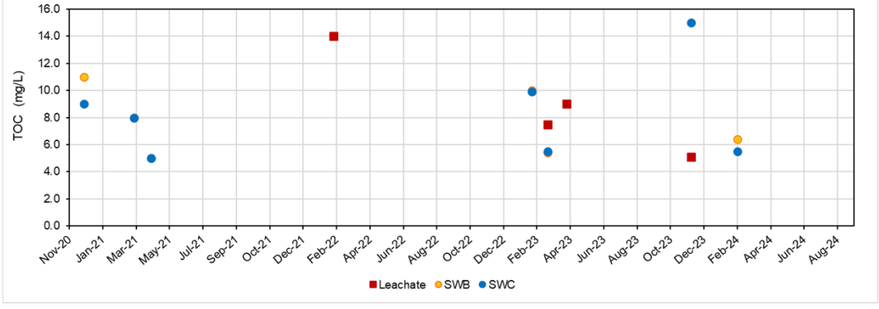

Iron (mg/L)
12.0
11.0
10.0
9.0
8.0
7.0
6.0
5.0
4.0
3.0
2.0
1.0
0.0
Nov-20 Jan-21 Mar-21 May-21 Jul-21 Sep-21 Oct-21 Dec-21 Feb-22 Apr-22 Jun-22 Aug-22 Oct-22 Dec-22 Feb-23 Apr-23 Jun-23 Aug-23 Oct-23 Dec-23 Feb-24 Apr-24 Jun-24 Aug-24
Leachate
SWB
SWC
Trigger value - surface water

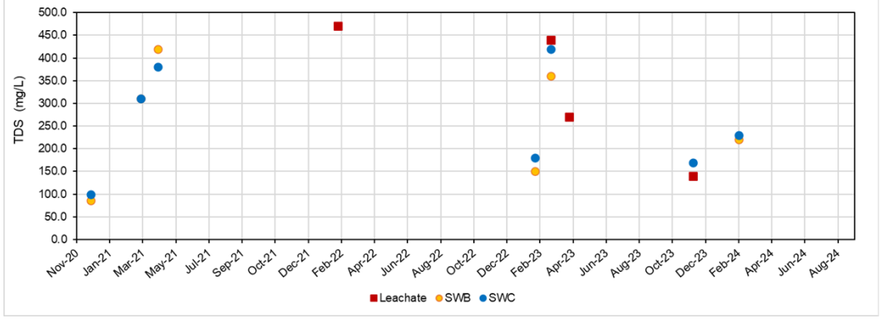

Lead (mg/L)
0.0100
0.0090
0.0080
0.0070
0.0060
0.0050
0.0040
0.0030
0.0020
0.0010
0.0000
Nov-20 Jan-21 Mar-21 May-21 Jul-21 Sep-21 Oct-21 Dec-21 Feb-22 Apr-22 Jun-22 Aug-22 Oct-22 Dec-22 Feb-23 Apr-23 Jun-23 Aug-23 Oct-23 Dec-23 Feb-24 Apr-24 Jun-24 Aug-24
Leachate
SWB
SWC
Trigger value - surface water

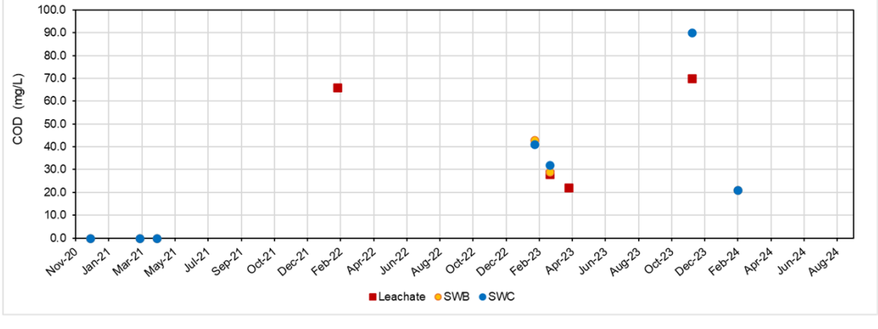

Manganese (mg/L)
4.0
3.0
2.0
1.0
0.0
Nov-20 Jan-21 Mar-21 May-21 Jul-21 Sep-21 Oct-21 Dec-21 Feb-22 Apr-22 Jun-22 Aug-22 Oct-22 Dec-22 Feb-23 Apr-23 Jun-23 Aug-23 Oct-23 Dec-23 Feb-24 Apr-24 Jun-24 Aug-24
Leachate
SWB
SWC
Trigger value - surface water

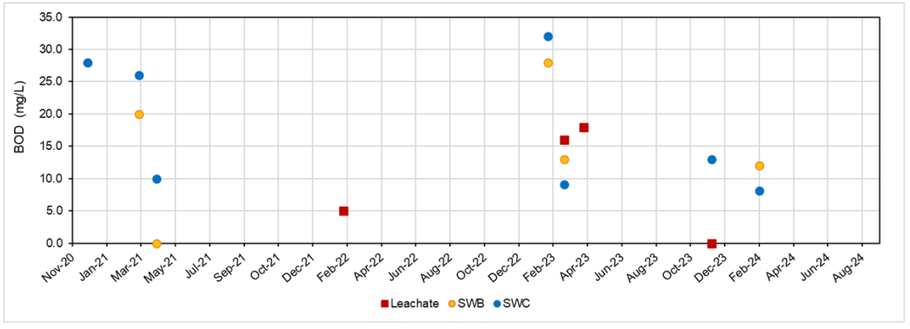

Nickel (mg/L)
0.0140
0.0120
0.0100
0.0080
0.0060
0.0040
0.0020
0.0000
Nov-20 Jan-21 Mar-21 May-21 Jul-21 Sep-21 Oct-21 Dec-21 Feb-22 Apr-22 Jun-22 Aug-22 Oct-22 Dec-22 Feb-23 Apr-23 Jun-23 Aug-23 Oct-23 Dec-23 Feb-24 Apr-24 Jun-24 Aug-24
Leachate
SWB
SWC
Trigger value - surface water

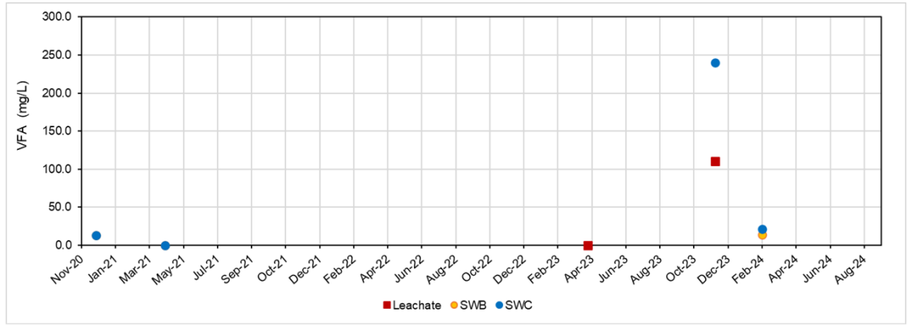

Aluminium (mg/L)
3.50
3.00
2.50
2.00
1.50
1.00
0.50
0.00
Nov-20 Jan-21 Mar-21 May-21 Jul-21 Sep-21 Oct-21 Dec-21 Feb-22 Apr-22 Jun-22 Aug-22 Oct-22 Dec-22 Feb-23 Apr-23 Jun-23 Aug-23 Oct-23 Dec-23 Feb-24 Apr-24 Jun-24 Aug-24
Leachate
SWB
SWC

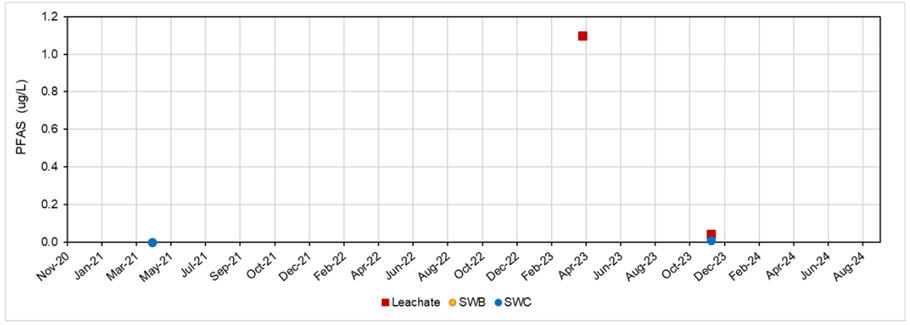

TOC (mg/L)
16.0
14.0
12.0
10.0
8.0
6.0
4.0
2.0
0.0
Nov-20 Jan-21 Mar-21 May-21 Jul-21 Sep-21 Oct-21 Dec-21 Feb-22 Apr-22 Jun-22 Aug-22 Oct-22 Dec-22 Feb-23 Apr-23 Jun-23 Aug-23 Oct-23 Dec-23 Feb-24 Apr-24 Jun-24 Aug-24
Leachate
SWB
SWC


TDS (mg/L)
500.0
450.0
400.0
350.0
300.0
250.0
200.0
150.0
100.0
50.0
0.0
Nov-20 Jan-21 Mar-21 May-21 Jul-21 Sep-21 Oct-21 Dec-21 Feb-22 Apr-22 Jun-22 Aug-22 Oct-22 Dec-22 Feb-23 Apr-23 Jun-23 Aug-23 Oct-23 Dec-23 Feb-24 Apr-24 Jun-24 Aug-24
Leachate
SWB
SWC

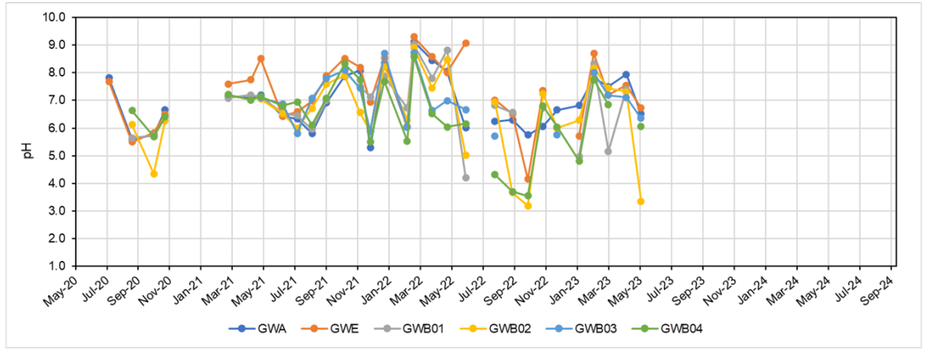

COD (mg/L)
100.0
90.0
80.0
70.0
60.0
50.0
40.0
30.0
20.0
10.0
0.0
Nov-20 Jan-21 Mar-21 May-21 Jul-21 Sep-21 Oct-21 Dec-21 Feb-22 Apr-22 Jun-22 Aug-22 Oct-22 Dec-22 Feb-23 Apr-23 Jun-23 Aug-23 Oct-23 Dec-23 Feb-24 Apr-24 Jun-24 Aug-24
Leachate
SWB
SWC

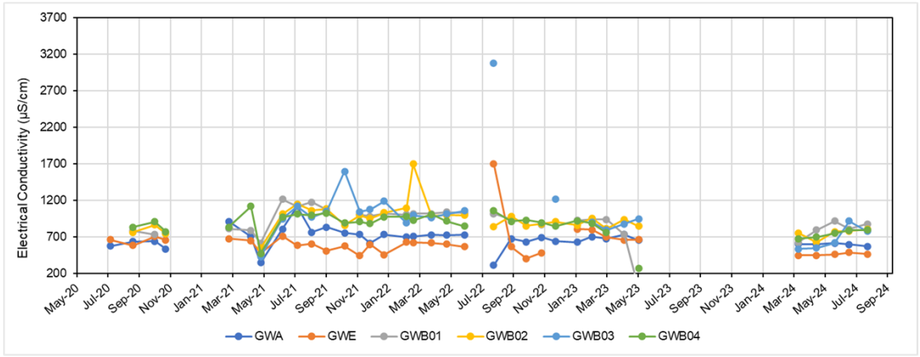

BOD (mg/L)
35.0
30.0
25.0
20.0
15.0
10.0
5.0
0.0
Nov-20 Jan-21 Mar-21 May-21 Jul-21 Sep-21 Oct-21 Dec-21 Feb-22 Apr-22 Jun-22 Aug-22 Oct-22 Dec-22 Feb-23 Apr-23 Jun-23 Aug-23 Oct-23 Dec-23 Feb-24 Apr-24 Jun-24 Aug-24
Leachate SWB SWC

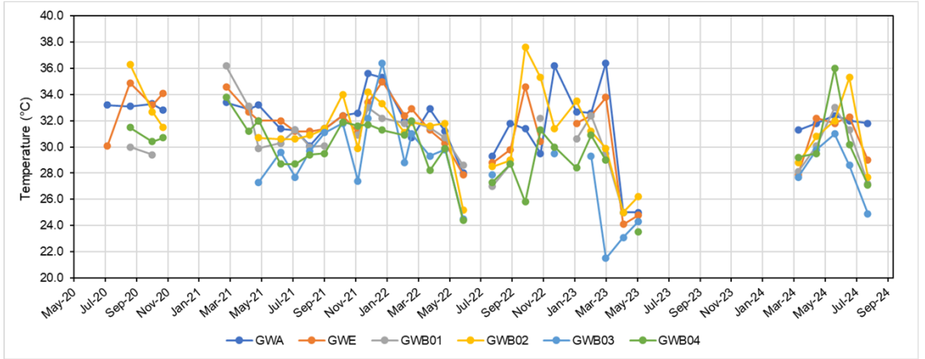

VFA (mg/L)
300.0
250.0
200.0
150.0
100.0
50.0
0.0
Nov-20 Jan-21 Mar-21 May-21 Jul-21 Sep-21 Oct-21 Dec-21 Feb-22 Apr-22 Jun-22 Aug-22 Oct-22 Dec-22 Feb-23 Apr-23 Jun-23 Aug-23 Oct-23 Dec-23 Feb-24 Apr-24 Jun-24 Aug-24
Leachate SWB SWC

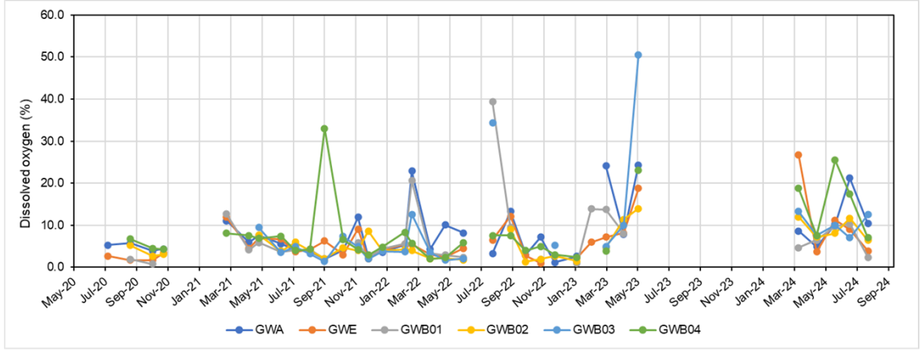

PFAS (ug/L)
1.2
1.0
0.8
0.6
0.4
0.2
0.0
Nov-20 Jan-21 Mar-21 May-21 Jul-21 Sep-21 Oct-21 Dec-21 Feb-22 Apr-22 Jun-22 Aug-22 Oct-22 Dec-22 Feb-23 Apr-23 Jun-23 Aug-23 Oct-23 Dec-23 Feb-24 Apr-24 Jun-24 Aug-24
Leachate SWB SWC

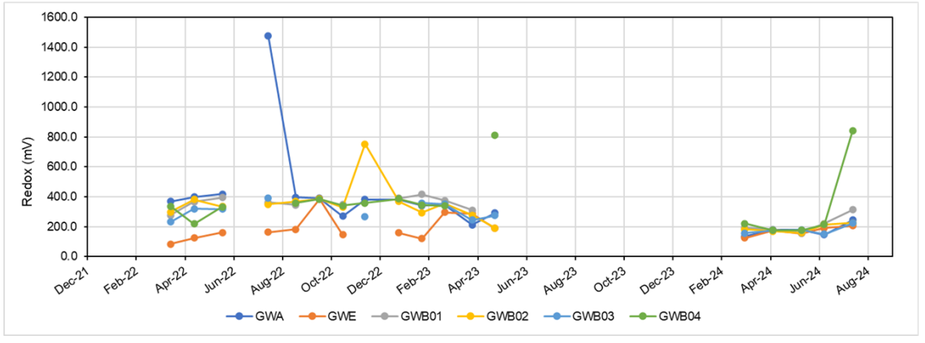
Groundwater

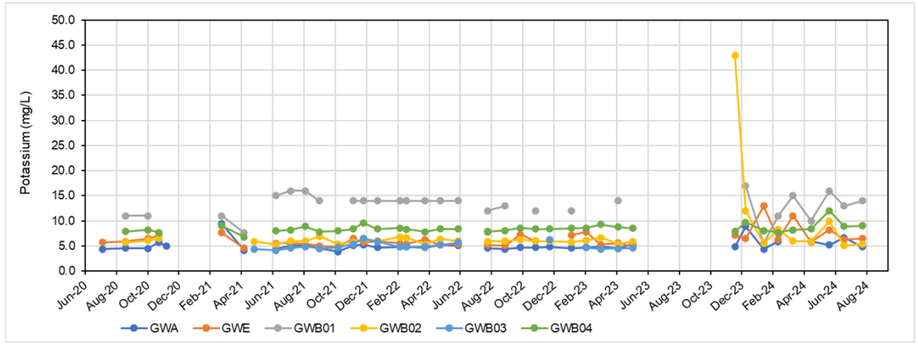


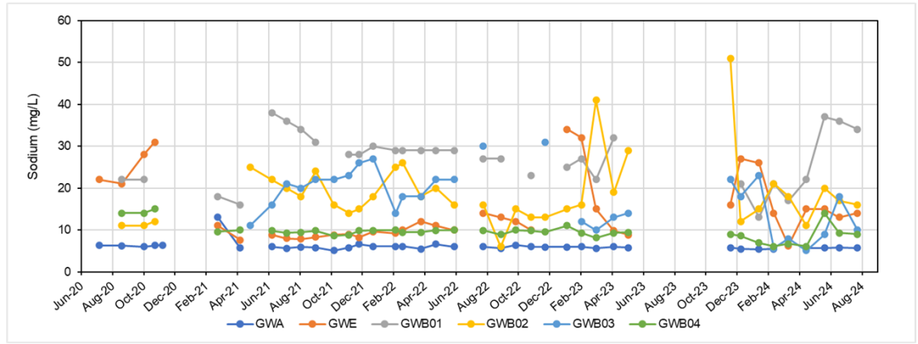


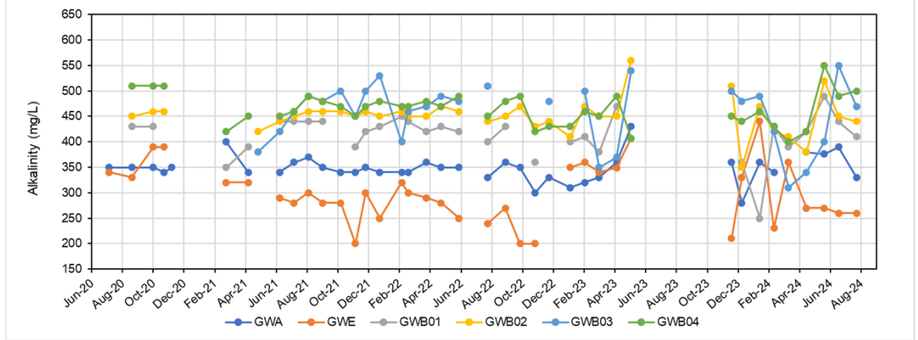


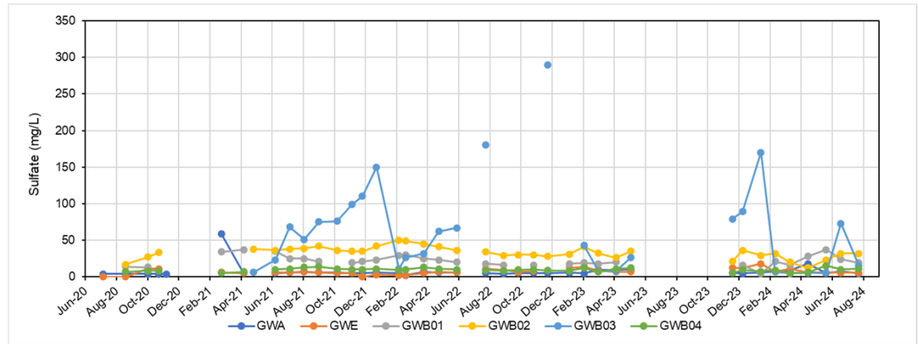


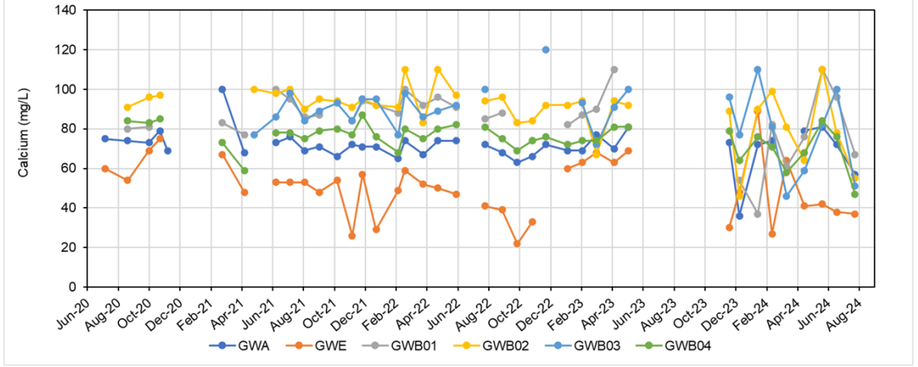


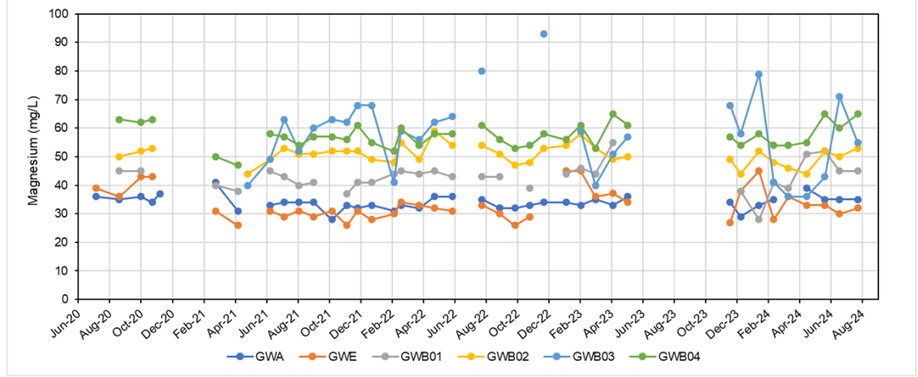

Potassium (mg/L)
50.0
45.0
40.0
35.0
30.0
25.0
20.0
15.0
10.0
5.0
0.0
Jun-20 Aug-20 Oct-20 Dec-20 Feb-21 Apr-21 Jun-21 Aug-21 Oct-21 Dec-21 Feb-22 Apr-22 Jun-22 Aug-22 Oct-22 Dec-22 Feb-23 Apr-23 Jun-23 Aug-23 Oct-23 Dec-23 Feb-24 Apr-24 Jun-24 Aug-24
GWA GWE GWB01 GWB02 GWB03 GWB04

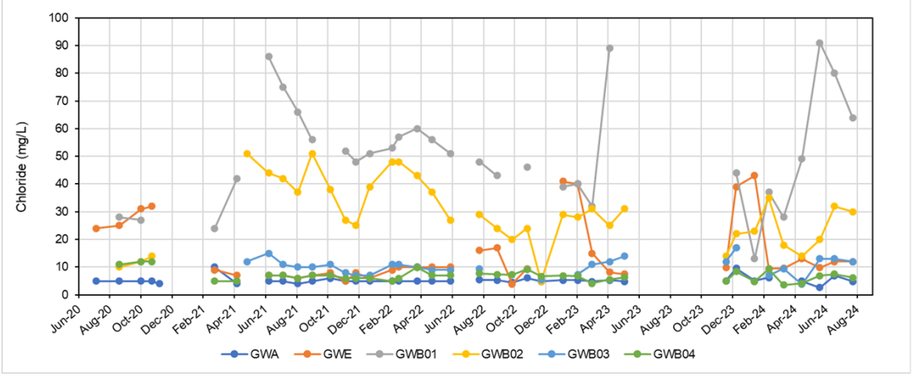

Sodium (mg/L)
60
50
40
30
20
10
0
Jun-20 Aug-20 Oct-20 Dec-20 Feb-21 Apr-21 Jun-21 Aug-21 Oct-21 Dec-21 Feb-22 Apr-22 Jun-22 Aug-22 Oct-22 Dec-22 Feb-23 Apr-23 Jun-23 Aug-23 Oct-23 Dec-23 Feb-24 Apr-24 Jun-24 Aug-24
GWA GWE GWB01 GWB02 GWB03 GWB04

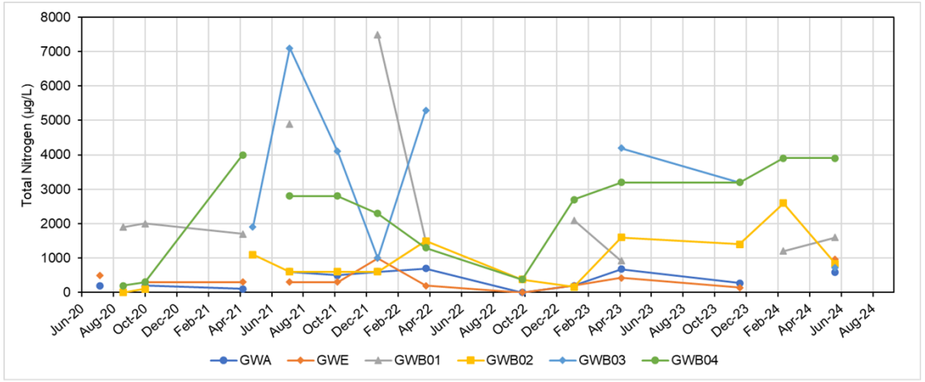

Alkalinity (mg/L)
650
600
550
500
450
400
350
300
250
200
150
Jun-20 Aug-20 Oct-20 Dec-20 Feb-21 Apr-21 Jun-21 Aug-21 Oct-21 Dec-21 Feb-22 Apr-22 Jun-22 Aug-22 Oct-22 Dec-22 Feb-23 Apr-23 Jun-23 Aug-23 Oct-23 Dec-23 Feb-24 Apr-24 Jun-24 Aug-24
GWA GWE GWB01 GWB02 GWB03 GWB04

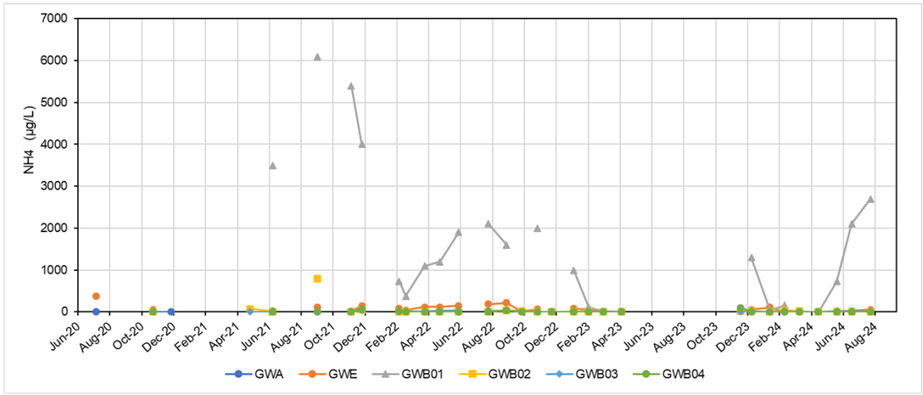

Sulfate (mg/L)
350
300
250
200
150
100
50
0
Jun-20 Aug-20 Oct-20 Dec-20 Feb-21 Apr-21 Jun-21 Aug-21 Oct-21 Dec-21 Feb-22 Apr-22 Jun-22 Aug-22 Oct-22 Dec-22 Feb-23 Apr-23 Jun-23 Aug-23 Oct-23 Dec-23 Feb-24 Apr-24 Jun-24 Aug-24
GWA GWE GWB01 GWB02 GWB03 GWB04

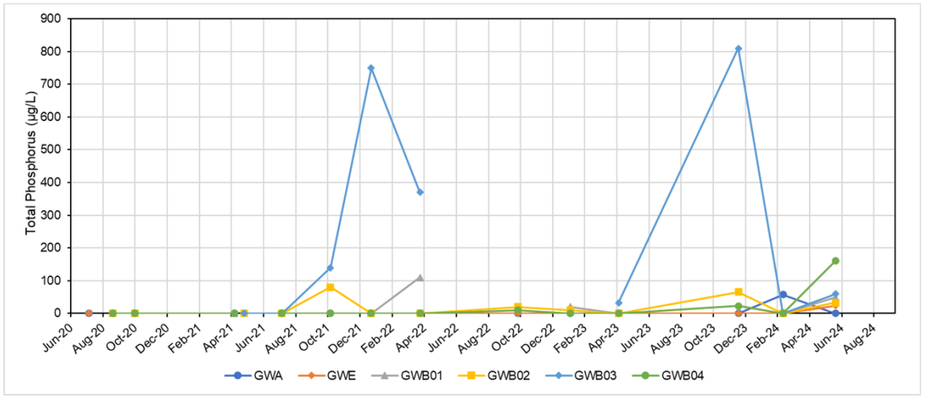

Calcium (mg/L)
140
120
100
80
60
40
20
0
Jun-20 Aug-20 Oct-20 Dec-20 Feb-21 Apr-21 Jun-21 Aug-21 Oct-21 Dec-21 Feb-22 Apr-22 Jun-22 Aug-22 Oct-22 Dec-22 Feb-23 Apr-23 Jun-23 Aug-23 Oct-23 Dec-23 Feb-24 Apr-24 Jun-24 Aug-24
GWA GWE GWB01 GWB02 GWB03 GWB04

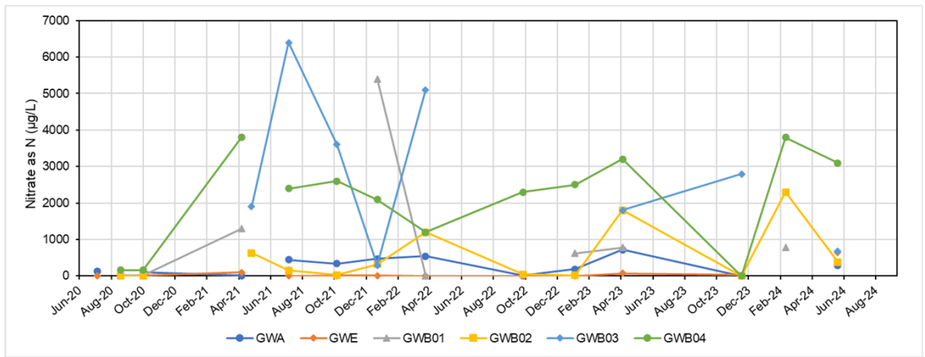

Magnesium (mg/L)
100
90
80
70
60
50
40
30
20
10
0
Jun-20 Aug-20 Oct-20 Dec-20 Feb-21 Apr-21 Jun-21 Aug-21 Oct-21 Dec-21 Feb-22 Apr-22 Jun-22 Aug-22 Oct-22 Dec-22 Feb-23 Apr-23 Jun-23 Aug-23 Oct-23 Dec-23 Feb-24 Apr-24 Jun-24 Aug-24
GWA GWE GWB01 GWB02 GWB03 GWB04

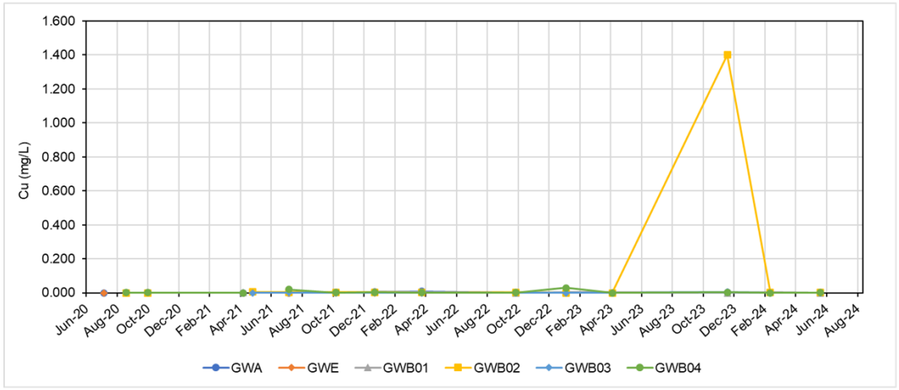

Chloride (mg/L)
100
90
80
70
60
50
40
30
20
10
0
Jun-20 Aug-20 Oct-20 Dec-20 Feb-21 Apr-21 Jun-21 Aug-21 Oct-21 Dec-21 Feb-22 Apr-22 Jun-22 Aug-22 Oct-22 Dec-22 Feb-23 Apr-23 Jun-23 Aug-23 Oct-23 Dec-23 Feb-24 Apr-24 Jun-24 Aug-24
GWA GWE GWB01 GWB02 GWB03 GWB04

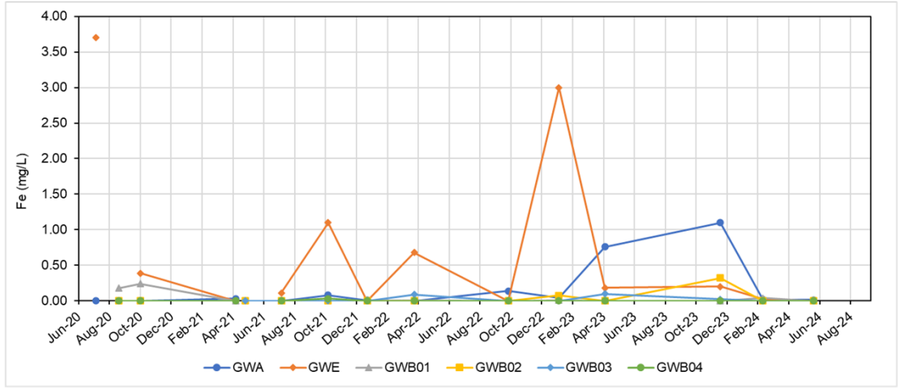

Total Nitrogen (µg/L)
8000
7000
6000
5000
4000
3000
2000
1000
0
Jun-20 Aug-20 Oct-20 Dec-20 Feb-21 Apr-21 Jun-21 Aug-21 Oct-21 Dec-21 Feb-22 Apr-22 Jun-22 Aug-22 Oct-22 Dec-22 Feb-23 Apr-23 Jun-23 Aug-23 Oct-23 Dec-23 Feb-24 Apr-24 Jun-24 Aug-24
GWA GWE GWB01 GWB02 GWB03 GWB04

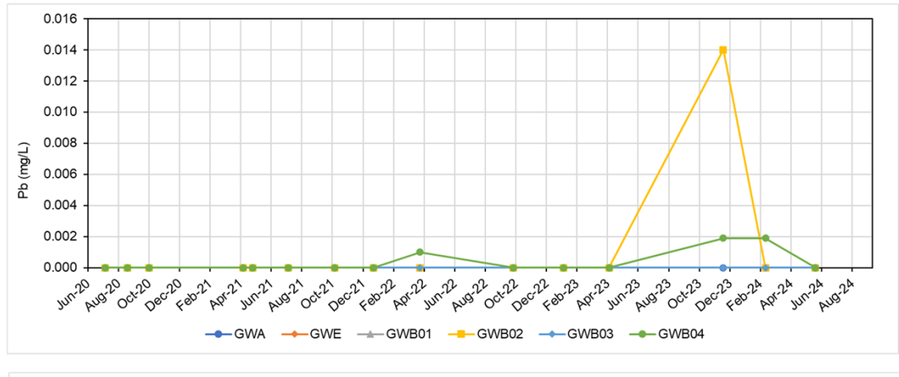

NH4 (µg/L)
7000
6000
5000
4000
3000
2000
1000
0
Jun-20 Aug-20 Oct-20 Dec-20 Feb-21 Apr-21 Jun-21 Aug-21 Oct-21 Dec-21 Feb-22 Apr-22 Jun-22 Aug-22 Oct-22 Dec-22 Feb-23 Apr-23 Jun-23 Aug-23 Oct-23 Dec-23 Feb-24 Apr-24 Jun-24 Aug-24
GWA GWE GWB01 GWB02 GWB03 GWB04

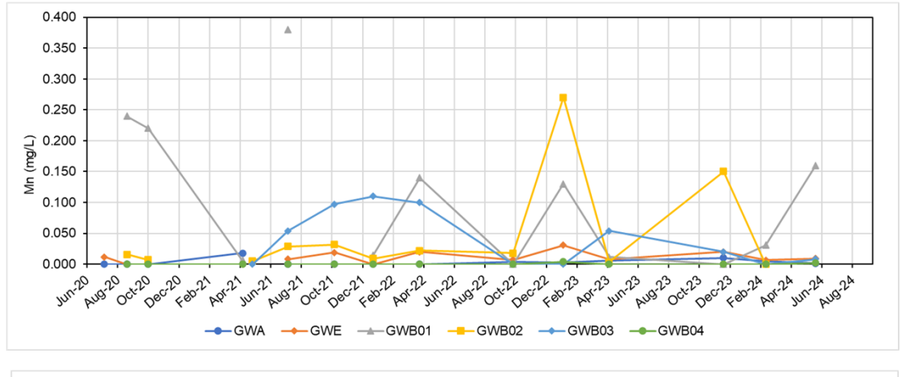

Total Phosphorus (µg/L)
900
800
700
600
500
400
300
200
100
0
Jun-20 Aug-20 Oct-20 Dec-20 Feb-21 Apr-21 Jun-21 Aug-21 Oct-21 Dec-21 Feb-22 Apr-22 Jun-22 Aug-22 Oct-22 Dec-22 Feb-23 Apr-23 Jun-23 Aug-23 Oct-23 Dec-23 Feb-24 Apr-24 Jun-24 Aug-24
GWA GWE GWB01 GWB02 GWB03 GWB04

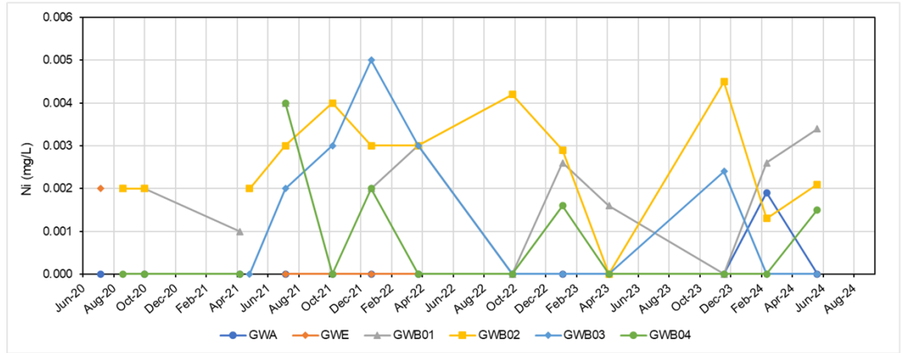

Nitrate as N (µg/L)
7000
6000
5000
4000
3000
2000
1000
0
Jun-20 Aug-20 Oct-20 Dec-20 Feb-21 Apr-21 Jun-21 Aug-21 Oct-21 Dec-21 Feb-22 Apr-22 Jun-22 Aug-22 Oct-22 Dec-22 Feb-23 Apr-23 Jun-23 Aug-23 Oct-23 Dec-23 Feb-24 Apr-24 Jun-24 Aug-24
GWA GWE GWB01 GWB02 GWB03 GWB04

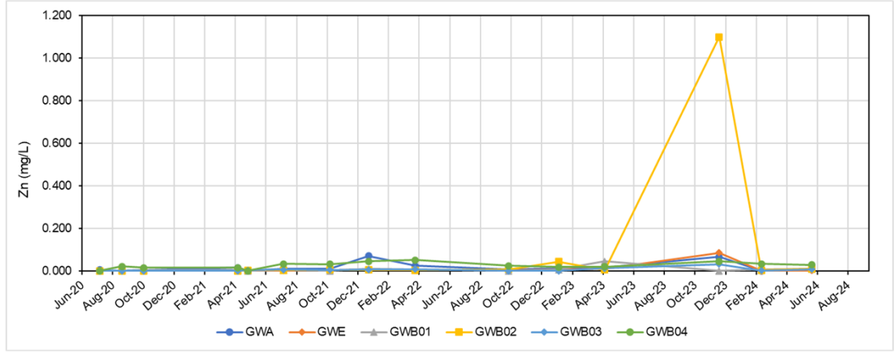

Cu (mg/L)
1.600
1.400
1.200
1.000
0.800
0.600
0.400
0.200
0.000
Jun-20 Aug-20 Oct-20 Dec-20 Feb-21 Apr-21 Jun-21 Aug-21 Oct-21 Dec-21 Feb-22 Apr-22 Jun-22 Aug-22 Oct-22 Dec-22 Feb-23 Apr-23 Jun-23 Aug-23 Oct-23 Dec-23 Feb-24 Apr-24 Jun-24 Aug-24
GWA GWE GWB01 GWB02 GWB03 GWB04

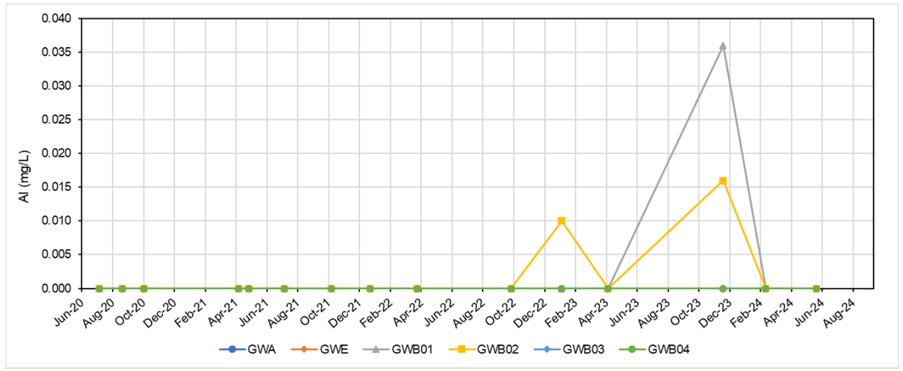

Fe (mg/L)
4.00
3.50
3.00
2.50
2.00
1.50
1.00
0.50
0.00
Jun-20 Aug-20 Oct-20 Dec-20 Feb-21 Apr-21 Jun-21 Aug-21 Oct-21 Dec-21 Feb-22 Apr-22 Jun-22 Aug-22 Oct-22 Dec-22 Feb-23 Apr-23 Jun-23 Aug-23 Oct-23 Dec-23 Feb-24 Apr-24 Jun-24 Aug-24
GWA GWE GWB01 GWB02 GWB03 GWB04

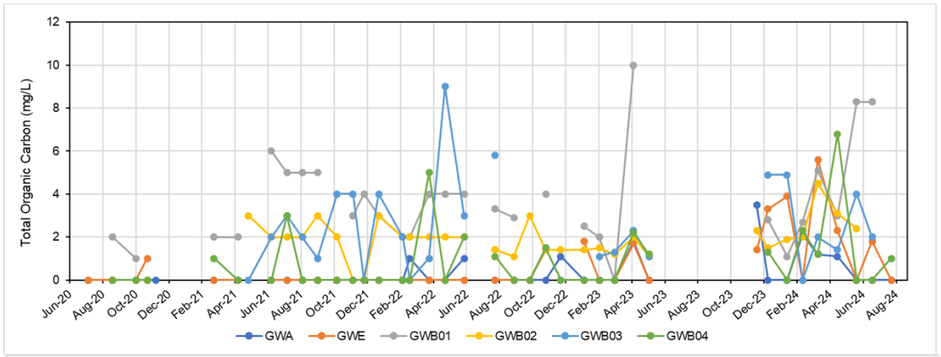

Pb (mg/L)
0.016
0.014
0.012
0.010
0.008
0.006
0.004
0.002
0.000
Jun-20 Aug-20 Oct-20 Dec-20 Feb-21 Apr-21 Jun-21 Aug-21 Oct-21 Dec-21 Feb-22 Apr-22 Jun-22 Aug-22 Oct-22 Dec-22 Feb-23 Apr-23 Jun-23 Aug-23 Oct-23 Dec-23 Feb-24 Apr-24 Jun-24 Aug-24
GWA GWE GWB01 GWB02 GWB03 GWB04

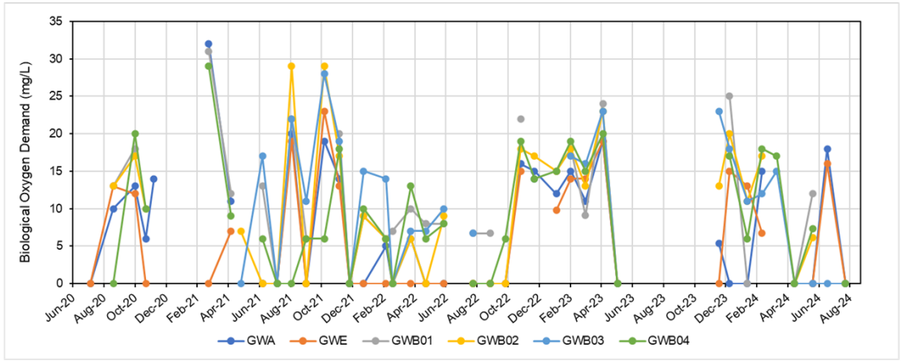

Mn (mg/L)
0.400
0.350
0.300
0.250
0.200
0.150
0.100
0.050
0.000
Jun-20 Aug-20 Oct-20 Dec-20 Feb-21 Apr-21 Jun-21 Aug-21 Oct-21 Dec-21 Feb-22 Apr-22 Jun-22 Aug-22 Oct-22 Dec-22 Feb-23 Apr-23 Jun-23 Aug-23 Oct-23 Dec-23 Feb-24 Apr-24 Jun-24 Aug-24
GWA GWE GWB01 GWB02 GWB03 GWB04

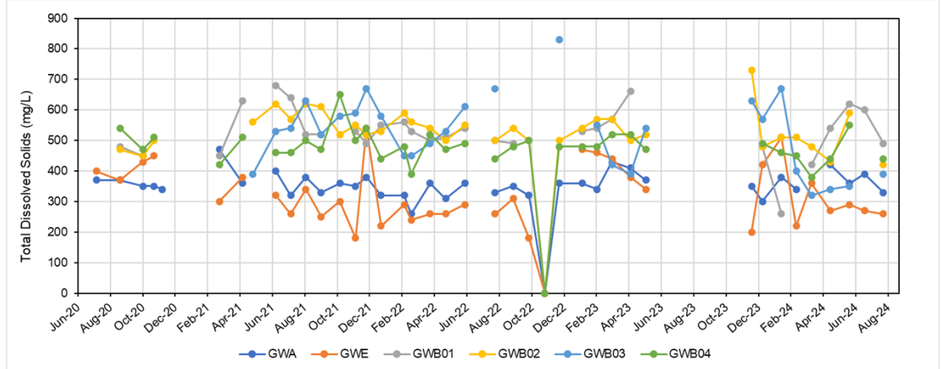

Ni (mg/L)
0.006
0.005
0.004
0.003
0.002
0.001
0.000
Jun-20 Aug-20 Oct-20 Dec-20 Feb-21 Apr-21 Jun-21 Aug-21 Oct-21 Dec-21 Feb-22 Apr-22 Jun-22 Aug-22 Oct-22 Dec-22 Feb-23 Apr-23 Jun-23 Aug-23 Oct-23 Dec-23 Feb-24 Apr-24 Jun-24 Aug-24
GWA GWE GWB01 GWB02 GWB03 GWB04

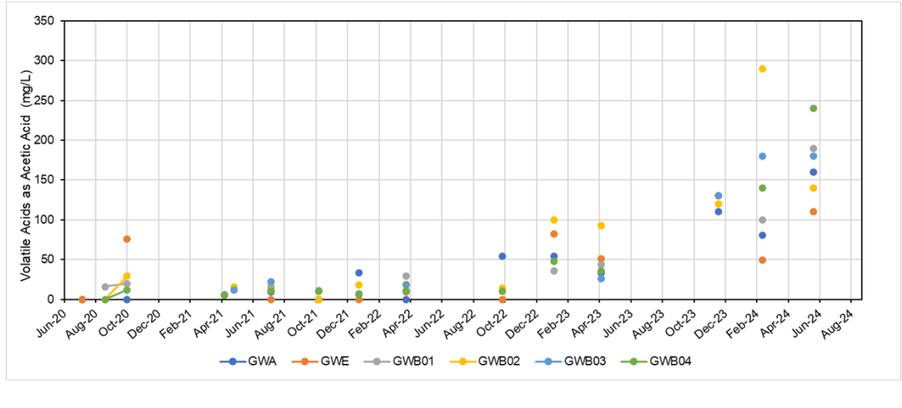

Zn (mg/L)
1.200
1.000
0.800
0.600
0.400
0.200
0.000
Jun-20 Aug-20 Oct-20 Dec-20 Feb-21 Apr-21 Jun-21 Aug-21 Oct-21 Dec-21 Feb-22 Apr-22 Jun-22 Aug-22 Oct-22 Dec-22 Feb-23 Apr-23 Jun-23 Aug-23 Oct-23 Dec-23 Feb-24 Apr-24 Jun-24 Aug-24
GWA GWE GWB01 GWB02 GWB03 GWB04

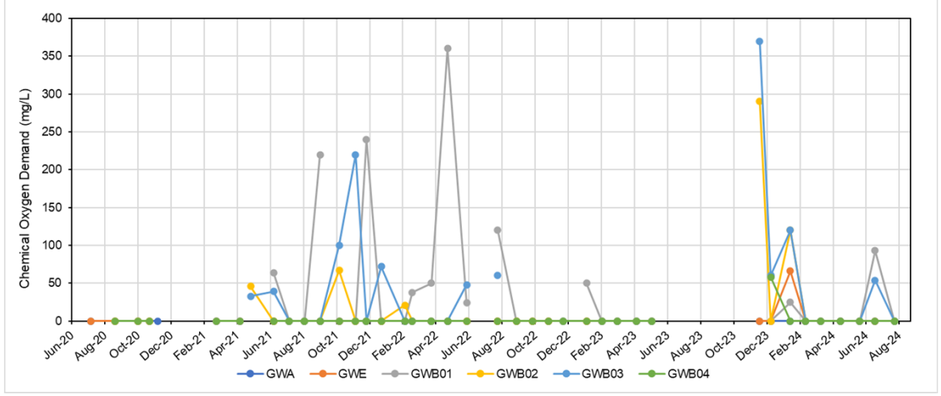

Al (mg/L)
0.040
0.035
0.030
0.025
0.020
0.015
0.010
0.005
0.000
Jun-20 Aug-20 Oct-20 Dec-20 Feb-21 Apr-21 Jun-21 Aug-21 Oct-21 Dec-21 Feb-22 Apr-22 Jun-22 Aug-22 Oct-22 Dec-22 Feb-23 Apr-23 Jun-23 Aug-23 Oct-23 Dec-23 Feb-24 Apr-24 Jun-24 Aug-24
GWA GWE GWB01 GWB02 GWB03 GWB04

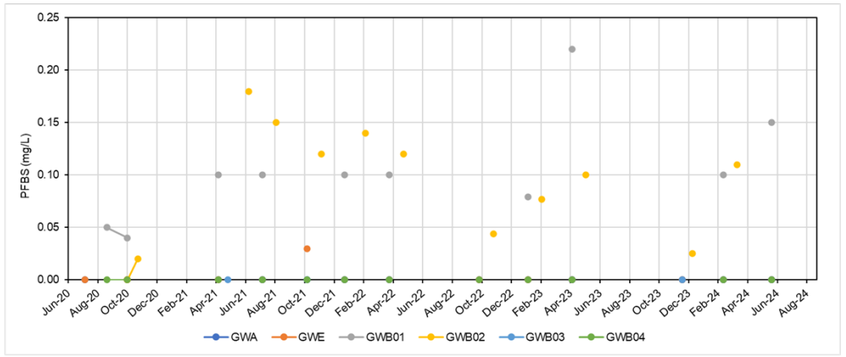

Total Organic Carbon (mg/L)
0
2
4
6
8
10
12
Jun-20
Aug-20
Oct-20
Dec-20
Feb-21
Apr-21
Jun-21
Aug-21
Oct-21
Dec-21
Feb-22
Apr-22
Jun-22
Aug-22
Oct-22
Dec-22
Feb-23
Apr-23
Jun-23
Aug-23
Oct-23
Dec-23
Feb-24
Apr-24
Jun-24
Aug-24
GWA
GWE
GWB01
GWB02
GWB03
GWB04

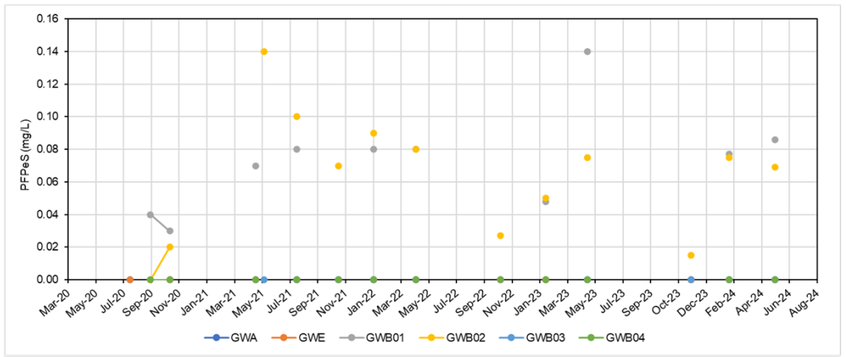

Biological Oxygen Demand (mg/L)
0
5
10
15
20
25
30
35
Jun-20
Aug-20
Oct-20
Dec-20
Feb-21
Apr-21
Jun-21
Aug-21
Oct-21
Dec-21
Feb-22
Apr-22
Jun-22
Aug-22
Oct-22
Dec-22
Feb-23
Apr-23
Jun-23
Aug-23
Oct-23
Dec-23
Feb-24
Apr-24
Jun-24
Aug-24
GWA
GWE
GWB01
GWB02
GWB03
GWB04

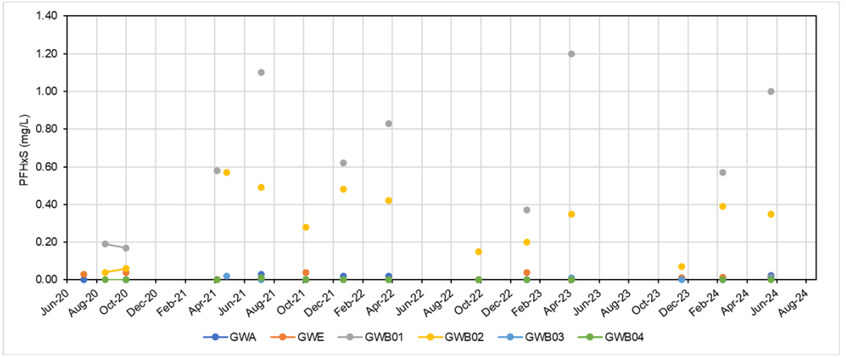

Total Dissolved Solids (mg/L)
0
100
200
300
400
500
600
700
800
900
Jun-20
Aug-20
Oct-20
Dec-20
Feb-21
Apr-21
Jun-21
Aug-21
Oct-21
Dec-21
Feb-22
Apr-22
Jun-22
Aug-22
Oct-22
Dec-22
Feb-23
Apr-23
Jun-23
Aug-23
Oct-23
Dec-23
Feb-24
Apr-24
Jun-24
Aug-24
GWA
GWE
GWB01
GWB02
GWB03
GWB04

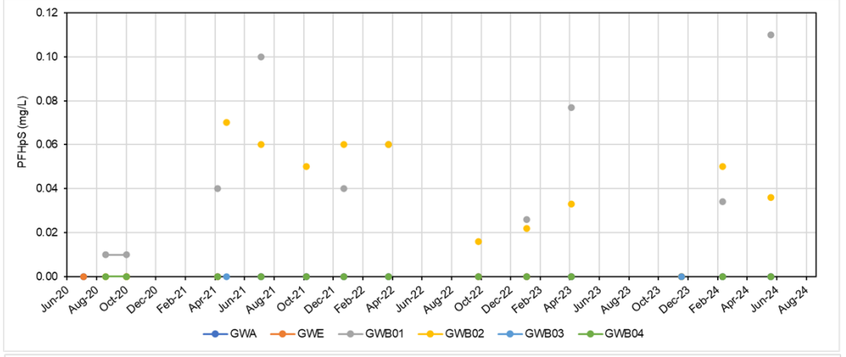

Volatile Acids as Acetic Acid (mg/L)
0
50
100
150
200
250
300
350
Jun-20
Aug-20
Oct-20
Dec-20
Feb-21
Apr-21
Jun-21
Aug-21
Oct-21
Dec-21
Feb-22
Apr-22
Jun-22
Aug-22
Oct-22
Dec-22
Feb-23
Apr-23
Jun-23
Aug-23
Oct-23
Dec-23
Feb-24
Apr-24
Jun-24
Aug-24
GWA
GWE
GWB01
GWB02
GWB03
GWB04

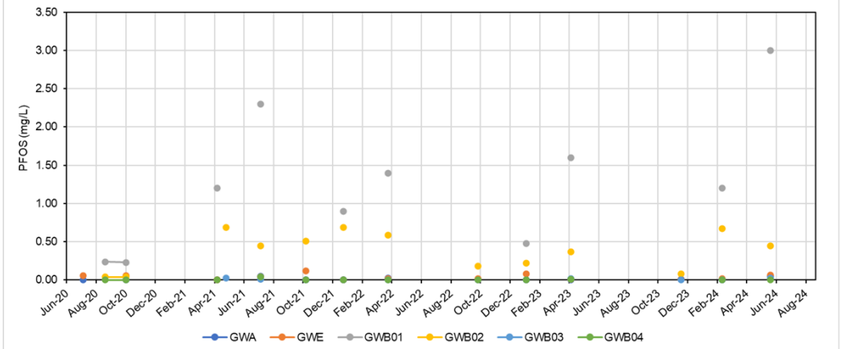

Chemical Oxygen Demand (mg/L)
0
50
100
150
200
250
300
350
400
Jun-20
Aug-20
Oct-20
Dec-20
Feb-21
Apr-21
Jun-21
Aug-21
Oct-21
Dec-21
Feb-22
Apr-22
Jun-22
Aug-22
Oct-22
Dec-22
Feb-23
Apr-23
Jun-23
Aug-23
Oct-23
Dec-23
Feb-24
Apr-24
Jun-24
Aug-24
GWA
GWE
GWB01
GWB02
GWB03
GWB04

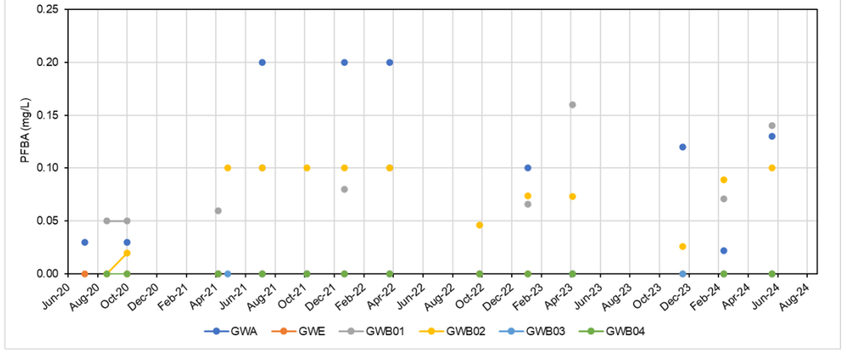

PFBS (mg/L)
GWA GWE GWB01 GWB02 GWB03 GWB04

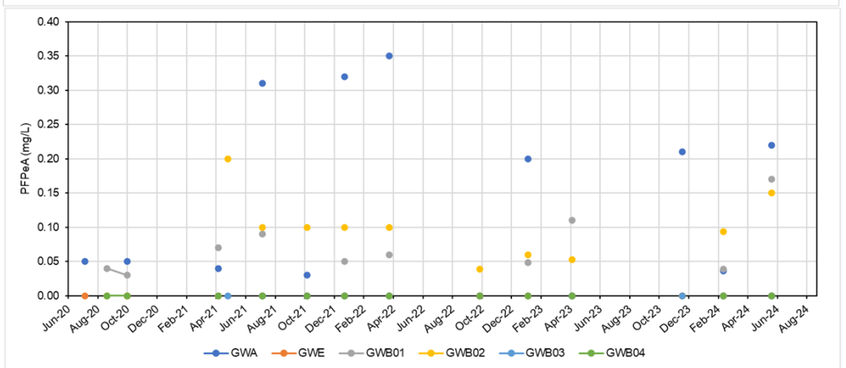

PFPeS (mg/L)
GWA GWE GWB01 GWB02 GWB03 GWB04

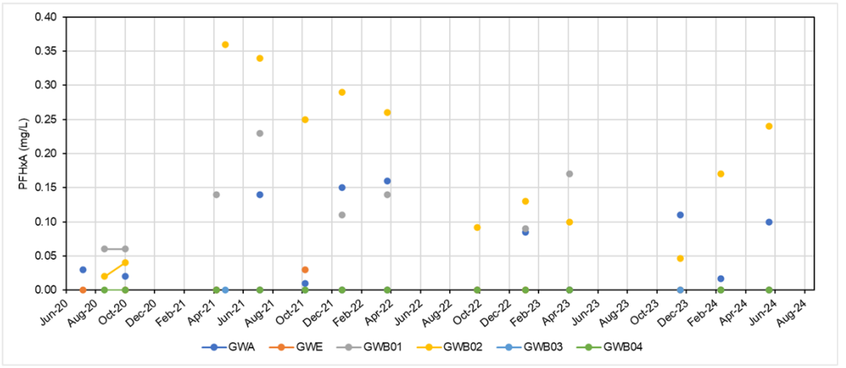

PFHxS (mg/L)
GWA GWE GWB01 GWB02 GWB03 GWB04

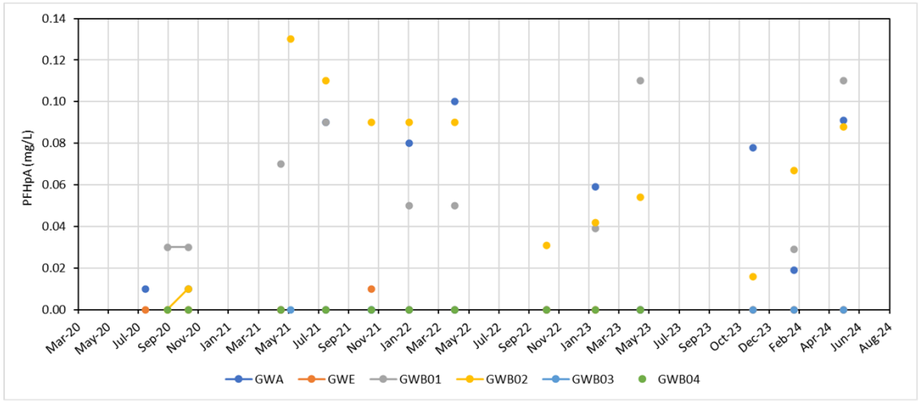

PFHpS (mg/L)
GWA GWE GWB01 GWB02 GWB03 GWB04

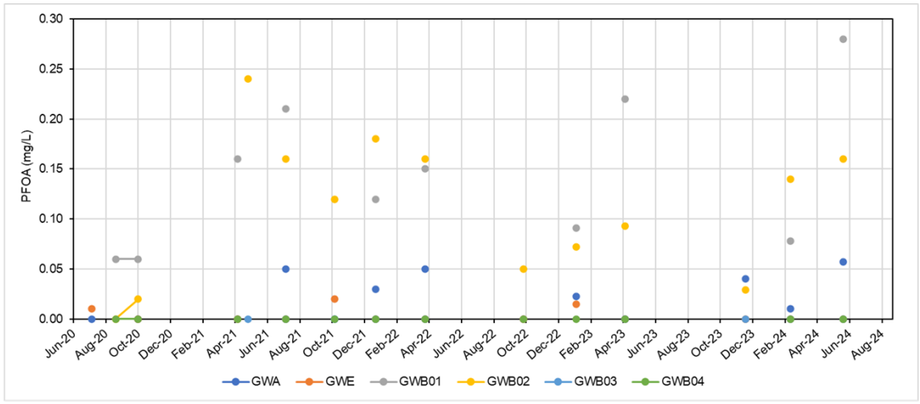

PFOS (mg/L)
GWA GWE GWB01 GWB02 GWB03 GWB04

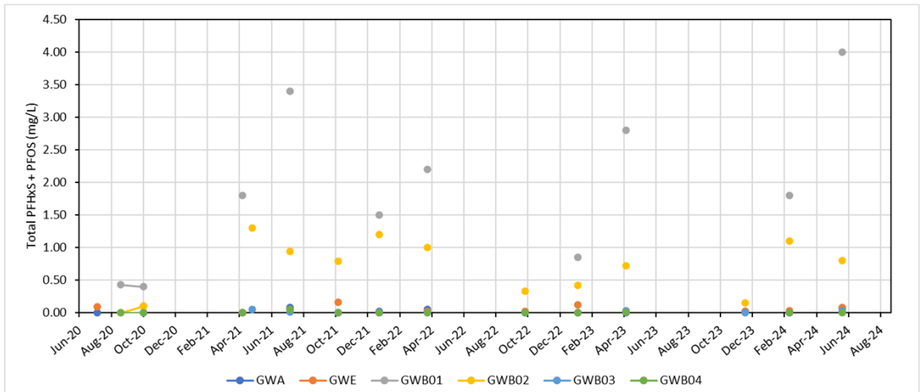

PFBA (mg/L)
GWA GWE GWB01 GWB02 GWB03 GWB04

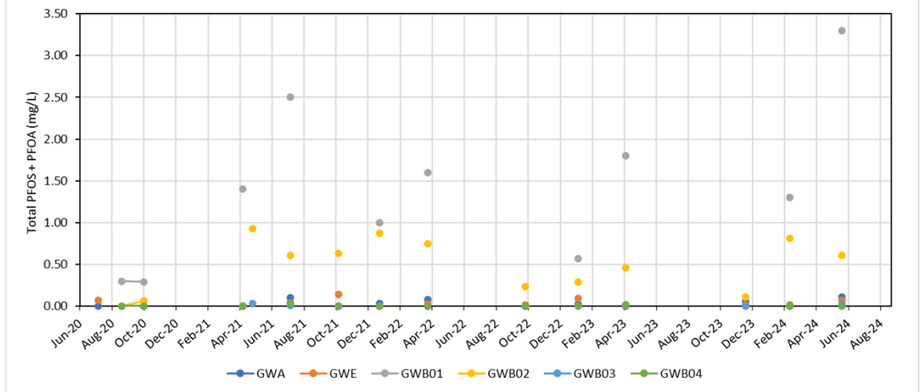

PFPeA (mg/L)
GWA GWE GWB01 GWB02 GWB03 GWB04

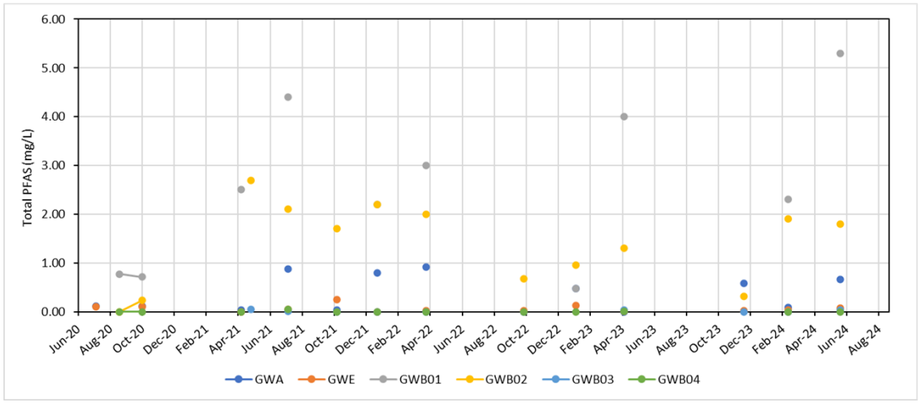

PFHxA (mg/L)
GWA GWE GWB01 GWB02 GWB03 GWB04


PFHpA (mg/L)
0.14
0.12
0.10
0.08
0.06
0.04
0.02
0.00
Mar-20 May-20 Jul-20 Sep-20 Nov-20 Jan-21 Mar-21 May-21 Jul-21 Sep-21 Nov-21 Jan-22 Mar-22 May-22 Jul-22 Sep-22 Nov-22 Jan-23 Mar-23 May-23 Jul-23 Sep-23 Oct-23 Dec-23 Feb-24 Apr-24 Jun-24 Aug-24
GWA GWE GWB01 GWB02 GWB03 GWB04


PFOA (mg/L)
0.30
0.25
0.20
0.15
0.10
0.05
0.00
Jun-20 Aug-20 Oct-20 Dec-20 Feb-21 Apr-21 Jun-21 Aug-21 Oct-21 Dec-21 Feb-22 Apr-22 Jun-22 Aug-22 Oct-22 Dec-22 Feb-23 Apr-23 Jun-23 Aug-23 Oct-23 Dec-23 Feb-24 Apr-24 Jun-24 Aug-24
GWA GWE GWB01 GWB02 GWB03 GWB04


Total PFHxS + PFOS (mg/L)
4.50
4.00
3.50
3.00
2.50
2.00
1.50
1.00
0.50
0.00
Jun-20 Aug-20 Oct-20 Dec-20 Feb-21 Apr-21 Jun-21 Aug-21 Oct-21 Dec-21 Feb-22 Apr-22 Jun-22 Aug-22 Oct-22 Dec-22 Feb-23 Apr-23 Jun-23 Aug-23 Oct-23 Dec-23 Feb-24 Apr-24 Jun-24 Aug-24
GWA GWE GWB01 GWB02 GWB03 GWB04


Total PFOS + PFOA (mg/L)
3.50
3.00
2.50
2.00
1.50
1.00
0.50
0.00
Jun-20 Aug-20 Oct-20 Dec-20 Feb-21 Apr-21 Jun-21 Aug-21 Oct-21 Dec-21 Feb-22 Apr-22 Jun-22 Aug-22 Oct-22 Dec-22 Feb-23 Apr-23 Jun-23 Aug-23 Oct-23 Dec-23 Feb-24 Apr-24 Jun-24 Aug-24
GWA GWE GWB01 GWB02 GWB03 GWB04


Total PFAS (mg/L)
6.00
5.00
4.00
3.00
2.00
1.00
0.00
Jun-20 Aug-20 Oct-20 Dec-20 Feb-21 Apr-21 Jun-21 Aug-21 Oct-21 Dec-21 Feb-22 Apr-22 Jun-22 Aug-22 Oct-22 Dec-22 Feb-23 Apr-23 Jun-23 Aug-23 Oct-23 Dec-23 Feb-24 Apr-24 Jun-24 Aug-24
GWA GWE GWB01 GWB02 GWB03 GWB04

APPENDIX D LABORATORY REPORTS

Envirolab Services (WA) Pty Ltd trading as MPL Laboratories
ABN 53 140 099 207
16-18 Hayden Court Myaree WA 6154
ph +61 8 9317 2505
lab@mpl.com.au
www.mpl.com.au

Certificate of Analysis PEK2136

Client Details

Client	Katherine Town Council - NT
Contact	Brett Kimpton
Address	PO Box 1071, KATHERINE, NT, 0851

Sample Details

Your Reference	Katherine Town Council - EPL298 - Quarterly
Number of Samples	8 Water
Date Samples Received	29/11/2023
Date Instructions Received	29/11/2023

Analysis Details

Please refer to the following pages for results, methodology summary and quality control data.
Samples were analysed as received from the client. Results relate specifically to the samples as received.
Results are reported on a dry weight basis for solids and on an as received basis for other matrices.

Report Details

Date Results Requested by	11/12/2023
Date of Issue	11/12/2023

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Accredited for compliance with ISO/IEC 17025. Tests not covered by NATA are denoted with *.

Authorisation Details

Results Approved By	Diego Bigolin, Supervisor, Inorganics Heram Halim, Operations Manager Lien Tang, Assistant Operations Manager Sean McAlary, Chemist Travis Carey, Organics Supervisor
Laboratory Manager	Michael Kubiak

Certificate of Analysis PEK2136

Samples in this Report

Envirolab ID	Sample ID	Matrix	Date Sampled	Date Received
PEK2136-01	SWC	Water	27/11/2023	29/11/2023
PEK2136-02	Leachate	Water	27/11/2023	29/11/2023
PEK2136-03	GWA (RN031131)	Water	27/11/2023	29/11/2023
PEK2136-04	GWE (RN022487)	Water	27/11/2023	29/11/2023
PEK2136-05	GWB02	Water	27/11/2023	29/11/2023
PEK2136-06	GWB03	Water	27/11/2023	29/11/2023
PEK2136-07	GWB04	Water	27/11/2023	29/11/2023
PEK2136-08	Trip Blank	Water	27/11/2023	29/11/2023

Sample Comments

SWC	Sample(s) was/were received with headspace, analytical results may be affected.
Leachate	Sample(s) was/were received with headspace, analytical results may be affected.
GWE (RN022487)	Sample(s) was/were received with headspace, analytical results may be affected.
GWB02	Sample(s) was/were received with headspace, analytical results may be affected.
GWB03	Sample(s) was/were received with headspace, analytical results may be affected.
Trip Blank	Sample(s) was/were received with headspace, analytical results may be affected.

