Wastewater Treatment Division 2023 Annual Report

Introduction

The City of Portage la Prairie Wastewater Treatment Division is comprised of the Class IV Water Pollution Control Facility (WPCF) and thirteen lift stations within the City and Poplar Bluff Industrial Park that convey the wastewater to the WPCF. The WPCF receives wastewater from three main sources - domestic wastewater from the City of Portage la Prairie and the surrounding areas in the RM of Portage la Prairie, and industrial wastewater from Poplar Bluff Industrial Park as well as the McMillan Industrial Park.

The industrial wastewater from the industrial parks is first treated in a Low-Rate Anaerobic Reactor (LRAR) for the removal of solids and organics. Once pretreated, the industrial water is combined with the domestic (residential/commercial wastewater) in a common lift station and is pumped into one of the four Sequencing Batch Reactors (SBRs). Through cycles of aeration, mixing, and settling, the wastewater is treated through the activity of specialized bacteria that remove the organic waste in the water as well as ammonia. The treated water is then disinfected via Ultraviolet exposure before being discharged into the Assiniboine River.

The biological activity required for treatment produces residual solids that accumulate in the SBRs. A calculated volume of these solids must be removed each day. These solids are thickened, and then anaerobically digested for stabilization. Stabilized solids are referred to as Biosolids. Biosolids are stored and then applied to farmland as fertilizer.

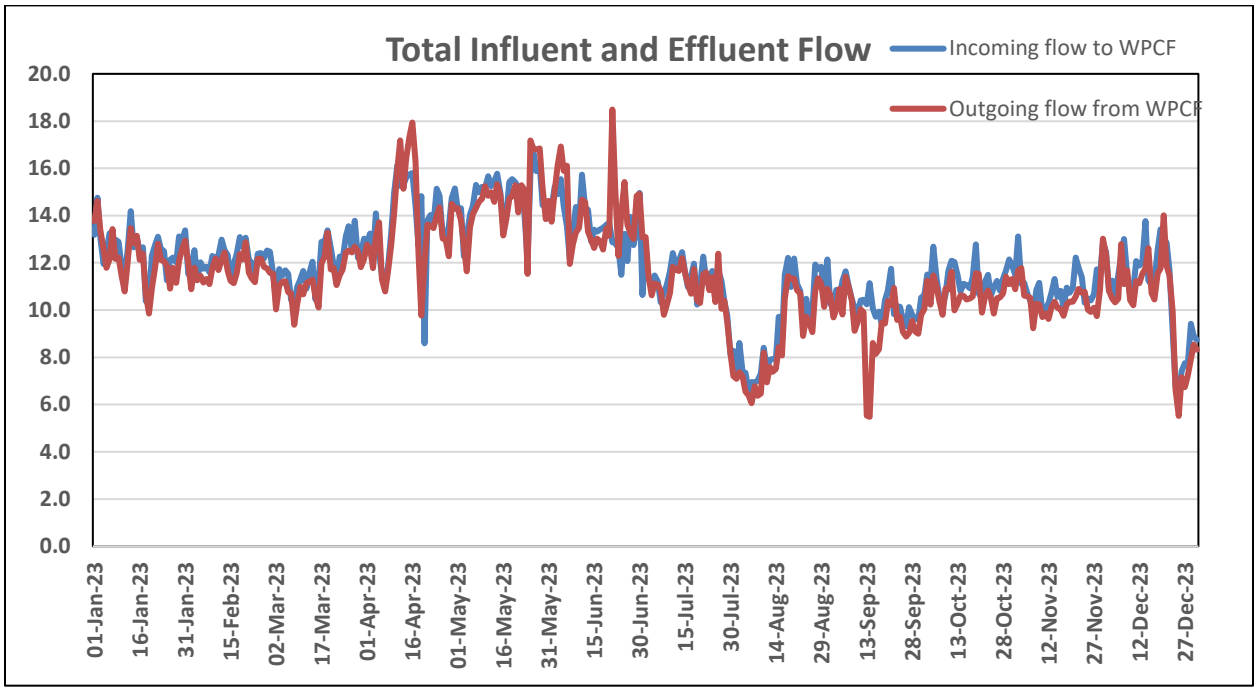
Facility Performance and License Compliance

In 2023, the WPCF received an average of 11,881,000 L of wastewater each day, for a total volume of 4,336,640 L or 4.34 billion litres. This is a slight decrease from the 4.95 BL received in 2022 and is primarily due to fluctuations in processing at the local industries.

