

Natural Channel Design Solutions and Municipal Infrastructure: They Can Co-exist



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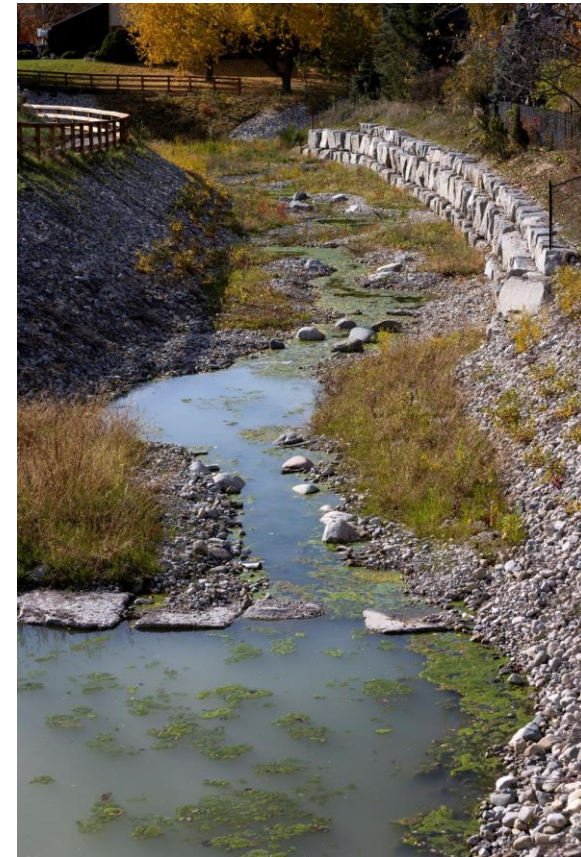
Ottawa, ON

November 20, 2024



Outline

- Introduction/Background
- Policy Context
- Project Context
- Natural Channel Design Elements
- Engineering Design Elements
- Construction Challenges
- Future Considerations
- Finished Product
- Questions





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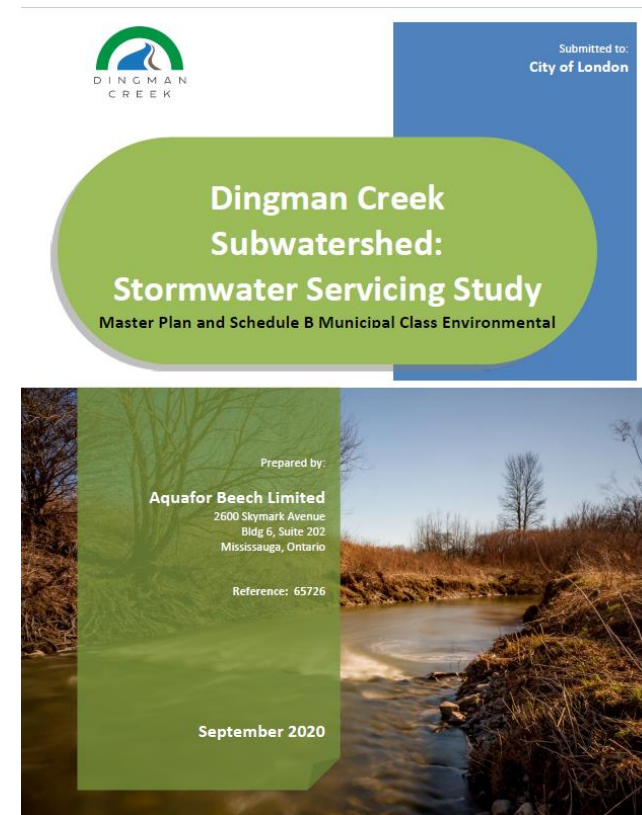
London's Stormwater Engineering Division



