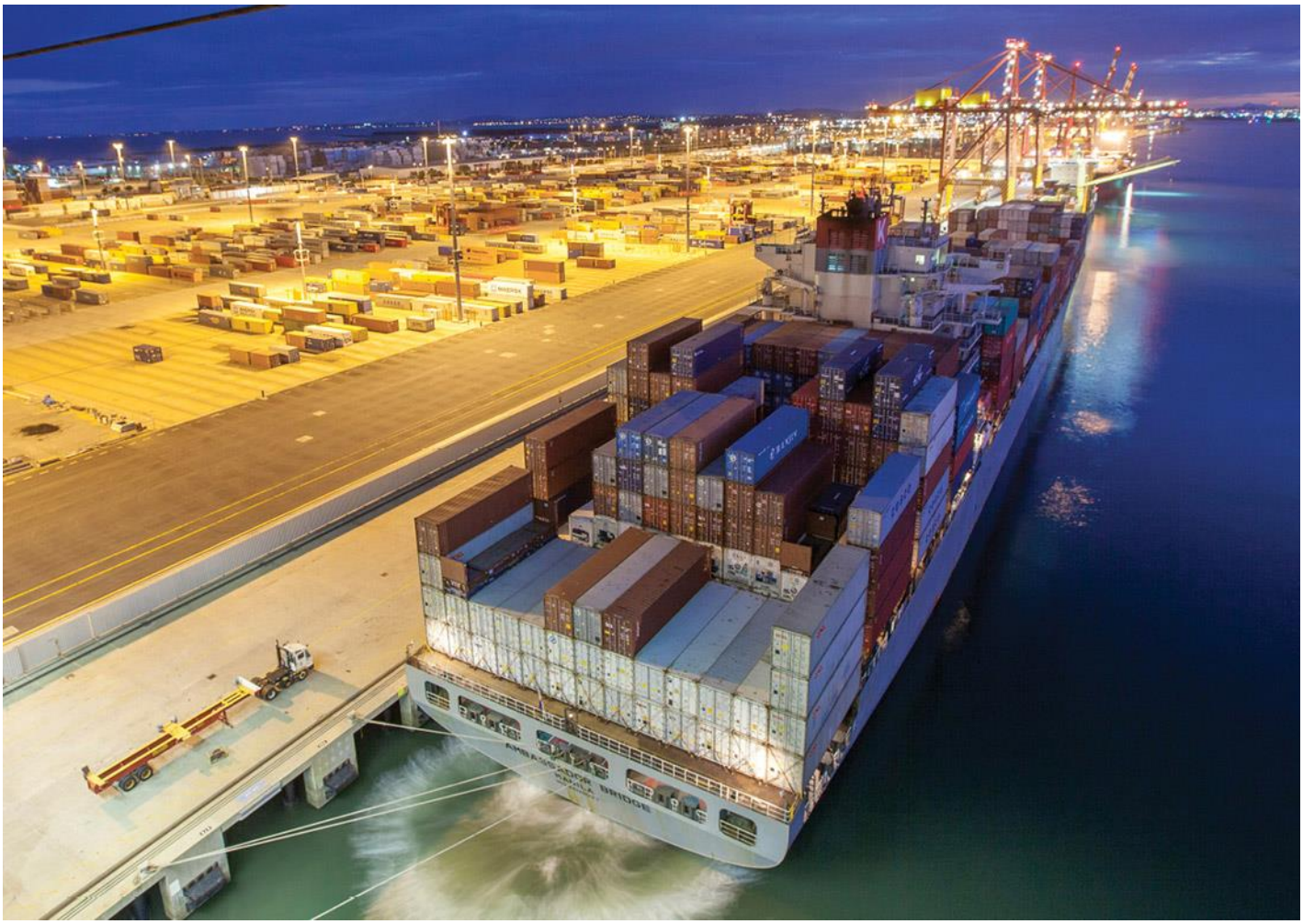
Drinking Water Service

2023-24 Annual Report

11 DECEMBER 2024



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Introduction

The Port of Brisbane is located at the mouth of the Brisbane River. The port is managed by the Port of Brisbane Pty Ltd (PBPL) and processes around 2,600 ships each year.

PBPL is responsible for the site potable water reticulation network and is committed to ensuring that the water systems are managed so that the supply does not constitute a hazard to employees or the public. PBPL draws its drinking water supply from Urban Utilities' (UU) reticulated supply through metered supply points for Fisherman Islands, Port Gate, Port West, Port North and the Brisbane International Cruise Terminal (BICT). The management of water quality until it is supplied to PBPL is the responsibility of UU. The Australian Drinking Water Guidelines (ADWG) require management of drinking water quality through to the consumer and therefore PBPL is considered a Water Service Provider under Queensland legislation. PBPL is required to have a Drinking Water Quality Management Plan (DWQMP) in place to manage water quality within its reticulation system.