The peak flow of 16,633,000 L was received on May 26, 2023, and the minimum flow of 6,423,000 L was observed on December 25, 2023. This is attributable to industrial shutdowns that occurred. The incoming flow is 53% domestic and commercial wastewater and 47% from industrial sources.

The WCPF operates under Environment Act License #2543 R, which is issued by the Province of Manitoba Department of Environment and Climate. In addition to outlining requirements for treatment processes, sampling, and reporting, it also provides maximum limits on the total amount of Suspended Solids, Biological Oxygen Demand, and Ammonia that the facility can discharge in the treated wastewater each day and a monthly geometric mean for fecal bacteria. The facility is also required to assess for toxicity on a

monthly and quarterly basis. Any exceedance is reported to Manitoba Environment and Climate Change within 24 hours of the limit being surpassed.



Total Suspended Solids

Total Suspended Solids (TSS) are the amount of particulate matter suspended in the water that is released from the WPCF. By license, this is to not exceed 30 mg/L per day. The average daily TSS discharged in 2023 was 12.7 mg/L and there were five occurrences where this limit was exceeded for a 98.63% compliance rating. These exceedances occurred as follows.

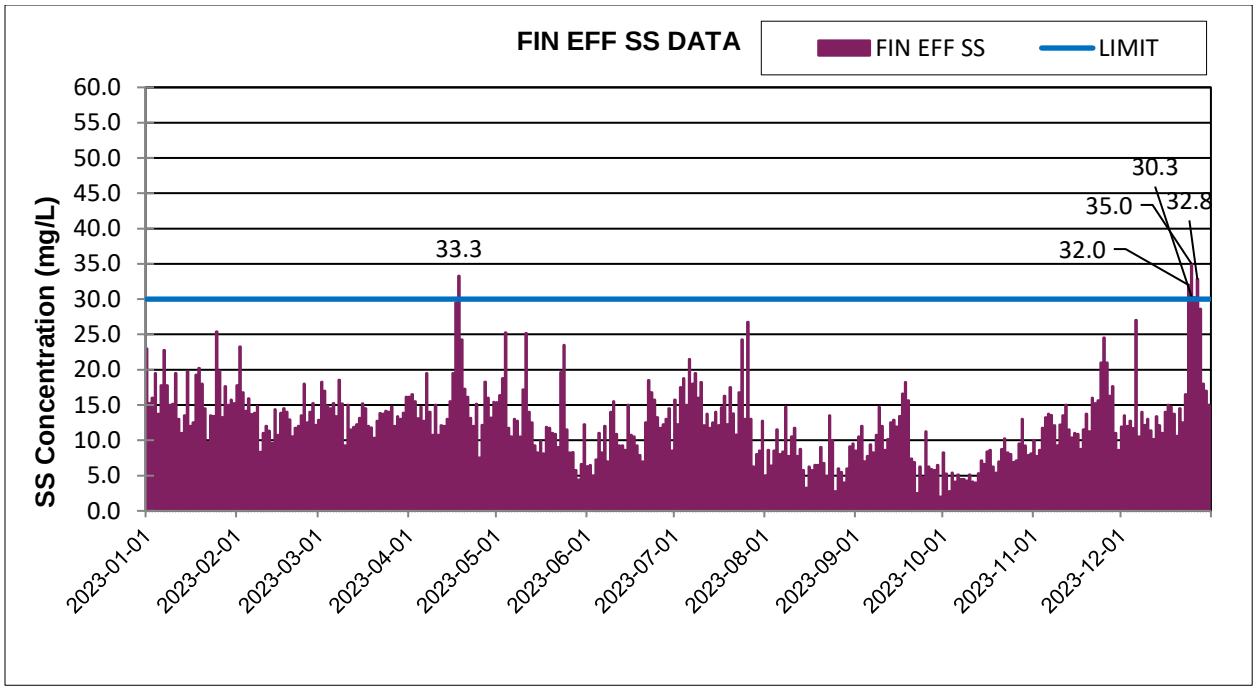
April 18- 33.3 mg/L- The pumps in the EQ basin were set to drop the level too low, pulling up settled debris. Set points were adjusted and the issue was resolved.

