



City of Hamilton **Watershed Action Plan**

2024

AECOM

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Land Acknowledgement

The City of Hamilton is situated upon the traditional territories of the Erie, Neutral, Huron-Wendat, Haudenosaunee and Mississaugas. This land is covered by the Dish With One Spoon Wampum Belt Covenant, which was an agreement between the Haudenosaunee and Anishinaabek to share and care for the resources around the Great Lakes. We further acknowledge that this land is covered by the Between the Lakes Purchase, 1792, between the Crown and the Mississaugas of the Credit First Nation.

Today, the City of Hamilton is home to many Indigenous people from across Turtle Island (North America) and we recognize that we must do more to learn about the rich history of this land so that we can better understand our roles as residents, neighbours, partners and caretakers.

1. Introduction

The City of Hamilton Watershed Action Plan (Plan) will help to improve the health of watersheds within the City of Hamilton (City) and progress towards delisting Hamilton Harbour as an International Joint Commission Area of Concern.

For many years, investments have been made by the City into reducing point-source pollution in Hamilton Harbour through the Clean Harbour Program, which supports the Hamilton Harbour Remedial Action Plan. Now, the Clean Harbour Program will expand to include this Plan which will identify and guide work to address non-point-source pollution and will focus on activities that are within the care and control of the City.

The Plan is a strategic and collaborative effort to address the complex challenges facing watersheds within the City. It is informed by extensive engagement with internal City departments and external community partners, including Conservation Authorities, government agencies, non-governmental organizations, academic institutions, Indigenous peoples, and the public.

The Plan outlines the historical condition of Hamilton Harbour, the evolution in design standards, and the current status of the harbour, highlighting the need for concerted efforts to address non-point sources of pollution. It includes actions that are the City's responsibility that address one or more of the five objectives detailed in the Plan. More specifically, these actions will aim to reduce pollutants like phosphorus and nitrogen, improve stormwater management systems, promote green infrastructure, change policies, improve biodiversity, and foster community engagement in sustainable water management practices.

What is a Watershed?

A watershed is an area of land that drains rainfall and snowmelt into streams and rivers which then flow into a larger body of water such as a lake or harbour. Healthy watersheds are important and beneficial to both humans and the environment. Healthy watersheds can improve water quality, control flooding, and increase biodiversity amongst many other benefits.

All watersheds in Hamilton drain into the Great Lakes, waterbodies that are essential to humans, as they contain a fifth of the world's fresh surface water supply and the largest freshwater ecosystem on Earth. The water quality and the Great Lakes' ecosystem health are assessed by the [State of the Great Lakes](#). Overall, water quality of the Great Lakes is rated as "fair".



View of Hamilton Harbour from Sam Lawrence Park.
PHOTO City of Hamilton

From this Plan, actions will be prioritized, a financial strategy developed, and timelines established. By implementing the recommended actions, the long-term goal is to enhance the health of Hamilton Harbour, local marshes, and surrounding tributaries, ensuring they support nature, recreation, and flood management while fostering a City that takes pride in its healthy waters.

1.1 Addressing Point-Source and Non-Point-Source Pollution

Point-source pollution refers to pollution that comes from a single, identifiable source. Many of the actions undertaken to date to improve water quality of watercourses within the City and Hamilton Harbour have been focused on point-sources of pollution, such as waste from industries and wastewater treatment plants. In fact, the City has made large investments and a number of important contributions to reducing and preventing point-source pollution within our waterways over the past 20 years through the Clean Harbour Program.

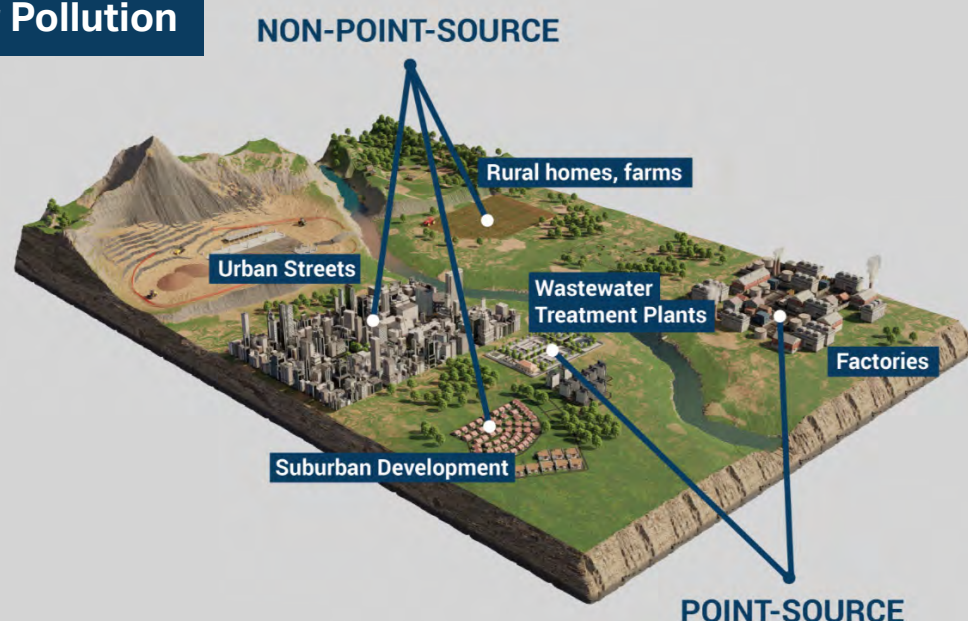
For the first time in 100 years, water quality in Hamilton Harbour is now most influenced by stormwater runoff or non-point-source pollution. One of the main reasons for this change is the addition of tertiary treatment at the Woodward Wastewater Treatment Plant in 2023.

Non-point-source pollution is harder to identify because it does not originate from a single,

discrete source but rather from many places. Non-point-sources of pollution can come from things like water that runs off urban streets, commercial parking lots, construction sites, or agricultural lands after a period of rain, picking up contaminants or soils as it flows into a nearby ditch or catch basin and ultimately into local watercourses, marshes and lakes.

The City of Hamilton Watershed Action Plan is the City's plan to address non-point-sources of pollution in Hamilton's watersheds. To determine where environmental actions would be most impactful, the City and its community partners have long-term monitoring programs to identify the waterways that are most degraded. This data will be supplemented by information from Conservation Authorities and other partners to drive pollutant hot-spot identification and help ensure that the Plan's actions are implemented in the most effective way possible.

Sources of Water Pollution



1.2 Watersheds in Hamilton

Hamilton covers a large geographical area and contains many watersheds and sub watersheds. These watersheds are shared between several municipalities and are regulated by local Conservation Authorities, specifically Conservation Halton, the Hamilton Conservation Authority, the Niagara Peninsula Conservation Authority and the Grand River Conservation Authority.

The watercourses that flow through the City and drain to Cootes Paradise, Hamilton Harbour, directly into Lake Ontario, and to Lake Erie, have been found to have varying levels of surface water quality, with numerous watersheds ranking as very poor or poor, according to the 2023 Watershed Report Card evaluation developed by Conservation Ontario. With respect to Cootes Paradise and Hamilton Harbour specifically, the Chedoke Creek and Red Hill Creek subwatersheds have been determined to be the most impacted in terms of water quality.



Algal Bloom at Bayfront Park. PHOTO City of Hamilton

What is a Watershed Action Plan?

A Watershed Action Plan is a framework to guide decisions and actions to protect, restore and enhance natural resources to support healthy and resilient communities.

What's the difference between the City's Watershed Action Plan and the Conservation Authorities' watershed-based resource management strategy?

The City can enhance its environmental stewardship by tackling issues that are contributing to environmental impact, as a result of the City's policies, operation and maintenance practices, or capital projects. The Plan focuses on the localized area within the boundaries of the municipality, considering the unique characteristics and challenges of this local watershed.

The Conservation Authority resource management strategy is mandated by provincial legislation to ensure that programs and services address watershed-wide issues. This holistic approach considers the interconnectedness of the entire watershed and mainly focuses on broader initiatives like flood management, and erosion control.



Conservation Authorities within the City of Hamilton Boundary

What is surface water quality?

Surface water quality refers to the condition of water found in lakes and rivers. It is assessed based on various chemical (e.g., nutrients, metals and pollutants), physical (e.g., temperature and suspended solids) and biological parameters (e.g., E. coli and algae) to determine its suitability for different uses,

such as drinking, recreational activities and supporting aquatic life.

The City monitors water quality through the [Surface Water Quality Program](#) to better understand and mitigate City infrastructure impacts on receiving waters.



Spencer Creek. PHOTO Royal Botanical Gardens

1.3 Community Partner Engagement and Public Outreach

1.3.1 Community Partners

Collaboration is an important part of the Hamilton Harbour remediation efforts, and this Plan is informed by extensive engagement with a variety of internal City departments and external community partners. Since 2022, a Liaison Committee has served as a forum for collaboration between the City and partners involved in the protection of the local watershed, including Hamilton Harbour, marshes and surrounding tributaries. Members of the Liaison Committee provided input and recommendations to support the development

of the Plan. This included identifying actions, the evaluation methodology, and informing the public engagement process. One-on-one meetings with other community partners provided a platform for in-depth discussions, allowing for a diverse range of feedback that was important to informing the Plan's actions.

