WELCOME

Pine Creek Erosion Assessment
Municipal Class Environmental Assessment
PUBLIC INFORMATION CENTRE
May 18, 2023

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

Aquafor Beech Limited

City of PICKERING

FIRST NATIONS LAND ACKNOWLEDGEMENT

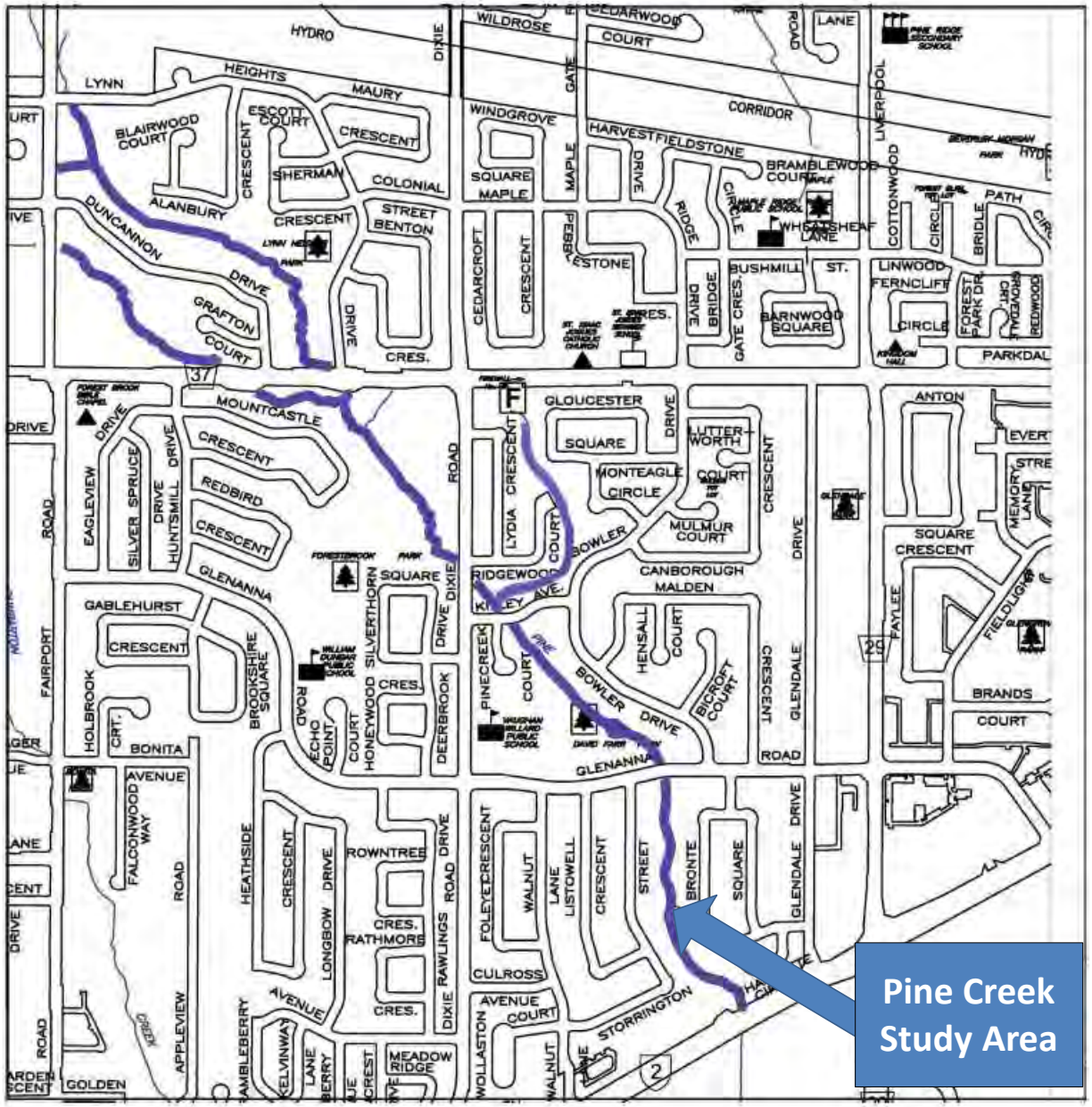
We acknowledge that the City of Pickering resides on land within the Treaty and traditional territory of the Mississaugas of Scugog Island First Nation and Williams Treaties signatories of the Mississauga and Chippewa Nations.

Pickering is also home to many Indigenous persons and communities who represent other diverse, distinct, and autonomous Indigenous nations.

This acknowledgement reminds us of our responsibilities to our relationships with the First Peoples of Canada, and to the ancestral lands on which we learn, share, work, and live.

STUDY AREA

The study area includes the Pine Creek corridor from Kingston Road to Kitley Avenue, Kitley Avenue to Finch Avenue, & Finch Avenue to Fairport Road as well as the Kitley Ravine.



STUDY PURPOSE / PROBLEM DEFINITION

This study is being carried out to assess the erosion related risks to private property and public infrastructure within the Pine Creek valley corridor, with the intent of providing recommendations to reduce erosion and protect the natural heritage of the area.

PUBLIC INFORMATION CENTRE PURPOSE

This Public Information Centre (PIC) is designed to:

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

To gain community input on:

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

MUNICIPAL CLASS ENVIRONMENTAL ASSESSMENT PROCESS

CLASS EA PROCESS - SCHEDULE B

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

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

Phase 1 – Identify Problems

- ✓ Identify Problem or Opportunity
- ✓ Public Consultation

We Are Here →

Phase 2 – Alternate Solutions

- ✓ Identify Alternative Solutions
- ✓ Inventory Natural, Social, Economic Environment
- ✓ Environmental Impacts and Mitigation
- ✓ Alternatives Evaluation
- Review Agency and Public Consultation
- Select Preferred Solution
- Review and Confirm Choice of Schedule
- Notice of Completion to Review Agency & Public
- Implementation

NATURAL HERITAGE ASSESSMENT

To assess the existing natural environment within the study area, the following studies were undertaken:

1. Vegetation community classification (Ecological Land Classification (ELC) protocol);
2. Terrestrial wildlife and habitat assessment;
3. Species at Risk (SAR) screening and habitat assessment;
4. Significant Wildlife Habitat (SWH) screening and assessment;
5. Natural heritage assessment;
6. Tree inventories;
7. Aquatic habitat assessment
8. Fish community assessment

SPECIES AT RISK

For the purpose of this study, Species at Risk (SAR) are defined as species listed as Endangered (END), Threatened (THR), or Special Concern (SC) under the Provincial Endangered Species Act (ESA) and/or the Federal Species at Risk Act (SARA). Other Species of Conservation Concern (SOCC) are those with Global ranks of G1-G3 and/or Subnational/Provincial ranks of S1-S3, and species considered rare within the Toronto Region Conservation Authority (TRCA) watershed (L-Ranks 2017) or in Eco-region 7E-4 (Oldham, 2017), where those species were not already considered under the SAR assessment noted above.

Species included in the screening assessment include those provided by secondary sources and those documented via direct observations by Aquafor Beech Limited. **A total of 13 SAR and SOCC were determined to be present or have some potential to be present in the study area.** These species include:

1. Butternut – Endangered
2. Barn Swallow – Threatened
3. Eastern Wood-Pewee – Special Concern
4. Wood Thrush – Special Concern
5. Yellow-Breasted Chat – Endangered
6. Eastern Milk snake – Special Concern
7. Midland Painted Turtle – Special Concern
8. Snapping Turtle – Special Concern
9. Western Chorus Frog – Threatened
10. Monarch – Special Concern
11. Little Brown Myotis – Endangered
12. Northern Myotis – Endangered
13. Tricolored Bat – Endangered

VEGETATION COMMUNITY CLASSIFICATION

Vegetation communities within the study area were identified during field surveys completed in accordance with the *Ecological Land Classification (ELC) System for Southern Ontario: First Approximation and its Application* (Lee et al., 1998) protocol in 2022.

Determining the vegetation communities within the study area aids in identifying the presence of significant vegetation communities, Significant Wildlife Habitat (SWH), and the habitats of potential Species at Risk.

In total, 10 vegetation communities are present within the study area. Community types ranged from disturbed woodlands and open meadows, to deciduous forest habitats containing mature species and moderate to high quality habitat.

Polygon #	Community Code	
1	CUW1-A3 (CUW1)	Native Deciduous Successional Woodland (Mineral Cultural Woodland)
2	FOM3-2	Dry – Fresh Sugar Maple – Hemlock Mixed Forest Type
3	FOD5-1	Dry – Fresh Sugar Maple Deciduous Forest Type
4	MAM2-10	Mixed Forb Mineral Meadow Marsh Type
5	WOMM4-1/CUW1-A3 (CUW1)	Native Deciduous Successional Woodland (Mineral Cultural Woodland)
6	FOM2-2a	Dry – Fresh White Pine – Sugar Maple Mixed Forest Type
7	FOM2-2b	Dry – Fresh White Pine – Sugar Maple Mixed Forest Type
8	WOMM4-1/CUW1-A1 (CUW1)	Native Deciduous Successional Woodland (Mineral Cultural Woodland)
9	FOC1-2	Dry – Fresh White Pine – Red Pine Coniferous Forest Type
-	ANTH	Anthropogenic

ELC mapping upstream of Finch Avenue

VEGETATION COMMUNITY CLASSIFICATION

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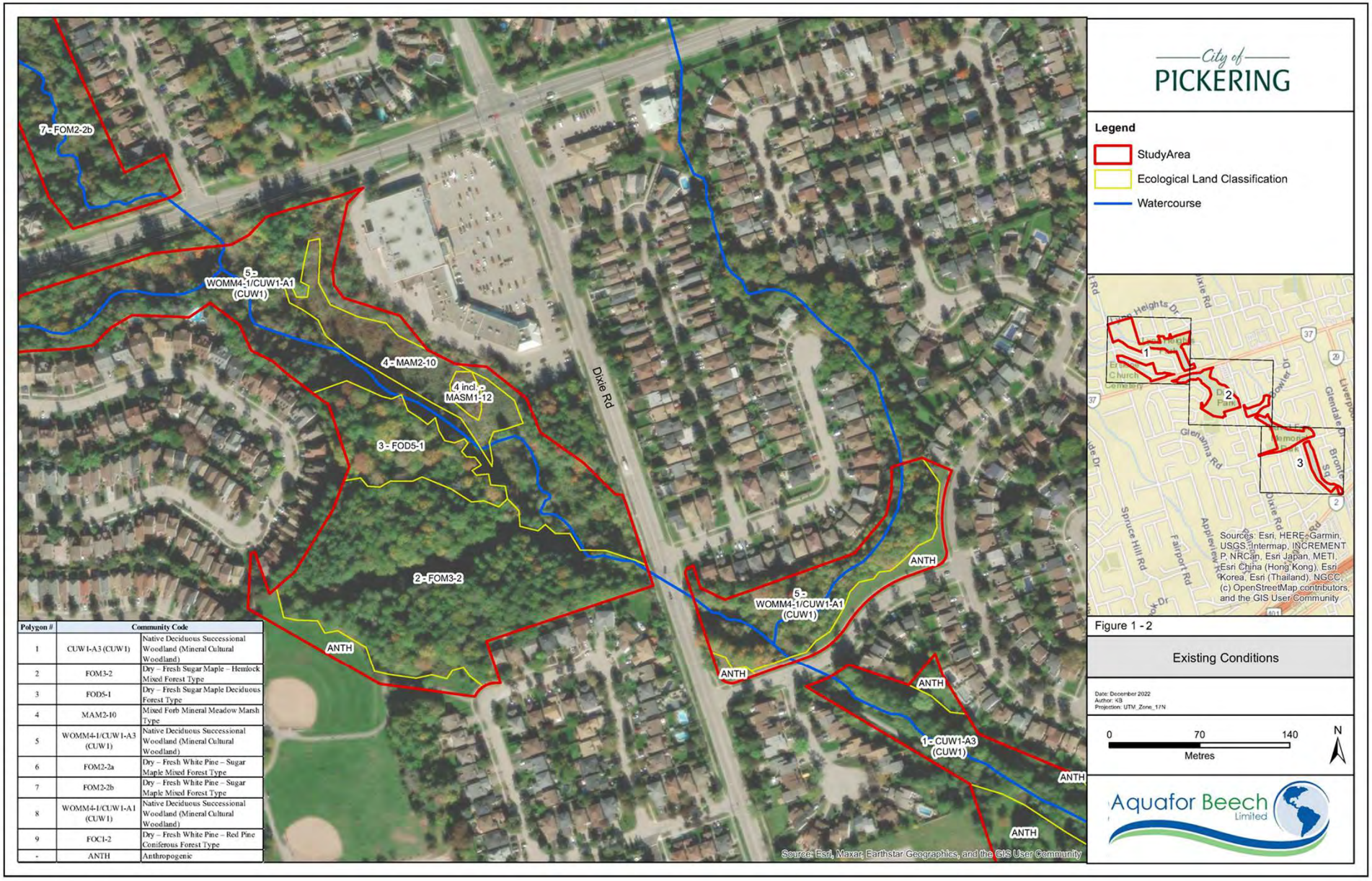
Pine Creek Erosion Assessment
Municipal Class Environmental Assessment



Polygon #	Community Code	
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ELC mapping between Dixie Road and Finch Avenue

VEGETATION COMMUNITY CLASSIFICATION

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-	ANTH	Anthropogenic

ELC mapping upstream of Kingston Road

FISHERIES & AQUATIC HABITAT

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

- Aquatic habitat assessments at six (6) locations throughout the study area, from Kingston Road upstream to Lynn Heights Drive
- Aquatic community assessments of historic data; and,
- SAR screening and potential habitat identification.

Summary of Fish Community Assessment

Scientific Name	Common Name
Rhinichthys atratulus	Blacknose dace
Semotilus atromaculatus	Creek chub
Umbra limi	Central Mudminnow
Luxilus cornutus	Common Shiner
Percina caprodes	Logperch
Catostomus commersoni	White sucker

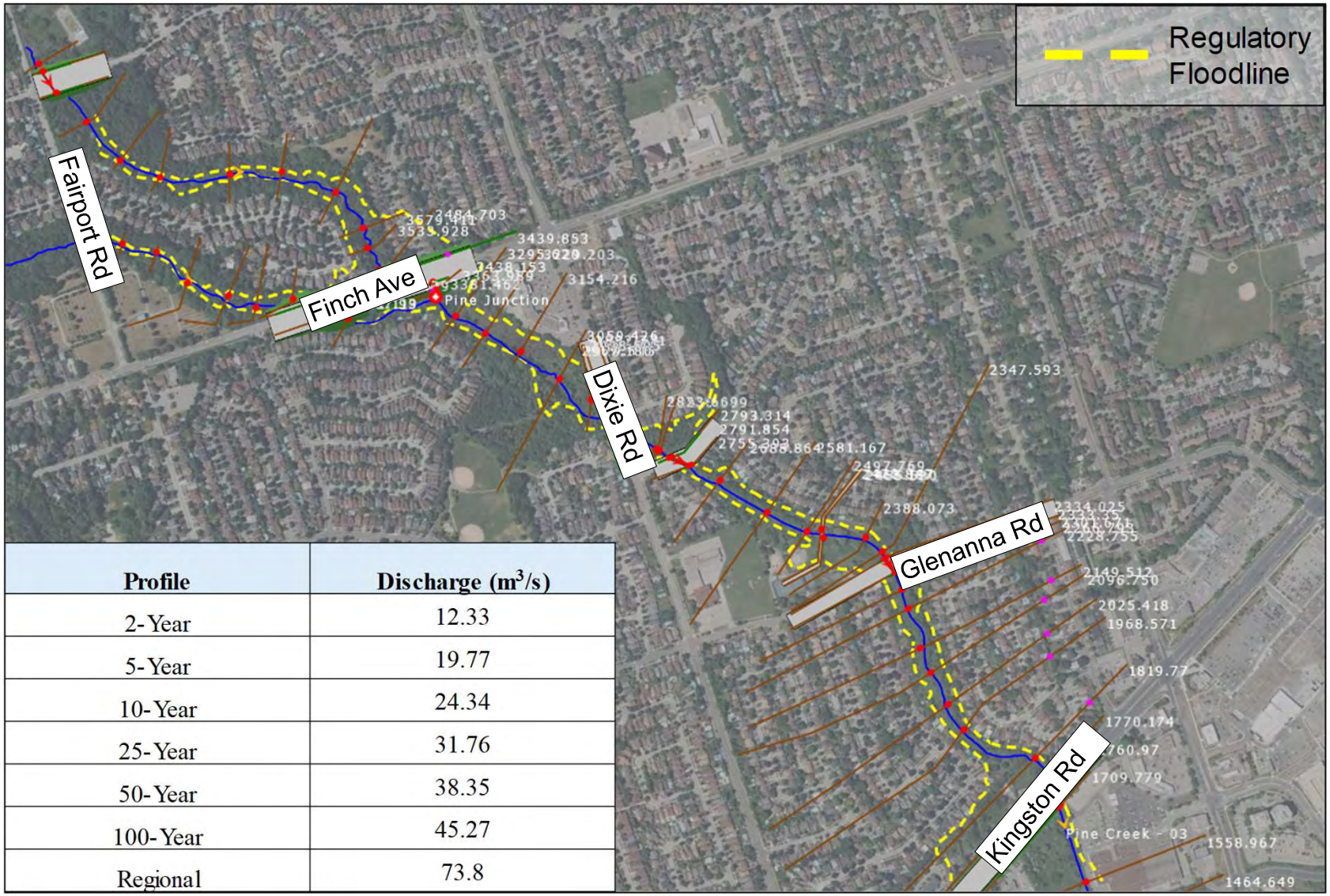
Key Findings:

- No aquatic SAR were identified within the study area;
- The thermal classification of Pine Creek within the study area is that of a Cool-Warmwater thermal regime and is dominated by warmwater and coolwater species.
- Habitat quality and quantity vary throughout the study area and is largely dependent on surrounding land uses;
- A number of **fish barrier(s)** were observed throughout the study area, such as beaver dams and the Dixie Road culvert crossing.
- There are opportunities to improve fish habitat.