December 24- 32.0 mg/L- Decant header began to pass small amounts of solids.

December 25- 35.0 mg/L- Decant header continues to pass small amounts of solids. Basins 2 and 3 have partially floating headers so it is difficult to identify which one is causing the issue.

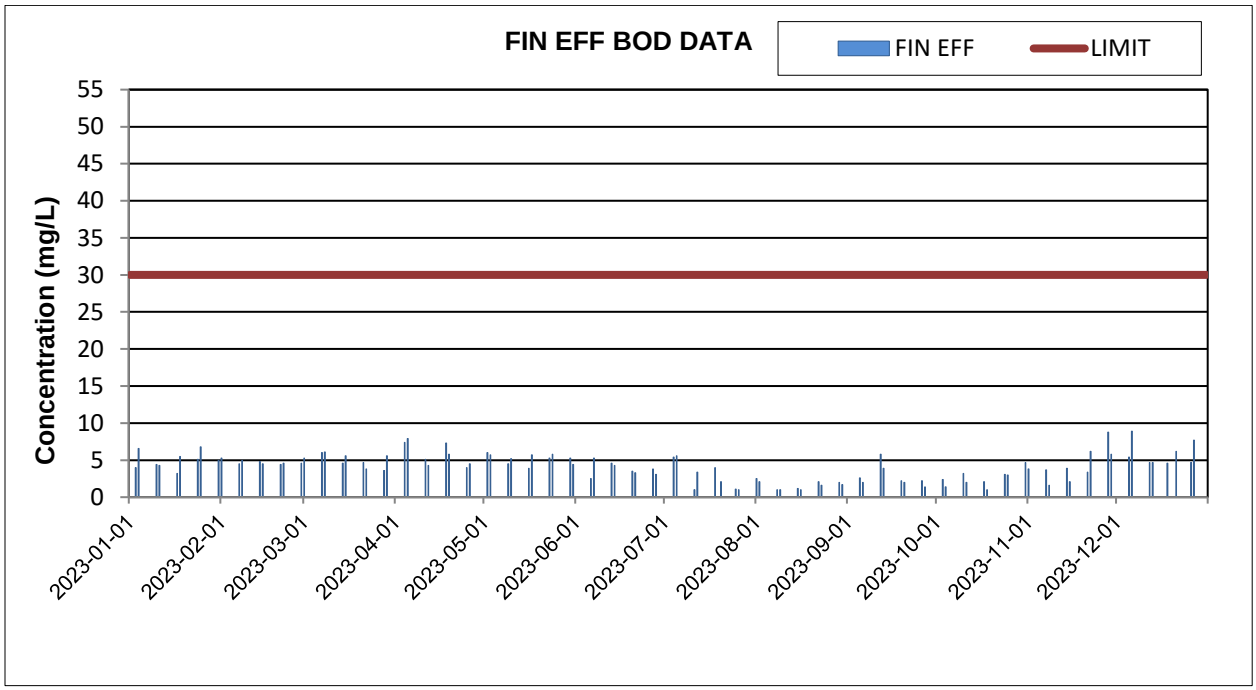
December 26- 30.3 mg/L- Decant headers continue to pass small amounts of solids but results trended downward.

December 27- 32.8 mg/L- As flows increased after the holiday break, the flows through the headers increased and so did the TSS. Operators took the suspected equipment offline to have repaired and the solids declined to below 30 mg/L the next day. No other exceedances were reported for TSS or other parameters.



