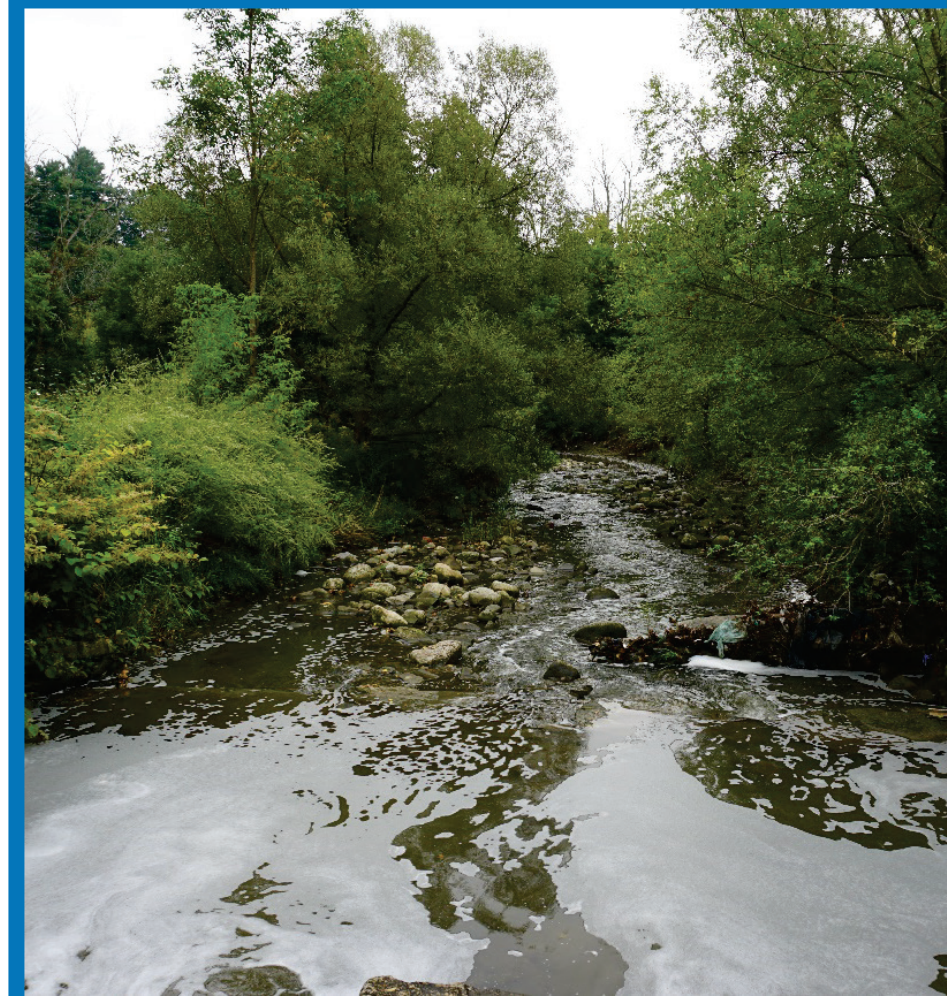


Wolfedale Creek Erosion Control Project from Burnhamthorpe Road West to the Credit River

**Municipal Class Environmental
Assessment**

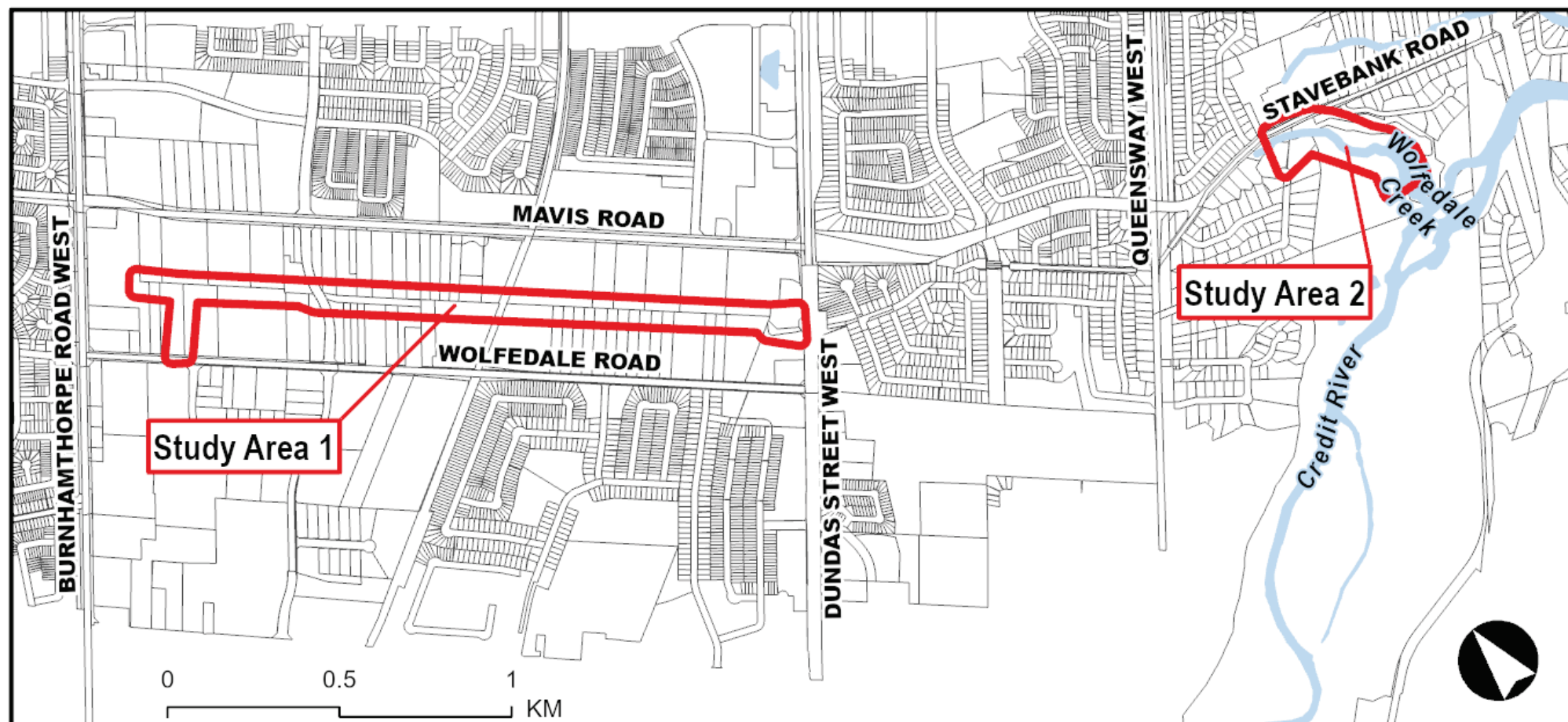
Online Public Information Centre

Date: June 18, 2024



What is the Purpose of the Online Public Information Centre?

- Introduce you to the Wolfedale Creek Erosion Control Project study, including key findings of supporting studies completed to date
- Present the alternatives considered, including the preliminary preferred erosion control and restoration strategy
- Share how potential impacts will be addressed
- Identify next steps and how to provide feedback



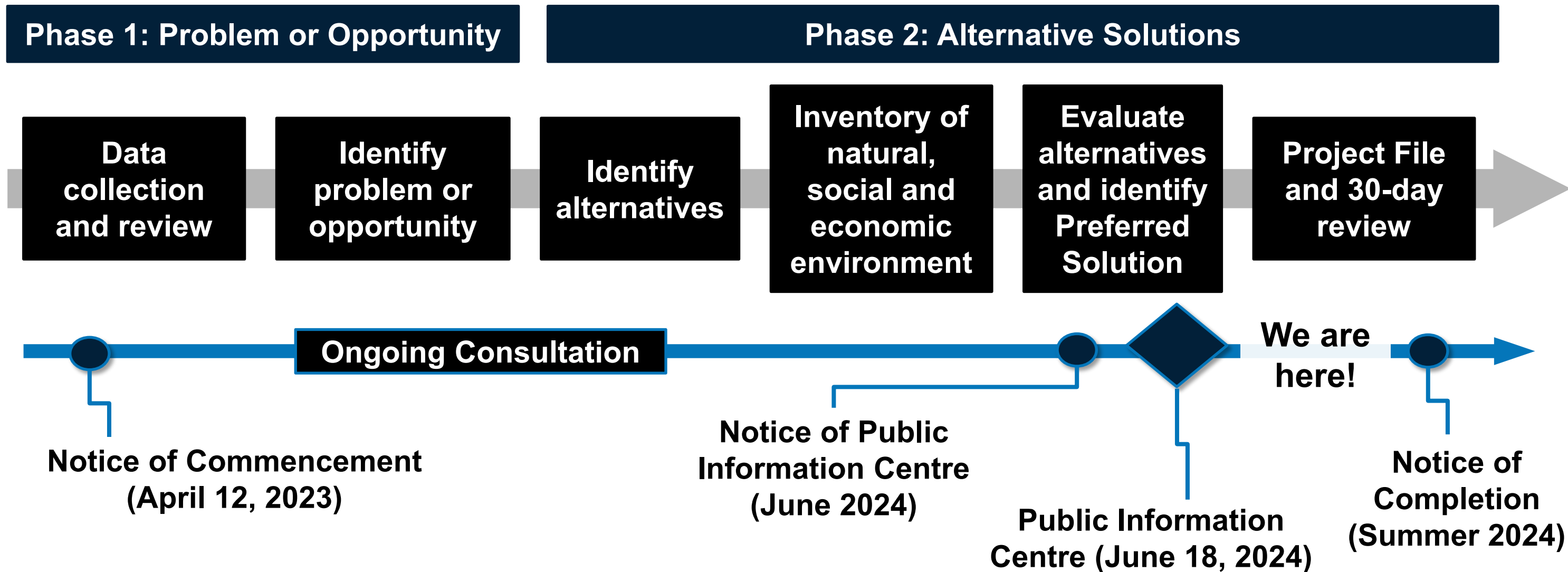
Why this Study?

- The City recognizes that sections of Wolfedale Creek need rehabilitation to remediate existing erosion issues and improve safety
- This current study aims to:
 - mitigate the existing erosion problems
 - ensure stability of the creek using natural design techniques, where feasible
 - protect or enhance the existing natural environment within the area



Municipal Class Environmental Assessment Process

- This study is following the Schedule B planning process, which includes Phases 1 and 2
- At the end of Phase 2 a Project File documenting the planning process, including the consultation component will be posted for 30-day public review



Project Overview – Study Area 1

- Study Area 1 includes Wolfedale Creek from Burnhamthorpe Road West to Dundas Street West
- The land is heavily urbanized, with many industrial and commercial establishments
- Wolfedale Creek flows to Study Area 1 from a storm sewer outlet from Burnhamthorpe Road West to Dundas Street West. From there it enters another storm sewer pipe, and the flows are conveyed underground for approximately 1.5 km before outletting just West of Stavebank Road into the Study Area 2, which outlets to the Credit River



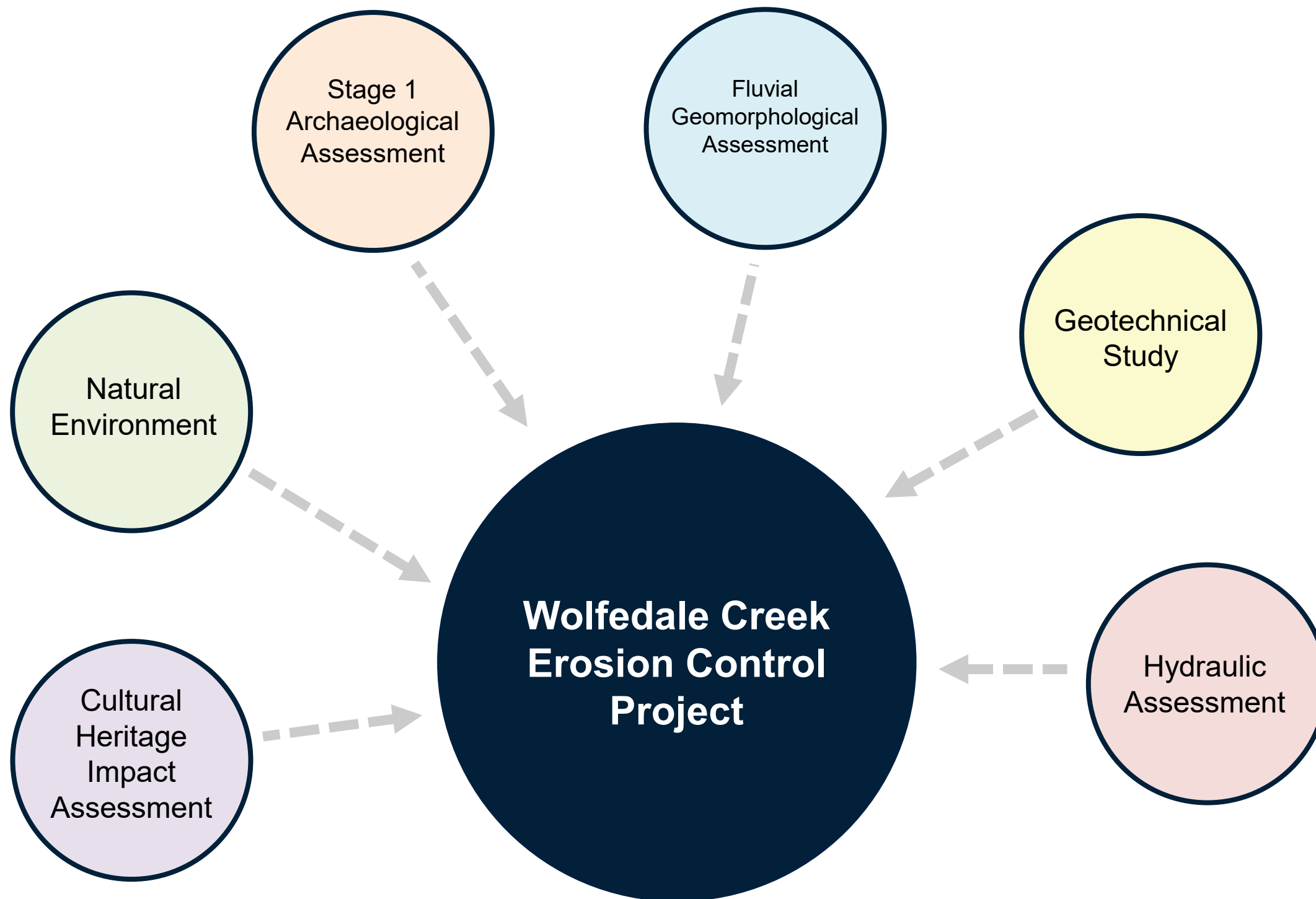
Project Overview – Study Area 2

- Study Area 2 includes the tributary outlet to the Credit River, south of Queensway West and west of Stavebank Road
- The watercourse is surrounded by residential development to the west and east and by forested lands/ a large golf course in the south.
- The watercourse discharges into the Credit River



