Basement Flooding Study Area 59

South Scarborough – Highland Creek

Public Drop-In Consultation

July 17, 2024

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Study Overview

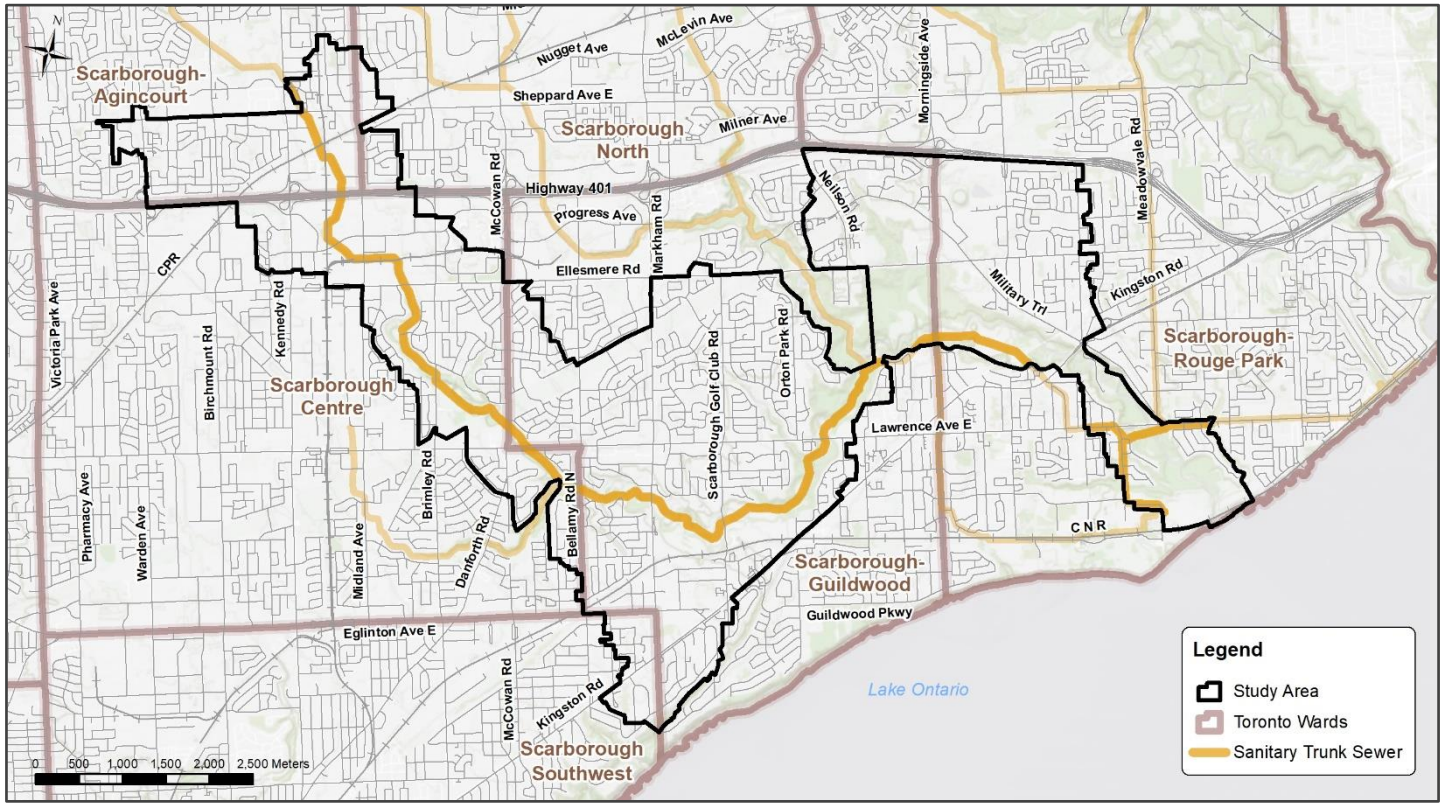
The City's sewer and drainage system was originally designed to handle average rainfall events and not extreme rainfall events (e.g. 100-year storm).

For Study Area 59, the City is creating a flood-risk reduction strategy that involves an:

- Examination of the City's sewer and drainage system.
- Identifying causes of basement and surface flooding.
- Identifying where the system does not meet the Basement Flooding Protection Program's Level-Of-Service targets.
- Evaluating options and recommending solutions to achieve the targets.

Study Area 59

- Approximately 3,100 ha
- Spans Ward 20-25:
  - Scarborough Southwest
  - Scarborough Centre
  - Scarborough-Agincourt
  - Scarborough North
  - Scarborough-Guildwood
  - Scarborough-Rouge Park
- Generally bound by Sheppard Avenue to the north, Warden Avenue/Brimley Avenue/Bellamy Road to the west, Orton Park to the east and Kingston Road to the south
- Study area is positioned based on existing storm and sanitary sewer system connections



City's Basement Flooding Protection Program

The City of Toronto has established **"Level Of Service" (L-O-S)** targets for the wastewater collection and storm drainage system it owns and operates. These targets are to ensure minimal risk of property and roadway flooding.

Combined sewers and storm sewers

- Ability to handle an extreme rainfall event of 90 mm rain within 6 hours, 40 mm of which falls in 10 minutes (100-year storm)

Sanitary sewers

- Ability to handle an extreme rainfall event similar to May 12, 2000

Municipal roadways target during 100-year storm:

- Arterial roads: ponding permitted on outer lanes; however centre lanes must be open for travel in each direction
- Collector/local roads: ponding permitted within the City's right-of-way (depending on road design)

Performance of the sewer system is evaluated using a detailed computer simulation of an extreme rainfall event, which identifies all locations where L-O-S targets are not met. The simulation is then used to examine solutions.

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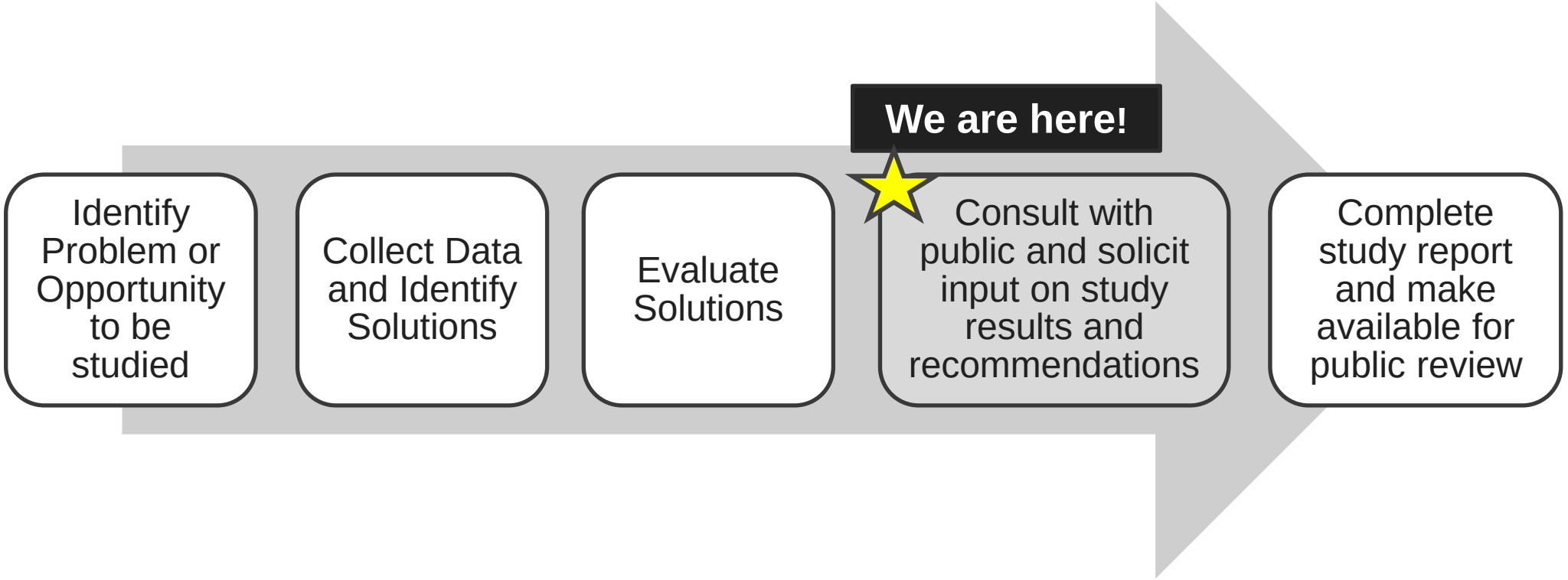
Level-Of-Service Exceptions

- While the City aims to achieve the Basement Flooding Protection Program's target Level-Of-Service (L-O-S) throughout the study area, this is not always possible due to technical limitations. In study areas 59, certain locations were exempted from meeting these targets based on the low level of flood risk to private property.

- Below are the types of areas with L-O-S target exceptions in Study Area 59:
  1. Areas with low risk of basement flooding or no sewer connections to houses.
  2. Areas where sewers discharge into Lake Ontario or Highland Creek where the sewers cannot be lowered below the lake or creek level.
  3. Privately owned sewers, which are the responsibility of the property owner to manage.
  4. Sewers impacted by the sanitary trunk sewer (trunk sewer capacity to be assessed through a separate project).

Study Process

For each study area, the City is following the Municipal Class Environmental Assessment process, an approved planning process under the Ontario Environmental Assessment Act.



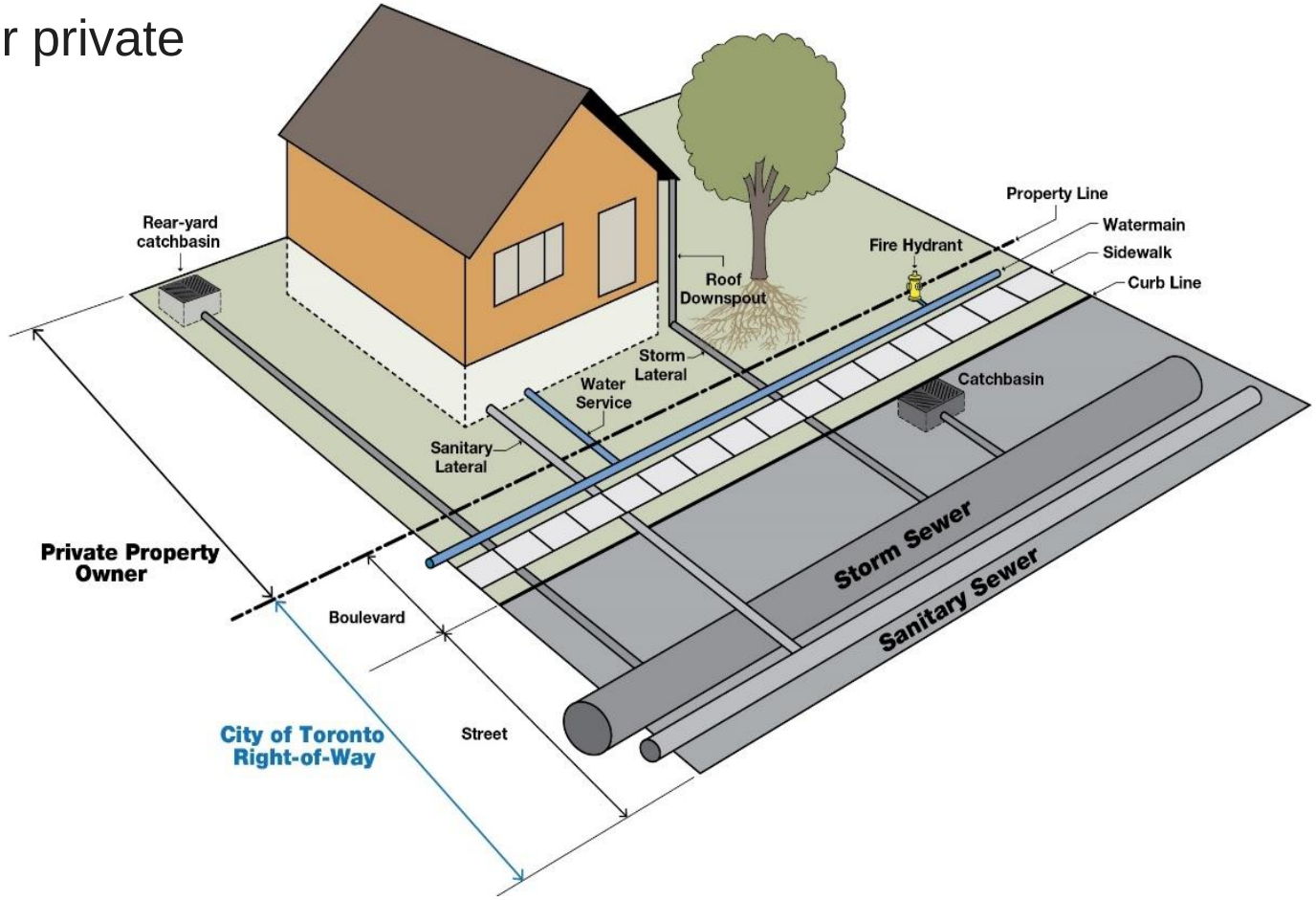
Understanding the Sewer System

Areas of Responsibility

The City is responsible for infrastructure within the public Right-of-Way.

