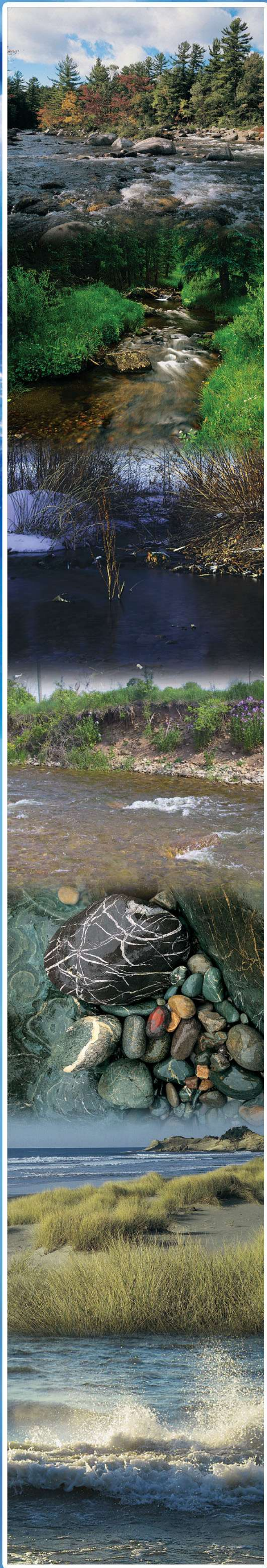

water's edge
ENVIRONMENTAL SOLUTIONS TEAM LTD.

963 County Road 10, Millbrook Cavan-Monaghan, ON

Fluvial Geomorphic Assessment

February 26, 2026

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1. INTRODUCTION

Water's Edge was engaged by Valdor Engineering Inc. to complete a fluvial geomorphic assessment of a tributary of Baxter Creek which runs through 963 County Road 10, Millbrook, as required by the Otonabee Region Conservation Authority (ORCA). The intent of the assessment is to support proposed residential developments on the property and to inform the design of an associated road crossing. The subject property and watercourse are shown below in **Figure 1**. The assessment incorporates information from sources including (but not limited to) the following:

- Physiography of Southern Ontario by Chapman & Putnam (digital data from Ministry of Northern Development and Mines (MNDM)),
- Ontario Soil Survey Index (Ontario GeoHub)
- Site survey and field assessments; and,
- Ontario Watershed Information Tool (OWIT)
- Aerial imagery from the Trent University Archives and Ontario GeoHub

Several site visits were completed by Water's Edge in January 2026, following a review of background information and aerial imagery to understand general watercourse and catchment characteristics. All provided project documentation was also reviewed to ensure information gathering was performed in a way which aligned with project objectives and legislative requirements.

The Baxter Creek tributary passes beneath County Road 10 (via a large concrete box culvert) and through 1069 County Road 10 before it runs through the property of interest in an approximately west-to-east direction. It then continues southeast to the main branch of Baxter Creek.

The proposed road crossing would run in a north-to-south direction near the east property boundary. No realignment of the channel is currently proposed to accommodate the road crossing.

Figure 1: Subject property and watercourse of interest

2. EXISTING CONDITIONS

Broad characteristics of the subject watercourse and surrounding lands have been identified through desktop investigations and confirmed during field activities. Site photos can be found in **Appendix A**.

2.1 Geology & Physiography

Watercourse form and natural progression is heavily influenced by the surficial geology of the area through which it flows. Channel bed materials and local variations thereof partially determine (along with slope and volumetric flow) the tendency and degree of aggradation or degradation which may occur. These characteristics also contribute to the formation of flow structures/patterns; namely natural pool-riffle sequences.

In this area the Baxter Creek Tributary is underlain by sand and gravel (**Figure 2**), which field investigations confirmed. The site is fully within the Peterborough Drumlin Field physiographic region with local landforms being drumlinized till plains.

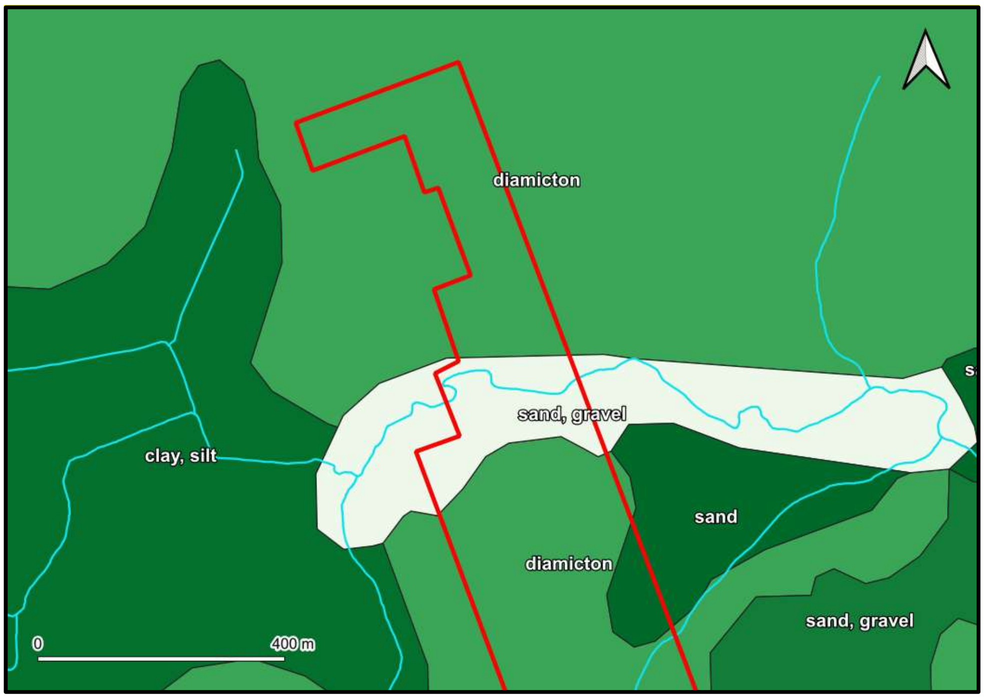

Figure 2: Surficial geology within the study area

2.2 General Watershed Characteristics

Baxter Creek and its tributaries are part of the broader Otonabee River watershed, which itself contributes to the Trent River system, ultimately entering Lake Ontario in the city of Trenton. The subcatchment contributing to the study reach drains lands between Peterborough County Road 21 and Syer Line to the south and north, respectively, extending west just beyond Tapley Quarter Line.

The Ontario Watershed Information Tool identifies a catchment area of 11.2 km^2 with an overall slope of 4.8%. The channel itself has an average slope of 1.1%. Land use in the area is dominated by "Agricultural/Undifferentiated" (72%), and "Community Infrastructure (12%), with small proportions of swamp and forest. There are likely minor inaccuracies in these values given recent residential developments within the catchment.

2.3 Geomorphic Channel Conditions

Examination of existing channel conditions and historical changes allow for the development of well-justified crossing recommendations. An infrastructure solution which does not oppose natural tendencies is much less likely to face geomorphic threats and will remain functional in the long-term.

2.4 Baxter Creek Tributary

The tributary of interest collects flow from a number of smaller tributaries including roadside ditches. The longest continuous channel appears to originate south of Fallis Line and east of Tapley Quarter Line, flowing northeast across Fallis Line, and toward the County Road 10 crossing immediately upstream of the site. Through the site, the channel flows generally west-to-east with several sharp (approximately ninety degree) bends.