Supporting Studies

- The following supporting studies are being undertaken to inform the Wolfedale Creek Erosion Control Project during this Environmental Assessment study



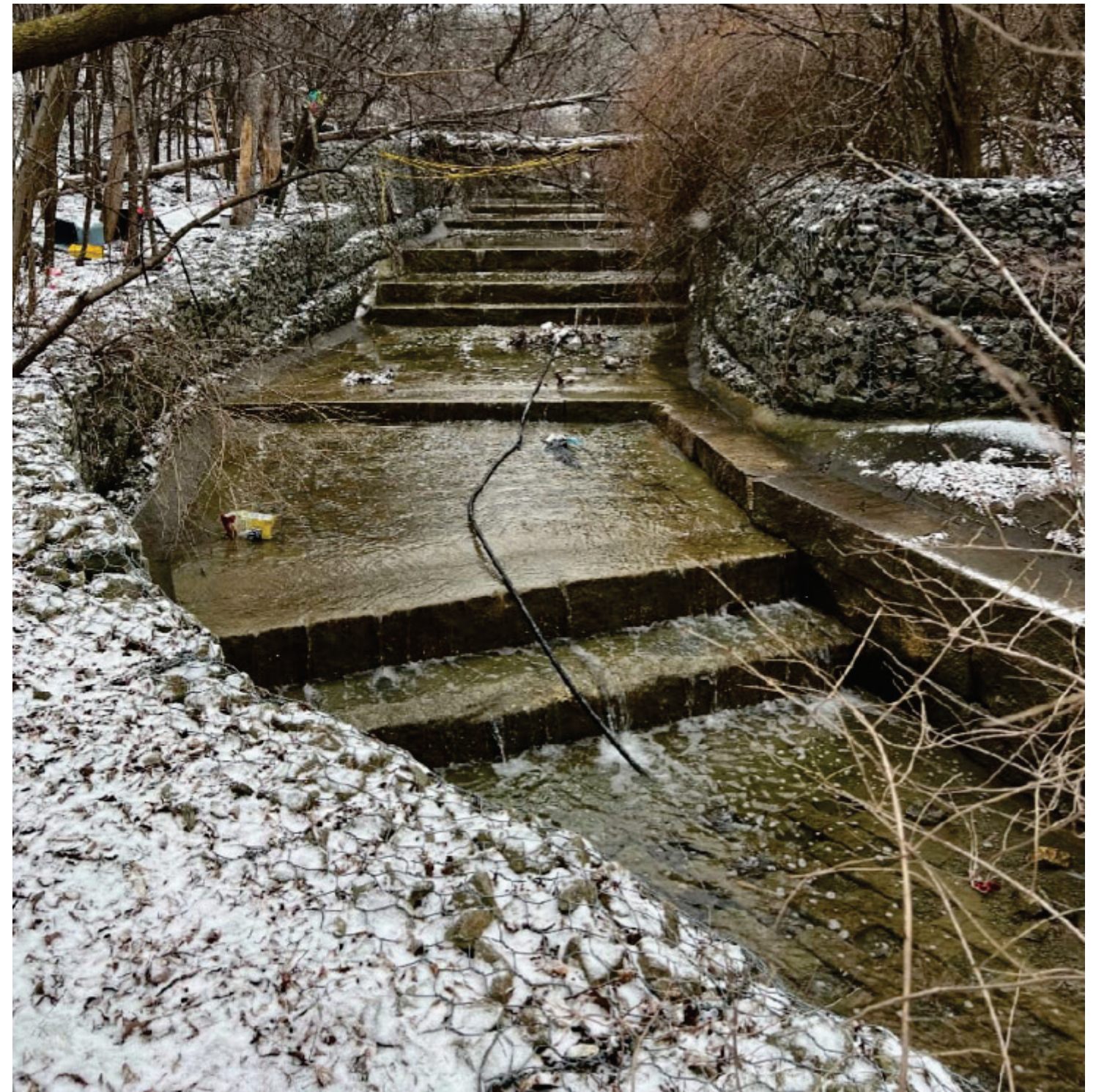
Fluvial Geomorphic Assessment

- A Fluvial Geomorphic Assessment has been completed and below summarizes the key findings:
 - Portions of the watercourse in both study areas have been altered by human activity, which have effectively reduced the watercourse length, increased the channel gradient, and introduced obstructions to fish migration
 - Exposed bedrock along the channel banks and bed is a major constraint for the study area, impacting the watercourse shape, pattern, and susceptibility to erosion. Bedrock may also limit the type of bank protection treatment options that can be applied
 - Erosion of the creek banks was identified throughout most of the study area. Undercutting of the creek banks was observed in most areas, in addition to evidence of channel bed downcutting, and multiple woody debris jams
 - There are several bank protection structures within the creek that have been applied historically to maintain the channelized shape of the watercourse. Many of the structures are now failing
 - Slope stability concerns were identified in multiple spots in the Study Area
 - Study Area 1 is heavily urbanized, which contributes to increased stormwater runoff
 - The steep channel bed slope upstream of Study Area 2 can increase flow velocities and erosion in the watercourse



Hydraulics

- The study area is very confined with often steep and occasionally vertical side slopes. During large storm events water levels along the creek increase quickly
- In locations where the creek is confined to a concrete lined channel with vertical side walls, flow velocities will become quite high in large storms due to the smooth surfaces
- High velocities may create erosion concerns. Hydraulic modelling for the existing conditions has been updated to reflect current conditions and will be used for comparison of the detailed design of the preferred solution
- The cross-sections of the proposed design will be reflected in the proposed conditions hydraulic model



Geotechnical/Slope Stability

- Geotechnical investigations have been completed. Six (6) boreholes were drilled. A monitoring well was also installed
- Generally, the subsurface profile consists of topsoil overlying varying thickness of fill. The native soils underlying the fill consist of a brown sand and gravel overlying sandy silt.
- It is anticipated that seasonal fluctuations in groundwater levels will occur. It is recommended that additional groundwater level measurements and monitoring well development be completed to aid the detailed design process
- Based on the analysis results, it is noted that some of the existing conditions along the channel do not meet the recommended Factor of Safety (FS) (FS >1.3 and FS > 1.5) based on the Canadian Foundation Engineering Manual for the short-term and long-term condition, respectively
- Design options:
 - Improve Slope Drainage, as elevated groundwater and pore pressures can result in loss of shear strength of the soil.
 - Improve surface drainage
 - Installing sub-horizontal drains within slope face at critical locations
 - Re-grading & Revegetation of Slopes
 - Increase weight distribution at the toe of slope to provide extra resistance against sliding.
 - Soil Nails or Anchors in areas with limited access or tight property constraints



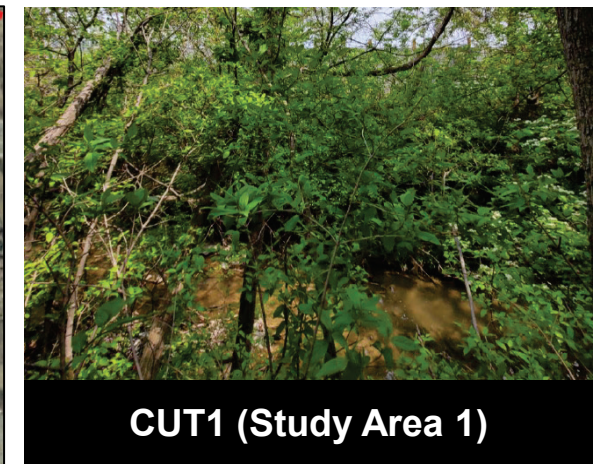
Natural Environment

Natural Heritage Features

- Study Area 1: none identified
- Study Area 2: contained valleylands, Credit River Coastal Marsh Provincially Significant Wetland complex, the Credit River Marshes Regional ANSI and Stavebank Oak Woods Environmentally Significant Area

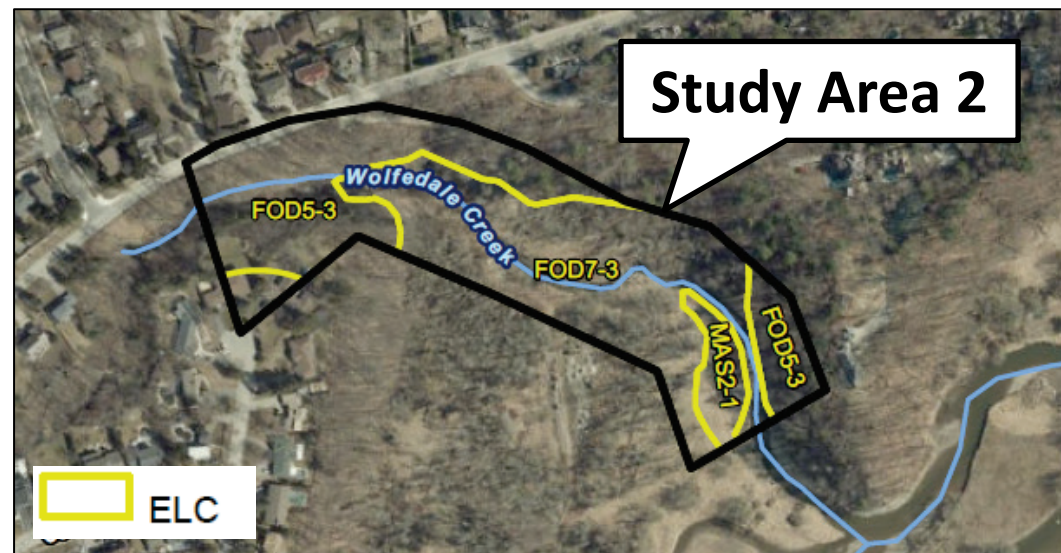
Ecological Land Classification

- Study Area 1: all vegetation communities were disturbed and largely limited to narrow vegetation strips along Wolfedale Creek surrounded by heavily developed commercial and industrial areas
- Study Area 2: consisted of more naturalized communities that were a part of the Credit River Marshes Wetland PSW Complex and ANSI, which were surrounded by residential development and the Mississauga Golf and Country Club



ELC Code/Description

- CUT1:** Mineral Cultural Thicket Ecosite
- FOD7-2:** Fresh-Moist Ash Lowland Deciduous Forest
- CUW1:** Mineral Cultural Woodland Ecosite
- FOD7-3:** Fresh-Moist Willow Lowland Deciduous Forest
- MAS2-1:** Cattail Mineral Shallow Marsh
- FOD5-3:** Dry-Fresh Sugar Maple Deciduous Forest



