

# Beaver Dam Drain Public Information Centre

November 19, 2019 18:00

Council Chambers CITY HALL

66 Charlotte St, Port Colborne, ON L3K 3C8

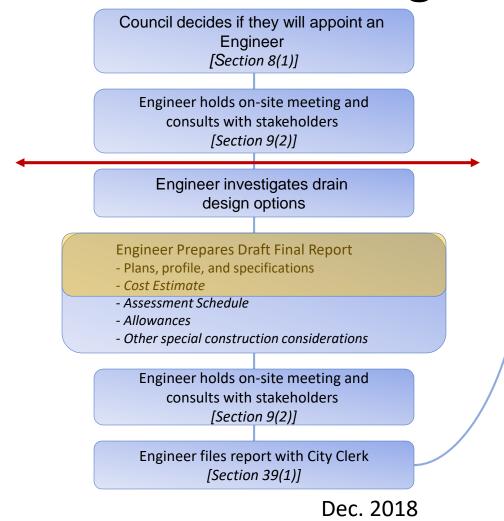


### Agenda

- Role of Public Information Centre in the Drainage Act
- Drainage History
- Baseline Report Highlights
- Beaver Dam Watershed Modelling
- Baseline Report Review and Public Input / Comments
- Next Steps
  - PIC #2



### The Ontario Drainage Act Process



Council decides whether to proceed [Section 41(1)] Appeal to Tribunal [Section 45(2)] **Council Meeting to Consider** Petitioners decide whether to proceed [Section 42] Appeal to Tribunal [Section 45(2)] Council decides whether to proceed [Section 41(1)] Finalize Engineer's Report when adopted [Section 45(1)] Court of Revision for Assessment Appeals [Section 45(2)] By-law passed once appeals heard or expired [Section 58(1)] Construction takes place [Section 58(1)]



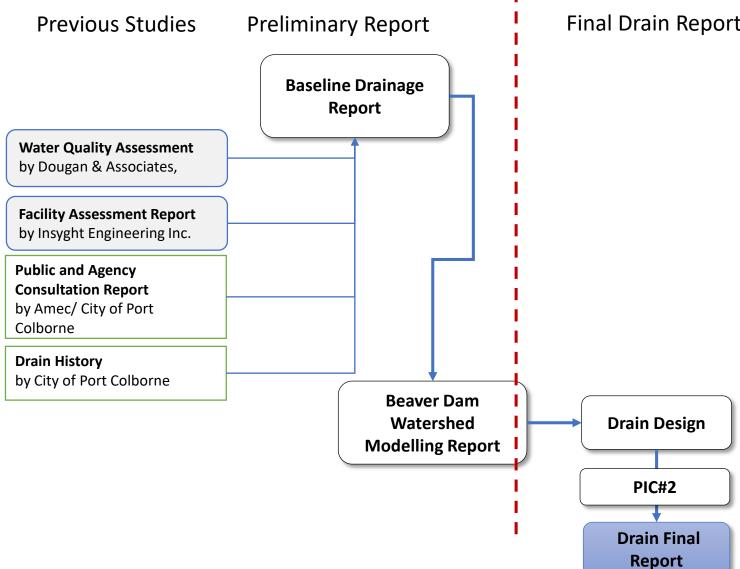
#### Modified Process

**Previous Works** 

Final Drain Report

Today

**Public & Agency** Consultation by Amec, 2011-



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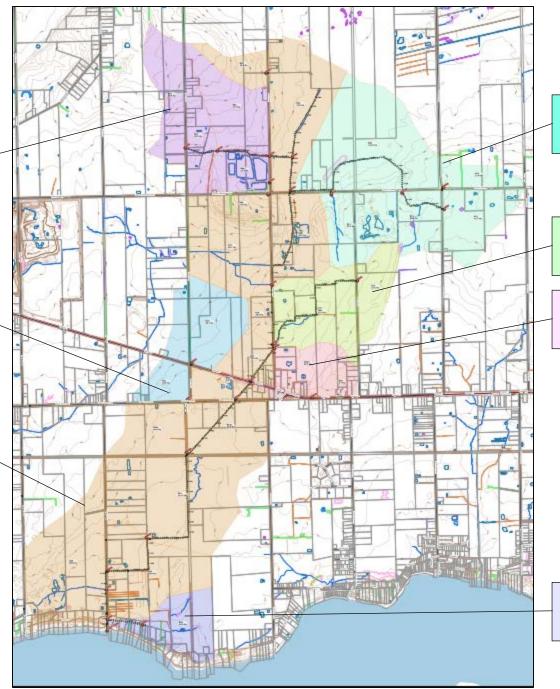
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West Branch

**ROW Drainage** 

Beaver Dam Drain





**East Branch** 

James Craig Agreement

David Michener Award

> CIP Arch Catchment

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# Baseline Report – Overview

**Baseline Report** 

Baseline Plan & Profile Drawings

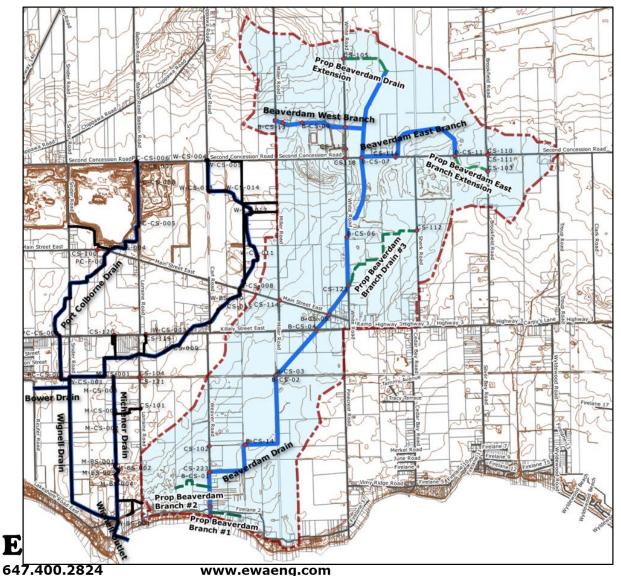
**Environmental Conditions** 



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### Baseline Report



- Serves an area of 1236 hectares based on the defined drain boundary.
- The main branch of the drain is 6,650m in length from 1000m north of Second Concession Rd. to the outlet into Lake Erie.
- The watershed boundary or high point is 194m.
   The average lake level is 174.15. The lake level fluctuates and for the month of June, 2019 has been at record levels 1.6 & 1.8 above chart datum, 173.5m (175.1m to 175.3)
- Control Gate Sill elevations;
  - East side is 174.05
  - West side is 174.45
- This Beaver Dam drain slope characterises as low slope or slow watershed.
  - Watershed average fall (slope) is given as 0.24% or 2.4m per 1000m
  - Drain average fall (slope) is given as 0.062% or 0.62m per 1000m

