Basement Flooding Study Area 63

Malvern Area, Scarborough North

(Markham Road to Murison Boulevard, north of Highway 401)

Municipal Class Environmental Assessment Study

December 2022

TORONTO

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 63 in the neighbourhoods extending from Markham Road to Murison Boulevard, south of Tapscott Road and north of Highway 401

You will learn about:

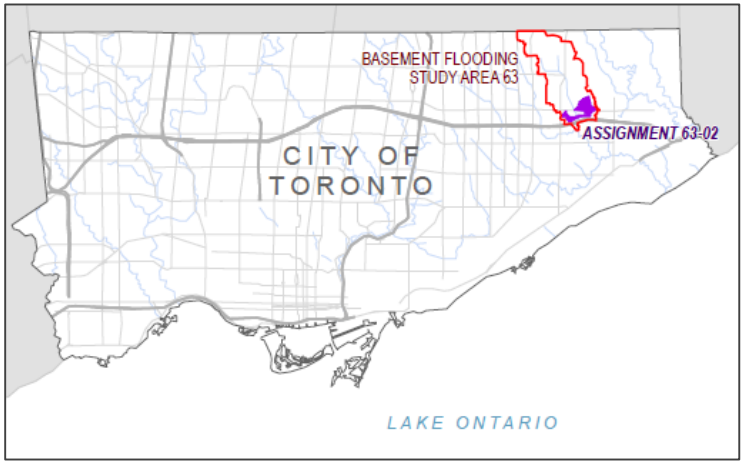
- the purpose of the study
- what solutions have been considered and the recommended solution
- how impacts will be managed
- how to get in touch with City staff to ask questions or share your comments

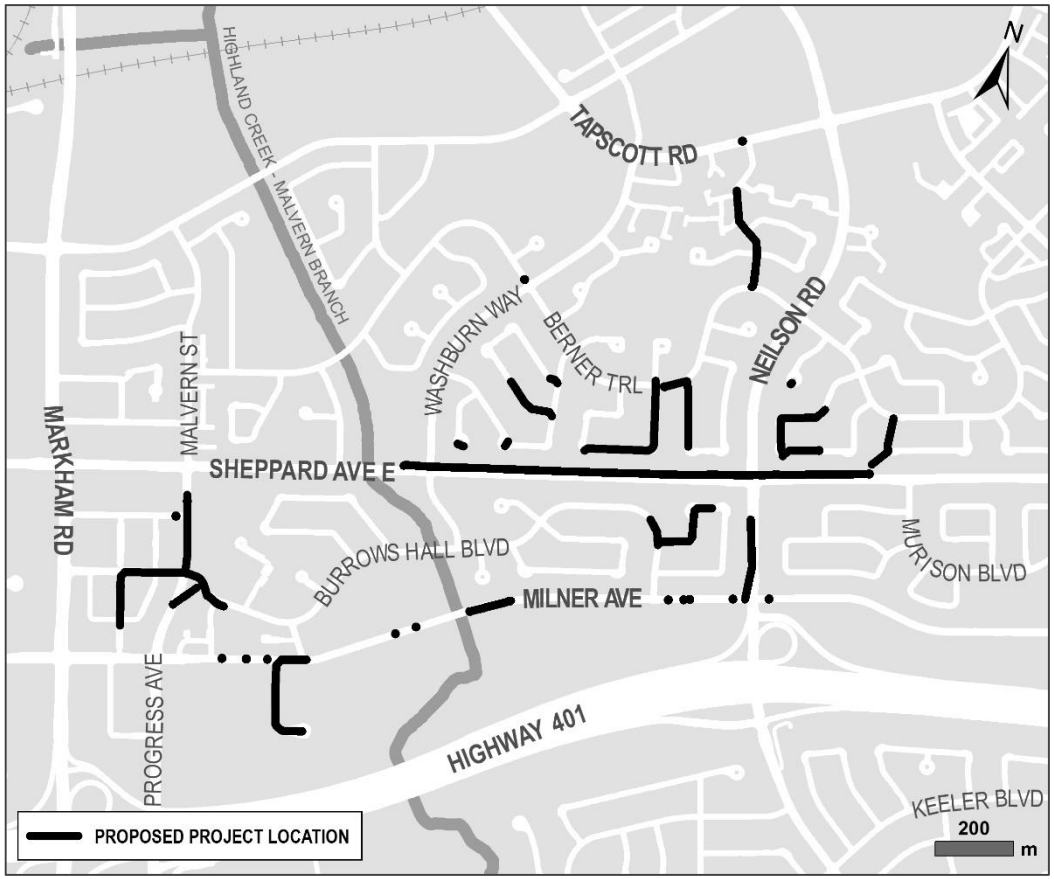
TORONTO

Study Area

Assignment 63-02 is located within Scarborough North, roughly bounded by:

- Markham Road to the west
- Murison Boulevard to the east
- Tapscott Road to the north
- Highway 401 to the south





Maps highlighting the extents of the proposed project for Assignment 63-02, and the location of Assignment 63-02 within Study Area 63 and the City of Toronto.