Volatile TRH and BTEX (Water)

Envirolab ID	Units	PQL	PEK2136-01	PEK2136-02	PEK2136-03	PEK2136-04	PEK2136-05
Your Reference			SWC	Leachate	GWA (RN031131)	GWE (RN022487)	GWB02
Date Sampled			27/11/2023	27/11/2023	27/11/2023	27/11/2023	27/11/2023
TRH C6-C9	µg/L	10	<10	<10	<10	<10	<50 [7]
TRH C6-C10	µg/L	10	<10	<10	<10	<10	<50 [7]
TRH C6-C10 less BTEX (F1)	µg/L	10	<10	<10	<10	<10	<50 [7]
Methyl tert butyl ether (MTBE)	µg/L	1.0	<1.0	<1.0	<1.0	<1.0	<5.0 [7]
Benzene	µg/L	1.0	<1.0	<1.0	<1.0	<1.0	<5.0 [7]
Toluene	µg/L	1.0	<1.0	<1.0	<1.0	<1.0	<5.0 [7]
Ethylbenzene	µg/L	1.0	<1.0	<1.0	<1.0	<1.0	<5.0 [7]
meta+para Xylene	µg/L	2.0	<2.0	<2.0	<2.0	<2.0	<10 [7]
ortho-Xylene	µg/L	1.0	<1.0	<1.0	<1.0	<1.0	<5.0 [7]
Total Xylene	µg/L	3.0	<3.0	<3.0	<3.0	<3.0	<15 [7]
Naphthalene (value used in F2 calc)	µg/L	1.0	<1.0	<1.0	<1.0	<1.0	<5.0 [7]
Surrogate Dibromofluoromethane	%		*98.3*	*96.3*	*93.8*	*94.1*	*93.7*
Surrogate Toluene-D8	%		*90.4*	*94.2*	*91.5*	*91.2*	*91.1*
Surrogate 4-Bromofluorobenzene	%		*99.0*	*98.4*	*100*	*97.8*	*99.0*

Envirolab ID	Units	PQL	PEK2136-06	PEK2136-08
Your Reference			GWB03	Trip Blank
Date Sampled			27/11/2023	27/11/2023
TRH C6-C9	µg/L	10	<10	<10
TRH C6-C10	µg/L	10	<10	<10
TRH C6-C10 less BTEX (F1)	µg/L	10	<10	<10
Methyl tert butyl ether (MTBE)	µg/L	1.0	<1.0	<1.0
Benzene	µg/L	1.0	<1.0	<1.0
Toluene	µg/L	1.0	<1.0	<1.0
Ethylbenzene	µg/L	1.0	<1.0	<1.0
meta+para Xylene	µg/L	2.0	<2.0	<2.0
ortho-Xylene	µg/L	1.0	<1.0	<1.0
Total Xylene	µg/L	3.0	<3.0	<3.0
Naphthalene (value used in F2 calc)	µg/L	1.0	<1.0	<1.0
Surrogate Dibromofluoromethane	%		*91.3*	*97.0*
Surrogate Toluene-D8	%		*93.7*	*93.5*
Surrogate 4-Bromofluorobenzene	%		*98.8*	*98.8*

Semi-volatile TRH (Water)

Envirolab ID	Units	PQL	PEK2136-01	PEK2136-02	PEK2136-03	PEK2136-04	PEK2136-05
Your Reference			SWC	Leachate	GWA (RN031131)	GWE (RN022487)	GWB02
Date Sampled			27/11/2023	27/11/2023	27/11/2023	27/11/2023	27/11/2023
TRH C10-C14	µg/L	50	<50	<50	440	<50	<50
TRH C15-C28	µg/L	100	<100	<100	<100	<100	<100
TRH C29-C36	µg/L	100	<100	<100	<100	<100	<100
Total +ve TRH C10-C36	µg/L	50	<50	<50	440	<50	<50
TRH >C10-C16	µg/L	50	<50	<50	450	<50	<50
TRH >C10-C16 less Naphthalene F2	µg/L	50	<50	<50	450	<50	<50
TRH >C16-C34 (F3)	µg/L	100	<100	<100	<100	<100	<100
TRH >C34-C40 (F4)	µg/L	100	<100	<100	<100	<100	<100
Total +ve TRH >C10-C40	µg/L	50	<50	<50	450	<50	<50
Surrogate o-Terphenyl	%		*54.7 [3]*	*77.1*	*80.6*	*75.3*	*83.7*

Envirolab ID	Units	PQL	PEK2136-06	PEK2136-07	PEK2136-08
Your Reference			GWB03	GWB04	Trip Blank
Date Sampled			27/11/2023	27/11/2023	27/11/2023
TRH C10-C14	µg/L	50	<50	<50	<50
TRH C15-C28	µg/L	100	<100	<100	<100
TRH C29-C36	µg/L	100	<100	<100	<100
Total +ve TRH C10-C36	µg/L	50	<50	<50	<50
TRH >C10-C16	µg/L	50	<50	<50	<50
TRH >C10-C16 less Naphthalene F2	µg/L	50	<50	[NA]	<50
TRH >C16-C34 (F3)	µg/L	100	<100	<100	<100
TRH >C34-C40 (F4)	µg/L	100	<100	<100	<100
Total +ve TRH >C10-C40	µg/L	50	<50	<50	<50
Surrogate o-Terphenyl	%		*77.5*	*75.5*	*67.7*

Polycyclic Aromatic Hydrocarbons (Water)

Envirolab ID	Units	PQL	PEK2136-01	PEK2136-02	PEK2136-03	PEK2136-04	PEK2136-05
Your Reference			SWC	Leachate	GWA (RN031131)	GWE (RN022487)	GWB02
Date Sampled			27/11/2023	27/11/2023	27/11/2023	27/11/2023	27/11/2023
Naphthalene	µg/L	0.10	<0.10	<0.10	<0.10	<0.10	<0.10
Acenaphthylene	µg/L	0.10	<0.10	<0.10	<0.10	<0.10	<0.10
Acenaphthene	µg/L	0.10	<0.10	<0.10	<0.10	<0.10	<0.10
Fluorene	µg/L	0.10	<0.10	<0.10	<0.10	<0.10	<0.10
Phenanthrene	µg/L	0.10	<0.10	<0.10	<0.10	<0.10	<0.10
Anthracene	µg/L	0.10	<0.10	<0.10	<0.10	<0.10	<0.10
Fluoranthene	µg/L	0.10	<0.10	<0.10	<0.10	<0.10	<0.10
Pyrene	µg/L	0.10	<0.10	<0.10	<0.10	<0.10	<0.10
Benzo(a)anthracene	µg/L	0.10	<0.10	<0.10	<0.10	<0.10	<0.10
Chrysene	µg/L	0.10	<0.10	<0.10	<0.10	<0.10	<0.10
Benzo(b,j,k)fluoranthene	µg/L	0.20	<0.20	<0.20	<0.20	<0.20	<0.20
Benzo(a)pyrene	µg/L	0.10	<0.10	<0.10	<0.10	<0.10	<0.10
Indeno(1,2,3-c,d)pyrene	µg/L	0.10	<0.10	<0.10	<0.10	<0.10	<0.10
Dibenzo(a,h)anthracene	µg/L	0.10	<0.10	<0.10	<0.10	<0.10	<0.10
Benzo(g,h,i)perylene	µg/L	0.10	<0.10	<0.10	<0.10	<0.10	<0.10
Total +ve PAH	µg/L	0.10	<0.10	<0.10	<0.10	<0.10	<0.10
Surrogate p-Terphenyl-D14	%		*52.9 [3]*	*79.8*	*81.7*	*71.9*	*84.5*

Envirolab ID	Units	PQL	PEK2136-06	PEK2136-07	PEK2136-08
Your Reference			GWB03	GWB04	Trip Blank
Date Sampled			27/11/2023	27/11/2023	27/11/2023
Naphthalene	µg/L	0.10	<0.10	<0.10	<0.10
Acenaphthylene	µg/L	0.10	<0.10	<0.10	<0.10
Acenaphthene	µg/L	0.10	<0.10	<0.10	<0.10
Fluorene	µg/L	0.10	<0.10	<0.10	<0.10
Phenanthrene	µg/L	0.10	<0.10	<0.10	<0.10
Anthracene	µg/L	0.10	<0.10	<0.10	<0.10
Fluoranthene	µg/L	0.10	<0.10	<0.10	<0.10
Pyrene	µg/L	0.10	<0.10	<0.10	<0.10
Benzo(a)anthracene	µg/L	0.10	<0.10	<0.10	<0.10
Chrysene	µg/L	0.10	<0.10	<0.10	<0.10
Benzo(b,j,k)fluoranthene	µg/L	0.20	<0.20	<0.20	<0.20
Benzo(a)pyrene	µg/L	0.10	<0.10	<0.10	<0.10
Indeno(1,2,3-c,d)pyrene	µg/L	0.10	<0.10	<0.10	<0.10
Dibenzo(a,h)anthracene	µg/L	0.10	<0.10	<0.10	<0.10
Benzo(g,h,i)perylene	µg/L	0.10	<0.10	<0.10	<0.10
Total +ve PAH	µg/L	0.10	<0.10	<0.10	<0.10
Surrogate p-Terphenyl-D14	%		*54.8 [5]*	*79.9*	*62.9*

Polychlorinated Biphenyls (Water)

Envirolab ID	Units	PQL	PEK2136-01	PEK2136-02	PEK2136-03	PEK2136-04	PEK2136-05
Your Reference			SWC	Leachate	GWA (RN031131)	GWE (RN022487)	GWB02
Date Sampled			27/11/2023	27/11/2023	27/11/2023	27/11/2023	27/11/2023
Aroclor 1016	µg/L	2.0	<2.0	<2.0	<2.0	<2.0	<2.0
Aroclor 1221	µg/L	2.0	<2.0	<2.0	<2.0	<2.0	<2.0
Aroclor 1232	µg/L	2.0	<2.0	<2.0	<2.0	<2.0	<2.0
Aroclor 1242	µg/L	2.0	<2.0	<2.0	<2.0	<2.0	<2.0
Aroclor 1248	µg/L	2.0	<2.0	<2.0	<2.0	<2.0	<2.0
Aroclor 1254	µg/L	2.0	<2.0	<2.0	<2.0	<2.0	<2.0
Aroclor 1260	µg/L	2.0	<2.0	<2.0	<2.0	<2.0	<2.0
Total +ve PCB (1016-1260)	µg/L	2.0	<2.0	<2.0	<2.0	<2.0	<2.0
Surrogate 2-Fluorobiphenyl	%		*60.4*	*78.6*	*79.3*	*76.5*	*88.4*

Envirolab ID	Units	PQL	PEK2136-06	PEK2136-07	PEK2136-08
Your Reference			GWB03	GWB04	Trip Blank
Date Sampled			27/11/2023	27/11/2023	27/11/2023
Aroclor 1016	µg/L	2.0	<2.0	<2.0	<2.0
Aroclor 1221	µg/L	2.0	<2.0	<2.0	<2.0
Aroclor 1232	µg/L	2.0	<2.0	<2.0	<2.0
Aroclor 1242	µg/L	2.0	<2.0	<2.0	<2.0
Aroclor 1248	µg/L	2.0	<2.0	<2.0	<2.0
Aroclor 1254	µg/L	2.0	<2.0	<2.0	<2.0
Aroclor 1260	µg/L	2.0	<2.0	<2.0	<2.0
Total +ve PCB (1016-1260)	µg/L	2.0	<2.0	<2.0	<2.0
Surrogate 2-Fluorobiphenyl	%		*77.3*	*82.0*	*78.0*

Acid Extractable Low Level Metals (Water)

Envirolab ID	Units	PQL	PEK2136-01	PEK2136-02	PEK2136-03	PEK2136-04	PEK2136-05
Your Reference			SWC	Leachate	GWA (RN031131)	GWE (RN022487)	GWB02
Date Sampled			27/11/2023	27/11/2023	27/11/2023	27/11/2023	27/11/2023
Aluminium	µg/L	10	2900	7200	16	54	2000
Cadmium	µg/L	0.10	<0.10	<0.10	<0.10	<0.10	0.48
Chromium	µg/L	1.0	4.8	14	<1.0	<1.0	5.8
Copper	µg/L	1.0	6.7	30	7.3	5.1	1600
Iron	µg/L	10	3800	11000	2000	2900	5700
Manganese	µg/L	1.0	47	130	10	18	230
Nickel	µg/L	1.0	3.5	11	<1.0	2.0	10
Lead	µg/L	1.0	2.7	5.4	<1.0	4.8	46
Selenium	µg/L	1.0	<1.0	<1.0	<1.0	<1.0	<1.0
Zinc	µg/L	1.0	6.7	26	70	130	1300

Envirolab ID	Units	PQL	PEK2136-06	PEK2136-07	PEK2136-08
Your Reference			GWB03	GWB04	Trip Blank
Date Sampled			27/11/2023	27/11/2023	27/11/2023
Aluminium	µg/L	10	47000	35	<10
Cadmium	µg/L	0.10	0.28	<0.10	<0.10
Chromium	µg/L	1.0	79	<1.0	<1.0
Copper	µg/L	1.0	490	4.2	<1.0
Iron	µg/L	10	63000	93	<10
Manganese	µg/L	1.0	1600	2.4	<1.0
Nickel	µg/L	1.0	74	<1.0	<1.0
Lead	µg/L	1.0	160	3.6	<1.0
Selenium	µg/L	1.0	<1.0	<1.0	<1.0
Zinc	µg/L	1.0	370	44	<1.0

Dissolved Low Level Metals (Water)

Envirolab ID	Units	PQL	PEK2136-01	PEK2136-02	PEK2136-03	PEK2136-04	PEK2136-05
Your Reference			SWC	Leachate	GWA (RN031131)	GWE (RN022487)	GWB02
Date Sampled			27/11/2023	27/11/2023	27/11/2023	27/11/2023	27/11/2023
Aluminium	µg/L	10	28	15	<10	<10	16
Cadmium	µg/L	0.10	<0.10	<0.10	<0.10	<0.10	0.36
Chromium	µg/L	1.0	<1.0	<1.0	<1.0	<1.0	<1.0
Copper	µg/L	1.0	3.1	3.3	2.9	2.1	1400
Iron	µg/L	10	55	25	1100	200	320
Manganese	µg/L	1.0	2.2	<1.0	10	20	150
Nickel	µg/L	1.0	<1.0	<1.0	<1.0	<1.0	4.5
Lead	µg/L	1.0	<1.0	<1.0	<1.0	<1.0	14
Selenium	µg/L	1.0	<1.0	<1.0	<1.0	<1.0	<1.0
Zinc	µg/L	1.0	<1.0	<1.0	66	86	1100

Envirolab ID	Units	PQL	PEK2136-06	PEK2136-07	PEK2136-08
Your Reference			GWB03	GWB04	Trip Blank
Date Sampled			27/11/2023	27/11/2023	27/11/2023
Aluminium	µg/L	10	<10	<10	<10
Cadmium	µg/L	0.10	<0.10	<0.10	<0.10
Chromium	µg/L	1.0	<1.0	<1.0	<1.0
Copper	µg/L	1.0	5.0	2.9	<1.0
Iron	µg/L	10	21	<10	<10
Manganese	µg/L	1.0	20	<1.0	<1.0
Nickel	µg/L	1.0	2.4	<1.0	<1.0
Lead	µg/L	1.0	<1.0	1.9	<1.0
Selenium	µg/L	1.0	<1.0	<1.0	<1.0
Zinc	µg/L	1.0	32	45	<1.0

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Inorganics - Physical Parameters (Water)

Envirolab ID	Units	PQL	PEK2136-01	PEK2136-02	PEK2136-03	PEK2136-04	PEK2136-05
Your Reference			SWC	Leachate	GWA (RN031131)	GWE (RN022487)	GWB02
Date Sampled			27/11/2023	27/11/2023	27/11/2023	27/11/2023	27/11/2023
Total Dissolved Solids	mg/L	5.0	170 [1]	140	350	200	730

Envirolab ID	Units	PQL	PEK2136-06	PEK2136-08
Your Reference			GWB03	Trip Blank
Date Sampled			27/11/2023	27/11/2023
Total Dissolved Solids	mg/L	5.0	630	12

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Inorganics - Physical Parameters (Water) - Analysed By Envirolab Services Sydney

Envirolab ID	Units	PQL	PEK2136-01	PEK2136-02	PEK2136-03	PEK2136-04	PEK2136-05
Your Reference			SWC	Leachate	GWA (RN031131)	GWE (RN022487)	GWB02
Date Sampled			27/11/2023	27/11/2023	27/11/2023	27/11/2023	27/11/2023
Volatile Fatty Acids*	mg/L	5.0	240	110	110	130	120

Envirolab ID	Units	PQL	PEK2136-06	PEK2136-08
Your Reference			GWB03	Trip Blank
Date Sampled			27/11/2023	27/11/2023
Volatile Fatty Acids*	mg/L	5.0	130	<5.0

Inorganics - Ionic Balance and Indexes (Water)

Envirolab ID	Units	PQL	PEK2136-01	PEK2136-02	PEK2136-03	PEK2136-04	PEK2136-05
Your Reference			SWC	Leachate	GWA (RN031131)	GWE (RN022487)	GWB02
Date Sampled			27/11/2023	27/11/2023	27/11/2023	27/11/2023	27/11/2023
Bicarbonate Alkalinity as CaCO3	mg/L as CaCO3	5.0	86	51	360	210	510
Carbonate Alkalinity as CaCO3	mg/L as CaCO3	5.0	<5.0	<5.0	<5.0	<5.0	<5.0
Hydroxide OH- as CaCO3	mg/L as CaCO3	5.0	<5.0	<5.0	<5.0	<5.0	<5.0
Total Alkalinity as CaCO3	mg/L as CaCO3	5.0	86	51	360	210	510
Chloride	mg/L	1.0	1.8	3.4	5.1	9.9	14
Sulfate	mg/L	1.0	3.1	11	5.2	12	21
Calcium	mg/L	0.50	19	13	73	30	89
Magnesium	mg/L	0.50	5.8	4.4	34	27	49
Potassium	mg/L	0.50	6.3	3.6	4.8	7.1	43
Sodium	mg/L	0.50	1.1	2.3	5.8	16	51
Hardness as CaCO3	mg/L	3.0	72	51	320	190	420
Ionic Balance	%		-5.2	-7.3	-5.4	-0.083	3.1
Total Anions	mg/L	7.0	91	65	370	230	550
Anions as meq	meq/L	0.59	1.5	1.2	6.2	3.9	9.2
Total Cations	mg/L	2.0	32	24	120	81	230
Cations as meq	meq/L	0.10	1.7	1.2	6.8	4.7	12

Envirolab ID	Units	PQL	PEK2136-06	PEK2136-07	PEK2136-08
Your Reference			GWB03	GWB04	Trip Blank
Date Sampled			27/11/2023	27/11/2023	27/11/2023
Bicarbonate Alkalinity as CaCO3	mg/L as CaCO3	5.0	500	450	<5.0
Carbonate Alkalinity as CaCO3	mg/L as CaCO3	5.0	<5.0	<5.0	<5.0
Hydroxide OH- as CaCO3	mg/L as CaCO3	5.0	<5.0	<5.0	<5.0
Total Alkalinity as CaCO3	mg/L as CaCO3	5.0	500	450	<5.0
Chloride	mg/L	1.0	12	5.0	<1.0
Sulfate	mg/L	1.0	79	5.3	<1.0
Calcium	mg/L	0.50	96	79	<0.50
Magnesium	mg/L	0.50	68	57	<0.50
Potassium	mg/L	0.50	5.8	7.9	<0.50
Sodium	mg/L	0.50	22	9.0	<0.50
Hardness as CaCO3	mg/L	3.0	520	430	<3.0
Ionic Balance	%		-2.0	-0.32	-97
Total Anions	mg/L	7.0	590	460	<7.0
Anions as meq	meq/L	0.59	10	7.7	<0.59
Total Cations	mg/L	2.0	190	150	<2.0
Cations as meq	meq/L	0.10	12	9.3	<0.10

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Inorganics - Carbons, Nitrogen Species, Sulfur Species (Water)

Envirolab ID	Units	PQL	PEK2136-01	PEK2136-02	PEK2136-03	PEK2136-04	PEK2136-05
Your Reference			SWC	Leachate	GWA (RN031131)	GWE (RN022487)	GWB02
Date Sampled			27/11/2023	27/11/2023	27/11/2023	27/11/2023	27/11/2023
Total Organic Carbon	mg/L	1.0	15	5.1	3.5	1.4	2.3

Envirolab ID	Units	PQL	PEK2136-06	PEK2136-08
Your Reference			GWB03	Trip Blank
Date Sampled			27/11/2023	27/11/2023
Total Organic Carbon	mg/L	1.0	2.5	<1.0

Inorganics - Speciated Cr (III/VI) and Fe (II/III) (Water)

Envirolab ID	Units	PQL	PEK2136-01	PEK2136-02	PEK2136-03	PEK2136-04	PEK2136-05
Your Reference			SWC	Leachate	GWA (RN031131)	GWE (RN022487)	GWB02
Date Sampled			27/11/2023	27/11/2023	27/11/2023	27/11/2023	27/11/2023
Hexavalent Chromium	mg/L	0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050
Hexavalent Chromium (Total)	mg/L	0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050
Trivalent Chromium	mg/L	0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050
Trivalent Chromium (Total)*	mg/L	0.0050	<0.0050	0.014	<0.0050	<0.0050	0.0058

Envirolab ID	Units	PQL	PEK2136-06	PEK2136-07	PEK2136-08
Your Reference			GWB03	GWB04	Trip Blank
Date Sampled			27/11/2023	27/11/2023	27/11/2023
Hexavalent Chromium	mg/L	0.0050	<0.0050	<0.0050	<0.0050
Hexavalent Chromium (Total)	mg/L	0.0050	<0.0050	<0.0050	<0.0050
Trivalent Chromium	mg/L	0.0050	<0.0050	<0.0050	<0.0050
Trivalent Chromium (Total)*	mg/L	0.0050	0.079	<0.0050	<0.0050

Inorganics - Nutrients (Water)

Envirolab ID	Units	PQL	PEK2136-01	PEK2136-02	PEK2136-03	PEK2136-04	PEK2136-05
Your Reference			SWC	Leachate	GWA (RN031131)	GWE (RN022487)	GWB02
Date Sampled			27/11/2023	27/11/2023	27/11/2023	27/11/2023	27/11/2023
Ammonia as N	mg/L	0.0050	0.011	0.0065	0.031	0.022	0.029
Free Ammonia (unionised) as N by calculation*	mg/L	0.0070	<0.0070	<0.0070	<0.0070	<0.0070	<0.0070
Ammonium (NH4+) as N by calculation	mg/L	0.0070	0.011	<0.0070	0.031	0.022	0.029
Nitrate as N	mg/L	0.0050	<0.050 [10]	0.96	<0.0050	0.031	<0.0050
Nitrate as NO3 by calculation	mg/L	0.020	<0.20 [10]	4.3	<0.020	0.14	<0.020
Total Nitrogen	mg/L	0.10	0.86	1.6	0.27	0.14	1.4
Total Phosphorus	mg/L	0.010	0.041	0.071	<0.010	<0.010	0.065

Envirolab ID	Units	PQL	PEK2136-06	PEK2136-07	PEK2136-08
Your Reference			GWB03	GWB04	Trip Blank
Date Sampled			27/11/2023	27/11/2023	27/11/2023
Ammonia as N	mg/L	0.0050	0.0096	0.10	0.0076
Free Ammonia (unionised) as N by calculation*	mg/L	0.0070	<0.0070	<0.0070	<0.0070
Ammonium (NH4+) as N by calculation	mg/L	0.0070	0.0096	0.10	0.0076
Nitrate as N	mg/L	0.0050	2.8	<0.0050	<0.0050
Nitrate as NO3 by calculation	mg/L	0.020	13	<0.020	<0.020
Total Nitrogen	mg/L	0.10	3.2	3.2	<0.10
Total Phosphorus	mg/L	0.010	0.81	0.023	<0.010

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Inorganics - Common Wastewater Parameters (Water)

Envirolab ID	Units	PQL	PEK2136-01	PEK2136-02	PEK2136-03	PEK2136-04	PEK2136-05
Your Reference			SWC	Leachate	GWA (RN031131)	GWE (RN022487)	GWB02
Date Sampled			27/11/2023	27/11/2023	27/11/2023	27/11/2023	27/11/2023
BOD	mg/L	5.0	13 [12]	<5.0 [12]	5.4 [12]	<5.0 [12]	13 [12]
COD	mg O2/L	20	90	70	<20	<20	290

Envirolab ID	Units	PQL	PEK2136-06	PEK2136-08
Your Reference			GWB03	Trip Blank
Date Sampled			27/11/2023	27/11/2023
BOD	mg/L	5.0	23 [12]	<5.0 [12]
COD	mg O2/L	20	370	<20

PFAS Extended List (Water) - Analysed By Envirolab Services Sydney

Envirolab ID	Units	PQL	PEK2136-01	PEK2136-02	PEK2136-03	PEK2136-04	PEK2136-05
Your Reference			SWC	Leachate	GWA (RN031131)	GWE (RN022487)	GWB02
Date Sampled			27/11/2023	27/11/2023	27/11/2023	27/11/2023	27/11/2023
Perfluorobutanesulfonic acid (PFBS)	µg/L	0.010	<0.010	<0.010	<0.010	<0.010	0.025
Perfluoropentanesulfonic acid (PFPeS)	µg/L	0.010	<0.010	<0.010	<0.010	<0.010	0.015
Perfluorohexanesulfonic acid (PFHxS)	µg/L	0.010	0.013	<0.010	0.012	0.012	0.072
Perfluoroheptanesulfonic acid (PFHpS)	µg/L	0.010	<0.010	<0.010	<0.010	<0.010	<0.010
Perfluorooctanesulfonic acid (PFOS)	µg/L	0.010	0.088	0.033	0.013	0.014	0.082
Perfluorodecanesulfonic acid (PFDS)	µg/L	0.020	<0.020	<0.020	<0.020	<0.020	<0.020
Perfluorobutanoic acid (PFBA)	µg/L	0.020	<0.020	<0.020	0.12	<0.020	0.026
Perfluoropentanoic acid (PFPeA)	µg/L	0.020	<0.020	<0.020	0.21	<0.020	<0.020
Perfluorohexanoic acid (PFHxA)	µg/L	0.010	<0.010	<0.010	0.11	<0.010	0.046
Perfluoroheptanoic acid (PFHpA)	µg/L	0.010	<0.010	<0.010	0.078	<0.010	0.016
Perfluorooctanoic acid (PFOA)	µg/L	0.010	<0.010	0.010	0.040	<0.010	0.029
Perfluorononanoic acid (PFNA)	µg/L	0.010	<0.010	<0.010	<0.010	<0.010	<0.010
Perfluorodecanoic acid (PFDA)	µg/L	0.020	<0.020	<0.020	<0.020	<0.020	<0.020
Perfluoroundecanoic acid (PFUnDA)	µg/L	0.020	<0.020	<0.020	<0.020	<0.020	<0.020
Perfluorododecanoic acid (PFDoDA)	µg/L	0.050	<0.050	<0.050	<0.050	<0.050	<0.050
Perfluorotridecanoic acid (PFTrDA)	µg/L	0.10	<0.10	<0.10	<0.10	<0.10	<0.10
Perfluorotetradecanoic acid (PFTeDA)	µg/L	0.50	<0.50	<0.50	<0.50	<0.50	<0.50
4:2 Fluorotelomer sulfonic acid (4:2 FTS)	µg/L	0.010	<0.010	<0.010	<0.010	<0.010	<0.010
6:2 Fluorotelomer sulfonic acid (6:2 FTS)	µg/L	0.010	<0.010	<0.010	<0.010	<0.010	<0.010
8:2 Fluorotelomer sulfonic acid (8:2 FTS)	µg/L	0.020	<0.020	<0.020	<0.020	<0.020	<0.020
10:2 Fluorotelomer sulfonic acid (10:2 FTS)	µg/L	0.020	<0.020	<0.020	<0.020	<0.020	<0.020
Perfluorooctane sulfonamide (FOSA)	µg/L	0.10	<0.10	<0.10	<0.10	<0.10	<0.10
N-Methyl perfluorooctane sulfonamide (MeFOSA)	µg/L	0.050	<0.050	<0.050	<0.050	<0.050	<0.050
N-Ethyl perfluorooctane sulfonamide (EtFOSA)	µg/L	0.10	<0.10	<0.10	<0.10	<0.10	<0.10
N-Methyl perfluorooctane sulfonamidoethanol	µg/L	0.050	<0.050	<0.050	<0.050	<0.050	<0.050
N-Ethyl perfluorooctane sulfonamidoethanol	µg/L	0.50	<0.50	<0.50	<0.50	<0.50	<0.50
N-Methyl perfluorooctane sulfonamidoacetic acid	µg/L	0.020	<0.020	<0.020	<0.020	<0.020	<0.020
N-Ethyl perfluorooctane sulfonamidoacetic acid	µg/L	0.020	<0.020	<0.020	<0.020	<0.020	<0.020
Surrogate 13C8 PFOS	%		*101*	*103*	*101*	*101*	*101*
Surrogate 13C2 PFOA	%		*110*	*109*	*114*	*107*	*108*
Total +ve PFHxS+PFOS	µg/L	0.010	0.10	0.033	0.025	0.026	0.15
Total +ve PFOA+PFOS	µg/L	0.010	0.088	0.043	0.053	0.014	0.11
Total +ve PFAS	µg/L	0.010	0.10	0.043	0.58	0.026	0.31
Extraction Internal Standard 13C3 PFBS	%		*104*	*103*	*101*	*103*	*101*
Extraction Internal Standard 18O2 PFHxS	%		*132*	*135*	*130*	*131*	*131*
Extraction Internal Standard 13C4 PFOS	%		*107*	*107*	*106*	*110*	*110*
Extraction Internal Standard 13C4 PFBA	%		*95.3*	*109*	*116*	*117*	*121*
Extraction Internal Standard 13C3 PFPeA	%		*117*	*115*	*115*	*117*	*116*
Extraction Internal Standard 13C2 PFHxA	%		*116*	*110*	*107*	*109*	*111*
Extraction Internal Standard 13C4 PFHpA	%		*93.0*	*91.4*	*90.9*	*93.4*	*93.2*
Extraction Internal Standard 13C4 PFOA	%		*116*	*115*	*106*	*114*	*116*
Extraction Internal Standard 13C5 PFNA	%		*132*	*126*	*129*	*123*	*122*

PFAS Extended List (Water) - Analysed By Envirolab Services Sydney

Envirolab ID	Units	PQL	PEK2136-01	PEK2136-02	PEK2136-03	PEK2136-04	PEK2136-05
Your Reference			SWC	Leachate	GWA (RN031131)	GWE (RN022487)	GWB02
Date Sampled			27/11/2023	27/11/2023	27/11/2023	27/11/2023	27/11/2023
Extraction Internal Standard 13C2 PFDA	%		*125*	*126*	*121*	*117*	*116*
Extraction Internal Standard 13C2 PFUnDA	%		*132*	*125*	*119*	*123*	*119*
Extraction Internal Standard 13C2 PFDoDA	%		*124*	*126*	*122*	*126*	*123*
Extraction Internal Standard 13C2 PFTeDA	%		*93.5*	*92.9*	*89.8*	*83.7*	*80.6*
Extraction Internal Standard 13C2 4:2FTS	%		*132*	*111*	*102*	*105*	*104*
Extraction Internal Standard 13C2 6:2FTS	%		*136*	*119*	*108*	*113*	*113*
Extraction Internal Standard 13C2 8:2FTS	%		*166 [6]*	*155 [6]*	*153 [6]*	*153 [6]*	*152 [6]*
Extraction Internal Standard 13C8 FOSA	%		*93.7*	*96.0*	*96.4*	*96.5*	*85.6*
Extraction Internal Standard d3 N MeFOSA	%		*111*	*112*	*112*	*114*	*111*
Extraction Internal Standard d5 N EtFOSA	%		*124*	*124*	*120*	*121*	*118*
Extraction Internal Standard d7 N MeFOSE	%		*97.9*	*94.3*	*101*	*103*	*104*
Extraction Internal Standard d9 N EtFOSE	%		*106*	*106*	*106*	*105*	*108*
Extraction Internal Standard d3 N MeFOSAA	%		*127*	*121*	*120*	*141*	*140*
Extraction Internal Standard d5 N EtFOSAA	%		*155 [6]*	*149*	*145*	*154 [6]*	*166 [6]*

Envirolab ID	Units	PQL	PEK2136-06	PEK2136-08
Your Reference			GWB03	Trip Blank
Date Sampled			27/11/2023	27/11/2023
Perfluorobutanesulfonic acid (PFBS)	µg/L	0.010	<0.010	<0.010
Perfluoropentanesulfonic acid (PFPeS)	µg/L	0.010	<0.010	<0.010
Perfluorohexanesulfonic acid (PFHxS)	µg/L	0.010	<0.010	<0.010
Perfluoroheptanesulfonic acid (PFHpS)	µg/L	0.010	<0.010	<0.010
Perfluorooctanesulfonic acid (PFOS)	µg/L	0.010	<0.010	<0.010
Perfluorodecanesulfonic acid (PFDS)	µg/L	0.020	<0.020	<0.020
Perfluorobutanoic acid (PFBA)	µg/L	0.020	<0.020	<0.020
Perfluoropentanoic acid (PFPeA)	µg/L	0.020	<0.020	<0.020
Perfluorohexanoic acid (PFHxA)	µg/L	0.010	<0.010	<0.010
Perfluoroheptanoic acid (PFHpA)	µg/L	0.010	<0.010	<0.010
Perfluorooctanoic acid (PFOA)	µg/L	0.010	<0.010	<0.010
Perfluorononanoic acid (PFNA)	µg/L	0.010	<0.010	<0.010
Perfluorodecanoic acid (PFDA)	µg/L	0.020	<0.020	<0.020
Perfluoroundecanoic acid (PFUnDA)	µg/L	0.020	<0.020	<0.020
Perfluorododecanoic acid (PFDoDA)	µg/L	0.050	<0.050	<0.050
Perfluorotridecanoic acid (PFTrDA)	µg/L	0.10	<0.10	<0.10
Perfluorotetradecanoic acid (PFTeDA)	µg/L	0.50	<0.50	<0.50
4:2 Fluorotelomer sulfonic acid (4:2 FTS)	µg/L	0.010	<0.010	<0.010
6:2 Fluorotelomer sulfonic acid (6:2 FTS)	µg/L	0.010	<0.010	<0.010
8:2 Fluorotelomer sulfonic acid (8:2 FTS)	µg/L	0.020	<0.020	<0.020
10:2 Fluorotelomer sulfonic acid (10:2 FTS)	µg/L	0.020	<0.020	<0.020
Perfluorooctane sulfonamide (FOSA)	µg/L	0.10	<0.10	<0.10
N-Methyl perfluorooctane sulfonamide (MeFOSA)	µg/L	0.050	<0.050	<0.050
N-Ethyl perfluorooctane sulfonamide (EtFOSA)	µg/L	0.10	<0.10	<0.10
N-Methyl perfluorooctane sulfonamidoethanol	µg/L	0.050	<0.050	<0.050
N-Ethyl perfluorooctane sulfonamidoethanol	µg/L	0.50	<0.50	<0.50

PFAS Extended List (Water) - Analysed By Envirolab Services Sydney

Envirolab ID	Units	PQL	PEK2136-06	PEK2136-08
Your Reference			GWB03	Trip Blank
Date Sampled			27/11/2023	27/11/2023
N-Methyl perfluorooctane sulfonamidoacetic acid	µg/L	0.020	<0.020	<0.020
N-Ethyl perfluorooctane sulfonamidoacetic acid	µg/L	0.020	<0.020	<0.020
Surrogate 13C8 PFOS	%		*102*	*104*
Surrogate 13C2 PFOA	%		*110*	*110*
Total +ve PFHxS+PFOS	µg/L	0.010	<0.010	<0.010
Total +ve PFOA+PFOS	µg/L	0.010	<0.010	<0.010
Total +ve PFAS	µg/L	0.010	<0.010	<0.010
Extraction Internal Standard 13C3 PFBS	%		*99.6*	*101*
Extraction Internal Standard 18O2 PFHxS	%		*125*	*131*
Extraction Internal Standard 13C4 PFOS	%		*106*	*106*
Extraction Internal Standard 13C4 PFBA	%		*113*	*117*
Extraction Internal Standard 13C3 PFPeA	%		*112*	*116*
Extraction Internal Standard 13C2 PFHxA	%		*103*	*113*
Extraction Internal Standard 13C4 PFHpA	%		*88.6*	*92.8*
Extraction Internal Standard 13C4 PFOA	%		*108*	*112*
Extraction Internal Standard 13C5 PFNA	%		*118*	*120*
Extraction Internal Standard 13C2 PFDA	%		*112*	*114*
Extraction Internal Standard 13C2 PFUnDA	%		*118*	*120*
Extraction Internal Standard 13C2 PFDoDA	%		*122*	*124*
Extraction Internal Standard 13C2 PFTeDA	%		*69.9*	*85.0*
Extraction Internal Standard 13C2 4:2FTS	%		*95.8*	*106*
Extraction Internal Standard 13C2 6:2FTS	%		*105*	*111*
Extraction Internal Standard 13C2 8:2FTS	%		*142*	*146*
Extraction Internal Standard 13C8 FOSA	%		*85.2*	*97.0*
Extraction Internal Standard d3 N MeFOSA	%		*107*	*111*
Extraction Internal Standard d5 N EtFOSA	%		*112*	*119*
Extraction Internal Standard d7 N MeFOSE	%		*94.8*	*94.8*
Extraction Internal Standard d9 N EtFOSE	%		*99.4*	*102*
Extraction Internal Standard d3 N MeFOSAA	%		*133*	*143*
Extraction Internal Standard d5 N EtFOSAA	%		*144*	*149*

Result Comments

Identifier	Description
[1]	Some EC to TDS ratios are outside normal expected values. Note that some solid material appears to have passed through the glass fibre filter paper(s).
[3]	Surrogate recovery was low due to sample(s) emulsifying during liquid liquid extraction.
[5]	Surrogate recovery was outside routine acceptance criteria (60-140%) due to sample matrix effects. This may be due to the presence of carbon and/or other artefacts. An acceptable recovery was achieved for the LCS surrogates.
[6]	For PFAS Extracted Internal Standards denoted with ## or being outside the 50-150% acceptance range, the respective target analyte results may be unaffected, in other circumstances the PQL has been raised to accommodate the outlier(s).
[7]	PQL(s) has/have been raised as the sample(s) was/were foamy and therefore required dilution.
[10]	Duplicate %RPD may be flagged as an outlier to routine laboratory acceptance, however, where one or both results are <10*PQL, the RPD acceptance criteria increases exponentially.
[12]	Sample frozen on receipt to elongate technical holding time.

Method Summary

Method ID	Methodology Summary
Calc	Calculation
INORG-006	Alkalinity - determined titrimetrically based on APHA latest edition 2320-B. Solids reported from a 1:5 water extract unless otherwise specified. Total Carbon Dioxide - determined by calculation in accordance with APHA latest edition,4500-CO2 D.
INORG-018	Total Dissolved Solids - determined gravimetrically. The solids are dried at 180±10°C. NOTE: Where the EC of the sample is <100µS/cm, the TDS will typically be below 70mg/L (as the sample is very likely to be at least drinking water quality). Therefore to ensure data quality for TDS, the TDS is typically calculated as per the equation: TDS = EC*0.6
INORG-040	The concentrations of the major ions (mg/L) are converted to milliequivalents and summed. The ionic balance should be within +/- 15% i.e. total anions = total cations +/-15%.
INORG-055	Nitrate/Nitrite/NOx/TKN - determined colourimetrically. Waters samples are filtered on receipt prior to analysis. Soils/solids are analysed following a water extraction.
INORG-057	Ammonia - determined colourimetrically. Water samples are filtered on receipt prior to analysis. Soils and OHS media are analysed following a water extraction. Alternatively, Ammonia can be extracted from soil using 1M KCl.
INORG-060_TP	Total Phosphorus - determined colourimetrically using APHA latest edition 4500-P J. Water samples are filtered on receipt prior to analysis. Soils are analysed from a water extract.
INORG-067	Samples are digested in acid with a known excess of potassium dichromate then the colour change is determined by discrete analyser or UV-VIS in accordance with APHA latest edition 5220 D.
INORG-079	Carbon forms (inorganic, organic, total) determined using a TOC/NDIR analyser via combustion. Dissolved aqueous\forms require filtering prior to determination.
INORG-081	Anions determined by Ion Chromatography. Waters samples are filtered on receipt prior to analysis. Solids are analysed from a water extract. Alternatively determined by colourimetry/turbidity using Discrete Analyser.
INORG-091	BOD and/or cBOD - Analysed in accordance with APHA latest edition 5210 D.
INORG-111	Volatile Fatty Acids determined by distillation and titration.
INORG-118	Hexavalent Chromium by Ion Chromatographic separation and colourimetric determination. Waters samples are filtered prior to analysis. Solids are extracted with an alkaline buffered solution, for air sampling media the same alkali extraction can be used or alternatives from NIOSH/OSHA. For aqueous samples, Total Hexavalent Chromium includes the dissolved Hexavalent Chromium and any Hexavalent Chromium solubilised by the preservative i.e. Sodium Hydroxide from any particulate that may be present.
INORG-127	Total Nitrogen by high temperature catalytic combustion with chemiluminescence detection. Organic Carbon forms (inorganic, organic, total) determined using a TOC/NDIR analyser via combustion. Dissolved forms require filtering prior to determination.
METALS-020	Determination of various metals by ICP-OES.
METALS-022	Determination of various metals by ICP-MS. Please note for Bromine and Iodine, any forms of these elements that are present are included together in the one result reported for each of these two elements.
ORG-020	Soil samples are extracted with Dichloromethane/Acetone and waters with Dichloromethane and analysed by GC-FID. F2 = (>C10-C16)-Naphthalene as per NEPM B1 Guideline on Investigation Levels for Soil and Groundwater (HSLs Tables 1A (3, 4)). Note Naphthalene is determined from the VOC analysis. Note, the Total +ve TRH PQL is reflective of the lowest individual PQL and is therefore "Total +ve TRH" is simply a sum of the positive individual TRH fractions (>C10-C40).
ORG-021/022/025_PCB	Soil samples are extracted with dichloromethane/acetone and waters with dichloromethane and analysed by GC-ECD and/or GC-MS/GC-MSMS.
ORG-022_PAH	Determination of semi-volatile organic compounds (SVOCs) by GC-MS. Water samples are extracted by LLE and solids using DCM/Acetone/Methanol. For PAHs:- Benzo(a)pyrene TEQ as per NEPM B1 Guideline on Investigation Levels for Soil and Groundwater - 2013. 1. 'TEQ PQL' values are assuming all contributing PAHs reported as <PQL are actually at the PQL. This is the most conservative approach and can give false positive TEQs given that PAHs that contribute to the TEQ calculation may not be present. 2. 'TEQ zero' values are assuming all contributing PAHs reported as <PQL are zero. This is the least conservative approach and is more susceptible to false negative TEQs when PAHs that contribute to the TEQ calculation are present but below PQL. 3. 'TEQ half PQL' values are assuming all contributing PAHs reported as <PQL are half the stipulated PQL. Hence a mid-point between the most and least conservative approaches above. Note, for Total +ve calculations, the PQL is reflective of the lowest individual PQL and therefore, for example, "Total +ve PAHs" is simply a sum of the positive individual PAHs.
ORG-023_F1_TOT	Determination of volatile organic compounds (VOCs) by P&T-GC-MS. Water samples are analysed directly by purge and trap GC-MS. Solids are extracted with Methanol, diluted and analysed by purge and trap GC-MS. F1 = (C6-C10)-BTEX as per NEPM B1 Guideline on Investigation Levels for Soil and Groundwater. Note, the Total +ve Xylene PQL is reflective of the lowest individual PQL and is therefore "Total +ve Xylenes" is simply a sum of the positive individual Xylenes.

Method Summary

Method ID	Methodology Summary
ORG-029	Soil/solid and sorbent samples are extracted with basified Methanol. Waters and soil/sorbent extracts are directly injected and/or concentrated/extracted using SPE. TCLP/ASLP leachates are centrifuged, the supernatant is then analysed (including amendment with solvent) - as per the option in AS4439.3. Analysis is undertaken with LC-MSMS. PFAS results include the sum of branched and linear isomers where applicable. Please note that PFAS results are corrected for Extracted Internal Standards (QSM 5.4 Table B-15 terminology), which are mass labelled analytes added prior to sample preparation to assess matrix effects and verify processing of the sample. PFAS analytes without a commercially available mass labelled analogue are corrected vs a closely eluting mass labelled PFAS compound. Surrogates are also reported, in this context they are mass labelled PFAS compounds added prior to extraction but are used as monitoring compounds only (not used for result correction). Envicarb (or similar) is used discretionally to remove interfering matrix components. Please contact the laboratory if estimates of Measurement Uncertainty are required as per WA DER.

Result Definitions

Identifier	Description
NR	Not reported
NEPM	National Environment Protection Measure
NS	Not specified
LCS	Laboratory Control Sample
RPD	Relative Percent Difference
>	Greater than
<	Less than
PQL	Practical Quantitation Limit
INS	Insufficient sample for this test
NA	Test not required
NT	Not tested
DOL	Samples rejected due to particulate overload (air filters only)
RFD	Samples rejected due to filter damage (air filters only)
RUD	Samples rejected due to uneven deposition (air filters only)
##	Indicates a laboratory acceptance criteria outlier, for further details, see Result Comments and/or QC Comments

Quality Control Definitions

Blank

This is the component of the analytical signal which is not derived from the sample but from reagents, glassware etc, and is determined by processing solvents and reagents in exactly the same manner as for samples.

Surrogate Spike

Surrogates are known additions to each sample, blank, matrix spike and LCS in a batch, of compounds which are similar to the analyte of interest, however are not expected to be found in real samples.

LCS (Laboratory Control Sample)

This comprises either a standard reference material or a control matrix (such as a blank sand or water) fortified with analytes representative of the analyte class. It is simply a check sample.

Matrix Spike

A portion of the sample is spiked with a known concentration of target analyte. The purpose of the matrix spike is to monitor the performance of the analytical method used and to determine whether matrix interferences exist.

Duplicate

This is the complete duplicate analysis of a sample from the process batch. The sample selected should be one where the analyte concentration is easily measurable.

Laboratory Acceptance Criteria

Duplicate sample and matrix spike recoveries may not be reported on smaller jobs, however, were analysed at a frequency to meet or exceed NEPM requirements. All samples are tested in batches of 20. The duplicate sample RPD and matrix spike recoveries for the batch were within the laboratory acceptance criteria. Filters, swabs, wipes, tubes and badges will not have duplicate data as the whole sample is generally extracted during sample extraction. Spikes for Physical and Aggregate Tests are not applicable. For VOCs in water samples, three vials are required for duplicate or spike analysis.

General Acceptance Criteria (GAC) - Analyte specific criteria applies for some analytes and is reflected in QC recovery tables.

Duplicates: >10xPQL - RPD acceptance criteria will vary depending on the analytes and the analytical techniques but is typically in the range 20%-50% - see ELN-P05 QAQC tables for details (available on request); <10xPQL - RPD are higher as the results approach PQL and the estimated measurement uncertainty will statistically increase. Matrix Spikes, LCS and Surrogate recoveries: Generally 70-130% for inorganics/metals; 60-140% for organics (+/-50% surrogates) and 10-140% for labile SVOCs (including labile surrogates), ultra trace organics and speciated phenols is acceptable.

In circumstances where no duplicate and/or sample spike has been reported at 1 in 10 and/or 1 in 20 samples respectively, the sample volume submitted was typically insufficient in order to satisfy laboratory QA/QC protocols.

Miscellaneous Information

When samples are received where certain analytes are outside of recommended technical holding times (THTs), the analysis has proceeded. Where analytes are on the verge of breaching THTs, every effort will be made to analyse within the THT or as soon as practicable.

Where sampling dates are not provided, Envirolab are not in a position to comment on the validity of the analysis where recommended technical holding times may have been breached. We have taken the sampling date as being the date received at the laboratory.

Two significant figures are reported for the majority of tests and with a high degree of confidence, for results <10*PQL, the second significant figure may be in doubt i.e. has a relatively high degree of uncertainty and is provided for information only.

Measurement Uncertainty estimates are available for most tests upon request.

Analysis of aqueous samples typically involves the extraction/digestion and/or analysis of the liquid phase only (i.e. NOT any settled sediment phase but inclusive of suspended particles if present), unless stipulated on the Envirolab COC or by correspondence. Notable exceptions include certain Physical Tests (pH/EC/BOD/COD/Apparent Colour etc.), Solids testing, Total Recoverable metals and PFAS where sediment/solids are included by default.

Urine Analysis - The BEI values listed are taken from the 2022 edition of *TLVs and BEIs Threshold Limits by ACGIH*.

Air volume measurements are not covered by Envirolab's NATA accreditation.

Data Quality Assessment Summary PEK2136

Client Details

Client	Katherine Town Council - NT
Your Reference	Katherine Town Council - EPL298 - Quarterly
Date Issued	11/12/2023

Recommended Holding Time Compliance

Recommended holding time exceedances exist - See detailed list below

Quality Control and QC Frequency

QC Type	Compliant	Details
Blank	Yes	No Outliers
LCS	No	LCS Outliers Exist - See detailed list below
Duplicates	No	Duplicate Outliers Exist - See detailed list below
Matrix Spike	No	Matrix Spike Outliers Exist - See detailed list below
Surrogates / Extracted Internal Standards	No	Surrogates / Extracted ISTD Outliers Exist - See detailed list below
QC Frequency	No	QC Frequency Outliers Exist - See detailed list below

Surrogates/Extracted Internal Standards, Duplicates and/or Matrix Spikes are not always relevant/applicable to certain analyses and matrices. Therefore, said QC measures are deemed compliant in these situations by default. See Laboratory Acceptance Criteria for more information

Recommended Holding Time Compliance

Analysis	Sample Number(s)	Date Sampled	Date Extracted	Date Analysed	Compliant
vTRH&MBTEXN | Water	1-6, 8	27/11/2023	01/12/2023	01/12/2023	Yes
sTRH | Water	1-8	27/11/2023	01/12/2023	02/12/2023	Yes
PAH | Water	1-8	27/11/2023	01/12/2023	01/12/2023	Yes
PCB | Water	1-8	27/11/2023	01/12/2023	01/12/2023	Yes
Total Metals (LL) | Water	1-5, 7-8	27/11/2023	01/12/2023	05/12/2023	Yes
	6	27/11/2023	01/12/2023	06/12/2023	Yes
Dissolved Metals (LL) | Water	1-8	27/11/2023	01/12/2023	04/12/2023	Yes
TDS | Water	1-6, 8	27/11/2023	04/12/2023	04/12/2023	Yes
VFA | Water	1-6, 8	27/11/2023	06/12/2023	06/12/2023	Yes
Alkalinity Suite | Water	1-8	27/11/2023	01/12/2023	01/12/2023	Yes
Chloride | Water	1-8	27/11/2023	30/11/2023	01/12/2023	Yes
Dissolved Cations | Water	1-8	27/11/2023	01/12/2023	04/12/2023	Yes
Ion Balance | Water	1-8	27/11/2023	30/11/2023	06/12/2023	Yes
Sulfate | Water	1-8	27/11/2023	30/11/2023	01/12/2023	Yes
Total Organic Carbon | Water	1-6, 8	27/11/2023	01/12/2023	01/12/2023	Yes
Cr6+ | Water	1-8	27/11/2023	04/12/2023	05/12/2023	Yes
Cr6+ - Total | Water	1-8	27/11/2023	04/12/2023	05/12/2023	Yes
Nitrogen - Ammonia | Water	2-8	27/11/2023	04/12/2023	04/12/2023	Yes
	1	27/11/2023	04/12/2023	05/12/2023	Yes
Nitrogen - Nitrate | Water	2-8	27/11/2023	04/12/2023	04/12/2023	Yes
	1	27/11/2023	04/12/2023	05/12/2023	Yes
Nitrogen - Total N | Water	1-8	27/11/2023	01/12/2023	02/12/2023	Yes
Total Phosphorus | Water	1-8	27/11/2023	04/12/2023	04/12/2023	Yes
BOD | Water	1-6, 8	27/11/2023	05/12/2023	11/12/2023	No
COD | Water	1-6, 8	27/11/2023	30/11/2023	04/12/2023	Yes
PFAS EXT-ISTD | Water	1-6, 8	27/11/2023	01/12/2023	02/12/2023	Yes
PFAS-Extended | Water	1-6, 8	27/11/2023	01/12/2023	02/12/2023	Yes

Outliers: Laboratory Control Samples

ORG-020|Semi-volatile TRH (Water)| Batch BEL0016

Sample ID	Analyte	% Limits	% Recovery
BEL0016-BS1	o-Terphenyl	60 - 140	##

Data Quality Assessment Summary PEK2136

Outliers: Duplicates

METALS-022|Dissolved Low Level Metals (Water)| Batch BEL0072

Sample ID	Duplicate ID	Analyte	% Limits	RPD
BEL0072-DUP1#	DUP1	Cadmium	20.00	200[10]

Outliers: Matrix Spike

INORG-127|Inorganics - Nutrients (Water)| Batch BEL0012

Sample ID	Analyte	% Limits	% Recovery
BEL0012-MS1#	Total Nitrogen	70 - 130	##[2]

METALS-022|Acid Extractable Low Level Metals (Water)| Batch BEL0105

Sample ID	Analyte	% Limits	% Recovery
BEL0105-MS1#	Iron	70 - 130	##[2]
BEL0105-MS1#	Manganese	70 - 130	##[2]

ORG-020|Semi-volatile TRH (Water)| Batch BEL0016

Sample ID	Analyte	% Limits	% Recovery
PEK2136-02	o-Terphenyl	60 - 140	##[4]

Outliers: Surrogate / Extracted Internal Standards

ORG-020|Semi-volatile TRH (Matrix)| Batch BEL0016

Sample ID	Analyte	% Limits	% Recovery
PEK2136-01	o-Terphenyl	60 - 140	54.7% [3]

ORG-022_PAH|Polycyclic Aromatic Hydrocarbons (Matrix)| Batch BEL0016

Sample ID	Analyte	% Limits	% Recovery
PEK2136-01	p-Terphenyl-D14	60 - 140	52.9% [3]
PEK2136-06	p-Terphenyl-D14	60 - 140	54.8% [5]

ORG-029|PFAS Extended List (Matrix)| Batch BEL0336

Sample ID	Analyte	% Limits	% Recovery
PEK2136-01	Extraction Internal Standard d5 N EtFOSAA	50 - 150	155 [6]
	Extraction Internal Standard 13C2 8:2FTS	50 - 150	166 [6]
PEK2136-02	Extraction Internal Standard 13C2 8:2FTS	50 - 150	155 [6]
PEK2136-03	Extraction Internal Standard 13C2 8:2FTS	50 - 150	153 [6]
PEK2136-04	Extraction Internal Standard d5 N EtFOSAA	50 - 150	154 [6]
	Extraction Internal Standard 13C2 8:2FTS	50 - 150	153 [6]
PEK2136-05	Extraction Internal Standard d5 N EtFOSAA	50 - 150	166 [6]
	Extraction Internal Standard 13C2 8:2FTS	50 - 150	152 [6]

Outliers: QC Frequency

INORG-091|Inorganics - Common Wastewater Parameters (Water)| Batch BEL0494

Analysis	QC Type	Expected	Reported
BOD	Duplicate	2	0

INORG-111|Inorganics - Physical Parameters (Water)| Batch BEL0680

Analysis	QC Type	Expected	Reported
VFA	Duplicate	1	0

ORG-023_F1_TOT|Volatile TRH and BTEX (Water)| Batch BEL0085

Analysis	QC Type	Expected	Reported
vTRH&MBTEXN	Duplicate	1	0
	Matrix Spike	1	0

Quality Control PEK2136

ORG-023_F1_TOT|Volatile TRH and BTEX (Water) | Batch BEL0085

Analyte	Units	PQL	Blank	LCS %
TRH C6-C9	µg/L	10	<10	108
TRH C6-C10	µg/L	10	<10	109
TRH C6-C10 less BTEX (F1)	µg/L	10	<10	[NA]
Methyl tert butyl ether (MTBE)	µg/L	1.0	<1.0	[NA]
Benzene	µg/L	1.0	<1.0	106
Toluene	µg/L	1.0	<1.0	93.4
Ethylbenzene	µg/L	1.0	<1.0	102
meta+para Xylene	µg/L	2.0	<2.0	108
ortho-Xylene	µg/L	1.0	<1.0	107
Total Xylene	µg/L	3.0	<3.0	[NA]
Naphthalene (value used in F2 calc)	µg/L	1.0	<1.0	[NA]
Surrogate Dibromofluoromethane	*%*		*92.7*	*96.1*
Surrogate Toluene-D8	*%*		*95.3*	*95.6*
Surrogate 4-Bromofluorobenzene	*%*		*94.2*	*104*

ORG-020|Semi-volatile TRH (Water) | Batch BEL0016

Analyte	Units	PQL	Blank	DUP1 PEK2136-01 Samp | QC | RPD %	DUP2 PEK2136-08 Samp | QC | RPD %	LCS %	Spike % PEK2136-02
TRH C10-C14	µg/L	50	<50	<50 | <50 | [NA]	<50 | <50 | [NA]	88.1	84.5
TRH C15-C28	µg/L	100	<100	<100 | <100 | [NA]	<100 | <100 | [NA]	92.8	90.8
TRH C29-C36	µg/L	100	<100	<100 | <100 | [NA]	<100 | <100 | [NA]	87.2	83.8
TRH >C10-C16	µg/L	50	<50	<50 | <50 | [NA]	<50 | <50 | [NA]	91.2	87.9
TRH >C16-C34 (F3)	µg/L	100	<100	<100 | <100 | [NA]	<100 | <100 | [NA]	92.3	90.3
TRH >C34-C40 (F4)	µg/L	100	<100	<100 | <100 | [NA]	<100 | <100 | [NA]	77.2	74.4
Surrogate o-Terphenyl	*%*		*60.1*	*54.7 | 57.0 [3]*	*67.7 | 71.6*	*##*	*##[4]*

ORG-022_PAH|Polycyclic Aromatic Hydrocarbons (Water) | Batch BEL0016

Analyte	Units	PQL	Blank	DUP1 PEK2136-01 Samp | QC | RPD %	DUP2 PEK2136-08 Samp | QC | RPD %	LCS %	Spike % PEK2136-03
Naphthalene	µg/L	0.10	<0.10	<0.10 | <0.10 | [NA]	<0.10 | <0.10 | [NA]	84.0	87.5
Acenaphthylene	µg/L	0.10	<0.10	<0.10 | <0.10 | [NA]	<0.10 | <0.10 | [NA]	[NA]	[NA]
Acenaphthene	µg/L	0.10	<0.10	<0.10 | <0.10 | [NA]	<0.10 | <0.10 | [NA]	79.3	84.4
Fluorene	µg/L	0.10	<0.10	<0.10 | <0.10 | [NA]	<0.10 | <0.10 | [NA]	83.3	88.6
Phenanthrene	µg/L	0.10	<0.10	<0.10 | <0.10 | [NA]	<0.10 | <0.10 | [NA]	84.7	88.8
Anthracene	µg/L	0.10	<0.10	<0.10 | <0.10 | [NA]	<0.10 | <0.10 | [NA]	[NA]	[NA]
Fluoranthene	µg/L	0.10	<0.10	<0.10 | <0.10 | [NA]	<0.10 | <0.10 | [NA]	87.0	92.1
Pyrene	µg/L	0.10	<0.10	<0.10 | <0.10 | [NA]	<0.10 | <0.10 | [NA]	89.8	95.4
Benzo(a)anthracene	µg/L	0.10	<0.10	<0.10 | <0.10 | [NA]	<0.10 | <0.10 | [NA]	[NA]	[NA]
Chrysene	µg/L	0.10	<0.10	<0.10 | <0.10 | [NA]	<0.10 | <0.10 | [NA]	73.7	83.0
Benzo(b,j,k)fluoranthene	µg/L	0.20	<0.20	<0.20 | <0.20 | [NA]	<0.20 | <0.20 | [NA]	[NA]	[NA]
Benzo(a)pyrene	µg/L	0.10	<0.10	<0.10 | <0.10 | [NA]	<0.10 | <0.10 | [NA]	61.8	78.5
Indeno(1,2,3-c,d)pyrene	µg/L	0.10	<0.10	<0.10 | <0.10 | [NA]	<0.10 | <0.10 | [NA]	[NA]	[NA]
Dibenzo(a,h)anthracene	µg/L	0.10	<0.10	<0.10 | <0.10 | [NA]	<0.10 | <0.10 | [NA]	[NA]	[NA]
Benzo(g,h,i)perylene	µg/L	0.10	<0.10	<0.10 | <0.10 | [NA]	<0.10 | <0.10 | [NA]	[NA]	[NA]
Surrogate p-Terphenyl-D14	*%*		*64.0*	*52.9 | 52.2 [3]*	*62.9 | 76.5*	*72.5*	*86.2*

Quality Control PEK2136

ORG-021/022/025_PCB|Polychlorinated Biphenyls (Water) | Batch BEL0016

Analyte	Units	PQL	Blank	DUP1 PEK2136-01 Samp | QC | RPD %	DUP2 PEK2136-08 Samp | QC | RPD %	LCS %	Spike % PEK2136-03
Aroclor 1016	µg/L	2.0	<2.0	<2.0 | <2.0 | [NA]	<2.0 | <2.0 | [NA]	[NA]	[NA]
Aroclor 1221	µg/L	2.0	<2.0	<2.0 | <2.0 | [NA]	<2.0 | <2.0 | [NA]	[NA]	[NA]
Aroclor 1232	µg/L	2.0	<2.0	<2.0 | <2.0 | [NA]	<2.0 | <2.0 | [NA]	[NA]	[NA]
Aroclor 1242	µg/L	2.0	<2.0	<2.0 | <2.0 | [NA]	<2.0 | <2.0 | [NA]	[NA]	[NA]
Aroclor 1248	µg/L	2.0	<2.0	<2.0 | <2.0 | [NA]	<2.0 | <2.0 | [NA]	[NA]	[NA]
Aroclor 1254	µg/L	2.0	<2.0	<2.0 | <2.0 | [NA]	<2.0 | <2.0 | [NA]	[NA]	[NA]
Aroclor 1260	µg/L	2.0	<2.0	<2.0 | <2.0 | [NA]	<2.0 | <2.0 | [NA]	[NA]	[NA]
PCB C28	µg/L	0.006		<0.0060 | <0.0060 | [NA]	<0.0060 | <0.0060 | [NA]	[NA]	[NA]
PCB C52	µg/L	0.006		<0.0060 | <0.0060 | [NA]	<0.0060 | <0.0060 | [NA]	[NA]	[NA]
PCB C103	µg/L			0.00 | 0.00 | [NA]	0.00 | 0.00 | [NA]	75.2	92.1
PCB C101	µg/L	0.006		<0.0060 | <0.0060 | [NA]	<0.0060 | <0.0060 | [NA]	[NA]	[NA]
PCB C118	µg/L	0.006		<0.0060 | <0.0060 | [NA]	<0.0060 | <0.0060 | [NA]	[NA]	[NA]
PCB C153	µg/L	0.006		<0.0060 | <0.0060 | [NA]	<0.0060 | <0.0060 | [NA]	[NA]	[NA]
PCB C138	µg/L	0.006		<0.0060 | <0.0060 | [NA]	<0.0060 | <0.0060 | [NA]	[NA]	[NA]
PCB C180	µg/L	0.006		<0.0060 | <0.0060 | [NA]	<0.0060 | <0.0060 | [NA]	[NA]	[NA]
Surrogate 2-Fluorobiphenyl	*%*		*65.5*	*60.4 | 63.8*	*78.0 | 84.9*	*77.6*	*87.5*

METALS-022|Acid Extractable Low Level Metals (Water) | Batch BEL0105

Analyte	Units	PQL	Blank	DUP1 BEL0105-DUP1# Samp | QC | RPD %	DUP2 PEK2136-01 Samp | QC | RPD %	LCS %	Spike % BEL0105-MS1#
Aluminium	µg/L	10	<10	<10 | <10 | [NA]	2900 | 2830 | 2.51	113	106
Cadmium	µg/L	0.10	<0.10	<0.10 | <0.10 | [NA]	<0.10 | <0.10 | [NA]	120	115
Chromium	µg/L	1.0	<1.0	<1.0 | <1.0 | [NA]	4.81 | 4.40 | 8.75	113	106
Copper	µg/L	1.0	<1.0	23.9 | 24.6 | 2.73	6.70 | 6.46 | 3.60	115	106
Iron	µg/L	10	<10	19700 | 19700 | 0.117	3830 | 3820 | 0.283	119	##[2]
Lead	µg/L	1.0	<1.0	<1.0 | <1.0 | [NA]	2.66 | 2.66 | 0.0376	109	103
Manganese	µg/L	1.0	<1.0	446 | 456 | 2.23	46.8 | 44.8 | 4.36	107	##[2]
Nickel	µg/L	1.0	<1.0	3.12 | 3.24 | 4.09	3.49 | 3.80 | 8.53	114	106
Selenium	µg/L	1.0	<1.0	<1.0 | <1.0 | [NA]	<1.0 | <1.0 | [NA]	119	113
Zinc	µg/L	1.0	<1.0	13.6 | 13.1 | 3.99	6.72 | 6.41 | 4.65	114	97.8

The QC reported was not specifically part of this workorder but formed part of the QC process batch.

METALS-022|Dissolved Low Level Metals (Water) | Batch BEL0072

Analyte	Units	PQL	Blank	DUP1 BEL0072-DUP1# Samp | QC | RPD %	DUP2 BEL0072-DUP2# Samp | QC | RPD %	LCS %	Spike % BEL0072-MS1#
Aluminium	µg/L	10	<10	<10 | <10 | [NA]	<10 | <10 | [NA]	86.3	105
Cadmium	µg/L	0.10	<0.10	0.102 | <0.10 | 200 [10]	<0.10 | <0.10 | [NA]	94.1	113
Chromium	µg/L	1.0	<1.0	<1.0 | <1.0 | [NA]	<1.0 | <1.0 | [NA]	90.4	111
Copper	µg/L	1.0	<1.0	2.45 | 2.46 | 0.285	<1.0 | <1.0 | [NA]	90.6	107
Iron	µg/L	10	<10	3500 | 3410 | 2.46	254 | 256 | 0.749	93.7	116
Lead	µg/L	1.0	<1.0	<1.0 | <1.0 | [NA]	<1.0 | <1.0 | [NA]	89.0	106
Manganese	µg/L	1.0	<1.0	131 | 131 | 0.139	75.0 | 75.7 | 0.924	87.4	106
Nickel	µg/L	1.0	<1.0	1.01 | 1.07 | 5.86	<1.0 | <1.0 | [NA]	91.2	109
Selenium	µg/L	1.0	<1.0	<1.0 | <1.0 | [NA]	<1.0 | <1.0 | [NA]	93.3	116
Zinc	µg/L	1.0	<1.0	102 | 103 | 0.535	<1.0 | <1.0 | [NA]	89.2	108

The QC reported was not specifically part of this workorder but formed part of the QC process batch.

INORG-018|Inorganics - Physical Parameters (Water) | Batch BEL0372

Analyte	Units	PQL	Blank	DUP1 BEL0372-DUP1# Samp | QC | RPD %	DUP2 BEL0372-DUP2# Samp | QC | RPD %	LCS %
Total Dissolved Solids	mg/L	5.0	<5.0	781 | 765 | 2.07	542 | 545 | 0.552	98.6

The QC reported was not specifically part of this workorder but formed part of the QC process batch.

Quality Control PEK2136

INORG-111 | Inorganics - Physical Parameters (Water) | Batch BEL0680

Analyte	Units	PQL	Blank	LCS %
Volatile Fatty Acids	mg/L	5.0	<5.0	101

INORG-081 | Inorganics - Ionic Balance and Indexes (Water) | Batch BEK3835

Analyte	Units	PQL	Blank	DUP1 BEK3835-DUP1# Samp | QC | RPD %	DUP2 PEK2136-05 Samp | QC | RPD %	LCS %	Spike % BEK3835-MS1#
Chloride	mg/L	1.0	<1.0	153 | 152 | 0.460	14.0 | 14.0 | 0.00430	98.7	93.9
Sulfate	mg/L	1.0	<1.0	18.3 | 18.2 | 0.568	20.7 | 20.7 | 0.0416	95.7	105

The QC reported was not specifically part of this workorder but formed part of the QC process batch.

METALS-020 | Inorganics - Ionic Balance and Indexes (Water) | Batch BEL0073

Analyte	Units	PQL	Blank	DUP1 BEL0073-DUP1# Samp | QC | RPD %	DUP2 BEL0073-DUP2# Samp | QC | RPD %	LCS %	Spike % BEL0073-MS1#
Calcium	mg/L	0.50	<0.50	13.7 | 13.7 | 0.175	48.8 | 48.7 | 0.162	99.3	96.7
Magnesium	mg/L	0.50	<0.50	16.3 | 16.3 | 0.325	15.2 | 14.7 | 3.21	97.8	96.4
Potassium	mg/L	0.50	<0.50	12.2 | 12.2 | 0.181	10.2 | 10.2 | 0.579	96.2	95.5
Sodium	mg/L	0.50	<0.50	238 | 238 | 0.143	89.0 | 86.1 | 3.36	98.2	85.1
Hardness as CaCO3	mg/L	3.0	<3.0	101 | 101 | 0.156	184 | 182 | 1.19	[NA]	[NA]

The QC reported was not specifically part of this workorder but formed part of the QC process batch.

INORG-006 | Inorganics - Ionic Balance and Indexes (Water) | Batch BEL0081

Analyte	Units	PQL	Blank	DUP1 BEL0081-DUP1# Samp | QC | RPD %	DUP2 BEL0081-DUP2# Samp | QC | RPD %	LCS %
Bicarbonate Alkalinity as CaCO3	mg/L as CaCO3	5.0	<5.0	113 | 115 | 1.39	216 | 207 | 4.24	[NA]
Carbonate Alkalinity as CaCO3	mg/L as CaCO3	5.0	<5.0	<5.0 | <5.0 | [NA]	<5.0 | <5.0 | [NA]	[NA]
Hydroxide OH- as CaCO3	mg/L as CaCO3	5.0	<5.0	<5.0 | <5.0 | [NA]	<5.0 | <5.0 | [NA]	[NA]
Total Alkalinity as CaCO3	mg/L as CaCO3	5.0	<5.0	113 | 115 | 1.39	216 | 207 | 4.24	104

The QC reported was not specifically part of this workorder but formed part of the QC process batch.

INORG-079 | Inorganics - Carbons, Nitrogen Species, Sulfur Species (Water) | Batch BEL0014

Analyte	Units	PQL	Blank	DUP1 BEL0014-DUP1# Samp | QC | RPD %	DUP2 BEL0014-DUP2# Samp | QC | RPD %	LCS %	Spike % BEL0014-MS1#
Total Organic Carbon	mg/L	1.0	<1.0	<5.0 | <5.0 | [NA] [9]	<1.0 | <1.0 | [NA]	93.9	102

The QC reported was not specifically part of this workorder but formed part of the QC process batch.

INORG-118 | Inorganics - Speciated Cr (III/VI) and Fe (II/III) (Water) | Batch BEL0172

Analyte	Units	PQL	Blank	DUP1 PEK2136-01 Samp | QC | RPD %	LCS %	Spike % PEK2136-02
Hexavalent Chromium (Total)	mg/L	0.0050	<0.0050	<0.0050 | <0.0050 | [NA]	98.1	108

INORG-118 | Inorganics - Speciated Cr (III/VI) and Fe (II/III) (Water) | Batch BEL0173

Analyte	Units	PQL	Blank	DUP1 PEK2136-01 Samp | QC | RPD %	DUP2 PEK2136-06 Samp | QC | RPD %	LCS %	Spike % PEK2136-02
Hexavalent Chromium	mg/L	0.0050	<0.0050	<0.0050 | <0.0050 | [NA]	<0.0050 | <0.0050 | [NA]	98.5	106

Quality Control PEK2136

INORG-127 | Inorganics - Nutrients (Water) | Batch BEL0012

Analyte	Units	PQL	Blank	DUP1 BEL0012-DUP1# Samp | QC | RPD %	DUP2 PEK2136-08 Samp | QC | RPD %	LCS %	Spike % BEL0012-MS1#
Total Nitrogen	mg/L	0.10	<0.10	134 | 132 | 1.21	<0.10 | <0.10 | [NA]	103	##[2]

The QC reported was not specifically part of this workorder but formed part of the QC process batch.

INORG-060_TP | Inorganics - Nutrients (Water) | Batch BEL0171

Analyte	Units	PQL	Blank	DUP1 PEK2136-01 Samp | QC | RPD %	DUP2 BEL0171-DUP2# Samp | QC | RPD %	LCS %	Spike % PEK2136-02
Total Phosphorus	mg/L	0.010	<0.010	0.0407 | 0.0390 | 4.22	<0.010 | <0.010 | [NA]	100	96.3

The QC reported was not specifically part of this workorder but formed part of the QC process batch.

INORG-057 | Inorganics - Nutrients (Water) | Batch BEL0323

Analyte	Units	PQL	Blank	DUP1 PEK2136-01 Samp | QC | RPD %	DUP2 BEL0323-DUP2# Samp | QC | RPD %	LCS %	Spike % PEK2136-02
Ammonia as N	mg/L	0.0050	<0.0050	0.0107 | 0.0120 | 11.7	0.201 | 0.198 | 1.18	114	119
Nitrate as N	mg/L	0.0050	<0.0050	<0.050 | <0.050 | [NA] [8] [10]	<0.0050 | <0.0050 | [NA]	106	128
Nitrate as NO3 by calculation	mg/L	0.020	<0.020			[NA]	[NA]

The QC reported was not specifically part of this workorder but formed part of the QC process batch.

INORG-067 | Inorganics - Common Wastewater Parameters (Water) | Batch BEK3821

Analyte	Units	PQL	Blank	DUP1 BEK3821-DUP1# Samp | QC | RPD %	DUP2 PEK2136-01 Samp | QC | RPD %	LCS %
COD	mg O2/L	20	<20	186 | 187 | 0.536	90.0 | 87.0 | 3.39	100

The QC reported was not specifically part of this workorder but formed part of the QC process batch.

INORG-091 | Inorganics - Common Wastewater Parameters (Water) | Batch BEL0494

Analyte	Units	PQL	Blank	LCS %
BOD	mg/L	5.0	<5.0	78.3

ORG-029|PFAS Extended List (Water) | Batch BEL0336

Analyte	Units	PQL	Blank	DUP1 PEK2136-01 Samp | QC | RPD %	LCS %	Spike % PEK2136-02
Perfluorobutanesulfonic acid (PFBS)	µg/L	0.010	<0.010	<0.010 | <0.010 | [NA]	114	112
Perfluoropentanesulfonic acid (PFPeS)	µg/L	0.010	<0.010	<0.010 | <0.010 | [NA]	94.9	93.2
Perfluorohexanesulfonic acid (PFHxS)	µg/L	0.010	<0.010	0.0132 | 0.0144 | 8.70	103	104
Perfluoroheptanesulfonic acid (PFHpS)	µg/L	0.010	<0.010	<0.010 | <0.010 | [NA]	92.8	88.7
Perfluorooctanesulfonic acid (PFOS)	µg/L	0.010	<0.010	0.0884 | 0.0878 | 0.681	103	102
Perfluorodecanesulfonic acid (PFDS)	µg/L	0.020	<0.020	<0.020 | <0.020 | [NA]	89.6	88.3
Perfluorobutanoic acid (PFBA)	µg/L	0.020	<0.020	<0.020 | <0.020 | [NA]	112	111
Perfluoropentanoic acid (PFPeA)	µg/L	0.020	<0.020	<0.020 | <0.020 | [NA]	109	111
Perfluorohexanoic acid (PFHxA)	µg/L	0.010	<0.010	<0.010 | <0.010 | [NA]	109	118
Perfluoroheptanoic acid (PFHpA)	µg/L	0.010	<0.010	<0.010 | <0.010 | [NA]	112	110
Perfluorooctanoic acid (PFOA)	µg/L	0.010	<0.010	<0.010 | <0.010 | [NA]	119	124
Perfluorononanoic acid (PFNA)	µg/L	0.010	<0.010	<0.010 | <0.010 | [NA]	106	103
Perfluorodecanoic acid (PFDA)	µg/L	0.020	<0.020	<0.020 | <0.020 | [NA]	96.0	94.4
Perfluoroundecanoic acid (PFUnDA)	µg/L	0.020	<0.020	<0.020 | <0.020 | [NA]	101	97.9
Perfluorododecanoic acid (PFDoDA)	µg/L	0.050	<0.050	<0.050 | <0.050 | [NA]	103	91.6
Perfluorotridecanoic acid (PFTrDA)	µg/L	0.10	<0.10	<0.10 | <0.10 | [NA]	97.1	92.3
Perfluorotetradecanoic acid (PFTeDA)	µg/L	0.50	<0.50	<0.50 | <0.50 | [NA]	133	130
4:2 Fluorotelomer sulfonic acid (4:2 FTS)	µg/L	0.010	<0.010	<0.010 | <0.010 | [NA]	108	111
6:2 Fluorotelomer sulfonic acid (6:2 FTS)	µg/L	0.010	<0.010	<0.010 | <0.010 | [NA]	120	120
8:2 Fluorotelomer sulfonic acid (8:2 FTS)	µg/L	0.020	<0.020	<0.020 | <0.020 | [NA]	109	109
10:2 Fluorotelomer sulfonic acid (10:2 FTS)	µg/L	0.020	<0.020	<0.020 | <0.020 | [NA]	131	128
Perfluorooctane sulfonamide (FOSA)	µg/L	0.10	<0.10	<0.10 | <0.10 | [NA]	126	123
N-Methyl perfluorooctane sulfonamide (MeFOSA)	µg/L	0.050	<0.050	<0.050 | <0.050 | [NA]	111	110
N-Ethyl perfluorooctane sulfonamide (EtFOSA)	µg/L	0.10	<0.10	<0.10 | <0.10 | [NA]	110	106
N-Methyl perfluorooctane sulfonamidoethanol	µg/L	0.050	<0.050	<0.050 | <0.050 | [NA]	113	123
N-Ethyl perfluorooctane sulfonamidoethanol	µg/L	0.50	<0.50	<0.50 | <0.50 | [NA]	130	126
N-Methyl perfluorooctane sulfonamidoacetic acid	µg/L	0.020	<0.020	<0.020 | <0.020 | [NA]	114	112
N-Ethyl perfluorooctane sulfonamidoacetic acid	µg/L	0.020	<0.020	<0.020 | <0.020 | [NA]	102	100
Surrogate 13C8 PFOS	%		*102*	*101 | 100*	*101*	*102*
Surrogate 13C2 PFOA	%		*115*	*110 | 107*	*113*	*115*
Extraction Internal Standard 13C3 PFBS	%		*101*	*104 | 102 | 2.27*	[NA]	[NA]
Extraction Internal Standard 18O2 PFHxS	%		*129*	*132 | 128 | 3.71*	[NA]	[NA]
Extraction Internal Standard 13C4 PFOS	%		*106*	*107 | 108 | 0.942*	[NA]	[NA]
Extraction Internal Standard 13C4 PFBA	%		*118*	*95.3 | 89.7 | 6.12*	[NA]	[NA]
Extraction Internal Standard 13C3 PFPeA	%		*120*	*117 | 111 | 4.97*	[NA]	[NA]
Extraction Internal Standard 13C2 PFHxA	%		*111*	*116 | 111 | 4.12*	[NA]	[NA]
Extraction Internal Standard 13C4 PFHpA	%		*90.9*	*93.0 | 91.9 | 1.22*	[NA]	[NA]
Extraction Internal Standard 13C4 PFOA	%		*110*	*116 | 114 | 2.21*	[NA]	[NA]
Extraction Internal Standard 13C5 PFNA	%		*129*	*132 | 123 | 6.67*	[NA]	[NA]
Extraction Internal Standard 13C2 PFDA	%		*126*	*125 | 120 | 4.08*	[NA]	[NA]
Extraction Internal Standard 13C2 PFUnDA	%		*121*	*132 | 119 | 10.7*	[NA]	[NA]
Extraction Internal Standard 13C2 PFDoDA	%		*128*	*124 | 119 | 4.00*	[NA]	[NA]
Extraction Internal Standard 13C2 PFTeDA	%		*88.4*	*93.5 | 83.7 | 11.1*	[NA]	[NA]
Extraction Internal Standard 13C2 4:2FTS	%		*106*	*132 | 126 | 4.46*	[NA]	[NA]
Extraction Internal Standard 13C2 6:2FTS	%		*113*	*136 | 131 | 3.58*	[NA]	[NA]
Extraction Internal Standard 13C2 8:2FTS	%		*160 [6]*	*166 | 158 | 4.84 [6]*	[NA]	[NA]
Extraction Internal Standard 13C8 FOSA	%		*98.4*	*93.7 | 90.2 | 3.76*	[NA]	[NA]
Extraction Internal Standard d3 N MeFOSA	%		*112*	*111 | 108 | 3.08*	[NA]	[NA]
Extraction Internal Standard d5 N EtFOSA	%		*122*	*124 | 119 | 4.63*	[NA]	[NA]
Extraction Internal Standard d7 N MeFOSE	%		*95.7*	*97.9 | 91.9 | 6.27*	[NA]	[NA]
Extraction Internal Standard d9 N EtFOSE	%		*106*	*106 | 98.9 | 7.09*	[NA]	[NA]
Extraction Internal Standard d3 N MeFOSAA	%		*128*	*127 | 123 | 3.35*	[NA]	[NA]
Extraction Internal Standard d5 N EtFOSAA	%		*151 [6]*	*155 | 150 | 3.29 [6]*	[NA]	[NA]

QC Comments

Identifier	Description
[2]	Spike recovery is not applicable due to the relatively high analyte background in the sample (>3* spike level). However, the LCS recovery is within acceptance criteria.
[3]	Surrogate recovery was low due to sample(s) emulsifying during liquid liquid extraction.
[4]	Surrogate recovery is outside routine acceptance criteria (60-140%) as a result of the high concentration of analyte(s) in the sample.
[6]	For PFAS Extracted Internal Standards denoted with ## or being outside the 50-150% acceptance range, the respective target analyte results may be unaffected, in other circumstances the PQL has been raised to accommodate the outlier(s).
[8]	PQL(s) has/have been raised due to matrix interference.
[9]	PQL has been raised due to matrix requiring dilution
[10]	Duplicate %RPD may be flagged as an outlier to routine laboratory acceptance, however, where one or both results are <10*PQL, the RPD acceptance criteria increases exponentially.

