2024 Annual Report

North Bay Wastewater Treatment System

Description of the Works

Wastewater Treatment Plant:

The original sewage plant was built in 1961-62 providing secondary treatment for 18,160 cubic meters/day. The plant was expanded in 1973 to a capacity of 36,320 cubic meters/day, and in 1984 the plant was expanded again to its present capacity of 54,500 cubic meters/day. Phosphorus removal was included in the 1984 expansion/upgrade. To protect spawning grounds, the plant operates a discontinuous chlorination program (chlorination period is May 15th to October 15th).

The North Bay Wastewater Treatment Plant is a conventional activated sludge facility, using biological oxidation, anaerobic sludge digestion than centrifugation for sludge dewatering. The plant treats urban wastewater and discharges the processed effluent water into Lake Nipissing. The solid sludge material produced through primary settlement and the biological secondary treatment process "activated sludge process", is stabilized through anaerobic digestion which reduces its organic content and renders it non-putrescible. The anaerobically digested sludge is thickened by centrifugation with polymer addition. Dewatered sludge with an approximate solid's concentration of 19-24% is hauled from the Wastewater Treatment Plant and utilized at the Merrick Landfill Site as sections are closed and used as a topping material.

The works consist of:

Preliminary Treatment

- A raw sewage pumping station with two (2) debris grinders and four variable speed raw sewage pumps, two (2) rated at 80,352 m^3/d against 10.6 m TDH. Two (2) upgraded variable speed raw sewage pumps each rated at 95,904 m^3/d against 10.9m TDH.
- Two (2) mechanically cleaned bar screens.
- One (1) screening screw conveyor and dewatering press
- Two (2) vortex grit removal tanks with a total peak flow capacity of flow of 108,960 m^3/d.
- Two (2) 2.83 m^3/min. blowers and three (3) 1.42 m^3/min blowers
- One (1) grit classifier and dewatering screw

Primary Treatment

- Four (4) primary clarifiers each with a surface area of 250.25 m^2 providing a total surface area of 1001 m2 and two (2) large primary clarifiers each with a surface area of 613.7 m^2 providing a total surface area of 1227 m^2.
- Four (4) waste sludge pumps, two (2) with rated capacity of 18.9 L/s for clarifiers 1-4 and two (2) with rated capacity of 22.5 L/s for clarifiers 5 & 6.

Secondary Treatment

- Three (3) aeration tanks providing a total volume of 10,150 m^3 with each tank equipped with fine bubble diffused aeration system, and Six (6) positive displacement lobe type blowers, each rated at 500 c.f.m.at a maximum of 14 psi.
- Four secondary clarifiers (1-4) each with volume of 1,138m^3 providing a total surface area of 1,478 m^2 and two (2) large rectangular clarifiers (5-6) each with surface area of 739 m^2 providing a total surface area of 1,478 m^2.
- One (1) constant speed waste activated sludge (WAS) pump for secondary clarifiers #1-4 having a rated capacity of 27.6 L/s at 24.7 m TDH.
- Two (2) return activated sludge (RAS) pumps with Variable frequency drives for secondary clarifier's #1-4, each having a rated capacity of 415 L/s.
- Five (5) RAS/WAS sludge pumps for secondary clarifiers #5-6, each having a rated capacity of 76 L/s at 9.1 m TDH.
- Two (2) chemical metering pumps for chemical addition for phosphorus removal, each having a rated capacity of 6mL - 65 L/hr.
- Two industrial effluent water pumps (one duty and one standby) each rated at 3.5 L/s at 59.8 m TDH.

Disinfection & Discharge

- A chlorine disinfection system consisting of two chlorine contact tanks, one providing a volume of 764 m^3 and a second chlorine contact tank providing a total volume of 784 m^3.
- Two 4,280L CAPTOR storage tanks.
- A dechlorinating system consisting of two chemical metering pumps each rated at 18 - 32 liters per hour, and three oxidation reduction potential (ORP) probes to monitor chlorine residuals.
- Approximately 322 m of 1500 mm diameter discharge/outfall pipe, discharging from an overflow chamber into Lake Nipissing.

Sludge Processing

- A sludge digestion and storage system consisting of one (1) anaerobic digester (primary digester) providing a digestion volume of 3,434 m^3 and two (2) anaerobic digesters (secondary digesters), each having the

volume of 2,060 m^3 to provide a total digestion volume of 7,580 m^3; and one (1) digested sludge holding tank having a volume of approximately 1,500 m^3.

- One Bird Model 3700 dewatering centrifuge and one Andritz Model sludge dewatering centrifuge capable of dewatering sludge up to 680 kg/h of dry solids.

Back-up Power and Electrical Equipment

- Two (2) 750 kW, 347/600V diesel driven power generator. Each generator containing an attached 7,466 L double walled fuel tank provides partial emergency power to the raw sewage pumps and critical plant processes during power outages. Sized for future addition of secondary treatment equipment.
- All other controls, electrical equipment, instrumentation, piping, pumps, valves and appurtenances essential for the proper operation of the sewage works.

