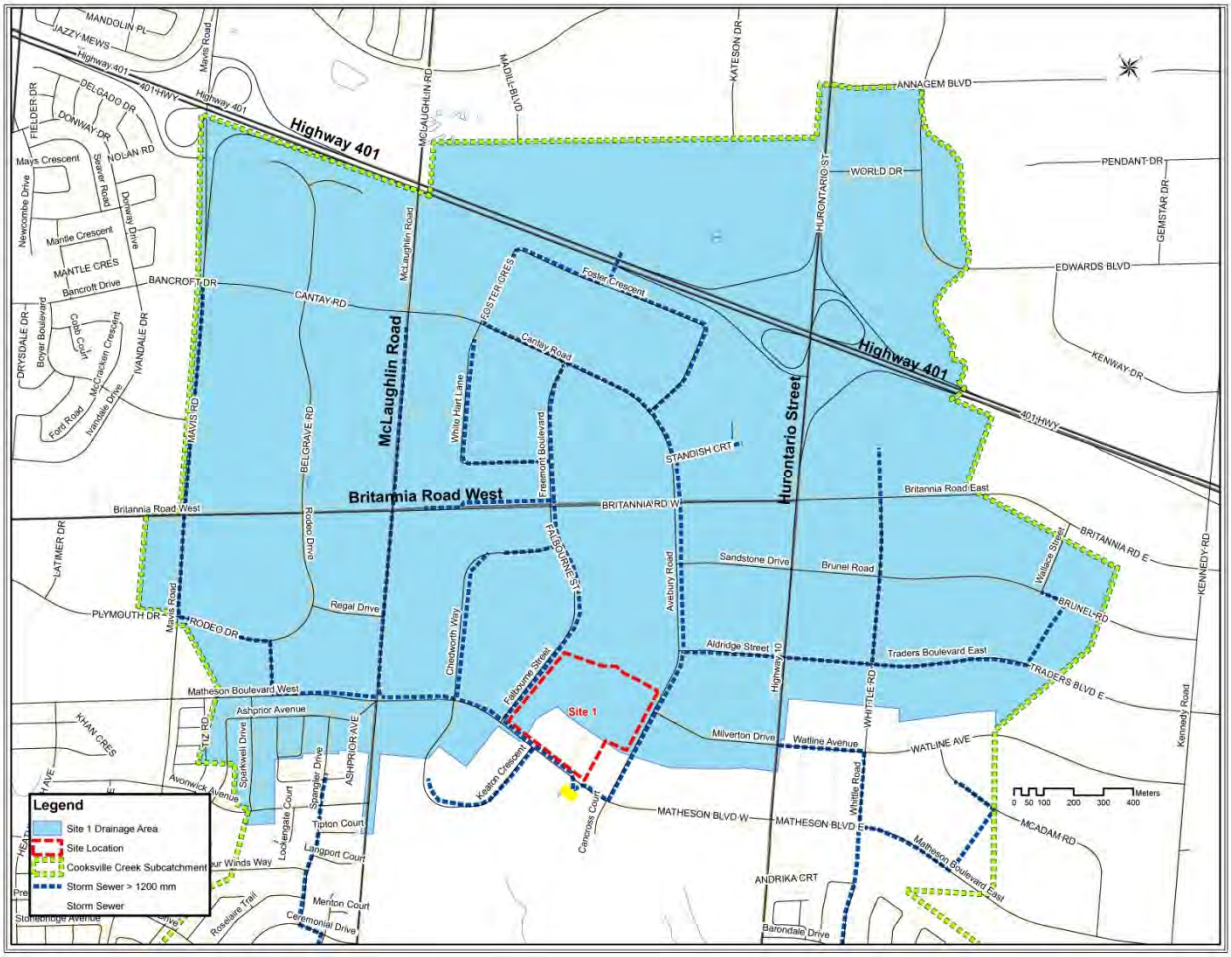
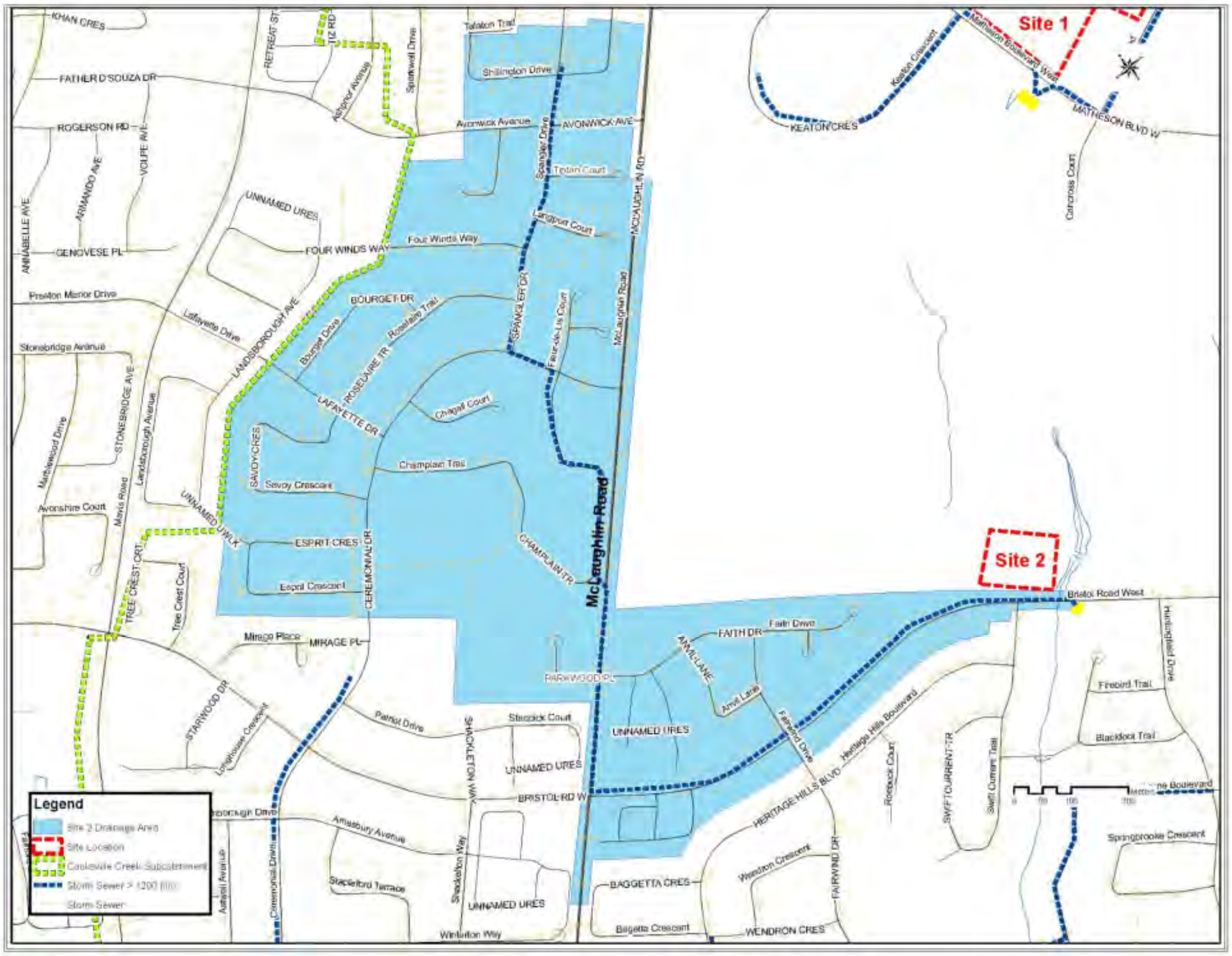
APPENDIX A

Catchment Delineation for Flood Storage Sites

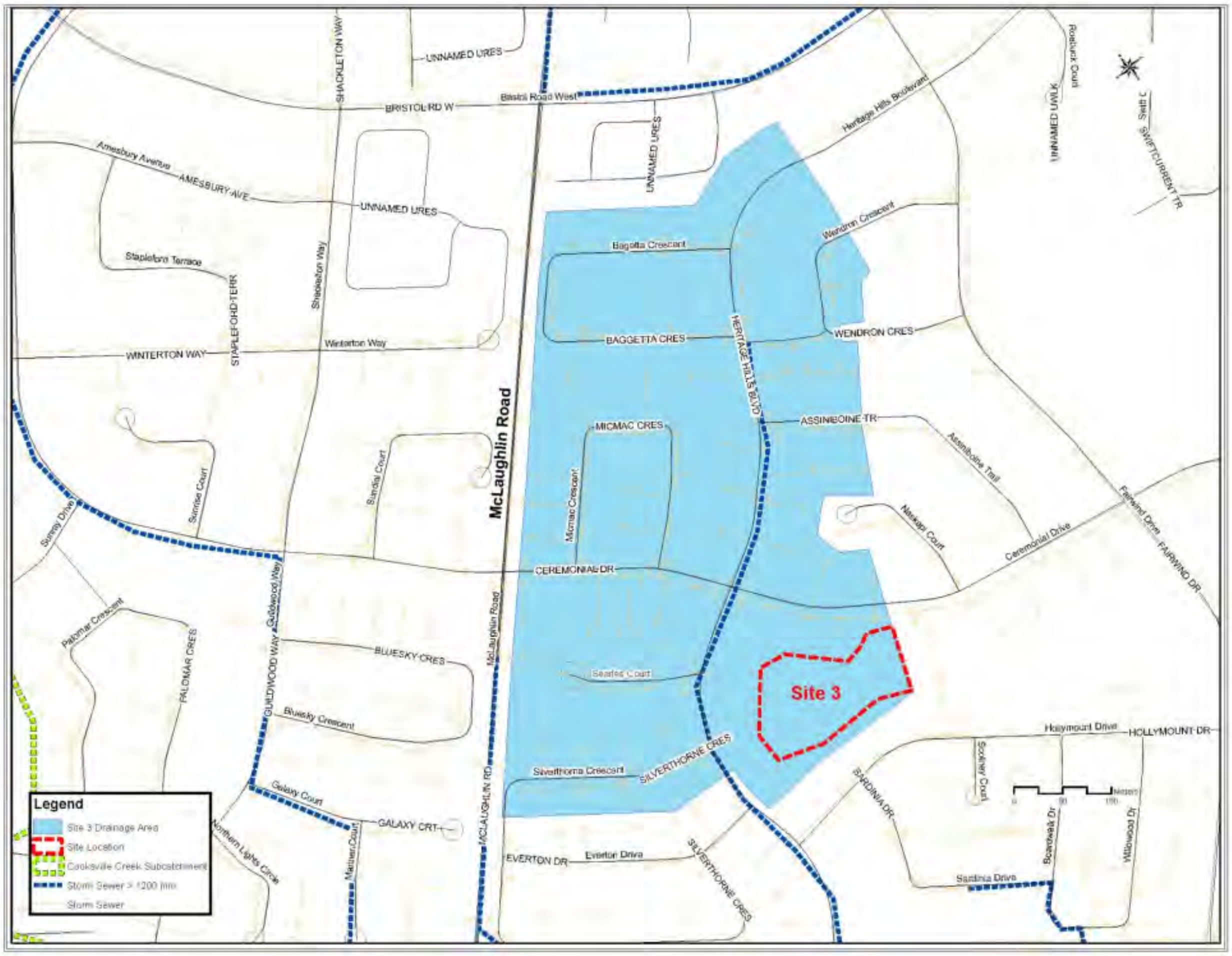
Site 1


Highway 401
McLaughlin Road
Britannia Road West
Hurontario Street
Site 1
Legend
Site 1 Drainage Area
Site Location
Cooksville Creek Subcatchment
Storm Sewer > 1200 mm
Storm Sewer
Meters
0 50 100 200 300 400

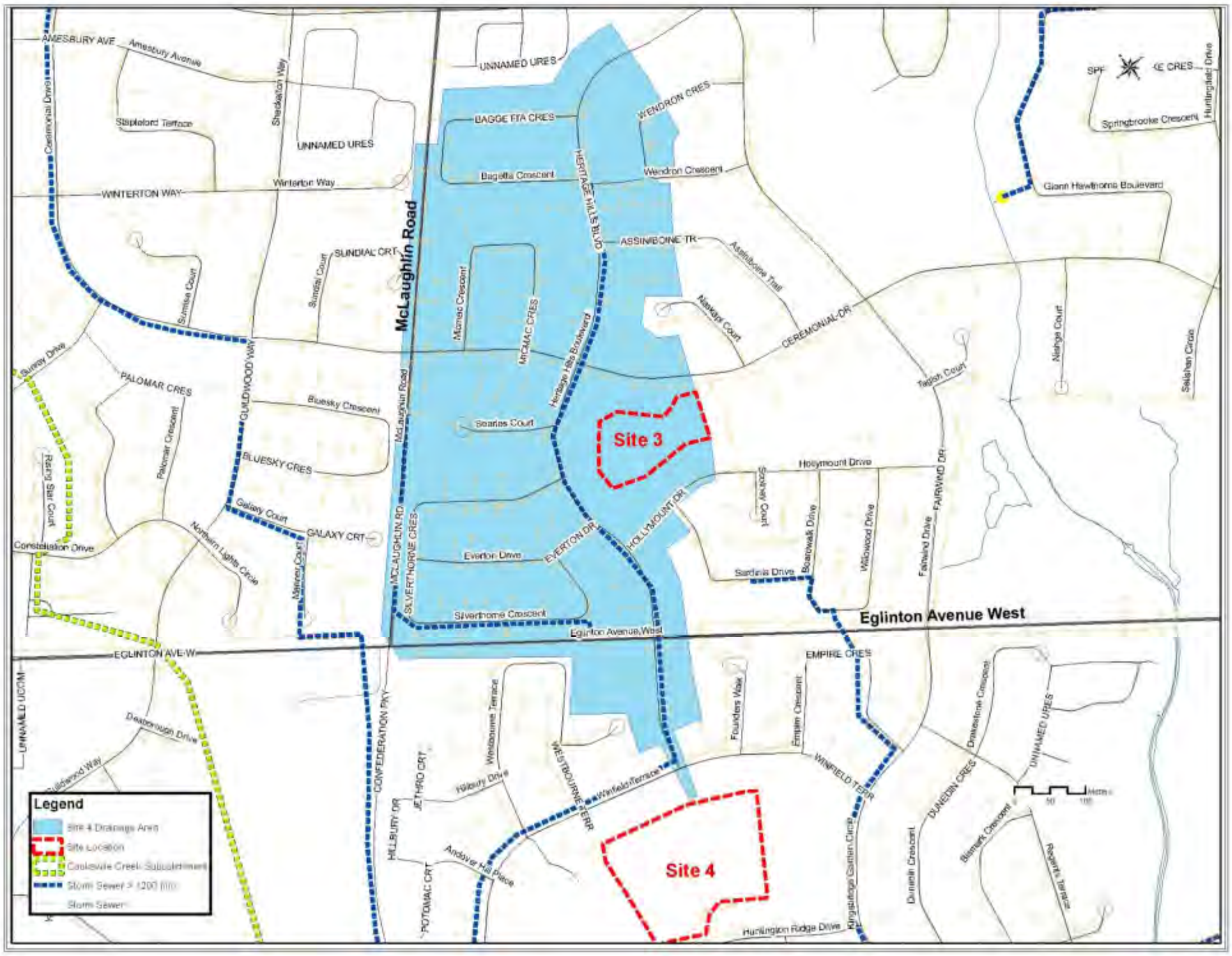
Site 2


Site 1
Site 2
McLaughlin Road
Bristol Road West
MATHESON BLVD W
KEATON CRES
FOUR WINDS WAY
AVONWICK AVE
BRISTOL RD W
HERITAGE HILLS BLVD
Legend

