

# Design of Westminster Drive and Woodhaven Park Drive Improvements

## Westminster Drive Storm Drainage Maps

The Coronation Park Drainage Assessment Class Environmental Assessment reviewed the existing and future storm drainage systems in a minor (5-year) and major (100-year) storm event. During the detail design of Westminster Drive, modelling of different scenarios under the 100-year storm was also conducted.

### Existing Conditions

Under existing conditions, runoff from a 100-year event would not be contained within the ditch system, and flooding of private property along Westminster Drive would occur. The Coronation Park EA identified two areas where flows would not be contained within the ditch system in a 100-year storm under existing conditions, as denoted by the thinner orange lines in Exhibit C-1.

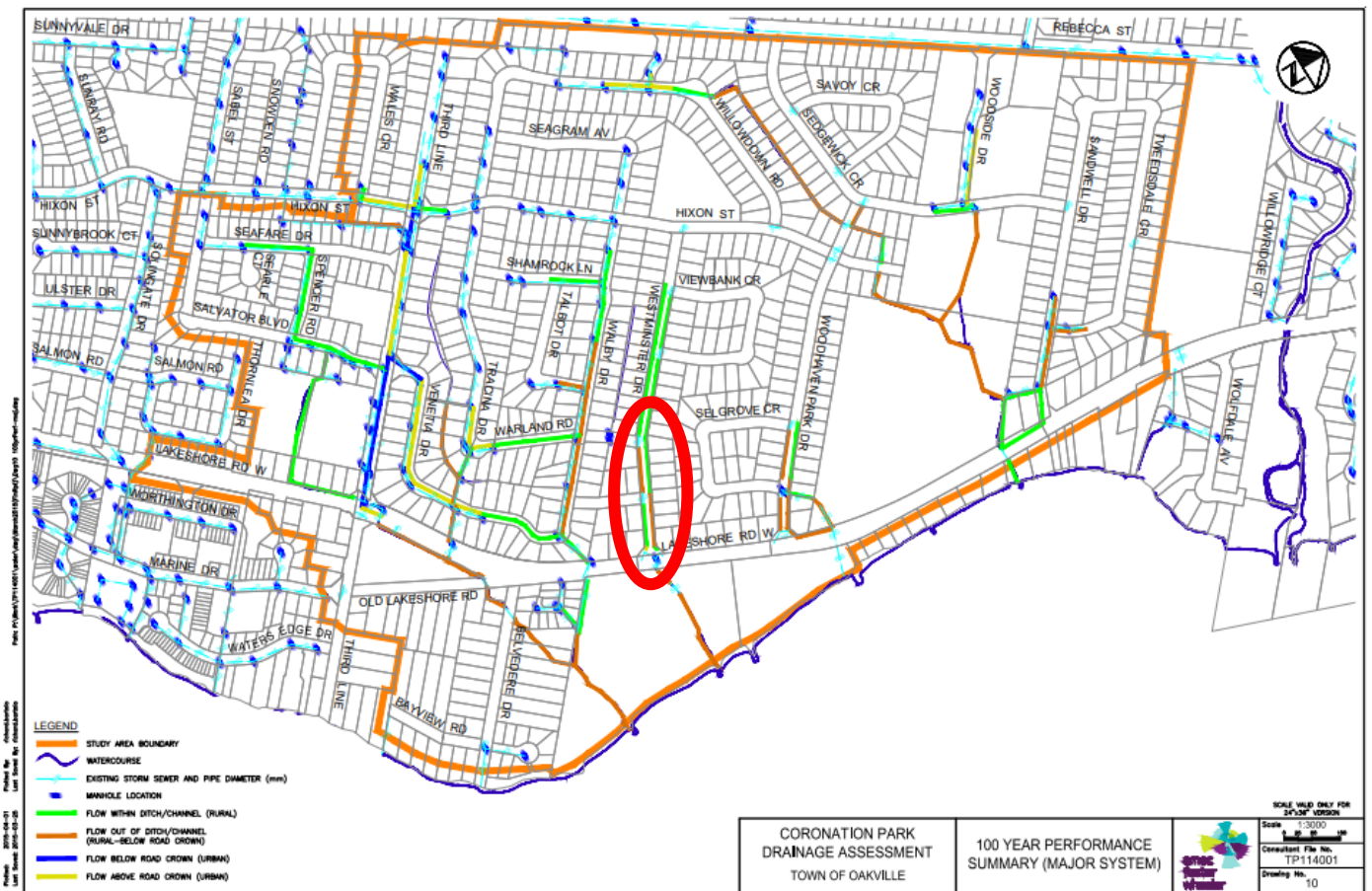
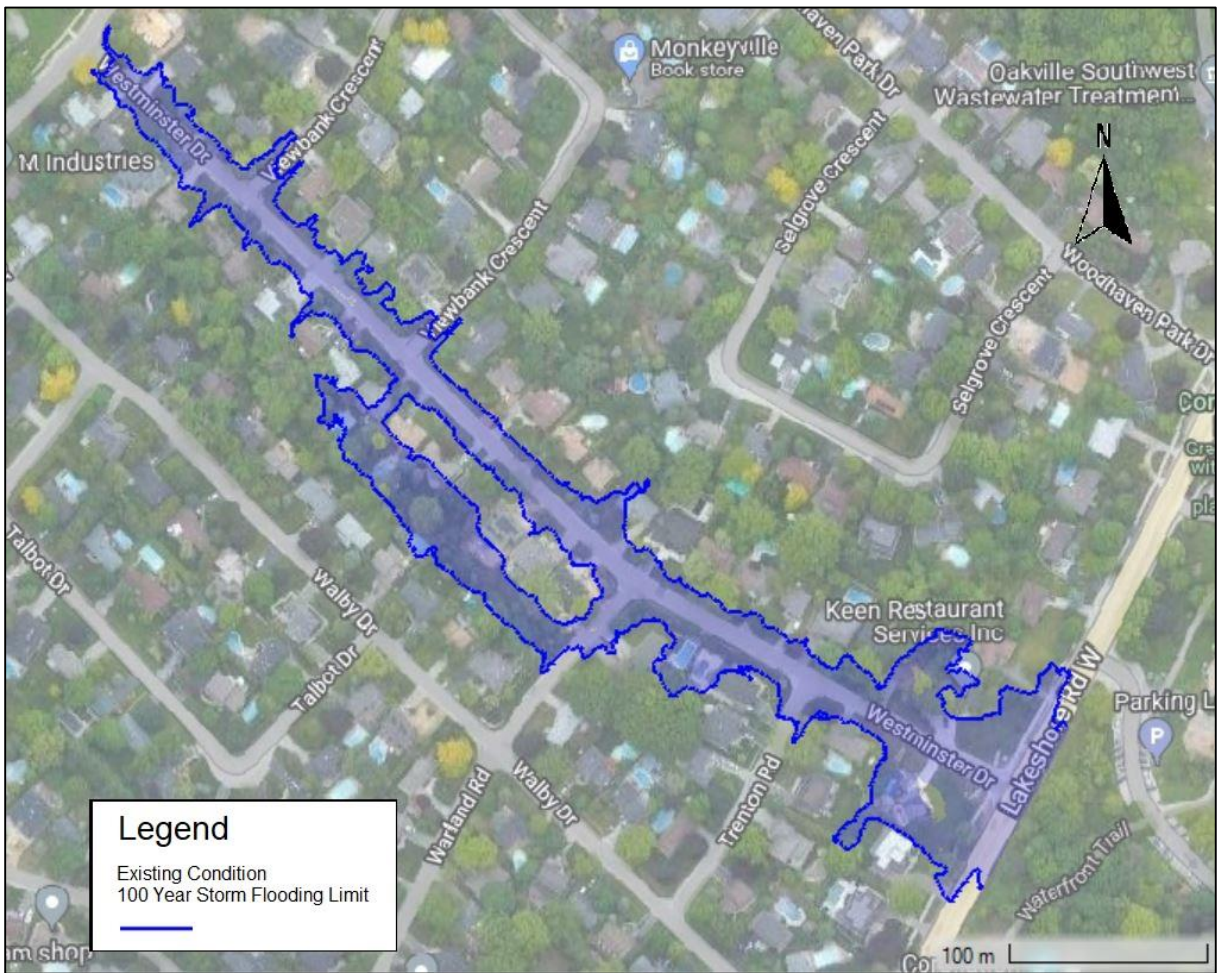


