PORT COLBORNE

Oil Mill Creek Drain
Public Information Centre

February 23, 2022 @ 18:00

Zoom meeting

EWA Engineering Inc.
647.400.2824 www.ewaeng.com

Agenda

- Role of Public Information Centre in the Drainage Act
- Drainage History
- Baseline Report
  - Public Input / Comments
- Watershed Modelling
- Drain Improvements
  - Public Input / Comments
- Next Steps
  - Agency Consultations
  - Design Progress submissions

The Ontario Drainage Act Process

PIC #1

PIC #2

Council decides if they will appoint an Engineer
[Section 8(1)]

Engineer holds on-site meeting and consults with stakeholders
[Section 9(2)]

Engineer investigates drain design options

Engineer Prepares Draft Final Report
- Plans, profile, and specifications
- *Cost Estimate*
- *Assessment Schedule*
- *Allowances*
- *Other special construction considerations*

Engineer holds on-site meeting and consults with stakeholders
[Section 9(2)]

Engineer files report with City Clerk
[Section 39(1)]

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)]

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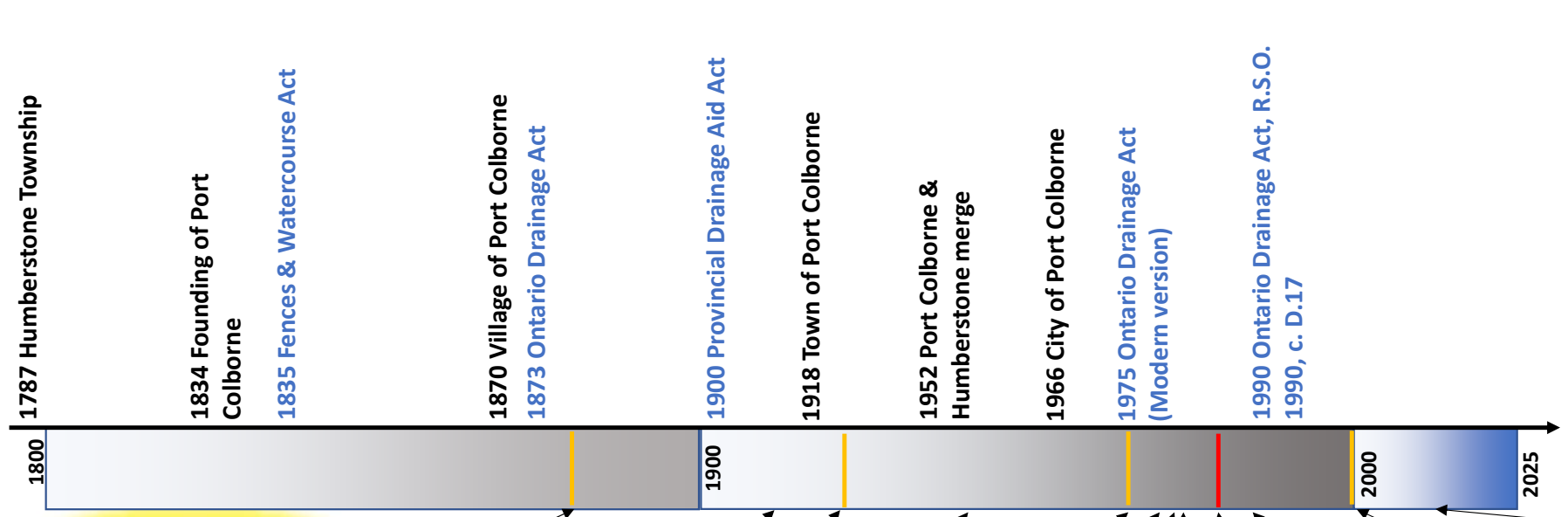
Oil Mill Creek Drain - History



1888 – Geo. Ross Report for drain repair & stone wall constr. East Side of the outlet Twp. Of Humberstone

1916 – By-Law No. 465 Improvement and Extension of OMC Drain Twp. of Humberstone

1929 – Ross and Scott Report for Drainage West Branch, Vimy Rd.

1961 – By-Law No. 1193 OMC Drain C.J. Clarke Report – petition for repairs – outlet overgrown, West Branch lower end overgrown & filled in with brush.

1977 – RVA OMC Drain and West Branch Report, Court of Revision

1979 – City of Port Colborne, OMC Drain East Branches Report, Court of Revision

1980 – OMC Drain Main Branch Report Amended

1981 – Intergovernmental Affairs Special Emergency Assistance Program OMC Contract

1984 – Engineer's Report, Apportioning West Branch, steel arch pipe (12m, 36"x22") ordered to replace existing culvert that carries West Branch of OMC under Vimy Ridge Rd.

1986 – Engineer's Report (Not adopted)

- Proposed new drain outlet at Pinecrest Rd.
- Apportioning part of Lot 13, Concession 1

2000 – By-Law No. 3904/49/00 OMC Drain K.Smart Report – Court of Revision Ont. Drainage Tribunal

2008 – By-Law No. 5206/112/08 OMC Drain Maintenance – Erosion Protection

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Appeals Tribunal - 1979

COURT OF REVISION

WEDNESDAY, SEPTEMBER 26th, 1979

OIL MILL CREEK DRAIN - MAIN BRANCH & WEST BRANCH

A Court of Revision on the OIL MILL CREEK DRAIN - MAIN BRANCH AND WEST BRANCH was held on September 26th, 1979, with the following in attendance.

Chairman, Len Hallborg
Member, Frank Murray
Member, Alec Danch

Deputy Clerk, Pat Premi,

Doug Ingram, R. V. Anderson & Associates

Lester B. Anthes
Leo Vandervaart
Richard Bell
Dale Biko
Garry Kelly
Arthur Rickerson
John Kish

Objections in writing to their proposed assessments were received from Messrs. Anthes, Bell and Vandervaart.

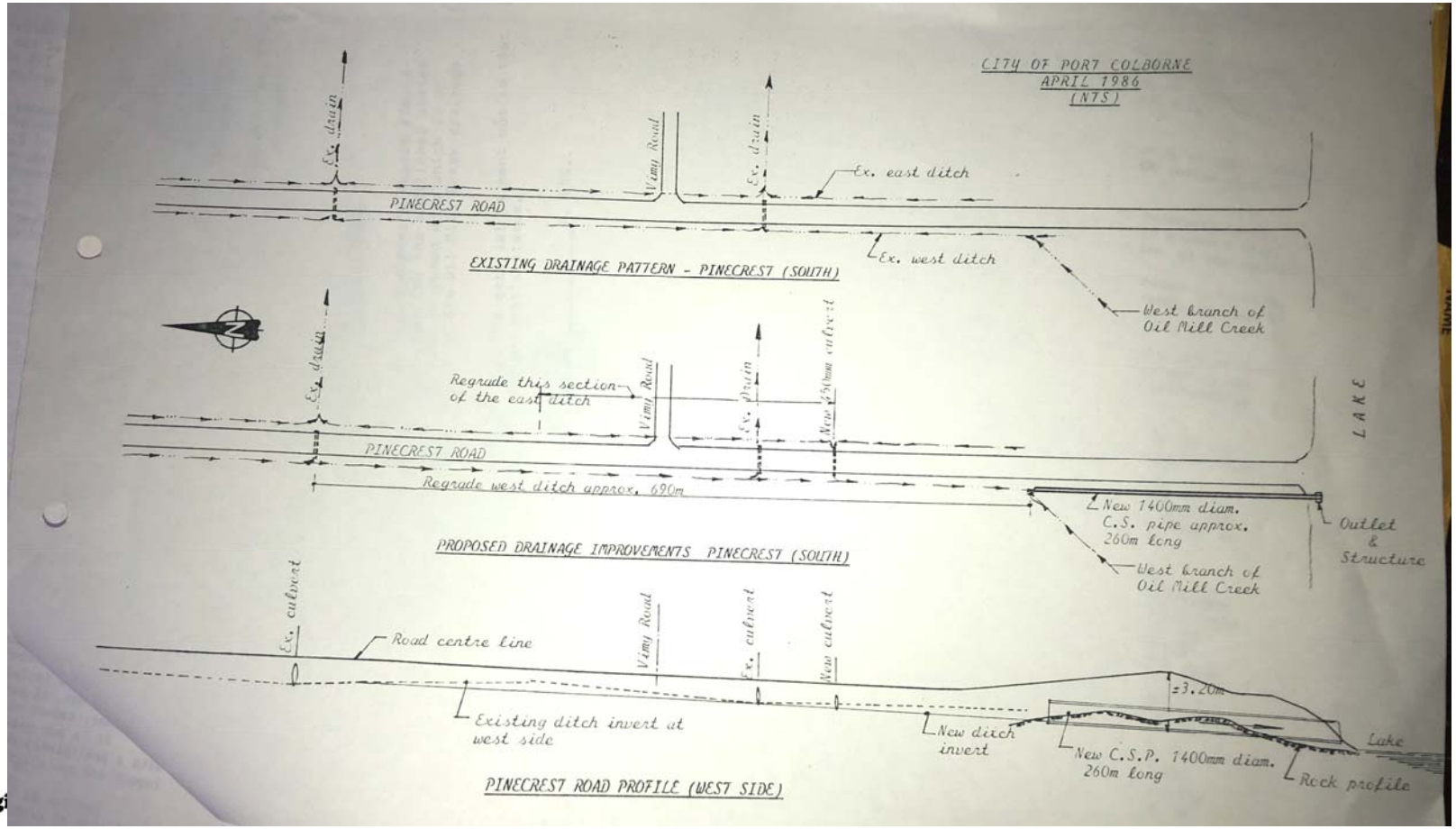
APPELLANT	COMPLAINT	DECISION OF THE COURT
L. B. Anthes	See Above	Allowed
R. Bell	See Above	Disallowed
L. Vandervaart	See Above	Allowed. The Court recommended that the injuring liability assessments in the amount of $146.30 and $40.00 be credited to any charges levied against Mr. Vandervaart under the/East Branch Drain. proposed
J. Kish	See Above	Disallowed
G. Kelly	See Above	Assessment appeal disallowed Engineer's will arrange for relocation of the ditch with the the extra cost to be borne by Mr. Kelly

The Court adjourned at 8:35 P.M.

CHAIRMAN

Patricia Premi
DEPUTY CLERK

1979 Pinecrest Rd Proposed Pipe Outlet



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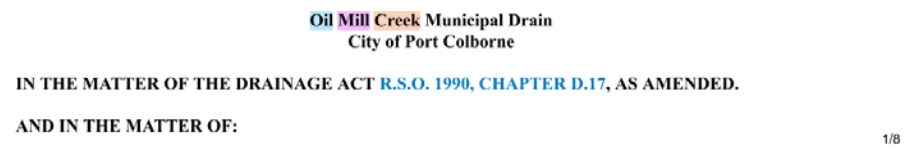
Appeals Tribunal - 2000



Oil Mill Creek Municipal Drain
City of Port Colborne

IN THE MATTER OF THE DRAINAGE ACT R.S.O. 1990, CHAPTER D.17, AS AMENDED.