This report is the eighth annual report of the DWQMP and summarises all relevant actions taken in the 2023-24 financial year.

Purpose and objectives of the DWQMP

The PBPL DWQMP contributes to maintaining a safe and reliable drinking water supply for consumers. The plan is based on the principles described in the Framework for Management of Drinking Water Quality contained in the Australian Drinking Water Guidelines 2011, version 3.8 updated September 2022 (ADWG).

The purpose of the DWQMP is to provide an overview of PBPL's current management system for achieving/maintaining drinking water quality and plans to develop and continually improve the water quality management systems. The management plan focuses on the section of the drinking water scheme over which PBPL has direct control (reticulation operation, maintenance, monitoring, and corrective action). The supply components over which PBPL has no control (catchment management, treatment, and storage) are the responsibility of UU and SEQWater and are considered by their respective DWQMP's.

The PBPL DWQMP addresses the 12 elements of the ADWG Framework in order to meet the required levels of service relating to drinking water quality and the legislative requirements of the Queensland *Water Supply (Safety and Reliability) Act 2008* and the *Queensland Public Health Regulation 2018*. The specific objectives of the Drinking Water Quality Management Plan are:

- To demonstrate due diligence and protect public health by implementing a management strategy to ensure a high-quality water is supplied to consumers.
- To improve consumer confidence in water quality and the supplier.
- Clearly define current and future management procedures and strategies for maintaining water quality.
- Clearly define strategies for monitoring the quality of water supplied to consumers; and
- To implement a process for continual review, development, and improvement of the water quality management system.

Implementation of the DWQMP

Collaborative Risk Assessment workshop with UU

PBPL conducted a Risk assessment workshop with UU in June 2023 to identify risks associated with drinking water supply and quality. Two partners worked through the water quality notification trigger points and proposed improvement actions to mitigate the risk of water supply interruption to PBPL.

Sampling points relocation

All the sampling points have relocated to the property meter instead of inside the buildings as of August 2023. This change was identified during the risk workshop to make the sampling points independent of the buildings' plumbing conditions and more representative of networks' water quality. These new sample points became operational following the end of this reporting period (starting July 2024).

Critical documents review

PBPL has reviewed and updated its customers' complaint management process over this reporting period to identify any trends and possible areas of improvement in the operation, maintenance and management of our water networks.

PBPL's customer charter (Water and Sewerage Services) was reviewed in June 2024 to update the water supply and sewerage charges for the FY25. Latest revision of the PBPL's customer charter is accessible via link below.

Water and Sewerage Services - Port of Brisbane - portbris.com.au

Monitoring and Compliance

Quarterly Monitoring

PBPL undertakes quarterly verification monitoring at six representative sites at the Port of Brisbane. The original DWQMP included only three test sites. A fourth site, Port West Bunnings, was added in September 2013 to capture water quality at the new PBPL Port West estate. A fifth site, reclamation, was added in May 2014 to capture water quality at the Port of Brisbane reclamation site office. An additional site located at the Brisbane International Cruise Terminal was added in June 2022 prior to operations commencing.

Verification sampling was undertaken September 2023, December 2023, March 2024 and June 2024 (Appendix). No exceedances were recorded in FY23-24. Elevated levels of heterotrophic plate count were detected during each sampling period across each site. No action was taken in regard to these levels.

E.coli Monitoring

PBPL undertake weekly monitoring for E.coli at the PBPL Main Office. Initial samples are tested in a desktop E.coli sample kit. Where results indicate possible E.coli, a sample is sent to a laboratory for analysis.

	Jul	Aug	Sep	Oct	Nov	Dec	Jan	Feb	Mar	Apr	May	Jun
No. samples collected	3	5	4	5	4	4	5	3	4	5	4	4
No. samples collected in which E.coli detected	0	0	0	0	0	0	0	0	0	0	0	0
No. detections in previous 12 months	0	0	0	0	0	0	0	0	0	0	0	0
% samples that comply	100	100	100	100	100	100	100	100	100	100	100	100
Compliance with 98% annual value	yes	yes	yes	yes	yes	yes	yes	yes	yes	yes	yes	yes

Incidents reported to the regulator

There were no incidents in the reporting period.

Drinking water quality related customer complaints

There were no water quality complaints in the reporting period.

DWQMP Review and Audit

DWQMP Review

A major review of the DWQMP was undertaken in 2023 with the revised document submitted to the Regulator for approval in August 2023. DWQMP review outcomes are listed in Table 1.

