

Water Treatment Plant Year-end Report for 2024

For Information Only

Water demand

The total influent volume of water drawn from the Assiniboine River for treatment in 2024 was very close to that in 2023, and about 21% higher than in 2020. 2024 had an influent volume of 9,617,934 m³ compared to 9,650,037 m³ in 2023.

The total treated volume of water pumped to the distribution system from the water treatment plant was approximately 8,866,354 in 2024, compared to 8,827,055 in 2023.

The volume of water used internally for the treatment process in 2024 was 182,093 m³ versus 203,846 m³ in 2023. This water is used in the process production for mixing chemicals, dilution of chemicals for pumping purposes, and flushing pipes after sludge removal from process systems.

Raw Water Quality

The raw water quality for 2024 was substantially better than 2023, with fewer turbidity spikes caused by the spring thaw, and ice jams on the Assiniboine River. The Actiflo clarifier was able to reduce any high levels of turbidity to minimize the impact on the downstream treatment process. The plant effluent turbidity rose slightly in the spring as usual. This is due to organics, and water chemistry changes as the near freezing water warms up.

The average raw water hardness for the winter months; January, February, March, October, November, and December 2024, was 408 ppm. The average raw water hardness for the other six months was 330 ppm. The treated water average hardness was 190 ppm and 170 ppm for the respective periods. The 2023 yearly average hardness for Raw Water was 386 ppm and Treated Water was 195 ppm.

Plant operation during fall freeze up was similar to an average year with no major problems.

Distribution System Water Quality

Distribution testing for 2024 was done on a weekly basis for Total Coliforms and Escherichia Coli. All Office of Drinking Water treatment parameters were met.

General Chemistry samplings were conducted on a semi-annual basis on the WTP Raw and finished water, and two other locations in the City. The samples were sent for the assessment of multiple water parameters, including routine, nutrients, metals, and non-metals. The samples were sent to an independent lab and all results were forwarded, by the

lab, to the Manitoba Conservation and Climate, Office of Drinking Water Officer for our area. The guidelines were met for all of these samples.

On March 8, 2019, Health Canada set new regulatory guidelines for lead in potable water. The new Canadian Drinking Water Quality Guideline maximum acceptable concentration (MAC) for total lead was lowered from 0.010 mg/L, set in 1992, to 0.005 mg/L. This is based on a sample of water taken at the consumer's tap.

Starting in 2022, the provincial Office of Drinking Water, partnered with Manitoba Health has mandated the City to do lead testing in forty residences per year. In 2024, 49 sets of samples were obtained from participants homes and tested for total lead. One sample was taken straight out of the tap without flushing and a second sample was taken after flushing the tap for 5 minutes. Many of the homes tested in 2024 had confirmed lead service lines.

The findings from Portage la Prairie's 2024 drinking water testing in residential homes show that 20.4% of the homes tested, had lead in drinking water levels above the guideline on a random day time sample (RDT). Keep in mind that over 85% of the samples taken in 2024 were from homes with lead service lines. However, after 5 minutes of flushing the water, 95.9 % of the higher risk homes tested, had decreased lead in drinking water levels at or below the standard.

More information may be obtained from the City's web page, and in the 2024 Public Water system annual report, including how the City mitigates corrosion to reduce lead exposure.

Water Quality Monitoring and Analyses

Each year, an annual water system report is to be completed by the City and submitted to Manitoba Conservation & Climate, Office of Drinking Water by March 31st. The Office of Drinking Water and the City of Portage la Prairie will continue implementing testing improvements at the Water Treatment Plant to enhance the water quality and will continue to work jointly with the local Drinking Water Officer.

The attached graphs for Hardness show the Raw Water followed a typical annual pattern, being softer after spring runoff and harder near year end. In January and February however, there were natural large jumps in the raw hardness that were harder to deal with. Overall, in 2024 the plant operators did a good job dealing with the hardness, the average finished total hardness was about 180 ppm much lower than the previous years, 195 ppm.

In 2024 the WTP experienced lower turbidity spikes than usual. The higher spring raw water turbidities impact was negligible on the effluent turbidities. None of the 2024 results were over the standard of 0.3 NTU for more than 12 hours.