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Certificate of Analysis PEL1307

Client Details

Client	Katherine Town Council - NT
Contact	Brett Kimpton
Address	PO Box 1071, KATHERINE, NT, 0851

Sample Details

Your Reference	Katherine Town Council - EPL298-01 - Monthly
Number of Samples	7 Water
Date Samples Received	19/12/2023
Date Instructions Received	19/12/2023

Analysis Details

Please refer to the following pages for results, methodology summary and quality control data.
Samples were analysed as received from the client. Results relate specifically to the samples as received.
Results are reported on a dry weight basis for solids and on an as received basis for other matrices.

Report Details

Date Results Requested by	05/01/2024
Date of Issue	28/12/2023

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Authorisation Details

Results Approved By	Heram Halim, Operations Manager
Laboratory Manager	Michael Kubiak

Certificate of Analysis PEL1307

Samples in this Report

Envirolab ID	Sample ID	Matrix	Date Sampled	Date Received
PEL1307-01	GWA (RN031131)	Water	17/12/2023	19/12/2023
PEL1307-02	GWE (RN022487)	Water	17/12/2023	19/12/2023
PEL1307-03	GWB01	Water	17/12/2023	19/12/2023
PEL1307-04	GWB02	Water	17/12/2023	19/12/2023
PEL1307-05	GWB03	Water	17/12/2023	19/12/2023
PEL1307-06	GWB04	Water	17/12/2023	19/12/2023
PEL1307-07	Trip Blank	Water	17/12/2023	19/12/2023

Certificate of Analysis PEL1307

Inorganics - Physical Parameters (Water)

Envirolab ID	Units	PQL	PEL1307-01	PEL1307-02	PEL1307-03	PEL1307-04	PEL1307-05
Your Reference			GWA (RN031131)	GWE (RN022487)	GWB01	GWB02	GWB03
Date Sampled			17/12/2023	17/12/2023	17/12/2023	17/12/2023	17/12/2023
Total Dissolved Solids	mg/L	5.0	300	420	480	480	570

Envirolab ID	Units	PQL	PEL1307-06	PEL1307-07
Your Reference			GWB04	Trip Blank
Date Sampled			17/12/2023	17/12/2023
Total Dissolved Solids	mg/L	5.0	490	<5.0

Inorganics - Ionic Balance and Indexes (Water)

Envirolab ID	Units	PQL	PEL1307-01	PEL1307-02	PEL1307-03	PEL1307-04	PEL1307-05
Your Reference			GWA (RN031131)	GWE (RN022487)	GWB01	GWB02	GWB03
Date Sampled			17/12/2023	17/12/2023	17/12/2023	17/12/2023	17/12/2023
Bicarbonate Alkalinity as CaCO3	mg/L as CaCO3	5.0	280	330	360	350	480
Carbonate Alkalinity as CaCO3	mg/L as CaCO3	5.0	<5.0	<5.0	<5.0	<5.0	<5.0
Hydroxide OH- as CaCO3	mg/L as CaCO3	5.0	<5.0	<5.0	<5.0	<5.0	<5.0
Total Alkalinity as CaCO3	mg/L as CaCO3	5.0	280	330	360	350	480
Chloride	mg/L	1.0	9.6	39	44	22	17
Sulfate	mg/L	1.0	4.8	12	16	36	89
Calcium	mg/L	0.50	36	48	54	46	77
Magnesium	mg/L	0.50	29	38	38	44	58
Potassium	mg/L	0.50	8.9	6.5	17	12	8.8
Sodium	mg/L	0.50	5.5	27	21	12	18
Hardness as CaCO3	mg/L	3.0	210	270	290	300	430
Ionic Balance	%		-11	-7.9	-9.6	-10	-11
Total Anions	mg/L	7.0	290	380	420	410	580
Anions as meq	meq/L	0.59	4.9	6.8	7.5	7.2	10
Total Cations	mg/L	2.0	80	120	130	120	160
Cations as meq	meq/L	0.10	4.7	6.8	7.2	6.8	9.6

Envirolab ID	Units	PQL	PEL1307-06	PEL1307-07
Your Reference			GWB04	Trip Blank
Date Sampled			17/12/2023	17/12/2023
Bicarbonate Alkalinity as CaCO3	mg/L as CaCO3	5.0	440	<5.0
Carbonate Alkalinity as CaCO3	mg/L as CaCO3	5.0	<5.0	<5.0
Hydroxide OH- as CaCO3	mg/L as CaCO3	5.0	<5.0	<5.0
Total Alkalinity as CaCO3	mg/L as CaCO3	5.0	440	<5.0
Chloride	mg/L	1.0	8.4	<1.0
Sulfate	mg/L	1.0	9.7	<1.0
Calcium	mg/L	0.50	64	<0.50
Magnesium	mg/L	0.50	54	<0.50
Potassium	mg/L	0.50	9.7	<0.50
Sodium	mg/L	0.50	8.6	<0.50
Hardness as CaCO3	mg/L	3.0	380	<3.0
Ionic Balance	%		-6.3	-99
Total Anions	mg/L	7.0	460	<7.0
Anions as meq	meq/L	0.59	7.7	<0.59
Total Cations	mg/L	2.0	140	<2.0
Cations as meq	meq/L	0.10	8.2	<0.10

Certificate of Analysis PEL1307

Inorganics - Carbons, Nitrogen Species, Sulfur Species (Water)

Envirolab ID	Units	PQL	PEL1307-01	PEL1307-02	PEL1307-03	PEL1307-04	PEL1307-05
Your Reference			GWA (RN031131)	GWE (RN022487)	GWB01	GWB02	GWB03
Date Sampled			17/12/2023	17/12/2023	17/12/2023	17/12/2023	17/12/2023
Total Organic Carbon	mg/L	1.0	<1.0	3.3	2.8	1.5	4.9

Envirolab ID	Units	PQL	PEL1307-06	PEL1307-07
Your Reference			GWB04	Trip Blank
Date Sampled			17/12/2023	17/12/2023
Total Organic Carbon	mg/L	1.0	1.3	<1.0

Certificate of Analysis PEL1307

Inorganics - Nutrients (Water)

Envirolab ID	Units	PQL	PEL1307-01	PEL1307-02	PEL1307-03	PEL1307-04	PEL1307-05
Your Reference			GWA (RN031131)	GWE (RN022487)	GWB01	GWB02	GWB03
Date Sampled			17/12/2023	17/12/2023	17/12/2023	17/12/2023	17/12/2023
Ammonia as N	mg/L	0.0050	<0.0050	0.058	1.3	0.024	0.015
Free Ammonia (unionised) as N by calculation*	mg/L	0.0070	<0.0070	<0.0070	0.0098	<0.0070	<0.0070
Ammonium (NH4+) as N by calculation	mg/L	0.0070	<0.0070	0.058	1.3	0.024	0.015

Envirolab ID	Units	PQL	PEL1307-06	PEL1307-07
Your Reference			GWB04	Trip Blank
Date Sampled			17/12/2023	17/12/2023
Ammonia as N	mg/L	0.0050	<0.0050	<0.0050
Free Ammonia (unionised) as N by calculation*	mg/L	0.0070	<0.0070	<0.0070
Ammonium (NH4+) as N by calculation	mg/L	0.0070	<0.0070	<0.0070

Certificate of Analysis PEL1307

Inorganics - Common Wastewater Parameters (Water)

Envirolab ID	Units	PQL	PEL1307-01	PEL1307-02	PEL1307-03	PEL1307-04	PEL1307-05
Your Reference			GWA (RN031131)	GWE (RN022487)	GWB01	GWB02	GWB03
Date Sampled			17/12/2023	17/12/2023	17/12/2023	17/12/2023	17/12/2023
BOD	mg/L	5.0	<5.0 [3]	15 [3]	25 [3]	20 [3]	18 [3]
COD	mg O2/L	20	<20	<20	<100 [1] [2]	<20	60

Envirolab ID	Units	PQL	PEL1307-06	PEL1307-07
Your Reference			GWB04	Trip Blank
Date Sampled			17/12/2023	17/12/2023
BOD	mg/L	5.0	17 [3]	10 [3]
COD	mg O2/L	20	58	<20

Result Comments

Identifier	Description
[1]	Matrix interference - sample contained elevated chloride levels.
[2]	PQL has been raised due to matrix requiring dilution
[3]	Sample frozen on receipt to elongate technical holding time.

Method Summary

Method ID	Methodology Summary
Calc	Calculation
INORG-006	Alkalinity - determined titrimetrically based on APHA latest edition 2320-B. Solids reported from a 1:5 water extract unless otherwise specified. Total Carbon Dioxide - determined by calculation in accordance with APHA latest edition,4500-CO2 D.
INORG-018	Total Dissolved Solids - determined gravimetrically. The solids are dried at 180±10°C. NOTE: Where the EC of the sample is <100µS/cm, the TDS will typically be below 70mg/L (as the sample is very likely to be at least drinking water quality). Therefore to ensure data quality for TDS, the TDS is typically calculated as per the equation: TDS = EC*0.6
INORG-040	The concentrations of the major ions (mg/L) are converted to milliequivalents and summed. The ionic balance should be within +/- 15% i.e. total anions = total cations +/-15%.
INORG-057	Ammonia - determined colourimetrically. Water samples are filtered on receipt prior to analysis. Soils and OHS media are analysed following a water extraction. Alternatively, Ammonia can be extracted from soil using 1M KCl.
INORG-067	Samples are digested in acid with a known excess of potassium dichromate then the colour change is determined by discrete analyser or UV-VIS in accordance with APHA latest edition 5220 D.
INORG-079	Carbon forms (inorganic, organic, total) determined using a TOC/NDIR analyser via combustion. Dissolved aqueous\forms require filtering prior to determination.
INORG-081	Anions determined by Ion Chromatography. Waters samples are filtered on receipt prior to analysis. Solids are analysed from a water extract. Alternatively determined by colourimetry/turbidity using Discrete Analyser.
INORG-091	BOD and/or cBOD - Analysed in accordance with APHA latest edition 5210 D.
METALS-020	Determination of various metals by ICP-OES.

Result Definitions

Identifier	Description
NR	Not reported
NEPM	National Environment Protection Measure
NS	Not specified
LCS	Laboratory Control Sample
RPD	Relative Percent Difference
>	Greater than
<	Less than
PQL	Practical Quantitation Limit
INS	Insufficient sample for this test
NA	Test not required
NT	Not tested
DOL	Samples rejected due to particulate overload (air filters only)
RFD	Samples rejected due to filter damage (air filters only)
RUD	Samples rejected due to uneven deposition (air filters only)
##	Indicates a laboratory acceptance criteria outlier, for further details, see Result Comments and/or QC Comments

Quality Control Definitions

Blank

This is the component of the analytical signal which is not derived from the sample but from reagents, glassware etc, and is determined by processing solvents and reagents in exactly the same manner as for samples.

Surrogate Spike

Surrogates are known additions to each sample, blank, matrix spike and LCS in a batch, of compounds which are similar to the analyte of interest, however are not expected to be found in real samples.

LCS (Laboratory Control Sample)

This comprises either a standard reference material or a control matrix (such as a blank sand or water) fortified with analytes representative of the analyte class. It is simply a check sample.

Matrix Spike

A portion of the sample is spiked with a known concentration of target analyte. The purpose of the matrix spike is to monitor the performance of the analytical method used and to determine whether matrix interferences exist.

Duplicate

This is the complete duplicate analysis of a sample from the process batch. The sample selected should be one where the analyte concentration is easily measurable.

Laboratory Acceptance Criteria

Duplicate sample and matrix spike recoveries may not be reported on smaller jobs, however, were analysed at a frequency to meet or exceed NEPM requirements. All samples are tested in batches of 20. The duplicate sample RPD and matrix spike recoveries for the batch were within the laboratory acceptance criteria. Filters, swabs, wipes, tubes and badges will not have duplicate data as the whole sample is generally extracted during sample extraction. Spikes for Physical and Aggregate Tests are not applicable. For VOCs in water samples, three vials are required for duplicate or spike analysis.

General Acceptance Criteria (GAC) - Analyte specific criteria applies for some analytes and is reflected in QC recovery tables.

Duplicates: >10xPQL - RPD acceptance criteria will vary depending on the analytes and the analytical techniques but is typically in the range 20%-50% - see ELN-P05 QAQC tables for details (available on request); <10xPQL - RPD are higher as the results approach PQL and the estimated measurement uncertainty will statistically increase. Matrix Spikes, LCS and Surrogate recoveries: Generally 70-130% for inorganics/metals; 60-140% for organics (+/-50% surrogates) and 10-140% for labile SVOCs (including labile surrogates), ultra trace organics and speciated phenols is acceptable.

In circumstances where no duplicate and/or sample spike has been reported at 1 in 10 and/or 1 in 20 samples respectively, the sample volume submitted was typically insufficient in order to satisfy laboratory QA/QC protocols.

Miscellaneous Information

When samples are received where certain analytes are outside of recommended technical holding times (THTs), the analysis has proceeded. Where analytes are on the verge of breaching THTs, every effort will be made to analyse within the THT or as soon as practicable.

Where sampling dates are not provided, Envirolab are not in a position to comment on the validity of the analysis where recommended technical holding times may have been breached. We have taken the sampling date as being the date received at the laboratory.

Two significant figures are reported for the majority of tests and with a high degree of confidence, for results <10*PQL, the second significant figure may be in doubt i.e. has a relatively high degree of uncertainty and is provided for information only.

Measurement Uncertainty estimates are available for most tests upon request.

Analysis of aqueous samples typically involves the extraction/digestion and/or analysis of the liquid phase only (i.e. NOT any settled sediment phase but inclusive of suspended particles if present), unless stipulated on the Envirolab COC or by correspondence. Notable exceptions include certain Physical Tests (pH/EC/BOD/COD/Apparent Colour etc.), Solids testing, Total Recoverable metals and PFAS where sediment/solids are included by default.

Urine Analysis - The BEI values listed are taken from the 2022 edition of *TLVs and BEIs Threshold Limits by ACGIH*.

Air volume measurements are not covered by Envirolab's NATA accreditation.

Data Quality Assessment Summary PEL1307

Client Details

Client	Katherine Town Council - NT
Your Reference	Katherine Town Council - EPL298-01 - Monthly
Date Issued	28/12/2023

Recommended Holding Time Compliance

Recommended holding time exceedances exist - See detailed list below

Quality Control and QC Frequency

QC Type	Compliant	Details
Blank	Yes	No Outliers
LCS	Yes	No Outliers
Duplicates	Yes	No Outliers
Matrix Spike	Yes	No Outliers
Surrogates / Extracted Internal Standards	Yes	No Outliers
QC Frequency	No	QC Frequency Outliers Exist - See detailed list below

Surrogates/Extracted Internal Standards, Duplicates and/or Matrix Spikes are not always relevant/applicable to certain analyses and matrices. Therefore, said QC measures are deemed compliant in these situations by default. See Laboratory Acceptance Criteria for more information

Data Quality Assessment Summary PEL1307

Recommended Holding Time Compliance

Analysis	Sample Number(s)	Date Sampled	Date Extracted	Date Analysed	Compliant
TDS | Water	1-7	17/12/2023	22/12/2023	22/12/2023	Yes
Alkalinity Suite | Water	1-7	17/12/2023	19/12/2023	21/12/2023	Yes
Chloride | Water	1-7	17/12/2023	22/12/2023	22/12/2023	Yes
Dissolved Cations | Water	1-7	17/12/2023	19/12/2023	21/12/2023	Yes
Ion Balance | Water	1-7	17/12/2023	22/12/2023	27/12/2023	Yes
Sulfate | Water	1-7	17/12/2023	22/12/2023	22/12/2023	Yes
Total Organic Carbon | Water	1-7	17/12/2023	21/12/2023	22/12/2023	Yes
Nitrogen - Ammonia | Water	1-6	17/12/2023	21/12/2023	21/12/2023	Yes
	7	17/12/2023	21/12/2023	22/12/2023	Yes
BOD | Water	1-7	17/12/2023	21/12/2023	27/12/2023	No
COD | Water	1-7	17/12/2023	22/12/2023	28/12/2023	Yes

Outliers: QC Frequency

INORG-091\|Inorganics - Common Wastewater Parameters (Water)\| Batch BEL2777

Analysis	QC Type	Expected	Reported
BOD	Duplicate	2	0

Quality Control PEL1307

INORG-018 | Inorganics - Physical Parameters (Water) | Batch BEL2947

Analyte	Units	PQL	Blank	DUP1 BEL2947-DUP1# Samp | QC | RPD %	DUP2 PEL1307-07 Samp | QC | RPD %	LCS %
Total Dissolved Solids	mg/L	5.0	<5.0	22.0 | 22.0 | 0.00	<5.0 | <5.0 | [NA]	103

The QC reported was not specifically part of this workorder but formed part of the QC process batch.

METALS-020 | Inorganics - Ionic Balance and Indexes (Water) | Batch BEL2473

Analyte	Units	PQL	Blank	DUP1 BEL2473-DUP1# Samp | QC | RPD %	DUP2 PEL1307-02 Samp | QC | RPD %	LCS %	Spike % BEL2473-MS1#
Calcium	mg/L	0.50	<0.50	45.5 | 45.5 | 0.0462	47.6 | 47.4 | 0.360	89.4	94.8
Magnesium	mg/L	0.50	<0.50	45.9 | 46.1 | 0.419	37.6 | 37.2 | 0.813	92.5	92.9
Potassium	mg/L	0.50	<0.50	14.6 | 14.6 | 0.0344	6.50 | 6.47 | 0.461	97.1	99.2
Sodium	mg/L	0.50	<0.50	95.8 | 96.4 | 0.634	26.7 | 26.7 | 0.288	91.7	113
Hardness as CaCO3	mg/L	3.0	<3.0	303 | 304 | 0.279	273 | 272 | 0.616	[NA]	[NA]

The QC reported was not specifically part of this workorder but formed part of the QC process batch.

INORG-006 | Inorganics - Ionic Balance and Indexes (Water) | Batch BEL2497

Analyte	Units	PQL	Blank	DUP1 BEL2497-DUP1# Samp | QC | RPD %	DUP2 PEL1307-03 Samp | QC | RPD %	LCS %
Bicarbonate Alkalinity as CaCO3	mg/L as CaCO3	5.0	<5.0	500 | 503 | 0.618	361 | 348 | 3.70	[NA]
Carbonate Alkalinity as CaCO3	mg/L as CaCO3	5.0	<5.0	<5.0 | <5.0 | [NA]	<5.0 | <5.0 | [NA]	[NA]
Hydroxide OH- as CaCO3	mg/L as CaCO3	5.0	<5.0	<5.0 | <5.0 | [NA]	<5.0 | <5.0 | [NA]	[NA]
Total Alkalinity as CaCO3	mg/L as CaCO3	5.0	<5.0	500 | 503 | 0.618	361 | 348 | 3.70	[NA]

Analyte	Units	PQL	Blank	LCS %
Total Alkalinity as CaCO3	mg/L as CaCO3	5		93.6

The QC reported was not specifically part of this workorder but formed part of the QC process batch.

INORG-081 | Inorganics - Ionic Balance and Indexes (Water) | Batch BEL2848

Analyte	Units	PQL	Blank	DUP1 BEL2848-DUP1# Samp | QC | RPD %	DUP2 PEL1307-01 Samp | QC | RPD %	LCS %	Spike % BEL2848-MS1#
Chloride	mg/L	1.0	<1.0	1.13 | 1.13 | 0.636	9.60 | 9.60 | 0.00730	97.4	101
Sulfate	mg/L	1.0	<1.0	<1.0 | <1.0 | [NA]	4.78 | 4.50 | 6.20	92.7	98.5

The QC reported was not specifically part of this workorder but formed part of the QC process batch.

INORG-079 | Inorganics - Carbons, Nitrogen Species, Sulfur Species (Water) | Batch BEL2730

Analyte	Units	PQL	Blank	DUP1 BEL2730-DUP1# Samp | QC | RPD %	DUP2 PEL1307-02 Samp | QC | RPD %	LCS %	Spike % PEL1307-01
Total Organic Carbon	mg/L	1.0	<1.0	<1.0 | <1.0 | [NA]	3.33 | 3.13 | 6.28	96.9	119

The QC reported was not specifically part of this workorder but formed part of the QC process batch.

INORG-057 | Inorganics - Nutrients (Water) | Batch BEL2800

Analyte	Units	PQL	Blank	DUP1 BEL2800-DUP1# Samp | QC | RPD %	DUP2 BEL2800-DUP2# Samp | QC | RPD %	LCS %	Spike % BEL2800-MS1#
Ammonia as N	mg/L	0.0050	<0.0050	145 | 144 | 0.717	<0.0050 | <0.0050 | [NA]	106	124

The QC reported was not specifically part of this workorder but formed part of the QC process batch.

Quality Control PEL1307

INORG-091 | Inorganics - Common Wastewater Parameters (Water) | Batch BEL2777

Analyte	Units	PQL	Blank	LCS %
BOD	mg/L	5.0	<5.0	97.8

INORG-067 | Inorganics - Common Wastewater Parameters (Water) | Batch BEL2863

Analyte	Units	PQL	Blank	DUP1 PEL1307-01 Samp | QC | RPD %	DUP2 BEL2863-DUP2# Samp | QC | RPD %	LCS %
COD	mg O2/L	20	<20	<20 | <20 | [NA]	280 | 290 | 3.51	115

The QC reported was not specifically part of this workorder but formed part of the QC process batch.

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Certificate of Analysis PFA1047

Client Details

Client	Katherine Town Council - NT
Contact	Brett Kimpton
Address	PO Box 1071, KATHERINE, NT, 0851

Sample Details

Your Reference	Katherine Town Council - EPL298-01 - Monthly
Number of Samples	7 Water
Date Samples Received	23/01/2024
Date Instructions Received	23/01/2024

Analysis Details

Please refer to the following pages for results, methodology summary and quality control data.
Samples were analysed as received from the client. Results relate specifically to the samples as received.
Results are reported on a dry weight basis for solids and on an as received basis for other matrices.

Report Details

Date Results Requested by	07/02/2024
Date of Issue	07/02/2024

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Authorisation Details

Results Approved By	Ben Carpenter, Metals Technician Lien Tang, Assistant Operations Manager
Laboratory Manager	Michael Kubiak

Certificate of Analysis PFA1047

Samples in this Report

Envirolab ID	Sample ID	Matrix	Date Sampled	Date Received
PFA1047-01	GWA (RN031131)	Water	21/01/2024	23/01/2024
PFA1047-02	GWE (RN022487)	Water	21/01/2024	23/01/2024
PFA1047-03	GWB01	Water	21/01/2024	23/01/2024
PFA1047-04	GWB02	Water	21/01/2024	23/01/2024
PFA1047-05	GWB03	Water	21/01/2024	23/01/2024
PFA1047-06	GWB04	Water	21/01/2024	23/01/2024
PFA1047-07	Trip Blank	Water	21/01/2024	23/01/2024

Certificate of Analysis PFA1047

Inorganics - Physical Parameters (Water)

Envirolab ID	Units	PQL	PFA1047-01	PFA1047-02	PFA1047-03	PFA1047-04	PFA1047-05
Your Reference			GWA (RN031131)	GWE (RN022487)	GWB01	GWB02	GWB03
Date Sampled			21/01/2024	21/01/2024	21/01/2024	21/01/2024	21/01/2024
Total Dissolved Solids	mg/L	5.0	380	510	260	510	670

Envirolab ID	Units	PQL	PFA1047-06	PFA1047-07
Your Reference			GWB04	Trip Blank
Date Sampled			21/01/2024	21/01/2024
Total Dissolved Solids	mg/L	5.0	460	<5.0

Certificate of Analysis PFA1047

Inorganics - Ionic Balance and Indexes (Water)

Envirolab ID	Units	PQL	PFA1047-01	PFA1047-02	PFA1047-03	PFA1047-04	PFA1047-05
Your Reference			GWA (RN031131)	GWE (RN022487)	GWB01	GWB02	GWB03
Date Sampled			21/01/2024	21/01/2024	21/01/2024	21/01/2024	21/01/2024
Bicarbonate Alkalinity as CaCO3	mg/L as CaCO3	5.0	360	440	250	470	490
Carbonate Alkalinity as CaCO3	mg/L as CaCO3	5.0	<5.0	<5.0	<5.0	<5.0	<5.0
Hydroxide OH- as CaCO3	mg/L as CaCO3	5.0	<5.0	<5.0	<5.0	<5.0	<5.0
Total Alkalinity as CaCO3	mg/L as CaCO3	5.0	360	440	250	470	490
Chloride	mg/L	1.0	5.1	43	13	23	11
Sulfate	mg/L	1.0	6.1	18	4.3	29	170
Calcium	mg/L	0.50	72	89	37	90	110
Magnesium	mg/L	0.50	33	45	28	52	79
Potassium	mg/L	0.50	4.4	13	5.5	5.6	7.7
Sodium	mg/L	0.50	5.4	26	13	15	23
Hardness as CaCO3	mg/L	3.0	320	410	210	440	600
Ionic Balance	%		-5.6	-4.3	-6.5	-5.1	-1.5
Total Anions	mg/L	7.0	370	510	270	520	670
Anions as meq	meq/L	0.59	6.2	8.9	4.6	8.9	12
Total Cations	mg/L	2.0	120	170	84	160	220
Cations as meq	meq/L	0.10	6.7	9.6	4.9	9.6	13

Envirolab ID	Units	PQL	PFA1047-06	PFA1047-07
Your Reference			GWB04	Trip Blank
Date Sampled			21/01/2024	21/01/2024
Bicarbonate Alkalinity as CaCO3	mg/L as CaCO3	5.0	460	<5.0
Carbonate Alkalinity as CaCO3	mg/L as CaCO3	5.0	<5.0	<5.0
Hydroxide OH- as CaCO3	mg/L as CaCO3	5.0	<5.0	<5.0
Total Alkalinity as CaCO3	mg/L as CaCO3	5.0	460	<5.0
Chloride	mg/L	1.0	4.9	<1.0
Sulfate	mg/L	1.0	7.5	<1.0
Calcium	mg/L	0.50	76	<0.50
Magnesium	mg/L	0.50	58	<0.50
Potassium	mg/L	0.50	8.1	<0.50
Sodium	mg/L	0.50	6.9	<0.50
Hardness as CaCO3	mg/L	3.0	430	<3.0
Ionic Balance	%		-2.0	-100
Total Anions	mg/L	7.0	470	<7.0
Anions as meq	meq/L	0.59	7.8	<0.59
Total Cations	mg/L	2.0	150	<2.0
Cations as meq	meq/L	0.10	9.1	<0.10

Certificate of Analysis PFA1047

Inorganics - Carbons, Nitrogen Species, Sulfur Species (Water)

Envirolab ID	Units	PQL	PFA1047-01	PFA1047-02	PFA1047-03	PFA1047-04	PFA1047-05
Your Reference			GWA (RN031131)	GWE (RN022487)	GWB01	GWB02	GWB03
Date Sampled			21/01/2024	21/01/2024	21/01/2024	21/01/2024	21/01/2024
Total Organic Carbon	mg/L	1.0	<1.0	3.9	1.1	1.9	4.9

Envirolab ID	Units	PQL	PFA1047-06	PFA1047-07
Your Reference			GWB04	Trip Blank
Date Sampled			21/01/2024	21/01/2024
Total Organic Carbon	mg/L	1.0	<1.0	<1.0

Certificate of Analysis PFA1047

Inorganics - Nutrients (Water)

Envirolab ID	Units	PQL	PFA1047-01	PFA1047-02	PFA1047-03	PFA1047-04	PFA1047-05
Your Reference			GWA (RN031131)	GWE (RN022487)	GWB01	GWB02	GWB03
Date Sampled			21/01/2024	21/01/2024	21/01/2024	21/01/2024	21/01/2024
Ammonia as N	mg/L	0.0050	<0.0050	0.11	0.045	<0.0050	<0.0050
Free Ammonia (unionised) as N by calculation*	mg/L	0.0070	<0.0070	<0.0070	<0.0070	<0.0070	<0.0070
Ammonium (NH4+) as N by calculation	mg/L	0.0070	<0.0070	0.11	0.045	<0.0070	<0.0070

Envirolab ID	Units	PQL	PFA1047-06	PFA1047-07
Your Reference			GWB04	Trip Blank
Date Sampled			21/01/2024	21/01/2024
Ammonia as N	mg/L	0.0050	<0.0050	<0.0050
Free Ammonia (unionised) as N by calculation*	mg/L	0.0070	<0.0070	<0.0070
Ammonium (NH4+) as N by calculation	mg/L	0.0070	<0.0070	<0.0070

Certificate of Analysis PFA1047

Inorganics - Common Wastewater Parameters (Water)

Envirolab ID	Units	PQL	PFA1047-01	PFA1047-02	PFA1047-03	PFA1047-04	PFA1047-05
Your Reference			GWA (RN031131)	GWE (RN022487)	GWB01	GWB02	GWB03
Date Sampled			21/01/2024	21/01/2024	21/01/2024	21/01/2024	21/01/2024
BOD	mg/L	5.0	<5.0	13	<5.0	11	11
COD	mg O2/L	20	<20	66	25	120	120

Envirolab ID	Units	PQL	PFA1047-06	PFA1047-07
Your Reference			GWB04	Trip Blank
Date Sampled			21/01/2024	21/01/2024
BOD	mg/L	5.0	6.0	<5.0
COD	mg O2/L	20	<20	<20

Certificate of Analysis PFA1047

General - Field Data (Water)

Envirolab ID	Units	PQL	PFA1047-01	PFA1047-02	PFA1047-03	PFA1047-04	PFA1047-05
Your Reference			GWA (RN031131)	GWE (RN022487)	GWB01	GWB02	GWB03
Date Sampled			21/01/2024	21/01/2024	21/01/2024	21/01/2024	21/01/2024
Temperature (Client Supplied)*	o C		20.0 [2]	20.0 [2]	20.0 [2]	20.0 [2]	20.0 [2]

Envirolab ID	Units	PQL	PFA1047-06	PFA1047-07
Your Reference			GWB04	Trip Blank
Date Sampled			21/01/2024	21/01/2024
Temperature (Client Supplied)*	o C		20.0 [2]	20.0 [2]

Result Comments

Identifier	Description
[2]	Field temperature not supplied by client, 20oC has been assumed for Ammonia as NH4 calculation.

Method Summary

Method ID	Methodology Summary
Calc	Calculation
Field Data	Field Data supplied by client
INORG-006	Alkalinity - determined titrimetrically based on APHA latest edition 2320-B. Solids reported from a 1:5 water extract unless otherwise specified. Total Carbon Dioxide - determined by calculation in accordance with APHA latest edition,4500-CO2 D.
INORG-018	Total Dissolved Solids - determined gravimetrically. The solids are dried at 180±10°C. NOTE: Where the EC of the sample is <100µS/cm, the TDS will typically be below 70mg/L (as the sample is very likely to be at least drinking water quality). Therefore to ensure data quality for TDS, the TDS is typically calculated as per the equation: TDS = EC*0.6
INORG-040	The concentrations of the major ions (mg/L) are converted to milliequivalents and summed. The ionic balance should be within +/- 15% i.e. total anions = total cations +/-15%.
INORG-057	Ammonia - determined colourimetrically. Water samples are filtered on receipt prior to analysis. Soils and OHS media are analysed following a water extraction. Alternatively, Ammonia can be extracted from soil using 1M KCl.
INORG-067	Samples are digested in acid with a known excess of potassium dichromate then the colour change is determined by discrete analyser or UV-VIS in accordance with APHA latest edition 5220 D.
INORG-079	Carbon forms (inorganic, organic, total) determined using a TOC/NDIR analyser via combustion. Dissolved aqueous\forms require filtering prior to determination.
INORG-081	Anions determined by Ion Chromatography. Waters samples are filtered on receipt prior to analysis. Solids are analysed from a water extract. Alternatively determined by colourimetry/turbidity using Discrete Analyser.
INORG-091	BOD and/or cBOD - Analysed in accordance with APHA latest edition 5210 D.
METALS-020	Determination of various metals by ICP-OES.

Result Definitions

Identifier	Description
NR	Not reported
NEPM	National Environment Protection Measure
NS	Not specified
LCS	Laboratory Control Sample
RPD	Relative Percent Difference
>	Greater than
<	Less than
PQL	Practical Quantitation Limit
INS	Insufficient sample for this test
NA	Test not required
NT	Not tested
DOL	Samples rejected due to particulate overload (air filters only)
RFD	Samples rejected due to filter damage (air filters only)
RUD	Samples rejected due to uneven deposition (air filters only)
##	Indicates a laboratory acceptance criteria outlier, for further details, see Result Comments and/or QC Comments

Quality Control Definitions

Blank

This is the component of the analytical signal which is not derived from the sample but from reagents, glassware etc, and is determined by processing solvents and reagents in exactly the same manner as for samples.

Surrogate Spike

Surrogates are known additions to each sample, blank, matrix spike and LCS in a batch, of compounds which are similar to the analyte of interest, however are not expected to be found in real samples.

LCS (Laboratory Control Sample)

This comprises either a standard reference material or a control matrix (such as a blank sand or water) fortified with analytes representative of the analyte class. It is simply a check sample.

Matrix Spike

A portion of the sample is spiked with a known concentration of target analyte. The purpose of the matrix spike is to monitor the performance of the analytical method used and to determine whether matrix interferences exist.

Duplicate

This is the complete duplicate analysis of a sample from the process batch. The sample selected should be one where the analyte concentration is easily measurable.

Laboratory Acceptance Criteria

Duplicate sample and matrix spike recoveries may not be reported on smaller jobs, however, were analysed at a frequency to meet or exceed NEPM requirements. All samples are tested in batches of 20. The duplicate sample RPD and matrix spike recoveries for the batch were within the laboratory acceptance criteria. Filters, swabs, wipes, tubes and badges will not have duplicate data as the whole sample is generally extracted during sample extraction. Spikes for Physical and Aggregate Tests are not applicable. For VOCs in water samples, three vials are required for duplicate or spike analysis.

General Acceptance Criteria (GAC) - Analyte specific criteria applies for some analytes and is reflected in QC recovery tables.

Duplicates: >10xPQL - RPD acceptance criteria will vary depending on the analytes and the analytical techniques but is typically in the range 20%-50% - see ELN-P05 QAQC tables for details (available on request); <10xPQL - RPD are higher as the results approach PQL and the estimated measurement uncertainty will statistically increase. Matrix Spikes, LCS and Surrogate recoveries: Generally 70-130% for inorganics/metals; 60-140% for organics (+/-50% surrogates) and 10-140% for labile SVOCs (including labile surrogates), ultra trace organics and speciated phenols is acceptable.

In circumstances where no duplicate and/or sample spike has been reported at 1 in 10 and/or 1 in 20 samples respectively, the sample volume submitted was typically insufficient in order to satisfy laboratory QA/QC protocols.

Miscellaneous Information

When samples are received where certain analytes are outside of recommended technical holding times (THTs), the analysis has proceeded. Where analytes are on the verge of breaching THTs, every effort will be made to analyse within the THT or as soon as practicable.

Where sampling dates are not provided, Envirolab are not in a position to comment on the validity of the analysis where recommended technical holding times may have been breached. We have taken the sampling date as being the date received at the laboratory.

Two significant figures are reported for the majority of tests and with a high degree of confidence, for results <10*PQL, the second significant figure may be in doubt i.e. has a relatively high degree of uncertainty and is provided for information only.

Measurement Uncertainty estimates are available for most tests upon request.

Analysis of aqueous samples typically involves the extraction/digestion and/or analysis of the liquid phase only (i.e. NOT any settled sediment phase but inclusive of suspended particles if present), unless stipulated on the Envirolab COC or by correspondence. Notable exceptions include certain Physical Tests (pH/EC/BOD/COD/Apparent Colour etc.), Solids testing, Total Recoverable metals and PFAS where sediment/solids are included by default.

Urine Analysis - The BEI values listed are taken from the 2022 edition of *TLVs and BEIs Threshold Limits by ACGIH*.

Air volume measurements are not covered by Envirolab's NATA accreditation.

Data Quality Assessment Summary PFA1047

Client Details

Client	Katherine Town Council - NT
Your Reference	Katherine Town Council - EPL298-01 - Monthly
Date Issued	07/02/2024

Recommended Holding Time Compliance

No recommended holding time exceedances

Quality Control and QC Frequency

QC Type	Compliant	Details
Blank	Yes	No Outliers
LCS	Yes	No Outliers
Duplicates	No	Duplicate Outliers Exist - See detailed list below
Matrix Spike	Yes	No Outliers
Surrogates / Extracted Internal Standards	Yes	No Outliers
QC Frequency	No	QC Frequency Outliers Exist - See detailed list below

Surrogates/Extracted Internal Standards, Duplicates and/or Matrix Spikes are not always relevant/applicable to certain analyses and matrices. Therefore, said QC measures are deemed compliant in these situations by default. See Laboratory Acceptance Criteria for more information

Data Quality Assessment Summary PFA1047

Recommended Holding Time Compliance

Analysis	Sample Number(s)	Date Sampled	Date Extracted	Date Analysed	Compliant
TDS | Water	1-7	21/01/2024	25/01/2024	25/01/2024	Yes
Alkalinity Suite | Water	1-7	21/01/2024	23/01/2024	23/01/2024	Yes
Chloride | Water	1-7	21/01/2024	24/01/2024	25/01/2024	Yes
Dissolved Cations | Water	1-7	21/01/2024	24/01/2024	25/01/2024	Yes
Ion Balance | Water	1-7	21/01/2024	29/01/2024	07/02/2024	Yes
Sulfate | Water	1-7	21/01/2024	24/01/2024	25/01/2024	Yes
Total Organic Carbon | Water	1-7	21/01/2024	25/01/2024	25/01/2024	Yes
Nitrogen - Ammonia | Water	1-7	21/01/2024	25/01/2024	25/01/2024	Yes
BOD | Water	1-7	21/01/2024	24/01/2024	30/01/2024	Yes
COD | Water	1-7	21/01/2024	29/01/2024	29/01/2024	Yes

Outliers: Duplicates

METALS-020|Inorganics - Ionic Balance and Indexes (Water)| Batch BFA2208

Sample ID	Duplicate ID	Analyte	% Limits	RPD
BFA2208-DUP1#	DUP1	Calcium	20.00	77.1
BFA2208-DUP1#	DUP1	Hardness as CaCO3	20.00	75.4
BFA2208-DUP1#	DUP1	Magnesium	20.00	75.9
BFA2208-DUP1#	DUP1	Potassium	20.00	45.6
BFA2208-DUP1#	DUP1	Sodium	20.00	26.6

Outliers: QC Frequency

INORG-091|Inorganics - Common Wastewater Parameters (Water)| Batch BFA2232

Analysis	QC Type	Expected	Reported
BOD	Duplicate	1	0

Quality Control PFA1047

INORG-018 | Inorganics - Physical Parameters (Water) | Batch BFA2379

Analyte	Units	PQL	Blank	DUP1 BFA2379-DUP1# Samp | QC | RPD %	DUP2 BFA2379-DUP2# Samp | QC | RPD %	LCS %
Total Dissolved Solids	mg/L	5.0	<5.0	37.0 | 37.0 | 0.00	45.0 | 43.0 | 4.55 [1]	104

The QC reported was not specifically part of this workorder but formed part of the QC process batch.

INORG-006 | Inorganics - Ionic Balance and Indexes (Water) | Batch BFA2135

Analyte	Units	PQL	Blank	DUP1 PFA1047-01 Samp | QC | RPD %	DUP2 BFA2135-DUP2# Samp | QC | RPD %	LCS %
Bicarbonate Alkalinity as CaCO3	mg/L as CaCO3	5.0	<5.0	359 | 361 | 0.528	12.5 | 11.8 | 5.76	[NA]
Carbonate Alkalinity as CaCO3	mg/L as CaCO3	5.0	<5.0	<5.0 | <5.0 | [NA]	<5.0 | <5.0 | [NA]	[NA]
Hydroxide OH- as CaCO3	mg/L as CaCO3	5.0	<5.0	<5.0 | <5.0 | [NA]	<5.0 | <5.0 | [NA]	[NA]
Total Alkalinity as CaCO3	mg/L as CaCO3	5.0	<5.0	359 | 361 | 0.528	12.5 | 11.8 | 5.76	[NA]

Analyte	Units	PQL	Blank	LCS %
Total Alkalinity as CaCO3	mg/L as CaCO3	5		92.4

The QC reported was not specifically part of this workorder but formed part of the QC process batch.

METALS-020 | Inorganics - Ionic Balance and Indexes (Water) | Batch BFA2208

Analyte	Units	PQL	Blank	DUP1 BFA2208-DUP1# Samp | QC | RPD %	DUP2 BFA2208-DUP2# Samp | QC | RPD %	LCS %	Spike % PFA1047-01
Calcium	mg/L	0.50	<0.50	2.82 | 1.25 | 77.1	8.66 | 8.88 | 2.53	97.6	93.4
Magnesium	mg/L	0.50	<0.50	4.91 | 2.21 | 75.9	16.0 | 16.3 | 1.93	98.9	101
Potassium	mg/L	0.50	<0.50	1.15 | 0.723 | 45.6	1.80 | 1.82 | 1.37	97.4	97.6
Sodium	mg/L	0.50	<0.50	108 | 83.0 | 26.6	110 | 112 | 1.68	97.1	100
Hardness as CaCO3	mg/L	3.0	<3.0	27.0 | 12.2 | 75.4	87.3 | 89.2 | 2.08	[NA]	[NA]

The QC reported was not specifically part of this workorder but formed part of the QC process batch.

INORG-081 | Inorganics - Ionic Balance and Indexes (Water) | Batch BFA2290

Analyte	Units	PQL	Blank	DUP1 PFA1047-01 Samp | QC | RPD %	DUP2 BFA2290-DUP2# Samp | QC | RPD %	LCS %	Spike % PFA1047-02
Chloride	mg/L	1.0	<1.0	5.13 | 5.13 | 0.0467	761 | 760 | 0.0884	97.3	99.9
Sulfate	mg/L	1.0	<1.0	6.09 | 6.02 | 1.03	41.5 | 41.2 | 0.611	89.9	99.9

The QC reported was not specifically part of this workorder but formed part of the QC process batch.

INORG-079 | Inorganics - Carbons, Nitrogen Species, Sulfur Species (Water) | Batch BFA2333

Analyte	Units	PQL	Blank	DUP1 PFA1047-01 Samp | QC | RPD %	DUP2 PFA1047-07 Samp | QC | RPD %	LCS %	Spike % PFA1047-02
Total Organic Carbon	mg/L	1.0	<1.0	<1.0 | <1.0 | [NA]	<1.0 | <1.0 | [NA]	107	106

INORG-057 | Inorganics - Nutrients (Water) | Batch BFA2355

Analyte	Units	PQL	Blank	DUP1 BFA2355-DUP1# Samp | QC | RPD %	DUP2 BFA2355-DUP2# Samp | QC | RPD %	LCS %	Spike % BFA2355-MS1#
Ammonia as N	mg/L	0.0050	<0.0050	0.0154 | 0.0162 | 5.09	<0.0050 | <0.0050 | [NA]	91.0	82.7

The QC reported was not specifically part of this workorder but formed part of the QC process batch.

Quality Control PFA1047

INORG-067|Inorganics - Common Wastewater Parameters (Water) | Batch BFA2425

Analyte	Units	PQL	Blank	DUP1 PFA1047-01 Samp | QC | RPD %	DUP2 BFA2425-DUP2# Samp | QC | RPD %	LCS %
COD	mg O2/L	20	<20	<20 | <20 | [NA]	249 | 253 | 1.59	116

The QC reported was not specifically part of this workorder but formed part of the QC process batch.

QC Comments

Identifier	Description
[1]	Some EC to TDS ratios are outside normal expected values. Results were confirmed.

Envirolab Services (WA) Pty Ltd trading as MPL Laboratories
ABN 53 140 099 207
16-18 Hayden Court Myaree WA 6154
ph +61 8 9317 2505
lab@mpl.com.au
www.mpl.com.au

Certificate of Analysis PFB1283

Client Details

Client	Katherine Town Council - NT
Contact	Brett Kimpton
Address	PO Box 1071, KATHERINE, NT, 0851

Sample Details

Your Reference	Katherine Town Council - EPL298 - Quarterly
Number of Samples	11 Water
Date Samples Received	21/02/2024
Date Instructions Received	21/02/2024

Analysis Details

Please refer to the following pages for results, methodology summary and quality control data.
Samples were analysed as received from the client. Results relate specifically to the samples as received.
Results are reported on a dry weight basis for solids and on an as received basis for other matrices.

Report Details

Date Results Requested by	08/03/2024
Date of Issue	08/03/2024

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Accredited for compliance with ISO/IEC 17025. Tests not covered by NATA are denoted with *.

Authorisation Details

Results Approved By	Amanda Chui, Senior Chemist Ben Carpenter, Metals Technician Heram Halim, Operations Manager Lien Tang, Assistant Operations Manager Michael Mowle, Inorganics Supervisor Priya Samarawickrama, Senior Chemist, Inorganics Travis Carey, Organics Supervisor
Laboratory Manager	Michael Kubiak

Certificate of Analysis PFB1283

Samples in this Report

Envirolab ID	Sample ID	Depth	Matrix	Date Sampled	Date Received
PFB1283-01	SWB		Water	18/02/2024	21/02/2024
PFB1283-02	SWC		Water	18/02/2024	21/02/2024
PFB1283-03	GWA (RN031131)		Water	18/02/2024	21/02/2024
PFB1283-04	GWE (RN022487)	6.54Meters	Water	18/02/2024	21/02/2024
PFB1283-05	GWB01	6.40Meters	Water	18/02/2024	21/02/2024
PFB1283-06	GWB02	6.10Meters	Water	18/02/2024	21/02/2024
PFB1283-07	GWB03	5.10Meters	Water	18/02/2024	21/02/2024
PFB1283-08	GWB04	6.20Meters	Water	18/02/2024	21/02/2024
PFB1283-09	Field Blank		Water	18/02/2024	21/02/2024
PFB1283-10	Duplicate		Water	18/02/2024	21/02/2024
PFB1283-11	Trip Blank		Water	18/02/2024	21/02/2024

Sample Comments

GWA (RN031131)	Sample(s) was/were received with headspace, analytical results may be affected.
GWE (RN022487)	Sample(s) was/were received with headspace, analytical results may be affected.
GWB01	Sample(s) was/were received with headspace, analytical results may be affected.
GWB01	Insufficient sample - BOD & TDS not tested
GWB02	Sample(s) was/were received with headspace, analytical results may be affected.
GWB03	Sample(s) was/were received with headspace, analytical results may be affected.
GWB04	Sample(s) was/were received with headspace, analytical results may be affected.
Field Blank	Sample(s) was/were received with headspace, analytical results may be affected.
Duplicate	Sample(s) was/were received with headspace, analytical results may be affected.

Volatile TRH and BTEX (Water)

Envirolab ID	Units	PQL	PFB1283-04	PFB1283-05	PFB1283-06	PFB1283-07	PFB1283-08
Your Reference			GWE (RN022487)	GWB01	GWB02	GWB03	GWB04
Date Sampled			18/02/2024	18/02/2024	18/02/2024	18/02/2024	18/02/2024
Depth			6.54	6.40	6.10	5.10	6.20
TRH C6-C9	µg/L	10	<10	<10	<10	<10	<10
TRH C6-C10	µg/L	10	<10	<10	<10	<10	<10
TRH C6-C10 less BTEX (F1)	µg/L	10	<10	<10	<10	<10	<10
Methyl tert butyl ether (MTBE)	µg/L	1.0	<1.0	<1.0	<1.0	<1.0	<1.0
Benzene	µg/L	1.0	<1.0	<1.0	<1.0	<1.0	<1.0
Toluene	µg/L	1.0	<1.0	<1.0	<1.0	<1.0	<1.0
Ethylbenzene	µg/L	1.0	<1.0	<1.0	<1.0	<1.0	<1.0
meta+para Xylene	µg/L	2.0	<2.0	<2.0	<2.0	<2.0	<2.0
ortho-Xylene	µg/L	1.0	<1.0	<1.0	<1.0	<1.0	<1.0
Total Xylene	µg/L	3.0	<3.0	<3.0	<3.0	<3.0	<3.0
Naphthalene (value used in F2 calc)	µg/L	1.0	<1.0	<1.0	<1.0	<1.0	<1.0
Surrogate Dibromofluoromethane	%		*86.0*	*84.4*	*87.0*	*87.9*	*87.7*
Surrogate Toluene-D8	%		*100*	*99.7*	*101*	*98.1*	*102*
Surrogate 4-Bromofluorobenzene	%		*99.1*	*101*	*99.8*	*99.3*	*101*

Envirolab ID	Units	PQL	PFB1283-09	PFB1283-10	PFB1283-11
Your Reference			Field Blank	Duplicate	Trip Blank
Date Sampled			18/02/2024	18/02/2024	18/02/2024
TRH C6-C9	µg/L	10	<10	<10	<10
TRH C6-C10	µg/L	10	<10	<10	<10
TRH C6-C10 less BTEX (F1)	µg/L	10	<10	<10	<10
Methyl tert butyl ether (MTBE)	µg/L	1.0	<1.0	<1.0	<1.0
Benzene	µg/L	1.0	<1.0	<1.0	<1.0
Toluene	µg/L	1.0	<1.0	<1.0	<1.0
Ethylbenzene	µg/L	1.0	<1.0	<1.0	<1.0
meta+para Xylene	µg/L	2.0	<2.0	<2.0	<2.0
ortho-Xylene	µg/L	1.0	<1.0	<1.0	<1.0
Total Xylene	µg/L	3.0	<3.0	<3.0	<3.0
Naphthalene (value used in F2 calc)	µg/L	1.0	<1.0	<1.0	<1.0
Surrogate Dibromofluoromethane	%		*89.8*	*88.9*	*94.5*
Surrogate Toluene-D8	%		*100*	*98.6*	*101*
Surrogate 4-Bromofluorobenzene	%		*98.2*	*96.7*	*97.1*

Semi-volatile TRH (Water)

Envirolab ID	Units	PQL	PFB1283-04	PFB1283-05	PFB1283-06	PFB1283-07	PFB1283-08
Your Reference			GWE (RN022487)	GWB01	GWB02	GWB03	GWB04
Date Sampled			18/02/2024	18/02/2024	18/02/2024	18/02/2024	18/02/2024
Depth			6.54	6.40	6.10	5.10	6.20
TRH C10-C14	µg/L	50	<50	<50	<50	<50	<50
TRH C15-C28	µg/L	100	<100	<100	<100	<100	<100
TRH C29-C36	µg/L	100	<100	<100	<100	<100	<100
Total +ve TRH C10-C36	µg/L	50	<50	<50	<50	<50	<50
TRH >C10-C16	µg/L	50	<50	<50	<50	<50	<50
TRH >C10-C16 less Naphthalene F2	µg/L	50	<50	<50	<50	<50	<50
TRH >C16-C34 (F3)	µg/L	100	<100	<100	<100	<100	<100
TRH >C34-C40 (F4)	µg/L	100	<100	<100	<100	<100	<100
Total +ve TRH >C10-C40	µg/L	50	<50	<50	<50	<50	<50
Surrogate o-Terphenyl	%		*82.1*	*71.7*	*68.9*	*80.4*	*78.7*

Envirolab ID	Units	PQL	PFB1283-09	PFB1283-10	PFB1283-11
Your Reference			Field Blank	Duplicate	Trip Blank
Date Sampled			18/02/2024	18/02/2024	18/02/2024
TRH C10-C14	µg/L	50	<50	<50	<50
TRH C15-C28	µg/L	100	<100	<100	<100
TRH C29-C36	µg/L	100	<100	<100	<100
Total +ve TRH C10-C36	µg/L	50	<50	<50	<50
TRH >C10-C16	µg/L	50	<50	<50	<50
TRH >C10-C16 less Naphthalene F2	µg/L	50	<50	<50	<50
TRH >C16-C34 (F3)	µg/L	100	<100	<100	<100
TRH >C34-C40 (F4)	µg/L	100	<100	<100	<100
Total +ve TRH >C10-C40	µg/L	50	<50	<50	<50
Surrogate o-Terphenyl	%		*83.5*	*63.9*	*88.2*

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Polycyclic Aromatic Hydrocarbons (Water)

Envirolab ID	Units	PQL	PFB1283-04	PFB1283-05	PFB1283-06	PFB1283-07	PFB1283-08
Your Reference			GWE (RN022487)	GWB01	GWB02	GWB03	GWB04
Date Sampled			18/02/2024	18/02/2024	18/02/2024	18/02/2024	18/02/2024
Depth			6.54	6.40	6.10	5.10	6.20
Naphthalene	µg/L	0.10	<0.10	<0.10	<0.10	<0.10	<0.10
Acenaphthylene	µg/L	0.10	<0.10	<0.10	<0.10	<0.10	<0.10
Acenaphthene	µg/L	0.10	<0.10	<0.10	<0.10	<0.10	<0.10
Fluorene	µg/L	0.10	<0.10	<0.10	<0.10	<0.10	<0.10
Phenanthrene	µg/L	0.10	<0.10	<0.10	<0.10	<0.10	<0.10
Anthracene	µg/L	0.10	<0.10	<0.10	<0.10	<0.10	<0.10
Fluoranthene	µg/L	0.10	<0.10	<0.10	<0.10	<0.10	<0.10
Pyrene	µg/L	0.10	<0.10	<0.10	<0.10	<0.10	<0.10
Benzo(a)anthracene	µg/L	0.10	<0.10	<0.10	<0.10	<0.10	<0.10
Chrysene	µg/L	0.10	<0.10	<0.10	<0.10	<0.10	<0.10
Benzo(b,j,k)fluoranthene	µg/L	0.20	<0.20	<0.20	<0.20	<0.20	<0.20
Benzo(a)pyrene	µg/L	0.10	<0.10	<0.10	<0.10	<0.10	<0.10
Indeno(1,2,3-c,d)pyrene	µg/L	0.10	<0.10	<0.10	<0.10	<0.10	<0.10
Dibenzo(a,h)anthracene	µg/L	0.10	<0.10	<0.10	<0.10	<0.10	<0.10
Benzo(g,h,i)perylene	µg/L	0.10	<0.10	<0.10	<0.10	<0.10	<0.10
Total +ve PAH	µg/L	0.10	<0.10	<0.10	<0.10	<0.10	<0.10
Surrogate p-Terphenyl-D14	%		*82.6*	*71.3*	*67.4*	*74.9*	*67.6*

Envirolab ID	Units	PQL	PFB1283-09	PFB1283-10	PFB1283-11
Your Reference			Field Blank	Duplicate	Trip Blank
Date Sampled			18/02/2024	18/02/2024	18/02/2024
Naphthalene	µg/L	0.10	<0.10	<0.10	<0.10
Acenaphthylene	µg/L	0.10	<0.10	<0.10	<0.10
Acenaphthene	µg/L	0.10	<0.10	<0.10	<0.10
Fluorene	µg/L	0.10	<0.10	<0.10	<0.10
Phenanthrene	µg/L	0.10	<0.10	<0.10	<0.10
Anthracene	µg/L	0.10	<0.10	<0.10	<0.10
Fluoranthene	µg/L	0.10	<0.10	<0.10	<0.10
Pyrene	µg/L	0.10	<0.10	<0.10	<0.10
Benzo(a)anthracene	µg/L	0.10	<0.10	<0.10	<0.10
Chrysene	µg/L	0.10	<0.10	<0.10	<0.10
Benzo(b,j,k)fluoranthene	µg/L	0.20	<0.20	<0.20	<0.20
Benzo(a)pyrene	µg/L	0.10	<0.10	<0.10	<0.10
Indeno(1,2,3-c,d)pyrene	µg/L	0.10	<0.10	<0.10	<0.10
Dibenzo(a,h)anthracene	µg/L	0.10	<0.10	<0.10	<0.10
Benzo(g,h,i)perylene	µg/L	0.10	<0.10	<0.10	<0.10
Total +ve PAH	µg/L	0.10	<0.10	<0.10	<0.10
Surrogate p-Terphenyl-D14	%		*96.4*	*75.7*	*86.3*

Polychlorinated Biphenyls (Water)

Envirolab ID	Units	PQL	PFB1283-04	PFB1283-05	PFB1283-06	PFB1283-07	PFB1283-08
Your Reference			GWE (RN022487)	GWB01	GWB02	GWB03	GWB04
Date Sampled			18/02/2024	18/02/2024	18/02/2024	18/02/2024	18/02/2024
Depth			6.54	6.40	6.10	5.10	6.20
Aroclor 1016	µg/L	2.0	<2.0	<2.0	<2.0	<2.0	<2.0
Aroclor 1221	µg/L	2.0	<2.0	<2.0	<2.0	<2.0	<2.0
Aroclor 1232	µg/L	2.0	<2.0	<2.0	<2.0	<2.0	<2.0
Aroclor 1242	µg/L	2.0	<2.0	<2.0	<2.0	<2.0	<2.0
Aroclor 1248	µg/L	2.0	<2.0	<2.0	<2.0	<2.0	<2.0
Aroclor 1254	µg/L	2.0	<2.0	<2.0	<2.0	<2.0	<2.0
Aroclor 1260	µg/L	2.0	<2.0	<2.0	<2.0	<2.0	<2.0
Total +ve PCB (1016-1260)	µg/L	2.0	<2.0	<2.0	<2.0	<2.0	<2.0
Surrogate 2-Fluorobiphenyl	%		*73.8*	*74.7*	*79.2*	*70.1*	*65.9*

Envirolab ID	Units	PQL	PFB1283-09	PFB1283-10	PFB1283-11
Your Reference			Field Blank	Duplicate	Trip Blank
Date Sampled			18/02/2024	18/02/2024	18/02/2024
Aroclor 1016	µg/L	2.0	<2.0	<2.0	<2.0
Aroclor 1221	µg/L	2.0	<2.0	<2.0	<2.0
Aroclor 1232	µg/L	2.0	<2.0	<2.0	<2.0
Aroclor 1242	µg/L	2.0	<2.0	<2.0	<2.0
Aroclor 1248	µg/L	2.0	<2.0	<2.0	<2.0
Aroclor 1254	µg/L	2.0	<2.0	<2.0	<2.0
Aroclor 1260	µg/L	2.0	<2.0	<2.0	<2.0
Total +ve PCB (1016-1260)	µg/L	2.0	<2.0	<2.0	<2.0
Surrogate 2-Fluorobiphenyl	%		*82.5*	*63.7*	*76.4*

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Acid Extractable Low Level Metals (Water)

Envirolab ID	Units	PQL	PFB1283-01	PFB1283-02	PFB1283-03	PFB1283-04	PFB1283-05
Your Reference			SWB	SWC	GWA (RN031131)	GWE (RN022487)	GWB01
Date Sampled			18/02/2024	18/02/2024	18/02/2024	18/02/2024	18/02/2024
Depth						6.54	6.40
Aluminium	µg/L	10	1000	970	<10	<10	37
Cadmium	µg/L	0.10	<0.10	<0.10	<0.10	<0.10	<0.10
Chromium	µg/L	1.0	1.9	1.9	<1.0	<1.0	<1.0
Copper	µg/L	1.0	2.3	2.3	4.5	<1.0	3.9
Iron	µg/L	10	1600	1600	120	240	59
Manganese	µg/L	1.0	27	26	1.1	7.6	15
Nickel	µg/L	1.0	1.4	1.4	<1.0	<1.0	1.6
Lead	µg/L	1.0	<1.0	<1.0	<1.0	<1.0	<1.0
Selenium	µg/L	1.0	<1.0	<1.0	<1.0	<1.0	<1.0
Zinc	µg/L	1.0	3.3	3.4	32	1.0	4.4

Envirolab ID	Units	PQL	PFB1283-06	PFB1283-07	PFB1283-08	PFB1283-09	PFB1283-10
Your Reference			GWB02	GWB03	GWB04	Field Blank	Duplicate
Date Sampled			18/02/2024	18/02/2024	18/02/2024	18/02/2024	18/02/2024
Depth			6.10	5.10	6.20		
Aluminium	µg/L	10	22	20	140	<10	<10
Cadmium	µg/L	0.10	<0.10	<0.10	<0.10	0.12	<0.10
Chromium	µg/L	1.0	<1.0	<1.0	<1.0	<1.0	<1.0
Copper	µg/L	1.0	2.6	1.5	1.0	<1.0	27
Iron	µg/L	10	41	32	130	<10	2800
Manganese	µg/L	1.0	3.5	1.9	3.8	<1.0	5.0
Nickel	µg/L	1.0	1.5	<1.0	<1.0	<1.0	2.0
Lead	µg/L	1.0	<1.0	<1.0	2.8	<1.0	2.1
Selenium	µg/L	1.0	<1.0	<1.0	<1.0	<1.0	<1.0
Zinc	µg/L	1.0	6.6	6.5	37	1.2	330

Envirolab ID	Units	PQL	PFB1283-11
Your Reference			Trip Blank
Date Sampled			18/02/2024
Aluminium	µg/L	10	<10
Cadmium	µg/L	0.10	<0.10
Chromium	µg/L	1.0	<1.0
Copper	µg/L	1.0	<1.0
Iron	µg/L	10	<10
Manganese	µg/L	1.0	<1.0
Nickel	µg/L	1.0	<1.0
Lead	µg/L	1.0	<1.0
Selenium	µg/L	1.0	<1.0
Zinc	µg/L	1.0	1.0

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Dissolved Low Level Metals (Water)

Envirolab ID	Units	PQL	PFB1283-01	PFB1283-02	PFB1283-03	PFB1283-04	PFB1283-05
Your Reference			SWB	SWC	GWA (RN031131)	GWE (RN022487)	GWB01
Date Sampled			18/02/2024	18/02/2024	18/02/2024	18/02/2024	18/02/2024
Depth						6.54	6.40
Aluminium	µg/L	10	<10	<10	<10	<10	36
Cadmium	µg/L	0.10	<0.10	<0.10	<0.10	<0.10	<0.10
Chromium	µg/L	1.0	<1.0	<1.0	<1.0	<1.0	<1.0
Copper	µg/L	1.0	1.2	1.1	4.0	<1.0	5.2
Iron	µg/L	10	<10	<10	16	21	41
Manganese	µg/L	1.0	4.8	4.1	<1.0	6.5	31
Nickel	µg/L	1.0	<1.0	<1.0	<1.0	<1.0	2.6
Lead	µg/L	1.0	<1.0	<1.0	<1.0	<1.0	<1.0
Selenium	µg/L	1.0	<1.0	<1.0	<1.0	<1.0	<1.0
Zinc	µg/L	1.0	1.3	2.2	35	<1.0	6.8

Envirolab ID	Units	PQL	PFB1283-06	PFB1283-07	PFB1283-08	PFB1283-09	PFB1283-10
Your Reference			GWB02	GWB03	GWB04	Field Blank	Duplicate
Date Sampled			18/02/2024	18/02/2024	18/02/2024	18/02/2024	18/02/2024
Depth			6.10	5.10	6.20		
Aluminium	µg/L	10	<10	<10	<10	<10	<10
Cadmium	µg/L	0.10	<0.10	<0.10	<0.10	<0.10	<0.10
Chromium	µg/L	1.0	<1.0	<1.0	<1.0	<1.0	<1.0
Copper	µg/L	1.0	2.4	<1.0	<1.0	<1.0	14
Iron	µg/L	10	<10	<10	<10	<10	<10
Manganese	µg/L	1.0	<1.0	<1.0	<1.0	<1.0	4.4
Nickel	µg/L	1.0	1.3	<1.0	<1.0	<1.0	1.9
Lead	µg/L	1.0	<1.0	<1.0	1.9	<1.0	<1.0
Selenium	µg/L	1.0	<1.0	<1.0	<1.0	<1.0	<1.0
Zinc	µg/L	1.0	3.4	2.0	33	<1.0	340

Envirolab ID	Units	PQL	PFB1283-11
Your Reference			Trip Blank
Date Sampled			18/02/2024
Aluminium	µg/L	10	<10
Cadmium	µg/L	0.10	<0.10
Chromium	µg/L	1.0	<1.0
Copper	µg/L	1.0	<1.0
Iron	µg/L	10	<10
Manganese	µg/L	1.0	<1.0
Nickel	µg/L	1.0	<1.0
Lead	µg/L	1.0	<1.0
Selenium	µg/L	1.0	<1.0
Zinc	µg/L	1.0	<1.0

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Inorganics - Physical Parameters (Water)

Envirolab ID	Units	PQL	PFB1283-01	PFB1283-02	PFB1283-03	PFB1283-04	PFB1283-06
Your Reference			SWB	SWC	GWA (RN031131)	GWE (RN022487)	GWB02
Date Sampled			18/02/2024	18/02/2024	18/02/2024	18/02/2024	18/02/2024
Depth						6.54	6.10
Total Dissolved Solids	mg/L	5.0	220 [1]	230	340	220	510

Envirolab ID	Units	PQL	PFB1283-07	PFB1283-08	PFB1283-09	PFB1283-10	PFB1283-11
Your Reference			GWB03	GWB04	Field Blank	Duplicate	Trip Blank
Date Sampled			18/02/2024	18/02/2024	18/02/2024	18/02/2024	18/02/2024
Depth			5.10	6.20			
Total Dissolved Solids	mg/L	5.0	400	450	<5.0	310	<5.0

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Inorganics - Physical Parameters (Water) - Analysed By Envirolab Services Sydney

Envirolab ID	Units	PQL	PFB1283-01	PFB1283-02	PFB1283-03	PFB1283-04	PFB1283-05
Your Reference			SWB	SWC	GWA (RN031131)	GWE (RN022487)	GWB01
Date Sampled			18/02/2024	18/02/2024	18/02/2024	18/02/2024	18/02/2024
Depth						6.54	6.40
Volatile Fatty Acids*	mg/L	5.0	14	21	76	49	100

Envirolab ID	Units	PQL	PFB1283-06	PFB1283-07	PFB1283-08	PFB1283-09	PFB1283-10
Your Reference			GWB02	GWB03	GWB04	Field Blank	Duplicate
Date Sampled			18/02/2024	18/02/2024	18/02/2024	18/02/2024	18/02/2024
Depth			6.10	5.10	6.20		
Volatile Fatty Acids*	mg/L	5.0	290	180	140	<5.0	81

Envirolab ID	Units	PQL	PFB1283-11
Your Reference			Trip Blank
Date Sampled			18/02/2024
Volatile Fatty Acids*	mg/L	5.0	<5.0

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Inorganics - Ionic Balance and Indexes (Water)

Envirolab ID	Units	PQL	PFB1283-01	PFB1283-02	PFB1283-03	PFB1283-04	PFB1283-05
Your Reference			SWB	SWC	GWA (RN031131)	GWE (RN022487)	GWB01
Date Sampled			18/02/2024	18/02/2024	18/02/2024	18/02/2024	18/02/2024
Depth						6.54	6.40
Bicarbonate Alkalinity as CaCO3	mg/L as CaCO3	5.0	210	230	340	230	430
Carbonate Alkalinity as CaCO3	mg/L as CaCO3	5.0	<5.0	<5.0	<5.0	<5.0	<5.0
Hydroxide OH- as CaCO3	mg/L as CaCO3	5.0	<5.0	<5.0	<5.0	<5.0	<5.0
Total Alkalinity as CaCO3	mg/L as CaCO3	5.0	210	230	340	230	430
Chloride	mg/L	1.0	6.3	7.1	6.2	9.5	37
Sulfate	mg/L	1.0	1.7	1.9	7.5	6.8	21
Calcium	mg/L	0.50	43	47	74	27	82
Magnesium	mg/L	0.50	18	20	35	28	41
Potassium	mg/L	0.50	8.4	5.6	5.9	6.3	11
Sodium	mg/L	0.50	5.0	5.4	5.1	14	21
Hardness as CaCO3	mg/L	3.0	180	200	330	180	380
Ionic Balance	%		-4.4	-6.2	-1.2	-6.8	-7.3
Total Anions	mg/L	7.0	220	240	350	240	490
Anions as meq	meq/L	0.59	3.7	4.0	5.8	4.1	8.5
Total Cations	mg/L	2.0	74	78	120	75	160
Cations as meq	meq/L	0.10	4.0	4.4	7.0	4.4	8.7

Envirolab ID	Units	PQL	PFB1283-06	PFB1283-07	PFB1283-08	PFB1283-09	PFB1283-10
Your Reference			GWB02	GWB03	GWB04	Field Blank	Duplicate
Date Sampled			18/02/2024	18/02/2024	18/02/2024	18/02/2024	18/02/2024
Depth			6.10	5.10	6.20		
Bicarbonate Alkalinity as CaCO3	mg/L as CaCO3	5.0	420	420	430	6.5	300
Carbonate Alkalinity as CaCO3	mg/L as CaCO3	5.0	<5.0	<5.0	<5.0	<5.0	<5.0
Hydroxide OH- as CaCO3	mg/L as CaCO3	5.0	<5.0	<5.0	<5.0	<5.0	<5.0
Total Alkalinity as CaCO3	mg/L as CaCO3	5.0	420	420	430	6.5	300
Chloride	mg/L	1.0	35	7.1	9.4	<1.0	4.9
Sulfate	mg/L	1.0	32	7.0	9.2	<1.0	4.4
Calcium	mg/L	0.50	99	81	71	<0.50	67
Magnesium	mg/L	0.50	48	41	54	<0.50	31
Potassium	mg/L	0.50	8.3	4.2	7.7	<0.50	4.3
Sodium	mg/L	0.50	21	5.6	6.1	<0.50	5.5
Hardness as CaCO3	mg/L	3.0	450	370	400	<3.0	290
Ionic Balance	%		-0.035	-5.8	-3.5	-90 [8]	-0.030
Total Anions	mg/L	7.0	490	430	450	<7.0	310
Anions as meq	meq/L	0.59	8.5	7.2	7.5	<0.59	5.2
Total Cations	mg/L	2.0	180	130	140	<2.0	110
Cations as meq	meq/L	0.10	10	7.8	8.5	<0.10	6.2

Envirolab ID	Units	PQL	PFB1283-11
Your Reference			Trip Blank
Date Sampled			18/02/2024
Bicarbonate Alkalinity as CaCO3	mg/L as CaCO3	5.0	6.3
Carbonate Alkalinity as CaCO3	mg/L as CaCO3	5.0	<5.0
Hydroxide OH- as CaCO3	mg/L as CaCO3	5.0	<5.0
Total Alkalinity as CaCO3	mg/L as CaCO3	5.0	6.3
Chloride	mg/L	1.0	<1.0

Inorganics - Ionic Balance and Indexes (Water)

Envirolab ID	Units	PQL	PFB1283-11
Your Reference			Trip Blank
Date Sampled			18/02/2024
Sulfate	mg/L	1.0	<1.0
Calcium	mg/L	0.50	<0.50
Magnesium	mg/L	0.50	<0.50
Potassium	mg/L	0.50	<0.50
Sodium	mg/L	0.50	<0.50
Hardness as CaCO3	mg/L	3.0	<3.0
Ionic Balance	%		-99 [8]
Total Anions	mg/L	7.0	<7.0
Anions as meq	meq/L	0.59	<0.59
Total Cations	mg/L	2.0	<2.0
Cations as meq	meq/L	0.10	<0.10

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Inorganics - Carbons, Nitrogen Species, Sulfur Species (Water)

Envirolab ID	Units	PQL	PFB1283-01	PFB1283-02	PFB1283-03	PFB1283-04	PFB1283-05
Your Reference			SWB	SWC	GWA (RN031131)	GWE (RN022487)	GWB01
Date Sampled			18/02/2024	18/02/2024	18/02/2024	18/02/2024	18/02/2024
Depth						6.54	6.40
Total Organic Carbon	mg/L	1.0	6.4	5.5	2.1	<1.0	2.7

Envirolab ID	Units	PQL	PFB1283-06	PFB1283-07	PFB1283-08	PFB1283-09	PFB1283-10
Your Reference			GWB02	GWB03	GWB04	Field Blank	Duplicate
Date Sampled			18/02/2024	18/02/2024	18/02/2024	18/02/2024	18/02/2024
Depth			6.10	5.10	6.20		
Total Organic Carbon	mg/L	1.0	2.0	<1.0	2.3	<1.0	<1.0

Envirolab ID	Units	PQL	PFB1283-11
Your Reference			Trip Blank
Date Sampled			18/02/2024
Total Organic Carbon	mg/L	1.0	<1.0

Inorganics - Speciated Cr (III/VI) and Fe (II/III) (Water)

Envirolab ID	Units	PQL	PFB1283-01	PFB1283-02	PFB1283-03	PFB1283-04	PFB1283-05
Your Reference			SWB	SWC	GWA (RN031131)	GWE (RN022487)	GWB01
Date Sampled			18/02/2024	18/02/2024	18/02/2024	18/02/2024	18/02/2024
Depth						6.54	6.40
Hexavalent Chromium	mg/L	0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050
Hexavalent Chromium (Total)	mg/L	0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050
Trivalent Chromium	mg/L	0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050
Trivalent Chromium (Total)*	mg/L	0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050

Envirolab ID	Units	PQL	PFB1283-06	PFB1283-07	PFB1283-08	PFB1283-09	PFB1283-10
Your Reference			GWB02	GWB03	GWB04	Field Blank	Duplicate
Date Sampled			18/02/2024	18/02/2024	18/02/2024	18/02/2024	18/02/2024
Depth			6.10	5.10	6.20		
Hexavalent Chromium	mg/L	0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050
Hexavalent Chromium (Total)	mg/L	0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050
Trivalent Chromium	mg/L	0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050
Trivalent Chromium (Total)*	mg/L	0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050

Envirolab ID	Units	PQL	PFB1283-11
Your Reference			Trip Blank
Date Sampled			18/02/2024
Hexavalent Chromium	mg/L	0.0050	<0.0050
Hexavalent Chromium (Total)	mg/L	0.0050	<0.0050
Trivalent Chromium	mg/L	0.0050	<0.0050
Trivalent Chromium (Total)*	mg/L	0.0050	<0.0050

Inorganics - Nutrients (Water)

Envirolab ID	Units	PQL	PFB1283-01	PFB1283-02	PFB1283-03	PFB1283-04	PFB1283-05
Your Reference			SWB	SWC	GWA (RN031131)	GWE (RN022487)	GWB01
Date Sampled			18/02/2024	18/02/2024	18/02/2024	18/02/2024	18/02/2024
Depth						6.54	6.40
Ammonia as N	mg/L	0.0050	<0.0050	<0.0050	<0.0050	<0.0050	0.16
Free Ammonia (unionised) as N by calculation*	mg/L	0.0070	<0.0070	<0.0070	<0.0070	<0.0070	<0.0070
Ammonium (NH4+) as N by calculation	mg/L	0.0070	<0.0070	<0.0070	<0.0070	<0.0070	0.16
Nitrate as N	mg/L	0.0050	0.014	1.3	2.7	2.5	0.79
Nitrate as NO3 by calculation	mg/L	0.020	0.064	5.6	12	11	3.5
Total Nitrogen	mg/L	0.10	0.44	0.41	1.3	0.30	1.2
Total Phosphorus	mg/L	0.010	0.016	0.010	0.057	<0.010	<0.010

Envirolab ID	Units	PQL	PFB1283-06	PFB1283-07	PFB1283-08	PFB1283-09	PFB1283-10
Your Reference			GWB02	GWB03	GWB04	Field Blank	Duplicate
Date Sampled			18/02/2024	18/02/2024	18/02/2024	18/02/2024	18/02/2024
Depth			6.10	5.10	6.20		
Ammonia as N	mg/L	0.0050	0.039	0.018	<0.0050	<0.0050	<0.0050
Free Ammonia (unionised) as N by calculation*	mg/L	0.0070	<0.0070	<0.0070	<0.0070	<0.0070	<0.0070
Ammonium (NH4+) as N by calculation	mg/L	0.0070	0.039	0.018	<0.0070	<0.0070	<0.0070
Nitrate as N	mg/L	0.0050	2.3	5.5	3.8	0.0084 [9]	0.015
Nitrate as NO3 by calculation	mg/L	0.020	10	24	17	0.037 [9]	0.066
Total Nitrogen	mg/L	0.10	2.6	3.8	3.9	<0.10	0.12
Total Phosphorus	mg/L	0.010	<0.010	<0.010	<0.010	<0.010	<0.010

Envirolab ID	Units	PQL	PFB1283-11
Your Reference			Trip Blank
Date Sampled			18/02/2024
Ammonia as N	mg/L	0.0050	<0.0050
Free Ammonia (unionised) as N by calculation*	mg/L	0.0070	<0.0070
Ammonium (NH4+) as N by calculation	mg/L	0.0070	<0.0070
Nitrate as N	mg/L	0.0050	0.0062
Nitrate as NO3 by calculation	mg/L	0.020	0.028
Total Nitrogen	mg/L	0.10	<0.10
Total Phosphorus	mg/L	0.010	<0.010

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Inorganics - Common Wastewater Parameters (Water)

Envirolab ID	Units	PQL	PFB1283-01	PFB1283-02	PFB1283-03	PFB1283-04	PFB1283-05
Your Reference			SWB	SWC	GWA (RN031131)	GWE (RN022487)	GWB01
Date Sampled			18/02/2024	18/02/2024	18/02/2024	18/02/2024	18/02/2024
Depth						6.54	6.40
BOD	mg/L	5.0	12	8.1	15	6.7	[NA]
COD	mg O2/L	20	21	21	<20	<20	<20

Envirolab ID	Units	PQL	PFB1283-06	PFB1283-07	PFB1283-08	PFB1283-09	PFB1283-10
Your Reference			GWB02	GWB03	GWB04	Field Blank	Duplicate
Date Sampled			18/02/2024	18/02/2024	18/02/2024	18/02/2024	18/02/2024
Depth			6.10	5.10	6.20		
BOD	mg/L	5.0	17	12	18	<5.0	5.6
COD	mg O2/L	20	<20	<20	<20	<20	<20

Envirolab ID	Units	PQL	PFB1283-11
Your Reference			Trip Blank
Date Sampled			18/02/2024
BOD	mg/L	5.0	<5.0
COD	mg O2/L	20	<20