Table 1: DWQMP Review Outcomes

Review Component	Findings	Outcomes	Status of Actions	Responsible Position
Review Date: August 2023				
Service description	Clarifying the interface between Urban Utilities (UU) and PBPL	Figure 2-Water Supply Scheme Schematic added	Completed	Utilities Engineer
Details of infrastructure	No changes	Not applicable	Not applicable	Not applicable
Key Stakeholders	State the external lab and contractors	Table2 updated (List of Key stakeholders)	Completed	Utilities Engineer
Information Gathering for Hazard Identification	PBPL tests for E.coli in house to be reviewed.	Weekly E.coli testing to be outsourced to the PBPL's external lab	Representative sample points have been installed on the network	Utilities Engineer
	The risk register was not comprehensive	A comprehensive risk workshop has been conducted including all relevant stakeholders and an associated action plans have been developed	Completed	Utilities Engineer Viridis Consultant
Risk management improvement Plan	A number of improvement actions have been implemented and some are in progress.	Actions tracking-PBPL-DWQMP-Risk Management Improvement Plan to be developed	Actions tracking-PBPL-DWQMP-Risk Management Improvement Plan_v2.0 is developed. The action plan is reviewed, updated on an annual basis.	Utilities Engineer Manager Asset Services
Documented Procedures	A list of the documents which contain procedures and responsibilities relating to the PBPL system is required	Table 3 PBPL Procedure Documents added including the position responsible for reviewing and updating the documents	Completed	Utilities Engineer
	A procedure describes the method to be used by personnel ensuring effective disinfection practices when working on potable bulk water supply and wastewater networks is required	PBPL's Maintenance contractor has a procedure	Ventia SOP-Disinfection - TSAI-031020-OPS-PR-108	PBPL's Maintenance contractor

Review Component	Findings	Outcomes	Status of Actions	Responsible Position
Management of Incidents and Emergencies	Referred to Critical Incident Plan (CIP).	In relation to drinking water quality events and incidents, the current DWQMP is the first port of call. Table 4 Drinking water incident and event classification and response overview added	Completed	Utilities Engineer Viridis Consultant
Verification monitoring	Sample points inside the buildings were not representative of the Network.	Sample points relocated to the water network	Completed	Utilities Engineer
	Quarterly monitoring plan needs to be reviewed as PBPL only distributes treated water received from UU.	Table 6 updated monitoring program added	Completed	Utilities Engineer Viridis Consultant

DWQMP Audit

Karen Pither of Pither Consulting Pty Ltd undertook the regular (external) audit of the Port of Brisbane Pty Ltd (PBPL) Drinking Water Quality Management Plan (DWQMP).

The site audit was conducted on 6 February 2024 and was finalized on 6 March 2024. The audit included a desktop review of the requested audit evidence, site inspection and interviews with relevant PBPL team members to review and confirm that each auditable element exists, is implemented and is effective at managing risk.

The auditor submitted the audit report to the regulator on 13 March 2024.

The objective of undertaking the DWQMP audit is to inform the regulator about how the provider is complying with its approved DWQMP and any Conditions of the approved DWQMP. Additionally, the DWQMP audit assesses if data provided to the regulator is accurate and the relevance of the approved DWQMP to the drinking water service(s) being provided at the time of audit. The audit findings and PBPL's action plan are summarized in Table 2.

Table 2: Audit Findings Action Plan

Item	Recommendation / Opportunity for improvement (OFI)	Action	Status of actions	Responsible position
When preparing the Annual Report, ensure the mandatory information identified in the Water Supply (Safety and Reliability) Act 2008 is provided in the annual report.	Recommendation	will be applied in future annual reports	Dec-24	Utilities Engineer Manager Asset Services
Establish and ensure robust processes are in place to notify the regulator of any non-compliances or events, including missed samples	Recommendation	Update Variation Reporting and Investigation Standard	Work in progress to be completed by Dec 2024	Governance team
Refer to the Regulator's Guideline for the preparation, review and audit of drinking water quality management plans for guidance when preparing the annual report	OFI	will be applied in future annual reports	Dec-24	Utilities Engineer Manager Asset Services

Item	Recommendation / Opportunity for improvement (OFI)	Action	Status of actions	Responsible position
to ensure that the required information is presented as per Section 9 and Appendix D				
Consider requesting results of water quality testing undertaken by Ventia after works to confirm preventive actions have been applied successfully	OFI	Ventia developed Service line repair ITP including Flushing And Recharging procedure, they also have a procedure (Ventia SOP-Disinfection - TSAI-031020-OPS-PR-108) in place for equipment disinfection	Completed	PBPL Maintenance contractor
Ensure all sampling is undertaken as required by the approved DWQMP. Prioritise the implementation of the approved verification monitoring program	OFI	All sampling has been outsourced to a NATA-accredited lab	Completed	PBPL Sampling and Testing Contractor
Establish contingencies to continue sampling over periods of leave	OFI	All sampling has been outsourced to a NATA-accredited lab	Completed	PBPL Sampling and Testing Contractor
Ensure appropriate QA/QC processes are in place for any in-house testing.	OFI	All testing has been outsourced to a NATA-accredited lab	Completed	PBPL Sampling and Testing Contractor
Review the automated SCADA email system to ensure the emails are being sent and received by the correct person	OFI	SCADA alarming has been reviewed and a mobile sms contingency for high and critical alarms has been implemented (Twilio sms system)	Completed	IoT team
Confirm with the laboratory that there are protocols in place for immediate notification of abnormal results	OFI	The lab provides exceedance notifications in the form of an email. These are marked with high priority and include an alert in the subject heading.	Completed	Utilities Engineer
Reconsider the use of in-house testing for verification. It is best practice to use a NATA certified laboratory. In-house testing is usually considered appropriate for providers that do	OFI	All testing has been outsourced to a NATA-accredited lab	Completed	PBPL Sampling and Testing Contractor
Establish a water quality incident contacts list to ensure all relevant contacts are on hand and up to date.	OFI	Key contact list has been updated in Business Continuity Plan Rev November 2023	Completed	Utilities Engineer
Prioritise progressing the due items on the Risk Management Improvement Plan, particularly the actions to improve the reliability of the verification monitoring data	OFI	A number of improvement actions have been implemented and some are in progress. Verification Monitoring improvement has been completed	Completed	Utilities Engineer Manager Asset Services

