Public Works Committee
March 17, 2014
Item 7.2

Sewer Cross-Connection Pilot Study

Sewer Cross-Connection Pilot Study

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Introduction

In December 2001 the City of Hamilton was issued four orders by the Ministry of the Environment (MOE) for discharging contaminants to the environment, more specifically E-coli into the Red Hill Creek.

That event triggered a series of activities to locate and eliminate what was believed the most likely source of contamination, namely Sewer Cross Connections.

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Areas of Study – Outfalls of Concern Identified 2002 - 2004

Red Hill Creek Valley Watershed 2002

- 75 storm outfalls
- 23 measured high Ecoli
- Subsewersheds upstream of outfalls were sampled
- Areas of contamination identified

Chedoke Creek Watershed 2003

- 5 storm outfalls along Scenic Drive
- 5 measured high Ecoli
- Subsewersheds upstream of outfalls were sampled
- Areas of contamination identified

Dundas Valley Watershed 2004

- 73 storm outfalls
- 9 measured high Ecoli
- 3 identified as potential sewer cross-connection related
- 6 identified to be resulting from surface run-off

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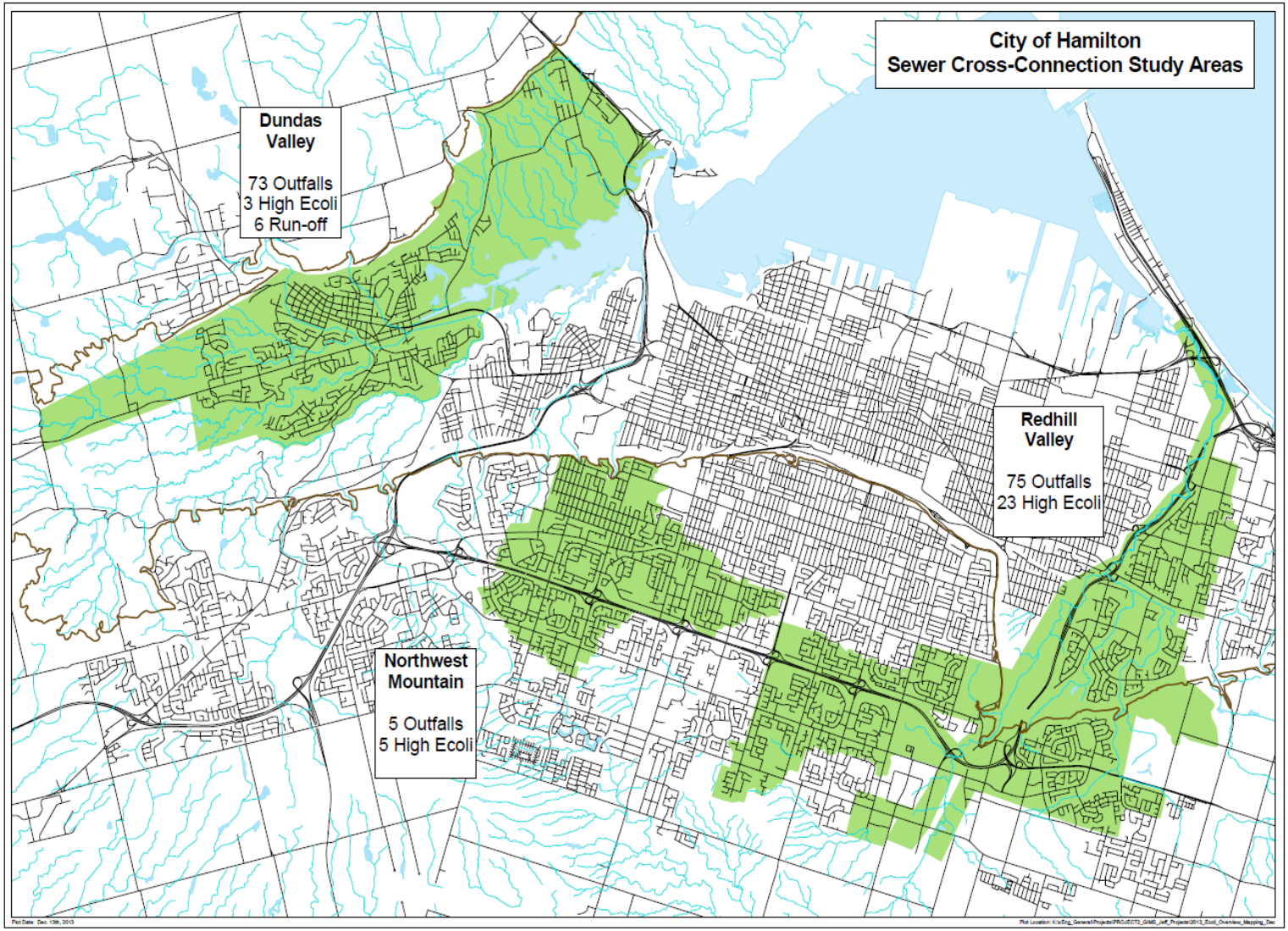
Areas of Study – Outfalls of Concern Identified 2002 - 2004