Registration of the Wastewater Works:

Municipal Location	City of North Bay
Works Number	110000533
Facility Classification	WWC Level II, Certificate #1447
	issued 21 September, 1990
	WWTP Level IV, Certificate #154
	issued 17 January, revised 2012
	upgraded to a class 4
Certificate of Approval	Certificate of Approval #6310-CG3NM9
Population Served	54,000 people

Wastewater Collection System Pumping Station Descriptions:

The Barber (Coreen/Wickstead) sewage lift pumping station Is a factory built wet well/dry well station without an overflow. It has two (2) 30 HP, 575 Volt, 3 Phase, Flygt submersible pumps. It is also equipped with a 125 KVA standby diesel gen set to provide emergency power. A small building on site houses the pump controls and the standby gen set.

The Booth Road sewage lift pumping station Is a wet well type of station without an overflow. It has two (2) 20 HP, 575 Volt, 3 Phase, Flygt submersible pumps. It is also equipped with a 62.5 KVA standby gen set to provide emergency power. A small building on site houses the pump controls and the standby gen set.

The Chapais Street sewage lift pumping station Is a wet well type of station with an overflow. It has two (2) 3.5 HP, 220 Volt, 3 Phase, Flygt submersible pumps. It is also equipped with a 50 KVA standby gen set to provide emergency power. The gen set is an external, fixed pad mounted, self-contained unit. There is no building at this site, only an above ground pump control panel for the pumps which are in a sub grade wet well.

The Foran sewage lift pumping station Is a wet well type of station with an overflow. It has two (2) 5 HP, 220 Volt, 3 Phase, Flygt submersible pumps. This station does not have a permanently installed standby gen set to provide emergency power. A mobile gen set must be used to provide emergency power when required. There is no building at this site, only an above ground pump control panel for the pumps which are in a sub grade wet well.

The Gertrude Road sewage lift pumping station Is a factory built 3.6m diameter by 7.7m deep wet well/dry well station. It has two (3) 12 HP Flygt submersible pumps capable of a peak flow of 76 l/s. It is also equipped with a 32.5 KVA standby gen set to provide emergency power. Site is equipped with a Kohler 80KW standby power diesel generator with sound dampening enclosure. There is no building at this site, only an above ground pump control panel for the pumps which are located in a sub grade well.

The Judge Street sewage lift pumping station Is a factory built wet well/dry well station without an overflow. It has two (2) 20 HP, 575 Volt, 3 Phase, Flygt pumps. It is also equipped with a 75 KVA standby gen set to provide emergency power. A small building at this site houses the pump controls and the standby gen set.

The Lakeside pumping station Is a dry well/wet well type station without an overflow. It has two (2) 3.5 HP, 220 Volt, 3 Phase, Flygt submersible pumps. This pumping station does not have a permanently installed standby gen set to provide emergency power. A mobile 32.5 KVA standby gen set stored at the public works must be transported to the site and used to provide emergency power to this station when required. There is no building at this site, only an above ground pump control panel for the pumps which are located in a sub grade dry well.

The Lake Heights sewage lift pumping station Is a wet well type station with an overflow. It has two (2) 29 HP, 575 Volt, 3 Phase, Flygt submersible pumps. It is also equipped with a 62 KVA standby gen set to provide emergency power. A small building at this site houses the pump controls and the standby gen set.

The Marsh Drive sewage lift pumping station Is a wet well type of station without an overflow. It has two (2) 30 HP, 575 Volt, 3 Phase, and Gorman Rupp above ground pumps. This pumping station is located at the Marsh Landfill site and collects the leachate and pumps it into the municipal sewage system. This station does not have a permanently installed standby gen set to provide emergency power. A mobile gen set must be transported to the site and used to provide emergency power when required. A small building at this site houses the above ground pumps with suction piping extending into the wet well and pump controls.

The Marshall Sewage lift pumping station is a wet well type station without an overflow. It has (3) dry submersible pumps, (1) 75 HP, 575 Volt, 3 Phase, Crane Deming dry pit pump and (2) 85 Hp Flygt pumps with a 240 L/s capacity respectively. The station is also equipped with a 150KW 600/347-volt standby generator to provide emergency power. The structure houses the pump controls, and the standby gen set in the above ground level of the building and the dry well pumps are in a below ground (basement) level. Access is provided via a separate external door to a staircase which leads down to a screening unit for wastewater entering the stations wet well.

The Merlin Street sewage lift pumping station Is a wet well type of station with an overflow. It has two (2) 3.5 HP, 575 Volt, 3 Phase, Flygt submersible pumps. It is also equipped with a 35 KVA standby gen set to provide emergency power. The gen set is an external, fixed pad mounted, self-contained unit. There is no building at this site, only an above ground pump control panel for the pumps which are in a sub grade wet well.

The Northgate sewage lift pumping station Is a wet well type of station without an overflow. It has two (2) 9.4 HP, 575 Volt, 3 Phase, Flygt submersible pumps. It is also equipped with a 75 KVA standby gen set to provide emergency power. The gen set is an external, fixed pad mounted, self-contained unit. There is no building at this site, only an above ground pump control panel for the pumps which are in a sub grade wet well. An upstream manhole with inline 5HP, 575 Volt, 3phase 3-Hydro-C-1800 inline grinder before the wet well. This is to deal with large amounts of rags and other debris which was damaging pumps.