Biological Oxygen Demand

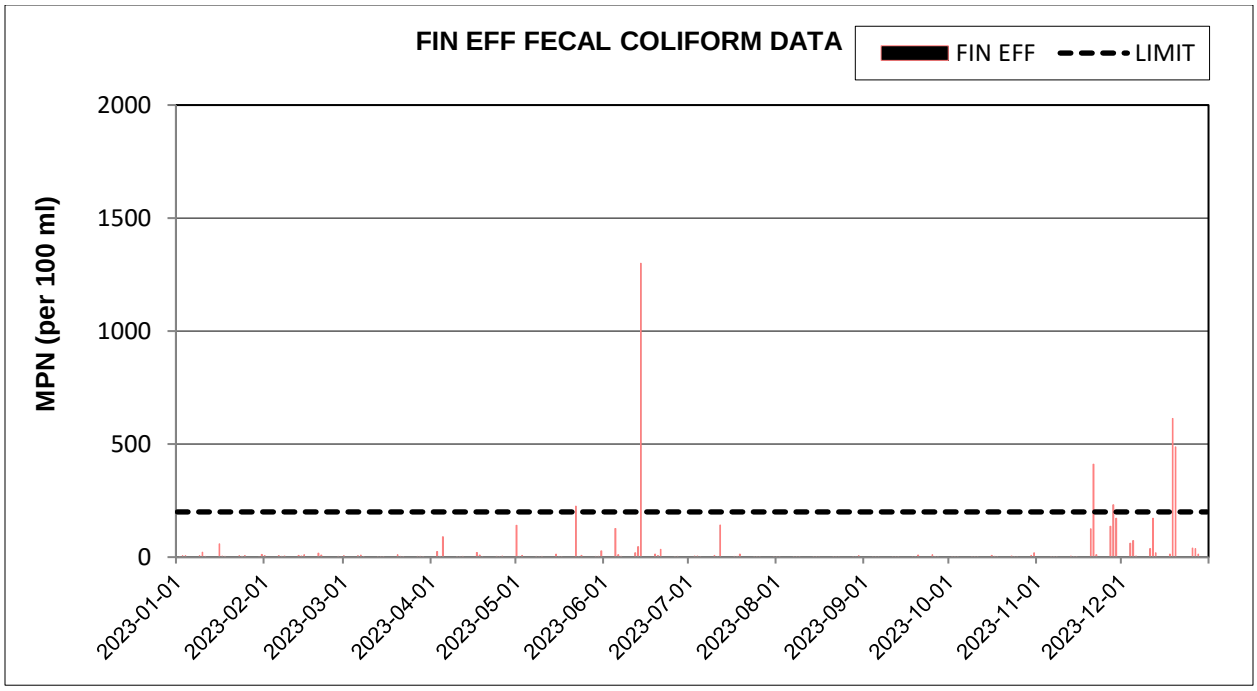
Biological Oxygen Demand (BOD) is an indicator of the amount of dissolved oxygen needed by the remaining biological organisms to break down organic matter once it reaches the river. The EAL permits a maximum daily discharge of 30 mg/L. There were zero reported exceedances of this parameter for 100% compliance and the average daily discharge value was 4.1 mg/L.



Coliforms

Fecal Coliform is a measurement of the amount of fecal coliform organisms within 100 mL of effluent. There is not a daily discharge limit but a limit on the monthly geometric mean that must not exceed 200 CFU/100mL. Samples must be submitted three times per week and sampled on consecutive days. Although there were individual days where the results were reported above the limit, the monthly geometric mean limit was not exceeded for 100% compliance with the license. As indicated in the graph, there was an increase in coliform levels in December. Operators cleaned and replaced bulbs as required and the issue was resolved.

