MEMO

TO: Mark West, E.S. Fox Ltd.

FROM: Robin LeCraw, Senior Ecologist, WSP; Courtney Huber, Ecologist, WSP

SUBJECT: **Headwater Drainage Features Assessment – Parcel C Memorandum**

DATE: **March 30, 2023**

INTRODUCTION

WSP has been retained by E.S. Fox Ltd. to provide environmental services for the development of four parcels on Montrose Road and Grassy Brook Road in the City of Niagara Falls. The Study area designated as Parcel C is located on Grassy Brook Road, adjacent to (southwest of) the existing E.S. Fox facility, bounded by existing access roads on the east and west sides of the parcel. The parcel is not within any regulation area, with the exception of the northeast corner, and does not contain any other designated natural heritage features, therefore an Environmental Impact Study was not requested for this parcel through pre-consultation with the Region of Niagara, City of Niagara Falls, and Niagara Peninsula Conservation Authority (NPCA). However, within Parcel C, a drainage feature was identified in the Study Area through aerial imagery, which is regulated by NPCA. Therefore, to satisfy the request to characterize and assess all watercourses associated with the proposed developments, a Headwater Drainage Features (HDF) assessment was conducted following the Evaluation, Classification, and Management of Headwater Drainage Features Guidelines (TRCA, CVC, 2013), and the Ontario Stream Assessment Protocol (OSAP). This assessment characterizes and determines the appropriate management strategy for the HDF. Representative photos are attached to this memo.

BACKGROUND

The HDF assessment was conducted on Parcel C on April 12, 2022 following spring freshet and a rainfall event and followed by a secondary visit to observe baseflow conditions on September 1st, 2022. The watercourse was determined to contain very shallow (0.5 – 1.6 mm) standing water in the spring of 2022, and was dry by early September 2022.

The assessed feature is a straightened channel conveying stormwater along the perimeter of the E.S. Fox Ltd. Facility from Parcel C to the Welland River. The drainage feature originates as flows concentrated through stormwater pipes below the E.S. Fox Ltd parking lot and beneath the fabrication building approximately 15 m north of the Study Area. The main channel flows from east to west parallel with the northside of the Study Area for approximately 115 m before it makes a 90 degree turn north. The drainage feature continues to the north and joins with several other stormwater outlets from the E.S. Fox Ltd fabrication building outside of the Study Area. The mapped watercourse eventually discharges to the Welland River approximately 475 m downstream of the Study Area. The entire length of the assessed reach has been channelized and is not naturally occurring.

The drainage feature meets the criteria of a HDF in the HDF Guidelines (TRCA, CVC 2013). Namely HDFs are defined with the following characteristics:

- non-permanently flowing drainage features
- may not have defined bed or banks
- first-order and zero-order intermittent and ephemeral channels, swales and connected headwater wetlands
- part of the drainage network (i.e. drainage channels that are identified from aerial photography, and/or drainage lines result from ArcHydro analysis)
- a connected headwater wetland (a surface outlet connects to downstream)
- does not include rills, furrows or mapped or known perennially flowing streams.

EXISTING CONDITIONS

The HDF assessment involved a spring visit on April 12, 2022 to identify HDF characteristics during spring freshet as per the OSAP Headwater Drainage module. A September 1, 2022 site visit was conducted to confirm the state of the drainage feature during summer conditions. Additionally, subsequent data regarding hydroperiod and vegetation later in the spring and summer were collected during site visits for vegetation and wildlife surveys (May 17, July 11, and September 7, 2022).

As shown in Figure 1, the HDF was divided into three distinct reaches;

- Reach 1 is the channelized section running through the phragmites (*Phragmites australis subsp. australis*) community along the north boundary of the Study Area, originating from the east parking lot pipe outlet to the downstream CSP culvert crossing.
- Reach 2 is the straight open channelized section running north, parallel with E.S. Fox fence.
- Reach 3 begins at the end of the E.S. Fox fence between the open channelized reach and the Welland River.