Sodium hydroxide is added to help increase the pH of the finished water. However, final pH is difficult to control due to consistent fluctuations in the raw water pH. The raw water pH tends to follow seasonal trends for highs and lows, but often as in 2024 there are substantial variance within each season or sometimes even day to day. Sodium Hydroxide is added to help prevent metal corrosion, and the leaching of metals into the water from too low of a pH.

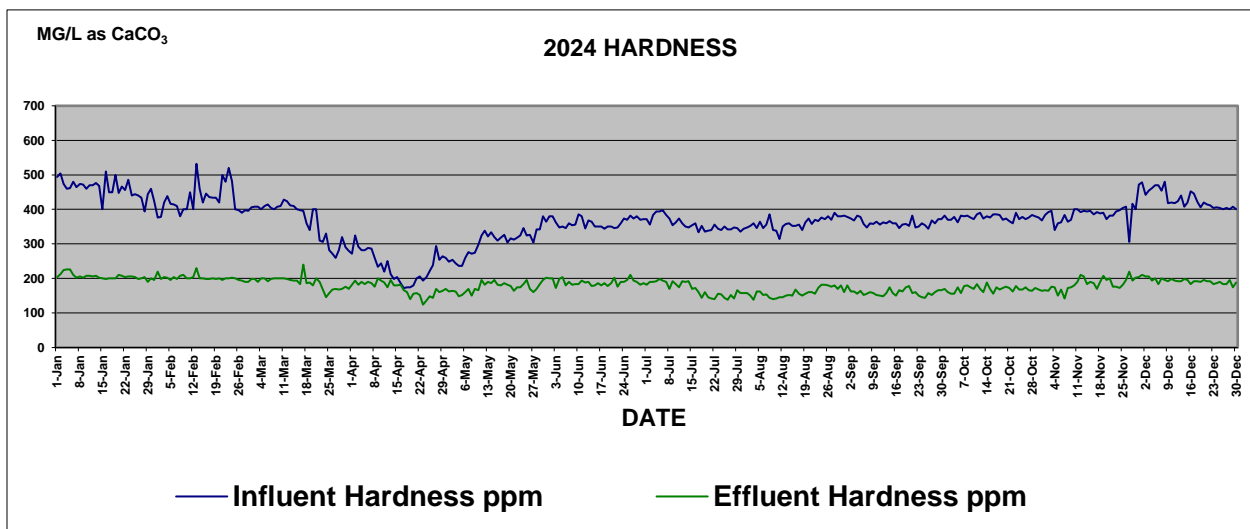
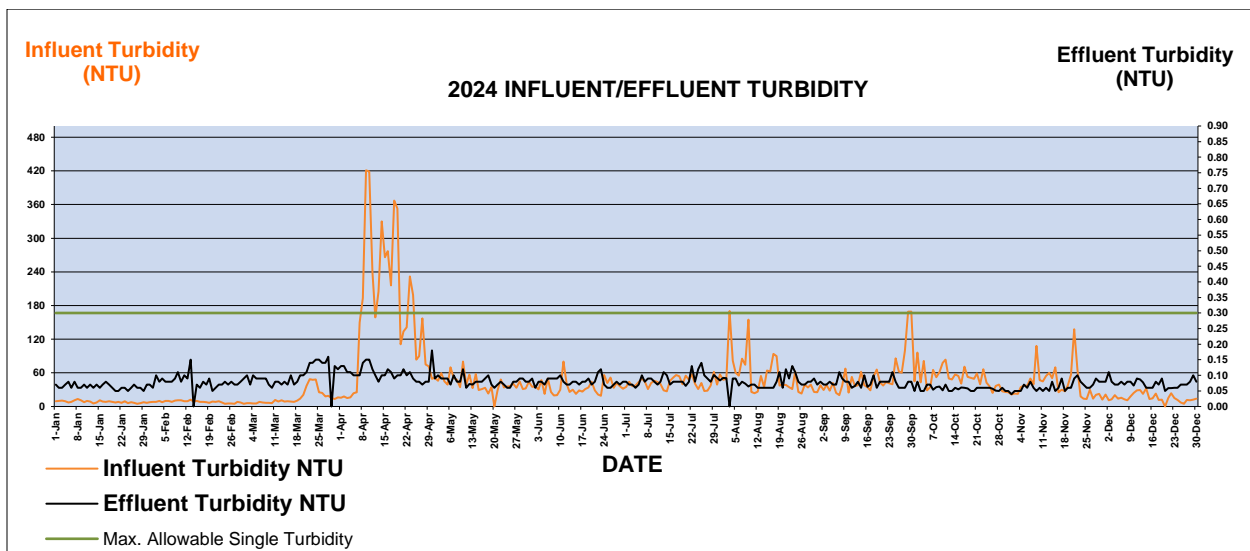
Despite this, for most part of the year, the effluent pH was over 7.5, and it was always over 7.0.

