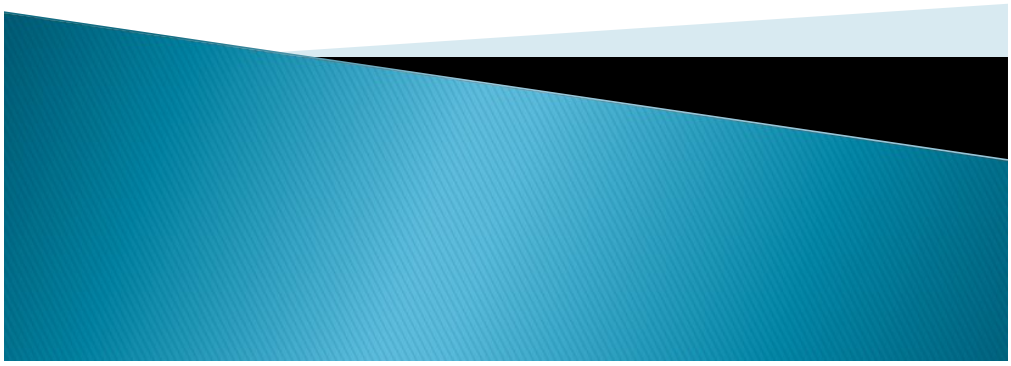
Public Water System
2022 Annual Report

City of Portage la Prairie
March 2023



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Maintenance	Supervisor: Bryan Cairns	Phone: 1-204-239-8362
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1.0 Introduction

The 2022 annual report for the City of Portage la Prairie (City) summarizes the information that demonstrates the Water Treatment Plant's ability to produce safe potable water and meet the requirements of all provincial regulations. Copies of this report will be available to the public at City Hall, and on the City website by March 31st, 2023.

1.1 Description of Water System

The City of Portage la Prairie's public water system (PWS) provides potable drinking water to a population of approximately 16,000 residents. The PWS also supplies water to three other regional water systems – the rural municipality of Portage la Prairie, The Cartier Regional, and the Yellowhead Regional water systems. The Yellowhead Regional Water Co-op is the largest consumer after the City of Portage la Prairie, Roquette, McCain foods, and Simplot potato processors.

The water treatment plant obtains water for treatment from the Assiniboine River. The intake structure is located 0.5 km from the plant. The Assiniboine River water is a collection of water from Alberta, central Saskatchewan, southern Saskatchewan, North Dakota, and southern and western Manitoba. Several large cities and processing companies are located along the Assiniboine River and Souris River systems and use the waterway as a source water supply.

2.0 General Design Data and Operational Information

A report was prepared in March 1974 by Wardrop and Associates Ltd for construction of the Water Treatment Plant at the present-day location. The plant construction was started in the fall of 1976 and completed in April of 1978. The plant replaced the previous water treatment plant that was constructed in 1953. The new plant was one of the first in Canada to use ozone in its treatment process.

In the late 1990's, the City, in partnership with the Manitoba water services board, undertook studies to evaluate the capacity and ability of the existing plant to meet current and future demands. The plant had been challenged at times to maintain water quality due to poor river water quality and increasing demands on an aging plant. As a result, the City identified a schedule of upgrades that would increase capacity to meet short-term demands, and that would meet current and anticipated Canadian Drinking Water Guidelines.

Major improvements to the plant since 2001, including significant improvements in 2019-2022, include the addition of pre-clarification; improved rapid sand filtration; backwash process; replacement of ozone generators for disinfection; expanded softening capabilities; granular activated carbon adsorption filters; increased treated water storage facility; increased chlorine contact time; pumping capacity increased to both raw water to the plant and out to the distribution system; residuals management via sludge drying beds; addition of a larger lime storage facility, and replacement of the lime feed system. Most of the major components have also been designed to be easily expanded to meet future needs.

2.1 Design Capacity

The Water Treatment Plant (WTP) has a rated production capacity of 34 million litres/day. Although the plants' Firm capacity is only 17 MLD. The City of Portage la Prairie has two reservoirs; the first is located at the water treatment plant and the second in the northwest section of the City. 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 WTP 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 WTP has a capacity of 4.64 million litre, and the McKay reservoir has 9.25 million litre capacity.

A new reservoir to service the Poplar Bluff industrial park and the Yellowhead Regional Water Co-op is currently under construction and will be commissioned in 2023.

2.2 General Plant Description

The Portage la Prairie WTP is a conventional lime softening plant with pre-clarification, biologically activated 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).

The City obtains its water from the Assiniboine River (River). There are three 125-hp motors-265 l/s pumps to transfer the raw water from the river impoundment area upstream of the spillway structure to the WTP.

Each stage of treatment is described below:

2.2.1 Ballasted Flocculation Clarification

Ballasted flocculation clarification is a unique process. Poly-aluminum Chloride and polymers are added to the raw water inside a mixing chamber to promote coagulation and flocculation (a process in which suspended solids are drawn together to form larger/heavier settleable clusters known as floc) Very fine sand is added to the mix to make the floc settle very quickly. This portion removes a large portion of turbidity, organics, and algae, thus reducing taste odour issues. Potassium permanganate is added as a pre-oxidant. The pre-clarified water is then passed through to the next process.

2.2.2 Softening Clarifiers

Softening clarifiers are large circular basins, where hydrated lime and polymers are added for further coagulation and flocculation. Lime raises the ph. to a point where calcium and magnesium are settled out, thus removing substantial 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.

2.2.3 Re-Carbonation

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. and prevents corrosion or scaling throughout the City's water distribution system. The lowering of the ph. also aids in the ozone process.

2.2.4 Ozone

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 filtration.

2.2.5 Calcium Thiosulphate

Calcium Thiosulphate is a chemical added after ozonation, for the removal of excess ozone gas.

2.2.6 Filtration

Dual media filtration follows the ozone disinfection process. The brake down of organics promote biologically active filtration which significantly improves further organics removal. The filters contain anthracite and sand media in separate layers for extended filter life. The filters have up to date stainless-steel under-drain system for improved filtration and the backwashing. 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.

2.2.7 GAC Filters

Granular activated carbon contactors are utilized as a final polishing step for the ultimate reduction in organics, and for the final taste and odour 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.

2.2.8 Disinfection

Chlorine gas is used as a final disinfectant for the filtered water. Chlorine is injected between the GAC filters and the onsite reservoir. The on-site reservoir provides contact time well above the 20-minute minimum and this ensure complete disinfection. A chlorine residual is maintained in the distribution system to eliminate any re-growth of pathogenic organisms.

2.2.9 Fluoride

Fluoride addition is mandated by Manitoba Public Health and is added to potable water for dental health reasons. Fluoride strengthens tooth enamel and assists in the reduction of tooth decay. Fluoride naturally occurs in surface and groundwater in this area at concentrations of 0.2 to 0.4 mg/l. The WTP fluoride addition only increases the concentration to about 0.6 – 0.7 mg/l. Manitoba health, seniors, and active living provides funding and monitoring for the fluoridation program.

2.2.10 Orthophosphate

A very low concentration of phosphoric acid is added as an orthophosphate source. Orthophosphates reduce corrosion within the distribution system, and they reduce the leaching of lead from a homes service line into an individual customers drinking water.

2.2.11 Sodium Hydroxide

Otherwise known as caustic, this added to raise the ph. and increase the alkalinity of the water prior to entering the distribution system. Increases the ph of the finished water also reduces corrosivity.

2.2.12 Residuals Solids Management

Softening Clarifiers periodically blowdown sludge that accumulates on the bottom of their basins. 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 sludge drying ponds. These ponds are located south of the WTP and across the river, the sludge settles to the bottom and clarified water is returned to the river.

2.3 City Distribution System

Portage la Prairie's current population of approximately 13,000 persons are serviced by 115 km of water mains in the distribution system with fifty-five hundred metered users.

2.4 Classification and Certification

Water treatment, water distribution facilities, and operator classifications, fall under the Environment Act's Water and Wastewater facility operators regulation.

The Portage la Prairie Water Treatment Plant is a Class 4 Facility

Division Manager, Jared Smith	Level 4 Water Treatment Certification
Water Treatment Operators:	
Supervisor, Ben Olson	Level 4 Water Treatment Certification
Kaley Giffin	Level 4 Water Treatment Certification
Soyan Ibrahim	Level 4 Water Treatment Certification
Joel Trandafir	Level 3 Water Treatment Certification
Andre Wantanabe	Level 2 Water Treatment Certification
David Radu	Level 1 Water Treatment Certification

The City Of Portage la Prairie has a Class 2 Water Distribution Facility

Superintendent, Brian Taylor	Class 2 Water Distribution Certification
	Class 2 Wastewater Collection Certification
Supervisor, Keith Barron	Class 2 Water Distribution Certification
	Class 2 Wastewater Collection Certification

Distribution System Operators:

Grant Mcdonald	Class 2 Water Distribution Certification
	Class 2 Wastewater Collection Certification
Jim Morrison	Class 2 Water Distribution Certification
	Class 2 Wastewater Collection Certification
Terry Nichols	Class 2 Water Distribution Certification
	Class 2 Wastewater Collection Certification
Virgil (Max) Chaske	Class 2 Wastewater Collection Certification

3.0 Disinfection System in Use

The final step in the treatment of safe drinking water is disinfection. Disinfection is the selective destruction or inactivation of potential disease-causing organisms in water. As per the drinking water safety act the Portage la Prairie PWS must ensure that a disinfection residual of at least:

0.5 mg of free chlorine per litre of water is detectable at the point where water enters the distribution system, after a minimum contact time of 20 minutes.

0.1 mg of free chlorine per litre of water is always detectable at any point in the distribution system.

3.1 Type of Disinfection Used:

The Portage la Prairie water treatment plant disinfects by adding gas chlorine solution by way of an induction system direct from chlorine cylinders, into the influent for the onsite water reservoir.

There is a re-chlorination system at both reservoir's locations, the water treatment plant reservoir and McKay reservoir using a calcium hypochlorite chlorine solution. The re-chlorination systems are used if the free chlorine concentration falls near and below acceptable standards.

3.2 Equipment Redundancy and Monitoring Requirements:

As required by the drinking water safety act, the Portage la Prairie WTP ensures continuous disinfection is maintained at the plant by keeping in stock all spare parts required for the chlorine feed system. A complete spare chlorinator is also kept in the plant. Also, a backup system using liquid sodium hypochlorite has now been installed. This system is designed to be used in an emergency until the malfunctioning gas chlorine system is repaired.

Chlorine residuals are monitored continuously at the plant by electronic analyzers. Chlorine is also manually tested a minimum of three times per day for quality control. Testing is done weekly at several different locations throughout the distribution system to ensure water safety and compliance. The results are recorded on appropriate government forms and sent to the Office of Drinking Water at the end of each month.

3.3 Disinfection Overall Performance/Results:

All water samples leaving the WTP in 2022 have met the minimum regulatory disinfection requirements. The City has had no total coliform or E. Coli positive distribution samples from its scheduled weekly monitoring program for the entire year of 2022.

4.0 Water Quality

4.1 Standards Compliance

The City of Portage la Prairie water treatment plant submitted water samples from the City of Portage la Prairie water system for chemical and physical analyzes during 2022. The treated water met all the applicable Guidelines for Canadian Drinking Water Quality (GCDWQ) health-based maximum acceptable concentrations (MAC), of the water quality standard.

4.1.1 Turbidity

Turbidity is an indicator of suspended particles that are present in water and is measured as NTU (nephelometric turbidity units). The presence of suspended particles in the water could be an indicator that there is a potential for pathogens present of cryptosporidium oocysts, giardia lamblia cysts or viruses.

The City of Portage la Prairie's water treatment plant has four dual media filters which are monitored 24 hrs/day by the computer SCADA system. The computer monitoring program takes samples every five minutes from each individual filter.

The monitoring system is programmed to shut off the filter if the turbidity reading reaches 0.295, which is just below the 0.30 NTU Standard.

4.1.2 Trihalomethane (THM's)

Trihalomethane are produced by the interaction between any materials that can be converted into a trihalomethane during disinfection with chlorine or ozone. Typically, THM precursors are constituents of natural organic matter, either suspended or dissolved in the source water. In addition, the bromide ion (Br-) is a precursor material.

Trihalomethane standard (in milligram per litre, mg/l)

Standard of 0.1 mg/l or less annual average was met over the four testing periods in 2022. The annual average is 0.0665 mg/l.

4.1.3 Haloacetic Acids (HAA's)

Haloacetic acids (HAA's) are a group of compounds that can form in the water distribution systems when chlorine used to disinfect drinking water reacts with naturally occurring organic matter in the source water. Haloacetic acids (HAA's) may form if humic acids are present and tend to decline over time within the distribution system.

