1009 Trim Road

Headwater Drainage Feature Assessment

Prepared for:
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1.0 INTRODUCTION

Trim Road I LP, here after referred to as the proponent, is looking to develop a parcel of land situated in the City of Ottawa at 1009 Trim Road. It is located on the northeast corner of the Trim Road and Jeanne d'Arc Boulevard North intersection (Figure 1). It is part of Lot 30, Concession 1 in the Township of Cumberland. It fronts the Ottawa River and Petrie Island Marsh (a provincially significant wetland) (Figure 2). Bowfin Environmental Consulting (Bowfin) has been retained to assist with the natural heritage features assessment and permitting. Part of this work included the completion of this Headwater Drainage Feature Assessment Report. As described in this report, the feature identified as a possible headwater feature found does not appear to meet the definition of a headwater. Notwithstanding, a full assessment of the feature has been conducted and is being reported on in this report. The methods and findings are described below.

2.0 METHODOLOGY

This assessment report of the one potential Headwater Drainage Feature identified on the site involved the evaluation of this area based on the guidelines outlined in the *Evaluation, Classification and Management of Headwater Drainage Features Guidelines* (here after referred to as the Guideline) (prepared by Credit Valley Conservation Authority and Toronto and Region Conservation, revised July 2014). The Guideline is divided into three parts.

- Part 1 - Evaluation and various suggested study designs/methods
- Part 2 - Classification of features
- Part 3 - Management Recommendations.

As per the Guideline and the relevant *Ontario Stream Assessment Protocol* (OSAP) sections, a headwater feature must have a catchment that is at least 2.5 ha and is less than 1000 ha (or <10 km^2). Headwaters are further defined in Part 1 of the Guidelines as a drainage feature that is:

- *"Part of a drainage network or*
- *A groundwater seepage area or spring, or*
- *A connected headwater wetland (a surface outlet connects to downstream),* ***and***
- *not a mapped or known perennially flowing stream*[1]*."*

The evaluation of the feature requires the collection of various data, habitat descriptions, fish community sampling and amphibian surveys. The surveys completed for this file and methods used are discussed in the next section.