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Follow Up Activities 2005 to 2009

- Various attempts were undertaken to isolate sources of contamination.
  - Smoke testing – inconclusive
  - Dye Testing - hampered by the process surrounding communication with affected residents

- Early attempts to address the cross connection issue helped identify a number of legal and technical constraints. A Sewer Cross Connection Pilot Study was selected as a practical means to move this initiative forward.

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Sewer Cross Connection Pilot Study 2009

- The concept of the pilot is to gather data to define the predominant contamination source and quantify the severity of the problem.
- Long term objective was to develop a permanent Sewer Cross Connection Program.
- In order to get homeowner participation and allow entry into their homes the City waived any liability associated with the study findings.

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Sewer Cross-Connection Pilot Study - Study Approach

Step 1 - Sampling of Outfalls and Upstream Storm Sewers

Step 2 - Storm Sewer CCTV Inspections

Step 3 - Letters to Homeowners

Step 4 - Dye-tests and Sewer Lateral CCTV Inspections

Step 5 - Engineering Investigations

Step 6 - Corrective Action.

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Sewer Cross-Connection Pilot Study - Study Approach

Step 1: Sampling of Outfalls and Upstream Storm Sewers

- Outfalls of concern are sampled for Ecoli and caffeine
- Caffeine allows us to differentiate human waste from other waste sources.
- Samples are collected along the sewer upstream and upstream of the outfall with the goal of pinpointing dominant contaminate areas
- Sampling results are mapped out indicating where cross-connections are most likely to be found.

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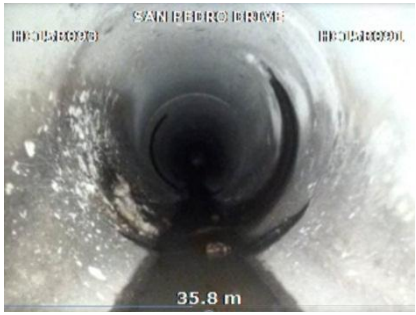
Sewer Cross-Connection Pilot Study - Study Approach

Step 2: Storm Sewer CCTV Inspections

- All storm sewers within areas of concern are video inspected.
- Signs of sanitary discharge from sewer laterals or staining of the sewer walls are indicators of cross connection.
- Homes who's laterals show signs of cross connection are included in follow up investigations



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Step 3: Letters to Homeowners Requesting Participation

- The process to make contact with owners and schedule an investigation is slow.
- The process can involve multiple letters and phone calls to explain the issue, what the City is asking of the customer and what risks exist for the customer.
- Some owners did not call back or refused participation for various reasons:
  - Not interested without providing explanation
  - No time to schedule inspection
  - It's the City's problem. The connection should have been inspected during the building inspection process
  - Concerned that the City would enforce corrections at owner's expense