HAA standard (in milligram per litre, mg/l)

Standard of 0.08 mg/l or less annual average was met over the four testing periods in 2022. The annual average is 0.0282 mg/l.

4.2 Water System Incidents and Corrective Actions:

Due to water line replacement on Saskatchewan Avenue, some areas of the City experienced discolored water due to pipe corrosion and high localized flow rates, and lower chlorine residuals. Dead end water lines were flushed regularly to maintain water quality and free chlorine residual.

Rarely, water in the distribution system can be found to not meet the regulated 0.1 mg/l minimum free chlorine or the 0.5 mg/l minimum total chlorine regulation. In each case the system is considered non-compliant, and each time the area was flushed and the chlorine dose at the plant increased. Each year WTP staff alone, complete over five hundred chlorine tests throughout the distribution system.

4.3 Drinking Water Safety Orders On The Portage la Prairie PWS:

In 2022, no drinking water safety orders were issued for the Portage la Prairie public water system.

4.4 Boil Water Advisories And Actions Taken In Response:

In 2022, no boil water advisories were issued for the Portage la Prairie water system, as a whole. The City of Portage la Prairie did issue approximately 60 boil water maintenance advisories to homes as a proactive measure while work was being completed on watermains in the effected area. Homes and businesses that are affected by these advisories are always notified. Many of these small precautionary advisories were linked to the construction on Saskatchewan Avenue. Each boil water advisory impacted small, isolated areas of the distribution system. The advisories were lifted following repairs and the bacteriological testing results met regulatory requirements.

4.5 Warnings or Charges in Accordance with the Drinking Water Act:

In 2022, no warnings or charges were laid against the Portage la Prairie water system.

5.0 Lead and Corrosion Control

The City raises the ph of the finished water and adds an orthophosphate to provide corrosion control throughout the water mains and distribution system. In 2021, the City was notified by the Office of Drinking Water that new random day-time lead testing requirements will come into effect in 2022. In 2022 City staff ensured we met these requirements by implementing the program. The report outlining the program is available on the City's website and is attached below in Appendix F.

6.0 Continuous Improvement

Improvements made to reduce organics in finished water:

While better management of meltwater and rainwater runoff that is presently being allowed to freely enter the Assiniboine River system carrying significant concentrations of suspended and dissolved organic matter would improve the City's source water

quality. The City is required to treat the source water, whatever the quality that the City receives at its' river intake. The WTP staff will continue to maximize the treatment process to lower organic compounds during treatment stages.

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.

In 2012, the City initiated a treated water quality study to identify potential methods of reducing the total organic carbon content through the treatment process prior to the disinfection step. Potential mitigative measures were identified and investigations into these began in 2013 and trials continued into 2017. The treated water quality study and the water treatment functional design upgrades is being coordinated by AECOM engineering and trials were conducted by the City of Portage la Prairie water treatment plant staff.

With Phase One upgrades complete in 2017, water quality distribution pressure and chemical dosing has enhanced due to the upgrades which included the following:

Pre – treatment jet flash mixing/enhanced coagulation was added for removal of total organic carbon and dissolved organic carbon.

Magnetic flowmeters replaced the existing insertion probe meters. Allowing for further accuracy for in chemical dosing into the softening clarifiers, reducing chemical usage. Sodium hydroxide was added to the softening clarifiers for non-carbonate hardness removal, and to lower the overall hardness in the treated water.

Ozone quenching system installation is to address the ozone off gassing after the ozone chamber. Allow for a higher concentration of ozone gas to be applied in the contract chambers for pathogen removal.

Chlorination modification included, relocating chlorine dosing injection point for disinfection and contact time in the treated reservoir. Allowing for even dispersal of the chlorine residual in the finished water before entering the distribution system. Since the relocation of the injection point the chlorine demand has decreased.

McKay reservoir flow control upgrades. Two new motors and variable frequency drive were added with modification to the supervisory control and data acquisition program. Allowing for better control on the overall water distribution system. Maintaining a constant pressure in the system and directional flow control of the system. Also reducing water main breaks within the distribution system.

Most of Phase Two (A) of the water treatment functional design upgrade was completed in 2019. However, certain upgrades were not completed until 2022 which include: lime batching alterations and the makeup water system for chemical batch tanks.

Phase Two (A) upgrades also included the following: Raw water flow control, pre-treatment screening system, lime batching alteration, ozone contactor upgrades, makeup water system for chemical batch tanks, City distribution pumps, plc upgrades, WTP & McKay reservoir SCADA system upgrade, flow-paced sodium hydroxide addition, compound loop control for chlorination, dissolved ozone probe with transmitter, online UVT analyzer and GAC flow control.

Phase Two (B) upgrades include the following: new backup generator, air -scouring system for pre-treatment process and new ozonation system. Phase Two (B) was spilt into two contracts one for the backup generators and the other for installation of the ozonation system and air-scouring system.

Backup generator was tendered in January 2020 and was awarded to Trotter and Morton Industrial Contracting Inc. With completion date of March 31, 2021.

Air – scouring and ozonation system installation was tendered November 2020 and was awarded to ABCO supply & service ltd. With completion date of November 2021

Phase Three of the water plant upgrades includes a 38 million-liters-day water treatment plant expansion. Stantec Consulting Ltd. completed the functional design report for the expansion in January 2021. The report was updated for higher projected flows in August 2022. On January 27th, 2023, the Manitoba Government announced a 50% funding partnership or about $38 million dollars to go towards the estimated $76 million dollar expansion to the Portage la Prairie WTP. The Manitoba Water Services Board has also announced 50% funding for the complete final design of the expansion. City council must vote on accepting these funds by March 31, 2023.

The City will continue to work with the Province of Manitoba toward the development of a Watershed Management Strategy which will focus on maintaining or improving the water quality of the Assiniboine River. City staff regularly participate in the Shellmouth Reservoir and Assiniboine River advisory committee meetings.

7.0 Major Expenses Incurred in 2022

Ozone air compressor ventilation system install.	$92,176.00
Poplar bluff supply pump VFD replacement.	$15,701.18

Ozone room air conditioner install.	$20,287.20
Blowdown sludge pump repair	$9,294.56
Gas chlorine system upgrades	$6,433.65
Ozone vacuum/pressure relief valve install and venting.	$7,378.72
McKay reservoir mcc bucket replacements.	$56,540.94
McKay reservoir roof condition study.	$5,602.26
Heat loop circulation pump replacement.	$7,764.18
Loop heat exchanger replacement.	$19,618.45

This report, and all third-party laboratory testing results for 2022 will be available on the City of Portage la Prairie's web site at http://www.City-plap.com/main/water-treatment.

Date prepared March 2023

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Jared Smith
Manager, Water Treatment Division
City of Portage la Prairie

Manitoba
Environment, Climate and Parks
Office of Drinking Water
1007 Century Street, Winnipeg, Manitoba R3H 0W4

OPERATING LICENCE FOR A PUBLIC WATER SYSTEM

LICENCE NUMBER: PWS-08-147-02 A

THE DRINKING WATER SAFETY ACT CHAPTER D101, C.C.S.M.

WATER SYSTEM CODE: **171.00**

OPERATION ID: **28564**

EFFECTIVE DATE: **MAY 1, 2022**

EXPIRY DATE: **NOVEMBER 30, 2023**

IN ACCORDANCE WITH THE DRINKING WATER SAFETY ACT, THIS OPERATING LICENCE IS ISSUED PURSUANT TO SUBSECTION 8(1) TO:

CITY OF PORTAGE LA PRAIRIE: "THE LICENSEE"

FOR THE OPERATION OF THE **PORTAGE LA PRAIRIE PUBLIC WATER SYSTEM**, WHICH INCLUDES INTAKE STRUCTURES, TREATMENT FACILITIES, WATER STORAGE RESERVOIRS, AND DISTRIBUTION LINES, SUBJECT TO THE ATTACHED TERMS AND CONDITIONS.

THIS LICENCE DOES NOT AFFECT THE LICENSEE'S OBLIGATIONS WITH RESPECT TO COMPLIANCE WITH ALL APPLICABLE MUNICIPAL, PROVINCIAL, AND FEDERAL LEGISLATION. THIS LICENCE SUPERSEDES ALL PREVIOUS LICENCES FOR THIS PUBLIC WATER SYSTEM.

Digitally signed by Kate Bolton
Date: 2022.04.29 15:09:27 -05'00'

DATE: April 29, 2022

Kate Bolton
Director, Office of Drinking Water

TERMS AND CONDITIONS

1. GENERAL

1.1. The Licensee shall operate the public water system in accordance with all applicable requirements of The Drinking Water Safety Act and its regulations, and the requirements of this licence. In the event that specific terms and conditions of this licence imposed under the authority of subsection 8(3) of the Act exceed the general requirements of the Act and regulations, the specific requirements of this licence shall apply.

1.2. The Licensee shall obtain approval from the Office of Drinking Water prior to making any significant alterations to the water source, the water treatment process, the water storage facilities, or the water distribution system.

1.3. This licence may be amended by the director where, in the opinion of the director, an amendment is necessary and the amendment will not negatively impact the safety of water obtained from the water system, or effective environmental management.

1.4. The Licensee may request an amendment to this licence by submitting an amendment application to the Office of Drinking Water.

1.5. This licence may be suspended or cancelled by the director for any of the reasons identified in Section 11 of Manitoba Regulation 40/2007, Drinking Water Safety Regulation or due to a failure to comply with any term or condition of this licence.

1.6. The Licensee shall provide written notice to the Office of Drinking Water of any change in ownership of the water system within seven days of the transfer of ownership.

1.7. The Licensee shall provide written notice to the Office of Drinking Water of any changes in the operational status of the water system, such as a permanent cessation of service, or changing the length of service from year-round to seasonal or the opposite.

1.8. The director of the Office of Drinking Water, medical officer of health or drinking water officer may enter any water system facility as necessary to carry out the provisions of The Drinking Water Safety Act and its regulations.

1.9. The Licensee shall post a copy of the first page of this licence at the water treatment facility.

1.10. The Licensee shall keep a copy of this licence in its entirety at a location established by the drinking water officer and ensure all operators are familiar with its terms and conditions.

1.11. The Licensee shall apply for renewal of this licence at least 60 days prior to its expiry.

2. OPERATION - GENERAL

2.1. The Licensee shall operate all water system facilities, control systems and equipment as efficiently as possible, inspect them on a regular basis, maintain them in good working order, and ensure that the water system is protected from the risks associated with cross-contamination.

2.2. The Licensee shall ensure that all chemicals and components that may come into contact with potable water are certified safe for potable water use through AWWA Standards, ANSI/NSF Standard 60 or 61, Health Canada, or other standards acceptable to the Director.

2.3. No alternate water source shall be brought into service without the consent of the drinking water officer and the maintenance of adequate cross connection control between the alternate source and the primary source.

2.4. The Licensee shall have re-assessments of the water system infrastructure and water supply sources completed by a qualified professional engineer, who is not an employee of the water system, in accordance with terms of reference for engineering assessments by March 1, 2024, and every five years thereafter.

2.5. The Licensee shall, upon request from the Office of Drinking Water, submit or re-submit a compliance plan, in a form satisfactory to the director, to address any non-compliance issues identified at the time.

3. OPERATION – EMERGENCIES

3.1. The Licensee shall ensure that disinfection is undertaken following construction, repair or maintenance activities on the water system, in accordance with applicable AWWA standards, or Manitoba Water Services Board specifications, or any other standards approved by the director. A copy of all associated test results must be kept available for review by the Office of Drinking Water for a minimum of 24 months.

3.2. The Licensee shall ensure that all equipment used for disinfection is maintained in effective working order and keep available for immediate use all spare parts and chemical supplies as may be necessary to ensure continuous disinfection, including a spare disinfection unit, if necessary.

3.3. The Licensee shall immediately notify the Office of Drinking Water of any condition that may affect the ability of the water system to produce or deliver safe drinking water including but not limited to treatment upsets or bypass conditions, contamination of the source water or treated water, a disinfection system failure, or a distribution system failure.

3.4. If a medical officer of health, the director of the Office of Drinking Water, or a drinking water officer issues a water advisory on the water system, the Licensee shall provide notice of the advisory to all water users in accordance with the Advisory Notification Plan or by a method acceptable to the issuer.

