

Mill Creek and Ben's Ditch Floodplain Mapping Study

Virtual Public Information Centre

March 28, 2024



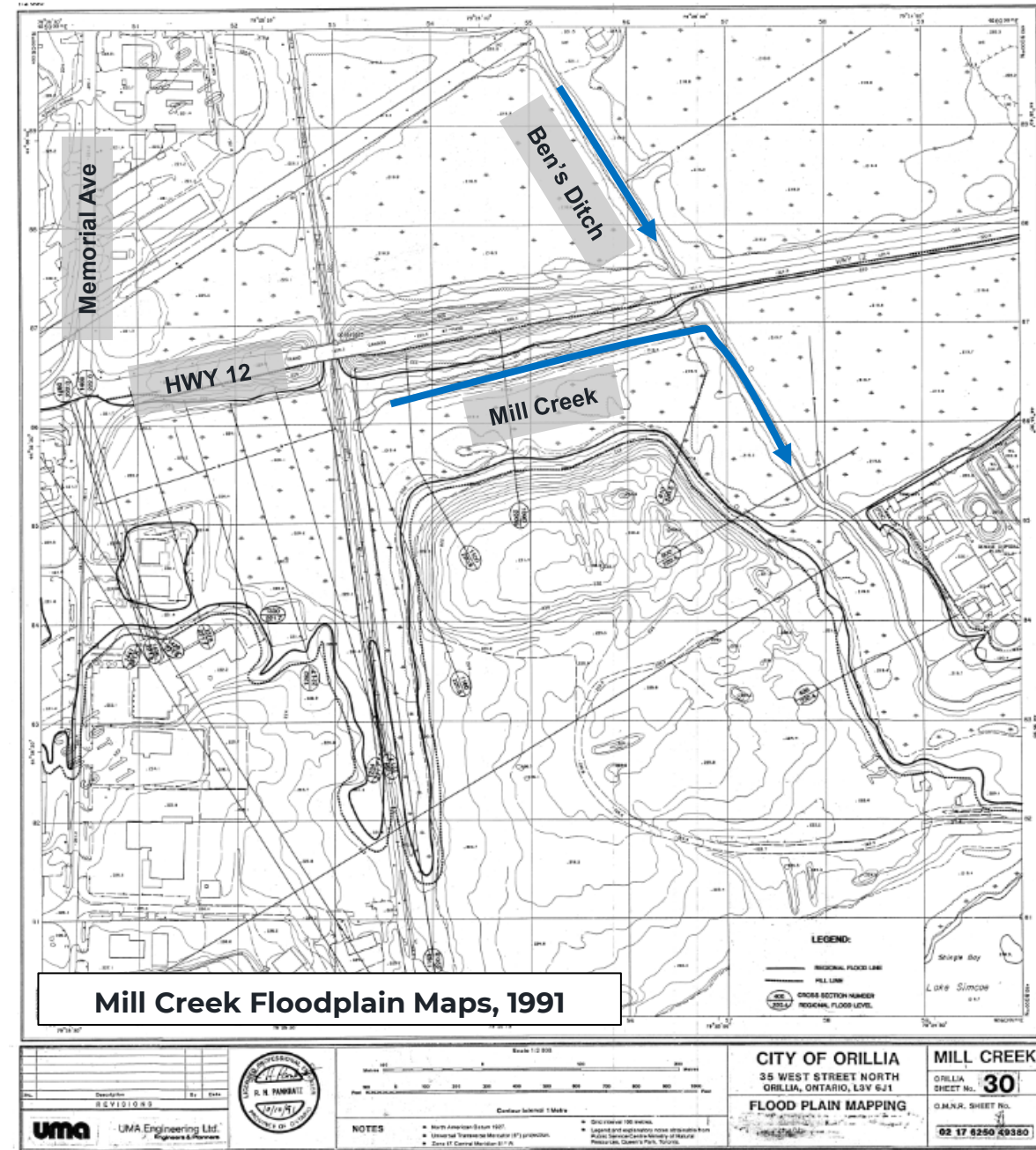
Project Overview

Study Background

- This study has been undertaken to update the City's floodplain mapping for Mill Creek and Ben's Ditch.
- The Mill Creek floodplain was last mapped during 1991 and did not include floodplain mapping of Ben's Ditch.
- Floodplain mapping helps to identify areas at risk of flooding during severe and infrequent storm events.
- The updated flood hazard mapping will inform the City's updated Official Plan, which will in turn inform the Zoning By-law provisions for floodproofing to address the negative impacts caused by flooding.

