



**WELCOME**

**Loyalist Creek Erosion Control behind Thorn  
Lodge Drive Class Environmental Assessment  
VIRTUAL PUBLIC INFORMATION CENTRE  
June 18<sup>th</sup>, 2021**

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





## STUDY PURPOSE / PROBLEM DEFINITION

The study is being carried out to define the preferred restoration opportunity to address the erosion issues along Loyalist Creek.

This will improve the stability and health of the watercourse, mitigate risks to private properties, City's infrastructure, public safety, and enhance the aesthetics of the creek corridor.

## VIRTUAL PUBLIC INFORMATION CENTRE PURPOSE



### **This Virtual Public Information Centre (PIC) is Designed to:**

- Present information on existing conditions
- Present alternative creek restoration options
- Present study process and timelines



### **To Gain Community Input on:**

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



# MUNICIPAL CLASS ENVIRONMENTAL ASSESSMENT PROCESS

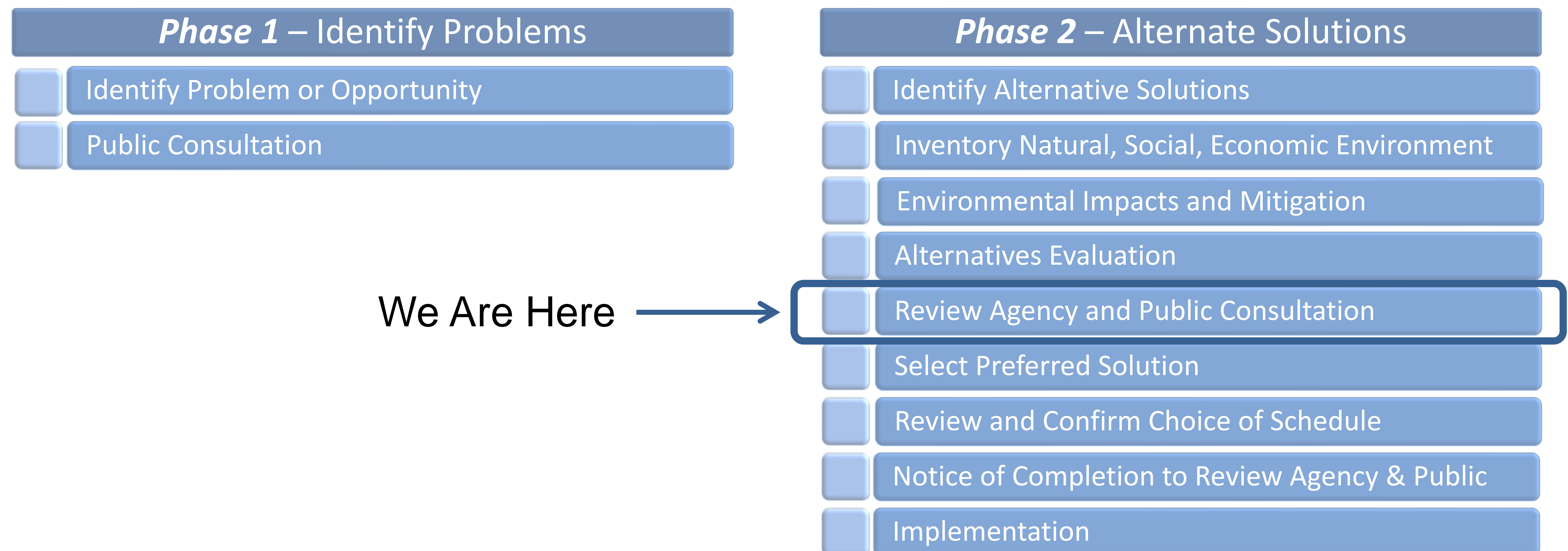


Loyalist Creek Erosion Control Class EA

## CLASS EA PROCESS - SCHEDULE B

Many projects related to municipal systems that are similar in nature, are carried out routinely, and have predictable and mitigatable environmental effects are addressed in accordance with the Municipal Engineers Association “Municipal Class Environmental Assessment” (October 2000, as amended in 2007 & 2015).

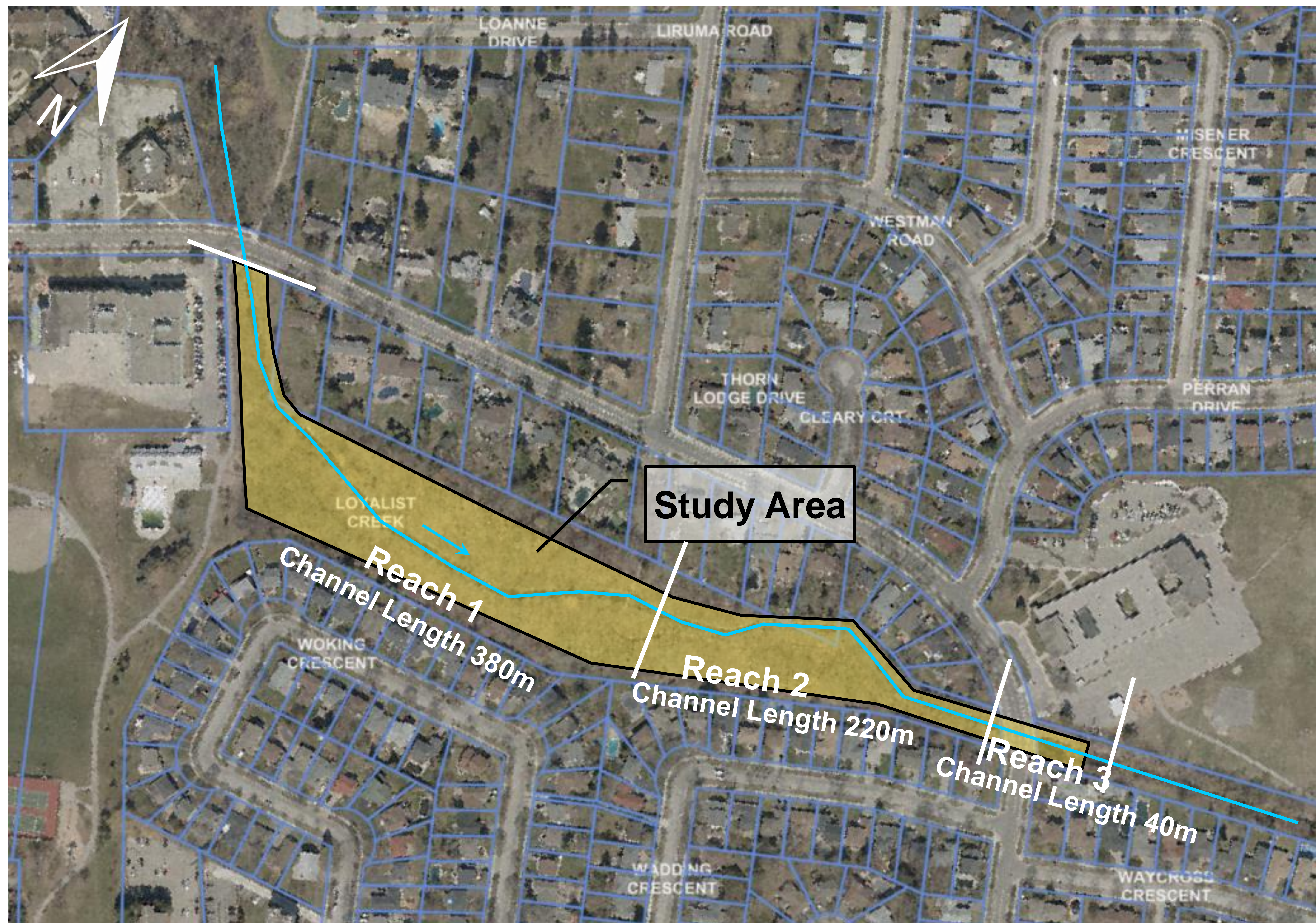
This study is being undertaken as a “Schedule B” project under the Municipal Class Environmental Assessment process. The flow chart below illustrates the key steps to be undertaken as part of the EA process.