Site 3


Legend
Site 3 Drainage Area
Site Location
Cooksville Creek Subcatchment
Storm Sewer > 1200 mm
Storm Sewer
Site 3
McLaughlin Road
BRISTOL RD W
Bristol Road West
AMESBURY AVE
Amesbury Avenue
WINTERTON WAY
Winterton Way
SHACKLETON WAY
Shackleton Way
STAPLEFORD TERR
Stapleford Terrace
UNNAMED CRES
Baggetta Crescent
BAGGETTA CRES
Heritage Hills Boulevard
HERITAGE HILLS BLVD
Wendron Crescent
WENDRON CRES
MICMAC CRES
Micmac Crescent
ASSINIBOINE TR
Assiniboine Trail
Naskapi Court
CEREMONIAL DR
Ceremonial Drive
Fairwind Drive
FAIRWIND DR
SILVERTHORNE CRES
Silverthorne Crescent
Seaflea Court
BLUESKY CRES
Bluesky Crescent
GUILDWOOD WAY
Guildwood Way
Galaxy Court
GALAXY CRT
MCLAUGHLIN RD
McLaughlin Road
EVERTON DR
Everton Drive
SARDINIA DR
Sardinia Drive
Hollymount Drive
HOLLYMOUNT DR
Boardwalk Dr
Palomar Crescent
PALOMAR CRES
Sunrise Court
Sundial Court
Northern Lights Circle
Mariner Court
Summit Drive
SWIFTCURRENT TR
UNNAMED LWK

Site 4



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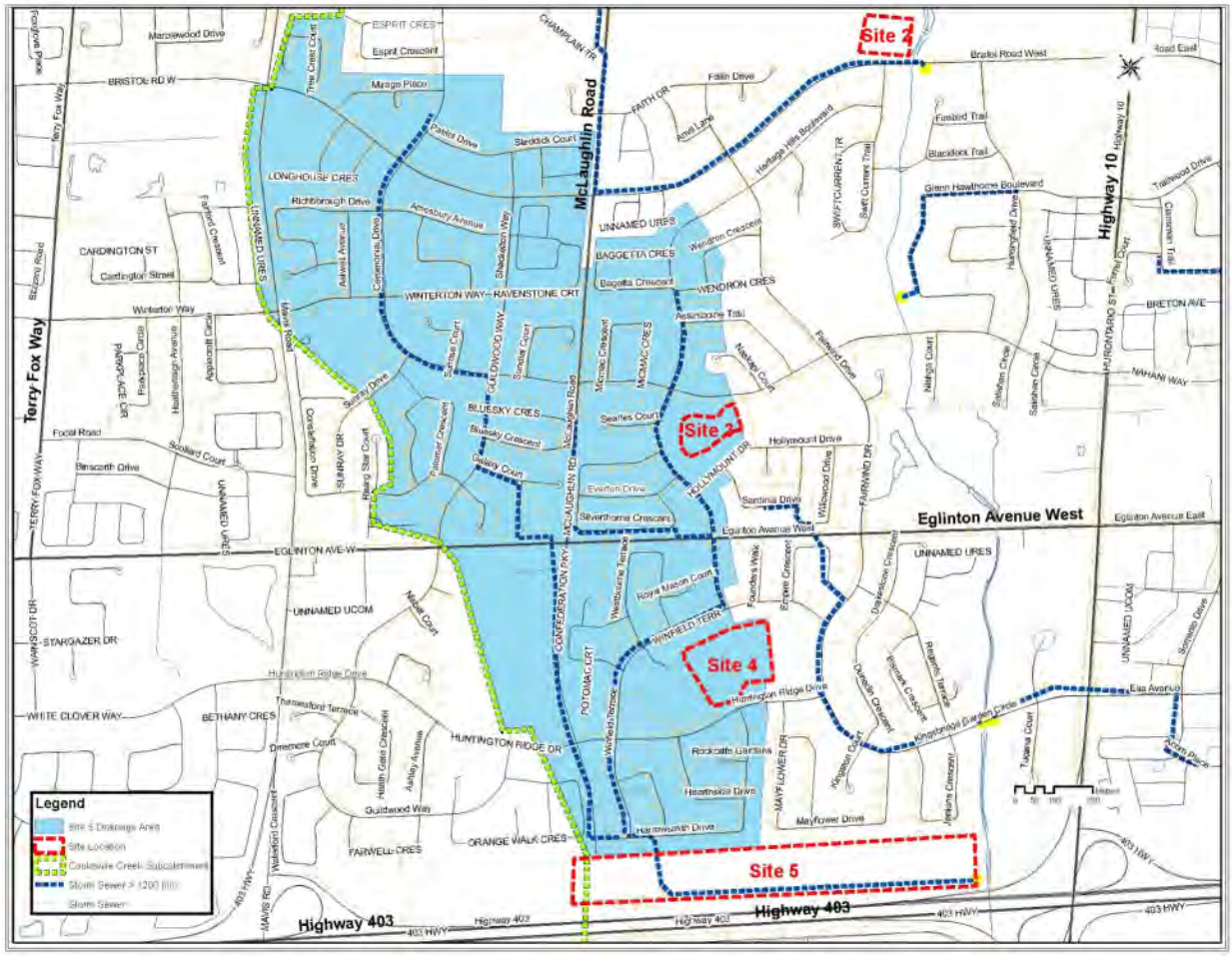
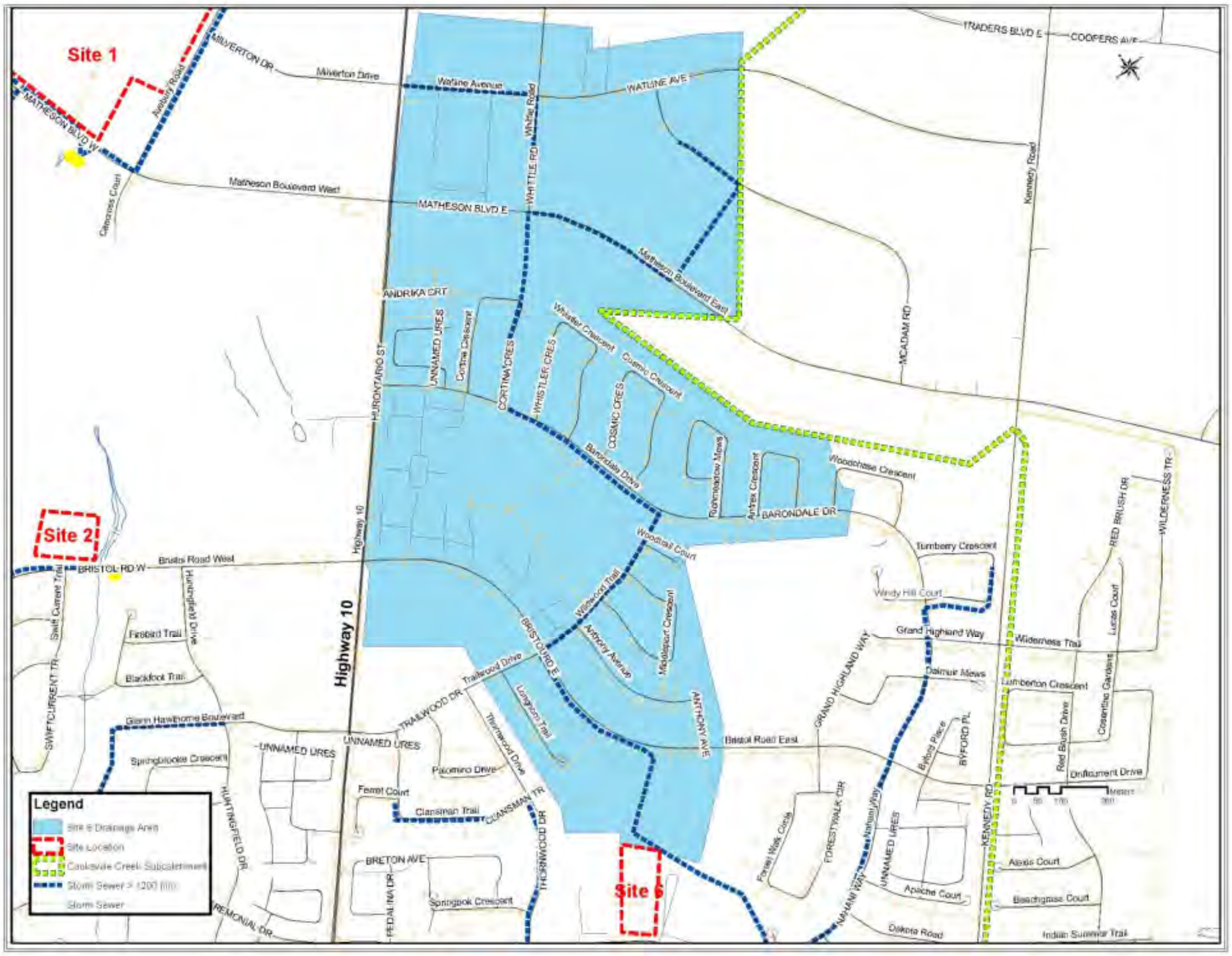

Site 1
Site 2
Site 4
Site 4
Site 5
McLaughlin Road
Terry Fox Way
Eglinton Avenue West
Highway 403
Highway 403
Highway 10
Legend
Site 5 Drainage Area
Site Location
Cooksville Creek Subcatchment
Storm Sewer
Storm Sewer

Site 6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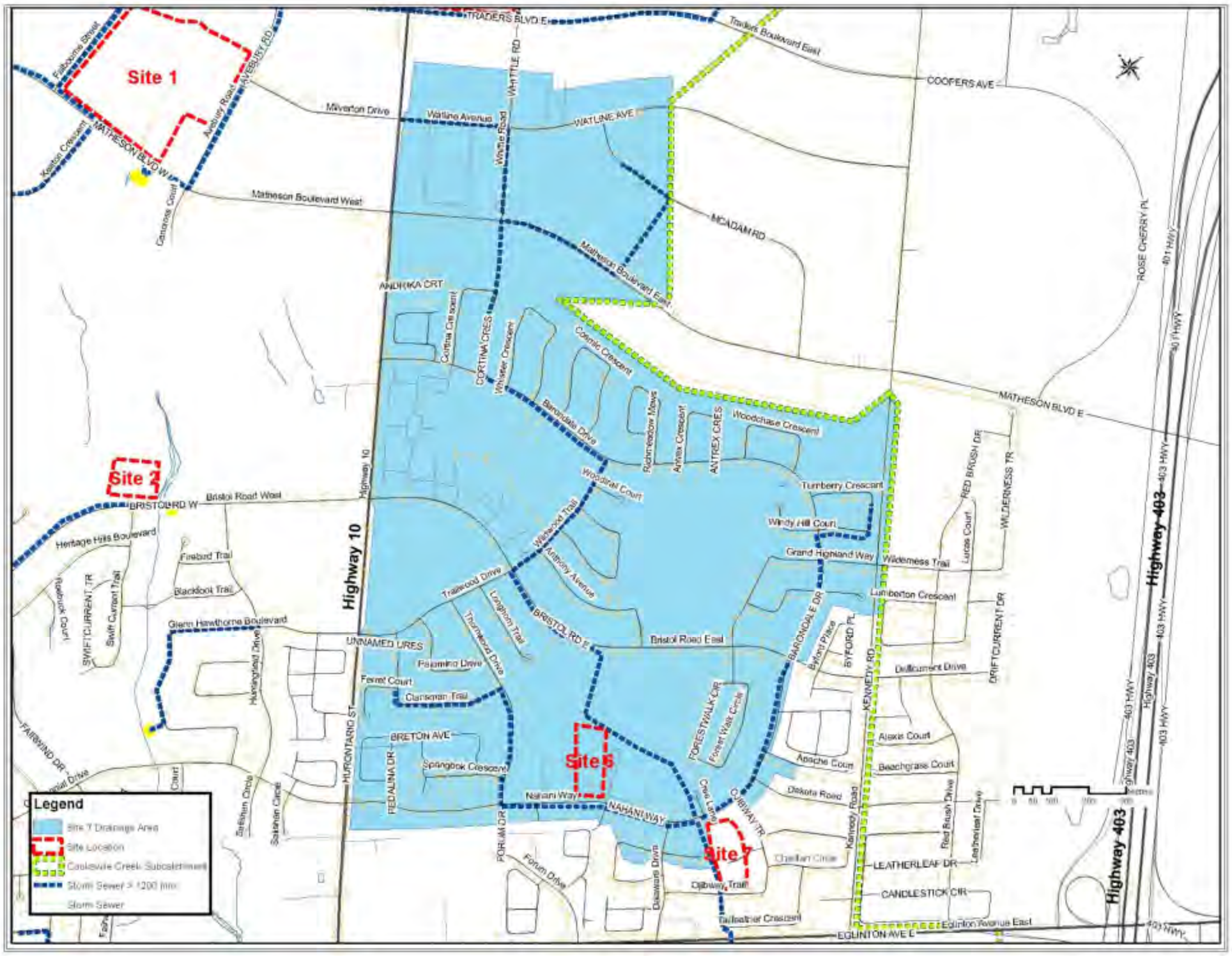
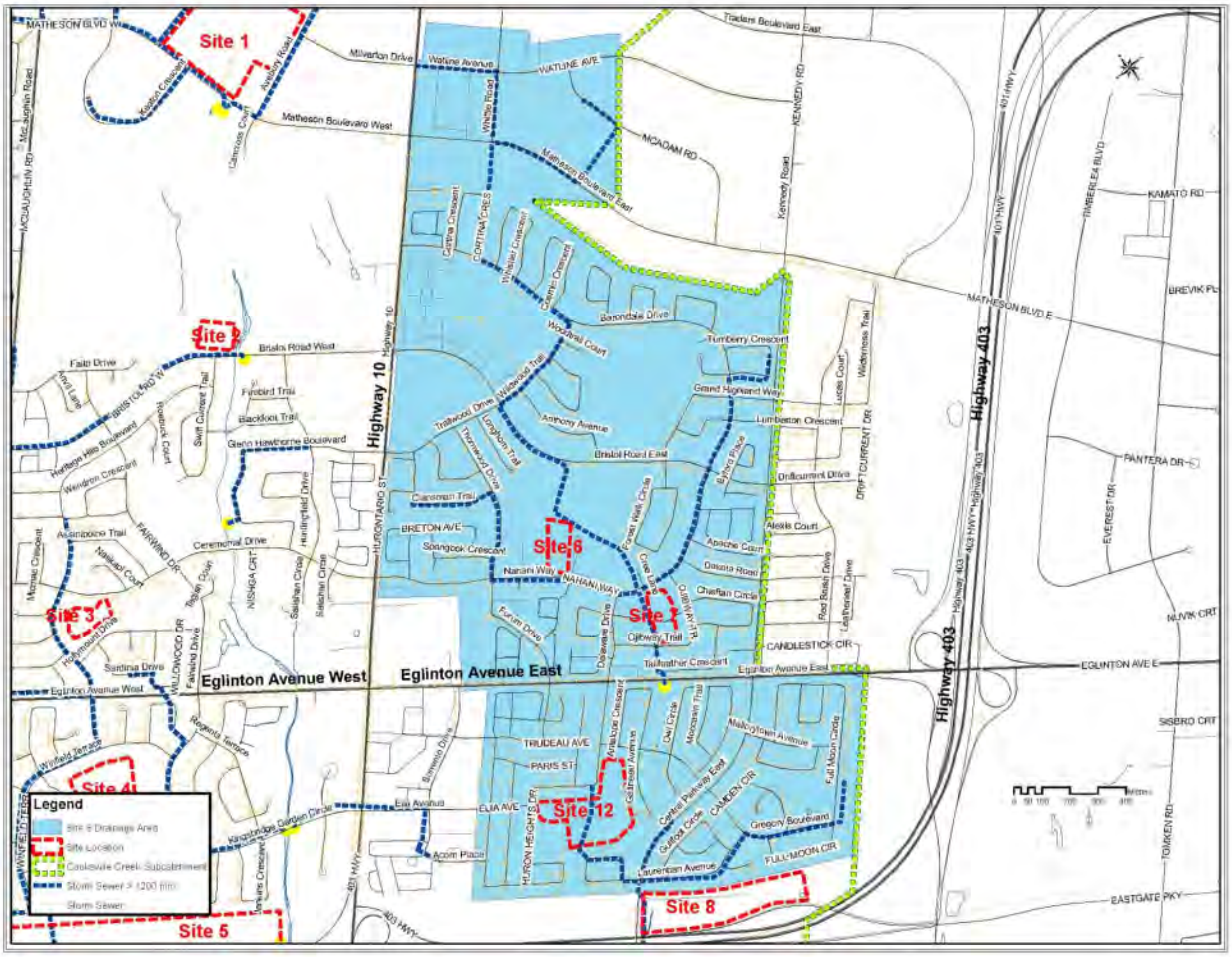
Site 2
Site 6
Highway 10
MATHESON BLVD E
Matheson Boulevard West
WATLINE AVE
BRISTOL RD W
Bristol Road East
TRADERS BLVD E
COOPERS AVE
Kennedy Road
Legend

