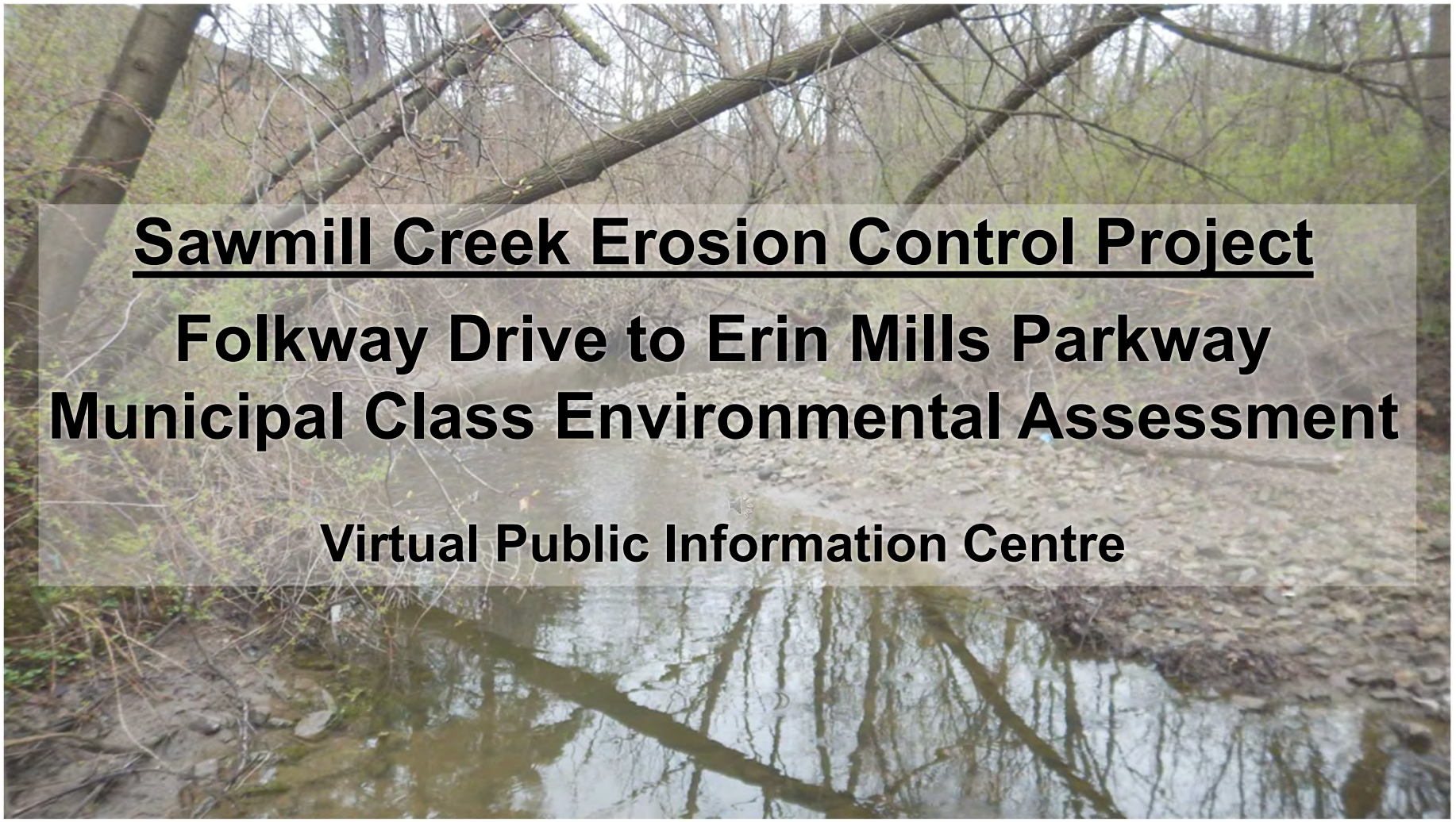


Sawmill Creek Erosion Control Project

Folkway Drive to Erin Mills Parkway
Municipal Class Environmental Assessment

Virtual Public Information Centre

MISSISSAUGA

ecosystem recovery inc.
PROFESSIONAL ENGINEERS

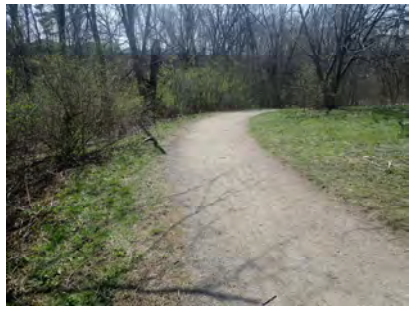
Sawmill Creek Erosion Control Project

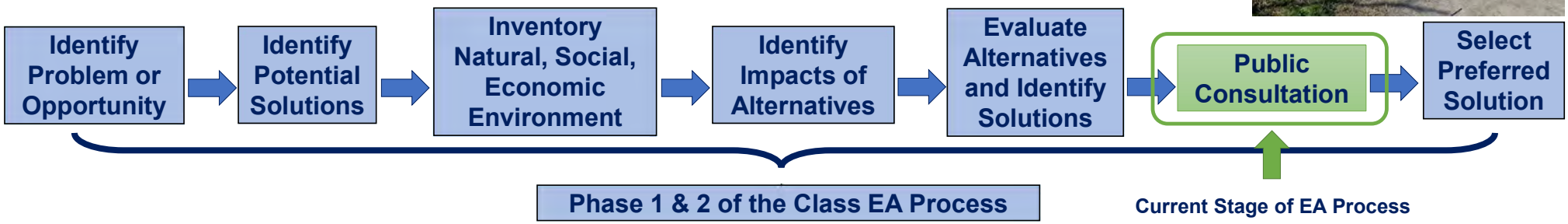
Thank you for your interest in the Environmental Assessment for the Sawmill Creek Erosion Control Project that is currently ongoing from Folkway Drive to Erin Mills Parkway in the City of Mississauga.

