



# **Class Environmental Assessment for Mount Joy Creek Flood Mitigation**

Second Public Information Centre (PIC)

**September 10<sup>th</sup>, 2025**

# Land Acknowledgement

We begin today by acknowledging the traditional territories of Indigenous peoples and their commitment to stewardship of the land. We acknowledge the communities in circle. The North, West, South and Eastern directions, and Haudenosaunee, Huron-Wendat, Anishnabeg, Seneca, Chippewa, and the Mississaugas of the Credit peoples.

As a municipality, the City of Markham shares the responsibility with the caretakers of this land to ensure the dish is never empty and to restore relationships that are based on peace, friendship, and trust. We are committed to reconciliation, partnership and enhanced understanding.

# Study Area Overview

- The study area encompasses a section of a residential area and industrial area located in the Mount Joy Creek (Exhibition Creek) corridor, between Major Mackenzie Drive and Bur Oak Avenue for the Northern and Southern limits, and between Kentland Street and Metrolinx Railway corridor for the Western and Eastern limits.
- Within this area, Mount Joy Creek is a combination of piped and open channel segments causing recurrent tableland flooding issues.







# Existing Structure Images



*Upstream of Major MacKenzie Drive*



*Upstream of Harvard Way*



*Upstream of 9833 Markham Road*



*Downstream of Major MacKenzie Drive*



*Downstream of Harvard Way /  
Markham Road*



*Downstream of Anderson Avenue*

# Study Purpose / Problem Definition

The City of Markham is undertaking a Municipal Class Environmental Assessment (Class EA) Study for the Mount Joy Creek Flood Mitigation Project.

The objective of the project is to propose flood mitigation alternatives that reduce frequent tableland flooding of the properties adjoining the creek corridor, which to facilitate the future development ambition for the area defined in the recently completed Markham Road Mount Joy Secondary Plan.

# Public Information Center Purpose

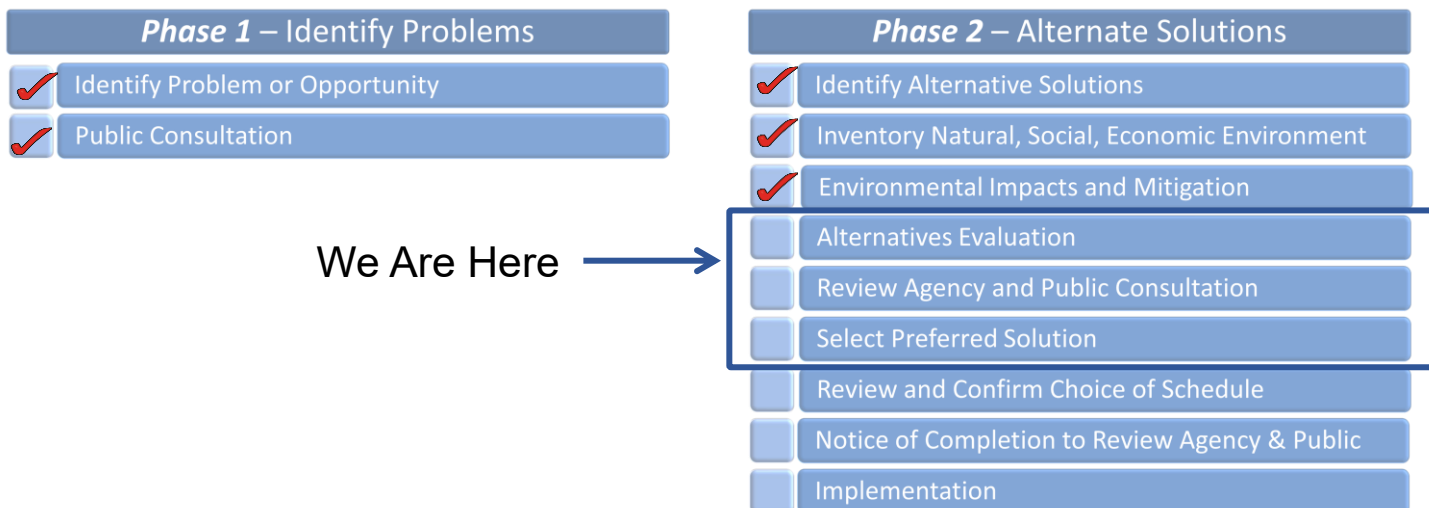
The Public Information Center (PIC) is designed to:

- Present alternative approaches to flood mitigation
- Gain community input on the evaluation and preferred alternative

# Municipal Class EA Process

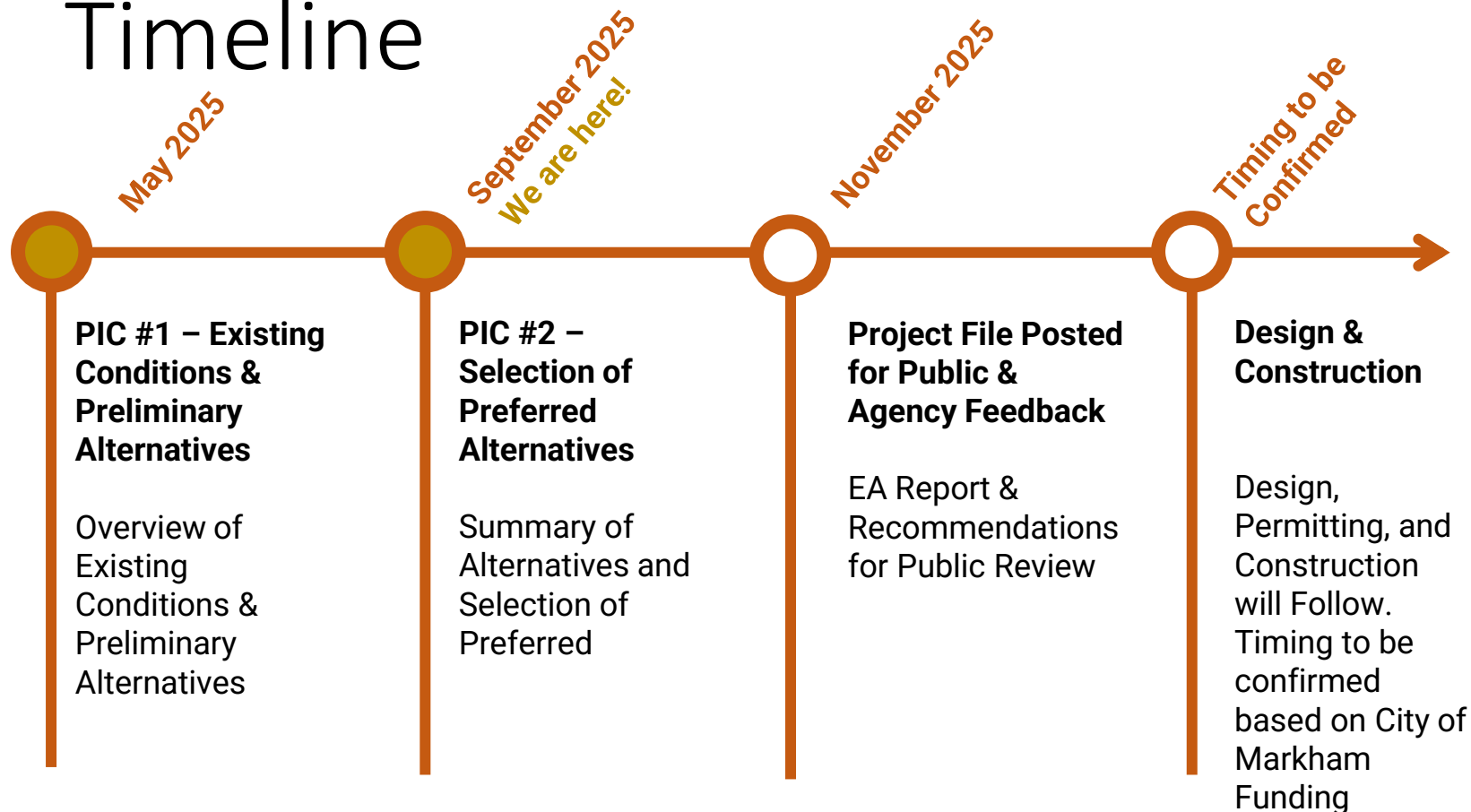
Many projects related to municipal systems that are similar in nature, are carried out routinely, and have predictable and mitigatable environmental effects which are addressed in accordance with the Municipal Engineers Association “Municipal Class Environmental Assessment” (amended, 2023).

This study is being undertaken as a “Schedule B” project under the Municipal Class Environmental Assessment process. The flow chart below illustrates the key steps to be undertaken as part of the EA process.





# Timeline





# What We Heard – PIC #1

We hear you! Here are some things people would like to see as part alternatives assessment



Alternatives that maximize the flooding improvements along the entire study area are required



Protection of the private properties from flooding is of paramount importance



Use of culverts to convey watercourse preferred over open channel



Reduced floodplain will allow for adjacent development opportunities.

We heard the following feedback about the engagement process



First Nations Interest in Stage 2 Archaeological Investigations



Direct mailouts to property owners recommended to ensure maximum participation

## PIC #1 questions and answers

**Question #1:** When do you anticipate to start construction?

**Answer #1:** Following the EA, a detailed design will be required. This will be followed by construction. Timing will be dependent on City budgets.

**Question #2:** Will the proposed plans be safe from flooding.

**Answer #2:** The alternatives will consider safety improvements associated with flood mitigation and safety of the surrounding community.





# Vegetation Communities & Species at Risk

The overall study area is highly developed with few remaining patches of natural or regenerating habitat. The eastern half of the study area included only cultural vegetation communities (Cultural Meadow; Cultural Thicket) and landscaped areas associated with anthropogenic features (e.g., houses, roads, parking lots). West of Markham Road, air photo interpretation suggests similar conditions. Impacts to ecological features will require consideration of Species at Risk (Bats and Redside Dace).



*Cultural Thicket - Upstream of  
Anderson Drive*



*Cultural Thicket - Downstream of  
Harvard Way*



*Cultural Meadow - Downstream of  
Major MacKenzie Drive*

# Aquatic Ecosystems

To assess the existing aquatic habitat within the study area, the following studies were undertaken:

- Aquatic assessments of historic data;
- SAR screening and potential habitat identification; and,
- Field confirmation of site conditions.

