ECA Number: **023-W601**
Wastewater System Number: 120003619

St. Catharines

City of St. Catharines

Wastewater Collection System

2024 Annual Performance Report

For submission to the Ministry of Environment, Conservation and Parks

March 2025

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*Request access to the appendices by emailing Engineering Facilities and Environmental Services at efesall@stcatharines.ca.

Glossary

Term	Explanation
CLI-ECA	A framework approval that outlines pre-authorized conditions for changes to the sewage works system and ensures standardized operating and reporting conditions to safeguard accountability and oversight, with enhanced requirements for monitoring and system operation.
Combined Sewers	A sewer in which all sanitary and storm flows are collected within the same pipe.
CSO Regulators / Overflows	A flow-regulating device / structure that directs dry weather flow to a WWTP and diverts wet weather flows in excess of the regulator's capacity to outfalls / receiving waters.
Forcemains	Pipes located downstream of a pump station that convey wastewater under pressure.
Fully Separated Sewer	Sewers that allow only sanitary flows to be collected within the sewer - there are no stormwater connections. All stormwater is collected within a separate sewer.
MECP Procedure F-5-5	Determination of treatment requirements for municipal and private combined and partially separated sewer systems - outlines the rules for treating the wastewater from municipal and private combined and partially separated sewage systems.
Outlets / Outfalls	The point where the system discharges into the natural environment / receiving waters.

Glossary

Term	Explanation
Overflow Events	Events that result in a surcharge of the sanitary sewer system or WWTP, which discharge into the natural environment / receiving waters.
Partially Separated Sewer	Sewers that collect all sanitary flows and some stormwater from weeping tiles and roof leaders. Stormwater from roadways is collected in a separate sewer.
Receiving Water	A natural body of water into which treated or untreated wastewater is discharged.
Spill	An accidental, unplanned or unpermitted release of wastewater into the natural environment.
Stormwater	Refers to rainwater runoff, snow melt and surface runoff.
Wastewater Collection System	City-owned sewage works / infrastructure that collects and transmits sanitary wastewater.
Wet Weather Flows	Flows resulting from the combination of sanitary sewage and extraneous flows, resulting from a weather event such as rainfall or snow melt.
Storm Sewer	Collects and transmits stormwater resulting from precipitation and snow melt.
Wet Weather Storage Facility	A facility that provides temporary storage of excess wet weather flows that can later be treated at a WWTP.

Glossary

Acronym	Definition
City	City of St. Catharines
CLI-ECA	Consolidated Linear Infrastructure Environmental Compliance Approval
CSO	Combined Sewer Overflow
CSO Outfall	Combined Sewer Overflow Outfall
GEI	GEI Consultants Canada Ltd.
MECP	Ministry of Environment, Conservation and Parks
Niagara Region or Region	The Regional Municipality of Niagara
SAC	Spills Action Center
WWTP	Wastewater Treatment Plant

Introduction and Purpose

The City of St. Catharines (the City or St. Catharines) owns and operates the St. Catharines Wastewater Collection System, which is operated under a Consolidated Linear Infrastructure Environmental Compliance Approval (CLI-ECA), issued by the Ministry of the Environment, Conservation, and Parks (MECP). The approval replaces the numerous pipe-by-pipe Environmental Compliance Approvals (ECAs) that were previously issued for components of the municipal sewage collection system. The streamlined CLI-ECA outlines pre-authorized conditions for changes to the sewage works system and ensures standardized operating and reporting conditions to safeguard accountability and oversight, with enhanced requirements for monitoring and system operation. One condition of this CLI-ECA is preparing an annual report outlining actions relating to the CLI-ECA.

This Annual Performance Report is for the Period of Jan. 1 to Dec. 31, 2024, and fulfills the reporting requirements in the CLI-ECA. It is important to note some of the CLI-ECA requirements are phased in and therefore not all of the requirements are in place. As additional requirements come into effect and additional information becomes available it will be reflected in future annual reports.

Background

Wastewater Collection System

The City of St. Catharines' Wastewater Collection System is classified by the MECP as a Class I System (Wastewater System Number: 120003619) and services a population of approximately 144,800 residents. St. Catharines operates within a two-tier wastewater management structure:

- Niagara Region is responsible for wastewater treatment, trunk conveyance, pumping stations, and major trunk sewers
- The City of St. Catharines manages the local collection system, including sanitary and combined sewers

Wastewater flows in St. Catharines are collected and treated at two Wastewater Treatment Plants (WWTPs):

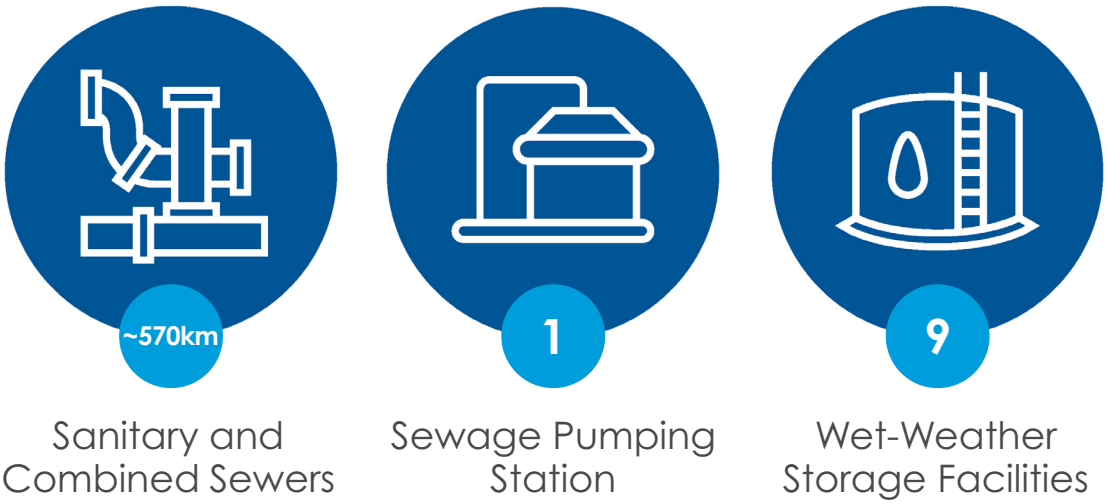
- Port Dalhousie WWTP (serving western St. Catharines and northwest Thorold)
- Port Weller WWTP (serving eastern St. Catharines, northeast Thorold, and parts of Niagara-on-the-Lake)

Both the Port Dalhousie and the Port Weller WWTPs as well as 15 sewage pumping stations are owned and operated by the Region and are beyond the scope of this report. Appendix A shows the catchment area boundaries for each Wastewater Treatment Plant.