This presentation will discuss the scope and nature of issues that have been identified in this area, as well as the different solutions (alternatives) that are being considered. Lastly, you will learn about how you can voice your questions and concerns throughout the study process.

Study Introduction and Process

- The City of Mississauga identified this section of Sawmill Creek as a high priority area in need of rehabilitation based on the severity of creek erosion and risk to infrastructure.
- Key concerns include damaged gabion baskets, broken concrete, bank erosion impacting vegetation and the adjacent park trail, exposed and damaged pedestrian bridge footings, and deposition and vegetation growth within the creek.
- The city is initiating a **Municipal Class Environmental Assessment** (MCEA) under a Schedule B to investigate the causes, extent, and mitigating alternatives of the issues identified in this area.
- The Municipal Class Environmental Assessment process provides opportunities for the **public and stakeholders** to bring forward **questions, concerns, and feedback** throughout the study period.
- This process ensures that all **reasonable alternatives** are considered, and that a preferred alternative be selected for implementation such that it would have net positive or minimal negative impact on the surrounding environment.





Existing Conditions

STUDY AREA

- Sawmill Creek originates at Folkway Drive and flows southeast, joining with the Credit River at Mississauga Rd. and Dundas St W.
- The study area is located within the City of Mississauga's Sawmill Valley Trail area and includes the Sawmill Valley Trail network.

CHANNEL CONDITION

- Bank protection (gabions, concrete channel lining, large angular stone) occurred along ~39% of the total bank length (1,037 m).
- Bank protection conditions ranges from being in a deteriorated state (fallen gabions, cracked concrete) to being in fair condition.
- 19 weirs (gabion, concrete) situated across the channel; many are compromised.

HYDROLOGY

- The hydrology of Sawmill Creek reflects the urbanized condition of the watershed and the limited stormwater management measures that occur. All surface water upstream of Folkway Drive is conveyed through a stormwater system to Sawmill Creek.

GEOMORPHOLOGY

- Sawmill Creek is a meandering channel with a pool-riffle bed morphology sequence through the study area.
- Bed morphology is partially influenced by the erosion control and grade control measures (weirs) implemented on the channel banks and bed. As such, the stream type through the study area is 'semi-structural control and alluvial'.
- 6 reaches were defined based on the channel bed profile and erosion control characteristics.
- The channel cross-section is generally well connected to the floodplain, with the exception of the downstream third portion of the channel which has incised into the floodplain setting, creating high steep channel banks.
- Erosion and evidence of channel adjustment through channel widening, scour pool development and outflanking/undermining of erosion and grade control measures is abundant through the entire channel within the study area.





Existing Conditions

ARCHAEOLOGY

- A Stage 1 Archaeological Assessment was conducted by Timmins Martelle Heritage Consultants. The Stage 1 report indicated that, within proximity to the site, there were two previously identified archaeological sites, an area of early 19th-century settlement and early historical transportation routes.
- A Stage 2 survey has been recommended to be completed for the grassed and wooded areas (23% of study area).

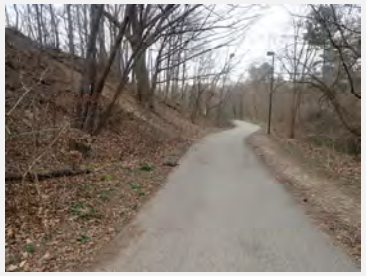
SOCIAL

- The City's Sawmill Valley Trail area extends throughout the study area.
- A multi-use trail runs along the extent of Sawmill Creek; the pedestrian pathway network includes two bridge crossings over Sawmill Creek through the study area. The trail and connecting pathways serve to link communities on both sides of the creek as well as to the parkette located midway through the study area

NATURAL ENVIRONMENT

- Five vegetation communities were delineated: mineral cultural meadow (CUM1-1), cultural woodland (CUW1), willow lowland deciduous forest (FOD7-3), red oak deciduous forest (FOD1-1), and sugar maple oak deciduous forest (FOD5-3), as well as a small cultural meadow inclusion along the paved pedestrian trails.
- 114 vegetation species were observed (both native and non-native species).
- 33 bird species were observed, all common in Ontario urban environments.
- Mammals observed include northern raccoon, white-tailed deer, eastern cottontail, grey squirrel, eastern chipmunk, and red squirrel.
- One reptile was observed (Dekay's brownsnake).
- 6 aquatic reaches were assessed; most had areas of erosion and failing bank protection measures but impacts of erosion were greatest at the downstream reaches. A fisheries assessment was not completed but one minnow was observed at the furthest upstream reach. Seasonal fish passage barriers were present in the form of failing weirs, logjams, and erosion areas.
- 2 species at risk observed: butternut (endangered) and monarch (special concern)

