

Public Water System Annual Report (258.00)

-2022-

Name of the Public Water System: Yellowhead Regional Water Co-op (YRWC)

Name of the Legal Owner: Yellowhead Regional Water Co-op Inc.

Contact Person: Operations Manager – Vince Hiebert
Office Phone: (204) 685-2211

Emergency number:

(204) 871-5137 (YRWC Operations Manager) – Vince Hiebert

(431) 554-2332 (Westlake-Gladstone) – Richard Collardo

(204) 841-3742 (Glenella-Lansdowne) – Gary Funk

(204) 871-2073 (MacGregor) – Stacey Knelsen

(204) 463-0044 (Austin) - Hanzel Laus

(204) 871-2425 (North Norfolk - Rural) – Ryan Palas

Phone during business hours:

(204) 685-2211 (North Norfolk)

(204) 385-2332 (Westlake-Gladstone)

(204) 352-4281 (Glenella-Lansdowne)



Date Prepared: March 2023

*Vince Hiebert, Operations Manager
Yellowhead Regional Water Co-op Inc.*

Table of Contents

1. Introduction:	3
2. Description of the Water System	3
<i>2.1. Water Supply Source</i>	<i>3</i>
<i>2.2 Water Treatment Process</i>	<i>3</i>
<i>2.3 Classification and Certification</i>	<i>5</i>
3. Water System Non-Compliance Incidents	6
4. Drinking Water Safety Orders, Warnings, and Charges	6
5. Major Expenses Incurred	5
6. YRWC System Maintenance	6
7. Future System Expansion	7
8. List of Water Quality Standards	7
Appendix A / Results and Analysis	10
Appendix B / PWTP Process Diagram	22

1. Introduction:

The Yellowhead Regional Water Co-op Annual Report for 2022 summarizes the water utility's ability to provide safe potable water and comply with provincial regulations.

2. Description of the Water System

The Yellowhead Regional Water Co-op (YRWC) provides potable drinking water to a population of approximately 3,500 residents. Corrective actions were taken and reported as required for normal minor variations during the course of operations.

The Yellowhead Regional Co-op water system consists of a network of pressure pipelines, booster stations, a pressure reducing station, water storage reservoirs, and meter stations. The YRWC owns the Arden, Austin, MacGregor, Plumas, and Gladstone (yellowhead) water storage reservoirs. The Co-op also owns the Lansdowne, Poplar Bluff and Bagot booster stations, as well as the Westbourne reducing station.

2.1 Water Supply Source

The YRWC receives its treated water supply from the City of Portage la Prairie Water Treatment Plant (City of Portage WTP), which uses the Assiniboine River as the raw water supply. The system provides treated water to the Rural Municipalities of North Norfolk, Westlake-Gladstone, Glenella-Lansdowne and the Towns of Gladstone and MacGregor; and the Villages of Austin, Bagot, Rossendale, Westbourne, Plumas and Arden.

2.2 Water Treatment Plant Process (City of Portage)

- *General Plant Description:*
The city obtains its water from the Assiniboine River. Three 125-hp 265 l/s pumps transfer the raw water from the river impoundment area upstream of the spillway structure to the water treatment plant. The first stage of treatment is a pre-clarification process.
- *Ballasted Flocculation Clarification:*
Is a unique process, where, in addition to various chemicals that are added to promote the coagulation and flocculation (sticking together in big clumps), very fine sand is added to the mix to make the floc (clumps) settle very quickly. This portion removes a large portion of turbidity, organics, and algae, reducing taste odor issues. Potassium permanganate is added as a pre-oxidant. The pre-clarified water is then passed through to the next process.
- *The softening clarifiers:*
Are large circular basins, where hydrated lime and synthetic polymers are added for further coagulation and flocculation. Lime raises the pH to a point where calcium and magnesium are settled out, thus removing hardness from the water. Sodium Hydroxide is also added to the softening clarifiers to aid in the removal of non-carbonate hardness lowering the overall water hardness.
- *Re-carbonation:*
Is the next step, where carbon dioxide is bubbled through the water to form carbonic acid to lower the pH. Stabilizing the pH prevents corrosion or scaling throughout the City's water distribution system. The lowering of the pH also aids in the Ozone process.

- **Ozone:**
Is a strong oxidant that is effective at destroying parasitic organisms such as giardia lamblia and cryptosporidium cysts, and the breakdown of organics. It is also effective in the elimination of viruses and bacteria. This process involves the bubbling of Ozone gas that is produced on site into the water prior to the filters.
- **Calcium Thiosulphate:**
Is added after ozonation, for the removal of excess ozone gas after leaving the ozone contactor chamber.
- **Dual Media Filtration:**
Follows the Ozone disinfection process. The break down of organics promote biologically active filtration which significantly improves further organics removal. The Filters contain Anthracite and Sand media in separate layers for longer filter life and filtering of the water. In 2008 a new stainless-steel under-drain system was installed in the sand filters to promote better filtration and the backwashing of the filters. Organics removal is crucial to the reduction of distribution by-products found in the drinking water supply after chlorination. The filtered water is then passed to a under floor reservoir where the water is then either pumped to the Granular Activated Carbon (GAC) Contactors, continued treatment process, or it is diverted for back washing the dual media filters or the GAC contactors. Using non-chlorinated water for backwashing respects the environment, as the backwash waste is ultimately returned to the river.
- **Granular Activated Carbon Contactors:**
Are utilized as a final polishing step for the ultimate reduction in organics, and for the final taste and odor elimination. The adsorption of organic matter by the activated carbon reduces the amount of chlorine required for final disinfection, which ultimately minimizes disinfection by-products in the drinking water system. New Granular Activated Carbon was installed in the fall of 2008 and the spent GAC was returned for regeneration and reuse instead of shipping to landfill sites.
- **Disinfection:**
Occurs in the Storage Reservoir. Final treatment occurs by adding Chlorine and allowing contact time. Chlorine is added for final disinfection, and a residual is maintained in the distribution system to eliminate any re-growth of pathogenic organisms.
- **Hydrofluosilicic Acid – Fluoride:**
Is added for dental health and an Orthophosphate is added to reduce corrosion within the distribution system. The orthophosphate creates a thin film on the inside of the piping throughout the distribution system and helps prevent lead from leaching into the water supply.
- **Sodium Hydroxide:**
Is added to raise the pH and increase the alkalinity of the water prior to entering the distribution system. The City of Portage la Prairie has two Reservoirs with a third “*Poplar Bluff Industrial Park Reservoir*” being built with anticipation to be completed in the fall of 2023. The first is located at the Water Treatment Plant and the second in the Northwest section of the city and the third and new reservoir is located directly east of Roquette pea processing plant. The reservoir located at the Water Treatment Plant has five 40 horsepower driven pumps to supply water to the McKay Reservoir and the distribution systems of the City of Portage la Prairie and Regional Water Systems. The Water Treatment Plant reservoir also has three 100 horsepower variable speed driven pumps to supply water to the Poplar Bluff Industrial Park and Regional Water Systems. The McKay Reservoir has eight 40 horsepower driven, 70 L/S pumps to supply water to the City of Portage la Prairie distribution system and other regional water systems. The Reservoir at the Water Treatment Plant has a capacity of 4.64 ML and the McKay Reservoir has 9.25 ML capacity.