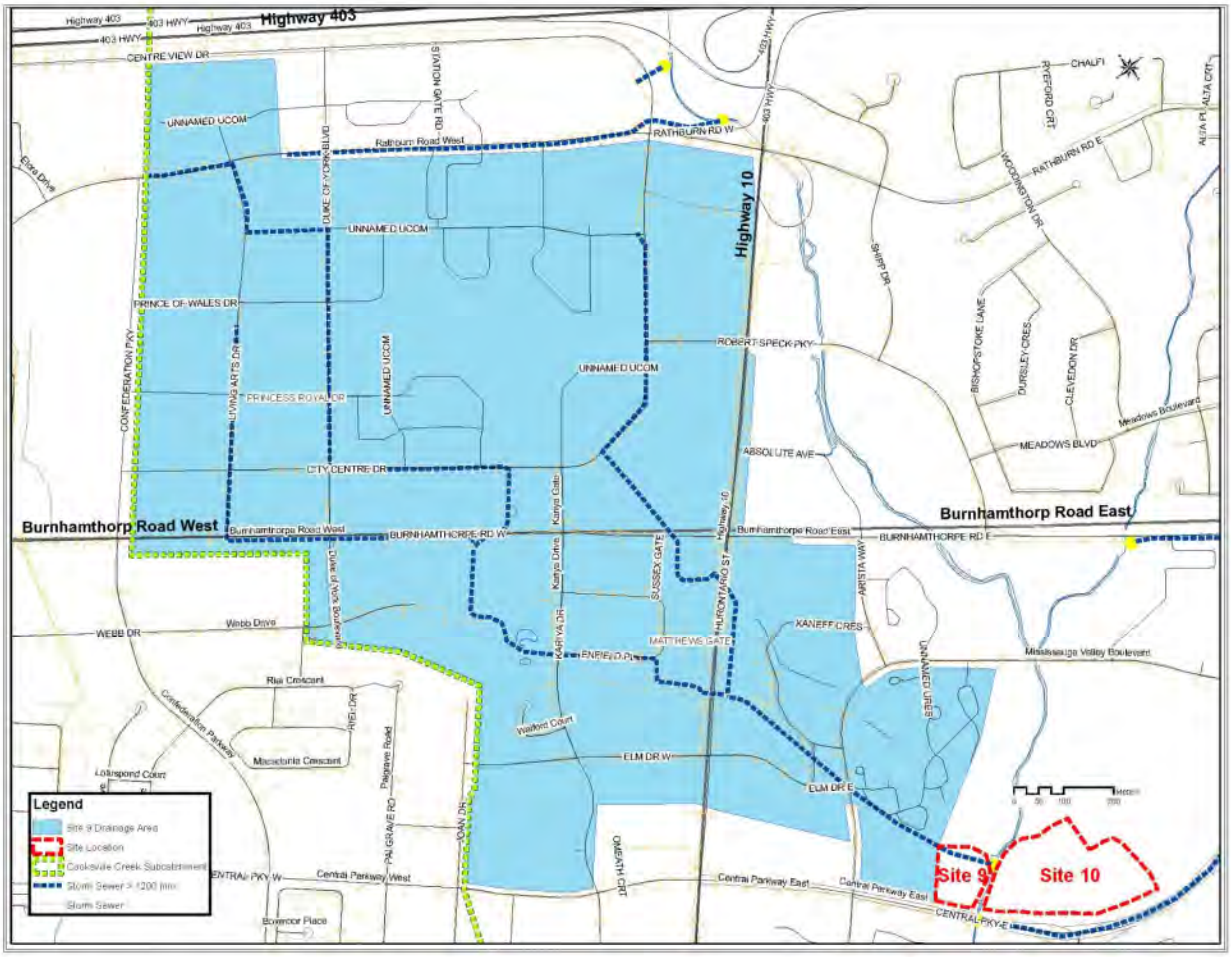
Site 7


Site 1
Site 2
Site 6
Site 7
Highway 10
Highway 403
TRADERS BLVD E
Traders Boulevard East
COOPERS AVE
Milverton Drive
Watline Avenue
WATLINE AVE
WHITTLE RD
Matheson Boulevard West
MATHESON BLVD W
Matheson Boulevard East
MATHESON BLVD E
MCADAM RD
ROSE CHERRY PL
ANDRIKA CRT
CORTINA CRES
Whistler Crescent
Bristol Road West
BRISTOL RD W
Bristol Road East
BRISTOL RD E
Heritage Hills Boulevard
Glenn Hawthorne Boulevard
UNNAMED URES
Palomino Drive
Ferret Court
BRETON AVE
Springbok Crescent
Nahani Way
NAHANI WAY
FORUM DR
Forum Drive
FORESTWALK CIR
Woodchase Crescent
Turnberry Crescent
Windy Hill Court
Grand Highland Way
Wilderness Trail
Lamberton Crescent
BARONDALE DR
SYFORD PL
KENNEDY RD
Kennedy Road
Driftcurrent Drive
DRIFTCURRENT DR
RED BRUSH DR
WILDERNESS TR
Alaska Court
Apache Court
Beachgrass Court
Dakota Road
Red Brush Drive
Leatherleaf Drive
LEATHERLEAF DR
CANDLESTICK CIR
Ojibway Trail
OJIBWAY TR
Tailfeather Crescent
Eglinton Avenue East
EGLINTON AVE E
HURONTARIO ST
FAIRWIND DR
Legend
Site 7 Drainage Area
Site Location
Cooksville Creek Subcatchment
Storm Sewer > 1200 mm
Storm Sewer

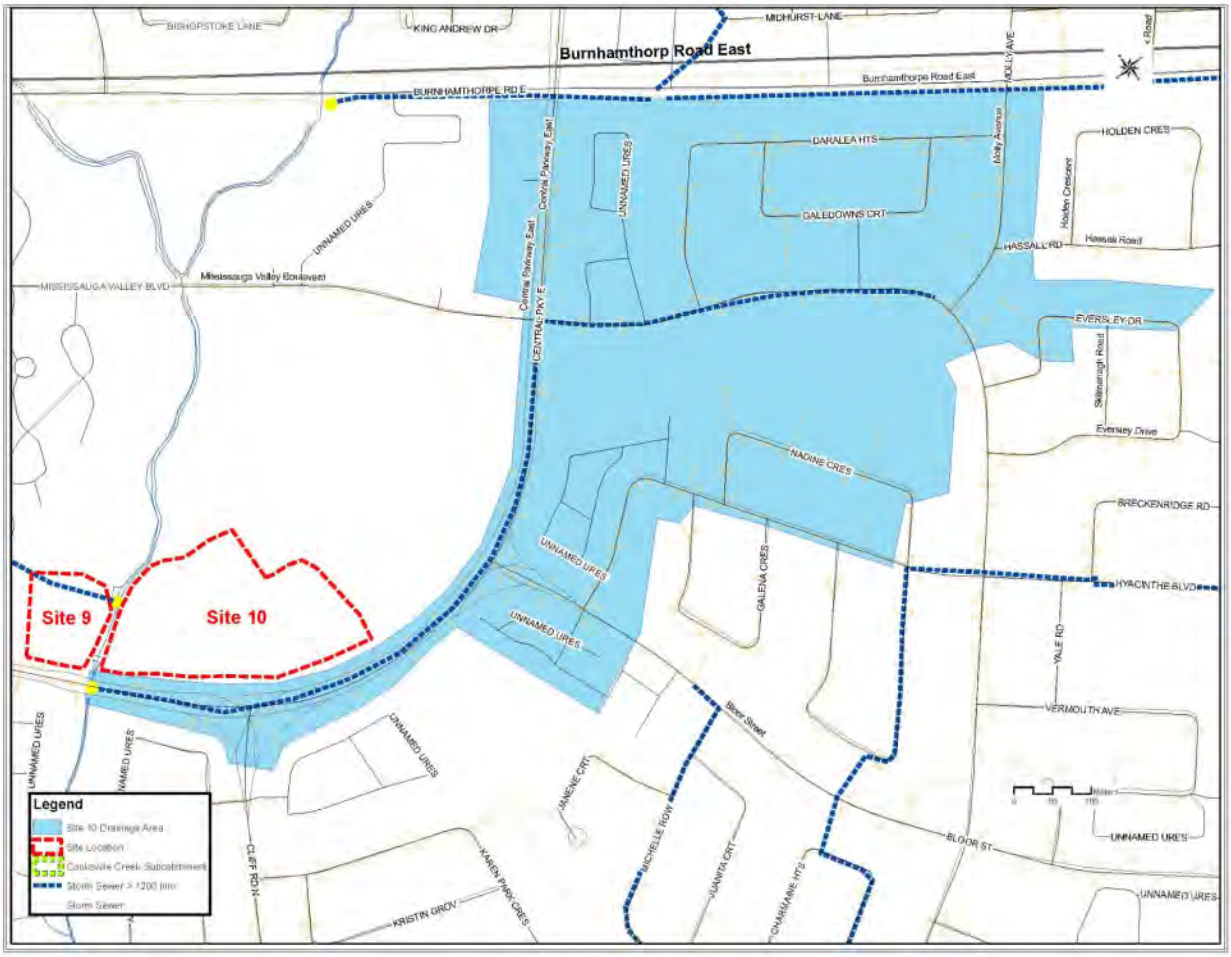
Site 8


Site 1
Site 2
Site 3
Site 4
Site 5
Site 6
Site 7
Site 8
Site 12
Eglinton Avenue West
Eglinton Avenue East
Highway 10
Highway 403
Legend
Site 8 Drainage Area
Site Location
Cooksville Creek Subdestrimers
Storm Sewer
Storm Sewer

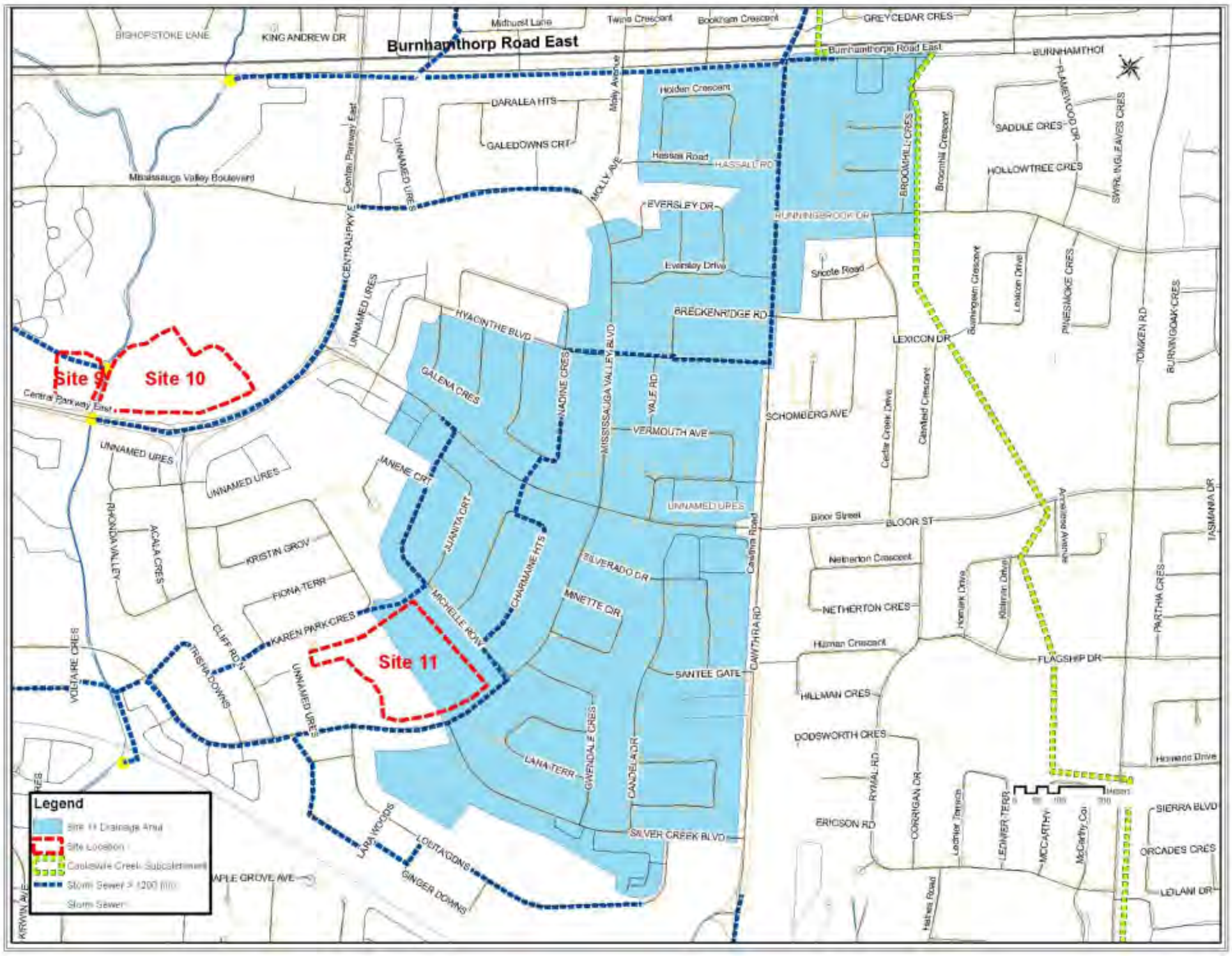
Site 9


Highway 403
Burnhamthorp Road West
Burnhamthorp Road East
Highway 10
Site 9
Site 10
Legend
Site 9 Drainage Area
Site Location
Cooksville Creek Subcatchment
Storm Sewer
Storm Sewer > 1200 mm