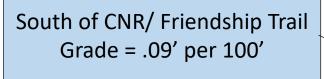


### Drain History

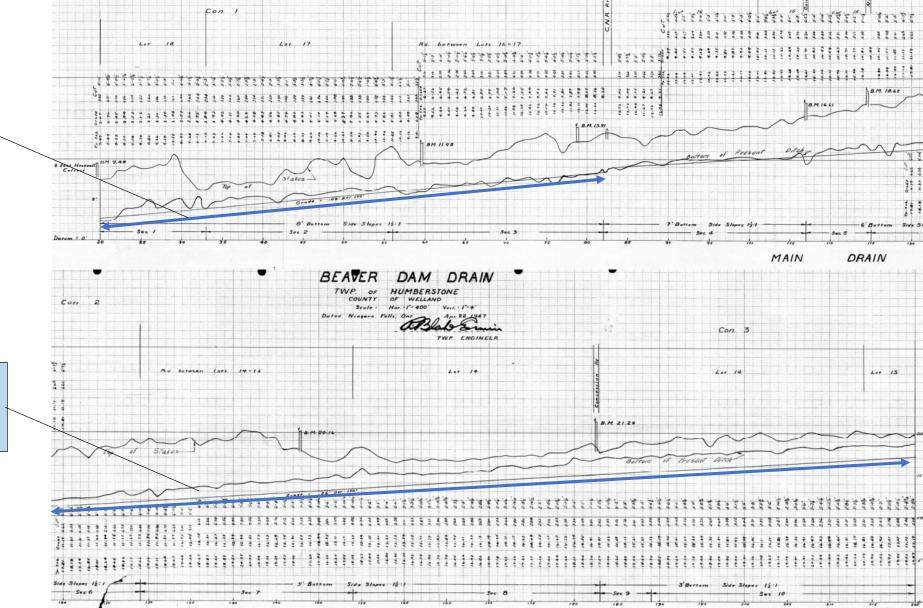
- Dates back to 1885
  - earliest record of the Beaver Dam Drain dates back to 1885 in the requisition by Samuel Knisley, Frederick Knoll & others in the Geo. Ross award for the deepening and maintaining of the Beaver Dam Ditch. Later, the Geo. Ross petition of 1890 was awarded for the Deterling-Noxel extension of the Beaver Dam Ditch that later became the West Branch Drain
- 1905 the James Craig Agreement Ditch
- April 27, 1916
  - repairs to the northern part of the Drain and to the East Branch, along Second Concession Road.
- Engineer's Report of 1947
  - drainage area of 2550 acres (1000 ha).
  - flooded constantly
  - the drain width was 0.9 m at the north and 2.4 m at Lake Erie.
- Flood control gates
  - 1954, the first petition by Lawrence F. Townsend & others
  - Engineer's Report dated May 28, 1973 was prepared by C.J. Clarke regarding the flood control for the Beaver Dam Drain ARDA Grant.
  - In 1982, maintenance works on the flood control gates was undertaken

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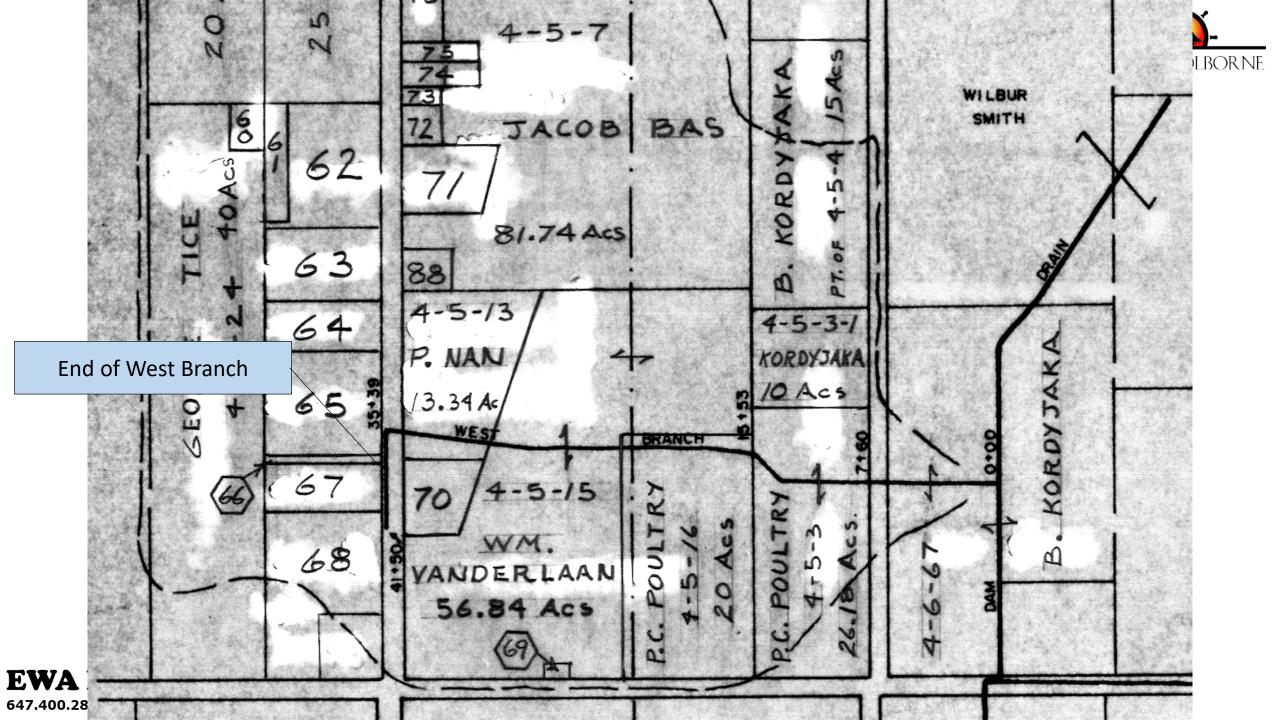