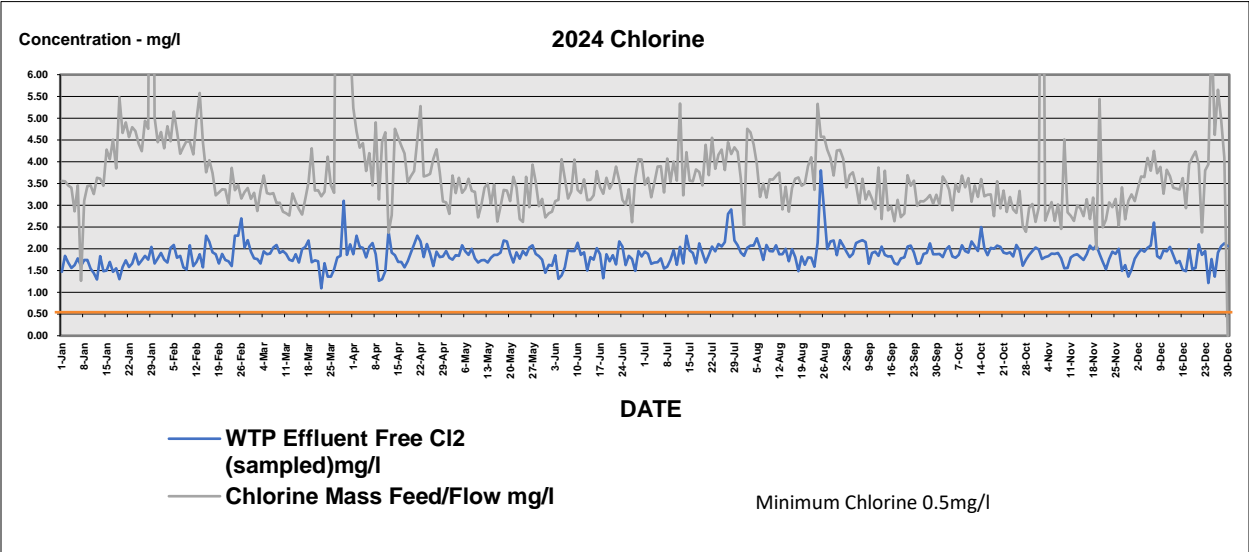
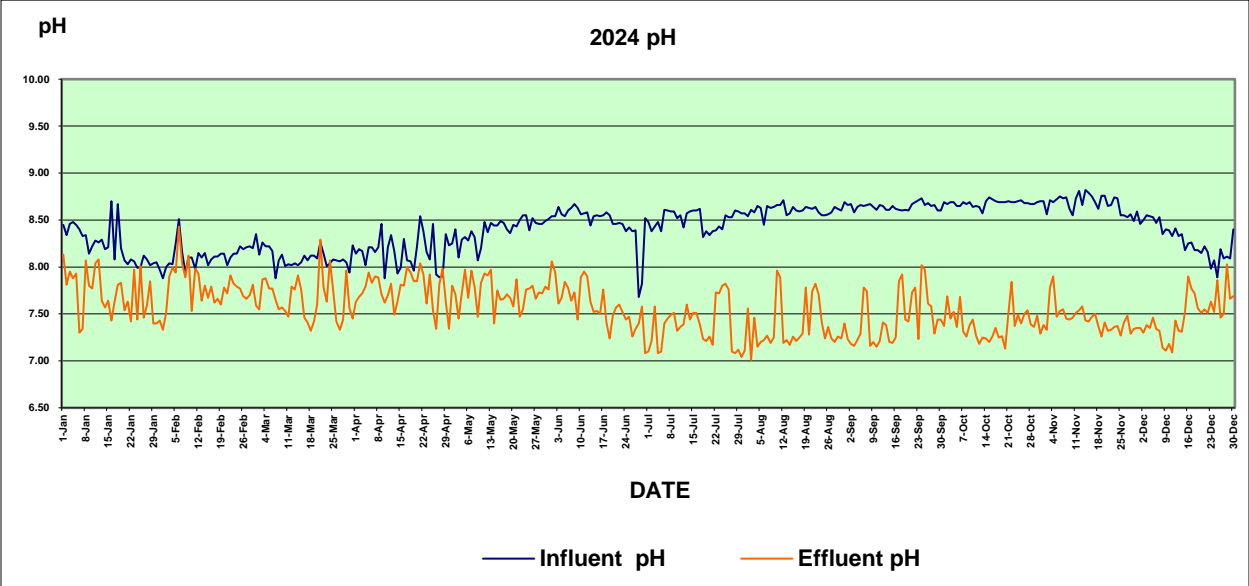
The Fluoride graph shows some variation in Fluoride levels in 2024. Fluctuation is common on feeding fluoride due to the very low level injected and the fact that the method used for in-house testing of Fluoride is not very accurate. The fluoride test results are from the morning sample and represent the reading in the effluent water at that time, and not as a daily average. A concentration of 0.70 mg/l has been deemed optimum by Health Canada.