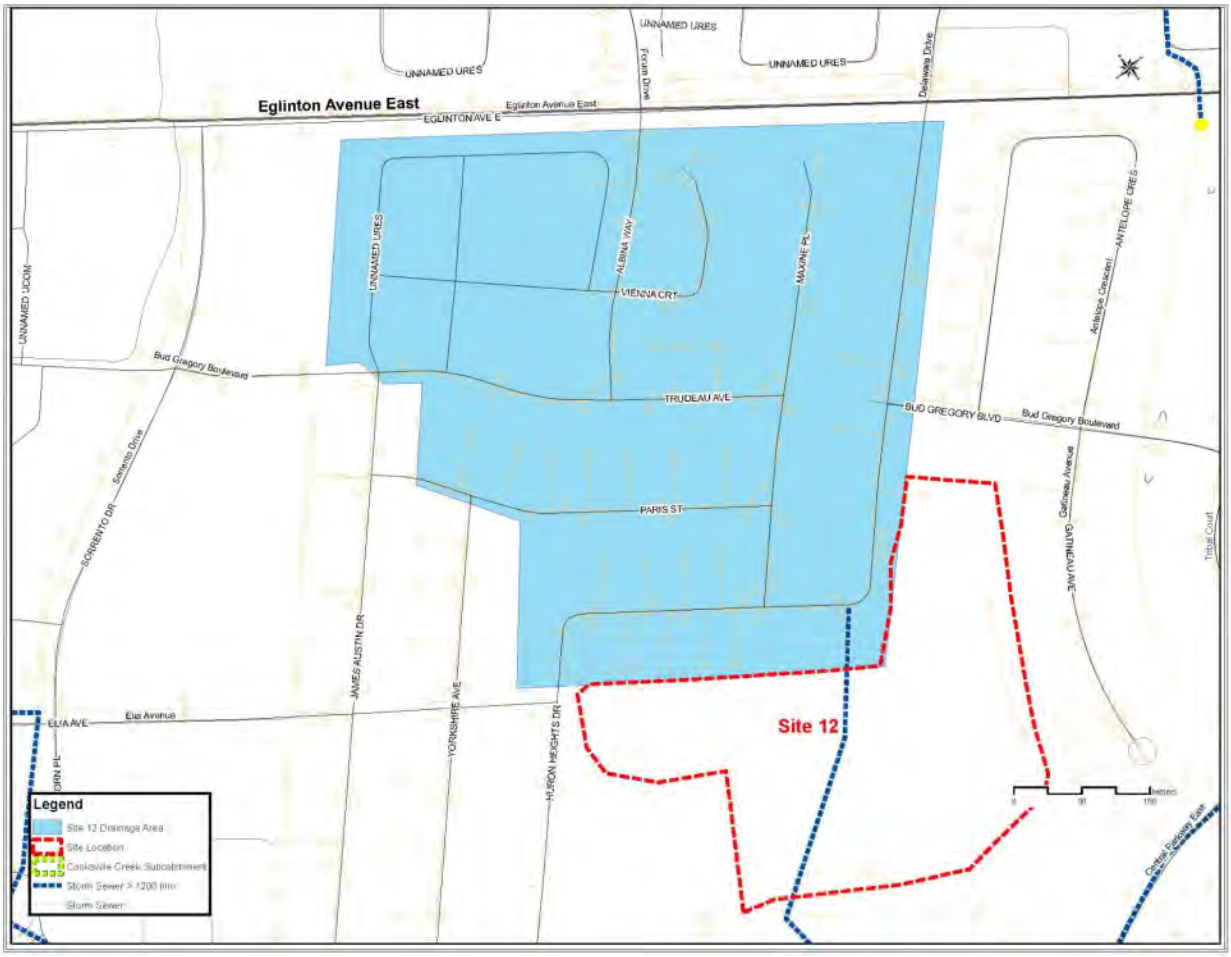
Site 10


Burnhamthorp Road East
Site 9
Site 10
Legend
Site 10 Drainage Area
Site Location
Cooksville Creek Subcatchment
Storm Sewer > 1200 mm
Storm Sewer
MISSISSAUGA VALLEY BLVD
Mississauga Valley Boulevard
CENTRAL PKY E
Central Parkway East
DARALEA HTS
GALEDOWNS CRT
HASSALL RD
Hassall Road
HOLDEN CRES
Holden Crescent
EVERSLEY DR
Eversley Drive
Skimmingh Road
NADINE CRES
BRECKENRIDGE RD
HYACINTHE BLVD
GALENA CRES
YALE RD
VERMOUTH AVE
Bloor Street
BLOOR ST
UNNAMED URES
KRISTIN GROV
KAREN PARK CRES
CLIFF RDN
MICHELLE ROW
JUANITA CRT
CHARMAINE HTS
ANANE CRT
BISHOPSTOKE LANE
KING ANDREW DR
MIDHURST LANE
BURNHAMTHORPE RD E
Burnhamthorpe Road East
HOLLY AVE
Holly Avenue

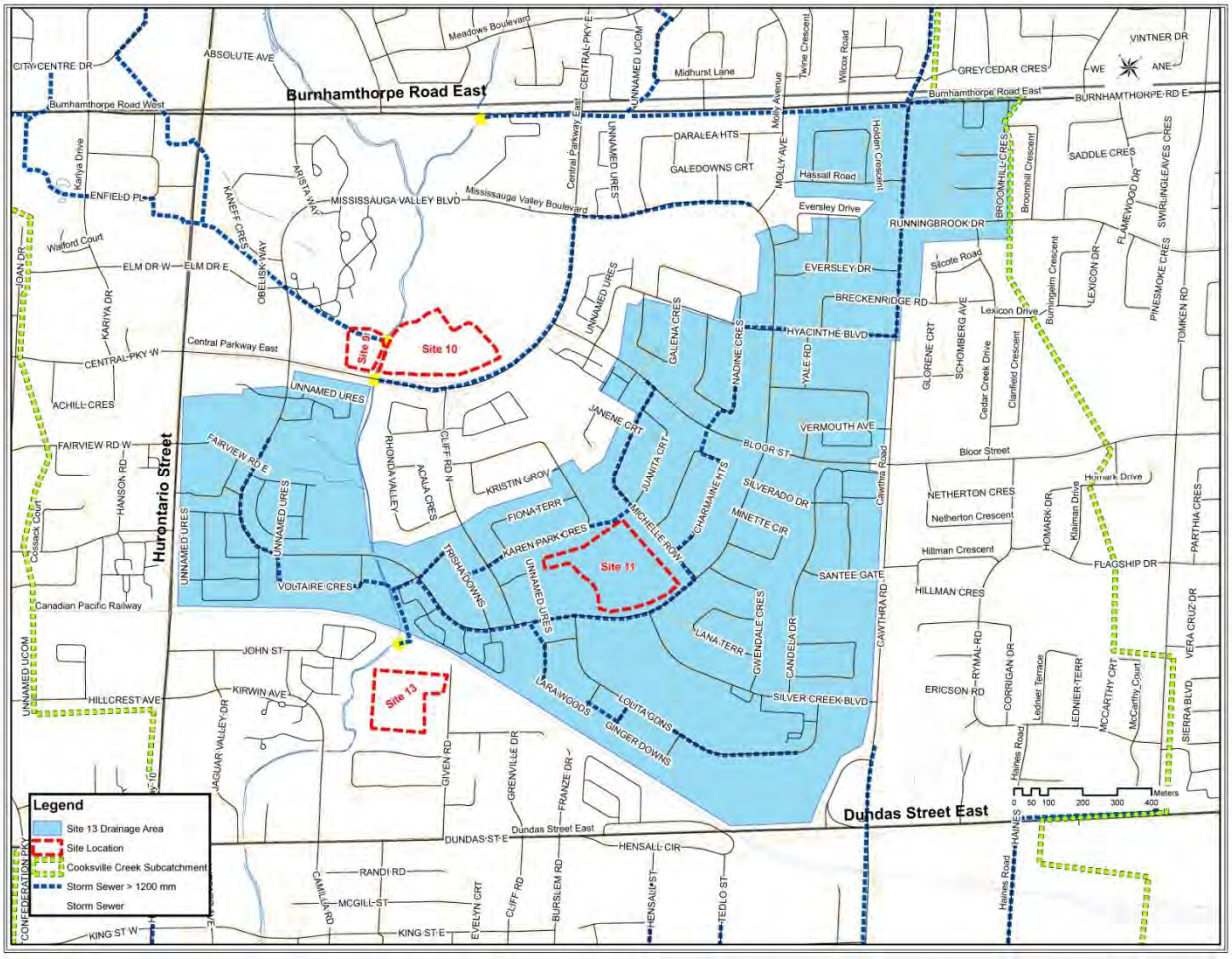
Site 11


Burnhamthorp Road East
Site 9
Site 10
Site 11
Legend
GREYCEDAR CRES
KING ANDREW DR
DARALEA HTS
GALEDOWNS CRT
Holden Crescent
EVERSLEY DR
BRECKENRIDGE RD
HYACINTHE BLVD
GALENA CRES
MISSISSAUGA VALLEY BLVD
VERMOUTH AVE
SCHOMBERG AVE
LEXICON DR
JANENE CRT
UNNAMED URES
KRISTIN GROV
FIONA TERR
KAREN PARK CRES
MICHELLE ROW
CHARMAINE HTS
SILVERADO DR
MINETTE DR
SANTEE GATE
SILVER CREEK BLVD
CAWTHRA RD
BLOOR ST
NETHERTON CRES
HILLMAN CRES
DODSWORTH CRES
ERICSON RD
FLAGSHIP DR
SADDLE CRES
HOLLOWTREE CRES
SIERRA BLVD
ORCADES CRES
LOLANI DR
LARA WOODS
GINGER DOWNS
VOLTAIRE CRES
RHONDA VALLEY
ACALA CRES
CLIFF RDN

Site 12


Eglinton Avenue East
EGLINTON AVE E
UNNAMED URES
UNNAMED UDCM
Frum Drive
Driveway Drive
ALBINA WAY
VIENNA CRT
MAXINE PL
ANTELOPE CRES
Antelope Crescent
Bud Gregory Boulevard
TRUDEAU AVE
BUD GREGORY BLVD
PARIS ST
SORRENTO DR
Sorrento Drive
Gateway Avenue
GATEWAY AVE
Tripp Court
JAMES AUSTIN DR
YORKSHIRE AVE
HURON HEIGHTS DR
ELIA AVE
Elia Avenue
Site 12
Legend
Site 12 Drainage Area
Site Location
Cooksville Creek Subcatchment
Storm Sewer
Central Parkway East

Site 13


Burnhamthorpe Road East
Burnhamthorpe Road West
Dundas Street East
Hurontario Street
Central Parkway East
Mississauga Valley Boulevard
Site 10
Site 11
Site 13
Legend
Site 13 Drainage Area
Site Location
Cooksville Creek Subcatchment
Storm Sewer > 1200 mm
Storm Sewer

APPENDIX B

Hydrologic and Hydraulic Modeling

Introduction and Summary

Modifications of the Cooksville Creek SWMHYMO model were made in July of 2011 to test the benefit of using upper-basin offline storage to reduce peak flows for larger wet weather events. Modifications included development of new model inputs for a damaging storm that occurred on August 4, 2009, insertion of proposed storage basins developed in coordination with Aquafor Beech Ltd in model sub basins using the route reservoir command in the model, modifying the outflow-storage relationships for each storage basin to optimize peak flow reduction, and quantifying peak flow reductions throughout the watershed. Selected results were also input into the current HEC-2 model of the watershed to quantify the benefits of predicted flow reductions in lowering predicted maximum Cooksville Creek water surface elevations (WSEs).

Preliminary results indicate peak flows can be reduced to 127 m^3/sec at Dundas Street for the 100 year storm with the addition of all proposed storage basins. This corresponds to a 39 percent reduction from the 207 m^3/sec peak flow. For the August 2009 storm, the SWMHYMO model predicts that peak flow can be reduced from 235 m^3/sec to 129 m^3/sec at Dundas Street. HEC-2 model outputs predicted an average WSE decrease of 0.84 meters for the 100 year storm through inclusion of the storage basins.

It should be noted (reference should also be made to **Section 6.2.1** of the main report) that sites 14 and 15, while included in this Technical Appendix, were dropped during the site selection process.

Model Development

The current version of the future land use Cooksville Creek SWMHYMO model implemented in the 2002 Cooksville Creek Flood Remediation Plan (ERWG 2002) was used as a base for this modeling effort. The 100 year storm was not modified from the current version of the model. The model was then modified to create a new file for the August 4, 2009 storm. The hyetograph for the August 2009 storm was created from data provided in the 2009 Cooksville Creek August 2009 Flooding report for Mississauga rainfall recording station six (EWRG 2010). This station recorded the greatest 60 minute rainfall depth of the ten stations cited in the report. The timestep throughout the model had to be altered for the August 2009 storm because the Mississauga recording stations measured rainfall at 5 minute intervals, instead of the 10 minute intervals used for the 100 year storm.

Although the magnitude of the August 2009 storm peak rainfall intensity was less than that of the 100 year storm, the rainfall intensities in the time intervals leading up to the peak were greater in the August 2009 storm (Figure 1). In addition, the station six hyetograph was applied over the entire Cooksville Creek watershed in the SWMHYMO model, when in reality it only fell over a portion of the watershed. This resulted in higher peak flows in Cooksville Creek from the August

2009 storm than the 100 year storm for a number of locations in the watershed (Table 1).The model was then modified to include the fifteen storage basins.

The location, size and drainage area information for each potential storage basin used in this assessment was first developed by Aquafor Beech. Locations of the fifteen sites of interest are included in Figure 2. Delineated storage basin drainage areas were cross referenced with a provided Cooksville Creek watershed map delineated with major roads and the sub basins as defined in the SWMHYMO model. The storage basins were then inserted into the model using the route reservoir command. Two sub basins as defined in the SWMHYMO model included multiple storage basins. Storage basins 3, 4, and 5 are in the same sub basin and so were lumped into one route reservoir command with an equivalent total capacity for this analysis. Storage basins 10, 11, and 16 were also lumped in similar manner. Figure 3 shows the updated schematic for the Cooksville Creek SWMHYMO model with these storage basin additions included.

To most effectively reduce the peak flow from each sub basin, route reservoir outflow-storage relationships were developed such that an outflow rate small enough to reduce the peak predicted flow rate for the sub basin but large enough to reserve storage basin capacity for the largest predicted flows in the sub basin. If a storage basin filled before the inflow peak arrived at the basin, then offline storage would not be available to capture a portion of the peak flow and the storage volume would not be used effectively. In short, storage basin overflow curves were developed to balance the need to reserve capacity to capture the peak of the storm while minimizing the peak flow rate delivered to the creek.

To accomplish this goal, the outflow-storage curves were adjusted such that a storage basin begins storing runoff only when the inflow rate is greater than a certain percentage of the 100 year peak inflow. This percentage is unique for each storage basin and depends on the characteristics of the sub basin and the storage basin size and location. Each outflow-storage curve was refined using an iterative method in which the storage basin curves were adjusted based on previous trial results. In some cases, the storage basin outflow rate could be lowered while still preventing the storage basin from filling before the inflow peak occurred. In other cases, the storage basins filled before the peak inflow occurred, so the outflow rate was raised to pass a larger percentage of the pre-peak flow while still capturing the inflow peak. An example of an outflow-storage curve used for storage basin 2 is shown in Figure 4.

A final adjustment to the SWMHYMO model involved reducing the timestep used to calculate outflow hydrographs from the storage basins. This was necessary because too large a timestep caused flow pulsing from the storage basins during the falling limb of the outflow hydrographs.

Results

SWMHYMO model results for the original storms and most recent analyses are summarized in Table 1. Peak flows through channels downstream of the storage basins were reduced to 61-70

percent of the 100 year storm peak and 55-67 percent of the August 2009 storm peak. The maximum peak flow discharged from the sub basins where storage basins were implemented ranged from 5 to 50 percent of the 100 year storm. A large area of the Cooksville Creek watershed remains unaffected by installation of the proposed storage basins. Particularly, runoff from sub basins CC1, CC2, CC3, CC4, CC5, CC8, CC9, CC10, CC11, CCWT1, and CCEB1 is not directed to a stormwater control.

Peak flow rates from the SWMHYMO model output at 15 locations were then input into the HEC-2 model using the original and storage basin-updated 100 year storm flow rates. Initial results indicate a decrease in the water surface elevation ranging from 0.03 to 2.61 meters with an average decrease of 0.84 meters (Figure 5a, Figure 5b).

References

Environmental Water Resources Group (EWRG). 2002. Cooksville Creek Flood Remediation Plan. May.