North of CNR/ Friendship Trail Grade = .06' per 100'

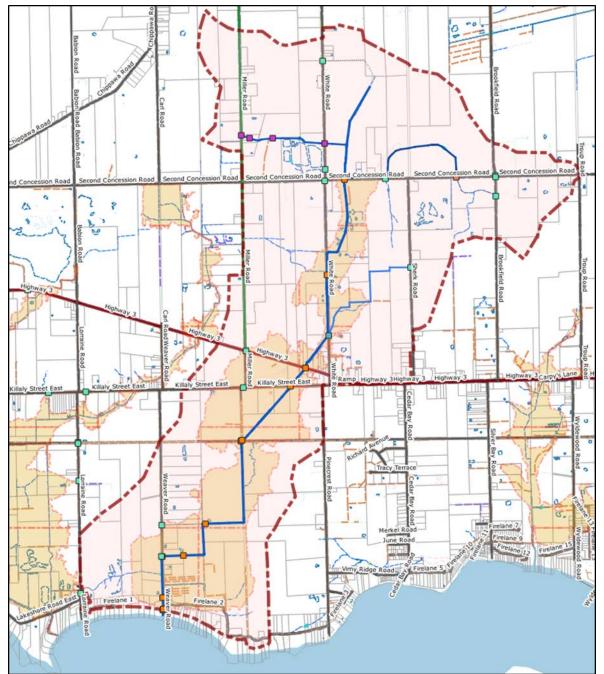


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### NPCA determined Floodlines



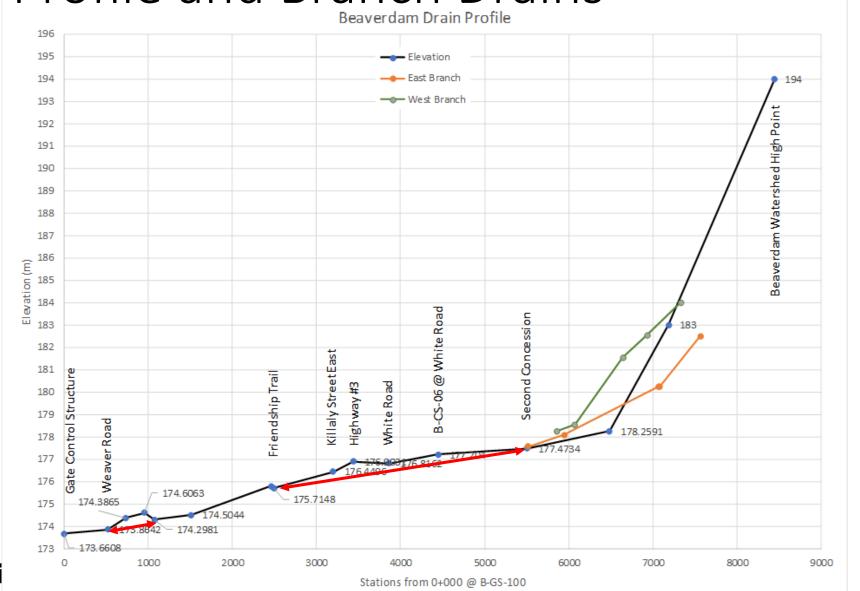


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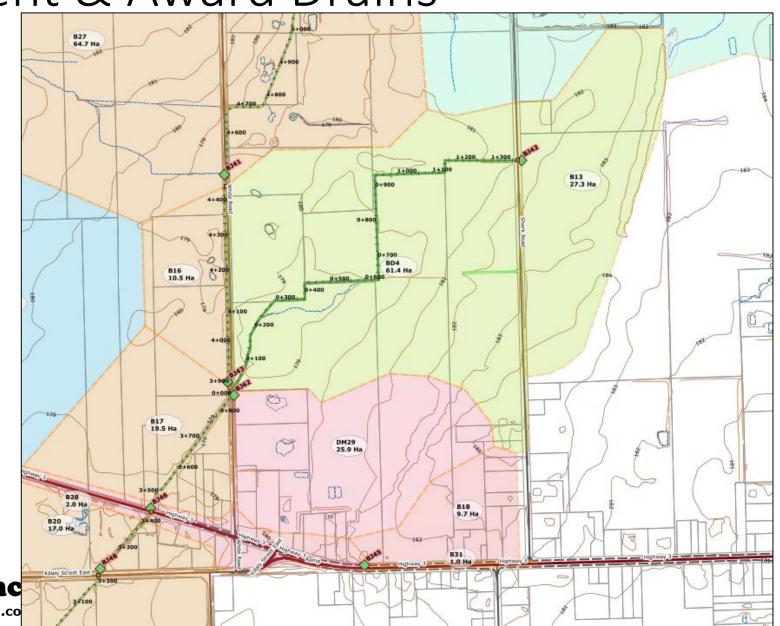


Drain Profile and Branch Drains





Agreement & Award Drains

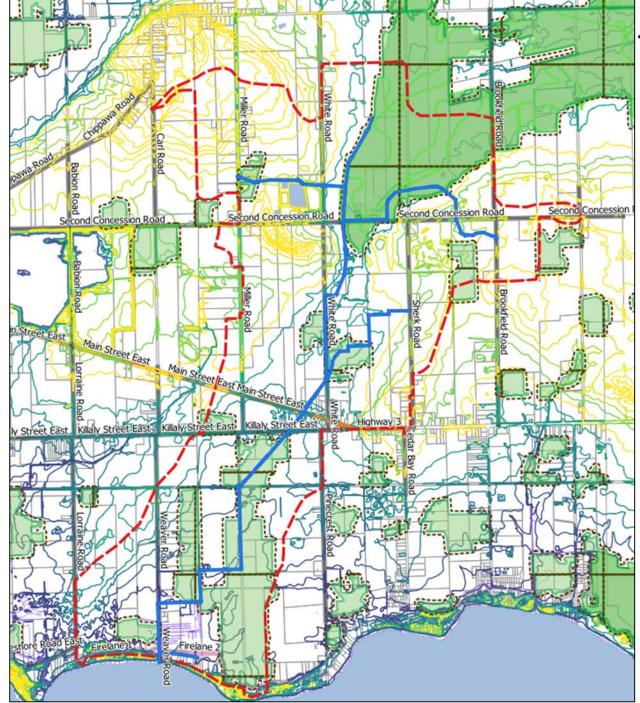


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### Drain Status – Issues, Problems & Opportunities

- Has maintenance been regularly performed? Are the channels free and clear of obstructions.
- Are the culverts in good condition? Do they cause flooding? Is there a history of flooding.
- Is the existing infrastructure new or old?
- Are there environmental impacts that would affect the drain?
- Are there specific petition based improvements requested?
- Are there opportunities for improvement?