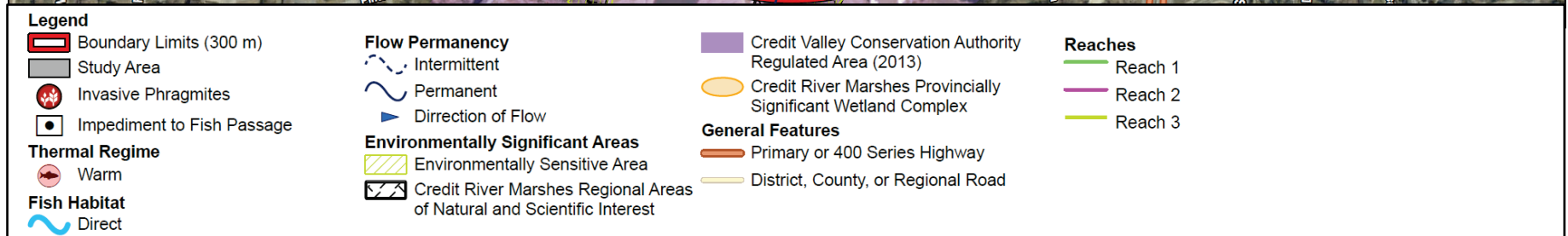
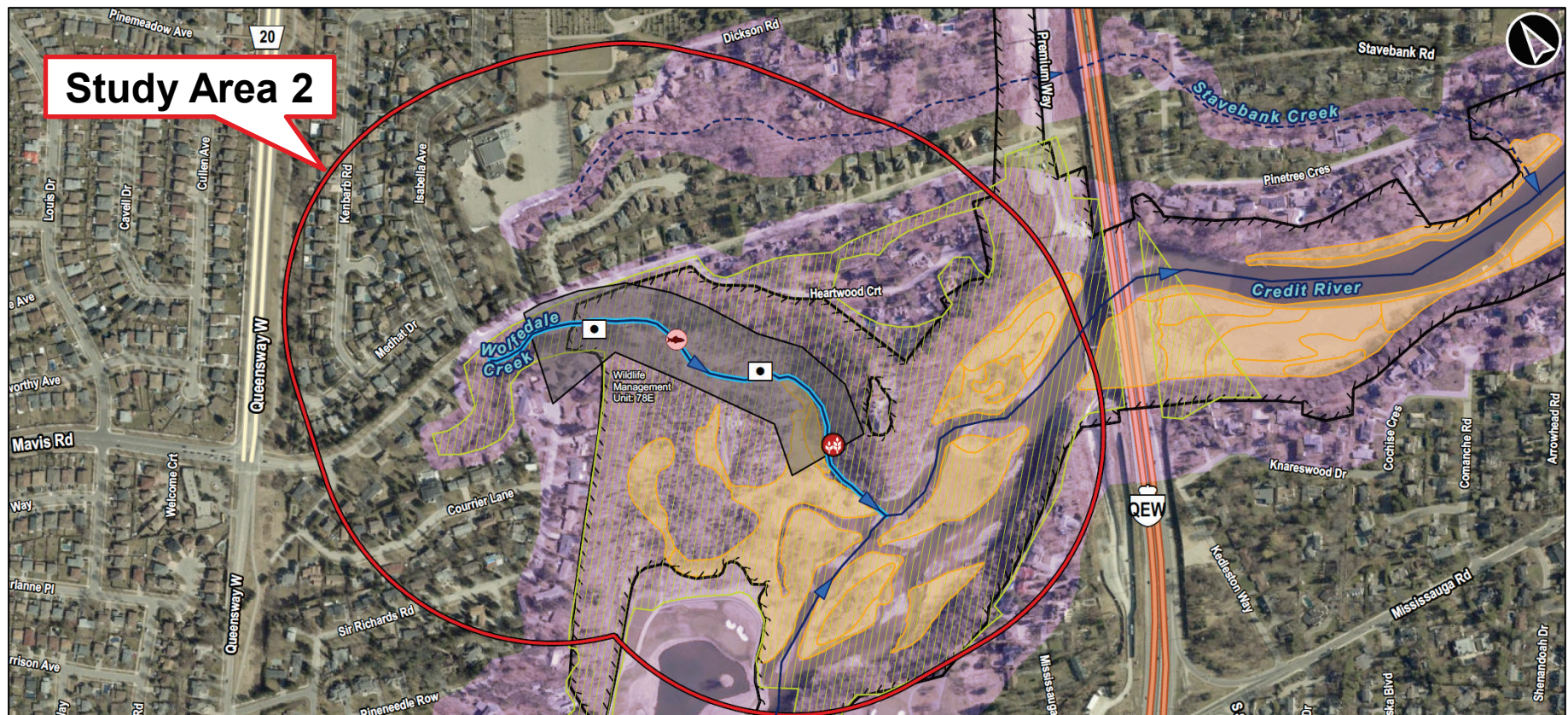
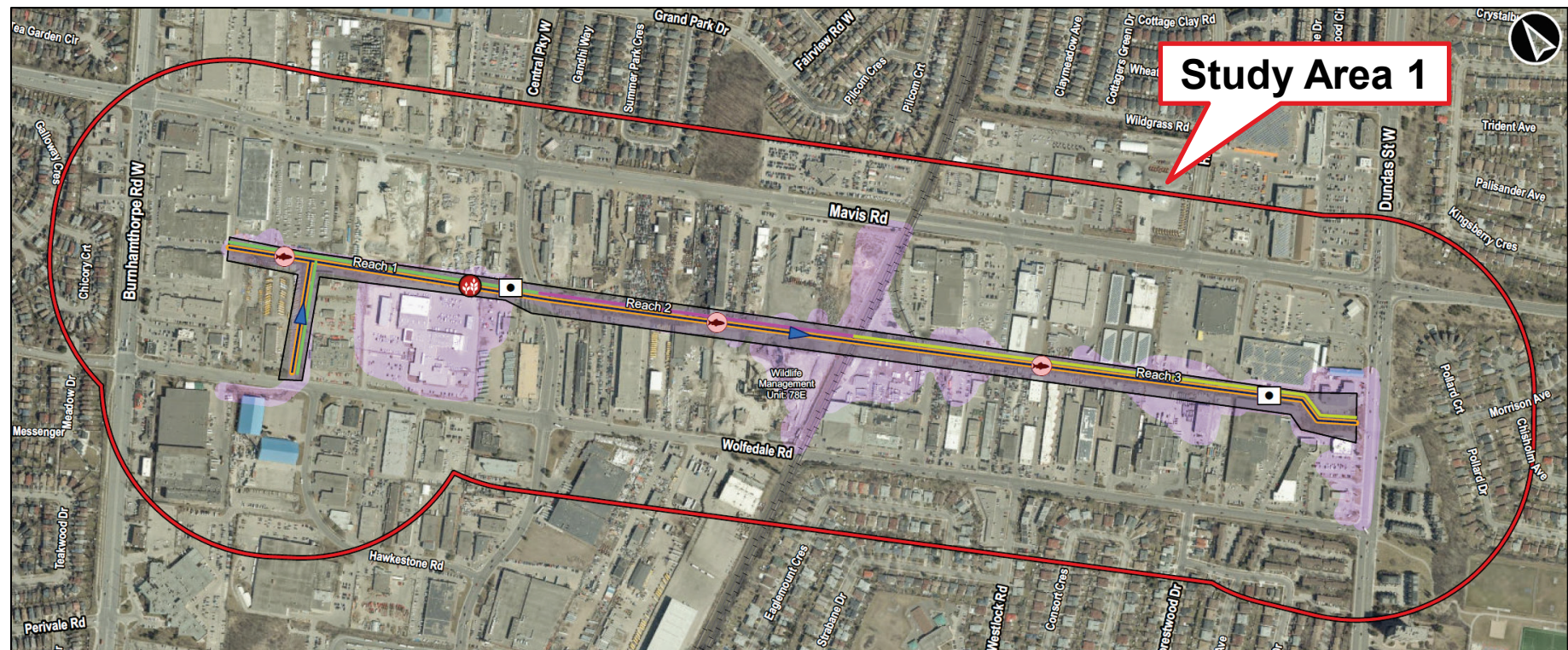
Natural Environment

Fish and Fish Habitat

- A detailed assessment of aquatic habitat in Wolfedale Creek was completed
- Study Areas 1 and 2 have been identified as direct fish habitat for a community that consists of warmwater and a few coolwater species
- American Eel has been determined to have a high potential to occur within Study Area 2
- Impediments to fish passage were observed along the creek

Species at Risk (SAR)

- The SAR Habitat Assessment identified eight SAR species with the potential to occur within the Study Areas:
 - Chimney Swift, Red-headed Woodpecker, Eastern small-footed myotis, Little Brown Myotis, Northern Myotis, Tricolored bat, Black Ash and Butternut
- Species-specific surveys targeting SAR presence/absence may be required during detailed design



Natural Environment

Significant Wildlife Habitat – Study Area 1

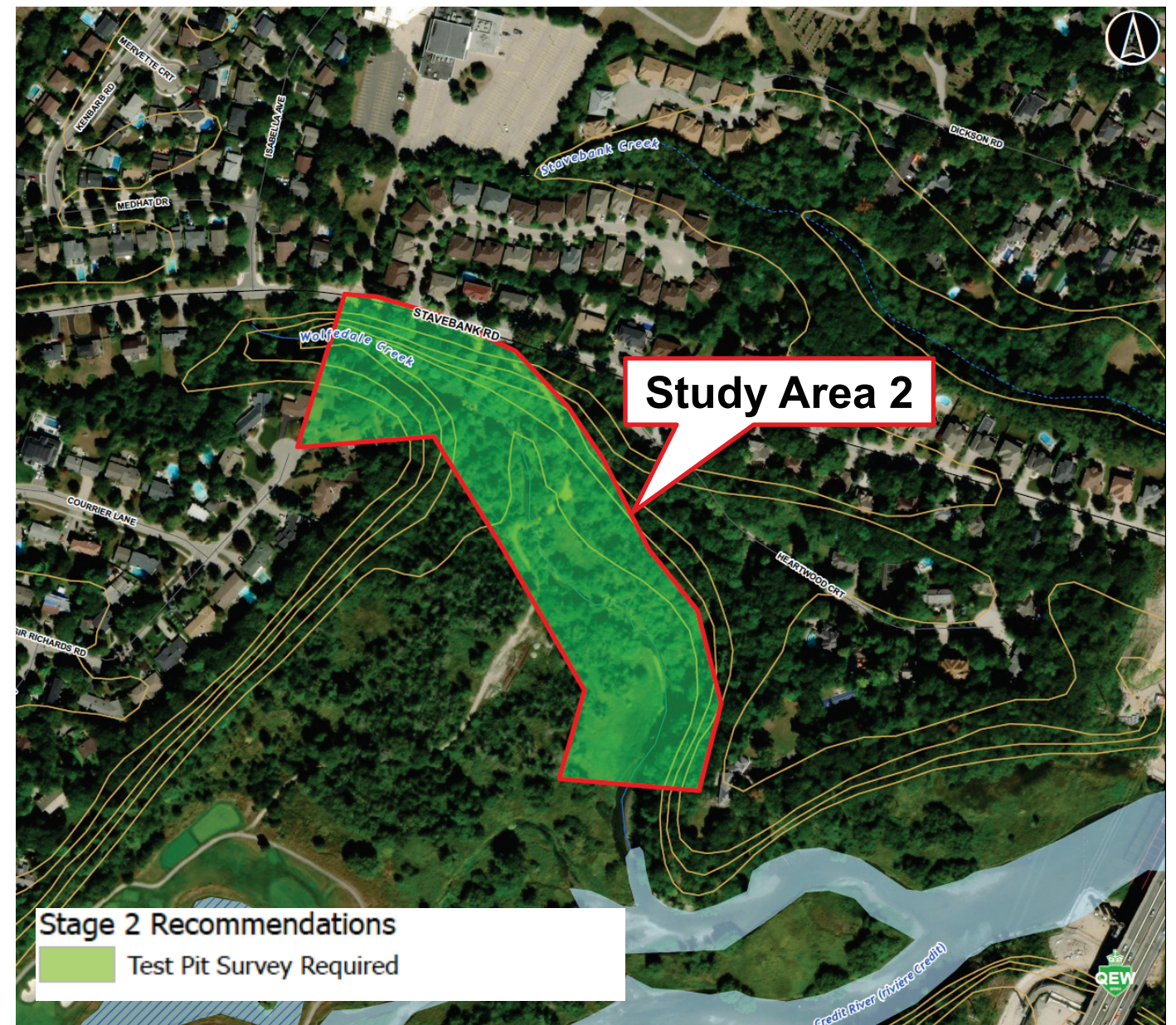
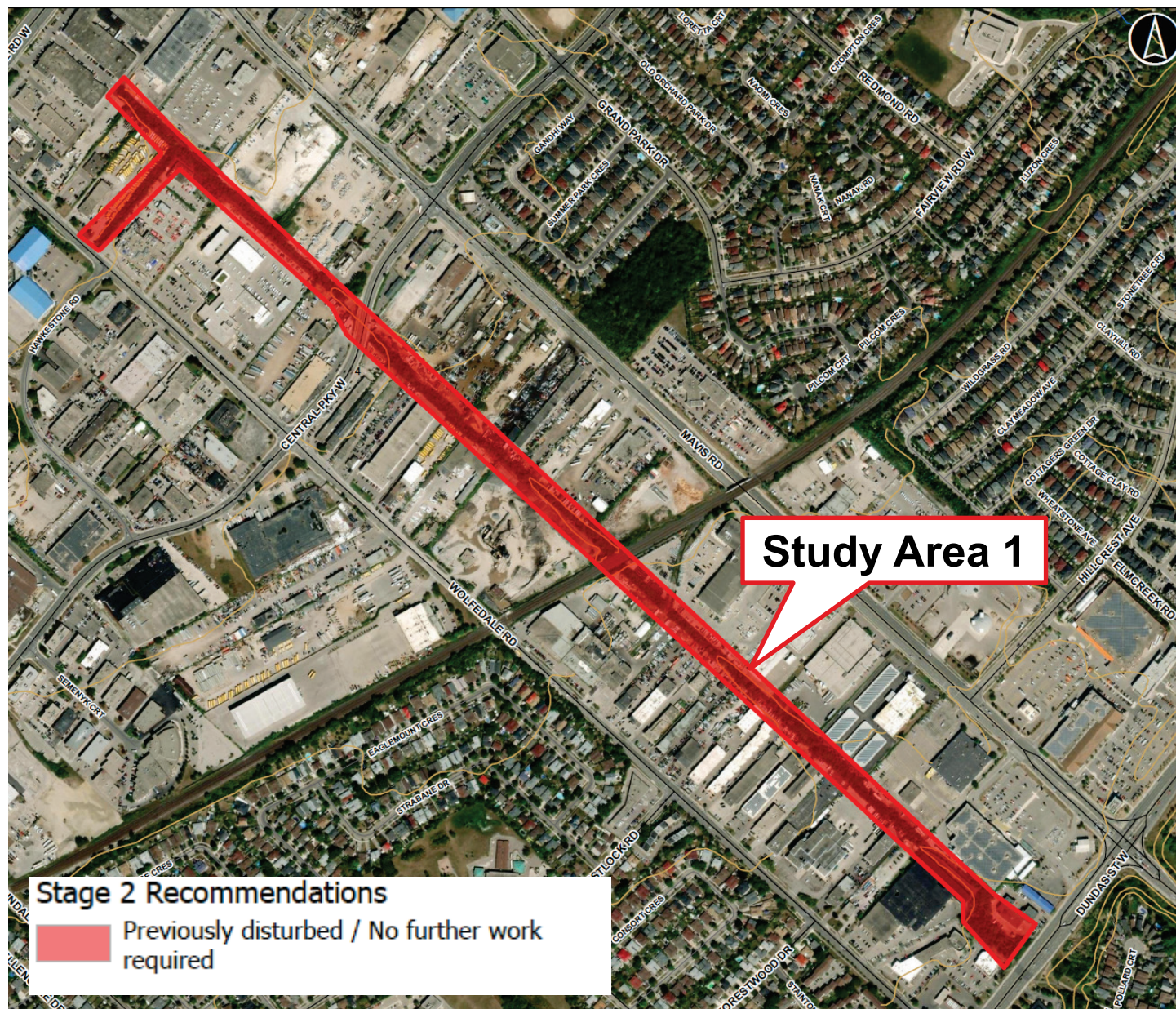
- Seasonal concentration areas:
 - Candidate Bat Maternity Colonies within the Fresh – Moist Ash Lowland Deciduous Forest Ecosite (FOD7-2) and Mineral Cultural Woodland Ecosite (CUW1)
 - Candidate Turtle Wintering Areas within Wolfedale Creek
- Habitats for the following Species of Conservation Concern (SOCC) were identified:
 - Candidate habitat for Barn Swallow (*Hirundo rustica*) on buildings
 - Candidate habitat for Common Nighthawk (*Chordeiles minor*) on flat-topped buildings
 - Candidate habitat for Snapping Turtle (*Chelydra serpentina*) in Wolfedale Creek
- Amphibian Movement Corridor may be present along Wolfedale Creek watercourse and vegetation communities associated with the creek.