## Summary of Fish Community Assessment:

Common Name	Scientific Name
Bluegill	<i>Lepomis macrochirus</i>
Brook stickleback	<i>Culaea inconstans</i>
Brown bullhead	<i>Ameiurus nebulosus</i>
Common carp	<i>Cyprinus carpio</i>
Fathead minnow	<i>Pimephales promelas</i>
Goldfish	<i>Carassius auratus</i>
Largemouth bass	<i>Micropterus nigricans</i>
Pumpkinseed	<i>Lepomis gibbosus</i>
Redside dace	<i>Clinostomus elongatus</i>

## Key Findings:

- All species recorded in the study area (with the exception of Redside dace) are common and intermediately tolerant to disturbance.
- Fish communities represent spring spawning and majorly warmwater species.
- Although Redside dace, an endangered species under the Endangered Species Act (ESA), have potential to be found within the study area, habitat does not appear to support the requirements for Redside dace.
- The natural habitat conditions in Mount Joy were observed through the watercourse, with the Fish IBI rating measured as “poor”.



# Cultural Heritage

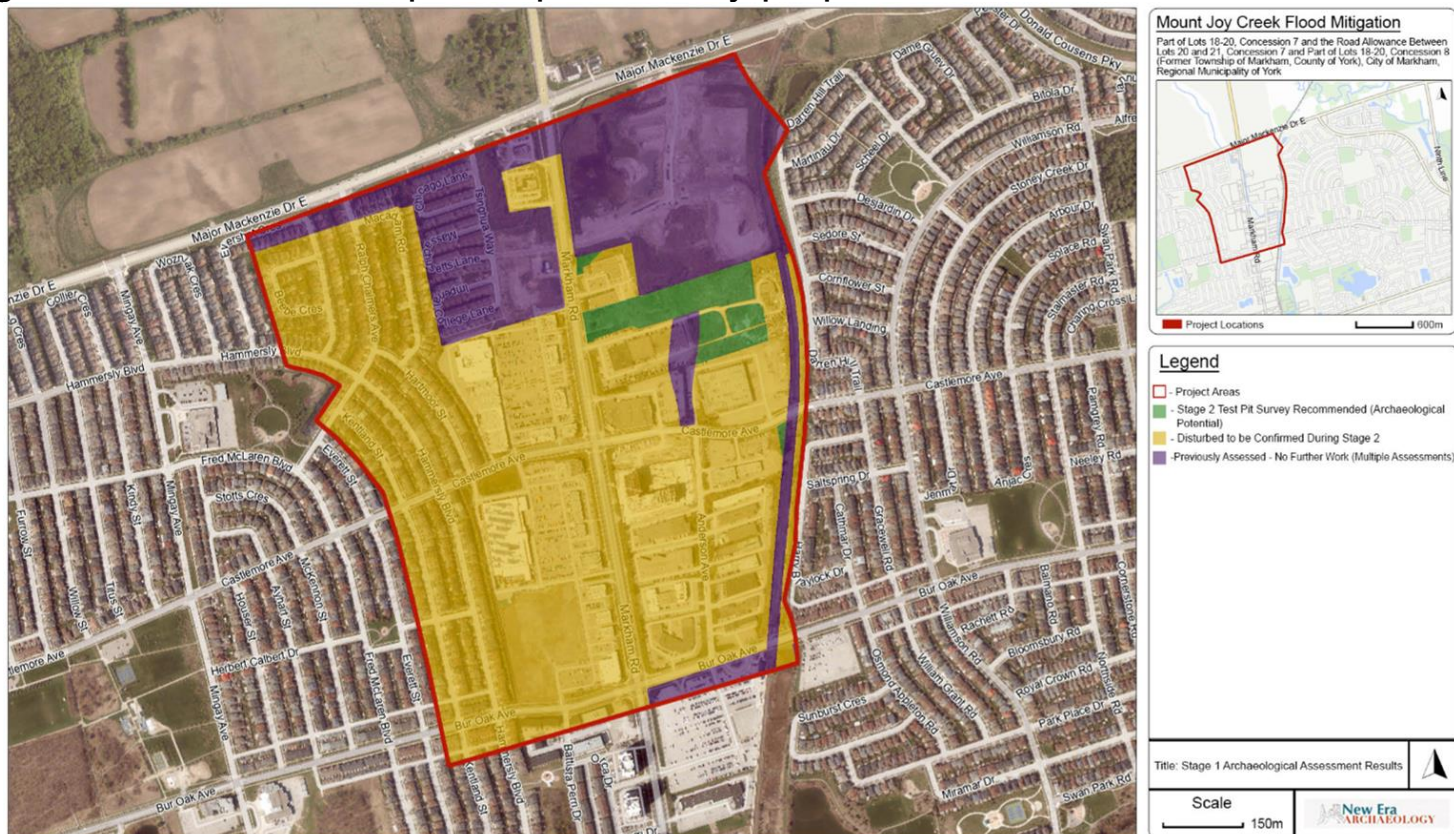
- A screening for Cultural Heritage properties within the Study Area was completed and one property was found
- The William Read House (9899 Markham Road) currently has a Heritage Status of, “Part IV (Individual)”
- The Cultural Heritage property will not be impacted by any of the proposed alternatives





# Archaeology

- A Stage 1 Archaeological Assessment was completed for the Study Area, to determine areas of Archaeological potential
- The locations within the study area which contain archaeological potential will have a Stage 2 assessment completed prior to any proposed construction





# Hydrology & Existing Flooding Conditions

Existing floodplain mapping for Mount Joy Creek was completed by the TRCA in July 2022 and found occurrences of spills at three major locations:

## Spill #1 – Major Mackenzie Dr

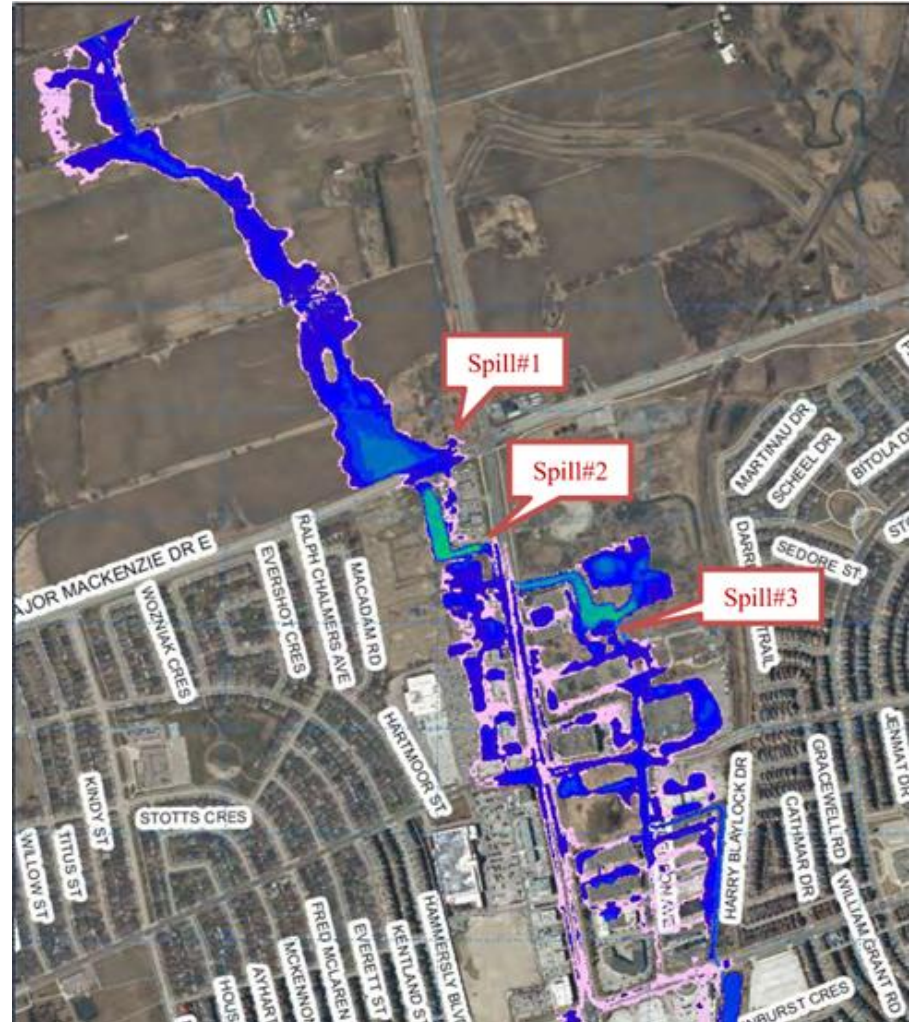
- Mainly caused due to undersized culvert & low point on Major Mackenzie Dr

## Spill #2 – West Side of Hwy 48 near 9900 Markham Rd

- Mainly caused due to low point of a swale & undersized Markham Road

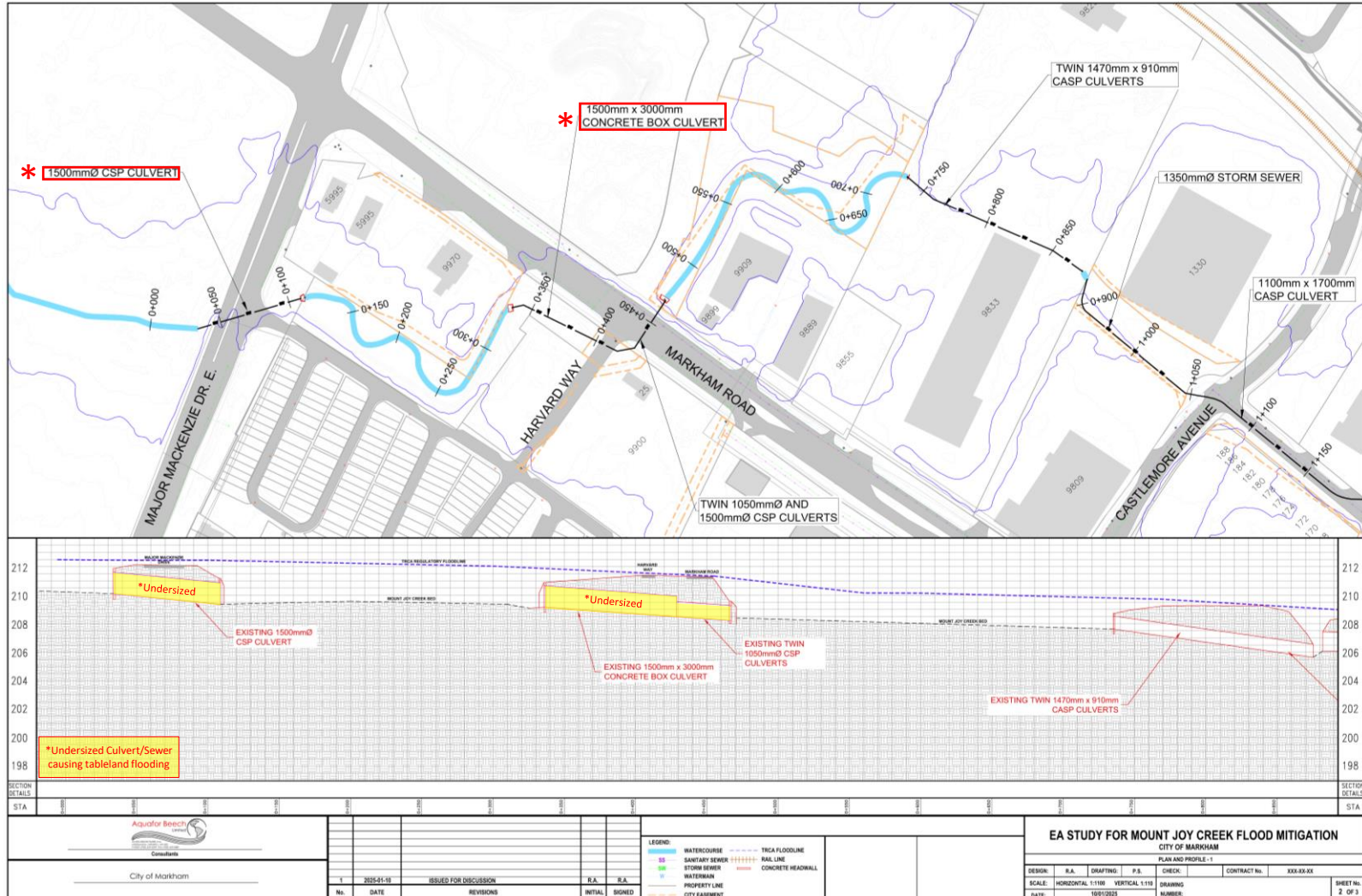
## Spill #3 – Inlet of Buried Pipes on Anderson Ave