Exhibit C-1 – existing condition flood limit in a 100-year storm – Coronation Park EA

As part of the detailed design work, following the EA, updated modelling was completed for the existing conditions, with results illustrated in Exhibit C-2. In Exhibit C-2, the extent of flooding in a 100-year storm event, under existing conditions, as denoted by the blue line and shading:



*Exhibit C-2 – Existing condition flood limit in a 100-year storm (modelled)*

Some attendees of the October 5, 2023 Public Information Centre stated that their properties currently flood under less extreme storms than the 100-year event.

**Future Conditions**

The Coronation Park EA recommended that the drainage infrastructure on Westminster Drive include roadside ditches with ditch inlet catchbasins, and a storm sewer. Exhibit C-3 (taken from the Coronation Park EA) shows the major drainage system performance, with these improvements in place for a 100-year storm.



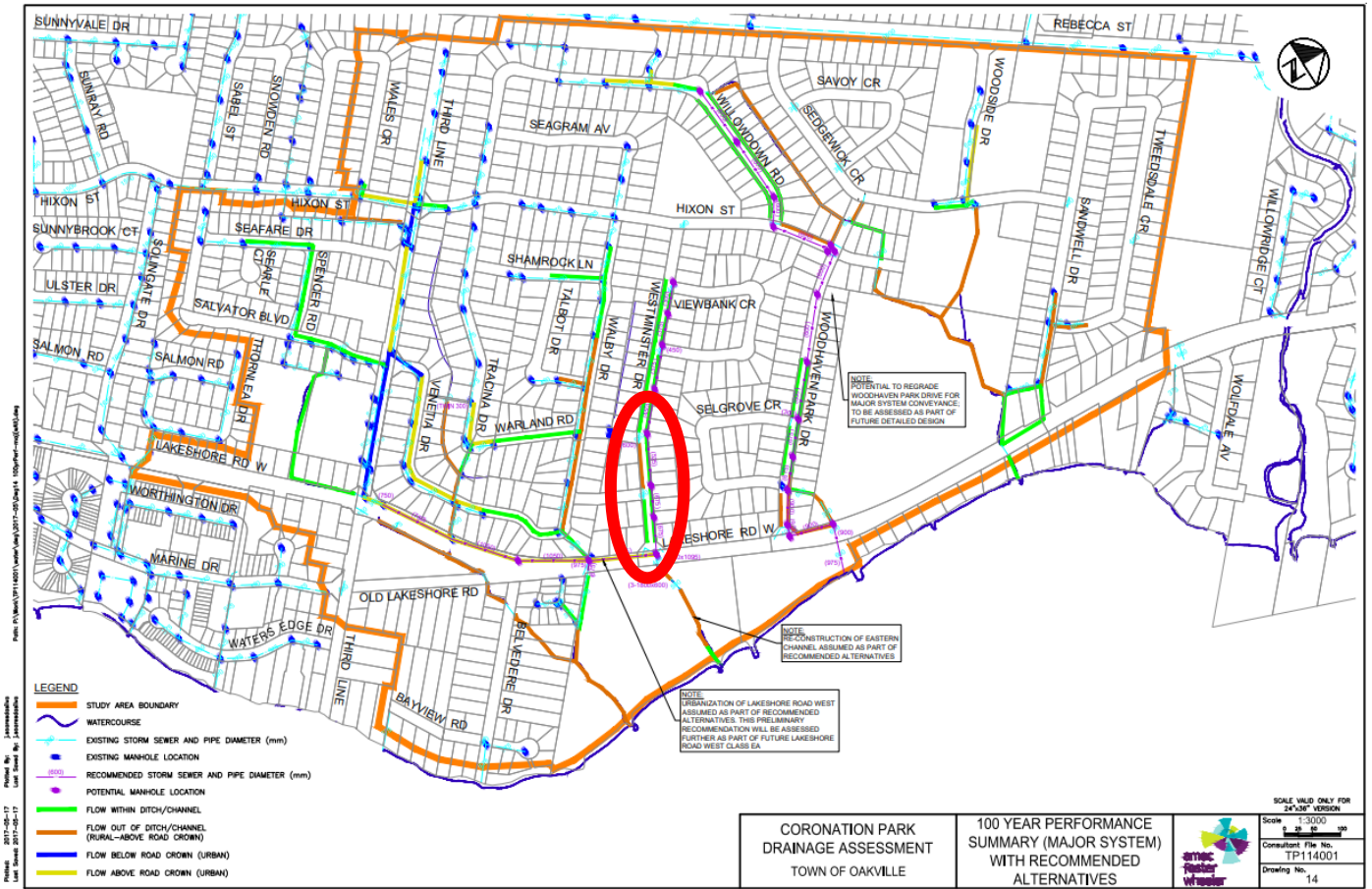


Exhibit C-3 – Coronation Park EA mapping of major system performance in a 100-year storm of the EA Preferred Alternative

The majority of storm drainage on Westminster Drive would be captured and conveyed by the ditches and storm sewer in a 100-year storm, but there would be an area, shown by the thin orange line, where flows will not be contained within the ditch and could impact private property under the EA preferred alternative.