Significant Wildlife Habitat – Study Area 2

- Seasonal concentration areas:
 - Candidate Bat Maternity Colonies within the Fresh – Moist Willow Lowland Deciduous Forest Ecosite (FOD7-3) and Dry-Fresh Sugar Maple Deciduous Forest (FOD5-3)
 - Candidate Turtle Wintering Areas within Wolfedale Creek and Credit River.
- Specialized Habitats of Wildlife:
 - Candidate Woodland Raptor Nesting Habitat within forested communities
 - Candidate Amphibian Breeding Habitat (Woodland) within Moist Willow Lowland Deciduous Forest Ecosite (FOD7-3).
- Habitats for the following SOCC were identified:
 - Confirmed habitat for Eastern Wood-pewee (*Contopus virens*) within forested communities
 - Candidate habitat for Wood Thrush (*Hylocichla mustelina*) within forested communities
 - Candidate habitat for Western-chorus Frog (*Pseudacris triseriata*) within the Cattail Mineral Shallow Marsh (MAS2-1) and Fresh – Moist Willow Lowland Deciduous Forest Ecosite (FOD7-3)
 - Candidate habitat for Snapping Turtle (*Chelydra serpentina*) in Wolfedale Creek and Credit River
- Amphibian Movement Corridor may be present along Wolfedale Creek watercourse and vegetation communities associated with the creek

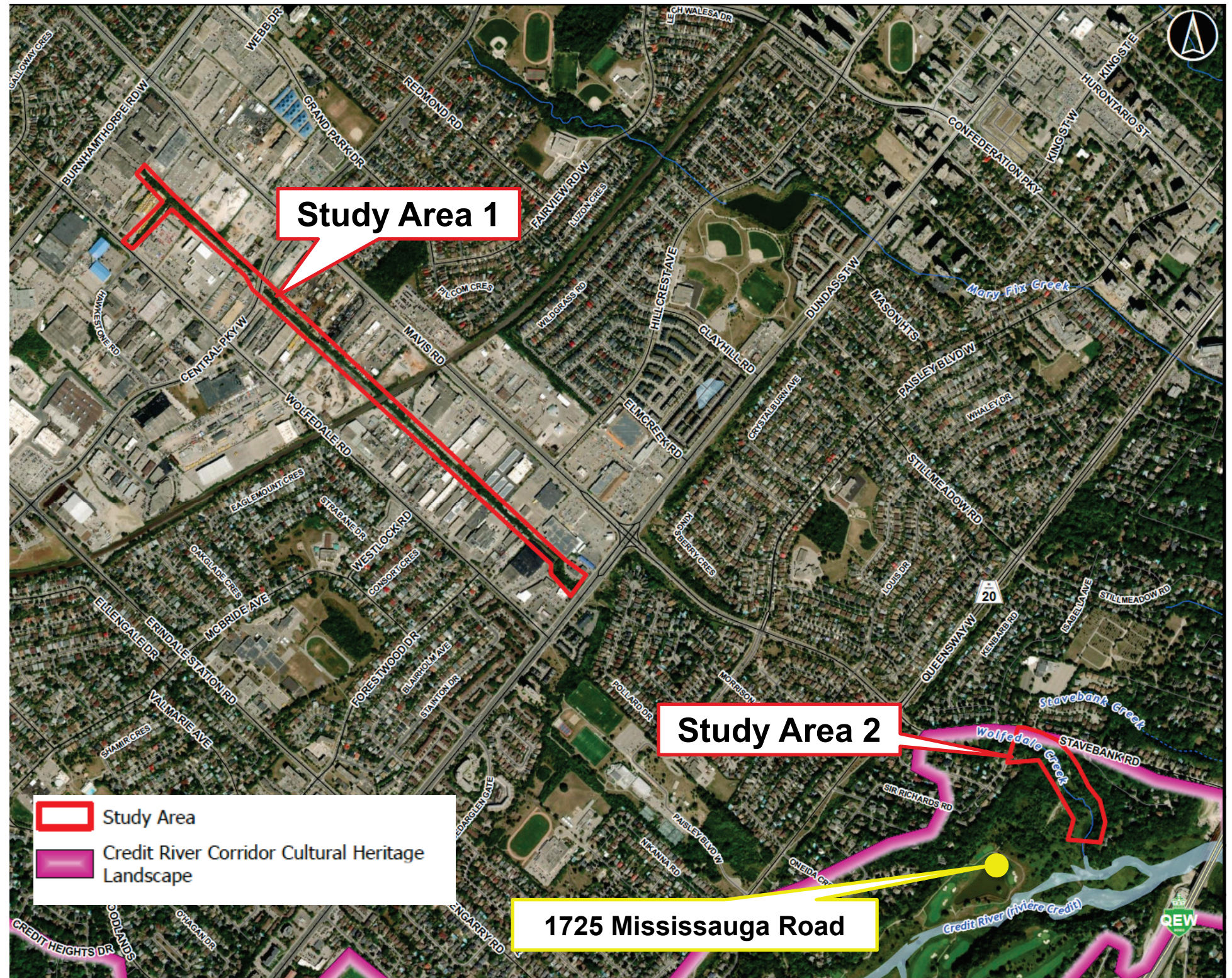
Cultural Heritage Environment – Archaeological Resources

- A Stage 1 Archaeological Assessment has been completed and concluded:
 - Study Area 1: previously disturbed and no further archaeological works are recommended
 - Study Area 2: Stage 2 archaeological assessment is recommended for all areas of potentially undisturbed land within the Study Area 2 limits



Cultural Heritage Environment – Cultural Heritage Landscape

- A Heritage Impact Assessment has been completed for the following Cultural Heritage Landscapes (CHLs) within Study Area 2 as they may have potential to be impacted by the erosion control and restoration strategy:
 - 1725 Mississauga Road (Mississauga Golf and Country Club) CHL. No direct or indirect impacts are anticipated to this CHL
 - Credit River Corridor CHL. Mitigation measures will be required for this CHL based on the findings of the heritage assessment of impacts
- There are no known built heritage resources (BHRs) or CHLs within or adjacent to Study Area 1



Phase 1: Problem or Opportunity Statement

- Located in the City of Mississauga Wolfedale Creek originates at a storm sewer outlet south of Burnhamthorpe Road West, flows parallel to and between Wolfedale Road and Mavis Road and ultimately discharges into the Credit River, south of Queensway West and immediately west of Stavebank Road
- Ongoing erosion within the Wolfedale Creek corridor has resulted in vertical and unstable creek banks, loss of habitat, potential scour and sediment deposition along the channel bed, and impacts to adjacent land uses posing a risk to private property and infrastructure
- The creek bank and bed erosion happens when frequent high stormwater flows from upstream and/or adjacent urbanized catchment areas are discharged into Wolfedale Creek without adequate dissipation (i.e., natural floodplains or engineered methods)
- The majority of the channel was originally constructed in a straightened alignment approximately 40 to 50 years ago, and rehabilitation was completed over the years for certain segments
- The City has determined segments of Wolfedale Creek require rehabilitation through its ongoing erosion monitoring program and has accordingly identified the need for an erosion control and restoration strategy, including engineered bank stabilization, to help prevent further issues for the creek and neighbouring properties
- Environmental enhancement opportunities will also be explored as part of the preferred erosion mitigation strategy

Phase 2: Alternative Solutions

The following alternative solutions have been considered:

Alternative 1 – Do Nothing

- This will be used as a base case comparison to other more viable alternatives or strategies

Alternative 2 – Structural Bank Protection

- Full replacement of failed bank protection with structural bank protection options to maintain long term erosion protection, such as reinforced soil slope walls, cast-in-place re-enforced concrete walls, or steel sheet pile
- Structural grade control solutions will consist of structural options, such as concrete weir structures. Incorporation of a natural channel bed will be included to improve fish habitat and passage



Example of Structural Bank Protection – Soil Nails



Example of Structural Bank Protection – Concrete Revetment and Armourstone Retaining Wall

Phase 2: Alternative Solutions

Alternative 3 – Non-structural Bank Protection

- Full replacement of failed bank protection with non-structural bank protection options to maintain long term erosion protection, such as rock, green gabion, or geogrid retaining walls
- Non-structural grade control could include rock weir structures
- Incorporation of a natural channel bed will be included to improve fish habitat and passage



Example of Non-structural Bank Protection – Turf Reinforcement Matting

Alternative 4 – Combination of both Structural and Non-structural Bank Protection

- Combination of Alternatives 2 and 3

Alternative 5 – Enclose the Watercourse in Storm Sewer

- Enclose the watercourse in storm sewer and landscape a trail over top.



Example of Enclosed Watercourse in Storm Sewer

	Criteria	Alternative 1: Do nothing	Alternative 2: Structural bank protection	Alternative 3: Non-structural bank protection	Alternative 4: Combination of both structural and non-structural bank protection	Alternative 5: Enclose the watercourse in storm sewer	
Physical and Natural Environment	Potential effects on terrestrial habitat and species	<ul style="list-style-type: none"> No direct impacts, however potential for loss of riparian habitat and potential impacts to species. 	<ul style="list-style-type: none"> Study Area 1: Low potential effects on terrestrial habitat and species given the limited removal of generally low-quality riparian vegetation. No opportunities for planting native plants as restoration. Study Area 2: Medium potential effects on terrestrial habitat and species given the removal of higher quality riparian vegetation and significant natural heritage features (e.g., valleyland, Credit River Coastal Marsh PSW complex, Credit River Marshes Regional ANSI, Stavebank Oak Woods Environmentally Significant Area). No opportunities for planting native plants as restoration. 	<ul style="list-style-type: none"> Study Area 1: Low potential effects on terrestrial habitat and species given the limited removal of generally low-quality riparian vegetation and wildlife habitat. Opportunities for planting native species as part of non-structural bank protection could be a benefit. Study Area 2: Low to medium potential effects on terrestrial habitat and species given the removal of higher quality riparian vegetation habitat and significant natural heritage features. Opportunities for planting native species as part of non-structural bank protection could be a benefit. 	<ul style="list-style-type: none"> Study Area 1: Low potential effects on terrestrial habitat and species given the limited removal of generally low-quality riparian vegetation and wildlife habitat. Opportunities for planting native species as part of non-structural bank protection could be a benefit. Study Area 2: Medium potential effects on terrestrial habitat and species given the removal of higher quality riparian vegetation habitat and significant natural heritage features. Opportunities for planting native species as part of non-structural bank protection could be a benefit. 	<ul style="list-style-type: none"> Study Area 1 and 2: Highest potential effects on terrestrial habitat and species based on the potential construction footprint and removal/alteration of habitat to entomb the watercourse and landscape the resulting space 	
	Potential effects on aquatic habitat and species	<ul style="list-style-type: none"> Continued degradation of aquatic habitat and potential impacts to species. 	<ul style="list-style-type: none"> Study Area 1: Medium potential effects on aquatic habitat and species based on potential construction footprint of structural bank protection options. Study Area 2: Medium potential effects on aquatic habitat and species based on potential construction footprint of structural bank protection options. 	<ul style="list-style-type: none"> Study Area 1: Low to medium potential effects on aquatic habitat and species based on potential construction footprint of non-structural bank protection options based on opportunities for additional riparian plantings, in stream cover base of retaining walls. Study Area 2: Low to medium potential effects on aquatic habitat and species based on potential construction footprint of non-structural bank protection options based on opportunities for additional riparian plantings, in stream cover base of retaining walls. 	<ul style="list-style-type: none"> Study Area 1: Medium potential effects on aquatic habitat and species based on potential construction footprint of structural and non-structural bank protection options. Study Area 2: Low to medium potential effects on aquatic habitat and species based on potential construction footprint of structural and non-structural bank protection options 	<ul style="list-style-type: none"> Study Area 1 and 2: Highest potential effects on aquatic habitat and species 	
	Potential effects on channel morphology.	<ul style="list-style-type: none"> Continued erosion along the channel bed and banks and sediment accumulation for channel morphology. Potential for continued failure of existing bank protection and grade control structures. 	<ul style="list-style-type: none"> High potential effects on channel morphology as structural solutions lock the channel in place and eliminate sediment input into channel. In addition, structural solutions tend to modify channel hydraulics and could result in increased erosion potential. 	<ul style="list-style-type: none"> Medium potential effects on channel morphology as non-structural solutions also lock channel in place but provide more opportunities to offset this through incorporation of natural features. Channel hydraulics and erosion potential can also be impacted by non-structural solutions. 	<ul style="list-style-type: none"> Medium to high potential effects on channel morphology As structural and non-structural solutions lock channel in place but incorporating non-structural solutions provides more opportunities to offset this through the addition of natural features. Channel hydraulics and erosion potential are impacted by both options. 	<ul style="list-style-type: none"> Highest potential effects on channel morphology. 	
	Potential effects on hydraulics and flooding impacts.	<ul style="list-style-type: none"> Minimal flooding impacts. 	<ul style="list-style-type: none"> Minimal flooding impacts. Bank protection will not require loss of flood storage. 	<ul style="list-style-type: none"> Minimal flooding impacts. Bank protection will not require loss of flood storage. 	<ul style="list-style-type: none"> Minimal flooding impacts. Bank protection will not require loss of flood storage. 	<ul style="list-style-type: none"> Minimal flooding impacts. Bank protection will not require loss of flood storage. 	<ul style="list-style-type: none"> Highest potential impact to flooding upstream and downstream of watercourse.
	Potential effects on surface water and groundwater.	<ul style="list-style-type: none"> No additional impacts to surface water and groundwater interaction. 	<ul style="list-style-type: none"> Minor potential effects to groundwater flow paths and minimize impact to groundwater-surface interaction. 	<ul style="list-style-type: none"> Minimal potential effects to groundwater flow paths and groundwater-surface interaction. 	<ul style="list-style-type: none"> Minor potential effects to groundwater flow paths and minimize impact to groundwater-surface interaction. 	<ul style="list-style-type: none"> High potential effects to groundwater flow paths and groundwater-surface interaction. Natural groundwater recharge would be impacted for northern portion of Study Area, with impacts to the groundwater-surface interaction. 	