Homeowners are responsible for the operation and maintenance of drainage systems on their private property, including:

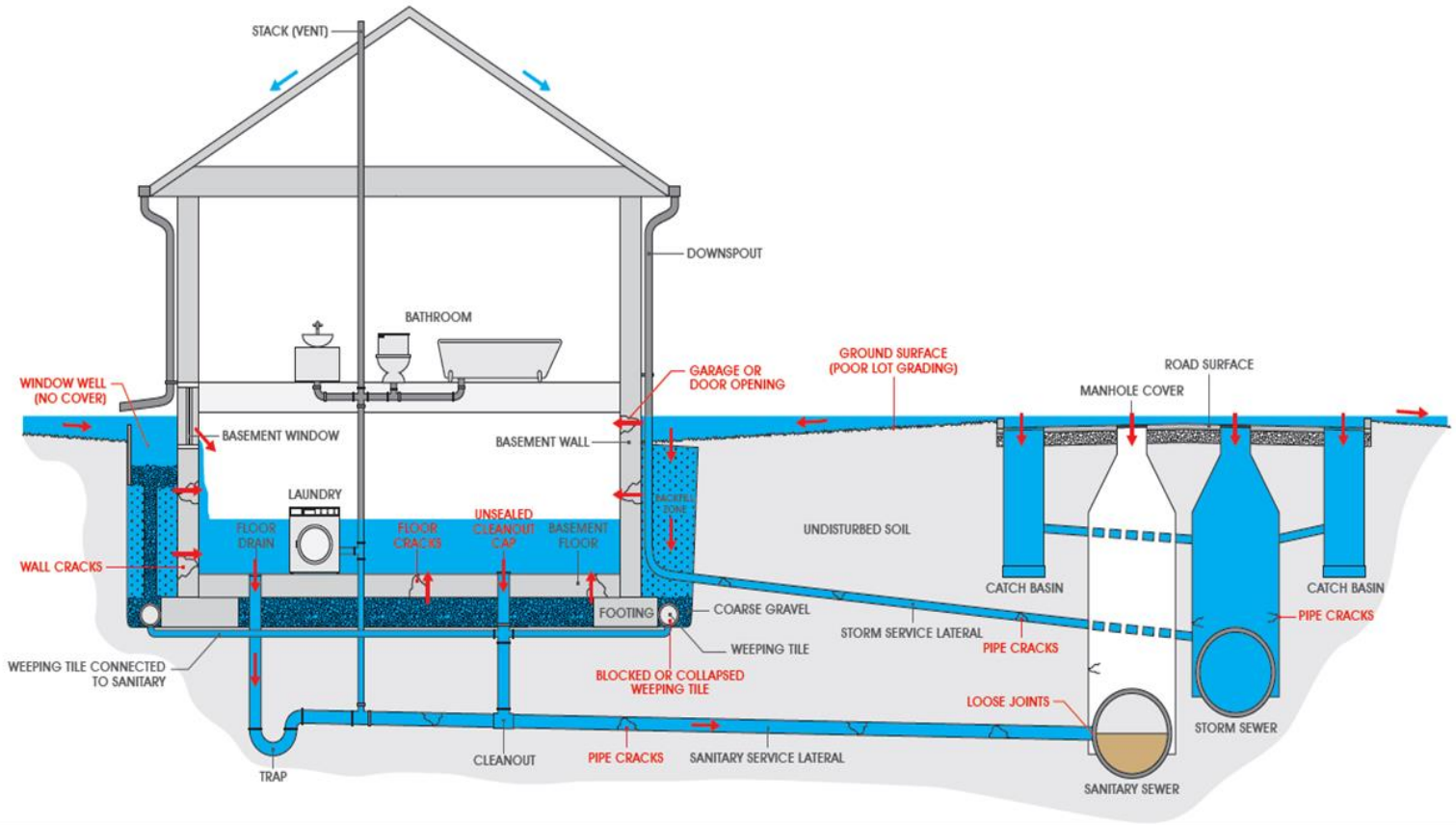
- Lot grading
- Front and rear-yard or driveway drainage catchbasins
- Foundation drains
- Sump pumps and backwater valves
- Private tree roots and what you put down the drain (fats, oils, grease, etc.)
- Disconnecting downspouts



Separated Sewer System Design

Storm Sewers capture rainwater or melted snow, mainly through catch basins, the square grates on the side of the road. This water flows directly into nearby waterways including streams, rivers and Lake Ontario.

Sanitary Sewers transport wastewater released from a drain, toilet, sink or appliance such as a clothes or dishwasher. This wastewater from residences and businesses flows to treatment plants where it is cleaned before being released into Lake Ontario.

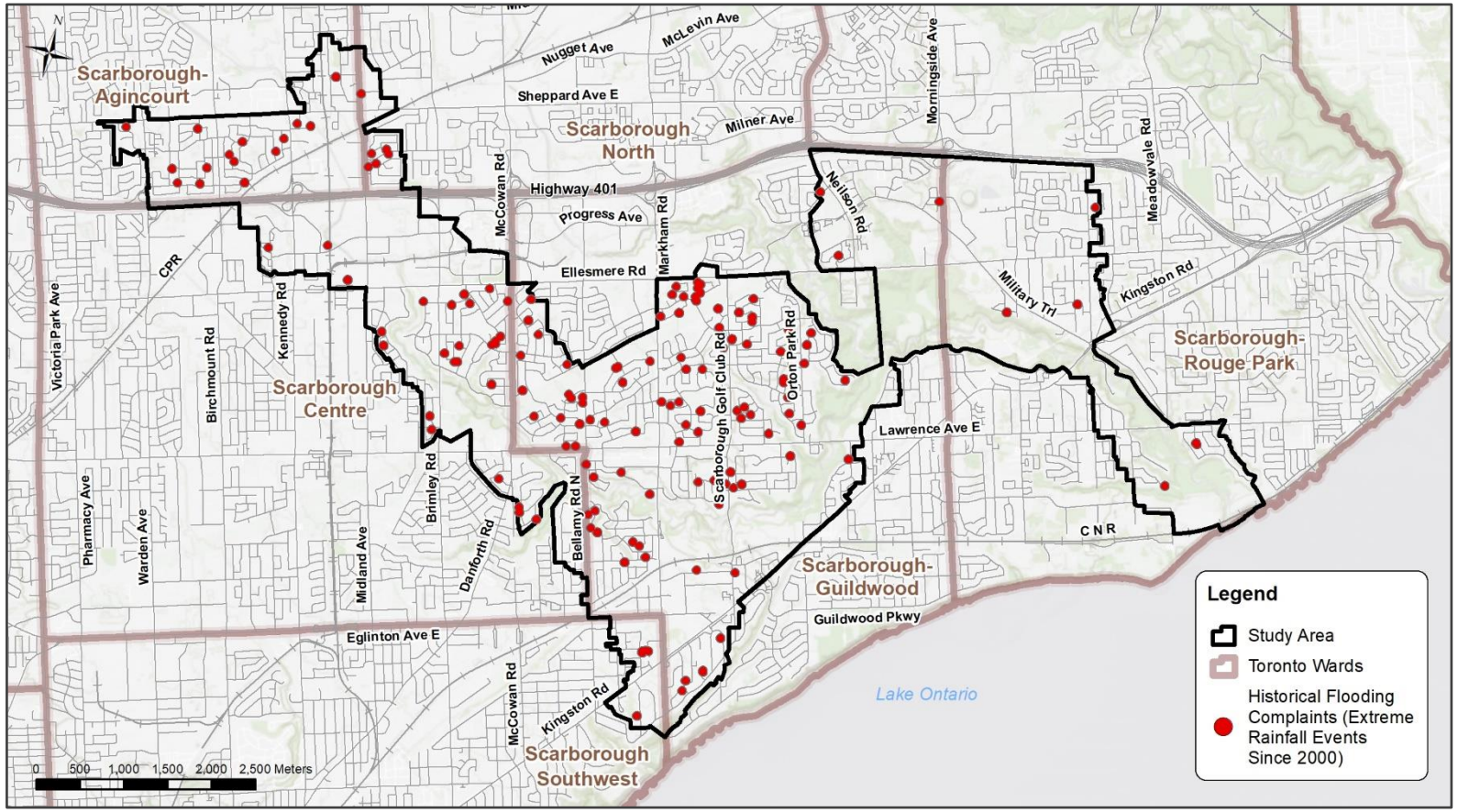


Separated sewer systems have two pipes: sanitary sewers and storm sewers

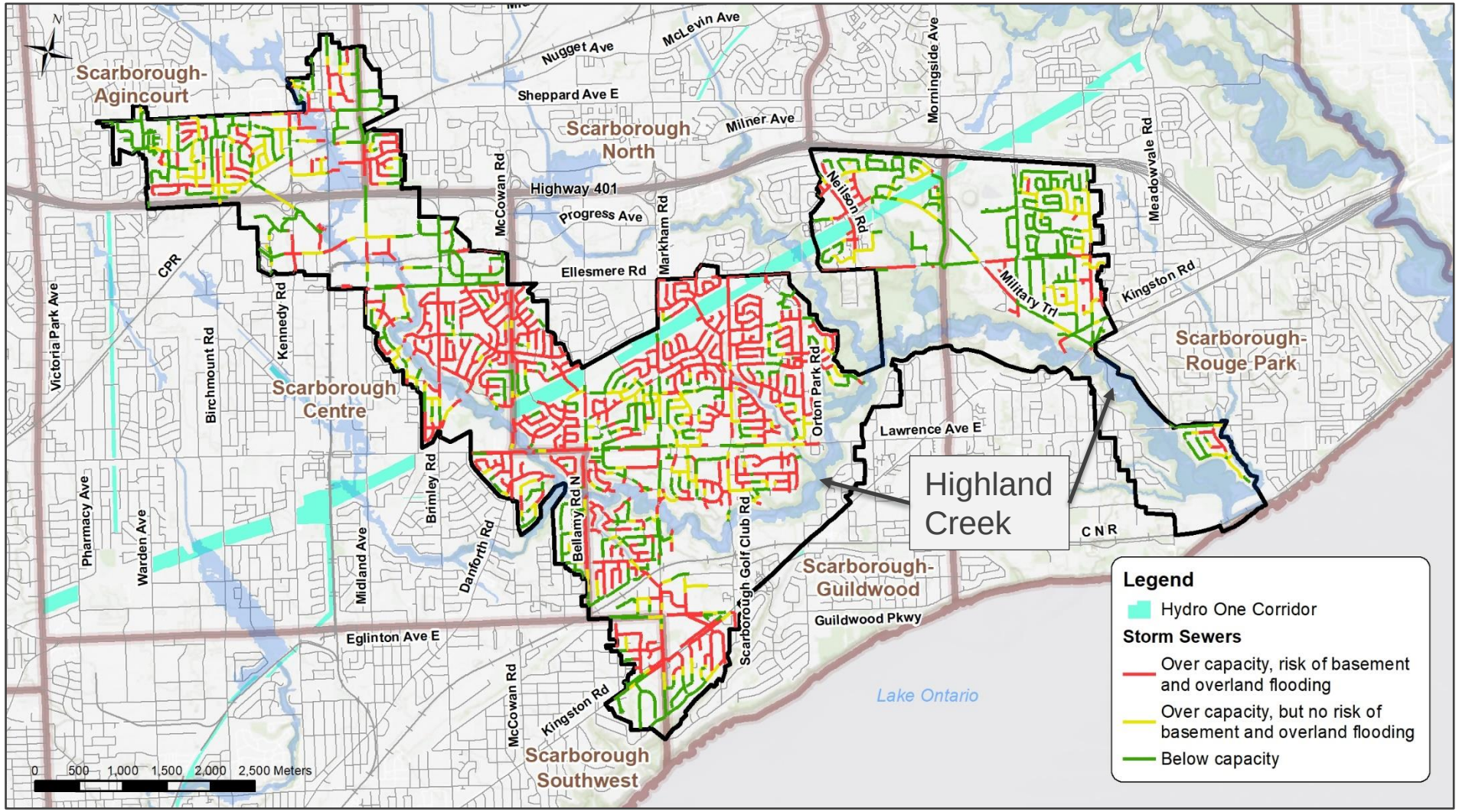
Reports of Basement Flooding

Property flooding has been reported to the City after extreme rainfall events such as August 7, 2018, and July 8, 2013.