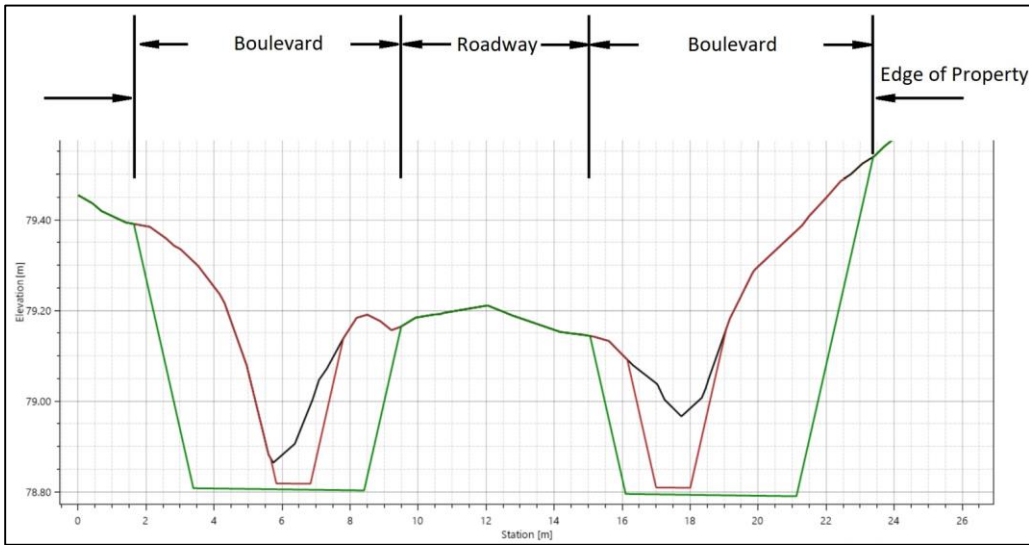
**Screening Analysis**

As part of the analysis of options to manage stormwater drainage (volume and flows) from a 100-year storm in the future, a screening analysis was conducted, comparing existing conditions, a scenario with minor re-grading of the existing ditches, and a scenario where major regrading of the ditches. In each of these scenarios, the ditches are a standalone measure to mitigate the flows and volume from a 100-year event; they are not supplemented by a storm sewer.

**Ditch Regrading Options – Cross-Section and Property Impacts**

Exhibit C-4, below, shows a typical cross-section of Westminster Drive with the 3 ditch scenarios overlaid on each other:

- Existing conditions (black line)
- Scenario 1 – minor regrading of existing ditches (red line)
- Scenario 2 – major regrading of existing ditches (green line)



- Existing conditions (3.0m ditch) —
- Scenario 1: — Minor re-grading of existing ditches (3.5m ditch)
- Scenario 2: — Major re-grading of existing ditches (8.5m ditch)

Exhibit C-4 –cross-section of ditch regrading options)

Exhibit C-5 shows the three scenarios overlaid on an airphoto of a property of Westminster Drive. The property line is shown in grey, and the black, red and green lines show the proximity of the edge of the ditch to the property line under existing conditions, Scenario 1 and Scenario 2, respectively.