- **Residuals Solids Management**
Is accomplished via sludge drying beds. The waste sludge, comprised of “unwanted” material removed from the raw water, as well as the chemicals and lime used through the treatment process, is collected and pumped to two 45,000 cubic meter ponds. In these ponds, the sludge settles to the bottom and clarified water is returned to the river.
- **Plant Specifications:**
The Plant type is a Conventional lime softening plant with Pre-clarification, biologically activate dual media filtration, ozone, carbon dioxide for pH adjustment and Granular Activated Carbon filters with chlorine disinfection for the distribution system. Design capacity of 34 million litres/day (net).

2.3 Classification and Certification

- The City of Portage WTP is classified as a Class 4 water treatment facility and a Class 2 Water Distribution facility, and the YHRC water distribution system is classified as a Class 2 water distribution facility.
- The facility classifications are used to determine certification requirements for water system operators, and falls under the Manitoba Environment, Climate and Parks’ *Water and Wastewater Facility Operators Regulation* under the Environment Act.

3. Water System Non-Compliance Incidents (YRWC)

DATE	INCIDENT	OUTCOME
2022	The YRWC met all Water Quality/Treatment standards in 2022	Compliant

4. Drinking Water Safety Orders, Warnings, and Charges

There were no Drinking Water Safety Orders or warnings issued under the Yellowhead licence (258.00), nor were any charges laid on the system.

5. Major Expenses Incurred

Aside from routine maintenance in 2022 the Yellowhead Regional Water Coop contributed financially to a few projects that will benefit the coop in years to come. These projects included 1.) Updating the truck fill systems in MacGregor, Austin, Gladstone, and Arden. 2.) Pumphouse upgrades at the reservoir in the town of Plumas, and 3.) Financially contributing to the new Poplar Bluff Industrial Park Reservoir which will supply water to the Coop once it’s completed in the fall of 2023. The total financial contribution by the Coop in 2022 for these projects totaled \$441,409.00 in capital expenditures.

Also, a mainline water break which occurred ½ mile west of the Poplar Bluff booster was discovered on the 27th of December. The repairs for this leak took place early January and was billed to the coop in 2023 by EF moon construction.

6. YRWC system maintenance (Brief Overview)

- Poplar Bluff Booster- No repairs required.
- Bagot Booster- No repairs required.
- MacGregor Reservoir (100,000gal)
 - In 2022 the Coop installed a new bulk water card reader system as well as a new bulk water pump
 - Also, in April of 2022 the chlorine analyzer water return pump was replaced due to end-of-life service.
- Austin Reservoir (120,000gal) – In 2022 the Coop installed a new bulk water card reader system as well as a new bulk water pump.
- Pressure Reducing Station- In Dec of 2022 we installed a new satellite communication board for the Hightide alarm system to ensure more reliable alarm communications.
- Gladstone Reservoir (500,000 gal)
 - In March of 2022 the Pressure reducing valve which supplies the town of Gladstone water was repaired due to end-of-life service.
 - In April of 2022 the main power wires were repaired on the generator which supplies emergency backup power to the wtp in power outage situations
 - Also, in April of 2022 we had Cobbes plumbing perform maintenance on the Gladstone standby pump.
 - In May 2022 we installed a VPN device at the Gladstone water plant. This allows operators to login remotely to view live flows and pressures as well as other conditions in the water plant.
 - In August of 2022 the Coop installed a card reader system for the bulk water at the Gladstone wtp.
- Lansdowne Booter- In April some repairs were completed in the Lansdowne booter on the VFD's and distribution pipes.
- Plumas Reservoir (90,000 gal) –
 - Planning continues to take place for future upgrades to the Plumas reservoir
 - In October of 2022 a new distribution pump was installed in the Plumas reservoir due to end-of-life service.
- Arden Reservoir (35,000gal) – In November of 2022 the coop installed a new up to date truck fill card reader system.

7. Future System Expansion

- *POPLAR BLUFF INDUSTRIAL PARK RESERVOIR AND PUMPHOUSE:*

The Yellowhead Water Coop board in cooperation with the Manitoba Water Services Board, City of Portage, and the RM of Portage continue plans to build a water storage reservoir in the RM of Portage la Prairie. This reservoir will increase storage capacity for the city as well as improve the reliability of water supply to the entire YRWC. The new reservoir is to be constructed at the Poplar Bluff Industrial Park (PBIP) site, immediately east of the Roquette site and west of the Portage Diversion channel. The proposed PBIP reservoir will be sized to meet both the industrial and regional demands as well as meet the required residual pressure at the respective facilities based on the supplementary distribution pumping system at this site. In addition, it is also indicated that the existing 450 mm dia. supply pipeline from the City's WTP to new reservoir in PBIP would be twinned. This would ensure an uninterrupted supply of water in case one of the supply lines required repairs. Construction began in the late summer of 2022 and is anticipated to be completed in the fall of 2023.

List of Water Quality Standards

The Province of Manitoba has adopted a number of water quality standards from the Health Canada *Guidelines for Canadian Drinking Water Quality*. The health-based parameters express the maximum acceptable concentrations for drinking water. Concentration values in excess of the guidelines constitute a health-related issue and require corrective actions. Public water systems are required to monitor chlorine levels and undertake regular bacterial testing.

All health-based parameters were within the limits in 2022 for the YHRC Water System (coc258.00), excluding Municipalities of North Norfolk (coc151.50) and Lansdowne Glenella (coc6.25). In previous years a compliance plan has been required to address elevated THM levels, which mainly consists of the combination of further operational changes and mechanical upgrades to the City of Portage WTP to improve organics removal and reduce THM formation potential. In 2018 the YHRC completed a pilot project to use specific aeration equipment (PAX) to target and decrease THM in the treated water which installed at the Plumas Reservoir. This system is still in operation and continues to lower THM's in the Plumas distribution system. Efforts continue to lower THM levels through out the whole system

The Manitoba health-based standards for THM and HAA are 100 µg/L (micrograms per liter) and 80 µg/L, respectively. Both THM and HAA are by-products of disinfection, where chlorine combines with trace amounts of organics in the water. THM and HAA levels in the YRWC distribution system are sampled every second year, they were monitored again 2022 and scheduled again in 2024. Below are the water quality and treatment standards as well as the water quality monitoring requirements for the Yellowhead Regional Water Coop for 2022.

Test results are shown in **Appendix A**.