TORONTO

Study Purpose

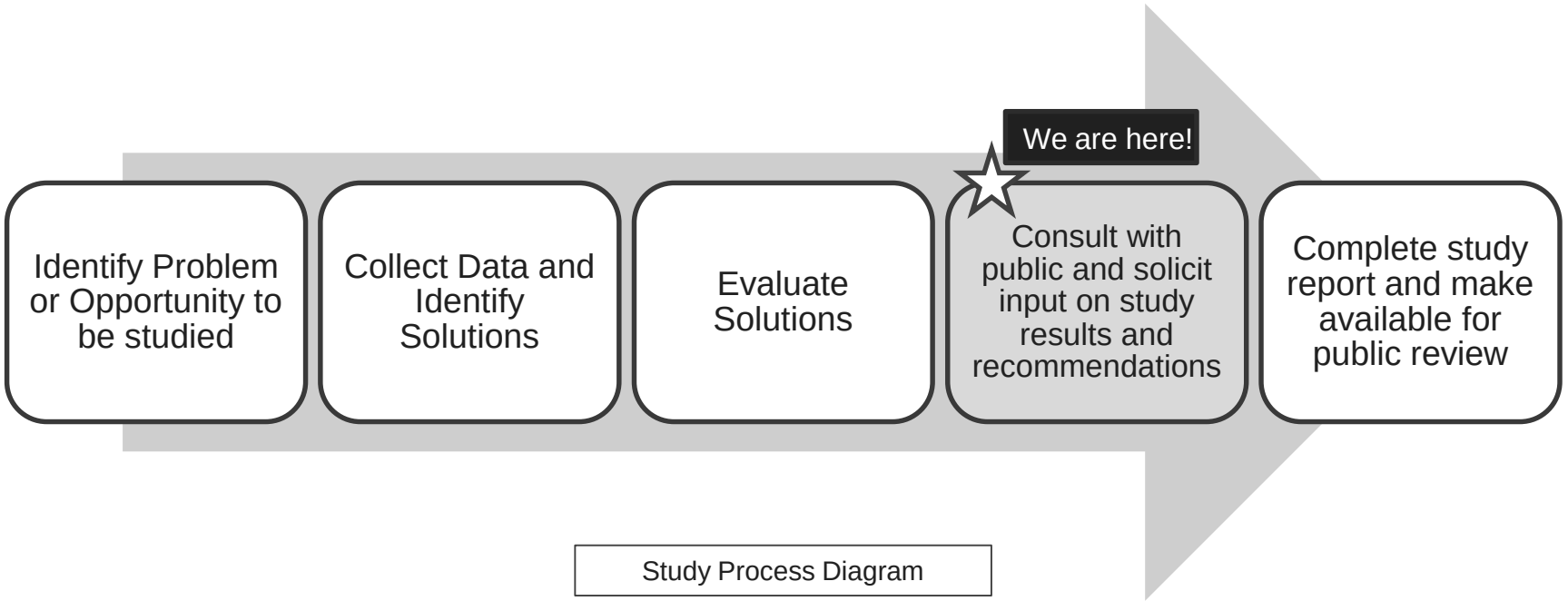
The City is undertaking a Basement Flooding Study to:

- 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

TORONTO

Study Process

The study is being undertaken in accordance with the Municipal Engineers Association's Municipal Class Environmental Assessment process for Schedule B projects which involves completion of Phases 1 & 2 of the planning process as illustrated below:



Study Process Diagram

About Basement Flooding

Flooding within the Study Area

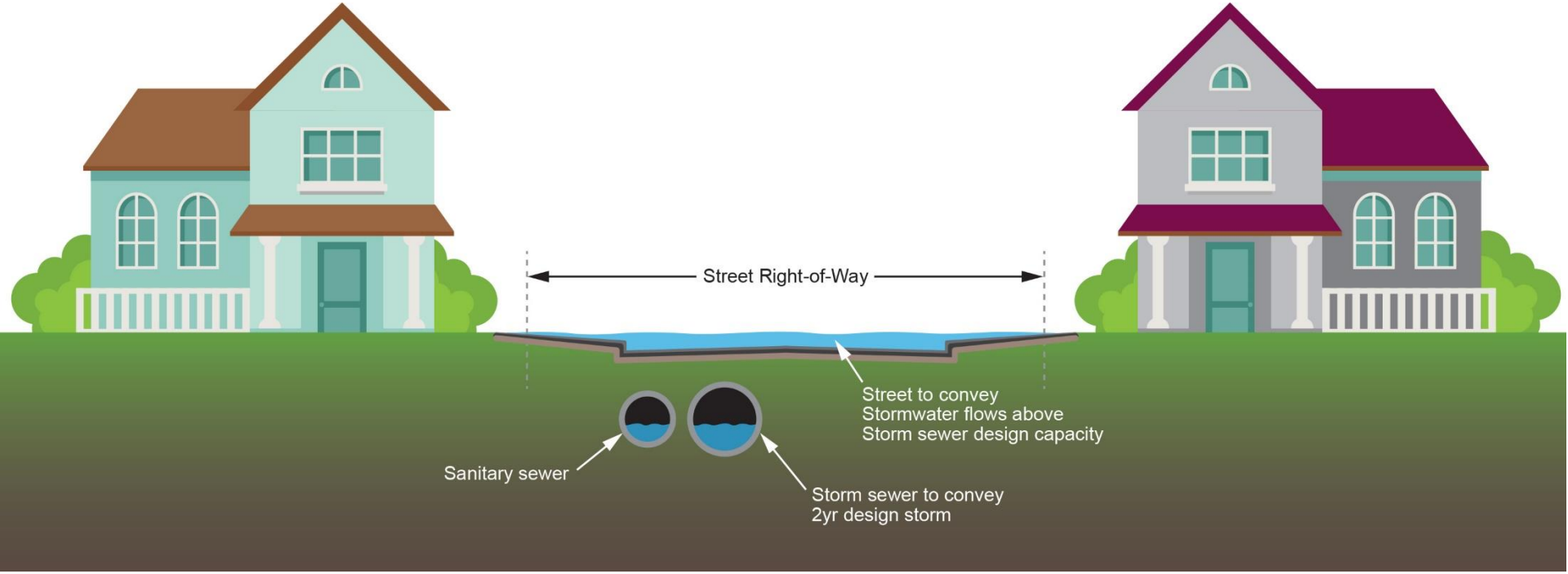
There are a number of factors contributing to potential flood risk, including:

- Sanitary trunk sewer aligned with major watercourses, offering potential for inflow and infiltration
- Presence of shallow sewers and therefore potentially less vertical distance from basement to sewer pipes
- Backup from storm sewer outfall due to high creek levels and/or accumulation of sediment in the watercourse
- Accumulation of surface rainwater runoff in low-lying areas
- Undersized storm sewer and/or catchbasins resulting in high overland flow
- Large industrial-commercial-institutional sector with high levels of paved surfaces leading to increased storm runoff potential

