

City of Toronto

Wet Weather Flow Management

**Master Plan Overview and
25 Year Implementation Plan**

July 2003



Table of Contents

Acknowledgements	3
1. Introduction	7
2. Background	9
2.1. Study Principles	9
2.2. Problem Definition	9
2.3. Vision	9
2.4. Goal	10
2.5. Objectives	10
3. Development of the Wet Weather Flow Management Master Plan	12
3.1. Study Area	12
3.2. Public Consultation	14
3.3. Development of Wet Weather Flow Management Strategies	16
3.4. Alternative Strategies	17
3.5. Preferred Strategy	18
3.6. Implementation Plan	19
3.7. Monitoring and Plan Review	21
4. Funding Options and Wet Weather Flow Management Policy	21

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1. Introduction

Development and urban growth within the City of Toronto and surrounding regions has resulted in very intense pressures on the ecosystem, and the alteration of the hydrologic cycle and natural environment.

Urban development has two major adverse effects on wet weather flows; increased stormwater runoff quantity and degradation of stormwater runoff quality. The increase in impervious area, changes in surface grading and high surface runoff associated with urban development all act to reduce stormwater infiltration into the ground and increase the volume and peak flow rates of stormwater runoff to receiving waters. Wet weather flow also results in combined sewer overflows (CSOs), storm sewer discharges, and infiltration and inflow (I/I) into the sewer system causing treatment plant by-passes all of which contribute to degraded water quality in area watercourses and the waterfront. The consequences of these negative impacts include increased flooding and erosion, physical destruction of terrestrial and aquatic habitat, reduced stream base flow, postings of recreational beaches, nutrient enrichment, contaminated sediments, stressed aquatic communities and degradation of the overall environment.

More recently the impacts have been summarized through the Metro Toronto Remedial Action Plan Stage 1: Environmental Conditions and Problem Definition report (Environment Canada, *et al.*, 1993) and have contributed to Toronto's designation as one of 42 polluted areas of concern within the Great Lakes.

Prior to amalgamation of the six area and regional municipalities of Toronto, each municipality undertook independent actions to address these problems. In the absence of a legislative requirement for wet weather flow management, previous measures were driven, in large part, by the need to address flooding problems and impacts on recreational beach areas. Although source control options have been considered and implemented to varying degrees, to date the problems have largely been addressed through the construction of infrastructure and end-of-pipe treatment facilities.

Although these initiatives represent significant efforts and provide local environmental improvements, it was recognized that a City-wide strategy was required to provide a more comprehensive and consistent approach to mitigating the impacts of wet weather flows. In 1994, the Environmental Assessment Advisory Committee, in their report on the City of Toronto's Western Beaches Storage Tunnel, identified a strong need for master planning on a watershed basis in order to restore beneficial uses within the watersheds.

In 1997, the City of Toronto initiated the development of a Wet Weather Flow Management Master Plan (WWFMMP) to address the impacts of wet weather flow. Instead of focusing on site specific wet weather flow issues, the plan development considered the whole natural hydrologic cycle within the context of watershed management and ecosystem protection.

The master plan is comprised of a four step process :

Step 1 - data gathering, problem definition and policy formulation

Step 2 - development of the Wet Weather Flow Management Master Plan

Step 3 - implementation of the Master Plan

Step 4 – ongoing monitoring and updating of the Master Plan

Step 1 of the WWFMMP was completed in December 1998, and is documented in “*Toronto Master Plan For Wet Weather Flow Management*”, Step 1 Report (Dillon Consulting Limited, 1998).

The current work, Step 2 of the WWFMMP, has spanned a three-year timeframe, initiated in August 2000. Steps 3 and 4, the implementation and monitoring phases respectively, are expected to be initiated in the fall of 2003, pending approval of the Plan by Toronto City Council.

Stakeholder and public consultation is a major component of the Plan development process. The development of the WWFMMP has followed the master planning requirements of the Environmental Assessment Act for Approach 1 as detailed in Appendix 4 of the Class Environmental Assessment for Municipal Water and Wastewater Projects (Municipal Engineers Association, June 2000), incorporating broad public and agency consultation on all aspects of the Plan development.

This document presents an overview of the Plan development process which is detailed in a series of companion documents highlighted below:

Public Consultation:

Public Consultation Summary Report, by Lura Consulting, April 2003

Watershed WWFMMP Reports:

- Study Area 1 – Combined Sewershed Area (MacViro Consultants Inc. and CH2M HILL Canada, 2003);
- Study Area 2 – Etobicoke and Mimico Watersheds (Totten Sims Hubicki Associates, 2003);
- Study Area 3 – Humber River Watershed (XCG Consultants Ltd., 2003)
- Study Area 4 – Don River Watershed (Marshall Macklin Monaghan Limited, 2003);
- Study Area 5 – Highland Creek and Rouge River Watersheds (Aquafor Beech Limited, 2003)

Waterfront WWFMMP Reports:

- Study Area 6 – Waterfront Water Quality Response (Modelling Surface Water Limited, 2003);
- Waterfront Response (City of Toronto, 2003). This report contains a summary of the above five Watershed Reports and documents the impacts of the watershed wet weather flow management strategies on the Toronto waterfront.

Technical Reports:

- List of CSO/Stormwater Control Alternatives, 2002
- Management and Operation Practices Evaluation, 2003

2. Background

Step 1 involved review, consolidation and synthesis of background information based on previous initiatives and current practices, data gathering and analysis, a description of the existing conditions and data gaps, the development of a vision, a philosophy, a goal, a problem statement, and objectives. Public involvement in Step 1 included public members on the Steering Committee, the distribution of information to groups and individuals interested in wet weather flow issues, the preparation and distribution of newsletters, posting project updates on the City's web site and hosting two public forums.

2.1. Study Principles

A new philosophy was developed in Step 1, in consultation with key stakeholders, representing a re-thinking of the way that the City is to manage stormwater. It was modified to form the following "Principles" to guide the development of the plan:

Rainwater is a resource. As a priority, rainwater (including snowmelt) should be managed where it falls on the lots and streets of our City, particularly before it enters a sewer. Wet weather flow will be managed on a watershed basis with a natural system approach being applied to stormwater management as a priority. A hierarchy of wet weather flow solutions will be implemented – starting with "at source", then "conveyance", and finally "end of pipe". Toronto's communities need to be made aware of wet weather flow issues and involved in the solutions.