The majority of the reach is unshaded and passes through a low-lying field/meadow with a well-connected floodplain to the south but bounded by a steep slope to the north. The channel is directly adjacent to the slope toe near the upstream end but has some separation farther downstream. At the downstream end of the reach, the channel enters a cedar stand where an old barbed-wire fence delineating the property boundary crosses the channel. There is minimal woody debris in the channel and only shrubs and grasses within the floodplain.

The channel does exhibit some natural pool-riffle sequencing, with pool features having substrate comprised of coarse sand and fine gravel, while the riffle features are comprised of much larger particles including cobbles approaching 300mm in diameter. Several large boulders also exist within and adjacent to the channel. The sharp bends have steep (albeit short) outer banks showing signs of erosion and there are instances throughout where the channel is braided or small islands have formed, sometimes due to the boulder locations.

Field investigations were somewhat hampered by snow and ice, but photos were taken, as were manual measurements of substrate and bank dimensions. Parameters are shown below in **Table 1** and site photos are shown in **Appendix A**.

Table 1: Summary of the Baxter Creek tributary geomorphic parameters

Parameter	Baxter Creek Tributary
Bankfull Width (m)	3.35
Bankfull Mean Depth (m)	0.22
Bankfull Area (m^2)	0.74
Width/Depth Ratio	16.74
Entrenchment Ratio	5.50
Bankfull Slope (m/m)	0.013
Pool Substrate	Coarse Sand – Medium Gravel
Riffle Substrate	Small – Large Cobbles

Examining **Table 1**, the reach of interest is shown to be slightly entrenched with a moderate width/depth ratio, providing the broad designation as a ‘C’ type channel under the Rosgen system. When combined with the overall slope and substrate, the classification is narrowed down to the C3 – C5 range. C type channels are common to glacial till plains, identified as the dominant landforms in the area.

3 STREAM ASSESSMENT SCORES

Existing channel dimensions are useful for informing crossing designs, but qualitative assessments also provide an opportunity to examine indicators of geomorphic change. The Rapid Geomorphic Assessment (RGA) and Rapid Stream Assessment Technique (RSAT) were used to characterize watercourse condition/quality and the changes which it is undergoing. The results apply to the full reach of interest given its general 'geomorphic homogeneity'. Field data sheets are shown in **Appendix B**.

3.1 Rapid Geomorphic Assessment (RGA)

The Ontario Ministry of the Environment developed the Rapid Geomorphic Assessment in 2003. It relies on the presence (yes/no) of various geomorphic indicators relating to the categories of aggradation, degradation, widening, and planimetric form adjustment. Scores from each of these categories are used to determine an overall "stability index". This method is commonly applied by Water's Edge and other professionals in the completion of fluvial geomorphic assessments. RGA classifications and score ranges are shown below in **Table 2**.

Table 2: Interpretation of RGA Score

Stability Index (SI) Value	Classification	Interpretation
SI ≤ 0.20	In Regime	The channel morphology is within a range of variance for rivers of similar hydrographic characteristics and evidence of instability is isolated or associated with normal river meander processes.
0.21 ≤ SI ≤0.40	Transitional/Stressed	Channel morphology is within a range of variance for rivers of similar hydrographic characteristics, but the evidence of instability is frequent.
SI ≥ 0.40	In Adjustment	Channel morphology is not within the range of variance and evidence of instability is wide- spread.

A Stability Index of 0.30 was identified during field activities, placing it squarely in the "Transitional/Stressed" category. More than half of the widening indicators were observed, generally relating to bank scour (which is also supported by degradation scoring higher than aggradation). Several indicators of planimetric adjustment were also observed, namely the presence of small islands/braided channels in some places. This suggests that the channel may be naturally progressing toward a higher width-depth ratio and experiences some movement within the floodplain.

3.2 Rapid Stream Assessment Technique (RSAT)

The Rapid Stream Assessment Technique (RSAT) was created by the Metropolitan Washington (DC) Council of Governments (Galli et al) in 1996. Its primary purpose is to examine watercourse response to urban development pressures. It involves the following six categories:

1. Channel stability,
2. Channel scouring and sediment deposition,
3. Physical in-stream habitat,
4. Water quality,
5. Riparian habitat conditions, and
6. Biological conditions.

The RSAT uses numerical ranking which can introduce some subjectivity. Consistent methodology and comparison to other assessments (performed by Water's Edge and others) helps minimize any bias. RSAT scoring classifications are shown below in **Table 3.**

Table 3: Interpretation of RSAT Score

RSAT Score	Ranking
41-50	Excellent
31-40	Good
21-30	Fair
11-20	Poor
0-10	Degraded

An RSAT score of 34 was identified during the field assessment, corresponding to a “Good” ranking. Most categories scored moderately well, although riparian habitat scored relatively low due to lack of shading and forest cover through the reach.

4 WATERCOURSE CROSSING RECOMMENDATIONS

4.1 Structure Sizing (Natural Hazard Objectives)

Section 8 of ORCA’s *Watershed Planning and Regulation Policy and Procedures Manual* (2025) discusses interference with watercourses, including construction of new crossing structures. The following points are considered noteworthy in the context of this assessment:

- *Crossings avoid any bends in the watercourse to the extent practical*
- *Crossing structures avoid the erosion hazard in order to accommodate natural watercourse movement*
- *Interference with hydrologic function…is minimized*
- *The risk of flood damage to upstream or downstream properties is reduced through site and crossing design*
- *Physical realignments or alterations to the…watercourse are avoided*

This scenario involves a confined system, as it is within a defined valley/low-lying area with limited (but not non-existent) possibility for lateral migration. The ORCA guidelines reference the Ministry of Natural Resources’ *Rivers and Stream Systems: Erosion Hazard Limit – Technical Guide* Which can be used in conjunction with the Toronto and Region Conservation Authority’s (TRCA) *Crossing Guidelines for Valley and Stream Corridors* (2015), which in turn relies upon the *Belt Width Delineation Procedures Manual* (2001), prepared by Parish Geomorphic.

The TRCA Crossing Guidelines suggest that a structure spanning the meander belt width is the most preferable option. In confined situations, delineation of the meander belt width is influenced by valley/stream corridor. Typically, a line along the top of the slope or the midpoint of the slope would be used in the absence of any erosion resistant (bedrock) features, which are not present here. A cursory check of the Digital Elevation Model (DEM) available through Ontario GeoHub indicates that this could result in a meander belt width of at least 30 metres, which is considered excessive for a low-volume two-lane crossing.

The second preference outlined in the manual is the 100-year erosion limit. Aerial imagery from 1961, 1976, 1999, 2013, and 2023 was used to examine historical watercourse migration. The older imagery was unsuitable for tracking bank migration due to poor resolution (coupled with small channel size) and difficulty setting control points for georeferencing in a predominantly rural area. Thus, the “Determination of Toe Erosion Allowance” table from the MNRF Erosion Hazard Limit Technical Manual (Section 3.1, Table 3, see below) was consulted. It relies on geomorphic indicators and soil type to determine a minimum allowance.

