

Memorandum

To Vince Deschamps Page 1

CC

Subject Fisheries Survey – Uppers Property near Thorold (Walker Aggregates)

From Caroline Boros, Nick Hodges

Date June 16, 2010 Project Number 60119472

1. Introduction

AECOM was retained by Walker Aggregates to conduct a fisheries assessment on the unnamed tributary flowing through the centre of Walker Aggregates Uppers land parcel. The intention is to re-align the creek to allow for expansion of the aggregate extraction operations.

The goal of this document is to provide a description of the unnamed tributary in terms of ecological function and significance and sensitivity to the proposed works as it relates to fish and fish habitat. The 2010 survey results are compared to the 2008 fish habitat survey results with habitat conditions updated accordingly. The 2008 survey was conducted in September. The intention of the 2010 surveys was to document early- and mid-spring conditions in the tributary. Accordingly, the 2010 surveys were conducted in the months of March and May.

Key considerations to obtaining approvals required for relocation of the stream are provided at the end of this memo.

2. Methods

2.1 *Secondary Source Review*

Information on fish habitat and potential fish community composition was obtained through review of secondary source material from the following sources:

- Ontario Natural Heritage Information Centre on-line database;
- Niagara Region Conservation Authority (NPCA); and
- Aerial photography

2.2 *Field Investigations*

AECOM biologists conducted the fish habitat survey on March 26, 2010. During this survey various habitat features were documented, including:

- Instream cover;
- Bank stability;
- Substrate composition;
- Stream morphology;
- Barriers to fish;
- Canopy cover;
- Aquatic vegetation; and,
- Riparian vegetation

Documentation of these features was necessary as it aids in the identification of critical habitat within the tributary such as spawning, nursery, feeding and migratory habitat.

The habitat assessment was completed along the entire length of the tributary within the borders of the Uppers land parcel. A photographic record of the study area was documented during the field survey and is shown in Appendix A.

AECOM biologists conducted the fish community survey on May 27, 2010. The survey was completed using a backpack electrofisher, and fish were released live to the stream following identification. The intention of the survey was to identify the present species and infer the type of fish community present.

The survey was conducted along the entire tributary within the borders of the Uppers land parcel where sufficient water was present. Records of all fish caught are listed in section 3.

3. Results

3.1 *Fish Habitat Assessment*

During the March 26, 2010 fish habitat assessment the tributary was observed to be a meandering channel with a substrate consisting of fines and organic muck (photos 1-9, Appendix A). Flow conditions appeared to be intermittent with seasonal low flow barriers beginning approximately 150 meters (m) south of Uppers Lane. Isolated pools and wet stream reaches continued south to the boundary of the Walker land parcel.

At the northern edge of the property (ie. closer to the main Beaver Dams Creek channel) the unnamed tributary had an average width of 2.0-5.0 m and 0.25 m depth narrowing to 0.5-1.0 m width and 0.10 m depth until Uppers Lane where pooling occurs both upstream and downstream of the culvert present. The pools are approximately 7 m x 10 m and approximately 1.0-1.5 m deep (photo 5,6, Appendix A). South of Uppers Lane the tributary channel narrows to approximately 0.3 m with a depth of 0.05 m. Intermittent pools are found throughout the tributary and are approximately 0.5 m x

3 m with a depth of 0.15 m. The observed thermal regime averaged 20°C through the main channel, and 18°C in the pools located at the Uppers culvert.

Riparian vegetation was dense and dominated by cattail, iris and purple loosestrife. Other riparian vegetation present were grasses, willow and dogwood species. The width of the riparian area varied from approximately 2-30 m, creating dense canopy cover in some areas. The aquatic vegetation consisted mainly of emergent grasses and cattails providing 40 % cover. Banks were stable throughout the tributary.

Drainages into the tributary from the surrounding agricultural fields were noted to be ephemeral and photo-logged in Appendix B. Also, the pond noted on the aerial photograph south of Uppers Lane is no longer present; it appeared to be filled in (photo 7, Appendix B).

Contrary to what was observed in the 2008 fish habitat survey, the tributary appeared to be direct fish habitat for the entire length on property, and this was confirmed with a fish observed approximately 60 m from the south property border. Potential spawning habitat for northern pike occurred at the north end of Walkers property boundary as the channel was slightly braided and had an area of sedge hummocks which are preferred spawning habitat for this species.

