



# Natural Hazards Presentation Series - Part 4: Flood Plains – Part 2

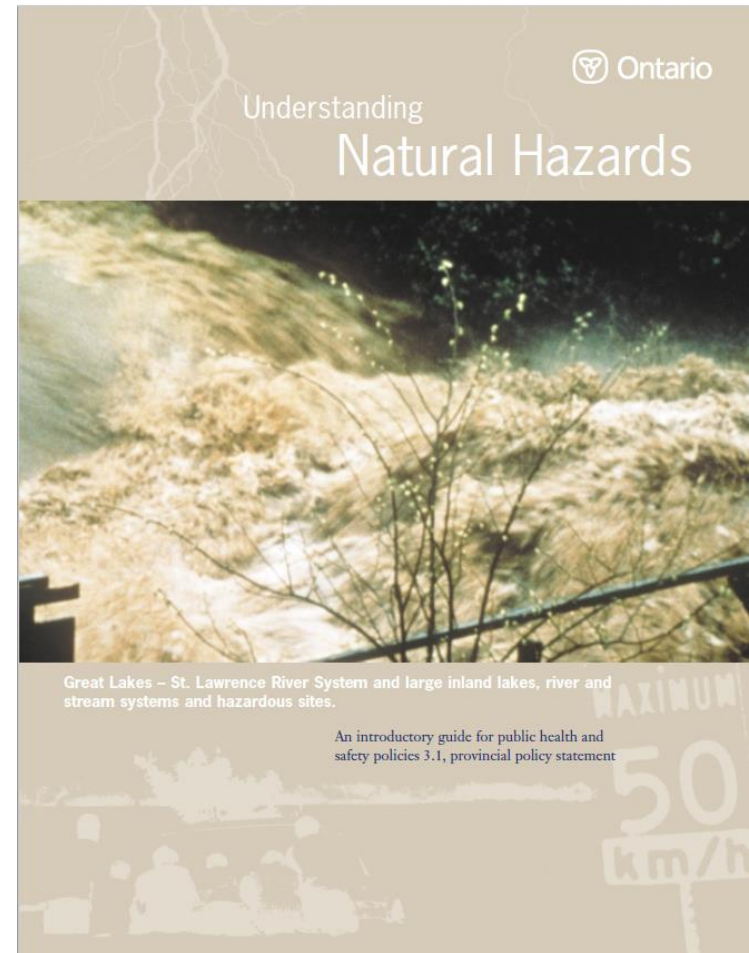
Ken Thajer, MCIP, RPP  
Planning and Regulations Coordinator

GRCA Board Meeting  
June 15, 2023



# Outline

- Background
- Section 28 of the Conservation Authorities Act
- Natural Hazards Presentation Series
- Overview of Flood Plain Hazards
- Conclusion



# Background

- Conservation Authorities Act enacted in 1946 in response to erosion and drought concerns. These issues are best managed on a watershed basis.
- It provided the means by which the province and the municipalities could join together to form a Conservation Authority within a specified area - the watershed - to undertake programs for natural resource management.
- The Conservation Authorities Act and corresponding regulations are designed to protect people and property from flooding and erosion hazards
- Development and construction within hazardous lands is costly to build and requires maintenance
- Good planning saves the taxpayer significant dollars



# Section 28 of the Conservation Authorities Act

- In 1956, in response to devastating impacts from Hurricane Hazel, amendments to the Conservation Authorities Act empowered Conservation Authorities to create regulations to prohibit filling in floodplains
- Regulations were broadened in 1960 to regulate the placing or dumping of fill
- In 1968, amendments to the Conservation Authorities Act further extended the regulations to prohibit or control construction and alteration to waterways, in addition to filling.
- In 1995, an MOU was signed by Province delegating commenting role for Natural Hazards from MNR to the Conservation Authorities for planning matters.



# Section 28 of the Conservation Authorities Act

- In 1998, the Conservation Authorities Act was amended to ensure that regulations were consistent across the province and complementary to provincial policies.
- In 2004, Ontario Regulation 97/04 was approved and outlined the content that each Conservation Authority's Regulation would contain. The amendments required all Conservation Authorities to regulate Great Lakes shorelines, interconnecting channels, inland lakes and wetlands in addition to the areas and features each Conservation Authority historically regulated.
- In 2006, each CA had their revised regulations approved (to match wording of Regulation 97/04).



