# Basement Flooding Study Area 57

## Morningside Ave/Kingston Rd

(South Scarborough – Highland Creek east)

Municipal Class Environmental Assessment Study

December 2022

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# Learn about our Study

We invite you to read through this presentation to learn more about the City's study about basement flooding for Study Area 57 extending from Kingston Road North to Lake Ontario South.

You will learn about:

- the purpose of the study
- what solutions have been considered and the preferred solution
- how impacts will be managed
- how to get in touch with City staff to ask questions or share your comments

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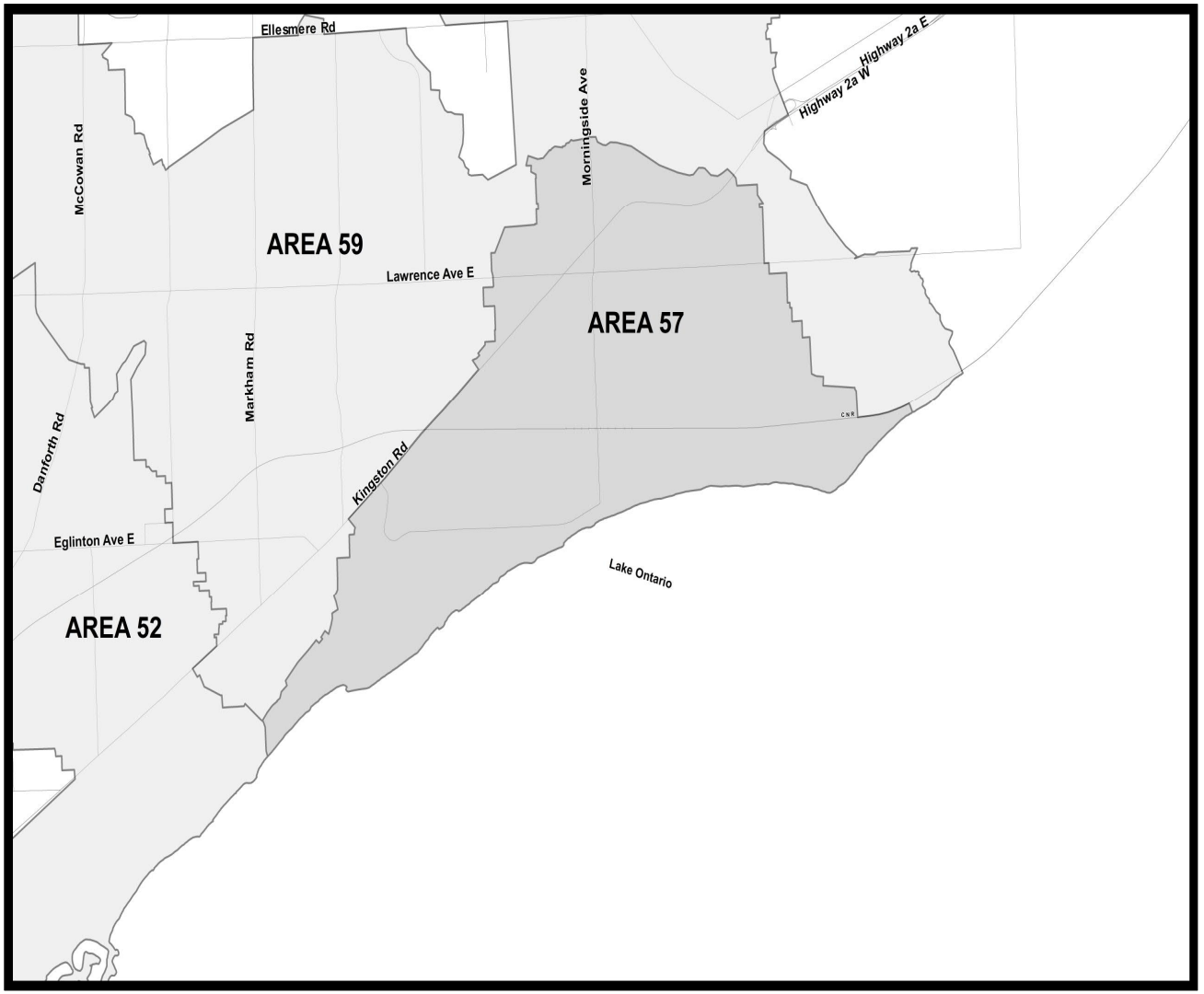
# Study Area

- The Study Area is located entirely within the Highland Creek Watershed.
- This area is bounded by Kingston Road and Highland Creek to the north and Lake Ontario to the south.
- Adjacent BFPP Study Areas include Areas 52 to the west and Area 59 along the north, and east study limits.

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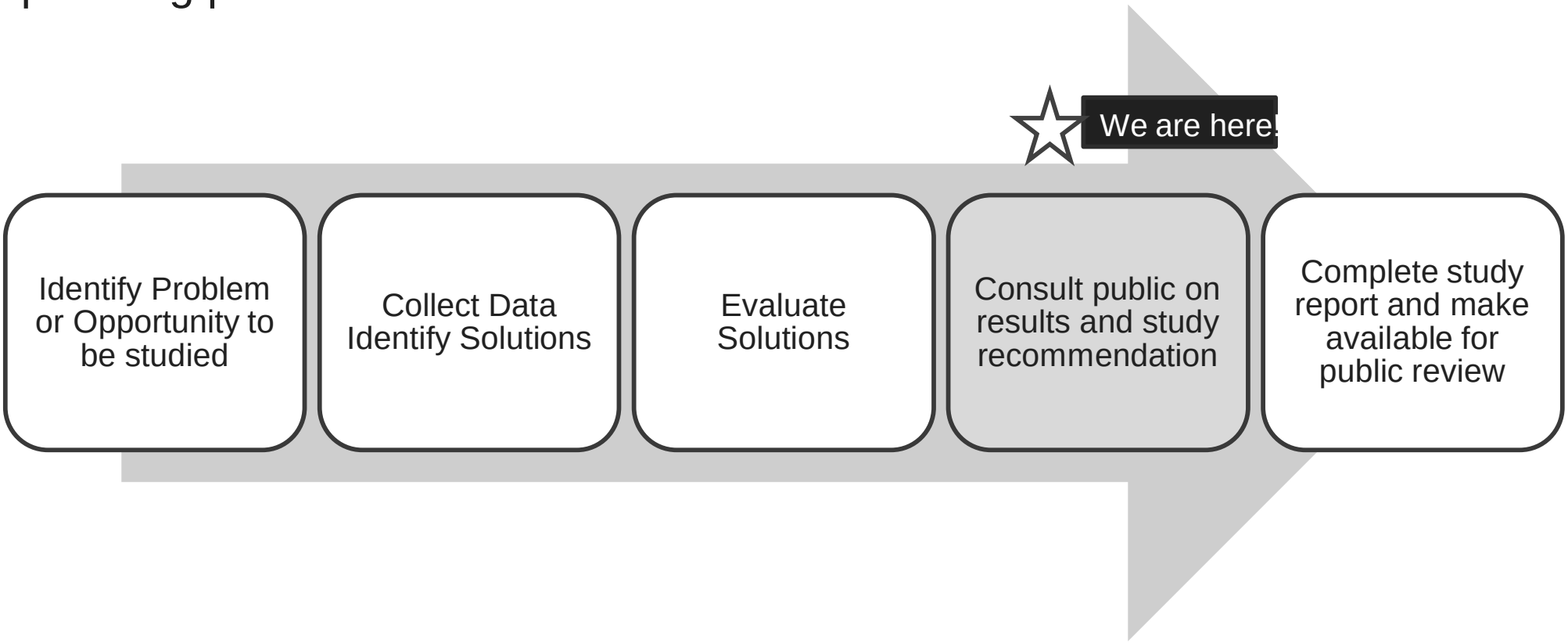
# Study Purpose

The City is undertaking a Basement Flooding Study to:

- examine the existing storm water drainage and sanitary sewer systems and identify the causes of basement flooding and/or surface flooding (severe ponding on streets during extreme storms)
- identify and evaluate solutions
- make recommendations to reduce the risk of future basement flooding in the area and increase capacity in the City's storm and sanitary collection and overland drainage systems

# Study Process

The study is being undertaken in accordance with the Municipal Engineers Association's Municipal Class Environmental Assessment process. The Schedule B planning process involves completion of Phases 1 and 2 of the planning process.