Table 3: Determination of Toe Erosion Allowance

MINIMUM TOE EROSION ALLOWANCE - River Within 15 m of Slope Toe*

Type of Material Native Soil Structure	**Evidence** of Active Erosion** **OR** Bankfull Flow Velocity > Competent Flow Velocity*** RANGE OF SUGGESTED TOE **EROSION ALLOWANCES**	**No evidence** of Active Erosion** **OR** Bankfull Flow Velocity <Competent Flow Velocity*** Bankfull Width < 5m	5-30m	> 30m
1.Hard Rock (granite) *	0 - 2 m	0 m	0 m	1 m
2.Soft Rock (shale, limestone) Cobbles, Boulders *	2 - 5 m	0 m	1 m	2 m
3.Stiff/Hard Cohesive Soil (clays, clay silt), Coarse Granular (gravels) Tills *	5 - 8 m	1 m	2 m	4 m
4.Soft/Firm Cohesive Soil, loose granular, (sand, silt) Fill *	8 - 15 m	1-2 m	5 m	7 m

*Where a combination of different native soil structures occurs, the greater or largest range of applicable toe erosion allowances for the materials found at the site should be applied

****Active Erosion** is defined as: bank material is exposed directly to stream flow under normal or flood flow conditions where undercutting, oversteepening, slumping of a bank or down stream sediment loading is occurring. An area may have erosion but there may not be evidence of 'active erosion' either as a result of well rooted vegetation or as a result of a condition of net sediment deposition. The area may still suffer erosion at some point in the future as a result of shifting of the channel. The toe erosion allowances presented in the right half of Table 3 are suggested for sites with this condition. See Step 3.

*****Competent Flow Velocity** is the flow velocity that the bed material in the stream can support without resulting in erosion or scour. For *bankfull width* and *bankfull flow velocity*, see Section 3.1.2.

The scour noted during field investigations is considered "evidence of active erosion" while the Land Information Ontario (LIO) viewed through Ontario Geohub suggests surficial geology of sand and gravel. This was also supported by site observations which noted sand in the slower-flowing areas. It should be noted that this measurement does not account for any slope stability issues which may be identified during geotechnical investigations.

Although the historical imagery was not suitable for detailed bank delineation, it was sufficient for examination of long-term trends in general watercourse alignment. When comparing a 1975 aerial to a 2024 aerial, it seems that one meander bend on the upstream portion of the property was cutoff at some point between 1975 and 1999, but that the remainder of the watercourse (specifically near the proposed crossing) has remained generally unchanged. It appears that the watercourse centreline has moved between 0 and 3 metres over the past 50 years as indicated by the georeferenced points on **Figure 3**, although there may be some subjectivity in the photo georeferencing. This suggests that a toe erosion allowance at the lower end of the MNRF recommendation would be suitable as a 100-year erosion rate proxy. In this case however, even an 8-metre buffer on either side of the watercourse would still result in an excessively wide crossing. Therefore, a crossing span coinciding with the Credit Valley Conservation (CVC) recommendation of spanning at least 3 times the bankfull width for watercourses less than 4 metres wide (CVC, 2019) would be more appropriate.

It should be noted that **Table 1** provides average values observed through the full reach. In the vicinity of the proposed crossing (near georeferencing control point #5 in **Figure 3**), the bankfull width is approximately 2.5 metres. When combined with the increasing confinement of the watercourse in this area due to the north and south slopes, a buffer of 2 metres on either side of the watercourse is deemed appropriate. This would result in an overall crossing span of approximately 6.5 metres.

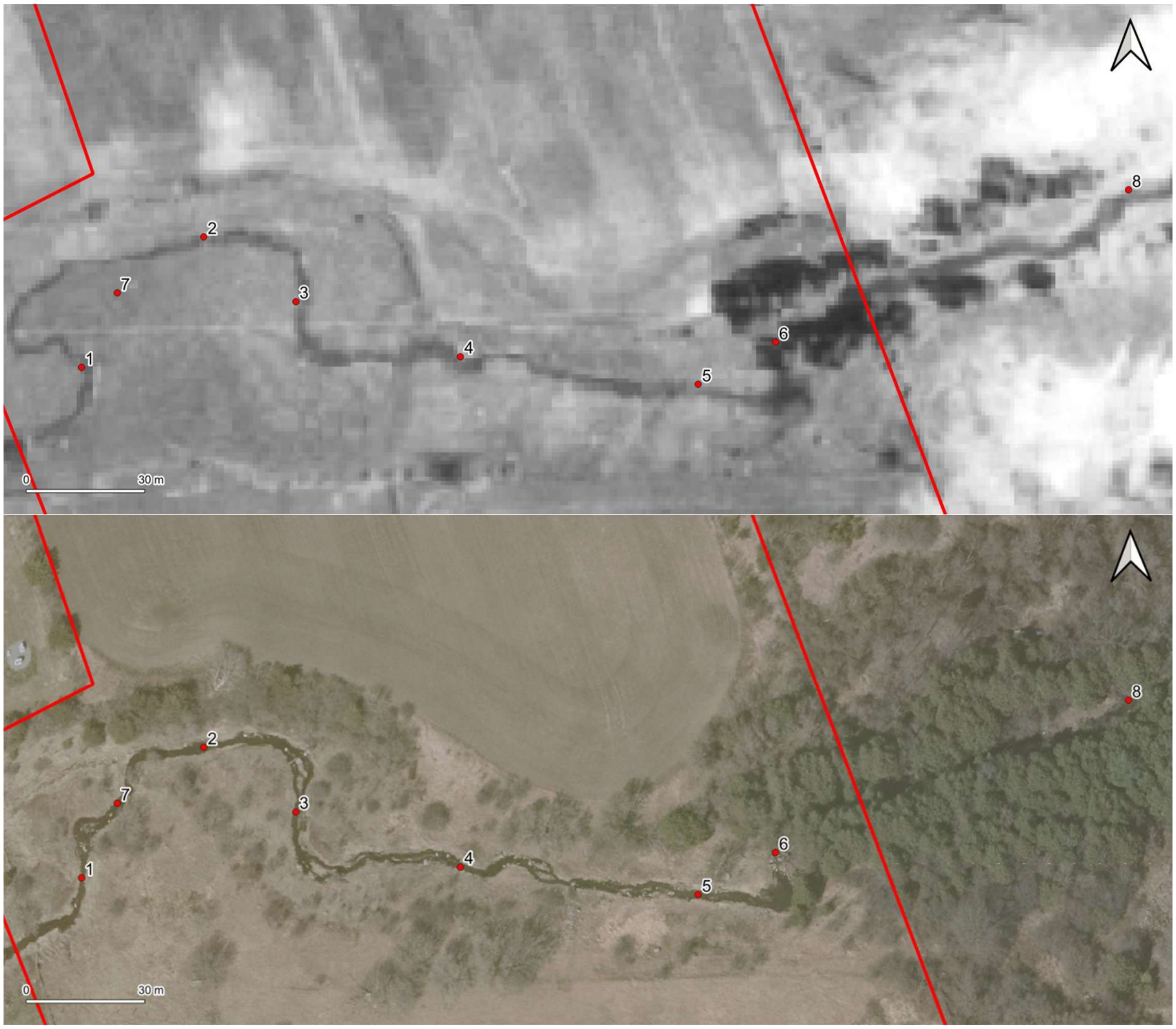

Figure 3: Aerial photo comparison from 1975 to 2024

As a general recommendation, the length of the structure should be limited as much as possible while still maintaining roadbed stability. It should be aligned with the current, relatively straight flow path.