# Natural Hazards Presentation Series

Over the coming months, staff will provide an overview of the various hazardous areas in which CAs regulate development and activities:

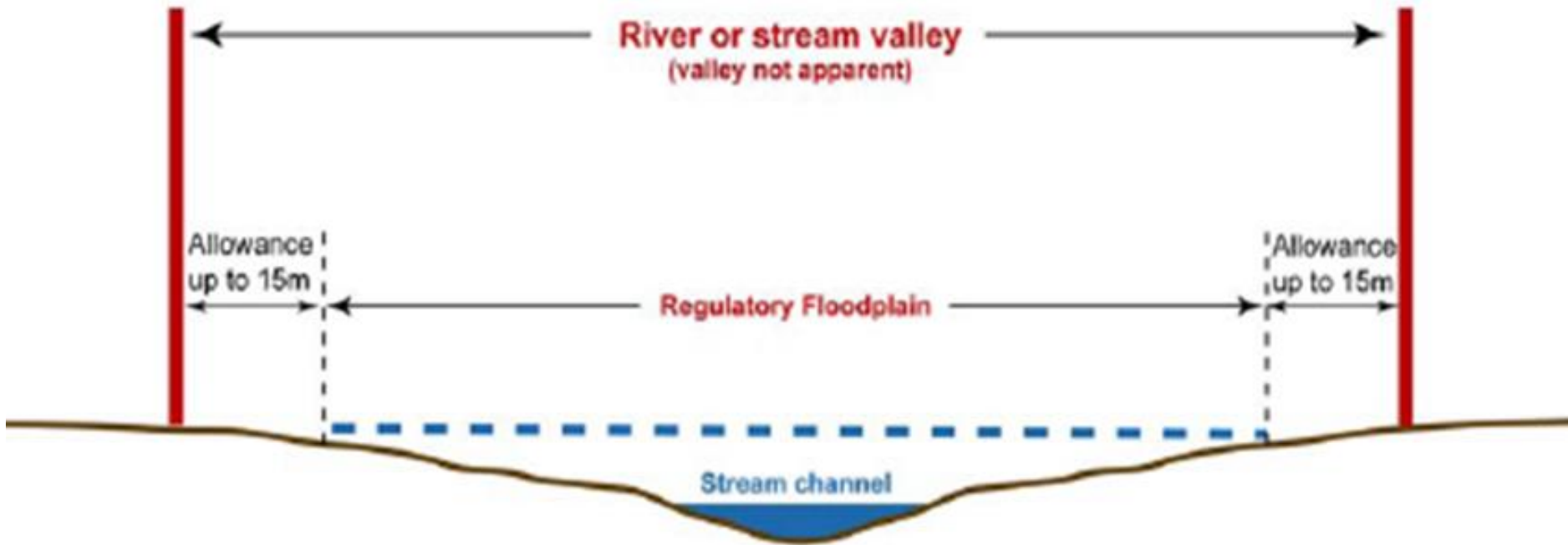
- In or adjacent to river or stream valleys (Section 2(1)(b))
- Adjacent or close to the shorelines of the Great Lakes and inland lakes (Section 2(1)(a))
- Watercourses (Section 5)
- Hazardous lands (Section 2(1)(c))
- Wetlands (Sections 2(1)(d) and 5)
- Other Areas that could interfere with the hydrologic function of a wetland (Section 2(1)(e))