Background

The St. Catharines wastewater collection system is made up of many components and generally consists of approximately 570 kilometres of sanitary and combined sewers, one (1) sewage pumping station, nine (9) wet-weather storage facilities, and associated forcemains.

Figure 1: Wastewater Collection System Icons



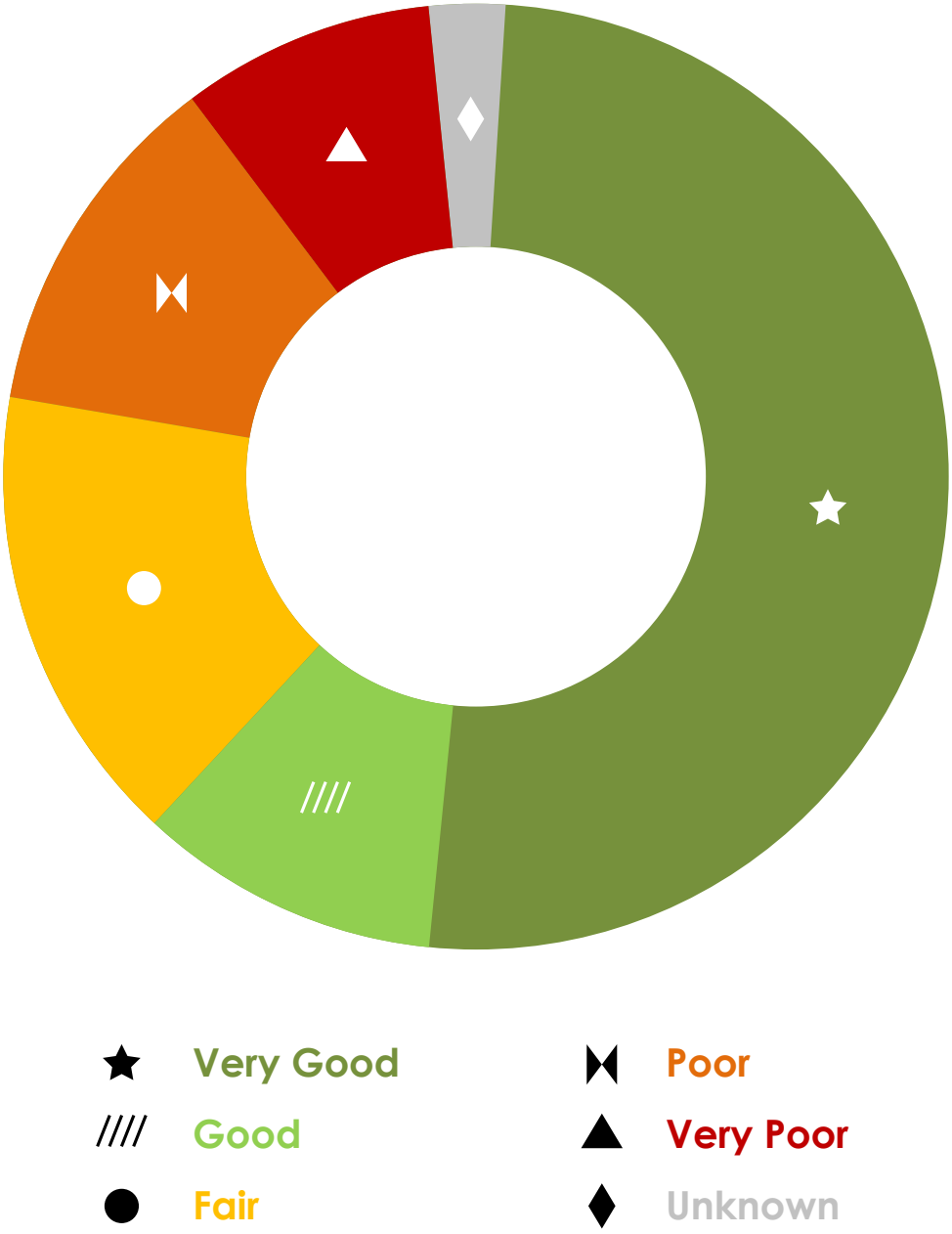
The City actively monitors, operates, and maintains the system to ensure regulatory compliance and system reliability. The City is also responsible for maintaining the system in a state of good repair.

As part of the City's Asset Management programs, condition assessments are undertaken. Nearly 62 per cent of the assets are in 'Good or Very Good' condition and 16 per cent are in 'Fair' condition. Approximately 20 per cent have been rated in 'Poor or Very Poor' condition. For further details, view Figure 2 on page 9.

Staff working in the wastewater collection system hold certifications through the Ontario Water and Wastewater Certifications Office as per O. Reg. 129 / 04 (Licensing of Sewage Works Operators) under the Ontario Water Resources Act. Staff must meet specific testing, education and experience requirements as well as ongoing training to maintain their certifications.

Background

Figure 2: Summary of Wastewater Asset Conditions



Note: The asset condition distribution is based on the asset replacement cost

Background

Types of Sewers

St. Catharines is serviced through networks of fully separated, partially separated and combined sanitary and storm sewers. These types of sewers are defined as follows:

Fully Separated

Only sanitary flows are collected within the sanitary sewer - there are no stormwater connections. All stormwater is collected within a separate storm sewer. These types of sewers are mandatory for all new developments where no new storm connections to the sanitary sewer are allowed.

Partially Separated

Stormwater from roadways is collected in a separate storm sewer. The partially separated sanitary sewer collects all sanitary flows and some stormwater from weeping tiles and downspouts.

Combined Sewers

All sanitary and storm flows are collected within the same sewer.

