



WELCOME

Beverley Acres German Mills Creek Erosion Control
PUBLIC INFORMATION CENTRE
April 22nd, 2024

Your comments are encouraged and appreciated, as this will provide us an opportunity to address project issues and concerns.



Land Acknowledgment



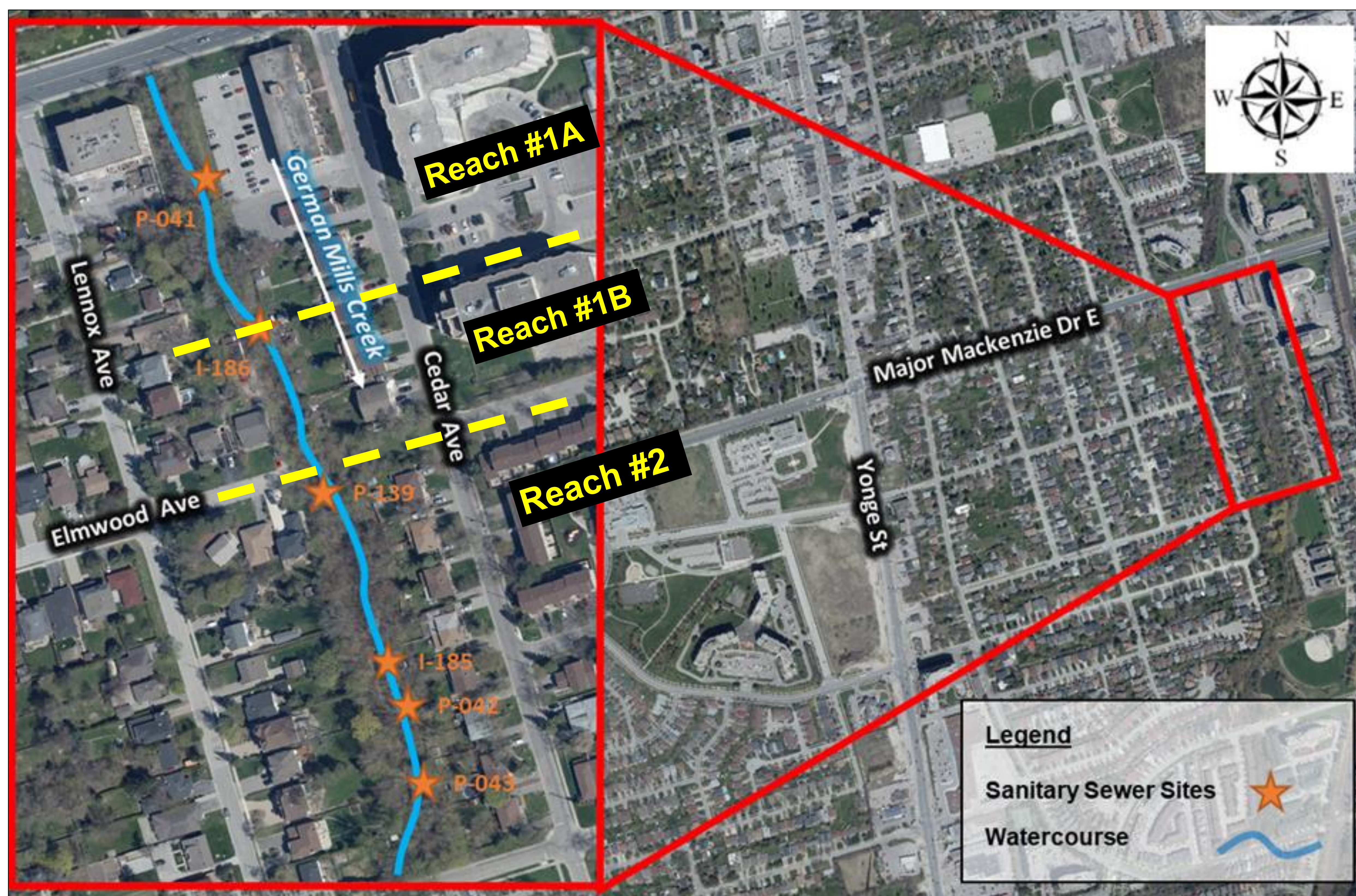
Beverley Acres German Mills Creek Erosion Control

We respectfully acknowledge the lands we are situated on are Traditional Territories and Treaty Lands, in particular those of the Mississaugas of the Credit, as well as the Anishinaabeg of the Williams Treaty First Nations, the Huron-Wendat, the Haudenosaunee, and are now home to many diverse First Nations, Inuit and Métis peoples. Toronto and Region Conservation Authority appreciates and respects the history and diversity of the land and is grateful to have the opportunity to work and meet in this territory.



Project Overview

Erosion and natural hazards are placing York Region sanitary sewer infrastructure at risk along a portion of German Mills Creek in the Beverly Acres Community of Richmond Hill. A total of six (x6) sanitary sewer risk sites have been identified. TRCA, in partnership with York Region, have retained Aquafor Beech Limited to complete an Environmental Assessment and detailed design to address the risks to York Region infrastructure.



Project Study Area

Problem Statement



Beverley Acres German Mills Creek Erosion Control



Toronto and Region Conservation Authority, in partnership with the Regional Municipality of York is initiating a Municipal Class Environmental Assessment to identify erosion control solutions for sanitary infrastructure protection. The study area includes municipal lands and easements along German Mills Creek between Major Mackenzie Drive East and Palmer Avenue, in the City of Richmond Hill.

PUBLIC INFORMATION CENTRE PURPOSE



This Public Information Centre (PIC) is designed to:

- Present information on existing conditions
- Present alternative approaches to erosion protection
- Present study process and timelines



To gain community input on:

- Existing conditions information
- Identification of opportunities and mitigation preferences
- Alternative evaluation criteria and scoring
- Selection of preferred solutions



Municipal Class Environmental Assessment Process

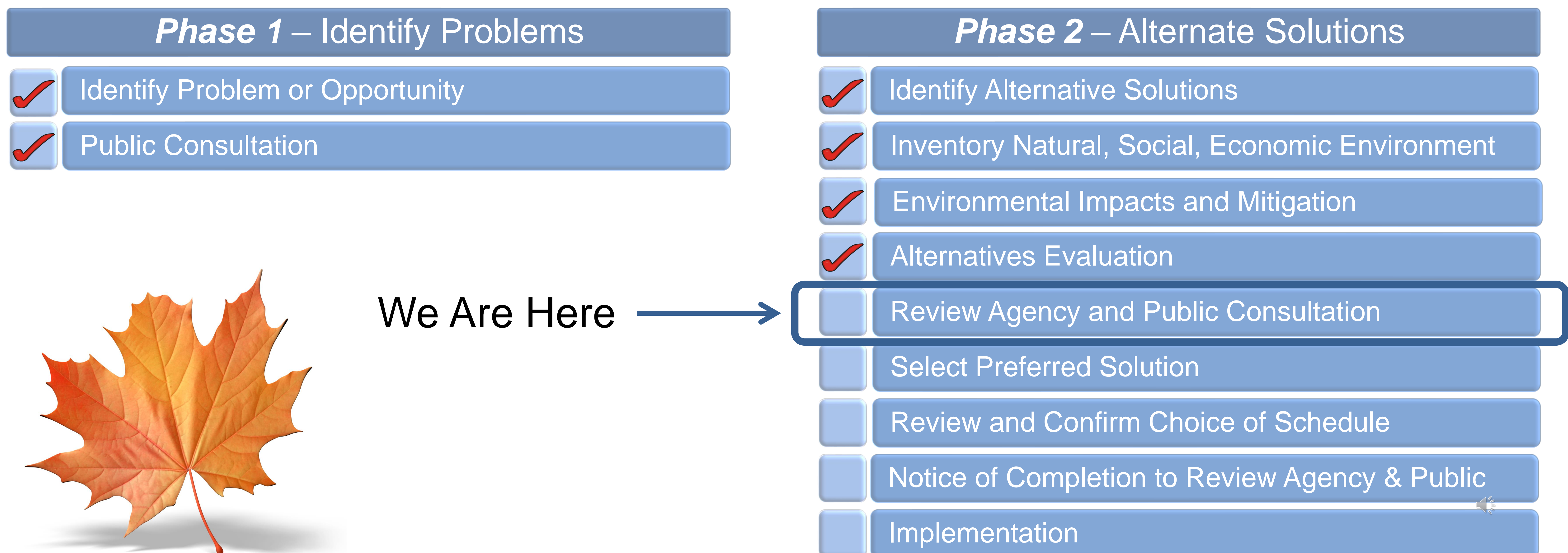


Beverley Acres German Mills Creek Erosion Control

CLASS EA PROCESS - SCHEDULE B

Many projects related to municipal systems are similar in nature, are carried out routinely, and have predictable and mitigatable environmental effects which are investigated according to the Municipal Engineers Association “Municipal Class Environmental Assessment” process (October 2000, as amended in 2007, 2011, 2015 & 2023).

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



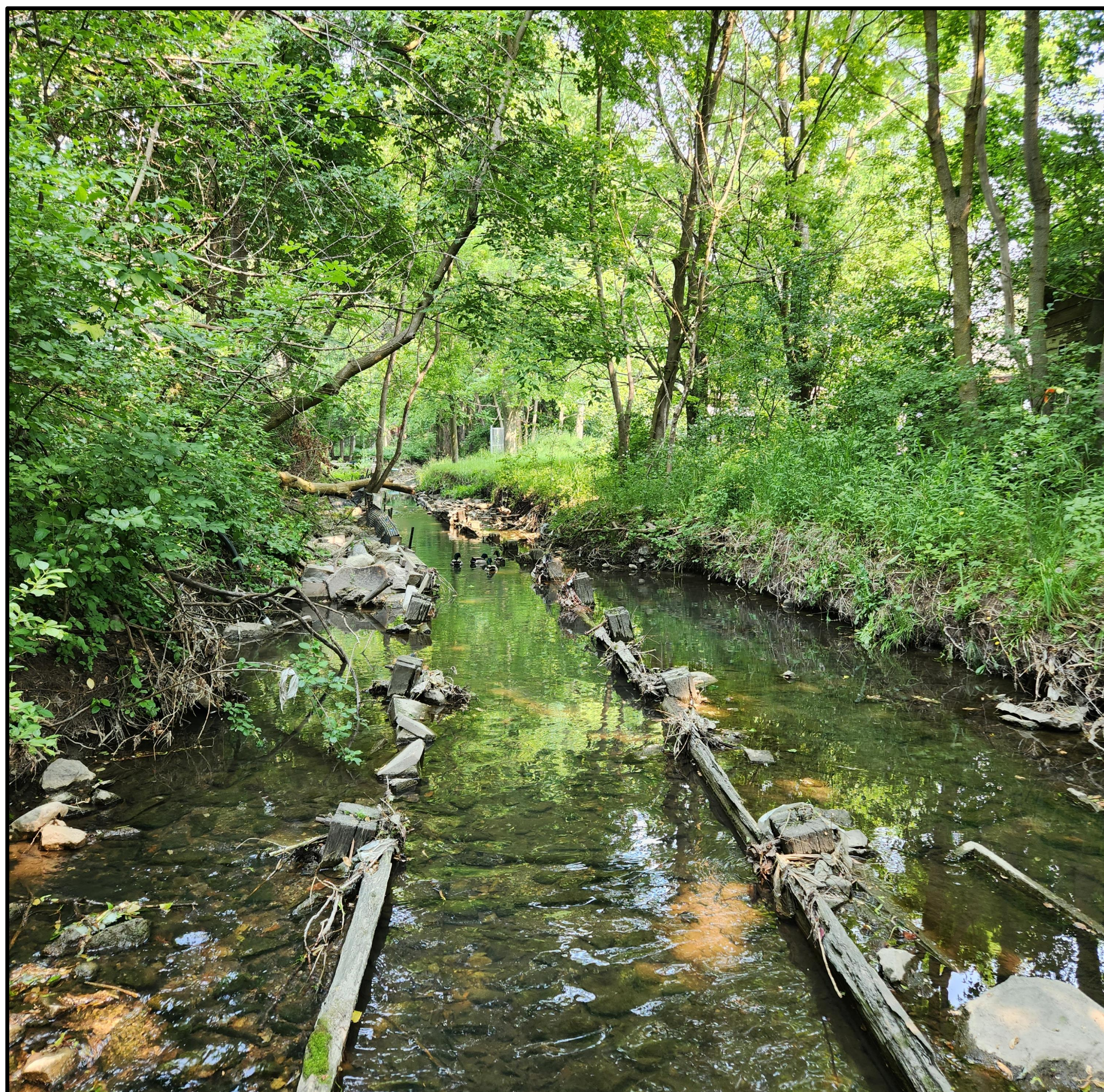
Background Information

Historic and recently constructed bank protection works within German Mills Creek are common within the study area, including:

- Wooden retaining walls, gabion baskets and timber channel lining

These bank protection measures have started to degrade, fail, and become outflanked and undermined, leading to accelerated erosion

This erosion has placed the adjacent sanitary sewer and residential private properties at risk



