



Port Dalhousie Wastewater
Treatment Plant
Annual Performance Summary Report
Treatment and Collection
Reporting Year: 2023

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PD-T-1 Wastewater Treatment Process Description

The Port Dalhousie Wastewater Treatment Plant (WWTP) is located at 40 Lighthouse Road in the City of St. Catharines and provides wastewater treatment to the City of St. Catharines, and portions of the City of Thorold. The Port Dalhousie WWTP is a class IV conventional activated sludge treatment facility and has recently been designed and upgraded to fully treat all flows up to 122,700 m³/d from the previous design flow rate of 100,000 m³/d.

The Port Dalhousie WWTP operates under the following Ministry of Environment, Conservation and Parks (MECP) approvals:

Environmental Compliance Approval (ECA) - Sewage: 8135-B8XS6U, Issued June 19, 2019

Environmental Compliance Approval (ECA) - Air: 2155-BEBHK9, Issued July 25, 2019

The Port Dalhousie WWTP uses the following processes to treat wastewater:

- Imported Sewage Receiving
- Screening
- Grit Removal
- Primary Treatment
- Phosphorus Removal
- Secondary Treatment (Aeration and Settling)
- Disinfection (Chlorination and Dechlorination)
- Solids Handling – sludge digestion and transportation
- Storm Treatment

Imported Sewage Receiving Station: To provide service to Niagara Region residents outside the wastewater servicing area, the Port Dalhousie WWTP accepts imported sewage from commercial haulers. Receiving stations are situated to ensure all imported sewage receives full treatment.

Screening: Mechanically cleaned screens remove rags and large debris that could harm pumps and process equipment. Screenings are sent for disposal in landfill.

Grit Removal: Grit tanks equipped with coarse bubble diffusers are used to remove grit from wastewater. Heavy suspended material such as sand and small stones (grit) is settled to the bottom of the tanks while lighter organic particles are kept in suspension and pass through the tanks for further treatment. The grit removed is dewatered for landfill disposal.

Primary Treatment: Primary clarifiers are large tanks that allow the incoming wastewater to slow down. The slower speed allows heavier solids to fall from the wastewater to the bottom of the tank. Sludge collected at the bottom of the primary clarifiers is removed and sent to the solids handling process.

Phosphorus Removal: A coagulant, ferric chloride, is added to the treatment process to aid in phosphorus and suspended solids removal.

Secondary Treatment:

Aeration Tank: Large tanks are equipped with air diffusers to add fine bubbles into the wastewater. This oxygen-enriched environment encourages microorganisms (or “bugs”) to remove dissolved and suspended organics and nutrients. Activated sludge is returned to the aeration process to ensure enough bugs are present to provide adequate wastewater treatment.

Secondary Clarifiers: Secondary clarifiers receive effluent from the aeration tanks which separates the microorganism population and remaining solids. Solids settle as activated sludge on the bottom of the clarifier while a clean effluent flows from the clarifiers to be disinfected and discharged to the environment. A portion of the activated sludge collected on the bottom of the clarifier is pumped back to the front of the aeration tanks to ensure a healthy microbial population. Excess activated sludge is ‘wasted’ or removed from the process and sent to the primary clarifiers for thickening.

Disinfection (chlorination/dechlorination):

Chlorine in the form of liquid sodium hypochlorite is added into the effluent stream for pathogen control from April 1 to October 31 each year. Adequate contact time is provided by the chlorine contact chamber. As chlorine can be toxic to aquatic species, disinfected effluent is dechlorinated with a sodium bisulphite solution before being discharged to the lower Twelve Mile Creek.

Solids Handling

Anaerobic Digestion: Sludge from the primary clarifiers is pumped to one of three (3) primary anaerobic digesters, which overflow into one (1) secondary digester for thickening. Anaerobic digestion allows a further breakdown of pollutants and pathogens in the collected sludge. The digested sludge is transported from site for further treatment such as land application or dewatering at the Garner Road Biosolids Facility.

Storm Treatment: Flows greater than 122,700 m³/d are diverted from the treatment plant to a storm treatment system. Storm flows are screened, chlorinated and dechlorinated prior to discharge to the environment. This is called a plant overflow.

PD-T-2 Review of Plant Flows, Influent and Imported Sewage Sampling and Monitoring

Review of 2023 Plant Flows

Table PD-T-1 below outlines the volume of sewage treated at the Port Dalhousie WWTP during the reporting year. It also outlines how much Imported Sewage was received at site for treatment.

Table PD-T-1: Table of Port Dalhousie WWTP Design Flows, 2023 Treated Flows and Reported Imported Sewage Volumes

Flow Statistic	Value
Design Average Daily Flow (ML/d)	61.350
Design Peak Flow Rate (ML/d)	122.700
Total Volume Processed (ML)	10,649.108
Annual Average Daily Flow (MLD)	29.176
% Annual Average Daily Flow Utilization	48%
% Increase/Decrease over prior year	-1%
Volume Imported Sewage Received (ML)	0.000
% Increase/Decrease Imported Sewage over prior year	-100%
Imported Sewage as % of Flow	0.00%

Reviewing the treated flows in 2023, it was observed that, on average, the plant is utilizing 48% of its design Average Daily Flow capacity. This indicates that the facility has the hydraulic capacity to meet the needs of the collection system with room for additional future flows that may be added from development. Where the utilization becomes greater than 80%, plant expansion should be considered.

Daily flows to the plant were reviewed. In 2023, there were 17 instances where the flow to the plant was greater than the design Average Daily Flow, amounting to approximately 5% of the year. These instances occurred during times of wet weather or heavy snow melt. The Port Dalhousie WWTP collection system receives flow from a portion of combined sewers and is impacted by wet weather.

A review of the monthly average daily flow rate for the prior 10-year period was also completed. This can be observed below in Figure PD-T-1 below. There is a slight downward trend in average daily flow, but this may correlate to changes in precipitation amounts. Spikes during typical wet weather seasons further support increased flows are occurring due to remaining combined sewers and Inflow and Infiltration present in the collection system.