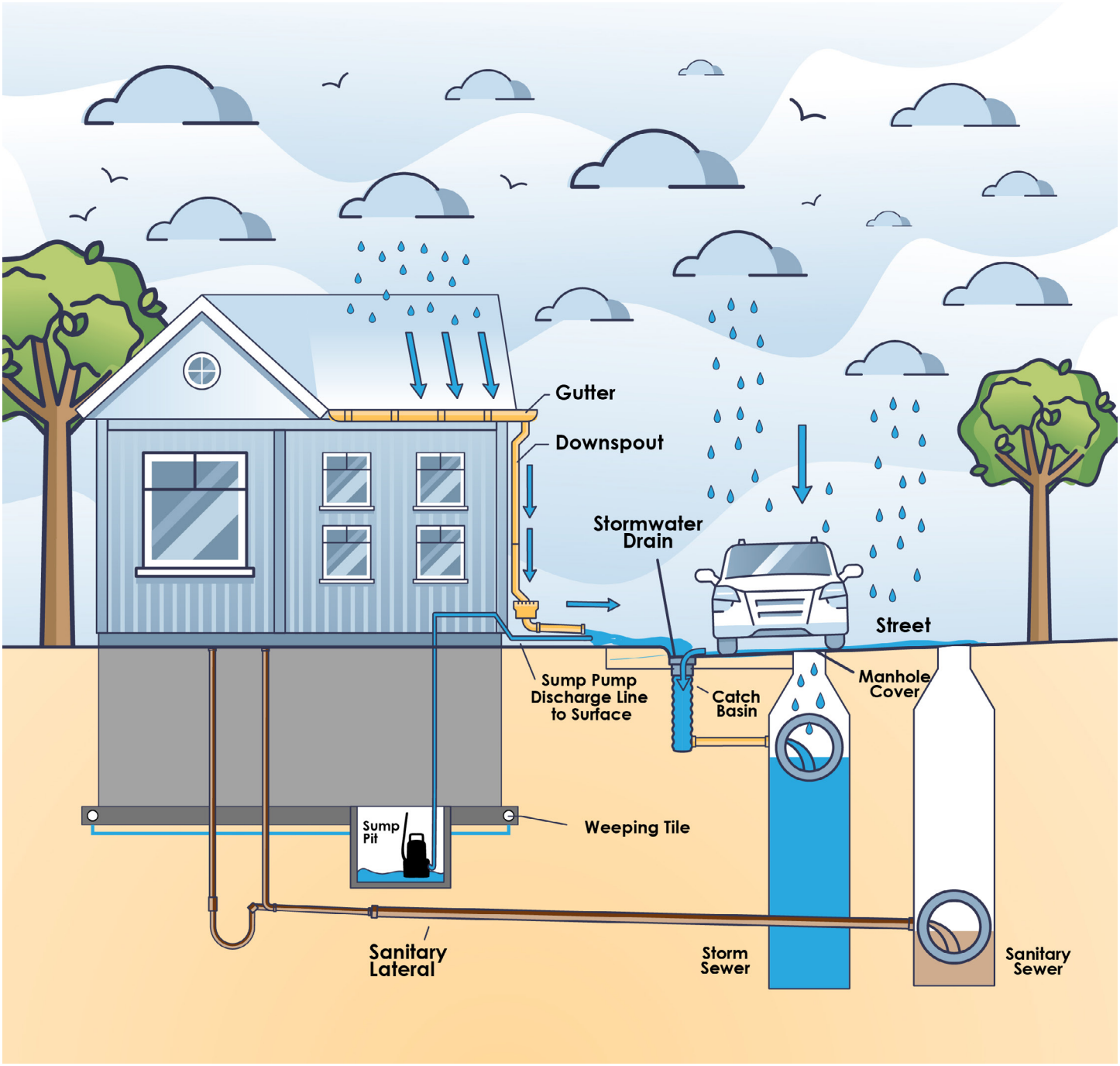
Storm Sewers

Collects and transmits stormwater resulting from precipitation and snow melt tiles and downspouts.

Note: the above sewer system type definitions are slightly different that those defined in the CLI-ECA. The City is working to better align these discrepancies, as part of the ongoing transitional efforts for improved consistency.

