



**To:** COUNCIL  
**Meeting Date:** 4/15/2025  
**Subject:** 2024 Wastewater System Performance Report  
**Submitted By:** Jason Alexander, Manager of Wastewater  
**Prepared By:** Jason Alexander, Manager of Wastewater; and  
David Cattrysse, Utility Compliance Technologist  
**Report No.:** 25-007-IFS  
**File No.:** C11  
**Wards Affected:** All Wards

### **RECOMMENDATION(S):**

THAT Report 25-007-IFS 2024 Wastewater System Performance Report be received for information.

### **EXECUTIVE SUMMARY:**

#### **Purpose**

To provide the Ministry of the Environment, Conservation and Parks (MECP), and Council with an annual update on the status of the City of Cambridge's (City's) Wastewater Collection System for 2024, in compliance with the City's Consolidated Linear Infrastructure Environmental Compliance Approval (CLI-ECA).

#### **Key Findings**

#### **System Description:**

- The City of Cambridge operates 19 pumpstations, 563 km of sanitary pipe, 8,236 manholes and 40,785 sanitary services in the Wastewater Collection System with a total replacement value of \$857M.
- 40,786 commercial and residential sanitary service connections are maintained by the City.
- The System is operated by 15 wastewater collection operators, 1 wastewater technologist, and overseen by 1 supervisor and 1 manager.

## Monitoring Data:

- The Region of Waterloo, through the efforts of OCWA, treated 15,761,105 m<sup>3</sup> of sewage, up from 15,139,650 m<sup>3</sup> treated in 2023.
- Inflow and Infiltration (rainwater/groundwater entering the collection system) has been estimated to be roughly 2,396,213 m<sup>3</sup> (15.2%), compared to 3,077,463 m<sup>3</sup> (20.3%) in 2023, a 5.1% reduction year over year.
- The City received and investigated 1,125 pump station alarm notifications of varying severity, down from 1,357 alarms in 2023.
- Additional reporting for the retired Newton Landfill can be found in Appendix A: Newton Landfill Leachate Collection System Annual Sampling Report.

## Emergency Responses and Corrective Actions:

- 15 wastewater main blockages occurred in 2024, with 6 (40%) blockages discovered through proactive grid checks. In comparison, 18 blockages occurred in 2023, with 9 (50%) discovered through grid checks.
- Backup power generation was needed once in 2024 to maintain continual pump station operations because of 1 loss-of-power scenario of 6 or more hours.
- 42 pump faults/failure events occurred at pump stations in 2024, with 8 (19%) of these events requiring reactive maintenance.
- A Wastewater Quality Management System Audit was performed in April 2024 yielding zero (0) non-conformances, four (4) opportunities for improvement, and four (4) staff suggested opportunities for improvement.

## Preventative Maintenance:

- 2,488 sanitary mains (147 km) were flushed, up from 2,241 (136 km) in 2023.
- 6298 (76.1%) maintenance holes were inspected, up from 5,122 (62%) in 2023.
- 715 sanitary mains (39km) were inspected by CCTV video inspection. 93% of the Wastewater Collection System has now been completed by video inspection.
- 9 sanitary main repairs were completed in 2024.
- Todd St. Siphon trunk main cleaning project restored system integrity at a vital location in the City's Wastewater Collection System.

### **Customer Feedback:**

- 204 sanitary service blockage calls were received in 2024, down from 237 calls in 2023.
- 31 sanitary service repairs were made, 21 by Environmental Services staff and 10 by third-party contractor, up from 28 sanitary service repairs in 2023.
- 19 sanitary odour complaints were investigated, with 3 requiring remedial action.
- 7 sewer surcharge rebates were issued, saving commercial customers a total of \$71,689.

### **System Alterations:**

- 6 modifications to the wastewater system were approved through the City's CLI-ECA process.
- 3,131 m of sanitary pipe replaced, up from 1,433 m in 2023.
- 3,789 m of new sanitary pipe installed, compared to 3,473 m in 2023.
- King St. pump station reconstruction was initialized in 2024, costing \$815, 800 to date. Construction to be completed early 2025.