Community Partners

City of Hamilton Departments

Public Works

Planning and Economic
Development

Healthy and Safe
Communities

Bay Area Restoration Council

Hamilton Harbour Remedial Action Plan

Non-Governmental Organizations

Environment Hamilton

Green Venture

Conservation Authorities

Hamilton Conservation
Authority

Conservation Halton

Niagara Peninsula
Conservation Authority

Grand River
Conservation Authority

Government Agencies

Environment and
Climate Change
Canada

Ministry of the
Environment,
Conservation and
Parks

Ontario Ministry of
Transportation

Fisheries and Oceans
Canada

Indigenous Peoples and Communities

Six Nations of the
Grand River

Mississaugas of the
Credit First Nation

Members of the urban
Indigenous community

Academic Institutions

McMaster University

Redeemer University

Mohawk College

1.3.2 Public Engagement

Public input was an important factor in developing the City of Hamilton Watershed Action Plan. During the engagement phase in the spring and summer of 2024, the City collected insights from the public through virtual meetings, participation in local events and a City-wide online survey. This input helped the City understand the community's priorities and align the proposed actions with the community's interests. This helps to ensure that the Plan addresses public needs and concerns about Hamilton Harbour and our watersheds.

What We Heard (Key Survey Results)

97% of survey respondents feel that Hamilton Harbour, our waterbodies and natural environment are either very important or important.

Priority concerns, issues and actions based on survey responses are presented below. They are ranked from highest to lowest.

Community concerns about Hamilton Harbour, our waterbodies and natural environment:

1. Water quality (e.g., pollution or algal blooms)
2. Loss of wildlife habitat (e.g., terrestrial and aquatic)
3. Water quantity (e.g., flooding or erosion)
4. Access to recreation

Water **quality** issues that should be addressed

1. Combined sewer overflows
2. Runoff from roads (e.g., oil, sand, salt)
3. Runoff from land surface (e.g., soil, fertilizer, pesticides)
4. Algal blooms
5. Debris or litter

Water **quantity** issues that should be addressed

1. Lack of stormwater absorption methods
2. Lack of stormwater control policies
3. Shoreline erosion
4. Flooding

Actions that the City of Hamilton should take to help improve and protect Hamilton Harbour, our waterbodies and natural environment

1. Enhancing green infrastructure
2. Strengthening pollution control regulations
3. Supporting habitat restoration projects
4. Making changes to City practices
5. Educating the community about rural and urban stormwater and its impacts to the overall health of watersheds

1.4 Studies and Reports that Informed the Plan

The actions and recommendations outlined in the Plan are informed by task groups, multiple related studies and reports, as described below. Additional actions, not included in existing studies were solicited from internal and external partners. Just as nature is dynamic, our planning and action must also be dynamic. The need or opportunity for additional actions that are currently not outlined in the Plan may arise in response to pressures like development, regulatory, policy, climate and technological changes. Consequently, measures have been enacted to support continual adaptation as implementation of the Plan unfolds. Of the identified actions to date, some require funding and Council approval (Appendix A Table 1) and some are already funded as they have received approval (Appendix A Table 2).

To support the change in impact from point-source to non-point-source pollution, three (3) task groups were established by the Hamilton Harbour Remedial Action Plan (HHRAP) in 2014, as outlined in sections 1.4.1 to 1.4.3 below. Each task group focused on a different source of pollution and consisted of multiple community partners including representation from the Conservation Authorities and federal, provincial and municipal governments. The task groups outlined recommendations for each community partner to implement, including the City, to support tackling impacts from stormwater runoff.

1.4.1 Urban Runoff Report and Recommendations (2016, Updated 2020)

The task group provided recommendations to transition to Low Impact Development (LID) techniques to improve water quality, including updating manuals, expanding training, and implementing LID practices in urban

planning and construction. There were also recommendations for managing stormwater on private properties, including maintenance and incentive programs for LID adoption.

1.4.2 Rural Runoff Task Group Recommendations (2017)

The task group focused on rural runoff contributing to the eutrophication, particularly focusing on phosphorus (often associated with fertilizer) and sediment levels. Recommendations targeted initiatives in the Spencer Creek and Grindstone Creek watersheds and included monitoring, identifying high-contributing areas, and engaging with landowners for stewardship projects. Overall, the recommendations emphasized the need

for collaborative efforts between various community partners to reduce phosphorus and sediment runoff from rural land uses.

1.4.3 Erosion and Sediment Control on Active Construction Sites Task Group Recommendations (2016)

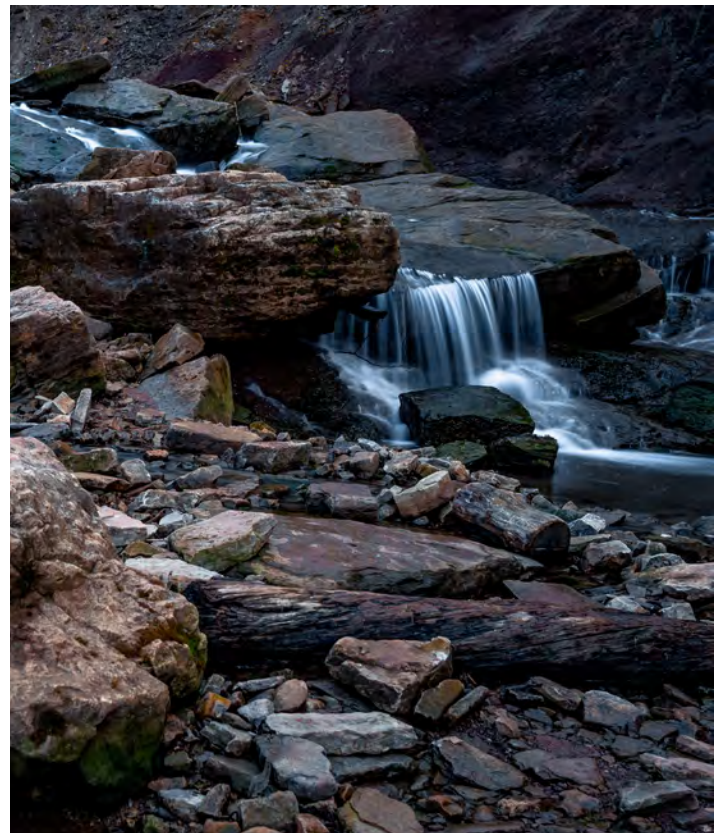


Sediment Control Fencing. PHOTO City of Hamilton

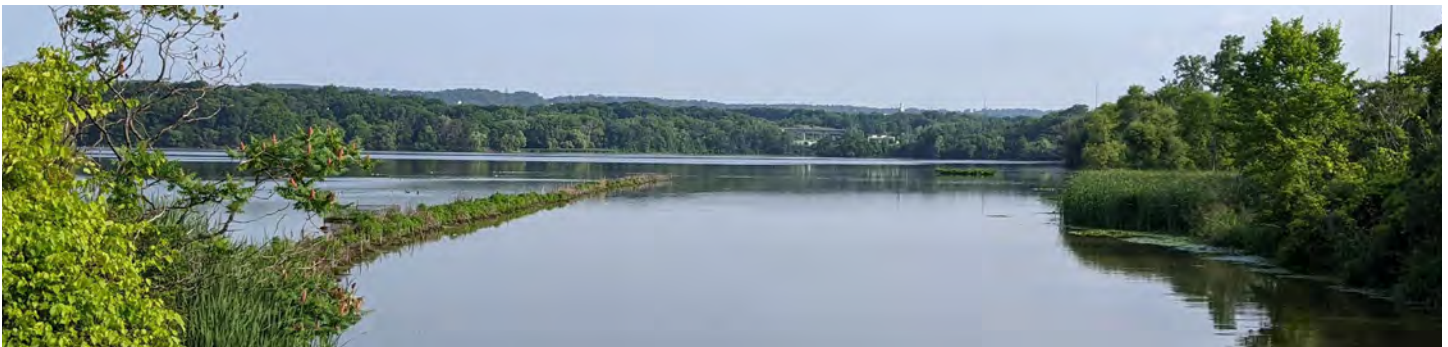
The task group outlined recommendations for improving erosion and sediment control (ESC) practices during construction, emphasizing education and training in ESC, fostering collaboration among municipalities, Conservation Authorities, and other community partners, and ensuring compliance with ESC measures. By continuously improving ESC practices at construction sites, the Plan aims to mitigate the impact of stormwater runoff on water quality to achieve lasting positive outcomes for the environment and the community.

1.4.4 Chedoke Creek Water Quality Improvement Framework Study (2021)

The study outlines a framework for improving water quality in Chedoke Creek following the 2014-2018 combined sewer discharge event from the Main-King combined sewer overflow tank. It covers historical issues related to water quality and conditions during the discharge event. The study objectives aim to consolidate existing information and recommend solutions for water quality improvements. These objectives focus on non-point-sources, point-sources, and the creek itself. The framework also establishes management objectives, including visions for Chedoke Creek and Cootes Paradise, along with performance indicators for monitoring progress. Additionally, the document considers a range of preventative, mitigative, and restorative solutions, prioritizing them based on their potential effectiveness in meeting the project goals. Many recommendations from the study have been expanded City-wide as there are common issues in many urban watercourses across the City.



Chedoke Falls in Hamilton. STOCK PHOTO



Mouth of Chedoke Creek within Cootes Paradise. PHOTO City of Hamilton.