AND IN THE MATTER OF:

1/8

A Drainage Tribunal was held on September 20, 2000 with 15 appellants with a proposed project estimate of $72,000 for 61m to enclose the outlet portion of the drain south of Vimy Rd. The major problem facing the engineer was the methods used to apportion the costs.

The Tribunal reduced additional $200 assessments for the short-listed area upstream properties and increased the benefit assessment to the four properties adjacent to the proposed enclosed drain works.

This work proceeded to construction.

Order of the Tribunal

1. Work is approved
2. 38 properties on sand ridge – deleted from assessment, reallocated $7,600.00
3. all parcels of property assessed further $10.00, total $2,640
4. Benefit assessment of 4 properties (total $4960) Summary is set out in Appendix B.
5. That schedule B, Schedule for Assessment for Future Maintenance, be revised for each property in Appendix A $200 reduction and the total adjusted accordingly.
6. Engineer prepare revised schedules of assessment.
7. All other appeals are dismissed.
8. Non-admin costs of the CofPC form part of the cost. All other parties shall be responsible for their own costs.

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Baseline Report – Overview

Baseline Report

Baseline Plan & Profile Drawings

Environmental Conditions

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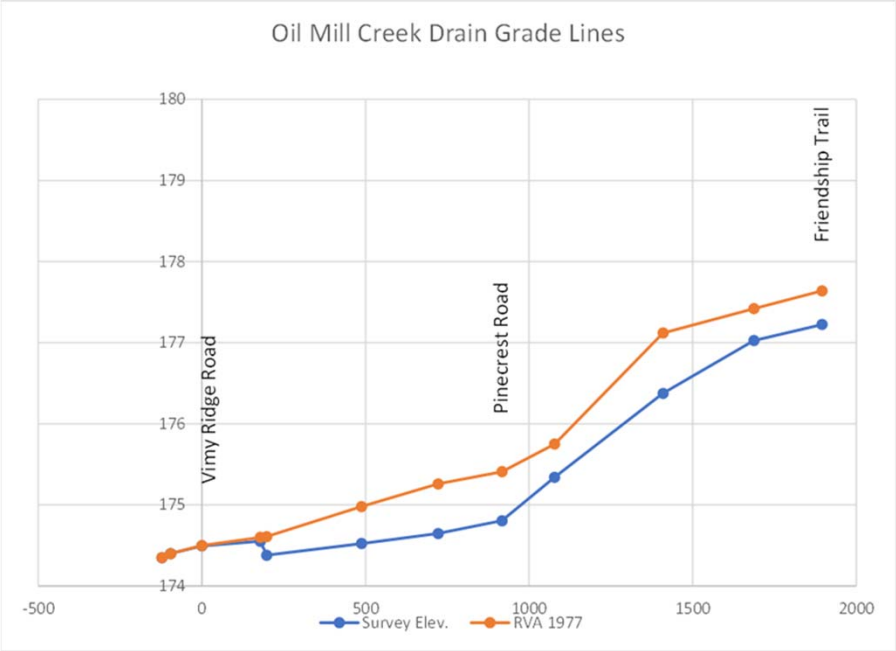
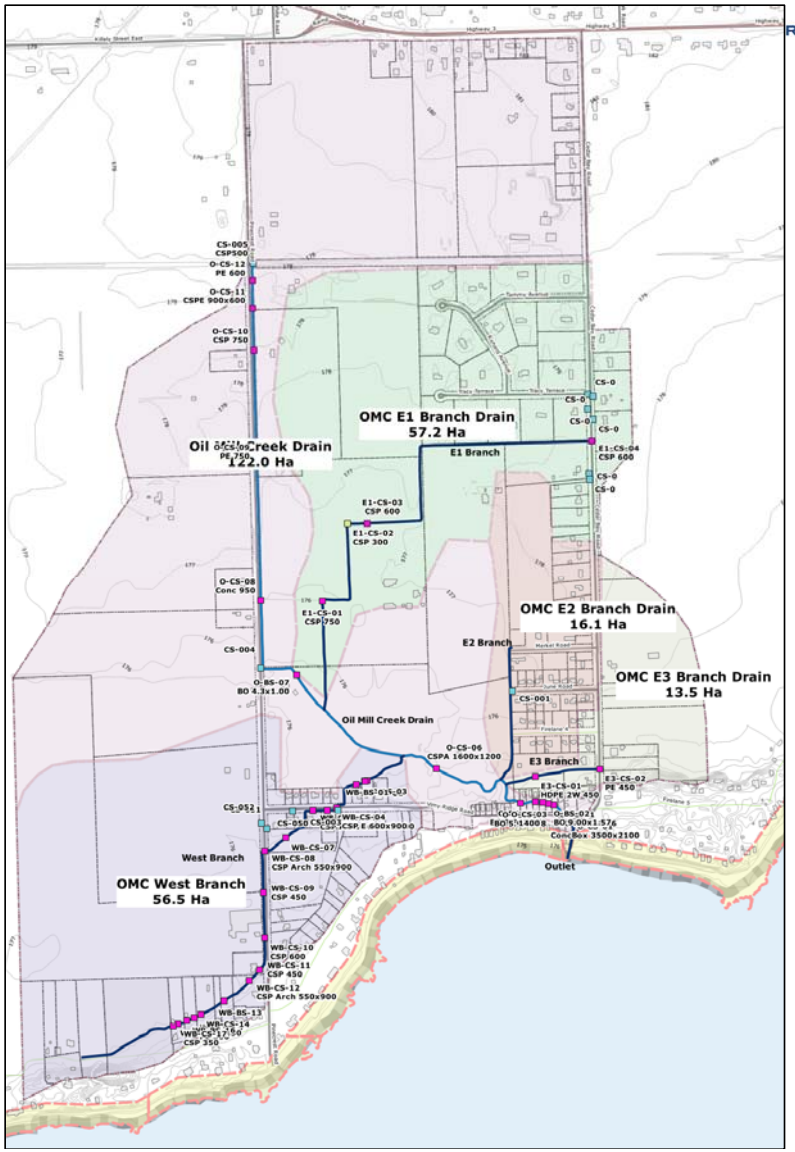
Baseline Report



- Serves an area of 255.7 hectares based on the defined drain boundary.
- The main branch of the drain is 2,008m to the outlet into Lake Erie.
- The watershed boundary or high point is 182m. The average lake level is 174.16 IGLD (revised).
- Outlet - elevation;
  - North side is 174.5
  - South side (Control Gate) is 174.28
- This Oil Mill Creek drain slope characterised as a split watershed, high slope upper catchment and very low slope in the lower half of the drain.
  - Watershed average fall (slope) is given as 0.27% or 2.7m per 1000m
  - Drain average fall (slope) is given as 0.13% or 1.3m per 1000m

Drain and Branch Drains

- Oil Mill Creek E1 Branch
  - E1 is 1277m long and with an overall grade of 0.23%.
  - It's standing water in several places despite reasonable grades.
- Oil Mill Creek E2 & E3 Branches
  - E2 was lowered from its original intended profile mostly at the outlet as expected creating a considerable grade back to Merkel Road (original grade RVA 0.44% now 0.54%. The 325m Drain has an overall grade of 0.54% making it the steepest portion of the Oil Mill Creek drains.
  - E3 is 223m long with an overall grade of 0.22% corresponding to 2.2m over 1000m of fall. The survey recorded significant ponded or still water with a culvert submerged.
- Oil Mill Creek West Branch
  - The West Branch has a very low grade profile over it's 1265m of length making it one of the poorer functioning portions of the Oil Mill Creek. The overall grade is 0.05% or 0.5m per 1000m.
- Oil Mill Creek Drain
  - The Oil Mill Creek Drain has by design a very low grade in the first 600m of the drain, roughly to the point of confluence with the West Branch outlet. From the point adjacent to the Pinecrest Road, there is an improved grade line to the Friendship Trail.