Outflanked historic timber channel lining



Undermined gabion baskets and heavily eroded channel banks



Bank erosion impacting adjacent residential properties

Technical Assessments

The following technical assessments have been completed in support of the EA and Detailed Design:

1. Topographical survey
2. Geomorphic analysis

The following technical assessments are currently underway in support of the EA and Detailed Design:

1. Tree inventory and arborist report
2. Terrestrial and aquatic ecological inventories including Species at Risk screening
3. Hydraulic modelling investigation
4. Geotechnical investigation



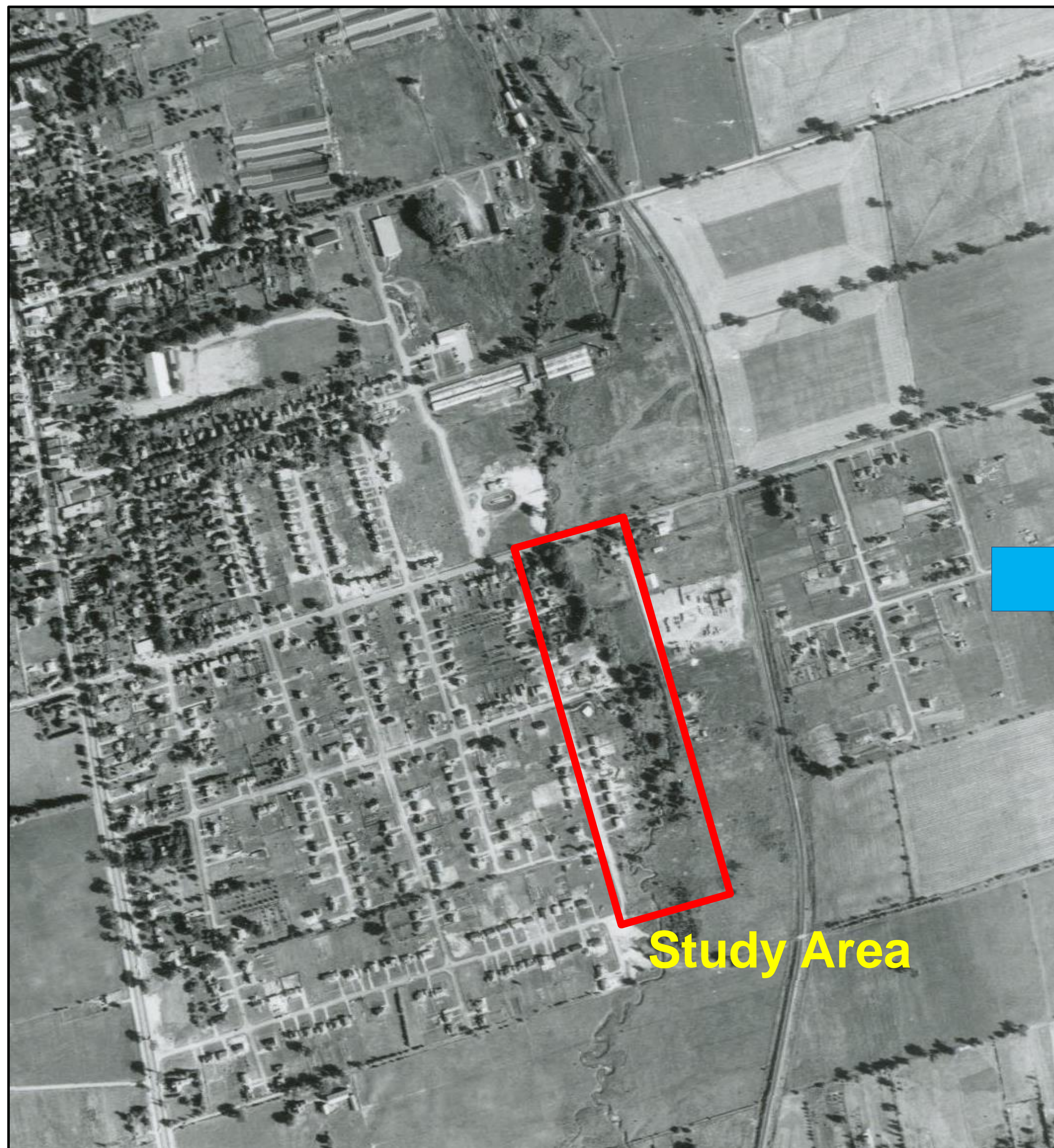
Topographic Survey of Study Area



Geomorphic Analysis of German Mills Creek

Geomorphic Analysis

Aquafor's fluvial geomorphology team has reviewed available background information and existing site conditions to define key geomorphic parameters including: substrate composition, watercourse stability, dominant geomorphic processes and estimated rates of erosion.



Historic Ortho Imagery - 1954



Historic Ortho Imagery - 1988

Hydraulic Modelling Investigation

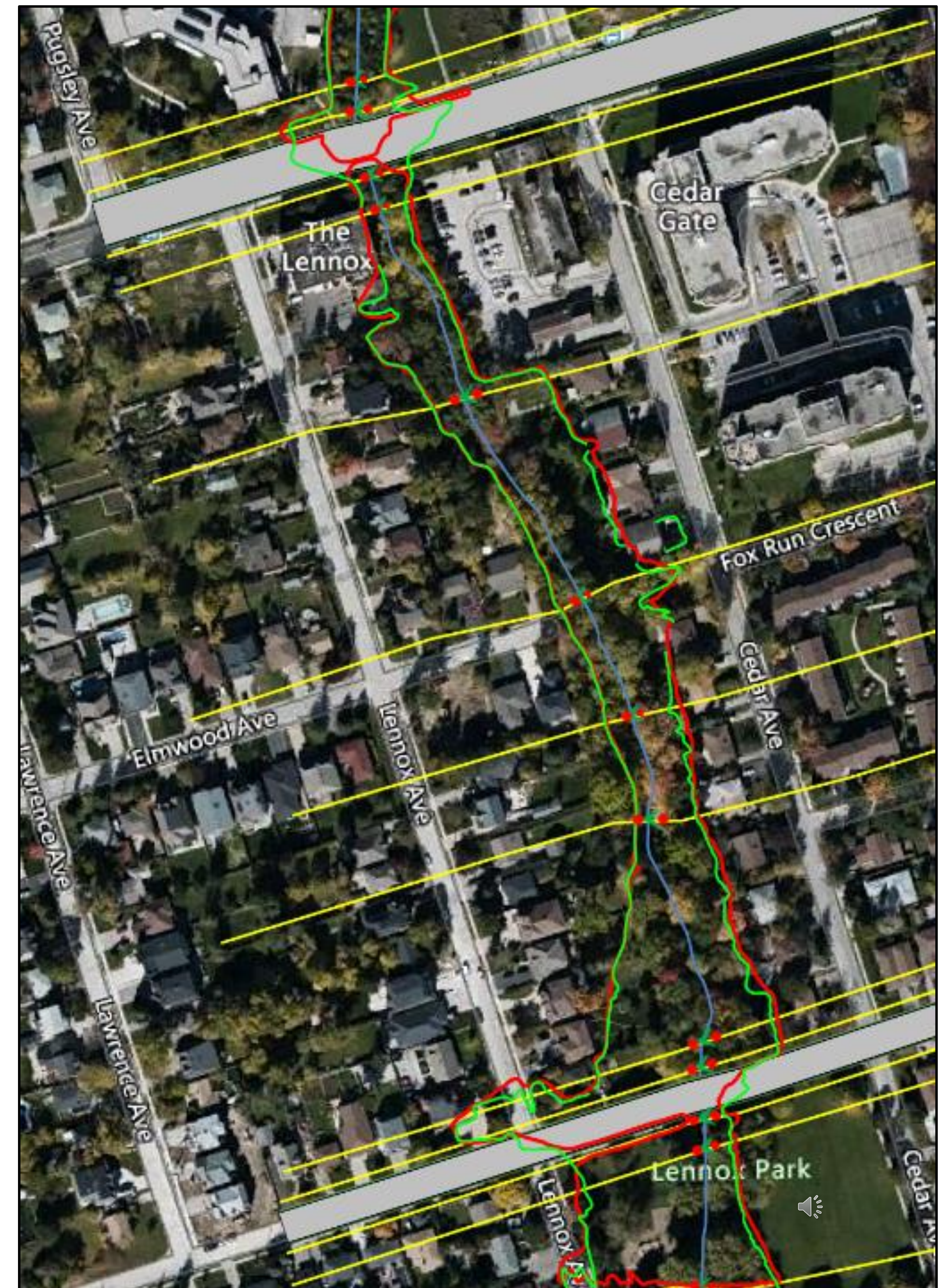
TRCA's HEC-RAS model will be used to define the impact of the proposed design on:

- Water surface elevations and modelled flood line extents
- Erosion forces (i.e., channel velocities and shear stress values)
- Fish passage potential

The design will ensure there is no negative impact with respect to flooding or erosion control when compared to existing conditions.

Detailed hydraulic modelling and confirmation of flood line extents will be completed at the detailed design phase.

A coarse high-level assessment has been completed at the EA stage to guide the evaluation of alternatives.



Preliminary Hydraulic Analysis within Study Area

Preliminary Alternative Solutions

Alternative 0 – Do Nothing

- Define existing levels of risk and continue monitoring until further restoration works are required.



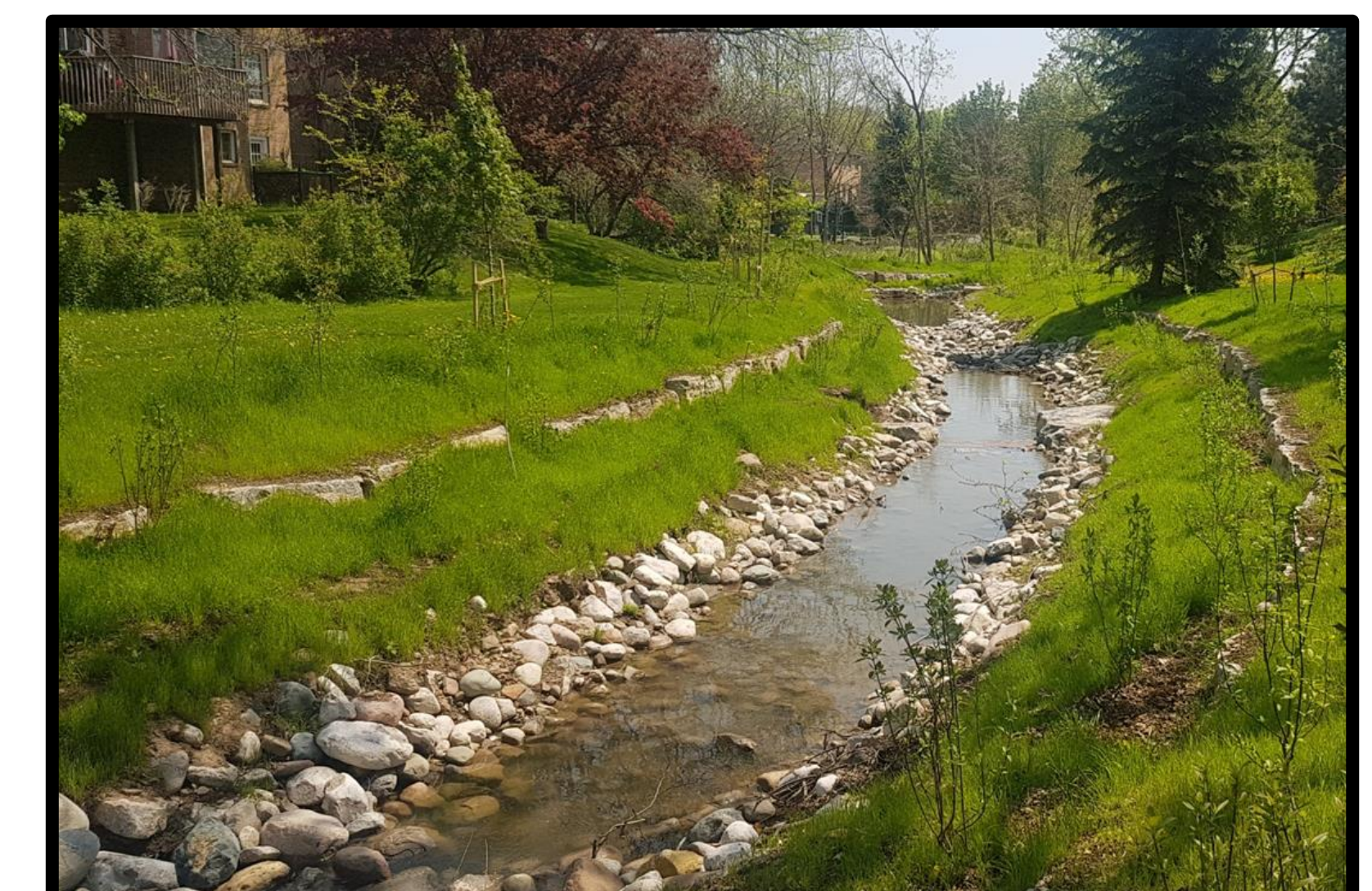
Alternative 1 – Localized Channel Restoration

- Includes localized bank protection and channel restoration works at high-risk areas.