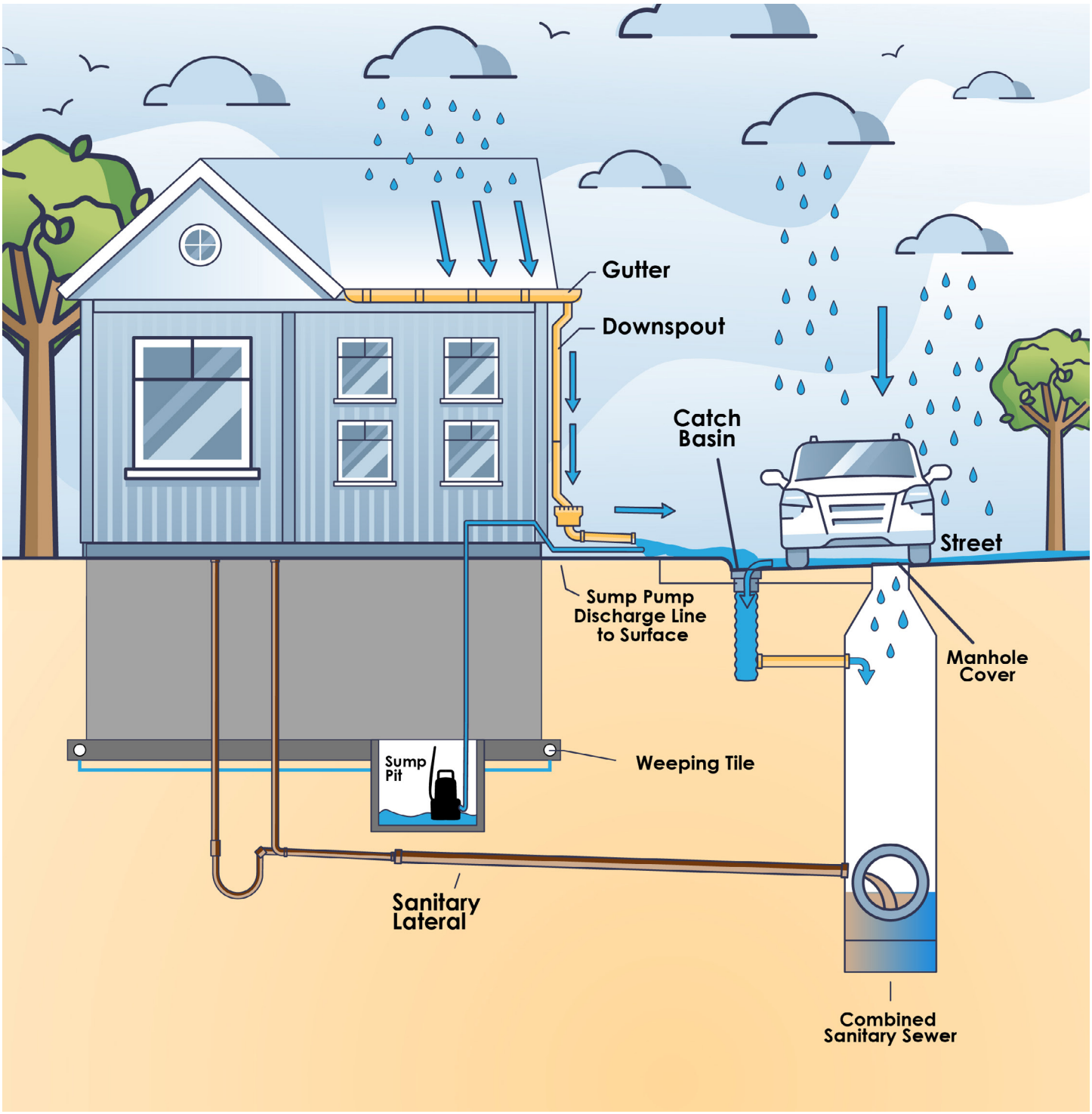
Background

Figure 3: Typical Separated Sewer System



Background

Figure 4: Typical Combined Sewer System



Background

Combined Sewer Overflows

Combined sewers were designed to transport both sanitary sewage and stormwater in the same pipes and were generally installed prior to the mid-1900s. During dry weather these sewers transport all the flow to a wastewater treatment plant. However, during large rainstorms, the volume of flow can exceed the capacity of the sewer system. When this happens, a portion of the flow is diverted away from the wastewater treatment plant and untreated sewage mixed with stormwater is released directly into local receiving waters and ultimately Lake Ontario.

The regulating structures (e.g. weirs) in the wastewater collection system that allow sanitary flows to be diverted to the natural environment, during wet weather events, are called Combined Sewer Overflow (CSO) Regulators. When these regulators become active, they discharge into the natural environment and are commonly referred to as CSO Outfalls. Discharge water from CSOs often contain high levels of pollutants such as pathogenic microorganisms, suspended solids, nutrients, oils, and grease. Discharge waters represent a potential health hazard and can have the potential for adverse effects on aquatic life, recreational uses, and water supplies. CSO regulators are generally located in the older neighbourhoods of Port Dalhousie, Merritton and central St. Catharines.

There are 101 CSO regulators in the St. Catharines wastewater collection system and 54 CSO outfalls. Appendix B shows the locations of the CSO regulators.

Sanitary Sewer Overflows

A Sanitary Sewer Overflow (SSO) refers to an overflow within the wastewater collection system that occurs under dry weather flow conditions and is not influenced by wet weather. There are no SSOs located within St. Catharines.

Combined Sewer Separation

The City actively pursues sewer separation opportunities where feasible. Sewer separation may be undertaken as part of regular construction programs, or in specific areas identified through the Pollution Prevention and Control Program, Environmental Assessments, inflow and infiltration investigations or regular operations activities.

Background

Procedure F-5-5

The MECP's Procedure F-5-5, determination of treatment requirements for municipal and private combined and partially separated sewer systems, outlines the rules for treating the wastewater from municipal and private combined and partially separated sewage systems. The goals of Procedure F-5-5 are to:

- Eliminate the occurrence of dry weather overflows;
- Minimize the potential for impacts on human health and aquatic life resulting from CSOs; and
- Achieve as a minimum, compliance with recreational water quality objectives at beaches in the summer months.

2024 Annual Wastewater Activities

Each year the City undertakes a number of projects and programs related to the wastewater collection system. For the purposes of this report the actions are categorized as Environmental Education and Public Outreach; Operations and Maintenance; Capital Works Projects; and System Monitoring. These actions were taken, in part, to address CLI-ECA requirements and Procedure F-5-5 requirements.

Environmental Education

Public education and awareness campaigns have always been an important and highly visible component of the City's wastewater activities. City staff participated in the annual Niagara Children's Water Festival held at Brock University. Last year, the festival was held from April 30 to May 3 and provided engaging presentations and activities focused on water themes, with approximately 3,620 students attending in person.

In addition to public education initiatives, the City has targeted awareness campaigns related to specific concerns, such as specific messaging to restaurants and residential areas about the proper disposal of fats, oils, and grease.

Rain Barrel Subsidy

On Sept. 14, 2024, the City held its 17th annual rain barrel sale for residents. Approximately, 160 rain barrels were subsidized for sale, at a cost of $60 each. It is estimated that the installation of each new rain barrel removes 1.2 m^3 of stormwater annually, and that approximately 20 per cent are installed on properties serviced by a combined sewer, with the rest being installed on properties serviced by fully or partially separated sewers. On average each rain barrel is filled six times per year (Region of Waterloo).

2024 Annual Wastewater Activities

Weeping Tile Disconnection

The Flood Alleviation (FLAP) is a grant program that subsidizes the cost of installing flood prevention devices (e.g. a backwater valve) on qualifying residential properties. Requirements of the program include disconnecting weeping tile connections from the sanitary sewer lateral of the home and redirecting them to a sump pump, as well as disconnection of the home's downspouts as required by St. Catharines Sewer Use By-Law. In 2024, 79 homes applied to the FLAP program, with 19 homes having flood prevention devices installed.

In 2024, as part of the FLAP, the weeping tiles / foundation drains of 13 homes connected to the sanitary sewer system, were removed and the flows redirected to the surface via a sump pump. Weeping tiles are known to be a significant source of inflow and infiltration into the combined sewers and removing these flows from private properties results in significant system improvements. It is estimated that the installation of each new sump pump removes 110 m^3 annually from the combined sewer system. Grant expenditures on this program were approximately $70,000 not including staff time and other internal resources.

Weeping tiles are also disconnected in some infill projects. In recent years, there were several infill projects where existing residential houses are demolished, and new units are built. In other cases, existing sewer laterals were repurposed. The current building code does not allow weeping tile connections to sanitary or combined sewers, instead a sump pit and pump are installed which directs flows overland (typically). While infill developments create an increase in sanitary flows, the wet weather flows from the weeping tile connections are significantly reduced. In 2024, three (3) properties were demolished, and the sewer laterals were removed / capped. In addition, five (5) other properties had their sewer lateral repurposed (i.e. weeping tile directed to a sump pit).