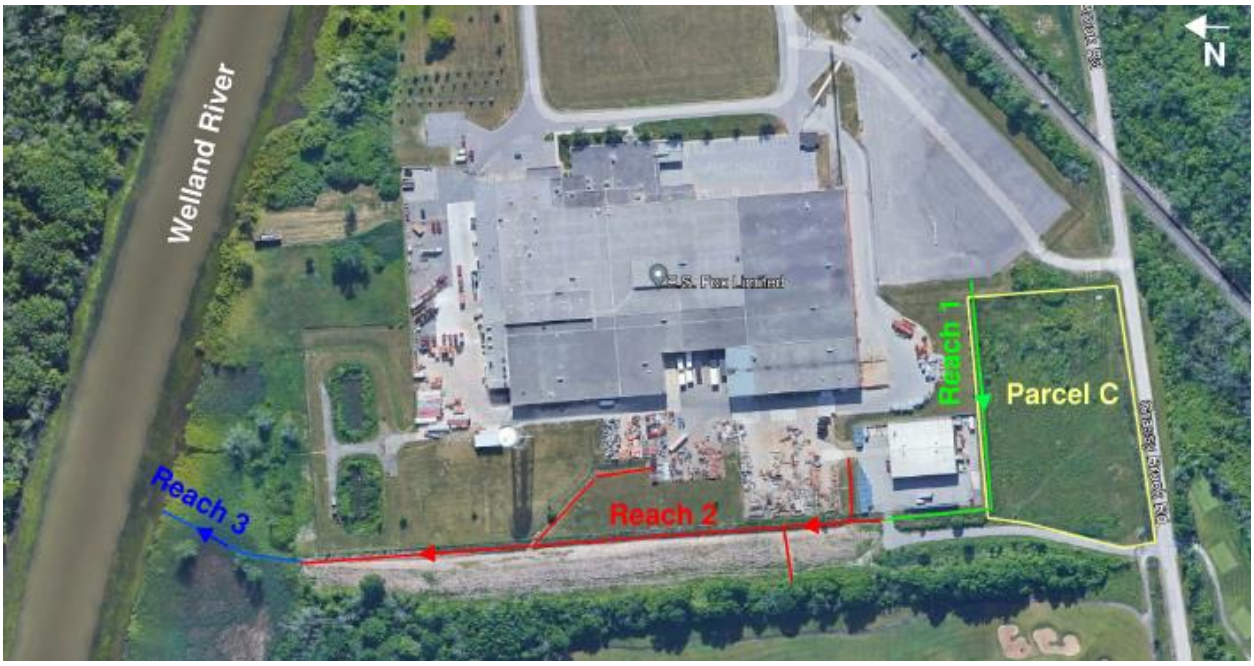

Figure 1. The HDF Classification Reaches

At the April 12 site visit, Reach 1 was identified as a phragmites dominated channel, with very little flow. The feature width was measured 0.3 m, with a bankfull width of 4 m, and a feature water depth of 1.6 cm. There was no evidence of sediment transport or deposition, and the feature had 100% cover from dense phragmites vegetation. Riparian vegetation up to 30 m was identified as meadow, manicured lawn and asphalt.

Reach 2 was defined as an open channelized reach that had been excavated and straightened to run parallel with the E.S. Fox fenceline. There was little flow during the April 2022 assessment. As a result of the excavation, areas of sediment transport and minor deposition was observed as little vegetation cover has established. The main channel in Reach 2 was measured to have a feature width of 0.8 m, with a bankfull width of 6 m and water depth of 1.5 cm. The feature has 20% cover from phragmites vegetation and grasses scattered throughout. The riparian vegetation up to 30 m is meadow on the west and manicured lawn along the east of the main channel. The feature had three drainage channels that converge with the main channel. Two from the east, originating from beneath the E.S. Fox structure, and one from the west originating from the golf course treeline.