Environmental Water Resources Group (EWRG). 2010. Cooksville Creek Flooding August 2009. September

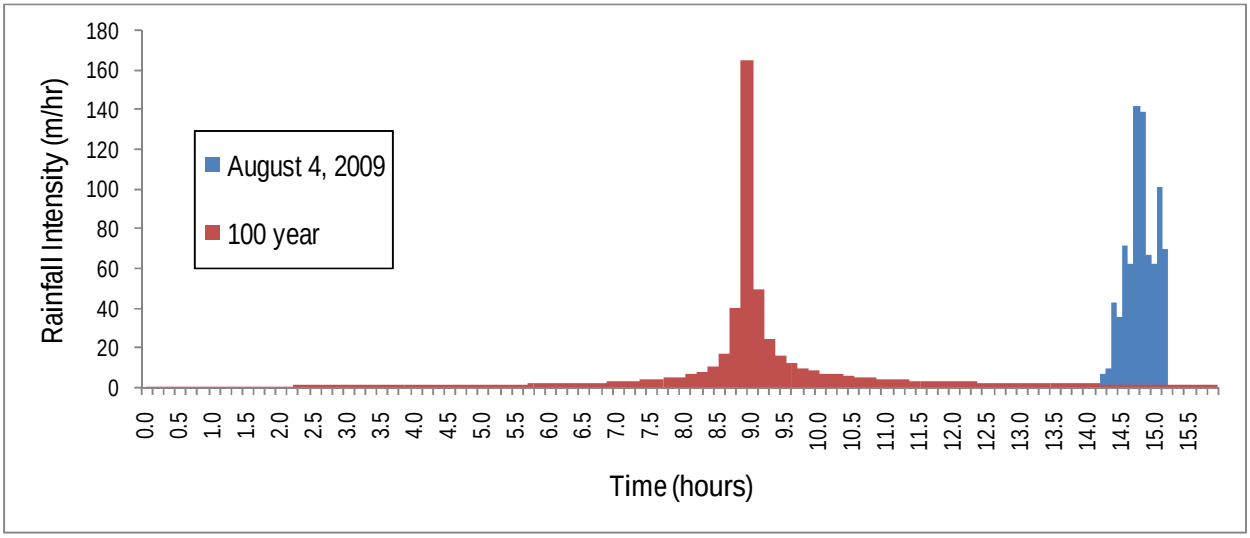


Figure 1. Hyetographs for the 100 year storm and August 4, 2009 storm (EWRG 2010).

Table 1. Cooksville Creek SWMHYMO Results for 100 year and August 2009 storms

Location	100 year storm			August 2009 storm		
	Original	Route Reservoirs for Basins 1-16		Original	Route Reservoirs for Basins 1-16	
	m^3/sec	m^3/sec	% of original	m^3/sec	m^3/sec	% of original
Site 14	7.4	0.4	5.4%	7.0	0.4	5.7%
Site 15	20.4	3.1	15.5%	19.1	3.2	16.6%
Site 1	62.0	9.4	15.1%	67.4	9.4	13.9%
Site 2	30.9	6.3	20.3%	27.2	17.8	65.2%
Site 3+4+5	29.8	6.1	20.3%	30.7	6.1	19.7%
Site 6	29.6	13.4	45.3%	27.0	22.8	84.3%
Site 7	42.0	16.9	40.2%	40.7	33.7	83.0%
Site 12	9.4	4.3	45.8%	8.2	9.3	113.3%
Site 8	57.6	23.1	40.1%	60.5	29.3	48.4%
Site 9	33.2	16.7	50.3%	35.3	33.1	93.7%
Site 10+11+16	43.3	8.8	20.2%	44.0	8.8	19.9%
After Route CC5 (Dundas St)	207.3	126.6	61.1%	234.5	129.1	55.1%
After Route CC4 (QW West)	210.1	131.8	62.7%	220.4	131.4	59.6%
After Route CC3 (QEW)	203.4	131.1	64.5%	208.1	127.0	61.0%
After Route CC2 (CNR)	196.9	130.1	66.1%	196.7	123.2	62.6%
After Route CC1 (Lakeshore Rd)	220.2	154.5	70.2%	217.3	145.2	66.8%
Lake Ontario	220.9	155.2	70.3%	217.5	145.4	66.8%

Figure 2. Overall map showing locations of storage basins (obtained from Aquafor Beech, 7/13/2011)

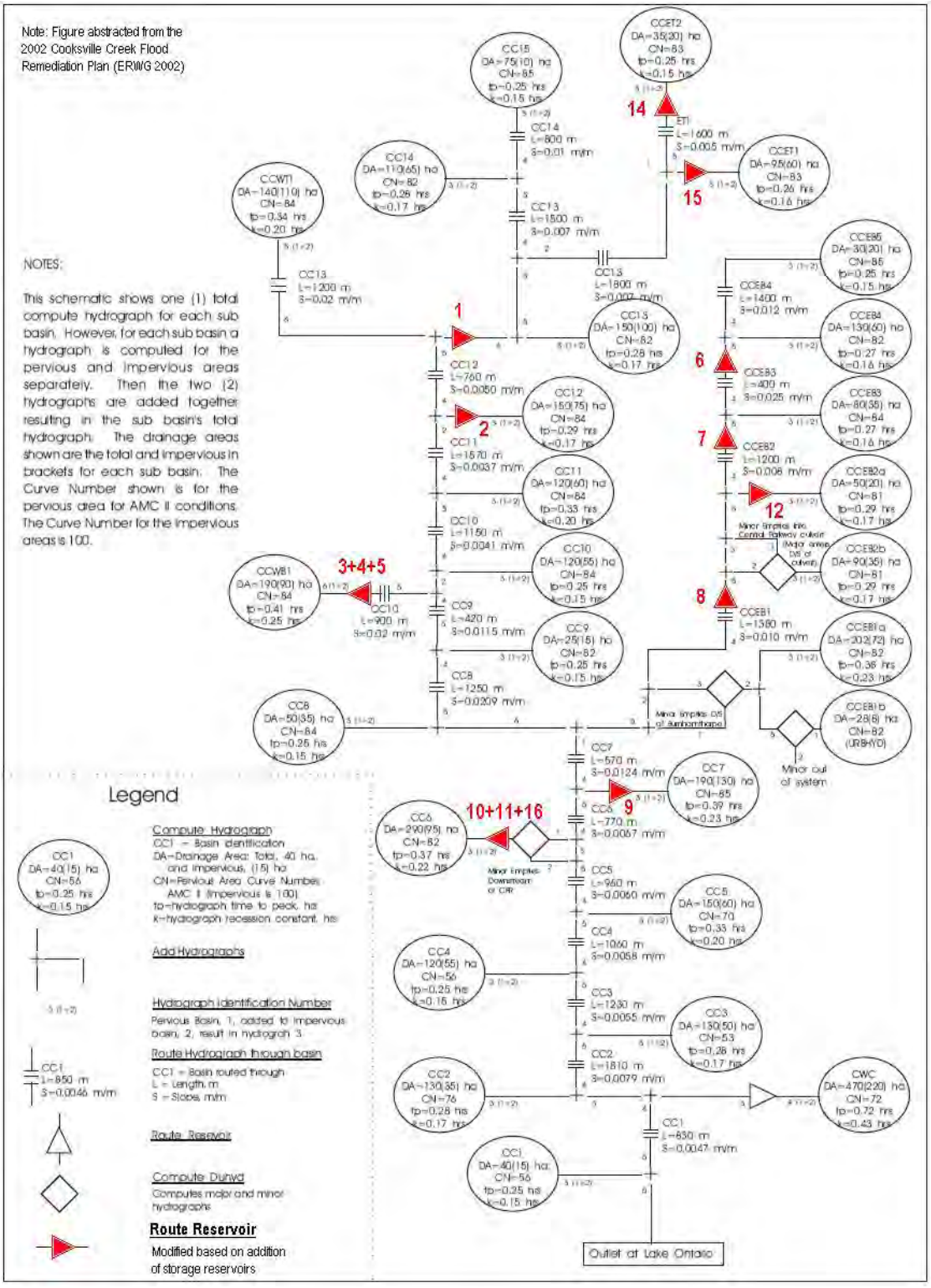


Figure 3. Modified Cooksville Creek SWMHYMO Computation Schematic

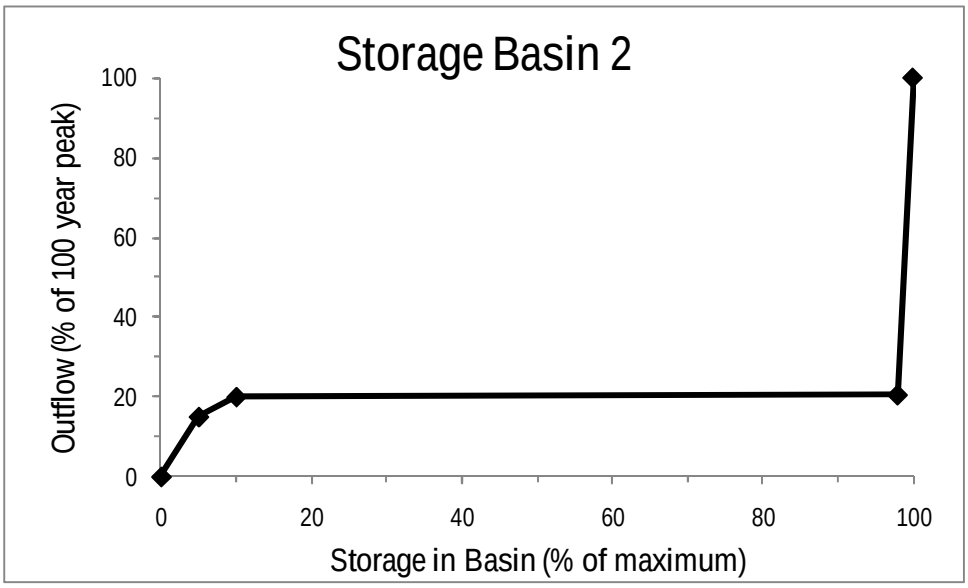


Figure 4. Outflow-Storage Curve for Storage Basin 2

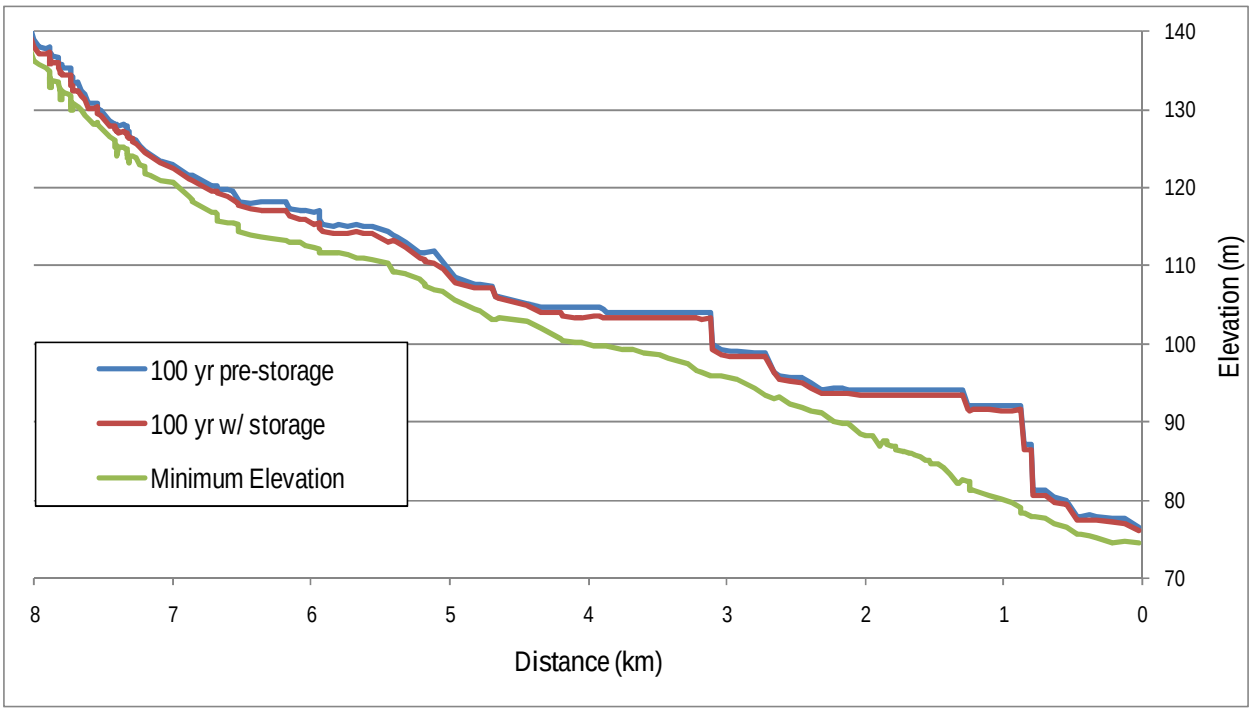


Figure 5a. Water surface elevations for the pre- and post-100 year storm updated files

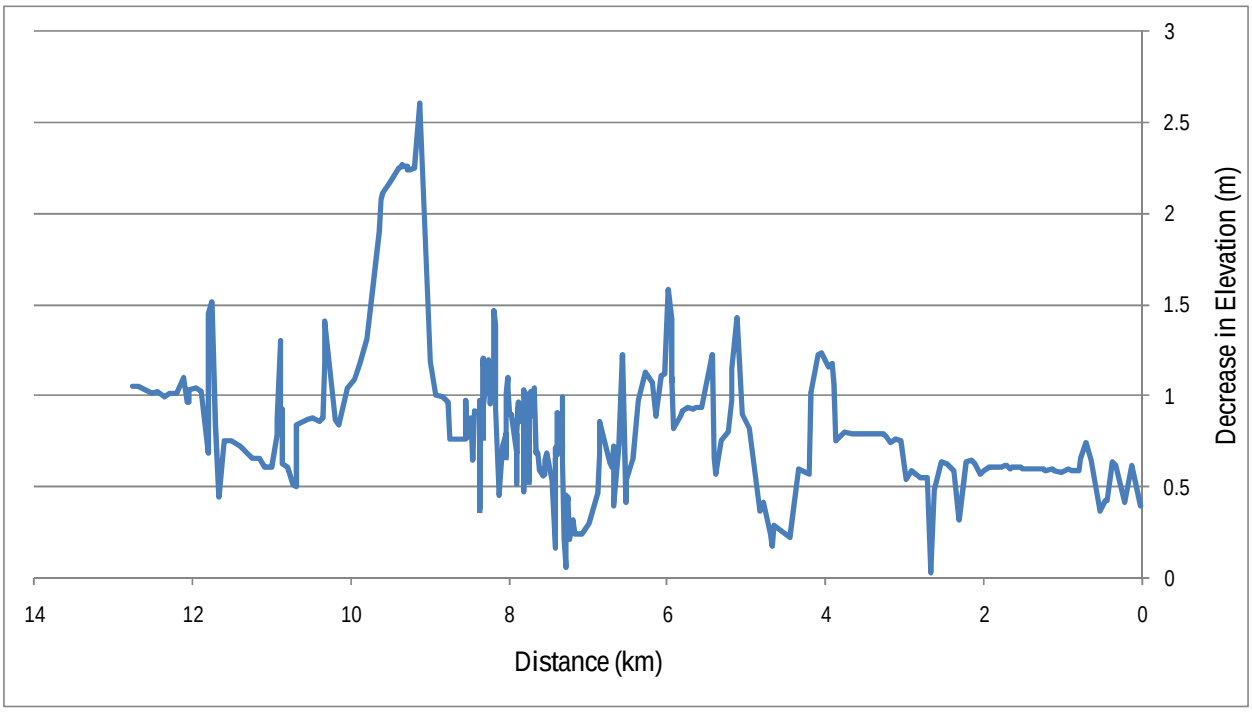


Figure 5b. Decrease in water surface elevations for the 100 year storm by addition of storage basins

APPENDIX C

Public Consultation Material

Notice of Study Commencement and Public Information Centre

MISSISSAUGA
Leading today for tomorrow

CORPORATION OF THE CITY OF MISSISSAUGA
CLASS ENVIRONMENTAL ASSESSMENT MASTER PLAN
COOKSVILLE FLOOD EVALUATION STUDY

NOTICE OF STUDY COMMENCEMENT &
PUBLIC INFORMATION CENTRE

The City of Mississauga has initiated the Cooksville Flood Evaluation Study. The purpose of this study is to determine a feasible approach to reduce occurrence of riverine flooding for dwellings and properties adjacent to Cooksville Creek. The study is being conducted as a **Master Plan** to meet the requirements for **Schedule B** projects under the **Municipal Class Environmental Assessment process,** which is an approved process under the Environmental Assessment Act. As such, the study will be completed to meet the Phase 1 and 2 Class EA requirements.