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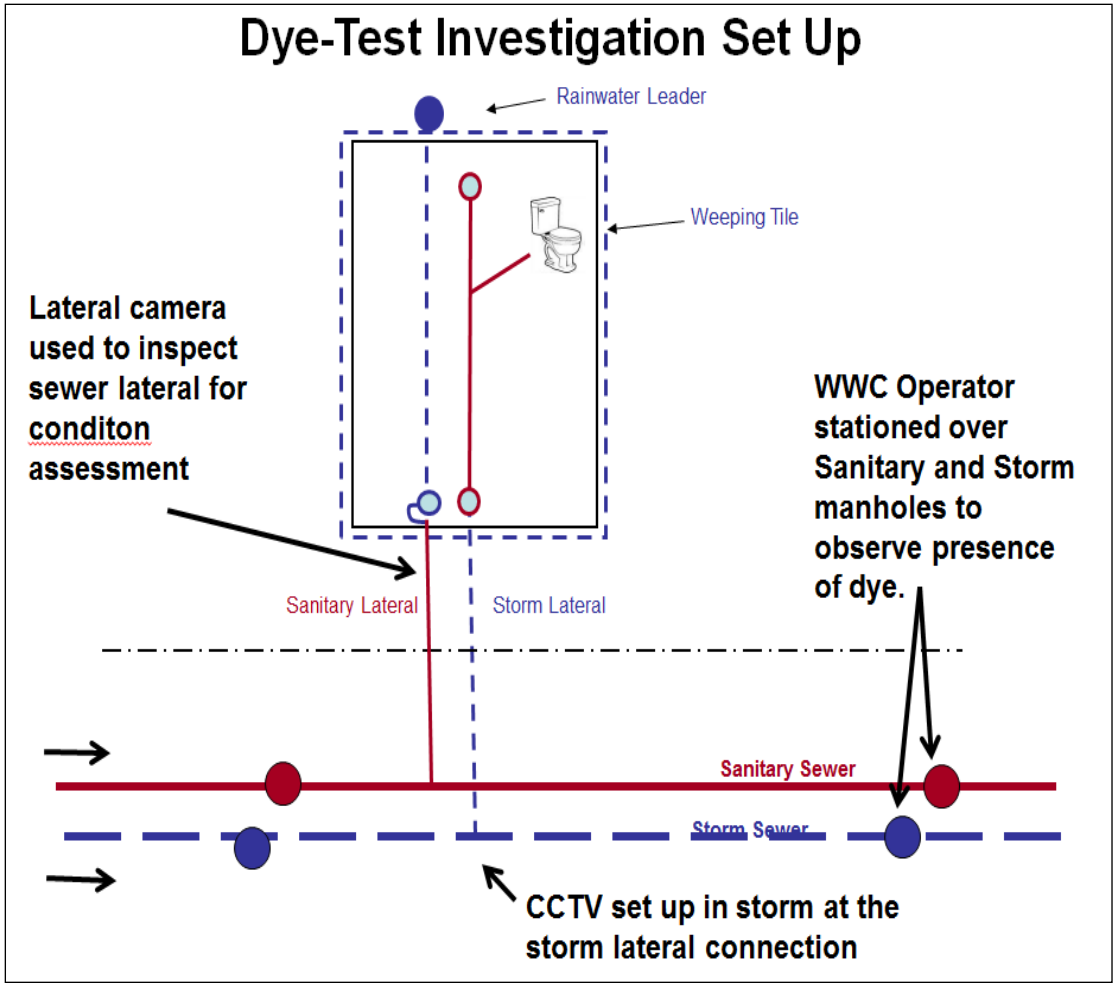
Sewer Cross-Connection Pilot Study - Study Approach

Step 4: Dye-Testing and Sewer Lateral CCTV Inspections



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Sewer Cross-Connection Pilot Study - Study Approach

Step 5: Engineering Investigations for Corrective Action

- Sewer Lateral CCTV reports are reviewed to assess the structural condition of the entire sewer lateral.
- Sewer **as-built** drawings are reviewed to determine whether depths of sanitary and storm sewers may permit reversal of both laterals.
- The site is reviewed to confirm location of laterals in reference to driveways, landscaping, trees, etc which factor into whether a correction can be made if full replacement is required.
- Prior to initiating a correction staff advises the homeowner of the scope of work required to correct the cross-connection and makes recommendations if issues are found on the private potion of the lateral.