4. WATER QUALITY/TREATMENT STANDARDS

4.1. The Licensee shall operate the water system in a manner that achieves the water quality/treatment standards specified in Table 1, as determined through the monitoring requirements specified in Table 2:

Table 1: Water Quality/Treatment Standards

Parameter	Quality Standard
Total Coliform	Less than one total coliform bacteria detectable per 100 mL in all treated and distributed water
E. coli	Less than one *E. coli* bacteria detectable per 100 mL in all treated and distributed water
Chlorine Residual	A free chlorine residual of at least 0.5 mg/L in water entering the distribution system following a minimum contact time of 20 minutes A free chlorine residual of at least 0.1 mg/L at all times at any point in the water distribution system
Chlorine dioxide	Chlorine dioxide dosage rate not to exceed 1.2 mg/L at any time Treated water residual not to exceed 0.8 mg/L in water entering the distribution system
Bromate	Less than or equal to 0.01 mg/L
Chlorite	Less than or equal to 1.0 mg/L
Chlorate	Less than or equal to 1.0 mg/L
Turbidity	Less than or equal to 0.3 NTU in 95% of the measurements in a month of the effluent from each operating filter Not exceed 0.3 NTU for more than 12 consecutive hours of filter operation Not exceed 1.0 NTU for any measurement
Arsenic	Less than or equal to 0.01 mg/L
Fluoride	Less than or equal to 1.5 mg/L
Manganese	Less than or equal to 0.12 mg/L
Total Trihalomethanes (THMs)	Less than or equal to 0.10 mg/L as locational running annual average of quarterly samples
Total Haloacetic Acids (HAAs)	Less than or equal to 0.08 mg/L as locational running annual average of quarterly samples
Lead	Less than or equal to 0.005 mg/L based on a sample(s) collected at a cold water tap or other appropriate location where water may be used for drinking or food preparation
Total Microcystins	Less than or equal to 0.0015 mg/L
Uranium	Less than or equal to 0.02 mg/L

4.2. If a bacteriological standard is not met, the Licensee shall immediately undertake the applicable corrective actions as listed in "Schedule A" of Manitoba Regulation 41/2007, Drinking Water Quality Standards Regulation.

4.3. If a microbial, chemical, radiological, or physical standard is not met, the Licensee shall immediately undertake the applicable corrective actions specified in "Schedule C" of Manitoba Regulation 41/2007, the Drinking Water Quality Standards Regulation.

4.4. The Licensee shall have in place and maintain in effective working order, filtration and disinfection equipment and controls designed to provide reduction or inactivation of 99.9% (3-log) of *Cryptosporidium* oocysts and 99.9% (3-log) of *Giardia lamblia* cysts.

4.5. The Licensee shall have in place and maintain in effective working order, filtration and/or disinfection equipment and controls designed to provide reduction or inactivation of 99.99% (4-log) of viruses.

4.6. The Licensee shall maintain in effective working order chlorination and treated water storage equipment and controls designed to achieve a minimum of 20 minutes of chlorine contact time prior to water entering the distribution system.

5. WATER QUALITY MONITORING

5.1. The Licensee shall ensure monitoring is completed as set out in Table 2.

Table 2: Monitoring Schedule

Parameter	Monitoring Requirement
Bacteriological (total coliform and *E. coli*)	Weekly sampling program with each set of samples consisting of one raw, one treated, and a minimum of 3 distribution samples Consecutive samples to be separated by at least 5 days
Free Chlorine (treated water)	Continuous sampling of water entering the distribution system following at least 20 minutes of contact time A confirmatory sample to be taken daily at the online chlorine analyzer sampling or effluent point
Free Chlorine (distribution system)	At the same times and location(s) as bacteriological distribution system sampling
Total Chlorine (treated water)	One sample per day of water entering the distribution system following at least 20 minutes of contact time
Total Chlorine (distribution system)	At the same times and location(s) as bacteriological distribution system sampling
Chlorite (treated water)	One sample taken weekly from the combined clarifier effluent when chlorine dioxide is used in place of ozone
Chlorate (treated water)	One sample taken weekly from the combined clarifier effluent when chlorine dioxide is used in place of ozone
Bromate (treated water)	One treated water sample every six months
Chlorine dioxide	At the same time and location as bacteriological distribution sampling when chlorine dioxide is in use One sample per day of water entering the distribution system following disinfection contact time
Turbidity	One raw water sample per day Continuous sampling of the effluent from each operating particulate filter A confirmatory sample to be taken daily at the online turbidity analyzer sampling or effluent point
Turbidity (distribution system)	At the same times and location(s) as bacteriological distribution system sampling

Parameter	Monitoring Requirement
General Chemistry (parameter list provided by Office of Drinking Water)	One raw and one treated water sample every six months
Total Metals (distribution system)	Two samples taken at the same time(s) as general chemistry sampling at a mid-point in the distribution system
Arsenic, Uranium, Fluoride, Nitrate/Nitrite	Monitoring included in general chemistry and/or total metals analysis
Total Trihalomethanes (THMs) (distribution system)	Four preserved samples taken on a quarterly basis during February, May, August, and November, every year at the furthest points in the distribution system
Total Haloacetic Acids (HAAs) (distribution system)	Four preserved samples taken on a quarterly basis during February, May, August, and November, every year at a mid-point in the distribution system
Lead	As per ODW-OG-17 Monitoring Lead at the Tap A minimum of 40 residential tap water samples collected throughout the year, with 2/3 of the samples being collected between June and October every year
Manganese	One raw, one treated, and one distribution water sample every year Four distribution samples taken on a quarterly basis during February, May, August, and November, every year.
Total Microcystins	One sample collected from a raw water sampling point every year in August Visual inspection once per week of the source water and raw water treatment infrastructure for signs of algae Event based testing as per *ODW-OG-20 Monitoring for Total Microcystins in Drinking Water*
Other Parameters	As per the instructions of the drinking water officer

5.2. The Licensee shall ensure that an accredited laboratory, as specified in section 35 of Manitoba Regulation 40/2007 the Drinking Water Safety Regulation, undertake the following analysis required in Table 2:

a) bacteriological (total coliform and *E. coli*)
b) chlorite
c) chlorate
d) bromate
e) general chemistry
f) total metals
g) manganese
h) lead
i) total trihalomethanes
j) total haloacetic acids
k) total microcystins
l) any other parameter required by the drinking water officer

and that all samples are collected, handled, and submitted in a manner that is satisfactory to the accredited laboratory.

5.3. The Licensee shall ensure that parameters listed in Table 2 but not specified in clause 5.2 are measured utilizing certified water quality monitoring equipment and methods

approved by the latest edition of *Standard Methods for the Examination of Water and Wastewater* published jointly by the American Public Health Association, the American Water Works Association and the Water Environment Federation.

5.4. The Licensee shall ensure that all water quality monitoring equipment is properly maintained and calibrated by a qualified person according to manufacturer recommendations and that records are maintained to that effect.

5.5. The Licensee shall operate equipment capable of continuously monitoring the free chlorine residual at no more than five-minute intervals in water entering the water distribution system following a minimum of 20 minutes of contact time.

5.6. The Licensee shall operate equipment capable of continuously monitoring the turbidity level at no more than five-minute intervals in the effluent from each particulate filter to ensure compliance with the turbidity standards and to satisfy the removal requirement specified in Clause 4.4.

5.7. In instances where continuous disinfectant residual and/or turbidity monitoring equipment is offline, the Licensee shall ensure that a minimum of four samples per day are tested at the online analyzer sampling or effluent point using an approved portable analysis unit and that the results are recorded in a form satisfactory to the director.

5.8. The Licensee shall ensure that sampling within the distribution system takes place at varied locations acceptable to the drinking water officer.

5.9. The Licensee shall submit treated water samples for chlorate and chlorite analysis weekly when chlorine dioxide is in use. Samples are to be collected from a location where water is entering the distribution system. Additional sample locations may be requested of the distribution system, specified by the drinking water officer.

6. RECORD-KEEPING AND REPORTING

6.1. The Licensee shall maintain in a secure location all construction drawings for the life of the water system components.

6.2. The Licensee shall retain in chronological order for a minimum of 24 months all information specified in subsection 34(2) of Manitoba Regulation 40/2007, Drinking Water Safety Regulation.

6.3. The Licensee shall ensure the information identified in clause 6.2 is available for inspection by any member of the public during normal business hours at the office of the water supplier or at a location convenient to the users of the system.

6.4. The Licensee shall record disinfectant residual measurements on the monthly disinfection report or other forms satisfactory to the director.

6.5. The Licensee shall record turbidity measurements on the monthly report forms or other forms satisfactory to the director.

6.6. The Licensee shall keep one copy of all monthly report forms required in this licence, and forward the original copy to the drinking water officer within seven days after the end of each calendar month.

6.7. The Licensee shall record all distribution system measurements specified in *Table 2: Monitoring Schedule* on the chain of custody form (laboratory submission form) which accompanies the bacteriological sample bottles to the laboratory.

6.8. The Licensee shall ensure that water metering devices at the water treatment plant or storage reservoir are maintained in good working order and that flow meter readings are recorded on a daily basis and such records are made available for inspection by a drinking water officer.

6.9. The Licensee shall submit an annual report to the director by March 31st of each year on the operation of the water system in the immediately preceding calendar year. The report shall include the information as set out in subsection 32(2) of Manitoba Regulation 40/2007, Drinking Water Safety Regulation.

6.10. The Licensee shall inform the public, in a form satisfactory to the director, when an annual report has been prepared and identify how a free copy can be obtained.

6.11. The Licensee shall make a copy of each annual report available to the public at no charge on an internet website within two weeks of the issuance of the report, unless otherwise approved by the director. The annual report shall remain available to the public for at least one year.

6.12. The Licensee shall maintain and submit an advisory notification plan to the drinking water officer by May 1st of each year. The plan must include a detailed description of communication tools and methods to be used to notify the public of a drinking water emergency, considering key contacts, fan-outs, critical customers, susceptible or difficult-to-reach sub-groups, and template notices where applicable.

Appendix B – Water Rights License

MG-14853 (English)

Spec. Ref.

Licence to Use Water for Municipal Purposes

Manitoba Conservation
Water Branch

200 Saulteaux Cresc.
Winnipeg, Manitoba
R3J 3W3

Issued in accordance with the provisions of
The Water Rights Act and regulations made thereunder.

Licence No.: **2003-022**
(Replaces Licence No. 95-17)
U.T.M.: Zone 14 547862 E
5533632 N

Know all men by these presents that in consideration of and subject to the provisos, conditions and restrictions hereinafter contained, the Minister of Conservation for the Province of Manitoba does by these presents give full right and liberty, leave and licence to **The City of Portage la Prairie** in the Province of Manitoba (hereinafter called "the LICENSEE") to divert water from the **Assiniboine River** for **municipal** purposes by means of a pumping intake system attached to the Assiniboine-Portage Diversion control structure located on the Assiniboine River and a raw water conveyance pipeline extending from the pumping intake to a water treatment and water distribution plant, the raw water intake system and conveyance pipeline, (all hereinafter collectively called "the WORKS"), and generally shown on a copy of a location sketch hereto attached and marked Exhibit "A", the water treatment plant located on the following described lands:

All those portions of Parish Lots 22 and 23 of the Parish of Portage la Prairie, in Manitoba, as more particularly described in Deeds Nos. 71459 and 119851 and Certificate of Title No. 25027, all registered in the Portage la Prairie Land Titles Office.