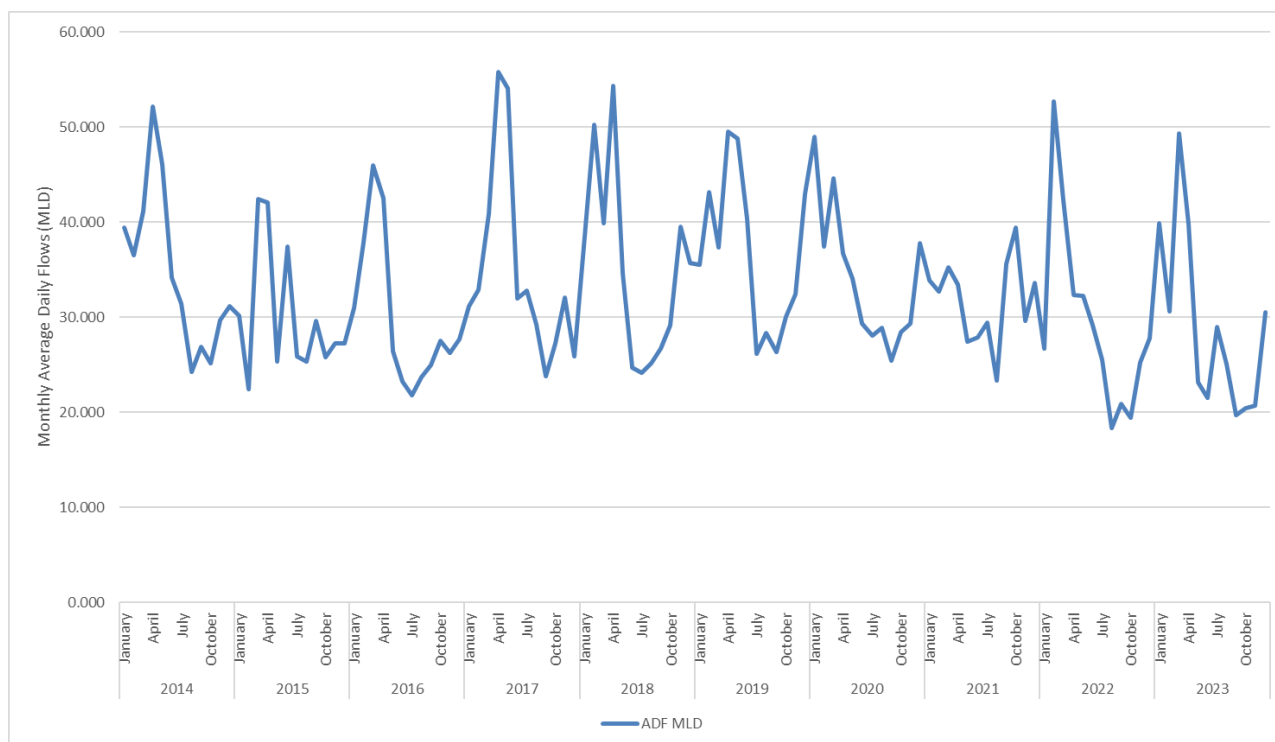


Figure PD-T-1: Graph displaying the Monthly Average Daily Flow Rate in Megalitres per Day (MLD)

Imported Sewage was not received at the Port Dalhousie WWTP in 2023. The station was closed to allow for construction activities on-site to occur safely and efficiently.

Review of Influent Sampling and Monitoring Activities

In 2023, there were 103 samples of influent collected and tested. An annual summary of influent sampling can be observed in Table PD-T-3 below.

Although the volume of sewage is an important consideration for the effective operation of a wastewater treatment plant, another important factor to monitor is plant loading. Plant loading displays if the strength of the sewage received at the plant is getting stronger or weaker. Stronger sewage may impact the amount of sewage the plant can treat effectively.

Plant loading is calculated by measuring the average strength of a pollutant per liter of influent sewage and multiplying it by the average volume of sewage received. This is displayed as kilograms of pollutant per day or kg/d. Below in Figure PD-T-2, is a graph depicting four commonly monitored pollutant loadings to the plant for the period of 2021-2023.

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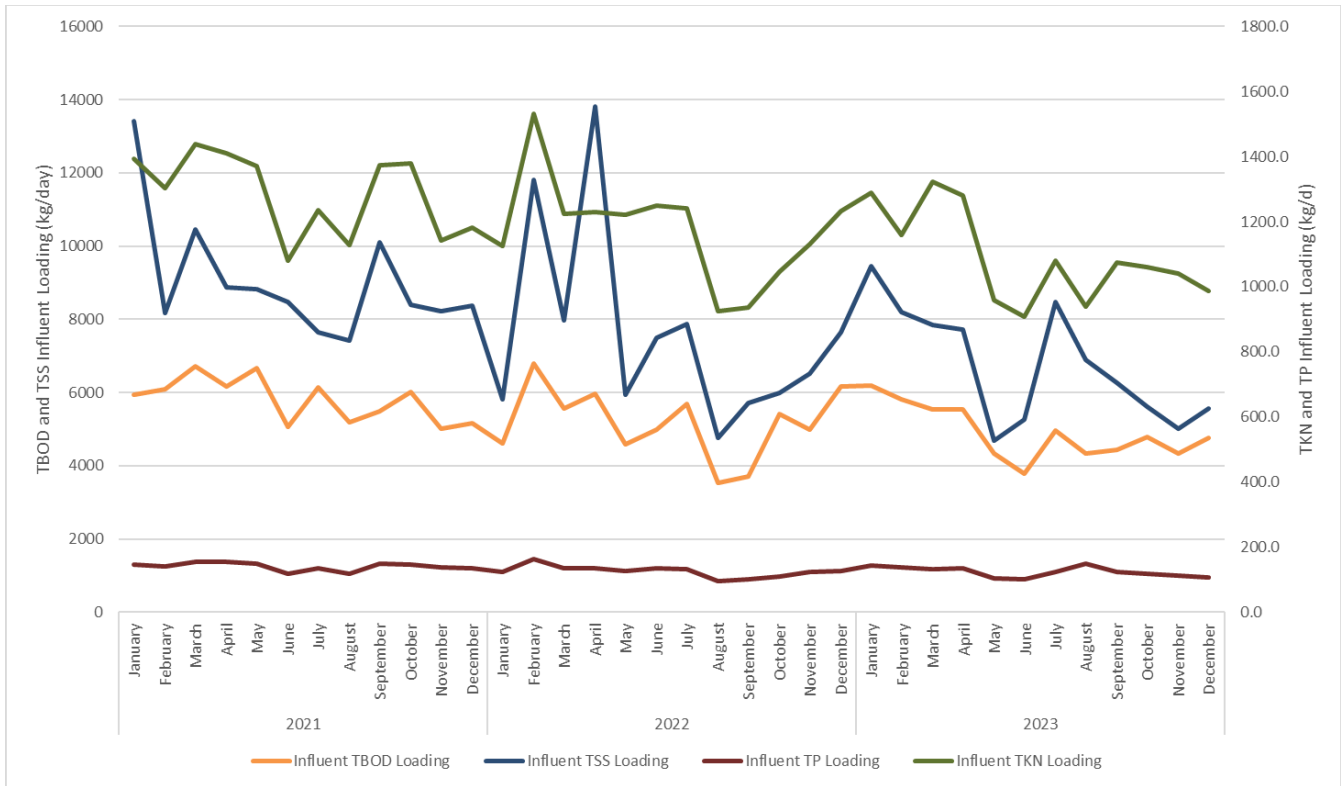


Figure PD-T-2: Figure of monthly plant loadings to the Port Dalhousie WWTP for Total Biochemical Oxygen Demand (TBOD), Total Suspended Solids (TSS), Total Kjeldahl Nitrogen (TKN) and Total Phosphorus (TP), in kg/d, for the period 2021 to 2023.

Reviewing the calculated loadings for TBOD, TSS, TKN and TP for the past three years shows a slight decrease in all parameters over the period. Loadings will continue to be monitored to observe if the trend continues.

Review of Imported Sewage Sampling and Monitoring

No imported sewage was received at the Port Dalhousie WWTP in 2023. No sampling or monitoring activities were undertaken.

Review of Final Effluent Sampling and Monitoring Activities

In 2023, 103 samples of final effluent were collected and tested. Individual as well as monthly average results are reviewed and compared to the objective and compliance limits stated in the facility ECA. Table PD-T-2 below summarizes the number of monthly objective and compliance limit exceedances at the Port Dalhousie WWTP in the reporting year.

Table PD-T-2: Evaluation of Final Effluent sample results to ECA objectives and compliance limits

Pollutant	ECA Monthly Concentration Objective	ECA Monthly Concentration Limit	Number of Objective Concentration Exceedances	Number of Monthly Limit Concentration Exceedances	Monthly Loading Objective	Monthly Loading Limit	Number of Monthly Loading Objectives Exceeded	Number of Monthly Loading Limits Exceeded
pH ¹	6.0-9.5	6.0-9.5	0	0	-	-	-	-
Carbonaceous Biochemical Demand (CBOD)	15 mg/L	25 mg/L	0	0	920 kg/d	1534 kg/d	0	0
Total Suspended Solids (TSS)	15 mg/L	25 mg/L	2	2	920 kg/d	1534 kg/d	0	0
Total Phosphorus (TP)	0.5 mg/L	1.0 mg/L	6	2	30.7 kg/d	61.5 kg/d	1	0
Total Residual Chlorine (TRC) ²	Non-detect	0.02 mg/L	0	0	-	-	-	-
E.Coli (<i>geomean</i>) ³	200 MPN/100 mL	200 MPN/100 mL	1	1	-	-	-	-

¹ pH must meet objectives/limits at all times (inclusive)

² Total Residual Chlorine monitoring only required April 01 to October 31 inclusive

³ E.Coli monitoring only required April 01 to October 31 inclusive

The Port Dalhousie WWTP exceeded the ECA compliance limits for TSS and TP in August 2023 as well as TSS, TP and E.Coli in September 2023. These exceedances occurred due to issues related to the changeover to the new fine bubble aeration equipment starting in July 2023. This is discussed in greater detail in section PD-T-3 Operational Issues Encountered below.