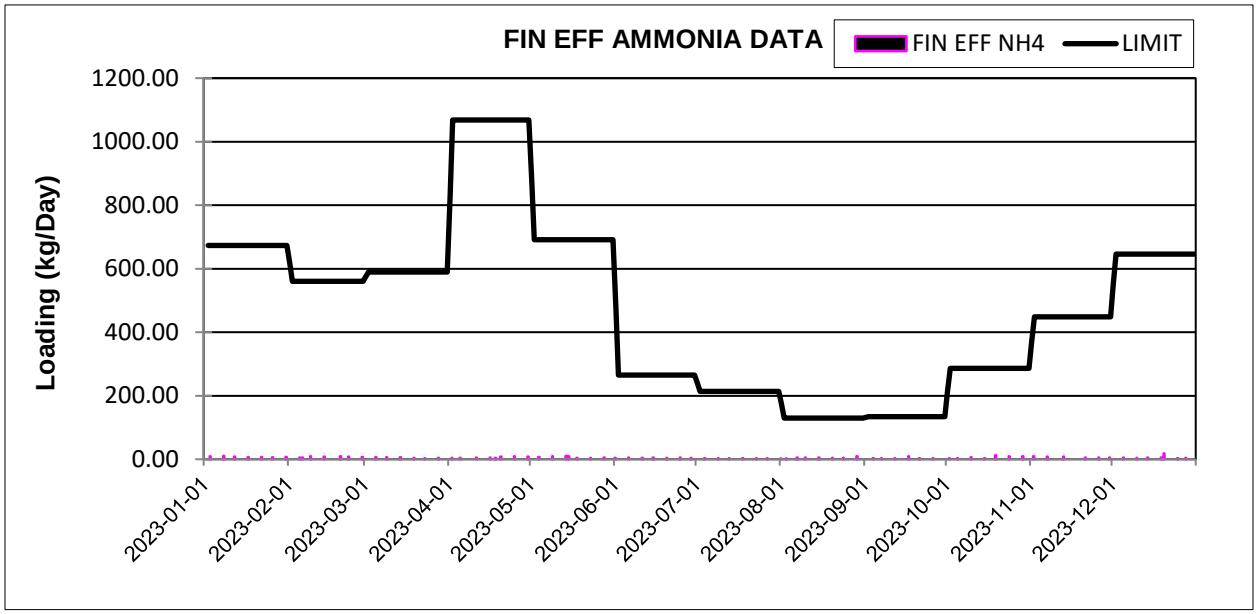
During the week of February 20-22, Coliform samples were submitted to our contracted lab as required. We were notified that the sample sent on February 22 was misplaced by the lab and only two consecutive days were sampled. Manitoba Environment and Climate Change was notified of the error and no additional sampling was required.



Ammonia

Ammonia is a pollutant that may be toxic to aquatic life depending on the concentration. The allowable daily load of ammonia that can be discharged to the Assiniboine River changes each month. There were no incidents of ammonia exceedance, and the daily average is significantly less than the allowable limits, regardless of the monthly limit. The chart below indicates the discharge limit for each month compared to the average daily amount that was recorded. A compliance of 100% was achieved.

Month	Limit (kg/day)	Daily average (kg/day)
January	673	7.8
February	560.1	7.5
March	589.3	5.0
April	1068.2	5.9
May	691.8	7.1
June	264.6	4.4
July	213.2	3.3
August	19.6	4.5
September	134.4	4.1
October	286.4	6.5
November	448	7.0
December	646.4	6.3
Daily Average		5.8



Toxicity

In addition to ammonia testing for toxicity, samples are submitted for toxicity verification through lethality testing. Daphnia toxicity sampling occurs monthly, and trout toxicity is completed quarterly. These tests are reported as passing or failing. There were no failures reported for 100% compliance.

Month	Toxicity Test	Pass/Fail
January	Trout	Pass
February	Daphnia	Pass
March	Daphnia	Pass
April	Trout	Pass
May	Daphnia	Pass
June	Daphnia	Pass

July	Trout	Pass
August	Daphnia	Pass
September	Daphnia	Pass
October	Trout	Pass
November	Daphnia	Pass
December	Daphnia	Pass

Odour

The EAL speaks to the requirement to limit nuisance odours. Three written complaints, from three different sources must be received to be considered "non-compliant." Staff monitor and adjust the chemical feed system but without significant upgrades to the automation system, there are times that the system is over or under-dosing. There were no complaints received regarding odour in 2023.

Biogas

Biogas is a form of gas that is produced from the biological activity of anaerobic bacteria. At WPCF, this is produced in the LRAR, the anaerobic digester and potentially in the BVF. The EAL requires biogas to be captured and reused or flared.

