AGENDA

GENERAL COMMITTEE

THE CORPORATION OF THE CITY OF MISSISSAUGA
www.mississauga.ca

WEDNESDAY, APRIL 8, 2015 – 9:00 AM
COUNCIL CHAMBER – 2nd FLOOR – CIVIC CENTRE
300 CITY CENTRE DRIVE, MISSISSAUGA, ONTARIO, L5B 3C1

Members

Mayor Bonnie Crombie	
Councillor Jim Tovey	Ward 1
Councillor Karen Ras	Ward 2
Councillor Chris Fonseca	Ward 3
Councillor Carolyn Parrish	Ward 5
Councillor Ron Starr	Ward 6
Councillor Nando Iannicca	Ward 7
Councillor Matt Mahoney	Ward 8 (Chair)
Councillor Pat Saito	Ward 9
Councillor Sue McFadden	Ward 10
Councillor George Carlson	Ward 11

Contact: Sacha Smith, Legislative Coordinator, Office of the City Clerk
905-615-3200 ext. 4516 / Fax 905-615-4181
sacha.smith@mississauga.ca

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CALL TO ORDER

APPROVAL OF THE AGENDA

DECLARATIONS OF CONFLICT OF INTEREST

PRESENTATIONS - Nil

DEPUTATIONS

A. Anu Vittal, Executive Director, Mississauga Arts Council with respect to the Mississauga Arts Council's 2015 strategic direction and programming initiatives.

MATTERS TO BE CONSIDERED

1. Lisgar District Basement Water Infiltration Study Findings and Single Source Contract Award to Amec Foster Wheeler Environment & Infrastructure, File Ref. Procurement No. FA. 49.301-15 (Ward 10)

Corporate Report dated March 27, 2015 from the Commissioner of Transportation and Works with respect to the Lisgar District Basement Water Infiltration Study Findings and single source contract award to Amec Foster Wheeler Environment& Infrastructure.

RECOMMENDATION

1. That the Prioritized Action Plan from the *Lisgar District Basement Water Infiltration Investigation – Summary Report (March 2015)* as outlined in the report dated March 27, 2015, from the Commissioner of Transportation and Works titled *Lisgar District Basement Water Infiltration Study Findings and Single Source Contract Award to Amec Foster Wheeler Environment & Infrastructure, File Ref. Procurement No. FA.49.301-15 (Ward 10)* be endorsed.

2. That PN 15-146 Lisgar District Implementation Projects – Phase 1 be established with a gross and net budget of $3.9 million.

3. That a by-law be enacted to fund PN 15-146 Lisgar District Implementation Projects – Phase 1 with $3.9 million from the Capital Reserve Fund (Account 33121).

(1.)

4. That the Purchasing Agent be authorized to execute the appropriate forms of commitment to Amec Foster Wheeler Environment & Infrastructure in the estimated amount of $600,000 for the design, monitoring, contract administration and construction inspection services in support of the *Lisgar District Implementation Projects – Phase 1.*

5. That a copy of the report dated March 27, 2015, from the Commissioner of Transportation and Works titled *Lisgar District Basement Water Infiltration Study Findings and Single Source Contract Award to Amec Foster Wheeler Environment & Infrastructure, File Ref. Procurement No. FA.49.301-15 (Ward 10)* be forwarded to Conservation Halton for information.

2. Assumption of Municipal Works (Ward 6)

Corporate Report dated March 17, 2015 from the Commissioner of Transportation and Works with respect to the assumption of municipal works.

RECOMMENDATION

That the City of Mississauga assume the municipal works as constructed by the developer under the terms of the Servicing Agreement for 43M-1786, Southlawn Developments Inc., (lands located north of Highway 403, south of Eglinton Avenue West, west of Mavis Road and east of Wainscot Drive, in Z-30, Known as Southlawn Phase II Subdivision), and that the Letter of Credit in the amount of $488,559.05 be returned to the developer and that a by-law be enacted to assume the road allowances within the Registered Plan as public highway and part of the municipal system of the City of Mississauga.

3. Metrolinx Request for Temporary Road Closure of Commerce Boulevard between Eglinton Avenue East and Skymark Avenue for Construction of an Overpass Bridge as part of the Mississauga Transitway Renforth Gateway (Ward 5)

Corporate Report dated March 30, 2015 from the Commissioner of Transportation and Works with respect to the Metrolinx request for a temporary road closure of Commerce Boulevard between Eglinton Avenue East and Skymark Avenue for construction of an overpass bridge as part of the Mississauga Transitway Renforth Gateway.

RECOMMENDATION

That Metrolinx and its General Contractor Dufferin Construction Company (Dufferin) be granted permission to temporarily close Commerce Boulevard between Eglinton Avenue East and Skymark Avenue to undertake construction of an overpass bridge as part of Mississauga Transitway Metrolinx's Renforth Gateway starting at 6:00 a.m. on Monday, April 27, 2015 and ending at 6:00 a.m. on Tuesday, October 13, 2015.

4. Application of Noise Attenuation Barrier Policy for 1116 Deer Run under Ontario Regulation 586/06 of the Municipal Act, 2001, Local Improvement Charges – Priority Lien Status (Ward 6)

Corporate Report dated March 16, 2015 from the Commissioner of Transportation and Works with respect to an application of Noise Attenuation Barrier Policy for 1116 Deer Run.

RECOMMENDATION

1. That a new noise attenuation barrier be constructed under the Noise Attenuation Barrier Retrofit Program along the south side of Rathburn Road West from approximately 18 metres (59 feet) west of Deer Run to a point approximately 20 metres (66 feet) westerly, in accordance with Corporate Policy 09-03-03 Noise Attenuation Barriers on Major Highways; and

2. That a by-law be enacted authorizing the dismantling and removal of the existing fence and the installation of a 2.4 metre (7.85 foot) high concrete noise attenuation barrier along the south side of Rathburn Road West from approximately 18 metres (59 feet) west of Deer Run to a point approximately 20 metres (66 feet) westerly, to be financed in accordance with Ontario Regulation 586/06 of the Municipal Act, 2001, Local Improvement Charges – Priority Lien Status, at an estimated cost to the City of approximately $16,800 with 50% of the cost to be recovered from the homeowner.

5. Contract Amendment and Single Source Extension for Supply of Multi-Function Devices for a Three-Year Term – File Ref: Procurement FA.49.873-08

Corporate Report dated March 23, 2015 form the Commissioner of Corporate Services and Chief Financial Officer with respect to a contract amendment and single source extension with Ricoh Canada for the supply of Multi-Function Devices.

RECOMMENDATION

1. That the renewal proposal received from Ricoh Canada be accepted for the term June 1, 2015 to May 31, 2018.

2. That the contract with Ricoh Canada for the supply of Multi-Function Devices (MFD's) and related services and supplies be amended in accordance with the renewal proposal and extended for the period June 1, 2015 to May 31, 2016, as provided for in the original contract and be continued for the period of June 1, 2016 to May 31, 2018, on a single source basis, in order to obtain the savings provided by the strategic renewal proposal.

(5.)

3. That Ricoh Canada be recognized as a single source for the term June 1, 2015 to May 31, 2018 in order to accommodate the supply of additional MFD's and related services and supplies, as required, subject to budget funding availability.

4. That the Purchasing Agent be authorized to execute the appropriate forms of commitment to Ricoh Canada in the estimated amount of $900,000 excluding taxes, for the provision of MFD's and related services and supplies for the term June 1, 2015 to May 31, 2018.

5. That the Purchasing Agent be authorized to execute contract amendments to Ricoh Canada for the provision of additional MFD's and related services and supplies, as required, subject to budget funding availability, for the term June 1, 2015 to May 31, 2018.

ADVISORY COMMITTEE REPORTS

Traffic Safety Council Report 2-2015 March 25, 2015

RECOMMENDATIONS

TSC-0042-2015
That Peter Westbrook be appointed as Chair of the Traffic Safety Council for the term ending in November 30, 2018 or until a successor is appointed.
(TSC-0042-2015)

TSC-0043-2015
That Heather Relf be appointed as Vice-Chair of the Traffic Safety Council for the term ending in November 30, 2018 or until a successor is appointed.
(TSC-0043-2015)

TSC-0044-2015
1. That a crossing guard be implemented on Lamplight Way, east of Second Line effective at the commencement of the school year in September 2015 due to the number of students attending St. Julia Catholic School who will not be on the school bus.
2. That the Site Inspection Subcommittee conduct site inspections at the intersection of Second Line and Lamplight Way in September and October 2015, to determine if the warrants are met to retain the crossing guard for the students attending St. Julia Catholic School.
3. That the crossing guard at the intersection of Second Line and Lamplight Way be removed at the Christmas break 2015, if the site inspections conducted in September and October 2015 determine that the warrants are not met for the retention of the crossing guard.

(Ward 11)
(TSC-0044-2015)

TSC-0045-2015

1. That Parking Enforcement be requested to enforce parking prohibitions on Terragar Boulevard from 8:40 a.m. to 9:05 a.m. and from 3:20 p.m. to 3:45 p.m., for students attending Kindree Public School
2. That Transportation and Works be requested to consider the feasibility to extend the "No Stopping" zone on the north side of Terragar Boulevard, west of Kindree Public School to Cork Tree Row.

(Ward 10)
(TSC-0045-2015)

TSC-0046-2015

That the request for a second crossing guard at the northwest corner at Credit Valley Road and Glen Erin Drive, for the students attending Credit Valley Public School be denied as the warrants are not met.
(Ward 8)
(TSC-0046-2015)

TSC-0047-2015

That the Site Inspection Report for the safety review conducted on February 17, 2015 at 2800 Erin Centre Boulevard at the driveway of St. Aloysius Gonzaga Secondary School be received for information.
(Ward 9)
(TSC-0047-2015)

TSC-0048-2015

1. That the request for a crossing guard at the intersection of Mississauga Valley Boulevard and Daralea Heights for the students attending Canadian Martyrs Catholic School and Briarwood Public School be denied as the warrants are not met.
2. That Parking Enforcement be requested to enforce parking prohibitions on Mississauga Valley Boulevard and Daralea Heights from 2:50 p.m. to 3:15 p.m., for the students attending Canadian Martyrs Catholic School and Briarwood Public School

(Ward 4)
(TSC-0048-2015)

TSC-0049-2015

That the request for a crossing guard on Homelands Drive and Thorn Lodge Drive for the students attending Sheridan Park Public School be denied as the warrants are not met.
(Ward 2)
(TSC-0049-2015)

TSC-0050-2015

1. That Transportation and Works be requested to consider the feasibility of installing speed awareness signage on Seagull Drive behind Hillside Middle School.
2. That Transportation and Works be requested to review the signage on Seagull Drive and consider the feasibility of replacing faded signage.

(Ward 2)
TSC-0050-2015

TSC-0051-2015

1. That the request for a crossing guard at the intersection of Huron Heights Drive and Maxine Place for the students attending St. Pio of Pietrelcina be denied as the warrants are not met.
2. That Transportation and Works be requested to review the feasibility of installing curb cuts and landing pads aligning with the park pathway on the west leg of the intersection of Huron Heights Drive and Maxine Place.

(Ward 4)
(TSC-0051-2015)

TSC-0052-2015
That the email dated February 24, 2015 from Councillor Chris Fonseca, on behalf of a resident, requesting a site inspection to determine if the warrants are met for the implementation of a school crossing guard at the intersection of Runningbrook Drive and Tomken Road for the students attending Blessed Teresa of Calcutta Catholic School be received and referred to the Site Inspection Subcommittee for a report back to Traffic Safety Council.
(Ward 3)
(TSC-0052-2015)

TSC-0053-2015
That the email dated March 13, 2015 from Jacqueline Fleming, Directrice de E.E.C. at Ange-Gabriel Catholic Elementary School requesting a site inspection and safety review be received and referred to the Site Inspection Subcommittee for a report back to Traffic Safety Council.
(Ward 9)
(TSC-0053-2015)

TSC-0054-2015
That the email dated February 26, 2015 from a Ward 5 resident requesting a safety review in front of Barondale Public School be received and referred to the Site Inspection Subcommittee for a report back to Traffic Safety Council.
(Ward 5)
(TSC-0054-2015)

TSC-0055-2015
That the email dated March 9, 2015 requesting the placement of a crossing guard at the intersection of McBride Avenue and Grechen Road for the students attending McBride Avenue Public School be received and referred to the Site Inspection Subcommittee for a report back to Traffic Safety Council.
(Ward 6)
(TSC-0055-2015)

TSC-0056-2015
That the Parking Enforcement reports with respect to parking enforcement in school zones for the month of January and February 2015 be received for information.
TSC-0056-2015)

TSC-0057-2015
That the Action Items List from the Transportation and Works Department for January and February 2015 be received for information.
(TSC-0057-2015)

TSC-0058-2015
That up to three (3) Traffic Safety Council members be authorized to attend the 2015 Ontario Traffic Council Annual Conference, on May 3 to May 5, 2015 in Sault Ste. Marie, and that the costs for registration, accommodation and travel (approximately $1,500 per attendee) to attend the Conference be allocated in the 2015 Traffic Safety Council budget.
(TSC-0058-2015)

TSC-0059-2015
That the Site Inspection Subcommittee be requested to conduct a safety review at the intersection of Credit Valley Road and Metcalfe Avenue for the students attending Credit Valley Public School for a report back to Traffic Safety Council.
(Ward 8)
(TSC-0059-2015)

COUNCILLORS' ENQUIRIES

OTHER BUSINESS/ANNOUNCEMENTS

CLOSED SESSION - NIL
(Pursuant to Subsection 239 (2) of the *Municipal Act, 2001*)

ADJOURNMENT

Clerk's Files

Originator's Files MG.23.REP

Corporate Report

DATE: March 27, 2015

TO: Chair and Members of General Committee
Meeting Date: April 8, 2015

General Committee
APR 08 2015

FROM: Martin Powell, P. Eng.
Commissioner of Transportation and Works

SUBJECT: **Lisgar District Basement Water Infiltration Study Findings and Single Source Contract Award to Amec Foster Wheeler Environment & Infrastructure, File Ref. Procurement No. FA.49.301-15 (Ward 10)**

RECOMMENDATION:

1. That the Prioritized Action Plan from the *Lisgar District Basement Water Infiltration Investigation – Summary Report (March 2015)* as outlined in the report dated March 27, 2015, from the Commissioner of Transportation and Works titled *Lisgar District Basement Water Infiltration Study Findings and Single Source Contract Award to Amec Foster Wheeler Environment & Infrastructure, File Ref. Procurement No. FA.49.301-15 (Ward 10)* be endorsed.

2. That PN 15-146 Lisgar District Implementation Projects – Phase 1 be established with a gross and net budget of $3.9 million.

3. That a by-law be enacted to fund PN 15-146 Lisgar District Implementation Projects – Phase 1 with $3.9 million from the Capital Reserve Fund (Account 33121).

4. That the Purchasing Agent be authorized to execute the appropriate forms of commitment to Amec Foster Wheeler Environment & Infrastructure in the estimated amount of $600,000 for the design, monitoring, contract administration and construction inspection services in support of the *Lisgar District Implementation Projects – Phase 1.*

5. That a copy of the report dated March 27, 2015, from the Commissioner of Transportation and Works titled *Lisgar District Basement Water Infiltration Study Findings and Single Source Contract Award to Amec Foster Wheeler Environment & Infrastructure, File Ref. Procurement No. FA.49.301-15 (Ward 10)* be forwarded to Conservation Halton for information.

REPORT HIGHLIGHTS:

- The investigative study undertaken by Amec Foster Wheeler Environment & Infrastructure has determined that the basement water infiltration in the Lisgar District is caused by the build-up of water in the bedding material of the utility trenches that contain the storm, sanitary and foundation drain collector (FDC) sewer systems;
- A Prioritized Action Plan has been developed to address the basement water infiltration issue;
- Staff recommends that the two highest priority Actions in the Prioritized Action Plan commence in 2015 at an estimated cost of $3.9 million;
- Staff recommends that the remaining Actions identified in the Prioritized Action Plan, with an estimated capital cost of $18 million, be considered in the 2016 Budget and Business Planning process;
- Staff recommends that the Lisgar District Sump Pump Subsidy Program, that is currently available, continue to be offered to homeowners with reported basement water infiltration;
- The City-led High Water Protocol will continue until the effectiveness of the mitigation measures has been assessed;

- Strict stormwater management requirements will continue to be imposed on new development applications within the Lisgar District until they are determined to be no longer required to ensure that new development will not adversely impact the basement water infiltration problem; and

- Staff recommends that Amec Foster Wheeler Environment & Infrastructure be retained on a single source basis, for the design, monitoring, contract administration and construction inspection services in support of the *Lisgar District Implementation Projects – Phase 1*.

BACKGROUND:

The Lisgar District is situated in the northwest corner of the City and is bounded by the Canadian Pacific Railway tracks to the north, Britannia Road West to the south, Ninth Line to the west and Tenth Line West to the east. This residential area was primarily developed between 1986 and 2004 with a number of small in-fill developments occurring over the past few years.

The servicing of the Lisgar District is designed based on a three-pipe system: sanitary sewer, storm sewer and foundation drain collector (FDC). The sanitary sewer system collects household wastewater and basement floor drainage; the storm sewer system conveys road surface runoff (based on a 2-year return period design capacity) into the Sixteen Mile Creek and; the FDC system drains the weeping tiles surrounding the foundation of homes to a storm drainage outlet separate from the Sixteen Mile Creek system. Designs based on a three-pipe system approach are used in municipalities across Ontario and elsewhere.

Beginning in 2008, a number of residents in the Lisgar District started to experience water seepage in their basements following certain rainfall events, with the largest number of homes impacted during a rainfall event in late 2011. In total, 187 homes are known to have been affected to date. The affected areas are shown in Appendices 1 and 2.

When the City first became aware of basement water seepage, the cause of this unforeseen problem was not known. However, the City proactively undertook a number of precautionary, investigative and

maintenance actions on the storm and FDC sewer systems, the tributary of the East Branch of Sixteen Mile Creek ("creek"), and the Osprey Marsh Stormwater Management Pond ("pond") including:

- Video inspection and cleaning of the FDC sewer system;
- Removal of vegetation along the creek;
- Removal of excess sediment materials from the creek at bridge crossings and storm sewer outfalls;
- Putting in place a High Water Protocol (which deploys pumps during major storms);
- Sealing selected FDC manholes and pipe joints;
- Adjustments to the water level control structures of the pond; and
- Grading work to improve the movement of road runoff to the creek.

Details related to these actions are summarized in the consultant's report referred to below.

In October 2011, the engineering consulting firm of AMEC Environment & Infrastructure (now known as Amec Foster Wheeler Environment & Infrastructure) was retained to undertake an investigative study to determine the possible causes of the basement water infiltration problem and recommend corrective measures. This study, titled *Lisgar District Basement Water Infiltration Investigation – Summary Report (March 2015)* has been completed. A link to an electronic copy of this report is provided as Appendix 3. This Summary Report should be referred to for background details including the operation of a FDC system.

A fourth community meeting organized by Councillor McFadden's office was held on March 26, 2015 where findings of the investigative study were presented to the public by Amec Foster Wheeler Environment & Infrastructure.

This Corporate Report will highlight the findings of the Amec Foster Wheeler Environment & Infrastructure investigation and propose a number of mitigation measures to be implemented in 2015 for General Committee's and Council's consideration.

COMMENTS: Investigative Study

The Amec Foster Wheeler Environment & Infrastructure study included an extensive program of activities to better understand the performance of the existing drainage system, determine the cause of basement water infiltration and recommend mitigation measures. These activities included:

- Compiling a list of possible causes;
- Monitoring activities;
- Testing activities;
- Analysis of potential causes; and
- Recommending mitigation measures as part of a Prioritized Action Plan.

Possible Causes

An initial step undertaken in this study was to identify possible causes of basement water infiltration in light of the fact that homes in this area had not had any known issues for more than 20 years since development of the area began. The possible causes identified included:

- Stormwater in the utility trench;
- Changes to groundwater levels;
- Function and maintenance of the creek;
- Operation of the pond;
- All aspects of the FDC system;
- Construction of basement walkouts;
- Cross-connections between the FDC and sanitary systems;
- Construction of the Lisgar GO Station;
- Surcharging of the sanitary system;
- Changes to lot grading; and
- Basement construction/changes.

Each of the above possible causes was then assessed, individually and in combination, through extensive field monitoring, testing and analysis, to determine its relationship to the basement water infiltration issue. These activities included the following:

Monitoring

- Groundwater levels and temperatures;
- FDC and storm sewer systems (water levels and temperatures); and
- Creek flows and the pond water levels.

Testing

- Water quality characterization;
- Storm sewer leakage testing; and
- Storm sewer outfall collar testing.

Analysis

- Groundwater analysis;
- Design check of the FDC system; and
- Computer modelling of the FDC system.

As collected field monitoring data were analyzed and engineering assessments were undertaken, some of the possible causes started to be eliminated. Additional field work, testing and analysis activities were then carried out to further narrow in on the cause. This iterative process was lengthy and required a significant amount of time, necessitating multiple years of activities. It was found that the interactions between the various components of the drainage system were very complex and diverse, further complicating the search for the cause of the problem.

Cause of Basement Water Infiltration

The study findings have determined that the primary cause of the basement water infiltration is stormwater entering and residing within the utility trench that contains the storm, sanitary and FDC sewers. As storm sewers are not built to be watertight, stormwater is able to leak out and migrate into the utility trench, where the bedding material can allow water to travel rapidly. Storm sewer leakage is also expected to increase through normal aging of the sewers. Over time, water builds up in the utility trench from storm sewer leakage, as well as through other sources, and is unable to drain away quickly

due to the relatively impermeable ("tight") nature of the native soils surrounding the trench. It is this situation, in combination with certain storm conditions and local drainage from properties, where basement water infiltration issues may arise.

For instance, when the ground and utility trench are already wet, possibly from an earlier storm event, and heavy rainfall subsequently occurs, a condition may be created where water leakage from the storm sewer system during the subsequent rainfall event may fill an already saturated utility trench and push water up the bedding material around the FDC laterals servicing the homes and into the foundation weeping tiles. This water then drains directly into the FDC pipes through the weeping tiles, which may result in excess flow (surcharge) to the FDC system under the street. This condition may lead to water around the weeping tiles of homes being unable to drain away freely and instead seep into their basements.

The risk of basement water infiltration is also connected to the relative depths of the FDC system and basements of homes. The less vertical separation between the FDC sewer/utility trench and the basements, the more susceptible basements will be to water seepage.

The study also identified a number of other factors which may be impacting the overall operation of the FDC system; however, none of these factors, either alone or in combination, would cause water to seep into basements to the extent reported.

For additional information on the investigative study, please refer to the consultant's Summary Report available online. A link to an electronic copy of this report is provided in Appendix 3.

Prioritized Action Plan

Based on the study findings, five actions have been recommended as mitigation measures based on their level of feasibility and effectiveness. They are as follows:

1. *Storm Sewer Lining* – Sealing the inside surface of storm sewers in strategic locations with an impermeable liner to reduce/eliminate leakage into the utility trench and ultimately into the FDC system.

2. *Drain or dewater utility trench* – Dewater the bedding material around the FDC system at strategic locations to limit the accumulation of water in the utility trench and provide additional storage volume during storm events.

3. *FDC Pumping Stations* – Install pumping stations at key locations in the FDC system that will activate when the system approaches or reaches surcharge conditions and pump water to the creek, pond or other surface drainage system.

4. *Hydraulic Improvements to FDC Sewers* – Upsizing selected FDC sewers to increase their conveyance capacity and reduce the likelihood of surcharging. These works would be coordinated with planned road works and/or when the sewers are approaching the end of their service life.

5. *Sump Pumps (private)* – To assist homeowners with the cost of installing basement sump pump systems, the City should continue with its Lisgar District Sump Pump Subsidy Program for homes with reported basement water infiltration.

Next Steps

Based on the recommended implementation of the Prioritized Action Plan from Amec Foster Wheeler Environment & Infrastructure, staff recommends that the following projects be undertaken and funded at a cost of $3.9 million in 2015.