This Licence is issued upon the express condition that it shall be subject to the provisions of The Water Rights Act and Regulation and all amendments thereto and, without limiting the generality of the aforesaid, to the following terms and conditions, namely:

1. The water shall be used solely for **municipal** purposes.
2. The WORKS shall be operated in accordance with the terms herein contained.
3. a) The maximum rate at which water may be diverted pursuant hereto shall not exceed **0.44 cubic metres per second (15.5 cubic feet per second)**.

   b) The total quantity of water diverted in any one year shall not exceed **8948.94 cubic decametres (7255.00 acre feet)**.
4. The LICENSEE does hereby remise, release and forever discharge Her Majesty the Queen in Right of the Province of Manitoba, of and from all manner of action, causes of action, claims and demands whatsoever which against Her Majesty the LICENSEE ever had, now has or may hereafter have, resulting from the use of water for **municipal** purposes.
5. In the event that the rights of others are infringed upon and/or damage to the property of others is sustained as a result of the operation or maintenance of the WORKS and the rights herein granted, the LICENSEE shall be solely responsible and shall save harmless and fully indemnify Her Majesty the Queen in Right of the Province of Manitoba, from and against any liability to which Her Majesty may become liable by virtue of the issue of this Licence and anything done pursuant hereto.
6. This Licence is not assignable or transferable by the LICENSEE and when no longer required by the LICENSEE this Licence shall be returned to the Director, Water Branch, for cancellation on behalf of the Minister.
7. Upon the execution of this Licence the LICENSEE hereby grants the Minister or the Minister's agents the right of ingress and egress to and from the lands on which the WORKS are located for the purpose of inspection of the WORKS and the LICENSEE shall at all times comply with such directions and/or orders that may be given by the Minister or the Minister's agents in writing from time to time with regard to the operation and maintenance of the WORKS.
8. If for any reason whatsoever the Minister deems it advisable to cancel this Licence, he may do so by letter addressed to the LICENSEE at **97 Saskatchewan Avenue East, Portage la Prairie, MB, R1N 0L8, Canada** and thereafter this Licence shall be determined to be at an end.
9. The term of this Licence shall be **twenty (20) years** and this Licence shall become effective only on the date of execution hereof by a person so authorized in the Department of Conservation. The LICENSEE may apply for renewal of this Licence not more than 365 days and not less than 90 days prior to the expiry date.
10. This Licence expires automatically upon the loss of the legal control of any of the lands on which the WORKS are located or on which water is used, unless the Licence is transferred or amended by the Minister upon application for Licence transfer or amendment.
11. The LICENSEE shall keep records of daily and annual water use and shall provide a copy of such records to the Director, Water Branch, not later than February 1st of the following year.
12. The LICENSEE shall install and maintain, on the pumping WORKS, a water measuring device acceptable to the Director, Water Branch, that will accurately measure the instantaneous water flow and the accumulated annual volume of water diverted from the water source.

13. The LICENSEE shall comply with all instructions and specifications that may be issued by Fisheries and Oceans Canada under the fish habitat protection provisions of Canada's Fisheries and Oceans Act concering the construction, maintenance, and operation of the WORKS.

14. The LICENSEE shall hold and maintain all other regulatory approvals that may be required and shall comply with all other regulatory requirements for the construction, operation, or maintenance of the WORKS or to divert or use water as provided by this Licence.

15. This Licence is issued subject to the valid existing authorization of the Minister responsible for The Water Resources Administration Act, being Chapter W60 of the Continuing Consolidation of the Statutes of Manitoba issued pursuant to Subsection (4) of Section 14 of that Act, and upon the termination, or withdrawal or cancellation of this authorization as outlined in Clause 18, this Licence shall be void and at an end. This authorization is given under the express condition that it may be terminated by the Minister responsible for The Water Resources Administration Act by the mutual consent of the parties or by the termination or cancellation or withdrawal of this Water rights Licence No. 2003-022.

16. Subject to the conditions herein set out, in reference to the authorization noted in Clause 17, the LICENSEE may, construct and operate and maintain raw water intake pipelines and pumping works located on the upstream side of the dam constructed across the Assiniboine River immediately upstream of the City of Portage la Prairie water treatment plant and referred to as the Assiniboine-Portage diversion control dam.

In witness whereof I the undersigned hereby agree to accept the aforesaid Licence on the terms and conditions set forth therein and hereby set my hand and seal this 14th day of July A.D. 2003.

SIGNED, SEALED AND DELIVERED
in the presence of

Margaret Loewen } _____ (Seal)
Witness MANAGER OF ADMINISTRATION Licensee

Canada, PROVINCE OF MANITOBA To Wit:

I, _____ of the _____

of _____ in the Province of Manitoba, MAKE OATH AND SAY:

1. That I was personally present and did see _____, the within named party, execute the within Instrument.

2. That I know the said _____ and am satisfied that he/she is of the full age of eighteen years.

3. That the said Instrument was executed at _____ aforesaid and that I am subscribing witness thereto.

SWORN BEFORE me at the _____

in the Province of Manitoba this _____ day of _____ A.D. 20 ____.

_____ } _____
A COMMISSIONER FOR OATHS Witness
in and for the Province of Manitoba

My Commission expires _____

Issued at the City of Winnipeg, in the Province of Manitoba, this 23 day of July A.D. 2003.

_____
The Honourable the Minister of Conservation

City of Portage la Prairie
Appendix C – Bacteriological Sample Result

Date	Sample Identification	TC	EC	CL2 Free	CL2 Total	NTU
4-Jan-22	RAW	2	0	0.00	0.00	0.00
	WTP	0	0	0.00	0.00	0.00
	Nutri-Pea	0	0	0.44	0.88	0.42
	City Garage			0.03	0.07	3.38
	WPCF	0	0	0.67	1.13	0.16
	Coop Gas Bar	0	0	0.92	1.43	0.10
	PDGH	0	0	0.84	1.44	0.27
	Husky			0.42	0.80	0.39
	Tim Hortons	0	0	0.35	0.77	0.33
	Craig Dunn			1.01	1.63	0.20
	Island Park	0	0	0.42	0.86	0.44
	Firehall			0.32	0.74	0.38
11-Jan-22	RAW	1	0	0.00	0.00	0.00
	WTP	0	0	1.36	1.85	0.07
	Nutri-Pea			0.46	0.90	0.41
	City Garage	0	0	0.38	0.84	1.35
	WPCF			0.63	1.10	0.02
	Coop Gas Bar	0	0	0.38	1.06	0.62
	PDGH			0.72	1.25	0.33
	Husky	0	0	0.36	0.63	0.85
	Tim Hortons			0.10	0.35	1.31
	Craig Dunn	0	0	0.55	1.02	0.20
	Island Park			0.22	0.66	0.57
	Firehall	0	0	0.19	0.64	1.26
18-Jan-22	RAW	0	0	0.00	0.00	0.00
	WTP	0	0	0.00	0.00	0.00
	Nutri-Pea	0	0	0.48	0.66	0.45
	City Garage			0.10	0.29	1.70
	WPCF	0	0	0.57	0.82	0.08
	Coop Gas Bar			1.07	1.24	0.23
	PDGH	0	0	1.52	2.15	0.32
	Husky			0.63	0.88	0.51
	Tim Hortons	0	0	0.32	0.82	0.16
	Craig Dunn			1.68	2.12	0.24
	Island Park	0	0	0.72	1.18	0.27
	Firehall			0.16	0.43	0.81
25-Jan-22	RAW	0	0	0.00	0.00	0.00
	WTP	0	0	1.48	1.98	0.06
	Nutri-Pea	0	0	0.99	1.51	0.29
	City Garage			0.84	1.25	0.48
	WPCF	0	0	1.21	1.71	0.12
	Coop Gas Bar			1.37	1.89	0.15

Date	Sample Identification	TC	EC	CL2 Free	CL2 Total	NTU
	PDGH	0	0	1.13	1.69	0.22
	Husky			0.57	1.33	0.53
	Tim Hortons	0	0	0.69	1.33	0.24
	Craig Dunn			1.06	1.66	0.29
	Island Park	0	0	0.73	1.19	0.41
	Firehall			0.55	1.14	0.61
01-Feb-22	RAW	Present	Present	0.00	0.00	0.00
	WTP	Absent	Absent	1.42	1.92	0.07
	Nutri-Pea	Absent	Absent	0.31	0.66	0.39
	City Garage			0.16	0.33	1.41
	WPCF	Absent	Absent	0.75	1.20	0.29
	Coop Gas Bar			0.54	0.97	0.11
	PDGH	Absent	Absent	1.22	1.71	1.26
	Husky			0.39	0.75	0.47
	Tim Hortons	Absent	Absent	0.55	0.93	0.92
	Craig Dunn			0.71	1.12	0.10
	Island Park	Absent	Absent	0.30	0.70	0.58
	Firehall			0.38	0.76	0.87
08-Feb-22	RAW	83	1	0.00	0.00	0.00
	WTP	0	0	1.40	1.89	0.07
	Nutri-Pea			0.48	1.01	0.40
	City Garage			0.00	0.00	0.00
	WPCF	0	0	1.04	1.51	0.11
	Coop Gas Bar			0.99	1.48	0.00
	PDGH	0	0	1.12	1.60	0.84
	Husky			0.46	0.98	0.42
	Tim Hortons	0	0	0.00	0.00	0.00
	Craig Dunn			1.01	1.50	0.25
	Island Park	0	0	0.94	1.02	0.25
	Firehall			0.51	0.98	0.72
15-Feb-22	RAW	74	4	0.00	0.00	0.00
	WTP	0	0	1.67	2.40	0.08
	Nutri-Pea	0	0	1.06	1.39	0.08
	City Garage			0.00	0.00	0.00
	WPCF	0	0	0.96	1.56	0.17
	Coop Gas Bar			1.49	1.72	0.08
	PDGH	Absent	Absent	1.52	1.90	0.18
	Husky			0.91	1.26	0.59
	Tim Hortons	0	0	0.00	0.00	0.00
	Craig Dunn			1.59	1.71	0.04
	Island Park	Absent	Absent	0.63	0.97	0.30
	Firehall			0.00	0.00	0.00

Date	Sample Identification	TC	EC	CL2 Free	CL2 Total	NTU
22-Feb-22	RAW	2	0	0.00	0.00	0.00
	WTP	0	0	1.60	2.11	0.07
	Nutri-Pea			0.76	1.12	0.14
	City Garage	0	0	0.00	0.00	0.00
	WPCF			0.96	1.38	0.05
	Coop Gas Bar	0	0	1.32	1.82	0.24
	PDGH			1.20	1.68	0.24
	Husky	0	0	0.61	1.04	0.22
	Tim Hortons			0.00	0.00	0.00
	Craig Dunn	0	0	1.25	1.66	0.04
	Island Park			0.67	1.08	0.19
	Firehall	0	0	0.52	0.96	0.31
	Firehall			0.00	0.00	0.00
01-Mar-22	RAW	1	0	0.00	0.00	0.00
	WTP	0	0	1.55	2.13	0.07
	Nutri-Pea	0	0	0.59	1.16	0.15
	City Garage			0.00	0.00	0.00
	WPCF	0	0	1.12	1.63	0.33
	Coop Gas Bar			0.00	0.00	0.00
	PDGH	0	0	1.22	1.62	0.39
	Husky			0.89	1.31	0.19
	Tim Hortons	0	0	0.00	0.00	0.00
	Craig Dunn			1.23	1.75	0.41
	Island Park	0	0	0.52	1.08	0.25
	Firehall			0.37	0.93	0.27
08-Mar-22	RAW	83	2	0.00	0.00	0.00
	WTP	0	0	1.52	2.15	0.10
	Nutri-Pea			0.98	1.32	0.23
	City Garage	0	0	0.71	1.13	0.35
	WPCF			1.15	1.62	0.07
	Coop Gas Bar	0	0	1.55	1.91	0.33
	PDGH			1.21	1.59	0.17
	Husky	0	0	1.18	1.43	0.25
	Tim Hortons			0.70	0.92	0.19
	Craig Dunn	0	0	1.68	1.97	0.14
	Island Park			0.85	1.21	0.38
	Firehall	0	0	0.70	1.20	0.61
15-Mar-22	RAW	130	3	0.00	0.00	0.00
	WTP	0	0	1.62	2.06	0.08
	Nutri-Pea			0.67	1.07	0.17
	City Garage			0.00	0.00	0.00
	WPCF	0	0	0.92	1.30	0.16

Date	Sample Identification	TC	EC	CL2 Free	CL2 Total	NTU
	Coop Gas Bar			1.39	1.79	0.09
	PDGH	0	0	1.34	1.62	0.32
	Husky			1.07	1.39	0.28
	Tim Hortons	0	0	0.00	0.00	0.00
	Craig Dunn			1.37	1.79	0.08
	Island Park	0	0	0.58	0.99	0.08
	Firehall			0.65	0.99	0.19
22-Mar-22	RAW	145	11	0.00	0.00	0.00
	WTP	0	0	1.73	2.16	0.11
	Nutri-Pea			0.94	1.31	0.27
	City Garage	0	0	0.76	1.10	0.05
	WPCF			1.03	1.42	0.23
	Coop Gas Bar	0	0	1.35	1.90	0.40
	PDGH			1.26	1.71	0.18
	Husky	0	0	1.05	1.42	0.24
	Tim Hortons			n/a	n/a	n/a
	Craig Dunn	0	0	1.44	2.09	0.25
	Island Park			1.23	1.72	0.31
	Firehall	0	0	0.58	1.00	0.59
29-Mar-22	RAW	>200	29	0.00	0.00	0.00
	WTP	0	0	1.26	1.63	0.14
	Nutri-Pea	0	0	0.65	1.03	0.28
	City Garage			0.32	0.70	0.40
	WPCF	0	0	0.75	0.94	0.17
	Coop Gas Bar			0.99	1.27	0.31
	PDGH	0	0	0.86	1.30	0.46
	Husky			0.82	1.18	0.29
	Tim Hortons			0.56	0.99	0.55
	Craig Dunn			0.00	0.00	0.00
	Island Park	0	0	0.76	1.20	0.27
	Firehall			0.43	0.84	0.33
05-Apr-22	RAW	200	3	N/A	N/A	102.00
	WTP	0	0	1.43	1.97	0.12
	Nutri-Pea			0.47	0.96	0.21
	City Garage	0	0	0.41	0.89	0.29
	WPCF			0.60	1.32	0.11
	Coop Gas Bar	0	0	0.86	1.48	0.35
	PDGH			1.09	1.61	0.39
	Husky	0	0	0.52	1.04	0.60
	Tim Hortons			0.46	0.91	0.37
	Craig Dunn	0	0	0.65	1.12	0.34
	Island Park			0.71	1.13	0.24