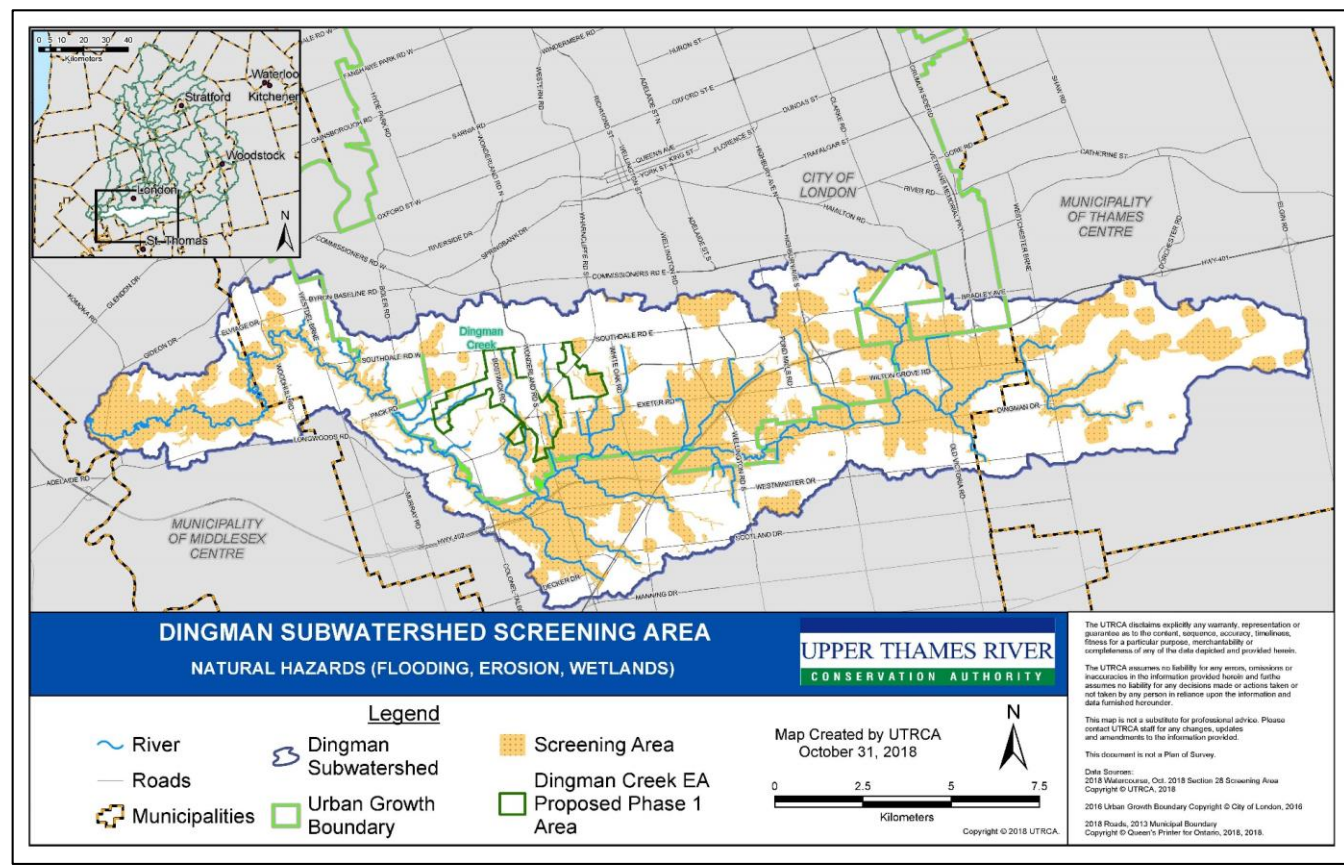


Dingman EA

- Initiated in 2017 to develop subwatershed-wide stormwater strategy
- Municipal Dry Ponds in neighbourhood areas
- Low Impact Development 25 mm capture for new development
- Complete Corridors – 2 new construction, 2 restoration focused
- Identified areas susceptible to flooding