Operations and Maintenance Activities

Inspection and maintenance activities are critical programs, designed to capture deficiencies, and proactively mitigate issues. The City has a variety of maintenance and inspection activities, to ensure sewer assets are operating as designed. These programs help identify operational issues and keep sewer assets in good working order. A summary of these initiatives can be found in Table 1.

2024 Annual Wastewater Activities

Table 1: Inspections, Maintenance, and Service Requests

Inspections, Maintenance Programs and Service Requests		
Type	**Frequency**	**2024 Comments**
CCTV Sewer Inspections	Inspections based on budget	9.8 km
Sewer Flushing and Cleaning Program	Flushed once every five years	Annual Sewer Flushing by City staff and / or contractor. Annual budget: $260,000
Main Sewer Repairs	As needed, sewers requiring immediate repairs	Annual Sewer Repair by City staff and / or contractor. Annual budget: $290,000
Emergency Response - Main Sewer Surcharging	As reported, mainly due to grease and stone build-up during wet weather events	40 Service requests

2024 Annual Wastewater Activities

Inspections, Maintenance Programs and Service Requests		
Emergency Response - Sewer Lateral	As needed, includes both private and public sewer laterals	290 Service requests
Sanitary Sewer Related Public Complaints	As reported	11 Complaints
Suspended Sewer Inspections	Visual inspection twice a year	2 Inspections
Sewer Lateral Replacements	As requested	79 Connections
Combined Sewer Overflow Inspection and Maintenance	Visual inspection or flushed	Inspected Monthly by staff
Wet Weather Storage Facilities (WWSF)	Annual Inspection	Inspected / monitored by staff and / or contractors as required
Sewage Pumping Station	Annual Inspection	1 Inspected
Equipment Calibration and Maintenance	Annual Inspection	All equipment inspected / monitored by staff as required

2024 Annual Wastewater Activities

CCTV Sewer Inspections

The City administers a closed-circuit television (CCTV) sewer inspection program for sanitary sewers. The use of CCTV technology allows a thorough examination of the sanitary collection system to ensure early and effective detection of any potential issues such as damaged pipes and potential blockages. The information garnered from the CCTV inspections help inform maintenance, repair and rehabilitation programs.

Sewer Flushing and Cleaning Program

The City has an annual sewer flushing program. Components of this program include cycle flushing, annual flushing, and semi-annual flushing. Cycle flushing is the City's regular flushing program which is intended to clean the entire system. Sewers up to a diameter of 525mm are flushed once every five (5) years, while sewers greater than 525mm are flushed as needed. The annual and semi-annual components of the program are specifically implemented to address areas of the system with known performance concerns which are susceptible to blockages and debris such as grease, stone, and infrastructure issues (e.g. flat sewers). Information from the flushing program is evaluated as needed and reviewed at the end of each program cycle.

As part of the annual flushing program, inspection manholes (MHs) are opened and inspected. Manholes adjoined to pipes up to 525mm diameter are inspected and cleaned as needed once every five years and those greater than 525mm are cleaned as needed.

Through normal operational activities, as well as a review of the flushing program information, areas of the wastewater system are then identified for enhanced maintenance. This is often the result of hardened grease deposits or calcite in the pipes which cannot be entirely or effectively removed by flushing activities. These locations are then scheduled for reaming activities as required. The 2024 budget for the program was $260,000.

Main Sewer Repairs

Regular operations activities as well as the CCTV program identify locations where immediate repairs are required to sections of the sewer system. The 2024 budget for the program was $290,000.

Emergency Response - Main Sewer Surcharging

In 2024, City staff responded to 40 main sewer surcharge events. These events were generally the result of debris such a grease or stone reducing capacity in the system during wet weather. The City's typical response to these issues is to remove the debris through flushing and vacuuming the impacted sections of sewer and restore the normal flow.

2024 Annual Wastewater Activities

Emergency Response - Sewer Laterals

In 2024, the City responded to 290 requests for service due to blocked sewer laterals (including both public side and private side deficiencies). Blocked drains normally occur when debris or roots affect the ability of residential wastewater to drain properly to the main sewer. This can cause wastewater to backup into the house or building, resulting in basement flooding.

Sanitary Sewer Related Public Complaints

The City receives various service requests and complaints from the public. All complaints are investigated, and corrective actions were performed as required. In 2024 the City received 11 complaints regarding the wastewater system. These included odour complaints and loose manhole covers. These complaints were in addition to the various service requests (e.g. blocked sewer laterals) noted elsewhere in this report.

Suspended Sewer Inspections

The St. Catharines wastewater system has eight (8) elevated or suspended sewers. These sewers cross over sensitive areas such as watercourses. These sewers are visually inspected twice a year to ensure they remain in good working order.

Sewer Lateral Replacements

In 2024 the City repaired or replaced 79 service connections to the wastewater system. These activities were either undertaken by the City or were completed by private contractors. Issues with service connections are most often identified due to blocked drain calls, inspections due to reported basement flooding and other regular operations activities.

Combined Sewer Overflow Inspections and Maintenance

St. Catharines regulators are regularly inspected by City staff. Any that cannot be safely visually inspected are included on the enhanced flushing list. Operational issues are dealt with on an ongoing basis as they are identified, and as budgetary allocations allow.

Wet Weather Storage Facility Operation and Maintenance

The City owns and operates nine (9) wet weather storage facilities. Seven (7) of these facilities are equipped with submersible pumps, six (6) of which operate in manual mode and one (1) operates in automatic mode. The water levels of these facilities are regularly monitored, and the water is pumped back into the sewer system as needed. A couple of the facilities provide inline storage. This refers to a secondary sewer pipe that holds capacity during a wet weather event. The remainder are offline facilities, that store capacity and return flows to the main sewer when they are no longer surcharged. Additional details for these facilities are shown in Table 2. The location of these facilities is shown in Appendix A.