Representative aquatic habitat photos

HYDROLOGY & EXISTING FLOODING PROFILE

Flows under various rainfall events are presented in the figure below along with the regulatory floodline extents.



Profile	Discharge (m^3/s)
2-Year	12.33
5-Year	19.77
10-Year	24.34
25-Year	31.76
50-Year	38.35
100-Year	45.27
Regional	73.8

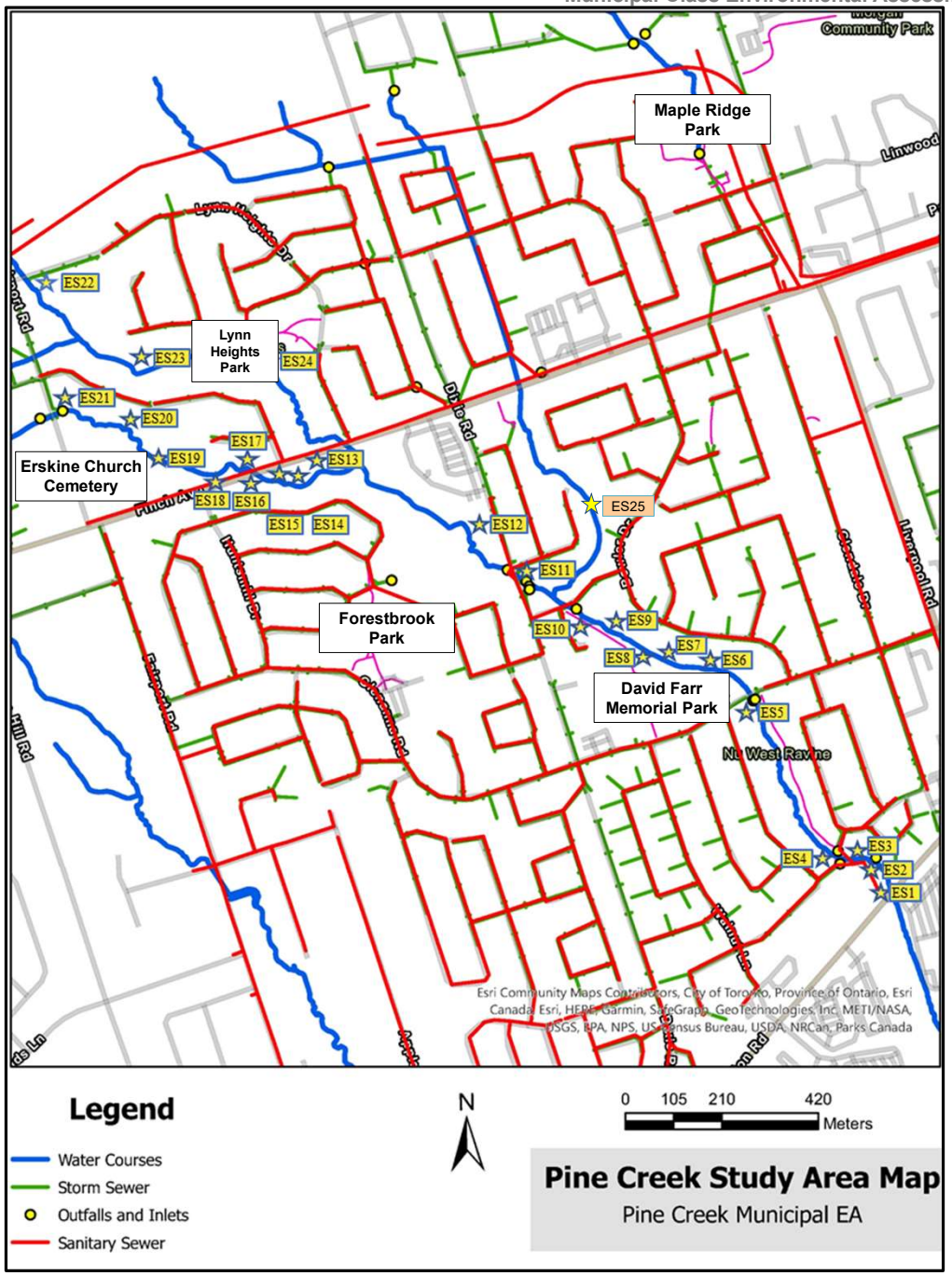
EROSION INVENTORY

Twenty five (x25) erosion sites were identified within the study area.

Risks observed at the erosion sites include:

- Risks to private properties;
- Risks to infrastructure;
- Negative impacts on water quality;
- Fish barriers;
- Woody debris and fallen trees within the creek – negative impact on flow conveyance;
- Deteriorating engineered structures requiring restoration / rehabilitation.

A series of alternatives have been developed to address the risks at each site.



EVALUATION CRITERIA

The following criteria are used to evaluate each alternative. It will help determine which alternative should be selected as the preliminary preferred alternative.

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

Physical / Natural Environment

Potential to Mitigate Existing Erosion Risks	Greater reduction of erosion risks scores higher
Potential to Improve Aquatic Habitat	Greater improvements to fish and aquatic habitat scores higher, including substrate, overhanging vegetation, turbidity, and passage/connectivity
Potential to Improve Terrestrial Habitat	Greater long-term benefit to terrestrial habitat conditions scores higher
Potential to Improve Terrestrial Vegetation	Smaller disturbance area scores higher as this minimizes vegetation removals
Potential to Reduce Impacts to Species at Risk	Minimal impact on terrestrial and aquatic habitat for Species at Risk scores higher
Potential to adapt to Climate Change	Higher ability to adapt to, and be resilient to, climate change scores higher

Social / Cultural Environment

Public Safety	Lower risks to public safety in the short and long-term scores higher
Landowner Impacts / Community Disruption	Smaller impact on private property, including short term and long term disturbances scores higher
Benefit to Community and Public Acceptance	Greater improvement of access to trails and enjoyment of surrounding lands scores higher
Archaeological Impacts	Less disturbance of areas with archaeological potential and cultural heritage resources scores higher
Aesthetic Value	Greater increase in the aesthetic value of the study area scores higher

Technical / Engineering Considerations

Regulatory Agency Acceptance	Greater ability to achieve regulatory agency acceptance scores higher
Impact on Existing Infrastructure	Greater protection of potential exposure of infrastructure scores higher
Flooding Impacts	Greater reduction of flooding risks to public and/or private lands for longer time scores higher
Technical Feasibility	Higher technically feasibility for implementing the project, including constructability and managing construction related disturbances to other infrastructure / property scores higher
Lifespan of Works	Greater expected lifespan scores higher

Economic Environment

Capital Costs	Lower capital cost with one time cost to City scores higher
Operation and Maintenance Costs	Lower operation and maintenance costs which ensure effectiveness of implemented measures scores higher
Life Cycle Costs	Lower life cycle costs relative to the other alternatives scores higher
Cost Effectiveness	Greater ability to provide multiple improvements, at a cost less then the total of completing all the works separately with ability to partner and share costs with other agencies scores higher

EVALUATION APPROACH

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

The evaluation uses a ranking scheme which accounts for Physical and Natural Environment, Social / Cultural Environment, Economic Environment and Technical / Engineering Considerations.

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

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

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

An example is illustrated in the adjacent table:

Ranking Scale					
No / Negative Impact	1	2	3	4	Ideal / Most Positive Impact

Erosion Site #1-4	Evaluation Criteria	Comment	Do Nothing	Local Works	Extended Works
Physical and Natural Environment	Mitigation of Existing Erosion Risks	Rate of erosion, loss of public / private lands and sediment deposition caused by erosion	1	4	4
	Aquatic Habitat	Impact on passage and quantity/quality of habitat	1	2	4
	Terrestrial Habitat	Impact on connectivity, diversity and quantity/quality of habitat	1	3	4
	Terrestrial Vegetation	Impact on existing woodlots; removals & restoration scheme	4	3	1
	Impacts to Species at Risk	Ability to improve suitability of terrestrial and aquatic habitat for Species at Risk, potentially affected temporarily or permanently.	4	3	1
	Climate Change	Ability to adapt to, and be resilient to, climate change	1	3	4
		Subtotal	**12**	**18**	**18**
		Weighted Score	**12.50**	**18.75**	**18.75**
Social / Cultural Environment	Public Safety	Impact on public safety	2	4	4
	Landowner Impacts / Community Disruption	Impact on private property	4	3	1
	Benefit to Community and Public Acceptance	Access to trails, enjoyment of surrounding lands	2	3	4
	Archaeological Impacts	Less disturbance of areas with archaeological potential and cultural heritage resources score higher	4	3	1
	Aesthetic Value	Impact on existing and proposed aesthetic value	1	3	4
		Subtotal	**13.00**	**16.00**	**14.00**
		Weighted Score	**16.25**	**20.00**	**17.50**
Economic Environment	Capital Costs	One time cost to City	4	3	1
	Operations & Maintenance Costs	Requirement for regular, irregular or no maintenance activities and ensure effectiveness of implemented measures	1	3	4
	Life Cycle Costs	Lower life cycle costs relative to the other alternatives scores higher	1	4	3
	Cost Effectiveness	Ability to provide multiple improvements, at a cost less then the total of completing all the works separately. Accounts for the ability of the City to partner and share costs with other agencies (i.e., Region of Durham, TRCA, etc.)	2	4	3
		Subtotal	**8.00**	**14.00**	**11.00**
		Weighted Score	**12.50**	**21.88**	**17.19**
Technical/Engineering Considerations	Regulatory Agency Acceptance	Satisfy City, TRCA, DFO and MNR mandates	2	4	3
	Impact on Existing Infrastructure	Protection or potential exposure of infrastructure (buildings, bridges, properties, sewers)	2	4	4
	Flooding Impacts	Greater reduction of flooding risks to public and/or private lands for longer time score higher	1	3	4
	Technical Feasibility	Complexity of implementing the Project, including constructability and need to manage construction related disturbances to other infrastructure / property	4	4	3
	Lifespan of Works	Expected lifespan / years of works before intervention needs to be repeated	1	3	4
		Subtotal	**10.00**	**18.00**	**18.00**
		Weighted Score	**12.50**	**22.50**	**22.50**
		TOTAL SCORE (/100)	**53.8**	**83.1**	**75.9**

Highest Score = Preferred Alternative

PRELIMINARY ALTERNATIVE SOLUTIONS

1. Do Nothing

- Leave the site as it is and allow erosional processes to continue within the watercourse corridor;
- Ongoing monitoring of erosion areas to address increased risks;
- Maintenance or possible emergency works may be required in the future.

Active bank erosion along the outer bend of the channel, risk to private property

2. Local Restoration Works

- Localized channel bank and/or bed work to address erosion issues at the site;
- May require ongoing maintenance, occasional repairs, or eventual replacement;
- Often preferred to limit the economic cost and the environmental damage of large-scale channel engineering and stream restoration works.

Creek restoration with natural channel design at selected locations

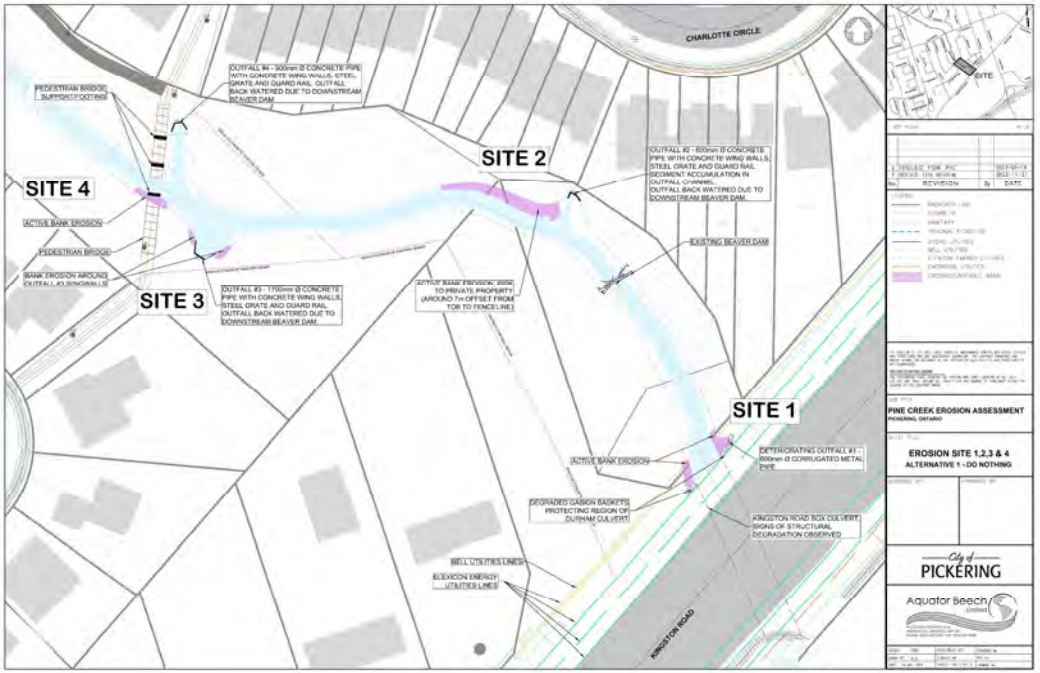
3. Extended Restoration Works

- A reach-based approach to address erosion issues at the site;
- Typically applied in highly constrained urban watercourses;
- Utilizes both “natural channel design” and “hard” channel engineering approaches;
- Higher capital cost, but requires minimal maintenance.

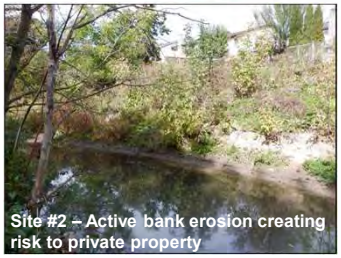
Armourstone bank treatment within confined channel

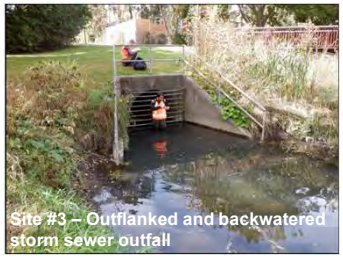
EROSION SITES 1 - 4

Existing conditions & erosion risks




Site #1 – Undermined gabion baskets upstream of Kingston Road culvert


Site #2 – Active bank erosion creating risk to private property

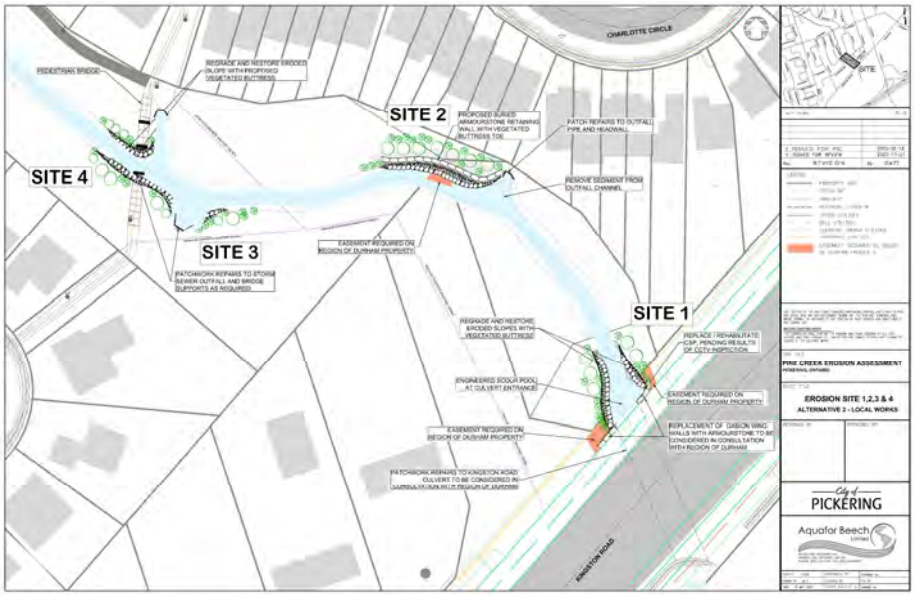

Site #3 – Outflanked and backwatered storm sewer outfall

Risks to private property, municipal & regional infrastructure and aquatic habitat due to:

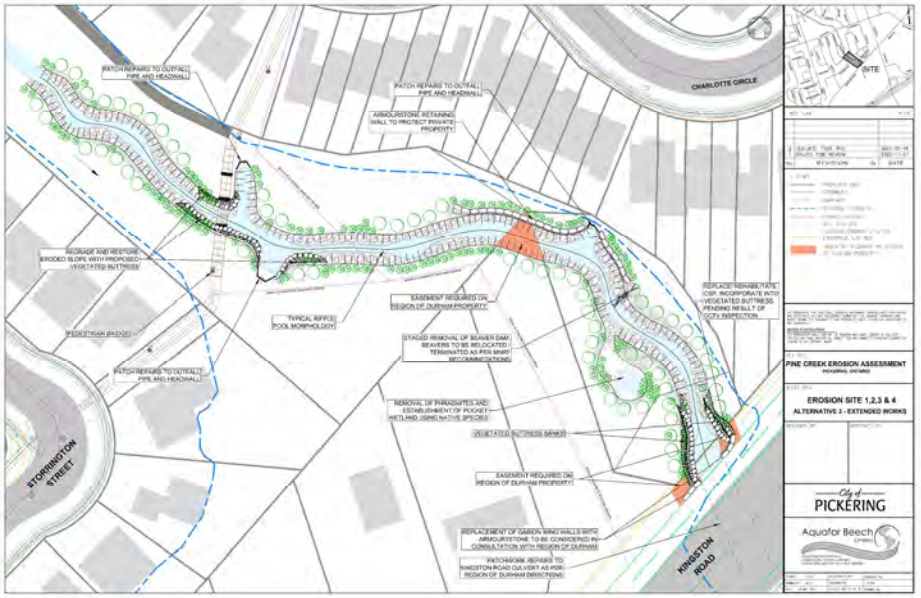
- Active bank erosion
- Beaver activity
- Aging infrastructure

Level of Risk: Low

Proposed restoration alternatives



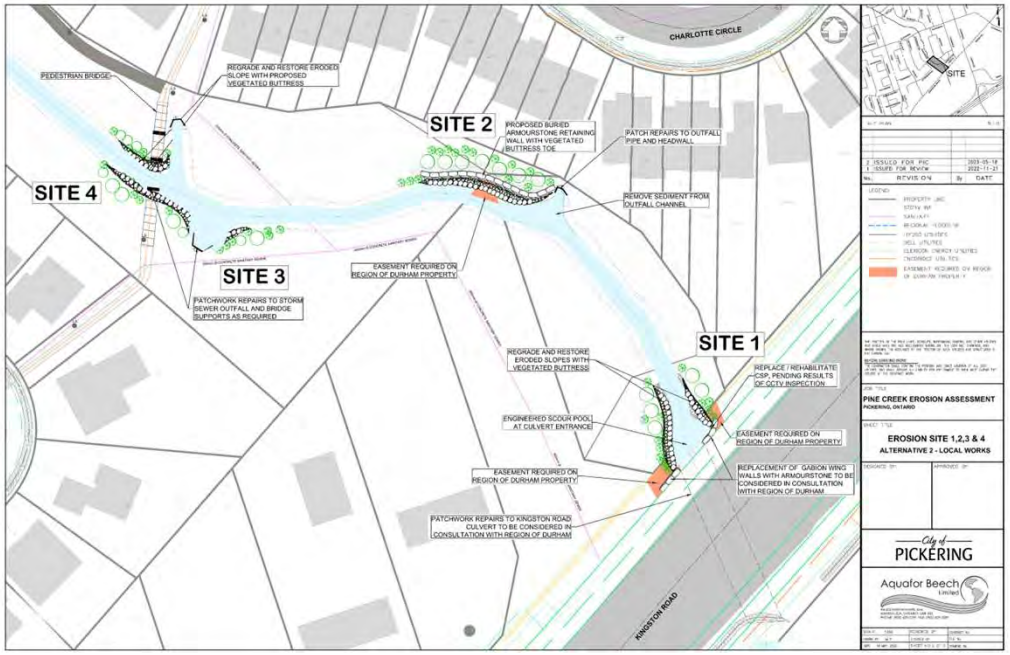
Alternative #1: Local Works



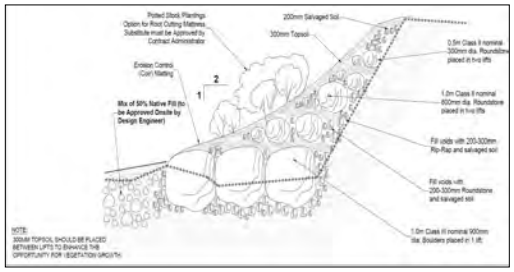
Alternative #2: Extended Works

EROSION SITES 1 - 4 – POTENTIAL PREFERRED ALTERNATIVE

Pine Creek Erosion Assessment
Municipal Class Environmental Assessment



An example of natural channel design enhanced with vegetated buttress



An example of vegetated buttress detail

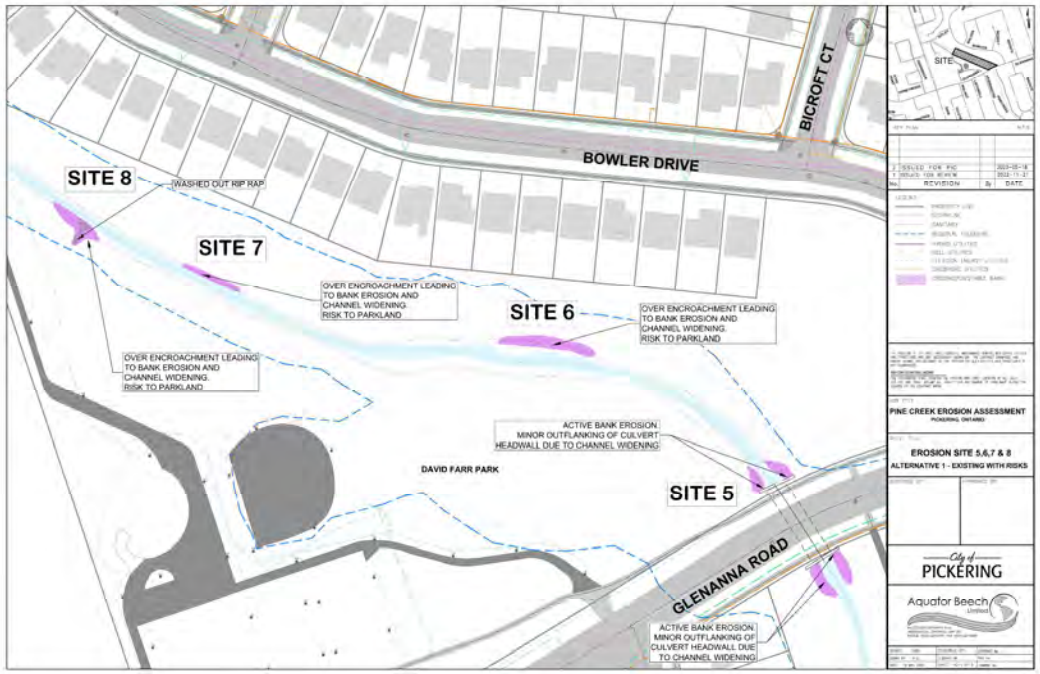
Erosion Site #1-4	Evaluation Criteria	Comment	Do Nothing	Local Works	Extended Works
Physical and Natural Environment	Mitigation of Existing Erosion Risks	Rate of erosion, loss of public / private lands and sediment deposition caused by erosion	1	4	4
	Aquatic Habitat	Impact on passage and quantity/quality of habitat	1	2	4
	Terrestrial Habitat	Impact on connectivity, diversity and quantity/quality of habitat	1	3	4
	Terrestrial Vegetation	Impact on existing woodlots; removals & restoration scheme	4	3	1
	Impacts to Species at Risk	Ability to improve suitability of terrestrial and aquatic habitat for Species at Risk, potentially affected temporarily or permanently.	4	3	1
	Climate Change	Ability to adapt to, and be resilient to, climate change	1	3	4
		Subtotal	**12**	**18**	**18**
		Weighted Score	**12.50**	**18.75**	**18.75**
Social / Cultural Environment	Public Safety	Impact on public safety	2	4	4
	Landowner Impacts / Community Disruption	Impact on private property	4	3	1
	Benefit to Community and Public Acceptance	Access to trails, enjoyment of surrounding lands	2	3	4
	Archaeological Impacts	Less disturbance of areas with archaeological potential and cultural heritage resources score higher	4	3	1
	Aesthetic Value	Impact on existing and proposed aesthetic value	1	3	4
		Subtotal	**13.00**	**16.00**	**14.00**
		Weighted Score	**16.25**	**20.00**	**17.50**
Economic Environment	Capital Costs	One time cost to City	4	3	1
	Operations & Maintenance Costs	Requirement for regular, irregular or no maintenance activities and ensure effectiveness of implemented measures	1	3	4
	Life Cycle Costs	Lower life cycle costs relative to the other alternatives scores higher	1	4	3
	Cost Effectiveness	Ability to provide multiple improvements, at a cost less then the total of completing all the works separately. Accounts for the ability of the City to partner and share costs with other agencies (i.e., Region of Durham, TRCA, etc.)	2	4	3
		Subtotal	**8.00**	**14.00**	**11.00**
		Weighted Score	**12.50**	**21.88**	**17.19**
Technical/Engineering Considerations	Regulatory Agency Acceptance	Satisfy City, TRCA, DFO and MNR mandates	2	4	3
	Impact on Existing Infrastructure	Protection or potential exposure of infrastructure (buildings, bridges, properties, sewers)	2	4	4
	Flooding Impacts	Greater reduction of flooding risks to public and/or private lands for longer time score higher	1	3	4
	Technical Feasibility	Complexity of implementing the Project, including constructability and need to manage construction related disturbances to other infrastructure / property	4	4	3
	Lifespan of Works	Expected lifespan / years of works before intervention needs to be repeated	1	3	4
		Subtotal	**10.00**	**18.00**	**18.00**
		Weighted Score	**12.50**	**22.50**	**22.50**
		TOTAL SCORE (/100)	**53.8**	**83.1**	**75.9**

Preliminary preferred alternative - Local Works

- Replace failed erosion control measures
- Restore eroded slopes and provide erosion protection through the construction of vegetated buttresses
- Removal of accumulated sediment and debris
- Repairs to degraded outfall structures
- Kingston Road culvert is a Region of Durham asset

EROSION SITES 5 - 8

Existing conditions & erosion risks




Site 5 – Minor outflanking of Glenanna Road culvert


Site 7 – Erosion risk to parkland

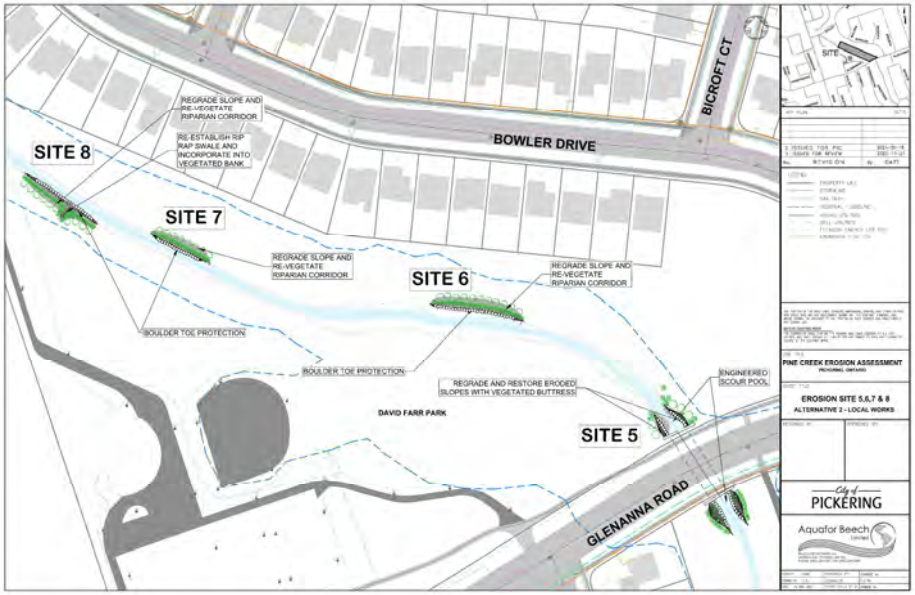

Site 8 – Failed erosion control works within David Farr Park

Risks to public parklands, municipal infrastructure and aquatic habitat due to:

- Active bank erosion
- Over encroachment
- Debris accumulation

Level of Risk: Low

Proposed restoration alternatives



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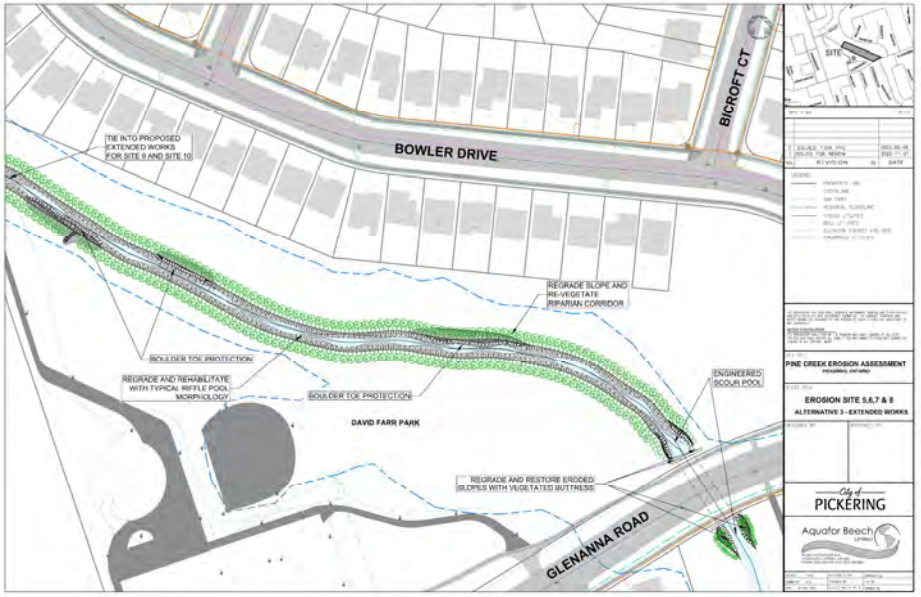
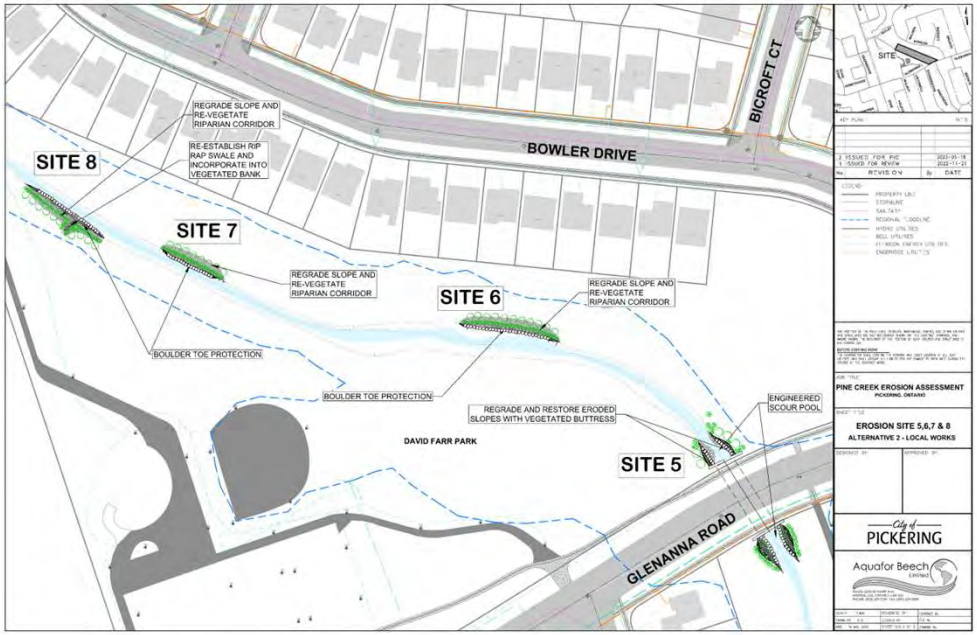