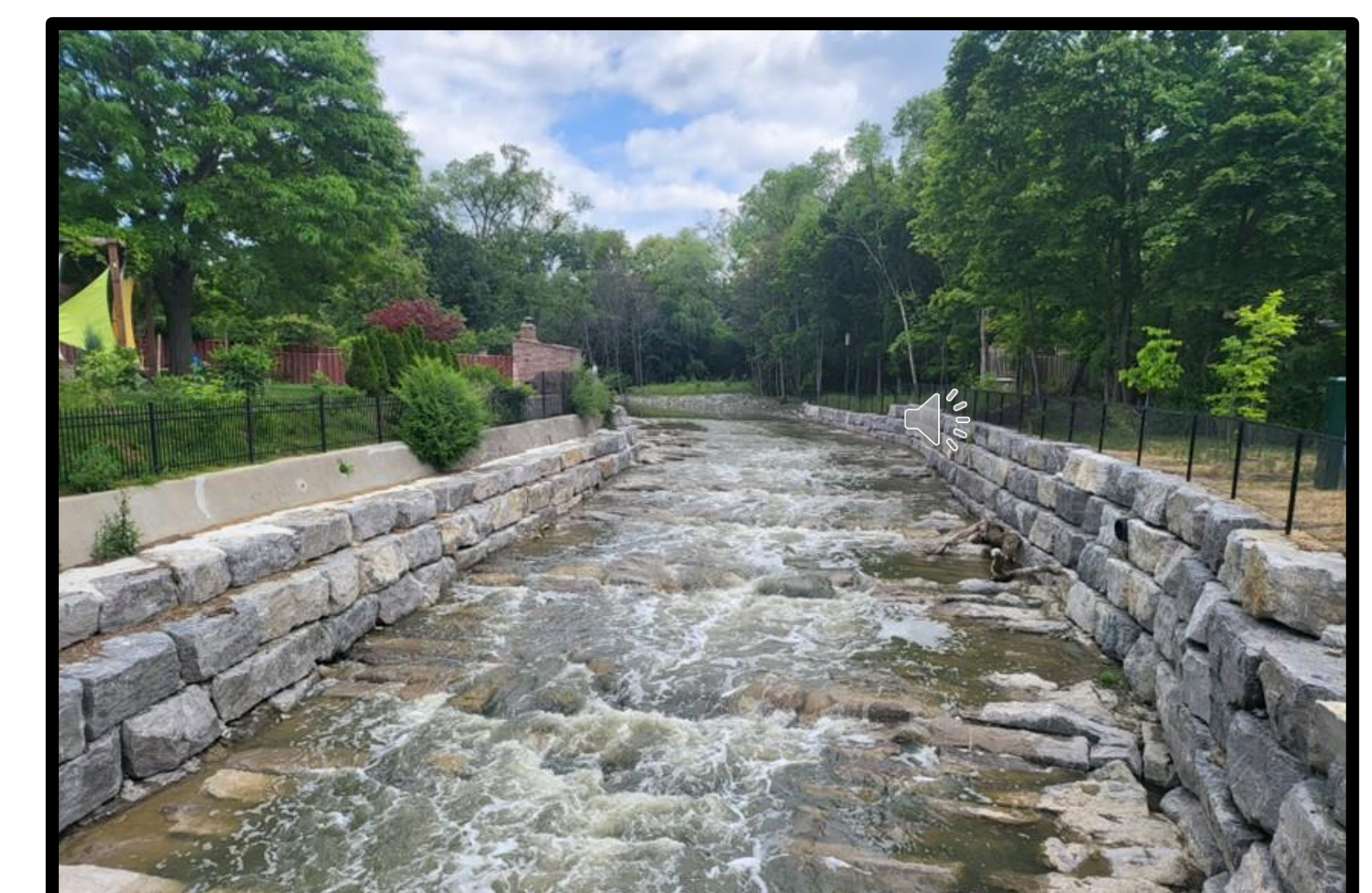
Alternative 2 – Extended Naturalized Channel Restoration

- Includes comprehensive restoration works for the entire study area using naturalized methods.



Alternative 3 – Extended Hardscaped Channel Restoration

- Includes comprehensive restoration works for the entire study area using hardened protection measures.



Existing Conditions – Do Nothing

Alternative 0 – Do Nothing

Summary

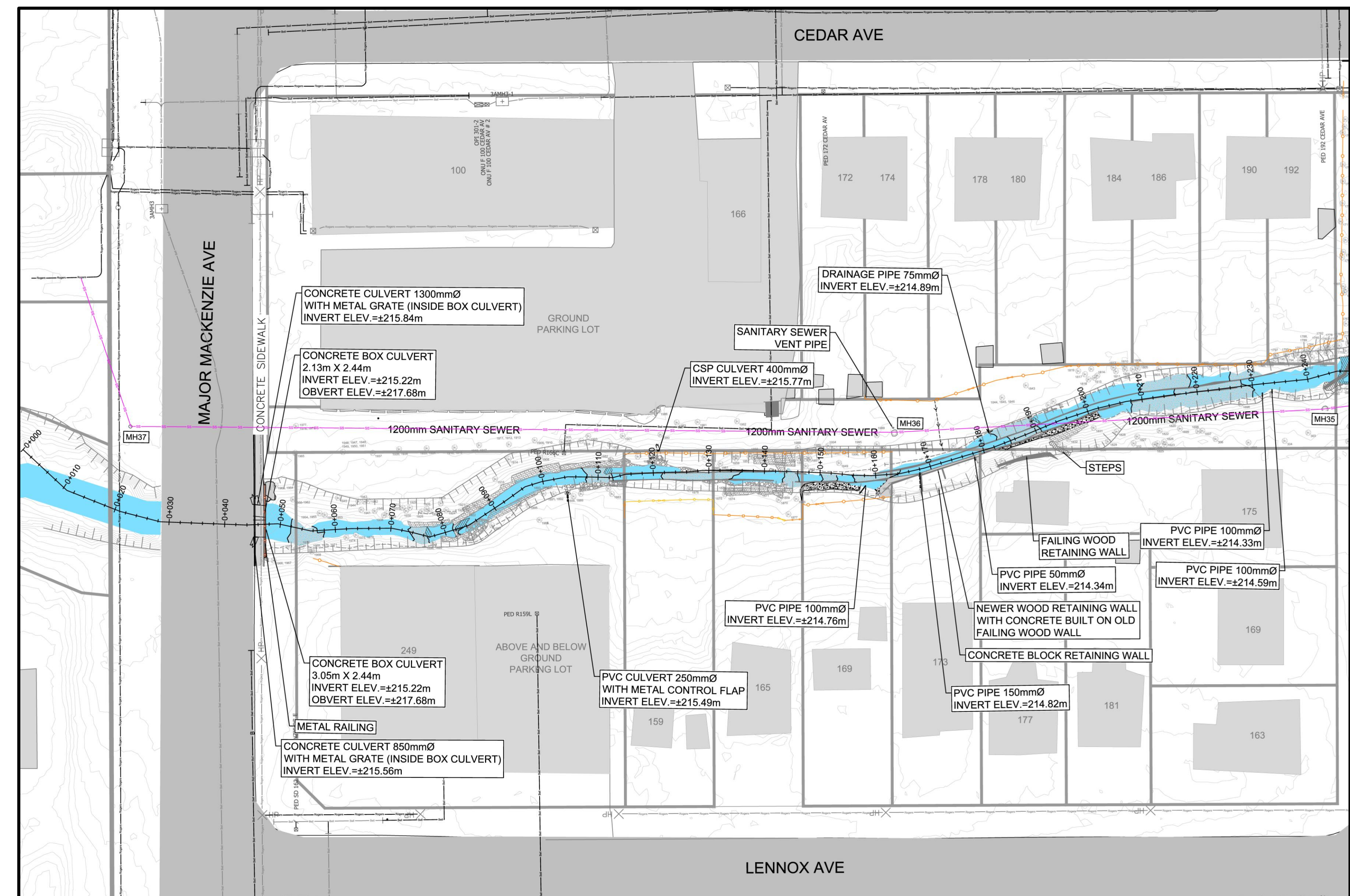
- Continued monitoring of the study area
- Continued erosion of German Mills Creek

Alternative 0 Advantages

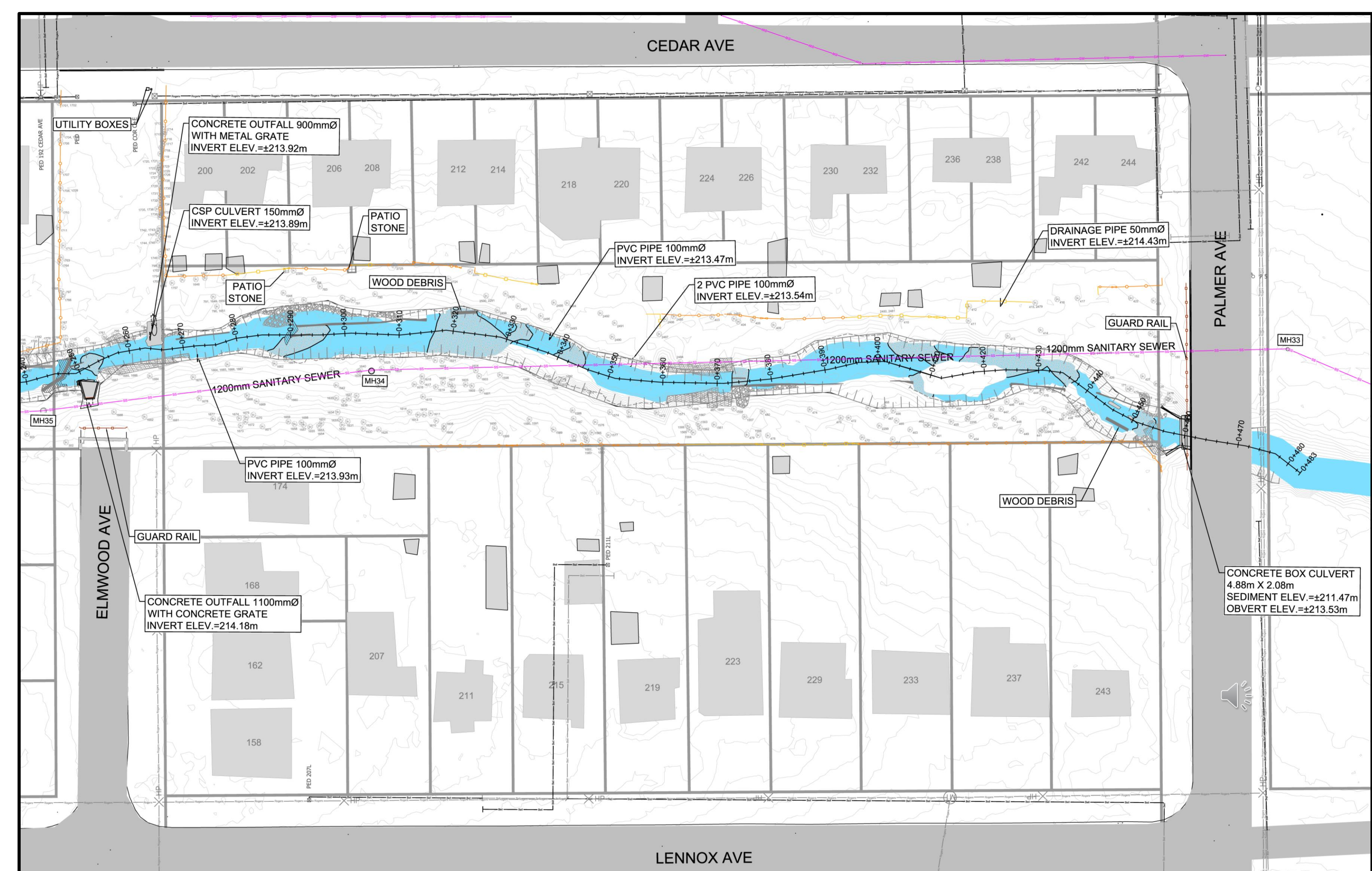
- No construction disturbance
- No immediate cost

Alternative 0 Disadvantages

- Sanitary sewer and private properties at continued risk of erosion
- No reduction of flood levels to surrounding properties
- Future emergency works/maintenance likely required if infrastructure becomes damaged



Alternative 0: Do Nothing – Reach #1



Alternative 0: Do Nothing – Reach #2

Existing Conditions – Do Nothing

Alternative 0 – Do Nothing

- Unprotected bank and channel bed within German Mills Creek
- Severely degraded or failed historic erosion control structures
- At-risk private properties and sanitary sewer infrastructure