Reach 3 was an undefined channel through a wetland feature, dominated by dense phragmites, and is considered to be part of the Welland River East Wetland Complex. The feature had little flow and no evidence of sediment transport or deposition. The feature width was estimated at 12 m however no flow was observed. Standing water was pooled in the feature and was approximately 0.5 cm deep. The riparian vegetation up to 30 m is wetland and abuts the Welland River to the north. Data from the May 17, 2022 site visit by WSP ecologists confirmed that this HDF is dry by late spring. Wetland vegetation (phragmites) persists in Reach 1, and Reach 3, however the dense vegetation and the lack of a defined channel at Reach 3 specifically limits fish movement from the Welland River upstream. There is no direct fish habitat within this HDF, for the purposes of the HDF evaluation, it is assumed that it contributes to downstream fish habitat in the Welland River.

CLASSIFICATION, EVALUATION & MANAGEMENT

The HDF was classified in terms of the importance of four types of function as per the TRCA / CVC HDF Guidelines: Hydrology, Riparian, Fish and Fish Habitat, and Terrestrial Habitat. Based on those classifications, the recommended management level for the HDF was determined following the decision-making tool in the HDF Guidelines. The classification is summarized in Table 1 below.

Table 1. Summary of HDF Classification and Management Evaluation

Reach	Function	HDF Code / Description	Classification	Management Recommendation
Reach 1	Hydrology	FT = 4, FC = 4 Ephemeral, channel with standing water in early April	Contributing Functions	**Conservation**
	Riparian	RC = 7 Wetland features (Phragmites)	Important Functions	
	Fish and Fish Habitat	No fish habitat present	Contributing Functions	
	Terrestrial Habitat	FT = 7 (swale)	Limited Functions	
Reach 2	Hydrology	FT = 4, FC = 4 Ephemeral, channel with minimal water in early April	Contributing Functions	**Mitigation**
	Riparian	RC = 4 Meadow riparian vegetation	Valued Functions	
	Fish and Fish Habitat	No fish habitat present	Contributing Functions	
	Terrestrial Habitat	FT = 7 (swale)	Limited Functions	
Reach 3	Hydrology	FT = 4, FC = 4 Ephemeral, channel with standing water in early April	Contributing Functions	**Protection**
	Riparian	RC = 7 Wetland features (Phragmites)	Important Functions	
	Fish and Fish Habitat	No fish habitat present	Contributing Functions	
	Terrestrial Habitat	FT = 6 (wetland)	Important Functions	

SUMMARY

Reach 1, adjacent to Parcel C, proposed for development, is assessed at the **Conservation Management Level**. The following guidelines are in place for Protection of HDFs:

- Maintain, relocate, and/or enhance drainage feature and its riparian zone corridor;
- If catchment drainage has been previously removed or will be removed due to diversion of stormwater flows, restore lost functions through enhanced lot level controls (i.e. restore original catchment using clean roof drainage), as feasible;
- Maintain or replace on-site flows using mitigation measures and/or wetland creation, if necessary;
- Maintain or replace external flows,
- Use natural channel design techniques to maintain or enhance overall productivity of the reach;
- Drainage feature must connect to downstream

The proposed development and site plan should adhere to the above stated management requirements to avoid any negative impacts to the functions of the HDF as they relate to retention, transport and quality of water and sediments between Parcel C and the Welland River.

Photo 1: Reach 1 looking east at the origin of the drainage channel from the E.S. Fox Ltd. Parking lot.

Photo 2: Reach 1 looking east from northside of Parcel C at the dense phragmites channel.

Photo 3: Reach 1 looking west along the northside of Parcel C at the channel and manicured lawn.

Photo 4: Reach 2 looking south from the centre of the channel at the convergence of a secondary drainage channel from the E.S. Fox facility.

Photo 5: Reach 2 looking north along the E.S. Fox Ltd fence line towards the Welland River.

Photo 6: Reach 2 looking south from the north end of the E.S. Fox fence.

Photo 7: Reach 3 looking north at the undefined channel between Reach 2 and Reach 3.

Photo 8: Reach 3 looking northwest at the phragmites area (~30 wide) along the Welland River.

E.S. Fox Ltd. – Headwater Drainage Feature Assessment

REPRESENTATIVE PHOTOGRAPHS

Date: April 12, 2022

Project No: 221-01147-00

Figure No: 1