Water Quality/Treatment Standards

Parameter	Quality Standard	Compliance
Total Coliform	Less than one total coliform bacteria detectable per 100mL in all distributed water	100%
E. coli	Less than one E. coli bacteria detectable per 100mL in all distributed water	100%
Chlorine Residual	A free Chlorine residual of at least 0.1mg/L at all times at any point in the water distribution system	100%
Total Trihalomethanes (THM's)	Less than or equal to 0.10 mg/L as locational annual average of quarterly samples	Compliant
Total Haloacetic acids (HAA's)	Less than or equal to 0.08 mg/L as locational annual average of quarterly samples	Compliant
Lead	Less than or equal to 0.005 mg/L in the water distribution system	n/a
Manganese	Less than or equal to 0.12 mg/L	Compliant

Water Quality Monitoring Requirements

Parameter	Monitoring Requirement	Compliance
Bacteriological (total coliform and E. coli)	<p>Biweekly sampling program with each set of samples consisting of a minimum of eight (8) distribution samples from the following.</p> <ul style="list-style-type: none"> Water entering the reservoir at Gladstone Water entering the reservoirs at Arden, Austin, MacGregor, and Plumas (two samples shall be alternated each sampling period) Water leaving the Arden, Austin, Gladstone, MacGregor and Plumas reservoirs <p>Consecutive sample sets to be separated by at least 12 days</p>	100%
Free chlorine (distribution system)	<ul style="list-style-type: none"> One sample per day of water entering the Yellowhead distribution system at the Poplar Bluff booster station One sample per day of water leaving the Arden, Austin, MacGregor and Plumas Reservoirs Continuous sampling of water entering the regional distribution system from the Gladstone reservoir A confirmatory sample to be taken daily at the online chlorine analyzer sampling point of water entering the regional distribution system from the Gladstone Reservoir At the same times and location(s) as bacteriological distribution system sampling 	100%

Total chlorine (distribution system)	<ul style="list-style-type: none"> • One sample per day of water entering the Yellowhead distribution system at the Poplar Bluff booster station • One sample per day of water leaving the Arden, Austin, MacGregor and Plumas reservoir • One confirmatory sample per day of water entering the regional distribution system from the Gladstone reservoir • At the same times and location(s) as bacteriological distribution system sampling 	100%
Total Metals	One Sample every two years at mid-point in the distribution system	Compliant
Total Trihalomethanes	One preserved distribution system sample taken on a quarterly basis during February, May, August, and November, every second year at the furthest point in the distribution system.	Compliant
Total Haloacetic acids (HAA's) (distribution system)	One preserved distribution system sample taken on a quarterly basis during February, May, August, and November, every second year at a mid point in the distribution system.	Compliant
Lead	As per the instructions of the Drinking Water Officer	n/a
Manganese	One Distribution Sample taken every year	Compliant
Other Parameters	As per the instructions of the Drinking Water Officer	n/a

Appendix A

Bacterial, THM & HAA Results

Chlorine Residual Analysis

Water Chemistry Results



Collection Date	Sample identification	TC	EC	CL2	CL2	HPC
M/D/Y				Free	Total	
1/4/2022	Yellowhead 3 Dist - Gladstone Outgoing	0	0	1.64	1.96	
1/4/2022	Yellowhead 3 Dist - Plumus Outgoing	0	0	1.12	1.53	
1/4/2022	Yellowhead 3 Dist - Gladstone Incoming	0	0	0.81	1.12	
1/5/2022	Yellowhead 3 Dist - MacGregor Outgoing	0	0	0.94	1.38	
1/5/2022	Yellowhead 3 Dist - MacGregor Incoming	0	0	1.02	1.44	
1/5/2022	Yellowhead 3 Dist - Austin Incoming	0	0	0.89	1.25	
1/5/2022	Yellowhead 3 Dist - Austin Outgoing	0	0	1.48	1.81	
1/17/2022	Yellowhead 3 Dist - MacGregor Outgoing	0	0	1.18	1.6	
1/17/2022	Yellowhead 3 Dist - Austin Outgoing	0	0	1.37	1.63	
1/17/2022	Yellowhead 3 Dist - Arden Outgoing	0	0	1.1	2.1	
1/17/2022	Yellowhead 3 Dist - Arden Incoming	0	0	0.6	1.2	
1/19/2022	Yellowhead 3 Dist - Gladstone Outgoing	0	0	1.5	1.47	
1/19/2022	Yellowhead 3 Dist - Plumus Outgoing	0	0	1.07	1.56	
1/19/2022	Yellowhead 3 Dist - Gladstone Incoming	0	0	0.36	0.67	
1/19/2022	Yellowhead 3 Dist - Plumas Incoming	0	0	1.68	1.91	
2/2/2022	Yellowhead 3 Dist - Gladstone Outgoing	0	0	1.29	1.67	
2/2/2022	Yellowhead 3 Dist - Plumus Outgoing	0	0	0.83	1.33	
2/2/2022	Yellowhead 3 Dist - Gladstone Incoming	0	0	0.56	0.89	
2/2/2022	Yellowhead 3 Dist - MacGregor Outgoing	0	0	0.82	1.18	
2/2/2022	Yellowhead 3 Dist - MacGregor Incoming	0	0	0.79	1.14	
2/2/2022	Yellowhead 3 Dist - Austin Incoming	0	0	0.98	1.27	
2/2/2022	Yellowhead 3 Dist - Austin Outgoing	0	0	1.31	1.57	
2/2/2022	Yellowhead 3 Dist - Arden Outgoing	0	0	1.1	1.6	
2/15/2022	Yellowhead 3 Dist - Gladstone Outgoing	0	0	1.9	2.2	
2/15/2022	Yellowhead 3 Dist - Plumus Outgoing	0	0	1.13	1.52	
2/15/2022	Yellowhead 3 Dist - Gladstone Incoming	0	0	0.93	1.47	
2/15/2022	Yellowhead 3 Dist - Plumas Incoming	0	0	0.77	1.2	
2/16/2022	Yellowhead 3 Dist - MacGregor Outgoing	0	0	1.32	1.6	
2/16/2022	Yellowhead 3 Dist - Austin Outgoing	0	0	1.97	2.2	
2/16/2022	Yellowhead 3 Dist - Arden Outgoing	frozen	frozen	1.1	1.8	
2/16/2022	Yellowhead 3 Dist - Arden Incoming	0	0	1.1	1.6	
2/17/2022	Yellowhead 3 Dist - Arden Outgoing	0	0	0.9	1.5	
2/28/2022	Yellowhead 3 Dist - Arden Outgoing	0	0	1.5	2.2	
2/28/2022	Yellowhead 3 Dist - MacGregor Outgoing	0	0	1.14	1.58	
2/28/2022	Yellowhead 3 Dist - MacGregor Incoming	0	0	0.97	1.40	
2/28/2022	Yellowhead 3 Dist - Austin Incoming	0	0	0.92	1.43	
2/28/2022	Yellowhead 3 Dist - Austin Outgoing	0	0	1.51	1.91	
3/1/2022	Yellowhead 3 Dist - Gladstone Outgoing	0	0	1.23	1.58	
3/1/2022	Yellowhead 3 Dist - Plumus Outgoing	0	0	0.81	1.25	
3/1/2022	Yellowhead 3 Dist - Gladstone Incoming	0	0	0.35	0.88	
3/14/2022	Yellowhead 3 Dist - MacGregor Outgoing	0	0	1.01	1.37	

