RIVERDALE MUNICIPALITY PUBLIC WATER SYSTEM ANNUAL REPORT - 2024

Riverdale Municipality strives to provide high quality drinking water in sufficient quantity to meet the needs of the public. It is our goal to do so in a safe, cost-effective manner while remaining in compliance with the regulatory requirements governing the provision of drinking water.
The operation of our water system is regulated in part by the Drinking Water Safety Act (MR40/2007), which came into force on March 1, 2007. Section 32(1) of the regulation stipulates that water systems serving 1,000 or more persons must prepare an annual report to its water users. Therefore, the following report has been prepared for the Town of Rivers water consumers.

Where does our water come from?

The Town of Rivers used water from four deep wells in the late 1940's but abandoned the wells when it bought the CNR dam on the Little Saskatchewan River south of town.
In 1991 the town began pumping water from Lake Wahtopanah, abandoning the reservoir at the river. This change has improved water quality thus reducing the cost of the treatment process.

How does the water get to our tap?

Source:

- Two 23 horse submersible pumps pump the raw water from Lake Wahtopanah to the water treatment plant through 2.5 kms of 250 mm C-900 PVC pipe.

Treatment:

- The raw water enters a pre-filter/strainer in the treatment facility that limits the quantity of larger particles entering the Membrane Filtration Units (MFU) and reduces the frequency of backwash cycles required to clean the units.
- After the pre-filters, the water goes through the MFU's. The MFU's consist of two sets of eight ultrafiltration (UF) modules each.
- Each UF module has hundreds of hollow straws (membranes) that the water is forced through.
- The water enters the module where pressure is applied to force water through the membranes. Most of the water passes out of the module through the inside of the membranes, while particles larger than the pore size of the membrane are rejected.
- This process removes bacteria, viruses, colloids, parasites such as Giardia and Cryptosporidium, and similar sized particles from the water.
- From the UF modules, the water is placed in a reservoir used to supply the Membrane Treatment Units (MTU). This reservoir is now being chlorinated to reduce biofouling in the RO membranes. Biofouling is biological growth that inhibits the flow of water through the membranes. As the water is pumped to the MTU's, Sodium Bisulfite is added to dechlorinate the water as chlorine will damage the membranes.
- The MTU's consist of two sets of four reverse osmosis (RO) modules and two Nano-filtration (NF) modules.

- The water from the UF reservoir is pumped to the modules where pressure is applied to the membranes, forcing the water through the membranes, leaving behind the small amount of water that will not pass through due to the dissolved substances that are too large for the membrane pore size, (concentrate).
- The concentrate is stored in a waste chamber where it is neutralized before being pumped out to the Little Saskatchewan River.
- The pure water (permeate) passes through the RO/NF membranes, removing dissolved contaminates such as salts and organics.

Distribution:

- The treated water is stored in a 1000m3/three chamber reservoir under the treatment facility.
- Chlorine is injected as the treated water enters the reservoir. This allows the chlorine adequate contact time to maintain the required residual.
- Treated water is pumped to the distribution system by 4-25 hp pumps which alternate between cycles and during low demand periods, a 7.5 hp "Jockey pump" is used.
- The distribution system pressure is currently set at 45 psi. (Pounds per square inch).
- The distribution piping is comprised of 150mm Transite water main and ¾ inch to 2-inch service connections. There are currently a total of 535 services which are all metered.
- An on-site backup generator at the treatment facility is used to run the distribution pumps in the event of a power outage.

What chemicals are used in the treatment of our water?

The clarity of surface water changes each season and is dependent on the weather (amount of precipitation, temperature, spring runoff, etc.). As the water changes, adjustments are made to the process to ensure the best possible finished water. The following is a list of the chemicals we currently use and a brief description of their function.

Anti-Scalant – Fed into the feed water of the MTU to control scaling of the membranes.
Sodium Hydroxide – Used for high PH cleanings on the UF's and fed into the permeate water of the MTU for PH adjustment.
Hydrochloric Acid - Used for low PH cleanings on the UF's and caustic neutralization.
Sodium Hypochlorite – Used in the UF membrane cleaning process. Also, an adequate amount of chlorine is added before the water enters the storage reservoir to provide a disinfectant residual throughout the distribution piping.
Corrosion Inhibitor – A liquid inhibitor formulated to control corrosion in our distribution lines.
Sodium Bisulphite- Injected into the MTU feed lines to dechlorinate the feed water and to dechlorinate CIP (clean in place) and CEB (chemically enhanced backwash) water in the UF's.

Is our water tested? What for? When?

Water tests are taken on a routine basis to ensure that the water is safe and to monitor how well the treatment process is working. We test the water at the water treatment facility every day. We also test the water in the distribution system, as well as the raw water regularly. It is a regulatory requirement that all water test results associated with water safety be submitted to the provincial Office of Drinking Water for review.

Disinfectant Testing: On- line chlorine analyzers in the treatment process continuously monitor the level of chlorine in the treated water, in addition to manual chlorine tests done by the operator several times per day to ensure that the water leaving the water treatment plant has enough chlorine to ensure proper disinfection throughout the system. We also test chlorine levels in the distribution system every time we take water samples for bacterial testing.

Turbidity Testing: Turbidity is defined as the cloudiness of a fluid caused by individual particles. Turbidity testing is a measurement of the clarity of water. We use turbidity to tell us how well our treatment process is working and to adjust our chemical feed rates throughout the year as the water changes. Five on- line turbidity analyzers continuously monitor the water as it goes through the treatment process, in addition to daily manual turbidity testing done by the operator.

Bacterial Testing: We test the raw water (untreated lake water), the treated water (leaving the water treatment plant) and the water in the distribution system at two locations every two weeks (bi-weekly) for the presences of Total Coliform and E. coli bacteria. If these bacteria are present in the water, it is an indication that disease-causing organisms may be present. If the laboratory results are positive, we resample and test again. If the results are still positive, a boil water advisory may be issued to the town at which time the public would be notified by the various media.

Trihalomethane (THM)/Haloacetic Acid (HAA) Testing: Trihalomethanes (THMs) and Haloacetic Acid (HAA) are by-products of the water treatment process. They are formed when natural organic material, such as the decaying vegetation commonly found in lakes and reservoirs, reacts with chlorine used to treat the water. This reaction produces "disinfection by-products," the most common of which are THMs and HAA's. Sampling is done four times per year, every second year, and the standard is based on these tests.

Chemical Testing: We test the raw and treated water for 60 chemical parameters on an annual basis. Sampling was completed in July 17th/24 Testing indicated that the treated water met all health and aesthetic guidelines. A copy of the chemical analysis report can be obtained from the Municipal office.

Microcystin Testing: During the summer months, we do visual inspections for algae near the raw water intake. If an algae bloom is present, we test for microcystin toxins every three days until the bloom has passed. In 2024, no microcystin was detected in the raw water.

Lead Testing: Lead testing in the distribution system was completed for 2024. 20 samples were collected at varying residences throughout the year. Test results indicated no results above the standard limit in all samples.

What are the results of the tests?

The following list summarizes all the treated water test results for 2024:

Table 1. Treated Water Test Results and Standards

Testing Parameter	Standard	Frequency	Test Results
Bacterial	0-TC*, 0-EC*	Bi-weekly	100% Compliance
Chlorine (leaving reservoir)	0.5mg/L	Continuous	100 % Compliance
Chlorine (in town)	0.1mg/L	Bi-weekly	100% Compliance

Turbidity	<0.1 NTU	Continuous	100% Compliance
THM (Trihalomethanes)	0.1 mg/L	Quarterly (2024 result)	.007 mg/L
HAA (Haloacetic Acids)	<0.005 mg/l	Quarterly (2024 result)	<0.005 mg/l
Microbial	3 LRV*	Daily	100% Compliance

How do we alert Public Utilities Staff to water emergencies?

The new Water Treatment Plant utilizes a SCADA program. SCADA is an acronym for Supervisory Control and Data Acquisition. SCADA generally refers to an industrial computer system that monitors and controls all the processes in the plant and through an alarm system alert Utilities Staff to any emergencies that might affect the town's water supply. There is an operator on call 24 hours a day, 7 days a week. The operator is always available via cell phone.

Were there any emergencies, regulatory compliance issues or other operational issues to report in 2024?

- We had one Boil Water Advisory issued on June 17th/24 and rescinded on June 24th/24. This was limited to the Memorial Drive subdivision and affected only those 4 residences. The BWA was due to depressurizing the water main for maintenance.

Future system expansion or expenses expected?

Currently we have applied for funding for a rural water pipeline to provide potable water to the rural population as well as constructing a Municipal owned Bulk Water Station.

Who can we call with questions or concerns regarding our drinking water?

For general questions during regular business hours, call the Riverdale Municipality Office from 8:30 am to 4:30 pm at 204-328-5300 or the Water Treatment Plant at 204-710-7000.

For after hour's emergencies Call 204-573-7841

Attached is a list of all chemical water quality standards that apply to the water system, microsystin test results and a summary of analysis results for each parameter before and after treatment.

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CERTIFICATE OF ANALYSIS (GUIDELINE EVALUATION)

Work Order	: **WP2417557**	Page	: 1 of 14
Client	: **Manitoba Conservation & Climate**	Laboratory	: ALS Environmental - Winnipeg
Contact	: Marc Balcaen	Account Manager	: Sheriza Rajack-Ahamed
Address	: 14 Fultz Boulevard Winnipeg MB Canada R3Y 0L6	Address	: 1329 Niakwa Road East, Unit 12 Winnipeg, Manitoba Canada R2J 3T4
Telephone	: 204 945 5776	Telephone	: +1 204 255 9720
Project	: Rivers - PWS 181.00	Date Samples Received	: 17-Jul-2024 10:19
PO	: ----	Date Analysis Commenced	: 17-Jul-2024
C-O-C number	: ----	Issue Date	: 01-Aug-2024 11:17
Sampler	: Jeff Worth		
Site	: Rivers - PWS 181.00 Op Id: 16843		
Quote number	: 2024 WTP Chemistry		
No. of samples received	: 3		
No. of samples analysed	: 3		

This report supersedes any previous report(s) with this reference. Results apply to the sample(s) as submitted. This document shall not be reproduced, except in full.

This Certificate of Analysis contains the following information:

- General Comments
- Analytical Results
- Guideline Comparison

Additional information pertinent to this report will be found in the following separate attachments: Quality Control Report, QC Interpretive report to assist with Quality Review and Sample Receipt Notification (SRN).

Signatories

This document has been electronically signed by the authorized signatories below. Electronic signing is conducted in accordance with US FDA 21 CFR Part 11.

Signatories	*Position*	*Laboratory Department*
Lee McTavish		Inorganics, Winnipeg, Manitoba
Lee McTavish		Metals, Winnipeg, Manitoba

No Breaches Found

General Comments

The analytical methods used by ALS are developed using internationally recognized reference methods (where available), such as those published by US EPA, APHA Standard Methods, ASTM, ISO, Environment Canada, BC MOE, and Ontario MOE. Refer to the ALS Quality Control Interpretive report (QCI) for applicable references and methodology summaries. Reference methods may incorporate modifications to improve performance.

Where a reported less than (<) result is higher than the LOR, this may be due to primary sample extract/digestate dilution and/or insufficient sample for analysis.
Where the LOR of a reported result differs from standard LOR, this may be due to high moisture content, insufficient sample (reduced weight employed) or matrix interference.

Additional information pertinent to this report will be found in the following separate attachments: Quality Control Report, QA/QC Compliance Assessment to assist with Quality Review and Sample Receipt Notification.

When sampling time information is not provided by the client, sampling dates are shown without a time component. In these instances, the time component has been assumed by the laboratory for processing purposes.

Application of guidelines is provided "as is" without warranty of any kind, either expressed or implied, including, but not limited to fitness for a particular purpose, or non-infringement. ALS assumes no responsibility for errors or omissions in the information. Guidelines are not adjusted for the hardness, pH or temperature of the sample (the most conservative values are used). Measurement uncertainty is not applied to test results prior to comparison with specified criteria values.

Key : LOR: Limit of Reporting (detection limit).

Unit	*Description*
-	no units
%	percent
% T/cm	% transmittance per centimetre
µg/L	micrograms per litre
µS/cm	microsiemens per centimetre
AU/cm	absorbance units per centimetre
CU	colour units (1 cu = 1 mg/l pt)
meq/L	milliequivalents per litre
mg/L	milligrams per litre
NTU	nephelometric turbidity units
pH units	pH units

>: greater than.

<: less than.

Red shading is applied where the result or the LOR is greater than the Guideline Upper Limit (or lower than the Guideline Lower Limit, if applicable).

For drinking water samples, Red shading is applied where the result for E.coli, fecal or total coliforms is greater than or equal to the Guideline Upper Limit.

Analytical Results Evaluation

Matrix: **Drinking Water**

			Client sample ID	**Rivers 3 - Distribution (mid)**	----	----	----	----	----	----
			Sampling date/time	16-Jul-2024 11:15	----	----	----	----	----	----
			Sub-Matrix	Drinking Water	----	----	----	----	----	----
Analyte	*CAS Number*	*Method/Lab*	*Unit*	WP2417557-003	--------	--------	--------	--------	--------	--------
Total Metals										
Aluminum, total	7429-90-5	E420/WP	µg/L	14.3	----	----	----	----	----	----
Antimony, total	7440-36-0	E420/WP	µg/L	<0.10	----	----	----	----	----	----
Arsenic, total	7440-38-2	E420/WP	µg/L	<0.10	----	----	----	----	----	----
Barium, total	7440-39-3	E420/WP	µg/L	1.14	----	----	----	----	----	----
Beryllium, total	7440-41-7	E420/WP	µg/L	Not Detected	----	----	----	----	----	----
Bismuth, total	7440-69-9	E420/WP	µg/L	<0.050	----	----	----	----	----	----
Boron, total	7440-42-8	E420/WP	µg/L	74	----	----	----	----	----	----
Cadmium, total	7440-43-9	E420/WP	µg/L	Not Detected	----	----	----	----	----	----
Calcium, total	7440-70-2	E420/WP	µg/L	1360	----	----	----	----	----	----
Cesium, total	7440-46-2	E420/WP	µg/L	<0.010	----	----	----	----	----	----
Chromium, total	7440-47-3	E420/WP	µg/L	Not Detected	----	----	----	----	----	----
Cobalt, total	7440-48-4	E420/WP	µg/L	Not Detected	----	----	----	----	----	----
Copper, total	7440-50-8	E420/WP	µg/L	6.83	----	----	----	----	----	----
Iron, total	7439-89-6	E420/WP	µg/L	<10	----	----	----	----	----	----
Lead, total	7439-92-1	E420/WP	µg/L	0.132	----	----	----	----	----	----
Lithium, total	7439-93-2	E420/WP	µg/L	6.8	----	----	----	----	----	----
Magnesium, total	7439-95-4	E420/WP	µg/L	618	----	----	----	----	----	----
Manganese, total	7439-96-5	E420/WP	µg/L	0.11	----	----	----	----	----	----
Molybdenum, total	7439-98-7	E420/WP	µg/L	<0.050	----	----	----	----	----	----
Nickel, total	7440-02-0	E420/WP	µg/L	<0.50	----	----	----	----	----	----
Phosphorus, total	7723-14-0	E420/WP	µg/L	118	----	----	----	----	----	----
Potassium, total	7440-09-7	E420/WP	µg/L	827	----	----	----	----	----	----
Rubidium, total	7440-17-7	E420/WP	µg/L	0.24	----	----	----	----	----	----
Selenium, total	7782-49-2	E420/WP	µg/L	Not Detected	----	----	----	----	----	----
Silicon, total	7440-21-3	E420/WP	µg/L	1020	----	----	----	----	----	----
Silver, total	7440-22-4	E420/WP	µg/L	Not Detected	----	----	----	----	----	----
Sodium, total	7440-23-5	E420/WP	µg/L	6740	----	----	----	----	----	----
Strontium, total	7440-24-6	E420/WP	µg/L	4.82	----	----	----	----	----	----

Analytical Results Evaluation

Matrix: **Drinking Water**

			Client sample ID	**Rivers 3 - Distribution (mid)**	----	----	----	----	----	----
			Sampling date/time	16-Jul-2024 11:15	----	----	----	----	----	----
			Sub-Matrix	Drinking Water	----	----	----	----	----	----
Analyte	*CAS Number*	*Method/Lab*	*Unit*	WP2417557-003	--------	--------	--------	--------	--------	--------
Total Metals										
Sulfur, total	7704-34-9	E420/WP	µg/L	<500	----	----	----	----	----	----
Tellurium, total	13494-80-9	E420/WP	µg/L	Not Detected	----	----	----	----	----	----
Thallium, total	7440-28-0	E420/WP	µg/L	Not Detected	----	----	----	----	----	----
Thorium, total	7440-29-1	E420/WP	µg/L	Not Detected	----	----	----	----	----	----
Tin, total	7440-31-5	E420/WP	µg/L	<0.10	----	----	----	----	----	----
Titanium, total	7440-32-6	E420/WP	µg/L	Not Detected	----	----	----	----	----	----
Tungsten, total	7440-33-7	E420/WP	µg/L	Not Detected	----	----	----	----	----	----
Uranium, total	7440-61-1	E420/WP	µg/L	0.016	----	----	----	----	----	----
Vanadium, total	7440-62-2	E420/WP	µg/L	<0.50	----	----	----	----	----	----
Zinc, total	7440-66-6	E420/WP	µg/L	<3.0	----	----	----	----	----	----
Zirconium, total	7440-67-7	E420/WP	µg/L	Not Detected	----	----	----	----	----	----

Please refer to the General Comments section for an explanation of any result qualifiers detected.