### **Spills:**

- 50 environmental spills were responded to in 2024 costing \$26,882 in City staffing and equipment, up from 43 spills worth \$13,707 in 2023.
- Sewage overflow (public and private) accounted for 5 spills in 2024.

### **Financial Implications:**

The 2024 operational budget for Wastewater was \$38,871,800. The budget increased by \$2.213M in 2025 for a total of \$41,084,900.

## **STRATEGIC ALIGNMENT:**

Strategic Action

**Objective(s):** Choose an Objective

**Strategic Action:** Choose a Strategic Action

**OR**

Core Service

**Program: Wastewater**

**Core Service:** Wastewater Network Maintenance

The maintenance and operation of the City's Wastewater Collection System is a core service and supports the continued growth and health of the community. The Wastewater Section of the Environmental Services Division oversees all annual maintenance activities related to the Wastewater Collection System and is designated as the system's "Operating Authority".

## **BACKGROUND:**

The City's Wastewater CLI-ECA was placed into effect on September 29, 2022. Starting with the 2023 calendar year, the City shall prepare an Annual Performance Report for the MECP which includes a summary of required monitoring data, action items/corrective actions, maintenance and repairs, customer feedback, system alterations, and spills. This report shall be made accessible to Council, as well as the public.

The City's Wastewater Quality Management System (WWQMS) was placed into effect on October 22, 2023. The WWQMS is based off the Drinking Water Quality Management Standard (DWQMS) and requires annual reporting of the continuing suitability, adequacy, and effectiveness of the WWQMS to Council to encourage transparency, as well as support informed decision making in relation to all matters concerning the wastewater collection system.

The City's Wastewater Annual Performance Report both complies with the City's CLI-ECA requirements and conforms with the City's WWQMS system processes.

## **ANALYSIS:**

### **System Description:**

The City of Cambridge Wastewater Collection System is primarily a gravity-based system comprised of 19 pumpstations equip with approximately 16.5 km of force mains discharging to 4 geographically separated treatment facilities run by the Ontario Clean Water Agency (OCWA) on behalf of the Region of Waterloo. Environmental Services is considered the system's Operating Authority and employs 15 wastewater collection operators and 1 wastewater technologist, overseen by 1 wastewater supervisor and 1 wastewater manager. Operational staff currently operate the Wastewater Collection System as well as assist with some Stormwater Management duties.

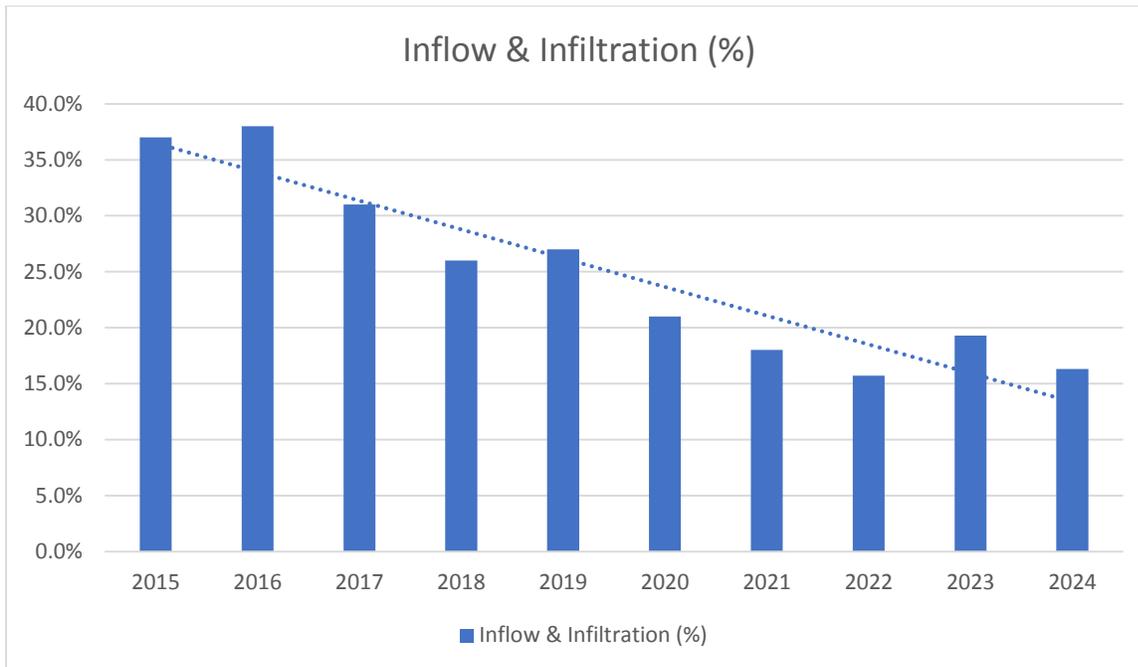
Within the wastewater collection system there is roughly 563 km of sanitary pipe, including approximately 560 km of City owned pipe and 3 km of pipe owned by the Region of Waterloo. The City maintains and operates all sanitary pipe within the city. There are 8,260 manholes which allow environmental service employees access to the collection system, 8 siphons which aid wastewater flow in topographically challenging areas, and approximately 40,786 commercial and residential service connections. The total asset replacement value of the wastewater collection system is approximately \$857M.