3/14/2022	Yellowhead 3 Dist - Austin Outgoing	0	0	1.23	1.72
3/15/2022	Yellowhead 3 Dist - Gladstone Outgoing	0	0	1.21	1.66
3/15/2022	Yellowhead 3 Dist - Plumus Outgoing	0	0	0.85	1.23
3/15/2022	Yellowhead 3 Dist - Gladstone Incoming	0	0	0.75	1.33
3/15/2022	Yellowhead 3 Dist - Plumas Incoming	0	0	0.84	1.35
3/15/2022	Yellowhead 3 Dist - Arden Outgoing	0	0	1.4	2.2
3/15/2022	Yellowhead 3 Dist - Arden Incoming	0	0	1.9	2.7
3/28/2022	Yellowhead 3 Dist - MacGregor Outgoing	0	0	1.09	1.46
3/28/2022	Yellowhead 3 Dist - MacGregor Incoming	0	0	0.98	1.37
3/28/2022	Yellowhead 3 Dist - Austin Incoming	0	0	0.72	1.19
3/28/2022	Yellowhead 3 Dist - Austin Outgoing	0	0	1.54	2.15
3/29/2022	Yellowhead 3 Dist - Gladstone Outgoing	0	0	1.06	1.47
3/29/2022	Yellowhead 3 Dist - Plumus Outgoing	0	0	0.62	1
3/29/2022	Yellowhead 3 Dist - Gladstone Incoming	0	0	0.58	1.09
3/29/2022	Yellowhead 3 Dist - Arden Outgoing	0	0	1.2	2.1
4/11/2022	Yellowhead 3 Dist - MacGregor Outgoing	0	0	1.09	1.47
4/11/2022	Yellowhead 3 Dist - Austin Outgoing	0	0	1.2	1.65
4/12/2022	Yellowhead 3 Dist - Gladstone Outgoing	0	0	0.94	1.41
4/12/2022	Yellowhead 3 Dist - Plumus Outgoing	0	0	1.8	2.2
4/12/2022	Yellowhead 3 Dist - Gladstone Incoming	0	0	0.47	1.14
4/12/2022	Yellowhead 3 Dist - Plumas Incoming	0	0	0.63	1.22
4/11/2022	Yellowhead 3 Dist - Arden Outgoing	0	0	1.4	2.2
4/11/2022	Yellowhead 3 Dist - Arden Incoming	0	0	1.9	2.7
4/25/2022	Yellowhead 3 Dist - MacGregor Outgoing	0	0	1.17	1.52
4/25/2022	Yellowhead 3 Dist - MacGregor Incoming	0	0	1.03	1.41
4/25/2022	Yellowhead 3 Dist - Austin Incoming	0	0	1.01	1.32
4/25/2022	Yellowhead 3 Dist - Austin Outgoing	0	0	1.18	1.51
4/26/2022	Yellowhead 3 Dist - Gladstone Outgoing	0	0	1.09	1.45
4/26/2022	Yellowhead 3 Dist - Plumus Outgoing	0	0	1.37	1.78
4/26/2022	Yellowhead 3 Dist - Gladstone Incoming	0	0	0.45	0.76
4/27/2022	Yellowhead 3 Dist - Arden Outgoing	0	0	1.2	2.1
5/9/2022	Yellowhead 3 Dist - MacGregor Outgoing	0	0	1.21	1.45
5/9/2022	Yellowhead 3 Dist - Austin Outgoing	0	0	1.41	1.81
5/10/2022	Yellowhead 3 Dist - Gladstone Outgoing	0	0	1.21	1.56
5/10/2022	Yellowhead 3 Dist - Plumus Outgoing	0	0	1.45	1.8
5/10/2022	Yellowhead 3 Dist - Gladstone Incoming	0	0	0.44	0.73
5/10/2022	Yellowhead 3 Dist - Plumas Incoming	0	0	1.49	2.14
5/10/2022	Yellowhead 3 Dist - Arden Outgoing	0	0	0.9	1.5
5/10/2022	Yellowhead 3 Dist - Arden Incoming	0	0	0.9	1.5
5/25/2022	Yellowhead 3 Dist - MacGregor Outgoing	0	0	1.1	1.45
5/25/2022	Yellowhead 3 Dist - MacGregor Incoming	0	0	1.01	1.38
5/25/2022	Yellowhead 3 Dist - Austin Incoming	0	0	0.9	1.49
5/25/2022	Yellowhead 3 Dist - Austin Outgoing	0	0	1.33	1.9
5/25/2022	Yellowhead 3 Dist - Gladstone Outgoing	0	0	1.01	1.36