[1] Taken from page 7 of the Guideline

Figure 1: General Location of Study Area

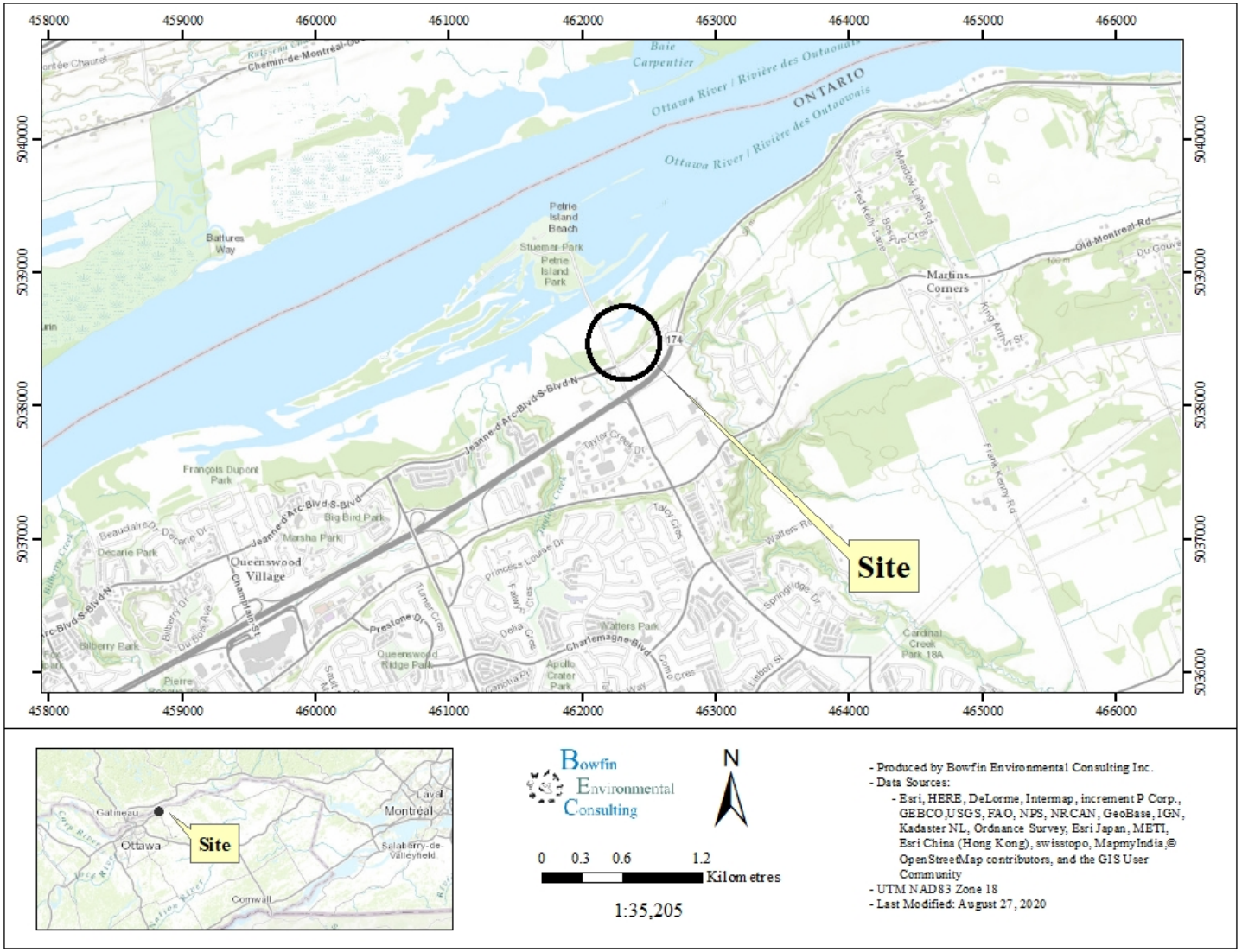
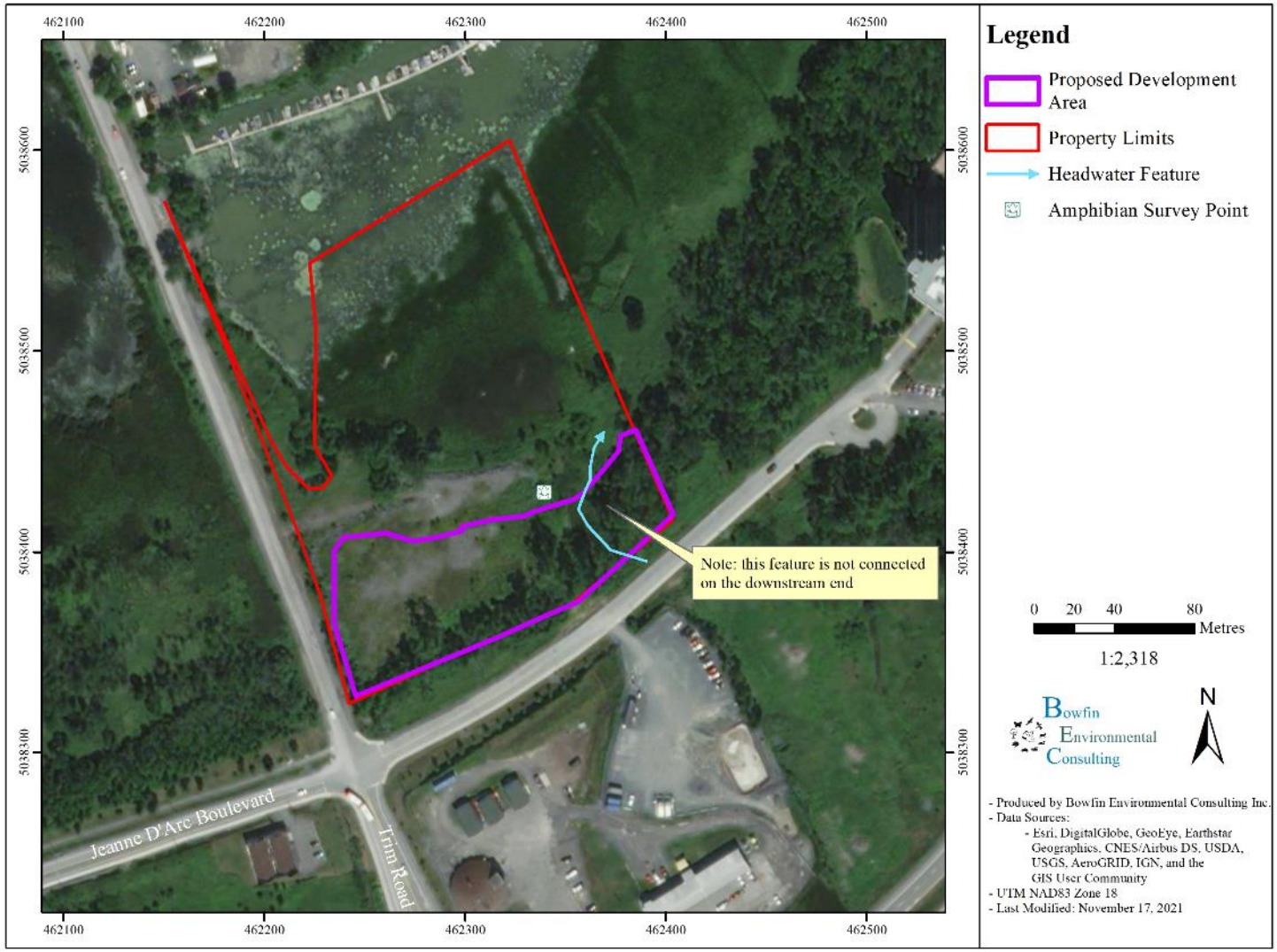


Figure 2: Location of Headwater Features and Survey Stations



2.1 Habitat Description

The potential headwater feature on the subject property did not have a defined channel on site and as such, its description was completed following the *Ontario Wetland Evaluation System* (OWES).