Date	Sample Identification	TC	EC	CL2 Free	CL2 Total	NTU
	Firehall	0	0	0.18	0.41	0.70
12-Apr-22	RAW	15	0	N/A	N/A	412.00
	WTP	0	0	1.72	2.12	0.18
	Nutri-Pea	0	0	0.60	1.08	0.20
	City Garage			0.11	0.36	1.03
	WPCF	0	0	0.82	1.21	0.14
	Coop Gas Bar			1.25	1.93	0.15
	PDGH	0	0	1.46	1.72	0.32
	Husky			0.74	1.04	0.19
	Tim Hortons	0	0	0.56	0.72	0.23
	Craig Dunn			1.42	1.95	0.29
	Island Park	0	0	0.41	0.74	0.30
	Firehall			0.88	1.31	0.61
19-Apr-22	RAW	200	16	N/A	N/A	27.10
	WTP	0	0	1.98	2.90	0.12
	Nutri-Pea			0.87	1.28	0.22
	City Garage	0	0	0.45	0.88	0.69
	WPCF			1.10	1.61	0.07
	Coop Gas Bar	0	0	1.70	2.19	0.25
	PDGH			1.44	1.93	0.14
	Husky	0	0	0.97	1.45	0.80
	Tim Hortons			0.71	1.15	0.19
	Craig Dunn	0	0	1.00	1.49	0.26
	Island Park			0.66	1.00	0.21
	Firehall	0	0	0.71	1.11	0.25
26-Apr-22	RAW	165	43	N/A	N/A	480.00
	WTP	0	0	1.38	1.79	0.11
	Nutri-Pea	0	0	0.60	0.97	0.15
	City Garage			0.38	0.77	0.69
	WPCF	0	0	0.73	1.08	0.15
	Coop Gas Bar			1.07	1.43	0.28
	PDGH	0	0	0.94	1.34	0.14
	Husky			0.94	1.22	0.35
	Tim Hortons	0	0	0.69	1.10	0.26
	Craig Dunn			0.62	1.07	0.19
	Island Park	0	0	0.74	1.05	0.12
	Firehall			0.45	0.91	0.51
03-May-22	RAW	>200	21	n/a	n/a	515.00
	WTP	0	0	1.64	2.03	0.09
	Nutri-Pea			0.52	0.90	0.25
	City Garage	0	0	0.55	0.96	0.33
	WPCF			1.03	1.31	0.26

Date	Sample Identification	TC	EC	CL2 Free	CL2 Total	NTU
	Coop Gas Bar	0	0	1.39	1.69	0.47
	PDGH			1.11	1.52	0.29
	Husky	0	0	0.77	1.26	0.32
	Tim Hortons			0.47	0.85	0.24
	Craig Dunn	0	0	0.81	1.08	0.18
	Island Park			0.40	0.83	0.30
	Firehall	0	0	0.40	0.82	0.40
10-May-22	RAW	>200	8	n/a	n/a	221.00
	WTP	0	0	1.72	2.19	0.10
	Nutri-Pea	0	0	0.46	0.92	0.14
	City Garage			0.32	0.80	0.29
	WPCF	0	0	0.80	1.28	0.32
	Coop Gas Bar			1.30	1.70	0.40
	PDGH	0	0	1.16	1.53	0.28
	Husky			0.50	0.89	0.36
	Tim Hortons	0.28	0.03	1.30	1.74	0.28
	Craig Dunn			1.19	1.89	0.18
	Island Park	0	0	1.31	1.79	0.18
	Firehall			0.22	0.48	0.56
17-May-22	RAW	>200	11	0.00	0.00	0.00
	WTP	0	0	1.70	2.08	0.10
	Nutri-Pea			n/a	n/a	n/a
	City Garage	0	0	0.16	0.54	0.39
	WPCF			0.86	1.17	0.21
	Coop Gas Bar	0	0	0.92	1.24	0.34
	PDGH			1.03	1.32	0.26
	Husky	0	0	0.77	1.09	0.33
	Tim Hortons			0.29	0.58	0.20
	Craig Dunn	0	0	0.40	0.68	0.27
	Island Park			0.22	0.54	0.32
	Firehall	0	0	0.12	0.44	0.56
24-May-22	RAW	>200	14	n/a	n/a	238.00
	WTP	0	0	1.88	2.20	0.09
	Nutri-Pea	0	0	0.77	1.13	0.15
	City Garage			0.80	1.21	0.13
	WPCF	0	0	1.44	1.79	0.05
	Coop Gas Bar			1.51	1.89	0.15
	PDGH	0	0	1.33	1.70	0.20
	Husky			0.81	1.18	0.30
	Tim Hortons	0	0	0.53	0.83	0.13
	Craig Dunn			0.74	1.13	0.12
	Island Park	0	0	0.58	0.94	0.20

Date	Sample Identification	TC	EC	CL2 Free	CL2 Total	NTU
	Firehall			0.68	1.04	0.28
31-May-22	RAW	>200	0			
	WTP	0	0	2.01	2.40	0.10
	Nutri-Pea			0.31	0.58	0.09
	City Garage	0	0	0.36	0.68	0.20
	WPCF			0.77	1.18	0.07
	Coop Gas Bar	0	0	0.25	0.98	0.09
	PDGH			1.31	1.49	0.17
	Husky	0	0	0.41	0.58	0.22
	Tim Hortons			0.14	0.56	0.08
	Craig Dunn	0	0	1.05	1.61	0.05
	Island Park			0.11	0.41	0.14
	Firehall	0	0	0.17	0.51	0.51
07-Jun-22	RAW	>200	11	-	-	64.90
	WTP	0	0	2.08	2.40	0.09
	Nutri-Pea	0	0	1.25	1.73	0.08
	City Garage			0.35	0.81	0.40
	WPCF	0	0	0.14	0.49	0.31
	Coop Gas Bar			1.36	1.87	0.20
	PDGH	0	0	0.96	1.56	0.13
	Husky			0.58	1.58	0.21
	Tim Hortons	0	0	0.34	0.82	0.21
	Craig Dunn			n/a	n/a	n/a
	Island Park	0	0	0.34	0.82	0.34
	Firehall			0.11	0.47	0.37
14-Jun-22	RAW	>200	95	n/a	n/a	42.00
	WTP	0	0	2.09	2.38	0.10
	Nutri-Pea			0.52	1.04	0.02
	City Garage	0	0	0.16	0.40	0.48
	WPCF			1.14	1.54	0.40
	Coop Gas Bar	0	0	0.76	1.37	0.24
	PDGH			0.90	1.46	0.12
	Husky	0	0	1.18	1.63	0.20
	Tim Hortons			0.83	1.48	0.19
	Craig Dunn	0	0	1.40	1.87	0.29
	Island Park			0.39	0.87	0.21
	Firehall	0	0	0.21	0.48	0.04
21-Jun-22	RAW	200	38	-	-	71.00
	WTP	0	0	1.68	2.13	0.10
	Nutri-Pea	0	0	0.17	0.48	0.10
	City Garage			0.10	0.29	0.29
	WPCF	0	0	0.51	0.91	0.23

Date	Sample Identification	TC	EC	CL2 Free	CL2 Total	NTU
	Coop Gas Bar			0.60	1.00	0.31
	PDGH	0	0	0.68	1.08	0.23
	Husky			0.28	0.91	0.29
	Tim Hortons	0	0	0.16	0.55	0.09
	Craig Dunn			1.03	1.34	0.22
	Island Park	0	0	0.72	1.12	0.17
	Firehall			0.11	0.35	0.41
28-Jun-22	RAW	>200	10	-	-	26.60
	WTP	0	0	2.50	3.00	0.08
	Nutri-Pea			1.04	1.45	0.11
	City Garage	0	0	0.26	0.65	0.59
	WPCF			1.02	1.63	0.23
	Coop Gas Bar	absent	absent	1.69	2.20	0.05
	PDGH			1.22	1.70	0.02
	Husky	absent	absent	1.17	1.60	0.33
	Tim Hortons			0.58	1.07	0.16
	Craig Dunn	0	0	1.90	2.30	0.07
	Island Park			1.07	1.45	0.28
	Firehall	0	0	0.15	0.40	0.63
05-Jul-22	RAW	165	25	-	-	40.80
	WTP	0	0	1.82	2.60	0.09
	Nutri-Pea	0	0	0.28	0.76	0.28
	City Garage			0.18	0.36	0.48
	WPCF	0	0	0.65	1.10	0.11
	Coop Gas Bar			1.01	1.43	0.30
	PDGH	0	0	0.67	1.12	0.04
	Husky			0.33	1.01	0.30
	Tim Hortons	0	0	0.42	0.91	0.19
	Craig Dunn			1.03	1.51	0.09
	Island Park	0	0	0.41	0.89	0.29
	Firehall			0.18	0.48	0.34
12-Jul-22	RAW	18	0	-	-	57.10
	WTP	0	0	2.10	2.70	0.11
	Nutri-Pea			0.18	0.50	0.08
	City Garage	0	0	0.11	0.28	0.52
	WPCF			0.50	0.98	0.02
	Coop Gas Bar	0	0	1.01	1.53	0.11
	PDGH			0.87	1.38	0.24
	Husky	0	0	0.59	1.14	0.10
	Tim Hortons			0.47	0.89	0.19
	Craig Dunn	0	0	1.24	1.78	0.05
	Island Park			0.26	0.67	0.27

Date	Sample Identification	TC	EC	CL2 Free	CL2 Total	NTU
	Firehall	0	0	0.10	0.33	0.67
19-Jul-22	RAW	>200	50	0.00	0.00	107.00
	WTP	0	0	1.80	2.20	0.08
	Nutri-Pea	0	0	0.14	0.61	0.31
	City Garage			0.11	0.38	0.29
	WPCF	0	0	1.05	1.41	0.15
	Coop Gas Bar			0.78	1.33	0.03
	PDGH	0	0	0.80	1.30	0.37
	Husky			0.85	1.27	0.31
	Tim Hortons	0	0	0.56	0.97	0.34
	Craig Dunn			0.18	0.53	0.14
	Island Park	0	0	0.69	1.19	0.24
	Firehall			0.10	0.30	0.33
26-Jul-22	RAW	>200	9	N/A	N/A	45.00
	WTP	0	0	1.42	1.89	0.10
	Nutri-Pea			0.33	0.80	0.59
	City Garage	0	0	0.21	0.47	0.65
	WPCF			0.92	1.41	0.08
	Coop Gas Bar	0	0	0.88	1.38	0.09
	PDGH			0.70	1.21	0.23
	Husky	0	0	0.62	1.10	0.63
	Tim Hortons			0.77	1.32	0.00
	Craig Dunn	0	0	1.21	1.62	0.40
	Island Park			0.49	0.86	0.23
	Firehall	0	0	0.16	0.38	0.46
02-Aug-22	RAW	>200	8	-	-	48.60
	WTP	0	0	1.74	2.11	0.10
	Nutri-Pea	0	0	0.18	0.33	0.22
	City Garage			0.12	0.20	5.15
	WPCF	0	0	0.80	1.20	0.36
	Coop Gas Bar			0.88	1.35	0.12
	PDGH	0	0	0.78	1.15	0.24
	Husky			0.45	1.23	0.42
	Tim Hortons	0	0	0.24	0.63	0.35
	Craig Dunn			0.68	1.03	0.31
	Island Park	0	0	0.14	0.33	0.51
	Firehall			0.26	0.31	0.74
09-Aug-22	RAW	>200	9	-	-	32.90
	WTP	0	0	2.15	2.50	0.07
	Nutri-Pea			0.48	0.60	0.53
	City Garage	0	0	0.11	0.33	0.69
	WPCF			1.06	1.58	0.11