# Overview of Flood Plain Hazards



# Regulatory Flood Plain





# Overview of Flood Plain Hazards

MNRF Defines Flood Standards for River Systems in Ontario

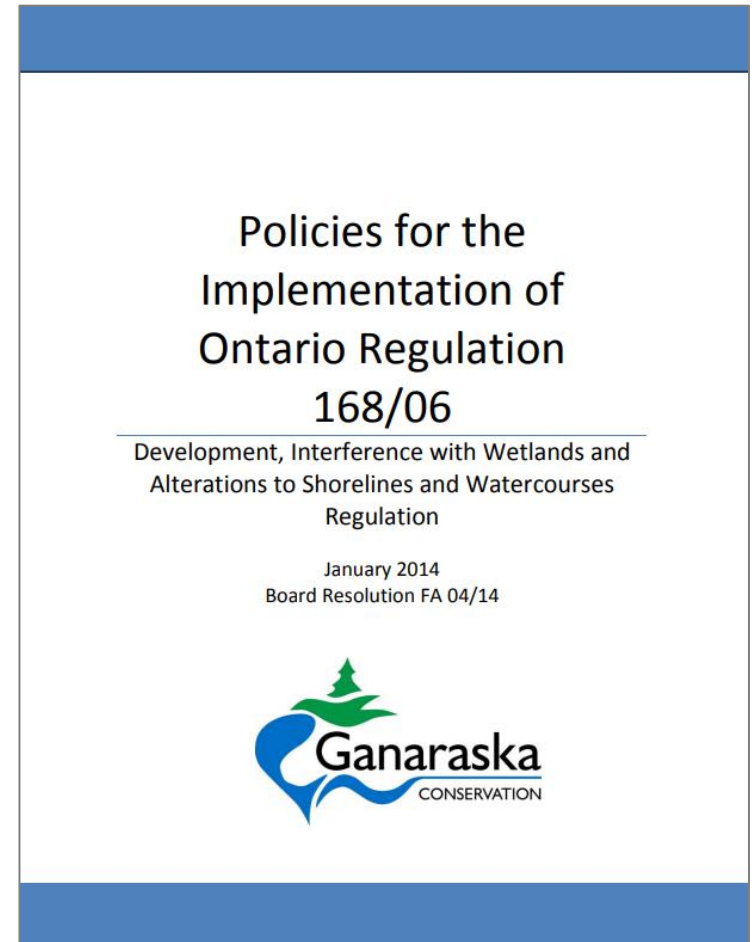
The flooding hazard limit is the greater of:

- i. the flood resulting from the **Hurricane Hazel** storm (1954) transposed over a specific watershed and combined with the local conditions, where evidence suggests that the storm event could have potentially occurred over watersheds in the general area;
- ii. the **one hundred year flood**; or
- iii. a **flood which is greater than i) or ii) which was actually experienced** on a particular watershed or portion thereof, or a **Special Policy Area (SPA)** approved by the Ministers of Natural Resources and Municipal Affairs and Housing. Storm standard identified in SPA.



# Flood Plain Development

- In general GRCA does not support new development within the floodplain except in certain circumstances.
- No institutional, emergency services or hazardous material permitted within the floodplain.
- Require development outside floodplain where feasible, or in area of least risk.
- GRCA has specific criteria for development within the floodplain.
  - Safe access criteria may need to be addressed.
  - Specific policy & technical requirements must be addressed.



# Planning Act Applications

- GRCA is responsible for commenting on Section 3.1 of the Provincial Policy Statement for *Planning Act* applications.
- No new property lines crossing/bisecting/fragmenting the floodplain. All new lots to be created must be entirely outside the floodplain.
- GRCA may support some applications, such as minor variances, for existing development in the floodplain, but it must be demonstrated that the structure can meet GRCA floodplain development criteria. A detailed technical submission would be provided in the permitting stage.

## 3.1.2 *Development and site alteration shall not be permitted within:*

- a) *the dynamic beach hazard;*
- b) *defined portions of the flooding hazard along connecting channels (the St. Marys, St. Clair, Detroit, Niagara and St. Lawrence Rivers);*
- c) *areas that would be rendered inaccessible to people and vehicles during times of flooding hazards, erosion hazards and/or dynamic beach hazards, unless it has been demonstrated that the site has safe access appropriate for the nature of the development and the natural hazard; and*
- d) *a floodway regardless of whether the area of inundation contains high points of land not subject to flooding.*