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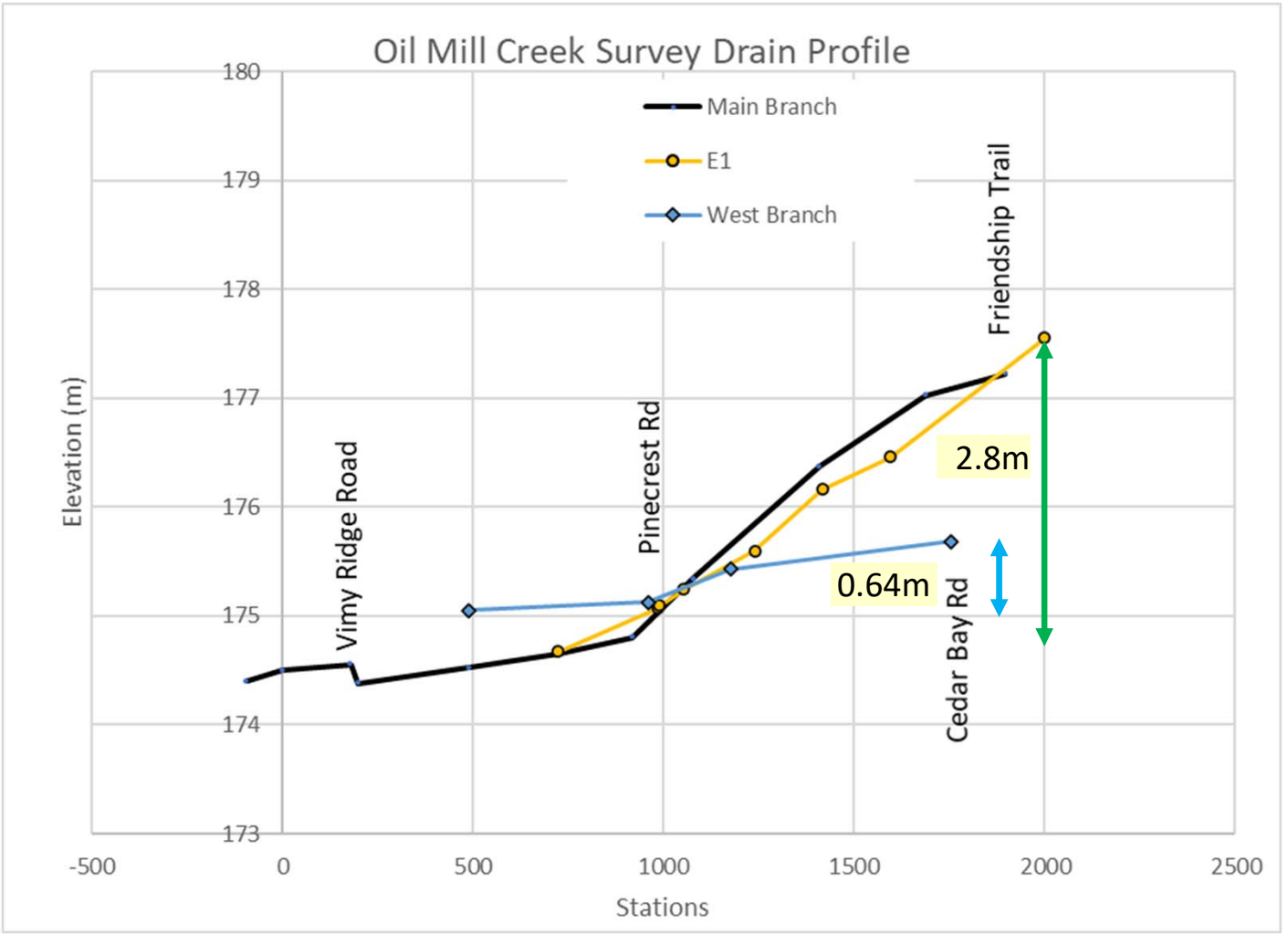
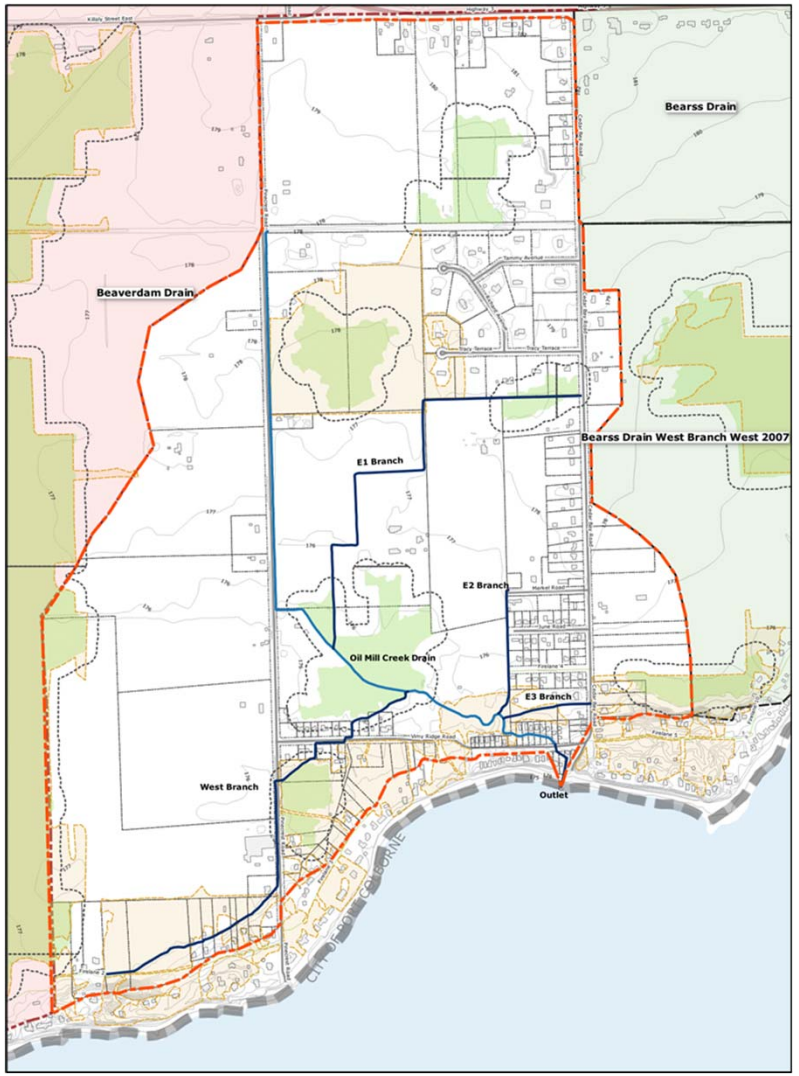
Comparison of drain slope

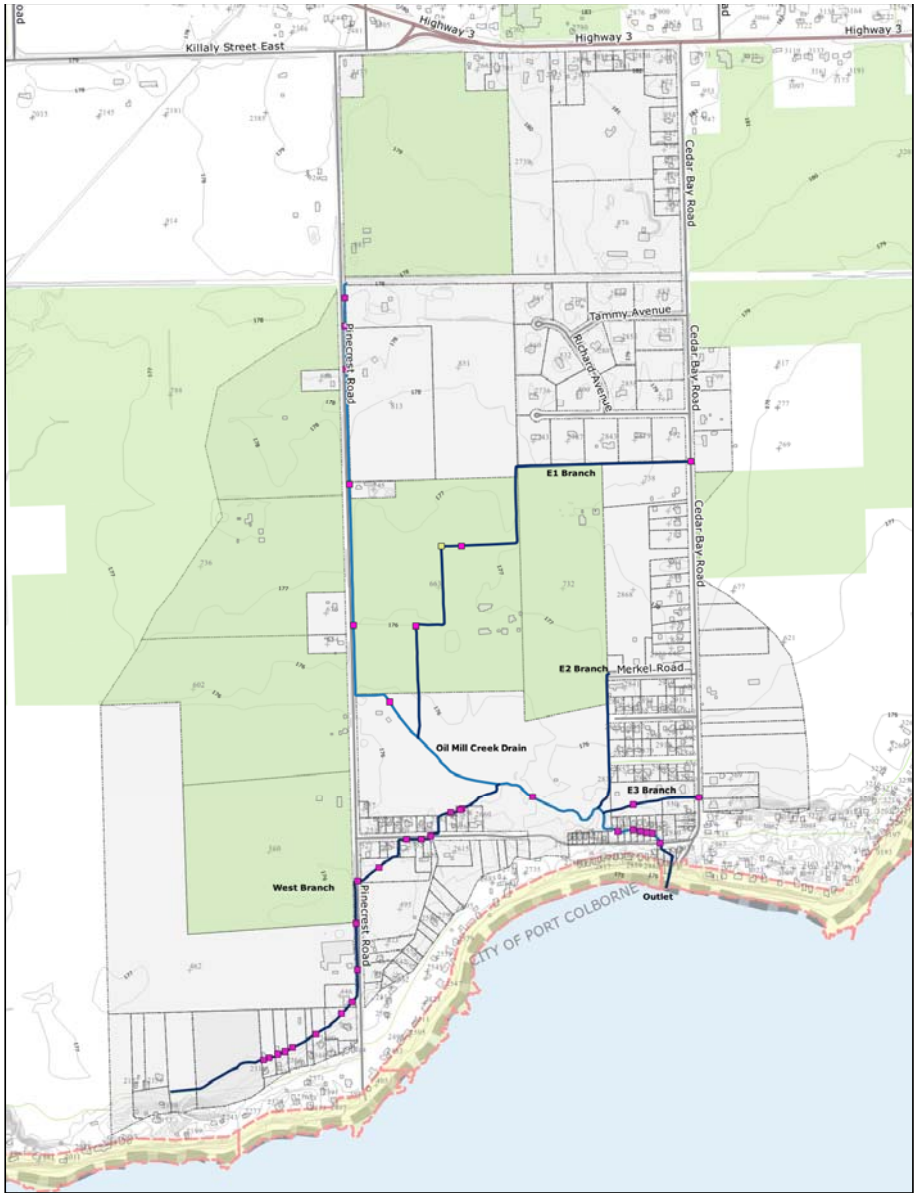


Environment

- Significant wetland features exist within the Drain and catchment.
- DFO rated stream assessment as ‘F’ Intermittent.



Farm Lands



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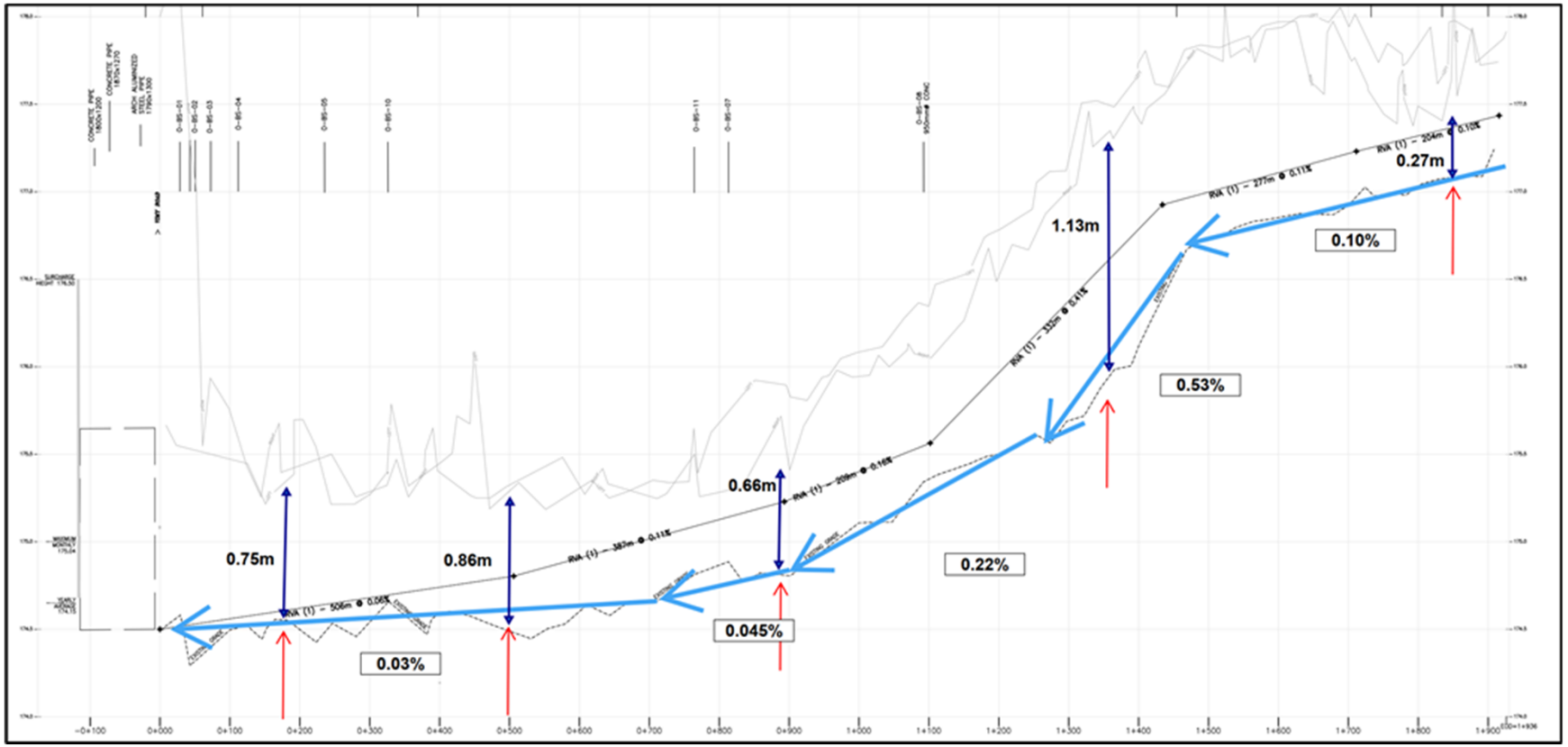
Drain Status – Issues, Problems & Opportunities

- Maintenance last performed in 2008, 2011 and most recently in 2019.
- Culverts inspected and few structural defects noted with replacements. Several culverts identified as undersized or high.
- Outlet is controlled by a winch, requires being set and does not adjust to flow. Only seals if free of debris.
- Are there environmental impacts that would affect the drain?
  - Wetlands, Park land, Road runoff.
- Are there specific petition based improvements requested?
  - Yes and maybe
- Are there opportunities for improvement?