Please refer to the Accreditation section for an explanation of analyte accreditations.

Analytical Results Evaluation

Matrix: **Treated Drinking Water**

Analyte	CAS Number	Method/Lab	Unit	Rivers 2 - Treated	----	----	----	----	----	----
Sampling date/time				16-Jul-2024 11:00	----	----	----	----	----	----
Sub-Matrix				Treated Drinking Water	----	----	----	----	----	----
				WP2417557-002	--------	--------	--------	--------	--------	--------
Physical Tests										
Absorbance, UV (@ 254nm)	----	E404/WP	AU/cm	0.0210	----	----	----	----	----	----
Alkalinity, bicarbonate (as CaCO3)	----	E290/WP	mg/L	17.3	----	----	----	----	----	----
Alkalinity, carbonate (as CaCO3)	----	E290/WP	mg/L	<1.0	----	----	----	----	----	----
Alkalinity, hydroxide (as CaCO3)	----	E290/WP	mg/L	<1.0	----	----	----	----	----	----
Alkalinity, total (as CaCO3)	----	E290/WP	mg/L	17.3	----	----	----	----	----	----
Colour, true	----	E329/WP	CU	<5.0	----	----	----	----	----	----
Conductivity	----	E100/WP	µS/cm	45.6	----	----	----	----	----	----
Hardness (as CaCO3), from total Ca/Mg	----	EC100A/WP	mg/L	5.54	----	----	----	----	----	----
Langelier index (@ 4°C)	----	EC105A/WP	-	-2.95	----	----	----	----	----	----
Langelier index (@ 60°C)	----	EC105A/WP	-	-2.16	----	----	----	----	----	----
pH	----	E108/WP	pH units	7.28	----	----	----	----	----	----
Solids, total dissolved [TDS]	----	E162-L/WP	mg/L	14.6	----	----	----	----	----	----
Turbidity	----	E121/WP	NTU	<0.10	----	----	----	----	----	----
Transmittance, UV (@ 254nm)	----	E404/WP	% T/cm	95.3	----	----	----	----	----	----
Anions and Nutrients										
Ammonia, total (as N)	7664-41-7	E298/WP	mg/L	0.0277	----	----	----	----	----	----
Bromide	24959-67-9	E235.Br-L/WP	mg/L	Not Detected	----	----	----	----	----	----
Chloride	16887-00-6	E235.Cl-L/WP	mg/L	1.93	----	----	----	----	----	----
Fluoride	16984-48-8	E235.F/WP	mg/L	<0.020	----	----	----	----	----	----
Nitrate (as N)	14797-55-8	E235.NO3-L/WP	mg/L	0.0816	----	----	----	----	----	----
Nitrite (as N)	14797-65-0	E235.NO2-L/WP	mg/L	<0.0010	----	----	----	----	----	----
Sulfate (as SO4)	14808-79-8	E235.SO4/WP	mg/L	1.31	----	----	----	----	----	----
Organic / Inorganic Carbon										
Carbon, dissolved organic [DOC]	----	E358-L/WP	mg/L	0.77	----	----	----	----	----	----
Carbon, total organic [TOC]	----	E355-L/WP	mg/L	<0.50	----	----	----	----	----	----
Ion Balance										
Anion sum	----	EC101A/WP	meq/L	0.43	----	----	----	----	----	----
Cation sum (total)	----	EC101A/WP	meq/L	0.43	----	----	----	----	----	----

Analytical Results Evaluation

Matrix: Treated Drinking Water

Analyte	CAS Number	Method/Lab	Unit	Rivers 2 - Treated	----	----	----	----	----	----
Sampling date/time				16-Jul-2024 11:00	----	----	----	----	----	----
Sub-Matrix				Treated Drinking Water	----	----	----	----	----	----
				WP2417557-002	--------	--------	--------	--------	--------	--------
Ion Balance										
Ion balance (cations/anions)	----	EC101A/WP	%	100	----	----	----	----	----	----
Ion balance (APHA)	----	EC101A/WP	%	0.0	----	----	----	----	----	----
Total Metals										
Aluminum, total	7429-90-5	E420/WP	µg/L	4.2	----	----	----	----	----	----
Antimony, total	7440-36-0	E420/WP	µg/L	<0.10	----	----	----	----	----	----
Arsenic, total	7440-38-2	E420/WP	µg/L	<0.10	----	----	----	----	----	----
Barium, total	7440-39-3	E420/WP	µg/L	1.01	----	----	----	----	----	----
Beryllium, total	7440-41-7	E420/WP	µg/L	Not Detected	----	----	----	----	----	----
Bismuth, total	7440-69-9	E420/WP	µg/L	<0.050	----	----	----	----	----	----
Boron, total	7440-42-8	E420/WP	µg/L	77	----	----	----	----	----	----
Cadmium, total	7440-43-9	E420/WP	µg/L	<0.0050	----	----	----	----	----	----
Calcium, total	7440-70-2	E420/WP	µg/L	1150	----	----	----	----	----	----
Cesium, total	7440-46-2	E420/WP	µg/L	<0.010	----	----	----	----	----	----
Chromium, total	7440-47-3	E420/WP	µg/L	Not Detected	----	----	----	----	----	----
Cobalt, total	7440-48-4	E420/WP	µg/L	Not Detected	----	----	----	----	----	----
Copper, total	7440-50-8	E420/WP	µg/L	6.27	----	----	----	----	----	----
Iron, total	7439-89-6	E420/WP	µg/L	<10	----	----	----	----	----	----
Lead, total	7439-92-1	E420/WP	µg/L	<0.050	----	----	----	----	----	----
Lithium, total	7439-93-2	E420/WP	µg/L	6.7	----	----	----	----	----	----
Magnesium, total	7439-95-4	E420/WP	µg/L	647	----	----	----	----	----	----
Manganese, total	7439-96-5	E420/WP	µg/L	<0.10	----	----	----	----	----	----
Molybdenum, total	7439-98-7	E420/WP	µg/L	<0.050	----	----	----	----	----	----
Nickel, total	7440-02-0	E420/WP	µg/L	<0.50	----	----	----	----	----	----
Phosphorus, total	7723-14-0	E420/WP	µg/L	123	----	----	----	----	----	----
Potassium, total	7440-09-7	E420/WP	µg/L	807	----	----	----	----	----	----
Rubidium, total	7440-17-7	E420/WP	µg/L	0.26	----	----	----	----	----	----
Selenium, total	7782-49-2	E420/WP	µg/L	Not Detected	----	----	----	----	----	----
Silicon, total	7440-21-3	E420/WP	µg/L	930	----	----	----	----	----	----

Analytical Results Evaluation

Matrix: **Treated Drinking Water**

			Client sample ID	**Rivers 2 - Treated**	----	----	----	----	----	----
			Sampling date/time	16-Jul-2024 11:00	----	----	----	----	----	----
			Sub-Matrix	Treated Drinking Water	----	----	----	----	----	----
Analyte	*CAS Number*	*Method/Lab*	*Unit*	WP2417557-002	--------	--------	--------	--------	--------	--------
Total Metals										
Silver, total	7440-22-4	E420/WP	µg/L	Not Detected	----	----	----	----	----	----
Sodium, total	7440-23-5	E420/WP	µg/L	6730	----	----	----	----	----	----
Strontium, total	7440-24-6	E420/WP	µg/L	4.16	----	----	----	----	----	----
Sulfur, total	7704-34-9	E420/WP	µg/L	<500	----	----	----	----	----	----
Tellurium, total	13494-80-9	E420/WP	µg/L	<0.20	----	----	----	----	----	----
Thallium, total	7440-28-0	E420/WP	µg/L	Not Detected	----	----	----	----	----	----
Thorium, total	7440-29-1	E420/WP	µg/L	Not Detected	----	----	----	----	----	----
Tin, total	7440-31-5	E420/WP	µg/L	<0.10	----	----	----	----	----	----
Titanium, total	7440-32-6	E420/WP	µg/L	Not Detected	----	----	----	----	----	----
Tungsten, total	7440-33-7	E420/WP	µg/L	Not Detected	----	----	----	----	----	----
Uranium, total	7440-61-1	E420/WP	µg/L	0.019	----	----	----	----	----	----
Vanadium, total	7440-62-2	E420/WP	µg/L	<0.50	----	----	----	----	----	----
Zinc, total	7440-66-6	E420/WP	µg/L	5.2	----	----	----	----	----	----
Zirconium, total	7440-67-7	E420/WP	µg/L	<0.20	----	----	----	----	----	----

Please refer to the General Comments section for an explanation of any result qualifiers detected.

Please refer to the Accreditation section for an explanation of analyte accreditations.

Analytical Results Evaluation

Matrix: Water

Analyte	CAS Number	Method/Lab	Unit	Rivers 1 - Raw	----	----	----	----	----	----
			Sampling date/time	16-Jul-2024 10:45	----	----	----	----	----	----
			Sub-Matrix	Water	----	----	----	----	----	----
				WP2417557-001	--------	--------	--------	--------	--------	--------
Physical Tests										
Absorbance, UV (@ 254nm)	----	E404/WP	AU/cm	0.493	----	----	----	----	----	----
Alkalinity, bicarbonate (as CaCO3)	----	E290/WP	mg/L	251	----	----	----	----	----	----
Alkalinity, carbonate (as CaCO3)	----	E290/WP	mg/L	5.0	----	----	----	----	----	----
Alkalinity, hydroxide (as CaCO3)	----	E290/WP	mg/L	<1.0	----	----	----	----	----	----
Alkalinity, total (as CaCO3)	----	E290/WP	mg/L	256	----	----	----	----	----	----
Colour, true	----	E329/WP	CU	41.6	----	----	----	----	----	----
Conductivity	----	E100/WP	µS/cm	818	----	----	----	----	----	----
Hardness (as CaCO3), from total Ca/Mg	----	EC100A/WP	mg/L	377	----	----	----	----	----	----
Langelier index (@ 4°C)	----	EC105A/WP	-	0.828	----	----	----	----	----	----
Langelier index (@ 60°C)	----	EC105A/WP	-	1.58	----	----	----	----	----	----
pH	----	E108/WP	pH units	8.30	----	----	----	----	----	----
Solids, total dissolved [TDS]	----	E162-L/WP	mg/L	551	----	----	----	----	----	----
Turbidity	----	E121/WP	NTU	1.40	----	----	----	----	----	----
Transmittance, UV (@ 254nm)	----	E404/WP	% T/cm	32.1	----	----	----	----	----	----
Anions and Nutrients										
Ammonia, total (as N)	7664-41-7	E298/WP	mg/L	0.0470	----	----	----	----	----	----
Bromide	24959-67-9	E235.Br-L/WP	mg/L	<0.050	----	----	----	----	----	----
Chloride	16887-00-6	E235.Cl-L/WP	mg/L	8.05	----	----	----	----	----	----
Fluoride	16984-48-8	E235.F/WP	mg/L	0.150	----	----	----	----	----	----
Nitrate (as N)	14797-55-8	E235.NO3-L/WP	mg/L	0.174	----	----	----	----	----	----
Nitrite (as N)	14797-65-0	E235.NO2-L/WP	mg/L	<0.0010	----	----	----	----	----	----
Sulfate (as SO4)	14808-79-8	E235.SO4/WP	mg/L	183	----	----	----	----	----	----
Organic / Inorganic Carbon										
Carbon, dissolved organic [DOC]	----	E358-L/WP	mg/L	17.4	----	----	----	----	----	----
Carbon, total organic [TOC]	----	E355-L/WP	mg/L	18.5	----	----	----	----	----	----
Ion Balance										
Anion sum	----	EC101A/WP	meq/L	9.17	----	----	----	----	----	----
Cation sum (total)	----	EC101A/WP	meq/L	9.09	----	----	----	----	----	----
Ion balance (cations/anions)	----	EC101A/WP	%	99.1	----	----	----	----	----	----

Analytical Results Evaluation

Matrix: **Water**

Analyte	CAS Number	Method/Lab	Unit	Rivers 1 - Raw	----	----	----	----	----	----
			Sampling date/time	16-Jul-2024 10:45	----	----	----	----	----	----
			Sub-Matrix	Water	----	----	----	----	----	----
				WP2417557-001	--------	--------	--------	--------	--------	--------
Ion Balance										
Ion balance (APHA)	----	EC101A/WP	%	-0.438	----	----	----	----	----	----
Total Metals										
Aluminum, total	7429-90-5	E420/WP	µg/L	16.1	----	----	----	----	----	----
Antimony, total	7440-36-0	E420/WP	µg/L	0.18	----	----	----	----	----	----
Arsenic, total	7440-38-2	E420/WP	µg/L	3.70	----	----	----	----	----	----
Barium, total	7440-39-3	E420/WP	µg/L	43.3	----	----	----	----	----	----
Beryllium, total	7440-41-7	E420/WP	µg/L	<0.020	----	----	----	----	----	----
Bismuth, total	7440-69-9	E420/WP	µg/L	<0.050	----	----	----	----	----	----
Boron, total	7440-42-8	E420/WP	µg/L	92	----	----	----	----	----	----
Cadmium, total	7440-43-9	E420/WP	µg/L	0.0052	----	----	----	----	----	----
Calcium, total	7440-70-2	E420/WP	µg/L	71500	----	----	----	----	----	----
Cesium, total	7440-46-2	E420/WP	µg/L	<0.010	----	----	----	----	----	----
Chromium, total	7440-47-3	E420/WP	µg/L	<0.50	----	----	----	----	----	----
Cobalt, total	7440-48-4	E420/WP	µg/L	0.24	----	----	----	----	----	----
Copper, total	7440-50-8	E420/WP	µg/L	0.91	----	----	----	----	----	----
Iron, total	7439-89-6	E420/WP	µg/L	43	----	----	----	----	----	----
Lead, total	7439-92-1	E420/WP	µg/L	<0.050	----	----	----	----	----	----
Lithium, total	7439-93-2	E420/WP	µg/L	57.7	----	----	----	----	----	----
Magnesium, total	7439-95-4	E420/WP	µg/L	48100	----	----	----	----	----	----
Manganese, total	7439-96-5	E420/WP	µg/L	156	----	----	----	----	----	----
Molybdenum, total	7439-98-7	E420/WP	µg/L	1.70	----	----	----	----	----	----
Nickel, total	7440-02-0	E420/WP	µg/L	2.06	----	----	----	----	----	----
Phosphorus, total	7723-14-0	E420/WP	µg/L	220	----	----	----	----	----	----
Potassium, total	7440-09-7	E420/WP	µg/L	8090	----	----	----	----	----	----
Rubidium, total	7440-17-7	E420/WP	µg/L	2.38	----	----	----	----	----	----
Selenium, total	7782-49-2	E420/WP	µg/L	0.278	----	----	----	----	----	----
Silicon, total	7440-21-3	E420/WP	µg/L	9410	----	----	----	----	----	----
Silver, total	7440-22-4	E420/WP	µg/L	<0.010	----	----	----	----	----	----
Sodium, total	7440-23-5	E420/WP	µg/L	31000	----	----	----	----	----	----

Analytical Results Evaluation

Matrix: **Water**

			Client sample ID	**Rivers 1 - Raw**	**----**	**----**	**----**	**----**	**----**	**----**
			Sampling date/time	16-Jul-2024 10:45	----	----	----	----	----	----
			Sub-Matrix	Water	----	----	----	----	----	----
Analyte	*CAS Number*	*Method/Lab*	*Unit*	WP2417557-001	--------	--------	--------	--------	--------	--------
Total Metals										
Strontium, total	7440-24-6	E420/WP	µg/L	286	----	----	----	----	----	----
Sulfur, total	7704-34-9	E420/WP	µg/L	66800	----	----	----	----	----	----
Tellurium, total	13494-80-9	E420/WP	µg/L	0.29	----	----	----	----	----	----
Thallium, total	7440-28-0	E420/WP	µg/L	<0.010	----	----	----	----	----	----
Thorium, total	7440-29-1	E420/WP	µg/L	<0.10	----	----	----	----	----	----
Tin, total	7440-31-5	E420/WP	µg/L	<0.10	----	----	----	----	----	----
Titanium, total	7440-32-6	E420/WP	µg/L	0.50	----	----	----	----	----	----
Tungsten, total	7440-33-7	E420/WP	µg/L	Not Detected	----	----	----	----	----	----
Uranium, total	7440-61-1	E420/WP	µg/L	3.01	----	----	----	----	----	----
Vanadium, total	7440-62-2	E420/WP	µg/L	1.62	----	----	----	----	----	----
Zinc, total	7440-66-6	E420/WP	µg/L	<3.0	----	----	----	----	----	----
Zirconium, total	7440-67-7	E420/WP	µg/L	<0.20	----	----	----	----	----	----

Please refer to the General Comments section for an explanation of any result qualifiers detected.