### Channel Improvements



Good





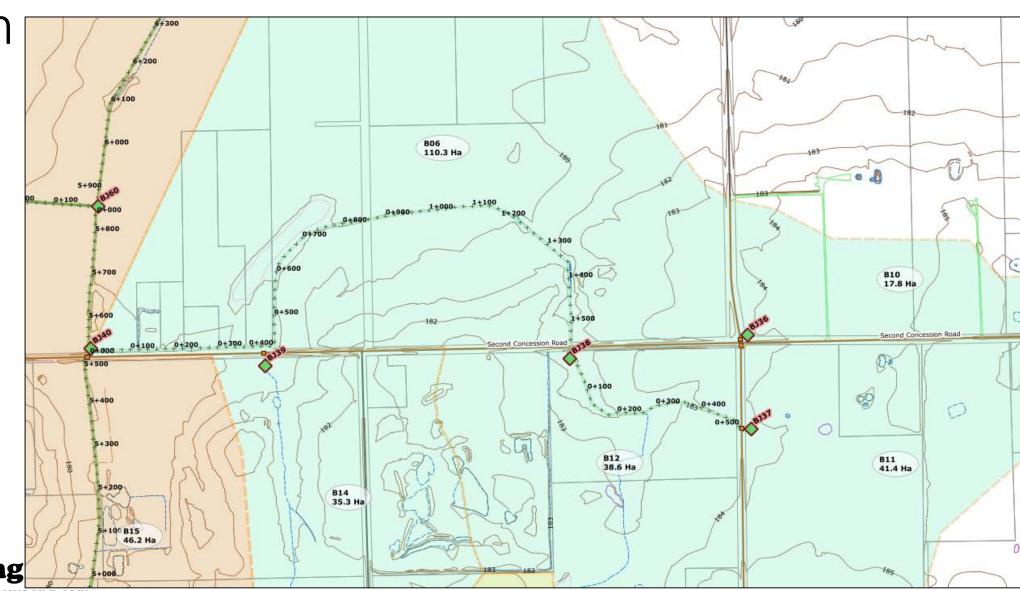
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Beaver Dam looking Southwest from White Rd.



### Extension Conversion to Closed Conduit

Option



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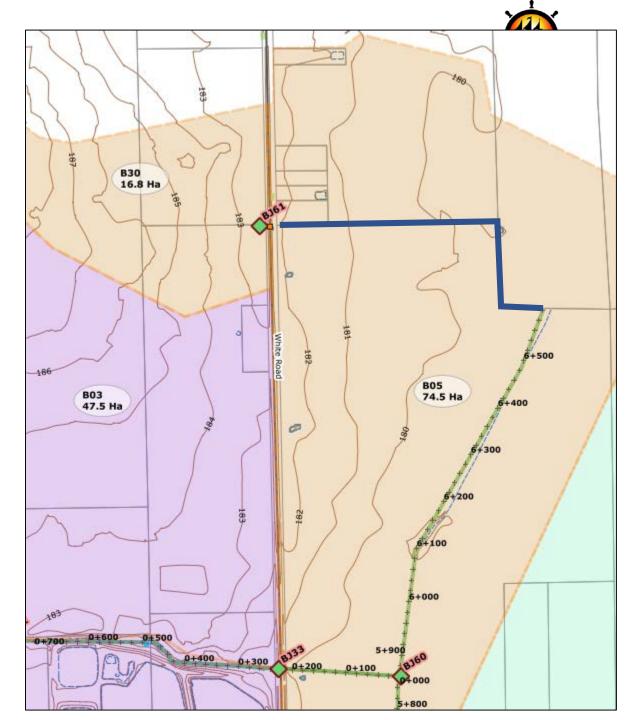
West Branch – Abandon portion of existing