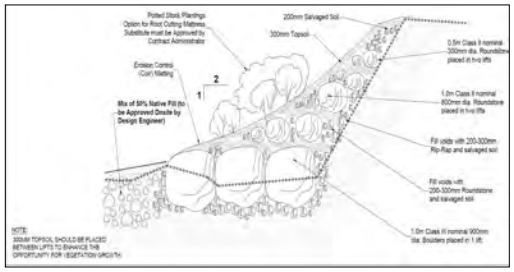
Alternative #2: Extended Works

EROSION SITES 5-8 – POTENTIAL PREFERRED ALTERNATIVE

Pine Creek Erosion Assessment
Municipal Class Environmental Assessment



An example of natural channel design enhanced with vegetated buttress



An example of vegetated buttress detail

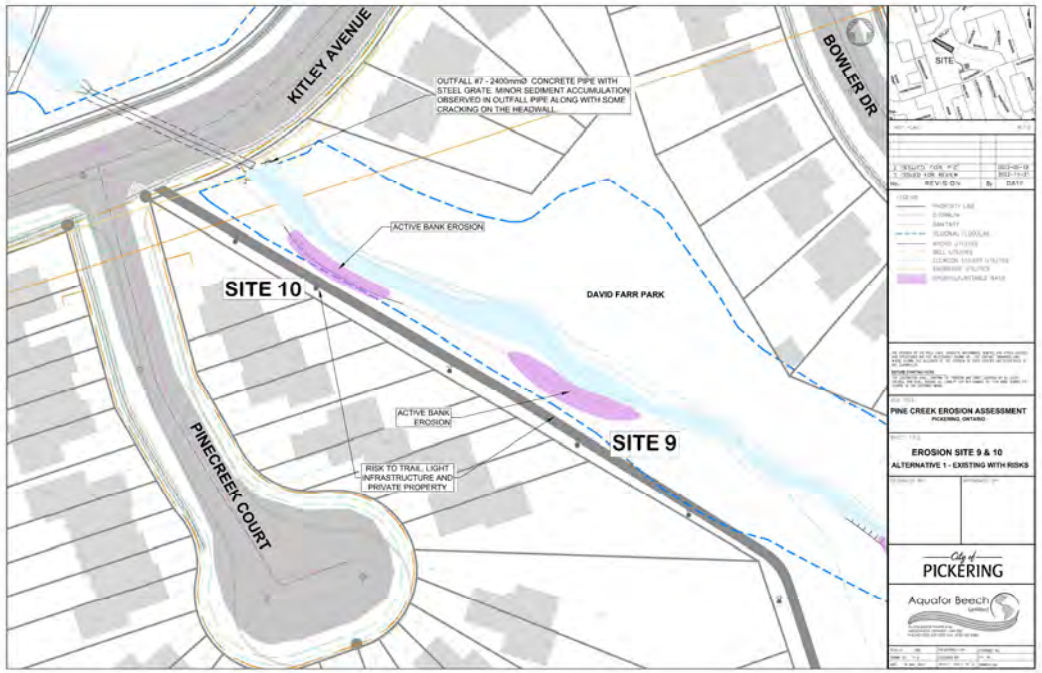
Erosion Site #5-8	Evaluation Criteria	Comment	Do Nothing	Local Works	Extended Works
Physical and Natural Environment	Mitigation of Existing Erosion Risks	Rate of erosion, loss of public / private lands and sediment deposition caused by erosion	1	4	4
	Aquatic Habitat	Impact on passage and quantity/quality of habitat	1	2	4
	Terrestrial Habitat	Impact on connectivity, diversity and quantity/quality of habitat	1	3	4
	Terrestrial Vegetation	Impact on existing woodlots; removals & restoration scheme	4	3	1
	Impacts to Species at Risk	Ability to improve suitability of terrestrial and aquatic habitat for Species at Risk, potentially affected temporarily or permanently.	4	3	2
	Climate Change	Ability to adapt to, and be resilient to, climate change	1	3	4
		Subtotal	**12**	**18**	**19**
		Weighted Score	**12.50**	**18.75**	**19.79**
Social / Cultural Environment	Public Safety	Impact on public safety	2	4	4
	Landowner Impacts / Community Disruption	Impact on private property	4	2	1
	Benefit to Community and Public Acceptance	Access to trails, enjoyment of surrounding lands	2	3	4
	Archaeological Impacts	Less disturbance of areas with archaeological potential and cultural heritage resources score higher	4	3	1
	Aesthetic Value	Impact on existing and proposed aesthetic value	1	3	4
		Subtotal	**13.00**	**15.00**	**14.00**
		Weighted Score	**16.25**	**18.75**	**17.50**
Economic Environment	Capital Costs	One time cost to City	4	3	1
	Operations & Maintenance Costs	Requirement for regular, irregular or no maintenance activities and ensure effectiveness of implemented measures	1	3	4
	Life Cycle Costs	Lower life cycle costs relative to the other alternatives scores higher	1	4	3
	Cost Effectiveness	Ability to provide multiple improvements, at a cost less then the total of completing all the works separately. Accounts for the ability of the City to partner and share costs with other agencies (i.e., Region of Durham, TRCA, etc.)	2	4	3
		Subtotal	**8.00**	**14.00**	**11.00**
		Weighted Score	**12.50**	**21.88**	**17.19**
Technical/Engineering Considerations	Regulatory Agency Acceptance	Satisfy City, TRCA, DFO and MNR mandates	2	4	3
	Impact on Existing Infrastructure	Protection or potential exposure of infrastructure (buildings, bridges, properties, sewers)	2	4	4
	Flooding Impacts	Greater reduction of flooding risks to public and/or private lands for longer time score higher	2	3	4
	Technical Feasibility	Complexity of implementing the Project, including constructability and need to manage construction related disturbances to other infrastructure / property	4	4	3
	Lifespan of Works	Expected lifespan / years of works before intervention needs to be repeated	1	3	4
		Subtotal	**11.00**	**18.00**	**18.00**
		Weighted Score	**13.75**	**22.50**	**22.50**
		TOTAL SCORE (/100)	**55.0**	**81.9**	**77.0**

Preliminary preferred alternative - Local Works

- Restore eroded slopes and provide erosion protection through the construction of vegetated buttresses
- Removal of accumulated sediment and debris
- Replanting of the riparian zone to provide erosion protection and improve terrestrial and aquatic habitat conditions
- Recommend alterations to park management processes to prevent over encroachment within the riparian corridor

EROSION SITES 9 - 10

Existing conditions & erosion risks




Site 9 – Actively eroding bank creating risk to public trail system


Site 9 – Actively eroding bank creating risk to public trail system

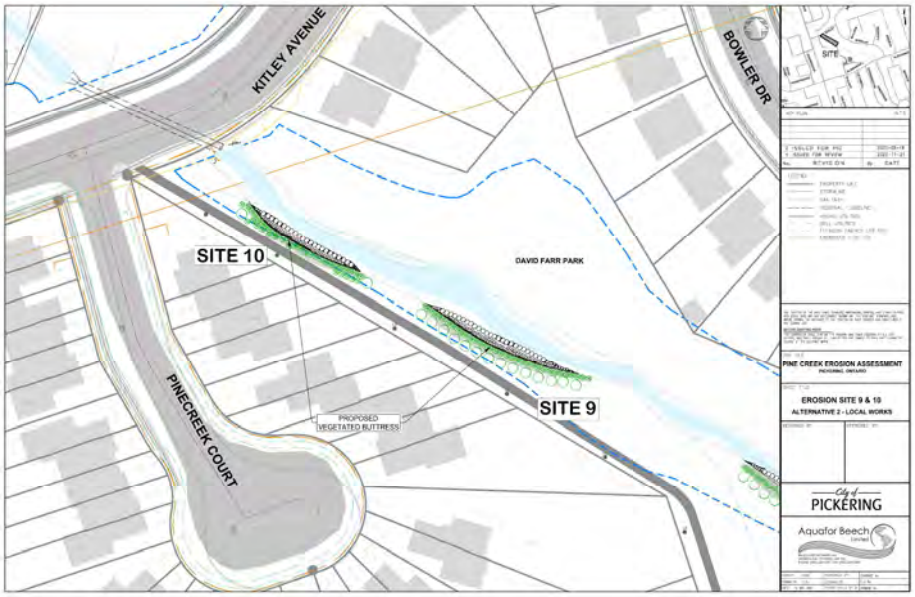

Site 10 – Actively eroding bank creating risk to public trail system

Risks to private property, municipal infrastructure and aquatic habitat due to:

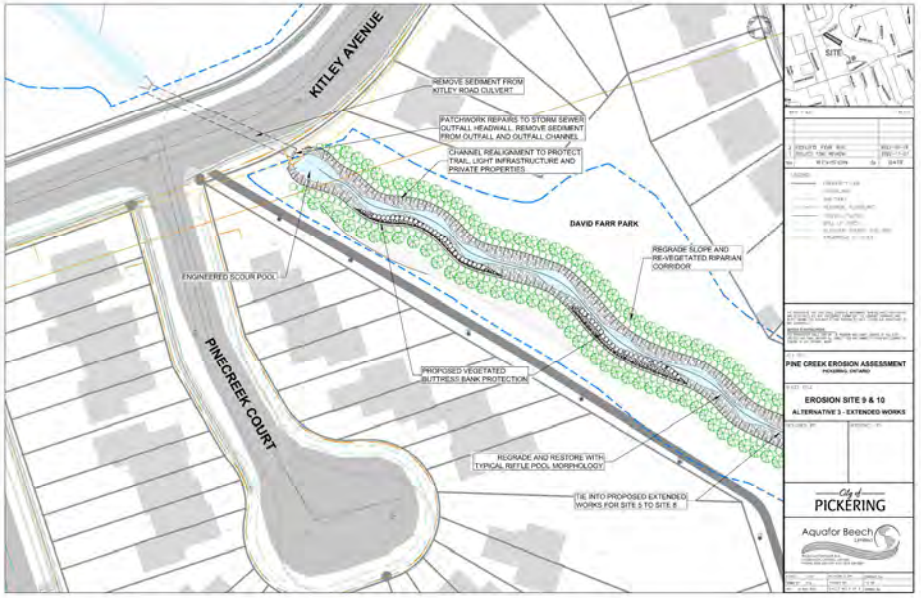
- Active bank erosion
- Channel degradation

Level of Risk: Medium

Proposed restoration alternatives

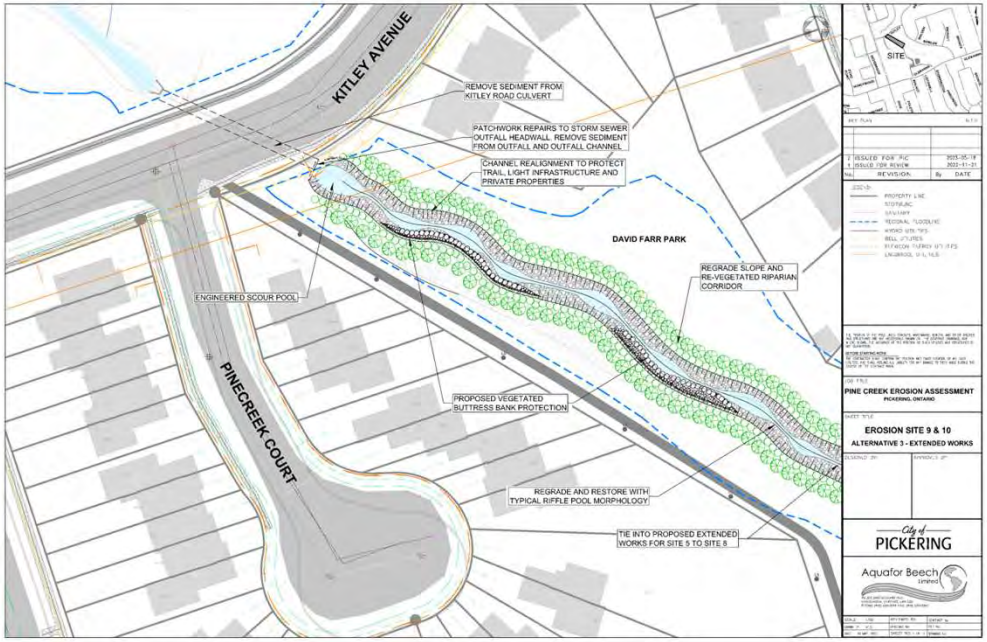


Alternative #1: Local Works

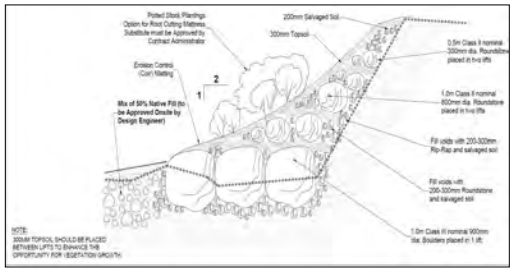


Alternative #2: Extended Works

EROSION SITES 9 - 10 – POTENTIAL PREFERRED ALTERNATIVE



An example of natural channel design with riffle-pool morphology



An example of vegetated buttress detail

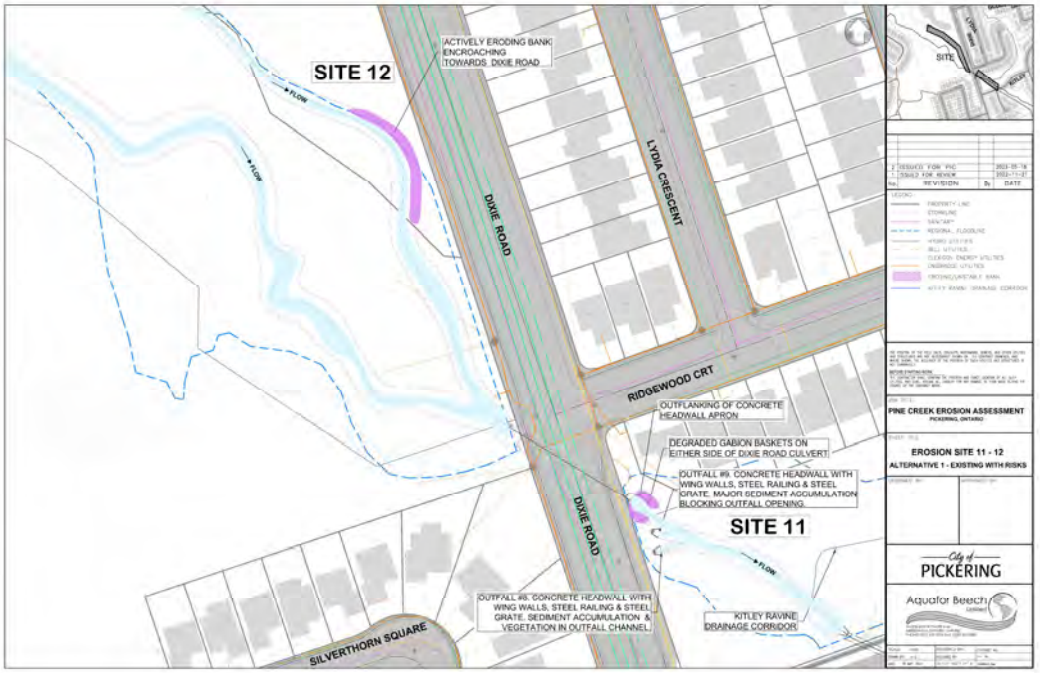
Erosion Site #9-10	Evaluation Criteria	Comment	Do Nothing	Local Works	Extended Works
Physical and Natural Environment	Mitigation of Existing Erosion Risks	Rate of erosion, loss of public / private lands and sediment deposition caused by erosion	1	3	4
	Aquatic Habitat	Impact on passage and quantity/quality of habitat	1	2	4
	Terrestrial Habitat	Impact on connectivity, diversity and quantity/quality of habitat	1	2	4
	Terrestrial Vegetation	Impact on existing woodlots; removals & restoration scheme	4	3	1
	Impacts to Species at Risk	Ability to improve suitability of terrestrial and aquatic habitat for Species at Risk, potentially affected temporarily or permanently.	4	3	2
	Climate Change	Ability to adapt to, and be resilient to, climate change	1	2	4
		Subtotal	**12**	**15**	**19**
		Weighted Score	**12.50**	**15.63**	**19.79**
Social / Cultural Environment	Public Safety	Impact on public safety	1	3	4
	Landowner Impacts / Community Disruption	Impact on private property	1	3	4
	Benefit to Community and Public Acceptance	Access to trails, enjoyment of surrounding lands	1	3	4
	Archaeological Impacts	Less disturbance of areas with archaeological potential and cultural heritage resources score higher	4	3	1
	Aesthetic Value	Impact on existing and proposed aesthetic value	1	2	4
		Subtotal	**8.00**	**14.00**	**17.00**
		Weighted Score	**10.00**	**17.50**	**21.25**
Economic Environment	Capital Costs	One time cost to City	4	3	1
	Operations & Maintenance Costs	Requirement for regular, irregular or no maintenance activities and ensure effectiveness of implemented measures	1	2	4
	Life Cycle Costs	Lower life cycle costs relative to the other alternatives scores higher	1	3	4
	Cost Effectiveness	Ability to provide multiple improvements, at a cost less then the total of completing all the works separately. Accounts for the ability of the City to partner and share costs with other agencies (i.e., Region of Durham, TRCA, etc.)	2	3	4
		Subtotal	**8.00**	**11.00**	**13.00**
		Weighted Score	**12.50**	**17.19**	**20.31**
Technical/Engineering Considerations	Regulatory Agency Acceptance	Satisfy City, TRCA, DFO and MNR mandates	2	4	4
	Impact on Existing Infrastructure	Protection or potential exposure of infrastructure (buildings, bridges, properties, sewers)	2	3	4
	Flooding Impacts	Greater reduction of flooding risks to public and/or private lands for longer time score higher	2	3	4
	Technical Feasibility	Complexity of implementing the Project, including constructability and need to manage construction related disturbances to other infrastructure / property	4	4	2
	Lifespan of Works	Expected lifespan / years of works before intervention needs to be repeated	1	2	4
		Subtotal	**11.00**	**16.00**	**18.00**
		Weighted Score	**13.75**	**20.00**	**22.50**
		TOTAL SCORE (/100)	**48.8**	**70.3**	**83.9**

Preliminary preferred alternative - Extended Works

- Minor channel realignment with riffle-pool morphology to improve ecological conditions and provide an offset from the park trail
- Removal of debris and sediment from the channel
- Outfall repairs / restoration