The Premier Road sewage lift pumping station Is a factory built wet well/dry well station without an overflow. It has two (2) 2 HP, 575 Volt, 3 Phase, Allis Chalmers/Smith & Lovelace pumps. It is also equipped with a 35 KVA standby gen set to provide emergency power. The gen set is an external, fixed pad mounted, self-contained unit. There is no building at this site, only an above ground pump control panel for the pumps which are in a sub grade wet well.

The Tenth Street pumping station Is a wet well type of station with an overflow. It has two (2) 5 HP, 600 Volt, 3 Phase, and Flygt submersible pump. (This station is operational in the summer months only) This station does not have a permanently installed standby gen set to provide emergency power. There is no building at this site, only an above ground pump control panel for the pumps which are in a sub grade wet well.

The Timmins/Gorman sewage lift pumping station Is a wet well type of station with an overflow. It has two (2) 7.5 HP, 230 Volt, 3 Phase, Flygt submersible pumps. This station does not have a permanently installed standby gen set to provide emergency power. A mobile gen set/thawing stored by the city must be transported to the site and used to provide emergency power when required. A very small building at this site houses the pump controls for the pumps which are in a sub grade dry well/wet well.

The Wallace Road sewage lift pumping station Is a factory built dry well/wet well station without an overflow. It has two (3) 12 HP, 575 Volt, 3 Phase, Flygt pumps giving the stations a pumping capacity of 50 L/s at 16.8 TDH. It is also equipped with a 80KW standby gen set to provide emergency power. The gen set is an external, fixed pad mounted, self-contained unit. There is no building at this site, only an above ground pump control panel for the pumps which are in a sub grade wet well.

The Waterfront Storm Water pumping station located at Community Waterfront Friends Waterfront Park in the City of North Bay, designed for peak flow of 113L/s, consisting of a 3.81m x 3.81m precast concrete structure wet well equipped with two (2) 20HP, 600 Volt, 3 Phase, Flygt Model 3153.181 LT submersible pumps, one for duty and one for standby, each pump has a rated capacity of 110 L/s at a total dynamic head of 8.2m, complete with electrical and electronic control systems, float control systems, discharge piping, valves, and all other appurtenances necessary to have a complete and operable pumping station, discharging to the proposed 1200mm diameter storm sewer via the proposed 300mm diameter storm water force main.

Summary & Interpretation of Sampling and Monitoring Data:

The Certificate of Approval (ECA) #6310-CG3NM9 issued for the North Bay Wastewater Treatment Plant on August 7, 2022, requires the Owner to prepare and submit a performance report annually within (90) days following the period reported on.
The City of North Bay acts as the operating authority and operated the North Bay Wastewater Treatment Facility and the Wastewater Collection System in 2024. This Annual Wastewater System Report covers the period from 01 Jan 2024 to 31 December 2024.

Summary of Raw Sewage Sampling Data and Annual Flow Data

The sewage treatment plant has the *Rated Capacity* of 54,480 m^3/day with a secondary treatment Peak Flow Rate of 108,960 m^3/day. In 2024 the average daily raw sewage flow was 32,347 m^3/day. The annual average daily flow was within the design capacity, with the average daily flow running at 59% of the wastewater systems rated design capacity.

The annual minimum daily raw sewage flow was 20,879 m^3/day and occurred in April 2024. The maximum daily raw sewage flow was 95,945 m^3/day and occurred in April 2024.

The total raw sewage flow for the year was 11,839,024 m^3.

Raw Sewage Sampling Summary:
The operator collects a composite sample of raw sewage monthly sending it to Near North Laboratories in North Bay for analysis for BOD_5, Total Suspended Solids, TKN and Total Phosphorus as required by the ECA. The reported analysis results are forwarded to City of North Bay staff.

The average raw sewage BOD_5 concentration was 78.88 mg/L.

The average raw sewage Total Suspended Solids (TSS) concentration was 154.16 mg/L.

The average raw sewage Total Phosphorus (TP) concentration was 5.89 mg/L

The average raw sewage Total Kjeldahl Nitrogen (TKN) concentration was 41.95 mg/L.

See the accompanying North Bay WWTP 2024 Monthly Data Summary for complete raw wastewater flow and analyses data.

Treated Sewage Sampling Summary

The annual average treated sewage effluent $CBOD_5$ was 4.62 mg/L.

The annual average treated sewage effluent Total Suspended Solids (TSS) was 5.76 mg/L.

The annual average treated sewage effluent Total Phosphorus (TP) was 0.78 mg/L.

The average monthly geometric mean of treated sewage effluent E. coli during the period of chlorination was 87.11 CFU/100mL.

The Ann. Avg. treated sewage effluent Total Chlorine residual during the period of chlorination was 0.45 mg/L.

The Ann. Avg. treated sewage effluent Total Chlorine residual after dechlorination was 0.02 mg/L.

The annual average treated sewage effluent pH was 6.72.

The annual average sewage effluent temperature was 14.7 degrees C.