Port Dalhousie WWTP did not achieve the monthly average compliance objective for TP on six (6) occasions, May through October. The monthly average daily loading objective for TP was also not met in September. The monthly average objective for TSS was not met on two (2) occasions in August and September. The Port Dalhousie WWTP has been undergoing construction of its secondary treatment processes; to build new aeration tanks with fine bubble diffusers. More information is available in section PD-T-3 Operational Issues Encountered regarding the objective exceedances.

A review of individual results against ECA objectives was also complete. Below summarizes the percentage of individual samples that were over the ECA objective for a compliance parameter:

- CBOD – 1%
- TSS – 17%
- TP – 39%
- E.Coli – 20%

Final Effluent sample results did not exceed the ECA objective greater than 50% of the time.

With the completion and changeover to the new fine bubble aeration process in 2023, the plant is very effectively treating all wastewater. Fewer objective exceedances are expected in 2024 with the new system in place. An annual summary of monthly average final effluent sample results can be observed in Table PD-T-3 below.

Table PD-T-3: Annual Summary of Port Dalhousie Plant and Imported Sewage Flows, Influent and Effluent Sampling and Monitoring Results

Measured Parameter	January	February	March	April	May	June	July	August	September	October	November	December	Total / Average	Samples Collected
Influent - Monthly Average TSS (mg/L)	237	268	159	194	202	245	292	275	318	275	242	182	241	
Number of Influent TSS Samples	10	8	9	7	10	7	9	9	8	9	9	8		103
Influent - Monthly Average TBOD5 (mg/L)	155	190	112	139	187	176	171	173	225	234	209	156	177	
Number of Influent TBOD5 Samples	10	8	9	7	10	7	9	9	8	9	9	8		103
Influent - Monthly Average TP (mg/L)	3.6	4.5	2.7	3.4	4.5	4.7	4.3	5.9	6.3	5.8	5.5	3.5	4.6	
Number of Influent TP Samples	10	8	9	7	10	7	9	9	8	9	9	8		103
Influent - Monthly Average TKN (mg/L)	32.31	37.80	26.81	32.20	41.33	42.23	37.23	37.41	54.39	51.99	50.31	32.33	39.70	
Number of Influent TKN Samples	10	8	9	7	10	7	9	9	8	9	9	8		103
Total Plant Flows (ML)	1,236.347	857.519	1,530.326	1,192.768	718.945	645.044	899.386	777.529	591.960	632.589	621.009	945.686	10,649.108	
Daily Average (MLD)	39.882	30.626	49.365	39.759	23.192	21.501	29.012	25.082	19.732	20.406	20.700	30.506	29.176	
Maximum Flow (ML)	75.296	61.500	126.271	95.319	60.987	60.998	85.753	39.180	44.297	49.088	54.444	87.177	MAX	126.271
Minimum Flow (ML)	25.738	22.425	30.623	21.593	16.863	12.276	16.232	18.890	14.809	13.608	17.259	19.068	MIN	12.276
Volume Imported Sewage Received (ML)	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	
Final Effluent - Monthly Average TSS (mg/L)	9.9	7.5	8.4	6.0	5.3	12.6	12.6	26.4	42.9	7.2	7.4	8.3	12.9	
Final Effluent - Average Daily TSS Loading (kg/d)	395	230	415	239	123	271	366	662	847	147	153	253	376	
Number of Final Effluent TSS Samples	10	8	9	7	10	7	9	9	8	9	9	8		103
Final Effluent - Monthly Average CBOD5 (mg/L)	6.5	6.5	4.0	4.0	4.2	7.7	6.6	5.6	8.9	4.4	4.2	4.1	5.6	
Final Effluent - Average Daily CBOD5 Loading (kg/d)	259	199	197	159	97	166	191	140	176	90	87	125	162	
Number of Final Effluent CBOD5 Samples	10	8	9	7	10	7	9	9	8	9	9	8		103
Final Effluent - Monthly Average TP (mg/L)	0.35	0.35	0.26	0.26	0.57	0.81	0.54	1.05	2.01	0.77	0.38	0.27	0.64	
Final Effluent - Average Daily TP Loading (kg/d)	13.96	10.72	12.83	10.34	13.22	17.42	15.67	26.34	39.66	15.71	7.87	8.24	18.53	
Number of Final Effluent TP Samples	10	8	9	7	10	7	9	9	8	9	9	8		103
Final Effluent - Monthly Average TKN (mg/L)	20.46	23.08	16.10	17.83	22.08	24.14	20.77	4.42	6.85	2.44	2.24	2.90	13.61	
Number of Final Effluent TKN Samples	10	8	9	7	10	7	9	9	8	9	9	8		103
Final Effluent - Monthly Average NH3 (mg/L)	18.04	21.15	14.01	18.24	19.66	20.33	16.82	1.23	2.14	0.42	0.40	1.29	11.14	
Number of Final Effluent NH3 Samples	10	8	9	7	10	7	9	9	8	9	9	8		103
Final Effluent - Monthly Average NO3 (mg/L)	0.79	1.08	1.54	0.41	0.50	0.66	0.89	16.93	17.11	18.79	16.09	12.30	7.26	
Number of Final Effluent NO3 Samples	10	8	9	7	10	7	9	9	8	9	9	8		103
Final Effluent - Monthly Average NO2 (mg/L)	0.38	0.34	0.37	0.56	1.26	0.87	1.56	1.01	0.84	0.42	0.44	0.45	0.71	
Number of Final Effluent NO2 Samples	10	8	9	7	10	7	9	9	8	9	9	8		103
Final Effluent - Monthly Geomean E.Coli (MPN/100mL)				25	24	28	64	137	253	15			48	
Number of Final Effluent E.Coli Samples				7	9	8	9	9	8	9				59

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Measured Parameter	January	February	March	April	May	June	July	August	September	October	November	December	Total / Average	Samples Collected
Final Effluent - Monthly Average TRC (mg/L)				0.00	0.00	0.00	0.00	0.00	0.00	0.00			0.00	
Number of Final Effluent TRC Samples				30	31	30	31	31	30	31				214
Final Effluent - Monthly Average Temperature (°C)	13.15	12.40	11.83	12.86	15.00	18.30	20.32	21.77	21.78	18.81	14.43	13.96	16.22	
Number of Final Effluent Temperature Samples	10	8	9	7	10	7	9	9	8	9	9	8		103
Final Effluent - Monthly Average pH	7.23	7.34	7.22	7.24	7.33	7.36	7.34	7.02	6.75	6.83	6.97	7.09	7.14	
Number of Final Effluent pH Samples	10	8	9	7	10	7	9	9	8	9	9	8		103

Effluent Quality Assurance Measurements and Control Measures

To ensure Port Dalhousie WWTP continues to produce a high-quality effluent the following measures have been implemented:

- Development and implementation of a Wastewater Quality Management System (WWQMS) program
 - This program promotes an environment of continuous improvement for all staff impacting the quality of wastewater
- Compliance samples are analyzed by an ISO 17025:2017 accredited laboratory unless sample results are required to be collected in the field at the time of sampling
- Standard Operating Procedures (SOPs) are in place to support proper sampling and field measurements
- A compliance sampling schedule is created each year to ensure regulatory requirements are being met, as a minimum
- Equipment used in the monitoring and measurement of Final Effluent quality are calibrated annually

Deviations from Scheduled Sampling Days

Compliance sampling activities at the Port Dalhousie WWTP are scheduled to ensure all provincial and federal requirements are met. A schedule is prepared for the upcoming year and is submitted to the MECP as part of the annual reporting requirement.