Table 2: Wet Weather Storage Facilities 1 of 2

Facility Name	Asset ID	Location	Type	Capacity[1]	Year[2]
Corbett Avenue	STOT220	Corbett Avenue Within Road Allowance	Inline	450 m^3	1992
Guy Road	STOT121	Guy Road Park 61A Duncan Dr.	Offline	2,770 m^3	2007
Lakeside Park	STOT180	Lakeside Park Parking Lot	Inline	700 m^3	1994
Walkers Creek	STOT123	Walkers Creek Park 142A Parnell Rd.	Offline	400 m^3	2003
Kernahan Park	STOT122	Kernahan Park 381 Queenston St.	Offline	600 m^3	2004
Welland / Ontario	STOT140	12 Mile Creek Valley 2 Welland Ave.	Offline	7,000 m^3	2006
Lockview	STOT120	Lockview Park 28A Rochelle Dr.	Offline	2,800 m^3	2007

2024 Annual Wastewater Activities

Facility Name	Asset ID	Location	Type	Capacity[1]	Year[2]
Capner / Oakdale	STOT103	Former Canal Valley 166 Westchester Cres.	Offline	1,000 m^3	2007
Glengarry	STOT240	Glengarry Park 63 Glengarry.	Offline	3,300 m^3	2021

Notes: 1 - Storage Capacity in cubic metres | 2 - Year the facility was commissioned

2024 Annual Wastewater Activities

In April 2024, the City received complaints of odour in proximity of the Welland / Ontario (STOT140) facility. Upon inspection, it was determined that an electrical failure had occurred, and work was carried out to replace the associated electrical components. The odour issue was resolved as a result.

In September 2024, inspections were conducted on the pumps in three (3) of the wet weather storage facilities, including those at Guy Road Park (STOT121), Welland / Ontario (STOT140), and Capner / Oakdale (STOT103). The pumps at Welland / Ontario and Guy Road Park were deemed to be in acceptable condition, while the pump at Capner / Oakdale was found to be in poor condition. As a result, a rental pump was installed at Capner / Oakdale until a replacement pump can be installed in 2025.

Additionally, Guy Road Park has encountered ongoing issues with rags becoming entangled in the pump impeller, as well as electrical issues, which have hindered its operations. Solutions to these challenges will be further investigated in 2025.

Condition assessments for each wet weather storage facility are scheduled to commence in 2025.

Sewage Pumping Station

The City owns and operates one sewage pumping station located on Nadine Crescent. This pumping station services an area of approximately two hectares (serving 10 single detached properties). The station is connected to a forcemain of which discharges into the sanitary sewer on Erion Road.

Equipment Calibration and Maintenance

All in-house monitoring equipment is calibrated / verified as per manufacturer's recommendations.

Staff utilize the Ventis MX4 Gas Meters to conduct atmospheric testing before entering a confined space or opening manholes. These multi-gas monitors are capable of detecting oxygen, carbon monoxide, hydrogen sulfide and combustible gases. All meters are verified prior to daily use, using the bump testing method with methane, according to manufacture specification. These meters are also calibrated by a third party on an annual basis.

Preventative maintenance is scheduled for all equipment at regular frequency (frequency depends on the equipment and type of maintenance).

2024 Annual Wastewater Activities

Several of the City's wet weather storage facilities are outfitted with backflow devices. These devices protect the drinking water system from contamination and are installed in accordance with the Ontario Building Code and "CAN / CSA-864.1 0-94 Manual for the Selection, Installation, Maintenance and Field Testing of Backflow Prevention Devices", as amended from time to time. These devices are inspected and tested annually to ensure they are in good working condition, by certified City staff.

Figure 5: Glengarry Road CSO Tank

2024 Capital Works Projects

Authorized Alterations

Under the CLI-ECA, the City is pre-authorized for alterations to the existing works including changes, additions and extensions. These pre-authorized alterations are completed in accordance with conditions in the CLI-ECA and guidance materials titled 'Design Criteria for Sanitary Sewers, Storm Sewers and Forcemains for Alterations
Pre-authorized' under a CLI-ECA.

Pre-Authorized Requirements

There are various requirements that must be met for pre-authorization including sewer capacity checks for both City and Regional sewers (if identified), permission if connecting into another system (e.g. connecting to a regional trunk) and works requiring Niagara Peninsula Conservation Authority permits and / or approvals.

Significant Drinking Water Threat Assessment Report

All Proposed Alterations to the Wastewater Collection System are required to complete a Significant Drinking Water Threat (SDWT) Assessment Report. The City must ensure that any alteration to the Authorized System(s) is designed, constructed, and operated in such a way as to be protective of sources of drinking water in Vulnerable Areas as identified in the Source Protection Plan. A copy of the SDWT Assessment Report can be found in Appendix C.

Direct Submissions

Activities that alter or modify the City's Wastewater Collection System and have not been included as a pre-authorized condition in the CLI-ECA, require an amendment or direct submission to the Ministry for approval. The City did not require any direct submissions in 2024.

2024 Capital Works Projects

Sanitary Sewer Improvement Projects

In 2024, the City completed a number of sanitary sewer improvements with overall sanitary sewer improvement project expenditures of $1,430,000. In addition, the City cost shared one sanitary sewer project in conjunction with Regional roadworks, with the Regional Municipality of Niagara. This information was derived from capital works projects completed in 2024. A summary of budgeted projects is included in Appendix D.

Storm Sewer Projects

In 2024, the City invested $996,000 into a number of storm sewer projects. These capital investments resulted in improvements to the system specifically to reduce stormwater impacts in these catchments. In addition, the City cost shared one storm sewer project in conjunction with Regional roadworks, with the Regional Municipality of Niagara. A summary of budgeted projects is included in Appendix D.

2024 System Monitoring Activities

Rainfall and Sewer Flow Monitoring Program

The City uses site-specific flow monitoring data to help characterize system functionality on an as-needed basis for development planning and to validate sewer works. The City conducted flow monitoring at three locations in the wastewater collection system from October to December 2024. Monitors were installed on a temporary basis to allow City staff to calibrate flow modelling software, and to identify areas of significant inflow and infiltration for future examination. The City also operates four SmartCover type sewer monitors. These are level sensors specifically designed for monitoring flows in sanitary sewers.

In 2024, the City retained GEI Consultants Canada Ltd. (GEI) to complete an analysis of the wastewater system and included rainfall analysis. For F-5-5 requirements rainfall data is analyzed for the period of April to November. Table 3 summarizes the total rainfall volume, maximum one-hour volume and maximum 24-hour volume for the seven-month period of April to November (F-5-5 Reporting Period).