Effluent Chlorination and E Coli Levels:

The sewage treatment plant effluent is chlorinated using chlorine gas during the disinfection period of May 15 to October 15. In 2024 a total of 5,938.80 kg of chlorine was used. The average dosage of Cl_2 applied in 2024 was 1.30 mg/L. The average chlorine residual in the effluent was 0.45 mg/L before de-chlorination. The minimum and maximum E Coli levels measured in the effluent during the period of chlorination were respectively 5 CFU/100ml and 2000 CFU/100ml. The annual average for monthly geometric means for E Coli level in the effluent for 2024 was 87.11 CFU/100ml. The Monthly Geometric Mean Density Objectives of 150 counts/100 mL for E.coli *Effluent Limits* set in the ECA was achieved for all chlorination season of 2024.

Effluent Total Phosphorus Levels:

After primary treatment is completed the sewage ferric sulfate (iron salts) is added at the beginning of the secondary treatment process to reduce the Total Phosphorus level. The monthly averages for Total Phosphorus in the effluent ranged from 0.28 mg/L to 1.78 mg/L. The annual average Total Phosphorus level measured of the effluent was 0.78 mg/L. Therefore, the *Annual* Average Effluent Objective *of* 0.8 mg/L set in the ECA was achieved in 2024.

See the accompanying North Bay 2024 Summary of Sewage Effluent Sampling Data and Annual Flow Data for complete wastewater effluent flow and analyses data.

ECA Effluent Compliance Limits and Operational Objectives
Please see table below which shows the ECA effluent compliance limits, operational objectives and North Bay Wastewater Treatment Plant Effluent results for 2024.

Effluent Parameter	**Annual Average**	**Concentration**	
	(mg/L unless otherwise indicated)		
	Compliance	**Operational**	**2024**
	Limit	**Objective**	**Results**
CBOD5	25	15	4.62
Total Suspended Solids (TSS)	25	15	5.76
Total Phosphorus (TP)	1	0.8	0.78
Total Ammonia Nitrogen	N/A	N/A	13.86
E. Coli *[1]	200 counts/100ml	150 counts/100ml	44.73
	(monthly Geometric	(Monthly Geometric	
	Mean Density)	Mean Density)	
Total Chlorine Residual*[1]	N/A	N/A	0.45
Total Chlorine Residual After Dechlorination	0.02	0.00	0.02
pH	6.0-9.5	6.5-8.5	6.72
Temperature	N/A	N/A	14.7

*[1] During the disinfection period between May 15 to October 15, every year.

Weekly samples are taken immediately to Near North Laboratories in North Bay for analysis. Should the samples not be processed for analysis immediately, they are refrigerated at 4° C until analysed in the laboratory.

The ECA Annual Average Concentration Effluent Limits of 25.0 mg/L for $CBOD_5$, 25.0 mg/L for Suspended Solids, 1.0 mg/L for Total Phosphorus were all met. Therefore, the plant was in compliance with the ECA with exception to the following: The pH of the effluent ranged between pH 5.48 to pH 7.28 and averaged pH 6.72. This met the ECA effluent limits for pH being maintained between pH 6.0 to 9.5, inclusive at all times with exception of three occasions. July 24, 2024 with a pH of 5.81, July 31, 2024 with a pH of 5.84 and August 1, 2024 with a pH of 5.48. Total Chlorine Residuals in final effluent were collected daily from grab samples after dechlorination. The

chlorine residuals ranged from 0.00 to 0.36 mg/L; the plant was in compliance majority of the year with exception multiple days in May/June/August & September which we were over our limit of 0.02mg/L.

The ECA Effluent Objective concentrations of 15.0 mg/L for $CBOD_5$, 0.8 mg/L for Total Phosphorus, 15.0 mg/L for Suspended and were achieved. The pH Objective of maintaining between 6.5 – 8.5 was achieved most of the time through the year with exception of a small percentage of days. We did not meet the objective of Total Chlorine Residuals being maintained at 0.00mg/L for most of the season. This is also due to the equipment reading the residuals accuracy is +/- 0.02mg/L.

The Monthly Geometric Mean Density of 150 counts/100 mL for E. coli Effluent Objective set in the ECA was achieved all chlorination months except June. The average monthly geometric mean for the sewage effluent E. Coli during the period of chlorination was 87.11 CFU/100mL.

Tabulation of the Volume of Sludge Generated

Sludge that settles to the bottom of the primary clarifier tanks, referred to as primary sludge is drawn from the tanks and pumped to the primary digester for reduction through the primary and secondary sludge digestion processes. The digested sludge is then processed through centrifugation to thicken the sludge to reduce water content. Thickened sludge (11 to 25% solids) is then hauled away from the wastewater facility. The sludge is hauled to Merrick Landfill site and is then mixed with sand and used as a topping material to cover closed out sections of the landfill. The sludge blended with the sand is nutrient rich and promotes vegetative growth to cover the closed-out sections of the landfill.

In 2024 the volume of primary sludge produced was 71,883 m^3. The total volume of digested sludge that was processed through dewatering after the digestion process was 33,001 m^3. The total weight of dewatered sludge that was hauled away from the WWTP was 4,577,010 Kg which was taken to the Merrick Landfill site to be blended with sand and used for top cover which stimulates rapid vegetation growth.