### **Monitoring Data:**

Over the course of 2024 the City's Wastewater Collection System discharged 13,203,301 m<sup>3</sup> of sewage to 4 geographically separated treatment facilities, compared to 12,223,364 m<sup>3</sup> discharged in 2023. The Region of Waterloo and their treatment plant operator, OWCA, treated 15,761,105 m<sup>3</sup> of sewage, leading inflow & infiltration (rainwater/groundwater entering the collection system) to be calculated at roughly 2,557,804 m<sup>3</sup> (16.2%). This is a significant reduction compared with the 2,916,285 m<sup>3</sup> (19.3%) of the 15,139,650 m<sup>3</sup> treated in 2023.

The City continues to prioritize projects and preventative maintenance designed to minimize inflow and infiltration, leading to a steady decrease as seen in **Figure 1**.

**Figure 1 – Inflow and Infiltration**



All 19 of the City’s pumpstations are continuously monitored by a Supervisory Control and Data Acquisition (SCADA) system. The SCADA system can be used to observe, control, or change various aspects of the pumping stations remotely, and will send alarm notifications during abnormal events that deviate from set alarm ranges. The City received and dealt with 1,125 pumpstation alarm notifications of varying severity in 2024, down from 1,357 in 2023. The severity of each alarm is observed on a case-by-case basis by Environmental Services staff. Alarms may indicate brief parameter fluctuations, notification of operational activity, loss of cellular communication, or issues requiring reactive maintenance. The SCADA system’s historian monitors and tracks wet-well pumping levels, pump start/stop events and pump station alarms, amongst other parameters, and is reviewed daily by Environmental Services staff.