EROSION SITES 11 - 12

Existing conditions & erosion risks




Site 11 – Sediment accumulation downstream of Dixie Road


Site 11 – Failed gabion baskets creating a risk of headwall becoming outflanked

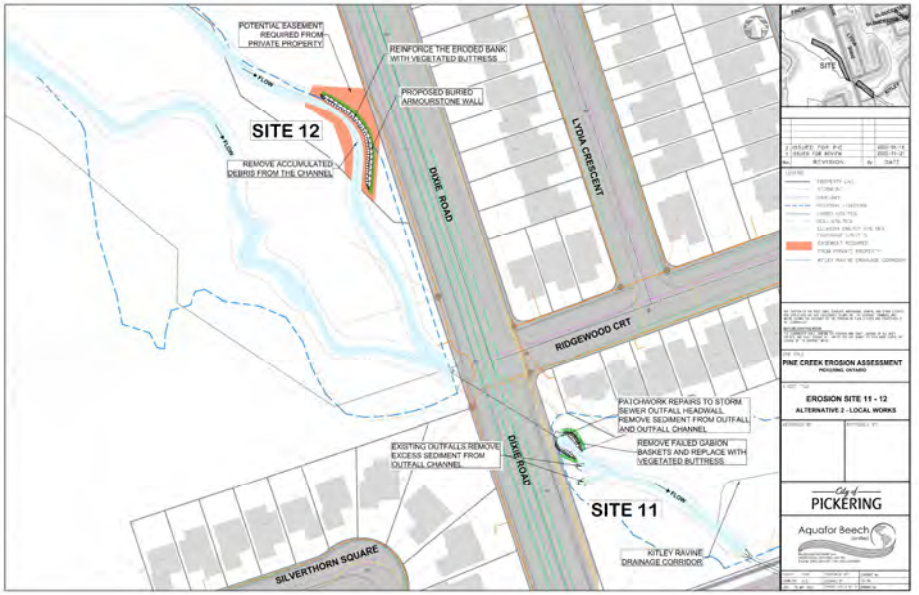

Site 12 – Slope failure creating risk to Dixie Road

Risks to municipal infrastructure, private property and aquatic habitat due to:

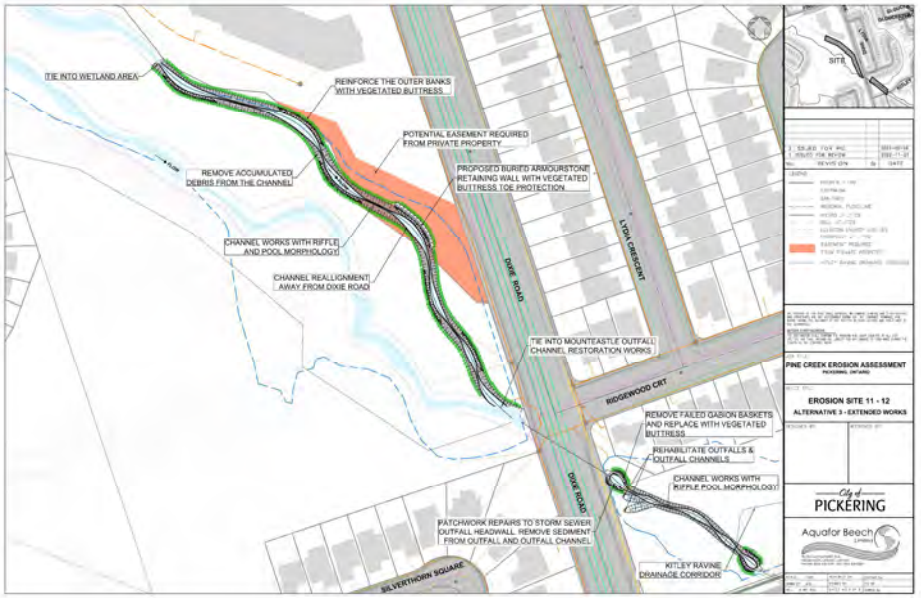
- Active channel erosion
- Sediment accumulated in front of storm sewer outfalls
- Aging / deteriorated infrastructure
- Debris jams

Level of Risk: Moderate

Proposed restoration alternatives

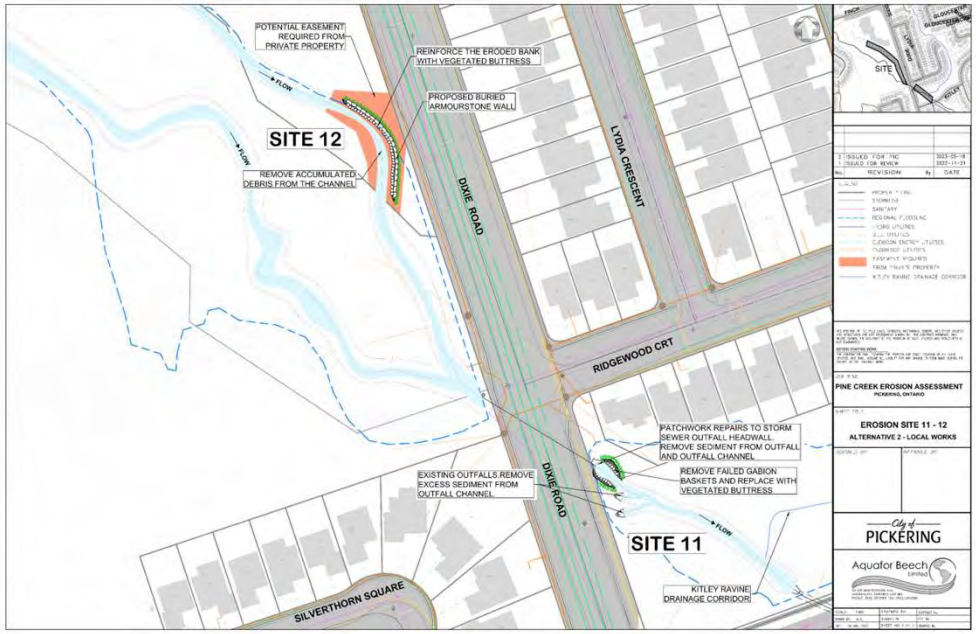


Alternative #1: Local Works

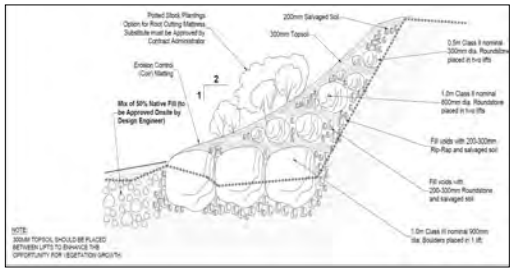


Alternative #2: Extended Works

EROSION SITES 11-12 – POTENTIAL PREFERRED ALTERNATIVE



An example of natural channel design enhanced with vegetated buttress



An example of vegetated buttress detail

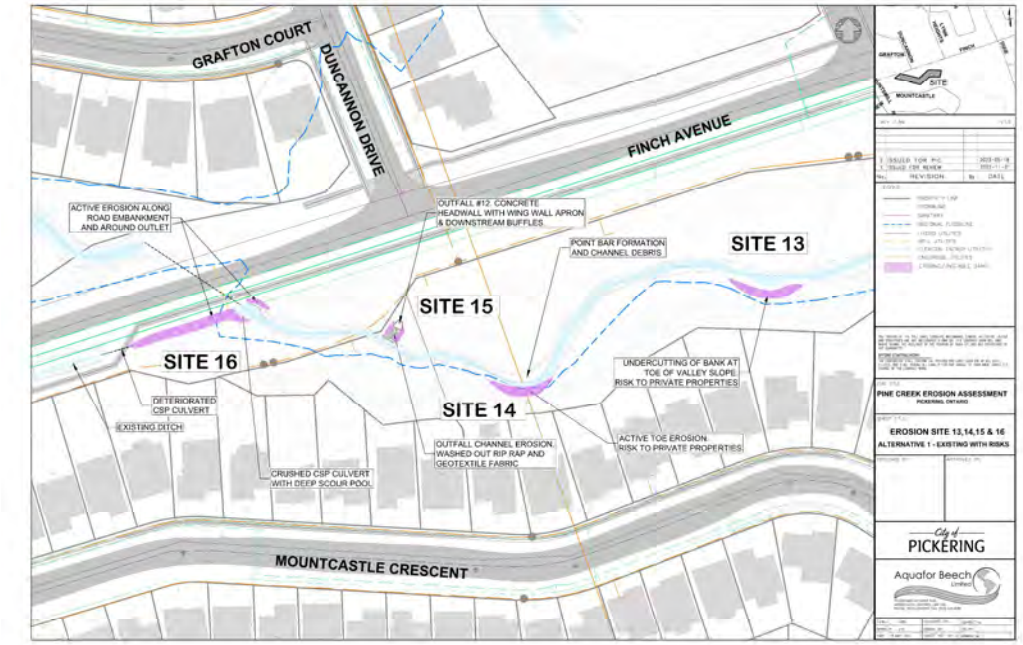
Erosion Site #11-12	Evaluation Criteria	Comment	Do Nothing	Local Works	Extended Works
Physical and Natural Environment	Mitigation of Existing Erosion Risks	Rate of erosion, loss of public / private lands and sediment deposition caused by erosion	1	3	4
	Aquatic Habitat	Impact on passage and quantity/quality of habitat	1	2	4
	Terrestrial Habitat	Impact on connectivity, diversity and quantity/quality of habitat	1	2	4
	Terrestrial Vegetation	Impact on existing woodlots; removals & restoration scheme	4	3	1
	Impacts to Species at Risk	Ability to improve suitability of terrestrial and aquatic habitat for Species at Risk, potentially affected temporarily or permanently.	4	3	1
	Climate Change	Ability to adapt to, and be resilient to, climate change	1	3	4
		Subtotal	**12**	**16**	**18**
		Weighted Score	**12.50**	**16.67**	**18.75**
Social / Cultural Environment	Public Safety	Impact on public safety	2	4	4
	Landowner Impacts / Community Disruption	Impact on private property	4	3	1
	Benefit to Community and Public Acceptance	Access to trails, enjoyment of surrounding lands	1	3	4
	Archaeological Impacts	Less disturbance of areas with archaeological potential and cultural heritage resources score higher	4	3	1
	Aesthetic Value	Impact on existing and proposed aesthetic value	1	3	4
		Subtotal	**12.00**	**16.00**	**14.00**
		Weighted Score	**15.00**	**20.00**	**17.50**
Economic Environment	Capital Costs	One time cost to City	4	3	1
	Operations & Maintenance Costs	Requirement for regular, irregular or no maintenance activities and ensure effectiveness of implemented measures	1	3	4
	Life Cycle Costs	Lower life cycle costs relative to the other alternatives scores higher	1	4	3
	Cost Effectiveness	Ability to provide multiple improvements, at a cost less then the total of completing all the works separately. Accounts for the ability of the City to partner and share costs with other agencies (i.e., Region of Durham, TRCA, etc.)	2	4	3
		Subtotal	**8.00**	**14.00**	**11.00**
		Weighted Score	**12.50**	**21.88**	**17.19**
Technical/Engineering Considerations	Regulatory Agency Acceptance	Satisfy City, TRCA, DFO and MNR mandates	2	4	3
	Impact on Existing Infrastructure	Protection or potential exposure of infrastructure (buildings, bridges, properties, sewers)	2	3	4
	Flooding Impacts	Greater reduction of flooding risks to public and/or private lands for longer time score higher	2	3	4
	Technical Feasibility	Complexity of implementing the Project, including constructability and need to manage construction related disturbances to other infrastructure / property	4	4	2
	Lifespan of Works	Expected lifespan / years of works before intervention needs to be repeated	1	3	4
		Subtotal	**11.00**	**17.00**	**17.00**
		Weighted Score	**13.75**	**21.25**	**21.25**
		TOTAL SCORE (/100)	**53.8**	**79.8**	**74.7**

Preliminary preferred alternative – Local Works

- Repairs to storm sewer outfall at Site #11
- Removal of accumulated channel sediment, remove failed gabion baskets at Site #11 and replace with vegetated buttresses
- Regrade and restore eroded slope at Site #12, remove debris jams, and install vegetated buttress to provide erosion control protection

EROSION SITES 13 - 16

Existing conditions & erosion risks




Site 13 – Slope instability risk to private property


Site 14 – Slope instability risk to private property

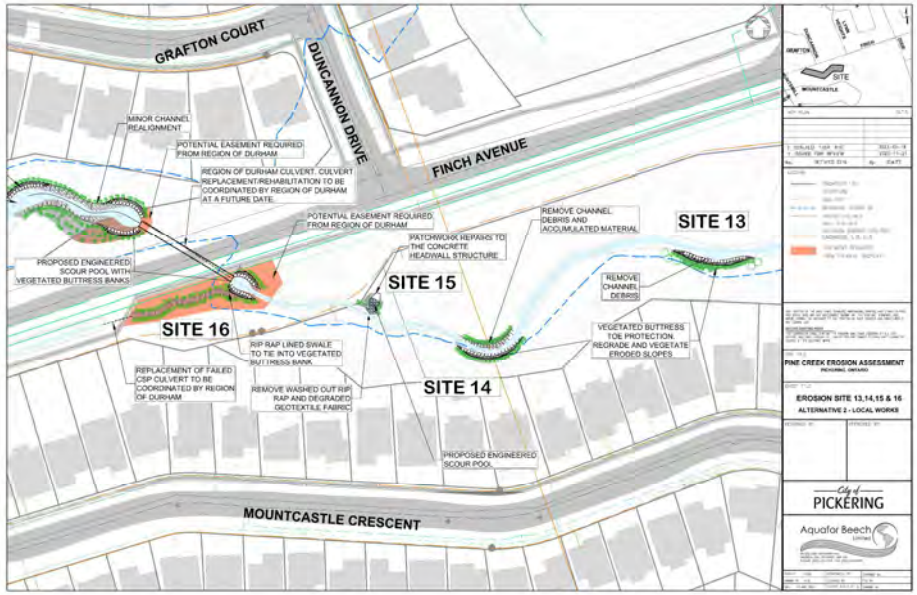

Site 16 – Scouring downstream of Finch Avenue culvert

Risks to private property, municipal & regional infrastructure and aquatic habitat due to:

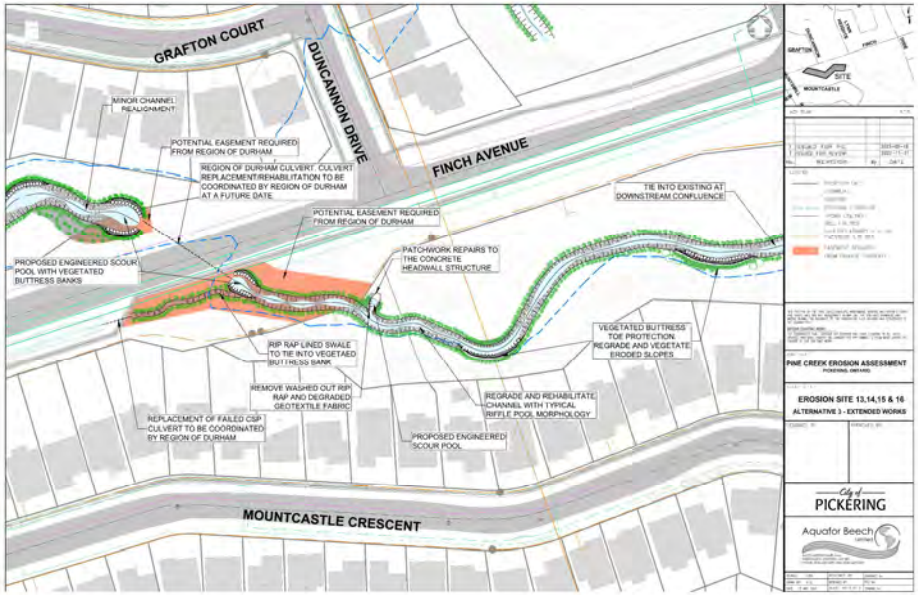
- Active bank erosion
- Woody debris jams in the channel
- Undercut and fallen trees

Level of Risk: High

Proposed restoration alternatives



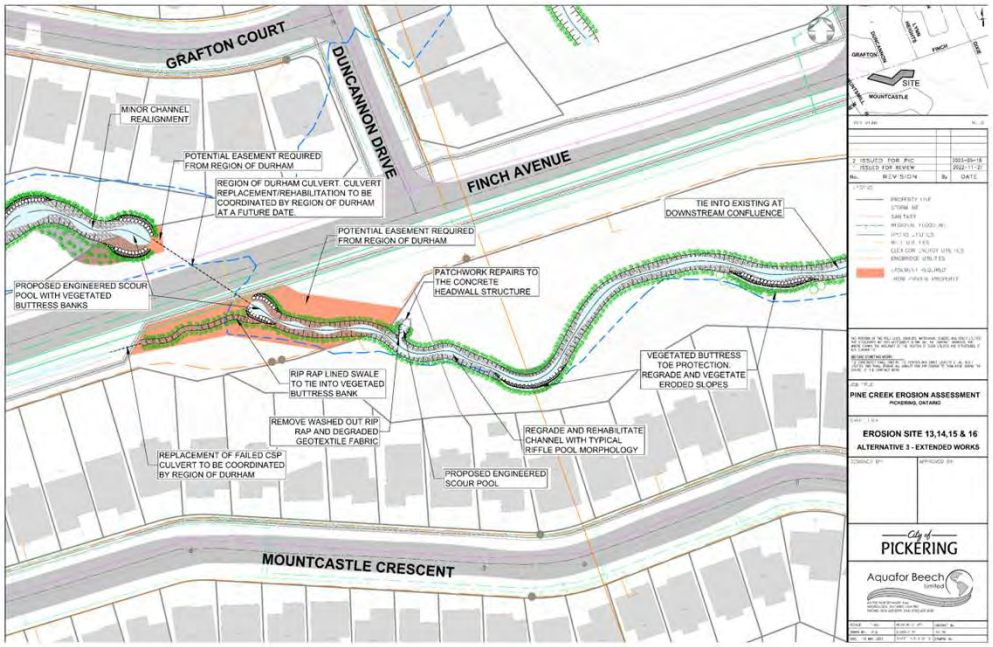
Alternative #1: Local Works



Alternative #2: Extended Works

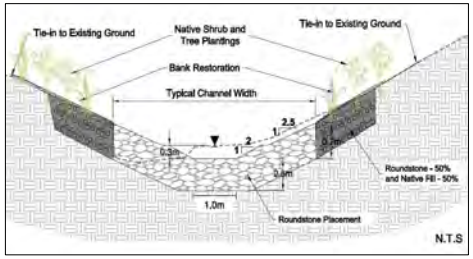
EROSION SITES 13 - 16 – POTENTIAL PREFERRED ALTERNATIVE

