

# **2022 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. In order 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 solids 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 72,640 m<sup>3</sup>/d against 10.4 m TDH. Two (2) upgraded variable speed raw sewage pumps each rated at 95,904 m<sup>3</sup>/d against 10.9m TDH
- Two (2) mechanically cleaned bar screen.
- 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<sup>3</sup>/d.
- Two (2) 2.83 m<sup>3</sup>/min. blowers and three (3) 1.42 m<sup>3</sup>/min blowers
- One (1) grit classifier and dewatering screw

### Primary Treatment

- Four (4) primary clarifiers each with surface area of 250.25 m<sup>2</sup> providing a total surface area of 1001 m<sup>2</sup> and two (2) large primary clarifiers each with a surface area of 613.7 m<sup>2</sup> providing a total surface area of 1227 m<sup>2</sup>;
- 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<sup>3</sup> 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 p.s.i.;
- Four secondary clarifiers (#1-4) each with volume of 3,383m<sup>3</sup> providing a total surface area of 1,340 m<sup>2</sup> and two (2) large rectangular clarifiers (#5-6) each with surface area of 739 m<sup>2</sup> providing a total surface area of 1,478 m<sup>2</sup>.
- 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 18 - 32 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<sup>3</sup> and a second chlorine contact tank providing a total volume of 784 m<sup>3</sup>.
- Two 3,200L CAPTOR storage tanks.
- A dechlorinating system consisting of two chemical metering pumps each rated at 12.3 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<sup>3</sup> and two (2) anaerobic digesters (secondary digesters), each having the volume of 2,060 m<sup>3</sup> to provide a total digestion volume of 7,580 m<sup>3</sup>;

and one (1) digested sludge holding tank having a volume of approximately 1,500 m<sup>3</sup>.

- 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 aforementioned 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 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 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 located in a sub grade wet well.

The Foran sewage lift pumping station Is a wet well type 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 located 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 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 also the dry well pumps 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 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 located in a sub grade wet well.

The Northgate sewage lift pumping station Is a wet well type 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 located in a sub grade wet well.

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 located in a sub grade wet well.

The Tenth Street pumping station Is a wet well type 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 located in a sub grade wet well.

The Timmins/Gorman sewage lift pumping station Is a wet well type 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 located 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 located 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 (C of A) #6310-CG3NM9 issued for the North Bay Wastewater Treatment Plant on July 31, 2014 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

2022. This Annual Wastewater System Report covers the period from 01 Jan 2022 to 31 December 2022.

### **Summary of Raw Sewage Sampling Data and Annual Flow Data**

The sewage treatment plant has the *Rated Capacity* of 54,480 m<sup>3</sup>/day with a secondary treatment Peak Flow Rate of 108,960 m<sup>3</sup>/day. In 2022 the average daily raw sewage flow was 32,755 m<sup>3</sup>/day. Therefore the annual average day flow was within the design capacity, with the average daily flow running at 60% of the wastewater systems rated design capacity.

The annual minimum daily raw sewage flow was 21,892 m<sup>3</sup>/day and occurred in March 2022. The maximum daily raw sewage flow was 74,225 m<sup>3</sup>/day and occurred in March 2022.

The total raw sewage flow for the year was 11,955,505 m<sup>3</sup>.

#### Raw Sewage Sampling Summary:

The operator collects a composite sample of raw sewage on a monthly basis sending it to Near North Laboratories in North Bay for analysis for BOD<sub>5</sub>, 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<sub>5</sub> concentration was 92.72 mg/L.

The average raw sewage Total Suspended Solids (TSS) concentration was 129.51 mg/L.

The average raw sewage Total Phosphorus (TP) concentration was 2.89 mg/L

The average raw sewage Total Kjeldahl Nitrogen (TKN) concentration was 26.70 mg/L.

*See the accompanying North Bay WWTP 2022 Monthly Data Summary for complete raw wastewater flow and analyses data.*

#### Treated Sewage Sampling Summary

The annual average treated sewage effluent CBOD<sub>5</sub> was 7.75 mg/L.