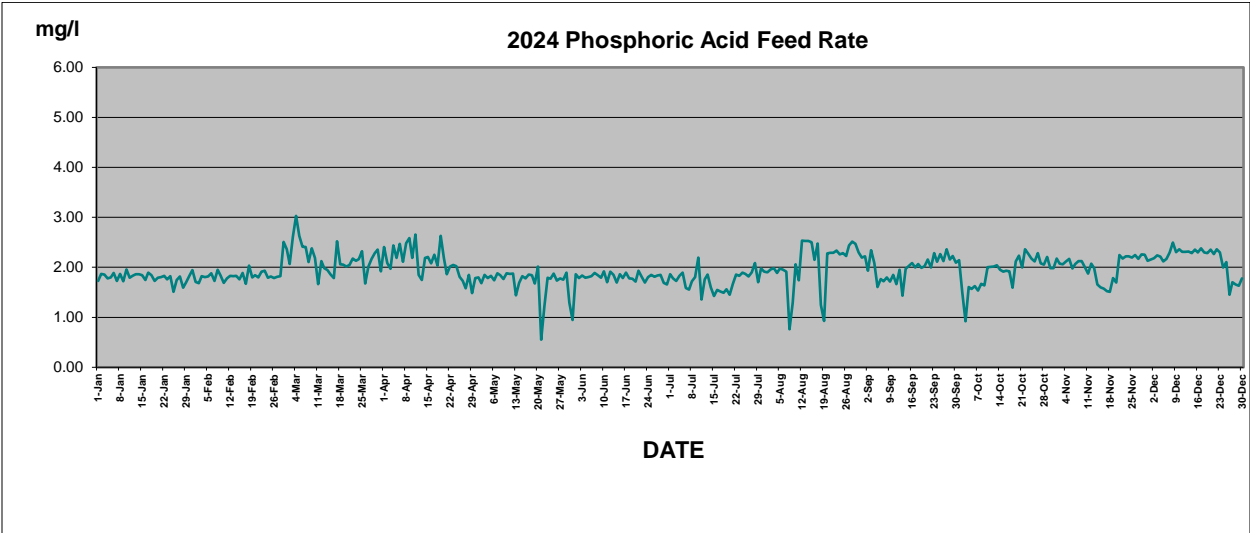
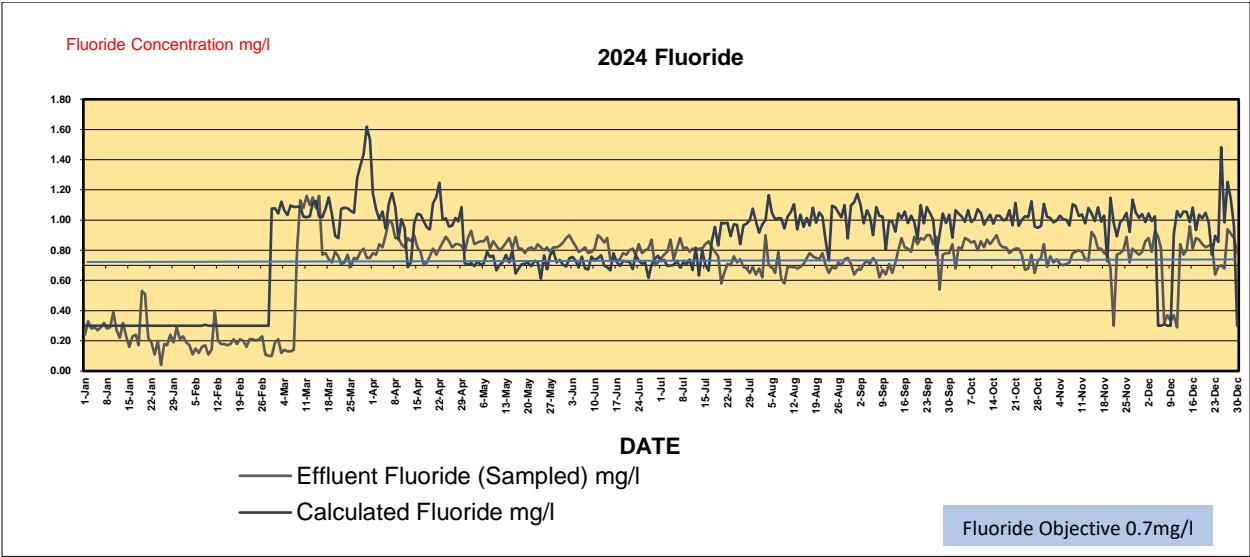
As a whole, the chlorine feed was more consistent in 2024 than 2023 and there was less day-to-day variation in residuals. The plant is also working towards more redundancy in the chlorine feed systems. Weekly sampling of the distribution areas for chlorine residual were conducted while samples were collected for bacteria analysis. The samples are sent to an independent lab for analysis and reporting to the Drinking Water Officer and Water Plant Management. None of our scheduled weekly samples came back as positive out of over 350 taken each year.