Storm Drainage System

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

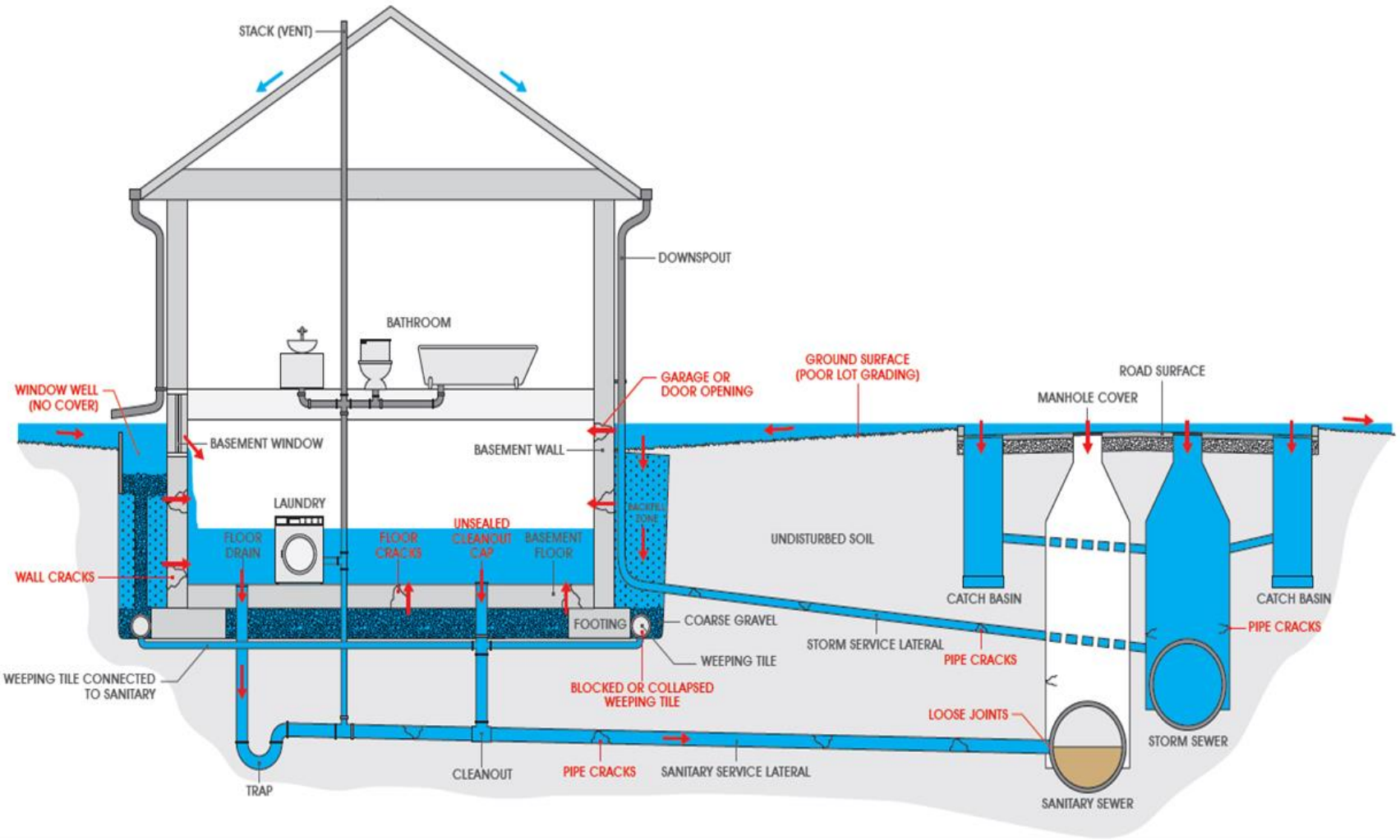
Streets (or major system) convey major storms that exceed the storm sewer capacity. Temporary ponding on streets is expected during major rainstorms.



Graphic showing the conveyance of stormwater along the storm sewers (minor system) and streets (major system)

TORONTO

Typical Causes of Basement Flooding



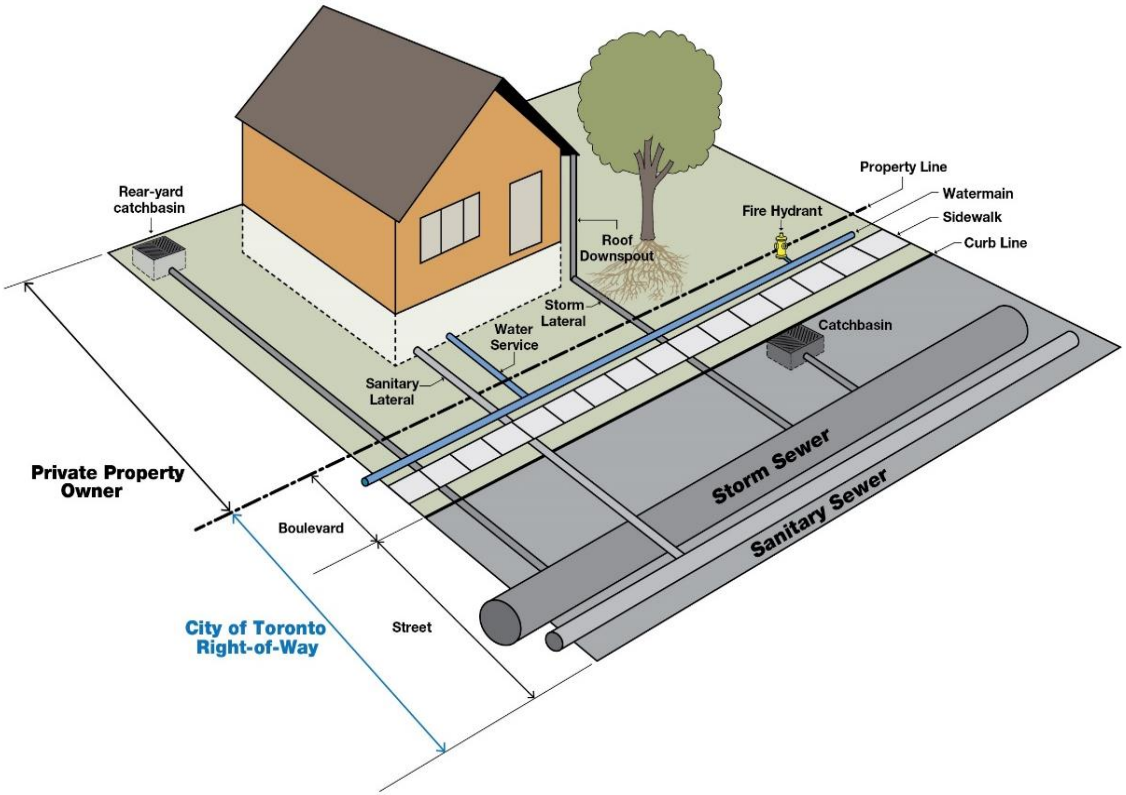
Graphic highlighting the typical causes of basement flooding for a house