Pine Creek Erosion Assessment
Municipal Class Environmental Assessment



Erosion Site #13-16	Evaluation Criteria	Comment	Do Nothing	Local Works	Extended Works
Physical and Natural Environment	Mitigation of Existing Erosion Risks	Rate of erosion, loss of public / private lands and sediment deposition caused by erosion	1	2	4
	Aquatic Habitat	Impact on passage and quantity/quality of habitat	1	2	4
	Terrestrial Habitat	Impact on connectivity, diversity and quantity/quality of habitat	1	2	4
	Terrestrial Vegetation	Impact on existing woodlots; removals & restoration scheme	4	3	1
	Impacts to Species at Risk	Ability to improve suitability of terrestrial and aquatic habitat for Species at Risk, potentially affected temporarily or permanently.	4	3	2
	Climate Change	Ability to adapt to, and be resilient to, climate change	1	2	4
		Subtotal	**12**	**14**	**19**
		Weighted Score	**12.50**	**14.58**	**19.79**
Social / Cultural Environment	Public Safety	Impact on public safety	1	2	4
	Landowner Impacts / Community Disruption	Impact on private property	1	2	4
	Benefit to Community and Public Acceptance	Access to trails, enjoyment of surrounding lands	1	3	4
	Archaeological Impacts	Less disturbance of areas with archaeological potential and cultural heritage resources score higher	4	3	1
	Aesthetic Value	Impact on existing and proposed aesthetic value	1	2	4
		Subtotal	**8.00**	**12.00**	**17.00**
		Weighted Score	**10.00**	**15.00**	**21.25**
Economic Environment	Capital Costs	One time cost to City	4	3	1
	Operations & Maintenance Costs	Requirement for regular, irregular or no maintenance activities and ensure effectiveness of implemented measures	1	2	4
	Life Cycle Costs	Lower life cycle costs relative to the other alternatives scores higher	1	2	4
	Cost Effectiveness	Ability to provide multiple improvements, at a cost less then the total of completing all the works separately. Accounts for the ability of the City to partner and share costs with other agencies (i.e., Region of Durham, TRCA, etc.)	2	3	4
		Subtotal	**8.00**	**10.00**	**13.00**
		Weighted Score	**12.50**	**15.63**	**20.31**
Technical/Engineering Considerations	Regulatory Agency Acceptance	Satisfy City, TRCA, DFO and MNR mandates	2	3	4
	Impact on Existing Infrastructure	Protection or potential exposure of infrastructure (buildings, bridges, properties, sewers)	2	3	3
	Flooding Impacts	Greater reduction of flooding risks to public and/or private lands for longer time score higher	1	3	4
	Technical Feasibility	Complexity of implementing the Project, including constructability and need to manage construction related disturbances to other infrastructure / property	4	3	2
	Lifespan of Works	Expected lifespan / years of works before intervention needs to be repeated	1	2	4
		Subtotal	**10.00**	**14.00**	**17.00**
		Weighted Score	**12.50**	**17.50**	**21.25**
		TOTAL SCORE (/100)	**47.5**	**62.7**	**82.6**

An example of channel restoration design



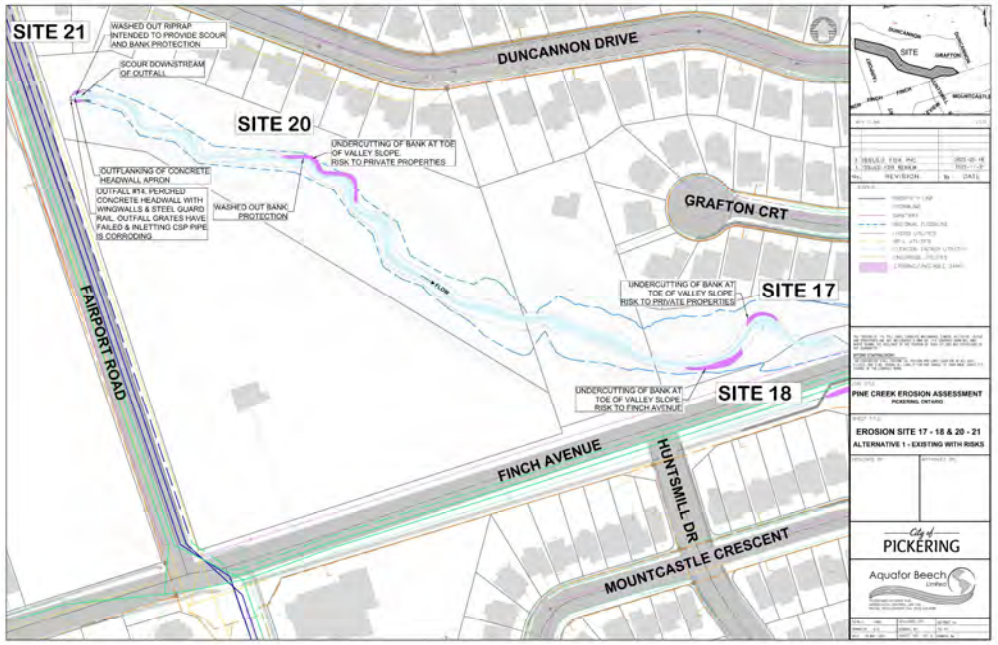
An example of typical roundstone riffle – local gravel placement

Preliminary preferred alternative – Extended Works

- Extended natural channel restoration works
- Regrade and stabilize failing slopes
- Repair/rehabilitate scour pools downstream of culverts and outfalls
- Finch Avenue culvert is a Region of Durham asset

EROSION SITES 17 - 21

Existing conditions & erosion risks




Site 17 – Slope stability risk to Private Property


Site 18 – Slope stability risk to Finch Avenue

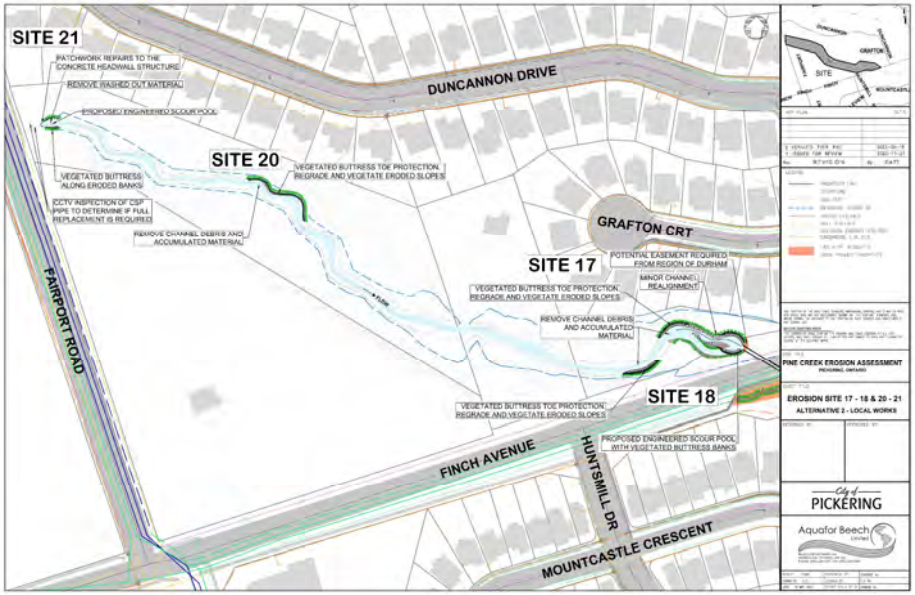

Site 21 – Degraded and perched outfall downstream of Fairport Road.

Risks to private property, Finch Avenue, municipal infrastructure and aquatic habitat due to:

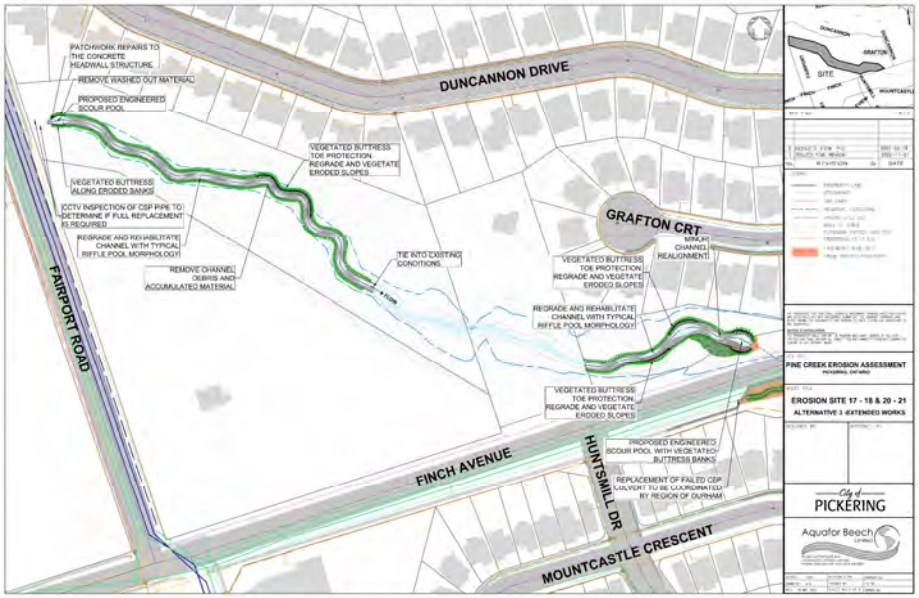
- Active bank erosion
- Slope failures and fallen trees
- Woody debris jams

Level of Risk: Moderate

Proposed restoration alternatives



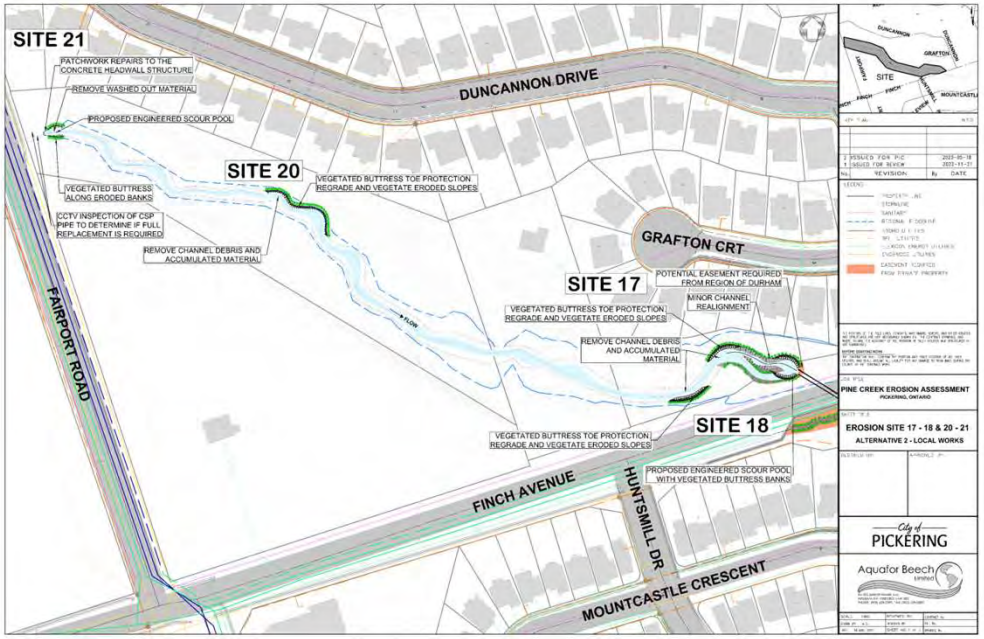
Alternative #1: Local Works



Alternative #2: Extended Works

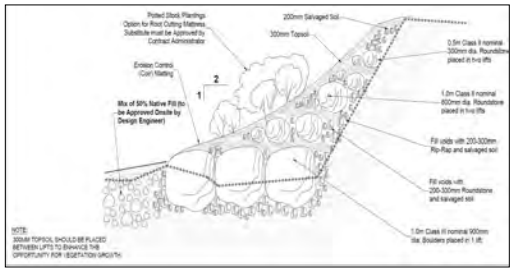
EROSION SITES 17-21 – POTENTIAL PREFERRED ALTERNATIVE

Pine Creek Erosion Assessment
Municipal Class Environmental Assessment



Erosion Site #17-21	Evaluation Criteria	Comment	Do Nothing	Local Works	Extended Works
Physical and Natural Environment	Mitigation of Existing Erosion Risks	Rate of erosion, loss of public / private lands and sediment deposition caused by erosion	1	4	4
	Aquatic Habitat	Impact on passage and quantity/quality of habitat	1	3	4
	Terrestrial Habitat	Impact on connectivity, diversity and quantity/quality of habitat	1	3	4
	Terrestrial Vegetation	Impact on existing woodlots; removals & restoration scheme	4	2	1
	Impacts to Species at Risk	Ability to improve suitability of terrestrial and aquatic habitat for Species at Risk, potentially affected temporarily or permanently.	4	3	2
	Climate Change	Ability to adapt to, and be resilient to, climate change	1	3	4
		Subtotal	**12**	**18**	**19**
		Weighted Score	**12.50**	**18.75**	**19.79**
Social / Cultural Environment	Public Safety	Impact on public safety	1	4	4
	Landowner Impacts / Community Disruption	Impact on private property	1	4	4
	Benefit to Community and Public Acceptance	Access to trails, enjoyment of surrounding lands	1	4	3
	Archaeological Impacts	Less disturbance of areas with archaeological potential and cultural heritage resources score higher	4	2	1
	Aesthetic Value	Impact on existing and proposed aesthetic value	1	3	4
		Subtotal	**8.00**	**17.00**	**16.00**
		Weighted Score	**10.00**	**21.25**	**20.00**
Economic Environment	Capital Costs	One time cost to City	4	2	1
	Operations & Maintenance Costs	Requirement for regular, irregular or no maintenance activities and ensure effectiveness of implemented measures	1	3	4
	Life Cycle Costs	Lower life cycle costs relative to the other alternatives scores higher	1	4	2
	Cost Effectiveness	Ability to provide multiple improvements, at a cost less then the total of completing all the works separately. Accounts for the ability of the City to partner and share costs with other agencies (i.e., Region of Durham, TRCA, etc.)	2	3	3
		Subtotal	**8.00**	**12.00**	**10.00**
		Weighted Score	**12.50**	**18.75**	**15.63**
Technical/Engineering Considerations	Regulatory Agency Acceptance	Satisfy City, TRCA, DFO and MNR mandates	2	4	3
	Impact on Existing Infrastructure	Protection or potential exposure of infrastructure (buildings, bridges, properties, sewers)	2	4	4
	Flooding Impacts	Greater reduction of flooding risks to public and/or private lands for longer time score higher	1	3	3
	Technical Feasibility	Complexity of implementing the Project, including constructability and need to manage construction related disturbances to other infrastructure / property	4	3	2
	Lifespan of Works	Expected lifespan / years of works before intervention needs to be repeated	1	3	4
		Subtotal	**10.00**	**17.00**	**16.00**
		Weighted Score	**12.50**	**21.25**	**20.00**
		TOTAL SCORE (/100)	**47.5**	**80.0**	**75.4**