2.2. Problem Definition

The "WWF problem" has been defined as the degraded environment in the City's watersheds and near shore zone of Lake Ontario as a result of a number of WWF management barriers, and the lack of a city-wide comprehensive strategy.

2.3. Vision

WWF will be managed on a watershed basis in a manner that recognizes rainwater as a potential resource to be utilized to improve the health of Toronto's watercourses and near shore zones of Lake Ontario and to protect and enhance the natural environment of Toronto's watersheds.

2.4. Goal

To reduce and ultimately eliminate the adverse impacts of wet weather flow on the built and natural environment in a timely and sustainable manner and to achieve a measurable improvement in ecosystem health of the watersheds.

2.5. Objectives

Institutional Objective

Wet weather flow issues will be recognized in the City's Strategic Plan, Official Plan policies, zoning by-laws and Environment Plan, and the City will use both by-laws and incentives to achieve its goals. WWF management activities will be undertaken in a co-operative manner by the City of Toronto, the Toronto Region Conservation Authority, government agencies and community groups with emphasis on private stewardship and community involvement. WWF problems that originate beyond the City's boundaries, will be addressed in a coordinated manner with headwater (upstream) municipalities.

Financial Objective

Both the generators of pollution and the beneficiaries of a clean environment should contribute equitably to the financing of wet weather flow management initiatives. The costs of protecting the environment against potential pollution from new development should be borne by the developer.

Technical Objectives:

The project steering committee, in consultation with stakeholders, revised the technical objective developed in Step 1 to form the following 13 technical objectives, grouped into four major categories: Water Quality, Water Quantity, Natural Areas and Wildlife and Sewer System, to direct the development of the WWFMMP.

Water Quality

Meet or exceed guidelines for water and sediment quality:

Contribute to achieving federal, provincial and municipal water and sediment quality objectives and guidelines in area watercourses and along the waterfront.

Virtual elimination of toxics through pollution prevention:

Contribute to the virtual elimination of toxic contaminants in groundwater and surface water utilizing the principle of pollution prevention at the source.

Improve water quality in rivers and the lake for body contact recreation:

Improve water quality for body contact recreation in rivers and recreational areas and reduce posting of beaches by the Medical Officer of Health.

Improve aesthetics:

Contribute to eliminating objectionable deposits, nuisance algae growth, unnatural colour, turbidity and odour in order to improve the aesthetics of area surface waters.

Water Quantity

Preserve and Re-establish a natural hydrologic cycle:

Contribute to the re-establishment of a more natural hydrologic process to protect and restore groundwater and surface water resources, based on maximizing permeability and minimizing runoff at source.

Reduce erosion impacts on habitats and property:

Manage wet weather flows to reduce erosion impacts on stream and riparian habitats on public and private properties and open spaces.

Eliminate or minimize threats to life and property from flooding:

Eliminate or minimize threat to life and property from flooding.

Natural Areas and Wildlife

Preserve, re-establish and rehabilitate natural features (e.g., wetlands):

Contribute to the protection, enhancement and restoration of natural features and functions such as wetlands and riparian and other ecological corridors.

Achieve healthy aquatic communities:

Contribute to achieving healthy aquatic communities, including warmwater or coldwater fisheries as appropriate.

Reduce fish consumption advisories:

Contribute to reducing fish consumption advisories due to local wet weather sources.

Sewer System

Eliminate discharges of sanitary sewage:

Eliminate discharges of sanitary sewage to receiving waters including those associated with CSOs, SSOs, treatment plant bypasses, illegal cross-connections and spills.

Reduce infiltration and inflow to sanitary sewers:

Reduce sanitary sewer infiltration and inflows to City design standards.

Reduce basement flooding:

Manage wet weather flow to reduce basement flooding.

3. Development of The Wet Weather Flow Management Master Plan

The development of the Wet Weather Flow Management Master Plan was initiated in 2000 and included establishing targets, filling data gaps, development of strategies for controlling wet weather flow impacts on the environment, preparation of an implementation plan and a monitoring plan. Concurrently, a WWF Management Policy and a dedicated and sustainable funding mechanism to support the implementation of the WWFMMP were also developed.

