WELCOME

Colborne Street (East) Slope Stabilization
Municipal Class Environmental Assessment

Public Information Centre No. 3

St. Peter's School
Wednesday, November 13th, 2019
7:00 pm - 8:30 pm
Open House Format

PLEASE SIGN IN AND TAKE A COMMENT SHEET

THE CORPORATION OF THE CITY OF BRANTFORD

ARA
ARCHAEOLOGY | HERITAGE | OUTREACH | EDUCATION

PINCHIN

ecosystem recovery inc.
PROFESSIONAL ENGINEERS

PIC Purpose and Study Background

Purpose of the PIC today:

- ❑ Summarize and address comments from PIC #2
- ❑ Present the selected alternative solution
- ❑ Present the current preferred alternative design
- ❑ Provide an update on the Environmental Assessment timeline
- ❑ Consult with the public on the preferred alternative design

Environmental Assessment (EA):

The EA study follows the **Municipal Class Environmental Assessment** under Schedule 'C' for the slope area situated between Colborne Street (East) and the north bank of the Grand River at a road section between Calvin Street to the west, and Johnson Road to the east in the City of Brantford.

Problem Statement:

Since the landslide event that occurred in 1986, several studies have been completed to determine cause and effects. Monitoring shows that slope movement continues to occur. Slope stability concerns revolve around soil type and moisture issues as well as toe erosion.

The EA is being initiated to develop feasible alternatives to address stability concerns and to create a management strategy for the area.

Background Information and Timeline

Beach Road after 1986 landslide

1987
First Environmental Study Report (ESR) completed by Golder for GRCA. Landslide was determined to be primarily caused by ongoing riverbank erosion and high groundwater levels. First slope stability analysis completed as part of report.

1995
First EA completed by Golder; presented the preferred alterative as toe erosion protection with minor regrading of the slope.

1999
Grand River bank failure along toe of slope.

Evidence of toe erosion, including bare banks and fallen trees, April 2016

2012
Update to 1995 EA including revisiting slope stability, no change to the preferred alternative. A detailed Environmental Assessment was noted as required to adopt a preferred solution.

Slumping of the slope adjacent to the Rail Trail, October 2018

Sept 2018
First PIC for Colborne Street (East) EA.

951 Colborne Street (East) after 1986 landslide

1988
Canadian Pacific Railway removed.

1996
Former railbed converted to Hamilton-Brantford Rail Trail.

Hamilton-Brantford Rail Trail within Study Area, April 2016

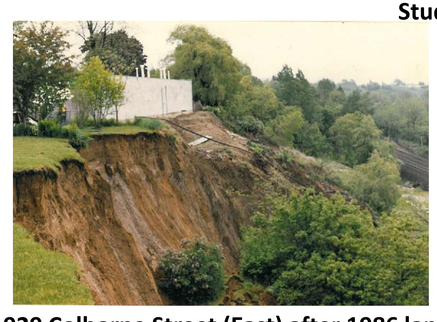
2015/2016
Additional studies to review slope monitoring data and collect additional field observations undertaken by Ecosystem Recovery Inc.

March 2019
Second PIC for Colborne Street (East) EA.

Nov 2019 (today)
Third and final PIC, Draft of the Environmental Study Report to be completed by the end of the year.

Railway along Beach Road after 1986 landslide

1986
Major slope failure on South side of Colborne Street. Initiated investigations into slope failure within study area. Slope monitoring begins with installation of monitoring equipment.



929 Colborne Street (East) after 1986 landslide

Slope monitoring in 2016, unstable slope evidence (left) and slumping near property line (right)

City of Brantford
Public Information Centre

Municipal Class EA Process Overview (Schedule 'C')

Environmental Assessment (EA) Study Duration (12-16 Month Process)

Design and Construction

PIC #1
September 2018

PIC #2
March 2019

PIC #3
November 2019

2020 **2021** **2022**

Identify the problem or opportunity

Develop and Evaluate broad Alternative Solutions

Select a Preferred Alternative Solution

Develop and Evaluate more detailed Alternative Designs

Select a Preferred Alternative Design

Finalize Environmental Study Report (ESR), 30-day public review

Issue Notice of Completion (EA Completion)

Detailed Design (2020)

Phase I Construction (2021)

Monitoring and Verification of Approach

Phase II Construction (2022)