- Mainly caused due to undersized buried long pipes





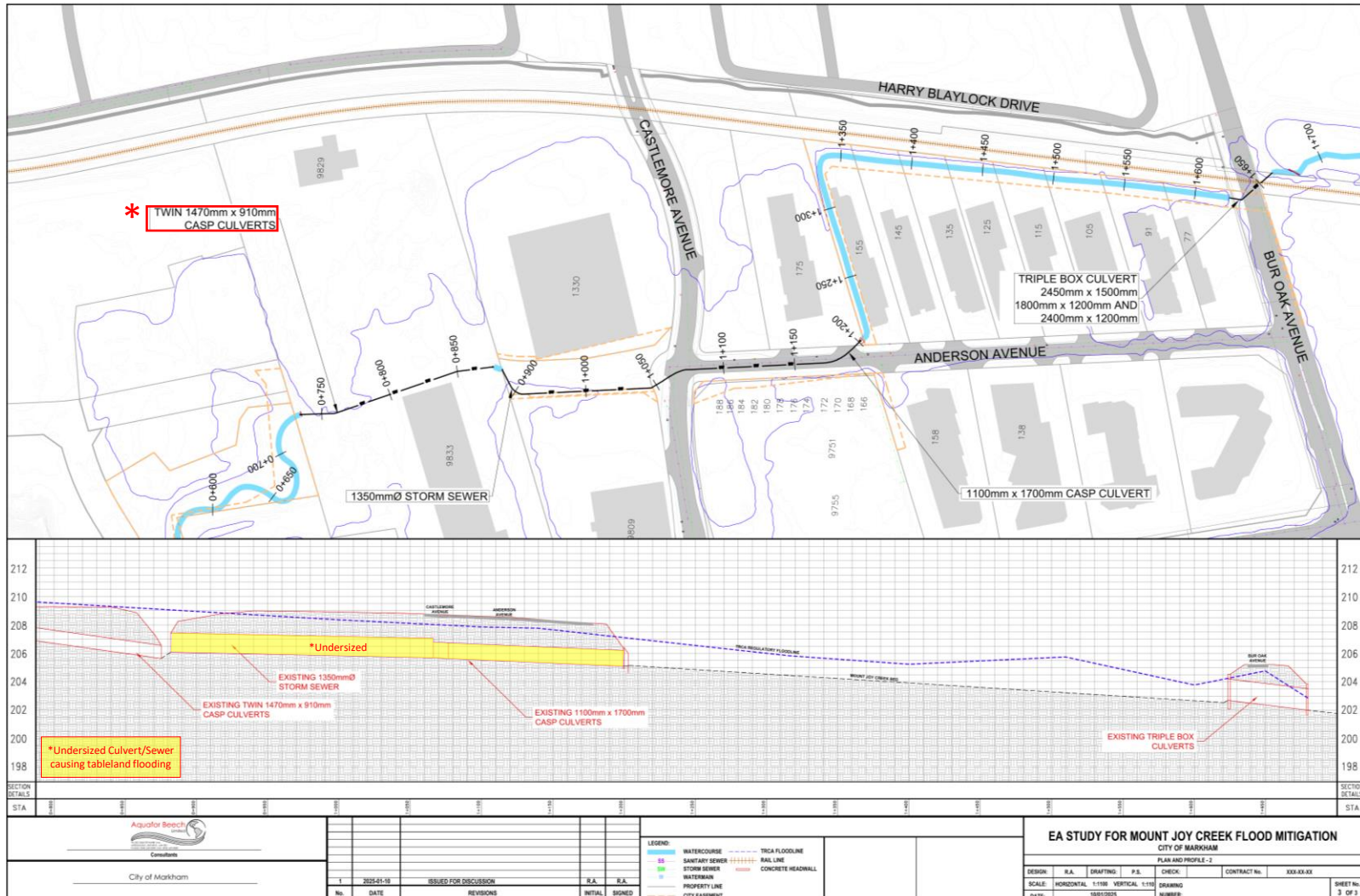
# Existing Drainage Corridor – Plan and Profile







# Existing Drainage Corridor – Plan and Profile





# Alternative Assessment

A series of 8x alternatives were considered at PIC#1. Alternatives were screened for further consideration based upon ability to meet the project objective (flood mitigation) and stakeholder input:

**Alt 1 – Do Nothing** – Existing Flood Hazard Remains

**Alt 2 – Stormwater Reduction Pond** – Existing Flood Hazard Remains

**Alt 3 – Upstream Only Improvements** – Spill #1 & #3 Remain

**Alt 4 – Open Channel Realignment** – Spill Areas Mitigated, Flood Hazard Relocated into Private Properties & Metrolinx Corridor

**Alt 5 – Upstream Improvements & Culvert Enlargement** – Flood Hazard Remains Upstream Harvard Way

**Alt 6 – Upstream Improvements & Culvert Realignment** - Flood Hazard Remains Upstream Harvard Way, Flood Hazard Relocated into Private Properties