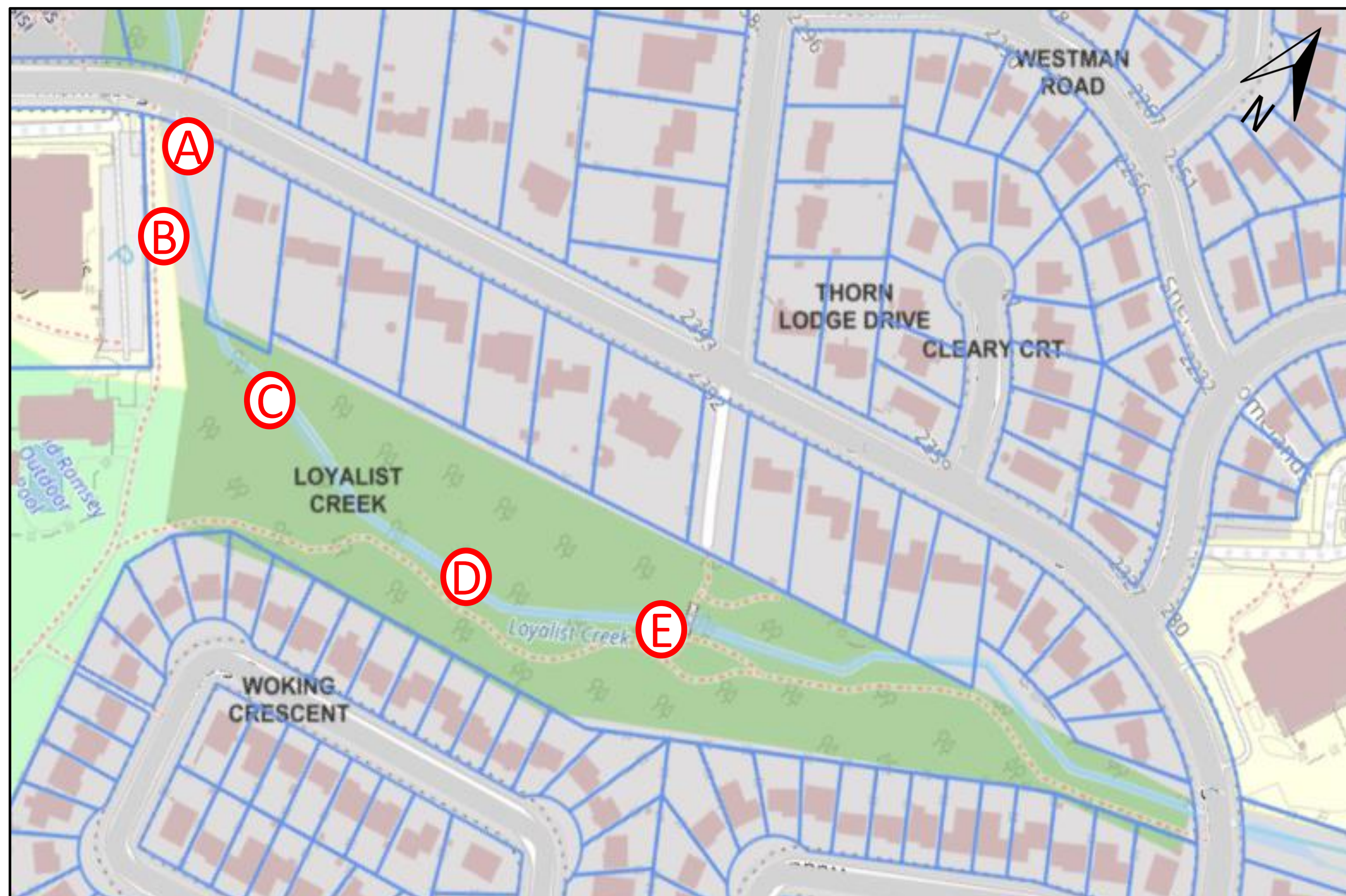
# STUDY AREA

Loyalist Creek within the study area flows easterly behind Thorn Lodge Drive. The creek has been historically straightened and channelized, and has since deteriorated. For the purposes of this study, the study area is divided into 3 reaches.



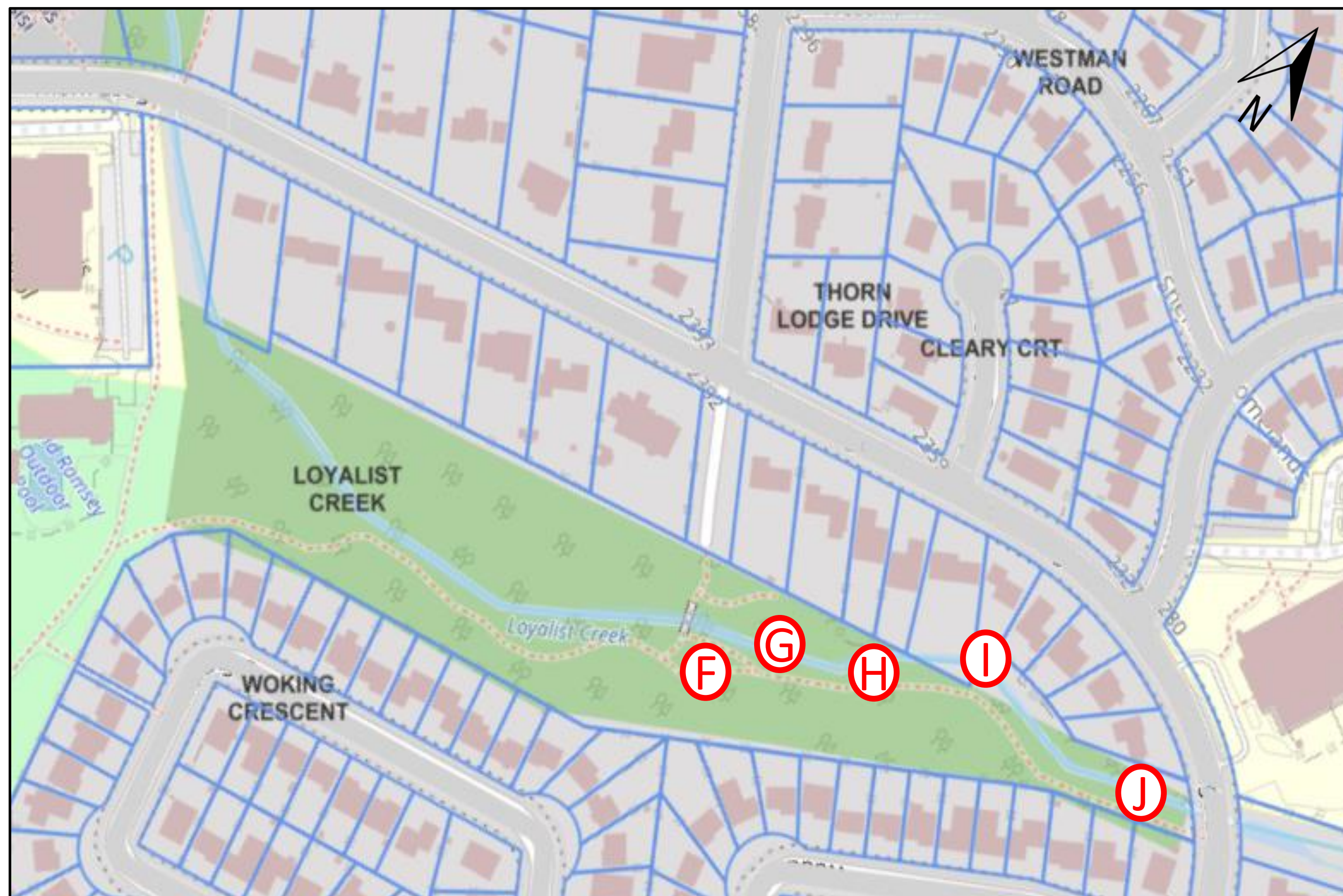


# EXISTING CONDITIONS – REACH 1





# EXISTING CONDITIONS – REACH 2





# EXISTING CONDITIONS – REACH 3





# TERRESTRIAL ECOLOGY

Ecological Land Classification (ELC) is a standard practice used to describe, identify, classify and map vegetation communities on the landscape. Community types found within the study area range from cultural thickets to woodlands as shown in the map below.



## Legend

- Watercourse
- Study Area
- Ecological Land Classification (ELC)
- Trails
- Approximate Location of Butternuts

## THDM2-6

Hawthorn Shrub Thicket

## WODM4

Dry-fresh Deciduous Woodland

## WODM4-4

Dry-fresh Black Walnut Deciduous Woodland

## FOD4-6

Norway Maple Deciduous Forest



The study assessed aquatic habitat and fisheries within Loyalist Creek to define existing conditions.



- Fish were not observed within the study area during the field investigation. However, past fish community studies provided fish collection records within the subwatershed.
- No major fish barriers were observed within the site.
- Aquatic habitat is generally in poor conditions, demonstrating characteristics of a channelized, urban-impacted and stormwater fed watercourse.
- Aquatic habitat potentially supports localized communities or vagrant species, and could be improved through restoration by adding more in-water cover and allowing the river to return to a more natural meandering pattern.

## TARGET FISHERIES CONDITIONS

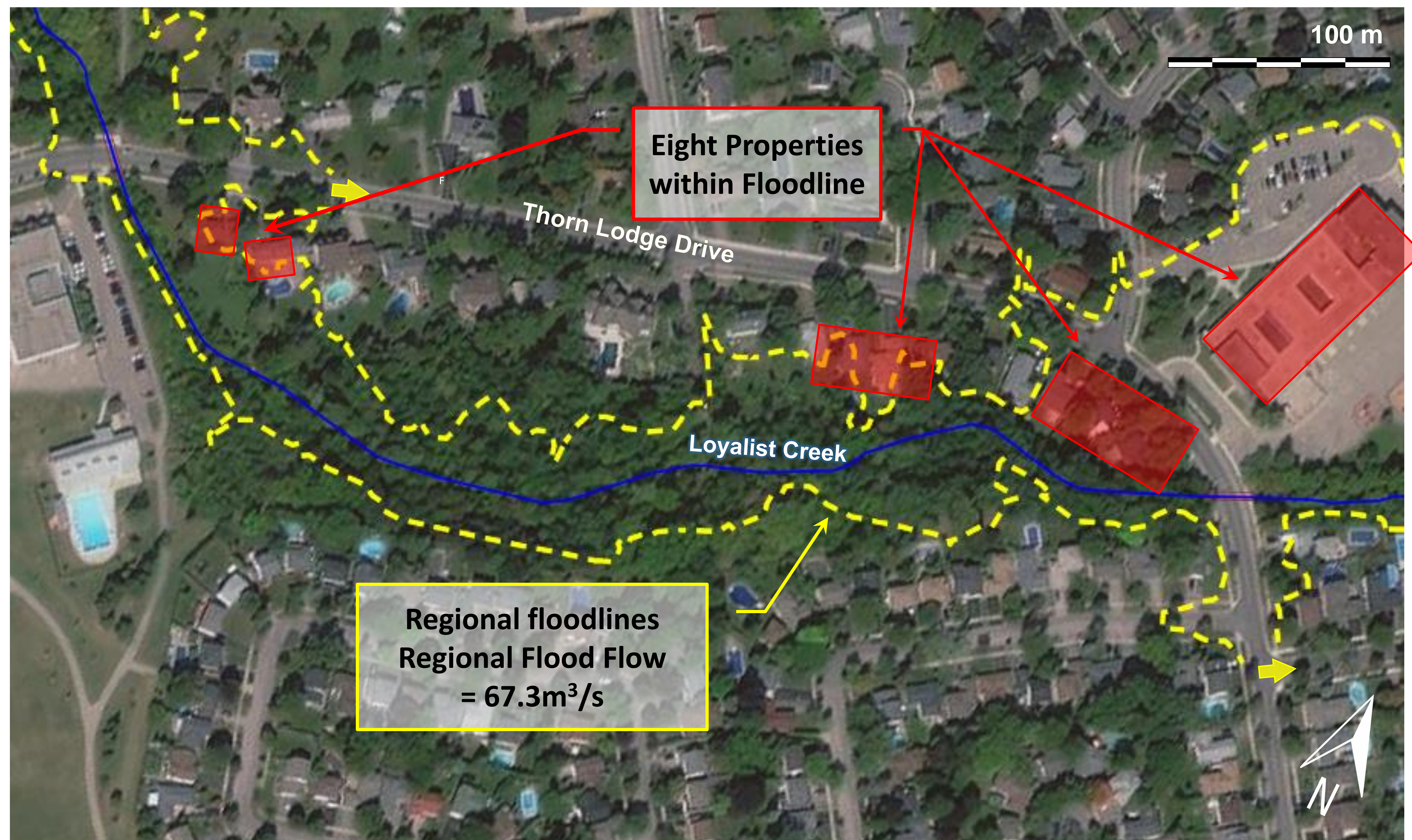
- Improved bank structure, providing cover and riparian vegetation
- Increased channel morphology, providing varied habitat and flow
- Improved variety of substrate to provide a better mix of habitat types and potential spawning areas





The study looked into Hydrology and Hydraulics of Loyalist Creek in order to understand how water flows through the creek, the forces it exerts under normal and extreme conditions, and the extent of flooding, so as to not worsen or impact flood levels.