Customer service standards review outcomes

PBPL customer service standards were reviewed in October 2023, and no changes were made.

Appendix-Quarterly monitoring results

YEAR			2023													2024											
MONTH			September						December							March						June					
Analyte	Unit	ADWG & Health Guidelines	Pinkenba Kitchen	NPO Ground Floor Bathroom	Port West Warehouse	Reclamation	Tea Room Maintenance Building	International Terminal	Tea Room Maintenance Building	NPO Ground Floor Bathroom	Pinkenba Kitchen	Port West Warehouse	Reclamation	International Terminal	Port Office (Outside)	Tea Room Maintenance Building	Pinkenba Kitchen	Port West Warehouse	Reclamation	International Terminal	Port Office (Outside)	Tea Room Maintenance Building	NPO Ground Floor Bathroom	Pinkenba Kitchen	Port West Warehouse	Reclamation	International Terminal
pH	pH Unit	6.5-8.5 (aesthetic) No health guideline	7.34	7.6	7.66	7.74	7.71	7.7	7.9	7.91	7.83	7.85	8.05	7.91	7.99	7.99	7.95	7.71	8.04	8.07	7.89	7.99	7.91	7.9	7.83	7.97	7.92
TDS	mg/L	-	301	275	279	275	276	294	268	265	248	259	272	256	262	339	352	333	339	339	347	308	326	316	308	309	309
Colour (True)	PCU	-	2	2	2	2	2	2	5	4	3	2	3	2	2	2	2	2	2	2	2	2	2	2	2	2	2
Turbidity	NTU	5	0.50	0.2	0.2	0.2	0.2	0.2	0.7	0.4	1	0.2	0.2	0.2	0.2	0.3	2.1	0.2	0.1	0.2	0.2	0.2	0.2	0.3	0.2	0.2	0.2
Total Hardness as CaCO3	mg/L	-	138	142	138	150	145	147	123	137	132	132	153	115	120	142	142	142	145	132	142	157	144	153	156	149	153
Hydroxide Alkalinity as CaCO3	mg/L	-	<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
Carbonate Alkalinity as CaCO3	mg/L	-	<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
Bicarbonate Alkalinity as CaCO3	mg/L	-	103	102	102	110	105	102	95	94	93	94	107	91	94	116	103	112	118	96	103	108	104	103	102	109	102
Total Alkalinity as CaCO3	mg/L	-	103	102	102	110	105	102	95	94	93	94	107	91	94	116	103	112	118	96	103	108	104	103	102	109	102
Sulphate as SO4	mg/L	500	39	38	39	39	39	39	34	34	33	34	34	31	34	47	56	47	54	59	58	37	37	41	38	40	39
Chloride	mg/L	250 (aesthetic) No health guideline	56	56	55	55	55	56	54	53	54	57	58	54	55	70	74	69	72	74	75	67	68	66	68	68	66
Dissolved Major Cations																											
Calcium	mg/L	-	32	34	32	37	35	34	31	35	33	33	40	28	30	32	32	32	35	30	32	38	33	35	36	35	35
Magnesium	mg/L	-	14	14	14	14	14	15	11	12	12	12	13	11	11	15	15	15	14	14	15	15	15	16	16	15	16
Sodium	mg/L	-	36	36	37	37	37	38	35	36	34	36	38	34	34	52	52	50	55	52	53	43	41	47	46	43	48
Potassium	mg/L	-	3	3	3	3	3	3	3	3	3	3	4	3	3	4	4	4	4	4	4	3	3	4	3	3	4
Dissolved Metals																											
Aluminium	mg/L	-	0.02	0.03	0.03	0.05	0.03	0.04	0.04	0.04	0.03	0.05	0.05	0.04	0.03	0.03	0.05	0.05	0.04	0.04	0.04	0.03	0.02	0.02	0.03	0.03	0.03