In 2023, five (5) deviations from the scheduled sampling days occurred. Note that all scheduled Imported Sewage samples were not collected as the imported sewage receiving station was closed due to construction activities. Table PD-T-4 below provides the instances where a deviation occurred and a reason for the deviation.

The 2024 sampling schedule is available upon request.

Table PD-T-4: Table of 2023 sampling schedule deviations

Sampling Date Deviation	Sample Type(s)	Reason
2023-06-21	Influent/Primary Effluent/ Final Effluent	Disruption in courier service. Samples delivered to lab past holding times. Could not be analyzed.
2023-07-27 2023-08-24 2023-08-30	Primary Effluent	Sample was not available due to construction activities.
2023-10-19	Influent	Influent sampler malfunctioned. Sample submitted following day.

PD-T-3 Description of Operating Problems Encountered and Corrective Actions Taken

The Port Dalhousie WWTP had challenges with meeting monthly objectives for TP and TSS in 2023. The ECA compliance limit for TP and TSS were also exceeded in August and September of 2023. Up to the end of July, objective exceedances were the result of an aging secondary treatment process in need of upgrades and replacements. Temporary jet aeration pumps were put in place to supplement the air requirements of the aeration process until the construction of the secondary treatment upgrades were completed. The reduced dissolved oxygen levels impact the performance of the secondary treatment process and the removal of suspended solids. The total phosphorus objective exceedances were related to the higher suspended solids or solids carryover in the final effluent.

To reduce the TSS and TP and improve effluent quality, a capital project was undertaken at the Port Dalhousie WWTP to replace the aging aeration system with a newly constructed fine bubble aeration system. The new system came online July 25, 2023.

The limit exceedances experienced in August and September can be attributed to:

- Drastic changes associated with changeover from the existing mechanical aeration to the newly constructed fine bubble aeration system
- installation/programming errors associated with the new dissolved oxygen (DO) control and blower systems
- wet weather/high flow events which caused significant washout within the new aeration basins.

During the changeover to the new process, some issues occurred, mainly with the dissolved oxygen control, resulting in over aeration of the mixed liquor leading to settling problems and elevated final effluent TSS. Two issues identified and corrected were:

- Dissolved oxygen (DO) meters were installed incorrectly – DO meters were to be installed at a 45-degree angle but the contractor installed at 90-degree angle leading to improper readings. These readings were being used as an input on a feedback loop controlling the blowers leading to over aeration.
- Programming issues with the DO meters – during the programming, tags for the DO meters were mixed up. Certain areas are supposed to have lower dissolved oxygen and others higher but because some tags were reversed, some areas were being under aerated while others were being over aerated.
- High-flow gates in the new aeration cell were not configured correctly and some solids washout occurred leading to higher solids entering the final clarifier during high flow/rain events in September

These issues have been corrected and final effluent values have been meeting and exceeding effluent limits.

PD-T-4 Summary of Major Maintenance Activities and Capital Works

Summary of Maintenance Carried out on Major Equipment

Niagara Region works to keep wastewater infrastructure in a state of good repair. Maintenance activities completed include regular preventative maintenance (PM) activities and normal and emergency equipment repair or replacement. Where a substantial amount of upgrade is required, this work is carried out under the capital works program.

Below is a summary of normal and emergency repairs carried out on major equipment at the Port Dalhousie WWTP:

- Repair and rehabilitation of primary clarifier chain and flights
- Repair and rebuild of west clarifier raw sludge pump

This list does not include Preventative Maintenance (PM) activities. PMs are completed and tracked in a computerized maintenance management system. PM activities completed during the reporting year are available upon request.

Planned Capital Upgrades

The following is a list of capital upgrades forecasted for the Port Dalhousie WWTP:

- Port Dalhousie WWTP secondary treatment upgrades – in construction (95% complete)
- Port Dalhousie Digester Cleanout/Instrumentation – finalizing design
- Port Dalhousie waste gas burner replacement – awaiting approval
- Phase 2 -90%

Summary and Update of Notice of Modifications Completed

Through the facility ECA, MECP has given System Owners the ability to complete low risk changes to a treatment plant without requiring approval from the MECP. These modifications are documented on a Notice of Modification form and are signed off by the Owner or delegate of the system. Any pre-authorized modifications must be reported on annually to the MECP.

During the reporting year 2023, no Notice of Modification were completed.

No Notice of Modification forms were completed in previous reporting years. No status update is required.

Proposed Works – Status Update

ECA 8135-B8XS6U includes Proposed Works including:

- Reconstruction of the influent channel and the influent overflow channel
- One screw compactor and two screw conveyors for the mechanical screens
- Flow measurement devices on the influent and overflow channels
- Existing storm tank to be converted into a primary clarifier with sludge and scum removal mechanisms
- Aeration system replacement – two new aeration tanks equipped with fine bubble system. Coarse air bubblers to be installed in inlet, effluent and splitter chambers within the aeration system.
- Five blower units to provide air to fine bubble aeration system and Two blower units for the coarse air system
- Three return activated sludge pumps (two duty, one standby)

The phase one construction project at Port Dalhousie is approximately 95% complete. All of the above Proposed Works are now in service with the exception of one blower unit. Minor contractual items are still outstanding. The fine bubble aeration system was brought online in July 2023.

PD-T-5 Summary Calibration Activities

Flow Meter Calibration – Influent, Effluent and Imported Sewage

Flow meters measuring discharges to the environment are calibrated at minimum, once per calendar year. Below in Table PD-T-5 provides a summary of flow meter calibration

Table PD-T-5: Summary of Flow Meter Calibration

Meter Name	Date Calibrated	Comments
Port Dalhousie Final Effluent Meter	2023-04-18	Passed
Port Dalhousie Storm Flow Meter	2023-04-18	Passed
Port Dalhousie Final Effluent Meter	2023-11-16	Passed
Port Dalhousie Storm Flow Meter	2023-11-16	Passed

Calibration certificates are available upon request.

The volume of Imported Sewage received at site is reported by the sewage hauler on submitted paper manifests. No calibration required.

Effluent Monitoring Equipment Calibration/Verification

It is a requirement to calibrate, or, where unable to calibrate, verify equipment that is used to measure effluent quality.

Some effluent monitoring equipment calibration or verification is completed daily or as used by operations staff such as pH meter calibration or verification of the Total Residual Chlorine colorimeter.

Once annually, calibration or verification on all effluent monitoring equipment is completed. A summary of annual calibration/verification activities are available in Table PD-T-6 below.

Table PD-T-6: Summary of Calibration/Verification of Effluent Monitoring Equipment

Equipment Description	Date Calibrated	Comments
Balance – 204TS	2023-09-13	Passed
COD Reactor (Hach DRB 200)	2023-08-10	Passed
Spectrophotometer (Hach DR1900)	2023-08-10	Passed
Spectrophotometer (Hach DR2700)	2023-08-10	Passed
HQ30D Portable Meter with pH Probe	2023-08-10	Passed
HQ40D Portable Meter with DO Probe	2023-08-10	Passed
Pocket Chlorine Colorimeter	2023-08-10	Passed
Benchtop pH meter - Thermo	2023-08-10	Passed

Calibration certificates are available upon request.