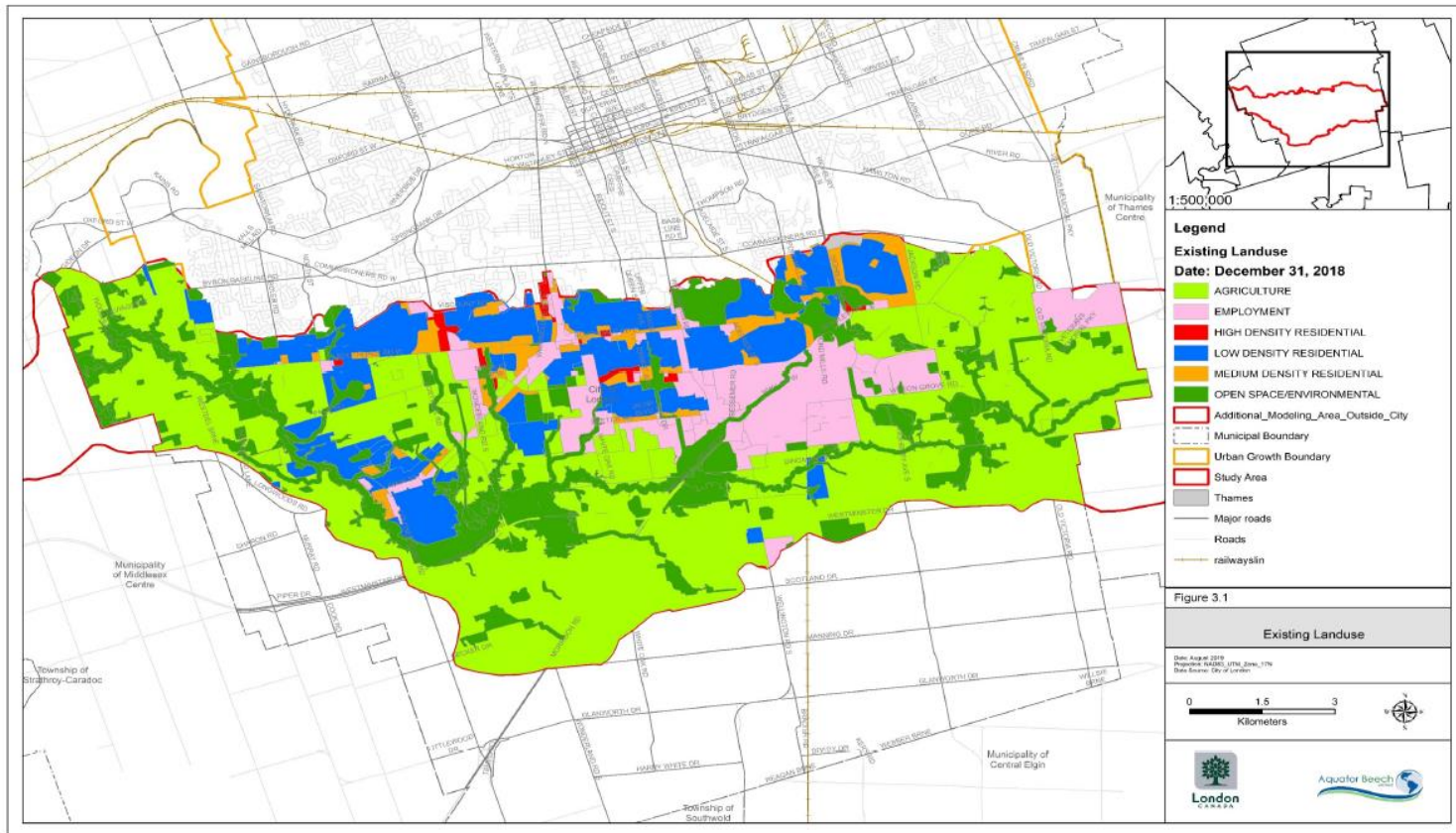
Dingman EA : Flood Model Update





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2018 Land Use





Dingman Stage 1 EA: Strategy

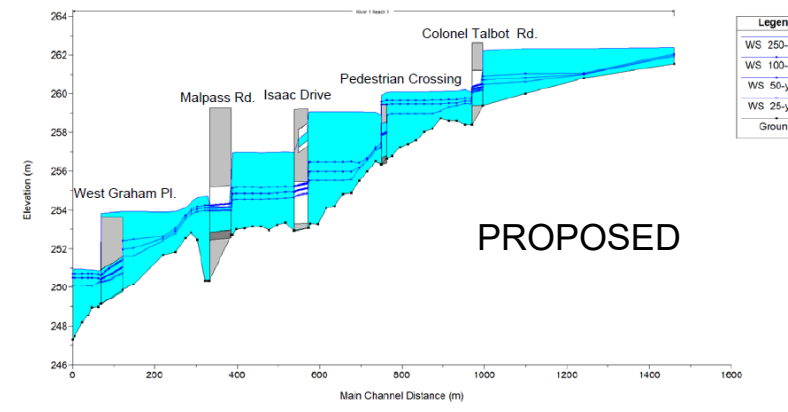
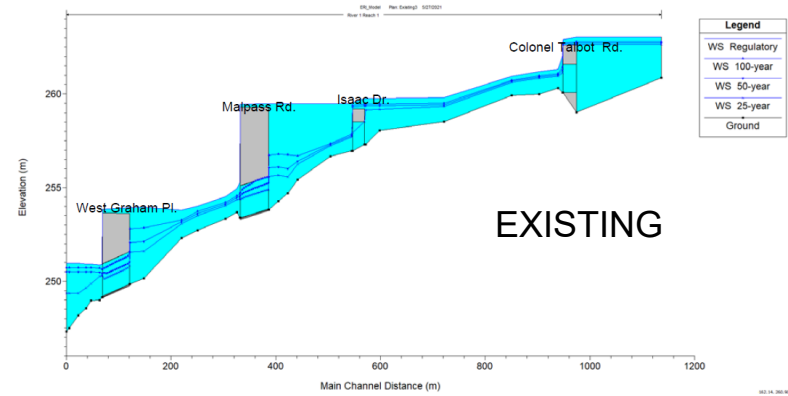