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Envirolab ID	Units	PQL	PFB1283-03	PFB1283-04	PFB1283-05	PFB1283-06	PFB1283-07
Your Reference			GWA (RN031131)	GWE (RN022487)	GWB01	GWB02	GWB03
Date Sampled			18/02/2024	18/02/2024	18/02/2024	18/02/2024	18/02/2024
Depth				6.54	6.40	6.10	5.10
Perfluorobutanesulfonic acid (PFBS)	µg/L	0.010	<0.010	<0.010	0.10	0.11	<0.010
Perfluoropentanesulfonic acid (PFPeS)	µg/L	0.010	<0.010	<0.010	0.077	0.075	<0.010
Perfluorohexanesulfonic acid (PFHxS)	µg/L	0.010	<0.010	0.013	0.57	0.39	<0.010
Perfluoroheptanesulfonic acid (PFHpS)	µg/L	0.010	<0.010	<0.010	0.034	0.050	<0.010
Perfluorooctanesulfonic acid (PFOS)	µg/L	0.010	<0.010	0.016	1.2	0.67	<0.010
Perfluorodecanesulfonic acid (PFDS)	µg/L	0.020	<0.020	<0.020	<0.020	<0.020	<0.020
Perfluorobutanoic acid (PFBA)	µg/L	0.020	0.021	<0.020	0.071	0.089	<0.020
Perfluoropentanoic acid (PFPeA)	µg/L	0.020	0.033	<0.020	0.039	0.094	<0.020
Perfluorohexanoic acid (PFHxA)	µg/L	0.010	0.015	<0.010	0.067	0.17	<0.010
Perfluoroheptanoic acid (PFHpA)	µg/L	0.010	0.015	<0.010	0.029	0.067	<0.010
Perfluorooctanoic acid (PFOA)	µg/L	0.010	0.010	<0.010	0.078	0.14	<0.010
Perfluorononanoic acid (PFNA)	µg/L	0.010	<0.010	<0.010	<0.010	<0.010	<0.010
Perfluorodecanoic acid (PFDA)	µg/L	0.020	<0.020	<0.020	<0.020	<0.020	<0.020
Perfluoroundecanoic acid (PFUnDA)	µg/L	0.020	<0.020	<0.020	<0.020	<0.020	<0.020
Perfluorododecanoic acid (PFDoDA)	µg/L	0.050	<0.050	<0.050	<0.050	<0.050	<0.050
Perfluorotridecanoic acid (PFTrDA)	µg/L	0.10	<0.10	<0.10	<0.10	<0.10	<0.10
Perfluorotetradecanoic acid (PFTeDA)	µg/L	0.50	<0.50	<0.50	<0.50	<0.50	<0.50
4:2 Fluorotelomer sulfonic acid (4:2 FTS)	µg/L	0.010	<0.010	<0.010	<0.010	<0.010	<0.010
6:2 Fluorotelomer sulfonic acid (6:2 FTS)	µg/L	0.010	<0.010	<0.010	<0.010	<0.010	<0.010
8:2 Fluorotelomer sulfonic acid (8:2 FTS)	µg/L	0.020	<0.020	<0.020	<0.020	<0.020	<0.020
10:2 Fluorotelomer sulfonic acid (10:2 FTS)	µg/L	0.020	<0.020	<0.020	<0.020	<0.020	<0.020
Perfluorooctane sulfonamide (FOSA)	µg/L	0.10	<0.10	<0.10	<0.10	<0.10	<0.10
N-Methyl perfluorooctane sulfonamide (MeFOSA)	µg/L	0.050	<0.050	<0.050	<0.050	<0.050	<0.050
N-Ethyl perfluorooctane sulfonamide (EtFOSA)	µg/L	0.10	<0.10	<0.10	<0.10	<0.10	<0.10
N-Methyl perfluorooctane sulfonamidoethanol	µg/L	0.050	<0.050	<0.050	<0.050	<0.050	<0.050
N-Ethyl perfluorooctane sulfonamidoethanol	µg/L	0.50	<0.50	<0.50	<0.50	<0.50	<0.50
N-Methyl perfluorooctane sulfonamidoacetic acid	µg/L	0.020	<0.020	<0.020	<0.020	<0.020	<0.020
N-Ethyl perfluorooctane sulfonamidoacetic acid	µg/L	0.020	<0.020	<0.020	<0.020	<0.020	<0.020
Surrogate 13C8 PFOS	%		*98.6*	*95.4*	*93.8*	*96.8*	*94.2*
Surrogate 13C2 PFOA	%		*93.2*	*96.7*	*95.4*	*97.0*	*93.4*
Total +ve PFHxS+PFOS	µg/L	0.010	<0.010	0.029	1.8	1.1	<0.010
Total +ve PFOA+PFOS	µg/L	0.010	0.010	0.016	1.3	0.81	<0.010
Total +ve PFAS	µg/L	0.010	0.094	0.029	2.3	1.9	<0.010
Extraction Internal Standard 13C3 PFBS	%		*112*	*104*	*106*	*106*	*111*
Extraction Internal Standard 18O2 PFHxS	%		*110*	*104*	*108*	*107*	*103*
Extraction Internal Standard 13C4 PFOS	%		*107*	*108*	*109*	*107*	*109*
Extraction Internal Standard 13C4 PFBA	%		*111*	*107*	*106*	*108*	*108*
Extraction Internal Standard 13C3 PFPeA	%		*106*	*105*	*105*	*107*	*105*
Extraction Internal Standard 13C2 PFHxA	%		*109*	*106*	*106*	*107*	*105*
Extraction Internal Standard 13C4 PFHpA	%		*114*	*109*	*111*	*111*	*111*
Extraction Internal Standard 13C4 PFOA	%		*119*	*115*	*116*	*116*	*115*

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Envirolab ID	Units	PQL	PFB1283-03	PFB1283-04	PFB1283-05	PFB1283-06	PFB1283-07
Your Reference			GWA (RN031131)	GWE (RN022487)	GWB01	GWB02	GWB03
Date Sampled			18/02/2024	18/02/2024	18/02/2024	18/02/2024	18/02/2024
Depth				6.54	6.40	6.10	5.10
Extraction Internal Standard 13C5 PFNA	%		*110*	*106*	*109*	*107*	*108*
Extraction Internal Standard 13C2 PFDA	%		*112*	*107*	*110*	*109*	*109*
Extraction Internal Standard 13C2 PFUnDA	%		*109*	*107*	*109*	*107*	*106*
Extraction Internal Standard 13C2 PFDoDA	%		*110*	*105*	*106*	*101*	*106*
Extraction Internal Standard 13C2 PFTeDA	%		*92.8*	*83.1*	*81.5*	*71.5*	*87.2*
Extraction Internal Standard 13C2 4:2FTS	%		*113*	*110*	*117*	*108*	*108*
Extraction Internal Standard 13C2 6:2FTS	%		*112*	*111*	*120*	*125*	*110*
Extraction Internal Standard 13C2 8:2FTS	%		*115*	*115*	*117*	*123*	*116*
Extraction Internal Standard 13C8 FOSA	%		*118*	*115*	*113*	*111*	*114*
Extraction Internal Standard d3 N MeFOSA	%		*112*	*112*	*112*	*109*	*111*
Extraction Internal Standard d5 N EtFOSA	%		*116*	*111*	*110*	*107*	*111*
Extraction Internal Standard d7 N MeFOSE	%		*108*	*104*	*110*	*110*	*109*
Extraction Internal Standard d9 N EtFOSE	%		*105*	*102*	*105*	*100*	*103*
Extraction Internal Standard d3 N MeFOSAA	%		*118*	*118*	*118*	*121*	*116*
Extraction Internal Standard d5 N EtFOSAA	%		*113*	*120*	*116*	*119*	*113*

Envirolab ID	Units	PQL	PFB1283-08	PFB1283-09	PFB1283-10	PFB1283-11
Your Reference			GWB04	Field Blank	Duplicate	Trip Blank
Date Sampled			18/02/2024	18/02/2024	18/02/2024	18/02/2024
Depth			6.20			
Perfluorobutanesulfonic acid (PFBS)	µg/L	0.010	<0.010	<0.010	<0.010	<0.010
Perfluoropentanesulfonic acid (PFPeS)	µg/L	0.010	<0.010	<0.010	<0.010	<0.010
Perfluorohexanesulfonic acid (PFHxS)	µg/L	0.010	<0.010	<0.010	<0.010	<0.010
Perfluoroheptanesulfonic acid (PFHpS)	µg/L	0.010	<0.010	<0.010	<0.010	<0.010
Perfluorooctanesulfonic acid (PFOS)	µg/L	0.010	<0.010	<0.010	<0.010	<0.010
Perfluorodecanesulfonic acid (PFDS)	µg/L	0.020	<0.020	<0.020	<0.020	<0.020
Perfluorobutanoic acid (PFBA)	µg/L	0.020	<0.020	<0.020	0.022	<0.020
Perfluoropentanoic acid (PFPeA)	µg/L	0.020	<0.020	<0.020	0.036	<0.020
Perfluorohexanoic acid (PFHxA)	µg/L	0.010	<0.010	<0.010	0.017	<0.010
Perfluoroheptanoic acid (PFHpA)	µg/L	0.010	<0.010	<0.010	0.019	<0.010
Perfluorooctanoic acid (PFOA)	µg/L	0.010	<0.010	<0.010	<0.010	<0.010
Perfluorononanoic acid (PFNA)	µg/L	0.010	<0.010	<0.010	<0.010	<0.010
Perfluorodecanoic acid (PFDA)	µg/L	0.020	<0.020	<0.020	<0.020	<0.020
Perfluoroundecanoic acid (PFUnDA)	µg/L	0.020	<0.020	<0.020	<0.020	<0.020
Perfluorododecanoic acid (PFDoDA)	µg/L	0.050	<0.050	<0.050	<0.050	<0.050
Perfluorotridecanoic acid (PFTrDA)	µg/L	0.10	<0.10	<0.10	<0.10	<0.10
Perfluorotetradecanoic acid (PFTeDA)	µg/L	0.50	<0.50	<0.50	<0.50	<0.50
4:2 Fluorotelomer sulfonic acid (4:2 FTS)	µg/L	0.010	<0.010	<0.010	<0.010	<0.010
6:2 Fluorotelomer sulfonic acid (6:2 FTS)	µg/L	0.010	<0.010	<0.010	<0.010	<0.010
8:2 Fluorotelomer sulfonic acid (8:2 FTS)	µg/L	0.020	<0.020	<0.020	<0.020	<0.020
10:2 Fluorotelomer sulfonic acid (10:2 FTS)	µg/L	0.020	<0.020	<0.020	<0.020	<0.020
Perfluorooctane sulfonamide (FOSA)	µg/L	0.10	<0.10	<0.10	<0.10	<0.10
N-Methyl perfluorooctane sulfonamide (MeFOSA)	µg/L	0.050	<0.050	<0.050	<0.050	<0.050
N-Ethyl perfluorooctane sulfonamide (EtFOSA)	µg/L	0.10	<0.10	<0.10	<0.10	<0.10

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Envirolab ID	Units	PQL	PFB1283-08	PFB1283-09	PFB1283-10	PFB1283-11
Your Reference			GWB04	Field Blank	Duplicate	Trip Blank
Date Sampled			18/02/2024	18/02/2024	18/02/2024	18/02/2024
Depth			6.20			
N-Methyl perfluorooctane sulfonamidoethanol	µg/L	0.050	<0.050	<0.050	<0.050	<0.050
N-Ethyl perfluorooctane sulfonamidoethanol	µg/L	0.50	<0.50	<0.50	<0.50	<0.50
N-Methyl perfluorooctane sulfonamidoacetic acid	µg/L	0.020	<0.020	<0.020	<0.020	<0.020
N-Ethyl perfluorooctane sulfonamidoacetic acid	µg/L	0.020	<0.020	<0.020	<0.020	<0.020
Surrogate 13C8 PFOS	%		*98.6*	*98.1*	*98.4*	*97.4*
Surrogate 13C2 PFOA	%		*94.2*	*93.0*	*96.2*	*96.0*
Total +ve PFHxS+PFOS	µg/L	0.010	<0.010	<0.010	<0.010	<0.010
Total +ve PFOA+PFOS	µg/L	0.010	<0.010	<0.010	<0.010	<0.010
Total +ve PFAS	µg/L	0.010	<0.010	<0.010	0.094	<0.010
Extraction Internal Standard 13C3 PFBS	%		*111*	*106*	*108*	*107*
Extraction Internal Standard 18O2 PFHxS	%		*108*	*107*	*105*	*101*
Extraction Internal Standard 13C4 PFOS	%		*108*	*107*	*108*	*107*
Extraction Internal Standard 13C4 PFBA	%		*111*	*110*	*109*	*108*
Extraction Internal Standard 13C3 PFPeA	%		*107*	*105*	*106*	*106*
Extraction Internal Standard 13C2 PFHxA	%		*109*	*108*	*106*	*109*
Extraction Internal Standard 13C4 PFHpA	%		*112*	*112*	*113*	*112*
Extraction Internal Standard 13C4 PFOA	%		*119*	*118*	*114*	*115*
Extraction Internal Standard 13C5 PFNA	%		*109*	*109*	*110*	*107*
Extraction Internal Standard 13C2 PFDA	%		*111*	*108*	*108*	*108*
Extraction Internal Standard 13C2 PFUnDA	%		*110*	*110*	*109*	*107*
Extraction Internal Standard 13C2 PFDoDA	%		*108*	*105*	*110*	*102*
Extraction Internal Standard 13C2 PFTeDA	%		*86.6*	*81.5*	*83.6*	*86.1*
Extraction Internal Standard 13C2 4:2FTS	%		*110*	*112*	*108*	*108*
Extraction Internal Standard 13C2 6:2FTS	%		*119*	*118*	*116*	*111*
Extraction Internal Standard 13C2 8:2FTS	%		*119*	*114*	*114*	*113*
Extraction Internal Standard 13C8 FOSA	%		*114*	*114*	*114*	*115*
Extraction Internal Standard d3 N MeFOSA	%		*109*	*109*	*109*	*111*
Extraction Internal Standard d5 N EtFOSA	%		*113*	*112*	*112*	*115*
Extraction Internal Standard d7 N MeFOSE	%		*112*	*110*	*108*	*109*
Extraction Internal Standard d9 N EtFOSE	%		*101*	*104*	*101*	*103*
Extraction Internal Standard d3 N MeFOSAA	%		*120*	*125*	*122*	*124*
Extraction Internal Standard d5 N EtFOSAA	%		*119*	*115*	*115*	*114*

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General - Field Data (Water)

Envirolab ID	Units	PQL	PFB1283-01	PFB1283-02	PFB1283-03	PFB1283-04	PFB1283-05
Your Reference			SWB	SWC	GWA (RN031131)	GWE (RN022487)	GWB01
Date Sampled			18/02/2024	18/02/2024	18/02/2024	18/02/2024	18/02/2024
Depth						6.54	6.40
pH (Client Supplied)*	pH units		3.30	3.20	2.52	3.00	2.56
Temperature (Client Supplied)*	o C		33.5	31.6	32.5	33.8	31.3

Envirolab ID	Units	PQL	PFB1283-06	PFB1283-07	PFB1283-08
Your Reference			GWB02	GWB03	GWB04
Date Sampled			18/02/2024	18/02/2024	18/02/2024
Depth			6.10	5.10	6.20
pH (Client Supplied)*	pH units		2.59	3.26	2.73
Temperature (Client Supplied)*	o C		31.9	33.6	35.9

Result Comments

Identifier	Description
[1]	Some EC to TDS ratios are outside normal expected values. Results were confirmed.
[8]	Ion Balance indicative only for samples with low Electrical Conductivity.
[9]	Result confirmed through re-analysis.

Method Summary

Method ID	Methodology Summary
Calc	Calculation
Field Data	Field Data supplied by client
INORG-006	Alkalinity - determined titrimetrically based on APHA latest edition 2320-B. Solids reported from a 1:5 water extract unless otherwise specified. Total Carbon Dioxide - determined by calculation in accordance with APHA latest edition,4500-CO2 D.
INORG-018	Total Dissolved Solids - determined gravimetrically. The solids are dried at 180±10°C. NOTE: Where the EC of the sample is <100µS/cm, the TDS will typically be below 70mg/L (as the sample is very likely to be at least drinking water quality). Therefore to ensure data quality for TDS, the TDS is typically calculated as per the equation: TDS = EC*0.6
INORG-040	The concentrations of the major ions (mg/L) are converted to milliequivalents and summed. The ionic balance should be within +/- 15% i.e. total anions = total cations +/-15%.
INORG-055	Nitrate/Nitrite/NOx/TKN - determined colourimetrically. Waters samples are filtered on receipt prior to analysis. Soils/solids are analysed following a water extraction.
INORG-057	Ammonia - determined colourimetrically. Water samples are filtered on receipt prior to analysis. Soils and OHS media are analysed following a water extraction. Alternatively, Ammonia can be extracted from soil using 1M KCl.
INORG-060_TP	Total Phosphorus - determined colourimetrically using APHA latest edition 4500-P J. Water samples are filtered on receipt prior to analysis. Soils are analysed from a water extract.
INORG-067	Samples are digested in acid with a known excess of potassium dichromate then the colour change is determined by discrete analyser or UV-VIS in accordance with APHA latest edition 5220 D.
INORG-079	Carbon forms (inorganic, organic, total) determined using a TOC/NDIR analyser via combustion. Dissolved aqueous\forms require filtering prior to determination.
INORG-081	Anions determined by Ion Chromatography. Waters samples are filtered on receipt prior to analysis. Solids are analysed from a water extract. Alternatively determined by colourimetry/turbidity using Discrete Analyser.
INORG-091	BOD and/or cBOD - Analysed in accordance with APHA latest edition 5210 D.
INORG-111	Volatile Fatty Acids determined by distillation and titration.
INORG-118	Hexavalent Chromium by Ion Chromatographic separation and colourimetric determination. Waters samples are filtered prior to analysis. Solids are extracted with an alkaline buffered solution, for air sampling media the same alkali extraction can be used or alternatives from NIOSH/OSHA. For aqueous samples, Total Hexavalent Chromium includes the dissolved Hexavalent Chromium and any Hexavalent Chromium solubilised by the preservative i.e. Sodium Hydroxide from any particulate that may be present.
INORG-127	Total Nitrogen by high temperature catalytic combustion with chemiluminescence detection. Organic Carbon forms (inorganic, organic, total) determined using a TOC/NDIR analyser via combustion. Dissolved forms require filtering prior to determination.
METALS-020	Determination of various metals by ICP-OES.
METALS-022	Determination of various metals by ICP-MS. Please note for Bromine and Iodine, any forms of these elements that are present are included together in the one result reported for each of these two elements.
ORG-020	Soil samples are extracted with Dichloromethane/Acetone and waters with Dichloromethane and analysed by GC-FID. F2 = (>C10-C16)-Naphthalene as per NEPM B1 Guideline on Investigation Levels for Soil and Groundwater (HSLs Tables 1A (3, 4)). Note Naphthalene is determined from the VOC analysis. Note, the Total +ve TRH PQL is reflective of the lowest individual PQL and is therefore "Total +ve TRH" is simply a sum of the positive individual TRH fractions (>C10-C40).
ORG-021/022/025_PCB	Soil samples are extracted with dichloromethane/acetone and waters with dichloromethane and analysed by GC-ECD and/or GC-MS/GC-MSMS.
ORG-022_PAH	Determination of semi-volatile organic compounds (SVOCs) by GC-MS. Water samples are extracted by LLE and solids using DCM/Acetone/Methanol. For PAHs:- Benzo(a)pyrene TEQ as per NEPM B1 Guideline on Investigation Levels for Soil and Groundwater - 2013. 1. 'TEQ PQL' values are assuming all contributing PAHs reported as <PQL are actually at the PQL. This is the most conservative approach and can give false positive TEQs given that PAHs that contribute to the TEQ calculation may not be present. 2. 'TEQ zero' values are assuming all contributing PAHs reported as <PQL are zero. This is the least conservative approach and is more susceptible to false negative TEQs when PAHs that contribute to the TEQ calculation are present but below PQL. 3. 'TEQ half PQL' values are assuming all contributing PAHs reported as <PQL are half the stipulated PQL. Hence a mid-point between the most and least conservative approaches above. Note, for Total +ve calculations, the PQL is reflective of the lowest individual PQL and therefore, for example, "Total +ve PAHs" is simply a sum of the positive individual PAHs.
ORG-023_F1_TOT	Determination of volatile organic compounds (VOCs) by P&T-GC-MS. Water samples are analysed directly by purge and trap GC-MS. Solids are extracted with Methanol, diluted and analysed by purge and trap GC-MS. F1 = (C6-C10)-BTEX as per NEPM B1 Guideline on Investigation Levels for Soil and Groundwater. Note, the Total +ve Xylene PQL is reflective of the lowest individual PQL and is therefore "Total +ve Xylenes" is simply a sum of the positive individual Xylenes.

Method Summary

Method ID	Methodology Summary
ORG-029	Soil/solid and sorbent samples are extracted with basified Methanol. Waters and soil/sorbent extracts are directly injected and/or concentrated/extracted using SPE. TCLP/ASLP leachates are centrifuged, the supernatant is then analysed (including amendment with solvent) - as per the option in AS4439.3. Analysis is undertaken with LC-MSMS. PFAS results include the sum of branched and linear isomers where applicable. Please note that PFAS results are corrected for Extracted Internal Standards (QSM 5.4 Table B-15 terminology), which are mass labelled analytes added prior to sample preparation to assess matrix effects and verify processing of the sample. PFAS analytes without a commercially available mass labelled analogue are corrected vs a closely eluting mass labelled PFAS compound. Surrogates are also reported, in this context they are mass labelled PFAS compounds added prior to extraction but are used as monitoring compounds only (not used for result correction). Envicarb (or similar) is used discretionally to remove interfering matrix components. Please contact the laboratory if estimates of Measurement Uncertainty are required as per WA DER.

Result Definitions

Identifier	Description
NR	Not reported
NEPM	National Environment Protection Measure
NS	Not specified
LCS	Laboratory Control Sample
RPD	Relative Percent Difference
>	Greater than
<	Less than
PQL	Practical Quantitation Limit
INS	Insufficient sample for this test
NA	Test not required
NT	Not tested
DOL	Samples rejected due to particulate overload (air filters only)
RFD	Samples rejected due to filter damage (air filters only)
RUD	Samples rejected due to uneven deposition (air filters only)
##	Indicates a laboratory acceptance criteria outlier, for further details, see Result Comments and/or QC Comments

Quality Control Definitions

Blank

This is the component of the analytical signal which is not derived from the sample but from reagents, glassware etc, and is determined by processing solvents and reagents in exactly the same manner as for samples.

Surrogate Spike

Surrogates are known additions to each sample, blank, matrix spike and LCS in a batch, of compounds which are similar to the analyte of interest, however are not expected to be found in real samples.

LCS (Laboratory Control Sample)

This comprises either a standard reference material or a control matrix (such as a blank sand or water) fortified with analytes representative of the analyte class. It is simply a check sample.

Matrix Spike

A portion of the sample is spiked with a known concentration of target analyte. The purpose of the matrix spike is to monitor the performance of the analytical method used and to determine whether matrix interferences exist.

Duplicate

This is the complete duplicate analysis of a sample from the process batch. The sample selected should be one where the analyte concentration is easily measurable.

Laboratory Acceptance Criteria

Duplicate sample and matrix spike recoveries may not be reported on smaller jobs, however, were analysed at a frequency to meet or exceed NEPM requirements. All samples are tested in batches of 20. The duplicate sample RPD and matrix spike recoveries for the batch were within the laboratory acceptance criteria. Filters, swabs, wipes, tubes and badges will not have duplicate data as the whole sample is generally extracted during sample extraction. Spikes for Physical and Aggregate Tests are not applicable. For VOCs in water samples, three vials are required for duplicate or spike analysis.

General Acceptance Criteria (GAC) - Analyte specific criteria applies for some analytes and is reflected in QC recovery tables.

Duplicates: >10xPQL - RPD acceptance criteria will vary depending on the analytes and the analytical techniques but is typically in the range 20%-50% - see ELN-P05 QAQC tables for details (available on request); <10xPQL - RPD are higher as the results approach PQL and the estimated measurement uncertainty will statistically increase. Matrix Spikes, LCS and Surrogate recoveries: Generally 70-130% for inorganics/metals; 60-140% for organics (+/-50% surrogates) and 10-140% for labile SVOCs (including labile surrogates), ultra trace organics and speciated phenols is acceptable.

In circumstances where no duplicate and/or sample spike has been reported at 1 in 10 and/or 1 in 20 samples respectively, the sample volume submitted was typically insufficient in order to satisfy laboratory QA/QC protocols.

Miscellaneous Information

When samples are received where certain analytes are outside of recommended technical holding times (THTs), the analysis has proceeded. Where analytes are on the verge of breaching THTs, every effort will be made to analyse within the THT or as soon as practicable.

Where sampling dates are not provided, Envirolab are not in a position to comment on the validity of the analysis where recommended technical holding times may have been breached. We have taken the sampling date as being the date received at the laboratory.

Two significant figures are reported for the majority of tests and with a high degree of confidence, for results <10*PQL, the second significant figure may be in doubt i.e. has a relatively high degree of uncertainty and is provided for information only.

Measurement Uncertainty estimates are available for most tests upon request.

Analysis of aqueous samples typically involves the extraction/digestion and/or analysis of the liquid phase only (i.e. NOT any settled sediment phase but inclusive of suspended particles if present), unless stipulated on the Envirolab COC or by correspondence. Notable exceptions include certain Physical Tests (pH/EC/BOD/COD/Apparent Colour etc.), Solids testing, Total Recoverable metals and PFAS where sediment/solids are included by default.

Urine Analysis - The BEI values listed are taken from the 2022 edition of *TLVs and BEIs Threshold Limits by ACGIH*.

Air volume measurements are not covered by Envirolab's NATA accreditation.

Data Quality Assessment Summary PFB1283

Client Details

Client	Katherine Town Council - NT
Your Reference	Katherine Town Council - EPL298 - Quarterly
Date Issued	08/03/2024

Recommended Holding Time Compliance

Recommended holding time exceedances exist - See detailed list below

Quality Control and QC Frequency

QC Type	Compliant	Details
Blank	Yes	No Outliers
LCS	No	LCS Outliers Exist - See detailed list below
Duplicates	No	Duplicate Outliers Exist - See detailed list below
Matrix Spike	No	Matrix Spike Outliers Exist - See detailed list below
Surrogates / Extracted Internal Standards	Yes	No Outliers
QC Frequency	No	QC Frequency Outliers Exist - See detailed list below

Surrogates/Extracted Internal Standards, Duplicates and/or Matrix Spikes are not always relevant/applicable to certain analyses and matrices. Therefore, said QC measures are deemed compliant in these situations by default. See Laboratory Acceptance Criteria for more information

Data Quality Assessment Summary PFB1283

Recommended Holding Time Compliance

Analysis	Sample Number(s)	Date Sampled	Date Extracted	Date Analysed	Compliant
vTRH&MBTEXN | Water	4-11	18/02/2024	22/02/2024	23/02/2024	Yes
sTRH | Water	4-6	18/02/2024	22/02/2024	22/02/2024	Yes
	7-11	18/02/2024	22/02/2024	23/02/2024	Yes
PAH | Water	4-6	18/02/2024	22/02/2024	25/02/2024	Yes
	7-11	18/02/2024	22/02/2024	26/02/2024	Yes
PCB | Water	4-6	18/02/2024	22/02/2024	25/02/2024	Yes
	7-11	18/02/2024	22/02/2024	26/02/2024	Yes
Total Metals (LL) | Water	1-11	18/02/2024	26/02/2024	27/02/2024	Yes
Dissolved Metals (LL) | Water	1-11	18/02/2024	26/02/2024	27/02/2024	Yes
TDS | Water	1-4, 6-11	18/02/2024	26/02/2024	26/02/2024	No
VFA | Water	1-11	18/02/2024	26/02/2024	04/03/2024	Yes
Alkalinity Suite | Water	1-11	18/02/2024	22/02/2024	22/02/2024	Yes
Chloride | Water	1-11	18/02/2024	23/02/2024	27/02/2024	Yes
Dissolved Cations | Water	1-11	18/02/2024	26/02/2024	26/02/2024	Yes
Ion Balance | Water	1-11	18/02/2024	22/02/2024	01/03/2024	Yes
Sulfate | Water	1-11	18/02/2024	23/02/2024	27/02/2024	Yes
Total Organic Carbon | Water	1-11	18/02/2024	26/02/2024	27/02/2024	Yes
Cr6+ | Water	1-11	18/02/2024	23/02/2024	26/02/2024	Yes
Cr6+ - Total | Water	1-11	18/02/2024	23/02/2024	26/02/2024	Yes
Nitrogen - Ammonia | Water	1-11	18/02/2024	26/02/2024	27/02/2024	Yes
Nitrogen - Nitrate | Water	1-11	18/02/2024	26/02/2024	27/02/2024	Yes
Nitrogen - Total N | Water	1-10	18/02/2024	23/02/2024	23/02/2024	Yes
	11	18/02/2024	23/02/2024	24/02/2024	Yes
Total Phosphorus | Water	1-11	18/02/2024	26/02/2024	26/02/2024	Yes
BOD | Water	1-4, 6-11	18/02/2024	22/02/2024	27/02/2024	Yes
COD | Water	1-11	18/02/2024	23/02/2024	01/03/2024	Yes
PFAS EXT-ISTD | Water	3-11	18/02/2024	23/02/2024	24/02/2024	Yes
PFAS-Extended | Water	3-11	18/02/2024	23/02/2024	24/02/2024	Yes

Outliers: Laboratory Control Samples

ORG-020|Semi-volatile TRH (Water)| Batch BFB2398

Sample ID	Analyte	% Limits	% Recovery
BFB2398-BS1	o-Terphenyl	60 - 140	##[4]

Data Quality Assessment Summary PFB1283

Outliers: Duplicates

INORG-055|Inorganics - Nutrients (Water)| Batch BFB2890

Sample ID	Duplicate ID	Analyte	% Limits	RPD
PFB1283-11	DUP2	Nitrate as N	30.00	199

INORG-081|Inorganics - Ionic Balance and Indexes (Water)| Batch BFB2724

Sample ID	Duplicate ID	Analyte	% Limits	RPD
PFB1283-10	DUP2	Chloride	30.00	200
PFB1283-10	DUP2	Sulfate	20.00	200

METALS-022|Dissolved Low Level Metals (Water)| Batch BFB2765

Sample ID	Duplicate ID	Analyte	% Limits	RPD
BFB2765-DUP1#	DUP1	Cadmium	20.00	200[5]
BFB2765-DUP1#	DUP1	Copper	20.00	200[5]
BFB2765-DUP1#	DUP1	Manganese	20.00	200[5]

ORG-020|Semi-volatile TRH (Water)| Batch BFB2398

Sample ID	Duplicate ID	Analyte	% Limits	RPD
PFB1283-05	DUP1	TRH >C34-C40 (F4)	50.00	200[5]
PFB1283-05	DUP1	TRH C29-C36	50.00	200[5]
PFB1283-06	DUP2	TRH >C34-C40 (F4)	50.00	200[5]

Outliers: Matrix Spike

INORG-055|Inorganics - Nutrients (Water)| Batch BFB2890

Sample ID	Analyte	% Limits	% Recovery
PFB1283-02	Nitrate as N	70 - 130	##[3]

METALS-020|Inorganics - Ionic Balance and Indexes (Water)| Batch BFB2767

Sample ID	Analyte	% Limits	% Recovery
BFB2767-MS1#	Sodium	70 - 130	##[2]

ORG-020|Semi-volatile TRH (Water)| Batch BFB2398

Sample ID	Analyte	% Limits	% Recovery
BFB2398-MS1#	o-Terphenyl	60 - 140	##[4]

Data Quality Assessment Summary PFB1283

Outliers: QC Frequency

INORG-091|Inorganics - Common Wastewater Parameters (Water)| Batch BFB2531

Analysis	QC Type	Expected	Reported
BOD	Duplicate	1	0

INORG-111|Inorganics - Physical Parameters (Water)| Batch BFB2758

Analysis	QC Type	Expected	Reported
VFA	Duplicate	2	0

ORG-023_F1_TOT|Volatile TRH and BTEX (Water)| Batch BFB2532

Analysis	QC Type	Expected	Reported
vTRH&MBTEXN	Duplicate	2	1
	Matrix Spike	1	0

ORG-029|PFAS Extended List (Water)| Batch BFC0207

Analysis	QC Type	Expected	Reported
PFAS EXT-ISTD	Duplicate	1	0
	Matrix Spike	1	0
PFAS-Extended	Duplicate	1	0
	Matrix Spike	1	0

Quality Control PFB1283

ORG-023_F1_TOT|Volatile TRH and BTEX (Water) | Batch BFB2532

Analyte	Units	PQL	Blank	DUP1 PFB1283-05 Samp | QC | RPD %	LCS %
TRH C6-C9	µg/L	10	<10	<10 | <10 | [NA]	97.5
TRH C6-C10	µg/L	10	<10	<10 | <10 | [NA]	95.4
TRH C6-C10 less BTEX (F1)	µg/L	10	<10	<10 | <10 | [NA]	[NA]
Methyl tert butyl ether (MTBE)	µg/L	1.0	<1.0		[NA]
Benzene	µg/L	1.0	<1.0	<1.0 | <1.0 | [NA]	80.2
Toluene	µg/L	1.0	<1.0	<1.0 | <1.0 | [NA]	80.8
Ethylbenzene	µg/L	1.0	<1.0	<1.0 | <1.0 | [NA]	80.0
meta+para Xylene	µg/L	2.0	<2.0	<2.0 | <2.0 | [NA]	81.8
ortho-Xylene	µg/L	1.0	<1.0	<1.0 | <1.0 | [NA]	86.2
Total Xylene	µg/L	3.0	<3.0	<3.0 | <3.0 | [NA]	[NA]
Naphthalene (value used in F2 calc)	µg/L	1.0	<1.0	<1.0 | <1.0 | [NA]	[NA]
Surrogate Dibromofluoromethane	*%*		*93.8*	*84.4 | 87.7*	*96.7*
Surrogate Toluene-D8	*%*		*100*	*99.7 | 100*	*102*
Surrogate 4-Bromofluorobenzene	*%*		*96.6*	*101 | 99.7*	*98.7*

ORG-020|Semi-volatile TRH (Water) | Batch BFB2398

Analyte	Units	PQL	Blank	DUP1 PFB1283-05 Samp | QC | RPD %	DUP2 PFB1283-06 Samp | QC | RPD %	LCS %	Spike % BFB2398-MS1#
TRH C10-C14	µg/L	50	<50	<50 | <50 | [NA]	<50 | <50 | [NA]	104	99.7
TRH C15-C28	µg/L	100	<100	<100 | <100 | [NA] [5]	<100 | <100 | [NA]	106	105
TRH C29-C36	µg/L	100	<100	<100 | <100 | 200 [5]	<100 | <100 | [NA] [5]	109	121
TRH >C10-C16	µg/L	50	<50	<50 | <50 | [NA]	<50 | <50 | [NA]	105	101
TRH >C16-C34 (F3)	µg/L	100	<100	<100 | <100 | [NA] [5]	<100 | <100 | [NA]	106	106
TRH >C34-C40 (F4)	µg/L	100	<100	<100 | <100 | 200 [5]	<100 | <100 | 200 [5]	112	95.8
Surrogate o-Terphenyl	*%*		*69.6*	*71.7 | 66.5*	*68.9 | 64.2*	*## [4]*	*##[4]*

The QC reported was not specifically part of this workorder but formed part of the QC process batch.

ORG-022_PAH|Polycyclic Aromatic Hydrocarbons (Water) | Batch BFB2398

Analyte	Units	PQL	Blank	DUP1 PFB1283-05 Samp | QC | RPD %	DUP2 PFB1283-06 Samp | QC | RPD %	LCS %	Spike % BFB2398-MS2#
Naphthalene	µg/L	0.10	<0.10	<0.10 | <0.10 | [NA]	<0.10 | <0.10 | [NA]	87.2	96.8
Acenaphthylene	µg/L	0.10	<0.10	<0.10 | <0.10 | [NA]	<0.10 | <0.10 | [NA]	[NA]	[NA]
Acenaphthene	µg/L	0.10	<0.10	<0.10 | <0.10 | [NA]	<0.10 | <0.10 | [NA]	85.8	96.5
Fluorene	µg/L	0.10	<0.10	<0.10 | <0.10 | [NA]	<0.10 | <0.10 | [NA]	86.8	97.5
Phenanthrene	µg/L	0.10	<0.10	<0.10 | <0.10 | [NA]	<0.10 | <0.10 | [NA]	87.8	101
Anthracene	µg/L	0.10	<0.10	<0.10 | <0.10 | [NA]	<0.10 | <0.10 | [NA]	[NA]	[NA]
Fluoranthene	µg/L	0.10	<0.10	<0.10 | <0.10 | [NA]	<0.10 | <0.10 | [NA]	88.6	99.2
Pyrene	µg/L	0.10	<0.10	<0.10 | <0.10 | [NA]	<0.10 | <0.10 | [NA]	88.9	99.2
Benzo(a)anthracene	µg/L	0.10	<0.10	<0.10 | <0.10 | [NA]	<0.10 | <0.10 | [NA]	[NA]	[NA]
Chrysene	µg/L	0.10	<0.10	<0.10 | <0.10 | [NA]	<0.10 | <0.10 | [NA]	86.5	91.1
Benzo(b,j,k)fluoranthene	µg/L	0.20	<0.20	<0.20 | <0.20 | [NA]	<0.20 | <0.20 | [NA]	[NA]	[NA]
Benzo(a)pyrene	µg/L	0.10	<0.10	<0.10 | <0.10 | [NA]	<0.10 | <0.10 | [NA]	89.5	97.4
Indeno(1,2,3-c,d)pyrene	µg/L	0.10	<0.10	<0.10 | <0.10 | [NA]	<0.10 | <0.10 | [NA]	[NA]	[NA]
Dibenzo(a,h)anthracene	µg/L	0.10	<0.10	<0.10 | <0.10 | [NA]	<0.10 | <0.10 | [NA]	[NA]	[NA]
Benzo(g,h,i)perylene	µg/L	0.10	<0.10	<0.10 | <0.10 | [NA]	<0.10 | <0.10 | [NA]	[NA]	[NA]
Surrogate p-Terphenyl-D14	*%*		*85.4*	*71.3 | 64.2*	*67.4 | 65.9*	*72.3*	*77.2*

The QC reported was not specifically part of this workorder but formed part of the QC process batch.

Quality Control PFB1283

ORG-021/022/025_PCB|Polychlorinated Biphenyls (Water) | Batch BFB2398

Analyte	Units	PQL	Blank	DUP1 PFB1283-05 Samp | QC | RPD %	DUP2 PFB1283-06 Samp | QC | RPD %	LCS %	Spike % BFB2398-MS2#
Aroclor 1016	µg/L	2.0	<2.0	<2.0 | <2.0 | [NA]	<2.0 | <2.0 | [NA]	[NA]	[NA]
Aroclor 1221	µg/L	2.0	<2.0	<2.0 | <2.0 | [NA]	<2.0 | <2.0 | [NA]	[NA]	[NA]
Aroclor 1232	µg/L	2.0	<2.0	<2.0 | <2.0 | [NA]	<2.0 | <2.0 | [NA]	[NA]	[NA]
Aroclor 1242	µg/L	2.0	<2.0	<2.0 | <2.0 | [NA]	<2.0 | <2.0 | [NA]	[NA]	[NA]
Aroclor 1248	µg/L	2.0	<2.0	<2.0 | <2.0 | [NA]	<2.0 | <2.0 | [NA]	[NA]	[NA]
Aroclor 1254	µg/L	2.0	<2.0	<2.0 | <2.0 | [NA]	<2.0 | <2.0 | [NA]	[NA]	[NA]
Aroclor 1260	µg/L	2.0	<2.0	<2.0 | <2.0 | [NA]	<2.0 | <2.0 | [NA]	[NA]	[NA]
PCB C28	µg/L	0.006		<0.0060 | <0.0060 | [NA]	<0.0060 | <0.0060 | [NA]	[NA]	[NA]
PCB C52	µg/L	0.006		<0.0060 | <0.0060 | [NA]	<0.0060 | <0.0060 | [NA]	[NA]	[NA]
PCB C103	µg/L			0.00 | 0.00 | [NA]	0.00 | 0.00 | [NA]	106	117
PCB C101	µg/L	0.006		<0.0060 | <0.0060 | [NA]	<0.0060 | <0.0060 | [NA]	[NA]	[NA]
PCB C118	µg/L	0.006		<0.0060 | <0.0060 | [NA]	<0.0060 | <0.0060 | [NA]	[NA]	[NA]
PCB C153	µg/L	0.006		<0.0060 | <0.0060 | [NA]	<0.0060 | <0.0060 | [NA]	[NA]	[NA]
PCB C138	µg/L	0.006		<0.0060 | <0.0060 | [NA]	<0.0060 | <0.0060 | [NA]	[NA]	[NA]
PCB C180	µg/L	0.006		<0.0060 | <0.0060 | [NA]	<0.0060 | <0.0060 | [NA]	[NA]	[NA]
Surrogate 2-Fluorobiphenyl	*%*		*86.2*	*74.7 | 74.0*	*79.2 | 76.1*	*64.7*	*78.3*

The QC reported was not specifically part of this workorder but formed part of the QC process batch.

METALS-022|Acid Extractable Low Level Metals (Water) | Batch BFB2897

Analyte	Units	PQL	Blank	DUP1 BFB2897-DUP1# Samp | QC | RPD %	DUP2 PFB1283-05 Samp | QC | RPD %	LCS %	Spike % BFB2897-MS1#
Aluminium	µg/L	10	<10	18.8 | 19.9 | 5.80	37.1 | 30.8 | 18.4	103	91.8
Cadmium	µg/L	0.10	<0.10	<0.10 | <0.10 | [NA]	<0.10 | <0.10 | [NA]	101	104
Chromium	µg/L	1.0	<1.0	1.11 | 1.19 | 7.11	<1.0 | <1.0 | [NA]	112	107
Copper	µg/L	1.0	<1.0	<1.0 | <1.0 | [NA]	3.88 | 3.87 | 0.206	115	107
Iron	µg/L	10	<10	16.0 | 16.5 | 3.11	58.6 | 48.9 | 18.0	116	123
Lead	µg/L	1.0	<1.0	3.24 | 3.34 | 3.19	<1.0 | <1.0 | [NA]	102	97.0
Manganese	µg/L	1.0	<1.0	3.93 | 4.16 | 5.83	15.5 | 14.7 | 4.88	106	101
Nickel	µg/L	1.0	<1.0	<1.0 | <1.0 | [NA]	1.59 | 1.63 | 2.79	112	108
Selenium	µg/L	1.0	<1.0	2.20 | 2.31 | 4.74	<1.0 | <1.0 | [NA]	115	110
Zinc	µg/L	1.0	<1.0	24.1 | 24.6 | 2.17	4.39 | 5.24 | 17.7	107	88.5

The QC reported was not specifically part of this workorder but formed part of the QC process batch.

METALS-022|Dissolved Low Level Metals (Water) | Batch BFB2765

Analyte	Units	PQL	Blank	DUP1 BFB2765-DUP1# Samp | QC | RPD %	DUP2 PFB1283-05 Samp | QC | RPD %	LCS %	Spike % BFB2765-MS1#
Aluminium	µg/L	10	<10	24.2 | 20.9 | 14.6	36.2 | 32.6 | 10.4	111	117
Cadmium	µg/L	0.10	<0.10	0.340 | <0.10 | 200 [5]	<0.10 | <0.10 | [NA]	110	103
Chromium	µg/L	1.0	<1.0	<1.0 | <1.0 | [NA]	<1.0 | <1.0 | [NA]	109	109
Copper	µg/L	1.0	<1.0	1.16 | <1.0 | 200 [5]	5.22 | 4.48 | 15.2	109	102
Iron	µg/L	10	<10	92.8 | 92.5 | 0.356	40.8 | 41.1 | 0.758	110	109
Lead	µg/L	1.0	<1.0	<1.0 | <1.0 | [NA]	<1.0 | <1.0 | [NA]	106	98.1
Manganese	µg/L	1.0	<1.0	1.24 | <1.0 | 200 [5]	31.3 | 27.3 | 13.9	108	87.3
Nickel	µg/L	1.0	<1.0	3.76 | 3.25 | 14.6	2.60 | 2.26 | 14.0	110	105
Selenium	µg/L	1.0	<1.0	2.99 | 2.79 | 6.92	<1.0 | <1.0 | [NA]	108	105
Zinc	µg/L	1.0	<1.0	4.65 | 3.94 | 16.5	6.79 | 5.74 | 16.8	110	105

The QC reported was not specifically part of this workorder but formed part of the QC process batch.

INORG-111|Inorganics - Physical Parameters (Water) | Batch BFB2758

Analyte	Units	PQL	Blank	LCS %
Volatile Fatty Acids	mg/L	5.0	<5.0	83.0

Quality Control PFB1283

INORG-018 | Inorganics - Physical Parameters (Water) | Batch BFB2930

Analyte	Units	PQL	Blank	DUP1 PFB1283-01 Samp | QC | RPD %	DUP2 BFB2930-DUP2# Samp | QC | RPD %	LCS %
Total Dissolved Solids	mg/L	5.0	<5.0	225 | 220 | 2.25 [1]	436 | 430 | 1.39	104

The QC reported was not specifically part of this workorder but formed part of the QC process batch.

INORG-006 | Inorganics - Ionic Balance and Indexes (Water) | Batch BFB2450

Analyte	Units	PQL	Blank	DUP1 BFB2450-DUP1# Samp | QC | RPD %	DUP2 BFB2450-DUP2# Samp | QC | RPD %	LCS %
Bicarbonate Alkalinity as CaCO3	mg/L as CaCO3	5.0	<5.0	139 | 145 | 4.28	197 | 191 | 3.04	[NA]
Carbonate Alkalinity as CaCO3	mg/L as CaCO3	5.0	<5.0	<5.0 | <5.0 | [NA]	<5.0 | <5.0 | [NA]	[NA]
Hydroxide OH- as CaCO3	mg/L as CaCO3	5.0	<5.0	<5.0 | <5.0 | [NA]	<5.0 | <5.0 | [NA]	[NA]
Total Alkalinity as CaCO3	mg/L as CaCO3	5.0	<5.0	139 | 145 | 4.28	197 | 191 | 3.04	[NA]

Analyte	Units	PQL	Blank	LCS %
Total Alkalinity as CaCO3	mg/L as CaCO3	5		105

The QC reported was not specifically part of this workorder but formed part of the QC process batch.

INORG-006 | Inorganics - Ionic Balance and Indexes (Water) | Batch BFB2451

Analyte	Units	PQL	Blank	DUP1 PFB1283-05 Samp | QC | RPD %	DUP2 BFB2451-DUP2# Samp | QC | RPD %	LCS %
Bicarbonate Alkalinity as CaCO3	mg/L as CaCO3	5.0	<5.0	428 | 407 | 5.10	<5.0 | <5.0 | [NA]	[NA]
Carbonate Alkalinity as CaCO3	mg/L as CaCO3	5.0	<5.0	<5.0 | <5.0 | [NA]	<5.0 | <5.0 | [NA]	[NA]
Hydroxide OH- as CaCO3	mg/L as CaCO3	5.0	<5.0	<5.0 | <5.0 | [NA]	<5.0 | <5.0 | [NA]	[NA]
Total Alkalinity as CaCO3	mg/L as CaCO3	5.0	<5.0	428 | 407 | 5.10	<5.0 | <5.0 | [NA]	[NA]

The QC reported was not specifically part of this workorder but formed part of the QC process batch.

INORG-081 | Inorganics - Ionic Balance and Indexes (Water) | Batch BFB2724

Analyte	Units	PQL	Blank	DUP1 PFB1283-01 Samp | QC | RPD %	DUP2 PFB1283-10 Samp | QC | RPD %	LCS %	Spike % PFB1283-02
Chloride	mg/L	1.0	<1.0	6.31 | 6.30 | 0.195	4.88 | <1.0 | 200	94.6	107
Sulfate	mg/L	1.0	<1.0	1.69 | 1.69 | 0.160	4.37 | <1.0 | 200	96.1	98.7

METALS-020 | Inorganics - Ionic Balance and Indexes (Water) | Batch BFB2767

Analyte	Units	PQL	Blank	DUP1 BFB2767-DUP1# Samp | QC | RPD %	DUP2 PFB1283-05 Samp | QC | RPD %	LCS %	Spike % BFB2767-MS1#
Calcium	mg/L	0.50	<0.50	531 | 526 | 0.882	82.5 | 83.7 | 1.51	96.5	108
Magnesium	mg/L	0.50	<0.50	233 | 233 | 0.00857	41.1 | 42.2 | 2.64	100	85.9
Potassium	mg/L	0.50	<0.50	34.8 | 34.8 | 0.112	11.1 | 11.0 | 0.380	95.2	87.2
Sodium	mg/L	0.50	<0.50	2930 | 2940 | 0.0681	21.0 | 21.4 | 1.76	94.5	##[2]
Hardness as CaCO3	mg/L	3.0	<3.0	2290 | 2270 | 0.514	375 | 383 | 2.02	[NA]	[NA]

The QC reported was not specifically part of this workorder but formed part of the QC process batch.

INORG-079 | Inorganics - Carbons, Nitrogen Species, Sulfur Species (Water) | Batch BFB2771

Analyte	Units	PQL	Blank	DUP1 BFB2771-DUP1# Samp | QC | RPD %	LCS %	Spike % BFB2771-MS1#
Total Organic Carbon	mg/L	1.0	<1.0	<1.0 | <1.0 | [NA]	80.0	83.4

The QC reported was not specifically part of this workorder but formed part of the QC process batch.

Quality Control PFB1283

INORG-118 | Inorganics - Speciated Cr (III/VI) and Fe (II/III) (Water) | Batch BFB2565

Analyte	Units	PQL	Blank	DUP1 PFB1283-01 Samp | QC | RPD %	DUP2 PFB1283-11 Samp | QC | RPD %	LCS %	Spike % PFB1283-02
Hexavalent Chromium (Total)	mg/L	0.0050	<0.0050	<0.0050 | <0.0050 | [NA]	<0.0050 | <0.0050 | [NA]	95.6	104

INORG-118 | Inorganics - Speciated Cr (III/VI) and Fe (II/III) (Water) | Batch BFB2566

Analyte	Units	PQL	Blank	DUP1 PFB1283-01 Samp | QC | RPD %	DUP2 PFB1283-11 Samp | QC | RPD %	LCS %	Spike % PFB1283-02
Hexavalent Chromium	mg/L	0.0050	<0.0050	<0.0050 | <0.0050 | [NA]	<0.0050 | <0.0050 | [NA]	98.8	108

INORG-127 | Inorganics - Nutrients (Water) | Batch BFB2563

Analyte	Units	PQL	Blank	DUP1 PFB1283-01 Samp | QC | RPD %	DUP2 PFB1283-11 Samp | QC | RPD %	LCS %	Spike % PFB1283-02
Total Nitrogen	mg/L	0.10	<0.10	0.444 | 0.438 | 1.23	<0.10 | <0.10 | [NA]	96.2	82.3

INORG-060_TP | Inorganics - Nutrients (Water) | Batch BFB2790

Analyte	Units	PQL	Blank	DUP1 PFB1283-01 Samp | QC | RPD %	DUP2 PFB1283-10 Samp | QC | RPD %	LCS %	Spike % PFB1283-02
Total Phosphorus	mg/L	0.010	<0.010	0.0158 | 0.0120 | 27.7	<0.010 | <0.010 | [NA]	104	101

INORG-057 | Inorganics - Nutrients (Water) | Batch BFB2890

Analyte	Units	PQL	Blank	DUP1 PFB1283-01 Samp | QC | RPD %	DUP2 PFB1283-11 Samp | QC | RPD %	LCS %	Spike % PFB1283-02
Ammonia as N	mg/L	0.0050	<0.0050	<0.0050 | <0.0050 | [NA]	<0.0050 | <0.0050 | [NA]	95.0	94.7
Nitrate as N	mg/L	0.0050	<0.0050	0.0144 | 0.0145 | 0.797	0.00625 | 2.15 | 199	120	##[3]
Nitrate as NO3 by calculation	mg/L	0.020	<0.020			[NA]	[NA]

INORG-067 | Inorganics - Common Wastewater Parameters (Water) | Batch BFB2701

Analyte	Units	PQL	Blank	DUP1 BFB2701-DUP1# Samp | QC | RPD %	DUP2 PFB1283-02 Samp | QC | RPD %	LCS %
COD	mg O2/L	20	<20	1240 | 1230 | 0.731	21.0 | 21.0 | 0.00	106

The QC reported was not specifically part of this workorder but formed part of the QC process batch.

Quality Control PFB1283

ORG-029|PFAS Extended List (Water) | Batch BFC0207

Analyte	Units	PQL	Blank	LCS %
Perfluorobutanesulfonic acid (PFBS)	µg/L	0.010	<0.010	105
Perfluoropentanesulfonic acid (PFPeS)	µg/L	0.010	<0.010	113
Perfluorohexanesulfonic acid (PFHxS)	µg/L	0.010	<0.010	110
Perfluoroheptanesulfonic acid (PFHpS)	µg/L	0.010	<0.010	110
Perfluorooctanesulfonic acid (PFOS)	µg/L	0.010	<0.010	107
Perfluorodecanesulfonic acid (PFDS)	µg/L	0.020	<0.020	103
Perfluorobutanoic acid (PFBA)	µg/L	0.020	<0.020	108
Perfluoropentanoic acid (PFPeA)	µg/L	0.020	<0.020	105
Perfluorohexanoic acid (PFHxA)	µg/L	0.010	<0.010	106
Perfluoroheptanoic acid (PFHpA)	µg/L	0.010	<0.010	105
Perfluorooctanoic acid (PFOA)	µg/L	0.010	<0.010	102
Perfluorononanoic acid (PFNA)	µg/L	0.010	<0.010	107
Perfluorodecanoic acid (PFDA)	µg/L	0.020	<0.020	109
Perfluoroundecanoic acid (PFUnDA)	µg/L	0.020	<0.020	114
Perfluorododecanoic acid (PFDoDA)	µg/L	0.050	<0.050	109
Perfluorotridecanoic acid (PFTrDA)	µg/L	0.10	<0.10	99.6
Perfluorotetradecanoic acid (PFTeDA)	µg/L	0.50	<0.50	103
4:2 Fluorotelomer sulfonic acid (4:2 FTS)	µg/L	0.010	<0.010	108
6:2 Fluorotelomer sulfonic acid (6:2 FTS)	µg/L	0.010	<0.010	108
8:2 Fluorotelomer sulfonic acid (8:2 FTS)	µg/L	0.020	<0.020	109
10:2 Fluorotelomer sulfonic acid (10:2 FTS)	µg/L	0.020	<0.020	111
Perfluorooctane sulfonamide (FOSA)	µg/L	0.10	<0.10	105
N-Methyl perfluorooctane sulfonamide (MeFOSA)	µg/L	0.050	<0.050	108
N-Ethyl perfluorooctane sulfonamide (EtFOSA)	µg/L	0.10	<0.10	104
N-Methyl perfluorooctane sulfonamidoethanol	µg/L	0.050	<0.050	120
N-Ethyl perfluorooctane sulfonamidoethanol	µg/L	0.50	<0.50	121
N-Methyl perfluorooctane sulfonamidoacetic acid	µg/L	0.020	<0.020	107
N-Ethyl perfluorooctane sulfonamidoacetic acid	µg/L	0.020	<0.020	108
Surrogate 13C8 PFOS	*%*		*100*	*97.4*
Surrogate 13C2 PFOA	*%*		*96.3*	*93.5*
Extraction Internal Standard 13C3 PFBS	*%*		*104*	*[NA]*
Extraction Internal Standard 18O2 PFHxS	*%*		*103*	*[NA]*
Extraction Internal Standard 13C4 PFOS	*%*		*104*	*[NA]*
Extraction Internal Standard 13C4 PFBA	*%*		*107*	*[NA]*
Extraction Internal Standard 13C3 PFPeA	*%*		*106*	*[NA]*
Extraction Internal Standard 13C2 PFHxA	*%*		*103*	*[NA]*
Extraction Internal Standard 13C4 PFHpA	*%*		*111*	*[NA]*
Extraction Internal Standard 13C4 PFOA	*%*		*113*	*[NA]*
Extraction Internal Standard 13C5 PFNA	*%*		*106*	*[NA]*
Extraction Internal Standard 13C2 PFDA	*%*		*108*	*[NA]*
Extraction Internal Standard 13C2 PFUnDA	*%*		*107*	*[NA]*
Extraction Internal Standard 13C2 PFDoDA	*%*		*102*	*[NA]*
Extraction Internal Standard 13C2 PFTeDA	*%*		*75.0*	*[NA]*
Extraction Internal Standard 13C2 4:2FTS	*%*		*110*	*[NA]*
Extraction Internal Standard 13C2 6:2FTS	*%*		*113*	*[NA]*
Extraction Internal Standard 13C2 8:2FTS	*%*		*111*	*[NA]*
Extraction Internal Standard 13C8 FOSA	*%*		*112*	*[NA]*
Extraction Internal Standard d3 N MeFOSA	*%*		*107*	*[NA]*
Extraction Internal Standard d5 N EtFOSA	*%*		*107*	*[NA]*
Extraction Internal Standard d7 N MeFOSE	*%*		*110*	*[NA]*
Extraction Internal Standard d9 N EtFOSE	*%*		*101*	*[NA]*
Extraction Internal Standard d3 N MeFOSAA	*%*		*119*	*[NA]*
Extraction Internal Standard d5 N EtFOSAA	*%*		*118*	*[NA]*

QC Comments

Identifier	Description
[1]	Some EC to TDS ratios are outside normal expected values. Results were confirmed.
[2]	Spike recovery is not applicable due to the relatively high analyte background in the sample (>3* spike level). However, the LCS recovery is within acceptance criteria.
[3]	Spike recovery is outside routine acceptance criteria (70-130%), this may be due to suspected non-homogeneity and/or matrix interference effects. However, an acceptable recovery was achieved for the LCS.
[4]	Surrogate recovery is outside routine acceptance criteria (60-140%) as a result of the high concentration of analyte(s) in the sample.
[5]	Duplicate %RPD may be flagged as an outlier to routine laboratory acceptance, however, where one or both results are <10*PQL, the RPD acceptance criteria increases exponentially.

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Certificate of Analysis PFC1193

Client Details

Client	Katherine Town Council - NT
Contact	Brett Kimpton
Address	PO Box 1071, KATHERINE, NT, 0851

Sample Details

Your Reference	Katherine Town Council - EPL298-01 - Monthly
Number of Samples	9 Water
Date Samples Received	19/03/2024
Date Instructions Received	19/03/2024

Analysis Details

Please refer to the following pages for results, methodology summary and quality control data.
Samples were analysed as received from the client. Results relate specifically to the samples as received.
Results are reported on a dry weight basis for solids and on an as received basis for other matrices.

Report Details

Date Results Requested by	27/03/2024
Date of Issue	28/03/2024

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Authorisation Details

Results Approved By	Heram Halim, Operations Manager Lien Tang, Assistant Operations Manager Michael Mowle, Inorganics Supervisor
Laboratory Manager	Michael Kubiak

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Samples in this Report

Envirolab ID	Sample ID	Matrix	Date Sampled	Date Received
PFC1193-01	GWA (RN031131)	Water	17/03/2024	19/03/2024
PFC1193-02	GWE (RN022487)	Water	17/03/2024	19/03/2024
PFC1193-03	GWB01	Water	17/03/2024	19/03/2024
PFC1193-04	GWB02	Water	17/03/2024	19/03/2024
PFC1193-05	GWB03	Water	17/03/2024	19/03/2024
PFC1193-06	GWB04	Water	17/03/2024	19/03/2024
PFC1193-07	Field Blank	Water	17/03/2024	19/03/2024
PFC1193-08	Duplicate	Water	17/03/2024	19/03/2024
PFC1193-09	Trip Blank	Water	11/03/2024	19/03/2024

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Inorganics - Physical Parameters (Water)

Envirolab ID	Units	PQL	PFC1193-01	PFC1193-02	PFC1193-03	PFC1193-04	PFC1193-05
Your Reference			GWA (RN031131)	GWE (RN022487)	GWB01	GWB02	GWB03
Date Sampled			17/03/2024	17/03/2024	17/03/2024	17/03/2024	17/03/2024
Total Dissolved Solids	mg/L	5.0	220	360	420	480	320

Envirolab ID	Units	PQL	PFC1193-06	PFC1193-07	PFC1193-08	PFC1193-09
Your Reference			GWB04	Field Blank	Duplicate	Trip Blank
Date Sampled			17/03/2024	17/03/2024	17/03/2024	11/03/2024
Total Dissolved Solids	mg/L	5.0	380	9.0	330	7.0

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Inorganics - Ionic Balance and Indexes (Water)

Envirolab ID	Units	PQL	PFC1193-01	PFC1193-02	PFC1193-03	PFC1193-04	PFC1193-05
Your Reference			GWA (RN031131)	GWE (RN022487)	GWB01	GWB02	GWB03
Date Sampled			17/03/2024	17/03/2024	17/03/2024	17/03/2024	17/03/2024
Bicarbonate Alkalinity as CaCO3	mg/L as CaCO3	5.0	220	360	390	410	310
Carbonate Alkalinity as CaCO3	mg/L as CaCO3	5.0	<5.0	<5.0	<5.0	<5.0	<5.0
Hydroxide OH- as CaCO3	mg/L as CaCO3	5.0	<5.0	<5.0	<5.0	<5.0	<5.0
Total Alkalinity as CaCO3	mg/L as CaCO3	5.0	220	360	390	410	310
Chloride	mg/L	1.0	16	9.6	28	18	9.5
Sulfate	mg/L	1.0	5.2	11	16	20	4.9
Calcium	mg/L	0.50	29	64	61	81	46
Magnesium	mg/L	0.50	24	36	39	46	36
Potassium	mg/L	0.50	9.9	11	15	6.0	3.7
Sodium	mg/L	0.50	13	6.2	17	18	7.9
Hardness as CaCO3	mg/L	3.0	170	310	310	390	260
Ionic Balance	%		-8.7	-6.9	-9.0	-2.0	-7.0
Total Anions	mg/L	7.0	240	380	430	450	320
Anions as meq	meq/L	0.59	4.2	6.4	7.4	7.7	5.4
Total Cations	mg/L	2.0	76	120	130	150	94
Cations as meq	meq/L	0.10	4.2	6.7	7.4	8.8	5.7

Envirolab ID	Units	PQL	PFC1193-06	PFC1193-07	PFC1193-08	PFC1193-09
Your Reference			GWB04	Field Blank	Duplicate	Trip Blank
Date Sampled			17/03/2024	17/03/2024	17/03/2024	11/03/2024
Bicarbonate Alkalinity as CaCO3	mg/L as CaCO3	5.0	400	<5.0	320	<5.0
Carbonate Alkalinity as CaCO3	mg/L as CaCO3	5.0	<5.0	<5.0	<5.0	<5.0
Hydroxide OH- as CaCO3	mg/L as CaCO3	5.0	<5.0	<5.0	<5.0	<5.0
Total Alkalinity as CaCO3	mg/L as CaCO3	5.0	400	<5.0	320	<5.0
Chloride	mg/L	1.0	3.6	<1.0	7.3	<1.0
Sulfate	mg/L	1.0	4.8	<1.0	8.2	<1.0
Calcium	mg/L	0.50	58	<0.50	56	<0.50
Magnesium	mg/L	0.50	54	<0.50	36	<0.50
Potassium	mg/L	0.50	8.2	<0.50	7.1	<0.50
Sodium	mg/L	0.50	6.7	<0.50	5.4	<0.50
Hardness as CaCO3	mg/L	3.0	370	<3.0	290	<3.0
Ionic Balance	%		-2.5	-81	-3.8	-96
Total Anions	mg/L	7.0	410	<7.0	330	<7.0
Anions as meq	meq/L	0.59	6.8	<0.59	5.6	<0.59
Total Cations	mg/L	2.0	130	<2.0	110	<2.0
Cations as meq	meq/L	0.10	7.9	<0.10	6.3	<0.10

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Inorganics - Carbon, Nitrogen and Sulfur Species (Water)

Envirolab ID	Units	PQL	PFC1193-01	PFC1193-02	PFC1193-03	PFC1193-04	PFC1193-05
Your Reference			GWA (RN031131)	GWE (RN022487)	GWB01	GWB02	GWB03
Date Sampled			17/03/2024	17/03/2024	17/03/2024	17/03/2024	17/03/2024
Total Organic Carbon	mg/L	1.0	<1.0	5.6	5.1	4.5	2.0

Envirolab ID	Units	PQL	PFC1193-06	PFC1193-07	PFC1193-08	PFC1193-09
Your Reference			GWB04	Field Blank	Duplicate	Trip Blank
Date Sampled			17/03/2024	17/03/2024	17/03/2024	11/03/2024
Total Organic Carbon	mg/L	1.0	1.2	<1.0	1.2	<1.0

Certificate of Analysis PFC1193

Inorganics - Nutrients (Water)

Envirolab ID	Units	PQL	PFC1193-01	PFC1193-02	PFC1193-03	PFC1193-04	PFC1193-05
Your Reference			GWA (RN031131)	GWE (RN022487)	GWB01	GWB02	GWB03
Date Sampled			17/03/2024	17/03/2024	17/03/2024	17/03/2024	17/03/2024
Ammonia as N	mg/L	0.0050	<0.0050	<0.0050	0.0081	0.016	<0.0050
Free Ammonia (unionised) as N by calculation*	mg/L	0.0070	<0.0070	<0.0070	<0.0070	<0.0070	<0.0070
Ammonium (NH4+) as N by calculation	mg/L	0.0070	<0.0070	<0.0070	0.0081	0.016	<0.0070

Envirolab ID	Units	PQL	PFC1193-06	PFC1193-07	PFC1193-08	PFC1193-09
Your Reference			GWB04	Field Blank	Duplicate	Trip Blank
Date Sampled			17/03/2024	17/03/2024	17/03/2024	11/03/2024
Ammonia as N	mg/L	0.0050	<0.0050	0.016	<0.0050	<0.0050
Free Ammonia (unionised) as N by calculation*	mg/L	0.0070	<0.0070	<0.0070	<0.0070	<0.0070
Ammonium (NH4+) as N by calculation	mg/L	0.0070	<0.0070	0.016	<0.0070	<0.0070

Certificate of Analysis PFC1193

Inorganics - Common Wastewater Parameters (Water)

Envirolab ID	Units	PQL	PFC1193-01	PFC1193-02	PFC1193-03	PFC1193-04	PFC1193-05
Your Reference			GWA (RN031131)	GWE (RN022487)	GWB01	GWB02	GWB03
Date Sampled			17/03/2024	17/03/2024	17/03/2024	17/03/2024	17/03/2024
BOD	mg/L	5.0	9.7 [2]	15 [2]	10 [2]	15 [2]	15 [2]
COD	mg O2/L	20	<20	<20	<20	<20	<20

Envirolab ID	Units	PQL	PFC1193-06	PFC1193-07	PFC1193-08	PFC1193-09
Your Reference			GWB04	Field Blank	Duplicate	Trip Blank
Date Sampled			17/03/2024	17/03/2024	17/03/2024	11/03/2024
BOD	mg/L	5.0	17 [2]	15 [2]	<5.0 [2]	14 [2]
COD	mg O2/L	20	<20	<20	<20	<20

Certificate of Analysis PFC1193

General - Field Data (Water)

Envirolab ID	Units	PQL	PFC1193-01	PFC1193-02	PFC1193-03	PFC1193-04	PFC1193-05
Your Reference			GWA (RN031131)	GWE (RN022487)	GWB01	GWB02	GWB03
Date Sampled			17/03/2024	17/03/2024	17/03/2024	17/03/2024	17/03/2024
pH (Client Supplied)*	pH units		4.90	5.60	3.20	3.20	3.50
Temperature (Client Supplied)*	o C		31.0	28.0	28.0	28.0	27.0

Envirolab ID	Units	PQL	PFC1193-06
Your Reference			GWB04
Date Sampled			17/03/2024
pH (Client Supplied)*	pH units		3.20
Temperature (Client Supplied)*	o C		29.0

Result Comments

Identifier	Description
[2]	Sample frozen on receipt to elongate technical holding time.

Method Summary

Method ID	Methodology Summary
Calc	Calculation
Field Data	Field Data supplied by client
INORG-006	Alkalinity - determined titrimetrically based on APHA latest edition 2320-B. Solids reported from a 1:5 water extract unless otherwise specified. Total Carbon Dioxide - determined by calculation in accordance with APHA latest edition,4500-CO2 D.
INORG-018	Total Dissolved Solids - determined gravimetrically. The solids are dried at 180±10°C. NOTE: Where the EC of the sample is <100µS/cm, the TDS will typically be below 70mg/L (as the sample is very likely to be at least drinking water quality). Therefore to ensure data quality for TDS, the TDS is typically calculated as per the equation: TDS = EC*0.6
INORG-040	The concentrations of the major ions (mg/L) are converted to milliequivalents and summed. The ionic balance should be within +/- 15% i.e. total anions = total cations +/-15%.
INORG-057	Ammonia - determined colourimetrically. Water samples are filtered on receipt prior to analysis. Soils and OHS media are analysed following a water extraction. Alternatively, Ammonia can be extracted from soil using 1M KCl.
INORG-067	Samples are digested in acid with a known excess of potassium dichromate then the colour change is determined by discrete analyser or UV-VIS in accordance with APHA latest edition 5220 D.
INORG-079	Carbon forms (inorganic, organic, total) determined using a TOC/NDIR analyser via combustion. Dissolved aqueous\forms require filtering prior to determination.
INORG-081	Anions determined by Ion Chromatography. Waters samples are filtered on receipt prior to analysis. Solids are analysed from a water extract. Alternatively determined by colourimetry/turbidity using Discrete Analyser.
INORG-091	BOD and/or cBOD - Analysed in accordance with APHA latest edition 5210 D.
METALS-020	Determination of various metals by ICP-OES.

Result Definitions

Identifier	Description
NR	Not reported
NEPM	National Environment Protection Measure
NS	Not specified
LCS	Laboratory Control Sample
RPD	Relative Percent Difference
>	Greater than
<	Less than
PQL	Practical Quantitation Limit
INS	Insufficient sample for this test
NA	Test not required
NT	Not tested
DOL	Samples rejected due to particulate overload (air filters only)
RFD	Samples rejected due to filter damage (air filters only)
RUD	Samples rejected due to uneven deposition (air filters only)
##	Indicates a laboratory acceptance criteria outlier, for further details, see Result Comments and/or QC Comments

Quality Control Definitions

Blank

This is the component of the analytical signal which is not derived from the sample but from reagents, glassware etc, and is determined by processing solvents and reagents in exactly the same manner as for samples.

Surrogate Spike

Surrogates are known additions to each sample, blank, matrix spike and LCS in a batch, of compounds which are similar to the analyte of interest, however are not expected to be found in real samples.

LCS (Laboratory Control Sample)

This comprises either a standard reference material or a control matrix (such as a blank sand or water) fortified with analytes representative of the analyte class. It is simply a check sample.

Matrix Spike

A portion of the sample is spiked with a known concentration of target analyte. The purpose of the matrix spike is to monitor the performance of the analytical method used and to determine whether matrix interferences exist.

Duplicate

This is the complete duplicate analysis of a sample from the process batch. The sample selected should be one where the analyte concentration is easily measurable.

Laboratory Acceptance Criteria

Duplicate sample and matrix spike recoveries may not be reported on smaller jobs, however, were analysed at a frequency to meet or exceed NEPM requirements. All samples are tested in batches of 20. The duplicate sample RPD and matrix spike recoveries for the batch were within the laboratory acceptance criteria. Filters, swabs, wipes, tubes and badges will not have duplicate data as the whole sample is generally extracted during sample extraction. Spikes for Physical and Aggregate Tests are not applicable. For VOCs in water samples, three vials are required for duplicate or spike analysis.

General Acceptance Criteria (GAC) - Analyte specific criteria applies for some analytes and is reflected in QC recovery tables.

Duplicates: >10xPQL - RPD acceptance criteria will vary depending on the analytes and the analytical techniques but is typically in the range 20%-50% - see ELN-P05 QAQC tables for details (available on request); <10xPQL - RPD are higher as the results approach PQL and the estimated measurement uncertainty will statistically increase. Matrix Spikes, LCS and Surrogate recoveries: Generally 70-130% for inorganics/metals; 60-140% for organics (+/-50% surrogates) and 10-140% for labile SVOCs (including labile surrogates), ultra trace organics and speciated phenols is acceptable.

In circumstances where no duplicate and/or sample spike has been reported at 1 in 10 and/or 1 in 20 samples respectively, the sample volume submitted was typically insufficient in order to satisfy laboratory QA/QC protocols.

Miscellaneous Information

When samples are received where certain analytes are outside of recommended technical holding times (THTs), the analysis has proceeded. Where analytes are on the verge of breaching THTs, every effort will be made to analyse within the THT or as soon as practicable.

Where sampling dates are not provided, Envirolab are not in a position to comment on the validity of the analysis where recommended technical holding times may have been breached. We have taken the sampling date as being the date received at the laboratory.

Two significant figures are reported for the majority of tests and with a high degree of confidence, for results <10*PQL, the second significant figure may be in doubt i.e. has a relatively high degree of uncertainty and is provided for information only.

Measurement Uncertainty estimates are available for most tests upon request.

Analysis of aqueous samples typically involves the extraction/digestion and/or analysis of the liquid phase only (i.e. NOT any settled sediment phase but inclusive of suspended particles if present), unless stipulated on the Envirolab COC or by correspondence. Notable exceptions include certain Physical Tests (pH/EC/BOD/COD/Apparent Colour etc.), Solids testing, Total Recoverable metals and PFAS where sediment/solids are included by default.

Urine Analysis - The BEI values listed are taken from the 2022 edition of *TLVs and BEIs Threshold Limits by ACGIH*.

Air volume measurements are not covered by Envirolab's NATA accreditation.

Data Quality Assessment Summary PFC1193

Client Details

Client	Katherine Town Council - NT
Your Reference	Katherine Town Council - EPL298-01 - Monthly
Date Issued	28/03/2024

Recommended Holding Time Compliance

Recommended holding time exceedances exist - See detailed list below

Quality Control and QC Frequency

QC Type	Compliant	Details
Blank	Yes	No Outliers
LCS	Yes	No Outliers
Duplicates	Yes	No Outliers
Matrix Spike	No	Matrix Spike Outliers Exist - See detailed list below
Surrogates / Extracted Internal Standards	Yes	No Outliers
QC Frequency	No	QC Frequency Outliers Exist - See detailed list below

Surrogates/Extracted Internal Standards, Duplicates and/or Matrix Spikes are not always relevant/applicable to certain analyses and matrices. Therefore, said QC measures are deemed compliant in these situations by default. See Laboratory Acceptance Criteria for more information

Data Quality Assessment Summary PFC1193

Recommended Holding Time Compliance

Analysis	Sample Number(s)	Date Sampled	Date Extracted	Date Analysed	Compliant
TDS | Water	9	11/03/2024	21/03/2024	21/03/2024	No
	1-8	17/03/2024	21/03/2024	21/03/2024	Yes
Alkalinity Suite | Water	9	11/03/2024	21/03/2024	22/03/2024	Yes
	1-8	17/03/2024	21/03/2024	22/03/2024	Yes
Chloride | Water	9	11/03/2024	20/03/2024	20/03/2024	Yes
	1-8	17/03/2024	20/03/2024	20/03/2024	Yes
Dissolved Cations | Water	9	11/03/2024	22/03/2024	22/03/2024	Yes
	1-6	17/03/2024	21/03/2024	21/03/2024	Yes
	7-8	17/03/2024	22/03/2024	22/03/2024	Yes
Ion Balance | Water	9	11/03/2024	21/03/2024	26/03/2024	Yes
	1-8	17/03/2024	21/03/2024	26/03/2024	Yes
Sulfate | Water	9	11/03/2024	20/03/2024	20/03/2024	Yes
	1-8	17/03/2024	20/03/2024	20/03/2024	Yes
Total Organic Carbon | Water	9	11/03/2024	25/03/2024	25/03/2024	Yes
	1-8	17/03/2024	25/03/2024	25/03/2024	Yes
Nitrogen - Ammonia | Water	9	11/03/2024	21/03/2024	21/03/2024	Yes
	1-8	17/03/2024	21/03/2024	21/03/2024	Yes
BOD | Water	9	11/03/2024	22/03/2024	27/03/2024	No
	1-8	17/03/2024	22/03/2024	27/03/2024	No
COD | Water	9	11/03/2024	21/03/2024	22/03/2024	Yes
	1-8	17/03/2024	21/03/2024	22/03/2024	Yes

Outliers: Matrix Spike

INORG-057 | Inorganics - Nutrients (Water) | Batch BFC2377

Sample ID	Analyte	% Limits	% Recovery
BFC2377-MS1#	Ammonia as N	70 - 130	##[1]

Outliers: QC Frequency

INORG-091 | Inorganics - Common Wastewater Parameters (Water) | Batch BFC2695

Analysis	QC Type	Expected	Reported
BOD	Duplicate	2	0

Quality Control PFC1193

INORG-018 | Inorganics - Physical Parameters (Water) | Batch BFC2543

Analyte	Units	PQL	Blank	DUP1 BFC2543-DUP1# Samp | QC | RPD %	DUP2 PFC1193-05 Samp | QC | RPD %	LCS %
Total Dissolved Solids	mg/L	5.0	<5.0	726 | 744 | 2.45	320 | 311 | 2.85	94.9

The QC reported was not specifically part of this workorder but formed part of the QC process batch.

INORG-081 | Inorganics - Ionic Balance and Indexes (Water) | Batch BFC2339

Analyte	Units	PQL	Blank	DUP1 PFC1193-01 Samp | QC | RPD %	DUP2 BFC2339-DUP2# Samp | QC | RPD %	LCS %	Spike % PFC1193-02
Chloride	mg/L	1.0	<1.0	16.2 | 16.2 | 0.0741	405 | 407 | 0.495	94.1	110
Sulfate	mg/L	1.0	<1.0	5.23 | 5.24 | 0.210	80.7 | 81.2 | 0.632	98.0	116

The QC reported was not specifically part of this workorder but formed part of the QC process batch.

METALS-020 | Inorganics - Ionic Balance and Indexes (Water) | Batch BFC2400

Analyte	Units	PQL	Blank	DUP1 PFC1193-01 Samp | QC | RPD %	DUP2 BFC2400-DUP2# Samp | QC | RPD %	LCS %	Spike % PFC1193-02
Calcium	mg/L	0.50	<0.50	29.1 | 29.1 | 0.192	18.2 | 18.4 | 1.03	94.8	87.8
Magnesium	mg/L	0.50	<0.50	23.5 | 23.2 | 1.61	1.17 | 1.18 | 0.145	96.5	100
Potassium	mg/L	0.50	<0.50	9.85 | 9.97 | 1.15	1.14 | 1.14 | 0.465	102	105
Sodium	mg/L	0.50	<0.50	13.0 | 13.0 | 0.338	27.6 | 27.5 | 0.632	97.3	104
Hardness as CaCO3	mg/L	3.0	<3.0	170 | 168 | 0.997	50.3 | 50.8 | 0.948	[NA]	[NA]

The QC reported was not specifically part of this workorder but formed part of the QC process batch.