1. Design, construction and monitoring of the storm sewer lining in the Black Walnut Trail area, at a gross cost of $3.62 million (Appendix 4);

2. Conduct background work and testing to refine key details of the proposed utility trench dewatering system to determine cost estimates, locations and any land acquisition

requirements for highest priority locations, at a gross cost of $170,000 (refer to Appendix 4 for preliminary locations);

3. Pre-construction monitoring program to establish "baseline" conditions to confirm the effectiveness of the proposed measures, at a gross cost of $60,000; and

4. Continuation of the High Water Protocol until the effectiveness of the proposed actions is known, at a gross cost of $30,000.

It should be emphasized that the basement water infiltration issue is complex and the selection of measures to appropriately address this issue remains an iterative process. Actions in the Prioritized Action Plan will be implemented in stages where constructed projects are monitored to assess their effectiveness and to assist staff in making informed decisions on subsequent actions.

The Lisgar District Sump Pump Subsidy Program that is currently available should continue to be offered to homeowners with reported basement water infiltration. This program will provide a financial subsidy for up to 50 percent of the cost to supply and install a sump pump to a maximum of $3,000 per household.

The remainder of the recommended projects identified in the Prioritized Action Plan, with an estimated capital cost of $18 million, will be considered in the 2016 Budget and Business Planning process where priorities and funding options will be investigated.

Strict stormwater management requirements will continue to be imposed on new development applications within the Lisgar District to ensure new developments will not adversely impact the basement water infiltration problem. These requirements may include the following:

a) Foundation weeping tiles are not permitted to be connected to the FDC, storm or sanitary sewer systems.

b) Sump pumps for foundation drainage must discharge to the ground surface and be directed away from the house.

c) Post-development stormwater flow rates and volumes are to be maintained to existing levels and must drain to an appropriate outlet.

These requirements will remain in place until they are determined to be no longer required based on Action Plan monitoring results.

Consulting Services

Staff recommends that Amec Foster Wheeler Environment & Infrastructure be retained to provide the consulting services now required for the *Lisgar District Implementation Projects – Phase 1* on the basis that it is cost effective to do so.

Based on an estimate provided by Amec Foster Wheeler Environment & Infrastructure, the proposed cost for engineering consulting services for the design, monitoring, contract administration and construction inspection services in support of the *Lisgar District Implementation Projects – Phase 1* is approximately $600,000 (refer to Appendix 5 for Scope of Work). This amount forms part of the total $3.9 million requested to undertake the Phase 1 works.

Amec Foster Wheeler Environment & Infrastructure was the original consultant engaged in 2011to undertake this very complex investigative study and has successfully demonstrated proficiency in determining the cause of the basement water infiltration problem and recommending corrective measures. Amec Foster Wheeler Environment & Infrastructure is very familiar with the recommended projects and does not need to familiarize itself with the complex multi-year investigative works and can therefore proceed immediately upon Council's approval of the award recommendation.

Purchasing By-law No. 374-06 provides for single source awards such as this wherein it states, in Schedule A 1. (b) (iv) *the solicitation of competitive Bids would not be economical to the City.* Council approval is required for single source contracts having a value of $100,000 or more.

STRATEGIC PLAN: Not applicable.

FINANCIAL IMPACT: A new project has been created to address the highest priority recommendations from the *Lisgar District Basement Water Infiltration Investigation – Summary Report (March 2015)*. The estimated cost of the Phase 1works is $3.9 million and will be funded from the Capital Reserve Fund.

The study has identified other projects with an estimated cost of $18 million. These additional projects will be considered in the 2016 Budget and Business Planning process where priorities and funding options will be investigated.

CONCLUSION: The findings of the investigative study represent a significant step in understanding the causes of a complex basement water infiltration issue in the Lisgar District. Commencement of the two highest priority measures in 2015, subject to Council approval, will begin to improve the drainage system's performance and reduce the risk of future basement water infiltration.

Staff is recommending that Amec Foster Wheeler Environment & Infrastructure be retained to provide consulting services for the Phase 1 work, on a single source basis, being an economical solution for the City.

ATTACHMENTS:

Appendix 1: General Affected Area – North Lisgar
Appendix 2: General Affected Area – South Lisgar
Appendix 3: Lisgar District Basement Water Infiltration Investigation - Summary Report

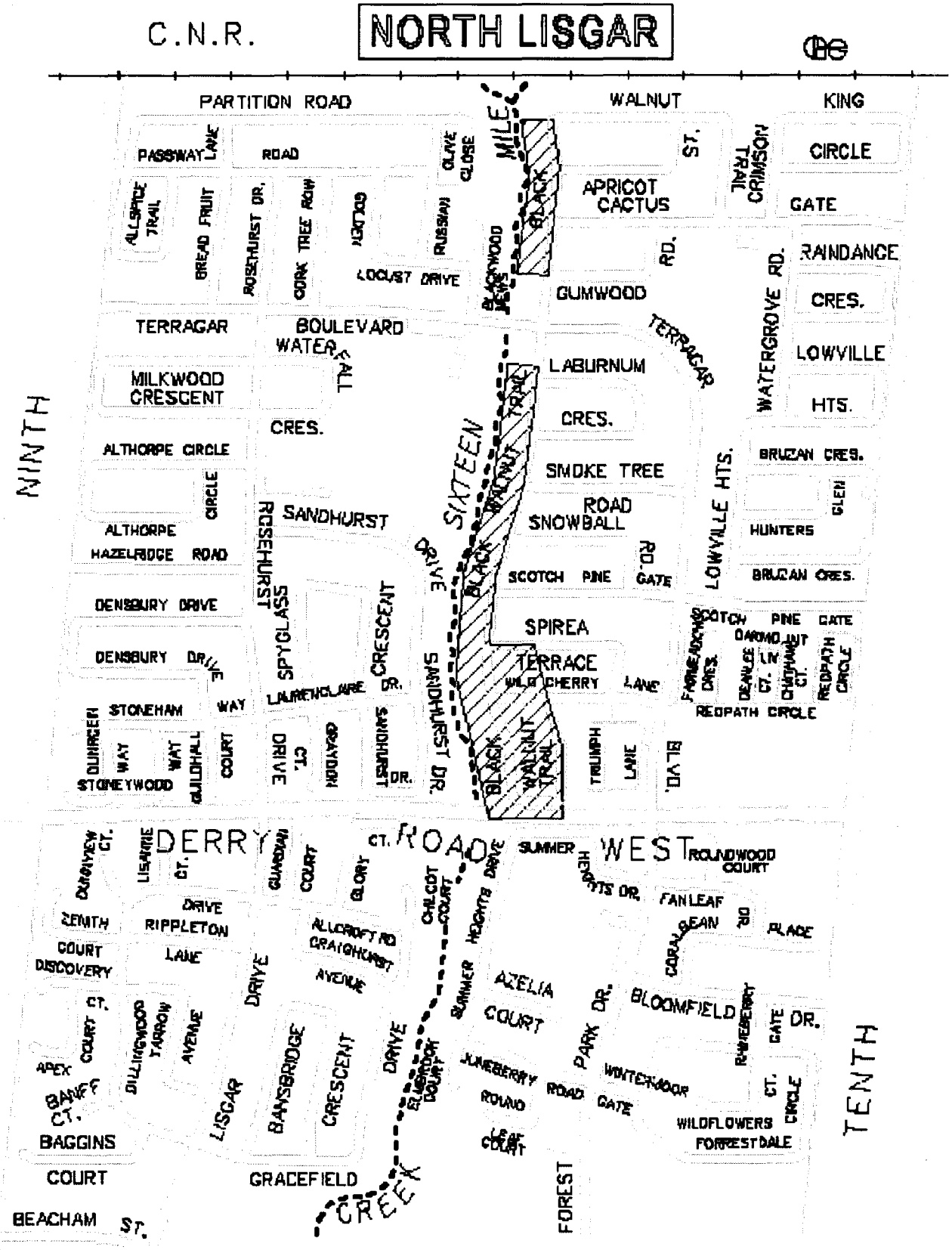
Note: To support the City's environmental commitments and to achieve savings, The City is reducing unnecessary printing and copying of large documents by providing access to electronic files. Appendix 3 of this corporate report is only available online at:
www7.mississauga.ca/documents/tw/LisgarFindings.pdf

Appendix 4: Locations of Proposed Storm Sewer Lining and Dewatering – Black Walnut Trail Area
Appendix 5: Scope of Work from Amec Foster Wheeler Environment & Infrastructure

Martin Powell, P.Eng.
Commissioner of Transportation and Works

Prepared By: Anthony DiGiandomenico, P.Eng.
Storm Drainage Engineer

Appendix 1:
General Affected Area - North Lisgar



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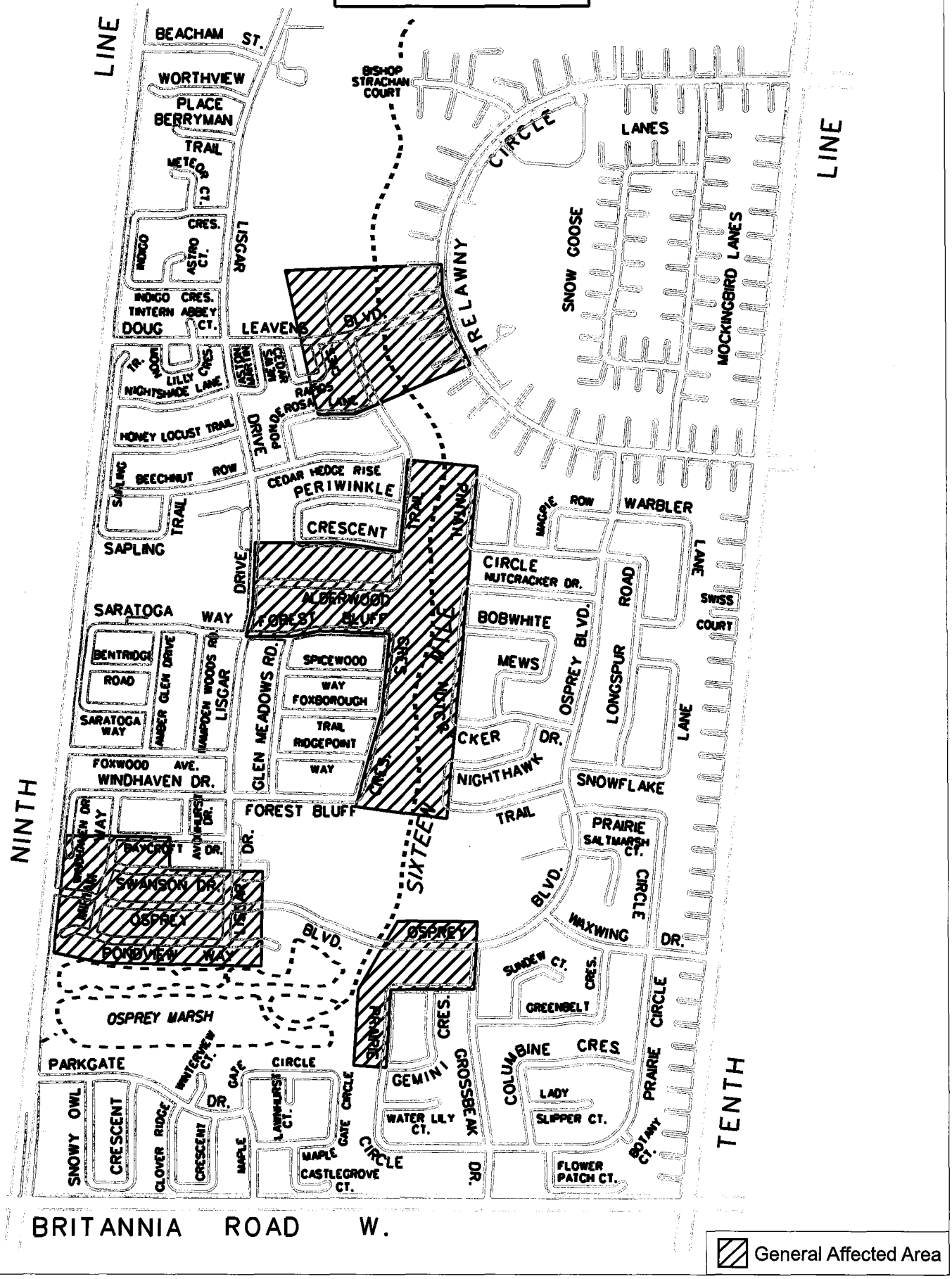
SOUTH LISGAR

Appendix 2:
General Affected Area - South Lisgar



General Affected Area

LISGAR DISTRICT
BASEMENT WATER INFILTRATION INVESTIGATION

SUMMARY REPORT

Submitted to:

City of Mississauga
Mississauga, Ontario

Submitted by:

Amec Foster Wheeler Environment & Infrastructure

A division of Amec Foster Wheeler Americas Limited
3215 North Service Road
Burlington, ON L7N 3G2

Tel: 905-335-2353
Fax: 905-335-1414

March 2015

TP111119B

EXECUTIVE SUMMARY

Lisgar District Basement Water Infiltration Assessment

Commencing in 2008 a number of homes in the Lisgar District experienced water seeping into their basements following certain rainfall events, with the largest number of homes impacted during a rainfall event in late 2011. A total of 187 homes are known to have been affected to date.

After becoming aware of the scale of this issue, the City undertook a number of actions, including:

- Video inspection and cleaning of the foundation drain collector (FDC) system;
- Removal of vegetation along Sixteen Mile Creek;
- Clean-out of bridge crossings and storm outfalls to Sixteen Mile Creek;
- Putting in place a High Water Protocol (deploy pumps during major storms);
- Sealing selected FDC manholes and pipe joints; and
- Adjustment to the Osprey Marsh Stormwater Pond outlet.

In October 2011, the engineering consulting firm of AMEC Environment & Infrastructure (now known as Amec Foster Wheeler Environment & Infrastructure) was retained to undertake an engineering study to determine the cause(s) of basement water infiltration and recommend corrective measures.

After a lengthy and comprehensive monitoring period and analysis, the study findings have determined the problem to be primarily related to the build-up of water in the bedding material of the utility trenches that contain the storm, sanitary and FDC sewer systems.

Leakage from the storm sewer, which is a normal occurrence, combined with the presence of slow draining native soils around the utility trenches has been found to result in water build-up within these trenches. If the build-up of water is significant enough it can travel up the bedding material around the FDC laterals servicing the homes and into the foundation weeping tiles. This water then drains directly into the FDC pipes through the weeping tiles which may result in excess flow in the FDC system (surcharge). However, this condition by itself may not lead to basement water seepage. It is this condition in combination with certain storm conditions (preceding rainfall followed by a sufficiently large storm event) and local lot drainage that may lead to water around the weeping tiles being unable to drain and potentially seeping into the basements of homes.

The exact reasons why homes in the Lisgar District have not had basement water seepage before 2008 are not known. It is considered that the increasing leakage of water from the storm sewers through normal aging gradually increased the volume of water collected in the trenches over time, ultimately contributing to the problems first experienced in 2008.

During the course of the investigations a number of other factors have been identified which may be impacting the overall operation of the FDC system; however, based on the information available, none of them, either alone or in combination would cause water to seep into the basements to the extent reported.

These factors include:

- The depth of the FDC system and utility trench relative to residential weeping tile systems in some areas;
- Capacity issues related to pipe sizes and slopes in some sections of the FDC system;
- Potential inflows to the utility trench from groundwater and surface water sources; and
- Rain water and runoff from the lot or roof entering drains in basement walkout areas that are connected to the FDC system

Based on the findings presented in this study, the following two measures are recommended as the highest priorities for the City to deal with the basement water infiltration issue:

- Strategic lining of priority storm sewers to minimize leakage; and
- Construction of a utility trench dewatering system.

Other actions that may be implemented after the highest priority measures are completed include:

- Build permanent FDC pumping stations for high flows; and
- Replace deficient FDC pipe lengths when they reach the end of their engineered lifespan.

It is also suggested that residents who qualify for the City's Lisgar District Sump Pump Subsidy Program take advantage of the program.

The findings of the engineering study represent a significant step in understanding the cause of a complex basement water infiltration issue in the Lisgar District. Implementation of the two highest priority measures to improve the drainage system's performance and minimize the risk of future basement water infiltration is recommended to be initiated as soon as funding and approvals are secured.

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1.0 INTRODUCTION

The Lisgar District is situated in the northwest corner of the City of Mississauga and is bounded by the Canadian Pacific Railway tracks to the north, Britannia Road West to the south, Ninth Line to the west and Tenth Line to the east. It is located within the Sixteen Mile Creek watershed and drains to a small tributary of the east branch of Sixteen Mile Creek (Figure 1).

The Lisgar District is mainly made up of single family homes which were largely built over a 25-year period starting in the early 1980s as shown in Figure 2.

Commencing in 2008, a number of homes in the Lisgar District have experienced water seeping into their basements following certain rainfall events. A total of 187 homes are known to have been affected to date.

In response to these events, the engineering consulting firm of AMEC Environment & Infrastructure (now known as Amec Foster Wheeler Environmental & Infrastructure) was retained in late 2011 to undertake an engineering study to determine the cause(s) of basement water infiltration and recommend corrective measures.

This Summary Report provides a high-level discussion on the following matters based on three years of comprehensive field monitoring (2012-2014) and engineering analysis:

- Description of the drainage system servicing the Lisgar District;
- Summary of City-led actions to proactively address concerns;
- Summary of potential causes of the basement water infiltration;
- Detailed description of study activities including field work, testing, monitoring and analysis; and
- Outline of the proposed mitigation approach comprised of priority-based actions for 2015 and beyond.

Figure 1: Subwatershed Map

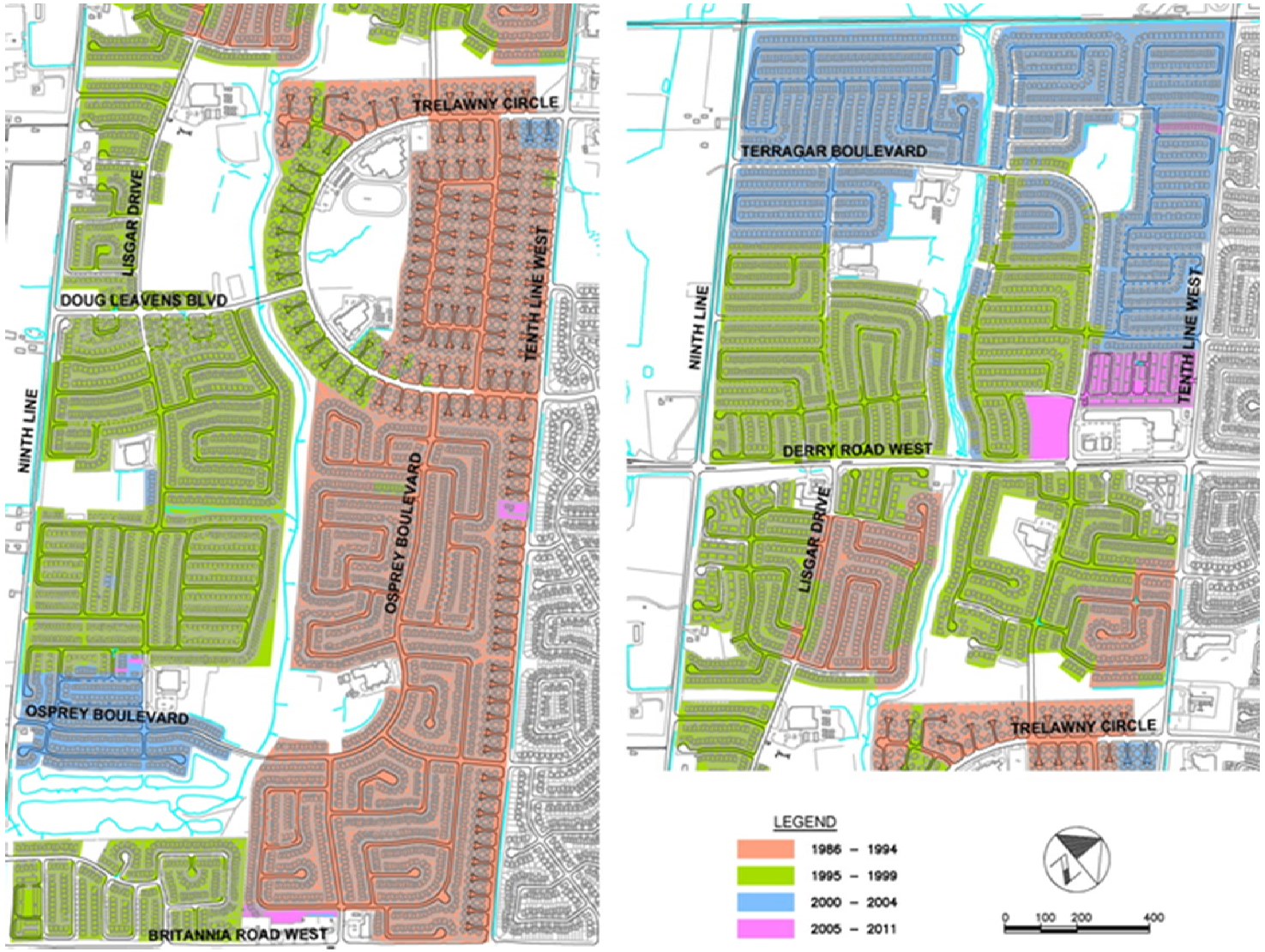


Figure 2: Historic Development of Lisgar District

2.0 OVERVIEW OF DRAINAGE SYSTEMS

When agricultural or open space lands are converted to urban uses, such as residential or employment, municipal services including watermains, sanitary sewers and storm sewers are typically constructed within road allowances or public easements to support these developments. The City of Mississauga is responsible for managing all aspects of stormwater within its jurisdiction, whereas the Region of Peel is responsible for stormwater on Regional roads, as well as drinking water, wastewater and solid waste management.

Storm sewers are designed to capture surface runoff from rainfall or snowmelt and then convey this water safely to a waterbody such as a creek, river or lake. In areas with stormwater management facilities (commonly referred to as ponds), designed to provide water quality and/or flood control, this water would first outlet into these ponds for treatment before being released to a waterbody. Where the waterbody is low in relation to the surrounding lands, the storm sewers can be built sufficiently deep below the ground surface to also capture and convey water draining from the weeping tiles around the basement foundations of homes (Figure 3). Alternatively, where the receiving waterbody is high compared to the surrounding lands and basement foundations, the weeping tiles around the homes would not be able to drain through gravity into the storm sewers. In these circumstances, one of two systems would be required to drain the foundation around the homes:

- Sump Pumps; or
- A Foundation Drain Collector.

A sump pump is a mechanical pump used to remove water captured by the weeping tiles around the basement foundations of homes that has been collected in a sump pit (basin) in the basement. Water from the sump pit would either be pumped to the ground surface or underground into a shallow storm sewer (Figure 4).

A Foundation Drain Collector (FDC), typically located in the same utility trench as other municipal services, is a sewer system dedicated to only collect and drain water from weeping tiles of homes to an outlet by gravity flow (Figure 5). The FDC system is often referred to as part of a 3-pipe system, the other two being the storm and sanitary systems. At the time of its construction, the FDC system was considered to be a preferred solution for many new areas. In fact, the text book *Modern Sewer Design (Canadian Edition, 1980)* states: "*This system virtually eliminates the probability of back-ups into foundation drains, which have caused considerable flooding, and damage to basements*".

The Lisgar District is one area that is serviced by a 3-pipe system. Figure 6 depicts the limits of the area within Mississauga served by an FDC system.

The following images graphically represent the three alternative systems designed to capture and drain water away from the foundations of homes.