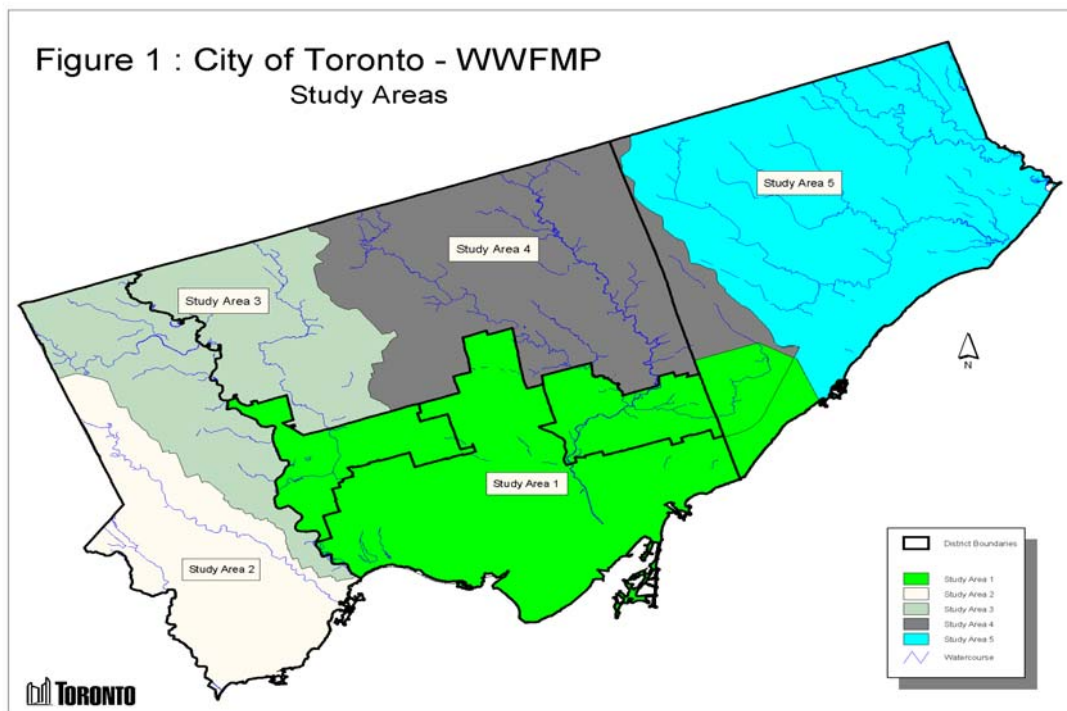
3.1. Study Area

The study area extends across the whole City of Toronto, encompassing the six major watersheds of the Rouge River, Highland Creek, Don River, Humber River, Mimico Creek, Etobicoke Creek and the lake-based watersheds draining directly to Lake Ontario.

With the exception of the Highland Creek watershed, the remaining five watersheds extend beyond the City's borders. Although the Master Plan is focused on the area contained within the City's boundaries the study extended to include the entire watershed and therefore collaboration with the bordering municipalities was essential in forecasting the potential future impact on the watersheds. A collaborative effort with these municipalities, TRCA and the provincial ministries of the Environment and Natural Resources will be essential to improve and protect the environmental health of these systems in the future.

Consistent with the watershed based planning approach, the City was divided into six (6) separate study areas on a watershed basis and the Lakefront. A separate study team was engaged for each study area, illustrated in Figure 1, and summarized as follows:

- Study Area 1 - The total combined sewer service area in the City of Toronto, which includes sections in the former municipalities of East York, York, Toronto, and Scarborough was undertaken by the Joint Venture of MacViro Consultants Inc. and CH2M HILL Canada;
- Study Area 2 - Mimico Creek and Etobicoke Creek watersheds and the corresponding Lakefront watershed in Etobicoke was undertaken by Totten Sims Hubicki Associates;
- Study Area 3 - Humber River watershed area excluding the combined sewer area was undertaken by XCG Consultants Ltd.;
- Study Area 4 - Don River watershed area excluding the combined sewer area was undertaken by Marshall Macklin Monaghan Limited;
- Study Area 5 - Rouge River and Highland Creek watersheds and the corresponding Lakefront watershed in Scarborough was undertaken by Aquafor Beech Limited; and
- Study Area 6 - The City waterfront from the mouth of the Rouge River to the mouth of Etobicoke Creek was undertaken by Modelling Surface Water Limited.



3.2. Public Consultation

The Mediation Agreement “Mediator’s Report, City of Toronto Environmental Assessment, Main Treatment Plant (MTP), by Stephen Garrod, April 16, 1999”, developed during the Ashbridges Bay (formerly the “Main”) Sewage Treatment Plant Environmental Assessment, specified that the public consultation for the WWFMMP had to be at least as comprehensive and inclusive as if the project were to undergo a full Environmental Assessment (EA), even though it is being carried out as a Class EA. The notification, communication and consultation activities and results met those requirements.

Lura Consulting was engaged to develop, implement and document the public consultation program in accordance with the Municipal Class Environmental Assessment process.

A multi-stakeholder Steering Committee was formed to advise the Commissioner of Works and Emergency Services on the development of the WWFMMP. Composition of the WWFMMP Steering Committee was as follows:

- 12 public members
- 2 City Councillors (+ 1 alternate)
- 6 staff representatives
 - Water & Wastewater Services Division (2 representatives)
 - Technical Services Division
 - Transportation Services Division
 - Urban Planning and Development Services Division
 - Parks and Recreation Division
- 4 agency representatives
 - Ontario Ministry of the Environment
 - Ontario Ministry of Natural Resources
 - Toronto and Region Conservation Authority
 - Waterfront Regeneration Trust

A Public Consultation Sub-Committee of the Steering Committee were core contributors to the public consultation program, providing valuable input and direction and helping to ensure that the WWFMMP benefited from contributions from a wide range of perspectives and interests.

Public consultation activities consisted of fifteen study area workshops held around the City; one City-wide workshop; twelve focus groups held with residential property owners, industrial, commercial, and institutional property owners and developers; the distribution of a “Progress Update” document providing an “Opportunity Assessment” to watershed and other target groups; two formal meetings with representatives from government agencies; and two meetings with the “905” municipalities to introduce the study, preliminary findings and discuss common initiatives. Additional consultation included the mailing of two newsletters to over 5,500 individuals and groups; outreach to and meetings with community and watershed groups; ongoing meetings and liaison with individual agencies; as well as e-consultation through the City’s Web site.

Public input received throughout the process helped to shape the Wet Weather Flow Management Master Plan. The engagement of stakeholders during the planning stages was also an important step towards establishing longer-term partnerships and leveraging support for implementation of the Master Plan. As in the planning process, communications, public outreach and consultation activities will be critical components of the plan implementation. In addition to the public education and outreach component of the WWFMMP, which will involve a wide array of both communications and public involvement activities, many of the individual projects will be subject to their own Environmental Assessment processes, and community involvement will be integral to these projects.

The consultation work was divided into the following four stages:

Stage 1:- Introduction and Target Setting (August – December 2000) - introduced the Master Planning process to stakeholders, obtained feedback and advice on the project objectives, as well as the target-setting framework, and collected local knowledge regarding watershed issues. Efforts to engage stakeholders and members of the public began with notification, a newsletter, media communications, and advertising. Following this initial phase of awareness-building, consultation on targets on a watershed-wide basis began. The public at large was involved through workshops in each study area and e-consultation through the City's Web site. Government review agencies and "upper watershed" area municipalities were also consulted through special working sessions and individual meetings. An opportunity to identify linkages between the five study area watersheds and the City-wide targets was provided at the RAP Summit on November 18, 2000 where wet weather targets were one of the discussion topics.