# Floodplain Development Survey

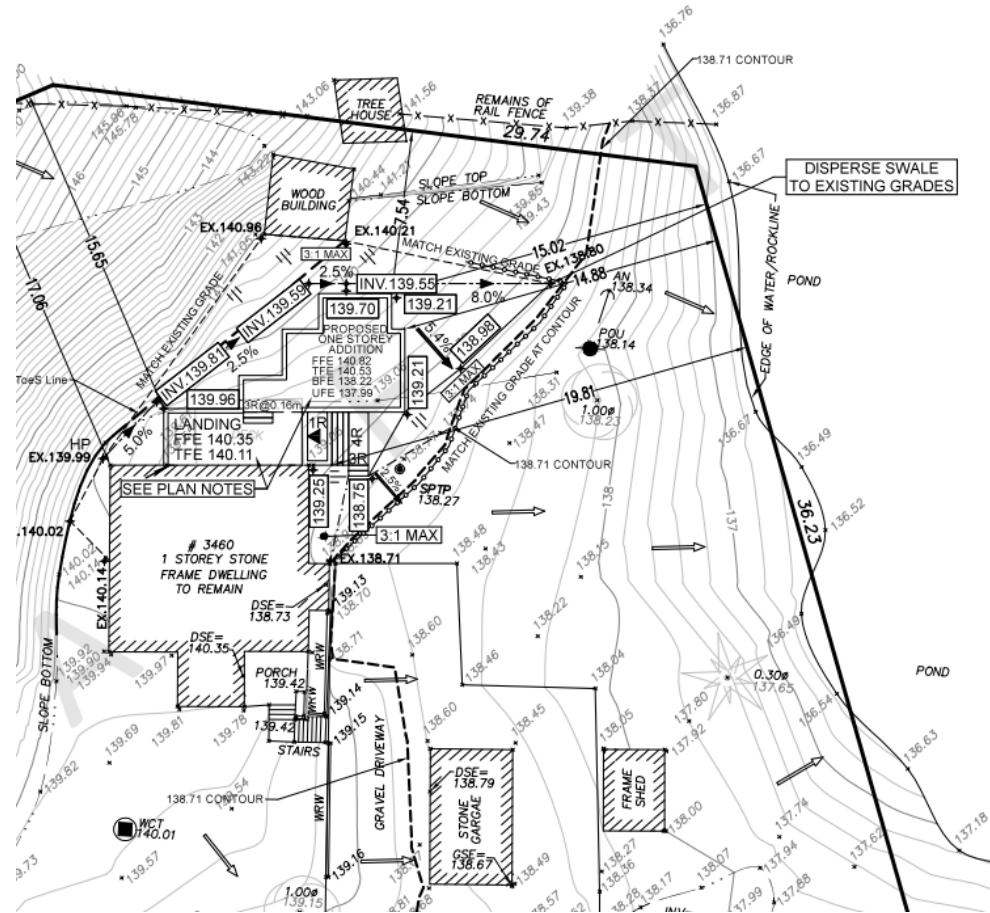
- Floodplain mapping is very important as it determines the location of the extent of the floodplain.
- Notwithstanding having floodplain mapping, GRCA requires a survey by an Ontario Land Surveyor (OLS) or Professional Engineer (P. Eng.) for development within, or in close proximity, to the floodplain.



# Survey

Reasons for requiring a survey:

- Establishes building envelope;
- To determine the exact depth of flooding on the property;
- To determine new lot lines/limits;
- Assists engineering consultant with designing floodproofing;
- To determine if changes to grade are proposed;
- Necessary to show elevations of openings (doors, windows, vents, etc.);
- Ensures proponent is not grading into the floodplain.



# Wet vs. Dry Flood Proofing

- For habitable structures (including seasonal cottages), GRCA requires dry, passive floodproofing. Passive meaning no openings, regardless of being sealed.
- For non-habitable structures (sheds, barns, garages, workshops), GRCA recommends dry-floodproofing, where feasible, or wet-floodproofing at a minimum.
- To convert a non-habitable structure into a habitable structure, the proponent would need to demonstrate the structure can be dry-floodproofed.



# Dry Flood Proofing

- Staff refer to the MNRF Technical Guide.
- Standard wall construction provides inferior defence against flooding. Susceptible to leakage, hydrostatic pressures and structural failure.
- Required for all habitable structures in one-zone floodplains.
- Survey by OLS/P.Eng. required to confirm grades/openings.
- Wall and basement reinforcement required.
  - E.g.: Extra concrete, thicker walls reinforced with rebar.
- All openings (windows, doors, vents) to be 0.3m above the floodplain. This includes proposed additions to existing structures.
- No basements should be within the floodplain.
- **Design must be completed by a Professional Engineer.**
- **Final drawings must be stamped by a P. Eng.**
- Dry flood proofing can be expensive.



# Hydrostatic Pressures

- The most important consideration in floodproofing design.
- Correlated with flood depth and saturated soil depth in contact with a structure.
- Equal in all directions and acts perpendicular to a given surface.
- Can be defined into vertical or down, horizontal or lateral, and uplift or buoyant pressures.
- These pressures can cause the structure to heave, rupture or float.