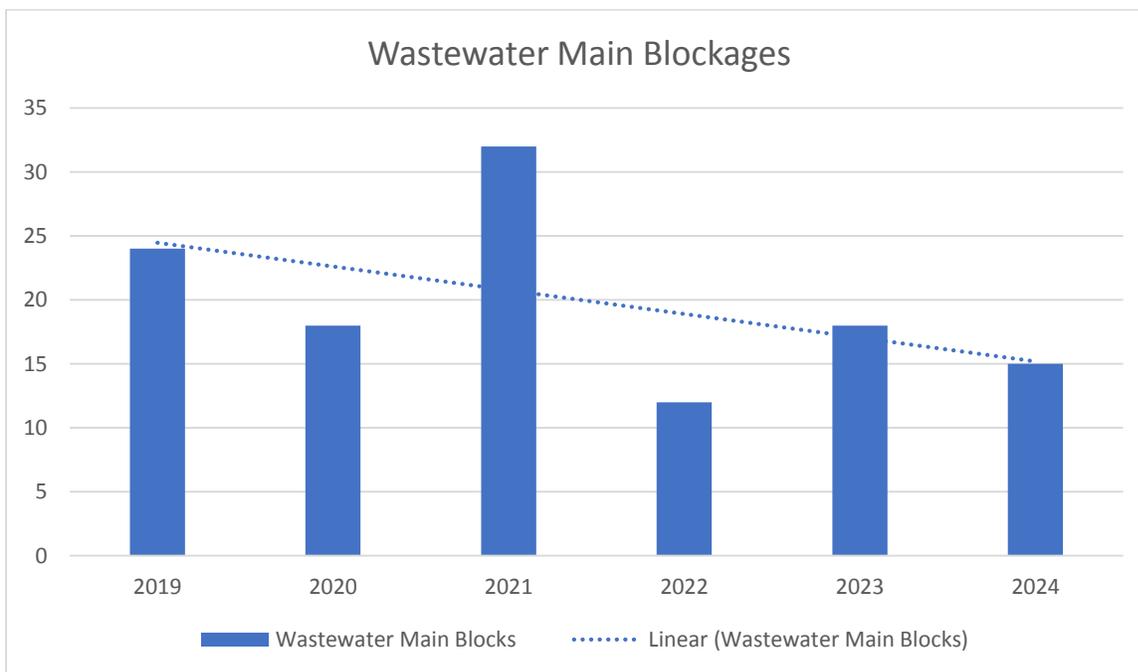
The City monitors the Newton Landfill Leachate Collection System (LCS) through the third-party efforts of Civica. Sampling data for the Newton Landfill LCS can be found in Appendix A: 2024 Newton Landfill Leachate Collection System Sampling Report.

**Operational Problems and Corrective Actions:**

Environmental Services defines “operational problem” as an exceptional circumstance which may directly affect the City’s ability to provide safe and reliable sanitary service for customers including, but not limited to, main blocks/collapse, emergency pipe/service failure, force main repairs, pump failures, and extended power failures.

The City’s main flushing preventative maintenance schedule has helped prevent large blockages from occurring in recent years. In 2024 the City experienced 15 wastewater main blockages, seen in **Figure 2**, down from 18 in 2023. Through proactive grid checks the city was able to locate 6 (40%) of these blockages before they became emergencies, down from 9 (50%) in 2023. The City used a variety of methods to clear all main blocks including rodding, flushing, and if necessary, replacement. An additional 2 potential main blockages were tracked, investigated, and ruled out by Environmental Services staff in 2024, as the increased sewer volumes were caused by unrelated acute inflow situations.

**Figure 2 – Wastewater Main Blockages**



The City has a variety of emergency power sources to ensure individual pumpstations are able to continuously function during loss of power scenarios. Over the course of 2024, the City experienced 1 loss of power scenarios which lasted over 6 hours, down from 4 in 2023.

An array of operational and environmental concerns can result from pump faults and failures within the City’s pumpstations. Environmental Services received and investigated 148 alarms from its SCADA system indicating 42 events involving pump faults, pump failures, and excessive pump cycling at various pumpstations. The results of these alarms vary from operational activity such as cycling power on pumps for preventative maintenance, to brief telecommunication signal losses between the station and the SCADA monitoring system, to actual pump failures requiring the pumps to be

pulled from their wet well for reactive maintenance. These 42 events yielded 8 incidents requiring pumps to be pulled out for reactive maintenance.

The City maintains force mains for each pumpstation. Additional planning and pumpstation diversion are required when isolating force mains for repairs to avoid operational and environmental concerns. There were zero (0) force main repairs during 2024 for the City.

Future operational problems and corrective actions may be located, tracked, and addressed by the City through self-regulated WWQMS requirements including internal audits and top management reviews. The City completed its 2024 WWQMS Internal Audit on April 7, 2024. The audit was conducted by Acclaims Environmental, an independent third-party auditor, and was supported by the City's Environmental Services staff. The objective of the audit was to determine whether the City's WWQMS conformed, where applicable, to the MECP's DWQMS standard. Through this exercise zero (0) non-conformances, four (4) opportunities for improvement, and four (4) staff suggested opportunities for improvement were identified. All opportunities for improvement were documented, followed up on, and resolved by Environmental Services staff. The City conducted its 2024 WWQMS Top Management Review on February 19, 2025. The review evaluated the suitability, adequacy, and effectiveness of the City's WWQMS during 2024.