Sludge was removed on a regular basis for the sewage effluent $CBOD_5$, Suspended Solids and total phosphorus to meet compliance criteria.

The total treated sewage effluent flow for the year 2024 was 11,839,024 m^3 minus 4,577,010 Kg of sludge with an approximate 17 - 39 % solids concentration which was hauled away from the facility for disposal.

See the accompanying North Bay 2024 Summary of Sewage Sludge Volumes and Disposal Data for complete wastewater effluent flow and analyses data.

Summary of Effluent Quality Assurance or Control Measures Taken:

In 2024 as on-going efforts to ensure optimal operation or the treatment process and best possible effluent quality the following measures were followed:

- Routine data reviews to identify trends or developing process problems.
- In-house sampling in addition to regulatory sampling required by the ECA.
- Routine maintenance on all equipment
- Process changes to optimize treatment effectiveness.
- On-going training of operators
- Upgrading equipment where needed to increase effectiveness of plant.

Operational Problems and Corrective Actions

- Each year we have periodic issues with a sludge matte developing on the secondary clarifiers #5 & #6. This is believed to be of a result in swings of temperature and F/M ratios. To mitigate this issue, we have reduced our biology concentrations which we carry in the plant and have an operator cleaning up any sludge accumulation daily when there is an occurrence.
- Adding chlorine gas and Ferric Sulfate created low pH issues during the months between June – October. Both chemicals are acids and drop our pH naturally due to low alkalinity in the sewage. We have also discovered we need to reduce dissolved oxygen concentration and SRT to avoid ammonia break down, this uses alkalinity and contributes to lowering our ph. We were able to manage the pH for most of this time with three incidents where our pH dropped below our regulatory limit causing a non-compliance report.
    - For the most part we lowered the ferric and chlorine dosing when possible, we also worked on dissolved oxygen controls to mitigate over aeration.
- Managing to keep our total chlorine residuals below 0.02 mg/L had proven to be a challenge. Currently we did not have equipment which could accurately read residuals this low. This resulted in overdosing with our de-chlorination chemical to avoid adverse residuals, most of our non-compliances were due to trying to optimize the best we can.
    - These immediate issues were fixed with lowering the chlorine dosing and increasing the dosing of the dichlorination chemical.
    - The city has purchased a newer technology ultra low-level total chlorine analyzer and an amperometric titrator which are capable of reading residuals this low. This online analyzer will allow much tighter controls on the de-chlorination system. This will be installed in 2025 season.
- Digester #3 had a major rag matte inside which blocked all transfer lines and sewer. This caused the digester to overflow back to the head end and flood the basement multiple times. The mixing and recirculation pumps plugged non-stop causing the digester to lose temperature and mix adequately, threatening to upset the digester.
    - This warranted multiple weeks of shift change to watch over system, continue unplugging pumps and an emergency cleaning of the digester.

Summary of Plant Sewage By-passes or Abnormal Discharge Events

There was one secondary bypass that occurred from the North Bay Wastewater Treatment Plant during the 2024 reporting period. A secondary by-pass would be initiated by operations staff to avoid losing the biomass due to solids being flushed out of the aeration tanks and secondary clarifiers during high flow conditions. The events would be reported to the Ministry of the Environment as required and samples would be collected for analysis thorough out the events.

There were two spills, and one bypasses at the lift stations and collection system in 2024:

1. On April 13, 2024 a secondary bypass was initiated at the wastewater treatment plant at 00:49 and was run until 18:58 bypassing a total volume of 5,531m3. This was due to two days of rain with the frost not allowing the ground to absorb it pushing our head end flows in excess of 100,000m3/d. These flows begun to push the biomass over the weirs requiring the bypass to protect the plants biomass. Chlorination was initiated and samples collected as required by our ECA. Bypass reported to SAC and District Manager as required in report REF#1-5P4U23
2. On September 13, 2024 the was a sewage spill on to the ground from a manhole at the Patton St. dumping station. While a septic truck was offloading there truck the sewer blocked and overflowed the manhole on to the ground with approximately 20L of sewage. Sewage did not escape into ground water or surface water and was cleaned up with city flusher. Reported spill to SAC and District Manager as required in report REF#1-AQXPE5
3. On December 1, 2024, there was a sewage spill at McKeown Ave. & Champlain St. intersection. this was caused by a blockage in the sewer main caused by grease from upstream restaurants. The sewer main surcharged causing approximately 100L of sewage to overflow out of a manhole on the road. Staff cleared blockage with flusher truck and cleaned main downstream, standing sewage and catch basins cleaned up with flusher. The spill was reported to SAC in the report Reference # 1-E5BXT2

There were thirteen abnormal discharge events which had taken place in 2024:

- On January 24, 2024, there was a non-compliance called in due to an acute Lethality sample failing. This is due to pH increasing over the 96-hour test reacting with Ammonia in effluent sample. An additional sample was taken as a pH Stabilized method sample which passed.

Environment Canada accepted this as a pass and allowed us to use this method moving forward. Reported to SAC in report Ref# 1-1-MMIUIQ.

