NORTH TORONTO TREATMENT PLANT

2024 Annual Report

March 31, 2025

EXECUTIVE SUMMARY

The North Toronto Treatment Plant (NTTP) is one of four wastewater treatment facilities operated by the City of Toronto. This facility, located in the Don Valley, has a rated capacity of 45.5 ML/day, normally operates at a controlled flow rate, and serves an equivalent population of approximately 183,000. The North Toronto Treatment Plant discharges to the Don River and operates under Environmental Compliance Approval (ECA) No. 7459-B6QPM2 issued June 21, 2019.

The average daily influent flow rate in 2024 was 18.3 ML/day. Influent concentrations of Biochemical Oxygen Demand (BOD_5), Total Phosphorus (TP) and Total Suspended Solids (TSS) averaged 211 mg/L, 5.2 mg/L and 275 mg/L, respectively.

North Toronto Treatment Plant achieved the following effluent quality and loading rates in 2024 in comparison to ECA limits:

Parameter	ECA[1]	2024 Final Effluent
Total Suspended Solids (TSS)	25.0 mg/L	8.3
Carbonaceous Biological Oxygen Demand ($CBOD_5$)	25.0 mg/L	2.0
Total Phosphorus (TP)	1.0 mg/L	0.58
Escherichia Coli (E. Coli)[2]	200 CFU/100mL	24
pH	6.0-9.5	7.0
Total Residual Chlorine (TRC) (Dechlorination)	0.02 mg/L	0.012
TSS Loading Rate	1,137.5 kg/day	152.6
$CBOD_5$ Loading Rate	1,137.5 kg/day	37.2
TP Loading Rate	45.5 kg/day	10.6

[1] Referenced from ECA No. 7459-B6QPM2 issued on June 21, 2019.

[2] Arithmetic mean of monthly geometric mean data.

Sludge (raw sludge and waste activated sludge) generated at the North Toronto Treatment Plant is conveyed by gravity via the North Toronto Sanitary Trunk Sewer (STS) and the Coxwell STS to the Ashbridges Bay Treatment Plant for further treatment and disposal. A daily average of 430 m^3/day at 0.73 % Total Solids (TS) sludge was transferred in 2024.

Ferrous chloride consumption for phosphorus removal totalled 82.4 tonnes as iron (Fe). Total sodium hypochlorite (12% w/v) consumption for effluent disinfection totalled 132.6 m^3. Sodium bisulphite (SBS) (38% w/w) consumption for effluent de-chlorination totalled 74.6 tonnes.

Work continued on capital projects, with the Process Upgrades project achieving substantial completion in fall 2024. Construction of a new server room continued and is expected to be completed during 2025. A variety of scheduled, preventative, predictive and reactive maintenance was performed, including annual calibration of effluent monitoring equipment.

Total annual consumption for potable water and hydro was 59,263 m^3 and 2.76 M kWh, respectively.

Direct operating costs for 2024 totalled $2.63M. In 2024, the North Toronto Treatment Plant had 9 employees. As of December 31, 2024, there was one lost time incident and 36 lost time days due to work related injuries.

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GLOSSARY OF ABREVIATIONS

AAC	Annual Average Concentration
BOD5	Five-Day Biochemical Oxygen Demand
CBOD5	Five-Day Carbonaceous Biochemical Oxygen Demand
CEU	Continuing Education Units
CFU	Colony Forming Units
E. Coli	Escherichia Coli
ECA	Environmental Compliance Approval
Fe	Iron
kg	kilogram
kWh	Kilowatt-hour
MAC	Monthly Average Concentration
MGMD	Monthly Geometric Mean Concentration
MWh	Megawatt-hour
m3	Cubic metre
m3 /day	Cubic metre per day
mA	Milliamps
mg/L	Milligrams per litre
mL	Millilitre
ML	Megalitre (million litres)
MECP	Ministry of the Environment, Conservation and Parks
Q	Flow Rate
RAS	Return Activated Sludge
SBS	Sodium Bisulphite
SBS (P)	Sodium Bisulphite Presence
scm	Standard Cubic Metres
SS	Suspended Solids
TRC	Total Residual Chlorine
TP	Total Phosphorus
TS	Total Solids
TSS	Total Suspended Solids
TVS	Total Volatile Solids
TWAS	Thickened Waste Activated Sludge
µg/L	Micrograms per litre
WAS	Waste Activated Sludge
% w/v	Percent concentration of components of solution expressed as weight by volume
% w/w	Percent concentration of components of a solution expressed as weight by weight

Definitions

Bypass: A bypass is defined as a diversion of sewage around one or more unit processes within the plant with the diverted sewage flows being returned to the plant treatment train upstream of the final effluent sampling location, and discharging to the environment through the plant outfall.

Overflow: An overflow is defined as a discharge to the environment from the plant at a location other than the plant outfall downstream of the final effluent sampling station.

Spill: A spill is defined within the meaning of Part X of the Environmental Protection Act. "Spill", when used in reference to a pollutant, means a discharge,

a) into the natural environment,
b) from or out of a structure, vehicle or other container, and
c) that is abnormal in quality or quantity in light of the discharge.

Abnormal Discharge: A discharge of a pollutant designated by the regulations at a location designated by the regulations shall be deemed to be in a quantity or with a quality abnormal at the location. R.S.O. 1990, c. E.19, s. 91 (2).

$$Loading\left(\frac{kg}{day}\right) = Concentration\left(\frac{mg}{L}\right) \times Flow\left(\frac{ML}{day}\right)$$

$$Percent\ Removal\ (\%) = 1 - \frac{Concentration\ (Final)}{Concentration\ (Initial)}$$

$$Aeration\ Loading = \left(\frac{kg\ cBOD}{m^3\ aeration\ capacity}\right) = \frac{(Q_{Primary\ Effluent} + Q_{RAS}) \times [cBOD_{5\ primary\ effluent}]}{V_{aeration\ Tanks}}$$

$$Solids\ Capture\ (\%) = \frac{Centrifuge\ Feed\ TS - Centrate\ TSS}{Centrifuge\ Feed\ TS} \times 100$$

1 INTRODUCTION

The North Toronto Treatment Plant (NTTP) is one of four wastewater treatment facilities operated by the City of Toronto under the responsibility of the Wastewater Treatment section of Toronto Water. The facility is located at 21 Redway Road, in the Don Valley on a 27.2 ha site serving a sewershed of approximately 3,060 ha. This area contains an estimated connected population of 183,000[1]. The North Toronto Treatment Plant operates at a controlled flow rate and has a rated capacity of 45,500 m^3/day, or 45.5 ML/day. Wastewater in excess of the controlled rate is diverted to the North Toronto Sanitary Trunk Sewer (STS) and then conveyed by gravity to the Ashbridges Bay Treatment Plant via the Coxwell STS.

Major treatment processes include screening and grit removal, primary treatment, secondary treatment, phosphorus removal, effluent disinfection and de-chlorination. Treated effluent is discharged to the Don River. Co-settled sludge (raw sludge and waste activated sludge) is transferred via the North Toronto STS and the Coxwell STS to the Ashbridges Bay Treatment Plant for further treatment and disposal. Numerous auxiliary systems are required for proper operation of many plant processes, including potable water, process water, heating, ventilation and air conditioning (HVAC), SCADA, odour control, electrical power distribution, and chemicals.

The Ministry of the Environment, Conservation and Parks (MECP) has classified the North Toronto Treatment Plant as a Class III wastewater treatment facility under Regulation 129/04. The facility operates under Environmental Compliance Approval (ECA) No. 7459-B6QPM2 issued June 21, 2019.

This report is a summary of plant operations and performance in 2024. Highlights of the report include a discussion on effluent quality and summaries of process operations, maintenance, chemical and utility consumption, capital projects, operational costs and human resources.