5/25/2022	Yellowhead 3 Dist - Plumus Outgoing	0	0	0.91	1.39
5/25/2022	Yellowhead 3 Dist - Gladstone Incoming	0	0	0.39	0.77
5/25/2022	Yellowhead 3 Dist - Arden Outgoing	0	0	1	1.3
6/6/2022	Yellowhead 3 Dist - MacGregor Outgoing	0	0	1.01	1.31
6/6/2022	Yellowhead 3 Dist - Austin Outgoing	0	0	1.67	2.2
6/7/2022	Yellowhead 3 Dist - Arden Outgoing	0	0	1	1.9
6/7/2022	Yellowhead 3 Dist - Arden Incoming	0	0	1.3	1.9
6/7/2022	Yellowhead 3 Dist - Gladstone Outgoing	0	0	1.24	1.79
6/7/2022	Yellowhead 3 Dist - Plumus Outgoing	0	0	0.76	0.96
6/7/2022	Yellowhead 3 Dist - Gladstone Incoming	0	0	0.47	0.92
6/7/2022	Yellowhead 3 Dist - Plumas Incoming	0	0	1.1	1.52
6/7/2022	Yellowhead 3 Dist - Arden Outgoing	0	0	1	1.9
6/7/2022	Yellowhead 3 Dist - Arden Incoming	0	0	1.3	1.9
6/20/2022	Yellowhead 3 Dist - MacGregor Outgoing	0	0	1.02	1.45
6/20/2022	Yellowhead 3 Dist - MacGregor Incoming	0	0	0.99	1.41
6/20/2022	Yellowhead 3 Dist - Austin Incoming	0	0	0.83	1.26
6/20/2022	Yellowhead 3 Dist - Austin Outgoing	0	0	1.23	1.68
6/20/2022	Yellowhead 3 Dist - Arden Outgoing	0	0	0.9	1.5
6/21/2022	Yellowhead 3 Dist - Gladstone Outgoing	0	0	0.67	1.04
6/21/2022	Yellowhead 3 Dist - Plumus Outgoing	0	0	0.57	0.85
6/21/2022	Yellowhead 3 Dist - Gladstone Incoming	0	0	0.44	0.78
7/4/2022	Yellowhead 3 Dist - MacGregor Outgoing	0	0	0.99	1.27
7/4/2022	Yellowhead 3 Dist - Austin Outgoing	0	0	1.05	1.6
7/5/2022	Yellowhead 3 Dist - Gladstone Outgoing	0	0	0.9	1.23
7/5/2022	Yellowhead 3 Dist - Plumus Outgoing	0	0	0.96	1.11
7/5/2022	Yellowhead 3 Dist - Gladstone Incoming	0	0	0.24	0.61
7/5/2022	Yellowhead 3 Dist - Plumas Incoming	0	0	1.3	1.47
7/5/2022	Yellowhead 3 Dist - Arden Outgoing	0	0	1.2	1.7
7/5/2022	Yellowhead 3 Dist - Arden Incoming	0	0	2.2	3.4
7/18/2022	Yellowhead 3 Dist - MacGregor Outgoing	0	0	1.03	1.38
7/18/2022	Yellowhead 3 Dist - MacGregor Incoming	0	0	0.76	1.21
7/18/2022	Yellowhead 3 Dist - Austin Incoming	0	0	0.6	1.06
7/18/2022	Yellowhead 3 Dist - Austin Outgoing	0	0	1.11	1.63
7/19/2022	Yellowhead 3 Dist - Arden Outgoing	0	0	1	1.8
7/19/2022	Yellowhead 3 Dist - Gladstone Outgoing	0	0	1.12	1.49
7/19/2022	Yellowhead 3 Dist - Plumus Outgoing	0	0	1.27	1.45
7/19/2022	Yellowhead 3 Dist - Gladstone Incoming	0	0	0.46	0.63
8/2/2022	Yellowhead 3 Dist - Arden Outgoing	0	0	1	2.1
8/2/2022	Yellowhead 3 Dist - Arden Incoming	0	0	0.6	1.4
8/3/2022	Yellowhead 3 Dist - Gladstone Outgoing	0	0	1.1	1.57
8/3/2022	Yellowhead 3 Dist - Plumus Outgoing	0	0	1.06	1.48
8/3/2022	Yellowhead 3 Dist - Gladstone Incoming	0	0	0.21	0.89
8/3/2022	Yellowhead 3 Dist - Plumas Incoming	0	0	0.38	0.89
8/3/2022	Yellowhead 3 Dist - MacGregor Outgoing	0	0	0.87	1.27

8/3/2022	Yellowhead 3 Dist - Austin Outgoing	0	0	0.99	1.48
8/16/2022	Yellowhead 3 Dist - Gladstone Outgoing	0	0	0.92	1.21
8/16/2022	Yellowhead 3 Dist - Plumus Outgoing	0	0	0.55	0.95
8/16/2022	Yellowhead 3 Dist - Gladstone Incoming	0	0	0.35	0.7
8/16/2022	Yellowhead 3 Dist - Arden Outgoing	0	0	1.4	2.1
8/17/2022	Yellowhead 3 Dist - MacGregor Outgoing	0	0	1.07	1.45
8/17/2022	Yellowhead 3 Dist - MacGregor Incoming	0	0	0.81	1.1
8/17/2022	Yellowhead 3 Dist - Austin Incoming	0	0	0.5	1.02
8/17/2022	Yellowhead 3 Dist - Austin Outgoing	0	0	1.19	1.71
8/29/2022	Yellowhead 3 Dist - Arden Outgoing	0	0	1.3	2.3
8/29/2022	Yellowhead 3 Dist - Arden Incoming	0	0	0.6	1.1
8/29/2022	Yellowhead 3 Dist - MacGregor Outgoing	0	0	1.22	1.58
8/29/2022	Yellowhead 3 Dist - Austin Outgoing	0	0	1.01	1.5
8/30/2022	Yellowhead 3 Dist - Gladstone Outgoing	0	0	1.12	1.53
8/30/2022	Yellowhead 3 Dist - Plumus Outgoing	0	0	1.65	2.1
8/30/2022	Yellowhead 3 Dist - Gladstone Incoming	0	0	0.26	0.63
8/30/2022	Yellowhead 3 Dist - Plumas Incoming	0	0	0.28	0.68
9/12/2022	Yellowhead 3 Dist - MacGregor Outgoing	0	0	1.21	1.53
9/12/2022	Yellowhead 3 Dist - MacGregor Incoming	0	0	1.05	1.42
9/12/2022	Yellowhead 3 Dist - Austin Incoming	0	0	0.89	1.39
9/12/2022	Yellowhead 3 Dist - Austin Outgoing	0	0	1.14	1.61
9/13/2022	Yellowhead 3 Dist - Arden Outgoing	0	0	1.5	2.6
9/13/2022	Yellowhead 3 Dist - Gladstone Outgoing	0	0	1.17	1.62
9/13/2022	Yellowhead 3 Dist - Plumus Outgoing	0	0	0.65	1.05
9/13/2022	Yellowhead 3 Dist - Gladstone Incoming	0	0	0.78	1.22
9/26/2022	Yellowhead 3 Dist - MacGregor Outgoing	0	0	0.81	1.18
9/26/2022	Yellowhead 3 Dist - Austin Outgoing	0	0	1.22	1.7
9/27/2022	Yellowhead 3 Dist - Gladstone Outgoing	0	0	1.32	1.75
9/27/2022	Yellowhead 3 Dist - Plumus Outgoing	0	0	0.95	1.42
9/27/2022	Yellowhead 3 Dist - Gladstone Incoming	0	0	1.78	2.1
9/27/2022	Yellowhead 3 Dist - Plumas Incoming	0	0	1.5	1.87
9/27/2022	Yellowhead 3 Dist - Arden Outgoing	0	0	1.2	1.7
9/27/2022	Yellowhead 3 Dist - Arden Incoming	0	0	1.1	1.7
10/11/2022	Yellowhead 3 Dist - Arden Outgoing	0	0	1	1.6
10/12/2022	Yellowhead 3 Dist - Gladstone Outgoing	0	0	1.18	1.37
10/12/2022	Yellowhead 3 Dist - Plumus Outgoing	0	0	0.99	1.33
10/12/2022	Yellowhead 3 Dist - Gladstone Incoming	0	0	0.47	0.8
10/12/2022	Yellowhead 3 Dist - MacGregor Outgoing	0	0	0.92	1.2
10/12/2022	Yellowhead 3 Dist - MacGregor Incoming	0	0	0.42	0.74
10/12/2022	Yellowhead 3 Dist - Austin Incoming	0	0	0.53	0.91
10/12/2022	Yellowhead 3 Dist - Austin Outgoing	0	0	1.21	1.63
10/24/2022	Yellowhead 3 Dist - MacGregor Outgoing	0	0	0.87	1.13
10/24/2022	Yellowhead 3 Dist - Austin Outgoing	0	0	0.52	0.86
10/25/2022	Yellowhead 3 Dist - Gladstone Outgoing	0	0	1.67	1.93