The annual average treated sewage effluent Total Suspended Solids (TSS) was 6.13 mg/L.

The annual average treated sewage effluent Total Phosphorus (TP) was 0.80 mg/L.

The average monthly geometric mean of treated sewage effluent E. coli during the period of chlorination was 65.65 CFU/100 mL.

The Ann. Avg. treated sewage effluent Total Chlorine residual during the period of chlorination was 0.39 mg/L.

The annual average treated sewage effluent pH was 6.70

The annual average sewage effluent temperature was 13.9 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 2022 a total of 8,094.26 kg of chlorine was used. The average dosage of Cl<sub>2</sub> applied in 2022 was 1.66 mg/L. The average chlorine residual in the effluent was 0.39 mg/L before dechlorination. The minimum and maximum E Coli levels measured in the effluent during the period of chlorination were respectively 10 CFU/100ml and 2000 CFU/100ml. The annual average for monthly geometric means for E Coli level in the effluent for 2022 was 65.65 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 2022.

#### 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 0.39 mg/L to 2.28 mg/L. The annual average Total Phosphorus level measured of the effluent was 0.80 mg/L. Therefore the *Annual Average Effluent Objective of 0.8 mg/L* set in the ECA was achieved in 2022.

*See the accompanying North Bay 2022 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 2022.



<b>Effluent Parameter</b>	<b>Annual Average</b>	<b>Concentration</b>	
	(mg/L unless otherwise indicated)		
	<b>Compliance Limit</b>	<b>Operational Objective</b>	<b>2022 Results</b>
CBOD5	25	15	7.75
Total Suspended Solids (TSS)	25	15	6.13
Total Phosphorus (TP)	1	0.8	0.80
Total Ammonia Nitrogen	N/A	N/A	7.81
E. Coli * <sup>1</sup>	200 counts/100ml	150 counts/100ml	65.65
	(monthly Geometric Mean Density)	(Monthly Geometric Mean Density)	
Total Chlorine Residual* <sup>1</sup>	N/A	N/A	0.39
pH	6.0-9.5	6.5-8.5	6.70
Temperature	N/A	N/A	13.9

\*<sup>1</sup> 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<sub>5</sub>, 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. The pH of the effluent ranged between pH 5.90 to pH 7.40 and averaged pH 6.70. This met the ECA effluent limits for pH being maintained between pH 6.0 to 9.5, inclusive at all times with exception of June 21 with a pH of 5.94 & June 28, 2022 with a pH of 5.90 otherwise.

The ECA Effluent Objective concentrations of 15.0 mg/L for CBOD<sub>5</sub>, 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.

The Monthly Geometric Mean Density of 150 counts/100 mL for E.coli Effluent Objective set in the ECA was achieved all chlorination months. The average monthly geometric mean for the sewage effluent E. Coli during the period of chlorination was 65.65 CFU/100 mL.

## 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 (19 to 23% 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 landfills

In 2022 the volume of primary sludge produced was 33,515 m<sup>3</sup>. The total volume of digested sludge that was processed through dewatering after the digestion process was 28,081 m<sup>3</sup>. The total weight of dewatered sludge that was hauled away from the WWTP was 4,100,370 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<sub>5</sub>, Suspended Solids and total phosphorus to meet compliance criteria.

The total treated sewage effluent flow for the year 2022 was 11,955,505 m<sup>3</sup> minus 4,100,370 Kg of sludge with an approximate 16 - 42 % solids concentration which was hauled away from the facility for disposal.

*See the accompanying North Bay 2022 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 2022 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 mat 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.
- Taking Digester #4 offline for replacement caused issues with more supernating of thicker solids to head end. This was caused by removing the storage space and being unable to process enough sludge to make room in other digesters for the first few weeks. This had caused higher BOD's and nutrient levels in effluent requiring us to increase our Ferric sulfate dosing to remove it. This caused a drop in our pH.
  - We had staff work extra hours and shifts to create more storage room.
- Higher than normal chlorine demand was taking place all summer long, this caused us to increase our dosing which had driven our pH down even more than the addition of Ferric sulfate was doing.
  - For the most part we lowered the ferric when possible otherwise we had to find balance with chlorine dosing and pH.