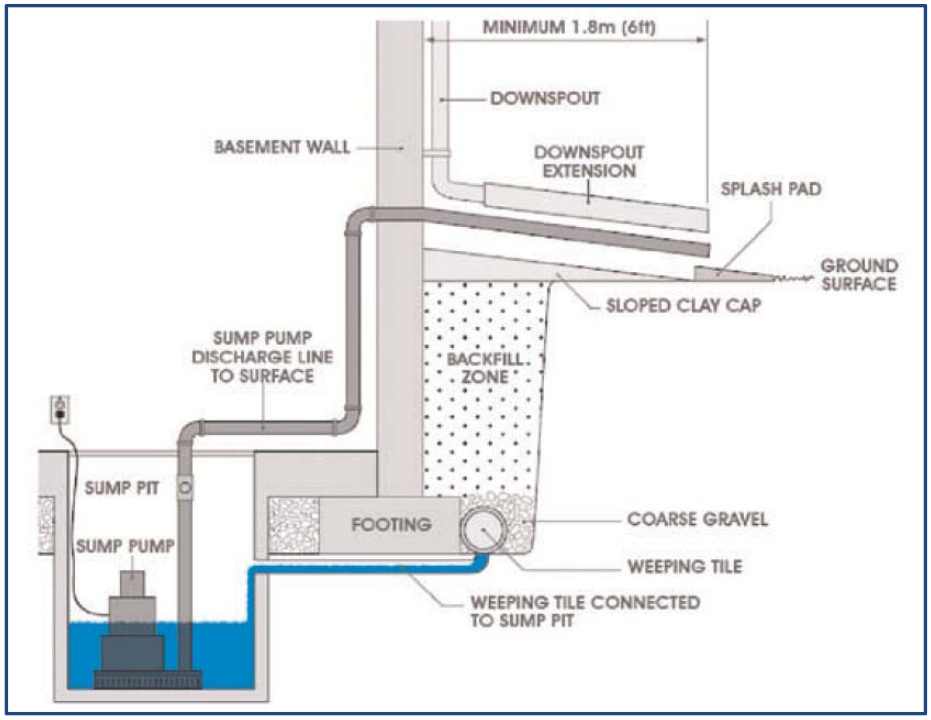


Figure 3: Conventional Foundation Drain connected to Storm Sewer

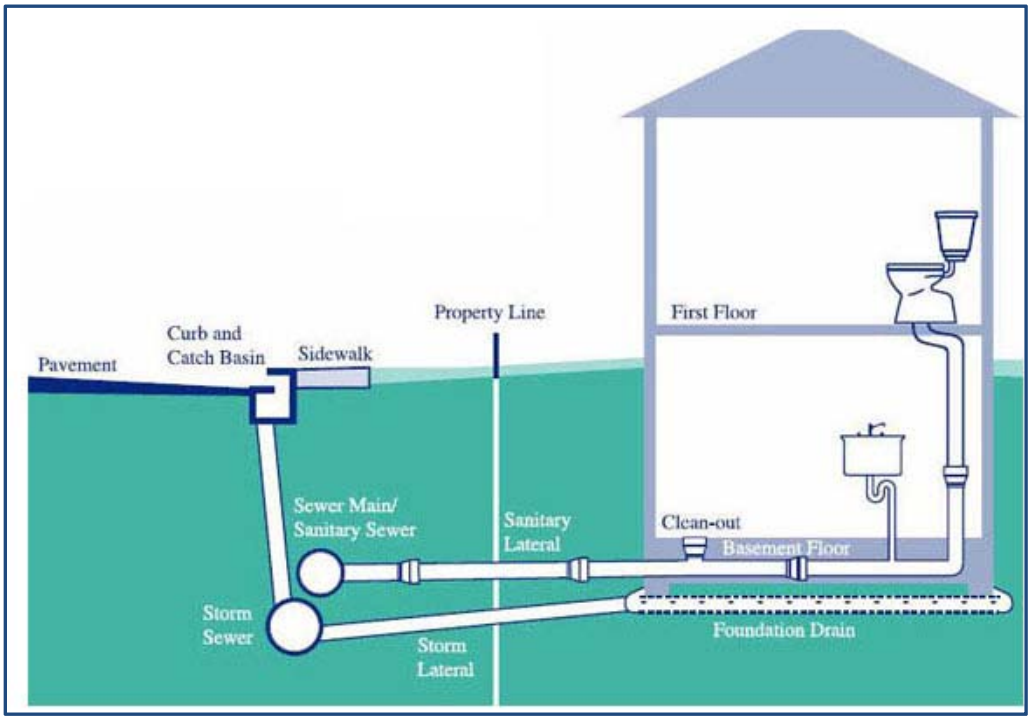


Figure 4: Sump Pump to Front/Rear Yards or Storm Sewer

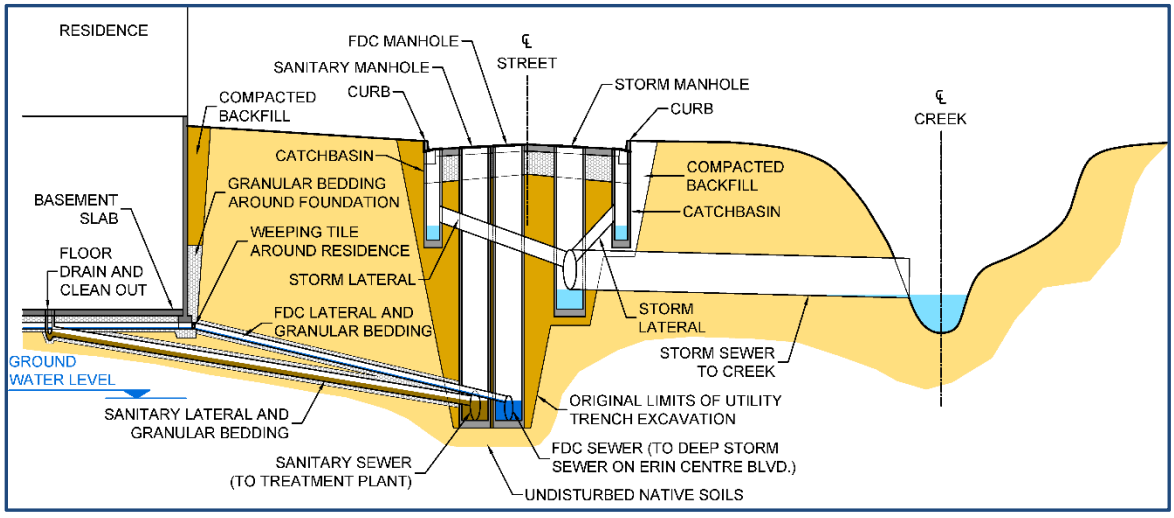


Figure 5: Foundation Drain Collector as Found in the Lisgar District

The following table provides a brief summary of the advantages and disadvantages of these three distinct foundation drainage systems.

Type	Advantages	Disadvantage
Gravity to Storm Sewer	• no additional infrastructure • comparatively low cost • no reliance on mechanical system or power	• may back up if storm sewer is overwhelmed • some additional cost to upsize storm sewers
Sump Pump	• disconnected from municipal system	• requires homeowner to operate and maintain the system • mechanical system needs to operate to function • relies on power
Foundation Drain Collector	• dedicated, providing drainage for foundation only • no reliance on mechanical system or power • “virtually eliminates the probability of back-ups into foundation drains” • allows for smaller sized storm sewers • successfully installed in numerous other municipalities without incident (Brampton, Vaughan, Barrie)	• comparatively high cost to install additional deep and long pipe systems

It should be noted that the technical term ‘surcharge’ is often used in this report when referring to the flow conditions of sewers. This term refers to a gravity sewer that is overloaded beyond its pipe full flow capacity such that the flow is under pressure.

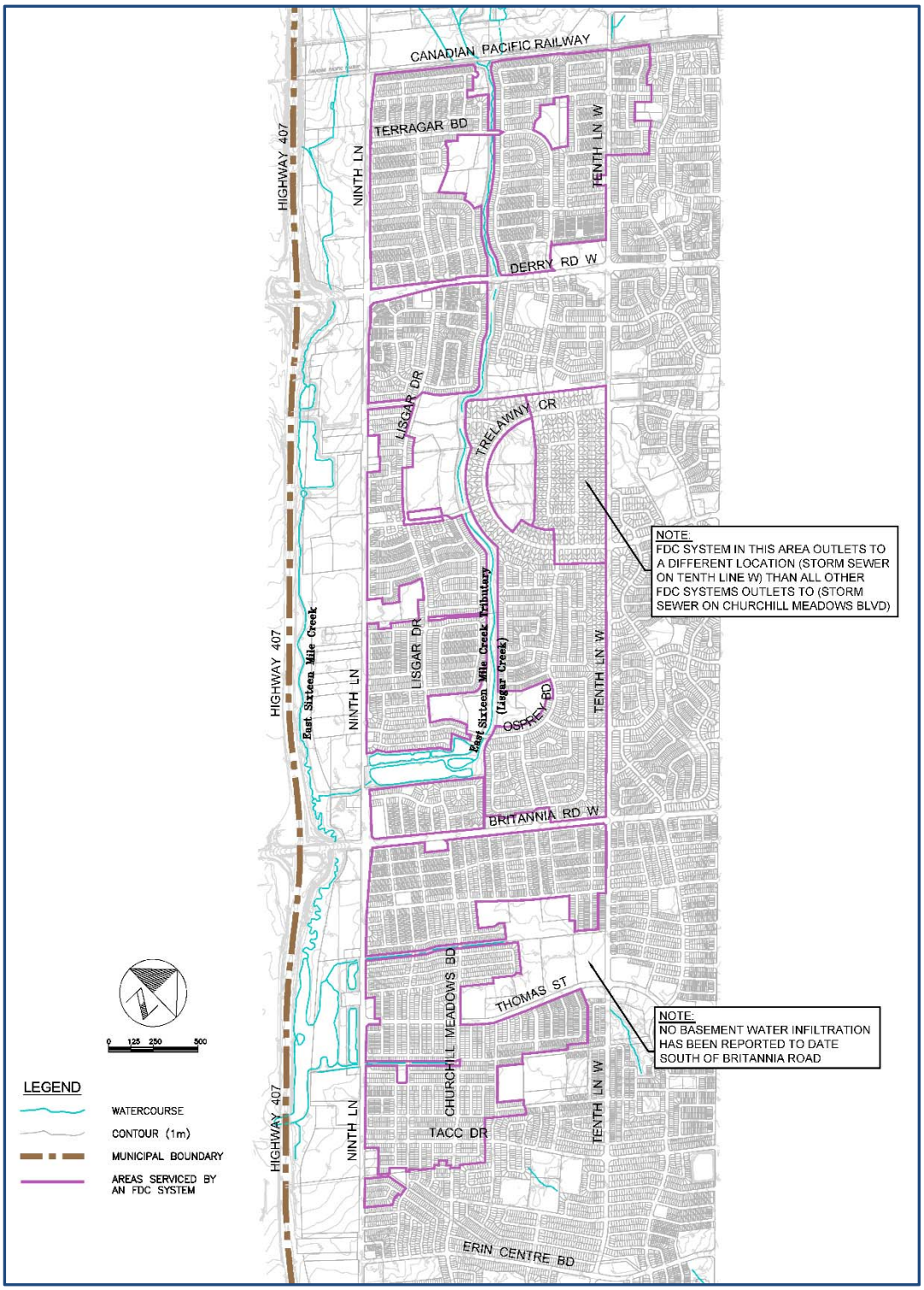


Figure 6: Servicing Limits of FDC System in Mississauga

3.0 CITY-LED ACTIVITIES

When the City of Mississauga first became aware of basement water seepage, the causes of this unexpected problem were not known. However, the City proactively undertook a number of precautionary, investigative and maintenance actions on the storm and FDC sewer systems, the tributary of the East Branch of Sixteen Mile Creek, and the Osprey Marsh Stormwater Management Pond. The following summarizes the work completed by the City in the Lisgar District.

FDC and Storm Sewers

Video Inspection and Flushing of FDC and Storm Sewer Systems

Video inspections of the FDC system and a large portion of the storm sewer system were carried out to identify any potential cracks and leaks (FDC system), as well as debris or obstructions (both systems). Only a few cracks and leaks were detected. Most of them have subsequently been repaired by the City. No significant blockages or debris were observed in either system.

Despite the lack of any significant debris or blockages in the storm and FDC systems, as a further precautionary measure, the FDC system and a portion of the storm sewer system were flushed to clean-out any minor debris accumulations.

Identifying Sewer Cross-connections

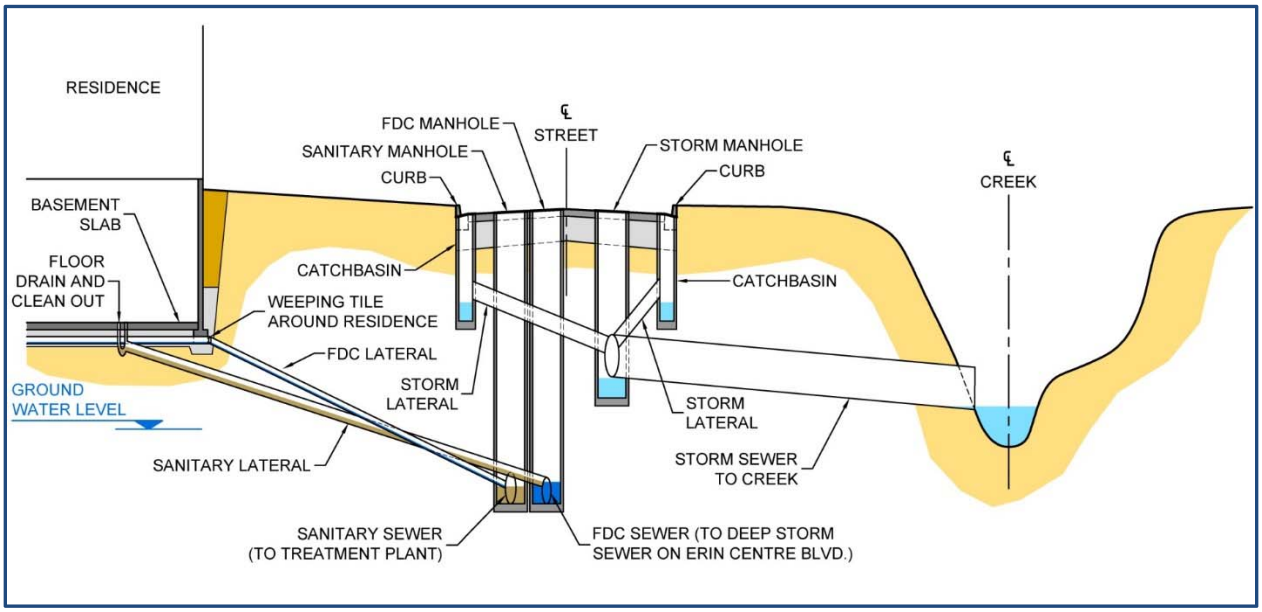


Figure 7: Schematic of Sewer Cross-Connection

The City used investigative techniques (video inspections and dye and smoke tests) to identify homes where cross-connections were suspected; specifically where a residential foundation drain is connected to the sanitary sewer system and the residential sanitary lead is connected to the FDC. Such an occurrence would be expected to increase flows to the FDC sewer system.

The investigation identified two cross-connections. Both have since been repaired.

Sealing FDC Maintenance Access Lids and Cracks

The lids of maintenance access chambers (commonly called “manholes”) to the FDC system were identified as being a potential source of surface water inflow to the FDC system. The City installed maintenance access lid seals to prevent this surface water from entering the FDC system in vulnerable locations; primarily where the FDC sewer is situated adjacent to the tributary of the east branch of Sixteen Mile Creek, and at low points along the roadway where water would be expected to pond during large storm events.

Cracks and leaks in the FDC system, as identified through the video inspection, have also been repaired as noted previously.

Cleaning Storm Sewer Outfalls to Creek

City staff conducted an inspection of the storm sewer outlets to the tributary of the east branch of Sixteen Mile Creek, and identified those where removal of accumulated sediment would benefit the proper operation of the storm sewer system. A total of ten storm sewer outfalls along the tributary between Doug Leavens Boulevard and Osprey Boulevard were subsequently cleaned-out.

Where conditions warranted, the outfalls were also lined with large stones to reduce erosion and ease future clean-out efforts.

Improvements to Overland Flow Routes

In response to reported roadway flooding during the large storm events in 2010 and 2011, grading improvements were undertaken at three locations along Black Walnut Trail (Cactus Gate, Smoke Tree Road, and Scotch Pine Gate) to better define the pathway for surface water to flow to the creek and reduce the potential depth of roadway ponding in these areas.

High Water Protocol

Since late 2011, the City has implemented a High Water Protocol for the Lisgar District. Under this protocol, weather forecasts and other weather-related information such as High Water Bulletins from local Conservation Authorities are continuously monitored by City staff. When unfavorable weather conditions are predicted, City staff and/or its contractors are deployed to three locations within the Lisgar District with portable pumps on standby to pump water from the FDC system if required.

Since this protocol was put into effect, City staff and/or its contractors have operated the pumps on several occasions, including April 10-12, 2013, June 11-12, 2014, and September 10, 2014. No basement water infiltration problems were reported during any of these events.

East Sixteen Mile Creek Tributary and Osprey Marsh Stormwater Management Pond

Creek Vegetation Trimming and Debris Removal

In response to concerns raised by residents, considerable effort and expense was spent by the City to trim the vegetation along the creek corridor between the Canadian Pacific Railway tracks and Doug Leavens Boulevard over the course of 2012. It should be noted that this is not a typical practice for the maintenance and stewardship of a naturalized creek corridor system. The trimmed vegetation re-grew very quickly and has subsequently re-established itself. Further trimming was not undertaken given the findings of this study.

Sediment and Vegetation Removal from Bridge Crossings and Storm Outfalls

Inspections of the bridge crossings and storm outfalls along the tributary of the east branch of Sixteen Mile Creek identified certain areas of sediment and vegetation accumulation. Although the potential impact of this in relation to the basement water infiltration issue was unclear at the time, accumulated sediment, vegetation and other debris were removed from several storm outfalls and beneath the bridges at Osprey Boulevard, Alderwood Trail, and Doug Leavens Boulevards in 2013.

Creek Inspection Protocol

A protocol for a more frequent regular inspection of the tributary of the east branch of Sixteen Mile Creek and bridge crossings was developed to proactively monitor and identify issues such as excessive sediment or debris in the creek which may impede its ability to safely convey water.

Reconfiguration of Osprey Marsh Stormwater Management Pond Outlet

Prior to this study, the City had an approved capital project planned to remove and reconfigure the outlet structures of the Osprey Marsh Stormwater Management Pond. These structures were not allowing the water in the pond to draw down in a timely manner resulting in a higher than normal pond water elevation for an extended period of time. In light of the basement water infiltration concerns, the City proactively cleaned out the accumulated sediment and vegetation around two of the pond outlet structures in late 2011/early 2012 to improve the drainage function of the pond. This was done in advance of the capital project undertaken in 2012 to reconstruct the entire outlet configuration of the pond.

4.0 SUMMARY OF POTENTIAL CAUSES

A main objective of this study was to identify and assess the potential causes of basement water infiltration in the Lisgar District in light of the fact that homes in this area have not had any known issues prior to 2008; more than 20 years since development of the area began. This section discusses a number of these possible causes with more detailed analyses and discussions to follow in subsequent sections.

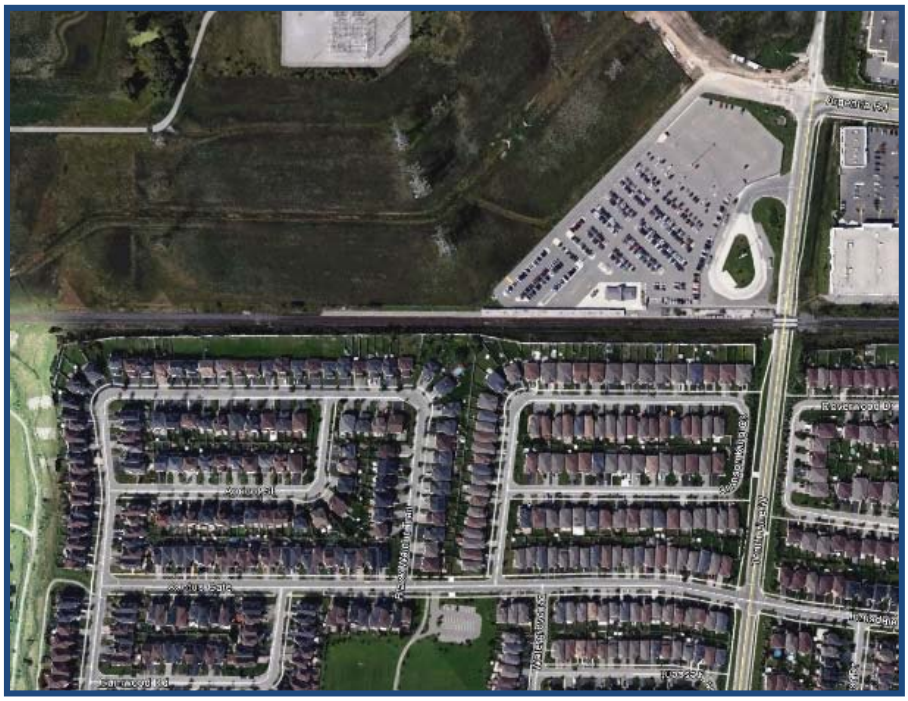
Changes Since Development

One of the initial steps undertaken in this study was to determine what changes could have possibly taken place since the development of the Lisgar District and how these changes may have contributed to basement water infiltration. A list was compiled in consultation with City staff and each possible change was screened based on engineering judgment for further consideration. The possible changes are discussed as follows:

Climate

Most experts agree that weather patterns are changing and extreme weather events are becoming more frequent and more intense. However, rainstorms more severe than those experienced during the basement water infiltration events have occurred over the Lisgar District without any known occurrences of water seepage in basements. While rainfall plays a role with respect to the infiltration events, it is not the more frequent and intense storms that seem to be causing the problem, as will be discussed later in this report. As such, intense storms due to a changing climate were ruled out as a contributing factor to the basement water infiltration issue.

Development



The Lisgar District has been more or less fully developed since the mid-2000s, with a small number of in-fill developments occurring over the past few years. The only significant development in the area was the Lisgar GO Station which was constructed to the north of the Lisgar District around 2007. Further investigation was undertaken to determine if the development of the Lisgar GO Station contributed to the basement water infiltration issue and is discussed later in this report.

Creek block maturing with vegetation

As the vegetation along the tributary of the east branch of Sixteen Mile Creek has matured over time, the carrying capacity of this channel, which local storm sewers drain into, has reduced somewhat. This vegetation also traps sediment causing a further loss in capacity, and thereby reduces the efficiency of the tributary to move water. However, the FDC system that conveys water from the foundations of basements does not outlet into this tributary. Nevertheless, investigations were carried out to determine if there are other ways that the tributary may potentially contribute to the basement water infiltration issue.

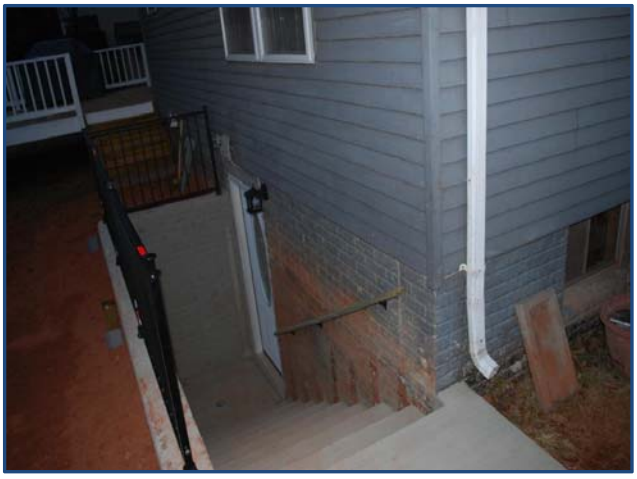
Osprey Marsh Stormwater Management Pond

The Osprey Marsh Stormwater Management Pond has been seen by some residents as a barrier to water conveyance from the tributary of the east branch of Sixteen Mile Creek. However, the pond serves the dual purpose of providing water quality treatment and quantity control for the upstream development lands.

As previously mentioned, the City had a planned and approved capital project to remove and reconfigure the outlet structures of the Osprey Marsh Stormwater Management Pond, prior to the City becoming aware of the scale of water seepage in basements of homes. As a proactive measure, two outlet structures in the pond, which had accumulated sediment and vegetation resulting in a higher than normal water level (1 m +/-), were cleaned out to improve drainage from the pond. The City has since completed the capital project to reconfigure the outlet of the pond, further reducing the drawdown time of the pond following large rainfall events.

It should be noted that the FDC system that conveys water from the foundations of basements does not outlet into this pond. However, further investigation was carried out to determine if other connections exist between the pond and the basement water infiltration issue.

Changes to homes/properties (lot grades, basement walkouts)



Over time, lot grades may change due to the settlement of soils or through physical alterations by homeowners. Depending on this change, the grades on a property may allow water runoff to flow back towards the house, instead of away, thereby increasing the amount of water which may drain to the foundation. However, there is insufficient information to predict with any certainty the level of influence altered grades may have on the basement water infiltration issue.