Active Bank Erosion



Active Channel Widening

Conceptual Design Drawings – Localized Channel Restoration

Alternative 1 - Localized Channel Restoration

Design Summary

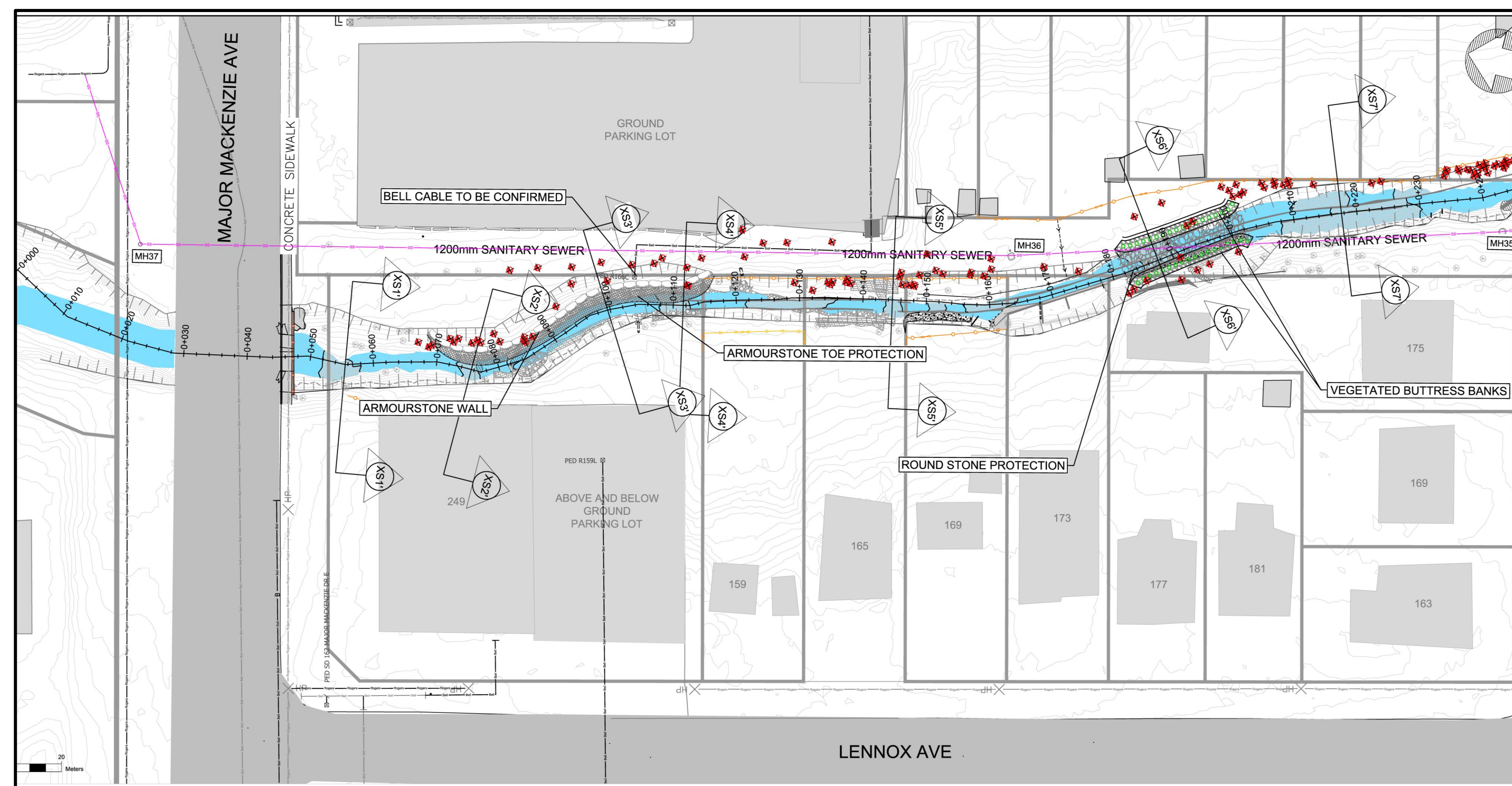
- Localized bank protection and channel restoration works
- Design consists of a combination of Armourstone wall, vegetated buttresses, and roundstone bed treatment

Alternative 1 Advantages

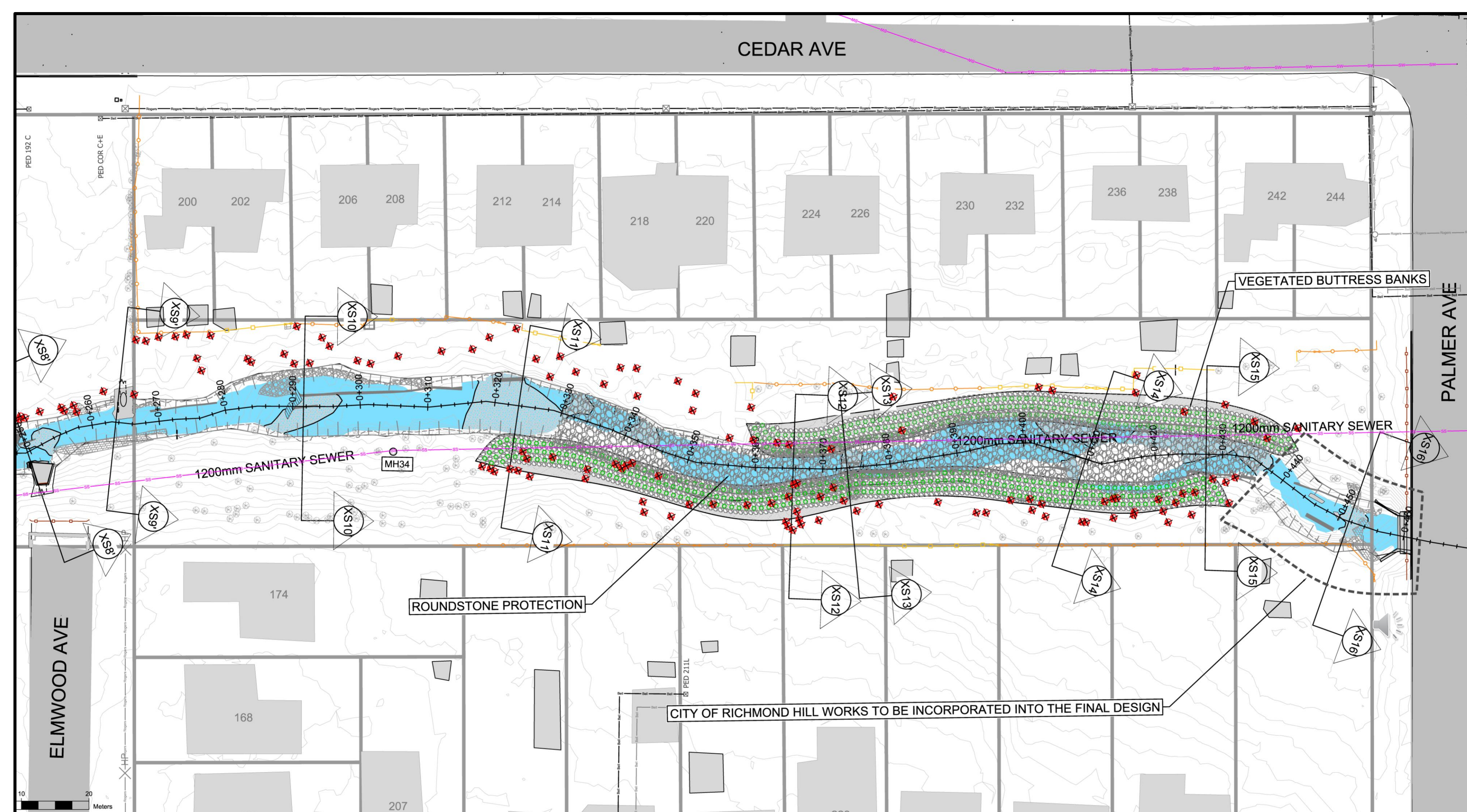
- Critical sewer and private property protection in localized areas
- Comparatively low cost and minimal construction disturbance

Alternative 1 Disadvantages:

- Continued erosion risk to sewer and private properties at some locations
- Does not include upstream channel widening by Major Mackenzie
- No reduction in modelled flood elevations



Alternative 1: Localized Channel Restoration (Reach 1)



Alternative 1: Localized Channel Restoration (Reach 2)

Example – Localized Channel Restoration

Erosion Restoration of Mount Joy Creek – City of Markham

- 40 m of local channel restoration works to protect an at-risk maintenance hole and sewer crossing
- Increased depth of cover over sewer
- Armourstone retaining walls installed to prevent lateral bank erosion



Pre-Construction – September 2019



Two Years Post Construction – August 2023

Conceptual Design Drawings – Extended Naturalized Channel Restoration

Alternative 2 - Extended Naturalized Channel Restoration

Design Summary

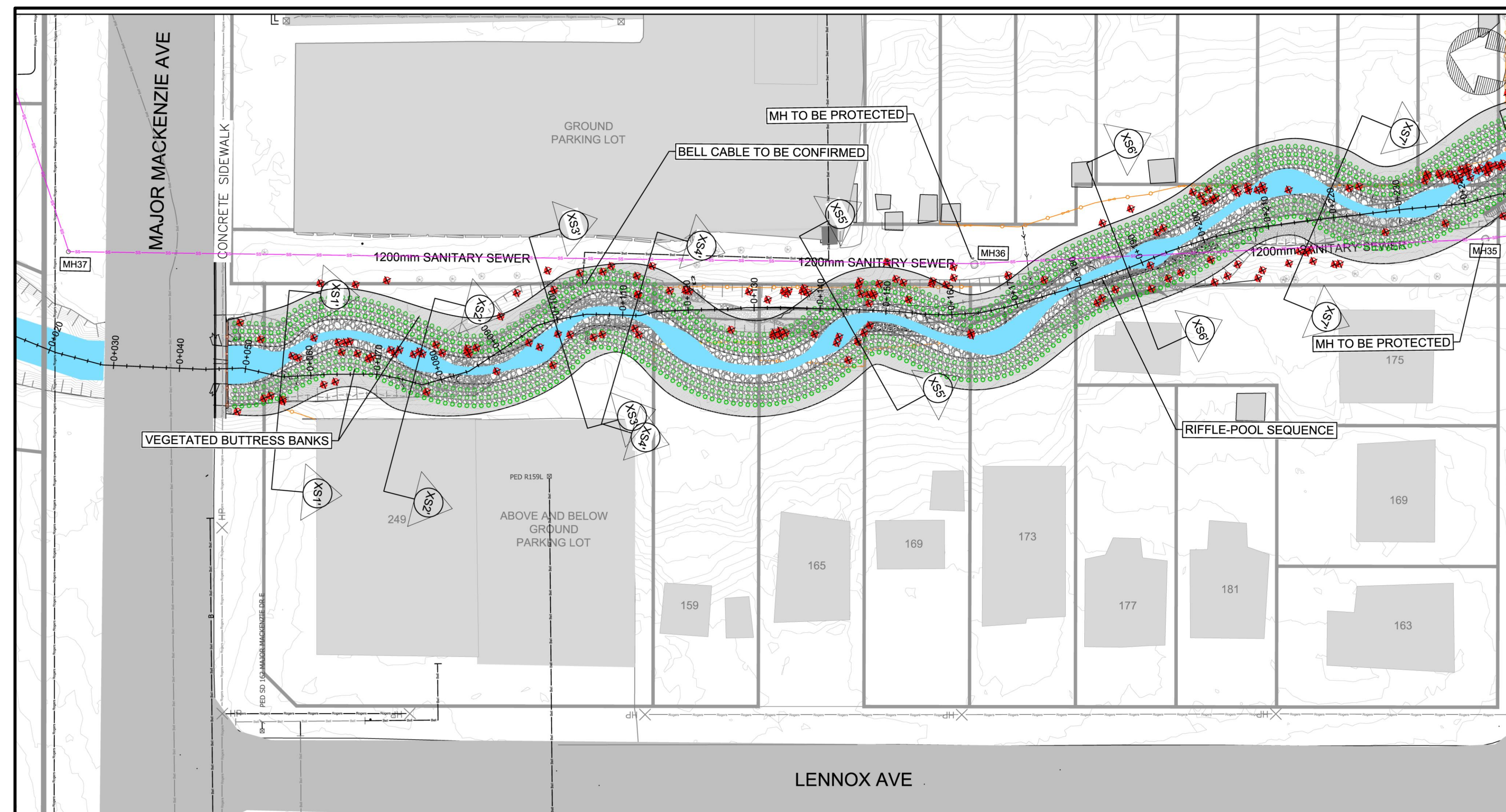
- Restoration works for the entire study area
- Design consists of vegetated buttress bank protection and roundstone bed protection along entire length of channel