## **Summary of Plant Sewage By-passes or Abnormal Discharge Events**

There were no secondary bypasses that occurred from the North Bay Wastewater Treatment Plant during the 2022 reporting period. A secondary bypass 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 throughout the events.

There were two spills and no bypasses at the lift stations in 2022:

1. On May 4, 2022 there was an oil spill at 10 Judge Ave., this was caused by a surcharge in the storm sewer washing oil residue from a catch basin. There was less than 10 Liters spilled into Lake Nippissing. There were absorbent sock booms placed at discharge to absorb oil residue from surface of the water. The spill was reported to the MECP in the report Reference # 1-1SEIO
2. On September 19, 2022 there was a sewage spill at Patton St. dumping station, this was caused by a sewer back up. There was approximately 100 Liters spilled onto parking lot which lasted approximately 1.5 hours. Chlorine was added to the sewage pool and the spill was cleaned up as much as possible with a vacuum truck. The spill was reported to the MECP SAC Reference #1-26983H

There was two abnormal discharge events which had taken place in 2022:

- On June 21, 2022 there was a non-compliance called in due to a low pH recorded in the effluent sample. This was by the high chlorine demand causing high chlorine dosing coupled with the high dosing of Ferric Sulfate due to increasing nutrient loading from digester project. The two chemicals are acids which lowered the pH below our limit with a pH of 5.94, chlorine dosing was reduced to help mitigate the pH issue. This were reported to the MECP in report Ref# 2165-CFLRZF
- On June 28, 2022 there was a non-compliance called in due to a low pH recorded in the effluent sample. This was by the high chlorine demand causing high chlorine dosing coupled with the high dosing of Ferric Sulfate due to increasing nutrient loading from digester project. The two chemicals are acids which lowered the pH below our limit giving a pH of 5.90, chemical dosing was reduced as much as possible to help mitigate the pH issue. This were reported to the MECP in report Ref# 5063-CFTQQ9

### **Flow Measurement & Annual Calibration**

The annual calibrations of the raw sewage flow meters were completed in November 2022. In addition other flow meters throughout the sewage treatment plant were calibrated at the same time.

### **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 2022 Major Maintenance Activities , Capital Upgrades or Equipment Replacement at the Facility:**

- Rebuilt Primary Clarifier #6, replacing all chain/wear shoes and 4 sprockets. Also built up metal on floor and side rails and added antiwear strips.
- Had one pump from Marsh Liftstation rebuilt do to wear and tear.
- Rebuilt and rewound the 10 Hp pump for North Gate Lift Station
- Worked on piping and added a product to the pipes to protect from corrosion and worked on valves for Marshall Lift Station
- Decommissioning and demolition of the old Digester #4
- Roof Replacements on Digester #3 & #4 pump house buildings
- Roof Replacement on Digester #1 & #2 buildings
- Enigneering Head end Intake Chamber and WWTP capacity study rewarded
- Renovations of administrations building creating new office spaces.
- Concrete repairs of defective concrete under the Ferric Sulfate Tanks
- Concrete repairs to the outer walls of the New Contact Tank
- Cleaning of accumulated grit in bottom of aeration cells, all air stones were cleaned while tanks were empty. Repaired broken stones.
- Replaced main MCC's in the Administration building
- Tray work and wires run for the extension of the backup generator project
- Rebuilt one gas compressor for Methane System
- Rebuilt Moyno cake pump for Bird Centrifuge
- Concrete repairs on old secondary clarifier feed channel and to the weirs on Secondary Clarifiers #6
- Replaced 55m of 300mm storm sewer on Ivanhoe Dr..
- Replaced 13m of 375mm storm sewer on Ivanhoe Dr..
- Replaced 16m of 450mm storm sewer on Ivanhoe Dr..
- Replaced 15m of 525mm storm sewer on Ivanhoe Dr..
- Replaced 192m of 750mm storm sewer on Ivanhoe Dr..
- Replaced 76m of 300mm sanitary sewer on Ivanhoe Dr..
- Replaced 76m of 200mm sanitary sewer on Ivanhoe Dr..
- Installed and commissioned a new Sewage Lift Station on Wallace Rd., with three 12 hp power pumps capable of pumping 16.8m TDH