Date	Sample Identification	TC	EC	CL2 Free	CL2 Total	NTU
	Coop Gas Bar	0	0	1.07	1.59	0.07
	PDGH			0.89	1.49	0.28
	Husky	0	0	1.10	1.53	0.06
	Tim Hortons			0.76	1.09	0.32
	Craig Dunn	0	0	1.47	1.78	0.06
	Island Park			1.01	1.45	0.09
	RCMP	0	0	0.12	0.36	0.54
16-Aug-22	RAW	>200	59	-	-	28.60
	WTP	0	0	2.11	2.50	0.07
	Nutri-Pea	0	0	1.20	1.70	0.11
	City Garage			0.10	0.34	0.28
	WPCF	0	0	0.17	0.55	0.31
	Coop Gas Bar			1.33	1.65	0.21
	PDGH	0	0	1.17	1.62	0.32
	Husky			0.93	1.39	0.27
	Tim Hortons	0	0	0.73	1.21	0.20
	Craig Dunn			n/a	n/a	n/a
	Island Park	0	0	0.71	1.15	0.50
	Firehall			0.11	0.37	0.33
23-Aug-22	RAW	>200	21	n/a	n/a	21.70
	WTP	0	0	1.64	2.01	0.10
	Nutri-Pea			0.10	0.43	0.30
	City Garage	0	0	0.17	0.36	0.28
	WPCF			0.98	1.13	0.79
	Coop Gas Bar	0	0	0.70	0.94	0.22
	PDGH			0.64	1.11	0.23
	Husky	0	0	0.62	0.96	0.20
	Tim Hortons			0.60	1.04	0.11
	Craig Dunn	0	0	1.12	1.60	0.06
	Island Park			0.69	0.95	0.15
	Firehall	0	0	0.14	0.33	0.67
30-Aug-22	RAW	165	32	N/A	N/A	29.70
	WTP	0	0	1.47	1.88	0.07
	Nutri-Pea	0	0	0.17	0.52	0.46
	City Garage			0.21	0.57	0.20
	WPCF	0	0	0.77	1.19	0.21
	Coop Gas Bar			1.04	1.49	0.49
	PDGH	0	0	0.71	1.12	0.39
	Husky			0.26	0.48	0.26
	Tim Hortons	0	0	0.40	0.68	0.06
	Craig Dunn			0.91	1.22	0.18
	Island Park	0	0	0.77	1.29	0.36

Date	Sample Identification	TC	EC	CL2 Free	CL2 Total	NTU
	Firehall			0.11	0.27	0.86
06-Sep-22	RAW	41	0	-	-	32.30
	WTP	0	0	1.34	1.72	0.06
	Nutri-Pea			0.24	0.71	0.29
	City Garage	0	0	0.10	0.34	0.77
	WPCF			0.40	0.82	0.13
	Coop Gas Bar	0	0	0.81	1.24	0.03
	PDGH			0.23	0.87	0.27
	Husky	0	0	0.36	0.79	0.30
	Tim Hortons			0.20	0.46	0.19
	Craig Dunn	0	0	0.55	0.93	0.13
	Island Park			0.11	0.31	0.33
	Firehall	0	0	0.10	0.32	0.57
13-Sep-22	RAW	>200	45	n/a	n/a	32.00
	WTP	0	0	2.04	2.41	0.05
	Nutri-Pea	0	0	0.66	1.11	0.29
	City Garage			0.24	0.55	0.19
	WPCF	0	0	0.76	1.38	0.10
	Coop Gas Bar			1.05	1.54	0.07
	PDGH	0	0	1.32	1.81	0.24
	Husky			0.36	0.98	0.29
	Tim Hortons	0	0	0.60	1.28	0.04
	Craig Dunn			0.99	1.51	0.17
	Island Park	0	0	0.21	0.50	0.30
	Firehall			0.20	0.48	0.42
20-Sep-22	RAW	>200	200	N/A	N/A	35.50
	WTP	0	0	1.93	2.40	0.06
	Nutri-Pea			0.92	1.23	0.35
	City Garage	0	0	0.55	0.99	0.61
	WPCF			0.97	1.46	0.13
	Coop Gas Bar	0	0	1.62	2.03	0.07
	PDGH			1.15	1.71	0.54
	Husky	0	0	0.75	1.22	0.39
	Tim Hortons			0.67	0.92	0.12
	Craig Dunn	0	0	1.00	1.23	0.03
	Island Park			0.26	0.64	0.21
	Firehall	0	0	0.18	0.58	0.53
27-Sep-22	RAW	>200	78	n/a	n/a	30.30
	WTP	absent	absent	1.92	2.50	0.06
	Nutri-Pea	0	0	0.95	1.28	0.27
	City Garage			0.18	0.47	0.33
	WPCF	0	0	1.09	1.45	0.14

Date	Sample Identification	TC	EC	CL2 Free	CL2 Total	NTU
	Coop Gas Bar			1.34	1.77	0.19
	PDGH	0	0	1.20	1.57	0.24
	Husky			0.69	1.10	0.31
	Tim Hortons	0	0	0.61	0.98	0.29
	Craig Dunn			n/a	n/a	n/a
	Island Park	0	0	0.57	0.93	0.22
	Firehall			0.17	0.46	0.28
04-Oct-22	RAW	>200	83	n/a	n/a	40.00
	WTP	0	0	1.97	2.50	0.08
	Nutri-Pea			0.74	1.14	0.05
	City Garage	0	0	0.60	1.00	2.53
	WPCF			1.07	1.41	0.12
	Coop Gas Bar	0	0	1.33	1.83	0.12
	PDGH			1.05	1.48	0.37
	Husky	0	0	0.42	0.80	0.27
	Tim Hortons			0.53	0.86	0.02
	Craig Dunn	0	0	0.88	1.25	0.11
	Island Park			0.59	0.95	0.47
	Firehall	0	0	0.20	0.47	0.59
11-Oct-22	RAW	>200	53	n/a	n/a	32.90
	WTP	0	0	1.67	2.01	0.05
	Nutri-Pea	0	0	0.74	1.13	0.23
	City Garage			0.37	0.76	0.42
	WPCF	0	0	0.90	1.33	0.18
	Coop Gas Bar			1.20	1.60	0.16
	PDGH	0	0	0.92	1.58	0.27
	Husky			0.30	0.62	0.24
	Tim Hortons	0	0	0.42	0.86	0.25
	Craig Dunn			0.89	1.18	0.22
	Island Park	0		0.48	0.85	0.25
	Firehall			0.26	0.63	0.22
18-Oct-22	RAW	53	0	n/a	n/a	26.50
	WTP	0	0	1.58	1.89	0.05
	Nutri-Pea			0.60	0.95	0.50
	City Garage	0	0	0.48	0.92	0.29
	WPCF			0.97	1.31	0.27
	Coop Gas Bar	0	0	1.32	1.74	0.44
	PDGH			1.12	1.59	0.55
	Husky	0	0	0.96	1.24	0.25
	Tim Hortons			0.33	0.61	0.10
	Craig Dunn	0	0	0.80	1.18	0.22
	Island Park			0.29	0.68	0.22

Date	Sample Identification	TC	EC	CL2 Free	CL2 Total	NTU
	Firehall	0	0	0.21	0.53	0.73
25-Oct-22	RAW	200	101	n/a	n/a	31.60
	WTP	0	0	1.50	1.83	0.06
	Nutri-Pea	0	0	0.57	0.83	0.28
	City Garage			0.24	0.50	0.55
	WPCF	0	0	0.61	1.04	0.36
	Coop Gas Bar			1.37	1.60	0.12
	PDGH	0	0	1.17	1.41	0.30
	Husky			0.77	1.09	0.32
	Tim Hortons	0	0	0.44	0.65	0.07
	Craig Dunn			1.30	1.58	0.09
	Island Park	0	0	0.49	0.80	0.37
	Firehall			0.19	0.48	0.49
01-Nov-22	RAW	29	0	N/A	N/A	55.90
	WTP	0	0	1.59	2.02	0.07
	Nutri-Pea			0.41	0.68	0.09
	City Garage	0	0	0.14	0.39	0.49
	WPCF			0.69	0.92	0.12
	Coop Gas Bar	0	0	1.24	1.70	0.17
	PDGH			0.66	1.07	0.04
	Husky	0	0	1.11	1.35	0.09
	Tim Hortons			0.64	0.80	0.15
	Craig Dunn	0	0	1.32	1.82	0.33
	Island Park			0.47	0.93	0.65
	Firehall	0	0	0.10	0.37	0.95
08-Nov-22	RAW	>200	9	N/A	N/A	39.60
	WTP	0	0	1.19	1.59	0.11
	Nutri-Pea	0	0	0.26	0.48	0.10
	City Garage			0.29	0.74	0.29
	WPCF	0	0	0.50	1.01	0.20
	Coop Gas Bar			0.76	1.32	0.15
	PDGH	0	0	0.92	1.45	0.06
	Husky			0.48	0.98	0.07
	Tim Hortons	0	0	0.49	0.96	0.31
	Craig Dunn			1.04	1.61	0.30
	Island Park	0		0.40	0.89	0.29
	Firehall			0.21	0.58	0.81
15-Nov-22	RAW	11	0	N/A	N/A	12.50
	WTP	0	0	1.72	2.20	0.08
	Nutri-Pea			0.12	0.42	0.45
	City Garage	0	0	0.11	0.38	0.86
	WPCF			0.49	1.08	0.30

Date	Sample Identification	TC	EC	CL2 Free	CL2 Total	NTU
	Coop Gas Bar	0	0	0.35	0.74	0.25
	PDGH			0.38	0.75	0.37
	Husky	0	0	0.15	0.55	0.60
	Tim Hortons			0.27	0.68	0.31
	Craig Dunn	0	0	1.33	1.81	0.27
	Island Park			0.55	1.02	0.23
	Firehall	0		0.12	0.48	0.75
22-Nov-22	RAW	200	8	N/A	N/A	14.50
	WTP	0	0	1.69	2.04	0.06
	Nutri-Pea			0.00	0.00	0.00
	City Garage	0	0	0.41	0.70	0.50
	WPCF	0	0	0.65	1.25	0.08
	Coop Gas Bar			1.36	1.66	0.20
	PDGH	0	0	1.15	1.46	0.32
	Husky			0.75	1.08	0.42
	Tim Hortons	0	0	0.91	1.19	0.21
	Craig Dunn			1.56	1.82	0.17
	Island Park	0	0	0.94	1.21	0.22
	Firehall			0.34	0.58	0.77
29-Nov-22	RAW	>200	4	N/A	N/A	38.80
	WTP	0	0	1.55	1.88	0.06
	Nutri-Pea	0	0	0.44	0.81	0.27
	City Garage			0.13	0.41	0.61
	WPCF	0	0	0.61	1.07	0.03
	Coop Gas Bar			1.18	1.46	0.09
	PDGH	0	0	1.10	1.29	0.14
	Husky			0.76	1.04	0.30
	Tim Hortons	0	0	0.40	0.73	0.10
	Craig Dunn			1.05	1.47	0.14
	Island Park	0		0.37	0.60	0.16
	Firehall			0.14	0.41	0.38
06-Dec-22	RAW	>200	0	n/a	n/a	25.50
	WTP	0	0	1.72	2.20	0.06
	Nutri-Pea			0.36	0.87	0.26
	City Garage	0	0	0.42	1.00	0.28
	WPCF			n/a	n/a	n/a
	Coop Gas Bar	0	0	1.22	1.62	0.31
	PDGH			0.88	1.48	0.22
	Husky	0	0	0.78	1.27	0.44
	Tim Hortons			0.32	0.84	0.41
	Craig Dunn	0	0	0.61	1.28	0.14
	Island Park			n/a	n/a	n/a

Date	Sample Identification	TC	EC	CL2 Free	CL2 Total	NTU
	Firehall	0	0	0.11	0.53	0.59
13-Dec-22	RAW	165	5	N/A	N/A	16.00
	WTP	0	0	1.49	1.94	0.07
	Nutri-Pea	0	0	0.26	0.49	0.21
	City Garage			0.24	0.41	0.78
	WPCF	0	0	0.52	1.02	0.09
	Coop Gas Bar			0.93	1.00	0.11
	PDGH	0	0	1.01	1.50	0.14
	Husky			0.42	0.87	0.30
	Tim Hortons	0	0	0.49	0.95	0.36
	Craig Dunn			1.49	1.91	0.12
	Island Park	0	0	0.21	0.68	0.32
	Firehall			0.18	0.48	0.50
20-Dec-22	RAW	4	0			
	WTP	0	0	n/a	n/a	13.20
	Nutri-Pea			1.16	1.76	0.08
	City Garage	0	0	0.48	0.76	0.28
	WPCF			0.33	0.88	0.34
	Coop Gas Bar	0	0	0.65	1.24	0.50
	PDGH			0.36	0.77	0.15
	Husky	0	0	0.58	1.09	0.25
	Tim Hortons			0.56	1.03	0.38
	Craig Dunn	0	0	0.53	0.80	0.38
	Island Park			0.53	1.11	0.04
	Firehall	0	0	0.19	0.70	0.10
28-Dec-22	RAW	145	2	N/A	N/A	18.50
	WTP	0	0	1.22	1.76	0.07
	Nutri-Pea	0	0	0.75	1.02	0.33
	City Garage			0.54	0.84	0.40
	WPCF	0	0	1.10	1.72	0.08
	Coop Gas Bar			1.28	1.60	0.10
	PDGH	0	0	1.27	1.66	0.16
	Husky			1.11	1.46	0.27
	Tim Hortons	0	0	1.03	1.39	0.21
	Craig Dunn			1.22	1.55	0.07
	Island Park	0	0	0.89	1.12	0.24
	Firehall			0.25	0.59	0.37