Channel Improvements



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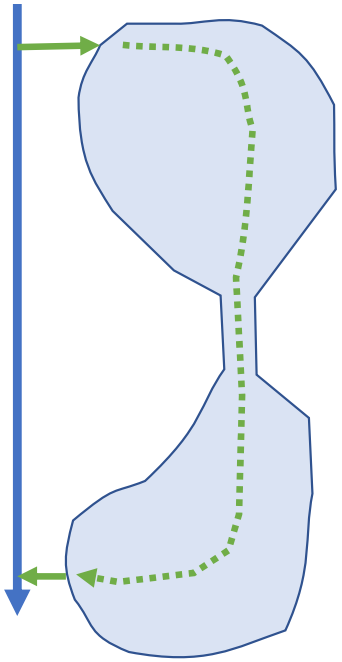
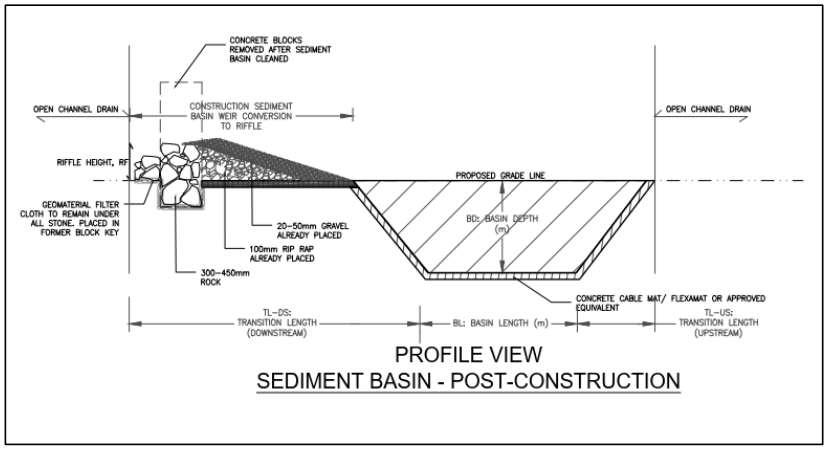
Drain Water Quality Improvements

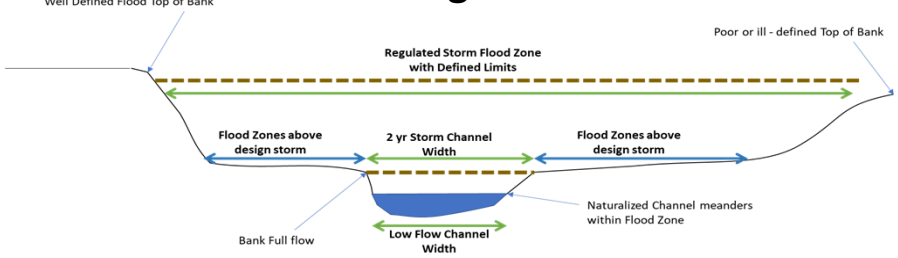
1. Possible Wetland or Pond implementation



2. Sediment Basins



3. Natural Channel Design



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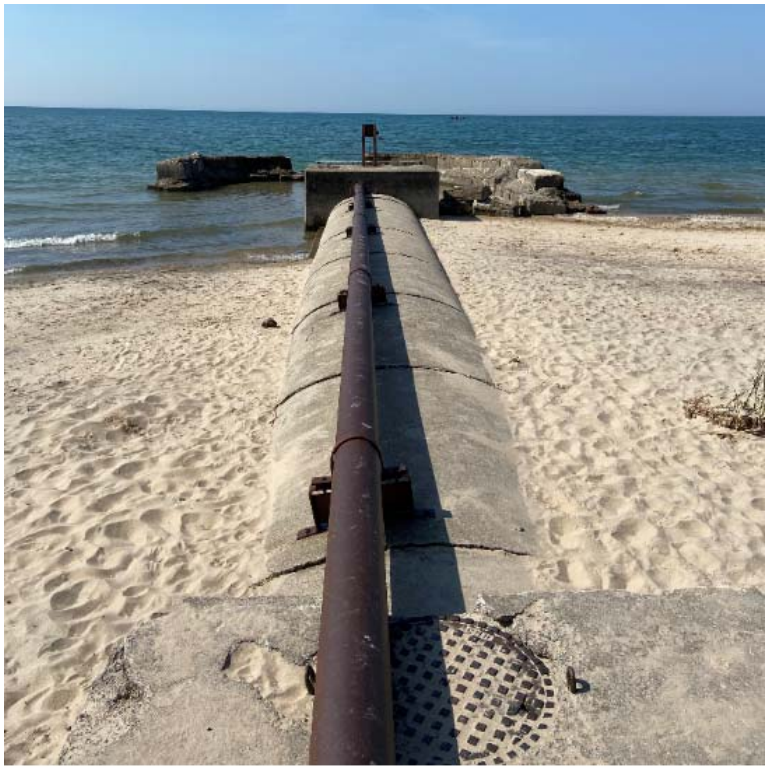
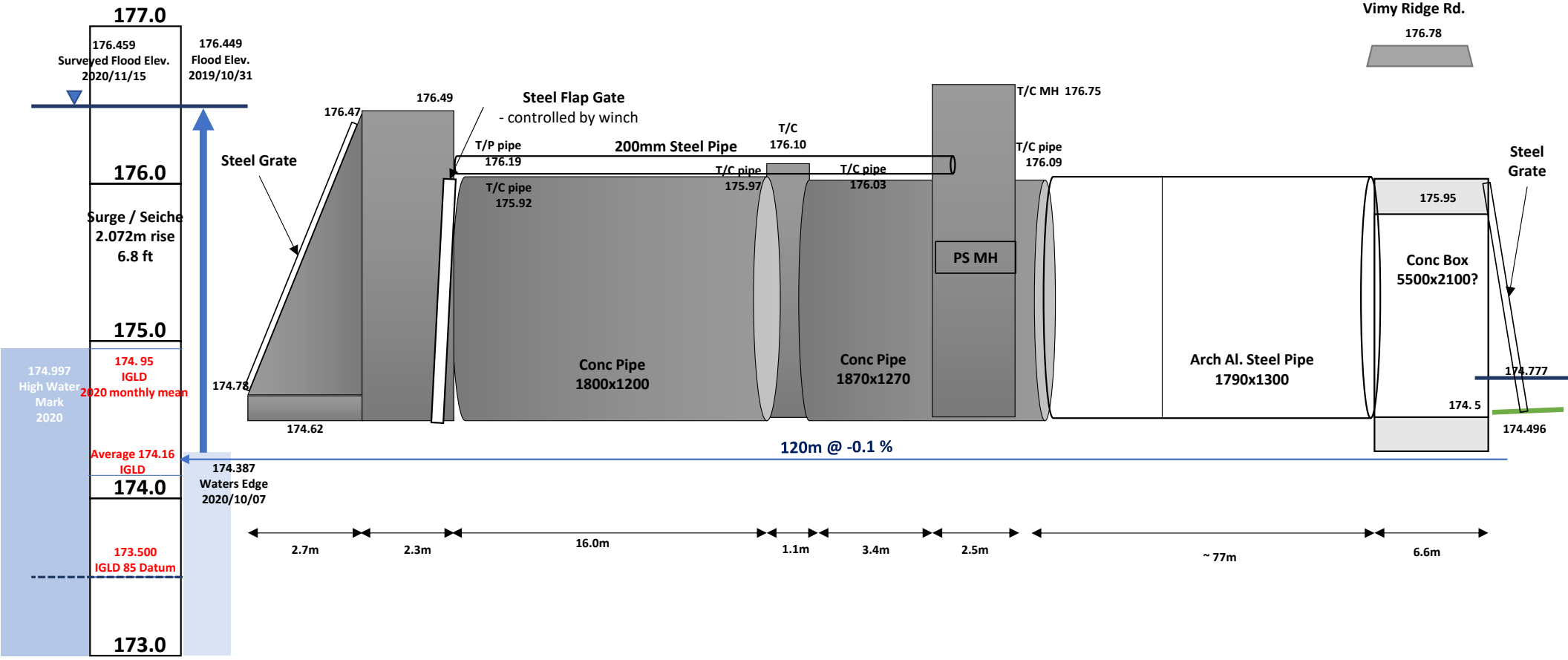
Drain Control Structure

- Control Structure Considerations:
  - Pumping
  - Existing pump structure – hasn't operated for a long time.
- Control Structure Gate flow capacity
  - Runoff flow through openings 1:100 year storm
  - Storm surge level control
  - Modernization - Implementing remote operation
- Site improvements

Gate Flow vs. Pumping





Note: IGLD vertical measurements are based on different datum from the survey measurements using NAD 83 UTM coordinates.

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Oil Mill Creek Watershed Report

Computer Based Hydrologic and Hydraulic Analysis

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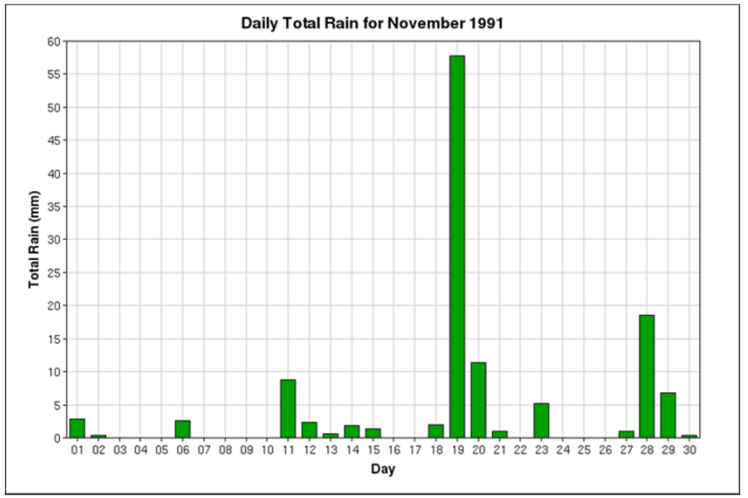
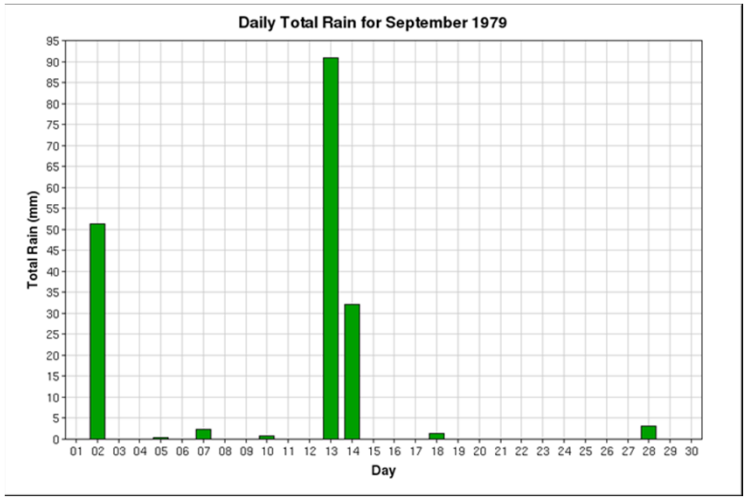
Some Storms