# About Basement Flooding

# Flooding within the Study Area

There are a number of factors contributing to flooding in the area, including:

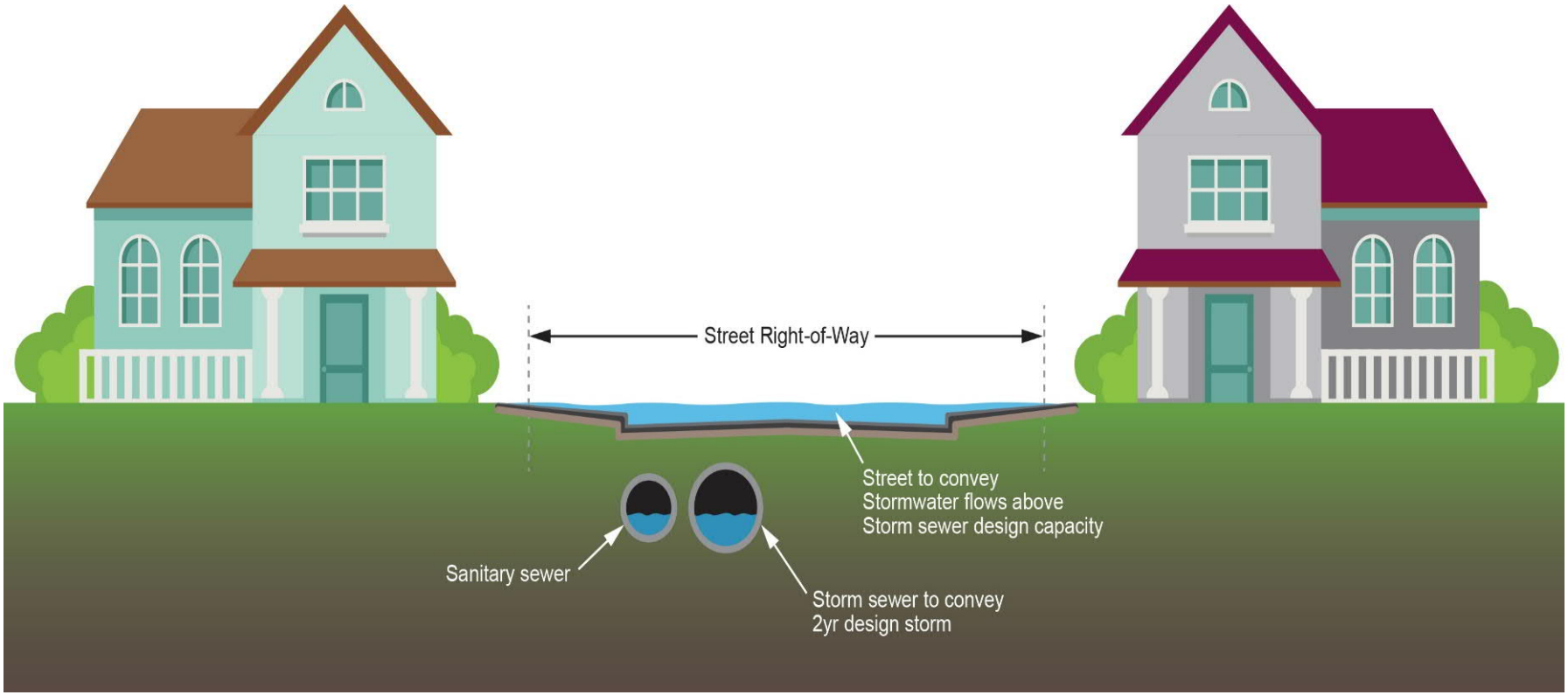
- Surcharge (overflow) of the sanitary sewer during heavy rainfall
- Surcharge of the storm sewer system, which may result in increasing the flow to the sanitary sewer system through potential interaction between the two systems
- High groundwater table, above the sewer or basement elevation
- Accumulation of surface rainwater runoff in low-lying areas
- Backup from sewer outfall or accumulation of sediment in the outflow conduit (channel)
- High overland flow depth on the right-of-way (roadway)
- Undersized storm sewer or undersized catchbasins resulting in high overland flow
- Blocked/broken storm and sanitary sewers, maintenance holes and catchbasins

# Storm Drainage System

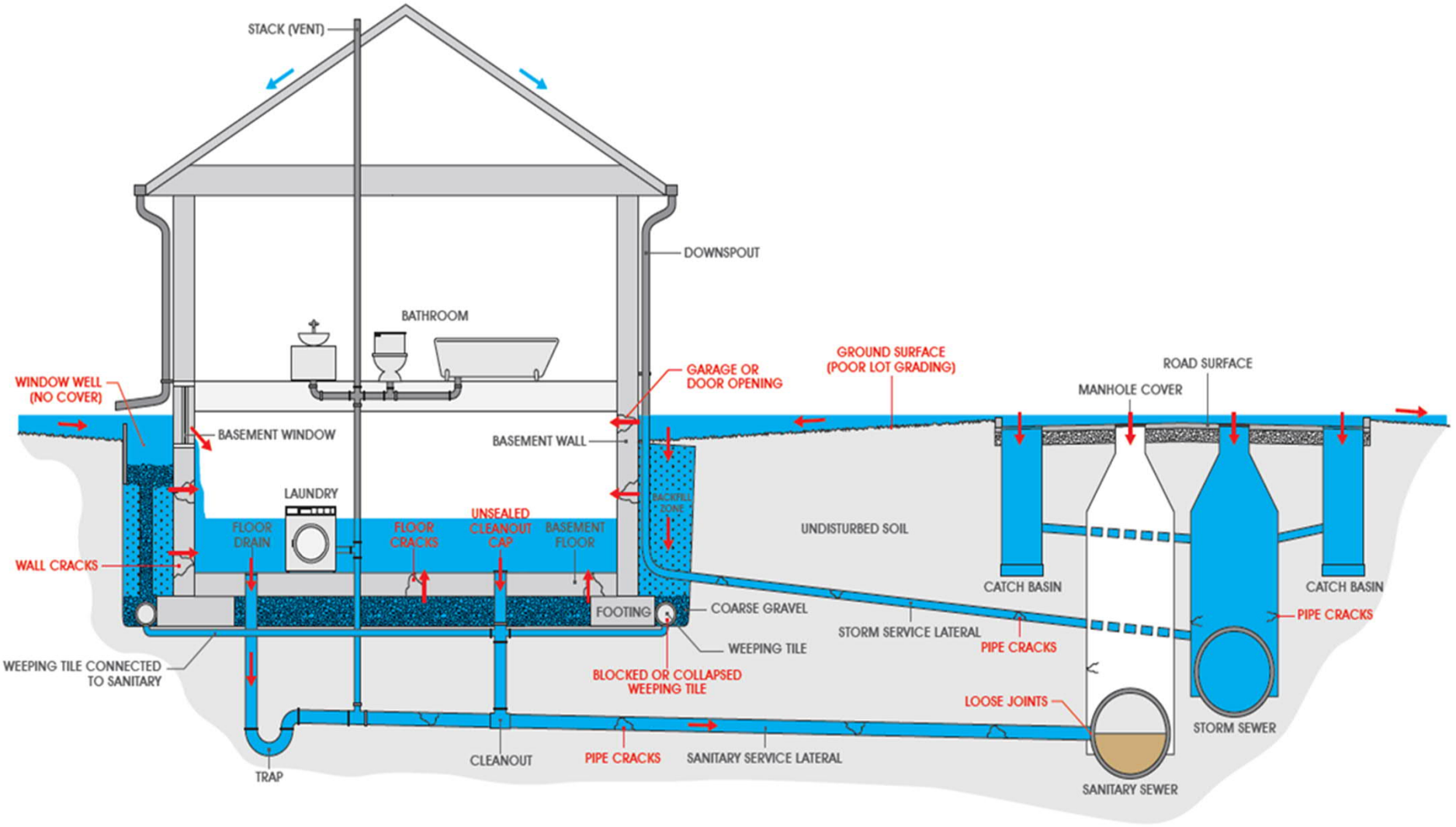
Storm sewers (or minor system) convey stormwater runoff from up to 2-year design storm

Streets (or major system) convey major storms that exceed the storm sewer capacity