[1] Population estimated by sewershed delineation and 2021 census data

2 PLANT PROCESS OVERVIEW

A description of the plant process is included below. A plant process flow diagram is available in Appendix A. Additional information on the plant's process can be found on the City of Toronto website[2].

2.1 Influent

Wastewater from the Forman-Yonge Combined Trunk Sewer and Millwood Combined Trunk Sewer flows to the plant via a common sewer.

2.2 Preliminary Treatment

Raw wastewater enters the Headworks for grit and screenings removal. There is one automatic climber type bar screen that removes rags and large pieces of debris. Grit channels located downstream of the screen remove sand, gravel and similar heavy inorganic material by gravity separation. The removed grit and screenings are hauled to a sanitary landfill site.

2.3 Primary Treatment

Primary Treatment occurs in the Primary Clarification Tanks, where the flow velocity of the wastewater is reduced to allow heavier solids to settle to the bottom. There are four Primary Clarification Tanks. Sludge collectors in the tanks sweep the settled sludge, called primary or raw sludge, into sludge hoppers at the bottom of the tank. Floating solids, called scum, are drained periodically from the top of the tanks. The primary sludge and scum are then pumped out via the North Toronto STS and the Coxwell STS to the Ashbridges Bay Treatment Plant for further treatment. The primary effluent continues to secondary treatment.

2.4 Secondary Treatment

The primary effluent undergoes secondary treatment through a Conventional Activated Sludge process, which includes an aeration step followed by secondary clarification. Ferrous chloride is injected into either the distribution conduits to the Aeration Tanks or the grit chamber effluent conduit for chemical phosphorous removal.

There are a total of eight Aeration Tanks and five Final Clarifiers. Upon completion of the Process Upgrades capital project, the secondary treatment process was configured into three

[2] *https://www.toronto.ca/services-payments/water-environment/managing-sewage-in-toronto/wastewater-treatment-plants-and-reports/*

plants: Plant 1, 2 and 3. Each plant has dedicated final clarifiers and RAS pumps, and air to the aeration tanks is supplied by three turbo blowers.

Plant 1 consists of Aeration Tanks 1 and 2 and Final Clarifier 1. These aeration tanks are equipped with Membrane Aerated Biofilm Reactor technology in the anoxic/swing zone, and membrane diffusers in the aerobic zone.

Plant 2 consists of Aeration Tanks 3 and 4 and Final Clarifier 2. This plant is equipped with membrane diffusers in all zones of the aeration tanks.

Plant 3 consists of Aeration Tanks 5 to 8 and Final Clarifiers 3 to 5. This plant has membrane diffusers in the anoxic/swing zone of all four tanks but has three different types of diffusers in the aerobic zones: ceramic diffusers in Tank 5, high density membrane diffusers in Tank 6, and Strip/Panel Diffusers in Tanks 7 and 8.

The Process Upgrades project also eliminated the need for co-settling in Primary Clarifiers by upgrading the waste activated sludge (WAS) pumping system, allowing the plant to discharge all WAS into the North Toronto STS, which leads to Ashbridges Bay Treatment Plant for further treatment. The ability to send WAS to the Primary Clarifiers is retained as a backup wasting option.

2.5 Final Effluent

Sodium hypochlorite is used to disinfect and kill pathogens in the final effluent. Sodium bisulphite (SBS) is added after disinfection to remove excess chlorine from the wastewater (i.e. dechlorinate); helping to protect the aquatic environment. The final effluent is discharged into the Don River. The plant uses direct measurement of Total Residual Chlorine (TRC) in the final effluent for monitoring and compliance.

2.6 Solids Handling

All primary sludge, WAS, and scum from the Primary and Secondary Clarification Tanks, collectively called sludge, is transferred to the Ashbridges Bay Treatment Plant for further treatment.

3 PROCESS SUMMARY

3.1 Process Parameters

In 2024, the North Toronto Treatment Plant continued to produce a high quality effluent. A summary of key final effluent parameters against the ECA objectives and limits are shown in Table 1. Influent and effluent performance charts are available in Appendix B. Historical performance data is included in Appendix C.

Table 1: Final Effluent Parameters

Parameter	$cBOD_5$ (mg/L)	TSS (mg/L)	TP (mg/L)	TRC[1] (mg/L)	E-Coli (count/100mL)	pH Min	pH Max
January	2.2	6.9	0.7	0.020	17	6.9	7.8
February	2.6	7.5	0.7	0.020	91	6.8	7.5
March	1.3	4.4	0.4	0.020	36	6.5	7.0
April	1.0	4.1	0.3	0.020	21	6.8	7.1
May	1.5	6.2	0.5	0.020	19	6.7	7.1
June	1.9	8.6	0.4	0.020	17	6.7	7.2
July	2.1	8.4	0.5	0.020	12	6.7	7.1
August	1.2	9.8	0.6	0.020	3	6.7	7.2
September	1.4	8.8	0.7	0.020	12	6.7	7.3
October	1.4	6.5	0.6	0.020	17	6.9	7.3
November	4.5	15.1	1.0	0.020	35	6.8	7.4
December	3.2	13.7	0.6	0.020	9	6.7	7.2
Annual Average	**2.0**	**8.3**	**0.6**	**0.012**	**24**	**7.0**	
Loading (kg/d)[2]	37.2	152.6	10.6	N/A	N/A	N/A	
Removal Efficiency[3] (%)	99%	97%	89%	N/A	N/A	N/A	
ECA Requirements[4,5]							
Effluent Objective	AAC: 15 mg/L	AAC: 15 mg/L	MAC: 0.9 mg/L	MAC: non-detect	MGMD: 150 CFU/100 mL	6.5 - 8.5	
Effluent Limit	AAC: 25 mg/L	AAC: 25 mg/L	MAC: 1 mg/L	MAC: 0.02 mg/L	MGMD: 200 CFU/100 mL	6.0 - 9.5	
Average Waste Loading Limit[2]	AAL: 1,137.5 kg/d	AAL: 1,137.5 kg/d	AAL: 45.5 kg/d	N/A	N/A	N/A	

[1]TRC – Total Residual Chlorine. Reported figure is the monthly maximum for the month. Annual Average is the average of all sample results.
[2]Loading is calculated based on flow rates as provided in Table 2
[3]CBOD = 0.8 * BOD assumed for removal efficiency calculatons
[4]Referenced from ECA No. 7459-B6QPM2 issued June 21, 2019.
[5]AAC refers to Annual Average Concentration, MAC refers to Monthly Average Concentration, MGMD refers to Monthly Geometric Mean Density, and AAL refers to Annual Average Daily Loading.

Influent and Final effluent concentrations of eleven select heavy metals have been included in Appendix D. Any discharge into City sewers must meet the sewer use By-law limits. Final effluent concentrations are presented to assess the treatment plant's removal capacity.

A summary of the annual average of process parameters over the past three years is shown in Table 2.

Table 2: Process Summary

Parameter	Units in report	2024	2023	2022
Influent Parameters				
Flow[1]	ML/day	18.3	14.7	16.0
Total Annual Flow[1]	ML	6714	5358	5838
Total Suspended Solids (TSS)	mg/L	275	334	226
Biological Oxygen Demand (BOD)	mg/L	211	233	183
Total Phosphorus (TP)	mg/L	5.2	5.3	4.7
Total Kjeldahl Nitrogen (TKN)	mg/L	42.4	40.1	36.7
Preliminary Treatment				
Grit and Screenings	kg/day	204	166	169
Primary Treatment				
TSS	mg/L	183	97	126
cBOD5	mg/L	143	87	94
Secondary Treatment				
Aeration Loading	Kg cBOD5/ m3 day	0.26	0.13	0.15
Mixed Liquor Suspended Solids	mg/L	4301	2561	2442
Solids Handling				
Sludge to Ashbridges Bay Flow	ML/day	0.43	0.56	0.46
Sludge to Ashbridges Bay TS	%	0.73	0.55	0.94

[1]Based on final effluent flow meters

Influent flow to the North Toronto Treatment Plant increased by 25% in 2024. Influent strength of BOD, TSS, and TP decreased by 9%, 18%, and 3% respectively, while influent TKN increased by 6%.