A key component is stakeholder consultation (public, landowners and regulatory agencies). A Public Information Centre (PIC) will be held to provide an opportunity to review this project. Subject to public input and approvals, the City of Mississauga would then proceed with the design and construction of the relevant projects thereafter. You are invited to the PIC scheduled for the time and date below:

Date:	**Tuesday, May 1st, 2012**
Time:	**6 p.m. to 8 p.m.**
Venue:	**Mississauga Civic Centre, Committee Room 'A'** **300 City Centre Drive, Mississauga, ON**

The PIC will be a drop-in with displays illustrating a list of alternatives and projects associated with a preferred solution. There will be an opportunity to meet with the Project Team, review material and discuss the project. City staff and the project consultant will be on hand to answer questions.

We are interested in hearing your comments about this project. With the exception of personal information, all comments will become part of the public record. Comments and information regarding the study are being collected to assist the City in meeting the requirements of the Environmental Assessment Act. This material will be maintained on file for use during the project and may be included in project documentation.

For further information or if you are unable to attend but wish to provide your views, you may write or contact Muneef Ahmad or Dave Maunder as listed below:

Mr. Muneef Ahmad, P. Eng., LEED AP
Water Resources Engineer
City of Mississauga
Transportation and Works Department
201 City Centre Drive, Ste 800
Mississauga, ON L5B 2T4
Phone: 905 615 3200 ext.4793
E-mail: muneef.ahmad@mississauga.ca

Mr. Dave Maunder, M.Sc., P. Eng.
Principal, Senior Project Manager
Aquafor Beech Limited
Consultant
2600 Skymark Avenue, Ste 202, Bldg 6
Mississauga, ON L4W 5B2
Phone: 905 629 0099 ext.290
Email: maunder.d@aquaforbeech.com

Public Information Centre Presentation Boards

City of Mississauga: Flood Control Evaluation Study - Municipal Class EA

Welcome

The City of Mississauga is undertaking a Flood Evaluation Study on Cooksville Creek. The study is being completed as a Municipal Class Environmental Assessment and the study area is shown in the figure to the right.

Background

The Cooksville Creek watershed has an area of about 34 km^2 with its headwaters originating north of Highway 401. The watercourse flows to the south and drains to Lake Ontario. The watershed is long and narrow and is fully developed with the exception of a few vacant parcels of land.

Cooksville Creek exhibits varying conditions throughout its length, ranging from a natural state to significant portions which have undergone some degree of channelization.

Numerous homes and properties have flooded over the years, most notably on August 4, 2009. It is estimated that approximately 120 buildings would flood for the 100 year storm and approximately 300 buildings would flood for the Regional storm (Hurricane Hazel).

Cooksville Creek also has a considerable history of erosion problems along the watercourse. The City has spent approximately $8 million since the mid 1990's to remediate erosion problems. There are also other issues related to degraded water quality, lack of base flow and aquatic resources.

The current study is being undertaken as a flood control Municipal Class Environmental Assessment (EA) with a study area extending from Highway 401 to Lake Ontario. Through the EA process, alternatives have been developed to address the flood prone sites which have been identified. The EA process provides an opportunity for the public to offer comments and insight to the study, and to discuss related concerns with the study team.

Objectives of Tonight's Meeting

The objectives of tonight's meeting are to present the identified problems and alternative solutions and to provide an opportunity to the public to review this material and provide input. Attendees are asked to fill out the questionnaire provided to help establish public acceptance of each of the alternatives.

Objectives of the Study

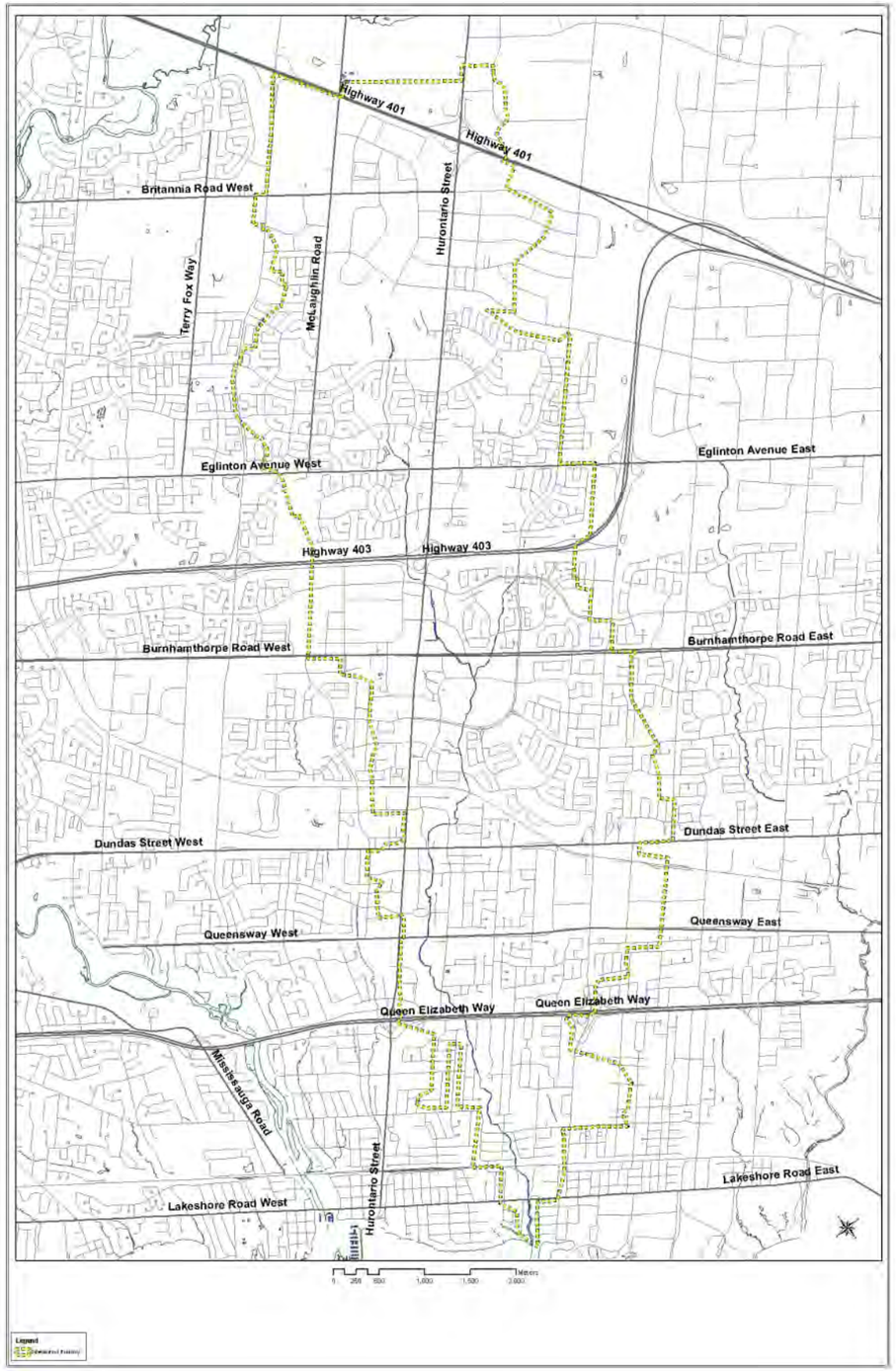
The objectives of the study are as follows:

Primary Objective:

- Reduce occurrence of riverine flooding for dwellings and properties adjacent to Cooksville Creek

Secondary Objectives:

- Reduce extent and frequency of erosion
- Improve water quality conditions within Cooksville Creek
- Improve aquatic habitat conditions



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City of Mississauga: Flood Control Evaluation Study - Municipal Class EA

Problem and Opportunity Identification

PROBLEMS

Flooding
•Approximately 300 dwellings are located within the Regulatory floodline.
•Flooding of dwellings has occurred several times, most recently as a result of the August 4, 2009 storm.

Erosion
- City has undertaken restoration works at 12 sites over the past 20 years.
- Approximately 10 priority erosion sites remain.

Water Quality
- Existing water quality conditions are such that Provincial Water Quality Objectives are not met a majority of the time. This results in loss of aquatic life and degradation of aesthetic conditions.

Aquatic Resources
- Only tolerant fish species reside in the creek as a result of degraded water quality, poor habitat conditions and instream barriers.

OPPORTUNITIES

- Reduction in flooding could occur as a result of expanding the capacity of existing culverts or bridges, reducing the amount of flow getting into the stream and/or expanding the capacity of the floodplain.

- Some of the above measures could be used to reduce erosion problems, improve water quality conditions and improve aquatic habitat conditions.

City of Mississauga: Flood Control Evaluation Study - Municipal Class EA

Existing Environmental Conditions

The existing environmental conditions within the study area are summarized below.

Flooding

- A total of 300 dwellings are located within the Regulatory foodline. As noted in the accompanying figure a majority of the flood susceptible homes are located downstream of Burnhamthorpe Road.
- The area most susceptible to flooding is located between Burnhamthorpe Road and Dundas Street. Dwellings in the King Street and Paisley Boulevard area could experience flooding every 5 - 10 years, on average.

Erosion

- Cooksville Creek has experienced significant erosion over the last 20 years as a result of urbanization, lack of stormwater management measures and the unique characteristics of the stream which consists of shale and limestone in the lower reaches.

Fishery

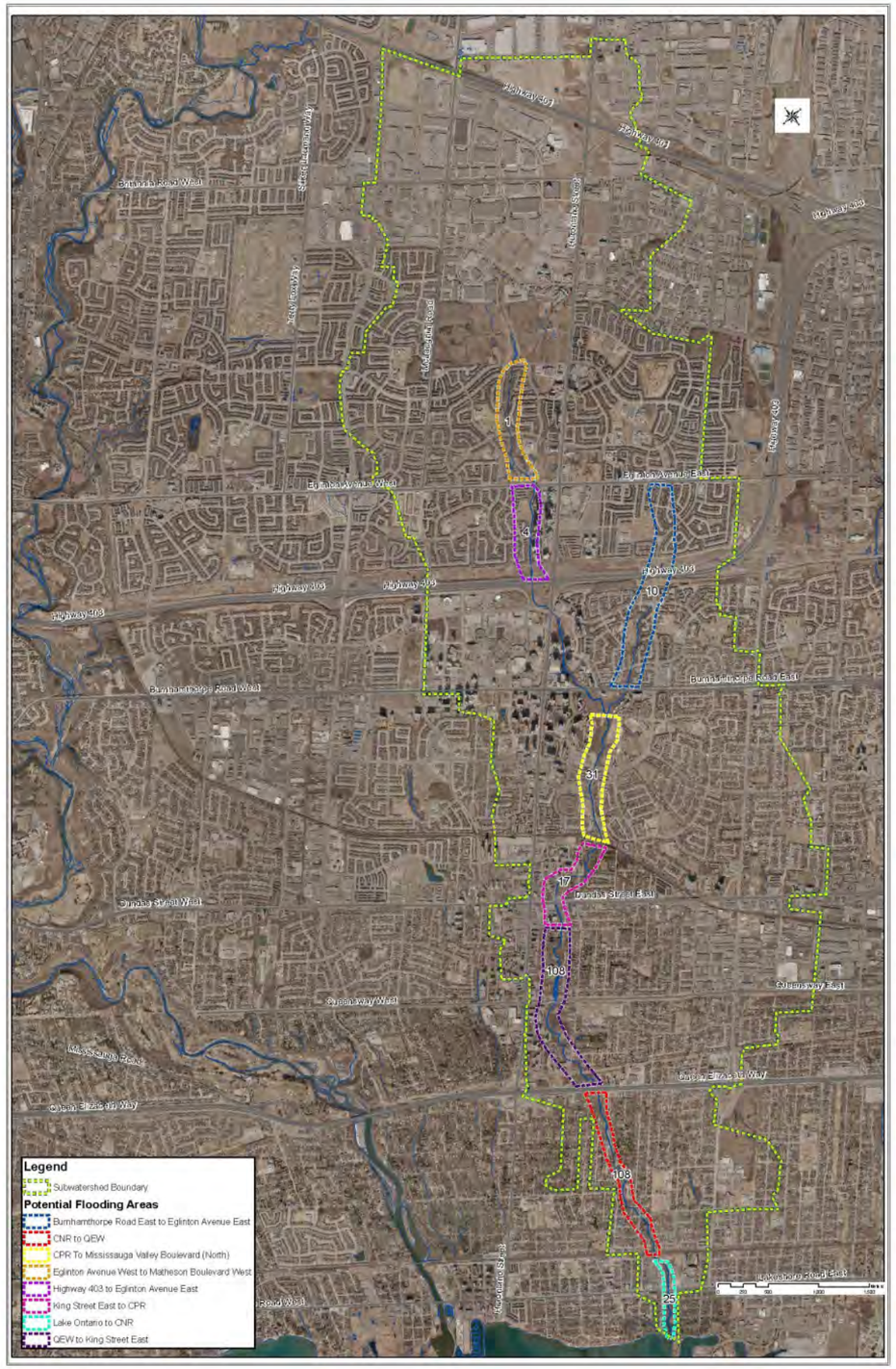
- Generally, there are poor quality habitats along Cooksville Creek due to unstable substrates, lack of instream cover and extreme variation in flows from dry to wet weather periods.
- A few warmwater fish species that tolerate poor water quality conditions have been identified.

Terrestrial Habitat

- The terrestrial habitat along the stream corridor generally consists of manicured properties or a narrow band of culturally influenced and heavily disturbed riparian woodland.
- There are approximately 12 Natural Areas (wetlands, woodlands) located within the watershed.

Infrastructure

- A sanitary trunk sewer runs adjacent to Cooksville Creek in the lower reaches. At times, the sewer or manholes have been exposed as a result of stream erosion.



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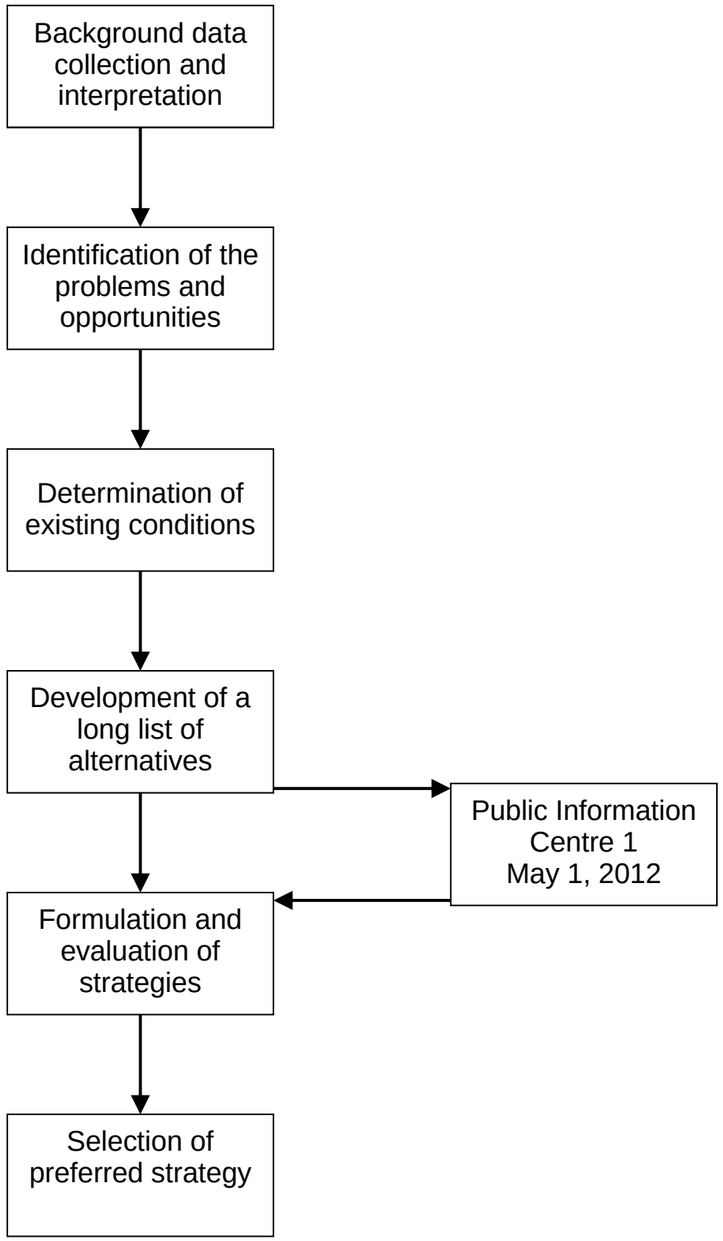
Environmental Assessment Process

Many projects related to municipal systems are similar in nature, are carried out routinely, and have predictable and mitigatable environmental effects which are investigated according to the Municipal Engineers Association “Municipal Class Environmental Assessment” (October 2000, as amended in 2007).