The map shows locations of reported flooding in study area 59 after extreme rainfall events since 2000.



Assessment of Existing Storm Sewer System



The Hydro One corridor, and the railway corridors (CPR/CNR) represent physical barriers to overland flow.

The result is a lack of overland flow routes in the streets to redirect water away from private properties.

Insufficient local storm sewer capacity also leads to ponding on the streets.

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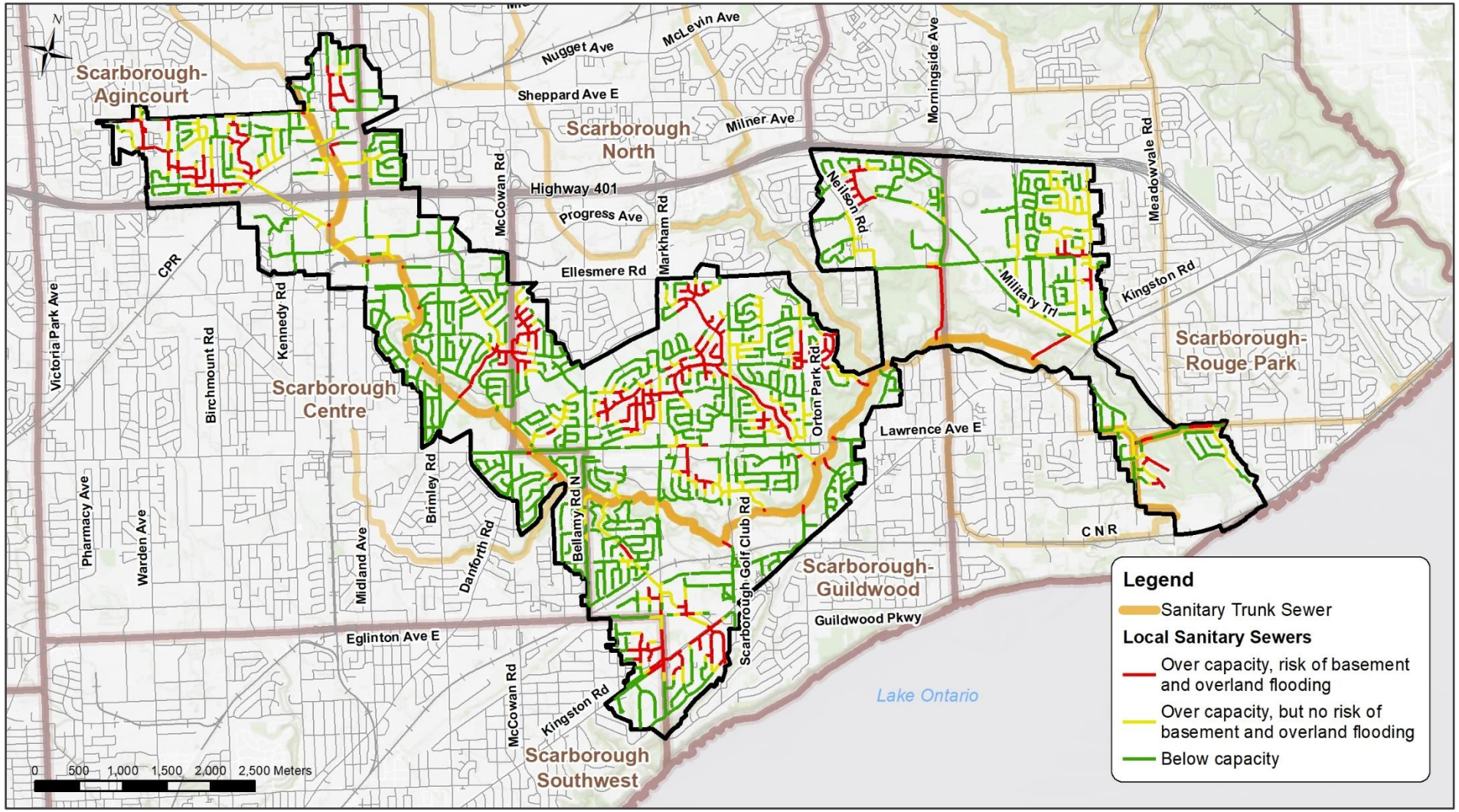
Assessment of Existing Sanitary Sewer System



The sanitary sewers within the study area experience capacity issues (red, yellow), and some are at risk of basement and overland flooding during extreme rainfall events.

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Causes of Flooding in the Study Area

- Existing local storm and sanitary sewers have limited conveyance capacity, or ability to carry large amounts of water, during extreme rainfall.
- High river flows and water levels in Highland Creek following extreme rainfall events back up into storm sewers upstream, reducing sewer conveyance capacity.
- There are insufficient catchbasins to capture water flow, resulting in surface flooding.
- Buildup of surface stormwater in low-lying areas with no suitable overland flow route.

Basement flooding due to sewer overflow

Surface flooding

Riverine flooding caused by high water levels in the creek that back up into storm sewers upstream

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Study Recommendations

Potential Solutions to Basement Flooding

Below are potential solutions to basement flooding in the study area, which can be combined:

More Conveyance Capacity

- New sewers on local roads
- New catchbasins
- Replace existing sewers with larger pipes

Storage Facilities

- Underground tanks or in-line storage pipes
- Large sewers with vertical storage shafts
- Stormwater management ponds

Creek Improvement

- Replace the enclosed creek sections with open channel

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Recommended Approach for Area 59

More Conveyance Capacity

Storage Facilities

Creek Improvements

- A **“hybrid”** approach is recommended, which would apply a combination of solutions to address flooding.
- **Conveyance improvement, supported by new underground storage, is the central and most important element to a system-wide solution.**
- Increased conveyance capacity in the sewer system is required to relieve local flooding issues and achieve the Basement Flooding Program’s Level-Of-Service targets, where feasible.
- Creek improvements will reduce the water level in the creek to avoid backup in the local storm sewer system.

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Replacement Storm and/or Sanitary Sewers

- Replacing existing sewers with larger sewers so the upgraded system can convey a greater volume of stormwater.
- Replacement requires excavation of the road to remove the old sewer, manhole and catchbasins, and disconnect the sewer service line(s).
- A new sewer is then installed and connected to the system, followed by restoration of the road and boulevard.

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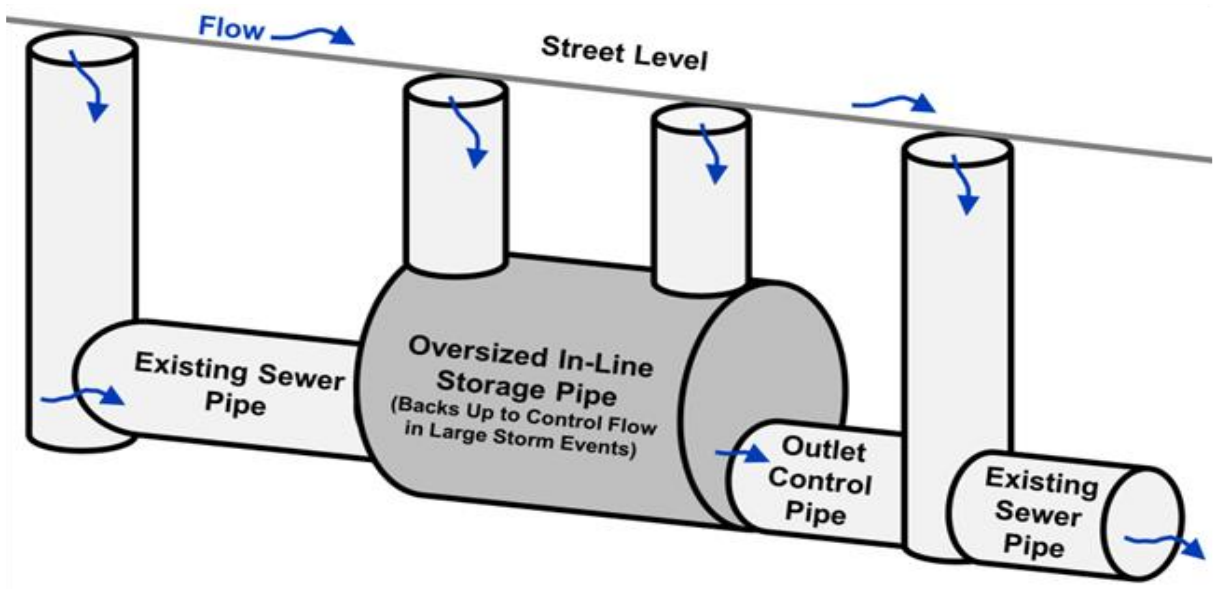
Storage Facilities

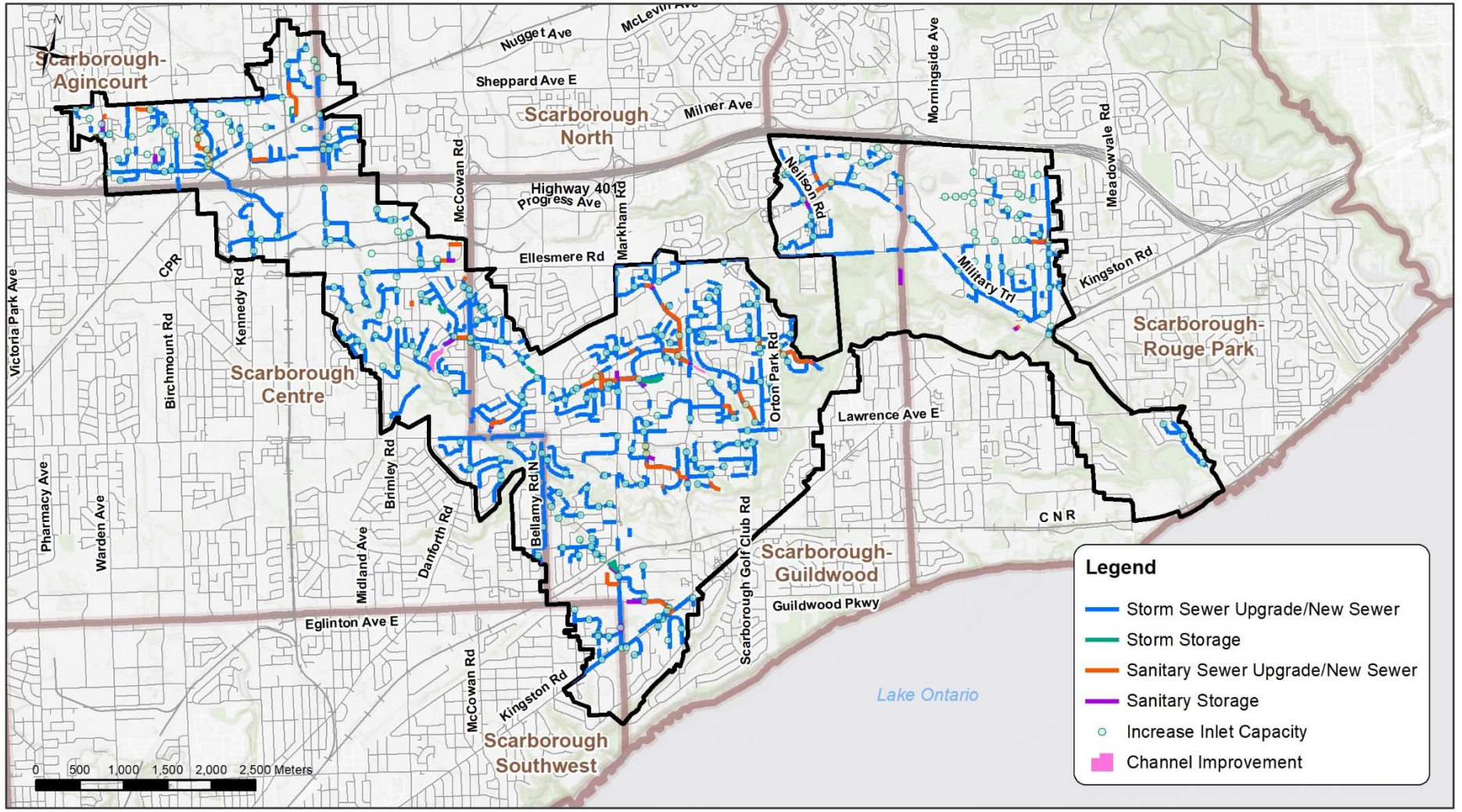
- New underground storage facilities would temporarily store water during storm events and relieve overloading of the sewer system.
- Construction of storage facilities requires excavation of the road or open space area to remove old sewers, manholes and disconnect the sewer service line(s).
- A new tank or sewer is then installed and connected to the system followed by restoration of the road or open space area.