2.2 Fish Community Sampling

During the initial visit, it was confirmed that this feature is not connected to the Ottawa River during the spring or any other time of the year (Figure 3). Further, the upstream portion of this feature was severely impacted by the City influencing the habitat present on site. Finally, there was no water available for fish community sampling. No fish community sampling took place.

2.3 Amphibian Surveys

Nighttime amphibian calling surveys were completed as per the *Environment Canada Marsh Monitoring Program* (MMP) guide. The protocol is summarized below:

- The surveys were completed 3 times during the spring and early summer (once during each of the three survey periods to collect data on all species).
- Observations began 30 minutes after sunset and end before midnight.
- Each station was surveyed for 3 minutes during which time the species and the calling code were recorded for each of the following distances: 0-50m, 50-100m, and >100m. Additional notes were taken on whether amphibians were in the feature being assessed. The calling codes were recorded as one of:
    - Code 1: Calls not simultaneous, number of individuals can be accurately counted
    - Code 2: Some calls simultaneous, number of individuals can be reliably estimated
    - Code 3: Full chorus, calls continuous and overlapping, number of individuals cannot be reliably estimated
- Surveys were only conducted if the wind strength was Code 0, 1, 2 or 3 on the Beaufort Wind Scale.
- The MMP protocol calls for the stations to be separated by at least 500 m however, in this instance, the stations were positioned to capture the amphibian data on the various headwater drainage features and as such, some stations were closer.

All surveys include the recording of the following information:

- Date
- Name of observer(s) conducting field work
- Time (start and end time, duration)
- Weather conditions (temperature, % cloud cover, wind)
- GPS location

- Species presence and abundance information

3.0 PART 1: DESCRIPTION OF THE FEATURE'S HABITAT from BACKGROUND REVIEW and SITE INVESTIGATIONS

3.1 Headwater Feature Conditions (Past and Present)

There were no potential headwater features identified for the western portion of the proposed development area , but one was noted within the eastern portion of the proposed development area. From what can be observed on readily obtainable satellite and air photo imagery (google and GeoOttawa), there was no feature prior to the construction of Inlet Private. Even after its construction, there was still no sign of downstream connection to the Ottawa River. By 2005 the infilling of the 1009 Trim Road property began and the available images (which only provide a snapshot in time) suggests that the initial activities impacted the lands from Trim to at least 155-180 m to the east. This would have affected any flow patterns from the Inlet Private culvert towards the Ottawa River, pushing the flow further towards the east. Regardless, as verified during site investigations, there continued to be no downstream connection. This is in contrast to another feature, located offsite to the east, that is situated within a defined valley lands that ends just south of the PSW. While that feature's flow is absorbed into the marsh (no defined channel through the marsh) it does have a continues channel with sorted material throughout the remainder of the feature.

The habitat within the onsite feature meets the definition of wetland based on the *Ontario Wetland Evaluation System* (OWES), though it does not meet the minimum size criteria for the vegetation community to be described or assessed (minimum size requirements is 0.5 ha for description and, typically, 2 ha for assessment). The vegetation within this pocket with wetland features consisted of cattails and purple loosestrife over clay. Water depths, when present, were always less than 10-15 cm.

This potential headwater begins south of Inlet Private. However, in 2020 the City of Ottawa cleared the vegetation and left bare soil throughout and along the banks of this upstream portion. Further, a hose was present suggesting that pumping was occurring. More recently, the upstream end has been altered for the construction of the new Trim Road alignment. It is assumed that it could receive some flow from the road ditches upstream.

3.2 Review of Feature and Guidelines Definition

Comments from other members of the consulting team for 1009 Trim Road, indicate that the feature's catchment meets the minimum and does not exceed the maximum thresholds. However, it has characteristics of wetland feature without a downstream connection. Even during the historical flood levels of spring 2017, the Ottawa River water levels did not reach the

downstream end of the wetland pocket (Figure 3). The Ottawa River levels, remained below the reed canary on clay table lands. Because of the lack of downstream connection, it does not meet the definition of a headwater feature under the guidelines. The lack of a downstream connection could be attributed to the fill and the low volume of water exiting the Inlet Private culvert to the area in question. Any water that may have flowed through the Inlet Private culvert could have been retained by the fill (which curls around the downstream end). From there it could have percolated through the fill (the fill on the west side of the feature is gravel/rock) or been absorbed by the vegetation. However, since there was no connection noted in the background review, prior to the fill, it seems more likely that there has simply never been sufficient flow to create a headwater feature.