Temporary ponding on streets is expected during major rainstorms



# Typical Causes of Basement Flooding

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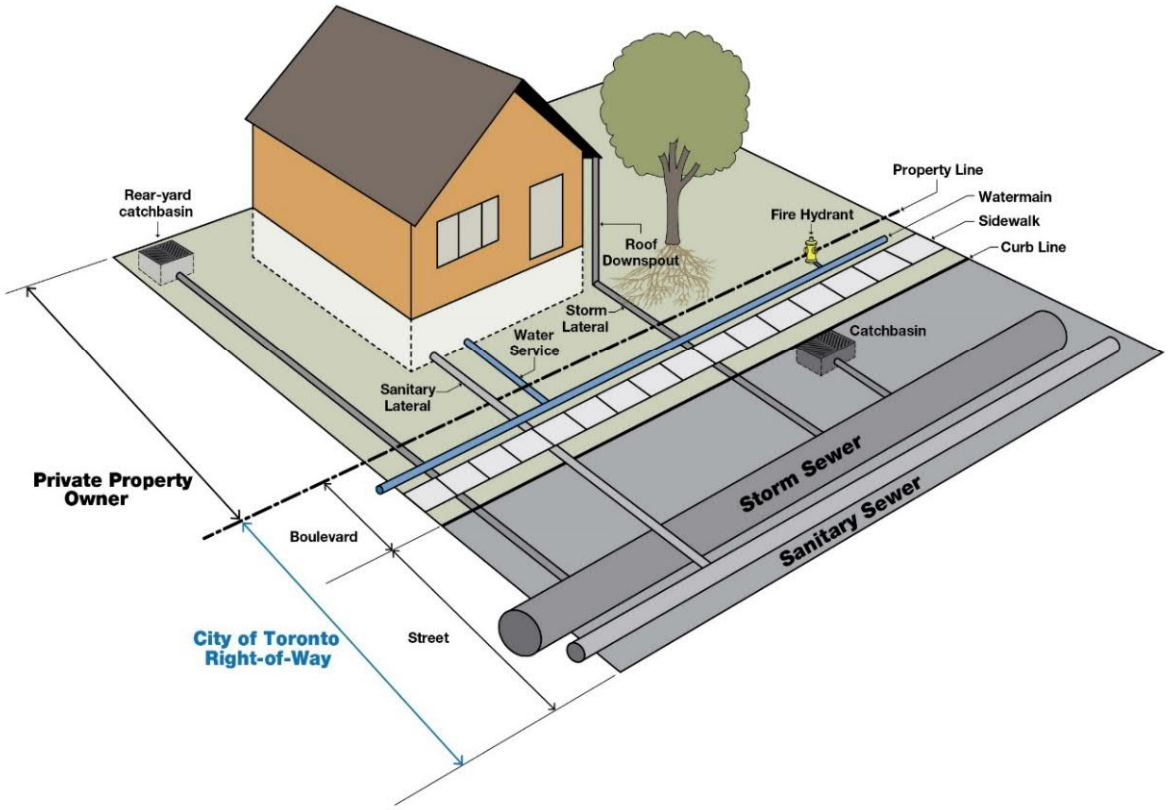
# Areas of Responsibility - City

The City is responsible for infrastructure within the public Right-of-Way and plans to achieve a higher than existing level of service for:

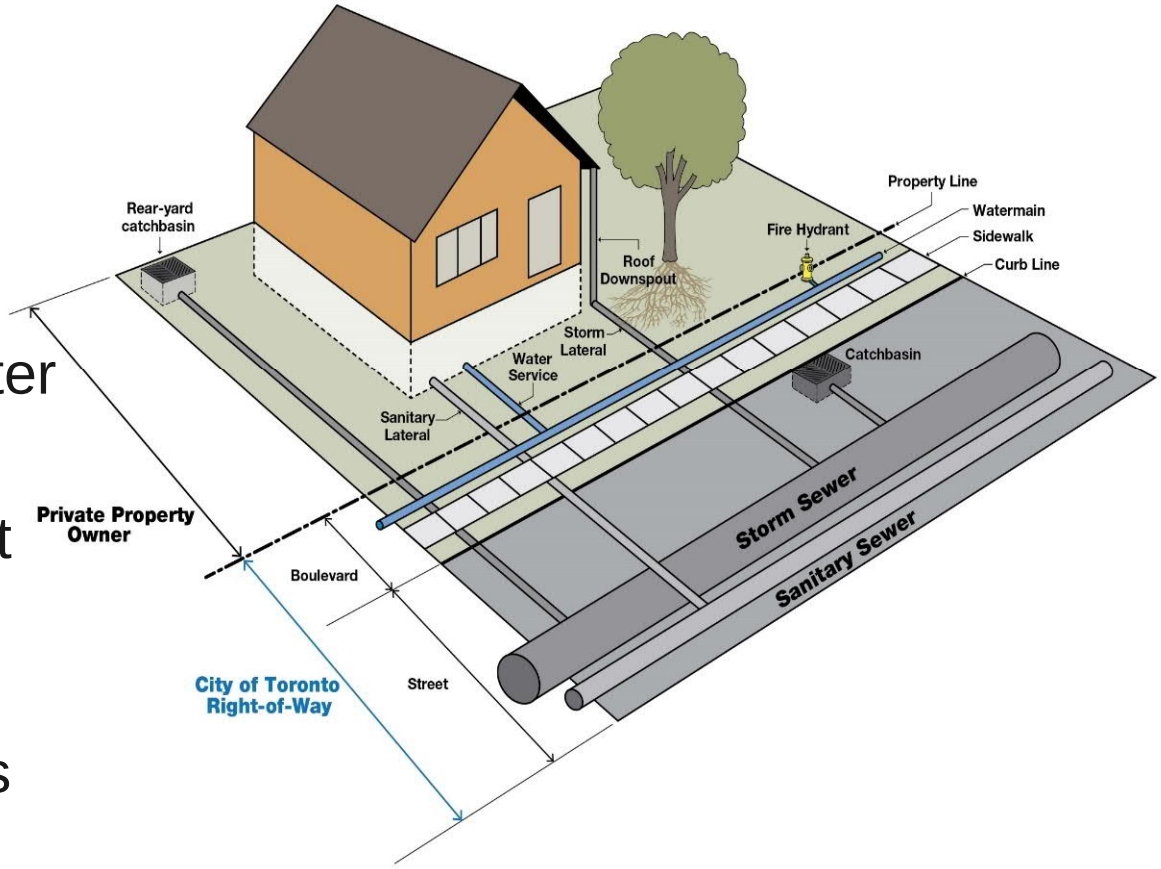
- Sanitary Sewers
- Storm Sewers
- Catchbasins within roadways
- Overland drainage within roadways



# Area of Responsibility – Property Owner

Each homeowner is responsible for the operation and maintenance of drainage systems on 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 drains (fats, oils, grease, etc.)
- Disconnecting downspouts



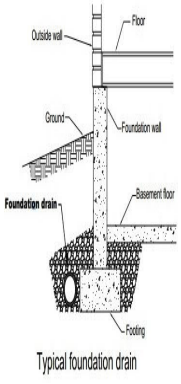
# Property Owner – Potential Solutions

Source control solutions that can be implemented by property owners include:

**Maintaining front and rear-yard drainage or driveway catchbasins**

**Installing backwater valve**


**Installing permeable paving**



Typical foundation drain

**Disconnecting foundation drains from sanitary sewer and installing / maintaining sump pumps**

**Improving lot grading**

**Disconnect downspouts**

**Using rain barrels**

# Existing Study Area Conditions

# Existing Conditions

- The study area falls entirely within the Highland Creek Watershed - part of the City's Natural Heritage System and regulated by Toronto and Region Conservation Authority
- The predominant land use within the study area is residential, with some Institution/Commercial/Industrial land uses, and open spaces mostly associated with valley/natural environmental features along Highland Creek and its tributaries, and the Lake Ontario shoreline
- The key environmental feature in the area is the Scarborough Bluffs located along the Lake Ontario shoreline. Due to the relatively steep and highly erosive slopes, the Bluffs are characterized as a very sensitive feature
- Half of the storm sewer system is at risk of flooding in a 100-year storm; A quarter of the overland drainage system (roads) is at risk of flooding in a 100-year storm; Ten percent of the sanitary system is at risk of flooding in the May 12, 2000 storm