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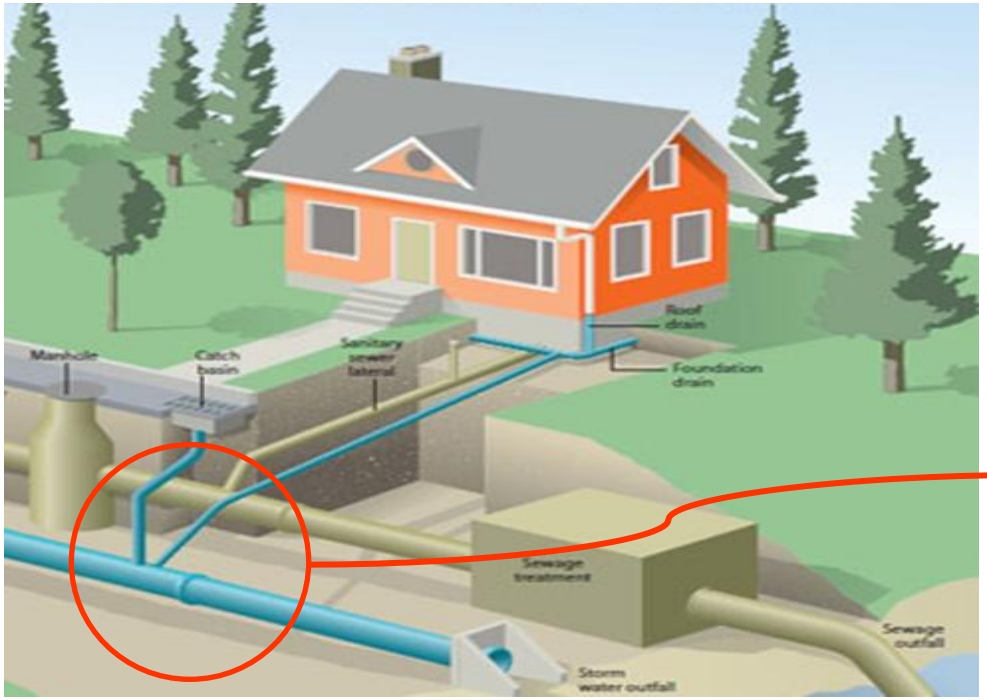
Sewer Cross-Connection Pilot Study - Study Approach

Step 6: Sewer Lateral Cross-Connection Corrections

- Sanitary and storm laterals are physically crossed so that they discharge to the correct sewer.