TORONTO

Area 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

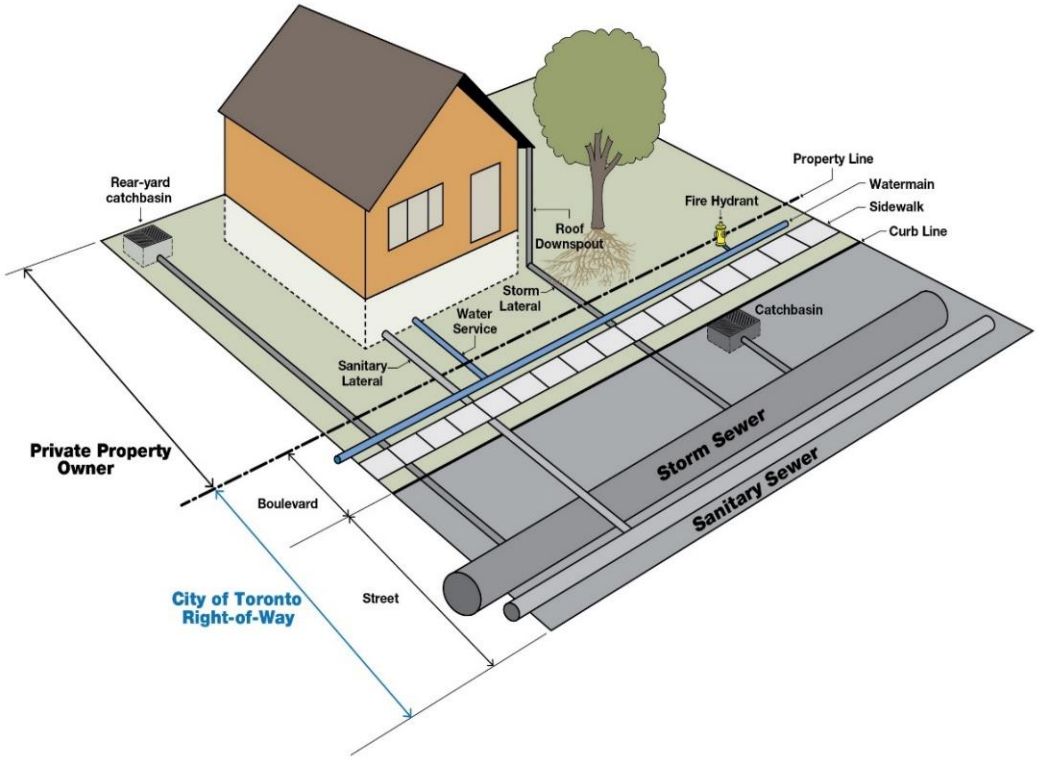


Graphic showing infrastructure within and outside of the Public Right-of-Way

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



Graphic showing infrastructure within and outside of the Public Right-of-Way

TORONTO

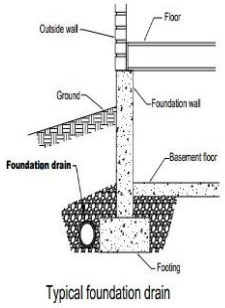
Property Owner – Potential Solutions

Solutions that can be implemented by property owners include:

Maintaining front and rear-yard drainage or driveway catchbasins

Installing backwater valve

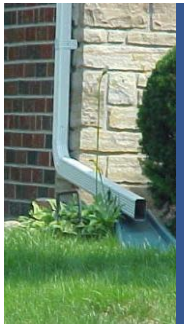
Installing permeable paving



Typical foundation drain

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

Improving lot grading



Disconnecting downspouts

Using rain barrels

TORONTO

Existing Flooding Conditions

Existing Sewer System Conditions

The City and its consultants have examined the existing sewer systems:

- Separated Sanitary and Storm sewer network, draining north to south
- The Storm sewer is tributary to the Malvern Branch of East Highland Creek

Factors related to flooding include:

- Sanitary trunk sewer aligned with the watercourses with potential for inflow and infiltration, resulting in elevated baseflows in the sanitary sewer that take up flow capacity
- Storm drainage system influenced by high amounts of paved area and high water levels in the receiving watercourse
- Presence of shallow sewers, providing less potential for vertical separation from basements and sewer pipe
- Presence of perforated maintenance hole covers

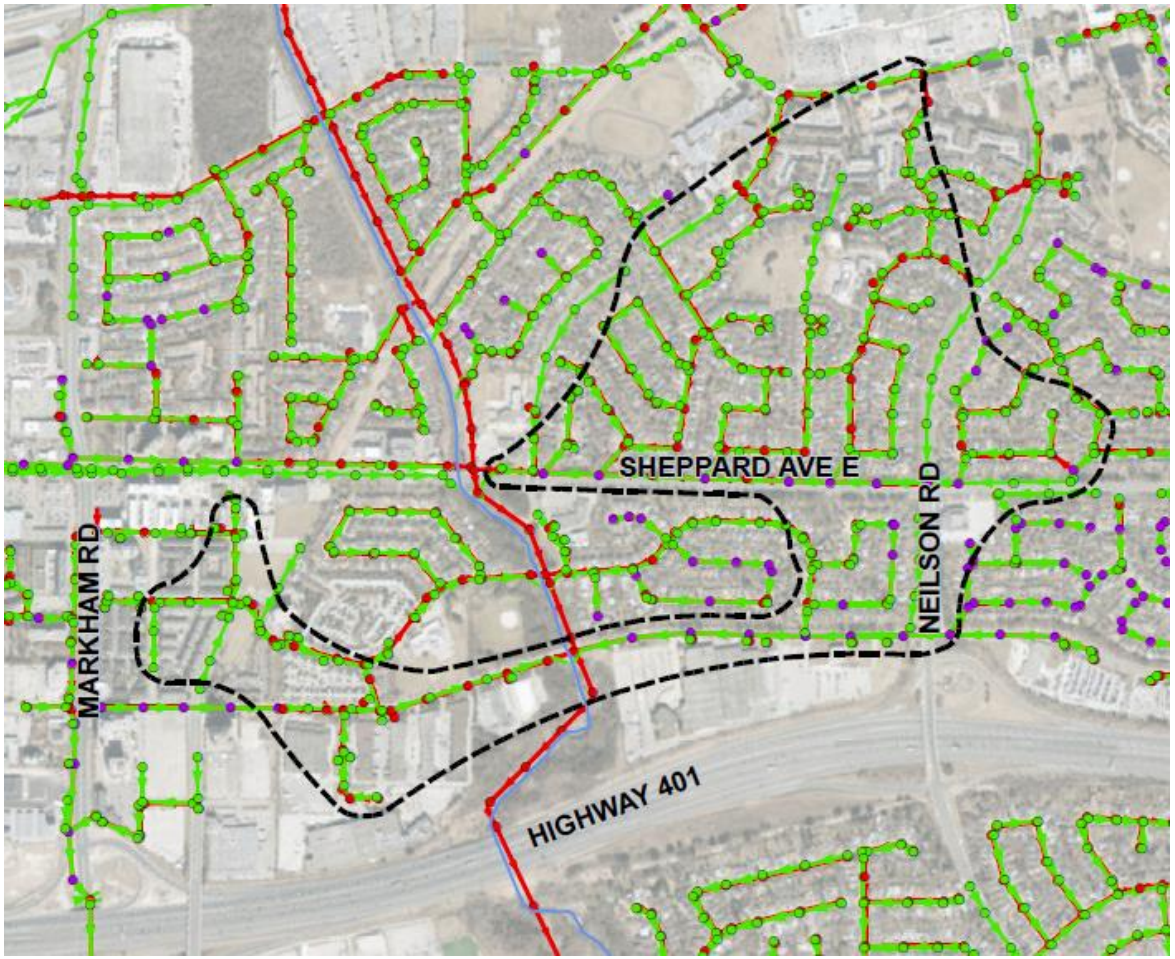
Existing Sewer Network

Legend

- Assignment 63-02 Area
- Storm Manhole
- Sanitary Manhole
- Dual Manhole
- Storm Sewer
- Sanitary Sewer