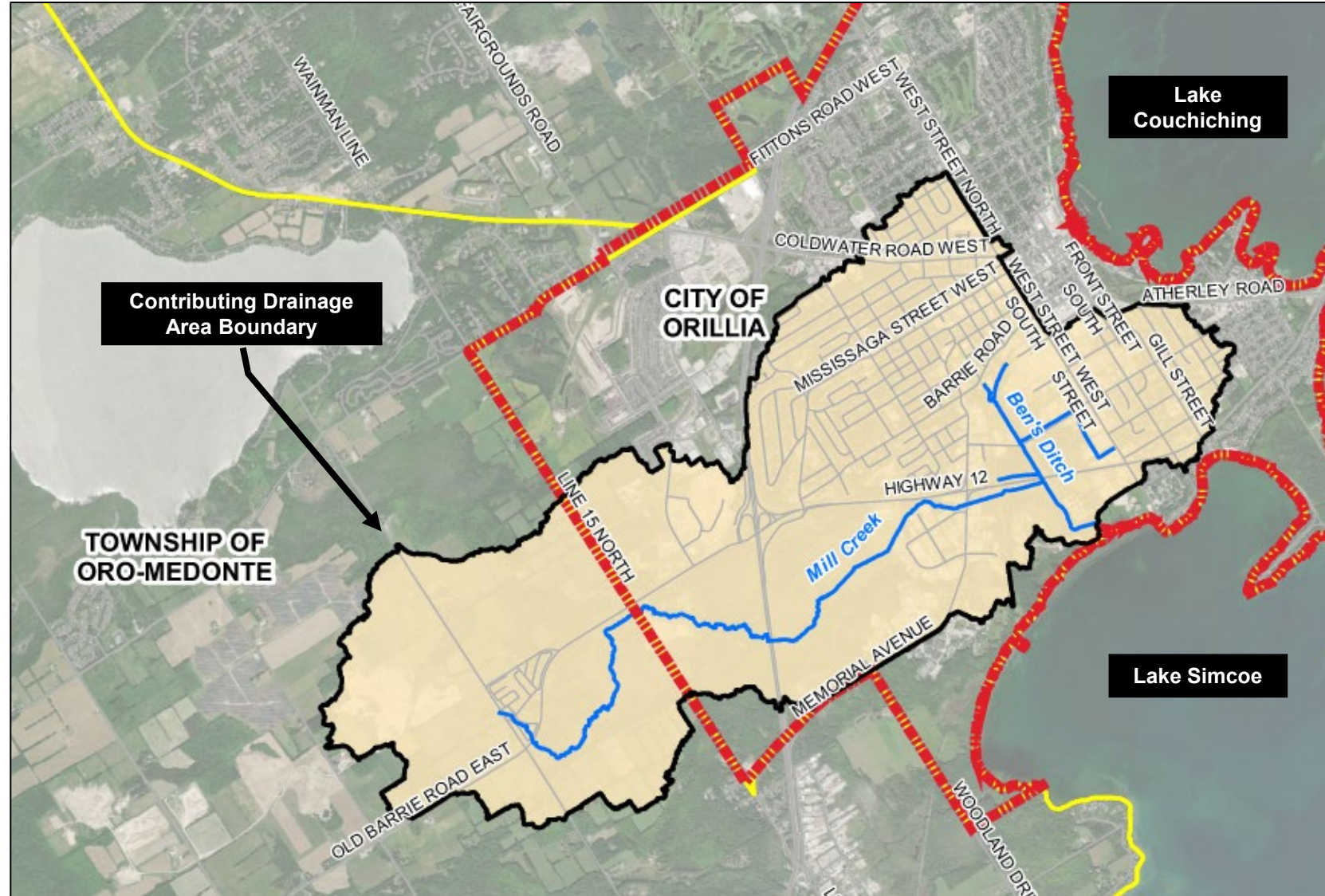
History

- The Mill Creek floodplain was last mapped during 1991 and did not include floodplain mapping of Ben’s Ditch.
- The current study (2024) was completed by using the most up-to-date modelling technology based on the latest background information (e.g., land use, soil, weather data, topographic data, etc.)



Study Area

Mill Creek and Ben's Ditch have **contributing drainage areas** of approximately 11.5 km² and 5.8 km² respectively.



Project Partners

The flood plain mapping study is being undertaken with the support of the Natural Resource Canada (NRCan) through the Ontario Ministry of Natural Resources and Forestry (MNR) as part of the Flood Hazard Identification and Mapping Program (FHIMP).

Note that the views expressed in the publication material are the views of the City and do not necessarily reflect those of the Province.