Catchbasins

- Increasing the number of catchbasins would improve capture flow from the surface.
- Minor excavation of the road is required to install the new catchbasin(s) and connect them to the storm sewer, along with restoration of the curb and road.

Recommended Solutions Overview



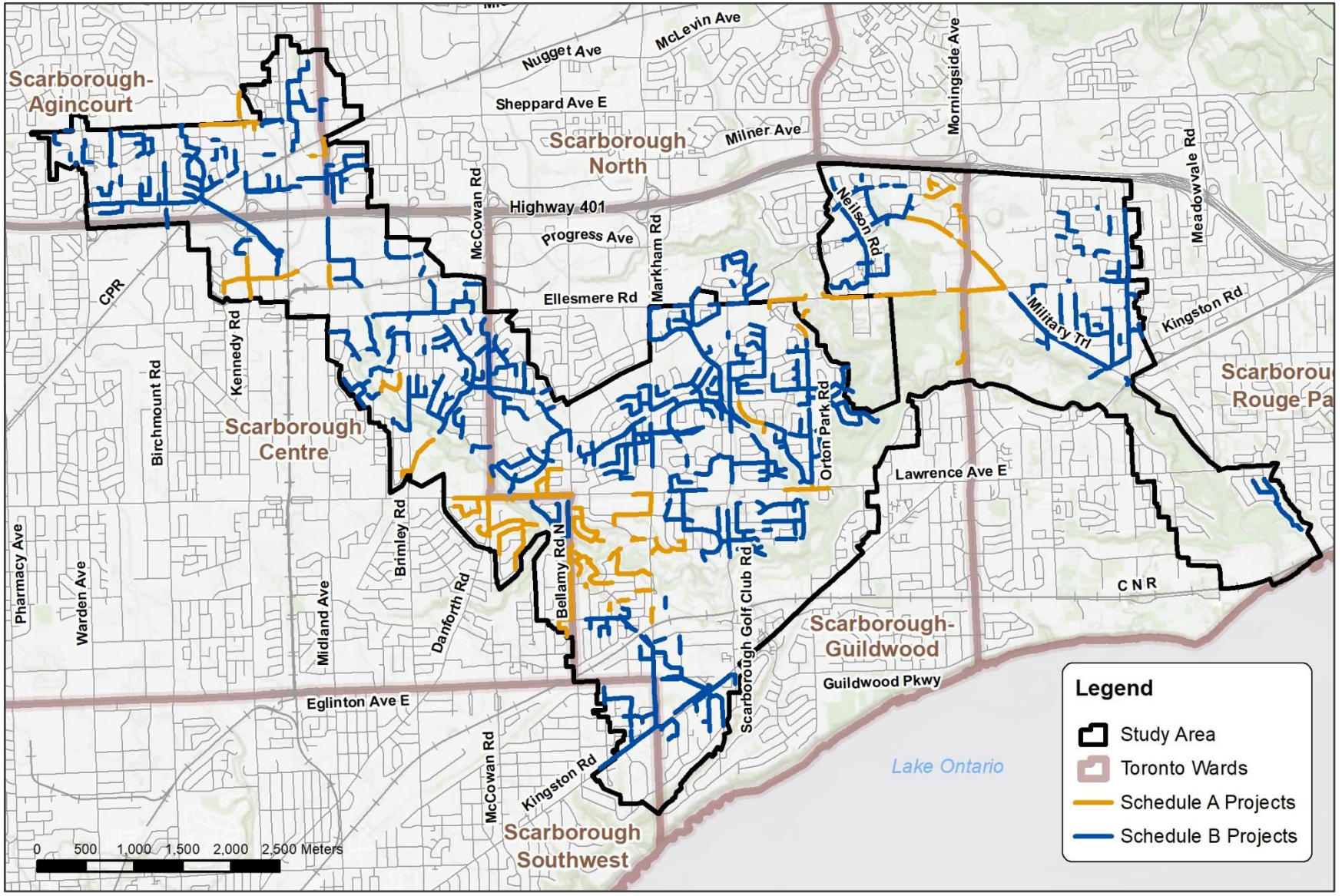
The recommended solutions involve a “hybrid” approach, which would apply a combination of solutions to address flooding, including sewer upgrades/new sewers, storage pipes and channel improvement.

The majority (111 km) of proposed sewer upgrades are small diameter sewers, with 2.9 km of storage pipes recommended.

Recommended Projects

The recommended solutions were grouped into sixty-five projects based on their alignment to the sewer system:

- Twenty-six Schedule A projects, which are within the City's right of way. These projects are pre-approved/exempt under the Municipal Class EA process.
- Thirty-nine Schedule B projects, which are within new or existing easements, and may impact private property.



Alternative Solutions

Alternative Solutions

Alternative solutions were assessed in seven areas due to potential property or environmental impacts and/or greater technical or cost complexities. A recommended solution was chosen in each area.

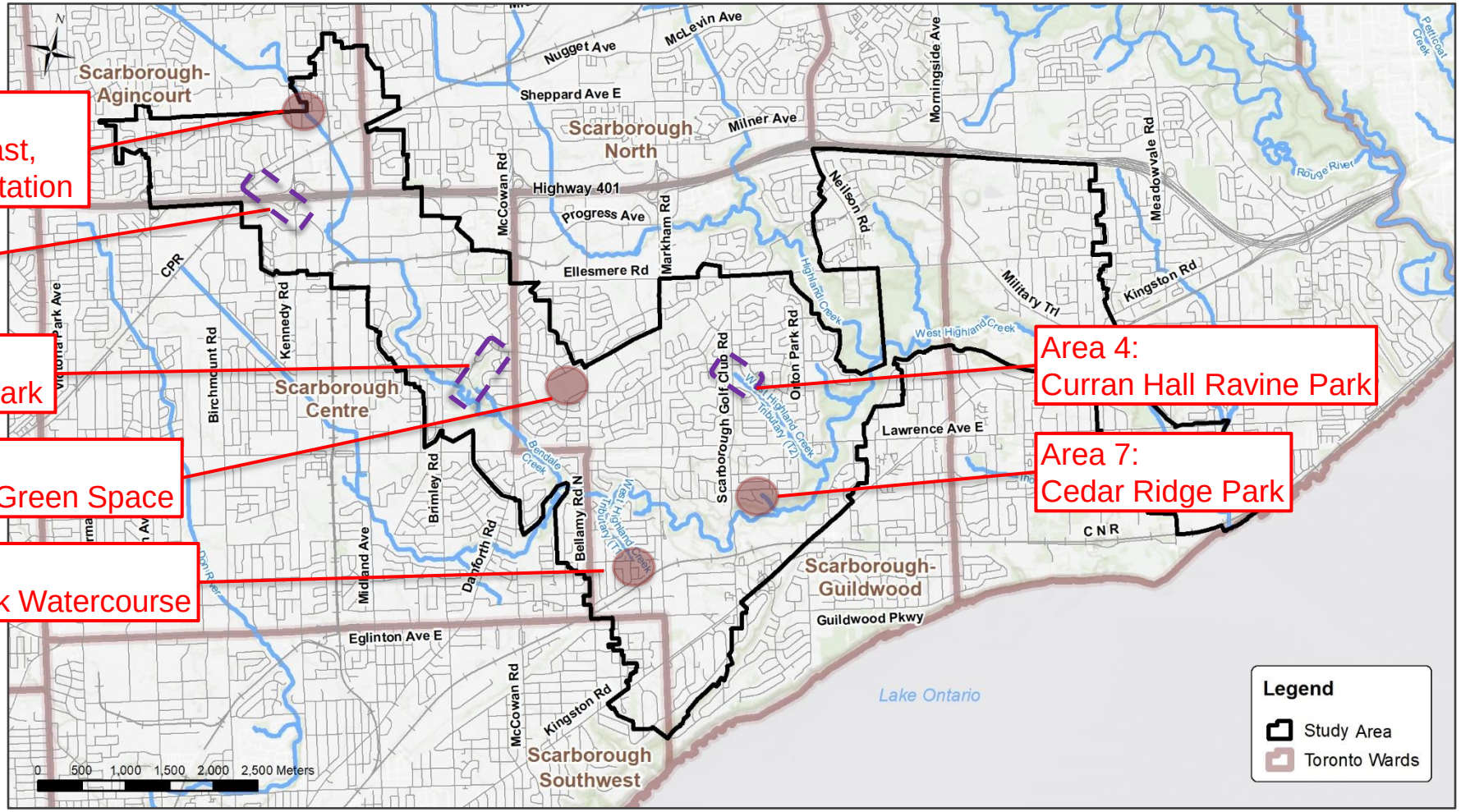
Area 2:
Sheppard Avenue East, near Agincourt GO Station

Area 1:
Highway 401

Area 3:
Amberdale Ravine Park

Area 5:
Scarborough Hydro Green Space

Area 6:
West Highland Creek Watercourse



Area 4:
Curran Hall Ravine Park

Area 7:
Cedar Ridge Park

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Criteria to Assess Alternative Solutions

Alternative solutions were assessed based on their ability to address the Study's purpose and the criteria below:

Natural Environment

Effectiveness in reducing impacts on:

- Terrestrial systems (vegetation, trees, wildlife)
- Aquatic systems (aquatic life and vegetation)
- Surface and groundwater
- Soil and geology
- Receiving water quality
- Stream erosion

Socio-Cultural

Effectiveness in reducing:

- Land use impacts (parks, ravines, open spaces)
- Community disruption during construction (traffic, noise, construction in easements)
- Community disruption after construction (visual impact, odour, safety)
- Potential impacts to archaeological and cultural resources
- Impacts to First Nations

Technical

- Effectiveness in reducing surface and basement flooding
- Improvement to runoff quality
- Feasibility of implementation (available space, accessibility, constructability, easement requirements, approvals)
- Reducing potential impacts on upstream/downstream and surrounding area infrastructure
- Reducing potential impacts on operating and maintenance requirements