- Installed 92 m of 375mm Storm sewer on Lakeside Dr.
- Installed 43 m of 250mm Storm sewer on Lakeside Dr.
- Commissioned 99m of 375mm sanitary main on Wallace Rd.
- Commissioned 31m of 250mm sanitary main on Wallace Rd.
- Commissioned 390m of 250mm sanitary force main on Wallace Rd.

**Summary of Complaints Received and Steps Taken to Address Them:**

- There was one odour complaint brought to our attention on September 1, 2022. This was due to a mechanical break down in one of our clarifiers at the WWTP. While draining the tank to make the repairs the sludge was exposed creating a bad odour. A crew worked on the repair immediately resolving the issue in the same day.

Report prepared by

Jonathan Dewey, C-tech.

Operations Supervisor Water & Wastewater Facilities

March 29, 2022

**MONTHLY PROCESS DATA**

Facility: North Bay Waste Water Treatment Plant  
 Classification: Class 4 Treatment, Class 2 Wastewater Collection  
 Water Receiver: Lake Nipissing

Period: January 1, 2022 to December 31, 2022  
 Population Served: 54,000  
 Total Design Capacity (m3/d): 54,540

	Jan-22	Feb-22	Mar-22	Apr-22	May-22	Jun-22	Jul-22	Aug-22	Sep-22	Oct-22	Nov-22	Dec-22	Summary
<b>Raw Sewage</b>													
<b>Volume (m3/d)</b>													
<i>Avg</i>	25,059	23,198	41,570	48,450	38,610	35,163	29,561	31,439	29,945	33,127	27,755	28,539	<b>32,754.81</b>
<i>Max</i>	27,465	26,845	74,225	60,895	64,141	58,256	36,582	46,247	42,650	41,284	31,976	33,636	<b>74,225.00</b>
<i>Min</i>	23,542	22,600	21,892	40,494	31,841	28,023	25,632	26,401	25,208	28,741	25,484	24,075	<b>21,892.00</b>
<i>Sum</i>	776,841	649,528	1,288,676	1,454,989	1,196,911	1,054,900	916,399	974,610	898,336	1,026,946	831,651	884,718	<b>11,955,505.00</b>
<b>Peak Flow (M3/d)</b>													
<i>Max</i>	69,756	68,875	108,399	103,849	102,353	103,087	102,512	105,862	90,449	70,200	66,987	71,337	<b>108,399.0</b>
<b>BOD5</b>													
<i>Avg</i>	79.4	95.5	68.5	74.9	66.3	116.3	59.8	132.7	136.0	124.2	116.2	37.3	<b>92.72</b>
<b>Total Phosphorus (mg/L)</b>													
<i>Avg</i>	1.67	3.27	3.48	2.40	3.70	4.10	1.40	3.68	3.21	2.71	2.87	1.40	<b>2.89</b>
<b>TKN (mg/L)</b>													
<i>Avg</i>	20.50	24.40	38.90	15.90	52.50	26.20	16.50	17.80	35.60	36.40	30.60	16.50	<b>26.70</b>
<b>Suspended Solids (mg/L)</b>													
<i>Avg</i>	53.3	164.0	75.3	100.3	124.0	170.5	367.0	65.6	178.0	93.3	106.0	45.0	<b>129.51</b>

**MONTHLY PROCESS DATA**

Facility: North Bay Waste Water Treatment Plant  
 Classification: Class 4 Treatment, Class 2 Wastewater Collection  
 Water Receiver: Lake Nipissing

Period: January 1, 2022 to December 31, 2022  
 Population Served: 54,000  
 Total Design Capacity (m3/d): 54,540