Since the roadway elevation will approach the top of the valley corridor, a structure rise of greater than 2 metres is possible and will improve floodwater conveyance and habitat connectivity, although floodplain delineation is outside the scope of this assessment.

4.2 Natural Character (Natural Heritage Function Objectives)

It should be noted that the TRCA crossing guidelines suggest avoiding channel alterations or specifically hardening areas. Thus, open bottom/span structures which allow the watercourse to pass through unimpeded are highly preferred. Ensuring the bankfull channel is maintained through the crossing also supports fish passage by ensuring adequate depth during low flow conditions. This may also involve addition of some rounded riverstone to provide stability through the structure and at the inlet and outlet since the establishment of vegetation will be highly limited. The addition of some riverstone through the crossing should be sized based on the cobbles already present in the watercourse, maintaining the existing character of the area.

The suggestion for a span structure is also supported by the document's terrestrial objectives, which promote habitat connectivity. They also emphasize limiting the disturbance to surrounding natural areas. In this case, care should be taken not to disrupt the cedar stand along the east property boundary, to the extent feasible.

4.3 Additional Considerations

The proposed crossing structure will be located immediately upstream of a large meander bend. Although the georeferenced photo comparison suggests this area is relatively stable, protection measures should be considered during the detailed design phase. This would serve to mitigate any potential bank erosion that could arise due to more concentrated flows.

5 RECOMMENDATIONS

The field and desktop assessments outlined herein have informed the following recommendations:

- The proposed road crossing recommendations has been developed with consideration for the TRCA, CVC, and MNRF documentation described herein,
- The structure should have a span of approximately 6.5 metres and a rise of at least 2 metres,
- An open-bottom structure is recommended to maintain the natural character of the channel,
- The length of the structure should be as small as possible without compromising the roadway and associated infrastructure,
- The crossing design should minimize disturbance to the surrounding area although some inlet/outlet embankment treatment will mitigate future erosion concerns,
- A low-flow channel should be maintained through the structure involving placement of appropriately sized rounded riverstone,
- Bank protection within the downstream meander bend should be considered during detailed design; and,
- Appropriate erosion and sediment control measures should be implemented during construction to limit adverse impacts to the downstream watercourse,

Should you have any questions or concerns, please do not hesitate to contact the undersigned.

Respectfully submitted,

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ATTACHMENTS

Appendix A: Site Photos
Appendix B: Field Data Sheets
Appendix C: Profile and Cross-Sections

REFERENCES

Chapman, L.J. and D.F. Putnam. 1984. Physiography of Southern Ontario: Ontario Geological Survey Special Volume 2.

Credit Valley Conservation. 2019. Technical Guidelines for Watercourse Crossings – Version 1.0.

Galli, J. 1996, *Rapid Stream Assessment Technique (RSAT) field methods*. 36 pp. Metropolitan Washington Council of Governments, Department of Environmental Programs, Washington, DC.

Ministry of the Environment Ontario. 2003. Rapid Geomorphic Assessment.

Ministry of Natural Resources Ontario. 2002. Technical Guide River & Stream Systems: Erosion Hazard Limits.

Otonabee Region Conservation Authority. 2025. Watershed Planning and Regulations: Policies and Procedures

Parish Geomorphic. 2001. Belt Width Delineation Procedures.

Toronto and Region Conservation Authority. 2015. Crossings Guideline for Valley and Stream Corridors.

APPENDIX A:

Site Photos

FROM: County Road 10
LOOKING: Downstream (east)
COMMENT: Vegetated channel corridor confined by steep slope to north (left side)

FROM: Left bank
LOOKING: Upstream (south)
COMMENT: Well-connected floodplain, shallow flow through riffle

FROM: Right bank
LOOKING: Toward left bank (northeast)
COMMENT: Steep, scoured bank on outer meander bend

FROM: Left bank, midway through reach
LOOKING: Downstream (east)
COMMENT: Valley increasingly confined, forested area/property limit in background

FROM: Left bank, near property boundary
LOOKING: Upstream (west)
COMMENT: Gentle meandering with pool-riffle sequence, several large boulders visible

FROM: Right bank
LOOKING: Down, at channel bed
COMMENT: Riffle substrate comprised of small-large cobbles (image filtered for visibility)

APPENDIX B:

Field Data Sheets

Rapid Geomorphic Assessment

Date: 2026-01-20
Evaluator: DF
Stream: Baxter Creek Trib
Conditions: Sunny, -10 deg. C, snowy/icy

Form / Process (1)	Geomorphic Indicator No (2)	Description (3)	Present No (4)	Present Yes (5)	Factor Value (6)
Evidence of Aggradation	1	Lobate bar	1		
	2	Coarse material in riffles embedded	1		
	3	Siltation in pools	1		
	4	Medial bars		1	
	5	Accretion on point bars	1		
	6	Poor longitudinal sorting of bed materials	1		
	7	Deposition in the overbank zone	1		
		Sum of Indices	6	1	0.14
Evidence of Degradation (DI)	1	Exposed bridge footing(s)			
	2	Exposed sanitary/storm sewer/pipeline/etc.			
	3	Elevated storm sewer outfall(s)			
	4	Undermined gabion baskets/concrete aprons/etc.			
	5	Scour pools d/s of culverts/storm sewer outlets			
	6	Cut face on bar forms	1		
	7	Head cutting due to knick point migration	1		
	8	Terrace cut through older bar material	1		
	9	Suspended armour layer visible in bank	1		
	10	Channel worn into undisturbed overburden/bedrock		1	
		Sum of Indices	4	1	0.20
Evidence of Widening (WI)	1	Fallen/leaning trees/fence posts/etc.		1	
	2	Occurrence of large organic debris	1		
	3	Exposed tree roots	1		
	4	Basal scour on inside meander bends		1	
	5	Basal scour on both sides of channel through riffle		1	
	6	Gabion baskets/concrete walls/etc. out flanked			
	7	Length of basal scour >50% through subject reach		1	
	8	Exposed length of previously buried pipe/cable/etc.			
	9	Fracture lines along top of bank	1		
	10	Exposed building foundation			
		Sum of Indices	3	4	0.57
Evidence of Planimetric Form Adjustment (PI)	1	Formation of cut (s)	1		
	2	Single thread channel to multiple channel		1	
	3	Evolution of pool-riffle form to low bed relief form	1		
	4	Cutoff channel(s)	1		
	5	Formation of island(s)		1	
	6	Thalweg alignment out of phase meander form	1		
	7	Bar forms poorly formed/reworked/removed	1		
		Sum of Indices	5	2	0.29
Stability Index (SI) = (AI + DI+ WI+ PI) /m					0.30
		Condition:	Transitional		

General Comments:

Bank scour, steep banks in meander bends

Moderate sinuosity, semi-defined pool-riffle sequence

Some large boulders/island formation

Steep valley slope on north side, more gradual to the south

Generally open corridor, little shading, primarily small shrubs and grass

RAPID STREAM ASSESSMENT TECHNIQUE (RSAT) Evaluation

water's edge ENVIRONMENTAL SOLUTIONS TEAM LTD.