Please refer to the Accreditation section for an explanation of analyte accreditations.

Summary of Guideline Limits

Analyte	*CAS Number*	*Unit*	CDWG AO	CDWG MAC	CDWG OG				
Physical Tests									
Absorbance, UV (@ 254nm)	----	AU/cm	--	--	--				
Alkalinity, bicarbonate (as CaCO3)	----	mg/L	--	--	--				
Alkalinity, carbonate (as CaCO3)	----	mg/L	--	--	--				
Alkalinity, hydroxide (as CaCO3)	----	mg/L	--	--	--				
Alkalinity, total (as CaCO3)	----	mg/L	--	--	--				
Colour, true	----	CU	**15 CU**	--	--				
Conductivity	----	µS/cm	--	--	--				
Hardness (as CaCO3), from total Ca/Mg	----	mg/L	--	--	--				
Langelier index (@ 4°C)	----	-	--	--	--				
Langelier index (@ 60°C)	----	-	--	--	--				
pH	----	pH units	--	--	**7 - 10.5 pH units**				
Solids, total dissolved [TDS]	----	mg/L	**500 mg/L**	--	--				
Transmittance, UV (@ 254nm)	----	% T/cm	--	--	--				
Turbidity	----	NTU	**1 NTU**	--	--				
Anions and Nutrients									
Ammonia, total (as N)	7664-41-7	mg/L	--	--	--				
Bromide	24959-67-9	mg/L	--	--	--				
Chloride	16887-00-6	mg/L	**250 mg/L**	--	--				
Fluoride	16984-48-8	mg/L	--	**1.5 mg/L**	--				
Nitrate (as N)	14797-55-8	mg/L	--	**10 mg/L**	--				
Nitrite (as N)	14797-65-0	mg/L	--	**1 mg/L**	--				
Sulfate (as SO4)	14808-79-8	mg/L	**500 mg/L**	--	--				
Organic / Inorganic Carbon									
Carbon, dissolved organic [DOC]	----	mg/L	--	--	--				
Carbon, total organic [TOC]	----	mg/L	--	--	--				
Ion Balance									
Anion sum	----	meq/L	--	--	--				
Cation sum (total)	----	meq/L	--	--	--				
Ion balance (APHA)	----	%	--	--	--				
Ion balance (cations/anions)	----	%	--	--	--				
Total Metals									
Aluminum, total	7429-90-5	µg/L	--	**2900 µg/L**	**100 µg/L**				
Antimony, total	7440-36-0	µg/L	--	**6 µg/L**	--				
Arsenic, total	7440-38-2	µg/L	--	**10 µg/L**	--				
Barium, total	7440-39-3	µg/L	--	**2000 µg/L**	--				
Beryllium, total	7440-41-7	µg/L	--	--	--				

Analyte	CAS Number	Unit	CDWG AO	CDWG MAC	CDWG OG				
Total Metals - Continued									
Bismuth, total	7440-69-9	µg/L	--	--	--				
Boron, total	7440-42-8	µg/L	--	**5000 µg/L**	--				
Cadmium, total	7440-43-9	µg/L	--	**7 µg/L**	--				
Calcium, total	7440-70-2	µg/L	--	--	--				
Cesium, total	7440-46-2	µg/L	--	--	--				
Chromium, total	7440-47-3	µg/L	--	**50 µg/L**	--				
Cobalt, total	7440-48-4	µg/L	--	--	--				
Copper, total	7440-50-8	µg/L	**1000 µg/L**	**2000 µg/L**	--				
Iron, total	7439-89-6	µg/L	**300 µg/L**	--	--				
Lead, total	7439-92-1	µg/L	--	**5 µg/L**	--				
Lithium, total	7439-93-2	µg/L	--	--	--				
Magnesium, total	7439-95-4	µg/L	--	--	--				
Manganese, total	7439-96-5	µg/L	**20 µg/L**	**120 µg/L**	--				
Molybdenum, total	7439-98-7	µg/L	--	--	--				
Nickel, total	7440-02-0	µg/L	--	--	--				
Phosphorus, total	7723-14-0	µg/L	--	--	--				
Potassium, total	7440-09-7	µg/L	--	--	--				
Rubidium, total	7440-17-7	µg/L	--	--	--				
Selenium, total	7782-49-2	µg/L	--	**50 µg/L**	--				
Silicon, total	7440-21-3	µg/L	--	--	--				
Silver, total	7440-22-4	µg/L	--	--	--				
Sodium, total	7440-23-5	µg/L	**200000 µg/L**	--	--				
Strontium, total	7440-24-6	µg/L	--	**7000 µg/L**	--				
Sulfur, total	7704-34-9	µg/L	--	--	--				
Tellurium, total	13494-80-9	µg/L	--	--	--				
Thallium, total	7440-28-0	µg/L	--	--	--				
Thorium, total	7440-29-1	µg/L	--	--	--				
Tin, total	7440-31-5	µg/L	--	--	--				
Titanium, total	7440-32-6	µg/L	--	--	--				
Tungsten, total	7440-33-7	µg/L	--	--	--				
Uranium, total	7440-61-1	µg/L	--	**20 µg/L**	--				
Vanadium, total	7440-62-2	µg/L	--	--	--				
Zinc, total	7440-66-6	µg/L	**5000 µg/L**	--	--				
Zirconium, total	7440-67-7	µg/L	--	--	--				

Please refer to the General Comments section for an explanation of any qualifiers detected.

Key:

CDWG		Canada Guidelines for Canadian Drinking Water Quality (JAN, 2023)
	AO	Aesthetic Objective
	MAC	Maximum Acceptable Concentrations
	OG	Operational Guidance

QUALITY CONTROL INTERPRETIVE REPORT

Work Order	: **WP2417557**	Page	: 1 of 13
Client	: **Manitoba Conservation & Climate**	Laboratory	: ALS Environmental - Winnipeg
Contact	: Marc Balcaen	Account Manager	: Sheriza Rajack-Ahamed
Address	: 14 Fultz Boulevard Winnipeg MB Canada R3Y 0L6	Address	: 1329 Niakwa Road East, Unit 12 Winnipeg, Manitoba Canada R2J 3T4
Telephone	: ----	Telephone	: +1 204 255 9720
Project	: Rivers - PWS 181.00	Date Samples Received	: 17-Jul-2024 10:19
PO	: ----	Issue Date	: 01-Aug-2024 11:17
C-O-C number	: ----		
Sampler	: Jeff Worth		
Site	: Rivers - PWS 181.00 Op Id: 16843		
Quote number	: 2024 WTP Chemistry		
No. of samples received	: 3		
No. of samples analysed	: 3		

This report is automatically generated by the ALS LIMS (Laboratory Information Management System) through evaluation of Quality Control (QC) results and other QA parameters associated with this submission, and is intended to facilitate rapid data validation by auditors or reviewers. The report highlights any exceptions and outliers to ALS Data Quality Objectives, provides holding time details and exceptions, summarizes QC sample frequencies, and lists applicable methodology references and summaries.

Key

Anonymous: Refers to samples which are not part of this work order, but which formed part of the QC process lot.
CAS Number: Chemical Abstracts Service number is a unique identifier assigned to discrete substances.
DQO: Data Quality Objective.
LOR: Limit of Reporting (detection limit).
RPD: Relative Percent Difference.

Workorder Comments

Holding times are displayed as "---" if no guidance exists from CCME, Canadian provinces, or broadly recognized international references.

Summary of Outliers

Outliers : Quality Control Samples

- No Duplicate outliers occur.
- No Laboratory Control Sample (LCS) outliers occur
- No Matrix Spike outliers occur.
- Method Blank value outliers occur - please see following pages for full details.
- No Test sample Surrogate recovery outliers exist.

Outliers: Reference Material (RM) Samples

- No Reference Material (RM) Sample outliers occur.

Outliers : Analysis Holding Time Compliance (Breaches)

- Analysis Holding Time Outliers exist - please see following pages for full details.

Outliers : Frequency of Quality Control Samples

- No Quality Control Sample Frequency Outliers occur.

Outliers : Quality Control Samples

Duplicates, Method Blanks, Laboratory Control Samples and Matrix Spikes

Matrix: **Water**

Analyte Group	Laboratory sample ID	Client/Ref Sample ID	Analyte	CAS Number	Method	Result	Limits	Comment
Method Blank (MB) Values								
Total Metals	QC-MRG4-1571103 001	----	Silver, total	7440-22-4	E420	0.000026 B mg/L	0.00001 mg/L	Blank result exceeds permitted value
Total Metals	QC-MRG4-1571103 001	----	Tin, total	7440-31-5	E420	0.00169 B mg/L	0.0001 mg/L	Blank result exceeds permitted value

Result Qualifiers

Qualifier	*Description*
B	*Method Blank exceeds ALS DQO. Associated sample results which are < Limit of Reporting or > 5 times blank level are considered reliable.*

Analysis Holding Time Compliance

This report summarizes extraction / preparation and analysis times and compares each with ALS recommended holding times, which are selected to meet known provincial and /or federal requirements. In the absence of regulatory hold times, ALS establishes recommendations based on guidelines published by organizations such as CCME, US EPA, APHA Standard Methods, ASTM, or Environment Canada (where available). Dates and holding times reported below represent the first dates of extraction or analysis. If subsequent tests or dilutions exceeded holding times, qualifiers are added (refer to COA).

If samples are identified below as having been analyzed or extracted outside of recommended holding times, measurement uncertainties may be increased, and this should be taken into consideration when interpreting results.

Where actual sampling date is not provided on the chain of custody, the date of receipt with time at 00:00 is used for calculation purposes.

Where only the sample date without time is provided on the chain of custody, the sampling date at 00:00 is used for calculation purposes.

Matrix: **Water**

Evaluation: × = Holding time exceedance ; ✓ = Within Holding Time

Analyte Group : Analytical Method Container / Client Sample ID(s)	Method	Sampling Date	Extraction / Preparation				Analysis			
			Preparation Date	Holding Times Rec	Holding Times Actual	Eval	Analysis Date	Holding Times Rec	Holding Times Actual	Eval
Anions and Nutrients : Ammonia by Fluorescence										
Amber glass total (sulfuric acid) Rivers 1 - Raw	E298	16-Jul-2024	22-Jul-2024	28 days	6 days	✓	22-Jul-2024	28 days	6 days	✓
Anions and Nutrients : Ammonia by Fluorescence										
Amber glass total (sulfuric acid) Rivers 2 - Treated	E298	16-Jul-2024	22-Jul-2024	28 days	6 days	✓	22-Jul-2024	28 days	6 days	✓
Anions and Nutrients : Bromide in Water by IC (Low Level)										
HDPE Rivers 1 - Raw	E235.Br-L	16-Jul-2024	17-Jul-2024	28 days	1 days	✓	17-Jul-2024	28 days	1 days	✓
Anions and Nutrients : Bromide in Water by IC (Low Level)										
HDPE Rivers 2 - Treated	E235.Br-L	16-Jul-2024	17-Jul-2024	28 days	1 days	✓	17-Jul-2024	28 days	1 days	✓
Anions and Nutrients : Chloride in Water by IC (Low Level)										
HDPE Rivers 1 - Raw	E235.Cl-L	16-Jul-2024	17-Jul-2024	28 days	1 days	✓	17-Jul-2024	28 days	1 days	✓
Anions and Nutrients : Chloride in Water by IC (Low Level)										
HDPE Rivers 2 - Treated	E235.Cl-L	16-Jul-2024	17-Jul-2024	28 days	1 days	✓	17-Jul-2024	28 days	1 days	✓
Anions and Nutrients : Fluoride in Water by IC										
HDPE Rivers 1 - Raw	E235.F	16-Jul-2024	17-Jul-2024	28 days	1 days	✓	17-Jul-2024	28 days	1 days	✓

Matrix: **Water**

Evaluation: × = Holding time exceedance ; ✓ = Within Holding Time

Analyte Group : Analytical Method / Container / Client Sample ID(s)	Method	Sampling Date	Extraction / Preparation: Preparation Date	Holding Times Rec	Holding Times Actual	Eval	Analysis: Analysis Date	Holding Times Rec	Holding Times Actual	Eval
Anions and Nutrients : Fluoride in Water by IC										
HDPE Rivers 2 - Treated	E235.F	16-Jul-2024	17-Jul-2024	28 days	1 days	✓	17-Jul-2024	28 days	1 days	✓
Anions and Nutrients : Nitrate in Water by IC (Low Level)										
HDPE Rivers 1 - Raw	E235.NO3-L	16-Jul-2024	17-Jul-2024	3 days	1 days	✓	17-Jul-2024	3 days	1 days	✓
Anions and Nutrients : Nitrate in Water by IC (Low Level)										
HDPE Rivers 2 - Treated	E235.NO3-L	16-Jul-2024	17-Jul-2024	3 days	1 days	✓	17-Jul-2024	3 days	1 days	✓
Anions and Nutrients : Nitrite in Water by IC (Low Level)										
HDPE Rivers 1 - Raw	E235.NO2-L	16-Jul-2024	17-Jul-2024	3 days	1 days	✓	17-Jul-2024	3 days	1 days	✓
Anions and Nutrients : Nitrite in Water by IC (Low Level)										
HDPE Rivers 2 - Treated	E235.NO2-L	16-Jul-2024	17-Jul-2024	3 days	1 days	✓	17-Jul-2024	3 days	1 days	✓
Anions and Nutrients : Sulfate in Water by IC										
HDPE Rivers 1 - Raw	E235.SO4	16-Jul-2024	17-Jul-2024	28 days	1 days	✓	17-Jul-2024	28 days	1 days	✓
Anions and Nutrients : Sulfate in Water by IC										
HDPE Rivers 2 - Treated	E235.SO4	16-Jul-2024	17-Jul-2024	28 days	1 days	✓	17-Jul-2024	28 days	1 days	✓
Organic / Inorganic Carbon : Dissolved Organic Carbon by Combustion (Low Level)										
Amber glass dissolved (sulfuric acid) Rivers 1 - Raw	E358-L	16-Jul-2024	18-Jul-2024	28 days	2 days	✓	18-Jul-2024	28 days	2 days	✓
Organic / Inorganic Carbon : Dissolved Organic Carbon by Combustion (Low Level)										
Amber glass dissolved (sulfuric acid) Rivers 2 - Treated	E358-L	16-Jul-2024	18-Jul-2024	28 days	2 days	✓	18-Jul-2024	28 days	2 days	✓

Matrix: **Water**

Evaluation: × = Holding time exceedance ; ✓ = Within Holding Time

Analyte Group : Analytical Method / Container / Client Sample ID(s)	Method	Sampling Date	Extraction / Preparation: Preparation Date	Extraction / Preparation: Holding Times Rec	Extraction / Preparation: Holding Times Actual	Extraction / Preparation: Eval	Analysis: Analysis Date	Analysis: Holding Times Rec	Analysis: Holding Times Actual	Analysis: Eval
Organic / Inorganic Carbon : Total Organic Carbon (Non-Purgeable) by Combustion (Low Level)										
Amber glass total (sulfuric acid) Rivers 1 - Raw	E355-L	16-Jul-2024	18-Jul-2024	28 days	2 days	✓	18-Jul-2024	28 days	2 days	✓
Organic / Inorganic Carbon : Total Organic Carbon (Non-Purgeable) by Combustion (Low Level)										
Amber glass total (sulfuric acid) Rivers 2 - Treated	E355-L	16-Jul-2024	18-Jul-2024	28 days	2 days	✓	18-Jul-2024	28 days	2 days	✓
Physical Tests : Alkalinity Species by Titration										
HDPE Rivers 1 - Raw	E290	16-Jul-2024	18-Jul-2024	14 days	2 days	✓	18-Jul-2024	14 days	2 days	✓
Physical Tests : Alkalinity Species by Titration										
HDPE Rivers 2 - Treated	E290	16-Jul-2024	18-Jul-2024	14 days	2 days	✓	18-Jul-2024	14 days	2 days	✓
Physical Tests : Colour (True) by Spectrometer (5 CU)										
HDPE Rivers 1 - Raw	E329	16-Jul-2024	19-Jul-2024	3 days	3 days	✓	19-Jul-2024	3 days	3 days	✓
Physical Tests : Colour (True) by Spectrometer (5 CU)										
HDPE Rivers 2 - Treated	E329	16-Jul-2024	19-Jul-2024	3 days	3 days	✓	19-Jul-2024	3 days	3 days	✓
Physical Tests : Conductivity in Water										
HDPE Rivers 1 - Raw	E100	16-Jul-2024	18-Jul-2024	28 days	2 days	✓	18-Jul-2024	28 days	2 days	✓
Physical Tests : Conductivity in Water										
HDPE Rivers 2 - Treated	E100	16-Jul-2024	18-Jul-2024	28 days	2 days	✓	18-Jul-2024	28 days	2 days	✓
Physical Tests : pH by Meter										
HDPE Rivers 1 - Raw	E108	16-Jul-2024	18-Jul-2024	0.25 hrs	49 hrs	× EHTR-FM	18-Jul-2024	0.25 hrs	50 hrs	× EHTR-FM