In general, the storm drainage system is overwhelmed under extreme storm events and is affected by the Malvern Branch water levels at some outfalls

Portions of the sanitary system are overwhelmed under extreme storm events



Map showing the existing network of Sanitary and Storm sewers

TORONTO

Basement Flooding Solutions

Solutions to Basement Flooding

To help reduce the risk of future basement flooding, the City has identified several solutions prioritized for implementation, which include:

- Overland controls
- Increasing the number of catchbasins
- Catchbasin inlet controls
- In-line storage pipes
- Replacing existing pipes with new larger pipes

Solutions are intended to improve drainage system capacity to the Council-approved Enhanced protection levels (100-year storm for the storm drainage system, and the historic May 12, 2000 event for the sanitary system).

Storm Sewer Basement Flooding Solutions

Overland Control

- This solution diverts stormwater away from low lying areas that have no direct outlet to reduce ponding on the surface

What Does it Involve?

- Installation of a large inlet grate or “curb drain” (shown below) to intercept road or boulevard flows and direct the flow into the sewer system

TORONTO

Storm Sewer Basement Flooding Solutions

Increasing the Number of Catchbasins

- 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

TORONTO

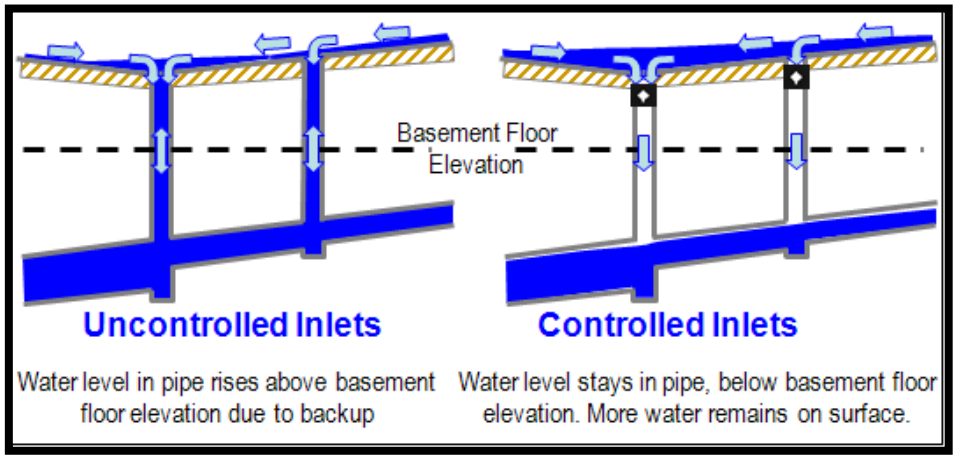
Storm Sewer Basement Flooding Solutions

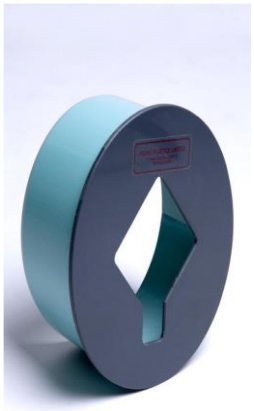
Catchbasin Inlet Controls

- Can limit flow into the storm sewer system to control back-up
- Used in locations where more water can be kept on the surface

What Does it Involve?

- Installation of a plastic or metal plate / device inside the catchbasin outlet and is not visible
- Requires minimal effort and time to install





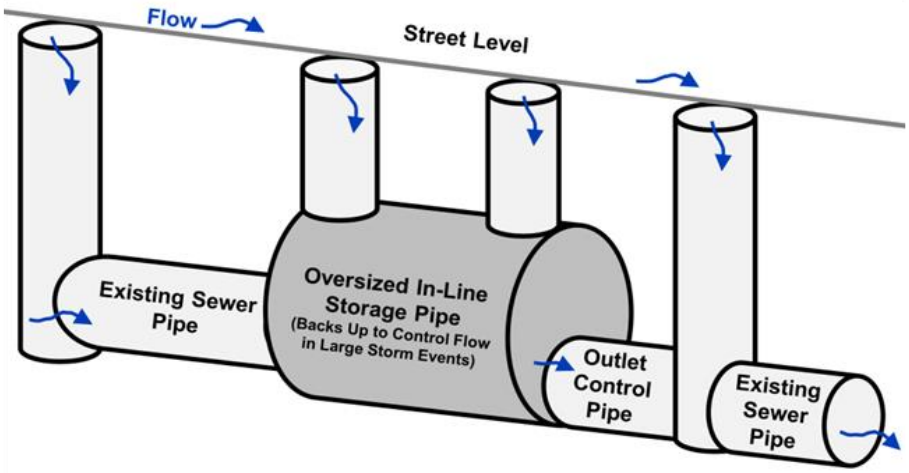
Storm / Sanitary Sewer Basement Flooding Solutions

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, maintenance hole and catchbasin 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



TORONTO

Storm / Sanitary Sewer Basement Flooding Solutions

Replacement of Existing Storm, Combined 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, maintenance hole 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

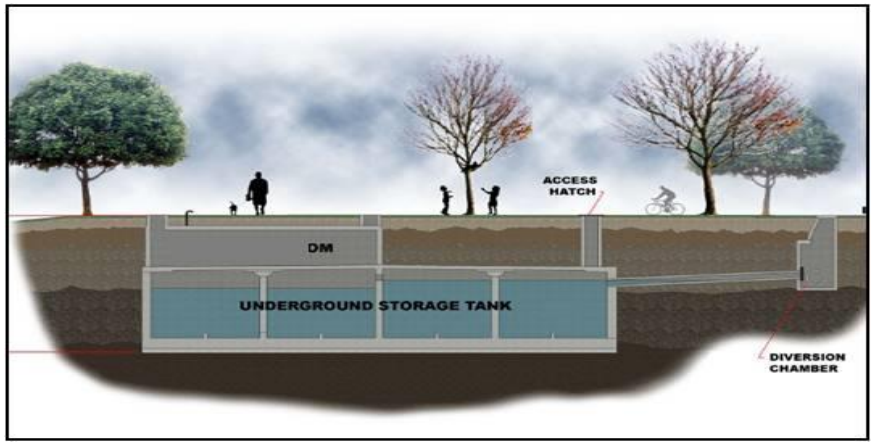


Image of storm sewer replacement in road during construction

TORONTO

Evaluation of Alternatives and Recommended Solutions

Alternative Solutions

Three alternative solutions have been identified to mitigate surface and basement flood risk within the study area.