PD-T-6 Solids Handling

Processed Organics Received

No processed organics were received at the Port Dalhousie WWTP during the reporting period. Port Dalhousie WWTP does not typically receive processed organics.

Volumes Sludge Generated and Removed From Site

Solids removed from the treatment process are digested and transported from site for further processing and beneficial re-use. All sludge removed from the Port Dalhousie WWTP is taken to Niagara Region’s Garner Road Biosolids Facility where it is stored, further thickened and either sent for land application or for dewatering and conversion to a pelletized fertilizer. Table PD-T-7 provides a summary of 2022 and 2023 sludge volumes removed from site.

Table PD-T-7: Summary of Sludge Removed from Site 2023

Month	2023 Volume Sludge Hauled (ML)	Prior Year Volume Sludge Hauled (ML)
January	4.900	6.504
February	5.420	7.328
March	5.940	8.325
April	5.854	7.501
May	7.198	7.154
June	5.767	7.241
July	4.770	5.854
August	6.504	6.200
September	5.203	5.767
October	6.200	5.637
November	6.374	5.767
December	6.244	5.637
TOTAL	70.373	78.915

An 11% decrease in sludge removed from site in 2023 versus reporting year 2022 was observed.

No changes are anticipated for sludge handling in 2024 at the Port Dalhousie WWTP.

Sludge Quality Monitoring

Digested sludge is sampled and analyzed bi-weekly to meet regulatory requirements of the Garner Road Biosolids Facility and Port Dalhousie WWTP ECA and maintain our ability to beneficially re-use biosolids. Results are trended and compared to Nutrient Management Act (NMA) limits. Where a trend is detected, investigations are initiated to identify potential sources of the pollutant and correct any issue identified. Average monthly results for 2023 biosolids analysis from the Port Dalhousie WWTP is included in Table PD-T-8.

PD-T-7 Complaints

No complaints were received in 2023 regarding the operation of the Port Dalhousie WWTP.

Table PD-T-8: Summary of Monthly Average Sludge Results

Analyte	Units	January	February	March	April	May	June	July	August	September	October	November	December
Total Solids	%	1.30	1.85	1.75	2.65	2.80	1.40	1.85	1.35	1.50	1.43	1.40	1.55
Ammonia as N	mg/Kg	1035	1175	1070	1155	973	1060	900	625	665	653	605	805
Nitrate+Nitrite	mg/Kg	0.99	1.00	0.99	1.00	0.99	1.00	1.00	1.00	0.99	0.99	0.99	1.00
Phosphorus	mg/Kg	27,550	19,409	27,950	28,950	27,600	29,450	26,200	25,000	27,150	27,500	28,250	27,000
Arsenic	mg/Kg	3.19	3.10	3.89	3.81	3.11	2.35	2.69	1.77	3.70	2.41	6.20	3.12
Cadmium	mg/Kg	0.95	0.60	0.60	0.70	0.50	0.50	0.50	0.65	1.25	0.57	0.80	0.50
Chromium	mg/Kg	47.95	31.93	57.20	56.75	51.37	48.50	49.25	38.10	42.00	52.63	47.80	51.70
Cobalt	mg/Kg	2.05	1.57	3.20	2.60	2.77	2.65	3.30	3.00	4.45	1.30	1.50	2.70
Copper	mg/Kg	507	291	527	519	496	516	527	353	346	565	478	516
Lead	mg/Kg	31.00	15.19	29.00	31.00	27.00	23.50	27.00	23.00	18.00	190.33	190.50	104.00
Mercury	mg/Kg	0.32	0.24	0.57	0.40	0.30	0.36	0.32	0.44	0.35	0.51	0.32	0.37
Molybdenum	mg/Kg	7.50	3.05	6.50	5.00	5.67	8.50	8.00	6.50	10.00	9.33	8.00	8.00
Nickel	mg/Kg	29.75	10.26	29.35	25.00	25.70	19.80	10.10	15.70	18.30	29.77	25.30	19.35
Potassium	mg/Kg	10,965	3,618	7,800	6,975	5,033	8,730	5,805	11,380	17,360	6,593	9,100	7,150
Selenium	mg/Kg	3.38	3.40	3.70	3.30	3.51	2.90	2.71	1.96	3.00	2.49	2.90	2.79
Zinc	mg/Kg	683.00	397.10	698.00	708.50	614.00	670.00	753.00	557.00	533.50	729.00	526.00	607.50

PD-T-8 Bypasses, Overflows, other situations outside Normal Operating, Spills and Abnormal Discharge Events

Bypasses and Overflows

There were 12 plant overflow events at the Port Dalhousie WWTP in 2023. Plant overflows from this facility receive preliminary treatment prior to discharge to the environment including screening, chlorination and dechlorination (between April 1 and October 31). No secondary bypass events occurred at Port Dalhousie WWTP in 2023. To facilitate the construction activities within the primary distribution box, a Notice of Equipment Out of Service was submitted in August 2021 to the MECP. The storm primary clarifier was removed from service for the construction period and converted to a primary clarifier. Upon changeover to the new aeration system, the Port Dalhousie plant can now fully treat wastewater flows up to 122,700 m³/d. Previously, flows between 100,000 m³/d and 122,700 m³/d received primary treatment, chlorination and dechlorination prior to discharge. Secondary bypass is no longer required or possible. Table PD-T-9 provides a monthly breakdown of bypass and overflow events occurring at the Port Dalhousie WWTP during the reporting period.

Table PD-T-9: Annual Summary of Secondary Bypass and Plant Overflow Events by Month

Month	Number of Plant Overflow Events	Number of Secondary Bypass Events	Total Volume (ML)
January	1	0	26.698
February	1	0	57.341
March	1	0	22.036
April	3	0	39.718
May	0	0	0.000
June	1	0	1.544
July	3	0	47.540
August	0	N/A	0.000
September	0	N/A	0.000
October	0	N/A	0.000
November	1	N/A	5.555
December	1	N/A	7.963
Total	12	0	208.395

Overflow events are sampled and submitted for analysis. Overflow samples are collected at the start of each event and every eight hours for the duration of the event. Results for overflow samples are shown in **Error! Not a valid bookmark self-reference.** below.

Table PD-T-10: 2023 Port Dalhousie WWTP Plant Overflow Sampling Results

Date	T BOD (mg/L)	Total Suspended Solids (mg/L)	Phosphorus (total) (mg/L)	Total Kjeldahl Nitrogen (mg/L)	Ammonia as N (mg/L)	Nitrate (mg/L)	Nitrite (mg/L)	E. Coli ⁴ (MPN/ 100 mL)
2023-01-04/ Event Start	40	141	1.13	7.80	1.91	1.90	0.10	
2023-01-05/ Event 8 Hour	43	44	1.00	11.30	5.40	1.70	0.20	
2023-02-09/ Event Start	102	154	3.30	28.20	14.80	0.20	0.10	
2023-02-09/ Event 8 Hour	54	73	1.20	10.50	5.60	0.20	0.10	
2023-03-03/ Event Start	47	167	1.80	11.70	4.00	0.40	0.10	
2023-03-04/ Event 8 Hour	40	66	1.59	10.80	5.80	0.50	0.30	
2023-04-01/ Event Start	69	105	0.90	11.60	7.80	0.40	0.10	300,000
2023-04-01/ Event 8 Hour	24	18	0.40	9.40	7.30	1.40	0.40	9,000
2023-04-01/ Event 16 Hour	78	67	1.30	13.80	7.80	1.00	0.40	40,000
2023-04-04/ Event Start	42	45	0.60	6.20	2.90	1.30	0.10	10,000
2023-04-04/ Event 8 Hour	24	22	0.60	7.40	3.50	1.50	0.10	10,000
2023-04-05/ Event Start	81	155	3.20	20.50	9.50	0.20	0.20	220,000
2023-06-12/ Event Start	57	75	1.60	16.50	5.70	0.20	0.10	2,490,000
2023-07-20/ Event Start	97	219	2.20	14.60	6.90	0.20	0.10	461,000
2023-07-27/ Event Start	48	56	1.80	11.30	5.80	0.30	0.10	1,110,000
2023-07-29/ Event Start	40	31	0.70	9.60	4.30	0.20	0.20	2,050,000
2023-11-09/ Event Start	44	135	1.70	12.90	5.50	0.90	0.30	
2023-12-27/ Event Start	51	71	1.30	13.40	3.30	0.80	0.10	

⁴ Sampling and analysis of E.Coli is required April 01 to October 31 annually
Section: Port Dalhousie WWTP – Treatment (PD-T)

Situations Outside of Normal Operating Conditions

The MECP defines “Normal Operating Condition” as when all unit process(es), excluding Preliminary Treatment System, in a treatment train is operating within its design capacity.