Photo 1: Headwater feature looking upstream from Jeanne D'Arc boulevard (May 21, 2020)

Photo 2: Headwater feature looking downstream from Jeanne D'Arc boulevard (May 21, 2020)

Figure 3: Satellite imagery showing water levels on April 22, 2017 (historical flood levels)

3.3 Summary of Visits and Sampling Site Locations

Several visits were completed between April and August 2020. The pertinent visits to this report are those visits associated with gathering information on amphibians and the presence of surface water in the area examined as a possible headwater. The only other item worth noting, is that the reed canary grass tablelands were walked repeatedly, and no surface water was ever present. Environmental conditions for each visit are described in Table 1 below.

Table 1: Summary of Dates, Times of Site Investigations

Date	Time (h)	Staff	Air Temperature (Min-Max) °C	Cloud Cover (%) Beaufort Wind Scale [Descriptor (scale)]	Rainfall 7 days Prior to Visit (mm)	Purpose
April 29, 2020	1845-2115	M. Lavictoire	14.0 (1.9-16.8)	Overcast, gentle breeze (3) changing to overcast, light rain, light air to light breeze (1-2)	0.4	- HDF Flow Visit #1 -Amphibian Survey #1
May 19, 2020	2200 - 2215	C. Fontaine A. Yates	16.0 (7.9-19.5)	20% cloud cover, gentle breeze (2)	n/a	-Amphibian Survey #2
May 21, 2020	1330-1500	M. Lavictoire	24.0 (8.1-24.8)	Gentle breeze (3)	24.2	- HDF Flow Visit #2
June 16, 2020	2015-2130	S. Lafrance A. Yates	22.0 (8.7-27.3)	Clear skies, calm (0)	n/a	- Amphibian Survey #3
July 27, 2020	0915-1315	C. Fontaine	20.0-30.0 (23.2-31.6)	Light rain, light air (1) changing to overcast, light breeze (2)	2.7* (note 6.3 mm rain fell on this day prior to and during visit)	- HDF Flow Visit #3

M. Lavictoire – Michelle (Nunas) Lavictoire – B. Sc. Wildlife Resources and M.Sc. Natural Resources
S. Lafrance – Sophie Lafrance – B.Sc. Biology and Graduate Certificate in Ecological Restoration
C. Fontaine - Cody Fontaine - Fisheries and Wildlife Technologist
A. Yates – Abby Yates – B.Sc. Env. Ecology

**Min-Max Temp Taken and Rainfall From: Environment Canada. National Climate Data and Information Archive. Ottawa International Airport. Available https://climate.weather.gc.ca/ [August 11, 2020]

4.0 PART 2: HEADWATER DRAINAGE FEATURES CLASSIFICATION

4.1 Feature Type

The classification of the feature type is an important step in determining the hydrological and terrestrial (read amphibian) functions as well as the recommended management. As per the Guideline, the OSAP section S4M10 Table 2 is used for the choosing of a feature type. The rational for the choice for this site is provided in this report's Table 2, below.

Table 2: Description of Feature Type based on Guideline (OSAP Table 2 in S4M10)

Feature ID	Feature Type (Code) from Guidelines	Comments/Modifiers
1	Channelized/ Constrained (2) (Upstream) Wetland (6) (Downstream)	The upstream end (City lands) is channelized but has been impacted by the City. Downstream of Inlet Private, the vegetation is cattails and purple loosestrife. Bowfin took soil samples but only the top layer of soil was collected to define edge of rock fill. No information on mottling or water table was gathered. That information is required to assign a soil moisture regime. The soil was clay. It is assumed that the soil is hydric. The background information suggests that this area was constructed, and the feature is constrained by the fill and the treed banks but there is no dug channel (such as that seen on the upstream side). There is no natural channel, and the water does not continue downstream. There is no substrate sorting. There is seasonal water and possible groundwater upwelling or collection of water from fill. The possible groundwater was noted at the very end of the feature and in an area that was impacted by fill (soil). The presence of the rock fill, in the lands west and north of the feature, may also influence the surface water in the drain.

4.2 Hydrology Classification

In Step 1 the flow is classified based on the data recorded during the three flow visits. These are summarized in Table 3 (as per OSAP S4.M10). To put the flows observed into context, a summary of the snowpack and rain during the seven days preceding the visits is provided below. This is followed by background information provided by RVCA and discussion on RVCA and Bowfin's findings.

The winter of 2019-2020 was unusually mild, with lower-than-average snowfall (just under 200 cm by early April), resulting in a below average snowpack. By early April, there was little amount of snowpack left across the Ottawa Area. There were a few snowfall events in mid-April, but all snow was gone by late April. The Rideau Valley Watershed remained in flood warning conditions from late March to early May. Water levels remained average until early June, when a minor low water status was put in place until mid-July, when it became moderate. The amount of rainfall recorded in the seven days preceding each station visit is summarized in Table 1.

As noted above, the City of Ottawa impacted the headwater feature upstream of Inlet Private. For this reason, the Rideau Valley Conservation Authority (RVCA) was contacted to find out if they had any information collected prior to this disturbance. RVCA provided their data recorded in 2014 and 2017 (Appendix A). Their data noted that it had minimal flow on their April 18, 2017, visit, which they considered a freshet visit (Appendix A). Their summer data was from 2014 and noted that the feature was dry on the upstream side.