**Alt 7 – Culvert Enlargement** – Flood Hazard and Spills Mitigated

**Alt 8 – Additional Parallel Culverts** – Flood Hazard and Spills Mitigated





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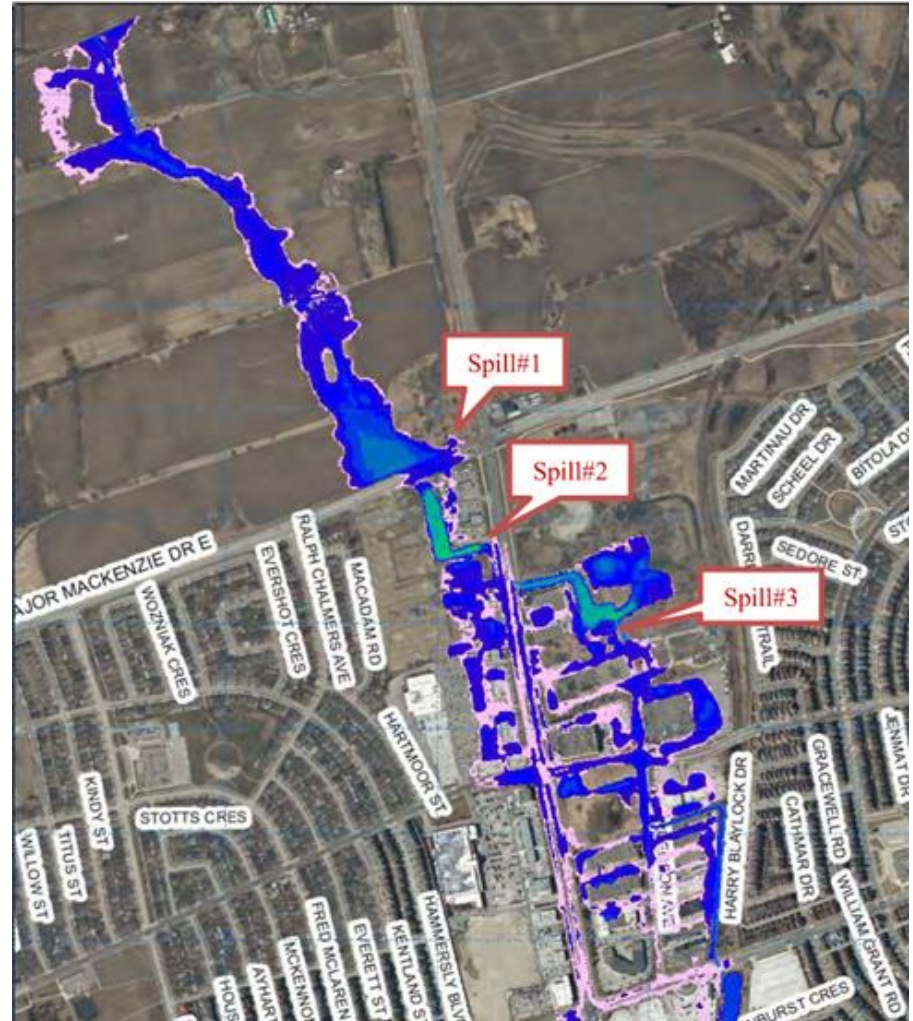
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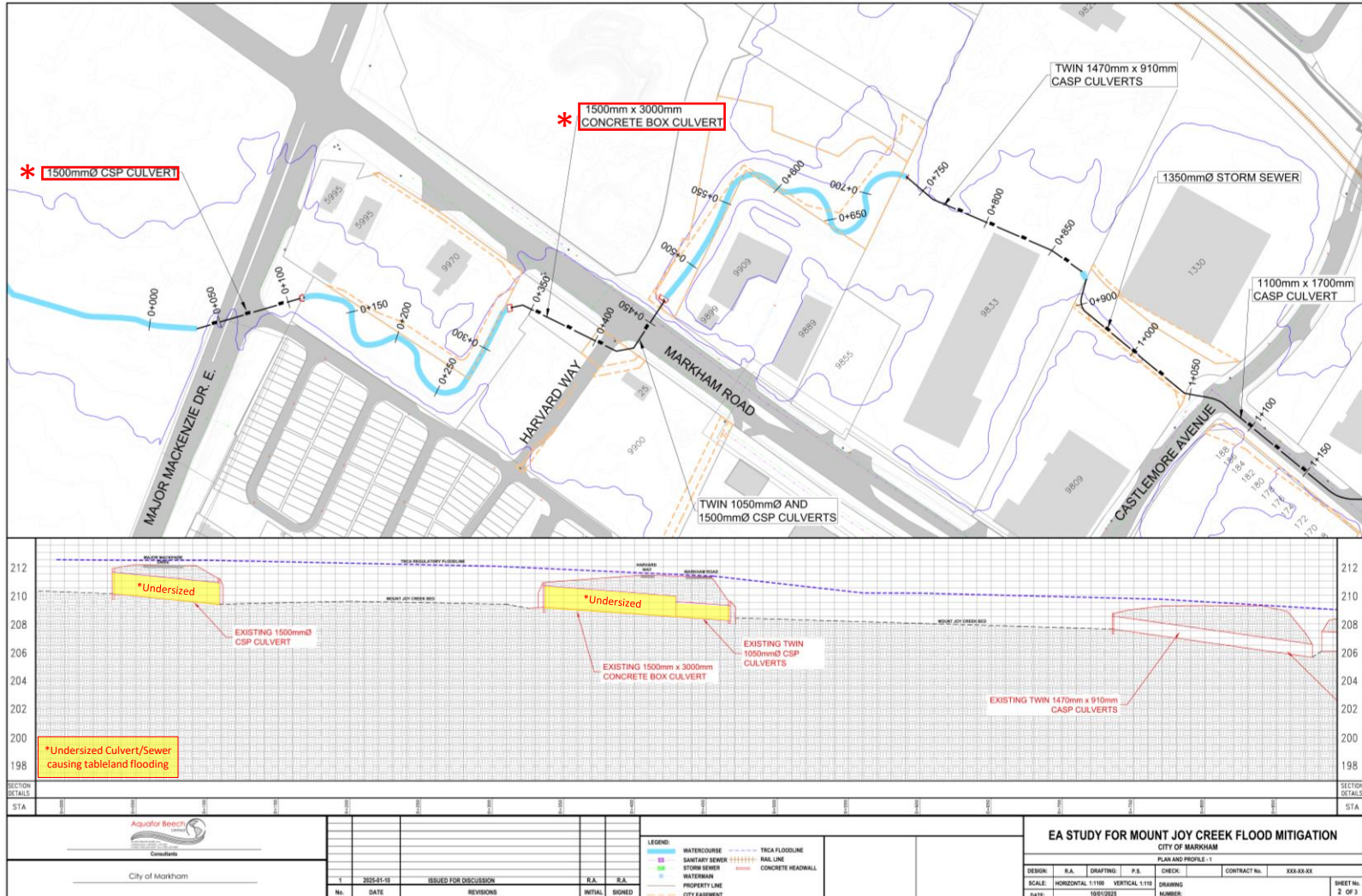
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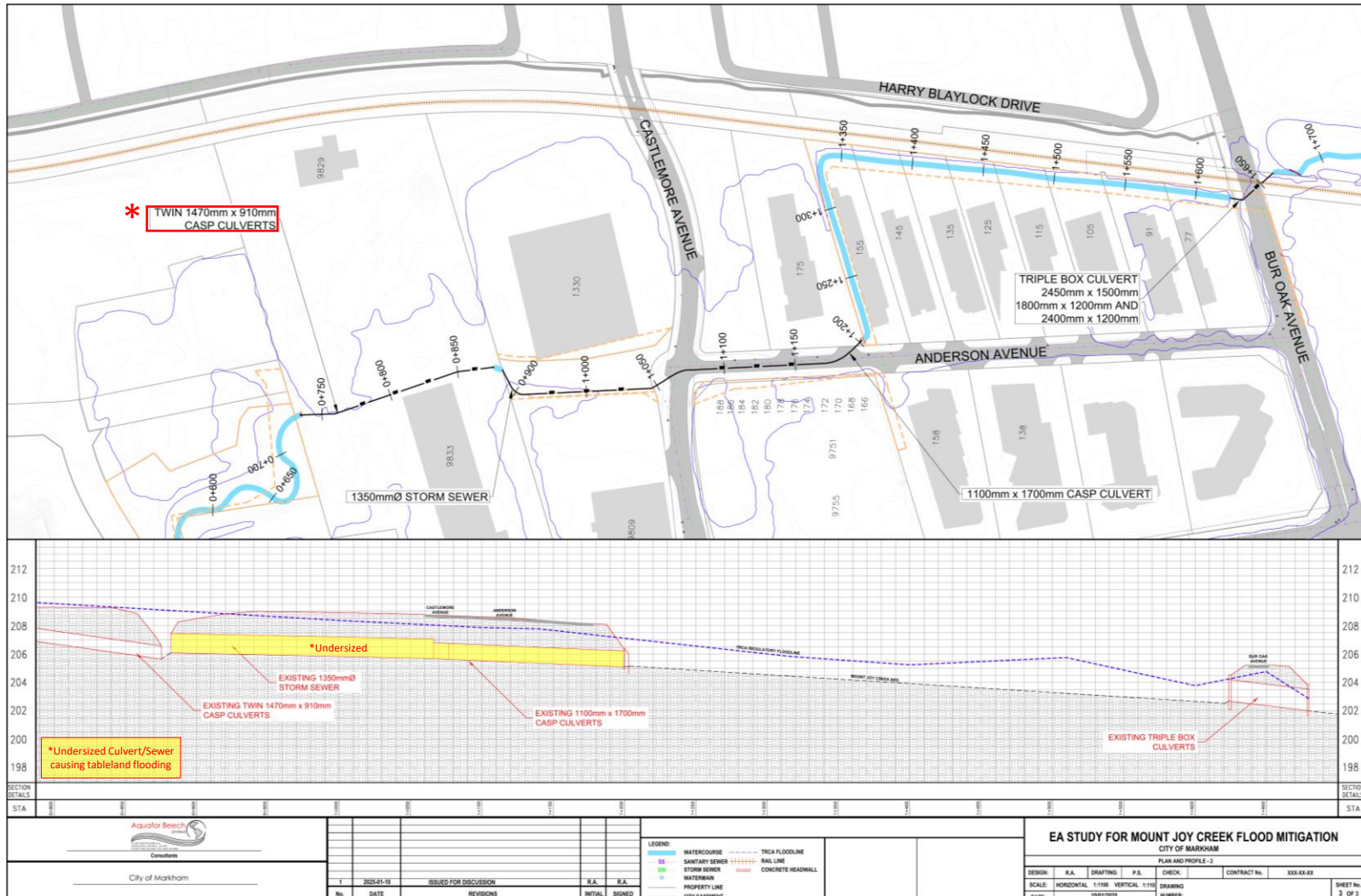
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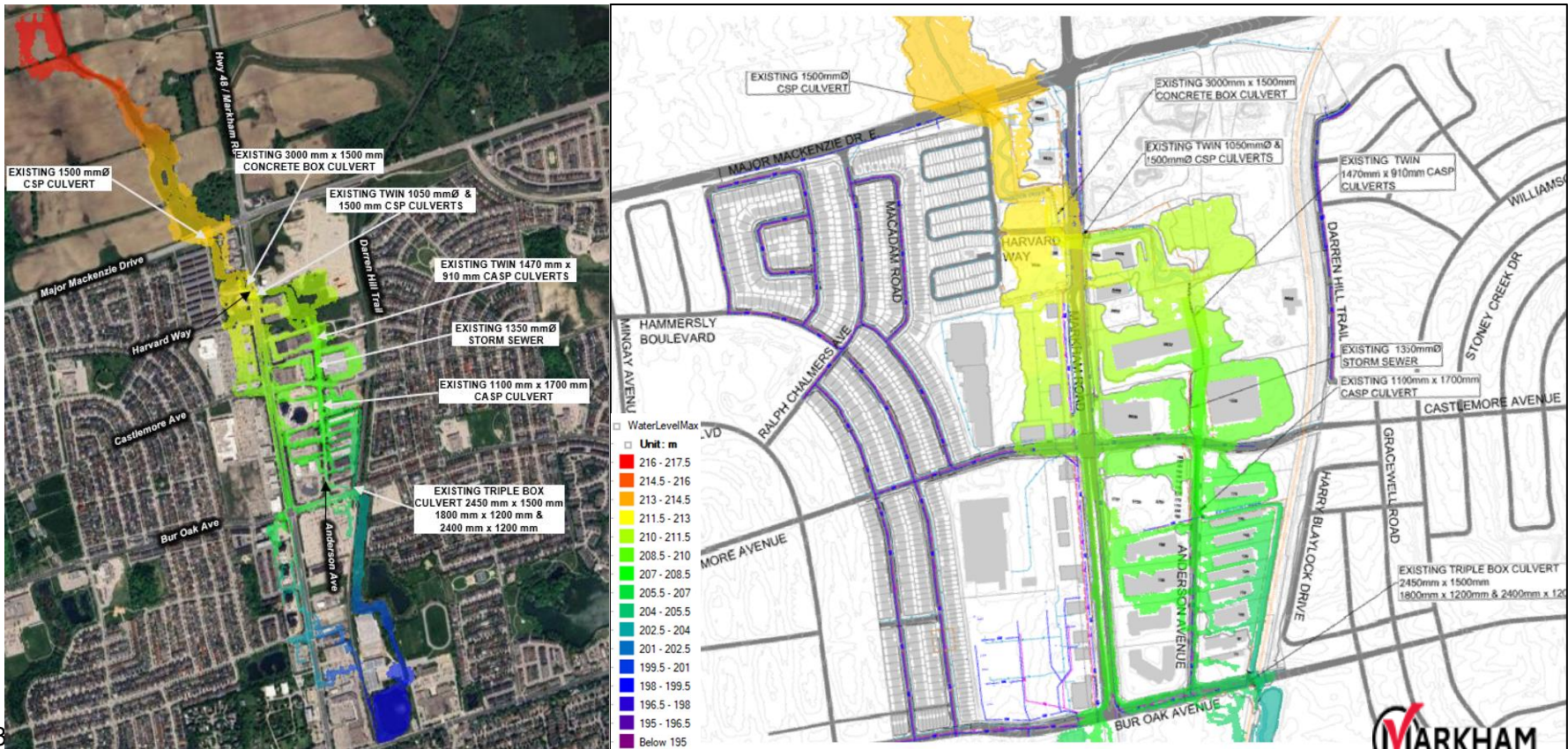