	Criteria	Alternative 1: Do nothing	Alternative 2: Structural bank protection	Alternative 3: Non-structural bank protection	Alternative 4: Combination of both structural and non-structural bank protection	Alternative 5: Enclose the watercourse in storm sewer
Physical and Natural Environment	Erosion mitigation.	<ul style="list-style-type: none"> Existing erosion unmitigated and increased potential for further erosion. 	<ul style="list-style-type: none"> High degree of erosion mitigated for replacement of failed bank protection with structural bank protection options. Isolated works would stabilize and lock the channel in place Due to the potential for altered channel hydraulics, there is increased potential for erosion to occur in additional locations along the bed and/or channel banks. Structural solutions are possible in locations where banks are 1H:1V, elevated bank height is present, and consideration for weight restrictions at top of bank is required. 	<ul style="list-style-type: none"> High degree of erosion mitigated for replacement of failed bank protection with non-structural bank protection options. Isolated works would stabilize and lock the channel in place Due to the potential for altered channel hydraulics, there is increased potential for erosion to occur in additional locations along the bed and/or channel banks. Non-structural solutions are possible where the bank slope can be graded to a stable angle, lower bank slopes are present, and vegetation used in the solution can grow. 	<ul style="list-style-type: none"> High degree of erosion mitigated for replacement of failed bank protection with structural and non-structural bank protection options. Isolated works would stabilize and lock the channel in place Due to the potential for altered channel hydraulics, there is increased potential for erosion to occur in additional locations along the bed and/or channel banks. Structural solutions are possible in locations where banks are 1H:1V, elevated bank height is present, and consideration for weight restrictions at top of bank is required. Non-structural solutions are possible where the bank slope can be graded to a stable angle, lower bank slopes are present, and vegetation used in the solution can grow. 	<ul style="list-style-type: none"> High degree of erosion mitigated for enclosure of watercourse in storm sewer.
	Potential effects on Species at Risk and Species at Risk habitat.	<ul style="list-style-type: none"> Continued degradation of terrestrial habitat adjacent to Wolfedale Creek and potential impacts to Species at Risk and their habitat. 	<ul style="list-style-type: none"> Medium potential effects on Species at Risk and Species at Risk habitat, including: <ul style="list-style-type: none"> American Eel (Study Area 2 only); Red-Headed Woodpecker; Bat SAR; Black Ash; and Butternut. 	<ul style="list-style-type: none"> Lowest potential effects on Species at Risk and Species at Risk habitat, including: <ul style="list-style-type: none"> American Eel (Study Area 2 only); Red-Headed Woodpecker; Bat SAR; Black Ash; and Butternut. 	<ul style="list-style-type: none"> Low to medium potential effects on Species at Risk and Species at Risk habitat, including: <ul style="list-style-type: none"> American Eel (Study Area 2 only); Red-Headed Woodpecker; Bat SAR; Black Ash; and Butternut. 	<ul style="list-style-type: none"> Highest Potential effects on Species at Risk and Species at Risk habitat, including: <ul style="list-style-type: none"> American Eel (Study Area 2 only); Red-Headed Woodpecker; Bat SAR; Black Ash; and Butternut.
	Anticipated environmental permitting and approval considerations.	<ul style="list-style-type: none"> No permits and approvals required. 	<ul style="list-style-type: none"> Straight forward environmental permitting and approvals that may include: <ul style="list-style-type: none"> CVC development permit under Ontario Regulation 41/24: Prohibited Activities, Exemptions, and Permits A permit will be required under the City of Mississauga Public Tree Protection By-law 0020-2022 if tree removals are required. A request for review will be required by DFO due to construction activities occurring below the high water line. Permits may be required under the ESA. 	<ul style="list-style-type: none"> Straight forward environmental permitting and approvals that may include: <ul style="list-style-type: none"> CVC development permit under Ontario Regulation 41/24: Prohibited Activities, Exemptions, and Permits A permit will be required under the City of Mississauga Public Tree Protection By-law 0020-2022 if tree removals are required. A request for review will be required by DFO due to construction activities occurring below the high water line. Permits may be required under the ESA. Applicable permits will be identified during the Environmental Assessment phase and confirmed during Preliminary and Detailed Design based on the final construction footprint. 	<ul style="list-style-type: none"> Straight forward environmental permitting and approvals that may include: <ul style="list-style-type: none"> CVC development permit under Ontario Regulation 41/24: Prohibited Activities, Exemptions, and Permits A permit will be required under the City of Mississauga Public Tree Protection By-law 0020-2022 if tree removals are required. A request for review will be required by DFO due to construction activities occurring below the high water line. Permits may be required under the ESA. Applicable permits will be identified during the Environmental Assessment phase and confirmed during Preliminary and Detailed Design based on the final construction footprint. 	<ul style="list-style-type: none"> Most difficult environmental permitting and approvals that may include: <ul style="list-style-type: none"> CVC development permit under Ontario Regulation 41/24: Prohibited Activities, Exemptions, and Permits A permit will be required under the City of Mississauga Public Tree Protection By-law 0020-2022 if tree removals are required. A request for review will be required by DFO due to construction activities occurring below the high water line. An Authorization under the Fisheries Act is anticipated due to the entombment of the watercourse, which will permanently alter fish habitat and has the potential to destroy fish habitat. Permits may be required under the ESA.
	Physical and Natural Environment Evaluation Ranking	Low Constraints (More Preferred)	Medium Constraints (Moderately Preferred)	Low Constraints (More Preferred)	Low (More Preferred) to Medium Constraints (Moderately Preferred)	High Constraints (Less Preferred)

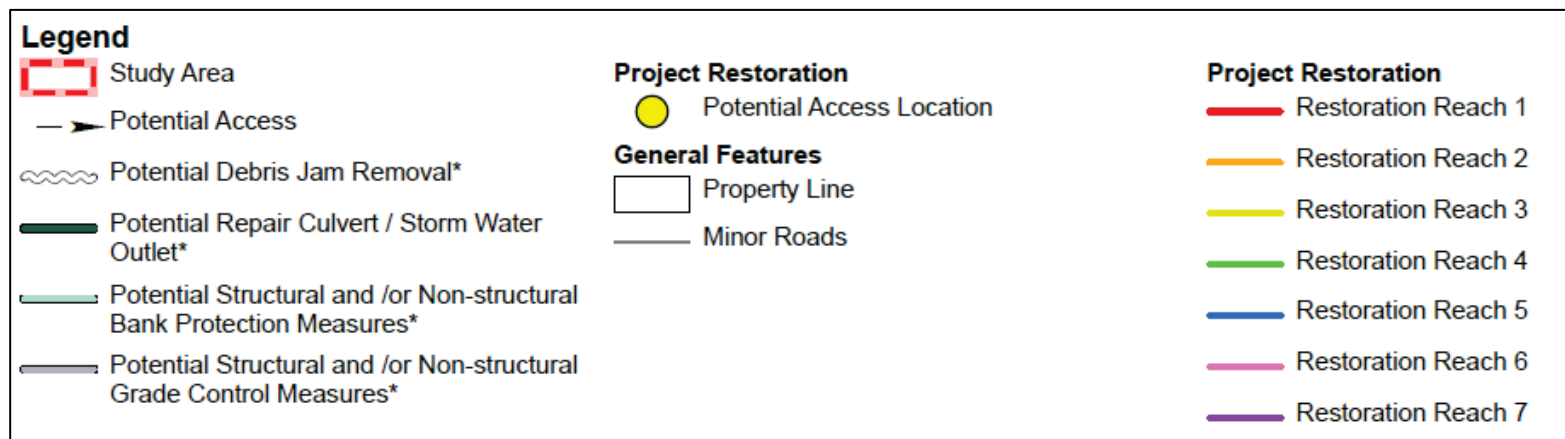
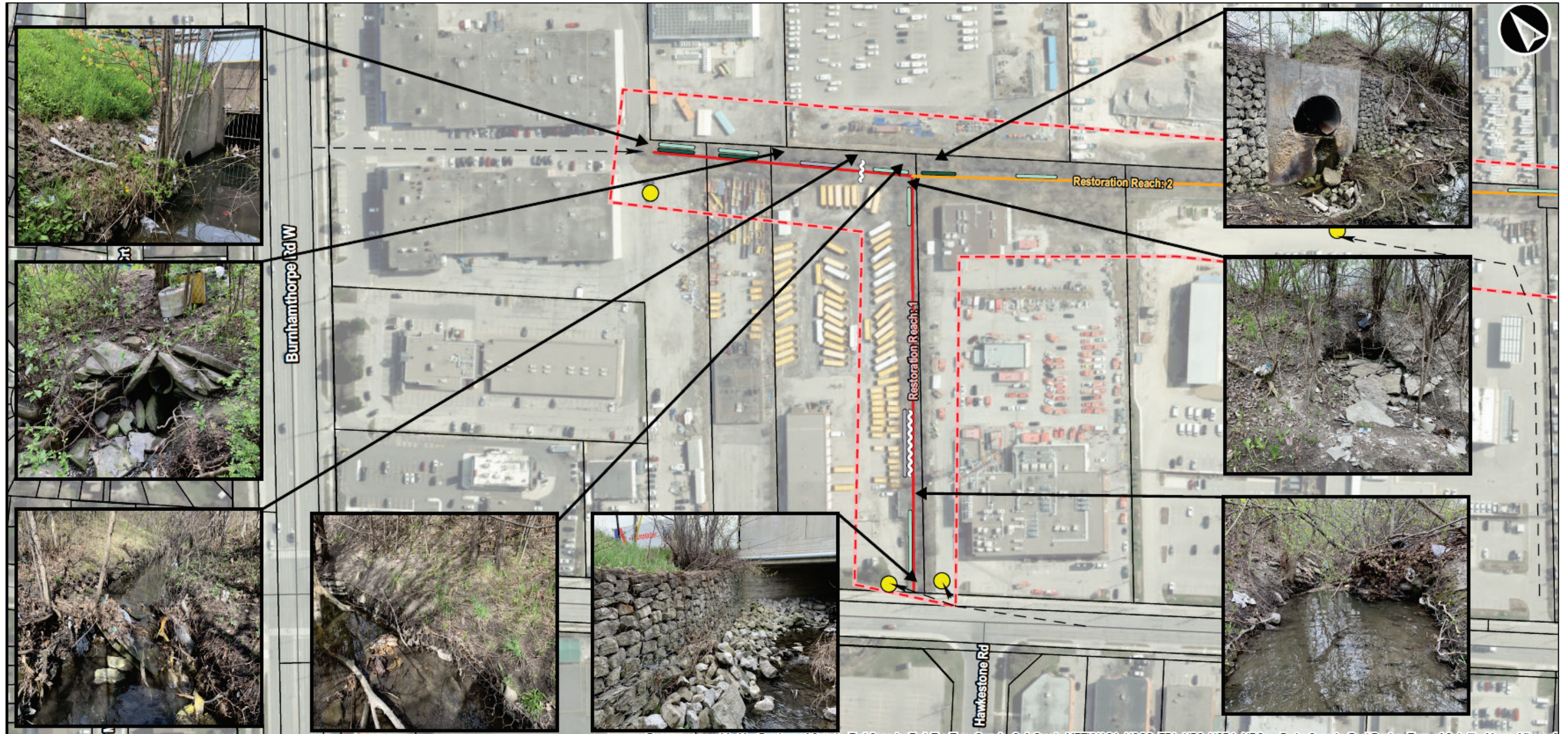
	Criteria	Alternative 1: Do nothing	Alternative 2: Structural bank protection	Alternative 3: Non-structural bank protection	Alternative 4: Combination of both structural and non-structural bank protection	Alternative 5 : Enclose the watercourse in storm sewer	
Socio-Economic Environment	Impact on Public Safety.	<ul style="list-style-type: none"> Existing risks associated with failed bank protection and erosion unmitigated. 	<ul style="list-style-type: none"> Mitigated erosion reduces risk to public safety. 	<ul style="list-style-type: none"> Mitigated erosion reduces risk to public safety. 	<ul style="list-style-type: none"> Mitigated erosion reduces risk to public safety. 	<ul style="list-style-type: none"> Mitigated erosion reduces risk to public safety. 	
	Potential impacts to the community during construction (e.g. noise, air).	<ul style="list-style-type: none"> No impacts to the community as no construction is proposed. 	<ul style="list-style-type: none"> Impacts anticipated with construction area in proximity to private properties. 	<ul style="list-style-type: none"> Impacts anticipated with construction area in proximity to private properties. 	<ul style="list-style-type: none"> Impacts anticipated with construction area in proximity to private properties. 	<ul style="list-style-type: none"> Largest construction area/duration with highest impacts to properties along creek. 	
	Potential impacts to adjacent properties and access.	<ul style="list-style-type: none"> No impacts to adjacent properties and access. Existing risks associated with failed bank protection unmitigated. 	<ul style="list-style-type: none"> Impacts to adjacent properties in key locations of proposed works. Access required at select locations and will require negotiation and result in temporary disruption to use of property. Land modifications to the top of bank required to prevent future encroachment 	<ul style="list-style-type: none"> Impacts to adjacent properties in key locations of proposed works. Access required at select locations and will require negotiation and result in temporary disruption to use of property. Land modifications to the top of bank required to prevent future encroachment 	<ul style="list-style-type: none"> Impacts to adjacent properties in key locations of proposed works. Access required at select locations and will require negotiation and result in temporary disruption to use of property. Land modifications to the top of bank required to prevent future encroachment 	<ul style="list-style-type: none"> Impacts to adjacent properties in key locations of proposed works. Access required at select locations and will require negotiation and result in temporary disruption to use of property. Modification to top of bank would be required. 	
	Potential for property acquisition.	<ul style="list-style-type: none"> No property acquisition. 	<ul style="list-style-type: none"> No property acquisition anticipated. Work with select land owners to provide buffer from top of bank. 	<ul style="list-style-type: none"> No property acquisition anticipated. Work with select land owners to provide buffer from top of bank. 	<ul style="list-style-type: none"> No property acquisition anticipated. Work with select land owners to provide buffer from top of bank. 	<ul style="list-style-type: none"> No property acquisition anticipated. Work with select land owners to provide buffer from top of bank. 	<ul style="list-style-type: none"> No property acquisition anticipated.
	Socio-Economic Evaluation Ranking	Low Constraints (More Preferred)	Medium Constraints (Moderately Preferred)	Medium Constraints (Moderately Preferred)	Medium Constraints (Moderately Preferred)	High Constraints (Less Preferred)	
Cultural Heritage Environment	Potential effects on archaeological resources.	<ul style="list-style-type: none"> No improvements proposed – no effects on archaeological resources. 	<ul style="list-style-type: none"> Study Area 1: No further work is recommended, Study Area 2: Stage 2 archaeological assessment (and further assessments, as required) required for all areas of potentially undisturbed land Potential for marine archaeological impacts if creek bed is disturbed within the Study Area 2. To be confirmed based on final proposed construction footprint. 	<ul style="list-style-type: none"> Study Area 1: No further work is recommended, Study Area 2: Stage 2 archaeological assessment (and further assessments, as required) required for all areas of potentially undisturbed land Potential for marine archaeological impacts if creek bed is disturbed within the Study Area 2. To be confirmed based on final proposed construction footprint. 	<ul style="list-style-type: none"> Study Area 1: No further work is recommended, Study Area 2: Stage 2 archaeological assessment (and further assessments, as required) required for all areas of potentially undisturbed land Potential for marine archaeological impacts if creek bed is disturbed within the Study Area 2. To be confirmed based on final proposed construction footprint. 	<ul style="list-style-type: none"> Study Area 1: No further work is recommended, Study Area 2: Stage 2 archaeological assessment (and further assessments, as required) required for all areas of potentially undisturbed land Potential for marine archaeological impacts if creek bed is disturbed within the Study Area 2. To be confirmed based on final proposed construction footprint. 	
	Potential effects on built heritage resources and cultural heritage landscapes.	<ul style="list-style-type: none"> Study Area 1: No improvements proposed – no effects on built heritage resources and cultural heritage landscapes. Study Area 2: No improvements proposed – no effects on built heritage resources and cultural heritage landscapes. 	<ul style="list-style-type: none"> Study Area 1: No potential effects identified on built heritage resources and cultural heritage landscapes. Scope of work limited to Heritage Impact Assessment. Study Area 2: High potential for direct effects on the Credit River Corridor Cultural Heritage Landscape. No potential effects anticipated on the Mississauga Golf and Country Club (1725 Mississauga Road) that is designated as a Heritage Property and is listed on the City of Mississauga Register. 	<ul style="list-style-type: none"> Study Area 1: No potential effects identified on built heritage resources and cultural heritage landscapes. Scope of work limited to Heritage Impact Assessment. Study Area 2: High potential for direct effects on the Credit River Corridor Cultural Heritage Landscape. No potential effects anticipated on the Mississauga Golf and Country Club (1725 Mississauga Road) that is designated as a Heritage Property and is listed on the City of Mississauga Register. 	<ul style="list-style-type: none"> Study Area 1: No potential effects identified on built heritage resources and cultural heritage landscapes. Scope of work limited to Heritage Impact Assessment. Study Area 2: High potential for direct effects on the Credit River Corridor Cultural Heritage Landscape. No potential effects anticipated on the Mississauga Golf and Country Club (1725 Mississauga Road) that is designated as a Heritage Property and is listed on the City of Mississauga Register. 	<ul style="list-style-type: none"> Study Area 1: No potential effects identified on built heritage resources and cultural heritage landscapes. Scope of work limited to Heritage Impact Assessment. Study Area 2: High potential for direct effects on the Credit River Corridor Cultural Heritage Landscape. No potential effects anticipated on the Mississauga Golf and Country Club (1725 Mississauga Road) that is designated as a Heritage Property and is listed on the City of Mississauga Register. 	
	Cultural Heritage Evaluation Ranking	Low Constraints (More Preferred)	High Constraints (Moderately Preferred)	High Constraints (Moderately Preferred)	High Constraints (Moderately Preferred)	High Constraints (Moderately Preferred)	