Stage 2: Options, Indicators and Evaluation Criteria (January 2001 – March 2002) - sought community and stakeholder input on a wide range of potential stormwater management control alternatives, focusing on people's "willingness to implement" various measures, as well as the approach for evaluating and deciding on different management strategies that would work best in Toronto. Consultation activities included a City-wide workshop; focus groups with City of Toronto staff, including one with members of Toronto's Interdepartmental Environment (TIE) Group, and two with District Operations Managers in the Works & Emergency Services Department; four with City of Toronto residents; and five with representatives of other key "sectors" including the industrial, commercial and institutional sectors, and members of the development community; a workshop with "upper watershed" municipalities; and a number of meetings with community and watershed-based groups. Communication efforts included a second WWFMMP newsletter, a detailed Progress Update, and e-consultation through the City's Web site.

Stage 3: Alternative Management Strategies (April 2002 – July 2002) - obtained community and stakeholder input on a short list of alternative stormwater management strategies; the approach and criteria for choosing the preferred strategy; and actions and initiatives in each study area and across the City as a whole, that should take priority during implementation of the Master Plan. Communications with stakeholders continued through direct mail, the City's Web site and advertising in community newspapers. The consultation program in Stage 3 involved a series of five study area workshops on the alternative management strategies.

Stage 4: Preferred Management Strategies (August 2002 – December 2002) - Stage 4 obtained community and stakeholder input on the preferred City-wide and study area strategies; the 25-year Implementation Plan and financing options; and the willingness of individuals and community groups to get involved with implementation. Communications with stakeholders continued through direct mail, the City's Web site and advertising in community newspapers. The consultation program in Stage 4 involved a series of five study area workshops on the preferred management strategies; a number of meetings with community and watershed-based groups; and e-consultation through the City's Web site.

Many different consultation reports and products were prepared during the course of implementing the Step 2 WWFMMP public consultation program. These reports provide documentation of specific consultation activities, results and action that was taken as a result of that advice. These reports are contained in the "*City of Toronto, Wet Weather Flow Management Master Plan, Public Consultation Summary Report*", by Lura Consulting, April 2003, under a separate cover.

3.3. Development of the Wet Weather Flow Management Strategies

Initial activities in the development of WWF management strategies included establishing targets, evaluation criteria and identifying WWF control measures.

Targets were established for the thirteen WWFMMP objectives. Three levels of targets were established: "maintaining status quo"; achieving a "moderate level of improvement" which will result in improved conditions within the watersheds, subwatersheds and infrastructure; and "achieving a significant level of improvement" (i.e. meeting the Provincial Water Quality Objectives).

Evaluation criteria for the assessment of alternative wet weather flow management strategies were established incorporating: adherence to the WWFMMP principles, effectiveness in meeting the study objectives, operational and maintenance criteria as well as social/cultural, environmental and economic factors.

Over 90 potential stormwater management and combined sewer overflow control measures were compiled for consideration in the development of the alternative strategies. They are documented in the "*City of Toronto, Wet Weather Flow Program, List of CSO/Stormwater Control Alternatives, Final Report*", TSH et al [Totten Sims Hubicki Associates Aquafor Beech Limited MacViro Consultants Inc. and CH2M HILL Canada Limited Marshall Macklin Monaghan Limited XCG Consultants Limited], March 2002". They are categorized as source controls, conveyance controls, end-of-pipe controls, and special measures which are not actual WWF "control works" but provide an enhancement that will provide a watershed or stream improvement, such as the removal of fish barriers. Evaluation of management & operational practices is documented under a separate cover in "*Management/Operation Practices, City of Toronto Wet Weather Flow Management Master Plan*", TSH et al, July 2003.

Subsequent tasks included the development and evaluation of alternative strategies, the selection of a preferred strategy, the development of a 25 year implementation plan and a monitoring plan that will measure the effectiveness of the strategies as they are implemented.

Documentation of the various tasks, including assumptions, conclusions and recommendations, is provided in the following individual technical reports (including appendices) :

- *City of Toronto, Wet Weather Flow Management Master Plan, CSO Study Area, Final Report*, by MacViro Consultants Inc. and CH2M HILL Canada, June 2003;
- *City of Toronto, Toronto Wet Weather Flow Management Master Plan, Area 2: Etobicoke and Mimico Watersheds, Final Report*, by Totten Sims Hubicki Associates, July 2003;
- *City of Toronto, Wet Weather Flow Management Master Plan, Study Area 3, Humber River, Final Report*, by XCG Consultants Ltd., July 2003;
- *City of Toronto, Wet Weather Flow Management Master Plan – Stage 2, Don River Watershed, Study Area 4, Final Report*, by Marshall Macklin Monaghan Limited, July 2003;
- *Area 5, Highland Creek, Rouge River and Waterfront Area, Final Report*, by Aquafor Beech Limited, July 2003;
- *City of Toronto WWFMMP, Waterfront Water Quality Response*, by Modelling Surface Water Limited, July 2003; and
- *Wet Weather Flow Management, Master Plan, Waterfront Response, Final Report*, City of Toronto, July 2003.

3.4. Alternative Strategies

Through a strategic planning process a number of alternative strategies for the management of wet weather flow impacts were formulated. Each of the alternative strategies were developed using a hierarchical approach to stormwater management: considering source controls measures first, then conveyance controls measures followed by end-of-pipe control measures based on a set of assumptions summarized as follows:

Strategy 1:- (Status Quo) implementation of Stormwater Best Management Practices (BMPs) that maintain existing environmental conditions with future intensification within the City.

Strategy 2:- (Opportunistic) implementation of opportunistic BMPs (i.e. those BMPs that could be implemented as opportunities arise).

Strategy 3:- (Strive for Moderate Targets - end of pipe focus) implementation of BMPs that strive towards achieving moderate environmental improvements based on a voluntary uptake for source controls which requires more focus on end-of-pipe controls. Two alternative (3 and 3a) strategies were considered for the Combined Sewer Service Area consisting of different combinations of source and end-of-pipe controls.

Strategy 4:- (Strive for Moderate Targets – source control focus) implementation of BMPs that strive towards achieving the same level of moderate environmental improvements

as strategy 3 but with the focus on an enhanced level of uptake for source controls and less focus on end-of-pipe controls. Strategies 3 and 4 helped to illustrate the differences in environmental impacts and types of BMPs required when “Voluntary” versus “Enhanced” uptake for source controls are applied.