3.2 Fish Community Assessment

The fish community assessment was completed through primary fish collection by electrofishing, as well as secondary source information.

Due to the low water conditions of the stream the electrofishing survey was conducted in the isolated pools present throughout the entire tributary located on the Walkers property. During the May 27, 2010 electrofishing survey the following species were captured:

Common Name	Scientific Name	Habitat Preference ¹	Thermal Preference	Spawning Months	Notes
Northern Pike	<i>Esox lucius</i>	clear, cool to warm, weedy bays of lakes and slow, meandering, heavily vegetated rivers; preferred water temperature range 17-21°C	Coolwater	March – May	All specimens caught were Young of Year and found throughout the tributary, excluding the pool at Uppers Lane.
Pumpkinseed	<i>Lepomis gibbosus</i>	warm, shallows of lakes and ponds, quiet, pools of creeks and small rivers, with aquatic vegetation and organic debris; preferred water temperature range 22-30°C	Warmwater	May – August	All specimens caught were found in the pool located at the Uppers Lane culvert
Brown Bullhead	<i>Ameiurus nebulosus</i>	pools and sluggish runs over sand to mud substrates in creeks and rivers, impoundments, ponds and lake embayments; preferred water temperature range 26-30°C	Warmwater	May-June	All specimens caught were found in the pool located at the Uppers Lane culvert

¹ Habitat preferences from Ontario Freshwater Fishes Life History Database (Eakins, 2008)

Based on the electrofishing survey results, the pool at Uppers Lane and adjacent creek habitat provide year-round habitat for warmwater species such as Pumpkinseed and Brown Bullhead.

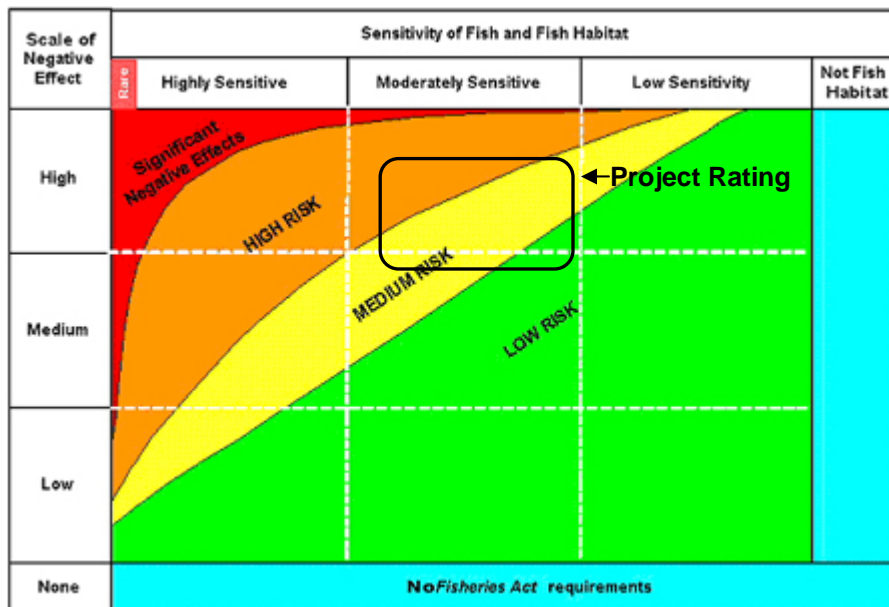
Northern Pike spawning occurred in the tributary in spring 2010 as evidenced by young of year (y.o.y.) observed throughout the entire tributary. This observation confirms there is direct fish habitat in the entire tributary on Walkers property; however, the number of y.o.y. pike that will be able to migrate back to the main channel of Beaverdams Creek is unknown as many of the fish were found in isolated shallow pools that will likely become dry through the summer months. Although the pool at Uppers Lane could potentially provide refuge habitat for northern pike the remainder of the tributary limits pike productivity due to seasonal low flows and lack of a forage fish base upon which the predatory pike species relies.

No species at risk, at provincial or federal level, were captured during AECOM's fisheries survey.

4. Department of Fisheries and Oceans Risk Assessment

As part of the Environmental Process Modernization Plan the Department of Fisheries and Oceans (DFO) have developed a Risk Management Framework (RMF) which allows for the streamlining of the approvals under the *Fisheries Act* for water works (DFO, 2005). This framework is intended to determine the level of risk associated with proposed works with respect to fish and fish habitat, and ultimately decided which avenue is most likely to proceed (ie. a Letter of Advice or DFO authorization). Below is the attempted categorization as seen by AECOM using the Risk Management Framework Matrix (Figure 2).