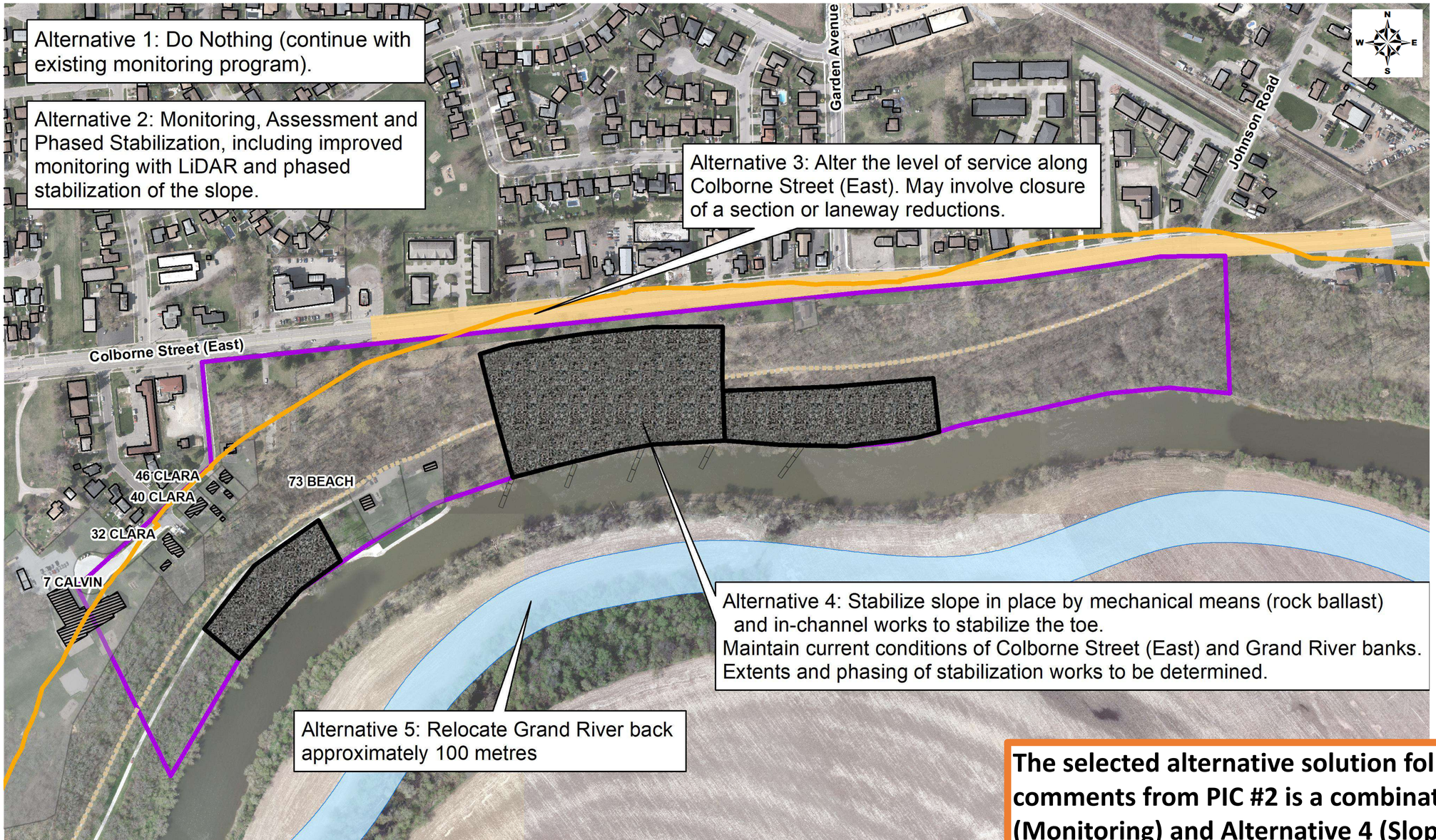
City of Brantford

Public Information Centre

THE CORPORATION OF THE CITY OF BRANTFORD

ecosystem recovery inc. PROFESSIONAL ENGINEERS

Summary of Alternative Solutions (from PIC #2)



The selected alternative solution following public comments from PIC #2 is a combination of Alternative 2 (Monitoring) and Alternative 4 (Slope Stabilization).