There are also a significant number of homes in the Lisgar District in which basement walkouts have been built. Rain water and runoff from the lot or roof which flows into a basement walkout can contribute directly to the FDC system since this water may be collected by a drain connected to the home's weeping tiles. While the lack of available information has made it difficult to determine if basement walkouts have contributed to basement water infiltration, further analysis was undertaken based on assumptions regarding the level of influence basement walkouts may be having on the operation of the FDC system.

Aging basement walls and foundations

Concrete foundations are not resistant to cracks. Cracks in a foundation wall can be caused by a number of factors such as concrete shrinkage, aging, settlement into the soil or poor drainage around the house. These cracks provide the opportunity for water to seep into the basement from the exterior. While cracks in foundations are not uncommon, it is challenging to obtain data to determine the level of influence this may have on basement water infiltration given that foundations are located on private property. As such, this possible cause was not analyzed further.

Aging Infrastructure

Like all infrastructure, stormwater related infrastructure gradually ages over time and its concrete components, such as pipes and manholes, typically have a service life of approximately 100 years. While the municipal services in the Lisgar District are comparatively young (less than 35 years), leakage from the storm sewer, which is a normal occurrence, can occur due to:

- cracks in manholes
- displaced/settled sewers
- seals and sewer joints breaking down

As storm sewers are not built to remain watertight, leakage from the system is considered normal. However, in locations where a 3-pipe system is used, opportunities may arise where water, which has leaked from storm sewers, may enter into the FDC system. Additional investigative work was carried out with respect to the issue of storm sewer leakage.

Other Potential Causes

In addition to examining changes that may have taken place since the development of the Lisgar District, other potential causes were also considered, as follows:

Groundwater

Groundwater can be a potential cause of water seepage into basements; however a review of groundwater levels in the area and the properties of the native soils suggest that water moves very slowly in this mainly clay/silt-based soil. This information formed the basis for a number of subsequent tests and analyses on the causes of basement water infiltration which are discussed later.

Foundation Drain Collector

As set out earlier in this report, the FDC system is a sewer system dedicated to only collect and drain water from weeping tiles of homes to an outlet by gravity flow. Issues related to the proper construction and operation of this system may affect the way water around the foundations of homes is conveyed away from the house. Significant efforts were dedicated to the review and analysis of this system. The information below highlights how design and construction issues may affect the proper operation of this system.

a. Maintenance

   Since the FDC system is essentially a closed system connected only to foundation weeping tiles, it would be expected only to collect clean filtered foundation drainage and that maintenance needs would be nominal.

b. Design

   Design criteria for FDC systems are not as well defined as for other infrastructure such as storm or sanitary sewers; hence values from designers are more difficult to verify based on conventional engineering principles. It should be noted, however, that the design of the Lisgar FDC system was based on the best engineering knowledge at the time.

c. Hydraulics

The capacity of the FDC pipe to carry flow is based on, among other factors, the proper size (diameter) and slope of the pipe for gravity drainage. If the FDC pipe is found to have capacity issues, it may surcharge (exceed capacity and flow under pressure), thereby placing those locations served by that FDC pipe at risk.

d. Outlet

The FDC sewer system ultimately outlets into a downstream storm sewer system at Erin Centre Boulevard. If the capacity of this storm sewer system was to be exceeded under large storm events, this could potentially affect the operation of the FDC system.

e. Depths

Locations with shallower FDC depths in relation to adjacent residential weeping tile systems may be at higher risk of basement water infiltration.

f. Inflow/Infiltration

Some FDC joints at manholes and other locations (cracks) have been shown, based on video camera inspections, to allow water to get into the FDC system. They were comparatively minor and most of them have subsequently been repaired by the City.

g. Construction

Similar to FDC hydraulics, if sections of the FDC system were not constructed in accordance with the specified design, this would be expected to have an impact on FDC conveyance capacity. The potential also exists for the FDC pipes and the utility trench, in which the sewers reside, to have been poorly constructed in a manner which would allow water to directly enter the FDC system. Unfortunately, this is difficult to determine without wide-scale, disruptive excavation. However, video camera inspections suggest that the occurrence of this is low.

Sanitary System

The water that seeped into the affected basements was found to be essentially clear, largely odourless and unlikely to contain sanitary sewage. These findings have been supported based on data collected by the Region of Peel which showed that the sanitary system did not experience any capacity issues. As such, it was determined early on in the study that the sanitary system did not contribute to the basement water infiltration problem.

Private Side of Weeper System (cross-connections and Weeping Tile System condition)

As discussed earlier, extensive testing identified only two cross-connections between the FDC and sanitary sewer systems, which have since been repaired. As there were so few cross-connections discovered, this potential cause has been ruled out as having any influence on the basement water infiltration problem.

The condition of the private side weeping tile system has also been considered as a potential source of the problem as some granular material was found in the FDC sewer through video

inspection suggesting some possible localized failures. However, this is very difficult to validate without wide-scale and disruptive excavation around private homes.

Stormwater Leakage to Utility Trench

Storm sewer systems, which capture and convey surface water, are not designed to be water-tight. It is not uncommon or unexpected for storm sewers to leak. However, leakage of stormwater can be substantial and relatively continuous which can potentially fill the lower utility trench with water where the FDC and laterals reside. Investigation into this issue in relation to basement water infiltration was undertaken as part of this study.

5.0 STUDY ACTIVITIES

Amec Foster Wheeler has conducted an extensive program of activities in support of the Lisgar District Basement Water Infiltration Investigation. These activities, which included extensive field monitoring, testing, and analysis, have been undertaken to better understand the existing performance of the various drainage systems and their inter-relationships. These activities have also been conducted to either validate or rule out the possible causes of the observed basement water infiltration as discussed in the previous sections.

Field monitoring is heavily dependent on weather conditions and rainfall. Without the reoccurrence of weather conditions experienced during the basement infiltration events, it is difficult to fully assess how the drainage system responded during those events, and understand the likely primary causes of basement water infiltration. Accordingly, monitoring work has extended over multiple years in order to collect enough representative field data.

In addition, it should be recognized that the interactions between the various components of the drainage system in the Lisgar District have proven to be extremely complex and varied. In order to undertake a complete and thorough investigation, a review of all potential causes of basement water infiltration was required. As field monitoring data were collected and analyzed through the course of the study, Amec Foster Wheeler was able to eliminate some potential causes, and focus on others. As the potential causes were narrowed, additional field work, testing and analysis activities were carried out to clearly prove or disprove theories. This iterative process was lengthy and required a significant amount of time, necessitating multiple years of activities. This process has ensured that a complete and thorough investigation has been undertaken and that appropriate mitigation measures are recommended to reduce the risk of future instances of basement water infiltration.

The study activities completed by Amec Foster Wheeler are summarized as follows:

Monitoring Work

During the course of the study, a comprehensive monitoring program was undertaken over multiple years to collect field data needed to help understand the cause(s) of basement water infiltration and to provide guidance in finding the appropriate mitigation measures. The monitoring work undertaken is described as follows.

A. Groundwater

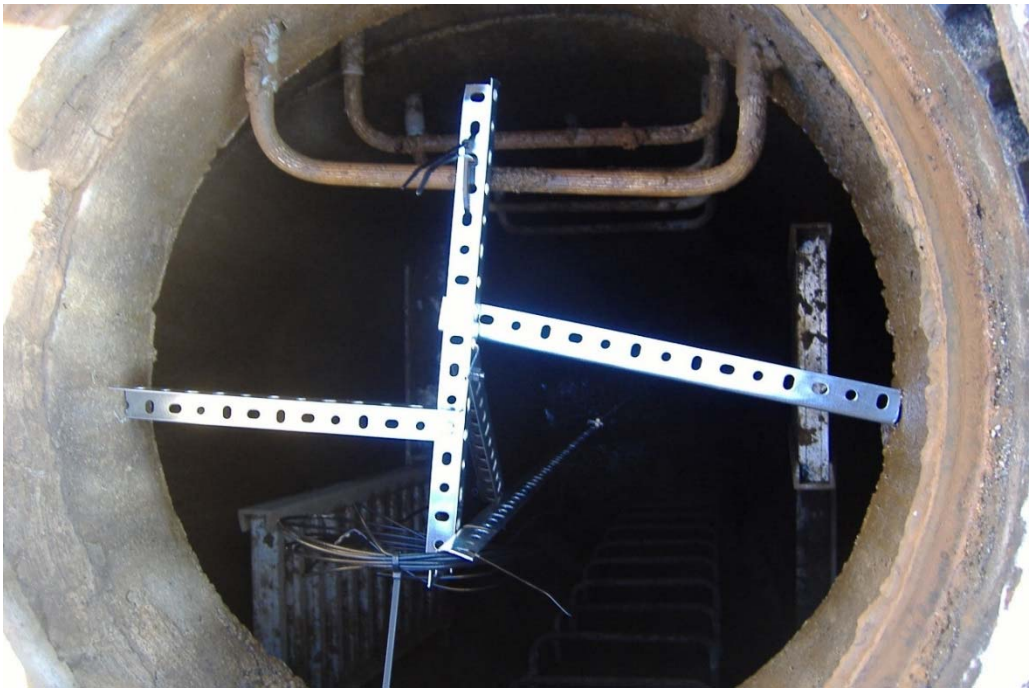
- Monitoring wells were installed at four main sites:
  - Black Walnut Trail at Scotch Pine Gate (late 2011);
  - Osprey Boulevard (late 2011);
  - Alderwood Trail (2013); and
  - Pondview Way (2014).
- Two primary types of monitoring wells were installed:
  - In the native (undisturbed) soils; and
  - In the gravel material found in the utility trench.
- Both water level and water temperature were monitored continuously at these sites.

Findings

1. Groundwater temperatures in the native soils do not vary greatly and are not affected by precipitation events.

2. The shallow groundwater levels in the native soils do not increase rapidly enough during precipitation events which proves that basement water infiltration is not caused by flow through the native soils from the Tributary to the East Branch of Sixteen Mile Creek or the Osprey Marsh Stormwater Management Pond.

B. FDC and Storm Sewer System



- Water level monitoring gauges were installed within the FDC and storm sewer systems in order to observe how water levels in these systems respond to storm events;

- The gauges also recorded water temperature, which is a useful parameter as it can distinguish between sources of water; and

- The number and locations of gauges were adjusted over the course of the study to the most suitable sites through interpretation of the collected data:

    - A total of 17 water level monitoring gauges were installed within the FDC sewer system; extending from the Canadian Pacific Railway tracks to Erin Centre Boulevard; and

    - Three additional water level monitoring gauges were installed over the course of the study within the storm sewer system.

Findings

Recorded data from these gauges have shown that:

1. The FDC system has been observed to surcharge rapidly in response to rainfall events (water levels exceed the top of the pipes meaning that the system is flowing under pressure); this surcharging occurs in different locations and in different amounts depending on the storm event.

2. Surcharging is most common along Black Walnut Trail and in the vicinity of Osprey Boulevard, which is generally consistent with locations of reported basement water infiltration.

3. The short period of time in which the water level in the FDC system has been observed to surcharge and then quickly drop back down strongly suggests that the water is coming in from surface water sources rather than groundwater, which moves much more slowly due to the properties of the native soils.

4. The water temperature data from the observed surcharge events also suggest that the water is coming from surface water sources (rise in water temperature over the summer months - warm surfaces, or a drop in water temperature over the early spring/fall/winter months – cold surfaces).

5. Water levels in the storm sewer along Erin Centre Boulevard, which takes drainage from the FDC system, show that it is not the cause of FDC surcharging.

C. Tributary and Stormwater Management Pond

- Water level monitoring gauges were installed and monitored at key locations along the tributary of the east branch of Sixteen Mile Creek and within the Osprey Marsh Stormwater Management Pond during non-winter periods (April to November);

- The number and locations of gauges were adjusted over the course of the study to the most suitable sites through interpretation of the collected data:
  - Gauges were installed at five different locations along the creek, as well as a gauge directly within the pond; and
  - A temporary rainfall gauge was installed for two of the monitoring years.

Findings

Recorded data from these gauges have shown that:

1. There is nominal creek flow from the GO Station channel, and no apparent connection between these flows and FDC surcharging.

2. There is no apparent connection between creek flows and FDC surcharging.

3. There is no apparent connection between water levels within the Osprey Marsh Stormwater Management Pond and FDC surcharging.

Testing Work

To better understand the interactions between the various water sources and components of the drainage system in the Lisgar District, testing work was undertaken through water sampling and 'in-ground' pilot projects to validate some of the theories. The testing work undertaken is described in the following:

A. Water Quality Characterization

- A characterization program was completed to assess the chemical properties of the water found in:
  - native soils (i.e. the groundwater);
  - utility trench (i.e. where the municipal services are);
  - creek;
  - Osprey Marsh Stormwater Management Pond; and
  - FDC system.

- The testing was able to identify commonalities among the various different water sources, and in particular the source of the water in the FDC.

Findings

1. Under expected operating conditions the quality of the water in the FDC system should show some similarities with the shallow groundwater. However, water in the FDC system water was found to be salt rich, similar to the utility trench, the tributary and the pond. This suggests that the water in the FDC system is very similar to surface water (and dissimilar to groundwater). This similarity is particularly evident in winter conditions when surface water was found to contain elevated salt concentrations from the application of road salt.

B. Storm Sewer Leakage Testing

- Storm sewer leakage testing was undertaken in 2013 at three sites where basement water infiltration occurred (Alderwood Trail and Black Walnut Trail at both Wild Cherry Lane and Scotch Pine Gate). The photos above illustrate some of the steps in the leakage testing process;

- The intent of the tests was to confirm whether or not, under high flows, the storm sewer system would be expected to leak and contribute water to the utility trench where the FDC system resides; and

- The tests were comprised of:
  - Blocking the storm sewers and filling them with water to replicate surcharge conditions (under pressure);
  - Addition of a green fluorescent dye to the storm sewer; and
  - Monitoring of the dye concentrations and water levels in the utility trench, groundwater and FDC system.

Findings

1. At all three sites, the storm sewers leaked and at two sites (Wild Cherry Lane and Scotch Pine Gate), the dye was detected in the FDC after two hours.

2. Tests have proven that there is a flow path from the storm sewer to the FDC through the utility trench with a response time consistent with that observed between major storm events and instances of basement water infiltration.

C. Storm Sewer Outfall Collar Testing

- Over the course of the study, it was speculated that water from the tributary of the east branch of Sixteen Mile Creek or the Osprey Marsh Stormwater Management Pond could possibly move upstream through the storm sewer bedding and contribute excess water to the utility trench;

- In order to verify if water in the utility trench was coming from the tributary or the Osprey Marsh SWM pond, a test was conducted at the end of 2014;

- Impermeable concrete collars were installed in the utility trench near the outfall of the storm sewers at two locations:
  - Sixteen Mile Creek (Scotch Pine Gate); and
  - Osprey Marsh SWM Pond (Pondview Way).

- These collars were installed with backflow valves that allow water from the utility trench to drain to the tributary and pond, but not in the other direction; and

- Monitoring is currently underway at both of these sites to assess the effectiveness of the collar in preventing elevated water levels in the utility trench which may be due to inflow from the creek or pond during larger storm events.

Analysis Work

Using the data collected over the monitoring periods, as well as additional information provided by the City on the FDC system and area services, Amec Foster Wheeler conducted a series of technical analyses as follows:

A. Groundwater analysis

Testing work and analyses were undertaken for both the native soils and granular materials (utility trench) at the groundwater monitoring sites.

Findings

1. Tests have shown that the permeability of the granular materials in the utility trench is up to 10 million times greater than the native soils. This has further confirmed that the utility trench is the primary linkage for surface water to reach the FDC system.

B. Design check of the FDC system

A review of the original design of the main FDC sewer system was undertaken. This analysis is described in greater detail as follows:

a. Comparison of the original number of intended residences to be served by the main FDC sewer system:

- This analysis has shown that a larger number of residences are currently connected to the FDC system than what was intended in the original design; and

- This was known by both the area developers and the City as the area was developed; a developer's consultant undertook a numerical analysis of the main FDC sewer using computer modelling to demonstrate that the system could accept the higher number of connected residences.

b. Comparison of original design sizes and slopes of the FDC sewers (which affect capacity – higher slopes provide more flow capacity, lower slopes less capacity) with as-constructed (current) characteristics:

- This review has shown that some sections of the FDC trunk sewer were constructed flatter than intended, which is expected to decrease the available flow capacity.

c. Verification of the design of the FDC trunk sewer, to determine if there is sufficient available capacity to handle expected flow rates, using the original design approach, and current information on the FDC system (sizes and slopes) including the current number of residences serviced by this system:

- The results of this analysis have shown that there are several sections of the FDC trunk sewer where the expected flow rates exceed the design capacity and would be expected to surcharge the FDC system in localized areas.

Findings

1. The results of these analyses have since identified deficiencies in the as-constructed design of the FDC trunk sewer system, which may contribute to FDC surcharge within localized areas of the overall system. However, given the results of the FDC monitoring,

these deficiencies are not considered to be a material contributor to FDC surcharging or a cause of the basement infiltration issue.

2. Observed FDC surcharging has also been noted in areas which are a considerable distance away from where FDC sewer deficiencies have been identified, which further suggests that these deficiencies, in and of themselves, are not a material contributor to the FDC surcharging or a cause of the basement infiltration issue.

C. Computer modelling of the FDC system

Computer modelling of the FDC system was undertaken in an effort to answer a number of questions related to its performance, and the impact of some of the potential causes. The performance questions and modelling results are provided in the following table.

Questions	Modelling Results
How much impact will high water levels at the downstream end of the FDC system (outlet) have on the Lisgar District?	Results show that high water levels downstream would have little impact on the FDC system performance within the Lisgar District, which further confirms that this is not a primary cause of FDC surcharging, although it may be a very limited contributing factor.
How much potential impact would water draining into basement walkouts be expected to have on the FDC system?	Results show that based on the number of basement walkouts identified by City staff (and the estimated flows from those walkouts to the foundation drain), basement walkouts are not the primary cause of FDC surcharging, although they may be a contributing factor at specific locations.
How much potential impact would storm sewer leakage have on the FDC system?	Results show that based on an average storm sewer leakage rate (calculated from the findings of the storm sewer leakage tests conducted in 2013), storm sewer leakage is the primary cause of FDC surcharging during storm events.
Are there certain areas within the Lisgar District which contribute higher flows to the FDC system?	Based on the modelling results for an observed surcharge event in the FDC system along Black Walnut Trail, north of Derry Road, several areas have been identified as having higher relative flow contributions to the FDC system. These identified areas are therefore considered a priority for the implementation of mitigation measures (ref. Section 6).
What measures would be most effective in reducing observed FDC surcharge?	Based on the modelling results for an observed surcharge event, two potential mitigation measures have been modelled and shown to be most effective at reducing FDC surcharge: • FDC sewer upgrades - increasing the sizes of the deficient pipes to better carry higher flows and reduce surcharge; and • FDC pumping - actively pumping out the FDC during surcharge events to limit the amount of surcharging. Both of these measures have been considered as part of the longer term mitigation action plan (Section 6).

Summary and Conclusions

Based on all of the comprehensive monitoring, testing and analysis work, Amec Foster Wheeler has concluded that the primary cause of the basement water infiltration relates to stormwater entering the utility trench.

As storm sewers are not built to be watertight, and due to cracks and leaks expected through aging, stormwater is able to leak out during storm events and migrate into the utility trench, where the bedding material, made of gravel and other granular soils can allow water to move very quickly. Over time, water builds up in the utility trench from storm sewer leakage, as well as through other sources (other utilities, groundwater, et cetera), and is unable to drain away quickly due to the relatively impermeable nature of the native soils surrounding the trench.

It is this situation, in combination with certain storm conditions and local lot drainage where issues may arise. For instance, where the ground and utility trench are already wet, possibly from an earlier storm event, and rainfall subsequently occurs, this may create a condition where there is enough leakage from the storm sewer system during the rainfall event to fill an already wet utility trench and push water up the bedding material around the FDC laterals servicing the homes and into the foundation weeping tiles. This water then drains directly into the FDC pipes through the weeping tiles, which may result in excess flow in the FDC system (surcharge). However, this condition by itself may not lead to basement water seepage. It is this condition, in combination with certain storm conditions (preceding rainfall followed by a sufficiently large storm event) and local lot drainage that may lead to water around the weeping tiles being unable to drain and potentially seeping into the basements of homes. This process is illustrated in Figures 8A to 8F.