There were no situations outside of Normal Operating Conditions during the reporting year.

Spills

Niagara Region strives to maintain and operate wastewater infrastructure so spills to the environment do not occur. However, circumstances arise where a spill occurs due to equipment malfunction, failure or other reasons. Occasionally, a spill is required to safely complete required maintenance to critical equipment. If this is necessary, approval from the MECP is obtained in advance.

All spills are reported to the MECP Spills Action Centre upon discovery and follow up written reports are completed and submitted to the MECP and Environment and Climate Change Canada as required by regulation. Below in Table PD-T-11 summarizes spills that occurred at the Port Dalhousie WWTP in 2023.

Table PD-T-11: Summary of spills occurring at the Port Dalhousie WWTP during the reporting year

Spill Date	MECP Incident Number	Description of Spill
2023-02-02	1-2HGRNG	<p>Unplanned Spill of Digester Biogas – Waste Gas Burner Loss of Pilot Light</p> <p>On plant rounds, the operator observed the waste gas burner was in an alarm condition. Due to extreme high wind conditions, the pilot light had blown out and the operator was unable to restart. As a result, unburned biogas was subsequently released to atmosphere.</p> <p>The operator reduced raw sludge pumping to the digester to minimize the production of biogas and made sure plant boiler units were set to run off of biogas to divert as much biogas away from the waste gas burner as possible until the pilot could be relit. The pilot was successfully lit the following day.</p>
2023-08-24	1-3RTB2L	<p>Unplanned Spill of Biosolids - Spill During Truck Loading</p> <p>During the loading of a tanker truck with biosolids to be transported to Garner Road Biosolids Facility, the hose</p>

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Spill Date	MECP Incident Number	Description of Spill
		<p>attachment became dislodged from the loading port resulting in a spill of biosolids onto the truck and pavement below.</p> <p>The spill was contained to the paved area around the loading zone and to the catch basin that discharges back to the headworks of the plant. A vacuum truck was used to clean up the area. All spilled biosolids were contained to the plant and were not discharged to the environment.</p>
2023-11-09	1-4DRTGJ	<p>Unplanned Spill of Sewage – Construction Bypass Failure During Wet Weather</p> <p>During a rainfall and high flow event, a spill of sewage combined with rainwater occurred in the construction area. The spill was contained to the surrounding excavation area and driveway.</p> <p>The spill resulted from the failure of a temporary construction bypass pumping set up. Only one (1) pump was running during the high flow of the four (4) pumps available. The contractor responded to site and was able to start the back-up pumps. The back-up pumps did not start automatically as expected due to failure of the pump float system.</p> <p>The contractor performed site clean up and remediation. Spilled material was contained to the excavation area and was pumped back to the primary clarifiers for treatment.</p>
2023-12-07	1-4H90HF	<p>Unplanned Spill of Digester Biogas – Waste Gas Burner Electrical Fault</p> <p>The Operator received an alarm indicating a waste gas burner circuit fault. Upon inspection of the waste gas burner, they found the heater unit had short circuited and caused the main breaker to trip. This caused the burner to shut off. As a result, a spill of unburned biogas to the atmosphere. The operator immediately closed the digester gas feed valve stopping any further release to the environment.</p> <p>Electrical staff were called to site. They replaced the heater unit, reset the circuit breaker and restarted the pilot. Operations then opened the digester gas feed valve and returned to normal</p>

Spill Date	MECP Incident Number	Description of Spill
		operation. A capital project is underway to replace the waste gas burner at the Port Dalhousie WWTP.

Abnormal Discharges

An abnormal discharge is a discharge to the environment that is abnormal in quality or quantity.

There were no instances of abnormal discharges at Port Dalhousie WWTP in the reporting year.

PD-T-9 Summary of Efforts to Achieve Conformance with F-5-1 and/or F-5-5

Summary of Efforts – Procedure F-5-1 – Secondary Treatment Equivalent

Procedure F-5-1 states wastewater treatment facilities are to provide treatment of wastewater to a minimum of secondary treatment equivalence. This means the WWTP should be designed to meet objectives of 15 mg/L for CBOD and TSS and 1.0 mg/L for TP.

As demonstrated above in section PD-T-2 and PD-T-3, Port Dalhousie WWTP experienced some difficulty with achieving effluent objectives for TSS and TP. With the changeover to the new aeration process, it is anticipated that the Port Dalhousie WWTP will meet all secondary treatment equivalent MECP design objectives in 2024.

Summary of Efforts – Procedure F-5-1 and F-5-5 – Bypassing from Combined Sewer Systems

The Port Dalhousie WWTP receives sewage from portions of the City of Port Dalhousie where combined sewer systems still exist. Procedure F-5-1 and F-5-5 require that a staged program be developed for the ultimate goal of total containment and treatment of all sewage flows.

Being a two-tier system, Niagara Region works closely with the City of St. Catharines, and the City of Thorold to reduce bypasses at the wastewater treatment plant. Pollution Prevention and Control Plans (PPCP) are undertaken by area municipalities with support and participation from Niagara Region. As well, Niagara Region undergoes a Master Servicing Plan every five years to identify areas that require I&I reduction or capacity increases based on expected

development growth in the area. Both studies take into consideration impacts from wet weather and provide recommended actions to reduce wet weather overflows/bypasses.

Niagara Region participates in a cost sharing strategy with lower tier municipalities to fund overflow reduction projects and pollution prevention and control plan updates. In 2023, Niagara Region had an approved budget totaling \$4.0M for the overflow reduction cost sharing program. One project was approved for cost sharing in the City of St. Catharines with Niagara Region contributing \$445,486 to support overflow reduction activities.

With the completion of the phase one upgrade, the plant capacity was increased to fully treat all flows up to 122,700 m³/d, increased from the previous rate of 100,000 m³/d. This will help reduce the volume of bypasses and overflows at the Port Dalhousie WWTP.

Excess Primary Treatment Capacity

F-5-1 allows for excess primary treatment where it is impractical or uneconomical to provide secondary treatment to wet weather flow. As Port Dalhousie WWTP services a collection system that is impacted by wet weather flow, fully treating the combined sewage and stormwater is not feasible. Port Dalhousie was equipped with storm treatment for flows greater than 100,000 m³/d, up to a maximum flow of 122,700 m³/d.

Flows to the storm treatment system receive screening, grit removal, settling (solids removal), chlorination and dechlorination (from April 1 to October 31). It recombines and is sampled with the final effluent prior to discharge to the environment. The storm system also acts as a storage tank during wet weather. Captured wastewater is returned to the plant for full treatment when the wet weather event is over.