The limits of Regional floodplain is shown below, highlighting the private properties within the existing floodplain.





A Stage 1 Archaeological Assessment was completed, involving background research and property inspection in order to determine the potential for the presence of archaeological and cultural resources to exist within the site. The following criteria indicative of archaeological potential were found through the assessment, which in turn recommended that a Stage 2 Archaeological Assessment to be completed, including test pit surveys:

- Water Sources:  
Loyalist Creek
- Early Historic Transportation Routes:  
Dundas Street
- Previous Identified Archaeological Sites:  
AjGv-76 – Pre Contact Indigenous; Euro-Canadian
- Well Drained Soil:  
Oneida clay loam.

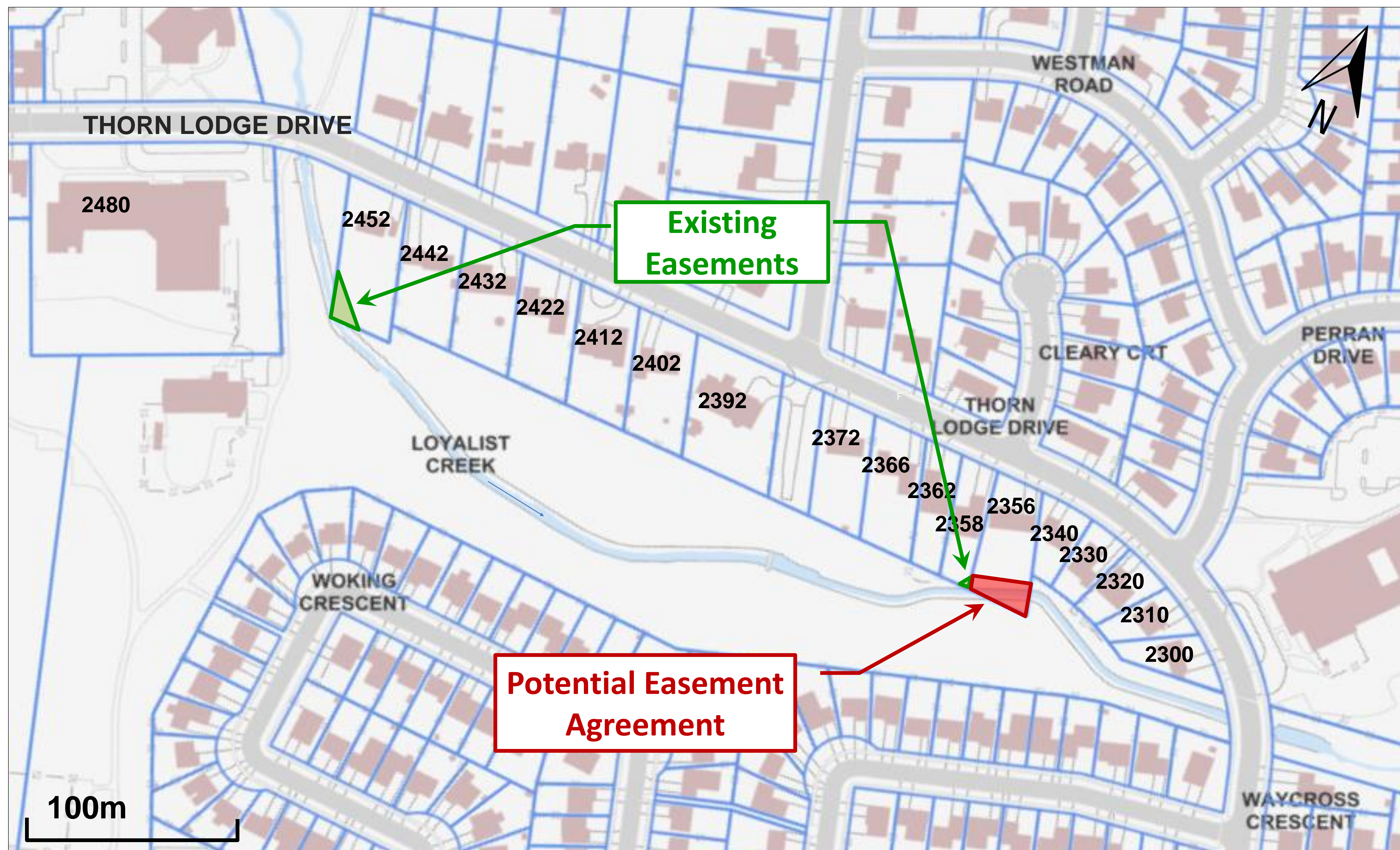




# OWNERSHIP AND EASEMENT

Loyalist Creek within the study area mostly flows through the City property of Thorn Lodge Park, with three sections running through private properties.

City maintains easements for the creek sections within 2452 and 2358 Thorn Lodge Drive, and has been discussing options for maintaining or moving the section of creek through 2356 Thorn Lodge Drive.





# EVALUATION APPROACH AND CRITERIA

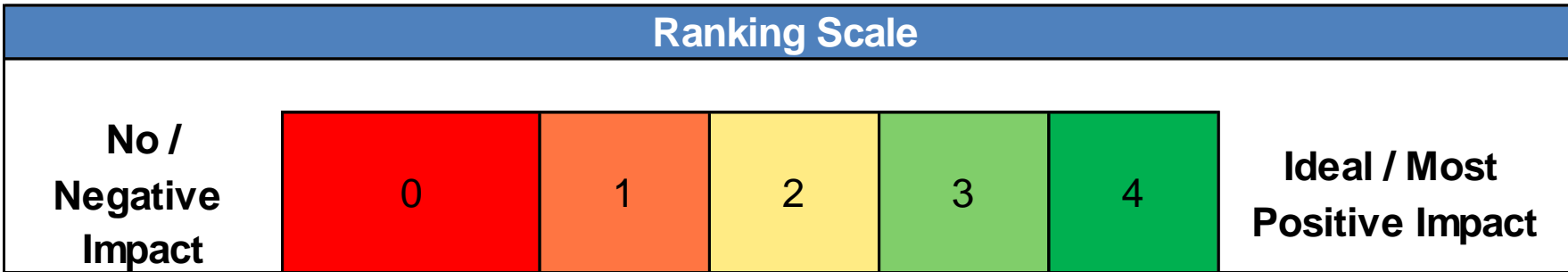
There are four alternative approaches being considered for this project:

1. Do Nothing

2. Local Restoration
3. Engineered Channel Restoration

4. Natural Channel Restoration

The following criteria will be used to evaluate each alternative to determine the preferred method for rehabilitation of Loyalist Creek. The evaluation uses a normalized ranking scheme to provide equal weighting for each category of evaluation criteria. A ranking scale from 0 (no / negative impact) to 4 (ideal / most positive impact) is applied to each criterion.

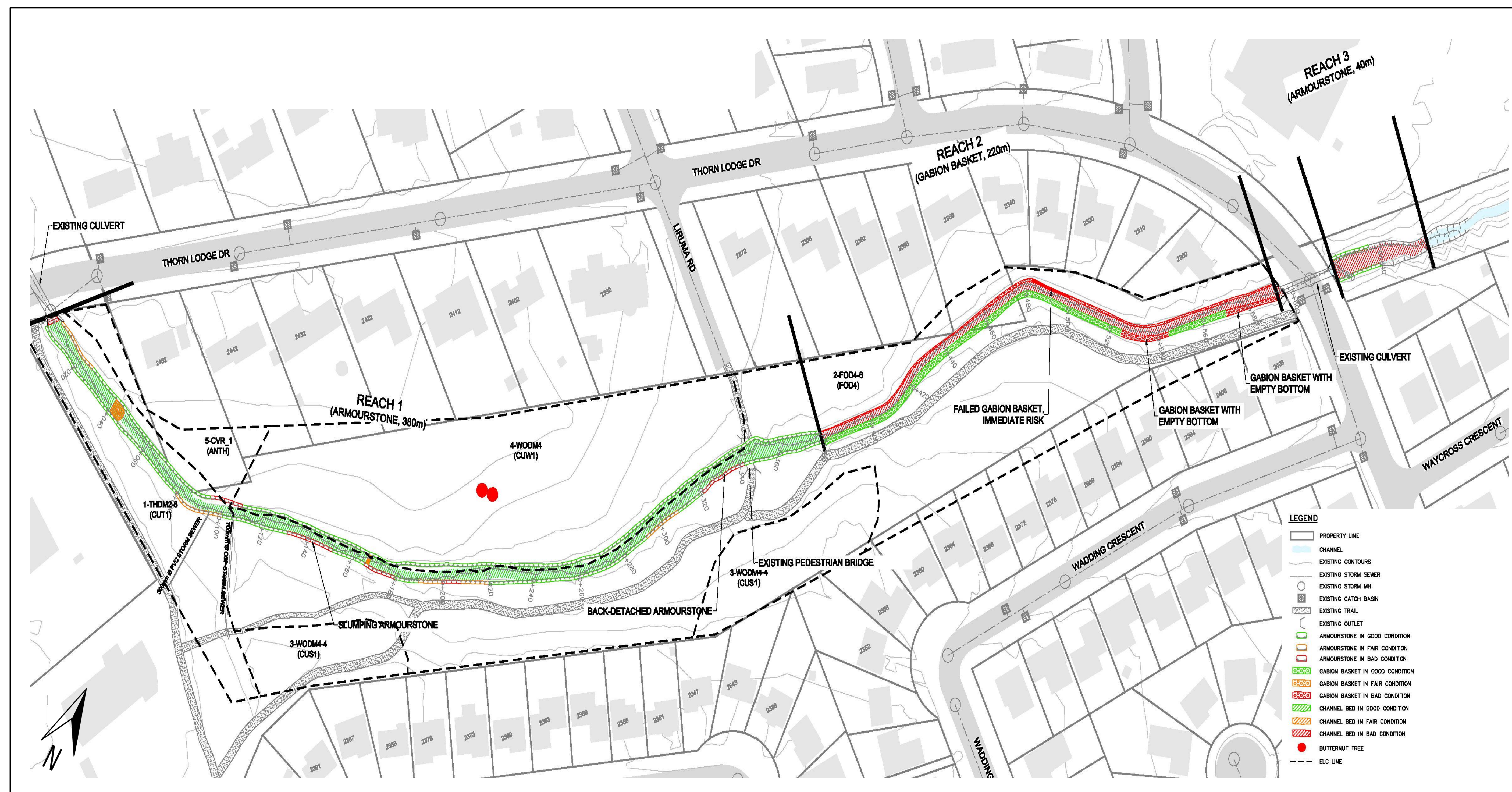


Comment sheets are provided to collect public feedback on the evaluation criteria and preliminary evaluation / outcome.