INORG-006 | Inorganics - Ionic Balance and Indexes (Water) | Batch BFC2444

Analyte	Units	PQL	Blank	DUP1 PFC1193-01 Samp | QC | RPD %	DUP2 BFC2444-DUP2# Samp | QC | RPD %	LCS %
Bicarbonate Alkalinity as CaCO3	mg/L as CaCO3	5.0	<5.0	223 | 212 | 4.95	170 | 176 | 3.49	[NA]
Carbonate Alkalinity as CaCO3	mg/L as CaCO3	5.0	<5.0	<5.0 | <5.0 | [NA]	<5.0 | <5.0 | [NA]	[NA]
Hydroxide OH- as CaCO3	mg/L as CaCO3	5.0	<5.0	<5.0 | <5.0 | [NA]	<5.0 | <5.0 | [NA]	[NA]
Total Alkalinity as CaCO3	mg/L as CaCO3	5.0	<5.0	223 | 212 | 4.95	170 | 176 | 3.49	[NA]

Analyte	Units	PQL	Blank	LCS %
Total Alkalinity as CaCO3	mg/L as CaCO3	5		99.5

The QC reported was not specifically part of this workorder but formed part of the QC process batch.

METALS-020 | Inorganics - Ionic Balance and Indexes (Water) | Batch BFC2663

Analyte	Units	PQL	Blank	DUP1 BFC2663-DUP1# Samp | QC | RPD %	DUP2 BFC2663-DUP2# Samp | QC | RPD %	LCS %	Spike % PFC1193-07
Calcium	mg/L	0.50	<0.50	288 | 292 | 1.18	448 | 446 | 0.313	105	99.1
Magnesium	mg/L	0.50	<0.50	43.5 | 45.0 | 3.42	1020 | 1020 | 0.280	107	101
Potassium	mg/L	0.50	<0.50	10.8 | 10.9 | 0.388	387 | 395 | 1.96	107	101
Sodium	mg/L	0.50	<0.50	136 | 137 | 0.900	8630 | 8620 | 0.185	108	101
Hardness as CaCO3	mg/L	3.0	<3.0	899 | 914 | 1.63	5330 | 5320 | 0.287	[NA]	[NA]

The QC reported was not specifically part of this workorder but formed part of the QC process batch.

Quality Control PFC1193

INORG-079 | Inorganics - Carbon, Nitrogen and Sulfur Species (Water) | Batch BFC2748

Analyte	Units	PQL	Blank	DUP1 BFC2748-DUP1# Samp | QC | RPD %	DUP2 PFC1193-01 Samp | QC | RPD %	LCS %	Spike % BFC2748-MS1#
Total Organic Carbon	mg/L	1.0	<1.0	32.1 | 32.4 | 1.01	<1.0 | <1.0 | [NA]	105	109

The QC reported was not specifically part of this workorder but formed part of the QC process batch.

INORG-057 | Inorganics - Nutrients (Water) | Batch BFC2377

Analyte	Units	PQL	Blank	DUP1 BFC2377-DUP1# Samp | QC | RPD %	DUP2 PFC1193-02 Samp | QC | RPD %	LCS %	Spike % BFC2377-MS1#
Ammonia as N	mg/L	0.0050	<0.0050	17.9 | 16.8 | 6.49	<0.0050 | <0.0050 | [NA]	95.4	##[1]

The QC reported was not specifically part of this workorder but formed part of the QC process batch.

INORG-067 | Inorganics - Common Wastewater Parameters (Water) | Batch BFC2512

Analyte	Units	PQL	Blank	DUP1 BFC2512-DUP1# Samp | QC | RPD %	DUP2 PFC1193-01 Samp | QC | RPD %	LCS %
COD	mg O2/L	20	<20	753 | 745 | 1.07	<20 | <20 | [NA]	106

The QC reported was not specifically part of this workorder but formed part of the QC process batch.

INORG-091 | Inorganics - Common Wastewater Parameters (Water) | Batch BFC2695

Analyte	Units	PQL	Blank	LCS %
BOD	mg/L	5.0	<5.0	91.1

QC Comments

Identifier	Description
[1]	Spike recovery is not applicable due to the relatively high analyte background in the sample (>3* spike level). However, the LCS recovery is within acceptance criteria.

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Certificate of Analysis PFD1531

Client Details

Client	Katherine Town Council - NT
Contact	Brett Kimpton
Address	PO Box 1071, KATHERINE, NT, 0851

Sample Details

Your Reference	Katherine Town Council - EPL298-01 - Monthly
Number of Samples	9 Water
Date Samples Received	23/04/2024
Date Instructions Received	23/04/2024

Analysis Details

Please refer to the following pages for results, methodology summary and quality control data.
Samples were analysed as received from the client. Results relate specifically to the samples as received.
Results are reported on a dry weight basis for solids and on an as received basis for other matrices.

Report Details

Date Results Requested by	01/05/2024
Date of Issue	30/04/2024

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Authorisation Details

Results Approved By	Ben Carpenter, Metals Technician Heram Halim, Operations Manager Jessica Miller, Microbiological Supervisor Lien Tang, Assistant Operations Manager
Laboratory Manager	Michael Kubiak

Samples in this Report

Envirolab ID	Sample ID	Depth	Matrix	Date Sampled	Date Received
PFD1531-01	GWA (RN031131)		Water	21/04/2024	23/04/2024
PFD1531-02	GWE (RN022487)	6.13	Water	21/04/2024	23/04/2024
PFD1531-03	GWB01	6.40	Water	21/04/2024	23/04/2024
PFD1531-04	GWB02	6.20	Water	21/04/2024	23/04/2024
PFD1531-05	GWB03	4.80	Water	21/04/2024	23/04/2024
PFD1531-06	GWB04	5.90	Water	21/04/2024	23/04/2024
PFD1531-07	Field Blank		Water	21/04/2024	23/04/2024
PFD1531-08	Duplicate		Water	21/04/2024	23/04/2024
PFD1531-09	Trip Blank		Water	21/04/2024	23/04/2024

Certificate of Analysis PFD1531

Inorganics - Physical Parameters (Water)

Envirolab ID	Units	PQL	PFD1531-01	PFD1531-02	PFD1531-03	PFD1531-04	PFD1531-05
Your Reference			GWA (RN031131)	GWE (RN022487)	GWB01	GWB02	GWB03
Date Sampled			21/04/2024	21/04/2024	21/04/2024	21/04/2024	21/04/2024
Depth				6.13	6.40	6.20	4.80
Total Dissolved Solids	mg/L	5.0	420	270	540	430	340

Envirolab ID	Units	PQL	PFD1531-06	PFD1531-07	PFD1531-08	PFD1531-09
Your Reference			GWB04	Field Blank	Duplicate	Trip Blank
Date Sampled			21/04/2024	21/04/2024	21/04/2024	21/04/2024
Depth			5.90			
Total Dissolved Solids	mg/L	5.0	440	5.0	390	<5.0

Inorganics - Ionic Balance and Indexes (Water)

Envirolab ID	Units	PQL	PFD1531-01	PFD1531-02	PFD1531-03	PFD1531-04	PFD1531-05
Your Reference			GWA (RN031131)	GWE (RN022487)	GWB01	GWB02	GWB03
Date Sampled			21/04/2024	21/04/2024	21/04/2024	21/04/2024	21/04/2024
Depth				6.13	6.40	6.20	4.80
Bicarbonate Alkalinity as CaCO3	mg/L as CaCO3	5.0	360	270	420	380	340
Carbonate Alkalinity as CaCO3	mg/L as CaCO3	5.0	<5.0	<5.0	<5.0	<5.0	<5.0
Hydroxide OH- as CaCO3	mg/L as CaCO3	5.0	<5.0	<5.0	<5.0	<5.0	<5.0
Total Alkalinity as CaCO3	mg/L as CaCO3	5.0	360	270	420	380	340
Chloride	mg/L	1.0	5.0	13	49	14	3.8
Sulfate	mg/L	1.0	18	5.6	28	12	5.5
Calcium	mg/L	0.50	75	41	76	64	59
Magnesium	mg/L	0.50	39	33	51	44	36
Potassium	mg/L	0.50	5.9	5.8	10	5.9	4.0
Sodium	mg/L	0.50	5.6	15	22	11	5.1
Hardness (calc) equivalent CaCO3	mg/L	3.0	350	240	400	340	300
Ionic Balance	%		-2.4	-2.5	-5.4	-4.9	-5.5
Total Anions	mg/L	7.0	380	290	490	410	350
Anions as meq	meq/L	0.59	6.4	4.9	8.8	6.9	5.8
Total Cations	mg/L	2.0	130	94	160	130	100
Cations as meq	meq/L	0.10	7.4	5.6	9.3	7.5	6.2

Envirolab ID	Units	PQL	PFD1531-06	PFD1531-07	PFD1531-08	PFD1531-09
Your Reference			GWB04	Field Blank	Duplicate	Trip Blank
Date Sampled			21/04/2024	21/04/2024	21/04/2024	21/04/2024
Depth			5.90			
Bicarbonate Alkalinity as CaCO3	mg/L as CaCO3	5.0	420	<5.0	380	<5.0
Carbonate Alkalinity as CaCO3	mg/L as CaCO3	5.0	<5.0	<5.0	<5.0	<5.0
Hydroxide OH- as CaCO3	mg/L as CaCO3	5.0	<5.0	<5.0	<5.0	<5.0
Total Alkalinity as CaCO3	mg/L as CaCO3	5.0	420	<5.0	380	<5.0
Chloride	mg/L	1.0	4.1	<1.0	4.9	<1.0
Sulfate	mg/L	1.0	6.1	<1.0	18	<1.0
Calcium	mg/L	0.50	68	<0.50	79	<0.50
Magnesium	mg/L	0.50	55	<0.50	39	<0.50
Potassium	mg/L	0.50	8.4	<0.50	5.9	<0.50
Sodium	mg/L	0.50	6.1	<0.50	5.7	<0.50
Hardness (calc) equivalent CaCO3	mg/L	3.0	390	<3.0	360	<3.0
Ionic Balance	%		-1.7	-72	-3.2	-99
Total Anions	mg/L	7.0	430	<7.0	400	<7.0
Anions as meq	meq/L	0.59	7.1	<0.59	6.7	<0.59
Total Cations	mg/L	2.0	140	<2.0	130	<2.0
Cations as meq	meq/L	0.10	8.4	<0.10	7.6	<0.10

Certificate of Analysis PFD1531

Inorganics - Carbon, Nitrogen and Sulfur Species (Water)

Envirolab ID	Units	PQL	PFD1531-01	PFD1531-02	PFD1531-03	PFD1531-04	PFD1531-05
Your Reference			GWA (RN031131)	GWE (RN022487)	GWB01	GWB02	GWB03
Date Sampled			21/04/2024	21/04/2024	21/04/2024	21/04/2024	21/04/2024
Depth				6.13	6.40	6.20	4.80
Total Organic Carbon	mg/L	1.0	1.1	2.3	3.0	3.1	1.4

Envirolab ID	Units	PQL	PFD1531-06	PFD1531-07	PFD1531-08	PFD1531-09
Your Reference			GWB04	Field Blank	Duplicate	Trip Blank
Date Sampled			21/04/2024	21/04/2024	21/04/2024	21/04/2024
Depth			5.90			
Total Organic Carbon	mg/L	1.0	6.8	<1.0	<1.0	<1.0

Certificate of Analysis PFD1531

Inorganics - Nutrients (Water)

Envirolab ID	Units	PQL	PFD1531-01	PFD1531-02	PFD1531-03	PFD1531-04	PFD1531-05
Your Reference			GWA (RN031131)	GWE (RN022487)	GWB01	GWB02	GWB03
Date Sampled			21/04/2024	21/04/2024	21/04/2024	21/04/2024	21/04/2024
Depth				6.13	6.40	6.20	4.80
Ammonia as N	mg/L	0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050
Free Ammonia (unionised) as N by calculation*	mg/L	0.0070	<0.0070	<0.0070	<0.0070	<0.0070	<0.0070
Ammonium (NH4+) as N by calculation	mg/L	0.0070	<0.0070	<0.0070	<0.0070	<0.0070	<0.0070

Envirolab ID	Units	PQL	PFD1531-06	PFD1531-07	PFD1531-08	PFD1531-09
Your Reference			GWB04	Field Blank	Duplicate	Trip Blank
Date Sampled			21/04/2024	21/04/2024	21/04/2024	21/04/2024
Depth			5.90			
Ammonia as N	mg/L	0.0050	<0.0050	<0.0050	<0.0050	<0.0050
Free Ammonia (unionised) as N by calculation*	mg/L	0.0070	<0.0070	[NA]	<0.0070	[NA]
Ammonium (NH4+) as N by calculation	mg/L	0.0070	<0.0070	[NA]	<0.0070	[NA]

Certificate of Analysis PFD1531

Inorganics - Common Wastewater Parameters (Water)

Envirolab ID	Units	PQL	PFD1531-01	PFD1531-02	PFD1531-03	PFD1531-04	PFD1531-05
Your Reference			GWA (RN031131)	GWE (RN022487)	GWB01	GWB02	GWB03
Date Sampled			21/04/2024	21/04/2024	21/04/2024	21/04/2024	21/04/2024
Depth				6.13	6.40	6.20	4.80
BOD	mg/L	5.0	<5.0 [1]	<5.0 [1]	<5.0 [1]	<5.0 [1]	<5.0 [1]
COD	mg O2/L	20	<20	<20	<20	<20	<20

Envirolab ID	Units	PQL	PFD1531-06	PFD1531-07	PFD1531-08	PFD1531-09
Your Reference			GWB04	Field Blank	Duplicate	Trip Blank
Date Sampled			21/04/2024	21/04/2024	21/04/2024	21/04/2024
Depth			5.90			
BOD	mg/L	5.0	<5.0 [1]	<5.0 [1]	<5.0 [1]	<5.0 [1]
COD	mg O2/L	20	<20	<20	<20	<20

Certificate of Analysis PFD1531

General - Field Data (Water)

Envirolab ID	Units	PQL	PFD1531-01	PFD1531-02	PFD1531-03	PFD1531-04	PFD1531-05
Your Reference			GWA (RN031131)	GWE (RN022487)	GWB01	GWB02	GWB03
Date Sampled			21/04/2024	21/04/2024	21/04/2024	21/04/2024	21/04/2024
Depth				6.13	6.40	6.20	4.80
pH (Client Supplied)*	pH units		3.17	3.07	3.36	3.38	3.52
Temperature (Client Supplied)*	o C		31.8	32.2	30.1	30.8	29.8

Envirolab ID	Units	PQL	PFD1531-06	PFD1531-08
Your Reference			GWB04	Duplicate
Date Sampled			21/04/2024	21/04/2024
Depth			5.90	
pH (Client Supplied)*	pH units		3.36	3.17
Temperature (Client Supplied)*	o C		29.5	31.8

Result Comments

Identifier	Description
[1]	Sample frozen on receipt to extend technical holding time.

Method Summary

Method ID	Methodology Summary
Calc	Calculation
Field Data	Field Data supplied by client
INORG-006	Alkalinity - determined titrimetrically based on APHA latest edition 2320-B. Solids reported from a 1:5 water extract unless otherwise specified. Total Carbon Dioxide - determined by calculation in accordance with APHA latest edition,4500-CO2 D.
INORG-018	Total Dissolved Solids - determined gravimetrically. The solids are dried at 180±10°C. NOTE: Where the EC of the sample is <100µS/cm, the TDS will typically be below 70mg/L (as the sample is very likely to be at least drinking water quality). Therefore to ensure data quality for TDS, the TDS is typically calculated as per the equation: TDS = EC*0.6
INORG-040	The concentrations of the major ions (mg/L) are converted to milliequivalents and summed. The ionic balance should be within +/- 15% i.e. total anions = total cations +/-15%.
INORG-057	Ammonia - determined colourimetrically. Water samples are filtered on receipt prior to analysis. Soils and OHS media are analysed following a water extraction. Alternatively, Ammonia can be extracted from soil using 1M KCl.
INORG-067	Samples are digested in acid with a known excess of potassium dichromate then the colour change is determined by discrete analyser or UV-VIS in accordance with APHA latest edition 5220 D.
INORG-079	Carbon forms (inorganic, organic, total) determined using a TOC/NDIR analyser via combustion. Dissolved aqueous\forms require filtering prior to determination.
INORG-081	Anions determined by Ion Chromatography. Waters samples are filtered on receipt prior to analysis. Solids are analysed from a water extract. Alternatively determined by colourimetry/turbidity using Discrete Analyser.
INORG-091	BOD and/or cBOD - Analysed in accordance with APHA latest edition 5210 D.
METALS-020	Determination of various metals by ICP-OES.

Result Definitions

Identifier	Description
NR	Not reported
NEPM	National Environment Protection Measure
NS	Not specified
LCS	Laboratory Control Sample
RPD	Relative Percent Difference
>	Greater than
<	Less than
PQL	Practical Quantitation Limit
INS	Insufficient sample for this test
NA	Test not required
NT	Not tested
DOL	Samples rejected due to particulate overload (air filters only)
RFD	Samples rejected due to filter damage (air filters only)
RUD	Samples rejected due to uneven deposition (air filters only)
##	Indicates a laboratory acceptance criteria outlier, for further details, see Result Comments and/or QC Comments

Quality Control Definitions

Blank

This is the component of the analytical signal which is not derived from the sample but from reagents, glassware etc, and is determined by processing solvents and reagents in exactly the same manner as for samples.

Surrogate Spike

Surrogates are known additions to each sample, blank, matrix spike and LCS in a batch, of compounds which are similar to the analyte of interest, however are not expected to be found in real samples.

LCS (Laboratory Control Sample)

This comprises either a standard reference material or a control matrix (such as a blank sand or water) fortified with analytes representative of the analyte class. It is simply a check sample.

Matrix Spike

A portion of the sample is spiked with a known concentration of target analyte. The purpose of the matrix spike is to monitor the performance of the analytical method used and to determine whether matrix interferences exist.

Duplicate

This is the complete duplicate analysis of a sample from the process batch. The sample selected should be one where the analyte concentration is easily measurable.

Laboratory Acceptance Criteria

Duplicate sample and matrix spike recoveries may not be reported on smaller jobs, however, were analysed at a frequency to meet or exceed NEPM requirements. All samples are tested in batches of 20. The duplicate sample RPD and matrix spike recoveries for the batch were within the laboratory acceptance criteria. Filters, swabs, wipes, tubes and badges will not have duplicate data as the whole sample is generally extracted during sample extraction. Spikes for Physical and Aggregate Tests are not applicable. For VOCs in water samples, three vials are required for duplicate or spike analysis.

General Acceptance Criteria (GAC) - Analyte specific criteria applies for some analytes and is reflected in QC recovery tables.

Duplicates: >10xPQL - RPD acceptance criteria will vary depending on the analytes and the analytical techniques but is typically in the range 20%-50% - see ELN-P05 QAQC tables for details (available on request); <10xPQL - RPD are higher as the results approach PQL and the estimated measurement uncertainty will statistically increase. Matrix Spikes, LCS and Surrogate recoveries: Generally 70-130% for inorganics/metals; 60-140% for organics (+/-50% surrogates) and 10-140% for labile SVOCs (including labile surrogates), ultra trace organics and speciated phenols is acceptable.

In circumstances where no duplicate and/or sample spike has been reported at 1 in 10 and/or 1 in 20 samples respectively, the sample volume submitted was typically insufficient in order to satisfy laboratory QA/QC protocols.

Miscellaneous Information

When samples are received where certain analytes are outside of recommended technical holding times (THTs), the analysis has proceeded. Where analytes are on the verge of breaching THTs, every effort will be made to analyse within the THT or as soon as practicable.

Where sampling dates are not provided, Envirolab are not in a position to comment on the validity of the analysis where recommended technical holding times may have been breached. We have taken the sampling date as being the date received at the laboratory.

Two significant figures are reported for the majority of tests and with a high degree of confidence, for results <10*PQL, the second significant figure may be in doubt i.e. has a relatively high degree of uncertainty and is provided for information only.

Measurement Uncertainty estimates are available for most tests upon request.

Analysis of aqueous samples typically involves the extraction/digestion and/or analysis of the liquid phase only (i.e. NOT any settled sediment phase but inclusive of suspended particles if present), unless stipulated on the Envirolab COC or by correspondence. Notable exceptions include certain Physical Tests (pH/EC/BOD/COD/Apparent Colour etc.), Solids testing, Total Recoverable metals and PFAS where sediment/solids are included by default.

Urine Analysis - The BEI values listed are taken from the 2022 edition of *TLVs and BEIs Threshold Limits by ACGIH*.

Air volume measurements are not covered by Envirolab's NATA accreditation.

Data Quality Assessment Summary PFD1531

Client Details

Client	Katherine Town Council - NT
Your Reference	Katherine Town Council - EPL298-01 - Monthly
Date Issued	30/04/2024

Recommended Holding Time Compliance

Recommended holding time exceedances exist - See detailed list below

Quality Control and QC Frequency

QC Type	Compliant	Details
Blank	Yes	No Outliers
LCS	Yes	No Outliers
Duplicates	Yes	No Outliers
Matrix Spike	Yes	No Outliers
Surrogates / Extracted Internal Standards	Yes	No Outliers
QC Frequency	No	QC Frequency Outliers Exist - See detailed list below

Surrogates/Extracted Internal Standards, Duplicates and/or Matrix Spikes are not always relevant/applicable to certain analyses and matrices. Therefore, said QC measures are deemed compliant in these situations by default. See Laboratory Acceptance Criteria for more information

Data Quality Assessment Summary PFD1531

Recommended Holding Time Compliance

Analysis	Sample Number(s)	Date Sampled	Date Extracted	Date Analysed	Compliant
TDS | Water	1-9	21/04/2024	29/04/2024	29/04/2024	No
Alkalinity Suite | Water	1-9	21/04/2024	24/04/2024	26/04/2024	Yes
Chloride | Water	1-9	21/04/2024	23/04/2024	24/04/2024	Yes
Dissolved Cations | Water	1-9	21/04/2024	24/04/2024	26/04/2024	Yes
Ion Balance | Water	1-9	21/04/2024	22/04/2024	30/04/2024	Yes
Sulfate | Water	1-9	21/04/2024	23/04/2024	24/04/2024	Yes
Total Organic Carbon | Water	1-9	21/04/2024	26/04/2024	29/04/2024	Yes
Nitrogen - Ammonia | Water	1-9	21/04/2024	26/04/2024	26/04/2024	Yes
BOD | Water	1-9	21/04/2024	24/04/2024	29/04/2024	No
COD | Water	1-9	21/04/2024	24/04/2024	29/04/2024	Yes

Outliers: QC Frequency

INORG-091 | Inorganics - Common Wastewater Parameters (Water) | Batch BFD3114

Analysis	QC Type	Expected	Reported
BOD	Duplicate	2	0

Quality Control PFD1531

INORG-018 | Inorganics - Physical Parameters (Water) | Batch BFD3193

Analyte	Units	PQL	Blank	DUP1 PFD1531-01 Samp | QC | RPD %	DUP2 PFD1531-06 Samp | QC | RPD %	LCS %
Total Dissolved Solids	mg/L	5.0	<5.0	419 | 396 | 5.64	443 | 449 | 1.35	99.7

INORG-081 | Inorganics - Ionic Balance and Indexes (Water) | Batch BFD2818

Analyte	Units	PQL	Blank	DUP1 BFD2818-DUP1# Samp | QC | RPD %	DUP2 BFD2818-DUP2# Samp | QC | RPD %	LCS %	Spike % BFD2818-MS1#
Chloride	mg/L	1.0	<1.0	94.9 | 94.8 | 0.0938	171 | 170 | 0.624	104	101
Sulfate	mg/L	1.0	<1.0	62.6 | 62.6 | 0.0251	310 | 307 | 1.07	102	105

The QC reported was not specifically part of this workorder but formed part of the QC process batch.

METALS-020 | Inorganics - Ionic Balance and Indexes (Water) | Batch BFD2898

Analyte	Units	PQL	Blank	DUP1 BFD2898-DUP1# Samp | QC | RPD %	DUP2 PFD1531-07 Samp | QC | RPD %	LCS %	Spike % BFD2898-MS1#
Calcium	mg/L	0.50	<0.50	5.37 | 5.39 | 0.262	<0.50 | <0.50 | [NA]	91.9	89.3
Magnesium	mg/L	0.50	<0.50	8.06 | 8.23 | 2.03	<0.50 | <0.50 | [NA]	92.6	97.2
Potassium	mg/L	0.50	<0.50	<0.50 | <0.50 | [NA]	<0.50 | <0.50 | [NA]	90.9	92.8
Sodium	mg/L	0.50	<0.50	43.4 | 44.3 | 1.98	<0.50 | <0.50 | [NA]	91.6	79.1
Hardness (calc) equivalent CaCO3	mg/L	3.0	<3.0	46.6 | 47.3 | 1.52	<3.0 | <3.0 | [NA]	[NA]	[NA]

The QC reported was not specifically part of this workorder but formed part of the QC process batch.

INORG-006 | Inorganics - Ionic Balance and Indexes (Water) | Batch BFD2907

Analyte	Units	PQL	Blank	DUP1 PFD1531-01 Samp | QC | RPD %	DUP2 BFD2907-DUP2# Samp | QC | RPD %	LCS %
Bicarbonate Alkalinity as CaCO3	mg/L as CaCO3	5.0	<5.0	361 | 368 | 1.76	153 | 149 | 2.98	[NA]
Carbonate Alkalinity as CaCO3	mg/L as CaCO3	5.0	<5.0	<5.0 | <5.0 | [NA]	<5.0 | <5.0 | [NA]	[NA]
Hydroxide OH- as CaCO3	mg/L as CaCO3	5.0	<5.0	<5.0 | <5.0 | [NA]	<5.0 | <5.0 | [NA]	[NA]
Total Alkalinity as CaCO3	mg/L as CaCO3	5.0	<5.0	361 | 368 | 1.76	153 | 149 | 2.98	[NA]

Analyte	Units	PQL	Blank	LCS %
Total Alkalinity as CaCO3	mg/L as CaCO3	5		102

The QC reported was not specifically part of this workorder but formed part of the QC process batch.

INORG-006 | Inorganics - Ionic Balance and Indexes (Water) | Batch BFD2908

Analyte	Units	PQL	Blank	DUP1 PFD1531-08 Samp | QC | RPD %	DUP2 BFD2908-DUP2# Samp | QC | RPD %	LCS %
Bicarbonate Alkalinity as CaCO3	mg/L as CaCO3	5.0	<5.0	379 | 365 | 3.85	28.0 | 29.6 | 5.77	[NA]
Carbonate Alkalinity as CaCO3	mg/L as CaCO3	5.0	<5.0	<5.0 | <5.0 | [NA]	<5.0 | <5.0 | [NA]	[NA]
Hydroxide OH- as CaCO3	mg/L as CaCO3	5.0	<5.0	<5.0 | <5.0 | [NA]	<5.0 | <5.0 | [NA]	[NA]
Total Alkalinity as CaCO3	mg/L as CaCO3	5.0	<5.0	379 | 365 | 3.85	27.9 | 29.6 | 5.77	[NA]

Analyte	Units	PQL	Blank	LCS %
Total Alkalinity as CaCO3	mg/L as CaCO3	5		99.4

The QC reported was not specifically part of this workorder but formed part of the QC process batch.

Quality Control PFD1531

INORG-079 | Inorganics - Carbon, Nitrogen and Sulfur Species (Water) | Batch BFD3012

Analyte	Units	PQL	Blank	DUP1 PFD1531-01 Samp | QC | RPD %	DUP2 BFD3012-DUP2# Samp | QC | RPD %	LCS %	Spike % PFD1531-02
Total Organic Carbon	mg/L	1.0	<1.0	1.13 | 1.39 | 20.6	4.67 | 4.30 | 8.33	107	96.0

The QC reported was not specifically part of this workorder but formed part of the QC process batch.

INORG-057 | Inorganics - Nutrients (Water) | Batch BFD3070

Analyte	Units	PQL	Blank	DUP1 PFD1531-01 Samp | QC | RPD %	DUP2 BFD3070-DUP2# Samp | QC | RPD %	LCS %	Spike % PFD1531-02
Ammonia as N	mg/L	0.0050	<0.0050	<0.0050 | <0.0050 | [NA]	0.00708 | 0.00708 | 0.0706	102	104

The QC reported was not specifically part of this workorder but formed part of the QC process batch.

INORG-067 | Inorganics - Common Wastewater Parameters (Water) | Batch BFD2886

Analyte	Units	PQL	Blank	DUP1 PFD1531-01 Samp | QC | RPD %	DUP2 PFD1531-08 Samp | QC | RPD %	LCS %
COD	mg O2/L	20	<20	<20 | <20 | [NA]	<20 | <20 | [NA]	95.5

INORG-091 | Inorganics - Common Wastewater Parameters (Water) | Batch BFD3114

Analyte	Units	PQL	Blank	LCS %
BOD	mg/L	5.0	<5.0	80.2

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www.mpl.com.au

Certificate of Analysis PFE1877

Client Details

Client	Katherine Town Council - NT
Contact	Brett Kimpton
Address	PO Box 1071, KATHERINE, NT, 0851

Sample Details

Your Reference	Katherine Town Council - EPL298 - Quarterly
Number of Samples	9 Water
Date Samples Received	28/05/2024
Date Instructions Received	28/05/2024

Analysis Details

Please refer to the following pages for results, methodology summary and quality control data.
Samples were analysed as received from the client. Results relate specifically to the samples as received.
Results are reported on a dry weight basis for solids and on an as received basis for other matrices.

Report Details

Date Results Requested by	05/06/2024
Date of Issue	05/06/2024

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Authorisation Details

Results Approved By	Jenny Xin He, Chemist Lien Tang, Assistant Operations Manager Michael Mowle, Inorganics Supervisor Sean McAlary, Chemist Travis Carey, Organics Supervisor
Laboratory Manager	Michael Kubiak

Certificate of Analysis PFE1877

Samples in this Report

Envirolab ID	Sample ID	Depth	Matrix	Date Sampled	Date Received
PFE1877-01	GWA (RN031131)		Water	26/05/2024	28/05/2024
PFE1877-02	GWE (RN022487)	7.80	Water	26/05/2024	28/05/2024
PFE1877-03	GWB01	8.80	Water	26/05/2024	28/05/2024
PFE1877-04	GWB02	8.60	Water	26/05/2024	28/05/2024
PFE1877-05	GWB03	6.16	Water	26/05/2024	28/05/2024
PFE1877-06	GWB04	9.18	Water	26/05/2024	28/05/2024
PFE1877-07	Field Blank		Water	26/05/2024	28/05/2024
PFE1877-08	Duplicate		Water	26/05/2024	28/05/2024
PFE1877-09	Trip Blank		Water	26/05/2024	28/05/2024

Sample Comments

GWE (RN022487)	Sample(s) was/were received with headspace, analytical results may be affected.
GWB01	Sample(s) was/were received with headspace, analytical results may be affected.
GWB02	Sample(s) was/were received with headspace, analytical results may be affected.
GWB03	Sample(s) was/were received with headspace, analytical results may be affected.
GWB04	Sample(s) was/were received with headspace, analytical results may be affected.
Field Blank	Sample(s) was/were received with headspace, analytical results may be affected.
Duplicate	Sample(s) was/were received with headspace, analytical results may be affected.

Volatile TRH and BTEX (Water)

Envirolab ID	Units	PQL	PFE1877-01	PFE1877-02	PFE1877-03	PFE1877-04	PFE1877-05
Your Reference			GWA (RN031131)	GWE (RN022487)	GWB01	GWB02	GWB03
Date Sampled			26/05/2024	26/05/2024	26/05/2024	26/05/2024	26/05/2024
Depth				7.80	8.80	8.60	6.16
TRH C6-C9	µg/L	10	<10	<10	<10	<10	<10
TRH C6-C10	µg/L	10	<10	<10	<10	<10	<10
TRH C6-C10 less BTEX (F1)	µg/L	10	<10	<10	<10	<10	<10
Methyl tert butyl ether (MTBE)	µg/L	1.0	<1.0	<1.0	<1.0	<1.0	<1.0
Benzene	µg/L	1.0	<1.0	<1.0	<1.0	<1.0	<1.0
Toluene	µg/L	1.0	<1.0	<1.0	<1.0	<1.0	<1.0
Ethylbenzene	µg/L	1.0	<1.0	<1.0	<1.0	<1.0	<1.0
meta+para Xylene	µg/L	2.0	<2.0	<2.0	<2.0	<2.0	<2.0
ortho-Xylene	µg/L	1.0	<1.0	<1.0	<1.0	<1.0	<1.0
Total Xylene	µg/L	3.0	<3.0	<3.0	<3.0	<3.0	<3.0
Naphthalene (value used in F2 calc)	µg/L	1.0	<1.0	<1.0	<1.0	<1.0	<1.0
Surrogate Dibromofluoromethane	%		*108*	*109*	*105*	*106*	*105*
Surrogate Toluene-D8	%		*96.9*	*95.6*	*94.4*	*95.1*	*95.0*
Surrogate 4-Bromofluorobenzene	%		*97.4*	*93.2*	*93.7*	*98.1*	*95.5*

Envirolab ID	Units	PQL	PFE1877-06	PFE1877-07	PFE1877-08	PFE1877-09
Your Reference			GWB04	Field Blank	Duplicate	Trip Blank
Date Sampled			26/05/2024	26/05/2024	26/05/2024	26/05/2024
Depth			9.18			
TRH C6-C9	µg/L	10	<10	<10	<10	<10
TRH C6-C10	µg/L	10	<10	<10	<10	<10
TRH C6-C10 less BTEX (F1)	µg/L	10	<10	<10	<10	<10
Methyl tert butyl ether (MTBE)	µg/L	1.0	<1.0	<1.0	<1.0	<1.0
Benzene	µg/L	1.0	<1.0	<1.0	<1.0	<1.0
Toluene	µg/L	1.0	<1.0	<1.0	<1.0	<1.0
Ethylbenzene	µg/L	1.0	<1.0	<1.0	<1.0	<1.0
meta+para Xylene	µg/L	2.0	<2.0	<2.0	<2.0	<2.0
ortho-Xylene	µg/L	1.0	<1.0	<1.0	<1.0	<1.0
Total Xylene	µg/L	3.0	<3.0	<3.0	<3.0	<3.0
Naphthalene (value used in F2 calc)	µg/L	1.0	<1.0	<1.0	<1.0	<1.0
Surrogate Dibromofluoromethane	%		*106*	*107*	*107*	*106*
Surrogate Toluene-D8	%		*95.5*	*95.5*	*95.7*	*96.0*
Surrogate 4-Bromofluorobenzene	%		*93.3*	*97.1*	*97.4*	*96.0*

Semi-volatile TRH (Water)

Envirolab ID	Units	PQL	PFE1877-01	PFE1877-02	PFE1877-03	PFE1877-04	PFE1877-05
Your Reference			GWA (RN031131)	GWE (RN022487)	GWB01	GWB02	GWB03
Date Sampled			26/05/2024	26/05/2024	26/05/2024	26/05/2024	26/05/2024
Depth				7.80	8.80	8.60	6.16
TRH C10-C14	µg/L	50	<50	<50	<50	<50	<50
TRH C15-C28	µg/L	100	<100	<100	160	<100	<100
TRH C29-C36	µg/L	100	<100	<100	<100	<100	<100
Total +ve TRH C10-C36	µg/L	50	<50	<50	160	<50	<50
TRH >C10-C16	µg/L	50	<50	<50	<50	<50	<50
TRH >C10-C16 less Naphthalene F2	µg/L	50	<50	<50	<50	<50	<50
TRH >C16-C34 (F3)	µg/L	100	<100	<100	150	<100	<100
TRH >C34-C40 (F4)	µg/L	100	<100	<100	<100	<100	<100
Total +ve TRH >C10-C40	µg/L	50	<50	<50	150	<50	<50
Surrogate o-Terphenyl	%		*96.6*	*95.6*	*95.5*	*89.6*	*86.4*

Envirolab ID	Units	PQL	PFE1877-06	PFE1877-07	PFE1877-08	PFE1877-09
Your Reference			GWB04	Field Blank	Duplicate	Trip Blank
Date Sampled			26/05/2024	26/05/2024	26/05/2024	26/05/2024
Depth			9.18			
TRH C10-C14	µg/L	50	<50	98	<50	<50
TRH C15-C28	µg/L	100	<100	210	<100	<100
TRH C29-C36	µg/L	100	<100	<100	<100	<100
Total +ve TRH C10-C36	µg/L	50	<50	310	<50	<50
TRH >C10-C16	µg/L	50	<50	220	<50	<50
TRH >C10-C16 less Naphthalene F2	µg/L	50	<50	220	<50	<50
TRH >C16-C34 (F3)	µg/L	100	<100	<100	<100	<100
TRH >C34-C40 (F4)	µg/L	100	<100	<100	<100	<100
Total +ve TRH >C10-C40	µg/L	50	<50	220	<50	<50
Surrogate o-Terphenyl	%		*92.9*	*88.1*	*86.8*	*95.5*

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Polycyclic Aromatic Hydrocarbons (Water)

Envirolab ID	Units	PQL	PFE1877-01	PFE1877-02	PFE1877-03	PFE1877-04	PFE1877-05
Your Reference			GWA (RN031131)	GWE (RN022487)	GWB01	GWB02	GWB03
Date Sampled			26/05/2024	26/05/2024	26/05/2024	26/05/2024	26/05/2024
Depth				7.80	8.80	8.60	6.16
Naphthalene	µg/L	0.10	<0.10	<0.10	<0.10	<0.10	<0.10
Acenaphthylene	µg/L	0.10	<0.10	<0.10	<0.10	<0.10	<0.10
Acenaphthene	µg/L	0.10	<0.10	<0.10	<0.10	<0.10	<0.10
Fluorene	µg/L	0.10	<0.10	<0.10	<0.10	<0.10	<0.10
Phenanthrene	µg/L	0.10	<0.10	<0.10	<0.10	<0.10	<0.10
Anthracene	µg/L	0.10	<0.10	<0.10	<0.10	<0.10	<0.10
Fluoranthene	µg/L	0.10	<0.10	<0.10	<0.10	<0.10	<0.10
Pyrene	µg/L	0.10	<0.10	<0.10	<0.10	<0.10	<0.10
Benzo(a)anthracene	µg/L	0.10	<0.10	<0.10	<0.10	<0.10	<0.10
Chrysene	µg/L	0.10	<0.10	<0.10	<0.10	<0.10	<0.10
Benzo(b,j,k)fluoranthene	µg/L	0.20	<0.20	<0.20	<0.20	<0.20	<0.20
Benzo(a)pyrene	µg/L	0.10	<0.10	<0.10	<0.10	<0.10	<0.10
Indeno(1,2,3-c,d)pyrene	µg/L	0.10	<0.10	<0.10	<0.10	<0.10	<0.10
Dibenzo(a,h)anthracene	µg/L	0.10	<0.10	<0.10	<0.10	<0.10	<0.10
Benzo(g,h,i)perylene	µg/L	0.10	<0.10	<0.10	<0.10	<0.10	<0.10
Total +ve PAH	µg/L	0.10	<0.10	<0.10	<0.10	<0.10	<0.10
Surrogate p-Terphenyl-D14	%		*76.5*	*79.3*	*77.8*	*83.9*	*101*

Envirolab ID	Units	PQL	PFE1877-06	PFE1877-07	PFE1877-08	PFE1877-09
Your Reference			GWB04	Field Blank	Duplicate	Trip Blank
Date Sampled			26/05/2024	26/05/2024	26/05/2024	26/05/2024
Depth			9.18			
Naphthalene	µg/L	0.10	<0.10	<0.10	<0.10	<0.10
Acenaphthylene	µg/L	0.10	<0.10	<0.10	<0.10	<0.10
Acenaphthene	µg/L	0.10	<0.10	<0.10	<0.10	<0.10
Fluorene	µg/L	0.10	<0.10	<0.10	<0.10	<0.10
Phenanthrene	µg/L	0.10	<0.10	<0.10	<0.10	<0.10
Anthracene	µg/L	0.10	<0.10	<0.10	<0.10	<0.10
Fluoranthene	µg/L	0.10	<0.10	<0.10	<0.10	<0.10
Pyrene	µg/L	0.10	<0.10	<0.10	<0.10	<0.10
Benzo(a)anthracene	µg/L	0.10	<0.10	<0.10	<0.10	<0.10
Chrysene	µg/L	0.10	<0.10	<0.10	<0.10	<0.10
Benzo(b,j,k)fluoranthene	µg/L	0.20	<0.20	<0.20	<0.20	<0.20
Benzo(a)pyrene	µg/L	0.10	<0.10	<0.10	<0.10	<0.10
Indeno(1,2,3-c,d)pyrene	µg/L	0.10	<0.10	<0.10	<0.10	<0.10
Dibenzo(a,h)anthracene	µg/L	0.10	<0.10	<0.10	<0.10	<0.10
Benzo(g,h,i)perylene	µg/L	0.10	<0.10	<0.10	<0.10	<0.10
Total +ve PAH	µg/L	0.10	<0.10	<0.10	<0.10	<0.10
Surrogate p-Terphenyl-D14	%		*85.1*	*114*	*86.5*	*90.2*

Polychlorinated Biphenyls (Water)

Envirolab ID	Units	PQL	PFE1877-01	PFE1877-02	PFE1877-03	PFE1877-04	PFE1877-05
Your Reference			GWA (RN031131)	GWE (RN022487)	GWB01	GWB02	GWB03
Date Sampled			26/05/2024	26/05/2024	26/05/2024	26/05/2024	26/05/2024
Depth				7.80	8.80	8.60	6.16
Aroclor 1016	µg/L	2.0	<2.0	<2.0	<2.0	<2.0	<2.0
Aroclor 1221	µg/L	2.0	<2.0	<2.0	<2.0	<2.0	<2.0
Aroclor 1232	µg/L	2.0	<2.0	<2.0	<2.0	<2.0	<2.0
Aroclor 1242	µg/L	2.0	<2.0	<2.0	<2.0	<2.0	<2.0
Aroclor 1248	µg/L	2.0	<2.0	<2.0	<2.0	<2.0	<2.0
Aroclor 1254	µg/L	2.0	<2.0	<2.0	<2.0	<2.0	<2.0
Aroclor 1260	µg/L	2.0	<2.0	<2.0	<2.0	<2.0	<2.0
Total +ve PCB (1016-1260)	µg/L	2.0	<2.0	<2.0	<2.0	<2.0	<2.0
Surrogate 2-Fluorobiphenyl	%		*82.0*	*74.0*	*77.1*	*78.6*	*89.3*

Envirolab ID	Units	PQL	PFE1877-06	PFE1877-07	PFE1877-08	PFE1877-09
Your Reference			GWB04	Field Blank	Duplicate	Trip Blank
Date Sampled			26/05/2024	26/05/2024	26/05/2024	26/05/2024
Depth			9.18			
Aroclor 1016	µg/L	2.0	<2.0	<2.0	<2.0	<2.0
Aroclor 1221	µg/L	2.0	<2.0	<2.0	<2.0	<2.0
Aroclor 1232	µg/L	2.0	<2.0	<2.0	<2.0	<2.0
Aroclor 1242	µg/L	2.0	<2.0	<2.0	<2.0	<2.0
Aroclor 1248	µg/L	2.0	<2.0	<2.0	<2.0	<2.0
Aroclor 1254	µg/L	2.0	<2.0	<2.0	<2.0	<2.0
Aroclor 1260	µg/L	2.0	<2.0	<2.0	<2.0	<2.0
Total +ve PCB (1016-1260)	µg/L	2.0	<2.0	<2.0	<2.0	<2.0
Surrogate 2-Fluorobiphenyl	%		*76.7*	*69.4*	*76.8*	*82.9*

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Acid Extractable Low Level Metals (Water)

Envirolab ID	Units	PQL	PFE1877-01	PFE1877-02	PFE1877-03	PFE1877-04	PFE1877-05
Your Reference			GWA (RN031131)	GWE (RN022487)	GWB01	GWB02	GWB03
Date Sampled			26/05/2024	26/05/2024	26/05/2024	26/05/2024	26/05/2024
Depth				7.80	8.80	8.60	6.16
Aluminium	µg/L	10	<10	<10	710	35	46
Cadmium	µg/L	0.10	<0.10	<0.10	<0.10	<0.10	<0.10
Chromium	µg/L	1.0	<1.0	<1.0	1.0	<1.0	<1.0
Copper	µg/L	1.0	<1.0	<1.0	17	2.1	<1.0
Iron	µg/L	10	110	58	820	39	64
Manganese	µg/L	1.0	1.5	9.8	180	13	8.7
Nickel	µg/L	1.0	<1.0	<1.0	4.5	2.0	<1.0
Lead	µg/L	1.0	<1.0	<1.0	4.1	<1.0	<1.0
Selenium	µg/L	1.0	<1.0	<1.0	<1.0	<1.0	<1.0
Zinc	µg/L	1.0	8.2	5.1	13	5.6	2.9

Envirolab ID	Units	PQL	PFE1877-06	PFE1877-07	PFE1877-08	PFE1877-09
Your Reference			GWB04	Field Blank	Duplicate	Trip Blank
Date Sampled			26/05/2024	26/05/2024	26/05/2024	26/05/2024
Depth			9.18			
Aluminium	µg/L	10	24	<10	<10	<10
Cadmium	µg/L	0.10	<0.10	<0.10	<0.10	<0.10
Chromium	µg/L	1.0	1.7	<1.0	<1.0	<1.0
Copper	µg/L	1.0	<1.0	<1.0	<1.0	<1.0
Iron	µg/L	10	40	<10	120	<10
Manganese	µg/L	1.0	1.7	<1.0	1.5	<1.0
Nickel	µg/L	1.0	<1.0	<1.0	<1.0	<1.0
Lead	µg/L	1.0	1.7	<1.0	<1.0	<1.0
Selenium	µg/L	1.0	<1.0	<1.0	<1.0	<1.0
Zinc	µg/L	1.0	38	<1.0	4.1	<1.0

Dissolved Low Level Metals (Water)

Envirolab ID	Units	PQL	PFE1877-01	PFE1877-02	PFE1877-03	PFE1877-04	PFE1877-05
Your Reference			GWA (RN031131)	GWE (RN022487)	GWB01	GWB02	GWB03
Date Sampled			26/05/2024	26/05/2024	26/05/2024	26/05/2024	26/05/2024
Depth				7.80	8.80	8.60	6.16
Aluminium	µg/L	10	<10	<10	<10	<10	<10
Cadmium	µg/L	0.10	<0.10	<0.10	<0.10	<0.10	<0.10
Chromium	µg/L	1.0	<1.0	<1.0	<1.0	<1.0	<1.0
Copper	µg/L	1.0	<1.0	<1.0	4.2	2.3	<1.0
Iron	µg/L	10	13	<10	<10	<10	<10
Manganese	µg/L	1.0	1.5	9.4	160	10	8.2
Nickel	µg/L	1.0	<1.0	<1.0	3.4	2.1	<1.0
Lead	µg/L	1.0	<1.0	<1.0	<1.0	<1.0	<1.0
Selenium	µg/L	1.0	<1.0	<1.0	<1.0	<1.0	<1.0
Zinc	µg/L	1.0	3.9	2.6	9.3	9.4	7.8

Envirolab ID	Units	PQL	PFE1877-06	PFE1877-07	PFE1877-08	PFE1877-09
Your Reference			GWB04	Field Blank	Duplicate	Trip Blank
Date Sampled			26/05/2024	26/05/2024	26/05/2024	26/05/2024
Depth			9.18			
Aluminium	µg/L	10	<10	<10	<10	<10
Cadmium	µg/L	0.10	<0.10	<0.10	<0.10	<0.10
Chromium	µg/L	1.0	<1.0	<1.0	<1.0	<1.0
Copper	µg/L	1.0	2.5	<1.0	<1.0	<1.0
Iron	µg/L	10	<10	<10	14	<10
Manganese	µg/L	1.0	2.2	<1.0	1.7	<1.0
Nickel	µg/L	1.0	1.5	<1.0	<1.0	<1.0
Lead	µg/L	1.0	<1.0	<1.0	<1.0	<1.0
Selenium	µg/L	1.0	<1.0	<1.0	<1.0	<1.0
Zinc	µg/L	1.0	29	<1.0	6.7	<1.0

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Inorganics - Physical Parameters (Water)

Envirolab ID	Units	PQL	PFE1877-01	PFE1877-02	PFE1877-03	PFE1877-04	PFE1877-05
Your Reference			GWA (RN031131)	GWE (RN022487)	GWB01	GWB02	GWB03
Date Sampled			26/05/2024	26/05/2024	26/05/2024	26/05/2024	26/05/2024
Depth				7.80	8.80	8.60	6.16
Total Dissolved Solids	mg/L	5.0	360	290	620	590	350

Envirolab ID	Units	PQL	PFE1877-06	PFE1877-07	PFE1877-08	PFE1877-09
Your Reference			GWB04	Field Blank	Duplicate	Trip Blank
Date Sampled			26/05/2024	26/05/2024	26/05/2024	26/05/2024
Depth			9.18			
Total Dissolved Solids	mg/L	5.0	550	11	360	5.0

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Inorganics - Physical Parameters (Water) - Analysed By Envirolab Services Sydney

Envirolab ID	Units	PQL	PFE1877-01	PFE1877-02	PFE1877-03	PFE1877-04	PFE1877-05
Your Reference			GWA (RN031131)	GWE (RN022487)	GWB01	GWB02	GWB03
Date Sampled			26/05/2024	26/05/2024	26/05/2024	26/05/2024	26/05/2024
Depth				7.80	8.80	8.60	6.16
Volatile Fatty Acids*	mg/L	5.0	160	110	190	140	180

Envirolab ID	Units	PQL	PFE1877-06	PFE1877-07	PFE1877-08	PFE1877-09
Your Reference			GWB04	Field Blank	Duplicate	Trip Blank
Date Sampled			26/05/2024	26/05/2024	26/05/2024	26/05/2024
Depth			9.18			
Volatile Fatty Acids*	mg/L	5.0	240	10	140	7.0

Inorganics - Ionic Balance and Indexes (Water)

Envirolab ID	Units	PQL	PFE1877-01	PFE1877-02	PFE1877-03	PFE1877-04	PFE1877-05
Your Reference			GWA (RN031131)	GWE (RN022487)	GWB01	GWB02	GWB03
Date Sampled			26/05/2024	26/05/2024	26/05/2024	26/05/2024	26/05/2024
Depth				7.80	8.80	8.60	6.16
Bicarbonate Alkalinity as CaCO3	mg/L as CaCO3	5.0	360	270	490	520	400
Carbonate Alkalinity as CaCO3	mg/L as CaCO3	5.0	<5.0	<5.0	<5.0	<5.0	<5.0
Hydroxide OH- as CaCO3	mg/L as CaCO3	5.0	<5.0	<5.0	<5.0	<5.0	<5.0
Total Alkalinity as CaCO3	mg/L as CaCO3	5.0	360	270	490	520	400
Chloride	mg/L	1.0	2.3	9.8	91	20	13
Sulfate	mg/L	1.0	4.7	5.4	37	23	5.0
Calcium	mg/L	0.50	78	42	110	110	82
Magnesium	mg/L	0.50	35	33	52	52	43
Potassium	mg/L	0.50	5.0	8.2	16	9.9	8.4
Sodium	mg/L	0.50	5.7	15	37	20	8.9
Hardness (calc) equivalent CaCO3	mg/L	3.0	340	240	490	500	380
Ionic Balance	%		-0.91	-0.53	-5.6	-1.3	-1.3
Total Anions	mg/L	7.0	360	280	620	560	420
Anions as meq	meq/L	0.59	6.0	4.7	11	9.5	7.0
Total Cations	mg/L	2.0	120	98	210	190	140
Cations as meq	meq/L	0.10	7.2	5.7	12	11	8.2

Envirolab ID	Units	PQL	PFE1877-06	PFE1877-07	PFE1877-08	PFE1877-09
Your Reference			GWB04	Field Blank	Duplicate	Trip Blank
Date Sampled			26/05/2024	26/05/2024	26/05/2024	26/05/2024
Depth			9.18			
Bicarbonate Alkalinity as CaCO3	mg/L as CaCO3	5.0	550	<5.0	370	<5.0
Carbonate Alkalinity as CaCO3	mg/L as CaCO3	5.0	<5.0	<5.0	<5.0	<5.0
Hydroxide OH- as CaCO3	mg/L as CaCO3	5.0	<5.0	<5.0	<5.0	<5.0
Total Alkalinity as CaCO3	mg/L as CaCO3	5.0	550	<5.0	370	<5.0
Chloride	mg/L	1.0	6.9	<1.0	2.6	<1.0
Sulfate	mg/L	1.0	15	<1.0	5.3	<1.0
Calcium	mg/L	0.50	84	<0.50	81	<0.50
Magnesium	mg/L	0.50	65	<0.50	34	<0.50
Potassium	mg/L	0.50	12	<0.50	5.2	<0.50
Sodium	mg/L	0.50	14	<0.50	5.6	<0.50
Hardness (calc) equivalent CaCO3	mg/L	3.0	480	<3.0	340	<3.0
Ionic Balance	%		-5.2	-96 [6]	-2.8	-98 [6]
Total Anions	mg/L	7.0	580	<7.0	380	<7.0
Anions as meq	meq/L	0.59	9.6	<0.59	6.3	<0.59
Total Cations	mg/L	2.0	170	<2.0	130	<2.0
Cations as meq	meq/L	0.10	10	<0.10	7.2	<0.10

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Inorganics - Carbon, Nitrogen and Sulfur Species (Water)

Envirolab ID	Units	PQL	PFE1877-01	PFE1877-02	PFE1877-03	PFE1877-04	PFE1877-05
Your Reference			GWA (RN031131)	GWE (RN022487)	GWB01	GWB02	GWB03
Date Sampled			26/05/2024	26/05/2024	26/05/2024	26/05/2024	26/05/2024
Depth				7.80	8.80	8.60	6.16
Total Organic Carbon	mg/L	1.0	<1.0	<1.0	8.3	2.4	4.0

Envirolab ID	Units	PQL	PFE1877-06	PFE1877-07	PFE1877-08	PFE1877-09
Your Reference			GWB04	Field Blank	Duplicate	Trip Blank
Date Sampled			26/05/2024	26/05/2024	26/05/2024	26/05/2024
Depth			9.18			
Total Organic Carbon	mg/L	1.0	<1.0	<1.0	<1.0	<1.0

Inorganics - Speciated Cr (III/VI) and Fe (II/III) (Water)

Envirolab ID	Units	PQL	PFE1877-01	PFE1877-02	PFE1877-03	PFE1877-04	PFE1877-05
Your Reference			GWA (RN031131)	GWE (RN022487)	GWB01	GWB02	GWB03
Date Sampled			26/05/2024	26/05/2024	26/05/2024	26/05/2024	26/05/2024
Depth				7.80	8.80	8.60	6.16
Hexavalent Chromium	mg/L	0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050
Hexavalent Chromium (Total)	mg/L	0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050
Trivalent Chromium	mg/L	0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050
Trivalent Chromium (Total)	mg/L	0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050

Envirolab ID	Units	PQL	PFE1877-06	PFE1877-07	PFE1877-08	PFE1877-09
Your Reference			GWB04	Field Blank	Duplicate	Trip Blank
Date Sampled			26/05/2024	26/05/2024	26/05/2024	26/05/2024
Depth			9.18			
Hexavalent Chromium	mg/L	0.0050	<0.0050	<0.0050	<0.0050	<0.0050
Hexavalent Chromium (Total)	mg/L	0.0050	<0.0050	<0.0050	<0.0050	<0.0050
Trivalent Chromium	mg/L	0.0050	<0.0050	<0.0050	<0.0050	<0.0050
Trivalent Chromium (Total)	mg/L	0.0050	<0.0050	<0.0050	<0.0050	<0.0050

Inorganics - Nutrients (Water)

Envirolab ID	Units	PQL	PFE1877-01	PFE1877-02	PFE1877-03	PFE1877-04	PFE1877-05
Your Reference			GWA (RN031131)	GWE (RN022487)	GWB01	GWB02	GWB03
Date Sampled			26/05/2024	26/05/2024	26/05/2024	26/05/2024	26/05/2024
Depth				7.80	8.80	8.60	6.16
Ammonia as N	mg/L	0.0050	<0.0050	0.017	0.73	<0.0050	0.0066
Nitrate as N	mg/L	0.0050	0.26	0.64	0.012	0.38	0.68
Nitrate as NO3 by calculation	mg/L	0.020	1.2	2.8	0.054	1.7	3.0
Total Nitrogen	mg/L	0.10	0.51	0.97	1.6	0.84	0.72
Total Phosphorus	mg/L	0.010	<0.010	0.024	0.049	0.033	0.059

Envirolab ID	Units	PQL	PFE1877-06	PFE1877-07	PFE1877-08	PFE1877-09
Your Reference			GWB04	Field Blank	Duplicate	Trip Blank
Date Sampled			26/05/2024	26/05/2024	26/05/2024	26/05/2024
Depth			9.18			
Ammonia as N	mg/L	0.0050	0.0083	<0.0050	<0.0050	<0.0050
Nitrate as N	mg/L	0.0050	3.1	0.014	0.29	0.0065
Nitrate as NO3 by calculation	mg/L	0.020	14	0.064	1.3	0.029
Total Nitrogen	mg/L	0.10	3.9	0.10	0.59	0.13
Total Phosphorus	mg/L	0.010	0.16	<0.010	<0.010	<0.010

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Inorganics - Common Wastewater Parameters (Water)

Envirolab ID	Units	PQL	PFE1877-01	PFE1877-02	PFE1877-03	PFE1877-04	PFE1877-05
Your Reference			GWA (RN031131)	GWE (RN022487)	GWB01	GWB02	GWB03
Date Sampled			26/05/2024	26/05/2024	26/05/2024	26/05/2024	26/05/2024
Depth				7.80	8.80	8.60	6.16
BOD	mg/L	5.0	<5.0	<5.0	12	6.1	<5.0
COD	mg O2/L	20	<20	<20	<20	<20	<20

Envirolab ID	Units	PQL	PFE1877-06	PFE1877-07	PFE1877-08	PFE1877-09
Your Reference			GWB04	Field Blank	Duplicate	Trip Blank
Date Sampled			26/05/2024	26/05/2024	26/05/2024	26/05/2024
Depth			9.18			
BOD	mg/L	5.0	7.3	<5.0	<5.0	<5.0
COD	mg O2/L	20	<20	<20	<20	<20

PFAS Extended List (Water) - Analysed By Envirolab Services Sydney

Envirolab ID	Units	PQL	PFE1877-01	PFE1877-02	PFE1877-03	PFE1877-04	PFE1877-05
Your Reference			GWA (RN031131)	GWE (RN022487)	GWB01	GWB02	GWB03
Date Sampled			26/05/2024	26/05/2024	26/05/2024	26/05/2024	26/05/2024
Depth				7.80	8.80	8.60	6.16
Perfluorobutanesulfonic acid (PFBS)	µg/L	0.010	<0.010	<0.010	0.15	0.14	<0.010
Perfluoropentanesulfonic acid (PFPeS)	µg/L	0.010	<0.010	<0.010	0.086	0.069	<0.010
Perfluorohexanesulfonic acid (PFHxS)	µg/L	0.010	0.022	0.013	1.0	0.35	0.010
Perfluoroheptanesulfonic acid (PFHpS)	µg/L	0.010	<0.010	<0.010	0.11	0.036	<0.010
Perfluorooctanesulfonic acid (PFOS)	µg/L	0.010	0.042	0.067	3.0	0.45	0.024
Perfluorodecanesulfonic acid (PFDS)	µg/L	0.020	<0.020	<0.020	<0.020	<0.020	<0.020
Perfluorobutanoic acid (PFBA)	µg/L	0.020	0.13	<0.020	0.14	0.10	<0.020
Perfluoropentanoic acid (PFPeA)	µg/L	0.020	0.22	<0.020	0.17	0.15	<0.020
Perfluorohexanoic acid (PFHxA)	µg/L	0.010	0.10	<0.010	0.26	0.24	<0.010
Perfluoroheptanoic acid (PFHpA)	µg/L	0.010	0.089	<0.010	0.11	0.088	<0.010
Perfluorooctanoic acid (PFOA)	µg/L	0.010	0.053	<0.010	0.28	0.16	<0.010
Perfluorononanoic acid (PFNA)	µg/L	0.010	<0.010	<0.010	<0.010	<0.010	<0.010
Perfluorodecanoic acid (PFDA)	µg/L	0.020	<0.020	<0.020	<0.020	<0.020	<0.020
Perfluoroundecanoic acid (PFUnDA)	µg/L	0.020	<0.020	<0.020	<0.020	<0.020	<0.020
Perfluorododecanoic acid (PFDoDA)	µg/L	0.050	<0.050	<0.050	<0.050	<0.050	<0.050
Perfluorotridecanoic acid (PFTrDA)	µg/L	0.10	<0.10	<0.10	<0.10	<0.10	<0.10
Perfluorotetradecanoic acid (PFTeDA)	µg/L	0.50	<0.50	<0.50	<0.50	<0.50	<0.50
4:2 Fluorotelomer sulfonic acid (4:2 FTS)	µg/L	0.010	<0.010	<0.010	<0.010	<0.010	<0.010
6:2 Fluorotelomer sulfonic acid (6:2 FTS)	µg/L	0.010	<0.010	<0.010	<0.010	<0.010	<0.010
8:2 Fluorotelomer sulfonic acid (8:2 FTS)	µg/L	0.020	<0.020	<0.020	<0.020	<0.020	<0.020
10:2 Fluorotelomer sulfonic acid (10:2 FTS)	µg/L	0.020	<0.020	<0.020	<0.020	<0.020	<0.020
Perfluorooctane sulfonamide (FOSA)	µg/L	0.10	<0.10	<0.10	<0.10	<0.10	<0.10
N-Methyl perfluorooctane sulfonamide (MeFOSA)	µg/L	0.050	<0.050	<0.050	<0.050	<0.050	<0.050
N-Ethyl perfluorooctane sulfonamide (EtFOSA)	µg/L	0.10	<0.10	<0.10	<0.10	<0.10	<0.10
N-Methyl perfluorooctane sulfonamidoethanol	µg/L	0.050	<0.050	<0.050	<0.050	<0.050	<0.050
N-Ethyl perfluorooctane sulfonamidoethanol	µg/L	0.50	<0.50	<0.50	<0.50	<0.50	<0.50
N-Methyl perfluorooctane sulfonamidoacetic acid	µg/L	0.020	<0.020	<0.020	<0.020	<0.020	<0.020
N-Ethyl perfluorooctane sulfonamidoacetic acid	µg/L	0.020	<0.020	<0.020	<0.020	<0.020	<0.020
Surrogate 13C8 PFOS	%		*97.2*	*102*	*98.8*	*95.2*	*96.2*
Surrogate 13C2 PFOA	%		*98.8*	*101*	*97.8*	*101*	*100*
Total +ve PFHxS+PFOS	µg/L	0.010	0.064	0.080	4.0	0.80	0.034
Total +ve PFOA+PFOS	µg/L	0.010	0.095	0.067	3.3	0.61	0.024
Total +ve PFAS	µg/L	0.010	0.66	0.080	5.3	1.8	0.034
Extraction Internal Standard 13C3 PFBS	%		*104*	*105*	*105*	*101*	*102*
Extraction Internal Standard 18O2 PFHxS	%		*107*	*109*	*106*	*112*	*110*
Extraction Internal Standard 13C4 PFOS	%		*109*	*109*	*111*	*112*	*111*
Extraction Internal Standard 13C4 PFBA	%		*108*	*110*	*97.9*	*103*	*106*
Extraction Internal Standard 13C3 PFPeA	%		*106*	*108*	*108*	*105*	*109*
Extraction Internal Standard 13C2 PFHxA	%		*103*	*106*	*108*	*100*	*105*
Extraction Internal Standard 13C4 PFHpA	%		*111*	*113*	*106*	*110*	*107*
Extraction Internal Standard 13C4 PFOA	%		*126*	*131*	*129*	*126*	*126*

PFAS Extended List (Water) - Analysed By Envirolab Services Sydney

Envirolab ID	Units	PQL	PFE1877-01	PFE1877-02	PFE1877-03	PFE1877-04	PFE1877-05
Your Reference			GWA (RN031131)	GWE (RN022487)	GWB01	GWB02	GWB03
Date Sampled			26/05/2024	26/05/2024	26/05/2024	26/05/2024	26/05/2024
Depth				7.80	8.80	8.60	6.16
Extraction Internal Standard 13C5 PFNA	%		*140*	*133*	*125*	*136*	*133*
Extraction Internal Standard 13C2 PFDA	%		*148*	*142*	*151 [3]*	*144*	*146*
Extraction Internal Standard 13C2 PFUnDA	%		*172 [3]*	*171 [3]*	*172 [3]*	*191 [3]*	*195 [3]*
Extraction Internal Standard 13C2 PFDoDA	%		*176 [3]*	*175 [3]*	*185 [3]*	*197 [3]*	*186 [3]*
Extraction Internal Standard 13C2 PFTeDA	%		*136*	*145*	*144*	*165 [3]*	*158 [3]*
Extraction Internal Standard 13C2 4:2FTS	%		*108*	*112*	*121*	*118*	*105*
Extraction Internal Standard 13C2 6:2FTS	%		*153 [3]*	*156 [3]*	*150 [3]*	*144*	*139*
Extraction Internal Standard 13C2 8:2FTS	%		*190 [3]*	*199 [3]*	*## [3]*	*192 [3]*	*180 [3]*
Extraction Internal Standard 13C8 FOSA	%		*115*	*117*	*117*	*116*	*116*
Extraction Internal Standard d3 N MeFOSA	%		*106*	*107*	*108*	*114*	*109*
Extraction Internal Standard d5 N EtFOSA	%		*106*	*114*	*110*	*110*	*107*
Extraction Internal Standard d7 N MeFOSE	%		*105*	*112*	*113*	*107*	*105*
Extraction Internal Standard d9 N EtFOSE	%		*94.8*	*100*	*103*	*104*	*105*
Extraction Internal Standard d3 N MeFOSAA	%		*146*	*158 [3]*	*156 [3]*	*149*	*156 [3]*
Extraction Internal Standard d5 N EtFOSAA	%		*157 [3]*	*150 [3]*	*147*	*155 [3]*	*148*

Envirolab ID	Units	PQL	PFE1877-06	PFE1877-07	PFE1877-08	PFE1877-09
Your Reference			GWB04	Field Blank	Duplicate	Trip Blank
Date Sampled			26/05/2024	26/05/2024	26/05/2024	26/05/2024
Depth			9.18			
Perfluorobutanesulfonic acid (PFBS)	µg/L	0.010	<0.010	<0.010	<0.010	<0.010
Perfluoropentanesulfonic acid (PFPeS)	µg/L	0.010	<0.010	<0.010	<0.010	<0.010
Perfluorohexanesulfonic acid (PFHxS)	µg/L	0.010	<0.010	<0.010	0.022	<0.010
Perfluoroheptanesulfonic acid (PFHpS)	µg/L	0.010	<0.010	<0.010	<0.010	<0.010
Perfluorooctanesulfonic acid (PFOS)	µg/L	0.010	<0.010	<0.010	0.052	<0.010
Perfluorodecanesulfonic acid (PFDS)	µg/L	0.020	<0.020	<0.020	<0.020	<0.020
Perfluorobutanoic acid (PFBA)	µg/L	0.020	<0.020	<0.020	0.12	<0.020
Perfluoropentanoic acid (PFPeA)	µg/L	0.020	<0.020	<0.020	0.21	<0.020
Perfluorohexanoic acid (PFHxA)	µg/L	0.010	<0.010	<0.010	0.10	<0.010
Perfluoroheptanoic acid (PFHpA)	µg/L	0.010	<0.010	<0.010	0.091	<0.010
Perfluorooctanoic acid (PFOA)	µg/L	0.010	<0.010	<0.010	0.057	<0.010
Perfluorononanoic acid (PFNA)	µg/L	0.010	<0.010	<0.010	<0.010	<0.010
Perfluorodecanoic acid (PFDA)	µg/L	0.020	<0.020	<0.020	<0.020	<0.020
Perfluoroundecanoic acid (PFUnDA)	µg/L	0.020	<0.020	<0.020	<0.020	<0.020
Perfluorododecanoic acid (PFDoDA)	µg/L	0.050	<0.050	<0.050	<0.050	<0.050
Perfluorotridecanoic acid (PFTrDA)	µg/L	0.10	<0.10	<0.10	<0.10	<0.10
Perfluorotetradecanoic acid (PFTeDA)	µg/L	0.50	<0.50	<0.50	<0.50	<0.50
4:2 Fluorotelomer sulfonic acid (4:2 FTS)	µg/L	0.010	<0.010	<0.010	<0.010	<0.010
6:2 Fluorotelomer sulfonic acid (6:2 FTS)	µg/L	0.010	<0.010	<0.010	<0.010	<0.010
8:2 Fluorotelomer sulfonic acid (8:2 FTS)	µg/L	0.020	<0.020	<0.020	<0.020	<0.020
10:2 Fluorotelomer sulfonic acid (10:2 FTS)	µg/L	0.020	<0.020	<0.020	<0.020	<0.020
Perfluorooctane sulfonamide (FOSA)	µg/L	0.10	<0.10	<0.10	<0.10	<0.10
N-Methyl perfluorooctane sulfonamide (MeFOSA)	µg/L	0.050	<0.050	<0.050	<0.050	<0.050
N-Ethyl perfluorooctane sulfonamide (EtFOSA)	µg/L	0.10	<0.10	<0.10	<0.10	<0.10

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PFAS Extended List (Water) - Analysed By Envirolab Services Sydney

Envirolab ID	Units	PQL	PFE1877-06	PFE1877-07	PFE1877-08	PFE1877-09
Your Reference			GWB04	Field Blank	Duplicate	Trip Blank
Date Sampled			26/05/2024	26/05/2024	26/05/2024	26/05/2024
Depth			9.18			
N-Methyl perfluorooctane sulfonamidoethanol	µg/L	0.050	<0.050	<0.050	<0.050	<0.050
N-Ethyl perfluorooctane sulfonamidoethanol	µg/L	0.50	<0.50	<0.50	<0.50	<0.50
N-Methyl perfluorooctane sulfonamidoacetic acid	µg/L	0.020	<0.020	<0.020	<0.020	<0.020
N-Ethyl perfluorooctane sulfonamidoacetic acid	µg/L	0.020	<0.020	<0.020	<0.020	<0.020
Surrogate 13C8 PFOS	%		*98.8*	*93.8*	*101*	*96.4*
Surrogate 13C2 PFOA	%		*102*	*99.7*	*100*	*102*
Total +ve PFHxS+PFOS	µg/L	0.010	<0.010	<0.010	0.074	<0.010
Total +ve PFOA+PFOS	µg/L	0.010	<0.010	<0.010	0.11	<0.010
Total +ve PFAS	µg/L	0.010	<0.010	<0.010	0.65	<0.010
Extraction Internal Standard 13C3 PFBS	%		*103*	*97.6*	*96.5*	*96.4*
Extraction Internal Standard 18O2 PFHxS	%		*109*	*106*	*103*	*108*
Extraction Internal Standard 13C4 PFOS	%		*110*	*106*	*106*	*104*
Extraction Internal Standard 13C4 PFBA	%		*108*	*105*	*102*	*99.4*
Extraction Internal Standard 13C3 PFPeA	%		*107*	*104*	*103*	*102*
Extraction Internal Standard 13C2 PFHxA	%		*102*	*99.4*	*97.0*	*94.6*
Extraction Internal Standard 13C4 PFHpA	%		*109*	*107*	*104*	*101*
Extraction Internal Standard 13C4 PFOA	%		*125*	*117*	*115*	*113*
Extraction Internal Standard 13C5 PFNA	%		*133*	*133*	*133*	*135*
Extraction Internal Standard 13C2 PFDA	%		*141*	*134*	*136*	*132*
Extraction Internal Standard 13C2 PFUnDA	%		*178 [3]*	*178 [3]*	*180 [3]*	*178 [3]*
Extraction Internal Standard 13C2 PFDoDA	%		*179 [3]*	*184 [3]*	*185 [3]*	*173 [3]*
Extraction Internal Standard 13C2 PFTeDA	%		*154 [3]*	*148*	*158 [3]*	*146*
Extraction Internal Standard 13C2 4:2FTS	%		*116*	*104*	*107*	*98.5*
Extraction Internal Standard 13C2 6:2FTS	%		*137*	*124*	*126*	*133*
Extraction Internal Standard 13C2 8:2FTS	%		*199 [3]*	*168 [3]*	*159 [3]*	*186 [3]*
Extraction Internal Standard 13C8 FOSA	%		*115*	*110*	*111*	*107*
Extraction Internal Standard d3 N MeFOSA	%		*112*	*106*	*114*	*108*
Extraction Internal Standard d5 N EtFOSA	%		*107*	*93.0*	*105*	*99.1*
Extraction Internal Standard d7 N MeFOSE	%		*114*	*104*	*103*	*102*
Extraction Internal Standard d9 N EtFOSE	%		*101*	*101*	*100*	*99.7*
Extraction Internal Standard d3 N MeFOSAA	%		*156 [3]*	*136*	*150 [3]*	*148*
Extraction Internal Standard d5 N EtFOSAA	%		*154 [3]*	*138*	*135*	*143*

Result Comments

Identifier	Description
[3]	For PFAS Extracted Internal Standards denoted with ## or being outside the 50-150% acceptance range, the respective target analyte results may be unaffected, in other circumstances the PQL has been raised to accommodate the outlier(s).
[6]	Ion Balance indicative only for samples with low Electrical Conductivity.

Method Summary

Method ID	Methodology Summary
Calc	Calculation
INORG-006	Alkalinity - determined titrimetrically based on APHA latest edition 2320-B. Solids reported from a 1:5 water extract unless otherwise specified. Total Carbon Dioxide - determined by calculation in accordance with APHA latest edition,4500-CO2 D.
INORG-018	Total Dissolved Solids - determined gravimetrically. The solids are dried at 180±10°C. NOTE: Where the EC of the sample is <100µS/cm, the TDS will typically be below 70mg/L (as the sample is very likely to be at least drinking water quality). Therefore to ensure data quality for TDS, the TDS is typically calculated as per the equation: TDS = EC*0.6
INORG-040	The concentrations of the major ions (mg/L) are converted to milliequivalents and summed. The ionic balance should be within +/- 15% i.e. total anions = total cations +/-15%.
INORG-055	Nitrate/Nitrite/NOx/TKN - determined colourimetrically. Waters samples are filtered on receipt prior to analysis. Soils/solids are analysed following a water extraction.
INORG-057	Ammonia - determined colourimetrically. Water samples are filtered on receipt prior to analysis. Soils and OHS media are analysed following a water extraction. Alternatively, Ammonia can be extracted from soil using 1M KCl.
INORG-060_TP	Total Phosphorus - determined colourimetrically using APHA latest edition 4500-P J. Water samples are filtered on receipt prior to analysis. Soils are analysed from a water extract.
INORG-067	Samples are digested in acid with a known excess of potassium dichromate then the colour change is determined by discrete analyser or UV-VIS in accordance with APHA latest edition 5220 D.
INORG-079	Carbon forms (inorganic, organic, total) determined using a TOC/NDIR analyser via combustion. Dissolved aqueous\forms require filtering prior to determination.
INORG-081	Anions determined by Ion Chromatography. Waters samples are filtered on receipt prior to analysis. Solids are analysed from a water extract. Alternatively determined by colourimetry/turbidity using Discrete Analyser.
INORG-091	BOD and/or cBOD - Analysed in accordance with APHA latest edition 5210 D.
INORG-111	Volatile Fatty Acids determined by distillation and titration.
INORG-118	Hexavalent Chromium by Ion Chromatographic separation and colourimetric determination. Waters samples are filtered prior to analysis. Solids are extracted with an alkaline buffered solution, for air sampling media the same alkali extraction can be used or alternatives from NIOSH/OSHA. For aqueous samples, Total Hexavalent Chromium includes the dissolved Hexavalent Chromium and any Hexavalent Chromium solubilised by the preservative i.e. Sodium Hydroxide from any particulate that may be present.
INORG-127	Total Nitrogen by high temperature catalytic combustion with chemiluminescence detection. Organic Carbon forms (inorganic, organic, total) determined using a TOC/NDIR analyser via combustion. Dissolved forms require filtering prior to determination.
METALS-020	Determination of various metals by ICP-OES.
METALS-022	Determination of various metals by ICP-MS.Please note for Bromine and Iodine, any forms of these elements that are present are included together in the one result reported for each of these two elements.Salt forms and/or anion/cation forms (e.g. FeO, PbO, ZnO, BO3) are determined stoichiometrically from the base metal concentration.
ORG-020	Soil samples are extracted with Dichloromethane/Acetone and waters with Dichloromethane and analysed by GC-FID. F2 = (>C10-C16)-Naphthalene as per NEPM B1 Guideline on Investigation Levels for Soil and Groundwater (HSLs Tables 1A (3, 4)). Note Naphthalene is determined from the VOC analysis. Note, the Total +ve TRH PQL is reflective of the lowest individual PQL and is therefore "Total +ve TRH" is simply a sum of the positive individual TRH fractions (>C10-C40).
ORG-021/022/025_PCB	Soil samples are extracted with dichloromethane/acetone and waters with dichloromethane and analysed by GC-ECD and/or GC-MS/GC-MSMS.
ORG-022_PAH	Determination of semi-volatile organic compounds (SVOCs) by GC-MS. Water samples are extracted by LLE and solids using DCM/Acetone/Methanol. For PAHs:- Benzo(a)pyrene TEQ as per NEPM B1 Guideline on Investigation Levels for Soil and Groundwater - 2013. 1. 'TEQ PQL' values are assuming all contributing PAHs reported as <PQL are actually at the PQL. This is the most conservative approach and can give false positive TEQs given that PAHs that contribute to the TEQ calculation may not be present. 2. 'TEQ zero' values are assuming all contributing PAHs reported as <PQL are zero. This is the least conservative approach and is more susceptible to false negative TEQs when PAHs that contribute to the TEQ calculation are present but below PQL. 3. 'TEQ half PQL' values are assuming all contributing PAHs reported as <PQL are half the stipulated PQL. Hence a mid-point between the most and least conservative approaches above. Note, for Total +ve calculations, the PQL is reflective of the lowest individual PQL and therefore, for example, "Total +ve PAHs" is simply a sum of the positive individual PAHs.
ORG-023_F1_TOT	Determination of volatile organic compounds (VOCs) by P&T-GC-MS. Water samples are analysed directly by purge and trap GC-MS. Solids are extracted with Methanol, diluted and analysed by purge and trap GC-MS. F1 = (C6-C10)-BTEX as per NEPM B1 Guideline on Investigation Levels for Soil and Groundwater. Note, the Total +ve Xylene PQL is reflective of the lowest individual PQL and is therefore "Total +ve Xylenes" is simply a sum of the positive individual Xylenes.