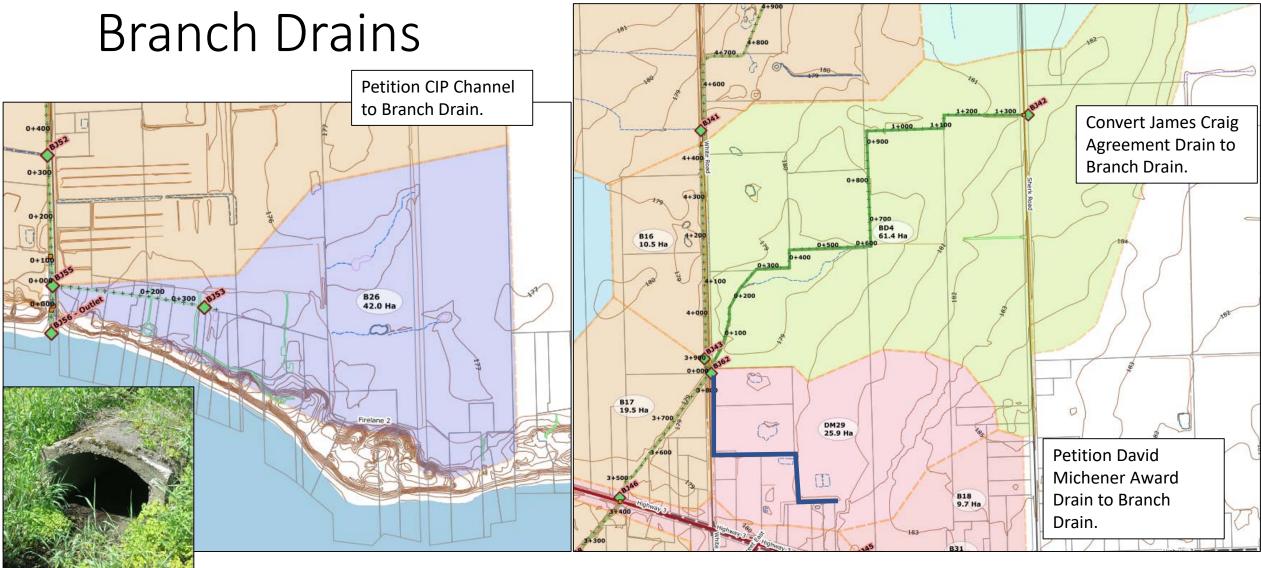
#### Main Branch Extension







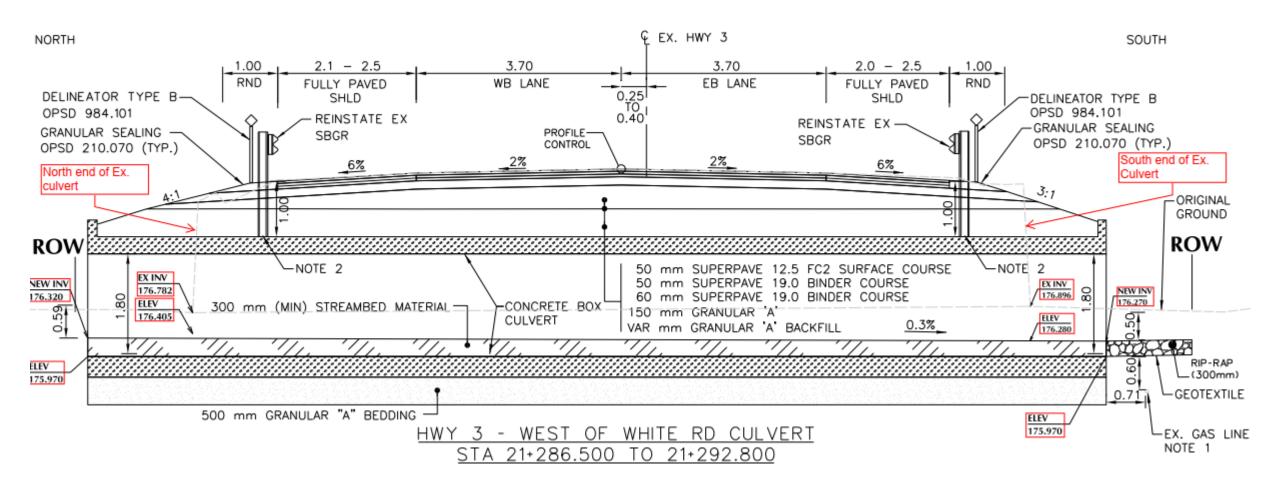




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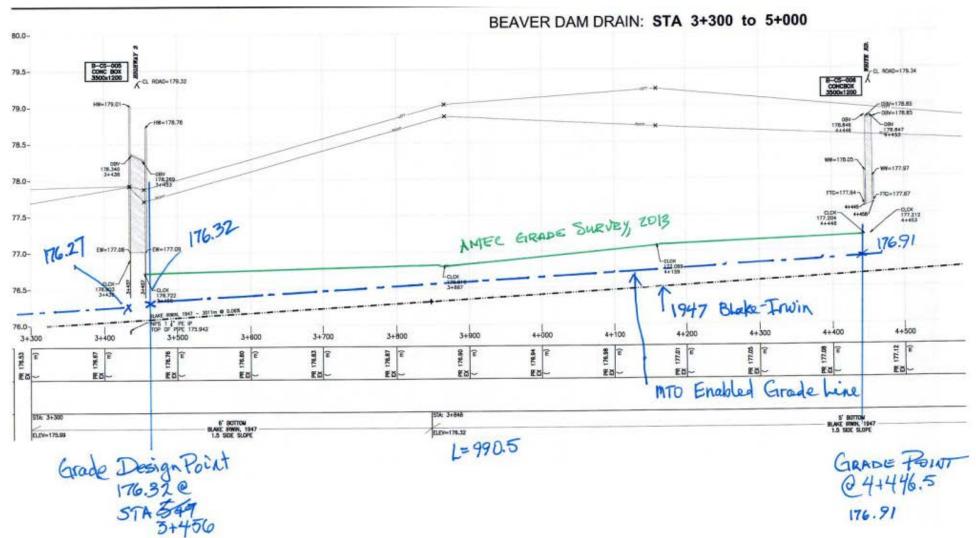