# Alternative 1 – Do Nothing

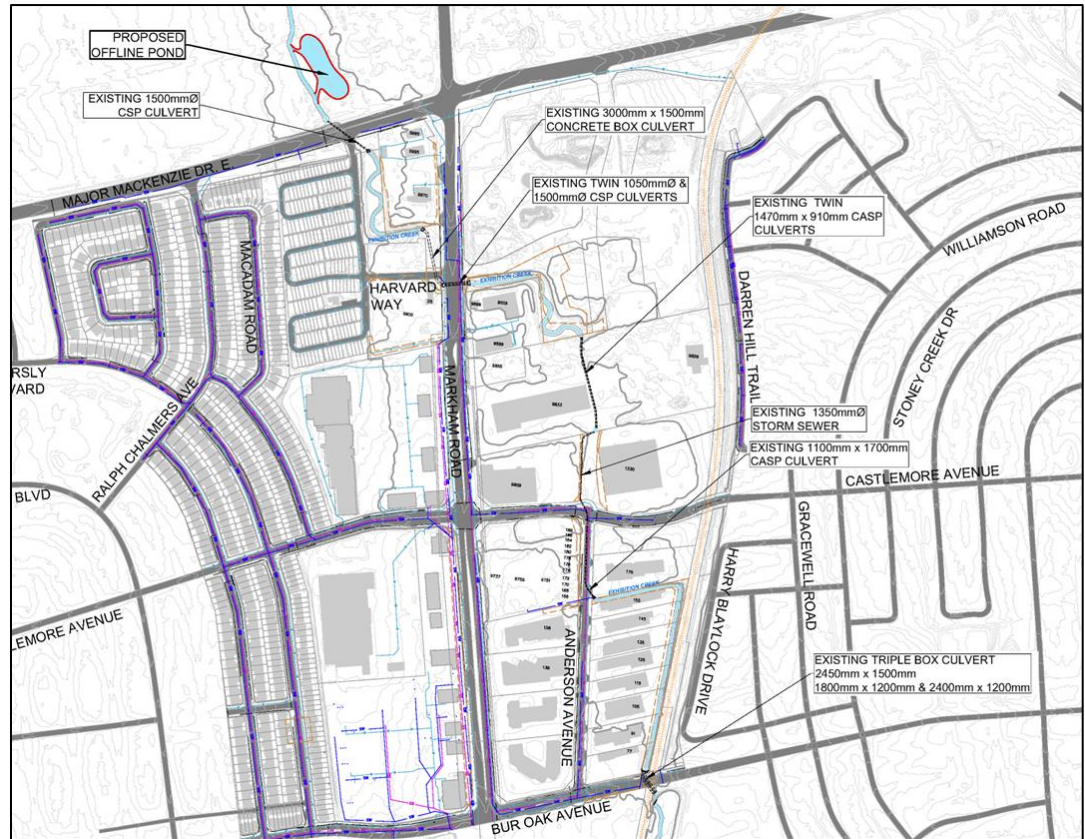
## Engineering

- Leaving the subject area as is, and undertaking continued monitoring to see if flooding issues continue to persist or worsen overtime.
- Continued tableland flooding issues as a result of undersized drainage infrastructure within the Mount Joy Creek corridor.
- Continued maintenance activities will be required, including pumping standing water out of the residential backyards.
- 3x floodplain spill areas remain
- Flooding conditions and depths based upon current TRCA 2D modelling



# Alternative 2 – Stormwater Reduction Pond

- Stormwater management (SWM) pond proposed to be constructed upstream of the study area north of Major Mackenzie Drive
- The pond will be an offline SWM pond, meaning that it will run in parallel with Mount Joy Creek
- No other changes will be made to the stormwater infrastructure within the Study Area
- Available area not large enough to offer regulatory floodplain reduction
- Flood hazard remains



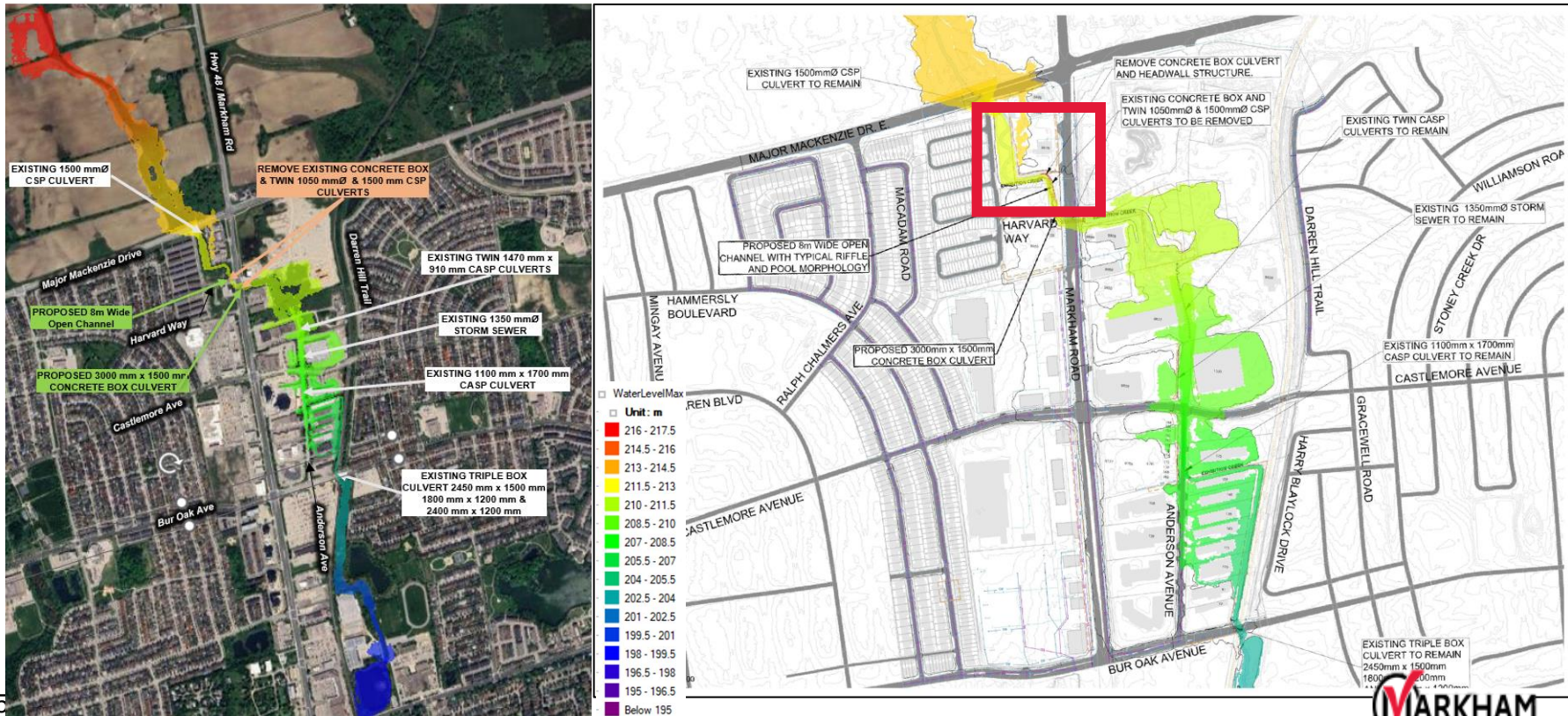




# Alternative 3 – Upstream Only Improvements

Engineering

- Existing culverts located south of 9970 Markham Rd and extending to Mount Joy Creek north of 9899 Markham Rd to be removed
- Mount Joy Creek channel to be extended to the north side of Harvard Way
- Existing Culvert from the north side of Harvard Way to Mount Joy Creek north of 9899 to be replaced with a larger culvert
- Flooding locally mitigated upstream of Markham Road only



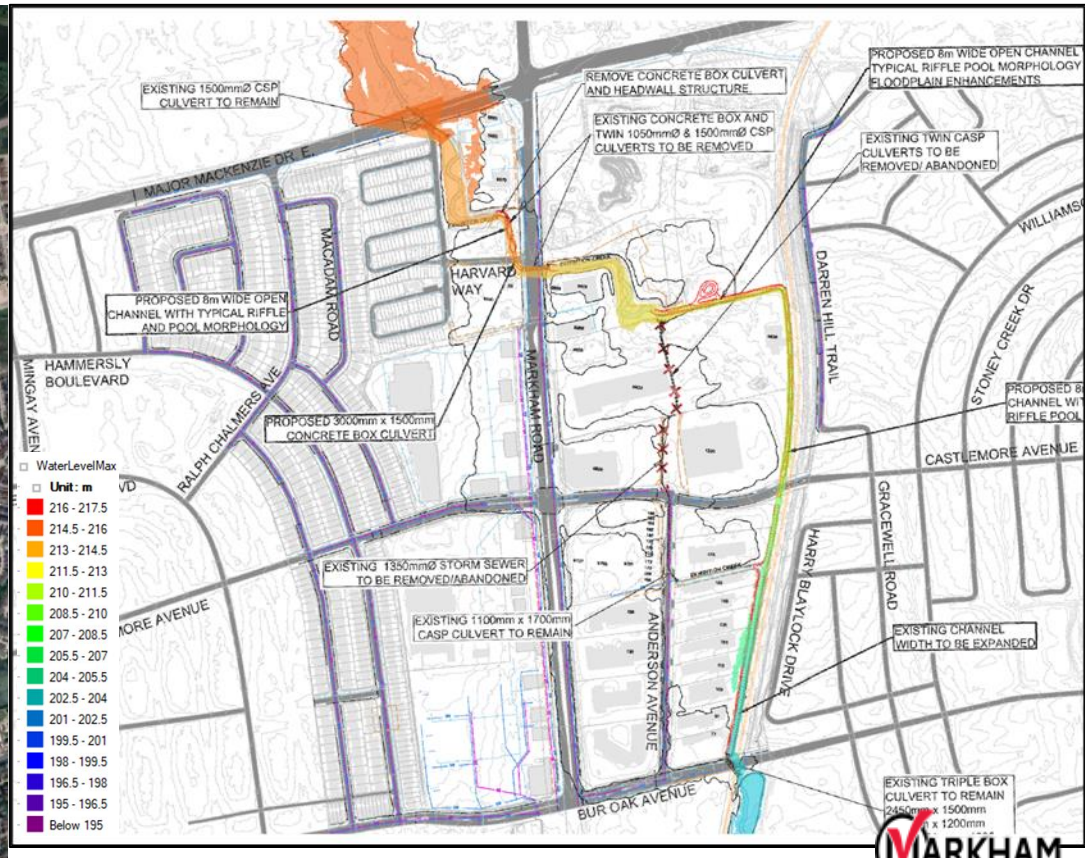
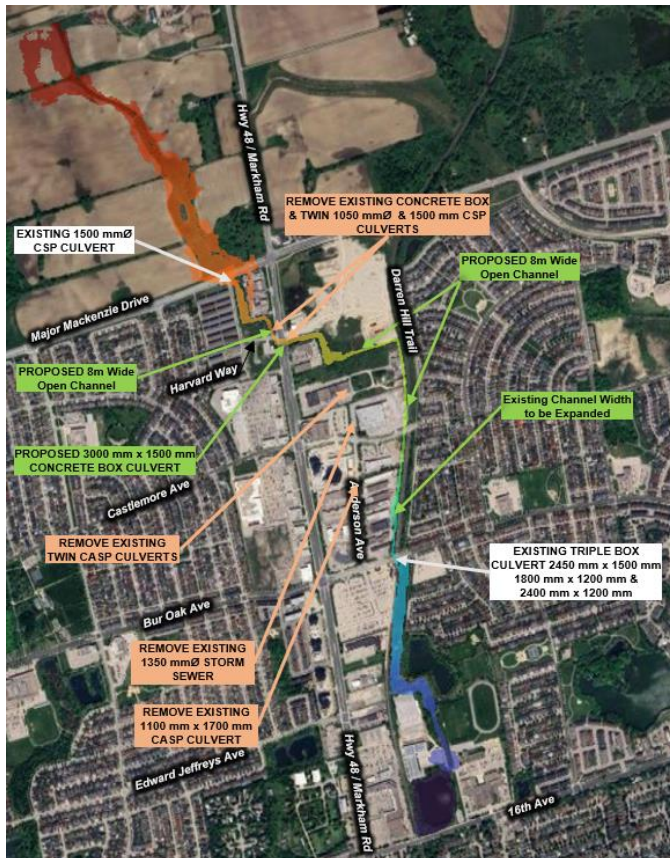