1.4.5 Grindstone Creek Watershed- Natural Asset Management (2022)

The comprehensive report on the Grindstone Creek Watershed Natural Assets Management Project, by the Natural Asset Initiative, details an initiative to enhance municipal infrastructure through the valuation and management of natural assets. The report outlines the project's goals, such as sustainable service delivery and climate-resilient infrastructure and acknowledges financial support from various organizations. It emphasizes the importance of natural assets in providing essential services and the need for their inclusion in financial

planning and asset management programs. The report also discusses the local context, including geographical features, land uses, and risks related to the watershed. It highlights the project's outcomes, like the development of an interactive natural asset inventory and modelling to assess flood reduction roles. Finally, it offers recommendations for policy review, collaborative watershed management, and continuous improvement in natural asset management practices.

1.4.6 Hamilton Flooding and Drainage Improvement Framework (2022)

This framework outlines a comprehensive strategy to manage and enhance the City's combined sewer system. Initiated in summer 2021, the framework aims to address flooding and drainage issues by developing a long-term strategy. Key objectives include understanding the sewer system's configuration, identifying contributors to flooding, and prioritizing solutions. The vision is to create a robust wastewater and stormwater collection system that minimizes flooding, enhances public safety, and adapts to climate change. The approach involves short-term conveyance improvements and storage infrastructure, alongside a long-

term strategy for managed sewer separation. The implementation plan spans from 2022 to 2032, with a preliminary budget of over \$1 billion. This foundational document sets the stage for future actions to improve resilience against flooding and environmental outcomes in the City. Most of the recommendations in this report are point-source projects such as the elimination of combined sewers. As such, many of the recommendations from this report have not been brought into the Plan's action list but will be addressed through other City initiatives.

1.4.7 Hamilton's Climate Change Action Strategy (2022)

The Hamilton Climate Change Action Strategy (HCCAS) outlines a series of actions, prioritized as short-term, medium-term, and long-term, to mitigate climate risks and adapt to changing conditions. These actions involve community engagement, infrastructure resilience, and public health measures. City teams leading the Climate Change Action Strategy and this Plan will continue to collaborate to ensure that resources are used efficiently, and efforts are aligned towards common goals.



Cootes Paradise. PHOTO AECOM

1.4.8 Hamilton Biodiversity Action Plan (2023)

The Hamilton Biodiversity Action Plan (BAP) was created in April 2023 and serves as a multi-community partner strategy to protect and enhance the natural environment for future generations. The BAP includes actions related to policy, regulatory programs, and on-the-ground initiatives across various organizations. The BAP aims to protect biodiversity, explore and learn about it through partnerships, connect policies and processes to support biodiversity, and restore it through stewardship activities. Key Priority #6 from the BAP is directly related

to this Plan, it states "Enhance local aquatic habitats through sustainable stormwater management practices and restoration of degraded watercourses, waterbodies, and wetlands." There are numerous actions related to this priority, many of which are already funded or on the Plan's list of pending actions and the respective City teams will continue to collaborate to achieve the shared priorities.



Spencer Creek in Webster Falls Conservation Area. STOCK PHOTO

2. Vision, Goal and Objectives

2.1 City of Hamilton Watershed Action Plan Vision and Goal

Vision: Helping Hamilton become a City that is proud of its healthy waters that support nature, recreation, and flood management, and realized through the City's commitment to environmental stewardship.

Goal: With the support of community partners, the City will plan and implement targeted actions that address non-point-sources of pollution and will contribute to the health of Hamilton Harbour, marshes and surrounding tributaries, enhance public engagement, and foster sustainable watershed management practices.

2.2 City of Hamilton Watershed Action Plan Objectives and Actions

To achieve the Plan's vision and goal, the City will work towards addressing five objectives by implementing associated actions. These actions were developed through the HHRAP, reports completed by the City and through partner engagement (see Sections 1.1 and 1.4) and are grouped into three main categories:

Capital/Study

**Operations and
Maintenance**

Policy/ Program

The actions were further split into pending actions (meaning those that need resources; Appendix A Table 1) and funded actions (meaning those that have the necessary resources; Appendix A Table 2). The City will implement the pending actions based on their potential impact and the availability of resources. The impact was determined through the support of the Liaison Committee and an evaluation matrix that assessed the environmental, economic and social impact of each pending action. The length of time that a pending action will take to implement once prioritized has been divided into three categories:

Short term:

Actions that can be implemented in 1-3 years

Medium term:

Actions that can be implemented in 3-6 years

Long term:

Actions that can be implemented within 6+ years

Each action addresses one or more of the five objectives of the Plan, as described below.

Objective 1: Pollution Reduction

- Implement effective strategies to significantly reduce non-point-source pollution entering watercourses, marshes, and Hamilton Harbour.
- Prioritize actions that address critical pollutants such as phosphorus and nitrogen, sediment, and contaminants from urban runoff and agricultural activities.

Task Groups from the Hamilton Harbour Remedial Action Plan have detailed that for the first time in 100 years that the quality of water in Hamilton Harbour is most impacted by non-point-source pollution issues, specifically watershed runoff. No longer is the harbour water quality most determined by industrial or domestic wastewater inputs. For this reason, one of the City's key objectives is to support non-point-source pollution reduction to continue improving water quality within the City and in Hamilton Harbour.

Examples of Related Actions:

- **Review the inventory of watercourse erosion sites and prioritize remedial action:** Prioritize sites based on the risk

to natural ecosystems, including water quality degradation, loss of riparian habitat (the transitional area between aquatic and dry habitats) and sedimentation impacts downstream.

- **Desjardins Canal sediment investigation:** Investigate the Desjardins Canal near the Dundas Wastewater Treatment Plant outlet and review options for reducing the amount of phosphorus entering the waterbody and moving downstream into Cootes Paradise. This requires sediment investigations to study the nutrient pooling (a process called "eutrophication") in the waterbody.



Deposition Site from Erosion in Sydenham Creek.
PHOTO City of Hamilton

Objective 2: Infrastructure & Operational Improvements

- Upgrade and enhance stormwater management systems to handle current and projected future conditions under changing climate scenarios.
- Promote and facilitate the adoption of green infrastructure and low impact development practices in urban planning and development.

The City is looking internally at the various operations and infrastructure that are currently under its management. The City would like to be a leader in improving processes that impact the watershed. Improved stormwater management and roadway maintenance and focusing on areas that are the most impacted would support a healthier watershed and Hamilton Harbour.

Examples of Related Actions:

- **Enhanced salt management:** Strengthen the salt management plan by enhancing the water quality lens when applying salt across City infrastructure. This will reduce pollutants, most notably chloride, entering watersheds within the City.
- **Enhanced snow management:** Strengthen the snow management plan by enhancing the water quality lens when managing snow across the City. This will include reviewing existing and potential snow disposal sites to ensure that measures are in place to limit the impacts of snow with high salt amounts from degrading urban waterways. This will benefit watersheds by reducing urban pollutants, particularly chlorides, that are transferred through snow as urban runoff.
- **Catch basin cleaning program:** Strengthening the catch basin program with the use of improved sediment capturing technologies and / or increased cleaning frequencies in critical areas will support healthier watersheds.



Delsey Stormwater Management Pond. PHOTO City of Hamilton



Hamilton Open Streets Pop-up Booth. PHOTO AECOM



Carlisle Optimist Club Annual Duck Dash Pop-up booth. PHOTO City of Hamilton



Canada Day at Bayfront Park Pop-up Booth. PHOTO City of Hamilton

Objective 3: Education & Outreach

- Launch targeted educational and outreach programs aimed at increasing public awareness of watershed issues and the importance of sustainable water management.
- Provide resources and support for community-led initiatives that contribute to watershed health.

An improved watershed and harbour will only be achieved by an entire community contributing to its success. The City is and will continue to look at its practices specifically, but the ultimate vision will only be achieved by having a community that is educated and aligned with the same goals of improving watershed health. The City will look to educate the community on practices that residents can complete at home to further support the natural environment.

Examples of Related Actions:

- **Share remedial actions and best management practices most effective in reducing phosphorus and sediment runoff:** Conservation Authorities have outreach and restoration teams to support agricultural landowners protecting creeks, wetlands, floodplains and other natural features on their property. The City will aim to support these programs by enhancing program outreach, increasing program funding or by improving incentives.
- **Outreach and education programs for stormwater stewardship initiative:** The City will launch a public stormwater education campaign that aims to increase community understanding of the City's stormwater infrastructure, including understanding of its operation and maintenance practices. The City wants the public to have an understanding of how proper stormwater management can mitigate environmental impacts. This education campaign aims to foster positive behavioural changes that will benefit the environment.

Objective 4: Regulatory & Policy Development

- Review and enhance local regulations and policies to support effective watershed management, ensuring alignment with provincial and federal environmental standards.
- Develop incentives for private and commercial landowners to implement practices that contribute to watershed health.

The City will continue to update regulations and policies to ensure that they are effective at environmental protection. These updates need to be enhanced for both private and public infrastructure, so there is the greatest benefit to the watershed. Additionally, new incentives will be promoted to support the addition of stormwater management solutions on private property.