Before Correction

After Correction

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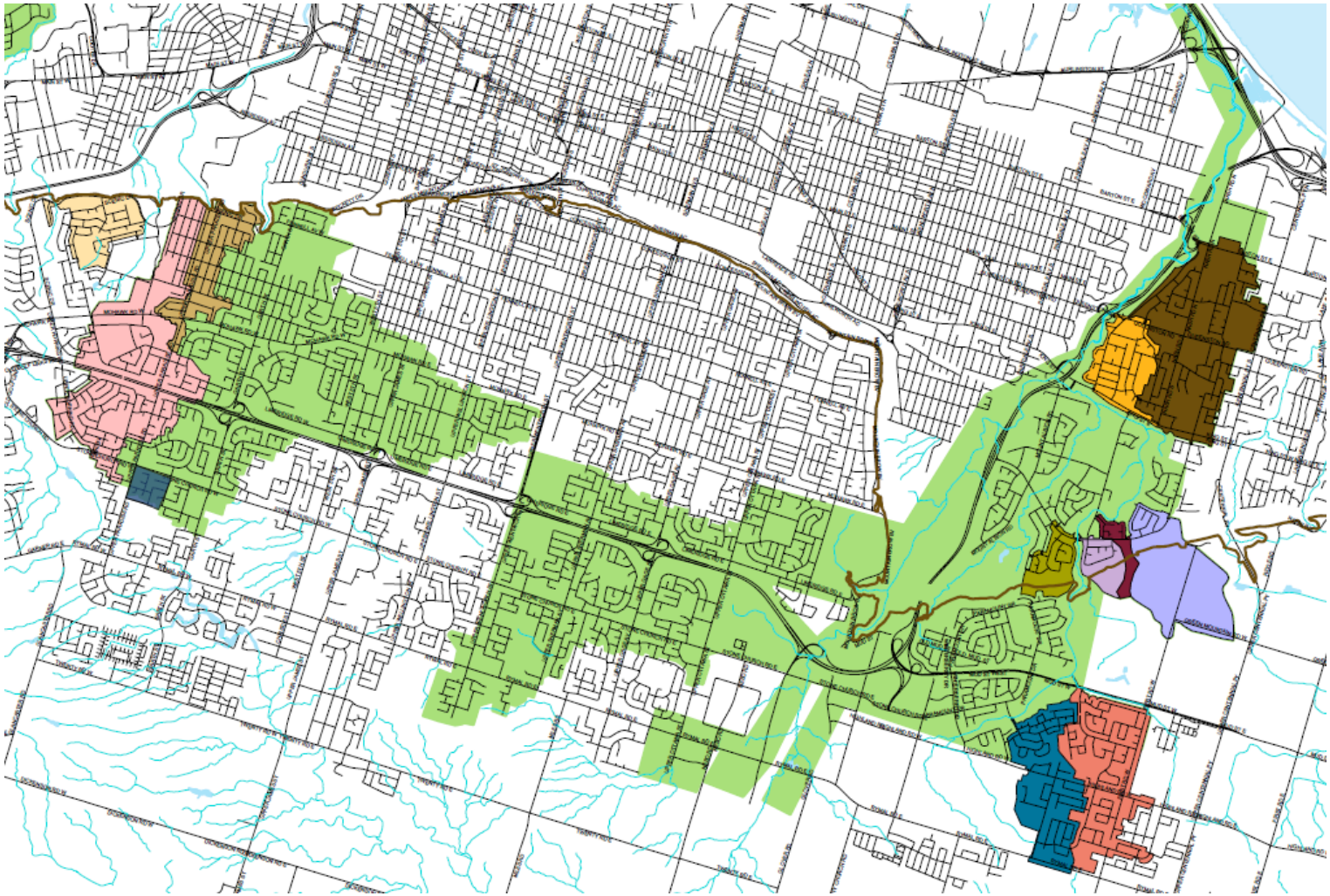
Current Areas of Study - Subsewersheds



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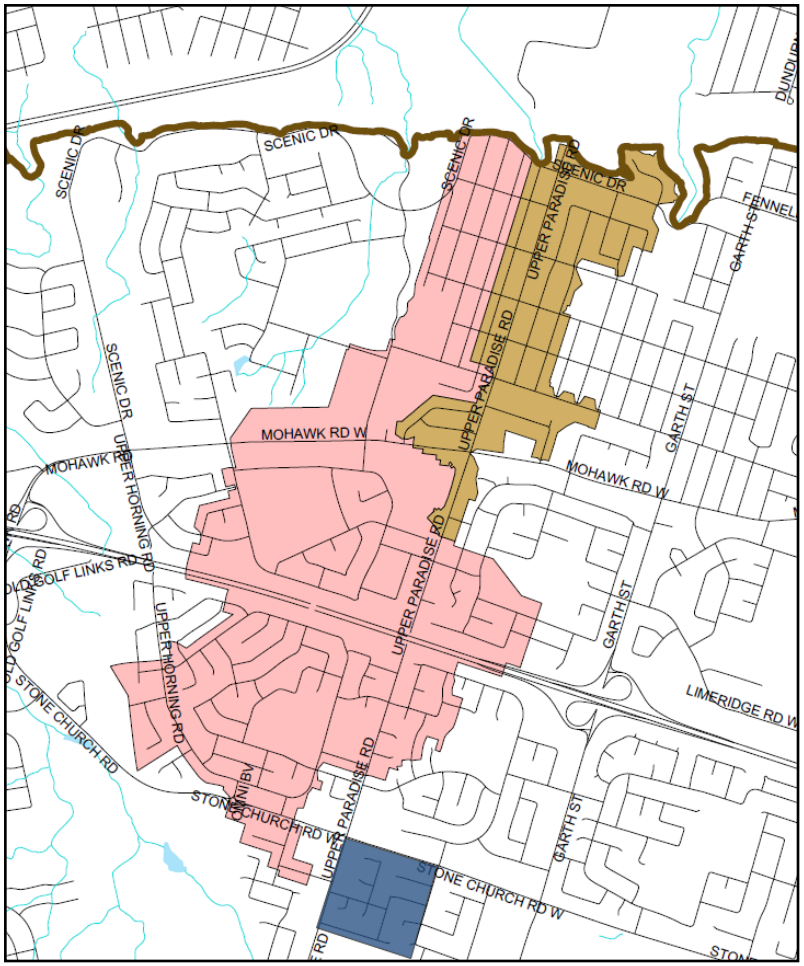
Investigations Completed - Chedoke Creek Study Areas