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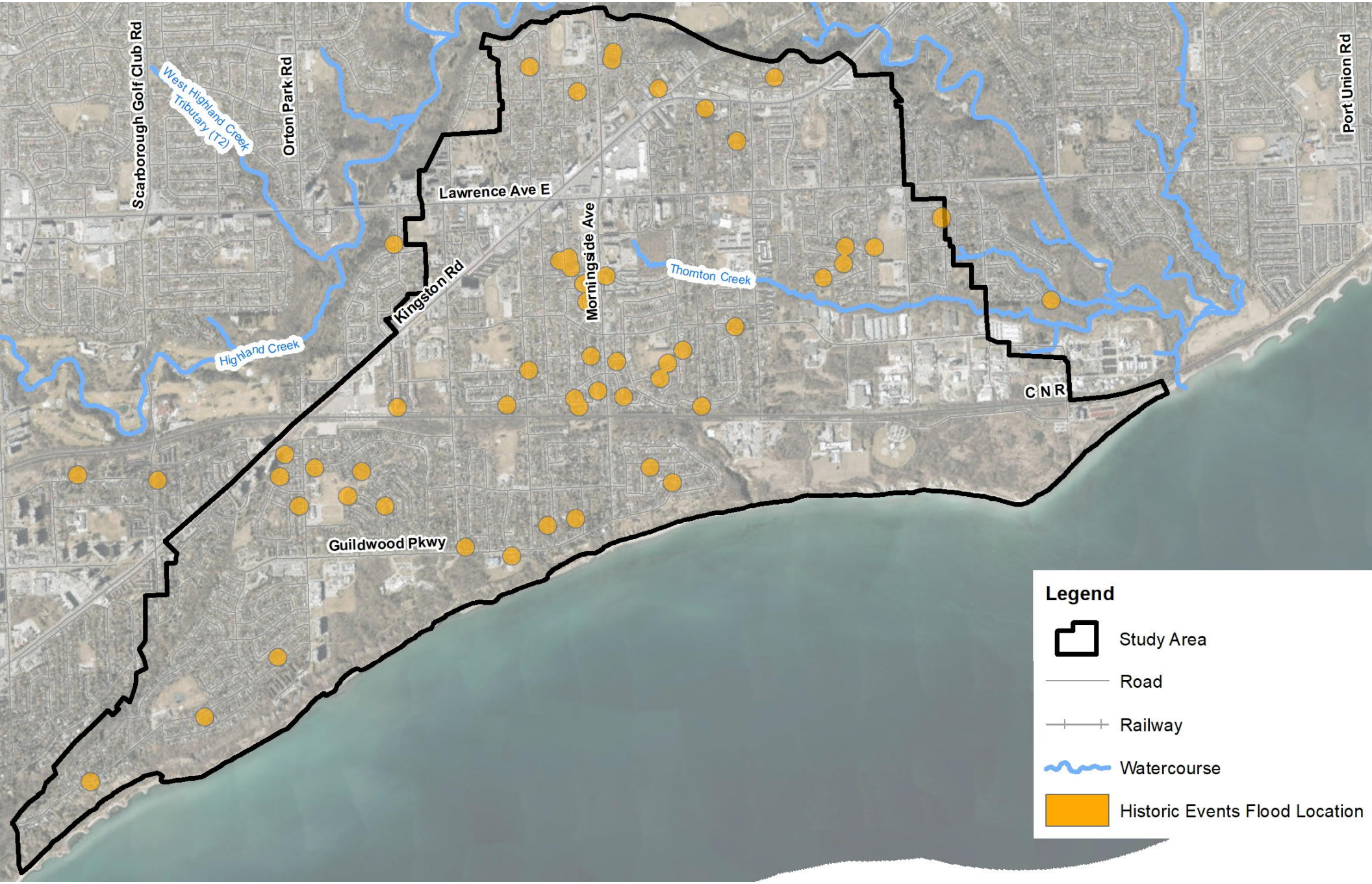
# Existing Flooding Conditions

The City and its consultants have examined a number of factors related to flooding. They include:

- Overland flow (i.e., the amount of surface drainage conveyed on the road during large rainfall events)
- Locations of sags in the roadway where overland flow will pond, which are vulnerable to surface and basement flooding
- Capacity of existing storm and sanitary sewers
- Insufficient number of storm outfalls where a large portion of the study area is serviced by only two lake outfalls – from Livingston Rd and Morningside Ave

The general locations of flooding experienced within the study area are shown in the following map.

# Flooding Details



# Basement Flooding Solutions

# Solutions to Basement Flooding

The City identified several solutions to:

- Protect and upgrade the sanitary system capacity to May 12, 2000 event and storm system capacity to 100-year protection levels
- Reduce the risk of future basement flooding in the area

Solutions:

- Increasing the number of catch basins
- In-line storage pipes
- Divert ponding away to open spaces for temporary detention storage and drainage
- Replacing existing storm and sanitary pipes with larger pipes

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# Basement Flooding Solutions

**Increasing the Number of Catch Basins**

- Where there is capacity in the storm sewer, the City will add more catchbasins to capture flow from the surface

**What Does it Involve?**

- Minor excavation of the road to install the new catchbasin(s) and connect to the storm sewer and restoration of the curb and road

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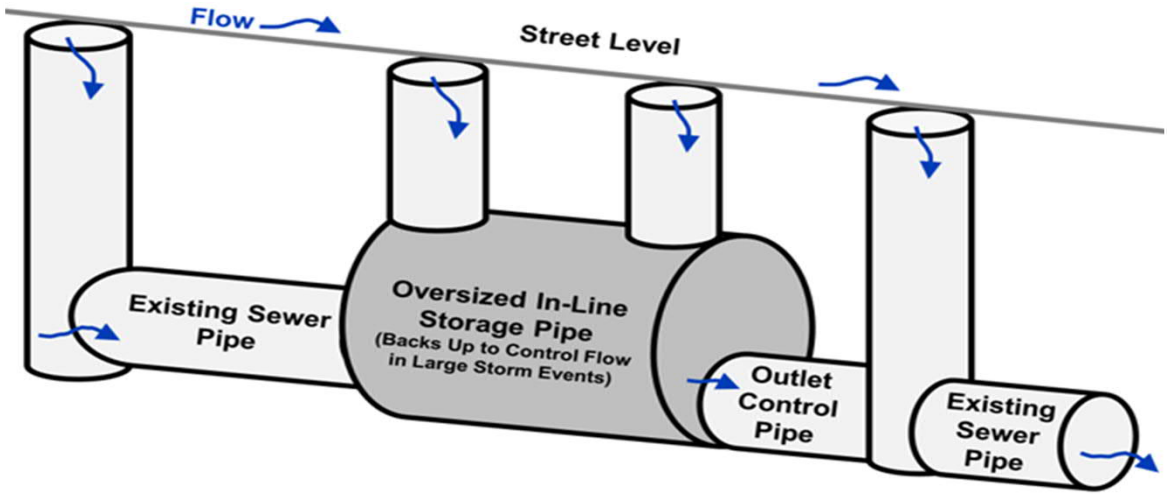
# Basement Flooding Solutions

**In-line Storage Pipes**

- New oversized pipes are constructed to temporarily store water and help relieve overloading of the sewer system

**What Does it Involve?**

- Excavation of the road to remove the old sewer, manhole and catch basin and disconnection of 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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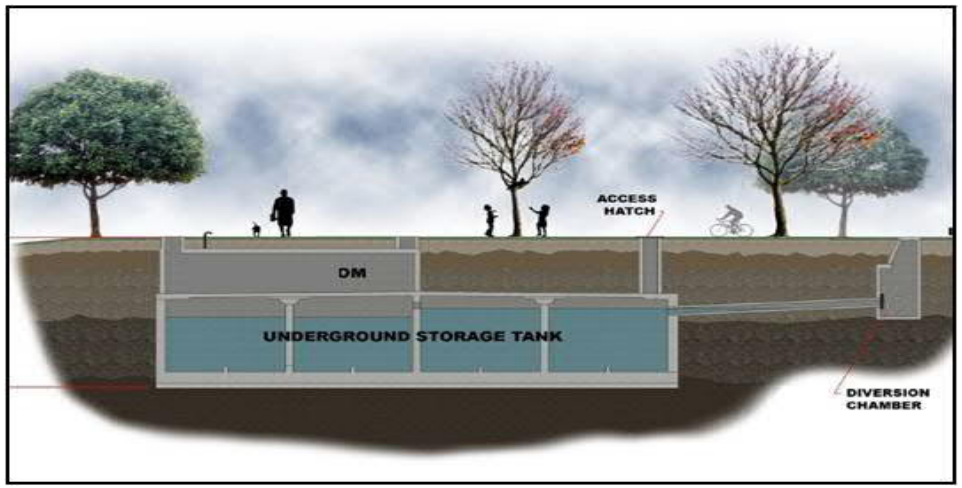
# Basement Flooding Solutions