2024 System Monitoring Activities

Table 3: Rainfall Summary compared to a Typical Year

		Typical Year	2024	Difference
St. Catharines – North[1]	Total (mm)	463.5	530.50	+14.5 per cent
	Max 1-hr (mm)	26.5	20.75	-21.7 per cent
	Max 24-hour (mm)	41.75	44.75	+7.2 per cent
St. Catharines – South[2]	Total (mm)	599.0	589.25	-1.6 per cent
	Max 1-hr (mm)	25.5	37.25	+46.1 per cent
	Max 24-hr (mm)	60.0	61.75	+2.9 per cent

Notes: 1 – As measured at the Port Dalhousie WWTP Climate Station | 2 – As measured at Niagara Region's Environmental Centre Climate Station | 2014 is used as a Typical Year

In north St. Catharines comparing the 2024 rainfall to a Typical Year, the 2024 total precipitation is 14.5 per cent greater, the maximum 1-hr rainfall is 21.7 per cent lower, and the maximum 24-hr rainfall is 7.2 per cent greater.

In south St. Catharines comparing the 2024 rainfall to a Typical Year, the 2024 total precipitation is 1.6 per cent lower, the maximum 1-hr rainfall is 46.1 per cent greater, and the max 24-hr rainfall is 2.9 per cent greater.

2024 System Monitoring Activities

Master Servicing Study

The City of St. Catharines has initiated a Sanitary Master Servicing Study. This Study will be a comprehensive assessment of the City's existing sanitary and combined sewer collection system to establish short-term and long-term vision, strategy, and policies to support the management and enhancement of sanitary and combined sewer collection system infrastructure. The Sanitary Master Servicing Study will determine and optimize future sanitary sewer infrastructure needs within the City of St. Catharines through to 2051 and beyond. This Study will be developed to align with Niagara Region's Master Servicing Plan.

Pollution Prevention and Control Plan

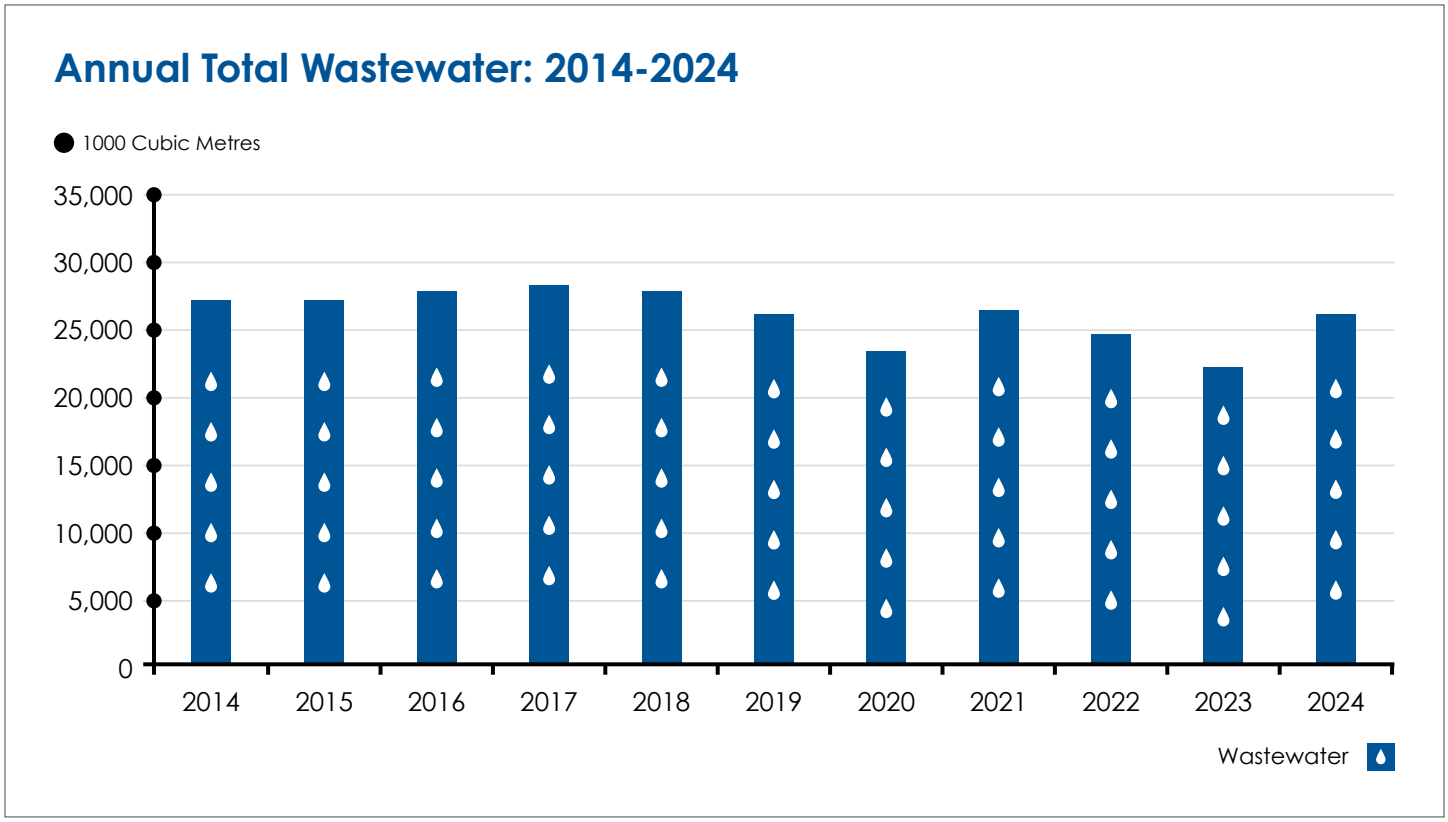
A Pollution Prevention and Control Plan (PPCP) was originally developed in 1990 and included a number of recommendations aimed at reducing combined sewer overflows. The PPCP has subsequently been updated with the most recent occurring in 2024. This plan evaluates and summarizes the structural and non-structural work that has been done to date; evaluate alternatives to reduce the volume and frequency of CSOs; and provide long-term strategies for the effective management of the wastewater collection system.

2024 System Performance

Annual Wastewater Treatment Plant Flows

In 2024, the St. Catharines contribution of annual flow to the wastewater treatment plants was 19,097 Mega Litres (ML). The annual wastewater flows in St. Catharines has slightly decreased over the past decade. These flows vary significantly over time due to a number of factors including annual precipitation. Figure 4 illustrates the annual flows to the wastewater treatment plants from 2014 to 2024.