3270 Properties

100 Complete Cross-Connections

94 Corrected to date

8 Partial Cross-Connections

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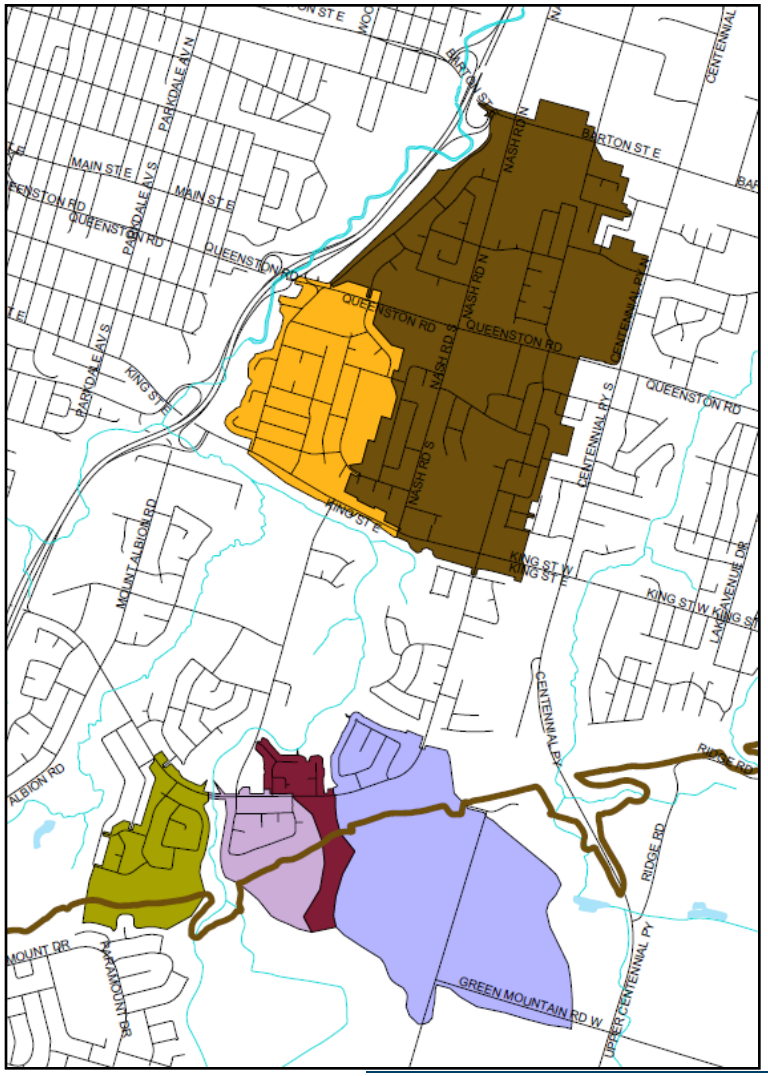
Investigations Completed - Red Hill Creek Study Areas