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

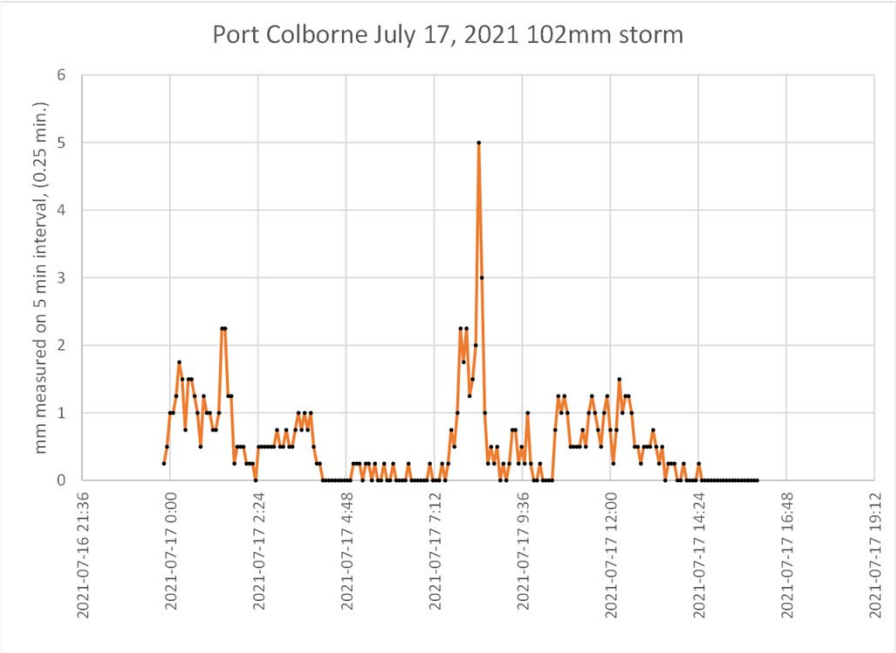


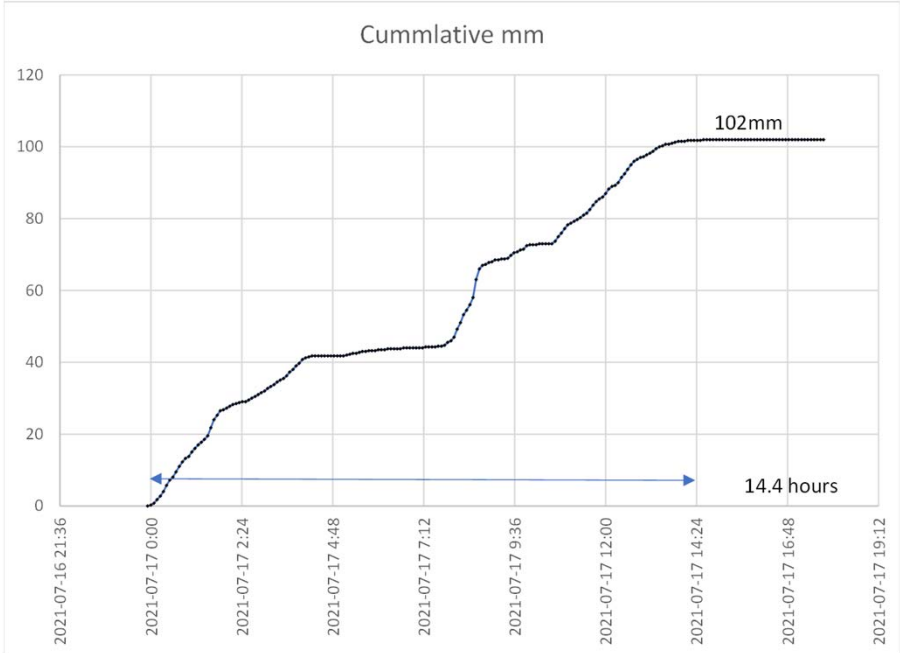
Year 1979 had a value greater than the 100 year storm. Data 116.4mm
100 year = 105.9 - 12 hour storm comparable value



Storm July 17, 2021

RMON NWIS opendata @ Port Colborne WWTP





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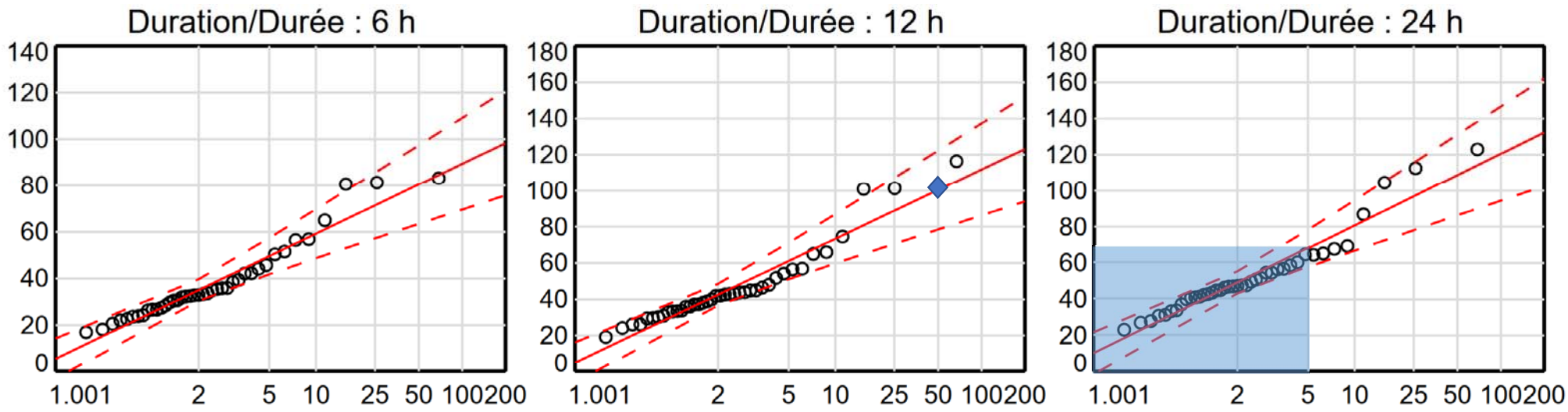
102mm over 14 hours on July 17, 2021



Environment Canada Environnement Canada

2021/03/26

Canada

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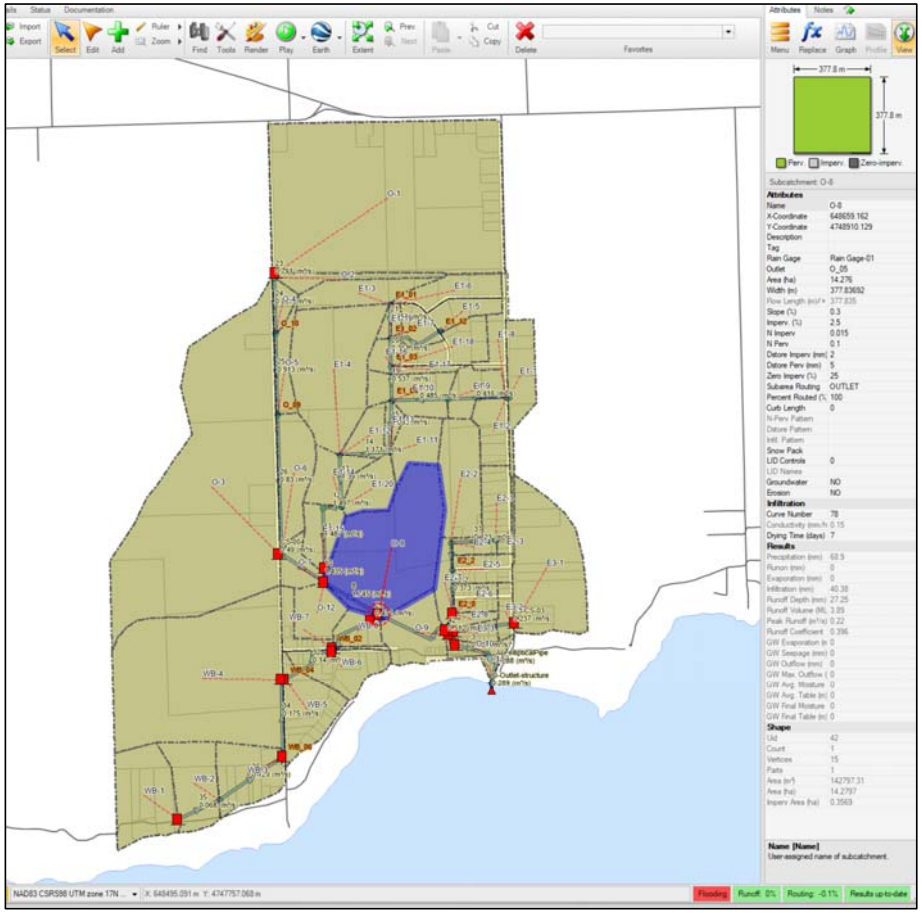
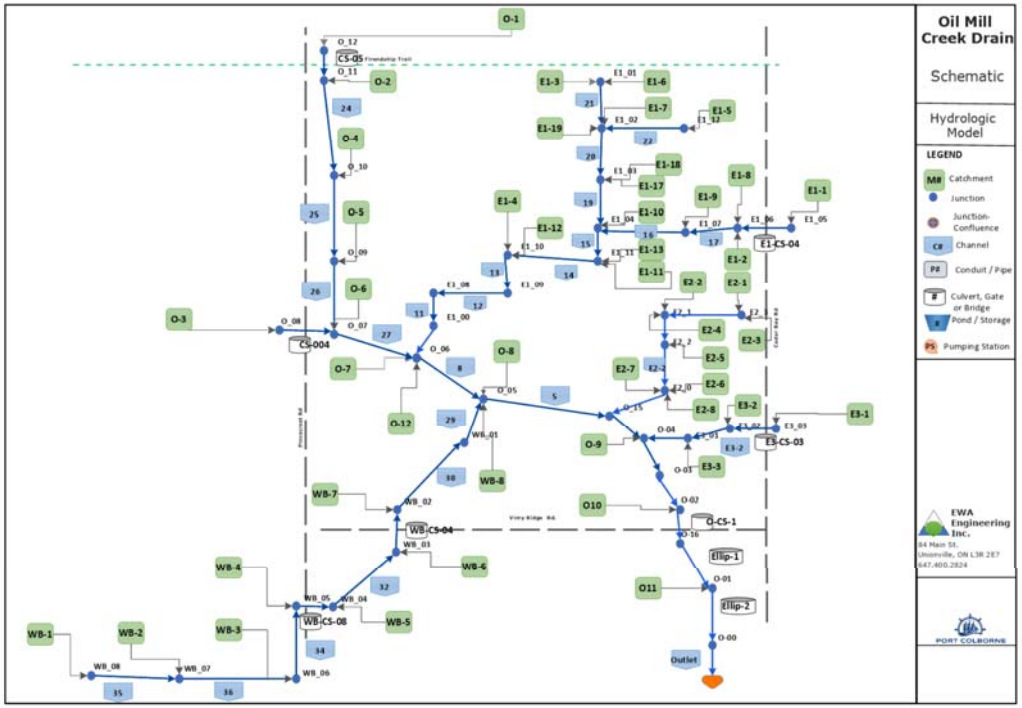
Watershed Analysis