**Replacement of Existing Storm and/or Sanitary Sewers**

- Increase the size of the sewer pipe by replacing the old sewer with a larger pipe (upsize), installing underground storage tanks

**What Does it Involve?**

- Excavation and removal of the old sewer, manhole and catchbasin and disconnection of 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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# Recommended Improvements

The City has identified 21 projects to address surface and basement flooding within Study Area 57 (as shown in Slide 23). The projects include:

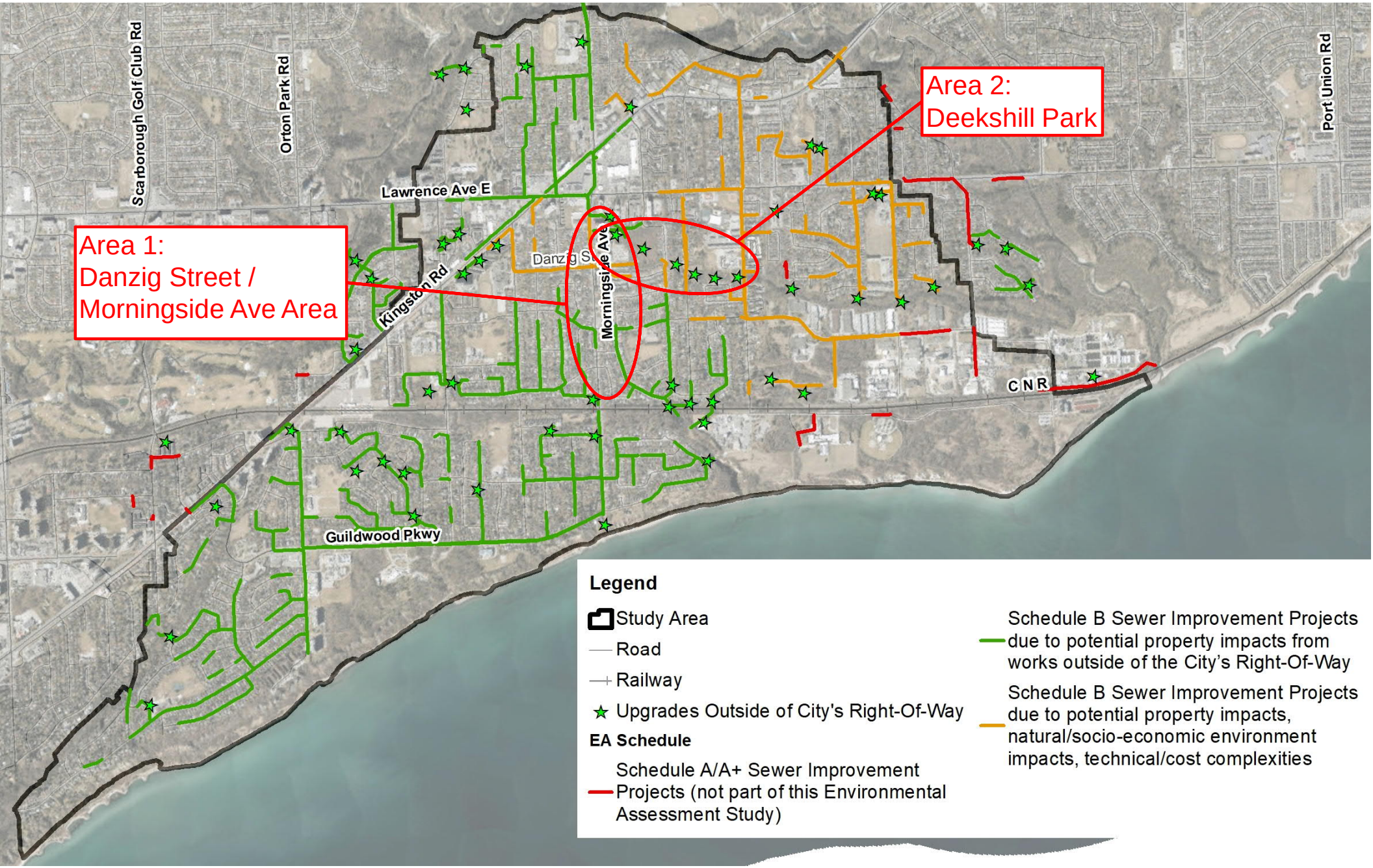
- Nine (9) projects identified as a Schedule A/A+ undertaking, which have followed a streamlined process to address surface and basement flooding and do not form part of this Environmental Assessment Study.
- Ten (10) projects identified as a Schedule B undertaking due to its potential property impacts from the proposed sewer reconstruction, e.g., upsizing within an existing easement.
- Impacted property owners and adjacent property owners have been notified individually as part of this Class Environmental Assessment Process. Refer to the supplementary information package for additional map details.

# Recommended Improvements (continued)

- Two (2) projects identified as a Schedule B undertaking due to its potential property impacts, potentially greater natural/socio-cultural environment impacts and/or greater technical/cost complexities.
  - Area 1: Danzig Street / Morningside Avenue Area (Storm Sewer System Upgrades)
  - Area 2: Deekshill Park (Storm Storage in the Park)

Alternatives have been developed and evaluated for each project following the Municipal Class Environmental Assessment process. See Slides 25 – 35 for details.

# Recommended Improvements



# Evaluation of Alternative Solutions

# Evaluation Criteria for Alternatives

Each alternative solution was evaluated based on its ability to address the Study's purpose and the criteria below

### Natural Environment

Potential impacts on:

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

*Note: aim is to reduce potential impacts

### Socio-Cultural

- ✓ 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)
- ✓ Potential impacts on upstream/downstream and surrounding area infrastructure
- ✓ Impacts on operating and maintenance requirements

### Economics

- ✓ Capital cost
- ✓ Operating and maintenance costs

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# Area 1: Danzig Street / Morningside Avenue Area (Within Project 57-02)

Danzig Street storm sewer diversion: four alternative solutions have been identified to minimize the extent of pipe upgrades south of Danzig Street and Morningside Avenue

| Alternative ID | Description | Design Considerations | Design/Constructability notes |
|---|---|---|---|
| Alternative 1 | Do nothing | Does not reduce the risk of surface and basement flooding | No construction impacts<br>No property/easement impacts |
| Alternative 2 | Increase pipe sizes following existing storm sewer alignment | Reduces risk of surface and basement flooding for upstream catchment | Requires very large storm sewer improvements along Morningside Avenue |
| Alternative 3a | Increase pipe sizes and new storm sewer (flow diversion) into Deekshill Park | Reduces risk of surface and basement flooding for upstream catchment<br><br>Reduces flow to Morningside Avenue, reduce extent of pipe upsizing | New sewer alignment between two properties and will need new easement |
| Alternative 3b | Same as Alternative 3a: Increase pipe sizes following storm flow diversion into Deekshill Park but this option follows another sewer alignment through a parking lot | Reduces risk of surface and basement flooding for upstream catchment<br><br>Reduces flow to Morningside Avenue, reduce extent of pipe upsizing | New sewer alignment in private parking lot and will need new easement |
| Alternative 4 | Provide storage downstream of Danzig Street/Morningside Avenue intersection to avoid pipe upsizing along Morningside Avenue, approximately to the Canadian National Railway crossing | Reduces risk of surface and basement flooding for upstream catchment<br><br>Reduces flow to Morningside Avenue south of the Canadian National Railway crossing, reduce extent of pipe upsizing | No property/easement impacts<br>storage facility needed within right-of-way |