LRAR- There were no occurrences of biogas being vented to the atmosphere. All biogas was flared.

BVF and Anaerobic Digester- The biogas from the anaerobic digester and a small amount produced in the Bulk Volume Fermenter (BVF) are piped to the BVF biogas flare system. With the construction of the LRAR and the BVF no longer in use, the current configuration will not allow the flare to operate safely from the anaerobic digester alone. Currently, this gas is being vented into the atmosphere. The City continues to work on solutions to allow this gas to be captured and flared. The entire biogas collection system will be refurbished during the Nutrient removal upgrade. This vented biogas does contain odorous compounds and may contribute to odour around the facility.

Additional Compliance Items

January- February Nutripea reports- there was an error in copying a formula when creating the 2023 spreadsheet. Nutripea's daily flows were incorrectly reported for January and February. When noted in March, new reports were generated and distributed.

July 27- While transferring biosolids from one Biosolids storage tank to the other, the valve to the truck fill station was opened. Biosolids were released onto the concrete pad and were drained into the sump pit, which is there for this purpose. The pump located in the pit failed so the material overflowed. Most of the biosolids were contained on the pad, however, approximately 15 gallons flowed to the grass/ gravel area. Cleanup involved washing the affected area back toward the pit with water and disinfecting the area using granular chlorine.

Biosolids

The application of biosolids is permitted under a separate Environment Act License, #1907. The land application of biosolids is a beneficial reuse of nutrients and metals contained in the residual solids' material generated as part of the wastewater treatment process as fertilizer for local farmland. Excess Waste waste-activated sludge (WAS) is removed from the SBR basins daily to maintain a proper amount of WAS within each basin. WAS is thickened and anaerobically digested, then stored in the Biosolids Storage Tanks (BSTs) or the BVF until they can be applied to agricultural land. Solids are also retained within the LRAR that require land application. The land application typically occurs in the Fall, once crops are harvested and land is available. The application of biosolids is a highly regulated process with restrictions on the field types, location to nearby housing and waterways, and background metals concentrations all being part of the verification process before application.

In 2023, 728 dry tonnes of material were injected on land within the RM of Portage la Prairie. Parameters such as metals, solids, and phosphorus were within license limits. There were no spills or concerns with transportation to report. A more complete report on the 2023 Biosolids Land Application Program is available and was submitted to Manitoba Environment and Climate Change.

Capital and Maintenance Items

Planned capital purchases included the new controllers for the SBR Dissolved Oxygen probes, insolation and control valves, and a pump for the SBR Lift Station. Improvements were made to the LRAR lift station as well as internal piping modifications to address operational issues.

As part of routine maintenance, staff take one SBR basin offline each summer. In 2023, Basin #4 was selected. This is a laborious job as all the sludge needs to be washed from the large tank. The liner and piping systems are inspected and repaired as needed and pumps are serviced or replaced. Defective flex hose was found and will be replaced in 2024. Once the basin is filled, it takes diligent monitoring and adjustment to ensure adequate treatment before putting the basin back in service.

Pumping Stations

The City of Portage la Prairie operates and maintains thirteen pumping stations throughout the city. These stations collect and pump wastewater to the treatment facility. All pump stations functioned as expected throughout the year.

The 2023 budget included two new pumps for Brandon Ave Lift Station and Lions Manor lift stations. A new portable generator was also purchased, however, due to production delays, it will not be received until the summer of 2024.

Reporting

Reporting is a major component of the Wastewater Treatment Division. All reports were filed as required.

Monthly- final effluent report and groundwater sampling results to Manitoba Environment and Climate; summary reports and exceedance letters to industrial partners; Nutrient Removal Upgrade update.

Quarterly- Wastewater Systems Effluent Report to the Government of Canada; Nutrient Reduction updates to Manitoba Environment and Climate

Annual- Annual WPCF Summary Report; Annual Biosolids Report; Total Phosphorous Discharge Summary; National Pollutant Release Inventory; Greenhouse Gas Emissions Summary.