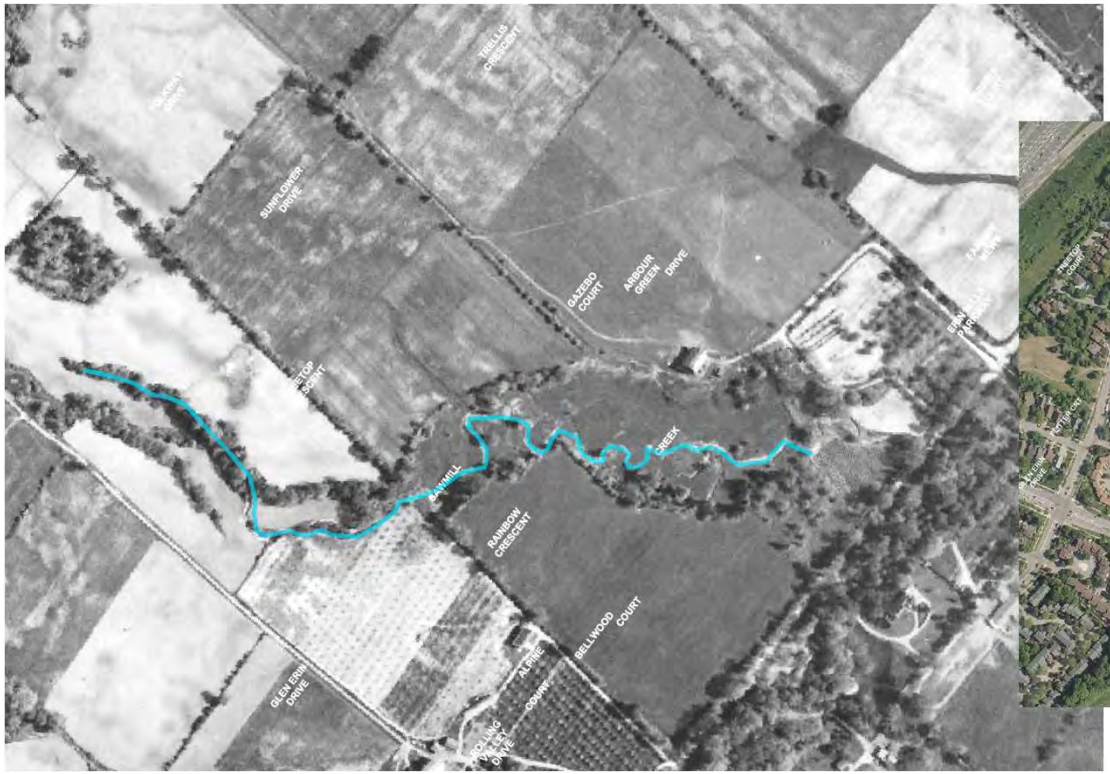


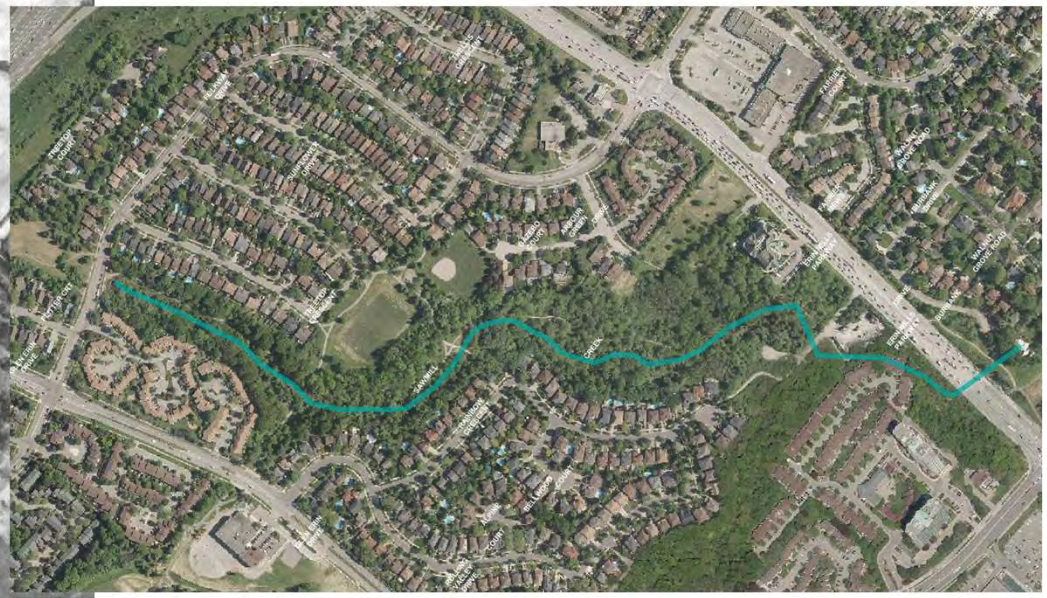

Historical Channel Conditions

OBSERVATIONS

- Extensive urbanization has occurred within the study area during the 1970s
- Sawmill Creek has been re-aligned through the study area as a result of a channelization project conducted between 1975 and 1977
- Vegetation communities reflect historical changes of study area



1954 Aerial Image
(National Air Photo Library)



2019 Aerial Image
(ESRI Online Services)

Systemic Issues and Concerns

ENGINEERED CHANNEL CONDITIONS

- 19 degraded / failing grade control weirs
- Failing / emptied gabion basket bank protection

CHANNEL BED AND BANK EROSION

- Channel has eroded into native underlying glacial till; difficult to maintain cover (i.e., substrate) once removed.

DEBRIS ACCUMULATION

- Large woody debris has accumulated within the channel, causing channel bank erosion, inhibiting fish passage, and promoting accumulation of urban debris.