- On May 15, 2024 a total chlorine residual was taken after dechlorination which exceeded the maximum concentration limit of 0.02 mg/L with a value of 0.06mg/L. The operators implemented corrective measures and increased the dosing of Captor to reduce chlorine residual. This event was reported to SAC and the MECP district manager as required in report Ref#1-6RRDOF.
- On May 17, 2024 a total chlorine residual was taken after dechlorination which exceeded the maximum concentration limit of 0.02 mg/L with a value of 0.05mg/L. The operators implemented corrective measures and increased the dosing of Captor to reduce chlorine residual. This event was reported to SAC and the MECP district manager as required in report Ref#1-6TDZ6M.
- On May 19, 2024 a total chlorine residual was taken after dechlorination which exceeded the maximum concentration limit of 0.02 mg/L with a value of 0.36mg/L. The operators implemented corrective measures taking additional samples discovering that the spectrophotometer was reading off when compared to the pocket colorimeter which had gotten a residual of 0.01mg/L. This event was reported to SAC and the MECP district manager as required in report Ref#1-6V9QDB.
- On June 2, 2024 an operator discovered there was no chlorine residual in the contact tanks. After more investigation it was found that the chlorine tonners had failed to switch automatically, and chlorination seized. This was a non-compliance as we are required to chlorinate from May 15 – October 15 every year. Called and reported to SAC and District Manager as required in report REF#1-79KBNM
- On June 12, 2024 a total chlorine residual was taken after dechlorination which exceeded the maximum concentration limit of 0.02 mg/L with a value of 0.03mg/L. The operators implemented corrective measures and increased the dosing of Captor and reduced chlorination rate in contacts to reduce chlorine residual. High flows were also creating issues with chlorination being we were down to one contact, operator put old contact tank back online to help with flows. A special note is the equipment used to read this residual had an accuracy of +/- 0.02mg/L, which made it difficult to know if we truly were over our limit. A new ultra low range analyzer was purchased at end of season for next year with the capability of reading residuals this low. This event was reported to SAC and the MECP district manager as required in report Ref#1-7MC56K.
- On July 9, 2024 after all wastewater sample results were received from lab and report completed. It was identified that there was a non-compliance with the monthly geometric mean for E-coli getting a result of 356.38. This was caused by electrical upgrades which caused out aeration to be offline for periods of time during the week. This caused

an upset with biology resulting in poor effluent quality for a sample driving e-coli number up. Chlorine residuals were increased for more effective disinfection and process changes made to improve effluent quality. This was reported to SAC and District Manager as required in report REF#1-8R2HOP

- On July 24, 2024 there was a non-compliance due to a low pH recorded in the final effluent sample. The two chemicals Chlorine and Ferric Sulfate are acids which are required and lowered the pH below our limit giving a pH of 5.81, chemical dosing was reduced as much as possible along with aeration DO to help mitigate the pH issue. This ware reported to SAC and District Manager in report Ref# 1- 9A27TO.
- On July 31, 2024 there was a non-compliance due to a low pH recorded in the final effluent sample. The two chemicals Chlorine and Ferric Sulfate are acids which are required and lowered the pH below our limit giving a pH of 5.84, chemical dosing was reduced as much as possible along with aeration DO to help mitigate the pH issue. This ware reported to SAC and District Manager in report Ref# 1- 9HVYUZ.
- On August 1, 2024 there was a non-compliance due to a low pH recorded in the final effluent sample. The two chemicals Chlorine and Ferric Sulfate are acids which are required and lowered the pH below our limit giving a pH of 5.48, chemical dosing was reduced as much as possible along with aeration DO to help mitigate the pH issue. This ware reported to SAC and District Manager in report Ref# 1- 9JCM6Q.
- On August 4, 2024 a total chlorine residual was taken after dechlorination which exceeded the maximum concentration limit of 0.02 mg/L with a value of 0.31mg/L. The operators implemented corrective measures such as increasing captor dosing and decreasing chlorine dosing. Adjustments were made when effluent quality was poor the day before getting reasonable residuals. When effluent cleared up, we were overdosing chlorine. This event was reported to SAC and the MECP district manager as required in report Ref#1-9LOW26.
- On August 27, 2024 a total chlorine residual was taken after dechlorination which exceeded the maximum concentration limit of 0.02 mg/L with a value of 0.04mg/L. The operators implemented corrective measures and increased the dosing of Captor and reduced chlorination rate in contacts to reduce chlorine residual. A special note is the equipment used to read this residual had an accuracy of +/- 0.02mg/L, which made it difficult to know if we truly were over our limit. A new ultra low range analyzer was purchased at end of season for next year with the capability of reading residuals this low. This event was reported to SAC and the MECP district manager as required in report Ref#1-AAD1BM.
- On September 7, 2024 a total chlorine residual was taken after dechlorination which exceeded the maximum concentration limit of 0.02 mg/L with a value of 0.03mg/L. A special note is the equipment

used to read this residual had an accuracy of +/- 0.02mg/L, which made it difficult to know if we truly were over our limit. A new ultra low range analyzer was purchased at end of season for next year with the capability of reading residuals this low. This event was reported to SAC and the MECP district manager as required in report Ref#1-ARHW5A.