This study is being carried out according to the requirements of a Master Plan. The flow chart to the right illustrates the key steps to be undertaken as part of the EA Process.



City of Mississauga: Flood Control Evaluation Study - Municipal Class EA

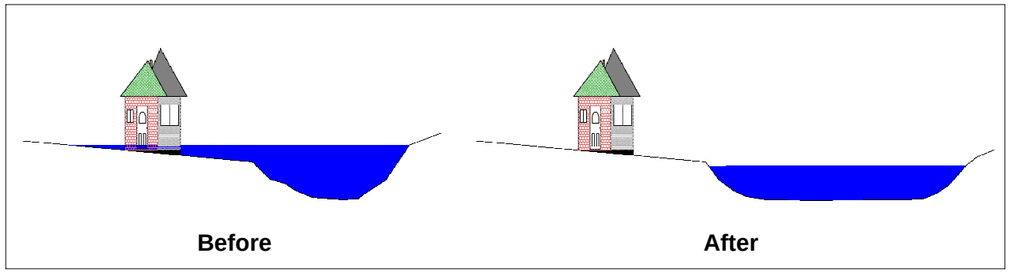
Development of a Long List of Alternatives

The long list of alternatives that were developed may be divided into two general categories (Traditional and Non Traditional). Each alternative was assessed based on criteria (see accompanying table) consistent with the Environmental Assessment Process. The alternatives which received a favourable rating were brought forward and will form the basis of the Preferred Strategy. Each of the alternatives that were considered are described below.

TRADITIONAL ALTERNATIVES

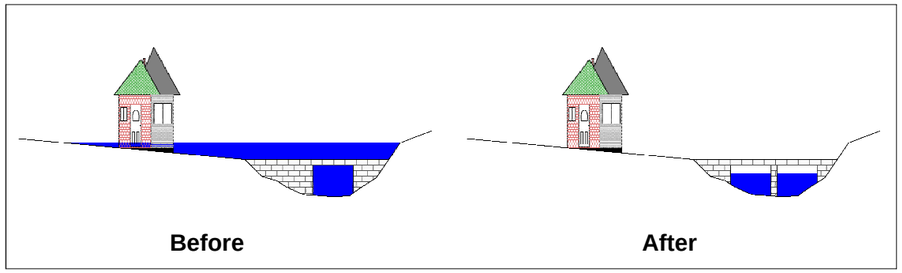
Watercourse Capacity Enlargement

Ÿ Increasing the capacity of the existing watercourse may reduce flood levels.



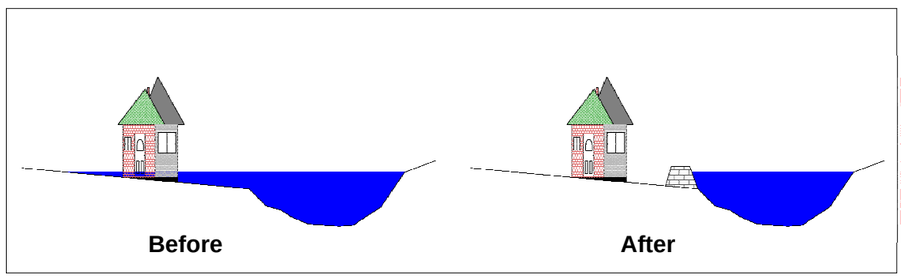
Crossing Capacity Enlargement

Ÿ Increasing the capacity of existing culverts or bridges may reduce water levels.



Dykes / Berms

Ÿ Dykes or berms are built adjacent to dwellings in order to contain flows within the floodplain.



Flood Proofing

Ÿ Landowners can floodproof buildings by sealing or filling in openings which are susceptible to flooding.

Land Acquisition

Ÿ Flood susceptible properties could be purchased by the City or Credit Valley Conservation and then removed.

City of Mississauga: Flood Control Evaluation Study - Municipal Class EA

Development of a Long List of Alternatives

The long list of alternatives that were developed may be divided into two general categories (Traditional and Non Traditional). Each alternative was assessed based on criteria (see accompanying table) consistent with the Environmental Assessment Process. The alternatives which received a favourable rating were brought forward and will form the basis of the Preferred Strategy. Each of the alternatives that were considered are described below.

NON TRADITIONAL ALTERNATIVES

Storage in Upstream Locations

Ÿ Storage in upstream lands within parks or vacant properties could be used to reduce flood levels in Cooksville Creek.

Source Control Measures

Ÿ These measures, which are implemented on private property, include roof downspout disconnection, use of rain barrels, pervious driveways and rain gardens.

In-Channel Storage

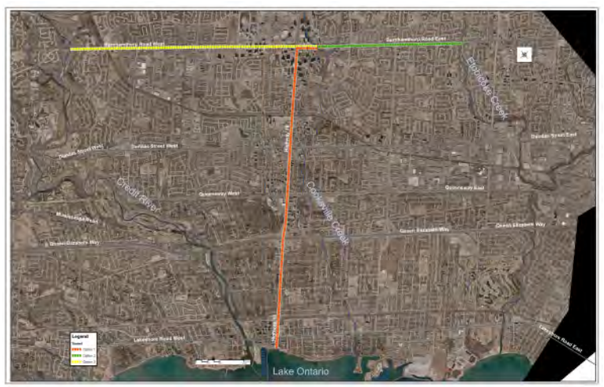
Ÿ Storage within Cooksville Creek could be used to reduce flood levels.

Conveyance Control Measures

Ÿ These measures, which are implemented within the municipal right-of-way may include bioretention units or perforated pipes. The measures encourage infiltration or evapotranspiration, thereby reducing runoff and flood levels.

Tunnel

Ÿ Construction of a tunnel, which would divert flows above levels which cause flooding could be considered.



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Description of the Natural Environmental Criteria Used for Selecting the Preferred Criteria

Evaluation Criteria	Description of Criteria
Potential to Reduce Riverine Flooding	• Potential to reduce flooding of properties along Cooksville Creek floodplain
Potential to Reduce Erosion	• Potential to reduce erosion within Cooksville Creek
Potential to Improve Water Quality	• Potential to improve water quality based on existing water quality conditions
Potential to Improve Aquatic Habitat	• Potential to improve aquatic habitats by improving baseflows, or stream habitat

Description of Social/Cultural Criteria used for the Selection of the Preferred Alternatives

Evaluation Criteria	Description of Criteria
Aesthetics / Recreation	• Potential for the alternative to be an asset to the community by integrating the alternative into existing site activities (walking, jogging, park usage) and/or improve aesthetics; or to impact existing park usage or detract from aesthetics
Compatibility with Adjacent Land Use	• There are potential impacts associated with construction of retrofit facilities, or future maintenance particularly with respect to adjacent land use • Access/egress also needs to be considered
Community Disruption	• The potential of the alternative to disrupt the community, more specifically given the surrounding land use – business activities during, or after the construction process
Public/User Acceptance	• Public/user acceptability of proposed alternative including construction impacts, property value, lifestyle changes, noise/odour issues

Description of the Economic Criteria Used for Selecting the Preferred Alternatives

Evaluation Criteria	Description of Criteria
Construction Costs	• The relative cost of the alternative
Operation and Maintenance	• The relative cost of operating and maintaining the alternative based on factors such as overall maintenance frequency and intensity, equipment needs and future permit requirement
Infrastructure Protection	• Potential to protect existing or proposed infrastructure including storm outfalls, sanitary sewers, pedestrian bridges, etc.

Description of Implementation Criteria used for the Selection of the Preferred Alternatives

Evaluation Criteria	Description of Criteria
Timing to Implement	• Length of time required to implement the proposed alternative
Technical Feasibility	• The feasibility of implementing the proposed alternative

Evaluation Matrix for Traditional Alternatives

Evaluation Criteria	Watercourse Capacity Enlargement	Crossing Capacity Enlargement	Dykes / Berms	Flood Proofing	Land Acquisition
Natural Environment	• Good potential to reduce riverine flooding	• Good potential to reduce riverine flooding	• Moderate potential to reduce riverine flooding	• Limited potential to reduce riverine flooding	• Limited potential to reduce riverine flooding
Economic	• Moderate construction cost • Low operation and maintenance cost	• Moderate construction cost • Low operation and maintenance cost	• Low to moderate construction cost • Moderate to high operation and maintenance cost	• Low to moderate construction cost • Moderate to high operation and maintenance cost	• Moderate to high construction cost • Low operation and maintenance cost
Social / Cultural	• Generally accepted by public and agencies • Limited disruption during construction • Compatible with adjacent land uses	• Generally accepted by public and agencies • Limited disruption during construction • Compatible with adjacent land uses	• Generally accepted by agencies, may be issue if constructed on private property • Limited disruption during construction • Compatibility with adjacent land uses to be assessed on site by site basis	• Generally accepted by agencies • Acceptance by homeowners site specific	• Last resort alternative by agencies • Generally does not meet with landowner approval
Technical	• Technically feasible • Short implementation period	• Technically feasible • Short implementation period	• Technically feasible • Moderate implementation period	• Feasibility dependent upon site conditions and flooding extent • Short implementation period	• Technically feasible • Moderate implementation period
Overall Alternative Rank					
Comment	• Brought forward	• Brought forward	• Brought forward, but limited to public lands or with homeowner consent	• Not brought forward, but to be implemented independently by homeowner	• Not brought forward except for vacant properties
Most Preferred  Least Preferred					

Evaluation Matrix for Non Traditional Alternatives

Evaluation Criteria	Storage in Upstream Locations	In-channel Storage	Source Control Measures	Conveyance Control Measures	Tunnel
Natural Environment	• Good potential to reduce riverine flooding, limited for basement flooding • Good potential for reducing erosion, improving water quality and aquatics	• Moderate potential to reduce riverine flooding • Moderate potential to reduce erosion	• Good potential to reduce riverine flooding, limited for basement flooding • Good potential for reducing erosion, improving water quality and aquatics	• Good potential to reduce riverine flooding, limited for basement flooding • Good potential for reducing erosion, improving water quality and aquatics	• Good potential to reduce riverine flooding
Economic	• Moderate construction cost • Moderate operation and maintenance cost • Moderate benefit in protecting existing infrastructure within floodplain	• Moderate construction cost • Moderate operation and maintenance cost	• Low construction cost • Low to moderate operation and maintenance cost • Moderate benefit in protecting existing infrastructure within floodplain	• Moderate construction cost • Moderate operation and maintenance cost • Moderate benefit in protecting existing infrastructure within floodplain	• High construction cost • High operation and maintenance cost
Social / Cultural	• Generally accepted by public and agencies • Low to moderate community disruption • Potential to be an asset to community	• Generally accepted by public and agencies • Low to moderate community disruption • Potential to be an asset to community	• Generally accepted by public and agencies • Low community disruption • Potential to be an asset to community	• Generally accepted by public and agencies • Low community disruption • Potential to be an asset to community	• Compatibility with adjacent land uses unknown • Questionable agency acceptance • Considerable community disruption
Technical	• Technically feasible • Short to moderate implementation period	• Feasibility dependent on site conditions • Short to moderate implementation period	• Technically feasible • Short implementation period	• Technically feasible • Short to moderate implementation period	• Feasibility dependent upon site conditions • Long implementation period
Overall Alternative Rank	●	◔	●	●	○
Comment	• Brought Forward	• Brought Forward	• Brought forward, but to be implemented as part of City Wide Water Quality Study Implementation	• Brought forward, but to be implemented as part of City Wide Water Quality Study Implementation	• Not brought Forward
Most Preferred ● ◔ ◑ ◕ ○ Least Preferred					

City of Mississauga: Flood Control Evaluation Study - Municipal Class EA

Description of the Preferred Strategy

The alternatives that received a favourable rating were brought forward and will form the basis of the Preferred Strategy. A description of the Preferred Strategy is provided below.

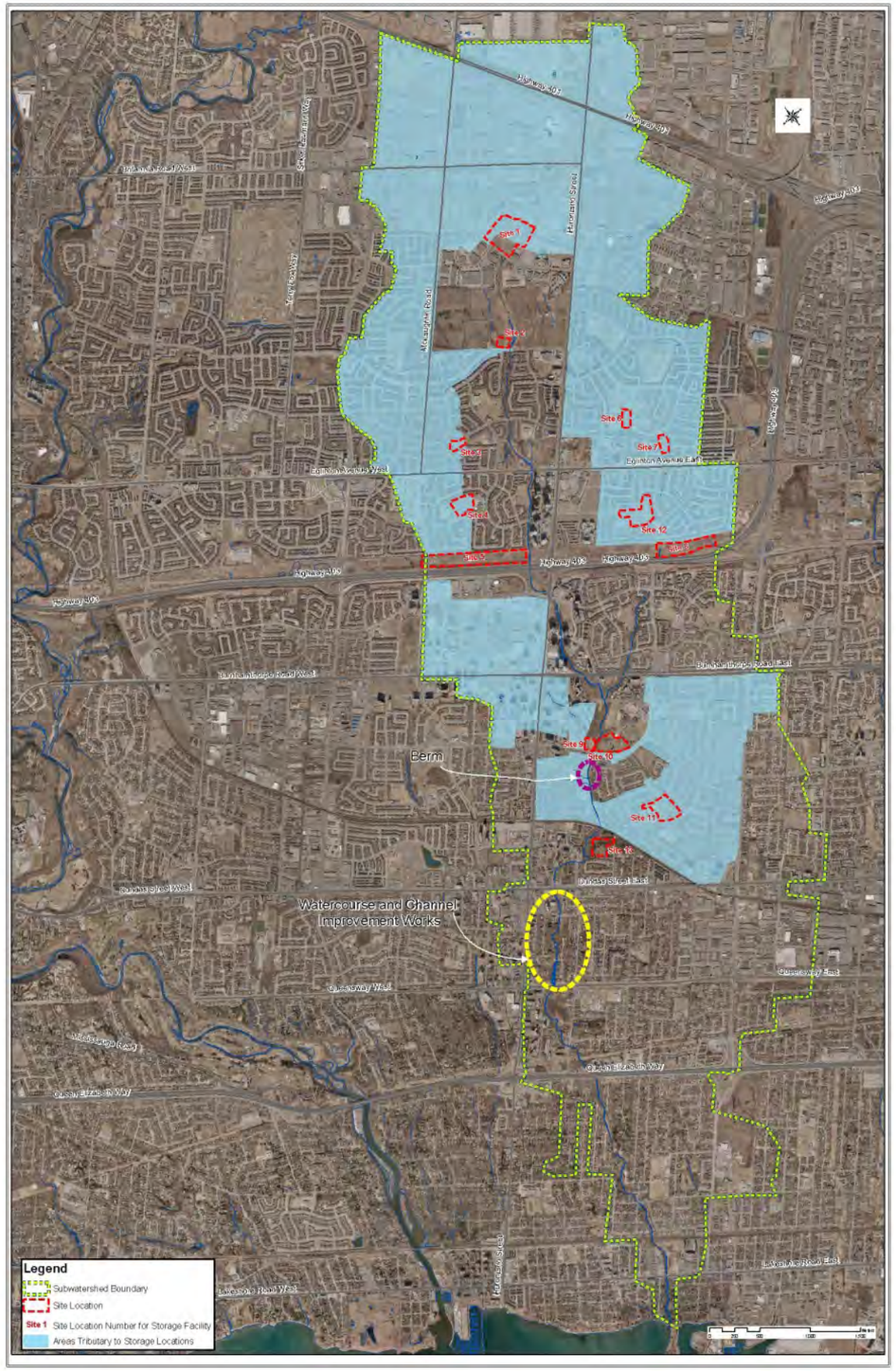
Description of the Preferred Strategy

The Preferred Strategy involves a combination of:

- Storage in upstream locations to reduce flows within Cooksville Creek to acceptable levels.
- Watercourse and channel capacity enlargements together with creation of a berm in the King Street and Paisley Road areas where homes are more susceptible.
- Construction of a berm adjacent to Cooksville Creek to protect homes along Rhonda Valley.
- Implementation of source and conveyance control measures (to be considered as part of the City Water Quality Strategy Update Study).