Final effluent annual average concentration for cBOD, TSS, and TP was 2.0 mg/L, 8.3 mg/L, and 0.6 mg/L, respectively, and met the yearly average effluent concentration limits for cBOD and TSS and the monthly average effluent concentration specified in Schedule C of the ECA for TP throughout 2024. The final effluent annual average for e. Coli monthly geometric mean

density in 2024 was 24 CFU/100 mL and also met the Schedule C compliance limit for each month. Final effluent total residual chlorine analysis did not exceed 0.02 mg/L in 2024. Furthermore, final effluent pH remained between the range of 6.0 – 9.5 throughout the course of 2024.

The North Toronto Treatment Plant encountered no chronic operating problems and continued to produce a high quality effluent through the continued improvement of operations and maintenance of treatment processes. The plant consistently surpassed the design objectives highlighted in Condition 6 as well as Schedule B of the ECA.

All parameters highlighted in the sampling program specified in Schedule D of the plants ECA meet or exceed the sampling frequency of 3 times/week specified by Condition 9(1)(b), negating the requirement for future sampling forecasts and scheduling. Plant operations were shut down from January 2 to 5 and December 11 to 17 for emergency repairs, from July 15 to 18 due to flooding caused by heavy rainfall, and on September 15, August 20, and August 27 to facilitate capital works construction. Therefore, no samples were taken on these days.

3.2 Biosolids Management

All sludge (primary sludge, WAS, and scum) generated at the North Toronto Treatment Plant is transferred to the Ashbridges Bay Treatment Plant for further treatment. The sludge generated during 2024 averaged 430 m^3/day (0.73% TS).

The influent flow projection for 2025 will not exceed the rated plant capacity of 45.5 ML/day and is expected to generate a sludge volume that will be similar to the given volume for 2024. The Ashbridges Bay Treatment Plant is designed to manage these additional solids.

3.3 Chemical Usage

Several chemicals are used during the treatment process at the plant. Table 3 outlines the chemical consumption for the current and previous year. Costs listed exclude applicable taxes.

Table 3: Chemical Usage Summary

Process	Chemical		2024	2023	2022
Phosphorus Removal	Ferrous Chloride as Fe	Dosage (mg/L)	10.94	12.06	12.93
		Consumption (tonnes)	82.42	75.79	72.69
		Cost ($)	$105,826.11	$93,737.09	$83,886.87
Disinfection	Sodium Hypochlorite (12% w/v)	Dosage (mg/L)	2.37	2.44	2.00
		Consumption (m^3)	132.62	109.09	97.43
		Cost ($)	$74,537.83	$114,780.85	$15,688.54
Dechlorination	Sodium Bisulfite (38% w/w)	Dosage (mg/L)	4.20	4.01	4.02
		Consumption (tonnes)	74.62	55.79	65.37
		Cost ($)	$44,678.41	$33,211.57	$15,232.50

3.4 Bypasses, Spills, and Abnormal Discharge Events

3.4.1 Bypasses

Treatment bypasses are not required or possible with the current plant configuration. The inflow to the plant is controlled.

3.4.2 Spills

There were no reportable spill events at the North Toronto Treatment Plant in 2024.

3.4.3 Abnormal Discharge Events

There were no abnormal discharge events at the North Toronto Treatment Plant in 2024.

3.5 Complaints

There were no odour or noise complaints received at the North Toronto Treatment Plant in 2024.

3.6 MECP Procedures F-5-1 and F-5-5

Condition 11 (4)(m) of the ECA describes requirements to summarize efforts to achieve conformance with MECP Procedure F-5-1 – Determination of Treatment Requirements for Municipal and Private Sewage Works and MECP Procedure F-5-5 – Determination of Treatment Requirements for Municipal and Private Combined and Partially Separated Sewer Systems.

In reference to procedure F-5-1, the plant utilizes the activated sludge treatment process to meet secondary or equivalent treatment and consistently achieves effluent quality at or beyond the objectives outlined in the ECA.

Furthermore, Toronto Water is committed to efforts to control the frequency and volume of CSO discharges and bypass events referenced in Procedure F-5-5. The City is currently implementing a 25 year plan related to its Wet Weather Flow Master Plan (WWFMP), which aims to reduce and eliminate the adverse impacts of storm water runoff and CSO discharges associated with wet weather events. It is expected that the on-going implementation of capital projects related to the City's WWFMP will virtually eliminate CSO discharges and ultimately improve the water quality in the Don River and the Inner Harbour.

3.7 Effluent Quality Assurance and Control Measures

Analytical tests to monitor required parameters are performed by the Toronto Water Laboratory which is accredited to ISO/IEC 17025 by Canadian Association for Laboratory Accreditation Inc. Plant operation and performance is monitored by licensed operators as well as by the facility management team. Standard Operation Procedures, emergency plans, equipment preventative and predictive maintenance, and a network of support staff, help ensure a rapid and effective response to issues, and maintain the high quality of the effluent and bio-solids. An Integrated Quality Management System emphasizing environmental, and health and safety objectives is also in the early implementation stages across Toronto Water and is expected to further standardize facility operations and improve facility performance.

4 CAPITAL PROJECTS

Under Toronto Water's capital program, the North Toronto Treatment Plant commenced or continued with the capital works projects and studies listed in Table 4 in 2024.

Table 4: Capital Projects

Project Name	Project Description	Project Stage (Dec 31, 2024)	Estimated Completion
TNT Process Upgrades	Various process upgrades to secondary treatment systems, supplementary treatment systems, and electrical systems listed in the proposed works in the ECA.	Substantially Complete	Completed in 2024
TNT Server Room	Construction of a new server room.	Construction	2025

5 MAINTENANCE

Staff from the North Toronto Plant performed a variety of scheduled, preventative, predictive and reactive maintenance on a diverse spectrum of equipment. Equipment availability and reliability ensures operational requirements are achieved.

The annual calibration and maintenance records of flow meters and on-line analysers for regulated parameters was completed in 2024 and found to be within acceptable limits. A summary of effluent monitoring equipment calibration and maintenance performed in 2024 is included in Table 5.

Table 5: Summary of Regulated Monitoring Equipment Calibration and Maintenance

Calibration and/or Maintenance Record	Completion Date
Final Effluent pH and Temperature Meter - Calibration	Daily
Final Effluent Flow Meter - TNT-DCL-FIT-0002 - Calibration	August 22, 2024
Final Effluent ORP Sensor – TNT-DCL-AIT-0002 – Calibration	August 22, 2024
Residual Sulphite Meter - TNT-DCL-AIT-0001 - Calibration	August 22, 2024
Total Residual Chlorine Benchtop Analyzer - HACH DR3900 - Calibration	December 10, 2024
Chlorine Contact Tank 1 ORP Sensor – TNT-DIS-AIT-0101 - Calibration	August 22, 2024
Chlorine Contact Tank 2 ORP Sensor – TNT-DIS-AIT-0201 - Calibration	August 22, 2024
Influent Autosampler – TNT-PLT-SP-0001 - Verification	Jan 12, Apr 12, Jul 12, Oct 25
Final Effluent Autosampler – TNT-FT-SP-0003 – Verification	Jan 12, Apr 12, Jul 12, Oct 25
Emergency Generator – TNT-ELS-GEN-0001 - Load Test	June 4, 2024

In 2024, there was a total of 3290 work orders completed; refer to Appendix F for a summary of maintenance activities as per Conditions 11(4)(e) of the ECA. None of the maintenance activities undertaken at the plant fell under Limited Operational Flexibility.