	Criteria	Alternative 1: Do nothing	Alternative 2: Structural bank protection	Alternative 3: Non-structural bank protection	Alternative 4: Combination of both structural and non-structural bank protection	Alternative 5 : Enclose the watercourse in storm sewer
Climate Change	Potential for greenhouse gas emissions.	■ No potential for greenhouse gas emissions – no changes proposed.	■ Potential for increased greenhouse gas emissions based on longer construction duration and use of heavy equipment.	■ Lower potential for increased greenhouse gas emissions based on shorter construction duration and potential for use of less heavy equipment.	■ Potential for increased greenhouse gas emissions based on longer construction duration and use of heavy equipment.	■ Potential for increased greenhouse gas emissions based on longer construction duration and use of heavy equipment.
	Vulnerability of project/ infrastructure to climate change effects.	■ Infrastructure subject to climate change effects unmitigated.	■ Structural bank protection options may result in less potential vulnerability to climate change effects.	■ Non-structural bank protection options may result in slightly higher potential vulnerability to climate change effects.	■ Structural and non-structural bank protection options may result in less potential vulnerability to climate change effects.	■ Enclose the watercourse may result in less potential vulnerability to climate change effects in Study Area 1; however, there are downstream infrastructure in Study Area 2 subject to negative impacts.
	Climate Change Evaluation Ranking	Low Constraints (More Preferred)	Medium Constraints (Moderately Preferred)	Medium Constraints (Moderately Preferred)	Medium Constraints (Moderately Preferred)	High Constraints (Less Preferred)
Technical Environment	Ability to address Problem and Opportunity Statement.	■ Does not address the Problem and Opportunity statement.	■ Addresses the Problem and Opportunity statement.	■ Addresses the Problem and Opportunity statement.	■ Addresses the Problem and Opportunity statement with greatest design flexibility.	■ Addresses the Problem and Opportunity statement.
	Potential constructability complexities related to access and staging.	■ No complexities as no changes are proposed.	■ Moderate constructability complexities related to access and staging; however, will require heavier machinery and deeper footings to install structural bank protection.	■ Moderate constructability complexities related to access and staging.	■ Moderate constructability complexities related to access and staging.	■ Highest constructability complexities related to access and staging.
	Ability to address slope stability.	■ Existing risk to slope stability unmitigated.	■ Mitigated erosion would reduce risk to slope stability at key locations.	■ Mitigated erosion would reduce risk to slope stability at key locations.	■ Mitigated erosion would reduce risk to slope stability at key locations with greatest design flexibility.	■ New sewer would address slope stability.
	Lifespan of infrastructure.	■ Existing risk to infrastructure lifespan unmitigated.	■ Structural bank protection options may have longer lifespan than non-structural options.	■ Non-structural bank protection options may have reduced lifespan.	■ Combination approach. Structural bank protection options may have longer lifespan than non-structural bank protection options.	■ Longest lifespan compared to other alternatives; however, may reduce lifespan of infrastructure in Study Area 2.
	Potential future maintenance requirements (e.g., structural maintenance and vegetation maintenance).	■ Potential for maintenance related to ongoing erosion (e.g. tree removal, sediment accumulation).	■ Lower maintenance required for structural bank protection options compared to non-structural bank protection options.	■ Higher maintenance required for non-structural bank protection options.	■ Lower maintenance required for structural bank protection options compared to non-structural bank protection options.	■ Lowest future maintenance requirements; however, may trigger additional maintenance for infrastructure in Study Area 2.
	Technical Environment Evaluation Ranking	High Constraints (Less Preferred)	Medium Constraints (Moderately Preferred)	Medium Constraints (Moderately Preferred)	Low (More Preferred) to Medium Constraints (Moderately Preferred)	Medium Constraints (Moderately Preferred)
	Estimated capital costs.	■ None.	■ \$5 M - \$10 M.	■ \$1 M - \$5 M.	■ \$1 M - \$10 M.	■ Greater than \$10 M.
Cost	Estimated operation and maintenance costs.	■ Potential for maintenance costs related to ongoing erosion (e.g. tree removal, sediment accumulation).	■ Regular maintenance required and may be higher in cost compared to non-structural.	■ Regular maintenance required. ■ Incorporation of vegetation in design details may require greater maintenance.	■ Regular maintenance required.	■ Regular maintenance required. ■ Confined space access will be required.
	Cost Evaluation Ranking	Low Constraints (More Preferred)	Medium Constraints (Moderately Preferred)	Low Constraints (More Preferred)	Low (More Preferred) to Medium Constraints (Moderately Preferred)	High Constraints (Less Preferred)
	Recommended Preferred Solution?	No	No	No	Yes	No

Preferred Erosion Control and Restoration Strategy

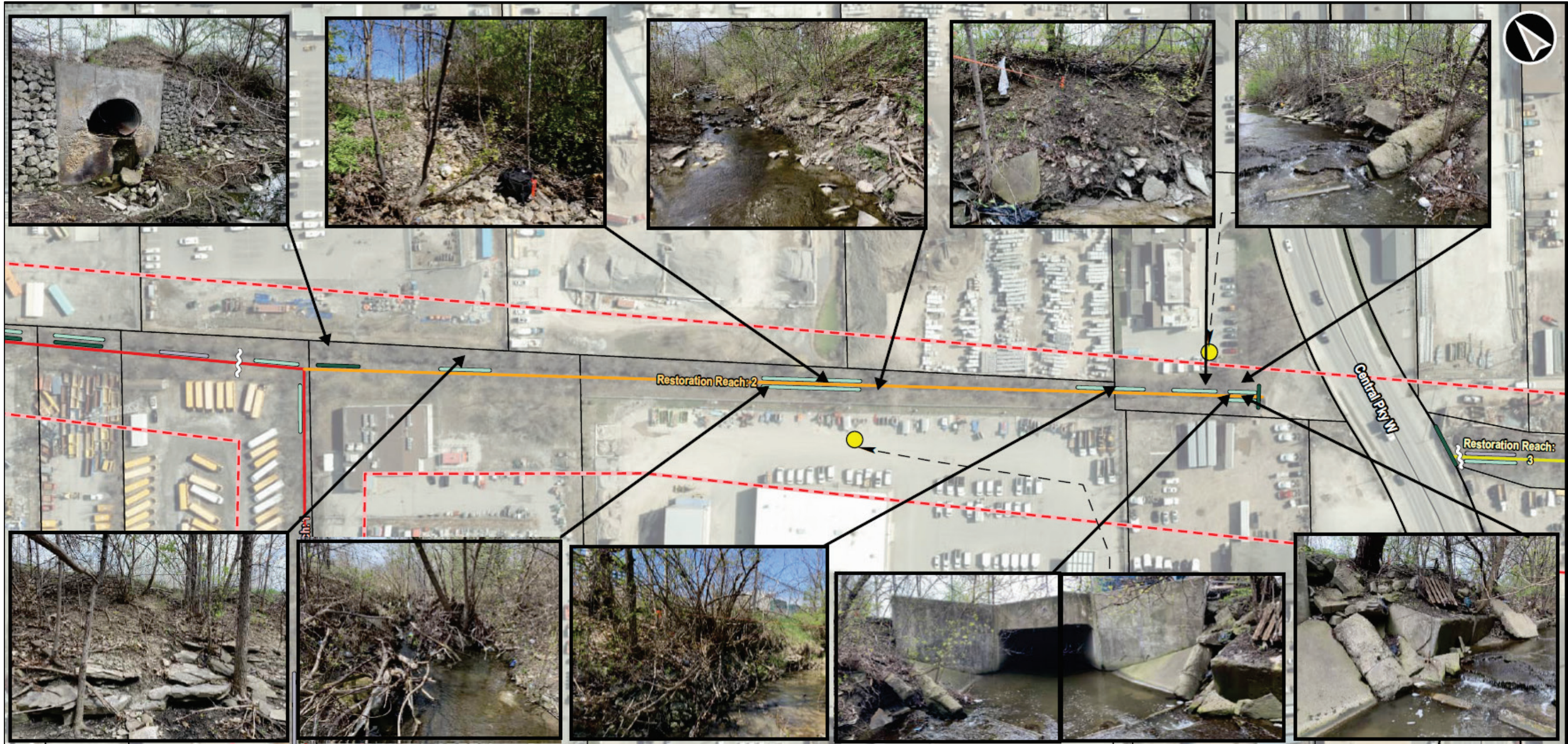
- Alternative 4 (combination of both structural and non-structural bank protection) is the overall recommended preliminary preferred solution based on the following rationale:
 - Flexibility to implement both non-structural and structural improvements
 - Lower anticipated environmental impacts
 - Constructability
 - There are no anticipated flooding impacts
 - Cost-effectiveness with primarily non-structural bank protection options being recommended with localized small-scale structural measures
- Overall, the improvements recommended are primarily non-structural with localized small-scale structural measures, such as retaining wall repairs or replacements in select areas.