Economics

- Limiting capital, operating and maintenance costs

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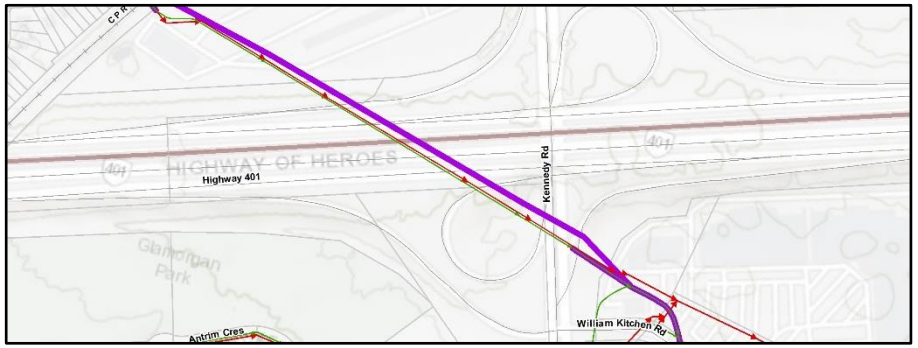
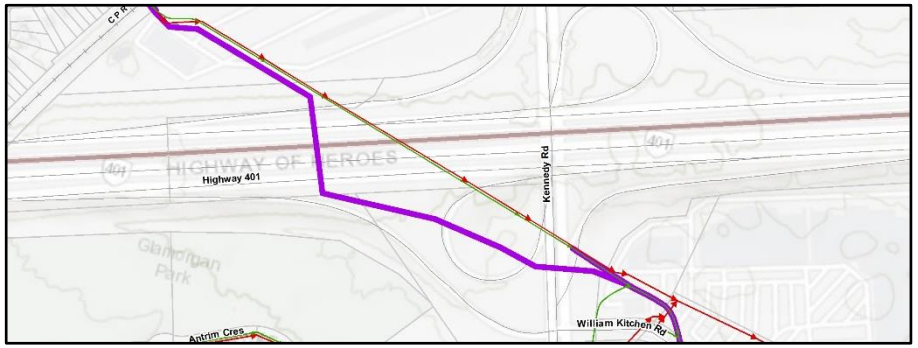
Alternatives for Area 1: Highway 401 Storm Sewer Crossing

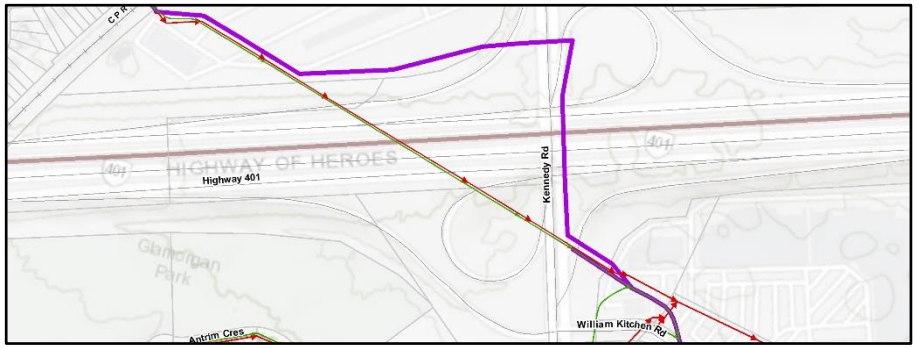
Storm sewer upsizing across the highway is required to reduce surface and basement flooding risks upstream of the highway. Three alternate solutions were identified for sewer upsizing.



Alternative 1
New relief sewer parallel to existing storm sewer.
- Results in longest sewer length across the highway corridor
- Largest amount of highway impacts



Alternative 2
New relief sewer crossing Highway 401 at the narrowest section.
- Shortest pipe length toward Kennedy Road
- Lowest cost



Alternative 3 – Recommended Solution
New relief sewer north of Highway 401.
- Passes through Kennedy Road under Highway 401
- Least amount of highway impacts

Legend
Existing Storm Sewer
Existing Sanitary Sewer
Proposed Sewer Upgrade (Storm)

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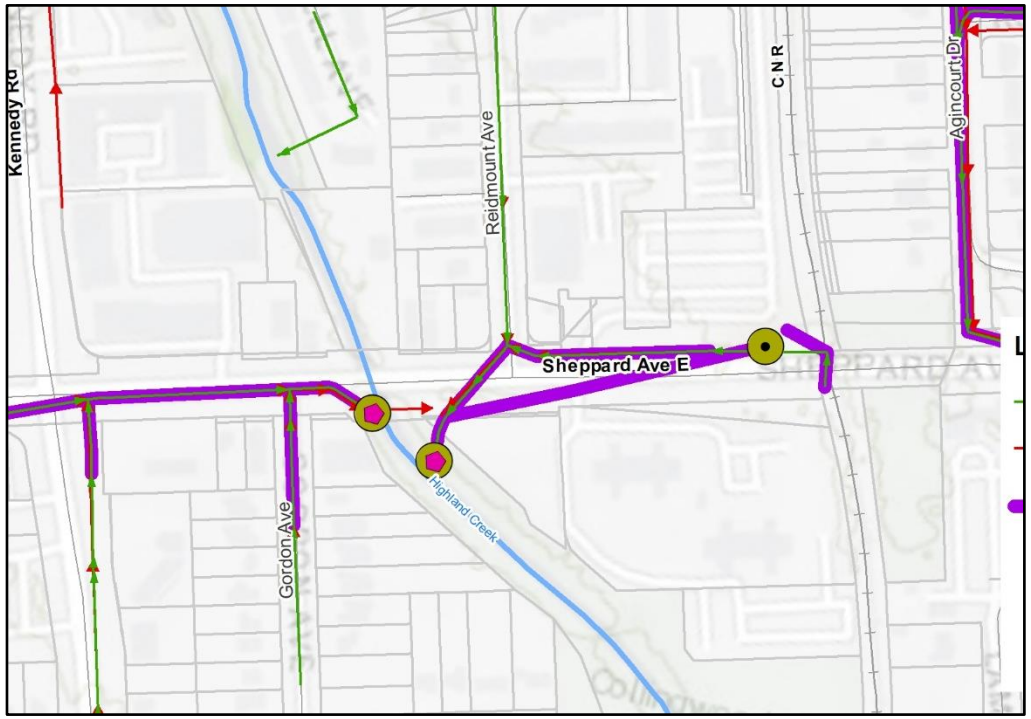
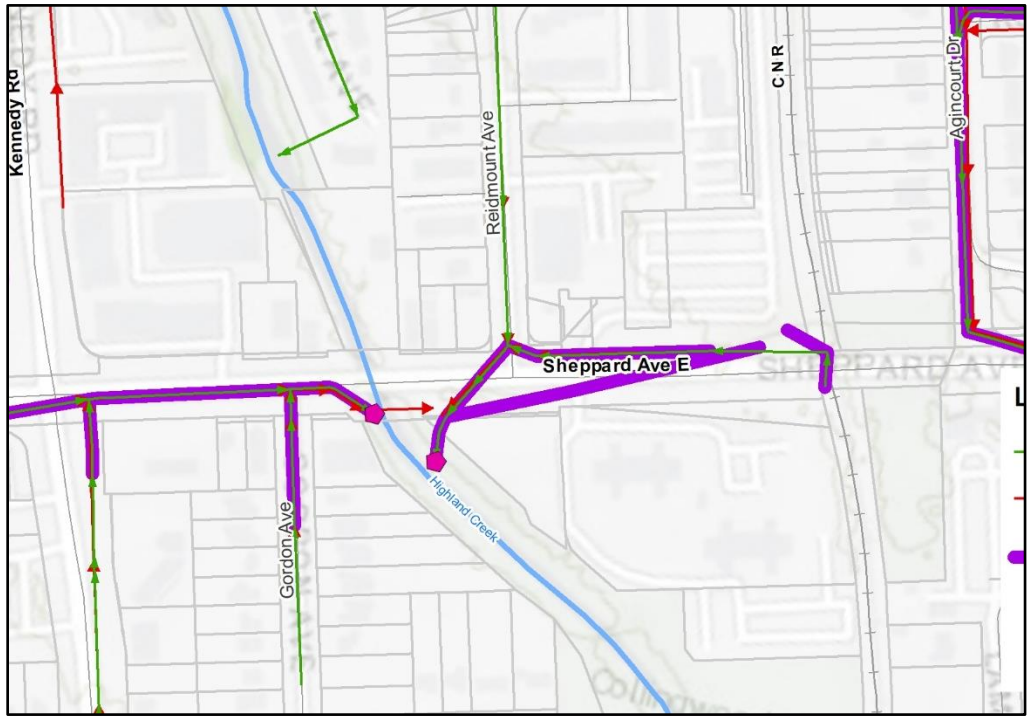
Alternatives for Area 2: Sheppard Avenue East

Two alternate solutions were identified to address surface and basement flooding upstream due to water levels in Highland Creek.



Alternative 1
Increase pipe sizes and add three storm pump stations at three locations, upstream of Highland Creek outfalls.

- Extensive property impacts to build pump stations



Alternative 2 – Recommended Solution
Increase pipe sizes without the need for pump stations.

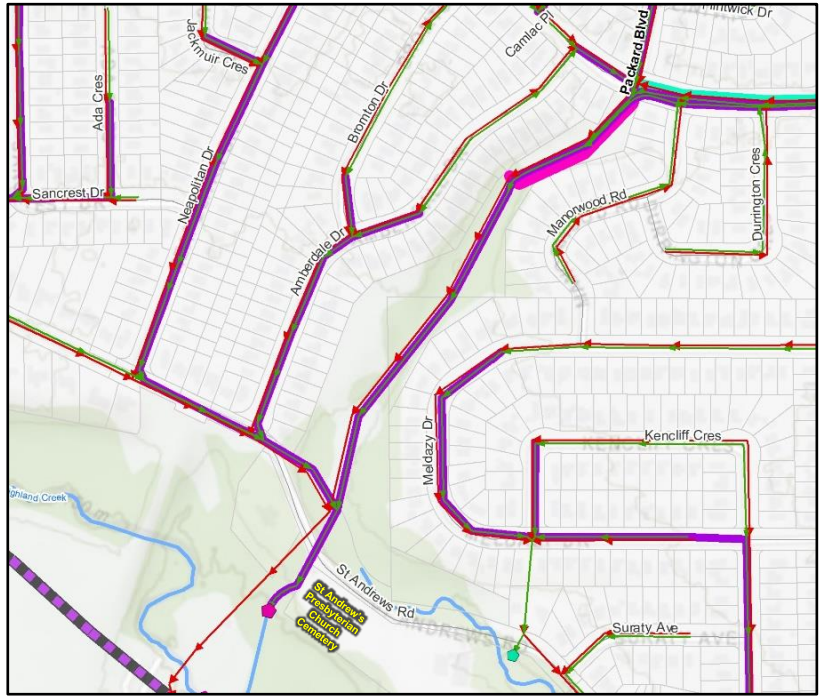
- Does not fully eliminate backwater into sewers

Legend

Existing Storm Sewer | Existing Sanitary Sewer | Proposed Sewer Upgrade (Storm) | Proposed Storm Pump Station | Proposed Outfall

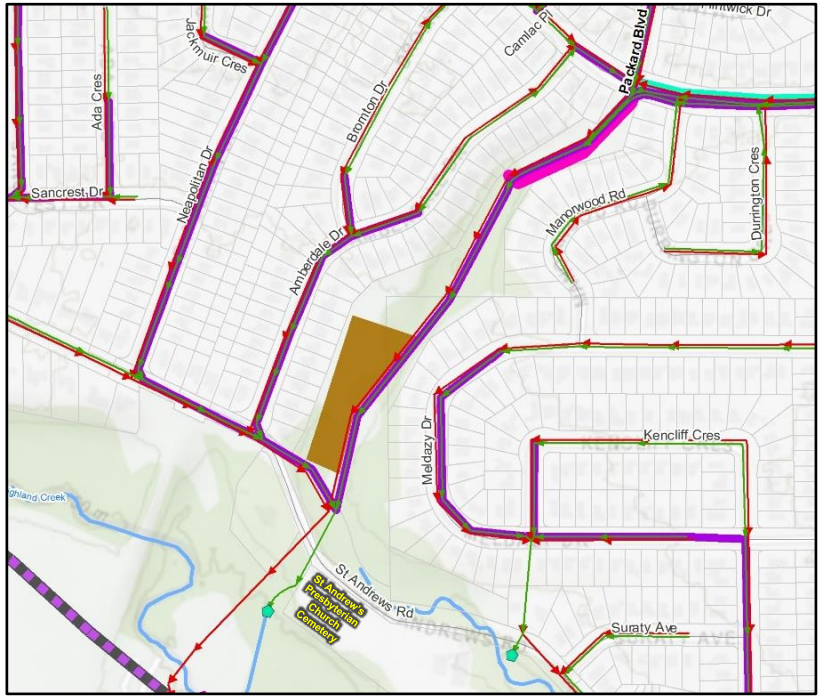
Alternatives for Area 3: Amberdale Ravine Park

Three alternate solutions were identified to increase conveyance capacity through Amberdale Ravine Park.