### MTO Hwy 3 Culvert Replacement, 2020



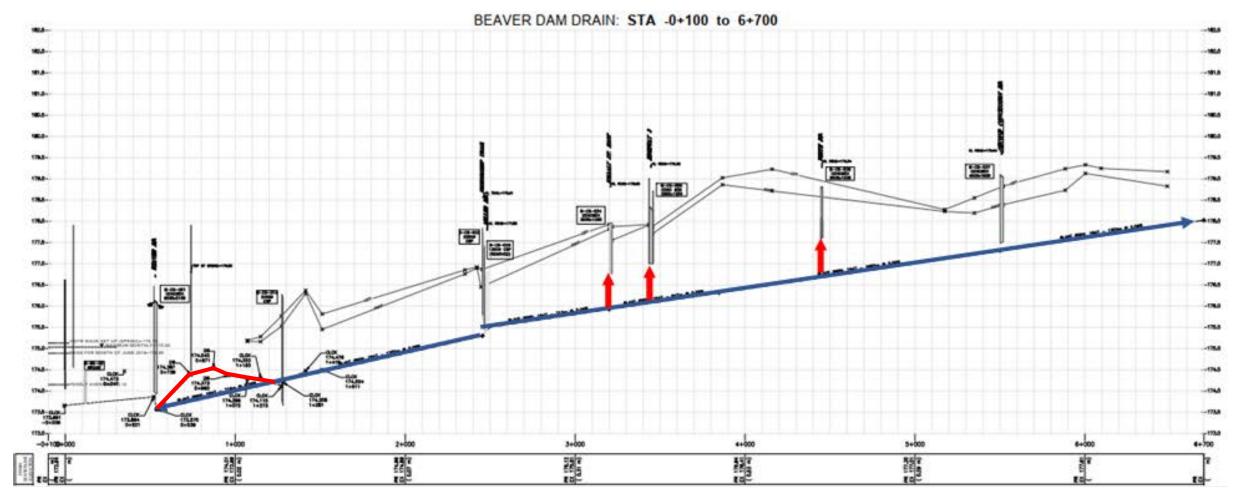


### Lower Hwy 3 Culvert impacts





### MTO culvert lowering impacts



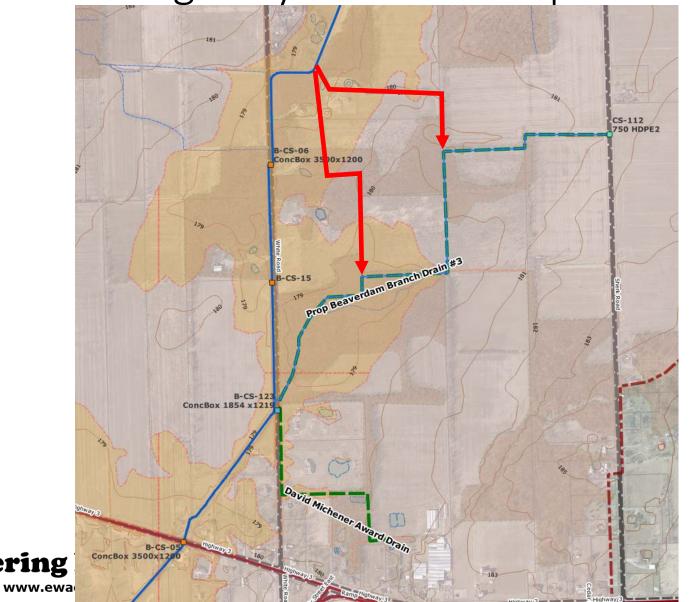
1,200m @ 0.09%

4,200m @ 0.06%

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### Re-alignment Based on MTO Highway #3 culvert replacement

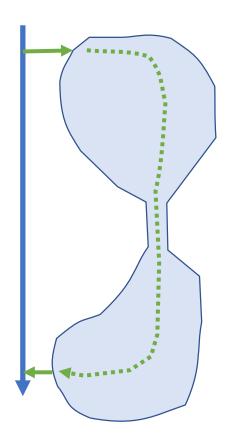




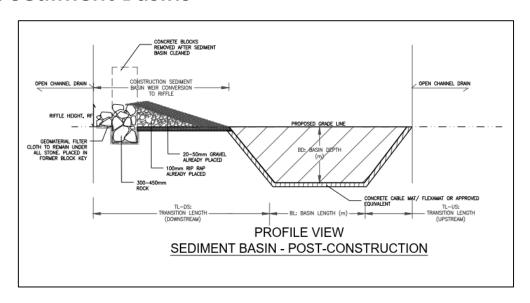


### Drain Water Quality Improvements

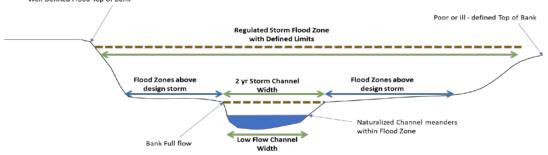
#### 1. Possible Wetland or Pond implementation



#### 2. Sediment Basins

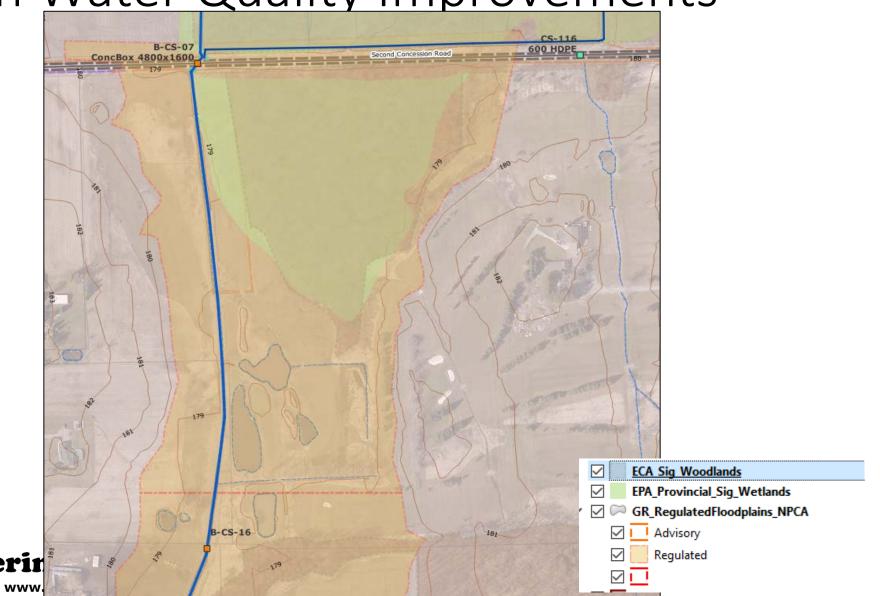


#### 3. Natural Channel Design





Drain Water Quality Improvements

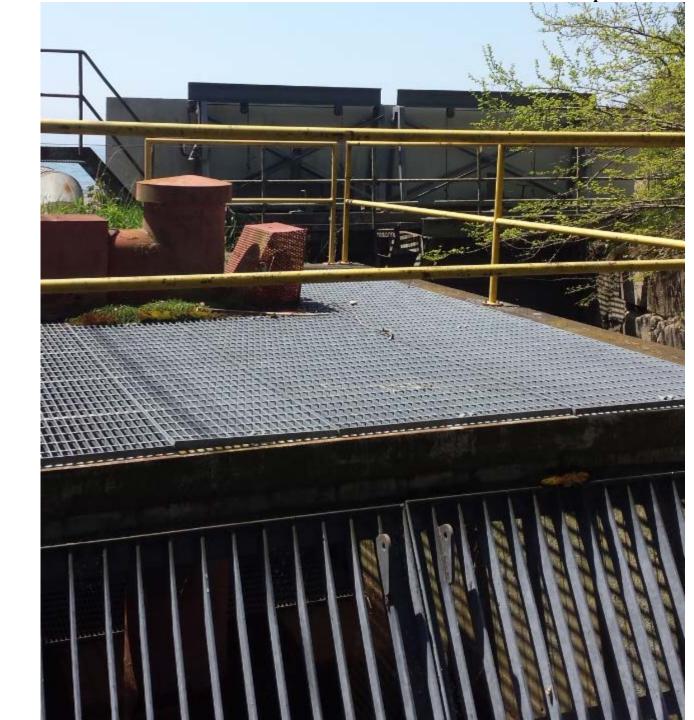


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#### **Drain Control Structure**