Staff Compliment

The Province of Manitoba requires operators and pumping station maintenance staff to be certified according to the classification of the facility. The Water Pollution Control Facility is deemed as Class 4 and the collection system is classified as Class 2. All operators must continue to work toward obtaining the same level of certification as the facilities they operate, through ongoing education and examination as well as on-the-job experience. Staff must also continually participate in ongoing education to maintain their certification levels.

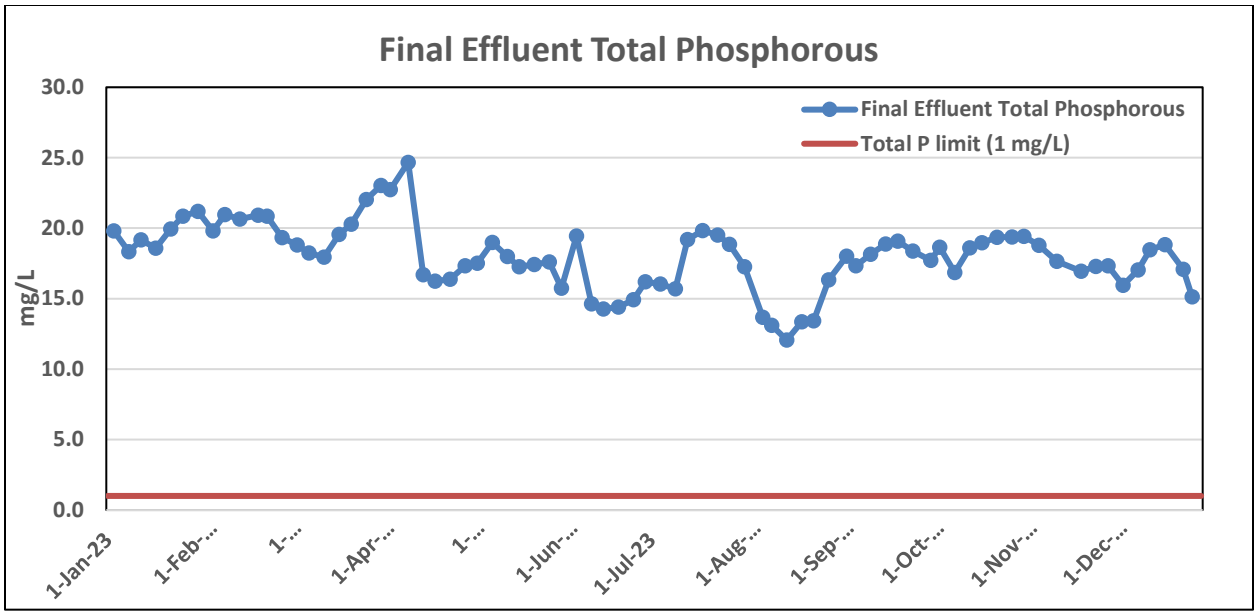
WPCF Operations team was staffed throughout 2023 by the Manager/Director of Utility (WWT 4, WC 2), Operations Supervisor (WWT 3, WC2), three Operators (1- WWT 4, WC 2; 1- WWT 4, WC2; 1- WWT 3, WC 2), and a lab technician. One of the operator positions remained vacant for the year. To offset some of the workload, two Seasonal staff were hired for most of the summer. One of those people also remained until the end of the year. The Operations supervisor was recognized for his service to the water industry and was the recipient of the Manitoba Water and Wastewater Operator of the Year award.