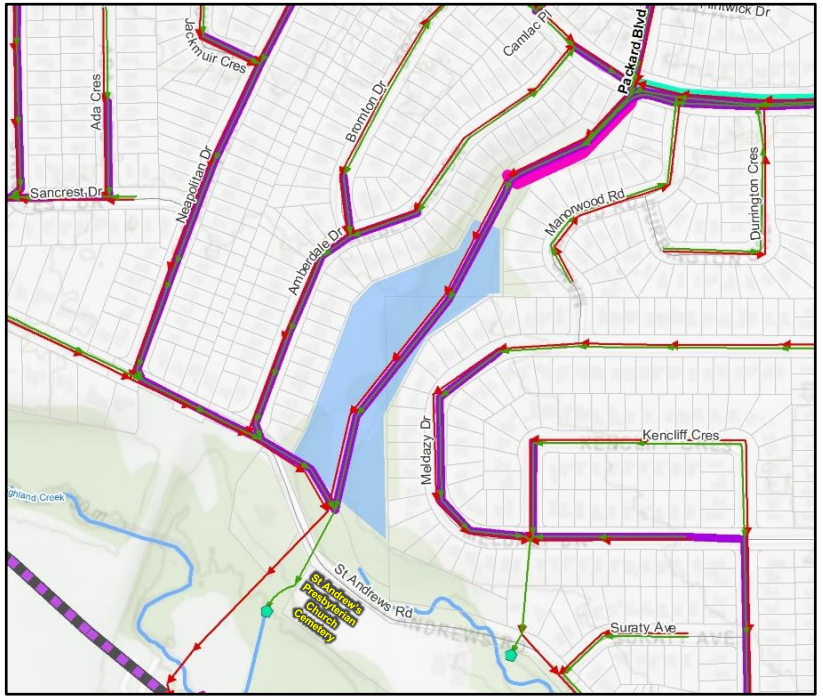


Alternative 1
Increase pipe sizes through Amberdale Ravine Park, crossing St. Andrew's Road to Highland Creek outfall.

- Impacts to St. Andrew's Presbyterian Church Cemetery



Alternative 2
Increase pipe sizes through Amberdale Ravine Park and add underground storage within the ravine.



Alternative 3 – Recommended Solution
Increase pipe sizes through Amberdale Ravine Park and add surface storage within the ravine through channel improvement.

Legend

- Existing Storm Sewer
- Existing Sanitary Sewer
- Sanitary Trunk Sewer
- Proposed Sewer Upgrade (Storm)
- Proposed Sewer Upgrade (Sanitary)
- Proposed Sanitary Offline Storage
- Existing Outfall
- Proposed Outfall
- Proposed Storm Offline Storage
- Proposed Channel Improvement Extent

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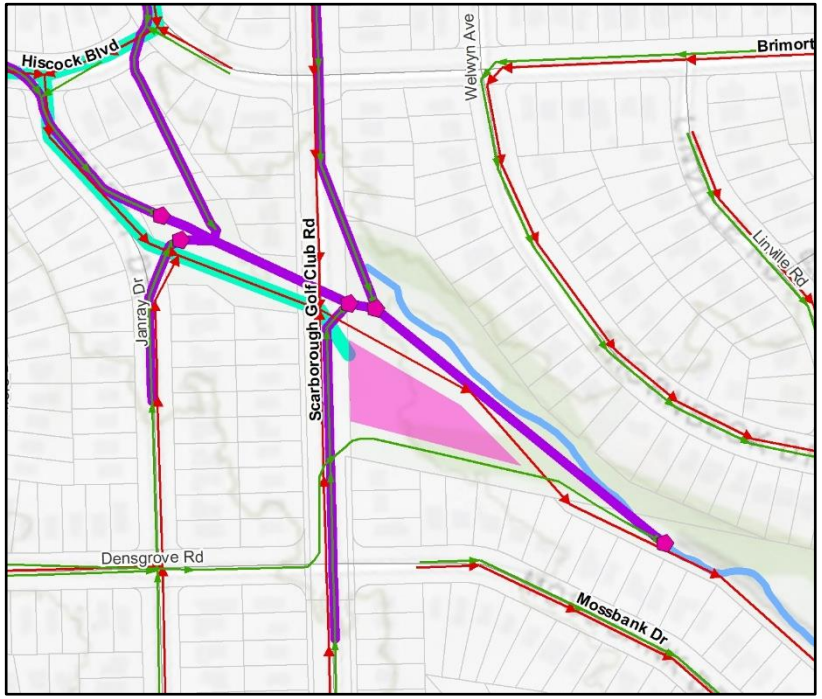
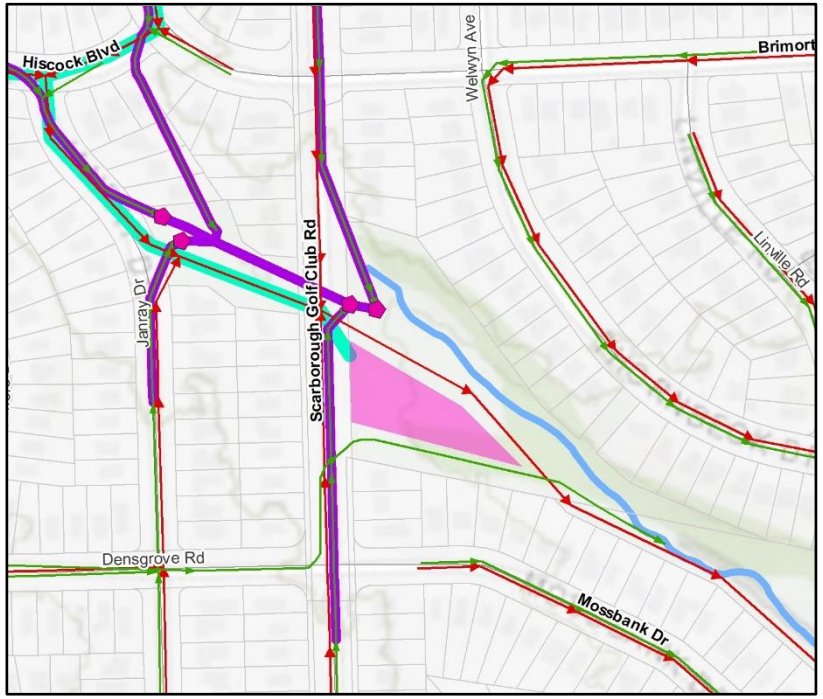
Alternatives for Area 4: Curran Hall Ravine Park

Three alternate solutions were identified to address surface and basement flooding upstream due to water levels in Curran Hall Ravine Park.



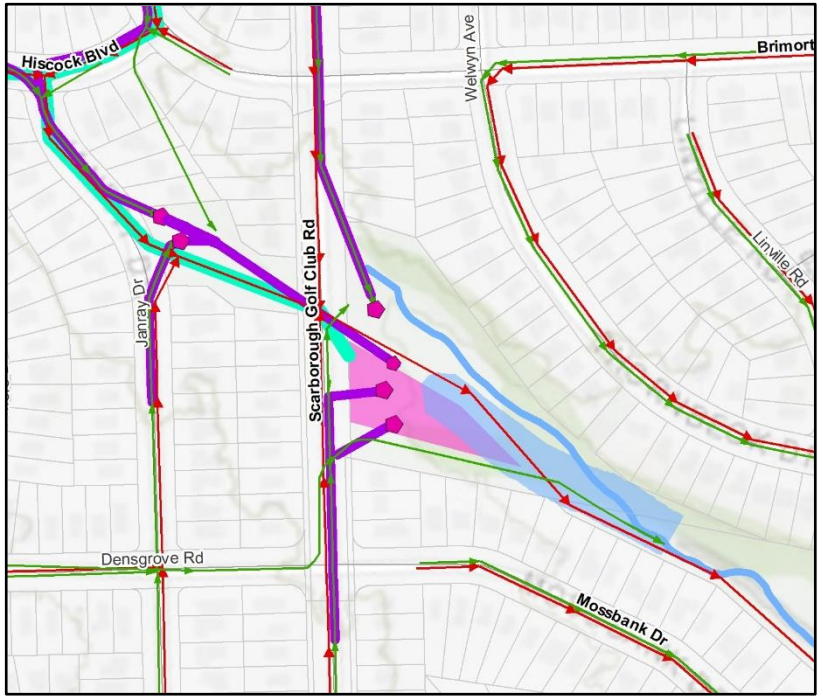
Alternative 1
Increase pipe sizes through Curran Hall Ravine Park.

- Largest ecological impacts



Alternative 2
Increase pipe sizes only on the west end of Curran Hall Ravine Park.

- Least ecological impacts
- Does not fully eliminate backwater effects



Alternative 3 – Recommended Solution
Increase pipe sizes only on the west end of Curran Hall Ravine Park and replace enclosed channel with open channel.

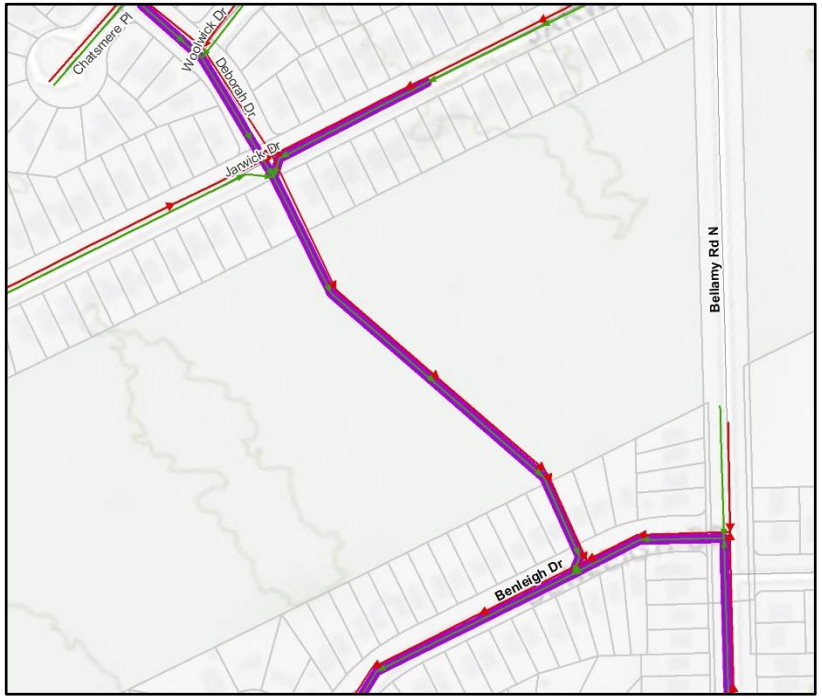
- Lowest cost

Legend

- Existing Storm Sewer
- Existing Sanitary Sewer
- Proposed Sewer Upgrade (Storm)
- Proposed Sewer Upgrade (Sanitary)
- Proposed Sanitary Storage
- Proposed Channel Improvement Extent
- Proposed Outfall

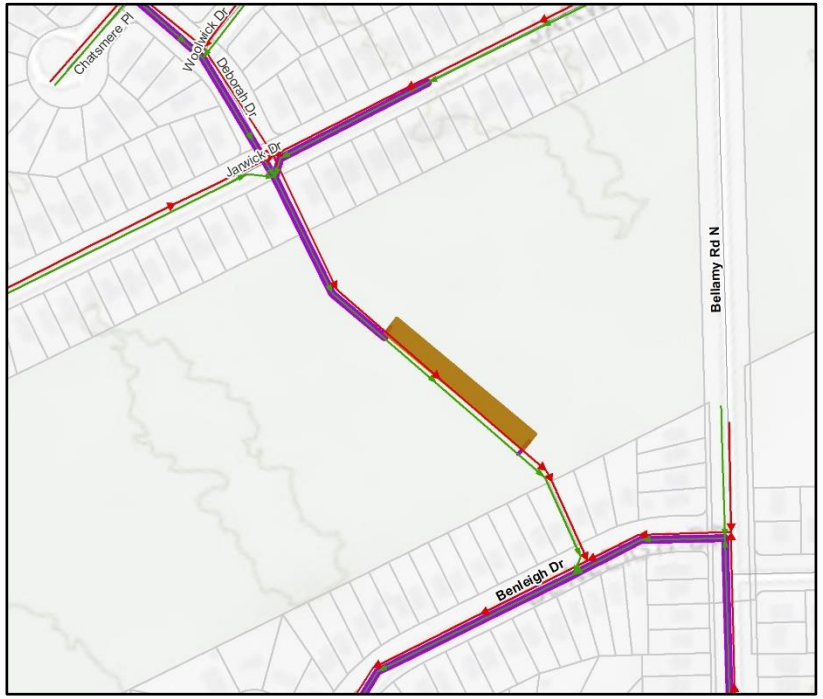
Alternatives for Area 5: Scarborough Hydro Green Space

Storm sewer upsizing across the Scarborough Hydro Green Space is required to reduce surface and basement flooding risks upstream of the green space. Three alternate solutions were identified for the sewer upsizing.