	Jan-22	Feb-22	Mar-22	Apr-22	May-22	Jun-22	Jul-22	Aug-22	Sep-22	Oct-22	Nov-22	Dec-22	Summary
<b>Final Effluent</b>													
<b>Temp Grab (oC)</b>													
<i>Avg</i>	9.9	10.2	10.3	11.7	12.6	15.5	18.4	18.7	18.0	16.4	15.0	12.4	13.9
<i>Max</i>	13.1	13.9	12.4	15.0	16.0	17.7	20.0	21.1	19.6	17.9	16.9	15.1	21.1
<i>Min</i>	8.1	9.7	8.3	7.8	10.2	11.6	17.2	15.5	13.2	15.2	13.3	9.5	8.1
<b>NH3: Ammonia as N (mg/L)</b>													
<i>Avg</i>	15.28	17.53	14.52	9.58	11.70	3.04	2.32	1.20	3.60	4.24	4.82	7.76	7.81
<b>CBOD5 (mg/L)</b>													
<i>Avg</i>	8.70	9.70	9.02	6.90	6.55	7.66	8.50	7.18	7.25	9.30	6.70	5.70	7.75
<b>PH</b>													
<i>Avg</i>	7.03	7.16	7.03	6.95	6.79	6.33	6.24	6.36	6.46	6.48	6.57	6.86	6.70
<i>Max</i>	7.28	7.40	7.24	7.17	7.14	6.75	6.47	6.83	7.03	6.94	7.01	7.10	7.40
<i>Min</i>	6.76	6.78	6.76	6.63	6.39	5.90	6.09	6.00	6.07	6.10	6.08	6.38	5.90
<b>Total Phosphorus (mg/L)</b>													
<i>Avg</i>	0.72	0.83	0.68	0.53	1.08	0.86	0.90	0.75	0.81	0.63	1.12	0.66	0.80
<b>TKN (mg/L)</b>													
<i>Avg</i>	25.50	23.15	24.50	13.00	18.30	4.50	3.70	2.64	6.18	8.24	5.61	13.05	12.13
<b>Suspended Solids (mg/L)</b>													
<i>Avg</i>	5.85	6.85	9.72	5.10	3.20	5.72	5.80	4.68	8.54	7.90	5.74	4.20	6.13
<b>E-coli (cfu/100 mL)</b>													
<i>Geo Mean</i>					105.36	72.72	103.33	15.85	40.98	55.68			65.65
<i>Max</i>					370.0	410.0	2000.0	50.0	470.0	310.0			2000.0
<i>Min</i>					30.0	10.0	10.0	10.0	10.0	10.0			10
<b>Chlorine used (kg)</b>													
<i>Sum</i>					563.44	1622.20	1393.15	1712.95	1675.02	1064.03			8,094.26
<b>Chlorine Dosage (mg/L)</b>													
<i>Avg</i>					0.85	1.61	1.63	1.77	1.84	1.94			1.66
<b>Total Chlorine Res. (mg/L)</b>													
<i>Avg</i>					0.55	0.49	0.24	0.30	0.36	0.49			0.39



**MONTHLY PROCESS DATA**

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	Jan-22	Feb-22	Mar-22	Apr-22	May-22	Jun-22	Jul-22	Aug-22	Sep-22	Oct-22	Nov-22	Dec-22	Summary
<b>Sludge/Biosolids Handling</b>													
<b>Volume to Primary Digester (m3)</b>													
<i>Sum</i>	2,327	2,334	2,926	2,223	2,965	3,331	2,570	3,247	2,180	3,698	2,645	3,069	<b>33,515.0</b>
<b>Sludge (Liquid) Volume Processed (m3)</b>													
<i>Sum</i>	2,312	1,864	2,506	1,808	1,912	2,575	2,434	2,745	2,139	2,609	2,763	2,414	<b>28,081.0</b>
<b>Sludge (Thickened) Volume Hauled x 1,000 Kg)</b>													
<i>Sum</i>	243.04	193.13	258.97	218.76	146.73	284.55	711.97	1132.51	217.39	275.34	215.38	202.60	<b>4,100.37</b>
<i>loads</i>	16.0	13.0	18.0	15.0	10.0	19.0	31.0	43.0	16.0	18.0	15.0	14.0	