Alternative 2 Advantages

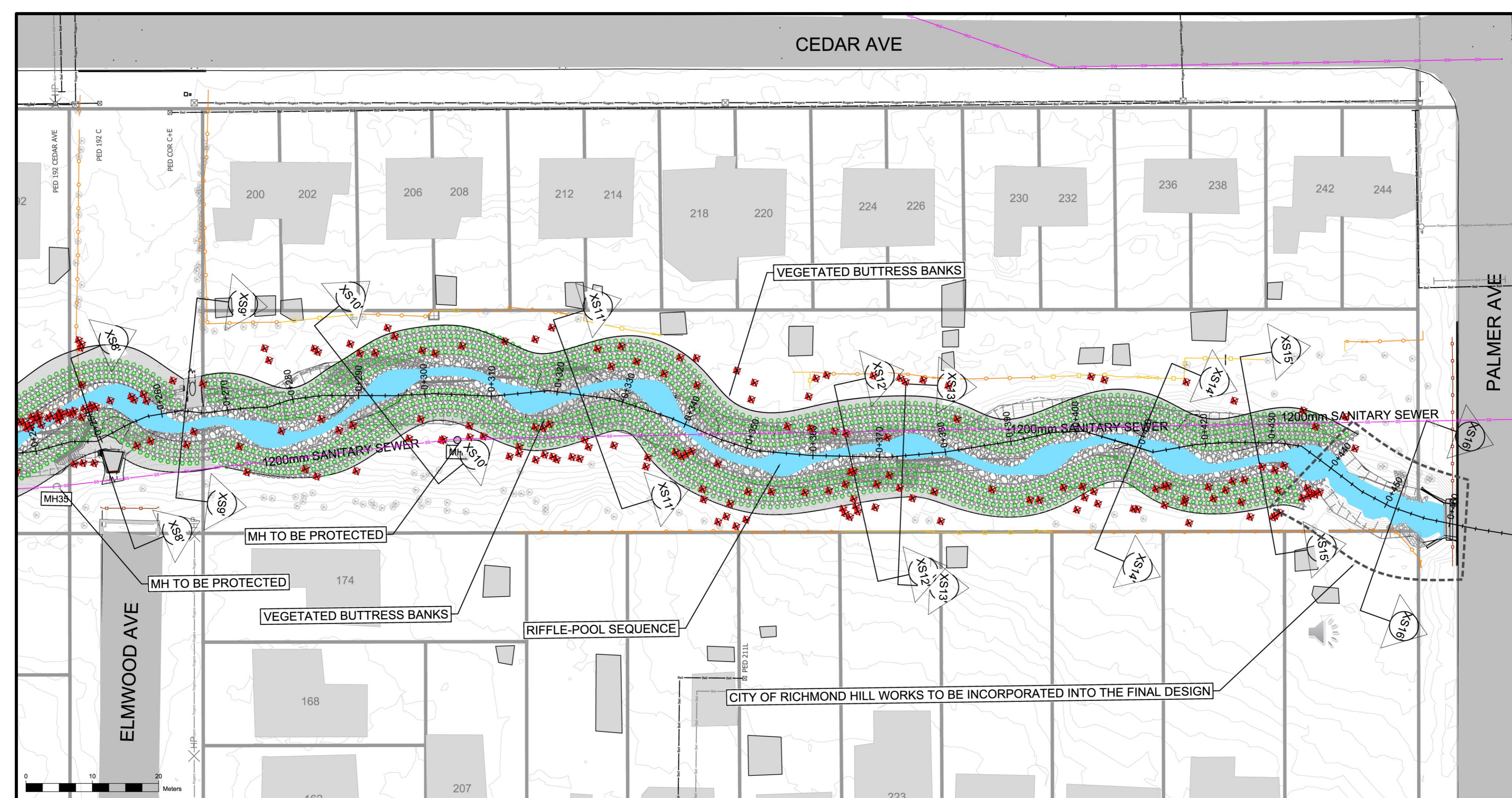
- Critical erosion protection to sanitary sewer and adjacent private properties along entire study area
- General widening of channel resulting in minor reduction to flood levels
- Enhanced aquatic and riparian habitat

Alternative 2 Disadvantages

- Significant tree removals required
- Wider channel form requires more space, leading to potential private property impacts



Alternative 2: Extended Naturalized Channel Restoration (Reach 1)



Alternative 2: Extended Naturalized Channel Restoration (Reach 2)

Example – Extended Naturalized Channel Restoration

Roseland Creek Restoration – City of Burlington

- ~800 m of continuous channel restoration works to protect at-risk infrastructure and private properties
- Combination of natural channel design and traditional engineering design principles



Pre-Construction – August 2014



Post Construction – May 2018

Conceptual Design Drawings – Extended Hardscaped Channel Restoration

Alternative 3 – Extended Hardscaped Channel Restoration

Design Summary

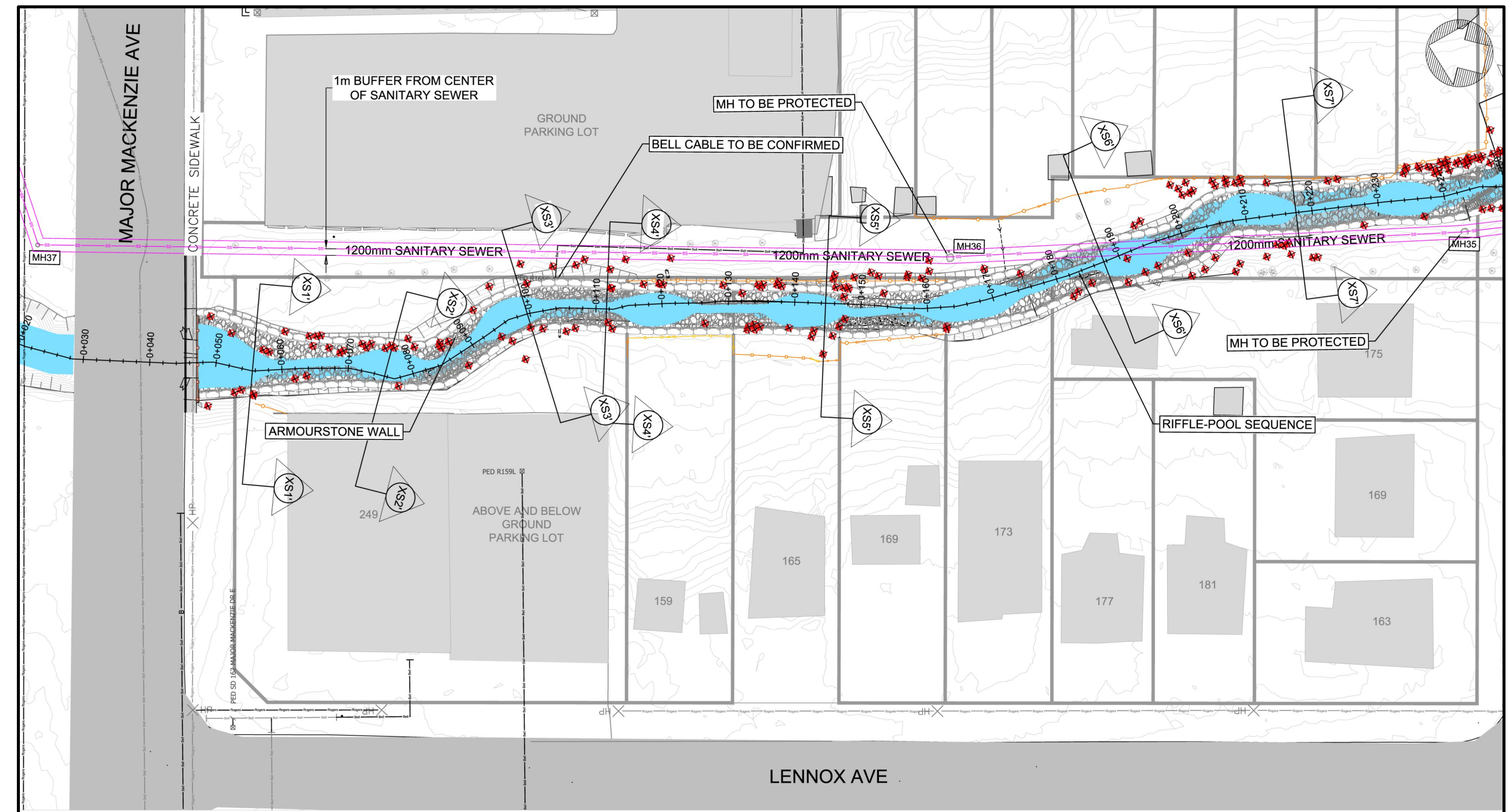
- Remediation of the entire length of channel using “hard” erosion controls
- Design consists of armourstone wall bank protection and roundstone bed treatment along entire length of channel

Alternative 3 Advantages

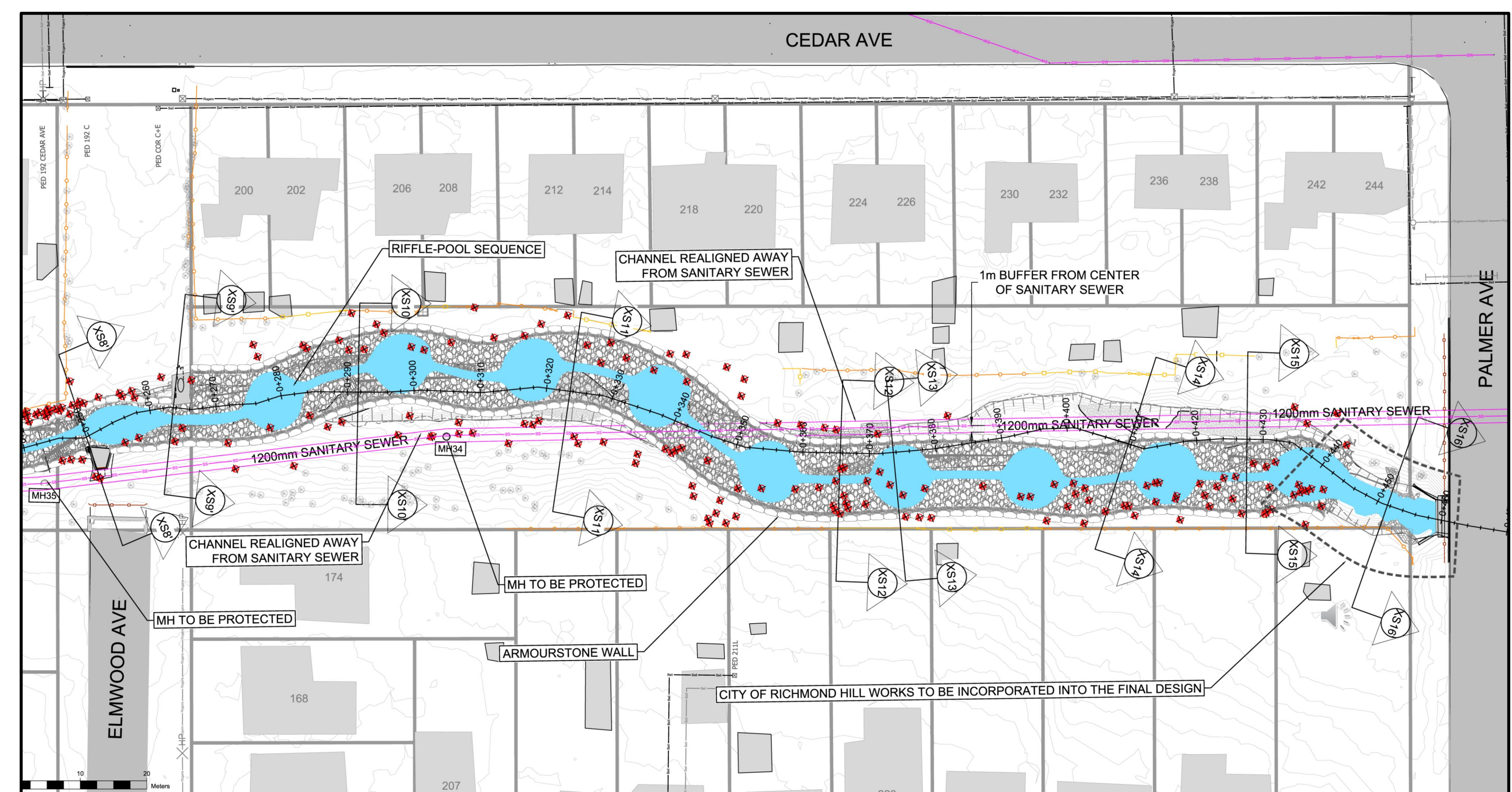
- Critical sewer and adjacent private property protection along entire study area
- General widening of channel resulting in minor reduction in flood levels
- Relative to Alternative 2, a more confined channel width, minimizing private property impacts

Alternative 3 Disadvantages

- “Hard” engineering approach has reduced habitat restoration potential
- Significant tree removals required
- Highest cost



Alternative 3: Extended Hardscaped Channel Restoration (Reach 1)



Alternative 3: Extended Hardscaped Channel Restoration (Reach 2)

Example – Extended Hardscaped Channel Restoration

Mimico Creek at Van Dusen – City of Toronto

- 130 m of channel restoration works to protect at-risk sanitary sewer infrastructure
- Consisting of armourstone retaining walls and armourstone channel bed lining
- Provided comprehensive protection to sanitary sewer infrastructure



Exposed Sanitary Sewer and Failed Armourstone Retaining Wall (August 2020)



Armourstone Bank and Bed Control (June 2023)

Preliminary Hydraulic Modelling Results

A coarse high-level hydraulic modelling assessment has been completed for each of the proposed design alternatives to guide and inform the evaluation process.

The proposed design for each alternative was incorporated into the hydraulic model, and the following preliminary results were observed:

Alternative #1: Localized Channel Restoration

- No significant improvement to flooding reduction within study area

Alternative #2: Extended Naturalized Channel Restoration

- Moderate improvement to flooding reduction of up to 0.25 metres within the study area for the 100 year storm event

Alternative 3 – Extended Hardscaped Channel Restoration

- Moderate improvement to flooding reduction of up to 0.20 metres within the study area for the 100 year storm event

These results are preliminary and are intended to guide the alternative evaluation process. Following the completion of public consultation, the preferred alternative will be further characterized and a more refined hydraulic model will be created.