Examples of Related Actions:

- **City stormwater rate:** The City is creating a municipal financial model for stormwater management based on an equitable rate structure. This will serve as a stable funding source for the City's stormwater management program.
- **Inspection of private stormwater management facilities:** The City will develop and implement a business case for a stormwater monitoring and enforcement program.
- **Review policies to protect existing natural assets:** Future land use change needs to consider the protection of natural assets. For example, replacing natural assets with residential or commercial land needs to consider the costs and the impact of developing new stormwater controls. Efforts should also be made to maintain existing natural assets where possible. As a general rule, it is more cost-effective to protect what already exists, than to attempt rehabilitation efforts later.

Objective 5: Biodiversity and Habitat Enhancement

- Identify and implement projects that protect and restore natural habitats within the watershed, focusing on biodiversity conservation.
- Collaborate with Conservation Authorities and environmental organizations to integrate biodiversity goals into all aspects of watershed management.

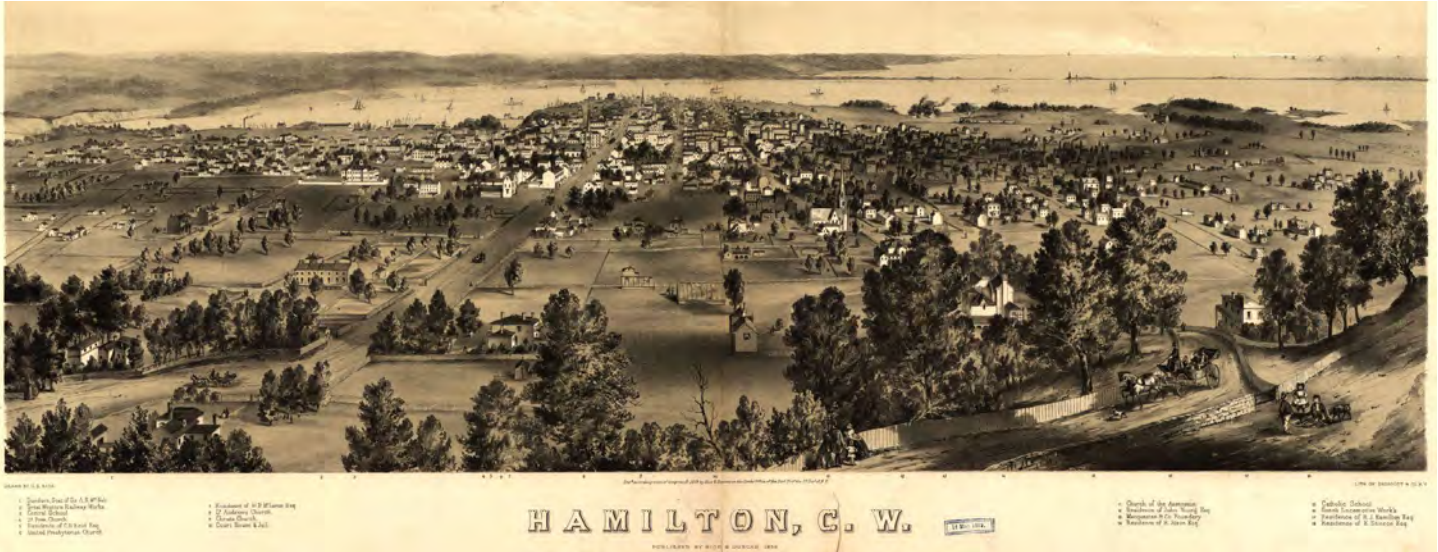
With the support from Hamilton's Biodiversity Action Plan and Hamilton's Climate Change Action Strategy, the Watershed Action Plan will aim to improve biodiversity and habitat within the City's watersheds and the Hamilton Harbour. Initially, the City is planning on completing an inventory of what natural assets are currently within the City and then determine strategies to protect, enhance and support more of these assets.

Examples of Related Actions:

- **Increase urban canopy cover:** Investigate opportunities to increase tree canopy cover in streets, school yards, parks, and in other locations across the City.
- **Improved integration of natural asset management into overall asset management practices:** Implement a natural asset management plan that develops a strategy around mapping, evaluating ecological and economical value, conducting condition assessments and long-term asset monitoring. The City's natural assets should be supported similarly to how it supports its built assets.

3. How We Got Here

3.1 Historical Condition of Hamilton Harbour



Hamilton, 1859 (Drawn. by C. S. Rice. Published by Rice & Duncan, n.d.)

Hamilton Harbour is located at the western end of Lake Ontario. It is a 2,150 hectare (ha) embayment with a watershed of approximately 500 km² (Hamilton Harbour Remedial Action Plan, 1992). The watershed can be broken down into three sub-watersheds; Grindstone Creek, Spencer Creek, and the Red Hill Creek watershed. Spencer Creek watershed enters through Cootes Paradise by a narrow channel formerly excavated for the Desjardins Canal, while Grindstone Creek and Red Hill Creek watersheds mainly discharge directly into Hamilton Harbour.

Originally, the harbour had a regular outflow channel maintained by all the inflowing watersheds at the north end of Burlington Beach. However, the channel would temporarily close due to storm wave action and in 1823 a canal was cut through the beach strip to permanently open the harbour to shipping (Cultural Landmarks of Hamilton-Wentworth, n.d.).

Hamilton Harbour is a

2,150 ha
embayment.

The watershed
flowing into
Hamilton Harbour

is **500** km².
It is home to
approximately
600,000 people.

Hamilton Harbour has
been impacted by over

100 years
of heavy industrial and
urban development.



Hamilton Historic Shoreline 1900-2000 (Paola, 1997)

Since there is only a small drain through the Burlington Ship Canal, water exchange to the deep open waters of Lake Ontario is limited. This makes the harbour more vulnerable to inputs of nutrients and contaminants. Another feature that impacts water quality is that approximately half of the flow into the harbour enters from three wastewater treatment facilities, the Woodward Wastewater Treatment Plant, the Dundas Wastewater Treatment Plant, and the Burlington Skyway Wastewater Treatment Plant. The other half is contributions from the watershed.

Before 1900, the harbour was a thriving wetland and fishery and a flourishing natural environment, but in the twentieth century it supported the largest concentration of heavy industry in Canada (Knox 2000). To concentrate and expand industry in this area, from 1930s to 1960s extensive infilling occurred of channels and wetlands, leaving only Cootes Paradise and Grindstone

Creek marshes mainly untouched. The infilling disrupted natural habitat for plants, birds, fish, and other animals. In the 1950s, Hamilton Harbour was deemed unfit for recreational use by City officials with public access and viewing of the harbour mainly blocked by fences. By 1965, there were 200,000 pounds of contaminants being dumped daily (OWRC 1964). Industrial practices along the southern shore led to the accumulation of harmful substances including PCBs (polychlorinated biphenyls), PAHs (polycyclic aromatic hydrocarbons), heavy metals (iron, zinc, and lead) and pesticides like DDT (dichlorodiphenyltrichloroethane). Exposure to these substances led to tumours, deformities, and reproductive issues in fish and wildlife. The pollution issues also impacted harbour sediment with areas being identified as the worst coal-tar contaminated site in Canada and labeled as hazardous waste.