Method Summary

Method ID	Methodology Summary
ORG-029	Soil/solid and sorbent samples are extracted with basified Methanol. Waters and soil/sorbent extracts are directly injected and/or concentrated/extracted using SPE. TCLP/ASLP leachates are centrifuged, the supernatant is then analysed (including amendment with solvent) - as per the option in AS4439.3. Analysis is undertaken with LC-MSMS. PFAS results include the sum of branched and linear isomers where applicable. Please note that PFAS results are corrected for Extracted Internal Standards (QSM 5.4 Table B-15 terminology), which are mass labelled analytes added prior to sample preparation to assess matrix effects and verify processing of the sample. PFAS analytes without a commercially available mass labelled analogue are corrected vs a closely eluting mass labelled PFAS compound. Surrogates are also reported, in this context they are mass labelled PFAS compounds added prior to extraction but are used as monitoring compounds only (not used for result correction). Envicarb (or similar) is used discretionally to remove interfering matrix components. Please contact the laboratory if estimates of Measurement Uncertainty are required as per WA DER.

Result Definitions

Identifier	Description
NR	Not reported
NEPM	National Environment Protection Measure
NS	Not specified
LCS	Laboratory Control Sample
RPD	Relative Percent Difference
>	Greater than
<	Less than
PQL	Practical Quantitation Limit
INS	Insufficient sample for this test
NA	Test not required
NT	Not tested
DOL	Samples rejected due to particulate overload (air filters only)
RFD	Samples rejected due to filter damage (air filters only)
RUD	Samples rejected due to uneven deposition (air filters only)
##	Indicates a laboratory acceptance criteria outlier, for further details, see Result Comments and/or QC Comments

Quality Control Definitions

Blank

This is the component of the analytical signal which is not derived from the sample but from reagents, glassware etc, and is determined by processing solvents and reagents in exactly the same manner as for samples.

Surrogate Spike

Surrogates are known additions to each sample, blank, matrix spike and LCS in a batch, of compounds which are similar to the analyte of interest, however are not expected to be found in real samples.

LCS (Laboratory Control Sample)

This comprises either a standard reference material or a control matrix (such as a blank sand or water) fortified with analytes representative of the analyte class. It is simply a check sample.

Matrix Spike

A portion of the sample is spiked with a known concentration of target analyte. The purpose of the matrix spike is to monitor the performance of the analytical method used and to determine whether matrix interferences exist.

Duplicate

This is the complete duplicate analysis of a sample from the process batch. The sample selected should be one where the analyte concentration is easily measurable.

Laboratory Acceptance Criteria

Duplicate sample and matrix spike recoveries may not be reported on smaller jobs, however, were analysed at a frequency to meet or exceed NEPM requirements. All samples are tested in batches of 20. The duplicate sample RPD and matrix spike recoveries for the batch were within the laboratory acceptance criteria. Filters, swabs, wipes, tubes and badges will not have duplicate data as the whole sample is generally extracted during sample extraction. Spikes for Physical and Aggregate Tests are not applicable. For VOCs in water samples, three vials are required for duplicate or spike analysis.

General Acceptance Criteria (GAC) - Analyte specific criteria applies for some analytes and is reflected in QC recovery tables.

Duplicates: >10xPQL - RPD acceptance criteria will vary depending on the analytes and the analytical techniques but is typically in the range 20%-50% - see ELN-P05 QAQC tables for details (available on request); <10xPQL - RPD are higher as the results approach PQL and the estimated measurement uncertainty will statistically increase. Matrix Spikes, LCS and Surrogate recoveries: Generally 70-130% for inorganics/metals; 60-140% for organics (+/-50% surrogates) and 10-140% for labile SVOCs (including labile surrogates), ultra trace organics and speciated phenols is acceptable.

In circumstances where no duplicate and/or sample spike has been reported at 1 in 10 and/or 1 in 20 samples respectively, the sample volume submitted was typically insufficient in order to satisfy laboratory QA/QC protocols.

Miscellaneous Information

When samples are received where certain analytes are outside of recommended technical holding times (THTs), the analysis has proceeded. Where analytes are on the verge of breaching THTs, every effort will be made to analyse within the THT or as soon as practicable.

Where sampling dates are not provided, Envirolab are not in a position to comment on the validity of the analysis where recommended technical holding times may have been breached. We have taken the sampling date as being the date received at the laboratory.

Two significant figures are reported for the majority of tests and with a high degree of confidence, for results <10*PQL, the second significant figure may be in doubt i.e. has a relatively high degree of uncertainty and is provided for information only.

Measurement Uncertainty estimates are available for most tests upon request.

Analysis of aqueous samples typically involves the extraction/digestion and/or analysis of the liquid phase only (i.e. NOT any settled sediment phase but inclusive of suspended particles if present), unless stipulated on the Envirolab COC or by correspondence. Notable exceptions include certain Physical Tests (pH/EC/BOD/COD/Apparent Colour etc.), Solids testing, Total Recoverable metals and PFAS where sediment/solids are included by default.

Urine Analysis - The BEI values listed are taken from the 2022 edition of *TLVs and BEIs Threshold Limits by ACGIH*.

Air volume measurements are not covered by Envirolab's NATA accreditation.

Data Quality Assessment Summary PFE1877

Client Details

Client	Katherine Town Council - NT
Your Reference	Katherine Town Council - EPL298 - Quarterly
Date Issued	05/06/2024

Recommended Holding Time Compliance

Recommended holding time exceedances exist - See detailed list below

Quality Control and QC Frequency

QC Type	Compliant	Details
Blank	Yes	No Outliers
LCS	Yes	No Outliers
Duplicates	No	Duplicate Outliers Exist - See detailed list below
Matrix Spike	No	Matrix Spike Outliers Exist - See detailed list below
Surrogates / Extracted Internal Standards	No	Surrogates / Extracted ISTD Outliers Exist - See detailed list below
QC Frequency	No	QC Frequency Outliers Exist - See detailed list below

Surrogates/Extracted Internal Standards, Duplicates and/or Matrix Spikes are not always relevant/applicable to certain analyses and matrices. Therefore, said QC measures are deemed compliant in these situations by default. See Laboratory Acceptance Criteria for more information

Data Quality Assessment Summary PFE1877

Recommended Holding Time Compliance

Analysis	Sample Number(s)	Date Sampled	Date Extracted	Date Analysed	Compliant
vTRH&MBTEXN | Water	7, 9	26/05/2024	30/05/2024	30/05/2024	Yes
	1-6, 8	26/05/2024	30/05/2024	31/05/2024	Yes
sTRH | Water	1-9	26/05/2024	30/05/2024	30/05/2024	Yes
PAH | Water	1-9	26/05/2024	30/05/2024	01/06/2024	Yes
PCB | Water	1-9	26/05/2024	30/05/2024	01/06/2024	Yes
Total Metals (LL) | Water	1-9	26/05/2024	30/05/2024	31/05/2024	Yes
Dissolved Metals (LL) | Water	1-9	26/05/2024	30/05/2024	31/05/2024	Yes
TDS | Water	1-9	26/05/2024	30/05/2024	30/05/2024	Yes
VFA | Water	1-9	26/05/2024	31/05/2024	05/06/2024	Yes
Alkalinity Suite | Water	1-9	26/05/2024	30/05/2024	30/05/2024	Yes
Chloride | Water	1-9	26/05/2024	29/05/2024	30/05/2024	Yes
Dissolved Cations | Water	1-9	26/05/2024	30/05/2024	30/05/2024	Yes
Ion Balance | Water	1-9	26/05/2024	31/05/2024	05/06/2024	Yes
Sulfate | Water	1-9	26/05/2024	29/05/2024	30/05/2024	Yes
Total Organic Carbon | Water	1-9	26/05/2024	31/05/2024	31/05/2024	Yes
Cr6+ | Water	1-9	26/05/2024	30/05/2024	04/06/2024	Yes
Cr6+ - Total | Water	1-9	26/05/2024	04/06/2024	04/06/2024	Yes
Nitrogen - Ammonia | Water	1-9	26/05/2024	29/05/2024	29/05/2024	Yes
Nitrogen - Nitrate | Water	1-9	26/05/2024	29/05/2024	29/05/2024	Yes
Nitrogen - Total N | Water	1-9	26/05/2024	30/05/2024	30/05/2024	Yes
Total Phosphorus | Water	1-9	26/05/2024	30/05/2024	30/05/2024	Yes
BOD | Water	1-9	26/05/2024	30/05/2024	04/06/2024	No
COD | Water	1-9	26/05/2024	30/05/2024	04/06/2024	Yes
PFAS EXT-ISTD | Water	1-9	26/05/2024	31/05/2024	01/06/2024	Yes
PFAS-Extended | Water	1-9	26/05/2024	31/05/2024	01/06/2024	Yes

Outliers: Duplicates

METALS-022|Dissolved Low Level Metals (Water)| Batch BFE5186

Sample ID	Duplicate ID	Analyte	% Limits	RPD
PFE1877-01	DUP1	Zinc	20.00	33.1[4]

Data Quality Assessment Summary PFE1877

Outliers: Matrix Spike

ORG-022_PAH | Polycyclic Aromatic Hydrocarbons (Water) | Batch BFE5251

Sample ID	Analyte	% Limits	% Recovery
BFE5251-MS2#	Naphthalene	60 - 140	56.7[1]

Outliers: Surrogate / Extracted Internal Standards

ORG-029|PFAS Extended List (Matrix)| Batch BFF0073

Sample ID	Analyte	% Limits	% Recovery
PFE1877-01	Extraction Internal Standard 13C2 8:2FTS	50 - 150	190 [3]
	Extraction Internal Standard 13C2 PFDoDA	50 - 150	176 [3]
	Extraction Internal Standard 13C2 PFUnDA	50 - 150	172 [3]
	Extraction Internal Standard d5 N EtFOSAA	50 - 150	157 [3]
	Extraction Internal Standard 13C2 6:2FTS	50 - 150	153 [3]
PFE1877-02	Extraction Internal Standard d3 N MeFOSAA	50 - 150	158 [3]
	Extraction Internal Standard 13C2 6:2FTS	50 - 150	156 [3]
	Extraction Internal Standard 13C2 8:2FTS	50 - 150	199 [3]
	Extraction Internal Standard 13C2 PFDoDA	50 - 150	175 [3]
	Extraction Internal Standard 13C2 PFUnDA	50 - 150	171 [3]
PFE1877-03	Extraction Internal Standard d3 N MeFOSAA	50 - 150	156 [3]
	Extraction Internal Standard 13C2 PFUnDA	50 - 150	172 [3]
	Extraction Internal Standard 13C2 PFDoDA	50 - 150	185 [3]
	Extraction Internal Standard 13C2 8:2FTS	50 - 150	## [3]
	Extraction Internal Standard 13C2 PFDA	50 - 150	151 [3]
PFE1877-04	Extraction Internal Standard d5 N EtFOSAA	50 - 150	155 [3]
	Extraction Internal Standard 13C2 8:2FTS	50 - 150	192 [3]
	Extraction Internal Standard 13C2 PFDoDA	50 - 150	197 [3]
	Extraction Internal Standard 13C2 PFTeDA	50 - 150	165 [3]
	Extraction Internal Standard 13C2 PFUnDA	50 - 150	191 [3]
PFE1877-05	Extraction Internal Standard 13C2 8:2FTS	50 - 150	180 [3]
	Extraction Internal Standard 13C2 PFTeDA	50 - 150	158 [3]
	Extraction Internal Standard 13C2 PFUnDA	50 - 150	195 [3]
	Extraction Internal Standard d3 N MeFOSAA	50 - 150	156 [3]
	Extraction Internal Standard 13C2 PFDoDA	50 - 150	186 [3]
PFE1877-06	Extraction Internal Standard d3 N MeFOSAA	50 - 150	156 [3]
	Extraction Internal Standard d5 N EtFOSAA	50 - 150	154 [3]
	Extraction Internal Standard 13C2 PFUnDA	50 - 150	178 [3]
	Extraction Internal Standard 13C2 PFTeDA	50 - 150	154 [3]
	Extraction Internal Standard 13C2 PFDoDA	50 - 150	179 [3]
	Extraction Internal Standard 13C2 8:2FTS	50 - 150	199 [3]
PFE1877-07	Extraction Internal Standard 13C2 PFDoDA	50 - 150	184 [3]
	Extraction Internal Standard 13C2 PFUnDA	50 - 150	178 [3]
	Extraction Internal Standard 13C2 8:2FTS	50 - 150	168 [3]
PFE1877-08	Extraction Internal Standard 13C2 8:2FTS	50 - 150	159 [3]
	Extraction Internal Standard 13C2 PFDoDA	50 - 150	185 [3]
	Extraction Internal Standard 13C2 PFTeDA	50 - 150	158 [3]
	Extraction Internal Standard 13C2 PFUnDA	50 - 150	180 [3]
PFE1877-09	Extraction Internal Standard 13C2 PFUnDA	50 - 150	178 [3]
	Extraction Internal Standard 13C2 8:2FTS	50 - 150	186 [3]
	Extraction Internal Standard 13C2 PFDoDA	50 - 150	173 [3]

Data Quality Assessment Summary PFE1877

Outliers: QC Frequency

INORG-091|Inorganics - Common Wastewater Parameters (Water)| Batch BFE5316

Analysis	QC Type	Expected	Reported
BOD	Duplicate	2	0

INORG-111|Inorganics - Physical Parameters (Water)| Batch BFE5664

Analysis	QC Type	Expected	Reported
VFA	Duplicate	1	0

ORG-023_F1_TOT|Volatile TRH and BTEX (Water)| Batch BFE5341

Analysis	QC Type	Expected	Reported
vTRH&MBTEXN	Duplicate	2	0
	Matrix Spike	1	0

ORG-029|PFAS Extended List (Water)| Batch BFF0073

Analysis	QC Type	Expected	Reported
PFAS EXT-ISTD	Matrix Spike	1	0
PFAS-Extended	Matrix Spike	1	0

Quality Control PFE1877

ORG-023_F1_TOT|Volatile TRH and BTEX (Water) | Batch BFE5341

Analyte	Units	PQL	Blank	LCS %
TRH C6-C9	µg/L	10	<10	100
TRH C6-C10	µg/L	10	<10	102
TRH C6-C10 less BTEX (F1)	µg/L	10	<10	[NA]
Methyl tert butyl ether (MTBE)	µg/L	1.0	<1.0	[NA]
Benzene	µg/L	1.0	<1.0	85.7
Toluene	µg/L	1.0	<1.0	97.0
Ethylbenzene	µg/L	1.0	<1.0	93.9
meta+para Xylene	µg/L	2.0	<2.0	96.0
ortho-Xylene	µg/L	1.0	<1.0	93.3
Total Xylene	µg/L	3.0	<3.0	[NA]
Naphthalene (value used in F2 calc)	µg/L	1.0	<1.0	[NA]
Surrogate Dibromofluoromethane	*%*		*105*	*105*
Surrogate Toluene-D8	*%*		*95.7*	*96.7*
Surrogate 4-Bromofluorobenzene	*%*		*95.5*	*94.5*

ORG-020|Semi-volatile TRH (Water) | Batch BFE5251

Analyte	Units	PQL	Blank	DUP1 BFE5251-DUP1# Samp | QC | RPD %	DUP2 BFE5251-DUP2# Samp | QC | RPD %	LCS %	Spike % BFE5251-MS1#
TRH C10-C14	µg/L	50	<50	223 | 231 | 3.90	54.4 | 59.0 | 8.06	95.9	92.6
TRH C15-C28	µg/L	100	<100	182 | 249 | 31.1	161 | 155 | 3.68	99.5	99.3
TRH C29-C36	µg/L	100	<100	<100 | <100 | [NA]	<100 | <100 | [NA]	122	122
TRH >C10-C16	µg/L	50	<50	256 | 274 | 6.51	104 | 109 | 4.73	96.7	94.7
TRH >C16-C34 (F3)	µg/L	100	<100	151 | 200 | 27.8	103 | <100 | 7.40	103	103
TRH >C34-C40 (F4)	µg/L	100	<100	<100 | <100 | [NA]	<100 | <100 | [NA]	102	102
Surrogate o-Terphenyl	*%*		*88.1*	*69.8 | 62.6*	*78.2 | 78.0*	*106*	*108*

The QC reported was not specifically part of this workorder but formed part of the QC process batch.

ORG-022_PAH|Polycyclic Aromatic Hydrocarbons (Water) | Batch BFE5251

Analyte	Units	PQL	Blank	DUP1 BFE5251-DUP1# Samp | QC | RPD %	DUP2 BFE5251-DUP2# Samp | QC | RPD %	LCS %	Spike % BFE5251-MS2#
Naphthalene	µg/L	0.10	<0.10	<0.10 | <0.10 | [NA]	<0.10 | <0.10 | [NA]	64.0	56.7[1]
Acenaphthylene	µg/L	0.10	<0.10	<0.10 | <0.10 | [NA]	<0.10 | <0.10 | [NA]	[NA]	[NA]
Acenaphthene	µg/L	0.10	<0.10	<0.10 | <0.10 | [NA]	<0.10 | <0.10 | [NA]	80.5	61.7
Fluorene	µg/L	0.10	<0.10	<0.10 | <0.10 | [NA]	<0.10 | <0.10 | [NA]	63.1	69.9
Phenanthrene	µg/L	0.10	<0.10	<0.10 | <0.10 | [NA]	<0.10 | <0.10 | [NA]	69.6	71.5
Anthracene	µg/L	0.10	<0.10	<0.10 | <0.10 | [NA]	<0.10 | <0.10 | [NA]	[NA]	[NA]
Fluoranthene	µg/L	0.10	<0.10	<0.10 | <0.10 | [NA]	<0.10 | <0.10 | [NA]	69.7	74.8
Pyrene	µg/L	0.10	<0.10	<0.10 | <0.10 | [NA]	<0.10 | <0.10 | [NA]	66.9	71.1
Benzo(a)anthracene	µg/L	0.10	<0.10	<0.10 | <0.10 | [NA]	<0.10 | <0.10 | [NA]	[NA]	[NA]
Chrysene	µg/L	0.10	<0.10	<0.10 | <0.10 | [NA]	<0.10 | <0.10 | [NA]	65.4	65.8
Benzo(b,j,k)fluoranthene	µg/L	0.20	<0.20	<0.20 | <0.20 | [NA]	<0.20 | <0.20 | [NA]	[NA]	[NA]
Benzo(a)pyrene	µg/L	0.10	<0.10	<0.10 | <0.10 | [NA]	<0.10 | <0.10 | [NA]	67.2	68.9
Indeno(1,2,3-c,d)pyrene	µg/L	0.10	<0.10	<0.10 | <0.10 | [NA]	<0.10 | <0.10 | [NA]	[NA]	[NA]
Dibenzo(a,h)anthracene	µg/L	0.10	<0.10	<0.10 | <0.10 | [NA]	<0.10 | <0.10 | [NA]	[NA]	[NA]
Benzo(g,h,i)perylene	µg/L	0.10	<0.10	<0.10 | <0.10 | [NA]	<0.10 | <0.10 | [NA]	[NA]	[NA]
Surrogate p-Terphenyl-D14	*%*		*79.6*	*55.8 | 41.8 [2]*	*64.7 | 58.6 [2]*	*84.6*	*62.9*

The QC reported was not specifically part of this workorder but formed part of the QC process batch.

Quality Control PFE1877

ORG-021/022/025_PCB|Polychlorinated Biphenyls (Water) | Batch BFE5251

Analyte	Units	PQL	Blank	DUP1 BFE5251-DUP1# Samp | QC | RPD %	DUP2 BFE5251-DUP2# Samp | QC | RPD %	LCS %	Spike % BFE5251-MS2#
Aroclor 1016	µg/L	2.0	<2.0	<2.0 | <2.0 | [NA]	<2.0 | <2.0 | [NA]	[NA]	[NA]
Aroclor 1221	µg/L	2.0	<2.0	<2.0 | <2.0 | [NA]	<2.0 | <2.0 | [NA]	[NA]	[NA]
Aroclor 1232	µg/L	2.0	<2.0	<2.0 | <2.0 | [NA]	<2.0 | <2.0 | [NA]	[NA]	[NA]
Aroclor 1242	µg/L	2.0	<2.0	<2.0 | <2.0 | [NA]	<2.0 | <2.0 | [NA]	[NA]	[NA]
Aroclor 1248	µg/L	2.0	<2.0	<2.0 | <2.0 | [NA]	<2.0 | <2.0 | [NA]	[NA]	[NA]
Aroclor 1254	µg/L	2.0	<2.0	<2.0 | <2.0 | [NA]	<2.0 | <2.0 | [NA]	[NA]	[NA]
Aroclor 1260	µg/L	2.0	<2.0	<2.0 | <2.0 | [NA]	<2.0 | <2.0 | [NA]	[NA]	[NA]
PCB C103	µg/L			0.00 | 0.00 | [NA]	0.00 | 0.00 | [NA]	77.3	90.0
Surrogate 2-Fluorobiphenyl	*%*		*72.5*	*67.3 | 60.9*	*63.2 | 68.7*	*90.4*	*70.7*

The QC reported was not specifically part of this workorder but formed part of the QC process batch.

METALS-022|Acid Extractable Low Level Metals (Water) | Batch BFE5182

Analyte	Units	PQL	Blank	DUP1 PFE1877-02 Samp | QC | RPD %	DUP2 BFE5182-DUP2# Samp | QC | RPD %	LCS %	Spike % PFE1877-01
Aluminium	µg/L	10	<10	<10 | <10 | [NA]	<10 | <10 | [NA]	98.3	98.0
Cadmium	µg/L	0.10	<0.10	<0.10 | <0.10 | [NA]	<0.10 | <0.10 | [NA]	116	112
Chromium	µg/L	1.0	<1.0	<1.0 | <1.0 | [NA]	<1.0 | <1.0 | [NA]	109	104
Copper	µg/L	1.0	<1.0	<1.0 | <1.0 | [NA]	3.64 | 3.69 | 1.34	113	107
Iron	µg/L	10	<10	57.6 | 76.4 | 28.0	<10 | <10 | [NA]	115	95.1
Lead	µg/L	1.0	<1.0	<1.0 | <1.0 | [NA]	<1.0 | <1.0 | [NA]	110	104
Manganese	µg/L	1.0	<1.0	9.77 | 9.90 | 1.27	<1.0 | <1.0 | [NA]	101	95.9
Nickel	µg/L	1.0	<1.0	<1.0 | <1.0 | [NA]	<1.0 | <1.0 | [NA]	112	104
Selenium	µg/L	1.0	<1.0	<1.0 | <1.0 | [NA]	<1.0 | <1.0 | [NA]	119	111
Zinc	µg/L	1.0	<1.0	5.14 | 5.05 | 1.71	3.12 | 3.29 | 5.21	110	91.7

The QC reported was not specifically part of this workorder but formed part of the QC process batch.

METALS-022|Dissolved Low Level Metals (Water) | Batch BFE5186

Analyte	Units	PQL	Blank	DUP1 PFE1877-01 Samp | QC | RPD %	DUP2 BFE5186-DUP2# Samp | QC | RPD %	LCS %	Spike % PFE1877-02
Aluminium	µg/L	10	<10	<10 | <10 | [NA]	<10 | <10 | [NA]	110	107
Cadmium	µg/L	0.10	<0.10	<0.10 | <0.10 | [NA]	<0.10 | <0.10 | [NA]	107	108
Chromium	µg/L	1.0	<1.0	<1.0 | <1.0 | [NA]	<1.0 | <1.0 | [NA]	106	106
Copper	µg/L	1.0	<1.0	<1.0 | <1.0 | [NA]	<1.0 | <1.0 | [NA]	108	105
Iron	µg/L	10	<10	13.5 | 13.5 | 0.260	<10 | <10 | [NA]	112	107
Lead	µg/L	1.0	<1.0	<1.0 | <1.0 | [NA]	<1.0 | <1.0 | [NA]	103	100
Manganese	µg/L	1.0	<1.0	1.49 | 1.49 | 0.335	39.1 | 39.0 | 0.213	106	103
Nickel	µg/L	1.0	<1.0	<1.0 | <1.0 | [NA]	<1.0 | <1.0 | [NA]	107	105
Selenium	µg/L	1.0	<1.0	<1.0 | <1.0 | [NA]	<1.0 | <1.0 | [NA]	110	125
Zinc	µg/L	1.0	<1.0	3.85 | 5.38 | 33.1 [4]	2.45 | 2.40 | 2.11	108	107

The QC reported was not specifically part of this workorder but formed part of the QC process batch.

INORG-018|Inorganics - Physical Parameters (Water) | Batch BFE5295

Analyte	Units	PQL	Blank	DUP1 BFE5295-DUP1# Samp | QC | RPD %	DUP2 BFE5295-DUP2# Samp | QC | RPD %	LCS %
Total Dissolved Solids	mg/L	5.0	<5.0	1580 | 1620 | 2.56	7430 | 7100 | 4.54	98.3

The QC reported was not specifically part of this workorder but formed part of the QC process batch.

INORG-111|Inorganics - Physical Parameters (Water) | Batch BFE5664

Analyte	Units	PQL	Blank	LCS %
Volatile Fatty Acids	mg/L	5.0	<5.0	[NA]

Quality Control PFE1877

INORG-081 | Inorganics - Ionic Balance and Indexes (Water) | Batch BFE5110

Analyte	Units	PQL	Blank	DUP1 PFE1877-01 Samp | QC | RPD %	DUP2 BFE5110-DUP2# Samp | QC | RPD %	LCS %	Spike % PFE1877-02
Chloride	mg/L	1.0	<1.0	2.32 | 2.37 | 1.94	<1.0 | <1.0 | [NA]	105	120
Sulfate	mg/L	1.0	<1.0	4.70 | 4.77 | 1.51	<1.0 | <1.0 | [NA]	107	118

The QC reported was not specifically part of this workorder but formed part of the QC process batch.

METALS-020 | Inorganics - Ionic Balance and Indexes (Water) | Batch BFE5187

Analyte	Units	PQL	Blank	DUP1 PFE1877-01 Samp | QC | RPD %	DUP2 BFE5187-DUP2# Samp | QC | RPD %	LCS %	Spike % PFE1877-02
Calcium	mg/L	0.50	<0.50	78.1 | 76.3 | 2.39	62.0 | 61.3 | 1.13	109	92.3
Magnesium	mg/L	0.50	<0.50	34.9 | 34.5 | 1.23	35.5 | 36.2 | 1.68	110	101
Potassium	mg/L	0.50	<0.50	5.02 | 4.88 | 2.79	18.0 | 18.0 | 0.356	110	101
Sodium	mg/L	0.50	<0.50	5.72 | 5.70 | 0.222	492 | 498 | 1.17	110	103
Hardness (calc) equivalent CaCO3	mg/L	3.0	<3.0	339 | 332 | 1.90	301 | 302 | 0.247	[NA]	[NA]

The QC reported was not specifically part of this workorder but formed part of the QC process batch.

INORG-006 | Inorganics - Ionic Balance and Indexes (Water) | Batch BFE5280

Analyte	Units	PQL	Blank	DUP1 PFE1877-01 Samp | QC | RPD %	DUP2 PFE1877-09 Samp | QC | RPD %	LCS %
Bicarbonate Alkalinity as CaCO3	mg/L as CaCO3	5.0	<5.0	356 | 376 | 5.38	<5.0 | <5.0 | [NA]	[NA]
Carbonate Alkalinity as CaCO3	mg/L as CaCO3	5.0	<5.0	<5.0 | <5.0 | [NA]	<5.0 | <5.0 | [NA]	[NA]
Hydroxide OH- as CaCO3	mg/L as CaCO3	5.0	<5.0	<5.0 | <5.0 | [NA]	<5.0 | <5.0 | [NA]	[NA]
Total Alkalinity as CaCO3	mg/L as CaCO3	5.0	<5.0	356 | 376 | 5.38	<5.0 | <5.0 | [NA]	97.5

Analyte	Units	PQL	Blank	LCS %
Total Alkalinity as CaCO3	mg/L as CaCO3	5		91.8

INORG-079 | Inorganics - Carbon, Nitrogen and Sulfur Species (Water) | Batch BFE5456

Analyte	Units	PQL	Blank	DUP1 PFE1877-01 Samp | QC | RPD %	DUP2 BFE5456-DUP2# Samp | QC | RPD %	LCS %	Spike % PFE1877-02
Total Organic Carbon	mg/L	1.0	<1.0	<1.0 | <1.0 | [NA]	12.2 | 12.7 | 4.08	108	109

The QC reported was not specifically part of this workorder but formed part of the QC process batch.

INORG-118 | Inorganics - Speciated Cr (III/VI) and Fe (II/III) (Water) | Batch BFE5206

Analyte	Units	PQL	Blank	DUP1 BFE5206-DUP1# Samp | QC | RPD %	DUP2 PFE1877-02 Samp | QC | RPD %	LCS %	Spike % BFE5206-MS1#
Hexavalent Chromium	mg/L	0.0050	<0.0050	<0.0050 | <0.0050 | [NA]	<0.0050 | <0.0050 | [NA]	100	111

The QC reported was not specifically part of this workorder but formed part of the QC process batch.

INORG-118 | Inorganics - Speciated Cr (III/VI) and Fe (II/III) (Water) | Batch BFF0124

Analyte	Units	PQL	Blank	DUP1 PFE1877-01 Samp | QC | RPD %	LCS %	Spike % PFE1877-02
Hexavalent Chromium (Total)	mg/L	0.0050	<0.0050	<0.0050 | <0.0050 | [NA]	98.8	109

Quality Control PFE1877

INORG-057 | Inorganics - Nutrients (Water) | Batch BFE5070

Analyte	Units	PQL	Blank	DUP1 BFE5070-DUP1# Samp | QC | RPD %	DUP2 PFE1877-05 Samp | QC | RPD %	LCS %	Spike % BFE5070-MS1#
Ammonia as N	mg/L	0.0050	<0.0050	<0.0050 | <0.0050 | [NA]	0.00660 | 0.00727 | 9.74	92.6	92.8
Nitrate as N	mg/L	0.0050	<0.0050	34.7 | 34.9 | 0.564	0.676 | 0.669 | 1.12	115	79.7
Nitrate as NO3 by calculation	mg/L	0.020	<0.020			[NA]	[NA]

The QC reported was not specifically part of this workorder but formed part of the QC process batch.

INORG-060_TP | Inorganics - Nutrients (Water) | Batch BFE5169

Analyte	Units	PQL	Blank	DUP1 PFE1877-01 Samp | QC | RPD %	LCS %	Spike % PFE1877-02
Total Phosphorus	mg/L	0.010	<0.010	<0.010 | <0.010 | [NA]	103	93.0

INORG-127 | Inorganics - Nutrients (Water) | Batch BFE5200

Analyte	Units	PQL	Blank	DUP1 BFE5200-DUP1# Samp | QC | RPD %	DUP2 BFE5200-DUP2# Samp | QC | RPD %	LCS %	Spike % BFE5200-MS1#
Total Nitrogen	mg/L	0.10	<0.10	1.70 | 1.43 | 16.9	1.21 | 1.14 | 6.23	101	104

The QC reported was not specifically part of this workorder but formed part of the QC process batch.

INORG-127 | Inorganics - Nutrients (Water) | Batch BFE5201

Analyte	Units	PQL	Blank	DUP1 PFE1877-02 Samp | QC | RPD %	DUP2 BFE5201-DUP2# Samp | QC | RPD %	LCS %	Spike % PFE1877-03
Total Nitrogen	mg/L	0.10	<0.10	0.971 | 1.01 | 3.53	0.379 | 0.425 | 11.5	101	101

The QC reported was not specifically part of this workorder but formed part of the QC process batch.

INORG-067 | Inorganics - Common Wastewater Parameters (Water) | Batch BFE5278

Analyte	Units	PQL	Blank	DUP1 BFE5278-DUP1# Samp | QC | RPD %	DUP2 PFE1877-01 Samp | QC | RPD %	LCS %
COD	mg O2/L	20	<20	643 | 640 | 0.468	<20 | <20 | [NA]	102

The QC reported was not specifically part of this workorder but formed part of the QC process batch.

INORG-091 | Inorganics - Common Wastewater Parameters (Water) | Batch BFE5316

Analyte	Units	PQL	Blank	LCS %
BOD	mg/L	5.0	<5.0	85.0

Quality Control PFE1877

ORG-029|PFAS Extended List (Water) | Batch BFF0073

Analyte	Units	PQL	Blank	DUP1 PFE1877-04 Samp | QC | RPD %	LCS %
Perfluorobutanesulfonic acid (PFBS)	µg/L	0.010	<0.010	0.140 | 0.146 | 4.06	99.9
Perfluoropentanesulfonic acid (PFPeS)	µg/L	0.010	<0.010	0.0694 | 0.0726 | 4.51	97.8
Perfluorohexanesulfonic acid (PFHxS)	µg/L	0.010	<0.010	0.348 | 0.351 | 0.743	99.0
Perfluoroheptanesulfonic acid (PFHpS)	µg/L	0.010	<0.010	0.0364 | 0.0396 | 8.42	101
Perfluorooctanesulfonic acid (PFOS)	µg/L	0.010	<0.010	0.454 | 0.465 | 2.48	96.0
Perfluorodecanesulfonic acid (PFDS)	µg/L	0.020	<0.020	<0.020 | <0.020 | [NA]	100
Perfluorobutanoic acid (PFBA)	µg/L	0.020	<0.020	0.104 | 0.0956 | 8.80	102
Perfluoropentanoic acid (PFPeA)	µg/L	0.020	<0.020	0.146 | 0.137 | 6.35	101
Perfluorohexanoic acid (PFHxA)	µg/L	0.010	<0.010	0.242 | 0.248 | 2.20	101
Perfluoroheptanoic acid (PFHpA)	µg/L	0.010	<0.010	0.0884 | 0.0900 | 1.79	103
Perfluorooctanoic acid (PFOA)	µg/L	0.010	<0.010	0.157 | 0.147 | 6.60	91.3
Perfluorononanoic acid (PFNA)	µg/L	0.010	<0.010	<0.010 | <0.010 | [NA]	103
Perfluorodecanoic acid (PFDA)	µg/L	0.020	<0.020	<0.020 | <0.020 | [NA]	98.5
Perfluoroundecanoic acid (PFUnDA)	µg/L	0.020	<0.020	<0.020 | <0.020 | [NA]	97.8
Perfluorododecanoic acid (PFDoDA)	µg/L	0.050	<0.050	<0.050 | <0.050 | [NA]	104
Perfluorotridecanoic acid (PFTrDA)	µg/L	0.10	<0.10	<0.10 | <0.10 | [NA]	115
Perfluorotetradecanoic acid (PFTeDA)	µg/L	0.50	<0.50	<0.50 | <0.50 | [NA]	79.7
4:2 Fluorotelomer sulfonic acid (4:2 FTS)	µg/L	0.010	<0.010	<0.010 | <0.010 | [NA]	94.8
6:2 Fluorotelomer sulfonic acid (6:2 FTS)	µg/L	0.010	<0.010	<0.010 | <0.010 | [NA]	105
8:2 Fluorotelomer sulfonic acid (8:2 FTS)	µg/L	0.020	<0.020	<0.020 | <0.020 | [NA]	104
10:2 Fluorotelomer sulfonic acid (10:2 FTS)	µg/L	0.020	<0.020	<0.020 | <0.020 | [NA]	122
Perfluorooctane sulfonamide (FOSA)	µg/L	0.10	<0.10	<0.10 | <0.10 | [NA]	102
N-Methyl perfluorooctane sulfonamide (MeFOSA)	µg/L	0.050	<0.050	<0.050 | <0.050 | [NA]	103
N-Ethyl perfluorooctane sulfonamide (EtFOSA)	µg/L	0.10	<0.10	<0.10 | <0.10 | [NA]	98.7
N-Methyl perfluorooctane sulfonamidoethanol	µg/L	0.050	<0.050	<0.050 | <0.050 | [NA]	88.2
N-Ethyl perfluorooctane sulfonamidoethanol	µg/L	0.50	<0.50	<0.50 | <0.50 | [NA]	104
N-Methyl perfluorooctane sulfonamidoacetic acid	µg/L	0.020	<0.020	<0.020 | <0.020 | [NA]	96.9
N-Ethyl perfluorooctane sulfonamidoacetic acid	µg/L	0.020	<0.020	<0.020 | <0.020 | [NA]	98.9
Surrogate 13C8 PFOS	%		*104*	*95.2 | 101*	*102*
Surrogate 13C2 PFOA	%		*99.8*	*101 | 98.8*	*97.2*
Extraction Internal Standard 13C3 PFBS	%		*102*	*101 | 102 | 1.04*	*[NA]*
Extraction Internal Standard 18O2 PFHxS	%		*110*	*112 | 114 | 1.35*	*[NA]*
Extraction Internal Standard 13C4 PFOS	%		*99.8*	*112 | 110 | 1.80*	*[NA]*
Extraction Internal Standard 13C4 PFBA	%		*109*	*103 | 107 | 4.38*	*[NA]*
Extraction Internal Standard 13C3 PFPeA	%		*104*	*105 | 110 | 5.15*	*[NA]*
Extraction Internal Standard 13C2 PFHxA	%		*105*	*100 | 102 | 1.59*	*[NA]*
Extraction Internal Standard 13C4 PFHpA	%		*114*	*110 | 110 | 0.809*	*[NA]*
Extraction Internal Standard 13C4 PFOA	%		*129*	*126 | 126 | 0.0715*	*[NA]*
Extraction Internal Standard 13C5 PFNA	%		*123*	*136 | 138 | 1.46*	*[NA]*
Extraction Internal Standard 13C2 PFDA	%		*144*	*144 | 144 | 0.0971*	*[NA]*
Extraction Internal Standard 13C2 PFUnDA	%		*159 [3]*	*191 | 182 | 4.54 [3]*	*[NA] [3]*
Extraction Internal Standard 13C2 PFDoDA	%		*167 [3]*	*197 | 187 | 5.26 [3]*	*[NA] [3]*
Extraction Internal Standard 13C2 PFTeDA	%		*138*	*165 | 166 | 0.730 [3]*	*[NA]*
Extraction Internal Standard 13C2 4:2FTS	%		*116*	*118 | 112 | 5.56*	*[NA]*
Extraction Internal Standard 13C2 6:2FTS	%		*151 [3]*	*144 | 139 | 3.08*	*[NA]*
Extraction Internal Standard 13C2 8:2FTS	%		*189 [3]*	*192 | 182 | 4.90 [3]*	*[NA] [3]*
Extraction Internal Standard 13C8 FOSA	%		*114*	*116 | 118 | 1.84*	*[NA]*
Extraction Internal Standard d3 N MeFOSA	%		*99.6*	*114 | 110 | 3.02*	*[NA]*
Extraction Internal Standard d5 N EtFOSA	%		*108*	*110 | 111 | 0.722*	*[NA]*
Extraction Internal Standard d7 N MeFOSE	%		*101*	*107 | 109 | 1.62*	*[NA]*
Extraction Internal Standard d9 N EtFOSE	%		*92.3*	*104 | 107 | 3.39*	*[NA]*
Extraction Internal Standard d3 N MeFOSAA	%		*141*	*149 | 149 | 0.228*	*[NA]*
Extraction Internal Standard d5 N EtFOSAA	%		*142*	*155 | 147 | 5.54*	*[NA]*

QC Comments

Identifier	Description
[1]	Spike recovery is outside routine acceptance criteria (60-140%), this may be due to suspected non-homogeneity and/or matrix interference effects. However, an acceptable recovery was achieved for the LCS.
[2]	Surrogate recovery was low due to sample(s) emulsifying during liquid liquid extraction.
[3]	For PFAS Extracted Internal Standards denoted with ## or being outside the 50-150% acceptance range, the respective target analyte results may be unaffected, in other circumstances the PQL has been raised to accommodate the outlier(s).
[4]	Duplicate %RPD may be flagged as an outlier to routine laboratory acceptance, however, where one or both results are <10*PQL, the RPD acceptance criteria increases exponentially.

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Client Details

Client	Katherine Town Council - NT
Contact	Brett Kimpton
Address	PO Box 1071, KATHERINE, NT, 0851

Sample Details

Your Reference	Katherine Town Council - WMS Dams
Number of Samples	3 Water
Date Samples Received	05/06/2024
Date Instructions Received	06/06/2024

Analysis Details

Please refer to the following pages for results, methodology summary and quality control data.
Samples were analysed as received from the client. Results relate specifically to the samples as received.
Results are reported on a dry weight basis for solids and on an as received basis for other matrices.

Report Details

Date Results Requested by	14/06/2024
Date of Issue	14/06/2024

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Accredited for compliance with ISO/IEC 17025. Tests not covered by NATA are denoted with *.

Authorisation Details

Results Approved By	Ben Carpenter, Metals Technician Diego Bigolin, Supervisor, Inorganics Heram Halim, Operations Manager Hien Luong, Organics Technician Huong Patfield, Organics Chemist Lien Tang, Assistant Operations Manager Michael Mowle, Inorganics Supervisor Sean McAlary, Chemist
Laboratory Manager	Michael Kubiak

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Samples in this Report

Envirolab ID	Sample ID	Matrix	Date Sampled	Date Received
PFF0291-01	Pit 1	Water	02/06/2024	06/06/2024
PFF0291-02	Pit 2	Water	02/06/2024	06/06/2024
PFF0291-03	Field Blank	Water	02/06/2024	06/06/2024

Sample Comments

General Comment	Proceeding with tests within holding time as per client
Pit 1	Sample(s) was/were received with headspace, analytical results may be affected.
Pit 2	Sample(s) was/were received with headspace, analytical results may be affected.
Field Blank	Sample(s) was/were received with headspace, analytical results may be affected.

Volatile TRH and BTEX (Water)

Envirolab ID	Units	PQL	PFF0291-01	PFF0291-02	PFF0291-03
Your Reference			Pit 1	Pit 2	Field Blank
Date Sampled			02/06/2024	02/06/2024	02/06/2024
TRH C6-C9	µg/L	10	<10	<10	<10
TRH C6-C10	µg/L	10	<10	<10	<10
TRH C6-C10 less BTEX (F1)	µg/L	10	<10	<10	<10
Methyl tert butyl ether (MTBE)	µg/L	1.0	<1.0	<1.0	<1.0
Benzene	µg/L	1.0	<1.0	<1.0	<1.0
Toluene	µg/L	1.0	<1.0	<1.0	<1.0
Ethylbenzene	µg/L	1.0	<1.0	<1.0	<1.0
meta+para Xylene	µg/L	2.0	<2.0	<2.0	<2.0
ortho-Xylene	µg/L	1.0	<1.0	<1.0	<1.0
Total Xylene	µg/L	3.0	<3.0	<3.0	<3.0
Naphthalene (value used in F2 calc)	µg/L	1.0	<1.0	<1.0	<1.0
Surrogate Dibromofluoromethane	%		*99.7*	*101*	*98.2*
Surrogate Toluene-D8	%		*102*	*101*	*102*
Surrogate 4-Bromofluorobenzene	%		*101*	*102*	*104*

Semi-volatile TRH (Water)

Envirolab ID	Units	PQL	PFF0291-01	PFF0291-02	PFF0291-03
Your Reference			Pit 1	Pit 2	Field Blank
Date Sampled			02/06/2024	02/06/2024	02/06/2024
TRH C10-C14	µg/L	50	<50	<50	<50
TRH C15-C28	µg/L	100	170	<100	<100
TRH C29-C36	µg/L	100	<100	<100	<100
Total +ve TRH C10-C36	µg/L	50	170	<50	<50
TRH >C10-C16	µg/L	50	<50	<50	<50
TRH >C10-C16 less Naphthalene F2	µg/L	50	<50	<50	<50
TRH >C16-C34 (F3)	µg/L	100	210	<100	<100
TRH >C34-C40 (F4)	µg/L	100	<100	<100	<100
Total +ve TRH >C10-C40	µg/L	50	210	<50	<50
Surrogate o-Terphenyl	%		*73.8*	*77.6*	*66.4*

Polycyclic Aromatic Hydrocarbons (Water)

Envirolab ID	Units	PQL	PFF0291-01	PFF0291-02	PFF0291-03
Your Reference			Pit 1	Pit 2	Field Blank
Date Sampled			02/06/2024	02/06/2024	02/06/2024
Naphthalene	µg/L	0.10	<0.10	<0.10	<0.10
Acenaphthylene	µg/L	0.10	<0.10	<0.10	<0.10
Acenaphthene	µg/L	0.10	<0.10	<0.10	<0.10
Fluorene	µg/L	0.10	<0.10	<0.10	<0.10
Phenanthrene	µg/L	0.10	<0.10	<0.10	<0.10
Anthracene	µg/L	0.10	<0.10	<0.10	<0.10
Fluoranthene	µg/L	0.10	<0.10	<0.10	<0.10
Pyrene	µg/L	0.10	<0.10	<0.10	<0.10
Benzo(a)anthracene	µg/L	0.10	<0.10	<0.10	<0.10
Chrysene	µg/L	0.10	<0.10	<0.10	<0.10
Benzo(b,j,k)fluoranthene	µg/L	0.20	<0.20	<0.20	<0.20
Benzo(a)pyrene	µg/L	0.10	<0.10	<0.10	<0.10
Indeno(1,2,3-c,d)pyrene	µg/L	0.10	<0.10	<0.10	<0.10
Dibenzo(a,h)anthracene	µg/L	0.10	<0.10	<0.10	<0.10
Benzo(g,h,i)perylene	µg/L	0.10	<0.10	<0.10	<0.10
Total +ve PAH	µg/L	0.10	<0.10	<0.10	<0.10
Surrogate p-Terphenyl-D14	%		*73.9*	*62.6*	*77.8*

Polychlorinated Biphenyls (Water)

Envirolab ID	Units	PQL	PFF0291-01	PFF0291-02	PFF0291-03
Your Reference			Pit 1	Pit 2	Field Blank
Date Sampled			02/06/2024	02/06/2024	02/06/2024
Aroclor 1016	µg/L	2.0	<2.0	<2.0	<2.0
Aroclor 1221	µg/L	2.0	<2.0	<2.0	<2.0
Aroclor 1232	µg/L	2.0	<2.0	<2.0	<2.0
Aroclor 1242	µg/L	2.0	<2.0	<2.0	<2.0
Aroclor 1248	µg/L	2.0	<2.0	<2.0	<2.0
Aroclor 1254	µg/L	2.0	<2.0	<2.0	<2.0
Aroclor 1260	µg/L	2.0	<2.0	<2.0	<2.0
Total +ve PCB (1016-1260)	µg/L	2.0	<2.0	<2.0	<2.0
Surrogate 2-Fluorobiphenyl	%		*65.5*	*71.2*	*71.8*

Acid Extractable Low Level Metals (Water)

Envirolab ID	Units	PQL	PFF0291-01	PFF0291-02	PFF0291-03
Your Reference			Pit 1	Pit 2	Field Blank
Date Sampled			02/06/2024	02/06/2024	02/06/2024
Aluminium	µg/L	10	460	19000	<10
Cadmium	µg/L	0.10	<0.10	<0.10	<0.10
Chromium	µg/L	1.0	1.0	63	5.3
Copper	µg/L	1.0	2.0	40	<1.0
Iron	µg/L	10	700	55000	31
Manganese	µg/L	1.0	57	230	3.8
Nickel	µg/L	1.0	3.9	21	<1.0
Lead	µg/L	1.0	<1.0	20	<1.0
Selenium	µg/L	1.0	<1.0	<1.0	<1.0
Zinc	µg/L	1.0	5.0	24	<1.0

Dissolved Low Level Metals (Water)

Envirolab ID	Units	PQL	PFF0291-01	PFF0291-02	PFF0291-03
Your Reference			Pit 1	Pit 2	Field Blank
Date Sampled			02/06/2024	02/06/2024	02/06/2024
Aluminium	µg/L	10	<10	13	<10
Cadmium	µg/L	0.10	<0.10	<0.10	<0.10
Chromium	µg/L	1.0	<1.0	3.1	<1.0
Copper	µg/L	1.0	<1.0	<1.0	<1.0
Iron	µg/L	10	<10	11	<10
Manganese	µg/L	1.0	6.4	<1.0	<1.0
Nickel	µg/L	1.0	3.0	<1.0	<1.0
Lead	µg/L	1.0	<1.0	<1.0	<1.0
Selenium	µg/L	1.0	<1.0	<1.0	<1.0
Zinc	µg/L	1.0	<1.0	<1.0	<1.0

Inorganics - Physical Parameters (Water)

Envirolab ID	Units	PQL	PFF0291-01	PFF0291-02	PFF0291-03
Your Reference			Pit 1	Pit 2	Field Blank
Date Sampled			02/06/2024	02/06/2024	02/06/2024
Total Dissolved Solids	mg/L	5.0	570	450 [1]	<5.0

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Inorganics - Physical Parameters (Water) - Analysed By Envirolab Services Sydney

Envirolab ID	Units	PQL	PFF0291-01	PFF0291-02	PFF0291-03
Your Reference			Pit 1	Pit 2	Field Blank
Date Sampled			02/06/2024	02/06/2024	02/06/2024
Volatile Fatty Acids*	mg/L	5.0	47	5.6	<5.0

Inorganics - Ionic Balance and Indexes (Water)

Envirolab ID	Units	PQL	PFF0291-01	PFF0291-02	PFF0291-03
Your Reference			Pit 1	Pit 2	Field Blank
Date Sampled			02/06/2024	02/06/2024	02/06/2024
Bicarbonate Alkalinity as CaCO3	mg/L as CaCO3	5.0	260	69	<5.0
Carbonate Alkalinity as CaCO3	mg/L as CaCO3	5.0	7.0	<5.0	<5.0
Hydroxide OH- as CaCO3	mg/L as CaCO3	5.0	<5.0	<5.0	<5.0
Total Alkalinity as CaCO3	mg/L as CaCO3	5.0	270	69	<5.0
Chloride	mg/L	1.0	84	2.7	<1.0
Sulfate	mg/L	1.0	98	<1.0	<1.0
Calcium	mg/L	0.50	34	4.9	<0.50
Magnesium	mg/L	0.50	60	2.7	<0.50
Potassium	mg/L	0.50	21	9.0	<0.50
Sodium	mg/L	0.50	40	17	<0.50
Hardness (calc) equivalent CaCO3	mg/L	3.0	330	23	<3.0
Ionic Balance	%		-4.6	-1.5	-99
Total Anions	mg/L	7.0	450	71	<7.0
Anions as meq	meq/L	0.59	8.9	1.2	<0.59
Total Cations	mg/L	2.0	160	33	<2.0
Cations as meq	meq/L	0.10	9.0	1.4	<0.10

Inorganics - Carbon, Nitrogen and Sulfur Species (Water)

Envirolab ID	Units	PQL	PFF0291-01	PFF0291-02	PFF0291-03
Your Reference			Pit 1	Pit 2	Field Blank
Date Sampled			02/06/2024	02/06/2024	02/06/2024
Total Organic Carbon	mg/L	1.0	23	4.0	1.0

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Inorganics - Speciated Cr (III/VI) and Fe (II/III) (Water)

Envirolab ID	Units	PQL	PFF0291-01	PFF0291-02	PFF0291-03
Your Reference			Pit 1	Pit 2	Field Blank
Date Sampled			02/06/2024	02/06/2024	02/06/2024
Hexavalent Chromium	mg/L	0.0050	<0.0050	<0.0050	<0.0050
Hexavalent Chromium (Total)	mg/L	0.0050	<0.0050	<0.0050	<0.0050
Trivalent Chromium	mg/L	0.0050	<0.0050	<0.0050	<0.0050
Trivalent Chromium (Total)	mg/L	0.0050	<0.0050	0.063	0.0053

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Inorganics - Nutrients (Water)

Envirolab ID	Units	PQL	PFF0291-01	PFF0291-02	PFF0291-03
Your Reference			Pit 1	Pit 2	Field Blank
Date Sampled			02/06/2024	02/06/2024	02/06/2024
Total Nitrogen	mg/L	0.10	4.0	1.6	<0.10
Total Phosphorus	mg/L	0.010	0.13	0.021	<0.010

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Inorganics - Common Wastewater Parameters (Water)

Envirolab ID	Units	PQL	PFF0291-01	PFF0291-02	PFF0291-03
Your Reference			Pit 1	Pit 2	Field Blank
Date Sampled			02/06/2024	02/06/2024	02/06/2024
COD	mg O2/L	20	69	57	<20

PFAS Extended List (Water) - Analysed By Envirolab Services Sydney

Envirolab ID	Units	PQL	PFF0291-01	PFF0291-02	PFF0291-03
Your Reference			Pit 1	Pit 2	Field Blank
Date Sampled			02/06/2024	02/06/2024	02/06/2024
Perfluorobutanesulfonic acid (PFBS)	µg/L	0.010	0.25	<0.010	<0.010
Perfluoropentanesulfonic acid (PFPeS)	µg/L	0.010	0.088	<0.010	<0.010
Perfluorohexanesulfonic acid (PFHxS)	µg/L	0.010	0.53	<0.010	<0.010
Perfluoroheptanesulfonic acid (PFHpS)	µg/L	0.010	0.030	<0.010	<0.010
Perfluorooctanesulfonic acid (PFOS)	µg/L	0.010	0.78	<0.010	<0.010
Perfluorodecanesulfonic acid (PFDS)	µg/L	0.020	<0.020	<0.020	<0.020
Perfluorobutanoic acid (PFBA)	µg/L	0.020	0.13	<0.020	<0.020
Perfluoropentanoic acid (PFPeA)	µg/L	0.020	0.35	<0.020	<0.020
Perfluorohexanoic acid (PFHxA)	µg/L	0.010	0.46	<0.010	<0.010
Perfluoroheptanoic acid (PFHpA)	µg/L	0.010	0.19	<0.010	<0.010
Perfluorooctanoic acid (PFOA)	µg/L	0.010	0.29	<0.010	<0.010
Perfluorononanoic acid (PFNA)	µg/L	0.010	0.020	<0.010	<0.010
Perfluorodecanoic acid (PFDA)	µg/L	0.020	<0.020	<0.020	<0.020
Perfluoroundecanoic acid (PFUnDA)	µg/L	0.020	<0.020	<0.020	<0.020
Perfluorododecanoic acid (PFDoDA)	µg/L	0.050	<0.050	<0.050	<0.050
Perfluorotridecanoic acid (PFTrDA)	µg/L	0.10	<0.10	<0.10	<0.10
Perfluorotetradecanoic acid (PFTeDA)	µg/L	0.50	<0.50	<0.50	<0.50
4:2 Fluorotelomer sulfonic acid (4:2 FTS)	µg/L	0.010	<0.010	<0.010	<0.010
6:2 Fluorotelomer sulfonic acid (6:2 FTS)	µg/L	0.010	<0.010	<0.010	<0.010
8:2 Fluorotelomer sulfonic acid (8:2 FTS)	µg/L	0.020	<0.020	<0.020	<0.020
10:2 Fluorotelomer sulfonic acid (10:2 FTS)	µg/L	0.020	<0.020	<0.020	<0.020
Perfluorooctane sulfonamide (FOSA)	µg/L	0.10	<0.10	<0.10	<0.10
N-Methyl perfluorooctane sulfonamide (MeFOSA)	µg/L	0.050	<0.050	<0.050	<0.050
N-Ethyl perfluorooctane sulfonamide (EtFOSA)	µg/L	0.10	<0.10	<0.10	<0.10
N-Methyl perfluorooctane sulfonamidoethanol	µg/L	0.050	<0.050	<0.050	<0.050
N-Ethyl perfluorooctane sulfonamidoethanol	µg/L	0.50	<0.50	<0.50	<0.50
N-Methyl perfluorooctane sulfonamidoacetic acid	µg/L	0.020	<0.020	<0.020	<0.020
N-Ethyl perfluorooctane sulfonamidoacetic acid	µg/L	0.020	<0.020	<0.020	<0.020
Surrogate 13C8 PFOS	%		*99.9*	*102*	*100*
Surrogate 13C2 PFOA	%		*93.8*	*99.1*	*98.4*
Total +ve PFHxS+PFOS	µg/L	0.010	1.3	<0.010	<0.010
Total +ve PFOA+PFOS	µg/L	0.010	1.1	<0.010	<0.010
Total +ve PFAS	µg/L	0.010	3.1	<0.010	<0.010
Extraction Internal Standard 13C3 PFBS	%		*105*	*104*	*102*
Extraction Internal Standard 18O2 PFHxS	%		*98.2*	*103*	*98.4*
Extraction Internal Standard 13C4 PFOS	%		*108*	*102*	*103*
Extraction Internal Standard 13C4 PFBA	%		*92.0*	*105*	*104*
Extraction Internal Standard 13C3 PFPeA	%		*106*	*105*	*102*
Extraction Internal Standard 13C2 PFHxA	%		*104*	*104*	*103*
Extraction Internal Standard 13C4 PFHpA	%		*112*	*109*	*108*
Extraction Internal Standard 13C4 PFOA	%		*121*	*112*	*109*
Extraction Internal Standard 13C5 PFNA	%		*130*	*128*	*123*
Extraction Internal Standard 13C2 PFDA	%		*131*	*124*	*118*

PFAS Extended List (Water) - Analysed By Envirolab Services Sydney

Envirolab ID	Units	PQL	PFF0291-01	PFF0291-02	PFF0291-03
Your Reference			Pit 1	Pit 2	Field Blank
Date Sampled			02/06/2024	02/06/2024	02/06/2024
Extraction Internal Standard 13C2 PFUnDA	%		*132*	*132*	*122*
Extraction Internal Standard 13C2 PFDoDA	%		*138*	*133*	*127*
Extraction Internal Standard 13C2 PFTeDA	%		*131*	*123*	*120*
Extraction Internal Standard 13C2 4:2FTS	%		*101*	*85.8*	*82.3*
Extraction Internal Standard 13C2 6:2FTS	%		*104*	*95.9*	*91.1*
Extraction Internal Standard 13C2 8:2FTS	%		*131*	*127*	*110*
Extraction Internal Standard 13C8 FOSA	%		*111*	*110*	*111*
Extraction Internal Standard d3 N MeFOSA	%		*107*	*107*	*105*
Extraction Internal Standard d5 N EtFOSA	%		*109*	*109*	*108*
Extraction Internal Standard d7 N MeFOSE	%		*99.9*	*100*	*98.5*
Extraction Internal Standard d9 N EtFOSE	%		*104*	*104*	*101*
Extraction Internal Standard d3 N MeFOSAA	%		*117*	*111*	*113*
Extraction Internal Standard d5 N EtFOSAA	%		*123*	*113*	*113*

Result Comments

Identifier	Description
[1]	Some EC to TDS ratios are outside normal expected values. Note that some solid material appears to have passed through the glass fibre filter paper(s).

Method Summary

Method ID	Methodology Summary
Calc	Calculation
INORG-006	Alkalinity - determined titrimetrically based on APHA latest edition 2320-B. Solids reported from a 1:5 water extract unless otherwise specified. Total Carbon Dioxide - determined by calculation in accordance with APHA latest edition,4500-CO2 D.
INORG-018	Total Dissolved Solids - determined gravimetrically. The solids are dried at 180±10°C. NOTE: Where the EC of the sample is <100µS/cm, the TDS will typically be below 70mg/L (as the sample is very likely to be at least drinking water quality). Therefore to ensure data quality for TDS, the TDS is typically calculated as per the equation: TDS = EC*0.6
INORG-040	The concentrations of the major ions (mg/L) are converted to milliequivalents and summed. The ionic balance should be within +/- 15% i.e. total anions = total cations +/-15%.
INORG-060_TP	Total Phosphorus - determined colourimetrically using APHA latest edition 4500-P J. Water samples are filtered on receipt prior to analysis. Soils are analysed from a water extract.
INORG-067	Samples are digested in acid with a known excess of potassium dichromate then the colour change is determined by discrete analyser or UV-VIS in accordance with APHA latest edition 5220 D.
INORG-079	Carbon forms (inorganic, organic, total) determined using a TOC/NDIR analyser via combustion. Dissolved aqueous\forms require filtering prior to determination.
INORG-081	Anions determined by Ion Chromatography. Waters samples are filtered on receipt prior to analysis. Solids are analysed from a water extract. Alternatively determined by colourimetry/turbidity using Discrete Analyser.
INORG-111	Volatile Fatty Acids determined by distillation and titration.
INORG-118	Hexavalent Chromium by Ion Chromatographic separation and colourimetric determination. Waters samples are filtered prior to analysis. Solids are extracted with an alkaline buffered solution, for air sampling media the same alkali extraction can be used or alternatives from NIOSH/OSHA. For aqueous samples, Total Hexavalent Chromium includes the dissolved Hexavalent Chromium and any Hexavalent Chromium solubilised by the preservative i.e. Sodium Hydroxide from any particulate that may be present.
INORG-127	Total Nitrogen by high temperature catalytic combustion with chemiluminescence detection. Organic Carbon forms (inorganic, organic, total) determined using a TOC/NDIR analyser via combustion. Dissolved forms require filtering prior to determination.
METALS-020	Determination of various metals by ICP-OES.
METALS-022	Determination of various metals by ICP-MS.Please note for Bromine and Iodine, any forms of these elements that are present are included together in the one result reported for each of these two elements.Salt forms and/or anion/cation forms (e.g. FeO, PbO, ZnO, BO3) are determined stoichiometrically from the base metal concentration.
ORG-020	Soil samples are extracted with Dichloromethane/Acetone and waters with Dichloromethane and analysed by GC-FID. F2 = (>C10-C16)-Naphthalene as per NEPM B1 Guideline on Investigation Levels for Soil and Groundwater (HSLs Tables 1A (3, 4)). Note Naphthalene is determined from the VOC analysis. Note, the Total +ve TRH PQL is reflective of the lowest individual PQL and is therefore "Total +ve TRH" is simply a sum of the positive individual TRH fractions (>C10-C40).
ORG-021/022/025_PCB	Soil samples are extracted with dichloromethane/acetone and waters with dichloromethane and analysed by GC-ECD and/or GC-MS/GC-MSMS.
ORG-022_PAH	Determination of semi-volatile organic compounds (SVOCs) by GC-MS. Water samples are extracted by LLE and solids using DCM/Acetone/Methanol. For PAHs:- Benzo(a)pyrene TEQ as per NEPM B1 Guideline on Investigation Levels for Soil and Groundwater - 2013. 1. 'TEQ PQL' values are assuming all contributing PAHs reported as <PQL are actually at the PQL. This is the most conservative approach and can give false positive TEQs given that PAHs that contribute to the TEQ calculation may not be present. 2. 'TEQ zero' values are assuming all contributing PAHs reported as <PQL are zero. This is the least conservative approach and is more susceptible to false negative TEQs when PAHs that contribute to the TEQ calculation are present but below PQL. 3. 'TEQ half PQL' values are assuming all contributing PAHs reported as <PQL are half the stipulated PQL. Hence a mid-point between the most and least conservative approaches above. Note, for Total +ve calculations, the PQL is reflective of the lowest individual PQL and therefore, for example, "Total +ve PAHs" is simply a sum of the positive individual PAHs.
ORG-023_F1_TOT	Determination of volatile organic compounds (VOCs) by P&T-GC-MS. Water samples are analysed directly by purge and trap GC-MS. Solids are extracted with Methanol, diluted and analysed by purge and trap GC-MS. F1 = (C6-C10)-BTEX as per NEPM B1 Guideline on Investigation Levels for Soil and Groundwater. Note, the Total +ve Xylene PQL is reflective of the lowest individual PQL and is therefore "Total +ve Xylenes" is simply a sum of the positive individual Xylenes.

Method Summary

Method ID	Methodology Summary
ORG-029	Soil/solid and sorbent samples are extracted with basified Methanol. Waters and soil/sorbent extracts are directly injected and/or concentrated/extracted using SPE. TCLP/ASLP leachates are centrifuged, the supernatant is then analysed (including amendment with solvent) - as per the option in AS4439.3. Analysis is undertaken with LC-MSMS. PFAS results include the sum of branched and linear isomers where applicable. Please note that PFAS results are corrected for Extracted Internal Standards (QSM 5.4 Table B-15 terminology), which are mass labelled analytes added prior to sample preparation to assess matrix effects and verify processing of the sample. PFAS analytes without a commercially available mass labelled analogue are corrected vs a closely eluting mass labelled PFAS compound. Surrogates are also reported, in this context they are mass labelled PFAS compounds added prior to extraction but are used as monitoring compounds only (not used for result correction). Envicarb (or similar) is used discretionally to remove interfering matrix components. Please contact the laboratory if estimates of Measurement Uncertainty are required as per WA DER.

Result Definitions

Identifier	Description
NR	Not reported
NEPM	National Environment Protection Measure
NS	Not specified
LCS	Laboratory Control Sample
RPD	Relative Percent Difference
>	Greater than
<	Less than
PQL	Practical Quantitation Limit
INS	Insufficient sample for this test
NA	Test not required
NT	Not tested
DOL	Samples rejected due to particulate overload (air filters only)
RFD	Samples rejected due to filter damage (air filters only)
RUD	Samples rejected due to uneven deposition (air filters only)
##	Indicates a laboratory acceptance criteria outlier, for further details, see Result Comments and/or QC Comments

Quality Control Definitions

Blank

This is the component of the analytical signal which is not derived from the sample but from reagents, glassware etc, and is determined by processing solvents and reagents in exactly the same manner as for samples.

Surrogate Spike

Surrogates are known additions to each sample, blank, matrix spike and LCS in a batch, of compounds which are similar to the analyte of interest, however are not expected to be found in real samples.

LCS (Laboratory Control Sample)

This comprises either a standard reference material or a control matrix (such as a blank sand or water) fortified with analytes representative of the analyte class. It is simply a check sample.

Matrix Spike

A portion of the sample is spiked with a known concentration of target analyte. The purpose of the matrix spike is to monitor the performance of the analytical method used and to determine whether matrix interferences exist.

Duplicate

This is the complete duplicate analysis of a sample from the process batch. The sample selected should be one where the analyte concentration is easily measurable.

Laboratory Acceptance Criteria

Duplicate sample and matrix spike recoveries may not be reported on smaller jobs, however, were analysed at a frequency to meet or exceed NEPM requirements. All samples are tested in batches of 20. The duplicate sample RPD and matrix spike recoveries for the batch were within the laboratory acceptance criteria. Filters, swabs, wipes, tubes and badges will not have duplicate data as the whole sample is generally extracted during sample extraction. Spikes for Physical and Aggregate Tests are not applicable. For VOCs in water samples, three vials are required for duplicate or spike analysis.

General Acceptance Criteria (GAC) - Analyte specific criteria applies for some analytes and is reflected in QC recovery tables.

Duplicates: >10xPQL - RPD acceptance criteria will vary depending on the analytes and the analytical techniques but is typically in the range 20%-50% - see ELN-P05 QAQC tables for details (available on request); <10xPQL - RPD are higher as the results approach PQL and the estimated measurement uncertainty will statistically increase. Matrix Spikes, LCS and Surrogate recoveries: Generally 70-130% for inorganics/metals; 60-140% for organics (+/-50% surrogates) and 10-140% for labile SVOCs (including labile surrogates), ultra trace organics and speciated phenols is acceptable.

In circumstances where no duplicate and/or sample spike has been reported at 1 in 10 and/or 1 in 20 samples respectively, the sample volume submitted was typically insufficient in order to satisfy laboratory QA/QC protocols.

Miscellaneous Information

When samples are received where certain analytes are outside of recommended technical holding times (THTs), the analysis has proceeded. Where analytes are on the verge of breaching THTs, every effort will be made to analyse within the THT or as soon as practicable.

Where sampling dates are not provided, Envirolab are not in a position to comment on the validity of the analysis where recommended technical holding times may have been breached. We have taken the sampling date as being the date received at the laboratory.

Two significant figures are reported for the majority of tests and with a high degree of confidence, for results <10*PQL, the second significant figure may be in doubt i.e. has a relatively high degree of uncertainty and is provided for information only.

Measurement Uncertainty estimates are available for most tests upon request.

Analysis of aqueous samples typically involves the extraction/digestion and/or analysis of the liquid phase only (i.e. NOT any settled sediment phase but inclusive of suspended particles if present), unless stipulated on the Envirolab COC or by correspondence. Notable exceptions include certain Physical Tests (pH/EC/BOD/COD/Apparent Colour etc.), Solids testing, Total Recoverable metals and PFAS where sediment/solids are included by default.

Urine Analysis - The BEI values listed are taken from the 2022 edition of *TLVs and BEIs Threshold Limits by ACGIH*.

Air volume measurements are not covered by Envirolab's NATA accreditation.

Data Quality Assessment Summary PFF0291

Client Details

Client	Katherine Town Council - NT
Your Reference	Katherine Town Council - WMS Dams
Date Issued	14/06/2024

Recommended Holding Time Compliance

No recommended holding time exceedances

Quality Control and QC Frequency

QC Type	Compliant	Details
Blank	Yes	No Outliers
LCS	Yes	No Outliers
Duplicates	No	Duplicate Outliers Exist - See detailed list below
Matrix Spike	No	Matrix Spike Outliers Exist - See detailed list below
Surrogates / Extracted Internal Standards	Yes	No Outliers
QC Frequency	No	QC Frequency Outliers Exist - See detailed list below

Surrogates/Extracted Internal Standards, Duplicates and/or Matrix Spikes are not always relevant/applicable to certain analyses and matrices. Therefore, said QC measures are deemed compliant in these situations by default. See Laboratory Acceptance Criteria for more information

Data Quality Assessment Summary PFF0291

Recommended Holding Time Compliance

Analysis	Sample Number(s)	Date Sampled	Date Extracted	Date Analysed	Compliant
vTRH&MBTEXN | Water	1-3	02/06/2024	07/06/2024	07/06/2024	Yes
sTRH | Water	1-3	02/06/2024	07/06/2024	08/06/2024	Yes
PAH | Water	1-3	02/06/2024	07/06/2024	08/06/2024	Yes
PCB | Water	1-3	02/06/2024	07/06/2024	08/06/2024	Yes
Total Metals (LL) | Water	1-3	02/06/2024	07/06/2024	12/06/2024	Yes
Dissolved Metals (LL) | Water	1-3	02/06/2024	07/06/2024	12/06/2024	Yes
TDS | Water	1-3	02/06/2024	07/06/2024	10/06/2024	Yes
VFA | Water	1-3	02/06/2024	11/06/2024	13/06/2024	Yes
Alkalinity Suite | Water	1-3	02/06/2024	07/06/2024	07/06/2024	Yes
Chloride | Water	1-3	02/06/2024	07/06/2024	10/06/2024	Yes
Dissolved Cations | Water	1-3	02/06/2024	07/06/2024	07/06/2024	Yes
Ion Balance | Water	1-3	02/06/2024	10/06/2024	12/06/2024	Yes
Sulfate | Water	1-3	02/06/2024	07/06/2024	10/06/2024	Yes
Total Organic Carbon | Water	1-3	02/06/2024	11/06/2024	11/06/2024	Yes
Cr6+ | Water	1-3	02/06/2024	10/06/2024	10/06/2024	Yes
Cr6+ - Total | Water	1-3	02/06/2024	10/06/2024	12/06/2024	Yes
Nitrogen - Total N | Water	1-3	02/06/2024	10/06/2024	11/06/2024	Yes
Total Phosphorus | Water	1-3	02/06/2024	06/06/2024	07/06/2024	Yes
COD | Water	1-3	02/06/2024	07/06/2024	07/06/2024	Yes
PFAS EXT-ISTD | Water	1-3	02/06/2024	07/06/2024	08/06/2024	Yes
PFAS-Extended | Water	1-3	02/06/2024	07/06/2024	08/06/2024	Yes

Outliers: Duplicates

ORG-020|Semi-volatile TRH (Water)| Batch BFF0841

Sample ID	Duplicate ID	Analyte	% Limits	RPD
BFF0841-DUP1#	DUP1	TRH >C34-C40 (F4)	50.00	200[4]

Outliers: Matrix Spike

METALS-022|Dissolved Low Level Metals (Water)| Batch BFF0794

Sample ID	Analyte	% Limits	% Recovery
BFF0794-MS1#	Aluminium	70 - 130	##[3]
BFF0794-MS1#	Iron	70 - 130	##[2]

Data Quality Assessment Summary PFF0291

Outliers: QC Frequency

INORG-111|Inorganics - Physical Parameters (Water)| Batch BFF1428

Analysis	QC Type	Expected	Reported
VFA	Duplicate	1	0

ORG-023_F1_TOT|Volatile TRH and BTEX (Water)| Batch BFF0984

Analysis	QC Type	Expected	Reported
vTRH&MBTEXN	Duplicate	2	0
	Matrix Spike	1	0

Quality Control PFF0291

ORG-023_F1_TOT|Volatile TRH and BTEX (Water) | Batch BFF0984

Analyte	Units	PQL	Blank	LCS %
TRH C6-C9	µg/L	10	<10	99.2
TRH C6-C10	µg/L	10	<10	98.4
TRH C6-C10 less BTEX (F1)	µg/L	10	<10	[NA]
Methyl tert butyl ether (MTBE)	µg/L	1.0	<1.0	[NA]
Benzene	µg/L	1.0	<1.0	111
Toluene	µg/L	1.0	<1.0	104
Ethylbenzene	µg/L	1.0	<1.0	99.6
meta+para Xylene	µg/L	2.0	<2.0	100
ortho-Xylene	µg/L	1.0	<1.0	96.3
Total Xylene	µg/L	3.0	<3.0	[NA]
Naphthalene (value used in F2 calc)	µg/L	1.0	<1.0	[NA]
Surrogate Dibromofluoromethane	*%*		*101*	*101*
Surrogate Toluene-D8	*%*		*104*	*107*
Surrogate 4-Bromofluorobenzene	*%*		*104*	*111*

ORG-020|Semi-volatile TRH (Water) | Batch BFF0841

Analyte	Units	PQL	Blank	DUP1 BFF0841-DUP1# Samp | QC | RPD %	DUP2 PFF0291-01 Samp | QC | RPD %	LCS %	Spike % PFF0291-02
TRH C10-C14	µg/L	50	<50	1720 | 1340 | 24.7	<50 | <50 | [NA]	99.1	78.9
TRH C15-C28	µg/L	100	<100	<100 | <100 | [NA]	167 | 150 | 10.6	109	84.6
TRH C29-C36	µg/L	100	<100	<100 | <100 | [NA] [4]	<100 | <100 | [NA]	108	100
TRH >C10-C16	µg/L	50	<50	1760 | 1370 | 24.7	<50 | <50 | [NA]	103	81.3
TRH >C16-C34 (F3)	µg/L	100	<100	<100 | <100 | [NA]	208 | 189 | 9.56	110	86.7
TRH >C34-C40 (F4)	µg/L	100	<100	<100 | <100 | 200 [4]	<100 | <100 | [NA]	104	86.8
Surrogate o-Terphenyl	*%*		*106*	*106 | 89.9*	*73.8 | 88.7*	*116*	*85.7*

The QC reported was not specifically part of this workorder but formed part of the QC process batch.

ORG-022_PAH|Polycyclic Aromatic Hydrocarbons (Water) | Batch BFF0841

Analyte	Units	PQL	Blank	DUP1 BFF0841-DUP1# Samp | QC | RPD %	DUP2 PFF0291-01 Samp | QC | RPD %	LCS %	Spike % PFF0291-03
Naphthalene	µg/L	0.10	<0.10	<0.10 | <0.10 | [NA]	<0.10 | <0.10 | [NA]	96.3	94.2
Acenaphthylene	µg/L	0.10	<0.10	<0.10 | <0.10 | [NA]	<0.10 | <0.10 | [NA]	[NA]	[NA]
Acenaphthene	µg/L	0.10	<0.10	<0.10 | <0.10 | [NA]	<0.10 | <0.10 | [NA]	93.1	91.9
Fluorene	µg/L	0.10	<0.10	<0.10 | <0.10 | [NA]	<0.10 | <0.10 | [NA]	95.9	95.3
Phenanthrene	µg/L	0.10	<0.10	<0.10 | <0.10 | [NA]	<0.10 | <0.10 | [NA]	96.6	95.1
Anthracene	µg/L	0.10	<0.10	<0.10 | <0.10 | [NA]	<0.10 | <0.10 | [NA]	[NA]	[NA]
Fluoranthene	µg/L	0.10	<0.10	<0.10 | <0.10 | [NA]	<0.10 | <0.10 | [NA]	99.4	98.7
Pyrene	µg/L	0.10	<0.10	<0.10 | <0.10 | [NA]	<0.10 | <0.10 | [NA]	99.5	98.2
Benzo(a)anthracene	µg/L	0.10	<0.10	<0.10 | <0.10 | [NA]	<0.10 | <0.10 | [NA]	[NA]	[NA]
Chrysene	µg/L	0.10	<0.10	<0.10 | <0.10 | [NA]	<0.10 | <0.10 | [NA]	87.7	87.7
Benzo(b,j,k)fluoranthene	µg/L	0.20	<0.20	<0.20 | <0.20 | [NA]	<0.20 | <0.20 | [NA]	[NA]	[NA]
Benzo(a)pyrene	µg/L	0.10	<0.10	<0.10 | <0.10 | [NA]	<0.10 | <0.10 | [NA]	83.9	92.2
Indeno(1,2,3-c,d)pyrene	µg/L	0.10	<0.10	<0.10 | <0.10 | [NA]	<0.10 | <0.10 | [NA]	[NA]	[NA]
Dibenzo(a,h)anthracene	µg/L	0.10	<0.10	<0.10 | <0.10 | [NA]	<0.10 | <0.10 | [NA]	[NA]	[NA]
Benzo(g,h,i)perylene	µg/L	0.10	<0.10	<0.10 | <0.10 | [NA]	<0.10 | <0.10 | [NA]	[NA]	[NA]
Surrogate p-Terphenyl-D14	*%*		*108*	*115 | 113*	*73.9 | 79.8*	*107*	*101*

The QC reported was not specifically part of this workorder but formed part of the QC process batch.