Flow Measurement & Annual Calibration

The annual calibrations of the raw sewage flow meters and all others in the facility were completed in November 2024.

Documentation and Reporting

An emergency SOP manual with procedures to deal with emergencies and complaints is kept updated and is stored for easy reference at the North Bay Wastewater Treatment Plant; along with SDS data sheets for the treatment chemicals. The Certificate of approval ECA for the facility is posted at the facility along with copies of the Facility Classification certificate. A copy of the wastewater treatment plant manual with process descriptions, procedures, checklists, treatment calculations and pertinent information for the operation of the facility is readily available for reference for the operators.

Plant logbooks, daily and monthly data record sheets are completed and retained as required by the ECA. Process treatment records and lab analysis report data are entered into a spreadsheet. The annual report will be filed with the MECP as required by the ECA.

Facility Maintenance

Certified electricians, SCADA technician, mechanics and operators, who operate the treatment facility and conduct maintenance of the appurtenances of the wastewater treatment system.

Summary of 2024 Major Maintenance Activities , Capital Upgrades or Equipment Replacement at the Facility:

- New manhole structure with grinder installed for sewer line between Patton Receiving station and North Gate Lift Station to mitigate rags issues.
- Swabbed and Flushed sewer lines from Marsh Lift Station
- Upgrade of Ferric dosing pumps from peristaltic to a diaphragm style pump due to consistent tube ruptures. Pumps replaced free of charge.

- Rebuilt the Old Return pump with addition of a new water jacket to allow us to run pump at lower RPM's.
- Contractor inspected asbestos capsulation and repaired and damaged parts at Wastewater plant.
- Emergency Cleaning of Digester #3 after a large rag matte clogged all the transfer lines and overflowed into sewer blocking sewer causing multiple floods. Rags were also clogging the recirculation and mixing pump threatening a major upset of the digester.
- Engineering of Head end Intake Chamber and WWTP capacity study completed.
- Rebuilt multiple New Return pumps.
- Replaced the mixing pump on digester #4 after pump failure.
- Replaced Pump #1 & #2 with new KSB dry submersible pumps capable of pumping 80,352 m^3/d against 10.6 m TDH.
- Rebuilt two air blowers at the head end for the Grit removal system.
- Cleaning of accumulated grit in bottom of aeration cells, all air stones were cleaned while tanks were empty. Repaired broken stones.
- Final installations of transfer switches to run the secondary equipment from the generators during a power outage.
- Replaced sludge feed pump for the Centrifuge system.
- Replaced Dewatering pump for old Secondary Clarifiers due to pump failure and not worth repairing.
- Concrete repairs on mixed liquor channel for old secondary clarifiers weirs and catwalk for Secondary #2.
- Rebuilt a pump from Foreign lift Station.
- Rewound pump in Aeration sump pit for draining new contacts and aerations cells after dead short in windings.
- Replaced upper shoes on Primary Clarifier #5.
- Annual Maintenance to the Chlorine Gas system.
- Replaced feed tube in Andritz, had technician on site to complete the 24,000hr maintenance.
- Inspection of lift station from Xylem.
- Bought maintenance part to begin inventory of repair parts for all equipment at the WWTP.
- Replaced 64m of 375mm sanitary sewer on Ferguson St. between Oak St. and Main St.
- Replaced 15m of 1650mm storm sewer on McKeown St.
- Replaced 32m of 750mm storm sewer on McKeown St.

- Replaced 68m of 450mm storm sewer on McKeown St.
- Installed 123m of 900mm storm sewer on McKeown St.
- Installed 130m of 600mm storm sewer on McKeown St.
- Replaced 300m of 450mm sanitary sewer on McKeown St. between One Kids Place and McNamara St.

Summary of Complaints Received and Steps Taken to Address Them:

There was one odour complaint brought to our attention in 2024.

- On July 27, 2024 there was an odour complaint received by a resident from 665 Oak St., complaining about a foul persistent odour coming from the wastewater treatment plant. This was due to the contractor cleaning digester #3, which they were asked to take all possible steps to minimize the smell for the duration of the job. Notification was sent to the MECP as required.

Report prepared by

Jonathan Dewey, C-tech.
Operations Supervisor Water & Wastewater Facilities
Completed: February 26, 2025

MONTHLY PROCESS DATA

Facility: North Bay Wastewater Treatment Plant **Period: January 1, 2024 to December 31, 2024**

Classification: Class 4 Treatment, Class 2 Wastewater Collection **Population Served: 54,000**