Preliminary Preferred Solution – Study Area 1



















- The City is currently investigating potential access locations across Study Area 1 and Study Area 2
- Access locations are subject to change

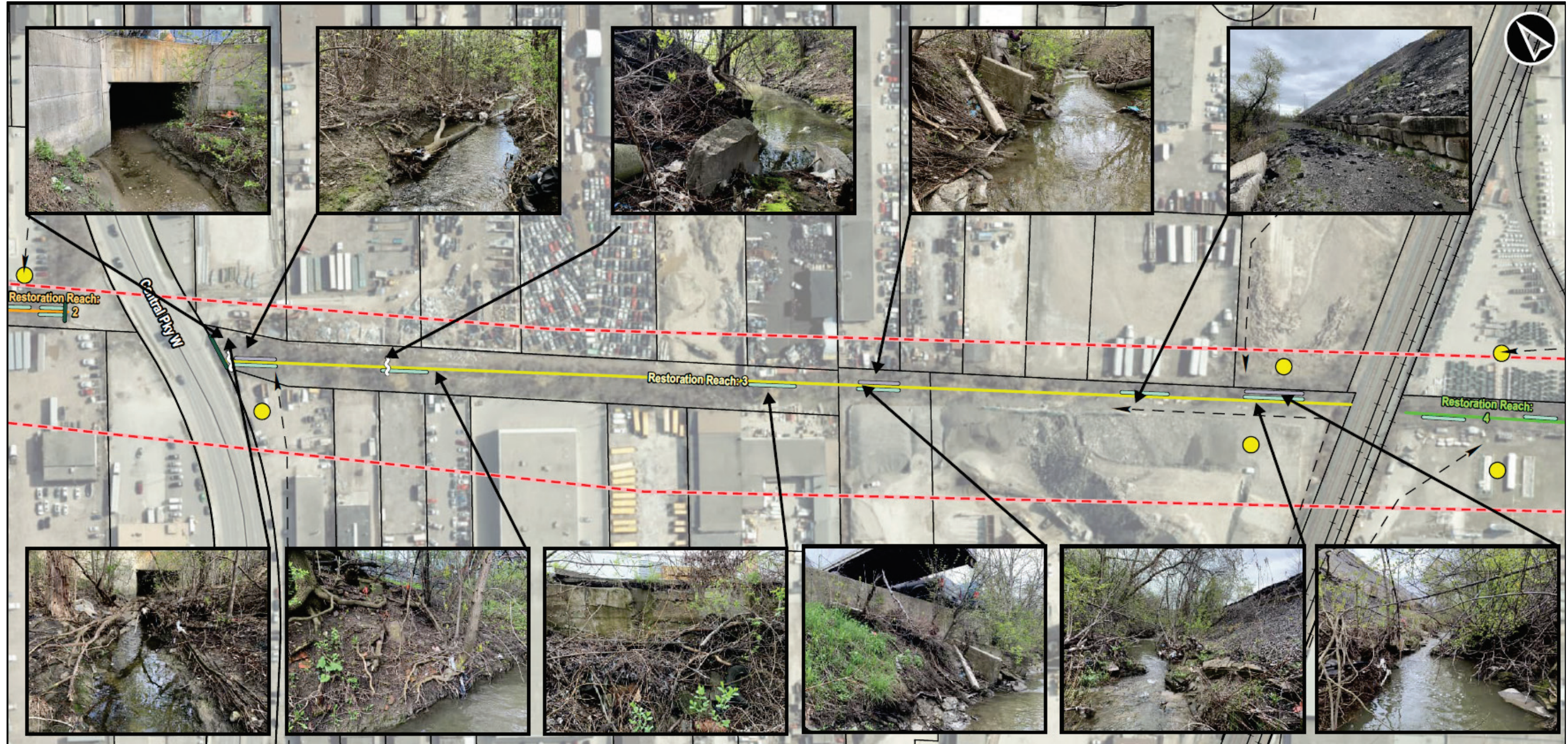
Preliminary Preferred Solution – Study Area 1



Legend

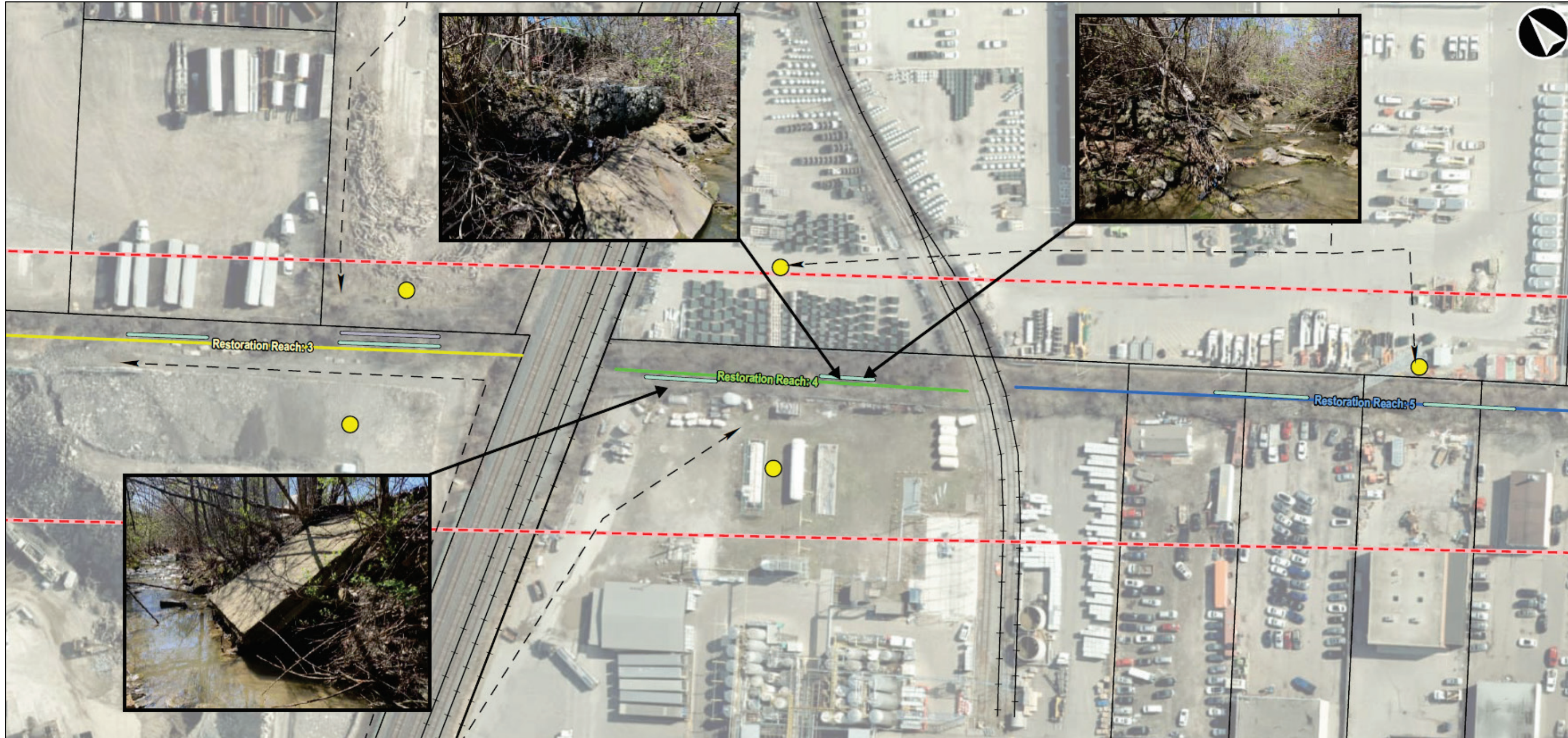
 Study Area	Project Restoration	Project Restoration
 Potential Access	 Potential Access Location	 Restoration Reach 1
 Potential Debris Jam Removal*	General Features	 Restoration Reach 2
 Potential Repair Culvert / Storm Water Outlet*	 Property Line	 Restoration Reach 3
 Potential Structural and /or Non-structural Bank Protection Measures*	 Minor Roads	 Restoration Reach 4
 Potential Structural and /or Non-structural Grade Control Measures*		 Restoration Reach 5
		 Restoration Reach 6
		 Restoration Reach 7

Preliminary Preferred Solution – Study Area 1



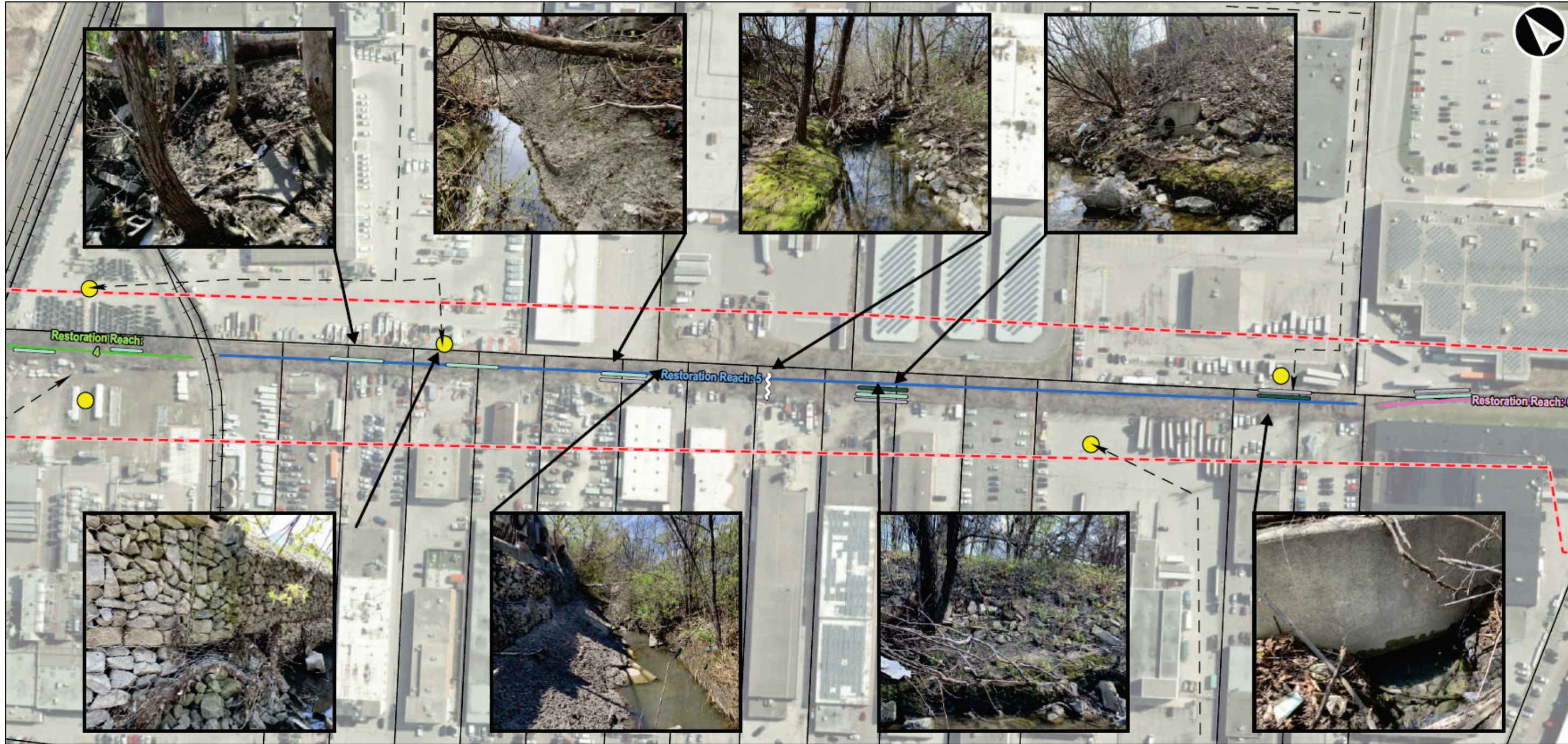
Legend		
	Study Area	
	Potential Access	
	Potential Debris Jam Removal*	
	Potential Repair Culvert / Storm Water Outlet*	
	Potential Structural and /or Non-structural Bank Protection Measures*	
	Potential Structural and /or Non-structural Grade Control Measures*	
	Potential Access Location	
	Property Line	
	Minor Roads	
	Restoration Reach 1	
	Restoration Reach 2	
	Restoration Reach 3	
	Restoration Reach 4	
	Restoration Reach 5	
	Restoration Reach 6	
	Restoration Reach 7	

Preliminary Preferred Solution – Study Area 1



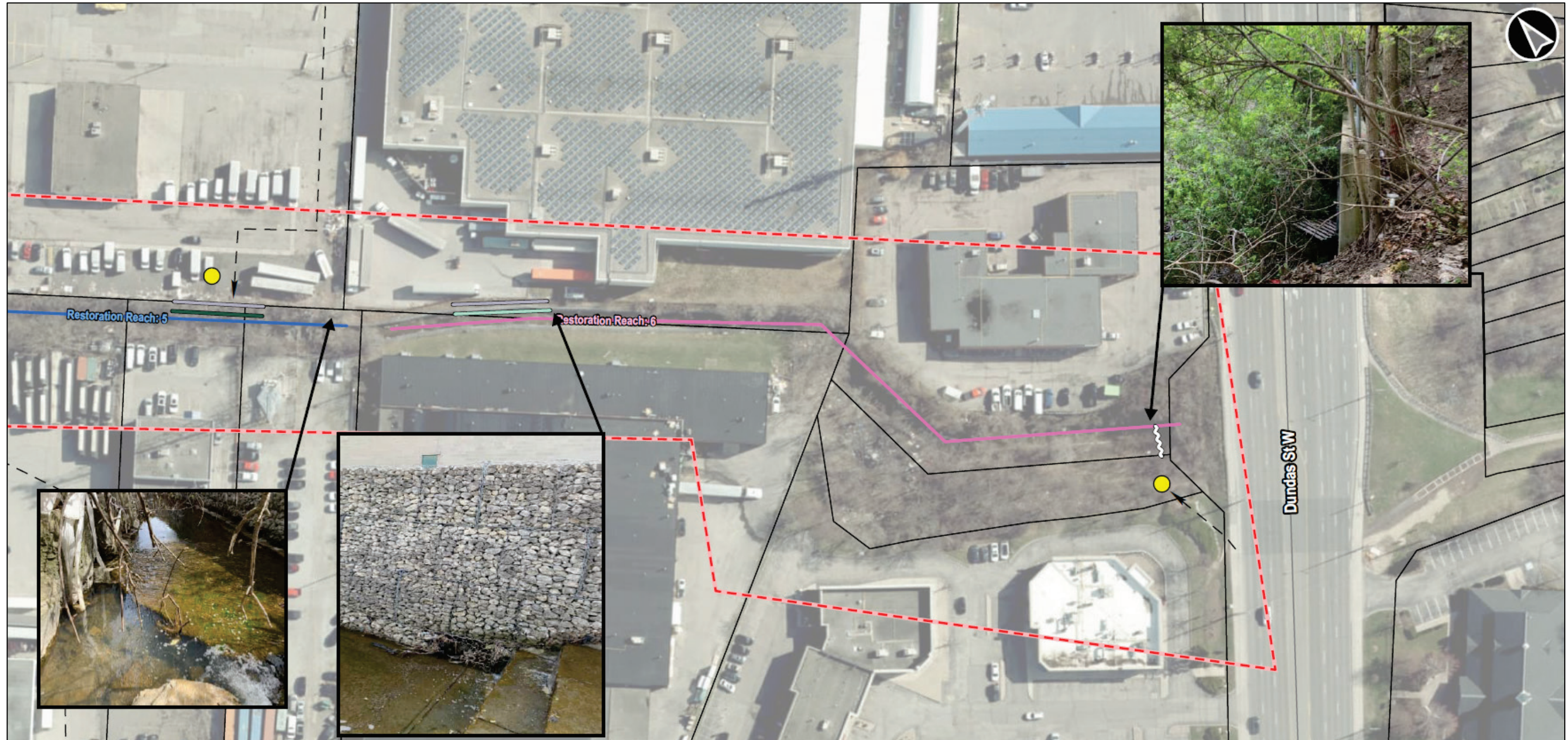
Legend		Project Restoration	
Study Area	Potential Access Location	Restoration Reach 1	
Potential Access	General Features	Restoration Reach 2	
Potential Debris Jam Removal*	Property Line	Restoration Reach 3	
Potential Repair Culvert / Storm Water Outlet*	Minor Roads	Restoration Reach 4	
Potential Structural and /or Non-structural Bank Protection Measures*		Restoration Reach 5	
Potential Structural and /or Non-structural Grade Control Measures*		Restoration Reach 6	
		Restoration Reach 7	