Figure 2. Project rating with reference to the Risk Management Framework Matrix



The unnamed tributary is defined as intermittent however, the habitat assessment showed suitable habitat that could be directly used by fish. The warmwater system contained adult species that can be considered resilient and common (Pumpkinseed and Brown Bullhead). However, the y.o.y.

Northern Pike found throughout the tributary indicates that spawning habitat is present for a coolwater species which increases the sensitivity of the habitat present. Ultimately, the sensitivity of the fish and fish habitat present can be considered Moderately Sensitive due to the presence of spawning habitat for Northern Pike.

The re-alignment of the tributary is considered be a High negative effect as the removal of the creek is a permanent loss of fish habitat. However, project risk is likely best categorized as Medium because it should be feasible to realign the stream and replace and/or enhance the habitat function it currently provides.

Due to the sensitivity, and high negative effect within the RMF this project will most likely be considered a Harmful Alteration, Disruption, or Destruction (HADD), thus requiring a DFO authorization.

5. Considerations for Channel Re-alignment

The initial survey completed in 2008 by AECOM referred to the tributary as having low quality of habitat, and the species sensitivities within the existing features, as extremely low. In light of the fish community survey conducted in May 2010 the sensitivity of fish habitat has changed from low to moderate. The system contains Northern Pike spawning habitat and therefore the scope of a channel design should reflect these conditions.

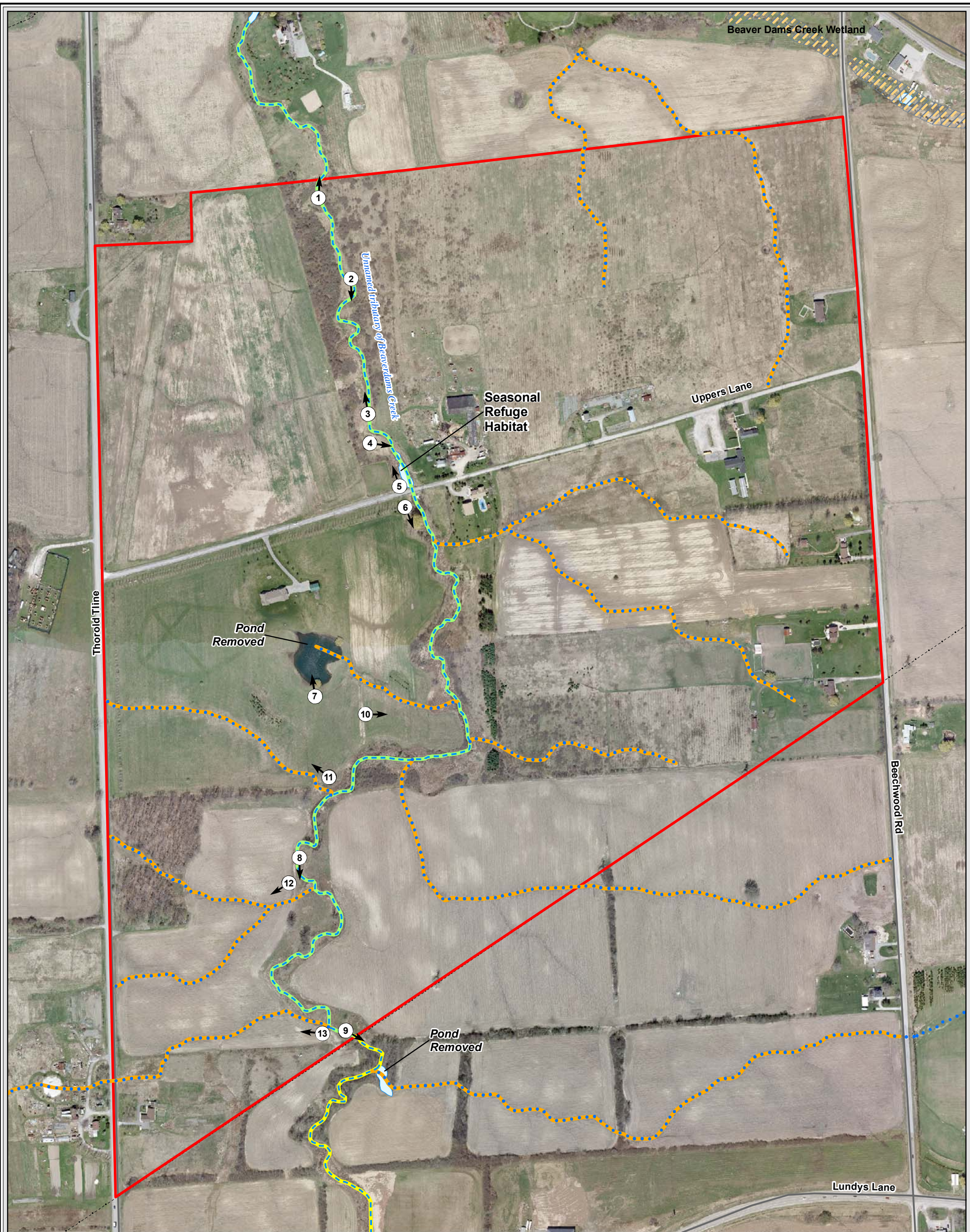
Considerations should also be given to topographical survey, fluvial geomorphology study, possible groundwater/surface water interactions.