YEAR			2023													2024											
MONTH			September						December							March						June					
Antimony	mg/L	-	<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	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001
Arsenic	mg/L	**0.01**	<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	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001
Barium	mg/L	**2**	0.028	0.028	0.027	0.035	0.03	0.029	0.025	0.026	0.026	0.026	0.032	0.024	0.026	0.03	0.03	0.032	0.036	0.03	0.031	0.027	0.03	0.031	0.031	0.032	0.032
Cadmium	mg/L	**0.002**	<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	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001
Chromium	mg/L	**0.05**	<0.001	<0.001	<0.001	<0.001	<0.001	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	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001
Copper	mg/L	**2**	0.703	0.165	0.064	0.004	0.042	0.053	0.132	0.204	1.41	0.027	0.008	0.117	0.083	0.109	0.14	0.041	0.006	0.13	0.054	0.044	0.133	0.76	0.049	0.007	0.152
Lead	mg/L	**0.01**	<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	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001
Manganese	mg/L	**0.5**	0.005	<0.001	0.001	<0.001	<0.001	0.002	<0.001	<0.001	0.002	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	0.001	<0.001	0.002
Molybdenum	mg/L	**0.05**	<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	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001
Nickel	mg/L	**0.02**	<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	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001
Selenium	mg/L	**0.01**	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01
Silver	mg/L	**0.1**	<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	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001
Zinc	mg/L	-	2.07	0.011	0.008	<0.005	0.011	0.007	0.01	0.008	0.039	<0.005	<0.005	0.008	<0.005	0.018	0.008	0.008	<0.005	0.012	<0.005	0.01	0.009	0.013	0.015	0.011	0.023
Boron	mg/L	**4**	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	0.06	0.07	0.08	0.05	<0.05	0.08	0.06	<0.05	<0.05	<0.05	0.06	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05
Iron	mg/L	-	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05
Total Metals																											
Aluminium	mg/L	-	0.03	0.03	0.04	0.04	0.03	0.05	0.04	0.03	0.03	0.04	0.04	0.04	0.04	0.03	0.05	0.05	0.04	0.05	0.04	0.03	0.04	0.03	0.04	0.03	0.04
Antimony	mg/L	-	<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	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001
Arsenic	mg/L	**0.01**	<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	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001
Barium	mg/L	**2**	0.028	0.028	0.028	0.035	0.03	0.027	0.026	0.024	0.026	0.025	0.031	0.025	0.026	0.03	0.031	0.032	0.038	0.03	0.031	0.027	0.031	0.031	0.03	0.034	0.032
Cadmium	mg/L	**0.002**	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	0.0003	0.0001	<0.0001	0.0002	<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	<0.0001
Chromium	mg/L	**0.05**	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	0.007	<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	<0.001	<0.001
Copper	mg/L	**2**	0.744	0.16	0.067	0.005	0.044	0.047	0.44	0.235	1.69	0.035	0.01	0.133	0.102	0.118	0.159	0.045	0.006	0.176	0.06	0.055	0.166	0.844	0.058	0.009	0.17
Lead	mg/L	**0.01**	<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	<0.001	0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001
Manganese	mg/L	**0.5**	0.006	0.001	0.006	<0.001	0.001	0.003	0.003	0.002	0.003	0.005	0.002	0.004	0.002	0.002	0.004	0.004	0.002	0.006	0.002	<0.001	<0.001	<0.001	0.002	<0.001	0.002
Molybdenum	mg/L	**0.05**	<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	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001
Nickel	mg/L	**0.02**	<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	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001
Selenium	mg/L	**0.01**	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01
Silver	mg/L	**0.1**	<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	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001
Zinc	mg/L	-	1.96	0.013	0.011	<0.005	0.015	0.007	0.014	0.014	0.046	<0.005	0.009	0.007	<0.005	0.02	0.009	0.01	<0.005	0.02	<0.005	0.013	0.014	0.018	0.027	0.012	0.027
Boron	mg/L	**4**	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	0.06	0.08	0.08	<0.05	<0.05	0.07	0.06	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05