Each involves a combination of pipe and inlet capacity improvements strategically located throughout the study area, with the following main differences:

Alternative 1

- Conveyance Upgrades
- Private Property Upgrades in Rear Yards
- No Upgrades Along Berner Park Trail
- In-line Storage, and Outfall Upgrade
- Cost: $52.8M

Alternative 2

- Conveyance Upgrades
- New Sewers Along Neilson Rd to Avoid Rear Yard Upgrades
- Upgrades Along Berner Park Trail,
- Additional In-line Storage to Avoid Outfall Upgrade
- Cost: $57.9M

Alternative 3

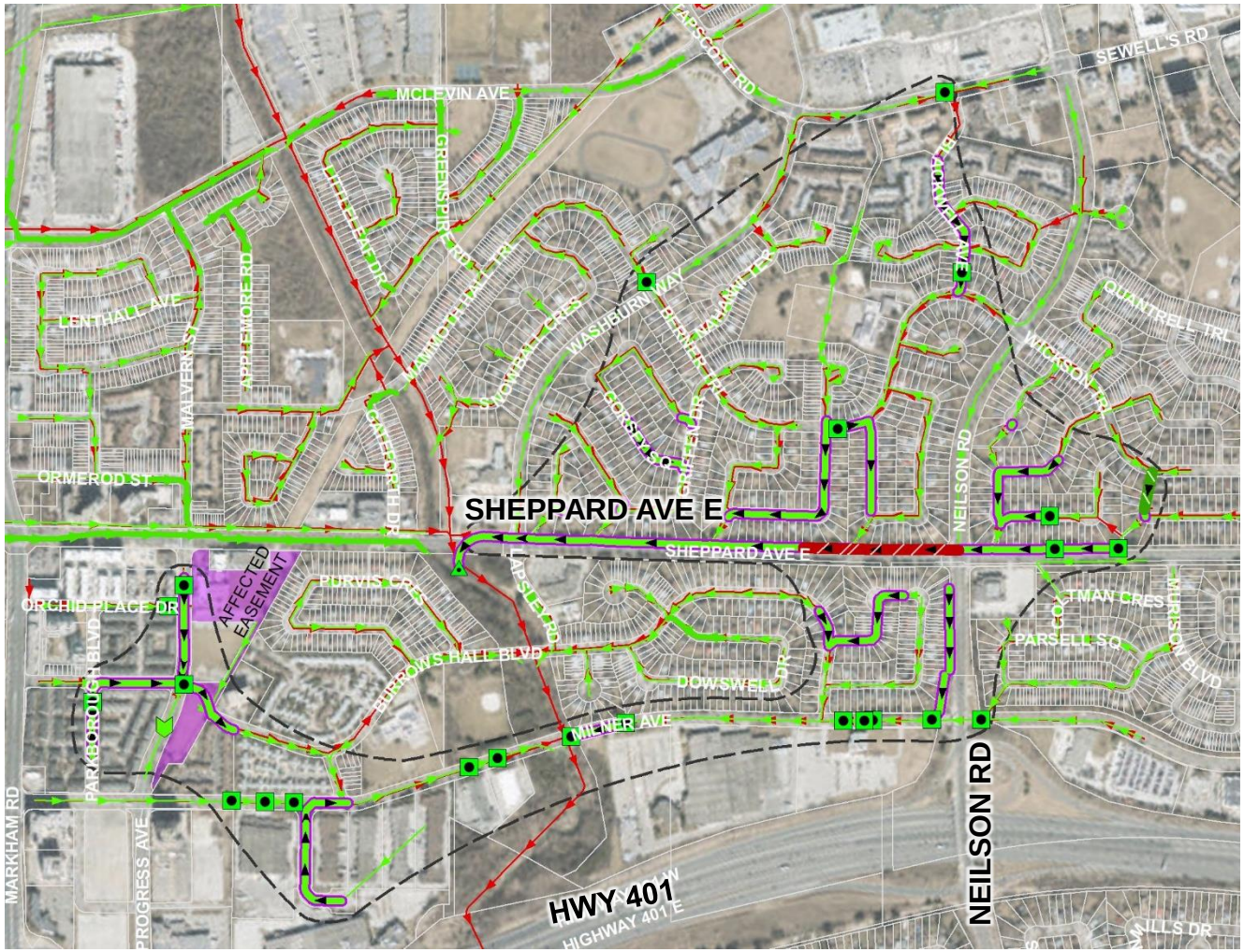
- Hybrid of Alternatives 1 and 2
- Conveyance Upgrades
- New Sewers Along Neilson Rd to Avoid Rear Yard Upgrades
- No Upgrades Along Berner Park Trail
- Additional In-line Storage to Avoid Outfall Upgrade
- Cost: $57.8M