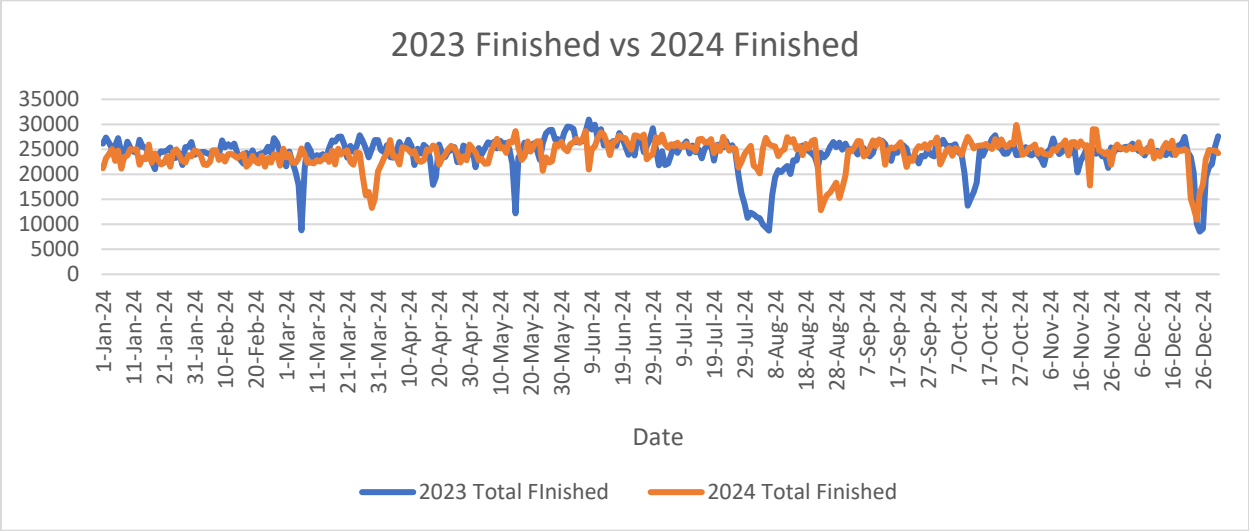
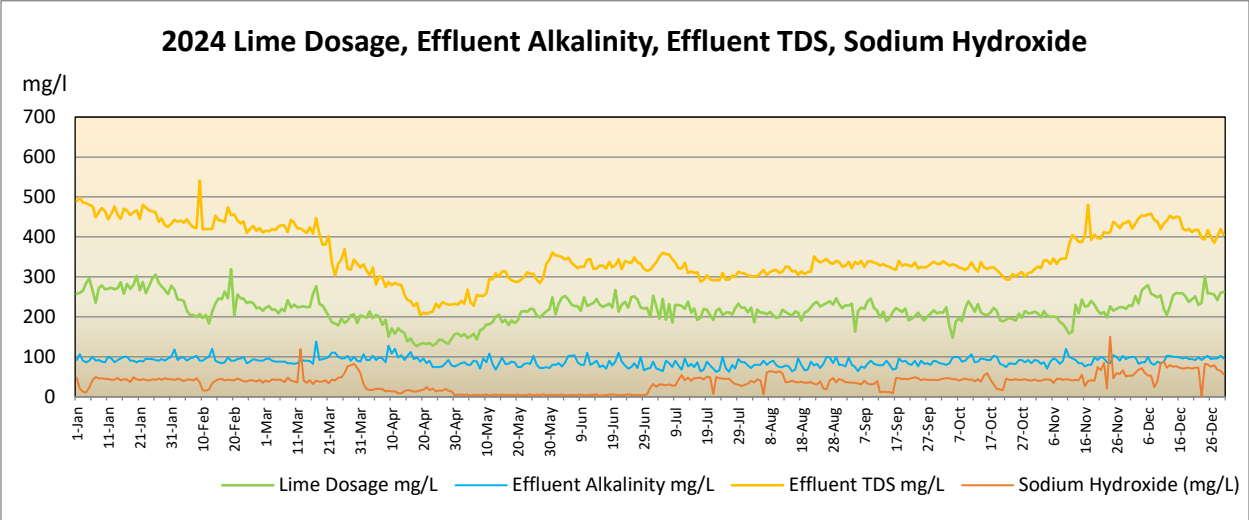
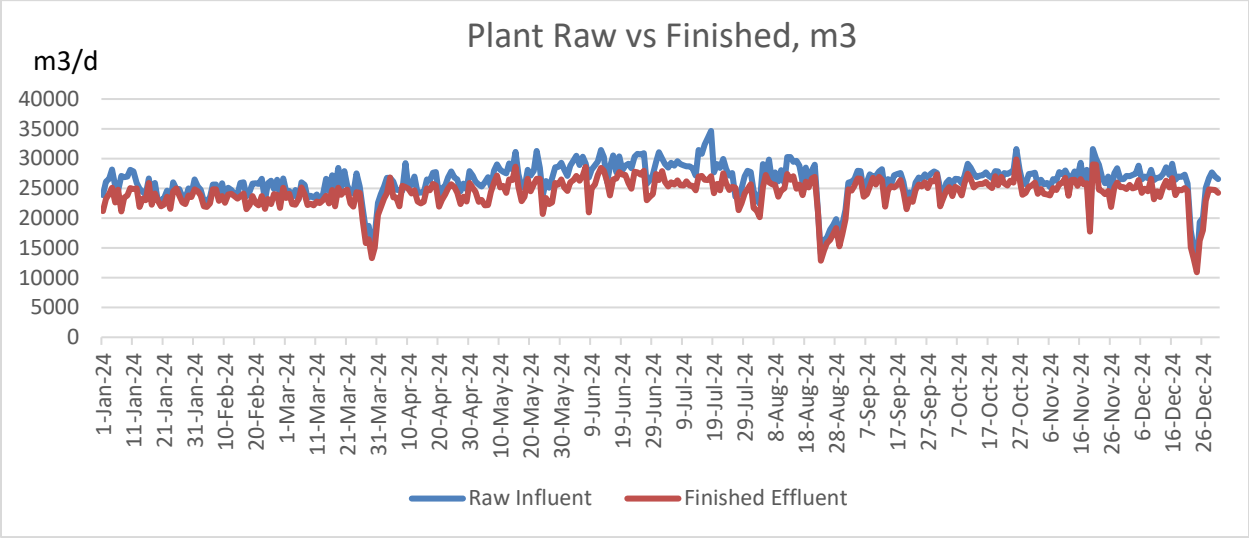
In 2024, the Tri-halomethane (THM) regulation requirements were met in the city limits. In the regional water systems where the water age increases, THM results are higher. THM's and other disinfection byproducts develop when chlorine reacts with organics in the water, organics can also cause taste and odour issues. Taste and odours are removed in part by the granular activated carbon filters. While these filters are still reducing tastes and odour, they are showing higher levels of embedded total organic carbon (TOC) that could react with chlorine to form THM'S. The effective removal of THM-forming compounds is limited. The expected life rating of the GAC media life is well below the original anticipated three years, but the replacement of the GAC media annually, or more frequently, would be cost prohibitive. Monitoring of the raw and treated water will continue to detect problems within the raw water that would cause this.