# Alternative 4 – Open Channel Realignment

Engineering

- Replaces the existing culvert near Markham Road and Harvard Way with an extended open channel and larger culvert similar to Alternative 3
- Remove or abandon the existing culverts and storm sewer located east of 9833 and 9809 Markham Road
- Flow from Mount Joy Creek redirected via a proposed open channel along Metrolinx corridor
- Flood hazard relocated along open channel

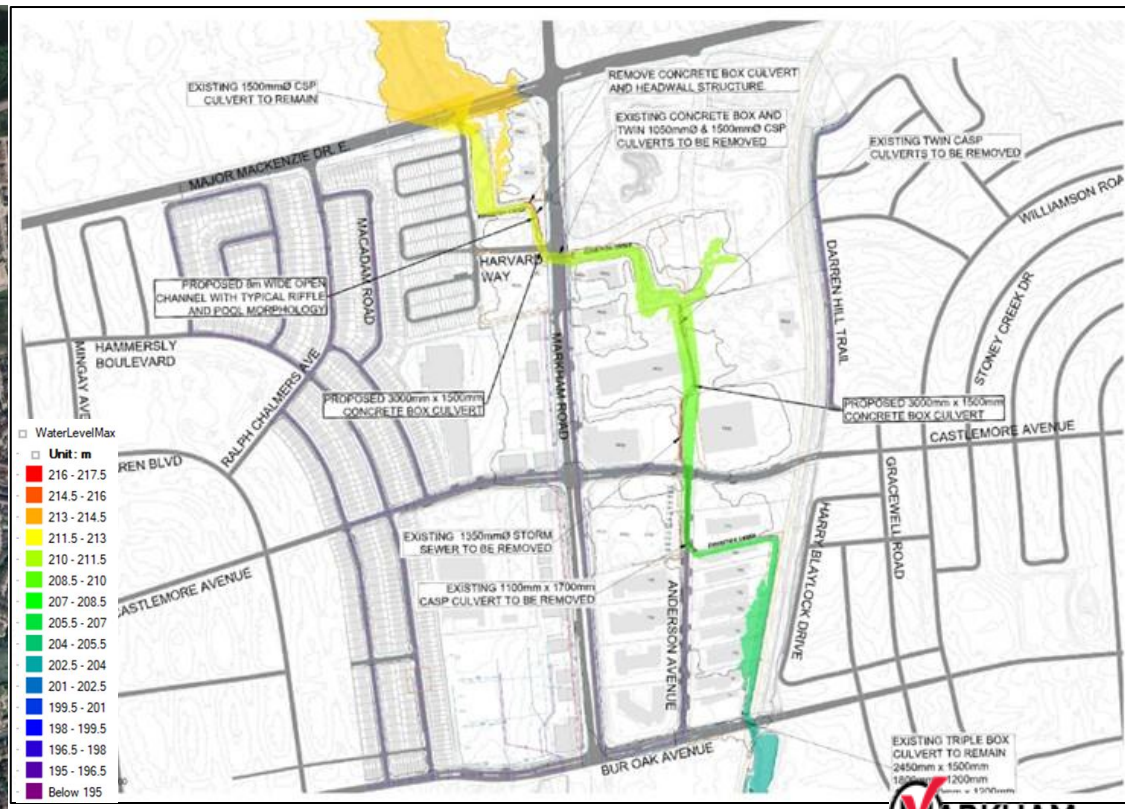






# Alternative 5 – Upstream Improvements & Culvert Enlargement Engineering

- Replaces the existing culvert near Markham Road and Harvard Way with an extended open channel and larger culvert similar to Alternative 3
- Additionally, will remove the existing culverts and storm sewer east of 9833 and 9809 Markham Road and west of 175 Anderson Avenue
- Larger culvert to replace existing culverts and storm sewer near Castlemore Avenue and Anderson Avenue



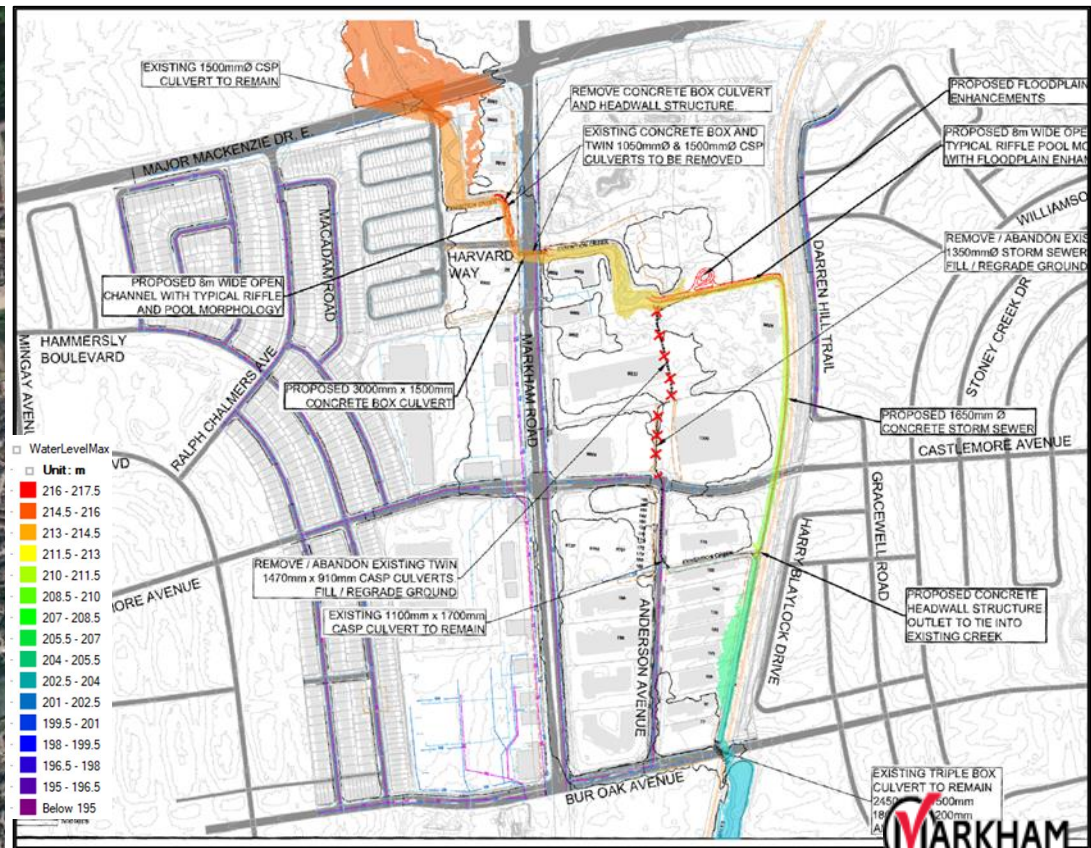




# Alternative 6 – Upstream Improvements & Culvert Realignment

## Engineering

- Replaces the existing culvert near Markham Road and Harvard Way with an extended open channel and larger culvert similar to Alternative 3
- Additionally, will remove or abandon the existing culverts and storm sewer located east of 9833 and 9809 Markham Road
- Flow from Mount Joy Creek will instead be redirected east towards Darren Hill Trail via a proposed open channel
- Flow will then be directed south via a proposed storm sewer and outlet at the existing Mount Joy Creek channel south of Castlemore Avenue via a proposed concrete headwall structure