Creek Name: Baxter Creek Tributary **RSAT Section #:**

Assessor: DF 2026-01-20

Coordinates:

Evaluation Category	Relative Significance	Criteria	Rating: Excellent	Good	Fair	Poor	Score
1 Channel Stability	Indicative of hydrologic/flow regime alteration and general condition of physical aquatic habitat. Provides insight into past, present and possible future changes in channel morphometry	Bank Stability	>80%	71-80 %	50-70 %	< 50 %	5
		Stream Bend Stability Outer bank height/bank overhang	<0.60 m / <0.60m	0.60 to 0.90 m / 0.60 to 0.75 m	0.90 to 1.20 m / 0.75 to 0.90 m	>1.20 m / >0.90 m	8
		Exposed roots and falls	old and large / 0-1	some young / 2-3	young common / 4-5	young abundant / >6	10
		Bottom 1/3 of Bank	resistant plant/soil	resistant plant/soil	highly erodable plant/soil	highly erodable plant/soil	5
		Cross-Section	V or U	V or U	Trapezoidal	Trapezoidal	7
		Typical Score:	**9 to 11**	**6 to 8**	**3 to 5**	**0 to 2**	**7**

NOTES:

Evaluation Category	Relative Significance	Criteria	Excellent	Good	Fair	Poor	Score
2 Channel Scour and Sediment Deposition	Relates to level of uncontrolled stormwater runoff, sediment load and transport and degradation of instream habitat.	Riffle Embeddedness	<25% sand & silt	25-50%	50-75%	>75%	7
		# of deep pools / substrate	high # / <30% fines	mod # / 30-60% fines	low-mod # / 60-80% fines	few # / >80 % fines	6
		Streak marks/sediment deposits absent	marks / dep absent	uncommon	common	common	8
		large sand deposits/fresh	rare / no fresh dep.	uncommon and small localized dep	common and small localized dep.	common and heavy dep along major portion	7
		Point bar/vege/sand	few / well vege / none	small/well vege/little	mod-large& unstable/high am't of sand common	mod-large& unstable/high am't of sand at most bends	7
		Typical Score:	**7 to 8**	**5 to 6**	**3 to 4**	**0 to 2**	**7**

NOTES:

Evaluation Category	Relative Significance	Criteria	Excellent	Good	Fair	Poor	Score
3 Physical In-stream Habitat	Relates to the ability of a stream to meet basic physical requirements necessary for the support of a well-balanced aquatic community (eg: depth of flow, water velocity, water temperature, substrate type and quality, etc).	Wetted Perimeter	> 85% of bottom width	61-85%	40 - 60 %	< 40 %	6
		Diversity of structure, velocity and depth of flow	All forms present, diverse vel. and depth of flow	Good mix of form, rel. diverse velocity and depth	Few pools, riffles and runs dominant, vel & depth gen shallow/slow	dominated by 1 type (usually runs) and 1 vel/depth (usually slow & shallow	5
		Riffle substrate	cobble, gravel, rubble, boulder mix with little sand & >50 % cobble	Good mix of gravel, cobble and rubble & 25-49% cobble	predominantly small cobble, gravel and sand & 5 - 24 % cobble	Predominantly gravel with high % sand & <5% cobble	7
		Riffle depth	>0.20 m	0.15 - 0.19 m	0.10 - 0.14 m	< 0.10 m	3
		Large Pool Depth	> 0.60 m	0.45 - 0.59 m	0.30 - 0.44 m	< 0.30 m	5
		Channel Process	No channel alteration of significant point bar formation or enlargement	Slight increase in point bar formation or slight amount of channel mod.	Mod. increase in point bars and / or channel mod.	extensive channel alteration or point bar formation / enlargement	6
		Riffle-Pool Ratio	0.9 - 1.1 to 1	0.7 - 0.89 to 1 or 1.11 - 1.3 to 1	0.5 - 0.69 to 1 or 1.31 - 1.5 to 1	< 0.49 to 1 or > 1.51 to 1	6
		Stream Temp. on a Summer Afternoon	< 20 ○ C	20 to 24 ○ C	24 to 26 ○ C	>27 ○ C	
		Typical Score:	**7 to 8**	**5 to 6**	**3 to 4**	**0 to 2**	**5.4285714**

NOTES:

Evaluation Category	Relative Significance	Criteria	Excellent	Good	Fair	Poor	Score
4 Water Quality	Indicative of watershed perturbations / general level of human activity, point and non-point source loads, and aquatic habitat conditions.	Substrate Fouling (on rock underside)	None: 0 -10%	Light: 11-20%	Mod: 21 - 50 %	High >50%	~
		Total Dissolved Solids (TDS)	<50mg/L	50-100 mg/L	101-150 mg/L	>150 mg/L	
		Clearness of Water	>0.90 m visibility	0.45 - 0.89 m	0.15 - 0.44 m	<0.15 m visible	6
		Odour	None	Slight organic odour	Slight - Moderate odour	Moderate to strong odour	8
		Typical Score:	**7 to 8**	**5 to 6**	**3 to 4**	**0 to 2**	**7**

NOTES:

Evaluation Category	Relative Significance	Criteria	Excellent	Good	Fair	Poor	Score
5 Riparian Habitat Conditions	Provides insight into change(s) in stream energetics, temperature regime, and both aquatic and terrestrial habitat conditions	Width of Riparian Buffer	Wide > 200' with mature forests on both sides	Forested buffer >100' along major portion	Predom. Wooded but major localized gaps	Mostly non-wooded vegetation, narrow width.	4
		Canopy coverage (Shading)	>80% shading	60-79% shading	50-60 % shading	<50 % shading	1
		Typical Score:	**6 to 7**	**4 to 5**	**2 to 3**	**0 to 1**	**2.5**

NOTES:

Evaluation Category	Relative Significance	Criteria	Excellent	Good	Fair	Poor	Score
6 Biological Indicators	Best overall indication of stream health and level of watershed perturbation	Diversity of macro-invert community	Diverse community present (mayflies, stoneflies, and cased caddisflies (few snails or leeches)	Mayflies and caddisflies (stoneflies absent)	Pollution-tolerant species; aquatic worms dominant	Poor diversity dominated by midgeflies, aquatic worms and snails.	5
		Number of Individuals	Mod to High #	Mod to High #	Low - Mod #	Low #	5
		Typical Score:	**7 to 8**	**5 to 6**	**3 to 4**	**0 to 2**	**5**

NOTES:

Biological indicators and water quality scores inferential based on minimally disturbed, natural character of corridor, and surrounding rural area

TOTAL SCORE:	**33.93**
CONDITION:	**Good**

water's edge
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Fluvial Geomorphology

Natural Channel Design

Stream Restoration

Monitoring

Erosion Assessment

Sediment Transport

Visit our Website at www.watersedge-est.ca

APPENDIX C:

Profile & Cross-Sections

Figure C-1: Location of cross-sections (cut from LiDAR).

