INFORMATION REPORT

TO:	Chair and Members Public Works Committee
COMMITTEE DATE:	June 14, 2021
SUBJECT/REPORT NO:	Enhanced Inspection and Monitoring - Hamilton Water and Wastewater (PW21019) (City Wide) **(Outstanding Business List Item)**
WARD(S) AFFECTED:	City Wide
PREPARED BY:	Nick Winters (905) 546-2424 Ext. 1474 Susan Girt (905) 546-2424 Ext. 2671
SUBMITTED BY: **SIGNATURE:**	Andrew Grice Director, Hamilton Water Public Works Department 

COUNCIL DIRECTION

Council at its meeting of November 27, 2019 approved General Issues Committee (2020 Rate Budget) Report 19-025. Report 19-025 included a motion to add five (5) additional Full Time Equivalent Rate Supported staff to the Hamilton Water budgeted complement consisting of: four (4) staff to improve the routine physical inspection and preventative maintenance programs for Hamilton Water infrastructure including water and wastewater treatment plants, pumping stations, reservoirs, water towers, well systems and combined sewer overflow tanks; and, one (1) staff to sample and analyse water and wastewater quality, and equipment/process related data. That same motion included the following:

(b) That staff be directed to report back to the PWC 1 year after the implementation of the additional 5 FTEs for the maintenance of the water and wastewater facilities/equipment and water quality control with information regarding the program improvements and the associated benefits that have been realized; and,

(d) That staff be directed to report back to PWC in 6 months with a matrix, stakeholder/partnership arrangements and testing locations, as it relates to enhanced inspections and monitoring for Hamilton Water and Wastewater.

INFORMATION

This report is responsive to items (b) and (d) from the 2019 motion. The new Full Time Equivalents (FTE) were used to create the Enhanced City of Hamilton Outstation (ECHO) Program and the Surface Water Quality Program (SWQP), each of which are described in detail below. In addition, this report provides information regarding other recently completed inspections at the City's Combined Sewer Overflow (CSO) facilities and resulting actions/improvements.

Enhanced City of Hamilton Outstation Program:

Four (4) of the FTEs approved by Council were used to staff the ECHO Program, which consists of a multi-disciplinary team tasked with completing regular thorough inspections and preventative maintenance at the City's water and wastewater treatment plants, pumping stations, reservoirs, water towers, well systems and combined sewer overflow tanks. The ECHO team is made up of one (1) Maintenance Operator, one (1) Millwright, one (1) Electrician, and one (1) Instrumentation Technician. The ECHO team is responsible for looking at a facility or process area as a whole to verify its operational functionality instead of focusing on preventative maintenance of individual components. This includes reviewing the process control narrative (PCN), SCADA (Supervisory Control and Data Acquisition) set points, Environmental Compliance Approval (ECA) requirements, asset information, and the facility/process standard operating procedure (SOP).

In 2020 and early 2021, the ECHO team has been coordinated by different Superintendents and Supervisors as available. Moving forward, the coordination of the ECHO team will transition to a newly created Maintenance Project Manager that was created utilizing a vacant FTE. The work of the ECHO team is also supported by other core SCADA staff, Quality and Health and Safety staff, and other subject matter experts on an ongoing basis.

The ECHO team was organized over the early part of 2020. This included planning and organizing the ECHO Program structure and responsibilities, the ECHO team technical/position structure, and creating the new positions. Unfortunately, none of the newly created positions were filled in 2020, partially due to complications introduced by the COVID 19 Pandemic, and partially due to other staffing departures (retirements, etc.). However, in order to get the program moving, staff from other areas of the operation were freed-up for periods of time to begin the ECHO program inspections. The first inspection began on Tuesday, August 18, 2020 at the Main/King CSO station. Over the following four (4) months the team completed inspections at 28 different locations, including all of the City's CSO tanks and CSO facilities. Several repairs have already been made enhancing the dependability of these critical facilities. A list of locations inspected is attached to Report PW21019 as Appendix "A". A sample of work

orders that have resulted from the ECHO inspections is attached to Report PW21019 as Appendix “B”.

Progress with the ECHO Program has slowed since December 2020, due to a large number of staffing vacancies, but ECHO inspections have been completed for an additional 18 locations as of April 30, 2021.

Key initiatives for 2021 include: filling the newly created Maintenance Project Manager position; filling a number of other staffing vacancies (Maintenance Operators, Millwrights, Electricians, and Instrumentation Technicians), so that resources are available to support the ECHO Program 5 (five) days per week and without upsetting other operational programs; completing the procurement of vehicles and other equipment to fully outfit the ECHO team; and developing formal documentation and processes for the team including detailed work orders, inspection checklists, and standard operating procedures.

Surface Water Quality Program (SWQP):

On June 22, 2020 a Water Quality Technologist (WQT) was hired by the Hamilton Water, Environmental Monitoring and Enforcement Unit (EME) to support the development of a SWQP of the watercourses in the City of Hamilton.

During 2020, the implementation of the SWQP included:

- Inventory of watercourses
- Inventory of Hamilton Water’s stormwater and wastewater infrastructure assets
- Review of key internal and external background data
- Identification and communication with key internal and external stakeholders
- Development of the Surface Water Quality Program Framework

Meetings were held with staff from Hamilton Water and Public Health Services, and external stakeholders throughout 2020 and 2021 in the development of the Surface Water Quality Program Framework.