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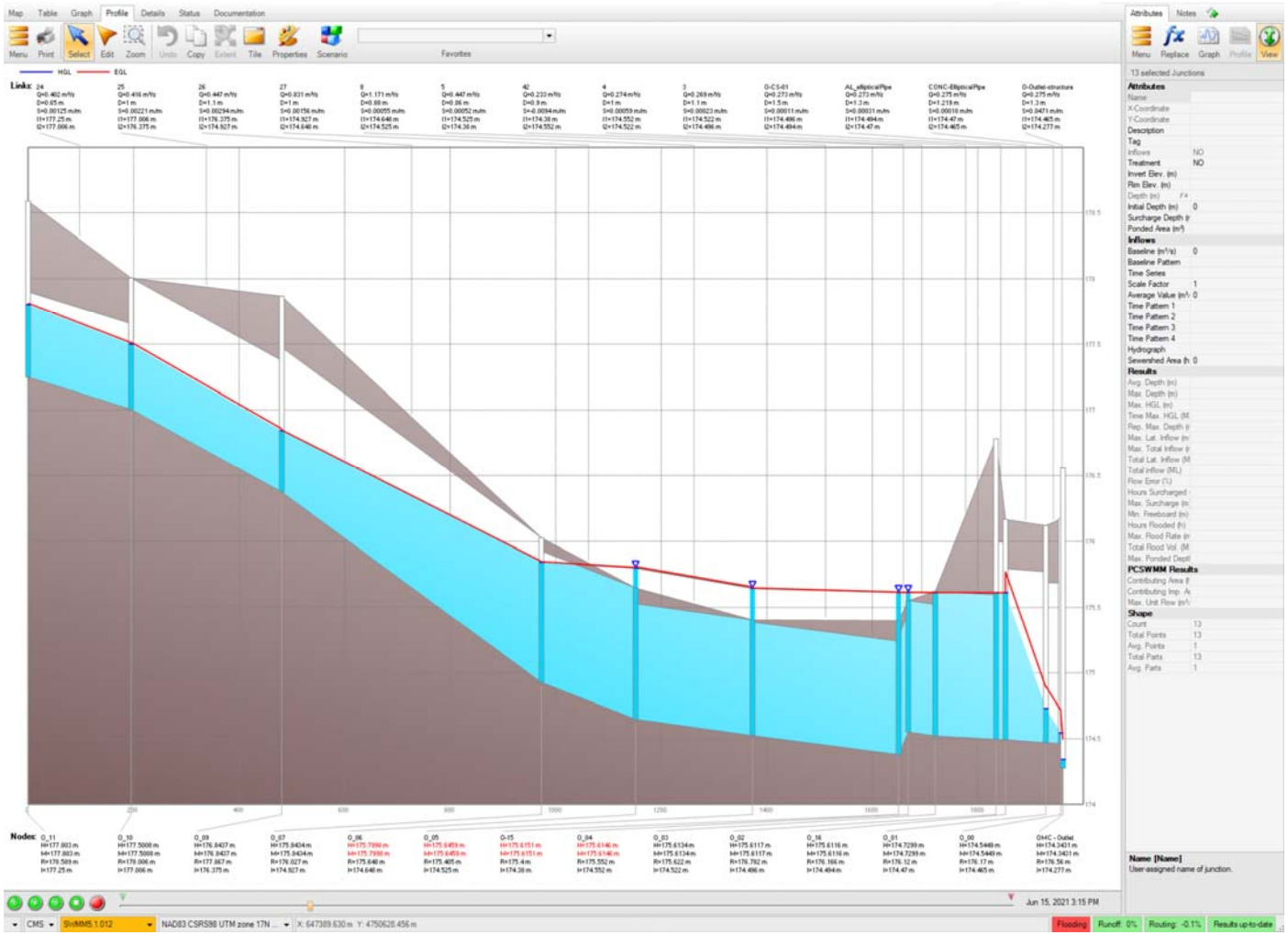
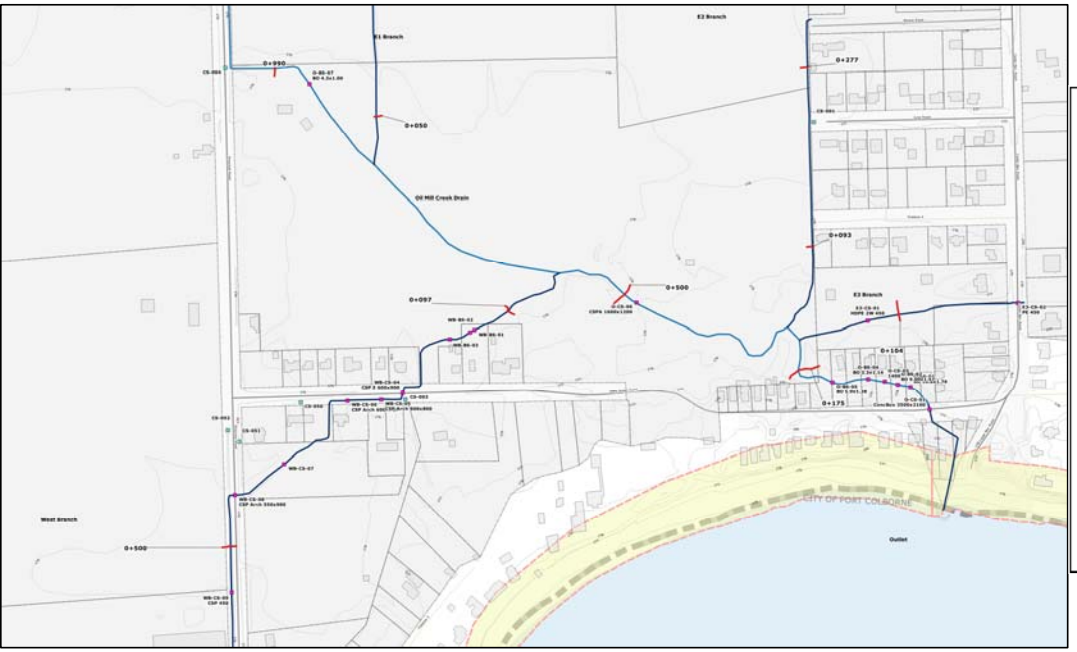
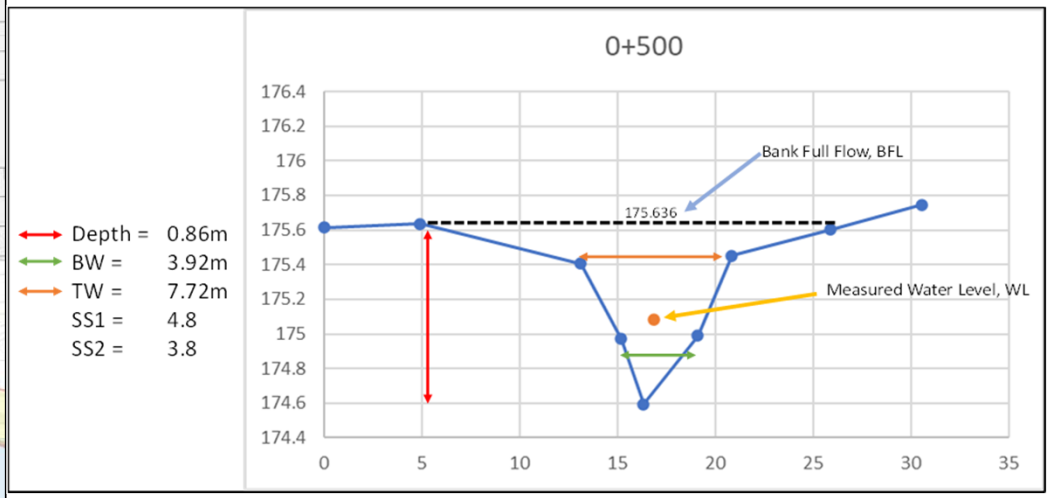
Hydrologic and Hydraulic Model results