### **Preventative Maintenance:**

The City has established a preventative maintenance schedule to help reduce operational problems before they occur within the Wastewater Collection System.

The City has implemented a weekly flushing program that has Environmental Services staff flush and clear sanitary mains in an organized grid to break up any potential small blockages before they can expand into larger operational problems. In 2024, Environmental Services staff flushed approximately 2,488 sanitary pipes, or roughly 147 km of the City's Wastewater Collection System, up from 2,241 (136 km) in 2023.

Environmental Services staff perform weekly manhole inspections as part of the Wastewater Collection System's preventative maintenance schedule. Of the 8,260 manholes within the Wastewater Collection System, Environmental Services staff inspected 6,298 (76.2%), up from 5,122 (62.0%) inspected in 2023. These manhole inspections allow Environmental Services staff to assess sanitary flow, observe potential issues within the Wastewater Collection System, and provide information for future works.

The integrity of the City's sanitary pipes is an important aspect of the Wastewater Collection System as the City aims to avoid blockages, leaks, or infiltration events which

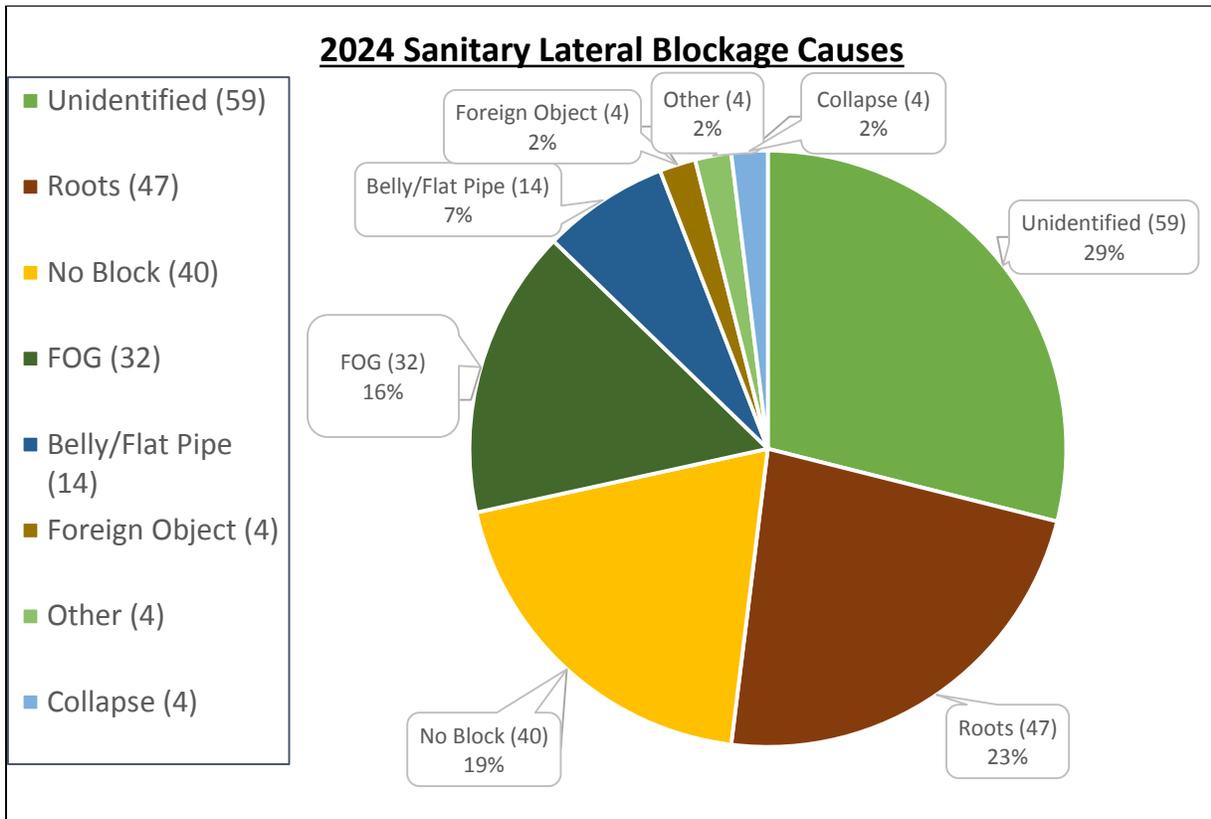
may cause larger operational problems. CCTV technology allows Environmental Services staff to assess pipe integrity, identify potential issues for future works, and observe blockages without disruption to customers. Environmental Services staff inspected 715 sanitary pipes, or roughly 39 km of the City's Wastewater Collection System, with CCTV cameras in 2024. The City has now documented 93% of the wastewater collection system on camera with the help of Environmental Service's staff.