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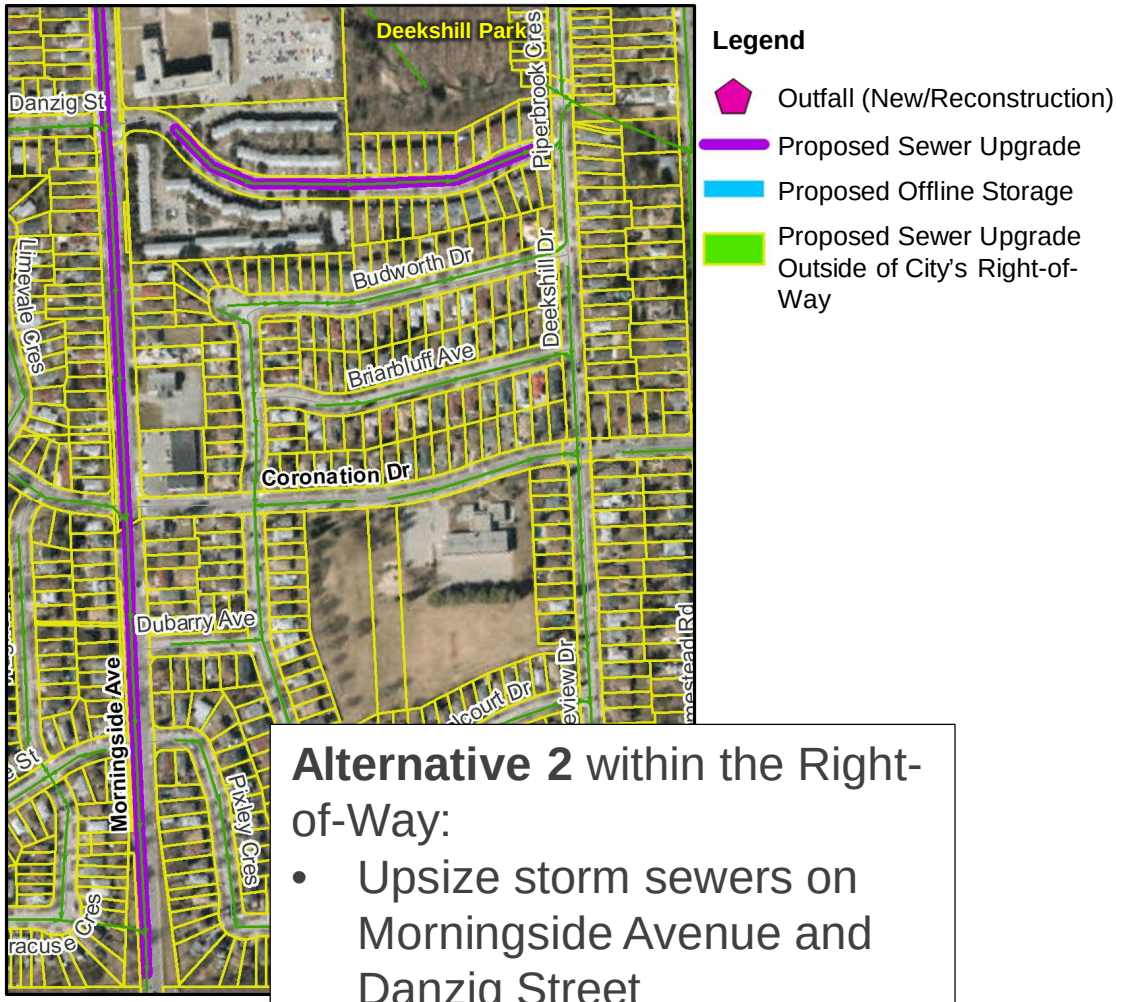
# Area 1: Danzig Street / Morningside Avenue Area

# Alternatives for Area 1: Danzig Street / Morningside Avenue Area

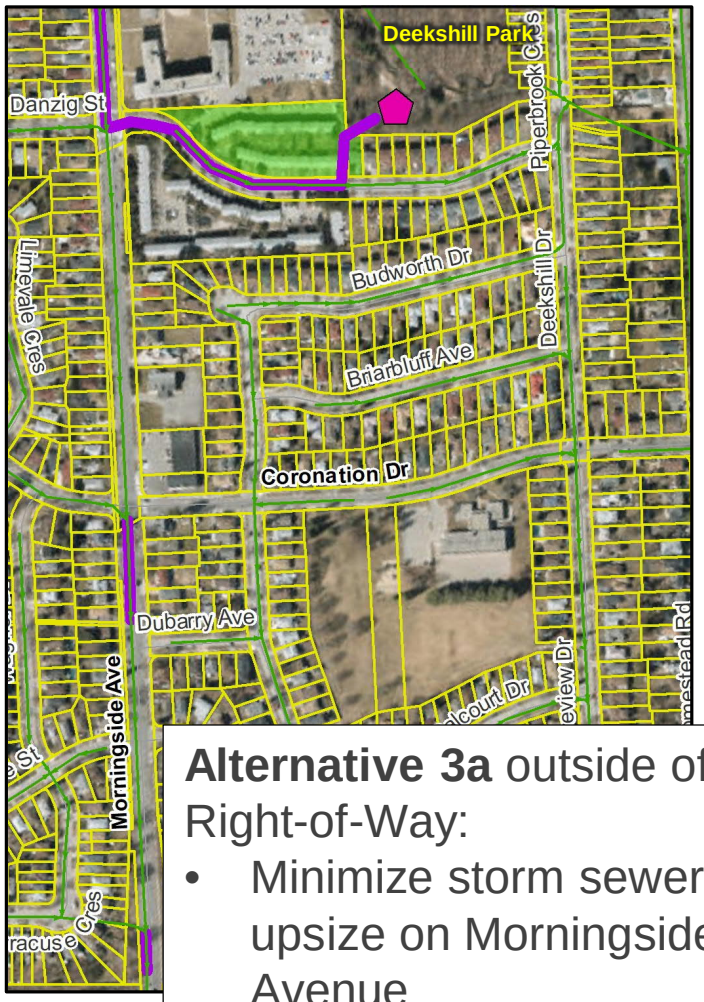



**Legend**

- Outfall (New/Reconstruction)
- Proposed Sewer Upgrade
- Proposed Offline Storage
- Proposed Sewer Upgrade Outside of City's Right-of-Way

**Alternative 2** within the Right-of-Way:

- Upsize storm sewers on Morningside Avenue and Danzig Street




**Alternative 3a** outside of the Right-of-Way:

- Minimize storm sewers upsize on Morningside Avenue
- New sewers on Danzig Street leading into Deekshill Park between residential properties

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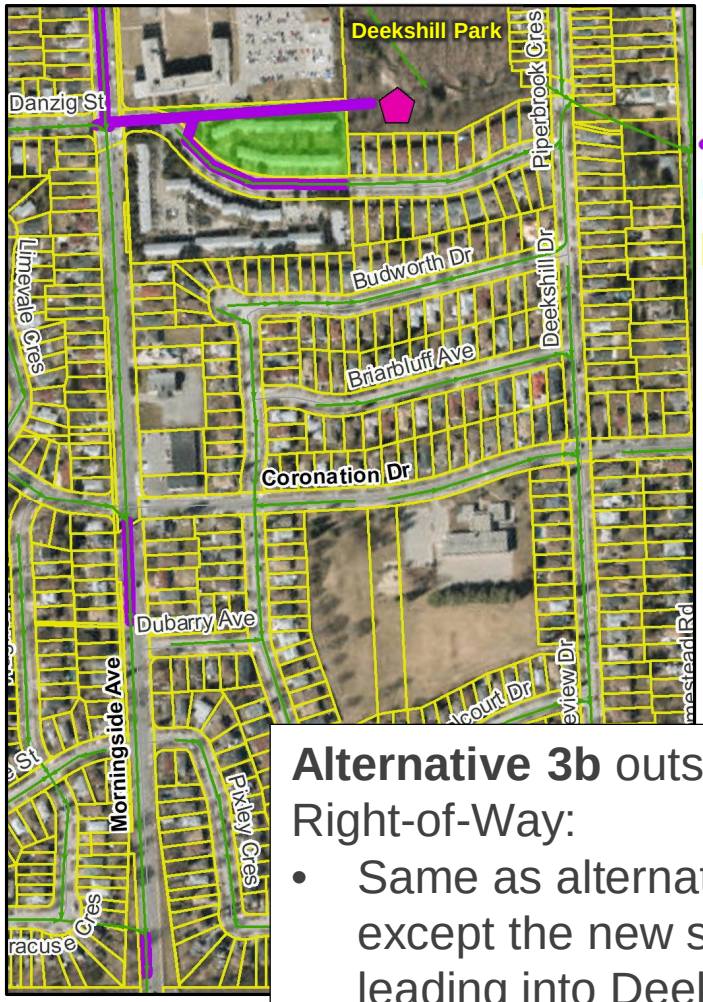
# Alternatives for Area 1: Danzig Street / Morningside Avenue Area