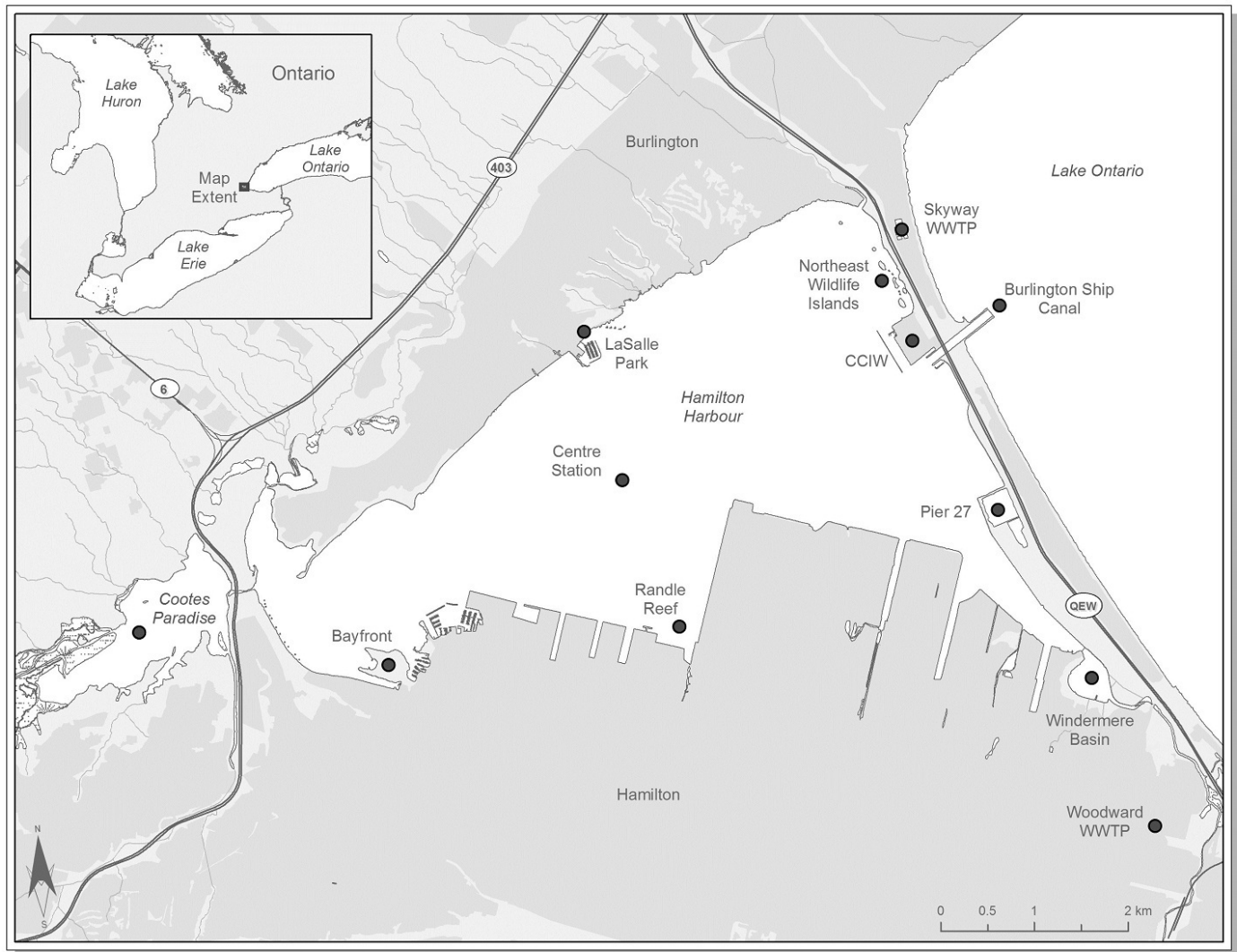


Industrial Effluent in Hamilton Harbour. PHOTO Chris McLaughlin - Bay Area Restoration Council

Due to expanding urban growth, Hamilton Harbour also faced increased domestic pollution pressure that deteriorated water quality, habitat, and degraded fish and wildlife populations. Without a safe process to dispose of sewage, private drinking water wells became contaminated, and a cholera outbreak occurred in 1854. This led to the creation of sewers that directed raw sewage directly into the Harbour until 1897 when the first sewage disposal plant was commissioned. Then in the 1950s, while the City was still lagging in sewage treatment capabilities, plans advanced to create the Woodward Avenue Wastewater Treatment Plant, a fully centralized facility with primary treatment and digestion of solids. During this same time period, construction of separated sewage and storm sewers began. No longer were combined



Citizen Overlooking Contaminated Harbour. PHOTO Chris McLaughlin - Bay Area Restoration Council



Hamilton Harbour showing the Burlington Ship Canal (A. Doolittle, 2014.)

systems, where sewage and rainwater enter the same pipe, accepted as a building practice. Many older cities in Canada are still dealing with the environmental impact of overflows from 100 years of combined system construction. The Woodward plant was completed in 1964 and biological secondary treatment was later added in 1972. In 2008, the City embarked on an ambitious mission to enhance the Woodward Treatment Plant to improve the health of the harbour and in 2023, a tertiary treatment facility was completed.

In 1985, the Hamilton Harbour was formally designated by the International Joint Commission as an Area of Concern in the Great Lakes Water Quality Agreement between the United States and Canada due to the long-term effects of discharges of industrial and municipal wastewater to the harbour and its tributaries, uncontrolled urban and rural stormwater runoff, and combined storm sewer/sanitary sewer system overflows. The listing of the Harbour as an Area of Concern, lead to the creation of the Hamilton Harbour Remedial Action Plan to support a path to recovery.

3.2 Hamilton's Clean Harbour Program

Restoring the harbour and Cootes Paradise's health is a big job. The City of Hamilton has been a participant in the **Hamilton Harbour Remedial Action Plan (HHRAP)** since its inception in 1992 and has implemented many projects in the decades since that contribute to its objective: the formal delisting of Hamilton Harbour as a Canadian Area of Concern. The Area of Concern includes the inlets of tributaries, Hamilton Harbour and the two large river mouth marshes of Cootes Paradise and Grindstone Marsh. The City developed the Clean Harbour Program in 2004, which included projects to support the objectives of the HHRAP and many years of work and investment have been allocated to reducing point-sources of pollution. The projects completed include:

- Construction of nine (9) Combined Sewer Overflow (CSO) tanks over 30 years (some of which were constructed prior to the Clean Harbour Program);
- Sewer lateral cross connection investigations and repairs;
- Primary treatment expansion at the Woodward Wastewater Treatment Plant;
- Addition of tertiary treatment at the Woodward Wastewater Treatment Plant;
- Real-time control of key wastewater collection system regulators;
- Decommissioning the Waterdown Wastewater Treatment Plant;
- Windermere Basin Restoration;
- Financial contribution to the Randle Reef Engineered Containment Facility; and
- Implementation of the Surface Water Quality Program



View of Princess Point in Cootes Paradise. PHOTO City of Hamilton

The City's largest most impactful investments in the HHRAP have been the result of forward-looking decisions by Hamilton's City Council via the Clean Harbour Program. Hamilton's Clean Harbour Program is the conduit for most of these investments. The more than \$530 million invested to Clean Harbour projects support water quality and natural habitat in the harbour by delivering new or improved infrastructure projects, often through funding partnerships that involve all three levels of government. The Clean Harbour Program's projects also enhance municipal services to local residents and businesses by, for example, reducing flood

risk, helping to secure drinking water quality and creating new public spaces. Details of some of the more notable projects have been provided below.



Heron in Cootes Paradise. PHOTO City of Hamilton

3.2.1 Combined Sewer Overflow Tanks

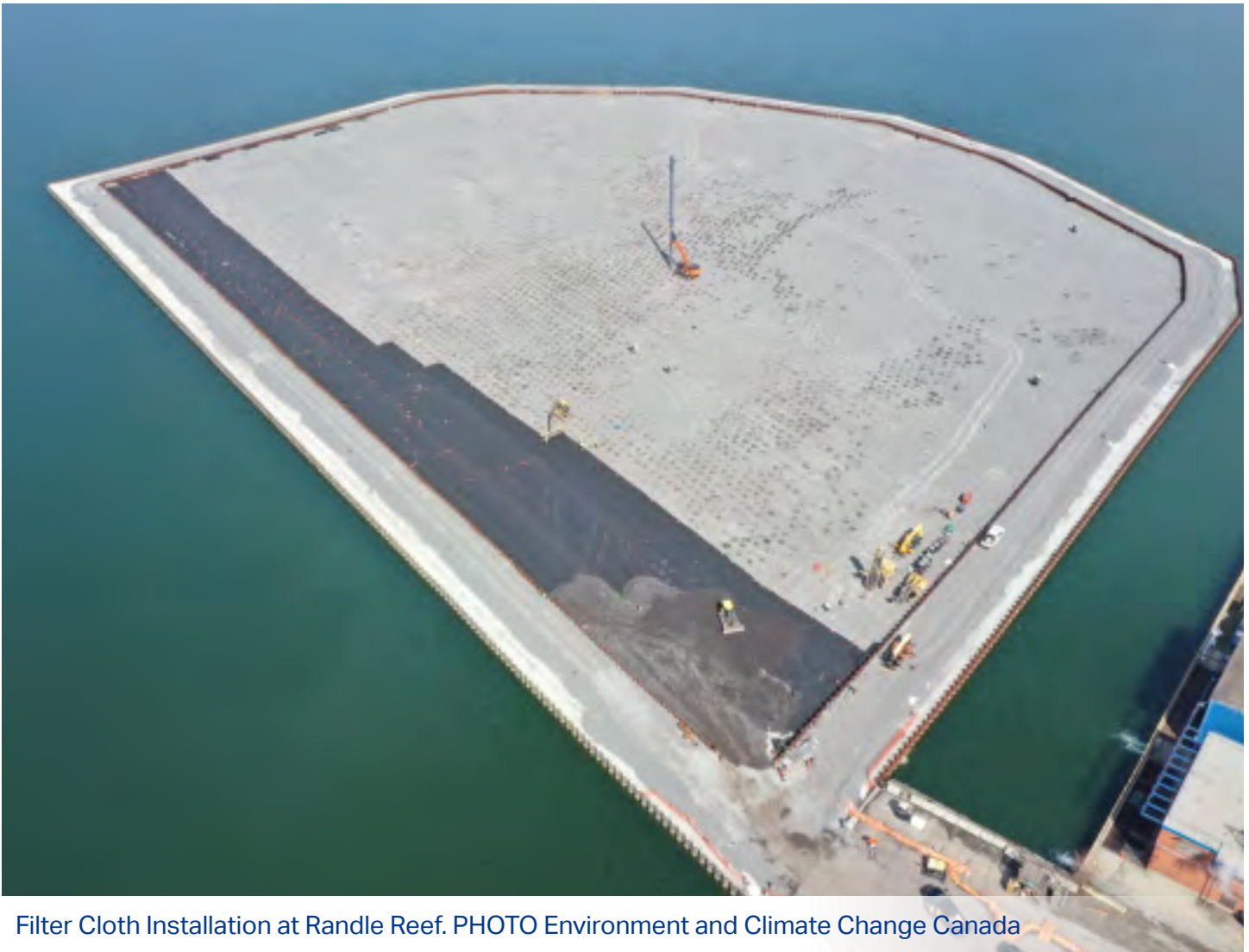


James Street North Combined Sewer Overflow Tank. PHOTO City of Hamilton.