Matrix: **Water**

Evaluation: ✘ = Holding time exceedance ; ✓ = Within Holding Time

Analyte Group : Analytical Method / Container / Client Sample ID(s)	Method	Sampling Date	Extraction / Preparation: Preparation Date	Extraction / Preparation: Holding Times Rec	Extraction / Preparation: Holding Times Actual	Extraction / Preparation: Eval	Analysis: Analysis Date	Analysis: Holding Times Rec	Analysis: Holding Times Actual	Analysis: Eval
Physical Tests : pH by Meter										
HDPE Rivers 2 - Treated	E108	16-Jul-2024	18-Jul-2024	0.25 hrs	49 hrs	✘ EHTR-FM	18-Jul-2024	0.25 hrs	50 hrs	✘ EHTR-FM
Physical Tests : TDS by Gravimetry (Low Level)										
HDPE Rivers 1 - Raw	E162-L	16-Jul-2024	----	----	----		18-Jul-2024	7 days	2 days	✓
Physical Tests : TDS by Gravimetry (Low Level)										
HDPE Rivers 2 - Treated	E162-L	16-Jul-2024	----	----	----		18-Jul-2024	7 days	2 days	✓
Physical Tests : Turbidity by Nephelometry										
HDPE Rivers 1 - Raw	E121	16-Jul-2024	----	----	----		18-Jul-2024	3 days	2 days	✓
Physical Tests : Turbidity by Nephelometry										
HDPE Rivers 2 - Treated	E121	16-Jul-2024	----	----	----		18-Jul-2024	3 days	2 days	✓
Physical Tests : UV Absorbance and Transmittance by Spectrometry										
HDPE Rivers 1 - Raw	E404	16-Jul-2024	----	----	----		19-Jul-2024	3 days	3 days	✓
Physical Tests : UV Absorbance and Transmittance by Spectrometry										
HDPE Rivers 2 - Treated	E404	16-Jul-2024	----	----	----		19-Jul-2024	3 days	3 days	✓
Total Metals : Total Metals in Water by CRC ICPMS										
HDPE total (nitric acid) Rivers 1 - Raw	E420	16-Jul-2024	30-Jul-2024	180 days	14 days	✓	30-Jul-2024	180 days	14 days	✓
Total Metals : Total Metals in Water by CRC ICPMS										
HDPE total (nitric acid) Rivers 2 - Treated	E420	16-Jul-2024	30-Jul-2024	180 days	14 days	✓	30-Jul-2024	180 days	14 days	✓

Matrix: **Water**

Evaluation: × = Holding time exceedance ; ✓ = Within Holding Time

Analyte Group : Analytical Method	Method	Sampling Date	Extraction / Preparation				Analysis			
Container / Client Sample ID(s)			Preparation Date	Holding Times Rec	Holding Times Actual	Eval	Analysis Date	Holding Times Rec	Holding Times Actual	Eval
Total Metals : Total Metals in Water by CRC ICPMS										
HDPE total (nitric acid)										
Rivers 3 - Distribution (mid)	E420	16-Jul-2024	30-Jul-2024	180 days	14 days	✓	30-Jul-2024	180 days	14 days	✓

Legend & Qualifier Definitions

EHTR-FM: Exceeded ALS recommended hold time prior to sample receipt. Field Measurement recommended

Rec. HT: ALS recommended hold time (see units).

Quality Control Parameter Frequency Compliance

The following report summarizes the frequency of laboratory QC samples analyzed within the analytical batches (QC lots) in which the submitted samples were processed. The actual frequency should be greater than or equal to the expected frequency.

Matrix: **Water**

Evaluation: × = QC frequency outside specification; ✓ = QC frequency within specification.

Quality Control Sample Type			Count		Frequency (%)		
Analytical Methods	*Method*	*QC Lot #*	*QC*	*Regular*	*Actual*	*Expected*	*Evaluation*
Laboratory Duplicates (DUP)							
Alkalinity Species by Titration	E290	1554006	1	13	7.6	5.0	✓
Ammonia by Fluorescence	E298	1557289	1	20	5.0	5.0	✓
Bromide in Water by IC (Low Level)	E235.Br-L	1551061	1	2	50.0	5.0	✓
Chloride in Water by IC (Low Level)	E235.Cl-L	1551062	1	2	50.0	5.0	✓
Colour (True) by Spectrometer (5 CU)	E329	1555275	1	18	5.5	5.0	✓
Conductivity in Water	E100	1554005	1	11	9.0	5.0	✓
Dissolved Organic Carbon by Combustion (Low Level)	E358-L	1551369	1	15	6.6	5.0	✓
Fluoride in Water by IC	E235.F	1551060	1	7	14.2	5.0	✓
Nitrate in Water by IC (Low Level)	E235.NO3-L	1551063	1	2	50.0	5.0	✓
Nitrite in Water by IC (Low Level)	E235.NO2-L	1551064	1	2	50.0	5.0	✓
pH by Meter	E108	1554004	1	20	5.0	5.0	✓
Sulfate in Water by IC	E235.SO4	1551065	1	7	14.2	5.0	✓
TDS by Gravimetry (Low Level)	E162-L	1551101	1	11	9.0	5.0	✓
Total Metals in Water by CRC ICPMS	E420	1571105	1	16	6.2	5.0	✓
Total Organic Carbon (Non-Purgeable) by Combustion (Low Level)	E355-L	1551173	1	20	5.0	5.0	✓
Turbidity by Nephelometry	E121	1551043	1	20	5.0	5.0	✓
UV Absorbance and Transmittance by Spectrometry	E404	1555039	1	17	5.8	5.0	✓
Laboratory Control Samples (LCS)							
Alkalinity Species by Titration	E290	1554006	1	13	7.6	5.0	✓
Ammonia by Fluorescence	E298	1557289	1	20	5.0	5.0	✓
Bromide in Water by IC (Low Level)	E235.Br-L	1551061	1	2	50.0	5.0	✓
Chloride in Water by IC (Low Level)	E235.Cl-L	1551062	1	2	50.0	5.0	✓
Colour (True) by Spectrometer (5 CU)	E329	1555275	1	18	5.5	5.0	✓
Conductivity in Water	E100	1554005	1	11	9.0	5.0	✓
Dissolved Organic Carbon by Combustion (Low Level)	E358-L	1551369	1	15	6.6	5.0	✓
Fluoride in Water by IC	E235.F	1551060	1	7	14.2	5.0	✓
Nitrate in Water by IC (Low Level)	E235.NO3-L	1551063	1	2	50.0	5.0	✓
Nitrite in Water by IC (Low Level)	E235.NO2-L	1551064	1	2	50.0	5.0	✓
pH by Meter	E108	1554004	1	20	5.0	5.0	✓
Sulfate in Water by IC	E235.SO4	1551065	1	7	14.2	5.0	✓
TDS by Gravimetry (Low Level)	E162-L	1551101	1	11	9.0	5.0	✓
Total Metals in Water by CRC ICPMS	E420	1571105	1	16	6.2	5.0	✓
Total Organic Carbon (Non-Purgeable) by Combustion (Low Level)	E355-L	1551173	1	20	5.0	5.0	✓
Turbidity by Nephelometry	E121	1551043	1	20	5.0	5.0	✓
UV Absorbance and Transmittance by Spectrometry	E404	1555039	1	17	5.8	5.0	✓

Matrix: **Water**

Evaluation: × = QC frequency outside specification; ✓ = QC frequency within specification.

Quality Control Sample Type			Count		Frequency (%)		
Analytical Methods	*Method*	*QC Lot #*	*QC*	*Regular*	*Actual*	*Expected*	*Evaluation*
Method Blanks (MB)							
Alkalinity Species by Titration	E290	1554006	1	13	7.6	5.0	✓
Ammonia by Fluorescence	E298	1557289	1	20	5.0	5.0	✓
Bromide in Water by IC (Low Level)	E235.Br-L	1551061	1	2	50.0	5.0	✓
Chloride in Water by IC (Low Level)	E235.Cl-L	1551062	1	2	50.0	5.0	✓
Colour (True) by Spectrometer (5 CU)	E329	1555275	1	18	5.5	5.0	✓
Conductivity in Water	E100	1554005	1	11	9.0	5.0	✓
Dissolved Organic Carbon by Combustion (Low Level)	E358-L	1551369	1	15	6.6	5.0	✓
Fluoride in Water by IC	E235.F	1551060	1	7	14.2	5.0	✓
Nitrate in Water by IC (Low Level)	E235.NO3-L	1551063	1	2	50.0	5.0	✓
Nitrite in Water by IC (Low Level)	E235.NO2-L	1551064	1	2	50.0	5.0	✓
Sulfate in Water by IC	E235.SO4	1551065	1	7	14.2	5.0	✓
TDS by Gravimetry (Low Level)	E162-L	1551101	1	11	9.0	5.0	✓
Total Metals in Water by CRC ICPMS	E420	1571105	1	16	6.2	5.0	✓
Total Organic Carbon (Non-Purgeable) by Combustion (Low Level)	E355-L	1551173	1	20	5.0	5.0	✓
Turbidity by Nephelometry	E121	1551043	1	20	5.0	5.0	✓
UV Absorbance and Transmittance by Spectrometry	E404	1555039	1	17	5.8	5.0	✓
Matrix Spikes (MS)							
Ammonia by Fluorescence	E298	1557289	1	20	5.0	5.0	✓
Bromide in Water by IC (Low Level)	E235.Br-L	1551061	1	2	50.0	5.0	✓
Chloride in Water by IC (Low Level)	E235.Cl-L	1551062	1	2	50.0	5.0	✓
Dissolved Organic Carbon by Combustion (Low Level)	E358-L	1551369	1	15	6.6	5.0	✓
Fluoride in Water by IC	E235.F	1551060	1	7	14.2	5.0	✓
Nitrate in Water by IC (Low Level)	E235.NO3-L	1551063	1	2	50.0	5.0	✓
Nitrite in Water by IC (Low Level)	E235.NO2-L	1551064	1	2	50.0	5.0	✓
Sulfate in Water by IC	E235.SO4	1551065	1	7	14.2	5.0	✓
Total Metals in Water by CRC ICPMS	E420	1571105	1	16	6.2	5.0	✓
Total Organic Carbon (Non-Purgeable) by Combustion (Low Level)	E355-L	1551173	1	20	5.0	5.0	✓

Methodology References and Summaries

The analytical methods used by ALS are developed using internationally recognized reference methods (where available), such as those published by US EPA, APHA Standard Methods, ASTM, ISO, Environment Canada, BC MOE, and Ontario MOE. Reference methods may incorporate modifications to improve performance (indicated by "mod").

Analytical Methods	Method / Lab	Matrix	Method Reference	Method Descriptions
Conductivity in Water	E100 ALS Environmental - Winnipeg	Water	APHA 2510 (mod)	Conductivity, also known as Electrical Conductivity (EC) or Specific Conductance, is measured by immersion of a conductivity cell with platinum electrodes into a water sample. Conductivity measurements are temperature-compensated to 25°C.
pH by Meter	E108 ALS Environmental - Winnipeg	Water	APHA 4500-H (mod)	pH is determined by potentiometric measurement with a pH electrode, and is conducted at ambient laboratory temperature (normally 20 ± 5°C). For high accuracy test results, pH should be measured in the field within the recommended 15 minute hold time.
Turbidity by Nephelometry	E121 ALS Environmental - Winnipeg	Water	APHA 2130 B (mod)	Turbidity is measured by the nephelometric method, by measuring the intensity of light scatter under defined conditions.
TDS by Gravimetry (Low Level)	E162-L ALS Environmental - Winnipeg	Water	APHA 2540 C (mod)	Total Dissolved Solids (TDS) are determined by filtering a sample through a glass fibre filter, with evaporation of the filtrate at 180 ± 2°C for 16 hours or to constant weight, with gravimetric measurement of the residue.
Bromide in Water by IC (Low Level)	E235.Br-L ALS Environmental - Winnipeg	Water	EPA 300.1 (mod)	Inorganic anions are analyzed by Ion Chromatography with conductivity and/or UV detection.
Chloride in Water by IC (Low Level)	E235.Cl-L ALS Environmental - Winnipeg	Water	EPA 300.1 (mod)	Inorganic anions are analyzed by Ion Chromatography with conductivity and/or UV detection.
Fluoride in Water by IC	E235.F ALS Environmental - Winnipeg	Water	EPA 300.1 (mod)	Inorganic anions are analyzed by Ion Chromatography with conductivity and/or UV detection.
Nitrite in Water by IC (Low Level)	E235.NO2-L ALS Environmental - Winnipeg	Water	EPA 300.1 (mod)	Inorganic anions are analyzed by Ion Chromatography with conductivity and/or UV detection.
Nitrate in Water by IC (Low Level)	E235.NO3-L ALS Environmental - Winnipeg	Water	EPA 300.1 (mod)	Inorganic anions are analyzed by Ion Chromatography with conductivity and/or UV detection.
Sulfate in Water by IC	E235.SO4 ALS Environmental - Winnipeg	Water	EPA 300.1 (mod)	Inorganic anions are analyzed by Ion Chromatography with conductivity and/or UV detection.

Analytical Methods	Method / Lab	Matrix	Method Reference	Method Descriptions
Alkalinity Species by Titration	E290 ALS Environmental - Winnipeg	Water	APHA 2320 B (mod)	Total alkalinity is determined by potentiometric titration to a pH 4.5 endpoint. Bicarbonate, carbonate and hydroxide alkalinity are calculated from phenolphthalein alkalinity and total alkalinity values.
Ammonia by Fluorescence	E298 ALS Environmental - Winnipeg	Water	Method Fialab 100, 2018	Ammonia in water is determined by automated continuous flow analysis with membrane diffusion and fluorescence detection, after reaction with OPA (ortho-phthalaldehyde). This method is approved under US EPA 40 CFR Part 136 (May 2021)
Colour (True) by Spectrometer (5 CU)	E329 ALS Environmental - Winnipeg	Water	APHA 2120 C (mod)	Colour (True Colour) is determined by filtering a sample through a 0.45 micron membrane filter followed by analysis of the filtrate using the platinum-cobalt colourimetric method. Colour measurements can be highly pH dependent, and apply to the pH of the sample as received (at time of testing), without pH adjustment.
Total Organic Carbon (Non-Purgeable) by Combustion (Low Level)	E355-L ALS Environmental - Winnipeg	Water	APHA 5310 B (mod)	Total Organic Carbon (Non-Purgeable), also known as NPOC (total), is a direct measurement of TOC after an acidified sample has been purged to remove inorganic carbon (IC). Analysis is by high temperature combustion with infrared detection of CO_2. NPOC does not include volatile organic species that are purged off with IC. For samples where the majority of total carbon (TC) is comprised of IC (which is common), this method is more accurate and more reliable than the TOC by subtraction method (i.e. TC minus TIC).
Dissolved Organic Carbon by Combustion (Low Level)	E358-L ALS Environmental - Winnipeg	Water	APHA 5310 B (mod)	Dissolved Organic Carbon (Non-Purgeable), also known as NPOC (dissolved), is a direct measurement of DOC after a filtered (0.45 micron) sample has been acidified and purged to remove inorganic carbon (IC). Analysis is by high temperature combustion with infrared detection of CO2. NPOC does not include volatile organic species that are purged off with IC. For samples where the majority of DC (dissolved carbon) is comprised of IC (which is common), this method is more accurate and more reliable than the DOC by subtraction method (i.e. DC minus DIC).
UV Absorbance and Transmittance by Spectrometry	E404 ALS Environmental - Winnipeg	Water	APHA 5910 B (mod)	UV Absorbance is determined by first filtering a sample through a 0.45 micron filter, followed by UV absorbance measurement in a quartz cell at 254 nm. The analysis is carried out without pH adjustment.
Total Metals in Water by CRC ICPMS	E420 ALS Environmental - Winnipeg	Water	EPA 200.2/6020B (mod)	Water samples are digested with nitric and hydrochloric acids, and analyzed by Collision/Reaction Cell ICPMS. Method Limitation (re: Sulfur): Sulfide and volatile sulfur species may not be recovered by this method.
Hardness (Calculated) from Total Ca/Mg	EC100A ALS Environmental - Winnipeg	Water	APHA 2340B	"Hardness (as CaCO3), from total Ca/Mg" is calculated from the sum of total Calcium and Magnesium concentrations, expressed in $CaCO_3$ equivalents. "Total Hardness" refers to the sum of Calcium and Magnesium Hardness. Hardness is normally or preferentially calculated from dissolved Calcium and Magnesium concentrations, because it is a property of water due to dissolved divalent cations. Hardness from total Ca/Mg is normally comparable to Dissolved Hardness in non-turbid waters.