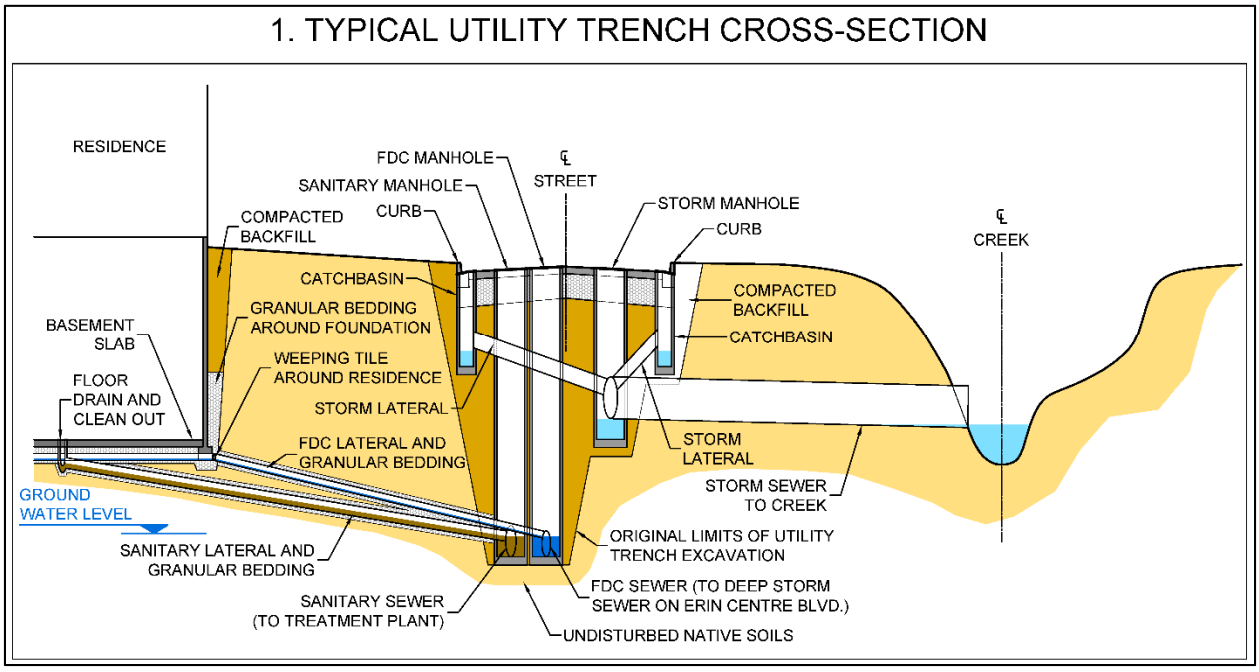


Figure 8A: Basement Infiltration due to water within the Utility Trench

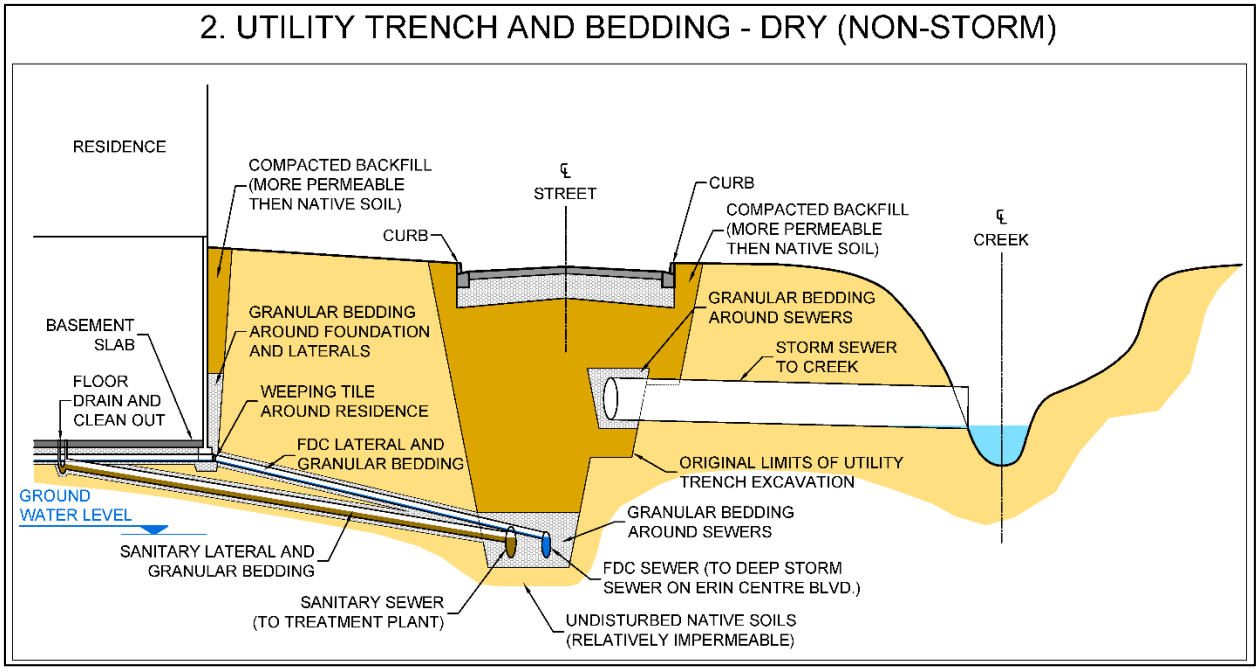


Figure 8B: Basement Infiltration due to water within the Utility Trench

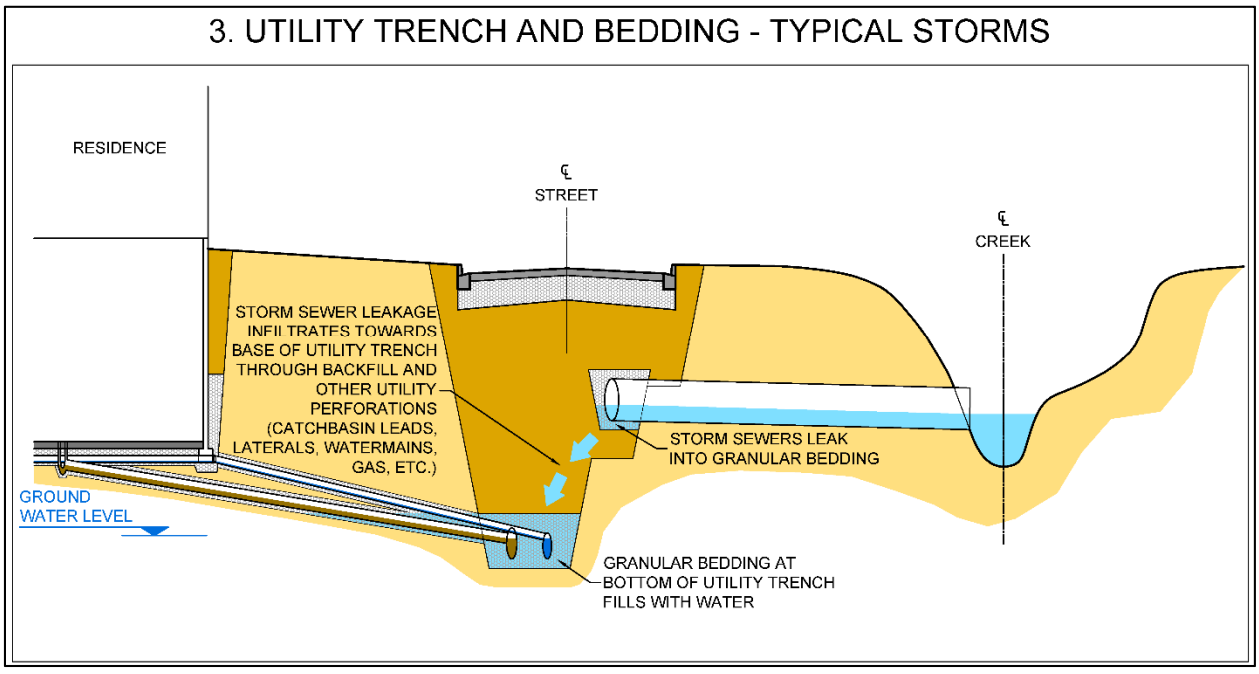


Figure 8C: Basement Infiltration due to water within the Utility Trench

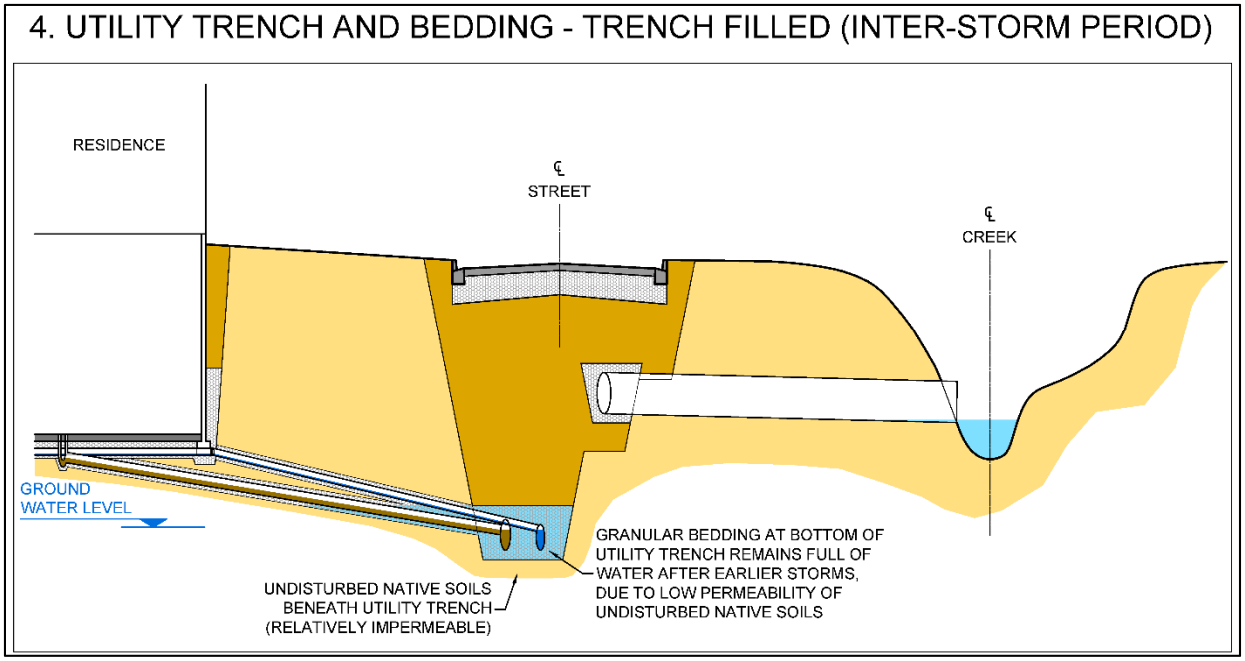


Figure 8D: Basement Infiltration due to water within the Utility Trench

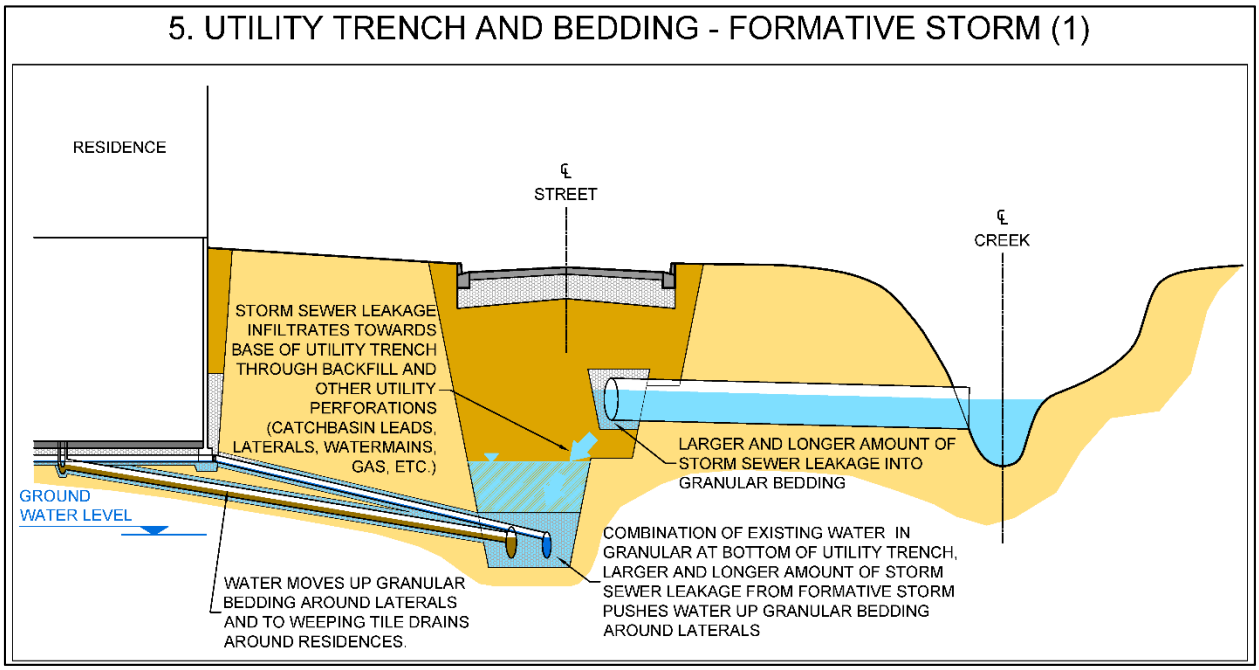


Figure 8E: Basement Infiltration due to water within the Utility Trench

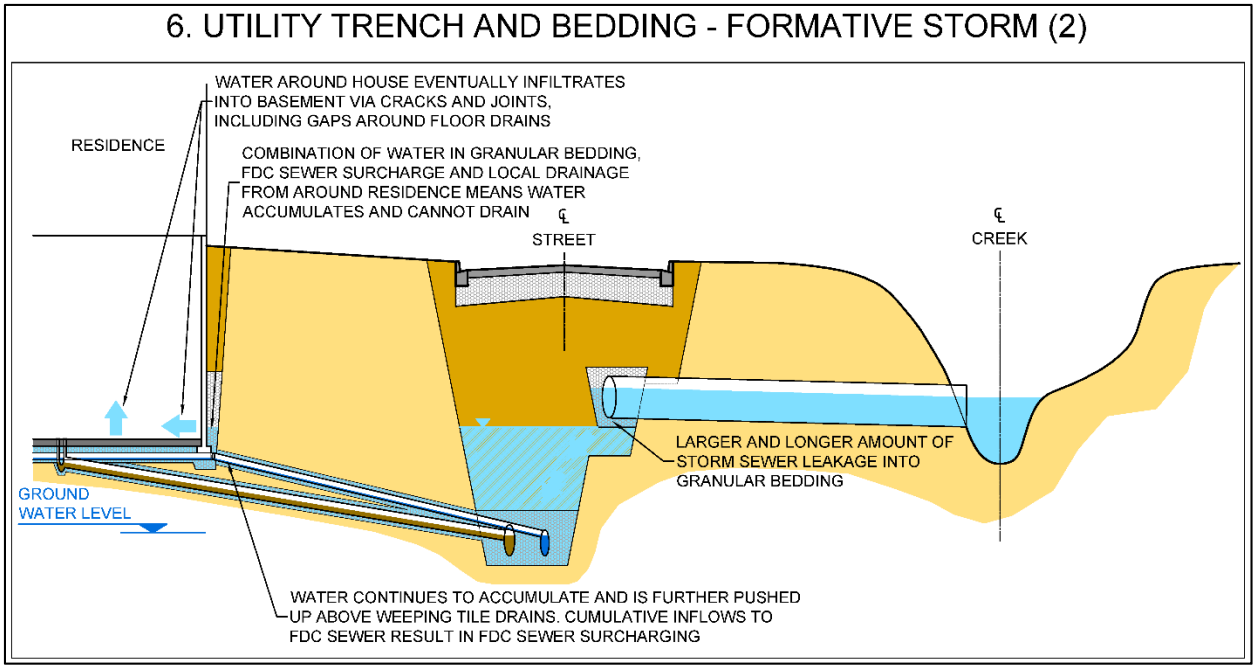


Figure 8F: Basement Infiltration due to water within the Utility Trench

The exact reasons why homes in the Lisgar District have not had basement water seepage before 2008 are not known. It is considered that the increasing leakage of water from the storm sewers through normal aging has gradually increased the volume of water collected in the trenches over time, ultimately contributing to the problems first experienced in 2008.

The risk of basement water infiltration is also connected to the relative depths of the FDC system and basements of homes in the different areas of the Lisgar District. Under the condition where water has moved up the bedding material surrounding the FDC laterals to the homes, the homes placed at greatest risk of basement water infiltration would be those where the FDC system (and thus the utility trench) is the shallowest. In other words, the less vertical separation between the FDC pipe/utility trench and the basements, the more susceptible basements will be to water seepage.

A number of other factors have been identified which may be impacting on the overall operation of the FDC system, however, none of them, either alone or in combination, would cause water to seep in to basements to the extent reported. The following table provides a summary of Amec Foster Wheeler's conclusions with respect to the potential contributing factors in the basement water infiltration investigation. A more extensive version of this table is provided as Appendix 'A'.

Summary of Assessment of Potential Factors in Basement Water Infiltration	
Potential Factor	**Level of Influence**
Stormwater to Utility Trench	Primary Cause
FDC and Utility Trench Depths	May increase risk of basement water infiltration at specific locations
Groundwater	May contribute additional/excess flows to the FDC and utility trench (Not sufficient to cause problem)
Creek Backwater	
Osprey Marsh Pond (SWM) Backwater	
Basement Walkouts	
Inflow/Infiltration to FDC	
FDC Hydraulics	May impair conveyance capacity of FDC system (Not sufficient to cause problem)
FDC Design	
FDC Tailwater	
FDC Maintenance	
FDC Construction	
Cross-Connections	Not Applicable
Creek Maintenance	
GO Station	
Sanitary System	
Lot Grading	Insufficient information
Basement Construction / Changes	

Based on the foregoing conclusions, Section 6 of this report describes potential mitigation measures which are intended to reduce the risk of future basement water infiltration.

6.0 MITIGATION PLAN

To address the basement water infiltration issue, eleven alternative actions were developed and evaluated for potential implementation. They are briefly described as follows:

1. *Strategic Lining of Storm Sewers* – line and seal the inside of selected storm sewers to minimize water leakage into the utility trench.

2. *Construction of a Utility Trench Dewatering System* - drain water from the utility trench at key locations to provide additional storage during storm events and reduce FDC surcharging.

3. *Construction of FDC Pumping Stations* – actively pump from the FDC sewer system to minimize surcharging of the FDC system.

4. *FDC Sewer Upgrades* – Strategically upgrade selected FDC sewers to increase capacity and reduce surcharging occurrences.

5. *Sump Pumps* - install new basement sump pumps to help in draining weeping tiles during storm events. The City should continue with its Lisgar District Sump Pump Subsidy Program for homes with reported basement water infiltration to assist homeowners with the cost of installing new sump pumps.

6. *FDC Backflow Preventers* – install a backflow preventer and clay barrier on residential FDC lateral pipes to prevent FDC surcharge from impacting weeping tiles.

7. *Storage* – construct a storage system (likely an underground tank) to temporarily store excess FDC flow during surcharge events and then release it in a controlled manner.

8. *Storm Sewer Outfall Collars* – construct concrete barriers at storm sewer outfalls (to creek or pond) to limit the ability of water to move back up through the utility trench.

9. *Basement Walkout Covers* – construct roofs/covers over residential basement walkout entrances, to limit stormwater from draining to the FDC.

10. *New FDC Outlet* – re-direct the FDC trunk sewer at the downstream limit away from the existing storm sewer and to a free flowing outfall (such as a creek).

11. *Creek Remediation* – trim or manage vegetation along creek corridor to improve capacity and reduce water levels during major storms.

These eleven actions were analyzed by the City and Amec Foster Wheeler for effectiveness (ability of proposed actions to reduce basement water infiltration) and feasibility (ease of implementation). Through this process, Actions #1 to #5 were carried forward to form a Prioritized Action Plan to reduce the risk of basement water infiltration while Actions #6 to #11 were screened out. A detailed matrix summarizing each of the eleven alternative actions is provided as Appendix ‘B’.

6.1 Prioritized Action Plan

The following five actions are recommended to be carried forward as mitigation actions based on their effectiveness and feasibility.

Item #	Action	Description
1	Strategic Lining of Storm Sewers	Sealing the inside surface of storm sewers in strategic locations with an impermeable liner to reduce/eliminate leakage into bedding (and ultimately into FDC system).
2	Construction of a Utility Trench Dewatering System	Dewater bedding material around the FDC system to limit the accumulation of water in the utility trench and provide additional storage volume during storm events.
3	Construction of FDC Pumping Stations	Install pumping stations at key locations of the FDC system which will activate when the system either approaches or reaches surcharge conditions and pump water to the ground surface.
4	FDC Sewer Upgrades	Upsizing selected FDC sewers to increase their conveyance capacity and reduce surcharge.
5	Sump Pumps	Home-owner installs a new basement sump pump system to help to drain the weeping tile system around the home; sump pump would discharge to ground surface.

Additional details related to the above Prioritized Action Plan are provided as Appendix ‘C’.

It should be noted that the basement water infiltration issue is extremely complex, and the selection of measures to appropriately address the problem remains an iterative process. Actions in the Prioritized Action Plan should be implemented in stages where constructed projects are monitored to assess their effectiveness and to assist staff in making informed decisions on subsequent Actions.

7.0 RECOMMENDED NEXT STEPS

Based on the Prioritized Action Plan, it is recommended that the two highest priority actions, Actions 1 and 2, be planned in order of implementation as soon as funding and approvals are secured to deal with the basement water infiltration issue. It is suggested that the following steps be undertaken:

a) Undertake the design, construction and monitoring related to the storm sewer lining (Action 1) of the Black Walnut Trail area (refer to Figure 9 for locations).

b) Conduct background work to refine key details of the utility trench dewatering system (Action 2) followed by detailed design, approvals, and construction.

c) Undertake additional monitoring to assess effectiveness of steps (a) and (b).

d) The balance of the recommended Actions (Actions 3 and 4) would be staged over time conditional on the results of steps (a), (b), and (c).

It is also recommended that residents who qualify for the City's Lisgar District Sump Pump Subsidy Program take advantage of this program (Action 5).

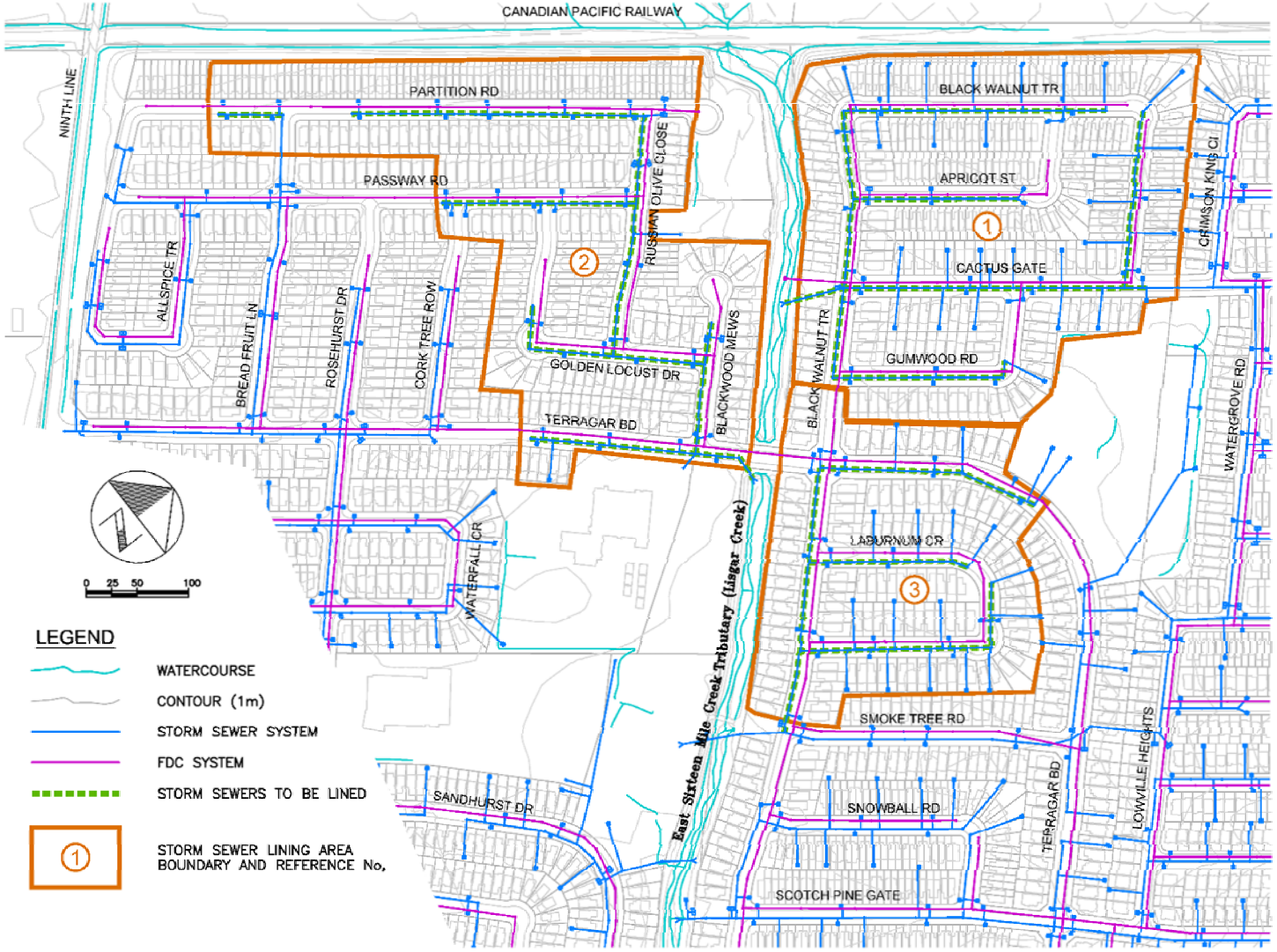


Figure 9: Locations of Proposed Storm Sewer Lining – Black Walnut Trail Area

APPENDIX ‘A’
Summary of Potential Factors of Basement Water Infiltration

APPENDIX 'A' - SUMMARY OF ASSESSMENT OF POTENTIAL FACTORS OF BASEMENT WATER INFILTRATION (MARCH 2015)