Clean Harbour Program Point of Interest

Combined Sewer Overflow Tanks

The oldest sewer infrastructure in Hamilton is known as a “combined system” and makes up around one third of the total sewer system. Under normal conditions, this system sends combined sewage (storm and sanitary flows) to the Woodward Wastewater Treatment Plant for treatment. During significant wet weather, the system was designed to release excess untreated combined sewage into local waterways to prevent basement flooding and to protect the wastewater treatment plant against overloading. To respond to this, the City built a series of nine combined sewer overflow tanks from the 1980s through to 2015 to limit combined sewage from flowing into Cootes Paradise and Hamilton Harbour. The combined sewer overflow tanks are installed in strategic locations across the City. The tanks capture untreated combined sewage during storms, releasing it back into the sewer system only when the Woodward Wastewater Treatment Plant has the capacity to handle it properly. These tanks have a total storage space of approximately 314 million litres, the equivalent of 125 Olympic-size swimming pools. The cost to construct all the tanks totalled \$89 million. The City reports the volume of combined sewer overflows to the environment at the following website: [CSO Overflows](#)



Filter Cloth Installation at Randle Reef. PHOTO Environment and Climate Change Canada

Clean Harbour Program Point of Interest

Randle Reef Sediment Remediation Project

The Randle Reef sediment project addresses the largest toxic sediment site in Canada by building an Engineered Containment Facility (ECF) that will isolate the contaminated material from Hamilton Harbour's ecosystem. Construction began in 2015 and will be completed in 2025/26. Stewardship of the ECF will be transferred to the Hamilton-Oshawa Port Authority which will use the facility to support shipping activity. The double sheet-steel walls of the ECF contains more than 695,000 m³ of material contaminated with polycyclic aromatic hydrocarbons (PAH). The 6.2-hectare facility was built to specifications that will ensure it has a 200-year lifespan. The estimated \$138.9 million project was led by Environment and Climate Change Canada with seven funding partners contributing, including the City's contribution of \$14 million.



Woodward Wastewater Treatment Plant. PHOTO City of Hamilton

Clean Harbour Program Point of Interest

Woodward Wastewater Treatment Plant

The Woodward Wastewater Treatment Plant has been Hamilton's main wastewater treatment plant since 1964. It uses up to five different processes – preliminary, primary and secondary treatment, as well as effluent disinfection and sludge digestion – to clean an average of 409 million litres of wastewater a day. The treatment process produces methane gas and biosolids which are used as fuel and agricultural fertilizer, respectively. The plant recently underwent a \$340 million upgrade (including a \$100 million contribution from both the federal and provincial governments) that improved the water quality of its effluent by adding a tertiary treatment process using filter disks. Because the plant effluent is the largest single source of water flowing into Hamilton Harbour, its quality has a powerful impact on the harbour's environmental health.



Waterdown Wastewater Treatment Plant. PHOTO City of Hamilton

Clean Harbour Program Point of Interest

Waterdown Wastewater Treatment Plant

An assessment of the Waterdown Wastewater Treatment Plant determined that converting the plant into a pumping station would reduce local environmental impacts while also saving money. In the past, treated wastewater flowed from the Waterdown plant to Grindstone Creek, a cold-water stream that flows to the harbour. The assessment concluded that the water quality of the creek would improve fish habitat without the treated wastewater flow. This would, in turn, help the fish in the harbour that spawn in Grindstone Creek. It was also determined that it was more cost-effective to treat wastewater at the Dundas Wastewater Treatment Plant instead of at the Waterdown plant. The \$8.2 million conversion ran from 2007-2010, concluding with Waterdown's wastewater being pumped and processed at the Dundas and Woodward Wastewater Treatment Plants.



Windermere Basin. PHOTO City of Hamilton

Clean Harbour Program Point of Interest

Windermere Basin Restoration

Located at the southeast corner of Hamilton Harbour, Windermere Basin was originally a vibrant marsh at the mouth of Red Hill Creek. However, decades of industry, shipping, urban runoff and wastewater degraded the marsh. In 2011, work began on a \$20.5 million effort to restore the basin to a wetland – this included a combined total of \$3 million provided by the federal and provincial governments. The project included rebuilding natural areas, as well as fish and wildlife habitats. The newly restored Windermere Basin has become a healthy and diverse Great Lakes coastal wetland and a sanctuary for wildlife. Bird watchers are also taking advantage of the restored 13-hectare environment.



Pier 4 Park. PHOTO City of Hamilton

3.3 Current Status of Cootes Paradise and Hamilton Harbour

Though Hamilton Harbour is still considered an Area of Concern today, harbour conditions are improving, and are better than in previous decades. 'Delisting' Hamilton Harbour, Cootes Paradise and Grindstone Marsh means that it would no longer be designated as an Area of Concern. Delisting can occur when improvements have been made and the water quality and ecosystem have been restored.

The Hamilton Harbour Remedial Action Plan (HHRAP) office tracks environmental conditions, activities and outcomes, and reports on the status of each of the Beneficial Use Impairments within the Hamilton Harbour Area of Concern. A

Beneficial Use Impairment describes a human or ecological use of the ecosystem that has been degraded because of human-caused environmental problems. The goal is ultimately shifting the status of each Beneficial Use Impairment from Impaired to Not Impaired. Once this happens, Hamilton Harbour moves from an Area of Concern to an Area of Concern in Recovery. Monitoring of Hamilton Harbour and marshes will continue for many years while the Area of Concern is in recovery before delisting can formally occur (HHRAP, 2024).

3.4 Status of Hamilton Harbour's Beneficial Use Impairments

3.4.1 Beneficial Use Impairments - Impaired



Restrictions on Fish Consumption:

There are fish consumption advisories due to elevated contaminant levels found in fish.



Degradation of Fish Populations:

Diversity of fish has declined due to pollution.



Degradation of Wildlife Populations:

Some bird populations have declined due to a lack of suitable nesting habitat.



Degradation of Benthos:

There has been stress on benthic communities (organisms that live in bottom sediments) due to contamination of sediment in the harbour.



Restrictions on Dredging Activities:

Dredging and open water disposal of navigational channels has been restricted due to contaminated sediment.



Eutrophication or Undesirable Algae:

Excessive phosphorous concentrations resulted in excessive algal growth in the harbour.



Beach Closings:

Beach closings have occurred due to high E. coli bacteria levels in the harbour. Toxins from cyanobacteria also impact Hamilton Harbour's beach.



Degradation of Aesthetics:

Issues with clarity, colour, odour and debris have been observed in the harbour.



Loss of Fish and Wildlife Habitat:

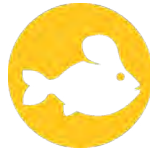
Contaminated sediment and low oxygen conditions in the harbour limit the diversity and abundance of fish and wildlife.

3.4.2 Beneficial Use Impairments - Requires Further Assessment



Restrictions on Wildlife Consumption:

Information on safe human consumption of wildlife was considered deficient.



Fish Tumours or Other Deformities:

Higher incidences of liver tumours were found in certain fish, however this was largely in older fish so further testing is required.



Bird or Animal Deformities or Reproductive Problems:

Deformities in birds and low reproduction rates in snapping turtles and frogs were found however more recent data is being reviewed.



Degradation of Phytoplankton and Zooplankton Populations:

Also related to high phosphorous levels, unhealthy phytoplankton and zooplankton communities exist in the harbour, however as phosphorous inputs are reduced, improvements to this impairment is expected.

3.4.3 Beneficial Use Impairments - Not Impaired



Tainting of Fish and Wildlife:

There has been no tainting of fish or wildlife flavour in the harbour due to phenols.



Drinking Water:

There are no drinking water intakes from within the harbour, so this impairment is not applicable.



Added Costs to Agriculture or Industry:

There are no significant additional costs beyond those normally required to treat water prior to industrial uses in Hamilton Harbour and water from the harbour is not used in agriculture.

To continue progress toward improved harbour conditions a concerted effort is required to assess and execute the most impactful opportunities that will make a difference for harbour water quality. Since extensive work has been completed addressing point-sources of pollution, the focus now shifts to addressing non-point sources of pollution, which is the primary aim of the City of Hamilton's Watershed Action Plan.

4. How You Can Help

4.1 Actions You Can Take at Home and Resources Available

There are many actions that you can take at home and in your business to help improve the health of your local watershed and the Hamilton Harbour. Resources and programs are available through the City and our community partners to help you take action. Even small changes can have a big impact.



- Consider directing your downspout onto pervious surfaces, such as a grassy area, rain garden or into a rain barrel to ensure as much water is absorbed as possible.
- Disconnecting your downspouts reduces the amount of stormwater that enters the sewer and helps minimize the risk of sewer backups in your basement and combined sewer overflows.

Resources:

- [*Downspout Disconnections \(City of Hamilton\)*](#)
- [*Rain Barrel Sale \(City of Hamilton\)*](#)
- [*Rain Barrel Sale \(Green Venture\)*](#)



- Only flush the 3Ps - pee, poo and toilet paper. Tampons, applicators, wipes and any other items are considered garbage and should not be flushed down the toilet. This can lead to sewer overflows into the environment.
- Secure household waste on collection day. The wind can carry loose waste into catch basins that lead directly into waterways.

Resources:

- [*Team Up to Clean Up \(City of Hamilton\) What*](#)
- [*Garbage Goes Where \(City of Hamilton\)*](#)
- [*Green Venture Cleans Up! \(Green Venture\)*](#)
- [*Flushables \(City of Hamilton\)*](#)



- Minimize salt use as much as possible.
 - Salt runoff from roads and driveways in the winter can enter catch basins and end up in our waterways.
 - Salt can be toxic to aquatic life, so consider using an environmentally friendly alternative.