Analytical Methods	Method / Lab	Matrix	Method Reference	Method Descriptions
Ion Balance using Total Metals	EC101A ALS Environmental - Winnipeg	Water	APHA 1030E	Cation Sum (using total metals), Anion Sum, and Ion Balance are calculated based on guidance from APHA Standard Methods (1030E Checking Correctness of Analysis). Minor ions are included where data is present. Ion Balance cannot be calculated accurately for waters with very low electrical conductivity (EC).
Saturation Index using Laboratory pH (Ca-T)	EC105A ALS Environmental - Winnipeg	Water	APHA 2330B	Langelier Index provides an indication of scale formation potential at a given pH and temperature, and is calculated as per APHA 2330B Saturation Index. Positive values indicate oversaturation with respect to CaCO3. Negative values indicate undersaturation of CaCO3. This calculation uses laboratory pH measurements and provides estimates of Langelier Index at temperatures of 4, 15, 20, 25, 66, and 77°C. Ryznar Stability Index is an alternative index used for scale formation and corrosion potential.

Preparation Methods	Method / Lab	Matrix	Method Reference	Method Descriptions
Preparation for Ammonia	EP298 ALS Environmental - Winnipeg	Water		Sample preparation for Preserved Nutrients Water Quality Analysis.
Preparation for Total Organic Carbon by Combustion	EP355 ALS Environmental - Winnipeg	Water		Preparation for Total Organic Carbon by Combustion
Preparation for Dissolved Organic Carbon for Combustion	EP358 ALS Environmental - Winnipeg	Water	APHA 5310 B (mod)	Preparation for Dissolved Organic Carbon

ALS Canada Ltd.

QUALITY CONTROL REPORT

Work Order	: **WP2417557**	Page	: 1 of 13
Client	: Manitoba Conservation & Climate	Laboratory	: ALS Environmental - Winnipeg
Contact	: Marc Balcaen	Account Manager	: Sheriza Rajack-Ahamed
Address	: 181.00 - Rivers - PWS Box 520 Rivers MB Canada R0K 1X0	Address	: 1329 Niakwa Road East, Unit 12 Winnipeg, Manitoba Canada R2J 3T4
Telephone	: ----	Telephone	: +1 204 255 9720
Project	: Rivers - PWS 181.00	Date Samples Received	: 17-Jul-2024 10:19
PO	: ----	Date Analysis Commenced	: 17-Jul-2024
C-O-C number	: ----	Issue Date	: 01-Aug-2024 11:17
Sampler	: Jeff Worth		
Site	: Rivers - PWS 181.00 Op Id: 16843		
Quote number	: 2024 WTP Chemistry		
No. of samples received	: 3		
No. of samples analysed	: 3		

This report supersedes any previous report(s) with this reference. Results apply to the sample(s) as submitted. This document shall not be reproduced, except in full.

This Quality Control Report contains the following information:

- Laboratory Duplicate (DUP) Report; Relative Percent Difference (RPD) and Data Quality Objectives
- Matrix Spike (MS) Report; Recovery and Data Quality Objectives
- Method Blank (MB) Report; Recovery and Data Quality Objectives
- Laboratory Control Sample (LCS) Report; Recovery and Data Quality Objectives

Signatories

This document has been electronically signed by the authorized signatories below. Electronic signing is conducted in accordance with US FDA 21 CFR Part 11.

Signatories	*Position*	*Laboratory Department*
Lee McTavish		Winnipeg Inorganics, Winnipeg, Manitoba
Lee McTavish		Winnipeg Metals, Winnipeg, Manitoba

General Comments

The ALS Quality Control (QC) report is optionally provided to ALS clients upon request. ALS test methods include comprehensive QC checks with every analysis to ensure our high standards of quality are met. Each QC result has a known or expected target value, which is compared against predetermined Data Quality Objectives (DQOs) to provide confidence in the accuracy of associated test results. This report contains detailed results for all QC results applicable to this sample submission. Please refer to the ALS Quality Control Interpretation report (QCI) for applicable method references and methodology summaries.

Key :

Anonymous = Refers to samples which are not part of this work order, but which formed part of the QC process lot.
CAS Number = Chemical Abstracts Service number is a unique identifier assigned to discrete substances.
DQO = Data Quality Objective.
LOR = Limit of Reporting (detection limit).
RPD = Relative Percent Difference
# = Indicates a QC result that did not meet the ALS DQO.

Workorder Comments

Holding times are displayed as "---" if no guidance exists from CCME, Canadian provinces, or broadly recognized international references.

Laboratory Duplicate (DUP) Report

A Laboratory Duplicate (DUP) is a randomly selected intralaboratory replicate sample. Laboratory Duplicates provide information regarding method precision and sample heterogeneity. ALS DQOs for Laboratory Duplicates are expressed as test-specific limits for Relative Percent Difference (RPD), or as an absolute difference limit of 2 times the LOR for low concentration duplicates within ~ 4-10 times the LOR (cut-off is test-specific).

Sub-Matrix: **Water**

					Laboratory Duplicate (DUP) Report						
Laboratory sample ID	Client sample ID	Analyte	CAS Number	Method	LOR	Unit	Original Result	Duplicate Result	RPD(%) or Difference	Duplicate Limits	Qualifier
Physical Tests (QC Lot: 1551043)											
WP2417527-003	Anonymous	Turbidity	----	E121	0.10	NTU	106	105	1.14%	15%	----
Physical Tests (QC Lot: 1551101)											
WP2417554-006	Anonymous	Solids, total dissolved [TDS]	----	E162-L	15.0	mg/L	2400	2410	0.437%	20%	----
Physical Tests (QC Lot: 1554004)											
WP2417527-007	Anonymous	pH	----	E108	0.10	pH units	8.35	8.36	0.120%	4%	----
Physical Tests (QC Lot: 1554005)											
WP2417527-007	Anonymous	Conductivity	----	E100	2.0	µS/cm	591	587	0.679%	10%	----
Physical Tests (QC Lot: 1554006)											
WP2417527-007	Anonymous	Alkalinity, total (as CaCO3)	----	E290	1.0	mg/L	189	188	0.531%	20%	----
Physical Tests (QC Lot: 1555039)											
WP2417557-001	Rivers 1 - Raw	Absorbance, UV (@ 254nm)	----	E404	0.0050	AU/cm	0.493	0.494	0.203%	20%	----
Physical Tests (QC Lot: 1555275)											
WP2417557-001	Rivers 1 - Raw	Colour, true	----	E329	5.0	CU	41.6	40.8	0.8	Diff <2x LOR	----
Anions and Nutrients (QC Lot: 1551060)											
WP2417557-001	Rivers 1 - Raw	Fluoride	16984-48-8	E235.F	0.020	mg/L	0.150	0.150	0.0002	Diff <2x LOR	----
Anions and Nutrients (QC Lot: 1551061)											
WP2417557-001	Rivers 1 - Raw	Bromide	24959-67-9	E235.Br-L	0.050	mg/L	<0.050	<0.050	0	Diff <2x LOR	----
Anions and Nutrients (QC Lot: 1551062)											
WP2417557-001	Rivers 1 - Raw	Chloride	16887-00-6	E235.Cl-L	0.10	mg/L	8.05	8.05	0.0261%	20%	----
Anions and Nutrients (QC Lot: 1551063)											
WP2417557-001	Rivers 1 - Raw	Nitrate (as N)	14797-55-8	E235.NO3-L	0.0050	mg/L	0.174	0.173	0.251%	20%	----
Anions and Nutrients (QC Lot: 1551064)											
WP2417557-001	Rivers 1 - Raw	Nitrite (as N)	14797-65-0	E235.NO2-L	0.0010	mg/L	<0.0010	<0.0010	0	Diff <2x LOR	----
Anions and Nutrients (QC Lot: 1551065)											
WP2417557-001	Rivers 1 - Raw	Sulfate (as SO4)	14808-79-8	E235.SO4	0.30	mg/L	183	183	0.0156%	20%	----
Anions and Nutrients (QC Lot: 1557289)											
WP2417576-001	Anonymous	Ammonia, total (as N)	7664-41-7	E298	0.0050	mg/L	0.133	0.134	0.501%	20%	----
Organic / Inorganic Carbon (QC Lot: 1551173)											
WP2417237-001	Anonymous	Carbon, total organic [TOC]	----	E355-L	0.50	mg/L	22.4	22.9	2.30%	20%	----
Organic / Inorganic Carbon (QC Lot: 1551369)											

Sub-Matrix: **Water**

Laboratory sample ID	Client sample ID	Analyte	CAS Number	Method	Laboratory Duplicate (DUP) Report						
					LOR	Unit	Original Result	Duplicate Result	RPD(%) or Difference	Duplicate Limits	Qualifier
Organic / Inorganic Carbon (QC Lot: 1551369) - continued											
WP2417464-009	Anonymous	Carbon, dissolved organic [DOC]	----	E358-L	0.50	mg/L	9.90	9.83	0.694%	20%	----
Total Metals (QC Lot: 1571105)											
WP2417554-008	Anonymous	Aluminum, total	7429-90-5	E420	0.0030	mg/L	0.0059	0.0063	0.0004	Diff <2x LOR	----
		Antimony, total	7440-36-0	E420	0.00010	mg/L	0.0205	0.0207	0.682%	20%	----
		Arsenic, total	7440-38-2	E420	0.00010	mg/L	0.00244	0.00237	2.71%	20%	----
		Barium, total	7440-39-3	E420	0.00010	mg/L	0.0194	0.0191	1.50%	20%	----
		Beryllium, total	7440-41-7	E420	0.000020	mg/L	<0.000020	<0.000020	0	Diff <2x LOR	----
		Bismuth, total	7440-69-9	E420	0.000050	mg/L	<0.000050	<0.000050	0	Diff <2x LOR	----
		Boron, total	7440-42-8	E420	0.010	mg/L	0.304	0.310	1.89%	20%	----
		Cadmium, total	7440-43-9	E420	0.0000050	mg/L	<0.0000050	<0.0000050	0	Diff <2x LOR	----
		Calcium, total	7440-70-2	E420	0.050	mg/L	257	257	0.0123%	20%	----
		Cesium, total	7440-46-2	E420	0.000010	mg/L	0.000477	0.000475	0.353%	20%	----
		Chromium, total	7440-47-3	E420	0.00050	mg/L	<0.00050	<0.00050	0	Diff <2x LOR	----
		Cobalt, total	7440-48-4	E420	0.00010	mg/L	0.00393	0.00394	0.468%	20%	----
		Copper, total	7440-50-8	E420	0.00050	mg/L	0.00230	0.00229	0.000008	Diff <2x LOR	----
		Iron, total	7439-89-6	E420	0.010	mg/L	0.230	0.232	0.979%	20%	----
		Lead, total	7439-92-1	E420	0.000050	mg/L	<0.000050	<0.000050	0	Diff <2x LOR	----
		Lithium, total	7439-93-2	E420	0.0010	mg/L	0.0278	0.0277	0.386%	20%	----
		Magnesium, total	7439-95-4	E420	0.0050	mg/L	33.0	33.4	0.934%	20%	----
		Manganese, total	7439-96-5	E420	0.00010	mg/L	0.00194	0.00190	1.72%	20%	----
		Molybdenum, total	7439-98-7	E420	0.000050	mg/L	0.00668	0.00671	0.419%	20%	----
		Nickel, total	7440-02-0	E420	0.00050	mg/L	0.00143	0.00145	0.00002	Diff <2x LOR	----
		Phosphorus, total	7723-14-0	E420	0.050	mg/L	<0.050	<0.050	0	Diff <2x LOR	----
		Potassium, total	7440-09-7	E420	0.050	mg/L	34.0	34.4	1.28%	20%	----
		Rubidium, total	7440-17-7	E420	0.00020	mg/L	0.0310	0.0317	2.18%	20%	----
		Selenium, total	7782-49-2	E420	0.000050	mg/L	0.000239	0.000150	0.000089	Diff <2x LOR	----
		Silicon, total	7440-21-3	E420	0.10	mg/L	1.44	1.44	0.446%	20%	----
		Silver, total	7440-22-4	E420	0.000010	mg/L	<0.000010	<0.000010	0	Diff <2x LOR	----
		Sodium, total	7440-23-5	E420	0.050	mg/L	180	178	0.987%	20%	----
		Strontium, total	7440-24-6	E420	0.00020	mg/L	1.62	1.62	0.214%	20%	----
		Sulfur, total	7704-34-9	E420	0.50	mg/L	274	276	0.422%	20%	----
		Tellurium, total	13494-80-9	E420	0.00020	mg/L	<0.00020	<0.00020	0	Diff <2x LOR	----
		Thallium, total	7440-28-0	E420	0.000010	mg/L	0.000023	0.000023	0.0000002	Diff <2x LOR	----
		Thorium, total	7440-29-1	E420	0.00010	mg/L	<0.00010	<0.00010	0	Diff <2x LOR	----

Sub-Matrix: **Water**

Laboratory sample ID	Client sample ID	Analyte	CAS Number	Method	LOR	Unit	Original Result	Duplicate Result	RPD(%) or Difference	Duplicate Limits	Qualifier
					Laboratory Duplicate (DUP) Report						
Total Metals (QC Lot: 1571105) - continued											
WP2417554-008	Anonymous	Tin, total	7440-31-5	E420	0.00010	mg/L	<0.00010	<0.00010	0	Diff <2x LOR	----
		Titanium, total	7440-32-6	E420	0.00030	mg/L	<0.00030	<0.00030	0	Diff <2x LOR	----
		Tungsten, total	7440-33-7	E420	0.00010	mg/L	0.00036	0.00035	0.000008	Diff <2x LOR	----
		Uranium, total	7440-61-1	E420	0.000010	mg/L	0.000034	0.000035	0.0000010	Diff <2x LOR	----
		Vanadium, total	7440-62-2	E420	0.00050	mg/L	<0.00050	<0.00050	0	Diff <2x LOR	----
		Zinc, total	7440-66-6	E420	0.0030	mg/L	<0.0030	<0.0030	0	Diff <2x LOR	----
		Zirconium, total	7440-67-7	E420	0.00020	mg/L	<0.00020	<0.00020	0	Diff <2x LOR	----

Method Blank (MB) Report

A Method Blank is an analyte-free matrix that undergoes sample processing identical to that carried out for test samples. Method Blank results are used to monitor and control for potential contamination from the laboratory environment and reagents. For most tests, the DQO for Method Blanks is for the result to be < LOR.