Strategy 5:- (Strive for Enhanced Targets) implementation of enhanced levels of source, conveyance and end-of-pipe control measures that strive towards achieving significant environmental improvements, such as achieving Provincial Water Quality Objectives. Three alternative (5, 5a and 5b) strategies were considered for the Combined Sewer Service Area consisting of different levels of sewer separation. Strategy 5 consists of complete sewer separation (roads and private property) whereas Strategy 5a consists of only opportunistic sewer separation or where it is needed to eliminate basement flooding and Strategy 5b consists of complete road sewer separation.

3.5. Preferred Strategy

Consistent with the requirements of the Environmental Assessment Act, the alternative strategies were assessed using the established evaluation criteria. Throughout the Plan development process, feedback from the steering committee and the broad public consultation process stressed that the WWFMMP should strive to meet Provincial Water Quality Objectives.

Based on the study philosophy and hierarchical principle, public feedback and the results of the evaluation process, Strategy 5 was selected as the preferred wet weather flow management strategy.

In the Combined Sewer Service Area, Strategy 5a was selected as the preferred strategy as it was the most flexible in ultimately achieving the study objectives, achieved higher levels of improvements in a shorter timeframe at considerably lower cost and with less social impacts than Strategies 5 or 5b.

Strategy 5a for the Combined Sewer Service Area is similar to Strategy 5 recommended in the separated sewer areas of the City. However, Strategy 5a includes road sewer separation as a measure to eliminate CSO. Road sewer separation would be implemented as required to eliminate basement flooding. In the remaining parts of the Combined Sewer Service Area, road sewer separation would be implemented on an opportunistic basis where soil conditions permit. The combined sewer overflows that remain, after accounting for the benefits of the proposed source controls and conveyance controls, would be managed through the implementation of underground storage facilities to provide detention, followed by treatment to meet the requirements of the Ontario Ministry of the Environment guidelines prescribed in Procedure F-5-5 for the control of CSO. In addition, in the next phase of the Class Environmental Assessment Process for the proposed end-of-pipe facilities within combined sewer service areas abutting separated sewer service areas, the option of separating the road drainage from the combined sewers and routing it to the abutting separated storm sewer system and providing an equivalent level of treatment to this intercepted flow, will be reviewed and assessed in greater detail.

To implement the combination of all enhanced source, conveyance and end-of-pipe control measures of the preferred strategy on a City-wide basis and to further achieve the ambitious goal of meeting Provincial Water Quality Objectives in area surface waters, the full Plan implementation may take 75 to 100 years at a cost estimated to be in the order of \$12 billion.

Consistent with the planning horizon for Master Plans, a 25 year implementation plan has been established, directed at achieving corporate priorities of health and safety (i.e. eliminate basement flooding and provide swimmable water quality at waterfront beaches), infrastructure protection (i.e., prevent stream erosion) and renewal (i.e., eliminate dry weather discharges), intensification (i.e., accommodate the City's Official Plan) and legislative requirements to eliminate combined sewer overflows (i.e., satisfy the Ministry of the Environment Procedure F-5-5).

The Implementation Plan also addresses the objectives of the City's Environmental Plan regarding water quality improvements and advances the water quality improvement objectives of the Toronto and Region Remedial Action Plan.

Overall benefits that would be incurred with the 25 year Implementation Plan are substantial across the City and include:

- Swimmable waterfront beaches
- Elimination of combined sewer overflows - in compliance with Ministry of the Environment requirements
- Elimination of dry weather discharges
- Basement flooding protection
- Protection of City's infrastructure from stream erosion
- Restoration of degraded local streams and improved stream water quality
- Reduction of algae growth along the waterfront and in streams
- Restoration of aquatic habitat

3.6. Implementation Plan

The Implementation Plan prioritizes and lists projects to be implemented over the next 25 years. The objective of the 25 year plan is to strive to meet the moderate level of targets. The plan will be reviewed and its effectiveness in achieving the targets established will be assessed in 5 year increments allowing for adjustments to the Plan if necessary. Regular updating will also permit a review of new and emerging technologies for their applicability and incorporation into the Plan.

The measures contained within the 25 year Implementation Plan consist of: an enhanced Public Education and Public Outreach Program as well as enhanced municipal operations including a dry weather discharge remediation program, shoreline management, source controls, conveyance controls, end-of-pipe controls, basement flooding protection works, stream restoration works and environmental monitoring and Plan review. A summary of the proposed works with their associated costs is provided in Table 1. A detailed listing of projects along with City maps

showing locations of proposed source controls, stream restoration, conveyance controls, end-of-pipe control measures are attached.

Table 1: 25-Year Implementation Plan

COMPONENT OF PLAN	CAPITAL COST (\$ million)
PUBLIC EDUCATION - city wide over 25 years <ul style="list-style-type: none"> focussed on increasing public awareness 	30
SOURCE CONTROLS - city wide over 25 years <ul style="list-style-type: none"> existing ~ 10-15% participation rate target of 40% participation rate is proposed 	112
MUNICIPAL OPERATIONS - city wide over 25 years <ul style="list-style-type: none"> search & eliminate Dry Weather discharges enhanced street sweeping and catchbasin cleaning monitoring of Plan implementation and effectiveness 	8
BASEMENT FLOODING – emphasis in first 5 years <ul style="list-style-type: none"> focused on cluster areas previously identified sewer system upgrading & “home isolation” program 	55
CONVEYANCE CONTROLS - city wide over 25 years <ul style="list-style-type: none"> protect existing ditch network exfiltration systems (“leaky” storm sewers) 	74
SHORELINE MANAGEMENT - implemented in first 10 years <ul style="list-style-type: none"> Humber River and Etobicoke Creek deflector structures Restoration of Highland Creek and Rouge Park Marshes 	42
STREAM RESTORATION - emphasis in first 15 years <ul style="list-style-type: none"> focus on protecting City’s infrastructure restore aquatic stream habitats 104 km of stream restoration proposed 	131
END-OF-PIPE CONTROLS- implemented over 25 years Green End-of-Pipe: Stormwater Ponds, Constructed Wetlands <ul style="list-style-type: none"> opportunistic basis where sufficient open space available 180 facilities proposed Underground Storage: space limited considerations <ul style="list-style-type: none"> necessary to address combined sewer overflows 16 CSO facilities proposed 50 stormwater facilities proposed 4 CSO treatment facilities proposed 	105 491
Total Capital Cost	1,047
Operation & Maintenance Cost (associated the new stormwater control measure)	233

The total capital cost for the 25 year Implementation Plan is estimated at \$1.047 billion resulting in an average annual expenditure of approximately \$42 million. The implementation of these new capital works will generate operational and maintenance costs estimated to be \$233 million with an accrued annual operating cost of about \$16 million projected by the end of the 25 year plan.