Physical and Natural Criteria		Social and Cultural Criteria	
Erosion	Rate of Erosion, slope failures, and loss of tablelands	Public Safety	Impact on public safety
Water Quality	Impact on water quality	Landowner Impacts	Impact on adjacent private properties and the City-owned Park
Aquatic Habitat	Impact on contributing aquatic habitat and linkage	Benefit to Community	Access to trails, enjoyment of surrounding lands
Terrestrial Habitat	Impact on connectivity, diversity, and quantity/quality of habitat	Aesthetic Value	Impact on existing and proposed aesthetic value
Terrestrial Vegetation	Impact on existing riparian vegetation and mature trees		
Technical and Engineering Criteria		Economic Criteria	
Existing Infrastructure	Protection or potential failure of infrastructure (bridges, trails, storm outfalls)	Capital Costs	One time cost to City
Constructability	Easiness to access, move equipment and construct	Operations & Maintenance Costs	Requirement for regular, irregular or no maintenance activities and ensure effectiveness of implemented measures
Lifespan of Works	Expected lifespan / years of works before intervention needs to be repeated		



# Potential Alternative #1 Do Nothing



Existing Conditions / Do Nothing

## Alternative # 1 – Do Nothing

**Definition:** No restoration measures taken, except on emergency basis.

**Description:** This alternative would involve leaving the existing creek, particularly the gabion baskets which line both banks, to continue failing. Existing risks associated with eroding of streambanks, deteriorated storm outfalls, loss of tableland within private properties, and public safety will remain. Habitat conditions would continue to degrade due to erosion.

Although no capital costs have been assigned to this alternative, ongoing operation and maintenance activities would continue. Under emergency conditions (i.e. failure) works would occur. Monitoring would be necessary.



# Potential Alternative #1

## Do Nothing – Cont.

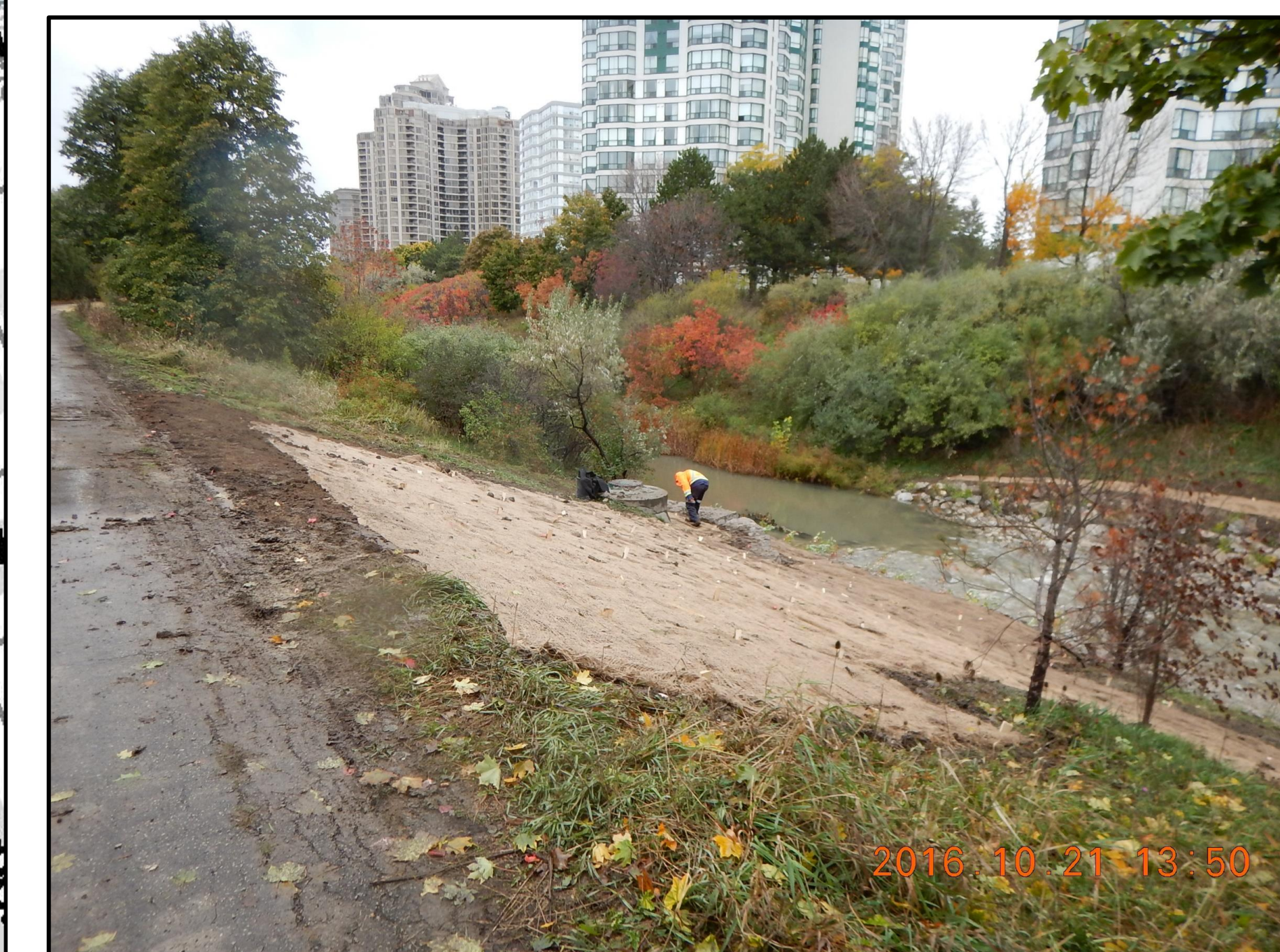
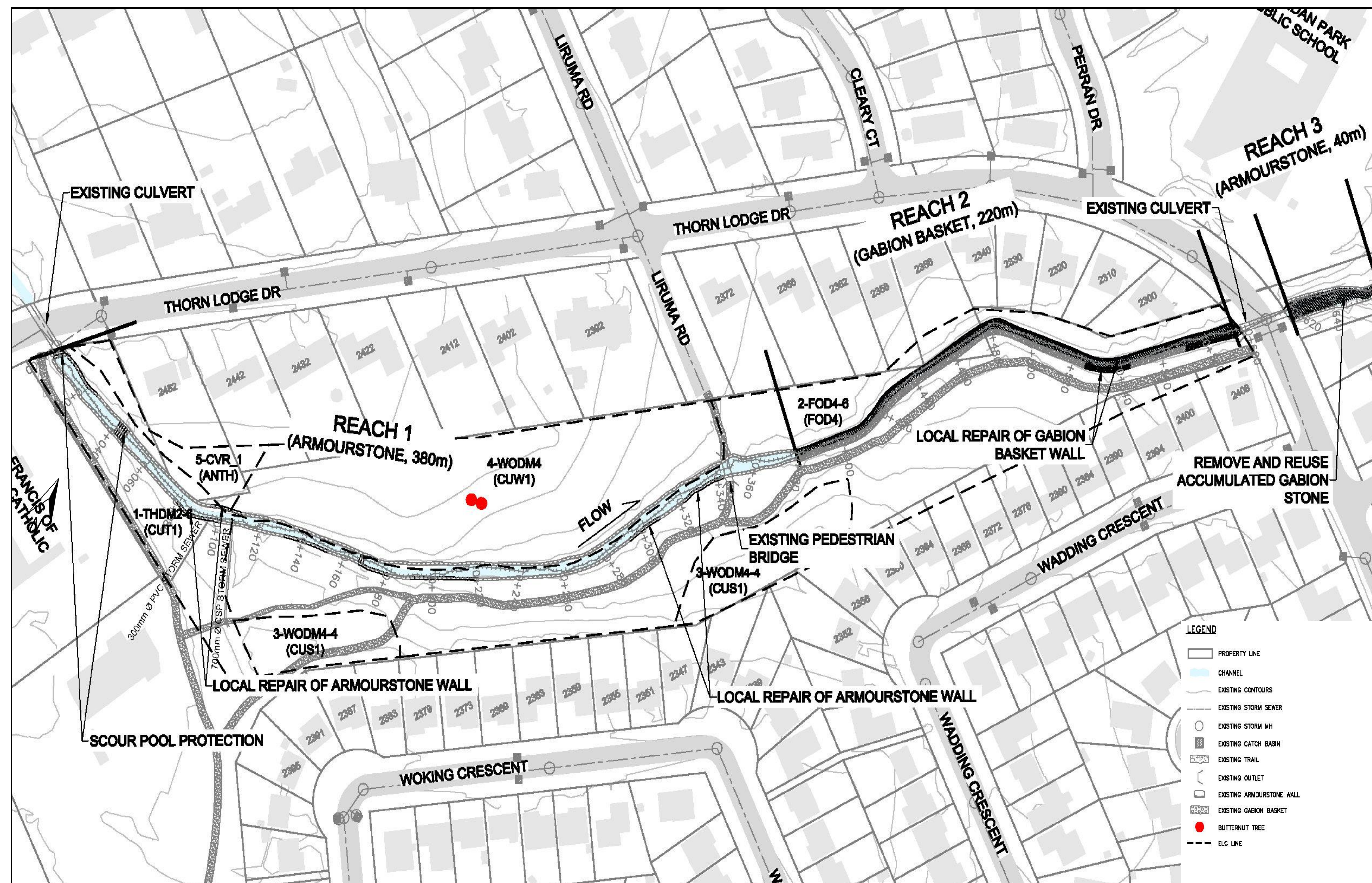