The lack of flow in this feature is also supported to the conditions on-site. While there is a short, south to north constructed passage through the Ottawa River valley[2] immediately north of the road, this was not continuous to the Ottawa River. Instead, there was only the flat tablelands. There was no evidence of any channel being carved through the vegetation. It is noted that the review of imagery from GeoOttawa did not indicate the presence of a south to north valley or channel prior to the construction of Inlet Private. The end of the headwater feature is depicted on Figure 2, and is accurate. There is no downstream connection.

It is noted that there was no water in the feature, where surveyed, during the second visit conducted by Bowfin in 2020. This was within roughly 45 m of the culvert and at the culvert itself. Notes from the staff from the summer visit identified water present, but they also indicated that it had been raining prior to and during the start of their visit. Soil samples (hand auger) collected in the feature indicated that the ground (outside of the rock fill) was clay. As

[2] The Ottawa River valley is represented by the steep banks running west to east

such it is not a recharge area. The potential groundwater noted in November did not contribute to any downstream habitat (no connection to Ottawa River) and served no ecological function (see further below, no fish or amphibian habitat).

Photo 3: Headwater Drainage Feature Culvert (downstream side) (April 29, 2020)

Table 3: Hydrology classification features using data from OSAP S4.

Feature	Definitions of Flow Influence	Flow Conditions	Feature Type Code	Comments/Modifier	Hydrology Classification
Feature 1	Spring freshet or rainfall events	Standing water (2)	Channelized/ Constrained (2) Or Wetland (6)	The standing water present during late summer visit may be due to 6.3 mm of rain occurring on the day of the visit or the result of groundwater. It is also noted that the soil was clay, and the site was adjacent to fill. It may be possible that the "groundwater" was the result of water slowly percolating through the fill. Note that iron staining, also a sign of groundwater, was observed along the road ditch of Trim Road heading north (also along the edge of fill).	Limited
	Late April - May	No surface water (1)			
	July - August	Standing water (2)			

Figure 4: Summary of Flow Conditions – Spring Freshet (April 29, 2020) and Late Summer visits (July 27, 2020)