10/25/2022	Yellowhead 3 Dist - Plumus Outgoing	0	0	1.02	1.23
10/25/2022	Yellowhead 3 Dist - Gladstone Incoming	0	0	2.2	2.2
10/25/2022	Yellowhead 3 Dist - Plumas Incoming	0	0	1.7	1.98
10/25/2022	Yellowhead 3 Dist - Arden Outgoing	0	0	1.2	1.8
10/25/2022	Yellowhead 3 Dist - Arden Incoming	0	0	0.8	1.4
11/8/2022	Yellowhead 3 Dist - Gladstone Outgoing	0	0	1.3	1.68
11/8/2022	Yellowhead 3 Dist - Plumus Outgoing	0	0	1.23	1.62
11/8/2022	Yellowhead 3 Dist - Gladstone Incoming	0	0	0.6	1.1
11/8/2022	Yellowhead 3 Dist - Arden Outgoing	0	0	1.2	1.8
11/9/2022	Yellowhead 3 Dist - MacGregor Outgoing	0	0	1.05	1.41
11/9/2022	Yellowhead 3 Dist - MacGregor Incoming	0	0	0.49	0.96
11/9/2022	Yellowhead 3 Dist - Austin Incoming	0	0	0.89	1.16
11/9/2022	Yellowhead 3 Dist - Austin Outgoing	0	0	0.93	1.21
11/21/2022	Yellowhead 3 Dist - MacGregor Outgoing	0	0	0.93	1.52
11/21/2022	Yellowhead 3 Dist - Austin Outgoing	0	0	1.45	1.87
11/22/2022	Yellowhead 3 Dist - Arden Outgoing	0	0	0.8	1.6
11/22/2022	Yellowhead 3 Dist - Arden Incoming	0	0	0.4	0.9
11/22/2022	Yellowhead 3 Dist - Gladstone Outgoing	0	0	1.3	1.86
11/22/2022	Yellowhead 3 Dist - Plumus Outgoing	0	0	1.22	1.73
11/22/2022	Yellowhead 3 Dist - Gladstone Incoming	0	0	0.24	0.57
11/22/2022	Yellowhead 3 Dist - Plumas Incoming	0	0	0.75	1.25
12/5/2022	Yellowhead 3 Dist - MacGregor Outgoing	0	0	0.98	1.42
12/5/2022	Yellowhead 3 Dist - MacGregor Incoming	0	0	0.69	1.06
12/5/2022	Yellowhead 3 Dist - Austin Incoming	0	0	0.84	1.22
12/5/2022	Yellowhead 3 Dist - Austin Outgoing	0	0	1.39	1.63
12/5/2022	Yellowhead 3 Dist - Gladstone Outgoing	0	0	2.1	2.2
12/5/2022	Yellowhead 3 Dist - Plumus Outgoing	0	0	0.8	1.27
12/5/2022	Yellowhead 3 Dist - Gladstone Incoming	0	0	0.95	1.7
12/6/2022	Yellowhead 3 Dist - Arden Outgoing	0	0	0.8	1.5
12/19/2022	Yellowhead 3 Dist - MacGregor Outgoing	0	0	0.9	1.35
12/19/2022	Yellowhead 3 Dist - Austin Outgoing	0	0	1.07	1.58
12/20/2022	Yellowhead 3 Dist - Gladstone Outgoing	0	0	1.31	1.89
12/20/2022	Yellowhead 3 Dist - Plumus Outgoing	0	0	1.6	2.2
12/20/2022	Yellowhead 3 Dist - Gladstone Incoming	0	0	0.47	0.99
12/20/2022	Yellowhead 3 Dist - Plumas Incoming	0	0	0.45	0.91
12/20/2022	Yellowhead 3 Dist - Arden Outgoing	0	0	1.1	1.8
12/20/2022	Yellowhead 3 Dist - Arden Incoming	0	0	0.7	1.4

Trihalomethane (THM) 2022 results

**** Next Sampling Year 2024****

WATER SYSTEM NAME	CODE	FEB	MAY	AUG	NOV	AVG THM (µg/L)
Municipality of North Norfolk	151.50	112	99.9	185	142	134.73
Municipality of Glenella-Lansdowne (@ Arden)	6.25	116	114	169	176	143.75
Municipality of Westlake-Gladstone (@ Plumas)	247.20	89.7	51.5	196	49.8	96.75
Yellowhead Regional	258.00	112	48.9	163	47.8	92.93
(Source - City PLaP - 171.00)						

Notes:

- All results reported in µg/l
- THM Annual Average Maximum Allowable Concentration = 100 µg/l

Haloacetic Acids (HAA) 2022 results

**** Next Sampling Year 2024****

WATER SYSTEM NAME	CODE	FEB	MAY	AUG	NOV	AVG HAA (µg/L)
Municipality of North Norfolk	151.50	12.2	41.3	63.9	46	40.85
Municipality of Glenella-Lansdowne (@ Arden)	6.25	24.4	83.5	43.8	23.6	43.83
Municipality of Westlake-Gladstone (@ Plumas)	247.20	31.5	70.4	101	66.4	67.33
Yellowhead Regional	258.00	17.1	45.9	67.9	25.7	39.2
(Source - City PLaP - 171.00)						

Notes:

- All results reported in µg/l
- HAA Annual Average Maximum Allowable Concentration = 80 µg/l



Office of Drinking Water

ATTN: HALEY CHAMPAGNE
25 Tupper Street N
Portage la Prairie MB R1N 3K1

Date Received: 21-SEP-22

Report Date: 29-SEP-22 09:43 (MT)
Version: FINAL

Client Phone: 204-901-4947

Certificate of Analysis

Lab Work Order #: L2733820

Project P.O. #:

Contract#: 5648 (MICROCHEM)

Job Reference:

YELLOWHEAD REGIONAL WATER CO-OP - PWS -
258.00

C of C Numbers:

Legal Site Desc:

42844

Hua Wo
Chemistry Laboratory Manager

[This report shall not be reproduced except in full without the written authority of the Laboratory.]