YEAR			2023													2024											
MONTH			September						December							March						June					
Iron	mg/L	-	0.08	<0.05	<0.05	<0.05	<0.05	<0.05	0.1	<0.05	0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	0.06	<0.05	<0.05	<0.05	<0.05	<0.05
Mercury	mg/L		<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	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001
Total Cyanide	mg/L		<0.004	<0.004	<0.004	<0.004	<0.004	<0.004	<0.004	<0.004	<0.004	<0.004	<0.004	<0.004	<0.004	<0.004	<0.004	<0.004	<0.004	<0.004	<0.004	<0.004	<0.004	<0.004	<0.004	<0.004	<0.004
Fluoride	mg/L	**1.5**	0.5	0.7	0.8	0.3	0.7	0.7	0.7	0.7	0.7	0.7	0.6	0.7	0.7	0.7	0.8	0.8	0.6	0.6	0.8	0.8	0.8	0.6	0.8	0.5	0.7
Ammonia	mg/L	-	<0.01	<0.01	0.24	<0.01	<0.01	0.02	0.02	0.01	0.15	0.06	0.02	0.03	0.06	0.02	0.31	0.01	<0.01	0.02	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01
Nitrite	mg/L	**3**	<0.01	<0.01	0.14	<0.01	<0.01	0.28	<0.01	<0.01	0.1	0.22	<0.01	0.01	<0.01	0.03	0.05	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	0.1	<0.01	0.02
Nitrate	mg/L	**50**	0.36	0.58	0.27	0.71	0.67	0.26	0.68	0.64	0.14	0.41	0.79	0.67	0.72	0.64	0.32	0.74	0.79	0.63	0.76	0.7	0.63	0.51	0.55	0.78	0.57
Nitrite and Nitrate as N	mg/L	-	0.36	0.58	0.41	0.71	0.67	0.54	0.68	0.64	0.24	0.63	0.79	0.68	0.72	0.67	0.37	0.74	0.79	0.63	0.76	0.7	0.63	0.51	0.65	0.78	0.59
Sulphide as S2	mg/L	-	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10
Monocyclic Aromatic Hydrocarbons																											
Benzene	µg/L	**1**	<1	<1	<1	<1	<1	<1	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1
Toluene	µg/L	**800**	<2	<2	<2	<2	<2	<2	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1
Ethylbenzene	µg/L	**300**	<2	<2	<2	<2	<2	<2	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1
meta- & para-Xylene	µg/L	**600**	<2	<2	<2	<2	<2	<2	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1
Styrene	µg/L	**30**	<5	<5	<5	<5	<5	<5								<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1
ortho-Xylene	µg/L	**600**	<2	<2	<2	<2	<2	<2	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1
Isopropyl benzene	µg/L	-	<5	<5	<5	<5	<5	<5	<5	<5	<5	<5	<5	<5	<5	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1
n-Propyl benzene	µg/L	-	<5	<5	<5	<5	<5	<5	<5	<5	<5	<5	<5	<5	<5	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1
1.3.5-Trimethylbenzene	µg/L	-	<5	<5	<5	<5	<5	<5	<5	<5	<5	<5	<5	<5	<5	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1
sec-Butylbenzene	µg/L	-	<5	<5	<5	<5	<5	<5	<5	<5	<5	<5	<5	<5	<5	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1
1.2.4-Trimethylbenzene	µg/L	-	<5	<5	<5	<5	<5	<5	<5	<5	<5	<5	<5	<5	<5	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1
tert-Butylbenzene	µg/L	-	<5	<5	<5	<5	<5	<5	<5	<5	<5	<5	<5	<5	<5	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1
p-Isopropyl toluene	µg/L	-	<5	<5	<5	<5	<5	<5	<5	<5	<5	<5	<5	<5	<5	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1
n-Butylbenzene	µg/L	-	<5	<5	<5	<5	<5	<5	<5	<5	<5	<5	<5	<5	<5	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1
Vinyl Acetate	µg/L	-	<50	<50	<50	<50	<50	<50	<50	<50	<50	<50	<50	<50	<50	<10	<10	<10	<10	<10	<10	<10	<10	<10	<10	<10	<10
2-Butanone (MEK)	µg/L	-	<50	<50	<50	<50	<50	<50	<50	<50	<50	<50	<50	<50	<50	<10	<10	<10	<10	<10	<10	<10	<10	<10	<10	<10	<10
4-Methyl-2-pentanone (MIBK)	µg/L	-	<50	<50	<50	<50	<50	<50	<50	<50	<50	<50	<50	<50	<50	<10	<10	<10	<10	<10	<10	<10	<10	<10	<10	<10	<10
2-Hexanone (MBK)	µg/L	-	<50	<50	<50	<50	<50	<50	<50	<50	<50	<50	<50	<50	<50	<10	<10	<10	<10	<10	<10	<10	<10	<10	<10	<10	<10
Carbon disulfide	µg/L	-	<5	<5	<5	<5	<5	<5	<5	<5	<5	<5	<5	<5	<5	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1
2.2-Dichloropropane	µg/L	-	<5	<5	<5	<5	<5	<5	<5	<5	<5	<5	<5	<5	<5	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1
1.2-Dichloropropane	µg/L	-	<5	<5	<5	<5	<5	<5	<5	<5	<5	<5	<5	<5	<5	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1