Sub-Matrix: **Water**

Analyte	CAS Number	Method	LOR	Unit	Result	Qualifier
Physical Tests (QCLot: 1551043)						
Turbidity	----	E121	0.1	NTU	<0.10	----
Physical Tests (QCLot: 1551101)						
Solids, total dissolved [TDS]	----	E162-L	3	mg/L	<3.0	----
Physical Tests (QCLot: 1554005)						
Conductivity	----	E100	1	µS/cm	<1.0	----
Physical Tests (QCLot: 1554006)						
Alkalinity, total (as CaCO3)	----	E290	1	mg/L	<1.0	----
Physical Tests (QCLot: 1555039)						
Absorbance, UV (@ 254nm)	----	E404	0.005	AU/cm	<0.0050	----
Physical Tests (QCLot: 1555275)						
Colour, true	----	E329	5	CU	<5.0	----
Anions and Nutrients (QCLot: 1551060)						
Fluoride	16984-48-8	E235.F	0.02	mg/L	<0.020	----
Anions and Nutrients (QCLot: 1551061)						
Bromide	24959-67-9	E235.Br-L	0.05	mg/L	<0.050	----
Anions and Nutrients (QCLot: 1551062)						
Chloride	16887-00-6	E235.Cl-L	0.1	mg/L	<0.10	----
Anions and Nutrients (QCLot: 1551063)						
Nitrate (as N)	14797-55-8	E235.NO3-L	0.005	mg/L	<0.0050	----
Anions and Nutrients (QCLot: 1551064)						
Nitrite (as N)	14797-65-0	E235.NO2-L	0.001	mg/L	<0.0010	----
Anions and Nutrients (QCLot: 1551065)						
Sulfate (as SO4)	14808-79-8	E235.SO4	0.3	mg/L	<0.30	----
Anions and Nutrients (QCLot: 1557289)						
Ammonia, total (as N)	7664-41-7	E298	0.005	mg/L	<0.0050	----
Organic / Inorganic Carbon (QCLot: 1551173)						
Carbon, total organic [TOC]	----	E355-L	0.5	mg/L	<0.50	----
Organic / Inorganic Carbon (QCLot: 1551369)						
Carbon, dissolved organic [DOC]	----	E358-L	0.5	mg/L	<0.50	----
Total Metals (QCLot: 1571105)						
Aluminum, total	7429-90-5	E420	0.003	mg/L	<0.0030	----
Antimony, total	7440-36-0	E420	0.0001	mg/L	<0.00010	----

Sub-Matrix: **Water**

Analyte	CAS Number	Method	LOR	Unit	Result	Qualifier
Total Metals (QCLot: 1571105) - continued						
Arsenic, total	7440-38-2	E420	0.0001	mg/L	<0.00010	----
Barium, total	7440-39-3	E420	0.0001	mg/L	<0.00010	----
Beryllium, total	7440-41-7	E420	0.00002	mg/L	<0.000020	----
Bismuth, total	7440-69-9	E420	0.00005	mg/L	<0.000050	----
Boron, total	7440-42-8	E420	0.01	mg/L	<0.010	----
Cadmium, total	7440-43-9	E420	0.000005	mg/L	<0.0000050	----
Calcium, total	7440-70-2	E420	0.05	mg/L	<0.050	----
Cesium, total	7440-46-2	E420	0.00001	mg/L	<0.000010	----
Chromium, total	7440-47-3	E420	0.0005	mg/L	<0.00050	----
Cobalt, total	7440-48-4	E420	0.0001	mg/L	<0.00010	----
Copper, total	7440-50-8	E420	0.0005	mg/L	<0.00050	----
Iron, total	7439-89-6	E420	0.01	mg/L	<0.010	----
Lead, total	7439-92-1	E420	0.00005	mg/L	<0.000050	----
Lithium, total	7439-93-2	E420	0.001	mg/L	<0.0010	----
Magnesium, total	7439-95-4	E420	0.005	mg/L	<0.0050	----
Manganese, total	7439-96-5	E420	0.0001	mg/L	<0.00010	----
Molybdenum, total	7439-98-7	E420	0.00005	mg/L	<0.000050	----
Nickel, total	7440-02-0	E420	0.0005	mg/L	<0.00050	----
Phosphorus, total	7723-14-0	E420	0.05	mg/L	<0.050	----
Potassium, total	7440-09-7	E420	0.05	mg/L	<0.050	----
Rubidium, total	7440-17-7	E420	0.0002	mg/L	<0.00020	----
Selenium, total	7782-49-2	E420	0.00005	mg/L	<0.000050	----
Silicon, total	7440-21-3	E420	0.1	mg/L	<0.10	----
Silver, total	7440-22-4	E420	0.00001	mg/L	# 0.000026	B
Sodium, total	7440-23-5	E420	0.05	mg/L	<0.050	----
Strontium, total	7440-24-6	E420	0.0002	mg/L	<0.00020	----
Sulfur, total	7704-34-9	E420	0.5	mg/L	<0.50	----
Tellurium, total	13494-80-9	E420	0.0002	mg/L	<0.00020	----
Thallium, total	7440-28-0	E420	0.00001	mg/L	<0.000010	----
Thorium, total	7440-29-1	E420	0.0001	mg/L	<0.00010	----
Tin, total	7440-31-5	E420	0.0001	mg/L	# 0.00169	B
Titanium, total	7440-32-6	E420	0.0003	mg/L	<0.00030	----
Tungsten, total	7440-33-7	E420	0.0001	mg/L	<0.00010	----
Uranium, total	7440-61-1	E420	0.00001	mg/L	<0.000010	----
Vanadium, total	7440-62-2	E420	0.0005	mg/L	<0.00050	----

Sub-Matrix: **Water**

Analyte	CAS Number	Method	LOR	Unit	Result	Qualifier
Total Metals (QCLot: 1571105) - continued						
Zinc, total	7440-66-6	E420	0.003	mg/L	<0.0030	----
Zirconium, total	7440-67-7	E420	0.0002	mg/L	<0.00020	----

Qualifiers

Qualifier	*Description*
B	*Method Blank exceeds ALS DQO. Associated sample results which are < Limit of Reporting or > 5 times blank level are considered reliable.*

Laboratory Control Sample (LCS) Report

A Laboratory Control Sample (LCS) is an analyte-free matrix that has been fortified (spiked) with test analytes at known concentration and processed in an identical manner to test samples. LCS results are expressed as percent recovery, and are used to monitor and control test method accuracy and precision, independent of test sample matrix.

Sub-Matrix: **Water**

					Laboratory Control Sample (LCS) Report				
					Spike	Recovery (%)	Recovery Limits (%)		
Analyte	**CAS Number**	**Method**	**LOR**	**Unit**	**Target Concentration**	**LCS**	**Low**	**High**	**Qualifier**
Physical Tests (QCLot: 1551043)									
Turbidity	----	E121	0.1	NTU	200 NTU	95.0	85.0	115	----
Physical Tests (QCLot: 1551101)									
Solids, total dissolved [TDS]	----	E162-L	3	mg/L	1000 mg/L	98.7	85.0	115	----
Physical Tests (QCLot: 1554004)									
pH	----	E108	----	pH units	7 pH units	101	98.0	102	----
Physical Tests (QCLot: 1554005)									
Conductivity	----	E100	1	µS/cm	1410 µS/cm	104	90.0	110	----
Physical Tests (QCLot: 1554006)									
Alkalinity, total (as CaCO3)	----	E290	1	mg/L	100 mg/L	101	85.0	115	----
Physical Tests (QCLot: 1555039)									
Absorbance, UV (@ 254nm)	----	E404	0.005	AU/cm	0.582 AU/cm	106	85.0	115	----
Physical Tests (QCLot: 1555275)									
Colour, true	----	E329	5	CU	250 CU	100	85.0	115	----
Anions and Nutrients (QCLot: 1551060)									
Fluoride	16984-48-8	E235.F	0.02	mg/L	1 mg/L	100	90.0	110	----
Anions and Nutrients (QCLot: 1551061)									
Bromide	24959-67-9	E235.Br-L	0.05	mg/L	0.5 mg/L	96.4	85.0	115	----
Anions and Nutrients (QCLot: 1551062)									
Chloride	16887-00-6	E235.Cl-L	0.1	mg/L	100 mg/L	99.8	90.0	110	----
Anions and Nutrients (QCLot: 1551063)									
Nitrate (as N)	14797-55-8	E235.NO3-L	0.005	mg/L	2.5 mg/L	99.3	90.0	110	----
Anions and Nutrients (QCLot: 1551064)									
Nitrite (as N)	14797-65-0	E235.NO2-L	0.001	mg/L	0.5 mg/L	100	90.0	110	----
Anions and Nutrients (QCLot: 1551065)									
Sulfate (as SO4)	14808-79-8	E235.SO4	0.3	mg/L	100 mg/L	99.4	90.0	110	----
Anions and Nutrients (QCLot: 1557289)									
Ammonia, total (as N)	7664-41-7	E298	0.005	mg/L	0.2 mg/L	95.7	85.0	115	----
Organic / Inorganic Carbon (QCLot: 1551173)									
Carbon, total organic [TOC]	----	E355-L	0.5	mg/L	8.57 mg/L	107	80.0	120	----
Organic / Inorganic Carbon (QCLot: 1551369)									

Sub-Matrix: **Water**

Analyte	CAS Number	Method	LOR	Unit	Laboratory Control Sample (LCS) Report: Spike Target Concentration	Recovery (%) LCS	Recovery Limits (%) Low	Recovery Limits (%) High	Qualifier
Organic / Inorganic Carbon (QCLot: 1551369) - continued									
Carbon, dissolved organic [DOC]	----	E358-L	0.5	mg/L	8.57 mg/L	99.3	80.0	120	----
Total Metals (QCLot: 1571105)									
Aluminum, total	7429-90-5	E420	0.003	mg/L	2 mg/L	99.5	80.0	120	----
Antimony, total	7440-36-0	E420	0.0001	mg/L	1 mg/L	98.5	80.0	120	----
Arsenic, total	7440-38-2	E420	0.0001	mg/L	1 mg/L	99.7	80.0	120	----
Barium, total	7440-39-3	E420	0.0001	mg/L	0.25 mg/L	99.3	80.0	120	----
Beryllium, total	7440-41-7	E420	0.00002	mg/L	0.1 mg/L	94.1	80.0	120	----
Bismuth, total	7440-69-9	E420	0.00005	mg/L	1 mg/L	101	80.0	120	----
Boron, total	7440-42-8	E420	0.01	mg/L	1 mg/L	91.9	80.0	120	----
Cadmium, total	7440-43-9	E420	0.000005	mg/L	0.1 mg/L	98.3	80.0	120	----
Calcium, total	7440-70-2	E420	0.05	mg/L	50 mg/L	97.0	80.0	120	----
Cesium, total	7440-46-2	E420	0.00001	mg/L	0.05 mg/L	100.0	80.0	120	----
Chromium, total	7440-47-3	E420	0.0005	mg/L	0.25 mg/L	95.9	80.0	120	----
Cobalt, total	7440-48-4	E420	0.0001	mg/L	0.25 mg/L	98.0	80.0	120	----
Copper, total	7440-50-8	E420	0.0005	mg/L	0.25 mg/L	97.6	80.0	120	----
Iron, total	7439-89-6	E420	0.01	mg/L	1 mg/L	92.8	80.0	120	----
Lead, total	7439-92-1	E420	0.00005	mg/L	0.5 mg/L	96.8	80.0	120	----
Lithium, total	7439-93-2	E420	0.001	mg/L	0.25 mg/L	88.1	80.0	120	----
Magnesium, total	7439-95-4	E420	0.005	mg/L	50 mg/L	103	80.0	120	----
Manganese, total	7439-96-5	E420	0.0001	mg/L	0.25 mg/L	97.2	80.0	120	----
Molybdenum, total	7439-98-7	E420	0.00005	mg/L	0.25 mg/L	96.8	80.0	120	----
Nickel, total	7440-02-0	E420	0.0005	mg/L	0.5 mg/L	96.4	80.0	120	----
Phosphorus, total	7723-14-0	E420	0.05	mg/L	10 mg/L	106	80.0	120	----
Potassium, total	7440-09-7	E420	0.05	mg/L	50 mg/L	96.4	80.0	120	----
Rubidium, total	7440-17-7	E420	0.0002	mg/L	0.1 mg/L	96.9	80.0	120	----
Selenium, total	7782-49-2	E420	0.00005	mg/L	1 mg/L	93.3	80.0	120	----
Silicon, total	7440-21-3	E420	0.1	mg/L	10 mg/L	98.6	80.0	120	----
Silver, total	7440-22-4	E420	0.00001	mg/L	0.1 mg/L	90.2	80.0	120	----
Sodium, total	7440-23-5	E420	0.05	mg/L	50 mg/L	99.9	80.0	120	----
Strontium, total	7440-24-6	E420	0.0002	mg/L	0.25 mg/L	98.2	80.0	120	----
Sulfur, total	7704-34-9	E420	0.5	mg/L	50 mg/L	86.6	80.0	120	----
Tellurium, total	13494-80-9	E420	0.0002	mg/L	0.1 mg/L	102	80.0	120	----
Thallium, total	7440-28-0	E420	0.00001	mg/L	1 mg/L	98.4	80.0	120	----
Thorium, total	7440-29-1	E420	0.0001	mg/L	0.1 mg/L	101	80.0	120	----
Tin, total	7440-31-5	E420	0.0001	mg/L	0.5 mg/L	96.6	80.0	120	----

Sub-Matrix: **Water**

Analyte	CAS Number	Method	LOR	Unit	Laboratory Control Sample (LCS) Report: Spike Target Concentration	Recovery (%) LCS	Recovery Limits (%) Low	Recovery Limits (%) High	Qualifier
Total Metals (QCLot: 1571105) - continued									
Titanium, total	7440-32-6	E420	0.0003	mg/L	0.25 mg/L	96.1	80.0	120	----
Tungsten, total	7440-33-7	E420	0.0001	mg/L	0.1 mg/L	99.8	80.0	120	----
Uranium, total	7440-61-1	E420	0.00001	mg/L	0.005 mg/L	103	80.0	120	----
Vanadium, total	7440-62-2	E420	0.0005	mg/L	0.5 mg/L	98.2	80.0	120	----
Zinc, total	7440-66-6	E420	0.003	mg/L	0.5 mg/L	95.1	80.0	120	----
Zirconium, total	7440-67-7	E420	0.0002	mg/L	0.1 mg/L	93.7	80.0	120	----

Matrix Spike (MS) Report

A Matrix Spike (MS) is a randomly selected intra-laboratory replicate sample that has been fortified (spiked) with test analytes at known concentration, and processed in an identical manner to test samples. Matrix Spikes provide information regarding analyte recovery and potential matrix effects. MS DQO exceedances due to sample matrix may sometimes be unavoidable; in such cases, test results for the associated sample (or similar samples) may be subject to bias. ND – Recovery not determined, background level >= 1x spike level.

Sub-Matrix: **Water**

					Matrix Spike (MS) Report					
					Spike		Recovery (%)	Recovery Limits (%)		
Laboratory sample ID	Client sample ID	Analyte	CAS Number	Method	Concentration	Target	MS	Low	High	Qualifier
Anions and Nutrients (QCLot: 1551060)										
WP2417557-001	Rivers 1 - Raw	Fluoride	16984-48-8	E235.F	1.02 mg/L	1 mg/L	102	75.0	125	----
Anions and Nutrients (QCLot: 1551061)										
WP2417557-001	Rivers 1 - Raw	Bromide	24959-67-9	E235.Br-L	0.489 mg/L	0.5 mg/L	97.8	75.0	125	----
Anions and Nutrients (QCLot: 1551062)										
WP2417557-001	Rivers 1 - Raw	Chloride	16887-00-6	E235.Cl-L	100 mg/L	100 mg/L	100	75.0	125	----
Anions and Nutrients (QCLot: 1551063)										
WP2417557-001	Rivers 1 - Raw	Nitrate (as N)	14797-55-8	E235.NO3-L	2.49 mg/L	2.5 mg/L	99.5	75.0	125	----
Anions and Nutrients (QCLot: 1551064)										
WP2417557-001	Rivers 1 - Raw	Nitrite (as N)	14797-65-0	E235.NO2-L	0.510 mg/L	0.5 mg/L	102	75.0	125	----
Anions and Nutrients (QCLot: 1551065)										
WP2417557-001	Rivers 1 - Raw	Sulfate (as SO4)	14808-79-8	E235.SO4	ND mg/L	----	ND	75.0	125	----
Anions and Nutrients (QCLot: 1557289)										
WP2417576-001	Anonymous	Ammonia, total (as N)	7664-41-7	E298	ND mg/L	----	ND	75.0	125	----
Organic / Inorganic Carbon (QCLot: 1551173)										
WP2417237-002	Anonymous	Carbon, total organic [TOC]	----	E355-L	ND mg/L	----	ND	70.0	130	----
Organic / Inorganic Carbon (QCLot: 1551369)										
WP2417557-001	Rivers 1 - Raw	Carbon, dissolved organic [DOC]	----	E358-L	ND mg/L	----	ND	70.0	130	----
Total Metals (QCLot: 1571105)										
WP2417554-008	Anonymous	Aluminum, total	7429-90-5	E420	0.207 mg/L	0.2 mg/L	104	70.0	130	----
		Antimony, total	7440-36-0	E420	ND mg/L	----	ND	70.0	130	----
		Arsenic, total	7440-38-2	E420	0.0206 mg/L	0.02 mg/L	103	70.0	130	----
		Barium, total	7440-39-3	E420	0.0198 mg/L	0.02 mg/L	99.0	70.0	130	----
		Beryllium, total	7440-41-7	E420	0.0378 mg/L	0.04 mg/L	94.4	70.0	130	----
		Bismuth, total	7440-69-9	E420	0.00904 mg/L	0.01 mg/L	90.4	70.0	130	----
		Boron, total	7440-42-8	E420	ND mg/L	----	ND	70.0	130	----
		Cadmium, total	7440-43-9	E420	0.00386 mg/L	0.004 mg/L	96.5	70.0	130	----
		Calcium, total	7440-70-2	E420	ND mg/L	----	ND	70.0	130	----
		Cesium, total	7440-46-2	E420	0.0104 mg/L	0.01 mg/L	104	70.0	130	----
		Chromium, total	7440-47-3	E420	0.0399 mg/L	0.04 mg/L	99.7	70.0	130	----
		Cobalt, total	7440-48-4	E420	0.0194 mg/L	0.02 mg/L	96.8	70.0	130	----
		Copper, total	7440-50-8	E420	0.0184 mg/L	0.02 mg/L	91.8	70.0	130	----
		Iron, total	7439-89-6	E420	1.92 mg/L	2 mg/L	96.1	70.0	130	----
		Lead, total	7439-92-1	E420	0.0180 mg/L	0.02 mg/L	90.1	70.0	130	----
		Lithium, total	7439-93-2	E420	0.0894 mg/L	0.1 mg/L	89.4	70.0	130	----