Environmental Services, through the efforts of Aquatech, performed preventative maintenance on the trunk main supplying the Todd St Siphon. The project aimed to clear out numerous obstructions within the trunk main, and involved diverting sanitary flow from Waterside Ave, bypassing the Todd St Siphon inlet, and continuing flow from Todd St towards Dayton St. The project was a success, and helped maintain the integrity of the City's Wastewater Collection System at a vital location.

### **Customer Feedback:**

Environmental Services staff promptly investigated 204 sanitary service blocks in 2024 compared to 237 in 2023. These investigations yielded 145 (71.1%) blockages on the public side, compared to 188 (79.3%) in 2023. Environmental Services staff addressed and helped clear all customer blockages occurring on the public side through a variety of methods including rodding, CCTV inspections, flushing, and if necessary, sanitary service repairs. Over the course of 2024 the City assisted customers with 31 sanitary service repairs, 21 completed by Environmental Services staff, and 10 contracted out to third parties. The most common cause for sanitary blocks in 2024 were unidentified sources (minor blocks that dissipate after minimal staff intervention), roots from nearby vegetation, as well as fats, oils, and greases (FOG) as seen in **Figure 3**.

**Figure 3 – 2024 Sanitary Lateral Blockage Causes**



Environmental Services' staff investigated 19 odour complaints on behalf of City customers in 2024, up from 14 in 2023, with 3 complaints requiring additional actions within the Wastewater Collection System including removal of sedentary debris, sanitary flushing, and by-law intervention. Explanations of potential causes, along with advice for remedial actions are provided to homeowners with each investigation.

Commercial and industrial facilities may be eligible for participation in the City's sewer rebate program which reduces their wastewater charges where process water is not directed to the collection system. For example, volumes of water that leave a facility in the form of steam to the atmosphere may be measured and refunded to a business. In 2024 the City provided 7 sewer rebates to customers for a total bill reduction of \$71,689.

**System Alterations:**

Six (6) projects involving modifications to the wastewater system were evaluated through the City's CLI-ECA process in 2024. Reviews are performed through collaboration between Environmental Services and Engineering departments, and projects required explicit approval before proceeding.

In 2024 the system grew by approximately 0.5%, the equivalent of 3.8 km of new sanitary pipe. An additional 3.1 km of pipe were replaced. 30 maintenance holes, and 240 new services were also added to support residential and industrial growth.

King Street pump station underwent a complete rebuild in 2024 including foundational repairs to the pump station and wet well, as well as new pumps, piping, valving, electrical controls, amongst other minor additions. The project remains underway with completion expected in 2025.

**Spills:**

Environmental Services staff responded to 50 individual environmental spills in 2024, compared to 43 in 2023. The total cost of the City’s 2024 spill response was \$26,882, up from \$13,707 in 2023. There were 26 (52%) billable spill responses in 2024 accounting for \$20,378 (76% of City costs). The City dealt with a diverse range of spills including various oil/gas-based substances, concrete slurries, and both public and private sewage overflows. A list of 2024 sewage overflow can be seen in **Table 1**.