6 UTILITIES

A summary of monthly utility consumption for the previous three years at the North Toronto Treatment Plant is provided in Figure 1. Table 6 below summarizes the total cost and average unit cost for water, and hydro. Total annual consumption for potable water and hydro was 59,263 m^3 and 2.76 M kWh, respectively.

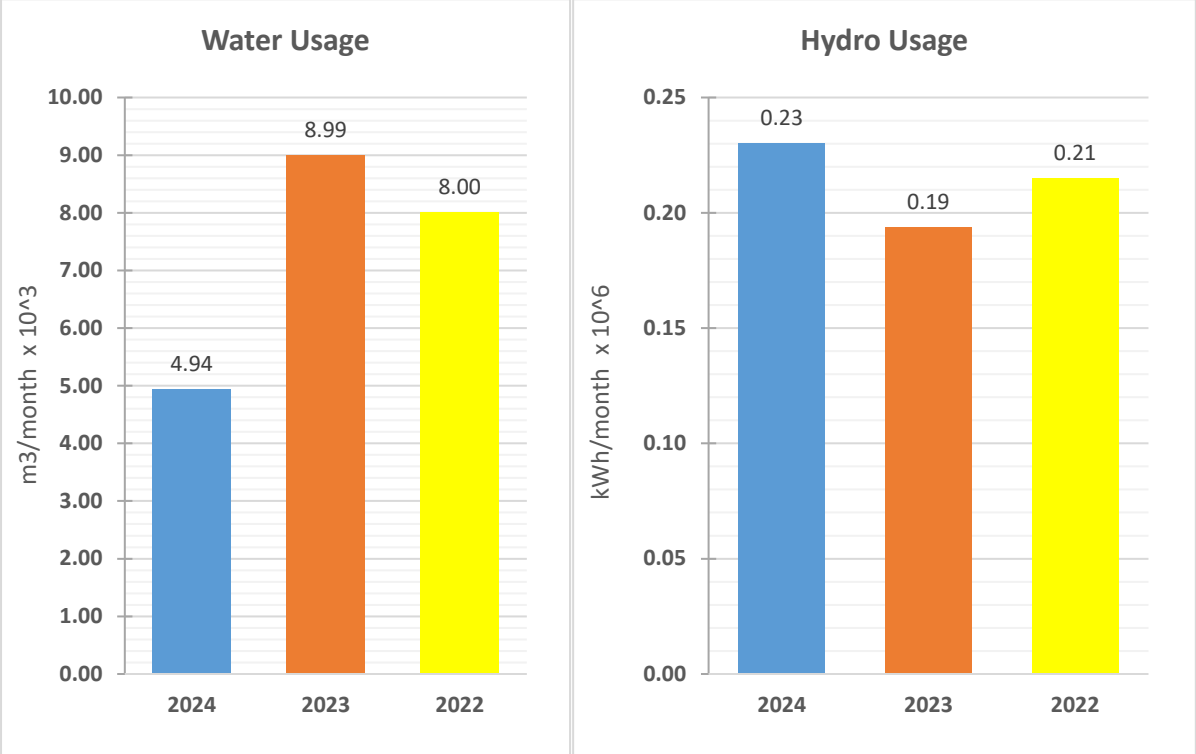


Figure 1: Monthly Utility Consumption (Water, Hydro)

Table 6: Average Unit and Total Utility Cost

Utility	2024	2023	2022
Water Unit Cost ($/$m^3$)	$4.76	$4.62	$4.48
Water Total Cost ($/year)	$281,824.71	$498,146.28	$430,207.33
Hydro Unit Cost ($/kWh)	$0.15	$0.13	$0.13
Hydro Total Cost ($/year)	$410,695.54	$310,924.90	$332,141.38

7 ADMINISTRATION

7.1 Operations and Maintenance Costs

The 2024 plant direct operational costs are broken down into five categories: Salaries and Benefits, Materials and Supplies, New Equipment, Services and Rents, and Inter-Divisional Charges. Materials and Supplies is further segregated into Utilities, Machine & Equipment Parts, Chemicals and Other Materials and Supplies. A breakdown of 2024, 2023 and 2022 annual operations and maintenance costs is illustrated in Figure 2. Overall, operational costs increased by 10.9 % from 2023.

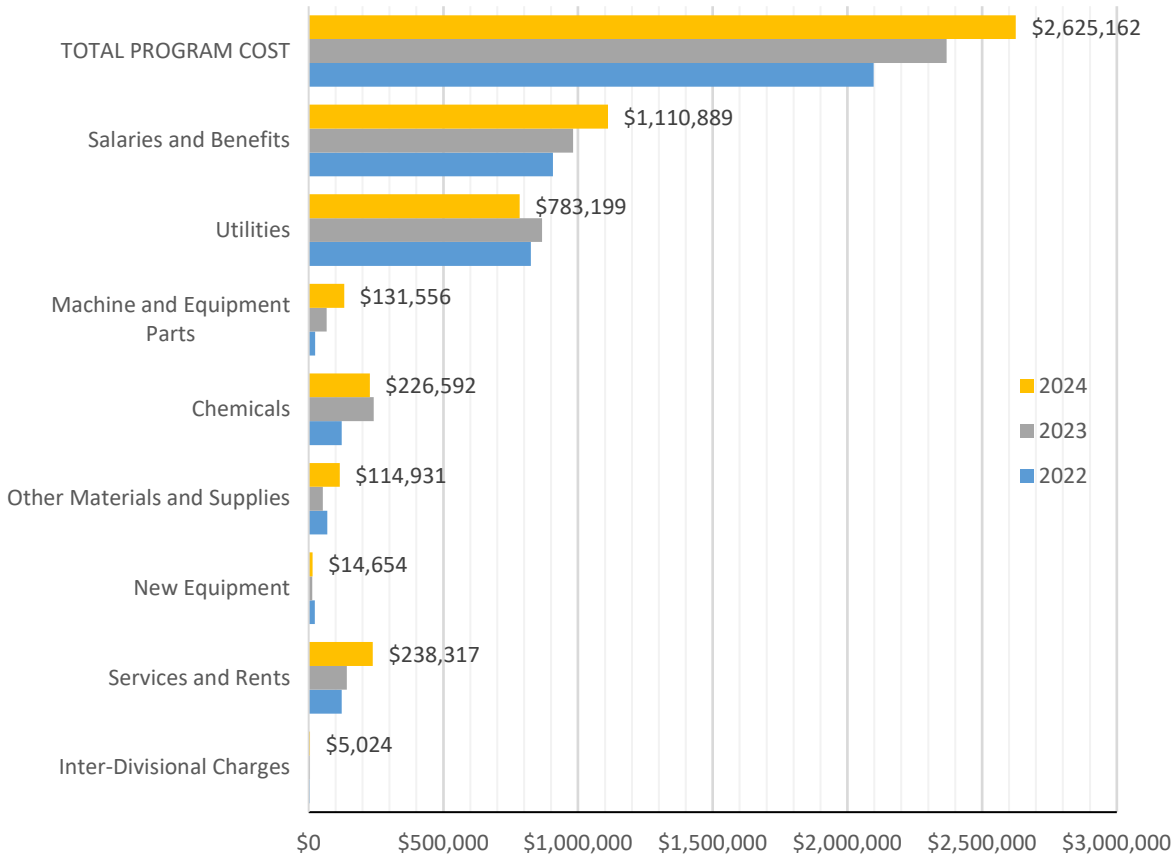


Figure 2: Operations and Maintenance Cost Breakdown

7.2 Human Resources

Plant Staffing at the North Toronto Treatment Plant in 2024 is shown in Table 7.

Table 7: Plant Staffing

Position	Number of FTE[1]
Area Supervisor, Process Operation and Maintenance	1
Electrical Instrumentation Control Technician	1
Plant Technician - Wastewater	2
Industrial Millwright	2
Wastewater Treatment Plant Worker	1
Developmental Plant Technician	2
Total FTE Positions	9

[1] FTE refers to Full Time Equivalent staff. Seasonal staff are considered 0.5 FTE staff.