### Loyalist Creek Erosion Control Class EA

EVALUATION CRITERIA		Alternative 1 - Do Nothing					
		Reach 1		Reach 2		Reach 3	
		Score	Explanation	Score	Explanation	Score	Explanation
Physical and Natural Criteria		1.0		1.0		1.0	
Erosion	Rate of erosion, slope failures, and loss of tablelands	0	Continued erosion, slope failures and loss of table / golf course lands	0	Continued erosion, slope failures and loss of table / golf course lands	0	Continued erosion, bedrock incision carrying further downstream
Water Quality	Impact on water quality	0	Hardened banks remain and lack of tree canopy keeps water warmer. No improvement to water quality.	0	Eroded banks remain and lack of tree canopy keeps water warmer. No improvement to water quality.	0	Accumulated gabion remains. No improvement to water quality.
Aquatic Habitat	Impact on contributing aquatic habitat	0	No improvement to habitat. Possibility the habitat will degrade as armourstone continue to fail and collect debris.	0	No improvement to habitat. Possibility the habitat will degrade as armourstone continue to fail and collect debris.	0	No improvement to habitat. Possibility the habitat will degrade as armourstone continue to fail and collect debris.
Terrestrial Habitat	Impact on connectivity, diversity and quantity/quality of habitat	4	Habitat stays in current condition, relatively healthy.	4	Habitat stays in current condition.	4	Habitat stays in current condition.
Terrestrial Vegetation	Impact on existing riparian vegetation and mature trees	4	Vegetation composition remains the same.	4	Vegetation composition remains the same.	4	Vegetation composition remains the same.
Social and Cultural Criteria		1.1		0.9		0.9	
Public Safety	Impact on public safety	1	Continued erosion and bank failure would create risks to public safety	0	Continued erosion and bank failure would create risks to public safety. Immediate risk to 1 landowner where the gabion baskets have completed failed.	0	Continued erosion and bank failure would create risks to public safety.
Landowner Impacts	Impact on adjacent private properties and the City-owned Park	1	Continued erosion and unstable slopes would potentially lead to loss of table / parklands	1	Continued erosion and unstable slopes would potentially lead to loss of table / parklands.	1	Continued erosion and unstable slopes would potentially lead to loss of table / parklands.
Benefit to Community	Access to trails, enjoyment of surrounding lands	4	No disturbance to access to trails, enjoyment of surrounding lands	4	No disturbance to access to trails, enjoyment of surrounding lands	4	No disturbance to access to trails, enjoyment of surrounding lands
Aesthetic Value	Impact on existing and proposed aesthetic value	1	Low aesthetic value due to structure failures within the channel	1	Low aesthetic value due to structure failures within the channel	1	Low aesthetic value due to accumulated gabion and debris within the channel
Technical and Engineer Criteria		1.3		1.5		1.7	
Impact on Existing Infrastructure	Protection or potential failure of infrastructure (bridges, trails, and storm outfalls)	1	Continued degradation of storm outfalls and risks to existing bridge.	3	No immediate risk to infrastructure	3	No immediate risk to infrastructure
Constructability	Easiness to access, move equipment and construct	4	No construction activity	4	No construction activity	4	No construction activity
Lifespan of Works	Expected lifespan / years of works before intervention needs to be repeated	1	Structures in various lifespan (good - fair - bad)	0	Structures at the end of lifespan	1	Structures near end of lifespan
Economic Criteria		1.3		1.3		1.3	
Capital Costs	One time cost to City	4	No capital cost to City	4	No capital cost to City	4	No capital cost to City
Operations & Maintenance Costs	Requirement for regular, irregular or no maintenance activities and ensure effectiveness of implemented measures	0	Regular monitoring and maintenance to mitigate the deterioration of the channel and tablelands. Emergency repairs on as-needed bases in perpetuity	0	Regular monitoring and maintenance to mitigate the deterioration of the channel and tablelands. Emergency repairs on as-needed bases in perpetuity	0	Regular monitoring and maintenance to mitigate the deterioration of the channel and tablelands. Emergency repairs on as-needed bases in perpetuity
TOTAL SCORE		4.6		4.6		4.9	



# Potential Alternative #2 Local Restoration



Local Restoration

## Alternative # 2 – Local Restoration

**Definition:** Stream restoration works at strategic locations in order to limit the impact of existing erosion problems .

**Description:** This Alternative would involve undertaking stream restoration works at priority problem locations. The proposed works would prevent local erosion of the channel by stabilization of the bed, banks and slopes. Where erosion is creating risks to infrastructure and properties, local bank or slope stabilization treatments would be placed by using either hardened (engineered) type treatments or retrofitting / repairing of existing structures. Benefits of local works include minimal disruption to the local natural environment, quick implementation to minimize short term risk. The lifespan of these works are generally defined as moderate. Intermediate and long term fluvial processes often / eventually undermine works, or similar issues are transcribed downstream.