3.7. Monitoring and Plan Review

A monitoring plan for each study area has been prepared which includes both environmental or field monitoring complete with “desktop” monitoring. Environmental monitoring and reporting includes assessing the effectiveness of the proposed works and determining the state of the watersheds, improvements towards meeting the WWFMMP targets as well as the rate of progress. Desktop monitoring is intended to track the progress in terms of plan implementation such as the number of roof downspouts disconnected, kilometres of streams restored, number of end-of-pipe facilities commissioned, etc.

The data and analysis derived from this monitoring program will be an integral component of the Plan review process described above.

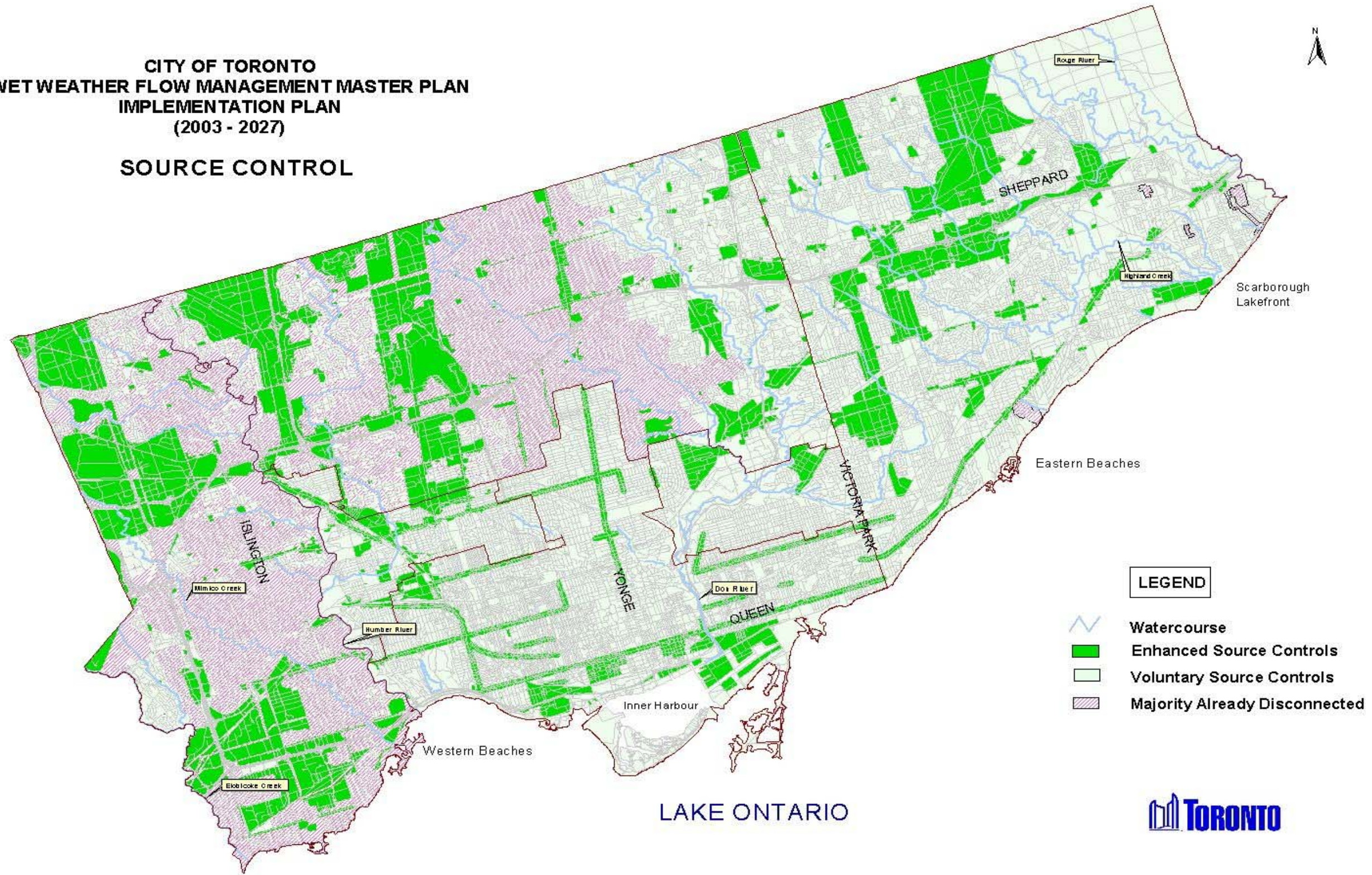
4. Funding Options And Wet Weather Flow Management Policy

To support the implementation of the Plan, the development of a sustainable and equitable funding mechanism and a harmonized Wet Weather Flow Management Policy were undertaken concurrently. Separate reports on these activities are expected to be submitted to Toronto City Council in September 2003.