YEAR			2023													2024											
MONTH			September						December							March						June					
cis-1.3-Dichloropropylene	µg/L	-	<5	<5	<5	<5	<5	<5	<5	<5	<5	<5	<5	<5	<5	<2	<2	<2	<2	<2	<2	<2	<2	<2	<2	<2	<2
trans-1.3-Dichloropropylene	µg/L	-	<5	<5	<5	<5	<5	<5	<5	<5	<5	<5	<5	<5	<5	<2	<2	<2	<2	<2	<2	<2	<2	<2	<2	<2	<2
1.2-Dibromoethane (EDB)	µg/L	-	<5	<5	<5	<5	<5	<5	<5	<5	<5	<5	<5	<5	<5	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1
Halogenated Aliphatic Compounds																											
Dichlorodifluoromethane	µg/L	-	<50	<50	<50	<50	<50	<50	<5	<5	<5	<5	<5	<5	<5	<10	<10	<10	<10	<10	<10	<10	<10	<10	<10	<10	<10
Chloromethane	µg/L	-	<50	<50	<50	<50	<50	<50	<5	<5	<5	<5	<5	<5	<5	<10	<10	<10	<10	<10	<10	<10	<10	<10	<10	<10	<10
Vinyl chloride	µg/L	**0.3**	<50	<50	<50	<50	<50	<50	<0.3	<0.3	<0.3	<0.3	<0.3	<0.3	<0.3	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2
Bromomethane	µg/L	-	<50	<50	<50	<50	<50	<50	<5	<5	<5	<5	<5	<5	<5	<10	<10	<10	<10	<10	<10	<10	<10	<10	<10	<10	<10
Chloroethane	µg/L	-	<50	<50	<50	<50	<50	<50	<5	<5	<5	<5	<5	<5	<5	<10	<10	<10	<10	<10	<10	<10	<10	<10	<10	<10	<10
Trichlorofluoromethane	µg/L	-	<50	<50	<50	<50	<50	<50	<5	<5	<5	<5	<5	<5	<5	<10	<10	<10	<10	<10	<10	<10	<10	<10	<10	<10	<10
1.1-Dichloroethene	µg/L	**30**	<5	<5	<5	<5	<5	<5	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1
Iodomethane	µg/L	-	<5	<5	<5	<5	<5	<5								<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1
trans-1.2-Dichloroethene	µg/L	**60**	<5	<5	<5	<5	<5	<5	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<2	<2	<2	<2	<2	<2
1.1-Dichloroethane	µg/L	-	<5	<5	<5	<5	<5	<5	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1
cis-1.2-Dichloroethene	µg/L	**30**	<5	<5	<5	<5	<5	<5	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1
1.1.1-Trichloroethane	µg/L	-	<5	<5	<5	<5	<5	<5	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1
1.1-Dichloropropylene	µg/L	-	<5	<5	<5	<5	<5	<5								<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1
Carbon Tetrachloride	µg/L	**3**	<5	<5	<5	<5	<5	<5	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1
1.2-Dichloroethane	µg/L	**3**	<5	<5	<5	<5	<5	<5	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1
Trichloroethene	µg/L	-	<5	<5	<5	<5	<5	<5	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1
Dibromoethane	µg/L	-	<5	<5	<5	<5	<5	<5	<5	<5	<5	<5	<5	<5	<5	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1
1.1.2-Trichloroethane	µg/L	-	<5	<5	<5	<5	<5	<5	<5	<5	<5	<5	<5	<5	<5	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1
1.3-Dichloropropane	µg/L	-	<5	<5	<5	<5	<5	<5	<5	<5	<5	<5	<5	<5	<5	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1
Tetrachloroethene	µg/L	**50**	<5	<5	<5	<5	<5	<5	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1
1.1.1.2-Tetrachloroethane	µg/L	**50**	<5	<5	<5	<5	<5	<5	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1
trans-1.4-Dichloro-2-butene	µg/L	-	<5	<5	<5	<5	<5	<5	<5	<5	<5	<5	<5	<5	<5	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1
cis-1.4-Dichloro-2-butene	µg/L	-	<5	<5	<5	<5	<5	<5	<5	<5	<5	<5	<5	<5	<5	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1
1.1.2.2-Tetrachloroethane	µg/L	-	<5	<5	<5	<5	<5	<5	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1
1.2.3-Trichloropropane	µg/L	-	<5	<5	<5	<5	<5	<5	<5	<5	<5	<5	<5	<5	<5	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1
Pentachloroethane	µg/L	-	<5	<5	<5	<5	<5	<5	<5	<5	<5	<5	<5	<5	<5	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1
1.2-Dibromo-3-chloropropane	µg/L	-	<5	<5	<5	<5	<5	<5	<5	<5	<5	<5	<5	<5	<5	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1
Hexachlorobutadiene	µg/L	**0.7**	<5	<5	<5	<5	<5	<5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5