Evaluation of Alternatives

Each reach will be specifically evaluated to determine the preferred method for rehabilitation.

The evaluation uses a ranking scheme which accounts for York Region infrastructure Risk, Physical and Natural Environment, Social and Cultural Environment, Technical Considerations, Constructability, Financial Considerations, and Public Safety.

A preliminary ranking has been applied to each alternative for each reach. The alternative with the highest score will define which alternative is preferred for each reach.

The ranking score has been normalized to provide equal weighting for each category of evaluation criteria.

Comment sheets are provided to gain public input on the preliminary ranking. The ranking will be finalized once public input has been incorporated.

Scoring Scale				
1	2	3	4	5
Least Preferred	Less Preferred	Neutral	More Preferred	Most Preferred

Category Scoring Scale

Category	Weighting Factor	Maximum Points for Category
York Region Infrastructure Risk Criteria	0.2	20
Physical and Natural Environment Criteria	0.2	20
Social and Cultural Environment Criteria	0.2	20
Technical Criteria	0.2	20
Constructability	0.2	20
Financial Criteria	0.2	20
Public Safety Criteria	0.2	20
Total	1.4	140

Category Weighting Factors

Evaluation Criteria

York Region Infrastructure Risk

Risk Reduction	Ability to reduce the risk to York Region infrastructure caused by watercourse erosion
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Physical and Natural Environment Criteria

Flooding	Impact on surface drainage, flooding; ability to meet legislated criteria for flooding and water management
Erosion	Impacts on soils, geology, rates of erosion
Terrestrial Habitat	Impacts on connectivity, diversity, and sustainability
Aquatic Habitat	Impacts on connectivity, spawning potential, habitat, and sustainability

Constructability

Complexity of Treatment	Requirements for specialized services to design or install unique or proprietary specifications that must be completed by a certified contractor or consultant
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Financial Criteria

Capital Cost	Rough Order of Magnitude (ROM) capital costs for the permitting and construction of the proposed concept
Maintenance Costs	Rough Order of Magnitude (ROM) costs to maintain the proposed structure

Technical Criteria

Regulatory Agency Acceptance	Satisfy TRCA, MNRF, MECP, and DFO criteria (as relevant)
Impacts on Existing Infrastructure	Protection of non-regional infrastructure (e.g., storm sewers, culverts, outfalls, etc.)
Maintenance Requirements	Requirement for regular, irregular, or no maintenance activities (e.g., structural or vegetation maintenance)
Climate Change Resilience	Ability of the design alternative to persist under the effects of climate change including higher peak flows leading to increased erosive forces

Social and Cultural Environment Criteria

Aesthetic Value	Impact on the aesthetic value of the study area
Benefit to Community	Ability of the design to maintain or enhance community safety, satisfaction, use and enjoyment of the riparian corridor, specifically with regard to properties directly backing onto German Mills Creek within the Study Area
Archaeological Features	Impacts on existing archaeological features

Public Safety

Potential Risk to the Public	Impact to public safety and requirement for safety features (e.g., safety fences)
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Evaluation Table For Sub-Reach #1A



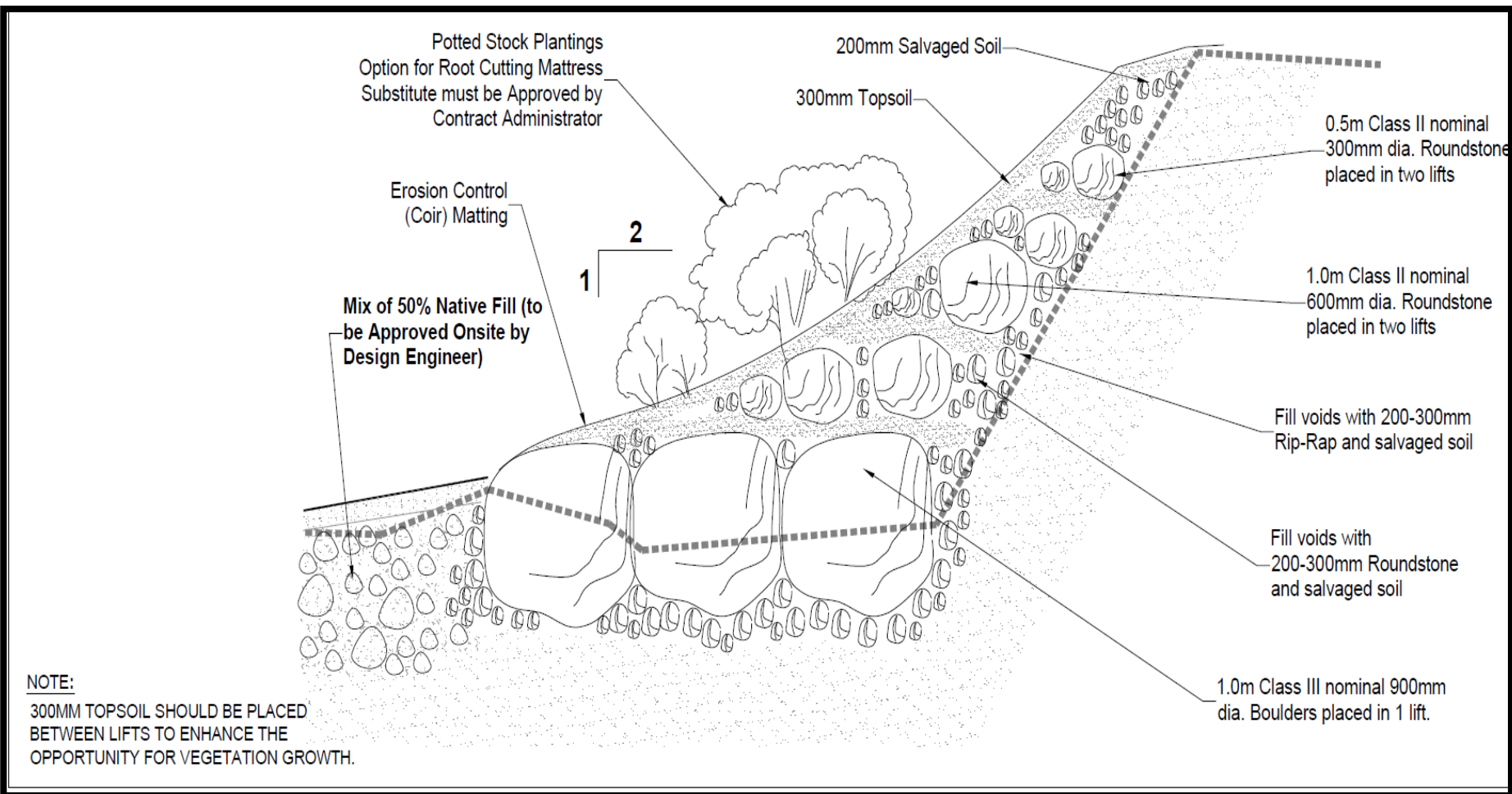
Beverley Acres German Mills Creek Erosion Control

Selection of the Preliminary Preferred Alternative

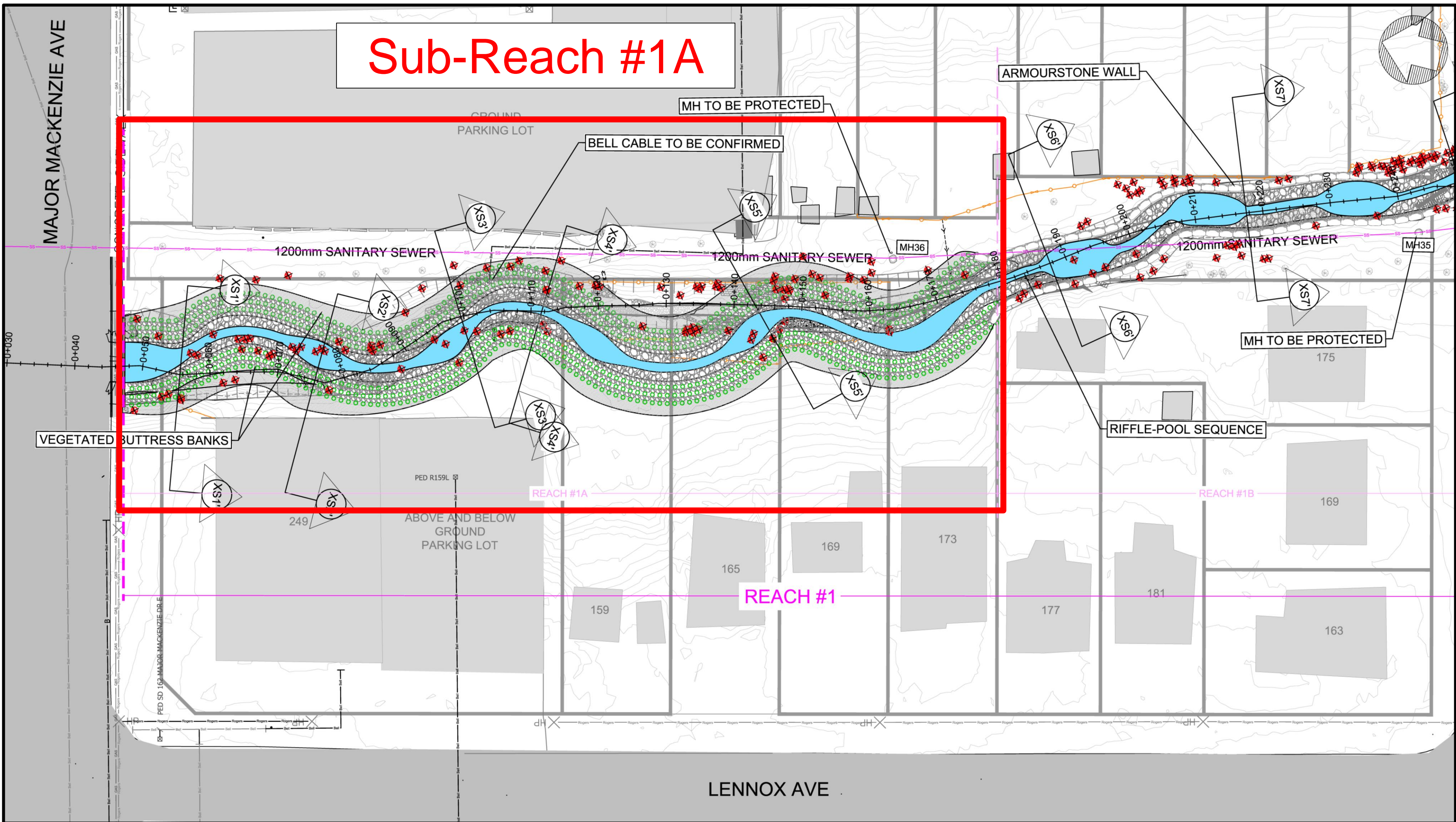
- Alternative #2 – Extended Naturalized Channel Restoration
- Comprehensive protection to private properties and sanitary sewer infrastructure
- Naturalizes and opens up channel directly downstream of Major Mackenzie Avenue, where historical filling has occurred



Implementation of Extended Naturalized Channel Restoration Works in Roseland Creek



Typical Vegetated Buttress Detail



Reach #1 Preferred Alternatives

Sub-Reach #1A - Evaluation Matrix						
Category	Evaluation Criteria	Score	Alt. 0 - Do	Alt. 1 -	Alt. 2 -	Alt. 3 -
York Region Infrastructure Risk	Risk Reduction	5	1	3	4	5
	Criteria Subtotal		1.00	3.00	4.00	5.00
	Weighted Score (maximum of 20 points)		4.00	12.00	16.00	20.00
Physical And Natural Environment	Flooding	5	3	3	4	4
	Erosion	5	1	3	4	5
	Terrestrial Habitat	5	2	3	4	2
	Aquatic Habitat	5	2	4	5	3
	Criteria Subtotal		8.00	13.00	17.00	14.00
	Weighted Score (maximum of 20 points)		8.00	13.00	17.00	14.00
Social and Cultural Environment	Aesthetic Value	5	1	2	4	3
	Benefit to Community	5	3	4	2	5
	Archaeological Features	5	3	3	3	3
	Criteria Subtotal		7.00	9.00	9.00	11.00
	Weighted Score (maximum of 20 points)		9.33	12.00	12.00	14.67
Technical Criteria	Regulatory Agency Acceptance	5	1	3	5	3
	Impact on Existing Infrastructure	5	1	3	5	5
	Maintenance Requirements	5	1	4	4	5
	Climate Change Resilience	5	1	3	5	5
	Criteria Subtotal		4.00	13.00	19.00	18.00
	Weighted Score (maximum of 20 points)		4.00	13.00	19.00	18.00
Constructability	Complexity of Treatment	5	5	4	3	2
	Criteria Subtotal		5.00	4.00	3.00	2.00
	Weighted Score (maximum of 20 points)		20.00	16.00	12.00	8.00
Financial Criteria	Capital Cost	5	5	4	3	2
	Maintenance Costs	5	2	4	5	5
	Criteria Subtotal		7.00	8.00	8.00	7.00
	Weighted Score (maximum of 20 points)		14.00	16.00	16.00	14.00
Public Safety	Potential Risks to the Public	5	2	3	4	4
	Criteria Subtotal		2.00	3.00	4.00	4.00
	Weighted Score (maximum of 20 points)		8.00	12.00	16.00	16.00
Total Score (Maximum of 140 points)			67.33	94.00	108.00	104.67