Upon completion of the current capital upgrade project, the WWTP is now capable of fully treating flows up to 122,700 m³/d.

Industrial Waste

Industrial waste can contain material that can have negative impacts on collection system infrastructure as well as the wastewater treatment process itself. Upsets to the treatment process can cause a plant to become non-compliant with ECA objectives and limits. To protect our infrastructure, the Niagara Region has a Sewer Use By-law in place. Environmental Enforcement Officers conduct industry inspections as well as sampling and monitoring of industrial discharges on a routine basis to ensure that they meet the Sewer Use By-law limits.

PD-C-1 Overview of the Port Dalhousie WWTP Collection System

The Port Dalhousie WWTP collection system is a class IV system that collects wastewater from domestic, commercial and industrial sources from portions of the City of St. Catharines, and portions of the City of Thorold. The collection system consists of the following:

- Local sanitary sewers
- 17.7 kilometres of regional gravity mains
- 7.9 kilometres of regional force mains
- 14 pumping stations:
 - Cole Farm Sewage Pumping Station
 - Lighthouse Road Sewage Pumping Station
 - Lakeside Sewage Pumping Station
 - Eastchester Sewage Pumping Station
 - Argyle Sewage Pumping Station
 - Renown Sewage Pumping Station
 - Glendale Sewage Pumping Station
 - Wellandvale Sewage Pumping Station
 - Riverview Sewage Pumping Station
 - Beaverdams Sewage Pumping Station
 - St. Georges Point Sewage Pumping Station
 - Snug Harbour Sewage Pumping Station
 - October Village Sewage Pumping Station
 - Confederation Heights Sewage Pumping Station
- Three Combined Sewer Overflows (CSOs) on Niagara Region infrastructure and four CSOs upstream of Niagara Region infrastructure.

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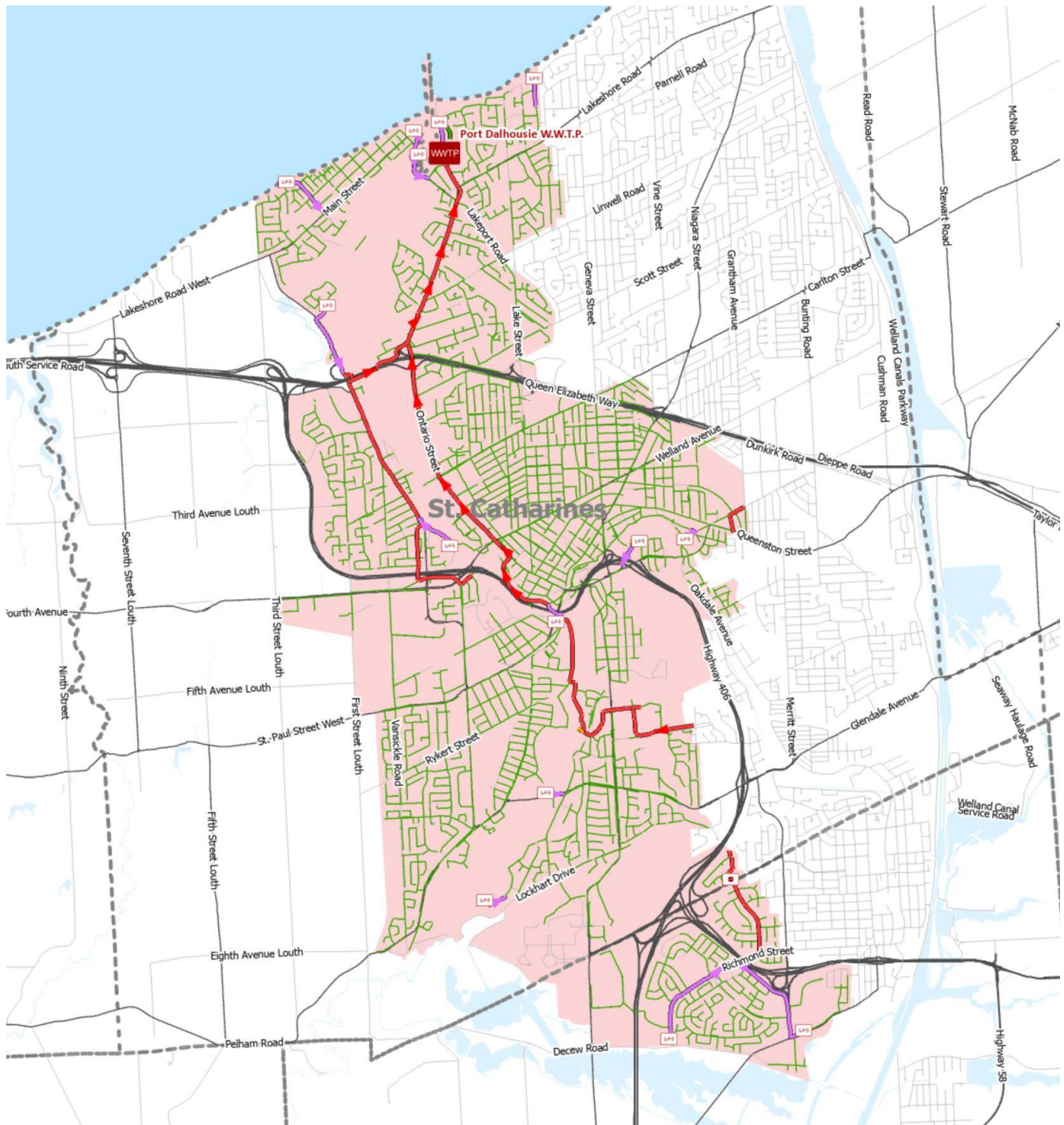


Figure PD-C-1: Map of Port Dalhousie WWTW Collection System

The collection system is operated under a two-tier system, where the area municipalities own and operate local gravity sanitary sewers and Niagara Region owns and operates sewage pumping stations, forcemains, larger gravity sanitary sewers or trunk sewers and some sewage detention facilities. It is classified as a combined sewer system. This means there are

a small portion of pipes still remaining in the system that were designed to collect sanitary sewage and storm water in a single pipe. Combined sewers are no longer allowed to be constructed in Ontario and are being replaced with separate sewer systems as funding allows. Combined systems are heavily impacted during wet weather and snow melt events. While the majority of the collection system is separated, the separated system may still be impacted by inflow and infiltration from sources such as roof leaders, foundation drains, leaky pipes and joints and maintenance holes.

The collection system operates under the following Consolidated Linear Infrastructure ECA:

- Port Dalhousie Wastewater Catchment System, 007-W605, issue number 1

Annual reporting has been prepared to meet the requirements of this approval.

PD-C-2 Summary and Interpretation of Collection System Monitoring Data

Monitoring of Pump Station Operations

Pump stations operate through automatic control and are monitored continuously using Supervisory Control and Data Acquisition (SCADA). Stations alarms are programmed to alert the operations staff at the Port Dalhousie WWTP 24 hours a day of potential issues including but not limited to high wet well levels, pump faults, communication failures and standby generator status. Operators will respond to station alarms as required to ensure proper station operation.

Station operation is trended in SCADA. SCADA trends are reviewed daily by operations staff to evaluate station performance. Operators will look at pump cycle times, station discharge flow and pump duty rotation to identify potential issues. Where potential issues are identified, work orders are generated for follow up by maintenance staff.

In addition to SCADA monitoring, monthly station inspections are completed by operations staff. This includes inspection of the station and testing of standby generator equipment.

Sanitary Sewer Closed-Circuit Television Inspection Program

Niagara Region owns and maintains 145 kilometers of trunk sanitary gravity sewers, 161 kilometers of sanitary forcemains, and 2,093 sanitary access chambers across 11 municipalities. Approximately 85% of its conventional trunk sanitary gravity system is inspected using closed-circuit television (CCTV) once every three years. The remaining 15% is large diameter trunk sewers which are inspected once every 10 to 15 years due to the necessity for specialized equipment to access and inspect sewers that have continuous high flow levels.