Culvert and Channel Capacity Analysis





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Improvement Opportunities

Design Options and Analysis

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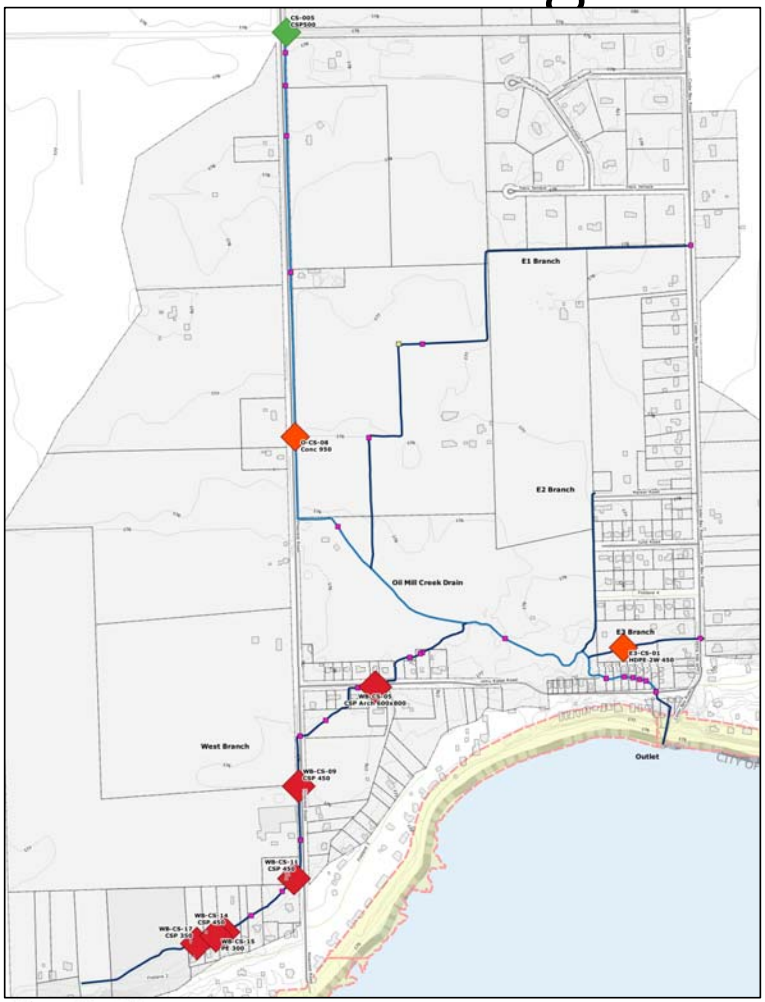
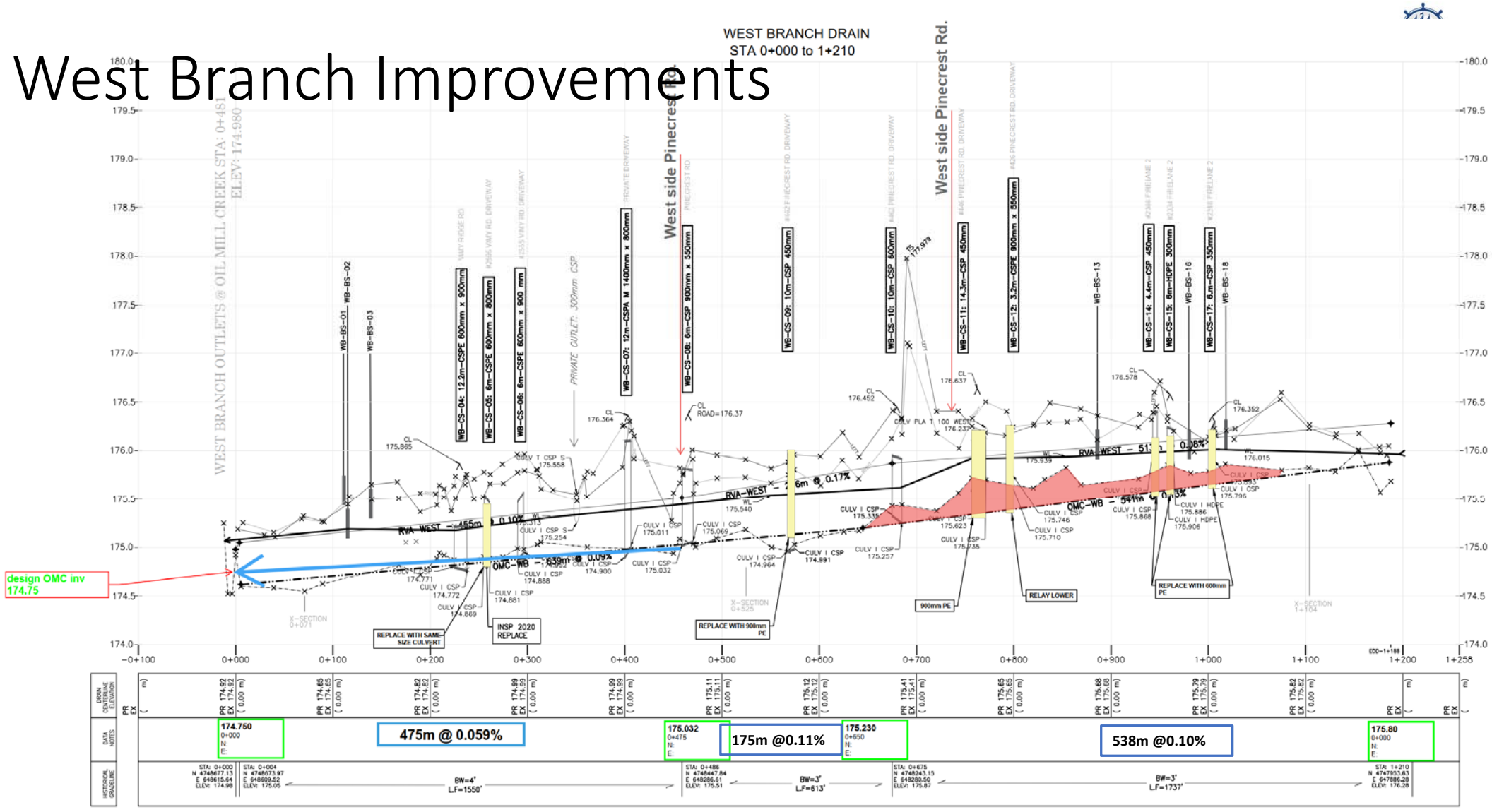
Oil Mill Creek Design Issues - Existing



1. Control Gate & Pumping Improvement Program
2. West Branch – grade improvements
3. Grade Issues on Main Drain in Lower segments.

West Branch Improvements



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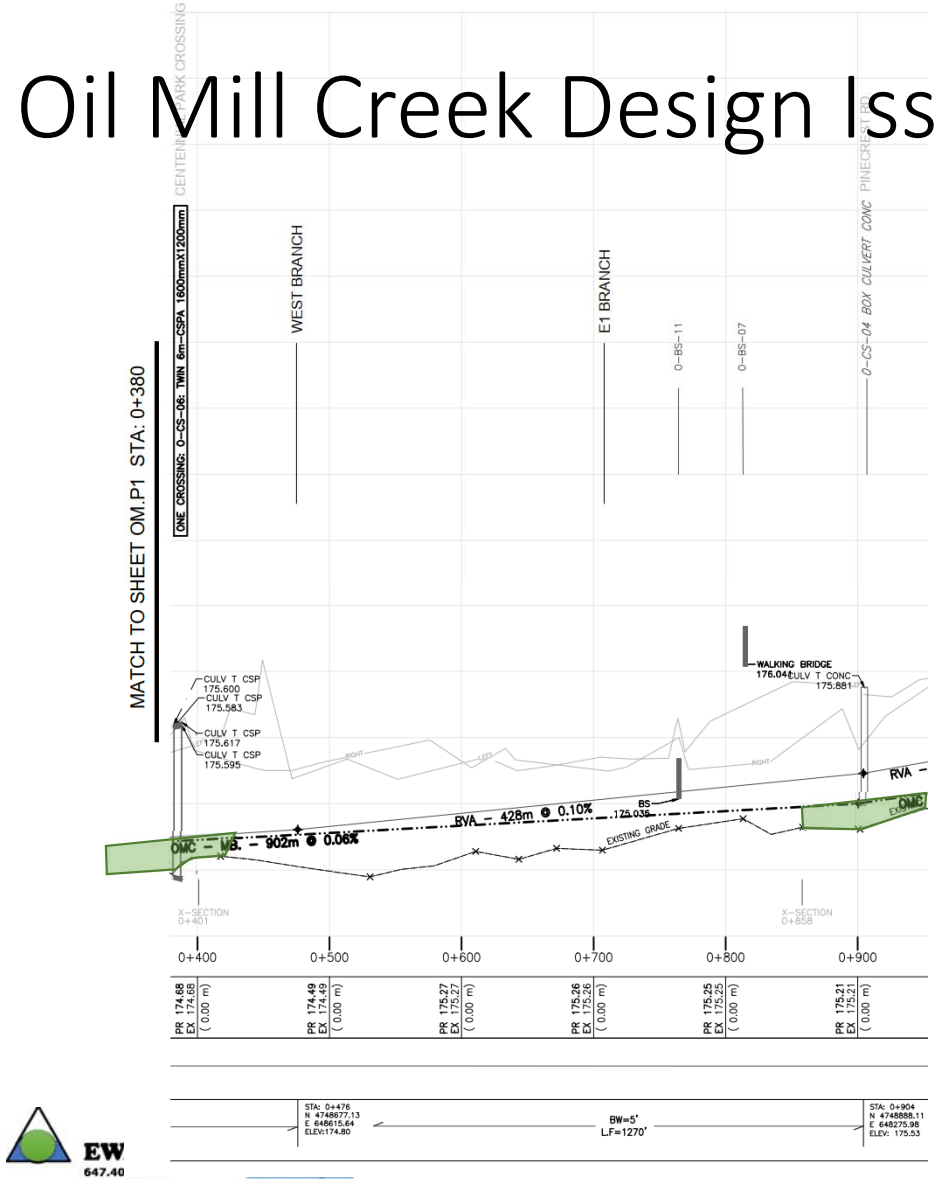
Oil Mill Creek Design Issues - Existing



1. **Grade Issues on Main Drain in Lower segments.**
    1. **Riffle & Pool natural design**

Tail of Pool, Crest of Riffle – the area at the most downstream end of a pool or the most upstream end of a riffle, where a slow, deep section of river becomes a shallow and fast section. This area is used to estimate pool depths during low flows, because it controls the pool depth by holding water back during low flow periods. The depth of flow on the crest of a riffle can be found by picturing a transect across the highest point of the riffle and measuring the depth at the lowest point (the thalweg) in this line. This is the last place water will drain from the pool.

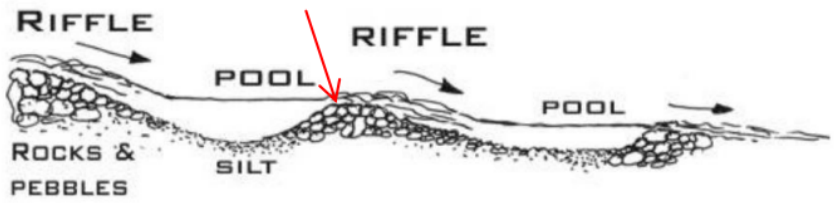
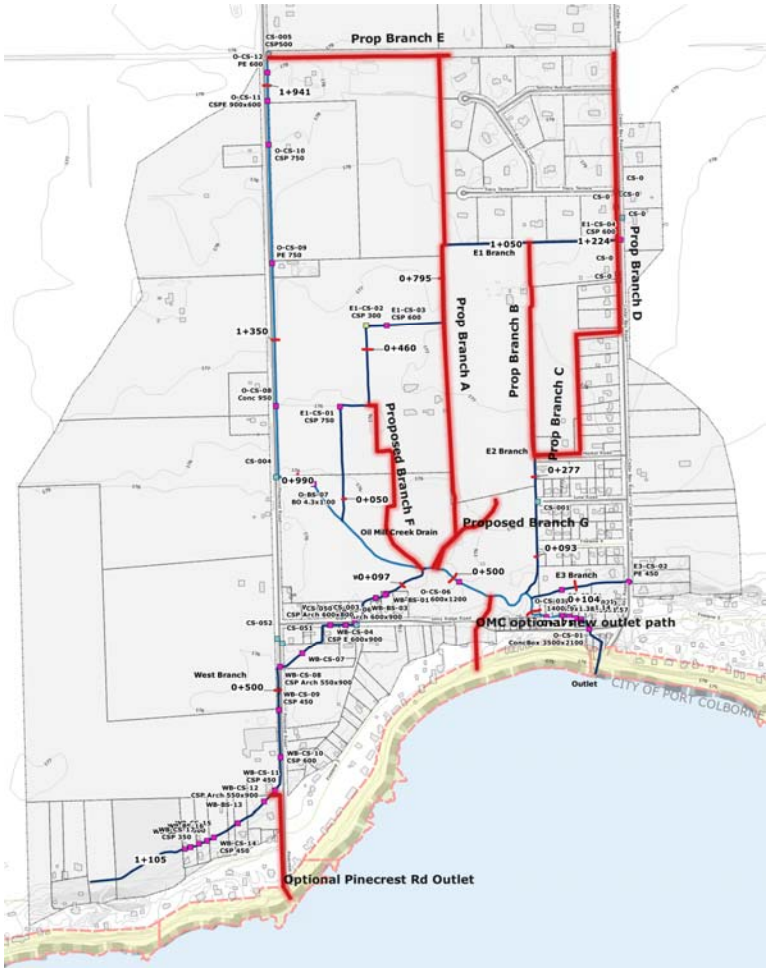