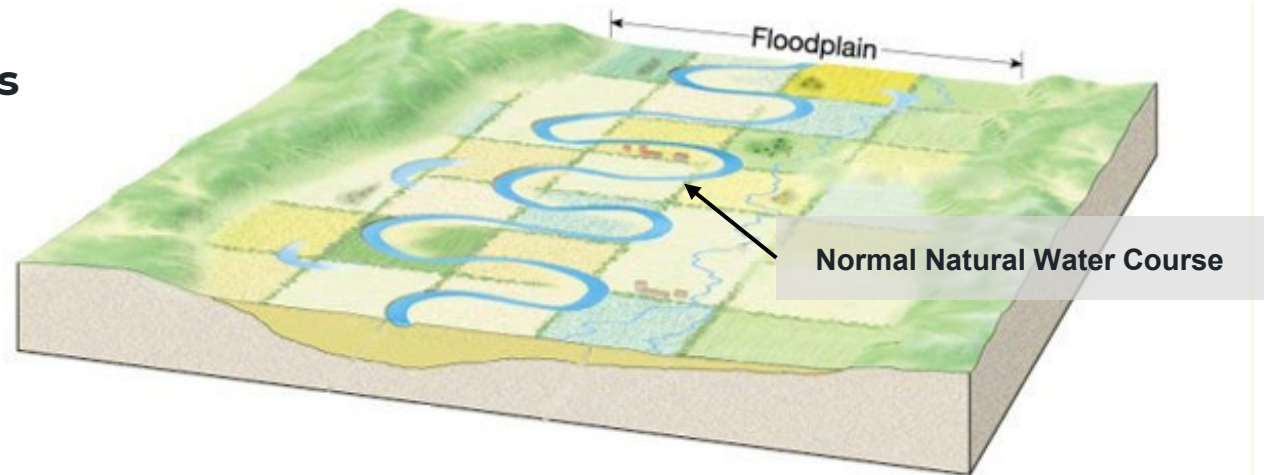


Floodplain Mapping Requirements

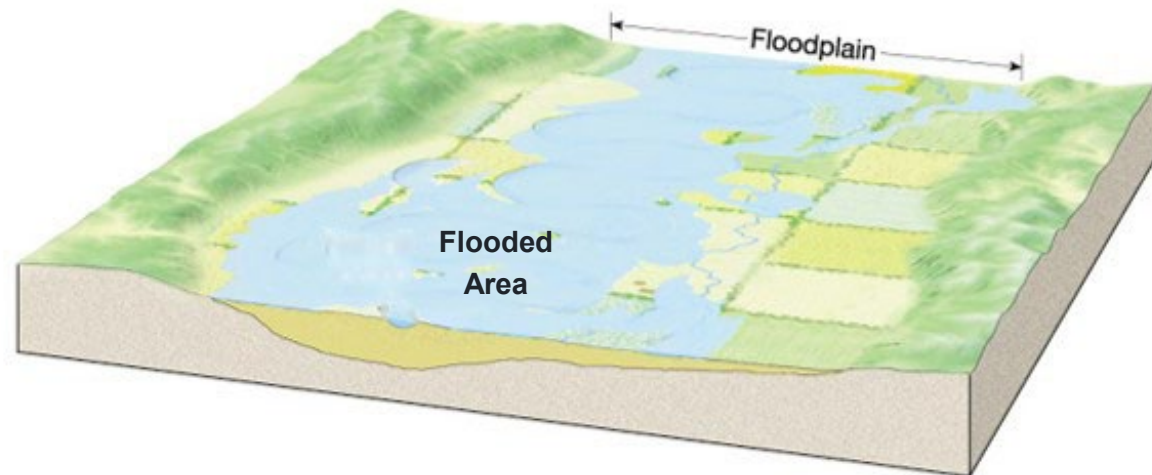
What is a Floodplain?

A floodplain is an area of land near a waterbody that is often flooded when that waterbody is too full. Floodplains are natural features that allow flood waters to spread across the landscape.