YEAR			2023													2024											
MONTH			September						December							March						June					
Halogenated Aromatic Compounds																											
Chlorobenzene	µg/L	**300**	<5	<5	<5	<5	<5	<5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1
Bromobenzene	µg/L	-	<5	<5	<5	<5	<5	<5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1
2-Chlorotoluene	µg/L	-	<5	<5	<5	<5	<5	<5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1
4-Chlorotoluene	µg/L	-	<5	<5	<5	<5	<5	<5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1
1.3-Dichlorobenzene	µg/L	-	<5	<5	<5	<5	<5	<5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1
1.4-Dichlorobenzene	µg/L	**40**	<5	<5	<5	<5	<5	<5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1
1.2-Dichlorobenzene	µg/L	**1500**	<5	<5	<5	<5	<5	<5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1
1.2.4-Trichlorobenzene	µg/L	**30**	<5	<5	<5	<5	<5	<5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1
1.2.3-Trichlorobenzene	µg/L	**30**	<5	<5	<5	<5	<5	<5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1
Trihalomethanes		**250**																									
Chloroform	µg/L		21	21	21	20	21	17	26	28	25	26	26	21	23	23	23	22	30	21	27	14	11	16	13	15	11
Bromodichloromethane	µg/L		21	17	26	<5	13	22	16	11	25	28	2	19	22	15	28	27	<1	17	26	4	14	20	18	<1	10
Dibromochloromethane	µg/L		14	12	21	<5	<5	18	6	6	20	21	<1	15	15	8	26	25	<1	14	9	1	9	19	19	<1	10
Bromoform	µg/L		<5	<5	<5	<5	<5	<5	<1	<1	4	4	<1	3	3	1	6	6	<1	3	1	<1	2	4	4	<1	2
Naphthalene	µg/L	-	<5	<5	<5	<5	<5	<5	<1	<1	<1	<1	<1	<1	<1	<5	<5	<5	<5	<5	<5	<5	<5	<5	<5	<5	<5
VOC Surrogates																											
1.2-Dichloroethane-D4	%	-	102	101	104	102	100	102	108	102	116	102	100	102	101	83.4	79.6	84.2	83	82.8	93.6	92.5	90.6	101	95.2	93.8	94.2
Toluene-D8	%	-	99.1	98.2	99.8	97.9	98.2	98.8	106	99.8	98.8	102	100	98.3	99.9	112	101	108	109	107	107	98.2	94.8	100	97	94.8	93.8
4-Bromofluorobenzene	%	-	86.9	101	103	100	101	101	92.3	103	105	105	92.8	106	90.9	111	107	114	110	109	105	99.2	98.3	96.9	96.7	97.3	96.1
Total Petroleum Hydrocarbons																											
C6 - C9 Fraction	µg/L	-	30	30	30	<20	20	30	30	20	40	40	<20	30	30	20	30	30	<20	20	30	<20	<20	20	20	<20	<20
C10 - C14 Fraction	µg/L	-	<50	<50	<50	<50	<50	<50	<50	<50	<50	<50	<50	<50	<50	<50	<50	<50	<50	<50	<50	<50	<50	<50	<50	<50	<50
C15 - C28 Fraction	µg/L	-	<100	<100	<100	<100	<100	<100	<100	<100	<100	<100	<100	<100	<100	<100	<100	<100	<100	<100	<100	<100	<100	<100	<100	<100	<100
C29 - C36 Fraction	µg/L	-	<50	<50	<50	<50	<50	<50	<50	<50	<50	<50	<50	<50	<50	<50	<50	<50	<50	<50	<50	<50	<50	<50	<50	<50	<50
C10 - C36 Fraction (sum)	µg/L	-	<50	<50	<50	<50	<50	<50	<50	<50	<50	<50	<50	<50	<50	<50	<50	<50	<50	<50	<50	<50	<50	<50	<50	<50	<50
Heterotrophic Plate Count (22°C)	CFU/mL	-	180	25	~3	30	~2	15	13	66	140	~9	53	72	100	~17000	~2	<1	69	230	72	10	13	46	51	350	51
Heterotrophic Plate Count (36°C)	CFU/mL	-	>57000	36	~9	120	~7	24	12	37	270	11	150	26	150	~17000	110	<1	130	28	150	37	110	110	130	1600	160
Faecal Coliforms	CFU/100mL	**nil**	<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

YEAR			2023													2024											
MONTH			September						December							March						June					
Escherichia coli	CFU/100mL	**nil**	<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
Coliforms	CFU/100mL	**nil**	<1	**~120**	<1	**~120**	<1	<1	<1	<1	<1	<1	57	<1	<1	<1	<1	<1	44	<1	55	<1	<1	<1	<1	<1	~20	~2
Total Chlorine	mg/L	**5**	0.03	0.05	0.71	0	0.12	0.07								0.03	0.21	0.05	0.02	0.03		0.02		0	0.21	0	0.04

Parameters tested with ADWG health guideline value color-coded.

Within ADWG health guideline value

Exceedance of ADWG health guideline value

Limit of reporting for the standard method testing of Analyte didn't comply with ADWG health limit. It was communicated with ALS lab and was corrected as of December 2023 sampling round.