INFRASTRUCTURE

- Sanitary sewer located beneath (~ 4 crossings) and in proximity to creek; associated manholes
- Pedestrian bridge crossings (2 formal; 1 low-lying). Fair to poor condition
- Erosion risk to multi-use trail where in proximity to channel

INVASIVE SPECIES

- Invasive and non-native species such as common buckthorn, winged spindle tree, and garlic mustard.

AQUATIC HABITAT

- Issues of fish passage due to large drops, log jams, and accumulation of debris from failed bank hardening structures.

Opportunities

OPPORTUNITIES

- Improve the native species composition through the removal of invasive and non-native species and replacement with native trees, shrubs, and herbaceous species along Sawmill Creek.
- Enhance morphological form and function of the watercourse by re-establishing natural channel conditions to re-establish dynamic stability.
- Removal of erosion and grade control along the channel, where feasible, to re-establish natural channel form and function
- Manage and/or remove large woody debris jams which are causing bank erosion, channel widening, and local backwatered conditions. The management or removal of debris within the channel would also improve fish passage.
- Re-connect the channel to the adjacent floodplain in downstream portion of the study area (Reach 2) to reduce ongoing bank erosion due to containment of high energy flows in the cross-section



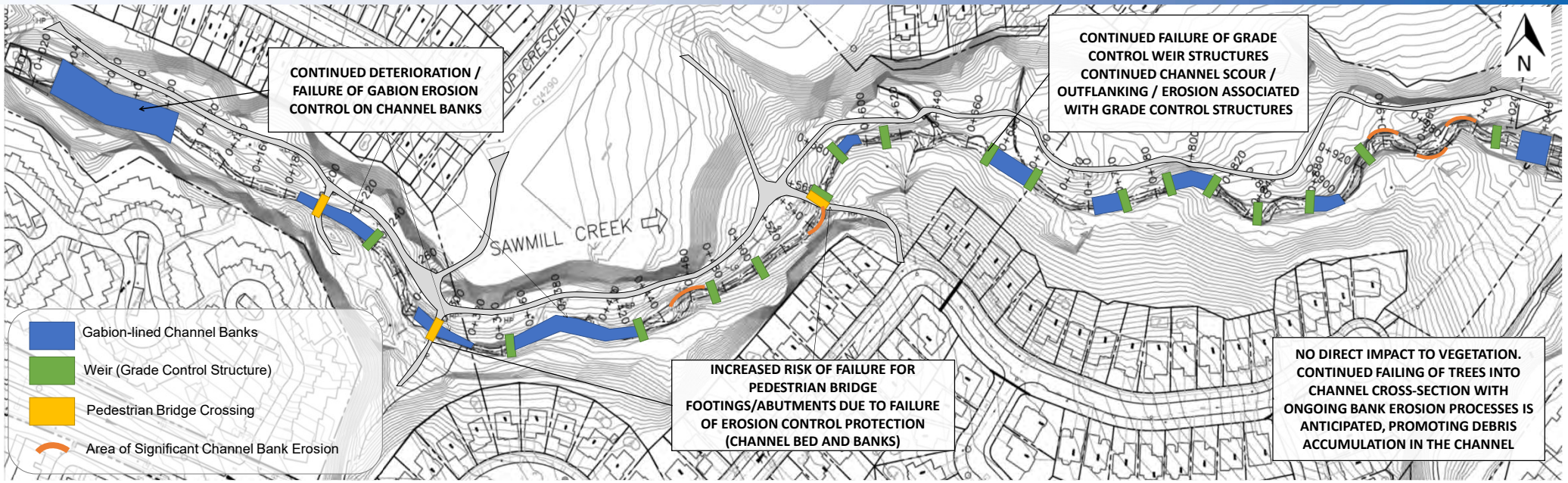

Constraints

CONSTRAINTS

- Subsurface infrastructure, including sanitary sewers and watermains, which occur adjacent to, below, or in proximity to Sawmill Creek, limit some alternatives and require protection.
- Multi-use pedestrian pathway located within the Sawmill Creek valley system limits channel design opportunities spatially (i.e., lateral extent) within the study area.
- Butternut tree species observed along Sawmill Creek should be preserved where feasible in the selection of the preferred alternative.
- Suitable bat habitat (cavities and tree snags) was observed within the study area. Tree removals should be selective in order to avoid potential impacts to bat habitat.
- Four locally rare vegetation species were recorded within the study area and should be preserved or relocated where feasible.