#### **Control Structure Considerations:**

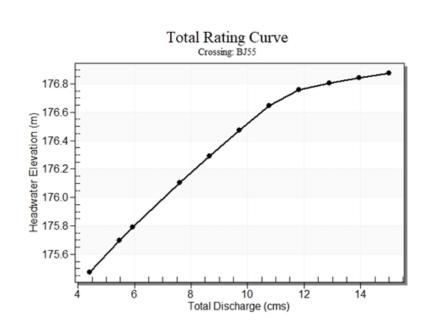
- 1. Pumping
  - 1. Report in 1997, 20 years
- 2. Control Structure Gate flow capacity
  - 1. Runoff flow through openings 1:100 year storm
  - 2. Storm surge level control
- 3. Modernization of Actuators; remote operation
- 4. Addition of flow level monitoring and water quality parameters
- 5. Stationary Motor to power pump
  - 1. Electrical, diesel, gas
- 6. Site improvements

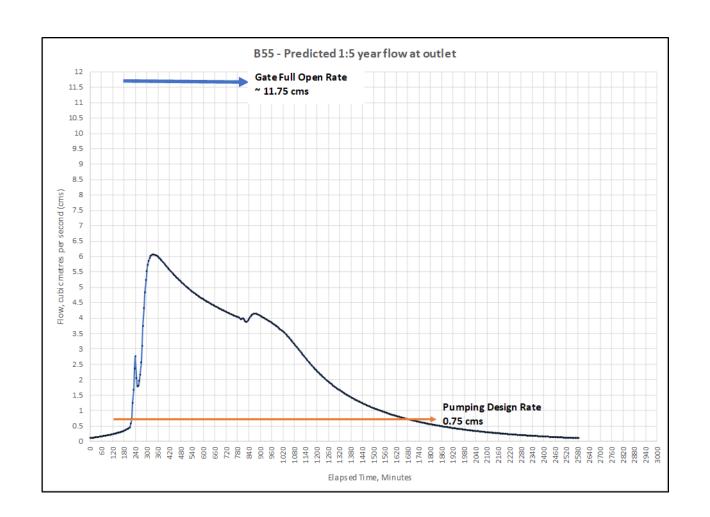


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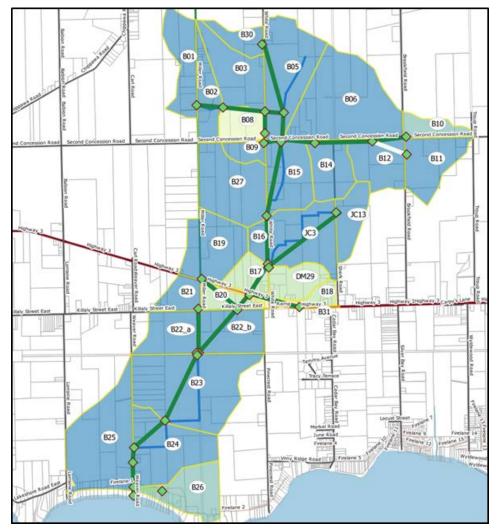
### Gate Flow vs. Pumping







### Watershed Analysis

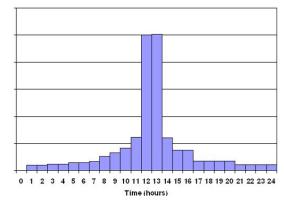


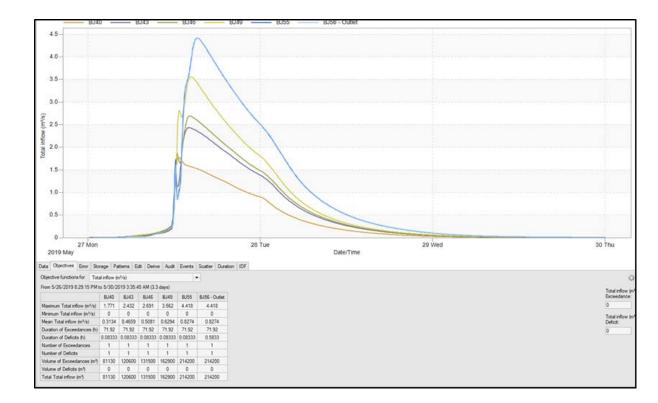
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#### SCS Type II 24 hour Design Storm

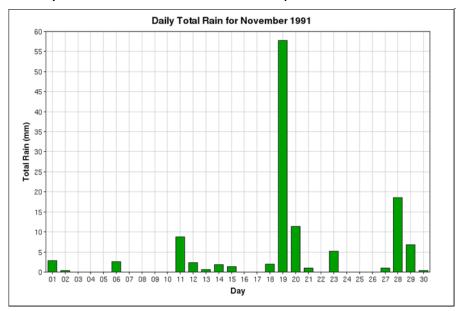




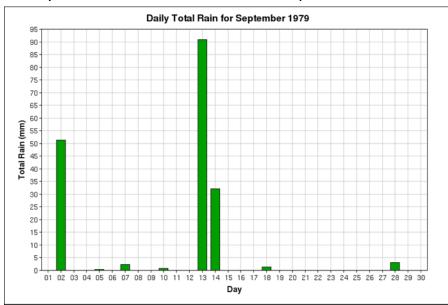
#### Some Storms

Design Storm	Probability return period	Volume, mm
SCS Type – 24 hour	1:2	49.8
	1:5	68.9
	1:10	81.5
	1:25	97.5
	1:50	109.3
	1:100	121.1

Year 1991 had a value greater than the 100 year storm. Data 64.2mm 100 year = 63.1 - 2 hour storm comparable event



Year 1979 had a value greater than the 100 year storm. Data 116.4mm 100 year = 105.9 - 12 hour storm comparable value