Sub-Matrix: **Water**

Laboratory sample ID	Client sample ID	Analyte	CAS Number	Method	Matrix Spike (MS) Report: Spike Concentration	Spike Target	Recovery (%) MS	Recovery Limits (%) Low	Recovery Limits (%) High	Qualifier
Total Metals (QCLot: 1571105) - continued										
WP2417554-008	Anonymous	Magnesium, total	7439-95-4	E420	ND mg/L	----	ND	70.0	130	----
		Manganese, total	7439-96-5	E420	0.0207 mg/L	0.02 mg/L	104	70.0	130	----
		Molybdenum, total	7439-98-7	E420	0.0204 mg/L	0.02 mg/L	102	70.0	130	----
		Nickel, total	7440-02-0	E420	0.0384 mg/L	0.04 mg/L	96.1	70.0	130	----
		Phosphorus, total	7723-14-0	E420	10.7 mg/L	10 mg/L	107	70.0	130	----
		Potassium, total	7440-09-7	E420	ND mg/L	----	ND	70.0	130	----
		Rubidium, total	7440-17-7	E420	ND mg/L	----	ND	70.0	130	----
		Selenium, total	7782-49-2	E420	0.0419 mg/L	0.04 mg/L	105	70.0	130	----
		Silicon, total	7440-21-3	E420	10.1 mg/L	10 mg/L	101	70.0	130	----
		Silver, total	7440-22-4	E420	0.00401 mg/L	0.004 mg/L	100	70.0	130	----
		Sodium, total	7440-23-5	E420	ND mg/L	----	ND	70.0	130	----
		Strontium, total	7440-24-6	E420	ND mg/L	----	ND	70.0	130	----
		Sulfur, total	7704-34-9	E420	ND mg/L	----	ND	70.0	130	----
		Tellurium, total	13494-80-9	E420	0.0410 mg/L	0.04 mg/L	102	70.0	130	----
		Thallium, total	7440-28-0	E420	0.00366 mg/L	0.004 mg/L	91.4	70.0	130	----
		Thorium, total	7440-29-1	E420	0.0201 mg/L	0.02 mg/L	100	70.0	130	----
		Tin, total	7440-31-5	E420	0.0213 mg/L	0.02 mg/L	106	70.0	130	----
		Titanium, total	7440-32-6	E420	0.0412 mg/L	0.04 mg/L	103	70.0	130	----
		Tungsten, total	7440-33-7	E420	0.0198 mg/L	0.02 mg/L	98.9	70.0	130	----
		Uranium, total	7440-61-1	E420	0.00392 mg/L	0.004 mg/L	98.1	70.0	130	----
		Vanadium, total	7440-62-2	E420	0.104 mg/L	0.1 mg/L	104	70.0	130	----
		Zinc, total	7440-66-6	E420	0.370 mg/L	0.4 mg/L	92.5	70.0	130	----
		Zirconium, total	7440-67-7	E420	0.0414 mg/L	0.04 mg/L	104	70.0	130	----

Manitoba

Office of Drinking Water
14 Fultz Boulevard, Winnipeg, Manitoba,
Canada R3Y 0L6

Chain of Custody (COC)
Manitoba Drinking Water Systems

Regular Service (default):	☒ Regular Service (is 5-7 Days):
Unless otherwise requested	☐ 1 Day, rush / priority ☐ 2 Day, rush / priority ☐ 3 Day, rush / priority

Report to Operator (email PDF):		**Report to Owner (email PDF):**		**Email PDF copy to:**	
Contact:	Jeff Worth	Contact:	Kat Bridgeman	DWO:	Christine Gerardy
Address:	Box 520, Rivers, MB R0K1X0	Address:	Box 520, Rivers, MB R0K1X0	DWO Address:	1129 Queens Ave., Brandon, MB R7A1L9
Phone:	(204) 710-7000	Phone:	(204) 328-5250	DWO Phone:	(204) 570-1405
Email:	riverswtp@riverdalemb.ca	Email:	cao@riverdalemb.ca	DWO Email:	Christine.Gerardy@gov.mb.ca
				Additional Email:	Joern.Muenster@gov.mb.ca; Marc.Balcaen@gov.mb.ca;

If an update in Owner or Operator contact information is required, please contact your Drinking Water Officer

Client / Project Information:	**Lab:**	**Account:**	Agency Code: 382	Report Type: EMS (Lab-MWS)	Project: DWQ-C

Operation Name:	RIVERS - PWS
Operation Code:	181.00
Operation ID:	16843
Sampled by:	Jeff Worth

…pected Sample Time:

January-2024

Environmental Division
Winnipeg
Work Order Reference
WP2417557

Telephone : +1 204 255 9720

Please record Free & Total Chlori… …y-product Sampling
DO NOT COPY or RE-USE this form. Sam… …o the Office of Drinking Water
and provide… …er.

Sample Number	Station Number	Sample Identification	…ee Chlorine (mg/L)	Total Chlorine (mg/L)	Sample Date dd-mmm-yyyy	Sample Time hh:mm	Sample Matrix	Sample Type	MB-CH-PWS-V2013	MB-MET-T-CCMS	# of Containers
2401CG5001	MB05MFD041	Rivers 1 - Raw	—	—	16-July-2024	10:45	6	1	X		4
2401CG5002	MB05MFD042	Rivers 2 - Treated	1.02	1.07	16-July-2024	11:00	10	1	X		4
2401CG5003	MB05MFD043	Rivers 3 - Distributon (mid)	0.95	0.99	16-July-2024	11:15	9	1		X	1

Failure to complete all portions of this form may delay analysis.	Sample Matrix: 6-Raw Water, 9-Distributed Water, 10-Treated Water
Please fill in this form LEGIBLY.	Sample Type: 1-Grab Sample

By the use of this form the user acknowledges and agrees with the Terms and Conditions as specified by the Laboratory.
For ALL other testing, please use Laboratory specific forms.

Relinquished By:	J Worth	Date & Time	July 16/24 - 11:15	Validated By (lab use only):	Date & Time:
				Sample Condition (lab use only)	
Received By: (lab use only)	Ledingham	Date & Time: (lab use only)	JUL 17 2024 10:19	Temperature 18.0°C	Samples Received in Good Condition? (Y) / N

Sample Intake

- Client: Office of Drinking Water
- COC receipt info complete ☑
- Express TAT? Yes: same day / 1 day / 2 day / 3 days / 4 day — no
- Short hold time? Yes: <24 hrs / 1 day / 2 days / 3 days / 4 days — no
- Matrix: Water / Soil/solid / Air / Biota / Food/micro / Other
- Total number of bottles/fractions: Green/white 2x500, Purple/white 2x100, Red/white 3x125, Dark green/white 2x100; Orange/black, Dark blue/white, Black/white, Brown/white, Pink/white

Manitoba

Office of Drinking Water
14 Fultz Boulevard, Winnipeg, Manitoba,
Canada R3Y 0L6

Chain of Custody (COC)
Manitoba Drinking Water Systems

Regular Service (default):	[X] Regular Service (is 5-7 Days):
Unless otherwise requested	[ ] **1 Day, rush / priority** [ ] **2 Day, rush / priority** [ ] **3 Day, rush / priority**

Report to Operator (email PDF):		**Report to Owner (email PDF):**		**Email PDF copy to:**	
Contact:	Jeff Worth	Contact:	Kat Bridgeman	DWO:	Christine Gerardy
Address:	Box 520, Rivers, MB R0K1X0	Address:	Box 520, Rivers, MB R0K1X0	DWO Address:	1129 Queens Ave., Brandon, MB R7A1L9
Phone:	(204) 710-7000	Phone:	(204) 328-5250	DWO Phone:	(204) 570-1405
Email:	riverswtp@riverdalemb.ca	Email:	cao@riverdalemb.ca	DWO Email:	Christine.Gerardy@gov.mb.ca
				Additional Email:	Joern.Muenster@gov.mb.ca; Marc.Balcaen@gov.mb.ca;

If an update in Owner or Operator contact information is required, please contact your Drinking Water Officer

Client / Project Information:	**Lab:**	**Account:**	Agency Code: 382	Report Type: EMS (Lab-MWS)	Project: DWQ-C
Operation Name:	RIVERS - PWS				
Operation Code:	181.00		...pected Sample Time:	**January-2024**	
Operation ID:	16843				
Sampled by:	Jeff Worth				

Environmental Division
Winnipeg
Work Order Reference
WP2417557
Telephone : +1 204 255 9720

Please record Free & Total Chlori... ...y-product Sampling
DO NOT COPY or RE-USE this form. Sam... ...the Office of Drinking Water
and provide... ...er.

Sample Number	Station Number	Sample Identification	...ee Chlorine (mg/L)	Total Chlorine (mg/L)	Sample Date dd-mmm-yyyy	Sample Time hh:mm	Sample Matrix	Sample Type	MB-CH-PWS-V2013	MB-MET-T-CCMS	# of Containers
2401CG5001	MB05MFD041	Rivers 1 - Raw	—	—	16-July-2024	10:45	6	1	X		4
2401CG5002	MB05MFD042	Rivers 2 - Treated	1.02	1.07	16-July-2024	11:00	10	1	X		4
2401CG5003	MB05MFD043	Rivers 3 - Distributon (mid)	0.95	0.99	16-July-2024	11:15	9	1		X	1

Failure to complete all portions of this form may delay analysis.	Sample Matrix: 6-Raw Water, 9-Distributed Water, 10-Treated Water
Please fill in this form LEGIBLY.	Sample Type: 1-Grab Sample

By the use of this form the user acknowledges and agrees with the Terms and Conditions as specified by the Laboratory.
For ALL other testing, please use Laboratory specific forms.

Relinquished By:	J Worth	Date & Time	July 16/24 - 11:15	Validated By (lab use only):	Date & Time:
				Sample Condition (lab use only)	
Received By: (lab use only)	Ledingham	Date & Time: (lab use only)	JUL 17 2024 10:19	Temperature 18.0°C	Samples Received in Good Condition? Y / N

Sample Intake

Client: Office of Drinking Water ✓				COC receipt info complete	✓

		Yes:				
Express TAT?	no	same day	1 day	2 day	3 days	4 day
Short hold time?	no	<24 hrs	1 day	~~Yes:~~ 2 days	3 days	4 days
Matrix	Water	Soil/solid	Air	Biota	Food/micro	Other

Total number of bottles/fractions:

Green/white	2x500	Orange/black	
Purple/white	2x100	Dark blue/white	
Red/white	3x125	Black/white	
Dark green/white		Brown/white	
Grey/white	2x100	Pink/white	
Yellow/black		Beige/white	
Light blue/white		Other (specify)	

Comments:

18.0°C, ice pack✓, cooling initiated

Sample Login

Receipt Window	✓/X	N/A	Bottles	✓/X	N/A
# of fractions, matrix and submatrix	✓		All received bottles have IDs	✓	
Client, office, contact, quote, project	✓		Type, volume, and locations	✓	
Receipt time/date, PO, project, site	✓		Labels and internal COCs printed	✓	
Temp, cooling method, sampler	✓		**Client Contacts**	**✓/X**	**N/A**
Sample Info	**✓/X**	**N/A**	Report/invoice/EDD recipients	✓	
Sample date/time	✓		Report types/formats	✓	
Sample ID/description	✓		**Post-committing**	**✓/X**	**N/A**
Sales items	✓		Runs built and field data entered		✓
Guidelines/thresholds	✓	✓	Billing information entered		✓
Additional sample/WO information	✓	~~✓~~	**Action Required?**	**Yes**	**No**
Due Dates	**✓/X**	**N/A**	Update default receipt data		✓
COC/GEL/client due dates match	✓		Update default report data		✓
Express TAT surcharges		✓	Add sales/billing items to quote		✓
Clock running for all samples	✓		SIF initiated (elaborate in comments)		✓

Comments:

August THM HAA Results 2024

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CERTIFICATE OF ANALYSIS (GUIDELINE EVALUATION)

Work Order	: **WP2419701**	Page	: 1 of 3
Client	: **Manitoba Conservation & Climate**	Laboratory	: ALS Environmental - Winnipeg
Contact	: Marc Balcaen	Account Manager	: Sheriza Rajack-Ahamed
Address	: 14 Fultz Boulevard Winnipeg MB Canada R3Y 0L6	Address	: 1329 Niakwa Road East, Unit 12 Winnipeg, Manitoba Canada R2J 3T4
Telephone	: 204 945 5776	Telephone	: +1 204 255 9720
Project	: Rivers - PWS 181.00	Date Samples Received	: 13-Aug-2024 11:21
PO	: ----	Date Analysis Commenced	: 16-Aug-2024
C-O-C number	: ----	Issue Date	: 23-Aug-2024 16:10
Sampler	: ----		
Site	: Rivers - PWS 181.00 Op Id: 16843		
Quote number	: 2024 WTP Chemistry		
No. of samples received	: 3		
No. of samples analysed	: 3		

This report supersedes any previous report(s) with this reference. Results apply to the sample(s) as submitted. This document shall not be reproduced, except in full.

This Certificate of Analysis contains the following information:

- General Comments
- Analytical Results
- Guideline Comparison

Additional information pertinent to this report will be found in the following separate attachments: Quality Control Report, QC Interpretive report to assist with Quality Review and Sample Receipt Notification (SRN).

Signatories

This document has been electronically signed by the authorized signatories below. Electronic signing is conducted in accordance with US FDA 21 CFR Part 11.

Signatories	*Position*	*Laboratory Department*
Gerry Vera	Analyst	Organics, Winnipeg, Manitoba
Ryan Velasco		Organics, Winnipeg, Manitoba
Stephanie Pinheiro	Team Leader - LCMS	LCMS, Waterloo, Ontario

No Breaches Found

General Comments

The analytical methods used by ALS are developed using internationally recognized reference methods (where available), such as those published by US EPA, APHA Standard Methods, ASTM, ISO, Environment Canada, BC MOE, and Ontario MOE. Refer to the ALS Quality Control Interpretive report (QCI) for applicable references and methodology summaries. Reference methods may incorporate modifications to improve performance.

Where a reported less than (<) result is higher than the LOR, this may be due to primary sample extract/digestate dilution and/or insufficient sample for analysis.
Where the LOR of a reported result differs from standard LOR, this may be due to high moisture content, insufficient sample (reduced weight employed) or matrix interference.

Additional information pertinent to this report will be found in the following separate attachments: Quality Control Report, QA/QC Compliance Assessment to assist with Quality Review and Sample Receipt Notification.

When sampling time information is not provided by the client, sampling dates are shown without a time component. In these instances, the time component has been assumed by the laboratory for processing purposes.

Application of guidelines is provided "as is" without warranty of any kind, either expressed or implied, including, but not limited to fitness for a particular purpose, or non-infringement. ALS assumes no responsibility for errors or omissions in the information. Guidelines are not adjusted for the hardness, pH or temperature of the sample (the most conservative values are used). Measurement uncertainty is not applied to test results prior to comparison with specified criteria values.

Key : LOR: Limit of Reporting (detection limit).

Unit	Description
µg/L	micrograms per litre
mg/L	milligrams per litre

>: greater than.
<: less than.
Red shading is applied where the result or the LOR is greater than the Guideline Upper Limit (or lower than the Guideline Lower Limit, if applicable).
For drinking water samples, Red shading is applied where the result for E.coli, fecal or total coliforms is greater than or equal to the Guideline Upper Limit.

Analytical Results Evaluation

Matrix: **Drinking Water**

			Client sample ID	Rivers 3 - Distribution (mid)	Rivers 3 - Distribution (end)	Rivers 1 - Raw	----	----	----	----
			Sampling date/time	12-Aug-2024 11:00	12-Aug-2024 10:45	12-Aug-2024 10:30	----	----	----	----
			Sub-Matrix	Drinking Water	Drinking Water	Drinking Water	----	----	----	----
Analyte	*CAS Number*	*Method/Lab*	*Unit*	WP2419701-001	WP2419701-002	WP2419701-003	--------	--------	--------	--------
Volatile Organic Compounds [THMs]										
Bromodichloromethane	75-27-4	E611B/WP	mg/L	----	0.0013	----	----	----	----	----
Bromoform	75-25-2	E611B/WP	mg/L	----	<0.0010	----	----	----	----	----
Chloroform	67-66-3	E611B/WP	mg/L	----	0.0054	----	----	----	----	----
Dibromochloromethane	124-48-1	E611B/WP	mg/L	----	<0.0010	----	----	----	----	----
Trihalomethanes [THMs], total	----	E611B/WP	mg/L	----	0.0067	----	----	----	----	----
Volatile Organic Compounds [THMs] Surrogates										
Bromofluorobenzene, 4-	460-00-4	E611B/WP	%	----	86.5	----	----	----	----	----
Difluorobenzene, 1,4-	540-36-3	E611B/WP	%	----	101	----	----	----	----	----
Haloacetic Acids										
Dibromoacetic acid	631-64-1	E750/WT	µg/L	<1.00	----	----	----	----	----	----
Dichloroacetic acid	79-43-6	E750/WT	µg/L	1.72	----	----	----	----	----	----
Monobromoacetic acid	79-08-3	E750/WT	µg/L	<1.00	----	----	----	----	----	----
Monochloroacetic acid	79-11-8	E750/WT	µg/L	<1.00	----	----	----	----	----	----
Trichloroacetic acid	76-03-9	E750/WT	µg/L	<1.00	----	----	----	----	----	----
Haloacetic acids, total [HAA5]	n/a	E750/WT	µg/L	<5.00	----	----	----	----	----	----
Organic Parameters										
Microcystin	101043-37-2	E576/WP	µg/L	----	----	<0.20	----	----	----	----

Please refer to the General Comments section for an explanation of any result qualifiers detected.