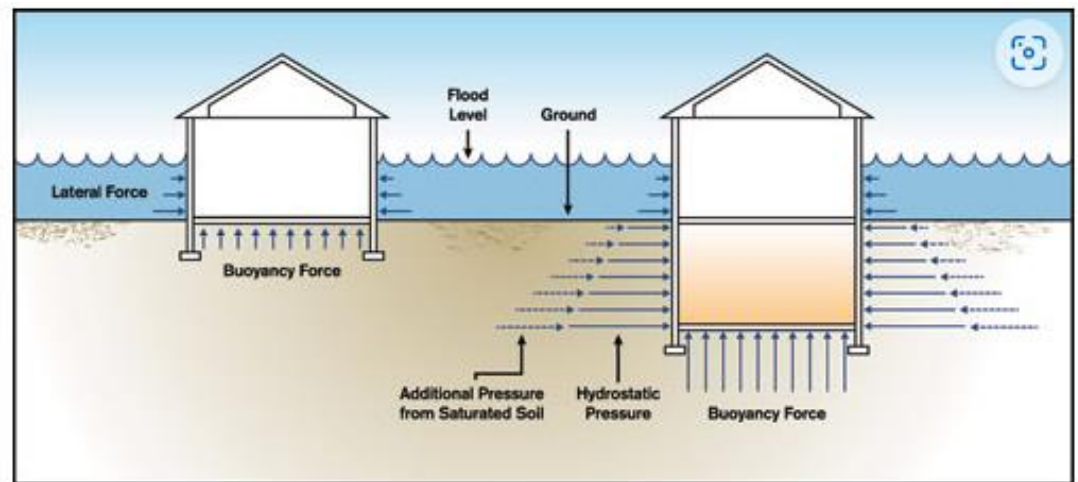


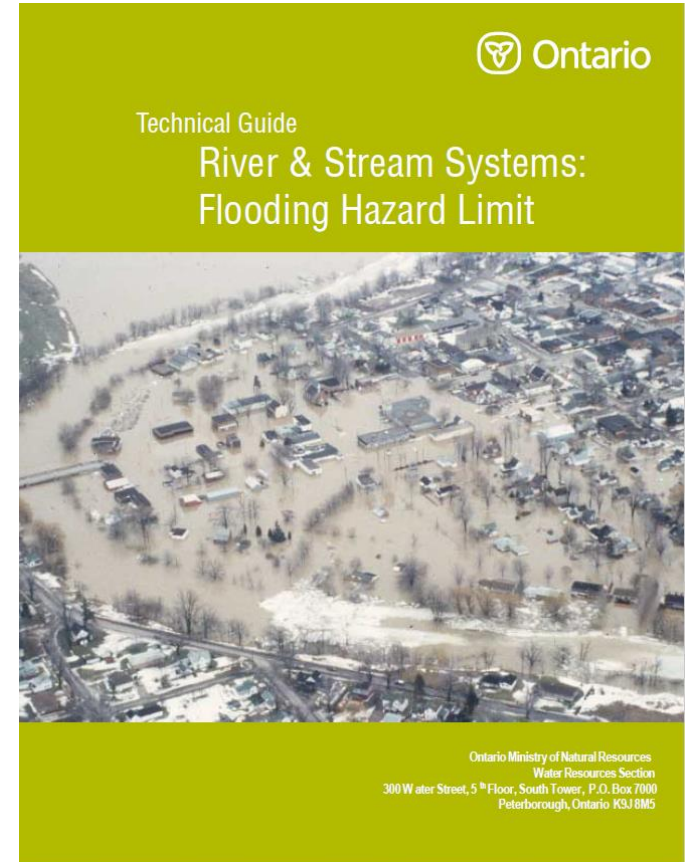
Photo by Smart Vent Products, Inc.