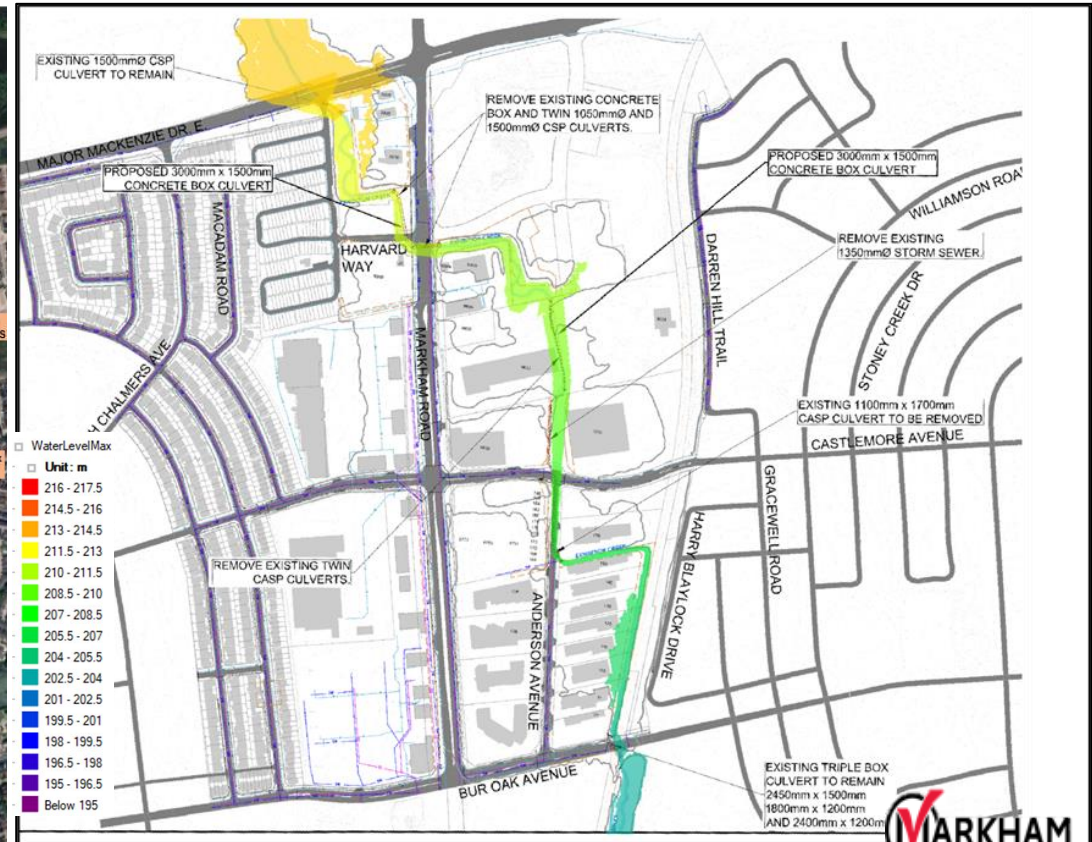




# Alternative 7 – Culvert Enlargement

## Engineering

- Existing culverts located south of 9970 Markham Rd and extending to Mount Joy Creek north of 9899 Markham Rd to be removed
- Larger culvert to replace existing culvert near Markham Road and Harvard Way
- Additionally, will remove the existing culverts and storm sewer east of 9833 and 9809 Markham Road and west of 175 Anderson Avenue
- Larger culvert to replace existing culverts and storm sewer near Castlemore Avenue and Anderson Avenue



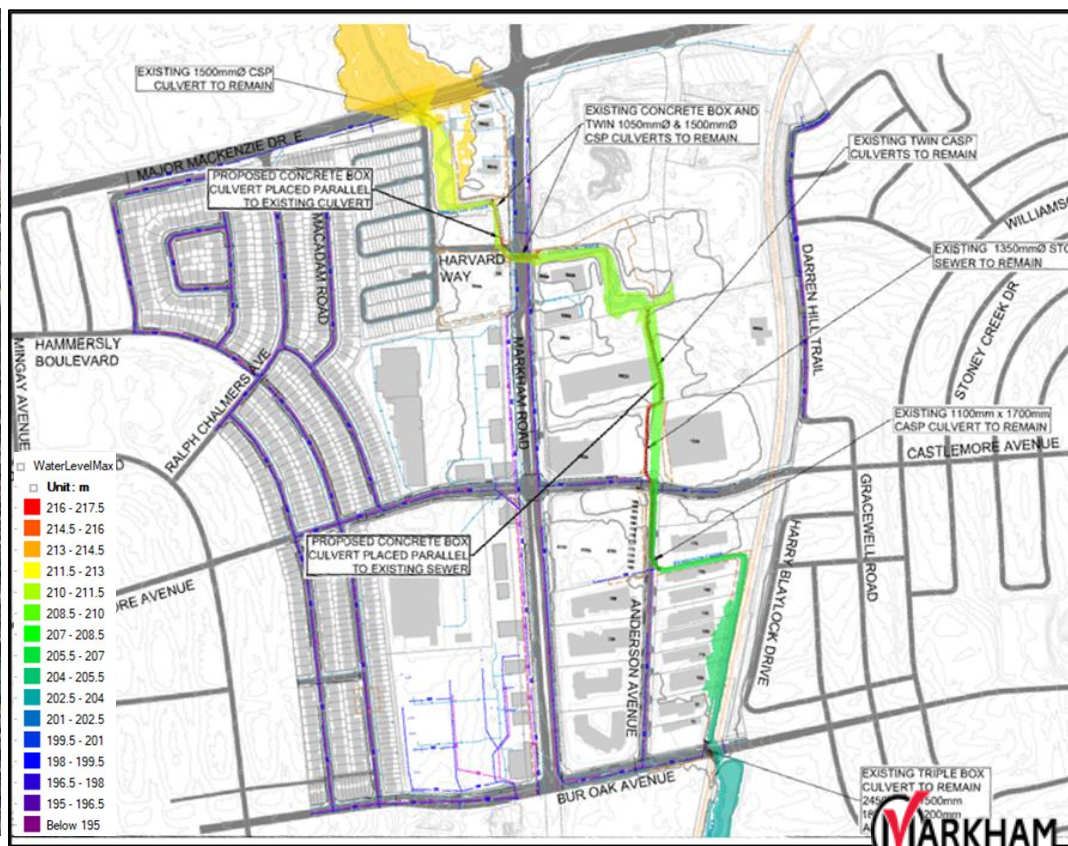




# Alternative 8 – Additional Parallel Culverts

## Engineering

- Existing culverts located south of 9970 Markham Rd and extending to Mount Joy Creek north of 9899 Markham Rd to remain
- Proposed culvert to be installed parallel to existing culvert near Markham Road and Harvard Way
- Additionally, existing culverts and storm sewer east of 9833 and 9809 Markham Road and west of 175 Anderson Avenue will remain as well
- Proposed culvert to be installed parallel to existing culverts and storm sewer near Castlemore Avenue and Anderson Avenue







# Evaluation Criteria

## Engineering

Evaluation Criteria	Description
<b>Physical/Natural Environment</b>	
Potential to Reduce Flooding Risks	Greater reduction of <u>flooding</u> risks to public and/or private lands for longer time scores higher
Potential to Improve Aquatic Habitat	Greater improvements to fish and aquatic habitat scores higher, including substrate, overhanging vegetation, turbidity, and passage/connectivity
Potential to Improve Terrestrial Habitat	Greater improvements to terrestrial habitat scores higher, including loss and replacement of vegetation and natural corridor connectivity
Integration with Existing Environment and Infrastructure	Greater integration and compatibility with existing environment and infrastructure scores higher
<b>Social/Cultural Environment</b>	
Aesthetics / Recreation	Greater improvements to the aesthetics of the creek corridor and how the alternative impacts recreational use of the corridor score higher
Compatibility with Adjacent Land Use	Greater compatibility with the land use of adjacent properties scores higher
Community Disruption	Less disruption of the surrounding community and residents scores higher
Public Health and Safety	Greater protection of public health and safety for a longer time scores higher
<b>Economic Environment</b>	
Construction Costs	Lower construction cost relative to other alternatives scores higher
Operation and Maintenance Costs	Lower operations and maintenance costs relative to other alternatives scores higher
Life Cycle Costs	Lower life cycle costs relative to the other alternatives scores higher
Land Requirement Costs	Lower Land Requirement costs relative to other alternatives scores higher
Infrastructure Protection	Greater protection of existing infrastructure for a longer time scores higher
<b>Technical and Engineering Considerations</b>	
Ease of Implementation	Greater ease of implementing scores higher
Agency Acceptance	Greater likelihood that TRCA will support the alternative scores higher
City Acceptance	Greater compliance with existing City plans, policies, and bylaw requirements scores higher
Technical Feasibility	Greater technical feasibility relative to other alternatives scores higher



# Alternatives Evaluation Matrix

Engineering

Evaluation Criteria	Alternative 1 - Do Nothing		Alternative 2 - Stormwater Reduction Pond		Alternative 3 - Upstream Only Improvements		Alternative 4 - Open Channel Realignment		Alternative 5 - Upstream Improvements & Culvert Enlargement		Alternative 6 - Upstream Improvements & Culvert Realignment		Alternative 7 - Culvert Enlargement		Alternative 8 - Additional Parallel Culverts	
Physical/Natural Environment																
Potential to Reduce Flood Risks		No change to flood risk.		Negative impact to flood risk.		Minor improvement to flood risk.		Minor improvement to flood risk.		Minor improvement to flood risk.		Minor improvement to flood risk.		Highest improvement to flood risk.		Highest improvement to flood risk.
Potential to Improve Aquatic Habitat		No effect to aquatic habitat.		Greatest improvement to aquatic habitat.		Positive impact to improvement to aquatic habitat.		Positive impact to improvement to aquatic habitat.		Positive impact to improvement to aquatic habitat.		Positive impact to improvement to aquatic habitat.		No effect to aquatic habitat.		No effect to aquatic habitat.
Potential to Improve Terrestrial Habitat		No impact to terrestrial habitat.		Potential improvement to terrestrial habitat.		Potential improvement to terrestrial habitat.		Potential improvement to terrestrial habitat.		Potential improvement to terrestrial habitat.		Potential improvement to terrestrial habitat.		No impact to terrestrial habitat.		No impact to terrestrial habitat.
Integration with the Existing Environment and Infrastructure		Low Compatability with exiting environment and infrastructure		Highest Compatability with exiting environment and infrastructure		High Compatability with exiting environment and infrastructure		Highest Compatability with exiting environment and infrastructure		High Compatability with exiting environment and infrastructure		High Compatability with exiting environment and infrastructure		High Compatability with exiting environment and infrastructure		High Compatability with exiting environment and infrastructure
Social/Cultural Environment																
Aesthetic/Recreation		No aesthetic/ recreational benefit.		Best improvement to aesthetic/ recreational benefit.		Improvement to aesthetic/ recreational benefit.		Improvement to aesthetic/ recreational benefit.		Improvement to aesthetic/ recreational benefit.		Improvement to aesthetic/ recreational benefit.		No aesthetic/ recreational benefit.		No aesthetic/ recreational benefit.
Compatibility with Adjacent Land Use		High compatibility with adjacent land use.		Good compatibility with adjacent land use.		Somewhat compatible with adjacent land use.		Somewhat compatible with adjacent land use.		Good compatibility with adjacent land use.		Somewhat compatible with adjacent land use.		Good compatibility with adjacent land use.		Good compatibility with adjacent land use.
Community Disruption		No community disruption.		Minor community disruption.		Minor community disruption.		Minor community disruption.		Significant community disruption.		Minor community disruption.		Minor community disruption.		Minor community disruption.
Public Health and Safety		Low protection to public health and safety.		Some protection to public health and safety.		Some protection to public health and safety.		Low protection to public health and safety.		High protection to public health and safety.		Low protection to public health and safety.		Greatest protection to public health and safety.		Greatest protection to public health and safety.
		Represents a low score for the alternative in the relevant criteria.						Represents a high score for the alternative in the relevant criteria.					PRELIMINARY PREFERRED			



