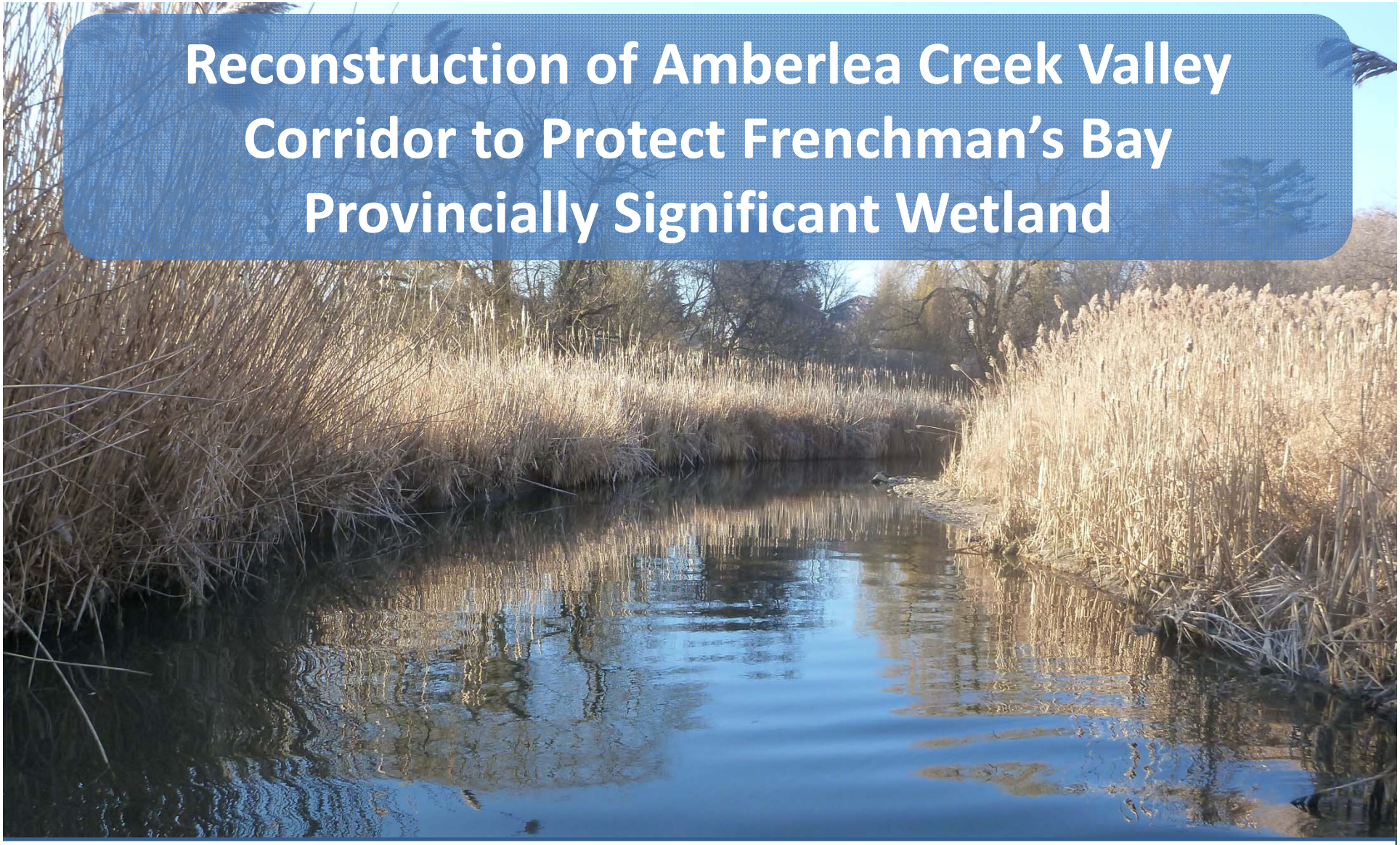
Reconstruction of Amberlea Creek Valley Corridor to Protect Frenchman's Bay Provincially Significant Wetland

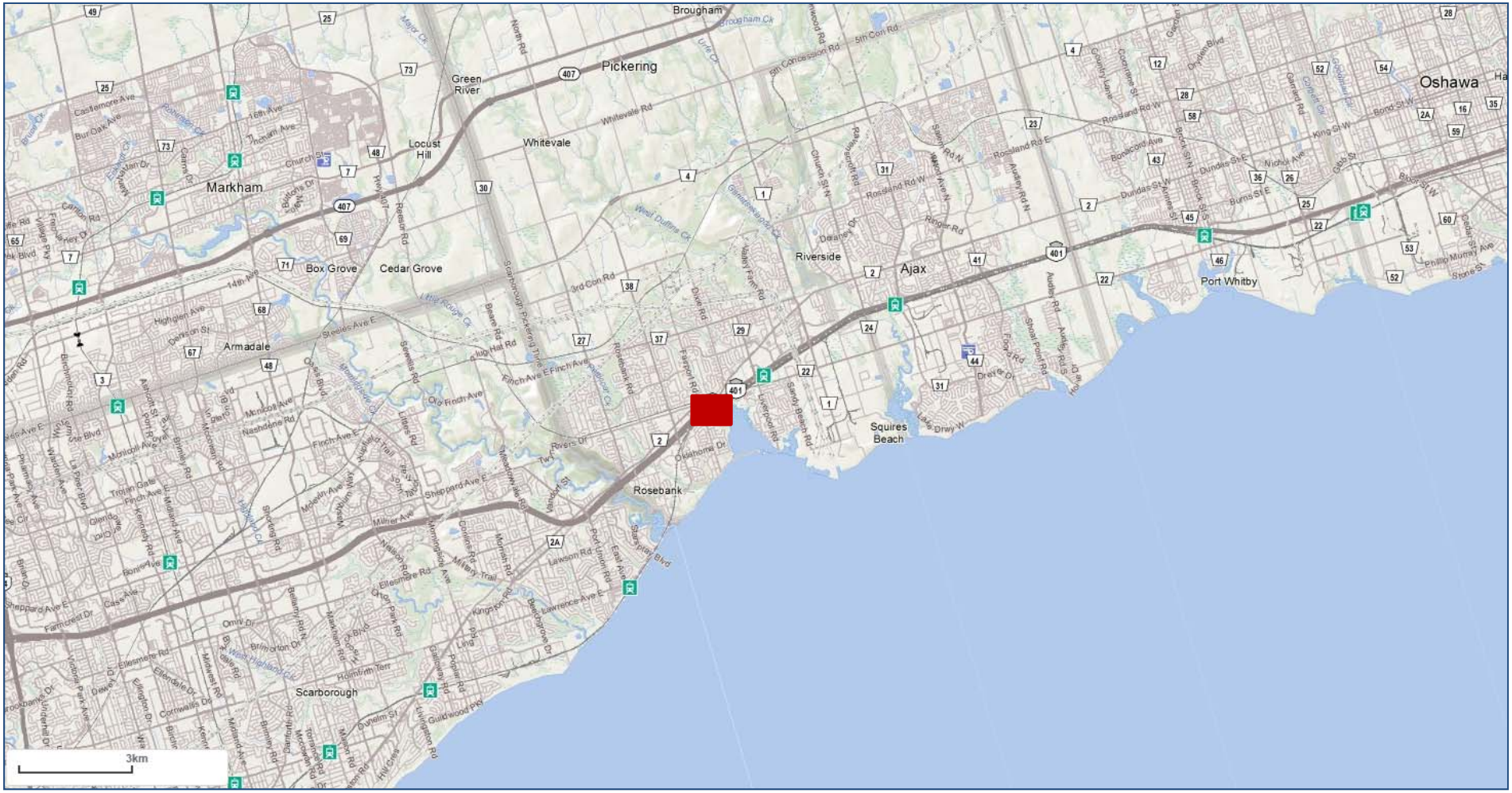


Aquafor Beech Limited

City of PICKERING

Toronto and Region Conservation for The Living City

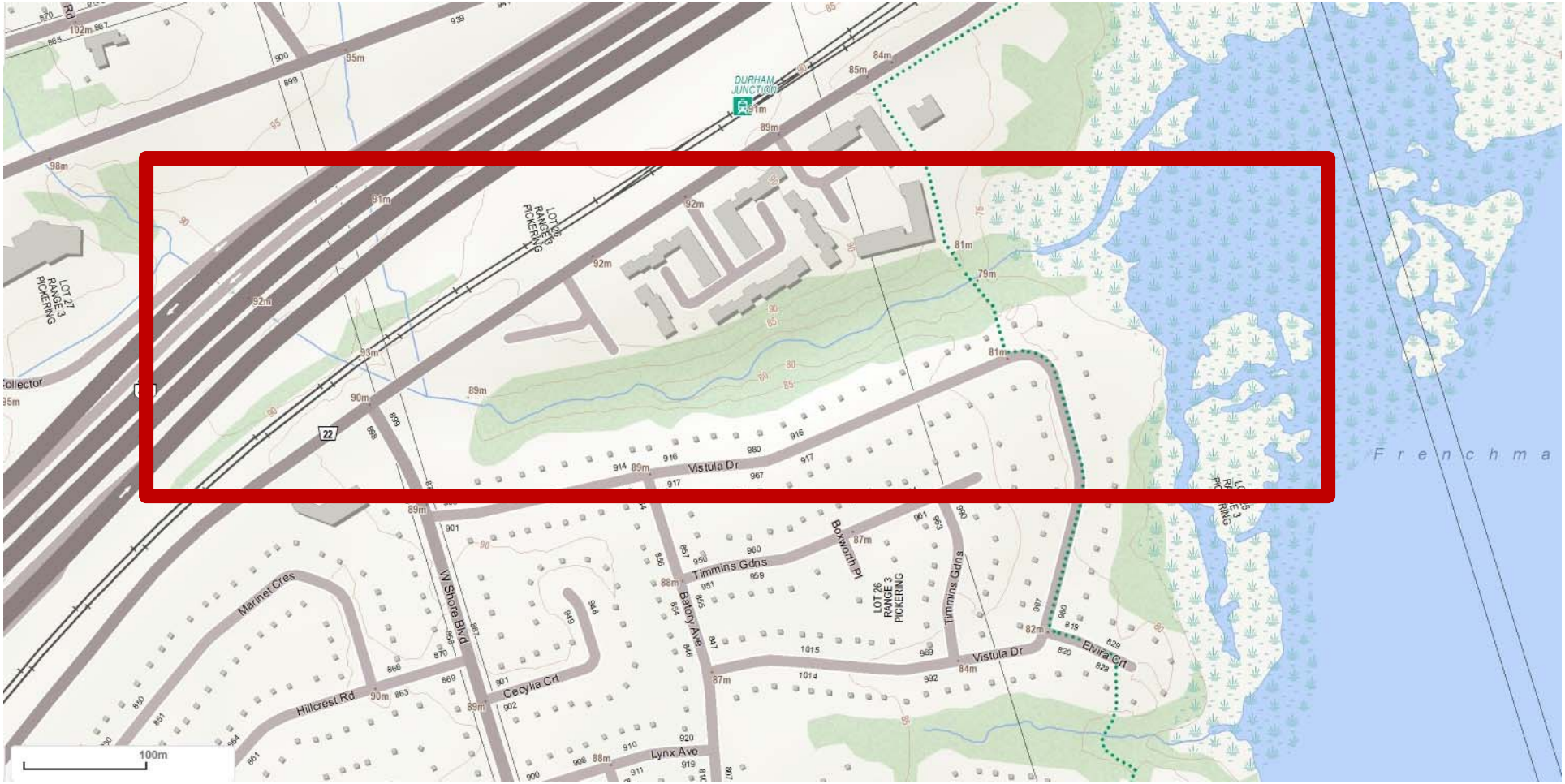
STUDY AREA


Brougham
Pickering
Green River
Whitevale
Locust Hill
Markham
Box Grove
Cedar Grove
Armadale
Riverside
Ajax
Oshawa
Port Whitby
Squires Beach
Rosebank
Scarborough
3km

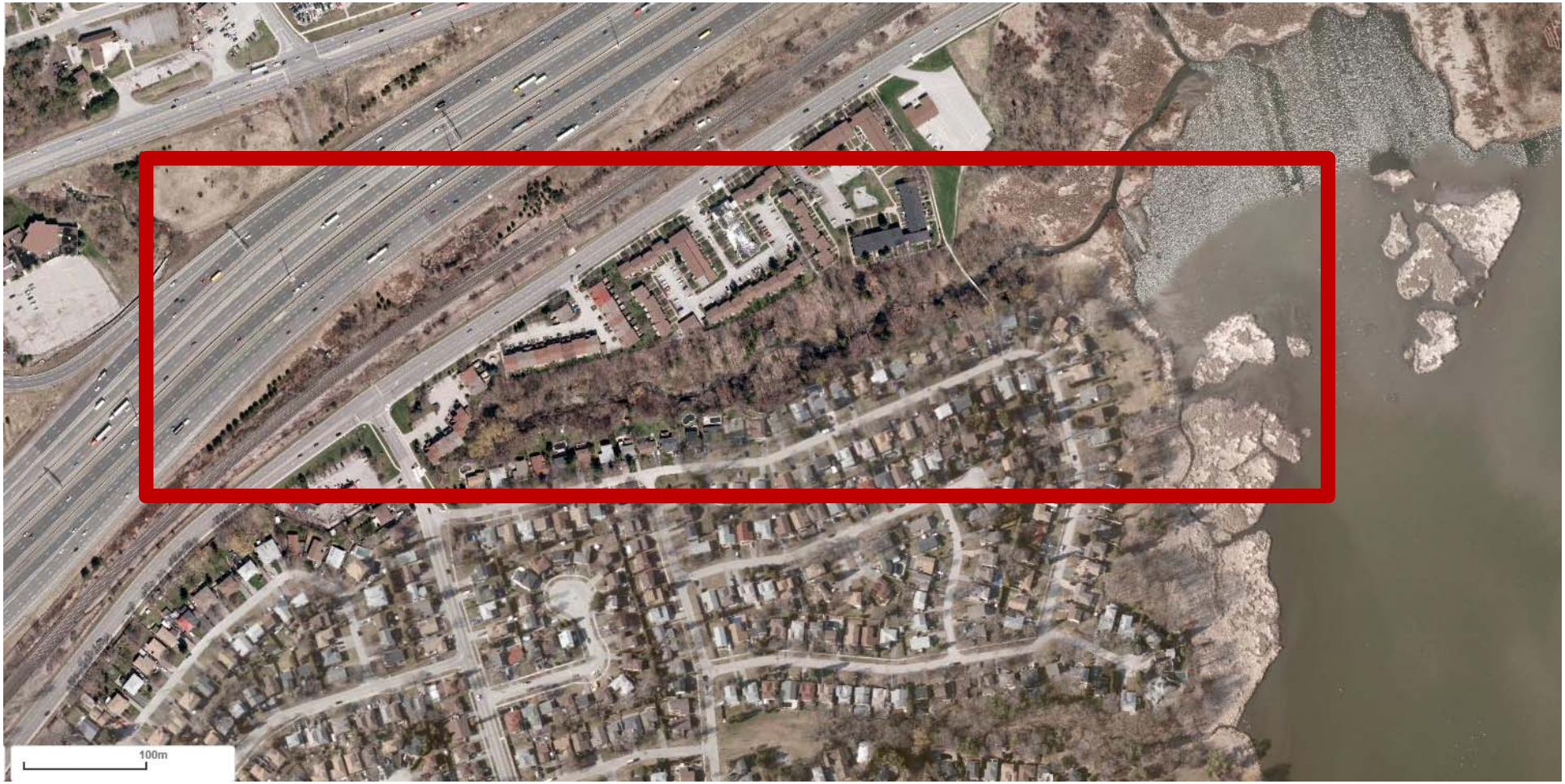
STUDY AREA

Sheppard Ave
Kingston Rd
Hwy 401
Hwy 401 Collector
Dunbarton Rd
Edgewood Rd
Shadybrook Dr
Durham Junction
Vistula Dr
Essa Cres
W Shore Blvd
Fairport Beach
Oklahoma Dr
Sunrise Ave
Breezy Dr
Beachpoint Prom
Frenchman's Bay
Liverpool Rd
Sandy Beach Rd
Fairport
Krosno Blvd
Colmar Ave
Commerce St
Annland St
Wharf St
Front Rd
Radom St
Douglas Ave
Fairview Ave
Balaton Ave
Montgomery
Oklahoma Dr
Marksbury Rd
Park Cres
Downland Dr
Creekview Cir
Broadgreen St
Stonebridge Lane
Granite Crt
Steeple Hill
Eyer Dr
Hillcrest Rd
Sanok Dr
Vicki Dr
Victory Dr
Hillview Cres
Dillingham Rd
0.3km

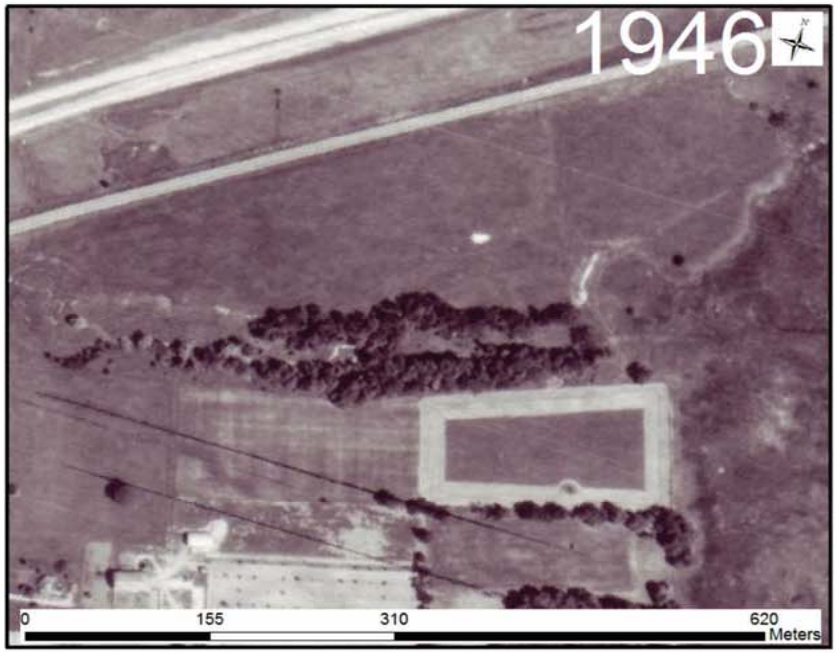
STUDY AREA

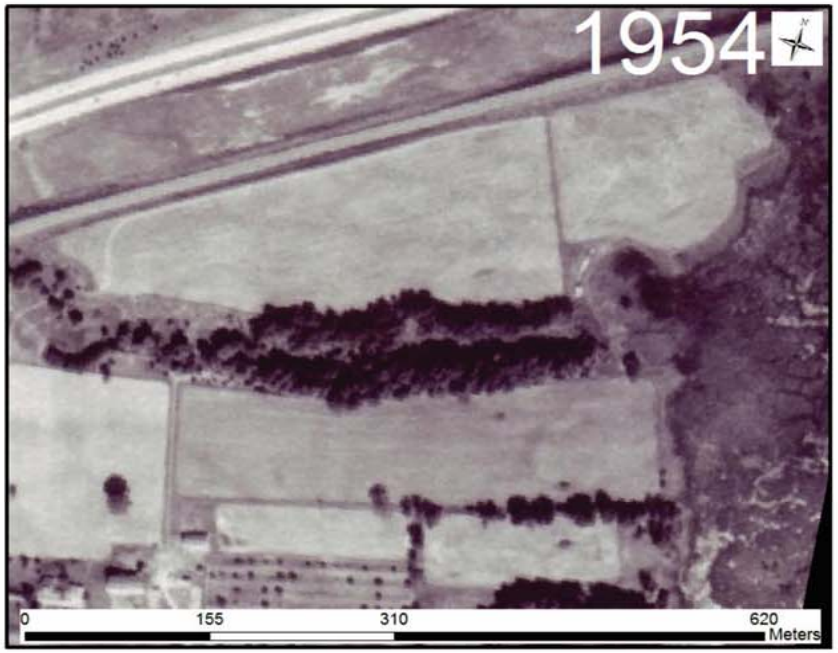

DURHAM JUNCTION
LOT 27 RANGE 3 PICKERING
LOT 26 RANGE 3 PICKERING
Vistula Dr
Timmins Gdns
Boxworth Pl
Bakory Ave
W. Shore Blvd
Mariner Cres
Hillcrest Rd
Cecylia Crt
Lynx Ave
Elvira Crt
Collector
22
100m
Frenchma

STUDY AREA



QUICK HISTORY





1940s & 50s

QUICK HISTORY

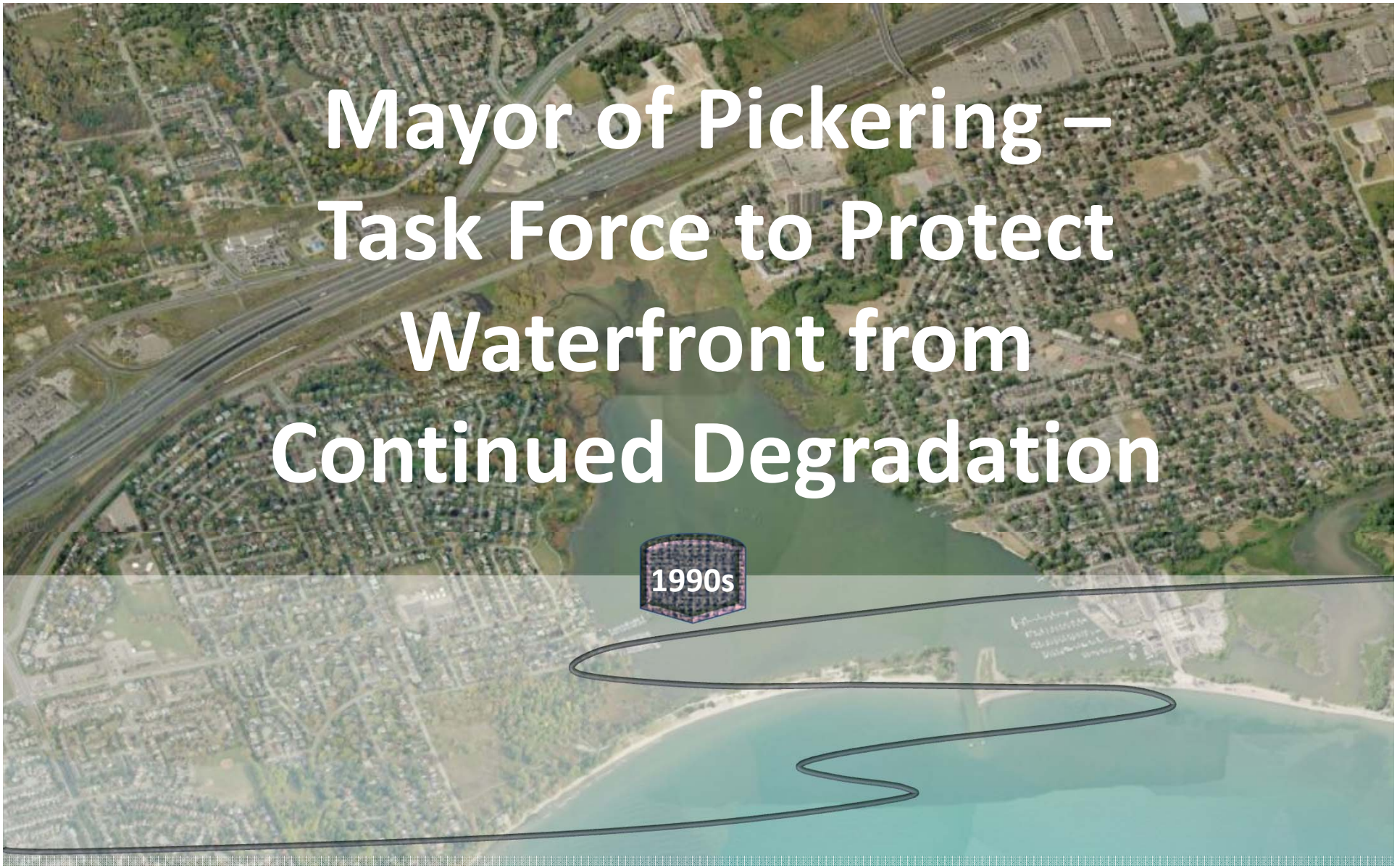
1960s
& 70s

QUICK HISTORY

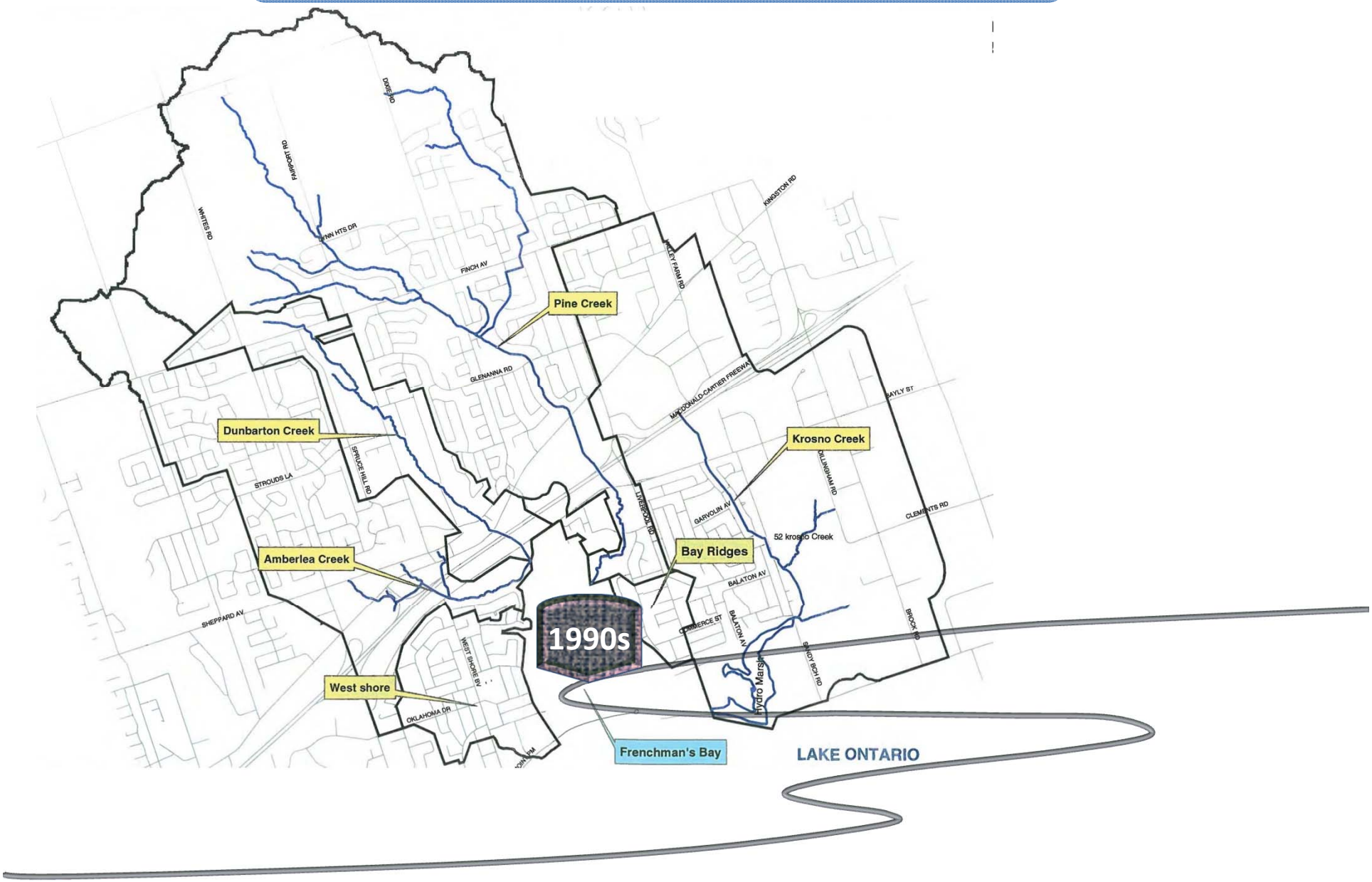
1980s & 90s

Stormwater Master Drainage Plan

INITIAL PROBLEM IDENTIFICATION



PROBLEM IDENTIFICATION



PROBLEM IDENTIFICATION

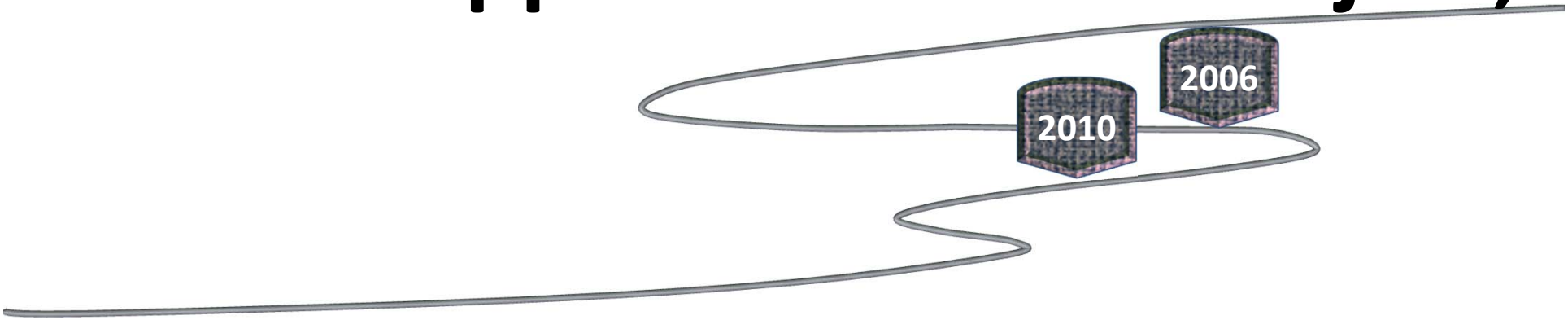
QUICK HISTORY

2002 & 2010

SITE SPECIFIC PROBLEM IDENTIFICATION

2006 – City Commissioned Stormwater Master Plan

2010 – City Council Endorses Recommendations Further Council Approval for Each Project,

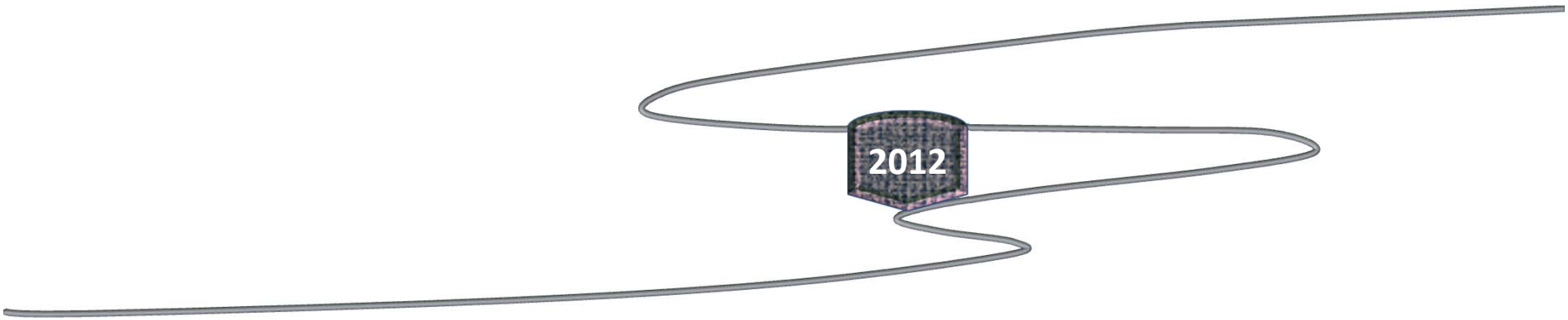


RETAIN A CONSULTANT

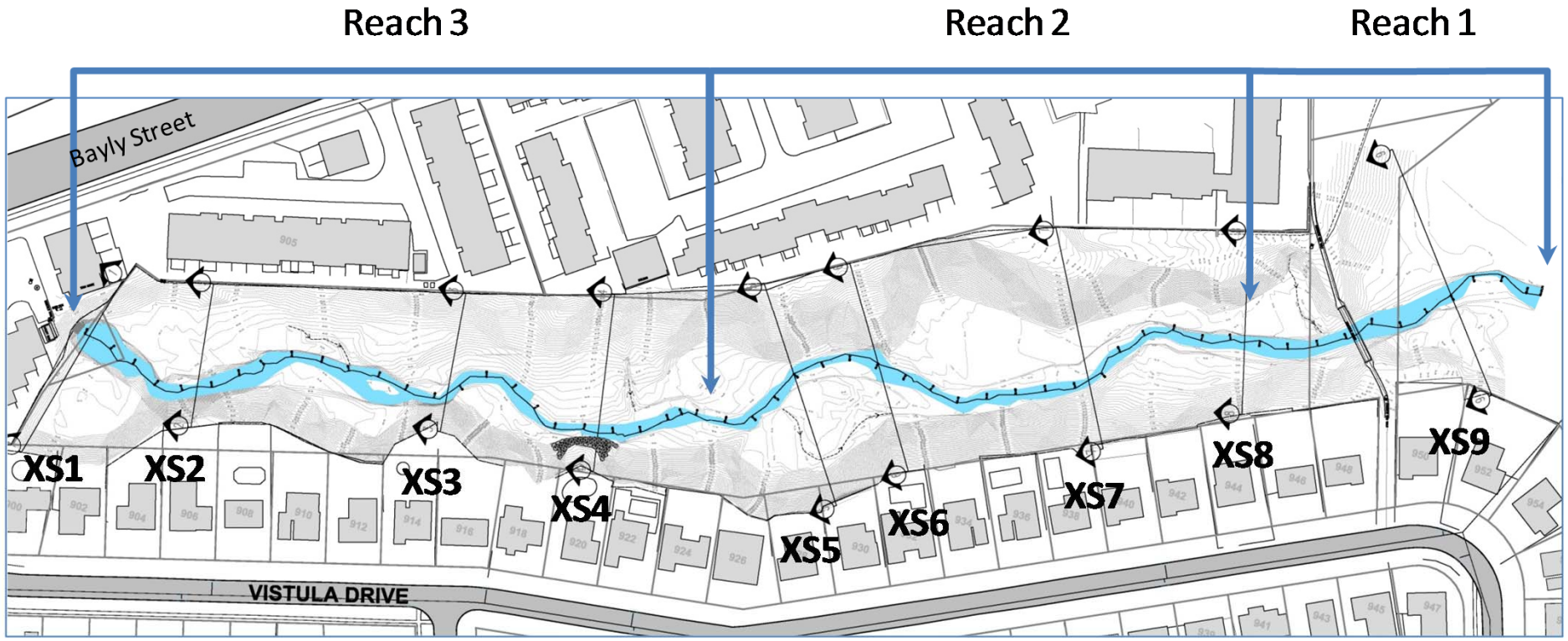
Aug. 2012 – Expression of Interest for EA & Design

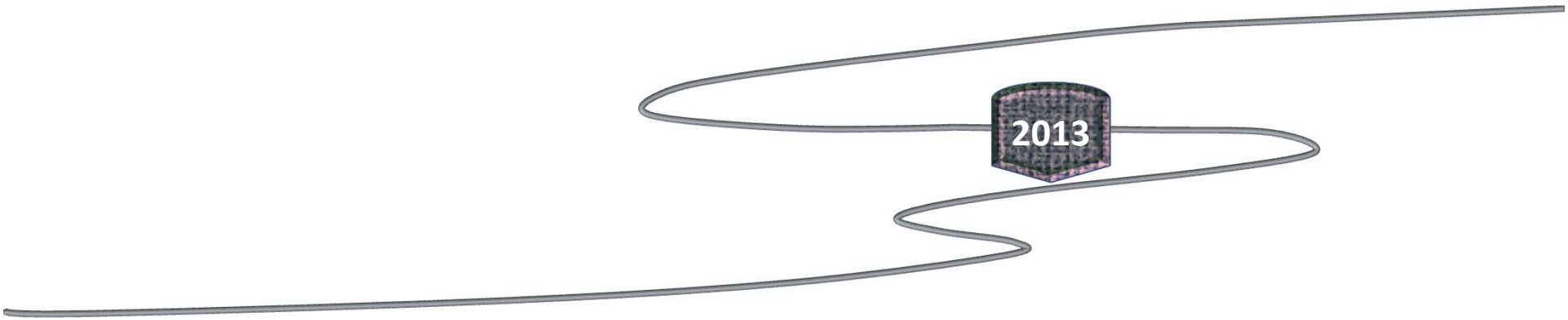
Oct. 2012 – Proposal & Costing

Nov. 2012 – Award / Study Kickoff

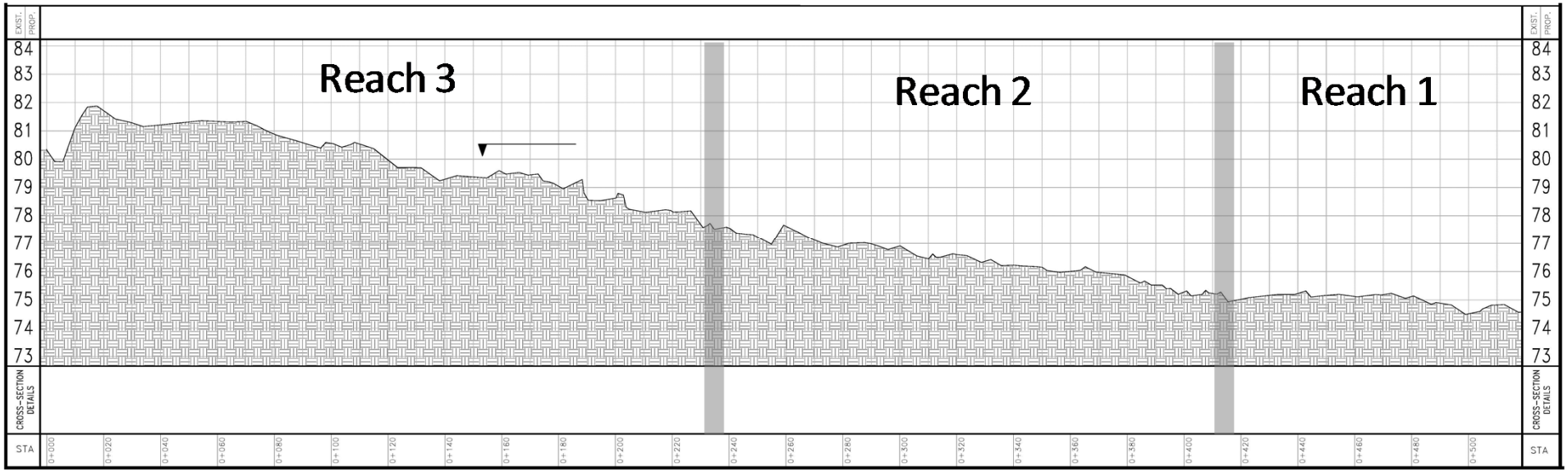


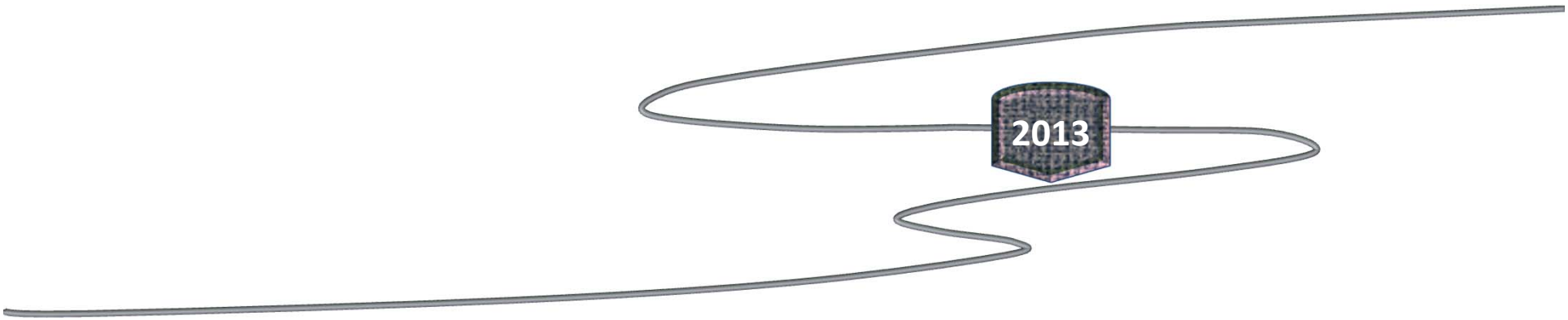
TECHNICAL ASSESSMENTS OF STUDY AREA – GEOMORPHIC ASSESSMENT





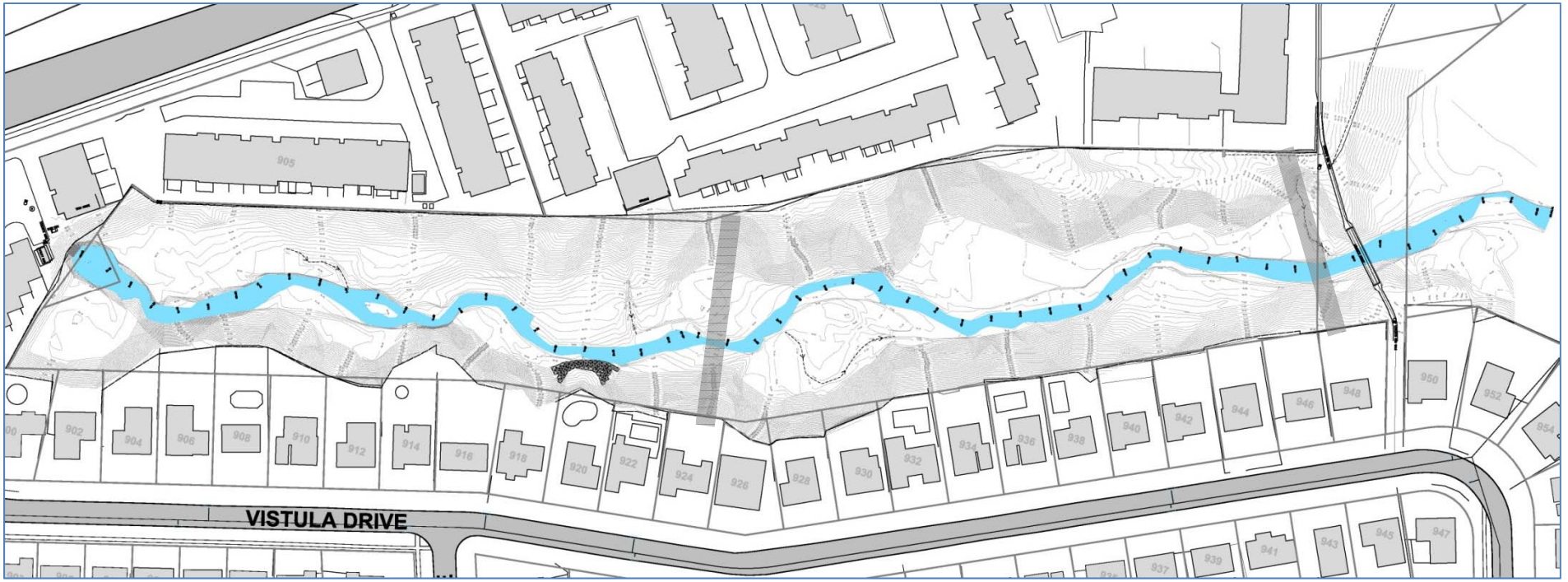
TECHNICAL ASSESSMENTS OF STUDY AREA – GEOMORPHIC ASSESSMENT

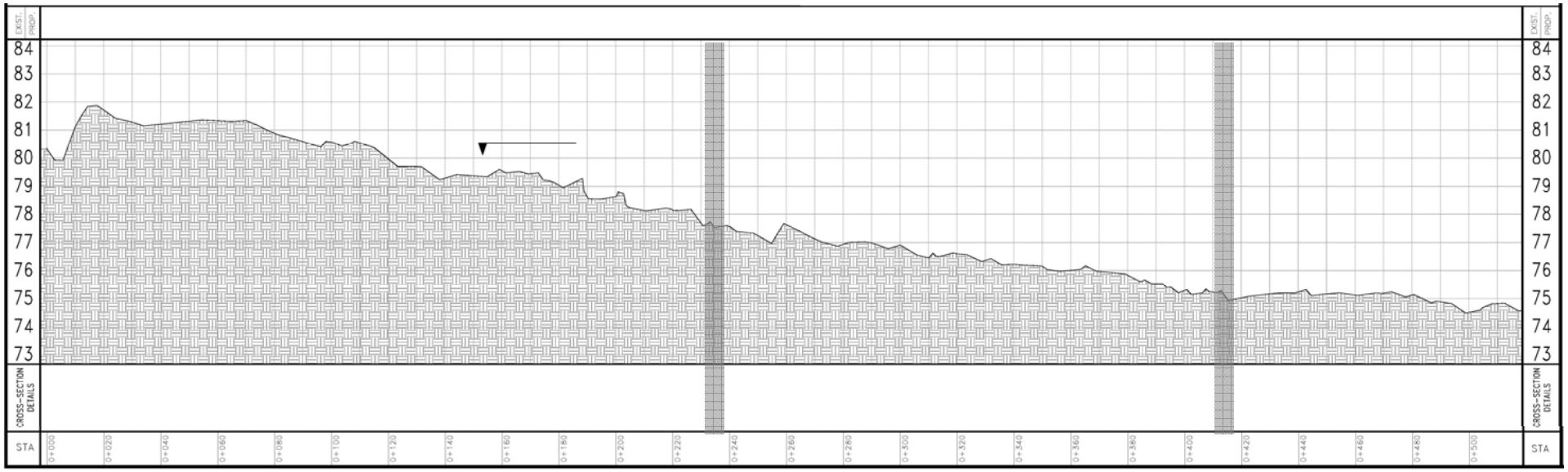




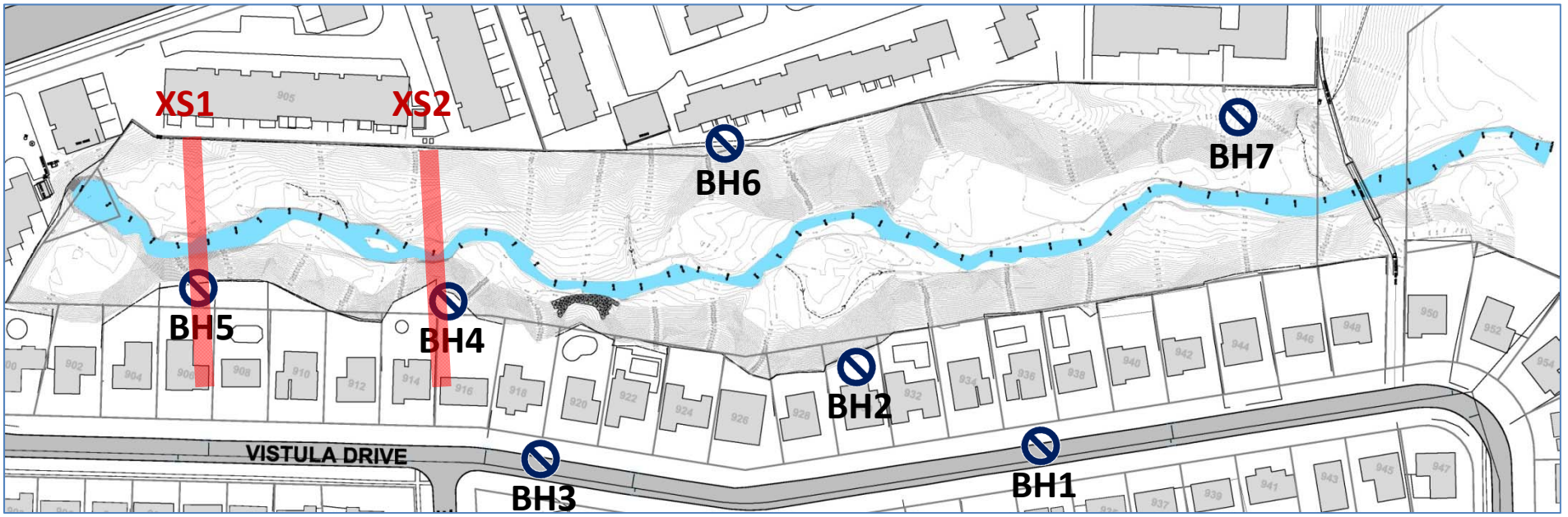
GEOMORPHIC ASSESSMENT

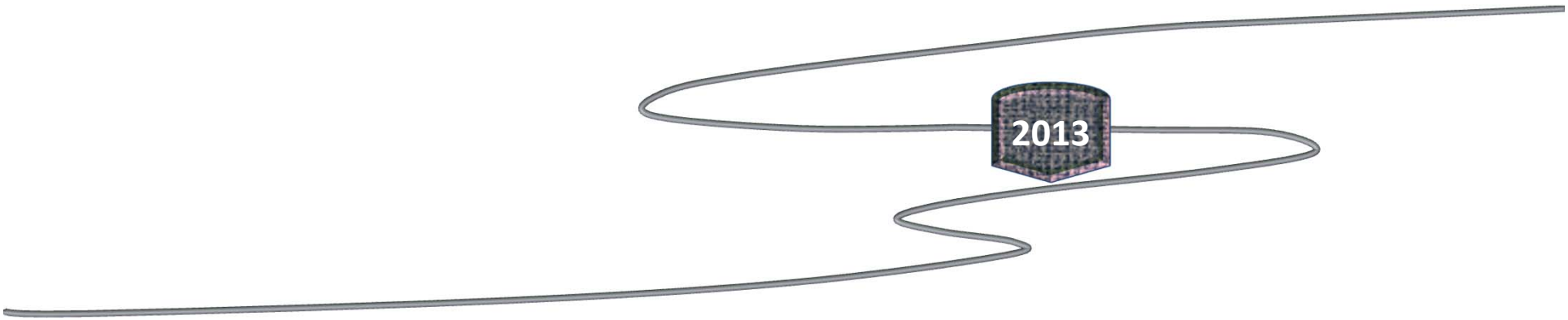
Reach 3 ← → Reach 2 ← → Reach 1





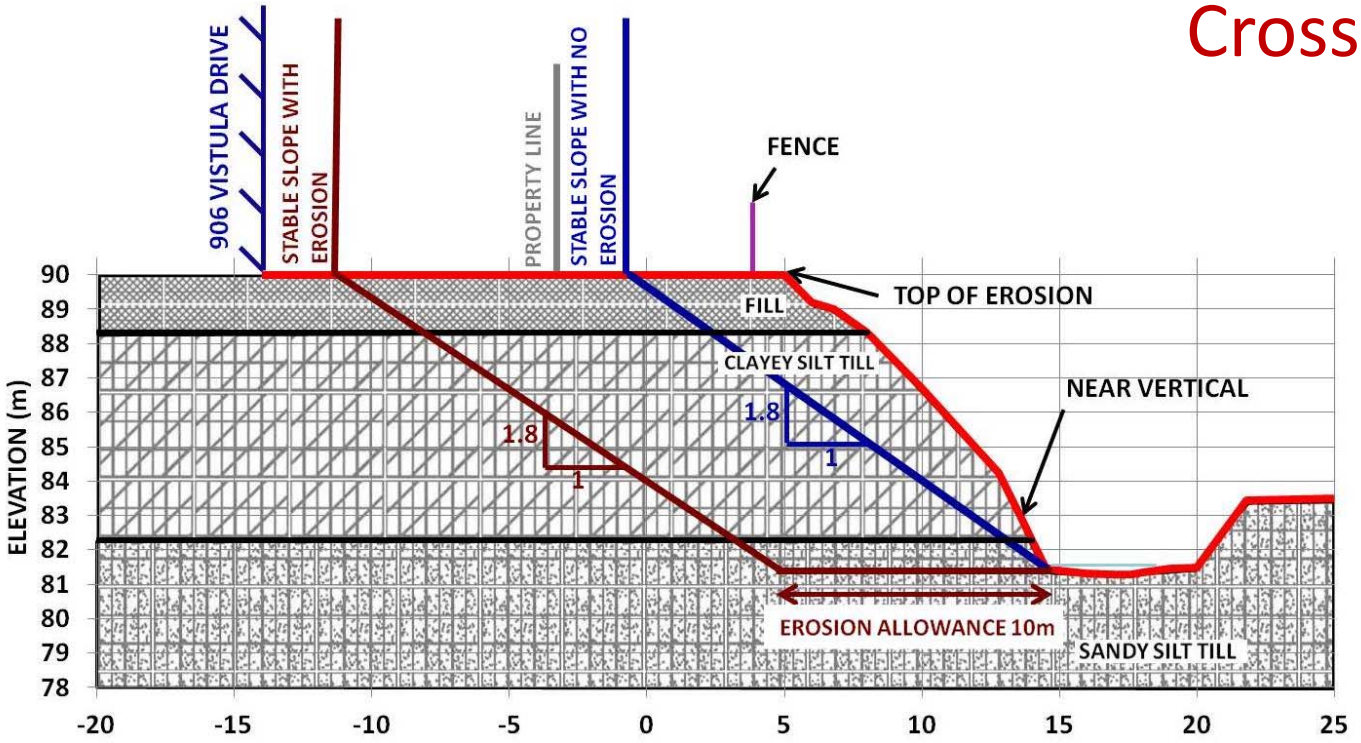
TECHNICAL ASSESSMENTS OF STUDY AREA – GEOTECHNICAL / SLOPE





TECHNICAL ASSESSMENTS OF STUDY AREA – GEOTECHNICAL / SLOPE

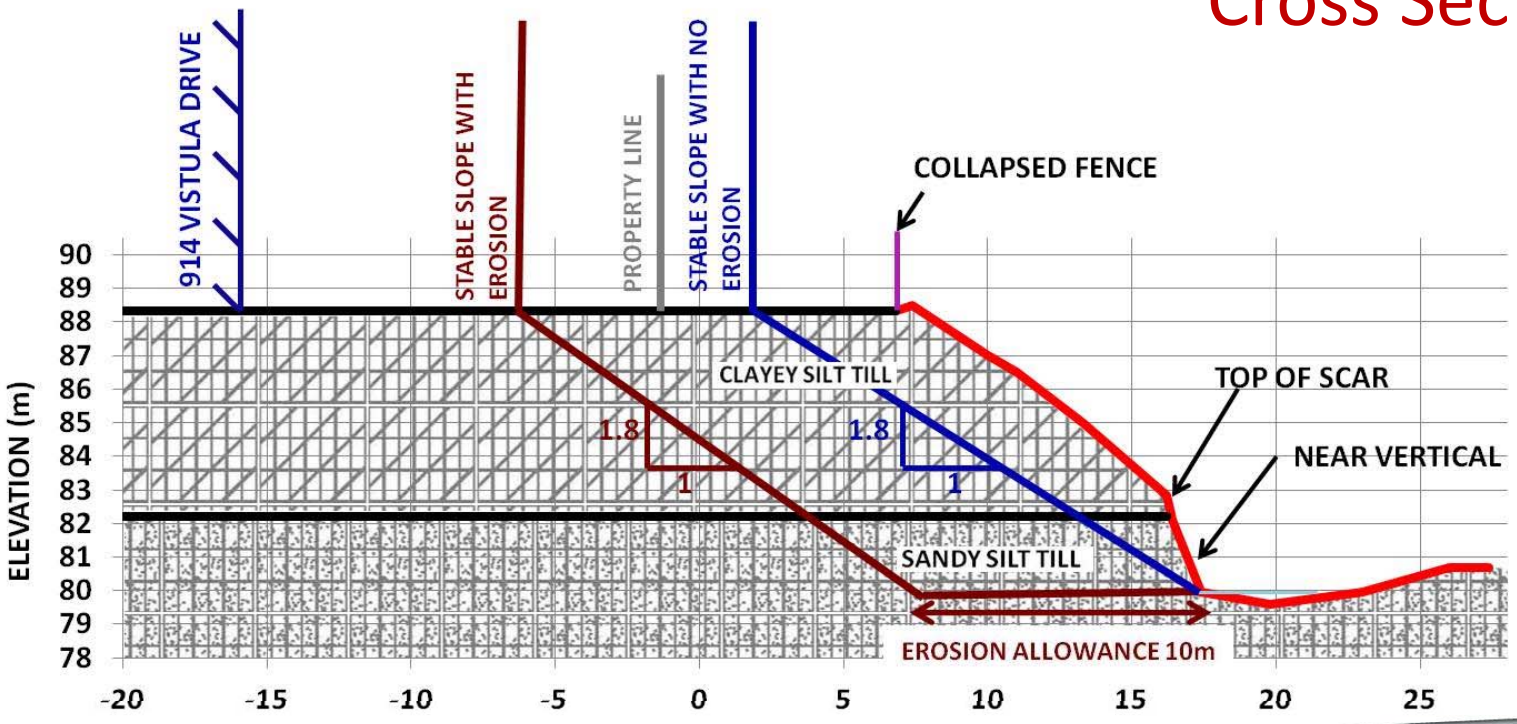
Cross Section 1

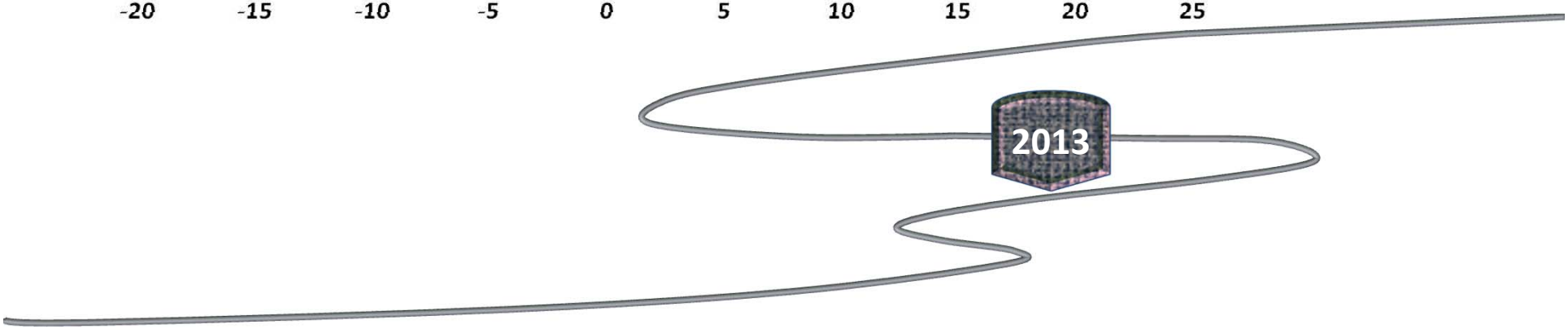


2013

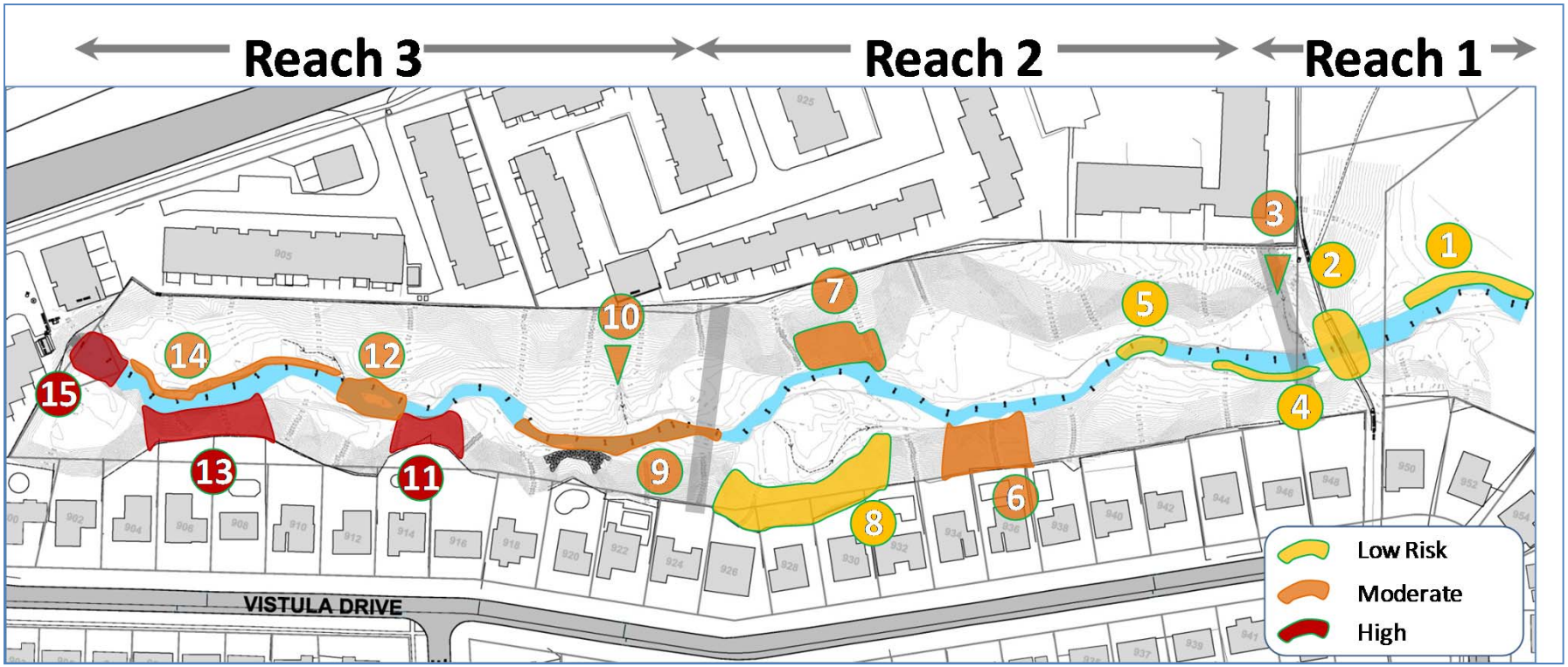
TECHNICAL ASSESSMENTS OF STUDY AREA – GEOTECHNICAL / SLOPE

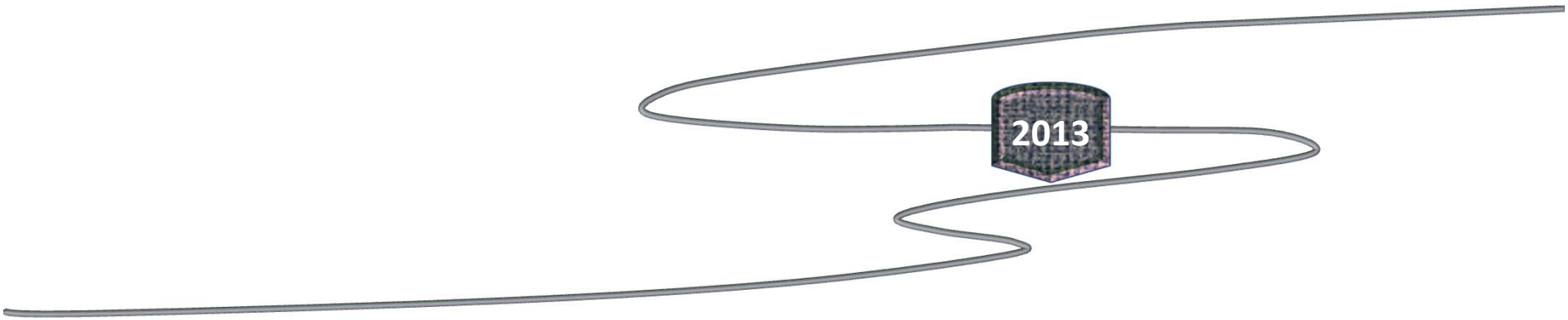
Cross Section 1



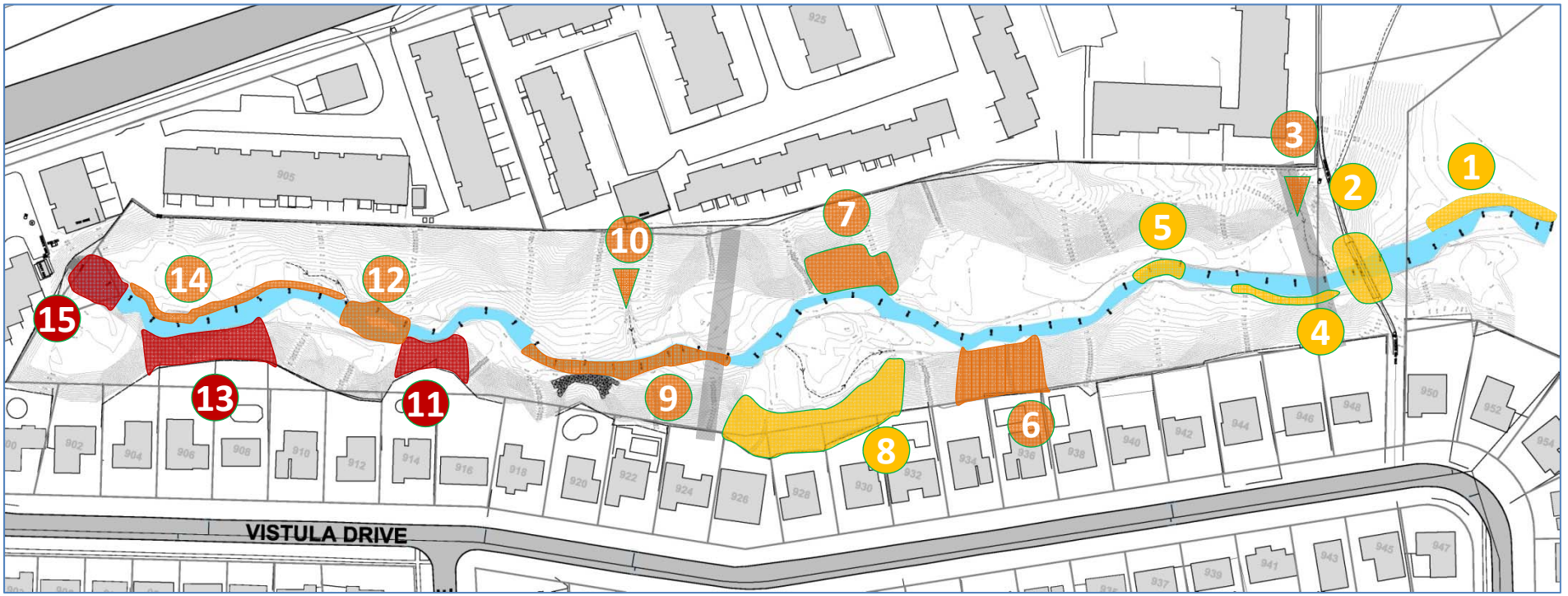


TECHNICAL ASSESSMENTS OF STUDY AREA





Preferred Alternative by Reach



Reach 3
Reach Based Works

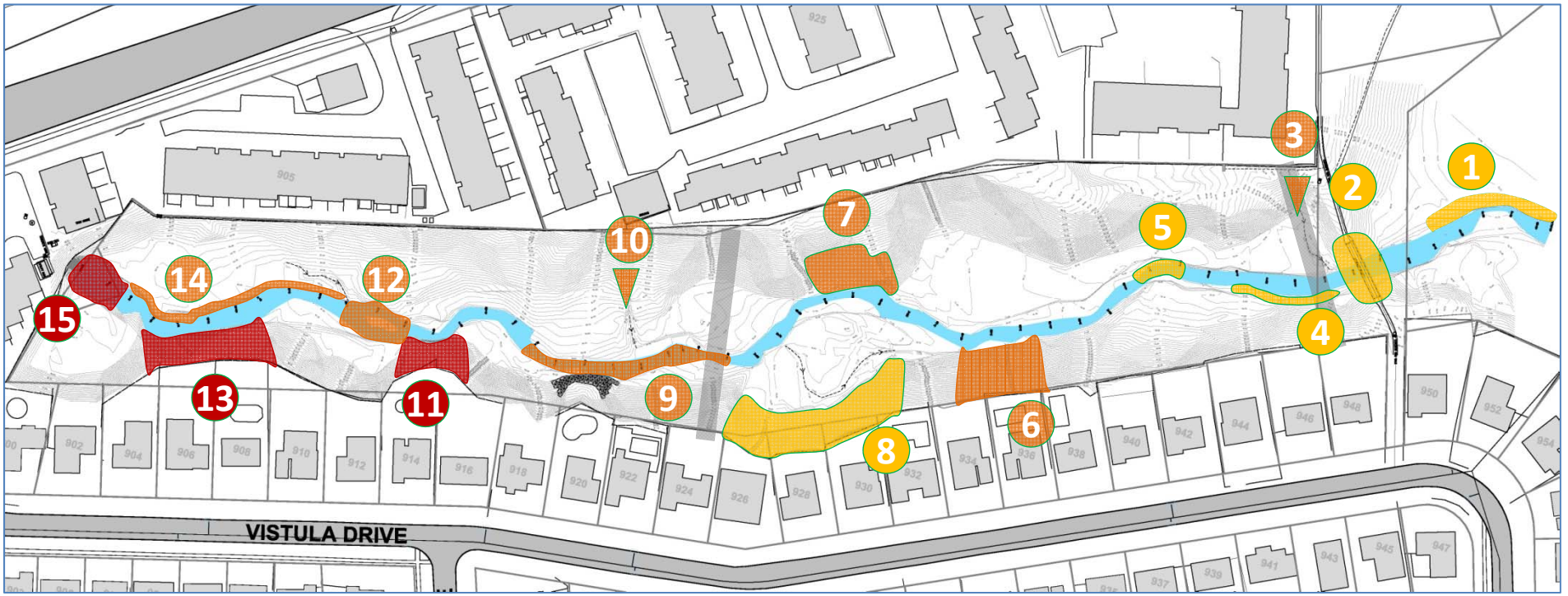
Reach 2
Selective Works

Reach 1
Do Nothing

- Involves complete restoration throughout the length of the study area, recreating 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). All disrupted areas will be restored with native plantings and seed mixes designed to provide stability and sustainability.

Preferred Alternative by Reach



Reach 3
Reach Based Works

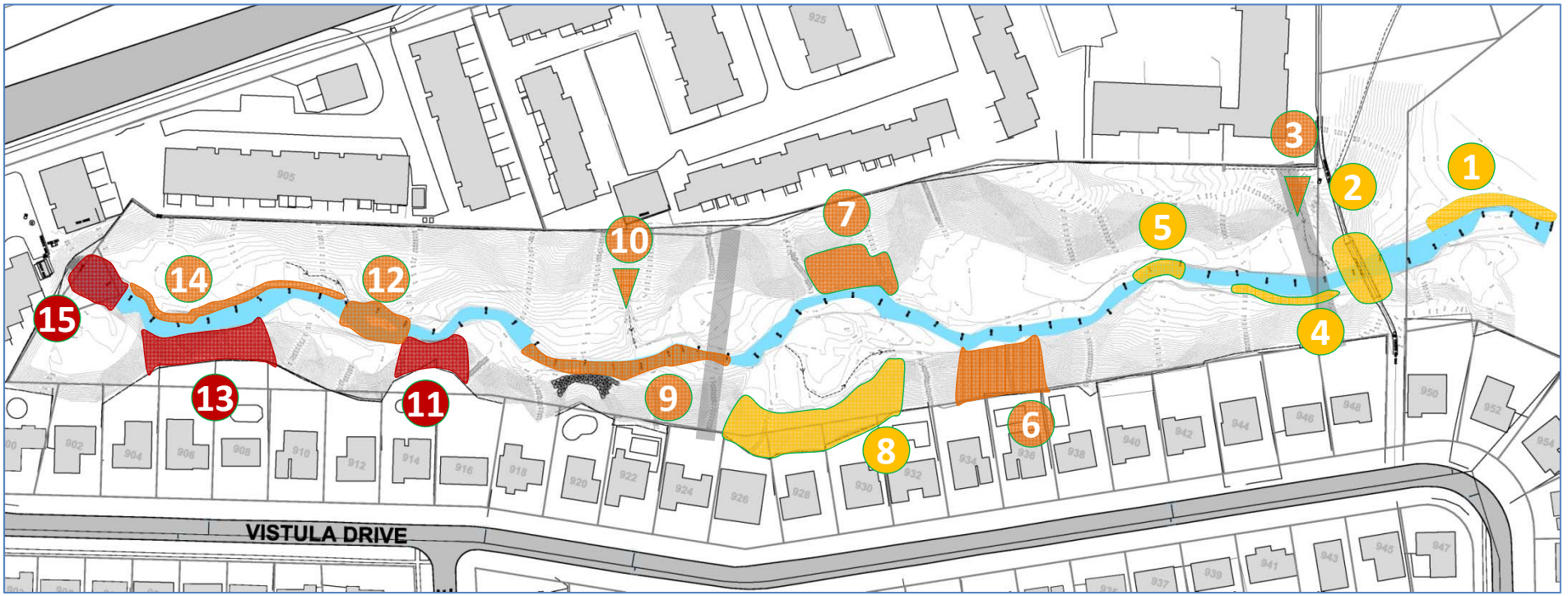
Reach 2
Selective Works

Reach 1
Do Nothing

• Involves stream restoration or mitigation works at strategic locations or areas of priortity problems. Where erosion is creating risks to private properties, local bank or slope stabilization treatments would be placed, using either hardened (engineered) type treatments, or more natural (vegetation & biotechnical engineered) type treatments.

• Benefits of selective works include minimal disruption to the local natural environment, maintaining existing channel function and natural features, and cost savings in comparison to reach based works.

Preferred Alternative by Reach



Reach 3
Reach Based Works

Reach 2
Selective Works

Reach 1
Do Nothing

- Involves only restoration of areas disturbed during construction.

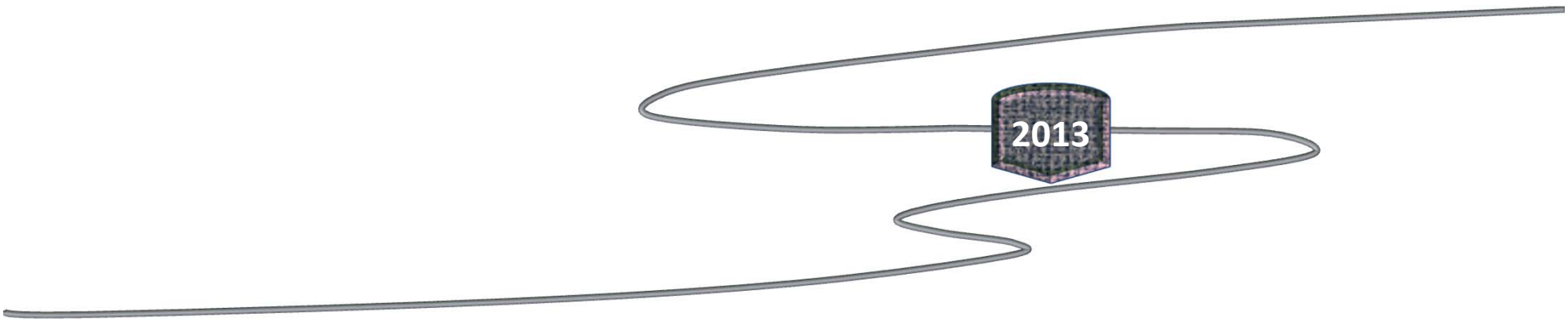
- Proposed replacement of multi-use bridge being undertaken under separate study.

- Possible areas of habitat enhancement downstream bridge.

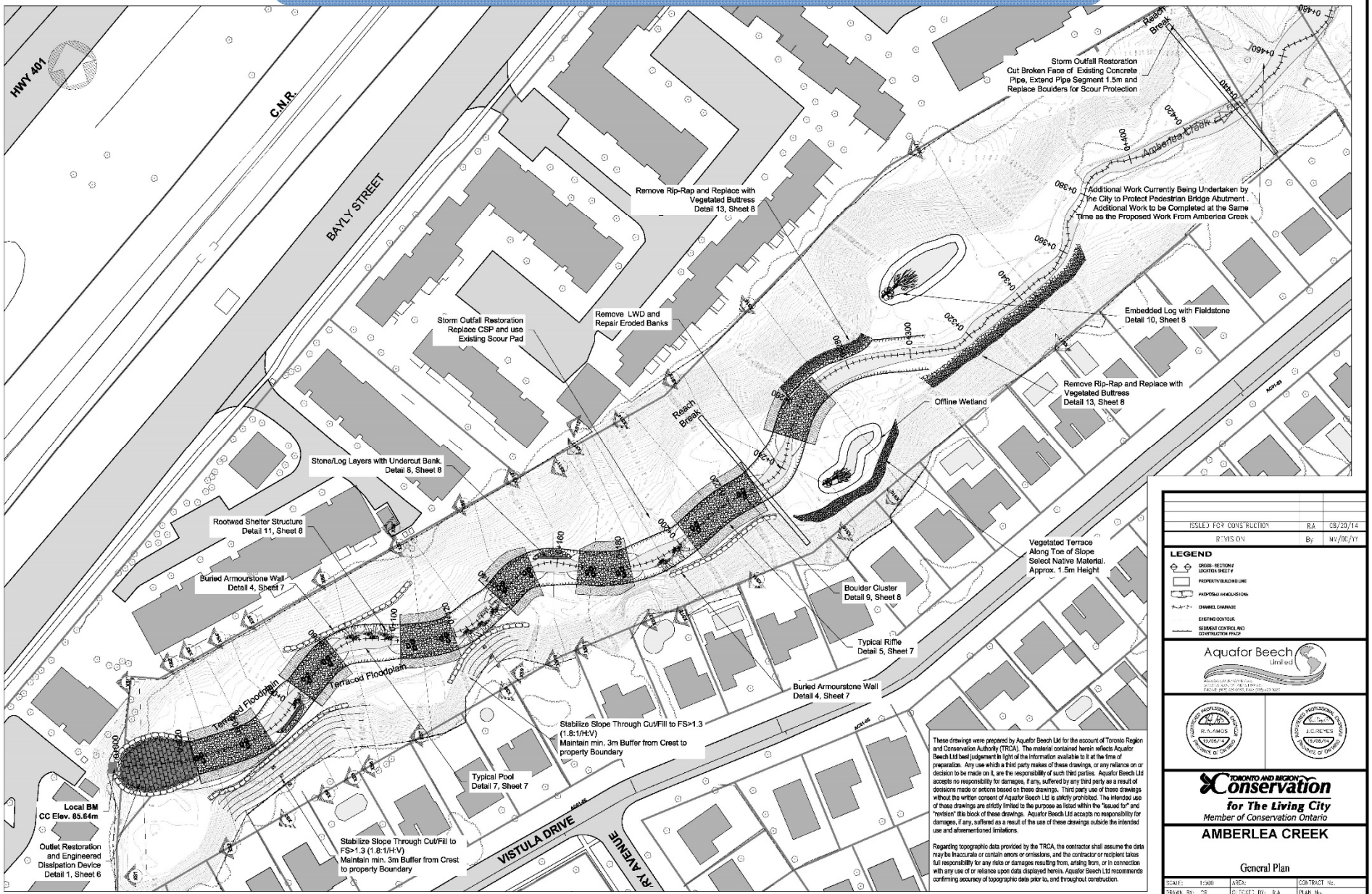
COMPLETE CLASS EA FOR EROSION AND FLOODING CONTROL

2013 – File EA Document

2014 – Respond to Bump Up Request



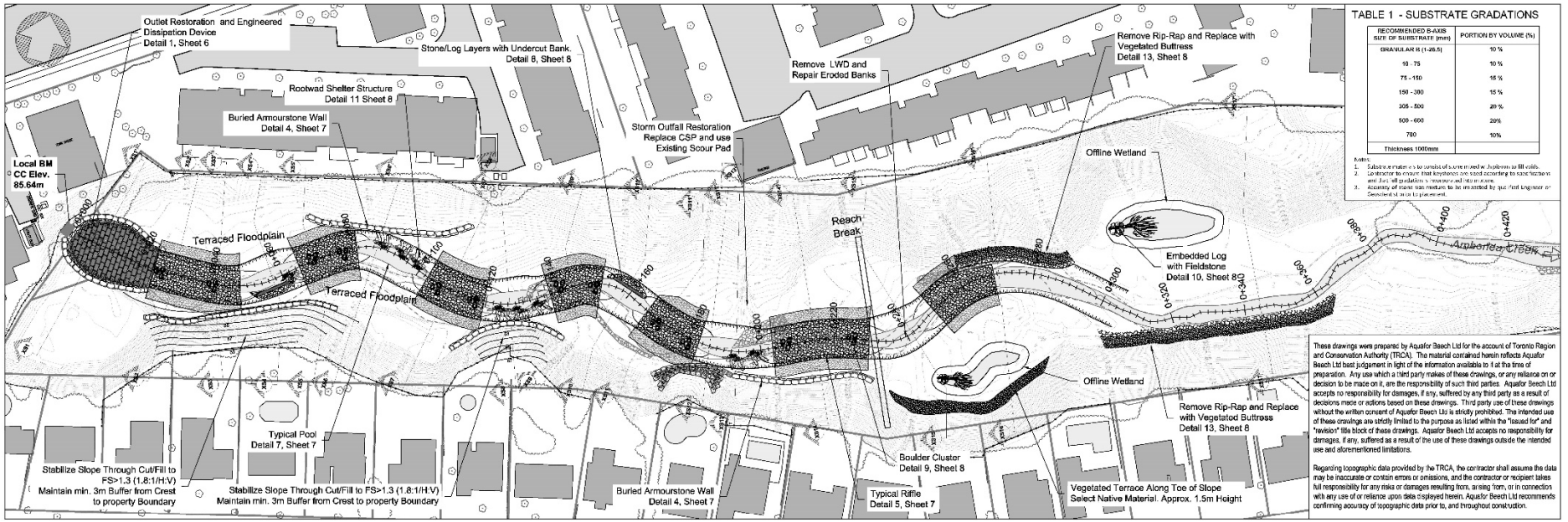
DETAILED DESIGN



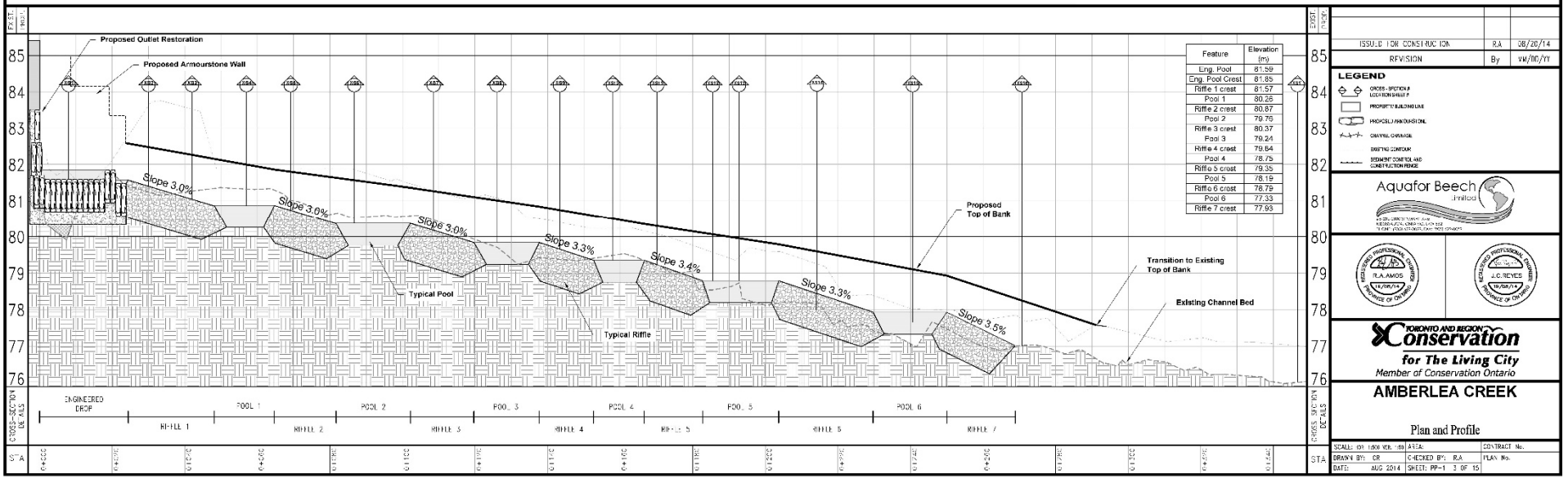
These drawings were prepared by Aquafor Beech Ltd for the account of Toronto Region and Conservation Authority (TRCA). The material contained herein reflects Aquafor Beech Ltd best judgement in light of the information available to it at the time of preparation. Any use which a third party makes of these drawings, or any reliance on or decision to be made on it, are the responsibility of such third parties. Aquafor Beech Ltd accepts no responsibility for damages, if any, suffered by any third party as a result of decisions made or actions based on these drawings. Third party use of these drawings without the written consent of Aquafor Beech Ltd is strictly prohibited. The intended use of these drawings are strictly limited to the purpose as listed within the "Issued for" and "revision" title block of these drawings. Aquafor Beech Ltd accepts no responsibility for damages, if any, suffered as a result of the use of these drawings outside the intended use and aforementioned limitations.

Regarding topographic data provided by the TRCA, the contractor shall assume the data may be inaccurate or contain errors or omissions, and the contractor or recipient takes full responsibility for any risks or damages resulting from, arising from, or in connection with any use of or reliance upon data displayed herein. Aquafor Beech Ltd recommends confirming accuracy of topographic data prior to, and throughout construction.

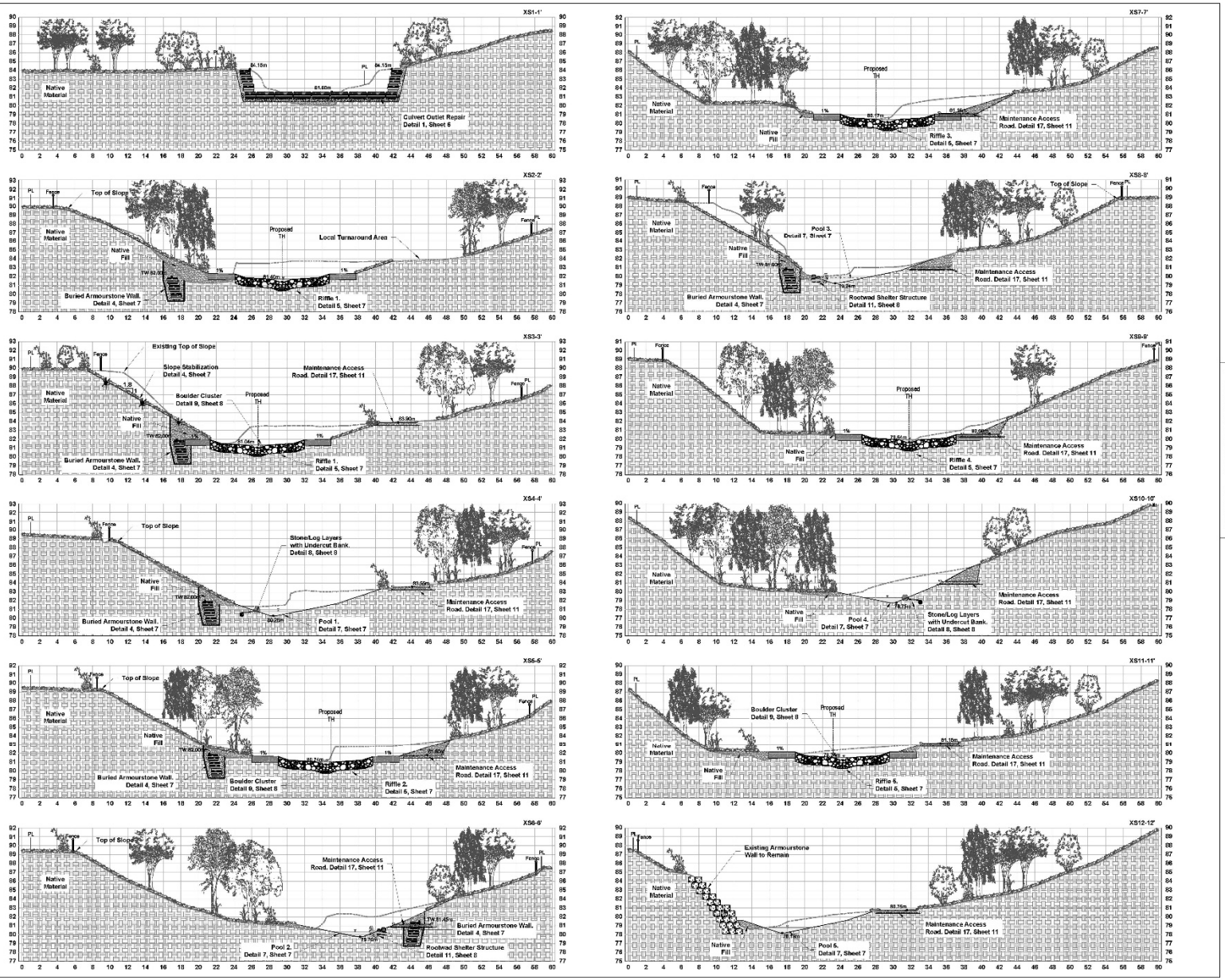
DETAILED DESIGN



AMBERLEA CREEK



DETAILED DESIGN



ISSUED FOR CONSTRUCTION	R.A	08/20/14
REVISION	By	MM/DD/YY

LEGEND

- CROSS - SECTION # LOCATION SHEET #
- PROPERTY/ BUILDING LINE
- PROPOSED MODIFICATIONS
- CHANNEL CHAINAGE
- EXISTING CONTOUR
- SEDIMENT CONTROL AND CONSTRUCTION FENCE

Aquafor Beech Limited

R.A. AMOS 10/08/14

J. CREYES 10/08/14

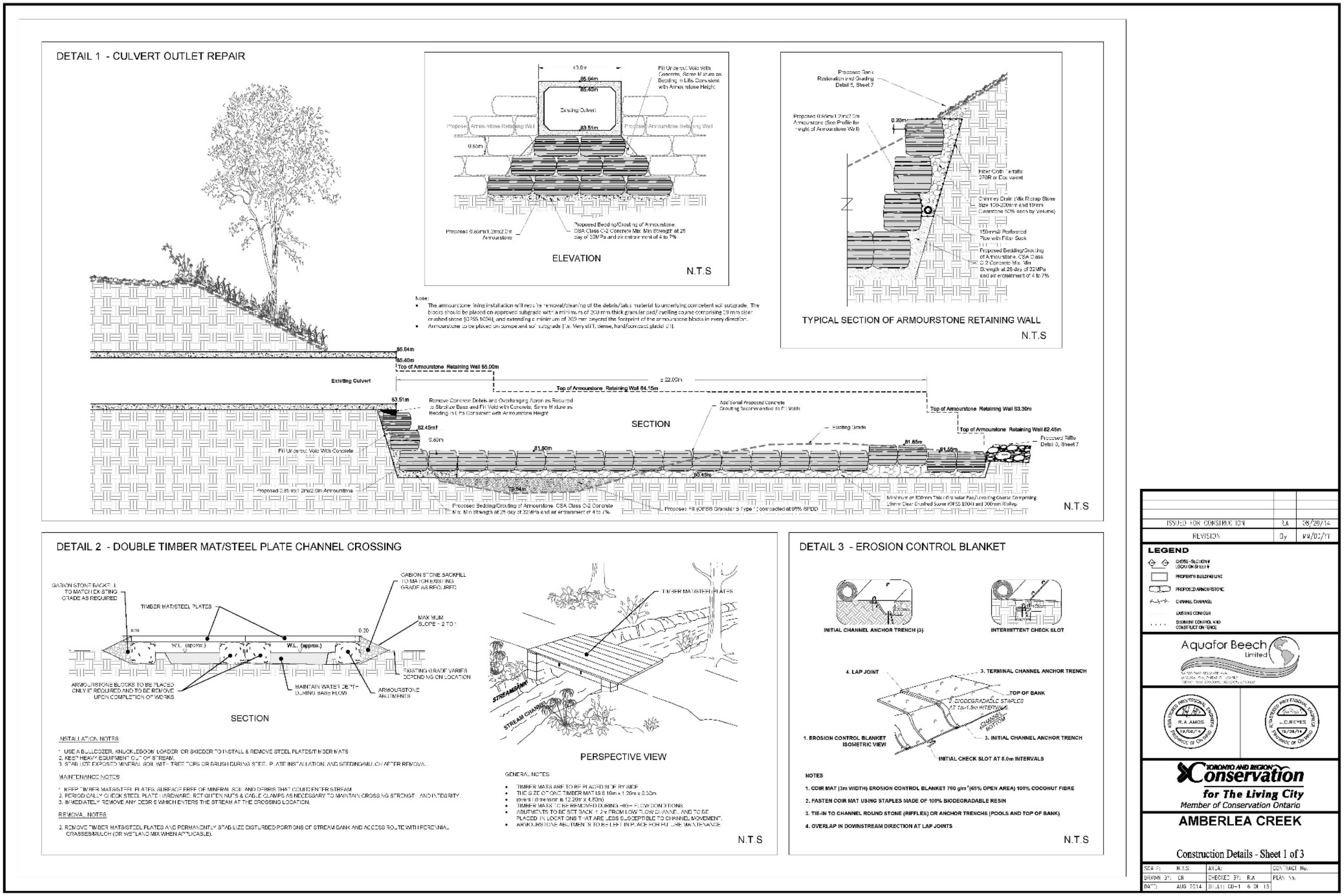
Toronto and Region Conservation for The Living City
Member of Conservation Ontario

AMBERLEA CREEK

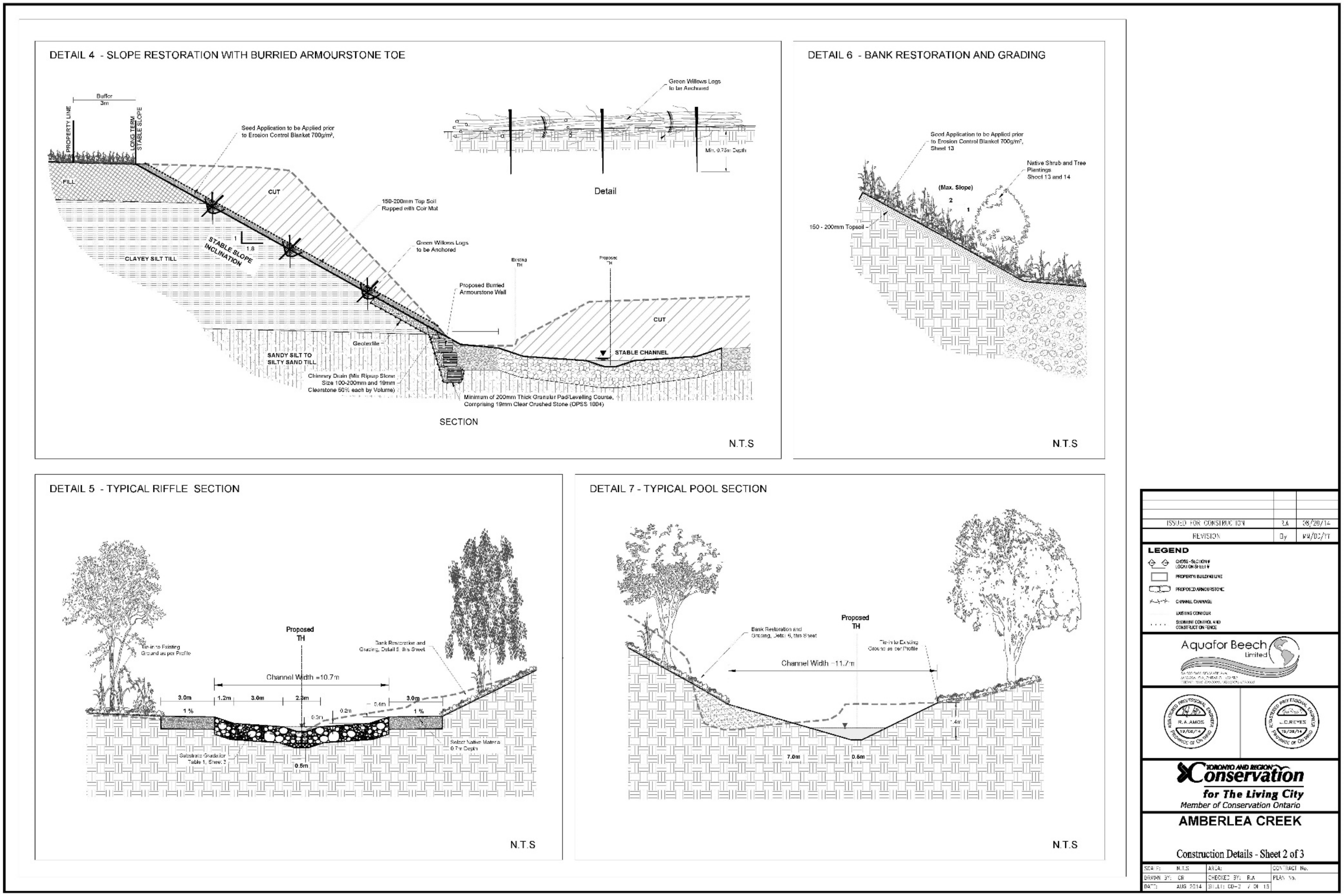
Sections - Sheet 1 of 2

SCALE: 1:100	AREA:		CONTRACT No.
DRAWN BY: CR	CHECKED BY: RA		PLAN No.
DATE: AUG 2014	SHEET: DS-1 4 OF 15		

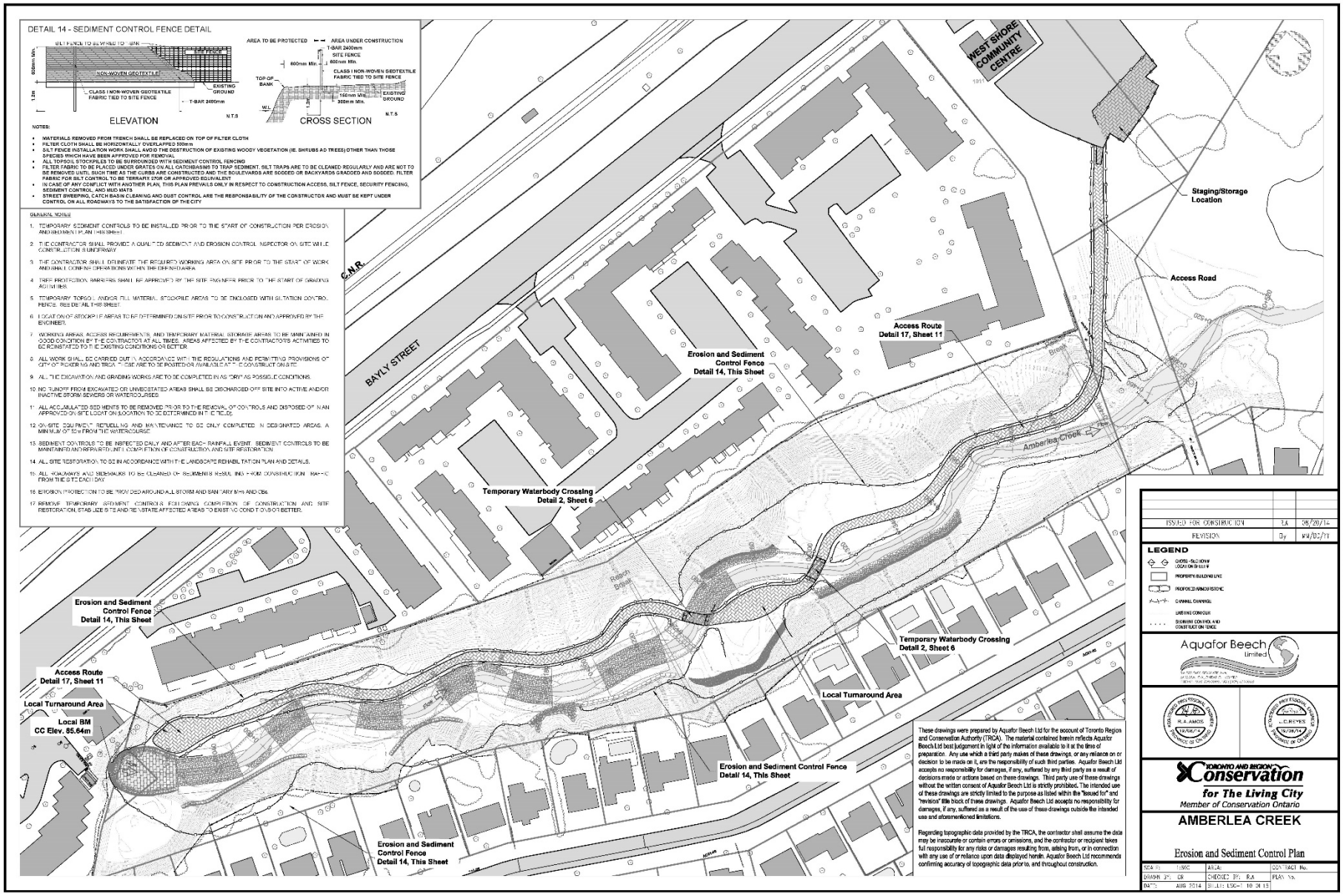
DETAILED DESIGN



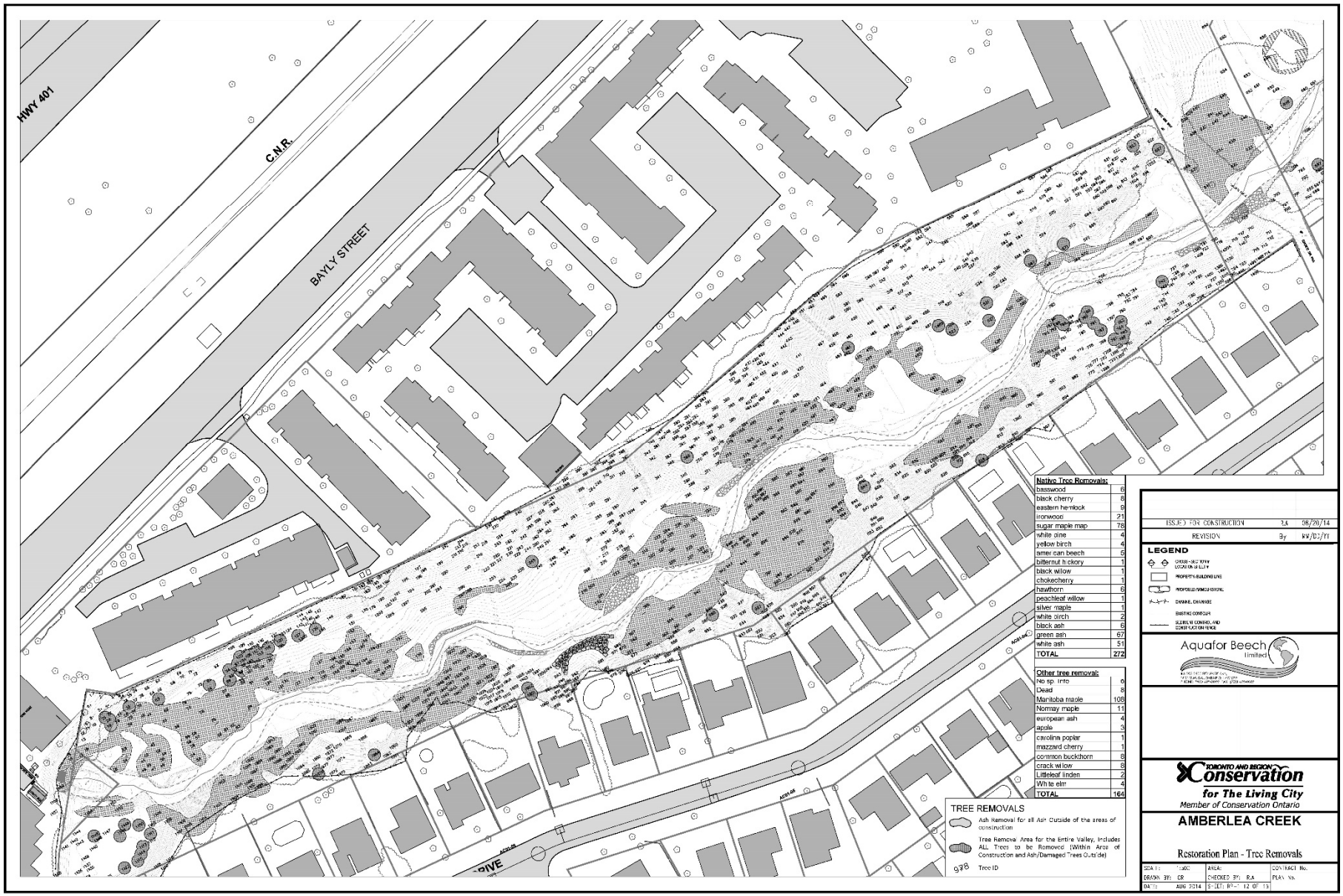
DETAILED DESIGN



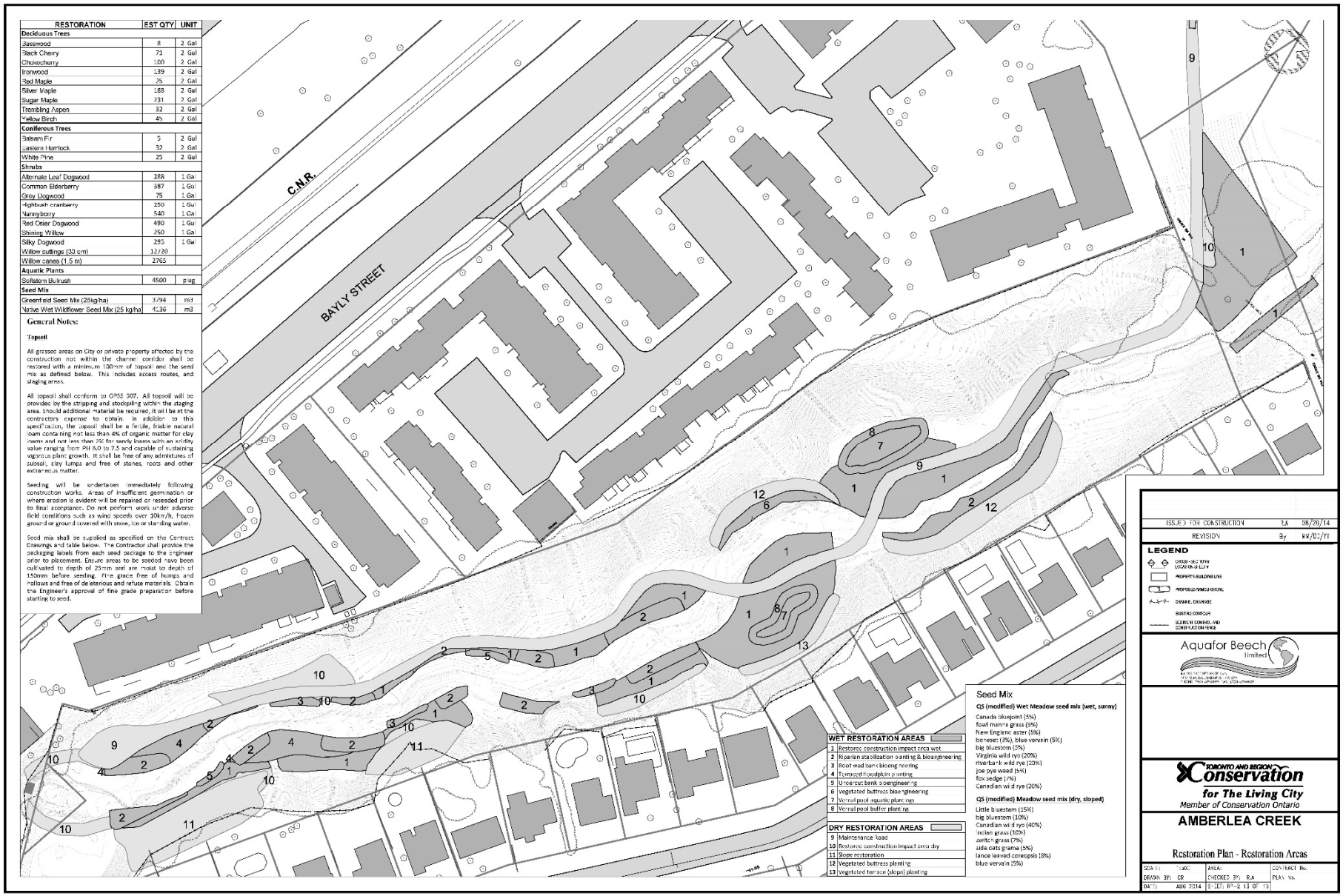
DETAILED DESIGN



DETAILED DESIGN



DETAILED DESIGN



RESTORATION	EST QTY	UNIT
Deciduous Trees		
Basswood	8	2 Gal
Black Cherry	71	2 Gal
Chokecherry	100	2 Gal
Ironwood	139	2 Gal
Red Maple	25	2 Gal
Silver Maple	188	2 Gal
Sugar Maple	231	2 Gal
Trembling Aspen	32	2 Gal
Yellow Birch	45	2 Gal
Coniferous Trees		
Balsam Fir	5	2 Gal
Eastern Hemlock	32	2 Gal
White Pine	25	2 Gal
Shrubs		
Alternate Leaf Dogwood	288	1 Gal
Common Elderberry	387	1 Gal
Grey Dogwood	75	1 Gal
Highbush cranberry	250	1 Gal
Nannyberry	500	1 Gal
Red Osier Dogwood	490	1 Gal
Shining Willow	250	1 Gal
Silky Dogwood	295	1 Gal
Willow cuttings (30 cm)	12720	
Willow canes (1.5 m)	2765	
Aquatic Plants		
Softstem Bulrush	4500	plug
Seed Mix		
Greenfield Seed Mix (25kg/ha)	3794	m3
Native Wet Wildflower Seed Mix (25 kg/ha)	4136	m3

General Notes:

Topsoil

All grassed areas on City or private property affected by the construction not within the channel corridor shall be restored with a minimum 100mm of topsoil and the seed mix as defined below. This includes access routes, and staging areas.

All topsoil shall conform to OPSS 802. All topsoil will be provided by the stripping and stockpiling within the staging area. Should additional material be required, it will be at the contractors expense to obtain. In addition to this specification, the topsoil shall be a fertile, friable natural loam containing not less than 4% of organic matter for clay loams and not less than 2% for sandy loams with an acidity value ranging from PH 6.0 to 7.5 and capable of sustaining vigorous plant growth. It shall be free of any admixtures of subsoil, clay lumps and free of stones, roots and other extraneous matter.

Seeding will be undertaken immediately following construction works. Areas of insufficient germination or where erosion is evident will be repaired or reseeded prior to final acceptance. Do not perform work under adverse field conditions such as wind speeds over 10km/h, frozen ground or ground covered with snow, ice or standing water.

Seed mix shall be supplied as specified on the Contract Drawings and table below. The Contractor shall provide the packaging labels from each seed package to the engineer prior to placement. Ensure areas to be seeded have been cultivated to depth of 25mm and are moist to depth of 150mm before seeding. Fine grade free of humps and hollows and free of deleterious and refuse materials. Obtain the Engineer's approval of fine grade preparation before starting to seed.

WET RESTORATION AREAS	
1	Restored construction impact area wet
2	Riparian stabilization planting & bioengineering
3	Root wad bank bioengineering
4	Terraced floodplain planting
5	Undercut bank bioengineering
6	Vegetated buttress bioengineering
7	Vernal pool aquatic plantings
8	Vernal pool buffer planting

DRY RESTORATION AREAS	
9	Maintenance Road
10	Restored construction impact area dry
11	Slope restoration
12	Vegetated buttress planting
13	Vegetated terrace (slope) planting

Seed Mix

QS (modified) Wet Meadow seed mix (wet, sunny)

Canada bluejoint (5%)
fowl manna grass (5%)
New England aster (5%)
boneset (3%), blue vervain (5%)
big bluestem (5%)
Virginia wild rye (20%)
riverbank wild rye (20%)
joe pye weed (5%)
fox sedge (7%)
Canadian wild rye (20%)

QS (modified) Meadow seed mix (dry, sloped)

Little bluestem (15%)
big bluestem (10%)
Canadian wild rye (40%)
Indian grass (10%)
switch grass (7%)
side oats grama (5%)
lance leaved coreopsis (8%)
blue vervain (5%)

ISSUED FOR CONSTRUCTION	JA	08/20/14
REVISION	By	MM/DD/YY

LEGEND

CROSS-SECTION LOCATION & ID
PROPERTY/BUILDING LINE
PROPOSED/MINOR CONTOUR
CHANNEL CENTERLINE
EXISTING CONTOUR
SILTATION CONTROL AND CONSTRUCTION FENCE

Aquafor Beech Limited

TORONTO AND REGION Conservation
for The Living City
Member of Conservation Ontario

AMBERLEA CREEK

Restoration Plan - Restoration Areas

SCALE:	1:400	AREA:	CONTRACT No.
DESIGN BY:	DB	CHECKED BY: RA	PLAN No.
DATE:	AUG 2014	SHEET: RP-2 13 OF 13	

RESTORATION IMPLEMENTATION

2015

RESTORATION IMPLEMENTATION

2015

RESTORATION IMPLEMENTATION

2015

RESTORATION IMPLEMENTATION

2015

RESTORATION IMPLEMENTATION

2015

RESTORATION IMPLEMENTATION

2015

RESTORATION IMPLEMENTATION

2015

RESTORATION IMPLEMENTATION

2015

RESTORATION IMPLEMENTATION

2015

MONITORING

2015

CONSTRUCTION