Potential Factor	Level of Influence	Notes
Stormwater to Utility Trench	Primary Cause	Validated by 2013 storm sewer leakage tests. 2014 impermeable collar test excavations confirmed significant amount of water in bedding material.
FDC and Utility Trench Depths	May increase risk of basement water infiltration at specific locations	Not a cause of basement water infiltration, but locations with shallower FDC depths (and thus utility trench depths) in relation to adjacent weeping tile systems would be expected to increase the risk of basement water infiltration.
Groundwater	May contribute additional/excess flows to the FDC and utility trench (Not sufficient to cause problem)	Groundwater in part contributes to water accumulation within utility trench bedding material but not viewed as a cause of the basement water infiltration experienced since 2008.
Creek Backwater		May contribute water to utility trench within bedding material, increased residence time within storm sewers but not viewed as a cause of the basement water infiltration experienced since 2008.
Osprey Marsh Pond (SWM) Backwater		Osprey Marsh Pond not a direct cause of surcharging or basement water infiltration, but may contribute to water within utility trench bedding material, increased residence time within storm sewers, however not viewed as a cause of the basement water infiltration experienced since 2008.
Basement Walkouts		Current hydraulic modelling efforts indicate an insufficient number to generate observed FDC flows and volumes under surcharge events; may still be a potential contributor to surcharging or basement water infiltration at specific locations however not viewed as a cause of the basement water infiltration experienced since 2008.
Inflow/Infiltration to FDC		Some contribution to FDC pipe flow due to amount of water within surrounding bedding material through cracks in pipes/MHs, but insufficient to be a cause of the basement water infiltration experienced since 2008.
FDC Hydraulics	May impair conveyance capacity of FDC system (Not sufficient to cause problem)	Sections of the FDC sewer system have been identified as undersized or poorly graded (flat) which exacerbates FDC surcharging, but not viewed as a cause of the basement water infiltration experienced since 2008
FDC Design		Analysis work indicates a number of deficiencies in FDC system using original design criteria, which may exacerbate FDC surcharging at specific locations. FDC system was however designed according to the approved criteria of that time. The deficiencies, while impairing the overall efficiency of the system, are not viewed as a cause of the basement water infiltration experienced since 2008.
FDC Tailwater		Receiving storm sewer has not surcharged during monitoring period; water levels have been above FDC outlet invert but for only brief periods and does not appear to directly correlate with observed FDC surcharge (and does not explain surcharge at upstream limits of system), thus not considered to be the cause of basement water infiltration experienced since 2008.
FDC Maintenance		FDC system flushed since study start-up; FDC systems are closed, hence would typically only require nominal maintenance. CCTV showed some issues with respect to debris accumulation, but generally minimal and not sufficient to cause persistent/widespread surcharge or the basement water infiltration experienced since 2008.
FDC Construction		Detailed information not available for all of the FDC system. Sections of trunk FDC along Ninth Line may have been constructed flatter than design, larger number of residences ultimately connected to FDC system than originally designed, however these discrepancies are not considered to be the primary cause of FDC surcharging or the cause of basement water infiltration experienced since 2008.
Cross-Connections	Not Applicable	Known cross-connections repaired; very few found
Creek Maintenance		Monitoring data do not indicate any correlation to FDC surcharge. Lands regulated by Conservation Halton; work needs to balance ecological impacts. City forces have cleared creek (sediment / vegetation) since study start-up with rapid re-growth noted.
GO Station		Monitoring data do not currently indicate any correlation between GO Station water infiltration and instances of observed FDC surcharge
Sanitary System		Region of Peel monitoring data indicated no sanitary system surcharging or correlation with identified FDC surcharging events
Lot Grading	Insufficient information	Insufficient information available to assess level of influence
Basement Construction / Changes		Insufficient information available to assess level of influence

APPENDIX ‘B’
Summary of Potential Mitigation Measures

APPENDIX 'B' - SUMMARY OF POTENTIAL MITIGATION MEASURES (MARCH 2015)

Items	Action	Description	Analytical Support / Theory	Technical Considerations	Policy and Implementation Considerations	Effectiveness	Feasibility	Priority	Potential Further Investigation related to uncertainties and information gaps

1	**Strategic Lining of Storm Sewers**	Sealing the inside surface of storm sewers in strategic locations with an impermeable liner to reduce/eliminate leakage into bedding (and ultimately into FDC)	• Storm sewer leakage tests (2013) confirmed that storm sewers leak into the FDC system
			• Impermeable collar tests (2014) confirmed a significant amount of water in bedding material; water quality typing suggests surface water as source
			• Rapid FDC surcharge and temperature signal data strongly suggest a stormwater input; storm sewers largest likely contributor
			• Preventing storm sewer leakage would directly limit FDC surcharge potential
				• Several key preliminary locations based on historic basement infiltration and computer modelling:
				  • Black Walnut Trail (BWT) north of Smoke Tree (32.9 ha – 3.6 km of storm sewer) – Highest priority area
				  • Doug Leavens Boulevard (4.3 ha – 0.5 km of storm sewer)
				  • Alderwood Trail (9.2 ha – 1.0 km of storm sewer)
				  • Osprey Boulevard (16.4 ha – 1.8 km of storm sewer)
					• Work would all be done within public right-of-way, minimal disruption
					• Some loss in storm sewer capacity due to lining, generally nominal (5% +\-)
					• Preferred methodology to seal MHs and CBs
					• Need to seal catchbasin leads as well.
					• Lining of rear-yard catchbasin leads is a potential future work item; private property access may be required
						Moderate to High	High	High ***(Recommended)***	• Further potential refinement to locations of lining; test effectiveness in select locations before doing widespread lining (additional monitoring)
									• Need to further explore alternative technologies to determine the optimal lining material

2	**Construction of Utility Trench Dewatering System**	Dewater bedding material around the FDC to limit accumulation of water and provide additional storage volume during storm events	• Impermeable collar tests (2014) confirmed a significant amount of water in bedding material
			• Would limit excess water accumulation in bedding material and restore storage capacity
				• Given depth of FDC sewer bedding relative to surface water, a pumping system would be required
				• Given that pumping would be quasi-continuous (i.e. during non-storm and storm periods) back-up pumps and power less necessary
				• Consider several preliminary locations based on historic basement infiltration and forensic modelling:
				  • BWT at Cactus Gate
				  • BWT at Scotch Pine Gate
				  • Along trunk between Derry and Osprey
				  • Osprey Boulevard
					• Work would all be done within public right-of-way, minimal disruption
					• Uncertainty related to available public land to construct; lands would need to be in close proximity to problem areas
					• Approach to discharge pumped water will need to consider impacts to receivers (storm sewer or creek)
						Moderate to High	Moderate to High	High ***(Recommended)***	• Variable cost of pumping systems; would need to confirm locations and determine sizing and feasibility before proceeding further. Requires a pre-engineering study
									• Test effectiveness of a single installation before proceeding with others (additional monitoring); number and location of potential pumping systems to be confirmed based on effectiveness of highest priority pumping system and land ownership.

APPENDIX 'B' - SUMMARY OF POTENTIAL MITIGATION MEASURES (MARCH 2015)

Items	Action	Description	Analytical Support / Theory	Technical Considerations	Policy and Implementation Considerations	Effectiveness	Feasibility	Priority	Potential Further Investigation related to uncertainties and information gaps
3	**Construction of FDC Pumping Stations**	Provide pumping stations at key locations for the FDC system; activated once the system either approaches or reaches surcharge conditions; flows to be pumped to surface	• Computer modelling of a monitored surcharge event showed that pumping would be largely successful in reducing surcharge (depth and duration) for upper limits of the FDC system	• A larger pumping system would be required than for utility trench drains given amount and rate of water to be pumped during a storm • Given the need for the system to operate during storm events, back-up power and back-up pumps would be required which would increase costs • Potentially located at same preliminary locations as applied for utility trench drains to reduce costs	• Similar to utility trench drains	Moderate	Moderate to High	Moderate to High ***(Recommended)***	• Additional modelling should be completed to better confirm feasibility and preferred locations of FDC pumping

4	**FDC Sewer Upgrades**	Upsizing selected FDC sewers to increase their conveyance capacity and reduce surcharge	• FDC monitoring data indicate that the FDC system surcharges frequently, particularly in certain locations
			• Computer modelling of a monitored surcharge event showed that a FDC upgrade along a portion of BWT would eliminate surcharge in this location
				• Strategic upsizing by one standard pipe size in two key preliminary locations:
				  • BWT (CNR to Scotch Pine Gate) – 1 km +\-
				  • Along creek (Doug Leavens Blvd. to Ninth Line) – 2 km +\-
				• Focus on trunk FDC pipes; other smaller branches may also be required for upsizing
				• Would need to consider overall cost benefits and likely initiate the work once area infrastructure reaches its engineered lifetime
					• Works along BWT would be disruptive to residents (road reconstruction)
					• Potential synergy with other measures since excavation would be required regardless
					• Works along the FDC system within creek block would be much less disruptive
						Moderate	Moderate	Moderate ***(Recommended)***	• Further modelling assessment required to confirm benefit of FDC sewer upgrade along creek and required extents as well as Ninth Line, if shown to be effective
									• Would need to assess if upgrades negatively impact downstream areas
									• Assess whether additional costs likely given depth of excavation required in some locations (5 m +\-), particularly along BWT

5	**Sump Pumps**	Homeowner installs a new basement sump pump system to help to drain the weeping tile system around the home; sump pump would discharge to surface	• A sump pump should provide added relief for accumulated water within the residential weeping tile system, which should reduce the duration that water is around the home, and thus reduce the potential for basement water infiltration	• 187 homes (to-date) have reported basement water infiltration • Homeowner should confirm that a sump pump can be effectively installed in their basement; in particular that a clear outlet to the surface can be achieved (at least 2 m away from the foundation)	• Homeowner-led approach • City subsidy program in place for homes that have experienced basement water seepage to assist homeowners with cost of installation (up to 50% of invoiced total, up to a maximum of $3,000) • Applications must be reviewed and approved by City staff	Moderate	Moderate	Moderate ***(Recommended)***	• N/A

APPENDIX 'B' - SUMMARY OF POTENTIAL MITIGATION MEASURES (MARCH 2015)

Items	Action	Description	Analytical Support / Theory	Technical Considerations	Policy and Implementation Considerations	Effectiveness	Feasibility	Priority	Potential Further Investigation related to uncertainties and information gaps
6	**FDC Backflow Preventers**	Provide an impermeable collar around FDC lateral to prevent migration of bedding water, combined with a backflow valve on FDC lateral itself to eliminate surcharge impact to home	• Storm sewer leakage tests (2013) and impermeable collar tests (2014) confirm significant amount of water within bedding material and the potential for this material to transport water • Monitoring results show a correlation between FDC surcharge and reported instances of basement infiltration (ref. storm event of January 13, 2013) • Assumption that eliminating potential for FDC surcharge and duration to impact basement foundations (via either lateral or bedding material) would therefore eliminate primary cause of basement water infiltration	• Need to confirm least invasive method to install – would open cut excavation be the only solution?	• Likely that collars and backflow valves could be placed within City property (roadway limits) to maintain control • Inspection and maintenance needs may be challenging depending on access and location	Low to Moderate	Low to Moderate	Low to Moderate ***(Screened)***	• Further investigation would be required to identify priority areas • Potential impact to foundations given that no drainage outlet would be available during FDC surcharge events (backflow valve) – would this increase potential for basement water infiltration for certain weather/seasonal conditions? Magnitude of inflow/infiltration though likely significantly less.
7	**Storage**	Incorporate offline storage features (likely underground storage tanks) to detain excess FDC flows and reduce the resulting FDC surcharge	• Monitoring data suggest FDC surcharge continues to occur in several locations; storing some or all of the FDC surcharge would be expected to reduce potential for basement water infiltration • Forensic hydrologic/hydraulic modelling will assist in confirming observed flows and associated volumes within the FDC system	• Would depths of FDC permit gravity drainage or would pumping be required?	• Underground storage systems require significant land at depths to be effective, potentially necessitating the acquisition of private property • Significant additional costs if pumping is required	Moderate	Low to Moderate	Low to Moderate ***(Screened)***	• Additional modelling would be required to confirm observed and required storage volumes for more formative events • Where are preferred locations of storage based on FDC surcharge and available land? • Where would pumping be required?

APPENDIX 'B' - SUMMARY OF POTENTIAL MITIGATION MEASURES (MARCH 2015)

Items	Action	Description	Analytical Support / Theory	Technical Considerations	Policy and Implementation Considerations	Effectiveness	Feasibility	Priority	Potential Further Investigation related to uncertainties and information gaps
8	**Storm Sewer Outfall Collars**	Construct an impermeable barrier around storm sewer outfalls (including all other utilities) to prevent the movement of water from the receiving system back along the bedding material and potentially into the FDC or utility trench	• Storm sewer leakage tests (2013) indicated that storm sewers leak, and that bedding material is likely pathway • Subsequent analyses considered the potential that FDC inflows and elevated water in bedding (and duration) could be the result of storm flows backing up in the bedding material from receiving watercourses, which would have elevated levels during storm events • Two impermeable collars were designed and constructed in 2014 (Scotch Pine Gate and Pondview Way) along with additional monitoring devices • Limited monitoring data to date given construction timing, however initial results suggest that bedding water is primarily coming from upstream rather than downstream	• 42 identified storm sewer outfalls, 2 completed to-date = 40 remaining outfalls. Would it be necessary to install collars for all 40 storm sewer outfalls?	• Would all be within public property, along creeks and Osprey Marsh – minimal disruption to the public	Unknown	Moderate	Low to Moderate ***(Screened)***	• Further monitoring data required to confirm effectiveness at 2 test locations • If considering this alternative, need to strategically target specific locations; more field investigations may be required accordingly
9	**Basement Walkout Covers**	Construct covers over all identified basement walkouts so that rainfall does not contribute to walkout sumps (and potentially directly into the FDC system)	• City reconnaissance work (air photos) indicates a significant number of potential basement walkouts in FDC service area (377 total) which may contribute stormwater flows to FDC • Modelling work to date however indicates that for the area north of Derry Road, there are an insufficient number to be a significant cause of observed FDC surcharge; may be a potential contributor however	• What type of design would be required? Would need to ensure that water drains sufficiently far away from walkout structure (> 2 m?)	• Given that this work would be wholly on private property the only way this action would be difficult to implement. Work would need to be led by the homeowner given that home and walkout configuration would be unique	Low to Moderate	Low	Low ***(Screened)***	• Additional modelling work would be required to confirm potential impact of basement walkouts in other areas (between Derry Road and Britannia Road in particular) • Field confirmation would be required to confirm how many "potential" walkouts are actually present, but difficult to confirm if these features have a direct connection to FDC system or bedding material. Field confirmations would likely reduce numbers and potential contribution; private homeowner cooperation would be required • Are there potentially other walkouts which could not be identified on aerial mapping?

APPENDIX 'B' - SUMMARY OF POTENTIAL MITIGATION MEASURES (MARCH 2015)

Items	Action	Description	Analytical Support / Theory	Technical Considerations	Policy and Implementation Considerations	Effectiveness	Feasibility	Priority	Potential Further Investigation related to uncertainties and information gaps
10	**New FDC Outlet**	Re-direct FDC trunk sewer along Ninth Line to a free outfall (i.e. open channel rather than closed storm sewer)	• Monitoring data indicate water levels in receiving storm sewer do rise to level of invert of FDC outlet; however this is generally brief (10-15 minutes) and at lower depth (only a portion of FDC pipe) • Computer modelling indicates that tailwater conditions have a limited impact on performance of upstream FDC • FDC analysis spreadsheet indicates that trunk along Ninth Line is over-capacity using different design approaches, including the section along Erin Centre Boulevard which would be eliminated under this option	• Sewer cannot be re-directed to Sixteen Mile Creek due to significant depth of sewer (11 m +\- below grade at Ninth Line and Erin Centre Boulevard) • Based on a review of City's topographic mapping, the only likely feasible outlet is watercourse at Ninth Line just east of Hwy 407 EB on-ramp from Hwy 403 (Joshua's Creek watershed – Conservation Halton jurisdiction) • Would need to confirm this channel would have limited backwater influence (free-flowing) and has sufficient capacity • Assume re-direction would begin at Ninth Line and Erin Centre Boulevard • Would require 1.3 km of new FDC sewer; would offer a 0.1% (+\-) grade	• Outlet would appear to still be within the City of Mississauga boundary, but would likely include MTO lands given proximity to Highway 407 and 403; would require consultation and approval with MTO • Would require disruption to traffic along Ninth Line which is a major arterial for the City	Low	Low	Low ***(Screened)***	• Would need to further confirm benefit of re-direction, but monitoring data suggest this would be limited – outlet does not appear to be the source of observed FDC surcharge, although it may be a minor contributor • Further analyses would be required to confirm feasibility of grading, potential utility conflicts, and capacity of receiving watercourse to accept additional flows
11	**Creek Remediation**	Clearing of vegetation growth within Lisgar Creek (Sixteen Mile Creek tributary) to improve conveyance capacity of the channel and lower peak water levels	• Monitoring data to date generally indicate little to no correlation between elevated water levels in watercourses and FDC surcharging; watercourse levels typically peak later than FDC • Speculation has been that elevated water levels within watercourses may contribute to inflows to bedding material via storm sewer outfalls; or may prevent drainage of both bedding material and storm sewers, which increases residence time and accumulation (i.e. exfiltration from storm sewers) • Data collection from impermeable collars (2014) may further assist in assessing impact, and potential benefit of impermeable collars.	• Need to review to determine if a product or approach could limit vegetation re-growth, while still maintaining a natural aesthetic and obtaining approval from Conservation Halton	• Previous clean-out was time consuming and labour intensive • Vegetation grew back rapidly, negating the effort • Work would run counter to Conservation Halton objectives, would require on-going permit applications	Low	Low	Low ***(Screened)***	• Further monitoring data collection from impermeable collars may assist in assessing impact of elevated creek water levels on potential for stormwater movement through bedding material; however this is currently speculated to be of minimal benefit • How much could peak water levels be reduced through vegetation clearing? Additional hydraulic analyses would be required; need to factor in rapid re-growth of vegetation as noted

APPENDIX ‘C’
Details of Prioritized Action Plan

The following provides additional details related to the recommended potential actions:

1. Storm Sewer Lining

What's involved?

Re-line and seal the inside of storm sewers in priority areas.

Why will it help?

By preventing water from leaking out of the storm sewer system, the potential for leakage into the utility trench below should be significantly reduced, which should also reduce FDC surcharging frequency and extent.

How is it done?

There are several different methods available: one method involves inserting and attaching a liner; another method involves spraying sealant around the inside of the sewer

Where would it be done?

A number of priority areas have been identified based on:

- Locations of reported basement water infiltration;
- Locations where field monitoring data show the most frequent FDC surcharge; and
- Locations identified by computer modelling analysis.

The current list of locations includes the areas around:

- Black Walnut Trail (north of Smoke Tree Road);
- Doug Leavens Boulevard (west of the creek);
- Alderwood Trail; and
- Osprey Boulevard (east of the creek).

Based on an initial screening process, Black Walnut Trail (north of Smoke Tree Road) is considered to be a priority location.

2. Utility Trench Dewatering

What's involved?

Continuously drain water that has been accumulating in the utility trench at key locations.

Why will it help?

By draining the water from the utility trench as it accumulates, storage volume is restored which can be available during storm events if required, which should further reduce FDC surcharging.

How is it done?

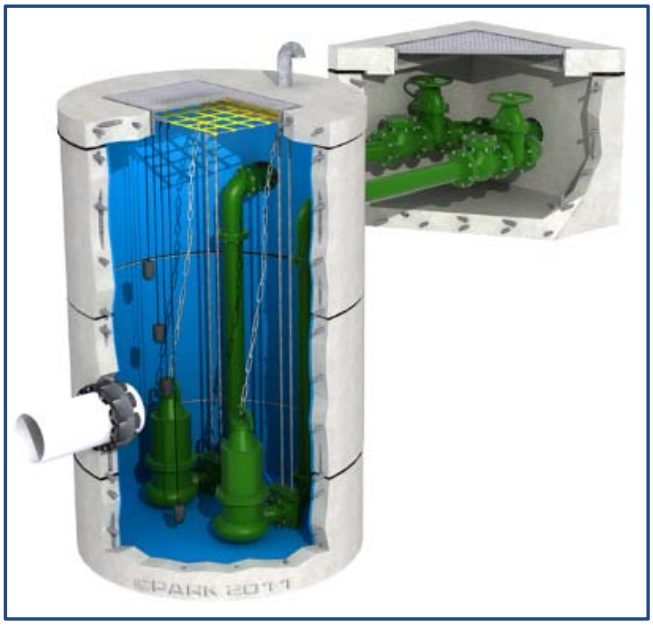
Because of the depth of the FDC system (in most locations), drainage by gravity is not possible. The water will therefore need to be pumped (using a system similar to a residential sump pump) to the surface, and then likely outlet to the creek.

Where would it be done?

A total of four different installations are currently considered; however, the precise number of installations required will need further study. The preliminary locations include:

- Black Walnut Trail (two different locations);
- Along the creek/trunk FDC between Derry Road and Osprey Boulevard; and
- Osprey Boulevard.

3. FDC Pumping Stations



What's involved?

Actively pump excess flow from the FDC sewer system during surcharge events.

Why will it help?

Pumping away the excess flow within the FDC system should reduce flows and therefore reduce the amount of FDC surcharge.

How is it done?

A permanent pumping station would need to be established which would be connected to the FDC system, likely by a new pipe at an existing FDC maintenance hole. The pumping station would involve an underground storage chamber with a "wet well" (to provide some depth of water to pump from) and one or more large pumps. These pumps would be triggered once water levels rise to a pre-set elevation, and would then turn on and pump the diverted water out of the FDC (likely to the surface and/or to the creek). The pumps would then shut off again once water levels drop enough

Where would it be done?

Further study and investigations would be required to confirm the precise number and locations of these pumping stations. Compared to dewatering of the utility trench, it should be noted that the FDC pumping costs will be significantly greater due to the requirements for larger pumps, backup units, backup power systems, more space and land.

4. FDC Sewer Upgrades

What's involved?

Increase the size and/or slope of existing FDC sewers.

Why will it help?

Larger and/or steeper sloped sewers can carry more water – by making the FDC sewers larger the amount of surcharging should be reduced.

How is it done?

The ground, including the roadway in most areas, is dug up to expose the existing FDC sewer pipe. The pipe is then removed piece by piece. A new larger pipe is installed including new larger maintenance holes, if required, and the ground and roadway are then restored.

Where would it be done?

No definite locations have been identified as of yet; further study and assessment would be required. Also, due to the disruption to the roadway, and the relative age of the FDC, storm and sanitary sewers, FDC upgrades should be coordinated with planned road works and/or when the sewer are approaching the end of their service life.

5. Sump Pumps

What's involved?

Homeowners in the Lisgar District with reported basement water infiltration installing a new sump pump system in their basement.

Why will it help?

Sump pumps would help to drain water from the weeping tile system around a home during a storm event, which should limit or reduce the potential for basement infiltration.

How is it done?

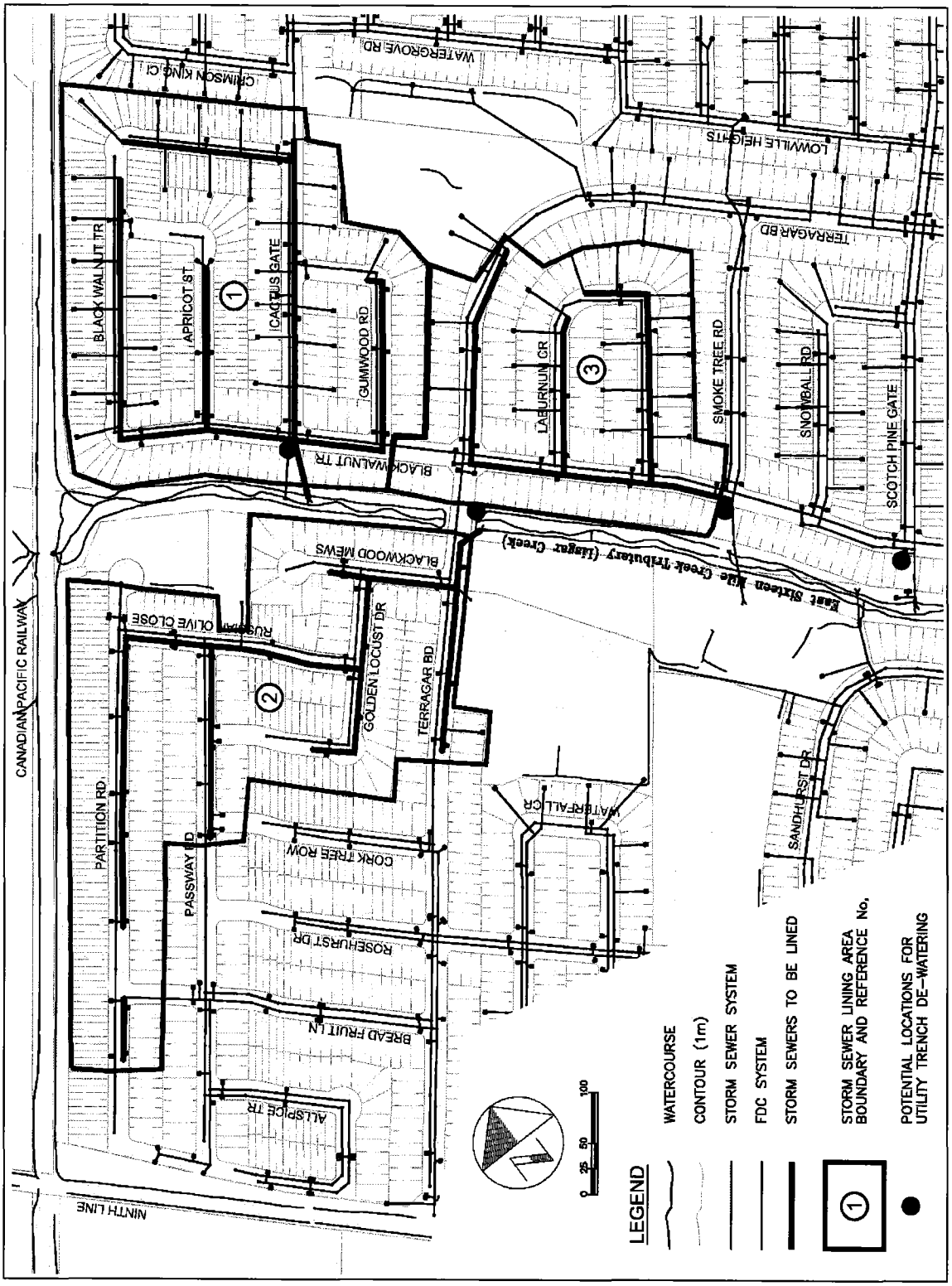
Part of the basement floor in a home would need to be cut and a sump pit created and connected in to the weeping tile system around the home. A sump pump is then installed, which begins pumping once water levels in the sump reach a pre-set water level. The water is then pumped out to the ground surface at a distance typically of at least 2 metres from the home.