ADDRESS: 1329 Niakwa Road East, Unit 12, Winnipeg, MB R2J 3T4 Canada | Phone: +1 204 255 9720 | Fax: +1 204 255 9721
ALS CANADA LTD Part of the ALS Group An ALS Limited Company

Environmental 

www.alsglobal.com

RIGHT SOLUTIONS RIGHT PARTNER

		ALS ID		L2733820-1
		Sampled Date		21-SEP-22
		Sampled Time		12:40
		Sample ID		YELLOWHEAD 3
Analyte	Unit	Guide Limit #1	Guide Limit #2	- DISTRIBUTION @ MIDPOINT
Aluminum (Al)-Total	mg/L	0.1	2.9	0.0068
Antimony (Sb)-Total	mg/L	-	0.006	0.00033
Arsenic (As)-Total	mg/L	-	0.01	0.00066
Barium (Ba)-Total	mg/L	-	2	0.0277
Beryllium (Be)-Total	mg/L	-	-	<0.00010
Bismuth (Bi)-Total	mg/L	-	-	<0.000050
Boron (B)-Total	mg/L	-	5	0.060
Cadmium (Cd)-Total	mg/L	-	0.005	<0.0000050
Calcium (Ca)-Total	mg/L	-	-	60.0
Cesium (Cs)-Total	mg/L	-	-	0.000035
Chromium (Cr)-Total	mg/L	-	0.05	0.00068
Cobalt (Co)-Total	mg/L	-	-	<0.00010
Copper (Cu)-Total	mg/L	1	2	0.118
Iron (Fe)-Total	mg/L	0.3	-	<0.010
Lead (Pb)-Total	mg/L	-	0.005	0.000349
Lithium (Li)-Total	mg/L	-	-	0.0625
Magnesium (Mg)-Total	mg/L	-	-	11.3
Manganese (Mn)-Total	mg/L	0.02	0.12	<0.00010
Molybdenum (Mo)-Total	mg/L	-	-	0.00340
Nickel (Ni)-Total	mg/L	-	-	0.00118
Phosphorus (P)-Total	mg/L	-	-	<0.030
Potassium (K)-Total	mg/L	-	-	11.3
Rubidium (Rb)-Total	mg/L	-	-	0.00337
Selenium (Se)-Total	mg/L	-	0.05	0.000423
Silicon (Si)-Total	mg/L	-	-	2.67
Silver (Ag)-Total	mg/L	-	-	<0.000010
Sodium (Na)-Total	mg/L	200	-	67.5
Strontium (Sr)-Total	mg/L	-	7	0.197
Sulfur (S)-Total	mg/L	-	-	76.3
Tellurium (Te)-Total	mg/L	-	-	<0.00020
Thallium (Tl)-Total	mg/L	-	-	<0.000010
Thorium (Th)-Total	mg/L	-	-	<0.00010
Tin (Sn)-Total	mg/L	-	-	<0.00010

Federal Guidelines for Canadian Drinking Water Quality (MAR, 2021)#1: GCDWQ - Aesthetic Objective/Other Value (Jan.2020)

#2: GCDWQ - Maximum Acceptable Concentrations (MACs-Jan.2020)



Detection Limit for result exceeds Guide Limit. Assessment against Guide Limit cannot be made.
Analytical result for this parameter exceeds Guide Limit listed on this report.

		ALS ID		L2733820-1
		Sampled Date		21-SEP-22
		Sampled Time		12:40
		Sample ID		YELLOWHEAD 3
Analyte	Unit	Guide Limit #1	Guide Limit #2	- DISTRIBUTION @ MIDPOINT
Titanium (Ti)-Total	mg/L	-	-	<0.00030
Tungsten (W)-Total	mg/L	-	-	<0.00010
Uranium (U)-Total	mg/L	-	0.02	0.000035
Vanadium (V)-Total	mg/L	-	-	0.00115
Zinc (Zn)-Total	mg/L	5	-	0.0116
Zirconium (Zr)-Total	mg/L	-	-	<0.00020

Federal Guidelines for Canadian Drinking Water Quality (MAR, 2021)#1: GCDWQ - Aesthetic Objective/Other Value (Jan.2020)

#2: GCDWQ - Maximum Acceptable Concentrations (MACs-Jan.2020)



Detection Limit for result exceeds Guide Limit. Assessment against Guide Limit cannot be made.
Analytical result for this parameter exceeds Guide Limit listed on this report.



City of Portage la Prairie - Portage la
Prairie - PWS
ATTN: JARED SMITH
Portage la Prairie Regional - PWS
97 Saskatchewan Avenue East
Portage la Prairie MB R1N 0L8

Date Received: 09-DEC-22
Report Date: 22-DEC-22 11:49 (MT)
Version: FINAL

Client Phone: 204-239-8372

Certificate of Analysis

Lab Work Order #: L2742792
Project P.O. #: NOT SUBMITTED
Job Reference: PORTAGE LA PRAIRIE - PWS 171.00
C of C Numbers:
Legal Site Desc: 28564

Craig Reddell, B.Sc.Ag
Account Manager

[This report shall not be reproduced except in full without the written authority of the Laboratory.]

ADDRESS: 1329 Niakwa Road East, Unit 12, Winnipeg, MB R2J 3T4 Canada | Phone: +1 204 255 9720 | Fax: +1 204 255 9721
ALS CANADA LTD Part of the ALS Group An ALS Limited Company

Environmental 

www.alsglobal.com

RIGHT SOLUTIONS RIGHT PARTNER

Physical Tests (WATER)

		ALS ID		L2742792-1	L2742792-2
		Sampled Date		08-DEC-22	08-DEC-22
		Sampled Time		11:30	11:20
		Sample ID		PORTAGE LA PRAIRIE 1 - RAW	PORTAGE LA PRAIRIE 2 - TREATED
Analyte	Unit	Guide Limit #1	Guide Limit #2		
Colour, True	CU	15	-	19.5 ^{HTD}	<5.0 ^{HTD}
Conductivity	umhos/cm	-	-	1320	967
Hardness (as CaCO3)	mg/L	-	-	574 ^{HTC}	239 ^{HTC}
Langelier Index (4 C)	No Unit	-	-	1.3	-0.42
Langelier Index (60 C)	No Unit	-	-	2.0	0.34
pH	pH units	7.00-10.5	-	8.47	7.82
Total Dissolved Solids	mg/L	500	-	896	635
Transmittance, UV (254 nm)	%T/cm	-	-	52.1	84.5
Turbidity	NTU	-	-	24.4	<0.10

Federal Guidelines for Canadian Drinking Water Quality (MAR, 2021)

#1: GCDWQ - Aesthetic Objective/Other Value (Jan.2020)

#2: GCDWQ - Maximum Acceptable Concentrations (MACs-Jan.2020)

Anions and Nutrients (WATER)

		ALS ID		L2742792-1	L2742792-2
		Sampled Date		08-DEC-22	08-DEC-22
		Sampled Time		11:30	11:20
		Sample ID		PORTAGE LA PRAIRIE 1 - RAW	PORTAGE LA PRAIRIE 2 - TREATED
Analyte	Unit	Guide Limit #1	Guide Limit #2		
Alkalinity, Total (as CaCO3)	mg/L	-	-	383	74.0
Ammonia, Total (as N)	mg/L	-	-	0.041	0.020
Bicarbonate (HCO3)	mg/L	-	-	445	90.3
Bromate	mg/L	-	0.01		<0.00078 ^{DLM}
Bromide (Br)	mg/L	-	-	0.074	0.040
Carbonate (CO3)	mg/L	-	-	10.9	<0.60
Chloride (Cl)	mg/L	250	-	39.8	45.8
Fluoride (F)	mg/L	-	1.5	0.19	0.624
Hydroxide (OH)	mg/L	-	-	<0.34	<0.34
Nitrate (as N)	mg/L	-	10	0.383	0.395
Nitrite (as N)	mg/L	-	1	<0.0050 ^{DLM}	<0.0020 ^{DLM}
Sulfate (SO4)	mg/L	500	-	329	325