<p>Date: November 2019 Source: City of London, 2016</p>	<p>Dingman Creek Subwatershed Study</p>	<p>Municipal Stormwater Facilities:</p> <ul style="list-style-type: none"> Control Point Stream Dingman Creek <p>IDF Management Recommendation:</p> <ul style="list-style-type: none"> Protection Conservation Mitigation No Management Required <p>Development - Nov 2019:</p> <ul style="list-style-type: none"> DISPERSED LOW DENSITY RESIDENTIAL MEDIUM DENSITY RESIDENTIAL HIGH DENSITY RESIDENTIAL RESIDENTIAL GROWTH <p>Other Features:</p> <ul style="list-style-type: none"> Channel Reconstruct Complete Corridor Width to be confirmed at functional design stage Previously Significant Wetlands Unserviced Wetland Locally Significant Wetlands Significant Woodlands Woodlands Environmentally Significant Areas Significant Valleys/lands Potential CCA Valleys/lands <p>Infrastructure:</p> <ul style="list-style-type: none"> Dingman Creek EA Stage 1 Dingman Creek EA Stage 2 Substations Tributaries <p>Notes:</p> <ul style="list-style-type: none"> Stream System Studies for White Oaks Final Geomorphic Assessment to be completed ICF Assessments to be completed Stream Hazards - member best assessment provided, stable slope hazard to be confirmed Maps are representative and do not include all features. 	
	<p>Implementation Plan - Overview</p>		

Tributary 12/Southwinds Channel



Flood Conditions





Proposed Flood Conditions (Cont.)

Crossing	Existing Culvert	Proposed Culvert	Utilities	Drop in Invert
Colonel Talbot Road	1.75 m x 1.5 m box	Twin 2.4 m x 1.8 m box (future work by others)	150 mm sanitary pipe 600 mm watermain	0.7 m
Pedestrian Crossing	-	2.1 m x 1.8 m box		-
Isaac Drive	1.8 x 0.9 m box 1.8 x 1.25 m box	2.1 m circular	200 mm sanitary pipe 200 mm watermain	3.7 m
Malpass Road	2.6 x 1.9 m arch	2.7 m x 3.0 m box	200 mm watermain	1.0 m
West Graham Place	2.6 x 1.9 m arch	-	200 mm sanitary pipe.	-



Isaac Drive



Pedestrian Crossing



Pedestrian Crossing

Site Constraints and Considerations

- Spatial
 - Horizontal
 - Vertical
- Geotechnical
 - Groundwater
- Ecology (EIS)
 - Fish passage for small bodied fish
 - Wetland pools
 - Amphibian, reptile, birds



Engineered Design Elements

- Side slopes
 - Armourstone wall
 - Rocky slopes
- Plunge pool
- Watermain support
- Pedestrian
 - Crossing
 - Trail





Permits

- **Permits:**

- **UTRCA**

- O. Reg 162/06
- Section 28

- **MECP**

- Environmental Activity Sector Registration (EASR)

- **DFO**

- Request for Review
- Letter of Advice

- **Construction:**

- In-water work: July 1 – March 31
- Migratory birds: Sept. 30 – March 31
- Began: October 2021
- Completed: September 2022



Natural Channel Design Elements

- Two Design Reaches

- Single Channel (0.2%)
- Bifurcated channel (1.6%)

- Instream features

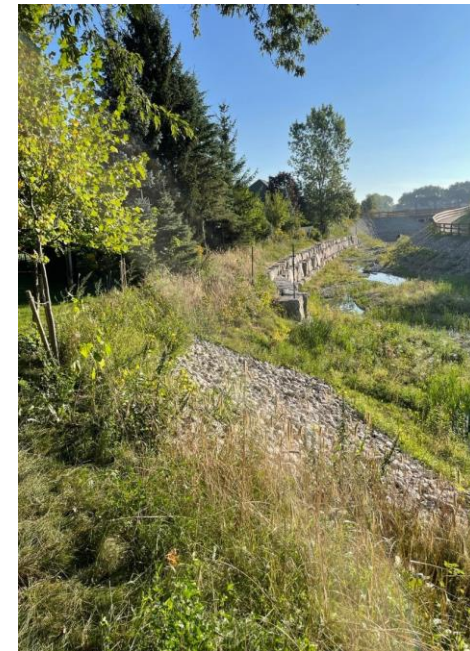
- Riffle logs
- Rootwads
- Pools
- Riffles