Preliminary Preferred Solution – Study Area 1



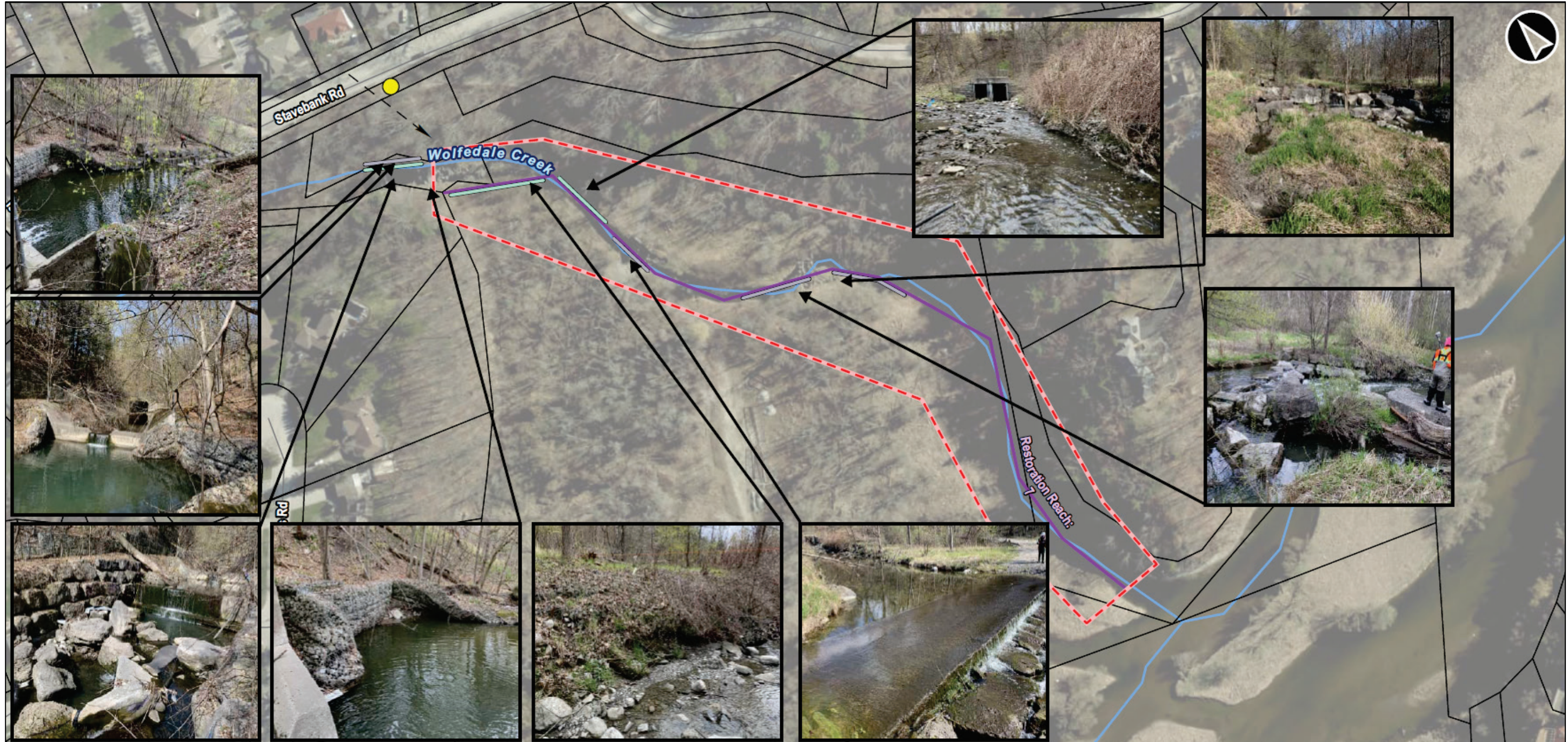
Legend		
Study Area	Potential Access Location	Project Restoration
Potential Access	General Features	Restoration Reach 1
Potential Debris Jam Removal*	Property Line	Restoration Reach 2
Potential Repair Culvert / Storm Water Outlet*	Minor Roads	Restoration Reach 3
Potential Structural and /or Non-structural Bank Protection Measures*		Restoration Reach 4
Potential Structural and /or Non-structural Grade Control Measures*		Restoration Reach 5
		Restoration Reach 6
		Restoration Reach 7

Preliminary Preferred Solution – Study Area 1



Legend		
	Study Area	
	Potential Access	
	Potential Debris Jam Removal*	
	Potential Repair Culvert / Storm Water Outlet*	
	Potential Structural and /or Non-structural Bank Protection Measures*	
	Potential Structural and /or Non-structural Grade Control Measures*	
	Potential Access Location	
	Property Line	
	Minor Roads	
	Restoration Reach 1	
	Restoration Reach 2	
	Restoration Reach 3	
	Restoration Reach 4	
	Restoration Reach 5	
	Restoration Reach 6	
	Restoration Reach 7	

Preliminary Preferred Solution – Study Area 2



Legend		
	Study Area	
	Potential Access	
	Potential Debris Jam Removal*	
	Potential Repair Culvert / Storm Water Outlet*	
	Potential Structural and /or Non-structural Bank Protection Measures*	
	Potential Structural and /or Non-structural Grade Control Measures*	
	Potential Access Location	
	Property Line	
	Minor Roads	
	Restoration Reach 1	
	Restoration Reach 2	
	Restoration Reach 3	
	Restoration Reach 4	
	Restoration Reach 5	
	Restoration Reach 6	
	Restoration Reach 7	

Preliminary Construction Impact Mitigation



Natural Environment

- Minimize vegetation removals to the extent possible. Vegetation removal activities should be limited to outside of the breeding bird nesting season (April 1 to August 31) and bat active season (April 1 to September 1)
- Comply with in-water timing window
- Avoid impacts to Species at Risk (e.g. American Eel) and their habitats. Authorization under the Endangered Species Act, 2007 may be required if impacts cannot be avoided.
- Avoid encroachment within the Natural Designated Areas (Credit River Coastal Marsh PSW complex, the Credit River Marshes Regional ANSI and Stavebank Oak Woods Environmentally Significant Area) to the extent possible and allow for a vegetation protection buffer of at least 30 m to PSWs where possible.
- Implement wildlife-specific mitigation measures
- Implement erosion and sediment control measures to prevent sediment from entering neighbouring properties and natural areas during construction



Socio-Economic Environment

- Implement Best Management Practices for dust control and vibration monitoring during construction
- Comply with the City’s Noise Bylaw restrictions
- Provide advance notice to adjacent property owners and the community, prior to construction. General project information and updates will be provided through the City’s website



Cultural Heritage Environment

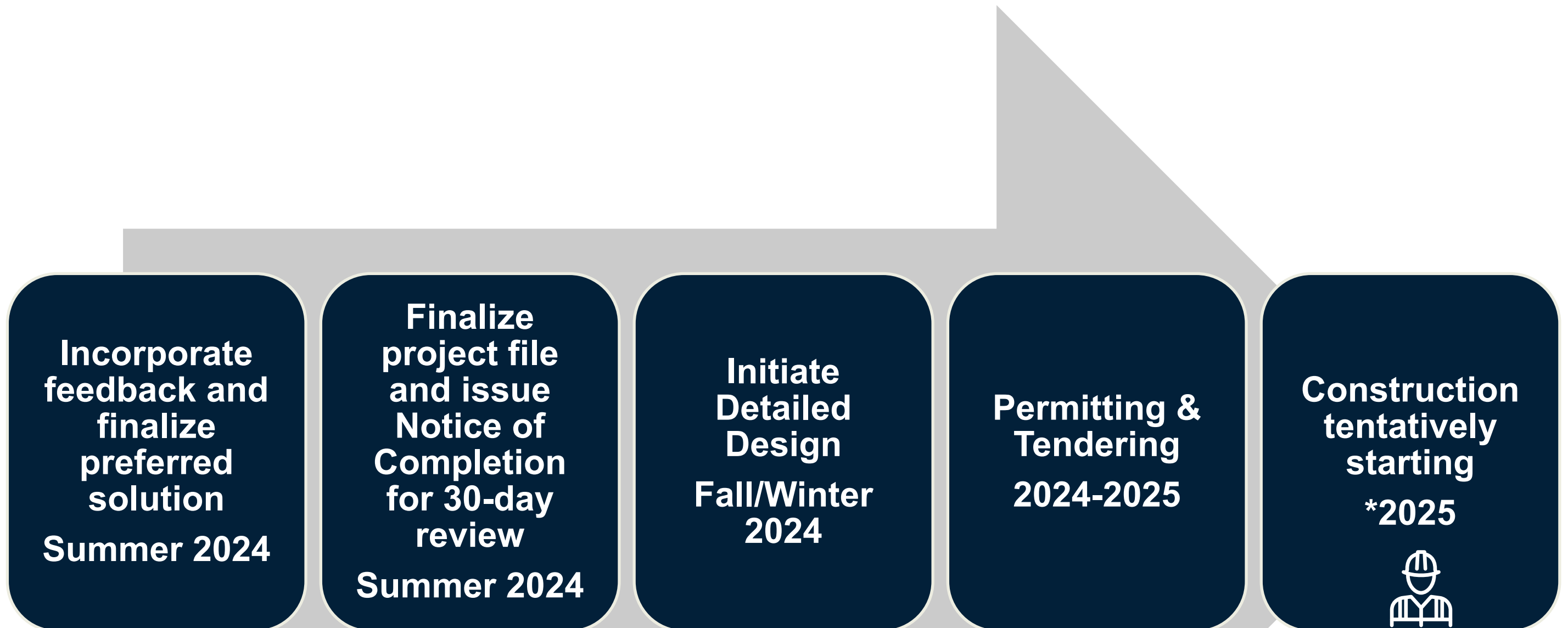
- Complete a Stage 2 Archaeological Assessment (and further assessments, if required)
- Implement mitigation measures for the Credit River Corridor Cultural Heritage Landscape to preserve the scenic quality of the natural environment of the corridor. Potential measures include:
 - Conducting a comprehensive site assessment (i.e., Tree Preservation Plan or Landscape Plan) to identify areas of vegetation that should be preserved due to their contribution to the scenic quality of the Valley's natural environment. Where vegetation removal is unavoidable, prioritizing the replanting of native species is recommended.
 - Installing temporary fencing and establishing no-go zones on construction maps to delineate areas of vegetation that must not be removed/disturbed.



Property Access (Refer to Slides 23-29)

- Temporary access from select adjacent properties is required to construct the proposed erosion control works
- The City will be engaging the identified landowners to discuss potential access through the identified properties during construction and for purposes of future monitoring and maintenance.

Project Timeline and Next Steps



**Subject to City's capital budget process.*

Construction may be undertaken in several phases over the short and long term

Questions? Would you like to be added to the Contact List?

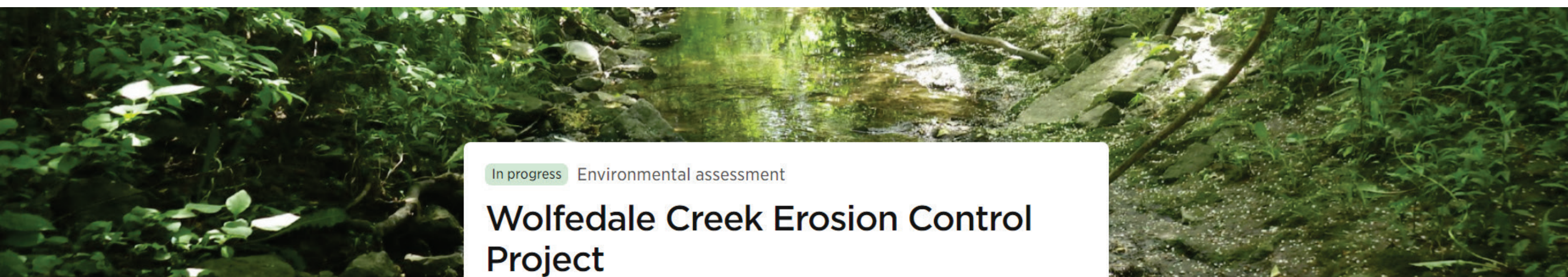
Please Contact:

Greg Frew, P.Eng.
City Project Manager
City of Mississauga
300 City Centre Drive
Mississauga, ON L5B 3C1
Greg.Frew@mississauga.ca

Kosta Paliouras, P.Eng.
Consultant Project Manager
AECOM Canada Ltd.
5080 Commerce Blvd.
Mississauga, ON L4W 4P2
kosta.paliouras@aecom.com

Project website: www.mississauga.ca/projects-and-strategies/environmental-assessments/wolfedale-creek-erosion-control

Comment form: We want to hear from you! A [comment form](#) is available for your feedback. Please submit comments by **July 18, 2024**



In progress Environmental assessment

Wolfedale Creek Erosion Control Project

The City of Mississauga is undertaking a Schedule B Class Environmental Assessment Study for erosion control and restoration of Wolfedale Creek from Burnhamthorpe Road West to the Credit River.