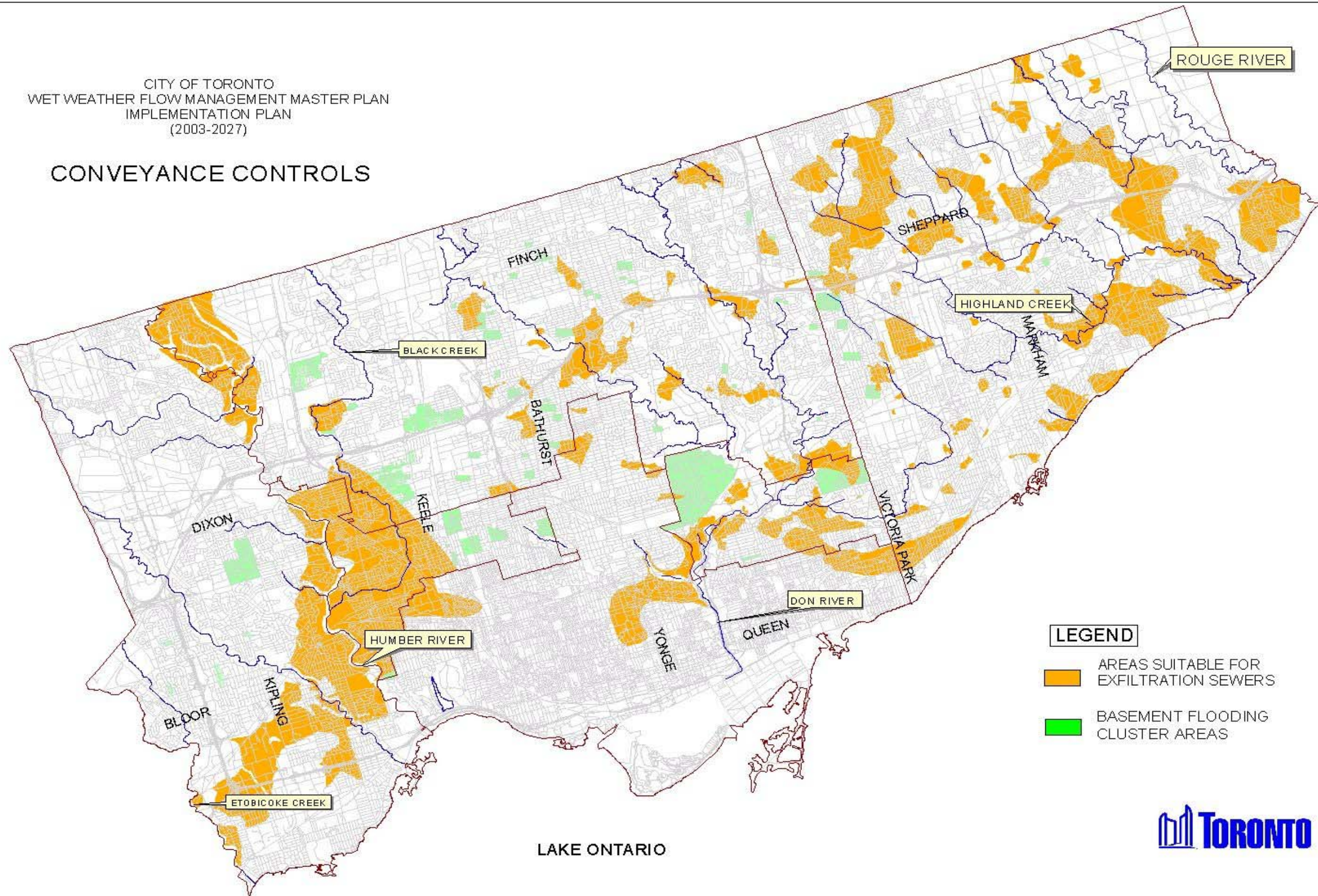
To support an expenditure of \$1 billion dollars over the next 25 years, the City’s Finance Department is assessing various funding options including increasing water rates, levying property taxes, implementing user charges apportioned to the percent impervious area of an individual lot, development charges and grants/subsidies, etc., as potential sources of revenue to finance the Plan. The financial impact on the average home owner has been estimated to be in the range of \$30 to \$90 per year depending on the funding option(s) recommended.

To guide the implementation of the WWFMMP, a Wet Weather Flow Management Policy is being developed consistent with the overall objectives and principles of the Plan. It will provide direction to City Departments, the development industry and to property owners in regards to wet weather flow management requirements.