7.3 Occupational Health & Safety

Continuous efforts are made to ensure a safe working environment at the North Toronto Treatment Plant. The Joint Health and Safety Committee (JHSC) assists management in resolving issues through regular meetings and monthly workplace inspections. Plant Health and Safety statistics for the North Toronto Treatment Plant are included in Figure 3.

As of December 31, 2024, there was one lost time incident and 36 lost time days in 2024 due to work related injuries.

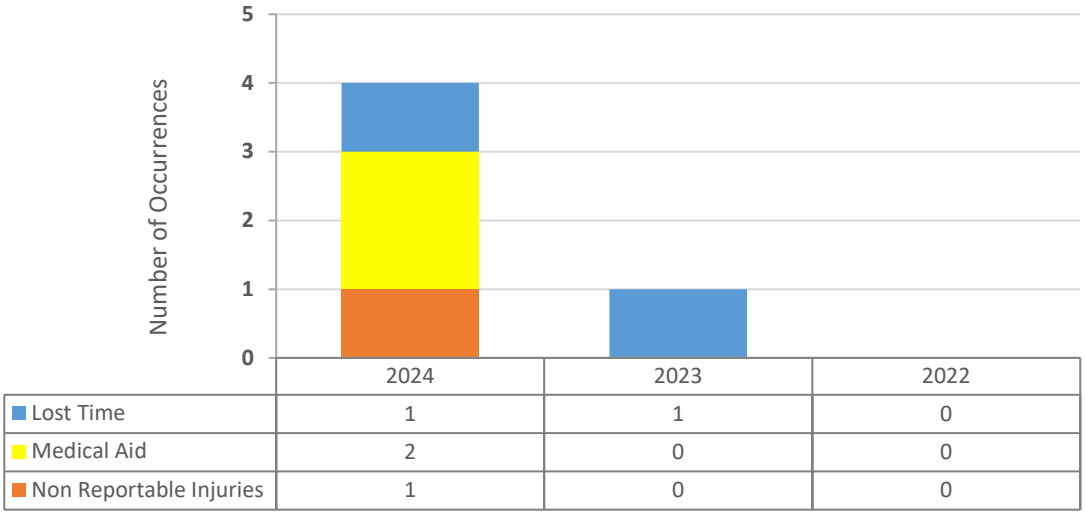


Figure 3: North Toronto Treatment Plant Health & Safety Injury Summary

7.4 Staff Training and Development

The Strategic Planning and Workforce Development unit of Toronto Water facilitates a comprehensive training program for all staff.

Training attended by North Toronto Treatment Plant operations and skilled trades staff in 2024 includes the list of courses shown in Appendix E. Some of these courses were eligible for Continuing Education Units (CEU's) as specified by the Ontario Water and Wastewater Certification Office. Additional training related to the start-up and commissioning of new equipment/systems installed as part of the capital program was provided as required.

7.5 Utility Operator Certification

Toronto Water trains and provides the required resources to ensure all operators achieve and maintain Class IV certifications. In addition, all skilled trade positions are required to achieve and maintain a Class I operator's licence. As part of this initiative, general operational/process training was delivered in order to prepare staff for any certification examination that they need to write. Table 8 summarizes the status of operator certification at the North Toronto Treatment Plant in 2024.

Table 8: Wastewater Treatment Certificates

Class Level	Number of Licenses
Class IV	2
Class III	2
Class II	1
Class I	1
O.I.T.	2
Total	8

7.6 MECP Correspondence

There were no orders issued by the Ministry of the Environment, Conservation and Parks (MECP).

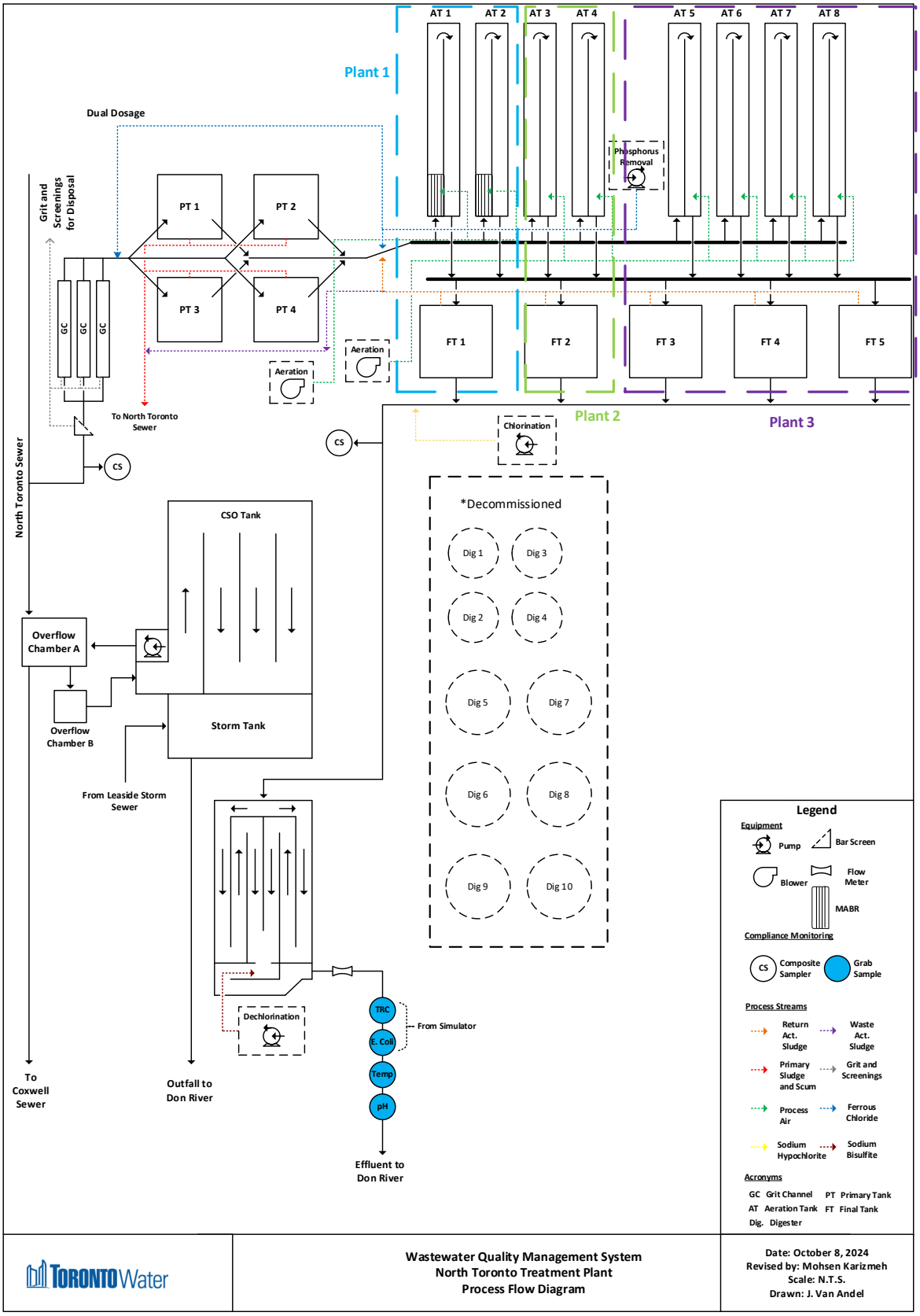
Table 9 summarizes the correspondence submitted to the MECP for the North Toronto Treatment Plant in 2024.