# Wet Flood Proofing

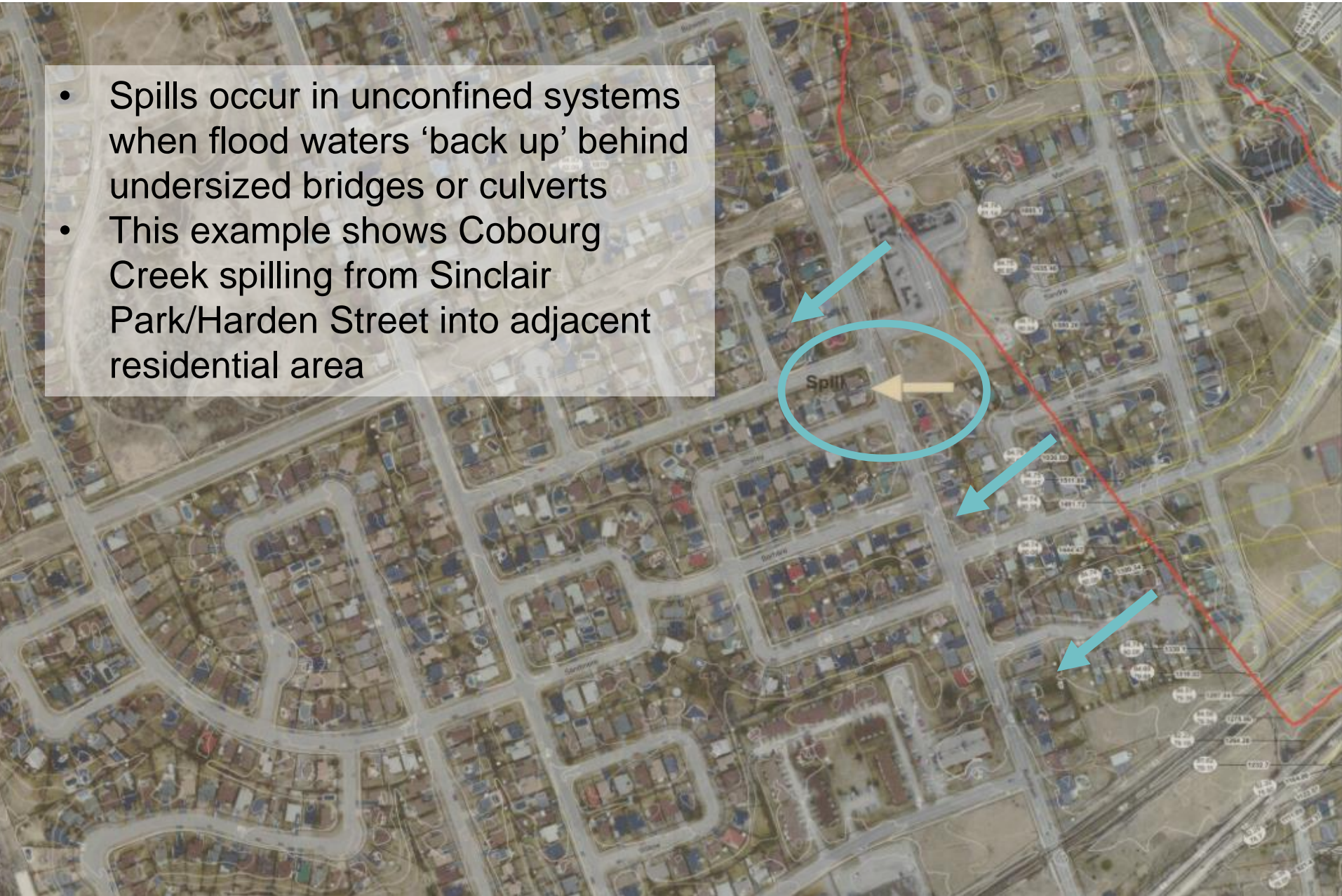
- Staff refer to the MNR Technical Guide.
- Required, to some extent, for all structures in the floodplain.
- Allows water to enter, move within and exit a structure to prevent hydrostatic pressures (lateral and buoyant).
- GRCA looks for openings (upstream and downstream) to allow water to enter and leave structure.
- May require anchoring to the ground.
- GRCA *may* require survey information and engineering – depending on the project.





# Floodplain Spills

- Spills occur in unconfined systems when flood waters 'back up' behind undersized bridges or culverts
- This example shows Cobourg Creek spilling from Sinclair Park/Harden Street into adjacent residential area



# Other Floodplain Considerations

- Berms and walls to divert floodplain are generally not supported as they could displace water elsewhere onto other properties.
- Development in floodplains may cause floodplain displacement. It may be required to demonstrate, through an engineering study, that there will be no measurable impacts to the floodplain as a result of the proposed development.
- Cut and fill may be considered in certain circumstances and where there is available land (eg: filling in the floodplain and cutting elsewhere to allow for flood storage). This must be undertaken through detailed engineering analysis.