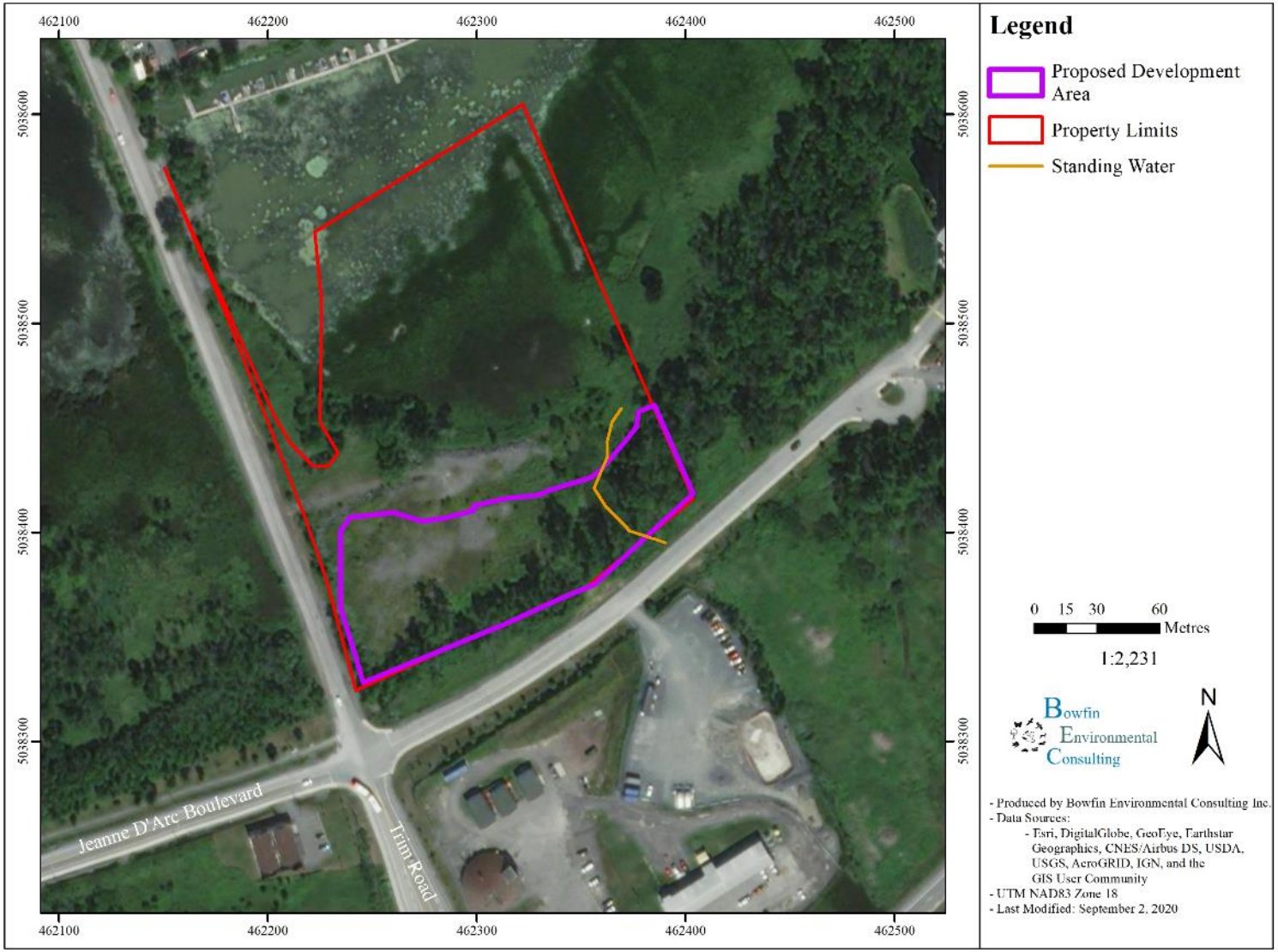
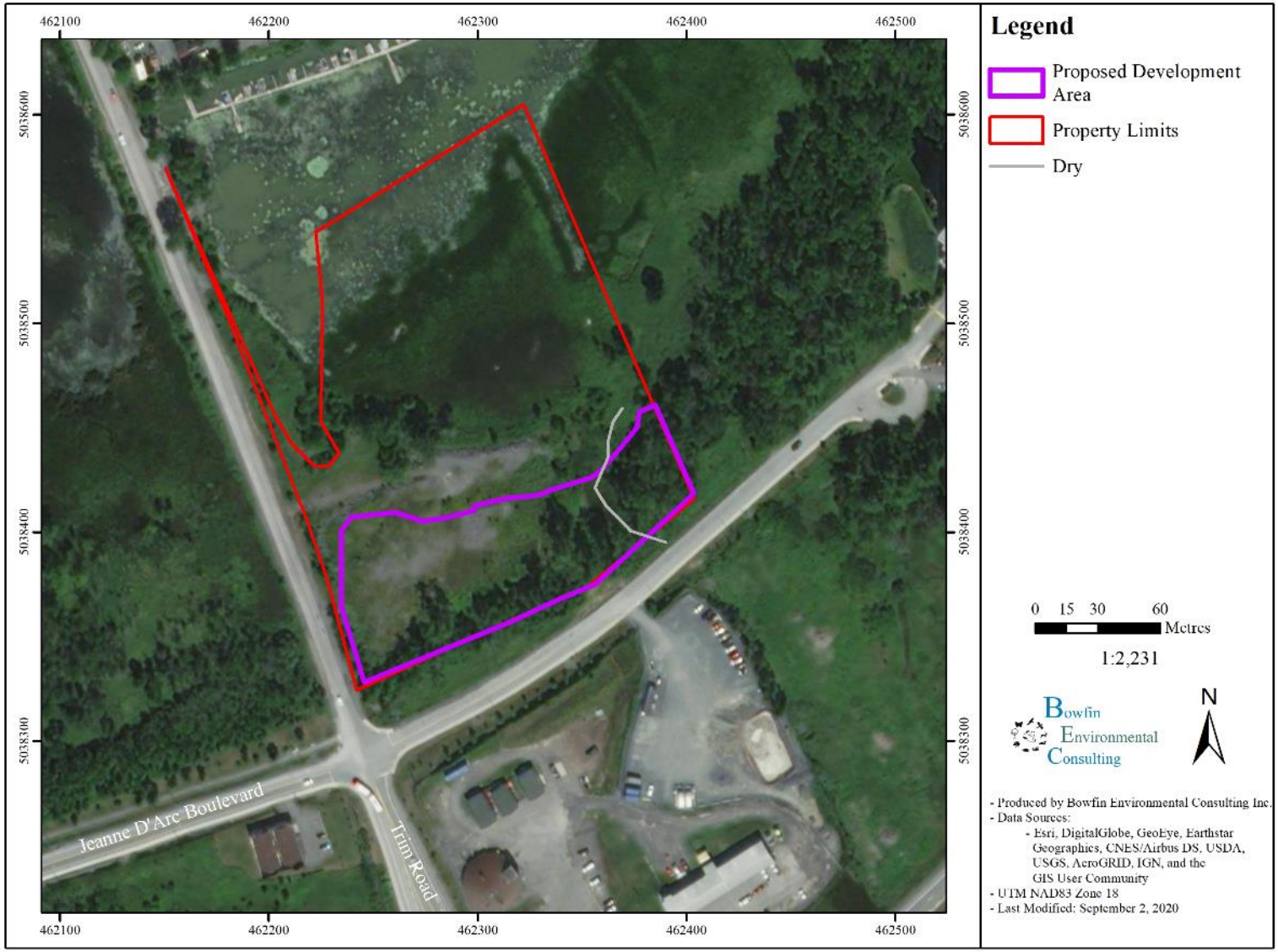


Figure 5: Summary of Flow Conditions – May visit (May 21, 2020)



4.3 Riparian Classification

In Step 2 the riparian habitat is classified based on the width and type of vegetation on the banks. These are summarized in Table 4.