In the major regrading scenario, Scenario 2, the edge of ditch would be at, or beyond the front property line.

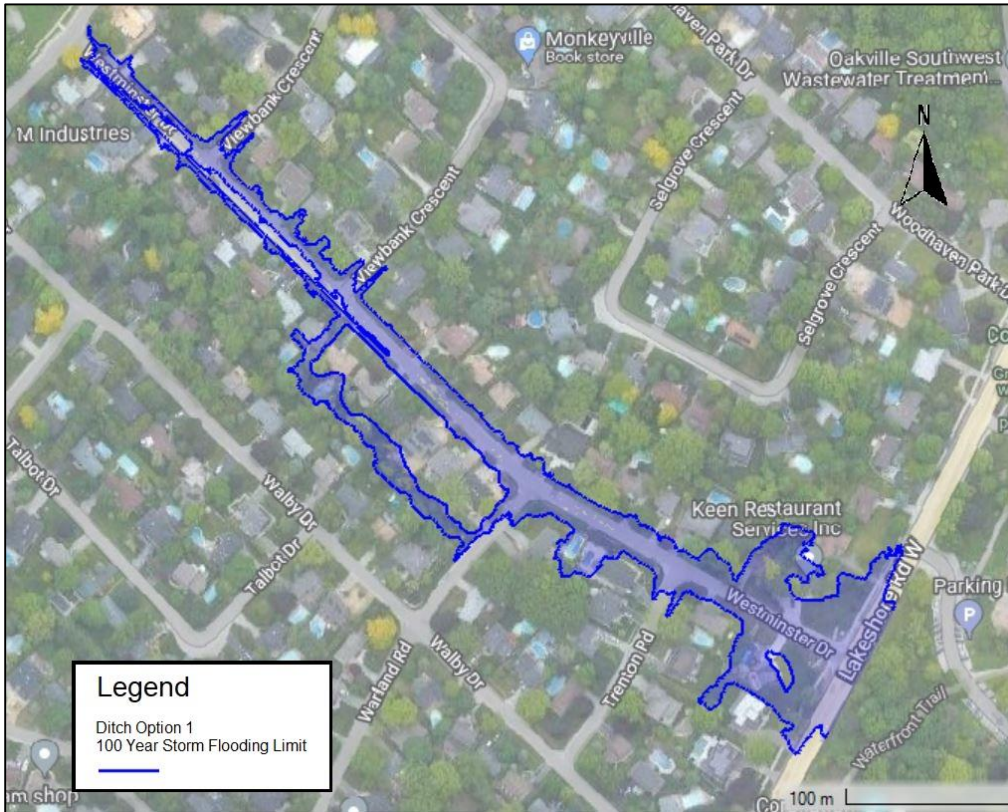


Exhibit C-5 –aerial view of extent of ditch limits for existing conditions, Scenario 1 and Scenario 2

**Flooding Limits with Minor and Major Ditch Regrading**

The effects of a 100-year storm with either minor or major ditch regrading were modelled and the 100-year flooding limits are shown on Exhibits C-6 and C-7.

In the minor ditch regrading scenario, Scenario 1, runoff is not well-contained within the ditch system, and flows spill into several properties during a 100-year storm (Exhibit C-6).



*Exhibit C-6 – 100-year flood limit (Scenario 1 – minor ditch regrading)*

In the major ditch regrading scenario, Scenario 2, runoff is mostly contained within the ditch system, but some flows spill into backyards year Viewbank Crescent and to properties at Lakeshore Road during a 100-year storm (Exhibit C-7).



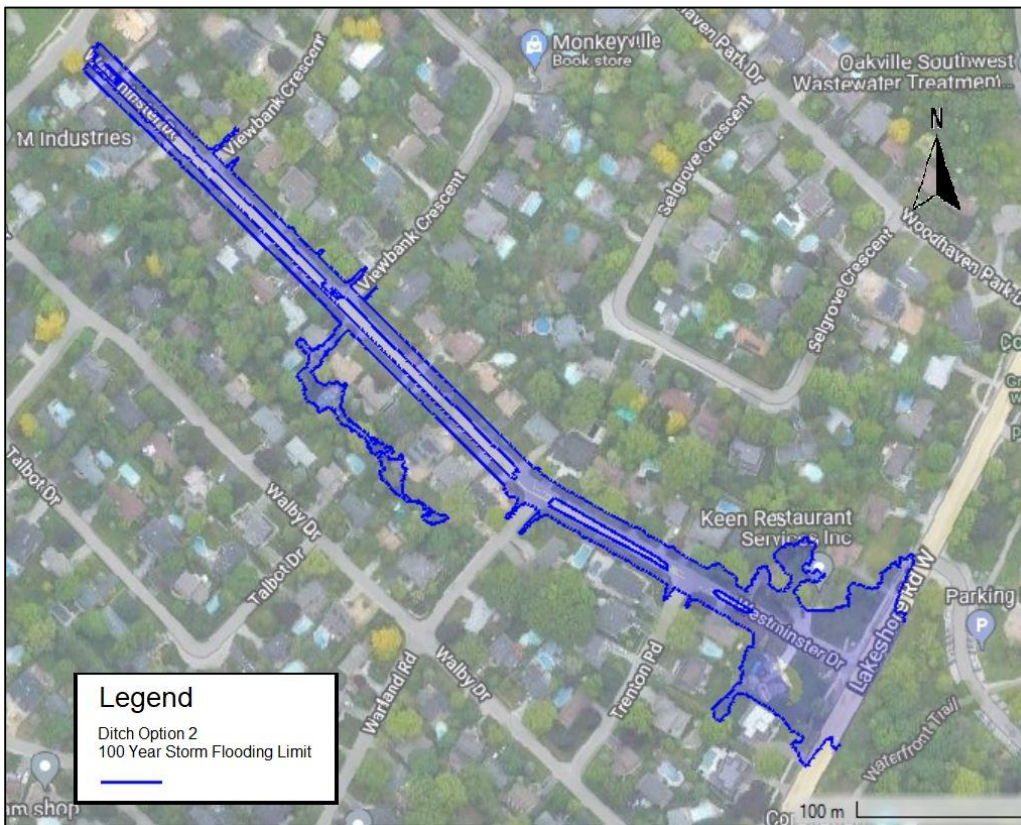


Exhibit C-7 – 100-year flood limit (Scenario 2 – major ditch regrading)

**Summary of Ditch Regrading Options**

As shown in Exhibits C-1, C-2, C-6 and C-7, the flows from a 100-year storm cannot be controlled by ditch regrading as a standalone measure. Exhibits C-7 show that Scenario 2, the option that has the greatest flood mitigation potential of the 3 ditch regrading options, has significant property impacts with ditches extending to, or beyond, the front property line. The depth and extent of the ditches in Scenario 2 would impact all trees and utilities currently in the right-of-way between the edge of pavement and the front property line.

These impacts are summarized in Table 1, below.

100-year Storm Event	Existing Conditions	Scenario 1: Minor Grading	Scenario 2: Major Grading
Width of Ditch	~3.0 m	~3.5 m	~8.5 m
Distance from property line to edge of ditch	~3.0 m	~2.4 m	~0 m (at or into property line)
Analysis	Several properties and buildings at flood risk	Some properties and buildings at flood risk	Infeasible due to property, tree, and utility impacts.

Table 1 –Summary of Ditch Regrading Only Options and Analysis

### Analysis of Storm Sewer Installation on 100-Year Storm Flooding

Managing the flows from a major (100-year) storm event is an important design criterion for the Westminster Drive project. Ditch regrading, as a standalone measure, is not feasible as a means to significantly mitigate the impacts of a 100-year storm event.

The installation of a storm sewer system on Westminster Drive can dramatically reduce the flooding limit under a 100-year storm event. Exhibit C-8 shows a comparison between the flood limit under existing conditions (dark blue line) and with a storm sewer in place (light blue line and shading).



Exhibit C-8 – 100-year flood limit comparison (existing conditions and storm sewer option)

#### Summary:

**A storm sewer has the greater benefit to mitigating the extent of overland flooding in the event of a 100-year storm than just regrading the existing ditches.** The planned cross-section and storm sewer significantly reduce the flow limits as compared to existing conditions.

**Further, the EA preferred alternative (ditch with storm sewer) shows there will continue to be overland flooding in a small area along Westminster Drive.**