City of Portage la Prairie Water Treatment Plant - 2024 Annual Data Summary								
	Influent Hardness ppm	Effluent Hardness ppm	Influent Turbidity NTU	Effluent Turbidity NTU	Influent pH	Effluent pH	WTP Effluent Free Cl ₂ (sampled)mg/l	W.T.P. Effluent Fluoride (Sampled) mg/l
								WTP Reservoir Influent Flow m3
TOTAL ANNUAL								9,353,260
AVERAGE	369	180	44.48	0.08	8.41	7.56	1.86	0.68
PEAK DAY	532	240	421.00	0.18	8.82	8.43	3.80	1.16
90th PERCENTILE	450	202	80.00	0.11	8.69	7.92	2.12	0.88
MEDIAN	373	182	31.45	0.08	8.47	7.54	1.86	0.77
WINTER AVG	408	190						
SUMMER AVG	330	170						









Major Maintenance in 2024

PROJECT	BUDGET	SPENT
WTP Detailed Design	\$ 1,400,000.00	ongoing
Lifting Beams	\$ 30,000.00	\$ 36,806.00
Flowmeter on Raw Water Line	\$ 14,500.00	\$ 14,500.00
Poplar Bluff Reservoir	\$ 278,391.00	\$ 203,301.00
Actiflow Hydrocyclones	\$ 15,000.00	\$ 13,524.00
Chlorine Feed Expansion	\$ 20,000.00	\$ 13,567.00
Clarifier 1 & 2 Anionic Polymer Pumps	\$ 24,000.00	\$ 24,000.00
McKay pressure relief valves	\$ 20,000.00	\$ 20,000.00
Unit Heater Replacements	\$ 27,000.00	\$ 19,302.00
GAC Filter Media Replacement	\$ 70,000.00	\$ 34,764.00
Caustic Pumps	\$ 24,000.00	\$ 25,711.00
Two 20" Actiflow Raw Valves	\$ 20,000.00	\$ 25,000.00
Two McKay Pumps	\$ 60,000.00	\$ 72,683.00
Ozone Filter Replacement	\$ 9,000.00	\$ 7,449.00
Heat Pump Replacements	\$ 20,000.00	\$ 15,336.00
McKay Reservoir - Roof Replacement	\$ 148,000.00	\$ 98,482.00
Repair Crack in WTP Wall/GAC Filter Room	\$ 25,000.00	\$ 19,625.00
	\$ 2,204,891.00	\$ 644,050.00

Summary

Ongoing continuous improvement will be used to optimize the treatment process to ensure a safe, reliable product for our customers.

The plant was kept in operation during maintenance work and plant shutdowns were done in a manner to keep the consumers supplied with water.

Operating staff will continue to abide by all Government operational requirements and work with the local Drinking Water Officer to ensure the best quality of water for all customers.