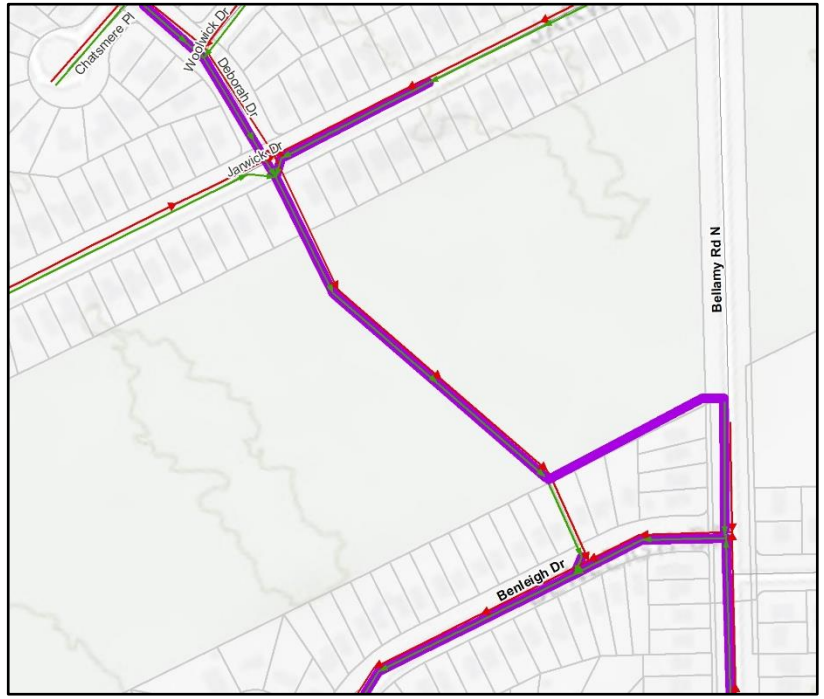


Alternative 1
Increase pipe sizes through the Hydro corridor and residential properties.

- Private property impacts



Alternative 2 – Recommended Solution
Increase pipe sizes and add new storage within the Hydro corridor.



Alternative 3
Increase pipe sizes and direct flow with new storm sewer within Hydro corridor to Bellamy Road.

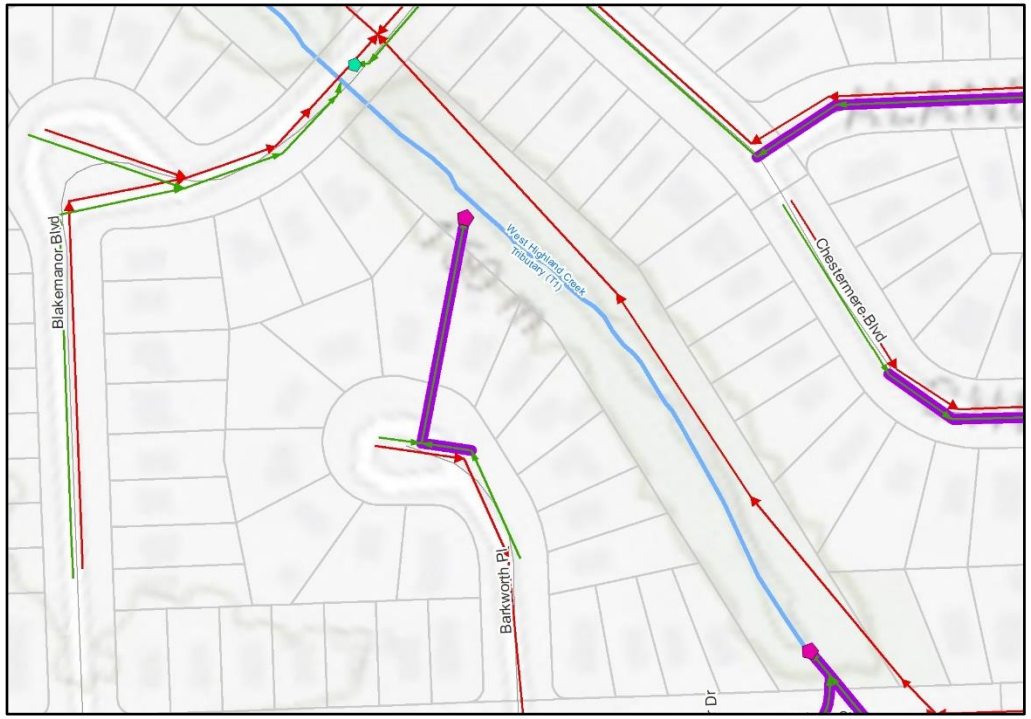
- Highest cost

Legend

Existing Storm Sewer | Existing Sanitary Sewer | Proposed Sewer Upgrade (Storm) | Proposed Storm Storage

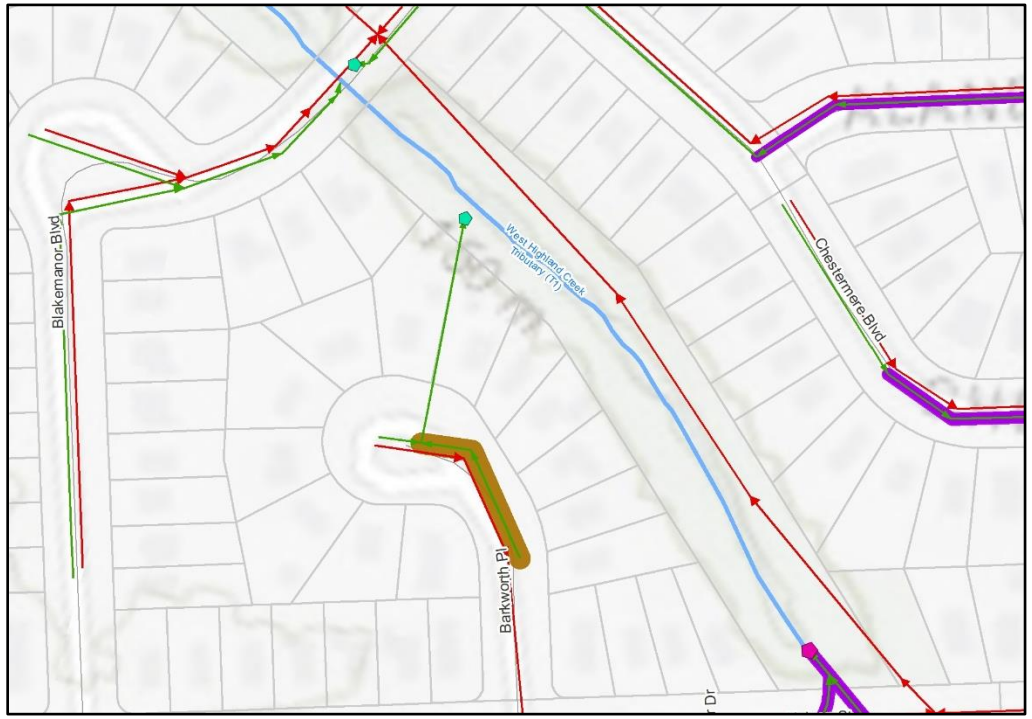
Alternatives for Area 6: West Highland Creek Watercourse

Two alternate solutions were identified to address surface and basement flooding upstream due to water levels in West Highland Creek.



Alternative 1
Increase pipe sizes through private properties.

- Private property impacts
- Terrestrial impacts



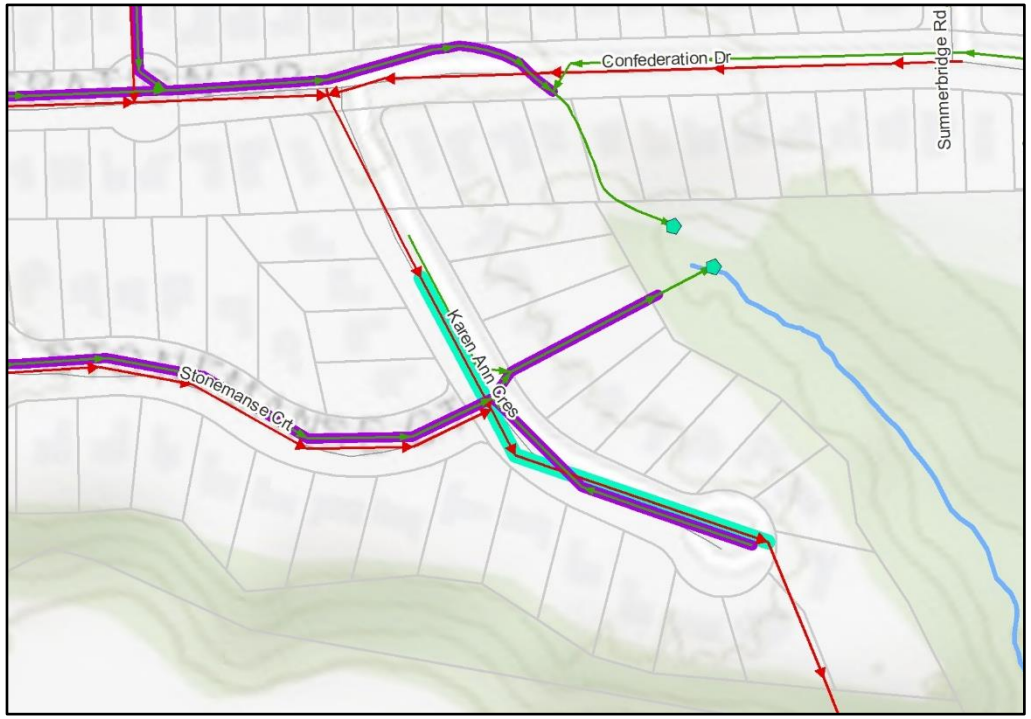
Alternative 2 – Recommended Solution
New storage within Barkworth Place.

Legend

- Existing Storm Sewer
- Existing Sanitary Sewer
- Existing Outfall
- Proposed Outfall
- Proposed Sewer Upgrade (Storm)
- Proposed Storm Storage

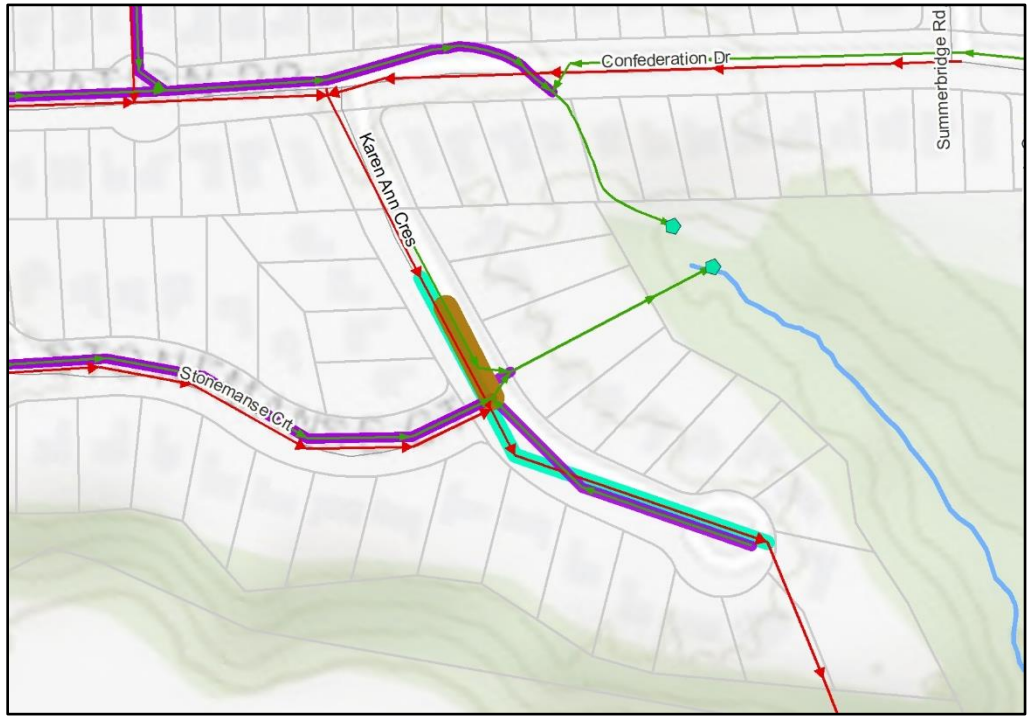
Alternatives for Area 7: Cedar Ridge Park

Two alternate solutions were identified to address surface and basement flooding upstream due to water levels in Highland Creek.