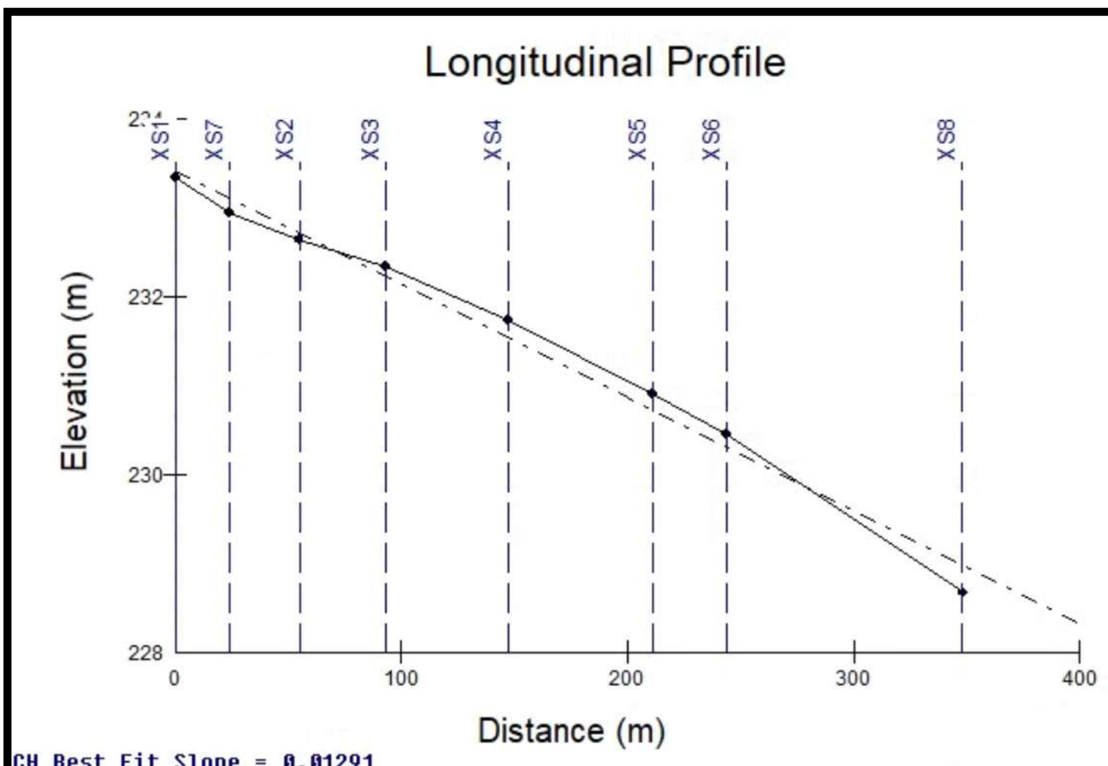

Figure C-2: Longitudinal profile through the reach of interest with cross-sections marked.

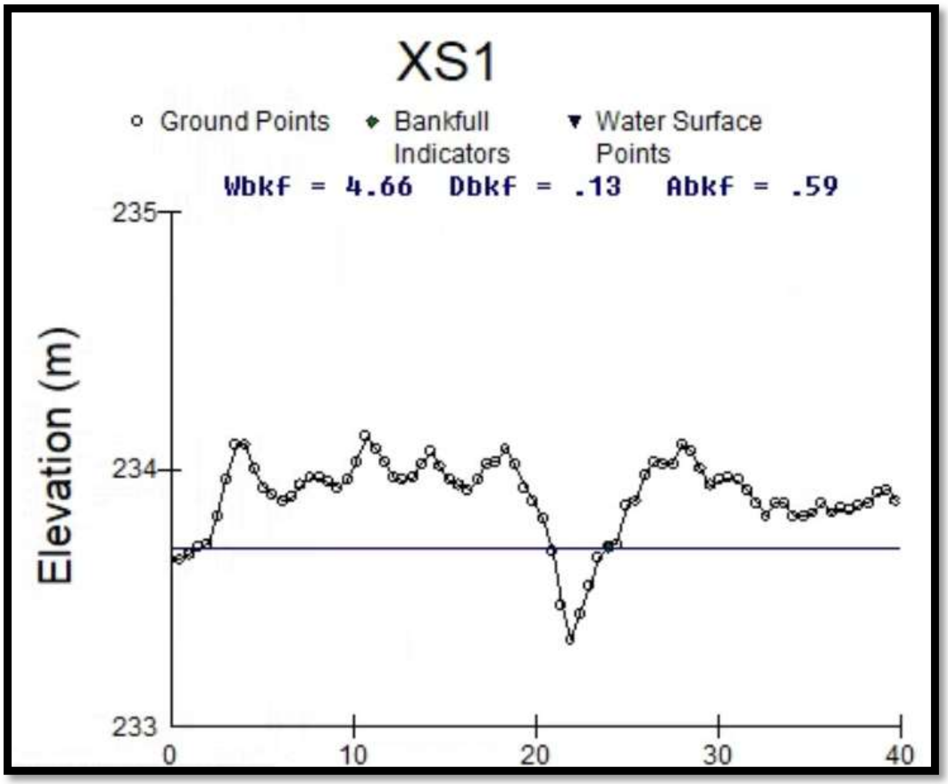

Figure C-3: Cross-section 1 (looking downstream)

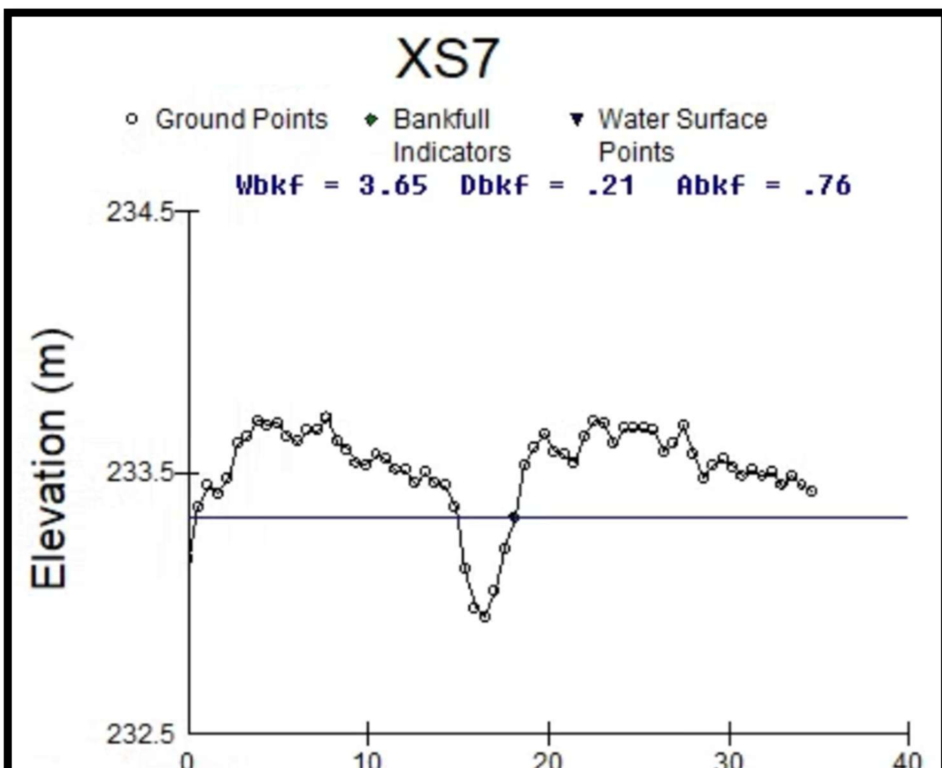

Figure C-4: Cross-section 7 (looking downstream)

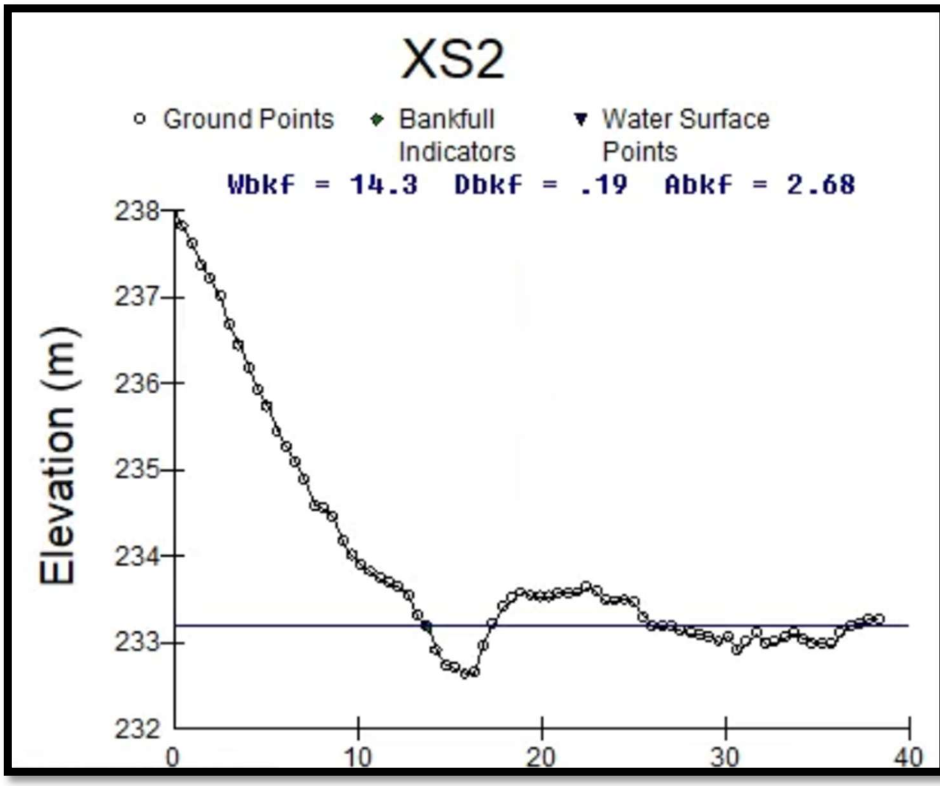

Figure C-5: Cross-section 2 (looking downstream)

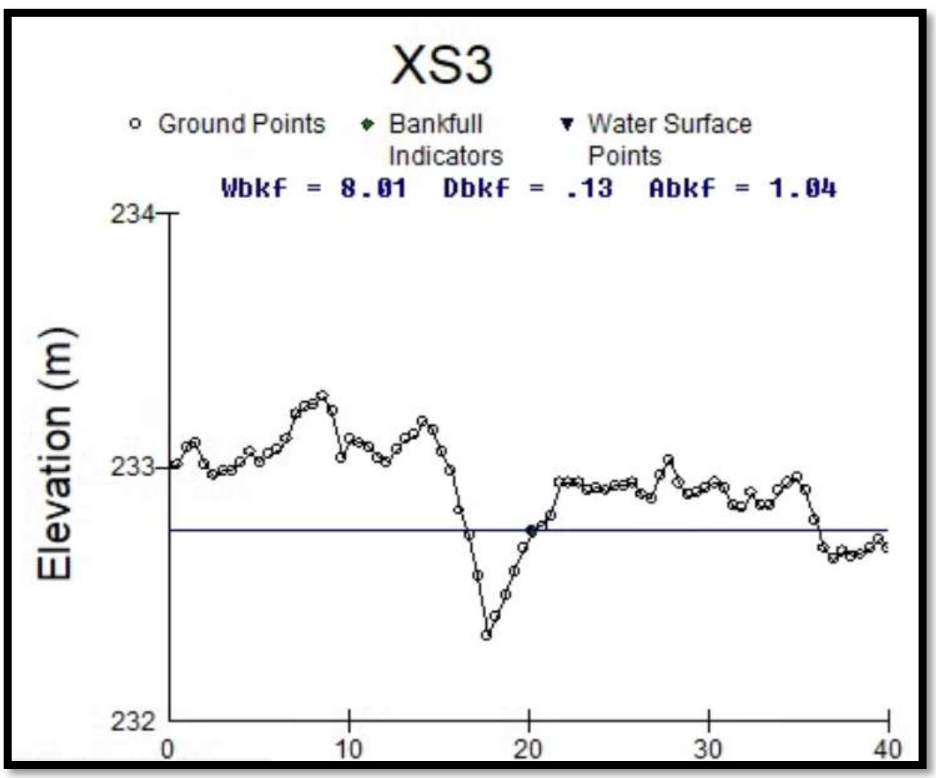

Figure C-6: Cross-section 3 (looking downstream)

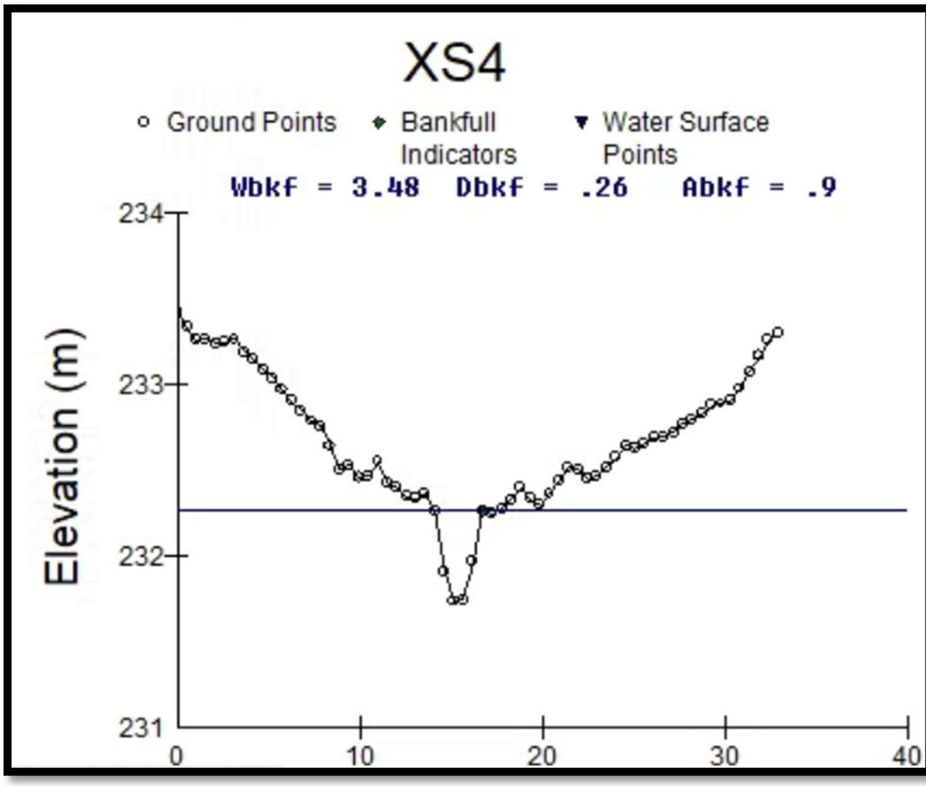

Figure C-7: Cross-section 4 (looking downstream)