Water Receiver: Lake Nipissing **Total Design Capacity (m3/d): 54,540**

	Jan-24	Feb-24	Mar-24	Apr-24	May-24	Jun-24	Jul-24	Aug-24	Sep-24	Oct-24	Nov-24	Dec-24	Summary
Raw Sewage													
Volume (m3/d)													
Avg	28.244	30,555	42,226	48,967	35,657	30,183	32,300	26,963	28,699	25,994	29,193	29,314	**32,347.06**
Max	31,730	47,844	68,859	95,945	45,035	46,054	44,357	30,586	34,490	29,067	35,560	55,207	**95,945.00**
Min	26,273	27,019	35,256	20,879	29,995	26,212	29,306	25,012	25,652	24,262	26,302	25,156	**20,879.00**
Sum	875,552	886,102	1,309,005	1,469,031	1,105,383	905,494	1,001,294	835,853	860,979	805,806	875,792	908,733	**11,839,024.0**
Peak Flow (M3/d)													
Max	105,199	92,264	99,899	102,499	97,062	101,937	103,087	84,799	100,787	79,899	99,887	101,987	**105,199.0**
BOD5													
Avg	117.0	105.5	46.0	64.0	64.0	68.0	42.0	105.0	90.0	94.0	114.0	37.0	**78.88**
Total Phosphorus (mg/L)													
Avg	2.68	3.60	1.99	3.49	3.56	2.37	2.06	4.05	5.63	15.80	3.60	21.80	**5.89**
TKN (mg/L)													
Avg	33.20	30.15	23.10	11.30	31.20	26.60	24.90	34.60	35.70	96.20	26.50	130.00	**41.95**
Suspended Solids (mg/L)													
Avg	177.0	126.0	50.0	72.4	114.0	56.6	33.0	221.0	208.0	620.0	145.0	26.9	**154.16**

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	Jan-24	Feb-24	Mar-24	Apr-24	May-24	Jun-24	Jul-24	Aug-24	Sep-24	Oct-24	Nov-24	Dec-24	Summary
Final Effluent													
Temp Grab (oC)													
Avg	10.6	10.7	11.3	11.1	14.4	17.1	18.4	19.2	19.0	17.3	14.1	12.7	14.7
Max	13.3	14.3	16.4	14.2	16.1	20.7	20.5	20.8	22.0	19.5	19.7	15.0	22.0
Min	8.2	6.3	7.4	9.9	12.1	14.5	17.1	17.9	11.9	14.8	8.8	10.0	6.3
NH3: Ammonia as N (mg/L)													
Avg	17.40	17.78	11.47	13.93	14.78	18.98	8.41	9.18	15.03	15.46	11.70	12.29	13.86
CB0D5 (mg/L)													
Avg	3.60	5.00	3.00	3.50	4.60	4.30	4.50	6.00	5.50	5.60	6.00	3.80	4.62
PH													
Avg	6.93	6.66	6.91	6.79	6.77	6.92	6.26	6.48	6.75	6.70	6.77	6.79	6.72
Max	7.13	7.05	7.19	7.28	7.05	7.23	6.77	6.96	6.96	7.17	7.06	6.98	7.28
Min	6.61	6.12	6.44	6.54	6.43	6.55	5.81	5.48	6.36	6.33	6.37	6.57	5.48
Total Phosphorus (mg/L)													
Avg	1.10	0.82	0.52	0.57	0.76	0.74	0.82	1.17	0.77	0.73	0.53	0.66	0.78
TKN (mg/L)													
Avg	19.32	18.25	16.65	13.13	14.82	20.63	11.04	11.09	18.25	19.58	13.50	15.16	15.95
Suspended Solids (mg/L)													
Avg	8.44	4.30	6.60	4.45	6.08	6.23	3.16	10.58	5.13	6.23	4.75	2.06	5.76
E-coli (cfu/100 mL)													
Geo Mean					43.80	356.28	18.99	20.48	34.09	48.99			44.73
Max					240.0	2000.0	130.0	90.0	150.0	480.0			2000.0
Min					5.0	80.0	5.0	5.0	5.0	5.0			5.0
Chlorine used (kg)													
Sum					521.20	730.29	1747.54	1561.74	981.14	396.90			5,938.80
Chlorine Dosage (mg/L)													
Avg					0.89	0.81	1.75	1.85	1.15	0.98			1.30
Total Chlorine Res. (mg/L)													
Avg					0.47	0.51	0.44	0.46	0.44	0.40			0.45
Max Total Chlorine Res. After Dechlor (mg/L)					0.36	0.03	0.02	0.31	0.03	0.02			0.36

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	Jan-24	Feb-24	Mar-24	Apr-24	May-24	Jun-24	Jul-24	Aug-24	Sep-24	Oct-24	Nov-24	Dec-24	Summary
Sludge/Biosolids Handing													
Volume to Primary Digester (m3)													
Sum	2,294	3,658	2,918	2,485	3,283	3,262	5,639	6,363	12,330	17,752	7,694	4,205	**71,883.0**
Sludge (Liquid) Volume Processed (m3)													
Sum	399.0	2,418	2,561	2,519	3,119	4,480	3,744	2,411	2,596	3,149	2,928	2,677	**33,001.0**
Sludge (Thickened) Volume Hauled x 1,000Kg)													
Sum	45.03	297.24	280.93	226.44	262.91	346.14	342.80	569.03	783.95	897.63	285.95	238.96	**4,577.01**
loads	3.0	19.0	17.0	15.0	17.0	21.0	17.0	11.0	12.0	19.0	18.0	15.0	

Larger than Normal Volume is due to cleaning of Digester #3. Loads in table are only bins processed by city staff; contractor hauled approximately 45 tractor trailer loads out from this job adding to total Sludge processed*