3039 Properties

1 Complete Cross-Connection
(correction to be scheduled)

2 Partial Cross-Connections

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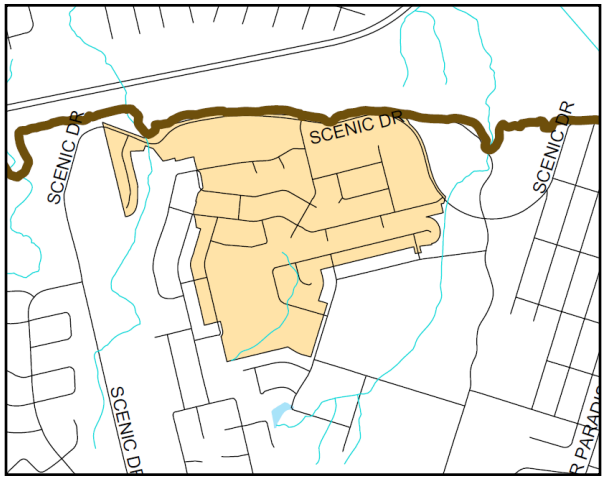
Investigations Ongoing



Mountview Falls – Chedoke Creek

514 Properties

3 Complete Cross-Connection to date

0 Partial Cross-Connections to date

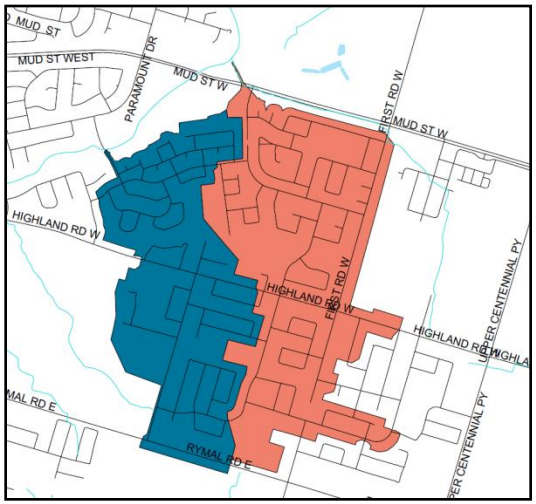
Upper Stoney Creek – Red Hill Creek

2549 Properties

14 Complete Cross-Connections to date

2 Corrected to date

0 Partial Cross-Connections to date



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Pilot Study Summary Totals to Date

- 48,000 Lim M – Storm Sewer CCTV Inspections
- 266 Dye-Tests & Lateral CCTV Inspections
- 127 Complete Cross-Connections Confirmed
- 14 Partial Cross-Connections Confirmed
- 113 Complete Cross-Connection Corrections
- 17 Indirect Cross-Connections Confirmed
- 250 Ecoli Samples

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Future Areas of Study

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Report PW14028 – Accelerated Remediation of Illegal Sewer Cross Connections

RECOMMENDATION SUMMARY

1) **Hire two additional staff to work exclusively on the Sewer Cross Connection Pilot Study and increase 2014 budget by $450K. These added resource are required to accelerate our progress on this study.**
2) **Report back to Council in 2016 on Program progress**

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Pilot Study Advantages

- **The pilot study has shed a light on a problem that has existed for quite some time. It has helped define gaps in the building/development process and has lead to positive changes in that regard.**
- **The social benefits of the study are to reduce or eliminate the visual signs of sewage waste at storm outfalls. These benefits more specifically relate to reduced public health risk and community enhancement.**
- **Environmental benefits, while difficult to quantify, are a reduction in the contamination loadings to receiving waters and by extension, enhancements to the in-water and near water environmental conditions along our rivers, creeks and ponds.**

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Pilot Study Challenges

- There will always exist some sources of contamination into the storm sewer systems and therefore storm water will always potentially contain E-coli to some degree.
- This is an issue that will persist well into the future – our current methodology will not find all cross connections and new cross connections will be created in the future.
- Partial (single fixture) cross connections are not addressed through the pilot program and there contamination sources will need to be address in the future

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Questions ?