Figure 6: St. Catharines Annual Wastewater Flows to Treatment Plants



2024 System Performance

Procedure F-5-5 Conformance

MECP Procedure F-5-5 outlines several controls to be implemented in relation to combined sewer overflows which are evaluated to measure combined system performance. The City's implementation status with relation to those controls can be found in Appendix E.

Each CSO location has a static overflow point, which happens automatically in the event of sewer surcharging. Currently, none of the overflows are monitored in real time. Overflow volumes are estimated using an all-pipes hydraulic sewer model. The Province of Ontario is in the process of developing additional guidance on CSO monitoring.

In 2024, the City retained GEI to perform a hydraulic sewer model simulation of the wastewater collection system. This included undertaking a continuous simulation of the sewer system for the F-5-5 time period. The annual simulation of the model provides data with regards to the number of combined sewer overflow events, as well as volumes. Table 4 lists total CSO volumes and percent capture by year from 2021 to 2024 based on the model results. Typically, approximately 99 per cent of all flows are sent to one of the two wastewater plants to be treated.

Table 4: Combined Sewer Overflow Volumes in St. Catharines

	2021	2022	2023	2024
Total CSO Volume	100,000 m^3	102,000 m^3	84,000 m^3	236,000 m^3
System Cature	99.2 per cent	99.2 per cent	99.4 per cent	98.8 per cent

In 2024, the City captured 98.8 per cent of all wastewater flows, with 1.2 per cent the flow being discharged to the environment from combined sewer overflows. Annual CSO volumes can vary significantly from year to year as they are heavily dependent on the magnitude and pattern of rainfall.

2024 System Performance

Sewage Spills

St. Catharines strives to maintain and operate wastewater infrastructure so that spills to the environment do not occur. However, there are circumstances that arise where a spill occurs due to equipment malfunction, failure, or other reasons. All spills are reported to the MECP Spills Action Centre upon discovery and to the Region of Niagara's Public Health Department. Spills are investigated and written reports are submitted to the MECP and (when required) Environment and Climate Change Canada, as required by legislation.

In 2024, the City reported six wastewater spills to the Spills Action Centre. All incidents were resolved promptly with no adverse affects to the natural environment or human health, and no further issues are outstanding.

2024 System Performance

Public Reporting

Public reporting is conducted through various social media platforms. Additionally, public reporting is posted on the City's public website at www.stcatharines.ca

Information publicly reported includes:

- Annual Performance Reports
- Emergency repairs requiring road closures
- Water – Wastewater Budgets and Financial Plans
- Capital Programs and Asset Management Plans
- Upcoming / Ongoing construction projects (e.g. sewer rehabilitation projects)
- Environmental Assessments and related studies posted publicly on EngageSTC at www.engagestc.ca/

2025 Planned Activities

Planned 2025 Programs, Activities and Maintenance

The City will continue to monitor, improve, and eliminate flows to the combined sewer system. Table 5 summarizes the various activities that the City will continue to implement for 2025, which includes system monitoring activities and programs, environmental education and public outreach activities and operations and maintenance activities. The City has approved a multi-year budget for 2024, 2025 and 2026. The approved capital budget investment for sanitary sewer is:

- $9.4 million in 2024
- $8.8 million in 2025
- $9.6 million in 2026

A copy of the approved multi-year capital budget can be found on the City of St. Catharines website. https: / / www.stcatharines.ca / en / council-and-administration / resources / Documents / Budgets / 2024-to-2026-Multi-Year-Capital-Budget.pdf

2025 Planned Activities

Table 5: Planned 2025 Programs, Activities and Maintenance

System Monitoring Activities	
Project	**2025 Budget**
Sewer System Update	Ongoing
Rainfall and Sewer Flow Monitoring Program	Ongoing
Sewer Sampling	Ongoing
Extraneous Flow Elimination	$52,500
Pollution Control Priority Program	$1,000,000
Sewershed Analysis	$10,500
Sanitary Sewer Capital Works	$8.8 million

Environmental Education and Outreach Activities	
Project	**2025 Budget**
Environmental Education	Ongoing
2025 Rain Barrel Program	$32,000
Flood Alleviation Program	$152,000

2025 Planned Activities

Operation and Maintenance Activities	
Project	**2025 Budget**
Sewer Flushing – Operations - Contractor	$254,500
Sewer Flushing – Operations - City	$10,700
Sewer Spot Repair – Operations	$60,760
Sewer Replacement – Operations	$49,490
Emergency Cleaning Main Sewer – Operations	$26,720
Sanitary Sewer Spot Repair Program	$262,500
Sanitary Sewer Reaming and Lining	$525,000
Sewer CCTV Inspections	$315,000

Additional Information: No additional information has been requested by the Niagara District MECP office.

Summary

The City of St. Catharines operates a Class 1 Wastewater Collection System servicing approximately 144,800 residents.

This report details 2024 activities including system maintenance, capital investments, monitoring, and compliance efforts. A wide variety of activities were undertaken with budget approval and expenditures of over $9.4 million. A copy of the approved Water and Wastewater Budget for 2024 to 2026 can be found posted on the City of St. Catharines website at https: // www.stcatharines.ca / en / council-and-administration / resources / Documents / Budgets / 2024-to-2026-Multi-Year-Water-and-Wastewater-Budget.pdf. These activities demonstrate the City of St. Catharines is in full compliance with the various CLI-ECA requirements.

Several metrics were used to assess the wastewater collection system in 2024. Notably 98.8 per cent of all wastewater flows were captured and treated, with 1.2 per cent of wet weather flow being discharged to the environment from combined sewer overflows. While there have been considerable improvements to the wastewater collection system over time CSOs still occur on a regular basis. This underscores the persistent nature of CSO issues and the long-term challenge they present. Continued efforts are required to fully meet the objectives of Procedure F-5-5 and eliminate the impact of CSOs on the environment.

It is important to note some of the CLI-ECA requirements are phased in and not all the requirements are in place at this time. As additional requirements come into effect and additional information becomes available this will be reflected in future annual reports.

Moving forward, the City will maintain ongoing system improvements, capital investments, and regulatory compliance efforts to ensure the long-term sustainability and efficiency of the wastewater collection system.

For further details, visit www.stcatharines.ca

Notice

Please note that every reasonable effort has been made to ensure the accuracy of this report and it contains the best available information at the time of publication. In the event that errors or omissions occur, the online report will be updated. Please refer to the online report for the most current version.

ECA Number: **023-W601**
Wastewater System Number: 120003619

City of St. Catharines

Wastewater Collection System

March 2025

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