Table 9: Correspondence submitted to the MECP

Date	Type	Description	Resolution	Resolution Date
Notification on Construction of Proposed Works				
N/A	N/A	No notifications in 2024.	N/A	N/A
MECP Inspection				
N/A	N/A	No inspections in 2024.	N/A	N/A

APPENDIX A – Plant Schematic

APPENDIX A – Plant Schematic



APPENDIX B – Influent and Effluent 2024 Performance Chart

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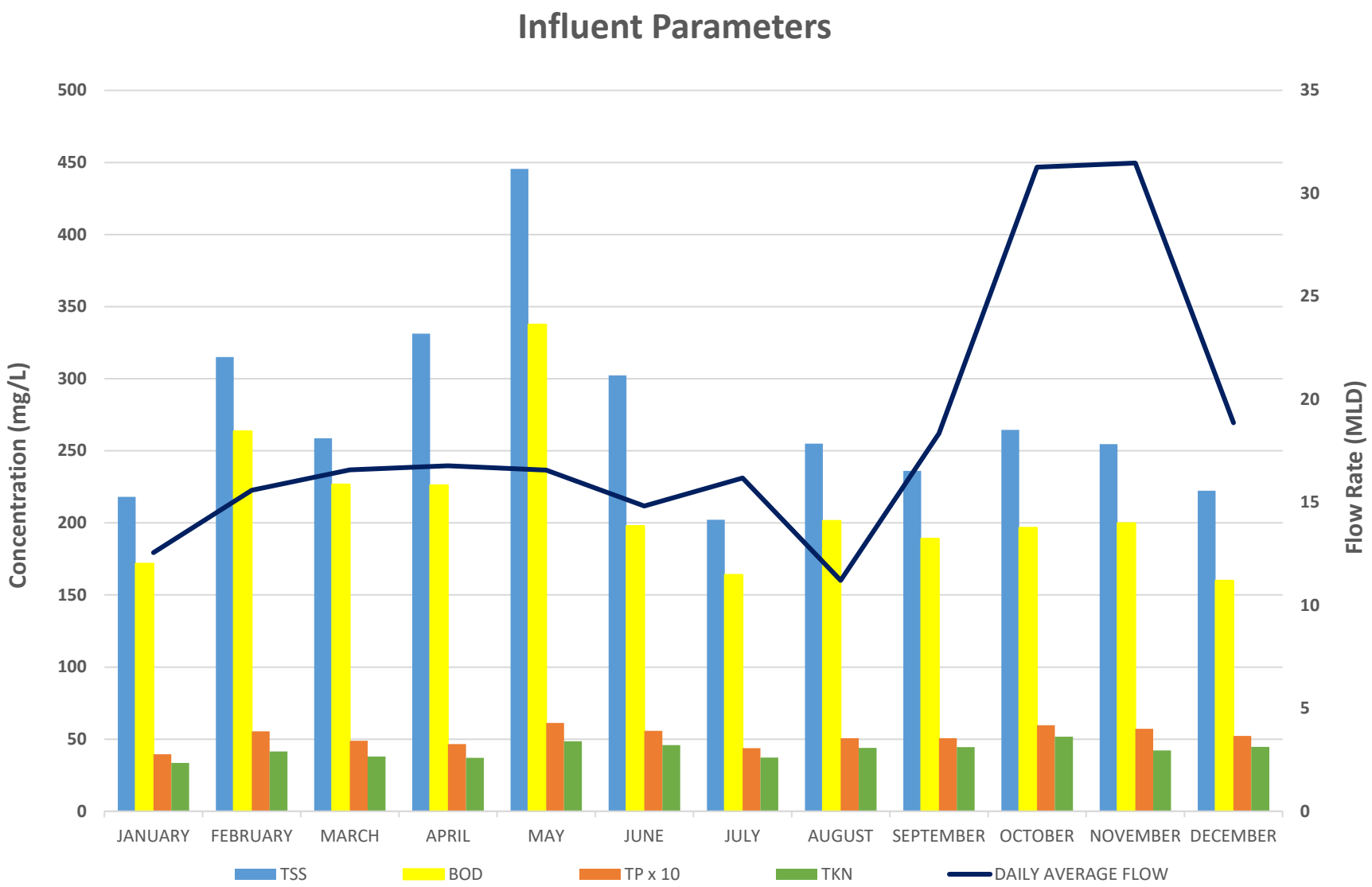
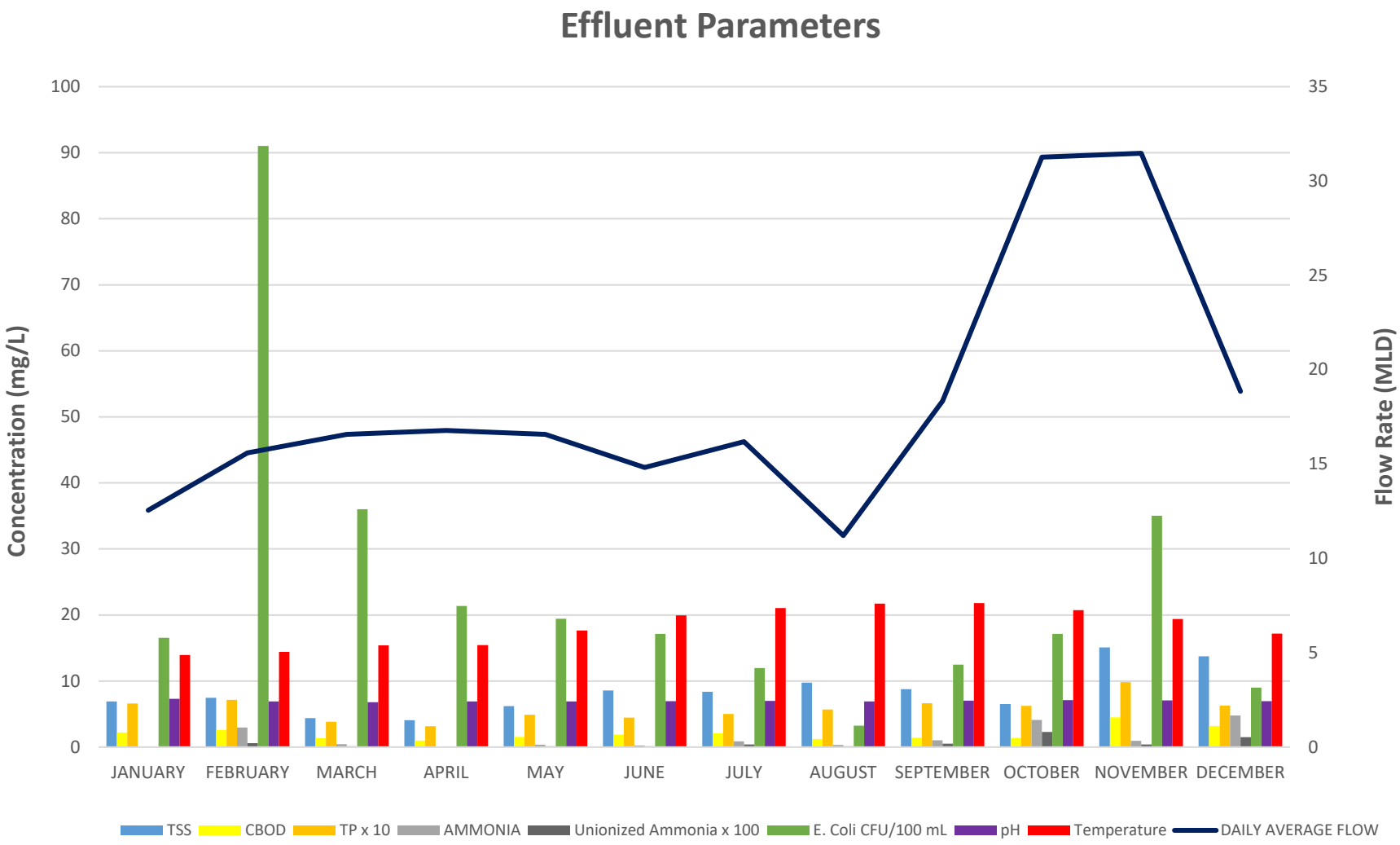