Figure 5 - Where to find the crest of a riffle, tail of a pool

Oil Mill Creek Design – New Options



1. New Outlets
    1. Overflow Outlet south through existing park.
    2. New Outlet through Pinecrest Rd.
2. New Drain Alignments
    1. Option A – yes improved
    2. Option B – works but min benefit
    3. Option C – local improvement
    4. Option D – existing path better
    5. Option E – Existing works
    6. Option F – No benefit
    7. Option G – existing path

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Petition Drains – Section 4 Improvements

- Petition Drains
  - (a) majority of owners (>50%)
  - (b) more than 60% of the land area
  - (c) required for a road, request by jurisdiction responsible for road.
  - (d) drainage required for agricultural purposes, the Director
- Option A – Proposed Bell Branch Drain and improved outlet
  - Petition 4 request by Road Authority for sufficient outlet.
- Option C – Local Improvement
- Pinecrest Outlet – upstream owners

Option C

- 10 properties, 5 for 50%
- 3.3 Ha – 1.98 (60%)

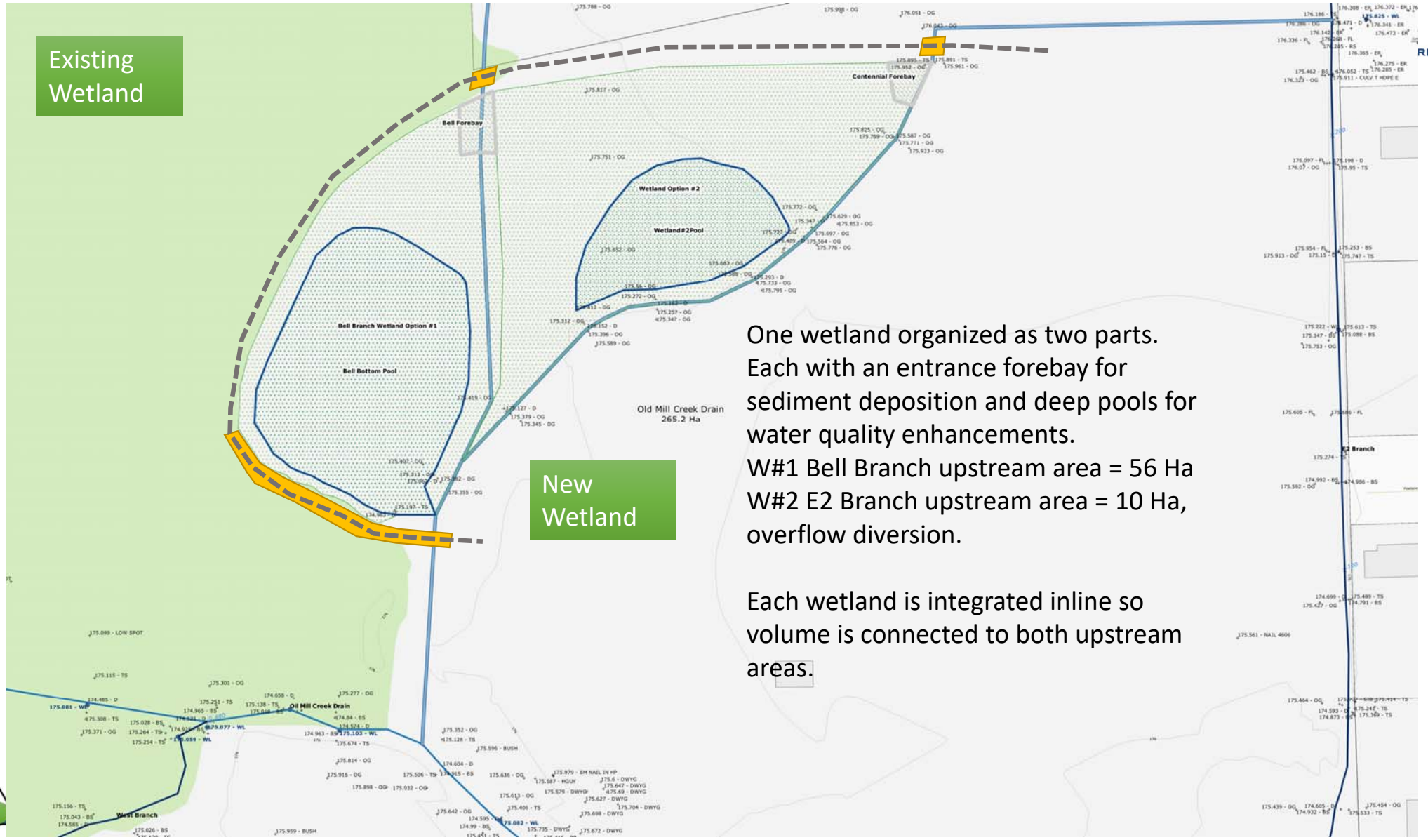
Controlling excess runoff

Natural or Green Infrastructure

- "Room for the River" – Dutch concept for flooding
- Incorporating existing wetlands into design solutions
- Adding additional wetlands for increased storage, (where wanted).
- Sustainable stormwater control features, (Sust-SWM)
- Channel Pool and Riffle to naturalize flows.

Pumping and/or Big Pipes (Grey Infrastructure)

- Stormwater pipes sized to outlet for 1:100 year storms
  - Examples; Markham / Thornhill
- Outlet Controls using computer controls
- Increase existing capacity through pumping station (PS) implementation
- Implement overflow or bypass outlets.



One wetland organized as two parts. Each with an entrance forebay for sediment deposition and deep pools for water quality enhancements.
W#1 Bell Branch upstream area = 56 Ha
W#2 E2 Branch upstream area = 10 Ha, overflow diversion.

Each wetland is integrated inline so volume is connected to both upstream areas.

Next Steps

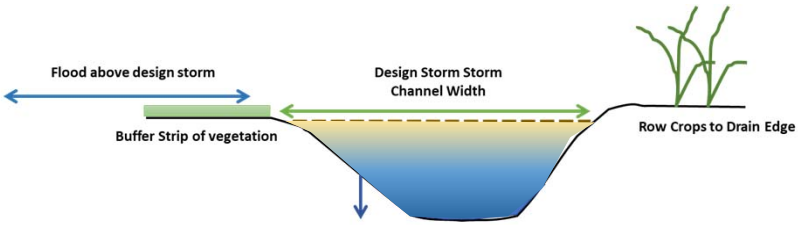
- Design Details – Review with approval Agencies for comment
- Engineer's Report:
  - Draft Final Report Oil Mill Creek Drain
  - Resolution of Petition 4 requests
- Public Information Centre #2: Design and Assessments
  - Seek public feedback on final improvements.
- Report Adoption by Council – Provisional
  - 40 day period for appeals
- By-law is passed –construction of proposed works to proceed

Thank you

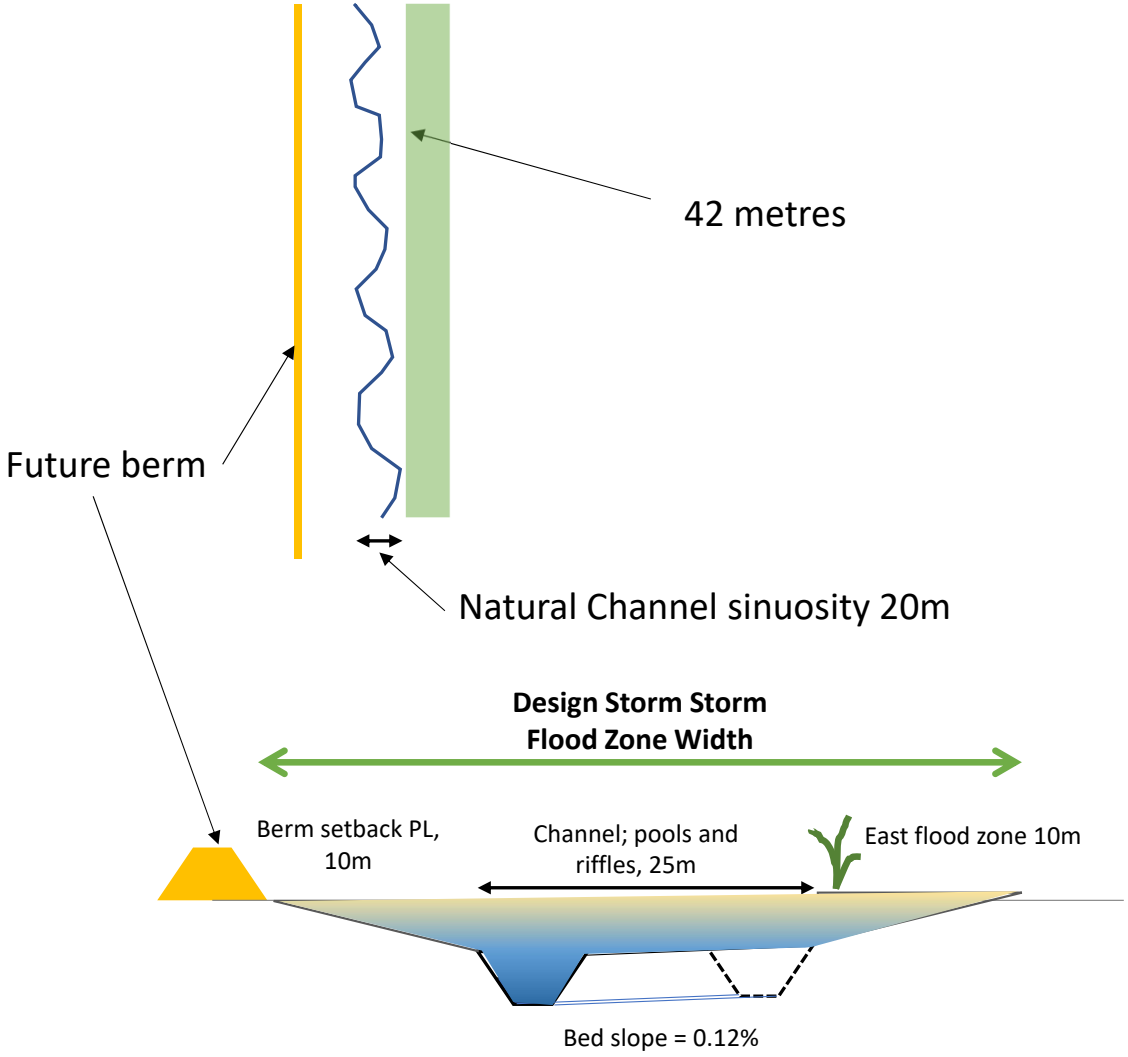
Paul C. Marsh, P.Eng. EWA Engineering Inc.
pcmarsh@ewaeng.com

Alana Vander Veen, Drainage Superintendent,
City of Port Colborne
alana.vanderveen@portcolborne.ca

Ditch vs Natural Channel



Traditional Ditch Design



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