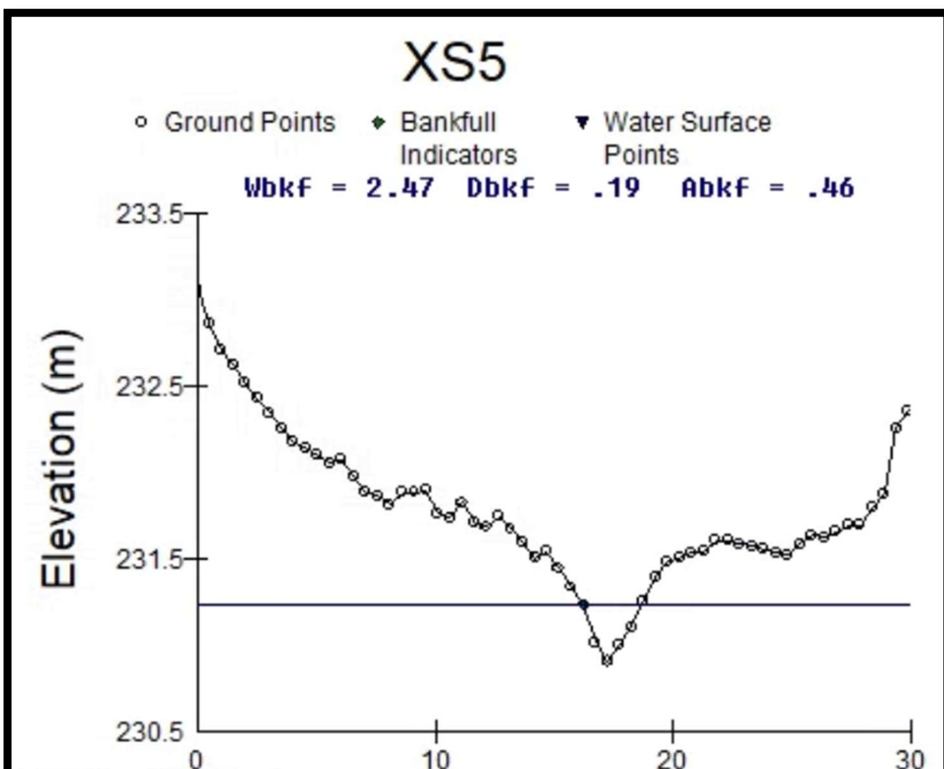

Figure C-8: Cross-section 5 (looking downstream)

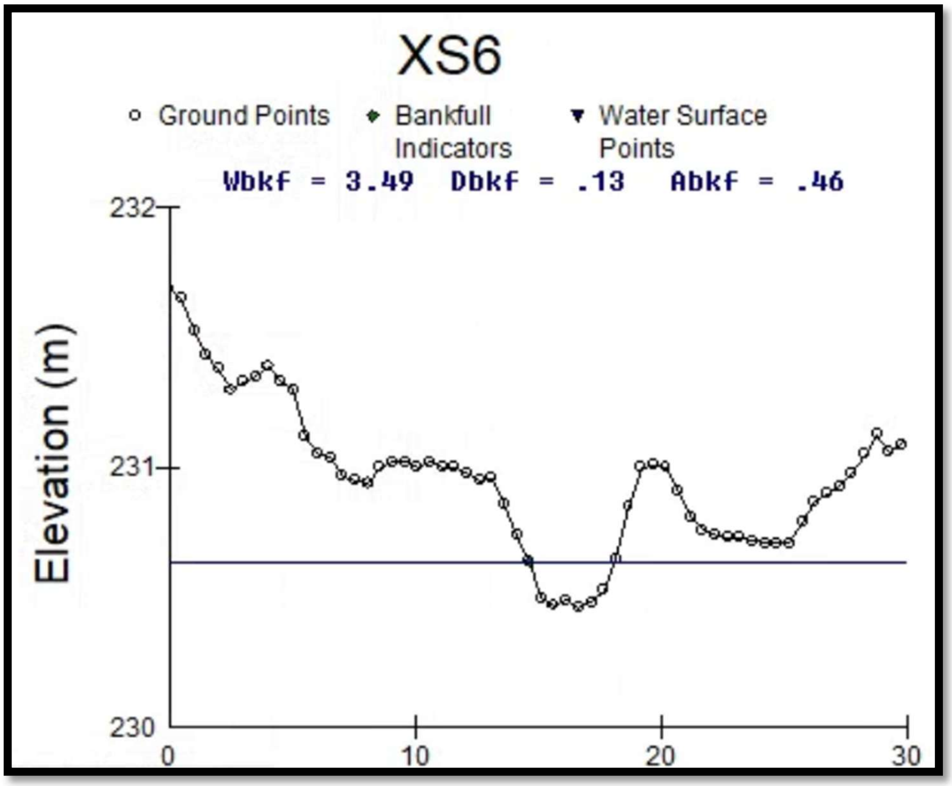

Figure C-9: Cross-section 6 (looking downstream)

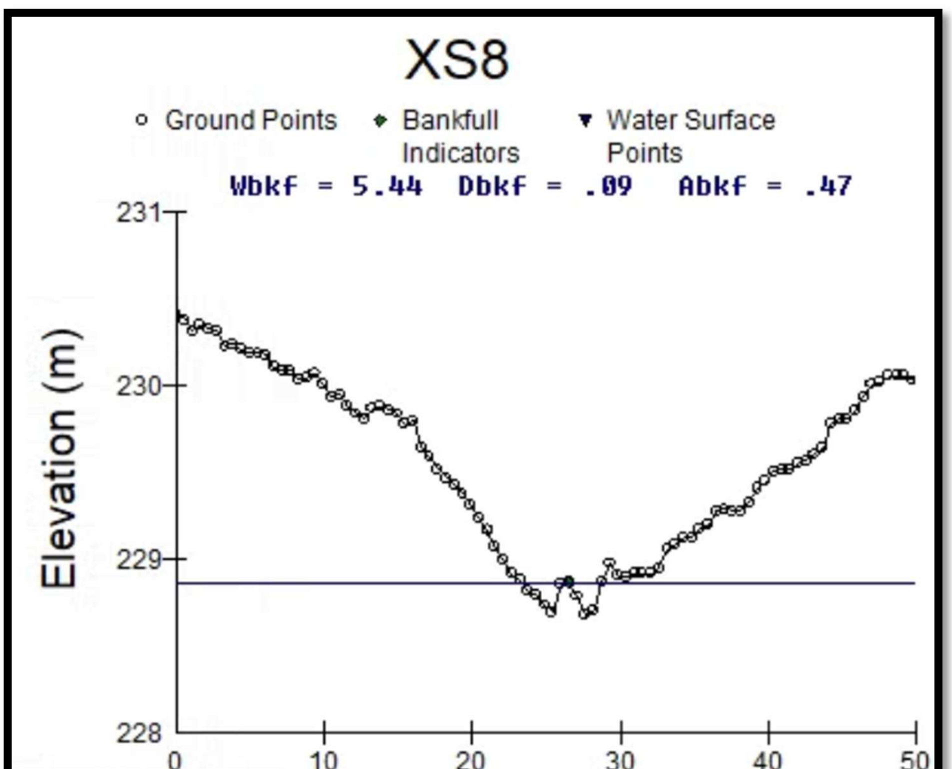

Figure C-10: Cross-section 8 (looking downstream)