Alternative 1 – Do Nothing

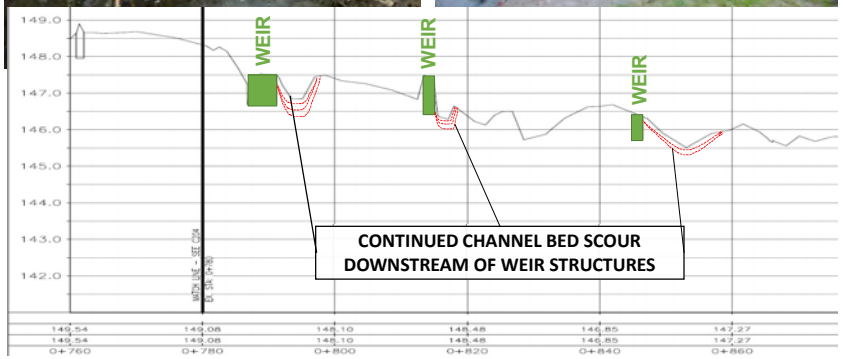


CONTINUED DETERIORATION / FAILURE OF GABION EROSION CONTROL ON CHANNEL BANKS

CONTINUED FAILURE OF EROSION CONTROL ON CHANNEL BANKS & AT PEDESTRIAN BRIDGE CROSSINGS

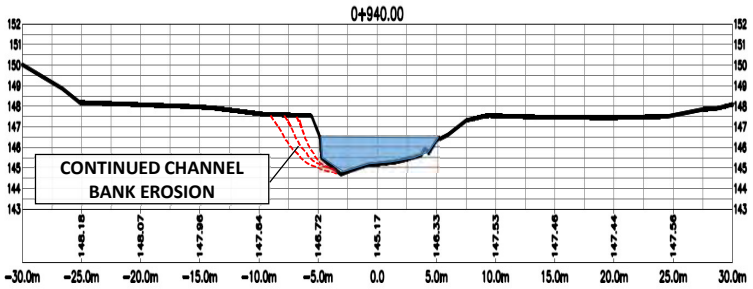
In the **Do Nothing alternative**, no action is taken to address the identified issues. This alternative is always considered in an Environmental Assessment (EA) in order to assess the impact of taking no. The Do Nothing Alternative would result in the following:

- Continuation of ongoing channel processes that are leading to the deterioration and failure of erosion control and grade control measures.
- Continued bank erosion and downcutting (scour) of the channel bed; exposure of underlying glacial till material
- Continued risk to existing infrastructure, due to ongoing processes, including bridges, sanitary sewer crossings and manholes, and pedestrian pathway, leading to eventual failure.



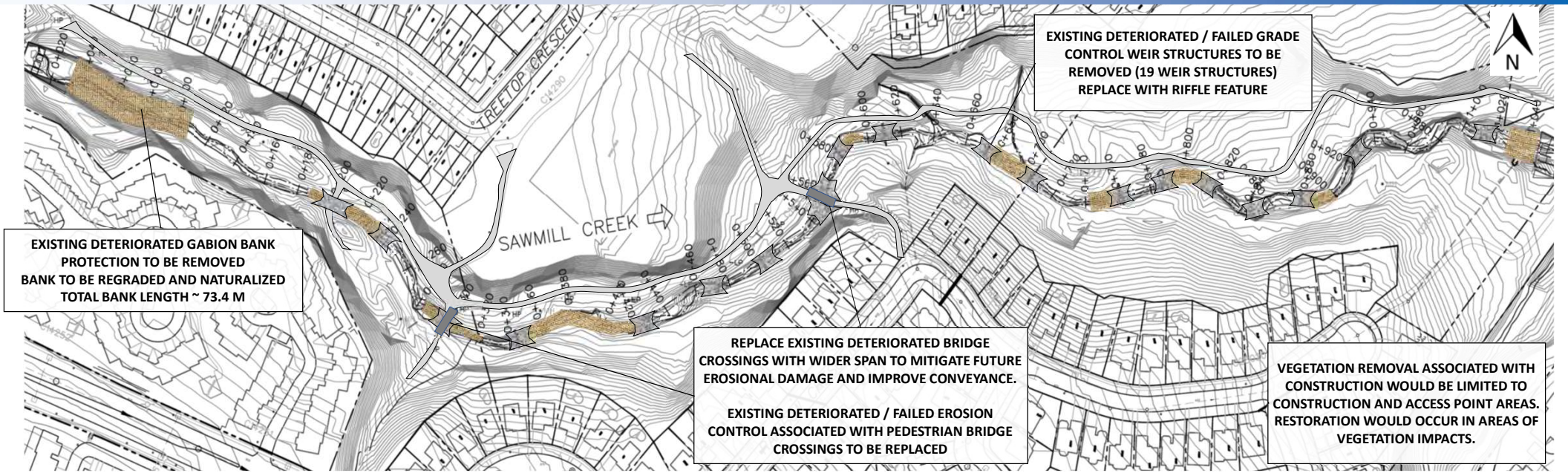
SAWMILL CREEK CHANNEL PROFILE – REACH 3

Example of failed gabion basket erosion control protection within the Study Area.



TYPICAL INCISED CHANNEL CROSS-SECTION

Alternative 2 – Spot Repairs



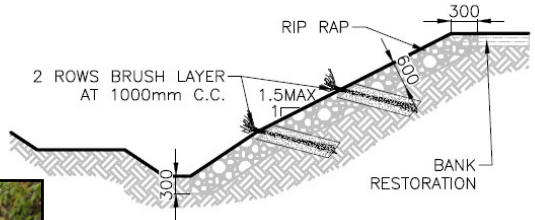
REMOVAL OF GABION EROSION CONTROL ON CHANNEL BANKS.

REPLACE WITH BIOENGINEERING, WHERE FEASIBLE. AREAS WITH POTENTIAL RISK (PEDESTRIAN PATHWAY, INFRASTRUCTURE, UTILITIES, ETC.) MAY REQUIRE 'HARD' EROSION CONTROL MEASURES (ARMOURSTONE WALL).