6. Summary

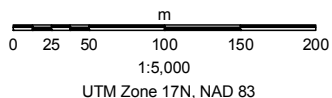
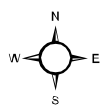
The unnamed tributary in the Uppers property near Thorold is an intermittent watercourse but can be considered direct fish habitat. Initially thought to be a tributary with low to no sensitive fish habitat, it is now observed to be a resource for fish habitat as well as spawning for a coolwater fish species, Northern Pike. Young of the year Northern Pike have been documented throughout the entire tributary.

The Department of Fisheries and Oceans has attempted to streamline approvals under the *Fisheries Act* by using the Risk Management Framework. When the sensitivity of the habitat and the scale of negative effect are considered this project is rated as a medium to high risk. This will likely result in a Harmful Alteration, Disruption or Destruction (HADD) of fish habitat and DFO authorization will be required for a stream relocation.

Figures



Basemapping from Ontario Ministry of Natural Resources
Orthophotography: 2006



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Legend

- Photo Location and Direction
- Ephemeral Drainage
- Intermittent Drainage
- Supports Seasonal Fish Habitat
- Fish Habitat Potential Not Assessed
- No Fish Habitat Potential
- Transmission Line
- Approximate Study Area
- Waterbody Segment
- Locally Significant Wetland
- Municipal Division

Walker Aggregates
Environmental Constraints Analysis

**Study Area and
Fish Habitat**

June 2010
Project 60119472



Figure 1

Appendix A

Tributary Photographic Log

- March 2010 Fish Habitat Survey
- May 2010 Fish Community Survey

- **March 2010 Fish Habitat Survey**



Photograph 1 ↑
Looking downstream at Northern border of property



Photograph 2 ↑
Looking upstream approximately 50 meters from Northern boarder of property



Photograph 3 ↑
Looking downstream approximately 35 meters north of Uppers Lane



Photograph 4 ↑
Looking upstream approximately 30 meters north of Uppers Lane



Photograph 5 ↑
North pool at Uppers Lane culvert



Photograph 6 ↑
South pool at Uppers Lane culvert



Photograph 7 ↑
Previous location of offline pond located on the property
South of Uppers Lane and West of the tributary



Photograph 8 ↑
Looking upstream approximately 130 meters from the
south border



Photograph 9 ↑

Looking upstream approximately 15 meters from the
south border

- May 2010 Fish Community Survey



↑
Looking upstream approximately 50 meters from the
northern property border



↑
Young of the Year Northern Pike



↑
Looking upstream approximately 30 meters north of
Uppers Lane



↑
Looking upstream approximately 100 meters north of
Uppers Lane



↑
Looking upstream approximately 120 meters north of
Uppers Lane



↑
Looking downstream approximately 50 meters north of
the southern property border



↑
Example of a low flow barrier found throughout the
tributary

Appendix B

Drainage Features Photographic Log



Photograph 10 ↑

Depression area where drainage from the pond previously located south of Uppers Lane and west of the tributary



Photograph 11 ↑

Recorded drainage feature approximately 50 meters south of the pond previously located south of Uppers Lane and west of the tributary



Photograph 12 ↑

Drainage feature located west of the tributary and approximately 100 m north of the south property border



Photograph 13 ↑

Drainage feature located west of the tributary and approximately 35 m north of the south property border