Where would it be done?

The City of Mississauga is continuing to offer the Lisgar District Sump Pump Subsidy Program to homeowners in the Lisgar District with reported basement water infiltration. A financial subsidy is available to eligible homeowners of up to 50% of the sump pump installation cost, to a maximum of $3,000 per household.

In

Appendix 4: Locations of Proposed Storm Sewer Lining and Dewatering - Black Walnut Trail Area



10

Memo

To: Anthony DiGiandomenico, City of Mississauga

From: Ron Scheckenberger, Matthew Senior, and Martin Shepley

Date: March 24, 2015

File: TP111119B-26

Re: **Lisgar District Basement Water Infiltration Assessment**
2015 Capital Remediation Program – Updated Initial Cost Estimate

Further to your e-mail request of March 23, 2015, we hereby provide you with a summary of all of the estimated costs for Amec Foster Wheeler's professional consulting services in support of the proposed 2015 Capital Remediation Program (Priority Action Plan outlined in the Summary Report) for the Lisgar District Basement Water Infiltration Assessment. This summary represents a more concise version of the January 30, 2015 estimate previously provided; some additional costs not accounted for in that summary (related to additional recommended testing activities and project meetings) have also been included in the current summary for your consideration.

It should be noted that the cost estimates provided are initial estimates for budgetary purposes only. Assuming that the overall budget request is approved, Amec Foster Wheeler intends to submit more detailed proposals for City approval for each of the required sub-tasks, in order to better quantify and qualify the scope of the proposed works and the associated estimated level of effort. However, in order to ensure that the current budget estimate is sufficiently conservative, we have suggested adding a contingency amount (10% +\-) to the total estimated amounts herein.

1. Pre-Construction Monitoring

a) Inspection, maintenance, downloading and analysis of all existing monitoring gauges (surface water and groundwater)	$11,000
b) Installation of additional surface water gauges	$5,000
c) Installation of additional groundwater gauges	$34,000
Total estimated cost for Pre-Construction Monitoring:	**$50,000**

3215 North Service Road
Burlington, ON L7N 3G2 Canada
905-335-2353
amecfw.com

Amec Foster Wheeler Environment & Infrastructure
a Division of Amec Foster Wheeler Americas Limited

2. Storm Sewer Lining

a) Design support work for storm sewer lining (preparation of drawings, form of tender, approvals, specifications, tender support, etcetera)	$108,000
b) Contract administration (on-site inspection, processing of change orders and payment certificates on behalf of the City)	$162,000
c) Post-construction storm sewer leakage tests within each of the proposed storm sewer lining areas (2 days each - to verify the effectiveness of the lining work)	$36,000
d) Allowance for meetings (related to design, construction, testing and other items associated with storm sewer lining)	$15,000
Total estimated cost for Storm Sewer Lining:	**$321,000**

3. Post-Construction Monitoring

a) Ongoing downloads of surface water and groundwater gauges on a bi-monthly/bi-annual basis	$18,000
b) Documentation and meeting (preparation of a technical memo/report and presentation of same to City staff)	$11,000
c) Additional groundwater gauge decommissioning (decommissioning of proposed 8 groundwater gauges not covered by previous proposals)	$4,000
Total estimated cost for Post-Construction Monitoring:	**$33,000**

4. Utility Trench (Bedding) Dewatering

a) Completion of a pre-engineering (feasibility) study related to a utility trench dewatering system, including reporting and a contingency amount	$34,000
b) Pilot feasibility test (including well installation, pumping test, permit to take water, analysis, decommissioning)	$100,000
c) Allowance for meetings (to discuss any issues related to the trench dewatering study)	$10,000
Total estimated cost for Utility Trench (Bedding) Dewatering:	**$144,000**

Based on the foregoing, we would estimate a total cost of $548,000 to address all of the identified tasks to be completed by Amec Foster Wheeler in support of the proposed capital remediation plan (i.e. Priority Action Plan) for the ongoing Lisgar District Basement Water Infiltration assessment. As noted, we would suggest adding a contingency of 10% +\- in order to account for any unforeseen additional requirements. **This would result in a total estimated cost of $600,000 +\- for budgetary purposes**.

1q

As noted previously, assuming that the overall budget request is approved by the City of Mississauga, Amec Foster Wheeler will submit more detailed proposals for City approval for each of the required tasks, in order to better quantify and qualify the scope of the proposed works and the associated estimated level of effort.

We trust that the foregoing meets your current requirements. We look forward to continuing to support the City with respect to the Lisgar District Basement Water Infiltration Assessment and Implementation, and thank the City for its continued support.

MJS/RBS/ll

Corporate Report

Clerk's Files

Originator's Files 43M-1786

2.

DATE: March 17, 2015

TO: Chair and Members of General Committee
Meeting Date: April 8, 2015

General Committee
APR 0 8 2015

FROM: Martin Powell, P.Eng.
Commissioner of Transportation and Works

SUBJECT: **Assumption of Municipal Works (Ward 6)**

RECOMMENDATION: That the City of Mississauga assume the municipal works as constructed by the developer under the terms of the Servicing Agreement for 43M-1786, Southlawn Developments Inc., (lands located north of Highway 403, south of Eglinton Avenue West, west of Mavis Road and east of Wainscot Drive, in Z-30, Known as Southlawn Phase II Subdivision), and that the Letter of Credit in the amount of $488,559.05 be returned to the developer and that a by-law be enacted to assume the road allowances within the Registered Plan as public highway and part of the municipal system of the City of Mississauga.

43M-1786 (Ward 6)

BACKGROUND: The developer identified on the attached Table of Assumptions (Appendix 1) has complied with all the requirements of the Servicing Agreement.

FINANCIAL IMPACT: With the assumption of Southlawn Phase II Subdivision (43M-1786), the City will now be required to provide maintenance of 1,465 meters (4,806 feet) of storm sewer and 1.61 lane kilometers (5,295 feet) of roadway.

CONCLUSION: It is in order for the City to assume the municipal works within the sites identified on the attached Table of Assumptions (Appendix 1).

ATTACHMENTS:

Appendix 1: Table of Assumptions

Appendix 2: Approximate location of Southlawn Phase II Subdivision (43M-1786).

Martin Powell, P. Eng.
Commissioner of Transportation and Works

Prepared by: *Silvio Cesario, P.Eng.*
Acting Manager, Development Construction

APPENDIX 1

TABLE OF ASSUMPTIONS				
PLAN/FILE REFERENCE #	**LOCATION**	**DEVELOPER ADDRESS**	**SERVICING AGREEMENT DATE**	**SECURITIES TO BE RELEASED**
43M-1786	North of Highway 403, south of Eglinton Avenue West, west of Mavis Road and east of Wainscot Drive, (Z-30).	Southlawn Developments Inc. 80 Tiverton Court, Suite 300 Markham, ON L3R 0G4 Attn: Mr. Al Brown	January 21, 2009	$488,559.05 Cancel Insurance

2c

APPENDIX 2

MISSISSAUGA

Transportation and Works

Engineering & Construction

Servicing Agreement for Southlawn Phase II Subdivision
Southlawn Developments Inc.
City File 43M-1786 , Ward 6 , Z-30

SCALE FOR REDUCED DRAWINGS
0m 25m 50m 100m 150m 200m 250m 500m

MISSISSAUGA **Corporate Report**

Clerk's Files 3.

Originator's Files MG.23.REP

DATE: March 30, 2015

TO: Chair and Members of General Committee
Meeting Date: April 8, 2015

General Committee
APR 08 2015

FROM: Martin Powell, P.Eng.
Commissioner of Transportation and Works

SUBJECT: **Metrolinx Request for Temporary Road Closure of Commerce Boulevard between Eglinton Avenue East and Skymark Avenue for construction of an overpass bridge as part of the Mississauga Transitway Renforth Gateway (Ward 5)**

RECOMMENDATION: That Metrolinx and its General Contractor Dufferin Construction Company (Dufferin) be granted permission to temporarily close Commerce Boulevard between Eglinton Avenue East and Skymark Avenue to undertake construction of an overpass bridge as part of Mississauga Transitway Metrolinx's Renforth Gateway starting at 6:00 a.m. on Monday, April 27, 2015 and ending at 6:00 a.m. on Tuesday, October 13, 2015.

BACKGROUND: The City of Mississauga (Mississauga) is in a partnership with Metrolinx to construct the Mississauga Transitway, which extends from Winston Churchill Boulevard to Renforth Drive.

Metrolinx is responsible for detail design and construction of the west segment from Winston Churchill Boulevard to Erin Mills Parkway and the Renforth Gateway. Mississauga is responsible for the design and construction of the east segment from Hurontario Street to Commerce Boulevard.

Mississauga retained Dufferin to construct the third segment of the Mississauga Transitway from Etobicoke Creek to Commerce

Boulevard. This segment includes a total of four (4) grade separation bridge structures at Spectrum Way, Satellite Drive, Orbitor Drive and Explorer Drive. (Key Map attached in Appendix 1). Work includes an access ramp west of Commerce Boulevard.

Metrolinx has retained Dufferin to construct the Renforth Gateway. Works include the construction of an overpass bridge at Commerce Boulevard. The contract provides for up to a six-month temporary closure of Commerce Boulevard while maintaining access via adjacent side streets.

Presently, Spectrum Way and Orbitor Drive are closed for the same purpose of overpass bridge construction under Mississauga's contract. Spectrum Way is scheduled to re-open on May 10, 2015. Orbitor bridge construction has experienced significant delay due to utility conflict, and is anticipated to re-open in summer 2015.

Satellite Drive is scheduled to close on June 10, 2015 and Explorer Drive is scheduled to close on October 13, 2015, both for a duration of six (6) months.

COMMENTS:

Metrolinx and its General Contractor Dufferin have requested permission to close Commerce Boulevard between Eglinton Avenue East and Skymark Avenue while maintaining access to local traffic to Skymark Avenue starting 6:00 a.m. on Monday, April 27, 2015 and ending at 6:00 a.m. on Tuesday, October 13, 2015 to undertake an overpass bridge construction. Traffic can be detoured via adjacent roads (i.e. Explorer Drive, Skymark Avenue, and Renforth Drive). Impact to motorists is deemed to be moderate. Impacted traffic signals timing will be reviewed by the City of Toronto to facilitate the closure. Advanced warning signage, notices and website notification will be implemented as part of the communication plan. All vehicular and pedestrian traffic will be required to use an alternate route. A number of MiWay and TTC bus routes will need to be detoured to accommodate the closure. All emergency services, 311 Customer Service Centre and adjacent local businesses will be notified.

The area Ward Councillor has been made aware of the temporary road closure.

Explorer Drive closure under Mississauga's contract is scheduled to start on October 13, 2015, the same day that Commerce Boulevard is proposed to re-open. As the two roadways are adjacent, any potential for delay experienced by Metrolinx could delay Mississauga's closure of Explorer Drive. To mitigate/eliminate this risk, Metrolinx has met with all of the affected utility companies and believes their relocation and/or temporary support during construction should not delay bridge completion. Metrolinx has committed to utilize additional resources and work overtime if required.

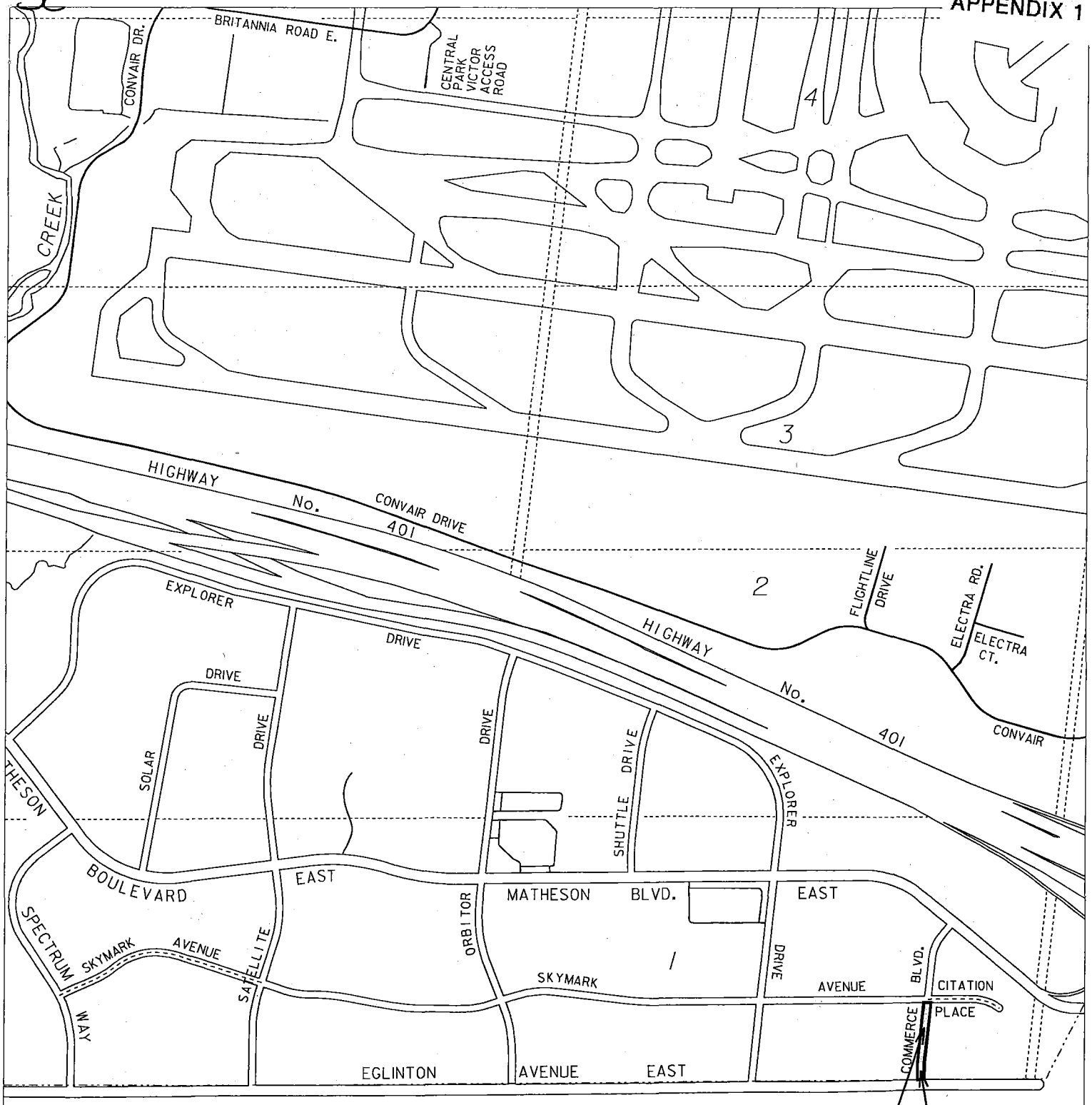
FINANCIAL IMPACT: There is no financial impact.

CONCLUSION: The Transportation and Works Department supports the temporary closure of Commerce Boulevard between Eglinton Avenue East and Skymark Avenue starting at 6:00 a.m. on Monday, April 27, 2015 and ending at 6:00 a.m. on Tuesday, October 13, 2015.

ATTACHMENTS: Appendix 1: Location Map
Appendix 2: Detour Plan

Martin Powell, P.Eng.
Commissioner of Transportation and Works

Prepared By: Jerry Che, P.Eng.
Capital Project Manager, Transitway Construction



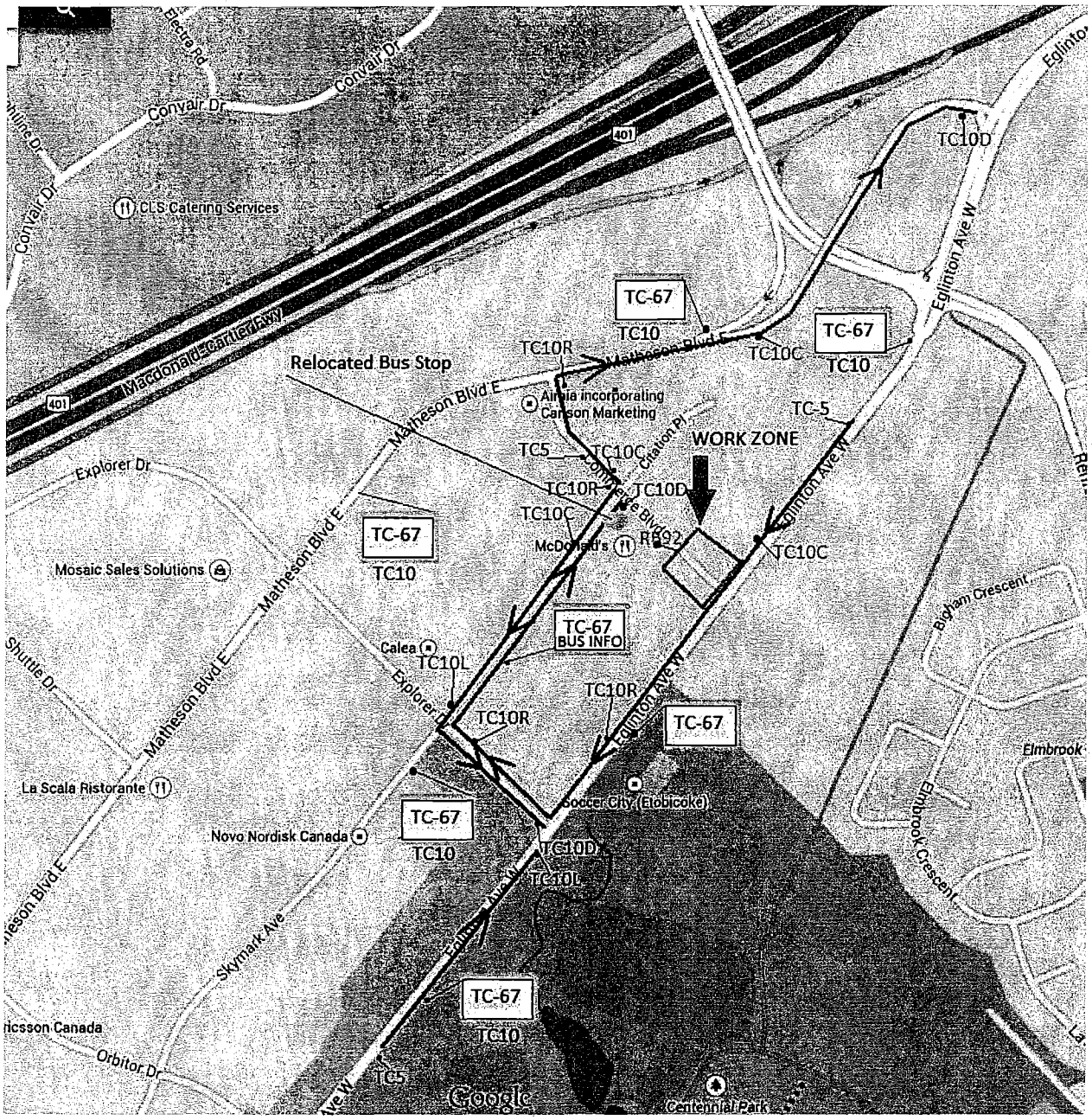
MISSISSAUGA

Transportation and Works

Engineering & Construction

Road Closure – Commerce Boulevard between Eglinton Avenue East and Skymark Avenue (Ward 5)

SCALE FOR REDUCED DRAWINGS



APPENDIX 2

MISSISSAUGA
Leading today for tomorrow

N

T & W – Transitway Construction

Detour Plan

Commerce Boulevard between Eglinton Avenue E. and Skymark Avenue

Corporate Report

Clerk's Files MG.23.REP 4.

Originator's Files

DATE: March 16, 2015

TO: Chair and Members of General Committee
Meeting Date: April 8, 2015

General Committee
APR 08 2015

FROM: Martin Powell, P. Eng.
Commissioner of Transportation and Works

SUBJECT: **Application of Noise Attenuation Barrier Policy for 1116 Deer Run under Ontario Regulation 586/06 of the Municipal Act, 2001, Local Improvement Charges – Priority Lien Status (Ward 6)**

RECOMMENDATION:

1. That a new noise attenuation barrier be constructed under the Noise Attenuation Barrier Retrofit Program along the south side of Rathburn Road West from approximately 18 metres (59 feet) west of Deer Run to a point approximately 20 metres (66 feet) westerly, in accordance with Corporate Policy 09-03-03 Noise Attenuation Barriers on Major Highways; and

2. That a by-law be enacted authorizing the dismantling and removal of the existing fence and the installation of a 2.4 metre (7.85 foot) high concrete noise attenuation barrier along the south side of Rathburn Road West from approximately 18 metres (59 feet) west of Deer Run to a point approximately 20 metres (66 feet) westerly, to be financed in accordance with Ontario Regulation 586/06 of the Municipal Act, 2001, Local Improvement Charges – Priority Lien Status, at an estimated cost to the City of approximately $16,800 with 50% of the cost to be recovered from the homeowner.

REPORT HIGHLIGHTS:	This report identifies the following location for the City's 50/50 Noise Barrier Retrofit Program: • 1116 Deer Run – Installation of a 2.4 metre (7.85 foot) high concrete noise attenuation barrier for a distance of 20 metres (66 feet), adjacent to Rathburn Road West.

BACKGROUND:

A petition was received by the Office of the City Clerk from the homeowner of 1116 Deer Run, requesting the dismantling and removal of the existing fence and construction of a noise attenuation barrier adjacent to Rathburn Road West under a local improvement (see Appendix 1). The petition was certified by the Deputy Clerk as sufficient according to the requirements of Ontario Regulation 586/06. It was received by Council on November 24, 2014 and referred to the Transportation and Works Department for appropriate action.

COMMENTS:

The City of Mississauga's Noise Attenuation Barriers on Major Roadways Corporate Policy 09-03-03, as amended, requires that in addition to a petition from abutting residents, certain criteria be met for construction of a retrofit noise barrier as follows:

The noise level must be greater than 60dBA (leq. daytime*)

A noise level measurement completed on June 25, 2014 for the 16 hour period found a sound level in the Outdoor Living Area or rear yard at 1116 Deer Run of 61.0 dBA. This level exceeds the minimum 60dBA requirement and therefore satisfies the noise level criteria.

* ***Leq.*** *means equivalent sound level*
* ***Daytime*** *means daytime average between 7:00AM-11:00PM*

The residential areas must be adjacent to arterial or major collector roads, as designated in the Official Plan

The rear yard of 1116 Deer Run is adjacent to Rathburn Road West, which is designated as a major collector road.

Barriers must be installed on a complete block to ensure their effectiveness

The proposed length of noise barrier adjacent to 1116 Deer Run is considered a complete block.

To reduce the existing and ultimate noise from Rathburn Road West to below the specified sound level of 60dBA (leq. daytime) in the rear yard of the subject property, a noise attenuation barrier of 2.4 metres (approximately 7.85 feet) in height is required.