Alternative 1
Increase pipe sizes through private properties.

- Private property impacts
- Terrestrial impacts



Alternative 2 - Recommended Solution
New storage within Karen Ann Crescent

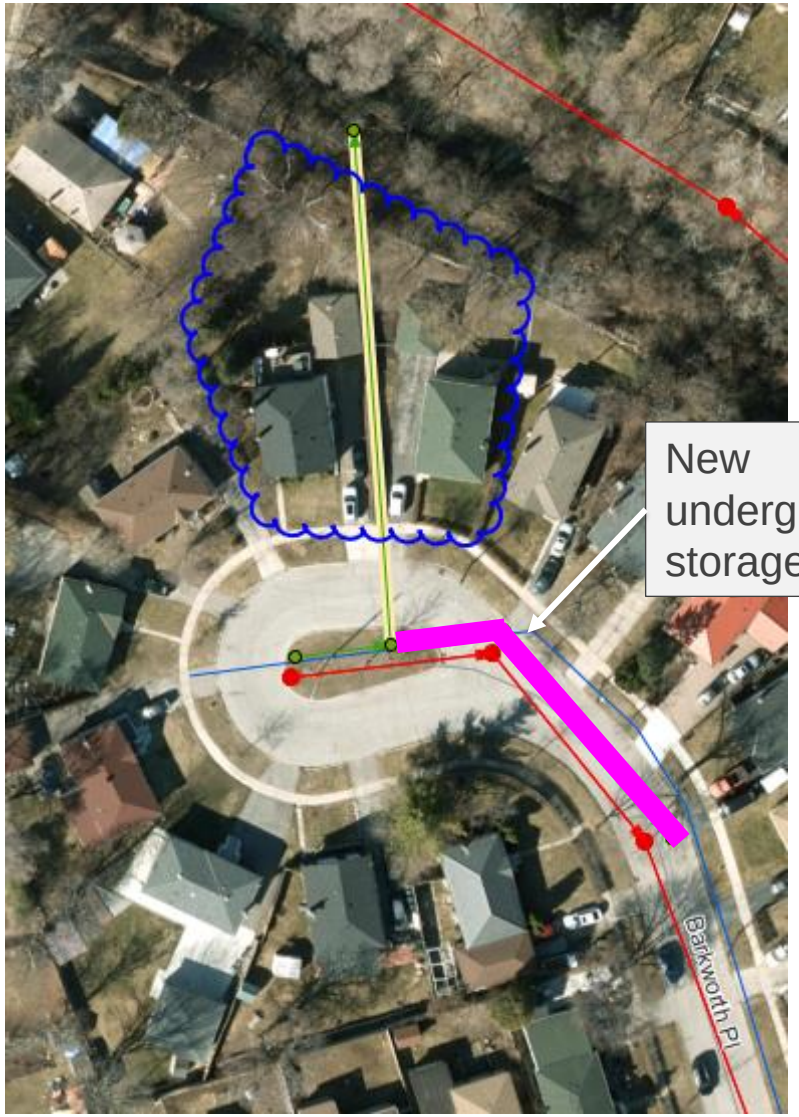
Legend

- Existing Storm Sewer
- Existing Sanitary Sewer
- Existing Outfall
- Proposed Outfall
- Sanitary Trunk Sewer
- Proposed Sewer Upgrade (Sanitary)
- Proposed Sewer Upgrade (Storm)
- Proposed Storm Storage

Limiting Impacts to Private Property

Several properties in Area 59 have an existing sewer passing underneath the property (examples shown in blue areas).

Where possible, solutions involving new local sewer alignment (left) or underground storage (right), were considered to increase sewer capacity without requiring construction on private property or changes to existing property easements.



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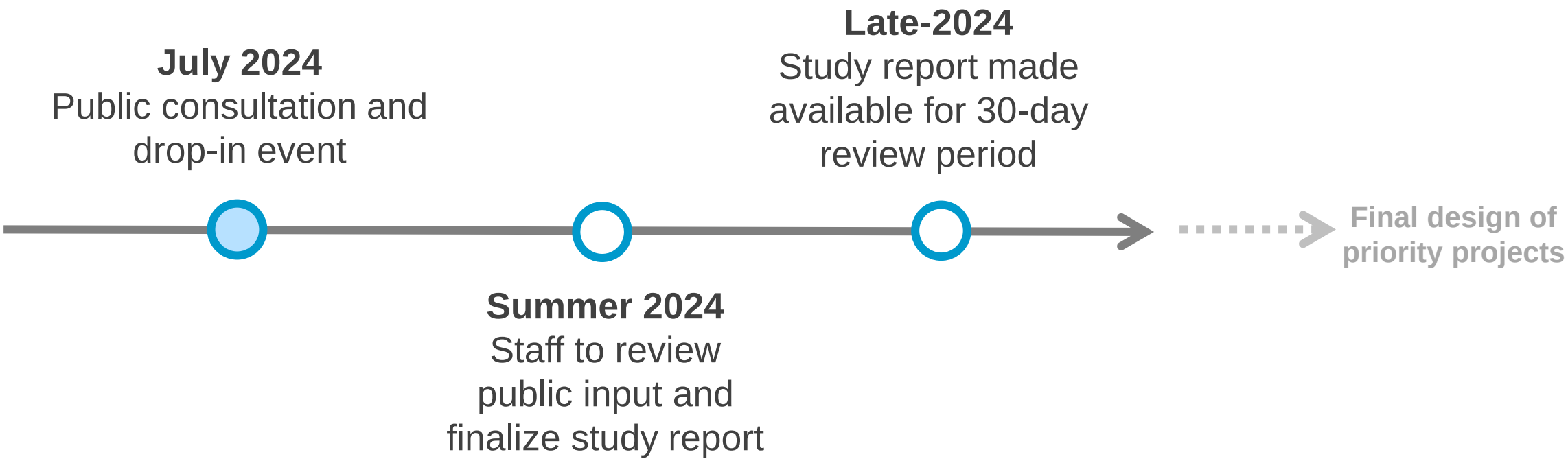
After Study Completion

- After the completion of the study, funding for the recommended projects must be arranged and approved.
- All City basement flooding projects must be prioritized to benefit the greatest number of properties and coordinated with other construction work. Projects are prioritized based on a Council-adopted $68,000 cost-per-benefitting-property threshold.
- Projects meeting the threshold at the completion of preliminary design may proceed to construction. Projects that exceed the threshold are moved into the deferred project list for future consideration, when projects under $68,000 have been advanced.
- During detailed design, solutions would be refined and property impacts would be confirmed.

Next Steps


July 2024
Public consultation and drop-in event
Summer 2024
Staff to review public input and finalize study report
Late-2024
Study report made available for 30-day review period
Final design of priority projects

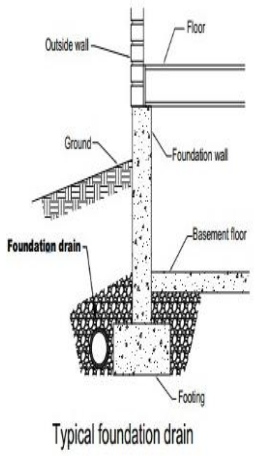
What You Can Do to Reduce Flooding

At-Source Measures

Clean out leaves, debris in front and rear-yard drainage or driveway catchbasins

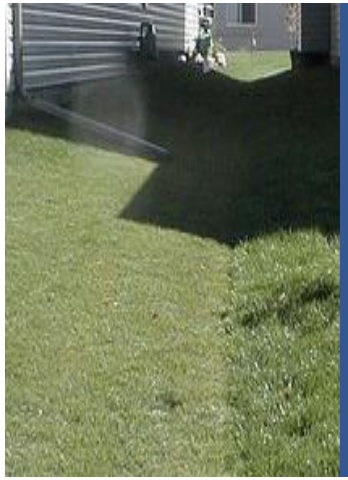
Install backwater valve

Install permeable surfaces



Typical foundation drain

Disconnect foundation drains from sanitary sewer and install/ maintain sump pumps



Improve lot grading

Disconnect downspouts

Use rain barrels

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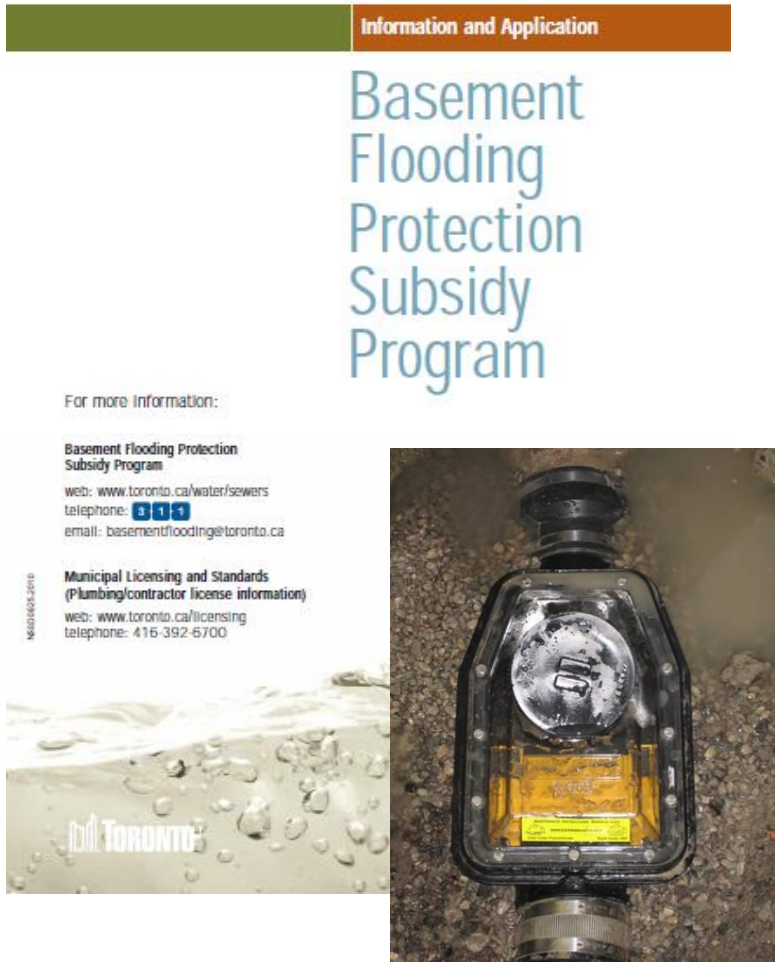
Subsidy Program

To assist homeowners, the City offers owners of single-family, duplex, triplex, and fourplex residential homes a financial subsidy of up to $3,400 per property to install flood protection devices including:

- a backwater valve
- a sump pump
- disconnection of a home's foundation drains (weeping tile) from the sewer system



For more information on the City of Toronto Basement Flooding Protection Subsidy Program, please scan the QR code:

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Contact Us

Visit our webpage at toronto.ca/bf59 to view information and submit written comments before July 31 to:

Kelly Rahardja
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