**Table 1 – 2024 Sewage Overflows**

Item No.	Date Remedied	Address	Estimated Volume
1	2024/04/02	2340 Fountain St N	Unknown
<p>SAC Ticket No. 1-5CIRPU</p> <p>High water table caused a septic bed to become saturated, causing an unknown quantity of sewage to mix with groundwater, ultimately ending up in a culvert. Septic tank was completely emptied, homeowner to fix the septic bed.</p>			
Item No.	Date Remedied	Address	Estimated Volume
2	2024/04/26	426 Hespeler Rd	~15 Gallons
<p>SAC Ticket No. 1-6A5H13</p> <p>Private sanitary lateral block caused approximately 15 gallons of sewage to seep out of a maintenance hole making its way into a private storm catch basin. Parking lot was cleaned, blockage was cleared, catch basin was cleaned out with a Vactor truck. Sewage was contained to the catch basin, and did not reach level of outlet pipe.</p>			

Item No.	Date Remedied	Address	Estimated Volume
3	2024/06/17	375 Sheldon Dr	Unknown
<p>SAC Ticket No. 1-7POGRX</p> <p>Porta Potty tipped over into a ditch, spilling its contents. Unknown amount of sewage travelled 10' down a culvert. Spill blocked from travelling further down the culvert and cleaned up with a Vactor truck.</p>			
Item No.	Date Remedied	Address	Estimated Volume
4	2024/10/23	1360 Hespeler Rd	~100,000 L
<p>SAC Ticket No. 1-CFBRMQ</p> <p>Constant flow of approximately 100,000 L due to a failure within the private Ontario Provincial Police pump station over a 19-month period. Wet well was emptied completely, and the area was sand bagged off to prevent further contamination. An environmental assessment has been ordered by MECP.</p>			
Item No.	Date Remedied	Address	Estimated Volume
5	2024/12/19	255 Ainslie	Unknown
<p>SAC Ticket No. 1-F2ACE3</p> <p>Sanitary main block occurring on Elliot St surcharged into 255 Ainslie St. Homeowner's sump pump discharged sewage back out onto the road and into the stormwater system. Block was resolved; storm sewer line cleaned with Vactor truck.</p>			

**EXISTING POLICY / BY-LAW(S):**

**City of Cambridge Wastewater Quality Management System Policy**

As the owners and operators of the City of Cambridge's wastewater collection system we are committed to:

- Providing safe and reliable sanitary service to our consumers while preventing environmental pollution.

- Complying with all legal requirements and wastewater regulations.
- Maintaining and continually improving our Quality Management System.

**FINANCIAL IMPACT:**

The 2024 operational budget for Wastewater was \$38,871,800. The budget increased by \$2.213M in 2025 for a total of \$41,084,900.

**PUBLIC VALUE:**

This report provides public information relating to the status of the 2024 Wastewater Collection System.

**ADVISORY COMMITTEE INPUT:**

N/A

**PUBLIC INPUT:**

This report has been posted to the City’s website with the agenda in advance of its submission into the Council Information Package.

**INTERNAL / EXTERNAL CONSULTATION:**

Internal consultation was completed with Finance, Asset Management, Engineering and Building Divisions.

**CONCLUSION:**

As referenced in the City of Cambridge CLI-ECA, Cambridge has met and continues to meet all legislative requirements and continues to improve and sustain its Wastewater Collection System.

**REPORT IMPACTS:**

Agreement: **No**

By-law: **No**

Budget Amendment: **No**

Policy: **No**

**APPROVALS:**

**This report has gone through the appropriate workflow and has been reviewed and or approved by the following as required:**

**Director**

**Deputy City Manager**

**Chief Financial Officer**

**City Solicitor**

**City Manager**

**ATTACHMENTS:**

1. 25-007-IFS Appendix A – 2024 Newton Landfill Sampling Report