# Potential Alternative #2

## Local Restoration



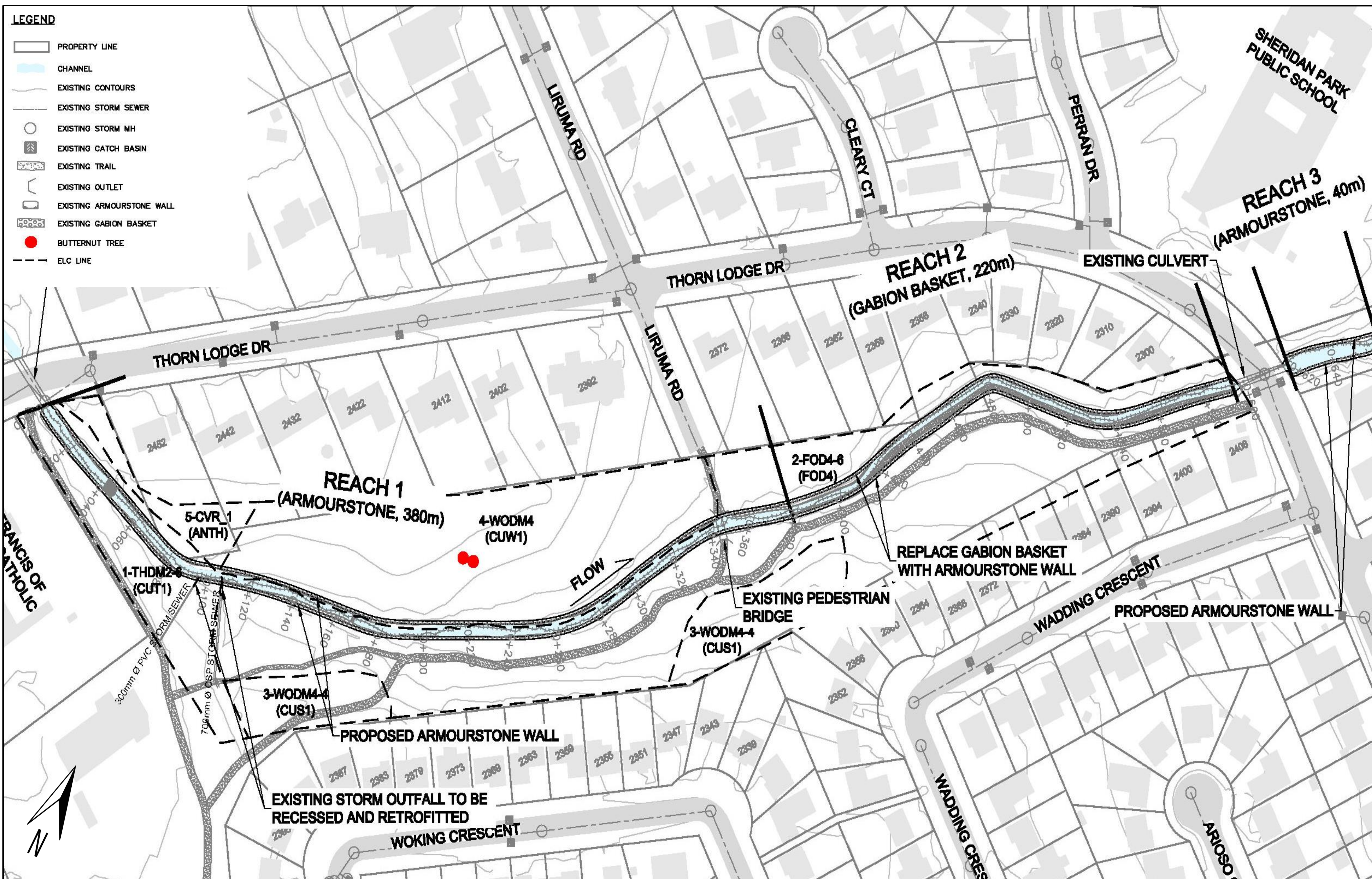
Loyalist Creek Erosion Control Class EA

EVALUATION CRITERIA		Alternative 2 - Local Restoration					
		Reach 1		Reach 2		Reach 3	
		Score	Explanation	Score	Explanation	Score	Explanation
Physical and Natural Criteria		1.6		1.1		1.8	
Erosion	Rate of erosion, slope failures, and loss of tablelands	3	Local repair using engineered materials would provide erosion control	3	Local repair using engineered materials would provide erosion control, however, erosion would continue to occur at other locations	3	Local repair by removing and reshaping the channel would minimize erosion.
Water Quality	Impact on water quality	2	Some improvement of water quality.	1	Limited improvements to the water quality	3	Removing and reshaping the accumulated gabions will improve the backwatered area upstream. Lowering the amount of stagnant water will improve water quality downstream.
Aquatic Habitat	Impact on contributing aquatic habitat	2	Knickpoint would be mitigated to allow fish access to upstream reaches. Substrate other than cobble could be added to the reach.	1	Limited improvement of aquatic habitat which may be suitable for different types of forage for fish.	2	The possible water quality improvements would make this reach suitable for different types of forage for fish.
Terrestrial Habitat	Impact on connectivity, diversity and quantity/quality of habitat	3	Minor impact to ecological communities due to construction will be mitigated by planting native species.	2	Moderate impact to ecological communities.	3	Minor impact to ecological communities.
Terrestrial Vegetation	Impact on existing riparian vegetation and mature trees	3	Limited vegetation loss due to construction. It will be mitigated through native species plantings throughout the reach; Removal of dead ash trees and invasive shrubs	2	Vegetation loss due to construction will be mitigated through native species plantings throughout the reach; Removal of some dead ash trees and invasive shrubs	3	Vegetation loss due to construction will be mitigated through native species plantings throughout the reach.
Social and Cultural Criteria		1.4		1.0		1.5	
Public Safety	Impact on public safety	3	Improved public safety by reducing erosions and stabilizing banks.	2	Improved public safety by reducing erosions and stabilizing banks.	3	Improved public safety by reducing erosions and flooding
Landowner Impacts	Impact on adjacent private properties and the City-owned Park	3	Minor disturbance to parkland due to construction access. Reduced risks of property loss	2	Minor disturbance to parkland due to construction access. Reduced risks of property loss	3	Minor disturbance to parkland due to construction access, as well as adjacent properties
Benefit to Community	Access to trails, enjoyment of surrounding lands	3	Minor disturbance to access to trails, enjoyment of surrounding lands	2	Disturbance to access to trails due to construction, however, trail will be restored.	3	Minor disturbance.
Aesthetic Value	Impact on existing and proposed aesthetic value	2	Some improvement of the value of the creek corridor.	2	Some improvement of the value of the creek corridor.	3	Improvement of the natural look and aesthetic value of the creek corridor.
Technical and Engineer Criteria		1.9		1.5		1.7	
Impact on Existing Infrastructure	Protection or potential failure of infrastructure (bridges, trails, and storm outfalls)	3	Repair of degraded storm outfalls. Risks to existing bridge remain.	3	No immediate risk to infrastructure	3	No immediate risk to infrastructure
Constructability	Easiness to access, move equipment and construct	3	Reach is accessible, with narrower corridor within a few sections. Local repair allows smaller machine to work within narrow corridor. Moderate clearing and grubbing required. No work within private property	2	Reach is accessible, moderate clearing and grubbing required. Work within private property	3	Only small equipment is required.
Lifespan of Works	Expected lifespan / years of works before intervention needs to be repeated	3	Long-term lifespan of works	2	Moderate lifespan of works	2	Moderate lifespan of works
Economic Criteria		1.9		1.3		1.9	
Capital Costs	One time cost to City	3	3rd Highest construction costs	2	2nd Highest construction costs	3	3rd Highest construction costs
Operations & Maintenance Costs	Requirement for regular, irregular or no maintenance activities and ensure effectiveness of implemented measures	3	Minimal monitoring and maintenance.	2	Annual monitoring and maintenance required.	3	Minimal monitoring and maintenance
TOTAL SCORE		6.8		4.8		6.8	





# Potential Alternative #3 Engineered Channel Restoration



Engineered Channel Restoration

## Alternative # 3 – Engineered Channel Restoration

**Definition:** Stream restoration in existing alignment, using armourstone as bank protection measures.

**Description:** This Alternative would involve a continuous restoration of the Loyalist Creek throughout the study area, replacing all existing bank and bed structures with armourstones. The existing channel width and alignment will be maintained. This alternative will require moderate disruption to the natural environment and adjacent properties, and provide long-term erosion protection to the watercourse. However, the creek will still runs through private properties, which may cause risks to the properties again in the long term. Improvement to the aquatic and terrestrial habitats is relatively low as minimal in-water and riparian vegetation could be planted. The lifespan of these works are generally defined as long, however, long-term maintenance or repair after significant rainfall will typically required to meet lifespan expectations.