Resources:

- [Get Smart About Salt \(Hamilton Conservation Authority\)](#)
- [Smart About Salt Council](#)
- [Let's Talk About Road Salt \(Green Venture\)](#)



- Maintain your car regularly and inspect for leaks.
- Take your car to a car wash instead of washing it in the driveway. The grease and oil that comes off your car at a commercial car wash is treated, but not when you wash your car in your driveway.

Resources:

- [Catch Basin and Street Drain Use \(City of Hamilton\)](#)
- [Household Hazardous Waste Removal \(City of Hamilton\)](#)



- Avoid single-use plastics wherever possible. Plastic litter tossed on the ground is easily washed away into our storm drains, which then enters our rivers and lakes.

Resources:

- [Strategy to Reduce Single-use Plastics \(City of Hamilton\)](#)
- [Proposed Single-use Plastic Prohibition Regulations \(Government of Canada\)](#)



- Most catch basins lead directly to local waterways, so only rain and snow melt should enter catch basins.
- Do not empty pools or hot tubs into a catch basin.

Resources:

- [Catch Basin and Street Drain Use \(City of Hamilton\)](#)
- [Emptying Pools and Hot Tubs \(City of Hamilton\)](#)
- [Yellow Fish Road Program \(Bay Area Restoration Council\)](#)



- Pick up pet waste, double bag it and place it in the trash.
- Never place pet waste in a catch basin (bagged or not).
- Do not flush or release aquatic pets into the environment. These pets can be invasive species and cause harm to the environment and native wildlife.

Resources:

- [*Flushables \(City of Hamilton\)*](#)
- [*Catch Basin and Street Drain Use \(City of Hamilton\)*](#)



- Household chemicals can be hazardous to the environment and should never be thrown in the garbage or poured down drains.
- Bring motor oil, paint, batteries, medication and other household chemicals to a community recycling centre for proper recycling.

Resources:

- [*Household Hazardous Waste Removal \(City of Hamilton\)*](#)



- Plant trees and shrubs that are native to Ontario in your gardens and on your property. Native plants are adapted to local conditions and are more efficient with water use.
- Grow longer lawns. Longer lawns absorb water runoff better than shorter lawns.
- Limit the use of pesticides and fertilizers. Rain and snow running off of lawns can carry these pollutants into the storm drains and out to our waterways.

Resources:

- [*Pollinators \(City of Hamilton\)*](#)
- [*Free Tree Giveaway \(City of Hamilton\)*](#)
- [*Hamilton Monarch Awards*](#)

5. Conclusion

There has been over 100 years of human impact on our local watersheds and Hamilton Harbour. The City has spent significant resources to tackle point-source pollution to begin the restoration process. The City of Hamilton Watershed Action Plan will continue these efforts by tackling non-point-source pollution to improve the health of watersheds within Hamilton and work towards delisting Hamilton Harbour as an Area of Concern. To achieve this, the City along with our community partners, including Conservation Authorities, government agencies, non-governmental organizations, institutions, Indigenous peoples, and the public, have created the Plan which includes a long list of actions that are aimed at reducing non-point-sources of pollution across the local watershed. The Plan includes actions that support one or more of the five objectives, pollution reduction, infrastructure and operational improvements,

education and outreach, regulatory and policy development and biodiversity and habitat enhancement. By implementing these actions, the City will work to improve the health of its watersheds, enhance recreation and natural habitats and make it a safe and beautiful place of pride for our community.

The Plan's ultimate vision is for Hamilton to become a City that is proud of its healthy waters and to have Hamilton Harbour delisted as an Area of Concern. The issues being faced are very complex, and it may take time for actions to have a noticeable impact on local watersheds. However, when viewed from a decade-to-decade perspective, considerable improvement becomes evident, and this Plan will continue to drive that progress moving forward.



Burlington Canal Lift Bridge. STOCK PHOTO

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Appendix

Appendix A. List of Recommended Actions

Table 1 is a summary of pending actions that require approval and implementation, while Table 2 is a summary of actions that are funded and already in progress.

Table 1. List of Pending Actions

Action	Type of Action	Action Timeline	Addresses Objective				
			1	2	3	4	5
Partner Recommendations							
Review park land leased to farmers and ensure that new and existing leases include environmental best practices, such as reducing soil erosion and runoff.	Operations & Maintenance	Short-term (1-3 years)	✓			✓	✓
Investigate and repair the source of sewage in Hickory Brook	Capital / Study	Short-term (1-3 years)	✓	✓			
Review Stormwater Management Facility 35 to ensure that the facility is working according to engineered designs.	Operations & Maintenance	Short-term (1-3 years)	✓	✓			
Review the large urban drain at the headwaters of Ancaster Creek to determine if there are opportunities to support erosion issues.	Capital / Study	Short-term (1-3 years)	✓	✓			
Review opportunities to divert pet waste from landfills and support education of disposing dog waste, so it is not washed into City creeks.	Operations & Maintenance	Short-term (1-3 years)	✓				
Investigate the need for volume control in Spring Creek.	Operations & Maintenance	Short-term (1-3 years)	✓	✓			
Investigate opportunities to daylight or naturalizing creeks. The Lower Chedoke environmental assessment will support naturalizing in this area.	Capital / Study	Mid-term (3-6 years)	✓				✓
Review the current property standards by-law requirements in order to evaluate the option to limit lawn mowing, allow maintenance of longer lawns, and reduce fertilizer and pesticide use.	Policy / Program	Short-term (1-3 years)	✓			✓	

Action	Type of Action	Action Timeline	Addresses Objective				
			1	2	3	4	5
Investigate the development of a policy around living tree removal on private property.	Policy / Program	Short-term (1-3 years)	✓			✓	✓
Explore the use of new technology for irrigation controls to assist in proper application of water on sports fields.	Operations & Maintenance	Short-term (1-3 years)	✓	✓			
Investigate opportunities to reduce phosphorus inputs within the Desjardins Canal.	Capital / Study	Short-term (1-3 years)	✓				
Hamilton Harbour Remedial Action Plan - Urban Runoff Recommendations							
Develop and implement a business case for a stormwater monitoring and enforcement program.	Policy / Program	Short-term (1-3 years)	✓	✓			
Strengthen the catch basin program with the use of improved sediment capture technologies and/or increased cleaning frequencies in critical areas throughout the City.	Operations & Maintenance	Short-term (1-3 years)	✓	✓			
Collaborate with other agencies to support social incentives for sustainable stormwater management within the community.	Policy / Program	Short-term (1-3 years)	✓		✓		
Collaborate with other agencies and organizations to promote and facilitate training workshops in low impact development.	Operations & Maintenance	Short-term (1-3 years)	✓		✓		
Collaborate with other agencies and organizations to promote and facilitate training workshops in stormwater management and low impact development maintenance.	Operations & Maintenance	Short-term (1-3 years)	✓		✓		
Review the inventory of watercourse erosion sites and prioritize remedial action at appropriate locations. A process map from identification of concern to completion of remedial action will be determined.	Capital / Study	Short-term (1-3 years)	✓				
Hamilton Harbour Remedial Action Plan - Rural Runoff Recommendations							
Collaborate with other agencies and organizations to further implement, present and share best management practices to reduce phosphorus and sediment runoff in the rural area.	Policy / Program	Short-term (1-3 years)	✓		✓		
Collaborate with other agencies and organizations to present and share surface water results to the rural community.	Operations & Maintenance	Short-term (1-3 years)	✓		✓		

Action	Type of Action	Action Timeline	Addresses Objective				
			1	2	3	4	5
Collaborate with other agencies and organizations to create informational materials, guidelines and promote and facilitate training workshops for rural landowners regarding fill activities.	Policy / Program	Short-term (1-3 years)	✓		✓		
Collaborate with other agencies and organizations to determine available data and potentially enhance the City's surface water quality monitoring program to include rural areas.	Operations & Maintenance	Short-term (1-3 years)	✓	✓			
Hamilton Harbour Remedial Action Plan - Erosion and Sediment Control Recommendations							
Collaborate with other agencies and organizations to create informational materials and promote and facilitate training workshops for contractors in erosion and sediment control.	Policy / Program	Short-term (1-3 years)	✓	✓			
Support the City's sediment enforcement team, as they review sediment control practices during construction.	Policy / Program	Short-term (1-3 years)	✓	✓			
Chedoke Creek Framework Study Recommendations							
Strengthen the snow management plan by enhancing the water quality lens when managing snow across the City.	Operations & Maintenance	Short-term (1-3 years)	✓	✓			
Strengthen the salt management plan by enhancing the water quality lens when applying salt across City infrastructure.	Operations & Maintenance	Short-term (1-3 years)	✓	✓			
Develop, review and/or improve the street sweeping program in critical areas throughout the City.	Operations & Maintenance	Short-term (1-3 years)	✓	✓			
Support the rehabilitation of the existing highway 403 culvert to eliminate landfill leachate from entering into Lower Chedoke Creek.	Capital / Study	Mid-term (3-6 years)	✓	✓			
Investigate enhancing the management of runoff from City golf courses. The Chedoke stormwater environmental assessment will further action this item.	Operations & Maintenance	Mid-term (3-6 years)	✓	✓			
Support the development and/or enhancement of a wet weather flow policy in the infrastructure serving new developments.	Policy / Program	Mid-term (3-6 years)	✓			✓	