Normal Conditions



Flood Conditions



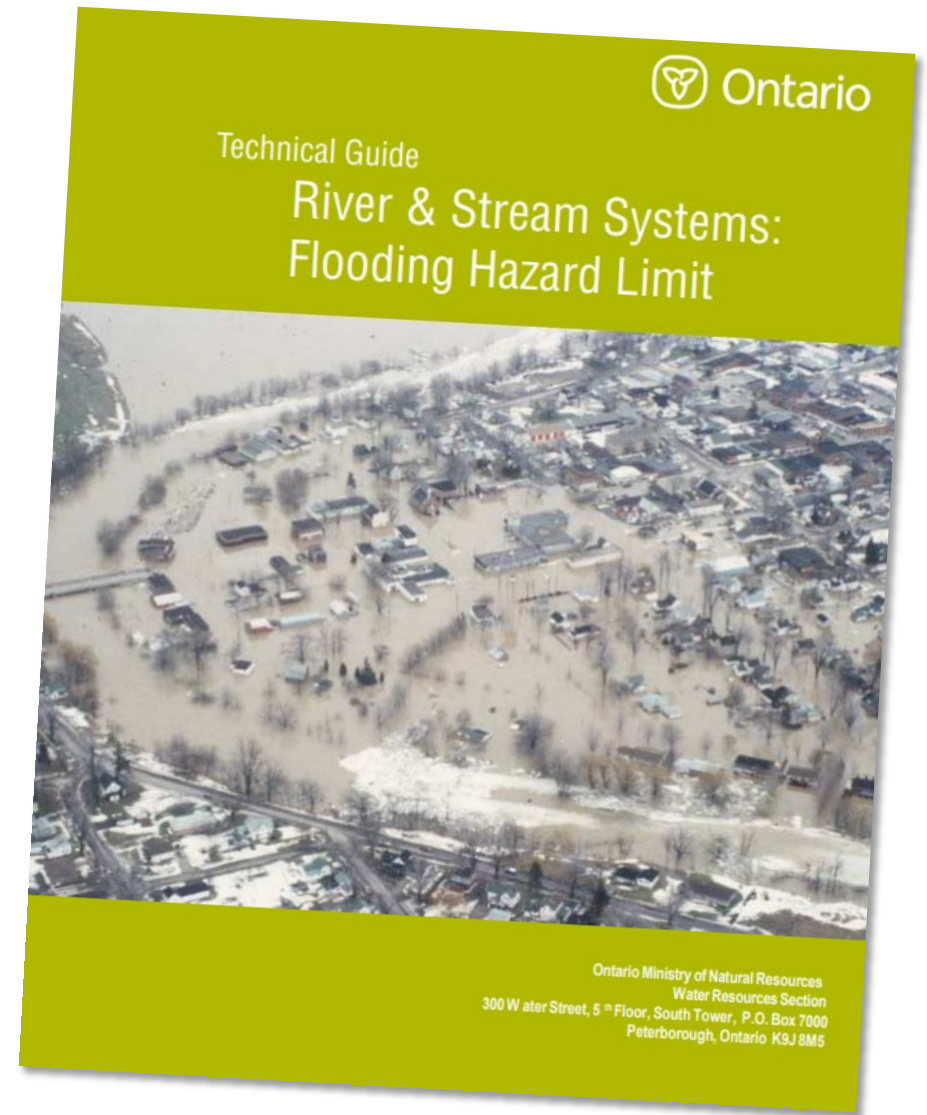
What is Floodplain Mapping?

Floodplain mapping is used to identify areas that may be susceptible to river flooding during large storm events. Floodplain mapping relies on field surveys and engineering analysis.



What Standards are Followed?

Floodplain mapping must be undertaken in a manner consistent with the Provincial Technical Guide – River & Stream Systems: Flood Hazard Limit (2002).



Why is Floodplain Mapping Important?

- The first step to reduce the cost of flood damage within a community is to have mapping that accurately shows the flood hazard.
- These maps help people prepare for and respond to potential flooding.
- The flood hazard mapping also informs the City's updated Official Plan and Zoning By-law provisions for floodproofing and guides future development.



Queen Street East / Front Street South, Orillia, July 2023

Source: OrilliaMatters



Don Valley Parkway, Toronto, July 2013

Source: The Canadian Press

There have been bigger storms in Ontario



Flooding during Hurricane Hazel - Toronto, 1954

Source: Government of Canada

From October 14 to October 15, 1954, an estimated 210 mm of rain fell on the Toronto Region. **Hurricane Hazel** induced the most severe flooding in Toronto in over 200 years. The flood damage was estimated at \$25 million (\$146.9 million in 1998 dollars) including, 81 lives lost, and 1868 families left homeless.



An undated photo of a flood in Timmins.

Source: Timmins Museum: National Exhibition Centre

In Timmins on August 31, 1961, the **Timmins Storm** (estimated 193 mm of rainfall) created severe property damage and resulted in loss of life on the banks of Town Creek. Although the downpour only lasted a few hours, the resulting flood destroyed roads and homes, undercut foundations, and damaged personal property.

What is the Regulated Flood Hazard?

For Mill Creek and Ben's Ditch watersheds, the Regulatory flood is produced by the Timmins Storm or the 100 Year Flood, whichever is greater (i.e., Zone 3 as per Figure 3.3 of MNR Technical Guide, 2002).