Appendix D: THM & HAA

Trihalomethane Results (max 0.1 mg/l)

WATER SYSTEM NAME	FEB	MAY	AUG	NOV	AVG THM (mg/L)
MB Hydro			0.0508	0.0383	0.0446
Fire Hall	0.0375	0.118	0.0852	0.0546	0.0738
Craig Dunn	0.0192	0.114	0.0753	0.0241	0.0582
City Garage	0.0440	0.119	0.0967	0.0521	0.0780
Husky	0.0313	0.104			0.0677

Haloacetic Acids Results (max 0.8mg/l)

WATER SYSTEM NAME	FEB	MAY	AUG	NOV	AVG HAA (mg/L)
Portage Hospital	0.0107	0.0419	0.0255	0.0151	0.0233
Tim Hortons - Downtown	0.0237	0.0696	0.0156	0.0197	0.0322
Fire Hall	0.0171	0.0559	0.0178	0.0183	0.0273
City Hall	0.0169	0.0588	0.0285	0.0211	0.0313

Appendix E: General Chemistry and Metals

Inorganic and Organic Testing **May-22**

Physical Tests (Water)

			ALS ID		
			Sampled Date		
			Sampled Time		
			Sample ID	Portage la Prairie 1 - Raw	Portage la Prairie 2 - Treated
Analyte	**Unit**	**Guide Limit #1**	**Guide Limit #2**		
Color, True	CU	15	-	48.9	<5.0
Conductivity	umhos/cm	-	-	782	647
Hardness (as CaCO3)	mg/L	-	-	402	218
Langelier Index (4 C)	No Unit	-	-	0.78	0.04

Langelier Index (60 C)	No Unit	-	-	1.5	0.80
pH	pH units	7.00-10.5	-	8.27	7.96
Total Dissolved Solids	mg/L	500	-	520	414
Transmittance, UV (254 nm)	% T	-	-	34.7	83.8
Turbidity	NTU	-	-	94.9	<0.10

Federal Guidelines for Canadian Drinking Water Quality (MAR, 2015)

#1: GCDWQ - Aesthetic Objective

#2: GCDWQ - Maximum Acceptable Concentrations (MACs)

Anions and Nutrients (Water)

			ALS ID		
			Sampled Date		
			Sampled Time		
			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	-	-	218	88.6
Ammonia, Total (as N)	mg/L	-	-	0.107	<0.010
Bicarbonate (HCO3)	mg/L	-	-	266	108
Bromate	mg/L	-	0.01		0.00045
Bromide (Br)	mg/L	-	-	0.048	<0.010
Carbonate (CO3)	mg/L	-	-	<0.60	<0.60
Chloride (Cl)	mg/L	250	-	16.2	22.8
Fluoride (F)	mg/L	-	1.5	0.160	0.738
Hydroxide (OH)	mg/L	-	-	<0.34	<0.34
Nitrate (as N)	mg/L	-	10	0.938	1.23
Nitrite (as N)	mg/L	-	1	0.0449	<0.0010
Sulfate (SO4)	mg/L	500	-	197	193

Federal Guidelines for Canadian Drinking Water Quality (MAR, 2015)

#1: GCDWQ - Aesthetic Objective

#2: GCDWQ - Maximum Acceptable Concentrations (MACs)

Organic / Inorganic Carbon (Water)

			ALS ID		
			Sampled Date		
			Sampled Time		
			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	-	-	13.8	6.28
Total Organic Carbon	mg/L	-	-	11.6	5.62

Federal Guidelines for Canadian Drinking Water Quality (MAR, 2015)

#1: GCDWQ - Aesthetic Objective

#2: GCDWQ - Maximum Acceptable Concentrations (MACs)

Total Metals (Water)

			ALS ID		
			Sampled Date		
			Sampled Time		
			Sample ID	Portage la Prairie 1 - Raw	Portage la Prairie 2 - Treated
Analyte	**Unit**	**Guide Limit #1**	**Guide Limit #2**		
Aluminum (Al)-Total	mg/L	0.1	-	0.772	0.0128
Antimony (Sb)-Total	mg/L	-	0.006	0.00030	0.00027
Arsenic (As)-Total	mg/L	-	0.01	0.00657	0.00075
Barium (Ba)-Total	mg/L	-	1	0.101	0.0622
Beryllium (Be)-Total	mg/L	-	-	0.00012	<0.00010
Bismuth (B)-Total	mg/L	-	-	<0.00050	<0.000050
Boron (B)-Total	mg/L	-	5	0.093	0.049
Cadmium (Cd)-Total	mg/L	-	0.005	0.000121	<0.0000050
Calcium (Ca)-Total	mg/L	-	-	82.3	69
Cesium (Cs)-Total	mg/L	-	-	0.000100	0.000025
Chromium (Cr)-Total	mg/L	-	0.05	0.00121	0.00051
Cobalt (Co)-Total	mg/L	-	-	0.00198	<0.00010
Copper (Cu)-Total	mg/L	1	2	0.00596	0.0267
Iron (Fe)-Total	mg/L	0.3	-	2.31	<0.010
Lead (Pb)-Total	mg/L	-	0.005	0.00234	<0.000050
Lithium (Li)-Total	mg/L	-	-	0.0589	0.544
Magnesium (Mg)-Total	mg/L	-	-	47.8	11.2
Manganese (Mn)-Total	mg/L	0.02	0.12	0.343	0.00057
Molybdenum (Mo)-Total	mg/L	-	-	0.00187	0.00291
Nickel (Ni)-Total	mg/L	-	-	0.00818	0.0012
Phosphorus (P)-Total	mg/L	-	-	0.381	0.471
Potassium (K)-Total	mg/L	-	-	11.5	11.8
Rubidium ((Rb)-Total	mg/L	-	-	0.00386	0.00338
Selenium (Se)-Total	mg/L	-	0.05	0.00079	0.000806
Silicon (Si)-Total	mg/L	-	-	12.1	2.72
Silver (Ag)-Total	mg/L	-	-	<0.000010	<0.000010
Sodium (Na)-Total	mg/L	200	-	42	50.7
Strontium (Sr)-Total	mg/L	-	-	0.286	0.201
Sulfur (S)-Total	mg/L	-	-		
Tellurium (Te)-Total	mg/L	-	-	<0.00020	<0.00020
Thallium (Tl)-Total	mg/L	-	-	0.000046	0.000015
Thorium (Th)-Total	mg/L	-	-	0.00033	<0.00010
Tin (Sn)-Total	mg/L	-	-	<0.00010	<0.00010
Titanium (Ti)-Total	mg/L	-	-	0.0128	<0.00030
Tungsten (W)-Total	mg/L	-	-	<0.00010	<0.00010

Uranium (U)-Total	mg/L	-	0.02	0.0037	0.000102
Vanadium (V)-Total	mg/L	-	-	0.007	0.00182
Zinc (Zn)-Total	mg/L	5	-	0.0119	<0.0030
Zirconium (Zr)-Total	mg/L	-	-	0.00177	<0.00020

Federal Guidelines for Canadian Drinking Water Quality (MAR, 2015)

#1: GCDWQ - Aesthetic Objective

#2: GCDWQ - Maximum Acceptable Concentrations (MACs)

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.**

Inorganic and Organic Testing

Dec-22

Physical Tests (Water)

			ALS ID		
			Sampled Date		
			Sampled Time		
			Sample ID	Portage la Prairie 1 - Raw	Portage la Prairie 2 - Treated
Analyte	**Unit**	**Guide Limit #1**	**Guide Limit #2**		
Color, True	CU	15	-	19.5	<5.0
Conductivity	umhos/cm	-	-	1320	967
Hardness (as CaCO3)	mg/L	-	-	574	239
Langelier Index (4 C)	No Unit	-	-	1.3	-0.420
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	-	-	52.1	84.5
Turbidity	NTU	-	-	24.4	<0.10

Federal Guidelines for Canadian Drinking Water Quality (MAR, 2015)

#1: GCDWQ - Aesthetic Objective

#2: GCDWQ - Maximum Acceptable Concentrations (MACs)

Anions and Nutrients (Water)

			ALS ID		
			Sampled Date		
			Sampled Time		
			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
Ammonia, Total (as N)	mg/L	-	-	0.041	0.02
Bicarbonate (HCO3)	mg/L	-	-	445	90.3
Bromate	mg/L	-	10		<0.00078
Bromide (Br)	mg/L	-	-	0.074	0.04
Carbonate (CO3)	mg/L	-	-	10.90	<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	<0.0020
Sulfate (SO4)	mg/L	500	-	329	325

Federal Guidelines for Canadian Drinking Water Quality (MAR, 2015)

#1: GCDWQ - Aesthetic Objective

#2: GCDWQ - Maximum Acceptable Concentrations (MACs)

Organic / Inorganic Carbon (Water)

			ALS ID		
			Sampled Date		
			Sampled Time		
			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, 2015)

#1: GCDWQ - Aesthetic Objective

#2: GCDWQ - Maximum Acceptable Concentrations (MACs)

Total Metals (Water)

			ALS ID		
			Sampled Date		
			Sampled Time		
			Sample ID	Portage la Prairie 1 - Raw	Portage la Prairie 2 - Treated

Analyte	Unit	Guide Limit #1	Guide Limit #2		
Aluminum (Al)-Total	mg/L	0.1	-	0.549	0.0084
Antimony (Sb)-Total	mg/L	-	0.006	0.00018	0.00018
Arsenic (As)-Total	mg/L	-	0.01	0.00436	0.00076
Barium (Ba)-Total	mg/L	-	1	0.129	0.0351
Beryllium (Be)-Total	mg/L	-	-	<0.00010	<0.00010
Bismuth (B)-Total	mg/L	-	-	<0.000050	<0.000050
Boron (B)-Total	mg/L	-	5	0.170	0.072
Cadmium (Cd)-Total	mg/L	-	0.005	0.000034	<0.0000050
Calcium (Ca)-Total	mg/L	-	-	109	43.3
Cesium (Cs)-Total	mg/L	-	-	0.000095	0.000036
Chromium (Cr)-Total	mg/L	-	0.05	0.00143	0.00056
Cobalt (Co)-Total	mg/L	-	-	0.00072	<0.00010
Copper (Cu)-Total	mg/L	1	2	0.00271	0.012
Iron (Fe)-Total	mg/L	0.3	-	1.24	<0.010
Lead (Pb)-Total	mg/L	-	0.005	0.000637	<0.000050
Lithium (Li)-Total	mg/L	-	-	0.0832	0.0806
Magnesium (Mg)-Total	mg/L	-	-	73.7	31.8
Manganese (Mn)-Total	mg/L	0.02	0.12	0.104	0.00013
Molybdenum (Mo)-Total	mg/L	-	-	0.00381	0.00398
Nickel (Ni)-Total	mg/L	-	-	0.00515	0.00098
Phosphorus (P)-Total	mg/L	-	-	0.121	0.424
Potassium (K)-Total	mg/L	-	-	14.7	15.4
Rubidium ((Rb)-Total	mg/L	-	-	0.00308	0.00319
Selenium (Se)-Total	mg/L	-	0.05	0.000557	0.000393
Silicon (Si)-Total	mg/L	-	-	10.3	3.58
Silver (Ag)-Total	mg/L	-	-	<0.000010	<0.000010
Sodium (Na)-Total	mg/L	200	-	98.0	113
Strontium (Sr)-Total	mg/L	-	7	0.493	0.212
Sulfur (S)-Total	mg/L	-	-		
Tellurium (Te)-Total	mg/L	-	-	<0.00020	<0.00020
Thallium (Tl)-Total	mg/L	-	-	0.000019	<0.000010
Thorium (Th)-Total	mg/L	-	-	0.00018	<0.00010
Tin (Sn)-Total	mg/L	-	-	<0.00010	<0.00010
Titanium (Ti)-Total	mg/L	-	-	0.0160	<0.00030
Tungsten (W)-Total	mg/L	-	-	<0.00010	<0.00010
Uranium (U)-Total	mg/L	-	0.02	0.00417	0.000126
Vanadium (V)-Total	mg/L	-	-	0.00314	0.00164
Zinc (Zn)-Total	mg/L	5	-	0.0050	<0.0030
Zirconium (Zr)-Total	mg/L	-	-	0.00086	<0.00020

Federal Guidelines for Canadian Drinking Water Quality (MAR, 2015)

#1: GCDWQ - Aesthetic Objective

#2: GCDWQ - Maximum Acceptable Concentrations (MACs)

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 F –Results from Random Daytime Lead Testing

Summary of 2022 Water System Random Daytime Residential Lead Testing
City of Portage la Prairie
January 17, 2023

Background

In 2020, the new Canadian Drinking Water Guideline for lead in drinking water was adopted in Manitoba. Due to the latest information about health effects from lower levels of lead exposure, the standard for total lead in drinking water was decreased from 0.01 mg/L to 0.005 mg/L.