City of Brantford

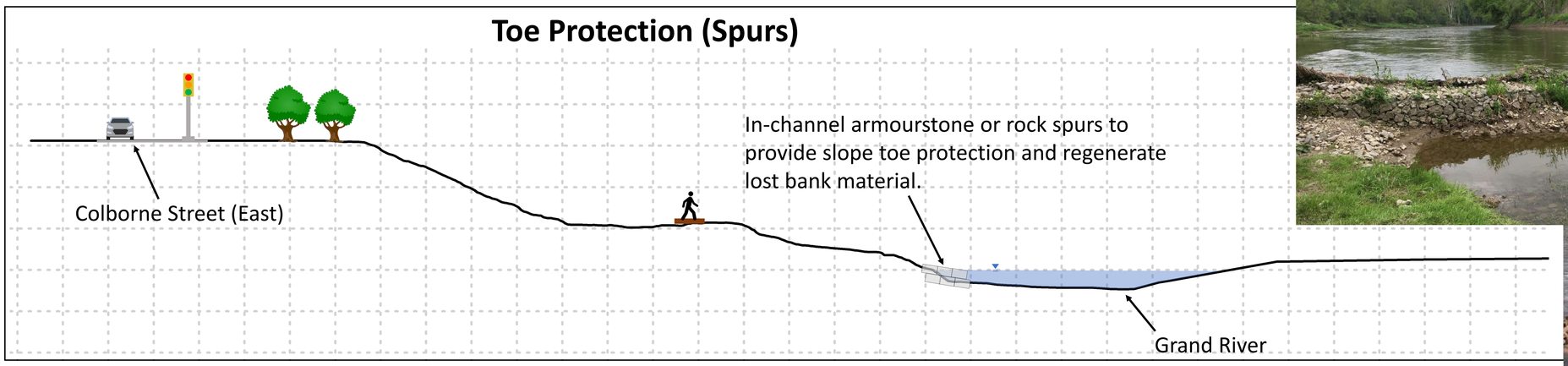
Public Information Centre

Summary of PIC #2 Comments and Responses

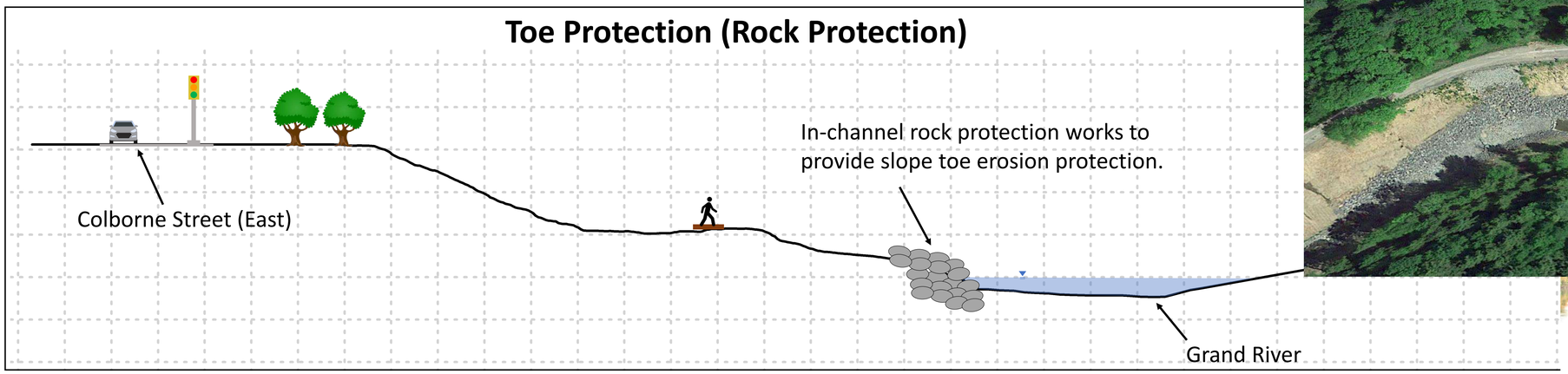
PIC #2 Received Comment	Response
Excessive rail vibration expressed as a concern for private property and potential for impacting slope stability.	The **key contributors** to the failing slope are the **presence of clay soils and high groundwater levels**, exacerbated by erosion of the toe of the slope at the Grand River and poor surface drainage.
Concern from the public received over the stability of the slope and potential for failure, with a strong call for action rather than further observation.	The preferred alternative was reviewed to ensure that steps to stabilize the slope will be taken in the first phase of the project construction.
Suggestion that moisture from the slope can be removed through a network of tile drains.	Given the clay soils present on the slope and the size of the site, a comprehensive network of subsurface tile drains is not technically or economically feasible. However, surface drains will be used to remove excess moisture from the slope, as shown in the preferred alternative design.
All of the considered alternatives should focus on the restoration of terrestrial vegetation on the site.	The preferred alternative design will minimize disruption to existing vegetation, as well as incorporate restorative vegetation where possible. Any rock placed will also incorporate vegetative plantings where possible.
Concern that important species are not included in the natural heritage assessment, including herptiles, turtles, and chorus frogs.	The natural heritage field assessment did not reveal and species at risk, however, these comments will be considered in the alternative design to minimize any potential disruptions to the habitat of important species in the study area.
The slope should be sufficiently stable at a 2.5H to 1V slope, and the recommended stable slope of 5.4H:1V is excessive.	The 5.4H:1V slope was calculated from a geotechnical investigation following the initial slope failure. The current slope inclination is approximately 4H:1V and the slope is currently experiencing signs of minor failures, indicating that a steeper slope would not be sufficiently stable.