The table below details the total length of sewers inspected over the past four years.

Table PD-C-1- CCTV Program Summary

Measurement in Kilometers (km)	2020	2021 ^[1]	2022	2023
Inspection Length (km)	37.9	18.5	59.3	33.0

Observations from the inspections are recorded for structural and operational deficiencies of the pipes. Operational deficiencies (blockage from grease, roots, debris) are addressed through the cleaning/flushing program. Structural deficiencies (broken, fractured, surface damage, holes) as well as Inflow and Infiltration are forwarded for consideration in the asset management plan and capital upgrade program.

Flow Monitoring

Niagara Region monitors sewer flows at 158 locations. Flow monitoring information is used for municipal Pollution Prevention and Control Plans (PPCPs), Master Servicing Plans (MSPs) including the 2021 Water and Wastewater MSP, Inflow and Infiltration studies, billing, development planning, and capital project design.

PD-C-3 Summary of Operating Issues Encountered and Corrective Actions Taken

Pump Stations and Forcemains

No operational issues were experienced at the pump stations or associated forcemains in 2023.

Gravity Trunk Sewers

No operational issues were experienced in the gravity trunk sewers in 2023.

^[1] 2021 marked the end of one inspection contract and the start of a new contract. Delays in the procurement process due to competing priorities resulted in a gap in inspection contracts. As a result, the length of sewers inspected in 2021 was less than in prior years.

PD-C-4 Summary of Major Maintenance, Capital Projects and Pre-Authorized Alterations

Summary of Maintenance Carried out on Major Equipment

Niagara Region works to keep wastewater infrastructure in a state of good repair. Maintenance activities completed include regular preventative maintenance (PM) activities and normal and emergency equipment repair or replacement. Where a substantial amount of upgrade is required, this work is carried out under the capital works program.

Below is a summary of normal and emergency repairs carried out on major equipment in the Port Dalhousie Collection System:

- Beaverdams SPS – Repair and rebuild of pump #1

This list does not include PM activities. PMs are completed and tracked in a computerized maintenance management system. PM activities completed during the reporting year are available upon request.

Planned Capital Upgrades

The following is a list of capital upgrades forecasted for the Port Dalhousie Collection System:

- Beaverdam SPS upgrades and forcemain replacement
- Cole Farm SPS upgrades
- Tupper Drive sewer relining project

Summary of Pre-Authorized Alterations Undertaken

Through collection system ECAs, MECP has given System Owners the ability to complete low risk changes to a sewage pumping station, forcemain or gravity main without requiring further approval from the MECP. These modifications are documented on an applicable MECP form and signed off by the Owner or delegate of the system. Any pre-authorized modifications must be reported on annually to the MECP.

During the reporting year 2023, no pre-authorized modifications were completed.

No pre-authorized works were completed and therefore, there were no alterations that would pose a significant threat to drinking water.

PD-C-5 Summary of Calibration Activities

Collection system overflow meters are calibrated at minimum once per year. Other instrumentation used in process control is calibrated on an as needed basis. Table PD-C-2 below provides a summary of calibrations completed in the collection system in 2023.

Table PD-C-2 - Summary of Calibration Activities Undertaken in the Port Dalhousie Collection System

Equipment Description	Date Calibrated	Comments
No system calibrations required.		

Calibration certificates are available upon request.

PD-C-6 Summary of Complaints

No complaints were received in 2023 regarding the operation of the Port Dalhousie collection system.

PD-C-7 Summary of Collection System Overflows and Spills

Collection System Overflows

The Port Dalhousie wastewater collection system is classified as a combined sewer system. This means the collection systems consists of a small portion of sewers that are designed to collect both sanitary and storm water while most sewers are separated. Collection system overflows occur during wet weather events due to combined sewers but also because of inflow and infiltration of storm water into sections of the sewage collection system that are separate. Overflows are necessary to prevent basement flooding and to protect downstream infrastructure and wastewater treatment processes.

Table PD-C-3 provides a summary of collection system overflows that occurred during the reporting year. The table includes volume discharge, overflow durations as well as pollutant loading to the environment.

More [information on sewage overflows and inflow and infiltration](http://www.niagararegion.ca/living/sewage/cso), is available on the Region's website (www.niagararegion.ca/living/sewage/cso).

Table PD-C-3: Collection System Overflow Event Details

Overflow Location	Overflow Date	Overflow Volume (ML)	Overflow Duration (hhh:mm)	BOD Loading (kg)	TSS Loading (kg)	TP Loading (kg)	TKN Loading (kg)	E.Coli ⁵ (MPN/100 mL)	Was the Overflow Disinfected (Yes/No)	Were Any Adverse Impacts Observed (Yes/No)	Corrective Actions Taken
No Collection System Overflow Events in 2023											

⁵ E.Coli sampling and analysis is required April 01 to October 31 annually.
 Section: Port Dalhousie – Collection (PD-C)

Collection System Spills

Niagara Region strives to maintain and operate wastewater infrastructure so spills to the environment do not occur. However, circumstances arise where a spill occurs due to equipment malfunction, failure or other reasons. Occasionally, a spill is required to safely complete required maintenance to critical equipment. If this is necessary, approval from the MECP is obtained in advance.

All spills are reported to the MECP Spills Action Centre upon discovery and follow up written reports are completed and submitted to the MECP and Environment and Climate Change Canada as required by regulation. Below in Table PD-C-4 summarizes spills that occurred in the Port Dalhousie collection system in 2023.

Table PD-C-4: Summary of Spills Occurring in the Port Dalhousie Collection System

Spill Date	MECP Incident Number	Description of Spill
No Collection System Spill events occurred in 2023.		

PD-C-8 Summary of Efforts to Reduce WWTP Bypasses/Overflows and Collection System Overflows

Projects Undertaken to Reduce Bypasses or Overflows

Being a two-tier system, Niagara Region works closely with the City of St. Catharines, and the City of Thorold to reduce overflows at the wastewater treatment plant. Niagara Region participates in a cost sharing strategy with lower tier municipalities to fund overflow reduction projects. In 2023, Niagara Region had an approved budget totaling \$4.0M for the overflow reduction cost sharing program. One project was approved for cost sharing in the City of St. Catharines with Niagara Region contributing \$445,486 to support overflow reduction activities.

There were no overflows from the Niagara Region portion of the Port Dalhousie collection system in 2023.

The Niagara Region undertook a capital project to reline approximately 700 m of trunk sewer along a portion of Richmond Street and Tupper Drive in Thorold as well as rehabilitate up to five maintenance holes. This section of sewer was identified to have significant levels of hydrogen sulphide corrosion through CCTV inspection and confirmed through a condition assessment of the sewer and maintenance holes. Relining of the sewer will help prolong the life and structural integrity of the sewer and prevent I&I from entering the collection system

Public Reporting of Bypasses and Overflows

Niagara Region reports all [bypass and overflow events](https://www.niagararegion.ca/living/sewage/CSO/Reporting/CSOLocations.aspx) publicly on the Niagara Region website (<https://www.niagararegion.ca/living/sewage/CSO/Reporting/CSOLocations.aspx>)

Niagara Region updates the data on recent overflows four times a year and displays any overflows that may have occurred in the past 12 months.

A [listing of overflow data back to 2008](https://niagaraopendata.ca/dataset/combined-sewage-overflow) is available through the Niagara Open Data website (<https://niagaraopendata.ca/dataset/combined-sewage-overflow>)

An active project is underway to improve public reporting of bypasses and overflows including making the data available in near real time.