Table 4: Riparian Classification

Feature/ Tributary	OSAP S4.M10 Code	Riparian Classification	Comments
Feature 1	None (1)	Limited	Upstream of Inlet Private, the City cleared all of the vegetation including the trees.
	Meadow (4) Forest (6)	Important	The remaining feature is surrounded by the cultural meadow on the rock fill and forested areas elsewhere.

4.4 Fish and Fish Habitat Classification

This feature is not connected to the Ottawa River. Once past the fill, it veers to the east and there is no distinct channel. The feature itself is not defined and is chocked with emergent vegetation. This feature does not provide fish habitat and, with little water leaving the site, it does not contribute water to downstream fish habitat in the Ottawa River. This particular feature does not meet any of the categories of the guidelines.

4.5 Terrestrial Habitat Classification

This step is more of a classification of amphibian habitat than of the terrestrial habitat. According to the guidelines, only those features associated with wetland habitats can be considered Important or Valued. Features classed as Contributing are those that may or do provide a linkage between habitat for wildlife movement and Limited is given to those that do not meet any of the above criteria.

The MMP amphibian monitoring protocol was followed with the extra step of identifying whether amphibians were calling from a specific feature or not. No amphibians were heard calling in the feature, and it does not serve as a connection (lands to the south are developed), resulting in a limited function classification. As a side note, one spring peeper was heard in the wetland near the Ottawa River on May 19, 2020. Two gray treefrogs and one green frog were heard across Inlet Private on June 16, 2020 (Appendix B).

Table 5: Terrestrial Habitat Classification

Feature/ Tributary	OSAP S4.M10 Code	Marsh Monitoring Protocol Calling Code	Comments	Classification
Feature 1	Channelized/ Constrained (2) Wetland (6)	0	No calls within the feature.	Limited

5.0 PART 3 – MANAGEMENT RECOMMENDATIONS

The management recommendations are grouped into six categories: Protection, Conservation, Mitigation, Maintain Recharge, Maintain/ Replicate Terrestrial Linkage, and No Management Required. The key functions that determined the management recommendations for each headwater or reach are highlighted in green in Table 6, it is these functions that should be managed.

The area of the site that received limited drainage from the Inlet Private culvert was examined as headwater feature. The area has been impacted historically and by recent developments. From what can be observed from background images, there was no feature prior to the construction of Inlet Private. After its construction, there was still no sign of downstream connection to the Ottawa River. This is in contrast to another feature, located offsite to the east, that is situated within a defined valley lands that ends south of the PSW. While that feature's flow is absorbed into the marsh (no defined channel through the marsh) it does have a continues channel with sorted material throughout the remainder.

More recently, on the upstream side, the City completely removed all vegetation and left it as bare soil in 2020. They also had a hose and were pumping to the stormwater system. As such, apart from extremely minimal flow in the spring, there was no water originating from the upstream end of the culvert. The 2017 RVCA data confirms those of 2020. Regardless of the impacts on the upstream side, the hydrological classification for this system would have been Limited. However, the management recommendations depends on the feature type code.

The RVCA defined the feature as Channelized/Constrained on the downstream side (Feature Type 2 see Appendix A). They did not have access to the downstream channel and would have likely based their classification from the road (Inlet Private) and desktop review. As mentioned above, the feature did not appear to exit prior 1976, when Inlet Private was constructed. The

construction of a culvert at this location likely included digging a channel through the valley for passage of flow, and along with the fill further down, could be what the RVCA was identifying as constrained. There was no "channelizing" of a feature though, as there was no dug channel. There is also no natural channel. Any water that may have flowed through this culvert seems to have been retained by the fill (which curls around the downstream end). From there is must have percolated through the fill or been absorbed by the vegetation. There is now cattails and purple loosestrife on clay fill. There is no outlet channel. As such, this feature does not provide fish habitat (direct or indirect), does not contribute sediment or allochthonous materials to downstream fish habitat, surveys found no amphibian or reptile use of the feature. Without a downstream connection, this feature would be classified as an Unconnected Wetland and would not be subject to the Guidelines or their recommendations.

6.0 CONCLUSION

A single potential headwater feature was identified at the 1009 Trim Road site. This feature did not appear on any background images reviewed until after the construction of Inlet Private. During that work, the banks of the Ottawa River would have been opened to allow flow from the newly installed culvert to continue downstream. Prior to 2005, when infilling began, the images found still did not suggest any downstream connection to the Ottawa River. After 2005, the fill would have pushed any flow further east or forced it to percolate through the fill or become absorbed by the vegetation. Regardless, there was still no channel downstream of the fill, even in 2020. Based on this, the feature does not meet the definitions of a headwater as it is a pocket with some wetland characteristics without a downstream connection.