Alternative Design - Toe Protection Concepts

Armourstone Spurs



Rock Protection

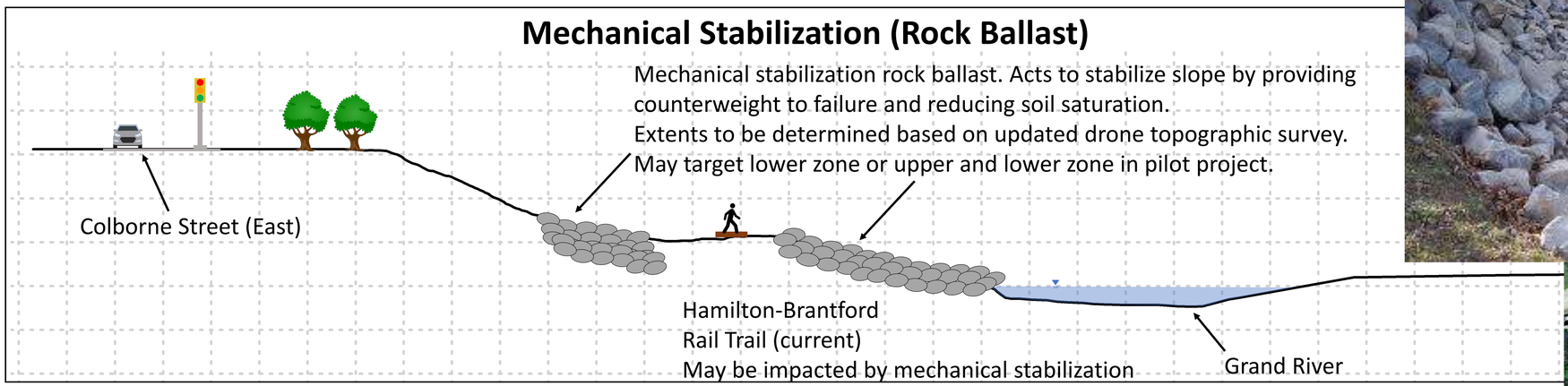


City of Brantford

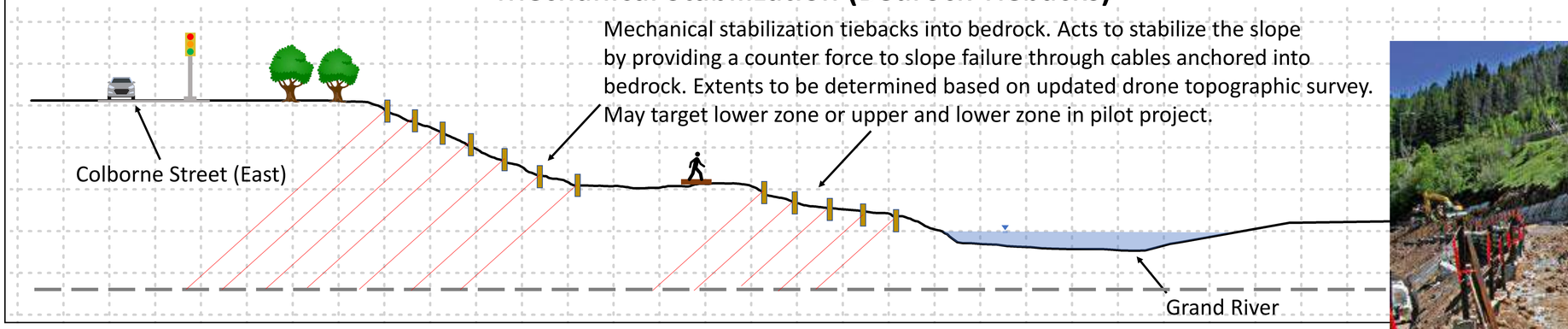
Public Information Centre

Alternative Design - Mechanical Stabilization Concepts

Rock Ballast



Tiebacks to Bedrock



City of Brantford

Public Information Centre

Alternative Design - Drainage Concepts

Berm

Berm to manage and redirect overland flows. Could be used at the top of slope to minimize runoff onto the slope.

Flexible Piping

Flexible HDPE pipes to convey water across the slope towards the Grand River without breaking during slope shifts and failures.