Example of bioengineering channel bank erosion control protection

VEGETATED REVETMENT NOTES:

1. ROUNDSTONE TO BE PLACED IN LIFTS OF 300mm.
2. BRUSH LAYER TO BE PLACE BETWEEN LIFT AT 500mm C.C.

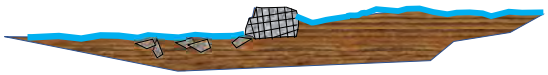


DETAIL: VEGETATED ROCK REVETMENT 1:50

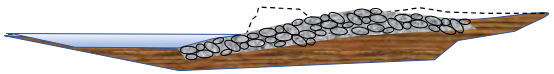
Example of bioengineering channel bank erosion control protection

TYPICAL RIFFLE AND EROSION CONTROL PROTECTION ASSOCIATED WITH FORMAL PEDESTRIAN BRIDGE CROSSINGS

EXISTING WEIR GRADE CONTROL STRUCTURES TO BE REMOVED AND REPLACED WITH RIFFLE FEATURES



EXISTING WEIR GRADE CONTROL

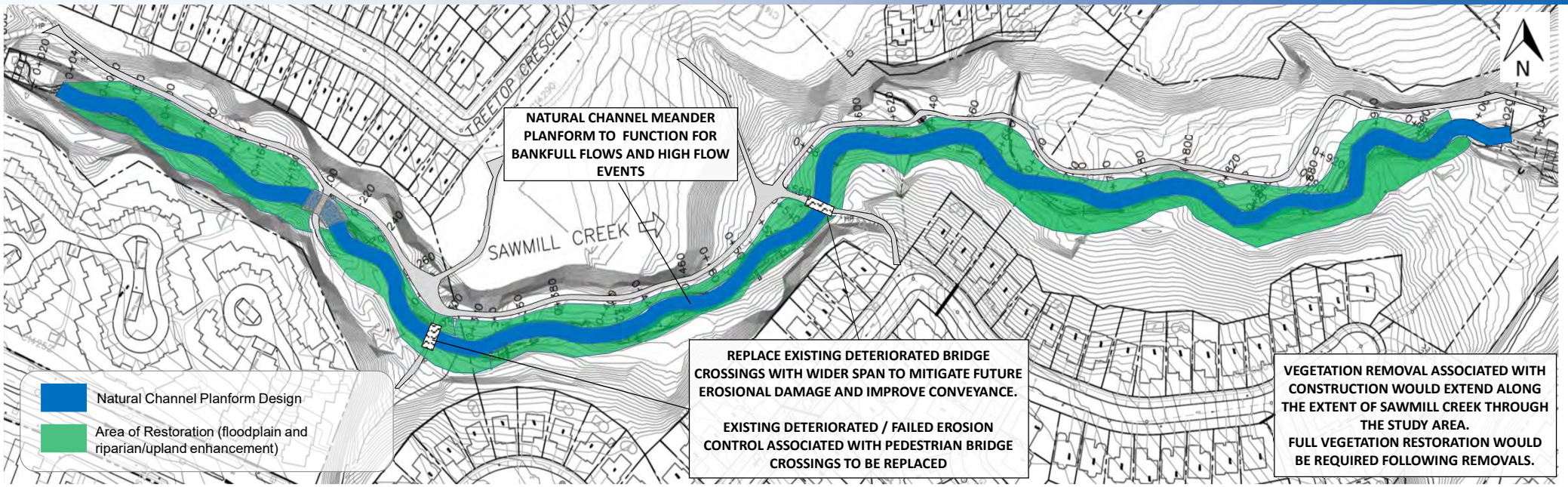


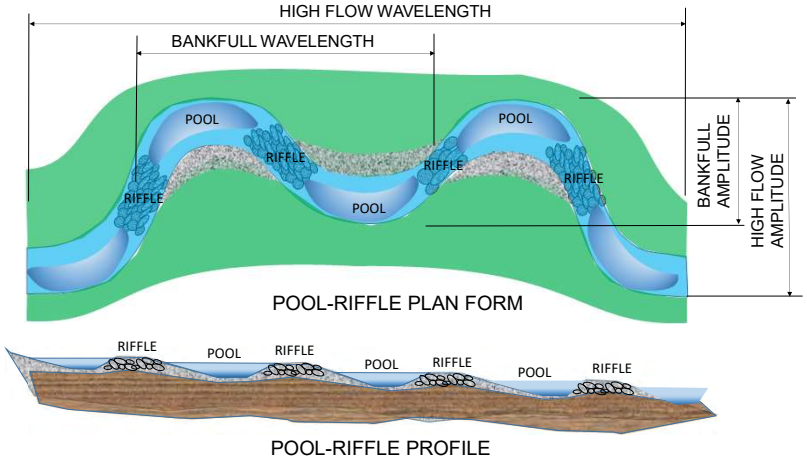
RIFFLE FEATURE

Local channel repairs/enhancements would aim to repair or replace (where necessary) failing erosion protection and grade controls, and remove accumulations of debris from the channel cross-section. This alternative maintains, or nearly maintains, the existing footprint of the channel. Features of the Spot Repair Alternative would include the following:

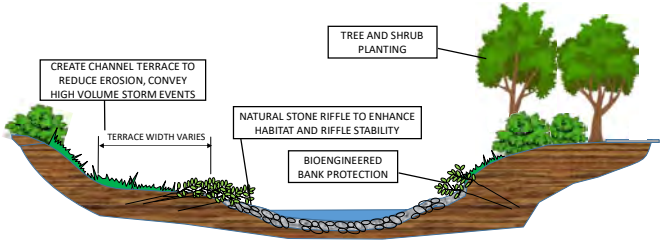
- Replacement of the two deteriorated existing bridge crossings. Areas of erosion / undermining of bridge crossings would be addressed
- Removal of the failed or outflanked gabion grade control structures (weirs) and replacement with natural stone riffles
- Removal of dead or unhealthy trees and channel debris
- Placement of natural stone or woody material to provide erosion control in vulnerable locations (pathways, slopes, buried infrastructure) where they are currently exposed

Alternative 3 – Full Restoration





PROPOSED NATURAL CHANNEL DESIGN



PROPOSED TYPICAL CHANNEL CROSS SECTION


Example of constructed meandering channel planform.