River Corridor Restoration

- Corridor features
 - Pocket wetlands
 - Snake hibernaculum
 - Vegetation
 - Brush layers and rootwads

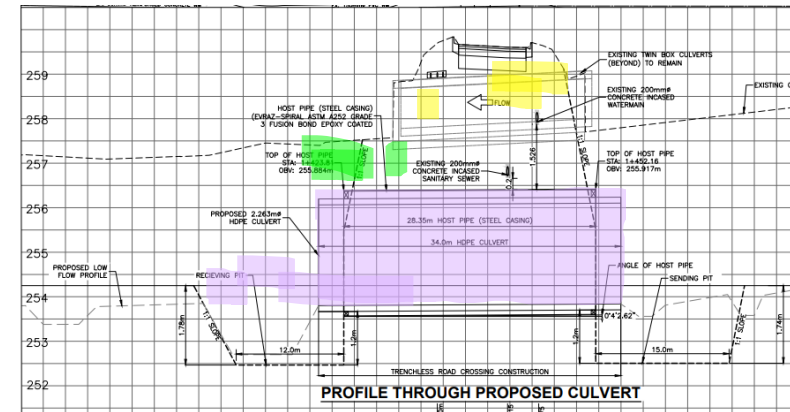




Construction Challenges

- Isaac Drive Culvert
 - Single road access to private condo site
 - Utilities (storm, sanitary) under road
 - Variable stratigraphy
 - Silt till
 - Sand (saturated)
 - Groundwater

- Impact
 - Longer days
 - Construction delay
 - Redesign of outlet pool



Construction Challenges

- Freeze-thaw
 - Dewatering pumps/hoses
 - Surface water ponding
 - Ground heave/settling
- Erosion and sediment control (turbidity)
- Public perception



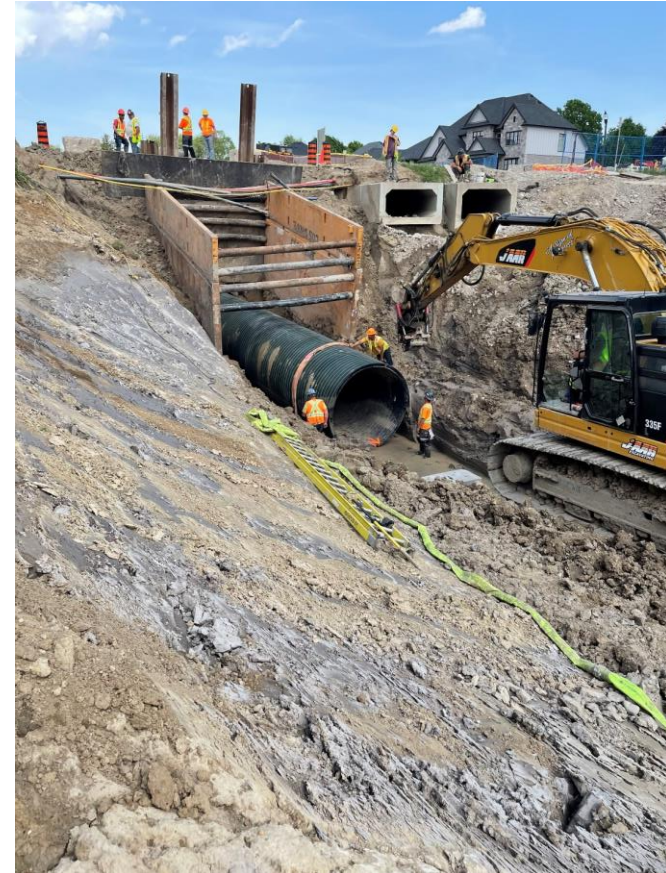
Construction Challenges

- Bifurcated channel
- Groundwater seeps on slopes



Future Considerations

- Impetus was uncontrolled regulatory flow
 - Leads to oversized channel
 - Consider risk-based approach
 - Consider level of service
 - Cost-benefit
- Environmental impact
 - Climate change resilience
 - Groundwater seepage
 - Groundwater infiltration
 - Narrower creek corridor
 - Downstream impacts





Then and Now

Downstream of
Colonel Talbot Road



Upstream of
Isaac Drive/
Ped bridge



Then and Now (Cont.)

Upstream of
Malpass Road



Downstream of
Malpass Road



Thank You