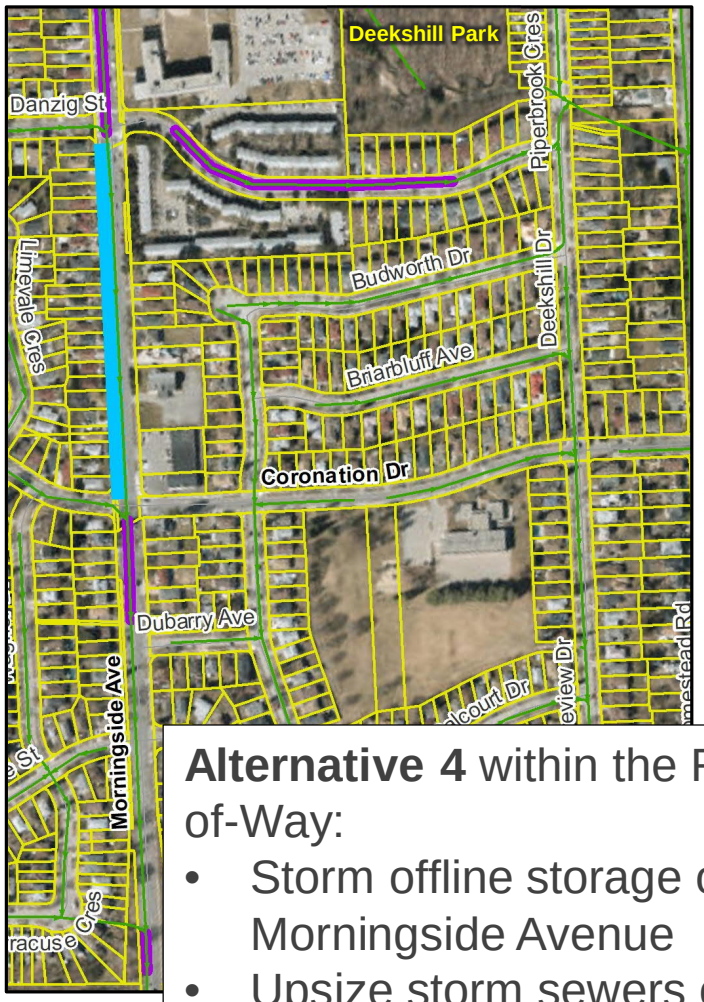



**Legend**

- Outfall (New/Reconstruction)
- Proposed Sewer Upgrade
- Proposed Offline Storage
- Proposed Sewer Upgrade Outside of City's Right-of-Way

**Alternative 3b** outside of the Right-of-Way:

- Same as alternative 3a except the new sewer leading into Deekshill Park goes through a parking lot instead of between residential properties




**Alternative 4** within the Right-of-Way:

- Storm offline storage on Morningside Avenue
- Upsize storm sewers on Morningside Avenue and Danzig Street

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# Preferred Solution – Alternative 3b

Based on the evaluation of alternative solutions, the preferred solution is Alternative 3b

- This solution utilizes naturally low-lying area for stormwater storage
- This solution reduces storm flows south along Morningside Avenue and reduces the extent of downstream flooding risks without requiring significant downstream sewer improvements
- This solution avoids construction disruption to Morningside Avenue
- This solution would have less constructability constraints within the parking lot compared to other solutions along the roadway or between two properties

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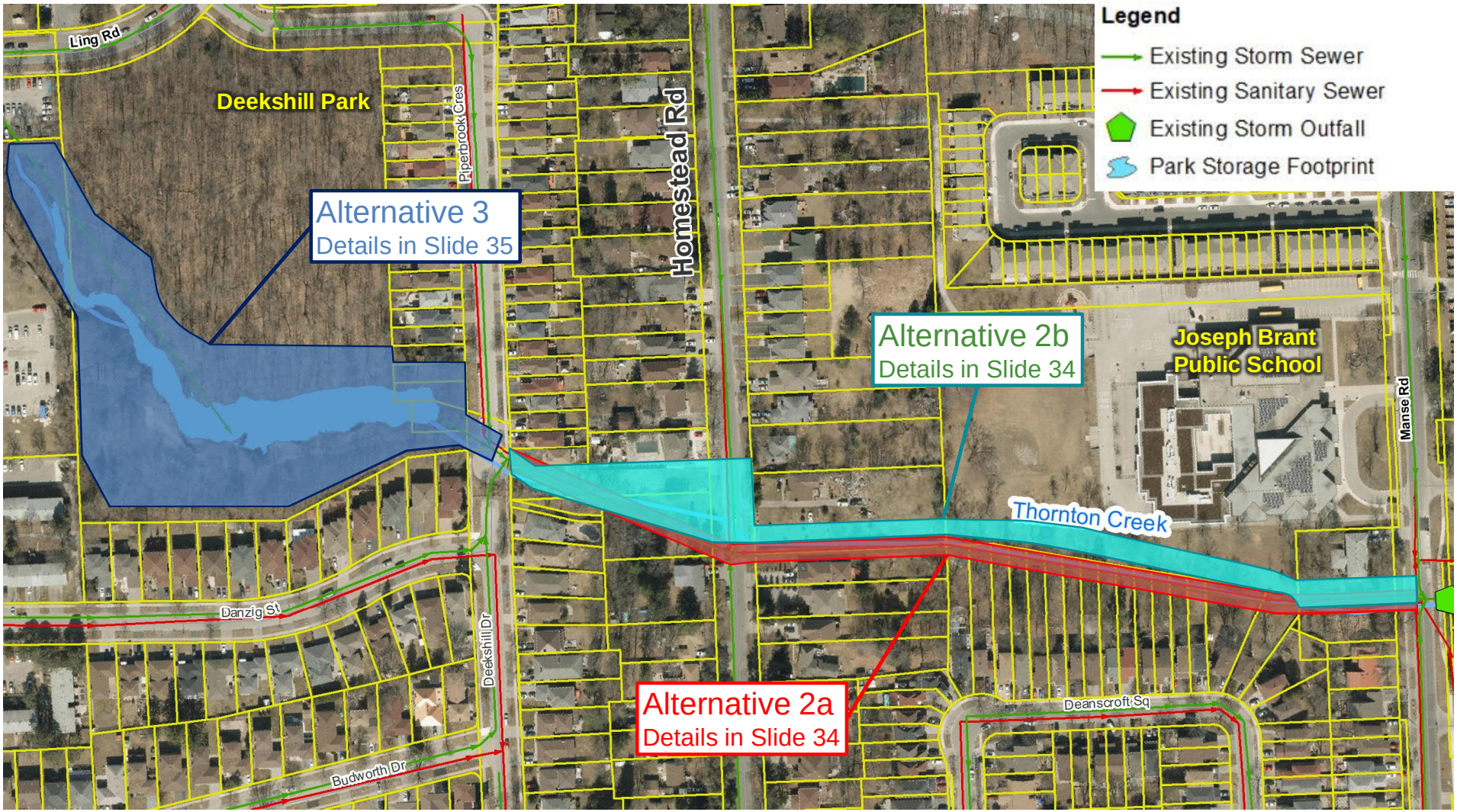
# Area 2: Deekshill Park (Within Project 57-01)

Three alternative solutions have been identified to avoid/reduce sewer upsizing and property impacts downstream of Deekshill Park

| Alternative ID | Description | Design Considerations | Design/Constructability notes |
|---|---|---|---|
| Alternative 1 | Do nothing | Does not reduce the risk of surface and basement flooding | No construction impacts<br>No property/easement impacts |
| Alternative 2a | Increase pipe sizes following existing storm sewer alignment | Reduces risk of surface and basement flooding for upstream catchment | Under existing conditions, minor system flows discharge into existing open channel through Deekshill Park. Channel outlets to existing 1800 mm sewer<br><br>Flow improvement alternative does not require any park modifications, outlet sewer will need to be upsized to box culvert to convey flows from park to outlet (Thornton Creek). Construction of sewer will impact existing easements through private properties and school block (Joseph Brant Public School) |
| Alternative 2b | Combination of increasing pipe sizes and channel sections following existing storm sewer alignment | Reduces risk of surface and basement flooding for upstream catchment<br><br>Open channel sections may also function as water quality control measures to satisfy TRCA requirements | Alternative same as Alternative 2a, but conveyance system downstream of Deekshill Park will comprise of rectangular sections and open channel sections to reduce construction costs. Will have similar property impacts as Alternative 2a<br><br>Alternative requires local relocation of existing sanitary sewer between Piperbrook Cres and Homestead Rd |
| Alternative 3 | Utilize natural depression storage in Deekshill Park | Reduces risk of surface and basement flooding for upstream and downstream catchment | Park has sufficient storage capacity to avoid downstream sewer upsizing, hence avoid downstream property impacts. |