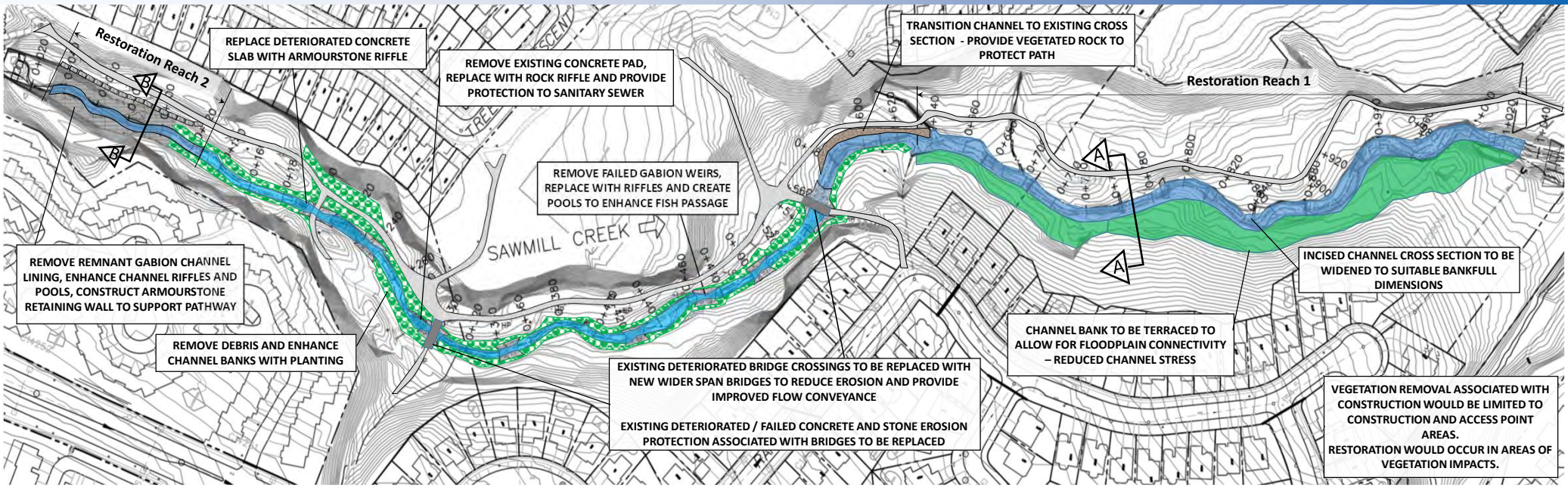

Example of constructed riffle-pool sequence bed morphology.

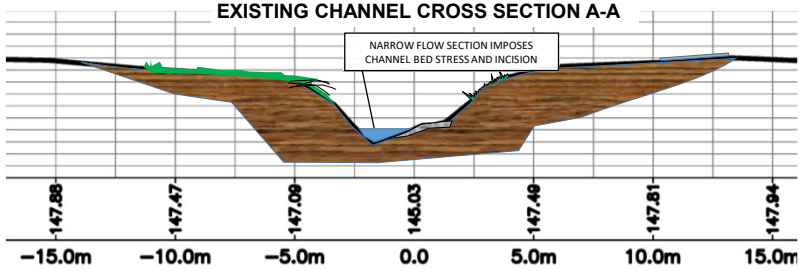
NATURAL CHANNEL EXAMPLES

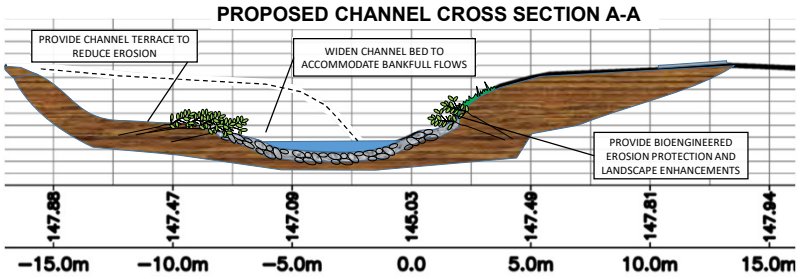
Full Channel Restoration would be based upon the principles of natural channel design with the objective that the channel will function dynamically to manage the erosion and sediment transport processes as well as the respective flow regime which result from the watershed hydrology. The full realignment would focus on maintaining and enhancing the existing geometry of the channel which has developed through the years while removing the failed erosion control systems and mitigating the risk to built and natural infrastructure. Features of a Full Restoration Alternative would include the following:

- Channel planform and bed profile enhancements using natural channel design approaches
- Removal of failed erosion control systems, gabion lining, gabion weirs
- Repair or replacement of existing pedestrian bridges
- Protection of at risk buried infrastructure (storm and sanitary services)
- Removal of dead or unhealthy vegetation, invasive species and debris
- Possible removal of vegetation where it would interfere with channel /valley geometry
- Installation of fish habitat structures, use of existing woody material within the channel
- Facilitated fish passage with pool and riffle channel profile geometry
- Riparian and upland planting restoration