# Potential Alternative #3

## Engineered Channel Restoration



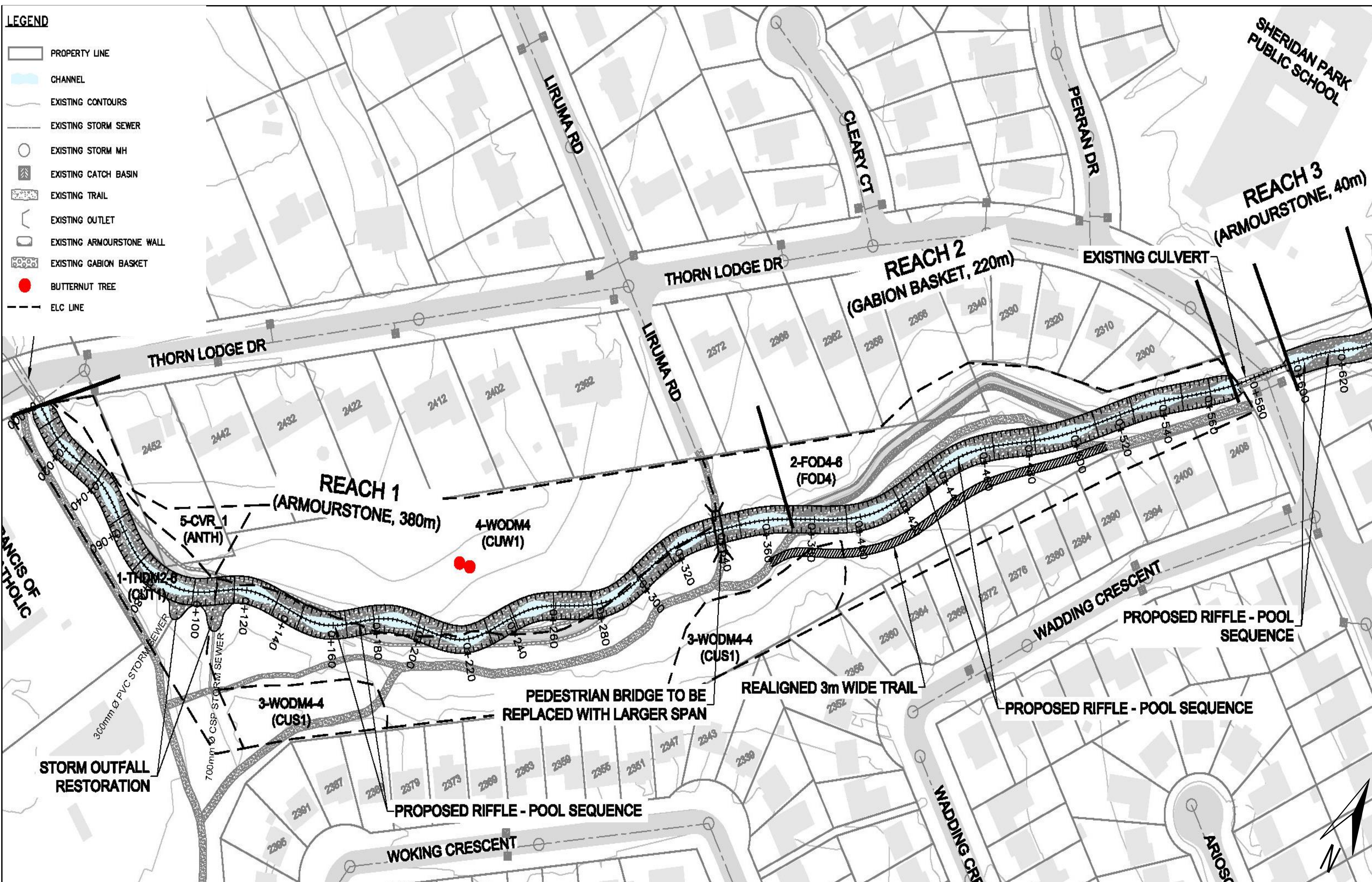
Loyalist Creek Erosion Control Class EA

EVALUATION CRITERIA		Alternative 3 - Engineered Channel Restoration					
		Reach 1		Reach 2		Reach 3	
		Score	Explanation	Score	Explanation	Score	Explanation
Physical and Natural Criteria		1.5		1.8		1.6	
Erosion	Rate of erosion, slope failures, and loss of tablelands	4	Long-term erosion protection with minimal opportunities for planform adjustment	4	Long-term erosion protection with minimal opportunities for planform adjustment	4	Long-term erosion protection with minimal opportunities for planform adjustment
Water Quality	Impact on water quality	2	Some improvement of water quality.	3	Some improvement of water quality.	3	Some improvement of water quality.
Aquatic Habitat	Impact on contributing aquatic habitat	2	Knickpoint would be mitigated to allow fish access to upstream reaches. Substrate other than cobble could be added to the reach.	3	Removal of failed gabions baskets to will improve instream conditions. Engineered riffles provide habitat for forage (such as important benthic macroinvertebrates)	2	The possible water quality improvements would make this reach suitable for different types of forage for fish.
Terrestrial Habitat	Impact on connectivity, diversity and quantity/quality of habitat	2	Additional localized loss of vegetation due to construction will be mitigated by planting native species. Limited opportunity to enhance riparian habitat diversity	2	Moderate impact to ecological communities. Loss of forest canopy cover until plantings mature and replace canopy	2	Moderate impact to ecological communities. Loss of forest canopy cover until plantings mature and replace canopy
Terrestrial Vegetation	Impact on existing riparian vegetation and mature trees	2	Vegetation loss to established vegetation community. Native species would be replanted for compensation	2	Vegetation loss due to construction will be mitigated through native species plantings throughout the reach; Removal of dead ash trees and invasive shrubs	2	Vegetation loss due to construction will be mitigated through native species plantings throughout the reach;
Social and Cultural Criteria		1.6		1.6		1.7	
Public Safety	Impact on public safety	3	Improved public safety by reducing erosions and stabilizing banks. However, certain safety measures may be required due to deep channel (~2m) with steep bank slopes.	3	Improved public safety by reducing erosions and stabilizing banks. However, certain safety measures may be required due to deep channel (~2m) with steep bank slopes.	4	Improved public safety by reducing erosions and flooding
Landowner Impacts	Impact on adjacent private properties and the City-owned Park	2	Moderate disturbance to parkland due to construction. Reduced risks of property loss	2	Moderate disturbance to parkland due to construction. Reduced risks of property loss	2	Moderate disturbance to parkland due to construction. Disturbance to adjacent properties due to narrow corridor
Benefit to Community	Access to trails, enjoyment of surrounding lands	2	Disturbance to access to trails due to construction, however, trail will be restored.	2	Disturbance to access to trails due to construction, however, trail will be restored.	2	Moderate disturbance.
Aesthetic Value	Impact on existing and proposed aesthetic value	3	Improvement of the natural look and aesthetic value of the creek corridor.	3	Improvement of the natural look and aesthetic value of the creek corridor.	3	Improvement of the natural look and aesthetic value of the creek corridor.
Technical and Engineer Criteria		1.9		1.9		1.5	
Impact on Existing Infrastructure	Protection or potential failure of infrastructure (bridges, trails, and storm outfalls)	4	Repair of degraded storm outfalls. Existing bridge abutments would be protected.	4	Reduced risk to infrastructure.	3	No immediate risk to infrastructure
Constructability	Easiness to access, move equipment and construct	2	Reach is accessible, moderate clearing and grubbing required. Work within private property	2	Reach is accessible, moderate clearing and grubbing required. Work within private property	1	Access would be difficult due to narrow corridor
Lifespan of Works	Expected lifespan / years of works before intervention needs to be repeated	3	Long-term life span ~ 50 years.	3	Long-term life span ~ 50 years.	3	Long-term life span ~ 50 years.
Economic Criteria		0.9		0.9		0.9	
Capital Costs	One time cost to City	0	Highest construction costs associated with significant amount of hard materials.	0	Highest construction costs associated with significant amount of hard materials.	0	Highest construction costs associated with significant amount of hard materials.
Operations & Maintenance Costs	Requirement for regular, irregular or no maintenance activities and ensure effectiveness of implemented measures	3	Long-term maintenance required to meet lifespan expectations.	3	Long-term maintenance required to meet lifespan expectations.	3	Long-term maintenance required to meet lifespan expectations.
TOTAL SCORE		5.9		6.1		5.7	





# Potential Alternative #4 Natural Channel Restoration



Natural Channel Restoration

## Alternative # 4 – Natural Channel Restoration

**Definition:** Restoration of the stream to a more naturalized form, realigning the creek away from the private properties.

**Description:** This Alternative would involve complete restoration of Loyalist Creek throughout the length of the study area, recreating the sinuosity of channel and restoring the channel bed and banks using a combination of natural channel design techniques as well as engineered methods. During construction, this option will involve the highest level of disruption to landowners, local residents, and habitat (including existing vegetation). Once completed however, it will provide improved conditions in terms of the natural function and processes of the watercourse. All disrupted areas will be restored with native plantings and seed mixes designed to provide stability and sustainability.



# Potential Alternative #4

## Natural Channel Restoration



### Loyalist Creek Erosion Control Class EA

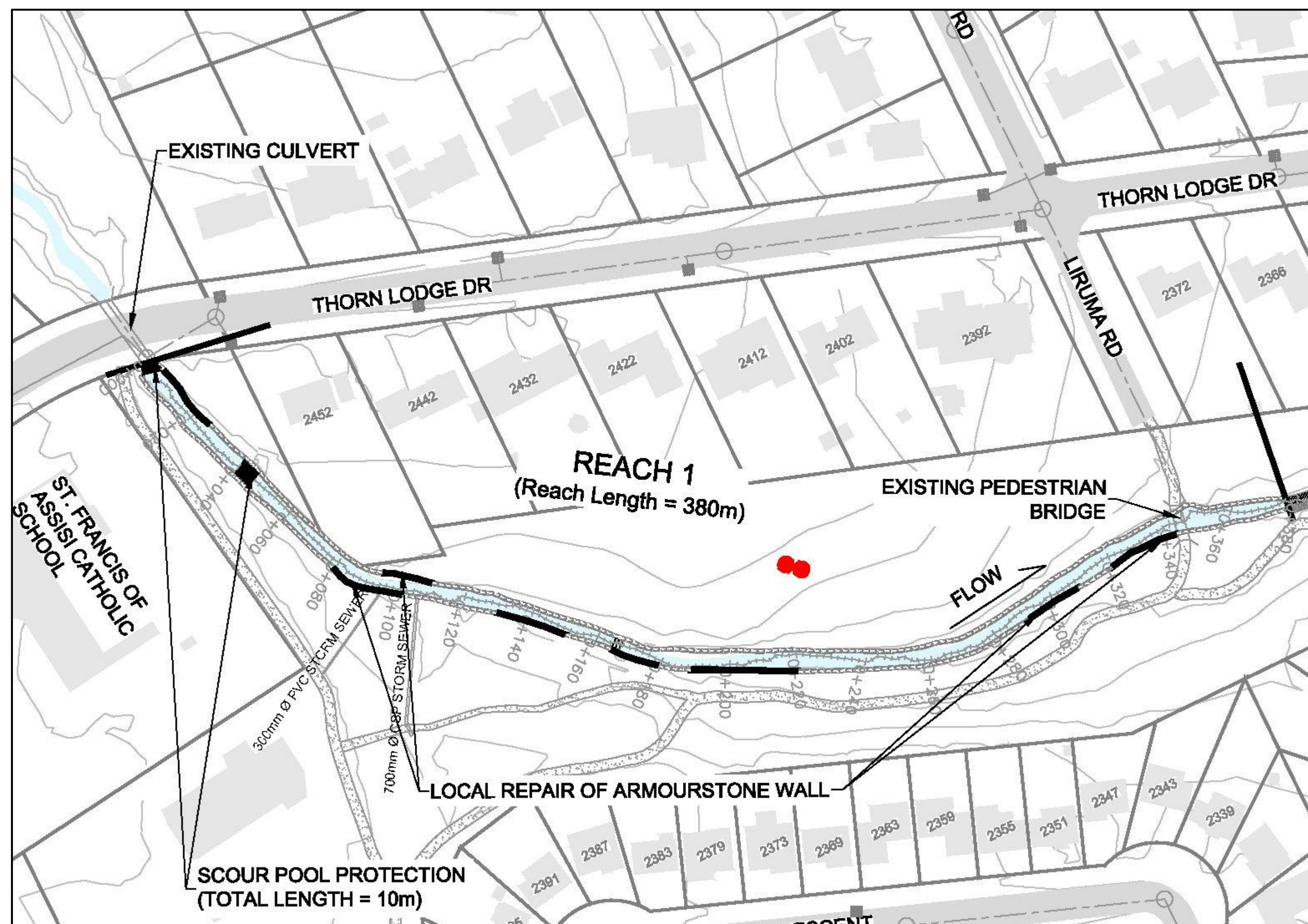
EVALUATION CRITERIA		Alternative 4 - Natural Channel Restoration					
		Reach 1		Reach 2		Reach 3	
		Score	Explanation	Score	Explanation	Score	Explanation
Physical and Natural Criteria		1.6		1.8		1.9	
Erosion	Rate of erosion, slope failures, and loss of tablelands	4	Minimized rate of erosion and loss of table / golf course land, provided stable slopes	4	Long-term erosion protection with minimal opportunities for planform adjustment	4	Minimized rate of erosion and loss of table / golf course land, provided stable slopes
Water Quality	Impact on water quality	3	Future vegetation cover from new riparian plantings will help to shade creek and keep the water cooler, as well as holding the banks together to reduce sedimentation from bank erosion	3	Some improvement of water quality.	4	Future vegetation cover from new riparian plantings will help to shade creek and keep the water cooler, as well as holding the banks together to reduce sedimentation from bank erosion
Aquatic Habitat	Impact on contributing aquatic habitat	4	Restoring the creek to a meandering form would encourage proper river function in the development of runs/riffles/pools, providing better habitat for fish and their forage. New riparian plantings would provide shade to creek and provide habitat for forage.	3	Removal of failed gabions baskets to will improve instream conditions. Engineered riffles provide habitat for forage (such as important benthic macroinvertebrates)	3	Development of runs/riffles/pools, providing better habitat for fish and their forage. New riparian plantings would provide shade to creek and provide habitat for forage.
Terrestrial Habitat	Impact on connectivity, diversity and quantity/quality of habitat	1	Likely removal of candidate bat maternity roosting sites and impact on existing 2x butternut trees. Loss of forest canopy cover until plantings mature and replace canopy.	2	Moderate impact to ecological communities. Loss of forest canopy cover until plantings mature and replace canopy	2	Likely removal of candidate bat maternity roosting sites. Loss of forest canopy cover until plantings mature and replace canopy . Opportunity to enhance riparian habitat diversity
Terrestrial Vegetation	Impact on existing riparian vegetation and mature trees	1	Vegetation loss to established vegetation community. Native species would be replanted for compensation	2	Vegetation loss due to construction will be mitigated through native species plantings throughout the reach; Removal of dead ash trees and invasive shrubs	2	Vegetation loss due to construction will be mitigated through native species plantings throughout the reach;
Social and Cultural Criteria		1.7		1.6		1.4	
Public Safety	Impact on public safety	4	Stable slope and natural meander form, flooding risks minimized	3	Improved public safety by reducing erosions and stabilizing banks. However, certain safety measures may be required due to deep channel (~2m) with steep bank slopes.	4	Stable slope and natural meander form.
Landowner Impacts	Impact on adjacent private properties and the City-owned Park	1	Moderate disturbance to parkland due to construction. Impact on 1 landowner who has the creek within his/her property.	2	Moderate disturbance to parkland due to construction. Reduced risks of property loss	1	Major disturbance to parkland due to construction. Disturbance to adjacent properties due to narrow corridor
Benefit to Community	Access to trails, enjoyment of surrounding lands	2	Disturbance to access to trails due to construction, however, trail will be restored.	2	Disturbance to access to trails due to construction, however, trail will be restored.	1	Major disturbance.
Aesthetic Value	Impact on existing and proposed aesthetic value	4	Significant enhancement of the natural look of the creek corridor and aesthetic value of creek corridor	3	Improvement of the natural look and aesthetic value of the creek corridor.	3	Improvement of the natural look and aesthetic value of the creek corridor.
Technical and Engineer Criteria		1.7		1.9		1.7	
Impact on Existing Infrastructure	Protection or potential failure of infrastructure (bridges, trails, and storm outfalls)	3	Repair of degraded storm outfalls. Existing bridge will be replaced	4	Reduced risk to infrastructure.	3	No immediate risk to infrastructure
Constructability	Easiness to access, move equipment and construct	1	Reach is accessible, moderate clearing and grubbing required. Work within private property	2	Reach is accessible, moderate clearing and grubbing required. Work within private property	1	Access would be difficult due to narrow corridor
Lifespan of Works	Expected lifespan / years of works before intervention needs to be repeated	4	Long lifespan of works > 50 years.	3	Long-term life span ~ 50 years.	4	Long lifespan of works > 50 years.
Economic Criteria		1.6		0.9		1.3	
Capital Costs	One time cost to City	1	2nd highest construction costs	0	Highest construction costs associated with significant amount of hard materials.	1	3rd highest construction costs
Operations & Maintenance Costs	Requirement for regular, irregular or no maintenance activities and ensure effectiveness of implemented measures	4	Minimal maintenance required.	3	Long-term maintenance required to meet lifespan expectations.	3	Minimal maintenance required.
TOTAL SCORE		6.6		6.1		6.2	