Federal Guidelines for Canadian Drinking Water Quality (MAR, 2021)

#1: GCDWQ - Aesthetic Objective/Other Value (Jan.2020)

#2: GCDWQ - Maximum Acceptable Concentrations (MACs-Jan.2020)

Organic / Inorganic Carbon (WATER)

		ALS ID		L2742792-1	L2742792-2
		Sampled Date		08-DEC-22	08-DEC-22
		Sampled Time		11:30	11:20
		Sample ID		PORTAGE LA PRAIRIE 1 - RAW	PORTAGE LA PRAIRIE 2 - TREATED
Analyte	Unit	Guide Limit #1	Guide Limit #2		
Dissolved Organic Carbon	mg/L	-	-	11.6	7.12
Total Organic Carbon	mg/L	-	-	11.8	6.86

Federal Guidelines for Canadian Drinking Water Quality (MAR, 2021)

#1: GCDWQ - Aesthetic Objective/Other Value (Jan.2020)

#2: GCDWQ - Maximum Acceptable Concentrations (MACs-Jan.2020)



ANALYTICAL REPORT

L2742792 CONTD....
PAGE 3 of 7
22-DEC-22 11:49 (MT)

Total Metals (WATER)

Analyte	Unit	ALS ID		L2742792-1	L2742792-2	L2742792-3
		Guide Limit #1	Guide Limit #2	08-DEC-22 11:30 PORTAGE LA PRAIRIE 1 - RAW	08-DEC-22 11:20 PORTAGE LA PRAIRIE 2 - TREATED	08-DEC-22 11:40 PORTAGE LA PRAIRIE 3 - DISTRIBUTION @ CO-OP GAS
Aluminum (Al)-Total	mg/L	0.1	2.0	0.549	0.0064	0.0078
Arsimony (Sb)-Total	mg/L	-	0.006	0.00018	0.00018	0.00017
Arsenic (As)-Total	mg/L	-	0.01	0.00436	0.00076	0.00077
Barium (Ba)-Total	mg/L	-	2	0.128	0.0351	0.0326
Beryllium (Be)-Total	mg/L	-	-	<0.00010	<0.00010	<0.00010
Bismuth (Bi)-Total	mg/L	-	-	<0.000050	<0.000050	<0.000050
Boron (B)-Total	mg/L	-	5	0.176	0.072	0.076
Cadmium (Cd)-Total	mg/L	-	0.005	0.000340	<0.000050	<0.000050
Calcium (Ca)-Total	mg/L	-	-	109	43.3	39.5
Cesium (Cs)-Total	mg/L	-	-	0.000026	0.000036	0.000032
Chromium (Cr)-Total	mg/L	-	0.05	0.00143	0.00056	0.00072
Cobalt (Co)-Total	mg/L	-	-	0.00072	<0.00010	<0.00010
Copper (Cu)-Total	mg/L	1	2	0.00271	0.0120	0.0330
Iron (Fe)-Total	mg/L	0.3	-	1.24	<0.010	<0.010
Lead (Pb)-Total	mg/L	-	0.005	0.000837	<0.000050	<0.000050
Lithium (Li)-Total	mg/L	-	-	0.0832	0.0806	0.0794
Magnesium (Mg)-Total	mg/L	-	-	73.7	21.0	34.1
Manganese (Mn)-Total	mg/L	0.02	0.12	0.104	0.00012	0.00030
Molybdenum (Mo)-Total	mg/L	-	-	0.00361	0.00098	0.00098
Nickel (Ni)-Total	mg/L	-	-	0.00515	0.00098	0.00114
Phosphorus (P)-Total	mg/L	-	-	0.121	0.424	0.423
Potassium (K)-Total	mg/L	-	-	14.7	16.4	14.0
Rubidium (Rb)-Total	mg/L	-	-	0.00308	0.00319	0.00340
Selenium (Se)-Total	mg/L	-	0.05	0.000527	0.000393	0.000424
Silicon (Si)-Total	mg/L	-	-	10.3	3.68	3.78
Silver (Ag)-Total	mg/L	-	-	<0.00010	<0.00010	<0.00010
Sodium (Na)-Total	mg/L	200	-	96.0	113	112
Strontium (Sr)-Total	mg/L	-	7	0.493	0.212	0.202
Sulfur (S)-Total	mg/L	-	-	-	-	1.28
Tellurium (Te)-Total	mg/L	-	-	<0.00020	<0.00020	<0.00020
Thallium (Tl)-Total	mg/L	-	-	0.00010	<0.00010	<0.00010
Thorium (Th)-Total	mg/L	-	-	0.00018	<0.00010	<0.00010
Tin (Sn)-Total	mg/L	-	-	<0.00010	<0.00010	<0.00010

Federal Guidelines for Canadian Drinking Water Quality (MAR, 2021)
#1: GCDWQ - Aesthetic Objectives/Other Values (Jan.2020)
#2: GCDWQ - Maximum Acceptable Concentrations (MACs-Jan.2020)



ANALYTICAL REPORT

L2742792 CONTD....
PAGE 4 of 7
22-DEC-22 11:49 (MT)

Total Metals (WATER)

Analyte	Unit	ALS ID		L2742792-1	L2742792-2	L2742792-3
		Guide Limit #1	Guide Limit #2	PORTAGE LA PRAIRIE 1 - RAW	PORTAGE LA PRAIRIE 2 - TREATED	PORTAGE LA PRAIRIE 3 - DISTRIBUTION @ CO-OP GAS
Titanium (Ti)-Total	mg/L	-	-	0.0180	<0.00030	<0.00030
Tungsten (W)-Total	mg/L	-	-	<0.00010	<0.00010	<0.00010
Uranium (U)-Total	mg/L	-	0.02	0.00417	0.000126	0.000143
Vanadium (V)-Total	mg/L	-	-	0.00314	0.00164	0.00167
Zinc (Zn)-Total	mg/L	5	-	0.0050	<0.0030	0.0065
Zirconium (Zr)-Total	mg/L	-	-	0.00086	<0.00020	<0.00020

Federal Guidelines for Canadian Drinking Water Quality (MAR, 2021)
 #1: GCDWQ - Aesthetic Objective/Other Value (Jan.2020)
 #2: GCDWQ - Maximum Acceptable Concentrations (MACs-Jan.2020)

Detection Limit for result exceeds Guide Limit. Assessment against Guide Limit cannot be made.
 Analytical result for this parameter exceeds Guide Limit listed on this report.
 * Please refer to the Reference Information section for an explanation of any qualifiers noted.

Appendix B

Water Treatment Plant Process Diagram¹

¹ Obtained from WSP (Formerly Genivar)