Benefits

- Collectively, implementation of the above measures will provide flood protection for all properties for the 100 year storm.
- Issues related to ongoing erosion, degraded water quality and poor aquatic habitat conditions will also be improved.



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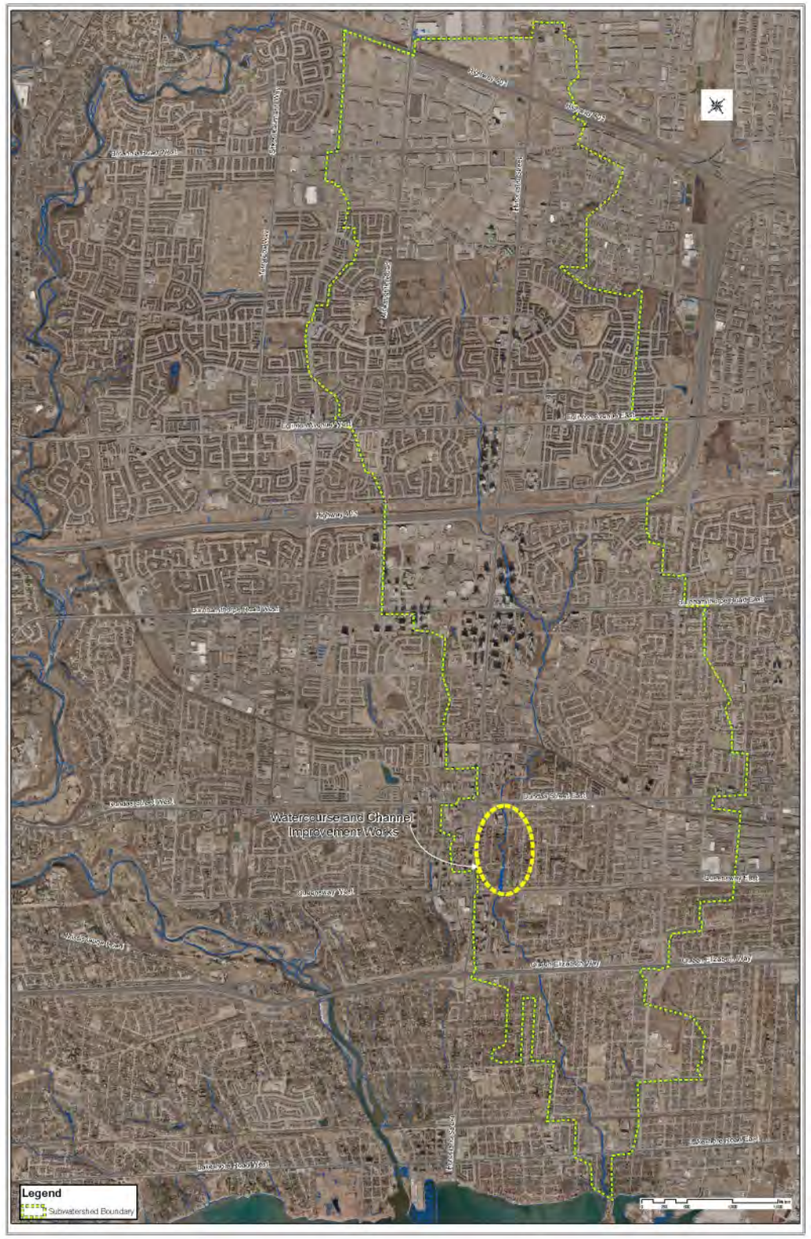
PREFERRED STRATEGY COMPONENTS:
Watercourse Crossing and Channel Improvements



Paisley Boulevard

Before

After

King Street

Before

After

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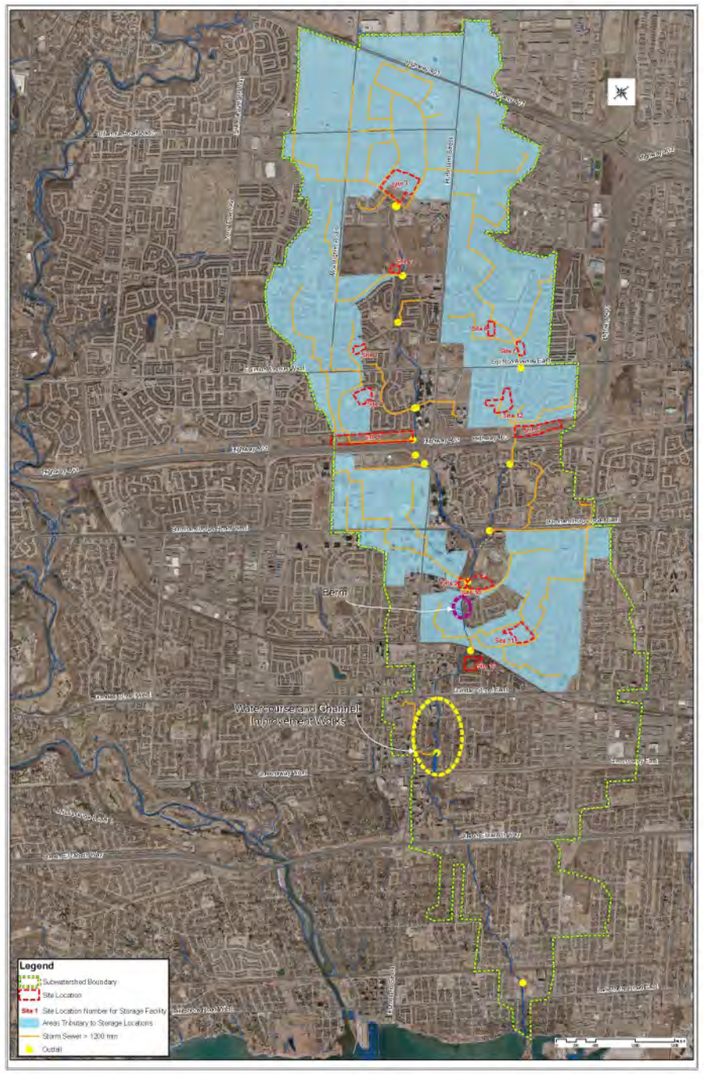
PREFERRED STRATEGY COMPONENTS:
Storage

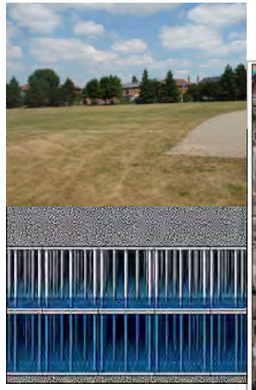


Potential Areas Where Storage Could be Implemented

Type	Number
Existing Parks	9
Vacant Land	2
Hydro Corridor	2

Sites		
1. Site 317	6. Frank McKechnie Park	11. McKenzie Park
2. Offline Britannia Farm	7. Eastgate Park	12. Huron Heights
3. Greyshale Park	8. Hydro Corridor - East	13. Given Road
4. Heritage Hills Park	9. Adjacent to Metro (food)	
5. Hydro Corridor - West	10. Central Parkway East	

A total of 13 potential sites have been identified. All but one of these sites would involve the construction of underground facilities to reduce peak flows and erosion, improve water quality and increase flows during dry periods.



Conceptual Image of Underground Storage

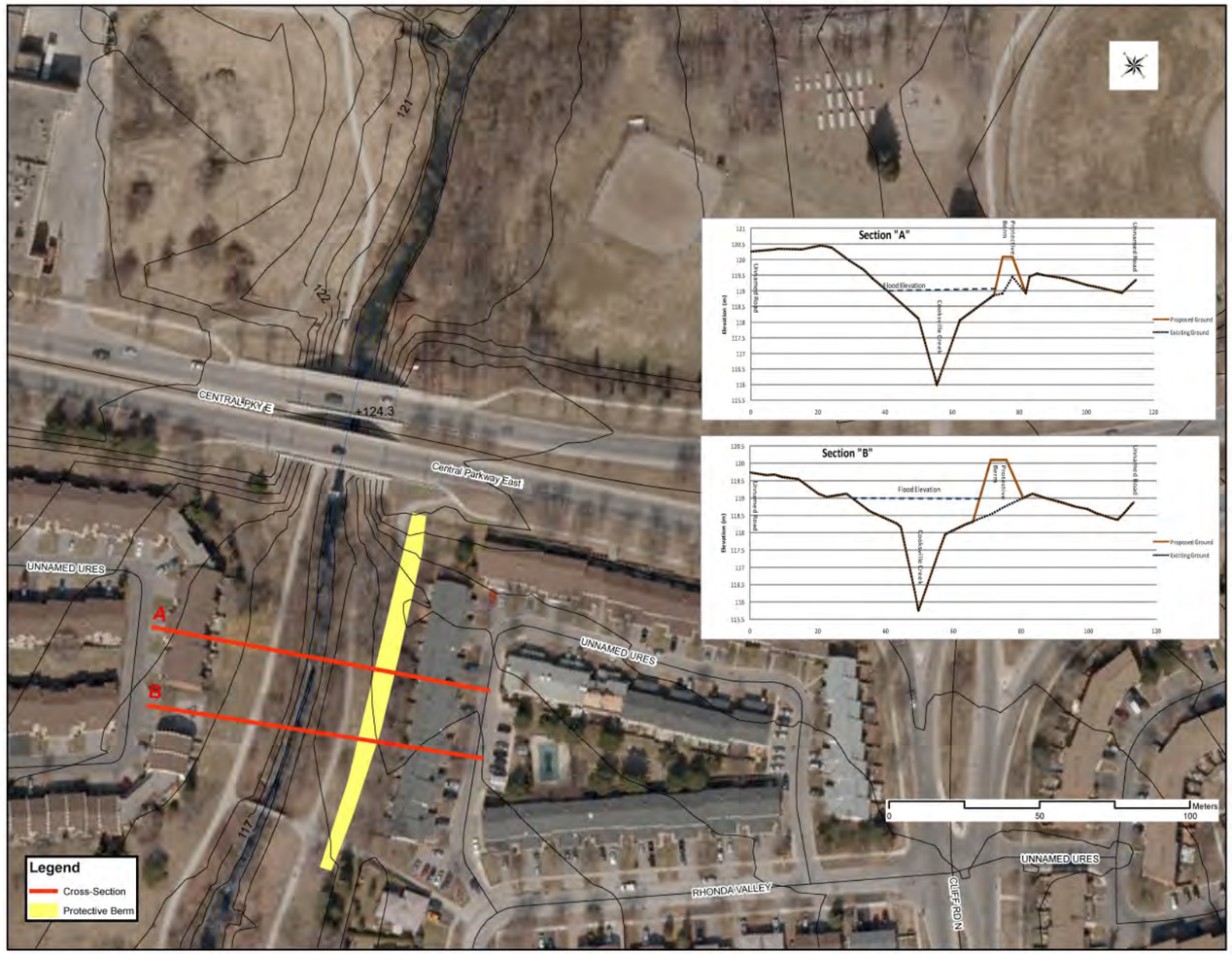
Eastgate Park

Park 317

City of Mississauga: Flood Control Evaluation Study - Municipal Class EA

PREFERRED STRATEGY COMPONENTS:
Construction of Berm

Rhonda Valley



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Thank you for your participation!

Next Steps

After tonight's meeting, we will undertake the following Steps:

- Gather your comments
- Review feedback
- Finalize alternative ranking
- Prepare conceptual designs for the preferred strategy components
- Complete the EA document
- Prepare a notice of completion and have the EA document available for review

For additional information, please contact one of the study team members:

Mr. Muneef Ahmad
Water Resources Engineer
City of Mississauga
201 City Centre Drive, Ste 800
Mississauga, ON L5B 2T4
Phone: 905 615 3200 ext.4793
E-mail: muneef.ahmad@mississauga.ca

Mr. Dave Maunder
Senior Project Manager
Aquafor Beech Limited
Consultant
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Mississauga, ON L4W 5B2
Phone: 905 629 0099 ext.290
Email: maunder.d@aquaforbeech.com

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Sign in Sheet and Comment Forms

Flood Control Evaluation Study
Municipal Class Environmental Assessment

City of Mississauga

Public Information Centre #1
May 1, 2012

Sign in Sheet

NAME (PLEASE PRINT)	SIGNATURE	EMAIL
PDF Loretta James	Loretta James	loretta.james@utoronto.ca.
PDF ERIC MISZCZUK OLGA MISZCZUK		ERIC @ COOKSVILLE STEEL.COM
BERNIE BASKOVIC 2407 SHEPARD AVE	Jim Bostic	BBASKOVIC @ DEFCONDO.COM
MONIQUE GAGNON	M Gagnon	mgagnon@ebmail.ca
A P Kennedy		
Helene Labrosse (MTO)		
Jeanne McKight	Jeanne McKight	jmcr1@bell.net
Dave & Pat Rudan	P. Rudan	davepat.rudan@sympatico.ca
WAYNE CARDINAL		wayne@waynecardinal.com

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Flood Control Evaluation Study: Municipal Class Environmental Assessment
Public Information Centre #1, May 1, 2012

Comment Form

Do you have any information on the conditions of Cooksville Creek that you think would be useful for the study team to know? If so, please tell us what they are.

More info about dumping in the creek.
Exact city property close to the creek.
Buildings at King + Shepard should stop blowing the leaves on city property close to the creek.

Do you have any concerns about the Flood Control Evaluation Study? If so, please tell us what they are.

By 3175 Kirwin. East-South corner of complex (Close to unit 111)
the storm drain is becoming a safety hazard. The dirt is very slippery and too many children are playing around it

Continued on Back...

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Please provide any additional comments on any other material presented tonight.

3#1 do not redirect the call to the right area concerning debris in the creek.

Name: Monique Gagnon

Address:

Affiliation (if any):

Email: Mogagnon@hotmail.com

*Thank you for your participation in the **Flood Control Evaluation Study: Municipal Class Environmental Assessment**. Please put your comment form in the drop box.*

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Flood Control Evaluation Study: Municipal Class Environmental Assessment
Public Information Centre #1, May 1, 2012

Comment Form

Do you have any information on the conditions of Cooksville Creek that you think would be useful for the study team to know? If so, please tell us what they are.

We have 45 years of documents of this creek. We passed it on to the new owners March 2011.

dave pat.rudan@sympatico.ca

formerly 1291 Mineola Gdns

Do you have any concerns about the Flood Control Evaluation Study? If so, please tell us what they are.

Too Bad it was so difficult to find this room!!

Continued on Back...

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Please provide any additional comments on any other material presented tonight.

Name:

Address:

Affiliation (if any):

Email:

*Thank you for your participation in the **Flood Control Evaluation Study: Municipal Class Environmental Assessment**. Please put your comment form in the drop box.*

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Flood Control Evaluation Study: Municipal Class Environmental Assessment
Public Information Centre #1, May 1, 2012

Comment Form

Do you have any information on the conditions of Cooksville Creek that you think would be useful for the study team to know? If so, please tell us what they are.

MEETING ROOM.
THE LOCATION OF THIS DISPLAY WAS VERY HARD TO FIND. WHY DID YOU MAKE THE INFORMATION SO OBSCURE?

Do you have any concerns about the Flood Control Evaluation Study? If so, please tell us what they are.

Continued on Back...

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Please provide any additional comments on any other material presented tonight.

Name:
Address:
Affiliation (if any):
Email:

*Thank you for your participation in the **Flood Control Evaluation Study: Municipal Class Environmental Assessment**. Please put your comment form in the drop box.*