TORONTO

Alternative 1

Legend

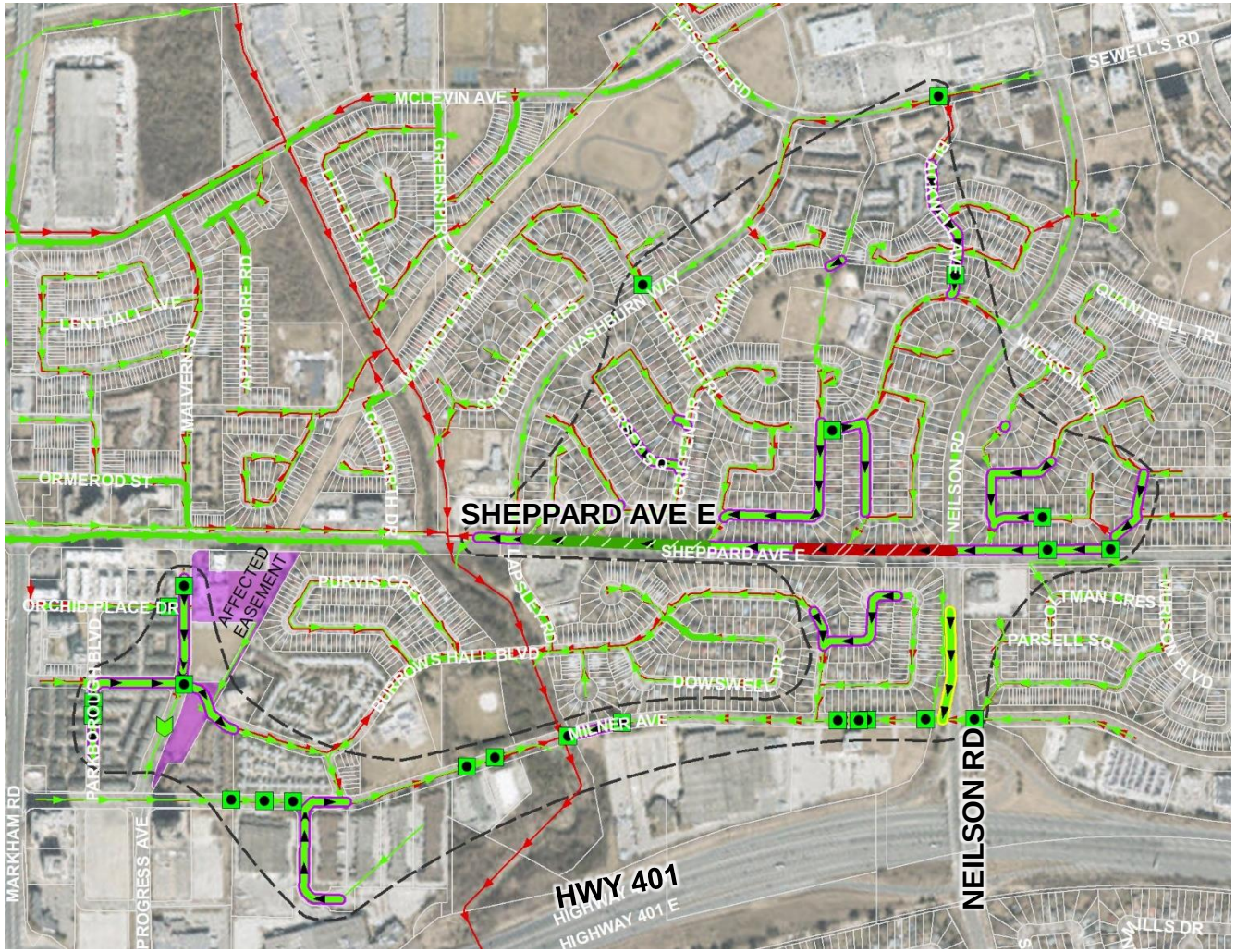
- Increase Inlet Capacity
- Depress Curb
- Upgrade Outfall
- New Storm
- Upgrade Storm
- Storm Inline Storage
- Sanitary Inline Storage
- Other Storm Solution
- Other Combined Solution
- Other Sanitary Solution
- Existing Storm
- Existing Combined
- Existing Sanitary
- Affected Easement
- Assignment 63-02 Area



Alternative 2

Legend

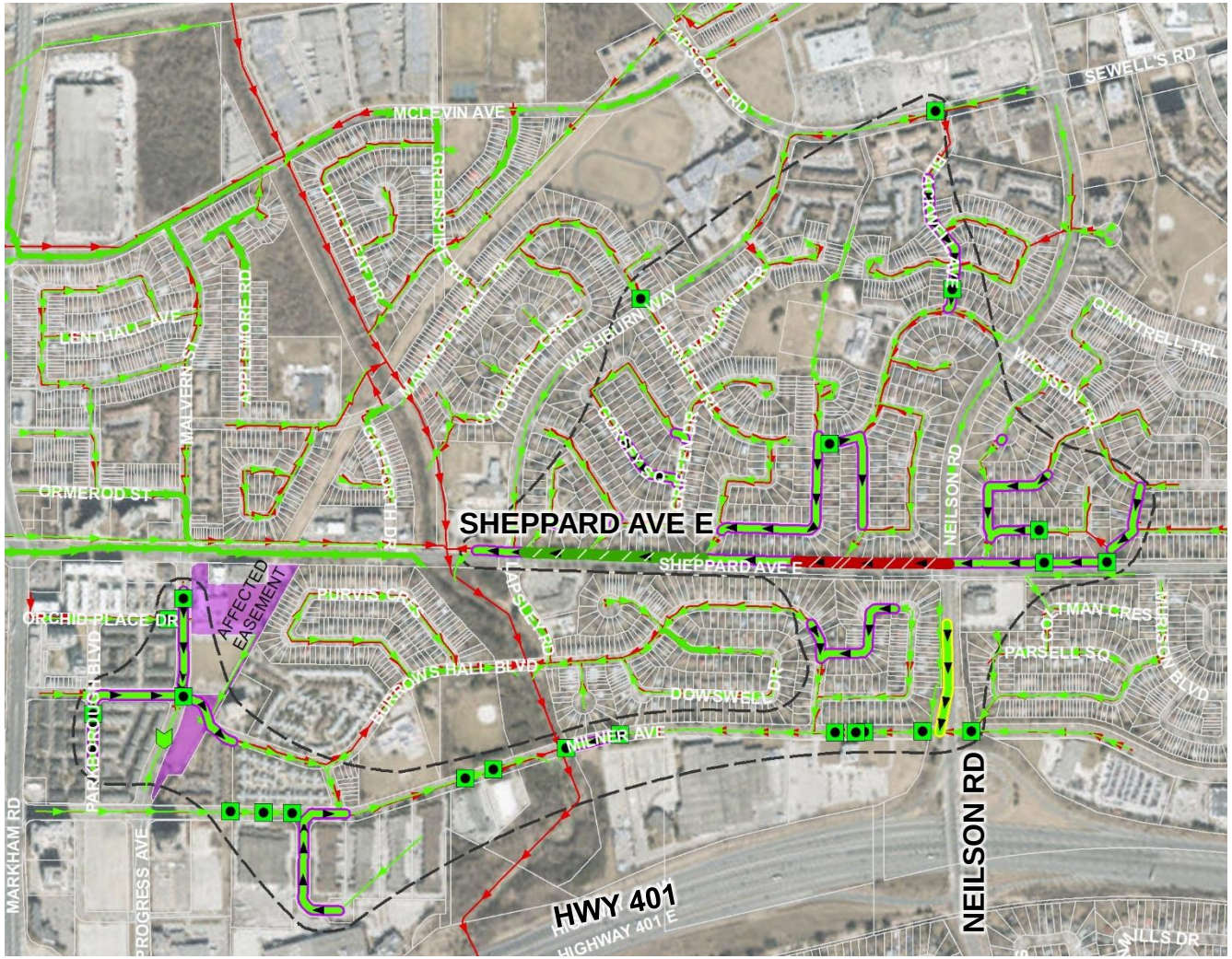
- Increase Inlet Capacity
- Depress Curb
- Upgrade Outfall
- New Storm
- Upgrade Storm
- Storm Inline Storage
- Sanitary Inline Storage
- Other Storm Solution
- Other Combined Solution
- Other Sanitary Solution
- Existing Storm
- Existing Combined
- Existing Sanitary
- Affected Easement
- Assignment 63-02 Area