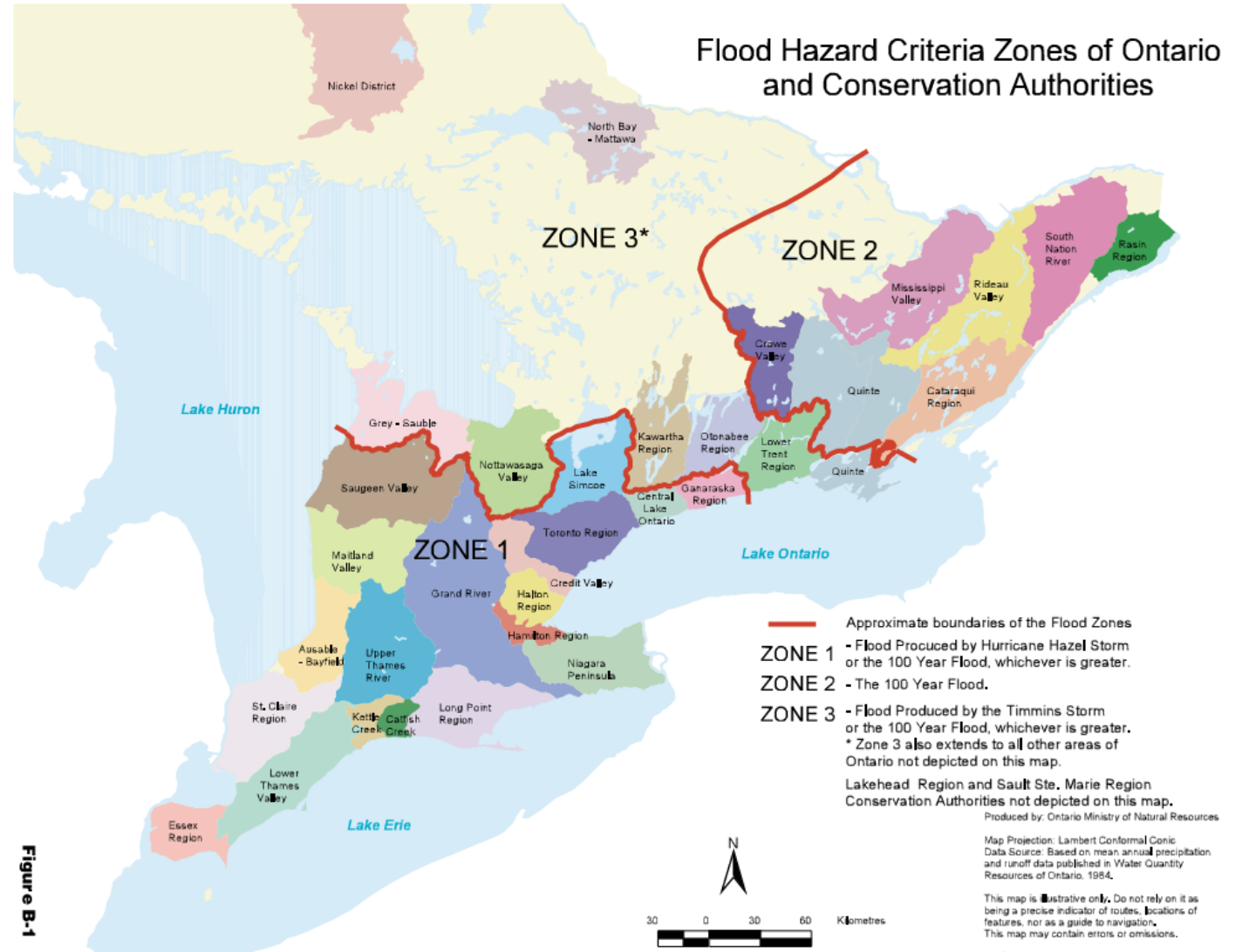


Figure B-1

Methodology

Development of Hydrologic Model

— Hydrology

Process of evaluating and characterizing the land area draining to a watercourse (or other point of interest). Often results in a method to estimate peak flow rates in that watercourse, often with a computer model.

— Watershed Discretization

Subwatershed Name	Total Drainage Area (ha)	No. of Catchments	Minimum Catchment Size (ha)	Maximum Catchment Size (ha)	Average Catchment Size (ha)	Median Catchment Size (ha)
Mill Creek and Ben's Ditch	1733.6	41	0.01	161.6	42.3	34.6

— Calibration and Validation

A robust, industry recognized approach to calibration and validation is required. This project uses the CIWEM Urban Drainage Group's "Code of Practice for Modelling of Urban Drainage Systems."