Quality Control PFF0291

ORG-021/022/025_PCB | Polychlorinated Biphenyls (Water) | Batch BFF0841

Analyte	Units	PQL	Blank	DUP1 BFF0841-DUP1# Samp | QC | RPD %	DUP2 PFF0291-01 Samp | QC | RPD %	LCS %	Spike % PFF0291-03
Aroclor 1016	µg/L	2.0	<2.0	<2.0 | <2.0 | [NA]	<2.0 | <2.0 | [NA]	[NA]	[NA]
Aroclor 1221	µg/L	2.0	<2.0	<2.0 | <2.0 | [NA]	<2.0 | <2.0 | [NA]	[NA]	[NA]
Aroclor 1232	µg/L	2.0	<2.0	<2.0 | <2.0 | [NA]	<2.0 | <2.0 | [NA]	[NA]	[NA]
Aroclor 1242	µg/L	2.0	<2.0	<2.0 | <2.0 | [NA]	<2.0 | <2.0 | [NA]	[NA]	[NA]
Aroclor 1248	µg/L	2.0	<2.0	<2.0 | <2.0 | [NA]	<2.0 | <2.0 | [NA]	[NA]	[NA]
Aroclor 1254	µg/L	2.0	<2.0	<2.0 | <2.0 | [NA]	<2.0 | <2.0 | [NA]	[NA]	[NA]
Aroclor 1260	µg/L	2.0	<2.0	<2.0 | <2.0 | [NA]	<2.0 | <2.0 | [NA]	[NA]	[NA]
PCB C103	µg/L			0.00 | 0.00 | [NA]	0.00 | 0.00 | [NA]	95.8	101
Surrogate 2-Fluorobiphenyl	*%*		*98.5*	*108 | 105*	*65.5 | 86.2*	*108*	*95.2*

The QC reported was not specifically part of this workorder but formed part of the QC process batch.

METALS-022 | Acid Extractable Low Level Metals (Water) | Batch BFF0803

Analyte	Units	PQL	Blank	DUP1 BFF0803-DUP1# Samp | QC | RPD %	DUP2 PFF0291-01 Samp | QC | RPD %	LCS %	Spike % BFF0803-MS1#
Aluminium	µg/L	10	<10	<10 | <10 | [NA]	458 | 443 | 3.23	101	116
Cadmium	µg/L	0.10	<0.10	<0.10 | <0.10 | [NA]	<0.10 | <0.10 | [NA]	113	110
Chromium	µg/L	1.0	<1.0	<1.0 | <1.0 | [NA]	1.02 | 1.00 | 1.39	110	107
Copper	µg/L	1.0	<1.0	8.35 | 8.35 | 0.0240	2.05 | 2.09 | 1.98	114	109
Iron	µg/L	10	<10	<10 | <10 | [NA]	703 | 683 | 2.86	113	129
Lead	µg/L	1.0	<1.0	<1.0 | <1.0 | [NA]	<1.0 | <1.0 | [NA]	101	97.9
Manganese	µg/L	1.0	<1.0	<1.0 | <1.0 | [NA]	57.4 | 57.5 | 0.308	103	99.2
Nickel	µg/L	1.0	<1.0	<1.0 | <1.0 | [NA]	3.90 | 3.98 | 1.93	111	108
Selenium	µg/L	1.0	<1.0	<1.0 | <1.0 | [NA]	<1.0 | <1.0 | [NA]	116	111
Zinc	µg/L	1.0	<1.0	4.76 | 5.76 | 18.9	5.02 | 4.82 | 3.99	108	103

The QC reported was not specifically part of this workorder but formed part of the QC process batch.

METALS-022 | Dissolved Low Level Metals (Water) | Batch BFF0794

Analyte	Units	PQL	Blank	DUP1 BFF0794-DUP1# Samp | QC | RPD %	DUP2 BFF0794-DUP2# Samp | QC | RPD %	LCS %	Spike % BFF0794-MS1#
Aluminium	µg/L	10	<10	29.8 | 31.3 | 4.61	<10 | <10 | [NA]	108	##[3]
Cadmium	µg/L	0.10	<0.10	<0.10 | <0.10 | [NA]	<0.10 | <0.10 | [NA]	107	108
Chromium	µg/L	1.0	<1.0	<1.0 | <1.0 | [NA]	<1.0 | <1.0 | [NA]	103	107
Copper	µg/L	1.0	<1.0	3.16 | 3.09 | 2.27	<1.0 | <1.0 | [NA]	104	107
Iron	µg/L	10	<10	130 | 128 | 1.13	11.7 | 11.7 | 0.0943	110	##[2]
Lead	µg/L	1.0	<1.0	<1.0 | <1.0 | [NA]	<1.0 | <1.0 | [NA]	101	101
Manganese	µg/L	1.0	<1.0	12.1 | 11.9 | 2.03	7.24 | 7.25 | 0.207	103	108
Nickel	µg/L	1.0	<1.0	<1.0 | <1.0 | [NA]	<1.0 | <1.0 | [NA]	105	106
Selenium	µg/L	1.0	<1.0	<1.0 | <1.0 | [NA]	<1.0 | <1.0 | [NA]	107	110
Zinc	µg/L	1.0	<1.0	56.4 | 55.9 | 0.884	1.72 | 2.04 | 17.4	104	114

The QC reported was not specifically part of this workorder but formed part of the QC process batch.

INORG-018 | Inorganics - Physical Parameters (Water) | Batch BFF1009

Analyte	Units	PQL	Blank	DUP1 PFF0291-01 Samp | QC | RPD %	DUP2 BFF1009-DUP2# Samp | QC | RPD %	LCS %
Total Dissolved Solids	mg/L	5.0	<5.0	567 | 567 | 0.00	1400 | 1390 | 1.15	109

The QC reported was not specifically part of this workorder but formed part of the QC process batch.

INORG-111 | Inorganics - Physical Parameters (Water) | Batch BFF1428

Analyte	Units	PQL	Blank	LCS %
Volatile Fatty Acids	mg/L	5.0	<5.0	88.7

Quality Control PFF0291

METALS-020|Inorganics - Ionic Balance and Indexes (Water) | Batch BFF0796

Analyte	Units	PQL	Blank	DUP1 BFF0796-DUP1# Samp | QC | RPD %	DUP2 BFF0796-DUP2# Samp | QC | RPD %	LCS %	Spike % BFF0796-MS1#
Calcium	mg/L	0.50	<0.50	9.35 | 9.63 | 2.92	147 | 146 | 0.484	101	91.0
Magnesium	mg/L	0.50	<0.50	2.83 | 2.90 | 2.38	19.9 | 19.9 | 0.0703	101	93.5
Potassium	mg/L	0.50	<0.50	15.5 | 15.4 | 0.291	6.87 | 6.87 | 0.0218	104	97.8
Sodium	mg/L	0.50	<0.50	12.7 | 13.0 | 1.90	20.6 | 20.6 | 0.286	99.8	94.4
Hardness (calc) equivalent CaCO3	mg/L	3.0	<3.0	35.0 | 36.0 | 2.74	449 | 447 | 0.409	[NA]	[NA]

The QC reported was not specifically part of this workorder but formed part of the QC process batch.

INORG-006|Inorganics - Ionic Balance and Indexes (Water) | Batch BFF0858

Analyte	Units	PQL	Blank	DUP1 BFF0858-DUP1# Samp | QC | RPD %	DUP2 BFF0858-DUP2# Samp | QC | RPD %	LCS %
Bicarbonate Alkalinity as CaCO3	mg/L as CaCO3	5.0	<5.0	633 | 631 | 0.364	47.4 | 47.8 | 0.840	[NA]
Carbonate Alkalinity as CaCO3	mg/L as CaCO3	5.0	<5.0	<5.0 | <5.0 | [NA]	9.90 | 10.2 | 2.99	[NA]
Hydroxide OH- as CaCO3	mg/L as CaCO3	5.0	<5.0	<5.0 | <5.0 | [NA]	<5.0 | <5.0 | [NA]	[NA]
Total Alkalinity as CaCO3	mg/L as CaCO3	5.0	<5.0	633 | 631 | 0.364	57.3 | 58.0 | 1.21	102

Analyte	Units	PQL	Blank	LCS %
Total Alkalinity as CaCO3	mg/L as CaCO3	5		109

The QC reported was not specifically part of this workorder but formed part of the QC process batch.

INORG-081|Inorganics - Ionic Balance and Indexes (Water) | Batch BFF1029

Analyte	Units	PQL	Blank	DUP1 PFF0291-01 Samp | QC | RPD %	DUP2 BFF1029-DUP2# Samp | QC | RPD %	LCS %	Spike % PFF0291-02
Chloride	mg/L	1.0	<1.0	83.8 | 84.0 | 0.162	25.3 | 25.4 | 0.303	112	106
Sulfate	mg/L	1.0	<1.0	98.2 | 98.3 | 0.0283	363 | 364 | 0.109	105	105

The QC reported was not specifically part of this workorder but formed part of the QC process batch.

INORG-079|Inorganics - Carbon, Nitrogen and Sulfur Species (Water) | Batch BFF1303

Analyte	Units	PQL	Blank	DUP1 PFF0291-01 Samp | QC | RPD %	LCS %	Spike % PFF0291-02
Total Organic Carbon	mg/L	1.0	<1.0	22.7 | 20.3 | 11.2	94.0	100

INORG-118|Inorganics - Speciated Cr (III/VI) and Fe (II/III) (Water) | Batch BFF1063

Analyte	Units	PQL	Blank	DUP1 BFF1063-DUP1# Samp | QC | RPD %	DUP2 BFF1063-DUP2# Samp | QC | RPD %	LCS %	Spike % BFF1063-MS1#
Hexavalent Chromium	mg/L	0.0050	<0.0050	<0.0050 | <0.0050 | [NA]	<0.0050 | <0.0050 | [NA]	99.4	109

The QC reported was not specifically part of this workorder but formed part of the QC process batch.

INORG-118|Inorganics - Speciated Cr (III/VI) and Fe (II/III) (Water) | Batch BFF1066

Analyte	Units	PQL	Blank	DUP1 PFF0291-01 Samp | QC | RPD %	DUP2 BFF1066-DUP2# Samp | QC | RPD %	LCS %	Spike % PFF0291-02
Hexavalent Chromium (Total)	mg/L	0.0050	<0.0050	<0.0050 | <0.0050 | [NA]	<0.0050 | <0.0050 | [NA]	94.9	107

The QC reported was not specifically part of this workorder but formed part of the QC process batch.

Quality Control PFF0291

INORG-060_TP | Inorganics - Nutrients (Water) | Batch BFF0559

Analyte	Units	PQL	Blank	DUP1 BFF0559-DUP1# Samp | QC | RPD %	LCS %	Spike % BFF0559-MS1#
Total Phosphorus	mg/L	0.010	<0.010	0.0110 | 0.0105 | 5.10	98.7	101

The QC reported was not specifically part of this workorder but formed part of the QC process batch.

INORG-127 | Inorganics - Nutrients (Water) | Batch BFF1151

Analyte	Units	PQL	Blank	DUP1 PFF0291-01 Samp | QC | RPD %	DUP2 BFF1151-DUP2# Samp | QC | RPD %	LCS %	Spike % PFF0291-02
Total Nitrogen	mg/L	0.10	<0.10	3.97 | 3.55 | 11.1	3.85 | 3.75 | 2.73	104	90.5

The QC reported was not specifically part of this workorder but formed part of the QC process batch.

INORG-067 | Inorganics - Common Wastewater Parameters (Water) | Batch BFF0887

Analyte	Units	PQL	Blank	DUP1 BFF0887-DUP1# Samp | QC | RPD %	DUP2 PFF0291-01 Samp | QC | RPD %	LCS %
COD	mg O2/L	20	<20	28.0 | 28.0 | 0.00	69.0 | 68.0 | 1.46	104

The QC reported was not specifically part of this workorder but formed part of the QC process batch.

Quality Control PFF0291

ORG-029|PFAS Extended List (Water) | Batch BFF1387

Analyte	Units	PQL	Blank	DUP1 PFF0291-01 Samp | QC | RPD %	LCS %	Spike % PFF0291-02
Perfluorobutanesulfonic acid (PFBS)	µg/L	0.010	<0.010	0.254 | 0.244 | 4.02	95.8	98.7
Perfluoropentanesulfonic acid (PFPeS)	µg/L	0.010	<0.010	0.0882 | 0.0774 | 13.0	98.0	99.1
Perfluorohexanesulfonic acid (PFHxS)	µg/L	0.010	<0.010	0.528 | 0.523 | 0.875	98.2	100
Perfluoroheptanesulfonic acid (PFHpS)	µg/L	0.010	<0.010	0.0304 | 0.0250 | 19.5	101	104
Perfluorooctanesulfonic acid (PFOS)	µg/L	0.010	<0.010	0.783 | 0.781 | 0.205	98.5	101
Perfluorodecanesulfonic acid (PFDS)	µg/L	0.020	<0.020	<0.020 | <0.020 | [NA]	115	108
Perfluorobutanoic acid (PFBA)	µg/L	0.020	<0.020	0.135 | 0.122 | 10.1	97.0	101
Perfluoropentanoic acid (PFPeA)	µg/L	0.020	<0.020	0.347 | 0.352 | 1.26	96.8	100
Perfluorohexanoic acid (PFHxA)	µg/L	0.010	<0.010	0.458 | 0.459 | 0.262	98.8	99.1
Perfluoroheptanoic acid (PFHpA)	µg/L	0.010	<0.010	0.192 | 0.196 | 2.27	94.5	99.6
Perfluorooctanoic acid (PFOA)	µg/L	0.010	<0.010	0.287 | 0.284 | 1.12	98.2	103
Perfluorononanoic acid (PFNA)	µg/L	0.010	<0.010	0.0198 | 0.0190 | 4.12	99.9	100
Perfluorodecanoic acid (PFDA)	µg/L	0.020	<0.020	<0.020 | <0.020 | [NA]	104	101
Perfluoroundecanoic acid (PFUnDA)	µg/L	0.020	<0.020	<0.020 | <0.020 | [NA]	98.6	98.5
Perfluorododecanoic acid (PFDoDA)	µg/L	0.050	<0.050	<0.050 | <0.050 | [NA]	92.3	104
Perfluorotridecanoic acid (PFTrDA)	µg/L	0.10	<0.10	<0.10 | <0.10 | [NA]	93.1	99.9
Perfluorotetradecanoic acid (PFTeDA)	µg/L	0.50	<0.50	<0.50 | <0.50 | [NA]	97.1	99.4
4:2 Fluorotelomer sulfonic acid (4:2 FTS)	µg/L	0.010	<0.010	<0.010 | <0.010 | [NA]	92.1	95.6
6:2 Fluorotelomer sulfonic acid (6:2 FTS)	µg/L	0.010	<0.010	<0.010 | <0.010 | [NA]	101	107
8:2 Fluorotelomer sulfonic acid (8:2 FTS)	µg/L	0.020	<0.020	<0.020 | <0.020 | [NA]	95.5	102
10:2 Fluorotelomer sulfonic acid (10:2 FTS)	µg/L	0.020	<0.020	<0.020 | <0.020 | [NA]	96.0	109
Perfluorooctane sulfonamide (FOSA)	µg/L	0.10	<0.10	<0.10 | <0.10 | [NA]	102	107
N-Methyl perfluorooctane sulfonamide (MeFOSA)	µg/L	0.050	<0.050	<0.050 | <0.050 | [NA]	98.9	102
N-Ethyl perfluorooctane sulfonamide (EtFOSA)	µg/L	0.10	<0.10	<0.10 | <0.10 | [NA]	95.2	99.1
N-Methyl perfluorooctane sulfonamidoethanol	µg/L	0.050	<0.050	<0.050 | <0.050 | [NA]	113	114
N-Ethyl perfluorooctane sulfonamidoethanol	µg/L	0.50	<0.50	<0.50 | <0.50 | [NA]	104	105
N-Methyl perfluorooctane sulfonamidoacetic acid	µg/L	0.020	<0.020	<0.020 | <0.020 | [NA]	102	99.6
N-Ethyl perfluorooctane sulfonamidoacetic acid	µg/L	0.020	<0.020	<0.020 | <0.020 | [NA]	98.1	93.5
Surrogate 13C8 PFOS	%		*103*	*99.9 | 102*	*101*	*96.5*
Surrogate 13C2 PFOA	%		*94.0*	*93.8 | 99.5*	*97.9*	*99.7*
Extraction Internal Standard 13C3 PFBS	%		*100*	*105 | 108 | 3.12*	*[NA]*	*[NA]*
Extraction Internal Standard 18O2 PFHxS	%		*102*	*98.2 | 101 | 2.79*	*[NA]*	*[NA]*
Extraction Internal Standard 13C4 PFOS	%		*99.2*	*108 | 106 | 2.09*	*[NA]*	*[NA]*
Extraction Internal Standard 13C4 PFBA	%		*105*	*92.0 | 92.4 | 0.445*	*[NA]*	*[NA]*
Extraction Internal Standard 13C3 PFPeA	%		*102*	*106 | 106 | 0.208*	*[NA]*	*[NA]*
Extraction Internal Standard 13C2 PFHxA	%		*100*	*104 | 101 | 3.27*	*[NA]*	*[NA]*
Extraction Internal Standard 13C4 PFHpA	%		*107*	*112 | 112 | 0.0889*	*[NA]*	*[NA]*
Extraction Internal Standard 13C4 PFOA	%		*111*	*121 | 116 | 3.82*	*[NA]*	*[NA]*
Extraction Internal Standard 13C5 PFNA	%		*116*	*130 | 129 | 1.30*	*[NA]*	*[NA]*
Extraction Internal Standard 13C2 PFDA	%		*99.9*	*131 | 129 | 1.30*	*[NA]*	*[NA]*
Extraction Internal Standard 13C2 PFUnDA	%		*118*	*132 | 137 | 3.80*	*[NA]*	*[NA]*
Extraction Internal Standard 13C2 PFDoDA	%		*110*	*138 | 136 | 1.67*	*[NA]*	*[NA]*
Extraction Internal Standard 13C2 PFTeDA	%		*108*	*131 | 137 | 4.13*	*[NA]*	*[NA]*
Extraction Internal Standard 13C2 4:2FTS	%		*86.9*	*101 | 105 | 3.57*	*[NA]*	*[NA]*
Extraction Internal Standard 13C2 6:2FTS	%		*82.9*	*104 | 111 | 6.10*	*[NA]*	*[NA]*
Extraction Internal Standard 13C2 8:2FTS	%		*82.0*	*131 | 136 | 3.95*	*[NA]*	*[NA]*
Extraction Internal Standard 13C8 FOSA	%		*109*	*111 | 112 | 0.602*	*[NA]*	*[NA]*
Extraction Internal Standard d3 N MeFOSA	%		*108*	*107 | 106 | 0.188*	*[NA]*	*[NA]*
Extraction Internal Standard d5 N EtFOSA	%		*111*	*109 | 110 | 1.31*	*[NA]*	*[NA]*
Extraction Internal Standard d7 N MeFOSE	%		*104*	*99.9 | 99.6 | 0.231*	*[NA]*	*[NA]*
Extraction Internal Standard d9 N EtFOSE	%		*108*	*104 | 102 | 1.17*	*[NA]*	*[NA]*
Extraction Internal Standard d3 N MeFOSAA	%		*97.6*	*117 | 117 | 0.231*	*[NA]*	*[NA]*
Extraction Internal Standard d5 N EtFOSAA	%		*109*	*123 | 130 | 5.60*	*[NA]*	*[NA]*

Quality Control PFF0291

QC Comments

Identifier	Description
[2]	Spike recovery is not applicable due to the relatively high analyte background in the sample (>3* spike level). However, the LCS recovery is within acceptance criteria.
[3]	Spike recovery is outside routine acceptance criteria (70-130%), this may be due to suspected non-homogeneity and/or matrix interference effects. However, an acceptable recovery was achieved for the LCS.
[4]	Duplicate %RPD may be flagged as an outlier to routine laboratory acceptance, however, where one or both results are <10*PQL, the RPD acceptance criteria increases exponentially.

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Certificate of Analysis PFF1498

Client Details

Client	Katherine Town Council - NT
Contact	Brett Kimpton
Address	PO Box 1071, KATHERINE, NT, 0851

Sample Details

Your Reference	Katherine Town Council - EPL298-01 - Monthly
Number of Samples	9 Water
Date Samples Received	25/06/2024
Date Instructions Received	25/06/2024

Analysis Details

Please refer to the following pages for results, methodology summary and quality control data.
Samples were analysed as received from the client. Results relate specifically to the samples as received.
Results are reported on a dry weight basis for solids and on an as received basis for other matrices.

Report Details

Date Results Requested by	04/07/2024
Date of Issue	04/07/2024

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Authorisation Details

Results Approved By	Diego Bigolin, Supervisor, Inorganics Heram Halim, Operations Manager Michael Mowle, Inorganics Supervisor
Laboratory Manager	Michael Kubiak

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Samples in this Report

Envirolab ID	Sample ID	Matrix	Date Sampled	Date Received
PFF1498-01	GWA (RN031131)	Water	23/06/2024	25/06/2024
PFF1498-02	GWE (RN022487)	Water	23/06/2024	25/06/2024
PFF1498-03	GWB01	Water	23/06/2024	25/06/2024
PFF1498-04	GWB02	Water	23/06/2024	25/06/2024
PFF1498-05	GWB03	Water	23/06/2024	25/06/2024
PFF1498-06	GWB04	Water	23/06/2024	25/06/2024
PFF1498-07	Field Blank	Water	23/06/2024	25/06/2024
PFF1498-08	Duplicate	Water	23/06/2024	25/06/2024
PFF1498-09	Trip Blank	Water	23/06/2024	25/06/2024

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Inorganics - Physical Parameters (Water)

Envirolab ID	Units	PQL	PFF1498-01	PFF1498-02	PFF1498-03	PFF1498-07	PFF1498-08
Your Reference			GWA (RN031131)	GWE (RN022487)	GWB01	Field Blank	Duplicate
Date Sampled			23/06/2024	23/06/2024	23/06/2024	23/06/2024	23/06/2024
Total Dissolved Solids	mg/L	5.0	380	270	600	<5.0	390

Envirolab ID	Units	PQL	PFF1498-09
Your Reference			Trip Blank
Date Sampled			23/06/2024
Total Dissolved Solids	mg/L	5.0	<5.0

Certificate of Analysis PFF1498

Inorganics - Ionic Balance and Indexes (Water)

Envirolab ID	Units	PQL	PFF1498-01	PFF1498-02	PFF1498-03	PFF1498-04	PFF1498-05
Your Reference			GWA (RN031131)	GWE (RN022487)	GWB01	GWB02	GWB03
Date Sampled			23/06/2024	23/06/2024	23/06/2024	23/06/2024	23/06/2024
Bicarbonate Alkalinity as CaCO3	mg/L as CaCO3	5.0	390	260	440	450	550
Carbonate Alkalinity as CaCO3	mg/L as CaCO3	5.0	<5.0	<5.0	<5.0	<5.0	<5.0
Hydroxide OH- as CaCO3	mg/L as CaCO3	5.0	<5.0	<5.0	<5.0	<5.0	<5.0
Total Alkalinity as CaCO3	mg/L as CaCO3	5.0	390	260	440	450	550
Chloride	mg/L	1.0	5.0	12	80	32	13
Sulfate	mg/L	1.0	7.3	5.5	24	32	73
Calcium	mg/L	0.50	72	38	96	78	100
Magnesium	mg/L	0.50	35	30	45	50	71
Potassium	mg/L	0.50	4.9	6.3	13	5.1	4.7
Sodium	mg/L	0.50	5.5	13	36	17	18
Hardness (calc) equivalent CaCO3	mg/L	3.0	320	220	430	400	540
Ionic Balance	%		-7.9	-3.9	-4.1	-9.0	-4.5
Total Anions	mg/L	7.0	400	270	540	520	630
Anions as meq	meq/L	0.59	6.6	4.7	9.9	9.0	11
Total Cations	mg/L	2.0	120	88	190	150	190
Cations as meq	meq/L	0.10	6.9	5.2	10	8.9	12

Envirolab ID	Units	PQL	PFF1498-06	PFF1498-07	PFF1498-08	PFF1498-09
Your Reference			GWB04	Field Blank	Duplicate	Trip Blank
Date Sampled			23/06/2024	23/06/2024	23/06/2024	23/06/2024
Bicarbonate Alkalinity as CaCO3	mg/L as CaCO3	5.0	490	<5.0	380	<5.0
Carbonate Alkalinity as CaCO3	mg/L as CaCO3	5.0	<5.0	<5.0	<5.0	<5.0
Hydroxide OH- as CaCO3	mg/L as CaCO3	5.0	<5.0	<5.0	<5.0	<5.0
Total Alkalinity as CaCO3	mg/L as CaCO3	5.0	490	<5.0	380	<5.0
Chloride	mg/L	1.0	7.5	<1.0	6.9	<1.0
Sulfate	mg/L	1.0	9.9	<1.0	7.2	<1.0
Calcium	mg/L	0.50	76	<0.50	72	<0.50
Magnesium	mg/L	0.50	60	<0.50	35	<0.50
Potassium	mg/L	0.50	8.9	<0.50	6.7	<0.50
Sodium	mg/L	0.50	9.3	<0.50	5.8	<0.50
Hardness (calc) equivalent CaCO3	mg/L	3.0	440	<3.0	330	<3.0
Ionic Balance	%		-4.5	-96	-6.4	-97
Total Anions	mg/L	7.0	510	<7.0	390	<7.0
Anions as meq	meq/L	0.59	8.5	<0.59	6.5	<0.59
Total Cations	mg/L	2.0	150	<2.0	120	<2.0
Cations as meq	meq/L	0.10	9.4	<0.10	6.9	<0.10

Certificate of Analysis PFF1498

Inorganics - Carbon, Nitrogen and Sulfur Species (Water)

Envirolab ID	Units	PQL	PFF1498-01	PFF1498-02	PFF1498-03	PFF1498-04	PFF1498-05
Your Reference			GWA (RN031131)	GWE (RN022487)	GWB01	GWB02	GWB03
Date Sampled			23/06/2024	23/06/2024	23/06/2024	23/06/2024	23/06/2024
Total Organic Carbon	mg/L	1.0	<1.0	1.8	8.3	2.3	2.0

Envirolab ID	Units	PQL	PFF1498-06	PFF1498-07	PFF1498-08	PFF1498-09
Your Reference			GWB04	Field Blank	Duplicate	Trip Blank
Date Sampled			23/06/2024	23/06/2024	23/06/2024	23/06/2024
Total Organic Carbon	mg/L	1.0	<1.0	<1.0	<1.0	<1.0

Certificate of Analysis PFF1498

Inorganics - Nutrients (Water)

Envirolab ID	Units	PQL	PFF1498-01	PFF1498-02	PFF1498-03	PFF1498-04	PFF1498-05
Your Reference			GWA (RN031131)	GWE (RN022487)	GWB01	GWB02	GWB03
Date Sampled			23/06/2024	23/06/2024	23/06/2024	23/06/2024	23/06/2024
Ammonia as N	mg/L	0.0050	<0.0050	0.029	2.1	<0.0050	0.021
Free Ammonia (unionised) as N by calculation*	mg/L	0.0070	<0.0070	<0.0070	<0.0070	<0.0070	<0.0070
Ammonium (NH4+) as N by calculation	mg/L	0.0070	<0.0070	0.029	2.1	<0.0070	0.021

Envirolab ID	Units	PQL	PFF1498-06	PFF1498-07	PFF1498-08	PFF1498-09
Your Reference			GWB04	Field Blank	Duplicate	Trip Blank
Date Sampled			23/06/2024	23/06/2024	23/06/2024	23/06/2024
Ammonia as N	mg/L	0.0050	<0.0050	<0.0050	0.0057	<0.0050
Free Ammonia (unionised) as N by calculation*	mg/L	0.0070	<0.0070	<0.0070	<0.0070	<0.0070
Ammonium (NH4+) as N by calculation	mg/L	0.0070	<0.0070	<0.0070	<0.0070	<0.0070

Certificate of Analysis PFF1498

Inorganics - Common Wastewater Parameters (Water)

Envirolab ID	Units	PQL	PFF1498-01	PFF1498-02	PFF1498-03	PFF1498-04	PFF1498-05
Your Reference			GWA (RN031131)	GWE (RN022487)	GWB01	GWB02	GWB03
Date Sampled			23/06/2024	23/06/2024	23/06/2024	23/06/2024	23/06/2024
COD	mg O2/L	20	<20	<20	93	<20	54

Envirolab ID	Units	PQL	PFF1498-06	PFF1498-07	PFF1498-08	PFF1498-09
Your Reference			GWB04	Field Blank	Duplicate	Trip Blank
Date Sampled			23/06/2024	23/06/2024	23/06/2024	23/06/2024
COD	mg O2/L	20	<20	<20	<20	40 [2]

Certificate of Analysis PFF1498

Inorganics - Common Wastewater Parameters (Water) - Analysed By Envirolab Services Sydney

Envirolab ID	Units	PQL	PFF1498-01	PFF1498-02	PFF1498-03	PFF1498-04	PFF1498-05
Your Reference			GWA (RN031131)	GWE (RN022487)	GWB01	GWB02	GWB03
Date Sampled			23/06/2024	23/06/2024	23/06/2024	23/06/2024	23/06/2024
BOD	mg/L	5.0	18	16	8.1	<5.0	<5.0

Envirolab ID	Units	PQL	PFF1498-06	PFF1498-07	PFF1498-08	PFF1498-09
Your Reference			GWB04	Field Blank	Duplicate	Trip Blank
Date Sampled			23/06/2024	23/06/2024	23/06/2024	23/06/2024
BOD	mg/L	5.0	8.1	7.2	<5.0	11

Certificate of Analysis PFF1498

General - Field Data (Water)

Envirolab ID	Units	PQL	PFF1498-01	PFF1498-02	PFF1498-03	PFF1498-04	PFF1498-05
Your Reference			GWA (RN031131)	GWE (RN022487)	GWB01	GWB02	GWB03
Date Sampled			23/06/2024	23/06/2024	23/06/2024	23/06/2024	23/06/2024
pH (Client Supplied)*	pH units		3.04	3.46	3.00	3.05	3.60
Temperature (Client Supplied)*	o C		32.0	32.0	31.0	35.0	28.0

Envirolab ID	Units	PQL	PFF1498-06
Your Reference			GWB04
Date Sampled			23/06/2024
pH (Client Supplied)*	pH units		3.07
Temperature (Client Supplied)*	o C		30.0

Result Comments

Identifier	Description
[2]	Result confirmed through re-analysis.

Method Summary

Method ID	Methodology Summary
Calc	Calculation
Field Data	Field Data supplied by client
INORG-006	Alkalinity - determined titrimetrically based on APHA latest edition 2320-B. Solids reported from a 1:5 water extract unless otherwise specified. Total Carbon Dioxide - determined by calculation in accordance with APHA latest edition,4500-CO2 D.
INORG-018	Total Dissolved Solids - determined gravimetrically. The solids are dried at 180±10°C. NOTE: Where the EC of the sample is <100µS/cm, the TDS will typically be below 70mg/L (as the sample is very likely to be at least drinking water quality). Therefore to ensure data quality for TDS, the TDS is typically calculated as per the equation: TDS = EC*0.6
INORG-040	The concentrations of the major ions (mg/L) are converted to milliequivalents and summed. The ionic balance should be within +/- 15% i.e. total anions = total cations +/-15%.
INORG-057	Ammonia - determined colourimetrically. Water samples are filtered on receipt prior to analysis. Soils and OHS media are analysed following a water extraction. Alternatively, Ammonia can be extracted from soil using 1M KCl.
INORG-067	Samples are digested in acid with a known excess of potassium dichromate then the colour change is determined by discrete analyser or UV-VIS in accordance with APHA latest edition 5220 D.
INORG-079	Carbon forms (inorganic, organic, total) determined using a TOC/NDIR analyser via combustion. Dissolved aqueous\forms require filtering prior to determination.
INORG-081	Anions determined by Ion Chromatography. Waters samples are filtered on receipt prior to analysis. Solids are analysed from a water extract. Alternatively determined by colourimetry/turbidity using Discrete Analyser.
INORG-091	BOD and/or cBOD - Analysed in accordance with APHA latest edition 5210 D.
METALS-020	Determination of various metals by ICP-OES.

Result Definitions

Identifier	Description
NR	Not reported
NEPM	National Environment Protection Measure
NS	Not specified
LCS	Laboratory Control Sample
RPD	Relative Percent Difference
>	Greater than
<	Less than
PQL	Practical Quantitation Limit
INS	Insufficient sample for this test
NA	Test not required
NT	Not tested
DOL	Samples rejected due to particulate overload (air filters only)
RFD	Samples rejected due to filter damage (air filters only)
RUD	Samples rejected due to uneven deposition (air filters only)
##	Indicates a laboratory acceptance criteria outlier, for further details, see Result Comments and/or QC Comments

Quality Control Definitions

Blank

This is the component of the analytical signal which is not derived from the sample but from reagents, glassware etc, and is determined by processing solvents and reagents in exactly the same manner as for samples.

Surrogate Spike

Surrogates are known additions to each sample, blank, matrix spike and LCS in a batch, of compounds which are similar to the analyte of interest, however are not expected to be found in real samples.

LCS (Laboratory Control Sample)

This comprises either a standard reference material or a control matrix (such as a blank sand or water) fortified with analytes representative of the analyte class. It is simply a check sample.

Matrix Spike

A portion of the sample is spiked with a known concentration of target analyte. The purpose of the matrix spike is to monitor the performance of the analytical method used and to determine whether matrix interferences exist.

Duplicate

This is the complete duplicate analysis of a sample from the process batch. The sample selected should be one where the analyte concentration is easily measurable.

Laboratory Acceptance Criteria

Duplicate sample and matrix spike recoveries may not be reported on smaller jobs, however, were analysed at a frequency to meet or exceed NEPM requirements. All samples are tested in batches of 20. The duplicate sample RPD and matrix spike recoveries for the batch were within the laboratory acceptance criteria. Filters, swabs, wipes, tubes and badges will not have duplicate data as the whole sample is generally extracted during sample extraction. Spikes for Physical and Aggregate Tests are not applicable. For VOCs in water samples, three vials are required for duplicate or spike analysis.

General Acceptance Criteria (GAC) - Analyte specific criteria applies for some analytes and is reflected in QC recovery tables.

Duplicates: >10xPQL - RPD acceptance criteria will vary depending on the analytes and the analytical techniques but is typically in the range 20%-50% - see ELN-P05 QAQC tables for details (available on request); <10xPQL - RPD are higher as the results approach PQL and the estimated measurement uncertainty will statistically increase. Matrix Spikes, LCS and Surrogate recoveries: Generally 70-130% for inorganics/metals; 60-140% for organics (+/-50% surrogates) and 10-140% for labile SVOCs (including labile surrogates), ultra trace organics and speciated phenols is acceptable.

In circumstances where no duplicate and/or sample spike has been reported at 1 in 10 and/or 1 in 20 samples respectively, the sample volume submitted was typically insufficient in order to satisfy laboratory QA/QC protocols.

Miscellaneous Information

When samples are received where certain analytes are outside of recommended technical holding times (THTs), the analysis has proceeded. Where analytes are on the verge of breaching THTs, every effort will be made to analyse within the THT or as soon as practicable.

Where sampling dates are not provided, Envirolab are not in a position to comment on the validity of the analysis where recommended technical holding times may have been breached. We have taken the sampling date as being the date received at the laboratory.

Two significant figures are reported for the majority of tests and with a high degree of confidence, for results <10*PQL, the second significant figure may be in doubt i.e. has a relatively high degree of uncertainty and is provided for information only.

Measurement Uncertainty estimates are available for most tests upon request.

Analysis of aqueous samples typically involves the extraction/digestion and/or analysis of the liquid phase only (i.e. NOT any settled sediment phase but inclusive of suspended particles if present), unless stipulated on the Envirolab COC or by correspondence. Notable exceptions include certain Physical Tests (pH/EC/BOD/COD/Apparent Colour etc.), Solids testing, Total Recoverable metals and PFAS where sediment/solids are included by default.

Urine Analysis - The BEI values listed are taken from the 2022 edition of *TLVs and BEIs Threshold Limits by ACGIH*.

Air volume measurements are not covered by Envirolab's NATA accreditation.

Data Quality Assessment Summary PFF1498

Client Details

Client	Katherine Town Council - NT
Your Reference	Katherine Town Council - EPL298-01 - Monthly
Date Issued	04/07/2024

Recommended Holding Time Compliance

Recommended holding time exceedances exist - See detailed list below

Quality Control and QC Frequency

QC Type	Compliant	Details
Blank	Yes	No Outliers
LCS	Yes	No Outliers
Duplicates	Yes	No Outliers
Matrix Spike	Yes	No Outliers
Surrogates / Extracted Internal Standards	Yes	No Outliers
QC Frequency	No	QC Frequency Outliers Exist - See detailed list below

Surrogates/Extracted Internal Standards, Duplicates and/or Matrix Spikes are not always relevant/applicable to certain analyses and matrices. Therefore, said QC measures are deemed compliant in these situations by default. See Laboratory Acceptance Criteria for more information

Data Quality Assessment Summary PFF1498

Recommended Holding Time Compliance

Analysis	Sample Number(s)	Date Sampled	Date Extracted	Date Analysed	Compliant
TDS | Water	1-3, 7-9	23/06/2024	25/06/2024	26/06/2024	Yes
Alkalinity Suite | Water	1-9	23/06/2024	27/06/2024	28/06/2024	Yes
Chloride | Water	1-9	23/06/2024	26/06/2024	28/06/2024	Yes
Dissolved Cations | Water	1-9	23/06/2024	26/06/2024	27/06/2024	Yes
Ion Balance | Water	1-9	23/06/2024	27/06/2024	03/07/2024	Yes
Sulfate | Water	1-9	23/06/2024	26/06/2024	28/06/2024	Yes
Total Organic Carbon | Water	8-9	23/06/2024	26/06/2024	27/06/2024	Yes
	1-7	23/06/2024	26/06/2024	28/06/2024	Yes
Nitrogen - Ammonia | Water	1-9	23/06/2024	27/06/2024	27/06/2024	Yes
BOD | Water	1-9	23/06/2024	27/06/2024	04/07/2024	No
COD | Water	1-9	23/06/2024	26/06/2024	26/06/2024	Yes

Outliers: QC Frequency

INORG-091\|Inorganics - Common Wastewater Parameters (Water)\| Batch BFF4475

Analysis	QC Type	Expected	Reported
BOD	Duplicate	2	0

Quality Control PFF1498

INORG-018 | Inorganics - Physical Parameters (Water) | Batch BFF3907

Analyte	Units	PQL	Blank	DUP1 BFF3907-DUP1# Samp | QC | RPD %	DUP2 BFF3907-DUP2# Samp | QC | RPD %	LCS %
Total Dissolved Solids	mg/L	5.0	<5.0	173 | 175 | 1.15	327 | 334 | 2.12	103

The QC reported was not specifically part of this workorder but formed part of the QC process batch.

METALS-020 | Inorganics - Ionic Balance and Indexes (Water) | Batch BFF4095

Analyte	Units	PQL	Blank	DUP1 BFF4095-DUP1# Samp | QC | RPD %	DUP2 BFF4095-DUP2# Samp | QC | RPD %	LCS %	Spike % BFF4095-MS1#
Calcium	mg/L	0.50	<0.50	14.3 | 14.9 | 3.89	20.3 | 20.7 | 1.73	93.9	88.7
Magnesium	mg/L	0.50	<0.50	13.2 | 13.5 | 2.50	<0.50 | <0.50 | [NA]	96.7	92.2
Potassium	mg/L	0.50	<0.50	14.4 | 14.6 | 0.910	<0.50 | <0.50 | [NA]	93.6	93.0
Sodium	mg/L	0.50	<0.50	68.7 | 69.2 | 0.812	10.5 | 10.6 | 1.27	92.4	73.3
Hardness (calc) equivalent CaCO3	mg/L	3.0	<3.0	90.1 | 92.9 | 3.05	52.2 | 53.1 | 1.71	[NA]	[NA]

The QC reported was not specifically part of this workorder but formed part of the QC process batch.

METALS-020 | Inorganics - Ionic Balance and Indexes (Water) | Batch BFF4219

Analyte	Units	PQL	Blank	DUP1 PFF1498-03 Samp | QC | RPD %	DUP2 BFF4219-DUP2# Samp | QC | RPD %	LCS %	Spike % PFF1498-04
Calcium	mg/L	0.50	<0.50	96.1 | 95.2 | 0.853	23.8 | 23.7 | 0.492	93.3	83.0
Magnesium	mg/L	0.50	<0.50	45.2 | 46.0 | 1.71	5.10 | 5.02 | 1.59	97.2	97.0
Potassium	mg/L	0.50	<0.50	13.4 | 13.5 | 0.892	2.97 | 3.01 | 1.26	93.7	93.7
Sodium	mg/L	0.50	<0.50	35.7 | 35.9 | 0.450	93.9 | 94.4 | 0.467	92.2	95.4
Hardness (calc) equivalent CaCO3	mg/L	3.0	<3.0	426 | 427 | 0.273	80.5 | 79.8 | 0.778	[NA]	[NA]

The QC reported was not specifically part of this workorder but formed part of the QC process batch.

INORG-081 | Inorganics - Ionic Balance and Indexes (Water) | Batch BFF4235

Analyte	Units	PQL	Blank	DUP1 BFF4235-DUP1# Samp | QC | RPD %	DUP2 BFF4235-DUP2# Samp | QC | RPD %	LCS %	Spike % BFF4235-MS1#
Chloride	mg/L	1.0	<1.0	126 | 126 | 0.484	106 | 105 | 0.717	103	114
Sulfate	mg/L	1.0	<1.0	63.2 | 62.8 | 0.568	47.3 | 47.1 | 0.317	94.4	126

The QC reported was not specifically part of this workorder but formed part of the QC process batch.

INORG-006 | Inorganics - Ionic Balance and Indexes (Water) | Batch BFF4303

Analyte	Units	PQL	Blank	DUP1 PFF1498-01 Samp | QC | RPD %	DUP2 BFF4303-DUP2# Samp | QC | RPD %	LCS %
Bicarbonate Alkalinity as CaCO3	mg/L as CaCO3	5.0	<5.0	387 | 375 | 2.99	180 | 178 | 1.11	[NA]
Carbonate Alkalinity as CaCO3	mg/L as CaCO3	5.0	<5.0	<5.0 | <5.0 | [NA]	<5.0 | <5.0 | [NA]	[NA]
Hydroxide OH- as CaCO3	mg/L as CaCO3	5.0	<5.0	<5.0 | <5.0 | [NA]	<5.0 | <5.0 | [NA]	[NA]
Total Alkalinity as CaCO3	mg/L as CaCO3	5.0	<5.0	387 | 375 | 2.99	180 | 178 | 1.11	107

The QC reported was not specifically part of this workorder but formed part of the QC process batch.

INORG-079 | Inorganics - Carbon, Nitrogen and Sulfur Species (Water) | Batch BFF4192

Analyte	Units	PQL	Blank	DUP1 BFF4192-DUP1# Samp | QC | RPD %	DUP2 PFF1498-01 Samp | QC | RPD %	LCS %	Spike % BFF4192-MS1#
Total Organic Carbon	mg/L	1.0	<1.0	<1.0 | <1.0 | [NA]	<1.0 | <1.0 | [NA]	102	120

The QC reported was not specifically part of this workorder but formed part of the QC process batch.

Quality Control PFF1498

INORG-057 | Inorganics - Nutrients (Water) | Batch BFF4282

Analyte	Units	PQL	Blank	DUP1 BFF4282-DUP1# Samp | QC | RPD %	DUP2 BFF4282-DUP2# Samp | QC | RPD %	LCS %	Spike % BFF4282-MS1#
Ammonia as N	mg/L	0.0050	<0.0050	<0.0050 | <0.0050 | [NA]	<0.0050 | <0.0050 | [NA]	102	96.3

The QC reported was not specifically part of this workorder but formed part of the QC process batch.

INORG-057 | Inorganics - Nutrients (Water) | Batch BFF4283

Analyte	Units	PQL	Blank	DUP1 BFF4283-DUP1# Samp | QC | RPD %	DUP2 BFF4283-DUP2# Samp | QC | RPD %	LCS %	Spike % BFF4283-MS1#
Ammonia as N	mg/L	0.0050	<0.0050	<0.0050 | <0.0050 | [NA]	<0.0050 | <0.0050 | [NA]	102	92.3

The QC reported was not specifically part of this workorder but formed part of the QC process batch.

INORG-067 | Inorganics - Common Wastewater Parameters (Water) | Batch BFF4072

Analyte	Units	PQL	Blank	DUP1 BFF4072-DUP1# Samp | QC | RPD %	DUP2 BFF4072-DUP2# Samp | QC | RPD %	LCS %
COD	mg O2/L	20	<20	90.0 | 84.0 | 6.90	140 | 142 | 1.42	116

The QC reported was not specifically part of this workorder but formed part of the QC process batch.

INORG-067 | Inorganics - Common Wastewater Parameters (Water) | Batch BFF4073

Analyte	Units	PQL	Blank	DUP1 PFF1498-04 Samp | QC | RPD %	LCS %
COD	mg O2/L	20	<20	<20 | <20 | [NA]	116

INORG-091 | Inorganics - Common Wastewater Parameters (Water) | Batch BFF4475

Analyte	Units	PQL	Blank	LCS %
BOD	mg/L	5.0	<5.0	85.0

Batch QC Comments: [1]

QC Comments

Identifier	Description
[1]	Unable to perform all QC according to our internal guidelines due to the limited amount of sample(s) available for testing.

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Certificate of Analysis PFG1818

Client Details

Client	Katherine Town Council - NT
Contact	Brett Kimpton
Address	PO Box 1071, KATHERINE, NT, 0851

Sample Details

Your Reference	Katherine Town Council - EPL298-01 - Monthly
Number of Samples	9 Water
Date Samples Received	30/07/2024
Date Instructions Received	30/07/2024

Analysis Details

Please refer to the following pages for results, methodology summary and quality control data.
Samples were analysed as received from the client. Results relate specifically to the samples as received.
Results are reported on a dry weight basis for solids and on an as received basis for other matrices.

Report Details

Date Results Requested by	13/08/2024
Date of Issue	13/08/2024

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Authorisation Details

Results Approved By	Jenny Xin He, Chemist Jessica Miller, Microbiological Supervisor Lien Tang, Assistant Operations Manager Lucas Yii, Inorganics Team Leader Michael Mowle, Inorganics Supervisor Varsha Ho Wing, Inorganics and Metals Supervisor
Laboratory Manager	Michael Kubiak

Certificate of Analysis PFG1818

Samples in this Report

Envirolab ID	Sample ID	Depth	Matrix	Date Sampled	Date Received
PFG1818-01	GWA (RN031131)		Water	28/07/2024	30/07/2024
PFG1818-02	GWE (RN022487)	10.20	Water	28/07/2024	30/07/2024
PFG1818-03	GWB01	11.20	Water	28/07/2024	30/07/2024
PFG1818-04	GWB02	10.70	Water	28/07/2024	30/07/2024
PFG1818-05	GWB03	8.90	Water	28/07/2024	30/07/2024
PFG1818-06	GWB04	12.00	Water	28/07/2024	30/07/2024
PFG1818-07	Field Blank		Water	28/07/2024	30/07/2024
PFG1818-08	Duplicate	10.20	Water	28/07/2024	30/07/2024
PFG1818-09	Trip Blank		Water	28/07/2024	30/07/2024

Certificate of Analysis PFG1818

Inorganics - Physical Parameters (Water)

Envirolab ID	Units	PQL	PFG1818-01	PFG1818-02	PFG1818-03	PFG1818-04	PFG1818-05
Your Reference			GWA (RN031131)	GWE (RN022487)	GWB01	GWB02	GWB03
Date Sampled			28/07/2024	28/07/2024	28/07/2024	28/07/2024	28/07/2024
Depth				10.20	11.20	10.70	8.90
Total Dissolved Solids	mg/L	5.0	330	240	490	420	390

Envirolab ID	Units	PQL	PFG1818-06	PFG1818-07	PFG1818-08	PFG1818-09
Your Reference			GWB04	Field Blank	Duplicate	Trip Blank
Date Sampled			28/07/2024	28/07/2024	28/07/2024	28/07/2024
Depth			12.00		10.20	
Total Dissolved Solids	mg/L	5.0	440	31	260	12

Certificate of Analysis PFG1818

Inorganics - Ionic Balance and Indexes (Water)

Envirolab ID	Units	PQL	PFG1818-01	PFG1818-02	PFG1818-03	PFG1818-04	PFG1818-05
Your Reference			GWA (RN031131)	GWE (RN022487)	GWB01	GWB02	GWB03
Date Sampled			28/07/2024	28/07/2024	28/07/2024	28/07/2024	28/07/2024
Depth				10.20	11.20	10.70	8.90
Bicarbonate Alkalinity as CaCO3	mg/L as CaCO3	5.0	330	250	410	440	470
Carbonate Alkalinity as CaCO3	mg/L as CaCO3	5.0	<5.0	<5.0	<5.0	<5.0	<5.0
Hydroxide OH- as CaCO3	mg/L as CaCO3	5.0	<5.0	<5.0	<5.0	<5.0	<5.0
Total Alkalinity as CaCO3	mg/L as CaCO3	5.0	330	250	410	440	470
Chloride	mg/L	1.0	4.8	11	64	30	12
Sulfate	mg/L	1.0	4.6	4.9	19	32	15
Calcium	mg/L	0.50	57	35	67	55	51
Magnesium	mg/L	0.50	35	29	45	53	55
Potassium	mg/L	0.50	4.8	6.2	14	5.4	5.5
Sodium	mg/L	0.50	5.7	13	34	16	10
Hardness (calc) equivalent CaCO3	mg/L	3.0	290	210	350	360	350
Ionic Balance	%		-5.7	-5.7	-7.0	-13	-13
Total Anions	mg/L	7.0	340	270	490	500	490
Anions as meq	meq/L	0.59	5.6	4.5	8.9	8.7	8.3
Total Cations	mg/L	2.0	100	83	160	130	120
Cations as meq	meq/L	0.10	6.1	4.8	8.9	8.0	7.7

Envirolab ID	Units	PQL	PFG1818-06	PFG1818-07	PFG1818-08	PFG1818-09
Your Reference			GWB04	Field Blank	Duplicate	Trip Blank
Date Sampled			28/07/2024	28/07/2024	28/07/2024	28/07/2024
Depth			12.00		10.20	
Bicarbonate Alkalinity as CaCO3	mg/L as CaCO3	5.0	500	<5.0	260	<5.0
Carbonate Alkalinity as CaCO3	mg/L as CaCO3	5.0	<5.0	<5.0	<5.0	<5.0
Hydroxide OH- as CaCO3	mg/L as CaCO3	5.0	<5.0	<5.0	<5.0	<5.0
Total Alkalinity as CaCO3	mg/L as CaCO3	5.0	500	<5.0	260	<5.0
Chloride	mg/L	1.0	6.2	<1.0	12	<1.0
Sulfate	mg/L	1.0	11	<1.0	5.6	<1.0
Calcium	mg/L	0.50	47	<0.50	37	<0.50
Magnesium	mg/L	0.50	65	<0.50	32	<0.50
Potassium	mg/L	0.50	9.0	<0.50	6.5	<0.50
Sodium	mg/L	0.50	9.0	<0.50	14	<0.50
Hardness (calc) equivalent CaCO3	mg/L	3.0	380	<3.0	220	<3.0
Ionic Balance	%		-11	-98 [2]	-4.4	-99 [2]
Total Anions	mg/L	7.0	510	<7.0	280	<7.0
Anions as meq	meq/L	0.59	8.5	<0.59	4.7	<0.59
Total Cations	mg/L	2.0	130	<2.0	89	<2.0
Cations as meq	meq/L	0.10	8.3	<0.10	5.2	<0.10

Certificate of Analysis PFG1818

Inorganics - Carbon, Nitrogen and Sulfur Species (Water)

Envirolab ID	Units	PQL	PFG1818-01	PFG1818-02	PFG1818-03	PFG1818-04	PFG1818-05
Your Reference			GWA (RN031131)	GWE (RN022487)	GWB01	GWB02	GWB03
Date Sampled			28/07/2024	28/07/2024	28/07/2024	28/07/2024	28/07/2024
Depth				10.20	11.20	10.70	8.90
Total Organic Carbon	mg/L	1.0	<1.0	<1.0	2.9	1.4	1.7

Envirolab ID	Units	PQL	PFG1818-06	PFG1818-07	PFG1818-08	PFG1818-09
Your Reference			GWB04	Field Blank	Duplicate	Trip Blank
Date Sampled			28/07/2024	28/07/2024	28/07/2024	28/07/2024
Depth			12.00		10.20	
Total Organic Carbon	mg/L	1.0	1.0	11 [4]	<1.0	<1.0

Certificate of Analysis PFG1818

Inorganics - Nutrients (Water)

Envirolab ID	Units	PQL	PFG1818-01	PFG1818-02	PFG1818-03	PFG1818-04	PFG1818-05
Your Reference			GWA (RN031131)	GWE (RN022487)	GWB01	GWB02	GWB03
Date Sampled			28/07/2024	28/07/2024	28/07/2024	28/07/2024	28/07/2024
Depth				10.20	11.20	10.70	8.90
Ammonia as N	mg/L	0.0050	0.0084	0.057	2.7	0.0089	0.0074
Free Ammonia (unionised) as N by calculation*	mg/L	0.0070	<0.0070	<0.0070	<0.0070	<0.0070	<0.0070
Ammonium (NH4+) as N by calculation	mg/L	0.0070	0.0084	0.057	2.7	0.0089	0.0074

Envirolab ID	Units	PQL	PFG1818-06	PFG1818-07	PFG1818-08	PFG1818-09
Your Reference			GWB04	Field Blank	Duplicate	Trip Blank
Date Sampled			28/07/2024	28/07/2024	28/07/2024	28/07/2024
Depth			12.00		10.20	
Ammonia as N	mg/L	0.0050	0.0070	<0.0050	0.055	<0.0050
Free Ammonia (unionised) as N by calculation*	mg/L	0.0070	<0.0070	<0.0070	<0.0070	<0.0070
Ammonium (NH4+) as N by calculation	mg/L	0.0070	0.0070	<0.0070	0.055	<0.0070

Certificate of Analysis PFG1818

Inorganics - Common Wastewater Parameters (Water)

Envirolab ID	Units	PQL	PFG1818-01	PFG1818-02	PFG1818-03	PFG1818-04	PFG1818-05
Your Reference			GWA (RN031131)	GWE (RN022487)	GWB01	GWB02	GWB03
Date Sampled			28/07/2024	28/07/2024	28/07/2024	28/07/2024	28/07/2024
Depth				10.20	11.20	10.70	8.90
COD	mg O2/L	20	<20	<20	<20	<20	<20

Envirolab ID	Units	PQL	PFG1818-06	PFG1818-07	PFG1818-08	PFG1818-09
Your Reference			GWB04	Field Blank	Duplicate	Trip Blank
Date Sampled			28/07/2024	28/07/2024	28/07/2024	28/07/2024
Depth			12.00		10.20	
COD	mg O2/L	20	<20	32 [3]	<20	<20

Certificate of Analysis PFG1818

Inorganics - Common Wastewater Parameters (Water) - Analysed By Envirolab Services Sydney

Envirolab ID	Units	PQL	PFG1818-01	PFG1818-02	PFG1818-03	PFG1818-04	PFG1818-05
Your Reference			GWA (RN031131)	GWE (RN022487)	GWB01	GWB02	GWB03
Date Sampled			28/07/2024	28/07/2024	28/07/2024	28/07/2024	28/07/2024
Depth				10.20	11.20	10.70	8.90
BOD	mg/L	5.0	<5.0	<5.0	<5.0	<5.0	<5.0

Envirolab ID	Units	PQL	PFG1818-06	PFG1818-07	PFG1818-08	PFG1818-09
Your Reference			GWB04	Field Blank	Duplicate	Trip Blank
Date Sampled			28/07/2024	28/07/2024	28/07/2024	28/07/2024
Depth			12.00		10.20	
BOD	mg/L	5.0	<5.0	<5.0	<5.0	<5.0

Certificate of Analysis PFG1818

General - Field Data (Water)

Envirolab ID	Units	PQL	PFG1818-01	PFG1818-02	PFG1818-03	PFG1818-04	PFG1818-05
Your Reference			GWA (RN031131)	GWE (RN022487)	GWB01	GWB02	GWB03
Date Sampled			28/07/2024	28/07/2024	28/07/2024	28/07/2024	28/07/2024
Depth				10.20	11.20	10.70	8.90
pH (Client Supplied)*	pH units		2.70	2.80	2.20	2.80	3.00
Temperature (Client Supplied)*	o C		32.0	29.0	27.0	28.0	25.0

Envirolab ID	Units	PQL	PFG1818-06
Your Reference			GWB04
Date Sampled			28/07/2024
Depth			12.00
pH (Client Supplied)*	pH units		3.30
Temperature (Client Supplied)*	o C		27.0

Result Comments

Identifier	Description
[2]	Ion Balance indicative only for samples with low Electrical Conductivity.
[3]	Reanalysis has confirmed the result
[4]	Result confirmed by re-analysis.

Method Summary

Method ID	Methodology Summary
Calc	Calculation
Calc - ION	Calculation
Field Data	Field Data supplied by client
INORG-006	Alkalinity - determined titrimetrically based on APHA latest edition 2320-B. Solids reported from a 1:5 water extract unless otherwise specified. Total Carbon Dioxide - determined by calculation in accordance with APHA latest edition,4500-CO2 D.
INORG-018	Total Dissolved Solids - determined gravimetrically. The solids are dried at 180±10°C. NOTE: Where the EC of the sample is <100µS/cm, the TDS will typically be below 70mg/L (as the sample is very likely to be at least drinking water quality). Therefore to ensure data quality for TDS, the TDS is typically calculated as per the equation: TDS = EC*0.6
INORG-040	The concentrations of the major ions (mg/L) are converted to milliequivalents and summed. The ionic balance should be within +/- 15% i.e. total anions = total cations +/-15%.
INORG-057	Ammonia - determined colourimetrically. Water samples are filtered on receipt prior to analysis. Soils and OHS media are analysed following a water extraction. Alternatively, Ammonia can be extracted from soil using 1M KCl.
INORG-067	Samples are digested in acid with a known excess of potassium dichromate then the colour change is determined by discrete analyser or UV-VIS in accordance with APHA latest edition 5220 D.
INORG-079	Carbon forms (inorganic, organic, total) determined using a TOC/NDIR analyser via combustion. Dissolved aqueous\forms require filtering prior to determination.
INORG-081	Anions determined by Ion Chromatography. Waters samples are filtered on receipt prior to analysis. Solids are analysed from a water extract. Alternatively determined by colourimetry/turbidity using Discrete Analyser.
INORG-091	BOD and/or cBOD - Analysed in accordance with APHA latest edition 5210 D.
METALS-020	Determination of various metals by ICP-OES.

Result Definitions

Identifier	Description
NR	Not reported
NEPM	National Environment Protection Measure
NS	Not specified
LCS	Laboratory Control Sample
RPD	Relative Percent Difference
>	Greater than
<	Less than
PQL	Practical Quantitation Limit
INS	Insufficient sample for this test
NA	Test not required
NT	Not tested
DOL	Samples rejected due to particulate overload (air filters only)
RFD	Samples rejected due to filter damage (air filters only)
RUD	Samples rejected due to uneven deposition (air filters only)
##	Indicates a laboratory acceptance criteria outlier, for further details, see Result Comments and/or QC Comments

Quality Control Definitions

Blank

This is the component of the analytical signal which is not derived from the sample but from reagents, glassware etc, and is determined by processing solvents and reagents in exactly the same manner as for samples.

Surrogate Spike

Surrogates are known additions to each sample, blank, matrix spike and LCS in a batch, of compounds which are similar to the analyte of interest, however are not expected to be found in real samples.

LCS (Laboratory Control Sample)

This comprises either a standard reference material or a control matrix (such as a blank sand or water) fortified with analytes representative of the analyte class. It is simply a check sample.

Matrix Spike

A portion of the sample is spiked with a known concentration of target analyte. The purpose of the matrix spike is to monitor the performance of the analytical method used and to determine whether matrix interferences exist.

Duplicate

This is the complete duplicate analysis of a sample from the process batch. The sample selected should be one where the analyte concentration is easily measurable.

Laboratory Acceptance Criteria

Duplicate sample and matrix spike recoveries may not be reported on smaller jobs, however, were analysed at a frequency to meet or exceed NEPM requirements. All samples are tested in batches of 20. The duplicate sample RPD and matrix spike recoveries for the batch were within the laboratory acceptance criteria. Filters, swabs, wipes, tubes and badges will not have duplicate data as the whole sample is generally extracted during sample extraction. Spikes for Physical and Aggregate Tests are not applicable. For VOCs in water samples, three vials are required for duplicate or spike analysis.

General Acceptance Criteria (GAC) - Analyte specific criteria applies for some analytes and is reflected in QC recovery tables.

Duplicates: >10xPQL - RPD acceptance criteria will vary depending on the analytes and the analytical techniques but is typically in the range 20%-50% - see ELN-P05 QAQC tables for details (available on request); <10xPQL - RPD are higher as the results approach PQL and the estimated measurement uncertainty will statistically increase. Matrix Spikes, LCS and Surrogate recoveries: Generally 70-130% for inorganics/metals; 60-140% for organics (+/-50% surrogates) and 10-140% for labile SVOCs (including labile surrogates), ultra trace organics and speciated phenols is acceptable.

In circumstances where no duplicate and/or sample spike has been reported at 1 in 10 and/or 1 in 20 samples respectively, the sample volume submitted was typically insufficient in order to satisfy laboratory QA/QC protocols.

Miscellaneous Information

When samples are received where certain analytes are outside of recommended technical holding times (THTs), the analysis has proceeded. Where analytes are on the verge of breaching THTs, every effort will be made to analyse within the THT or as soon as practicable.

Where sampling dates are not provided, Envirolab are not in a position to comment on the validity of the analysis where recommended technical holding times may have been breached. We have taken the sampling date as being the date received at the laboratory.

Two significant figures are reported for the majority of tests and with a high degree of confidence, for results <10*PQL, the second significant figure may be in doubt i.e. has a relatively high degree of uncertainty and is provided for information only.

Measurement Uncertainty estimates are available for most tests upon request.

Analysis of aqueous samples typically involves the extraction/digestion and/or analysis of the liquid phase only (i.e. NOT any settled sediment phase but inclusive of suspended particles if present), unless stipulated on the Envirolab COC or by correspondence. Notable exceptions include certain Physical Tests (pH/EC/BOD/COD/Apparent Colour etc.), Solids testing, Total Recoverable metals and PFAS where sediment/solids are included by default.

Urine Analysis - The BEI values listed are taken from the 2022 edition of *TLVs and BEIs Threshold Limits by ACGIH*.

Air volume measurements are not covered by Envirolab's NATA accreditation.

Data Quality Assessment Summary PFG1818

Client Details

Client	Katherine Town Council - NT
Your Reference	Katherine Town Council - EPL298-01 - Monthly
Date Issued	13/08/2024

Recommended Holding Time Compliance

No recommended holding time exceedances

Quality Control and QC Frequency

QC Type	Compliant	Details
Blank	Yes	No Outliers
LCS	Yes	No Outliers
Duplicates	Yes	No Outliers
Matrix Spike	Yes	No Outliers
Surrogates / Extracted Internal Standards	Yes	No Outliers
QC Frequency	No	QC Frequency Outliers Exist - See detailed list below

Surrogates/Extracted Internal Standards, Duplicates and/or Matrix Spikes are not always relevant/applicable to certain analyses and matrices. Therefore, said QC measures are deemed compliant in these situations by default. See Laboratory Acceptance Criteria for more information

Data Quality Assessment Summary PFG1818

Recommended Holding Time Compliance

Analysis	Sample Number(s)	Date Sampled	Date Extracted	Date Analysed	Compliant
TDS | Water	1-9	28/07/2024	31/07/2024	31/07/2024	Yes
Alkalinity Suite | Water	1-9	28/07/2024	31/07/2024	31/07/2024	Yes
Chloride | Water	1-9	28/07/2024	31/07/2024	31/07/2024	Yes
Dissolved Cations | Water	1-9	28/07/2024	31/07/2024	01/08/2024	Yes
Ion Balance | Water	1-9	28/07/2024	31/07/2024	01/08/2024	Yes
	1-9	28/07/2024	31/07/2024	13/08/2024	Yes
Sulfate | Water	1-9	28/07/2024	31/07/2024	31/07/2024	Yes
Total Organic Carbon | Water	4	28/07/2024	31/07/2024	02/08/2024	Yes
	7	28/07/2024	31/07/2024	07/08/2024	Yes
	1-3, 5-6, 8-9	28/07/2024	31/07/2024	31/07/2024	Yes
Nitrogen - Ammonia | Water	1-9	28/07/2024	31/07/2024	31/07/2024	Yes
BOD | Water	1-9	28/07/2024	06/08/2024	13/08/2024	Yes
COD | Water	1-9	28/07/2024	31/07/2024	31/07/2024	Yes

Outliers: QC Frequency

INORG-091 \| Inorganics - Common Wastewater Parameters (Water) \| Batch BFH2149

Analysis	QC Type	Expected	Reported
BOD	Duplicate	1	0

Quality Control PFG1818

INORG-018 | Inorganics - Physical Parameters (Water) | Batch BFG5153

Analyte	Units	PQL	Blank	DUP1 BFG5153-DUP1# Samp | QC | RPD %	DUP2 PFG1818-05 Samp | QC | RPD %	LCS %
Total Dissolved Solids	mg/L	5.0	<5.0	49.0 | 44.0 | 10.8	393 | 405 | 3.01	92.5

The QC reported was not specifically part of this workorder but formed part of the QC process batch.

INORG-081 | Inorganics - Ionic Balance and Indexes (Water) | Batch BFG5147

Analyte	Units	PQL	Blank	DUP1 PFG1818-01 Samp | QC | RPD %	DUP2 BFG5147-DUP2# Samp | QC | RPD %	LCS %	Spike % PFG1818-02
Chloride	mg/L	1.0	<1.0	4.83 | 4.83 | [NA]	91.0 | 91.1 | 0.0740	99.6	101
Sulfate	mg/L	1.0	<1.0	4.62 | 4.64 | [NA]	8.10 | 8.11 | 0.0827	97.1	105

The QC reported was not specifically part of this workorder but formed part of the QC process batch.

METALS-020 | Inorganics - Ionic Balance and Indexes (Water) | Batch BFG5199

Analyte	Units	PQL	Blank	DUP1 BFG5199-DUP1# Samp | QC | RPD %	DUP2 BFG5199-DUP2# Samp | QC | RPD %	LCS %	Spike % BFG5199-MS1#
Calcium	mg/L	0.50	<0.50	1.34 | 1.34 | [NA]	31.8 | 31.8 | 0.0283	99.4	101
Magnesium	mg/L	0.50	<0.50	1.45 | 1.44 | [NA]	22.1 | 22.1 | 0.389	100	105
Potassium	mg/L	0.50	<0.50	3.60 | 3.54 | 1.77	9.67 | 9.72 | 0.419	98.0	100
Sodium	mg/L	0.50	<0.50	84.0 | 84.0 | 0.0238	83.7 | 84.7 | 1.18	95.9	111
Hardness (calc) equivalent CaCO3	mg/L	3.0	<3.0	9.31 | 9.30 | [NA]	170 | 171 | 0.221	[NA]	[NA]

The QC reported was not specifically part of this workorder but formed part of the QC process batch.

METALS-020 | Inorganics - Ionic Balance and Indexes (Water) | Batch BFG5200

Analyte	Units	PQL	Blank	DUP1 PFG1818-04 Samp | QC | RPD %	DUP2 BFG5200-DUP2# Samp | QC | RPD %	LCS %	Spike % PFG1818-05
Calcium	mg/L	0.50	<0.50	54.9 | 55.1 | 0.413	55.4 | 55.8 | 0.764	99.3	102
Magnesium	mg/L	0.50	<0.50	53.2 | 53.9 | 1.26	50.1 | 49.9 | 0.440	101	117
Potassium	mg/L	0.50	<0.50	5.37 | 5.40 | 0.650	14.1 | 14.1 | 0.0426	96.9	102
Sodium	mg/L	0.50	<0.50	16.3 | 16.4 | 0.545	96.3 | 97.1 | 0.848	95.0	105
Hardness (calc) equivalent CaCO3	mg/L	3.0	<3.0	356 | 359 | 0.937	345 | 345 | 0.0451	[NA]	[NA]

The QC reported was not specifically part of this workorder but formed part of the QC process batch.

INORG-006 | Inorganics - Ionic Balance and Indexes (Water) | Batch BFG5248

Analyte	Units	PQL	Blank	DUP1 BFG5248-DUP1# Samp | QC | RPD %	DUP2 BFG5248-DUP2# Samp | QC | RPD %	LCS %
Bicarbonate Alkalinity as CaCO3	mg/L as CaCO3	5.0	<5.0	279 | 266 | 4.70	257 | 278 | 7.75	[NA]
Carbonate Alkalinity as CaCO3	mg/L as CaCO3	5.0	<5.0	22.5 | 22.0 | [NA]	9.30 | 7.90 | [NA]	[NA]
Hydroxide OH- as CaCO3	mg/L as CaCO3	5.0	<5.0	<5.0 | <5.0 | [NA]	<5.0 | <5.0 | [NA]	[NA]
Total Alkalinity as CaCO3	mg/L as CaCO3	5.0	<5.0	301 | 288 | 4.52	266 | 285 | 7.04	102

The QC reported was not specifically part of this workorder but formed part of the QC process batch.

INORG-079 | Inorganics - Carbon, Nitrogen and Sulfur Species (Water) | Batch BFG5207

Analyte	Units	PQL	Blank	DUP1 BFG5207-DUP1# Samp | QC | RPD %	DUP2 PFG1818-04 Samp | QC | RPD %	LCS %	Spike % BFG5207-MS1#
Total Organic Carbon	mg/L	1.0	<1.0	4.04 | 3.61 | [NA]	1.35 | 1.25 | [NA]	102	107

The QC reported was not specifically part of this workorder but formed part of the QC process batch.

Quality Control PFG1818

INORG-057 | Inorganics - Nutrients (Water) | Batch BFG5246

Analyte	Units	PQL	Blank	DUP1 BFG5246-DUP1# Samp | QC | RPD %	DUP2 PFG1818-01 Samp | QC | RPD %	LCS %	Spike % BFG5246-MS1#
Ammonia as N	mg/L	0.0050	<0.0050	0.174 | 0.173 | 0.748	0.00842 | 0.00868 | [NA]	88.9	99.0

The QC reported was not specifically part of this workorder but formed part of the QC process batch.

INORG-067 | Inorganics - Common Wastewater Parameters (Water) | Batch BFG5152

Analyte	Units	PQL	Blank	DUP1 BFG5152-DUP1# Samp | QC | RPD %	DUP2 PFG1818-01 Samp | QC | RPD %	LCS %
COD	mg O2/L	20	<20	249 | 249 | 0.00	<20 | <20 | [NA]	102

The QC reported was not specifically part of this workorder but formed part of the QC process batch.

INORG-091 | Inorganics - Common Wastewater Parameters (Water) | Batch BFH2149

Analyte	Units	PQL	Blank	LCS %
BOD	mg/L	5.0	<5.0	82.2

Batch QC Comments: [1]

QC Comments

Identifier	Description
[1]	Unable to perform all QC according to our internal guidelines due to the limited amount of sample(s) available for testing.