Action	Type of Action	Action Timeline	Addresses Objective				
			1	2	3	4	5
Grindstone Creek Natural Asset Study Recommendations							
Develop, review and/or improve policies to protect existing natural assets.	Policy / Program	Short-term (1-3 years)				✓	✓
Install low impact development projects in priority areas.	Capital / Study	Short-term (1-3 years)	✓	✓			
Collaborate with other agencies and organizations and develop a collaborative governance approach for the Grindstone Creek watershed.	Operations & Maintenance	Mid-term (3-6 years)	✓			✓	✓
Flood and Drainage Improvement Framework Recommendations							
Support the completion of the interceptor feasibility study and environmental assessment, and the scoped capacity assessment of the North Mountain area.	Policy / Program	Mid-term (3-6 years)	✓	✓			
Support the development of an update to the all-pipes model with flow monitoring results.	Operations & Maintenance	Mid-term (3-6 years)	✓	✓			
Support a 3D visual pipe model to better understand system connectivity and utility conflicts.	Operations & Maintenance	Mid-term (3-6 years)	✓	✓			
Support a western sanitary interceptor twinning or below Mountain interceptor feasibility study and environmental assessment.	Policy / Program	Mid-term (3-6 years)	✓	✓			

Table 2. List of Funded Actions

Action	Type of Action	Addresses Objective				
		1	2	3	4	5
Partner Recommendations						
Control waterfowl populations around the harbour and the City's watersheds, limiting the amount of E.coli.	Operations & Maintenance	✓				
Test soils yearly on sports fields to determine the exact needs for fertilizer, limiting the amount of unused phosphorus from entering the watershed.	Operations & Maintenance	✓	✓			
Collaborate with other agencies and organizations to improve watershed health.	Operations & Maintenance	✓		✓		
Investigate the Cootes Drive/Main St West stormwater catchment area that may be contributing to erosion and poor water quality near the receiving outfall.	Capital / Study	✓	✓			
Repair stormwater controls at wet pond #90, such that it functions as per its engineer design.	Operations & Maintenance	✓	✓			
Continue to build and strengthen partnerships with other agencies in the watershed, including Conservation Authorities.	Policy / Program	✓		✓		
Attempt to reduce the amount of phosphoric acid added to the distribution system which eventually may be released to the environment.	Operations & Maintenance	✓	✓			
Investigate opportunities to increase canopy cover throughout the City.	Policy / Program	✓	✓			✓
Hamilton Harbour Remedial Action Plan - Urban Runoff Recommendations						
Develop or update a stormwater management manual and master plan for the development community.	Policy / Program	✓			✓	
Review the Conservation Authority's watershed basin reports and develop a list of sub watersheds requiring updates and water quality improvements.	Capital / Study	✓	✓			
Determine ownership of all stormwater management facilities, including oil grit separators.	Operations & Maintenance	✓	✓			
Establish a monitoring procedure for the accumulation of sediment within City owned stormwater management ponds.	Operations & Maintenance	✓	✓			

Action	Type of Action	Addresses Objective				
		1	2	3	4	5
Establish a monitoring program to examine City stormwater management facilities to determine if they are addressing water quality requirements and functioning as designed	Operations & Maintenance	✓	✓			
Update the City's catch basin inventory and cleanout maintenance program.	Operations & Maintenance	✓	✓			
Optimize and find improvements in the City's combined sewer system.	Capital / Study	✓	✓			
Provide additional staffing and funding to accelerate the identification and remediation of cross connections from the sanitary to the separated storm sewer system.	Operations & Maintenance	✓	✓			
Support the development of the City stormwater rate to create a municipal financial model for stormwater management based on an equitable rate structure for a stable funding source.	Policy / Program	✓		✓	✓	
Support the development of the City stormwater rate which includes incentive programs for low impact development on private property.	Policy / Program	✓		✓		
Collaborate with other agencies and organizations to promote and facilitate outreach and education in stormwater management.	Policy / Program	✓		✓		
Hamilton Harbour Remedial Action Plan - Rural Runoff Recommendations						
Reduce the impacts of erosion with improved erosion and sediment control practices at large fill construction sites.	Policy / Program	✓	✓			
Support the development of an incentive program to landowners to support water quality and habitat improvement projects.	Policy / Program	✓		✓	✓	
Hamilton Harbour Remedial Action Plan - Erosion and Sediment Control Recommendations						
Individualized and tailored erosion and sediment control plans are required for all three phases of subdivision construction.	Policy / Program	✓	✓			

Action	Type of Action	Addresses Objective				
		1	2	3	4	5
Prior to initiating engineering design, a joint pre-consultation by the applicant's engineer, the City, and Conservation Authority be conducted for preparing erosion and sediment control plans.	Policy / Program	✓	✓			
Erosion and sediment control plans need to identify specific measures during the three phases of construction: 1) removals, 2) construction/grading, and 3) site restoration.	Policy / Program	✓	✓			
Reduce the length of time soil is exposed between construction/grading and site restoration phases of construction.	Policy / Program	✓	✓			
Approve grading plan complete with an erosion and sediment control plan prior to issuance of a building permit.	Policy / Program	✓	✓			
Inspect erosion and sediment control works to ensure they are installed in accordance with the approved grading plan.	Policy / Program	✓	✓			
Inspect erosion and sediment control works, while maintaining a reporting system during all stages of construction.	Policy / Program	✓	✓			
Require applicants to provide notification when a construction project is to start and complete regular erosion and sediment control inspection reports.	Policy / Program	✓	✓			
Require the applicant for a construction project to identify an on-site person who is designated responsible for the installation and maintenance of the erosion and sediment control measures.	Policy / Program	✓	✓			
Offer erosion and sediment control training for City employees annually.	Policy / Program	✓		✓		
Ensure that City tenders and contracts for infrastructure and capital projects require applicants to demonstrate proper knowledge, training and (preferably) certification in erosion and sediment control practices.	Policy / Program	✓	✓			
Update the erosion and sediment control guideline for urban construction.	Policy / Program	✓			✓	
Ensure consultants and contractors are following the updated erosion and sediment control guideline document in their submissions for development.	Policy / Program	✓	✓			

Action	Type of Action	Addresses Objective				
		1	2	3	4	5
Ensure consultants and contractors are using unit prices for erosion and sediment control items to ensure that these measures are installed and maintained appropriately.	Policy / Program	✓	✓			
Private contracts for erosion and sediment control items should use unit prices rather than lump sums to ensure that these measures are installed and maintained appropriately.	Policy / Program	✓	✓			
Include special provisions to ensure that erosion and sediment control measures are properly installed and maintained during all stages of City construction projects.	Policy / Program	✓	✓			
Pre-qualify contractors to ensure a basic level of erosion and sediment control competency.	Policy / Program	✓	✓			
Ensure that during stormwater management pond and creek remedial activities, erosion and sediment control measures are deployed.	Policy / Program	✓	✓			
Chedoke Creek Framework Study Recommendations						
Enhance the City surface water quality monitoring program and data management tools (e.g., create a centralized data sharing portal).	Operations & Maintenance	✓	✓			
Complete the water, wastewater and stormwater master plan.	Capital / Study	✓			✓	
Enhance real time overflow monitoring capabilities to support active management and limit combined sewer overflows.	Operations & Maintenance	✓	✓			
Continue to inspect and repair above and below ground infrastructure to reduce infiltration and the likelihood of combined sewer overflows.	Operations & Maintenance	✓	✓			
Twin the 403 trunk sewer to provide additional sanitary sewer capacity for the catchment upstream of the Main-King combined sewer overflow tank and provide an outlet for the Aberdeen combined sewer overflow.	Capital / Study	✓	✓			
Reduce inflow and infiltration (I&I) to limit additional water from entering the sewer system.	Capital / Study	✓	✓			
Engage residents about stormwater management and develop an advisory committee to continue to progress towards watershed improvements.	Capital / Study	✓		✓		

Action	Type of Action	Addresses Objective				
		1	2	3	4	5
Develop a stormwater management policy for all future redevelopment construction sites.	Policy / Program	✓			✓	
Develop a road retrofits rehabilitation/low impact development best management policy.	Policy / Program	✓			✓	
Complete an environmental assessment to evaluate the Lower Chedoke Creek and to determine solutions for enhancing this section of watercourse.	Capital / Study	✓	✓			✓
Complete an environmental assessment to evaluate the existing creek inputs into the combined sewer system within the Ainsley Woods neighbourhood in Mid Chedoke Creek.	Capital / Study	✓	✓			
Reduce flooding risk and improve stormwater drainage by completing a flooding and drainage master servicing study.	Capital / Study	✓	✓			
Complete an environmental assessment to evaluate the potential for stormwater management retrofits primarily in the Upper Chedoke Creek watershed.	Capital / Study	✓	✓			
Grindstone Creek Natural Asset Study Recommendations						
Collaborate with other agencies and organizations to develop a watershed-based monitoring plan.	Capital / Study	✓	✓			
Seek funding and prioritize remedial action at areas in need of erosion restoration.	Capital / Study	✓	✓			
Support the integration of City-wide natural asset management into the overall asset management practices.	Capital / Study	✓			✓	✓