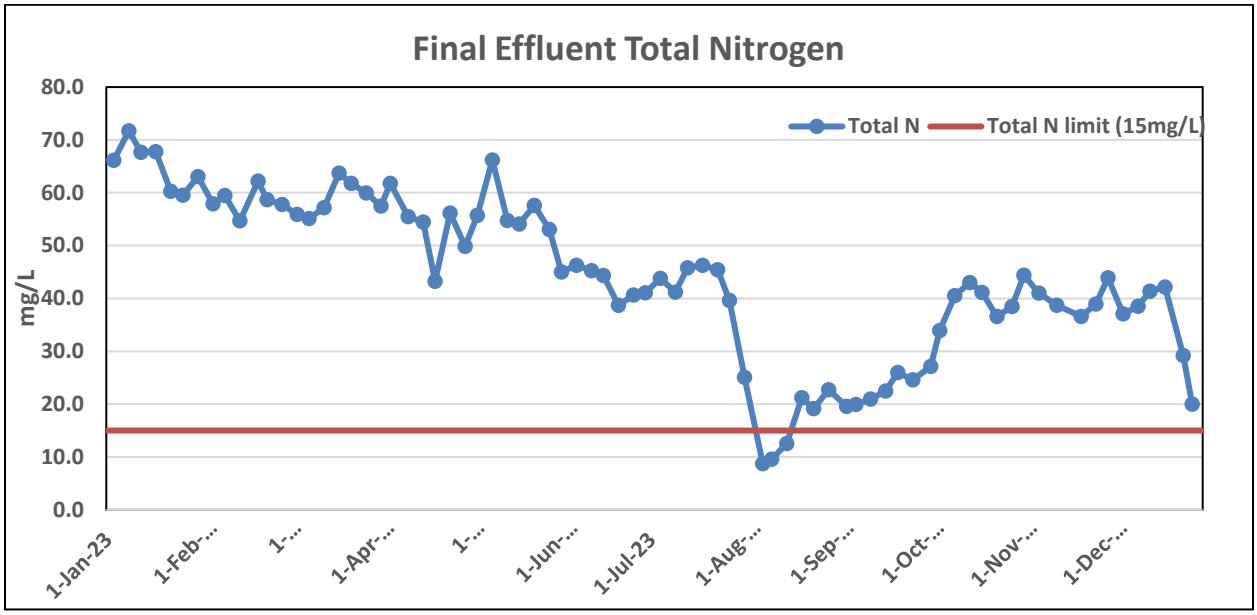
The Collection System was staffed by two lift station maintenance staff. One has level 2, and the other is an Operator in Training but will obtain level 1 early in 2024. The Lift Station Maintenance Supervisor also holds a level 2 certificate in Collections. The facility maintenance department was fully staffed with three additional certified electricians and/or millwrights.

The new utility maintenance building was completed and Utility Maintenance and Waterworks staff, as well as the Director of Utility, began working out of this building in March 2023.

Nutrient Removal Facility Upgrade/ P3 Project

The Water Quality Standards, Objectives and Guidelines regulation states that any wastewater facility discharges into Lake Winnipeg to reduce nutrients from the effluent by January 1, 2016. The limits imposed were 1 mg/L of phosphorus and 15 mg/L of Nitrogen. As demonstrated in the next two graphs, the existing facility was not designed to meet these limits and the quantities of each nutrient discharged daily are well above the regulatory requirement.





To address the regulatory change, the facility will require new treatment processes to be added as well as supplemental systems to be incorporated with the existing treatment stream. Several areas of the facility are deteriorating and are inefficient and other components have been identified that lack redundancy and therefore the ability to properly maintain.

This project will be implemented through a Private-Public Partnership and will consist of a Design, Build, Finance, Operate and Maintain contract for the WPCF including the existing infrastructure as well as the new processes required. In 2020, the City shortlisted three proponents: Plenary/PCL Environmental Infrastructure, Portage Water Solutions (Sacyr/SNC Lavalin/Ledcor), and EPCOR Water Resource Partners. The final Request for Proposal has

not yet been released. There have been delays due primarily to the financial risk of this project as the City's main source of revenue is from three industrial companies. Various solutions to address this risk have been investigated, however, the RFP will not be released until this risk is resolved. Once the RFP is released, this will start a 9–12-month negotiation process before the final submission is received. The City will select the successful proponent based on their submission for design compliance with the technical requirements as well as operation and maintenance plan and overall net present value. It is intended that a final contract will be signed in 2025 with construction to occur in 2025-2028.

With the continued delays in this project, several components of the WPCF have been stretched beyond their usable life. Administration is working with the grant funding partners to advance specific portions of the upgrading and will move forward with these in 2024.

Summary

As demonstrated throughout this report, and with 99.7% compliance on all reported results, the Wastewater Treatment Division successfully collected and treated over four billion litres of wastewater before discharging to the Assiniboine River.