Alternative 3

Legend

- Increase Inlet Capacity
- Depress Curb
- Upgrade Outfall
- New Storm
- Upgrade Storm
- Storm Inline Storage
- Sanitary Inline Storage
- Other Storm Solution
- Other Combined Solution
- Other Sanitary Solution
- Existing Storm
- Existing Combined
- Existing Sanitary
- Affected Easement
- Assignment 63-02 Area



Evaluation Criteria for Alternatives

Each alternative solution was evaluated based on their ability to address the Study's purpose and to compare their relative impact based on the criteria below:

Natural Environment

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

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 Indigenous Communities

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

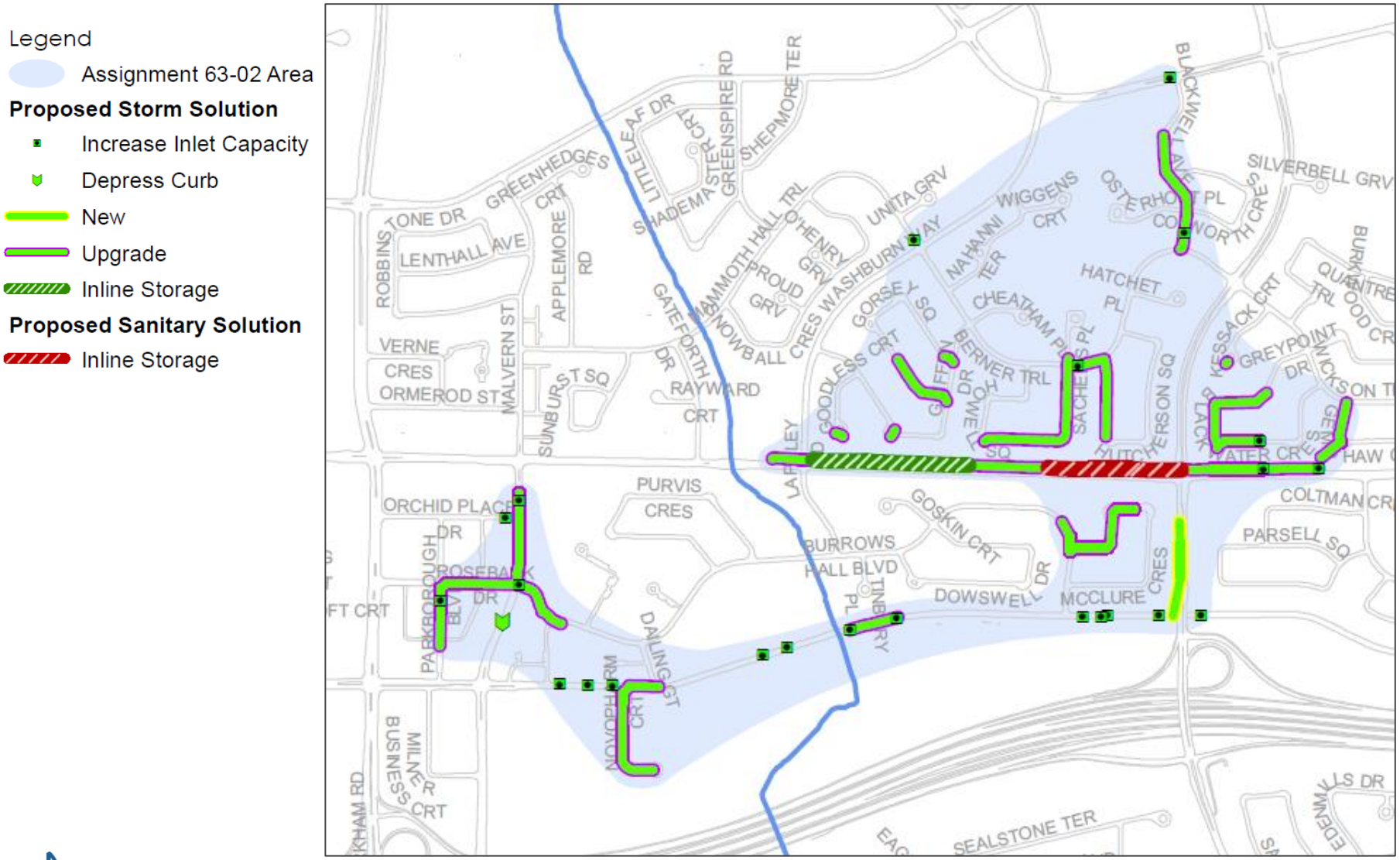
TORONTO

Recommended Improvements

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

- Alternative 3 is a hybrid of Alternatives 1 and 2
- The capital costs of all Alternatives are relatively similar, with Alternative 1 having a slightly lower cost
- Alternative 1 requires upgrades to sewers within private property rear yards along Neilson Rd, which is not preferred
- All three alternatives impact Rosebank Park, but Alternative 2 also requires upgrades along the Berner Park Trail, which Alternatives 1 and 3 avoid
- Alternatives 2 and 3 also avoid the outfall upgrade on Sheppard Ave E

Recommended Improvements



Map showing the Recommended Improvements for Assignment 63-02

Mitigation of Potential Impacts and Next Steps

Mitigation of Potential Impacts

Mitigation measures will be reviewed and refined during the detailed design

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
- Prepare tree compensation plans for tree removals
- 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

- Prior to the installation of a new outfall, determine increase in outlet velocities and flows and design energy dissipation measures as required to prevent erosion
- Consider flow path and outlet orientation with existing bank and potential for bank hardening to prevent erosion

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

TORONTO

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
- Once a project progresses to preliminary design, if there is a cost-benefit less than $68,000 per property, the project 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

TORONTO

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
- A project file report will then be completed in 2023 and made available for a 30-day public review

www.toronto.ca/BF63

TORONTO