An example of natural channel design enhanced with vegetated buttress



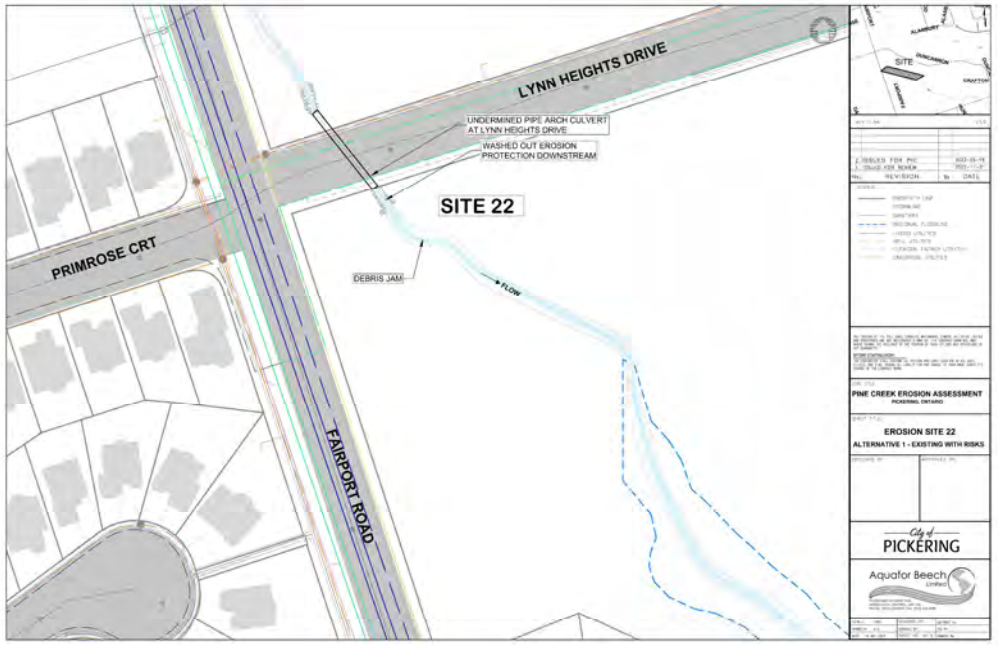
An example of vegetated buttress detail

Preliminary preferred alternative – Local Works

- Rehabilitate and restore eroded banks
- Minor channel realignment to establish a smoother transition into the downstream Finch Avenue culvert
- Construct vegetated buttresses at critical risk sites to provide erosion protection
- Outfall rehabilitation works and downstream scour protection (Site #21)

EROSION SITE 22

Existing conditions & erosion risks




Undermined pipe arch culvert at Lynn Heights Drive


Undermined toe of bank and debris jam downstream of Lynn Height Drive

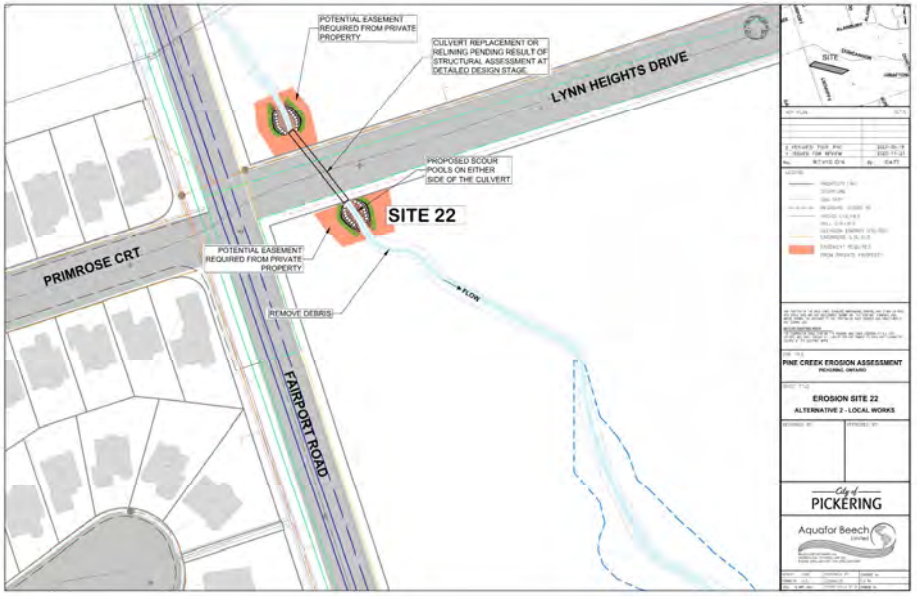

Washed out erosion protection downstream

Risks to municipal infrastructure and aquatic habitat due to:

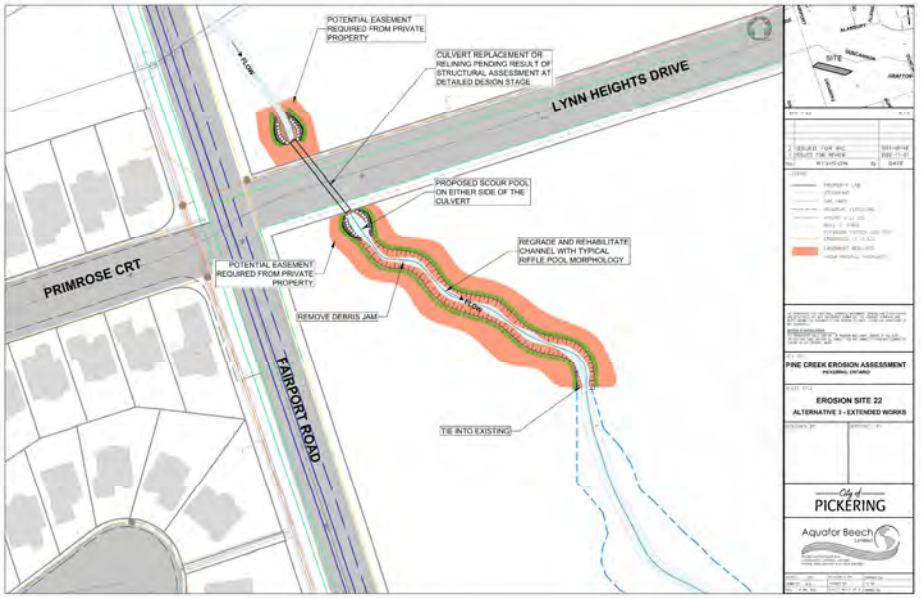
- Active scouring and erosion
- Infrastructure degradation and failure
- Debris accumulation

Level of Risk: High

Proposed restoration alternatives

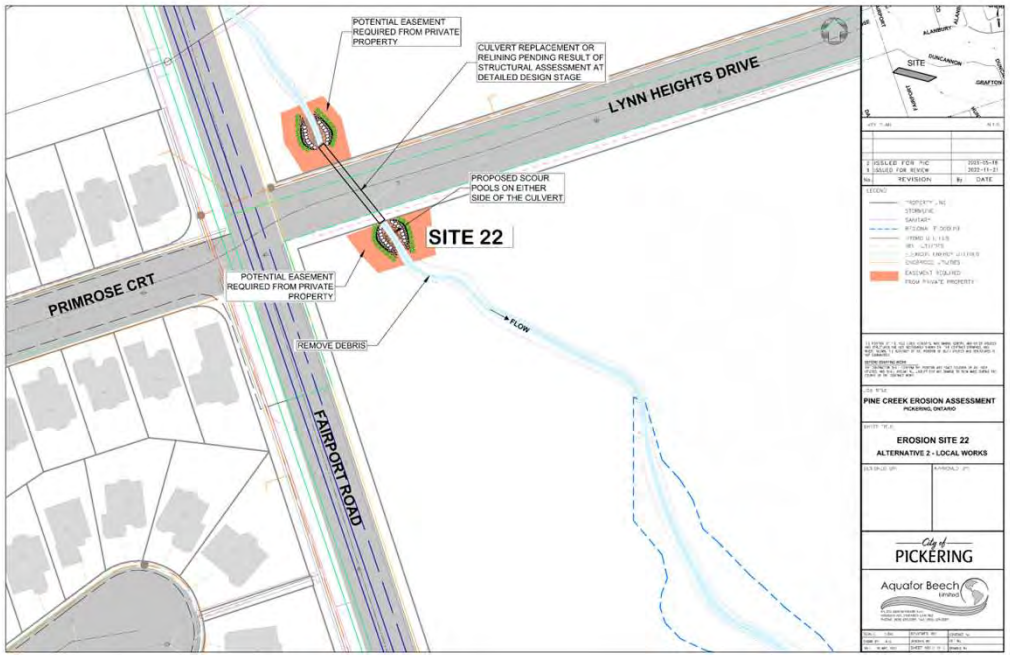


Alternative #1: Local Works

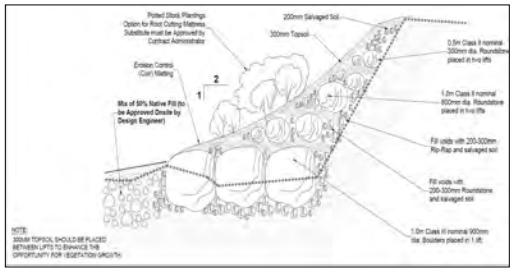


Alternative #2: Extended Works

EROSION SITE 22 – POTENTIAL PREFERRED ALTERNATIVE



An example of culvert rehabilitation and downstream scour pool works



An example of vegetated buttress detail

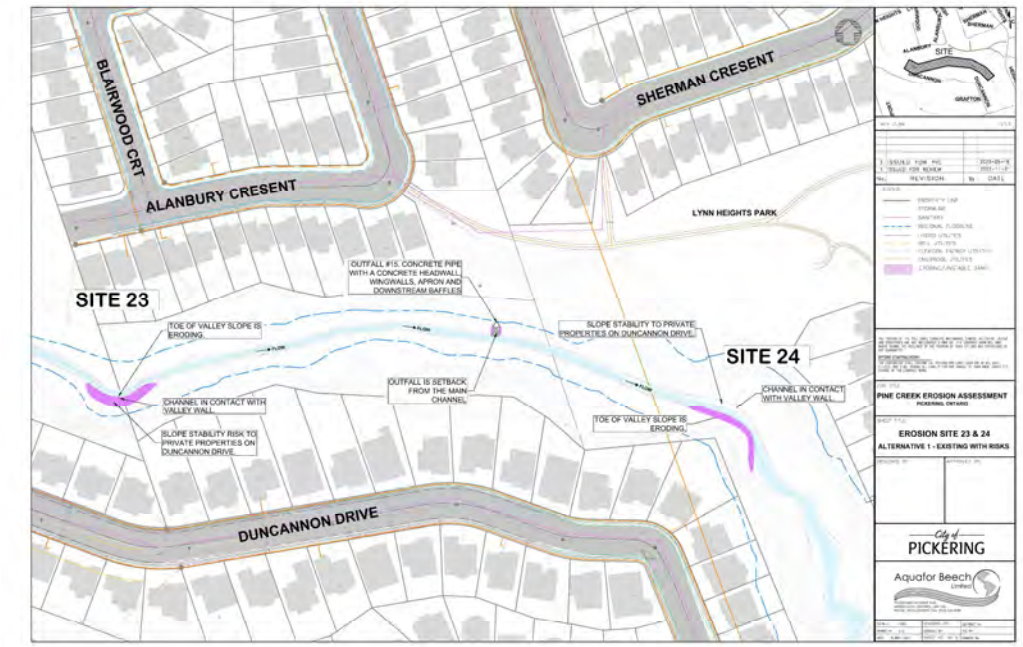
Erosion Site #22	Evaluation Criteria	Comment	Do Nothing	Local Works	Extended Works
Physical and Natural Environment	Mitigation of Existing Erosion Risks	Rate of erosion, loss of public / private lands and sediment deposition caused by erosion	1	4	4
	Aquatic Habitat	Impact on passage and quantity/quality of habitat	1	2	4
	Terrestrial Habitat	Impact on connectivity, diversity and quantity/quality of habitat	1	2	4
	Terrestrial Vegetation	Impact on existing woodlots; removals & restoration scheme	4	3	1
	Impacts to Species at Risk	Ability to improve suitability of terrestrial and aquatic habitat for Species at Risk, potentially affected temporarily or permanently.	4	3	1
	Climate Change	Ability to adapt to, and be resilient to, climate change	1	4	4
		Subtotal	**12**	**18**	**18**
		Weighted Score	**12.50**	**18.75**	**18.75**
Social / Cultural Environment	Public Safety	Impact on public safety	1	4	4
	Landowner Impacts / Community Disruption	Impact on private property	1	4	2
	Benefit to Community and Public Acceptance	Access to trails, enjoyment of surrounding lands	1	4	3
	Archaeological Impacts	Less disturbance of areas with archaeological potential and cultural heritage resources score higher	4	3	1
	Aesthetic Value	Impact on existing and proposed aesthetic value	1	2	4
		Subtotal	**8.00**	**17.00**	**14.00**
		Weighted Score	**10.00**	**21.25**	**17.50**
Economic Environment	Capital Costs	One time cost to City	4	3	2
	Operations & Maintenance Costs	Requirement for regular, irregular or no maintenance activities and ensure effectiveness of implemented measures	1	3	4
	Life Cycle Costs	Lower life cycle costs relative to the other alternatives scores higher	1	4	2
	Cost Effectiveness	Ability to provide multiple improvements, at a cost less then the total of completing all the works separately. Accounts for the ability of the City to partner and share costs with other agencies (i.e., Region of Durham, TRCA, etc.)	2	3	3
		Subtotal	**8.00**	**13.00**	**11.00**
		Weighted Score	**12.50**	**20.31**	**17.19**
Technical/Engineering Considerations	Regulatory Agency Acceptance	Satisfy City, TRCA, DFO and MNR mandates	2	4	3
	Impact on Existing Infrastructure	Protection or potential exposure of infrastructure (buildings, bridges, properties, sewers)	2	4	4
	Flooding Impacts	Greater reduction of flooding risks to public and/or private lands for longer time score higher	1	3	4
	Technical Feasibility	Complexity of implementing the Project, including constructability and need to manage construction related disturbances to other infrastructure / property	4	3	1
	Lifespan of Works	Expected lifespan / years of works before intervention needs to be repeated	1	4	4
		Subtotal	**10.00**	**18.00**	**16.00**
		Weighted Score	**12.50**	**22.50**	**20.00**
		TOTAL SCORE (/100)	**47.5**	**82.8**	**73.4**

Preliminary preferred alternative – Local Works

- Culvert replacement / rehabilitation
- Installation of bank erosion control and scour pools upstream and downstream of the culvert
- This alternative limits construction related impacts to private property

EROSION SITES 23 - 24

Existing conditions & erosion risks




Site 23 - Slope stability risk to private properties


Site 23 - Channel in contact with valley wall

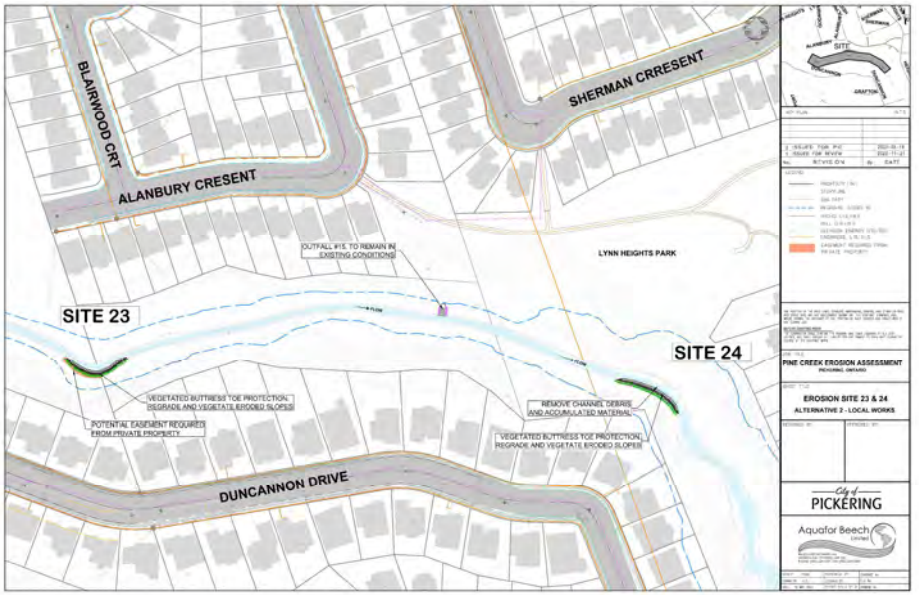

Site 24 - Erosion risk to private properties

Risks to private property and aquatic habitat due to:

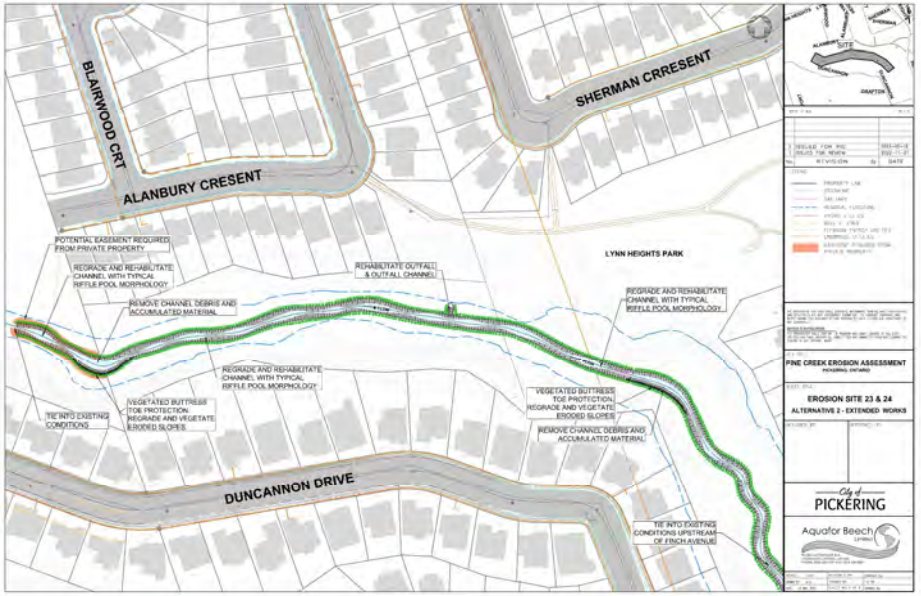
- Active bank erosion
- Slope failure and fallen trees