# Area 2: Deekshill Park

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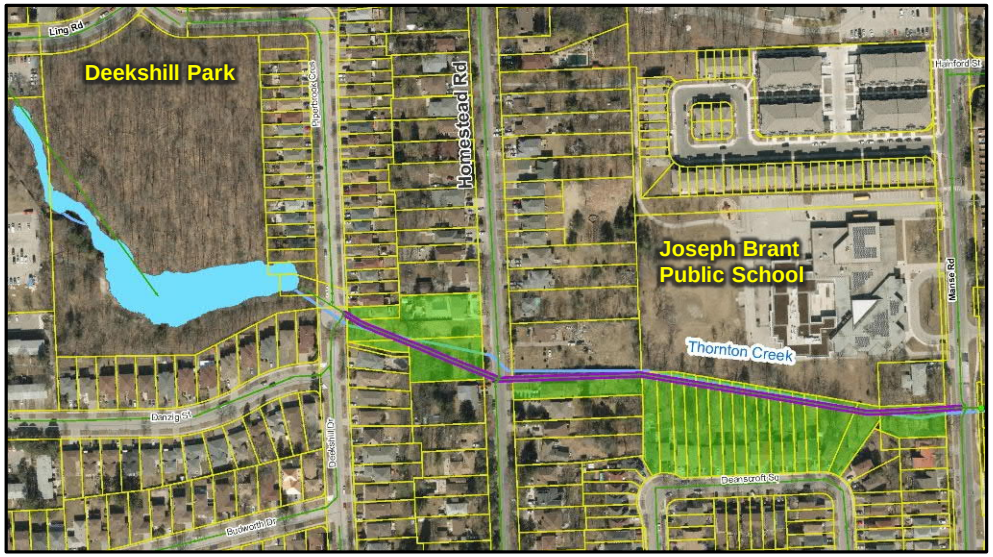
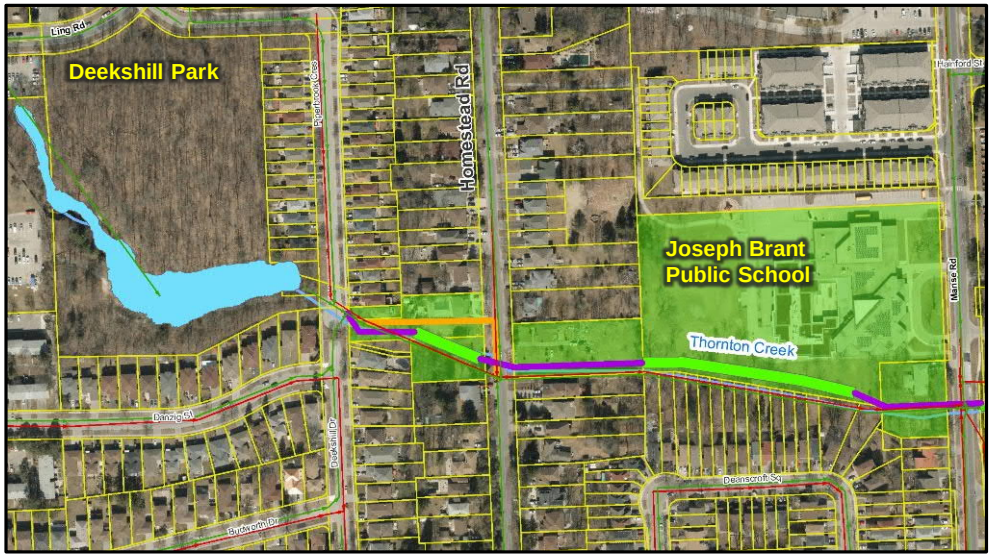
# Alternatives for Area 2: Deekshill Park




**Legend**

Park Storage Footprint | Existing Storm Outfall | Proposed Storm Sewer Upgrade | Proposed Open Channel

Proposed Sewer Upgrade Outside of City's Right-of-Way | Proposed Sanitary Realignment

**Alternative 2a** outside of the Right-of-Way:

- Upsize storm sewers following existing sewer alignment, through several residential properties

**Alternative 2b** outside of the Right-of-Way:

- Combination of storm sewers upsize and open channel elements, through several residential properties and Joseph Brant Public School
- Sanitary sewer realignment

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# Alternatives for Area 2: Deekshill Park


**Legend**

- Park Storage Footprint
- Existing Storm Outfall
- Proposed Storm Offline Storage
- Proposed Sewer Upgrade Outside of City's Right-of-Way
- Proposed Storage Outlet Reconstruction

**Alternative 3** outside of the Right-of-Way:

- Utilize natural depression storage in Deekshill Park
- Offline storm storage on Homestead Road

Ecological Considerations:

- The area surrounding the watercourse includes a woodland that has a number of non-native and invasive species (including some regulated under the Invasive Species Act)
- This area exhibits a high level of disturbance from human use of the trail as well
- The watercourse does not appear to support fish habitat
- Increased storage footprint would not result in a significant impact to existing vegetation given presence of non-native and invasive species

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# Preferred Solution – Alternative 3

Based on the evaluation of alternative solutions, the preferred solution is Alternative 3

- This solution utilizes existing flow channel and overbank areas for temporary storage in a natural park setting
- This solution results in less disruption to the community during construction by avoiding construction of a large sewer/open channel downstream
- This solution is least cost with no private property impacts nor disturbance to the TDSB property
- The duration of proposed flood inundation is the same as existing conditions for the 2-year storm or less – impacts would be minimal and infrequent
- The initial ELC mapping in the park suggests high level of disturbance with non-native and invasive species

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# Mitigation of Potential Impacts and Next Steps

# Mitigation of Potential Impacts

Mitigation measures will be reviewed and refined during the detailed design stage

**Habitat and Trees**

- Vegetation removal to occur outside of the breeding bird season of April to August
- If stockpiles of gravel and sand are required during the active turtle season (April to October), install turtle exclusion fencing around stockpiles prior
- Implement erosion and sediment control mitigation measures
- Spill Prevention and Contingency Plan to be developed prior to construction
- Prepare tree removal and protection plans, along with tree protection barriers and signage where required. A tree compensation program may be required if mature trees are removed
- Any damaged trees will be pruned through the implementation of proper arboricultural techniques, under supervision of a certified arborist
- On-site inspection during construction

# Mitigation of Potential Impacts

**Sediment and Watercourse Protection**

- Develop hydraulic model prior to the installation of new outfall to determine the impacts to the current banks required to prevent erosion
- Consider additional sediment inputs into the embayment, the creek, and its effects to the navigability of the watercourse through the detailed hydraulic model
- Consider and investigate the effects of increased sediment inputs to aquatic habitat

**Construction Measures**

- Complete Traffic Management Plan
- Conduct a field review to confirm the result of archaeological potential Use of Best Management Practices for dust control and vibration monitoring during construction
- Use of low noise equipment during construction, where possible
- Notify impacted property owners prior to construction
- Maintain access to fronting properties

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# From Study to Construction

- All City basement flooding projects are prioritized and scheduled to protect the greatest number of properties as soon as possible, within approved budgets and coordinated with other construction work as per Council approved criteria
- Projects are also prioritized for implementation based on a City Council adopted $68,000 cost per benefitting property threshold
- Projects with a cost-benefit less than $68,000 per property at the preliminary design stage may proceed to construction
- Projects that exceed the $68,000 cost per benefitting property threshold will be moved into the State-of-Good-Repair's long term capital plan

# Contact us

**Thank you for viewing the study information**

- Contact us if you have any questions or submit comments by email or phone
  - Mae Lee, Senior Public Consultation Coordinator
    - 416-392-8210 or floodingstudy@toronto.ca
- The study team will review your feedback and finalize the preferred solution
- A project file report will then be completed in 2023 and made available for a 30-day public review

**www.toronto.ca/BF57**

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