Highest Score = Preferred Alternative

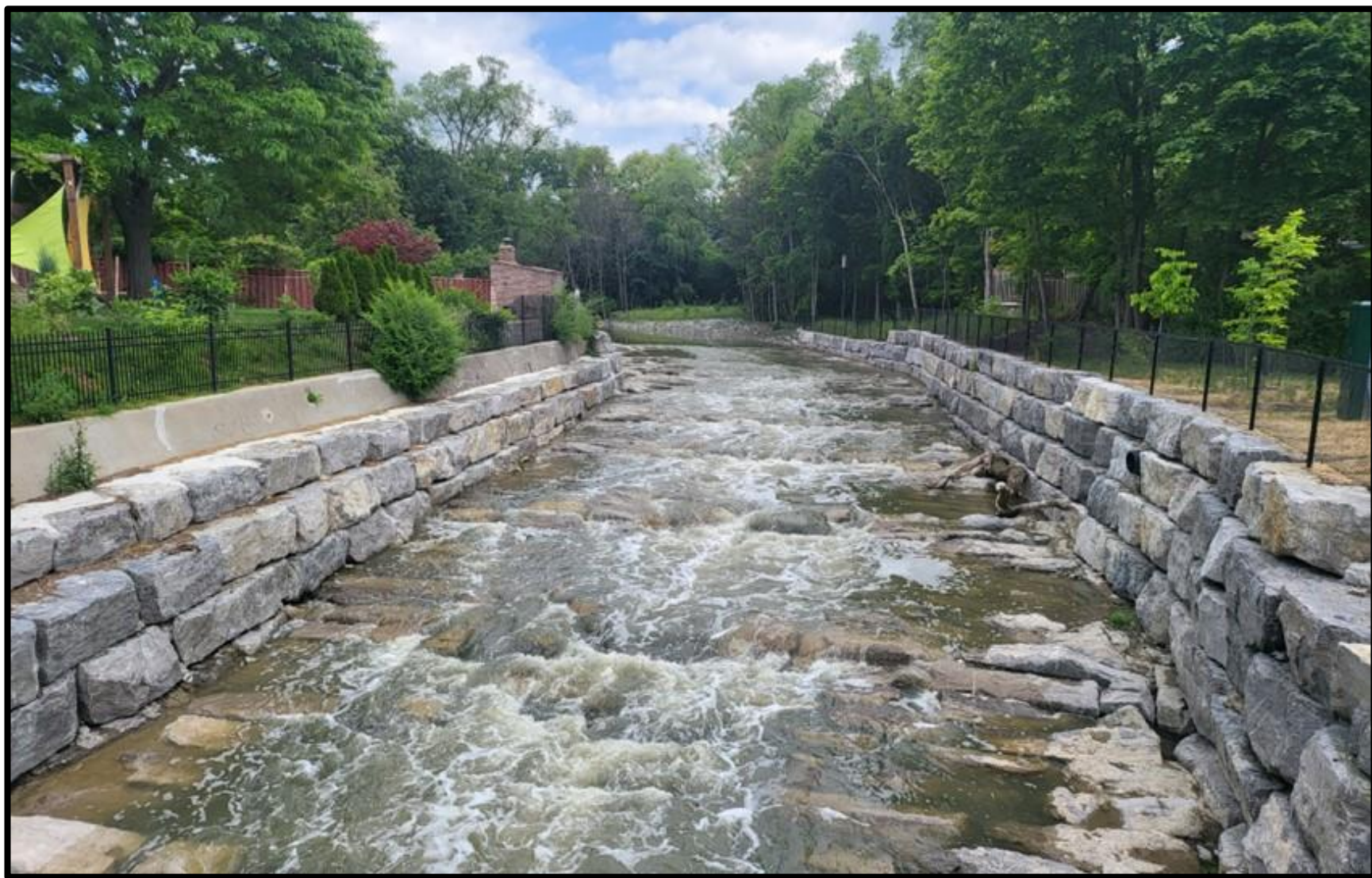
Evaluation Table For Sub-Reach #1B



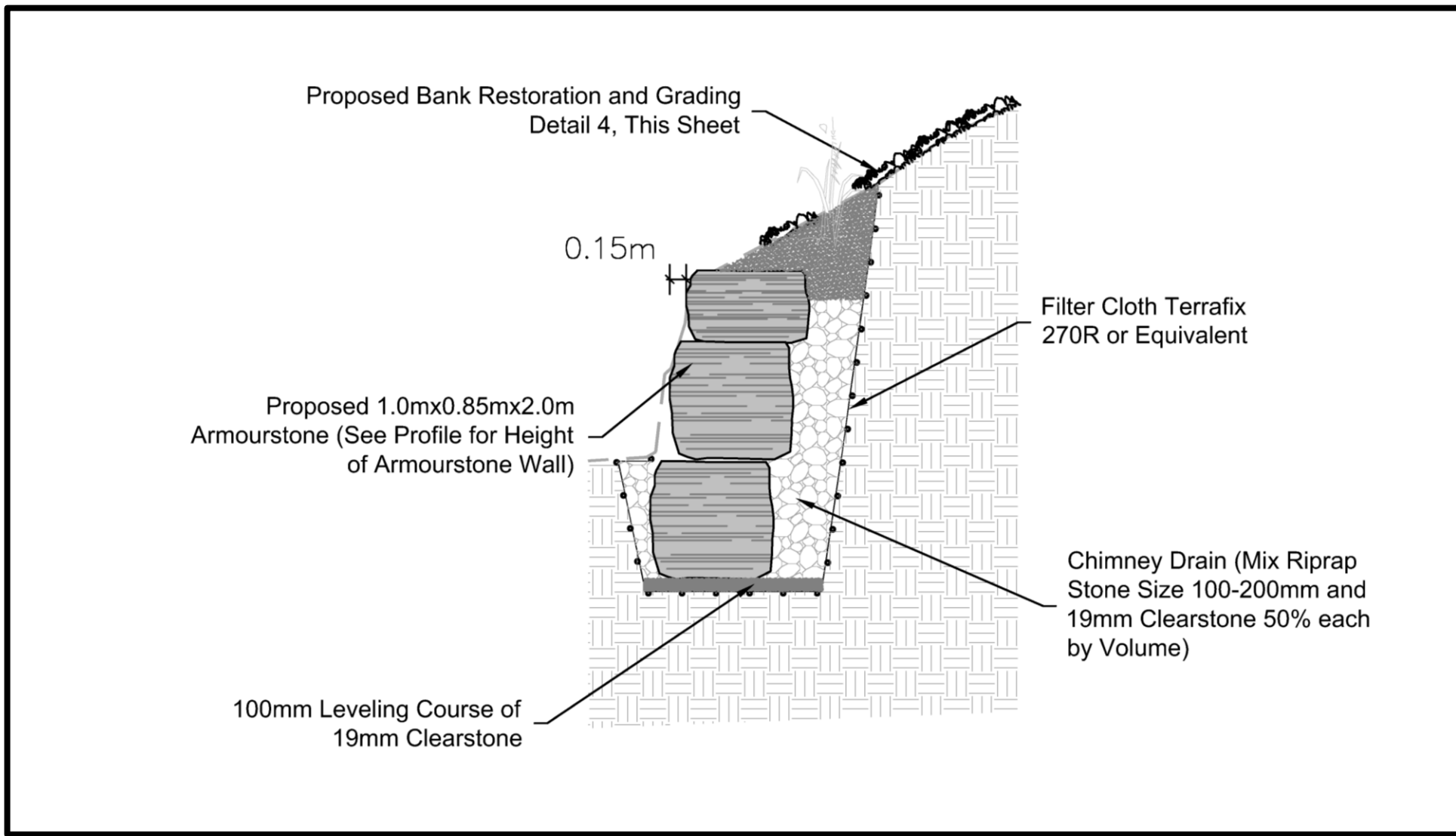
Beverley Acres German Mills Creek Erosion Control

Selection of the Preliminary Preferred Alternative

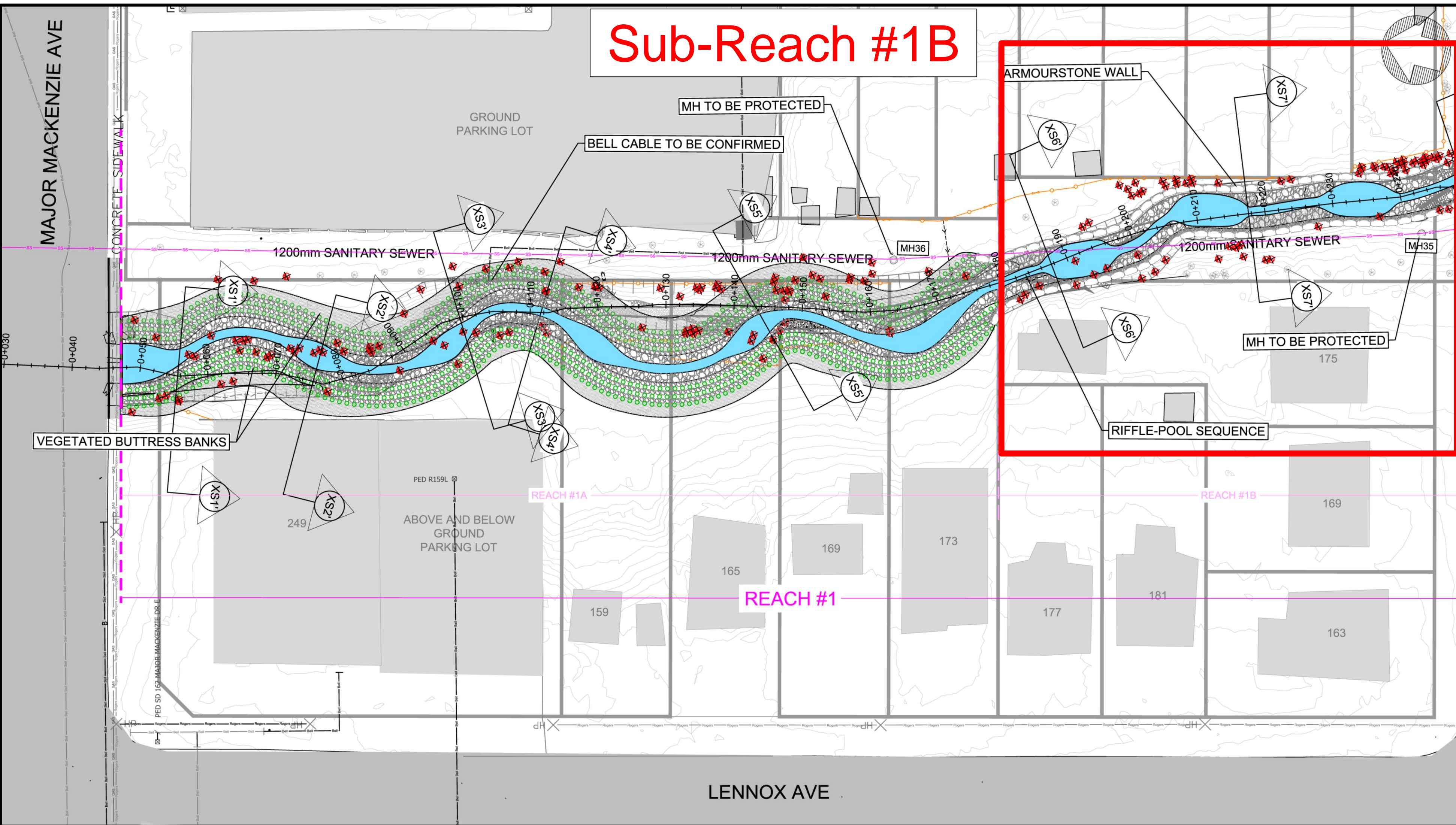
- Alternative 3 – Extended Hardscaped Channel Restoration
- Comprehensive protection to private properties and sanitary sewer infrastructure for the entire sub-reach using hardened protection measures