Please refer to the Accreditation section for an explanation of analyte accreditations.

Key:

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CERTIFICATE OF ANALYSIS (GUIDELINE EVALUATION)

Work Order	: **WP2404187**	Page	: 1 of 4
Client	: **Manitoba Conservation & Climate**	Laboratory	: ALS Environmental - Winnipeg
Contact	: Marc Balcaen	Account Manager	: Sheriza Rajack-Ahamed
Address	: 14 Fultz Boulevard Winnipeg MB Canada R3Y 0L6	Address	: 1329 Niakwa Road East, Unit 12 Winnipeg, Manitoba Canada R2J 3T4
Telephone	: 204 945 5776	Telephone	: +1 204 255 9720
Project	: Rivers - PWS 181.00	Date Samples Received	: 21-Feb-2024 10:30
PO	: ----	Date Analysis Commenced	: 23-Feb-2024
C-O-C number	: ----	Issue Date	: 06-Mar-2024 07:34
Sampler	: ----		
Site	: Rivers - PWS 181.00 Op Id: 16843		
Quote number	: WTP Chemistry		
No. of samples received	: 2		
No. of samples analysed	: 2		

This report supersedes any previous report(s) with this reference. Results apply to the sample(s) as submitted. This document shall not be reproduced, except in full.

This Certificate of Analysis contains the following information:

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- Analytical Results
- Guideline Comparison

Additional information pertinent to this report will be found in the following separate attachments: Quality Control Report, QC Interpretive report to assist with Quality Review and Sample Receipt Notification (SRN).

Signatories

This document has been electronically signed by the authorized signatories below. Electronic signing is conducted in accordance with US FDA 21 CFR Part 11.

Signatories	*Position*	*Laboratory Department*
Gerry Vera	Analyst	Organics, Winnipeg, Manitoba
Stephanie Pinheiro	Analyst	LCMS, Waterloo, Ontario

No Breaches Found

General Comments

The analytical methods used by ALS are developed using internationally recognized reference methods (where available), such as those published by US EPA, APHA Standard Methods, ASTM, ISO, Environment Canada, BC MOE, and Ontario MOE. Refer to the ALS Quality Control Interpretive report (QCI) for applicable references and methodology summaries. Reference methods may incorporate modifications to improve performance.

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Key : LOR: Limit of Reporting (detection limit).

Unit	*Description*
µg/L	micrograms per litre
mg/L	milligrams per litre

>: greater than.
<: less than.
Red shading is applied where the result or the LOR is greater than the Guideline Upper Limit (or lower than the Guideline Lower Limit, if applicable).
For drinking water samples, Red shading is applied where the result for E.coli, fecal or total coliforms is greater than or equal to the Guideline Upper Limit.

Analytical Results Evaluation

Matrix: **Water**

Analyte	CAS Number	Method/Lab	Unit	RIVERS 3 - DISTRIBUTION (MID)	RIVERS 3 - DISTRIBUTION (END)	----	----	----	----	----
Sampling date/time				20-Feb-2024 10:30	20-Feb-2024 10:45	----	----	----	----	----
Sub-Matrix				Water	Water	----	----	----	----	----
				WP2404187-001	WP2404187-002	--------	--------	--------	--------	--------
Volatile Organic Compounds [THMs]										
Bromodichloromethane	75-27-4	E611B/WP	mg/L	----	<0.0010	----	----	----	----	----
Bromoform	75-25-2	E611B/WP	mg/L	----	<0.0010	----	----	----	----	----
Chloroform	67-66-3	E611B/WP	mg/L	----	0.0013	----	----	----	----	----
Dibromochloromethane	124-48-1	E611B/WP	mg/L	----	<0.0010	----	----	----	----	----
Trihalomethanes [THMs], total	----	E611B/WP	mg/L	----	<0.0020	----	----	----	----	----
Volatile Organic Compounds [THMs] Surrogates										
Bromofluorobenzene, 4-	460-00-4	E611B/WP	%	----	77.2	----	----	----	----	----
Difluorobenzene, 1,4-	540-36-3	E611B/WP	%	----	117	----	----	----	----	----
Haloacetic Acids										
Dibromoacetic acid	631-64-1	E750/WT	µg/L	<1.00	----	----	----	----	----	----
Dichloroacetic acid	79-43-6	E750/WT	µg/L	<1.00	----	----	----	----	----	----
Monobromoacetic acid	79-08-3	E750/WT	µg/L	<1.00	----	----	----	----	----	----
Monochloroacetic acid	79-11-8	E750/WT	µg/L	<1.00	----	----	----	----	----	----
Trichloroacetic acid	76-03-9	E750/WT	µg/L	<1.00	----	----	----	----	----	----
Haloacetic acids, total [HAA5]	n/a	E750/WT	µg/L	<5.00	----	----	----	----	----	----

Please refer to the General Comments section for an explanation of any result qualifiers detected.

Please refer to the Accreditation section for an explanation of analyte accreditations.

Summary of Guideline Limits

Analyte	*CAS Number*	*Unit*	**CDWG MAC**						
Volatile Organic Compounds [THMs]									
Bromodichloromethane	75-27-4	mg/L	--						
Bromoform	75-25-2	mg/L	--						
Chloroform	67-66-3	mg/L	--						
Dibromochloromethane	124-48-1	mg/L	--						
Trihalomethanes [THMs], total	----	mg/L	**0.1 mg/L**						
Bromofluorobenzene, 4-	460-00-4	%	--						
Difluorobenzene, 1,4-	540-36-3	%	--						
Haloacetic Acids									
Dibromoacetic acid	631-64-1	µg/L	--						
Dichloroacetic acid	79-43-6	µg/L	--						
Haloacetic acids, total [HAA5]	n/a	µg/L	**80 µg/L**						
Monobromoacetic acid	79-08-3	µg/L	--						
Monochloroacetic acid	79-11-8	µg/L	--						
Trichloroacetic acid	76-03-9	µg/L	--						

Please refer to the General Comments section for an explanation of any qualifiers detected.

Key:

CDWG — Canada Guidelines for Canadian Drinking Water Quality (JAN, 2023)

MAC — Maximum Acceptable Concentrations

ALS Canada Ltd.

THM HAA MAY 2024

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CERTIFICATE OF ANALYSIS (GUIDELINE EVALUATION)

Work Order	: **WP2412744**	Page	: 1 of 4
Client	: **Manitoba Conservation & Climate**	Laboratory	: ALS Environmental - Winnipeg
Contact	: Marc Balcaen	Account Manager	: Sheriza Rajack-Ahamed
Address	: 14 Fultz Boulevard Winnipeg MB Canada R3Y 0L6	Address	: 1329 Niakwa Road East, Unit 12 Winnipeg, Manitoba Canada R2J 3T4
Telephone	: 204 945 5776	Telephone	: +1 204 255 9720
Project	: Rivers - PWS 181.00	Date Samples Received	: 22-May-2024 12:04
PO	: ----	Date Analysis Commenced	: 24-May-2024
C-O-C number	: ----	Issue Date	: 29-May-2024 16:48
Sampler	: ----		
Site	: Rivers - PWS 181.00 Op Id: 16843		
Quote number	: 2024 WTP Chemistry		
No. of samples received	: 2		
No. of samples analysed	: 2		

This report supersedes any previous report(s) with this reference. Results apply to the sample(s) as submitted. This document shall not be reproduced, except in full.

This Certificate of Analysis contains the following information:

- General Comments
- Analytical Results
- Guideline Comparison

Additional information pertinent to this report will be found in the following separate attachments: Quality Control Report, QC Interpretive report to assist with Quality Review and Sample Receipt Notification (SRN).

Signatories

This document has been electronically signed by the authorized signatories below. Electronic signing is conducted in accordance with US FDA 21 CFR Part 11.

Signatories	*Position*	*Laboratory Department*
Gerry Vera	Analyst	Organics, Winnipeg, Manitoba
Jihun Jeon	Laboratory Analyst	LCMS, Waterloo, Ontario

No Breaches Found

General Comments

The analytical methods used by ALS are developed using internationally recognized reference methods (where available), such as those published by US EPA, APHA Standard Methods, ASTM, ISO, Environment Canada, BC MOE, and Ontario MOE. Refer to the ALS Quality Control Interpretive report (QCI) for applicable references and methodology summaries. Reference methods may incorporate modifications to improve performance.

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Key : LOR: Limit of Reporting (detection limit).

Unit	*Description*
µg/L	micrograms per litre
mg/L	milligrams per litre

>: greater than.
<: less than.
Red shading is applied where the result or the LOR is greater than the Guideline Upper Limit (or lower than the Guideline Lower Limit, if applicable).
For drinking water samples, Red shading is applied where the result for E.coli, fecal or total coliforms is greater than or equal to the Guideline Upper Limit.

Qualifiers

Qualifier	*Description*
DLM	*Detection Limit Adjusted due to sample matrix effects (e.g. chemical interference, colour, turbidity).*

Analytical Results Evaluation

Matrix: **Drinking Water**

Analyte	CAS Number	Method/Lab	Unit	Rivers 3 - Distribution (mid)	Rivers 3 - Distribution (end)	----	----	----	----	----
			Sampling date/time	21-May-2024 09:15	21-May-2024 09:45	----	----	----	----	----
			Sub-Matrix	Drinking Water	Drinking Water	----	----	----	----	----
				WP2412744-001	WP2412744-002	--------	--------	--------	--------	--------
Volatile Organic Compounds [THMs]										
Bromodichloromethane	75-27-4	E611B/WP	mg/L	----	0.0014	----	----	----	----	----
Bromoform	75-25-2	E611B/WP	mg/L	----	<0.0010	----	----	----	----	----
Chloroform	67-66-3	E611B/WP	mg/L	----	0.0056	----	----	----	----	----
Dibromochloromethane	124-48-1	E611B/WP	mg/L	----	<0.0010	----	----	----	----	----
Trihalomethanes [THMs], total	----	E611B/WP	mg/L	----	0.0070	----	----	----	----	----
Volatile Organic Compounds [THMs] Surrogates										
Bromofluorobenzene, 4-	460-00-4	E611B/WP	%	----	83.4	----	----	----	----	----
Difluorobenzene, 1,4-	540-36-3	E611B/WP	%	----	102	----	----	----	----	----
Haloacetic Acids										
Dibromoacetic acid	631-64-1	E750/WT	µg/L	<1.00	----	----	----	----	----	----
Dichloroacetic acid	79-43-6	E750/WT	µg/L	2.07	----	----	----	----	----	----
Monobromoacetic acid	79-08-3	E750/WT	µg/L	<1.00	----	----	----	----	----	----
Monochloroacetic acid	79-11-8	E750/WT	µg/L	<1.00	----	----	----	----	----	----
Trichloroacetic acid	76-03-9	E750/WT	µg/L	<1.40 DLM	----	----	----	----	----	----
Haloacetic acids, total [HAA5]	n/a	E750/WT	µg/L	<5.00	----	----	----	----	----	----

Please refer to the General Comments section for an explanation of any result qualifiers detected.

Please refer to the Accreditation section for an explanation of analyte accreditations.

Summary of Guideline Limits

Analyte	CAS Number	Unit	CDWG MAC						
Volatile Organic Compounds [THMs]									
Bromodichloromethane	75-27-4	mg/L	--						
Bromoform	75-25-2	mg/L	--						
Chloroform	67-66-3	mg/L	--						
Dibromochloromethane	124-48-1	mg/L	--						
Trihalomethanes [THMs], total	----	mg/L	**0.1 mg/L**						
Bromofluorobenzene, 4-	460-00-4	%	--						
Difluorobenzene, 1,4-	540-36-3	%	--						
Haloacetic Acids									
Dibromoacetic acid	631-64-1	µg/L	--						
Dichloroacetic acid	79-43-6	µg/L	--						
Haloacetic acids, total [HAA5]	n/a	µg/L	**80 µg/L**						
Monobromoacetic acid	79-08-3	µg/L	--						
Monochloroacetic acid	79-11-8	µg/L	--						
Trichloroacetic acid	76-03-9	µg/L	--						

Please refer to the General Comments section for an explanation of any qualifiers detected.

Key:

CDWG — Canada Guidelines for Canadian Drinking Water Quality (JAN, 2023)

MAC — Maximum Acceptable Concentrations

THM HAA

Nov. 2024

ALS Canada Ltd.

right solutions.
right partner.

CERTIFICATE OF ANALYSIS (GUIDELINE EVALUATION)

Work Order	: **WP2425563**	Page	: 1 of 3
Client	: **Manitoba Conservation & Climate**	Laboratory	: ALS Environmental - Winnipeg
Contact	: Marc Balcaen	Account Manager	: Sheriza Rajack-Ahamed
Address	: 14 Fultz Boulevard Winnipeg MB Canada R3Y 0L6	Address	: 1329 Niakwa Road East, Unit 12 Winnipeg, Manitoba Canada R2J 3T4
Telephone	: 204 945 5776	Telephone	: +1 204 255 9720
Project	: Rivers - PWS 181.00	Date Samples Received	: 05-Nov-2024 11:56
PO	: ----	Date Analysis Commenced	: 07-Nov-2024
C-O-C number	: ----	Issue Date	: 12-Nov-2024 14:42
Sampler	: ----		
Site	: Rivers - PWS 181.00 Op Id: 16843		
Quote number	: 2024 WTP Chemistry		
No. of samples received	: 2		
No. of samples analysed	: 2		

This report supersedes any previous report(s) with this reference. Results apply to the sample(s) as submitted. This document shall not be reproduced, except in full.

This Certificate of Analysis contains the following information:

- General Comments
- Analytical Results
- Guideline Comparison

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Signatories

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Signatories	*Position*	*Laboratory Department*
Michelle Michalchuk	Analyst	Organics, Winnipeg, Manitoba
Stephanie Pinheiro	Team Leader - LCMS	LCMS, Waterloo, Ontario

No Breaches Found

General Comments

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Analytical Results Evaluation

Matrix: **Water**

Analyte	CAS Number	Method/Lab	Unit	Rivers 3 - Distribution (mid)	Rivers 3 - Distribution (end)	----	----	----	----	----
			Sampling date/time	04-Nov-2024 11:00	04-Nov-2024 10:45	----	----	----	----	----
			Sub-Matrix	Water	Water	----	----	----	----	----
				WP2425563-001	WP2425563-002	--------	--------	--------	--------	--------
Volatile Organic Compounds [THMs]										
Bromodichloromethane	75-27-4	E611B/WP	mg/L	----	<0.0010	----	----	----	----	----
Bromoform	75-25-2	E611B/WP	mg/L	----	<0.0010	----	----	----	----	----
Chloroform	67-66-3	E611B/WP	mg/L	----	0.0019	----	----	----	----	----
Dibromochloromethane	124-48-1	E611B/WP	mg/L	----	<0.0010	----	----	----	----	----
Trihalomethanes [THMs], total	----	E611B/WP	mg/L	----	<0.0020	----	----	----	----	----
Volatile Organic Compounds [THMs] Surrogates										
Bromofluorobenzene, 4-	460-00-4	E611B/WP	%	----	88.5	----	----	----	----	----
Difluorobenzene, 1,4-	540-36-3	E611B/WP	%	----	106	----	----	----	----	----
Haloacetic Acids										
Dibromoacetic acid	631-64-1	E750/WT	µg/L	<1.00	----	----	----	----	----	----
Dichloroacetic acid	79-43-6	E750/WT	µg/L	<1.00	----	----	----	----	----	----
Monobromoacetic acid	79-08-3	E750/WT	µg/L	<1.00	----	----	----	----	----	----
Monochloroacetic acid	79-11-8	E750/WT	µg/L	<1.00	----	----	----	----	----	----
Trichloroacetic acid	76-03-9	E750/WT	µg/L	<1.00	----	----	----	----	----	----
Haloacetic acids, total [HAA5]	n/a	E750/WT	µg/L	<5.00	----	----	----	----	----	----

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Key: