

TYPES OF FLOODING

The Study Area may be susceptible to riverine (fluvial) and urban flooding. This Study focuses on riverine flooding due to overtopping of the Joshua's Creek channel and inundation of the surrounding areas.



<https://www.insidehalton.com/news-story/7287659-flood-concerns-prompt-town-of-oakville-to-close-fields-parks-trails-and-piers/>



thestar.com/news/gta/2013/09/17/flood_will_cost_city_of_toronto_more_than_60_million.html

Riverine Flooding:

- Riverine flooding occurs when the water level in a natural watercourse increases beyond the capacity of the channel, overtops the banks and inundates the adjacent areas.

Urban Flooding:

- Urban flooding occurs when heavy rain falling on largely impervious areas overwhelms the capacity of the stormwater drainage system and inundates properties and development.

PROBLEM/OPPORTUNITY

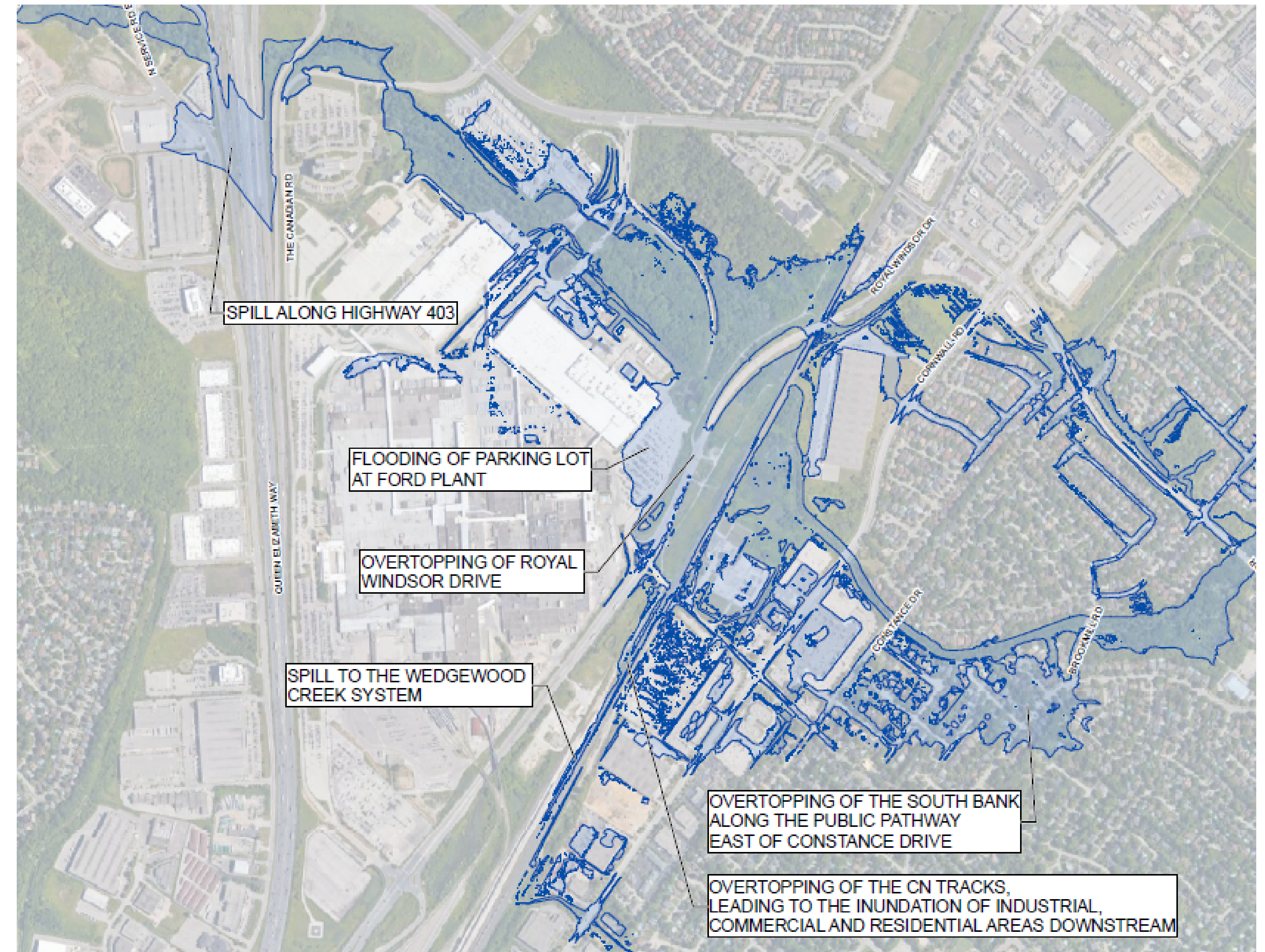
The Town has conducted several studies to assess flood risk along Joshua's Creek, identifying the following flood risk sites:

Primary Flood Risk Sites

- Flood inundation of the commercial and residential areas downstream of the Metrolinx Railway during the Regional flood event.
- Spills to the Wedgewood Creek system near the Royal Windsor Drive and Metrolinx Railway crossings during the 100-year climate change and Regional flood events.

Other Flood Risk Sites

- Overtopping of Royal Windsor Drive during the 25-year to Regional flood event
- Flood inundation of industrial parking lots and loading bays
- Spills upstream of Highway 403 during the Regional flood event.



PROBLEM/OPPORTUNITY

Problem/Opportunity Statement

- The Study objective is to determine the flood control infrastructure and/or non-structural measures that will most effectively reduce riverine flood risk along Joshua's Creek within the Town's jurisdiction.
- The Study goals are to enhance public safety and reduce property and environmental damages, economic losses, social disruption, public and private expenditures and impacts to critical infrastructure.
- Information from the Study will be used by Conservation Halton to develop screening mapping and may also be used to inform future updates to Conservation Halton's regulatory floodplain mapping.



NATURAL ENVIRONMENT

WILDLIFE

- Wildlife observed during surveys include grey squirrel, raccoon, American robin, Baltimore oriole, blue jay, gray catbird, killdeer, northern flicker, red-tailed hawk, and turkey vulture.
- The majority of species observed in the Study Area are tolerant of urban conditions.
- A variety of other wildlife dependent on wetlands and treed habitats are expected to occur throughout the Study Area (e.g., wetland foraging insectivores such as bats).



WETLANDS

- Although the Study Area has Joshua's Creek flowing through its entirety, there is only a small wetland in the central region.
- This wetland is a cattail meadow marsh (MAMM1-2) with a small tributary running through at the time of the September survey.
- This wetland features occasional patches dominated by the highly invasive European reed (*Phragmites australis* ssp. *australis*).



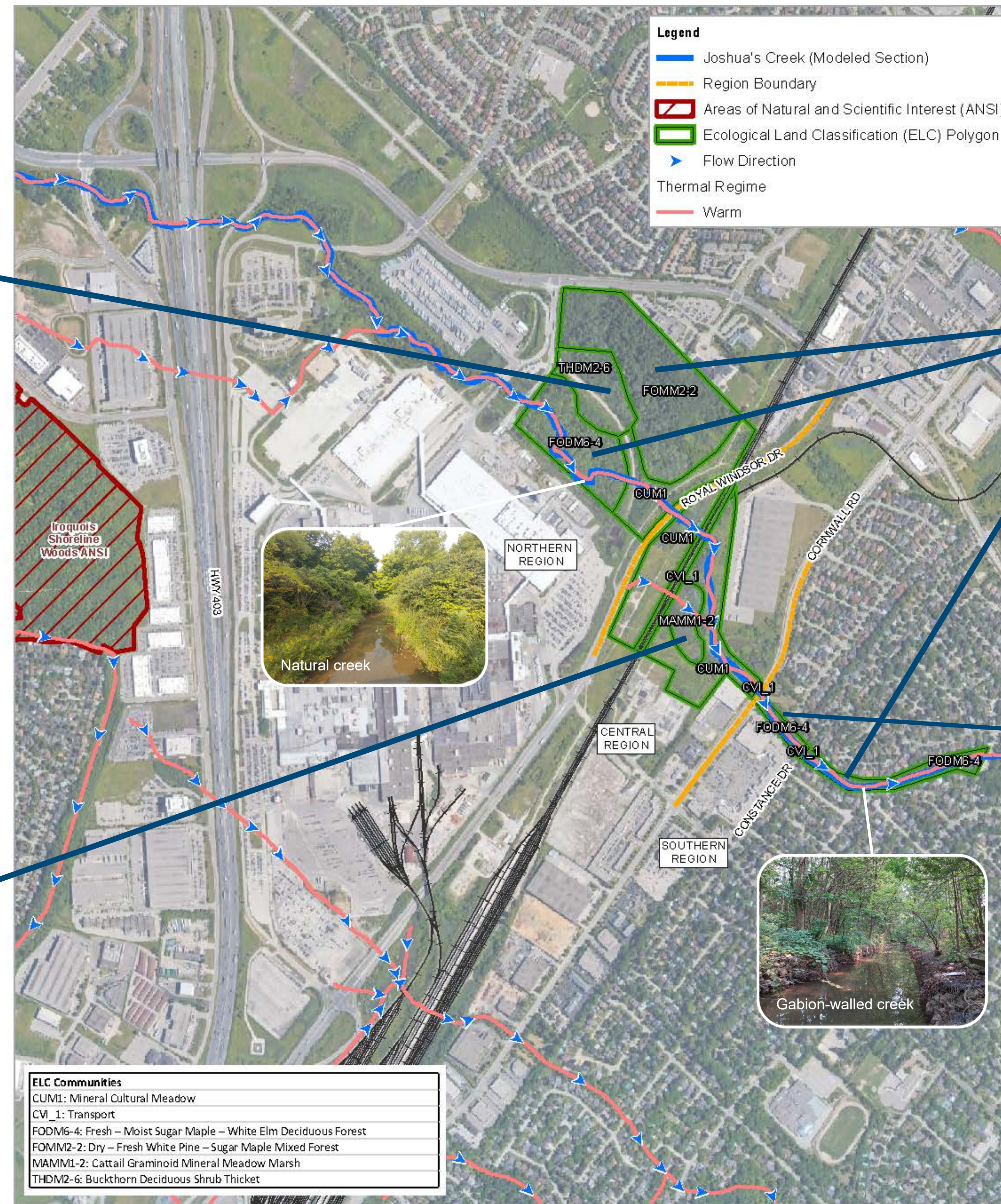
FORESTS

- The northern region is dominated by sugar maple - white elm deciduous forest (FODM6-4) and white pine - sugar maple mixed forest (FOMM2-2).
- The southern region is dominated by sugar maple - white elm deciduous forest running parallel to Joshua's Creek.
- These mature forests may provide potential maternity roosts for Endangered bats such as little brown myotis, northern myotis, and tri-coloured bat.

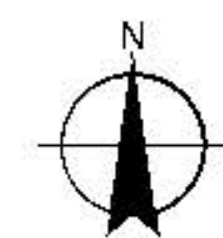


AQUATIC HABITAT

- Joshua's Creek has a warm thermal regime and flows from northwest to southeast throughout the Study Area.
- The northern region features natural creek, while the central and southern regions are lined with gabion walls.
- Land Information Ontario reports two aquatic surveys conducted within the area finding 11 species including blacknose dace, common shiner, fathead minnow and rainbow trout.
- More detailed aquatic habitat characterization field work may be required depending on the chosen solution.



Paper Size ANSI A
0 100 200 300
Meters
Map Projection: Transverse Mercator
Horizontal Datum: North American 1983
Grid: NAD 1983 UTM Zone 17 N



TOWN OF OAKVILLE
2D HYDRAULIC MODELLING OF JOSHUA'S CREEK
DESIGNATED AREAS AND NATURAL ENVIRONMENT FEATURES

Project No. 11211778
Revision No. -
Date Oct 22, 2020

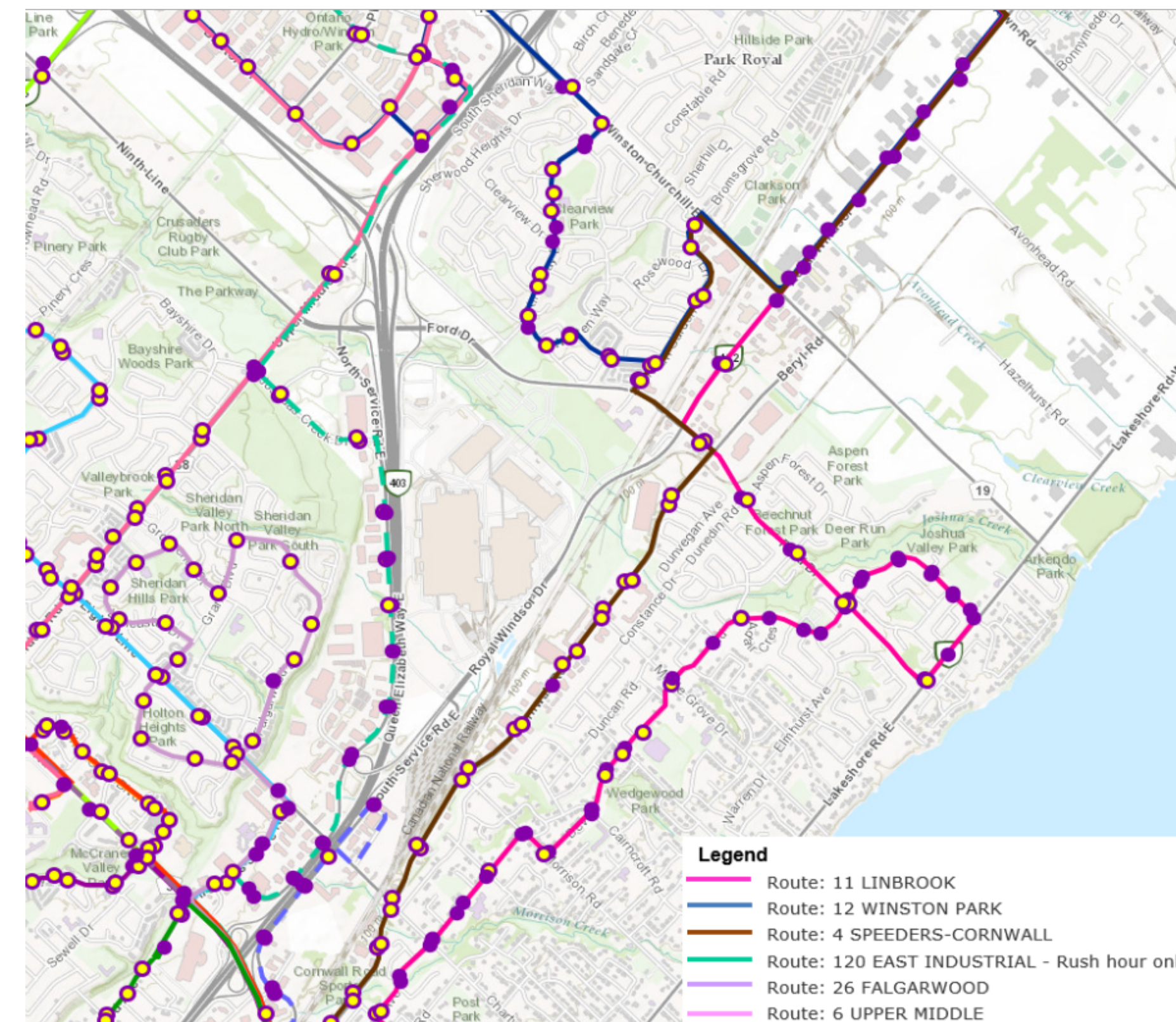
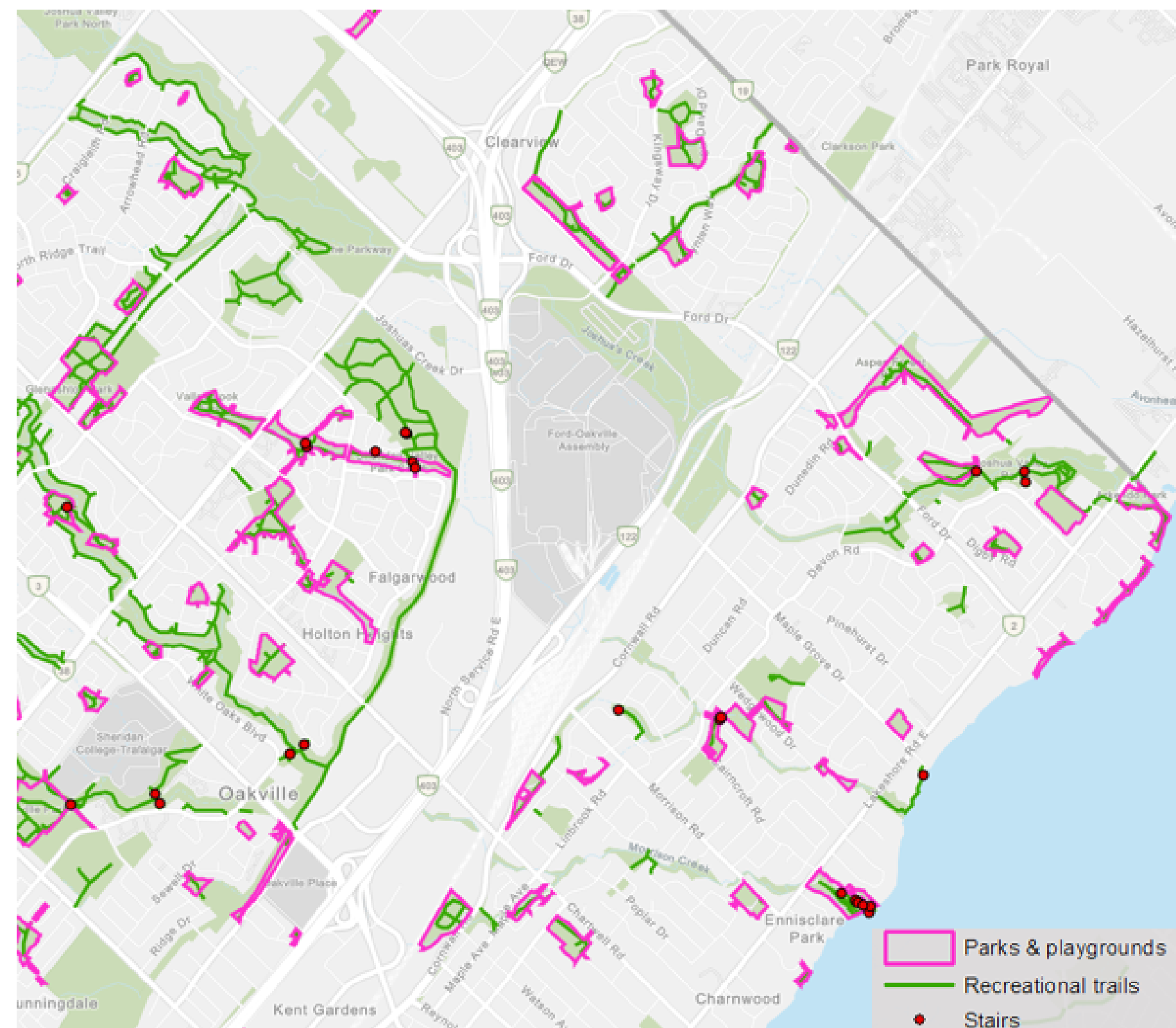
FIGURE 4.2

Q:\GIS\PROJECTS\11211778\11211778_01\Map\MapInfo\2020\11211778_202010_JMC_EAP\Progress\Report_GIS014.mxd Data source: Imagery © Google 2020, MNR/NRVS, 2019. Produced by GHD under licence from Ontario Ministry of Natural Resources and Forestry, © Queen's Printer 2020. Print date: 22 Oct 2020 - 14:04



SOCIAL, ECONOMIC AND CULTURAL ENVIRONMENTS

Social



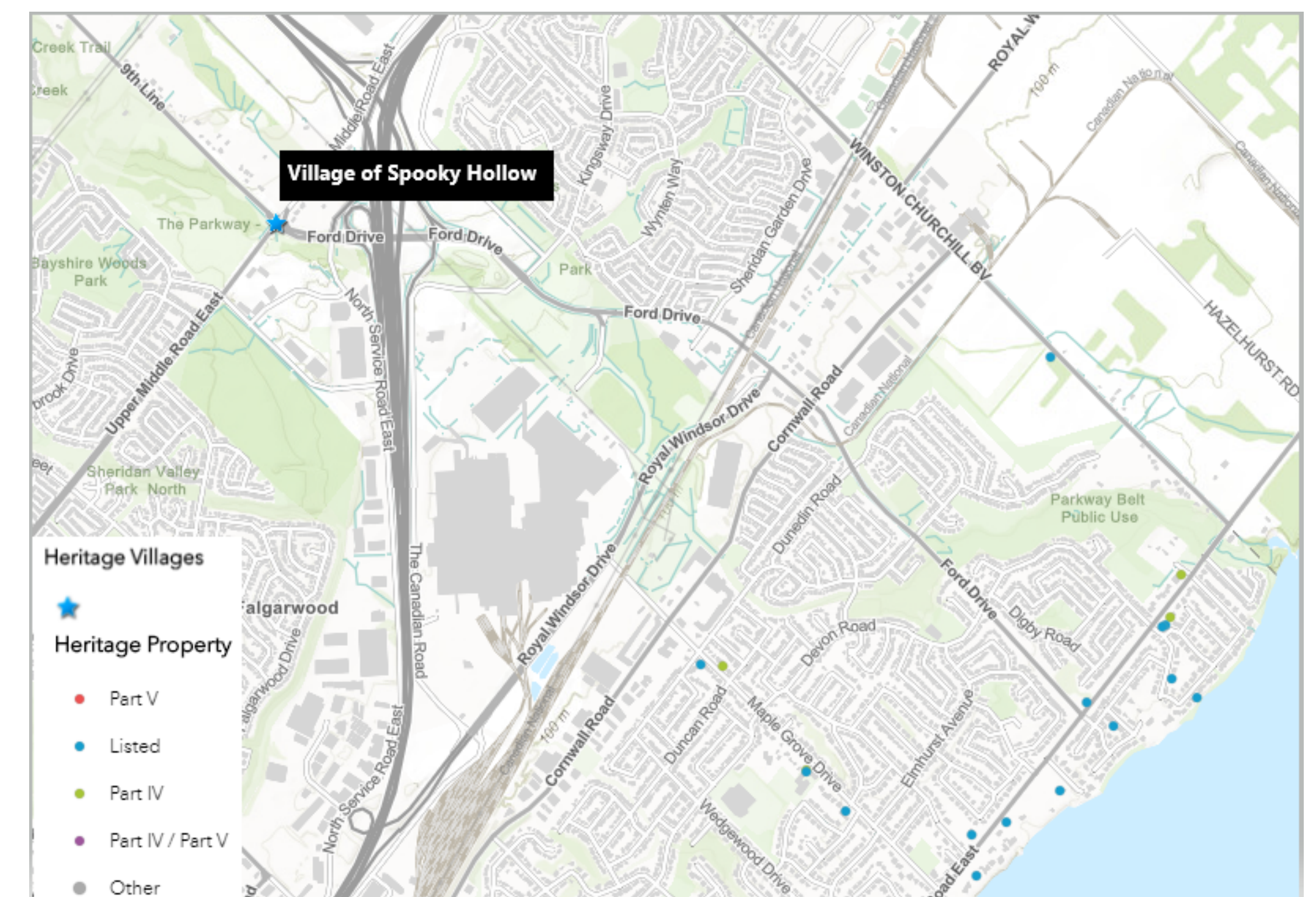
The Town is characterized with several parks and playgrounds, recreational trails as well as an extensive transit network that extends through the Study Area.

Economic

- Oakville is home to several leading companies including Ford Motor Company of Canada, Siemens Canada, Collins Aerospace, PwC, Aviva Canada, Rockstar Toronto and Geotab.
- There is healthy supply of designated employment land which totals nearly 2,150 gross hectares and approximately 727 net hectares of vacant employment land that the Town of Oakville is seeking to develop in the future to encourage business growth.

Cultural

- There are several heritage listed properties located within the Study Area.
- Three properties designated under Part IV on the Ontario Heritage Act adjacent to the Study Area.
- One Heritage Village – Village of Spooky Hollow is situated in the Study Area.



HYDROLOGIC & HYDRAULIC MODELLING OF JOSHUA'S CREEK

Flood potential along Joshua's Creek was assessed using hydrologic and hydraulic computer models.

Creek Flows

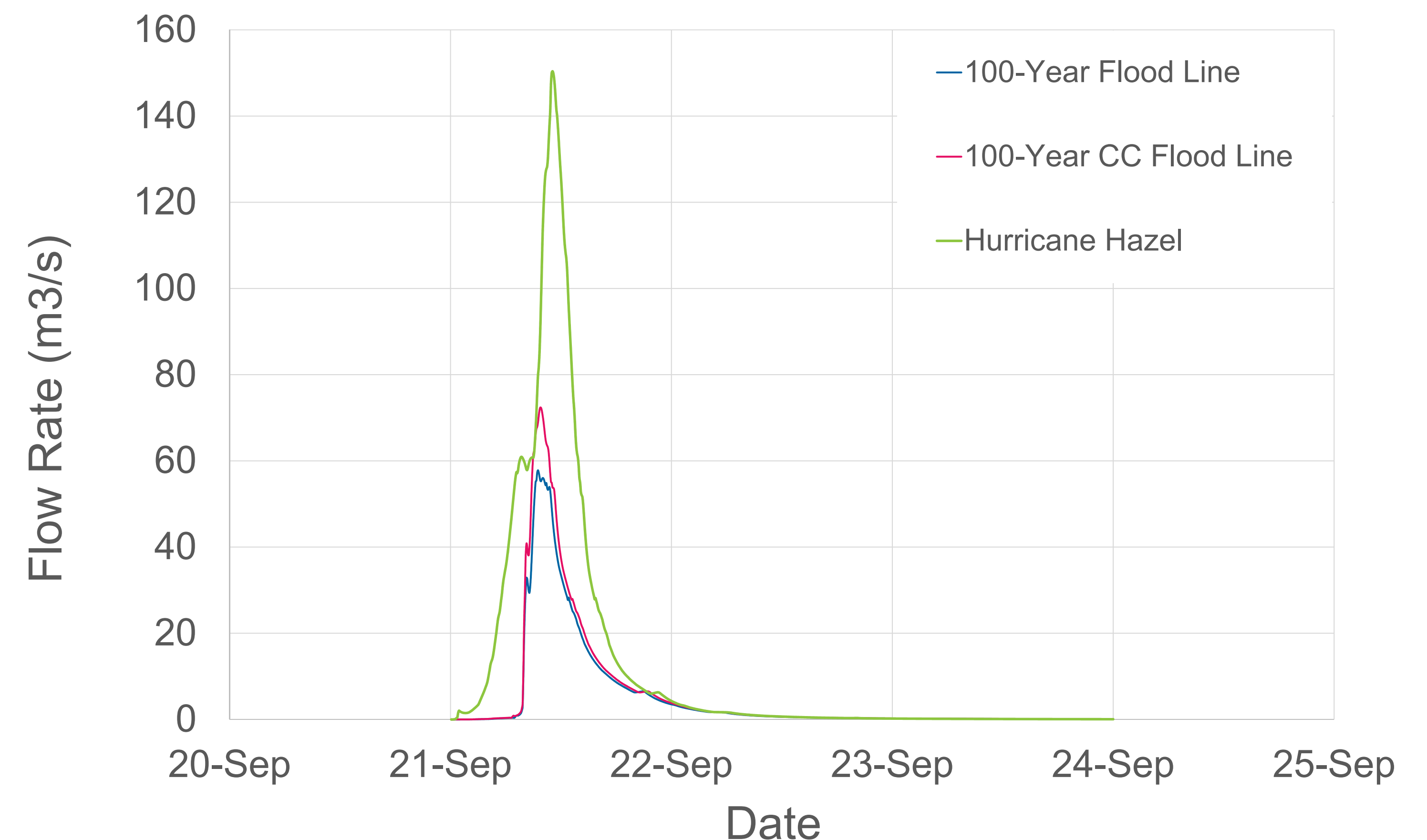
- A hydrologic model of the Joshua's Creek watershed was built to estimate creek flows for a range of storm events.

Flood Inundation Mapping

- Flood extents were generated using a combination of 1D and 2D hydraulic models.

Climate Change

- The Study has incorporated climate change into the hydrologic modelling.
- The 100-year flows were adjusted to represent a worst-case future scenario with respect to increased green house gas emissions.



Comparison of 100-year, 100-year climate change, Regional flow hydrographs

- The Regional peak flow rate is more than 2x's greater than the 100-year and 100-year climate change peak flow rates as shown on the graph presented above.