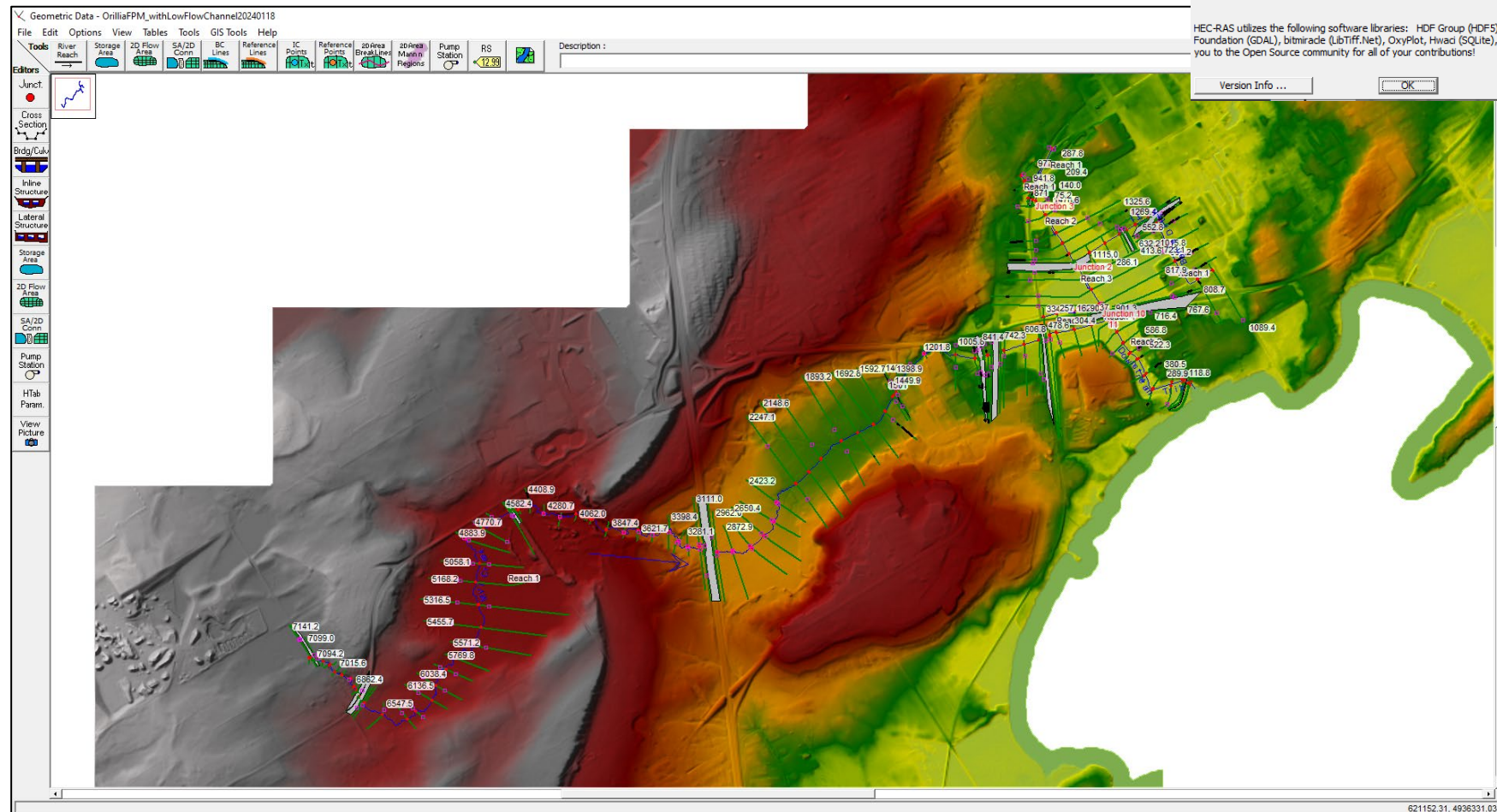
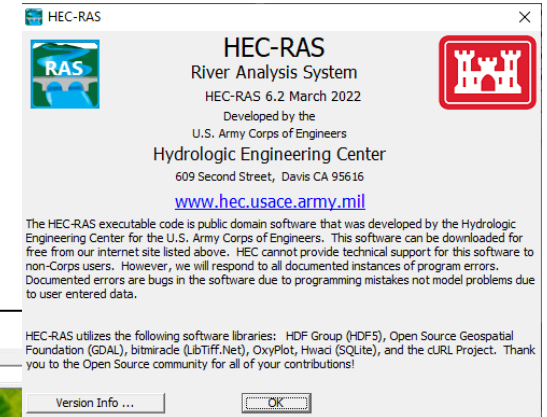
A process to ensure that flow predictions are 'real'. Requires historic rainfall records and streamflow measurements. The longer the rainfall-streamflow records, the more 'real' the predictions are.

Unfortunately, the streamflow and rain data available for model calibration and validation are very limited for the subject study.

Development of Hydraulic Model

HEC-RAS Hydraulic Model Software




A computer program that models the hydraulics of water flow through natural rivers and other channels.