# Alternatives Evaluation Matrix

Engineering

Evaluation Criteria	Alternative 1 - Do Nothing		Alternative 2 - Stormwater Reduction Pond		Alternative 3 - Upstream Only Improvements		Alternative 4 - Open Channel Realignment		Alternative 5 - Upstream Improvements & Culvert Enlargement		Alternative 6 - Upstream Improvements & Culvert Realignment		Alternative 7 - Culvert Enlargement		Alternative 8 - Additional Parallel Culverts		
Economic Criteria																	
Construction Costs		No cost.		High cost.		Lower cost.		Greatest cost.		High cost.		Greatest cost.		High cost.		High cost.	
Operation & Maintenance Costs		Major O&M cost.		Major O&M cost.		Minor O&M cost.		Major O&M cost.		Minor O&M cost.		Major O&M cost.		Minor O&M cost.		Minor O&M cost.	
Life Cycle Costs		High cost.		High cost.		Lower cost.		High cost.		High cost.		High cost.		Lower cost.		High cost.	
Land Requirement Costs		No cost.		Lower cost.		Lower cost.		Greatest cost.		High cost.		High cost.		High cost.		High cost.	
Infrastructure Protection		Lowest protection.		Lowest protection.		Lowest protection.		Lowest protection.		High protection.		Lowest protection.		Highest protection.		High protection.	
Technical/Engineering Considerations																	
Ease of Implementation		Least difficulty in implementing.		Minor difficulty in implementing.		Minor difficulty in implementing.		Greatest difficulty in implementing.		Minor difficulty in implementing.		Greatest difficulty in implementing.		Least difficulty in implementing.		Minor difficulty in implementing.	
Agency Acceptance		Acceptable.		Acceptable.		Acceptable.		Low agency acceptance.		High agency acceptance.		Low agency acceptance.		Greatest acceptability.		Greatest acceptability.	
City Acceptance		Low acceptance of policy and by-law requirements.		Achieves policy and by-law requirements.		Achieves policy and by-law requirements.		Low acceptance of policy and by-law requirements.		High level of acceptance of policy and by-law requirements.		Low acceptance of policy and by-law requirements.		Highest level of acceptance of policy and by-law requirements.		Highest level of acceptance of policy and by-law requirements.	
Technical Feasibility		Highly feasible.		Somewhat feasible.		Highly feasible.		Least feasible.		Highly feasible.		Least feasible.		Highly feasible.		Highly feasible.	
OVERALL RANKING																	
		Represents a low score for the alternative in the relevant criteria.							Represents a high score for the alternative in the relevant criteria.					PRELIMINARY PREFERRED			



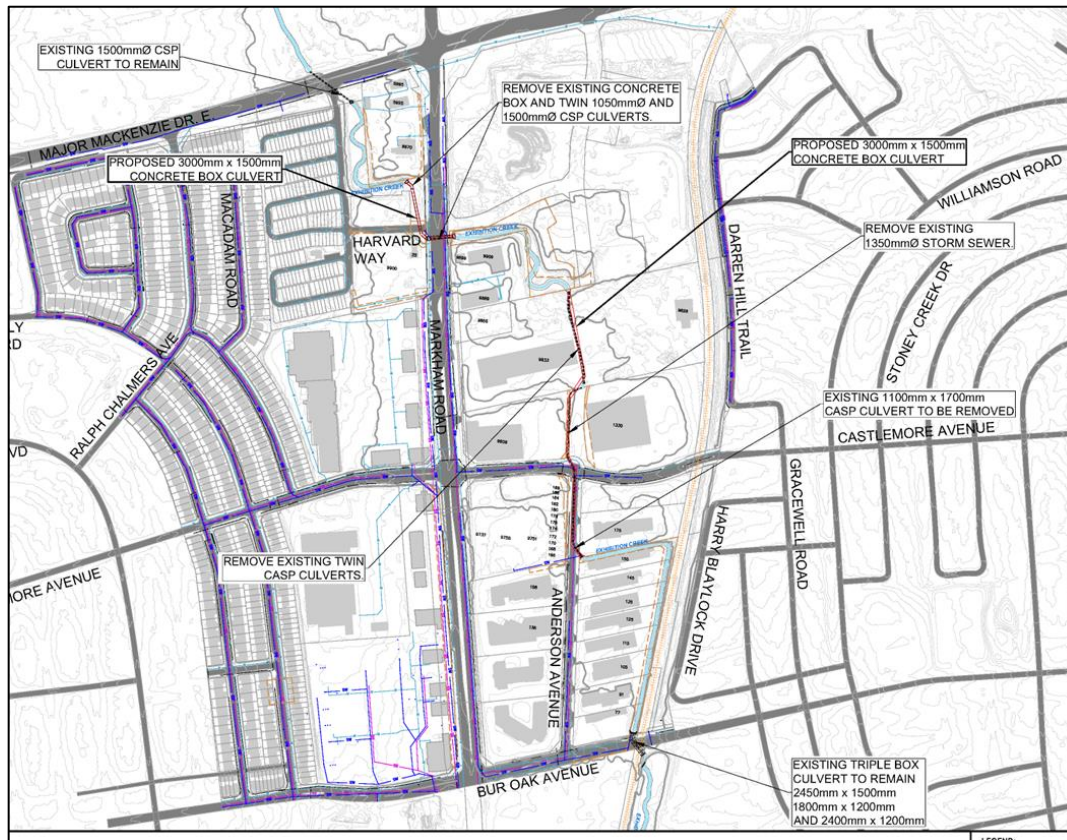


# Engineering Alternatives Evaluation Matrix

Alternative 1	Alternative 2	Alternative 3	Alternative 4	Alternative 5	Alternative 6	Alternative 7	Alternative 8
Do Nothing	Stormwater Reduction Pond	Upstream Only Improvements	Open Channel Realignment	Upstream Improvements &	Upstream Improvements &	Culvert Enlargement	Additional Parallel Culverts
Physical/Natural Environment							
Social/Cultural Environment							
Economic Criteria							
Technical/Engineering Considerations							
Total							
						PRELIMINARY PREFERRED	



# Preliminary Preferred – Alt 7 – Increased Culvert with Cost Estimate



SCHEDULE OF QUANTITIES					
EA Study for Mount Joy Creek Flood Mitigation - Alt #7 - Preliminary preferred					
City of Markham					
SECTION 1 - GENERAL					
Item	Description	Quantity	Unit	Unit Price	Price (Excl. HST)
1.1	Bonds and Insurance	1	L.S.	\$ 240,000.00	\$ 240,000.00
1.2	Traffic Control & Traffic Control Signage	1	L.S.	\$ 150,000.00	\$ 150,000.00
1.3	Utility, Service Locates and Construction Layout	1	L.S.	\$ 50,000.00	\$ 50,000.00
1.4	Mobilization, Demobilization, Access Route and Staging Area	1	L.S.	\$ 500,000.00	\$ 500,000.00
1.5	Tree Removals, Clearing and Grubbing	1	L.S.	\$ 10,000.00	\$ 10,000.00
1.6	Stream Bypass, Dewatering and Flow Control	1	L.S.	\$ 250,000.00	\$ 250,000.00
1.7	Positive Dewatering	1	L.S.	\$ 100,000.00	\$ 100,000.00
1.8	Erosion & Sediment Control	1	L.S.	\$ 50,000.00	\$ 50,000.00
1.9	Obtain MNRF Fish Collection Permit and Fish Rescues	1	L.S.	\$ 15,000.00	\$ 15,000.00
1.10	Temporary Support and Protection of Utilities	1	L.S.	\$ 250,000.00	\$ 250,000.00
Sub-total Tender Price Section 1					\$ 1,615,000.00
SECTION 2 - CULVERT REPLACEMENT & ROAD RECONSTRUCTION					
Item	Description	Quantity	Unit	Unit Price	Price (Excl. HST)
2.1	Saw Cut, Excavate and Disposal of Materials for Culvert Replacement (Asphalt, Granular, Fill, Sidewalk, Curb and Gutter, Gabions, etc.)	1	L.S.	\$ 1,500,000.00	\$ 1,500,000.00
2.2	Supply and Installation of Culvert	545	m	\$ 12,000.00	\$ 6,541,332.00
2.3	Asphalt Restoration	51	m <sup>2</sup>	\$ 250.00	\$ 12,741.25
2.4	Remove and Replace Maintenance Holes	3	ea.	\$ 50,000.00	\$ 150,000.00
2.5	Site Restoration Works (i.e., sodding, tree plantings, etc.)	1	L.S.	\$ 350,000.00	\$ 350,000.00
Sub-total Tender Price Section 2					\$ 8,554,073.25
SECTION 3 - ENGINEERING DESIGN					
Item	Description	Quantity	Unit	Unit Price	Price (Excl. HST)
3.1	Engineering Services and Design	1	L.S.	\$ 1,200,000.00	\$ 1,200,000.00
3.2	Construction Administration	1	L.S.	\$ 1,200,000.00	\$ 1,200,000.00
Sub-total Tender Price Section 3					\$ 2,400,000.00
SUMMARY					Price (Excl. HST)
SUB-TOTAL TENDER PRICE - SECTION 1 - General					\$ 1,615,000.00
SUB-TOTAL TENDER PRICE - SECTION 2 - Culvert Replacement & Road Reconstruction					\$ 8,554,073.25
SUB-TOTAL TENDER PRICE - SECTION 3 - Engineering Design					\$ 2,400,000.00
SUB-TOTAL (Excluding Provisional Items)					\$ 12,569,073.25
Contingency (30%)					\$ 3,770,721.98
SUB-TOTAL TENDER PRICE (Excluding Provisional Items)					\$ 16,339,795.23



# Next Steps

- Receive Input from Public & TRCA – September, 2025
- Confirm Preferred Alternative Based Upon Feedback – Oct. 2025
- **Final Class EA Report – November, 2025**

**To provide comment, please contact:**

Abdullah Hossain, P.Eng.  
Environmental Engineer,  
Engineering Department  
101 Town Centre Boulevard  
Markham, ON L3R 9W3  
T: 905.477.7000 Ext. 2628  
[ahossain2@markham.ca](mailto:ahossain2@markham.ca)

Robert Amos, MAsC., P. Eng.  
Consultant Project Manager  
Aquafor Beech Limited  
5405 Eglinton Avenue West, Suite 106  
Toronto, ON M9C 5K6  
(416) 705.2367  
[Amos.R@aquaforbeech.com](mailto:Amos.R@aquaforbeech.com)

# THANK YOU

For Participating In The Environmental Assessment for Mount Joy Creek Flood Mitigation