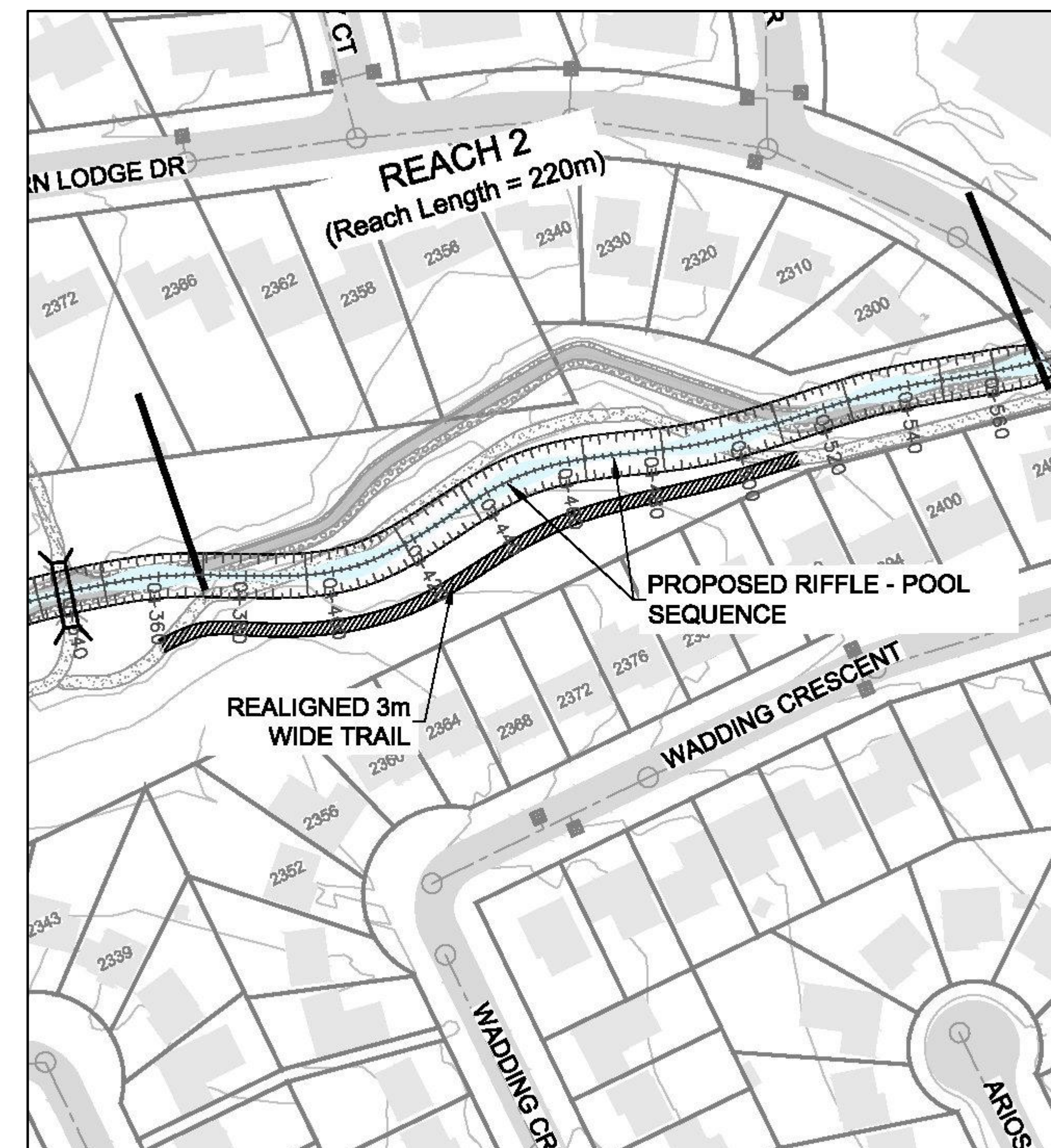
# Evaluation of Alternatives

The preliminary preferred alternatives for restoration are summarized below. Your comments on the ranking and preferred method of restoration are encouraged and appreciated. The study team will compile and review all feedback, and then finalize the preferred alternatives for each reach.



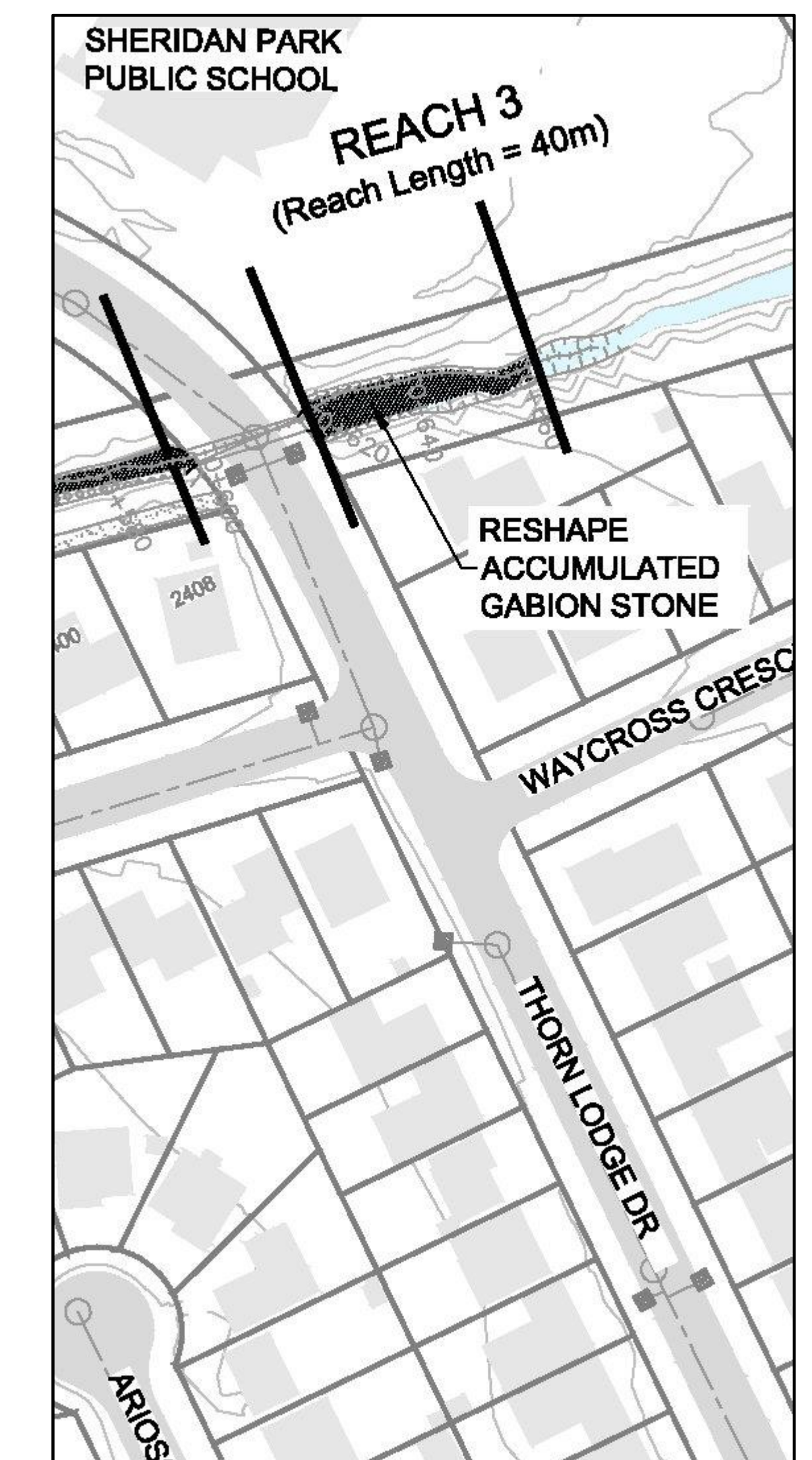
## Reach 1 – Local Restoration

Stream restoration works at strategic / priority locations to repair the failing armourstone.



## Reach 2 – Natural Channel Restoration

Continuous restoration of entire reach to a more natural form, and enhance terrestrial ecology.



## Reach 3 – Local Restoration

Stream restoration works at priority location to reduce backwatering.



## NEXT STEPS

### PUBLIC CONSULTATION – July, 2021

- Comment forms available for input.
- Consultant team will compile and review feedback, and will confirm or adapt the preliminary preferred alternative in response.

### SUBMIT EA PROJECT FILE AND OBTAIN AGENCY APPROVALS – 2021

- EA Project file posted for 30 day review period.

### DETAILED DESIGN & IMPLEMENTATION

- Detailed design and permitting to proceed in 2021.
- Construction scheduled for early-mid 2022.

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

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# THANK YOU

**FOR PARTICIPATING IN THE LOYALIST CREEK  
EROSION CONTROL CLASS ENVIRONMENTAL  
ASSESSMENT**