**CITY OF TORONTO
WET WEATHER FLOW MANAGEMENT MASTER PLAN
IMPLEMENTATION PLAN
(2003 - 2027)
SOURCE CONTROL**



CONVEYANCE CONTROLS



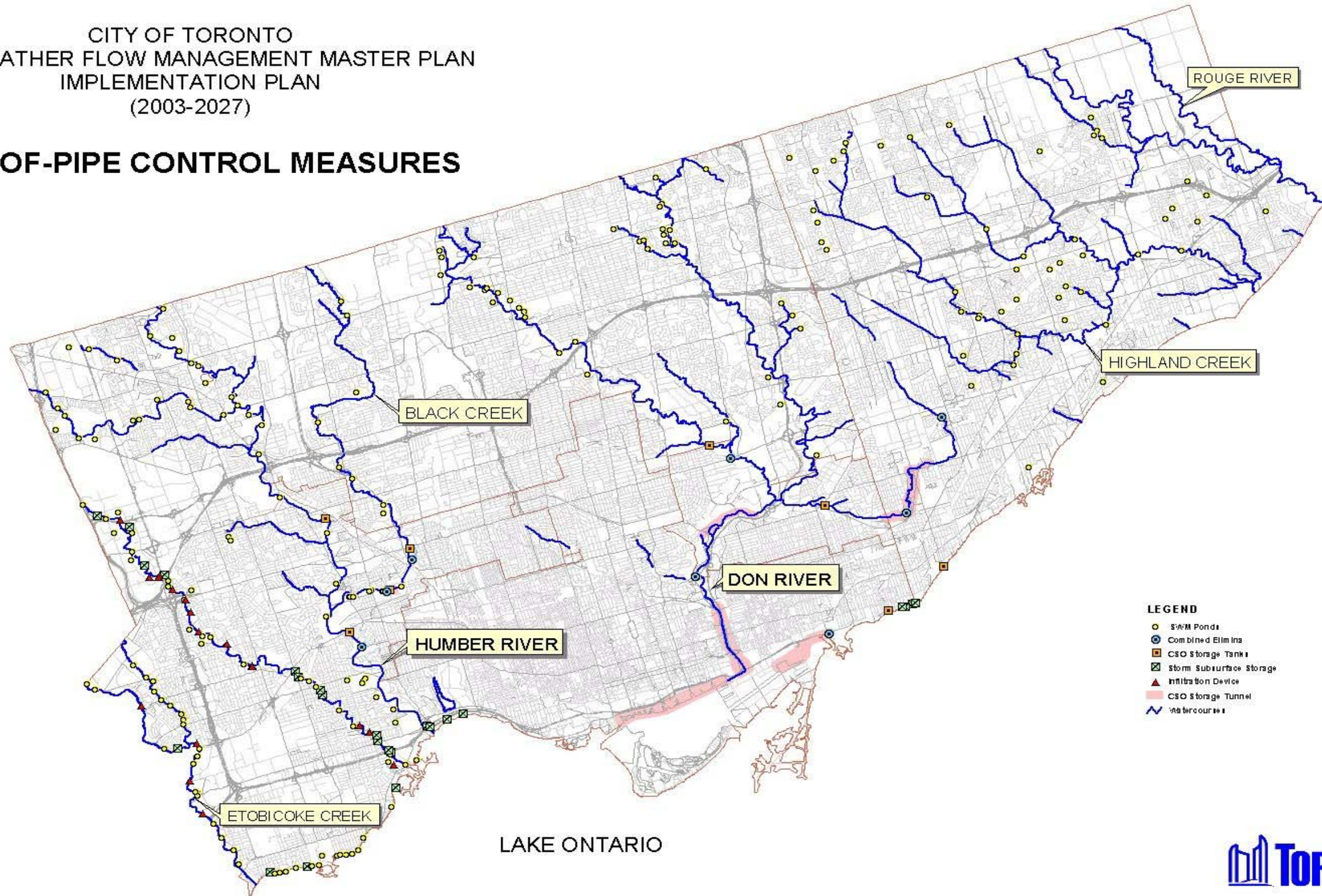
LEGEND

-  AREAS SUITABLE FOR EXFILTRATION SEWERS
-  BASEMENT FLOODING CLUSTER AREAS



CITY OF TORONTO
WET WEATHER FLOW MANAGEMENT MASTER PLAN
IMPLEMENTATION PLAN
(2003-2027)

END-OF-PIPE CONTROL MEASURES

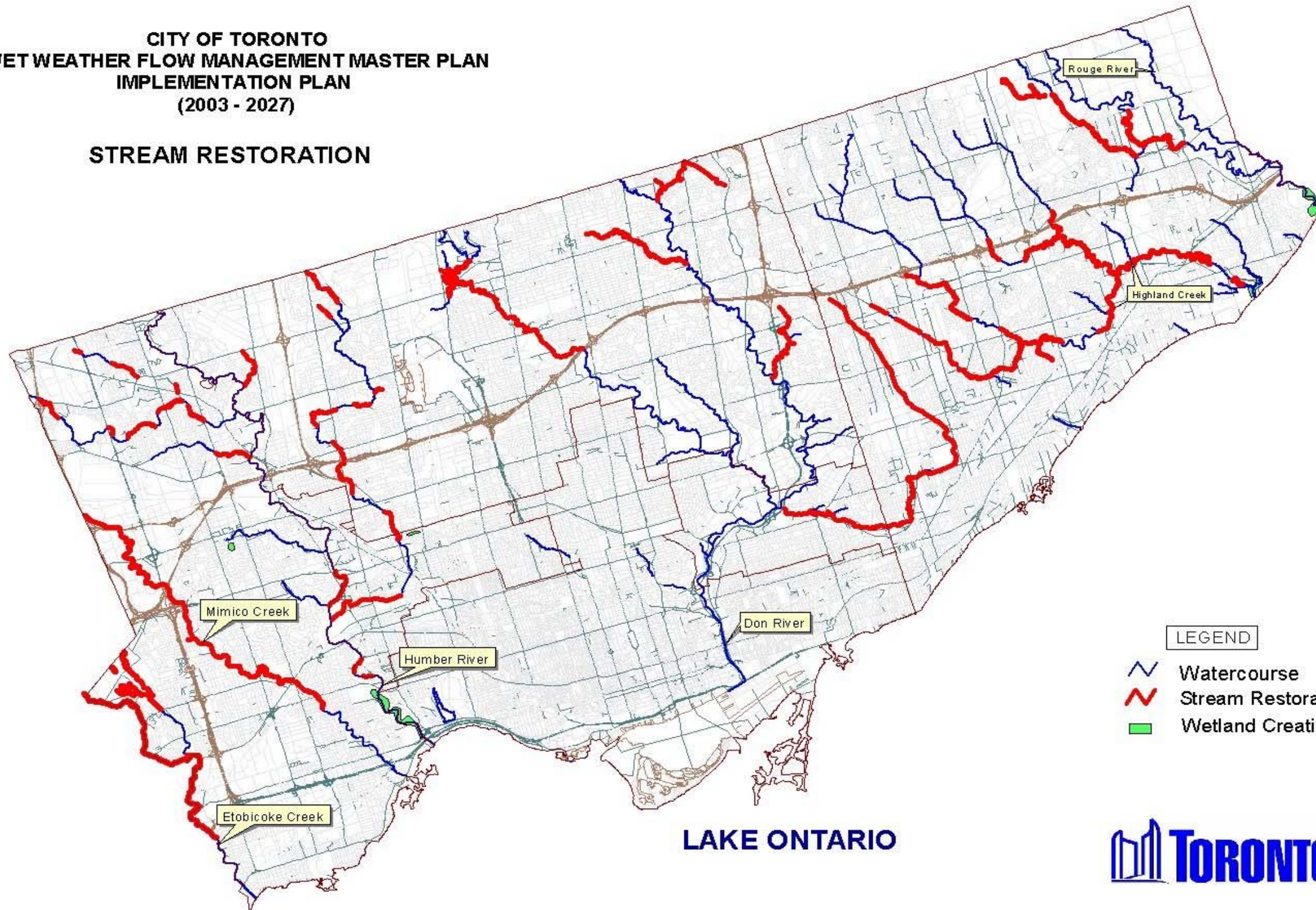


LAKE ONTARIO






**CITY OF TORONTO
WET WEATHER FLOW MANAGEMENT MASTER PLAN
IMPLEMENTATION PLAN
(2003 - 2027)**

STREAM RESTORATION



LEGEND

-  Watercourse
-  Stream Restoration
-  Wetland Creation/Restoration