Implementation of Extended Hardscaped Channel Restoration Works



Typical Armourstone Wall Detail



Reach #1 Preferred Alternatives

Sub-Reach #1B - Evaluation Matrix						
Category	Evaluation Criteria	Score	Alt. 0	Alt. 1	Alt. 2	Alt. 3
York Region Infrastructure Risk	Risk Reduction	5	1	3	4	5
	Criteria Subtotal		1.00	3.00	4.00	5.00
	Weighted Score (maximum of 20 points)		4.00	12.00	16.00	20.00
Physical And Natural Environment	Flooding	5	3	3	4	4
	Erosion	5	1	3	4	5
	Terrestrial Habitat	5	2	3	4	2
	Aquatic Habitat	5	2	4	5	3
	Criteria Subtotal		8.00	13.00	17.00	14.00
	Weighted Score (maximum of 20 points)		8.00	13.00	17.00	14.00
Social and Cultural Environment	Aesthetic Value	5	1	2	4	3
	Benefit to Community	5	3	4	2	5
	Archaeological Features	5	3	3	3	3
	Criteria Subtotal		7.00	9.00	9.00	11.00
	Weighted Score (maximum of 20 points)		9.33	12.00	12.00	14.67
Technical Criteria	Regulatory Agency Acceptance	5	1	3	2	5
	Impact on Existing Infrastructure	5	1	3	5	5
	Maintenance Requirements	5	1	4	4	5
	Climate Change Resilience	5	1	3	5	5
	Criteria Subtotal		4.00	13.00	16.00	20.00
	Weighted Score (maximum of 20 points)		4.00	13.00	16.00	20.00
Constructability	Complexity of Treatment	5	5	4	3	2
	Criteria Subtotal		5.00	4.00	3.00	2.00
	Weighted Score (maximum of 20 points)		20.00	16.00	12.00	8.00
Financial Criteria	Capital Cost	5	5	4	2	2
	Maintenance Costs	5	2	4	5	5
	Criteria Subtotal		7.00	8.00	7.00	7.00
	Weighted Score (maximum of 20 points)		14.00	16.00	14.00	14.00
Public Safety	Potential Risks to the Public	5	2	3	4	4
	Criteria Subtotal		2.00	3.00	4.00	4.00
	Weighted Score (maximum of 20 points)		8.00	12.00	16.00	16.00
Total Score (Maximum of 140 points)			67.33	94.00	103.00	106.67

Highest Score = Preferred Alternative

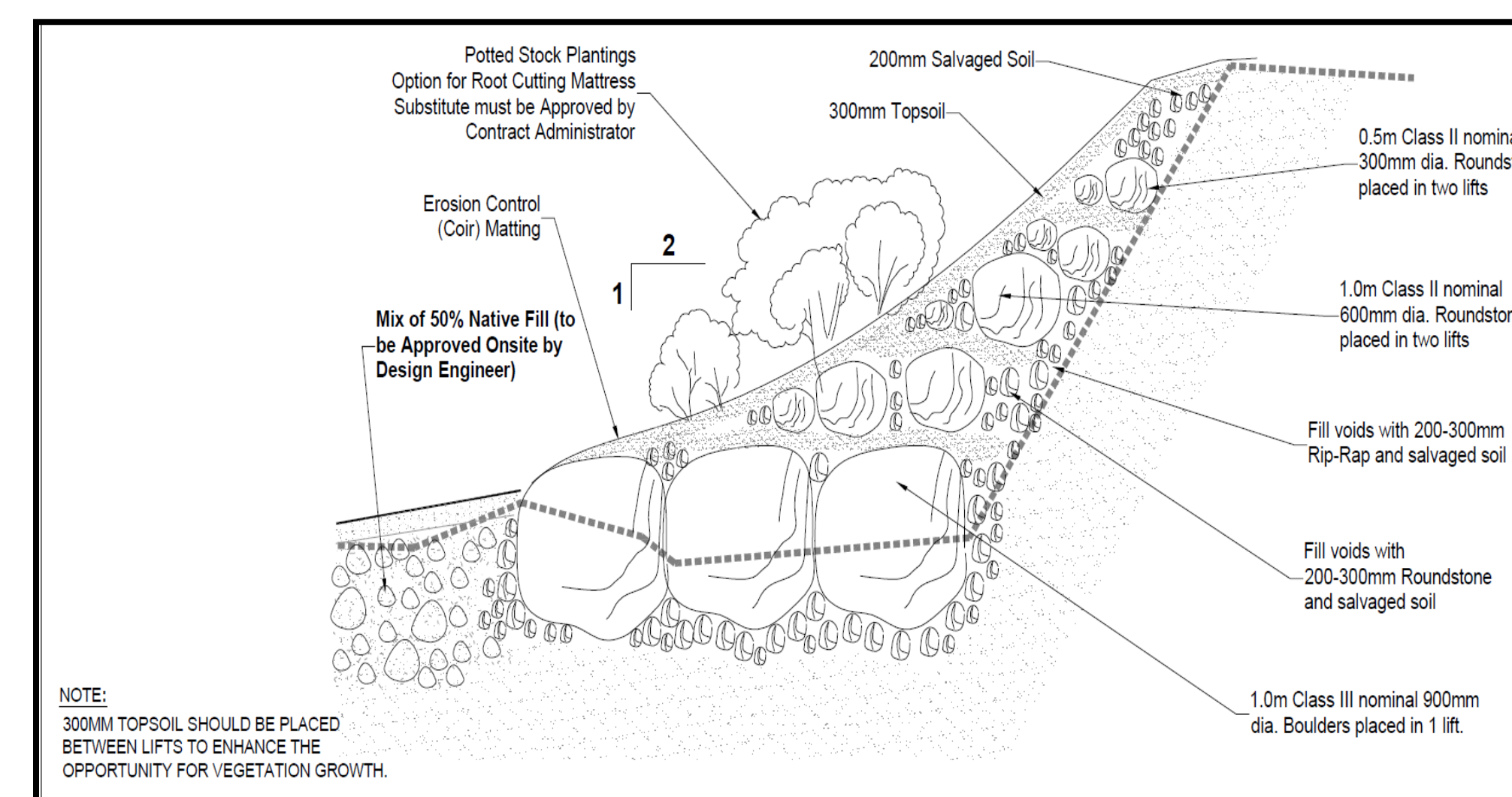
Evaluation Table For Reach #2

Selection of the Preliminary Preferred Alternative

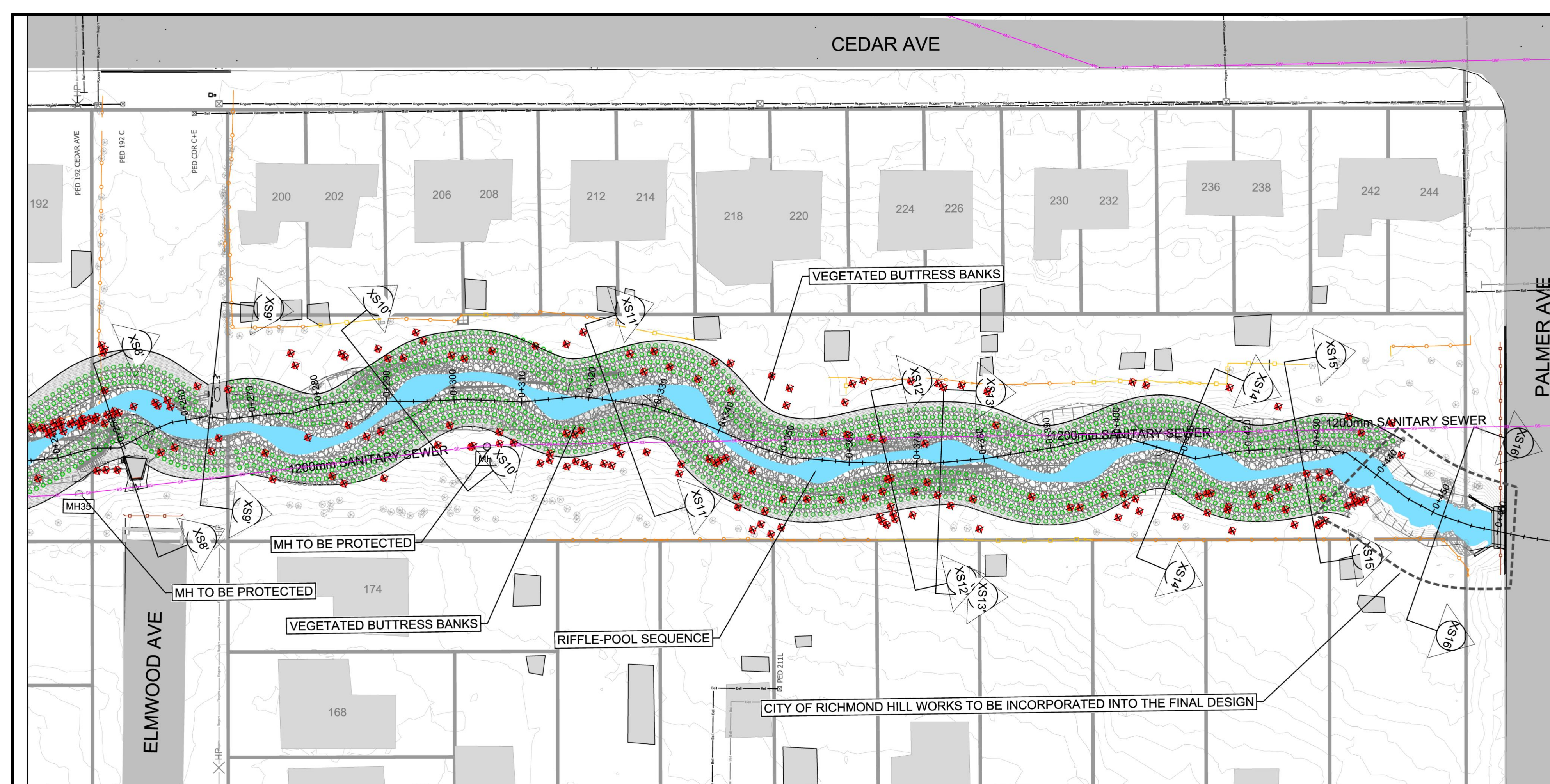
- Alternative #2 – Extended naturalized channel restoration works
- Comprehensive protection to private properties and sanitary sewer infrastructure
- Integrates smoothly into preliminary preferred alternative for Reach #1



Implementation of Extended Naturalized Channel Restoration Works in Roseland Creek



Typical Vegetated Buttress Detail



Alternative 2: Extended Naturalized Channel Restoration

Category	Evaluation Criteria	Alt. 0 - Do Nothing	Alt. 1 - Localized Channel Works	Alt. 2 - Extended Naturalized Channel Restoration	Alt. 3 - Extended Hardscaped Channel Restoration
York Region Infrastructure Risk	Risk Reduction	1	4	5	5
	Criteria Subtotal	1.00	4.00	5.00	5.00
	Weighted Score (maximum of 20 points)	4.00	16.00	20.00	20.00
Physical And Natural Environment	Flooding	3	3	4	4
	Erosion	1	2	4	5
	Terrestrial Habitat	2	3	4	2
	Aquatic Habitat	2	3	5	2
	Criteria Subtotal	8.00	11.00	17.00	13.00
	Weighted Score (maximum of 20 points)	8.00	11.00	17.00	13.00
Social and Cultural Environment	Aesthetic Value	1	2	4	3
	Benefit to Community	1	2	4	3
	Archaeological Features	3	3	3	3
	Criteria Subtotal	5.00	7.00	11.00	9.00
	Weighted Score (maximum of 20 points)	6.67	9.33	14.67	12.00
Technical Criteria	Regulatory Agency Acceptance	1	3	5	3
	Impact on Existing Infrastructure	1	3	5	5
	Maintenance Requirements	1	4	4	5
	Climate Change Resilience	1	3	5	5
	Criteria Subtotal	4.00	13.00	19.00	18.00
	Weighted Score (maximum of 20 points)	4.00	13.00	19.00	18.00
Constructability	Complexity of Treatment	5	4	3	2
	Criteria Subtotal	5.00	4.00	3.00	2.00
	Weighted Score (maximum of 20 points)	20.00	16.00	12.00	8.00
Financial Criteria	Capital Cost	5	4	3	2
	Maintenance Costs	2	4	5	5
	Criteria Subtotal	7.00	8.00	8.00	7.00
	Weighted Score (maximum of 20 points)	14.00	16.00	16.00	14.00
Public Safety	Potential Risks to the Public	2	3	5	4
	Criteria Subtotal	2.00	3.00	5.00	4.00
	Weighted Score (maximum of 20 points)	8.00	12.00	20.00	16.00
Total Score (Maximum of 140 points)		64.67	93.33	118.67	101.00

Highest Score = Preferred Alternative

NEXT STEPS

PUBLIC CONSULTATION – April 2024

- Please provide comments by May 10, 2024, through any of the following methods:
 - a) Hard copy at the April 22 in-person PIC
 - b) Mail to Phil Wolfraim, 101 Exchange Avenue, Vaughan, ON, L4K 5R6
 - c) Email to phil.wolfraim@trca.ca
 - d) Digital form on the project website at trca.ca/beverley-acres
- TRCA will compile and review PIC feedback, incorporate input, and update study results

Final MCEA Project File and MCEA Concept Evaluation Report – June 2024

- EA project file posted for 30 day review period.

Commencement of Construction - Winter 2026

- Construction timing to be refined by TRCA as the project progresses.

TO PROVIDE COMMENT, OR TO BE ADDED TO THE STUDY STAKEHOLDER LIST, PLEASE CONTACT:

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THANK YOU

**FOR PARTICIPATING IN THE BEVERLY ACRES
GERMAN MILLS CREEK EROSION CONTROL
MUNICIPAL CLASS ENVIRONMENTAL
ASSESSMENT**