APPENDIX B – Influent and Effluent 2024 Performance Chart



APPENDIX C – Historical Performance Data

APPENDIX C – Historical Performance Data

	Units	2024	2023	2022	2021	2020	2019	2018	2017	2016	2015	2014
Influent Parameters												
Flow	ML/day	18.3	14.7	16.0	17.5	17.4	21.5	18.8	15.7	17.6	20.0	23.2
Total Annual Flow	ML	6714	5358	5838	6380	6359	7,851	6,872	5,731	6,422	7,281	8,481
Total Suspended Solids (TSS)	mg/L	275.2	334.1	226.0	240.7	356.6	258.9	321.2	276.0	286.0	268.0	229.2
Biochemical Oxygen Demand (BOD_5)	mg/L	211.1	232.9	182.7	196.3	260.7	182.5	204.4	192.0	197.0	206.0	169.1
Total Phosphorus (TP)	mg/L	5.2	5.3	4.7	4.8	5.7	4.8	5.4	5.2	5.5	5.5	4.4
Total Kjeldahl Nitrogen (TKN)	mg/L	42.4	40.1	36.7	38.1	42.9	39.1	40.1	40.5	41.1	38.8	34.5
Preliminary Treatment												
Grit and Screenings	kg/day	203.6	165.9	169.0	290.6	231.7	296.4	290.8	295	306.6	396.4	302.9
Primary Treatment												
TSS	mg/L	183.4	96.7	125.9	117.2	107.9	101.7	102.5	86.0	100.0	116.0	106.4
Carbonaceous Biochemical Oxygen Demand ($cBOD_5$)	mg/L	142.9	87.3	93.7	91.4	92.1	70.9	85.0	69.0	89.0	89.0	73.5
Secondary Treatment												
Aeration Loading	kg $CBOD_5/m^3$.day	0.26	0.13	0.15	0.16	0.16	0.15	0.16	0.11	0.15	0.17	0.17
Mixed Liquor Suspended Solids	mg/L	4301	2561	2442	2258	2353	2,228	2,397	2,351	2,439	2,317	2,434
Final Effluent												
Final Effluent Daily Average Flow	ML/day	18.3	14.7	16.0	17.5	17.4	21.5	18.8	15.7	17.5	19.9	23.2
TSS	mg/L	8.3	9.1	6.7	7.5	7.0	5.8	6.6	3.0	3.0	3.6	4.2
TSS Loading Rate	kg/day	152.6	133.5	108.0	131.6	121.4	124.4	123.2	52.7	52.3	71.2	99.3
cBOD5	mg/L	2.0	3.2	3.1	3.2	2.8	3.6	3.1	2.0	2.0	2.2	2.4
cBOD5 Loading Rate	kg/day	37.2	47.1	49.7	56.5	48.2	78.2	57.6	26.5	31.1	42.9	55.9
TP	mg/L	0.6	0.5	0.5	0.6	0.6	0.6	0.6	0.5	0.7	0.7	0.4
TP Loading Rate	kg/day	10.6	7.7	7.9	10.1	10.6	11.9	11.0	8.5	12.1	13.4	9.9
Escherichia Coli (E. Coli)	CFU/100 mL	24	22	13	13	16	13	11	5	11	9	14
pH	-	7.0	7.5	7.2	7.0	7.2	7.1	7.1	7.3	7.1	7.4	7.6
Total Chlorine Residual	SBS (P)/mg/L	0.012	0.012	0.014	0.014	0.009	0.011	*	SBS (P)	SBS (P)	SBS (P)	SBS (P)

APPENDIX C – Historical Performance Data

	Units	2024	2023	2022	2021	2020	2019	2018	2017	2016	2015	2014
Total Kjeldahl Nitrogen (TKN)	mg/L	2.1	1.9	4.4	3.3	2.8	5.6	6.7	2.1	1.7	4.0	11.4
Total Ammonia Nitrogen	mg/L	1.3	1.0	3.4	2.8	2.2	5.3	6.0	1.5	0.9	3.2	10.0
Unionized Ammonia	mg/L	0.005	0.012	0.019	0.011	0.012	0.028	0.038	0.010	0.007	0.038	0.105
Nitrate +Nitrite	mg/L	16.7	19.4	14.6	15.3	15.8	11.7	10.5	15.7	13.9	11.7	6.0
Temperature	degrees Celsius	18	18	18	19	18	17	18	17	18	-	-
Solids Handling												
Sludge to Ashbridges Bay Treatment Plant (ABTP) – Flow	ML/day	0.43	0.56	0.46	0.55	0.45	0.49	0.46	0.40	0.48	0.32	0.30
Sludge to ABTP – Total Solids (TS)	%	0.73	0.55	0.94	0.89	0.91	1.00	0.92	0.97	0.96	1.60	1.40

*From January to April 2018 SBS presence was confirmed; from May to December 2018 post De-Chlorination TRC was measured

APPENDIX D – Influent and Effluent Metal Concentrations

APPENDIX D – Influent and Effluent Metal Concentrations

Influent (Daily Composite tested once/month for metals)

Parameter Units	Arsenic mg/L	Cadmium mg/L	Chromium mg/L	Cobalt mg/L	Copper mg/L	Iron mg/L	Lead mg/L	Manganese mg/L	Mercury mg/L	Nickel mg/L	Zinc mg/L
January	*0.005	*0.002	*0.002	*0.002	0.0785	0.663	*0.0025	0.0394	*0.00005	*0.0025	0.0998
February	*0.005	*0.002	*0.002	*0.002	0.0846	0.863	*0.0025	0.042	*0.00005	*0.0025	0.109
March	*0.005	*0.002	*0.002	*0.002	0.117	0.912	*0.0025	0.0433	*0.00005	*0.0025	0.143
April	*0.005	*0.002	*0.002	*0.002	0.0861	0.874	*0.0025	0.0425	*0.00005	*0.0025	0.122
May	*0.005	*0.002	*0.002	*0.002	0.16	1.4	0.00813	0.0548	0.00011	*0.0025	0.217
June	*0.005	*0.002	*0.002	*0.002	0.112	0.974	0.00666	0.0466	*0.00005	*0.0025	0.158
July	*0.005	*0.002	*0.002	*0.002	0.0866	0.944	*0.0025	0.0487	0.00012	*0.0025	0.12
August	*0.005	*0.002	*0.002	*0.002	0.124	1.14	*0.0025	0.0451	0.00012	*0.0025	0.16
September	*0.005	*0.002	*0.002	*0.002	0.114	0.807	*0.0025	0.0383	*0.00005	*0.0025	0.117
October	*0.005	*0.002	*0.002	*0.002	0.0979	0.636	*0.0025	0.0345	*0.00005	*0.0025	0.117
November	*0.005	*0.002	*0.002	*0.002	0.0938	0.629	*0.0025	0.033	*0.00005	*0.0025	0.105
December	*0.005	*0.002	*0.002	*0.002	0.0926	0.638	*0.0025	0.0371	*0.00005	*0.0025	0.103
Annual Average	**0.005**	**0.002**	**0.002**	**0.002**	**0.104**	**0.873**	**0.00332**	**0.0421**	**0.000067**	**0.0025**	**0.131**

Values in red with an asterisk prefix are half the MDL

APPENDIX D – Influent and Effluent Metal Concentrations

Final Effluent (Daily Composite tested once/month for metals)