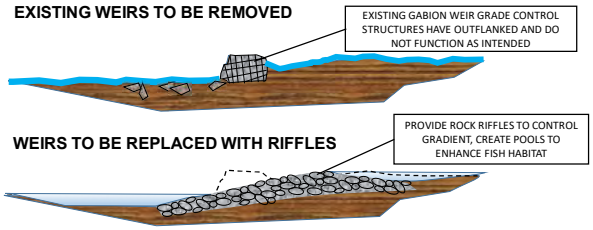
Alternative 4 – Reach Based Restoration

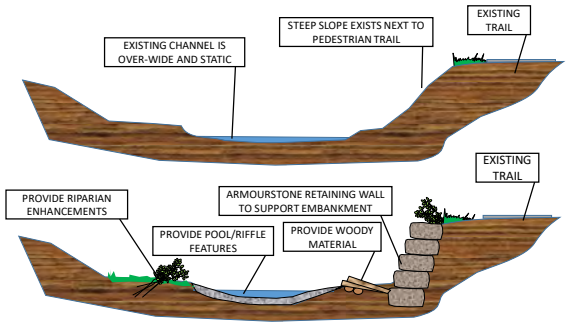






REACH 1 CROSS SECTION, EXISTING VS PROPOSED





REACH 2 CROSS SECTION, EXISTING VS PROPOSED

Reach Based Restoration focuses on selected reaches within the study area that contain similar physical features whereby a common mitigation strategy can be applied. Thus, any features of the study area that do not require mitigation, are not impacted. The features of this alternative would include the following:

- Channel realignment of approximately 400 metres at the downstream area and floodplain terracing to provide a wider flow path above the bankfull stage
- Replacement of the two deteriorated existing bridge crossings
- Removal of the failed or outflanked gabion grade control structures (weirs) and replacement with natural stone riffles and pools
- Removal of dead or unhealthy trees and channel debris
- Planting of native species trees and shrubs
- Reconfiguration of portions of channel using natural channel design
- Placement of natural stone or woody material to provide erosion control in vulnerable locations (pathways, slopes, buried infrastructure)

Example of existing steep banks where floodplain terracing would be applied

Example of existing gabion weir grade control to be replaced

EXISTING CHANNEL FEATURES

Evaluation Criteria

Category	Criteria	Description
Technical / Engineering	Flooding	Effectiveness of the alternative to manage or reduce flooding (i.e. effect on regional water level) or not cause negative impacts to flood hazards
	Channel Processes / Erosion	Effectiveness of the alternative to promote dynamic stability of channel processes and mitigate erosional impacts
	Protection of Infrastructure	Effectiveness of the alternative in mitigating risk to adjacent, or underlying, infrastructure (e.g., sanitary sewer)
	Constructability	Potential to construct the project using conventional, accepted construction and engineering practices
	Approvability	Potential for regulatory agencies to grant approval for implementation
Environmental	Terrestrial Impacts	Potential for impact to connectivity and terrestrial/wildlife (amphibian, mammal etc.) habitat due to implementation of the alternative
	Terrestrial Enhancement Potential	Potential for enhancement of the terrestrial environment (vegetation, habitat) due to implementation of the alternative
	Aquatic Habitat Enhancement	Effectiveness of the alternative to enhance fisheries habitat resources; fish diversity, food source, and fish passage
	Rare Plant Species and SAR Impacts/Enhancement	Potential for impact and/or enhancement to locally rare and SAR species
Social	Archaeology Impacts	Measure of the impact to potential archaeological areas in the study area.
	Impact to Property and Utility	Measure of the impact to adjacent private property (i.e., loss of property, access to property, aesthetic, basement flooding)
	Impact to Public Access	Measure of impact to public access (e.g., trails, recreation - picnic, fish, boat)
	Impact to Public Safety	Measure of the impact to public safety in the surrounding area resulting from the alternative
Economic	Construction Costs	Relative measure of the initial costs to install/construct the proposed works, including environmental mitigation, sediment management, well mitigation etc.)
	Maintenance / Future Costs	Relative measure of the ongoing maintenance costs following implementation (sedimentation)

Alternative Evaluation

Alternative		Benefits	Challenges
	**Do Nothing**	• No near future construction disturbance • No immediate costs	• Channel will continue to incise in some locations; further channel bank erosion may compromise channel stability • Bridges will continue to deteriorate • Invasive vegetation will continue
	**Spot Repairs**	• Makes repairs to portions of the project that have failed • Would replace the deteriorated bridges • Would have limited site disturbance • Costs would be comparatively low	• Does not address areas of channel incision • Does not address erosion potential • May require frequent future maintenance
	**Full Restoration**	• Addresses erosion concerns through natural channel design • Would replace bridges • Would remove invasive vegetation and restore with native vegetation	• Would require site-wide disturbance to gain construction access • Cost would be comparatively high
	**Reach Based Restoration**	• Provides focused improvements to areas of incision and to channel erosion • Would have moderate site disturbance • Would replace some invasive vegetation with native vegetation • Would replace bridges	• Would cause moderate site disturbance • Cost would be comparatively moderate

Next Steps

- The study team will compile and review feedback from virtual Public Information Centre
- The team will select preferred solution(s) and implementation plan
- The study report will be finalized for agency and public review (30-day comment period)
- The City will undertake detailed design of preferred alternative
- Construction anticipated for 2022

Consultation

Please complete a comment sheet and return it by April 22nd 2021 to the project representatives listed below.
Should you have any questions or concerns at any time during the project, please contact either of the following study representatives:

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