Level of Risk: Medium

Proposed restoration alternatives



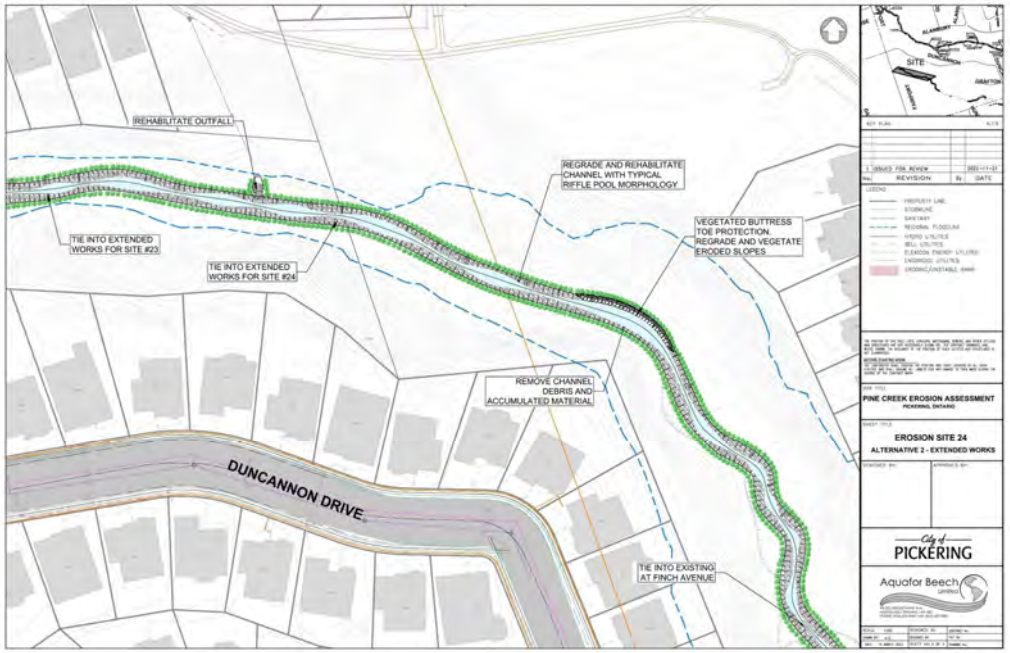
Alternative #1: Local Works



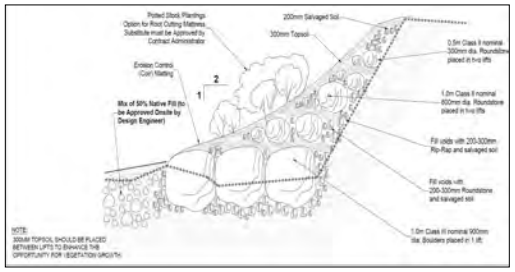
Alternative #2: Extended Works

EROSION SITES 23-24 – POTENTIAL PREFERRED ALTERNATIVE

Pine Creek Erosion Assessment
Municipal Class Environmental Assessment



An example of natural channel design enhanced with vegetated buttress



An example of vegetated buttress detail

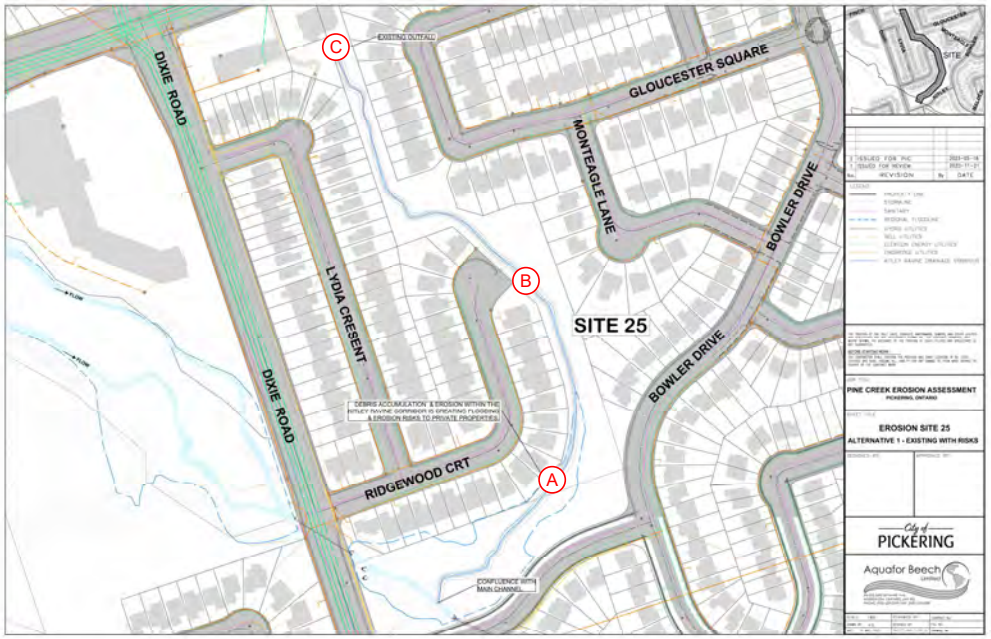
Erosion Site #23-24	Evaluation Criteria	Comment	Do Nothing	Local Works	Extended Works
Physical and Natural Environment	Mitigation of Existing Erosion Risks	Rate of erosion, loss of public / private lands and sediment deposition caused by erosion	1	2	4
	Aquatic Habitat	Impact on passage and quantity/quality of habitat	1	2	4
	Terrestrial Habitat	Impact on connectivity, diversity and quantity/quality of habitat	1	2	4
	Terrestrial Vegetation	Impact on existing woodlots; removals & restoration scheme	4	3	1
	Impacts to Species at Risk	Ability to improve suitability of terrestrial and aquatic habitat for Species at Risk, potentially affected temporarily or permanently.	4	3	1
	Climate Change	Ability to adapt to, and be resilient to, climate change	1	2	4
		Subtotal	**12**	**14**	**18**
		Weighted Score	**12.50**	**14.58**	**18.75**
Social / Cultural Environment	Public Safety	Impact on public safety	1	3	4
	Landowner Impacts / Community Disruption	Impact on private property	1	2	4
	Benefit to Community and Public Acceptance	Access to trails, enjoyment of surrounding lands	1	3	4
	Archaeological Impacts	Less disturbance of areas with archaeological potential and cultural heritage resources score higher	4	3	1
	Aesthetic Value	Impact on existing and proposed aesthetic value	1	2	4
		Subtotal	**8.00**	**13.00**	**17.00**
		Weighted Score	**10.00**	**16.25**	**21.25**
Economic Environment	Capital Costs	One time cost to City	4	3	1
	Operations & Maintenance Costs	Requirement for regular, irregular or no maintenance activities and ensure effectiveness of implemented measures	1	3	4
	Life Cycle Costs	Lower life cycle costs relative to the other alternatives scores higher	1	3	4
	Cost Effectiveness	Ability to provide multiple improvements, at a cost less then the total of completing all the works separately. Accounts for the ability of the City to partner and share costs with other agencies (i.e., Region of Durham, TRCA, etc.)	2	3	4
		Subtotal	**8.00**	**12.00**	**13.00**
		Weighted Score	**12.50**	**18.75**	**20.31**
Technical/Engineering Considerations	Regulatory Agency Acceptance	Satisfy City, TRCA, DFO and MNR mandates	2	3	4
	Impact on Existing Infrastructure	Protection or potential exposure of infrastructure (buildings, bridges, properties, sewers)	2	3	4
	Flooding Impacts	Greater reduction of flooding risks to public and/or private lands for longer time score higher	1	3	4
	Technical Feasibility	Complexity of implementing the Project, including constructability and need to manage construction related disturbances to other infrastructure / property	4	3	2
	Lifespan of Works	Expected lifespan / years of works before intervention needs to be repeated	1	3	4
		Subtotal	**10.00**	**15.00**	**18.00**
		Weighted Score	**12.50**	**18.75**	**22.50**
		TOTAL SCORE (/100)	**47.5**	**68.3**	**82.8**

Preliminary preferred alternative – Extended Works

- Regrade and restore eroded slopes
- Implement vegetated buttress to provide erosion protection
- Removal of accumulated channel debris
- Establish riffle-pool morphology

EROSION SITE 25 – Kitley Ravine

Existing conditions & erosion risks



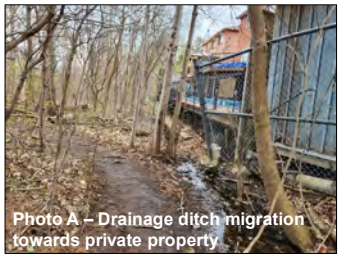


Photo A – Drainage ditch migration towards private property.


Photo B – Debris accumulation within the Kitley Ravine corridor.


Photo C – Upstream outfall. Note significant blockage due to sediment.

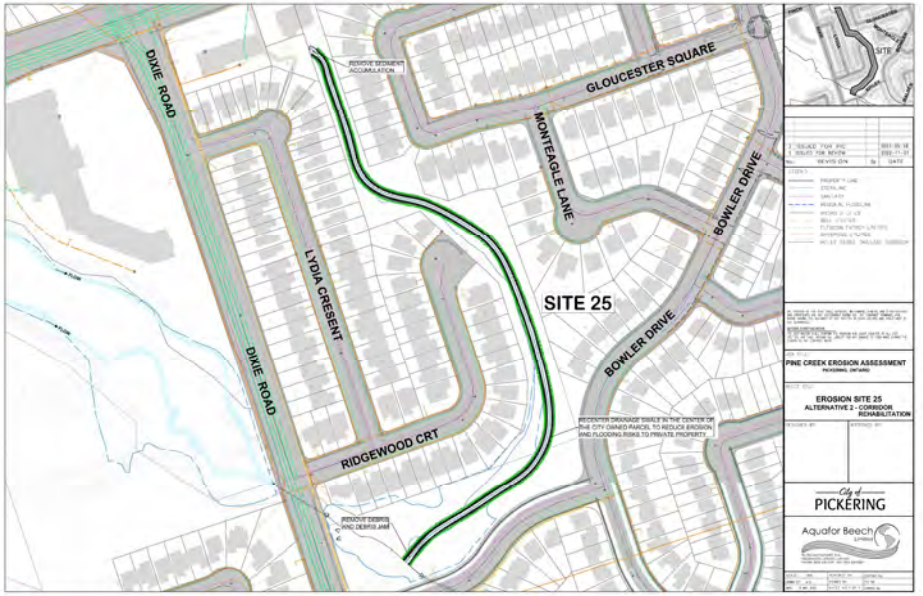
Risks to private property and municipal infrastructure due to:

- Channel migration
- Fallen trees and debris jams
- Sediment accumulation

Level of Risk: Medium

Proposed restoration alternatives

Alternative #1: Do Nothing

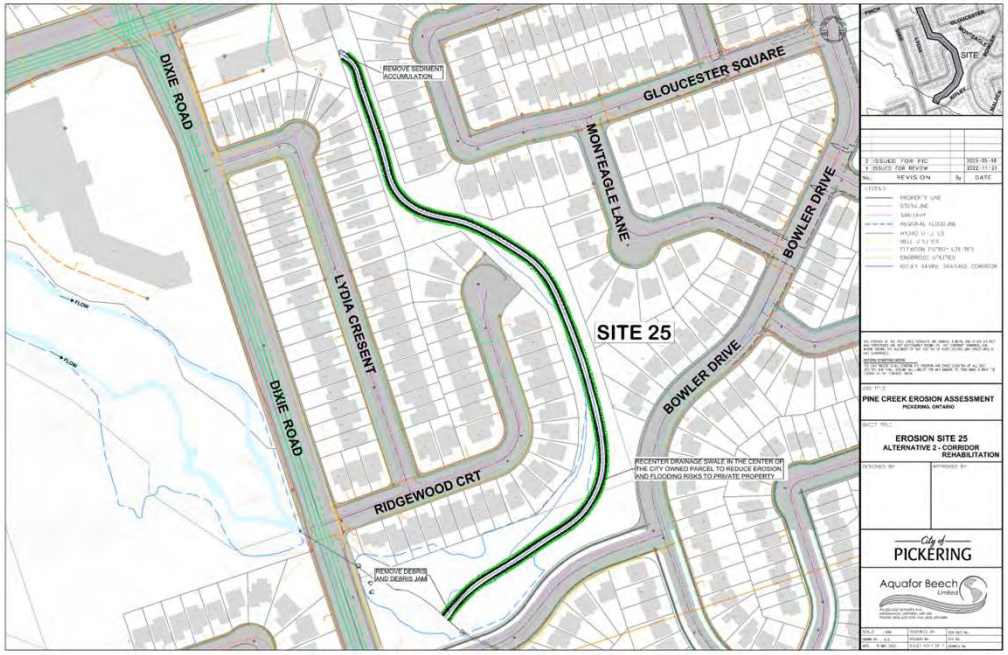


Alternative #2: Full Corridor Rehabilitation

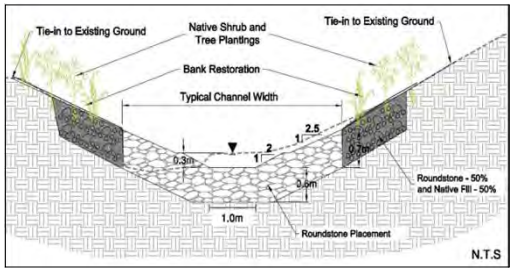
EROSION SITE 25 – POTENTIAL PREFERRED ALTERNATIVE

Aquafor Beech Limited | City of PICKERING

Pine Creek Erosion Assessment
Municipal Class Environmental Assessment



An example of a stone lined drainage channel



An example of a rip-rap lined ditch / channel

Erosion Site #25	Evaluation Criteria	Comment	Do Nothing	Corridor Rehabilitation
Physical and Natural Environment	Mitigation of Existing Erosion Risks	Rate of erosion, loss of public / private lands and sediment deposition caused by erosion	1	4
	Aquatic Habitat	Impact on passage and quantity/quality of habitat	2	2
	Terrestrial Habitat	Impact on connectivity, diversity and quantity/quality of habitat	1	3
	Terrestrial Vegetation	Impact on existing woodlots; removals & restoration scheme	4	2
	Impacts to Species at Risk	Ability to improve suitability of terrestrial and aquatic habitat for Species at Risk, potentially affected temporarily or permanently.	4	2
	Climate Change	Ability to adapt to, and be resilient to, climate change	1	4
		Subtotal	**13**	**17**
		Weighted Score	**13.54**	**17.71**
Social / Cultural Environment	Public Safety	Impact on public safety	1	4
	Landowner Impacts / Community Disruption	Impact on private property	1	4
	Benefit to Community and Public Acceptance	Access to trails, enjoyment of surrounding lands	1	3
	Archaeological Impacts	Less disturbance of areas with archaeological potential and cultural heritage resources score higher	4	1
	Aesthetic Value	Impact on existing and proposed aesthetic value	1	3
		Subtotal	**8.00**	**15.00**
		Weighted Score	**10.00**	**18.75**
Economic Environment	Capital Costs	One time cost to City	4	1
	Operations & Maintenance Costs	Requirement for regular, irregular or no maintenance activities and ensure effectiveness of implemented measures	1	3
	Life Cycle Costs	Lower life cycle costs relative to the other alternatives scores higher	1	3
	Cost Effectiveness	Ability to provide multiple improvements, at a cost less then the total of completing all the works separately. Accounts for the ability of the City to partner and share costs with other agencies (i.e., Region of Durham, TRCA, etc.)	1	4
		Subtotal	**7.00**	**11.00**
		Weighted Score	**10.94**	**17.19**
Technical/Engineering Considerations	Regulatory Agency Acceptance	Satisfy City, TRCA, DFO and MNR mandates	3	4
	Impact on Existing Infrastructure	Protection or potential exposure of infrastructure (buildings, bridges, properties, sewers)	3	4
	Flooding Impacts	Greater reduction of flooding risks to public and/or private lands for longer time score higher	2	4
	Technical Feasibility	Complexity of implementing the Project, including constructability and need to manage construction related disturbances to other infrastructure / property	4	2
	Lifespan of Works	Expected lifespan / years of works before intervention needs to be repeated	2	4
		Subtotal	**14.00**	**18.00**
		Weighted Score	**17.50**	**22.50**
		TOTAL SCORE (/100)	**52.0**	**76.1**

Preliminary preferred alternative – Full Corridor Rehabilitation

- Recenter the drainage ditch in the middle of the City owned parcel, increasing the erosion and flooding buffer between the ditch and private properties
- Install a rip-rap lining to limit future ditch migration / erosion
- Removal of accumulated channel debris
- Application of restoration plantings

NEXT STEPS

PUBLIC CONSULTATION – MAY 2023

- Receive PIC feedback, incorporate input and update results
- Compile and review feedback. Confirm or adapt preliminary preferred alternatives.

SUBMIT EA PROJECT FILE – SUMMER/FALL 2023

- EA project file posted for 30 day review period.

DETAILED DESIGN & IMPLEMENTATION

- Construction timing dependant on City of Pickering Capital Planning.

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

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THANK YOU

FOR PARTICIPATING IN THE PINE CREEK EROSION ASSESSMENT MUNICIPAL CLASS ENVIRONMENTAL ASSESSEMNT