Despite the feature not meeting the headwater definitions, work completed to date, as part of the natural heritage assessments, has identified recommended enhancement measures for the shoreline. This will include the removal of fill from some of the shoreline, thereby creating new wetland habitat, and the revegetation of the banks. These enhancement works are being developed and will form part of the review with the RVCA and City of Ottawa as part of a separate document.

7.0 REFERENCES

Environmental Guide for Fish and Fish Habitat. Ministry of Transportation (MTO), October 2006

Evaluation, Classification and Management of Headwater Drainage Features Guideline. Toronto and Region Conservation Authority and Credit Valley Conservation, TRCA Approval July 2013 (Finalized January 2014).

OMNR. (2014). Ontario Wetland Evaluation System 3rd. Edition Version 3.3. viii + 284pp.

Ontario Stream Assessment Protocol – Section 4: Module 10 – Assessing Headwater Drainage Features. L. Stanfield et al., March 2013.

RCVA 2017. Petrie Island Survey Results. April 2017

Table 6: Evaluation, Classification and Management Summary

Feature	Hydrology Classification	Riparian Classification	Fish and Fish Habitat Classification	Terrestrial Habitat Classification	Management Recommendation
Feature 1	Limited	Limited (upstream) Important (downstream)	None	Limited	Not Applicable

Appendix A: RVCA Data (April 18, 2017)

The Rideau Valley Conservation Authority (RVCA) which shows that during their freshet visit, there was minimum flow in the downstream side of the feature (flow code of 4 is minimum flow).

CSW423 West feature Downstream view on Inlet Private (spring vs. Summer)

Photo #	Photo Name	Photo #	Photo Name	Downstream Site Length (m)
				20

Downstream Feature

Type	Flow	Sediment Transport: Adjacent	Sediment Transport: Feature	Sediment Deposition	Width MT	Feature Width (m)	BF Depth (mm)	Entrenchment Width (m)	Perched Ht (mm)	Jumping Ht (mm)	Feature Roughness	Feat. Veg	Riparian Vegetation 0-1.5 m Left	0-1.5 m Right	1.5-10 m Left	1.5-10 m Right	10-30 m Left	10-30 m Right	Downstream Longitudinal Gradient: Method Used	Distance (m)	Elevation Rise (°)
2	4	1	1	2	3	9.5	/	/	190	150	4	6	5	5	5	5	7	7	2	6.6	8

Downstream Flow Measure — Record EITHER Hydraulic Head OR Volume OR Distance

Wetted Width (m)	Depth (mm) 1	Depth (mm) 2	Depth (mm) 3	Hydraulic Head (mm) 1	Hydraulic Head (mm) 2	Hydraulic Head (mm) 3	Volume (litre) 1	Volume (litre) 2	Volume (litre) 3	Distance (m) 1	Distance (m) 2	Distance (m) 3	Time (sec) 1	Time (sec) 2	Time (sec) 3
0.2	20	20	10	0	0	0									

Upstream & Downstream Site Features

	Category Value	Comments
Major nutrient sources upstream	1	ALGAL GROWTH US + DS
Potential contaminant sources upstream	4	
Channel hardening	4	
Dredging or straightening	2	MAY HAVE BEEN HISTORICALLY ALTERED
Barriers and/or dams in proximity	4	PERCHED CULVERT
On-line ponds upstream	4	
Springs or seeps at the site	4	
Evidence of channel scouring/erosion	4	
BMPs or restoration	4	

CHANNEL CONNECTIVITY (to downstream)

- ⊗ Surface
- ○ Unconnected

Connected (Surface): A surface water flow connection is apparent from the donating feature to the downstream watercourse with existing or potential overland flow.

Unconnected: A water flow feature that is not connected to the drainage network except by groundwater infiltration. These features drain to kettle wetlands or ponds etc., that have no outlet to the drainage network except via groundwater.

SITE FEATURES – CATEGORY VALUE
(1) ONGOING & ACTIVE
(2) HISTORICAL EVIDENCE
(3) NO EVIDENCE BUT REPORTED
(4) NO EVIDENCE
(5) UNKNOWN
(6) RECOMMENDED BMP

Downstream Comments

CULVERT DEGRADED + PERCHED

Crew Leader (initial & last name)	Crew	Recorder
J ROBERTS	RCE, LH	JR

Appendix B: Amphibian Results

Features	Amphibian Station	Visit 1 April 29, 2021 (Species, #)		Visit 2 May 19, 2021 (Species, #)		Visit 3 June 16, 2021 (Species, #)	
		In feature	In adjacent habitat	In feature	In adjacent habitat	In feature	In adjacent habitat
HDF 1	**1**	None	None	None	SPPE, 1	None	GREEN, 1 GRTR - 2

SPPE – Spring Peeper
GREEN – Green frog
GRTR – Gray Treefrog

Figure 6: Amphibian Survey Results