Rock Fingers

Series of rock drainage features on the lower slope to reduce soil moisture. Would be required to support mechanical stabilization.

Trail Culverts

Culverts installed at locations along the trail to drain pooled water along the trail. Would reduce soil moisture on the slope.

Interceptor Trench

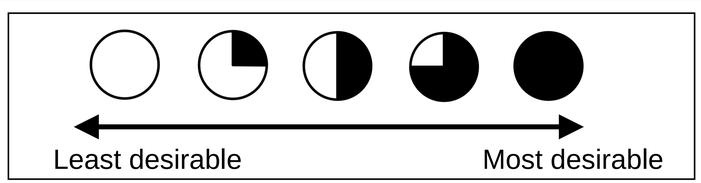
Interceptor Trench to collect and drain near-surface water at the top of slope and at the trail.

City of Brantford

Public Information Centre

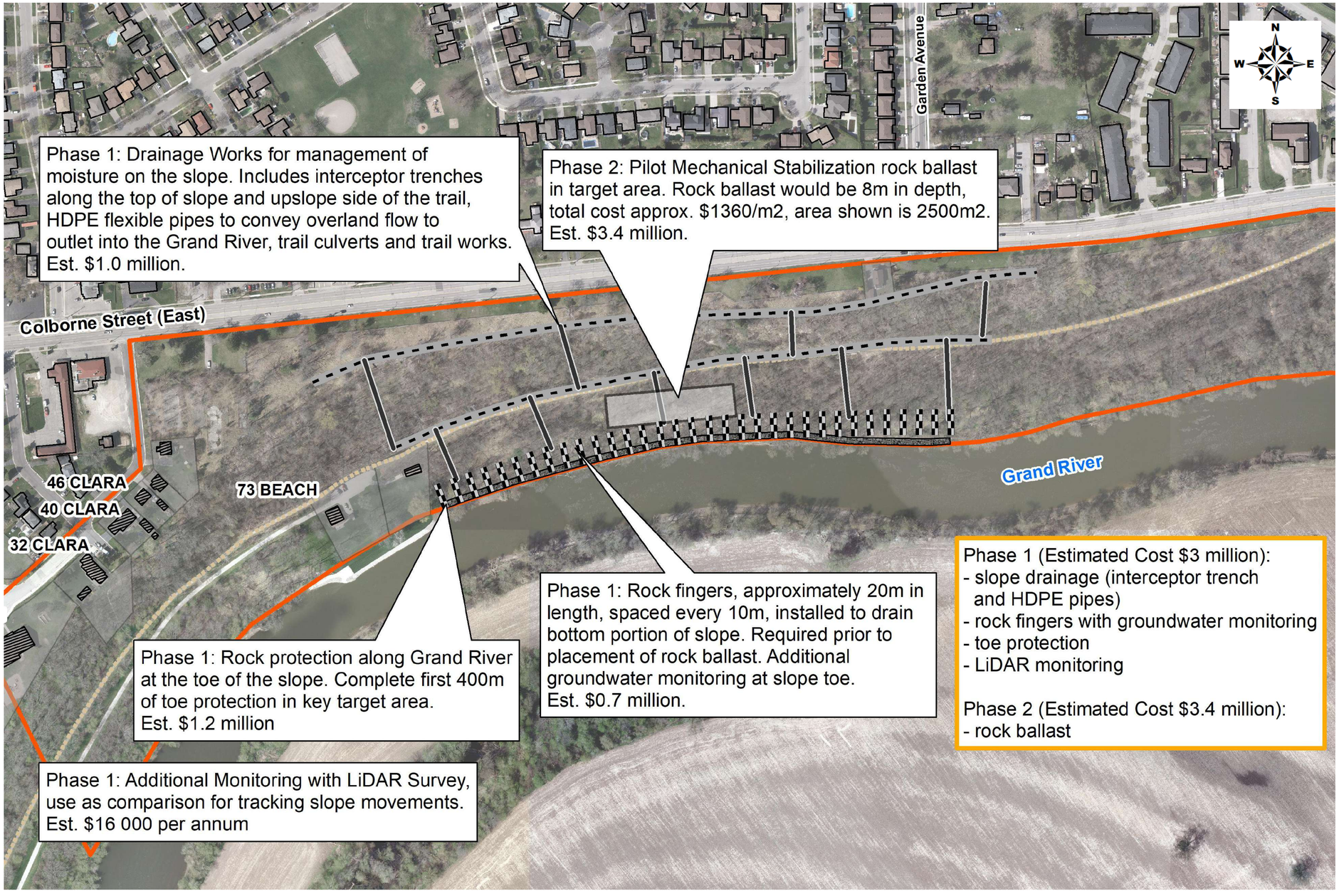
Alternative Design Concepts and Evaluation