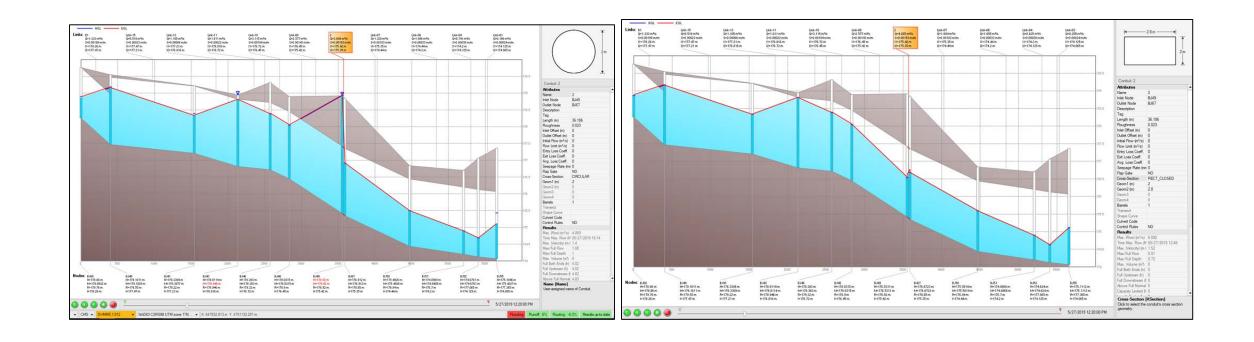


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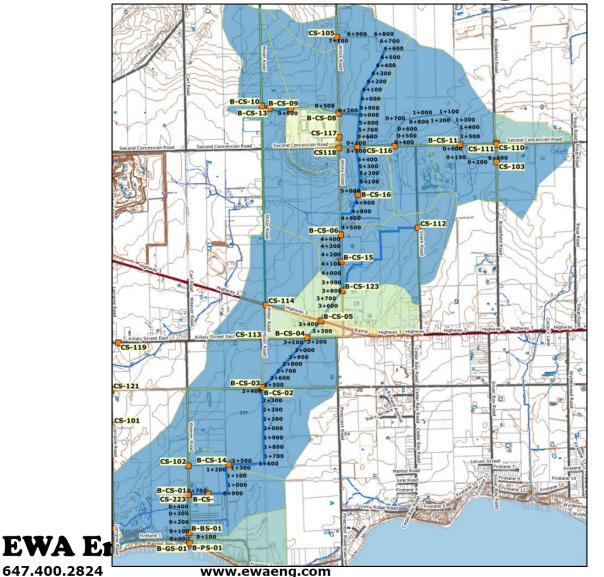


### Hydrologic and Hydraulic Model results





#### Beaver Dam Design Issues



- 1. New Branch Drain & Extensions
  - David Michener Award Drain
  - Cast In Place Drain
- 2. Abandon West Branch stub
- 3. MTO culvert replacement
- 4. Friendship Trail Culvert replacement& other culverts
- 5. New Alignment Options along White Road
- 6. Control Gate & Pumping Improvement Program
- 7. Water Quality Program



#### Next Steps

- Engineer's Report:
  - Beaver Dam Drain
  - Resolution of Branch Drains
- Public Information Centre #2: Design and Assessments
- Report Adoption by Council Provisional
  - 40 day period for appeals
- By-law is passed tendering and construction to proceed



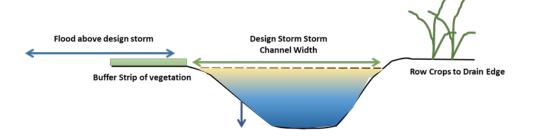
# Thank you

Paul C. Marsh, P.Eng. EWA Engineering Inc. – <a href="mailto:pcmarsh@ewaeng.com">pcmarsh@ewaeng.com</a> Alana Vander Veen, Drainage Superintendent, City of Port Colborne - <a href="mailto:alanavanderveen@portcolborne.ca">alanavanderveen@portcolborne.ca</a>

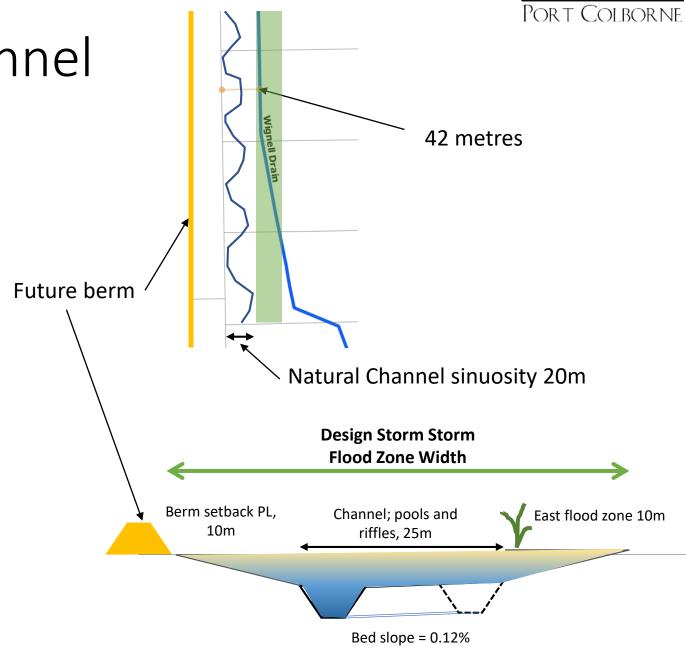
Chris Lee, Director of Engineering & Operations

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**Traditional Ditch Design** 



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The Ontario Drainage Act Process

Council decides if they will appoint an Engineer

- [Section 8(1)]
  Under Section 78 of the Act, Council appoints an Engineer to initiate a study and to prepare a report.

  Engineer holds on-site meeting and
- On Site Meeting; notice required by the tolers
- Preparation of a Preliminary Report [Section 9(2)]
  - Identification of the issues to be improved. Engineer investigates drain The preferred method for improvement design options

  - An estimate of the costs for improvement, and
  - The principles for revising, changing or otherwise adjusting the drainage schedule of cost sharingpares Draft Final Report
- Field Survey
- Plans, profile, and specifications - Cost Estimate
- **Detailed Design**
- Assessment Schedule
- Allowances
- Final Drainage Report Preparation considerations
- Drainage Report Review and Consideration site meeting and
- **Contract Tendering**

consults with stakeholders [Section 9(2)]

- Construction
- Post Construction Final Doctor entation of the brainage [Section 39(1)] Report

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