Parameter Units	Arsenic mg/L	Cadmium mg/L	Chromium mg/L	Cobalt mg/L	Copper mg/L	Iron mg/L	Lead mg/L	Manganese mg/L	Mercury mg/L	Nickel mg/L	Zinc mg/L
January	*0.005	*0.002	*0.002	*0.002	0.0231	0.507	*0.0025	0.0337	*0.00005	*0.0025	0.0268
February	*0.005	*0.002	*0.002	*0.002	0.0194	0.516	*0.0025	0.0816	*0.00005	*0.0025	0.0315
March	*0.005	*0.002	*0.002	*0.002	0.0157	0.495	*0.0025	0.0513	*0.00005	*0.0025	0.0255
April	*0.005	*0.002	*0.002	*0.002	0.0216	0.365	*0.0025	0.0294	*0.00005	*0.0025	0.0236
May	*0.005	*0.002	*0.002	*0.002	0.017	0.593	*0.0025	0.0311	*0.00005	*0.0025	0.0246
June	*0.005	*0.002	*0.002	*0.002	0.0203	0.897	*0.0025	0.0371	*0.00005	*0.0025	0.0271
July	*0.005	*0.002	*0.002	*0.002	0.0262	0.811	*0.0025	0.0216	*0.00005	*0.0025	0.0279
August	*0.005	*0.002	*0.002	*0.002	0.0423	0.894	*0.0025	0.0174	*0.00005	*0.0025	0.03
September	*0.005	*0.002	*0.002	*0.002	0.0232	0.826	*0.0025	0.0324	*0.00005	*0.0025	0.029
October	*0.005	*0.002	*0.002	*0.002	0.0131	0.441	*0.0025	0.0432	*0.00005	*0.0025	0.0259
November	*0.005	*0.002	*0.002	*0.002	0.0259	0.782	*0.0025	0.0337	*0.00005	*0.0025	0.0414
December	*0.005	*0.002	*0.002	*0.002	0.0235	1.55	*0.0025	0.0568	*0.00005	*0.0025	0.0299
Annual Average	**0.005**	**0.002**	**0.002**	**0.002**	**0.0226**	**0.723**	**0.0025**	**0.0391**	**0.00005**	**0.0025**	**0.0286**

Values in red with an asterisk prefix are half the MDL

APPENDIX E – Staff Training Courses

Training attended by North Toronto Treatment Plant operations and skilled trades staff in 2024 includes the list of courses below.

Technical and Health and Safety Training:

- Arc Flash For Non-Qualified Persons
- Corporate Security -Surviving an Active Attacker
- Distracted Driving
- Emergency Equipment (First Aid Kit, Eye Wash, Fire Extinguisher)
- Ergonomics Injuries Simple Precautions
- Fire Safety at Work
- Injury Reporting
- Lock Out, Tag Out & Test Awareness
- Mobile Elevating Work Platforms-Scissors Lift & Zoom Boom Training
- PPE - Hard Hats
- Preventing Heat Stress
- Respirators: Selection, Fit, Use, and Maintenance
- Safety on the Road
- Sewage Works and Surface Water Spill Response
- Slips, Trips and Falls
- Troubleshooting Wastewater Treatment Plant
- Winter Driving Safety
- Working At Heights Refresher

Other Training:

- Business Email Compromise
- Civility in the Workplace
- Confronting Anti-Black Racism Training
- How To Conduct Workplace Investigations
- Human Rights And Workplace Harassment Essentials For Management
- Internet of Things
- Learning And Leading With Human Rights
- Mobile Security
- Password Security

- Phishing
- Physical Security
- Public Wi-Fi
- Social Engineering
- Social Media Best Practices
- Unconscious Bias for People Leaders
- Working Remotely
- Workplace Harassment
- Workplace Violence Legislation & Policy Review

APPENDIX F – Maintenance Activities

The following maintenance activities on major structures and equipment at North Toronto Treatment Plant were completed in 2024:

Monthly Activities

- Clean drop shaft influent screens
- Clean primary wet well level transmitter
- Inspect and lubricate bar screen bar screen screw conveyor bearings
- Inspect and lubricate bar screen motor bearings, wiper pivot shaft, and pin rack
- Inspect and start-up auxiliary portable generator
- Inspect boilers
- Inspect portable gas monitors
- Inspect RAS and WAS pump gland packing water seal
- Inspect UPS battery charger and battery
- Lubricate bridge rotating collector
- Lubricate WAS and RAS pump coupling, bearing and motor bearing
- Maintain aeration blower valves
- Replace suspended solid transmitter pump tubing
- Test combustible gas detectors and alarms
- Test Standby WAS and RAS pumps

Quarterly Activities

- Calibrate the CI/ORP analyzer sample probe
- Exercise furnace oil manual valves
- Exercise the hot water primary loop manual valves
- Inspect and exercise manual sodium hypochlorite valve
- Inspect and exercise the manual sodium bisulphite valves
- Inspect burner furnace oil filter
- Inspect final clarifiers motor bearing
- Inspect Furnace oil feed pump and motor bearings
- Inspect roof air handler unit fan and motor bearings, damper links, filters, drive belts, shelves and structure
- Inspect sludge pump and sludge pump motor bearings
- Lubricate the drainage pump shaft and motor bearings
- Test sump pit submersible pump
- Test the sump pump float switch
- Verification and testing of autosamplers
- Verify the operation of Low Water Level cut out trip circuit

Semi-annual Activities

- Clean and test wet well low/high level float
- Clean chemical dosing pump diaphragm and valves
- Inspect and calibrate aeration dissolved oxygen analyzer transmitters
- Inspect and calibrate aeration flow transmitter
- Inspect and calibrate aeration flow transmitters
- Inspect and clean primary wet well
- Inspect and lubricate ferrous chloride feed pump
- Inspect and pressure match aeration pressure transmitters
- Inspect, clean, and lubricate belt driven roof exhaust fan bearings
- Lubricate bar screen channel inlet and discharge sluice gate stem
- Lubricate circular collector torque switch articulated arm
- Lubricate WAS pump
- Test sodium bisulphite/hypochlorite tank spill containment limit switch

Annual Activities

- Calibrate dissolved oxygen sensor
- Calibrate hypochlorite and sulphite analyzers
- Check oil level of sludge pump gearbox and macerator gearbox
- Clean air handling unit heating coil
- Clean and maintain aeration tank 9” membrane diffusers
- Clean heating coil on stand alone hot water driven heater
- Drain, clean, and inspect chlorine contact tank
- Exercise and check final clarifiers distribution channel gate valves
- Exercise and inspect secondary gate valves
- Exercise drainage pump system isolation valves
- Exercise sludge isolation, suction, discharge, bypass, and drain valves
- Functional test of circular collector shutdown torque switch
- Functional test of the HVAC unit high supply air temperature shutdown and alarm circuit
- Inspect and clean heater fan motor, sheaves and belts
- Inspect and lubricate rollup door
- Inspect boiler recirculation pumps mechanical seals
- Inspect bridge rotating collector
- Inspect final clarifiers motor sheave/drive belts
- Inspect motor/pump shaft sheave

- Inspect screw conveyor trough liner thickness and change gear box oil
- Inspect WAS and RAS pump/motor drive belts
- Inspect, change grease, and lubricate bearings on primary heating system recirculating pump drive coupling
- Load and performance test on boiler after annual maintenance outage
- Lubricate hot water boiler primary loop gate valves
- Lubricate primary tank inlet sluice gate valve stem and scum outlet sluice gate valve stem
- Lubricate roof air handler fan bearings
- Lubricate sluice gate and check oil of actuator
- Maintain aeration tank actuated air valve
- Maintain secondary clarifier RAS suction pipe actuated knife gate valve
- Perform megger test of the RAS/WAS pump and drainage pump motor winding insulation
- Test and inspect backflow preventers
- Wet well level transmitter functional test

Major Repairs

- Repair and replacement of bar screen rake mechanism, motor, and gear box
- Repair of two oil fired boilers due to flood damage, including replacement of oil burners and control panels
- Rebuild of drainage pump, including machining of impeller bore and fabrication of new parts