The Office of Drinking Water, under the Province of Manitoba Environment, Climate and Parks department, in collaboration with Manitoba Public Health, is working with water systems to implement the new standard. Portage la Prairie was required to conduct random daytime (RDT) residential sampling for lead in 2022.

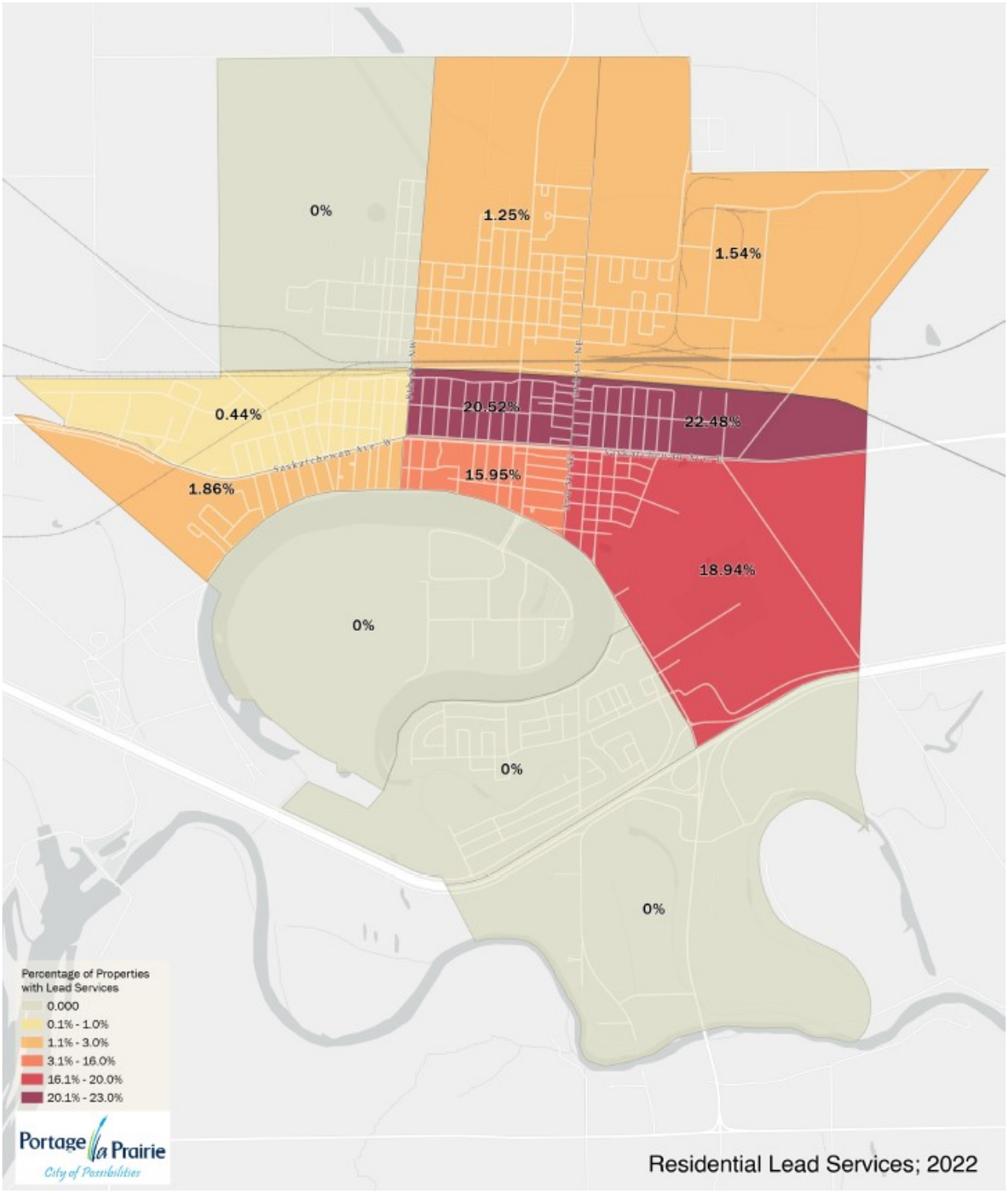
All water entering the City of Portage la Prairie (The City) distribution system from the water treatment plant meets the standard for lead and the total lead concentrations are often below the laboratory detection limit. The sources of lead in the water are usually related to lead service connections, lead solder in the plumbing of the home or lead plumbing fixtures. Therefore, testing at the tap in residential homes is the only way to determine if lead levels in drinking water are a concern.

Sampling program

The City was required to select 40 sample locations for representative RDT lead water sampling and reporting each year, in addition to the City's current self-administered lead and metals testing program. The City posted a request for volunteers via the City's website and social media, and a brochure/letter was included in water bills in the spring of 2022. Over 100 homeowners volunteered. Due to the overwhelming volume of applicants for lead in drinking water testing in the home, it was decided to focus mainly on homes likely to have lead water service lines. See the map of the area of homes prioritized for testing below or: Lead in Drinking Water Testing Program – City of Portage la Prairie (City-plap.com). 80% of the samples in 2022 were taken from homes on eight streets from either side of Tupper Street and two blocks north or south of Saskatchewan Avenue. The remainder of the samples were scattered across the City.

City staff contacted 45 of the volunteers and total lead sampling kits, made up by water treatment plant staff, were dropped off at participants' homes to conduct the sampling themselves. Out of the 45 volunteers, 42 sets of samples were obtained and sent to ALS Laboratory for analysis.

Participants were asked to take two samples from their principal drinking water tap in their homes. The first sample was a random daytime (RDT) sample. The second sample was taken five minutes after the first, with the tap running for that time. The second sample helps determine whether flushing the water tap before use would reduce the lead values to below the standard. All results from participating residents were received by early October.


0%
1.25%
1.54%
0.44%
20.52%
22.48%
1.86%
15.95%
18.94%
0%
0%
0%
Percentage of Properties with Lead Services
0.000
0.1% - 1.0%
1.1% - 3.0%
3.1% - 16.0%
16.1% - 20.0%
20.1% - 23.0%
Portage la Prairie
City of Possibilities
Residential Lead Services; 2022

Summary of Results

The following table summarizes the 42 sets of results:

City of Portage la Prairie Lead Water Quality Test Results					
The City has about 300 known residential lead water service lines out of approximately 4500 services. The following samples were taken from locations that are thought to be more likely to have older homes or lead service lines (see map above):					
Sample Type	Average (mg/L)	Minimum (mg/L)	Maximum (mg/L)	Number of samples	% of samples above guideline limit (0.005 mg/L)
RDT	0.00427	0.00005	0.02870	42	28%
5 Minute Flush	0.00147	0.00005	0.00500	42	0.00%

After the results came back, homeowners were provided with their results, information on in-home lead mitigation, and information on the City's partial reimbursement program for lead water service line replacement.

For over 15 years, the City has had a corrosion control program in place to help reduce leaching of metals into the treated water from the distribution system and service line pipes. A side benefit of reducing corrosion is that it also lengthens the life of the City's watermains. The program involves the addition of orthophosphate and increasing the pH of the water before it leaves the water treatment plant. This combination helps create a protective coating on the pipes, and thereby reduces the transfer of metals, like lead, into the water.

While the City of Portage la Prairie has confirmed about 300 homes that have lead water service lines, it is suspected there are many more. It is not feasible to confirm every home's water service. Individuals who are not sure what type of service is in their home should consult a certified plumber or contractor.

Findings

Manitoba Public Health, in collaboration with the Office of Drinking Water, has reviewed these findings and provides the following analysis and advice:

> The findings from Portage la Prairie's drinking water testing in residential homes show that over one quarter of the higher risk homes tested had lead in drinking water levels above the guideline on a random daytime sample (RDT). However, after 5 minutes of flushing the water, all of the homes tested had lead in drinking water levels at or below the standard.
>
> The RDT test is meant to give a general idea of the lead levels in drinking water that residents may be exposed to if they are not flushing their water before using for drinking or cooking or not using a filter that reduces lead. This means residents living in homes with lead in the plumbing may be drinking water with increased lead levels if the water has not been recently flushed.

It is difficult to predict lead levels in homes since the plumbing can be different from house to house. Testing the lead levels in your water can help you make decisions on what actions are necessary. For information on having your water tested for lead please see: Lead in Drinking Water: Information for Manitoba Homeowners and Home-based Child Care Providers (gov.mb.ca) or you can volunteer for the City of Portage la Prairie testing program.

Steps to reduce lead exposure

Lead is a soft heavy metal. Fetuses, infants, and young children are more sensitive to lead exposure. Lead exposure can have effects on the intellectual development and behaviour of children, even at low levels. Other health effects, such as increased blood pressure and reduced kidney function have also been associated with relatively low levels of lead exposure.

To reduce lead exposure, it is recommended that:

- Residents living in **homes with lead service lines** can flush their water or take other steps to reduce lead exposure;

- Residents living in **older homes (especially older than 1960) or homes in areas more likely to have lead service lines** can determine if they have lead service lines and / or test their water for lead. Lead solder was used in plumbing up to 1990. The older the home, the greater likelihood of lead plumbing and fixtures.

- Residents living in homes with known lead service lines, older homes, or homes in the lead service line area with **infants, young children, or pregnant people or those planning to become pregnant should take precautions to prevent lead exposure**.

- If you know or are concerned that you have increased lead in your drinking water:
    - follow the flushing protocol and test the water from the tap most commonly used for drinking water to be sure lead levels are well below the standard, or
    - use a filter, which is NSF certified for removing lead, on their drinking water tap or a certified pitcher and maintain it according to manufacturer directions, or
    - use alternate water with low lead levels.
    - never use tap water to make infant formula unless you are sure that lead levels are well below the standard. Please see Infant Formula Factsheet.

Tips from Manitoba Public Health and Manitoba Environment, Climate and Parks for reducing lead in drinking water:

1. Avoid drinking tap water that has been sitting in the plumbing system for a long time. For example, flush the toilet, take a shower, or do a load of laundry first thing in the morning and after work to clear water from the service line and then run the tap water until the water is cold.
2. Only use cold water for cooking and drinking. You can fill a container with flushed cold water to use for drinking and cooking and put the container in the fridge for later use.
3. Flush the service line and plumbing system whenever water has been sitting for several hours by running the water for two to five minutes before using it for cooking or drinking.

Water drawn off initially may be used for other purposes, such as watering plants or washing dishes.

4. Instead of flushing you can use a filter (install on your tap or a use pitcher) that is NSF certified to reduce lead. Not all filters reduce lead.
5. Clean the aerator/screen of the drinking water tap every month to remove any lead particles that may be caught there.
6. Avoid drinking discoloured water as it may contain elevated lead. Flush the tap until the water runs clear.
7. Replace your lead service line or address other sources of lead in your plumbing (e.g., lead fixtures).
8. Lead in drinking water is only a concern when consumed. The water is safe to shower, bathe, wash dishes, wash hands, and clean clothes.
9. Boiling water will not reduce lead.

For more information on lead in drinking water, see Lead in Drinking Water: Information for Manitoba Homeowners and Home-based Child Care Providers (gov.mb.ca) and Quick Guide for Reducing Lead Exposure After Testing (gov.mb.ca).

The City is required to conduct this program annually and there will again be a call for volunteers in the spring of 2023 and the applications received in the spring of 2022 that were not chosen for sampling will be kept and added to the 2023 list.