	Drainage					Mechanical Stabilization		Toe Protection		Slope Monitoring		
Criteria	**Berms**	**Trail Culverts**	**Flexible Piping**	**Interceptor Trenches**	**Rock Fingers**	**Rock Ballast**	**Bedrock Tiebacks**	**Rock Protection**	**Spurs**	**Groundwater Monitoring**	**Annual LiDAR Survey**	**Real-time Slope Monitoring**
Public Health and Safety (25%)	◑	◕	◕	◕	●	●	●	◕	◕	◔	◔	◑
Technical (10%)	◔	◑	◑	◑	◑	◕	◑	◕	◕			
Environmental (15%)	◑	◔	◔	◔	◔	◑	◑	◑	◑			
Heritage and Archaeological Resources (10%)	◔	◑	◑	◑	◑	◑	◑	◑	◑			
Socio-economic (15%)	◕	◑	◑	◕	◕	◔	◑	◑	◑			
Cost (15%)	○	◕	◕	◕	◑	◕	○	●	◔	◑	◑	◔
Constructability (10%)	◑	◑	◑	◑	◕	◕	○	●	◔	◑	◕	○
Include in Preferred Alternative Design?	○	●	●	●	●	●	○	●	○	●	●	○



City of Brantford
Public Information Centre

Preferred Alternative Design Concept



Legend

- Rock Fingers
- Pilot Mechanical Stabilization, Rock Ballast
- Toe Protection, Rock
- HDPE Pipe
- Interceptor Trench
- Hamilton-Brantford Rail Trail
- Building Footprint - Outside Study Area
- Building Footprint - Within Study Area
- Property Parcel
- Slope Monitoring Area

City of Brantford
Public Information Centre

THE CORPORATION OF THE CITY OF BRANTFORD

ecosystem recovery inc. PROFESSIONAL ENGINEERS

Steps Following PIC #3

- ❑ Finalization of the alternative design, considering public feedback
- ❑ Completion of the Environmental Study Report (ESR)
- ❑ Announcement of the 30-day public review period
- ❑ Notice of Completion for this study
- ❑ Final report and City Council presentation (March 2020)
- ❑ Detailed Design Tender (2020)
- ❑ Phase I Construction (2021)

Project Contacts

Please complete a Comment Sheet and leave it here today, or return it to Jeff Prince by November 27, 2019.

Should you have any questions or concerns at any time during the project, please contact either of the following people:

Jeff Prince, P. Eng
Senior Project Manager
Ecosystem Recovery Inc.
80 Courtland Ave East, Unit 2
Kitchener, Ontario N2G 2T8
Phone: 519-621-1500
Email: jeff.prince@ecosystemrecovery.ca

Matt Welsh C. Tech., PMP
Project Coordinator
Design and Construction
Public Works Commission
City of Brantford
100 Wellington Square, P.O. Box 818
Phone: 519-759-4150 ext 5446
Email: mwelsh@brantford.ca