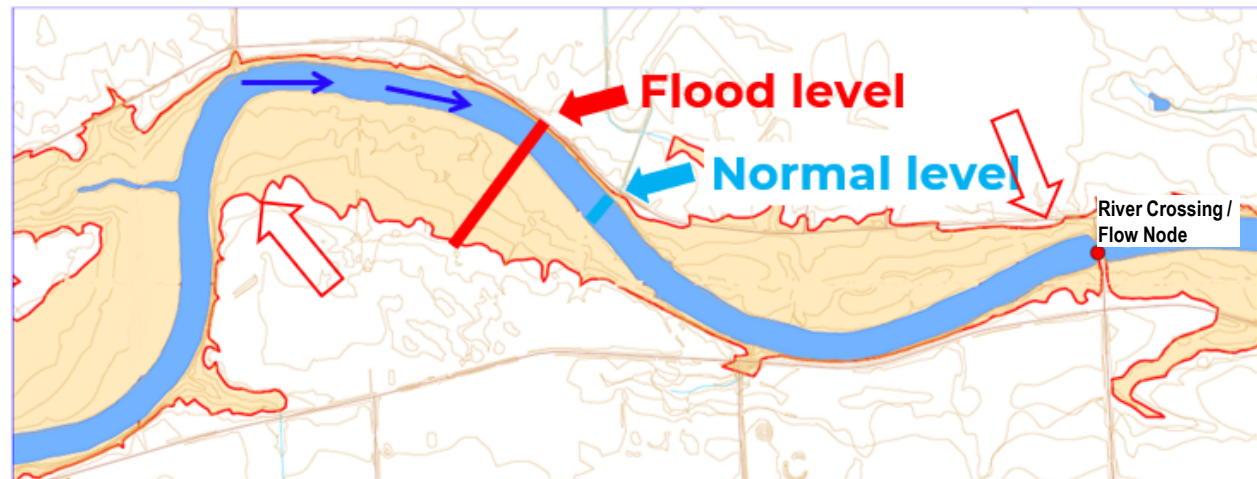


Development of Floodplain Maps

Floodplain Model → Flood Map

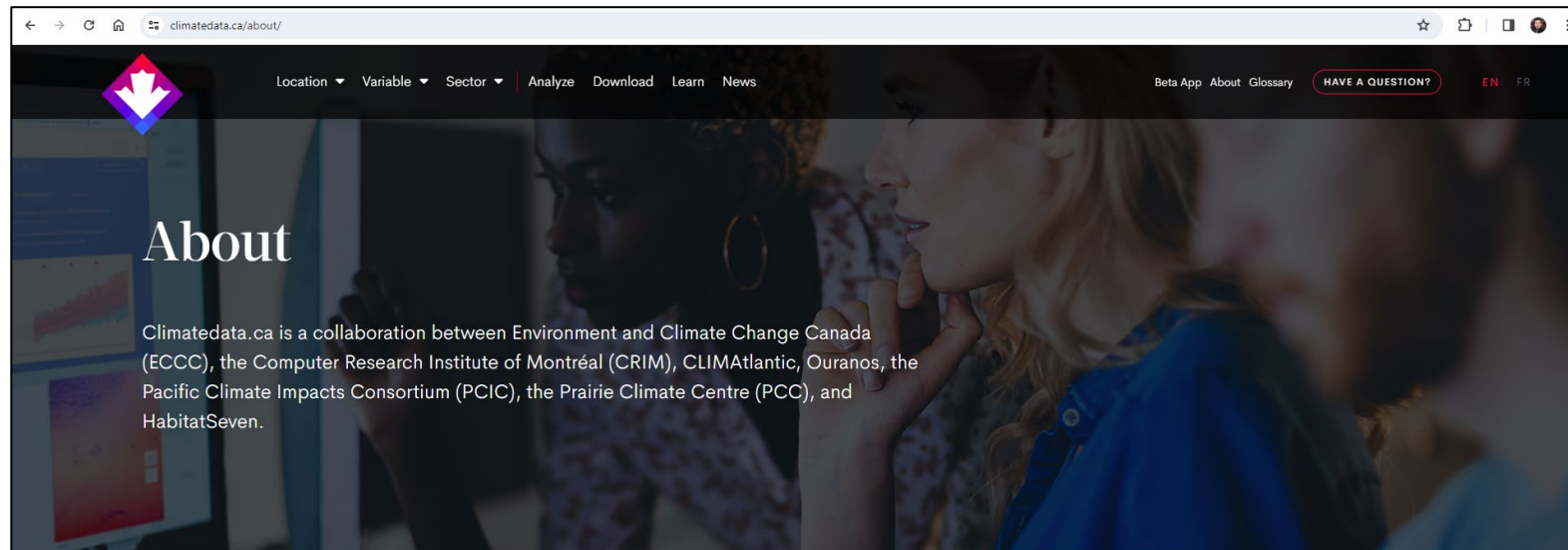


-  Flood line
-  Flood level
-  Normal level



Climate Change and Extreme Events

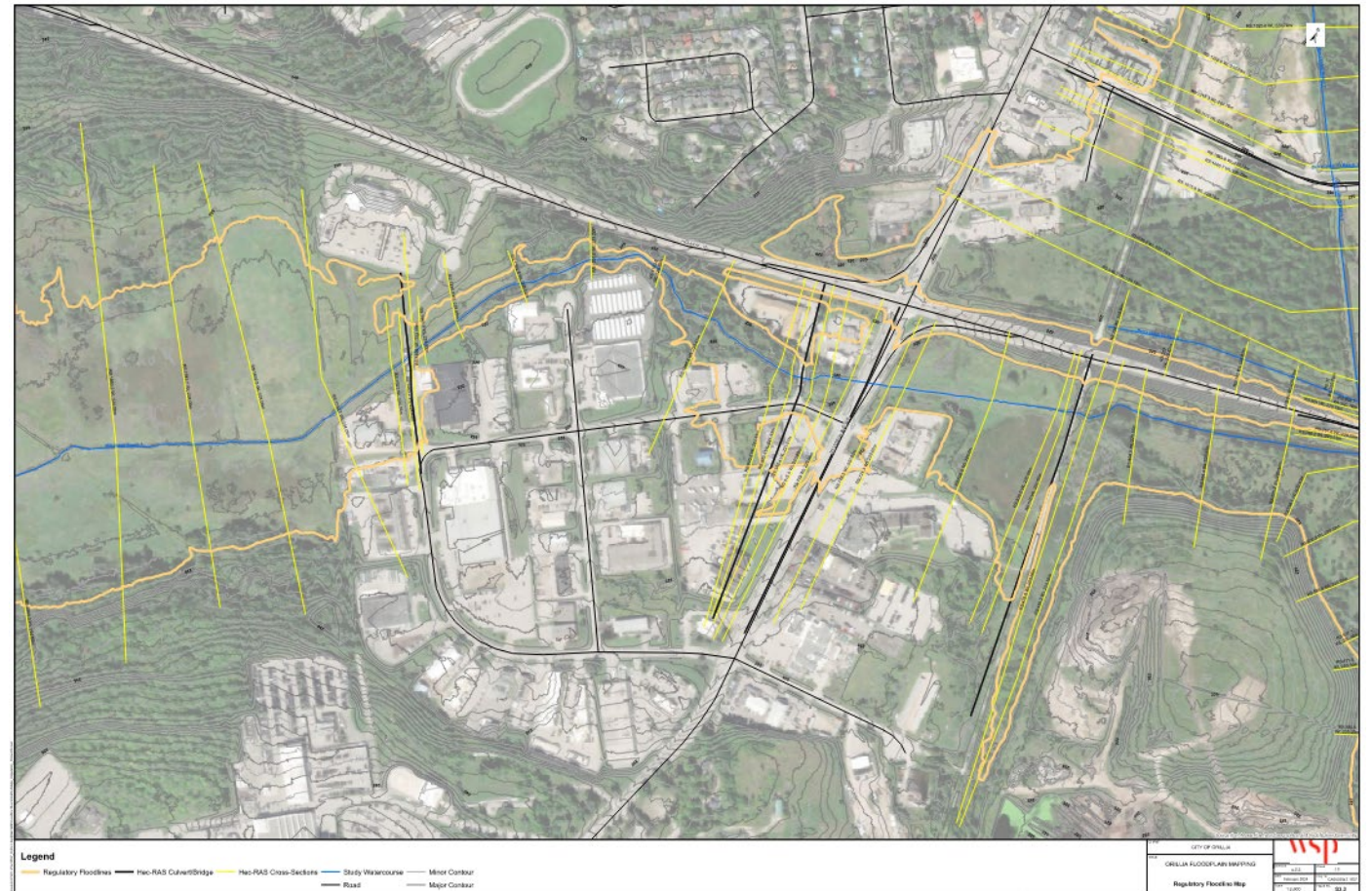
- As required under NRCan's FHIMP, climate change considerations in watershed hydrology and flood hazard mapping must be addressed.
- A flood event (or Extreme event) which has higher magnitude than the identified Regulatory event, shall serve as a proxy scenario for climate change.
- The study has adopted an approach to develop the extreme event based on the RCP 4.5 scenario using CMIP 5 (Representative Concentration Pathway where radiative forcing peaks at 4.5 W/m² by the year 2100). The approach is developed and recommended by Environment and Climate Change Canada (ECCC), as found on the climatedata.ca.



Floodplain Map Development

- Four (4) sets of Floodplain Maps associated with the 100-year event, Regional (Timmins storm) event, Regulatory event and Extreme Event were produced for Mill Creek and Ben's Ditch.

[Link to Floodplain Maps](#)



Next Steps

- The preliminary mitigation opportunities will be evaluated and identified for the existing buildings / structures impacted by the Regulatory flooding.
- Public consultation will take place later in Spring 2024 to present the preliminary mitigation opportunities.

Thank you!

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