External Stakeholders Contacted:

Hamilton Conservation Authority (HCA)	Royal Botanical Gardens (RBG)
Conservation Halton (CH)	Bay Area Restoration Council (BARC)
Environment Hamilton	Redeemer College
Grand River Conservation Authority (GRCA)	Niagara Peninsula Conservation Authority (NPCA)
Hamilton Harbour Remedial Action Plan (HHRAP)	Ministry of Environment, Conservation and Parks (MECP)
Environment Canada and Climate Change (ECCC)	

The following potential external stakeholders will be contacted in 2021:

- ArcelorMittal Dofasco
- Department of Fisheries and Oceans (DFO)
- Friends of Cootes to Escarpment EcoPark System
- Indigenous Communities
- McMaster University
- Ministry of Natural Resources and Forestry (MNRF)
- Ministry of Transportation (MTO)
- Mohawk College
- Stelco
- Stewards of Cootes Watershed
- Stewards of Redhill Watershed
- Transport Canada (TC)

To date, the following actions have been completed:

- Inventory of Receiving Water Bodies/Watercourses (Hamilton Harbour, Cootes Paradise, Chedoke Creek, Red Hill Creek and Grindstone Marsh).
- Verification of Hamilton Water's Wastewater Asset Inventory List (CSO Storage Facilities, Flow Regulators, CSO Outfalls, Sewage Pumping Stations, Cross-Connections) including Stormwater Collection and Treatment Systems.
- Prior to April 2021, four (4) locations were sampled by EME at Chedoke Creek. Current sampling now includes four (4) additional locations at Chedoke Creek and five (5) locations at Red Hill Valley Creek, including Albion Falls. This sampling program will expand to include other proposed locations in consultation with stakeholders in 2021.
- Development of the Geographic Information System (GIS) Surface Water Monitoring Map, which currently includes water quality data for the Chedoke

Creek, Red Hill Creek and Albion Falls. The map is updated monthly and is available on the City's Website (https://www.hamilton.ca/home-property-and-development/water-sewer/surface-water-quality-program).

- Stakeholder Memorandums of Understanding (MOUs) have been drafted and are in the process of being signed by the respective stakeholders.

The Surface Water Quality Program Framework is under development in 2021. The framework is the starting point for the City in gaining a holistic understanding of its receiving waters and the impacts from various assets within the wastewater collection and treatment systems. It highlights Hamilton's major receiving water bodies, wastewater collection and treatment systems, internal and external stakeholder engagement and a three-phased approach of program implementation. With this framework, Hamilton's goal is to build a wider baseline understanding of water quality over time, develop open communication and transparency with various stakeholders, and respond to and investigate any water quality anomalies that may be a result of wastewater infrastructure, throughout Hamilton's Watersheds.

In Q3 2021, the draft Surface Water Quality Program Framework will be sent to the stakeholders for their review and feedback. Finalization of the framework may lead to an expansion of the Monthly Surface Water Sampling Program, with new sampling locations in identified high risk areas.

In early 2022, the first annual Surface Water Quality Report will be prepared for 2021, outlining the technical components of the SWQP, such as sampling points, water quality, trends and areas of concern identified throughout the year.

The addition of five (5) FTE's to the Hamilton Water complement is providing better visibility in the field and is setting the groundwork for a watershed management approach. However, as we move forward with a more comprehensive wastewater quality management system, developing a long-term strategy for watershed management, and planning for capital rehabilitation of aging infrastructure, additional resources may be required to support the program. Any additional staffing requirements will be brought forward as part of future Water, Wastewater, and Stormwater Rate budget deliberations.

Other CSO Facility Improvements:

Hatch was retained to identify options to improve monitoring and redundancy of critical equipment. Capital cost estimates are identified for the implementation of all options, and recommendations are made for where improved monitoring is beneficial and what option HW should implement for the identified equipment/locations.

Generally, the recommendations fall into four (4) categories:

1) Install redundant (back-up) sensors on critical gates that will help to remotely identify if a gate is not moving.
2) Install pressure sensors on air bladders that 'seal' critical stop gates.
3) Install new flow measurement devices or relocate existing flow measurement devices.
4) Relocate water quality sampling equipment (and in some cases eliminate sampling equipment where the resulting laboratory data is not valuable).

The study was finalized in Q2 2020 and staff has implemented a pilot installation of redundant (back-up) sensor for a critical gate at the Woodward Avenue Wastewater Treatment Plant and the results are promising to date.

HW staff also worked with AECOM throughout 2020 on the CSO Outfall Monitoring Feasibility Study (Study). The Study was undertaken to determine the feasibility and estimated costs for fully monitoring the unmonitored and partially monitored CSO locations that are not associated with CSO facility discharges. The results of the Study were reported to the May 3, 2021 Public Works Committee (Report PW19091(b)).

Next steps include combining the recommendations from the Hatch and AECOM reports to develop a capital program and corresponding budget for implementation. It is anticipated that this capital program will be included in the 2022 Water, Wastewater and Storm Rate Budget for approval, with engineering design beginning in 2022, followed by capital construction.

APPENDICES AND SCHEDULES ATTACHED

Appendix "A" to Report PW21019 - Summary of 2020 ECHO Program Inspections

Appendix "B" to Report PW21019 - Sample of 2020 ECHO Program Work Orders