APPENDIX E MONTHLY OPERATIONAL CHECKLIST (AUGUST 2023 TO JULY 2024)

KWMF Site Inspection Checklist

ENVIRONMENTAL CONSULTANTS

Work Area / Location: WMF

Date and Time: 30/8/23

Inspected by (include all personnel who took part in the inspection)

Name(s): BRET KIMPTON

Position(s): SERVICES MANAGER

Signature(s):

1230

#	Inspection items	Yes	No	N/A	Comments
General site management					
1.	Have all actions raised in the previous inspections been closed out?	☐	☐	☑	
2.	Have all actions from any recent environmental incidents been adequately investigated and appropriately addressed?	☐	☐	☑	
3.	Is the work area free from visible incidents (i.e. chemical / hydrocarbon spills, leachate pools etc.)?	☑	☐	☐	
4.	Have all incidents been reported?	☐	☐	☑	
5.	Is the boundary fence in good working order?	☑	☐	☐	
6.	Is the induction register up to date? Are all staff and contractors working on site being inducted?	☑	☐	☐	
7.	Is the complaints register being used correctly? Are complaints being addressed ?	☑	☐	☐	
8.	Are the weighbridge operators following waste acceptance criteria guidelines in the EMP?	☑	☐	☐	
Water quality management					
9.	Is water quality monitoring being undertaken as per the program in the EMP / EPL?	☑	☑	☐	
10	Are all surface water courses unobstructed?	☑	☐	☐	
11.	Are erosion and sediment control structures intact and maintained (in good working order)?	☑	☐	☐	
12.	Are surface water structures free from erosion or scour?	☑	☐	☐	
13.	Is potentially contaminated storm water prevented from being discharged into the environment?	☑	☐	☐	
14.	Is there any evidence of leachate breakout or runoff from the landfill cells?	☐	☑	☐	
Dust and aesthetics management					
15.	Is the work area free from excessive visible dust?	☑	☐	☐	
16.	Are activities in the area creating minimal dust?	☑	☐	☐	
17.	Is dust suppression of dirt roads and other cleared areas being undertaken where excessive dust is visible?	☑	☐	☐	
18.	Are speed limits being enforced at site to reduce dust?	☑	☐	☐	
19.	Is there scattered rubbish around the site?	☐	☑	☐	
20.	Are there controls in place to catch wind-blown litter? Do these require maintenance?	☐	☑	☐	

KWMF Site Inspection Checklist

ENVIRONMENTAL CONSULTANTS

#	Inspection items	Yes	No	N/A	Comments
	Noise management				
21.	Are all equipment and machinery being maintained to manufacturers standards to prevent noise issues?	☑	☐	☐	
22.	Are any operations occurring outside standard work hours? Have the public, users and surrounding land owners been notified of works?	☑	☐	☐	
	Chemical, oil and fuel management				
23.	Are all chemicals, oils and fuels will be stored appropriately in locked areas that are bunded, impervious areas in accordance with their MSDS?	☑	☐	☐	
24.	Is bunding in good condition?	☑	☐	☐	
25.	Are MSDS available in a folder where the chemicals, oils and fuels are stored?	☑	☐	☐	
26.	Is equipment containing hazardous materials (including hydrocarbons, and hoses/pipes) free of spills/leaks?	☑	☐	☐	
27.	Are adequate spills kits available and fully stocked?	☑	☐	☐	
	Flora and fauna management				
28.	Do clearing works have the required approvals?	☑	☐	☐	
29.	Have any significant fauna sightings been reported to the Site Manager?	☐	☑	☐	
30.	Have any injured fauna been reported to the Site Manager?	☐	☐	☑	
31.	Are speed limits being enforced to minimise potential for fauna impact?	☑	☐	☐	
32.	Are disturbed areas being progressively rehabilitated, and done so with species local to the surrounding environment?	☑	☐	☐	
	Pest and weed management				
33.	Are there any pests and weeds in operational areas?	☐	☑	☐	
34.	Are pests and weeds being managed/controlled on site?	☑	☐	☐	
35.	Are there any signs of pooled water that could provide a breeding ground for mosquitos?	☐	☑	☐	
	Fire prevention				
36.	Are staff undertaking visual monitoring of loads going to landfill cells for evidence of smoking or hot loads?	☑	☐	☐	
37.	Are appropriate hot works procedures being followed?	☑	☐	☐	
38.	Is all fire-fighting equipment in date and accessible?	☑	☐	☐	
39.	Is there a designated smoking area? Is it being used?	☑	☐	☐	
40.	Is the 4m wide fire break (around the perimeter of the KWMF, around buildings and around operational areas) being maintained?	☑	☐	☐	
	Chemical containers (DrumMuster)				
41.	Is the area kept clean and tidy?	☑	☐	☐	
42.	All containers are contained?	☑	☐	☐	
43.	All containers are empty?	☑	☐	☐	
44.	Signage is erected? Not faded?	☑	☐	☐	

KWMF Site Inspection Checklist

ENVIRONMENTAL CONSULTANTS

#	Inspection Items	Yes	No	N/A	Comments
Tyres					
45.	Is the area kept clean and tidy?	☑	☐	☐	
46.	All waste is contained?	☑	☐	☐	
47.	Signage is erected? Not faded?	☐	☑	☐	
48.	Are tyres stacked in accordance with the CEMP?	☑	☐	☐	
49.	Is there sufficient separation between stockpiles for fire access?	☑	☐	☐	
Metal					
50.	Is the area kept clean and tidy?	☑	☐	☐	
51.	All waste is contained?	☑	☐	☐	
52.	Signage is erected? Not faded?	☑	☐	☐	
Green waste					
53.	Is the area kept clean and tidy?	☑	☐	☐	
54.	Is all green waste contained within the area?	☑	☐	☐	
55.	Are there any contaminants e.g. stone, plastic, steel?	☐	☑	☐	
56.	Signage is erected? Not faded?	☑	☐	☐	
57.	Does the green waste require shredding/composting?	☐	☑	☐	
58.	Is there any leachate or discoloured water flowing from the green waste area?	☐	☑	☐	
Transfer Station – batteries, waste oil, gas bottles, skip bins					
59.	Is the area kept clean and tidy?	☑	☐	☐	
60.	All waste is contained?	☑	☐	☐	
61.	Are transfer station skip bins being emptied when full and at least at the close of each working day?	☐	☑	☐	START OF DAY
62.	Are skip bins at the transfer station being cleaned at least monthly to prevent build-up of odours? Do they have a strong odour?	☑	☐	☐	
63.	Signage is erected? Not faded?	☑	☐	☐	
64.	No cross contamination of wastes?	☐	☑	☐	
65.	All waste oil is contained within the bund?	☐	☐	☑	NO WASTE OIL
66.	Empty oil containers are kept within the wheelie bins?	☐	☐	☑	
Landfill cells					
67.	Is cover material being placed as required?	☑	☐	☐	
68.	Is there acceptable plant and people separation at the tip face?	☑	☐	☐	
69.	Is there any evidence of prohibited waste disposal?	☐	☑	☐	
70.	Signage is erected? Not faded?	☐	☐	☐	
Asbestos cell					
71.	Is the area kept clean and tidy?	☑	☐	☐	
72.	All asbestos covered as per Regulations?	☑	☐	☐	
73.	Is there sufficient space for more deposits into the cell?	☑	☐	☐	
74.	Signage is erected? Not faded?	☑	☐	☐	

KWMF Site Inspection Checklist

#	Inspection Items	Yes	No	N/A	Comments
Incidents and reporting					
75.	Have any incidents occurred or been identified that require NT EPA notification?	☐	☐	☐	
76.	Has the appropriate incident response been initiated?	☐	☐	☐	

Issues raised during inspection

#	Identified Hazard	Actions Required	Due Date Responsible Person

Note: These actions need to be entered into the Management System for tracking and closeout with adequate evidence

Other Comments/ Notes:

KWMF Site Inspection Checklist

ENVIRONMENTAL CONSULTANTS

Work Area / Location: WMF

Date and Time: 27/9/23 0800

Inspected by (include all personnel who took part in the inspection)

Name(s): BRETT KIMPTON

Position(s): SERVICES MANAGER

Signature(s):

#	Inspection Items	Yes	No	N/A	Comments
General site management					
1.	Have all actions raised in the previous inspections been closed out?	☐	☐	☑	
2.	Have all actions from any recent environmental incidents been adequately investigated and appropriately addressed?	☐	☐	☑	
3.	Is the work area free from visible incidents (i.e. chemical / hydrocarbon spills, leachate pools etc.)?	☑	☐	☐	
4.	Have all incidents been reported?	☐	☐		
5.	Is the boundary fence in good working order?	☑	☐		
6.	Is the induction register up to date? Are all staff and contractors working on site being inducted?	☑	☐	☐	
7.	Is the complaints register being used correctly? Are complaints being addressed ?	☑	☐	☐	
8.	Are the weighbridge operators following waste acceptance criteria guidelines in the EMP?	☑	☐	☐	
Water quality management					
9.	Is water quality monitoring being undertaken as per the program in the EMP / EPL?	☑	☑	☐	
10	Are all surface water courses unobstructed?	☑	☐	☐	
11.	Are erosion and sediment control structures intact and maintained (in good working order)?	☑	☐	☐	
12.	Are surface water structures free from erosion or scour?	☑	☐	☐	
13.	Is potentially contaminated storm water prevented from being discharged into the environment?	☑	☐	☐	
14.	Is there any evidence of leachate breakout or runoff from the landfill cells?	☒	☑	☐	
Dust and aesthetics management					
15.	Is the work area free from excessive visible dust?	☑	☐	☐	
16.	Are activities in the area creating minimal dust?	☑	☐	☐	
17.	Is dust suppression of dirt roads and other cleared areas being undertaken where excessive dust is visible?	☑	☐	☐	
18.	Are speed limits being enforced at site to reduce dust?	☑	☐	☐	
19.	Is there scattered rubbish around the site?	☐	☑	☐	
20.	Are there controls in place to catch wind-blown litter? Do these require maintenance?	☑	☐	☐	

KWMF Site Inspection Checklist

ENVIRONMENTAL CONSULTANTS

#	Inspection items	Yes	No	N/A	Comments
	Noise management				
21.	Are all equipment and machinery being maintained to manufacturers standards to prevent noise issues?	☑	☐	☐	
22.	Are any operations occurring outside standard work hours? Have the public, users and surrounding land owners been notified of works?	☑	☐	☐	
	Chemical, oil and fuel management				
23.	Are all chemicals, oils and fuels will be stored appropriately in locked areas that are bunded, impervious areas in accordance with their MSDS?	☑	☐	☐	
24.	Is bunding in good condition?	☑	☐	☐	
25.	Are MSDS available in a folder where the chemicals, oils and fuels are stored?	☑	☐	☐	
26.	Is equipment containing hazardous materials (including hydrocarbons, and hoses/pipes) free of spills/leaks?	☑	☐	☐	
27.	Are adequate spills kits available and fully stocked?	☑	☐	☐	
	Flora and fauna management				
28.	Do clearing works have the required approvals?	☑	☐	☐	
29.	Have any significant fauna sightings been reported to the Site Manager?	☐	☑	☐	
30.	Have any injured fauna been reported to the Site Manager?	☐	☐	☑	
31.	Are speed limits being enforced to minimise potential for fauna impact?	☑	☐	☐	
32.	Are disturbed areas being progressively rehabilitated, and done so with species local to the surrounding environment?	☑	☐	☐	
	Pest and weed management				
33.	Are there any pests and weeds in operational areas?	☐	☑	☐	
34.	Are pests and weeds being managed/controlled on site?	☑	☐	☐	
35.	Are there any signs of pooled water that could provide a breeding ground for mosquitos?	☐	☑	☐	
	Fire prevention				
36.	Are staff undertaking visual monitoring of loads going to landfill cells for evidence of smoking or hot loads?	☑	☐	☐	
37.	Are appropriate hot works procedures being followed?	☑	☐	☐	
38.	Is all fire-fighting equipment in date and accessible?	☑	☐	☐	
39.	Is there a designated smoking area? Is it being used?	☑	☐	☐	
40.	Is the 4m wide fire break (around the perimeter of the KWMF, around buildings and around operational areas) being maintained?	☑	☐	☐	
	Chemical containers (DrumMuster)				
41.	Is the area kept clean and tidy?	☑	☐	☐	
42.	All containers are contained?	☑	☐	☐	
43.	All containers are empty?	☑	☐	☐	
44.	Signage is erected? Not faded?	☑	☐	☐	

KWMF Site Inspection Checklist

ENVIRONMENTAL CONSULTANTS

#	Inspection Items	Yes	No	N/A	Comments
Tyres					
45.	Is the area kept clean and tidy?	✓			
46.	All waste is contained?	✓			
47.	Signage is erected? Not faded?		✓		
48.	Are tyres stacked in accordance with the CEMP?	✓			
49.	Is there sufficient separation between stockpiles for fire access?	✓			
Metal					
50.	Is the area kept clean and tidy?	✓			
51.	All waste is contained?	✓			
52.	Signage is erected? Not faded?	✓			
Green waste					
53.	Is the area kept clean and tidy?	✓			
54.	Is all green waste contained within the area?	✓			
55.	Are there any contaminants e.g. stone, plastic, steel?		✓		
56.	Signage is erected? Not faded?	✓			
57.	Does the green waste require shredding/composting?		✓		
58.	Is there any leachate or discoloured water flowing from the green waste area?		✓		
Transfer Station – batteries, waste oil, gas bottles, skip bins					
59.	Is the area kept clean and tidy?	✓			
60.	All waste is contained?	✓			
61.	Are transfer station skip bins being emptied when full and at least at the close of each working day?		✓		START OF DAY
62.	Are skip bins at the transfer station being cleaned at least monthly to prevent build-up of odours? Do they have a strong odour?	✓			
63.	Signage is erected? Not faded?	✓			
64.	No cross contamination of wastes?		✓		
65.	All waste oil is contained within the bund?			✓	
66.	Empty oil containers are kept within the wheelie bins?			✓	NO WASTE OIL
Landfill cells					
67.	Is cover material being placed as required?	✓			
68.	Is there acceptable plant and people separation at the tip face?	✓			
69.	Is there any evidence of prohibited waste disposal?		✓		
70.	Signage is erected? Not faded?	✓			
Asbestos cell					
71.	Is the area kept clean and tidy?	✓			
72.	All asbestos covered as per Regulations?	✓			
73.	Is there sufficient space for more deposits into the cell?	✓			
74.	Signage is erected? Not faded?	✓			

KWMF Site Inspection Checklist

ENVIRONMENTAL CONSULTANTS

#	Inspection Items	Yes	No	N/A	Comments
Incidents and reporting					
75.	Have any incidents occurred or been identified that require NT EPA notification?	☐	☑	☐	
76.	Has the appropriate incident response been initiated?	☐	☑	☐	

Issues raised during inspection

#	Identified Hazard	Actions Required	Due Date Responsible Person

Note: These actions need to be entered into the Management System for tracking and closeout with adequate evidence

Other Comments/ Notes:

KWMF Site Inspection Checklist

ENVIRONMENTAL CONSULTANTS

Work Area / Location: WMF

Date and Time: 26/10/23 0700

Inspected by (include all personnel who took part in the inspection)

Name(s): BRETT KIMPTON

Position(s): SERVICES MANAGER

Signature(s):

#	Inspection items	Yes	No	N/A	Comments
General site management					
1.	Have all actions raised in the previous inspections been closed out?	☐	☐	☑	
2.	Have all actions from any recent environmental incidents been adequately investigated and appropriately addressed?	☐	☐	☑	
3.	Is the work area free from visible incidents (i.e. chemical / hydrocarbon spills, leachate pools etc.)?	☑	☐	☐	
4.	Have all incidents been reported?	☐	☐	☑	
5.	Is the boundary fence in good working order?	☑	☐	☐	
6.	Is the induction register up to date? Are all staff and contractors working on site being inducted?	☑	☐	☐	
7.	Is the complaints register being used correctly? Are complaints being addressed ?	☑	☐	☐	
8.	Are the weighbridge operators following waste acceptance criteria guidelines in the EMP?	☑	☐	☐	
Water quality management					
9.	Is water quality monitoring being undertaken as per the program in the EMP / EPL?	☑	☑	☐	
10	Are all surface water courses unobstructed?	☑	☐	☐	
11.	Are erosion and sediment control structures intact and maintained (in good working order)?	☑	☐	☐	
12.	Are surface water structures free from erosion or scour?	☑	☐	☐	
13.	Is potentially contaminated storm water prevented from being discharged into the environment?	☑	☐	☐	
14.	Is there any evidence of leachate breakout or runoff from the landfill cells?	☐	☑	☐	
Dust and aesthetics management					
15.	Is the work area free from excessive visible dust?	☑	☐	☐	
16.	Are activities in the area creating minimal dust?	☑	☐	☐	
17.	Is dust suppression of dirt roads and other cleared areas being undertaken where excessive dust is visible?	☑	☐	☐	
18.	Are speed limits being enforced at site to reduce dust?	☑	☐	☐	
19.	Is there scattered rubbish around the site?	☐	☑	☐	
20.	Are there controls in place to catch wind-blown litter? Do these require maintenance?	☑	☐	☐	

KWMF Site Inspection Checklist

ENVIRONMENTAL CONSULTANTS

#	Inspection items	Yes	No	N/A	Comments
Noise management					
21.	Are all equipment and machinery being maintained to manufacturers standards to prevent noise issues?	☑	☐	☐	
22.	Are any operations occurring outside standard work hours? Have the public, users and surrounding land owners been notified of works?	☐	☐	☐	
Chemical, oil and fuel management					
23.	Are all chemicals, oils and fuels will be stored appropriately in locked areas that are bunded, impervious areas in accordance with their MSDS?	☑	☐	☐	
24.	Is bunding in good condition?	☑	☐	☐	
25.	Are MSDS available in a folder where the chemicals, oils and fuels are stored?	☑	☐	☐	
26.	Is equipment containing hazardous materials (including hydrocarbons, and hoses/pipes) free of spills/leaks?	☑	☐	☐	
27.	Are adequate spills kits available and fully stocked?	☑	☐	☐	
Flora and fauna management					
28.	Do clearing works have the required approvals?	☑	☐	☐	
29.	Have any significant fauna sightings been reported to the Site Manager?	☐	☑	☐	
30.	Have any injured fauna been reported to the Site Manager?	☐	☑	☐	
31.	Are speed limits being enforced to minimise potential for fauna impact?	☑	☐	☐	
32.	Are disturbed areas being progressively rehabilitated, and done so with species local to the surrounding environment?	☑	☐	☐	
Pest and weed management					
33.	Are there any pests and weeds in operational areas?	☐	☑	☐	
34.	Are pests and weeds being managed/controlled on site?	☑	☐	☐	
35.	Are there any signs of pooled water that could provide a breeding ground for mosquitos?	☐	☑	☐	
Fire prevention					
36.	Are staff undertaking visual monitoring of loads going to landfill cells for evidence of smoking or hot loads?	☑	☐	☐	
37.	Are appropriate hot works procedures being followed?	☑	☐	☐	
38.	Is all fire-fighting equipment in date and accessible?	☑	☐	☐	
39.	Is there a designated smoking area? Is it being used?	☑	☐	☐	
40.	Is the 4m wide fire break (around the perimeter of the KWMF, around buildings and around operational areas) being maintained?	☑	☐	☐	
Chemical containers (DrumMuster)					
41.	Is the area kept clean and tidy?	☑	☐	☐	
42.	All containers are contained?	☑	☐	☐	
43.	All containers are empty?	☑	☐	☐	
44.	Signage is erected? Not faded?	☑	☐	☐	

KWMF Site Inspection Checklist

ENVIRONMENTAL CONSULTANTS

#	Inspection Items	Yes	No	N/A	Comments
Tyres					
45.	Is the area kept clean and tidy?	☑	☐	☐	
46.	All waste is contained?	☑	☐	☐	
47.	Signage is erected? Not faded?	☑	☐	☐	
48.	Are tyres stacked in accordance with the CEMP?	☑	☐	☐	
49.	Is there sufficient separation between stockpiles for fire access?	☑	☐	☐	
Metal					
50.	Is the area kept clean and tidy?	☑	☐	☐	
51.	All waste is contained?	☑	☐	☐	
52.	Signage is erected? Not faded?	☑	☐	☐	
Green waste					
53.	Is the area kept clean and tidy?	☑	☐	☐	
54.	Is all green waste contained within the area?	☑	☐	☐	
55.	Are there any contaminants e.g. stone, plastic, steel?	☐	☑	☐	
56.	Signage is erected? Not faded?	☑	☐	☐	
57.	Does the green waste require shredding/composting?	☐	☑	☐	
58.	Is there any leachate or discoloured water flowing from the green waste area?	☐	☑	☐	
Transfer Station – batteries, waste oil, gas bottles, skip bins					
59.	Is the area kept clean and tidy?	☑	☐	☐	
60.	All waste is contained?	☑	☐	☐	
61.	Are transfer station skip bins being emptied when full and at least at the close of each working day?	☑	☐	☐	
62.	Are skip bins at the transfer station being cleaned at least monthly to prevent build-up of odours? Do they have a strong odour?	☑	☐	☐	
63.	Signage is erected? Not faded?	☑	☐	☐	
64.	No cross contamination of wastes?	☑	☒	☐	
65.	All waste oil is contained within the bund?	☐	☐	☑	
66.	Empty oil containers are kept within the wheelie bins?	☐	☐	☑	
Landfill cells					
67.	Is cover material being placed as required?	☑	☐	☐	
68.	Is there acceptable plant and people separation at the tip face?	☑	☐	☐	
69.	Is there any evidence of prohibited waste disposal?	☐	☑	☐	
70.	Signage is erected? Not faded?	☑	☐	☐	
Asbestos cell					
71.	Is the area kept clean and tidy?	☑	☐	☐	
72.	All asbestos covered as per Regulations?	☑	☐	☐	
73.	Is there sufficient space for more deposits into the cell?	☑	☐	☐	
74.	Signage is erected? Not faded?	☑	☐	☐	

KWMF Site Inspection Checklist

#	Inspection items	Yes	No	N/A	Comments
Incidents and reporting					
75.	Have any incidents occurred or been identified that require NT EPA notification?	☐	☑	☐	
76.	Has the appropriate incident response been initiated?	☐	☐	☑	

Issues raised during inspection

#	Identified Hazard	Actions Required	Due Date Responsible Person

Note: These actions need to be entered into the Management System for tracking and closeout with adequate evidence

Other Comments/ Notes:

KWMF Site Inspection Checklist

ENVIRONMENTAL CONSULTANTS

Work Area / Location: WMF

Date and Time: 30/11/23 0630.

Inspected by (include all personnel who took part in the inspection)

Name(s): BRETT KIMPTON

Position(s): SERVICES MANAGER

Signature(s):

#	Inspection items	Yes	No	N/A	Comments
General site management					
1.	Have all actions raised in the previous inspections been closed out?	☐	☐	☑	
2.	Have all actions from any recent environmental incidents been adequately investigated and appropriately addressed?	☐	☐	☐	
3.	Is the work area free from visible incidents (i.e. chemical / hydrocarbon spills, leachate pools etc.)?	☑	☐	☐	
4.	Have all incidents been reported?	☐	☐	☑	
5.	Is the boundary fence in good working order?	☑	☐	☐	
6.	Is the induction register up to date? Are all staff and contractors working on site being inducted?	☑	☐	☐	
7.	Is the complaints register being used correctly? Are complaints being addressed ?	☑	☐	☐	
8.	Are the weighbridge operators following waste acceptance criteria guidelines in the EMP?	☑	☐	☐	
Water quality management					
9.	Is water quality monitoring being undertaken as per the program in the EMP / EPL?	☑	☒	☐	
10	Are all surface water courses unobstructed?	☑	☐	☐	
11.	Are erosion and sediment control structures intact and maintained (in good working order)?	☑	☐	☐	
12.	Are surface water structures free from erosion or scour?	☑	☐	☐	
13.	Is potentially contaminated storm water prevented from being discharged into the environment?	☑	☐	☐	
14.	Is there any evidence of leachate breakout or runoff from the landfill cells?	☐	☐	☑	
Dust and aesthetics management					
15.	Is the work area free from excessive visible dust?	☑	☐	☐	
16.	Are activities in the area creating minimal dust?	☑	☐	☐	
17.	Is dust suppression of dirt roads and other cleared areas being undertaken where excessive dust is visible?	☑	☐	☐	
18.	Are speed limits being enforced at site to reduce dust?	☑	☐	☐	
19.	Is there scattered rubbish around the site?	☐	☐	☑	
20.	Are there controls in place to catch wind-blown litter? Do these require maintenance?	☑	☐	☐	

KWMF Site Inspection Checklist

ENVIRONMENTAL CONSULTANTS

#	Inspection items	Yes	No	N/A	Comments
	Noise management				
21.	Are all equipment and machinery being maintained to manufacturers standards to prevent noise issues?	☑	☐	☐	
22.	Are any operations occurring outside standard work hours? Have the public, users and surrounding land owners been notified of works?	☑	☐	☐	
	Chemical, oil and fuel management				
23.	Are all chemicals, oils and fuels will be stored appropriately in locked areas that are bunded, impervious areas in accordance with their MSDS?	☑	☐	☐	
24.	Is bunding in good condition?	☑	☐	☐	
25.	Are MSDS available in a folder where the chemicals, oils and fuels are stored?	☑	☐	☐	
26.	Is equipment containing hazardous materials (including hydrocarbons, and hoses/pipes) free of spills/leaks?	☑	☐	☐	
27.	Are adequate spills kits available and fully stocked?	☑	☐	☐	
	Flora and fauna management				
28.	Do clearing works have the required approvals?	☑	☐	☐	
29.	Have any significant fauna sightings been reported to the Site Manager?	☐	☑	☐	
30.	Have any injured fauna been reported to the Site Manager?	☐	☑	☐	
31.	Are speed limits being enforced to minimise potential for fauna impact?	☑	☐	☐	
32.	Are disturbed areas being progressively rehabilitated, and done so with species local to the surrounding environment?	☑	☐	☐	
	Pest and weed management				
33.	Are there any pests and weeds in operational areas?	☐	☑	☐	
34.	Are pests and weeds being managed/controlled on site?	☑	☐	☐	
35.	Are there any signs of pooled water that could provide a breeding ground for mosquitos?	☐	☑	☐	
	Fire prevention				
36.	Are staff undertaking visual monitoring of loads going to landfill cells for evidence of smoking or hot loads?	☑	☐	☐	
37.	Are appropriate hot works procedures being followed?	☑	☐	☐	
38.	Is all fire-fighting equipment in date and accessible?	☑	☐	☐	
39.	Is there a designated smoking area? Is it being used?	☑	☐	☐	
40.	Is the 4m wide fire break (around the perimeter of the KWMF, around buildings and around operational areas) being maintained?	☑	☐	☐	
	Chemical containers (DrumMuster)				
41.	Is the area kept clean and tidy?	☑	☐	☐	
42.	All containers are contained?	☐	☐	☐	
43.	All containers are empty?	☑	☐	☐	
44.	Signage is erected? Not faded?	☑	☐	☐	

KWMF Site Inspection Checklist

ENVIRONMENTAL CONSULTANTS

#	Inspection items	Yes	No	N/A	Comments
Tyres					
45.	Is the area kept clean and tidy?	☑	☐	☐	
46.	All waste is contained?	☑	☐	☐	
47.	Signage is erected? Not faded?	☑	☐	☐	
48.	Are tyres stacked in accordance with the CEMP?	☑	☐	☐	
49.	Is there sufficient separation between stockpiles for fire access?	☑	☐	☐	
Metal					
50.	Is the area kept clean and tidy?	☑	☐	☐	
51.	All waste is contained?	☑	☐	☐	
52.	Signage is erected? Not faded?	☐	☐	☐	
Green waste					
53.	Is the area kept clean and tidy?	☑	☐	☐	
54.	Is all green waste contained within the area?	☑	☐	☐	
55.	Are there any contaminants e.g. stone, plastic, steel?	☐	☐	☑	
56.	Signage is erected? Not faded?	☑	☐	☐	
57.	Does the green waste require shredding/composting?	☐	☑	☐	
58.	Is there any leachate or discoloured water flowing from the green waste area?	☐	☐	☑	
Transfer Station – batteries, waste oil, gas bottles, skip bins					
59.	Is the area kept clean and tidy?	☑	☐	☐	
60.	All waste is contained?	☑	☐	☐	
61.	Are transfer station skip bins being emptied when full and at least at the close of each working day?	☑	☐	☐	
62.	Are skip bins at the transfer station being cleaned at least monthly to prevent build-up of odours? Do they have a strong odour?	☑	☐	☐	
63.	Signage is erected? Not faded?	☑	☐	☐	
64.	No cross contamination of wastes?	☑	☐	☐	
65.	All waste oil is contained within the bund?	☐	☐	☑	
66.	Empty oil containers are kept within the wheelie bins?	☐	☐	☑	
Landfill cells					
67.	Is cover material being placed as required?	☑	☐	☐	
68.	Is there acceptable plant and people separation at the tip face?	☑	☐	☐	
69.	Is there any evidence of prohibited waste disposal?	☐	☐	☑	
70.	Signage is erected? Not faded?	☐	☐	☐	
Asbestos cell					
71.	Is the area kept clean and tidy?	☑	☐	☐	
72.	All asbestos covered as per Regulations?	☑	☐	☐	
73.	Is there sufficient space for more deposits into the cell?	☑	☐	☐	
74.	Signage is erected? Not faded?	☑	☐	☐	

KWMF Site Inspection Checklist

#	Inspection Items	Yes	No	N/A	Comments
Incidents and reporting					
75.	Have any incidents occurred or been identified that require NT EPA notification?	☐	☑	☐	
76.	Has the appropriate incident response been initiated?	☐	☐	☑	

Issues raised during inspection

#	Identified Hazard	Actions Required	Due Date	Responsible Person

Note: These actions need to be entered into the Management System for tracking and closeout with adequate evidence

Other Comments/ Notes:

KWMF Site Inspection Checklist

ENVIRONMENTAL CONSULTANTS

Work Area / Location: WMF

Date and Time: 28/12/23 0900

Inspected by (include all personnel who took part in the inspection)

Name(s): BRETT KIMPTON

Position(s): SERVICES MANAGER

Signature(s):

#	Inspection items	Yes	No	N/A	Comments
General site management					
1.	Have all actions raised in the previous inspections been closed out?	☐	☐	☑	
2.	Have all actions from any recent environmental incidents been adequately investigated and appropriately addressed?	☐	☐	☑	
3.	Is the work area free from visible incidents (i.e. chemical / hydrocarbon spills, leachate pools etc.)?	☑	☐	☐	
4.	Have all incidents been reported?	☐	☐	☑	
5.	Is the boundary fence in good working order?	☑	☐	☐	
6.	Is the induction register up to date? Are all staff and contractors working on site being inducted?	☑	☐	☐	
7.	Is the complaints register being used correctly? Are complaints being addressed ?	☑	☐	☐	
8.	Are the weighbridge operators following waste acceptance criteria guidelines in the EMP?	☑	☐	☐	
Water quality management					
9.	Is water quality monitoring being undertaken as per the program in the EMP / EPL?	☑	☒	☐	
10	Are all surface water courses unobstructed?	☑	☐	☐	
11.	Are erosion and sediment control structures intact and maintained (in good working order)?	☑	☐	☐	
12.	Are surface water structures free from erosion or scour?	☑	☐	☐	
13.	Is potentially contaminated storm water prevented from being discharged into the environment?	☑	☐	☐	
14.	Is there any evidence of leachate breakout or runoff from the landfill cells?	☐	☑	☐	
Dust and aesthetics management					
15.	Is the work area free from excessive visible dust?	☑	☐	☐	
16.	Are activities in the area creating minimal dust?	☑	☐	☐	
17.	Is dust suppression of dirt roads and other cleared areas being undertaken where excessive dust is visible?	☑	☐	☐	
18.	Are speed limits being enforced at site to reduce dust?	☑	☐	☐	
19.	Is there scattered rubbish around the site?	☐	☑	☐	
20.	Are there controls in place to catch wind-blown litter? Do these require maintenance?	☑	☐	☐	

KWMF Site Inspection Checklist

ENVIRONMENTAL CONSULTANTS

#	Inspection items	Yes	No	N/A	Comments
	Noise management				
21.	Are all equipment and machinery being maintained to manufacturers standards to prevent noise issues?	☑	☐	☐	
22.	Are any operations occurring outside standard work hours? Have the public, users and surrounding land owners been notified of works?	☑	☐	☐	
	Chemical, oil and fuel management				
23.	Are all chemicals, oils and fuels will be stored appropriately in locked areas that are bunded, impervious areas in accordance with their MSDS?	☑	☐	☐	
24.	Is bunding in good condition?	☑	☐	☐	
25.	Are MSDS available in a folder where the chemicals, oils and fuels are stored?	☑	☐	☐	
26.	Is equipment containing hazardous materials (including hydrocarbons, and hoses/pipes) free of spills/leaks?	☑	☐	☐	
27.	Are adequate spills kits available and fully stocked?	☑	☐	☐	
	Flora and fauna management				
28.	Do clearing works have the required approvals?	☑	☐	☐	
29.	Have any significant fauna sightings been reported to the Site Manager?	☐	☑	☐	
30.	Have any injured fauna been reported to the Site Manager?	☐	☐	☐	
31.	Are speed limits being enforced to minimise potential for fauna impact?	☑	☐	☐	
32.	Are disturbed areas being progressively rehabilitated, and done so with species local to the surrounding environment?	☑	☐	☐	
	Pest and weed management				
33.	Are there any pests and weeds in operational areas?	☐	☑	☐	
34.	Are pests and weeds being managed/controlled on site?	☑	☐	☐	
35.	Are there any signs of pooled water that could provide a breeding ground for mosquitos?	☐	☐	☑	
	Fire prevention				
36.	Are staff undertaking visual monitoring of loads going to landfill cells for evidence of smoking or hot loads?	☑	☐	☐	
37.	Are appropriate hot works procedures being followed?	☑	☐	☐	
38.	Is all fire-fighting equipment in date and accessible?	☑	☐	☐	
39.	Is there a designated smoking area? Is it being used?	☑	☐	☐	
40.	Is the 4m wide fire break (around the perimeter of the KWMF, around buildings and around operational areas) being maintained?	☑	☐	☐	
	Chemical containers (DrumMuster)				
41.	Is the area kept clean and tidy?	☑	☐	☐	
42.	All containers are contained?	☑	☐	☐	
43.	All containers are empty?	☑	☑	☐	
44.	Signage is erected? Not faded?	☑	☐	☐	

KWMF Site Inspection Checklist

ENVIRONMENTAL CONSULTANTS

#	Inspection Items	Yes	No	N/A	Comments
Tyres					
45.	Is the area kept clean and tidy?	☑	☐	☐	
46.	All waste is contained?	☑	☐	☐	
47.	Signage is erected? Not faded?	☑	☐	☐	
48.	Are tyres stacked in accordance with the CEMP?	☑	☐	☐	
49.	Is there sufficient separation between stockpiles for fire access?	☑	☐	☐	
Metal					
50.	Is the area kept clean and tidy?	☑	☐	☐	
51.	All waste is contained?	☑	☐	☐	
52.	Signage is erected? Not faded?	☑	☐	☐	
Green waste					
53.	Is the area kept clean and tidy?	☑	☐	☐	
54.	Is all green waste contained within the area?	☑	☐	☐	
55.	Are there any contaminants e.g. stone, plastic, steel?	☐	☑	☐	
56.	Signage is erected? Not faded?	☑	☐	☐	
57.	Does the green waste require shredding/composting?	☐	☑	☐	
58.	Is there any leachate or discoloured water flowing from the green waste area?	☐	☐	☑	
Transfer Station – batteries, waste oil, gas bottles, skip bins					
59.	Is the area kept clean and tidy?	☑	☐	☐	
60.	All waste is contained?	☑	☐	☐	
61.	Are transfer station skip bins being emptied when full and at least at the close of each working day?	☑	☐	☐	
62.	Are skip bins at the transfer station being cleaned at least monthly to prevent build-up of odours? Do they have a strong odour?	☑	☐	☐	
63.	Signage is erected? Not faded?	☑	☐	☐	
64.	No cross contamination of wastes?	☑	☐	☐	
65.	All waste oil is contained within the bund?	☐	☐	☑	
66.	Empty oil containers are kept within the wheelie bins?	☐	☐	☐	
Landfill cells					
67.	Is cover material being placed as required?	☑	☐	☐	
68.	Is there acceptable plant and people separation at the tip face?	☑	☐	☐	
69.	Is there any evidence of prohibited waste disposal?	☐	☑	☐	
70.	Signage is erected? Not faded?	☑	☐	☐	
Asbestos cell					
71.	Is the area kept clean and tidy?	☑	☐	☐	
72.	All asbestos covered as per Regulations?	☑	☐	☐	
73.	Is there sufficient space for more deposits into the cell?	☑	☐	☐	
74.	Signage is erected? Not faded?	☑	☐	☐	

KWMF Site Inspection Checklist

#	Inspection Items	Yes	No	N/A	Comments
Incidents and reporting					
75.	Have any incidents occurred or been identified that require NT EPA notification?	☐	☑	☐	
76.	Has the appropriate incident response been initiated?	☐	☐	☑	

Issues raised during inspection

#	Identified Hazard	Actions Required	Due Date Responsible Person

Note: These actions need to be entered into the Management System for tracking and closeout with adequate evidence

Other Comments/ Notes:

KWMF Site Inspection Checklist

ENVIRONMENTAL CONSULTANTS

Work Area / Location: WMF

Date and Time: 29/1/24

Inspected by (include all personnel who took part in the inspection)

Name(s): BRET KIMPTON

Position(s): SERVICES MANAGER

Signature(s):

#	Inspection items	Yes	No	N/A	Comments
General site management					
1.	Have all actions raised in the previous inspections been closed out?	☐	☐	☑	
2.	Have all actions from any recent environmental incidents been adequately investigated and appropriately addressed?	☐	☐	☑	
3.	Is the work area free from visible incidents (i.e. chemical / hydrocarbon spills, leachate pools etc.)?	☑	☐	☐	
4.	Have all incidents been reported?	☐	☐	☑	
5.	Is the boundary fence in good working order?	☑	☐	☐	
6.	Is the induction register up to date? Are all staff and contractors working on site being inducted?	☑	☐	☐	
7.	Is the complaints register being used correctly? Are complaints being addressed ?	☑	☐	☐	
8.	Are the weighbridge operators following waste acceptance criteria guidelines in the EMP?	☑	☐	☐	
Water quality management					
9.	Is water quality monitoring being undertaken as per the program in the EMP / EPL?	☑	☒	☐	
10	Are all surface water courses unobstructed?	☑	☐	☐	
11.	Are erosion and sediment control structures intact and maintained (in good working order)?	☑	☐	☐	
12.	Are surface water structures free from erosion or scour?	☑	☐	☐	
13.	Is potentially contaminated storm water prevented from being discharged into the environment?	☑	☐	☐	
14.	Is there any evidence of leachate breakout or runoff from the landfill cells?	☐	☑	☐	
Dust and aesthetics management					
15.	Is the work area free from excessive visible dust?	☑	☐	☐	
16.	Are activities in the area creating minimal dust?	☑	☐	☐	
17.	Is dust suppression of dirt roads and other cleared areas being undertaken where excessive dust is visible?	☑	☐	☐	
18.	Are speed limits being enforced at site to reduce dust?	☑	☐	☐	
19.	Is there scattered rubbish around the site?	☐	☑	☐	
20.	Are there controls in place to catch wind-blown litter? Do these require maintenance?	☑	☐	☐	

KWMF Site Inspection Checklist

ENVIRONMENTAL CONSULTANTS

#	Inspection items	Yes	No	N/A	Comments
	Noise management				
21.	Are all equipment and machinery being maintained to manufacturers standards to prevent noise issues?	☑	☐	☐	
22.	Are any operations occurring outside standard work hours? Have the public, users and surrounding land owners been notified of works?	☑	☐	☐	
	Chemical, oil and fuel management				
23.	Are all chemicals, oils and fuels will be stored appropriately in locked areas that are bunded, impervious areas in accordance with their MSDS?	☑	☐	☐	
24.	Is bunding in good condition?	☑	☐	☐	
25.	Are MSDS available in a folder where the chemicals, oils and fuels are stored?	☑	☐	☐	
26.	Is equipment containing hazardous materials (including hydrocarbons, and hoses/pipes) free of spills/leaks?	☑	☐	☐	
27.	Are adequate spills kits available and fully stocked?	☑	☐	☐	
	Flora and fauna management				
28.	Do clearing works have the required approvals?	☑	☐	☐	
29.	Have any significant fauna sightings been reported to the Site Manager?	☐	☑	☐	
30.	Have any injured fauna been reported to the Site Manager?	☐	☑	☐	
31.	Are speed limits being enforced to minimise potential for fauna impact?	☑	☐	☐	
32.	Are disturbed areas being progressively rehabilitated, and done so with species local to the surrounding environment?	☑	☐	☐	
	Pest and weed management				
33.	Are there any pests and weeds in operational areas?	☐	☑	☐	
34.	Are pests and weeds being managed/controlled on site?	☑	☐	☐	
35.	Are there any signs of pooled water that could provide a breeding ground for mosquitos?	☐	☑	☐	
	Fire prevention				
36.	Are staff undertaking visual monitoring of loads going to landfill cells for evidence of smoking or hot loads?	☑	☐	☐	
37.	Are appropriate hot works procedures being followed?	☑	☐	☐	
38.	Is all fire-fighting equipment in date and accessible?	☑	☐	☐	
39.	Is there a designated smoking area? Is it being used?	☑	☐	☐	
40.	Is the 4m wide fire break (around the perimeter of the KWMF, around buildings and around operational areas) being maintained?	☑	☐	☐	
	Chemical containers (DrumMuster)				
41.	Is the area kept clean and tidy?	☑	☐	☐	
42.	All containers are contained?	☑	☐	☐	
43.	All containers are empty?	☑	☐	☐	
44.	Signage is erected? Not faded?	☑	☐	☐	

KWMF Site Inspection Checklist

ENVIRONMENTAL CONSULTANTS

#	Inspection items	Yes	No	N/A	Comments
Tyres					
45.	Is the area kept clean and tidy?	☑	☐	☐	
46.	All waste is contained?	☑	☐	☐	
47.	Signage is erected? Not faded?	☑	☐	☐	
48.	Are tyres stacked in accordance with the CEMP?	☑	☐	☐	
49.	Is there sufficient separation between stockpiles for fire access?	☑	☐	☐	
Metal					
50.	Is the area kept clean and tidy?	☑	☐	☐	
51.	All waste is contained?	☐	☐	☐	
52.	Signage is erected? Not faded?	☐	☐	☐	
Green waste					
53.	Is the area kept clean and tidy?	☑	☐	☐	
54.	Is all green waste contained within the area?	☐	☐	☐	
55.	Are there any contaminants e.g. stone, plastic, steel?	☐	☑	☐	
56.	Signage is erected? Not faded?	☐	☐	☐	
57.	Does the green waste require shredding/composting?	☐	☑	☐	
58.	Is there any leachate or discoloured water flowing from the green waste area?	☐	☐	☐	
Transfer Station – batteries, waste oil, gas bottles, skip bins					
59.	Is the area kept clean and tidy?	☑	☐	☐	
60.	All waste is contained?	☑	☐	☐	
61.	Are transfer station skip bins being emptied when full and at least at the close of each working day?	☑	☐	☐	
62.	Are skip bins at the transfer station being cleaned at least monthly to prevent build-up of odours? Do they have a strong odour?	☑	☐	☐	
63.	Signage is erected? Not faded?	☑	☐	☐	
64.	No cross contamination of wastes?	☑	☐	☐	
65.	All waste oil is contained within the bund?	☐	☐	☑	
66.	Empty oil containers are kept within the wheelie bins?	☐	☐	☑	
Landfill cells					
67.	Is cover material being placed as required?	☑	☐	☐	
68.	Is there acceptable plant and people separation at the tip face?	☑	☐	☐	
69.	Is there any evidence of prohibited waste disposal?	☐	☐	☐	
70.	Signage is erected? Not faded?	☐	☐	☐	
Asbestos cell					
71.	Is the area kept clean and tidy?	☑	☐	☐	
72.	All asbestos covered as per Regulations?	☑	☐	☐	
73.	Is there sufficient space for more deposits into the cell?	☑	☐	☐	
74.	Signage is erected? Not faded?	☐	☐	☐	

KWMF Site Inspection Checklist

#	Inspection items	Yes	No	N/A	Comments
Incidents and reporting					
75.	Have any incidents occurred or been identified that require NT EPA notification?	☐	☑	☐	
76.	Has the appropriate incident response been initiated?	☐	☐	☑	

Issues raised during inspection

#	Identified Hazard	Actions Required	Due Date Responsible Person

Note: These actions need to be entered into the Management System for tracking and closeout with adequate evidence

Other Comments/ Notes:

KWMF Site Inspection Checklist

ENVIRONMENTAL CONSULTANTS

Work Area / Location: KWMF

Date and Time: 27/2/24 9AM

Inspected by (include all personnel who took part in the inspection)

Name(s): BRETT KIMPTON

Position(s): SERVICES MANAGER

Signature(s):

#	Inspection items	Yes	No	N/A	Comments
General site management					
1.	Have all actions raised in the previous inspections been closed out?	☐	☐	☑	
2.	Have all actions from any recent environmental incidents been adequately investigated and appropriately addressed?	☐	☐	☑	
3.	Is the work area free from visible incidents (i.e. chemical / hydrocarbon spills, leachate pools etc.)?	☑	☐	☐	
4.	Have all incidents been reported?	☐	☐	☑	
5.	Is the boundary fence in good working order?	☑	☐	☐	
6.	Is the induction register up to date? Are all staff and contractors working on site being inducted?	☑	☐	☐	
7.	Is the complaints register being used correctly? Are complaints being addressed ?	☑	☐	☐	
8.	Are the weighbridge operators following waste acceptance criteria guidelines in the EMP?	☑	☐	☐	
Water quality management					
9.	Is water quality monitoring being undertaken as per the program in the EMP / EPL?	☑	☐	☐	
10	Are all surface water courses unobstructed?	☑	☐	☐	
11.	Are erosion and sediment control structures intact and maintained (in good working order)?	☑	☐	☐	
12.	Are surface water structures free from erosion or scour?	☑	☐	☐	
13.	Is potentially contaminated storm water prevented from being discharged into the environment?	☑	☐	☐	
14.	Is there any evidence of leachate breakout or runoff from the landfill cells?	☐	☑	☐	
Dust and aesthetics management					
15.	Is the work area free from excessive visible dust?	☑	☐	☐	
16.	Are activities in the area creating minimal dust?	☑	☐	☐	
17.	Is dust suppression of dirt roads and other cleared areas being undertaken where excessive dust is visible?	☑	☐	☐	
18.	Are speed limits being enforced at site to reduce dust?	☑	☐	☐	
19.	Is there scattered rubbish around the site?	☐	☑	☐	
20.	Are there controls in place to catch wind-blown litter? Do these require maintenance?	☑	☐	☐	

KWMF Site Inspection Checklist

ENVIRONMENTAL CONSULTANTS

#	Inspection items	Yes	No	N/A	Comments
	Noise management				
21.	Are all equipment and machinery being maintained to manufacturers standards to prevent noise issues?	☑	☐	☐	
22.	Are any operations occurring outside standard work hours? Have the public, users and surrounding land owners been notified of works?	☑	☐	☐	
	Chemical, oil and fuel management				
23.	Are all chemicals, oils and fuels will be stored appropriately in locked areas that are bunded, impervious areas in accordance with their MSDS?	☑	☐	☐	
24.	Is bunding in good condition?	☑	☐	☐	
25.	Are MSDS available in a folder where the chemicals, oils and fuels are stored?	☑	☐	☐	
26.	Is equipment containing hazardous materials (including hydrocarbons, and hoses/pipes) free of spills/leaks?	☑	☐	☐	
27.	Are adequate spills kits available and fully stocked?	☑	☐	☐	
	Flora and fauna management				
28.	Do clearing works have the required approvals?	☑	☐	☐	
29.	Have any significant fauna sightings been reported to the Site Manager?	☐	☑	☐	
30.	Have any injured fauna been reported to the Site Manager?	☐	☑	☐	
31.	Are speed limits being enforced to minimise potential for fauna impact?	☑	☐	☐	
32.	Are disturbed areas being progressively rehabilitated, and done so with species local to the surrounding environment?	☑	☐	☐	
	Pest and weed management				
33.	Are there any pests and weeds in operational areas?	☐	☑	☐	
34.	Are pests and weeds being managed/controlled on site?	☑	☐	☐	
35.	Are there any signs of pooled water that could provide a breeding ground for mosquitos?	☐	☑	☐	
	Fire prevention				
36.	Are staff undertaking visual monitoring of loads going to landfill cells for evidence of smoking or hot loads?	☑	☐	☐	
37.	Are appropriate hot works procedures being followed?	☑	☐	☐	
38.	Is all fire-fighting equipment in date and accessible?	☑	☐	☐	
39.	Is there a designated smoking area? Is it being used?	☑	☐	☐	
40.	Is the 4m wide fire break (around the perimeter of the KWMF, around buildings and around operational areas) being maintained?	☑	☐	☐	
	Chemical containers (DrumMuster)				
41.	Is the area kept clean and tidy?	☑	☐	☐	
42.	All containers are contained?	☑	☐	☐	
43.	All containers are empty?	☑	☐	☐	
44.	Signage is erected? Not faded?	☑	☐	☐	

KWMF Site Inspection Checklist

#	Inspection items	Yes	No	N/A	Comments
Tyres					
45.	Is the area kept clean and tidy?	☑	☐	☐	
46.	All waste is contained?	☑	☐	☐	
47.	Signage is erected? Not faded?	☑	☐	☐	
48.	Are tyres stacked in accordance with the CEMP?	☑	☐	☐	
49.	Is there sufficient separation between stockpiles for fire access?	☐	☐	☐	
Metal					
50.	Is the area kept clean and tidy?	☑	☐	☐	
51.	All waste is contained?	☑	☐	☐	
52.	Signage is erected? Not faded?	☑	☐	☐	
Green waste					
53.	Is the area kept clean and tidy?	☑	☐	☐	
54.	Is all green waste contained within the area?	☑	☐	☐	
55.	Are there any contaminants e.g. stone, plastic, steel?	☑	☐	☐	
56.	Signage is erected? Not faded?	☑	☐	☐	
57.	Does the green waste require shredding/composting?	☑	☐	☐	
58.	Is there any leachate or discoloured water flowing from the green waste area?	☐	☐	☐	
Transfer Station – batteries, waste oil, gas bottles, skip bins					
59.	Is the area kept clean and tidy?	☑	☐	☐	
60.	All waste is contained?	☑	☐	☐	
61.	Are transfer station skip bins being emptied when full and at least at the close of each working day?	☑	☐	☐	
62.	Are skip bins at the transfer station being cleaned at least monthly to prevent build-up of odours? Do they have a strong odour?	☑	☐	☐	
63.	Signage is erected? Not faded?	☑	☐	☐	
64.	No cross contamination of wastes?	☑	☐	☐	
65.	All waste oil is contained within the bund?	☐	☐	☑	
66.	Empty oil containers are kept within the wheelie bins?	☐	☐	☑	
Landfill cells					
67.	Is cover material being placed as required?	☑	☐	☐	
68.	Is there acceptable plant and people separation at the tip face?	☑	☐	☐	
69.	Is there any evidence of prohibited waste disposal?	☐	☑	☐	
70.	Signage is erected? Not faded?	☑	☐	☐	
Asbestos cell					
71.	Is the area kept clean and tidy?	☑	☐	☐	
72.	All asbestos covered as per Regulations?	☑	☐	☐	
73.	Is there sufficient space for more deposits into the cell?	☑	☐	☐	
74.	Signage is erected? Not faded?	☑	☐	☐	

KWMF Site Inspection Checklist

#	Inspection Items	Yes	No	N/A	Comments
Incidents and reporting					
75.	Have any incidents occurred or been identified that require NT EPA notification?	☐	☑	☐	
76.	Has the appropriate incident response been initiated?	☐	☐	☑	

Issues raised during inspection

#	Identified Hazard	Actions Required	Due Date Responsible Person

Note: These actions need to be entered into the Management System for tracking and closeout with adequate evidence

Other Comments/ Notes:

KWMF Site Inspection Checklist

ENVIRONMENTAL CONSULTANTS

Work Area / Location: KWMF

Date and Time: 28/3/24 1115

Inspected by (include all personnel who took part in the inspection)

Name(s): BRETT KIMPTON

Position(s): SERVICES MANAGER

Signature(s):

#	Inspection items	Yes	No	N/A	Comments
General site management					
1.	Have all actions raised in the previous inspections been closed out?	☐	☐	☑	
2.	Have all actions from any recent environmental incidents been adequately investigated and appropriately addressed?	☐	☐	☑	
3.	Is the work area free from visible incidents (i.e. chemical / hydrocarbon spills, leachate pools etc.)?	☑	☐	☐	
4.	Have all incidents been reported?	☐	☐	☑	
5.	Is the boundary fence in good working order?	☑	☐	☐	
6.	Is the induction register up to date? Are all staff and contractors working on site being inducted?	☑	☐	☐	
7.	Is the complaints register being used correctly? Are complaints being addressed ?	☑	☐	☐	
8.	Are the weighbridge operators following waste acceptance criteria guidelines in the EMP?	☑	☐	☐	
Water quality management					
9.	Is water quality monitoring being undertaken as per the program in the EMP / EPL?	☑	☐	☐	
10	Are all surface water courses unobstructed?	☑	☐	☐	
11.	Are erosion and sediment control structures intact and maintained (in good working order)?	☑	☐	☐	
12.	Are surface water structures free from erosion or scour?	☑	☐	☐	
13.	Is potentially contaminated storm water prevented from being discharged into the environment?	☑	☐	☐	
14.	Is there any evidence of leachate breakout or runoff from the landfill cells?	☐	☑	☐	
Dust and aesthetics management					
15.	Is the work area free from excessive visible dust?	☑	☐	☐	
16.	Are activities in the area creating minimal dust?	☑	☐	☐	
17.	Is dust suppression of dirt roads and other cleared areas being undertaken where excessive dust is visible?	☑	☐	☐	
18.	Are speed limits being enforced at site to reduce dust?	☑	☐	☐	
19.	Is there scattered rubbish around the site?	☐	☑	☐	
20.	Are there controls in place to catch wind-blown litter? Do these require maintenance?	☑	☐	☐	

KWMF Site Inspection Checklist

ENVIRONMENTAL CONSULTANTS

#	Inspection items	Yes	No	N/A	Comments
	Noise management				
21.	Are all equipment and machinery being maintained to manufacturers standards to prevent noise issues?	☑	☐	☐	
22.	Are any operations occurring outside standard work hours? Have the public, users and surrounding land owners been notified of works?	☑	☐	☐	
	Chemical, oil and fuel management				
23.	Are all chemicals, oils and fuels will be stored appropriately in locked areas that are bunded, impervious areas in accordance with their MSDS?	☑	☐	☐	
24.	Is bunding in good condition?	☑	☐	☐	
25.	Are MSDS available in a folder where the chemicals, oils and fuels are stored?	☑	☐	☐	
26.	Is equipment containing hazardous materials (including hydrocarbons, and hoses/pipes) free of spills/leaks?	☑	☐	☐	
27.	Are adequate spills kits available and fully stocked?	☑	☐	☐	
	Flora and fauna management				
28.	Do clearing works have the required approvals?	☑	☐	☐	
29.	Have any significant fauna sightings been reported to the Site Manager?	☐	☑	☐	
30.	Have any injured fauna been reported to the Site Manager?	☐	☑	☐	
31.	Are speed limits being enforced to minimise potential for fauna impact?	☑	☐	☐	
32.	Are disturbed areas being progressively rehabilitated, and done so with species local to the surrounding environment?	☑	☐	☐	
	Pest and weed management				
33.	Are there any pests and weeds in operational areas?	☐	☑	☐	
34.	Are pests and weeds being managed/controlled on site?	☑	☐	☐	
35.	Are there any signs of pooled water that could provide a breeding ground for mosquitos?	☐	☑	☐	
	Fire prevention				
36.	Are staff undertaking visual monitoring of loads going to landfill cells for evidence of smoking or hot loads?	☑	☐	☐	
37.	Are appropriate hot works procedures being followed?	☑	☐	☐	
38.	Is all fire-fighting equipment in date and accessible?	☑	☐	☐	
39.	Is there a designated smoking area? Is it being used?	☑	☐	☐	
40.	Is the 4m wide fire break (around the perimeter of the KWMF, around buildings and around operational areas) being maintained?	☑	☐	☐	
	Chemical containers (DrumMuster)				
41.	Is the area kept clean and tidy?	☑	☐	☐	
42.	All containers are contained?	☑	☐	☐	
43.	All containers are empty?	☐	☐	☐	
44.	Signage is erected? Not faded?	☐	☐	☐	

KWMF Site Inspection Checklist

ENVIRONMENTAL CONSULTANTS

#	Inspection Items	Yes	No	N/A	Comments
Tyres					
45.	Is the area kept clean and tidy?	☑	☐	☐	
46.	All waste is contained?	☑	☐	☐	
47.	Signage is erected? Not faded?	☑	☐	☐	
48.	Are tyres stacked in accordance with the CEMP?	☑	☐	☐	
49.	Is there sufficient separation between stockpiles for fire access?	☑	☐	☐	
Metal					
50.	Is the area kept clean and tidy?	☑	☐	☐	
51.	All waste is contained?	☑	☐	☐	
52.	Signage is erected? Not faded?	☑	☐	☐	
Green waste					
53.	Is the area kept clean and tidy?	☑	☐	☐	
54.	Is all green waste contained within the area?	☑	☐	☐	
55.	Are there any contaminants e.g. stone, plastic, steel?	☑	☐	☐	
56.	Signage is erected? Not faded?	☑	☐	☐	
57.	Does the green waste require shredding/composting?	☑	☐	☐	
58.	Is there any leachate or discoloured water flowing from the green waste area?	☑	☐	☐	
Transfer Station – batteries, waste oil, gas bottles, skip bins					
59.	Is the area kept clean and tidy?	☑	☐	☐	
60.	All waste is contained?	☑	☐	☐	
61.	Are transfer station skip bins being emptied when full and at least at the close of each working day?	☑	☐	☐	
62.	Are skip bins at the transfer station being cleaned at least monthly to prevent build-up of odours? Do they have a strong odour?	☑	☐	☐	
63.	Signage is erected? Not faded?	☑	☐	☐	
64.	No cross contamination of wastes?	☑	☐	☐	
65.	All waste oil is contained within the bund?	☐	☐	☑	
66.	Empty oil containers are kept within the wheelie bins?	☐	☐	☑	
Landfill cells					
67.	Is cover material being placed as required?	☑	☐	☐	
68.	Is there acceptable plant and people separation at the tip face?	☑	☐	☐	
69.	Is there any evidence of prohibited waste disposal?	☐	☑	☐	
70.	Signage is erected? Not faded?	☑	☐	☐	
Asbestos cell					
71.	Is the area kept clean and tidy?	☑	☐	☐	
72.	All asbestos covered as per Regulations?	☑	☐	☐	
73.	Is there sufficient space for more deposits into the cell?	☑	☐	☐	
74.	Signage is erected? Not faded?	☑	☐	☐	

KWMF Site Inspection Checklist

#	Inspection items	Yes	No	N/A	Comments
Incidents and reporting					
75.	Have any incidents occurred or been identified that require NT EPA notification?	☐	☑	☐	
76.	Has the appropriate incident response been initiated?	☐	☐	☑	

Issues raised during inspection

#	Identified Hazard	Actions Required	Due Date	Responsible Person

Note: These actions need to be entered into the Management System for tracking and closeout with adequate evidence

Other Comments/ Notes:

KWMF Site Inspection Checklist

ENVIRONMENTAL CONSULTANTS

Work Area / Location: WMF

Date and Time: 26/4/24 1030

Inspected by (include all personnel who took part in the inspection)

Name(s): BRETT KIMPTON

Position(s): SERVICES MANAGER

Signature(s):

#	Inspection items	Yes	No	N/A	Comments
General site management					
1.	Have all actions raised in the previous inspections been closed out?	☐	☐	☑	
2.	Have all actions from any recent environmental incidents been adequately investigated and appropriately addressed?	☐	☐	☑	
3.	Is the work area free from visible incidents (i.e. chemical / hydrocarbon spills, leachate pools etc.)?	☑	☐	☐	
4.	Have all incidents been reported?	☐	☐	☑	
5.	Is the boundary fence in good working order?	☑	☐	☐	
6.	Is the induction register up to date? Are all staff and contractors working on site being inducted?	☑	☐	☐	
7.	Is the complaints register being used correctly? Are complaints being addressed ?	☑	☐	☐	
8.	Are the weighbridge operators following waste acceptance criteria guidelines in the EMP?	☑	☐	☐	
Water quality management					
9.	Is water quality monitoring being undertaken as per the program in the EMP / EPL?	☑	☐	☐	
10	Are all surface water courses unobstructed?	☑	☐	☐	
11.	Are erosion and sediment control structures intact and maintained (in good working order)?	☑	☐	☐	
12.	Are surface water structures free from erosion or scour?	☑	☐	☐	
13.	Is potentially contaminated storm water prevented from being discharged into the environment?	☑	☐	☐	
14.	Is there any evidence of leachate breakout or runoff from the landfill cells?	☐	☑	☐	
Dust and aesthetics management					
15.	Is the work area free from excessive visible dust?	☑	☐	☐	
16.	Are activities in the area creating minimal dust?	☑	☐	☐	
17.	Is dust suppression of dirt roads and other cleared areas being undertaken where excessive dust is visible?	☑	☐	☐	
18.	Are speed limits being enforced at site to reduce dust?	☑	☐	☐	
19.	Is there scattered rubbish around the site?	☐	☑	☐	
20.	Are there controls in place to catch wind-blown litter? Do these require maintenance?	☑	☐	☐	

KWMF Site Inspection Checklist

ENVIRONMENTAL CONSULTANTS

#	Inspection items	Yes	No	N/A	Comments
	Noise management				
21.	Are all equipment and machinery being maintained to manufacturers standards to prevent noise issues?	☑	☐	☐	
22.	Are any operations occurring outside standard work hours? Have the public, users and surrounding land owners been notified of works?	☐	☐	☐	
	Chemical, oil and fuel management				
23.	Are all chemicals, oils and fuels will be stored appropriately in locked areas that are bunded, impervious areas in accordance with their MSDS?	☑	☐	☐	
24.	Is bunding in good condition?	☑	☐	☐	
25.	Are MSDS available in a folder where the chemicals, oils and fuels are stored?	☑	☐	☐	
26.	Is equipment containing hazardous materials (including hydrocarbons, and hoses/pipes) free of spills/leaks?	☑	☐	☐	
27.	Are adequate spills kits available and fully stocked?	☑	☐	☐	
	Flora and fauna management				
28.	Do clearing works have the required approvals?	☑	☐	☐	
29.	Have any significant fauna sightings been reported to the Site Manager?	☐	☑	☐	
30.	Have any injured fauna been reported to the Site Manager?	☐	☑	☐	
31.	Are speed limits being enforced to minimise potential for fauna impact?	☑	☐	☐	
32.	Are disturbed areas being progressively rehabilitated, and done so with species local to the surrounding environment?	☑	☐	☐	
	Pest and weed management				
33.	Are there any pests and weeds in operational areas?	☐	☑	☐	
34.	Are pests and weeds being managed/controlled on site?	☑	☐	☐	
35.	Are there any signs of pooled water that could provide a breeding ground for mosquitos?	☐	☑	☐	
	Fire prevention				
36.	Are staff undertaking visual monitoring of loads going to landfill cells for evidence of smoking or hot loads?	☑	☐	☐	
37.	Are appropriate hot works procedures being followed?	☑	☐	☐	
38.	Is all fire-fighting equipment in date and accessible?	☑	☐	☐	
39.	Is there a designated smoking area? Is it being used?	☑	☐	☐	
40.	Is the 4m wide fire break (around the perimeter of the KWMF, around buildings and around operational areas) being maintained?	☑	☐	☐	
	Chemical containers (DrumMuster)				
41.	Is the area kept clean and tidy?	☑	☐	☐	
42.	All containers are contained?	☑	☐	☐	
43.	All containers are empty?	☑	☐	☐	
44.	Signage is erected? Not faded?	☑	☐	☐	

KWMF Site Inspection Checklist

ENVIRONMENTAL CONSULTANTS

#	Inspection items	Yes	No	N/A	Comments
Tyres					
45.	Is the area kept clean and tidy?	☑	☐	☐	
46.	All waste is contained?	☑	☐	☐	
47.	Signage is erected? Not faded?	☑	☐	☐	
48.	Are tyres stacked in accordance with the CEMP?	☑	☐	☐	
49.	Is there sufficient separation between stockpiles for fire access?	☑	☐	☐	
Metal					
50.	Is the area kept clean and tidy?	☑	☐	☐	
51.	All waste is contained?	☑	☐	☐	
52.	Signage is erected? Not faded?	☑	☐	☐	
Green waste					
53.	Is the area kept clean and tidy?	☑	☐	☐	
54.	Is all green waste contained within the area?	☑	☐	☐	
55.	Are there any contaminants e.g. stone, plastic, steel?	☑	☐	☐	
56.	Signage is erected? Not faded?	☑	☐	☐	
57.	Does the green waste require shredding/composting?	☑	☐	☐	
58.	Is there any leachate or discoloured water flowing from the green waste area?	☑	☐	☐	
Transfer Station – batteries, waste oil, gas bottles, skip bins					
59.	Is the area kept clean and tidy?	☑	☐	☐	
60.	All waste is contained?	☑	☐	☐	
61.	Are transfer station skip bins being emptied when full and at least at the close of each working day?	☑	☐	☐	
62.	Are skip bins at the transfer station being cleaned at least monthly to prevent build-up of odours? Do they have a strong odour?	☑	☐	☐	
63.	Signage is erected? Not faded?	☑	☐	☐	
64.	No cross contamination of wastes?	☑	☐	☐	
65.	All waste oil is contained within the bund?	☐	☐	☑	
66.	Empty oil containers are kept within the wheelie bins?	☐	☐	☑	
Landfill cells					
67.	Is cover material being placed as required?	☑	☐	☐	
68.	Is there acceptable plant and people separation at the tip face?	☑	☐	☐	
69.	Is there any evidence of prohibited waste disposal?	☐	☑	☐	
70.	Signage is erected? Not faded?	☑	☐	☐	
Asbestos cell					
71.	Is the area kept clean and tidy?	☑	☐	☐	
72.	All asbestos covered as per Regulations?	☑	☐	☐	
73.	Is there sufficient space for more deposits into the cell?	☑	☐	☐	
74.	Signage is erected? Not faded?	☑	☐	☐	

KWMF Site Inspection Checklist

#	Inspection items	Yes	No	N/A	Comments
	Incidents and reporting				
75.	Have any incidents occurred or been identified that require NT EPA notification?	☐	☑	☐	
76.	Has the appropriate incident response been initiated?	☐	☐	☑	

Issues raised during inspection

#	Identified Hazard	Actions Required	Due Date	Responsible Person

Note: These actions need to be entered into the Management System for tracking and closeout with adequate evidence

Other Comments/ Notes:

KWMF Site Inspection Checklist

ENVIRONMENTAL CONSULTANTS

Work Area / Location: WMF

Date and Time: 31/5/24 0730

Inspected by (include all personnel who took part in the inspection)

Name(s): BRETT ILIMPTON

Position(s): SERVICES MANAGER

Signature(s):

#	Inspection items	Yes	No	N/A	Comments
General site management					
1.	Have all actions raised in the previous inspections been closed out?	☐	☐	☑	
2.	Have all actions from any recent environmental incidents been adequately investigated and appropriately addressed?	☐	☐	☑	
3.	Is the work area free from visible incidents (i.e. chemical / hydrocarbon spills, leachate pools etc.)?	☑	☐	☐	
4.	Have all incidents been reported?	☐	☐	☑	
5.	Is the boundary fence in good working order?	☑	☐	☐	
6.	Is the induction register up to date? Are all staff and contractors working on site being inducted?	☑	☐	☐	
7.	Is the complaints register being used correctly? Are complaints being addressed ?	☑	☐	☐	
8.	Are the weighbridge operators following waste acceptance criteria guidelines in the EMP?	☑	☐	☐	
Water quality management					
9.	Is water quality monitoring being undertaken as per the program in the EMP / EPL?	☑	☐	☐	
10	Are all surface water courses unobstructed?	☑	☐	☐	
11.	Are erosion and sediment control structures intact and maintained (in good working order)?	☑	☐	☐	
12.	Are surface water structures free from erosion or scour?	☑	☐	☐	
13.	Is potentially contaminated storm water prevented from being discharged into the environment?	☑	☐	☐	
14.	Is there any evidence of leachate breakout or runoff from the landfill cells?	☐	☑	☐	
Dust and aesthetics management					
15.	Is the work area free from excessive visible dust?	☑	☐	☐	
16.	Are activities in the area creating minimal dust?	☑	☐	☐	
17.	Is dust suppression of dirt roads and other cleared areas being undertaken where excessive dust is visible?	☑	☐	☐	
18.	Are speed limits being enforced at site to reduce dust?	☑	☐	☐	
19.	Is there scattered rubbish around the site?	☐	☑	☐	
20.	Are there controls in place to catch wind-blown litter? Do these require maintenance?	☑	☐	☐	

KWMF Site Inspection Checklist

ENVIRONMENTAL CONSULTANTS

#	Inspection items	Yes	No	N/A	Comments
	Noise management				
21.	Are all equipment and machinery being maintained to manufacturers standards to prevent noise issues?	☑	☐	☐	
22.	Are any operations occurring outside standard work hours? Have the public, users and surrounding land owners been notified of works?	☑	☐	☐	
	Chemical, oil and fuel management				
23.	Are all chemicals, oils and fuels will be stored appropriately in locked areas that are bunded, impervious areas in accordance with their MSDS?	☑	☐	☐	
24.	Is bunding in good condition?	☑	☐	☐	
25.	Are MSDS available in a folder where the chemicals, oils and fuels are stored?	☑	☐	☐	
26.	Is equipment containing hazardous materials (including hydrocarbons, and hoses/pipes) free of spills/leaks?	☑	☐	☐	
27.	Are adequate spills kits available and fully stocked?	☑	☐	☐	
	Flora and fauna management				
28.	Do clearing works have the required approvals?	☑	☐	☐	
29.	Have any significant fauna sightings been reported to the Site Manager?	☐	☑	☐	
30.	Have any injured fauna been reported to the Site Manager?	☐	☑	☐	
31.	Are speed limits being enforced to minimise potential for fauna impact?	☑	☐	☐	
32.	Are disturbed areas being progressively rehabilitated, and done so with species local to the surrounding environment?	☑	☐	☐	
	Pest and weed management				
33.	Are there any pests and weeds in operational areas?	☐	☑	☐	
34.	Are pests and weeds being managed/controlled on site?	☑	☐	☐	
35.	Are there any signs of pooled water that could provide a breeding ground for mosquitos?	☐	☑	☐	
	Fire prevention				
36.	Are staff undertaking visual monitoring of loads going to landfill cells for evidence of smoking or hot loads?	☑	☐	☐	
37.	Are appropriate hot works procedures being followed?	☑	☐	☐	
38.	Is all fire-fighting equipment in date and accessible?	☑	☐	☐	
39.	Is there a designated smoking area? Is it being used?	☑	☐	☐	
40.	Is the 4m wide fire break (around the perimeter of the KWMF, around buildings and around operational areas) being maintained?	☑	☐	☐	
	Chemical containers (DrumMuster)				
41.	Is the area kept clean and tidy?	☑	☐	☐	
42.	All containers are contained?	☑	☐	☐	
43.	All containers are empty?	☑	☐	☐	
44.	Signage is erected? Not faded?	☑	☐	☐	

KWMF Site Inspection Checklist

ENVIRONMENTAL CONSULTANTS

#	Inspection items	Yes	No	N/A	Comments
Tyres					
45.	Is the area kept clean and tidy?	☑	☐	☐	
46.	All waste is contained?	☑	☐	☐	
47.	Signage is erected? Not faded?	☑	☐	☐	
48.	Are tyres stacked in accordance with the CEMP?	☑	☐	☐	
49.	Is there sufficient separation between stockpiles for fire access?	☑	☐	☐	
Metal					
50.	Is the area kept clean and tidy?	☑	☐	☐	
51.	All waste is contained?	☑	☐	☐	
52.	Signage is erected? Not faded?	☑	☐	☐	
Green waste					
53.	Is the area kept clean and tidy?	☑	☐	☐	
54.	Is all green waste contained within the area?	☑	☐	☐	
55.	Are there any contaminants e.g. stone, plastic, steel?	☑	☐	☐	
56.	Signage is erected? Not faded?	☑	☐	☐	
57.	Does the green waste require shredding/composting?	☑	☐	☐	
58.	Is there any leachate or discoloured water flowing from the green waste area?	☑	☐	☐	
Transfer Station – batteries, waste oil, gas bottles, skip bins					
59.	Is the area kept clean and tidy?	☑	☐	☐	
60.	All waste is contained?	☑	☐	☐	
61.	Are transfer station skip bins being emptied when full and at least at the close of each working day?	☑	☐	☐	
62.	Are skip bins at the transfer station being cleaned at least monthly to prevent build-up of odours? Do they have a strong odour?	☑	☐	☐	
63.	Signage is erected? Not faded?	☑	☐	☐	
64.	No cross contamination of wastes?	☑	☐	☐	
65.	All waste oil is contained within the bund?	☐	☐	☑	
66.	Empty oil containers are kept within the wheelie bins?	☐	☐	☑	
Landfill cells					
67.	Is cover material being placed as required?	☑	☐	☐	
68.	Is there acceptable plant and people separation at the tip face?	☑	☐	☐	
69.	Is there any evidence of prohibited waste disposal?	☐	☑	☐	
70.	Signage is erected? Not faded?	☑	☐	☐	
Asbestos cell					
71.	Is the area kept clean and tidy?	☑	☐	☐	
72.	All asbestos covered as per Regulations?	☑	☐	☐	
73.	Is there sufficient space for more deposits into the cell?	☑	☐	☐	
74.	Signage is erected? Not faded?	☑	☐	☐	

KWMF Site Inspection Checklist

ENVIRONMENTAL CONSULTANTS

#	Inspection items	Yes	No	N/A	Comments
Incidents and reporting					
75.	Have any incidents occurred or been identified that require NT EPA notification?	☐	☑	☐	
76.	Has the appropriate incident response been initiated?	☐	☐	☑	

Issues raised during inspection

#	Identified Hazard	Actions Required	Due Date Responsible Person

Note: These actions need to be entered into the Management System for tracking and closeout with adequate evidence

Other Comments/ Notes:

KWMF Site Inspection Checklist

ENVIRONMENTAL CONSULTANTS

Work Area / Location: WMF

Date and Time: 27/6/24 0820

Inspected by (include all personnel who took part in the inspection)

Name(s): BRETT KIMPTON

Position(s): SERVICES MANAGER

Signature(s):

#	Inspection items	Yes	No	N/A	Comments
General site management					
1.	Have all actions raised in the previous inspections been closed out?	☐	☐	☑	
2.	Have all actions from any recent environmental incidents been adequately investigated and appropriately addressed?	☐	☐	☑	
3.	Is the work area free from visible incidents (i.e. chemical / hydrocarbon spills, leachate pools etc.)?	☑	☐	☐	
4.	Have all incidents been reported?	☐	☐	☑	
5.	Is the boundary fence in good working order?	☑	☐	☐	
6.	Is the induction register up to date? Are all staff and contractors working on site being inducted?	☑	☐	☐	
7.	Is the complaints register being used correctly? Are complaints being addressed ?	☑	☐	☐	
8.	Are the weighbridge operators following waste acceptance criteria guidelines in the EMP?	☑	☐	☐	
Water quality management					
9.	Is water quality monitoring being undertaken as per the program in the EMP / EPL?	☑	☐	☐	
10	Are all surface water courses unobstructed?	☑	☐	☐	
11.	Are erosion and sediment control structures intact and maintained (in good working order)?	☑	☐	☐	
12.	Are surface water structures free from erosion or scour?	☑	☐	☐	
13.	Is potentially contaminated storm water prevented from being discharged into the environment?	☑	☐	☐	
14.	Is there any evidence of leachate breakout or runoff from the landfill cells?	☐	☑	☐	
Dust and aesthetics management					
15.	Is the work area free from excessive visible dust?	☑	☐	☐	
16.	Are activities in the area creating minimal dust?	☑	☐	☐	
17.	Is dust suppression of dirt roads and other cleared areas being undertaken where excessive dust is visible?	☑	☐	☐	
18.	Are speed limits being enforced at site to reduce dust?	☑	☐	☐	
19.	Is there scattered rubbish around the site?	☐	☑	☐	
20.	Are there controls in place to catch wind-blown litter? Do these require maintenance?	☑	☐	☐	

KWMF Site Inspection Checklist

#	Inspection items	Yes	No	N/A	Comments
	Noise management				
21.	Are all equipment and machinery being maintained to manufacturers standards to prevent noise issues?	☑	☐	☐	
22.	Are any operations occurring outside standard work hours? Have the public, users and surrounding land owners been notified of works?	☐	☐	☐	
	Chemical, oil and fuel management				
23.	Are all chemicals, oils and fuels will be stored appropriately in locked areas that are bunded, impervious areas in accordance with their MSDS?	☑	☐	☐	
24.	Is bunding in good condition?	☑	☐	☐	
25.	Are MSDS available in a folder where the chemicals, oils and fuels are stored?	☑	☐	☐	
26.	Is equipment containing hazardous materials (including hydrocarbons, and hoses/pipes) free of spills/leaks?	☑	☐	☐	
27.	Are adequate spills kits available and fully stocked?	☑	☐	☐	
	Flora and fauna management				
28.	Do clearing works have the required approvals?	☑	☐	☐	
29.	Have any significant fauna sightings been reported to the Site Manager?	☐	☑	☐	
30.	Have any injured fauna been reported to the Site Manager?	☐	☑	☐	
31.	Are speed limits being enforced to minimise potential for fauna impact?	☑	☐	☐	
32.	Are disturbed areas being progressively rehabilitated, and done so with species local to the surrounding environment?	☑	☐	☐	
	Pest and weed management				
33.	Are there any pests and weeds in operational areas?	☐	☑	☐	
34.	Are pests and weeds being managed/controlled on site?	☑	☐	☐	
35.	Are there any signs of pooled water that could provide a breeding ground for mosquitos?	☐	☑	☐	
	Fire prevention				
36.	Are staff undertaking visual monitoring of loads going to landfill cells for evidence of smoking or hot loads?	☑	☐	☐	
37.	Are appropriate hot works procedures being followed?	☑	☐	☐	
38.	Is all fire-fighting equipment in date and accessible?	☑	☐	☐	
39.	Is there a designated smoking area? Is it being used?	☑	☐	☐	
40.	Is the 4m wide fire break (around the perimeter of the KWMF, around buildings and around operational areas) being maintained?	☑	☐	☐	
	Chemical containers (DrumMuster)				
41.	Is the area kept clean and tidy?	☑	☐	☐	
42.	All containers are contained?	☑	☐	☐	
43.	All containers are empty?	☑	☐	☐	
44.	Signage is erected? Not faded?	☑	☐	☐	

KWMF Site Inspection Checklist

ENVIRONMENTAL CONSULTANTS

#	Inspection items	Yes	No	N/A	Comments
Tyres					
45.	Is the area kept clean and tidy?	☑	☐	☐	
46.	All waste is contained?	☑	☐	☐	
47.	Signage is erected? Not faded?	☑	☐	☐	
48.	Are tyres stacked in accordance with the CEMP?	☑	☐	☐	
49.	Is there sufficient separation between stockpiles for fire access?	☑	☐	☐	
Metal					
50.	Is the area kept clean and tidy?	☑	☐	☐	
51.	All waste is contained?	☑	☐	☐	
52.	Signage is erected? Not faded?	☑	☐	☐	
Green waste					
53.	Is the area kept clean and tidy?	☑	☐	☐	
54.	Is all green waste contained within the area?	☑	☐	☐	
55.	Are there any contaminants e.g. stone, plastic, steel?	☑	☐	☐	
56.	Signage is erected? Not faded?	☑	☐	☐	
57.	Does the green waste require shredding/composting?	☑	☐	☐	
58.	Is there any leachate or discoloured water flowing from the green waste area?	☑	☐	☐	
Transfer Station – batteries, waste oil, gas bottles, skip bins					
59.	Is the area kept clean and tidy?	☑	☐	☐	
60.	All waste is contained?	☑	☐	☐	
61.	Are transfer station skip bins being emptied when full and at least at the close of each working day?	☑	☐	☐	
62.	Are skip bins at the transfer station being cleaned at least monthly to prevent build-up of odours? Do they have a strong odour?	☑	☐	☐	
63.	Signage is erected? Not faded?	☑	☐	☐	
64.	No cross contamination of wastes?	☑	☐	☐	
65.	All waste oil is contained within the bund?	☐	☐	☑	
66.	Empty oil containers are kept within the wheelie bins?	☐	☐	☑	
Landfill cells					
67.	Is cover material being placed as required?	☑	☐	☐	
68.	Is there acceptable plant and people separation at the tip face?	☑	☐	☐	
69.	Is there any evidence of prohibited waste disposal?	☐	☑	☐	
70.	Signage is erected? Not faded?	☑	☐	☐	
Asbestos cell					
71.	Is the area kept clean and tidy?	☑	☐	☐	
72.	All asbestos covered as per Regulations?	☑	☐	☐	
73.	Is there sufficient space for more deposits into the cell?	☑	☐	☐	
74.	Signage is erected? Not faded?	☑	☐	☐	

KWMF Site Inspection Checklist

#	Inspection items	Yes	No	N/A	Comments
Incidents and reporting					
75.	Have any incidents occurred or been identified that require NT EPA notification?	☐	☑	☐	
76.	Has the appropriate incident response been initiated?	☐	☐	☑	

Issues raised during inspection

#	Identified Hazard	Actions Required	Due Date Responsible Person

Note: These actions need to be entered into the Management System for tracking and closeout with adequate evidence

Other Comments/ Notes:

KWMF Site Inspection Checklist

ENVIRONMENTAL CONSULTANTS

Work Area / Location: WMF

Date and Time: 30/7/24 1315

Inspected by (include all personnel who took part in the inspection)

Name(s): Brett Kimpton

Position(s): Services Manager

Signature(s):

#	Inspection items	Yes	No	N/A	Comments
General site management					
1.	Have all actions raised in the previous inspections been closed out?	☐	☐	☑	
2.	Have all actions from any recent environmental incidents been adequately investigated and appropriately addressed?	☐	☐	☑	
3.	Is the work area free from visible incidents (i.e. chemical / hydrocarbon spills, leachate pools etc.)?	☑	☐	☐	
4.	Have all incidents been reported?	☐	☐	☑	
5.	Is the boundary fence in good working order?	☑	☐	☐	
6.	Is the induction register up to date? Are all staff and contractors working on site being inducted?	☑	☐	☐	
7.	Is the complaints register being used correctly? Are complaints being addressed ?	☑	☐	☐	
8.	Are the weighbridge operators following waste acceptance criteria guidelines in the EMP?	☑	☐	☐	
Water quality management					
9.	Is water quality monitoring being undertaken as per the program in the EMP / EPL?	☑	☐	☐	
10	Are all surface water courses unobstructed?	☑	☐	☐	
11.	Are erosion and sediment control structures intact and maintained (in good working order)?	☑	☐	☐	
12.	Are surface water structures free from erosion or scour?	☑	☐	☐	
13.	Is potentially contaminated storm water prevented from being discharged into the environment?	☑	☐	☐	
14.	Is there any evidence of leachate breakout or runoff from the landfill cells?	☐	☑	☐	
Dust and aesthetics management					
15.	Is the work area free from excessive visible dust?	☑	☐	☐	
16.	Are activities in the area creating minimal dust?	☑	☐	☐	
17.	Is dust suppression of dirt roads and other cleared areas being undertaken where excessive dust is visible?	☑	☐	☐	
18.	Are speed limits being enforced at site to reduce dust?	☑	☐	☐	
19.	Is there scattered rubbish around the site?	☐	☑	☐	
20.	Are there controls in place to catch wind-blown litter? Do these require maintenance?	☑	☐	☐	

KWMF Site Inspection Checklist

ENVIRONMENTAL CONSULTANTS

#	Inspection items	Yes	No	N/A	Comments
	Noise management				
21.	Are all equipment and machinery being maintained to manufacturers standards to prevent noise issues?	☑	☐	☐	
22.	Are any operations occurring outside standard work hours? Have the public, users and surrounding land owners been notified of works?	☑	☐	☐	
	Chemical, oil and fuel management				
23.	Are all chemicals, oils and fuels will be stored appropriately in locked areas that are bunded, impervious areas in accordance with their MSDS?	☑	☐	☐	
24.	Is bunding in good condition?	☑	☐	☐	
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KWMF Site Inspection Checklist

ENVIRONMENTAL CONSULTANTS

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KWMF Site Inspection Checklist

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Issues raised during inspection

#	Identified Hazard	Actions Required	Due Date Responsible Person

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Other Comments/ Notes:

EcOz Environmental Consultants

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