The noise barrier would be installed in the current privacy fence location to minimize damage to existing mature trees adjacent to Rathburn Road West from approximately 18 metres (59 feet) west of Deer Run to a point approximately 20 metres (66 feet) westerly. The location of the proposed noise barrier is shown in Appendix 2.

The cost for a concrete noise attenuation barrier of 2.4 metres (7.85 feet) in height which meets City of Mississauga standards is estimated at $840 per linear metre ($256.04 per foot), which includes removal, disposal and installation costs. Final costs charged to the applicant will be the actual costs, plus administration and taxes, cost-shared between the homeowner and the City of Mississauga on a 50/50 basis in accordance with Corporate Policy 09-03-03. A summary of the estimated costs is provided in Appendix 3.

The total estimated cost of the work along Rathburn Road West is $16,800, or $8,400 for each of the City and homeowner. In accordance with the City policy, the interest rate in effect at the time of construction will be applied to the homeowner's cost.

A public notice of the proposed local improvement by-law was placed in the Mississauga News on March 5, 2015 and sent to the affected homeowner. A letter was sent by the Transportation and Works Department to 1116 Deer Run abutting Rathburn Road West, indicating that the property qualified under the City of Mississauga's Retrofit Program with the associated costs.

Section 40 of Ontario Regulation 586/06 of the Municipal Act, 2001, Local Improvement Charges - Priority Lien Status, 2001, requires that before passing the by-law to undertake work, a report addressing the following items is required:

A report as to the lifetime of the work.
The minimum lifetime expectancy for a properly installed concrete noise attenuation barrier meeting required specifications is approximately 40 years.

A report as to reductions, if any, which ought to be made under Section 28 in respect of any lot and the aggregate amount of such reductions
No reduction under Section 28 of Ontario Regulation 586/06 of the Municipal Act, 2001, Local Improvement Charges - Priority Lien Status is being sought.

An estimate of the cost of the work
The estimated cost of the work along Rathburn Road West is $16,800. This is based on a length of approximately 20 metres (66 feet) at a cost of $840 per linear metre ($256.04 per foot).

A statement of the share or proportion of the cost that should be borne by the land abutting directly on the work and by the Corporation respectively
The estimated cost to be borne by the homeowner is $8,400 for works along Rathburn Road West. The City is responsible for $8,400.

A statement as to the number of installments by which the special assessment should be made payable
The installments will be made over a 20-year period unless a written request for a 10-year repayment term or a lump sum is received by the Deputy City Clerk from the property owners on or before **December 31, 2015.**

FINANCIAL IMPACT: The supply and installation of the necessary noise attenuation barrier will be tendered by the City of Mississauga. Adequate funds have been approved in the 2015 Capital Budget, PN 15-161.

CONCLUSION: The 1116 Deer Run location satisfies all criteria and requirements as identified in the City of Mississauga's Noise Attenuation Barrier on Major Highways Policy 09-03-03 for the construction of a new noise attenuation barrier under the Retrofit Program.

ATTACHMENTS: Appendix 1 – Petition – Noise Attenuation Barrier
Appendix 2 – Proposed Barrier Installation Location – 1116 Deer Run
Appendix 3 – Cost Estimate for 1116 Deer Run

Martin Powell, P. Eng.
Commissioner of Transportation and Works

Prepared By: Michael Long, CET
Transportation Infrastructure Technologist

4e

Appendix 1

Corporate Services
Legislative Services Division
City of Mississauga
300 City Centre Dr
MISSISSAUGA ON L5B 3C1

Leading today for tomorrow

www.mississauga.ca

November 25, 2014

Neale T. Tweedy
1116 Deer Run
Mississauga, ON L5C 3N4

Re: Petition – Noise Attenuation Barrier

This confirms that Mississauga City Council, at its meeting of November 24, 2014, received and referred your petition to the Transportation and Works Department for a report back.

Yours truly,

Carmela Radice
Legislative Coordinator
Legislative Services Division
Phone: 905-615-3200 Ext. 5426
E-Mail: carmela.radice@mississauga.ca

cc Martin Powell, Commissioner of Transportation and Works Department
encl.

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PETITION

LOCAL IMPROVEMENT CHARGES

COUNCIL AGENDA
NOV 24 2014

Municipal Act, 2001, R.S.O. 2001
Ontario Reg. 586/06

We the undersigned owners hereby petition the Council of the Corporation of the City of Mississauga to construct under Ontario Regulation 586/06 of the Municipal Act, 2001, R.S.O. 2001, the following works as a local improvement:

Description of Works:

The work will include removal of the private fence and the installation of a 2.4m high concrete noise attenuation barrier of approximately 20.0m in length along Rathburn Road West siding the property at 1116 Deer Run.

Ontario Regulation 586/06 of the Municipal Act, 2001, R.S.O. 2001, states the following:

9. (2) A petition in favour of undertaking a work as a local improvement shall be signed by at least two-thirds of the owners representing at least one-half of the value of the lots liable to be specially charged for the work

10. (5) Where two or more persons are jointly assessed for a lot, in determining the sufficiency of a petition,

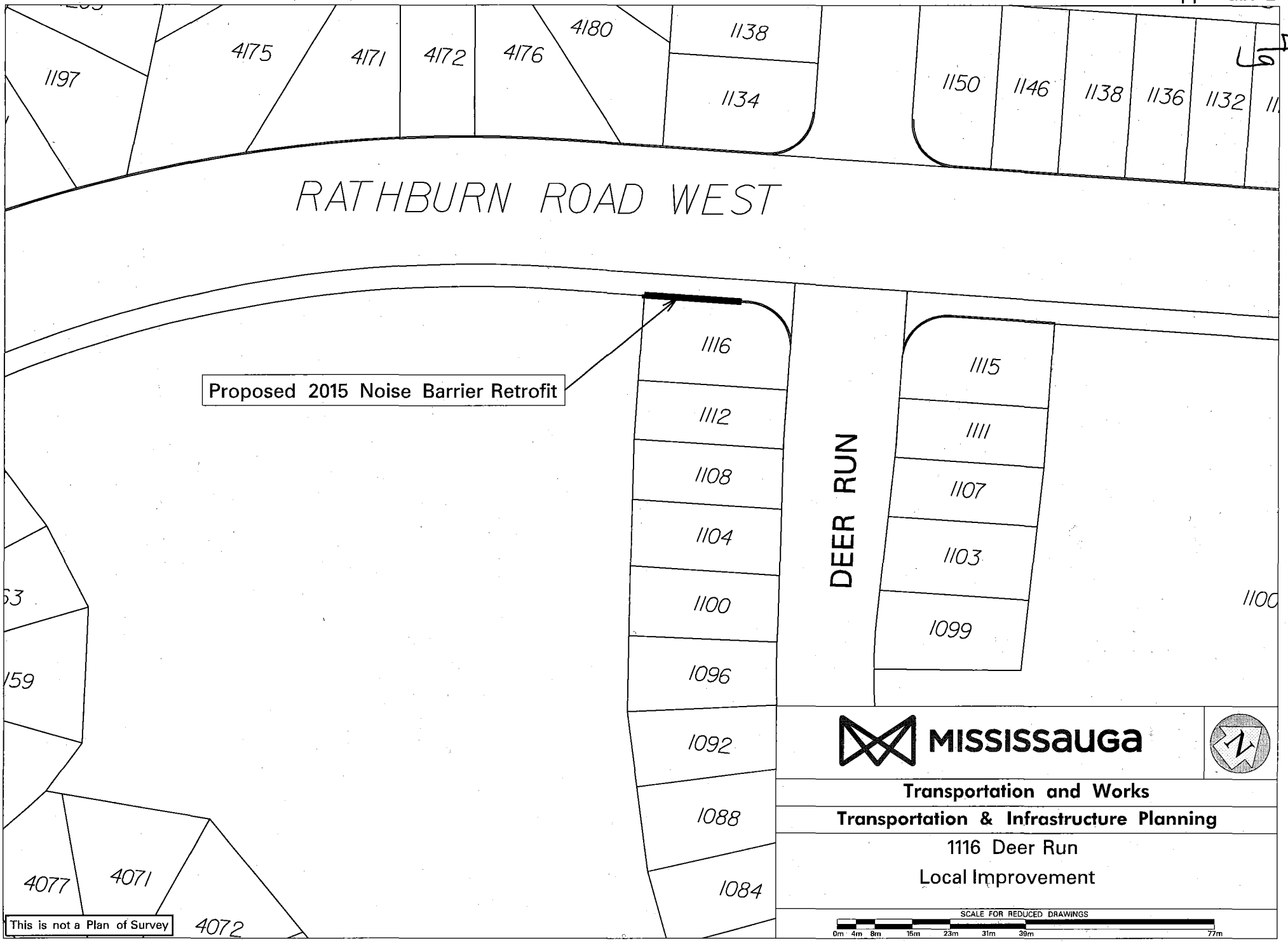
(a) they shall be treated as one owner only; and
(b) the majority of them must sign the petition for the petition to be determined sufficient.

Name of Petitioner (Owner)	Signature of Petitioner (Owner)	Property Address and Assessment Roll Number	Date	In Favour of Yes/No
NEALE T. TWEEDY	Neale T. Tweedy	1116 DEER RUN 05040152 57800 000002	Oct 9/14	Yes
PAMELA E. TWEEDY	Pamela E. Tweedy	1116 DEER RUN 05040152 57800 000002	Oct 9/14	Yes

☑ Receive	☐ Resolution
☐ Direction Required	☐ Resolution / By-Law
☐ Community Services ☐ Corporate Services	For ☐ Appropriate Action ☐ Information
☐ Planning & Building ☑ Transportation & Works	☐ Reply ☑ Report

RECEIVED
OCT 14

ML		


1197
4175
4171
4172
4176
4180
1138
1134
1150
1146
1138
1136
1132
RATHBURN ROAD WEST
Proposed 2015 Noise Barrier Retrofit
1116
1112
1108
1104
1100
1096
1092
1088
1084
DEER RUN
1115
1111
1107
1103
1099
1100
4077
4071
4072
This is not a Plan of Survey
MISSISSAUGA
Transportation and Works
Transportation & Infrastructure Planning
1116 Deer Run
Local Improvement
SCALE FOR REDUCED DRAWINGS
0m 4m 8m 15m 23m 31m 39m 77m

4h

Appendix 3

COST ESTIMATE 20 Year Ammortization: LOCAL IMPROVEMENT PAYMENT CALCULATION

Description:	**Concrete Noise Wall installation on the South-side of Rathburn Road West at property 1116 Deer Run approximately 20 metres.**
Location:	**House Siding Rathburn Road West**
Total Owners Portion of Cost:	**$8,400.00**
Total Meters:	**20.00**
Annual Interest:	**5.0%**
Amortization Term:	**20**

ANNUAL PAYMENT FORMULA

$$\text{Payment} = \frac{(OC)\,(i)}{1 - (1 + i)^{-N}}$$

(OC) = owner's cost
(i) = interest rate
(N) = total number of payments (amortization term)

Unit#	Lot Length (m)	Return Wall (m)	# Meters	Owner's Cost	Annual Payment
1116	20.00	0.00	20.00	8,400.00	674.04
Total	**20.00**	**0.00**	**20.00**	**8,400.00**	**674.04**

MISSISSAUGA **Corporate Report**

Clerk's Files

Originator's Files

5.

DATE: March 23, 2015

TO: Chair and Members of General Committee
Meeting Date: April 8, 2015

General Committee
APR 0 8 2015

FROM: Gary Kent
Commissioner of Corporate Services and Chief Financial Officer

SUBJECT: **Contract Amendment and Single Source Extension for Supply of Multi-Function Devices for a Three Year Term**
File Ref: Procurement FA.49.873-08

RECOMMENDATION:

1. That the renewal proposal received from Ricoh Canada be accepted for the term June 1, 2015 to May 31, 2018.

2. That the contract with Ricoh Canada for the supply of Multi-Function Devices (MFD's) and related services and supplies be amended in accordance with the renewal proposal and extended for the period June 1, 2015 to May 31, 2016, as provided for in the original contract and be continued for the period of June 1, 2016 to May 31, 2018, on a single source basis, in order to obtain the savings provided by the strategic renewal proposal.

3. That Ricoh Canada be recognized as a single source for the term June 1, 2015 to May 31, 2018 in order to accommodate the supply of additional MFD's and related services and supplies, as required, subject to budget funding availability.

4. That the Purchasing Agent be authorized to execute the appropriate forms of commitment to Ricoh Canada in the estimated amount of $900,000 excluding taxes, for the

provision of MFD's and related services and supplies for the term June 1, 2015 to May 31, 2018.

5. That the Purchasing Agent be authorized to execute contract amendments to Ricoh Canada for the provision of additional MFD's and related services and supplies, as required, subject to budget funding availability, for the term June 1, 2015 to May 31, 2018.

REPORT HIGHLIGHTS:	• The current contract for supply and servicing of MFD's expires on May 31, 2015 with a one year extension option to May 31, 2016 for the fleet (mostly City facilities) and of the Transportation & Works (T&W) and Fire facilities expiring on May 31, 2016. • Given the current good state of the equipment (minimal service to date) and the fact that most MFD's are utilized below the manufacturing capabilities, the City approached Ricoh Canada to make a proposal on extending the strategic renewal option for longer than one year. • The current rates paid by the City are a cost per copy of $0.0278 for black and white and $0.0800 for colour. The Ricoh Canada proposal is based on a three year extension with rate reductions to $0.0188 for black and white and $0.0670 for colour. • The resulting overall savings for the City will be approximately $434,000 over the three year extension period. • Additionally, potential requirements for colour printers in various administrative areas will be minimized by implementing 15 Mobile Release Colour Print Kiosks (centralized colour printing on most floors in major City facilities). • The contract commitment for a period of three years for both monochrome and colour machines is estimated at $900,000 excluding taxes. • In order to accept Ricoh's strategic renewal proposal and obtain savings, a three year commitment is required. The existing contract only provides for extension of one year. Therefore, the additional two years will be on a single source basis.

BACKGROUND:

Office photocopiers have gone from being simply "dumb" mechanical devices to being very sophisticated MFD's. In view of the significance of their IT aspects, the City's Information Technology (IT) Division of the Corporate Services Department manages the contract for all MFD's and oversees the program for all City Departments. All MFD's today are linked directly to City desktop computers.

The current contract for supply and service of MFD's expires on May 31, 2015 with a one year extension option to May 31, 2016 for the entire fleet (mostly City facilities) and for T&W and Fire facilities.

COMMENTS:

Given the current good state of the equipment (minimal service to date) and the fact that most MFD's are utilized below the manufacturing capabilities, the City approached Ricoh Canada to make a proposal on extending the strategic renewal option for longer than one year. Since the capital cost of equipment having been paid out as of May 31, 2015, the City envisioned potential for significant savings through rate reductions with a minimal servicing risk due to the stated current fleet's utilization.

Ricoh Canada responded to the City's request for proposal with a strategic renewal option for an additional three years. This will result in:

- A three year total cost savings to the City of approximately $434,000, since the cost per copy cost will now exclude the capital costs and only include the supplies and service cost; and

- New features to the current fleet to meet our strategic initiatives in the areas of mobility, security and green initiatives to include card release and secure scanning, Follow You Print and BYOid Print.

Additionally, the proposal includes 15 Mobile Release Colour Print Kiosks and an Electronic Records Pilot to explore records management features and capabilities.

It is recommended that the contract with Ricoh Canada be amended and extended for one year as provided in the original contact. It is further recommended that the contract with Ricoh Canada be continued for a further two year term on a single source basis, in accordance with the Purchasing By-law #374-2006, Schedule A 1 (b) (iv) *The solicitation of competitive bids would not be economical to the City.*

FINANCIAL IMPACT: The current rates paid by the City are a cost per copy of $0.0278 for black and white and $0.0800 for colour. The Ricoh Canada proposal, is based on a three year extension with rate reduction to $0.0188 for black and white and $0.0670 for colour.

Additionally, the rental costs paid for T&W and Fire facilities copiers and printers (approximately $1,194 monthly) will be eliminated after the first year of the proposed contract extension.

The overall total savings for the City are estimated based on current usage at $434,000 over the three year extension period.

All current contracts for MFD's at the City will be merged to become the "fleet" at the conclusion of the contract extension.

Additionally, potential requirements for colour printers in various administrative areas will be minimized by the introduction of 15 Mobile Release Colour Print Kiosks (centralized colour printing on most floors in major City facilities). This will represent a capital cost savings for those colour printers that would have otherwise been purchased, as well as reduce an inventory of colour printers due to the Mobile Release Colour Printer Kiosks availability.

The contract commitment for a period of three years for both monochrome and colour machines is estimated at $900,000 excluding taxes.

Funding is approved in the budget and departments are charged individually based on the number of images they produce.

CONCLUSION:

Based on the good state of the current MFD fleet equipment, our ability to extend the current contract with Ricoh Canada from one to three years is practical, prudent and economical. The proposed option also positions the City to take advantage of the existing technology requirements, moving forward with mobility, workgroup colour printing, security and green initiatives by including card release and secure scanning, Follow You Print and BYOiD print.

The above initiatives will continue to adhere to the printing strategy of the City by reducing paper usage, equipment footprints at the floor level and reduce power consumption. Overall the City's cost will be lowered while maintaining a high quality of equipment and services.

ATTACHMENTS:

Appendix 1: Three Year Strategic Renewal Option

G. Kent

Gary Kent
Commissioner of Corporate Services and Chief Financial Officer

Prepared By: Steve Draper, IT Manager, Service Management

MISSISSAUGA

Appendix 1

Recommendation

Three Year Strategic Renewal Option

3 Yr. Strategic Renewal Option	Year 1	Year 2	Year 3	Ext Total for Three Years
Effective B&W Fleet Rate	$ 0.0188	$ 0.0188	$ 0.0188	
Colour	$ 0.0670	$ 0.0670	$ 0.0670	
Avg Rate (B&W and Colour)	$ 0.0199	$ 0.0191	$ 0.0191	**$ 881,128.41**
Annual Total Spend	$ 301,765.47	$ 289,681.47	$ 289,681.47	
Monthly Spend	$ 25,147.12	$ 24,140.12	$ 24,140.12	
Monthly % Reduction	31%	34%	34%	33%

Infrastructure developments

Card Release and Secure Scanning Single sign on	Incl.
Follow You Printing To facilitate hotel desktops, secure release , and volume reduction	Incl.
BYOiD print Smart Phone and Tablet mobile printing	Incl.
15 Mobile Release Colour Kiosks To target unregulated colour	Incl.

3 Year Total Savings - $433,930 or 33% reduction

REPORT 2 - 2015

TO: CHAIR AND MEMBERS OF GENERAL COMMITTEE

The Traffic Safety Council presents its second report for 2015 and recommends:

TSC-0042-2015
That Peter Westbrook be appointed as Chair of the Traffic Safety Council for the term ending in November 30, 2018 or until a successor is appointed.
(TSC-0042-2015)

TSC-0043-2015
That Heather Relf be appointed as Vice-Chair of the Traffic Safety Council for the term ending in November 30, 2018 or until a successor is appointed.
(TSC-0043-2015)

TSC-0044-2015
1. That a crossing guard be implemented on Lamplight Way, east of Second Line effective at the commencement of the school year in September 2015 due to the number of students attending St. Julia Catholic School who will not be on the school bus.
2. That the Site Inspection Subcommittee conduct site inspections at the intersection of Second Line and Lamplight Way in September and October 2015, to determine if the warrants are met to retain the crossing guard for the students attending St. Julia Catholic School.
3. That the crossing guard at the intersection of Second Line and Lamplight Way be removed at the Christmas break 2015, if the site inspections conducted in September and October 2015 determine that the warrants are not met for the retention of the crossing guard.

(Ward 11)
(TSC-0044-2015)

TSC-0045-2015
1. That Parking Enforcement be requested to enforce parking prohibitions on Terragar Boulevard from 8:40 a.m. to 9:05 a.m. and from 3:20 p.m. to 3:45 p.m., for students attending Kindree Public School
2. That Transportation and Works be requested to consider the feasibility to extend the "No Stopping" zone on the north side of Terragar Boulevard, west of Kindree Public School to Cork Tree Row.

(Ward 10)
(TSC-0045-2015)

TSC-0046-2015
That the request for a second crossing guard at the northwest corner at Credit Valley Road and Glen Erin Drive, for the students attending Credit Valley Public School be denied as the warrants are not met.
(Ward 8)
(TSC-0046-2015)

TSC-0047-2015
That the Site Inspection Report for the safety review conducted on February 17, 2015 at 2800 Erin Centre Boulevard at the driveway of St. Aloysius Gonzaga Secondary School be received for information.
(Ward 9)
(TSC-0047-2015)

TSC-0048-2015
1. That the request for a crossing guard at the intersection of Mississauga Valley Boulevard and Daralea Heights for the students attending Canadian Martyrs Catholic School and Briarwood Public School be denied as the warrants are not met.
2. That Parking Enforcement be requested to enforce parking prohibitions on Mississauga Valley Boulevard and Daralea Heights from 2:50 p.m. to 3:15 p.m., for the students attending Canadian Martyrs Catholic School and Briarwood Public School

(Ward 4)
(TSC-0048-2015)

TSC-0049-2015
That the request for a crossing guard on Homelands Drive and Thorn Lodge Drive for the students attending Sheridan Park Public School be denied as the warrants are not met.
(Ward 2)
(TSC-0049-2015)

TSC-0050-2015
1. That Transportation and Works be requested to consider the feasibility of installing speed awareness signage on Seagull Drive behind Hillside Middle School.
2. That Transportation and Works be requested to review the signage on Seagull Drive and consider the feasibility of replacing faded signage.

(Ward 2)
TSC-0050-2015

TSC-0051-2015

1. That the request for a crossing guard at the intersection of Huron Heights Drive and Maxine Place for the students attending St. Pio of Pietrelcina be denied as the warrants are not met.
2. That Transportation and Works be requested to review the feasibility of installing curb cuts and landing pads aligning with the park pathway on the west leg of the intersection of Huron Heights Drive and Maxine Place.

(Ward 4)
(TSC-0051-2015)

TSC-0052-2015
That the email dated February 24, 2015 from Councillor Chris Fonseca, on behalf of a resident, requesting a site inspection to determine if the warrants are met for the implementation of a school crossing guard at the intersection of Runningbrook Drive and Tomken Road for the students attending Blessed Teresa of Calcutta Catholic School be received and referred to the Site Inspection Subcommittee for a report back to Traffic Safety Council.
(Ward 3)
(TSC-0052-2015)

TSC-0053-2015
That the email dated March 13, 2015 from Jacqueline Fleming, Directrice de E.E.C. at Ange-Gabriel Catholic Elementary School requesting a site inspection and safety review be received and referred to the Site Inspection Subcommittee for a report back to Traffic Safety Council.
(Ward 9)
(TSC-0053-2015)

TSC-0054-2015
That the email dated February 26, 2015 from a Ward 5 resident requesting a safety review in front of Barondale Public School be received and referred to the Site Inspection Subcommittee for a report back to Traffic Safety Council.
(Ward 5)
(TSC-0054-2015)

TSC-0055-2015
That the email dated March 9, 2015 requesting the placement of a crossing guard at the intersection of McBride Avenue and Grechen Road for the students attending McBride Avenue Public School be received and referred to the Site Inspection Subcommittee for a report back to Traffic Safety Council.
(Ward 6)
(TSC-0055-2015)

TSC-0056-2015
That the Parking Enforcement reports with respect to parking enforcement in school zones for the month of January and February 2015 be received for information.
TSC-0056-2015)

TSC-0057-2015
That the Action Items List from the Transportation and Works Department for January and February 2015 be received for information.
(TSC-0057-2015)

TSC-0058-2015
That up to three (3) Traffic Safety Council members be authorized to attend the 2015 Ontario Traffic Council Annual Conference, on May 3 to May 5, 2015 in Sault Ste. Marie, and that the costs for registration, accommodation and travel (approximately $1,500 per attendee) to attend the Conference be allocated in the 2015 Traffic Safety Council budget.
(TSC-0058-2015)

TSC-0059-2015
That the Site Inspection Subcommittee be requested to conduct a safety review at the intersection of Credit Valley Road and Metcalfe Avenue for the students attending Credit Valley Public School for a report back to Traffic Safety Council.
(Ward 8)
(TSC-0059-2015)